ABSTRACT

Title of Dissertation: MISKITO INDIAN ETHNOBOTANY IN NORTHEASTERN NICARAGUA

Patricia Sue De Angelis, Doctor Of Botany, 2000

Dissertation directed by: Professor James L. Reveal

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This botanical study is the first contemporary endeavor to study ethnobotany amongst the Miskito Indians on a regional level. Research reflects studies conducted from October 1993 through December 1994 within seven Miskito communities located in the Northern Autonomous Region of Nicaragua. Identifications to date have resulted in the identification of more than 244 species and varieties of plants to which just under 1200 applications are ascribed. The nine categories of usage (followed by the percentage of plants with these applications) are identified as medicinal (60%), edible (31%), ornamental (13%), household (11%), construction (10%), superstition (9%), fuel and additional (both with 7%) and personal uses (5%). Each category is discussed in detail. Appendices provide information on botanical, historical and cultural background concerning this study and the region as a whole. Glossaries listing botanical, medicinal, supernatural and food terminology are provided.

MISKITO INDIAN ETHNOBOTANY IN NORTHEASTERN NICARAGUA

by

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Chapter 1: Introduction

Amidst increasing concerns about environmental conservation, there is a heightened awareness that a reservoir of non-timber forest products can be obtained from our botanical environs (Baker 1988; Salick 1992). Indigenous plant usage can have local, regional and international implications. Locally, medicinal folk botany has been recognized as a valuable alternative to synthetic medicines for indigenous societies that are traditionally cash-poor (Elsberg, Blanco and Rodriguez 1992; Fey and Sindel 1988; Islam 1980; Morales T. 1990). Regionally, indigenous plant usage can serve as baseline information for environmental risk assessment to determine the "value" of environments in danger of being destroyed by modern development companies, encroaching farmers or logging companies (Arvigo and Balick 1993; Davis, et al. 1986; Head and Heinzman 1990; Lelyveld 1993; Mittermeier 1995). Studies of indigenous plant usage have also led to a myriad of theories on sustainable forest management (Honadle and VanSant 1985; McGaughey and Gregersen 1983; Mittermeier 1995; Salick 1992). Globally, pharmaceutical companies have used indigenous medicinal plants as a method for zeroing in on plants and plant groups that might harbor healing medicines (Burton 1994; Plotkin 1988; Shenon 1994; Stevens 1992). Despite the important implications of indigenous plant usage, there is a paucity of information on these practices (Salick 1992). Without documentation, there is a risk that the information will be lost to future generations (Arvigo 1994; Knowledge Recovery Foundation*Peru n.d.; Weiss 1994). Such is the case for the Miskito Indians of northeast Nicaragua.

Living in the Northern Autonomous Region, the Miskito are the largest indigenous population of Nicaragua.[1] Added to this is the fact that Nicaragua contains the largest extant tropical forest in Central America (Bursey-Wyss 1992; Sutton 1989; World Wildlife Fund 2000).[2] Despite this, there have been no broad-based botanical studies of the Miskito Indians to date. The goal of this research is to document the everyday plant usage of several Miskito communities with the expectation that there will be several applications for the information. First, this will be the first single and formal archive of botanical uses by Miskito on a regional level. Second and most importantly, it is expected that the plant uses documented in this study will serve as a vehicle for information exchange on a local level. Finally, the information could have implications on a regional level for Central Americans by providing information regarding environmental conservation techniques and new possibilities for development of non-timber forest products.

History of East Coast Ethnobotany

Preliminary estimates indicate that Nicaragua is home to at least 8000 species of plants (Rodriguez 1996).[3] Endemic species are numbered at 56, seven species are threatened and one is considered extinct (Davis et al. 1986; Sutton 1989). An updated Nicaraguan flora is being prepared as part of two major floristic inventories, the Flora de Nicaragua project,[4] a subset of the large Flora of Central America-Flora

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[1] For more information on this region, including the Miskito Indians and other indigenous populations in Nicaragua, see Appendix 4: Nicaraguan Geography and Demography.

[2] The current total area covered by rainforest, estimated at 3,600 km^2 (Sutton 1989), is believed to represent only 30 percent of its original size (Mirsky 1992).

[3] There are also an estimated 700 birds, 200 mammals, 300 reptiles and amphibians and 200 species of fish (Rodriguez 1996).

[4] The Flora de Nicaragua project began in 1977.

Mesoamericana Project being conducted by the Missouri Botanical Garden in cooperation with the Natural History Museum in London and the Instituto de Biología in Mexico. Campbell (1989) lists the Mosquitia region as an area of high priority for floristic inventories.[5]

Nicaraguan ethnobotanical information is found in studies on the Central American region (Duke 1981; Duke, et al. 1987; Seymour 1980; Sutton 1989). Formal botanical studies within Nicaragua have focused mostly on regions other than the East Coast (The Department of Nueva Segovia: Denevan 1961; Río San Juan International Peace Park: Salick 1992). The list of ethnobotanical studies on the East Coast is short. The bulk of the reference information for this study stems from travel accounts dating back to the seventeenth century (Dampier 1699; Roberts 1827; Young 1842) and nineteenth century missionary records (Kuschnig 1888; Marx and Heath 1992; Mueller 1932; Ziock 1894).

Most contemporary ethnobotanical studies on the East Coast have centered on the Southern Autonomous Región (Barrett 1993, 1994a and 1994b; Coe and Anderson 1996; Elsberg, Blanco and Rodriguez 1992; Fey and Sindel 1988; Nietschmann 1973).[6] Previous to the current investigation, only two studies have been conducted in the Northern Autonomous Región (Dennis 1981, 1988; Helms 1971). These studies were each conducted in a single Miskito community (Dennis in Awastara and Helms in Asang) and only Dennis focused specifically on ethnobotany.

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[5] High priority areas were determined by rating each region on four weighted factors. The factors (and the weight given them) were: threat to plants (three), collection density (two), endemism (one) and involvement in new distributions (one). Based on this system, areas of Nicaragua received scores ranging from 4-6 (Campbell 1989).

[6] The Mosquitia region on the East Coast, formerly called the Department of Zelaya, was divided in 1987 into the Southern Autonomous Región (RAAS) and the Northern Autonomous Región (RAAN; Regiones Autónomas 1997). For more information on this subject, see Appendix 4: Nicaraguan Geography and Demography.

This paucity of comprehensive ethnobotanical studies amongst the Miskito is the impetus for the current research. The focus of this study, to document everyday plant uses, is an attempt to determine the current importance of ethnobotany in several Miskito villages today.[7] In addition, the results of this survey will be used as a baseline study for a floristic inventory of the Miskito Cays Protected Area (MCPA), a project being conducted under the auspices of the U.S. Agency for International Development (USAID; See <u>Appendix 6: Mosquitia Resources and Livelihood</u>).

<u>Study Area and Methods</u>

Botanical surveys, conducted by the author from October 1993 to December 1994, focused on seven Miskito communities. The selected communities are representative of the range of ecosystems found along the coastal area of the entire Northern Autonomous Región (coastal, riverine, lowland swamp and savanna). The communities were Bismona, Haulover, Karatá, Lamlaya, Puerto Cabezas, Tuapí and Wawa. Only limited information from Puerto Cabezas is presented.[8] Of these communities, only three had electricity, Puerto Cabezas (the largest commercial center in the region), Lamlaya (located just outside Puerto Cabezas) and Bismona (located on the far northern reaches of the coast). Electricity was widely available in Puerto Cabezas[9] but was only available to selected homes in the latter two communities.[10]

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[7] It is important to remember that this survey is a static presentation of a dynamic subject matter: Miskito plant usage. This study is more a reflection of "a day in the life" of the Miskito communities, rather than an exhaustive floristic survey.

[8] Puerto Cabezas is the main commercial center in RAAN and served as a research base during the study. After this study, the official name was changed to Bilwi. Puerto Cabezas will be used here as that name was being used during this study.

[9] Although availability was widespread, outages were frequent and were often isolated to residential, non-governmental neighborhoods.

[10] In Lamlaya and Bismona, electricity was only documented in storefront residences and not in private residences. Presumably, electricity is otherwise unaffordable.

More information on these communities is located in Appendix 7: Study Communities. The various villages, rivers and other place names are explained in Glossary 3: Description of Place Names.

Accompanied by a representative of MIKUPIA,[11] field investigations in each community were prefaced by a visit with the community leaders and the selection of a community guide to serve as translator and collection assistant.[12] Information on plant-resource use was obtained through interviews with community members. As one goal of this study was to determine the importance of ethnobotany within Miskito society, interviews were mostly undirected.[13] Interviews were conducted in the mornings. An attempt was made to speak to as many people as possible. To assure accurate plant attribution for each use, informants were asked to provide a sample of the less frequently encountered plants. With the assistance of the guide, additional plant collections, specimen documentation (including surveys to document plantings around homes)[14] and plant processing (pressing and description) were done in the afternoons.

Informants, or study participants, range in age from 9 to 91. They were housewives, fishermen, schoolteachers, carpenters, bush doctors, midwives, students

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[11] MIKUPIA is an acronym for the Miskito words "Miskito Heart." This indigenous organization focuses on a number of issues that concern the communities, including environmental conservation and health information. The positive reaction toward and the high community participation in this study were a direct result of MIKUPIA's good reputation enjoyed within the survey communities.

[12] The community leaders include the judge, pastor, a government representative and village elders. Studies in each community were conducted only after the leaders granted formal permission to do so.

[13] This interview technique has been called the "observer/participant technique" (Coe and Anderson 1996).

[14] This resulted in an inventory of the plantings in and around approximately 700 homes.

and ancianos.[15] Interviews were conducted primarily in Miskito but occasionally in Spanish or Creole English. No monetary compensation was given directly to informants.[16] A complete list of the informants along with their demographic information is found in Appendix 8: Study Informants. Throughout this paper, informants are credited with the information they provided. The following attribution style is used: (Mariana Lopez/Bismona) identifies the specific informant (Mariana Lopez) and the community in which she lived and in which the information was obtained (Bismona).[17]

Plant usage was documented in nine categories: Medicinal, Edible, Ornamental, Household, Construction, Superstition, Fuel, Additional (including uses not covered in other chapter) and Personal Use. Multiple voucher specimens of each plant were collected for the purposes of identification and storage in various herbaria including, The University of Maryland's Norton Brown Herbarium (MARY), The Missouri Botanical Garden (MO) and the Universidad de Centro América (HNMN).[18] Every species from each community was given its own accession number.[19] Plant identifications were conducted in country (with the assistance of Dr. Alfredo Grijalva,

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[15] Anciano is a term given to community elders who are part of the village leadership.

[16] It was decided that the most effective method of remuneration for the community would be to donate items to the school and to the health clinic in each community surveyed. Thus, gratitude for assisting with the survey was expressed to the entire community through the children.

[17] In a few instances, the informant may not reside in the community in which the plant usage was documented. In this case, two communities are listed, separated by a hyphen, wherein the first community is the one in which the informant resided during the study and the second is the community in which the plant application was learned.

[18] With multiple collections, a total of 598 plant specimens were gathered from the study communities.

[19] This was done to create a set of collections unique to each community that may translate into subtle differences in the plants.

Herbario Nacional, Managua), at the University of Maryland (with the assistance of Mr. Jason Grant) and by the Missouri Botanical Garden (with the assistance of Dr. W. D. Stevens and others).

Overview of Results

A total of 244 species and varieties of plants were found to have just under 1200 useful applications.[20] Of the nine categories of plant usage, medicinal and edible plants make up the majority of collections and uses (with 60% and 30%, respectively). The remaining categories are considerably smaller. Ornamentals make up 13% of the plants collected. A similar number of plants were used in household applications, in construction and superstition (11%, 10% and 9%, respectively). The fuel and additional categories each comprise 7% of the plants in this collection. The final category, personal, included only 5% of the plants in this study.

Presentation of Results

There are two levels of organization within this paper. First, the overall arrangement consists of three parts: Chapters, appendices and glossaries. The chapters include the plant use information documented in this study, with each of the nine categories presented in a separate chapter. Chapters are arranged from largest to smallest in terms of the percentage of plant usage within each category. The plants documented in this study are referred to throughout by their common name. The scientific name is given in three places within each chapter: At the first mention of the plant in the chapter, in the plant list within the chapter and at first mention in the summarzing material of the chapter. Otherwise, the reader is referred to the plant list within each chapter or to Appendix 2: Directory of Miskito Ethnobotany to obtain this

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[20] See Appendix 2: Directory of Miskito Ethnobotany for a complete listing of the plants presented in this study and a synopsis of their uses.

information. Appendices include botanical identifications for the plants discussed in this paper (Appendices 1-3) as well as background information on the study area (Appendices 4-12). Finally, glossaries provide plant content information (Glossaries 1-2), local and technical terminology (Glossaries 3-6) and coastal recipes (Glossary 7).

The internal organization of each plant use category is explained below. The sections that comprise each chapter are discussed in turn. These sections may not always be presented in this order within each chapter and, where there is too little information to warrant a detailed discussion, some sections may be combined.

Categorical Perspective

This section is an overview of the category. Where relevant, it includes information from historical documents. For some categories, such as medicinals, there is a wealth of interesting historical information from centuries past. For other categories, such as household uses, there are only scant references to plant usage. In this case, the categorical perspective provides the context within which the category functions in the everyday life in a Miskito village.

Source of Plant Knowledge

This section contains detailed information on the sources of expertise for the plant use information. The importance of this information varies for each category. In some cases, as with personal uses, detailed discussion of the sources of the information would not be very meaningful and is not listed as a separate section but included elsewhere within the chapter. In other chapters, such as superstition, discussing the source of plant knowledge provided greater insight into the category of usage and resulted in the establishment of subcategories to provide more detail.

Location of Plant Material

Information in this section includes the physical setting from which the plant material is obtained. Again, the importance of this section varies with the category.

Ornamentals, for instance, are primarily located around the home whereas obtaining the plant material used in construction is more complex. This information may be combined with the categorical perspective or the source of materials.

Preparation of Plant Materials

Details on the processing and handling of plant material prior to usage can also vary widely with the category. Information on plant preparation techniques is necessary to understand the medicinal plant usage; this section is an integral part of that chapter. In cases where there is no manipulation of plant material, as with ornamentals, this section is excluded from the chapter.

Plant List

The plants used in each category are organized alphabetically according to the common name.[21] The common names are correlated throughout this study and are used to convey information on the plants in relevant glossaries and appendices. A comprehensive list of common names and their Miskito, English or Spanish counterparts is found in Appendix 3: Compendium of Common Names.

The scientific name (genus and species) accompanies each entry in the plant list. A complete list of all the plants documented in this study and mentioned in the text is located in Appendix 1: Nomenclature and Classification. The scientific or common name can also be used with Appendix 2: Directory of Miskito Ethnobotany to obtain more information about the plant, including a synopsis of the plant use categories for each plant documented in this study and the plant specimen voucher number.

Listed in addition to the specific application(s), are the plant's location and origin (sown or wild) as it was found in this study. Where relevant, other applications

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[21] More information on the derivation of common names is provided in Appendix 2: Directory of Miskito Ethnobotany.

obtained for the plant during this study are listed. For superstitious uses, symptoms are also given within the plant list in order to add perspective to the plant usage.

To put this information into perspective with established literature, accounts from other sources regarding similar plant usage are provided. The sources were chosen for their geographical proximity to the study site (Central American or northern South America) or because they are well-known ethnobotanical references. In some cases, uses for close relatives of the study plant may also be listed; this information is marked as such.

Summary of Plant Uses

Each chapter includes a summary of plant usage that reiterates salient aspects for each category of usage. For the larger plant use categories (medicinals and edibles), this section is quite large and detailed. In other cases, as with fuels, there is little variety in plant usage and this is reflected by its shorter summary.

Further Thoughts

This section provides insights to other aspects of the category that were not covered elsewhere in the chapter. Topics explored here may include unexpected omissions from the category or environmental implications for the level of plant usage. This section furnishes perspective on the category as it relates to the study as a whole.

Chapter 2: Medicinals

Historical Perspectives

The history of medicinal plant usage on the East Coast is not well known. Documentation by Moravian missionaries, who entered the region in the mid-nineteenth century, provides the most information. Missionaries viewed the use of bush medicine with cynicism and skepticism, the ramifications of which are further discussed in Chapter 7: Superstition.

Sources of Medicinal Knowledge

In the Miskito community, medicinal plant knowledge is not limited to people with vocations in healing. Almost any member of the community has knowledge of medicinal plant usage. However, the types of remedies obtained from these two groups differ, a circumstance that is briefly explored here.

Laypeople

The general populace in the study communities tended to have a basic understanding of medicinal plant use. Self-proclaimed healers and midwives make up only 18% of the 142 informants. Yet, 73% of the informants provided medicinal plant remedies. The lay population's familiarity with medicinal remedies varied with their occupation. Housewives were familiar with a variety of plant remedies associated with everyday adult and childhood illnesses, such as earaches and stomachaches. Farmers and fishermen were acquainted with medicinal plant remedies associated with occupational hazards or illnesses that may befall them in remote areas.

Healers and Grandies

Healers and grandies are two types of medical professionals in the local health system on the East Coast. The Miskito use many different terms to describe medicinal healers on the northeast coast of Nicaragua. This is due in part to the trilingual character of the area (See Appendix 9: Language in Mosquitia). The most common

Spanish term is curandero (or the female, curandera). Other terms include bush doctor (Caribbean English) and sukia (Miskito)[22]. In southeastern Nicaragua, the terms curandero, bush doctor and sukia are interchangeable (Barrett 1993). However, in the northeast, the term sukia refers to healers who specialize in illnesses considered to be of a supernatural nature. Marx and Heath (1992) also noted this distinction in their Miskito-Spanish dictionary. The Miskito term sukia is defined in Spanish as hechicero/a. In English, this means "sorcerer or sorceress". A different Miskito term, uhura, is defined as a curandero[23] and specifically notes that the uhura does not deal in sorcery. While informants in this study did not use the term uhura, their use of the word curandero was consistent with this definition. The supernatural aspects of plant usage are discussed in Chapter 7: Superstition.

As the various terms imply, healers may be either male or female. Of the thirteen healers in this study, only three were women. There is a sense that healing is a man's job. Healers make a living using their knowledge of unta saika or tasba saika (Miskito terms for "bush medicine") to cure the more obscure or difficult-to-cure illnesses. Remedies may be purchased or bartered. Many healers have other sources of income. Studies from Miskito communities in southeastern Nicaragua report the existence of specialists, specifically for snakebites (Coe and Anderson 1996; Dennis 1988; Elsberg, et al. 1992). The Miskito term for such a specialist is, pyuta saika kakaira, meaning "one who knows snake medicine" (Marx and Heath 1992). While

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[22]An additional term, obeah, was not encountered in this study. Obeah is used in the southeastern regions of Nicaragua (Barrett 1993).

[23] Interestingly, curandero is defined as "quack" in at least two Spanish-English dictionaries (Dubois-Charlier 1989; Williams 1991).

quite a few snakebite remedies are documented, no snakebite specialists were encountered in the Miskito communities surveyed.[24]

In contrast to healers, to be a grandy is a decidedly female occupation. Twelve women refer to themselves as grandies[25] (Caribbean English). These women are distinguished from the healers because their primary focus is obstetric; they also have gynecological and pediatric expertise. Also known as parteras (Spanish) or midwives, they employ grandy saika – "plants to have baby faster" (Mariana Lopez/Bismona).

Finding the Remedies

Strict medicinal plant gardens did not exist in any of the surveyed Miskito communities. More than one curandero explained that they do not plant medicinal gardens because "it would be hard to know which plant may be needed in any one day, it's better to just collect them as the need arises" (Madelma Regional/Karatá). Another curandero mentioned that one problem with keeping a medicinal garden was that the livestock (chicken, pigs and cows) are not penned up. Fencing was expensive both in terms of the cost of materials and the time required to maintain it. Without fencing, it was difficult to keep the plants safe from the herbivores (Cinbilin Ricardo/Bismona).

Some plants with medicinal applications were found in home gardens and patios.[26] Most medicinals in the home garden and patio had another use. Of the 32 plants sown in home gardens and patios that have medicinal applications, 14 are also

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[24] When asked if there are curanderos specializing in any remedies, informants say no (Nena Castillon/Lamlaya).

[25] Although there is a Miskito term for midwife, mairin aalkra (Marx and Heath 1992), grandy and partera are the preferred terms.

[26] The term "patio" refers to the yard area surrounding the home. Helms (1971) also described this as the open front yard area.

edible and eight serve as ornamentals (See Appendix 2: Directory of Miskito Ethnobotany, for a complete listing of the plants as well as their applications).

Home Garden Medicinals

In this study, a total of seven strictly medicinal plants were found amongst the food crops in five home gardens[27]. Four home gardens each contained one medicinal plant[28] and another home garden contained three medicinals.[29] Evidence that these were medicinal plantings was twofold. First, these plants were found normally only in the bush. Second, they were growing in such quantities that it was highly likely that they were being intentionally cultivated. Moreover, the garden with three exclusively medicinal plants was owned by a curandero, who, regrettably, refused an interview.

Despite the scarcity of medicinal plant gardens, many commonly used medicinals grow in patios (the yard area around the house) and common areas (pathways, open fields) within the communities. Patio medicinals are either intentionally planted by the homeowner or grow naturally as a result of handling.

Patio Medicinals

Sown patio medicinals were few but consistent across communities. Three notable transplants from the bush were John's Sails (*Hyptis verticellata*), pico de pájaro (*Senna occidentalis*) and sironcontil (*S. alata*).[30] Curative uses for these three plants

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[27] Plants are termed exclusive medicinals if they are planted solely for their medicinal applications.

[28] The four medicinals sown in three separate home gardens were delta (*Petiveria alliacea*), hierba buena (*Mentha spicata*), plang (*Cecropia peltata*) and sepol (as yet unidentified).

[29] The three exclusive medicinals found together in one garden were lengua de gallina (*Hemidiodia ocimifolia*), mutmutya (*Acalypha arvensis*; used in superstitious remedies) and pico de pájaro (*Senna occidentalis*).

[30] One informant actually named sironcontil as an ornamental plant as well.

were common knowledge; informants in every survey community mentioned medicinal applications for these plants. Once sown, the plants naturally regenerate themselves year after year. Other medicinals were intentionally planted in the patio but for ornamental purposes. According to informants, ornamentals were rarely sown primarily for their medicinal usage. Rather, knowledge of their medicinal application came secondarily. This is further explored in <u>Chapter 4: Ornamentals</u>.

Unintentional medicinal plantings included escapees and opportunists. Escapees are medicinals whose presence is a direct result of their usage. During frequent handling, they escaped (or were dropped) and became established on their own. The opportunists were simply weeds that inhabit disturbed areas. These unintentional plantings were found in most communities and tended to be exclusive medicinals.

<u>Bush Medicinals</u>

The largest source of medicinals was in the outlying areas called the "bush" (forest) or "monte" (open fields). From vines[31] to trees[32], medicinal plants were abundant and, for the most part, easily accessible. Sandy beaches and bogs were also a source of medicinals where such ecosystems exist.

<u>Market Medicinals</u>

Another source of medicinals was the local market in Puerto Cabezas. A number of informants specified that, for certain remedies, the necessary plant material could be purchased "in Puerto" or at the community store.[33] However, unlike the

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[31] These plants might also be found on well-established trees within the community.

[32] In rare instances, trees such as algodón (*Gossypium barbadense*) from the bush are transplanted within the community for their medicinal qualities.

[33] Some of the plant material that could be purchased in the market in 1993-1994 were anís (Rosa Lecayo/Lamlaya); canela (Madelma Regional/Karatá); romero (Fredolina

outdoor markets in Managua (see also Chow 1992), neither of the two markets in Puerto Cabezas had sections devoted strictly to medicinals. Produce and wood (firewood, planks, etc.) were the principal plant materials sold in the markets but some medicinals were available in dried form. Packaged in unidentified 2 oz. plastic bags, the leaves or powder sell for about C$1/bag.[34] Most vendors seemed to have only a vague knowledge of the origin, name or use of some of the plant materials.

Pharmacies

The pharmacies surveyed in Puerto Cabezas sell inglis saika[35] - not medicinal plants. However, some synthetic medicines were commonly incorporated into traditional plant remedies. Four popular synthetic medicines are Esencia Coronada, Agua Florida, Zepol and Divina. These synthetic medicines were also incorporated into traditional plant medicinal remedies in other cultures (Comerford 1996). The first two are liquids. Esencia Coronada is an additive for a wide range of ingested remedies. The bottle had no list of ingredients and efforts to determine the ingredients were unsuccessful.[36] Agua Florida (a.k.a. Agua del Paríaso), containing an alcohol and herb mixture (Comerford 1996), was used in remedial baths and as an ingredient in inhalant remedies but is never ingested. Zepol, a cream that smelled (and was probably the same as) Vick's Vapor Rub®[37], was sometimes called for in massage

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Levy/Tuapí); sepol (Amalia Warman Artola/Karatá; Anelia Zacarías/Tuapí; Eduardo Zacarías/Tuapí; Eldeponso Franklins/Tuapí; Kristilina Perera/Haulover); and tobacco (Jorge Molina/Haulover).

[34] This is approximately US$0.14, in 1994 dollars.

[35] Literally, "English medicine." Refers to non-indigenous medicine.

[36] When a baby is overdue, drinking Essencia de Coronada and an egg can induce labor (Chavela Walter/Lamlaya).

[37] Vicks® contains numerous plant extracts, most notably eucalípto.

therapies. Divina (a.k.a. Panadol), containing acetaminophen, was occasionally incorporated in remedies for headaches and similar discomforts.

The use of synthetic preparations with traditional remedies did not necessarily obviate the complexity of the remedy. Here is an example of a traditional remedy that incorporates a synthetic: For headache, "Take a young coconut and cut into four slices along the long axis; add salt, garlic, a small onion and Divina. Put in warm water. Wash head and face" (Filiberto Julias/Tuapí). With other traditional remedies, the synthetic were used as a backup, as in the use of pine tree resin for bug bites: "If doesn't heal, add sulpha to it" (Salvador Perez/Karatá).[38]

Preparing the Remedies

Forty-six percent of the remedies employ the leaf in some form (macerated, seared, dried, steeped, or soaked). The entire plant or the root, including the tuber, were employed 15% of the time. The bark and fruit were used in 9% and 6% of the remedies, respectively. Twigs, stems or wood were used 3% of the time, followed by seeds and flowers (used 3% of the time) and finally sap or resin (used in 1% of the remedies).

The popular use of leaves in plant remedies found in this study was consistent with studies focusing on the medicinal practices in the southern regions of the East Coast of Nicaragua. Dennis (1988), Elsberg, et al. (1992) and Fey and Sindel (1988) reported that 48%, 55% and 60%, respectively, of the documented remedies used the leaf as the main ingredient.[39] This is no coincidence – leaves (and bark) are known to

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[38] A vendor in the Mercado San Jerome (Puerto Cabezas) also mentioned the use of sulpha for bug bites (Asteria Francis Peralta/Dakban- Puerto Cabezas).

[39] After the leaf, parts usage varied as follows: Dennis (1988): Leaf>entire>root>bark; Elsberg, Blanco and Rodriguez (1992): Leaf>root>bark>seed>entire=latex>fruit; Fey and Sindel (1988): Leaf>root>bark=fruit=entire>seed=latex; Coe and Anderson (1996): Leaf>bark>root> fruit>sap=stem>seed>flower.

contain higher concentrations of bioactive compounds than other parts of the plant (Coe and Anderson 1996).

Remedial administration was split almost evenly between topical application and ingestion; a small percentage (3%) required both ingestion and topical application. Topical remedies were most commonly administered as a bath or rinse (19%); most preparations required some boiling of plant parts. Also common were poultices (13%) and rubs (11%) made from macerated or fire-seared plant parts.

By far, the most common form of ingestion was as a hot tea (40%). Other methods of ingestion included cold water preparations (5%), vapor inhalation (2%) and raw consumption (1%). According to many informants, the most effective medicinal preparations were made as needed (Alvin English/Lamlaya; Richaina Mybith/Lamlaya Pablo Joseph/Lamlaya; Nena Castillon/Lamlaya; Jerry Wellington/Puerto Cabezas-Lamlaya; Clipton Francis/Lamlaya; Juanita Walter/Lamlaya; Lydiana Francis/Karatá; Donisio Smith/Lamlaya; Anelia Zacarías/Tuapí; Aura Arguello/ Puerto Cabezas). Remedies in the form of a beverage were prepared for consumption over an entire day. Only one or two documented medications were made in large quantities and stored for usage over several days (one was a decoction using lythrum II (*Cuphea carthagensis* - Nils Philipe Washington/Karatá) and another, a remedy using pine resin (*Pinus caribaea* var. *hondurensis* - Anelia Zacarías/Tuapí).

The Remedies

Plants used as medicines are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 to obtain more information about each plant. The location(s) of the plant within the study site, other plant uses documented in this study and information indicating similar usage from the regional literature is also given. Illnesses and some medical terminology mentioned in this section are explained in Glossaries 4 and 5. The active ingredients and other components for the plants in this study are listed in Glossaries 1 and 2. Please note that cultivated plants are discussed further in Chapter 2: Edibles.

Symbols following each medicinal use indicate whether remedies from this study are corroborated by established literature. Novel information is denoted by (✐). Corroboration is indicated by (✔). In this case, the supporting literature is marked with a double underline. Two other symbols are used where there is no specific reference to the species in the listing. Possible corroboration is indicated by (? ✔). This means that there is direct evidence in the literature that the usage is warranted, either because of chemical constituents or because a related species is reported in the literature to have a similar usage. Possible novel usage is indicated by (?✐). This indicates that there is indirect evidence suggesting the use would be indicated but there is no specific reference to the illness and/or the species involved. Supporting literature that suggests corroboration but does not specify it is marked by a dotted underline.

achiote (*Bixa orellana*)
Home Garden (sown); Cultivated (Patio – Rarely Sown)
LEAF: Tea for baby jaundice (✔)
SEED: Paste as cream for chloasma[40] (?✐)
LEAF and SEED: Tea for high blood sugar (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Cold young LEAF infusion taken for diarrhea or dysentery, as cool wash for skin sores, rashes and infected bites; older LEAF as tea for vomiting blood, as bath for swellings
Bennett 1991: Macerated STEM in water overnight, add drop to each eye for conjunctivitis; LEAF decoction as strength restorer after birth
Coe and Anderson 1996: Used as medicine
Duke 1981: SEED/FRUIT: Astringent, febrifuge; treats erysipelas, dysentery, kidney diseases
Elsberg, Blanco and Rodriguez 1992: SEED and LEAF: diarrhea, menses regulator and childbirth facilitator; cooked LEAVES or SEEDS as rinse for mouth infections; put directly on affected area for burns and erysipelas
Johnson 2000: Astringent; digestive; diuretic; douche; expectorant; styptic

[40] This plant may seem efficacious against chloasma because it tints the skin a reddish tone.

Morton 1981: LEAF or ROOT decoction for jaundice, liver trouble; red FRUIT pulp mixed with oil and applied to skin ailments (promotes healing without scarring, also for measles)
Robineau 1991: LEAF and SEED hepatotropic; hypoglycemic
Smith, et al. 1992: Treats epilepsy, fever, dysentery, venereal disease; aphrodisiac qualities; LEAVES as poultice on forehead to relieve headache; PULP applied to burns; LEAF decoction as gargle for sore throat; ground FLOWERS to relieve itchy skin or as potion for purgative and to relieve inflammation; FRUIT PULP ingested to relieve kidney problems

afrika (*Hyptis capitata*)
Patio (wild)
LEAF: Bath for mareo (✓), nerves (✓); beaten and wrapped on head for headache (✓)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Fey and Sindel 1988: For diarrhea with mucus: LEAF and ROOT decoction by spoonful (children) or half glass (adults) every three hours for two days
Lewis and Elvin-Lewis 1977: Many species of *Hyptis* are used for colds

afrika II (*Lindernia diffusa*)
Common Areas (wild)
LEAF: Tea as emetic for upset stomach (✓)
Other uses in this study: Superstition
Regional literature regarding medicinal uses:
Dennis 1988: Boiled and drunk with glass warm water for "bile in your belly" (p. 20); makes you vomit/feel better
Duke 1981: Cooked LEAVES as emetic
Fey and Sindel 1988: For stomachache, boil in water 15 minutes, drink one glass after breakfast to vomit out all the suciedad (dirt)

ajo (*Allium sativum*)
Home Garden (sown)
Macerated CLOVE: In outer ear for earache (✓); infusion with young coco as head/face wash for headache (✓); after hot culantro tea, bathe with ajo, culantro and lime mixture for stomachache from bad food (✓); with sap of marañon rojo on snakebite (✓); with bayvine leaves as snakebite antidote (take one nip and put the rest on the bite) (✓)
Other uses in this study: Edible, Superstition
Regional literature regarding medicinal uses:
Barrett 1994a: CLOVE for cough, stomachache, fever, parasites or worms, snakebite, vomiting
Beckstrom-Sternberg, Duke and Wain 1994: Numerous medicinal uses, including: Earache, stomachache, snakebite, carminative, diarrhea, dyspepsia, nerve and snake repellant
Chow 1992: Naranjagrio fruit juice with *Cassia fistula*, hierba buena, culantro and ajo taken for liver ailments
Coe and Anderson 1996: Vermifuge with caña juice, culantro and cola de alacrán, weaker dose for children/stronger for adults; CLOVE mashed and heated with chicken fat for earache, poured into ear and capped with ajo clove or cotton ball

Duke 1981: Many medicinal uses, including:Carminative, earaches, *Allium* spp.: BULB rubbed on legs to prevent snakebite

Duke 1997: Eating garlic can ease migraines

Elsberg, Blanco and Rodriguez 1992: CLOVE for earache, asthma, diabetes and stomachache; mash 3 and cook in water, drink three tiems a day for parasites and hypertension; mashed as joint rub for rheumatism

Johnson 2000: Antibiotic, cathartic, demulcent; diaphoretic; diuretic; expectorant; contains allicin (antibacterial and antifungal properties)

Lewis and Elvin-Lewis 1977: For loose teeth

Morton 1981: Regular consumption lowers blood pressure; used externally for insect or scorpion bites

Tri-Light 2000: Lowers blood pressure and cholesterol levels; increases phagocyte and peritoneal macrophage production (acting as microbial); effective in treating throat infection

albahaca (*Ocimum basilicum*)

Home Garden (sown)

LEAF: Mashed and put in ear (or juice alone) for earache (✔); mashed and rubbed on chest for asthma (✔) and catarro (?✏); mashed and rubbed on head for fever (✔), on sore area for rheumatism (?✏); on body for epilepsy (?✏); infusion to bathe head for hangover (? ✔), mareo (?✏) and epilepsy (✏); tea for asthma (✔), cough (?✏) and high blood pressure (✏)

SEED: Inserted under eyelid to improve eyesight in the aged (✔)

Other uses in this study: Edible, Superstition

Regional literature regarding medicinal uses for this and other species in this genus:

Arvigo and Balick 1993: Dried SEED put in eye overnight to rid eyes of phlegm and discourage cataracts; LEAF juice in ear for earache

Barrett 1994a: *O. micranthum*: LEAF for earache, fever, high "pressure", kidney, stomachache

Bremness 1994: LEAF wine is tonic (stimulates adrenal cortex); LEAVES vermifuge, treat ringworm, snakebite, insect bites, acne, aids digestion and is antibacterial; inhaling essential OIL refreshes the mind and stimulates a sense of smell dulled by viral infection; in massage oils, it is a nerve tonic and eases overworked muscles

Coe and Anderson 1996: *O. micranthum*: For fungal infections, dandruff, scabies; LEAF infusion along with pisik tree, escoba amarga and reumatis saika or *Piper peltatum* bath for burns; LEAF tea for stomachache

Duke 1981: Demulcent, diaphoretic, diuretic, febrifuge and stimulant; used as a cataplasm; macerated LEAVES used externally for headache; juice from ENTIRE plant for earache

Elsberg, Blanco and Rodriguez 1992: *O. micranthum*: LEAVES: respiratory illnesses, fever, diarrhea, headache and asthma; put in ear for earache OR cook in water and apply three drops of liquid into ear; with sironcontil and herb III LEAVES, cook in water and drink a lot all day for the kidneys

Fey and Sindel 1988: *O. micranthum*: Heat LEAVES plus culantro in fire, mash, beat, strain, and put juice on cotton into ear for earache; well-mashed with culantro and san diego leaves, smeared on feverous person at bedtime

Johnson 2000: Demulcent; diaphoretic; diuretic

Lewis and Elvin-Lewis 1977: Many species of *Ocimum* are used for colds

Morton 1981: PLANT juice in ear for earache; LEAF stuffed in ear to remedy deafness; decoction for grippe (chest colds); FLOWER JUICE as eye drops

algodón (*Gossypium barbadense*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
LEAF: Mashed to bathe head or drink for lightheadedness/mareo (? ✔)
Other uses in this study: Household
Regional literature regarding medicinal uses for this or other species of this genus:
Dennis 1988: *G. hirsutum*: LEAVES crushed and rubbed on body for bla; crushed with pico de pájaro for wounds
Duke 1981: *Gossypium* spp.: Strings of SEEDS tied around joints for rheumatism; Raw as aphrodisiac, expectorant, laxative; for headache; SAP astringent and pectoral; ROOTS abortifacient, antihemmoraghic, and emmenogogic; LEAVES for rheumatism; FLOWER for bat bites
Johnson 2000: Abortifacient; analgesic; emmenogogic; lactogogue
Lewis and Elvin-Lewis 1977: ROOT tea eases labor
Morton 1981: ROOT decoction eases delivery, abortifacient; ROOT BARK: Hemostatic, vasoconstrictor
Robineau 1991: Oral LEAF decoction for stomachache, hypertension, gas, spasms; mashed LEAF bath for skin disorders; green CAPSULE juice for earache; ROOT emmenogogic, abortive; FRUIT febrifuge, anti-dysenteric

algodón criollo (*Ceiba pentandra*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
LEAVES: Bath for mareo/debil (? ✔)
FLOSS: To clean ear or wound (✔)
Other uses in this study: Household, Construction
Regional literature regarding medicinal uses for this species and other genera of the family:
Johnson 2000: Astringent; diuretic; emetic; emollient
Lewis and Elvin-Lewis 1977: *Bombax* spp.: As tonic and aphrodisiac; hemostatic properties
Morton 1981: Many external applications (e.g. BARK decoction on skin ailments, hemorrhoids)

almendra (*Terminalia catappa*)
Patio (sown)
LEAF: Mashed and put on head for headache (✔)
SEED: For tapeworms (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Analgesic activity
Duke 1981: BARK, LEAVES, FRUITS astringent; treat diarrhea and as ; YOUNG LEAVES ingested for colic; YOUNG LEAF JUICE ingested for headache; externally for scabies, itching and external ulcers
Johnson 2000: Anodyne; carminative; cathartic; emetic; tonic
Morton 1981: BARK decoction heals cracked nipples of nursing mothers; FRUIT ingested for diarrhea

anis (*Pimpinella anisum*)
Purchased
Powdered LEAVES: Cooked, strained, fed to baby as carminative (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:

Chow 1992: An ingredient in a remedial bath for migraines
Duke 1997: Promotes healthy lactation
Elsberg, Blanco and Rodriguez 1992: With culantro and pico de pájaro as remedy for colic
Johnson 2000: Cathartic; diaphoretic; diuretic; expectorant
Lewis and Elvin-Lewis 1977: SEED as carminative; tonic to improve well-being/mental harmony

aras pata (*Ixora coccinea*)
Patio (sown)
Unknown PART: Put on head for pain (✐)
Other uses in this study: Ornamental, Edible
Regional literature regarding medicinal uses: No medicinal literature found.

ayote (*Cucurbita moschata*)
Home Garden (sown)
FLOWER: Juice in ear for earache (?✐)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Abdomen, spasm, vermifuge, fever, laxative, tumor
Johnson 2000: *C. foetidissima*: Analgesic; diuretic
Robineau 1991: FRUIT juice orally for jaundice; boiled LEAF orally for weakness; LEAF juice topically for burns

B-16 (*Mecardonia procumbens*)
Patio (wild)
LEAF: Mashed and tied on head cooked or as is for headache (✐)
ENTIRE: Clean, cook and rinse mouth out for toothache (✐)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No medicinal literature found.

banano (*Musa acuminata*)
Home Garden (sown)
FRUIT: Boil and drink juice as tonic (✔) for the aged; grate while green, mix with fat and put on sore area for mumps or tonsillitis (? ✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses for the genus or a closely related species:
Beckstrom-Sternberg, Duke and Wain 1994: *M. sapentium*: Tonsilitis
Coe and Anderson 1996: *Musa* sp.: FRUIT/SAP taken orally or as poultice for bites and stings, diarrhea, cuts and hemorrhaging
Duke 1981: *Musa* spp.: Numerous medicinal uses, including: SEEDLING JUICE ingested or as infant bath for strength; sweetened shaved BARK tea of marañon and *Spondias* followed by drinking banana STEM juice as strength restorer for asthma, colds, congestion
Johnson 2000: *M. sapientum*: Dentifrice; diaphoretic; hemostat
Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity
Morton 1981: Infusion of LEAF decoction on inflamed gums; Panama: PSEUDOSTEM sap as strengthening tonic
Robineau 1991: LEAF decoction for inflammation, colds, cough; FRUIT pulp broth for weakness

bayvine (*Sphagneticola trilobata*)
Common Areas (wild)
Macerated LEAVES: Put on snakebite and spoonful of juice ingested (✔)
ENTIRE plant: Cooked in salt water and inhaled for refrio (✔), body aches (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Boil STEMS/LEAVES as bath for backache, rheumatism, muscle cramps, swellings; fresh LEAF/STEM juice on cloth applied to area for arthritis
Barrett 1994a: LEAF or ENTIRE for colds and to purge; crushed LEAF applied directly to snakebite and wounds; tea from ENTIRE plant taken for kidneys
Coe and Anderson 1996: FRUIT, LEAF, STEM decoction taken for bites, stings, childbirth, pregnancy, fever, infections; mixed with cola de alacrán, canela and clove oil to enhance fertility
Elsberg, Blanco and Rodriguez 1992: LEAF infusion taken daily for kidney infections and fever, snake repellent
Morton 1981: PLANT decoction, with FLOWERS, ingested to relieve fever, menstrual difficulties, cold remedy; LEAF poultice on sore feet

biuhu (*Chrysobalanus icaco* var. *ellipticus*)
Sandy Areas (wild)
LEAF: Infusion as vapor bath for face to alleviate vision problems due to overexposure to sun or foreign object in eye (✎)
Other uses in this study: Edible, Fuel, Additional
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Astringent, condyloma (genital/anal warts), diarrhea, abortifacient, gum, poison, sore throat
Coe and Anderson 1996: Oral ENTIRE plant decoction for diarrhea, astringent

bla (*Philodendron radiatum*)
Bush Medicine (wild)
LEAF: Cold water infusion as bath for nausea (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and a closely related species.
Beckstrom-Sternberg, Duke and Wain 1994: Anodyne, gout, rheumatism
Lewis and Elvin-Lewis 1977: *Philodendron* sp.: LEAF juice and soap for eczema

boton (*Drymaria villosa*)
Patio (wild)
ENTIRE plant: Tea for refrio (? ✔)
LEAF or ENTIRE plant: Cold water infusion on head for headache (?✎)
ENTIRE plant: Juice dropped in eyes for cataracts (? ✔)
LEAF: Rub on chest for asthma/catarro (? ✔); hot infusion as emetic for upset stomach (?✎); sip hot infusion for coughing up blood (?✎)
Other uses in this study: Superstition
Regional literature regarding medicinal uses for a close relative.
Coe and Anderson 1996: *D. cordata*: WHOLE plant decoction orally and topically for aches and pains, respiratory/pulmonary disorders
Dennis 1988: *D. cordata*: Eye medicine

bredbred II (*Inga thibaudiana*)
Forest Edge (wild)
ENTIRE plant: Tea for diarrhea (? ✔)
LEAVES: Chewed and put on wound for cuts (?✏), snakebite (✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and a related species:
Johnson 2000: Contains tannins (known astringents that counteract diarrhea)
Lewis and Elvin-Lewis 1987: *Inga* sp.: Used for diarrhea and stomachache

bredpru (*Artocarpus altilis*)
Patio (sown)
LEAF: Tea for high blood pressure (✔) or blood sugar problems (✏)
Other uses in this study: Edible, Household, Construction
Regional literature regarding medicinal uses for this and a related species:
Coe and Anderson 1996: LEAF decoction as poultice or SAP applied topically for aches, pains, hypertension
Morton 1981: LEAF decoction for high blood pressure
Smith, et al. 1992: Treats cough, bronchitis, asthma, ear problems

brum taplira II (*Leonurus japonicus*)
Common Areas (wild)
ROOT: Tea for stomach pain (?✏), pain after childbirth (? ✔)
LEAF: Macerated, rubbed on dermal infections/rashes until cured (?✏); tea for stomach pain (?✏), pain after childbirth (? ✔)
Other uses in this study: Superstition
Regional literature regarding medicinal uses for this genus:
Beckstrom-Sternberg, Duke and Wain 1994: Emmenagogue, hemostatic
Johnson 2000: *Leonurus* spp.: Astringent; diuretic; emmenogogic
Lewis and Elvin-Lewis 1977: *L. leonitis*: ENTIRE plant for snakebite; tonic for heart ailments, female weakness, hysteria; LEAF to promote menstruation
Wiersema and Leon 1999: Unspecified medicine

canela (*Cinnamomum verum*)
Purchased
BARK: Ground, cooked and put in baby bottle for gas (✔); cooked with palmera fruits taken for upset stomach (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Chow 1992: An ingredient in a remedial bath for migraines
Duke 1997: Contains catechins that relieve nausea
Elsberg, Blanco and Rodriguez 1992: Boiled with *Myristica fragrans* and sugar and taken for upset stomach, diarrhea and to stop vomiting
Johnson 2000: Carminative
Lewis 1992: For acne, nasal decongestant, rubefacient, wart remover
Lewis and Elvin-Lewis 1977: Canela oil on cotton used to clean carious teeth; LEAF/WOOD as stimulating beverage
Robineau 1991: BARK as carminative and for upset stomach
Smith, et al. 1992: DROPS as tonic, sedative during childbirth; headache, digestive, gastrointestinal, respiratory uses; chewed to hasten childbirth
Tyler 1994: Counterirritant properties

caña (*Saccharum officinarum*)
Home Garden/Plantation (sown)
LEAF: Tea for fever (?✎) with aching head (?✎)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Coe and Anderson 1996: Vermifuge of caña JUICE, ajo, culantro and cola de alacrán for intestinal parasites; weaker dose for children
Duke 1981: SUGAR as antidote for poison by copper, corrosive sublimate and arsenic; ROOT is demulcent and diuretic
Morton 1981: Dried LEAVES decoction relieves urinary problems; Cuba: Crushed STEM juice or ROOT decoction as diuretic; JUICE from roasted STEMS for chronic dysentery (Cuba), as cold remedy (Mexico); mashed ROOT extracts splinters; crushed ROOT and vinegar poultice on backache; mashed LEAVES for skin inflammations
Robineau 1991: STEM juice anti-influenza; LEAF and ROOT vulnerary; macerated STEM orally for urethritis; oral LEAF decoction for hypertension, emotional shock; LEAF and STEM juice diuretic
Young 1842: Hot sugarcane liquor as sudoriphic

carau (*Cassia grandis*)
Dense forest (wild)
LEAF: Tea for dolor de vientre (?✓) or purgative (✓); juice on sores (✓)
FRUIT: Cooked with sugar to make syrup for cough (✓)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this and related species and genera:
Barrett 1994a: FRUIT, LEAF and SEED used variously for "bad belly", colds, cough, skin disease, to clean the blood and to purge
Cisneros, García and Dávila 1992: SEED pulp cooked with milk consumed as stimulant/depurative
Duke 1981: PULP as purgative; LEAVES, crushed in lard for mange
Elsberg, Blanco and Rodriguez 1992: LEAVES placed on skin for sores, fungus; LEAF infusion taken as purgative for parasites or "dirty insides"; mashed PODS cooked with milk taken for anemia
Foster and Duke 1990: Powdered LEAF tea with pinch of ground coriander to prevent cramps
Lentz 1993: Juice from SEED PODS consumed fresh to strengthen the blood
Lewis and Elvin-Lewis 1977: *Cassia* spp.: Known purgatives; LEAF poultice for wounds; *C. laevigata*: ENTIRE plant as menses promoter; *Caesalpinia* sp.: LEAF powder as postpartum uterine tonic
Morton 1981: Sweetened PULP as pectoral, aboritifacient
Rabella and Pallais 1994: Medicinal SEED PODS

carpetgrass (*Axonopus fissifolius*)
Patio (wild)
Macerated LEAVES: Juice as collyrium drops for something in eye (✎)
ENTIRE plant: Cooled tea for female pain unrelated to menses (✎)
Other uses in this study: Personal
Regional literature regarding medicinal uses: No medicinal uses found.

chaparro (*Curatella americana*)
Fields (wild)

ENTIRE infusion: Bath for refrio (✏); gargle for toothache (✏)
LEAF infusion: Vapor bath on face as collyrium to alleviate vision problems due to overexposure to sun or foreign object in eye (✏)

Other uses in this study: Household

Regional literature regarding medicinal uses:

Duke 1981: BARK vulnerary; BUDS tea treats asthma and smoker's hack

Morton 1981: BUD decoction for chronic cough (from smoking); LEAF or BARK decoction wash for skin problems (ulcers, wounds)

chile picante (*Capsicum frutescens*)

Home Garden (sown)

ROOT: Unknown skin ailment (? ✓)

Other uses in this study: Edible, Superstition, Additional

Regional literature regarding medicinal uses:

Bremness 1994: Stimulates circulation, sensory nerves, eases sore throat, shingles, may prevent a fatal swallowing disorder in elderly people; infused OIL gives warming massage for rheumatism, cold limbs, neuralgia

Coe and Anderson 1996: As tea or broth as sudoriphic

Duke 1981: Used externally for giddiness, earache, and hemorrhoids; LEAVES as poultice for softening boils

Duke 1997: Cream with red pepper for dry skin and psoriasis

Johnson 2000: Antibiotic; poison antidote; carminative; diaphoretic

Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity; dried, ripe FRUIT poultice as counterirritant

Morton 1981: LEAF decoction on wound, boil; crushed FRUIT plaster on ulcer

Robineau 1991: Warmed LEAF on inflammation, skin sores; diuretic

cinco dedo (*Syngonium angustatum*)

Bush Medicine (wild)

Macerated LEAF: On lump, bump or pus-filled/bloody skin eruption (? ✓)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses for closely related species and genera.

Arvigo and Balick 1993: *S. podophyllum*: LEAF as warm wash for skin conditions, sores, dry skin, fungus, itching, rashes, bruises; LEAVES in alcohol, sunned for week as rub for rheumatism, arthritis, pains and swellings

Coe and Anderson 1996: *Xanthosoma mexicanum*: LEAF decoction applied topically for skin rashes/sores

Lentz 1993: *S. podophyllum*: Milky exudate from spadix applied to burns

cinerut (*Smilax domingensis*)

Bush (wild)

Sun-dried TUBER: Tea for anemia (✓), kidney problems (✓)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses for this and related species:

Arvigo and Balick 1993: *S.* aff. *lanceolata*: ROOT tonic for blood, fatigue, anemia, rheumatism, skin conditions

Barrett 1994a: *Smilax* spp.: LEAF and ROOT for anemia, colds and to build up the blood

Coe and Anderson 1996: *S. spinosa*: ROOT tonic mixed with milk, honey, wine, cloves and canela during pregnancy, for anemia, after childbirth, jaundice treatment, snakebites
Duke 1981: Remedy for sterility in barren women
Elsberg, Blanco and Rodriguez 1992: *Smilax* spp.: Large ROOT decoction (alone or with limsi BARK), take one glass three times a day for anemia
Lewis and Elvin-Lewis 1977: *Smilax* sp: Aphrodisiac, pancreas problems; ROOT for syphilis, decoction as stimulant; RHIZOME as tonic
Morton 1981: ROOT decoction with rhizome of *Renealmia aromatica*, pieces of *Vitis caribaea* vine, and *Typhalaea fruticosa* root as strengthening tonic
Rabella and Pallais 1994: Analgesic properties

clavel (*Gardenia jasminoides*)
Common Areas (wild)
LEAF (young): Cooked as bath for arthritis or bone pain (✎)
Seared LEAF: Put on splinter or metal nail in foot to draw it out (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Wiersema and Leon 1999: Unspecified medicine

clover (*Desmodium triflorum*)
Common Areas (wild)
ENTIRE plant: Tea for asthma (✎) and refrio de vientre (✓)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and a closely related species:
Coe and Anderson 1996: ROOT decoctions for malaria, sexually transmitted diseases; LEAF/ROOT taken orally for aches, pains, fever, infections
Foster and Duke 1990: *D. nudiflorum*: ROOT tea as bath for cramps

coco (*Cocos nucifera*)
Patio/Sandy Areas (sown)
NUT: Meat oil rubbed on serious burns (✓); mashed as head wash for headache (✎); tea for diarrhea (✓), constipation (✓) and hemorrhaging (✓); eaten raw for bloody diarrhea (✓); rubbed on ribs with other plants for asthma (✓); hot water infusion with sirpi taken for liver pain (✎)
WATER: Drink daily for kidney problems (✓)
LEAF: Tea for high blood pressure (?✎), blood sugar problems (?✎)
ROOT: Tea for diarrhea (✓)
Other uses in this study: Edible, Personal, Superstition, Construction, Additional
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Asthma, burn, constipation, hemostatic, jaundice, bladder or kidney stones
Borland 2000: Coconut WATER is espoused as a digestive aid
Duke 1981: Many medicinal uses, including: MATURE COCO WATER diuretic; anti-emetic; fermented as laxative; COCO OIL treats alopecia, burns; counteracts infection; mixed with honey, chicken fat and monkey fat, ingested for asthma; ROOTS for gonorrhea, antibronchitic, dysentery, febrifuge, antigigivitic; fine hairs (or "down") at LEAF base stops bleeding
Elsberg, Blanco and Rodriguez 1992: For dysuria, respiratory ailments, menorrhagia; grated, boiled IMMATURE NUT taken for diarrhea; milk from MATURE NUT MEAT taken for parasites

Fey and Sindel 1988: For bad diarrhea, cut small FRUITS that have fallen from tree into four pieces and boil in water, drink often but a little at a time
Johnson 2000: Antiseptic, dentifrice; diuretic
Lewis and Elvin-Lewis 1977: RESIN from inner husk chewed to relieve toothache; ROOTS astringent, anthelminthic
Morton 1981: Young NUTS split and boiled (with run) for dysentery; ROOT decoction treats menstrual hemorrhage, diarrhea
Robineau 1991: Water of dry fruit has hypotensive, hyperglycemic activity

cola de alacrán (*Stachytarpheta cayennensis*)
Common Areas (wild)
LEAF: Mashed and rubbed on wound as coagulant (✏); juice dripped in newborn's eyes (✏); tea for unknown ailment (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and related species and genera:
Arvigo and Balick 1993: BRANCH/LEAF tea for nerves, heart conditions, stomachache, cough, colds, fever, liver complaints; ENTIRE plant as postpartum steam bath preventing infection/ensuring womb returns to proper position; LEAF tea douche for gonorrhea/postpartum cleanser
Coe and Anderson 1996: Vermifuge with ajo, culantro and caña juice for intestinal parasites, weaker dose for children/stronger for adults; with bayvine and canela mixed with clove oil to enhance fertility; febrifuge, digestive problems, respiratory disorders, venereal disease, purgative
Elsberg, Blanco and Rodriguez 1992: *S. fratzii*: LEAVES and ROOTS used variously for fever, dolor de vientre and venereal disease; LEAF tea taken by the glass thrice daily for parasites
Foster and Duke 1990: *Verbena hastata*: LEAF tea as female tonic, colds, coughs, fevers, bowel complaints, dysentery, stomach cramps, emetic
Johnson 2000: Abortifacient; diuretic; emetic; emmenogogue; lactogogue
Lewis and Elvin-Lewis 1977: *Stachytarpheta* sp.: LEAF tea as stimulant

cuadrado (*Musa acuminata*)
Home Garden/Patio (sown)
LEAF/FRUIT: Grate and put on wound for snakebite (✔); tea for snakebite (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this genus:
Barrett 1994a: *Musa* spp.: LEAF, FLOWER, FRUIT or ROOT for "bad belly", diarrhea, snakebite
Coe and Anderson 1996: *Musa* sp.: FRUIT/SAP taken orally or as poultice for bites and stings, diarrhea, cuts and hemorrhaging

culantro (*Eryngium foetidum*)
Home Garden (sown)
ENTIRE: Rub on chest for asthma (✔); tea for asthma (✔)
ENTIRE, no ROOT: Mash with water and wash face for nausea (?✏)
LEAF: Rub on chest for asthma (✔), catarro (✔); cook and rub on chest for high blood pressure (✔), heart pain (?✏); mashed with water as face wash for lightheadedness (?✏)
ROOT: Tea for asthma (✔)
? part: Mash with water and wash face for nausea (?✏)
Other uses in this study: Edible, Superstition

Regional literature regarding medicinal uses:

Barrett 1994a: LEAVES and ENTIRE used variously for asthma, stomach pain, colic, colds, cough, diarrhea, earache, fever, giddiness, parasites, emetic

Chow 1992: With *Cassia fistula*, hierba buena, ajo and the juice of naranjagrio taken for liver ailments

Coe and Anderson 1996: Vermifuge with ajo, cola de alacrán and caña juice, weaker dose for children/stronger dose for adults

Duke 1981: Remedy for high blood pressure; infusion with salt for colic and gas

Elsberg, Blanco and Rodriguez 1992: With anís and pico de pájaro for colic; ROOTS and LEAVES for respiratory ailments, diarrhea, stomach ailments and vomiting; ROOTS with ajo cloves cooked in water, taken for parasites; mashed, heated juice ROOTS or LEAVES in ear for earache

Fey and Sindel 1988: Put juice from heat LEAVES plus *Ocimum micranthum* in ear for earache; well-mashed with LEAVES of san diego and *O. micranthum* smeared on body of feverous person at bedtime; boiled ROOT with that of zinza taken for green diarrhea

Johnson 2000: Anodyne; carminative; diaphoretic; emmenogogic; pectoral

Lentz 1993: Leaves put in ear for earache

Morton 1981: PLANT decoction lowers blood pressure

Robineau 1991: WHOLE plant decoction orally for fever, coughing; macerated LEAF orally for diarrhea, influenza, flatulence, hypertension; LEAF vulnerary, laxative; WHOLE plant emmenogogic

dayflower (*Commelina diffusa*)

Patio (sown)

LEAF: Bath for headache (?✎), nausea (✎)

Other uses in this study: Ornamental

Regional literature regarding medicinal uses:

Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, boil, bubo (a swollen lymph gland, especially in armpit or groin), depurative, nosebleed, metrorrhagia, ophthalmia, parturition, pile, swelling, tuberculosis, uteritis

Johnson 2000: Abortifacient; hemostat

Morton 1981: Many medicinal uses including hemostat, high blood pressure, urinary burning

delta (*Petiveria alliacea*)

Home Garden (sown)

Grated ROOT: For tooth extraction[41] (?✓)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses:

Coe and Anderson 1996: Crushed LEAF/BARK decoction for headache

Comerford 1996: Fresh LEAVES on forehead for headache; boiled LEAVES as bath for fever or drink for stomachache

Duke 1981: Febrifuge, induces menstruation, ecbolic; mixed with lemon for snakebite remedy; ROOTS chewed for toothache, sniffed for headache; LEAF infusion for childbirth; AERIAL PARTS for pulmonary ailments

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[41] "Breaks out tooth, piece by piece" (Delia Molina Chow/Haulover).

Elsberg, Blanco and Rodriguez 1992: ROOTS in alcohol inhaled for catarrh; ROOTS and BARK rested in water as head wash for headache
Lewis and Elvin-Lewis 1977: ROOT chewed for toothache relief
Lewis and Elvin-Lewis 1984: PLANT chewed as tooth blackener to prevent tooth decay
Morton 1981: Jamaica: Pieces of ROOT inserted in tooth cavities
Robineau 1991: ROOT infusion for flatulence, decoction for rheumatism; crushed LEAVES or mashed ROOTS inhaled for migraine; macerated LEAVES as mouthwash for toothache; pulverized ROOT/STEM for sinusitis

dinar II (*Chromolaena odorata*)[42]
Common Areas (wild)
LEAF: Cold water infusion heated in sun on head for headache (?✐) or rubbed on stomach and buttocks to induce labor (✐)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and related genera:
Comerford 1996: *Eupatorium laevigatum*: Boiled leaves as bath for body aches
Johnson 2000: *E. purpureum*: Anodyne; diuretic; emetic
Lewis and Elvin-Lewis 1977: *E. perfoliatum*: Febrifuge, anti-convulsent (epilepsy); dried LEAF/FLOWER as emetic; *E. purpureum*: Known hypoglycemic activity; *Eupatorium* spp.: Astringent; kidney ailments; bladder stones; LEAF/FLOWER as tonic, cure-all
Robineau 1991: LEAF decoction orally for colds, cough, influenza; warm LEAF mixed with oil topically for furuncles; fire-seared LEAF topically for skin ulcers; febrifuge; antidiabetic; emmenogogic; anti-rheumatic

dinar pauni (*Melochia villosa*)
Common Areas (wild)
LEAF: Bath for malestar (? ✔), nausea (? ✔), nerves (✐), skin problems (?✐)
ENTIRE plant: Tea for stomachache (✔)
Other uses in this study: Superstition
Regional literature regarding medicinal uses:
Coe and Anderson 1996: LEAF decoction taken orally for digestive, respiratory, pulmonary problems
Morton 1981: *M. pyramidata*: FLOWER infusion as wash for skin diseases

dinar relative (*Sida acuta*)
Common Areas (wild)
ROOT: Cooled tea for stomach tumor[43] (? ✔)
LEAF: Drink strained cold water decoction to induce labor (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:

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[42] The older literature often refers to this species as *Eupatorium*.

[43] "Will piss plenty" (Septimo McDonald/Puerto Cabezas).

Barrett 1994a: LEAF, ROOT and ENTIRE used variously for asthma, childbirth, cold, cough, fever, ulcer; ENTIRE as tea for headache or vermifuge; LEAVES bound to head for headache
Dennis 1988: ROOT crushed/boiled as tea to hasten birth in difficult deliveries
Morton 1981: STEM, LEAF or FLOWER decoction for vomiting blood

dog's tongue (*Pseudelephantopus spicatus*)
Patio (wild)
Mashed LEAVES: Topically (rubbed/wrapped) or ingested for low back pain (?✐), bleeding wound (✐), vaginal bleeding (✐); drink dilute solution and bathe for excessive sweating (until the smell is gone) (✐)
ROOT: Boil and drink all day for 1 week (or until better) for white vaginal discharge (✐)
ENTIRE: Cook and drink to relieve back/kidney pain (?✐), abdominal pain from fallen vagina (?✐), any swelling (stomach, hand, etc.) (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Lentz 1993: Ground ROOTS with warm water and consumed for childbirth pain
Morton 1981: Crushed PLANT poultices on swellings
Robineau 1991: LEAF decoction orally for sprains, trauma; LEAVES antitussive, anti-inflammatory, anti-influenza, cardiac disorders, febrifuge, emollient, analgesic, tonic

dormilona (*Mimosa pudica*)
Common Areas (wild)
LEAF: Tea for sleeplessness (✔); inhale vapor of boiled LEAVES for headache (✔); rubbed and tied onto areas with sores (?✐), sores (?✐); warmed, macerated and rubbed on infected areas (✔)
TWIG: Tea for bad knees (✔)
ENTIRE plant: Strong tea for stomachache (✔), ingested poison (?✐), kidney pain (✔)
Mashed LEAVES: On chest for asthma (? ✔), rubbed on sore areas for rheumatism (✔), arthritis (✔) and muscle or joint pain (✔)
ROOT: Tea as mouth rinse for toothache[44] (✔); strong tea for asthma (? ✔)
Other uses in this study: Superstition
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: BRANCH and LEAF tea as diuretic, relaxant, pain reliever, sleep inducer; boiled, mashed ROOT poultice for toothache
Barrett 1994a: LEAF for diarrhea, fever, headache, hemorrhage, parasites, stomachache, vomiting, postpartum tonic to "clean the womb" (p. 18), sedative "to make baby sleep" (p.18)
Coe and Anderson 1996: Crushed LEAF/BARK decoction for headache
Elsberg, Blanco and Rodriguez 1992: ROOTS, LEAVES for respiratory ailments, diarrhea, headache, toothache and upset stomach; ROOTS boiled alone or with wandering jew or pico de pájaro LEAVES taken for kidney or urinary infections; ROOTS boiled with LEAVES of *Chenopodium*

[44] "Doesn't break tooth out; calms pain" (Maira Molina/Haulover).

ambrosioides for parasites; handful LEAVES wet in alcohol or water with lemon juice and LEAVES of escoba lisa, scrub forehead for headache

Fey and Sindel 1988: Mashed ROOT boiled with a little salt, cooled and taken to stop postpartum hemorrhaging or as mouthwash for toothache (if does not calm, chew directly on washed ROOT)

Johnson 2000: Alopecia; bactericide; emetic

Morton 1981: ROOT decoction applied to eczema

escoba amarga (*Scoparia dulcis*)

Common Areas (wild)

ROOT: Tea for vaginal bleeding (? ✔), baby crying relentlessly (?colic) (✔)

LEAF juice: Drops in eye as collyrium (✔) or on face for pimples (✔)

Macerated LEAF: Tied to area for cuts[45] (✔)

ENTIRE plant: Juice on skin for sores (✔)

Other uses in this study: Superstition

Regional literature regarding medicinal uses:

Barrett 1994a: LEAF, ROOT and ENTIRE for stomach pain, childbirth, cough, fever, itch, labor; LEAF tea for diarrhea; poultice for headache and wounds; ENTIRE as tea for liver and kidney ailments

Coe and Anderson 1996: LEAF decoction treats malaria; ROOT decoction for sexually transmitted diseases; LEAF infusion with pisik tree, *Ocimum micranthum* and reumatis saika or *Piper peltatum* bath for burns; ROOT decoction with *Eleusine indica* and escoba lisa to prevent miscarriage

Dennis 1988: ENTIRE as tea for heart trouble, may be used with *Gossypium hirsutum* (the spouse); crushed LEAVES applied to snakebite

Duke 1981: Cataplasm with salt treats swelling from snakebite; ENTIRE for venereal disease

Fey and Sindel 1988: Mash and beat LEAVES until elastic and soft like soap, strain and wet head/bathe adult/child with liquid for fever and headache

Johnson 2000: Diuretic; emetic

Lentz 1993: Crushed ROOTS heated in water, cooled and taken as need for stomach pains and diarrhea; applied topically for skin infections

Morton 1981: PLANT decoction on eczema, internally for menorrhagia; ROOT decoction taken for painful menstruation; LEAF juice as eyewash

escoba lisa (*Sida rhombifolia*)

Common Areas (wild)

LEAF juice: On skin as fungicide[46] (? ✔); full strength or slightly diluted as collyrium for eye infection (✔), as bath for epilepsy (✎), for diarrhea (✔)

LEAF: Strained cold water decoction to wash head for head pain (✔); consumed starting the week prior to due date to hasten delivery/induce labor

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[45] "Next day, wound closed" (Elida Conrado/Haulover).

[46] While this seems to be a novel use, the plant is known to have anti-fungal activity (Robineau 1991).

(✓); cold or hot water infusion ingested and rubbed on stomach to induce labor[47] (✓) or during delivery to ease labor pain (✓); for indigestion (✓)
Macerated LEAF: Wrap around neck for gland pain[48] (✏)
ENTIRE plant: Bathe with juice for headache (✓), malaise (?✏)
ROOT: Hot tea for vomiting (✏), for fallen vagina (✏)
ENTIRE plant or LEAF tea: Drink for nausea (?✏)

Other uses in this study: Superstition, Personal

Regional literature regarding medicinal uses:

Arvigo and Balick 1993: LEAF tea for burning urination, stoppage of urine, gonorrhea, as expectorant; mashed ROOT poultice for sprains

Coe and Anderson 1996: ROOT decoction for sexually transmitted diseases; ROOT decoction with *Eleusine indica* and escoba amarga to prevent miscarriage; LEAVES with tree of life and clove oil massaged on stomach to facilitate delivery; crushed LEAF/BARK decoction for headache

Duke 1981: LEAVES treat stomach disorders, diuretic, sedative; SEEDS demulcent and emollient

Duke 1997: Herbal tea as stimulant for faintness

Elsberg, Blanco and Rodriguez 1992: LEAVES and ROOTS for toothache, alopecia; LEAVES wet in alcohol or water (alone or with lemon juice and LEAVES of dormilona), scrub forehead for headache; LEAVES in water with juice of many lemons as bath for fever; tea of ENTIRE plant taken daily for cough or painful menstruation

Fey and Sindel 1988: ROOT tea taken for hypertension until reduced; mashed, beaten LEAVES in pot, add a coin and let sit in sun for six hours, wash head of sunstroke victim with fresh concoction daily for four days

Morton 1981: PLANT decoction for indigestion; slightly cooked LEAF poultice very hot over ovaries for menstrual pain

Robineau 1991: Macerated LEAVES for conjunctivitis; LEAF for skin irritations; AERIAL PORTIONS poultice for sprains; oral LEAF decoction for diarrhea

eucalipto (Eucalyptus sp.)

Purchased

LEAF/FLOWER: Tea for fever (? ✓)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses:

Bellamy and Pfister 1992: *Eucalyptus* spp.: Ingredient in cold remedies

Chow 1992: An ingredient in a remedial bath for migraines

Lewis and Elvin-Lewis 1977: Expectorant; cough syrup

Morton 1981: Many species are used for fevers and as cold remedies

Rabella and Pallais 1994: Unspecified medicine

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[47] A number of informants made these similar comments about this remedy: "The liquid is "liso" (oily) and helps system move faster" (Mariana Lopez/Bismona); "With this, [the baby] has to be born" (Luzila Zamora/Haulover); "Baby will come fast" (Katrina Alfred Vegamin/Karatá); Makes "camino de bebe" (baby's pathway) more elastic (Zoila Velázquez/Wawa).

[48] This may be a novel use. According to Johnson (2000), ephedrine is present in this plant, which could be responsible for pain alleviation.

Robineau 1991: Oral LEAF decoction for asthma, influenza, coughing, respiratory illnesses
Wiersema and Leon 1999: *Eucalyptus* spp.: Unspecified medicine

flor de noche (*Ipomoae carnea* ssp. *fistulosa*)
Patio (sown)
LEAF: Tea as pacifier (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Duke 1981: STEMS cause dizziness in humans; LEAF extract for jellyfish sting; boiled, applied externally for colic or rheumatism; powdered and used in ointment for bedsores; may promote scabbing of ulcers
Johnson 2000: *Ipomoea* spp.: Analgesic; diuretic

frijol II (*Cleome serrata*)
Patio (wild)
ROOTLETS: Ball up and bite on for toothache (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for a related species:
Duke 1981: *C. spinosa*: LEAF infusion for earache

grass II (*Agalinis albida*)
Patio (wild)
ROOTS: Chopped as instant analgesic for toothache[49] (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No medicinal uses found.

green tea (*Lippia alba*)
Patio (wild)
LEAF: Tea for refrio (✔) or fever (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Coe and Anderson 1996: LEAF decoction or infusion taken orally for childbirth, pregnancy, fever, digestive disorders, respiratory/pulmonary problems, menstrual disorders and associated hemorrhage
Duke 1981: LEAF tea for stomach disorders, cough, cold

guanábana (*Annona muricata*)
Patio (sown)
LEAF: Cold water infusion as tea, rub and poultice on head for epilepsy (?✎); strained cold water infusion to expel placenta (? ✔); hot tea for headache (✔)
LEAF/STEM with LEAVES: Juice on forehead or as bath for malaise (✔), lightheadedness (✔)
SEEDS from cooked FRUIT: Placed on forehead for headache (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:

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[49] "Immediate pain relief" (Katrina Alfred Vegamin/Karatá).

Barrett 1994a: LEAF/FRUIT for childbirth, headache, giddiness, vomiting, weakness; tea with anís eases childbirth; boiled LEAF bath for headache
Beckstrom-Sternberg, Duke and Wain 1994: Depurative, fainting, nervousness, parturition, sedative, spasm
Coe and Anderson 1996: LEAF/SEED decoction with *A. glabra* and aguacate as abortifacient/contraceptive; decoction with pico de pájaro ROOTS and avocado taken to regulate period
Duke 1981: LEAF decoction pediculicidic; FLOWERS/LEAVES for kidney ails
Duke 1997: Crushed LEAF as smelling salts when someone feels faint
Elsberg, Blanco and Rodriguez 1992: Respiratory ailments, headache, vomiting; oral LEAF infusion for parasites; bath with ti and mango for fever
Johnson 2000: Diuretic; emetic
Paul and Cox 1995: Boiled LEAVES with naranjagrio leaves in bath for fever
Robineau 1991: LEAVES, STEMS, ROOTS for spasms, sedative; oral LEAF decoction for headache

guapinol (*Hymenaea courbaril*)
Dense forest (wild)
BARK: Tea for kidney problems (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Chow 1992: Cooked with sironcontil and *Costus villosissimus* for renal ailments
Coe and Anderson 1996: ROOT tonic during pregnancy
Duke 1981: COPAL (fossilized RESIN) for poor appetite, asthma, bronchitis, expectorant, indigestion, laryngitis, stomachic; BARK tea for rheumatism
Elsberg, Blanco and Rodriguez 1992: For kidney infections; BARK boiled in water with *Spondius purpurea* honey taken daily for anemia
Kricher 1989: LEAVES have anti-fungal activity
Morton 1981: Honduras: Quinine substitute; IMMATURE POD paste on burns

guayaba (*Psidium guajava*)
Patio (sown)
FRUIT: Eaten immature to quell morning sickness (✔)
BARK: Tea for diarrhea[50] (✔); infusion rubbed on sores (✔)
LEAF: Bath for fever (✔)
LEAF and BARK: Tea for infant vomiting (✔) and diarrhea (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: BARK tea for diarrhea, vomiting, upset stomach, dysentery, sore throat and as wash for wounds and skin ulcers
Barrett 1994a: LEAF, FRUIT and SEED for "bad belly", diarrhea, fever, "pressure", worms, weakness
Coe and Anderson 1996: LEAF decoction to treat malaria
Duke 1981: FRUIT for phlegm, cholera, jaundice, respiratory ailments in children; chew LEAVES for toothache; astringent, anti-diarrheal

[50] "Works immediately" (Katrina Alfred Vegamin/Karatá).

Elsberg, Blanco and Rodriguez 1992: For fever, parasites, kidney pain; FRUIT RINDS (sometimes LEAVES) in water with grated coconut and marañon LEAVES taken for diarrhea; RIND or LEAF decoction for sores
Fey and Sindel 1988: Boil 70 SEEDS from mature FRUITS with a little water and sugar, take two teaspoons every three hours for ulcers
Johnson 2000: Antiseptic; bactericide; cicatrizant; emmenogogic; hemostat
Lewis and Elvin-Lewis 1977: LEAF chewed for toothache relief
Morton 1981: LEAF decoction ingested for diarrhea, to bathe

guayaba acido (*Psidium cattleianum* var. *littorale*)
Patio (sown)
LEAF, ROOT or BARK: Tea for diarrhea (? ✔)
BARK: Wrap around appendage for broken bone (? ✔)
Other uses in this study: Edible, Superstition
Regional literature regarding medicinal uses for a closely related species:
Barrett 1994a: *P. guayava*: LEAF, FRUIT and SEED for diarrhea
Duke 1981: *P. guayava*: LEAVES as cataplasm, astringent, antidiarrhetic
Elsberg, Blanco and Rodriguez 1992: *P. guayava*: For diarrhea
Morton 1981: *P. guayava*: LEAF decoction ingested for diarrhea

guineafa (unidentified)
Bush (wild)
ROOT/LEAF: Boil, rub for lower back pain (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No references found for this common name.

herb II (*Chamaecrista kunthiana*)
Common Areas (wild)
LEAF: For infant mouth sores/thrush (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for a species in a related genus:
Duke 1981: *Cassia tora*: LEAVES applied to ulcers, other skin ailments; SEEDS for cheloid, leprosy, plague, psoriasis, ringworm

herb III (*Chamaesyce thymifolia* Millsp.)
Patio (wild)
ENTIRE plant: Tea for vaginal bleeding not due to menses (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Coe and Anderson 1996: ROOT decoction for sexually transmitted diseases
Elsberg, Blanco and Rodriguez 1992: ENTIRE plant boiled in water with wandering jew OR escoba lisa LEAVES taken for kidney infections
Lewis and Elvin-Lewis 1987: LATEX for rapid healing of athlete's foot, cuts and wounds
Morton 1981: PLANT decoction as depurative after childbirth, dysentery, skin problems, vermifuge; dried LEAVES/SEEDS for diarrhea in children

hierba buena (*Mentha spicata*)
Home Garden (sown)
Macerated LEAVES: On inflammations (✎)

ENTIRE plant: Chest rub for asthma (?✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and related species:

Chow 1992: Taken daily for heart problems; drink with *Cassia fistula*, culantro, ajo and juice of naranjagrio for liver ailments
Duke 1981: Lists hierba buena but gives no uses
Johnson 2000: *M. piperita*: Analgesic; adjuvant; anthelminthic; antidote; anti-emetic; aphrodisiac; astringent; carminative; digestive; febrifuge
Lewis and Elvin-Lewis 1977: *M. piperita*: Cough syrup; counterirritant
Tri-Light 2000: Antispasm; stomach

hombre grande (*Quassia amara*)
Dense forest (wild)
WOOD: Tea from for high blood pressure (?✎)
BARK: Strong tea for anemia (? ✓)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:

Coe and Anderson 1996: WOOD decoction used to treat malaria; for stomachaches; Boiled WOOD tonic promotes appetite and purifies blood
Duke 1981: WOOD infusion as febrifuge, liver and snakebite remedy; drinking bitter tea supposedly prevents snakebite
Elsberg, Blanco and Rodriguez 1992: BARK decoction taken by the half glass two to three times a day for four days for fever and cough
Lewis and Elvin-Lewis 1977: Powdered stem taken to stimulate appetite
Morton 1981: Decocotion of slender STEMS and BRANCHES taken as cure-all

ibu (*Dipteryx oleifera*)
Home Garden (sown)
BARK: Macerated for toothache (✓) and tooth extraction (✓)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this and a related species:

Coe and Anderson 1996: Topical BARK/FRUIT decoction for tooth extraction
Johnson 2000: *D. odorata*: Carminative; narcotic
Lewis and Elvin-Lewis 1977: *Dipteryx* sp.: Fermented BEAN as narcotic
Lewis and Elvin-Lewis 1987: *Dipteryx* sp.: For thrush

iska dura (*Acisanthera quadrata*)
Common Areas (wild)
ENTIRE: Cooked with a second unidentified plant as tea for placenta removal[51] (✎) or refrio de vientre (✎); as tea for dysuria (? ✓), blood in urine (? ✓), gonorrhea (? ✓) and syphilis (✎)[52]
Other uses in this study: None; exclusive medicinal

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[51] "Dries placenta up; never leaves body" (Kristilina Perera/Haulover).

[52] These illnesses seem to be related. According to a hospital nurse, "excessive washing" causes refrio de vientre. Dennis (1988) described a skin disease contracted from a parasite living in pools of standing water as kakmapara. The Miskito Dictionary defined kakmapara as a condition preceding gonorrhea (Marx and Heath 1992).

Regional literature regarding medicinal uses:

Dennis 1988: Crushed LEAVES as poultice on infected area for kakmapara[53]

John's sails (*Hyptis verticellata*)
Patio (sown)

Mashed LEAVES: As rub or as bath for epilepsy (✏), on skin for itching (✔)
LEAF: Cold water infusion for high blood pressure (✔), nerves (✏), stomachache (✏)
ROOT: Tea for infertility (?✏)

Other uses in this study: Superstition
Regional literature regarding medicinal uses:

Arvigo and Balick 1993: LEAF and BRANCHLET tea for coughs, mucus conditions, asthma, uterine fibroids, bronchitis; with ti for high fevers
Coe and Anderson 1996: As topical for fungal infections, dandruff, scabies; crushed LEAF poultice for headache
Duke 1981: LEAF tea for indigestion, rheumatism, itch, insect stings
Elsberg, Blanco and Rodriguez 1992: STEM/LEAF infusion taken for cough, catarrh and hypertension; LEAVES on skin for dermal fungus
Lewis and Elvin-Lewis 1977: Anticancer activity

kitkal (*Tillandsia streptophylla*)
Bush (wild)

ENTIRE plant: Tea for stomachache (✏)

Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for related species:

Beckstrom-Sternberg, Duke and Wain 1994: *Tillandsia* spp.: Astringent, chest, emmenagogue, epilepsy, fever, hemostat, inflammation, obesity, sudorific, tumor, vulnerary
Johnson 2000: *T. usneoides*: Astringent; emmenogogic

kiwa (unidentified)
Bush (wild)

BARK: Cooled tea for babies with blue diarrhea[54] (✏)

Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No references found for this common name.

krismis blossom II (*Senna undulata*)
Bush (wild)

LEAVES: As tea for purgative (?✔)

Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this species and close relatives:

Duke 1981: *Cassia fistula*, *Senna alata* and *S. occidentalis* are purgatives
Johnson 2000: Contains tannins (known anti-diarrheal agent)

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[53] Ibid.

[54] Believed to result from the infant having gazed upon a certain snake (Marx and Heath 1992).

latawira (*Hyptis conferta* var. *angustata*)
Patio (wild)
    LEAF: Juice as coagulant (✏)
    ROOT: Tea for metrorrhagia (✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No medicinal information found.

latawira II (*Desmodium incanum*)[55]
Common Areas (wild)
    ENTIRE plant: Mashed (with other plants) as chest rub for asthma (?✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
    Morton 1981: PLANT decoction for colds

lengua de gallina (*Hemidiodia ocymifolia*)
Home Garden (sown[56])//Common Areas (wild)
    Macerated LEAF: Big drink of juice from and tie macerated LEAVES on snakebite (✏)
    LEAF: Rub and tie onto ribcage for asthma (✏); mixed with/without oil and rubbed on sore joints/inflamed muscles (✏), back pain (? ✓), bone pain (? ✓), rheumatism (? ✓), black eye (✏); diluted juice in eyes to remove dirt[57] (✓)
    Cold water LEAF infusion: Strong tea ingested to expel placenta (?✏)
    ENTIRE plant: Breath vapor boiling for headache (? ✓)
Other uses in this study: Superstition
Regional literature regarding medicinal uses for this and a related species:
    Dennis 1988: ROOT only as tea for pain/cough; crushed LEAF as collyrium for eye problems
    Lewis and Elvin-Lewis 1987: *Hemidiodia* sp.: Used in postpartum recovery

lili tangni (*Crinum augustum*)
Bush (wild)
    ROOT: Cooked for stomachache (?✏), especially children
Other uses in this study: Ornamental
Regional literature regarding medicinal uses for unknown species of this genus:
    Beckstrom-Sternberg, Duke and Wain 1994: *Crinum* spp.: Earache, stomachache, lactogogue, laxative and numerous external applications

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[55] Although similar pheonotypically, informants distinguished between latawira (II) and prakprakya as different plants; there is some question as to their exclusive identities.

[56] One of three plants (including: Lengua de gallina, mutmutya - used in superstitious remedies and pico de pájaro) found together in one curandero's home garden. See "Finding the Remedies," earlier in this chapter, for more information.

[57] "Burns, but gets dirt out" (Basilicia Martin-Schultz/Tuapi).

liliura (*Abrus precatorius*)
Bush (wild)
Mashed STEM: Tied around stomach for diarrhea (✔)
ENTIRE plant: Tea for cough (✔)
Other uses in this study: Personal
Regional literature regarding medicinal uses:
Bremness 1994: Ayurvedic herb; treats intestinal problems and bleeding; LEAVES chewed for cough, sore throat; Asia: SEEDS as contraceptive
Duke 1981: SEEDS taken as contaceptive, powdered as snuff for headache; ROOTS sore throat, rheumatism; LEAF/ROOT decoction for coughs, colds
Johnson 2000: Cough, diarrhea, and numerous other medicinal uses
Morton 1981: LEAF, FLOWER, STEM or ROOT infusion for cough, sore throat; chew stem with leaves for asthma

limon agrio (*Citrus aurantiifolia*)
Patio (sown)
FRUIT: Drink juice for fever (✔), stomachache (✔), presion (✔); juice rubbed on head for malaria (✔)
LEAF: Tea for fever (✔)
ROOT: Tea for bloody diarrhea[58] (✔); chopped for toothache poultice (✔)
Other uses in this study: Edible, Household
Regional literature regarding medicinal uses:
Barrett 1994a: FRUIT, LEAF or ROOT used variously for stomach pain, childbirth, colds, cough, diarrhea, fever, headache, itching, kidney, nerves, parasites, weakness, vomiting, and to purge
Chow 1992: Drink with marañon and *Acacia* sp. LEAVES plus sorosil (liquid or LEAVES) to control cholesterol levels
Coe and Anderson 1996: ROOT decoction for malaria; JUICE with ti LEAVES with honey for fever; as topical for fungal infections, scabies and dandruff
Duke 1981: LEAF tea as tonic; FRUITS antiscorbutic, antiseptic, styptic, sudoriphic; JUICE believed to retard delivery; ROOT infusion for colic
Elsberg, Blanco and Rodriguez 1992: For headache, cough and catarrh; LEAVES and JUICE with ti and lula bakbak LEAVES OR LEAF infusion plus JUICE and PEEL of one lemon taken for fever; ROOTS cooked in water taken to ease labor pain
Fey and Sindel 1988: Boil ROOTS plus those of ti and *Piper auritum* together in pot of water with dried banana LEAVES as lid, breathe steam from four pots placed in front of patient after 6pm for four straight days for cold
Lewis and Elvin-Lewis 1977: Dysentery (especially peel), fever, headaches, oral infections, vermifuge, vomiting; twig as chew stick; volatile oils act as counter-irritants; FRUIT decoction as gargle for thrush/sore throat
Morton 1981: Sedative, hypotensive and pain-relieving qualities
Robineau 1991: For toothache
Tweedy 1953: Stewed FRUIT tea or externally for fever

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[58] "Pain stops immediately" (Robert Angus/Karatá).

limon mandarina (*Citrus reticulata*)
Patio (sown)
BARK: Chopped for toothache (?✎) or tooth extraction[59] (✎)
ROOT: Tea for stomachache (? ✓)
FRUIT: Rubbed on head for high fever (? ✓) with headache (? ✓)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this and related species:
Barrett 1994a: C. *aurantiifolia*: FRUIT, LEAF or ROOT for stomach pain, fever, headache
Coe and Anderson 1996: C. *aurantiifolia*: ROOT decoction for malaria; JUICE with ti LEAVES and honey for fever
Elsberg, Blanco and Rodriguez 1992: For headache, cough and catarrh; LEAVES and JUICE with ti and lula bakbak LEAVES OR LEAF infusion plus JUICE and PEEL of one lemon taken for fever; ROOTS cooked in water taken to ease labor pain
Morton 1981: PEEL antibiotic; FRUIT juice as decongestant
Robineau 1991: FRUIT juice for eye infections

limon merikano (*Citrus* sp.)
Patio (sown)
Cold water LEAF infusion: Bath for fever (? ✓); tea for stomachache (? ✓)
FRUIT: Drink juice for diarrhea (?✎)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this genus:
Barrett 1994a: C. *aurantiifolia*: FRUIT, LEAF or ROOT for stomach pain, fever, headache
Coe and Anderson 1996: C. *aurantiifolia*: ROOT decoction for malaria; JUICE with ti LEAVES and honey for fever
Elsberg, Blanco and Rodriguez 1992: C. *aurantiifolia*: LEAVES and JUICE with ti and lula bakbak LEAVES OR LEAF infusion plus JUICE and PEEL of one lemon taken for fever
Lewis and Elvin-Lewis 1977: Contains essential oils (limonene, linaool, nerol); volatile oils act as counter-irritants
Tweedy 1953: C. *aurantiifolia*: Stewed FRUIT tea or externally fever

limon miskito (*Citrus* sp.)
Patio (sown)
LEAF: Tea for nausea (?✎), fever[60] (? ✓), to induce labor[61] (?✎)
FRUIT: Drink juice for diarrhea (? ✓), fever (? ✓)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this genus:

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[59] "Tooth breaks out...in two days" (Eldeponso Franklins/Tuapi).

[60] "Instantaneous. Sweat like crazy and fever goes away" (Basilicia Martin-Schultz /Tuapi).

[61] "Tiene que tener bebe" (Sam Martin/Tuapi). This translates to, "You have to have the baby."

Barrett 1994a: *C. aurantiifolia*: FRUIT, LEAF or ROOT for stomach pain, childbirth, diarrhea, fever
Coe and Anderson 1996: *C. aurantiifolia*: ROOT decoction for malaria; JUICE with ti leaves and honey for fever
Elsberg, Blanco and Rodriguez 1992: *C. aurantiifolia*: LEAVES and JUICE with ti and lula bakbak LEAVES OR LEAF infusion plus JUICE and PEEL of one lemon taken for fever; ROOTS cooked in water taken to ease labor pain
Lewis and Elvin-Lewis 1977: Contains essential oils (limonene, linaool, nerol); volatile oils act as counter-irritants
Tweedy 1953: *C. aurantiifolia*: Stewed FRUIT tea or externally for fever

limon puro (*Citrus limon*)
Patio (sown)
LEAF: Cook, ingest steam for headache (? ✔); juice for diarrhea (? ✔)
Other uses in this study: Edible, Household, Personal
Regional literature regarding medicinal uses for closely related species:
Barrett 1994a: *C. aurantiifolia*: FRUIT, LEAF or ROOT for diarrhea, headache
Elsberg, Blanco and Rodriguez 1992: *C. aurantiifolia*: For headache

limsi (*Bursera simaruba*)
Dense forest (wild)
BARK: Tea for anemia (✔)
Other uses in this study: Construction, Superstition
Regional literature regarding medicinal uses:
Coe and Anderson 1996: ROOT tonic during pregnancy
Duke 1981: LEAF tea for venereal disease and obesity; infusion to wash cuts followed by application of ashes to wound; RESIN treats wounds, put on newborn naval; brings boils to a head; drink water by soaking a piece of WOOD for a day for renal afflictions
Elsberg, Blanco and Rodriguez 1992: Decoction of three pieces BARK in one half liter water with one large piece of cinerut ROOT and drink one glass every 15 days for anemia
Johnson 2000: Antiseptic; diaphoretic; diuretic; expectorant
Lentz 1993: Hot sap mixed with sugar consumed to "strengthen the blood", especially by pregnant women
Lewis and Elvin-Lewis 1977: RESIN for toothache relief
Morton 1981: BARK decoction for anemia, fever, rheumatism, syphilis

liwa mukya (*Cochlospermum religiosum*)
Wild (Forest Edge); Cultivated (Transplanted as living fence)
BARK and mashed LEAVES: Steeped in hot water, put on foot for sores (?✎)
Other uses in this study: Construction, Household
Regional literature regarding medicinal uses for this species and a close relative:
Bellamy and Pfister, 1992: Medicinal gum
Duke 1981: *C. vitifolium*: Considered sedative; brings infections to a head; LEAF infusions for jaundice; ROOT as emmenogogic
Morton 1981: *C. vitifolium*: LEAF decoction to bathe and pulverized LEAVES as dressing for ulcers

lula bakbak (*Piper jacquemontianum*)
Bush (wild)

LEAF: Steeped in boiled water rubbed on sore area for rheumatism (✔)
STEM, ROOT and smashed LEAVES: Cooked, strained taken for bla (?✔) and stomach pain (✔)

Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and other species:

Arvigo and Balick 1993: All species: LEAF bath for aches, pains, rheumatism, swellings, skin conditions, fatigue, sleeplessness; mashed ROOT as poultice for toothache; cold LEAF infusion for headache, constipation, as sedative; LEAF sitz bath for delayed menses, menstrual cramps
Barrett 1994a: LEAF and FLOWER for stomach pain, colds, fever, headache, kidneys, nerves, diabetes; *P. auritum*: LEAF for anemia, fever, headache, heart, kidneys, liver, rheumatism; apply mashed to sore gums or tooth
Coe and Anderson 1996: *Piper* sp.: Hot LEAF bath for fever; LEAF infusion with pisik tree, escoba amarga and *Ocimum micranthum* bath for burns; ROOT tea with *zinza*, canela after delivery; LEAVES heated with palma africana oil, applied to breast as lactogogue; SAP/mashed PLANT applied to toothache causing numbness
Duke 1981: *Piper* spp.: ROOTS facilitate bleeding from contusion; cooked as expectorant
Dennis 1988: *Piper* spp.: LEAF tea drunk and infused vaginally for "cold womb"; tea for snakebite
Elsberg, Blanco and Rodriguez 1992: Cooled infusion of handful LEAVES together with ti LEAVES and juice of one lemon as bath for fever
Fey and Sindel 1988: *P. auritum*: Fever; vapor from boiled LEAVES for a cold with aching bones, rheumatism, and toothache; steam boiled ROOTS with those of limon agrio and ti covered by dried banana leaves inhaled for cold
Johnson 2000: Carminative
Lewis and Elvin-Lewis 1977: *P. methysticum*: Cold water ROOT extract as tonic, stimulant; chewed STEM has narcotic effect

lythrum II (*Cuphea carthagenensis*)
Patio (wild)

ROOT/ENTIRE plant: Hot infusion for postnatal hemorrhaging (?✐), likia (✔)
Mashed LEAVES: To relieve mumps or tonsillitis (?✐)

Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for a close relative:

Arvigo and Balick 1993: *C. calophylla*: ENTIRE plant as bath for exhaustion/ chronic fatigue; as tea for dysentery
Johnson 2000: *C. glutinosa*: Diuretic
Lentz 1993: *C. utriculosa*: Ground LEAVES on skin for rashes
Morton 1981: PLANT decoction for gonorrhea, syphilis, malaria and general remedy

maíz (*Zea mays*)
Cultivated (Plantation – Common); Purchased
SEED: Toasted, powdered, cooked with water as lactogogue drink (?✎)[62]
Other uses in this study: Edible, Household
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Boiled corn SILK taken for retained urine, burning urine, kidney stones, bladder infections, gonorrhea
Beckstrom-Sternberg, Duke and Wain 1994: Numerous medicinal uses (including antiseptic, stimulant and pancea) but no record as a lactogogue
Johnson 2000: Alterative; analgesic; anodyne; antiseptic, demulcent; diuretic
Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity
Morton 1981: Argentina: To wean baby or halt flow of mother's milk: Two small cups of SILK decoction taken daily
Robineau 1991: Uterine stimulant effect

malinche (*Delonix regia*)
Sown (Patio - Transplanted)
FLOWER: Mashed and rubbed on face for chloasma
Other uses in this study: Ornamental, Construction
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Anemia, fever, malaria
Duke 1981: Purgative, epilepsy

mangle rojo (*Rhizophora mangle*)
Riverbanks (wild)
Liquid from chopped BARK boiled in water put on sores (✔)
Other uses in this study: Personal, Construction, Household, Fuel, Additional
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Boiled BARK as hot bath for stubborn sores, skin conditions, leprosy, swellings
Beckstrom-Sternberg, Duke and Wain 1994: Angina, astringent, boil, dyspepsia, elephantiasis, emmenagogue, expectorant, eye, fever, et al.
Coe and Anderson 1996: Tannins from BARK for fungal infections, dandruff, scabies; for diarrhea
Duke 1981: BARK as febrifuge, expectorant, hemostat; may cure leprosy
Johnson 2000: Astringent; emmenogogic; hemostat
Morton 1981: BARK decoction as lotion on skin sores

mango (*Mangifera indica*) and cultivars, including mango #11, beep mango, mango caraña, mango chancho, ihri mango, kidney mango, mango liso, mango manzana, mango manzanilla, mango mechudo, mango puro, mango rosa, round mango, sugar mango and torkentime mango
Patio (sown)/Common Areas (wild)
Immature FRUITS: Eaten raw for morning sickness (✎)
BARK: Tea for diarrhea (✔); grated, heated, rubbed on skin for tumors (?✎)

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[62] Note while no references explicitly refer to this plant's use as a lactogogue, it is interesting to note the Latin translation of the scientific name: *Zea* means "cause of life' and *mays* means "our mother" (Bremness 1994).

FRUITS: Eaten baked for tuberculosis[63] (?✐)
LEAF: Cooked as poultice for inflammation (✔) from bumps or bruises
Other uses in this study: Edible, Superstition, Additional
Regional literature regarding medicinal uses:
Barrett 1994a: BARK, FRUIT and LEAF for "bad belly", cough, diarrhea, fever, pain, rheumatism, skin disease
Chow 1992: An ingredient in a remedial bath for migraines
Cisneros, García and Dávila 1992: Cooked LEAVES as antitussive for asthma; pulverized SEEDS as vermifuge
Dennis 1988: Inside layer of BARK scraped off and applied to wound
Duke 1981: Many medicinal uses, including: RIPE FRUIT diuretic, laxative, unguent; GUM for scabies; SEEDS anthelminthic, antiasthmatic, antidysenteric, unguent; bleeding piles
Elsberg, Blanco and Rodriguez 1992: For respiratory ailments and catarrh; BARK decoction alone or with marañon FRUIT peels taken for diarrhea; LEAF decoction with carau OR sironcontil LEAVES as bath for skin rashes; boiled with salt as warm poultice on bruises/inflammation
Fey and Sindel 1988: Heat LEAVES in fire or in pot of water as suppurative poultice
Johnson 2000: Dentifrice; diuretic
Lewis and Elvin-Lewis 1977: Twig as chew stick; BARK for toothache relief; FRUIT skin treats uterine hemorrhaging
Morton 1981: LEAF infusion or decoction as pectoral for coughs, bronchitis, asthma, whooping cough; BARK decoction on skin ailments

manzanilla (*Matricaria recutita*)
Purchased
LEAVES: Tea/bath for refrio de vientre (✔) and menstrual cramps (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Barrett 1994a: FLOWER or LEAF for stomach pain, cough, menstrual pain, nerves, ovaries and to purge
Bremness 1994: Extracts soothe nervous stress, digestive problems, ulcerated or inflamed bowels; essential OILS prevent allergic seizures, inhibit inflammation, bacteria, ulcers, viruses, fungi, aids cell renewal, liver regeneration; on wounds, herpes, eczema and infections
Coe and Anderson 1996: ROOT tea with zinza and *Piper auritum* or *P. peltatum* as tonic after delivery; with *Wedelia* sp., *Stachytarpheta* sp. and clove oil (*Szygium aromaticum*) as fertility enhancer
Chow 1992: An ingredient in a remedial bath for migraines
Elsberg, Blanco and Rodriguez 1992: For alopecia; ENTIRE plant decoction as daily bath for skin ailments (including measles); taken daily for stomachache, nerves and diarrhea; with ti LEAVES as bath for fever
Johnson 2000: Antiphlogistic; carminative; cicatrizant; diaphoretic; discutient; diuretic; emollient; expectorant
Lewis and Elvin-Lewis 1977: Dry FLOWER head is emetic in large doses; SEED tea anthelminthic; bitter tonic tea

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[63] "Hair on peel helps cure lungs" (Salvador Perez/Karata).

Robineau 1991: LEAF/FLOWER for menstrual pain; LEAF for stomachache; WHOLE plant decoction orally for asthma, diarrhea, antispasmodic, menstrual pain, respiratory disorders, to clean after giving birth

Tri-Light 2000: FLOWERS reduce stomach problems; helps relieve cancer of the liver, mouth, skin and brain, applied internally and externally; calms anxiety; vermifuge; antibacterial; treats skin problems, spasms; carminative; anti-inflammatory; vulnerary

marañon, varieties (*Anacardium occidentale*)

Home Garden (sown); Cultivated (Patio – Spared)[64]

BARK infusion: Bath for burns (? ✔), skin problems (✔)

LEAF tea or BARK infusion: Drink for diarrhea (✔)

LEAF tea: For headache (✏)

Macerated LEAVES or SAP: On snakebite wounds (? ✔)

Other uses in this study: Edible

Regional literature regarding medicinal uses:

Barrett 1994a: BARK, FRUIT, and LEAF for stomachache, diarrhea, fever, skin disease; BARK or LEAF tea, alone or with guayaba, for diarrhea

Chow 1992: Drink LEAVES plus limon agrio and *Acacia* sp. LEAVES plus sorosil (liquid or LEAVES) to control cholesterol levels

Duke 1981: Antiscorbutic, anesthetic, treats haemoptysis, sore throat, amoebicidal, alexeritic, for malaria, syphilitic ulcers, strength restorer for asthma, colds, congestion, diabetes, discutient, fungicidal, repellent

Elsberg, Blanco and Rodriguez 1992: For skin infections and fever; BARK decoction in water OR syrup from FRUIT with sugar taken daily for diarrhea

Lewis and Elvin-Lewis 1977: Known hypoglycemic activity (decrease blood sugar); leprosy; anthelminthic; FRUIT oil antibiotic against bacteria

Morton 1981: Diluted SHELL OIL applied with caution to ulcers, warts and calluses; diarrhea

Smith, et al. 1992: BARK scrapings mixed with water to treat wounds; extract from nut shell treats skin problems (scurvy, sores, warts, ringworm, psoriasis); BARK and LEAF infusion for toothache, sore gums, taken internally for dysentery; APPLES for fever

Wiersema and Leon 1999: Beverage base; FRUIT and NUT eaten

mozote (*Pavonia schiedeana*)

Common Areas (wild)

LEAF: Tea before bed for stomachache (✏); strong infusion rubbed on body aches (✏); macerated and put on wart (?✏)

Cooked ENTIRE: With other plants, drink for excessive bleeding/cramps during menses or after miscarriage (? ✔)

Other uses in this study: Superstition

Regional literature regarding medicinal uses for closely related species:

Coe and Anderson 1996: *P. rosea* (known by the common name, mozote): Oral ROOT decoction for infections, venereal disease, menstrual disorders/associated hemorrhaging

Duke 1981: *P. fructosa*: ROOT as cough medicine

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[64] Spared plants are discussed in Chapter 3: Edibles.

Lentz 1993: *P. rosea*: Ground ROOT tea to ease childbirth pain
Robineau 1991: *P. spinifex*: Mashed ROOT/BARK/or LEAF topically for sores, wounds; FLOWER for boils or gum sores; WHOLE plant for gastritis

muspuskan (*Desmodium adscendens*)
Common Areas (wild)
LEAF: Infusion put on area as coagulant (? ✔); rubbed on face in downward motion for face or gland inflammation (topa) (? ✔)[65]
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and related species:
Coe and Anderson 1996: LEAF, WHOLE plant and ROOT infusions or decoctions for aches and pains, diarrhea, digestive (stomachache, ulcers), infections, skin rashes/sores, venereal disease
Duke 1981: Drink LEAF decoction for consumption; pounded, applied to wounds with lime juice; infusion for convulsions and venereal sores
Foster and Duke 1990: *D. nudiflorum*: Chew ROOT for mouth inflammation, sore bleeding gums and periodontal disease
Johnson 2000: *Desmodium* spp.: Analgesic properties
Lewis and Elvin-Lewis 1977: Fabaceae family: BARK used as gargle/mouthwash for toothache
Morton 1981: Crushed LEAVES with lime juice poultice on wounds

nancite (*Byrsonima crassifolia*)
Home Garden (sown)
Grated BARK: Itching (✔), welts (✔), fungus (✔), sores (✔); for screw worm infection[66] (? ✔)
BARK decoction: Bath for burns (✔), sores (✔)
Other uses in this study: Edible, Household, Superstition
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Astringent, snakebite, cold, diarrhea, diuretic, fever, gastritis, skin, sore, tumor
Coe and Anderson 1996: As topical for fungal infections, dandruff, scabies; for diarrhea
Duke 1981: WOOD yields red dye for skin afflictions
Morton 1981: BARK decoction for coughs, diarrhea, febrifuge, purgative, snakebite remedy; pulverized BARK for wounds, cuts, skin afflictions

naranja dulce (*Citrus sinensis*)
Patio (sown)
LEAF: Tea for stomachache (?✏)
FRUIT: Drink juice for stomachache [67](?✏)

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[65] Marx and Heath (1992) define muspuskan as a form of rheumatism. It translates literally as mus = body, puskan = swellings.

[66] "Acid kills the worm" (Salvador Perez/Karatá).

[67] "When you have air in your stomach" (Lena Dixon/Haulover). Informant used this after nothing cured her stomachache; it made her belch and she felt better.

PEEL: Tea for heart pain (? ✔), headache (? ✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Chow 1992: Aromatic bath with romero, naranjagrio, eucalípto, and *Ficus* sp. leaves plus mango, *Acacia* sp., *Dacryodes* sp., canela, manzanilla, clove, anís, and cumin for migraines
Coe and Anderson 1996: FRUIT juice/LEAF decoction orally for diarrhea, fever, hypertension, respiratory/pulmonary disorders
Duke 1981: PEELINGS for toothache; steamed for earache; LEAF as tea; taken with aspirin for fever
Johnson 2000: Carminative; expectorant; tonic
Lewis and Elvin-Lewis 1977: LEAF chewed for toothache relief; dried FRUIT peel as stimulating tonic

naranjagrio (*Citrus aurantium*)
Patio (sown)
FRUIT: Juice for high blood pressure (✔)
LEAF: Tea for high blood pressure (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Chow 1992: Ingredient in herbal remedy for migraines; drink FRUIT JUICE with *Cassia fistula*, hierba buena, culantro, ajo for liver ailments
Coe and Anderson 1996: FRUIT juice/LEAF or ROOT decoction/infusion as bath and orally for diarrhea, fever, digestive, hypertension, respiratory-pulmonary ailments
Duke 1981: LEAVES/BARK for bad heart; as antiseptic, hemostatic, sudoriphic
Elsberg, Blanco and Rodriguez 1992: For vomiting, headache and hypertension; infusion of seven to ten LEAVES in one liter water, drink one half glass thrice daily for nerves OR as body rinse and drink for fever
Johnson 2000: Expectorant; fatal poison; hemostat; narcotic
Lewis and Elvin-Lewis 1977: PEEL: Citrin
Morton 1981: JUICE for thrush, diuretic, purgative, coughs, fever
Paul and Cox 1995: LEAF tea with *Coffea arabica* for emotional shock and to regularize heat beat; heated LEAVES tied to forehead for headache; other uses such as fever, bruises, skin clarifier, liver ailments, digestive disorders

nerves (*Coccocypselum hirsutum*)
Bush (wild)
ENTIRE: Cook and bathe with to relax (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No medicinal uses found for this species or similar uses with close relatives.

node weed (*Synedrella nodiflora*)
Patio (wild)
Mashed LEAVES: Drops as collyrium at night to remove eye irritant (✎)
ENTIRE plant less LEAVES: Drink cold infusion for stomachache (?✎), headache (?✎), malaise (?✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:

Coe and Anderson 1996: LEAF decoction taken orally for diarrhea, respiratory/pulmonary disorders, cuts and hemorrhage
Johnson 2000: Laxative
Morton 1981: PLANT decoction as remedy for colds

palma africana (*Elaeis oleifera*)
Home Garden (sown); Wild
SEED oil: For any skin infection (✔)
Other uses in this study: Superstition, Edible, Personal, Construction
Regional literature regarding medicinal uses for this and related species:
Beckstrom-Sternberg, Duke and Wain 1994: Inflammation, stomach problems
Coe and Anderson 1996: As topical for fungal infections, scabies and dandruff; FRUIT decoction taken orally for childbirth/pregnancy, digestive, skin rashes/sores, purgative/laxative
Duke 1981: *E. guineensis*: For menorrhagia, gonorrhea; pulverized ROOT for headache; chewed as aphrodisiac
Johnson 2000: Anodyne

palmera (*Acoelorraphe wrightii*)
Forest Edge/Fields/Watershed Areas (wild)
FRUIT pulp: Cooked for upset stomach from bad food (? ✔)
Other uses in this study: Construction, Household, Edible
Regional literature regarding medicinal uses:
Coe and Anderson 1996: ROOT decoction taken orally for diarrhea

papaya (*Carica papaya*)
Home Garden (sown)
Grated ROOT: For toothache (✔)
SEEDS: To expel intestinal parasites (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Bellamy and Pfister 1992: Solutions applied to abscesses, ulcers and fissures of the tongue to digest dead tissue and promote healing
Coe and Anderson 1996: FRUIT juice/LEAF decoction/SAP for aches and pains, fever, digestive problems, menstrual disorders
Comerford 1996: FRUIT flesh on snakebite to stop spread of poison
Duke 1981: Numerous internal and external medicinal uses including: Anthelminthic LATEX and amoebicidal LEAVES
Duke 1997: SEEDS eaten as vermifuge
Elsberg, Blanco and Rodriguez 1992: LEAF infusion taken for liver problems; LATEX for parasites; LEAVES or LATEX applied to skin ailments
Fey and Sindel 1988: Cold water infusion of ground SEEDS given to children with worms; boiled LEAVES to wet cloth and rub on inflamed area; chopped STEM tied onto areas of severe inflammation, replaced regularly; LATEX from STEM put on cotton ball and in nose for nosebleeds
Johnson 2000: Digestive aid; antibiotic, bactericide; diuretic; emmenogogic
Lewis and Elvin-Lewis 1977: Inner bark for sore teeth; LATEX as amoebicide
Morton 1981: ROOT decoction, LATEX or strong LEAF decoction as vermifuge
Wiersema and Leon 1999: Papain and chymopapin used as medicine

pico de pájaro (*Senna occidentalis*)
Home Garden (sown[68])//Patio (wild)

ROOT: Tea for body aches (✔), cramps (✔), abdominal pain (✔), dolor de vientre (✔), infertility (✔), kidney problems (✔), internal infections (✔)

LEAF: Tea for labor pain (✔), overdue baby (?✔), urinary problem (✔), baby with gas in chest (?colic) (?✔), kidney problems (✔); bath for epilepsy (?✔), nausea (?✔); cold water infusion ingested as emetic for upset stomach (✔), to induce labor (✔) or to calm premature labor (?✎); juice in eye for conjunctivitis (✔); diluted juice for newborn's eyes (?✔); chloasma (?✎)

Mashed LEAVES: Rubbed on skin for inflammation (✔); rubbed on chest/body part for catarro (?✎), knee/bone pain (✔), fever (✔); on skin for wounds (✔)

Mashed LEAVES or ENTIRE plant: Rubbed on chest or ingested for asthma (children, too) (?✔)

FRUIT and LEAF: Tea as purgative (✔)

Heated LEAVES: To dry up boils (✔) or infections with pus (?✔)

Grated ROOT: To extract tooth with caries[69] (?✔)

Other uses in this study: Superstition

Regional literature regarding medicinal uses:

Arvigo and Balick 1993: ROOT tea for menstrual pain; ENTIRE plant tea as tonic for many ailments

Barrett 1994a: LEAF and ENTIRE for stomach pain, childbirth, cold, colic, fever, and headache

Coe and Anderson 1996: ROOT decoction for malaria; decoction alone or with avocado and guanábana drink two to three times a day to regulate period; ROOT/LEAF decoction for stomachache

Dennis 1988: Crushed and boiled as tea for "plauaia trobil" [uterine problems], baby constipation and pain in general

Duke 1981: SEEDS febrifuge, purgative and used to treat ringworm; ROOT BARK as quinine substitute and gonorrhea treatment; decoction for cataracts

Elsberg, Blanco and Rodriguez 1992: With anis and culantro as remedy for colic; ROOTS boiled in one liter water alone or with, if available, sironcontil LEAVES, taken daily for urinary infections; LEAF infusion, boiled and rested overnight as wash for eye infection or conjunctivitis; rub LEAVES directly on skin for sores OR boil in water with sironcontil leaves and bathe with it

Forey and Lindsay 1991: Dried LEAF infusion with zinza prevents cramps

Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity; SEED for ringworm, eczema, tonic, diuretic

Morton 1981: ROOT decoction for womb inflammation; ROOTS antispasmodic; SEED decoction used to treat cataracts

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[68] One of three plants (including: Lengua de gallina, mutmutya (used in superstitious remedies) and pico de pájaro) found together in one curandero's home garden. See "Finding the Remedies," earlier in this chapter, for more information.

[69] The root extract must be carefully placed only on the affected tooth "because it breaks out any tooth it touches" (Victoria Ignacio/Haulover).

Robineau 1991: Crushed leaves topically for skin disorders, on forehead for headache; oral WHOLE plant decoction for jaundice, fever; LEAF juice rubbed on skin for poor blood quality; LEAVES anti-inflammatory; ROOT antispasmodic; oxytocic properties (induces labor)

pino (*Pinus caribaea* var. *hondurensis*)
Wild (Forest Edge/Fields/Watershed Areas); Cultivated (Patio – Common)
RESIN: For sores (? ✔), burns (? ✔), bites (?✎)
BARK: For burns (? ✔), sores (? ✔)
Needle: For rheumatism (✔) and possibly pediculicidic (?✎)
Other uses in this study: Construction, Household, Fuel
Regional literature regarding medicinal uses for this and related species:
Beckstrom-Sternberg, Duke and Wain 1994: Anodyne, liminent, panacea, rubefacient, cold
Coe and Anderson 1996: LEAF/SAP decoction or topical poultice for aches and pains, inhaled for respiratory problems
Denevan 1961: RESIN for medicinal uses
Johnson 2000: *Pinus* spp.: Analgesic, anthelminthic; antiseptic; disinfectant; emetic; emmenogogic; expectorant; febrifuge; laxative
Lentz 1993: *P. oocarpa*: Sap applied to skin to kill worms
Lewis and Elvin-Lewis 1977: Turpentine OIL as expectorant and for chronic bronchitis; many gymnosperm spp. used as tea or inhalant for cold symptoms; *P. palustris*: RESIN oil ointment for gonorrhea, skin diseases; *Pinus* sp.: RESIN to heal open wounds
Morton 1981: Cuba: SAWDUST mixed with *Guaiacum officinale* and alcohol or RESIN with lemon (unspecified) juice as rub for rheumatitis; RESIN on eczema; WOOD and NEEDLE decoction in curative baths
Tyler 1994: Turpentine is known as a counterirritant

pisik shrub (*Cordia curassavica*)
Patio (sown)
LEAF: Tea for mennoraghia (? ✔) during menses or postnatally
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and related species:
Coe and Anderson 1996: FLOWER/LEAF/SAP decoction or juice of crushed parts orally or topically for aches and pains, childbirth/pregnancy, diarrhea, fever, hypertension
Lewis and Elvin-Lewis 1977: *Cordia alliodora*: LEAF/SHOOT has hemostatic properties; pulverized SEEDS as ointment for skin disease
Lewis and Elvin-Lewis 1987: *Cordia* spp.: Used for conjunctivitis, cuts, diarrhea, fever, hepatitis, respiratory congestion, skin ailments, sinusitiis, swollen legs and thrush
Ziock 1894: Cure for rheumatic pain

pisik tree (*Jatropha curcas*)
Patio (sown)
LEAF: Poultice for rheumatism (✔), yukri (✔) or to extract splinter or other foreign object from skin (✎)
Toasted or raw SEEDS: As purgative (✔) and emetic (✔) for stomachache (✔)
Toasted FRUIT: Eaten for diarrhea (✔)
Other uses in this study: Superstition

Regional literature regarding medicinal uses:

Beckstrom-Sternberg, Duke and Wain 1994: Lists 163 ethnobotanical uses for this species, including: diarrhea, purgative, rheumatism, wounds

Bremness 1994: SEED oil as purgative, stops bleeding, applied to burns, herpes, eczema and ringworm; FRUIT contraceptive; LEAF as fever wash

Coe and Anderson 1996: LEAF/SAP decoction orally for diarrhea, fever, vermifuge, venereal disease, purgative, laxative; LEAF infusion along with escoba amarga, *Ocimum micranthum* and reumatis saika or *Piper peltatum* bath for burns

Duke 1981: ENTIRE plant as purgative; LEAVES boiled gently, applied as poultice to external ulcers, taken internally for jaundice; LATEX styptic; cures piles/burns; serves as antiseptic

Johnson 2000: Anodyne, dentifrice, diuretic, emetic, emollient, lactogogue

Lentz 1993: Sap applied to cold sores of mouth

Lewis and Elvin-Lewis 1977: SEED/SEED OIL purgative; stem as chew stick

Morton 1981: LEAF poultice on abdomen for stomachache, decoction treats venereal disease

Rabella and Pallais 1994: LATEX: Unspecified medicinal properties

Robineau 1991: SAP rubbed in mouth for candidiasis, topically for burns, orally for asthma; oral LEAF decoction for abdominal pain, gas, liver disorders; fever, antivenereal, purgative; LEAF juice for cataracts, abscesses, wounds

plang (*Cecropia peltata*)

Forest Edge (wild)/Home Garden (sown)

Macerated BARK/young LEAVES: Cold decoction for bloody diarrhea (?✓)

LEAF bud: Boiled and drunk for diarrhea (not bloody) (✓)

Young, mashed LEAVES: Bathe with and tie to head for headache (✓)

Other uses in this study: Superstition

Regional literature regarding medicinal uses for this and other species:

Barrett 1994a: LEAF for "bad belly", diarrhea, fever, headache, liver; to "wash out the babies"; "best cure for the gastro"

Coe and Anderson 1996: LEAF decoction orally for aches, pains, fever, digestive problems, menstrual disorders and associated hemorrhage

Comerford 1996: Boiled LEAF bath for rheumatism; RESIN on bite for leishmaniasis

Elsberg, Blanco and Rodriguez 1992: For dolor de vientre and arthritis; LEAF syrup (boiled in water with syrup) daily for cough and catarrh; BARK decoction with marañon BARK taken daily for diarrhea

Kricher 1989: Antifungal activity; tannins highly concentrated in young leaves, decreasing in older leaves

Lentz 1993: FLOWER BUD tea to ease the pain of childbirth

Lewis and Elvin-Lewis 1977: Milky JUICE as wart remover

Morton 1981: Young SHOOT decoction as mouthwash for toothache; LEAF decoction for sore throat

platano (*Musa x paradisiaca*)

Home Garden (sown)

FRUIT: Boil and drink juice as tonic for the aged (✓); grate while green, mix with fat and put on sore area for mumps or tonsillitis (?✓)

Other uses in this study: Edible

Regional literature regarding medicinal uses for this and other species:

Barrett 1994a: For stomach pain
Coe and Anderson 1996: LEAF decoction orally for aches, pains, fever, digestive, menstrual disorders and associated hemorrhages; freshly cut branch SAP for burns
Duke 1981: *Musa* spp.: JUICE SAP alexeritic, on snakebite, chronic sores; SEEDLING JUICE ingested for strength; infants bathed in it; Numerous internal and external applications using various parts of the plant (including ROOT, YOUNG LEAVES, FLOWERS, BARK and ASHES)
Lewis and Elvin-Lewis 1977: JUICE from junction of branch and "stem" for toothache relief
Morton 1981: Infusion of LEAF decoction on inflamed gums; Panama: PSEUDOSTEM sap as strengthening tonic
Robineau 1991: LEAF decoction for inflammation, colds, cough; FRUIT pulp broth for weakness
Smith, et al. 1992: GREEN PLANTAIN to treat stomach ulcers (an active ingredient in plantain stimulates cell growth in the stomach lining)

prakprakya (*Desmodium incanum*)
Common Areas (wild)
Cold water LEAF infusion: Sipped for stomachache (? ✓)
Mashed LEAF: Put on snakebite wound to extricate tooth (✐)
Parched LEAF: Put on big cut (✓)
ENTIRE plant: Tea for tumor (✐), cough (✐); tea for excessive menstrual/ postnatal bleeding/cramps (? ✓)
Grated ROOT: Tea drunk and tied to wound for snakebite (✐)
Mashed LEAF or toasted, ground SEEDS: Put on festering sores (✓)
LEAF: Tea for palpitations (✐), nerves (✐); rub on area for bumps (?✐), bruises (?✐); juice on wounds (✓)
Other uses in this study: Superstition
Regional literature regarding medicinal uses for this and a related species:
Coe and Anderson 1996: Oral ROOT decoction for malaria, sexually transmitted diseases; LEAF/ROOT decoction orally for aches, pains, fever, infections, rashes, sores
Dennis 1988: LEAVES crushed and applied as poultice to wounds
Elsberg, Blanco and Rodriguez 1992: Three ROOTS (can also add LEAVES) boiled in one liter water, drink one glass thrice daily for renal infections
Foster and Duke 1990: *D. nudiflorum*: ROOT tea as bath for cramps
Morton 1981: PLANT decoction for hemostat, bleeding wounds, menorrhagia/accompanying pains, colds

pukru (*Pachira aquatica*)
Forest Edge/Fields (wild)
BARK: Put on bad cuts (? ✓), broken bones (✐); boiled and juice put on sores on foot (✓); sun-dried and steeped in water for anemia (✓)
Other uses in this study: Construction
Regional literature regarding medicinal uses for this and related genera:
Coe and Anderson 1996: BARK decoction orally for diarrhea, skin rashes or sores, anemia, tonic
Duke 1981: SEEDS as narcotic; BARK as diabetes cure

Lewis and Elvin-Lewis 1977: *Ochroma* sp.: WOOD used to make toothpick; many chew stick plants have antibacterial properties; *Bombax* spp.: As tonic and aphrodisiac; hemostatic properties
Morton 1981: Guatemala: New SHOOTS, BARK, young FRUITS treat liver ails; Panama: BARK decoction antidiabetic; SEEDS narcotic

pyuta saika (*Drymaria cordata*)
Common Areas (wild)
Mashed LEAVES: As a wrap for snakebite (✔)
ROOT/LEAVES: Abdominal rub, sip LEAVES in cold water to induce labor (✏)
ROOT: Tea for vaginal discharge/flujo (✏)
Other uses in this study: Superstition
Regional literature regarding medicinal uses:
Coe and Anderson 1996: ENTIRE decoction orally or topically for aches and pains, respiratory/pulmonary disorders
Dennis 1988: Macerated as poutlice for snakebite and as eye medicine
Duke 1981: LEAVES as blood purifier
Johnson 2000: Emollient
Morton 1981: Sudorific; blood purifier; asthma; roasted PLANT fumes inhaled for headache
Wiersema and Leon 1999: Unspecified medicine

rahstima (*Chamaecrista diphylla*)
Fields (wild)
LEAVES: For mouth/lip sores (✏); dirty tongue (thrush) (✏)
Other uses in this study: None; exclusive medicinal
Other uses in this study: No medicinal literature found.

raiti tangni (*Catharanthus roseus*)
Patio (sown)
FLOWER: Tea for heart palpitations (✔)
Other uses in this study: Superstition, Ornamental
Other uses in this study: Superstition, Ornamental
Arvigo and Balick 1993: LEAFY STEM tea for diabetes, menopause, high blood pressure
Comerford 1996: LEAF tea as abortive
Johnson 2000: Emetic; emmenogogic; hemostat; leukopenic; sedative
Lewis and Elvin-Lewis 1977: For mild hypertension
Wiersema and Leon 1999: Source of vinblastine and vincristine

reumatis saika (*Philodendron hederaceum*)
Bush (wild)
LEAF ONLY: Rubbed on and tied to sore area for rheumatitis[70] (✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and other species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: Testicular and joint tumors

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[70] Must be sure not to get any of the pedicel into the medicine or "it will burn" (Willy Molina/Haulover).

Coe and Anderson 1996: LEAF/STEM decoction orally and poultice for snakebite
Lewis and Elvin-Lewis 1977: *Philodendron* sp.: LEAF juice with soap for eczema

romero (*Rosmarinus officinalis*)
Purchased
LEAVES: For mennoraghia (?✎); tea and bath for refrio de vientre (?✎) and cramps (?✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Chow 1992: An ingredient in a remedial bath for migraines
Duke 1997: Tea for pain relief and relaxation
Johnson 2000: Astringent; carminative; diuretic; emmenogogic
Lewis and Elvin-Lewis 1977: Oil extract from fresh FLOWER tops as carminative and for nervous headache; expectorant; ENTIRE plant tea relieves nervous headache
Morton 1981: PLANT decoction abortifacient, promotes sterility, regulates menstruation
Tri-Light 2000: Treats headaches; soothes upset stomach; muscle stimulant; soothes irritated nerves

rosa (*Hibiscus rosa-sinensis*)
Patio (sown)
ROOTS or LEAVES and FLOWER: As beverage to induce labor (? ✔)
LEAVES and FLOWER: Cold infusion to induce labor (? ✔)
LEAF: Bath for nausea (✎); juice in eyes for blindness in old people (?cataracts) (? ✔)
FLOWER: Cooled tea as remedy for stomachache (?✎)
Other uses in this study: Superstition, Ornamental
Regional literature regarding medicinal uses for this and other species of this genus:
Arvigo and Balick 1993: LEAF and FLOWER tea for postpartum hemorrhages, miscarriage preventative, antimennorhagic
Beckstrom-Sternberg, Duke and Wain 1994: Numerous medicinal applications, including: Abortifacient, anodyne, antidote, eye, labor, laxative and ophthalmia
Coe and Anderson 1996: *Hibiscus* sp.: Oral FLOWER/LEAF decoction for fever, respiratory/pulmonary; oral BARK/LEAF decoction for childbirth/pregnancy, fever, constipation
Johnson 2000: Abortifacient; anodyne; aperient; cicatrizant; demulcent; dentifrice; emmenogogic; emollient; expectorant; pectoral
Morton 1981: Panama: FLOWER infusion as eye lotion/wash for inflamed eyes

san diego (*Tagetes erecta*)
Patio (Sown)
LEAVES: For epilepsy[71] (✏), asthma (? ✔), fever (✔), hangover (✏), lightheadedness (? ✔), nerves (? ✔)
Other uses in this study: Ornamental, Superstition
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: FLOWER tea for fever, infant colic, gastric pains, flatulence; ENTIRE plant boiled as bath for malaise, colic, diarrhea, fever, colds, flu, sores, abscesses, cuts, wounds; stimulant
Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal applications including anodyne, bronchitis, fever, muscle, respiratory and stimulant
Comerford 1996: Boiled LEAF bath for aches; crushed LEAF juice taken for intestinal worms
Fey and Sindel 1988: Well-mashed LEAVES with those of culantro and *Ocimum micranthum* smeared on entire body of feverish person at bedtime
Johnson 2000: Anodyne; carminative; emmenogoge; respiratory ailments
Lentz 1993: Crushed leaves mixed with chicken fat placed in ear for earache
Morton 1981: FLOWER decoction taken for stomachache; PLANT decoction as stimulant; FLOWER syrup ingested for respiratory complaints

scroph II (*Lindernia crustacea*)
Common Areas (wild)
LEAVES: Rubbed on stomach for overdue baby (✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No similar uses found.

sedge I (*Rhynchospora cephalotes*)
Common Areas (wild)
ENTIRE plant: Tea for bloody discharge unrelated to menses (✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No medicinal literature found.

sedge II (*Cyperus luzulae*)
Common Areas (wild)
ROOT: As tea and topical application for likia (? ✔), gonorrhea (? ✔)
Other uses in this study: Superstition
Regional literature regarding medicinal uses for this and species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: *Cyperus* spp.: Numerous medicinal applications including alterative and leucorrhea
Johnson 2000: *Cyperus* spp.: Anodyne; diuretic; emmenogogic; lactogogue
Lewis and Elvin-Lewis 1987: For heavy or prolonged hemorrhaging, female contraceptive (permanent/reversible), parturition and postpartum recovery

sepol (unidentified)
Home Garden (sown)
LEAF: Drink cold infusion for fever (✏), bronchitis (✏)

[71] "Won't have anymore - for life" (Anelia Zacarías/Tuapi).

CREAM (Store-bought): With dog's tongue as rub/poultice for back pain (✐); with *tuktukya* III, pico de pájaro and hierba buena as rub/poultice for inflammation (✐); with culantro and albahaca as neck rub for earache (✐); with san diego, pico de pájaro, culantro, lengua de gallina and coco as rub/poultice on ribs for asthma (✐); with culantro as tea for cough (✐)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses: No similar medical uses are found with this common name.

shrub II (*Hydrolea spinosa*)

Patio (wild)

Mashed LEAVES: Put on itchy spots (like measles eruptions) (✐)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses: No similar uses found.

siaya (*Miconia ciliata*)

Bush (wild)

BERRY: For mouth sores/dirty tongue (? ✔)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses for an unknown species in the genus:

Coe and Anderson 1996: *Miconia* sp.: LEAF decoction topically for skin rashes or sores

siaya tangni (*Tibouchina aspera*)

Bush (wild)

ROOTS: Cook with tumtum I and drink for mennoraghia (✐)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses: No similar medical uses.

sina (*Senna* sp.)

Market (?sown/wild)

LEAVES: As tea for powerful purgative (? ✔)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses for this and a close relative:

Duke 1981: *Cassia fistula*, *Senna alata* and *S. occidentalis* are purgatives

Johnson 2000: Contains tannins (known anti-diarrheal agent)

sirang saika (unidentified)

Common are (wild)

LEAF: Bathe for nerves (?✐)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses:

Marx and Heath 1992: Defines "sirang saika" as a remedy for heart palpitations and nerves

sironcontil (*Senna alata*)

Patio (sown)

LEAVES: For jaundice/kidney problems (✔), bites (? ✔), purgative (✔), festering sores (✔), rashes (? ✔)

ROOTS as purgative (✔), kidney problems (✔), infertility (✔), body aches (? ✔)

Other uses in this study: Superstition, Ornamental

Regional literature regarding medicinal uses for this and a related genus:

Arvigo and Balick 1993: For female infertility: Mashed ROOTS soaked in anís liquor for five days taken daily for ten days before onset of menstruation

Barrett 1994a: FLOWER, LEAF and ROOT for fever, liver, kidneys, "pressure", skin disease; purgative, "to cool [or] clean out the inside" (p.19)

Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, stomachache, antidote, bactericide, snakebite, bronchitis, constipation

Chow 1992: Tea with guapinol and *Costus villosissimus* for renal ailments

Coe and Anderson 1996: LEAF decoction/juice/poultice to treat athlete's foot ("Ground Itch"); FLOWER/LEAF decoction/juice as bath, orally and topically for diarrhea, fever, digestive, hypertension, infection, vermifuge, tonic, anemia, purgative/laxative

Dennis 1988: LEAVES crushed/rubbed on areas infected with ringworm; crushed in rag and juice squeezed onto athlete's foot; ROOT boiled/liquid as tea for stomachache; abortifacient

Duke 1981: For snakebite, venereal disease; LEAVES anthelminthic, fungicidal, insecticidal; ROOTS treat rheumatism, stomachache

Elsberg, Blanco and Rodriguez 1992: For hepatitis/liver problems, as purgative for upset stomach ("dirty insides"); LEAF infusion with wandering jew or dormilona leaves in water taken daily for kidney problems or urinary infections until better; rub on skin infections ("carate" and welts)

Lewis and Elvin-Lewis 1977: ROOT as purgative; LEAF juice for snakebite, on skin as antibiotic; *Cassia laevigata*: ENTIRE plant as menses promoter

Morton 1981: LEAF juice for bites (snake and chigger); ROOT decoction for stomachache, rheumatism and womb/uterus complaints

sirpi (*Polypodium* sp.)

Bush (wild)

ENTIRE: For liver pain/problems (? ✔), fever (? ✔), nerves (? ✔) and heart palpitations (? ✔)

LEAVES: For stomach problems (✎), coagulant (✎), cough (? ✔), refrio (? ✔), infected wounds (✎), pus-filled/bloody skin eruptions/infections (?✎)

Other uses in this study: Superstition

Regional literature regarding medicinal uses for fern taxa:

Coe and Anderson 1996: *Pityrograma* sp.: Oral/topical LEAF/ROOT decoction/infusion for fever, hypertension, respiratory/pulmonary disorders

Johnson 2000: *Polypodium* spp.: Analgesic

Lewis and Elvin-Lewis 1977: *Oleandra* sp.: Stipe as menses promoter

Morton 1981: *P. asplenifolium*: Cuba: Sweetened FROND decoction as lukewarm beverage, taken on an empty stomach treats liver problems; FROND tea (Argentina) or FROND/ROOT decoction reduced to syrup (Haiti) as deobstrunt for liver inflammation following malaria; *P. polypodioides*: Puerto Rico: Decoction of dried LEAVES as blood tonic; FROND infusion lowers blood pressure; Cuba: PLANT infusion for liver ailments; heart strengthener; Argentina: decoction for coughs and fever

soft elephant's ear (*Elephantopus mollis*)

Fields (wild)

LEAF: Macerated, juice put in ear for earache (? ✔)

Other uses in this study: None; exclusive medicinal

Regional literature regarding medicinal uses for this and a related species:

Coe and Anderson 1996: LEAF decoction taken orally for respiratory/pulmonary problems; *E. spicatus*: LEAF decoction taken orally for aches, pains, respiratory/pulmonary problems and as vermifuge
Johnson 2000: Astringent; tonic

sorosil (*Momordica charantia*)
Bush (wild)
LEAF: Tea for infertility (✔), irregular period (✔), matrise problems (✔) and high blood sugar (✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Barrett 1994a: LEAF for stomachache, to build up/strengthen/clean blood, childbirth, cold, cough, diabetes, skin disease
Chow 1992: Drink LEAF juice plus limon agrio, *Acacia* sp. and marañon LEAVES to control cholesterol levels
Coe and Anderson 1996: LEAF decoction to treat malaria/fever, aches/pains; fungal infections, scabies and dandruff; LEAVES/STEM boiled as tonic for promoting appetite and purifying blood; hypertension and diabetes
Duke 1981: LEAF tea as febrifuge; green FRUITS tea as febrifuge and emetic; ?JUICE as malaria preventative; PULP powdered ENTIRE for leprosy and malignant ulcers; LEAF/FRUIT SAP for colic and worms
Duke 1997: Powdered/cooked GOURD to control diabetes
Elsberg, Blanco and Rodriguez 1992: LEAVES and ENTIRE for dolor de vientre, diabetes, cough, anemia, spleen problems and pain; LEAVES or ENTIRE boiled in water taken daily for fever; LEAF rub for skin ailments
Johnson 2000: Abortifacient; aphrodisiac; emmenogogic; fatal poison; laxative
Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity; near mature FRUIT is pickled in alcohol and used like cough syrup
Morton 1981: Fresh/dried VINE decoction taken regularly before childbirth prevents miscarriage, taken before and after childbirth "to clean out" (p. 893), antidiabetic; PLANT decoction as blood tonic

spiny amaranth (*Amaranthus spinosus*)
Patio (wild)
ENTIRE plant: Vapor from hot infusion inhaled for headache (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Boil, bronchitis, colic, diuretic, dyspnea, eczema, emmenagogue, emollient, enema, eruption, expectorant, fever, gonorrhea, inflammation, lactogogue, menorrhagia, nausea, pile, snakebite, snuff, sudorific, tumor
Johnson 2000: Diuretic; expectorant; lactogogue
Morton 1981: Central America: ENTIRE plant decoction as bath for fever

sukling waika (unidentified fungus)
Bush (wild)
ENTIRE: For chloasma (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses: No medicinal uses found associated with this common name.

sundew (*Drosera capillaris*)
Marshes (wild)
ENTIRE: For chloasma (✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for close relatives:
Duke 1997: *Drosera* spp.: FRESH plant applied to bunions, corns, warts
Foster and Duke 1990: *D. rotundifolia*: Tea/tincture for dry, spasmodic coughs, asthma, chronic bronchitis; Poultice/plant JUICE on warts/corns
Johnson 2000: *D. rotundifolia*: Alterative; demulcent; diuretic; expectorant
Lewis and Elvin-Lewis 1977: *Drosera* sp.: ENTIRE plant decoction for toothache relief; counterirritant

swim kiama (unidentified fungus)
Bush (wild)
ENTIRE: Many mushrooms in a cloth are beaten to extract powder, which is applied to machete wound for three days in a row[72]
Other uses in this study: Edible
Regional literature regarding medicinal uses: No medicinal uses found associated with this common name.

syngonium (Syngonium podophyllum)
Bush(wild)
LEAF: Tied on to area where have lump or bump (?✎)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for close relatives:
Arvigo and Balick 1993: *S. podophyllum*: LEAF as warm wash for skin conditions, sores, dry skin, fungus, itching, rashes, bruises; LEAVES in alcohol, sunned for week as rub for rheumatism, arthritis, pains and swellings
Coe and Anderson 1996: *Xanthosoma* sp.: As topical for skin rash/sore
Comerford 1996: *S. podophyllum*: Boil LEAVES in water, bathe for rheumatism
Lewis and Elvin-Lewis 1977: *Philodendron* sp.: LEAF juice with soap for eczema

tamarindo (*Tamarindus indica*)
Home Garden/patio (sown)
LEAF tea: For high blood pressure (? ✔)
FRUIT juice: Beverage for chicken/small pox (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Coe and Anderson 1996: Oral BARK/FLOWER decoction for infections, purgative and laxative
Duke 1981: Numerous medicinal uses, including: BARK as tonic, alexeritic, antiseptic, cardiac, febrifuge, blood purifier; SEEDS, depurative, suppurative; LEAF suppurative
Johnson 2000: Abortifacient; anthelminthic; carminative; diuretic; lenitive

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[72] It is cautioned, however, that this might cause an infection, so it is best to go to a medical doctor.

Lewis and Elvin-Lewis 1977: FRUIT pulp as laxative
Morton 1981: LEAF decoction for measles
Robineau 1991: LEAF and STEM for chicken pox; oral LEAF, FRUIT or BARK decoction for jaundice; PULP and LEAF anti-influenza, antidiabetic

tatahku (*Mikania scandens*)
Bush (wild)
LEAVES: Tea for hiccups (✐); macerated in water as emetic (✐) and for snakebite (? ✔) or bad cut (✔)
Other uses in this study: Additional
Regional literature regarding medicinal uses for this and related species:
Coe and Anderson 1996: *Mikania* sp.: Oral/topical LEAF/STEM/ENTIRE decoction/poultice for aches/pains, snakebite remedy, skin rashes/sores
Dennis 1988: *M. micrantha*: LEAVES crushed in rag/applied as poultice to snakebite (especially fer-de-lance) wound and tea drunk
Duke 1981: *M. guaco*: reported snakebite remedy
Fey and Sindel 1988: *M. micrantha*: Stops bleeding wound, mash LEAVES and tie to wound with clean cloth.
Johnson 2000: *M. micrantha*: Hemostat; styptic
Johnston and Colquhoun 1996: *M. hookeriana*: Malaria, snakebite, syphilis, skin ulcers, indigestion
Tweedy 1953: LEAVES crushed and held against the roof of the mouth by the tongue to stop nosebleeds; infusion administered one teaspoon at a time (NO MORE THAN THREE TOTAL!) for hemorrhage

ti (*Cymbopogon citratus*)
Home Garden (sown)
LEAF tea: For fever (✔), headache (✔), cold (✔), cough (✔), bleeding from tooth extraction (? ✔)
Tea from ENTIRE plant: For mennoraghia (✐) or cramps (? ✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Mashed ROOT soaked in unspecified oil and rubbed on area for backache, muscle spasms, headache
Barrett 1994a: LEAF for stomach pain, colds, cough, fever, and "pressure"
Beckstrom-Sternberg, Duke and Wain 1994: Numerous meidicnal uses including headache, cold, cough, emmenagogue, fever, flu, gingivitis
Bremness 1994: LEAF treats diarrhea, stomachache, headache, fever, flu; OIL treats athlete's foot, acne, as spray reduces airborne bacteria
Coe and Anderson 1996: LEAF/ROOT infusion orally/topically as digestive, respiratory/pulmonary problems; LEAF decoction with limon agrio for fever
Elsberg, Blanco and Rodriguez 1992: LEAVES for dolor de vientre; LEAVES boiled in water, drink one glass two to three times a day for fever
Fey and Sindel 1988: Boil ROOTS with those of limon agrio and *Piper auritum* together in water with dried banana leaves as lid, breathe steam from four pots placed in front of patient after 6 p.m. for four straight days for cold
Johnson 2000: Carminative; dentifrice; diaphoretic; diuretic; expectorant
Morton 1981: Numerous medicinal uses, including: LEAF (often with ROOT) infusion as sudorific, cold, tuberculosis remedy; RHIZOME decoction as mouthwash for infected gums; boiled ENTIRE plant with the dirt on the ROOT diuretic for babies and for adult stomach/bowel pains

tobacco (*Nicotiana tobacum*)
Purchased
Macerated LEAVES: For chloasma (✎)[73]
Other uses in this study: Superstition
Regional literature regarding medicinal uses:
Coe and Anderson 1996: For fungal infections, scabies and dandruff; LEAF oral/topical for aches/pains, bites/stings
Comerford 1996: Crushed LEAVES on wounds; with Vick's VapoRub on children's chest for coughs; heated with fat on forehead for headache
Duke 1981: Green LEAVES in stews; as leggings to ward off snakebite
Johnson 2000: Anthelminthic; anticonvulsive; bee-sting, centipede, scorpion and spider antidote; central nervous system stimulant; dentifrice; diaphoretic; discutient; diuretic; emetic; fatal poison; hemostat; laxative
Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity; Crushed LEAF put on carious teeth; stimulant
Morton 1981: Chewed leaves on insect bites and to remove ticks
Wiersema and Leon 1999: Unspecified medicine

toronja (*Citrus paradisi*)
Home Garden (sown)
LEAF tea or FRUIT juice: For high blood pressure (✔)[74]
FRUIT peel tea: For low blood pressure (?✔), fever (✔) and malaria (✎)
Other uses in this study: Edible
Regional literature regarding medicinal uses for this and a related species:
Coe and Anderson 1996: FRUIT juice orally for diarrhea, fever, hypertension
Lewis and Elvin-Lewis 1977: *C. sinensis*: Dried FRUIT peel: Stimulating tonic

tree of life (*Bryophyllum pinnatum*)
Bush (wild)
Macerated or seared LEAVES: For headache (✔), joint pain (✔), inflammation (✔), high fever (✔), malaria (?✔) and earache (✔)
Other uses in this study: Household
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: LEAF decoction taken for cough, colds, sore throat, flu, weakness, as bath for swellings, sprains and bruises; mashed leaf on forehead for headache, with castor oil as rub on breast for mastitis
Coe and Anderson 1996: LEAF with escoba lisa mixed with clove oil massaged on stomach to facilitate delivery; crushed LEAF/BARK decoction for headache; for burns, respiratory/pulmonary disorders
Comerford 1996: Mashed LEAVES on skin infections or aches
Duke 1981: LEAF decoction emollient, hemostatic, vulnerary, good for ulcers/boils

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[73] Tobacco may seem effective against chloasma simply because the dark juice tints the lightened areas a darker color.

[74] There is also a belief that drinking toronja juice after having worked in the hot sun will cause sunstroke (Salvador Perez/Karatá).

Elsberg, Blanco and Rodriguez 1992: Mashed LEAVES applied to head for headache; add salt or reduce to syrup with leaves of aguacate and *Crescentia cujete* plus juice of one lemon boiled in water with sugar and honey, taken daily for respiratory infections (incl. bronchitis) and catarrh
Morton 1981: Heated LEAF juice in aching ear; crushed LEAF for head pain
Robineau 1991: Many medicinal uses, including LEAF applied for earache, migraine; LEAF analgesic, febrifuge and anti-inflammatory

tuktukya II (*Physalis angulata*)
Bush (wild)
Macerated LEAF: For toothache (✐)
ENTIRE plant: Macerated for pain (?✐) or inflammation (?✐)
Other uses in this study: Superstition
Regional literature regarding medicinal uses for this and other species of this genus:
Coe and Anderson 1996: LEAF/ENTIRE infusion orally for fever, malaria
Johnson 2000: Antidote; diuretic; *Physalis* sp.: Analgesic; emetic
Lewis and Elvin-Lewis 1987: *Physalis* sp.: Used to treat measles, skin ailments and infections
Morton 1981: Crushed PLANT infusion for liver inflammation

tuktukya III (*Physalis pubescens*)
Bush (wild)
Macerated LEAVES: For inflammation (?✐) or the bite of the black hairy caterpillar (?✐)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and related species:
Johnson 2000: *Physalis* sp.: Analgesic; antidote; emetic
Lewis and Elvin-Lewis 1987: *Physalis* sp.: Used to treat measles, skin ailments and infections
Morton 1981: LEAF juice in ear for earache; ROOT for toothache

tumtum I (*Nymphaea odorata*)
Marshes (wild)
Cooked ROOT/and FLOWER/or STEM (with siaya tangni): Drink for mennoraghia (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Anodyne, antiseptic, bruise, demulcent, sore, tumor, wound
Johnson 2000: Antiseptic; demulcent; eyewash
Foster and Duke 1990: ROOT tea for coughs, tuberculosis, inflamed glands, mouth sores, bowel problems; stops bleeding; poultice for swelling; JUICE mixed with lemon juice to remove freckles/pimples

tumtum relative C (*Sagittaria lancifolia*)
Marshes (wild)
ROOT: Use "milk" on face for pimples (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this species and members the family:
Beckstrom-Sternberg, Duke and Wain 1994: Corn, vesicant
Lewis and Elvin-Lewis 1977: *Alisma* sp.: ENTIRE as diuretic

Morton 1981: Cuba and Haiti: Crushed, fresh LEAVES or RHIZOMES rubbed on sciatica and on cheek for toothache (may blister skin if left on for more than 3 hours); Crushed LEAF poultice on infected sore, chronic itch and snake or insect bites

uva del mar (*Coccoloba uvifera*)
Home Garden (sown)
LEAF tea: For diarrhea (✔)
ROOT tea: For stomach ulcer (bleeding) (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Coe and Anderson 1996: BARK/LEAF decoction orally for diarrhea, digestive problems, skin rashes/sores
Duke 1981: BARK tannin for diarrhea
Lewis and Elvin-Lewis 1977: BARK extract as powerful astringent for diarrhea
Morton 1981: WOOD decoction halts hemorrhage; FRUIT halts diarrhea

vine I (*Ipomoea setifera*)
Bush (wild)
ENTIRE plant: Macerate for coagulant (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for related species:
Beckstrom-Sternberg, Duke and Wain 1994: *Ipomoea* spp.: Hemostat
Coe and Anderson 1996: *I. batatus*: LEAF decoction topically for cuts/hemorrhages
Lewis and Elvin-Lewis 1977: *Ipomoea* sp.: Purgative; BARK snakebite remedy
Wiersema and Leon 1999: *Ipomoea* spp.: Source of a drug called jalap

vine II (*Calopogonium mucunoides*)
Bush (wild)
STEM (without leaves, seeds and flowers): Tea for back pain (✏)
ROOT: Tea for irregular/unusual period (✏)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses:
Beckstrom-Sternberg, Duke and Wain 1994: Debility, filariasis (infestation with filarial worms in the blood)

vine III (*Cissus erosa*)
Bush (wild)
LEAF: Softened and put on head for headache (? ✔)
Other uses in this study: None; exclusive medicinal
Regional literature regarding medicinal uses for this and other species of the genus:
Beckstrom-Sternberg, Duke and Wain 1994: *C. sicyoides*: (Haiti) headache
Morton 1981: Leafy STEM decoction for kidney ails; externally as lotion to "ripen" tumors

wain (*Hibiscus sabdariffa*)
Home Garden (sown)
LEAF: Boiled, vapor breathed for chest pain (?✏) or refrio (✔)
Other uses in this study: Edible

Regional literature regarding medicinal uses:

Coe and Anderson 1996: FLOWER/LEAF decoction orally for diuretic, respiratory/pulmonary disorders and tonic

Duke 1981: SEEDS demulcent, diuretic, tonic; for debility, dyspepsia, dysuria

wandering jew (*Tradescantia zebrina*)

Patio (sown)

LEAF: Tea for headache (✓) and stomachache (?✓)

Other uses in this study: Ornamental

Regional literature regarding medicinal uses for this and other species of this genus:

Barrett 1994a: LEAF for the blood, pain and to purge; boiled with *Ocimum micranthum* and bayvine for kidneys

Beckstrom-Sternberg, Duke and Wain 1994: *Tradescantia* spp.: Dysentery, hemostat

Coe and Anderson 1996: ENTIRE decoction orally for diarrhea, digestive problems, respiratory/pulmonary disorders

Elsberg, Blanco and Rodriguez 1992: Infusion of handful LEAVES plus sironcontil or dormilona LEAVES in one liter water, drink one glass three times a day for kidney problems or urinary infections

Morton 1981: Cuba: LEAF and STEM decoction reduced and taken three times per day to relieve flatulence, colitis; ROOT and LEAF tea for hypertension

yuca (*Manihot esculenta*)

Home Garden (sown)

TUBER cooking water: Drink for diarrhea (child or adult) (✓) or joint pain (✓)

Dried, powdered LEAVES: Make into drink for diarrhea (✓)

Other uses in this study: Edible, Household, Additional

Regional literature regarding medicinal uses:

Barrett 1994a: LEAF, ROOT or STARCH used variously for stomach pain, diarrhea, fever, headache

Beckstrom-Sternberg, Duke and Wain 1994: Abscess, diarrhea, et al.

Coe and Anderson 1996: LEAF/ROOT decoction orally for aches/pains, diarrhea, fever

Duke 1981: STARCH/FLOUR spoonful in water for diarrhea; stewed LEAVES applied to tumors; STEM LATEX eye drops for conjunctivitis

Elsberg, Blanco and Rodriguez 1992: TUBER for headache; grated to starch, add water and juice of one lemon and take daily for diarrhea; add alcohol or vinegar to starch and rub on sides and head for fever

Johnson 2000: Demulcent; diuretic

Morton 1981: Dried, pulverized TUBER as enema for diarrhea; STARCH as eyewash for inflammation

yul kyama (*Psychotria tomentosa*)

Fields (wild)

Macerated LEAVES applied to skin infection (?✓)

Other uses in this study: Superstition

Regional literature regarding medicinal uses for this and related species:

Arvigo and Balick 1993: *P. acuminata*: LEAVES to bathe skin conditions, rheumatism, insomnia, headache, swellings, bruises; *P. tenuifolia*: Mashed LEAVES as poultice for infected sores

Lewis and Elvin-Lewis 1977: LEAF as menses promoter; *Psychotria* spp.: Many spp. of this family used as chew sticks (dentifrice); many chew stick plants have bactericidal properties; SAP decoction for mouth sores; LEAF for snakebite, insect bites
Morton 1981: FRUIT crushed in water and applied to thrush

zinza (*Zingiber officinale*)
Patio (sown)/Bush (wild)
Inner ROOT: Tea for sore throat (✔), expectorant (✔), upset stomach (✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses:
Arvigo and Balick 1993: Grated ROOT tea for stomachache, gas pains, indigestion; chew fresh ROOT for quick relief of stomach upsets, nausea, vomiting; cloth soaked in ROOT tea placed over sore area for muscle aches, menstrual cramps; grated ROOT poultice on chest for bronchitis
Barrett 1994a: RHIZOME for stomach pain, cough, fever, gas and sore throat
Beckstrom-Sternberg, Duke and Wain 1994: Numerous medicinal uses, including stomachache, anodyne, digestive, dyspepsia, expectorant, laryngitis, nausea, poison and stomachache
Coe and Anderson 1996: ROOT with canela and *Piper auritum* or *P. peltatum* as tea after delivery; ROOT decoction for stomachache
Duke 1981: ROOTSTOCK tea for pain and colicky children; abortifacient
Duke 1997: Many medicinal uses, including: sore throat, nausea, ulcers
Fey and Sindel 1988: Well-washed ROOT plus that of culantro boiled and taken daily for two days in a row for green diarrhea
Johnson 2000: Anodyne; scorpion antidote; antiseptic; carminative; digestive; expectorant; tonic
Lentz 1993: Ground RHIZOMES tea for cough/cold remedy
Lewis and Elvin-Lewis 1977: Known for hypoglycemic activity; rhizomes as carminative; stimulant
Morton 1981: RHIZOME chewed (Surinam) or decoction (Costa Rica) for sore throat; RHIZOME decoction with milk or water as expectorant (Puerto Rico); RHIZOME decoction for stomach cramps, carminative, digestive aid
Robineau 1991: RHIZOME decoction for vomiting, stomachache, coughing
Tri-Light 2000: As a gargle, temporarily relieves sore throat

zonzapote (*Licania platypus*)
Forests (wild)
BARK: Tea for cholera (?✐)/diarrhea (? ✔)
Other uses in this study: Edible
Regional literature regarding medicinal uses for a related species and the genus:
Beckstrom-Sternberg, Duke and Wain 1994: *L. microcarpa*: Astringent
Coe and Anderson 1996: *Chrysobalanaceae*: BARK/ROOT decoction orally for diarrhea/astringent

Summary of Remedies

A total of 147 medicinal plants (representing 60% of the total plant listing) are documented, for which 573 remedies are described. The most remedies were given for gastrointestinal complaints (actual number 68), aches/pains (62), dermal problems (60), and for obstetric-gynecological use (44). This is a reflection of the móst common ailments or conditions encountered by the general populace. Diarhhea and stomachaches are the chief gastrointestinal complaints. Muscle and joint problems dominate the aches and pains category. Rashes and sores are the predominant dermal complaints. And pregnancy or menses concerns are also of great importance.

Although there were a high number of plants used for obstetric-gynecological purposes, attempts to elucidate plants associated with contraception were eschewed. One midwife admitted that she knew of such a plant but for religious reasons, "...it is a sin to give" (Madelma Regional/Karatá). Another midwife could not offer a botanical treatment but related an old wives tale that burying the placenta in the ground upside down (with the red side up) would prevent future pregnancies (Rosa Lacayo/Lamlaya). Dennis (1988) reported a two-plant contraceptive consisting of "a common bromeliad with the fruit of an epiphytic plant that grows on the bark of the mango tree."[75] Three plants that fit this description were found in this study, including the bromeliad, kitkal (*Tillandsia streptophylla*) and the two epiphytes, sirpi (*Polypodium* sp.) and reumatis saika (*Philodendron hederaceum*), that grow on the bark of old mango trees.

Herbs are the most popular plant form, making up almost 40% of the total plants used in medicinal remedies; less than 30% are trees and less than 20% are shrubs. The lower plant forms, such as ferns and fungi, are rarely used medicinally despite their abundance within the communities and in the bush. In fact, one of the remedies for healing a wound with mushroom powder was then immediately discredited by the informant. It was cautioned that using this remedy might cause an

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[75] These plant parts are boiled together and several cups of the mixture are consumed daily. A heavy vaginal discharge will ensue and seemingly normal periods thereafter, however, the female is infertile (Dennis 1988).

infection, so it was best to go to a medical doctor (Nena Castillon/Lamlaya). Remedies involving mushrooms are also absent from publications for the southern coastal region (Elsberg, Blanco and Rodriguez 1992; Coe and Anderson 1996; Barrett 1994a). One explanation for this disparity may be that mushrooms seem to be associated with supernatural legends. This is explored further in the Chapter 7: Superstition.

By far, the greatest number of medicinal plants in this study belongs to the pea family (Fabaceae), with 21 plants involved in medicinal remedies. This family yielded the largest number of remedies for intestinal disorders, with as many applications for dermal problems. Members of the family were frequently cited for analgesic use in ache and pain remedies. The Fabaceae are known for their highly active tannin content (Lewis and Elvin-Lewis 1977). Tannins act as astringents by binding proteins making them resistant to proteolytic enzymes (Duke 1997; Tyler 1994). Thus, tannin-containing plants are a good choice for treating diarrhea (Coe and Anderson, 1996), the chief intestinal malady encountered in this study. According to Tyler, the astringent action of tannins is also effective against dermal problems. By binding to the surface proteins of the skin, they form a protective barrier against fungal or bacterial invasion. Finally, the analgesic applications seem to be justified due to the presence of bioactive compounds. Most analgesic remedies from the pea family employ pico de pájaro (*Senna occidentalis*) and dormilona (*Mimosa pudica*). Both of these plants contain alkaloids and are often associated with pain relief (Coe and Anderson 1996; Lewis and Elvin-Lewis 1977).

As for individual plants, the most popular are pico de pájaro, escoba lisa (*Sida rhombifolia*) and culantro (*Eryngium foetidum*). These plants were named in remedies the greatest number of times, with 36, 29 and 24, respectively. These plants are not unknown in medicinal botany. The specific uses by Miskitos appears to be consistent with established literature as indicated by the (✔) following each use. However there are a number of novel uses for escoba lisa amongst the Miskito. The corroboration rates of these three plants among the survey participants were also high (pico de pájaro with 53%, escoba lisa with 74% and culantro with 86% corroboration).[76]

The three most popular plants noted in this study were mentioned in another study from the region. Barrett (1994b) compiled a list of the "most used plants" of the general population in five southern coastal communities located within RAAS (the southern autonomous region). Pico de pájaro, escoba lisa and culantro ranked thirteenth, twenty-second and seventh, respectively. In fact, all but four of the plants on Barrett's list are mentioned in this study. This underscores the fact that, while differences exist, similar medicinal plant usage is found throughout the East Coast.

Multi-plant remedies are not the norm. Seventy-four percent of the remedies involve only one plant. Only 17 plants are used exclusively in multi-plant remedies. Some of the multi-plant remedies are part of a pairing system that has been noted in the region and is mentioned in this study. Dog's tongue (*Pseudelephantopus spicatus*) and pyuta saika (*Drymaria cordata*) are "spouses" for fluho (Zoila Velázquez/Wawa) while prakprakya (*Desmodium incanum*) and mozote (*Pavonia schiedeana*) are part of a male/female pairing (Aristan Zacarías/Puerto Cabezas-Bismona).

The principal of mate or partner is known in Miskito as aimia (Dennis 1988), which translates literally as "spouse." For many remedies, the use of each partner is perceived as a necessity to ensure the remedy's efficacy. A few comparisons between

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[76] Corroboration of remedies within this study was obtained at the end of the survey by grouping the specific uses given by the informants. This yielded unsolicited confirmations of medicinal plant usage. Confirmation estimates are conservative because plant uses were compared according to the use given by the informant. For example, a plant may be given as a remedy for both malaria and for fever. Although fever is a symptom of malaria, these are treated as two separate uses and not grouped together as corroborative uses. Despite this conservative method of estimation, a second individual corroborated just under half of the described remedies.

this study and one conducted by Dennis (1988) with Miskito living in the northernmost eastern coastal communities of Nicaragua spurs contemplation regarding this system.

Filiberto Julias (Tuapí) gave an example of the use of such a pairing system. He named two plants for a snakebite remedy: Pyuta saika waintka, "snake remedy male" (lengua de gallina - *Hemidiodia ocimifolia*) and pyuta saika mairin, "snake remedy female" (referenced in this study as "pyuta saika" - *Drymaria cordata*)[77]. Lengua de gallina and pyuta saika were not paired for any other remedies in this study. Both of these plants are mentioned in Dennis' study (only pyuta saika is noted for its use as a snakebite remedy) but there was no mention of the spousal pairing.

Interestingly, both plants have other cures in common in this study, although not in conjunction with each other. Aside from snakebite, they are each used to induce labor and to cure bad spirits. It is possible that, alone, both plants are efficacious but using them together may boost their efficacy. Looking at frequency of usage, lengua de gallina was mentioned for a wider variety of ailments (thirteen in all) and was used singly 62% of the time. In contrast, pyuta saika was mentioned in only four remedies and was used singly only 25% of the time. This points to the possibility that lengua de gallina may contain the compounds principally responsible in the cure and that pyuta saika may act as a synergistic catalyst in the cure.

Another plant pairing, escoba amarga (*Scoparia dulcis*) and algodón (*Gossypium barbadense*), was presented as a remedy for heart trouble (Dennis 1988). While both of these plants were documented in this study, they were neither suggested as partners nor were they given as a remedy for heart trouble. The aimia system

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[77] It is common for plants to be named for the remedy they effect. Therefore, it is possible to have a number of different plants with the same name. This has been noted in other literature from the region (Dennis 1988).

warrants further study to better understand its principles and to adequately determine its effectiveness.

In addition to paired plants, there are a limited numbers of multi-plant remedies that are not part of the aimia system. A total of 17 plants were used exclusively in multi-plant remedies. There were four additional instances where a second plant was mentioned as useful but not required.[78] Albahaca (*Ocimum basilicum*), culantro and pico de pájaro are most frequently used in combination remedies. These three plants are well known for their wide-ranging medicinal qualities (as evidenced by the supporting literature cited in the remedy list). Here again, it is possible that each of these plants contains the principle curative bioactivity in their respective remedies and that the addition of the other plants have a synergistic or augmenting effect.

Alternative treatments were suggested in only seven cases (just over 1% of the remedies). This is also a conservative estimate because there are often multiple remedies for the same illness. For instance, there are 21 different remedies for diarrhea. When asked why there is more than one remedy for diarrhea, one curandero explained that there are "two types. Both are strong. One found here [Bismona], the other on the Coast; both function well" (Cinbilin Ricardo/Bismona). Choice of remedy seemed to be dictated by differences in individual knowledge base (personal preference) and community of origin (due to seasonal and regional differences). A final factor that appears to influence Miskito medicinal practices is the humoral belief system. According to this system, certain objects, foods and drinks are imbued with hot or cold qualities. Cold illnesses are treated with hot remedies and vice versa (Barrett 1993; Elsberg, Blanco and Rodriguez 1992). Documentation from other

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[78] These remedies involve pukru, guanábana, san diego and shrub I as the principal ingredient.

studies indicated that the humoral belief system is followed throughout southeastern Nicaragua (Barrett 1993; Elsberg, Blanco and Rodriguez 1992). Among the Garífuna in the south, beans, seafood, game and sea turtle are considered hot foods and are, therefore, prohibited during treatment for hot illnesses (Coe and Anderson 1996).

Informants in this study provided similar treatment stipulations implying their belief in this humoral treatment system. Names of illnesses and plants often include references to hot or cold: Refrio de vientre means "cold of the uterus." The plant name sirpi (*Polypodium* sp.) is also known as "cold leaf." Methods of remedial administration suggest the existence of this humoral belief system amongst the Miskito, specifically the use of steam baths and hot teas to combat "cold" illnesses and cool body rinses to combat "hot" illnesses. Kristilina Perera (Haulover) mentioned that when drinking iska dura (*Acisanthera quadrata*) for placenta elimination, one should not "wash with cold water - use boiled" or it interferes with the remedy.

The humoral belief system also governs certain actions. As one informant suggested, "If [you are] working in sun a lot or if [you are] angry or work with machines that make your blood rise," you should avoid drinking tamarind juice; tamarind is considered "hot" (Salvador Perez/Karatá). Additional food restrictions are further discussed in the Chapter 7: Superstition, under Restrictions during treatment.

Diagnostic Efficacy

Diagnostic methodology is quite interesting. If a particular treatment does not cure the patient, the treatment itself is not deemed ineffective. Rather, the diagnosis is questioned and the treatment adjusted accordingly.

Zoila Velázquez (Wawa) mentioned that, when using marañon rojo (*Anacardium occidentale*) to treat diarrhea, "if doesn't work, different kind diarrhea. Use plang." Zoila said the same of another treatment using John's Sails (*Hyptis verticellata*) for bad spirits (discussed further in Chapter 7: Superstition). "If don't get better, isn't bad spirits" (Zoila Velázquez/Wawa). Similar statements are made with regard to other remedies in the medicinal chapter. Thomas Mybeth (Lamlaya) gave lili tangni (*Crinum augustum*) to cure stomachache, adding, "If doesn't cure, it was another illness." Finally, regarding a medicine for vaginal discharge (*Cuphea carthagenensis*), Nils Philipe Washington (Karatá) said, "If doesn't cure you, not that sickness."

A similar attitude was noted amongst the Miskito of the southern regions of Nicaragua. The efficacy of treatments was peculiarly dissociated from human error. As Dennis (1981) pointed out, proper treatment depends upon choosing the proper remedial herbs and application method and in following the required restrictions during treatment (discussed below). Efficacy has little to do with the healer's abilities.

Further Thoughts

Medicinal plants, whether novel or established, constitute a large part of the Miskito plant knowledge base. Of the nine categories of plant usage, 60% of the plants have medicinal applications (See Appendix 2) and many are exclusive medicinals. This is an indication that, despite a number of changes experienced there since colonial times and the introduction of western modern medicine, herbal remedies continue to be an important component in the Miskito health care system.

Miskitos' first introduction to a consistent availability of western medicine however only began in 1935 with the opening of the Moravian-built hospital in the village of Bilwaskarma (Coe and Anderson 1996). The next major healthcare advance arrived in the 1980s when state-run clinics were established in a number of communities.[79] Clinics were usually opened on specified days when a visiting nurse

[79] Lamlaya had no clinic as the village lies on the outskirts of Puerto Cabezas and is near to the hospital.

came to the village. Sometimes a nurse's aid from the village also had access to the clinic for emergency purposes (Yunita Fox/Haulover).

There appeared to be a fairly competent child vaccination program. But these clinics seem unable to meet the Miskitos' overall healthcare needs because clinics are poorly stocked and individual health poorly monitored. Clinics rely on more expensive, harder to obtain, man-made medicines. Even the most basic illnesses, such as headache or diarrhea, seemed to go untreated due to poorly stocked and understaffed community clinics. A midwife from Bismona, one of the more remote communities in this survey, stated that plants continued to be important medicines because "there is no way to get other stuff," meaning western medicines (Ledwina Bell Spellman).

Curanderos have a vast store of knowledge ranging from blood-clotting agents to asthma remedies and from tranquilizers to deodorants. Treatment typically costs about C$50[80] for two to three visits, "paid in cash, livestock" (Facundo Johnson/Tuapí), "chickens, or whatever" (Kristilina Perera/Bismona). Moreover, many do not charge for their services if the patient is not cured (Nena Castillon/Lamlaya). Older generations continue to recognize that medicinal plant use is a credible, inexpensive, and convenient alternative to synthetic medicines. To quote one anciano (community elder), "When doctor's pills don't work, plants do," (Jorge Molina/Haulover). It is another healer's opinion that pills often do not work, but plants do. "Leaf pain kaika" – leaves make fine remedies – (Filiberto Julias/Tuapí).

But plant knowledge is in danger of being lost for many reasons. First, for those who can afford and obtain it, pills are more convenient. An informant explained that he "know[s] many plant remedies but does not use, so forgets. People here use pills now. People use more plants in Rio Coco area" (Nils Philippe

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[80] This is approximately equivalent to US$7, in 1994 dollars.

Washington/Karatá). The Church has also had an influence on the use of herbal remedies. The "Church does not look well on bad curanderos" (Nena Castillon/Lamlaya). This aspect is explored further in Chapter 7: Superstition.

Among the younger generations, the attitude toward folk medicine is often one of indifference. Young people regard medicinal plant usage as old-fashioned and quirky. Young adults may turn to curanderos only after consultation with doctors and nurses has proven useless.

This lack of acceptance on the part of young people may be a contributing factor to the lack of curanderos' apprentices. Most of the curanderos in this study had no apprentices. Although the majority (eight out of 13) of the curanderos were 55 years of age or older, only two had apprentices.[81] When asked about apprentices, most curanderos claimed that their sons were not interested and implied that their daughters were not smart enough to learn about medicinal plants. Indeed, two curanderas (female healers) in this study credited their father with their knowledge because of lack of interest on the part of their brothers. This apathy from the sons may be due in part to the fact that men have a wider range of employment – especially the desirable wage-earning jobs - than do women (Nietschmann 1973). Changing occupations, thus, have led to a decline in plant usage. This could also signify the beginning of a shift of medicinal knowledge to the hands of women.

Midwives continue to hold strongly defined and respected roles. According to one informant, community midwifery was supported and encouraged by the government during the Somoza and Sandinista eras. In exchange for their service to the community, midwives were given money, provisions and soap by the government,

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[81] In addition, seven of the 12 grandies are over the age of 56, four of which specify that they do not have apprentices.

and their community provided them with firewood and food. A monetary payment of C$3 to 4[82] was considered optional (Ernestina Lopez Jacobo/Haulover)[83]. Although this barter system was no longer state policy in 1994, both the Nicaraguan government and aide organizations recognized and incorporated traditional plant use practices into their health programs. MINSA (Ministry of Health) doctors routinely visited the East Coast for educational purposes.[84]

Incorporating traditional medicines into training programs lent credence to the practice of using these readily available plant resources. A Haulover midwife recalled a conference held in Honduras, sponsored jointly by the United Nations High Commission on Refugees (UNHCR) and a Honduran non-governmental organization. In addition to conferring equipment (stethoscopes, scales and measuring tapes) to the midwives, a discussion of useful bush medicines validated for the participants that their traditional system of plant usage was important and useful.

Simple inter-community exchange could vastly expand inhabitants' traditional plant-use options. This study revealed that there are differences in plant usage between communities. Some communities may share the same plants but are not aware of the uses being employed in another community. While the ingredients of some remedies are staunchly guarded (Dennis 1988) there is often a willingness to share certain information with other people. Bringing together members from different communities could provide for an information exchange that would benefit everyone.

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[82] This is approximately equivalent to US$0.42 to 0.56, in 1994 dollars.

[83] Today, midwives charge from C$50 (approximately equivalent to US$7, in 1994 dollars) for uncomplicated deliveries to C$200 (US$28). One midwife charges C$150 (US$ 21) for female births and C$200 (US$28) for males. When asked the reason for the price difference, she could not say (Kristilina Perera/Haulover).

[84] A pediatrician interviewed in this survey was giving an instructional seminar to teach better health and nutrition based on commonly used local food plants.

Chapter 3: Edibles

Traditional Fare

Miskito food practices are mentioned in written accounts from the first Europeans to visit the East Coast of Nicaragua.[85] Historical accounts describe the indigenous population of the Miskito Coast as hunter-gatherers, having "no idea of the meaning of agriculture" (Hutton 1922: 326). The Miskito are better characterized as subsistence agtriculturalists, obtaining the majority of their plant-based foods through cultivation and relying minimally on gathering. Moreover, their food choices have remained consistent over the last four hundred years.

Plant-Based Foods

Food is a broad term and, with regard to plants, Miskito eat leaves, fruits, stems, flowers, nuts, seeds, roots, and apical meristem. Late seventeenth century accounts describe the Miskito[86] as subsisting on the readily available edibles in their surroundings as well as "small plantings of bananas [banano - *Musa acuminata*], plantains [platano - *Musa x paradisiaca*], maize [maiz - *Zea mays*] and sugarcane [caña - *Saccharum officinarum*]" (Helms 1971: 15).[87] By the early twentieth century, the list of plants identified as plantation crops had grown somewhat but the familiar staples remained. In addition to maiz, caña and banano, crops included yuca (*Manihot*

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[85] Christopher Columbus first landed on the East Coast of Nicaragua in 1502 (Olivares 2000). Within twenty years, British, Dutch and French privateers and pirates were making regular visits to the East Coast as the maze-like lagoon system provided an ideal hiding and resting place for the pirates between operations. By the 1600s, the East Coast was bustling with trading operations (see Appendix 5: The History of Mosquitia).

[86] At this time, the entire population of Miskito lived in two settlements near the Rio Coco (see Appendix 5).

[87] This is similar to the Sumu, who "are primar[ily] hunters and secondarily shifting farmers. Men hunt and fish, while women cultivate the crops" (Ryan et al. 1970: 68).

esculenta), batata (*Ipomoea batatas*) and dasheen (*Colocasia esculenta* - Mueller 1932). Today, the inventory of modern Miskito plantations has changed little. This basic collection of crops is cultivated today, the only significant addition to this list being arroz (*Oryza sativa*; see also Coe and Anderson 1996; Nietschmann 1973).

Supplementing

The Miskito are by no means vegetarians. "People raise cows and chickens and catch shrimp" (Nena Castillon/Lamlaya) and "people eat lots of fish" (Orlando Budier/Haulover). As in many traditional societies, meat is considered an integral part of every meal. Miskito women are averse to the prospect of cooking a meal without meat (Nietschmann 1973). An ideal meal includes some sort of meat[88] accompanied by "boiled young cassava [yuca], green banana [banano], duswa [quequisque - *Xanthosoma violaceum*],...wabul,"[89] bread and coffee (Nietschmann 1973: 107).

Miskito obtain the bulk of their meat from the sea. The Miskito reputation on the sea has been noted since their first encounters with the British on the Mosquito Coast. Those seafaring skills directly translated into a great ability to hunt at sea. Near the turn of the seventeenth century, Dampier (1681: 7-8) described the Miskito as

> ...very ingenious at throwing the Lance, fisgig (a harpoon with three or more barbed heads), Harpoon, or any manner of Dart, being bred to it from their Infancy...their chiefest employment in their own Country is to strike fish, Turtle or Manatee...For this they are esteemed and coveted by all Privateers for one or two of them in a Ship, will maintain 100 Men.

Miskito are as comfortable at sea as anyone would be walking on solid ground. "People here fish, lots of fish; in summer, shrimp" Orlando Budier (Haulover). In

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[88] The Miskito have an interesting classification system for determining the quality (and, therefore, desirability) of meat. See Nietschmann (1973:104) for more information.

[89] Wabul is a thick porridge. See the "Preparation Techniques," later in this chapter and Glossary 8: Recipes.

addition to catching turtle and shrimp,[90] Miskito round out their diet with subsistence fishing, hunting small mammals, keeping pigs and chickens, and marginal cattle raising (see also Helms 1971; Nietschmann 1973; Ryan, et al. 1970).[91]

Finding the Food

The communities in this study obtained their plant-based food in three ways: gathering from the wild, cultivation of small plots and procurement from markets or local sources. Of these three options, the communities surveyed secured the bulk of their food through cultivation. Collection from the wild and procurement from markets were supplemental options. These three methods of food acquisition, along with postulates as to their levels of usage, are discussed below.

Collection

Gathered foods included fruits, berries and palm nuts that grow wild on the plains and in the bush just outside the communities. The volume of gathered foods varies with the season. In Awastara, wild foods were gathered incidentally while out in the bush on another purpose, "or secondarily and as emergency food" (Nietschmann 1973: 150). This is not to say that wild foods are not anticipated. The plum-like fruits of icaco (*Chrysobalanus icaco*) and biuhu (*C. icaco* var. *ellipticus*), considered delicacies in Wawa, were collected with much zeal.

Many wild foods, such as snaiya (*Pacyanthus lundelliana*) and biuhu, are easy to collect and most require no technology or processing prior to eating (aside from

[90] There are numeous species of turtle and shrimp documented in the region; the most popular in this study were small shrimp, (*Xiphopenaeus kroyeri*), locally called "el chacalín" [Spanish] and green turtle, (*Cheloni nydas*) locally called lih [Miskito] (Caldera, et al. 1995).

[91] Judging from experiences in this study, chicken eggs are a delicacy that are eaten sparingly. The relished eggs are stored in a cool dry place; one informant stored her eggs in a "secret" drawer in her house (Basilicia Martin-Schultz/Tuapí).

shelling or peeling). For this reason, wild foods make great vitamin-packed snacks for children. While most wild foods are eaten as snacks, some are incorporated into daily meals as seasonal beverages (such as tea and fruit juice).

Wild foods were also harvested from feral trees, such as guayaba (*Psidium guajava*), granadilla (*Passiflora quadrangularis*), papaya (*Carica* papaya), palma africana (*Elaeis oleifera*), mango (*Mangifera indica*) and nancite (*Byrsonima crassifolia*). These trees are often spared when clearing land for a homestead (selective clearing is discussed further under "Patio Plantings"). Coconut trees (coco - *Cocos nucifera*) were also popular, and while they would never sprout on their own in the great numbers as that found in Miskito communities, their long life spans create the illusion that they are a natural part of the landscape.[92]

Fruit harvesting methods were as varied as the trees. Mango fruits that did not drop on their own were encouraged to do so by striking the fruiting branch with a stick. One informant harvested her nancite fruits by spreading a blanket under the tree and vigorously shaking the tree so that the fruits dropped to the ground (Nena Castillon/Lamlaya). Tree climbing was another options. The many branches on guayaba trees made climbing easy. Climbing coco trees, however, required a bit more skill. The climber, with his feet on either side of the tree, slipped his feet through a cloth cinch tied end-to-end. Ascending the tree, he reached up to hold fast with his hands and then pulled up his feet up. Using his feet to tighten the cinch around the tree, the climber released his handhold and reached upward again.

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[92] Once a coconut sprout has been planted and reaches reproductive age, it can produce coconuts for up to 80 years (Woodroof 1970).

Procurement

Although produce purchases were rare, villagers in the study communities regularly purchased a small number of food items (i.e. flour, sugar, spices and condiments). Food could be purchased from informal or formal sources. Informal sources, including neighbors and village stores, were the most convenient options for most communities in this study.[93] Formal sources (i.e. the markets in larger commercial centers) were not viable options due to distance considerations.

Local level procurement served an important function in households that lacked able-bodied men to work their own plantations. These villagers relied on local sources to procure staple foods. One woman from Wawa, who was the head of an entirely female household, ran a village store with supplies obtained from area villages (Zoila Velázquez/Wawa).[94] Rarely, farmers purchased the plant materials used in sowing their plantations. The aforementioned Wawa shopkeeper had a supplier for "cepas" (or banana scions), available from the nearby village of Betil (Zoila Velázquez/Wawa). Procurement on the local level was not limited to village stores. When unexpected food shortages arose, produce could be purchased from residents.[95]

Formal markets in the larger towns, like Puerto Cabezas and Waspam, were another source of food. Communities with ready access to these commercial centers also tend to purchase staple foods. In Karatá, for instance, villagers bought items such

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[93] Village stores carried a limited inventory of most staple foods and other items.

[94] Zoila named three savanna villages, Yulu, Dagban and Klingna, accessible from Wawa via the interior lagoon system, that reportedly kept large plantations.

[95] While working in Wawa, my hostess (Zoila Velázquez) was asked to provide food for a large meeting to be held there. As was customary for more than one hundred years, preparations for the impromptu party were handled quite smoothly (see Roberts (1827) for an early description). Zoila sent her niece to neighboring houses to buy tomatoes, green peppers and other produce. Meanwhile, Zoila, her sister and mother began cooking, assured that the ingredients they needed would soon arrive.

as rice, flour, beans, oil and meat from the markets in Puerto Cabezas (Salvador Perez/ Karatá).[96] Thus, communities with ready access to markets relied less on cultivation. For example, in 1994, the village of Lamlaya, located just on the outskirts of Puerto Cabezas, was cultivating only one plantation site, Pnata Parida. Though the ground at Pnata Parida had become too saline for planting beans, the villagers continued to plant other crops and opted to purchase beans in Puerto Cabezas.

There were two markets in Puerto Cabezas in 1993-1994, Mercado Municipal and Mercado San Jerome. A survey of these markets is presented below. Demographic information from the vendors and the types and sources of food items sold in each market provide insights on the cultural norms of East Coast life.

Mercado Municipal

Mercado Municipal is located in the center of downtown Puerto Cabezas and is the older of the two markets. In 1994, the entire market occupied half a city block and it was organized roughly into two sections. The majority of the market was devoted to selling clothes, household needs, music and gift items to name but a few. The plant section was relegated to an open alleyway that ran through the middle of the market. Vegetables and other foodstuffs were sold at small wooden stands, with wood products (planks, firewood and even canoes) being sold at one end of the alley.

Of the eleven vendors surveyed in Mercado Municipal (See Table 3.1), nine operated produce stands and the other two sold only wood products (See Chapter 6: Construction). Produce vendors ranged in age from 25 to 70 and only one was male. They came from as far south as Haulover, near the southern-most border of the

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[96] This was possible because daily trips were made overwater between Karatá and Puerto Cabezas. The ability to purchase food items was also a sign of affluence. Karatá holds the title to the land on which both Lamlaya and Puerto Cabezas are located. The "rent" for these holdings has provided a regular cash income for the community of Karatá.

Northern Autonomous Region, and as far north as Awastara, a village located almost at the northern border with Honduras.

3.1 Food Vendors in Puerto Cabezas Markets

Market	Name	Sex	Age	Community of Origin
Mercado Municipal	Chepita Chapin	F	38	Haulover
	Amanda Herman	F	32	Lamlaya
	Marcia Flores	F	24	Lamlaya
	Morly Garson	F	70	Awastara
	Porcien Lewis	M	30s	Sisin
	Nalia Rosales	F	39	Sisin/Lives in PC
	Melida Pudis	F	31	Sisin/Lives in PC
	Faustina Humphris	F	25	Puerto Cabezas
	Sevana Pasquier	F	45	Maniwatla
Mercado San Jerome	Mauricio Gonzalez	M	28	Managua/Lives in PC
	Leticia Garcia	F	50	Masaya/Lives in PC
	Olmita ?	F	47	Krukira/Lives PC
	Asteria Peralta	F	29	Dakban

Mercado San Jerome

In 1993-1994, this smaller market was located near a new fringe of expansion in Puerto Cabezas. A newer market, the vendors were considered "foreigners" (Aristan Bons Zacarías/Puerto Cabezas-Bismona) because a majority of them had emigrated from Masaya on the West Coast. In the early 1990s, the East Coast experienced a local food shortage and most local vendors at Mercado Municipal had gone. Produce from the West Coast became the only option and "foreign" vendors sold their goods from the empty stalls in Mercado Municipal. Despite high prices, the produce always sold (Aura Arguello/Puerto Cabezas).[97] When locally grown produce again became available, local vendors returned and the number of vendors increased significantly so the Masayan vendors relocated to Mercado San Jerome (Aristan Bons Zacarías).

[97] Other circumstances contributed to the arrival of these "foreigners." Following the Sandinista revolution, mestizos from the West Coast began dominating retail trade in all of the larger towns along the East Coast (Vilas 1989). Also, more rigid land-use regulations established by the Instituto Agrario de Nicaragua (IAN; formed in 1990, shortly after the end of the war) led to the displacement of many rural farmers who moved to larger towns to find employment (Pasquier 1993).

Like Mercado Municipal, most vendors in Mercado San Jerome were middle-aged women (See Table 3.1). Seventy-five percent of the people interviewed were female with an average age of 38 (comparable to the average age of 33 in Mercado Municipal). Unlike the Mercado Municipal vendors, San Jerome vendors met the study inquiries with circumspection and only four of the approximately dozen vendors agreed to be interviewed.[98] Two of those interviewed haled from the West Coast (the aforementioned foreigners) and the other two from local communities with reputed ties to the drug trade and thievery (Nena Castillon/Lamlaya).[99]

Market Produce

Despite the disparate backgrounds of the vendors, the produce available in the two markets were comparable, with only small differences in variety and price (See Table 3.2).[100] Market produce in 1994 included seasonal fruits, tubers, a variety of

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[98] San Jerome vendors were said to be leery of strangers and, indeed, this was the case (Aristan Bons Zacarías/Puerto Cabezas-Bismona). Of all the investigations conducted for this study, attempts to talk with the vendors of Mercado San Jerome were met with the most resistance to communication and reluctance to participation. Of the four people that agreed to be surveyed, some refused to answer certain questions (such as the source of their wares) and two refused to have their picture taken (something to which others had eagerly consented).

[99] An encounter in Krukira marked the only time during this study that I was threatened with bodily harm. On a return trip from Bismona to Puerto Cabezas (approximately an 8-hour drive), my colleagues stopped briefly in Krukira to present a seminar. Upon arriving in Krukira, it was immediately apparent that some of the Krukira residents (mainly, a gang of young men in their twenties) were opposed to our being there. In a small schoolroom, with only about a dozen villagers present (most were too scared to attend), my colleagues attempted their presentation. Within minutes, the gang began pounding on the tin roof of the schoolhouse with their machetes, making it impossible to hear the speaker. Deciding to postpone the seminar, we headed back to our vehicles with the machete-wielding gang in pursuit. One of my colleagues and a gang member were engaged briefly in a physical altercation but we all escaped without serious injuries. This experience lent credence to the notorious reputation of Krukira.

[100] For instance, apples (manzanas) and passion fruit (granadilla) were only available in Mercado San Jerome and some locally grown produce was cheaper in Mercado Municipal. Vendors with West Coast suppliers tended to have more commercial items (such as bullion cubes and candy) that would normally be sold in general stores.

vegetables and staples; the list of items was remarkably similar to market produce documented by Young (1842: 107) more than one hundred years ago.

Table 3.2 Produce and Prices in the Markets[101]

Name of Vendor	Wares	Cost (C$)/Volume	Origin of Wares
Porcien Lewis Mercado Municipal (MM)	quequisque quequisque yuca cuadrado	4/each big tuber 2/each small tuber 1/three-four pieces 1/four pieces	Sisin
Amanda Herman (MM)	arroz frijoles coco pimienta entera pimienta molida achiote cumin maíz molido maíz tostado	2/pound 3/pound 2 each 1/bag 1/bag 1/bag 1/bag 1/pound 5/pound	Managua
Marcia Flores (MM)	frijoles coco pimienta negro arroz ajo annatto canela maíz	3/pound 2 each 1/bag 2/pound 1/bag 1/bag 1/bag 1/pound	Managua
Nalia Rosales and Melida Pudis (MM)	banano yuca quequisque zinza naranja dulce	1/four pieces 5/five-six pieces 5/six-seven pieces 1 each 5/pound	Miskitos from Francia Sirpi
Faustina Humphris (MM)	pepino cebolla apio pimienta molida achiote molida chiltoma repollo chayote canela molida romero anís papas tomate	2 each 3/pound 1 each 1/bag 1/bag 2/pound 3/pound 2 each 1/bag 1/bag 1/bag 3/pound 8/pound	Managua

101 In 1994 dollars, C$7.14 was equal to US$1.

Table 3.2 Produce and Prices in the Markets (continued)[102]

Name of Vendor	Wares	Cost (C$)/Volume	Origin of Wares
Sevana Pasquier Mercado Municipal (MM)	yuca yuca chile picante zinza	1/four small tubers 5/four big tubers 1/seven pieces 1/handful	Maniwatla
Chepita Chapin (MM)	nancite	1/bag or 50/bucket	Rio Coco
Morly Garson (MM)	nancite limon	5/gallon bucket 7/pound	Awastara
Leticia Garcia Mercado San Jerome (SJ)	naranja repollo manzana perrote manzana chiquito platano banano granadilla cebolla tomate	10/dozen 3/pound 1 each 4/five pieces 4/dozen 4/dozen 4/five pieces 3/pound 8/pound	Pacific Coast
Mauricio Gonzalez (SJ)	frijoles azucar chayote granadilla tomate apio arroz harina melón chiltoma pepino cebolla repollo papas	3/pound 2/pound 3 each 10 each 7/pound 2 each 2.50/pound 2/pound 12 each .50 each 3 each 3/pound 3/pound 3/pound	Unknown
Olmita ? (SJ)	banano cuadrado yuca coco limon puro naranja dulce	5/dozen 1/three pieces 5/eight pieces 2 each 1/four pieces 1/three pieces	Unknown
Asteria Francis Peralta (SJ)	canela sina	1/bag 1/bag	Unknown

[102] In 1994 dollars, C$7.14 was equal to US$1.

Cultivation

Subsistence agriculture constituted the principal food source for Miskito in the study communities. Miskitos in this survey cultivated small plots of land in three distinct locations: Home gardens, patios, and plantations. Each of these locations required different management practices.

Home Gardens

Home gardens, also known as dooryard gardens (Coe and Anderson 1996),[103] were documented in every community although their frequency varied for each community (see Table 3.3). Two circumstances in this study account for some of this variation. First, most people did not plant a home garden in the winter; "people have gardens in the wet season" (Salvador Perez/Karatá). So depending on the time of year, fewer home gardens were encountered. Second, as mentioned during the discussion on markets, communities with greater access to larger commercial centers tend to concentrate less on cultivation. Note that Lamlaya and Karatá had the lowest home garden frequencies; both communities have easy access to the produce markets in Puerto Cabezas.

Table 3.3 Home Garden Demography

Community	Frequency	Range in Size	Average # of Plants
Lamlaya	40%	$140ft^2$ to $300ft^2$	4.8
Bismona	70%	$100ft^2$ to $300ft^2$	5.6
Haulover	80%	$225ft^2$ to $540ft^2$	7.7
Karatá	50%	$100ft^2$ to $600ft^2$	6
Tuapí	60%	$300ft^2$ to $900ft^2$	4.6
Wawa	80%	40 ft^2 to 360 ft^2	6.4
Avg. Across	Communities	$150ft^2$ to $500ft^2$	5.85

[103] There are many other synonyms (See Fernandez and Nair, 1986). In this study, community members often referred to their home garden as a plantation. To avoid confusion between this smaller garden that is located in the yard and the larger plantings found outside the village, the term home garden is used here.

Home gardens are traditionally associated with warm moist climates in primarily subsistence cultures (Fernandes and Nair 1986; Mergen 1987). Miskito sow food crops in two locations on their property within the village: In home gardens and in their patios. Three factors that distinguished home gardens from other plantings were: The garden was located within easy reach of the dwelling, it was surrounded by a fence and it was small in size.

While terrain dictated the exact location of a home garden, Miskito in this study preferred to have the garden adjoining their dwelling, sometimes accessible from a doorway in the kitchen. Because the main purpose of the home garden was to produce foods to be extracted on an as-needed basis, easy access was important. In turn, ease of access from the dwelling left the task of home garden maintenance to the women,[104] and sometimes the children, in the household. As Dampier (1699: 9) noted: "After the Man hath cleared a spot of Land, and hath planted it, he seldom minds it afterward, but leaves the managing of it to his Wife." Having the garden within easy reach of the dwelling would also be important during the rainy season, when lowland areas quickly became flooded (Nietschmann 1973).

Another characteristic of the home gardens in this study was that they were enclosed spaces. This distinguished home gardens from other plantings in the open yard (also known as the patio; discussed below). As noted by other authors on the region, the fencing material was often simple and crude (Helms 1971). Some fences in this study were constructed using found materials, including bambù (*Bambusa* sp.) trunks that had washed ashore, small branches that had fallen from trees, the midveins of fallen palm leaves, old fishing nets and wire. Miskito also made use of living fences,

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[104] The same is true for the Miskitos' southern neighbors, the Garífuna (Coe and Anderson 1996). This was also distinguishing characteristic between home gardens and plantations in this study as men primarily maintained the latter.

felled trees that resprouted upon being positioned in the ground around the garden (the trees used for this purpose are discussed in Chapter 6: Construction).

Finally, home gardens were distinguished from plantations by their small size and relatively high species diversity (see "Home Garden Crops" below). Home gardens averaged from 150ft^2 to 500 ft^2 across the communities (See Table 3.3). This figure was small relative to the overall size of most yards in this survey (which was estimated to be about 2000ft^2) and much less than the one-tenth of an acre mentioned by Mergen (1987).

The small amount of land that Miskito devote to agricultural pursuits was noted historically by Dampier, who traveled through Mosquitia 300 hundred years ago, and remarked, "their Plantations are so small, that they cannot subsist with what they produce..." (Dampier 1699: 9). More recent literature indicates that the tradition of planting small home gardens is common not only throughout the eastern seaboard of Nicaragua (see Helms 1971; Nietschmann 1973) but also in subsistence cultures around the world (Mergen 1987). One villager claimed that people did not have larger home gardens because, "they don't want big ones" and because the village "is real swampy" (Orlando Budier/ Haulover). At the same time, Orlando admitted that "if plant well and care for it, gives good crop – if not, nothing will come of it." These statements illustrate fundamental considerations that determine the success of a home garden: Desired time commitment, soil availability and soil preparation.

One reason for the traditionally small home gardens seen throughout the tropics is that home gardens require more energy input per unit area than do plantations (Coe and Anderson 1996). For instance, although the fencing was crudely constructed, it was nonetheless an expense, of time if not money, because fences must be continually maintained.[105] A distinguishing characteristic of home gardens is the combination of maintaining a number of different crops, multi-purpose trees and animals all within the same small space (Fernandes and Nair 1986). With animals roaming about freely, fences served as an exclusionary device requiring constant upkeep, lest the cows ravage the garden.[106]

Home garden crops

The home gardens in this study contained a mix of herbaceous plants and small trees. Typical of other traditional home garden systems, most home garden crops were perennials, not annuals (Mergen 1987). The 25 different home garden species documented in this study is similar to the number found in other cultures.[107] The number of species found in any one garden averaged 5.85 across communities (see Table 3.3).[108] Three basic crops were found in all the home gardens in this study: A minimum of one kind of banano or platano, yuca, and batata. These plants have

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[105] One informant indicated that he did not sow medicinal plants in his patio because he had "no money to buy fencing wire" (Cinbilin Ricardo/Bismona).

[106] For example, in early March of 1994, an industrious villager, Surrel Pinok (Tuapí), had a large number of food plants, including fruit trees (i.e., naranja -*Citrus sinensis*, coco and guayaba) and smaller food crops (i.e, piña -*Ananus comosus*, tomate - *Lycopersicon esculentum* and cuadrado - *Musa acuminata*) planted in multiple locations on his property (the total area of which was estimated at 600ft^2). Upon returning to Tuapí in August, it was learned that cows had broken into the gardens and eaten everything!

[107] According to a study that examined ten home gardens representing ecologically and culturally diverse regions, the range of home garden crops was reported as being between seven and 73 herbaceous species, with an overall average of 33 species per garden (Fernandes and Nair 1986).

[108] In general, the more space that was devoted to the garden, the larger the variety of food crops and the greater their tendency to contain ornamentals. Moreover, the variety of home garden crops documented in this study (25 species) was greater than that of plantation crops (11 species). Coe and Anderson (1996) remarked that species diversity was also greater in Garífuna in home gardens than in their plantations.

been traditional Miskito food crops for at least three hundred years[109] and are similar to the herbaceous crops in tropical home gardens around the world. This similarity is no coincidence; it stems from two important considerations that determine crop choice: The amount of time the farmer wishes to spend on the garden and the type of soil that is available to the gardener.

Fernandes and Nair (1986) posit that because crop choice dictates the amount of inputs that are necessary and home gardens are subsistence plots, plant selection is biased toward low maintenance, high yield crops. Batata, yuca and banano varieties lend themselves well to that purpose. Perennials and tubers require little maintenance and bear more than one crop a year. For instance, the carbohydrate-rich yuca tubers require little energy input (such as weeding), can be harvested year-round, year after year, and yield "more food energy per unit of land than any other staple crop" (CIAT 2000: 1; Fernandes and Nair 1986; Rogozinski 1992).[110]

Soil availability has also narrowed crop choices; many informants in this study stated that the "soil [was] not fertile" (e.g., Fernando Hodgson/Lamlaya). The rainy climate, clayey soil and relatively low soil fertility are well-known features of the East Coast (Rogozinski 1992; Vilas 1989). These soil characteristics are ideal for root crops and have contributed to making yuca the primary staple food of this and many other tropical regions of the world (Coe and Anderson 1996; Cock 1982).

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[109] Dampier (1699: 9-10) wrote, "...their largest plantations have not above 20 or 30 Platano Trees, a bed of Yams and Potatoes, a bush of Indian pepper [green peppers] and a small spot of Pine-apples."

[110] As most root crops provide little protein, diet supplementation by hunting and fishing is vital for meeting nutritional requirements (Rogozinski 1992; Vilas 1989).

Home garden planting

Households in all the study communities followed the same general rules when planting home gardens. Home garden planting involves soil preparations prior to planting, the source of the food crops to be planted and certain criteria that govern the overall home garden design. Each of these aspects is discussed in turn.

As mentioned, Miskito women historically maintain home gardens (Dampier 1699; Nietschmann 1973; Roberts 1827), but the job of preparing the land, constructing a fence and planting is shared with the husband. Soil preparation is minimal, involving pre-burning and selective tilling. Miskito are aware of the benefits of burning brush prior to planting. Zoila Velázquez (Wawa) explained that burning "makes vitamins for the soil" and Nena Castillon (Lamlaya) indicated that she would "burn soil first for better [quequisque] fruit." In addition, the resultant alkaline ash tends to make the soil less acidic (Kricher 1989). Some plants required "plow munaia," a mix of English and Miskito meaning, "to plow." It was learned that loosening of the soil was necessary before planting such crops as yuca, batata, tomate and repollo (Anelia Zacarías/Tuapí; Francisco Dublon/Bismona). Loosening the soil improves yield by allowing unimpeded growth for these root crops (Bouwkamp 1977). Yuca and batata were further distinguished by the fact that they were often intercropped in soil that had been tilled to create furrows for batata and ridges for yuca (Anelia Zacarías/Tuapí).[111]

The source of the plants to be sown in home gardens varied. Some were grown from seed and others vegetatively. Consistent with the practices in other countries (Duke 1981), platano, yuca, quequisque, malanga (*Dioscorea trifida*),[112]

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[111] According to Bouwkamp (1977), batata is usually planted on ridges to ensure proper soil drainage. It is unclear why the reverse method is used here.

[112] It should be noted that it was difficult to reconcile scientific names with the common names of these tubers in the regional literature. Duke (1981) listed malanga as a

batata and caña were grown vegetatively. Frijoles, maìz, arroz, sandìa (*Citrullus lanatus*) and coco were grown from seeds taken from the previous crop or bought in the market.

Crops are intercropped but not necessarily paired, as with yuca and batata. The location of crops within the home garden depends upon the terrain. Because terrain is a major determinant of home garden locations, the space allocated to home gardens may consist of one large area or many smaller sites on the individual's property. The actual planting pattern is discussed under "Plantations" below.

Patios

Miskito also cultivate edible plants in their patio. The patio, or, the yard around the home, extends to the boundary line of the property and is rarely marked by a fence.[113] Often the only separation between patios is a pathway that has been worn in the grass.[114] The plants in this category are treated in other studies as part of the home garden plantings.[115] However, the Miskito distinguish between home garden crops and patio plantings by referring to the former as the "plantacìon" (Spanish, meaning "plantation") and the latter as the "patio" (Spanish, meaning "patio"). Indeed, patio

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Xanthosoma species; Marx and Heath (1992) define malanga as duswa (known in this study as quequisque); USDA (2000) defines quequisque, a *Xanthosoma* species, as malanga; Rabella and Pallais (1994) and Nietschmann (1973) label malanga as dasheen. In this study, malanga samples were identified as *Dioscorea trifida* L.f.; quequisque samples as *Xanthosoma violaceum* Schott. and dasheen samples as *Colocasia esculenta* (L.) Schott and Endl.

[113] This is further discussed in the Construction chapter.

[114] In Karatá, the pathways through the communities are raised because most of Karatá is a floodplain. Dirt, shoveled out from either side of the path, is thrown atop the path and packed down. These augmented pathways remain passable during most of the wet season (Salvador Perez/Karatá).

[115] See Fernandes and Nair (1986).

plantings and home garden crops are distinct in terms of the types of plants involved, the space they occupy and the management regime they require. Patio plantings primarily include trees that grow essentially unprotected and untended in the patio.

Patio plantings

In contrast to home gardens, which included a large number of herbaceous species, trees (especially fruit trees)[116] dominated patio plantings. This is similar throughout the world (Fernandes and Nair 1986). A total of 30 different species (not including varieties and cultivars) were documented in the study community patios. In an extensive patio inventory of 67[117] households in Tuapí, a total of 21 different fruit trees were documented, averaging 7.4 trees per household. Four fruit trees were encountered in almost every patio: Coco (averaging 2 per household), mango (averaging 1.2 per household), varieties of limon (averaging 0.9 per household) and varieties of naranja (averaging 0.8 per household).[118] About half of the surveyed households also incorporated marañon, nancite and bredpru in their patio plantings. The remaining fruit trees were found less than 20 times in the survey.

The second distinguishing factor of patio edibles was that they grew in the open patio, often in a random design. Patio edibles are either wild or sown. Spared fruit trees are those wild or feral plants growing randomly that were spared when land was cleared or when cutting the grass in common areas. Trees or saplings of nancite, mango, marañon, naranja, coco and almendra are commonly spared (Nena Castillon/Lamlaya; Salvador Perez/Karatá).

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[116] This is in contrast to ornamentals, for example.

[117] This accounts for 74% of the total 91 households.

[118] *Musa* species are also standard in every household but they are always contained with the home garden, requiring the protection of the fence to guard against herbivory.

Patio edibles may include transplants from the bush sown in specific locations in the patio. Coco and citrus species were often sown grouped together. Some homes had up to 20 coco trees on one side of their property. The citrus "groves" were not monospecific plantings as there were often many different species of citrus trees planted together.[119] Larger fruit trees were often sown singly, taking light and soil into consideration. Coco enano (the stunted cultivar of coconut) was always located in a highly visible point on the property (such as outside the kitchen window). Sylvia Lavonte (Tuapí) explained that this prevented theft by a two-legged herbivore, man.

A final distinguishing factor of patio edibles was the management regime. While home garden crops were protected against herbivory by a fence this was not the case for patio edibles. Most patio edibles required protection only in their sapling stage. Feral patio edibles were usually beyond this vulnerable stage and rarely required protective measures. For those plants requiring protection, temporary protective measures included the use of blockades and repellants.

Blockade protection was afforded to fruit trees in a number of ways. Some trees were incorporated into home gardens, the home garden fence thus providing protection. In some cases fruit trees (e.g., guayaba, guanábana - *Annona muricata* and citrus) remained a permanent part of the home garden beyond the vulnerable sapling stage; in other cases, the home garden was relocated once the saplings were

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[119] In Lamlaya, the vestiges of a nancite grove were found. No other concentrated plantings of nancite was encountered in the study communities. The trees had been cut to the ground and small bushes, only half a foot tall, were growing from the stumps in 1994. Despite their diminutive size, these small bushes produce fruit because the stumps from which they emanate were "of age" (Nena Castillon/Lamlaya).

mature, leaving the fruit trees to stand alone (Willy Vasquez/Tuapí). This system worked well for smaller trees.[120]

Temporary fencing was another option for protecting fruit trees. Fences were almost universally used to protect bredpru (*Artocarpus altilis*) saplings.[121] This multi-branched, tender-leafed sapling made a tasty morsel for cows. Because of bredpru's rapid upward growth, the tree often reached heights well out of harm's way within in the first growing season. Once mature, the fence was dismantled and the extra work on the part of the homeowner was considered worthwhile.

A final protective measure was specific to the coco. Saplings were protected against herbivory using a locally produced repellant, manure. Throughout the communities, homeowners slathered the leaves of young coconut trees with a manure-water mixture. As cocos do not branch, the mixture was easily poured over the leaves. Requiring only the simplest of tools (a bucket and stirring stick) and using free ingredients (cow patties found throughout the communities), this method was practical and inexpensive with no adverse affect on the growth of the tree.

Protecting fruit trees from herbivory represents the only real inputs required of patio edibles. Once the fruit trees have grown beyond the reach of roaming animals, protection discontinues. At maturity, patio edibles require no inputs and can be harvested regularly as they fruit.

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[120] In this study, colossal mango trees were not fenced in. Mango season in the community of Wawa, where a large number of pigs were raised, was especially exciting. In the normally tranquil community, the characteristic sound of a mango fruit hitting the ground was heard only by the lucky few within earshot. A race then ensued to find the fallen fruit, which was then gobbled up by the victor, be it pig or man!

[121] In one Tuapí household, a homeowner discarded old coco shells around the base of her bredpru tree, creating an obstacle around the tree that was insurmountable by the local herbivores.

Plantations

For sowing crops in larger quantities than in home gardens, villages had a number of plots of land located outside the community boundaries (See Table 3.4). Two observations characterize the plantations documented in this study. First, although located on communal lands they are not considered communal undertakings. Second, plantations, also called insla, are primarily subsistence efforts. These two observations had ramifications on the interpersonal relations within a community.

Table 3.4 Principle Plantations (1993-1994)

Community	Plantation	Current Utilization	Distance to Plantation
Lamlaya	Tumtum	In fallow	1 1/2 hr (~5km) by dory
	Pnata Parida	In use	~1 hr away
	Warkwark	In fallow	~3 hr trip
	Tasina	In fallow	~1 1/2 hr
Tuapí	Unknown	In use ("new")	5 minutes by foot
	Posa Verde	In fallow	Far by boat
	Gung-Gung	In use	3 hrs away
	Agua La Pura	In use	Less than 3 hrs
Wawa	Yun Yun	In use	10 min by dory
	Unknown	Unknown	Inland from community
Karatá	Warkwark	In fallow	~2 hrs with motor
	Landin	In use	1 hr with motor
Haulover	Kukudakura	Unknown	1 hr by dory (~3 miles)
	Kahami	Unknown	~2 hrs by dory (~6 miles)
	Bibiskira	Unknown	25 min with motor; 1½ hr without
Bismona	Kua Awas	Unknown	unknown
	Sisin Pura	Unknown	unknown
	Iban Tara	Unknown	½ hr with motor, 2 hrs without

To the inexperienced outsider, plantations appear to be communal undertakings. Ask a community member where he plants his crops and he will name the same location as his neighbor. Visit a community during planting season and the village will be practically deserted. Travel to a plantation site and one will observe a large piece of cultivated land with no apparent divisions. But ask a villager the location of the community plantation and the response will be, "Miskitos do not have a community plantation; everyone has their own" (Salvador Perez/Karatá).

For the purposes of this study, a plantation can be defined as a large tract of land, specific to a community, which was subdivided into many smaller plots. Fencing was commonly limited to the perimeter of the plantation, with internal divisions, and individual usership, indicated only by the footpaths separating each plot. And, while villages seemed deserted during planting and harvesting seasons, this was a reflection of villagers working their own plots of land all at the same time. Plantations were communal, then, only in the sense that the families working the co-located plots of land were from the same community.

Communal landholdings have been noted in other Miskito communities along the coast (Coe and Anderson 1996; Nietschmann 1973). Advantages to this system of land sharing are many. Often, community members could share the labor involved in the planting and maintaining their plantations. And, there would usually be someone else around to scare off herbivorous animals or to help if one had an accident (Nietschmann 1973).[122]

Another distinguishing characteristic of the study plantations was that villagers demonstrated little interest in growing cash crops. Potential cash crops, such as arroz, caña and maíz, were grown in the communities. But only one villager indicated his intention to sell part of his rice crop (Nils Philipe Washington/Karatá). The typical Miskito farmer in the study communities did not grow food for the purpose of selling it at market (Orlando Budier/Haulover).[123] "Food only to eat, not to sell" (Filiberto Julias/Tuapí; Nena Castillon/Lamlaya) was echoed by other informants in this survey.

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[122] Concentrating food in one location can also attract game, which is favorable for hunting (Clay 1990: 27).

[123] In contrast, cows and pigs were raised with the intention of selling them, not for personal consumption (Yoneda Cordoba Tathum/Karatá and Nicholas Regional/Bluefields-Karatá).

Excess crops were occasionally sold to meet immediate needs for items such as cooking oil, sugar, cigarettes, clothing, canned goods and, sometimes, firewood (Nils Philippe Washington/Karatá). And an elaborate food-sharing network based on family connections also exists amongst the Miskito (see Nietschmann 1973 for details). But, in the study communities, plantations (and home gardens) were sown primarily for household consumption and were seldom used for growing cash crops.

Plantation site selection

This section focuses on considerations taken into account when selecting a plantation site. In fact, "new" sites were and have traditionally been a rarity in these communities. In Tuapí, a visit to what the informant called a "new" plantation revealed that the site was an old plantation that was being re-used. All of the plantations documented in this study were an active part of the cultivation-fallow system discussed in detail below under "Planting Cycles." According to informants, plantation sites were selected based upon two factors: Degree of accessibility and stage of forest succession. These considerations are applied to all plantations, both at their original inception and during later repeat usage, and determined the work requirements for each plantation.

Always located outside the village proper, a plantation's desirability was determined in large part by its distance from the village. Some plantations were located just beyond the inhabited areas and others were accessible only by boat (See Table 3.4).[124] According to Nietschmann (1973), plantations not easily reached by foot are judged by their degree of accessibility by dory.[125]

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[124] In addition, some communities had plantations both in the bush (forest plantations) and in the monte (field plantations). The different locations translated into slightly modified planting times. This is discussed below under "Planting Cycles."

[125] Dory is the name of the kind of boat used by the Miskito.

A lengthy distance between a community and the plantation had many ramifications. More distant plantations necessitated overnight stays in makeshift huts for periods of a week up to a few weeks at a time (Orlando Budier/Haulover; Salvador Perez/Karatá). Such overnight stays also meant that supplies had to be arranged beforehand. Provisions such as pots, a bucket (Facundo Johnson/Tuapí) and medicine were typically brought along. Suggested medicines included pills for headache and toothache and leaves of lengua de gallina (*Hemidiodia ocimifolia*) as snakebite medicine for bites from culebra pinta (Nena Castillon/Lamlaya).[126] Another informant suggested "clinic pills" be brought in case of "fever, machete cut or body pains" (Francisco Dublon/Bismona).

"Food is available" at the plantation site (Francisco Dublon/Bismona; Orlando Budier/Haulover). Informants across communities consistently mentioned that fish, yuca, platano and deer could be obtained at the plantation (Nena Castillon/Lamlaya; Orlando Budier/Haulover). But some food items had to be brought to the plantation. The following items were recommended: Water and food (Facundo Johnson/Tuapí); sugar, rice, coffee and beans (Francisco Dublon/Bismona); rice and beans (Orlando Budier/Haulover); salt, sugar and coffee (Nena Castillon/Lamlaya).

Another consideration when choosing a plantation site was stage of succession. Informants used the stage of succession as considered a visiual guideline indicating a plantation site's readiness to be reused. As seen in Table 3.5 (next page), informants mentioned that plantations were fallowed "until it becomes bush again" (Nena Castillon/Lamlaya). This is further discussed under "Planting Cycles" below.

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[126] These leaves should be brought along on any trip to the bush and, "if don't get bitten, throw away" (Nena Castillon/Lamlaya).

Table 3.5 Yearly Planting/Fallow Cycle

Community	Clear/Burn	Plant	Harvest	2nd Planting*	Years of fallow
Lamlaya	Jan.-Feb.	March-April	July	August	2-3, Until overgrown
Tuapí	February	March	July	-	6
Wawa	February	March-April	July	September	3-4
Karatá	February	March	August	September	Until overgrown or need
Haulover	Feb.-Apr.	February - May	September	-	8
Bismona	Jan.-Mar.	April-May	Aug.-Sept.	Nov-Dec	4-5

Plantation partitioning

The subplots within a plantation site were generally worked and maintained separately by different households and were considered to be individual property.[127] Dampier (1681) noted that a new plantation was one of the first duties following a marriage when "...the Man makes a very small Plantation." Traditionally, such lands have been passed on to children or to other family members (Francisco Dublon/ Bismona; Orlando Budier/Haulover).

Plantation partitioning was straightforward. With an adequate availability of land, it was subdivided without any formalities or size restrictions. "Choose whatever spot you want and then it's yours" (Francisco Dublon/Bismona). Each household determined the size of their plot of land based upon their estimation of family needs and their ability to maintain the area. "A person could choose whatever land they want – as much as they want" (Nena Castillon/Lamlaya).[128]

When a community grows too large or the region becomes too densely populated, plantation productivity decreases (Clay 1990). Villagers recognize this and

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[127] Because of the fallow system (discussed in detail under "Planting Cycles," below), families had rights to much more land than was in cultivation at any one time. Based on estimates from Nietschmann (1973), land rights were approximately four times that which was in current use.

such communities have two options. Some, like Sandy Bay[129], impose size restrictions (Francisco Dublon/Bismona). "If there was not enough land, have to go far away and find a new area" (Facundo Johnson/Tuapí). Because potential sites for new plantations become further and further away, this sometimes gives rise to new communities. This issue is addressed under "Further Thoughts," below.

Planting cycles

Plantations have two stages; the first is the active (planting) stage, the second is the passive (fallowing) stage. The two stages are discussed in turn, though it should be kept in mind that these are continuous cycles with ambiguous boundaries. In the active stage, "planting time depends on dirt...in plantation, soil is hot because mixed with sand, so plant in the bush in May and in the field February or May" (Orlando Budier/ Haulover). This quote embodies the Miskito planting philosophy. Planting time was based on the weather, on the soil and also on the crop itself.

Weather was probably the most important factor. As noted in Table 3.5, every community began initial plantings from March through May. This was near the beginning of the wet season as most rainfall occurs between May and December (Finnegan 1988; Helms 1971).[130] Many communities sowed a second planting of selected crops just before the end of the wet season.[131] The heaviest rains tend to fall

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[128] Nietschmann (1973) noted that rights to land can not be sold but can be relinquished, if desired.

[129] According to 1995 estimates, Sandy Bay had a population of 4918 people in an area of 8350 hectares (approximately 1.7 hectare/person) versus Bismona with a population of 997 in an area of 10,421 hectares (10.45 hectare/person). Population and territory data were taken from Caldera, et al. (1995).

[130] A true dry season exists only from March through May (Keller, Brosnahan and Rachowiecki 1992; Nicaragua 1994).

[131] Nietschmann (1973) pointed out that not all families have second plantings anymore because of competing demands for labor.

at the beginning and end of the wet season. By planting just ahead of these downpours, the Miskito optimized the rainfall patterns so those crops were well established before the onslaught of rain.[132]

Planting time was also determined by the soil at the plantation site. More accurately, soil temperature must be factored into the planting regimen. Composition renders soil hot or cool.[133] "Hot" soil was a mixture of sand and dirt (Orlando Budier/Haulover). This composition was highly desirable (Francisco Dublon/Bismona) but also demanded consideration when planting. Hot soils could not be cultivated too early; one must wait until near the inception of the wet season. Otherwise, plants would burn. Cool soils, with less sand, could be planted earlier. This accounts for the range in planting times in the various communities (Table 3.5).[134]

Finally, the crop itself dictated planting time (Anelia Zacarías/Tuapí; Facundo Johnson Tuapí; Francisco Dublon/Bismona; Nena Castillon/Lamlaya; Nils Philippe Washington/Karatá; Orlando Budier/Haulover; Zoila Velázquez/Wawa). Root crops were planted only once, in the dry season when the soil was not inundated with water. The crop would rot otherwise. Other crops (platano, cacao, coco, etc.) were planted year-round.[135] Frijoles (*Phaseolus vulgaris*) could be planted twice in one growing

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[132] Nietschmann (1973) noted that the ash layer from burning a plantation not only provided fertilizer, but also protected immature crops from the sun and from the first torrential downpours of the wet season.

[133] While shade afforded by surrounding vegetation could help mitigate high soil temperatures, this was not a primary consideration.

[134] Nietschmann (1973) noted that the Miskito village of Tasbapauni use certain plants as indicators of soil fertility. "Hot" land, indicated by the growth of cutting grasses (various species of grasses and sedges with knife-like edges on the leaves), was not considered arable. Cutting grass grows well on infertile, acid soils (Rodriguez 2000), not the most suitable land for crops. "Cool" land, indicated by the presence of silkgrass (*Aechmea magdalenae*), was more desirable for planting (Nietschmann 1973).

[135] In the home garden, these crops were planted year-round.

season with a second sowing occurring about six months after the initial planting. Arroz (*Oryza sativa*) and other lowland plants could be planted a little earlier while the ground was still wet.

This summarizes the active phase of the plantation. This phase was essentially an annual cycle revolving around the wet season. The factors governing planting time always went back to the weather – soil was hot in dry season, crops would rot in wet season. In contrast, fallowing, or the passive stage, was a long-term management practice lasting an average of five to eight years in the study communities.

Fallowing[136] usually began in the second year after cultivation. As noted in Table 3.5, plantations were rarely planted for more than two years in a row. Plantations were not completely abandoned became extractive resources such as yuca and other perennials planted in the previous year often continued to yield crops. Plantations with a number of fruit trees were also continuously extracted (Zoila Velázquez/Wawa).[137]

Many Miskito terms describe different aspects of planting during this time. A fallowed field was called prata. In fact the term for "weeding" was related to this, prata sakaia (Marx and Heath 1992), essentially means, "to prevent fallowing". Kayu prata describes an old field that continues to yield platano and other tubers. Insla prata describes the act of harvesting tukla (old ground crops that give again) from the previous year's plantation while waiting for the "new" plantation crops to mature (Nietschmann 1973). Insla durang describes a plantation lain fallow at the start of the dry season (Marx and Heath 1992). Other terms describe plant materials used in cultivation. Saumuk referred to seeds set aside from a current crop for the next

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[136] Nietschmann (1973: 103) called this a "forest-fallow system of shifting cultivation."

[137] Zoila had a personal piece of land with fruit trees that she never stopped using.

planting (Marx and Heath 1992). Another term, bila was a special designation given to second crops replanted into a semi-fallow plantation (Nietschmann 1973). Prawra was a term specific to yuca that meant replanting a tuber in the same place where one was pulled (Marx and Heath 1992).

Fallowing was measured not by years but by how overgrown the site became (see Table 3.5). The fallow period was also based on need, which was determined by the number of plantation sites available to the community (See Table 3.5). Depending on the community and the availability of land, then, fallowing could continue for as little as two years or for up to eight years. At any given time, each site was in various stages of fallow and more than one site could be used in a single growing season.

Plantation preparation

Preparing the plantation was a big undertaking, one shared by all community members. During clearing, planting or harvesting time, villages were virtually deserted because "the whole community does the work" (Nena Castillon/Lamlaya). Wives and children accompanied their husbands to assist with the fieldwork and to do the cooking. Plantation work involved clearing and drying, burning and cleaning, and planting and harvesting. The time it took to complete this process was dependent upon the length of the previous fallow period (see Table 3.5). For a typical plantation that had lain fallow for about five years, the task of just clearing, drying, burning and cleaning could take up to two months (Facundo Johnson/Tuapí; Francisco Dublon/Bismona; Orlando Budier/Haulover). Actions taken at each step influenced the success of the plantation.

Clearing and Drying

Insla disang, or clearing the land, was the first step in plantation preparation. Armed with an axe, a machete and a file for sharpening (Francisco Dublon/Bismona; Nena Castillon/Lamlaya; Nietschmann 1973), the plantation site is slashed-and-burned. As mentioned, trees such as nancite, marañon, naranja, almendra, mango and coco were often spared (Orlando Budier/Haulover; Salvador Perez/ Karatá). Large, unwanted trees were lopped off (Anelia Zacarías/Tuapí).[138] Selective clearing, whereby useful species are allowed to remain, is typical of most indigenous groups (Clay 1990).

Slash was not entirely unusable. Some wood was collected for fuel. Branches and small trunks suitable for fence building were used to create a perimeter around the plantation. The fencing wood will later be used for firewood when the plantation was again left to fallow. Leaving the cleared site to dry for about one month was the final step in this stage (Orlando Budier/Haulover).

Burning and Cleaning

Setting ablaze the dried cuttings for a "new" plantation was an exciting time for villagers. It represented the completion of a large portion of work. The fires were at once scary and exhilarating as evidenced by personally witnessing a huge mushroom cloud of smoke rising through trees across the water in Karatá. Because these fires could be so large, the Ministerio del Ambiente y Recursos Naturales (MARENA) required that one of their staff members were present during burning to ensure that the fire was properly controlled (Facundo Johnson/Tuapi).

After the land was burned, cleaning began. In this study, people rarely hired helpers for cleaning the burned land. One informant in this study that mentioned the use of wage labor was an unmarried woman with no grown men in her immediate family to do the necessary plantation work.[139] More often, women shared the work of cleaning or neighbors assisted on a barter basis (Orlando Budier/Haulover). Such non-

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[138] Leaving the tree stumps behind allows for faster regeneration later (Clay 1990).

[139] In 1993-1994, she paid C$20-30/day (equivalent to about US$2.80-4.20/day) for the work that might take up to three days (Zoila Velázquez/Wawa).

wage work sharing characterizes subsistence farmers in other Miskito communities (Nietschmann 1973).[140]

Planting and Harvesting

According to one anciano, the Miskito have "always planted rice, beans, plantain and cassava" (Gregorio Ingley/Bismona) even though rice and plantain were Old World crops and the combination of rice and beans was not considered typical Miskito cuisine.[141] Still, informants across the communities consistently named a similar combination of crops, adding dasheen, quequisque, yuca, banano, plantain, arroz, frijoles, caña and maíz (Ernesto ?/Karatá; Francisco Dublon/Bismona; Nena Castillon/Lamlaya; Orlando Budier/Haulover). Table 3.6 lists a selection of plantation crops and methods used to propagate them.

Table 3.6 Major Plantation Crops and their Sources

Crop	Source	Crop	Source
arroz	seed[142]	paisagua	cuttings
banano cultivars	rootstalk	quequisque	tuber cuttings
caña	root cuttings[143]	repollo	cuttings
coco	sprouted seeds	sandía	seed
dasheen	tuber cuttings	tomate	seed
frijoles	seed	yuca	stem/tuber cuttings

The root crops banano and platano, being staples of the Miskito diet (see also Coe and Anderson 1996; Nietschmann 1973), were mentioned most often. Coco and caña were also frequently mentioned; both served important roles in daily meals as beverages and sweeteners. Frijoles and arroz often accompanied the staples. The

[140] Nietschmann (1973) further noted that the willingness to share work did not extend to cash crop plantings, for which wage laborers must be hired.

[141] Combining rice and beans in a meal is a distinctly Spanish food choice.

[142] The seeds from one crop were dried and planted the next year.

[143] Specifically, a twelve-inch piece of stem was cut and buried on its side in the new location.

remaining crops were seldom mentioned which reflected the relative importance of these foods to the Miskito meal.[144]

Miskito utilized a variety of plant sources for their crops. Some plants were brought to the new plantation by horse or dory (Francisco Dublon/ Bismona); others were obtained at the plantation (Nils Philippe Washington/Karatá). For plants such as caña, dasheen, quequisque, yuca and platano, one must "move a piece of it to the new land, after [it] gives once, makes rootstocks that will give more" (Nena Castillon/Lamlaya). The variety of plant sources used in Miskito plantations (seeds, seedlings, cuttings and leftovers from previous years) is characteristic of indigenous groups that use slash-and-burn (swidden) agriculture (Clay 1990; Lentz 1993).

Plantation crops, like home garden crops, were sown with little in the way of soil manipulation.[145] The burnt soil was considered "prepared." Thereafter, plants were sown in a way that was consistent with the environment, based on the terrain. Facundo Johnson (Tuapí) explained that the land told him where to plant; "plant each type in own plot, separated...crops were as mixed as the land." This was corroborated by Orlando Budier (Haulover) who stated that, "if ground mixed well, will mix plants; planting depends on dirt."

High ground was reserved for maíz, platano, batata, yuca, malanga, quequisque and other root crops. Low-ground was for arroz, maíz, banano and quequisque. Riversides were planted with banano and sandía (Anelia Zacarías/Tuapí; Facundo Johnson Tuapí; Francisco Dublon/Bismona; Nena Castillon/Lamlaya; Nils

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[144] An integral part of Miskito plant-derived foods along the entire East Coast includes a selection of tubers and bananas (Coe and Anderson 1996; Nietschmann; 1973). See the "ideal meal" mentioned under "Supplementing" in this chapter.

[145] Although, Francisco Dublon (Bismona) advised that plow mohnaiya (creating a system of furrows and hillocks) is used with tomate and repollo.

Philippe Washington/Karatá; Orlando Budier/Haulover; Zoila Velázquez/Wawa). Plant cultivars also came into play here: Wiwi was best for sand (platano fell over) and pelipita was best in the swamp and near the Río Coco (Kristilina Perera/Haulover). Plantations were thus composed of a patchwork of intercropped plants.

Once planting was completed, informants visited the plantation infrequently to tend the maturing crops. Farmers returned to weed only once or twice before the crops were harvested (Francisco Dublon/Bismona; Nils Philippe Washington/Karatá). This could be a reflection of the fact that women maintain plantations once they have been planted. Harvesting, also achieved primarily by women, began about four to five months after planting.[146]

Crops were harvested differently depending on the plant. Root crops such as yuca were harvested piecemeal, on an as-needed basis.[147] Women return to the plantation every few days to obtain another armful of the tuber. Arroz must be harvested all at once and this might involve cooperation within and between families depending on the community. Helpers, paid in kind or with money, might also be hired (Orlando Budier/Haulover).[148]

The different harvesting routines were based largely upon the lack of food storage options available to the Miskito. This is discussed below, under "Food Storage." No post-harvest processing was done at the plantation site. Harvested crops were transported to the community via horse or dory where they were processed for consumption or storage.

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[146] Men harvested staple foods only if they happened to be in the plantation. This division of labor was also documented in Tasbapauni (Nietschmann 1973).

[147] Fresh tubers do not keep well (Duke 1981; Nietschmann 1973).

[148] According to Nietschmann (1973), compensation is based on the size of land planted or the amount of food harvested.

Preparing the Food

Miskito food preparation ran the normal gamut of boiling, frying, baking or eating the food raw. Beverage plants were squeezed, blended, steeped, cooked or fermented. The type of preparation actually provided little information as to the complexity and variety of foods that were part of the Miskito repertoire. The methods and ingredients made all the difference. This section gives a general overview of the techniques used to prepare edible plants for consumption. Processing methods of most commonly used ingredients, along with recipes, are discussed in Glossary 8.

Cooking Apparatus

Before discussing food preparation methods, a brief description of the kitchen is in order.[149] All cooked foods were prepared over a fire. In the kitchen, a fire was built in a kubus or stove. The basic kubus was built on a wooden frame at waist height. The stovetop consisted of a hearth made of clay or sand whereupon the fire was built. The cooking surface, made of either tin or metal rods, was positioned upon wooden or clay supports about 6 inches high that were built onto the sides of the hearth. The fire was built within the horseshoe-shaped clay platform.[150] The kubus might have a built-in oven. Built-in ovens, also lined with clay, were positioned just below the firebox, in an opening in the wooden frame.[151]

Outdoor fires were built when the kubus was in use or not in service. Foods that were particularly caustic or smoky were typically cooked outside. The choice of

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[149] Specific information on building structure is given in Chapter 6: Construction.

[150] The clay platform might be divided into two horseshoe-shaped areas for maintaining two separate fires (Helms 1971). Although Helms did not see this in Asang, I observed this set-up in one of the homes in Bismona.

[151] Baking was accomplished with or without an oven. For details, see the section below called, "Techniques."

firewood depended on the food being cooked (firewood is discussed in Chapter 8: Fuel). The day's firewood was stored in a space under the kubus. Pots and pans were hung on nails near the stove. Simply carved utensils, such as rolling pins, mortars and mixing spoons were kept handy on a nearby shelf.[152] A large bucket of water for cooking and drinking was always close at hand.

Women do the cooking. When there were visitors to a community, a group of women would share the burden of cooking for the group. The following was a brief account, taken from 1994 field notes made during this study, of the steps in making a fast and filling breakfast for six adults.

> Making breakfast with Celia Zamorra/Karatá; Edilmira ?/Karatá; Laurel Chevarría/Karatá; Yoneda Cordoba Tathum/Karatá): In kitchen at 5:30 am. Wash hands with soap. Start fire. Two women go to the well to fetch fresh water. Rice picked clean and washed. Put in pot with beans, which sat overnight in water. Add salt, cover and cook. Meanwhile, a second lady cracks open coconut and proceeds to make tortillas de harina; the third lady makes pan de coco with portion of dough. Breakfast was ready by 6:30 a.m.

General preparation techniques are discussed here in two sections, the first sections explains food preparation and the second with beverages.

Preparation Techniques

Food was prepared in a myriad of ways. Some preparation techniques were straightforward. The simplest method was crudo, Spanish for raw. Raw fruit (like icaco, naranja, guayaba, mango and marañon (*Anacardium occidentale*) or seeds (like carau (*Cassia grandis*) and coyol de leche (*Attalea cohune*) or nuts (like palmera - *Acoelorapphe wrightii* and palma africana) were usually eaten straight off the bush or tree, after any necessary peeling. Occasionally, fruit was rinsed with boiled water

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[152] Cooking tools and other utensils are discussed in further detail in Chapter 5: Household.

before eating (nancite) or sprinkled with salt (mango). Some fruits were mashed and eaten on bread (as with aguacate - *Persea americana* - "butter," for instance).

A number of foods (like arroz, tubers, platano, bredpru and pejibaye[153]) were eaten after boiling them in water and adding salt or other spices. The nuts of palma africana were also boiled and eaten "off the cob." Yuca, other tubers and the many cultivars of banano were cooked along with various spices in coconut milk (the derivation of which is described in <u>Glossary 8: Recipes</u>). The thick, sweet porridge, variously called wabul [Miskito] or atol [Spanish] was "eaten" from a cup.[154] A similar sweet dish, called budín [Spanish], was baked and resembled a sponge cake. Another confection, called caheta de coco [Spanish], was made using grated coco as the main ingredient. Many sweet (icaco, marañon and guayaba) and sour (especially mango) fruits were made into jelly.

Frying was another commonly employed technique (both for plant- and meat-based foods). In this case, it was not the method that was unique but the cooking oil that imparted an exotic taste in Miskito dishes. Some breads, bredpru and platano were fried in coco oil. Coco oil preparation is discussed in <u>Glossary 8: Recipes</u>.

Roasting was sometimes used in bread making by placing partially cooked dough directly into the fire. Nuts might also be roasted. Marañon nuts were roasted outdoors because the seed coat contains a caustic substance called cardol that is liberated during roasting. Not only did this produce irritating smoke but also the nuts could catch on fire in an explosive manner making outdoor preparation almost

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[153] The Atlantic coast of Nicaragua is said to host "truly wild peach palm" (Smith, et al. 1992: 304).

[154] Marx and Heath (1992) also mentioned a dish called ulang [Miskito], a thick broth derived from maíz or yuca; informants in this study did not use this term.

mandatory. This, of course, was referred to as toasting. Roasted nuts may be eaten as is or processed into "butter" (similar to peanut butter).

Baking was particularly interesting given the cooking apparatus. It could be relatively effortless with an oven-equipped kubus. But without a built-in oven, baking was accomplished either on the stovetop or on a temporary outdoor fire. Breads or cakes were placed in a cast iron cooking pan, the size of which depended upon the food.[155] A piece of tin was laid on top of the pan which, in turn, was topped with three pieces of firewood.[156] Thus, heat could be generated on all sides of the pan.[157]

Beverage preparation was not terribly remarkable, ranging from fresh to cooked to distilled. Fresh preparations were simple; fruits (like marañon, toronja -*Citrus paradisi* or guanábana) were squeezed into a container yielding pure jugo [Spanish]. The juice of other fruits was always mixed with water; this was especially true for the various forms of limon (*Citrus* spp.). Some beverages required more processing.

Most drinks involved cooking various parts (including seeds, fruits and/or calyces). A warm drink was made from cooked carau seeds in coco milk. Another drink, anivel, was made by cooking various fruits (including icaco, jocote - *Spondias purpurea*, mango, marañon, papaya – *Carica papaya* and piña) with sugar; other spices were added and then "drink like water" (Anelia Zacarías/Tuapí), meaning that it should be consumed at room temperature.

The most popular homemade beverage documented in this study was fresco [Spanish]. Fresco was made by cooking mashed parts (seeds, fruits or calyces) of

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[155] Some baking pans were the size of a large saucepan and others resembled woks.

[156] Methods of fire building, particularly the use of three pieces of firewood, are discussed further in Chapter 8: Fuel.

[157] More information on fuel choices is found Chapter 8: Fuel.

various plants (carau, granadilla, guanábana, guapinol - *Hymenaea courbaril*, guayaba, various cultivars of limon, mango, marañon, palma africana, tamarindo – *Tamarindus indica* and wain – *Hibiscus sabdariffa*) in water. When seeds were used, they were often cooked first, then ground and mixed with water. Fresco was consumed hot (Yoneda Córdoba Tathum/Karatá) or cooled (Salvador Perez[158]/Karatá).

Tea and coffee were also popular in the communities. Tea was made from fresh citrus or ti (*Cymbopogon citratus*) leaves steeped in hot water, which leaves might not be removed before serving. Another refreshing tea was made from grated zinza root with sugar added, if available. A greater variety of teas were used for medicinal purposes.[159] Coffee on the East Coast was not homegrown. Not a single coffee tree was documented in this study because people drank instant coffee. Instant coffee was convenient, stored well and affordable if consumed parsimoniously.

The final method of beverage preparation documented in this study was fermentation. Misla [Miskito] was made from a juice extracted from the stems of caña that was placed in a container with sugar and left in the sun for four days. This drink was also called chicha [Spanish]. Maíz could be used in place of caña, as is the case with Garífuna populations (Coe and Anderson 1996). Another fermented drink was called wain [Miskito]. Calyces from the plant, also named wain [Miskito], were either boiled or put in hot water. Then, in a container with a lid, it was left in the sun to ripen for two to three days. Sugar and spices could be added. The Garífuna, to the south, also make wain in this way (Coe and Anderson 1996).[160]

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[158] Salvador Perez (Karatá) recommended "add[ing] ice."

[159] See Chapter 2: Medicine for details on medicinal teas.

[160] Another fermented beverage was documented by Young (1842) amongst the Miskito but was not mentioned by informants in this study. The coyol de leche (*Attalea cohune*) tree exudes a liquid called vino de coriole. It was obtained by felling the tree,

Food Storage

Food storage options were limited on the Miskito Coast. Lack of refrigeration, rainy season dampness and vermin all contributed to a short shelf life for most foods (See Table 3.7). All of the items listed in Table 3.7 are fresh, unprocessed foods and the majority of them could be stored only for a week or less.

Table 3.7. Storage Intervals for Selected Foods

Plant Name	Period Before Spoilage
ahsi	1 month
banano cultivars	A few days
citrus	A few days
coco	3-4 weeks
cuadrado	A few days
dasheen	4-5 days
guanábana	A long time
mango	Two to three weeks immature
marañon	Two days
palma africana	One week
quequisque	4-5 days

Community members knew that careful harvesting was their greatest defense against food loss. Tubers store best in the dry ground, so yuca and other root crops were harvested piecemeal, usually no more than a couple days' supply (see also Nietschmann 1973). Coco lasted longer with the husk peeled off (Nena Castillon and Richaina Mybith/Lamlaya). Picking some fruits while green and allowing them to ripen over a period of days meant fewer trips to obtain them (Anelia Zacarías/Tuapí; Yoneda Cordoba Tathum/Karatá).

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removing the leaves, binding it tightly with a rope and capping the apex with mud (to retain the liquid). A hole about a foot deep and five inches wide was cut and the exposed tissue was covered with leaves. After twelve hours, the accumulated liquid was poured off and the outer layer of the exposed plant tissue was shaved, covered again and continued yielding liquid for up to forty-five days. By the third day, the liquid was "strong" and reached "perfection" by the twentieth day.

For long-term storage, some items could be dried. In fact, a drying platform was a permanent part of many homes.[161] Drying was a popular preserving method for both plant-based and non-plant foods.[162] Arroz was dried on large pieces of burlap cloth, around which a temporary fence was built to keep out the chickens and pigs.[163] Once dry, it was threshed in a giant mortar called a nuh [Miskito][164] and then stored in large plastic drums. Maíz was dried in the sun for about 30 minutes and then ground into flour in which form it could be stored for a short time in a tight container.[165] Herein lies the key: Containers must be fastened, not only to keep out the dampness but also to keep out rats and other vermin.[166]

Fermentation, another way to prolong the storage life of foods, was little used in the study communities. Marx and Heath (1992) and Nietschmann (1973) documented Miskito foods that are fermented as part of their preparation. Fermentation was only a factor for beverage making in this study and it appeared to be less for its preservative properties than for its alcoholic content (see misla and wain, in <u>Glossary 8: Recipes</u>).

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161 The drying platform is described in more detail in <u>Chapter 6: Construction</u>.

162 Wahsi sirpi [Miskito, meaning "small shrimp"] or el chacalín [Spanish] was plentiful in the dry season when the lagoon waters are low. Large quantities were dried atop an elevated piece of tin for about one week; then salt was added. The shrimp kept for a long time and could be eaten later when they were not readily available (Salvador Perez/Karatá). Kalwa [Miskito] or robalito [Spanish], (*Centropomus* spp.) were highly esteemed fish. The head was removed and the body cut open along the backbone and, without removing the bone, hung to dry. More information on meat storage procedures is available in Nietschmann (1973: 211).

163 In Asang, rice was dried atop a bamboo platform. However, observations during this study indicated that the raised platform was more popular for drying shellfish.

164 This and other household items are discussed in detail in Chapter 5.

165 While corn flour may have an extended shelf life, many informants mentioned drying and grinding corn kernels into flour just prior to use.

166 In Tuapí, the regular raiding by rats of a large plastic barrel of rice was easily remedied by the woman of the house who placed a heavy object atop the ill-fitting lid.

Overall, Miskito preferred fresh food; it simply "tastes better fresh" (Nena Castillon/Lamlaya). Fruits, vegetables, spices and baking goods were thus stored in small quantities for periods of short times and frequent food collecting trips were considered worthwhile. The absence of refrigeration,[167] increased dampness in the wet season and risk of infestation by pests make frequent harvesting a necessity.

The Foods

The edible plants documented in this study are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 for more information on the plants in this listing. The location(s) of the plant within the study sites, other plant uses documented in this study and similar uses found in established literature are provided, where applicable. Nutritional information for most of the plants is located in Glossaries 1 and 2; recipes are listed in Glossary 8.

achiote (*Bixa orellana*)
Cultivated (Home Garden – Common; Patio – Rare); Purchased
Ground SEED: Added to meat or soup as coloring
Other uses in this study: Medicinal
Literature pertaining to food usage:
Lentz 1993: SEED ARILS as food coloring and flavoring
Morton 1981: Food colorant (including soft drinks, cheese, butter, soups, rice)
Smith, et al. 1992: Food coloring until the advent of synthetic colorants
Wiersema and Leon 1999: Food coloring

aguacate (*Persea americana*)
Cultivated (Patio – Rare)
FRUIT: Made into bread spread
Other uses in this study: None
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Tea
Morton 1981: FLESH eaten raw, in salads, soups, guacamole, milkshake
Smith, et al. 1992: Eaten with tortillas as guacamole or cut up in soup
Wiersema and Leon 1999: FRUIT eaten

[167] Most communities in this survey did not have electricity; in those communities with electricity, not everyone had access to it.

ahsi (*Bromelia pinguin*)
Wild
FRUIT: Eaten raw as snack
Other uses in this study: None
Literature pertaining to food usage:
Morton 1981: Young SHOOTS edible; FRUIT juice taken, vinegar
Padilla 1973: INFLORESCENCE tasty vegetable; FRUIT used to make vinegar and a refreshing beverage

ajo (*Allium sativum*)
Home Garden (sown)
BULBULES cooked in many dishes
Other uses in this study: Medicine, Superstition
Literature pertaining to food usage for this species and the genus:
Duke, 1981: *Allium spp.*: Onion BULB eaten raw or cooked; to season pickles, curries and stews
Morton 1981: Important vegetable; popular flavoring

albahaca (*Ocimum basilicum*)
Cultivated (Home Garden - frequent)
LEAVES: As seasoning
Other uses in this study: Medicine, Superstition
Literature pertaining to food usage for this and other species of the genus:
Bremness 1994: LEAVES used in many dishes; flavors oil, vinegar and pesto; essential OIL flavors condiments and liqueurs
Coe and Anderson 1996: *O. micranthum*: Garifuna use for spice; make a warm LEAF tea as beverage
Morton 1981: LEAF: Food or beverage flavoring; steeped SEEDS as beverage
Wiersema and Leon 1999: Food flavoring

almendra (*Terminalia catappa*)
Cultivated (Patio – Rare); Wild (Spared)
NUT: Eaten raw
Other uses in this study: Medicine
Literature pertaining to food usage:
Morton 1981: Outer flesh of FRUIT eaten by children; NUT eaten roasted or raw, yields good cooking oil
Smith, et al. 1992: NUT and pulpy MESOCARP eaten
Wiersema and Leon 1999: SEEDS eaten

aras pata (*Ixora coccinea*)
Cultivated (Patio – Infrequent)
FLOWER: Remove stigma by pulling it through the base of the corolla tube and suck nectar (like honeysuckle)
Other uses in this study: Ornamental, Medicine
Literature pertaining to food usage: No literature referring to food uses.

arroz (*Oryza sativa*)
Cultivated (Plantation – Common); Purchased
GRAIN: As staple
Other uses in this study: Household
Literature pertaining to food usage:
Bremness 1994: Fermented to rice wine (sake)
Coe and Anderson 1996: Garífuna staple food
Duke 1981: Rice and beans common Latin American dish; Colombia: Rice and corn made into balls and wrapped in *Calathea* leaves; GRAIN fermented to beer; converted to starch for breadstuffs/puddings; SEEDLINGS edible

ayote (*Cucurbita moschata*)
Cultivated (Patio – Rare)
Cooked FRUIT: As vegetable
Other uses in this study: Medicine
Literature pertaining to food usage:
Lentz 1993: Planted in cornfields or next to manioc
Robineau 1991: FRUIT nutritious
Martin and Fennema 2000: Young/mature FRUIT, SEEDS, VINE TIPS edible
Wiersema and Leon 1999: Food

banano (*Musa acuminata*) and varieties including banano de rosa, lakatan
Cultivated (Home Garden – Common; Plantation - Infrequent); Purchased
FRUIT: Eaten raw as vegetable or as wabul
Other uses in this study: Medicine
Literature pertaining to food usage for this species and the genus:
Coe and Anderson 1996: *Musa* sp.: Important Garifuna home garden food crop and staple
Martin and Fennema 2000: *Musa* sp: FRUIT eaten raw and cooked
Smith, et al. 1992: Eaten fresh, sometimes boiled; made into chips, flour and puree; terminal FLOWER eaten; home-brewed beer; used to wrap food
Wiersema and Leon 1999: Beverage base, FRUIT eaten

batata (*Ipomoea batatas*)
Cultivated (Home Garden – Common; Plantation - Infrequent)
TUBER: As vegetable
Other uses in this study: Personal
Literature pertaining to food usage:
Duke 1981: Amerinds cultivated long before Columbus' arrival; TUBER eaten raw or cooked; Mayans bake in ashes, eat unseasoned; LEAVES eaten
Martin and Fennema 2000: SHOOT cooked yielding medium quality food; VINE TIPS and tuberous ROOT cooked
Wiersema and Leon 1999: Starch, vegetable (tuber)

biuhu (*Chrysobalanus icaco* var. *ellipticus*)
Wild
BERRY: Eaten raw as snack
Other uses in this study: Medicine, Fuel, Additional
Literature pertaining to food usage for this and a related species:
Morton 1981: FRUIT and KERNELS eaten raw, as jam, jelly
Pickering 1879: *C. ellipticus*: Black, thin-skinned FRUIT edible

bredbred (*Inga edulis*)
Wild
FRUIT: Eaten raw as snack
Other uses in this study: Fuel
Literature pertaining to food usage:
Coe and Anderson 1996: Used in food
Duke 1981: PULP eaten
Smith, et al. 1992: FRUIT consumed
Wiersema and Leon 1999: FRUIT eaten

bredpru[168] (*Artocarpus altilis*)[169]
Cultivated (Patio – Common)
FRUIT: Eaten like potatoes, fried as chips or boiled whole
LATEX: As chewing gum
Other uses in this study: Medicine, Household, Construction
Literature pertaining to food usage for this and a related species:
Coe and Anderson 1996: Garífuna staple food
Duke 1981: Unripe FRUIT eaten when pulp still white/mealy; eaten raw, baked, boiled, sliced, fried; fermented to form a paste baked into cakes; SEEDS eaten boiled, roasted
Lewis and Elvin-Lewis 1977: *A. cummingianus*: LATEX as chewing gum
Martin and Fennema 2000: FRUIT cooked
Morton 1981: FRUIT eaten baked or boiled (not raw); SEEDS boiled or roasted; cooked male FLOWER eaten
Rabella and Pallais 1994: Edible FRUIT
Smith, et al. 1992: FRUIT/roasted SEED/male FLOWER (with syrup) eaten
Wiersema and Leon 1999: FRUIT: As vegetable, starch source; SEEDS eaten

cacao (*Theobroma cacao*)
Cultivated (Patio – Rare)
SEED: As beverage
Other uses in this study: None
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna make non-fermented, warmed drink
Duke 1981: Dried, roasted and ground to cocao beverage, chocolates; edible PULP makes alcoholic beverages and vinegar
Lentz 1993: Sun-dried, ground SEEDS of ripe fruit with cow's milk or oatmeal
Lewis and Elvin-Lewis 1977: SEED as beverage
Martin and Fennema 2000: As beverage
Morton 1981: Dried SEEDS source of chocolate and cocoa
Smith, et al. 1992: Beverage, candy, juice
Wiersema and Leon 1999: Food flavoring and beverage

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[168] This plant was embroiled in the famous Mutiny on the Bounty. See Dodge (1959) for a good account.

[169] Informants differentiated between spiny and smooth-fruited breadfruit trees, although the uses are similar. Other local literature (Rabella and Pallais 1994) also distinguished between the two cultivars.

canela (*Cinnamomum verum*)
Purchased
BARK: As flavoring in wabul, caheta, anivel, budín[170]
Other uses in this study: Medicine
Literature pertaining to food usage:
Duke 1981: Dried BARK was the cinnamon of commerce
Smith, et al. 1992: Essential OILS flavor food, tobacco and beverages; distilled to produce a cordial (in medieval times); as coffee flavoring
Wiersema and Leon 1999: *Cinnamomum* sp.: Food flavoring

caña (*Saccharum officinarum*)
Cultivated (Plantation – Less Common)
STEM: For sugar and as a candy stick
Other uses in this study: Medicine
Literature pertaining to food usage:
Wiersema and Leon 1999: Food flavoring; beverage base; sugar
Coe and Anderson 1996: Garífuna make non-fermented beverage
Duke 1981: CANES eaten raw or converted to molasses, syrup, soft drinks, rum or alcohol; Panama: Crushed in a press to express juice for drinking; crushed, neutralized with sea shells, strained and boiled down to make sugar; SEEDS edible
Johnson 2000: Source of sucrose
Morton 1981: Fresh STEM chewed for the juice; crushed STEM juice drunk fresh, made into syrup or alcohol

carau (*Cassia grandis*)
Cultivated (Patio – Rare)
FRUITS: drink (fresco); snack
Other uses in this study: Medicine
Literature pertaining to food usage:
Duke 1981: Malodorous PULP around seed edible
Smith, et al. 1992: FRUIT consumed

chile picante (*Capsicum frutescens*)
Cultivated (Home Garden - Infrequent); Purchased
FRUIT: As seasoning
Other uses in this study: Medicine, Superstition, Additional
Literature pertaining to food usage:
Bremness 1994: Used in curries, enliven bland foods
Coe and Anderson 1996: Garífuna use as spice/condiment
Duke 1981: LEAVES: As stew flavor, potherb
Morton 1981: FRUIT eaten fresh, dried or pickled as condiment and ingredient in sauces
Pickering 1879: FRUIT used to make cayenne pepper
Rabella and Pallais 1994: Used as condiment
Wiersema and Leon 1999: Food flavoring (spice)

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[170] See Glossary 8: Recipes for more information.

chiltoma (*Capsicum annuum*)
Cultivated (Home Garden - Infrequent)
FRUIT: As seasoning
Other uses in this study: None
Literature pertaining to food usage for this and species of the genus:
Bremness 1994: Chopped in salads, cooked and pickled
Coe and Anderson 1996: *Capsicum spp.*: Garífuna use as spice/condiment
Duke 1981: Cultivated among Cuna
Lentz 1993: FRUITS (often dried) used as flavoring
Wiersema and Leon 1999: Food coloring and flavoring; FRUIT edible

coco (*Cocos nucifera*)
Cultivated (Patio – Common; Plantation – Less Common); Wild (Spared); Purchased
NUT WATER: As beverage
MEAT (endosperm; copra): Rarely, eaten after drinking the water
MILK: expressed from "meat"; ingredient in baking/cooking; pressed meat normally discarded
Coconut OIL from old nut: Used in cooking
Other uses in this study: Construction, Additional, Medicine, Personal, Superstition
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Food (intoxicant, liqueur)
Coe and Anderson 1996: Important Garífuna staple foods; coconut endosperm for food and source of cooking oil
Duke 1981: Eaten many ways, including: COCO MILK used in recipes; substitute for cream in coffee; to fry food; FLOWER JUICE yields toddy-like apple cider; TERMINAL VEGETATIVE BUD eaten boiled/raw; sprout eaten like celery; STEM PITH pickled in coco vinegar; STARCH extracted from fibrous parts to make bread; scorched ROOTS as coffee substitute; food wrapped in LEAVES and cooked between two halves COCO SHELL
Everett 1969: FLOWER clusters made into palm sugar and palm wine; COPRA yields coco oil for cooking and margarine; monospecific genus
Martin and Fennema 2000: Coconut SPROUT edible; oil
Morton 1981: Grated and powdered MEAT, MILK and CREAM popular in cooking; WATER as beverage; TERMINAL BUD as vegetable; SAP from inflorescence made into sugar or fermented beverage
Nietschmann 1973: As MILK and OIL, used in many foods (rich taste)
Wiersema and Leon 1999: NUT as food
Woodroof 1970: Coco OIL white at room temperature, clear when heated; highly desirable for confections, deep fat frying, bakery goods; CREAM (from grated, pressed meat) used raw for coffee or cooked with meat or as sauce for bananas; OIL used in cooking

coyol de leche (*Attalea cohune*)
Cultivated (Patio – Infrequent; Plantation – Infrequent)
NUT/FRUIT: Eaten raw
Other uses in this study: None
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Liqueur
Lentz 1993: Endosperm consumed fresh
Rabella and Pallais 1994: SAP used to make alcoholic beverage
Wiersema and Leon 1999: Oil/fat edible

cuadrado (*Musa acuminata*)
Cultivated (Home Garden – Common; Plantation - Common); Purchased
FRUIT: Fried or boiled as vegetable or made into wabul
Other uses in this study: Edible
Literature pertaining to food usage for species of this genus:
Duke 1981: See platano
Martin and Fennema 2000: *Musa* sp.: FRUIT eaten raw and cooked

culantro (*Eryngium foetidum*)
Cultivated (Home Garden - Common)
LEAVES: As seasoning
Other uses in this study: Medicine, Superstition
Literature pertaining to food usage:
Coe and Anderson 1996: Used as spice by Garífuna
Duke 1981: LEAF flavors soups
Lentz 1993: Young LEAVES eaten as potherb or mixed with fried foods
Morton 1981: Food flavoring; commonly used in soup and stew
Rabella and Pallais 1994: Used as condiment
Wiersema and Leon 1999: Food flavoring

dasheen (*Colocasia esculenta*)
Cultivated (Home Garden – Infrequent; Plantation – Common); Purchased
TUBER: As vegetable
Other uses in this study: None
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Intoxicant
Coe and Anderson 1996: Important Garifuna field crop and staple food
Lentz 1993: TUBERS chopped, boiled and eaten in soup
Martin and Fennema 2000: CORM cooked
Rabella and Pallais 1994: Edible TUBER
Wiersema and Leon 1999: Vegetable

frijol (*Phaseolus vulgaris*)
Cultivated (Plantation – Less Common); Purchased
BEANS: As vegetable
Other uses in this study: None
Literature pertaining to food usage:
CIAT 2000: Fourth most important protein source in tropical America; a cheap alternative to beef and milk. Comparing beans and cattle grown on one hectare of land, beans produce 123kg of protein versus 3.4kg from cattle.
Coe and Anderson 1996: Important Garifuna field crop and staple food
Duke 1981: Cooked SEEDS edible; Maya boil in salt water; small, white BEAN cooked with toasted squash seeds and chopped onion leaves
Martin and Fennema 2000: POD and dry SEEDS edible
Wiersema and Leon 1999: Pulse, vegetable

frijol blanco (*Canavalia ensiformis*)
Cultivated (Home Garden - Rare)
FRUIT: As vegetable
SEEDS: As side dish
Other uses in this study: None

Literature pertaining to food usage:
Martin and Fennema 2000: Small, young POD edible; poisonous and risky to use when older
Wiersema and Leon 1999: Soil improver; vegetable

granadilla (*Passiflora quadrangularis*)
Cultivated (Home Garden - Rare); Purchased
FRUIT: As dessert or drink
Other uses in this study: None
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna make non-fermented drink from FRUIT
Duke 1981: Ripe FRUITS edible; green, cooked as vegetable; ROOTS edible after baking or roasting; SEEDS should not be consumed
Morton 1981: Green FRUIT boiled as vegetable; ripe FRUIT eaten raw, candied, preserved PULP as beverage, dessert
Pickering 1879: Succulent PULP; must be artificially fertilized to produce fruit
Rabella and Pallais 1994: FRUITS for beverage
Smith, et al. 1992: Consumed as juice
Wiersema and Leon 1999: Beverage base; FRUIT eaten

guanábana (*Annona muricata*)
Cultivated (Patio – Common)
FRUIT: Eaten raw
FRUIT juice: As beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Liqueur; tea
Coe and Anderson 1996: Garífuna make non-fermented drink with fruit pulp mixed with milk and sugar
Duke 1981: Ripe FRUITS edible; made into jellies, preserves and beverage; chewed PULP expectorated into soup
Pickering 1879: FRUIT eaten; LEAVES: As tea
Smith, et al. 1992: Consumed as fruit, drink and ice cream
Wiersema and Leon 1999: FRUIT was beverage base

guapinol (*Hymenaea courbaril*)
Wild
FRUIT: Eaten raw as snack or made into beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Duke 1981: Malodorous PULP around seed edible; mixed with water as beverage, may be fermented
Lewis and Elvin-Lewis 1977: SEED pulp as carbohydrate source for making alcoholic beverage
Morton 1981: PULP eaten; dissolved in water and fermented to beverage
Rabella and Pallais 1994: Edible FRUIT
Wiersema and Leon 1999: FRUIT eaten

guayaba (*Psidium guajava*)
Patio (Common)
　　Immature and mature FRUIT: As jelly
　　Mature FRUIT juice: As beverage
　　Mature FRUIT: Eaten raw
Other uses in this study: Medicine
Literature pertaining to food usage:
　　Duke 1981: FRUIT edible; for wine, jelly; ROOTS eaten in soup
　　Martin and Fennema 2000: FRUIT eaten raw or cooked
　　Morton 1981: Fresh or dried FRUIT to make beverage
　　Smith, et al. 1992: Consumed as fruit
　　Wiersema and Leon 1999: Beverage base; FRUIT eaten

guayaba acido (*Psidium cattleianum* var. *littorale*)
Patio (Sown)
　　FRUIT eaten raw as snack
Other uses in this study: Medicine, Superstition
Literature pertaining to food usage:
　　Wiersema and Leon 1999: FRUIT eaten

guayaba rosa (*Psidium cattleianum*)
Patio (Sown)
　　FRUIT eaten raw as snack
Other uses in this study: None
Literature pertaining to food usage:
　　Wiersema and Leon 1999: FRUIT eaten

ibu (*Dipteryx oleifera*)
Wild
　　COTYLEDONS: Eaten raw as snack
Other uses in this study: Medicine
Literature pertaining to food usage:
　　Coe and Anderson 1996: Spice; forest food; SEED: Famine food; BEAN: non-fermented drink
　　Wiersema and Leon 1999: Serves as a substitute for vanilla

icaco (*Chrysobalanus icaco*)
Wild
　　BERRY: Eaten raw as snack
Other uses in this study: None
Literature pertaining to food usage:
　　Duke 1981: FRUITS eaten fresh, preserved; SEEDS edible, sometimes strung as candlenuts
　　Johnston and Colquhoun 1996: Edible OIL and FRUIT
　　Morton 1981: FRUIT and KERNELS eaten raw, as jam, jelly
　　Pickering 1879: Jamacians eat NUT interior; FRUIT: yellow
　　Rabella and Pallais 1994: Edible FRUITS
　　Wiersema and Leon 1999: FRUIT eaten as preserves

jocote (*Spondias purpurea*)
Cultivated (Patio – Rare)
FRUIT: As snack and drink
Other uses in this study: Construction
Literature pertaining to food usage:
Duke 1981: FRUIT eaten green, ripe, raw, cooked; as beverage; Colombia: pickled green in vinegar; LEAVES edible; SHOOTS edible, raw or cooked; SEEDS may be eaten; Trinidad: BUDS as vegetable
Morton 1981: FRUIT eaten raw, cooked, preserved, pickled, fermented to intoxicating beverage
Smith, et al. 1992: FRUIT eaten
Wiersema and Leon 1999: FRUIT edible

kru (*Psidium guineense*)
Wild (Spared)
FRUIT: Eaten raw as snack
Other uses in this study: None
Literature pertaining to food usage:
Smith, et al. 1992: Consumed as FRUIT
Morton 1981: Fresh or dried FRUIT to make beverage
Wiersema and Leon 1999: FRUIT eaten

limon agrio (*Citrus aurantiifolia*)
Cultivated (Patio – Common)
FRUIT juice: As beverage
Other uses in this study: Medicine, Household
Literature pertaining to food usage:
Duke 1981: JUICE as spice; as hot sauce with *Capsicum*
Martin and Fennema 2000: FRUIT eaten raw
Morton 1981: FRUITS for ade, food flavoring, pickled when green
Smith, et al. 1992: Juice and flavoring
Wiersema and Leon 1999: Flavoring; beverage base, fruit

limon mandarina (*Citrus reticulata*)
Cultivated (Patio – Common); Purchased
FRUIT juice: As beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Martin and Fennema 2000: FRUIT eaten raw
Morton 1981: FRUIT was leading source of breakfast juice
Smith, et al. 1992: As fruit and juice
Wiersema and Leon 1999: Fruit

limon merikano (*Citrus* sp.)
Cultivated (Patio – Common)
FRUIT: Eaten raw as snack
Other uses in this study: Medicine
Literature pertaining to food usage for the genus:
Martin and Fennema 2000: *Citrus* sp.: FRUIT eaten raw
Smith, et al. 1992: *Citrus* sp.: Used variously as fruit, juice and flavoring

limon Miskito (*Citrus* sp.)
Cultivated (Patio – Common)
FRUIT juice: As beverage
Other uses in this study: Medicine
Literature pertaining to food usage for this genus:
Martin and Fennema 2000: *Citrus* sp.: FRUIT eaten raw
Smith, et al. 1992: *Citrus* sp.: Used variously as fruit, juice and flavoring

limon puro (*Citrus limon*)
Cultivated (Patio – Common); Purchased
FRUIT: As snack
FRUIT juice: As beverage; used to clean meat before cooking
Other uses in this study: Medicine, Household, Personal
Literature pertaining to food usage for this genus:
Martin and Fennema 2000: *Citrus* sp.: FRUIT eaten raw
Smith, et al. 1992: *Citrus* sp.: Used variously as fruit, juice and flavoring

limon real (*Citrus* sp.)
Cultivated (Patio – Common)
FRUIT juice: As beverage
Other uses in this study: Personal
Literature pertaining to food usage for this genus:
Martin and Fennema 2000: *Citrus* sp.: FRUIT eaten raw
Smith, et al. 1992: *Citrus* sp.: Used variously as fruit, juice and flavoring

maiz (*Zea mays*)
Cultivated (Plantation – Common); Purchased
KERNELS: As vegetable
Other uses in this study: Medicine, Household
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Intoxicant, liqueur
Bremness 1994: Eaten as sweet corn, popcorn, corn meal, hominy; yields corn oil, flour and bourbon
Coe and Anderson 1996: Roasted and boiled by Garifuna; important staple food and cereal; makes chicha
Duke 1981: Panama: Green EAR eaten boiled/roasted; Mayans dried/stored on stalk; Panama: Stored on special shelf above fire site; KERNELS nutritious; cooked with meat; converted to starch for bread, atol, cornsticks, tortillas; boiled to make pizole; meal toasted to make pinole or boiled like gruel (to which cacao or caña may by added); fermented to beer/alcohol
Martin and Fennema 2000: Immature ear eaten
Morton 1981: SILKS flavor soft drinks, baked goods, candy and ice cream; South America: Colored strains used to make intoxicating beverages

malanga (*Dioscorea trifida*)
Cultivated (Home Garden - Infrequent)
TUBER: As vegetable
Other uses in this study: None
Literature pertaining to food usage for this and the genus:
Coe and Anderson 1996: Important Garífuna home garden crop

Duke 1981: *Dioscorea spp.*: Edible TUBERS baked, boiled, or ground into flour to make bread-stuffs; native species roots purportedly inedible
Martin and Fennema 2000: TUBERS cooked
Wiersema and Leon 1999: Vegetable

mamón (*Melicoccus bijugatus*)
Cultivated (Patio – Rare)
FRUIT: Eaten raw
Other uses in this study: None
Literature pertaining to food usage:
Duke 1981: Roasted SEED edible; used as yuca substitute by Orinoco Indians; PULP around seeds delicious
Morton 1981: FRUITS eaten by children and for ade
Smith, et al. 1992: FRUIT consumed
Wiersema and Leon 1999: FRUIT

mango (*Mangifera indica*) and cultivars, including mango #11, beep mango, mango caraña, mango chancho, ihri mango, kidney mango, mango liso, mango manzana, mango manzanilla, mango mechudo, mango puro, mango rosa, round mango, sugar mango and torkentime mango
Cultivated (Patio – Common); Wild (Spared)
FRUITS: Snack, side dish and beverage
Other uses in this study: Medicine, Superstition, Additional
Literature pertaining to food usage:
Cisneros, García and Dávila 1992: Cultivated for FRUITS
Coe and Anderson 1996: Most frequently cultivated Garifuna tree; FRUIT important seasonal food
Duke 1981: Eaten many ways, including: Ripe FRUIT (Cuba): Squash substitute, eaten fried/in omelets/with rice; young FLOWERS/LEAVES edible; GUM from trunks
Martin and Fennema 2000: FRUIT eaten raw or cooked
Morton 1981: FRUIT esteemed throughout tropics; LEAF tea as beverage
Pickering 1879: Unripe FRUIT for conserves, tarts, pickles
Smith, et al. 1992: FRUITS canned; immature FRUITS pickled or used in chutney; dried FRUITS ground as spice in cooking
Wiersema and Leon 1999: FRUIT eaten; beverage base

cv. beep mango
Knight and Schnell 1994: May be "peach" mango, introduced in Florida in 1868

cv. mango #11
Knight and Schnell 1994: No.11' came from Jamaica; planted there in 1782 after being found on a captured french vessel

cv. mango torkentime
Duke 1981: FRUIT from spontaneous seedlings may have turpentine flavor
Knight and Schnell 1994: SEEDS of the 'Turpentine' cultivar began distribution around 1880s; small, fibrous fruits with strongly resinous flavor; probably originated in Africa
Pickering 1879: FRUITS are turpentine flavored on ungrafted trees

marañon (*Anacardium occidentale*) and varieties,including marañon amarillo, marañon blanco, marañon de piña and marañon rojo
Cultivated (Patio – Common); Wild (Spared)
    Immature FRUIT: Juice, fresco, anivel
    Mature FRUIT: Eaten raw, made into jelly
    NUT: Eaten and made into cashew butter
Other uses in this study: Medicine
Literature pertaining to food usage:
    Cisneros, García and Dávila 1992: Edible FRUIT and NUT
    Coe and Anderson 1996: (Garífuna) Non-fermented drink from APPLE[171]
    Duke 1981: APPLE edible raw but hull contains acrid oil, made into jelly, fermented to alcohol/vinegar; avoid NUT (seed) until after roasting;
    Morton 1981: APPLE boiled to syrup
    Pickering 1879: Roasted before eating; FRUIT JUICE as wine or punch
    Smith, et al. 1992: NUTS as snack; used in confections/baking; APPLE eaten fresh, made into preserves or candies, squeezed to make juice that could be used to make cashew brandy and cashew wine; sweetens breath

masra (*Salacia impressifolia*)
Wild
    FRUITS: Eaten raw as snack
Other uses in this study: None
Literature pertaining to food usage: No literature referring to food uses.

nancite (*Byrsonima crassifolia*)
Cultivated (Patio – Common); Wild (Spared); Purchased
    FRUIT: Eaten raw as snack or made into beverage
Other uses in this study: Medicine, Fuel, Superstition
Literature pertaining to food usage:
    Beckstrom-Sternberg, Duke and Wain 1994: Liqueur
    Duke 1981: FRUIT as fermented beverage, sometimes frozen on a stick; edible butter extracted when boiled
    Morton 1981: FRUIT eaten with rice, soups, tamales, preserves; juice in carbonated drinks, fermented to chicha
    Smith, et al. 1992: Consumed as fruit
    Wiersema and Leon 1999: FRUIT eaten; charcoal

naranja dulce (*Citrus sinensis*)
Cultivated (Patio – Common); Wild (Spared); Purchased
    FRUIT: Eaten raw
Other uses in this study: Medicine
Literature pertaining to food usage:
    Coe and Anderson 1996: Garífuna cash crop; valuable vitamin/mineral source; non-fermented beverage
    Duke 1981: PEELINGS as food flavoring
    Martin and Fennema 2000: FRUIT eaten raw

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[171] The apple is the swollen pedicel that attaches the nut to the tree (Allaby 1929; Duke 1981; Smith, et al. 1992).

Smith, et al. 1992: FRUIT eaten and as juice
Wiersema and Leon 1999: FRUIT eaten and as juice, flavoring

naranjagrio (*Citrus aurantium*)
Cultivated (Patio – Common); Wild (Spared)
FRUIT juice: Rubbed on meat as seasoning before cooking
Other uses in this study: Medicine
Literature pertaining to food usage:
Duke 1981: Bitter juice of FRUITS used to remove wild taste from game
Coe and Anderson 1996: Garífuna cash crop; valuable vitamin/mineral source
Martin and Fennema 2000: FRUIT eaten raw
Morton 1981: Marmalade; PEEL OIL flavors food
Paul and Cox 1995: FRUIT to clean meats before cooking, added for taste and to help browning; FRUIT juice boiled with salt and strained through cloth to make 'vinaigre' for pickling vegetables; SKIN used to make rum/liqueur; white part of RIND used to make preserves; ripe FRUIT stored with other fruits to hasten ripening; as rootstock for sour orange
Smith, et al. 1992: Marmalade flavoring
Wiersema and Leon 1999: FRUIT: Beverage, flavoring; PEEL: Marmalades

paisagua (*Dioscorea bulbifera*)
Cultivated (Home Garden – Infrequent; Plantation – Less Common)
TUBER: As vegetable
Other uses in this study: None
Literature pertaining to food usage:
Duke 1981: BULBS (aerial) and TUBERS edible if peeled, sun-dried, cooked; TUBERS best when plant dying back for dry season
Robineau 1991: STARCH qualitatively and quantitatively similar to cornstarch
Wiersema and Leon 1999: BULBILS/TUBERS as vegetable

palma africana (*Elaeis oleifera*)
Cultivated (Patio – Common); Wild (Spared)
SEEDS: As snack
SEED juice: As beverage base
FRUITING STALK: As an "on the cob" vegetable
Other uses in this study: Superstition, Edible, Personal, Construction
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna forest food; fruit PULP as famine food; SEEDS as cooking oil; non-fermented drink from SEED PULP when crops fail
Martin and Fennema 2000: As oil
Wiersema and Leon 1999: Oil/fat for food

palmera (*Acoelorraphe wrightii*)
Wild (Spared)
APICAL MERISTEM: Eaten raw[172]
Other uses in this study: Medicine, Construction, Household
Literature pertaining to food usage: No literature referring to food uses.

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[172] Palmera hearts are also eaten on trips in the bush (Salvador Perez/Karatá).

papaya (*Carica papaya*)
Cultivated (Home Garden – Infrequent; Patio – Common)
FRUIT juice: As beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna make non-fermented drink from FRUIT
Duke 1981: Eaten many ways including: RIPE FRUIT: Preserved as a candy, confection, paste, puree, syrup, canned juice; RIPE PULP usually eaten as is, salt and pepper may be added; GREEN FRUIT boiled as vegetable, applesauce substitute, pickled, mashed to make beverage; YOUNG LEAVES, FLOWERS, YOUNG STEM PITH and SEEDS edible
Martin and Fennema 2000: FRUIT eaten raw or as juice
Morton 1981: FRUIT juice as beverage; FRUIT cooked as veggie; bruised LEAVES wrapped around tough meat
Pickering 1879: LEAVES/green FRUIT: As meat tenderizer
Smith, et al. 1992: As FRUIT and meat tenderizer
Wiersema and Leon 1999: Tenderizer, retards fermentation; FRUIT beverage

pejibaye (*Bactris gasipaes*)
Cultivated (Patio – Rare); Wild
NUT: Eaten boiled as snack
Other uses in this study: None
Literature pertaining to food usage:
Coe and Anderson 1996: Important Garífuna forest food; SEED PULP as beverage when crops fail
Roberts 1827: FRUIT excellent substitute for bread or vegetables
Smith, et al. 1992: Eaten many way, including: Starchy FRUITS and celery-like HEART OF PALMS edible; boiled in saltwater, outer skin removed and fleshy interior eaten; FLOWERS, SAP and FRUITS as flavoring/beverages
Wiersema and Leon 1999: Fruit, oil, fat, starch, vegetable

pera (*Syzygium malaccense*)
Cultivated (Patio – Rare)
FRUIT: Eaten raw
Other uses in this study: None
Literature pertaining to food usage:
Smith, et al. 1992: FRUIT eaten
Wiersema and Leon 1999: FRUIT edible

piña (*Ananas comosus*)
Cultivated (Home Garden - Infrequent)
FRUIT: As snack, beverage
Other uses in this study: None
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Intoxicant
Coe and Anderson 1996: Major Garífuna field/cash crop; non-fermented drink
Duke 1981: Cooked RIND makes chicha; ingredient in various dishes
Morton 1981: Eat PULP fresh/canned, young, tender SHOOTS; meat tenderizer
Wiersema and Leon 1999: Food tenderizer; FRUIT as beverage

pispis (*Lagenaria siceraria*)
Cultivated (Patio – Rare)
FRUIT: As vegetable
Other uses in this study: None
Literature pertaining to food usage:

Duke 1981: Young FRUIT/SHOOTS/LEAVES eaten cooked
Martin and Fennema 2000: Young FRUIT and SEEDS edible
Marx and Heath 1992: Lists pispis as calabazo with scientific name: *L. vulgaris*
Morton 1981: Young FRUITS/LEAVES eaten cooked
Wiersema and Leon 1999: Young FRUITS eaten as vegetable

platano (*Musa x paradisiaca*) and cultivars, including filipita[173], hunded finger, pelipink[174] and wiwi[175]
Cultivated (Home Garden – Common; Plantation – Common); Purchased
FRUIT: Eaten boiled or fried as vegetable or made into wabul
Other uses in this study: Medicine
Literature pertaining to food usage:

Coe and Anderson 1996: Important Garifuna home garden crop
Duke 1981: Eaten many ways, including: FRUIT cooked, steamed, boiled, baked, fried; as beer; Panama: GREEN PEEL in soup counters over saltiness; RIPE FRUITS peeled, sliced, dried, preserved, taken on trips; most parts edible; ASHES salt substitute
Morton 1981: Major food in much of the world
Smith, et al. 1992: Usually eaten boiled, steamed or fried; made into chips, flour and puree; terminal male FLOWER eaten
Wiersema and Leon 1999: Beverage base; fruit; starch

cv. filipita

Smith, et al. 1992: Probably the cooking banana called pelipita that shows high resistance to Panama Disease as well as Black Sigatoka
Stover and Simminds 1987: Less disease-resistant cultivars in Central America have been replaced by pelipita

quequisque (*Xanthosoma violaceum*)
Cultivated (Home Garden – Infrequent; Plantation – Common); Purchased
TUBER: As vegetable
Other uses in this study: None
Literature pertaining to food usage for this and other species of the genus:

Coe and Anderson 1996: *X. sagittifolium*: Garífuna field crop and staple food
Lentz 1993: ROOTS eaten and boiled or roasted
Martin and Fennema 2000: *Xanthosoma* sp.: CORM cooked; *X. brasiliense*: Cooked LEAF and STEM yield high quality food
Wiersema and Leon 1999: Vegetable; starch

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173 "Similar to platano but grows better" (Fernando Hodgson/Lamlaya).

174 Erwin Taylor (Tuapí) described this as "cuadrado duro".

175 "Like banano but eaten like platano" (Janis Molina/Haulover)

sandia (*Citrullus lanatus*)
Cultivated (Home Garden - Infrequent)
FRUIT: As snack
Other uses in this study: None
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna make non-fermented drink
Duke 1981: Panama: RIND sometimes preserved in sugar or vinegar
Morton 1981: RIND eaten pickled or preserved; roasted SEEDS edible
Wiersema and Leon 1999: FRUIT eaten

sapote (*Pouteria sapota*)
Cultivated (Patio – Rare); Wild (Spared)
FRUIT: Eaten raw
Other uses in this study: None
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna seasonal food
Ibarra-Manríquez, et. al. 1997: Edible fruits
Kricher 1989: LATEX yields chicle (the base of chewing gum)
Martin and Fennema 2000: FRUIT eaten raw
Peck 1947: FRUIT gives chicle
Smith, et al. 1992: FRUIT consumed

snaiya (*Pachyanthus lundelliana*)
Wild
FRUIT: Eaten raw as snack
Other uses in this study: None
Literature pertaining to food usage for a related genus:
Duke 1981: *Miconia spp.*: FRUITS mostly edible
Lewis and Elvin-Lewis 1977: *Miconia sp.*: LEAF tea

susul (*Alibertia edulis*)
Wild
FRUIT: Eaten raw as snack[176]
Other uses in this study: Household
Literature pertaining to food usage: No literature referring to food uses.

swim kiama (unidentified fungus)
Wild
ENTIRE: Edible[177]
Other uses in this study: Medicine
Literature pertaining to food usage: No literature referring to food uses.

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[176] "Black when mature. Peel, suck liquid and spit the seed" (Juan Carrasco Montoya/Lamlaya).

[177] The method of consumption was not given; the informant stated "Chinese eat it" (Janis Molina/Haulover). See "Further Thoughts" at the end of this chapter for a discussion on the Miskito use of mushrooms.

tamarindo (*Tamarindus indica*)
Cultivated (Patio – Common)
SEEDS: As beverage
FRUITS: As beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Coe and Anderson 1996: (Garífuna) Non-fermented drink from SEED PULP
Duke 1981: Eaten many ways, including: FRUIT PULP edible; Panama: Made into curries, beverages; dry, keeps well as a chewy candy; mixed with honey to make a sweetmeat; SEEDS eaten boiled/fried after being roasted, soaked and peeled; COTYLEDONS, SEEDLING, LEAF, FLOWERS, GREEN PODS eaten; SEED OIL used in cooking
Martin and Fennema 2000: FRUIT eaten raw or as juice
Morton 1981: LEAF tea with those of naranjagrio and guanábana; PULP as confection, syrup, beverage, sauces, sweet soups
Pickering 1879: India: PULP made into beer; SEEDS boiled, fried
Smith, et al. 1992: Juice, vegetable, sauces, candy
Wiersema and Leon 1999: Food flavoring

ti (*Cymbopogon citratus*)
Cultivated (Home Garden - frequent)
LEAVES: As tea
Other uses in this study: Medicine
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Tea
Bremness 1994: STEM/LEAF in Thai cuisine; essential OIL used in food
Coe and Anderson 1996: Warm tea as beverage
Wiersema and Leon 1999: Flavoring

tomate (*Lycopersicon esculentum*)
Cultivated (Home Garden – Infrequent; Plantation – Less Common); Purchased
FRUIT: As vegetable
Other uses in this study: None
Literature pertaining to food usage:
Bremness 1994: Raw or cooked to add significant flavoring
Duke 1981: FRUIT eaten raw or stewed
Martin and Fennema 2000: Young or mature FRUIT edible
Morton 1981: Eaten raw, cooked, canned, processed to juice, paste or in soup

toronja (*Citrus paradisi*)
Cultivated (Patio – Common)
FRUIT: Eaten raw
FRUIT juice: As beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Coe and Anderson 1996: Garífuna cash crop; vital vitamin/mineral source
Duke 1981: Panama: Rarely planted because too sour
Martin and Fennema 2000: FRUIT eaten raw
Wiersema and Leon 1999: Flavoring; beverage base, fruit

uva del mar (*Coccoloba uvifera*)
Wild
BERRY: Eaten raw as snack
Other uses in this study: Medicine
Literature pertaining to food usage:
Coe and Anderson 1996: Food
Duke 1981: PULP acid; edible fresh or in jams; beverage can be fermented
Morton 1981: FRUIT eaten raw or for juice, jelly, wine
Pickering 1879: Edible FRUIT
Wiersema and Leon 1999: FRUIT for preparing jelly

wain (*Hibiscus sabdariffa*)
Cultivated (Home Garden - Infrequent)
BUDS/SEPALS: As non-alcoholic and alcoholic beverage
Other uses in this study: Medicine
Literature pertaining to food usage:
Coe and Anderson 1996: Most frequently cultivated Garífuna shrub; red calyces used to make a holiday beverage
Duke 1981: CALYCES for beverage, jelly, jam; LEAVES as potherb, salad, curries; SEEDS eaten in Africa; toasted FRUITS make coffee-like beverage
Kays and Silva Dias 1995: CALYX and LEAVES eaten cooked
Martin and Fennema 2000: CALYCES of pod as fruit
Rabella and Pallais 1994: Red FLOWERS used to make beverage
Wiersema and Leon 1999: Food flavoring; vegetable

yuca (*Manihot esculenta*)
Cultivated (Home Garden – Common; Plantation – Common); Purchased
TUBER: As vegetable; cooked as budín[178]
SKIN peelings as fertilizer around crops
Other uses in this study: Medicine, Household
Literature pertaining to food usage:
Beckstrom-Sternberg, Duke and Wain 1994: Liqueur, intoxicant
Coe and Anderson 1996: Important Garífuna field crop; most important staple food; eaten roasted, boiled, fried and dehydrated; alcoholic beverage
Duke 1981: Eaten many ways, including: TUBERS eaten boiled, grated, fried as chips and sun dried (keeps well), partially chewed and fermented to beer; grated and dried to STARCH/FLOUR, eaten as baked or fried cake; West Indies: Burned or charred cakes
Lentz 1993: Honduras: Main Payan root crop
Martin and Fennema 2000: Tuberous ROOT, LEAF and SHOOT cooked yielding medium quality vegetable
Morton 1981: Cooked TUBER is a major worldwide food source; bread, pudding made from STARCH; cooked LEAVES eaten as greens
Wiersema and Leon 1999: As starch and vegetable; China: To make MSG

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[178] See Glossary 8: Recipes for more information.

zinza (*Zingiber officinale*)
Cultivated (Patio – common); Wild
ROOT: As tea and in cakes
Other uses in this study: Medicinal
Other Literature:
Beckstrom-Sternberg, Duke and Wain 1994: Aperitif, liqueur, spice
Coe and Anderson 1996: Garífuna make a holiday drink with this
Duke 1981: Ingredient in various dishes
Kays and Silva Dias 1995: RHIZOMES/young SHOOTS eaten raw/cooked
Rabella and Pallais 1994: Cultivated for export of spicy TUBER

Summary of Foods

The Miskito in this survey focused on a small number of plants to satisfy a majority of their food needs. Edible plants comprise the second largest category in this study.[179] A total of 174 (31%) of the documented plant uses were attributed to 73 species plus 24 varieties or cultivars. All but four of the plants in this listing were known edibles.[180] Plant-based foods were cultivated, gathered or purchased and each of these food-getting activities provided an important subset of the Miskito food repertoire today.[181] Of the 73 edible species, 57 were cultivated, 14 were gathered and two were exclusively purchased. In general, Miskito in this survey cultivated their dietary staples (e.g., yuca – *Manihot esculenta*), gathered nutritious snack foods (e.g., guayaba – *Psidium guajava*) and purchased spices (canela – *Cinnamomum verum*) and cash crops (such as tobacco – *Nicotiana tobacum*).

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[179] The number of documented food plants was about half the number of medicinals. Medicinals was the largest category.

[180] According to the literature survey, all plants except aras pata (*Ixora coccinea*), masra (*Salacia impressifolia*), palmera (*Acoelorraphe wrightii*) and swim kiama (unidentified fungus) are known edibles. Of these, the first three were snack foods, gathered incidentally. It should also be noted that swim kiama was not scientifically identified which precludes the ability to find similar uses amongst the literature.

[181] Other authors on the region have noted the important contribution that this variety of food choices has to the Miskito food repertoire (Dampier 1681, Helms 1971; Hutton 1922; Nietschmann 1973).

The edibles documented in this study reflect social and economic priorities in these communities. Two interrelated aspects are key to this category: Food choice and food acquisition methods. An examination of the most popular plant-based foods and the most popular methods of acquisition follow.

Food Choice

The most popular herbaceous and tree crops documented in this study[182] were nutritious and most had qualities that were especially suited to the local environment. Platano (*Musa* x *paradisiaca*), yuca, batata (*Ipomoea batatus*), coco (*Cocos nucifera*), mango (*Mangifera indica*), limon and naranja (*Citrus* species) were particularly popular. A brief examination of the nutritive and adaptive properties of these plants makes clear their importance in the Miskito food-getting complex.

Platano and banano species were major components both of home gardens and plantations. The East Coast of Nicaragua has long been recognized as having a great variety of banana cultivars.[183] The home gardens and plantations in this survey often contained at least one each of the platano and banano strain as well as some cultivars.[184] Phenotypically, these plants were morphologically similar and cultivars were difficult to distinguish unless the tree was actually fruiting. Locals referred to the different expressions as being like platano or banano. This was sufficient information to ascertain how the fruit was eaten. Platano referred to plants whose starchy fruits were usually eaten boiled or fried and banano referred to those whose fruits were

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[182] "Popularity" was measured by frequency of occurrence.

[183] In the mid-1800s, the Atlantic coast of Nicaragua is mentioned as having a large number of varieties. The numbers of banano and platano varieties around the world are estimated to be between 100 and 500 (Smith, et al. 1992).

[184] A number of cultivars were found in any one home garden, being chosen for their suitability to soil conditions, disease resistance, fruit size, or individual preference.

usually eaten raw. The fruits of these herbs could thus be eaten in a variety of ways. Moreover, the plants readily regenerated themselves and, in the tropical environment of the East Coast of Nicaragua, platano and banano fruited year-round.

Batata contains starch, vitamins A and C, potassium, sugar and some fat (Duke 1981; Martin and Fennema 2000). In fact, "an average-sized boiled sweet potato...will provide over half the recommended daily allowance (RDA) of Vitamin C and more than twice the RDA of Vitamin A for an adult male, 23 to 55 years old and weighing 154 pounds" (Bouwkamp 1977: 212).[185] This tuber is an important nutritious component of Miskito diet.

The most popular tuber, yuca, is particularly well suited for growing in tropical regions because of its ability to thrive despite adverse conditions. It grows in almost any soil, resists seasonal drought, survives rains in well-drained soil and tolerates shade with no adverse effects on crop production (CIAT 2000; Fernandes and Nair 1986; Rogozinski 1992). In fact, studies show that poor soil and/or water conditions have the opposite effect on yuca, as the plant tends to allocate more growth to its roots (Cock 1982). This characteristic is especially favorable since the roots (or tubers) are the desired food source.[186]

Of the food-producing trees, coco was most frequently encountered in the communities. Two cultivars were recognized in this survey, coco enano (short

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[185] Also contains protein (5%), calcium (6%), phosphorus (9%), iron (11%), thiamin (10%), niacin (5%) and riboflavin (6%) of US RDA (Bouwkamp 1977: 212).

[186] A health program sponsored by MINSA, the Nicaraguan Health Ministry, used the popularity of yuca (and other local plants) food to encourage better nutrition. For example, a powder made from dried, ground yuca leaves (high in zinc) could be sprinkled on meat and rice (Dr. Nelsys Menocal/Puerto Cabezas-Granada pediatrician).

coconut) and coco alto (tall coconut).[187] In general, the dwarf form flowered earlier (in the third year versus the tenth for the tall form) but the tall cultivar lived longer (up to 80 years versus 30-40 for the dwarfs; Woodroof 1970). The cultivar also determined the way the coco was used. In the survey communities, the dwarf form was preferred for drinking while the tall form was preferred for cooking. Aside from its use in a wide variety of foods (from breads and confections to more substantial meals; see Glossary 8: Recipes), coco had a social significance. It was a great sign of hospitality to offer to a visitor a freshly cut coco to drink.[188]

After cocos, the second most popular trees in the communities were the mangos. While cocos lined the shores, the impressive old growth mango trees distinguished the interior of many communities. Said to live up to one hundred years, they could reach heights greater than thirty feet (Smith, et al. 1992). Mangos were commonly spared when clearing land and the large, shade-providing tree was a distinctive aspect of some communities such as Wawa and Haulover.[189] Several different cultivars were recognized although the identity of a specific tree was generally not known until the tree had given fruit (Zoila Velázquez/Wawa).[190] There were probably as many ways to eat the fruit as there were local varieties. Mangos produced fruit near the end of the rainy season and were eaten raw, as juice, jelly, and were included in other interesting dishes (See Glossary 8: Recipes). In addition, the nutritious fruit (high in Vitamins A, B and C - Johnson 2000; Martin and Fennema 2000;

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[187] These two cultivars are recognized in other cultures but are only meaningful on the local level because of local variations (Woodroof 1970).

[188] Refusing this gracious offer was considered impolite.

[189] This contrasts to the savanna communities, such as Lamlaya, with few large trees.

[190] Along the same vein, Francisco Dublon (Bismona) said, "Don't know difference between marañon [cultivars] until they give fruit."

Smith, et al. 1992) is significant because, according to Smith, et al., the diet of most inhabitants of the humid tropics is usually deficient in Vitamin A.

Citrus trees were a third important group of food-producing trees in this study. Nine of the ten documented *Citrus* species and cultivars were consumed in some form or another.[191] The fruits were used as snacks, in beverages and as a meat marinade; the leaves were used in tea. Known in our culture as a signature source of Vitamin C, the fruits also contain Vitamin A, the significance of which was just mentioned.

In summary, these three herbs (platano, yuca and batata) and three trees (coco, mango, and *Citrus*) contribute a great deal to the Miskito diet both in terms of variety and nutrition. In addition to the food value associated with them, all but batata[192] are components in the local health system (See Chapter 2: Medicinals) and had other roles in household, personal and other uses in this study (see Appendix 2). Thus, these plants are an integral part of the Miskito plant-use complex.

Taking the entire food repertoire into account, the Miskito favor a number of foods that are packed with nutrition. *Dasheen*, for instance contains more carbohydrates and protein than potatoes (Duke 1981) and one guava contains 2-5 times more vitamin C than an orange (Arvigo and Balick 1993). Miskito food plants provide a variety of important nutrients, including folic acid, carotenoids and a number of essential amino acids.[193] Nietschmann's (1973) dietary intake study for Miskito in the village of Tasbapauni showed that the Miskito diet was high in calories, fat and

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[191] Five species and five cultivars were documented (See Appendix 2: Directory of Miskito Ethnobotany).

[192] Batata was not attributed with any medicinal uses in this study although it is known for its hypoglycemic activity (Lewis and Elvin-Lewis 1977).

[193] See Glossary 1 for more content information.

protein with an adequate supply of vitamins. Moreover, Miskito appeared to obtain their calories from a greater variety of foods than other indigenous cultures.[194]

Food acquisition methods

Equally as important as the choice of foods was the method of food acquisition. By far, the most important food-getting activity in this study was cultivation. Miskito agricultural practices were a textbook example of intercropped species managed through shifting agriculture.

Food was cultivated on small plots of land, both at the homestead itself and in larger detached plantations. Miskito cultivation methods represented a variety of agroforestry systems. Home garden plantings, with a mixture of trees and herbaceous species planted together (to the exclusion of animals), were an example of an agrisilviculture. Patio plantings, which combine food producing and other important trees with free-ranging animals in the open yard, were an example of a silvopastoral system. Finally, plantations exemplify the basis for agrosilvopastoral practices, combining crops, trees and animals in a pastoral setting (Nair 1985).

Intercropping is a primary feature of agroforestry. The Miskito cultivate a polycultural intermixture of plants and they do so in a way that was classically indigenous. Indigenous farmers are distinguished from colonists because the former let the soil dictate where to plant (Clay 1990). This method, termed here "patchwork intercropping," resulted in a plantation (or home garden) composed of patches of different crops. Patchwork intercropping had a number of advantages. Intermixture of crops protected against disease and helped reduce "the risk of total crop failure" (Clay

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[194] This was based on a comparison of the Miskito diet with that of the Bayano Cuna (Nietschmann 1973: 221-222).

1990: 27) due to flooding, insect and disease damage, which, in turn, reduced need for pesticides.

Another important feature of Miskito agriculture was their practice of shifting cultivation. Maintaining many different plots of land in various stages of fallow is symbolic of shifting cultivation (Clay 1990). For the farmers in this survey, plantation locations have been established for many decades and soil fertility has historically been maintained by fallowing for up to 20 years between crops. Current averages put this figure at ten years maximum (See Table 3.5: Yearly Planting/Fallow Cycle).[195] Thus, the changing locations from year to year involved the reuse of old fallowed sites. From an ecological perspective, fallowing is an environmentally sound method of cultivation that conserves rather than destroys pristine forest. But Miskito did not fallow with environmental preservation in mind. Other reasons of fundamental importance to the Miskito encouraged fallowing rather than abandoning a field site.

There are many reasons for fallowing. First, a site was only "work[ed] for two years because soil does not give well anymore" (Nena Castillon/Lamlaya). This explained the lack of use of fertilizers. Aside from the expense of commercial fertilizers, Miskito recognized that the yield did not merit the input. Soil fertility was maintained naturally through fallowing and by giving it a boost by burning before planting. One person mentioned spreading yuca peel on the soil around the plant as fertilizer (Nils Philipe Washington).[196] Another alternative, although not used as such,

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[195] Farmers mentioned that plantation yields were less than that from 20 years ago because of shortened fallowing peiods. This could indicate that overpopulation in the study area and soil degradation are jeopardizing the sustainability of these systems.

[196] The use of yuca peelings on plantations may do more than provide nutrients to the crops. Duke (1981) mentioned that the broken stems or leaves of yuca repel driver ants and Wiersema and Leon (1999) mentioned yuca as a mammal poison. Thus, yuca may assist in reducing herbivory.

was the aforementioned cow manure mixture used to protect coconut saplings from herbivory.

Fallowing was also necessary because animals and disease would begin to ruin the crops - deer love yuca leaves![197] The plantation site "Tumtum" was in fallow during this study because "too many animals [were] eating plants" (Nena Castillon/Lamlaya).[198] Herbivores were also a reason for having widely separated plantations, because "there were no animals there to eat the food" (Francisco Dublon/Bismona). Fallowing and widely separated fields also kept disease under control. Without fallowing, diseases could keep a stranglehold on a field (Clay 1990). This reduces the need for pesticides, of which the Miskito made no mention.

Another reason old plantation sites were not abandoned was because plantation preparation represented high labor inputs in terms of clearing and planting (Nietschmann 1973). The complete abandonment of a site after the first year would be a waste of energy. Other studies have shown that field sites that were properly managed through the various successional stages of fallow yielded best between four to twelve years following planting. Further, the yields could continue for as many as 30 years (Clay 1990).[199] A fallowed field site (old plantation) was also preferred to mature forest because secondary growth was easier to clear (Nietschmann 1973).

In summary, Miskito food preferences were reflected in the types of crops that were cultivated. Crop choice revealed that the Miskito in this survey obtain the majority

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[197] Orlando Budier (Haulover) heartily explained, "Many deer near plantation – like to eat yuca leaves – eat deer!"

[198] Clay (1990) mentioned that concentrated crop plants attract animals and some indigenous people use this to their advantage when hunting (see also Linares 1976).

[199] In the earliest fallow period, extraction of successional plants as well as crop plants were common; later, extractions included mostly food-producing trees (Clay 1990).

of their plant-based foods fresh; both cash crop production and market purchases (for plant-based foods) were minimal in the communities surveyed. The lack of interest in cash crops and the low utilization of market foods have social, environmental and economic ramifications in the study communities.

Cash crops

This study focused primarily on the Miskito practice of subsistence cultivation as the Miskito in this survey grew essentially all of their staple foods. Home gardens were planted with a high concentration of platano, batata and yuca. Plantations were consistently planted with a variety of tubers (including yuca, dasheen, quequisque and malanga), arroz and frijoles. Coco and mango were the major plants cultivated or spared in and around the communities. The home garden plantings alone ensured a regular supply of the foods that form the basic part of any meal. This was in keeping with observations from other Miskito communities, such as Asang[200], where the term plantation "does not refer to a large plot of land organized for the purpose of export or large-scale production" (Helms 1971: 53). It was also a reflection of the primarily seaside location of the study communities. García (1996) noted that coastal Miskito tended to be fishermen while riverine Miskito tended to be cattle ranchers and farmers.

That the Miskito in this survey did not concentrate on planting cash crops is typical of many indigenous people who choose not to produce surpluses because it represents more work. More importantly, perhaps, was the lack of an adequate infrastructure to make any cash crop profitable. It would be more trouble getting the produce to market than it was worth (Clay 1990). This explained one informants'

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[200] Asang is located about 200 miles inland along the Río Coco, on the Nicaragua and Honduras border.

comment that "some towns only plant to eat" (Nena Castillon/Lamlaya) because the location of the town determined, in large part, whether cash crops were viable.

Nietschmann (1973) pointed out that the Tasbapauni Miskito had a higher rate of participation in the market economy than other Miskito communities probably due to the proximity of numerous marine and land resources and the year-round accessibility to markets in Bluefields. The Garífuna, also centered in Bluefields, tend to focus even more on cash crops. Proportionally, more achiote (*Bixa orellana*) and wain (*Hibiscus sabdariffa*) were planted in Garífuna home gardens than other plants (Coe and Anderson 1996).[201] Neither of these plants are staple foods but both are marketable, achiote as a colorant and wain as a beverage. While Miskito share home garden crops among related households and occasionally sell excess produce to other community members, the home garden was used primarily for household consumption.

The tendency of the study community not to focus on cash crops had social, economic and environmental implications. Socially, this indifference toward in cash crops led to more cooperation among the villagers with regard to planting and harvesting. When cash crops came into play, communal cooperation tended to decrease. Nietschmann (1973) noted that in the village of Tasbapauni, wage labor must be hired, especially when planting cash crops. In contrast, informants in this study mentioned some degree of cooperation in all food-getting activities.

Economically, lack of cash crops in this study area meant that other dollar-earning endeavors were pursued. Dollars buy many provisions, such as gasoline, clothing and, occasionally, foodstuffs. Fishing and turtling therefore were especially

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[201] Similarly, one of the primary Garífuna plantation crops, piña (*Ananus comosus*), was their most important cash crop (Coe and Anderson 1996).

prevalent occupations among the villagers. In short, the sea rather than the land provided the cash crops for the Miskito in this study.

Finally, disinterest in cash crops resulted in environmental friendliness with regard to the local flora. Because the Miskito rely mainly on subsistence agriculture and secondarily on gathering from the wild, Miskito cultivation and food collecting practices constitute one of the primary pressures that the Miskito exert on their environment (Nietschmann 1973). If the focus shifted from subsistence to cash crops, the pressures put on the environment would almost certainly increase to unsustainable levels.[202]

Markets

Markets serve in two capacities: As a source of goods and as a source of income. People in the study communities participated in both types of interactions in the markets in Puerto Cabezas. Generally speaking, markets were not an important source of most plant-based foods for the Miskito. However, markets did serve as a source of income for some families in the study. The economic, social and environmental ramifications of these interactions are discussed as they relate to the studied communities.

The total number of plant-based foods purchased in the markets was small. Only two of the 73 species documented as edible in this study were exclusively purchased. This was not to say that community members did not purchase any plant-based foods. While most villagers were not purchasing fresh produce in the markets,

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[202] Nietschmann (1973) noted that the marketability of hawksbill turtles put pressures on the turtle populations that did not exist when the hawksbill was only exploited for subsistence purposes.

certain items, especially spices, salt and sugar, were standard market purchases.[203] The difficulty in producing such processed foods locally and the fact that these items could be bought and stored in large quantities certainly played a role.

One factor affecting modest market purchases was the access distance from Puerto Cabezas. Most vendors stated that their clientele were predominantly Puerto Cabezas residents. It has already been mentioned that villagers of Lamlaya and Karatá availed themselves of market purchases more than other communities because of distance considerations. In outlying communities, a number of ventas (locally run general stores) could be found, although they rarely carried fresh produce. In emergencies, outlying villagers resorted to purchasing fresh foods from neighbors (see "Procurement" above). So, with regard to purchases, local options were taken advantage of before resorting to the markets in Puerto Cabezas.

Markets played a greater role for the study participants as a source of income even though the majority of informants did not participate in cash crop production. Many people from the outlying communities whose market purchases were minimal participated by selling goods in Puerto Cabezas on a temporary basis. Looking at vendor demographics, a number of generalizations could be made about the fresh food vendors in the Puerto Cabezas markets. First, most vendors were female. Second, most vendors were temporary. Third, most vendors sold the same goods. These three factors help to explain the dynamics of interactions between the markets in Puerto Cabezas and the villagers in outlying communities.

A striking demographic feature of the market vendors in this study was that the majority of those selling plant-based items were women. Of the 13 vendors selling

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[203] In fact, a number of items sold in the market are not mentioned or grown in the survey communities. This includes spices (such as black pepper, cumin, anís) as well as cucumber, garlic, onion, chayote, potatoes, celery, apples (See Table 3.2).

plant-based foods interviewed 11 of them were women,[204] and moreover, most were young. This business appeared to be an acceptable vocation for young women.

Another consistent demographic feature of the surveyed vendors in the Puerto Cabezas markets was that, first, most did not operate their stalls on a permanent basis, second, they did not reside in Puerto Cabezas, and, third, most had been selling in the markets for less than three years. Six of the 13 vendors lived in Puerto Cabezas and maintained their stalls year-round.[205] The other vendors stayed in Puerto Cabezas temporarily until their wares were sold. Only one vendor came to the market on Friday and returned home the following Monday (Porcien Lewis/Sisin).

Finally, a remarkable feature of these markets was the consistency of goods from stall to stall. Every vendor sold practically the same items, of similar quality and price.[206] Since most vendors had a finite amount of stock, most were successful in this ephemeral livelihood.

The consistent demographics of the vendors resulted largely from the regional educational system. In most outlying communities, schools provided classes up to the 6th grade. Some communities did not have enough teachers, so classes were limited (Amalia Warman Artola/Karatá). One Bismona teacher expressed dismay over the lack of teachers noting that they needed three more but, despite repeated requests, the government had not sent them (Paunino Dimus Crawford/Bismona). To continue their education, children must go to a larger town, like Puerto Cabezas. Distance

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[204] In the produce section of Mercado Municipal, male vendors sold items geared more toward construction (see Chapter 6).

[205] It is interesting too that of the surveyed vendors, Mercado San Jerome had proportionally more permanent vendors than did Mercado Municipal.

[206] See the discussion on markets, above.

considerations often necessitated temporary relocation there.[207] Women, not men, usually accompanied their children to "town," in most cases, Puerto Cabezas (Facundo Johnson/Tuapí). Selling goods brought in the extra cash needed to stay in town, especially when there were no relatives with which to stay.

In conclusion, the interactions between the markets in Puerto Cabezas and the study communities revealed some interesting dynamics. First, formal markets were not an important source of plant-based foods. This was another reflection of Miskitos' preference to cultivate or gather the majority of these foods. Secondly, markets served a purpose in the study communities as a job for women, especially mothers of school-aged children. That markets were considered acceptable employment for women had social implications, giving women an alternative to more common vocations (housewives, midwives, etc.). Thirdly, markets served an economic function, providing a means to obtain extra cash on an as-needed basis.

Further Thoughts

Having looked at the role of plants as part of the Miskito food complex, two issues have yet to be considered. First, mushrooms had no food value in the Miskito diet. Second, Miskito food customs were indicative of social and cultural relationships. A discussion of these two topics follows.

Surprising Omission

Perhaps just as important as what was considered food was what was not considered food. Mushrooms abounded within the communities and the bush, but informants regarded mushrooms with complete indifference. The Miskito clearly attached no food value to the mushroom; as one informant put it, "mushrooms not

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[207] Orlando Budier (Haulover) said that of the 93 Haulover families, "many are in Puerto Cabezas watching their kids in school."

eaten" (Facundo Johnson/Tuapí). In fact informants went on to suggest that there was "no mushroom use" whatsoever (Anelia Zacarías/Tuapí; Facundo Johnson/Tuapí; Laurel Chevarría/Karatá; Zoila Velázquez/Wawa).[208] With regard to food uses, one informant stated that mushrooms were "Chinese food" (Janis Molina/Haulover) completely disclaiming any Miskito traditional use. There were a few possible reasons for this indifference toward mushrooms.

One possibility might have been the link between mushrooms and superstition. According to Miskito superstition, mushrooms were part of a spirit's wardrobe (see Chapter 7). Another possible influence was the Miskito notion of clean versus dirty food (Nietschmann 1973). This idea could be applied to both plants and animals wherein clean foods were desirable and dirty foods were undesirable for consumption. The mushroom may be considered dirty since it grows on dead trees or arises out of the mud.[209] Finally, while there was no specific information regarding the use of psychoactive elements within the Miskito communities in this study. It is possible that the Miskito may have used mushrooms for this purpose in the past but this was no longer an important aspect of modern Miskito culture. As mentioned throughout this study, the influence of the Moravian church has been great within the Miskito society. If the early Church encountered psychoactive plant usage, it would not be unreasonable to assume that they would have put a halt to such practices.

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[208] One informant provided a medicinal use for a mushroom called swim kiama (unidentified fungus), but discounted the remedy at the same time. See Chapter 2.

[209] Nietschmann (1973) gave detailed information regarding Miskito foodways in the village of Tasbapauni. Mushrooms were neither mentioned on a list of avoided foods (See Nietschmann 1973: 111) nor was there any mention of mushrooms in his study. This emphasized the intrigue surrounding the complete exclusion of mushroom use in Miskito culture.

Kinship Ties

In addition to food sharing practices based on kinship ties, the plantation system reveals other kinship ties. The Miskito tradition of sharing a community-based plantation site revealed relationships between communities. Note in Table 3.4 that both Lamlaya and Karatá operated plantations in the same location, specifically, the Warkwark plantation site. The land upon which Lamlaya (and, in fact, Puerto Cabezas) was founded was originally the property of Karatá and the pioneering Lamlayans were from Karatá. Karatá was referred to locally as the mother community of Lamlaya and Puerto Cabezas (Caldera, et al 1995). The inhabitants of the two villages were related to each other and their continued use of the same plantation site reflected that kinship.

Plantation sites are often the inception of new communities. According to interviews with ancianos (community elders) in this study, both Karatá and Lamlaya began as plantation sites. As the history of Lamlaya was told, "Withras Peralta liked the area for cattle. He brought cows; it was just plains then. He was from Karatá; came over 115 years ago. After him, other families came, had kids. This left lots of people" (Zeladon Dennis/Lamlaya).[210] Dana (2000) estimated that distances in excess of two hours would motivate the formation of a new community. Indeed, few plantations documented in this study exceeded two hours distance (see Table 3.4).

In addition to reflecting current kinship ties, Miskito food traditions were also indicative of cultural origins. Theories as to the origins of the pre-Columbian inhabitants of Nicaragua diverge. Nicaragua, being in the center of Central America, has the unique distinction of arising from either a Meso-American origin or a South American origin. A number of attributes have been used to discern the cultural origins of a group of people, including archeological remains (pottery, etc.), linguistics, folklore

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[210] Oral histories regarding community origins were similar throughout the communities.

and foodways (Werner 1993). Many researchers use the fact that Miskito agriculture was based on manioc (yuca), rather than maize (maíz),[211] to argue that the Miskito have South American origins, as opposed to Meso-American (Helms 1971; Ryan, et al. 1970; Werner 1993). This argument asserts that the Miskito retain several tribal characteristics typical of the South American system namely subsistence hunting, fishing, collecting and agriculture based on yuca (note these characteristics are related to food - Helms 1971; Ryan, et al. 1970).[212]

In conclusion, this study of the everyday use of plants in the Miskito diet indicated that between the plantation, home garden, natural sources and the markets, Miskito had many food options available to them. Dietary staples were assured through cultivation and dietary variety through hunting and gathering (eggs from chickens, turtle meat from the sea, shrimp from local lagoons and small mammals from the bush, etc.). In addition, the study of edible plants could be used to infer a number of sociocultural, economic and environmental implications that lead to a greater understanding of the Miskito within the backdrop of the Miskito Coast.

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211 Agriculture based on maize would be more akin to the Mayan culture (Espy and Creamer 1970).

212 See Appendix 5 for more information on the theory of cultural origin.

Chapter 4: Ornamentals

Introduction

This category includes plants ostensibly sown for their aesthetic qualities. As Helms (1971) noted in Asang, garden flowers and flowering bushes were commonplace in the Miskito study communities. However, the prevalence of ornamental plants in the communities was not necessarily a Miskito tradition. The major ornamentals documented in this study and their role in Miskito life are discussed.

The Plants

Ornamental plants are listed here according to the common name used by study participants. See to Appendices 1-3 for more information on these plants. The location(s) of the plant within the study site, other plant uses documented in this study and information from regional literature are provided where applicable.

In this listing, information from the regional was divided into two sections. The first section notes literature corroborating the ornamental usage of the plant; corroborated ornamentals are marked with the symbol symbol (✔). If the plant in question is not specified but a close relative has ornamental usage, the symbol (? ✔) follows the entry. The second section denotes medicinal uses found in the regional literature, the significance of which is discussed below under "Further Thoughts."

9-o'clock tangni[213] (*Portulaca pilosa*)
Sown (Patio - Common)
Ornamental (? ✔)
Other uses in this study: None
Literature corroborating ornamental usage for a related species.
Wiersema and Leon 1999: *P. grandiflora*
Medicinal uses in regional literature for this and a related species:
Morton 1981: Colombia: PLANT juice on erysipelas; decoction diuretic, sudorific, powerful vermifuge, burn remedy, indigestion

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[213] This is pronounced "nine-o'clock tangni." It is an admixture of Creole English and Miskito, where tangni means "flower." The explanation for this name is discussed in the "Summary of Ornamentals" below.

10-o'clock tangni[214] ***(Portulaca grandiflora)***
Sown (Patio - Common)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999: Ornamental
Medicinal uses in regional literature: No medicinal documentation for this species.

ala blanca *(Impatiens balsamina)*
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature for this and an unknown species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: Astringent, bactericide, cancer (esophageal and digestive), caries, circulation, dermal problems, diuretic, emetic, eye, inflammation, labor, laxative, uterine polyps, vulnerary
Duke 1992: *Impatiens* sp.: Counterirritant
Duke 1997: *Impatiens* sp.: For hives and for rashes from poison plants
Lewis and Elvin-Lewis 1977: Anti-fungal
Morton 1981: Headache, eyedrops, kidney ails, hepatitis, jaundice

aras pata *(Ixora coccinea)*
Sown (Patio – Infrequent)
Ornamental (✔)
Other uses in this study: Edible, Medicine
Literature corroborating ornamental usage:
Lennox and Seddon 1993
Valdez, et al. 1989
Medicinal uses in regional literature: No medicinal documentation for this species.

awas tangni *(Eupatorium capillifolium)*
Sown (Patio – Common - fenced)
Ornamental
Other uses in this study: None
Literature corroborating ornamental usage: None
Medicinal uses in regional literature for this and unknown species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: Insect bite
Lewis and Elvin-Lewis 1977: *Eupatorium* spp: Astringent; kidney ailments; bladder stones; tonic
Morton 1981: Lists twelve Eupatorium species (excluding this one) with medicinal uses

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[214] This is pronounced "ten-o'clock tangni." It is an admixture of Creole English and Miskito, where tangni means "flower." The explanation for this name is discussed in the "Summary of Ornamentals" below.

bachelor's button (*Gomphrena globosa*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Cough, depurative, diabetes, empacho, heart, hypertension, nosebleed
Duke 1981: Heart remedy
Morton 1981: Fever, dysentery, heart trouble, sudorific and carminative

bejuco II (*Clerodendrum thomsoniae*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature for species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: *Clerodendrum* spp.: Many remedies, including: Aches/pains, alexeritic, blindness, dermal problems, gastrointestinal/respiratory complaints, diuretic, fever, gonorrhea

bougainvillea (*Bougainvillea x buttiana*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature for closely related species:
Beckstrom-Sternberg, Duke and Wain 1994: *B. glabra*: Cold, cough, pertussis, flu; *B. spectabilis*: Cold
Morton 1981: *B. glabra*: BRACT decoction for cough; Fresh LEAF cleans wound; ROOT decoction febrifuge/purgative

butterfly flower (*Crotolaria retusa*)
Sown (Patio - Rare)
Ornamental
Other uses in this study: None
Literature corroborating ornamental usage: None
Medicinal uses in regional literature: No medicinal documentation for this species.

corazon de María (*Caladium bicolor*)
Sown (Patio - Common)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Angina, antiseptic, ascaricide, emetic, larvicide, purgative, sore, toothache

cosmos (*Cosmos bipinnatus*)
Sown (Patio – Rare - fenced)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature for species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: *Cosmos* spp.: Dyspepsia, scorpion bite, sore

croto (*Codiaeum variegatum*)
Sown (Patio - Common)
Ornamental
Other uses in this study: None
Literature corroborating ornamental usage: None
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, cough, dysuria, eye, pain, poultice, purgative, sore, stimulant, sudorific, syphilis, urogenital
Morton 1981: Aches, pains, for woman after childbirth, treats eye disease
Rabella and Pallais 1994: Febrifuge

dayflower (*Commelina diffusa*)
Sown (Patio – Rare– flowerpot)
Ornamental (✔)
Other uses in this study: Medicinal
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, boil, bubo (a swollen lymph gland, especially in armpit or groin), depurative, nosebleed, hemostat, metrorrhagia, ophthalmia, parturition, pile, tuberculosis, uteritis
Morton 1981: Many medicinal uses, including hemostat and urinary burning

dwarf poinciana (*Caesalpinia pulcherrima*)
Sown (Patio - Common)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Lennox and Seddon 1993
Valdez, et al. 1989
Wiersema and Leon 1999
Medicinal uses in regional literature:
Arvigo and Balick 1993: For *irritacion* – "irritiation"
Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, astringent, bile, catarrh, cathartic, cold, convulsion, cough, dairrhea, emmenagogue, epilepsy, erysipelis, fever, gargle, hepatitis, inflammation
Comerford 1996: Febrifuge
Duke 1981: Purgative, epilepsy
Lewis and Elvin-Lewis 1977: Dental hygiene
Morton 1981: Sore throat, eyewash, fever, cold remedy, laxative, mouth sores

Easter fern (*Lycopodiella cernua*)
Wild
Ornamental (? ✔)
Other uses in this study: None
Literature corroborating ornamental usage for a related species:
Wiersema and Leon 1999: *L. obscurum*
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Abscess, anodyne, beri-beri, bone ache, chest, cough, myalgia, numbness, rheumatism, skin, leg, spasm, trauma, sore, asthma, tonic

flor de paloma (*Impatiens balsamina*)
Sown (Patio - Rare)
Ornamental (? ✔)
Other uses in this study: None
Literature corroborating ornamental usage for unknown species of this genus:
Wiersema and Leon 1999: *Impatiens* spp.
Medicinal uses in regional literature for this and other species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: Antidote, astringent, bactericide, cancer (esophageal, adgiestive), caries, cathartic, circulation, diuretic, emetic, eye, fungicide, inflammation, labor, laxative, uterine polyps, sore, vulnerary, wound
Duke 1992: *Impatiens* sp.: Counterirritant
Duke 1997: *Impatiens* sp.: For hives and for rashes from poison plants
Lewis and Elvin-Lewis 1977: *Impatiens* spp.: Counterirritant
Morton 1981: Headache, eyedrops, kidney ails, hepatitis, jaundice

kalila lal (*Celosia argentea* var. *cristata*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal uses, including: Aches/pains, cancer, cough, depurative, dermal problems, dysuria, enterorraghia, epistaxis, fracture, hemorrhage, metrorrhagia, stomach complaints, scurvy, tonic, tumor, vermifuge, vision problems, vulnerary

lili tangni (*Crinum augustum*)
Wild
Ornamental (? ✔)
Other uses in this study: Medicinal
Literature corroborating ornamental usage for unknown species of this genus:
Wiersema and Leon 1999: *Crinum* spp.
Medicinal uses in regional literature for species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: *Crinum* spp.: Many medicinal uses, including: Aches/pains, asthma, bilious, bronchitis, dermal complaints, cardiotonic, cold, diaphoretic, dyspepsia, dysuria, edema, emetic, expectorant, fever, lactogogue, laxative, malaria, pectoral, poison, rubefactient, swelling, tonic, tumor

malinche (*Delonix regia*)
Sown (Patio – Common - Transplanted)
Ornamental (✔)
Other uses in this study: Medicinal, Construction
Literature corroborating ornamental usage:
Cisneros, García and Dávila 1992
Duke 1981
Rabella and Pallais 1994
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Anemia, fever, malaria
Duke 1981: Purgative, epilepsy

Managua tangnika (*Portulaca oleracea*)
Sown (Patio – Rare)
Ornamental
Other uses in this study: None
Literature corroborating ornamental usage: None
Medicinal uses in regional literature:
Arvigo and Balick 1993: Diuretic, blood cleaner, tonic; poultice to stop bleeding, heal ulcers, wounds
Duke 1997: Many medicinal uses, including: Antioxidant, helps prevent cataracts, treat heart disease, asthma and wrinkles
Johnson 2000: Analgesic; alterative; laxative; astringent; carminative; demulcent; detergent; diuretic; emollient; hemostat
Morton 1981: Laxative, diuretic, vermifuge, bladder, kidney and liver disorders
Wiersema and Leon 1999: Unspecified medicine

mozaica (*Solenostemon scutellarioides*)
Sown (Patio – Common - flowerpot)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Anodyne, asthma, colic, conjunctivitis, dyspepsia, elephantiasis, ophthalmia
Duke 1981: Asthma, chronic coughs, epilepsy, colic, dyspepsia, conjunctivitis

patita de paloma (*Alternanthera bettzickiana*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature for species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: *Alternanthera* spp.: Abdomen, abortifacient, anodyne, beriberi, snakebite, collyrium, cough, diuretic, dysentery, fever, lactogogue, laxative, malaria, puerperium, refrigernat, tonic, tumor, wound

pie del niño (*Pedilanthus tithymaloides*)
Sown (Patio - Common)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Carcinoma, caustic, centipede bite, corn, emetic, emmenagogue, hernia, leucoderma, poison, syphilis, tumor, wart
Morton 1981: Emmenagogue and menstrual pain

plato tangni (*Canna indica*)
Sown (Patio - Common)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Ibarra-Manríquez, et al. 1997
Wiersema and Leon 1999
Medicinal uses in regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Anitdote, demulcent, diaphoretic, diuretic, inflammation, sore throat, sudorific, tumor
Morton 1981: Diuretic (Guatemala/Costa Rica), sudorific, rheumatism

raiti tangni (*Catharanthus roseus*)
Sown (Patio – Common)
Ornamental (✔)
Other uses in this study: Superstition, Medicinal
Literature corroborating ornamental usage:
Lennox and Seddon 1993
Wiersema and Leon 1999
Medicinal uses in regional literature:
Johnson 2000: Source of anti-cancer drugs
Lewis and Elvin-Lewis 1977: Hypertension
Wiersema and Leon 1999: Source of anti-cancer drugs

receda cultivars I and II (*Lagerstroemia indica*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature:
Arvigo and Balick 1993: Diuretic, wounds, infections
Beckstrom-Sternberg, Duke and Wain 1994: Abdomen, abscess, antidote, astringent, decoagulant, dermatitis, diuretic dysentery, edema, fever, gargle, jaundice, narcotic, puerperium, purgative, sore, stimulant, vertigo

rosa (*Hibiscus rosa-sinensis*)
Patio (sown - Common)
    Ornamental (✔)
Other uses in this study: Superstition, Medicinal
Literature corroborating ornamental usage:
    Wiersema and Leon 1999
Medicinal uses in regional literature for this and other species of this genus:
    Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal uses, including: Abortifacient, anodyne, asthma, astringent, cancer, cold/flu symptoms, demulcent, dentifrice, dermal problems, emmenagogue, expectorant, eye problems, female conditions, hernia, parotitis, pectoral, poultice, purgative, swelling, tumor, urogenital, venereal disease
    Coe and Anderson 1996: *Hibiscus* sp.: Febrifuge, constipation, respiratory/pulmonary, childbirth/pregnancy

san diego (*Tagetes erecta*)
Patio (Sown)
    Ornamental (✔)
Other uses in this study: Medicinal, Superstition
Literature corroborating ornamental usage:
    Wiersema and Leon 1999
Medicinal uses in regional literature:
    Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal uses, including: Amenorrhea, anodyne, bactericide, dermal problems, respiratory problems, cold/malaria symptoms, conjunctivitis, diuretic, stomach/female ails
    Fey and Sindel 1988: Febrifuge

sironcontil (*Senna alata*)
Sown (Patio - Common)
    Ornamental (✔)
Other uses in this study: Medicinal, Superstition
Literature corroborating ornamental usage:
    Wiersema and Leon 1999
Medicinal uses in regional literature:
    Barrett 1994a: Febrifuge, liver, kidneys, skin disease, purgative
    Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, bactericide, snakebite, bronchitis, constipation, and stomachache
    Chow 1992: Renal ailments
    Coe and Anderson 1996: Anti-fungal, febrifuge, diarrhea, digestive, hypertension, infection, vermifuge, tonic, anemia, purgative/laxative
    Dennis 1988: Anti-fungal, skin infections, stomachache
    Duke 1981: Anti-venom, venereal disesae, anthelminthic, fungicidal, insecticidal, possibly piscidal, rheumatism, stomachache
    Elsberg, Blanco and Rodriguez 1992: Hepatitis/liver problems, hypertension, cough, diarrhea, purgative, kidney/urinary problems, skin infections
    Wiersema and Leon 1999: Unspecified medicine

tree, red flower[215] (***Jatropha integerrima***)
Sown (Patio - Rare)
Ornamental (? ✔)
Other uses in this study: None
Literature corroborating ornamental usage for species of this genus:
Wiersema and Leon 1999: *Jatropha* spp.
Medicinal uses in regional literature for unknown species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: Lists 24 *Jatropha* species (excluding this one) with an excess of 70 medicinal uses

yellow oleander (*Thevetia peruviana*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Ibarra-Manríquez, et al. 1997
Wiersema and Leon 1999
Medicinal uses in regional literature:
Duke 1981: Anesthetic, emetic, febrifuge, purgative
Lewis and Elvin-Lewis 1977: Toothache relief

zinnia (*Zinnia violacea*)
Sown (Patio - Rare)
Ornamental (✔)
Other uses in this study: None
Literature corroborating ornamental usage:
Wiersema and Leon 1999
Medicinal uses in regional literature for species of this genus:
Beckstrom-Sternberg, Duke and Wain 1994: *Zinnia* spp.: Anodyne, diarrhea, digestive, eye, menstruation, poison
Johnson 2000: *Zinnia* sp.: Febrifuge

Summary of Ornamentals

In this study, informants designated 32 plants as ornamentals making this the third largest category in this study.[216] Ranging from herbaceous annuals to perennial trees, most (23) were known ornamentals according to the literature consulted. In this study, all but two of the ornamentals were sown in the patio. The remaining two, Easter fern (*Lycopodiella cernua*) and lili tangni (*Crinum augustum* - an epiphytic

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[215] Septimo McDonald (Puerto Cabezas) said the tree had a name but he did not know it.

[216] Medicinals and Edibles were the largest categories, employing 60% and 31% of the total plants in this survey. Ornamentals came in a distant third, at 13%.

plant), grew wild in the bush. Note also that almost half of the plants were listed as "rare." Rare ornamentals were defined as being found, at most, in two of the seven communities. In other words, the plant was encountered at a rate of less than 30%. Many of the ornamentals were mentioned only once in this study.

Interesting associations

Some of the ornamentals played interesting roles in Miskito society. The Easter fern was given to parishioners in Church for Semana Santa.[217] "It symbolizes Christ entering Jerusalem" (Zoila Velázquez/Wawa). Various informants (Alman Dixon/Lamlaya; Anelia Zacarías/Tuapí; Nena Castillon/Lamlaya; Richaina Mybith/Lamlaya) mentioned three ornamentals (aras pata - *Ixora coccinea*, raiti tangni - *Catharanthus roseus* and san diego - *Tagetes erecta*) that were planted in the cemetery in addition to the patio. Cemetery plantings are discussed in Chapter 7.

Fascinating attributes

A number of plants collected in this study exhibited nyctinastic movements. Three plants, 9-o'clock tangni (*Portulaca pilosa*), 10-o'clock tangni (*P. grandiflora*) and escoba lisa (*Sida rhombifolia*), are discussed here.[218] Nyctinasty, also called "sleep movement," is a non-growth leaf movement. A response to changing light conditions, it occurs both in leaves and flowers and is poorly understood (Sobanski 1997).[219] Such movement is nonetheless fascinating as it occurs right before your eyes.

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217 Semana Santa is the week between Palm Sunday and Easter Sunday.

218 Two other study plants exhibited nycintasty, frijol (*Phaseolus vulgaris*) and dormilona (*Mimosa pudica*). Because these nastic movements involve the leaves, they are perhaps less spectacular. Dormilona is further discussed in Chapter 7.

219 Studies indicate that nastic movement is caused by changes in the turgor pressure of specialized cells of the pulvini, located at the base of the appendage (Salisbury and Ross 1985). Turgor pressure is regulated by ion transport but the trigger is uncertain. In *Mimosa pudica*, a number of substances, called turgorins, which activate the pulvini

Nine-o'clock tangni and 10-o'clock tangni were engaging for their ability to "tell time." These plants closed at 9 and 10 a.m., respectively, and reopened at night (Salvador Perez/Karatá; Yoneta Fox/Haulover).[220] Adding to this effect was the spiral motion that seemed to occur with the opening and closing of the flowers. Called circumscissile movement, this is characteristic of the genus (Gentry 1993). The fact that the two different *Portulaca* species were given different names, 9-o'clock and 10-o'clock tangni, indicated that locals recognized differences amongst the two species.[221]

Escoba lisa grew wild in the communities and locals do not consider this plant to be ornamental. However, the similarity in nastic flower movements warrants a brief mention. This plant actually exhibited the reverse movement by opening its bright yellow flowers at midday.[222] The movement occurred quickly and was striking. An entirely monochrome green yard was transformed with bright yellow points of light in an instant. The local designations for this plant were dinar (Miskito which loosely translates to "12 noon") or mediodía (Spanish for "midday"). These names were evidently based upon the coincidental timing of the flower opening with the largest meal of the day, dinner, which was taken at midday (see also Nietschmann 1973).

Further Thoughts

Of the 32 ornamentals, 75% were exclusive ornamentals in this study.[223] Thus, it would seem that most of these plants were strictly for adornment. However,

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were isolated in the ion stream (Hewitson 2000). The trigger in the case of 9- and 10-o'clock tangni could be light- or temperature-related (Hine 1999).

[220] The time difference might be due to heat differences based on spatial variation.

[221] Different names for the two species were corroborated by a number of informants.

[222] This is an especially handy plant when not wearing a wristwatch!

[223] In other words, the informants surveyed attributed no other uses to the plant.

evidence suggested that the ornamentals found in these communities were not used only for their aesthetic value.

First, Miskito traditions regarding ornamentals were borrowed from other cultures. Helms (1971) cited a chronicle from the Miskito region postulating that the Creoles or Spanish-speaking Nicaraguans brought flower cultivation to the East Coast. Similarly, the practice of cutting flowers for display appeared to be a Moravian introduction. Several informants said that flowers were not displayed in the home, but were displayed in Church on special occasions, like Semana Santa, Christmas, and for deaths (Anelia Zacarías/Tuapí; Facundo Johnson/Tuapí; Francisco Dublon/Bismona; Nena Castillon/Lamlaya; Zoila Velázquez/Wawa).[224]

Second, most of the plants in this category had other uses, if not always indicated by the informants in this study. Certain ornamentals were used in cemeteries and others were edible. Still others had medicinal value. Three informants (Anelia Zacarías/Tuapí and Facundo Johnson/Tuapí; Zoila Velázquez/Wawa) claimed no medicinal knowledge regarding ornamentals, but none was a healer.[225] Anelia Zacarías and Facundo Johnson (both of Tuapí) admitted that "some people have a plant just as an adornment and don't know it's medicine." Within this study, 20% of the ornamentals had medicinal applications. Moreover, the regional literature contained medicinal documentation for 90% of the ornamentals (or their close relatives).

Compelling evidence supporting the idea that ornamentals were not chosen primarily for aesthetic reasons was found at the home of Raphael Ingley Ricardo, the

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224 Flower color was also important. Informants from three communities stipulated that white or yellow cut flowers were used in Church (Anelia Zacarías and Facundo Johnson/Tuapí; Nena Castillon/Lamlaya; Zoila Velázquez/Wawa).

225 Healers included curanderos and grandies. See Chapter 2 for more information.

mystical curandero from Bismona.[226] As discussed in the Chapter 2: Medicinals, healers said that they did not plant medicinal gardens even though a number of medicinal plants were found in their patios and home gardens. Four of the ornamentals in this listing were potted plants on the steps of Raphael's home; this was the only instance where flowerpots were used in the outlying communities. The potted plants were dayflower (*Commelina diffusa*), mozaica (*Solenostemon scutellarioides*), patita de paloma (*Alternanthera bettzickiana*) and pie del niño (*Pedilanthus tithymaloides*). Dayflower and patita de paloma were documented only at the Raphael's home, who also attributed a medicinal use to the dayflower. Mozaica was found at three sites, two of the plantings belonged to unknown informants (both in Karatá). Pie del niño was also found at three locations, all were homes of people associated with healthcare.[227] Regional literature further indicated that *Pedilanthus* species have been planted in gardens to protect it from el mal aire ("bad air" - Valdez, et al. 1989).

In summary, the custom of keeping ornamental plants was a foreign adjunct to Miskito culture. Coupled with this was the evidence that a large number of the plants in this category also had medicinal uses. Based on this information, it seems likely that the choices in Miskito ornamentals were based primarily on the plant's medicinal (and other) values rather than on their aesthetic qualities.

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[226] Of all the healers in this study, Raphael Ingley Ricardo gave the most mysterious explanation for his powers (see Chapter 2: Medicinals).

[227] The three informants were Raphael Ingley Ricardo (Bismona), healer; Yunita Fox (Haulover), nurse's aid; and Kristilina Perera (Haulover), midwife.

Chapter 5: Household Use

Furnishing Perspectives

The array of home furnishings and utensils are the focus of this chapter. Items in this category include stuffing, wicks, torches, furniture, utensils, rope, fishing line, scrubbing tools, toilet paper and cleaning needs. Before discussing specific domestic plant usage, a brief introduction to Miskito interior decorating is in order. Prior to the arrival of the Moravian missionaries, Miskito household furnishings consisted of nothing more than a hammock with "whatever possessions of the inhabitants [that] are not in actual use, rest[ing] on the cross beams" (Mueller 1932: 37).

The tradition for the last hundred years or so is quite different. By the early twentieth century, the layout and furnishings of Miskito homes began to resemble their present day appearance. Today, home building and décor are reflections of the Moravian influence in Miskito society, most aspects of present day architecture being claimed as Moravian introductions (Helms, 1971; Mueller 1932).

Homes contain three basic rooms: A sitting room, a bedroom and a kitchen (home layouts are discussed in more detail in Chapter 6: Construction). In addition, most homes have a porch. The entire home is furnished sparingly and functionally. Following is a brief discussion of parts that make up the typical Miskito home.

Porch

Every space in the home is put to good use, beginning with the porch. The porch serves as a gathering place and as an outdoor workshop. At any time of the day, passing friends may stop for a chat and a respite from the sun. Men sharpen their machetes and repair fishing nets in the cool shade of the porch. Porch seating might include some combination of a long wooden bench,[228] a small stool, a chair reminiscent

[228] This bench is often carved from one piece of wood (Helms 1971).

of Adirondack-type construction, or a hammock[229]; the stairs also serve as seating. The storage space afforded by the protective overhang is put to good use. A rope strung across the length of the porch serves as a sheltered space for hanging laundry. Nails on the wall hold tools and fishing nets. Shovels, mortars, kindling, ropes and lanterns line the rear of the porch. Buoys used for net fishing are often hung from the porch rafters for storage, their bright colors suggest a party atmosphere.

Sitting Room

Sitting rooms have a table, some wooden chairs, a bookcase and a few hanging shelves. This is a multi-purpose room where guests can be entertained or the family gathers to listen to the radio.[230] Large plastic drums of food, such as corn, might be stored in a corner of this room. Curtains, pictures and trinkets distributed about the room create a homey atmosphere.

Bedroom

Bedroom furniture includes the bed,[231] a nightstand and, sometimes, a dresser (clothing is often hung from nails on the wall). Beds are usually single and married couples usually push two single beds together. Typical bedding includes one pillow,[232] cotton sheets, a blanket and a mosquito net.[233] Bedrooms of children grown and gone

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229 These are typical Miskito porch furnishings; Helms (1971) found the same items in the village of Asang.

230 In some instances, a sewing machine may be located in this room (Helms 1971). This room is sometimes converted into a venta (general supply store), with shelving and storage space to accommodate the merchandise, weighing scale, etc. Ventas are discussed in more detail in Chapter 6: Construction.

231 Hammocks were customary in the early nineteenth century (Roberts 1827) and are still found on occasion instead of a bed.

232 Often homemade, they are stuffed with natural fibers.

233 Helms (1971) notes that sheets may be made of bark cloth. She is probably referring to tunu [Miskito] (*Castilla fallax*) from which the Miskito used to make clothing

are converted to storage space. The bed remains for the occasional guest. Storage items are boxed and stowed under the bed[234] or stacked along the wall and hidden by a pretty cloth.

Kitchen

The kitchen furnishings are also examples of simplicity and functionality. In addition to the kubus (stove)[235] and various nearby shelves, there is a dining table, usually flanked by benches. The sink is usually a wooden, slatted shelf jutting out from the kitchen wall upon where food and dishes are cleaned (details on sink construction are found in Chapter 6: Construction). Various plastic bowls, buckets and a soap dish are kept in this space. Dishes are usually cleaned in a wide plastic bowl of cold well water; clean water for rinsing comes from a large container of water usually located on a shelf or stool right next to the sink.

The kitchen, in addition to succinctly fulfilling the three basic functions of cooking, eating and cleaning, may also serve as a storage facility with every available space being used to store just about anything, the atmosphere of the kitchen is one of organized chaos.

> Shelves for silverware, cheap enameled dishes and cups, odd cans, boxes and bottles, and the traditional calabashes, and the kubus or clay stove or cooking platform...Fishing rods, machetes, knives, cooking spoons, and wabul stirrers are hung on the walls or jammed behind upright posts against the wall. A variety of woven carrying baskets and fishing nets may be stored in corners or on the rafters (Helms 1971:50-51).

The montage of kitchen accouterments has changed little in twenty plus years.

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and bed sheets. Examples of the continued use of this plant for making cloth were not found in this study.

[234] The bedframe is usually two to three feet off the ground. This is typical of Miskito bed construction (see also Helms 1971).

[235] The stove is described in detail in Chapter 3: Edibles.

Sources of Domestic Items

The sources of domestic plant products, both in terms of locating the plants and fabricating the items, are discussed in this section. Household items are derived from both wild and domesticated plants. The items themselves could be either purchased or homemade.

Plants used in domestic products in this survey were derived equally from wild and domesticated sources. Of the domesticated plants, half came from transplants moved from the bush. Transplants were domesticated primarily for their usefulness within the home. Cultivated edible plants were a source of household items but were domesticated primarily for their edibility and only secondarily for household utility.

Carpenters could be hired to make most any item needed in the household (See Chapter 6: Construction for more details). Large and complex household products, such as mortars, washboards and furniture, may be purchased from a carpenter within the community (Basilicia Martin-Schultz/Tuapí). But the majority of domestic plant products, including most kitchen utensils and plain furnishing, were homemade.

Preparing Household Items

Preparation of household items runs the gamut from simple to complex. Some utensils require little-to-no "assembly" to obtain the finished product. Natural fibers for stuffing could be easily harvested and cleaned. Latex is extracted simply by cutting the plant and gathering the exudate.

Cooking utensils (such as wooden spoons, graters and beating sticks) are often simple creations, carved from a single piece of wood. Many kitchen utensils are derived from a combination of plant products and discarded objects. For example, a coconut grater may be made with an old piece of tin[236] that has been perforated and nailed to a wooden frame. A strainer is made from a small piece of window screen fitted to the bottom of a shallow wooden box (Laurel Chevarría, Yoneda Cordoba Tathum, and Celia Zamorra/Karatá).

Another important kitchen utensil is the standing mortar and pestle (called taro and paleta in Spanish and nuh and kustara in Miskito (Marx and Heath 1992; Yoneda Cordoba Tathum/ Karatá). [237] The mortar, standing about three feet tall, is used to thresh rice and to grind corn and other seeds into powder (Yoneda Cordoba Tathum/ Karatá; Luzila Zamora/Haulover; Coe and Anderson 1996). Carved from a single piece of wood, any hardwood will suffice but caoba (*Swietenia macrophylla*), Santa María (*Calophyllum brasiliense* var. *rekoi*) and níspero (*Manilkara* sp.) are preferred. Níspero is especially popular because it is "strong wood" (Pablo Joseph/Lamlaya). "This wood [níspero] lasts longest" (Luzila Zamora/Haulover). According to Mutchnick and McCarthy (1997), the wood of *Manilkara* is highly valued for its insect resistance and durability. The nuh is either homemade or purchased from a community member (Luzila Zamora/Haulover). Stored on the porch or under the home, the nuh is always readily accessible, the work being done in the patio.[238]

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[236] The tin may be obtained from an empty tin can that has been split open and flattened or an old piece of tin that has been used atop the cooking stove (fide from Nietschmann 1973).

[237] This is pronounced "nō." Duku is another Miskito term for mortar (Marx and Heath 1992), but informants in this study use nuh.

[238] Threshing or grinding is a chore often delegated to children. Two children often share the work by placing the nuh between them and alternating blows with a large wooden pestle. Many household chores are accomplished in the patio area including cloth beating (referring to tunu the bark cloth traditionally made by the Miskito; see Chapter 10: Personal Use, for more information), sugarcane crushing, or rice threshing (Helms 1971).

Canoes are fascinating pieces of craftsmanship. Forming the basic mode of transportation on the East Coast, most families own or have access to a canoe. The traditional Miskito dory is nothing more than a dugout canoe. Most people own smaller "pitpans", paddle-driven, round-bottomed canoes used on rivers (Mueller 1932).[239] Children and adults alike are equally adroit at their maneuvering.[240]

Larger canoes (called dories or *lanchas* [Spanish]) are built for seafaring, "with a keel, and often a small mast and a sail" (Mueller 1932). These more substantial structures could be fitted with an outboard motor (in which case, there is neither a mast nor sail). Dories could usually be afforded by only the select few.[241] A good dory builder who develops a local reputation is often commissioned by people from other villages and private organizations to build dories.[242]

Dories range from seven to twenty feet in length, one and one-half to three feet deep and two to four feet across.[243] Made from a variety of hardwoods, especially caoba, Santa María and piawat (*Myrica cerifera*), the hull of the boat is carved from a single log. The sides of the larger dories are built up with wooden planks using

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[239] I have seen these used in the lagoon system as well.

[240] In Lamlaya, collecting a number of plant specimens located along the lagoon was accomplished with the assistance of a seven-year-old chauffeur in a dory no longer than my height (5'10") and no deeper than my calves (16").

[241] Private companies, wealthier villagers and locals in the transportation business have the means to commission dories.

[242] During this study, the local group that assisted with the research for this study commissioned Amyllo Zelaya (Wawa) to build a large dory for their organization.

[243] Roberts (1827) noted the following, "...formed out of the trunk of a single tree of cedar, or mahogany...I have known some of these canoes above thirty-five feet long, about five feet deep, and nearly six feet broad" (page 120).

wooden pegs[244] to hold them in place. Wooden supports are mounted along the inside of the boat; this ribbing, situated about every two feet, provides reinforcement to the hull and planking. The front of the boat is engineered such that it comes to a prominent, sturdy point. The wood is sealed with coats of paint and the entire dory is completed in about 25 days (Amyllo Zelaya/Wawa). A number of removable wooden planks may be kept in the boat. Placing the board crossways about halfway up the dory walls provides seating to accommodate riders. Removing the planks allows for space to haul items.

Carpenters often purchase wood used to make furniture. Cedro real (*Cedrela odorata*) and caoba are preferred for making tables and chairs (Orlando Budier/Haulover; Castillo Penare/Wawa). While most furniture is simple in form, there are many examples of ornately carved and decorated pieces. Furniture makers are quite skilled in creating beautiful round tables, rocking chairs and small curio cabinets. Community members with a cash income could sometimes afford to purchase such items for themselves but carpenters are usually hired to make such items as gifts for special occasions. For more information of carpentry, see Chapter 5:Construction.

The Plants

The plants employed in household uses are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 for more information on the plants in this listing. The location(s) of the plant within the study site, other plant uses documented in this study and information from regional literature indicating established similar uses are provided where applicable.

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[244] A blue glue is also used to hold the planks together. This was purchased from Puerto Cabezas, but its the composition is unknown.

algodón (*Gossypium barbadense*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
COTTON for pillow and mattress stuffing,[245] cotton balls
WOOD to make rafts[246]
Other uses in this study: Medicine
Literature pertaining to household uses:
Lentz 1993: SEED FIBERS for cordage and thread
Martin and Fennema 2000: FIBER for stuffing
Wiersema and Leon 1999: FIBERS for textiles

algodón criollo (*Ceiba pentandra*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
COTTON for clothes and as lighter wick (in Somoza's time) and as cotton ball
Other uses in this study: Medicine, Construction
Literature pertaining to household uses:
Coe and Anderson 1996: COTTON: mattresses, pillows
Martin and Fennema 2000: FIBER for stuffing
Morton 1981: SEED oil for soap, illumination; FLOSS as stuffing
Smith, et al. 1992: Mattress filler
Wiersema and Leon 1999: FIBER for pillows, life preservers, and mattresses

bredpru (*Artocarpus altilis*)
Cultivated (Patio – Common)
LATEX: As glue
Other uses in this study: Medicine, Edible, Construction
Literature pertaining to household uses:
Duke 1981: BARK yields a fiber; LATEX for caulking boats
Smith, et al. 1992: LATEX for caulking boats

brum (*Hirtella racemosa* var. *hexandra*)
Wild
Cut TWIGS tied together to make an indoor/outdoor broom[247]
Other uses in this study: None
Literature pertaining to household uses: None found

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[245] This cotton is often too lumpy (Aristan Bons Zacarías/Puerto Cabezas-Bismona).

[246] These rafts, called "balsa," are more common near the Río Coco "for use in wet season when river high. Goods are sold from these rafts" (Aristan Bons Zacarías/Puerto Cabezas-Bismona). Helms (1971) noted that two floating commissaries "plyed their trade [on the Río Coco] between Waspam and Karisal" (page 40). Making trips about every 10 days, they sold "flour, salt, sugar, kerosene, cloth, thread, canned goods, candy, paper, pencils, tobacco, Vicks Vaporub, chewing gum, shoe polish, diaper pins, and fishing line" on their way upriver. On the return trip, vendors brought with them agricultural goods obtained from communities to deliver to merchants in coastal towns. Mail and passengers also rode the barges.

[247] The "branches, [which] get strong when dry out," (Anelia Zacarías/Tuapi) may be tied to piece of wood, but not necessarily.

caoba (*Swietenia macrophylla*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
WOOD for tables, chairs, desks, standing mortar/pestle
Other uses in this study: Construction
Literature pertaining to household uses:
Coe and Anderson 1996: COTTON as stuffing; WOOD for furniture and household utensils
Lentz 1993: WOOD for furniture
Mutchnick and McCarthy 1997: Tables, beds, dressers, ladders, washboards
Nietschmann 1973: WOOD for mortar, spoons, bowls, beating sticks

cáscara (*Peltaea ovata*)
Wild
Thin BARK easily peeled off and used as rope[248]
Other uses in this study: None
Literature pertaining to household uses: None found

cedro real (*Cedrela odorata*)
Wild (Bush)
WOOD for tables, chairs, colanders, etc.
Other uses in this study: Construction
Literature pertaining to household uses:
Cisneros, García and Dávila 1992: WOOD for furniture, wardrobes
Coe and Anderson 1996: WOOD for furniture and household utensils
Duke 1981: Aromatic WOOD for cigar boxes, mothproof chests, dugouts
Mutchnick and McCarthy 1997: (Petén, Guatemala) WOOD: Utensils
Nietschmann 1973: WOOD for spoons, bowls, beating sticks

chaparro (*Curatella americana*)
Wild (Fields)
Fresh LEAVES used to scrub dishes[249]
Other uses in this study: Medicinal
Literature pertaining to household uses:
Cisneros, García and Dávila 1992: WOOD for stakes
Duke 1981: LEAVES polish wooden articles, scrub pots and pans
Morton 1981: LEAVES used for scrubbing pots and pans
Ziock 1894: Tree whose LEAVES are used as 'glassed paper'

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[248] The strips of bark are used as is, without processing, braiding or weaving. This is a ready-made convenience used for bundling firewood on collecting forays in the bush (Nena Castillon/Lamlaya).

[249] "Must use fresh or gets stiff" (Anelia Zacarías/Tuapí).

jicaro (*Crescentia alata*)
Wild; Cultivated (Previously transplanted to Patio; currently spared[250])
FRUIT hulls as bowls, spoons, and other household utensils
Other uses in this study: None
Literature pertaining to household uses:
Coe and Anderson 1996: (Garífuna) Drinking gourds from SHELL
Duke 1981: MATURE FRUIT SHELL used for utensils, water jugs/bailers, chamber pots, sieves, containers (including salt)
Pickering 1879: FRUIT SHELL as basin, cup, spoon, water bottle, pail
Wiersema and Leon 1999: SHELLS for containers

karastingni[251] (*Bromelia karatas*)
Wild
LEAF TIP broken off to use as needle; strings[252] in the LEAF used as thread
Other uses in this study: None
Literature pertaining to household uses:
Morton 1981: LEAVES yield a fine fiber

limon agrio (*Citrus aurantiifolia*)
Cultivated (Patio – Common)
Add a LEAF to starch made from yuca tubers for ironing[253]
Other uses in this study: Edible, Medicine
Literature pertaining to household uses for species of this genus:
Lewis and Elvin-Lewis 1977: *Citrus* sp.: Used in perfumes, scented soap, oil, shampoo
Paul and Cox 1995: *Citrus aurantium*: FRUIT juice mixed with lime and water and painted onto house wall interiors (juice causes mixture to harden)
Wiersema and Leon 1999: Materials: Essential oils (in perfumery)

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250 For an explanation of spared plantings, see Chapter 3: Edibles.

251 According to Ishmael Warman and Salvador Perez (Karatá), the community of Karatá was named for the plant called "kara" that once grew in abundance on the point of land on the water's edge (ta, is Miskito for point). "Those plants fell into the water" (Salvador Perez, Karatá). Now, the point is called wahamtara (Miskito for, point of land covered with uva del mar). Interestingly, the scientific designation for the entire family can be traced to this plant. In the late seventeenth century, French explorer Father Charles Plumier visited the West Indies and noted the presence of a large, thorny plant locally called Karatas. Plumier "dignified" the plant by naming it after the Swedish botanist, Olaf Bromel (Padilla 1973).

252 These "strings" are composed of vascular tissue of the veins and associated cells.

253 See "Further Thoughts," below, for details on preparation.

limon grande (*Citrus* sp.)
Cultivated (Patio – Common)
FRUIT juice rubbed on rusted metal to counter oxidation[254]
Other uses in this study: None
Literature pertaining to household uses: No similar usage.

limon puro (*Citrus limon*)
Cultivated (Patio – Common)
FRUIT juice used to clean house[255]
Other uses in this study: Edible, Medicine, Personal
Literature pertaining to household uses for a closely related species:
Paul and Cox 1995: *C. aurantium*: FRUIT cut in half and put in room or near easel where painting with oil paints to 'detoxify' the air

liwa mukya[256] (*Cochlospermum religiosum*)
Wild (Forest Edge); Cultivated (Transplanted as living fence)
COTTON used to stuff pillows
Other uses in this study: Construction, Medicinal
Literature pertaining to household uses for this and a related species:
Duke 1981: *C. vitifolium*: COTTON used for pillows and at base of Indian darts
Wiersema and Leon 1999: Source of resin and insoluble gum

maíz (*Zea mays*)
Cultivated (Plantation – Common); Purchased
Mix corn MEAL with paint and stuff into termite damaged wood[257]
Other uses in this study: Medicine, Edible
Literature pertaining to household uses:
Beckstrom-Sternberg, Duke and Wain 1994: Soap
Duke 1981: HUSKS used as paper; if ground fine, substitutes for glass; COBS used as plug for jicaro (*Crescentia alata*) water jugs

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[254] "If file rusty, put juice on and three days later, it's like new" (Aristan Bons Zacarías/Puerto Cabezas-Bismona).

[255] The organic acid in the pulp acts as a cleaning agent and the essential oils impart a fresh, clean scent. Lysol® did not invent lemon scented cleaners!

[256] According to one informant, this tree is so named because when the flowers open, it attracts a big bee (Salvador Perez/Karatá). Mukya is Miskito for a large honeybee that does not sting (Marx and Heath 1992).

[257] As the seeds are rich in starch, the corn meal probably serves as a thickening agent.

mangle rojo (*Rhizophora mangle*)
Wild (Riverbanks)
BARK extract used as paint[258]
Other uses in this study: Construction, Medicinal, Fuel, Additional, Personal
Literature pertaining to household uses:
Duke 1981: BARK yields furniture stain; Panama: Brown BRANCHES used to make fishing line
Morton 1981: PROP ROOTS yield dye for furniture/floor stain

nispero (*Manilkara* sp.)
Wild (Bush)
WOOD for standing mortar/pestle, ruler, pipe, tool handle, washboard
Other uses in this study: Construction
Literature pertaining to household uses for species of this genus:
Mutchnick and McCarthy 1997: *M. zapota*: Used for slingshots
Wiersema and Leon 1999: *M. zapota*: FRUIT, mucilage

palmera (*Acoelorraphe wrightii*)
Wild (Forest Edge/Fields/Watershed Areas)
LEAVES used as broom[259]
Other uses in this study: Construction, Medicinal, Edible
Literature pertaining to household uses:
Coe and Anderson 1996: INFLORESCENCE rachis used as broom

pasta (*Luffa quinquefida*)
Cultivated (Patio – Rare)
Dried PULP to make loofah sponge[260]
Other uses in this study: None
Literature pertaining to household uses for related species:
Bremness 1994: *L. aegyptica*: Dried, soaked, bleached FRUIT yields the loofah, used for scrubbing the skin and dishes and as a shock absorber
Duke 1981: *L. acutangula and L. aegyptica*: RIPE PULP is a coarse sponge used to clean dishes in Panama
Morton 1981: *L. aegyptica*: DRY, peeled, cleaned mature FRUITS make sponges for scrubbing and cleaning

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[258] The procedure for making paint from mangle rojo bark is simple. "Cut bark into pieces; cook in pot. Yields red juice. Let sit a while; paint" (Yoneda Cordoba Tathum/Karatá).

[259] The palmera broom is made by first drying the leaves for up to 5 days. A number of leaves can be tied together and the bunch can then be attached to any kind of wood to make a handle for the broom (Luzila Zamora/Haulover; Laurel Chevarría/Karatá; Yoneda Cordoba Tathum/Karatá). Such brooms can last up to two years (Luzila Zamora/Haulover).

[260] "The pulp is dried and used to clean body" (Aristan Bons Zacarías/Puerto Cabezas-Bismona).

piawat (*Myrica cerifera*)
Wild (Riverside)
FLOWER for laundry soap[261]
WOOD for spoons[262] and tables
Other uses in this study: Construction, Fuel, Personal
Literature pertaining to household uses:
Beckstrom-Sternberg, Duke and Wain 1994: Soap
Lewis and Elvin-Lewis 1977: ROOT/BARK decoction for spongy gums
Morton 1981: Boiled FRUITS as soap (Guatemala)
Wiersema and Leon 1999: Wax

pino (*Pinus caribaea* var. *hondurensis*)
Wild (Forest Edge/Fields/Watershed Areas); Cultivated (Patio – Common)
WOOD sliver used as a torchlight[263]
Other uses in this study: Construction, Medicinal, Fuel
Literature pertaining to household uses:
Coe and Anderson 1996: WOOD for tables, chairs, bed-frames, and household utensils
Denevan 1961: Resin-soaked pine SPLINTERS for illumination and torches
Smith, et al. 1992: WOOD for pulp

Santa María (*Calophyllum brasiliense* var. *rekoi*)
Wild (Bush)
WOOD for bowls[264], standing mortar/pestle, dories
Other uses in this study: Construction, fuel
Literature pertaining to household uses:
Cisneros, García and Dávila 1992: WOOD for furniture, rowboats and ships
Coe and Anderson 1996: Garifuna use WOOD for tables, chairs, bed-frames, and household utensils
Duke 1981: LATEX for caulking
Mutchnick and McCarthy 1997: (Petén, Guatemala): WOOD to make stove

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[261] Flowers are mashed to make soap for washing laundry. "Used in old times, not now" (Basilicia Martin-Schultz/Tuapí)

[262] According to Pablo Joseph (Lamlaya), spoons were made from this tree in the "olden times."

[263] "Light end of splinter of wood; burns slowly" (Salvador Perez/Karatá).

[264] Bowls can be very large. One woman in Karatá has a bowl about one and one-half feet in diameter, made from a solid piece of wood.

siaya wahya[265] ***(Clidemia sericea)***
Wild (Shady Areas)
Fresh LEAF as toilet paper[266]
Other uses in this study: None
Literature pertaining to household uses: No similar usage.

susul *(Alibertia edulis)*
Wild (Fields)
BRANCH as fishing rod[267]
Other uses in this study: Edible
Literature pertaining to household uses: No similar usage.

tailo *(Xylopia aromatica)*
Wild (Fields)
BARK as rope[268]
Other uses in this study: Fuel
Literature pertaining to household uses for a related species:
Duke 1981: *X. frutescens*: BARK formerly for cordage

yuca *(Manihot esculenta)*
Cultivated (Home Garden – Common; Plantation – Common); Purchased
Starch made from TUBER for ironing[269]
Other uses in this study: Medicine, Edible, Additional
Literature pertaining to household uses: No similar usage.

Summary of Domestic Uses

Eleven percent[270] of the plants in this survey have some functional value in the household. Only about twenty different applications could be attributed here to the

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265 Siaya [Miskito] is described as a species of field bush with purple fruits and wahya [Miskito] mean "leaf of" (Marx and Heath 1992), a perfect fit for *Clidemia serciea*.

266 This leaf is thick and covered in fine green hairs making it very soft to the touch.

267 To make a fishing rod: "Choose straight branch of desired size; peel bark, put notch in one end and tie fishing line with hook to it. Go to water, bait line and throw in. Lasts until you snag a fish that's too big for rod" (Jaime Homer Dennis/Lamlaya).

268 To obtain rope, "Peel bark off tall, straight, young branch" (Anelia Zacarías/Tuapí). Can be used to tie up a bundle of firewood, to tie sacks (Anelia Zacarías) or to hold onto fishing net (Delia Zacarías-Zamora/Tuapí).

269 As the roots are high in starch (Martin and Fennema 2000), this plant is well-suited for use as a starching agent in ironing. See "Further Thoughts," for preparation details.

twenty-six plants listed in this chapter. This small number of plants could be attributed to the simplicity and functionality of Miskito household needs. The choice of long-lasting wood and simply fashioned products translates into more use and less repair and replacement. In addition, the low number of plants used as domestic plant products could be attributed to the availability today of inexpensive plastic and tin alternatives in the markets. This is expounded upon under "Further Thoughts," below.

The majority of the plant uses in this chapter were consistent with uses found in the regional literature. Similar uses were found in the regional literature for all but seven of the plants in this listing. Notably, the use of vascular strand from the leaves of karastingni for sewing is much like that found in *Agave* which are also known to have strong durable fibers in the leaves (Heywood 1993; Peck 1947) and which were used for sewing in much the same way in Mexico.

A number of uses appear to be novel, although not necessarily remarkable. The use of susul (*Alibertia edulis*) twigs for fishing rods is informative but not awe-inspiring, unless of course, the fish you "snagged" were too big. Obtaining cordage from bark (as with cáscara - *Peltaea ovata* and tailo - *Xylopia aromatica*) is also not unknown. Some novel uses were more interesting as with the use of siaya wahya as toilet paper, for instance. Quaint or not, household uses for plants were practical and functional, revealing that plants products continue to fulfill the most basic household needs.

Further Thoughts

Domestic plant usage on the East Coast of Nicaragua is reminiscent of the Gilded Age in the United States but in a twentieth century setting. Many of the

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[270] This figure is based on 244 plants listed in the Ethnobotanical Directory. Given 26 plants in this category, plants with household application make up 8.62% of the plants collected in this study.

customs, especially relating to domestic duties, were accomplished similarly to the way Americans achieved everyday chores at the turn of the nineteenth century. At the same time, the twentieth century has left its mark by supplanting many plant products with cheap, manufactured alternatives.

Getting the Job Done

Just as interesting as the items used in the household were the processes the locals use to carry out household duties. Observing how Miskito women accomplish the washing and ironing is enough to make anyone thankful for the modern-day convenience of electronic appliances. Laundry was scrubbed on a washboard, usually in a wash tub, with many changes of water. A common practice was to use an old dory that had outlived its usefulness on sea (Zoila Velázquez/Wawa). Atop wooden supports, the dory served out the rest of its days in practical use as a washtub.[271] A novel approach to washing the laundry was found in Tuapi. There, they took advantage of the proximity of the river on wash day. Two or three women usually went together to do the washing, hauling the laundry to the river in great wooden baskets. Large logs found along the shore were stacked upon each other to create a work surface about waist high in the water upon which the washboard was placed. The clothes were then easily washed and rinsed with little effort. The convenience of running water seemed to outweigh the inconvenience of hauling the laundry to and from the river.[272]

Ironing was accomplished effortlessly by Miskito women using information that would be largely unknown to women in the United States today. The iron itself is a

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[271] Old dory washtubs are also observed in Karatá.

[272] Laundered clothes are hung to dry. A rope may be strung inside the home, on the porch rafters, between the house posts of two buildings or on a rope strung between to tree trunks that have been cut and positioned in the patio.

cast iron frame with a wooden handle atop and an opening below for housing charcoal. Charcoal for ironing was chosen for its ability to last as well as to heat (charcoal is discussed in more detail in Chapter 8: Fuel). Once the "loaded" iron has reached the proper temperature, clothes were pressed either on a board or on a tabletop. Homemade starch was prepared ahead of time by grating and squeezing the juice from yuca (*Manihot esculenta*) tubers. A leaf of limon agrio (*Citrus aurantiifolia*) might be added to the liquid that was poured off after standing for one day. The remaining paste was put in the sun to dry (Nicholas Regional/Bluefields-Karatá; Salvador Perez/Karatá). The homemade starch was sprinkled on the clothes while ironing imparting a crisp, fresh smelling finish.

To Market, To Market

Markets have had a negative effect on domestic plant usage in the surveyed communities because cheap, imported alternatives made from tin or plastic have displaced the products once made from plants. At the same time, there is market potential for some domestic plant products. But the same stumbling blocks that hinder the marketing of cash crops (discussed in Chapter 3: Edibles) come into play with regard to marketing domestic plant products.

One particular plant with a long history of usage in the communities that has fallen to the wayside with the introduction of inexpensive alternatives was the jicaro (*Crescentia alata*).[273] With little effort, the gourd-like fruit from this tree could be fashioned into a plethora of useful objects, including bowls, drinking cups, ladles and spoons, being left "whole, when they were to be used as water vessels; halved, when they were to be used as cups and saucers" (Mueller 1932: 39). The fruit was cut in

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[273] The Miskito name for this plant, "kahmi" literally translates to "Columbus" (Marx and Heath 1992). Whether this is indicative of its long-standing usage within the communities was not completely certain.

half, the outer skin was scraped off and the contents were removed. After a good cleaning, the shell was left to dry in the sun. Then, it could be used as a bowl or cup or spoon and it lasts a long time (Basilicia Martin-Schultz/Tuapí; Nena Castillon/Lamlaya; Salvador Perez/Karatá).

Informants in this study relegated the use of jícaro to the "olden times" (Nena Castillon/Lamlaya) and indeed there were references to their use more than one hundred years ago (Roberts 1827; Mueller 1932). But, as early as the turn of the nineteenth century, the presence of glassware, silverware and dishes was reported in the homes of wealthier Miskito (headmen, chiefs, etc.), being a trade item between the Miskito and British or other foreigners (Roberts 1827).[274] Although not completely absent from modern households,[275] jícaro products were rarely seen in the communities during this study. Spared[276] jícaro trees dot the landscape of many communities and serve as a reminder of their once important role in everyday life. Their continued presence within outlying villages stands as a tribute to the "ancianos"[277] who once used them.

Another plant that was noticeably absent from this category was coco (*Cocos nucifera*). A plethora of household uses were given in reference literature. The shell could be made into utensils, bowls and cups; the inflorescence could be made into a broom; the fiber could be used to clean dishes and to make ropes and mats (Coe and

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[274] Previously, food was eaten from a banana leaf without the use of any utensils (Mueller 1932).

[275] "People in market [continue to] use as spoon (Anelia Zacarías/Tuapí). A number of kitchens were observed to have still an odd calabash bowl or two.

[276] Spared plants are those that are allowed to remain when land is cleared for home building. Spared plants are discussed in more detail in <u>Chapter 3: Edibles</u>.

[277] Ancianos are the elderly.

Anderson 1996; Duke 1981; Everett, 1969; Woodroof 1970). An interesting use by the Garífuna people of southeastern Nicaragua was to use the sheath covering (or spathe)[278] of the inflorescence as a strainer. That no informants in this study mentioned these or other household uses could be another indication that traditional plant uses are being supplanted by modern technologies.

While markets are the source of many items that have replaced some domestic plant products, they also harbor the potential for marketing other domestic plant products. Two marektable items include furniture and the plant locally called pasta (*Luffa quinquefida*), or loofah. As mentioned, furniture made by Miskito craftsmen could be quite ornate. Although the furniture was beautiful, "Miskito do not treat their wood," (Jon Ricardo/Bismona) so it was subject to cracking with changes in humidity levels.

The dried pulp of the cucumber-like vegetable, pasta, already enjoys international popularity as the loofah. In Nicaragua, loofahs were sold both in East and West Coast markets. The plant itself requires little inputs and, unlike edible cash crops as discussed in <u>Chapter 3: Edibles</u>, inadequate infrastructure may not be a hindrance. Drying the loofah prior to transporting it would negate problems of perishability. This plant seems to be the perfect candidate for marketing.

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[278] The spathe is a large bract subtending the inflorescence (Allaby 1992).

Chapter 6: Construction

The Frame of Reference

Miskito villages were distinguished by few structures. Structures were fabricated with simplicity and functionality in mind. These structures, along with the tools used to make them, are the focus of this chapter.

The Lay of the Land

Before discussing the use of plants in Miskito construction, a brief discussion of the terrain is in order. The outlying villages in this study represented a variety of ecosystems found along the East Coast. Villages were either coastal or riverine, in some combination with lowland swamp, bush or savanna.[279] As with plantations,[280] the terrain dictated the location of buildings because flooding had to be taken into consideration. In general, villages were laid out linearly. Homes were often erected along the water or along the main road through town. Ample space separated the rows of homes creating large, green thoroughfares through the community.[281]

In this village setting, the typical Miskito homestead included the main house, an outhouse and the well. Fences were often erected only around home gardens. The Moravian Church, present in each of the study communities, was the largest, most visible structure, and was often the first building encountered upon entering town.[282] When present, the school was relegated to one end of the village, often just at the edge of the bush.

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[279] For details on geographical information for each community, see Appendix 6.

[280] See Chapter 3 for more information.

[281] This village layout seemed to be typical of savanna, coastal and riverine villages (see also Helms 1971).

[282] The same was true for the Miskito village of Asang (Helms 1971).

Structures and their Design

Architecture on the East Coast has followed a logical progression from thatched huts, to wooden plank dwellings to cement buildings. Early accounts of Miskito communities depicted dwellings made of thatch and having no walls (Helms 1971).

> Constructed of about four to six posts of the hardest wood available, dug into the ground, and a roof of...Bapta leaf...The roof was six to eight feet above the ground. Usually there was no other floor plan than the bare ground and no walls or screens of any kind against the wind or weather (Mueller 1932: 37).[283]

Later accounts described Miskito architecture as being of the canol type: Rectangular structures, lacking halls and patios, with walls made of pole or cane, boards being used only occasionally (Ryan, et al. 1970). Today dwellings have changed slightly. In the study communities, dwellings generally shared three traits: All were elevated off the ground, all were built using wooden planks and most were topped with a thatched roof.[284] The architecture found in the study communities apparently reflects the Moravian influence on the East Coast as most aspects of design and construction were claimed as Moravian introductions (Helms 1971; Mueller 1932).[285]

The principal buildings found in Miskito villages included private homes, non-residential buildings (such as churches and clinics), outhouses, fences, chicken coops, lean-tos and wells. Following are details about the design of these major structures. Information on décor and furnishings are discussed in Chapter 5: Household.

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[283] "Bapta" is old Miskito for palmera (*Acoelorraphe wrightii*), spelled papta today.

[284] In contrast, houses made entirely of palmera were extant in Garífuna villages in 1996 (Coe and Anderson, 1996).

[285] Elements introduced by the Moravians are noted in this chapter and in Chapter 5: Household Use. More information on the Moravians is located in Appendix 10: Religion.

Private Homes

All homes shared three design aspects: They consisted of either one or two buildings, they were raised off the ground and they usually had a porch. Because most of the day was spent outdoors, homes were built to satisfy two needs: The need for a safe sleeping area and a convenient eating area.[286] This was accomplished in one of two ways. Homes might be single structures, with the kitchen and living quarters as part of the same building. Or, they might be two different structures, with the kitchen separated from the living quarters.

All dwellings were raised from 2 to 5 feet off the ground giving each village a uniform character. Wooden support posts were strategically spaced under the home. Raised homes were a Moravian introduction (Helms 1971; Mueller 1932). The Moravians, having found the indigenous population living in dirt floor homes that became inundated in the wet season, were first to raise the floors "about two feet above the ground" (Mueller 1932: 38). Community members appeared unaware of the Moravian origin of this tradition. As Laurel Chevarría (Karatá) stated, the "house [is] off [the] ground because all communities do it." In asking whether the raised home was a flood precaution, informants responded with a quizzical expression and an emphatic, "No" (Anelia Zacarías and Facundo Johnson/Tuapí; Orlando Budier/Haulover). From their perspective, there were two main advantages to an elevated home: To keep the environment within the home cleaner and cooler and to provide a dry storage space underneath.

Zoila Velázquez (Wawa) pointed to the "charco" (Spanish for "mud") under her the home and said that a raised house meant less dust inside. Homes were also kept

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[286] Helms (1971) also noted the Miskito affinity for working outdoors, be it in the patio, on the porch, in the fields or on the water. They even rested outdoors.

cleaner because a raised home helps to keep out roving animals (Helms 1971), although nothing could keep out persistent chickens once they discovered a cache of rice (from personal experience). House height was a matter of personal preference (Nena Castillon/Lamlaya). It "depends on whether people want it high or low" (Facundo Johnson/Tuapí). The general consensus was "...the higher [the house], the cooler [and the] more storage [space below] away from rain" (Facundo Johnson/Tuapí). But a home that was too high could be bad. It "costs money to have it high...because need taller posts" (Facundo Johnson/Tuapí). In Haulover, Orlando Budier advised, "houses [should be] no higher than three feet because so windy, messes up house."

There were many uses for the space under the home. Many people hung a hammock under their house (Francisco Dublon/Bismona; Nena Castillon/Lamlaya). Animals also rested in the cool shade under the house and a family in Lamlaya kept a monkey tied up there. The dry space under the home made an ideal storage space for firewood and mortars. A resident of Karatá used the space under her sleeping quarters as an outdoor kitchen while the old kitchen building was demolished and rebuilt (Edilmira ?/Karatá).[287]

The evolution of house walls progressed from "walls of bamboo [bambú] or bapta-palm [palmera] poles laid side by side," to "wicker-work" walls, to split bambú boards, to the standard planking of today (Mueller 1932: 38). Windows, lacking glass and screens, were equipped with wooden shutters that could be hinged either on one side or along the top; the latter window shutter being held open by wedging a wooden

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[287] The Miskito residents of Andris Tara used the space as a hiding place from rampaging victims of grisi siknis. According to Dennis (1981: 465), grisi siknis victims would sometimes attack people around them but apparently "don't bother" people hiding in the space under a house. For more information on grisi siknis, see "Further Thoughts, Rationalizing Supernatural Illnesses" in Chapter 7: Superstition.

stick between the windowsill and the shutter.[288] Doors of sleeping quarters were usually one-piece constructions. However, kitchens could be equipped with "Dutch" doors; shutting the bottom half of the door kept out unwanted animals (mainly dogs, chickens and pigs) but still allowed for air circulation.

Finally, most homes had a porch on them. Two-building homes might have a porch on either building or both the sleeping quarters and the kitchen, with the porch sometimes connecting the two buildings.[289] One-building homes might not have a porch depending on the affluence of the family. Completion of the porch appeared to be a low priority in some cases. Porches of well-worn homes often lacked various aspects such as railings, an overhang or stairs leading up to it.

Two-Building Homes

Two-building homes might be connected by a ramp or separated by an expanse of lawn.[290] The buildings were either square or rectangular, with the sleeping quarters larger than the kitchen building.[291] Typically, the two structures were located next to each other with a ramp forming the front porch. Occasionally the kitchen was located behind the sleeping quarters; in this case the two buildings might not be connected by a ramp but the kitchen could be accessed from the sleeping quarters by

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[288] Windows and doors were also Moravian introductions (Mueller 1932).

[289] According to Helms (1971), a traveler in the region in the early 1930s noted the porch running the length of the kitchen. In this study, the sleeping quarters tended to have porches while the kitchens did not.

[290] Helms (1971) also noted a connecting ramp between two building structures but did not provide details on the location of one building relative to the other.

[291] Estimated building size in Asang depicted the sleeping quarters as averaging about 18-19 x 22-24 ft and the kitchen at 14 x 19 ft (Helms 1971). These measurements were similar to that found in this study.

a back door. A ramp between the two buildings was especially helpful in the wet season when the ground was usually inundated.

The sleeping quarters could be accessed through a sturdy front door, made of wood and often equipped with a padlock. Upon entering the structure, the first room was usually a sitting room or common area within the home. This room might occupy the front corner of the home or it may run the length of the house with a door leading out the rear of the home. The roof on the sleeping quarters was thatch or corrugated tin (details on roofing materials were discussed in "Choice of Materials," below).

Beyond the anteroom, there were usually two bedrooms to accommodate parents and children. Bedrooms, separated from the anteroom by wooden dividers, often lacked wooden doors. These rooms were modestly proportioned, having only a narrow walk space between the furniture and the wall. Bedrooms rendered obsolete upon the departure of children were converted to storage space, with the bed being retained to accommodate temporary guests.

The kitchen building accommodated the sink for cleaning and food preparation, the stove for cooking and a table and chairs for eating. The sink may be three to five feet wide and it jutted out from the kitchen building approximately four feet.[292] From the outside, this parapet-like projection was supported from underneath with corner posts and had either a shuttered window or wooden slats as a facing. The sink slanted away from the house so that water drained through a two to three inch hole at the rear of the sink. The wooden floor of the sink also warped, the spaces creating another outlet for the water used in cleaning dishes and food. Other features varied from house to house; the sink design of one informant included a pull-down chopping block that was

[292] Sink construction seemed more elaborate today than even twenty years ago. A study in the Miskito village of Asang noted that kitchen sinks were only about a foot deep (Helms 1971). In the current study, kitchen sinks were much deeper.

used for cutting vegetables or as a platform on which to scrub dishes (Richaina Mybith/Lamlaya).

The stove was usually built in one corner on the short side of the rectangular kitchen building (see Chapter 3 for a detailed description of the stove). The other corner on that end of the building served as the pantry, with dried goods, fresh goods and larger items usually stored on the floor of the kitchen. Various shelves and nails between the sink and stove held the various cooking and cleaning needs. Dishes were stored on hooks and nails near the sink.

There were distinct advantages to having a separate kitchen. "Separate kitchen so no smoke gets in house...smoke blackens things" (Salvador Perez/Karatá). "Kitchen separate building from rest because sticky stuff, dirt, comes out of kitchen" (Richaina Mybith/Lamlaya). This practice of separating the kitchen from the sleeping quarters was also attributed to the Moravians (Helms 1971). The influence of Moravian introductions on construction is further discussed below.

Single-Building Homes

In terms of functionality, there was little difference in the single- versus double-building structures. Norms regarding roofing, windows, sinks, front stairs and porches applied similarly to single-building homes. The main difference from a constructional perspective was that a single building home fulfilled all the functions of two-building homes in one structure.

Single building homes varied from simple, one room open designs to partitioned, multiple room layouts. Some had no permanent internal dividing walls, with the sleeping area located on one side and the kitchen on the other.[293] Although bambú

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[293] In these homes, there were sometimes cloth or thatch dividers providing some functional division in the room.

house walls were not documented in the study communities, Helms (1971) noted that in Asang single-building homes were more likely to be built of bambú in some combination with wood and did not have tin roofs.[294]

More elaborate single building homes include more permanent wooden dividers separating the sitting room, bedroom(s) and kitchen. These dividers often stopped just short of the ceiling, creating a space for airflow and ventilation. One of the most sophisticated and innovative kitchen designs in this study was found in a single-building structure. In the Bismona home of a locally respected carpenter, Jon Ricardo, the kitchen ran the entire length of the rear of the home. Both the sink and stove projected out from one entire wall creating an extruded cooking surface and, thus, increasing floor space. The wall surrounding the cooking/sink area was made of wooden slats with two-inch gaps between them; this allows a lot of light and ventilation to the work surfaces. This layout resulted in a bright, airy and spacious arrangement that was unequalled in any other home in this survey.

There appears to be no formula for predicting the type of home a family would occupy. A number of factors played a role in the choice between two-building and single-building homes. But, societal norms and affluence were the two more influential factors. Societal norms tended toward the construction of two-building homes. Single-building structures appeared to pre-date two-building structures. Asang villagers, noting that the practice of separating the sleeping quarters and the kitchen was a

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[294] The infrequent use of tin roofing on single-building homes was due both to the inaffordability of tin and to the higher internal temperatures caused by tin roofing. These issues are explored below under "Sources and Choice of Materials."

Moravian missionary introduction, explained to Helms (1971) that this practice was "civilized."[295] Single building homes were considered less desirable.

Money was another determining factor in home choice. In most of the villages surveyed, the number of single- versus double-building homes was fairly equal except in the affluent village of Karatá.[296] There, only two homes were single building structures. Double building homes were a sign of affluence and affluence was linked to the demographics. Family units consisting of newly married couples, families with female heads of household and widowed persons living alone usually had little or no cash income. Low income meant less money for building materials and a single building home with an open floor plan would be cost less to build.[297] The upkeep requirements of one-building homes would also be less than that of two-building homes. And, in the case of widowed persons and families with female heads of household, a single building home probably suited the occupants' needs. Married couples could build a second structure later when children arrived and money allowed them to separate the kitchen from the sleeping quarters.

Non-Residential Buildings

Non-residential buildings included churches, clinics, schools and ventas. Of these buildings, only the freestanding ventas (supply stores) were built using traditional Miskito

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[295] Ancianos (elders) in this study referred to the time preceding the arrival of the Moravians as having been "uncivilized." Indeed, Moravian archives also referred to the "uncivilized" nature of the Miskito previous to their religious conversion (Kuschnig 1888). When trying to establish the founding date for Karatá, Ishmael Warman (Karatá), stated that they did not keep time then; the Miskito were not educated, did not know good from bad and "weren't civilized."

[296] The village of Asang had about equal numbers of the two home designs, with slightly more than half of the homes of the two-building type (Helms 1971).

[297] In Asang, Helms (1971) noted that single-building homes also tended to incorporate bamboo to a larger degree than double-building homes. This choice of materials reflects a lower economic outlay.

construction practices. Churches, clinics and schools shared few characteristics with other buildings in the village. Although villagers partook in their construction, churches were designed with Moravian oversight,[298] and clinics and schools were government structures. All three buildings were cinder block structures with tin roofs.[299] No private homes were made of cinder block and these non-residential buildings were typically the only ones in the community with a tin roof.[300]

Ventas

From the outside, freestanding ventas were small versions of single building homes. The wooden, raised structures measured perhaps 6 feet wide and 5 feet deep. The long front side of the building was equipped with a shutter that was propped open for business and a service counter running along the base of the opening. The rear wall was covered with shelves, nails and hooks to accommodate the wares and usually housed a single stool for the vendor. Only one freestanding venta was documented in this study, in the village of Karatá.[301] Most ventas were converted sitting rooms (the front room of the home).

Churches

The Church was typically a large rectangular building and at least twice the size (in width and height) of the average private home. A steeple topped with a cross adorned the peaked roof at the front of the church. Two separate entrances opened at the front of the

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[298] In Karatá, Lamlaya and Tuapí, the only church in each village was Moravian. More rarely, Adventist and Evangelical churches were encountered in outlying communities but services were usually conducted out of a church member's home.

[299] The Moravian Church in Haulover had a fiberglass roof (Janis Molina/Haulover).

[300] Congregations build the lay pastor's home. Although often one-building structures, the lay pastor's home was typical of wealthier Miskito village residences.

[301] According to Helms (1971), larger communities tended to have these small stores that sell supplies and, sometimes, produce. Distance from the nearest commercial center also played a role. The village of Wawa, about an hour by dory from Lamlaya, had at least six ventas being run out of private homes.

building; one entrance was for men, the other was for women. Inside, wooden pews were arranged on the bare cement floor in two groups, one side for women, the other for men. A completed church[302] had a covered porch along the front and the cinder blocks were coated with cement and painted white with red trim. The finishing touch was to paint the Moravian seal[303] on the front of the Church, atop which "Moravian Church" was written and below that was the name of the community.

Clinics

Clinics were government-built and -run. Every community in this study, except Lamlaya, had one clinic. Usually one square room made of cinder block, it had a cement floor, a wooden front door, shuttered windows and a tin roof.[304] The building interior was partitioned to create a locking medicine closet and, often, a privacy divider. The clinic was furnished with a small table, chairs and a sickbed, though the bedroll was usually lacking.[305]

Schools

Schools were an oblong row of three to six square, adjoining rooms with a covered front porch.[306] The space between the top of the wall and the peaked tin roof was left open for air circulation. A wooden door and a large shuttered window provided light and ventilation. Schools were often whitewashed with blue trim and children's murals often

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[302] Many churches were in different stages of completion. During this study, Wawa was in the first stages of building a new, and much larger, church. The Haulover church had a new roof but had yet to be painted.

[303] The seal of the Moravian Church reads, "Our Lamb Has Conquered, Let Us Follow Him" (Schattschneider 1990) and may be written in Spanish or Latin.

[304] The clinic in Bismona is built in the same style as a private single-building home.

[305] For details on clinics, see "Further Thoughts" in <u>Chapter 2: Medicinals</u>.

[306] In most communities, village schools only accomodated students up to the sixth grade (if there were a sufficient number of teachers). Thereafter, children went to a larger town (like Puerto Cabezas) to continue their schooling. Ramifications of this are discussed under "Markets" in <u>Chapter 3: Edibles</u>.

adorned their interior. These rooms were equipped with black boards, a teacher's desk and wooden pews for students.[307]

Outhouses

Also known as servicios [Spanish], outhouses were a part of every village; even private homes in the commercial center of Puerto Cabezas had outhouses.[308] Outhouses were always located off the beaten path and generally to the rear of the home. Many factors played a role in the location of the outhouse including wind direction, soil type, and distance from water sources. But the overriding factor that dictated where the outhouse could be built was the waste disposal system.

Some outhouses were built over trenches that retained the refuse. These outhouses required routine lime treatments and regular emptying (Basilicia Martin-Schultz/Tuapí). The best soil was stones mixed with the dirt because it was "stronger" (Francisco Dublon/Bismona). It was also important to "put [the outhouse] on [the] down flow of water, about 100 meters away from well" (Facundo Johnson/Tuapí).

Outhouses were sometimes built over running water, so that waste materials went directly into a moving water system. These outhouses did not need lime treatments but wind direction was a major concern. "Outhouses were always located west of the house because the wind comes from north and will blow smell in your house" (Francisco Dublon/Bismona).[309] And, because the waste emptied directly into

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[307] This basic equipment was often run-down. In 1994, the Bismona schoolhouse needed new chalkboards and teachers had to purchase teaching materials with their own money (Paunino Dimus Crawford/Bismona).

[308] Hotels that lodge foreign visitors often had running toilets and other luxuries of indoor plumbing. A transient water supply, however, rendered toilets, sinks and showers inoperable during certain parts of the day.

[309] For unknown reasons, informants in this study often referred to the eastward direction as north.

the water system, one informant advised that the outhouse not be located too near the well (Nena Castillon/Lamlaya).

Still other outhouses were built above ground, on stilts, with no retaining tank. Waste simply fell to the ground.[310] The impetus for this type of outhouse was the soil. "Couldn't make latrine because sandy. Water gets in and caves in" (Zoila Velázquez/Wawa). Another homeowner with this type of outhouse located in the bush behind her home stated, "Put wherever, soil not important" (Laurel Chevarría/Karatá).

All outhouses shared the fact that they were built of wood and were raised on stilts of varying lengths. Often equipped with a locking door, the interior consisted only of a bench-like seating area with a hole cut into it. There was variety in the details. Some outhouses had two different-sized openings in the seat, to accommodate children. Others were two-seaters, designed for use by two adults at once.

Enclosures

Enclosures included fences (around home gardens and paddocks) and animal enclosures (such as chicken coops and pigsties). Of the various types of enclosures, fencing that served to restrict access of animals to certain areas were more common than fences that served to restrain them. Protective fences around home gardens were universal in the communities while animal enclosures were found only rarely.

Fences were used in different capacities in the outlying villages versus larger commercial centers, like Puerto Cabezas. In Puerto Cabezas, fences were used to mark property boundaries and to serve as privacy barriers. Fences were tall and densely built such that the view into a property was often obscured. In outlying communities, fences were used primarily to protect home garden crops against

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[310] In one community, the many pigs wandering the community accomplished solid waste disposal.

herbivory and pilfering.[311] They were rarely used to mark property lines because, "no one would be able to walk through the community" (Zoila Velázquez/Wawa).[312] Home garden fences often had an open framework and were short enough to see over.

Animal enclosures were rare in the study communities; it was easier to keep animals out, than it was to keep them in. Early accounts on the Coast also noted this disposition; Young (1842: 126) observed that the natives preferred locating their plantations at considerable distance than "stying up the hogs." Chicken coops were unremarkable structures, usually located in the rear patio under a shade tree. Small and square, with wooden plank walls and a thatched or wooden roof, there was usually only one opening in the front with a door that could be latched closed. Enclosures for larger animals were more rare. Cows, plentiful in all the communities, were allowed to roam freely. Horses, seen less frequently, were corralled in some communities. One large paddock was documented in Haulover and several small paddocks were found in Wawa, in which community horses were particularly abundant.[313]

Shower Closets

As will discussed under "Wells" (see below), some communities had available to them a body of fresh water. This water could be used for washing clothes[314] and for bathing. Soap, a towel and fresh clothing were brought to the waterside. Children

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[311] For more information on the protective role of fencing, see "Home Gardens" in Chapter 3: Edibles.

[312] Occasionally, the home garden fence was constructed as a privacy barrier (Janis Molina/Haulover).

[313] The novelty of finding so many horses in Wawa made such an impression upon my first visit there, that part of my field notes on the general description of the community included, "Wawa has lotsa people on horseback."

[314] Laundering is discussed in more detail under "Getting the Job Done" in Chapter 5: Household Use.

usually bathed in the nude; adults either bathed in their underwear or removed their clothing once in the water.

In communities where a body of fresh water was not available, villagers used well water. Children were often bathed in the open air; adults bathed in bathing closets. Bathing closets were constructed on stilts, made of wood and, often, a tin roof. They usually accommodated only one person, thus their closet-like nature.[315] A large plastic bucket of water was kept in the closet or water was drawn from the well prior to bathing.[316] The wash water simply ran out through the floorboards.

Lean-tos

Lean-tos were representative of the earliest type of architecture used on the East Coast.[317] There were two types of lean-tos associated with the villages. One was located within the village proper and was used to dry food. The other was found in outlying plantations and was used for shelter. Although food is the topic of a separate chapter, both types of lean-tos will be briefly mentioned here to point out their similarity to earlier Miskito building design.[318]

The plantation lean-to was used for shelter when overnight stays were required. Reminiscent of the earliest accounts of Miskito homes, these makeshift shelters were made of wood supports, often lacking walls, with roofs made of thatch (Salvador

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[315] In Haulover, a kitchen building that was no longer used for cooking was used as bathing room.

[316] Drawing the water well ahead of time gave the chilly water time to warm up with the day's heat.

[317] This was based on early descriptions of Coastal dwellings in Helms (1971).

[318] For more information, see "Food Storage" in <u>Chapter 3: Edibles</u>.

Perez/Karatá).[319] They served as temporary shelter during short sojourns at the plantation site (Francisco Dublon/Bismona; Salvador Perez/Karatá).

Food drying lean-tos, also called raised platforms, were found on many properties in the villages. A piece of corrugated tin was placed atop four corner posts, with two posts on one side being were slightly shorter than the other two. This slanted platform was used to dry foods such as chacalín (small shrimp) and rice. Heat from the tin helped the drying process and the raised platform kept food out of reach from the chickens and pigs.

Bridges

In most villages, pathways required a bridge here and there. Bridges could be informal. In Wawa, for example, where a small river intersected the pathway, a number of logs were placed over the impassable area. In Karatá, a portion of the village was located on a point that was separated form the rest of the village by an inlet, the water level of which increased in the wet season. Along this path, residents built land bridges about every 15 feet, interspersed with short wooden plank bridges. This allowed the water to move freely across the space and was also less expensive than building a wooden bridge to span the entire gap.[320]

Wells

Sources of freshwater (li kauhla - Miskito) in the outlying communities were limited. Freshwater was obtained from the rain, from freshwater lakes or rivers and from wells. Large rain barrels strategically placed under roof gutters could catch the

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[319] Walls were not necessary as clearing and planting, the duties that requiring long stays at the plantation site, were accomplished in the dry season. For more information on plantation preparations, see "Plantations" in Chapter 3: Edibles

[320] During this study, the government funded the construction of a new bridge, built entirely of wooden planks, that ran the length of this large inlet.

run-off from rainstorms (Jacob Penare/Wawa; Orlando Budier/Haulover; Zoila Velázquez/Wawa). Some homes were equipped with a special gutter leading directly from the roof into the barrel to ensure maximum water collection during every storm (Jacob Penare/Wawa).

Only three of the study communities had ready access to freshwater rivers or lagoons. Tuapí and Haulover had freshwater rivers nearby. In Wawa, because of the community's unique location where the lagoon system meets the ocean, Laguna Wawa became a freshwater lagoon in the rainy season (Zoila Velázquez/Wawa).[321]

By far, the most relied upon source of water was from wells, or *posos* [Spanish]. Wells were simple structures: Square shafts, lined with wood or cement. Aboveground, a well was marked by nothing more than a short (perhaps 2 feet high) structure with four corner posts and wooden planks nailed to the sides. Sometimes there was also a wooden stage on which to stand. For safety reasons, a well opening that was made too large during construction was, upon completion, topped with wooden planks to reduce the size of the shaft.

Finding the right location for a well was critical. Francisco Dublon (Bismona) explained that you "need to determine if running water underground; when rains, path water runs in was where water was underground. Dig well in that path." Nena Castillon (Lamlaya) suggested a well be built "where there was mud." Sandy soil was the best type of soil in which to dig a well (Laurel Chevarría/Karatá). Further, "if soil fine and white, water will be white; if red sand, no good" (Zoila Velázquez/Wawa).

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[321] Another effect of this juncture between the lagoon and the sea was that, at certain times of day, the water approach to Wawa was quite turbulent. As Roberts (1827: 126) put it "a heavy sea falls on the coast" making for an exhilarating ride to and from the village for native and visitor alike.

Wells could be dug in the dry season or the wet season; each time of year having it's own pros and cons. As Nena Castillon (Lamlaya) explained:

> Build where there was mud. [But] fills with water as you dig. Easier to build in dry season, when soil hard (but costs more because you have to dig deeper to get water). [If you dig a well in the] wet season, soil softer and water closer, makes it harder to dig in the mud. If dig in wet season, will dry in the dry season and you'll have to dig more then.

Mostly, wells were built "at the end of the summer" (Anelia Zacarías and Facundo Johnson/Tuapí) because "lots of rain now" in the wet season (Laurel Chevarría/Karatá).

Wells had to be cleaned regularly. A "well gets bad in winter because rain makes dirty. Must clean in summer to use again" (Zoila Velázquez/Wawa). Wells could be easily cleaned at the change of season (summer to winter) after the well dried; any remaining "water and mud were removed, rain refills" (Anelia Zacarías/Tuapí). If the well was lined with cement, it was cleaned with brushes.

All villages had shared wells and some also had private wells.[322] Whether privately owned or not, well water was generally shared. Francisco Dublon (Bismona) explained that "everyone makes own well [but] neighbors use each other's wells." Well-sharing had a code of conduct that was similar across communities. In Karatá, friends and family shared the water and the maintenance costs (Laurel Chevarría/Karatá).[323] Maintenance included cleaning and chlorinating the well; chlorine was added every fifteen days (Anelia Zacarías/Tuapí). "Anyone could use the well, but they have to help clean it or give money to buy cement" when the users decided to line the well with cement walls (Facundo Johnson/Tuapí). Nena Castillon

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[322] Shared wells were documented in Lamlaya and Karatá; proportionally more private wells were found in Wawa and Bismona. In addition, Wawa had a number of wells enclosed within the home garden.

[323] Maintenance specifics are discussed below, under "Preparation and Construction."

(Lamlaya) shared a well with six families living nearby. In return for using the well, they helped to clean and pay for maintenance. In April, when the well started to dry, only the owner (Zeladon Dennis) could use the well. Then Nena used another family's well that she claimed was not as deep but "never dries" (Nena Castillon/Lamlaya).[324]

Whether water was drawn from rivers, rain barrels or wells, women and children did the fetching and hauling. Large plastic buckets were filled with fresh water each morning. Carried atop the head, at least one bucket was kept in the kitchen near the sink and another in the shower closets.

The Plants

The plants used for construction purposes are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 for more information on the plants in this listing. The location(s) of the plant within the study site, other plant uses documented in this study and information from regional literature indicating established similar uses is also provided.

algodón criollo (*Ceiba pentandra*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
　　WOOD for construction (planks)
Other uses in this study: Medicine, Household
Literature pertaining to construction uses:
　　Coe and Anderson 1996: WOOD for dories
　　Morton 1981: Lightweight WOOD used for canoes and box-making

bambú (*Bambusa* sp.)
Wild (Bush)
　　Fencing: CULMS as fence rails
　　Roofing: CULMS as anchors
Other uses in this study: None
Literature pertaining to construction uses for species of this genus:
　　Duke 1981: *B. arundinacea*: WOOD for construction
　　Morton 1981: *Bambusa* spp.: STEMS employed for scaffolding and furniture
　　Rabella and Pallais 1994: *Bambusa* spp.: For construction and crafts

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[324] Nena Castillon (Lamlaya) made this statement in February 1994. By May, the well had run dry and they and the other family were worried about it.

bredpru (*Artocarpus altilis*)
Cultivated (Patio – Common)
    LATEX as gum and glue used in construction
Other uses in this study: Medicine, Household, Edible
Literature pertaining to construction uses:
    Duke 1981: LATEX for caulking boats
    Smith, et al. 1992: LATEX for caulking boats

caoba (*Swietenia macrophylla*)
Wild (Forest Edge); Cultivated (Transplanted to patio)
    WOOD for Walls and floors boards, dories
Other uses in this study: Household
Literature pertaining to construction uses:
    Coe and Anderson 1996: WOOD for dories
    Lentz 1993: WOOD for house uprights, doors, fenceposts
    Morton 1981: WOOD: Important source of timber
    Mutchnick and McCarthy 1997: (Petén, Guatemala) Planking and tools
    Wiersema and Leon 1999: Used for its WOOD

cedro macho (*Carapa guianensis*)
Wild (Bush-swampy areas)
    WOOD as planks for houses
Other uses in this study: None
Literature pertaining to construction uses:
    Cisneros, García and Dávila 1992: WOOD for interior/exterior construction
    Duke 1981: WOOD as timber
    Morton 1981: WOOD: Much used for furniture and construction
    Wiersema and Leon 1999: Used for WOOD

cedro real (*Cedrela odorata*)
Wild (Bush)
    WOOD as planks for houses
Other uses in this study: Household
Literature pertaining to construction uses:
    Arvigo and Balick 1993: WOOD For timber
    Cisneros, García and Dávila 1992: WOOD for doors, canoes and construction
    Coe and Anderson 1996: WOOD: Corner posts, roof supports
    Ibarra-Manríquez, et al. 1997: Timber in Mexico
    Morton 1981: WOOD used in carpentry
    Mutchnick and McCarthy 1997: (Petén, Guatemala) Planking and tools
    Wiersema and Leon 1999: Used for WOOD

coco (*Cocos nucifera*)
Cultivated (Patio – Common; Plantation – Less Common); Wild (Spared); Purchased
    Fencing: Whole LEAVES or MIDVEINS as fence rail
    Roofing: LEAVES used as thatch
Other uses in this study: Medicine, Edible, Personal, Superstition, Additional
Other Literature pertaining to construction uses:
    Duke 1981: Used in house construction; LEAVES as thatching
    Everett 1969: TRUNK used in construction; LEAVES as thatch
    Morton 1981: SHELLS as cups

Wiersema and Leon 1999: NUT for fiber
Woodroof 1970: House building materials; materials for tools

jocote (*Spondias purpurea*)
Cultivated (Patio – Rare)
TRUNKS as fence posts (living fence)
Other uses in this study: Edible
Literature pertaining to construction uses:
Morton 1981: Living fence

limsi (*Bursera simaruba*)
Dense forest (wild)
TRUNKS as fence posts (living fence)
Other uses in this study: Medicinal, Superstition
Literature pertaining to construction uses:
Cisneros, García and Dávila 1992: Planks; posts; living fences
Duke 1981: GUM mends dishes and caulks dugouts (preventing worm damage); TREE could be living fence post
Ibarra-Manríquez, et al. 1997: Timber; paper; plywood; wood artwork
Martin and Fennema 2000: Industrial gum; living fence
Morton 1981: Living fence
Mutchnick and McCarthy 1997: (Petén, Guatemala) As living fence
Rabella and Pallais 1994: Used in living fences; WOOD for construction
Wiersema and Leon 1999: As boundary, barrier and for support; for gum/resin

liwa mukya (*Cochlospermum religiosum*)
Wild (Forest Edge); Cultivated (Transplanted as living fence)
WOOD as fence posts (living fence)
Other uses in this study: Medicinal, Household
Literature pertaining to construction uses for this and another species of this genus:
Duke 1981: *C. vitifolium*: Cultivated on San Blas Islands as living light poles
Marx and Heath 1992: Useful as living fence
Wiersema and Leon 1999: Source of resin and insoluble gum

malinche (*Delonix regia*)
Sown (Patio – Common - Transplanted)
WOOD for building homes
Other uses in this study: Medicinal, Ornamental
Literature pertaining to construction uses:
Cisneros, García and Dávila 1992: Short-term posts and boxes

mangle blanco (*Laguncularia racemosa*)
Wild (Riverbanks)
WOOD for corner posts and beams
TRUNKS for house posts and fences
WOOD beams and boards to line wells
Other uses in this study: Fuel
Literature pertaining to construction uses:
Coe and Anderson 1996: Liked by Garífuna for cooking and trash burning
Wiersema and Leon 1999: For WOOD

mangle rojo (*Rhizophora mangle*)
Wild (Riverbanks)
WOOD for corner posts and beams
TRUNKS as roof beams
Other uses in this study: Personal, Household, Medicinal, Fuel, Additional
Literature pertaining to construction uses:
Coe and Anderson 1996: (Garífuna) For cooking and trash burning
Duke 1981: WOOD (Panama) possible source of phone poles
Morton 1981: Heavy, hard WOOD for boats, pilings, building
Wiersema and Leon 1999: Used for WOOD

mihmi (*Conocarpus erectus*)
Wild (Bush)
WOOD for corner posts/beams[325]
TRUNKS as fence posts (living fence)
Other uses in this study: Fuel
Literature pertaining to construction uses:
Morton 1981: Heavy WOOD (durable in water) for boats, canoes, construction

níspero (*Manilkara* sp.)
Wild (Bush)
WOOD for corner posts and beams
Other uses in this study: Household
Literature pertaining to construction uses for species of this genus:
Johnston and Colquhoun 1996: *M. bidentata*: Timber, commercial gum
Mutchnick and McCarthy 1997: *M. zapota*: House posts and tools
Rabella and Pallais 1994: *Manilkara* spp.: BARK used to make shingles
Wiersema and Leon 1999: *M. zapota*: WOOD as timber

palma africana (*Elaeis oleifera*)
Cultivated (Home Garden); Wild
LEAVES as second (top) layer on thatched roof
Other uses in this study: Superstition, Edible, Medicinal, Personal
Literature pertaining to construction uses:
Coe and Anderson 1996: LEAVES for thatching

palmera (*Acoelorraphe wrightii*)
Wild (Forest Edge/Fields/Watershed Areas)
LEAVES as roofing material (thatch); most popular thatching material
Walls: Walls made of this in "earlier days"; most can afford to buy planks today
Other uses in this study: Household, Medicinal, Edible
Literature pertaining to construction uses:
Coe and Anderson 1996: Garífuna roof thatching; stems sometimes used for walls on houses/storage sheds, sties and fences
Mueller 1932: "Bapta" palm: LEAVES for roofs and palm-leaf fans

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325 "Best wood for posts" Charlie Williams (Wawa).

palo de agua (*Bravaisia* sp.)
Wild (Bush)
WOOD for house beams
Other uses in this study: Fuel
Literature pertaining to construction uses:
Duke 1981: Mentions palo de agua as a species of *Bravaisia* in Nicaragua but gives no construction
Gentry 1993: Described as multi-trunked trees of 20cm or more in diameter but no uses were given

palo de leche amarillo (*Maclura tinctoria*)
Wild (Bush)
WOOD for house construction
Other uses in this study: None
Literature pertaining to construction uses:
Cisneros, García and Dávila 1992: Yellow-tinted WOOD very ornamental; durable and heavy WOOD for construction, cabinetry and beds
Duke 1981: WOOD for furniture
Morton 1981: Construction and carpentry
Roberts 1827: Valued East Coast trade item in the mid-nineteenth century
Wiersema and Leon 1999: Materials: Tannins/dyestuff; WOOD for furniture and source of fustic yellow, a phenol-based dye

piawat (*Myrica cerifera*)
Wild (Riverside)
WOOD for dories
Other uses in this study: Personal, Fuel, Household
Literature pertaining to construction uses: None

pino (*Pinus caribaea* var. *hondurensis*)
Wild (Forest Edge/Fields/Watershed Areas); Cultivated (Patio – Common)
WOOD as planks for house walls and floors
TRUNKS as house posts and beams
WOOD beams and boards to line wells
Other uses in this study: Household, Medicinal, Fuel
Literature pertaining to construction uses:
Cisneros, García and Dávila 1992: WOOD for cabinetry, construction, plywood, light posts
Wiersema and Leon 1999: Used for WOOD

pochote (*Pachira quinata*)
Wild (Bush)
Houses/buildings
Other uses in this study: None
Literature pertaining to construction uses:
Duke 1981: WOOD favored by Darien for dugouts
Cisneros, García and Dávila 1992: WOOD for construction, living fences
Rabella and Pallais 1994: Excellent WOOD tree
Wiersema and Leon 1999: Used for WOOD

pukru (*Pachira aquatica*)
Forest Edge/Fields (wild)
TRUNKS as fence posts (living fence)
Other uses in this study: Medicine
Literature pertaining to construction uses:
Marx and Heath 1992: Good for fences
Wiersema and Leon 1999: Used for WOOD

Santa María (*Calophyllum brasiliense* var. *rekoi*)
Wild (Bush)
TRUNKS as house posts and beams
WOOD planks for walls, floors and well linings
Other uses in this study: Household, Fuel
Literature pertaining to construction uses:
Cisneros, García and Dávila 1992: Interior/exterior construction; bridges
Coe and Anderson 1996: Garífuna use WOOD for corner posts/roof supports
Duke 1981: TIMBER important Panama export; LATEX for caulking
Ibarra-Manríquez, et al. 1997: Timber in Mexico
Rabella and Pallais 1994: WOOD good for construction
Wiersema and Leon 1999: Timber WOOD

tamarindo (*Tamarindus indica*)
Wild (Bush)
House posts
Other uses in this study: Edible, Medicinal
Literature pertaining to construction uses:
Duke 1981: Yellow dye could be extracted from TREE
Wiersema and Leon 1999: Used for its WOOD timber

usupum (FAGACEAE, *Quercus oleoides*)
Wild (Fields/Bush)
Posts for houses
Other uses in this study: Fuel, Additional
Literature pertaining to construction uses:
Lentz 1993: *Quercus* spp.: WOOD for building houses, fence posts, corner posts, cross pieces

Summary of Construction Uses

Only 10% of the total plants documented in this survey were used to build the various structures discussed in this chapter. The Miskito remain conservative in their construction practices and this was reflected in the moderately low number of plants used for this purpose. Both preference and availability of materials was consistent across the communities studied.

Choice and Preparation of Materials

With all the structures found in communities, the most important decisions in choosing materials were made with regard to home building, well linings and fencing. For most other structures, "whatever" wood was fine (Laurel Chevarría/Karatá). As mentioned, churches, schools and clinics (listed above under "Non-Residential Buildings") were not built of traditional Miskito design or material. Choices in plant material concerning wooden structures, enclosures, and well linings are presented.

Wooden Buildings

This section focuses on materials chosen primarily to build private homes, the construction of which represented a large outlay of money and time. But, similar choices were made for the smaller wooden structures found in communinites such as outhouses, shower closets, animal enclosures and ventas. In general, wooden structures had three basic elements: Posts (for house supports and beams), planks (for wall and floors) and roofs (for support beams and coverings).

House posts

A number of trees were used as house posts; preferences varied with the individual. In Wawa, two sources agreed on the favored materials for posts but not on the most preferred. According to Zoila Velázquez (Wawa) and Castillo Penare (Wawa), tamarindo (*Tamarindus indica*), níspero (*Manilkara* sp.) or mihmi (*Conocarpus erectus*) were preferred woods for house posts and corner beams. Castillo Penare (a carpenter from Wawa) preferred mihmi, whereas Zoila Velázquez (Wawa) touted tamarindo as the "best of all three."[326] Luzila Zamora (Haulover) preferred níspero over Santa María (*Calophyllum brasiliense* var. *rekoi*) and caoba (*Swietenia macrophylla*) because "this wood lasts longest." Allen Webster (Lamlaya) also preferred Santa

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[326] Helms (1971) also noted a preference for tamarindo in the village of Asang.

María posts and pointed out a 1 1/2 year old specimen that was a sturdy seven inches in diameter.

Pino (*Pinus caribaea* var. *hondurensis*) was also used for house posts and structural beams (Emiliano Molina Chow/Haulover; Jon Ricardo/Bismona) but was especially preferred for wall and floor planking (see next section). Other woods that were used as house posts were usupum (*Quercus oleoides* - Aristan Bons Zacarías/Puerto Cabezas-Bismona; Richaina Mybith/Lamlaya), palo de agua (*Bravaisia* sp. - Gregorio Ingley/Bismona; Zeledon Dennis/Lamlaya)[327] and both types of mangle (*Laguncularia racemosa* and *Rhizophora mangle* - Richaina Mybith/Lamlaya; Gregorio Ingley/Bismona).

Walls and Floors

Informants consistently mentioned using four trees for wall and floor planking. In order of preference, they were: Caoba, cedro real (*Cedrela odorata*), Santa María and pino, (Alman Dixon/Wawa; Anelia Zacarías/Tuapí; Emiliano Molina Chow/Haulover; Jacob Penare/Wawa; Jon Ricardo/Bismona; Richaina Mybith/Lamlaya; Zoila Velázquez, Wawa). Caoba and cedro real, both hardwoods, were expensive and hard to find (fide Jacob Penare/Wawa).[328] Cedro real is valued for its smooth, light, easy to work and durable wood, the color of which resembles mahogany with a cedar-like odor (Cisneros, García and Dávila 1992; Morton 1981). Santa María and pino were more reasonable choices in house construction, both in terms of availability and cost.

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[327] Gregorio Ingley (Bismona) says this is a "strong wood."

[328] For more information on the source of these woods, see "Source of Materials," below.

Santa María, also a hardwood, was preferred over pino (Alman Dixon/Wawa; Emiliano Molina Chow/Haulover; Jacob Penare/Wawa; Orlando Budier/Haulover). "Santa María lasts longest for walls" (Nena Castillon/Lamlaya). According to Orlando Budier (Haulover), Santa María was used for house exteriors, including porches, because it was "mas aguantado" (more durable). Although he said that pino was also good for the "kitchen, house and holding top of roof down," his added that his kitchen porch was of pine "because he ran out of Santa María" (Orlando Budier, Haulover).

Pino, although a traditional softwood, had characteristics making it well suited to home building: Affordability and ease of manipulation. Pino was affordable because it was often planted within communities and many communities had access to nearby pine stands. Like nearly all pines, pino allowed one to "do fine work...because it was easy to cut" (Jon Ricardo/Bismona).

Most timber was cleaned of limbs and bark at the felling site and taken to the community to be cut and sun-dried (Allen Webster/Lamlaya; Isolina Howard/Tuapí). For wood that would be used as a living fence, "Do not peel - just put in ground; becomes living fence" (Cepriano Vigil/Tuapí). Timber, such as pino, might be dried for one month before using it (Isolina Howard/Tuapí). But some wood need not be dried. Santa María, for instance, could be used wet or dry (Allen Webster/Lamlaya).

Thatch

Thatch and corrugated tin were the two most common roofing options on the Coast.[329] Tin was expensive and hot and it readily and all too often rapidly rusted in the coastal climate. Tin was also noisy during heavy rainfalls in the wet season (Coe and Anderson 1996). By virtue of its cost, tin was a sign of affluence and most

[329] There was one recorded instance in this study of the use of a very expensive alternative to both thatch and tin: fiberglass. A fiberglass roof crowned the Moravian Church in Haulover.

villagers could not afford to buy it. The Moravian Church, the clinic and the school almost always had tin roofs.[330] Nonetheless many individuals were willing to withstand inconveniences of tin if the government donated the material (Francisco Dublon/Bismona).[331]

While tin might be preferred, thatch was the practical choice. Thatched roofs were used more often than tin on private homes, on lean-to's and animal enclosures.[332] Thatched roofs were well suited to the East Coast environment. A thatched roof allowed heat to escape and increased air circulation in the home (Coe and Anderson 1996). This quality was particularly appreciated in the dry season. Thatch was easily found in great abundance and as was free.[333] Thatching was also durable despite the harsh coastal environment and heavy downpours in the rainy season. Informants from

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[330] For details, see the section on "Non-Residential Buildings" in this chapter.

[331] There were certain situations where tin was never used, regardless of status. First, because of the heat factor, none of the study communities had tin roofs on their kitchen buildings. Second, communities like Haulover, are located directly on the oceanfront, could not use tin, because continual salt spray cause the tin to rust rapidly. In such cases, tin could not be used even on the Moravian Church and thus its fiberglass roof (Janis Molina/Haulover).

[332] Animal enclosures sometimes also had a wooden plank roof. See that section in this chapter for more details.

[333] The abundance of palmera (*Acoelorraphe wrightii*) and palma africana (*Elaeis oleifera*) were indicators of a healthy ecosystem. A study in the Brazilian rainforest showed that depletion of thatching material and certain woods (including *Cedrela odorata*) were more important forces leading to relocation of hunter-gatherer tribes than depletion of game animals, as had been previously believed (Kricher 1989).

both inland[334] and coastal[335] communities estimated that a thatched roof lasted an average of six years.[336]

A couple of indicators that a thatched roof had reached it's end were when "insects get in...sometimes gets bugs, sometimes not" (Nena Castillon/Lamlaya) and when the "rain comes in" (Francisco Dublon/Bismona). According to informants, workmanship, not the elements, was the major determinant in the life of a thatched roof. A roof that should last 5-7 years will only last four years "if not done well" (Orlando Budier, Haulover).

"Doing a roof well" meant using the right materials and assembling them properly. A typical thatched roof required staves, thatch, rope and a top weight. The staves, or mounting beams, were usually made from mangle rojo. Branches, usually about 1 inch in diameter were cut, stripped of their bark and mounted (with nails) between the gables of the house.[337] According to Charlie Williams (Lamlaya), the best wood was obtained if it was "cut when the moon good - was high in the sky, not low."[338]

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[334] Inland communities include Bismona, Tuapí and Lamlaya.

[335] Coastal communities included Haulover, Karatá and Wawa. These communities were prone to high winds and salt sprays off the water. Apparently, saltwater did not affect the life of a thatched roof.

[336] The following estimates were given by informants: Nena Castillon (Lamlaya), 3-10 years; Orlando Budier (Haulover), 5-7 years; Francisco Dublon (Bismona) 6 years on both kitchen and living quarters; Anelia Zacarías and Facundo Johnson (Tuapí), 6-7 years.

[337] An early account of the thatching process noted that thatching material was woven to the staves first and then being attached to the roof (Mueller 1932).

[338] This is discussed again in this chapter under "Further Thoughts – Durability."

The favored materials for thatch were palmera and palma africana. The spiny palmera leaves, also known as papta,[339] required some special handling. To use palmera, the leaves were carefully cut and the spines removed; this was easily accomplished by sliding the machete blade obliquely along each side of the stem (Carolina Isaiah/Tuapí; Zoila Velázquez/Wawa). Leaves could be dried from two days to one week; the longer they were dried, the stronger they would be (Anelia Zacarías and Facundo Johnson/Tuapí; Polenso Artola/Karatá; Zoila Velázquez/Wawa). When the leaves were dry, three were tied together and each trio was tied to the roof (Anelia Zacarías and Facundo Johnson/Tuapí). A second layer of thatch was then added, using palma africana leaves. The elongate leaves were tied side-by-side, with the leaf tips at the top of the roof, to form a meshed covering (Robert Angus/Karatá).

Thatch was tied onto the roof in a number of ways. One method was to make mecate (rope) from palm-shaped palmera leaves by ripping off 2 "fingers" and tying them end-to-end with two other fingers (Polenso Artola/Karatá). These ligatures were just long enough to tie off each piece of thatch. Another method employed the fingers while still attached to the leaf (Anelia Zacarías/Tuapí).

The final step in the thatching process was to anchor the roofing material. This was accomplished by tying together two long bambú (*Bambusa* sp.) trunks. This was then draped over the peak of the roof, securely holding the entire thatching assembly in place (Robert Angus/Karatá).

<u>*Enclosures*</u>

As mentioned previously, fences were used primarily to protect home gardens. Anything from old fishing nets to living fences were used as fencing in the study

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[339] It was interesting to note that the Miskito had a specific name for palmera leaves, papta, and another name for palmera trunks, kangko. These names were used only to designate those particular part of the plant (see also Marx and Heath 1992).

communities. Also common were bambú that had washed ashore and coco leaves that had fallen to the ground. More interesting, however, was the use of living fences.

Living fences were created when the fence posts re-sprouted after being positioned in the ground (Aristan Bons Zacarías/Puerto Cabezas-Bismona; Mutchnick and McCarthy 1997). Jocote (*Spondias purpurea*), pukru (*Pachira aquatica*), liwa mukia (*Cochlospermum religiosum*) and limsi (*Bursera simaruba*) were common choices as living fences. Living fences had a number of benefits, including providing shade, preventing animal entry, being a source of firewood, and providing food to people and favorable wildlife (Altieri and Farrell 1984; Aristan Bons Zacarías/Puerto Cabezas-Bismona). In addition, they were recognized for their decorative value. In Tuapí, two liwa mukia trees growing in the churchyard were planted 40 years before where the entrance to the old church was (Cepriano Vigil/Tuapí).

Well Linings:

The same considerations taken into account with home building, durability, accessibility and affordability were applicable when discussing well linings. Anelia Zacarías and Facundo Johnson (Tuapí) pointed out that, while caoba lasts longer, "plata mande" (Spanish for "money decides"). Francisco Dublon (Bismona) recommended the more affordable and available woods such as Santa María, old pino, or mangle blanco. Just as Santa Maria was preferred for home exteriors (Nena Castillon/Lamlaya; Orlando Budier/Haulover),[340] Zoila Velázquez (Wawa) advised that "Santa María lining lasts long with water."

Sources and Availability of Materials

This section focuses on the timber needs for private use. Logging, as an industry, has a long history on the East Coast. Along with other extractive industries

[340] This is discussed in the section above, entitled "Wall and Floors."

on the Coast, such as fishing and banana plantations, it continues to be a source of jobs and to have a major influence on the local environment. Logging is discussed in more depth in Appendix 6: Mosquitia Resources and Livelihood.

Outlying Communities

Outlying communities relied mostly on local sources of timber. While actual felling locations varied depending on the community, lumber was generally extracted from locations that required walking or canoeing at least one-half hour away. Informants from both Haulover and Wawa mentioned that timber, especially caoba, came from Layasiksa and Kukulaya (Castillo Penare/Wawa; Emiliano Molina Chow/Haulover; Orlando Budier/Haulover). Pine was found on the savanna; in the case of Wawa, the savanna was approximately 5 kilometers inland (Castillo Penare/Wawa).

In terms of availability, the law of supply and demand applied. The more popular the wood, the harder to find (Anelia Zacarias/Tuapi) and the more expensive (Jacob Penare/Wawa). Table 6.1 shows the cost of wood according to informants in outlying communities.

Table 6.1. Local Cost of Wood

Wood	Community	Cost (in cordobas)
pino	Wawa Haulover Bismona	C$1.50 C$1.50/ft - already cut C$2.50/ft - cost to cut
Santa María	Wawa Haulover	C$1.50 C$1.50/ft - already cut
caoba	Wawa Haulover	C$1.50;C$2 – already cut C$2/ft - already cut
cedro real	Haulover	C$2/ft - already cut

Jacob Penare (Wawa) stated that cedro real and caoba, the most desirable woods, were hardest to find; Santa María, a medium quality wood, was easier to locate, but pino, of sufficient quality, remained the most accessible. Anelia Zacarías (Tuapí) mentioned that wood for construction, such as cedro real, caoba, Santa María and níspero were "all very far away – near Kambla." This was not entirely due to indigenous harvesting. In the 1940s, lumber companies harvested caoba and cedro real in both the Puerto Cabezas and Waspam regions (Araquistain 1979). Pino had also been extensively harvested, especially along the Nicaraguan-Honduran border, but considerable pine reforestation has since occurred (fide Vilas 1989).

Carpenters

There were just over one dozen professional carpenters in this survey. Most villagers did some carpentry, fixing a board here, a leak there. But, for big jobs, they turned to carpenters, who were also the source of wood. In Wawa, "people buy wood from [local carpenter] Jacob Penare" (Zoila Velázquez/Wawa). In Karatá, posts could be purchased from local resident Cornelius Thompson who cut posts in Bilatara.

Carpenters made a wide range of items, "furniture, washboards, dories, anything made of wood" (Jon Ricardo/Bismona). Estimates of material and labor costs were agreed upon ahead of time (Jon Ricardo/Bismona; Thomason Jacobo/Puerto Cabezas).[341] Carpentry prices depended on the project. As an example, a rocking chair, four chairs and table were priced at C$500 and a school chair (desk/chair combination) costs C$130 (Thomason Jacobo/PC).[342] Most carpenters were known for their work and people solicited them for their services (Jon Ricardo/Bismona).

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[341] The following account concerns dory contracting of yore: "When the Prinzapulko Indians [living on the East Coast, south of Haulover] are desirous of procuring a vessel of the largest dimensions, the contract is made by giving the Indian with whom they agree, a piece of twine or packthread, on which is marked, by knots, the length, breadth, and depth of the vessel wanted...The Indian delivers a duplicate of these dimensions, together with a piece of silk grass [*Aechmea magdalenae*], with knots upon it, corresponding to the number of days in which he has agreed to fulfil [sic] his contract. One of these knots is cut off, or unloosed daily; and when they are reduced to the last, they can with certainty reckon upon the immediate appearance of the contractor..." (Roberts 1827: 120).

[342] In 1994 dollars, C$7.14 was equal to US$1.

Markets

Communities close to commercial centers had the option of purchasing wood in the market. In Lamlaya, wood could be purchased from fellow villagers or from Puerto Cabezas (Nena Castillon and Richaina Mybith/Lamlaya). A number of popular timber woods were available in the Puerto Cabezas markets (See Table 6.2).

Table 6.2. Wood Vendors in Puerto Cabezas Markets

Wood	Origin of Wood	Cost ($C)	Vendor
caoba	Varies	3/Ft	Erminio Mendozo
limsi	Unknown	Unknown	Name unknown
pino	Varies	2/Ft	Erminio Mendozo
	Awastingni[343]	3/Ft	Carlos Blexly
palo de leche amarilla	Varies	2-2.25/Ft	Erminio Mendozo
Santa Maria	Varies	2-2.25/Ft	Erminio Mendozo

Here, too, affordability appeared to mandate demand. A vendor Erminio Mendoza interviewed in Puerto Cabezas in 1994 mentioned that he was then out of pino and palo de leche amarilla (both cheaper yet satisfactory timber choices) because "people want them the most." Because market prices were about twice the cost as that found in the outlying communities, most villagers tried to obtain their timber locally and used larger markets only as a last resort (Jacob Penare/Wawa).

Further Thoughts

Tools

As Coe and Anderson (1996) pointed out, the Miskito have adopted modern aspects of construction with regard to building materials, and this was especially true with hardware and tools. Hardware, such as nails, hinges and padlocks (all introductions from the Moravians), could be purchased from general stores in larger towns. Although there were traditional accounts of vines being used in construction,[344]

[343] Awastingni translates to "source or wellspring of pine" (Marx and Heath 1992).

[344] Marx and Heath (1992) mentioned a vine called ustun, for example.

the use of plant-based cordage in home building has been largely abandoned; thatched roofs being the only area of construction in which cordage remains an integral part. The tools used in construction on the East Coast were mostly unremarkable. Ordinary saws, planes, levels and hammers were used commonly in construction (Jon Ricardo/Bismona). Still, there were two points of interest regarding construction tools: The use of chain saws and machetes.

Chain Saws

Most people owned small tools but chain saws were a luxury. In Bismona, Lamlaya, Tuapí and Wawa, at least one community member owned a chain saw (Anelia Zacarías; Penare/Wawa; Facundo Johnson/Tuapí; Francisco Dublon/Bismona; Nena Castillon/Lamlaya).[345] Wood to be cut could either be brought to the chain saw owner or finished planks could be purchased from him (Francisco Dublon/Bismona; Nena Castillon/Lamlaya). Sometimes, community members would rent the chain saw (Anelia Zacarías and Facundo Johnson/Tuapí).

In communities where no residents owned a chain saw, as in Haulover and Karatá, there were alternative ways to obtain wood. In Haulover, people purchased their wood from the neighboring villages of Layasiksa and Kukulaya (Orlando Budier/Haulover).[346] In Karatá, someone from Puerto Cabezas came twice a week to cut wood for people (Laurel Chevarría/Karatá). There was much excitement when the woodcutter came to the village, children and adults alike would gather around to watch the noisy and entertaining work.

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[345] Bismona and Lamlaya both had only one person each who owned a chain saw (Francisco Dublon/Bismona; Nena Castillon/Lamlaya). Tuapí had at least six people who owned chainsaws (Anelia Zacarías and Facundo Johnson/Tuapí). Wawa had two residents that owned a chainsaw (Castillo Penare/Wawa).

[346] For more information, see Table 5.2.

Machetes

Another interesting point about construction tools was the use of the machete. Miskito used the machete in many aspects of everyday life. Opening cocos (*Cocos nucifera*), clearing plantations and cutting the grass were a few examples of the ways machetes were used. Their skill at wielding the machete was evident in its use as a construction tool. The machete was used to make notches in the wooden support beams that formed the base for the floorboards. In observing the construction of a new kitchen at Karatá in 1994, the builder estimated the location for notches by holding the beam up to the building framework. Then, having neither marked the spot nor hesitated, the builder hacked the notch out of the wood, neatly and accurately.

Durability

To endure on the East Coast, timber must be resistant to insects and to rot. While there was "no wood that termites couldn't eat" (Salvador Perez/Karatá), care in choosing and diligence in upkeep could prolong the life of wood used in construction. The four most popular timber species, caoba, cedro real, Santa María and pino, were particularly durable. Both caoba and cedro real are known for their resistance to rot and to insects (Arvigo and Balick 1993; Coe and Anderson 1996).[347] *Manilkara* sp. (Santa María and relatives) are highly valued as main house posts because of their insect resistance and durability (Mutchnick and McCarthy 1997). Although a softwood, pino planks made of darker pine "lasts longer because the wood was more heavily impregnated with resin. White pine doesn't last as long" (Jon Ricardo/Bismona).

As Jon Ricardo (Bismona) succinctly stated, "Miskito don't treat their wood." But they do "paint to seal" the wood used in home building (Richaina Mybith/Lamlaya)

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[347] Apparently, cedro real contains a volatile oil that contributes to pest resistance (Arvigo and Balick 1993).

and other projects, such as dory making (Amyllo Zelaya/Wawa). Some informants used petroleo, described as "burnt oil," to paint the beams and posts under the house (Isolina Howard/Tuapí).

Other durability factors included the moon phase and plant gender. Mangle blanco "cut when moon is good [or high, yields] better posts" that last about 20 years (Nena Castillon/Lamlaya). There may be some scientific basis behind this theory. Lunar gardening dictates that, when the moon is waxing, there is good growth to aboveground parts. During the waning of the moon, there is more growth below ground; plants should also be sprayed for insects during the waning phase, implying that insect resistance was higher during the waxing phase of the moon (Miller 1998).[348]

With mangle rojo, gender was important. Mangle rojo was popularly used as the structural beams to tie the thatch onto. The female tree, called lawlo mairin [Miskito – woman mangrove], was good for construction, but not the male tree, called lawlo wainko [Miskito – man mangrove]; because the former "has thicker bark" it was more desirable (Salvador Perez/Karatá). Mangle bark is high in tannin. Tannins bind with proteins – which is how hides were tanned – and the tannins probably deter insect damage by binding with the proteins in the insect's gut (Mauseth 1988).

So how long does a house last? According to Zoila Velázquez (Wawa), homes lasted "20-25 years, if take good care of them." Other figures were similar; Salvador Perez (Karatá) estimated that "houses last 25-30 years." Richaina Mybith (Lamlaya) had a house made of pino, palo de leche amarillo and caoba and, while "some boards have been replaced," the original construction was 40 years old!

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[348] Miskito use moon phases to ensure high yields and prevent rot. "Aboveground plants [were sown] from the first quarter to the full moon and all belowground plants from the full to the last quarter" (Nietschmann 1973: 137). The same principles apply to the harvest (Miller 1998). In the waxing phase of the moon, produce should be eaten immediately; harvests in the waning phase are better suited to storing.

Chapter 7: Superstition

Earliest Accounts

> All the soukia did was...to blow tobacco-smoke over her while muttering strange words, to make a bubbling with a tobacco-pipe in a calabash of water, which she was then made to drink and to tie knotted string around her neck...For as many days as there were knots she must not eat the meat of certain animals, must suffer no one to pass windward of her, and must not see a woman with child (Bell, 1899: 97, taken from Dennis 1981: 468).

This excerpt depicting an elaborate "soukia"[349] healing ritual incorporates many of the superstitions and rituals still encountered amongst the Miskito today.[350] Some of the oldest written accounts date from the mid-nineteenth century with the arrival of the first missionaries, the Moravians. It was clear from the negative portrayals of ritualistic healing and bush medicine that the Moravians disapproved of the Miskito belief in evil spirits, including the remedies (tasba saika) and healers (sukias) who combated the spirits.[351] Thus, the earliest accounts of medicinal plant usage were derogatory.

"Sookeahs," as the term was spelled then, were depicted as powerful and avaricious proposing unfounded and useless cures. The Moravians viewed the sukias as con artists preying on the fears of the villagers for large sums of money (Wilson 1975).

> Their great evil spirit was the 'woolsaw'...to propitiate this evil spirit, was a part of the Sookeah man's business; and it was not the least profitable part of it (Roberts 1827: 267).[352]

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[349] "Soukia" is a term for healer. The current spelling "sukia" will be used in this paper.

[350] This is part of a remedy for grisi siknis, discussed below under "Further Thoughts."

[351] Two motivations might explain the Moravian condemnation of Miskito spirit beliefs. One perspective is that the Moravians had no confidence in the efficacy of bush medicine. Second, regardless of efficacy, healing was a part of a pagan belief system.

[352] "Woolsaw" is a reference to Ulasa, the group of spirits to which illnesses are attributed. This is further discussed in this chapter under "The Spirit World."

Other accounts focus not only on the ineffectiveness of traditional remedies but the injurious and fatal results.

> The native doctors have no method whatever of curing any positive disease; their ridiculous customs, in most instances, destroy all the benefit their roots and herbs might otherwise produce...I have known the poor innocent creatures [villagers], on the advice of a sookeah, remain on the sea-beach exposed to all weathers for two, three, and four days, rubbing their bodies with blood, abstaining from many articles of necessary food, and all to cure some slight pain. The absence of cripples and idiots was very remarkable (Young 1842: 74).

The following excerpt from the late nineteenth century diary of Brother Kuschnig, who was posted in Ephrata (known today as Haulover), recounts the events of traditional healing gone awry.

> October 20, 1888: Today the son of John Thomas burned himself, so that his right shoulder was covered with blisters. The child had a fever and to get rid of it, the mother fetched all sorts of bush medicine, which she put under the hammock in which he was laying, she lit it and caused his clothes to catch on fire (Kuschnig 1888: 1).[353]

By discrediting the sukias and their remedies, Moravian sought to stamp out the Miskito belief in evil spirits. This pagan belief system was in direct competition with the Moravian efforts to convert the locals to the Protestant religion (Dennis 1981; Vilas 1989). Elimination of such beliefs was an integral part of the conversion process.[354]

The ultimate success of the Moravians efforts to convert the Miskito was evidenced by the fact that the Miskito today were primarily Moravian.[355] And, as the

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[353] This was translated from Old German Script to High German and, in turn, to English.

[354] The Miskito King (discussed further in Appendix 5: The History of Mosquitia) also had a hand in eliminating the role of sukias. Accounts depict him as actively advancing the use of inglis saika (Miskito for English medicine) rather than consulting the sukia (Young 1842).

[355] For more on the religious influence of the Moravian Church on the region, see Appendix 10: Religion of Mosquitia.

following anecdote illustrates, Moravian introduction of western medicine was well received by the masses.

> The first station was at Pearl Lagoon, and received the name Magdala. The first missionary here was Jean Paul Jürgensen, a Dane. With his wife, twelve shillings in his pocket and a piece of salt-beef, he, on June 12th 1855, arrived on the scene; three days later there broke out an epidemic of cholera; and Jürgensen rendered such splendid medical service, boldly visiting all the patients and serving out useful drugs, that in less than a month the people adored him, attended his services in crowds, and even began conducting family prayers (Hutton 1922: 329).

Naturally, this resulted in a rivalry between the foreign and traditional healers. In a publication chronicling the history of Moravian missions, the following account demonstrates this enmity.

> At one time, when measles broke out, a mother brought her child to Pfeiffer [a missionary] for treatment. As the mother took his advice, the child began to recover; then a soukia [medicine man] arrived on the scene and washed the patient in some native concoction; and then, when the child died, the soukia denounced Pfeiffer as a murderer (Hutton 1922: 325).

The Miskitos' ready acceptance of foreign medicaments did not result in the total obliteration of traditional remedies, however. Nor did the Miskito completely reject the notion of a demonic realm whence originate illnesses. Albeit not readily discussed with outsiders, the Miskito in the late-twentieth century continue to attribute selected illnesses to supernatural causes. Beliefs surrounding the causes and effects of these two classes of illnesses are discussed in turn.

The Spirit World

One of the oldest accounts of Miskito supernatural beliefs depicted an orderly, uncomplicated interpretation of the spirit world. Five spirits were mentioned in an account from the 1850s (Hutton 1922). The preeminent spirit, Won Aisa (Miskito for "the father of all") was a neutral figure that does not meddle in human affairs but oversees the universe.[356] In contrast, evil spirits were responsible for the trials and tribulations of a person's daily life. These spirits were named waiwan tara (spirit of the land), prahaku (spirit of the air), liwa tara (spirit of the water), and ulasa (a group of disease-causing spirits).[357] The first three wreak havoc by way of natural phenomena (causing droughts, hurricanes, etc.), while the ulasa causes illness and death.

This simplified version of the Miskito spirit world serves as a springboard for a discussion of modern day folklore. The true complexity of Miskito supernatural beliefs, however, is revealed by an expanded examination of established literature (see Glossary 7: Miskito Spirits and Demons). The remainder of this chapter focuses on the primary sources of supernatural illnesses, the healers and the healing process.

Causes of Supernatural Illnesses

Supernatural illnesses originated, in this study, from two sources: Bad spirits and spells. Bad spirits are associated with non-human entities that inhabit the natural environment, such as the air, water, savannas, swamps and even plants and animals. Spells are of human origin and only specialists called sukias (discussed under "Sukias," below) could cast most spells.

Bad Spirits

The spirits described in the 1800s (see Hutton 1922) are still discernible today. According to contemporary regional literature, the indigenous populations of this region (including the Miskito, Garífuna and Sumu) continue to recognize four primary spirits (Barrett 1993, 1994b; Dennis 1981; Elsberg, Blanco and Rodriguez 1992; Marx and Heath 1992). These are the spirits of the savanna (aubia), water (liwa), bush (duende)

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[356] No form of worship or adoration was associated with this spirit (Wilson 1975).

[357] Young (1842: 72) noted that the Miskito do not go out after sunset because the "Oulasser" might "carry them away."

and air (prahaku). Note that today there are two land demons and no mention is made of Won Aisa.

Of these spirits, only two were specifically and consistently mentioned by name in this study: Liwa and duende. When these two demons were not invoked, the informant simply referred to the illness or the demon responsible as "bad spirits." The same generality was found in other Miskito communities (Coe and Anderson 1996; Dennis 1981).

"Bad spirits" are responsible for a flu-like illness with symptoms including general malaise, fever, loss of appetite and cold extremities. Green vomit and prominent whites of the eyes are sure signs of possession by bad spirits (see also Elsberg, Blanco and Rodriguez 1992). In addition, each spirit brings with it its own set of symptoms. Because of their repeated mention in this study, the symptoms and lore surrounding liwa and duende merit further elucidation. For information on the numerous other spirits, see Glossary 7: Miskito Spirits and Demons.

Liwa: Spirit of the water

The terms liwa mairin and sirena (Spanish for "mermaid") were used interchangeably by informants in this study. This spirit was also referred to simply as liwa. Liwa was also reportedly referred to as "merry maid" in southern coastal communities (Barrett 1994b). The expression "grand mermaid", liwa tara (Hutton 1922), was not encountered in this study.

While Marx and Heath (1992) described the liwa legend specifically as a "white" belief, the Miskito embraced it as their own. Not surprisingly, locals described the demon as having a fish-like tail, long hair and exposed breasts, a point confirmed previously by Barrett (1994b) and by Elsberg, Blanco and Rodriguez (1992). However, liwa could also come in the form of a human, male or female (Aristan Zacarías/Bismona; Dennis 1981; García 1996).

Liwa is responsible for upsetting boats and driving the fish away (Hutton 1922), striking when people are in or on the water. Following initial contact in this spirit's watery venue, liwa may revisit the victim several times. Visitations are made through dreams (both during the day and night) and entail acts of a sexual nature, such as intercourse (Anelia Zacarías/Tuapí). In addition to the flu-like symptoms mentioned above, the current study found that possession by the liwa mairin could also bring such side effects as the inability to concentrate, troubling sexual thoughts, severe itching and even death. Further observations concerning this spirit are found in Glossary 7: Miskito Spirits and Demons.

Duende: Spirit of the bush

The term duende is not a Miskito word. Rather, it is a bastardization of the Miskito term duhindo, meaning goblin (Marx and Heath 1992). Informants in this study commonly referred to this demon not with the Miskito name, but using the Spanish terms, duende or monte demon, literally "bush demon."

The duende was described as a little person with a big hat who lives in the bush, especially in termite houses, and likes to have sexual relations with people (Aristan Zacarias/Bismona). Others described this demon as a small man who carries an umbrella (Anelia Zacarías/Tuapí). Another informant commented that "if cross path, feel bad" (Delia Zacarías-Zamora/Tuapí) indicating that the residual effects from this demon remained potent even after the duende has left the area. Further observations concerning this spirit were found in Glossary 7: Miskito Spirits and Demons.

Casting Spells

In addition to being stricken with supernatural illnesses controlled by demons, there was also a possibility of being the subject of spells cast by men (or women). Spells that could be effected by people fall into two categories: "Veneno" and "sumthin'." Both types of spells involve their own set of rituals.

Veneno

Veneno, an injurious spell cast by people, can be characterized as follows. First, veneno is always harmful and might have deadly results. Second, in contrast with sumthin' (discussed below), veneno is strictly under the control of the sukia. Third, the plants involved are well-guarded secrets. To conclude the discussion on veneno, an example of veneno is given.

Veneno literally translates from Spanish as "poison." Informants also referred to veneno as humbugging (English), sika saura (Miskito), and puisin (Creole English). The belief appears to have been brought from Belize and Jamaica during the colonial period (Wilson 1975).[358] Sika saura, or "bad medicine," causes abrupt, unexplainable onset of illness or even death. Any number of symptoms were possible ranging from headache to maniacal manifestations and the usual remedies, i.e. aspirin, do not cure.

Veneno originated with the sukias. With regard to casting the spell, informants spoke of veneno in very general terms. Specific incantations were neither volunteered nor were the requisite plants for casting veneno revealed. However, according to informants, veneno may be inflicted in a number of ways. "If someone dopes someone else up, [they could] send with breeze, bury in ground, put in street and you hit with foot; when it touch you, it strike you" (Septimo McDonald/Puerto Cabezas). Past scholars have also documented the belief that veneno was a potion that was buried in the ground near the victim's home and takes effect when the intended recipient passes by it (Barrett 1993; Wilson 1975). A humbug for one person does not harm another (Septimo McDonald/Karatá). Veneno could also be put on the victim's food or on a possession of the victim.

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[358] The "colonial period" refers to a time when the Miskito had close ties with the British and actually became a British protectorate in the eighteenth century (Roberts 1940).

Paño blanco was considered to be the product of veneno. According to local belief, the afflicted person has wronged someone, who has, in turn, enlisted a sukia to exact revenge. An account from perhaps the early nineteenth century explains that a fine powder was sprinkled over the victim's food, which must be cold as heat renders the powder was ineffective (Tweedy 1953). Within a few days, the victim breaks out in white spots on all visible parts of the body. "It was not only unsightly, but visible evidence that one has fallen foul of the Indian" (Tweedy 1953: 103). For more information on paño blanco, refer to Glossary 6: Supernatural Illnesses.

Just as only a sukia could initiate a veneno, only a sukia knows the secret plant concoctions and incantations to cure it. As explained by Lumberto Bell (a healer from Bismona; see below), he sought the advice of a sukia when the usual remedies did not cure his ailing daughter and her unborn child. The inefficacy of routine cures was a sure sign of veneno. There was no one curative plant for veneno. The plants involved were not normally found in the village but must be obtained from the bush. As for the incantation that accompanies the cure, only one was provided in this study. Lumberto Bell (Bismona) describes the following: While pulling the plant from the ground, he chants: "El dueño, te quiere a usted"[359] and asks that the sickness be cured. The plant was then mashed and rubbed on the victim's body.

Sumthin'

Sumthin' spells, or charms, are only mentioned once in existing literature. García (1996) noted that "sonting," borrowed from the Creole "obiamen," was related to veneno. In the current study, however, sumthin' was distinguished from veneno by three main characteristics. First, all spells are fairly innocuous cases of mind control over the intended victim. Second, the general public often knows the spells. Third,

[359] This translates roughly from Spanish as, "Oh Master, I love you."

one particular plant, dormilona (*Mimosa pudica*), is used in almost every spell. A selection of spells is presented below.

Of the wide range of possible uses, sumthin' spells usually pertain to fulfilling love interests and getting out of binds. These charms, such as a love potion, are used to direct another person's actions, while such spells are usually benign, they could be used for harmful purposes. You could "use it for anything you want - even bad things - if you know the spell," (Orlando Budier/Haulover). The key, then, is the incantation.

This leads to the second characteristic of sumthin' spells, they are known among the general public. Of the seven informants providing spells, only two were healers. A farmer, a child, two housewives and a member of MIKUPIA provided the remainder of the spells. They ranged in age from 10 to 91. The benign nature of these spells probably explains their public domain.

Perhaps the most distinctive aspect of these spells is the use of dormilona[360]. Dormilona was a weedy, prostrate plant that grows readily throughout the study communities. This plant was also used in many medicinal remedies, yet one-third of the uses were superstitious and all but one were for sumthin'.

Why dormilona became the preeminent plant in sumthin' spells is uncertain. The answer could lie in its seemingly otherworldly ability to move on its own due to the

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[360] Not all sumthin' spells use dormilona. The following love potion incantation, translated from Spanish, used the nancite (*Byrsonima crassifolia*) flower.

> This must be done all by yourself. With a new, unopened bottle of perfume in your hand, say the following: 'All people love me like I was the King of the Earth – more. Like you want your body and your clothes, I want mine on yours. I love you with all my voluntary affection, as God is my witness.' Then, take the nancite flower, open the perfume bottle and say the name of the person as you put the flower in the bottle. Put perfume on and go about your day (Katrina Alfred Vegamin/Karatá).

She claimed to have gotten her husband this way!

existence of specialized cell, the pulvinus, located at the base of the leaf stalk. Any physical disturbance, such as the touch of a finger, causes the cells at the bottom part of the pulvinus to lose turgor (rigidity) resulting in closing or folding of the leaves (Johnson 1983). This typical mimosoid "sensitive plant" movement may be the foundation for its supernatural powers. In fact, the Miskito term for this plant, kiaya papulra, means "playful spine" (Marx and Heath 1992). This may be a reference to its movement capabilities or to its "playful" use in spells.

For instance, one of the youngest informants, aged 10, provided this magic formula "...to make your mother forget to spank you. Get a small rock. While chewing on two dormilona leaves, don't look at anyone and throw rock over shoulder. Spit leaves out and bury them " (Claudia Isabel "Candy" Tevas/Wawa).

In another spell, María Luiza Zamora (Haulover) explained that sumthin' could be used to induce a judge to release a suspect. "Put [dormilona] root in mouth - keep hidden. Chew on it and talk with judge while hidden in mouth. No one must know you have it." She claimed she used this to have her son released from jail and it is effective.

By far, the most often-cited use of dormilona in sumthin' spells is in love potions. Two Miskito terms may be used in connection with these spells to refer to the spell or to the dormilona plant itself. These are Kwin Mairin or King Aula[361]. These appear to be spirits but informants are unable to elucidate on the significance of the two names. A pattern develops, however, when the types of spell are compared.

In the following spell, this informant used the term Kwin Mairin. Speaking to a female guide, Eldeponso Franklins (Tuapí) said, "People become attracted to anyone

[361] In Miskito, aouhla (pronounced "Aula") means "to come".

using this plant. [You] could 'read' [the plant] at 11am on Friday[362] to see who likes you." In this case, a female spirit is invoked to assist in obtaining a male paramour.

Compare this with the following love potions in which the term King Aula is used. Paulinia Langos (Haulover) explained that it is used "to make woman fall in love with a man." And Lumberto Bell (Bismona) said the same: "For a guy who wants a girl." Speaking to a male guide, María Luiza Zamora (Haulover) said, "When pull up plant, say 'Only you, the King in this world – I will see you. Only you are the man in this life.'" The plant stems were then rolled into a palm-sized ball and inserted in a new bottle of cologne, which was then sprinkled on the body. She also specified that this must all be done at noon on Friday.

These excerpts illustrate a pattern of selective nomenclature depending on the spell's intention. Note that when a male seeks favor with a female, King Aula is invoked. Kwin Mairin is called upon when the reverse is true. Thus, King Aula and Kwin Mairin appear to be gender-specific matchmakers.

Informants did not offer any "remedies" to undo a sumthin' spell. It could be argued that there are no "cures" because the victims are not aware that a spell has been cast upon them. As no symptoms of illness accompany these spells, there is no need for a cure.

Sources of Supernatural Remedies

As mentioned above, supernatural illnesses resulting from bad spirits and veneno are under the control of the sukia, in that the sukia is the only hope for a cure. And, in the case of veneno, sukias are the source of the illness. Sukias, the origin of their power and various healing rituals encountered in this study are discussed below.

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[362] Other informants suggested taking advantage of this propitious day. "Friday is lucky day" (Zoila Velázquez/Wawa). She recommended a hair conditioner made with escoba lisa be used every seven days, on Fridays, to be most effective.

Sukias

Sukia (under various spellings) is the term used in some of the oldest documents to describe men who specialize in illnesses controlled by supernatural forces. According to Hutton (1922), only the "soukias" possessed the power to cure illnesses caused by the spirits. In essence, they are the mediators between the spirit world and lay people. This important position is once considered honorable and desirable. According to an excerpt from 1699 (as quoted in Barrett 1994b), a slave living among the Miskito impersonated a sukia to gain respect.

Once a term implying power and awe, sukia has undergone a shift in status. Likely due to its association with magic medicine and the outside world's (specifically, the Moravian Church's) denigration of such practices, the term sukia as used today by informants in this study has a negative connotation in modern Miskito society.[363] The Miskito-Spanish Dictionary defines sukia as a sorcerer or sorceress and the Miskito term pirit (undoubtedly a bastardization of the word "spirit") is defined as sorcerer or witchdoctor (Marx and Heath 1992). Sukias deal with supernatural illnesses and are distinguished from curanderos, who, according to Marx and Heath (1992) heal illnesses that are not of a supernatural origin.

Of all the healers in this study, only one was referred to as a sukia. During his interview, Philipe Solaris (Karatá), age 51, gave his occupation as a fisherman and a farmer. He denied any knowledge of remedial plants, which was unusual for a man of his age (most elders in this study, regardless of occupation, had some knowledge of plant remedies). The following details, from the village guide (Salvador Perez), afforded some explanation for Philipe's reticence to share curative information.

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[363] García (1996) further noted that the term sukia, being linked to the Miskitos' traditional past was considered pagan and "uncivilized."

Philipe, a medicine man, is an outcast because he developed a bad reputation. The villagers accused him of bringing forth an outbreak of paño blanco on half a dozen people (see Glossary 6: Supernatural Illnesses for further information on this affliction).[364] The local belief behind the motivation for this hex was explained by García (1996: 63): A disreputable sukia "can...send a plague over the people so that they come to him and he makes money." The affected Karatá villagers had even attempted to drown Philipe. Consequently, when interviewed in 1994, he kept all medicinal knowledge to himself.

This example illustrates the modern-day disposition toward the sukia. Sukia no longer connotes healing so much as it does wrongdoing, often with deadly intent. Obeah-man, a Caribbean English term commonly used amongst the Garífuna, appears to be synonymous with sukia (Barrett 1993; Dennis 1988). Barrett (1993) noted that in southeastern coastal Indian populations, villagers did not admit to having an obeah-man (or a person capable of witchcraft) in their own village but often blamed a village down the road when "handwork" (witchcraft) was suspected.

A similar attitude was found amongst the Miskito with regard to sukias. While most people disclaimed familiarity with sukias, certain men and women in each community were consulted in cases attributed to supernatural causes. These healers referred to themselves as curanderos. When asked to translate curandero into Miskito, one informant used the words sika uplika, meaning "medicine friend" (Cinbilin Ricardo/Bismona).[365] Although eschewed by the general populace, the term sukia will

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[364] Recall that paño blanco is considered a product of veneno that can only be caused by a sukia (see "Veneno," above).

[365] García (1996) documented gender-based terminology. In her study of a Miskito community far up the Río Coco, male healers were referred to as "propit" (a Miskito Creole term for profit) and female healers as "spirit-uplika" (Miskito for "spirit friend").

be used in this chapter to distinguish between the healers herein versus those in the medicinal chapter.

Origin of Healing Powers

As to the source of their knowledge, sukias' explanations varied widely. Some informants in this study claimed that their power came to them through a spirit in dreams. Others denied association with any spirits and claimed to have purchased remedies from other healers. Below are accounts from informants regarding their healing powers.

Raphael Ingley Ricardo/Bismona/22 years old

> At 12 years of age, I had an incurable sickness. At 15, I started bleeding through the mouth and lost consciousness for two hours during which time I dreamt that a light-skinned woman came down to me in a light. She was holding a candle in one hand and a bunch of flowers in the other. She said, 'Get up. You will work with me to save many lives – children and adults.'[366] I awoke and surmised that the spirit must have made me sick so it could enter me.[367] I lost consciousness again for another three hours during which time I walked to the lagoon – it was as if the woman was controlling me. I saw many light-skinned people in boats. My brother found me there at midnight and brought me home where I collapsed...The next day, the spirit entered me and told me that coconut water and juice from flowers could be mixed together and used as a bath to cure a number of sicknesses – headache, temperature and more.

For months, he resisted the spirit but she was persistent. Soon the spirit began to warn Raphael of imminent problems. The spirit showed him visions of people being poisoned or of sick people who would then come to him for help. The spirit once revealed to Raphael that a group of men were coming to town who intended to harm at

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Neither the gender distinction nor the healer terminology was found in this study. Note, however, that Cinbilin, the healer who used the term "sika uplika," is male.

[366] This is similar to accounts in two other studies concerning a healer's acquisition of curative power. See the opening quote in Barrett (1993) and also García (1996: 134).

[367] García also noted an informant's belief that illness preceded the appearance of the spirit helper as a test of strength. Having passed the test, the spirit takes on the informant as an "apprentice."

least a dozen children. Unbeknownst to the "bad men," Raphael intervened and saved the children from harm. When asked if he killed that "bad men," Raphael said he "would never kill anyone; his job was to save lives, not to take them."

Raphael has worked with up to forty-eight sick people at once. He could cure sirena, demons or veneno from someone (See Glossary 6: Supernatural Illnesses for details). Raphael knew of no others who have seen the same spirit with which he communed. There are many kinds of spirits; some come only in daylight, others at night. The spirit told Raphael that an old man in the village used to have a spirit helper but no longer used it.

Interestingly, the humoral belief system (discussed in detail in Chapter 2: Medicinals) also applies to sukias. The power to heal was considered a "hot" affectation. Raphael noted that, since the spirit "got him," he could no longer work in the sun or he gets headaches and nosebleeds.[368]

Lumberto Bell/Bismona (Cabo Viejo[369])/55 years old

Lumberto considered himself a curandero; he cured illnesses of natural and supernatural origin. He explains that there were different types of healers; some use spirits, others do not. Although he calls the spirits espirito malo, which when translated from Spanish means "bad spirit," Lumberto insists, "...not that the spirits were bad. They were just called that."[370] Lumberto did not use a spirit to cure illnesses.

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[368] According to Raphael, because of his inability to work in the heat, his spirit helper tried to entice villagers to assist him in the construction of a home by sending copious amounts of fish to the lagoon. Although there were more fish than usual, the villagers did not believe the fish boon was a deliberate gift from Raphael's spirit.

[369] Residents of Cabo Viejo were relocated to an area adjacent to Bismona after a hurricane decimated their village around 1971.

[370] García (1996) also noted this enigma and surmised that a spirit who could cause the illness, i.e., liwa, could in turn be the spirit helper. Lumberto's reference to bad spirits was the only indication of this juxtaposition between good and bad spirits.

Lumberto's interest in plant medicines stemmed from a time when his "...daughter became pregnant and someone put veneno on my porch to kill the baby. I bought plant medicine – two herbs - from an anciano [old man] in San Carlos" (a village near the Honduran border). He had learned many more remedies since then – some purchased, some self-taught. He also learned that there were certain "classes" of illnesses and knowing what group a sickness belonged to helped him determine the cure (as mentioned above in the discussion on bad spirits, spirit illnesses are accompanied by a specific set of symptoms). Of the supernatural illnesses that he was asked to cure, he mostly encountered liwa siksa and kukra. "Those two herbs [that he bought from the old man in San Carlos] also cure sirena [liwa siksa] and bad spirits from the cemetery [kukra]" (see Glossary 6: Supernatural Illnesses for details.)

Filiberto Julias/Tuapí (Pearl Lagoon[371])/73 years old

Filiberto's desire to learn bush medicine began when he became haunted in his sleep by a devil. "The devil would grab my throat and try to choke me. You need strong medicine for upla wlakaia," to free someone from the influence of the devil[372]. He purchased the plant remedy from a man in Masalpan (a village near the Pearl Lagoon, in southeastern Nicaragua). In seeking the cure, he became interested in other plant medicines.

The Curation Process

The cures in this section concern primarily the illnesses caused by supernatural demons. As mentioned above, informants in this study provided no cures for sumthin'

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[371] Filiberto married a woman from Tuapí in 1937 and relocated there with her from the Pearl Lagoon region.

[372] It was uncertain of which devil he spoke.

spells as they considered none were required. With regard to veneno, the single incantation obtained in this study was presented above in the discussion on veneno.

Sukia laka (witchcraft or spells) and sukia wita (healing rituals) have been discussed in several works on the region[373]. An historical perspective on healing methods was provided in descriptions of Miskito culture documented around the mid-nineteenth century. Hutton (1922) mentioned two curation methods, beginning with the whistling cure:

> With his hammock slung up near the patient's bed, he [the sukia] first whistled a luring air; then he groaned, sighed and stormed; and then, rushing forward with his hand over a calabash, he shouted triumphantly, 'I've got him,' and explained that he had just caught the evil spirit (Hutton 1922: 327).

According to Ziock (1894), who wrote an early edition of the Miskito dictionary, dadaskra was the name given to a sukia specializing in cures that involved the use of a flute and water. Marx and Heath (1992) defined dadaskra, or the synonym dasna, as "the fluting witch doctor." The following account explains this curative process.

> The other cure was the water-cure. By blowing at a trough of water through a bamboo pipe, the [sukia] endowed it with medicinal powers; and if the patient bathed therein, he was almost certain to receive some benefit (Hutton 1922: 327).

Both Ziock (1894) and Marx and Heath (1992) referred to this cure as li pubaia, which literally translates as "to blow water." It was further described as a sukia rite to purify water before bathing in or rubbing on a patient to treat yumo or a similar ailment (see also the ritual at the opening of this chapter). Animal sacrifice, biani, was also customary during these rituals (Marx and Heath 1992).

Contemporary literature reveals that elaborate healing rituals incorporating the use of amulets (sukia kinka) are still common along the East Coast of Nicaragua (Barrett 1993; Coe and Anderson, 1986; Dennis 1981; Elsberg, Blanco and Rodriguez

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[373] See also Barrett (1993) and Helms (1971).

1992). Informants in this study made no mention of amulets, animal sacrifices or of the healing rituals documented by Hutton (1922). However, some distinctive aspects were common to the healing rituals documented in this study: the incantation, the method of diagnosis and the terms of compensation. These traits distinguish cures for supernatural illnesses from cures for ailments of material origin.

No matter how simple or elaborate the ceremony, chanting was a key requirement in the healing process. Even the simplest of cures includes some sort of incantation – and only the sukia knows the required words. For example, one remedy for yumo consists of extracting the oil from palma africana (*Elaeis oleifera*) and placing it on the patient's stomach while the sukia chants (Clipton Francis/Lamlaya). In another remedy, Clipton Francis noted that "if the pain does not go away, you need to chant more."

Chanting was also necessary when the plant was pulled from the ground. Lumberto Bell's (Bismona) incantation for veneno is said while pulling the plant from the ground. "Plants understand and you have to speak to…it [the plant] and tell it that you need its help" (García 1996: 140). According to Raphael Ingley Ricardo (Bismona), "Plants are often used in my cures and I must chant something as I take the plant or plant part" otherwise the cure would be ineffective.

Another characteristic that distinguished these remedies from those listed in the medicinals chapter was the method of diagnosis. The victim's movements prior to becoming ill could determine which demon caused the illness and thereby which remedy should be used (Elsberg, Blanco and Rodriguez 1992). However, when this information was not available or the victim was unconscious an interesting method of self-diagnosis was documented in this study. The following account was obtained from the most mystical of all the sukias interviewed in this study.

The [curation] process follows along these lines...I could take the sick person's T-shirt to sleep with and, through dreams, I see what plant to use. If the illness was unknown to me, I must invoke the spirit. The spirit was invoked by placing a candle with a black thread at the foot of the patient. A sheet was put over the person and when the candle was burned, it gives off smoke that encompasses the patient. Four candles were also placed around the person in a square. If the person was unconscious, I place three plants from the bush in their hand to allow them to talk in their sleep. The spirit enters the person and, through that person, tells me what was wrong with him or her[374]. The cure ends by sitting the patient in front of a fire that has a mixture of powders[375] added to it, which burn and create smoke that envelops the patient (Raphael Ingley Ricardo/Bismona).[376]

Dreams seemed to be the sukia's primary mode of obtaining information. Not only were spirits contacted through dreams, but many informants also mentioned the discovery of remedial plants through dreams (Cinbilin Ricardo/Bismona; Juanita Walter/Lamlaya; Katrina Alfred Vegamin/Karatá; Nena Castillon/Lamlaya). In addition there were plants that induce a dream-like state resulting in the elucidation of the healing plant. The following account demonstrates both the use of a plant to assist in diagnosis and the revelation of the healing plant through a dream.

This [plant was called] Jamaican voodoo medicine.[377] To use this plant, two leaves were placed in each hand and tied to the bottoms of the feet in the shape of a cross.[378] Within one half hour of falling asleep, the talking starts.

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[374] Iya tauaia is the name given when a sukia loses contact with the demons as they come out of the trance.

[375] The powders might include azufre (locally called azul, sulfa or sulfur), or brillantina (coconut oil), depending on the illness. Sulfa, a blue powder, is sold in small baggies at the market in Puerto Cabezas. Sulfa drugs are used internally to combat bacterial infections in cases of penicillin resistance (Davis 1994). Locals often used sulfa, mixed with batana (African palm oil, also known as brillantina), to rub on insect bites (Asteria Francis Peralta/Dakban-Puerto Cabezas). The effect of external application of ignited sulfa is unknown.

[376] Garcia (1996: 139) gives the following, strikingly similar account: "A special leaf is used, which when tied around the head of the patient, makes him speak in dreams and say which spirit overpowered his will."

[377] Unfortunately, this plant sample was lost.

> They tell the medicine. Using two leaves of the plant in a half cup of water, a "hot, hot" tea was made. More [plant] was used to prepare a hot bath that was taken once daily for three days (Eldeponso Franklins/Tuapí).

Another informant mentioned the existence of a plant said to effect this trance-like self-diagnosis. He also broadened the range of uses for this "plant that makes you tell what was wrong with you, for [it could make tell] if you were cheating on your spouse" (Septimo McDonald/Puerto Cabezas). He could neither name nor furnish a sample of this plant.

A similar use of dreams to elucidate treatment programs has been recorded amongst the Garífuna of southeastern Nicaragua (Barrett 1993; Elsberg, Blanco and Rodriguez 1992). When deceased relatives were haunting someone and it was revealed[379] through a dream that conventional medicine will not be sufficient then a walagayo (or walagallo) must be performed to appease the ancestral spirits (Barrett 1994b; Dennis 1988; Elsberg, Blanco and Rodriguez 1992). The dream could also reveal an elaborate array of instructions, including the foods and beverages to be served during the three days and nights of chanting and dancing required for the cure.[380] The walagayo was discussed further in <u>Appendix 12: Miskito Myths</u>.

The final distinguishing characteristic of the curation process for supernatural remedies was the requisite "tribute". Called mana in Miskito, or pai in Creole English, this monetary tribute must be buried in the ground or given to the healer before the

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378 Many references to the placing plants in the shape of the cross are made, both in this study and in other studies from the region (See also "Summary of Remedies," in this chapter, and Fey and Sindel 1988). The form of the cross is believed to strengthen the power and efficacy of the remedy (Barrett 1994b).

379 Accounts from the Garífuna region differ slightly. Barrett (1993) noted that it is the sukia who received this information whereas Dennis (1988) and García (1996) indicated that the patient was the recipient of the information.

380 The sick person's family pays for the "festivities" (Barrett 1993).

plant was pulled (Marx and Heath 1992). The patient usually provided mana in advance although, according to the informants in this study, it might simply be added to the final cost of the curing process (See also Dennis 1981).

The payment of mana was distinct from fees for services. Miskito midwives and curanderos also charge for their services (sometimes for money, sometimes for trade). Healing was their livelihood and all healers, whether dealing in the supernatural or non-supernatural realm, obtain their knowledge primarily by purchasing medicinal recipes. The purchase price of plant medicines can be high. Virginia Warman (Karatá) bought her remedy for bad spirits during the 1980s for C$100[381]. This was a sizable amount of money for one remedy, considering the cost of most cures runs only between US$2 or $3. In contrast to fees for services, mana was intended to appease the spirits. Without this prepayment, the remedy will not be successful. The following sukias' accounts regarding tribute were similar to other accounts from the region (e.g., Dennis 1981).

Filiberto Julias/Tuapi

Payment must be made in the form of a tribute to the plant. You could not use the plant "without giving something back."

Lumberto Bell/Bismona

As for payment, C$10[382] was needed [in advance]. After the person was cured, they might pay another C$20-40[383] or bring him a chicken.

Raphael Ingley Ricardo/Bismona

"Some people charge a lot of money to go pull up the plant". The spirit tells him that he could not make people pay for the herb. "You can't say you have to give

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381 This is approximately equivalent to US$20, in 1994 dollars.

382 This is approximately equivalent to US$1.40, in 1994 dollars.

383 Ibid.

money to pull up the plant or it won't cure well." Still, before he pulls a plant, he must place a C$20[384] and C$10[385] in the form of a cross and say an incantation. The person pays between C$10-20[386] after they were cured. Adding to the mystical effect, the tribute was often interred where the plant was uprooted to appease the sika dawan, or owner spirit, of the plant (Filiberto Julias/Tuapí). However, as the literal translation of sika dawan implies, "he who knows the treatment for an illness," the tribute's final resting-place was the sukia's pocket.

Preparing the Remedies

Remedies from this survey were grouped into two main categories, topicals and ingestives. In this study, more than 60% of the remedies for supernatural ailments were topically applied, baths or rinses being the primary form of administration (33%). The most popular method of ingestion, hot tea, made up only 19%. This was an interesting contrast to the methods of administration for medicinals where most remedies were ingested (40% in the form of a hot tea) and baths and rinses make up only 19% of the remedial applications.

Topical rubs were the second most popular form of administration in this study of spiritual plant remedies, making up 26%. Remedial rubs and baths have in common a standard synthetic ingredient: Agua Florida. Agua Florida, an alcohol-herb mixture (Comerford 1996), was never ingested. The cooling effect created when alcohol was applied to the skin could explain its use and perceived efficacy in these remedies.

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384 Ibid.

385 Ibid.

386 Ibid.

Another form of remedial administration, sika dingkaia, or steam bath (called de bajo by Fey and Sindel 1988), was used in only 9% of the remedies in this study[387]. Although demographics vary widely along the East Coast, there was a regional consistency in this mode of administration for sika dingkaia was a ritual found repeatedly in the literature on the region (Dennis 1981 and 1988; Elsberg, Blanco and Rodriguez 1992; Fey and Sindel 1988).

Also called steaming "in the four directions," the process begins by boiling a pot of remedial herbs.[388] The pot was removed from the fire and placed between the legs of the patient. The patient was covered with a cloth sheet and was instructed to inhale the essence of the herb.[389] The pot of boiled herbs was placed alternately to the front, back and either side of the patient during the steaming process.

Dennis (1988) asserted that the term "steam bath" was a misnomer because the process results in the remedy being inhaled not absorbed by the skin. This fact was not wholly lost to the Miskito, although their interpretation was somewhat different. One informant explained that "over the chest was a hole [and the] vapor enters through there" (Waldiman Ignacio/Haulover). "Sweat bath" may be a more appropriate term as sika dingkaia was intended to make the patient sweat, a common mode of treatment on the Coast.

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[387] Steam baths are the preferred method of remedial administration for supernatural illnesses in southeastern Nicaragua (Elsberg, Blanco and Rodriguez 1992).

[388] Elsberg, Blanco and Rodriguez (1992) presented a formulaic method for determining the choice of remedial ingredients to use in the steam bath. It was based on the demonic source of the illness. Illness caused by Aubia (demon of the field) or Prahaku (the water demon) was cured by breathing vapor from a "lightning stone" boiled in rainwater. If the culprit was Unta dukia (the bush demon), medicinal leaves and aromatic herbs are used in the water. For liwa siknis (the water demon), multi-colored stones from the sandy banks of the river are used.

[389] An account from the early twentieth century noted the use of tunu (traditional Miskito bark cloth). See Chapter 10: Personal Use, for more information.

Restrictions During Treatment

Certain ambient factors were necessary to ensure a cure's effectiveness. Contraindications during treatment were called waila (Dennis 1981). Literally translated from Miskito, this means "enemy." Many regional authors have noted restrictions during diagnosis or treatment of an illness (Barrett 1993; Coe and Anderson 1996; Dennis 1981; Elsberg, Blanco and Rodriguez 1992; Marx and Heath 1992; Nietschmann 1973). Three particularly interesting restrictions were affirmed in this study. These were, the "east rule," female barriers and food bans. Note that all three of these restrictions were mentioned in the opening quote of this chapter.

Perhaps the most important of these factors was the "east rule." Called lalma laka in Miskito, this rule mandates that no one may pass to the east of a house during the treatment (Elsberg, Blanco and Rodriguez 1992; Marx and Heath 1992; Orlando Budier/Haulover). Not coincidentally, the ocean lies to the east and winds blow into the communities from that direction. Passing to the east of the house of a sick person will "intercept, or 'tak[e] away his breath'" (Roberts 1827: 269). It was believed that, when the sukia summons the powers of the spirit world, the energy to cure was drawn from the east. Passing to the east of the house will, therefore, interfere with the communication between the sukia and the spirits.

The second contraindication concerns the adverse affects of pregnant or menstruating women. One curandero mentioned that menstruating women "cannot look at a bad cut or it won't heal" (Nena Castillon/Lamlaya). For snakebite victims, if a pregnant woman views the victim, "he will surely die" (Janis Molina/Haulover). Clipton Francis (Lamlaya) added that hanging a piece of red cloth as a curtain around the bed could safeguard snakebite victims against a relapse. Raphael Ingley Ricardo, the sukia from Bismona, was advised by his spirit helper that he would become ill if a menstruating or sexually active woman prepared his food. Apparently, anyone eating food cooked by a menstruating woman would be susceptible to illness. This was especially true for the sukia, for not only would it interfere with his ability to commune with his spirit helper but it could also render his remedies ineffective (García 1996).[390]

The third requirement during the curative process involves food bans. It was believed that certain foods would render the charm or spell, termed kangbaika (or kangbaiya), that guards against the illness ineffective. Food avoidance was necessary to prevent slingwa, or ineffectiveness, of the bush medicine (Nietschmann 1973). A number of informants in this study mentioned restrictions on food consumption during treatment[391]. Food taboos were dictated by the illness. Snakebite victims must avoid eating eggs and quequisque until fully recovered (Janis Molina/Haulover). Robert Angus (Karatá) advised that it is "bad to eat catfish when sick with kidney pain." In his cure for humbugging, Septimo McDonald (Puerto Cabezas) stipulated, "Couldn't eat any kind of fish or turtle - makes you worse, incurable." A similar list of restrictions was noted in the village of Tasbapauni (southeastern Nicaragua). Most meats, including turtle and fish, were listed by Nietschmann (1973: 111).

These seemingly disparate taboos, the east rule, pregnant or menstruating women and food restrictions, do have a common denominator. As Dennis (1981) explained, kia saura, or "bad smell," is the link amongst the three. Anyone passing downwind of the victim may be menstruating or may have eaten one of the forbidden

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[390] The Miskito practice of separating women from others during menstruation or parturition was called unta dimaia and the house to which they were confined was termed tala watla, literally meaning "blood house" (Marx and Heath 1992). It was the custom to prepare a secluded hut in the woods especially for parturition in which the woman remained for "two moons." The east rule also applies with regard to the tala watla (Young 1842). The east rule also applied to the passersby who were pregnant (Marx and Heath 1992).

[391] Food restrictions are also associated with the humoral belief system found throughout Latin America. This is discussed further in <u>Chapter 2: Medicinals</u>.

foods and could, thereby, counteract the efficacy of the treatment. "Downwind" is generally always in the same direction, from the ocean, or in other words to the east.

The Remedies

The plants with superstitious uses are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 for more information on the plants in this listing. The location(s) of the plant within the study site, other plant uses documented in this study and information from regional literature indicating established similar uses are provided where applicable. This plant list includes a general description of preparation methods and administration of remedies for supernatural illnesses. For further details regarding the ailments in this section, refer to Glossary 6.

By looking at the symptoms of supernatural illnesses, the remedies can be compared with those found in Chapter 2: Medicinals as well as in the regional literature. Related symptoms are delineated following the symbol, "➢".The symbol (✔) indicates that documentation, from either the regional literature or from Chapter 2: Medicinals of this study, corroborates the use of this plant to treat similar symptoms of a medical condition. The symbol (✐) following any supernatural illness indicates that no corresponding medical literature treats similar symptoms. In addition, other superstitious uses mentioned in the regional literature are provided.

afrika II (*Lindernia diffusa*)
Common Areas (wild)
ENTIRE plant: Cold water infusion as bath for bad spirits (✔); mashed and rubbed on body and vapor breathed from boiling for veneno (✔); mashed and rubbed on skin for monte demon (✔)
LEAF: Bath or vapor from boiling for humbugging (✔), bad spirit (✔)
➢ Symptoms include an upset stomach
Similar medicinal uses in this study:
LEAF: Tea as emetic for upset stomach
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Dennis 1988: Boil and drink with a glass warm water for "bile in your belly" (p. 20), makes you vomit and feel better
Duke 1981: Cooked LEAVES induce vomiting
Fey and Sindel 1988: For stomachache, boil in water 15 minutes, drink one glass after breakfast to vomit out all the "suciedad" (dirt)

ajo (*Allium sativum*)
Home Garden (sown)
Mashed CLOVE with other plants as body rub for lasa (✔)
➢ Symptoms include uncontrollable behavior
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature:
Barrett 1994a: CLOVE used for bad spirits
Coe and Anderson 1996: CLOVE mashed and placed on baby fontanel to protect from evil spirits
Duke 1981: Hysteria, nervous condition

albahaca (*Ocimum basilicum*)
Home Garden (sown)
LEAVES mixed with agua florida as bath or head wash for duende (✔), bad spirits (✔), sirena (✔)
Juice from ENTIRE plant with other plants for lasa (✔)
➢ Symptoms of these supernatural illnesses include fever, malaise, flu symptoms (duende, bad spirits, sirena) and fits resembling epilepsy (lasa)
Similar medicinal uses in this study:
LEAF: Mashed and rubbed on head for fever, on body for epilepsy; infusion to bathe head for malaise/nausea and epilepsy
Superstitious or similar medicinal uses in regional literature for this and a closely related species; no supernatural uses:
Barrett 1994a: *O. micranthum*: Boiled with *Tagetes cf. tenuifolia* and culantro as tea for bad spirits
Duke 1981: Febrifuge
Elsberg, Blanco and Rodriguez 1992: LEAVES for fever
Fey and Sindel 1988: *O. micranthum*: Four LEAVES plus four each of culantro and ti cut in the form of a cross (north, south, east and west); place in pot also in the form of a cross to boil; place pot on ground in shape of cross and take steam four times over two days to get rid of the duende
Morton 1981: LEAF decoction for grippe (chest colds)

boton (*Drymaria villosa*)
Patio (wild)
Mashed LEAVES or ENTIRE with other plants: Bath, vapor or juice applied to skin for bad spirits (✔), veneno (✔), monte demon (✔), children with lasa (✔)
➢ Symptoms include flu-like illness, upset stomach or vomiting
Similar medicinal uses in this study:
ENTIRE plant: Tea for flu
LEAF: Rub on chest for asthma/cough; hot infusion as emetic for upset stomach
Superstitious or similar medicinal uses in regional literature for a close relative; no supernatural uses:
Coe and Anderson 1996: *D. cordata*: Whole plant decoction orally and topically for aches and pains, respiratory/pulmonary disorders

brum taplira II (*Leonurus japonicus*)
Common Areas (wild)
Macerated LEAVES: Rubbed on skin for paño blanco until cured (maybe 3-5 days) (✔)
➢ A dermal infection, symptoms include itching
Similar medicinal uses in this study:
LEAF: Macerated, rubbed on dermal infections/rashes
Superstitious or similar medicinal uses in regional literature for a member of the same family, John's sails (*Hyptis verticillata*); no supernatural uses:
Duke 1981: LEAF tea for itch
Elsberg, Blanco and Rodriguez 1992: LEAVES applied to dermal fungus

chile picante (*Capsicum frutescens*)
Home Garden (sown)
LEAVES: Drink or rub juice on body for liwa siksa (✔) and paño blanco (✔)
➢ Dermal infections, symptoms include itching
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature:
Duke 1981: LEAVES burned with cacao for nine days wards off evil spirits
Robineau 1991: Warmed LEAF inflammation and skin sores
Tyler 1994: FRUITS contain capsaicin (with counterirritant/analgesic action)

coco (*Cocos nucifera*)
Patio/Sandy Areas (sown)
NUT: Meat oil rubbed on stomach for yumo (✔)[392]
➢ Symptoms include diarrhea and pulsating feeling below belly button
Similar medicinal uses in this study:
NUT: Mash and wash head for headache; tea for diarrhea
ROOT: Tea for diarrhea
Superstitious or similar medicinal uses in regional literature:
Duke 1981: FLOWER JUICE regular ingestion by pregnant woman believed to make baby's skin lighter than parents'
Elsberg, Blanco and Rodriguez 1992: IMMATURE NUT grated and boiled in one half liter water, drink three to four times a day for diarrhea
Fey and Sindel 1988: For bad diarrhea, cut seven small fruits that have already fallen from tree into four pieces each, arrange in shape of cross in pot water and boil ten minutes, drink often but a little at a time

culantro (*Eryngium foetidum*)
Home Garden (sown)
LEAF juice from male and female plants, rubbed on body for lasa (✔)
➢ Symptoms include lightheadedness
Similar medicinal uses in this study:
LEAF: Mash with water and wash face for lightheadedness
Superstitious or similar medicinal uses in regional literature:
Barrett 1994a: LEAVES and ENTIRE used variously for "spirits"

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[392] Note: The use of this plant as a rub for headache and for yumo may indicate a role in blood pressure regulation.

Dennis 1988: For fits; For grisi siknis: LEAVES crushed and rubbed on the face to revive the victim; "the strong smell was what makes it work" (p. 19)
Duke 1981: Remedy for fits
Johnson 2000: Antihysteric
Fey and Sindel 1988: For duende, four LEAVES plus four each of ti and *Ocimum micranthum* cut in the form of a cross (north, south east and west), place in pot also in the form of a cross to boil, place on ground in shape of cross take steam four times over two days; for bad spirit, two ENTIRE with two entire afrika II, boil and breath vapor (only from the front) in the morning and afternoon for four days
Morton 1981: PLANT rubbed on body for fainting fits

dinar pauni (*Melochia villosa*)
Common Areas (wild)
LEAF: Bath for kukra, bad spirits
ROOT: Tea for yumo
- Symptoms include stomach pain, nausea

Similar medicinal uses in this study:
LEAF: Bath for nausea
ENTIRE plant: Tea for stomachache
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Coe and Anderson 1996: LEAF decoction taken orally for digestive

dormilona (*Mimosa pudica*)
Common Areas (wild)
LEAF and STEM: Tea for kukra (✔)
LEAVES, ROOTS, ENTIRE plant, any combination: Used in a variety of methods to cast a sumthin' spell
ENTIRE plant: Tea for kukra (✔)
- Symptoms include stomach pain

Similar medicinal uses in this study:
ENTIRE plant: Tea for stomachache
Superstitious or similar medicinal uses in regional literature:
Barrett 1994a: Stomachache
Elsberg, Blanco and Rodriguez 1992: ROOTS, LEAVES used variously for upset stomach
Morton 1981: Bathe babies in LEAF decoction to make them sleep like the leaves

escoba amarga (*Scoparia dulcis*)
Common Areas (wild)
LEAF juice, slightly diluted: Rubbed on skin for paño blanco (✔)
ROOT: Tea for yumo (✔)
- Symptoms include: Itching caused by dermal fungal infection (paño blanco) and stomach pain (yumo)

Similar medicinal uses in this study:
ENTIRE plant: Juice on skin for sores
Superstitious or similar medicinal uses in regional literature:

Barrett 1994a: LEAF, ROOT and ENTIRE used variously for handwork (witchcraft), bad sprits and yumu; LEAF poultice wounds;
Dennis 1988: Plant tea drunk for sirang[393]
Lentz 1993: ROOTS applied topically for skin infections
Morton 1981: PLANT decoction applied on eczema

escoba lisa (*Sida rhombifolia*)
Common Areas (wild)
Macerated LEAF: Bath for sirena (✔)
➢ Symptoms include malaise, nausea
Similar medicinal uses in this study:
ENTIRE plant: Bathe with juice for malaise
ROOT: Hot tea for vomiting
ENTIRE plant or LEAF tea: Drink for nausea
Superstitious or similar medicinal uses in regional literature for this and a related species; no supernatural uses:
Barrett 1994a: *S. acuta*: LEAF, ROOT and ENTIRE used variously for bad spirit, handwork (witchcraft) and yumu
Morton 1981: PLANT decoction for indigestion

frijol negro (*Phaseolus vulgaris*)
Patio (wild)
Bean: Cook and drink the water for paño blanco (?✐)
➢ Symptoms of this dermal infection include itching
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature for this and other species of this genus; no supernatural uses:
Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal uses, including: resolvent (to reduce swelling without causing a discharge of pus)
Duke 1981: *Phaseolus* spp.: Poultice for burns

guayaba acido (*Psidium cattleianum* var. *littorale*)
Patio (sown)
Mashed LEAF, with other plants: As body rub for lasa (✐)
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

Jamaican voodoo medicine (Unidentified)
Unknown growth habit
LEAF: Bathe three times and drink two leaves in one-half cup of hot water ("hot, hot!") three times over three days to cure voodoo; used to diagnose illnesses (bad spirits) (✐)
➢ No symptoms given
Similar medicinal uses in this study: None; exclusive supernatural
Superstitious or similar medicinal uses in regional literature: None found

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[393] Marx and Heath (1992) define sirang saika as any remedy for heart palpitations and nervous problems. Escoba amarga should not be confused with the plant called sirang saika (found in the medicinals chapter).

John's sails (*Hyptis verticellata*)
Patio (sown)
Mashed LEAVES: Rubbed on body or as bath for bad spirit (✔), sirena (✔)
LEAF juice: Taken for liwa siksa (✔), pihini (✔)

➢ Symptoms include upset stomach (bad spirit, sirena) and dermal itching (liwa siksa, pihini)

Similar medicinal uses in this study:
Mashed LEAVES: Rub on skin for itching
LEAF: Cold water infusion for stomachache

Superstitious or similar medicinal uses in regional literature:
Arvigo and Balick 1993: LEAF and BRANCHLET tea for coughs, colds, mucus conditions, fever, with ti for high fevers
Coe and Anderson 1996: As topical for fungal infections, dandruff, scabies; crushed LEAF poultice for headache
Dennis 1988: Breathe steam and rub on body for wahiwan siknis (same symptoms as bad spirits); rub LEAVES on skin as love potion; pound ROOT, boil, drink as tea for yumu
Duke 1981: LEAF tea for itch
Elsberg, Blanco and Rodriguez 1992: LEAVES applied directly for dermal fungus

joint bush (*Miconia albicans*)
Bush (wild)
Mashed LEAVES: Breath vapor for bad spirits (✏)

➢ Symptoms include malaise, flu symptoms

Similar medicinal uses in this study: None; exclusive supernatural
Superstitious or similar medicinal uses in regional literature for this and a closley related species:
Morton 1981: LEAF decoction bath to relieve sunstroke; *M. theaezans*: LEAF decoction as potent sudorific

lengua de gallina (*Hemidiodia ocymifolia*)
Home Garden (sown)[394]//Common Areas (wild)
Young LEAVES: As body rub for lasa or out of control children (✔)
LEAF: Rub on body for duende (✔); cold water infusion bath for bad spirits (✔)
ENTIRE: As tea in baby bottle for kukra (✏)

➢ Symptoms include uncontrollable behavior (lasa), headache and cough (duende)

Similar medicinal uses in this study:
ENTIRE plant: Breath vapor boiling for headache

Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Dennis 1988: ROOT only as tea for cough; with *Polypodium lycopodioides* and *Gossypium hirsutum*, breathe steam for liwa mairin siknis (similar symptoms to with duende*)*

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[394] One of three plants (lengua de gallina, mutmutya and pico de pájaro) found together in one curandero's home garden. The curandero refused an interview. All three plants have medicinal and supernatural uses.

limsi (*Bursera simaruba*)
Dense forest (wild)
Cut the BARK during Semana Santa and the tree bleeds
Other uses in this study: Construction, Medicinal
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

mango (*Mangifera indica*)
Patio (sown)/Common Areas (wild)
SEED: Tea for yumo (✔)
➢ Symptoms: Strong abdominal pains, diarrhea, nausea, vomiting, a tumor
Similar medicinal uses in this study:
BARK: Tea for diarrhea; grated, heated and rubbed on skin for tumors
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Barrett 1994a: BARK, FRUIT and LEAF for "bad belly", diarrhea
Duke 1981: RIPE FRUIT antidysenteric; BARK for stomachic
Elsberg, Blanco and Rodriguez 1992: Decoction five pieces BARK in one-half liter water alone or with marañon FRUIT peels, take two tablespoons three times a day for diarrhea

mozote (*Pavonia schiedeana*)
Common Areas (wild)
LEAF or ROOT: As tea for yumo (✔)
LEAF: As wrap around for persistent yumo (✔)
➢ Symptoms: Strong abdominal pains
Similar medicinal uses in this study:
LEAF: Tea before bed for stomachache
Superstitious or similar medicinal uses in regional literature for a related species; no supernatural uses:
Robineau 1991: *P. spinifex* Cav.: WHOLE plant for gastritis

mutmutya (*Acalypha arvensis.*)
Home garden (sown)[395]//Common areas (wild), exclusive superstition
LEAF: Rub on body for duende (✐); macerate, cook, breath vapor for sirena (✐); cold water infusion taken and to wash buttocks for kukra (✔)
➢ Symptoms: Gas in stomach (kukra); fever (duende or sirena)
Similar medicinal uses in this study: None; exclusive supernatural
Superstitious or similar medicinal uses in regional literature for this and related species; no supernatural uses:
Johnson 2000: *A. alopecuroides*: Carminative
Lewis and Elvin-Lewis 1977: *Acalypha* spp.: Used for fever
Morton 1981: Guatamela: PLANT decoction for skin diseases, venereal sores, snake and other bites

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[395] One of three plants (lengua de gallina, mutmutya and pico de pájaro) found together in one curandero's home garden. The curandero refused an interview. All three plants have medicinal and supernatural uses.

nancite (*Byrsonima crassifolia*)
Home Garden (sown)
FLOWER: Used to make love potion (sumthin') (✐)
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

palma africana (*Elaeis oleifera*)
Home Garden (sown); Wild
SEED oil: As body rub for paño blanco (✔); placed on stomach for yumo (? ✔)
- Symptoms: Strong abdominal pains, nausea, vomiting (yumo), dermal itching (paño blanco)

Similar medicinal uses in this study:
SEED oil: For any skin infection
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Beckstrom-Sternberg, Duke and Wain 1994: Inflammation; stomach problems
Coe and Anderson 1996: As topical for fungal infections; FRUIT decoction taken orally for digestive, skin rashes/sores

pico de pájaro (*Senna occidentalis*)
Home Garden//Patio (sown) [396]
LEAF: Bath for bad spirits; cold water infusion as bath for bad spirits (✔); rub juice on body for lasa (✔), sirena (✔), bad spirits (✔)
- Symptoms include uncontrollable behavior (lasa), body aches and cough (bad spirits and sirena)

Similar medicinal uses in this study:
ROOT: Tea for body aches
LEAF: Bath for epilepsy, nausea; cold water infusion ingested as emetic for upset stomach
Mashed LEAVES: Rub on chest part for cough
Superstitious or similar medicinal uses in regional literature:
Arvigo and Balick 1993: Pregnancy Test: Woman urinates on plant, if scorches, baby is due
Barrett 1994a: LEAF and ENTIRE for cold, fever
Coe and Anderson 1996: ROOT decoction for malaria
Duke 1981: SEEDS febrifuge
Morton 1981: ROOT decoction for womb inflammation; ROOTS antispasmodic
Robineau 1991: Oral WHOLE plant decoction for fever; ROOT antispasmodic

pisik tree (*Jatropha curcas*)
Patio (sown)
Cut the BARK on Good Friday and the tree bleeds
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

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[396] One of three plants (lengua de gallina, mutmutya and pico de pájaro) found together in one curandero's home garden. The curandero refused an interview. All three plants have medicinal and supernatural uses.

plang (*Cecropia peltata*)
Forest Edge (wild)
BARK: Macerated, strained and added to water taken for kukra (✔)
➢ Symptoms include stomach pain, diarrhea
Similar medicinal uses in this study:
Macerated BARK or young LEAVES: Cold decoction taken for bloody diarrhea
LEAF bud: Boiled and drunk for diarrhea (not bloody)
Superstitious or similar medicinal uses in regional literature:
Barrett 1994a: LEAF for "bad belly"; diarrhea; to "wash out the babies"; "best cure for the gastro" (gastritis)
Coe and Anderson 1996: LEAF decoction orally for digestive problems
Elsberg, Blanco and Rodriguez 1992: For diarrhea: BARK decoction along with marañon bark, taken by the glass three times per day
Fey and Sindel 1988: Boil four young LEAVES of this and *Piper auritum* in pot and take steam once daily for four days by placing a pot on each of four sides of person afflicted with bad spirit of the hills

prakprakya (*Desmodium incanum*)
Common Areas (wild)
Cold water LEAF infusion: Sipped and bathed in for bad spirits (✔)
ENTIRE plant: Tea for yumo (✔); as hot tea and head wrap for veneno (✔)
➢ Symptoms include cough, fever, cold symptoms (bad spirits; veneno), abdominal pain (yumo)
Similar medicinal uses in this study:
Cold water LEAF infusion: Sipped for stomachache
ENTIRE plant: Tea for cough
Superstitious or similar medicinal uses in regional literature for this and related species; no supernatural uses:
Coe and Anderson 1996: Oral ROOT decoction for malaria; LEAF/ROOT decoction orally for fever
Duke 1981: *Desmodium* spp.: Macerated FRUITS given to object of affection to induce reciprocal affection
Morton 1981: PLANT decoction for menorrhagia/accompanying pains, colds

pyuta saika (*Drymaria cordata*)
Common Areas (wild)
ENTIRE plant: As bath for bad spirits (✔)
➢ Symptoms include flu-like symptoms, fever, headache
Similar medicinal uses in this study:
No medicinal uses for similar symptoms mentioned in this study.
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Coe and Anderson 1996: ENTIRE decoction orally for respiratory/pulmonary disorders
Morton 1981: Sudorific; inhale fumes of roasted PLANT for headache

raiti tangni (*Catharanthus roseus*)
Patio (sown)
ENTIRE plant: Planted in cemetery and used as bath to keep dead spirits from bothering the living[397] (✐)
➢ *Symptoms may include sadness, kukra*
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

rosa (*Hibiscus rosa-sinensis*)
Patio (sown)
FLOWER: As bath for sirena (✔)
➢ Symptoms include nausea, stomachache, fever, flu symptoms
Similar medicinal uses in this study:
LEAF: Bath for nausea
FLOWER: Cooled tea as remedy for stomachache
Superstitious or similar medicinal uses in regional literature for this and a related species; no supernatural uses:
Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal uses, including: Antidote, cold, cough, fever, flu, laxative, pectoral poultice
Coe and Anderson 1996: *Hibiscus* sp.: FLOWER/LEAF decoction orally for fever, respiratory/pulmonary; BARK/LEAF decoction orally for fever

san diego (*Tagetes erecta*)
Patio (Sown)
ENTIRE plant: As rub and to breathe vapor for veneno (✔), bad spirit (✔)
LEAVES: As body rub and bath for duende (✔)
➢ Symptoms for all three conditions include flu symptoms and malaise
Similar medicinal uses in this study:
LEAVES: For fever, lightheadedness
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Arvigo and Balick 1993: FLOWER tea for fever; ENTIRE plant boiled as bath for malaise, diarrhea, fever, colds, flu
Beckstrom-Sternberg, Duke and Wain 1994: Many medicinal uses, including: Cold, cough and fever
Fey and Sindel 1988: Well-mashed LEAVES with those of culantro and *Ocimum micrathum* smeared on entire body of feverish person at bedtime
Johnson 2000: Respiratory ailments
Morton 1981: PLANT decoction as stimulant, for chest colds; FLOWER syrup ingested for respiratory complaints

sedge II (*Cyperus luzulae*)
Common Areas (wild)
Root: Tea and/or stomach rub for yumo (? ✔)
➢ Symptoms include abdominal pain
Similar medicinal uses in this study:
ROOT: As tea for gonorrhea (a symptom of which was lower abdominal pain)

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[397] In Miskito, this is called pruan lilkara wataukisni, see "Death Myths" in Appendix 12: Miskito Myths.

Superstitious or similar medicinal uses in regional literature for unknown members of this genus; no supernatural uses:

Beckstrom-Sternberg, Duke and Wain 1994: *Cyperus* spp.: Many gastro-intestinal applications (i.e., carminative, diarrhea, digestive)
Johnson 2000: *Cyperus* spp.: Anodyne
Lewis and Elvin-Lews 1987: Body pain, stomachache

sironcontil (*Senna alata*)
Patio (sown)

LEAVES: As body rub for paño blanco (✔)

➢ Symptoms of this dermal infection include itching

Similar medicinal uses in this study:

LEAVES: For bites, festering sores, rashes

Superstitious or similar medicinal uses in regional literature:

Barrett 1994a: FLOWER, LEAF and ROOT for skin disease
Beckstrom-Sternberg, Duke and Wain 1994: Abortifacient, stomachache, antidote, bactericide, snakebite, bronchitis, constipation
Coe and Anderson 1996: LEAF decoction/juice/poultice to treat "Shifting Cloud" (paño blanco); FLOWER/LEAF decoction/juice topically for infection
Dennis 1988: LEAVES crushed/rubbed on areas infected with ringworm; crushed in rag and juice squeezed onto athlete's foot
Duke 1981: LEAVES fungicidal
Elsberg, Blanco and Rodriguez 1992: Rub on skin infections (carate and welts)
Lewis and Elvin-Lewis 1977: LEAF juice on skin as antibiotic

sirpi (*Polypodium* sp.)
Bush (wild)

LEAVES: Breathe vapor and bathe for duende (✔), sirena (✔) and kukra (✔); as rub for yumo (✔)

➢ Symptoms include flu-like illness (duende), stomach pain (kukra and yumo)

Similar medicinal uses in this study:

ENTIRE: For fever
LEAVES: For stomach problems, cough, refrio

Superstitious or similar medicinal uses in regional literature for species of this genus and another fern taxon; no references to supernatural uses:

Coe and Anderson 1996: *Pityrograma* sp.: LEAF/ROOT decoction/infusion orally/topically for fever, respiratory disorders
Johnson 2000: *Polypodium* spp.: Analgesic
Morton 1981: *P. polypodioides*: Bitter decoction for coughs and fever

tobacco (*Nicotiana tobacum*)
Purchased

Bad spirit (✐): Three joint bush leaves wrapped around a second unidentified leaf. Macerate and wrap in bark of any plant, add DRIED TOBACCO and cook in one liter water. Steam face four times. Close eyes or dries them out.

➢ Symptoms: Palms and hands cold, foot to mid-calf cold; whites of eyes show; fever; no appetite; green vomit

Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

tuktukya II (*Physalis angulata*)
Bush (wild)
Cooked LEAVES: Wash head for bad spirits (✔)
- Symptoms include flu-like illness with accompanying aches and pains

Similar medicinal uses in this study:
ENTIRE plant: Macerated for pain
Superstitious or similar medicinal uses in regional literature for this and a related species; no supernatural uses:
Coe and Anderson 1996: LEAF/ENTIRE infusion orally for fever, malaria
Johnson 2000: *Physalis* sp.: Analgesic

wildflower II (*Polygala adenophora*)
Fields (wild)
ROOTS: Used in sumthin' (✐)
- As there were no specific symptoms, all medicinal or superstitious uses for this plant were listed below.

Similar medicinal uses in this study: None; exclusive supernatural
Superstitious or similar medicinal uses in regional literature; no supernatural uses:
Johnson 2000: Alterative

yul kyama (*Psychotria tomentosa*)
Fields (wild)
Macerated LEAVES: As bath for "crazy person" (including children who sweat day and night) (✐)
Similar medicinal uses in this study: None
Superstitious or similar medicinal uses in regional literature: None found

Summary of Remedies

Nine percent of the plant uses recorded in this study have superstitious applications. Coming in behind ornamentals, supernatural plant uses are the fourth largest category in this study. Compared to the first two categories, medicinals and edibles, which comprise 50% and 31%, respectively, this category is relatively small. However, it is important to remember that the categories in this study are artificial constructs intended to assist in the discussion of this large array of plant uses. Miskito do not differentiate between supernatural illnesses versus illnesses of material origin except for the purpose of diagnosis and treatment. That these two categories are interrelated is further emphasized by the parallelism between supernatural and medicinal plant usage.

Most of the superstitious uses were corroborated both within the study and in the regional literature. There were four exclusive medicinals, Jamaican voodoo medicine (unidentified), joint bush (*Miconia albicans*), mutmutya (*Acalypha arvensis*) and wildflower II (*Polygala adenophora*). Informants mentioned each of these plants only once. Aside from these exclusive medicinals, all other plants in this chapter had uses spanning multiple categories, including construction, edible, medicinal, ornamental and personal uses. All but one of the non-exclusive supernaturals had medicinal applications.

A comparison between remedies in this chapter and those in <u>Chapter 2: Medicinals</u> reveals that 77% of the plants treat similar symptoms. Prakprakya (*Desmodium incanum*), for example, treats stomachache and yumo (a symptom of which is stomachache). Boton (*Drymaria villosa*) and John's sails (*Hyptis verticellata*) both treat epilepsy and lasa (characterized by "fits"). This correlation between supernatural and medicinal plant usage indicates that these remedies were likely to have some medical basis for associated symptoms.

Corroborating evidence in established literature gives further emphasis to the efficacy of these. Eighty-four percent of the uses in this chapter were confirmed in the established literature. For instance, chile picante (*Capsicum frutescens*) was used in a remedy for liwa siksa and paño blanco. Although there was no corroborating evidence for this use in the medicinals section of this study, there was documentation to show its use for skin problems elsewhere (Robineau 1991) and to indicate that chile picante has both counterirritant and analgesic properties (Tyler 1994).

In some cases, it was not possible to link usage with other sources. Nancite (*Byrsonima crassifolia*), for instance, used in a love potion in this chapter, had applications in other categories but there no other usage that was consistent with its use herein. In this case, any information depicting its use as an aphrodisiac or tonic would, for the purposes of this study, corroborate its use; no such information was found.

There are a variety of reasons why some plants can not be corroborated either in this study or in the regional literature. First, in some cases, there are no symptoms to compare. For instance, an informant mentioned the medicinal use of chile picante as but could not provide specifics. In another example, yul kyama (*Psychotria tomentosa*) was used for "crazy people" but no symptoms were given. With regards to the Jamaican voodoo medicine there was no information on the plant itself and without an exact identification any corroboration in usage was impossible. Finally, it is important to stress that only a select number of references have been used in this study. It is possible that an expanded literature search would yield additional supportive information for the use of these plants.

In conclusion, a preponderance of the supernatural plant usage in this chapter is supported by information both within this study and within the established literature. Based on a comparison of the symptoms, many of the same plants are used to relieve similar ailments. This is a good indication that a number of the superstitious plant remedies have some medical basis and are likely to be pharmacologically effective.

Further Thoughts

Superstitious beliefs amongst the Miskito study groups are waning in magnitude. Once attributed entirely to demons, only a handful of illnesses are ascribed to supernatural causes today. Fewer spirits are mentioned by name and no power hierarchy is implicated.

There are many possible reasons for the decline in superstitious beliefs. For one, even the most remote communities have taken part in workshops that provide villagers with scientific information regarding transmission, cause and prevention of illnesses. Another contributing factor to this declining belief in spirits is "elimination by lack of dissemination." Knowledge has either been passed on with indifference or not passed on at all (see also the discussion on apprentices in Chapter 2: Medicinals) resulting in the loss of these beliefs. Indeed, supernatural beliefs are in transition.

This section focuses on that transition by examining four specific areas. First, a look at plant nomenclature demonstrates the former importance that supernatural beliefs once held among the Miskito. Second, most illnesses have made a shift from the metaphysical to the physical realm. Third, physical interpretations are presented that provide a modern rationale for the manifestations of two illnesses currently considered to be supernatural affectations. Finally, a brief analysis presented here shows how existing superstitions have been adapted into a modern framework promoting the persistence of supernatural beliefs into modern times.

Plant Nomenclature

To determine the broader sphere of influence that superstitions once held, one need only look at folk plant nomenclature. As mentioned elsewhere (Appendix 9: Language in Mosquitia), the Miskito have adopted many words as a result of their contacts with foreigners. Where plants are concerned, a similar phenomenon of adapting foreign words has occurred, mostly in the cash crop arena (see Marx and Heath 1992, for numerous examples). But for the more esoteric, local flora, the majority of Miskito names continue to be used. Foreigners would have had little interest in encouraging alternative plant names for the local flora with which they were unfamiliar. A brief examination of this slow-to-change nomenclature establishes a link to a more superstitious past.

Information that helps in the understanding the Miskito system of plant names is found by combing the available literature for references to plants and their uses as well as for illnesses and superstitions. By integrating information from the earliest ethnobotanical accounts (for example, Ziock's 1894 dictionary) to the present study of the Miskito region, a complex system of plant nomenclature is revealed. Some plant names stem from a general symptom (ispara saika, Miskito for "wound medicine") or a specific illness for which they are used (pyuta saika, literally translated from Miskito: "snake medicine," intended for bites). A number of plant names are derived from the animal that consumes it (for example, raua pata, translates as "parrot food"). Other names are based solely on growth habit (such as kiwa, Miskito for "vine") or a general group of plants (twi, for example, a graminoid or grass-like plant). Still others have some basis in Linneaus' binomial system of nomenclature (one informant referred to escoba lisa (*Sida acuta*) as "malva;" *Sida* is in the Malvaceae and related to the genus *Malva*.

Miskito plant names are a combination of Miskito, Spanish and (Creole) English. Examining some of the Miskito names that continue to be documented allows an understanding of the wider influence that superstition once held. Cinbilin Ricardo (Bismona) gave an example of this. Cinbilin considered himself a curandero because he dealt with non-supernatural illnesses. As a remedy for any kind of swelling, he gave the plant puskan kangbiaka (*Pseudelephantopus spicatus*). Translating this from Miskito, puskan is "swelling" and kangbaika is "any remedy against a spell" (Marx and Heath 1992). Though Cinbilin did not consider himself a healer of supernatural ails, his traditional plant name revealed the supernatural origins of the illnesses.

Another plant that is linked to superstition through traditional nomenclature is swim kiama. One of the mushrooms collected in this survey, is defined in Miskito dictionaries (Marx and Heath 1992; Ziock 1894) as "a meaty mushroom that grows on the sides of old tree trunks." The literal translation from the same sources reveals an association between this mushroom and supernatural legend. Swim translates as "dwarfs with big hats which guard or tend wild boars herds." Kiama means "umbrella." In other words, this mushroom is referred to as the property of the legendary duende, demon of the bush. Superstition may explain the paucity of remedial uses for mushrooms. It is possible the association of fungi with bad spirits has deterred any type of experimentation with fungi that would reveal their usefulness.[398] Of course, the fact that many local fungi are poisonous may also account for a tendency not to employ them in traditional remedies.

Supernatural No More

Several illnesses are now considered to be of material origin rather than a supernatural one. Once again, plant nomenclature exposes the evolution of illnesses and plant remedies as they metamorphose from the supernatural to the non-supernatural arena. The demonic origins of three illnesses, rheumatism, anemia and malaria, are presented. Because they are no longer considered supernatural, remedial information regarding these illnesses is listed in Chapter 2: Medicinals.

Rheumatism is referred to in Marx and Heath's dictionary (1992) as diman sikniska, which literally translates from Miskito as "demon sickness." It was once considered an affectation of the spirit kakmapara[399], a legendary serpent (Marx and Heath 1992) that lurked near the river (Ziock 1894). The bite of this serpent demon caused the painful swellings associated with rheumatism (Marx and Heath 1992; Ziock 1894).[400]

The cure includes an operation, specifically a machete, sharpened file or a piece of broken glass to cut the skin where the rheumatic pain is felt "to let the thing out, which causes the pain" (Mueller 1932:42). There is a Miskito term, kiaya dakaia,

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[398] As discussed in the appropriate chapters, mushrooms are neither used as medicine nor as food.

[399] Also known as kakamapara.

[400] These swellings may also be associated with gonorrhea (Marx and Heath 1992).

which is described as a sorcerer's trick in which he produces a spine or thorn (the source of the pain) during the cure for rheumatism (Marx and Heath 1992).

Today neither the Miskito designation is used nor is any supernatural significance postulated for the disease. Rheumatism is now referred to by the Spanish term, reumatismo. In fact, because informants in this study did not discuss this illness within a superstitious framework, the supernatural origins of this illness would have remained unknown were it not for the reference to diman sikniska in the Miskito dictionary (Marx and Heath 1992). The same is true for the next illness, anemia.

Tala apu, or anemia, is once considered to be the result of demonic possession. Literally meaning "no blood," the Miskito obviously recognized the physical basis of the illness. The cure, called tala prakaia (meaning "blood repair"), included piercing the patient's tongue, pulling a piece of thread through the hole, and tying it in a knot. Tying knots onto a patient's body, or knak wilkaia[401], was considered a preventive measure against the return of the demon responsible for the illness (Marx and Heath 1992; Ziock 1894). As Barrett (1993) pointed out, the Miskito continued to believe that strong or hot blood could prevent illness and they use many different tonics to build up the blood. None of the informants in this study referred to the demonic implications that this illness once held.

The third illness whose supernatural origins are revealed through plant nomenclature is malaria. Also called wrih, meaning "fever" in Miskito, there is no indication of the supernatural origins of this illness under this heading.[402] However, an obscure entry denotes its superstitious origins (Marx and Heath 1992). Pira kangbaia

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[401] Also known as nak wilkaia.

[402] It is possible that the long-standing knowledge of this illness as being mosquito-borne (something Miskito would have learned from the foreigners they came in contact with) has obliterated much of the superstition surrounding the illness.

saika was the name given to the traditional plant medicine used to cure malaria. It further stipulated that the cure must be administered by a sukia, as the cause was attributed to a devil.

Rationalizing Supernatural Illnesses

Looking at illnesses once considered supernatural and those still considered supernatural gives some perspective on the types of ailments that persist in the demonic stronghold. Two oft-mentioned illnesses in this study that are attributed to supernatural possession have possible medical explanations not yet recognized by the general populous. These are liwa mairin siknis and lasa. Another illness, known as grisi siknis, was not mentioned by name in this study. However, in view of its similarities to liwa mairin siknis and lasa, all three illnesses will be discussed in conjunction with each other.[403]

First, some background on grisi siknis. This "culture-bound" syndrome[404] was first documented in Krukira, a town located near Tuapí, more than 40 years ago (Dennis 1981). Also known as crazy sickness, a number of authors have noted its existence since the 1960s (see Barrett 1993; Dennis 1981). Dennis (1981) undertook an intensive study of this illness in the village of Awastara[405] in the late 1970s. His detailed account of victims' experiences during grisi siknis episodes allows for comparison with the symptoms of supernatural illnesses mentioned by informants in the current study.

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[403] See also Glossary 6: Supernatural Illnesses.

[404] Because of its localized existence within the Miskito communities on Nicaragua's East Coast, grisi siknis is considered a "culture-bound" illness (Dennis 1981).

[405] Although this village was not chosen as a study site in the current study, it is located in the center of the study area.

Symptoms bearing resemblance to liwa mairin siknis are found both before and during the onset of an attack of grisi siknis. As Dennis (1981) pointed out, grisi siknis victims experience bla (Miskito for feelings of malaise and uneasiness) followed by delusions frequently involving water and sex. This is highly reminiscent of liwa mairin siknis and Dennis himself noted the parallelism. The two themes, water and sex, are the crux of the liwa infection in this study. However, comparing Dennis' grisi siknis accounts with informant accounts of liwa mairin siknis in this study, the two illnesses diverge notably in the magnitude of fear experienced by the victims. Whereas victims of liwa mairin siknis describe experiencing troubling thoughts, victims of grisi siknis describe feelings of terror.

As the illness progresses, grisi siknis symptoms begin to resemble another illness mentioned in this study, lasa.[406] According to Dennis' (1981) account, when an attack would set in, grisi siknis victims lost consciousness, hallucinated that they were being beaten by their demonic attacker and ultimately ran wildly, and often nude, through the village and into the bush. Victims were often tied down to prevent them from harming others. Dennis also mentioned another notable trait of grisi siknis that compares similarly to lasa: It is limited primarily to younger people, average age 15. This description compares similarly with lasa as described by informants in this study. According to informants, lasa is characterized as a child's disease. It is impossible to postulate lasa victims' experiences during an attack because no victims were interviewed in this study and there are no lasa victim accounts in the existing literature. However, adult descriptions of lasa were comparable to grisi siknis. There is a Miskito term, wlasa prukisa, that means "to have an attack." Lasa is further described as

[406] This illness was not mentioned by name in Dennis' (1981) paper or in other accounts from the region.

uncontrollable behavior, or pits (fits), wherein the child runs wild and must often be restrained with ropes. In addition, one remedy for both illnesses is to rub the leaves of culantro (*Eryngium foetidum*) onto the victim's body.

While Dennis (1981) found no physiological cause for grisi siknis, he cited examples of Miskito behavior that emulated the various stages of grisi siknis. This included emotional outbursts during funerals and trance-like states in church. Given that there are greater restrictions on female social behavior and that histrionics are common in the Miskito culture, Dennis proposed that grisi siknis was a venting mechanism for expressing stress. The same could be said for lasa, which affects essentially the same demographic group.

It could also be demonstrated that liwa mairin siknis is a venting mechanism. Informant accounts suggest that this illness is a stress release for sexual tension. This spirit seems to be invoked as an explanation for untoward sexual desires. One informant explained the illness as a married man's sexual desires with women other than his wife (Jerry Wellington Angus/Lamlaya). Essentially, informants are describing sexual fantasies and associated feelings of guilt. The invocation of this spirit as an explanation for thinking dirty thoughts has not gone unnoticed by other writers (e.g., Dennis 1988). The ability to blame improper sexual thoughts and urges on a socially accepted cause, demonic possession, creates an outlet for the guilt that accompanies an attempt to come to terms with one's own sexuality.

It is not surprising that physical or material explanations could be attributed to both the lasa and liwa mairin conditions. Of interest here is not so much dispelling a myth. Rather, it is intriguing to note the nature of the superstitions that persist in the Miskito culture. Both illnesses reflect conditions that address issues of the mind, in this case, sexual tension and stress release. As García (1996: 124) stated, "The spirits...provide opportunities to form ties prohibited in the purely human social sphere." Perhaps the inability to deal with anxieties on a personal level, or lack of psychologists setting up shop in the villages, has allowed these superstitions to persist.

Adapting Through The Centuries

In the face of modern technology and outside influences, it is hard to believe that aspects of traditional Miskito spiritual beliefs have persevered. The final topic in this section briefly explores how the Miskito have adapted aspects of their traditional spiritual beliefs to the influences of organized religion they have encountered. This ability to assimilate two cultural beliefs seemingly into one has led to the persistence of certain supernatural beliefs.

One might argue that it is not in spite of outside influences but because of outside influences that the traditional beliefs have endured. There is no doubt that Miskito beliefs have been influenced by western religion, as noted by regional authors (Dennis 1981; Nietschmann 1973; Vilas 1989). The Miskito ability to adapt to new cultures has allowed for a continuation of some derivation, at least, of their traditional lore. Ironically, many aspects of the traditional healing process are linked to Christian symbols. Examples of admixtures in this study are found in the transposition of God for Won Aisa, the significance of the cruciform, explanations for various natural phenomena and, possibly, in repeated references to the number "three" in the traditional Miskito spiritual framework.

The reconciliation between traditional Miskito beliefs and organized western religion is exemplified in an exploration of the being referred to as Won Aisa. Won Aisa has been described previously as the overseer of all that is good and evil (Hutton 1922). Recent dictionaries define Won Aisa as, "the father of everything, God" (Marx and Heath 1992). García (1996) explains that the Moravians substituted Jehovah's name in the Bible for Won Aisa (or, sometimes, dawan – the spirit owners of different aspects of nature). Thus, Won Aisa made the transition from ancient beliefs to

Christian beliefs. The Miskito have similarly retrofitted their belief in devils, such as liwa and duende. These devils are considered to be different manifestations of Satan that took up residence in various natural surroundings on earth after being expelled from heaven by God (Dennis 1981).

As noted previously, the shape of the cross also bears significance when dealing with the supernatural. It is used to intensify the efficacy of diagnosis or treatment (Barrett 1994b). During diagnosis, plants are placed in the palms of the hands to assume this shape (see the account given by Eldeponso Franklins (Tuapí) earlier in this chapter, under "The Curation Process"). Mana is placed on the ground in this shape, as noted by Raphael Ingley Ricardo (Bismona; see also The Curation Process). Both Barrett (1994b) and Fey and Sindel (1988) noted cures that require plants to be placed in the pot in the shape of a cross. Thus, the crucifix has attained significance in several aspects of supernatural healing.

Another superstition concerns a phenomenon of religious significance that manifests itself in trees. Limsi (*Bursera simaruba*) and pisik tree (*Jatropha curcas*) are said to "bleed" on religious holidays (limsi during Semana Santa, the week before Easter, and pisik tree on Good Friday). The pisik tree leaf is known to yield gray, red and indelible black dyes (Bremness 1994). But, according to informants in this study, cutting the bark at any other time of the year yielded only clear liquids (Donisio Smith/Lamlaya; Elmer Sinclair Zamora/Tuapí). A consideration of plant physiology may explain this phenomenon. Both trees contain tannins, which are brownish-red in color and often found in highest concentration in the bark. Easter and Good Friday generally coincide with the height of the three-month dry season (April[407]). In the dry

[407] Incidentally, the Miskito term for April is wli waintka kati, meaning the "month needing rain" (Marx and Heath 1992).

months, tannin concentrations become less dilute. Cutting the bark at this time of year would certainly yield a darker red, more tannin-rich exudate effecting the "bleeding" phenomenon mentioned by informants in this study.

Another biblical reference may be found in the number "three." The number "three" figures prominently in many of the remedies: Regimen are followed for three days or taken three times daily. Septimo McDonald (Puerto Cabezas) noted in his cure for humbugging that the remedy afrika II (*Lindernia diffusa*) should be taken three times from the humbugged person's front and three times from their back. It is possible that the repeated use of the number three in remedies could be a reference to the trinity.

In summary, superstitious beliefs and remedies have endured, in part, because of their transmutability between traditional Miskito lore and outside cultures. Illnesses that are still considered to be demonic in origin tend to be those involving mental anxieties that are not addressed in this society because of the unavailability of trained professionals like psychologists. Many traditional illnesses have made the transition to the physical realm but could be traced to a demonic origin through local folk plant nomenclature. No doubt, in time, others will transform as well, leaving only "love potions" – a staple found throughout most cultures globally even today.

Chapter 8: Fuel

Introduction

Firewood, called pauta [Miskito] or leña [Spanish], was used for cooking, ironing and illumination. Although fuels used for illumination and ironing are mentioned in the plant list, the primary focus of this chapter was fuel wood used for cooking. During this study, illumination was accomplished mostly with kerosene lanterns. Ironing was discussed in more detail in Chapter 5: Household Uses.

The Miskito have a distinctive fire building technique. It is not clear whether this technique is an introduction or an indigenous custom. The terminology is documented in the Miskito-Spanish dictionary and the technique was used in all of the observed communities. A small fire was started in the hearth of the kubus using pine splinters.[408] The tips of three pieces of firewood, usually about two feet in length, were pushed into the burning mound from three different directions forming a teepee in the middle. The three burning tips were called pauta wihta [Miskito]. Fire temperature was regulated by taking hold of the "tails" of the firewood and either pushing the wood further into the fire (pauta prakaia [Miskito]) or pulling it out (prata witka sakaia) as needed. Once breakfast had been cooked, the fire was allowed to smolder and fuel was added as needed so that it was ready to use at a moment's notice (Nietschmann 1973).

Favored Fuels

There were many choices available for firewood. One informant named eight different trees.[409] Different wood has different burning qualities. Burn qualities to consider included temperature, length of burn, evenness of burn and smoke emission.

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[408] The kubus, or cooking stove, is discussed in further detail in Chapter 3: Edibles.

[409] Anelia Zacarías (Tuapí) mentioned tailo, nancite, palo de culebra, mustukra, querosin, palo de lora, usupum and piawat off the top of her head. See details in the plant listing below.

For instance, informants remarked that firewood that was best for baking, "burns hot" (Francisco Dublon/Bismona; Zoila Velázquez/Wawa).

Another consideration was the amount of smoke given off. Mihmi (*Conocarpus erectus*) gives off little smoke while burning and is favored for this quality in other regions (Walden 1963). For other fuel, locals know that certain firewood gives off less smoke when sufficiently dried. Informants pointed this out with regard to nancite (*Byrsonima crassifolia*) and tailo (*Xylopia aromatica*) that, "If dry, doesn't smoke (Aristan Bons Zacarías/Puerto Cabezas-Bismona; Delia Zacarías-Zamora/Tuapí).

Using carbón (Spanish for charcoal) instead of leña could also control smoke. Nena Castillon (Lamlaya) pointed out that carbón was not as messy or smoky as leña "makes more smoke; makes things dirty." In fact, one reason for having a kitchen building separated from the sleeping quarters was to avoid the dirt accumulation that results from the smoke given off during cooking (see also Chapter 6). Usupum (*Quercus oleoides*) and mihmi were favored wood for charcoal (Aristan Bons Zacarías/Puerto Cabezas-Bismona; Walden 1963).

Sources of Fuel

Firewood was collected on a daily basis. A small cache of firewood was often stored under the kubus or on the porch. It was rarely collected in large quantities. Usually, women and children collected the wood and men chopped it. Single or elderly women sometimes paid children a small amount to collect firewood for them in and around the community (Zoila Velázquez/Wawa).

Miskito do not cultivate trees for firewood and rarely will they cut down an entire tree for such. Occasionally, branches of living trees were cut for use as firewood; this was especially true for trees that were preferred for certain uses. An usupum tree growing wild at the edge of the bush in Karatá had been consistently hacked away until only a stump remained. More often, firewood was collected along the beach or obtained from newly cut plantations near the studied communities.[410]

The Plants

Plants used as fuel are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 to obtain more information about each plant. The location(s) of the plant within the study site, other plant uses documented in this study and information indicating similar usage from the regional literature is given.

bejuco negro (unidentified)
Wild
WOOD – general fuel use
Other uses in this study: None
Other literature pertaining to fuel usage: None found

biuhu (*Chrysobalanus icaco* var. *ellipticus*)
Wild
WOOD – general fuel use
Other uses in this study: Medicine, Edible, Additional
Other literature pertaining to fuel usage:
Duke 1981: FRUITS sometimes strung as candlenuts[411]
Morton 1981: KERNELS burned for illumination

bredbred (*Inga edulis*)
Wild
WOOD – general fuel use
Other uses in this study: Edible
Other literature pertaining to fuel usage:
Lentz 1993: WOOD as fuel

comida de lora (*Henriettella seemannii*)
Wild (Bush)
WOOD – general fuel use
Other uses in this study: None
Other literature pertaining to fuel usage: None found

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[410] As mentioned in Chapter 3: Edibles, slash from a cleared plantation is a ready source of firewood. Once dry, smaller pieces of wood are collected as fuel. Longer pieces, used primarily to build a fence around the plantation, may become fuel once the plantation is left to fallow (Anelia Zacarias/Tuapi).

[411] Candlenuts are often made from the fruit of a plant in the spurge family (*Aleurites moluccana*), whose fruits can be burned for illumination (Guralnik 1978).

mangle blanco (*Laguncularia racemosa*)
Wild (Riverbanks)
WOOD: Charcoal for ironing[412]
Other uses in this study: Construction
Other literature pertaining to fuel usage:
Coe and Anderson 1996: Used by the Garífuna for cooking and trash burning
Wiersema and Leon 1999: Used for its WOOD

mangle rojo (*Rhizophora mangle*)
Wild (Riverbanks)
WOOD – general fuel use[413]
Other uses in this study: Personal, Household, Medicinal, Construction, Additional
Other literature pertaining to fuel usage:
Duke 1981: WOOD source of charcoal
Coe and Anderson 1996: Used by the Garífuna for cooking and trash burning
Morton 1981: WOOD important source of charcoal
Wiersema and Leon 1999: Used for its WOOD

mihmi (*Conocarpus erectus*)
Wild (Bush)
WOOD – general fuel use
Charcoal for ironing
Other uses in this study: Construction
Other literature pertaining to fuel usage:
Duke 1981: WOOD as fuel and charcoal
Morton 1981: Usually used as high-grade charcoal
Wiersema and Leon 1999: Fuelwood

mustukra (*Pera arborea*)
Wild (Bush)
WOOD – general fuel use
Other uses in this study: None
Other literature pertaining to fuel usage: None found

nancite (*Byrsonima crassifolia*)
Cultivated (Patio – Common); Wild (Spared); Purchased
WOOD for baking
Other uses in this study: Medicine, Edible, Superstition
Other literature pertaining to fuel usage:
Duke 1981: WOOD for charcoal/fuel
Morton 1981: WOOD: Fuel, charcoal
Wiersema and Leon 1999: Charcoal

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[412] "Good for ironing because burns hotter" (Nena Castillon/Lamlaya).

[413] "Male good for fuel – not female," which is preferred for construction (Yoneda Cordoba Tathum/Karatá). The preferential attributes of the male were not learned.

palo de agua (*Bravaisia* sp.)
Wild (Bush)
WOOD for firewood
Other uses in this study: Construction
Other literature pertaining to fuel usage: None found

palo de culebra (*Matayba apetala*)
Wild (Bush)
WOOD – general fuel use
Other uses in this study: None
Other literature pertaining to fuel usage: None found

palo de lora (*Amanoa guianensis*)
Wild (Bush)
WOOD – general fuel use
Other uses in this study: None
Other literature pertaining to fuel usage: None found

piawat (*Myrica cerifera*)
Wild (Riverside)
WOOD – general fuel use
Other uses in this study: Personal, Household, Construction
Other literature pertaining to fuel usage: None found

pino (*Pinus caribaea* var. *hondurensis*)
Wild (Forest Edge/Fields/Watershed Areas)
Only as fire starter, not firewood
Torches
Other uses in this study: Construction, Medicinal, Household
Other literature pertaining to fuel usage:
Denevan 1961: RESIN-soaked pine splinters for illumination/torches

querosin (*Tetragastris panamensis*)
Wild (Bush)
WOOD – general fuel use[414]
Other uses in this study: None
Other literature pertaining to fuel usage: None found

Santa María (*Calophyllum brasiliense* var. *rekoi*)
Wild (Bush)
WOOD – general fuel use
Other uses in this study: Household, Construction
Other literature pertaining to fuel usage: None found

tailo (*Xylopia aromatica*)
Wild (Fields)
WOOD – general fuel use

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[414] "Lights fast and easy" (Anelia Zacarías/Tuapi).

Other uses in this study: Household
Other literature pertaining to fuel usage: None found

usupum (*Quercus oleoides*)
Wild (Fields/Bush)
WOOD – general fuel use[415]
Other uses in this study: Construction, Additional
Other literature pertaining to fuel usage:
Lentz 1993: WOOD as firewood

Summary of Fuel

The eighteen plants in this category represent 7% of the plants collected in this survey.[416] Wood was chosen to suit the task. Miskitos were keenly aware of which woods provided the best burning quality, most uniform heat emission, and length of burn suited to their needs. Baking and ironing were two tasks requiring this knowledge.

Both nancite (*Byrsonima crassifolia*) and mihmi (*Conocarpus erectus*) were good fuels for baking because they "burn hot" (Francisco Dublon/Bismona). In other words, they have high caloric values as fuel (Morton 1981). In addition to burning hot, mihmi also burns slowly, so "you can cook a lot with a little wood" (Zoila Velázquez/Wawa). Still, availability dictated the final choice. Basilicia Martin-Schultz (Tuapi) did not use mihmi often "because too far away."

Wood for ironing was also chosen based on its ability to burn hot. "Dry mangle blanco [*Laguncularia racemosa*] is hot – good for ironing" (Zoila Velázquez/Wawa).[417] Wood that made the best charcoal was also a good candidate for ironing. Usupum

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[415] "Best kind for firewood; used a lot" Nena Castillon/Lamlaya. "Best kind for charcoal" Aristan Bons Zacarías/Puerto Cabezas-Bismona).

[416] The Garífuna, southern neighbors of the Miskito, use twelve species of plants for fuel (Coe and Anderson 1996). Of the nine species specifically noted there, only one, mangle rojo (*Rhizophora mangle*), was noted in this study.

[417] Zoila distinguished between dry and wet mangle because mangle rojo also burns green (Duke 1981).

(*Quercus oleoides*), a preferred source of charcoal, was also preferred for ironing (Nena Castillon/Lamlaya).

Further Thoughts

The Miskito in this study demonstrated a low level of exploitation with regard to fuels. Fuel was collected on an as-needed basis by each household and was not considered a source of income for the majority of informants in this study. Both the level of usage and the variety of fuel choices are indicators of environmental health.

Fuel as Income

Firewood was primarily gathered, not purchased, in outlying villages (Nena Castillon/Lamlaya). In Puerto Cabezas, only two vendors, one in each market, sold firewood in 1993-1994. In Mercado Municipal, Carlos Blexly (Kuiwitingni) sold a little pile of nancite firewood for C$2. Usupum charcoal was also sold in Mercado San Jerome (price unknown). As mentioned previously in the discussion on "Markets" (see Chapter 3), the primary customers in the markets in Puerto Cabezas were residents of Puerto Cabezas. Fuel was generally not viewed as a cash commodity. Where fuel is generally considered a free resource, it is not commonly marketed (McGaughey and Gregersen 1983).

Environmental Health

The variety of fuel sources available to the Miskito indicates the health of the environment on the East Coast. In a depleted environment, less preferable fuel sources were used.[418] For instance, in Guatemala, large stands of pino (*Pinus caribaea* var. *hondurensis*) have been cut to serve as fuel (McGaughey and Gregersen 1983). In contrast, informants in this study used pino only as kindling. "Pino burns

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[418] I have observed in Bangladesh, where fuel is scarce, that leaves are gathered for fuel, practically as they fall from the tree.

well" (Zoila Velázquez/Wawa) but it was used "only as fire starter, not as firewood" (Francisco Dublon/Bismona). Pino was not a preferred source of firewood because the high resin and volatile oil content that allows the wood to ignite easily also makes it burn too fast. In addition, pino was highly valued for another purpose, construction (See Chapter 6: Construction, for details).

Another indicator that fuel scarcity was not a problem in the study communities was that the Miskito do not sow trees with the intention of using them for fuel. In some cultures that employ agroforestry techniques similar to the Miskito, trees are planted in part for their use as a fuel source (Nair 1985).[419] In addition, when fuel shortages loom, living fences are considered viable fuel alternatives (McGaughey and Gregersen 1983). In this study, two of the woods used as living fences were also considered a source of fuel: Mangle blanco and mihmi.[420] However, there were a number of other plants used for fencing, including living fences, which were not used for fuel.

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[419] Where scarcity is already an issue, plantations of quick-growing trees can be sown. Certain trees, such as *Leucaena*, produce multiple beneficial results. Among the benefits are leaves as fodder, beans as human food, wood as fuel and the leguminous roots enrich the soil (Smith, et al. 1992). However, such trees tend to be weedy and often are the cuase of a profound reduction in species diversity.

[420] Living fences are discussed in Chapter 6: Construction.

Chapter 9: Additional

Introduction

This chapter includes plants that were used in various ways not covered in the other chapters. Plants used for their extracts[421] and for forage are found here as well as plants that were attributed no useful purpose. A number of uses, such as poisons, were absent from this study. This is discussed under "Further Thoughts," below.

The Plants

The plants in this category are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 for more information on the plants in this listing. The location(s) of the plant within the study site, other uses documented in this study and similar uses from the regional literature are given. For plants with no useful purpose in this study, all uses from the regional literature are listed.

bejuco (*Hippocratea volubilis*)
Wild
No use given[422]
Other uses in this study: None
Literature pertaining to ANY usage:
Beckstrom-Sternberg, Duke and Wain 1994: Medicine (Snakebite, pectoral)

biuhu (*Chrysobalanus icaco* var. *ellipticus*)
Wild
FRUITS: Bird food
Other uses in this study: Medicine, Fuel, Edible
Literature pertaining to similar uses: None found

camotillo (unidentified)
Wild
SAP: Poisonous
Other uses in this study: None
Literature pertaining to similar uses for a plant with this common name:
Duke 1981: Lists camotillo as *Curcuma longa*: ROOT for dye, condiment
Rabella and Pallais 1994: Camotillo: Poisonous TUBER

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[421] Plant exudates that function as glues are noted in Chapters 5 and 6; plant-based dyes are mentioned in Chapter 10.

[422] Grows in abundance along waterways.

chile picante (*Capsicum frutescens*)
Cultivated (Home Garden - Infrequent); Purchased
FRUITS: Dog food
Other uses in this study: Medicine, Food
Literature pertaining to similar uses: None found

coco (*Cocos nucifera*)
Cultivated (Patio – Common; Plantation – Less Common); Wild (Spared); Purchased
MEAT as chicken food
Other uses in this study: Medicine, Personal, Superstition, Edible, Construction
Literature pertaining to similar uses:
Coe and Anderson 1996: ENDOSPERM as fodder
Nietschmann 1973: MEAT almost never eaten, fed to chicken/pigs
Wiersema and Leon 1999: NUT for animal fodder (from refuse of coco oil)

grama del llano (*Rhynchospora* sp.)
Wild
Grass BLADES as cow fodder[423]
Other uses in this study: None
Literature pertaining to ANY usage: None found

mala (*Dalechampia scandens*)
Wild
ENTIRE plant causes dermal rash
Other uses in this study: None
Literature pertaining to similar uses:
Morton 1981: Stinging hairs cause acute skin irritation

mangle rojo (*Rhizophora mangle*)
Wild (Riverbanks)
Tannins from BARK used to tan cowhide
Other uses in this study: Personal, Construction, Household, Fuel, Medicinal
Literature pertaining to similar uses:
Coe and Anderson 1996: Tannins from bark for curing hides
Duke 1981: Dried, smoked in pipes; dried FRUITS smoked like cigar; WOOD source of pulp; BARK source of tannins
Morton 1981: BARK for tanning
Wiersema and Leon 1999: Materials: Tannin/dyestuff

mango (*Mangifera indica*)
Cultivated (Patio – Common); Wild (Spared)
Mature/immature FRUITS as pig food
Other uses in this study: Medicine, Superstition, Edible
Literature pertaining to similar uses: None found

[423] "Cows eat" (Nena Castillon/Lamlaya).

sargassum (*Sargassum* sp.)
Wild
ENTIRE plant consumed by sea turtle[424]
Other uses in this study: None
Literature pertaining to similar uses: None found

sedge III (*Cyperus aggregatus*)
Wild
No use given
Other uses in this study: None
Literature pertaining to ANY usage:
Beckstrom-Sternberg, Duke and Wain 1994: Many uses, including those listed in Chapter 2: Medicinals; Food (coffee substitute); Crafts (basketry; chaplet); Personal (hair tonic)
Wiersema and Leon 1999: Considered a weed

sedge IV (*Lagenocarpus guianensis*)
Wild
No use given[425]
Other uses in this study: None
Literature pertaining to ANY usage: None found

tatahku (*Mikania scandens*)
Bush (wild)
ENTIRE plant as snake repellent
Other uses in this study: Medicinal
Literature pertaining to similar uses: None found

tumtum II (*Nymphoides indica*)
Wild
No use given
Other uses in this study: None
Literature pertaining to ANY usage:
Wiersema and Leon 1999: Ornamental

tumtum III (*Nymphaea ampla*)
Wild
No use given
Other uses in this study: None
Literature pertaining to ANY usage:
Beckstrom-Sternberg, Duke and Wain 1994: Medicine (narcotic)
Morton 1981: SEED OIL for intestinal infections (Brazil)
Wiersema and Leon 1999: No use given

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[424] The Miskito rely heavily on the green seat turtle as a source of food. Knowing what and where the turtles eat is, thus, important.

[425] Grows in abundance along waterways.

tumtum rel A (*Ludwigia sedoides*)
Wild
No use given
Other uses in this study: None
Literature pertaining to ANY usage for this and a closely related species:
Dennis 1988: *L. octovalvis*: Unspecified medicinal uses
Beckstrom-Sternberg, Duke and Wain 1994: Unspecified medicinal uses

turbinaria (*Turbinaria* sp.)[426]
Wild
ENTIRE plant consumed by sea turtle
Other uses in this study: None
Literature pertaining to similar uses: None found

usupum (*Quercus oleoides*)
Wild (Fields/Bush)
Pigs eat the white or yellow ACORNS
Other uses in this study: Construction, Fuel
Literature pertaining to similar uses for species of this genus:
Duke 1981: *Quercus* spp.: ACORNS eaten by frugivores; harmful to sheep

<u>Summary</u>

The eighteen plants in this chapter represent 7% of the total plants in the survey. The "all other" nature of this category results in a rather heterogeneous assortment of uses that could be loosely grouped as forage plants, undesignated plants and plant extracts. Plants for forage (8) and plants with no useful purpose (6) comprise the majority of this category. The final three plants were mentioned for their extracts, including poisons and tannins.

Of the forage foods, only two were fed to domesticated animals. The first was coco (*Cocos nucifera*). After squeezing out the "milk" from coco "meat" (endosperm), the meat was fed to the chickens (Celia Zamorra/Karatá).[427] The second, was chile picante (*Capsicum frutescens*). The fruits were "fed to dogs to make them nasty" (Yoneda Cordoba Tathum/Karatá). Aside from leftovers fed to pigs in their slop

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[426] The Miskito rely heavily on the green seat turtle as a source of food. Knowing what and where the turtles eat is, thus, important.

[427] Celia also mentioned that the meat would be otherwise discarded.

troughs, the remaining forage foods were literally scavenged. Domesticated pigs, chickens and cows were left to their own devices to find food,[428] eating fallen fruits and grasses at random.[429] A few forage plants eaten by wild animals were also mentioned. Birds eat biuhu (*Chrysobalanus icaco* var. *ellipticus*) fruit when it matures to a black color (Jerry Wellington Angus/Puerto Cabezas). Sea turtles eat sea grass, called siwaiwai in Miskito (Zoila Velázquez/Wawa). According to Zoila, there are three "classes" of sea grass, two classes of which were documented here as *Sargassum* and *Turbinaria*, both brown algae.

The next largest group of plants in this chapter had no use. It was interesting to find six plants with no useful purpose, especially when the plants in question grew in abundance. While the regional literature revealed that four of them have medicinal value (including bejuco - *Hippocratea volubilis*, tumtum III - *Nymphaea ampla*, tumtum relative A - *Ludwigia sedoides* and sedge III - *Cyperus aggregatus*) and another was a known ornamental (tumtum II - *Nymphoides indica*), there were no definitive uses documented in the regional literature for the remaining plant, sedge IV (*Lagenocarpus guianensis*).[430]

Two poisonous plants, mala and camotillo, were mentioned as a word of caution from informants. According to Zoila Velázquez (Wawa), mala (*Dalechampia*

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[428] In fact, pigs are such indiscriminate scavengers that their meat is considered "dirty" (Nietschmann 1973).

[429] For this reason, chickens are hard to keep out of a home once they find a food source (such as rice) and cows often break through home garden fences to get to tasty herbaceous crops therein.

[430] It is possible that sedge IV is used as an environmental indicator in Miskito agriculture. As mentioned in <u>Chapter 3: Edibles</u>, Nietschmann (1973) found that the Miskito look for certain wild plants that indicate the suitability of land for cultivation and that "cutting grasses" were considered negative indicators. Sedge IV is a cutting grass but, unfortunately, Nietschmann did not scientifically identify the cutting grasses to which he referred.

scandens) irritated the skin when touched. In support of this, Wiersema and Leon (1999) classify mala as a mammal poison. Camotillo (unidentified) could be deadly. "If cut with machete and then cut or peel a mango, your teeth and skin turn blue and you die" (Nils Philipe Washington/Karatá). Regional literature confirms that camotillo has a poisonous tuber but does not identify the plant scientifically (Rabella and Pallais 1994).

Only one plant was mentioned as a repellent: Tatahku (*Mikania scandens*). "Rub this plant on your body before going out and the snake does not bother you" (Orlando Budier/Haulover). Although its use as a repellent was not mentioned in the regional literature, the local efficacy of this plant as a snakebite remedy was evidenced by the numerous references in regional literature (Coe and Anderson 1996; Dennis 1988; Duke 1981; Johnston and Colquhoun 1996).

Finally, mangle rojo, known for the tannin content in its bark (Wiersema and Leon 1999), is used similarly throughout the region to tan hides (in southeastern Nicaragua - Coe and Anderson 1996, and in Panama - Duke 1981). The female "has thicker bark" and was therefore, a better source of tannins, but the "male" could also be used (Salvador Perez/Karatá). Simply placing the bark in water begins the extraction process; the water turns "red, red" (Anelia Zacarías/Tuapí) or almost black (Yoneda Cordoba Tathum/Karatá). In addition to its medicinal use in the villages,[431] the bark was stripped and sold in bulk to leather makers in Puerto Cabezas (Nena Castillon/Lamlaya).

Further Thoughts

There were a number of areas that could be further explored with regard to the plant uses in this category. One particular area of interest that was little mentioned by

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[431] Tannins are known anti-diarrheals and are used as such in the communities. See Chapter 2: Medicinals for further information.

informants was the use of plants to trap, repel or control living creatures. According to the regional literature, a number of plants in this study could be used as insect repellents, as poisons for pest control, as piscicides and in trapping animal.

Plants used for these purposes are of interest because they may have additional applications. Pyrethrine, derived from san diego (marigold) and rotenone (derived from a number of sources) are the active ingredients of several important insecticides. Derived from plant extracts, they are biodegradable and non-toxic to humans (see also Schultes and Raffauf 1992; Wiersema and Leon 1999). A number of poisons used for hunting have been developed as painkillers for rheumatism (Bremness 1994; Schultes and Raffauf 1992) and muscle relaxants (Plotkin 1988; Prance and Prance 1972; Schultes and Raffauf 1992). Following, is a brief discussion of piscicides, poisons, repellants and traps. This is followed by a list of plants from this study that are used for these purposes.

Piscicides

Poisons present in certain plants can, when placed in water, cause fish to rise to the surface. Rotenone is a well-known piscicidal agent used by indigenous cultures (Schultes and Raffauf 1992 list a number of plants used for this purpose, none of which was documented in this study). Piscicides generally function by depriving fish of oxygen by paralyzing their gills (Prance and Prance 1972). When the fish rise to the surface, they are easily collected. Because of their mode of action, many botanical fish intoxicants have no adverse effects on humans, birds or reptiles that consume either the affected water or fish (Trumbo 1994). Informants did not mention piscicides in this study, possibly because net and line fishing were the most popular methods of catching fish.

Poisons

Although not mentioned in this study, it is likely that the Miskito use plant extracts to poison mammalian pests. Coe and Anderson (1996) listed three plant species used for this purpose by the Garífuna (none was documented in this study).

Repellents

In this study, one repellent was mentioned (tatahku, for snakebite prevention - discussed above). One informant mentioned that thick-barked mangle rojo was preferred for roofing material (see Chapter 6: Construction). Although the reason for this preference was not given, it may be postulated that it was due to the presence of tannins in the bark, which probably act as a deterrent to bug infestation by binding the protein in the insect's gut. Otherwise, no informants mentioned repellents against such local nuisances as chiggers, mosquitoes or cockroaches.

Traps

Traps could be either structural enclosures (such as cages or pits) or substances used to ensnare by adhering game to a surface (such as gums). The use of traps in hunting was not mentioned in this study although one informant explained how the lora (parrot) could be caught. Loras make nests in holes in old trees. When such a nest was found, the young could be lured out using fruit as bait. The bird could then be taken home and raised as a pet (Salvador Perez/Karatá).

The Plants

The following list includes plants from this study that have been documented in the regional literature as being useful as a piscicide, poison, repellant or trap. This list is not exhaustive but shows that there are many other applications for the study plants than that which was documented in this survey.

achiote (*Bixa orellana*)
Uses in this study: Medicinal, Edible
Additional uses from the regional literature:
Duke 1981: Mosquito
Johnson 2000: Insecticide
Smith, et al. 1992: Insecticide

aguacate
Uses in this study: Edible
Additional uses from the regional literature:
Morton 1981: SEED put inside cheese for rat poison

ajo (*Allium sativum*)
Uses in this study: Medicinal, Edible, Superstition
Additional uses from the regional literature:
Morton 1981: Insecticide, animal/snake repellant
Wiersema and Leon 1999: Mammal poison

ala blanca (*Impatiens balsamina*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Cyanogenetic

albahaca (*Ocimum basilicum*)
Uses in this study: Medicine, Superstition, Edible
Additional uses from the regional literature:
Bremness 1994: LEAVES mosquito-repellent

awas tangni (*Eupatroim capillifolium*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Insecticide
Lewis and Elvin-Lewis 1977: Herb wards off insects

ayote (*Cucurbita moschata*)
Uses in this study: Edible, Medicine
Additional uses from the regional literature:
Duke 1981: LEAVES could be rubbed on cattle to discourage flies

bambú (*Bambusa* sp.)
Uses in this study: Construction
Additional uses from the regional literature:
Duke 1981: India: Sharp knives may be buried along path for protection; SAPLINGS made into string-tripped impaler called the "Malayan Gate"

bayvine (*Sphagneticola trilobata*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Elsberg, Blanco and Rodriguez 1992: Chew LEAF and spit in path as walk to repel snakes, thus preventing snakebite

bredpru (*Artocarpus altilis*)
Uses in this study: Medicine, Household, Construction, Edible
Additional uses from the regional literature:
Smith, et al. 1992: White sap used in bird traps

butterfly flower (*Crotolaria retusa*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Mammal poison
Wiersema and Leon 1999: Vertebrate poisons

caña (*Saccharum officinarum*)
Uses in this study: Medicine, Edible
Additional uses from the regional literature:
Duke 1981: JUICE used as fish poison by Panamanian Indians

cedro macho (*Carapa guianensis*)
Uses in this study: Construction
Additional uses from the regional literature:
Duke 1981: SEED oil as insect repellent
Morton 1981: SEED OIL mosquito repellant and pediculicidic

chile picante (*Capsicum frutescens*)
Uses in this study: Medicinal, Edible, Supersition, Additional
Additional uses from the regional literature:
Duke 1981: Burned to drive off rats; Panama: Strung on back of boat as shark repellent
Wiersema and Leon 1999: Mammal poison

coco (*Cocos nucifera*)
Uses in this study: Construction, Additional, Medicine, Personal, Superstition, Edible
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Insect repellant
Duke 1981: COCO OIL as insect repellent; HUSK burned as mosquito smudge; COPRA used to bait fish traps; MIDVEIN used to make fish traps; STALK made into crab traps

corazon de María (*Caladium bicolor*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

dasheen (*Colocasia esculenta*)
Uses in this study: Edible
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Cyanogenetic poison

delta (*Petiveria alliacea*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Morton 1981: ROOT insect repellant

dwarf poinciana (*Caesalpinia pulcherrima*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Insecticide
Morton 1981: LEAF as piscicide; mammal poison; insecticide
Wiersema and Leon 1999: Mammal poison

escoba amarga (*Scoparia dulcis*)
Uses in this study: Superstition, Medicinal
Additional uses from the regional literature:
Morton 1981: Fresh dried plant kills fleas, lice, vermin

eucalipto (Eucalyptus sp.)
Uses in this study: Medicinal
Other Additional uses from the regional literature:
Morton 1981: OIL used in mosquito repellants

flor de noche (*Ipomoae carnea* ssp. *fistulosa*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

flor de paloma (*Impatiens balsamina*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Cyanogenetic

frijol (*Phaseolus vulgaris*)
Uses in this study: Edible
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

frijol blanco (*Canavalia ensiformis*)
Uses in this study: Edible
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

frijol negro (*Phaseolus vulgaris*)
Uses in this study: Superstition
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

granadilla (*Canavalia ensiformis*)
Uses in this study: Edble
Additional uses from the regional literature:
Duke 1981: Considered insecticidal

guanábana (*Annona muricata*)
Uses in this study: Medicine, Edible
Additional uses from the regional literature:

Beckstrom-Sternberg, Duke and Wain 1994: Insecticide; cyanogenetic; piscicide
Duke 1981: SEEDS insecticidal, piscicidal

herb III (*Chamaesyce thymifolia*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Morton 1981: Insect repellent (flies/mosquitoes)

hombre grande (*Quassia amara*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Morton 1981: BARK: Insecticidal

jícaro (*Crescentia alata*)
Uses in this study: Household
Additional uses from the regional literature:
Duke 1981: Caribbean use to hunt aquatic birds:Half-empty shells were floated in the water, when bird was accustomed to it, hunter puts half shell on head, submerges body and sneaks up on bird

liliura (*Abrus precatorius*)
Uses in this study: Medicinal, Personal
Additional uses from the regional literature:
Adams 1976: SEEDS contain abrin, one of the most virulent of all plant poisons; must enter the bloodstream to cause harm; boiling destroys it
Bremness 1994: SEEDS fatally poisonous
Duke 1981: SEEDS very poisonous
Wiersema and Leon 1999: Mammal poison

maíz (*Zea mays*)
Uses in this study: Medicine, Household, Edible
Additional uses from the regional literature:
Morton 1981: Ingested seedlings could kill herbivores (cyanogenic glycoside)

Managua tangnika (*Portulaca oleracea*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

mango (*Mangifera indica*)
Uses in this study: Medicine, Superstition, Additional, Edible
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

marañon (*Anacardium occidentale*)
Uses in this study: Medicine, Edible
Additional uses from the regional literature:
Duke 1981: BARK piscidal without rendering the fish skin poisonous; GUM from bark obnoxious to insects and used in bookbinding for that reason

Lewis and Elvin-Lewis 1977: STEM gum in varnish to protect books/wood against ants/bugs
Wiersema and Leon 1999: Mammal poison

nancite (*Byrsonima crassifolia*)
Uses in this study: Medicine, Fuel, Superstition, Edible
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Piscicide
Duke 1981: BARK as fish poison
Morton 1981: Crushed BRANCHES piscicidal

paisagua (*Dioscorea bulbifera*)
Uses in this study: Edible
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Poison
Wiersema and Leon 1999: Mammal poison

pisik tree (*Jatropha curcas*)
Uses in this study: Superstition, Medicine
Additional uses from the regional literature:
Duke 1981: NUTS mixed with palm oil to kill rats; LEAVES as bug fumigant

quequisque (*Xanthosoma violaceum*)
Uses in this study: Edible
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Poison

reumatis saika (*Philodendron hederaceum*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Poison

romero (*Rosmarinus officinalis*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Morton 1981: Insecitcidal

san diego (*Tagetes erecta*)
Uses in this study: Medicinal, Superstition, Ornamental
Additional uses from the regional literature:
Morton 1981: ROOTS give off alpha-terthienyl inhibiting proliferation of rootknot nematodes
Wiersema and Leon 1999: Non-vertebrate poison

sironcontil (*Senna alata*)
Uses in this study: Medicinal, Superstition, Ornamental
Additional uses from the regional literature:
Duke 1981: LEAVES insecticidal, possibly piscidal

spiny amaranth (*Amaranthus spinosus*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Morton 1981: Nitrate content could poison livestock

ti (*Cymbopogon citratus*)
Uses in this study: Edible, Medicinal
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Insecticide

tobacco (*Nicotiana tobacum*)
Uses in this study: Superstition, Medicinal
Additional uses from the regional literature:
Duke 1981: LEAVES stuffed into decomposing meat when hunting condors which makes them drunk from eating it
Lewis and Elvin-Lewis 1977: Nicotine as contact insecticide
Martin and Fennema 2000: Insecticide
Morton 1981: Poisonous to grazing animals and could be fatal to humans applied externally or internally; nicptine sulfate as pesticide
Wiersema and Leon 1999: Mammal poison

tomate (*Lycopersicon esculentum*)
Uses in this study: Edible
Additional uses from the regional literature:
Robineau 1991: LEAVES have insecticidal activity

tree, red flower (*Jatropha integerrima*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Unspecified poison

tumtum I (*Nymphaea odorata*)
Uses in this study: Medicinal
Additional uses from the regional literature:
Wiersema and Leon 1999: Mammal poison

yellow oleander (*Thevetia peruviana*)
Uses in this study: Ornamental
Additional uses from the regional literature:
Duke 1981: WOOD as fish poison
Wiersema and Leon 1999: Mammal poison

yuca (*Manihot esculenta*)
Uses in this study: Edible, Medicinal, Household
Additional uses from the regional literature:
Beckstrom-Sternberg, Duke and Wain 1994: Cyanogenetic
Wiersema and Leon 1999: Mammal poison
Duke 1981: Broken stems repel driver ants

Chapter 10: Personal Use

Introduction

This category includes personal belongings, such as jewelry, clothing and toiletries, which were derived from plants. Crafts, toys and instruments are also recorded here. Looking at plant usage with respect to modern conveniences explains the Miskitos' current plant use level in this category.

The Plants

The plants used for personal purposes are listed alphabetically according to the common name used in the study. Refer to Appendices 1-3 for more information on the plants in this listing. The location(s) of the plant within the study site, other plant uses documented in this study and information from regional literature indicating established similar uses are provided.

batata (*Ipomoea* batatas)
Cultivated (Home Garden – Common; Plantation - Infrequent)
    LEAF extract as hair conditioner
Other uses in this study: Edible
Other literature pertaining to personal usage: None found

bloodflower (*Asclepias curassavica*)
Wild
    SEED extract used as nail polish
Other uses in this study: None
Other literature pertaining to personal usage: None found

carpetgrass (*Axonopus fissifolius*)
Wild (Patio)
    Hair tonic: Use LEAVES to rub in and wash hair with
Other uses in this study: Medicinal
Other literature pertaining to personal usage: None found

coco (*Cocos nucifera*)
Cultivated (Patio – Common; Plantation – Less Common); Wild (Spared); Purchased
    NUT used to make piñata to hold small gifts
    MIDVEIN used as a toy to push along a plastic or wire wheel[432]
Other uses in this study: Medicine, Edible, Superstition, Construction, Additional

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[432] This game is discussed in the summary below.

Other literature pertaining to personal usage:

Beckstrom-Sternberg, Duke and Wain 1994: Gargle, hairblack, mouthwash, shampoo, soap

Duke 1981: Coco OIL makes soap that floats and lathers in salt water; rancid oil is put in a seashell with wick for smokeless illumination; COCO BUTTER for candles; LEAVES covered in mud and placed over fire, keeps fire overnight; thread stripped from leaves and dried as quick-burning torch

Everett 1969: COPRA yields coco OIL for soap

Lewis and Elvin-Lewis 1977: MEAT as facial cream, salves (cosmetics)

Morton 1981: MEAT OIL for soap

Roberts 1827: Coco OIL extract used on hair

Woodroof 1970: OIL used in candles; materials for apparel; makes soap that lathers in brine and was useful at sea

escoba lisa (*Sida rhombifolia*)

Wild (Common Areas)

LEAF: Strained cold water decoction on hair for dandruff, as hair conditioner

Other uses in this study: Superstition, Medicinal

Other literature pertaining to personal usage:

Johnson 2000: Alopecia

liliura (*Abrus precatorius*)

Wild (Bush)

SEEDS: Strung as necklace

Other uses in this study: Medicinal

Other literature pertaining to personal usage:

Adams 1976: Boiled SEEDS strung as beads

Bremness 1994: SEEDS made into necklaces

Duke 1981: SEEDS used as necklace ornaments

Morton 1981: SEEDS used in necklaces, rosaries and toys (maracas)

Wiersema and Leon 1999: Beads

limon puro (*Citrus limon*)

Cultivated (Patio)

FRUIT: Juice as fingernail cleaner

Other uses in this study: Edible, Household, Medicinal

Other literature pertaining to personal usage for related species:

Paul and Cox, 1995: *Citrus aurantium*: FRUIT juice as hand wash to remove cement and paint

Lewis and Elvin-Lewis 1977: *Citrus* sp.: Used in perfumes, scented soap, oil, shampoo

limon real (*Citrus* sp.)

Cultivated (Patio – Common)

FRUIT: Juice as deodorant

Other uses in this study: Edible

Other literature pertaining to personal usage for species of this genus:

Lewis and Elvin-Lewis 1977: *Citrus* sp.: Used in perfumes, scented soap, oil, shampoo

mangle rojo (*Rhizophora mangle*)
Wild (Riverbanks)
FRUITS: As a toy because of their chick-like shape
Other uses in this study: Construction, Household, Medicinal, Fuel, Additional
Other literature pertaining to personal usage: None found

palma africana (*Elaeis oleifera*)
Cultivated (Home Garden); Wild
SEED oil extract for hair tonic
Other uses in this study: Superstition, Edible, Medicinal, Construction
Other literature pertaining to personal usage for this and a related species:
Coe and Anderson 1996: SEED pulp as topical for dandruff
Duke 1981: *E. guineensis:* Extract oil for hair dressing

piawat (*Myrica cerifera*)
Wild (Riverside)
WOOD: Carve into a top
Other uses in this study: Construction, Fuel, Household
Other literature pertaining to personal usage: None found

tree of life (*Bryophyllum pinnatum*)
Wild (Bush)
FLOWERS used as toy cups
Other uses in this study: Medicinal
Other literature pertaining to personal usage: None found

waisala (*Renealmia alpinia*)
Wild
Put juice from FRUIT on armpits as deodorant
Seared RHIZOME rubbed on armpits
Other uses in this study: None
Other literature pertaining to personal usage for a related species:
Beckstrom-Sternberg, Duke and Wain 1994: *R. aromatica*: Deodorant
Duke 1981: *R. aromatica*: LEAVES used by the Choco Indians as deodorant

Summary of Personal Uses

The thirteen plants employed in personal uses comprise a mere 5% of the plants documented in this study. There were a surprising number of omissions, including make-up, clothing, crafts and instruments. The complete exclusion of these items along with the meager size of this category is contemplated below under "Further Thoughts." The primary uses documented in this category can be grouped as toiletries and crafts, hair conditioners and toys being the most common uses. These items are expounded upon below.

Hair conditioners

Batata (*Ipomoea batatas*), escoba lisa (*Sida rhombifolia*), carpetgrass (*Axonopus fissifolius*) and palma africana (*Elaeis oleifera*) were employed variously as hair growth promoters and tonics. With the first three plants, leaves were used; the final plant employed seed oil. The leaves of carpetgrass, used as a shampoo, "makes hair long" (Nils Philipe Washington/Karatá).

The extract from mashed leaves of either batata or escoba lisa were applied as conditioners, after shampooing, and left on the hair to dry. Batata was recommended for daily use and "makes hair grow" (Zoila Velázquez/Wawa). Escoba lisa should be used every seven days[433] for dandruff and to "soften hair, makes hair thick and shiny and reduces hair loss" (Zoila Velázquez/Wawa).

Palma africana, was also used "if hair [was] falling out" and had the added advantage of turning the hair black (Salvador Perez/Karatá). This plant has a long history of use amongst the Miskito (Mueller 1932). Unlike the previously mentioned hair conditioners, that involve the use of leaves, this hair conditioner involves the use of a seed oil extract. The seed of the African oil palm, as it is known in English, contains between 35-60% oil (Kricher 1989). To prepare aceite de ohom [Spanish],[434] or bátana [Miskito] oil of palma africana, the fruit was cooked to remove the seeds. Seeds were then sun-dried for several days (up to four), until the seeds rattled when shaken (Nena Castillon/Lamlaya; Salvador Perez/Karatá). At this point, there were two methods of preparation. The seeds might be opened and the "meat" was cooked in a pan until the

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[433] Friday was considered a good day to use this "because [it is a] lucky day" (Zoila Velázquez/Wawa).

[434] The term "aceite de ohom" was commonly used to refer to the entire plant. The term is a combination of Spanish (aceite de, meaning "oil of") and Miskito (ohom, being the Miskito name for the fruit of the African oil palm (fide, Marx and Heath 1992; Salvador Perez/Karatá). It has been called hone oil in older publications (Young 1842).

oil came out and formed a butter that could be slathered on the hair (Nena Castillon/Lamlaya), or the seeds might be toasted over a fire and ground to a fine powder in a mortar.[435] In the latter instance, the powder was then cooked with approximately 2 liters of water per one entire fruiting stalk to obtain an oil that could be kept a long time (Salvador Perez/Karatá).[436]

Both escoba lisa and palma africana are known for their roles as hair restoratives. According to the regional literature, escoba lisa has anti-fungal activity (Lewis and Elvin-Lewis 1977) to which dandruff is attributed. In addition, it is believed to aid in the prevention of alopecia (Johnson 2000). The seed oil extract from palma africana is reputedly known regionally to combat dandruff and is often used as a styling aid (Coe and Anderson 1996; Duke 1981).

Toys

An informant stated that there were no toy makers (Anelia Zacarias/Tuapi) and this was evidenced by the few simplistic plant-based toys documented in this study. Three of the toys were ready-made, being plucked from the live plant and used as such. The fruit of mangle rojo (*Rhizophora mangle*) "looks like little chicken. Kids play farm with it" (Yoneda Cordoba Tathum/Karatá). Similarly, the oblong, bell-shaped flowers of the tree of life (*Bryophyllum pinnatum*), as described in Robineau (1991), were suited to their role as teacups.

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[435] Called nuh in Miskito, mortars are discussed in Chapter 5: Household Use.

[436] Bátana is well known amongst the Miskito for making hair stronger and blacker, both desirable traits. But it has the unfortunate side effect of imparting a bad odor (as oil will do after about three days on someone's sweaty head!). There is a manufactured substitute available, called brillantina, that retains a pleasant smell and is reasonably priced. Bátana is now considered the poor man's substitute for brillantina.

The third game that involved plant usage is known as hoops. This turn of the century[437] game involved propelling a lightweight plastic or wire wheel with a stick. In this case, the stick being used was the basal portion of the midvein of a coco leaf (*Cocos nucifera*) that had been stripped of its leaves. This game was played while walking and the cup-shaped base of the leaf became an excellent tool with which to drive the wheel forward.

The other two plant-based toys, coco and piawat (*Myrica cerifera*), required some modification from their original form. Unfortunately, informants did not describe specific preparation methods. The transformation of a coconut into a hanging piñata containing small gifts was not difficult to imagine; this use was obviously influenced by the Spanish culture. The only construction required in the preparation of a toy top from piawat wood was that the boys whittle the wood into the desired shape. The motivation for using piawat for this purpose, as opposed to other trees, was not discovered.

Toiletries

Three plants were used as toiletries, one cleaner and two deodorants. Limon puro (*Citrus limon*) was used as a nail cleaner. When the fingernails "get real dirty" (Zoila Velázquez/Wawa), wash with soap and a little juice from the fruit of limon puro. The acids in the pulp are known cleaning agents (Lewis and Elvin-Lewis 1977).

The two plants used as deodorants were limon real (*Citrus* sp.) and waisala (*Renealmia alpinia*). This use was not documented for either plant in the literature consulted. The fruit of limon real was cut in half and rubbed on the armpits (Orlando Budier and Janis Molina/Haulover). Species of *Citrus*, known for their essential oils, are used in other toiletries, such as perfumes and scented soaps (Lewis and Elvin-Lewis 1977). The essential oils could similarly be used to mask body odor.

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[437] Turn of the nineteenth century, that is.

The second plant that served as a deodorant was waisala, a ginger relative. Two informants suggested different plant parts be used. One advised using the juice from the fruit, adding that it "lasts all day" (Francisco Francis/Karatá). Another suggested using the rhizome. Searing the rhizome in fire caused it to "sweat" and it could then be rubbed on armpits (Katrina Alfred Vegamin/Karatá). This natural roll-on deodorant was not mentioned in the literature but a related species was. The Choco Indians of Panama use the leaves of *Renealmia aromatica* as deodorant (Duke 1981).

Further Thoughts

There were a number of potential plant uses in this category that were not mentioned by most informants. Most notably, there was no mention of present day plant-derived crafts, cosmetics or clothing. Available information regarding these uses and possible explanations for their absence are postulated below.

Crafts

Woodcarvings, jewelry and instrument making were three crafts that were anticipated in this category. Historical records make specific references to the use of plant products to make jewelry and instruments. However, none of the informants in this survey were engaged in woodcarving, jewelry or instrument making.[438]

With reference to jewelry, the wearing of decorative bands "made from the native cotton, and dyed blue or red" was common in the mid-nineteenth century (Young 1842: 29). Both Miskito men and women wore these bands on the wrists, ankles and legs (Mueller 1932; Young 1842).

In 1993-1994, locally made jewelry and woodcarvings were sold in makeshift stands at the airport in Puerto Cabezas. The Garífuna, the Miskitos' southern

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[438] Other than carpentry work mentioned in Chapter 4: Construction.

neighbors, are known to produce crafts as a means of income supplementation.[439] However, only one informant in this study mentioned a jewelry item derived from a plant. Highly poisonous liliura seeds (*Abrus precatorius*) were once used by girls to make jewelry but "now, they don't think of it" (Orlando Budier/Haulover). "Modern" alternatives to plant-based jewelry include glass bead necklaces. The popularity of necklaces made from colored beads became widespread in the mid-nineteenth century.[440]

As for instruments, past accounts mention that the Miskito were adept drummers and also that some were skilled in playing a crude flute.[441] The English drum, introduced during the early years of contact between the British and Miskito denizens, was played with "much dexterity" (Roberts 1827: 136). The Miskito also played a bambú pipe "with [a] hole, [a] mouthpiece and four finger-holes...[that] produces a dull monotonous tone, with very little variation" (Roberts 1827: 136).

Most informants showed little interest in instruments and one stated that there were no instrument makers (Anelia Zacarías/Tuapí). Another informant clarified the situation when she said, they "use guitar for entertainment, no other instruments. Listen to radio" (Richaina Mybith/Lamlaya). Modern devices have supplanted the need for live music making.

Cosmetics

Certain cosmetic items were noticeably absent in this study, including perfumes, lotions, make-up and dental hygiene materials. According to the literature

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439 The Garífuna make crafts (including guitars and woodcarvings) using cedar, mahogany and other woods to supplement income (Coe and Anderson 1996).

440 Young (1842) mentioned that red, white and blue beads were particularly relished. Glass bead necklaces were also mentioned by Mueller (1932).

441 Recall in Chapter 7: Superstition that a healing ritual involved the use of flutes.

used to verify plant uses in this survey, a number of the documented plants have been used in perfumery. Albahaca (*Ocimum basilicum*), cedro real (*Cedrela odorata*), cosmos (*Cosmos bipinnatus*), delta (*Petiveria alliacea*), eucalipto (*Eucalyptus* sp.), hierba buena (*Mentha spicata*), various *Citrus* species, rosa (*Hibiscus rosa-sinensis*), sedge II (*Cyperus luzulae*), ti (*Cymbopogon citratus*) and toronja (*Citrus paradisi*) were mentioned by various authors for their aromatic qualities (Bremness 1994; Duke 1981; Johnston and Colquhoun 1996; Lewis and Elvin-Lewis 1977; Wiersema and Leon 1999). Yet only one plant was espoused for its aroma within this study *Polygala adenophora*. The roots of this plant emit an aromatic odor, but as these roots are components of superstitious spells, they were not considered for use as personal toilettes (Aristan Bons Zacarías/Puerto Cabezas-Bismona).[442] In fact, one informant specifically mentioned the need to purchase a store-bought perfume (Katrina Alfred Vegamin/Karatá).

Similarly, plants used as lotions and make-up were mentioned in the regional literature. Extracts from coco (*Cocos nucifera*), papaya (*Carica papaya*), manzanilla (*Matricaria recutita*) and ti can be used as facial creams and cosmetics (Bremness 1994; Duke 1981; Lewis and Elvin-Lewis 1977; Wiersema and Leon 1999). In an 1842 account from the Miskito Coast, the common use of aceite de ohom was believed to improve the complexion (Young 1842). Today, aceite de ohom (as mentioned above) is used as a hair conditioner but its potential use as a skin cream was not mentioned.

Accounts of make-up and face painting were mentioned with reference to the Miskito Indians around the turn of the nineteenth century; dyes made from vegetable extracts were used as make-up (Young 1842). Face painting, using daubs of red or black dyes or stripes of yellow and red, were especially popular among the girls

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[442] See Chapter 7: Superstition for details.

(Mueller 1932; Young 1842). Young (1842) mentioned the use of "howlaler" which is a phonetic derivation of the Miskito term for achiote, "aulala." Achiote (*Bixa orellana*) was documented in this study for its use as a food colorant (See Chapter 3: Edibles), and as a remedial cream (See Chapter 2: Medicine), but its use as a cosmetic was not mentioned. In fact, dyes, in general, were not mentioned and an informant stated that there were no plant-based dyes (Anelia Zacarías/Tuapí).[443] The only mention of body painting in this study was with bloodflower (*Asclepias curassavica*), which was used as nail polish. According to the literature, face painting was already a novelty in the early twentieth century.[444]

Another major area of interest with respect to personal hygiene was dental care. The effective use of chew sticks in dental hygiene has been documented in many cultures (including in the West Indies [Young 1842], the Jívaro of Peru [Lewis and Elvin-Lewis 1984], and in African and Asian cultures [Elvin-Lewis and Lewis 1975]). Young (1842) noted the absence of chew sticks as remarkable considering that the Miskitos' teeth were exceptionally white. During this study, the use of chew sticks was neither mentioned nor witnessed.[445] Toothbrushes and commercial toothpaste, however, were commonly used, with finger brushing being resorted to on occasion.

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[443] There is another reference to the use of plant dyes. Palpa kwarka is a tree from which fruits are obtained to make an impermanent stain that tints clothing purple. No species identification is given in this reference (Marx and Heath 1992).

[444] That face painting was subsiding early by the twentieth century is evidenced from a remark by Mueller (1932: 27) that "occasionally this [face painting] is even found today."

[445] The absence of chew sticks was not due to a lack of candidates plant. The leaves and twigs of the abundant mango could be used to clean the teeth and are considered good for the gums (Duke 1981).

Clothing

Accounts from the 1800s characterized Miskito garments as fashioned from tree bark. The bark cloth tree, as it was known locally, was a palm (*Castilla fallax*). Perhaps better known for its latex, from which rubber was obtained (Duke 1981), it was the source of the traditional Miskito cloth called tunu (Marx and Heath 1992).

The making of bark cloth by Miskito was documented in two accounts (Roberts 1827; Mueller 1932). The following description is an amalgamation of the two descriptions. Oblong strips of tree bark, approximately 1 by 2 1/2 feet, were soaked in water. The strips were then placed atop a smooth log and beaten with a club until they were the thickness of sack cloth and as smooth as chamois. By re-wetting and pounding the two edges together, individual pieces could be joined. The final piece of cloth measured approximately 6 by 7 feet and was either reddish-brown or white in color. Designs were usually drawn upon the white cloth. A hole was cut in the middle and it was slipped over the head creating a fairly durable garment.

These early accounts also noted the influx of non-native apparel. Traditional clothing was well described by Young (1842). He noted that women wore "tournou"[446] tied at the waist with a piece of Osnaburg[447] or printed material that hung to the knees. Breasts and legs were usually bare except during special occasions when a printed cloth was tied up over the breasts. Male attire in the mid-nineteenth century varied. Some men wore a tunu tied at the waist while others donned in addition a checked shirt and hat. Still others wore Osnaburg "frocks" with red caps.

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[446] This is most likely a reference to tunu.

[447] Osnaburg is a course, heavy cloth made of cotton and was brought by foreigners to trade with the Miskito. Young (1842: 126) lists Osnaburg in a table of suggested trade items.

Native dress was considered both indecent and uncivilized by foreign visitors to the Miskito Coast. This was characterized by Roberts (1827: 76) who stated, "Now...they are dressed with greater decency, many of them put on even a complete European suit."[448] Mueller (1932: 36) also asserted the inferiority of traditional Miskito clothing when he noted that on Sunday, men "now wear the garb of civilized man, consisting of trousers and a white shirt." He further described ladies' attire as consisting of a long colorful skirt with a white sash and a white scarf on their heads, shoes and stockings being rare.[449] Children under eight were described as rarely wearing any clothes, save a piece of tunu for the girls.[450]

In the early nineteenth century, traditional clothing was already being supplanted by imports. Materials and notions have long been traded with foreigners and so have been available to the Miskito probably since the sixteenth century.[451] The Miskito King also bore some responsibility in the promotion of English dress. Roberts (1827) noted that the King showed him with pride that his people no longer wore their customary clothing, adopting jackets and trousers instead. According to other sources, the Miskito kings were particularly interested in declaring themselves "civilized" and demonstrated this by wearing English garments and becoming Christians.[452]

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[448] This European dress was likely quite uncomfortable in the tropical climate!

[449] Shoes and stockings were still rare in 1994, even school-going children were often barefoot.

[450] Twanka is the Miskito term describing a piece of tunu cloth used to cover a female's nether regions (Marx and Heath 1992). As a side note, when a young informant in this study (Claudia Isabel "Candy" Tevas/Wawa) turned ten, she was no longer allowed to swim in her underwear but was required to wear shorts and a shirt.

[451] For more information about Miskito contact with foreigners, see Appendix 5.

[452] More information on the Miskito kings is found in Appendix 5.

Appendix 1: Nomenclature and Classification[1]

This appendix is arranged in two parts, A and B. Part A has two sections. The first section is a classification scheme of the plants found in this study. This classification is given because it is often useful to know this when comparing plant uses. The only names in this section are those cited in the main headings of the plant lists in each chapter. Information on known synonyms and tentative identifications are also noted here.

The second section of the Part A includes the names mentioned in the text of this paper. For instance, names that are mentioned in the supporting regional literature are located in this section. This information was kept separate to emphasize which plants were documented in this study versus the information encountered in the literature.

Part B is an alphabetical listing of all the plant names mentioned in this paper, including those in the footnotes to the first part. This includes the names of the plants found in both sections of Part A. It is intended to facilitate the reader in quickly identifying family names given the binomial.

Binomial nomenclature throughout this paper follows that in the U.S.D.A. Germplasm Information Network (GRIN – see <http://www.ars-grin.gov/npgs/tax/taxfam.html>) and that in the Missouri Botanical Garden database Tropicos3 (see <http://mobot.mobot.org/Pick/Search/pick.html>). The classification scheme is a modification of that presented by Reveal (see <http://www.inform.umd.edu/PBIO/fam/revfam.html>).

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[1] Unless otherwise stated, only the typical variant or subspecies is listed.

Part A. Phylogenetic arrangement of plants mentioned in text

1. Phylogenetic classification of the plants encountered in the field[2]

Lycopodiophyta D.H. Scott
  Lycopodiopsida Bartl.
    Lycopodiidae Bek.
      Lycopodiaceae P. Beauv. ex Mirb.
        Lycopodeilla cernua (L.) Pic. Serm.[3]
Pteridophyta Bessey
  Polypodiopsida Cronquist, Takht. & Zimmerm.
    Polypodiidae Cronquist, Takht. & Zimmerm.
      Polypodiaceae Bercht. & J. Presl
        Polypodium sp.[4]
Pinophyta Cronquist, Takht., Zimmerm. ex Reveal
  Pinopsida Burnett
    Pinidae Cronquist, Takht. & Zimmerm.
      Pinaceae Adans.
        Pinus caribaea Morelet var. *hondurensis* Barrett & Golfari
Magnoliophyta Cronquist, Takht. & Zimmerm. ex Reveal
  Magnoliopsida Brogn.
    Magnoliidae Novák ex Takht.
      Annonaceae Adans.
        Annona muricata L..
        Xylopia aromatica (Lam.) Eichler
      Lauraceae Durandé
        Cinnamonum verum[5]
        Persea americana Mill.
  Nymphaeidae J.W. Walker ex Takht.
      Nymphaeaceae Salisb.
        Nymphaea ampla (Salisb.) DC.
        Nymphaea odorata Aiton
  Piperopsida Bartl.
    Piperidae Reveal
      Piperaceae Batsch
        Piper jacquemontianum Kunth

[2] In addition to the following vascular plants, also encountered in this survey were two algae *Sargassum* (Sargassaceae) and *Turbinaria* (Cystoseiraceae), both brown algae (Phaeophyta) and two undetermined species of fungi with the local common names swim kiama and sukling waika.

[3] Including *Lycopodium cernuum* L.., a synonym.

[4] Identity uncertain; may be a species of *Microgramma*.

[5] Species identity tentative.

Liliopsida Batsch
Alismatidae Takht.
Alismataceae Vent.
Sagittaria lancifolia L.
Aridae Takht.
Araceae Adans.
Caladium bicolor (Aiton) Vent.
Colocasia esculenta (L.) Schott
Philodendron hederaceum (Jacq.) Schott[6]
Philodendron radiatum Schott
Syngonium angustatum Schott
Syngonium podophyllum Schott[7]
Xanthosoma violaceum Schott
Liliidae J.H. Schaffn.
Alliaceae Batsch
Allium sativum L.
Amaryllidaceae J. St.-Hil.
Crinum augustum Roxb.
Dioscoreaceae R. Br.
Dioscorea bulbifera L.
Dioscorea trifida L. f.
Smilacaceae Vent.
Smilax domingensis Willd.
Arecidae Takht.
Arecaceae Schultz Sch.
Acoelorraphe wrightii (Griseb. & H. Wendl.) H. Wendl. ex Becc.
Attalea cohune Mart.[8]
Bactris gasipaes Kunth
Cocos nucifera L.[9]
Elaeis oleifera (Kunth) Cortés
Commelinidae Takht.
Bromeliaceae Juss.
Ananas comosus (L.) Merr.
Bromelia karatas L.
Bromelia pinguin L.
Tillandsia streptophylla Scheidw. & C. Morren[10]
Commelinaceae Mirb.
Commelina diffusa Burm. f.
Tradescantia zebrina hort. ex Bosse[11]

[6] Including *Philodendron scandens* K. Koch & Sello, a synonym.

[7] Species identification is tentative.

[8] Including *Orbignya cohune* (Mart.) Dahlgren ex Standl., a synonym.

[9] There are numerous named varieties and cultivars of this species including several informal folk taxonomic groups. None is now accepted.

[10] Including *Vriesea streptophylla* (Scheidw. & C. Morren) E. Morren, a synonym.

Cyperaceae Juss.
Cyperus aggregatus (Willd.) Endl.
Cyperus luzulae (L.) Rottb. ex Retz.
Lagenocarpus guianensis Nees[12]
Rhynchospora brachychaeta C. Wright[13]
Rhynchospora cephalotes (L.) Vahl
Poaceae Caruel
Axonopus fissifolius (Raddi) Kuhlm.
Bambusa sp.
Cymbopogon citratus (DC. ex Nees) Stapf
Oryza sativa L.
Saccharum officinarum L.
Zea mays L.
Zingiberidae Cronquist
Cannaceae Durandé
Canna indica L.
Musaceae Durandé
Musa acuminata Colla
Musa x *paradisiaca* L.[14]
Zingiberaceae Adans.
Renealmia alpinia (Rottb.) Maas
Zingiber officinale Roscoe
Rosopsida Barsch
Caryophyllidae Takht.
Amaranthaceae Adans.
Alternanthera bettzickiana (Regel) Voss[15]
Amaranthus spinosus L.
Celosia argentea L. var. *cristata* (L.) Kuntze
Gomphrena globosa L.
Caryophyllaceae Durandé
Drymaria cordata (L.) Willd. ex Schult
Drymaria villosa Cham. & Schltdl.
Nyctaginaceae Juss.
Bougainvillea x *buttiana* Holttum & Standl.[16]
Petiveriaceae C. Agardh
Petiveria alliacea L.
Polygonaceae Durandé
Coccoloba uvifera (L.) L.

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[11] Including *Zebrina pendula* Schnitzl. and *Tradescantia pendula* (Schnitzl.) D. R. Hunt, both synonyms.

[12] Identity uncertain.

[13] Species identification is tentative.

[14] A hybrid involving *M. acuminata* x *M. balbisiana* Colla.

[15] Identity uncertain.

[16] A hybrid involving *B. glabra* Choisy x *B. peruviana* Bonpl.

Portulacaceae Adans.
Portulaca grandiflora Hook.
Portulaca oleracea L.
Portulaca pilosa L.
Dilleniidae Takht. ex Reveal & Takht
Bixaceae Kunth
Bixa orellana L.
Bombacaceae Kunth
Ceiba pentandra (L.) Gaertn.
Pachira aquatica Aubl.
Pachira quinata (Jacq.) W. S. Alverson[17]
Cochlospermaceae Planch.
Cochlospermum religiosum (L.) Alston
Capparaceae Adans.
Cleome serrata Jacq.
Caricaceae Dumort.
Carica papaya L.
Cecropiaceae C.C. Berg
Cecropia peltata L.
Clusiaceae Lindl.
Calophyllum brasiliense Cambess. var. *rekoi* (Standl.) Standl.
Cucurbitaceae Durandé
Citrullus lanatus (Thunb.) Matsum. & Nakai
Cucurbita moschata (Duchesne ex Lam.) Duchesne ex Poir.[18]
Lagenaria siceraria (Molina) Standl.[19]
Luffa quinquefida (Hook. & Arn.) Seem.
Momordica charantia L.
Dilleniaceae Salisb.
Curatella americana L.
Droseraceae Salisb.
Drosera capillaris Poir.
Euphorbiaceae J.F. Gmel.
Acalypha arvensis Poepp. & Endl.
Amanoa guianensis Aubl.
Chamaesyce thymifolia (L.) Millsp.
Codiaeum variegatum (L.) A. Juss.
Dalechampia scandens L.
Jatropha curcas L.
Jatropha integerrima Jacq.
Manihot esculenta Crantz[20]
Pedilanthus tithymaloides Poit.

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[17] Including *Bombacopsis quinata* (Jacq.) Dugand, a synonym.

[18] Species identification is tentative.

[19] Including *Lagenaria leucantha* (Duchesne ex Lam.) Rusby, a synonym.

[20] Including *Manihot dulcis* (J. F. Gmel.) Pax, a synonym; numerous cultivars and folk taxonomic groups are recognized but none is accepted here.

Pera arborea Mutis
Malvaceae Adans.
Gossypium barbadense L.
Hibiscus rosa-sinensis L.
Hibiscus sabdariffa L.
Pavonia schiedeana Steud.[21]
Peltaea ovata (C. Presl) Standl.
Sida acuta Burm. f.
Sida rhombifolia L.
Moraceae Link
Artocarpus altilis (Parkinson) Fosberg[22]
Maclura tinctoria (L.) D. Don ex Steud.[23]
Passifloraceae Roussel
Passiflora quadrangularis L.
Sapotaceae Durandé
Manilkara sp.
Pouteria sapota (Jacq.) H. E. Moore & Stearn[24]
Sterculiaceae Vent. ex Salisb.
Melochia villosa (Mill.) Fawc. & Rendle
Theobroma cacao L.
Rosidae Takht.
Anacardiaceae R. Br.
Anacardium occidentale L.
Mangifera indica L.
Spondias purpurea L.
Balsaminaceae Bercht. & J. Presl
Impatiens balsamina L.
Impatiens sp.
Burseraceae Kunth
Bursera simaruba (L.) Sarg.
Tetragastris panamensis (Engl.) Kuntze
Celastraceae R. Br.[25]
Hippocratea volubilis L.
Salacia impressifolia (Miers) A.C. Sm.
Chrysobalanaceae R. Br.
Chrysobalanus icaco L.
Chrysobalanus icaco var. *ellipticus* (Sol. ex Sabine) Hook. f.
Hirtella racemosa Lam. var. *hexandra* (Willd. ex Roem. & Schult.) Prance

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[21] Based on *Pavonia rosea* Schltdl. (1837), nom. illeg., non *P. rosea* Wallich ex Moris (1833).

[22] Including *Artocarpus communis* J. R. Forst. & G. Forst., a synonym.

[23] Including *Chlorophora tinctoria* (L.) Benth. & Hook. f., a synonym.

[24] Including *Achras mammosa* L., an illegitimate name, and *Calocarpum sapota* (Jacq.) Merr., a synonym.

[25] Including *Hippocrateaceae* Juss.

Licania platypus (Hemsl.) Fritsch
Combretaceae R. Br.
Conocarpus erectus L.
Laguncularia racemosa (L.) C. F. Gaertn.
Terminalia catappa L.
Crassulaceae J. St.-Hil.
Bryophyllum pinnatum (Lam.) Oken
Fabaceae Lindl.[26]
Abrus precatorius L.
Caesalpinia pulcherrima (L.) Sw.
Calopogonium mucunoides Desv.
Canavalia ensiformis (L.) DC.
Cassia grandis L. f.
Chamaecrista diphylla (L.) Greene[27]
Chamaecrista kunthiana (Schltdl. & Cham.) H.S. Irwin & Barneby
Crotalaria retusa L.
Delonix regia (Bojer ex Hook.) Raf.
Desmodium adscendens (Sw.) DC.
Desmodium incanum DC.
Desmodium incanum DC.[28]
Desmodium triflorum (L.) DC.
Dipteryx oleifera Benth.[29]
Hymenaea courbaril L.
Inga edulis Mart.
Inga thibaudiana DC.
Mimosa pudica L.
Phaseolus vulgaris L.[30]
Senna alata (L.) Roxb.[31]
Senna occidentalis (L.) Link
Senna undulata (Benth.) H. S. Irwin & Barneby
Senna sp.
Tamarindus indica L.
Fagaceae Dumort.
Quercus oleoides Schltdl. & Cham.
Lythraceae J. St.-Hil.
Cuphea carthagenensis (Jacq.) J. F. Macbr.
Lagerstroemia indica L.

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[26] Including *Caelsapinaceae* R. Br. and *Mimosaceae* R. Br.

[27] The species of *Chamaecrista* were once commonly considered to belong to the genus *Cassia*.

[28] Species identification is tentative.

[29] Species identification is tentative.

[30] Including cultivars of both the common and the black bean.

[31] The species of *Senna* were once commonly considered to belong to the genus *Cassia*.

Malpighiaceae Durandé
Byrsonima crassifolia (L.) Kunth
Melastomataceae Juss.
Acisanthera quadrata Pers.
Clidemia sericea D. Don
Henriettella seemannii Naudin
Miconia albicans (Sw.) Triana
Miconia ciliata (Rich.) DC.
Pachyanthus lundellianus (L.O. Williams) Judd & Skean[32]
Tibouchina aspera Aubl.
Meliaceae Juss.
Carapa guianensis Aubl.
Cedrela odorata L.
Swietenia macrophylla King
Myricaceae A. Rich. ex Kunth
Myrica cerifera L.
Myrtaceae Adans.
Eucalyptus sp.
Psidium cattleianum Sabine
Psidium cattleianum Sabine var. *littorale* (Raddi) Fosberg
Psidium guajava L.
Psidium guineense Sw.
Syzygium malaccense (L.) Merr. & L. M. Perry
Onagraceae Adans.
Ludwigia sedoides (Humb. & Bonpl.) H. Hara
Polygalaceae Hoffmanns. & Link
Polygala adenophora DC.
Rhizophoraceae Pers.
Rhizophora mangle L.
Rutaceae Durandé
Citrus aurantiifolia (Christm.) Swingle
Citrus aurantium L.
Citrus limon (L.) Burm. f.[33]
Citrus reticulata Blanco
Citrus paradisi Macfad.
Citrus sinensis (L.) Osbeck
Sapindaceae Juss.
Matayba apetala Radlk.
Melicoccus bijugatus Jacq.
Simaroubaceae DC.
Quassia amara L.
Vitaceae Durandé
Cissus erosa Rich.

[32] Including *Miconia lundelliana* L.O. Williams, the basionym.

[33] Probably all of the references to "limon" in Appendix 2 refer to this species; the species is composed of numerous cultivars.

Cornidae Frohne & U. Jensen ex Reveal
Apiaceae Lindl.
Eryngium foetidum L.
Pimpinella anisum L.
Lamiidae Takht. ex Reveal
Acanthaceae Durandé
Bravaisia sp. or *Tricanthera* sp.[34]
Apocynaceae Adans.
Catharanthus roseus (L.) G. Don
Thevetia peruviana (Pers.) K. Schum.
Asclepiadaceae Medik. ex Borkh.
Asclepias curassavica L.
Bignoniaceae Durandé
Crescentia alata Kunth or *C. cujete* L.[35]
Boraginaceae Adans.
Cordia curassavica (Jacq.) Roem. & Schult.
Convolvulaceae Durandé
Ipomoea batatas (L.) Lam.
Ipomoea carnea subsp. *fistulosa* (Mart. ex Choisy) D. F. Austin
Ipomoea setifera Poir.
Hydroleaceae Bercht. & J. Presl
Hydrolea spinosa L.
Lamiaceae Martynov
Clerodendrum thomsoniae Balf.
Hyptis capitata Jacq.
Hyptis conferta Pohl ex Benth. var. *angustata* (Briq.) A. Pool & Harley
Hyptis verticillata Jacq.
Leonurus japonicus Houtt.[36]
Mentha spicata L.[37]
Ocimum basilicum L.
Rosmarinus officinalis L.
Solenostemon scutellarioides (L.) Codd
Menyanthaceae Bercht. & J. Presl
Nymphoides indica (L.) Kuntze
Orobanchaceae Vent.
Agalinis albida Britton & Pennell
Rubiaceae Durandé
Alibertia edulis (Ric.) A. Rich. ex DC.
Coccocypselum hirsutum Bartl. ex DC.
Diodia ocymifolia (Willd. ex Roem. & Schult.) Bremek.[38]

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[34] Identity uncertain.

[35] Species identification is uncertain.

[36] Identity uncertain.

[37] Species identification is tentative.

[38] Including *Hemidiodia ocymifolia* (Willd. ex Roem. & Schult.) K. Schum., a synonym.

Gardenia jasminoides J. Ellis[39]
Hemidiodia ocymifolia (Willd. ex Roem. & Schult.) K. Schum.
Ixora coccinea L.
Psychotria tomentosa (Aubl.) Müll. Arg.
Scrophulariaceae Juss.[40]
Lindernia crustacea (L.) F. Muell.
Lindernia diffusa (L.) Wettst.
Solanaceae Adans.
Capsicum annuum L.
Capsicum frutescens L.
Lycopersicon esculentum Mill.
Nicotiana tabacum L.
Physalis angulata L.
Physalis pubescens L
Verbenaceae Adans.
Lippia alba (Mill.) N. E. Br. ex Britton & P. Wilson
Stachytarpheta cayennensis (Rich.) Vahl
Vernonicaceae Durandé
Mecardonia procumbens (Mill.) Small
Scoparia dulcis L.
Asteridae Takht.
Asteraceae Martynov
Chromolaena odorata (L.) R. M. King & H. Rob.[41]
Cosmos bipinnatus Cav.
Elephantopus mollis Kunth
Eupatorium capillifolium (Lam.) Small
Matricaria recutita L.
Mikania scandens (L.) Willd.
Pseudelephantopus spicatus (Juss. ex Aubl.) C. F. Baker
Sphagneticola trilobata (L.) Pruski[42]
Synedrella nodiflora (L.) Gaertn.
Tagetes erecta L.
Zinnia violacea Cav.

[39] Including the illegitimate name *Gardenia augusta* Merr.

[40] The placement of *Lindernia* within the Lamiales is uncertain; the genus is retained in its traditional home, Scrophulariaceae, although this is most certainly incorrect.

[41] Species of *Chromolaena* were traditionally placed in *Eupatorium*.

[42] Including *Complaya trilobata* (L.) Strother, *Thelechitonia trilobata* (L.) H. Rob. & Cuatrec. and *Wedelia trilobata* (L.) Hitchc., all synonyms; the basionym is *Silphium trilobatum* L.

2. Alphabetical listing of other plant names mentioned in the text

Acacia L. (Fabaceae)
Acalypha alopecuroides Jacq. (Euphorbiaceae)
Acalypha sp. L. (Euphorbiaceae)
Achillea L. (Asteraceae)
Aechmea magdalenae (Andre) Andre ex Baker (Bromeliaceae)
Aleurites moluccana (L.) Willd. (Euphorbiaceae)
Alisma L. (Alismataceae)
Apocynum androsaemifolium L. (Apocynaceae)
Artocarpus cummingianus Trécul (Moraceae)
Bambusa bambos (L.) Voss[43] (Poaceae)
Bombax L. (Bombacaceae)
Bougainvillea spectabilis Willd. (Nyctaginaceae)
Caesalpinia L. (Fabaceae)
Capsicum sp. L. (Solanaceae)
Cassia fistula L. (Fabaceae)
Castilla fallax O.F. Cook (Moraceae)
Chamaesyce hirta (L.) Millsp. (Euphorbiaceae)
Chenopodium ambrosioides L. (Chenopodiaceae)
Chromolaena laevigata (Lam.) R.M. King & H. Rob.[44] (Asteraceae)
Chrysobalanus ellipticus Sol. ex Sabine (Chrysobalanaceae)
Cinchona L. (Rubiaceae)
Cinnamomum sp. Schaeff. (Lauraceae)
Cinnamomum verum J. Presl[45] (Lauraceae)
Cissus verticillata (L.) Nicolson & C. E. Jarvis[46] (Vitaceae)
Cleome spinosa Jacq. (Capparaceae)
Clerodendrum sp. L. (Lamiaceae)
Cochlospermum vitifolium (Willd.) Spreng. (Cochlospermaceae)
Coffea arabica L. (Rubiaceae)
Commelina elegans Kunth (Commelinaceae)
Costus villosissimus Jacq. (Zingiberidae Cronquist; Costaceae Nakai)
Cucurbita foetidissima Kunth (Cucurbitaceae)
Cuphea calophylla Cham. & Schltdl. (Lythraceae)
Cuphea glutinosa Cham. & Schltdl. (Lythraceae)
Cuphea utriculosa Koehne (Lythraceae)
Curcuma longa L. (Zingiberaceae)
Cyperus cyperoides (L.) Kuntze (Cyperaceae)
Cyperus rotundus L. (Cyperaceae)
Dacryodes sp. Vahl (Burseraceae)
Desmodium nudiflorum (L.) DC. (Fabaceae)
Desmodium sp. Desv. (Fabaceae)

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[43] Including *Bambusa arundinacea* (Retz.) Willd., a synonym.

[44] Including *Eupatorium laevigatum* Lam., the basionym.

[45] Including *Cinnamomum zeylanicum* Blume, a synonym.

[46] Including *Cissus sicyoides* L., a synonym.

Dipteryx odorata (Aubl.) Willd. (Fabaceae)
Drosera rotundifolia L. (Droseraceae)
Elaeis guineensis Jacq. (Arecaceae)
Eleusine indica (L.) Gaertn. (Poaceae)
Eupatorium perfoliatum L. (Asteraceae)
Eupatorium sp. L. (Asteraceae)
Euphorbia neriifolia L. (Euphorbiaceae)
Eupatorium odoratum L. (Asteraceae)
Ficus L. (Moraceae)
Gossypium hirsutum L. (Malvaceae)
Guaiacum officinale L. (Zygophyllaceae)
Hibiscus rostellatus Guill. & Perr. (Malvaceae)
Hibiscus sp. L. (Malvaceae)
Lagenaria vulgaris Ser. (Cucurbitaceae)
Leonurus cardiaca L. (Lamiaceae)
Lippia pringlei Briq. (Verbenaceae)
Ludwigia octovalvis L. (Onagraceae)
Luffa acutangula (L.) Roxb. (Cucurbitaceae)
Luffa aegyptiaca Mill.[47] (Cucurbitaceae)
Manilkara bidentata (A. DC.) A. Chev. (Sapotaceae)
Manilkara zapota (L.) P. Royen[48] (Sapotaceae)
Melochia pyramidata L. (Sterculiaceae)
Mentha x *piperita* L. (Lamiaceae)[49]
Miconia sp. Ruiz & Pav. (Melastomataceae)
Miconia theaezans Cogn. (Melastomataceae)
Microgramma lycopodiodes (L.) Copel.[50] (Polypodiidae: Polypodiaceae)
Mikania guaco Bonpl. (Asteraceae)
Mikania micrantha Kunth (Asteraceae)
Mimosa palmeri Rose (Fabaceae)
Mimosa pigra L. (Fabaceae)
Musa sapientum L. (Musaceae)
Neurolaena lobata (L.) R. Br. (Asteraceae)
Ocimum campechianum Mill.[51] (Lamiaceae)
Oleandra Cav. (Polypodiidae: Oleandraceae Ching ex Pic. Serm.)
Pavonia fruticosa (Mill.) Fawc. & Rendle (Malvaceae)
Pavonia spinifex (L.) Cav. (Malvaceae)
Philodendron popenoei Standl. & Steyerm. (Araceae)
Phyla scaberrima (Juss. ex Pers.) Moldenke[52] (Verbenaceae)
Physalis sp. L. (Solanaceae)

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[47] Including *Luffa cylindrica* M. Roem., a synonym.

[48] Including *Manilkara achras* (Mill.) Fosberg, a synonym.

[49] A hybrid between *Mentha aquatica* L. x *M. spicata* L.

[50] Including *Polypodium lycopodiodes* L., the basionym.

[51] Including *Ocimum micranthum* Willd., a synonym.

[52] Including *Lippia dulcis* Trevir., a synonym.

Pinus oocarpa Schiede ex Schltdl. (Pinaceae)
Pinus palustris Mill. (Pinaceae)
Piper auritum Kunth (Piperaceae)
Piper darienense C. DC. (Piperaceae)
Piper methysticum G. Forst. (Piperaceae)
Piper peltatum L. (Piperaceae)
Pityrogramma sp. Link (Polypodiidae: Adiantaceae Newman)
Polypodium asplenifolium L. (Pteridophyta)
Polypodium polypodioides (L.) Watt (Pteridophyta)
Prosopis L. (Fabaceae)
Psychotria acuminata Benth. (Rubiaceae)
Psychotria cooperi Standl. (Rubiaceae)
Psychotria tenuifolia Sw. (Rubiaceae)
Quassia cedron Baill. (Simaroubaceae)
Quercus sp. L. (Fagaceae)
Renealmia aromatica (Aubl.) Griseb. ex K. Schum. (Zingiberaceae)
Ricinus communis L. (Euphorbiaceae)
Sempervivum L. (Crassulaceae)
Senna marilandica (L.) Link[53] (Fabaceae)
Senna reticulata (Willd.) H. S. Irwin & Barneby[54] (Fabaceae)
Senna septentrionalis (Viv.) H. S. Irwin & Barneby[55] (Fabaceae)
Senna tora (L.) Roxb.[56] (Fabaceae)
Sida cordifolia L. (Malvaceae)
Spondias mombin L. (Anacardiaceae)
Stachytarpheta frantzii Polak. (Verbenaceae)
Stachytarpheta jamaicensis (L.) Vahl (Verbenaceae)
Swietenia mahagoni (L.) Jacq. (Meliaceae)
Syzygium aromaticum (L.) Merr. & L. M. Perry (Myrtaceae)
Syzygium cumini (L.) Skeels (Myrtaceae)
Tagetes minuta L. (Asteraceae)
Tagetes tenuifolia Cav. (Asteraceae)
Tillandsia usneoides (L.) L. (Bromeliaceae)
Verbena hastata L. (Verbenaceae)
Wedelia trilobata (L.) Hitchc. (Asteraceae)
Xanthosoma brasiliense (Desf.) Engl. (Araceae)
Xanthosoma mexicanum Liebm. (Araceae)
Xanthosoma sagittifolium (L.) Schott & Endl. (Araceae)
Xanthosoma sp. Schott (Araceae)
Xylopia frutescens Aubl. (Annonaceae)
Zinnia sp. L. (Asteraceae)

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[53] Including *Cassia marilandica* L., the basionym.

[54] Including *Cassia reticulata* Willd., the basionym.

[55] Including *Cassia laevigata* Willd., a synonym.

[56] Including *Cassia tora* L., the basionym.

Part B. Alphabetical arrangement of plant names[57]

Abrus precatorius L. (Fabaceae)
Acacia L. (Fabaceae)
Acalypha alopecuroides Jacq. (Euphorbiaceae)
Acalypha arvensis Poepp. & Endl. (Euphorbiaceae)
Acalypha sp. L. (Euphorbiaceae)
Achillea L. (Asteraceae)
Achras mammosa L. (Sapotaceae)
Acisanthera quadrata Pers. (Melastomataceae)
Aechmea magdalenae (Andre) Andre ex Baker (Bromeliaceae)
Anacardium occidentale L. (Anacardiaceae)
Acoelorraphe wrightii (Griseb. & H. Wendl.) H. Wendl. ex Becc. (Arecaceae)
Agalinis albida Britton & Pennell (Orobanchaceae)
Aleurites moluccana (L.) Willd. (Euphorbiaceae)
Alibertia edulis (Ric.) A. Rich. ex DC. (Rubiaceae)
Alisma L. (Alismataceae)
Allium sativum L. (Alliaceae)
Alternanthera bettzickiana (Regel) Voss (Amaranthaceae)
Amanoa guianensis Aubl. (Euphorbiaceae)
Amaranthus spinosus L. (Amaranthaceae)
Ananas comosus (L.) Merr. (Bromeliaceae)
Annona muricata L. (Annonaceae)
Apocynum androsaemifolium L. (Apocynaceae)
Artocarpus altilis (Parkinson) Fosberg (Moraceae)
Artocarpus communis J. R. Forst. & G. Forst. (Moraceae)
Artocarpus cummingianus Trécul (Moraceae)
Asclepias curassavica L. (Asclepiadaceae)
Attalea cohune Mart. (Arecaceae)
Axonopus fissifolius (Raddi) Kuhlm. (Poaceae)
Bactris gasipaes Kunth (Arecaceae)
Bambusa arundinacea (Retz.) Willd. (Poaceae)
Bambusa bambos (L.) Voss (Poaceae)
Bambusa sp. Schreb. (Poaceae)
Bixa orellana L. (Bixaceae)
Bombacopsis quinata (Jacq.) Dugand (Bombacaceae)
Bombax L. (Bombacaceae)
Bougainvillea x *buttiana* Holttum & Standl. (Nyctaginaceae)
Bougainvillea glabra Choisy (Nyctaginaceae)
Bougainvillea peruviana Bonpl. (Nyctangiaceae)
Bougainvillea spectabilis Willd. (Nyctaginaceae)
Bravaisia sp. (Acanthaceae)
Bromelia karatas L. (Bromeliaceae)
Bromelia pinguin L. (Bromeliaceae)
Bryophyllum pinnatum (Lam.) Oken (Crassulaceae)
Byrsonima crassifolia (L.) Kunth (Malpighiaceae)
Bursera simaruba (L.) Sarg. (Burseraceae)
Caesalpinia L. (Fabaceae)

[57] Including the names mentioned in the footnotes of this appendix.

Caesalpinia pulcherrima (L.) Sw. (Fabaceae)
Caladium bicolor (Aiton) Vent. (Araceae)
Calocarpum sapota (Jacq.) Merr. (Sapotaceae)
Calopogonium mucunoides Desv. (Fabaceae)
Calophyllum brasiliense Cambess. var. *rekoi* (Standl.) Standl. (Clusiaceae)
Canavalia ensiformis (L.) DC. (Fabaceae)
Canna indica L. (Cannaceae)
Capsicum annuum L. (Solanaceae)
Capsicum frutescens L. (Solanaceae)
Capsicum sp. L. (Solanaceae)
Carapa guianensis Aubl. (Meliaceae)
Carica papaya L. (Caricaceae)
Cassia fistula L. (Fabaceae)
Cassia grandis L. f. (Fabaceae)
Cassia laevigata Willd. (Fabaceae)
Cassia marilandica L. (Fabaceae)
Cassia reticulata Willd. (Fabaceae)
Cassia tora L. (Fabaceae)
Castilla fallax O.F. Cook (Moraceae)
Catharanthus roseus (L.) G. Don (Apocynaceae)
Cecropia peltata L. (Cecropiaceae)
Cedrela odorata L. (Meliaceae)
Ceiba pentandra (L.) Gaertn. (Bombacaceae)
Celosia argentea L. var. *cristata* (L.) Kuntze (Amaranthaceae)
Chamaecrista diphylla (L.) Greene (Fabaceae)
Chamaecrista kunthiana (Schltdl. & Cham.) H.S. Irwin & Barneby (Fabaceae)
Chamaesyce hirta (L.) Millsp. (Euphorbiaceae)
Chamaesyce thymifolia (L.) Millsp. (Euphorbiaceae)
Chenopodium ambrosioides L. (Chenopodiaceae)
Chlorophora tinctoria (L.) Benth. & Hook. f.
Chromolaena laevigata (Lam.) R.M. King & H. Rob. (Asteraceae)
Chromolaena odorata (L.) R. M. King & H. Rob. (Asteraceae)
Chrysobalanus ellipticus Sol. ex Sabine (Chrysobalanaceae)
Chrysobalanus icaco L. (Chrysobalanaceae)
Chrysobalanus icaco var. *ellipticus* (Sol. ex Sabine) Hook. f. (Chrysobalanaceae)
Cinchona L. (Rubiaceae)
Cinnamomum sp. Schaeff. (Lauraceae)
Cinnamomum verum J. Presl (Lauraceae)
Cinnamomum zeylanicum Blume (Lauraceae)
Cissus erosa Rich. (Vitaceae)
Cissus sicyoides L. (Vitaceae)
Cissus verticillata (L.) Nicolson & C. E. Jarvis (Vitaceae)
Citrullus lanatus (Thunb.) Matsum. & Nakai (Cucurbitaceae)
Citrus aurantiifolia (Christm.) Swingle (Rutaceae)
Citrus aurantium L. (Rutaceae)
Citrus limon (L.) Burm. f. (Rutaceae)
Citrus reticulata Blanco (Rutaceae)
Citrus paradisi Macfad. (Rutaceae)
Citrus sinensis (L.) Osbeck (Rutaceae)
Cleome serrata Jacq. (Capparaceae)
Cleome spinosa Jacq. (Capparaceae)

Clerodendrum sp. L. (Lamiaceae)
Clerodendrum thomsoniae Balf. (Lamiaceae)
Clidemia sericea D. Don (Melastomataceae)
Cochlospermum religiosum (L.) Alston (Cochlospermaceae)
Cochlospermum vitifolium (Willd.) Spreng. (Cochlospermaceae)
Coccocypselum hirsutum Bartl. ex DC. (Rubiaceae)
Coccoloba uvifera (L.) L. (Polygonaceae)
Cocos nucifera L. (Arecaceae)
Codiaeum variegatum (L.) A. Juss. (Euphorbiaceae)
Coffea arabica L. (Rubiaceae)
Colocasia esculenta (L.) Schott (Araceae)
Commelina diffusa Burm. f. (Commelinaceae)
Commelina elegans Kunth (Commelinaceae)
Complaya trilobata (L.) Strother (Asteraceae)
Conocarpus erectus L. (Combretaceae)
Cordia curassavica (Jacq.) Roem. & Schult. (Boraginaceae)
Cosmos bipinnatus Cav. (Asteraceae)
Costus villosissimus Jacq. (Costaceae)
Crescentia alata Kunth (Bignoniaceae)
Crescentia cujete L. (Bignoniaceae)
Crinum augustum Roxb. (Amaryllidaceae)
Crotalaria retusa L. (Fabaceae)
Cucurbita foetidissima Kunth (Cucurbitaceae)
Cucurbita moschata (Duchesne ex Lam.) Duchesne ex Poir. (Cucurbitaceae)
Cuphea calophylla Cham. & Schltdl. (Lythraceae)
Cuphea carthagenensis (Jacq.) J. F. Macbr. (Lythraceae)
Cuphea glutinosa Cham. & Schltdl. (Lythraceae)
Cuphea utriculosa Koehne (Lythraceae)
Curatella americana L. (Dilleniaceae)
Curcuma longa L. (Zingiberaceae)
Cymbopogon citratus (DC. ex Nees) Stapf (Poaceae)
Cyperus aggregatus (Willd.) Endl. (Cyperaceae)
Cyperus cyperoides (L.) Kuntze (Cyperaceae)
Cyperus luzulae (L.) Rottb. ex Retz. (Cyperaceae)
Cyperus rotundus L. (Cyperaceae)
Dacryodes Vahl (Burseraceae)
Dalechampia scandens L. (Euphorbiaceae)
Delonix regia (Bojer ex Hook.) Raf. (Fabaceae)
Desmodium adscendens (Sw.) DC. (Fabaceae)
Desmodium incanum DC. (Fabaceae)
Desmodium nudiflorum (L.) DC. (Fabaceae)
Desmodium sp. Desv. (Fabaceae)
Desmodium triflorum (L.) DC. (Fabaceae)
Diodia ocymifolia (Willd. ex Roem. & Schult.) Bremek. (Rubiaceae)
Dioscorea bulbifera L. (Dioscoreaceae)
Dioscorea trifida L. f. (Dioscoreaceae)
Dipteryx odorata (Aubl.) Willd. (Fabaceae)
Dipteryx oleifera Benth. (Fabaceae)
Drosera capillaris Poir. (Droseraceae)
Drosera rotundifolia L. (Droseraceae)
Drymaria cordata (L.) Willd. ex Schult (Caryophyllaceae)

Drymaria villosa Cham. & Schltdl. (Caryophyllaceae)
Elaeis guineensis Jacq. (Arecaceae)
Elaeis oleifera (Kunth) Cortés (Arecaceae)
Elephantopus mollis Kunth (Asteraceae)
Eleusine indica (L.) Gaertn. (Poaceae)
Eryngium foetidum L. (Apiaceae)
Eucalyptus sp. (Myrtaceae)
Eupatorium capillifolium (Lam.) Small (Asteraceae)
Eupatorium laevigatum Lam. (Asteraceae)
Eupatorium odoratum L. (Asteraceae)
Eupatorium perfoliatum L. (Asteraceae)
Eupatorium sp. L. (Asteraceae)
Euphorbia neriifolia L. (Euphorbiaceae)
Ficus L. (Moraceae)
Gardenia augusta Merr. (Rubiaceae)
Gardenia jasminoides J. Ellis (Rubiaceae)
Gomphrena globosa L. (Amaranthaceae)
Gossypium barbadense L. (Malvaceae)
Gossypium hirsutum L. (Malvaceae)
Guaiacum officinale L. (Zygophyllaceae)
Hemidiodia ocymifolia (Willd. ex Roem. & Schult.) K. Schum. (Rubiaceae)
Henriettella seemannii Naudin (Melastomataceae)
Hibiscus rosa-sinensis L. (Malvaceae)
Hibiscus rostellatus Guill. & Perr. (Malvaceae)
Hibiscus sabdariffa L. (Malvaceae)
Hibiscus sp. L. (Malvaceae)
Hippocratea volubilis L. (Celastraceae)
Hirtella racemosa Lam. var. *hexandra* (Willd. ex Roem. & Schult.) Prance (Chrysobalanaceae)
Hymenaea courbaril L. (Fabaceae)
Hydrolea spinosa L. (Hydroleaceae)
Hyptis capitata Jacq. (Lamiaceae)
Hyptis conferta Pohl ex Benth. var. *angustata* (Briq.) A. Pool & Harley (Lamiaceae)
Hyptis verticillata Jacq. (Lamiaceae)
Impatiens balsamina L. (Balsaminaceae)
Impatiens sp. L. (Balsaminaceae)
Inga edulis Mart. (Fabaceae)
Inga thibaudiana DC. (Fabaceae)
Ipomoea batatas (L.) Lam. (Convolvulaceae)
Ipomoea carnea subsp. *fistulosa* (Mart. ex Choisy) D. F. Austin (Convolvulaceae)
Ipomoea setifera Poir. (Convolvulaceae)
Ixora coccinea L. (Rubiaceae)
Jatropha curcas L. (Euphorbiaceae)
Jatropha integerrima Jacq. (Euphorbiaceae)
Lagenaria leucantha (Duchesne ex Lam.) Rusby
Lagenaria siceraria (Molina) Standl. (Cucurbitaceae)
Lagenaria vulgaris Ser. (Cucurbitaceae)
Lagenocarpus guianensis Nees (Cyperaceae)
Lagerstroemia indica L. (Lythraceae)
Laguncularia racemosa (L.) C. F. Gaertn. (Combretaceae)
Leonurus cardiaca L. (Lamiaceae)

Leonurus japonicus Houtt. (Lamiaceae)
Licania platypus (Hemsl.) Fritsch (Chrysobalanaceae)
Lindernia crustacea (L.) F. Muell. (Scrophulariaceae)
Lindernia diffusa (L.) Wettst. (Scrophulariaceae)
Lippia alba (Mill.) N. E. Br. ex Britton & P. Wilson (Verbenaceae)
Lippia dulcis Trevir. (Verbenaceae)
Lippia pringlei Briq. (Verbenaceae)
Ludwigia octovalvis L. (Onagraceae)
Ludwigia sedoides (Humb. & Bonpl.) H. Hara (Onagraceae)
Luffa acutangula (L.) Roxb. (Cucurbitaceae)
Luffa aegyptiaca Mill. (Cucurbitaceae)
Luffa cylindrica M. Roem. (Cucurbitaceae)
Luffa quinquefida (Hook. & Arn.) Seem. (Cucurbitaceae)
Lycopersicon esculentum Mill. (Solanaceae)
Lycopodiella cernua (L.) Pic. Serm. (Lycopodiaceae)
Lycopodium cernuum L. (Lycopodiaceae)
Mangifera indica L. (Anacardiaceae)
Manihot dulcis (J. F. Gmel.) Pax (Euphorbiaceae)
Manihot esculenta Crantz (Euphorbiaceae)
Manilkara achras (Mill.) Fosberg (Sapotaceae)
Manilkara bidentata (A. DC.) A. Chev. (Sapotaceae)
Manilkara sp. (Sapotaceae)
Manilkara zapota (L.) P. Royen (Sapotaceae)
Matayba apetala Radlk. (Sapindaceae)
Matricaria recutita L. (Asteraceae)
Mecardonia procumbens (Mill.) Small (Vernonicaceae)
Melicoccus bijugatus Jacq. (Sapindaceae)
Melochia pyramidata L. (Sterculiaceae)
Melochia villosa (Mill.) Fawc. & Rendle (Sterculiaceae)
Mentha aquatica L. (Lamiaceae)
Mentha balbisiana Colla (Lamiaceae)
Mentha x *piperita* L. (Lamiaceae)
Mentha spicata L. (Lamiaceae)
Miconia albicans (Sw.) Triana (Melastomataceae)
Miconia ciliata (Rich.) DC. (Melastomataceae)
Miconia lundelliana L.O. Williams (Melastomataceae)
Miconia sp. Ruiz & Pav. (Melastomataceae)
Miconia theaezans Cogn. (Melastomataceae)
Microgramma lycopodiodes (L.) Copel. (Polypodiaceae)
Mikania guaco Bonpl. (Asteraceae)
Mikania micrantha Kunth (Asteraceae)
Mikania scandens (L.) Willd. (Asteraceae)
Mimosa palmeri Rose (Fabaceae)
Mimosa pigra L. (Fabaceae)
Mimosa pudica L. (Fabaceae)
Momordica charantia L. (Cucurbitaceae)
Musa acuminata Colla (Musaceae)
Musa x *paradisiaca* L. (Musaceae)
Musa sapientum L. (Musaceae)
Myrica cerifera L. (Myricaceae)
Neurolaena lobata (L.) R. Br. (Asteraceae)

Nicotiana tabacum L. (Solanaceae)
Nymphaea ampla (Salisb.) DC. (Nymphaeaceae)
Nymphaea odorata Aiton (Nymphaeaceae)
Nymphoides indica (L.) Kuntze (Menyanthaceae)
Ocimum basilicum L. (Lamiaceae)
Ocimum campechianum Mill. (Lamiaceae)
Ocimum micranthum Willd. (Lamiaceae)
Oleandra Cav. (Polypodiidae; Oleandraceae)
Orbignya cohune (Mart.) Dahlgren ex Standl. (Aracaceae)
Oryza sativa L. (Poaceae)
Pachira aquatica Aubl. (Bombacaceae)
Pachira quinata (Jacq.) W. S. Alverson (Bombacaceae)
Pachyanthus lundellianus (L.O. Williams) Judd & Skean (Melastomataceae)
Passiflora quadrangularis L. (Passifloraceae)
Pavonia fruticosa (Mill.) Fawc. & Rendle (Malvaceae)
Pavonia rosea Schltdl. (Malvaceae)
Pavonia rosea Wallich ex Moris (Malvaceae)
Pavonia schiedeana Steud. (Malvaceae)
Pavonia spinifex (L.) Cav. (Malvaceae)
Pedilanthus tithymaloides Poit. (Euphorbiaceae)
Peltaea ovata (C. Presl) Standl. (Malvaceae)
Pera arborea Mutis (Euphorbiaceae)
Persea americana Mill. (Lauraceae)
Petiveria alliacea L. (Petiveriaceae)
Phaseolus vulgaris L. (Fabaceae)
Philodendron hederaceum (Jacq.) Schott (Araceae)
Philodendron popenoei Standl. & Steyerm. (Araceae)
Philodendron radiatum Schott (Araceae)
Philodendron scandens K. Koch & Sello (Araceae)
Phyla scaberrima (Juss. ex Pers.) Moldenke (Verbenaceae)
Physalis angulata L. (Solanaceae)
Physalis pubescens L (Solanaceae)
Physalis sp. L. (Solanaceae)
Pimpinella anisum L. (Apiaceae)
Pinus caribaea Morelet var. *hondurensis* Barrett & Golfari (Pinaceae)
Pinus oocarpa Schiede ex Schltdl. (Pinaceae)
Pinus palustris Mill. (Pinaceae)
Piper auritum Kunth (Piperaceae)
Piper darienense C. DC. (Piperaceae)
Piper jacquemontianum Kunth (Piperaceae)
Piper methysticum G. Forst. (Piperaceae)
Piper peltatum L. (Piperaceae)
Pityrogramma Link (Adiantaceae)
Polygala adenophora DC. (Polygalaceae)
Polypodium lycopodiodes L. (Polypodiaceae)
Polypodium asplenifolium L. (Pteridophyta)
Polypodium polypodioides (L.) Watt (Pteridophyta)
Polypodium sp. (Polypodiaceae)
Portulaca grandiflora Hook. (Portulacaceae)
Portulaca oleracea L. (Portulacaceae)
Portulaca pilosa L. (Portulacaceae)

Pouteria sapota (Jacq.) H. E. Moore & Stearn (Sapotaceae)
Prosopis L. (Fabaceae)
Pseudelephantopus spicatus (Juss. ex Aubl.) C. F. Baker (Asteraceae)
Psidium cattleianum Sabine (Myrtaceae)
Psidium cattleianum Sabine var. *littorale* (Raddi) Fosberg (Myrtaceae)
Psidium guajava L. (Myrtaceae)
Psidium guineense Sw. (Myrtaceae)
Psychotria acuminata Benth. (Rubiaceae)
Psychotria cooperi Standl. (Rubiaceae)
Psychotria tenuifolia Sw. (Rubiaceae)
Psychotria tomentosa (Aubl.) Müll. Arg. (Rubiaceae)
Quassia amara L. (Simaroubaceae)
Quassia cedron Baill. (Simaroubaceae)
Quercus oleoides Schltdl. & Cham. (Fagaceae)
Quercus sp. L. (Fagaceae)
Renealmia alpinia (Rottb.) Maas (Zingiberaceae)
Renealmia aromatica (Aubl.) Griseb. ex K. Schum. (Zingiberaceae)
Rhizophora mangle L. (Rhizophoraceae)
Rhynchospora brachychaeta C. Wright (Cyperaceae)
Rhynchospora cephalotes (L.) Vahl (Cyperaceae)
Ricinus communis L. (Euphorbiaceae)
Rosmarinus officinalis L. (Lamiaceae)
Sagittaria lancifolia L. (Alismataceae)
Saccharum officinarum L. (Poaceae)
Salacia impressifolia (Miers) A.C. Sm. (Celastraceae)
Scoparia dulcis L. (Vernonicaceae)
Sempervivum L. (Crassulaceae)
Senna alata (L.) Roxb. (Fabaceae)
Senna bicapsularis (L.) Roxb. (Fabaceae)
Senna marilandica (L.) Link (Fabaceae)
Senna occidentalis (L.) Link (Fabaceae)
Senna reticulata (Willd.) H. S. Irwin & Barneby (Fabaceae)
Senna septentrionalis (Viv.) H. S. Irwin & Barneby (Fabaceae)
Senna tora (L.) Roxb. (Fabaceae)
Senna undulata (Benth.) H. S. Irwin & Barneby (Fabaceae)
Sida acuta Burm. f. (Malvaceae)
Sida cordifolia L. (Malvaceae)
Sida rhombifolia L. (Malvaceae)
Silphium trilobatum L. (Asteraceae)
Solenostemon scutellarioides (L.) Codd (Lamiaceae)
Smilax domingensis Willd. (Smilacaceae)
Sphagneticola trilobata (L.) Pruski (Asteraceae)
Spondias mombin L. (Anacardiaceae)
Spondias purpurea L. (Anacardiaceae)
Stachytarpheta cayennensis (Rich.) Vahl (Verbenaceae)
Stachytarpheta frantzii Polak. (Verbenaceae)
Stachytarpheta jamaicensis (L.) Vahl (Verbenaceae)
Swietenia macrophylla King (Meliaceae)
Swietenia mahagoni (L.) Jacq. (Meliaceae)
Synedrella nodiflora (L.) Gaertn. (Asteraceae)
Syngonium angustatum Schott (Araceae)

Syngonium podophyllum Schott (Araceae)
Syzygium aromaticum (L.) Merr. & L. M. Perry (Myrtaceae)
Syzygium cumini (L.) Skeels (Myrtaceae)
Syzygium malaccense (L.) Merr. & L. M. Perry (Myrtaceae)
Tagetes erecta L. (Asteraceae)
Tagetes minuta L. (Asteraceae)
Tagetes tenuifolia Cav. (Asteraceae)
Tamarindus indica L. (Fabaceae)
Terminalia catappa L. (Combretaceae)
Tetragastris panamensis (Engl.) Kuntze (Burseraceae)
Thelechitonia trilobata (L.) H. Rob. & Cuatrec. (Asteraceae)
Theobroma cacao L. (Sterculiaceae)
Thevetia peruviana (Pers.) K. Schum. (Apocynaceae)
Tibouchina aspera Aubl. (Melastomataceae)
Tillandsia streptophylla Scheidw. & C. Morren
Tillandsia usneoides (L.) L. (Bromeliaceae)
Tradescantia pendula (Schnitzl.) D. R. Hunt (Commelinaceae)
Tradescantia zebrina hort. ex Bosse (Commelinaceae)
Tricanthera sp. (Acanthaceae)
Verbena hastata L. (Verbenaceae)
Vriesea streptophylla (Scheidw. & C. Morren) E. Morren (Bromeliaceae)
Wedelia trilobata (L.) Hitchc. (Asteraceae)
Xanthosoma brasiliense (Desf.) Engl. (Araceae)
Xanthosoma mexicanum Liebm. (Araceae)
Xanthosoma sagittifolium (L.) Schott & Endl. (Araceae)
Xanthosoma sp. Schott (Araceae)
Xanthosoma violaceum Schott (Araceae)
Xylopia aromatica (Lam.) Eichler (Annonaceae)
Xylopia frutescens Aubl. (Annonaceae)
Zea mays L. (Poaceae)
Zebrina pendula Schnitzl. (Commelinaceae)
Zingiber officinale Roscoe (Zingiberaceae)
Zinnia sp. L. (Asteraceae)
Zinnia violacea Cav. (Asteraceae)

Appendix 2: Directory of Miskito Ethnobotany

This is an ethnobotanical directory of the plants documented in this study and their uses. It is organized into two sections, parts A and B. Part A is an alphabetical listing of the study plants according to their binomial. In this section, plants as yet unidentified are listed at the end, alphabetized by the common name used in the study. Consult Appendix 1 for additional nomenclatural synonymy.

Part B is an alphabetical listing of plants according to the common name used in this study. Where possible, the common name is derived from that used by informants. For that reason, a common name may be in Miskito, Spanish or English (as indicated according to the legend below). A letter "R" preceding the common name indicates that the local name is either confusing or lacking.[1] Such plants are designated here with a reference name, as indicated by the letter "R".[2]

Usage categories attributed for each plant are given (see the legend below) and the reader may consult the corresponding chapters within this paper for details. Accession numbers are provided for all voucher specimens except where noted by the abbreviation "n.v." This signifies that no voucher specimen exists due to herbarium losses, distance considerations, or informant reluctance in providing specimens.

Legend:
Common Names: E = English; M = Miskito; R = Reference; S = Spanish
Plant Use Categories: A = Additional; H = Household; S = Superstition; C = Construction; M = Medicinal; E = Edible; O = Ornamental; F = Fuel; P = Personal

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[1] In some cases, community members refer to the same plant by more than one name or refer to different plants by the same name. The designated reference name is variously derived from a scientific determination, based on a phenotypic attribute or is a common English name. Common names are also discussed in Chapter 7: Superstition and in Dennis (1988: 26-27).

[2] The presence of "R" thus indicates that the name being used to identify the plant is not obtained from the community members and informants may not recognize a plant based on this reference name.

Part A. Alphabetical listing by binomial

Abrus precatorius	M	liliura	M	P			489
Acalypha arvensis	M	mutmutya	S				69
Acisanthera quadrata	M	iska dura	M				469
Acoelorraphe wrightii	S	palmera	M	C	H	E	8
Agalinis albida	R	grass II	M				161
Alibertia edulis	M	susul	E	H			17
Allium sativum	S	ajo	M	S	E		n.v.
Alternanthera bettzickiana	S	patita de paloma	O				283
Amanoa guianensis	S	palo de lora	F				91
Amaranthus spinosus	R	spiny amaranth	M				275
Anacardium occidentale	S	marañon	E	M			18
Ananas comosus	S	piña	E				52
Annona muricata	S	guanábana	E	M			77
Artocarpus altilis	M	bredpru	E	M	H	C	118
Asclepias curassavica	E	bloodflower	P				221
Attalea cohune	S	coyol de leche	E				224
Axonopus fissifolius	E	carpetgrass	M	P			566
Bactris gasipaes	S	pejibaye	E				130
Bambusa sp.	S	bambù	C				n.v.
Bixa orellana	S	achiote	E	M			112
Bougainvillea x buttiana	S	bougainvillea	O				311
Bravaisia sp.	S	palo de agua	C	F			n.v.
Bromelia karatas	M	karastingni	H				n.v.
Bromelia pinguin	M	ahsi	E				198
Bryophyllum pinnatum	E	tree of life	M	P			20
Bursera simaruba	M	limsi	M	C	S		121
Byrsonima crassifolia	S	nancite	E	M	F	S	289
Caesalpinia pulcherrima	E	dwarf poinciana	O				115
Caladium bicolor	S	córazon de Maria	O				286
Calophyllum brasiliense var. *rekoi*	S	Santa María	C	H	F		25
Calopogonium mucunoides	R	vine II	M				568
Canavalia ensiformis	S	frijol blanco	E				362
Canna indica	M	plato tangni	O				553
Capsicum annuum	S	chiltoma	E				364
Capsicum frutescens	S	chile picante	E	M	S	A	99
Carapa guianensis	S	cedro macho	C				n.v
Carica papaya	S	papaya	E	M			28
Cassia grandis	S	carau	M	E			*204*
Catharanthus roseus	M	raiti tangni	M	S	O		37
Cecropia peltata	M	plang	M	S			552
Cedrela odorata	S	cedro real	C	H			n.v.
Ceiba pentandra	S	algodón criollo	M	H	C		378
Celosia argentea var. cristata	M	kalila lal	O				365
Chamaecrista diphylla	M	rahstima	M				34
Chamaecrista kunthiana	R	herb II	M				481

Chamaesyce thymifolia	R	herb III	M						248
Chromolaena odorata	R	dinar II	M						462
Chrysobalanus icaco	S	icaco	E						127
Chrysobalanus icaco var. *ellipticus*	M	biuhu	E	M	F	A			29
Cinnamonum verum	S	canela	M	E					n.v.
Cissus erosa	R	vine III	M						303
Citrullus lanatus	S	sandía	E						390
Citrus aurantiifolia	S	limon agrio	E	M	H				151
Citrus aurantium	S	naranjagrio	E	M					85
Citrus limon	S	limon puro	E	M	H	P			39
Citrus sp.	S	limon grande	H						526
Citrus sp.	S	limon merikano	E	M					227
Citrus sp.	S	limon miskito	E	M					75
Citrus sp.	S	limon real	E	P					40
Citrus paradisi	S	toronja	E	M					41
Citrus reticulata	S	limon mandarina	E	M					60
Citrus sinensis	S	naranja dulce	E	M					116
Cleome serrata	R	frijol II	M						212
Clerodendrum thomsoniae	R	bejuco II	O						43
Clidemia sericea	M	siaya wahya	H						342
Coccocypselum hirsutum	R	nerves	M						54
Coccoloba uvifera	S	uva del mar	E	M					370
Cochlospermum religiosum	M	liwa mukya	M	C	H				123
Cocos nucifera	S	coco	E	M	P	S	C	A	13
Codiaeum variegatum	S	croto	O						285
Colocasia esculenta	E	dasheen	E						400
Commelina diffusa	E	dayflower	M	O					482
Conocarpus erectus	M	mihmi	C	F					304
Cordia curassavica	M	pisik shrub	M						70
Cosmos bipinnatus	E	cosmos	O						501
Crescentia alata	S	jícaro	H						42
Crinum augustum	M	lili tangni	M	O					421
Crotalaria retusa	R	butterfly flower	O						409
Cucurbita moschata	S	ayote	E	M					563
Cuphea carthagenensis	R	lythrum II	M						333
Curatella americana	S	chaparro	H	M					48
Cymbopogon citratus	M	ti	E	M					241
Cyperus aggregatus	R	sedge III	A						391
Cyperus luzulae	R	sedge II	M	S					125
Dalechampia scandens	S	mala	A						301
Delonix regia	S	malinche	O	C	M				295
Desmodium adscendens	M	muspuskan	M						67
Desmodium incanum	M	prakprakya	M	S					21
Desmodium incanum	M	latawira II	M						189
Desmodium triflorum	R	clover	M						349
Dioscorea bulbifera	M	paisagua	E						146

Dioscorea trifida	M	malanga	E					392
Dipteryx oleifera	M	ibu	E	M				n.v.
Drosera capillaris	R	sundew	M					520
Drymaria cordata	M	pyuta saika	M	S				385
Drymaria villosa	S	boton	M	S				22
Elaeis oleifera	S	palma africana	E	M	P	S	C	3
Elephantopus mollis	E	soft elephant's ear	M					58
Eryngium foetidum	S	culantro	E	M	S			64
Eucalyptus sp.	S	eucalipto	M					n.v.
Eupatorium capillifolium	M	awas tangni	O					188
Gardenia jasminoides	S	clavel	M					154
Gomphrena globosa	R	bachelor's button	O					530
Gossypium barbadense	S	algodón	H	M				136
Hemidiodia ocymifolia	S	lengua de gallina	M	S				23
Henriettella seemannii	S	comida de lora	F					350
Hibiscus rosa-sinensis	S	rosa	M	S	O			528
Hibiscus sabdariffa	M	wain	E	M				539
Hippocratea volubilis	S	bejuco	A					141
Hirtella racemosa var. *hexandra*	M	brum	H					113
Hydrolea spinosa	R	shrub II	M					278
Hymenaea courbaril	S	guapinol	E	M				341
Hyptis capitata	M	afrika	M					536
Hyptis conferta var. angustata	M	latawira	M					16
Hyptis verticillata	E	John's sails	M	S				1
Impatiens balsamina	S	ala blanca	O					184
Impatiens sp.	S	flor de paloma	O					185
Inga edulis	M	bredbred	E	F				351
Inga thibaudiniana	M	bredbred II	M					332
Ipomoea batatas	S	batata	E	P				537
Ipomoea carnea subsp. *fistulosa*	S	flor de noche	M					6
Ipomoea setifera	R	vine I	M					302
Ixora coccinea	M	aras pata	M	O	E			44
Jatropha curcas	M	pisik tree	M	S				53
Jatropha integerrima	R	tree, red flower	O					422
Lagenaria siceraria	M	pispis	E					460
Lagenocarpus guianensis	R	sedge IV	A					140
Lagerstroemia indica	S	receda I and II	O					296
Laguncularia racemosa	S	mangle blanco	C	F				10
Leonurus japonicus	M	brum taplira II	M	S				446
Licania platypus	S	zonzapote	M					316
Lindernia crustacea	R	scroph II	M					495
Lindernia diffusa	M	afrika II	M	S				207
Lippia alba	E	green tea	M					271
Ludwigia sedoides	M	tumtum relative A	A					55
Luffa quinquefida	S	pasta	H					538
Lycopersicon esculentum	S	tomate	E					305

Lycopodiella cernua	R	Easter fern	O				299
Maclura tinctoria	S	palo de leche amarillo	C				n.v.
Mangifera indica	S	mango	E	M	S	A	73
Manihot esculenta	S	yuca	E	M	H		25
Manilkara sp.	S	níspero	C	H			n.v.
Matayba apetala	S	palo de culebra	F				88
Matricaria recutita	S	manzanilla	M				n.v.
Mecardonia procumbens	R	B-16	M				474
Melicoccus bijugatus	S	mamon	E				367
Melochia villosa	M	dinar pauni	M	S			46
Mentha spicata	S	hierba buena	M				531
Miconia albicans	E	joint bush	S				352
Miconia ciliata	M	siaya	M				354
Mikania scandens	M	tatahku	M	A			14
Mimosa pudica	S	dormilona	M	S			389
Momordica charantia	S	sorosil	M				n.v.
Musa acuminata	S	banano	E	M			360
Musa acuminita	S	cuadrado	E	M			27
Musa x paradisiaca	S	platano	E	M			109
Myrica cerifera	M	piawat	H	F	P	C	31
Nicotiana tobacum	E	tobacco	M	S			n.v.
Nymphaea ampla	M	tumtum III	A				32
Nymphaea odorata	M	tumtum I	M				387
Nymphoides indica	M	tumtum II	A				269
Ocimum basilicum	S	albahaca	E	M	S		97
Oryza sativa	S	arroz	E				n.v.
Pachira aquatica	M	pukru	M	C			30
Pachira quinata	S	pochote	C				n.v.
Pachyanthus lundellianus	M	snaiya	E				179
Passiflora quadrangularis	S	granadilla	E				369
Pavonia schiedeana	S	mozote	M	S			24
Pedilanthus tithymaloides	S	pie del niño	O				430
Peltaea ovata	S	cáscara	H				36
Pera arborea	M	mustukra	F				89
Persea americana	S	aguacate	E				138
Petiveria alliacea	M	delta	M				454
Phaseolus vulgaris	R	frijol	E				n.v.
Phaseolus vulgaris	S	frijol negro	S				n.v.
Philodendron hederaceum	M	reumatis saika	M				438
Philodendron radiatum	M	bla	M				382
Physalis angulata	M	tuktukya II	M	S			273
Physalis pubescens	M	tuktukya III	M				96
Pimpinella anisum	S	anís	M				n.v.
Pinus caribaea var. *hondurensis*	S	pino	M	C	H	F	81
Piper jacquemontianum	M	lula bakbak	M				106
Polygala adenophora	R	wildflower II	S				521

Polypodium sp.	M	sirpi	M	S					383
Portulaca grandiflora	M	10-o'clock tangni	O						427
Portulaca oleracea	M	Managua tangnika	O						219
Portulaca pilosa	M	9-o'clock tangni	O						192
Pouteria sapota	S	sapote	E						131
Pseudelephantopus spicatus	E	dog's tongue	M						63
Psidium cattleianum	S	guayaba rosa	E						230
Psidium cattleianum var. *littorale*	S	guayaba acido	E	M	S				226
Psidium guajava	S	guayaba	E	M					78
Psidium guineense	M	kru	E						359
Psychotria tomentosa	M	yul kyama	M						104
Quassia amara	S	hombre grande	M						540
Quercus oleoides	M	usupum	C	F	A				92
Renealmia alpinia	M	waisala	P						182
Rhizophora mangle	S	mangle roho	M	C	H	F	P	A	9
Rhynchospora brachychaeta	S	grama del llano	A						139
Rhynchospora cephalotes	R	sedge I	M						344
Rosmarinus officinalis	S	romero	M						n.v.
Saccharum officinarum	S	caña	E	M					167
Sagittaria lancifolia	R	tumtum relative C	M						57
Salacia impressifolia	M	masra	E						144
Sargassum sp.	R	sargassum	A						298
Scoparia dulcis	S	escoba amarga	M	S					45
Senna alata	S	sironcontil	M	S	O				2
Senna occidentalis	S	pico de pajaro	M	S					19
Senna sp.	M	sina	M						572
Senna undulata	M	krismis blossom II	M						107
Sida rhombifolia	S	escoba lisa	M	S	P				4
Sida acuta	M	dinar relative	M						567
Smilax domingensis	S	cinerut	M						122
Solenostemon scutellarioides	S	mozaica	O						366
Sphagneticola trilobata	E	bayvine	M						436
Spondias purpurea	S	jocote	E	C					114
Stachytarpheta cayennensis	S	cola de alacran	M						5
Swietenia macrophylla	S	caoba	C	H					n.v.
Synedrella nodiflora	E	node weed	M						68
Syngonium angustatum	S	cinco dedo	M						317
Syngonium podophyllum	R	syngonium sp	M						355
Syzygium malaccense	S	pera	E						59
Tagetes erecta	M	san diego	M	O	S				47
Tamarindus indica	S	tamarindo	E	M	C				50
Terminalia catappa	S	almendra	E	M					12
Tetragastris panamensis	S	querosin	F						90
Theobroma cacao	S	cacao	E						291
Thevetia peruviana	E	yellow oleander	O						425
Tibouchina aspera	M	siaya tangni	M						105

Tillandsia streptophylla	M	kitkal	M			174
Tradescantia zebrina	R	wandering jew	M			n.v.
Turbinaria sp.	R	turbinaria	A			535
Xanthosoma violaceum	S	quequisque	E			236
Xylopia aromatica	M	tailo	H	F		35
Zea mays	S	maiz	E	M	H	237
Zingiber officinale	M	zinza	M			473
Zinnia violacea	E	zinnia	O			529
-	S	bejuco negro	F			n.v.
-	S	camotillo	A			n.v.
-	M	guineafa	M			n.v.
-	M	kiwa	M			n.v.
-	S	sepol	M			n.v.
-	M	sirang saika	M			461
-	M	sukling waika	M			394
-	M	swim kyama	M	E		429

Part B. Alphabetical listing by common name

9-o'clock tangni	M	*Portulaca pilosa*	O				192
10-o'clock tangni	M	*Portulaca grandiflora*	O				427
achiote	S	*Bixa orellana*	E	M			112
afrika	M	*Hyptis capitata*	M				536
afrika II	M	*Lindernia diffusa*	M	S			207
aguacate	S	*Persea americana*	E				138
ahsi	M	*Bromelia pinguin*	E				198
ajo	S	*Allium sativum*	M	S	E		n.v.
ala blanca	S	*Impatiens balsamina*	O				184
albahaca	S	*Ocimum basilicum*	E	M	S		97
algodón	S	*Gossypium barbadense*	H	M			136
algodón criollo	S	*Ceiba pentandra*	M	H	C		378
almendra	S	*Terminalia catappa*	E	M			12
anís	S	*Pimpinella anisum*	M				n.v.
aras pata	M	*Ixora coccinea*	M	O	E		44
arroz	S	*Oryza sativa*	E				n.v.
awas tangni	M	*Eupatorium capillifolium*	O				188
ayote	S	*Cucurbita moschata*	E	M			563
B-16	R	*Mecardonia procumbens*	M				474
bachelor's button	R	*Gomphrena globosa*	O				530
bambù	S	*Bambusa* sp.	C				n.v.
banano	S	*Musa acuminata*	E	M			360
batata	S	*Ipomoea batatas*	E	P			537
bayvine	E	*Sphagneticola trilobata*	M				436
bejuco	S	*Hippocratea volubilis*	A				141
bejuco II	R	*Clerodendrum thomsoniae*	O				43
bejuco negro	S	-	F				n.v.
biuhu	M	*Chrysobalanus icaco* var. *ellipticus*	E	M	F	A	29
bla	M	*Philodendron radiatum*	M				382
bloodflower	E	*Asclepias curassavica*	P				221
boton	S	*Drymaria villosa*	M	S			22
bougainvillea	S	*Bougainvillea x buttiana*	O				311
bredbred	M	*Inga edulis*	E	F			351
bredbred II	M	*Inga thibaudiniana*	M				332
bredpru	M	*Artocarpus altilis*	E	M	H	C	118
brum	M	*Hirtella racemosa* var. *hexandra*	H				113
brum taplira II	M	*Leonurus japonicus*	M	S			446
butterfly flower	R	*Crotalaria retusa*	O				409
cacao	S	*Theobroma cacao*	E				291
camotillo	S	-	A				n.v.
canela	S	*Cinnamonum verum*	M	E			167
caña	S	*Saccharum officinarum*	E	M			n.v.
caoba	S	*Swietenia macrophylla*	C	H			n.v.
carau	S	*Cassia grandis*	M	E			*204*

carpetgrass	E	*Axonopus fissifolius*	M	P					566
cáscara	S	*Peltaea ovata*	H						36
cedro macho	S	*Carapa guianensis*	C						n.v
cedro real	S	*Cedrela odorata*	C	H					n.v.
chaparro	S	*Curatella americana*	H	M					48
chile picante	S	*Capsicum frutescens*	E	M	S	A			99
chiltoma	S	*Capsicum annuum*	E						364
cinco dedo	S	*Syngonium angustatum*	M						317
cinerut	S	*Smilax domingensis*	M						122
clavel	S	*Gardenia jasminoides*	M						154
clover	R	*Desmodium triflorum*	M						349
coco	S	*Cocos nucifera*	E	M	P	S	C	A	13
cola de alacran	S	*Stachytarpheta cayennensis*	M						5
comida de lora	S	*Henriettella seemannii*	F						350
córazon de María	S	*Caladium bicolor*	O						286
cosmos	E	*Cosmos bipinnatus*	O						501
coyol de leche	S	*Attalea cohune*	E						224
croto	S	*Codiaeum variegatum*	O						285
cuadrado	S	*Musa acuminita*	E	M					27
culantro	S	*Eryngium foetidum*	E	M	S				64
dasheen	E	*Colocasia esculenta*	E						400
dayflower	E	*Commelina diffusa*	M	O					482
delta	M	*Petiveria alliacea*	M						454
dinar II	R	*Chromolaena odorata*	M						462
dinar pauni	M	*Melochia villosa*	M	S					46
dinar relative	M	*Sida acuta*	M						567
dog's tongue	E	*Pseudelephantopus spicatus*	M						63
dormilona	S	*Mimosa pudica*	M	S					389
dwarf poinciana	E	*Caesalpinia pulcherrima*	O						115
Easter fern	R	*Lycopodiella cernua*	O						299
escoba amarga	S	*Scoparia dulcis*	M	S					45
escoba lisa	S	*Sida rhombifolia*	M	S	P				4
eucalipto	S	*Eucalyptus* sp.	M						n.v.
flor de noche	S	*Ipomoea carnea* subsp. *fistulosa*	M						6
flor de paloma	S	*Impatiens* sp.	O						185
frijol	R	*Phaseolus vulgaris*	E						n.v.
frijol II	R	*Cleome serrata*	M						362
frijol blanco	S	*Canavalia ensiformis*	E						212
frijol negro	S	*Phaseolus vulgaris*	S						n.v.
grama del llano	S	*Rhynchospora brachychaeta*	A						139
granadilla	S	*Passiflora quadrangularis*	E						369
grass II	R	*Agalinis albida*	M						161
green tea	E	*Lippia alba*	M						271
guanábana	S	*Annona muricata*	E	M					77
guapinol	S	*Hymenaea courbaril*	E	M					341
guayaba	S	*Psidium guajava*	E	M					78

guayaba acido	S	*Psidium cattleianum* var. *littorale*	E	M	S				226
guayaba rosa	S	*Psidium cattleianum*	E						230
guineafa	M	-	M						n.v.
herb II	R	*Chamaecrista kunthiana*	M						481
herb III	R	*Chamaesyce thymifolia*	M						248
hierba buena	S	*Mentha spicata*	M						531
hombre grande	S	*Quassia amara*	M						540
ibu	M	*Dipteryx oleifera*	E	M					n.v.
icaco	S	*Chrysobalanus icaco*	E						127
iska dura	M	*Acisanthera quadrata*	M						469
jícaro	S	*Crescentia alata*	H						42
jocote	S	*Spondias purpurea*	E	C					114
John's sails	E	*Hyptis verticillata*	M	S					1
joint bush	E	*Miconia albicans*	S						352
kalila lal	M	*Celosia argentea var. cristata*	O						365
karastingni	M	*Bromelia karatas*	H						n.v.
kitkal	M	*Tillandsia streptophylla*	M						174
kiwa	M	-	M						n.v.
krismis blossom II	M	*Senna undulata*	M						107
kru	M	*Psidium guineense*	E						359
latawira	M	*Hyptis conferta var. angustata*	M						16
latawira II	M	*Desmodium incanum*	M						189
lengua de gallina	S	*Hemidiodia ocymifolia*	M	S					23
lili tangni	M	*Crinum augustum*	M	O					421
liliura	M	*Abrus precatorius*	M	P					489
limon agrio	S	*Citrus aurantiifolia*	E	M	H				151
limon grande	S	*Citrus* sp.	H						526
limon mandarina	S	*Citrus reticulata*	E	M					60
limon merikano	S	*Citrus* sp.	E	M					227
limon miskito	S	*Citrus* sp.	E	M					75
limon puro	S	*Citrus limon*	E	M	H	P			39
limon real	S	*Citrus* sp.	E	P					40
limsi	M	*Bursera simaruba*	M	C	S				121
liwa mukya	M	*Cochlospermum religiosum*	M	C	H				123
lula bakbak	M	*Piper jacquemontianum*	M						106
lythrum II	R	*Cuphea carthagenensis*	M						333
maíz	S	*Zea mays*	E	M	H				237
mala	S	*Dalechampia scandens*	A						301
malanga	M	*Dioscorea trifida*	E						392
malinche	S	*Delonix regia*	O	C	M				295
mamon	S	*Melicoccus bijugatus*	E						367
Managua tangnika	M	*Portulaca oleracea*	O						219
mangle blanco	S	*Laguncularia racemosa*	C	F					10
mangle roho	S	*Rhizophora mangle*	M	C	H	F	P	A	9
mango	S	*Mangifera indica*	E	M	S	A			73
manzanilla	S	*Matricaria recutita*	M						n.v.

marañon	S	*Anacardium occidentale*	E	M				18
masra	M	*Salacia impressifolia*	E					144
mihmi	M	*Conocarpus erectus*	C	F				304
mozaica	S	*Solenostemon scutellarioides*	O					366
mozote	S	*Pavonia schiedeana*	M	S				24
muspuskan	M	*Desmodium adscendens*	M					67
mustukra	M	*Pera arborea*	F					89
mutmutya	M	*Acalypha arvensis*	S					69
nancite	S	*Byrsonima crassifolia*	E	M	F	S		289
naranja dulce	S	*Citrus sinensis*	E	M				116
naranjagrio	S	*Citrus aurantium*	E	M				85
nerves	R	*Coccocypselum hirsutum*	M					54
níspero	S	*Manilkara* sp.	C	H				n.v.
node weed	E	*Synedrella nodiflora*	M					68
paisagua	M	*Dioscorea bulbifera*	E					146
palma africana	S	*Elaeis oleifera*	E	M	P	S	C	3
palmera	S	*Acoelorraphe wrightii*	M	C	H	E		8
palo de agua	S	*Bravaisia* sp.	C	F				n.v.
palo de culebra	S	*Matayba apetala*	F					88
palo de lora	S	*Amanoa guianensis*	F					n.v.
palo de leche amarillo	S	*Maclura tinctoria*	C					91
papaya	S	*Carica papaya*	E	M				28
pasta	S	*Luffa quinquefida*	H					538
patita de paloma	S	*Alternanthera bettzickiana*	O					283
pejibaye	S	*Bactris gasipaes*	E					130
pera	S	*Syzygium malaccense*	E					59
piawat	M	*Myrica cerifera*	H	F	P	C		31
pico de pajaro	S	*Senna occidentalis*	M	S				19
pie del niño	S	*Pedilanthus tithymaloides*	O					430
pino	S	*Pinus caribaea* var. *hondurensis*	M	C	H	F		52
piña	S	*Ananas comosus*	E					81
pisik shrub	M	*Cordia curassavica*	M					70
pisik tree	M	*Jatropha curcas*	M	S				53
pispis	M	*Lagenaria siceraria*	E					460
plang	M	*Cecropia peltata*	M	S				552
platano	S	*Musa x paradisiaca*	E	M				109
plato tangni	M	*Canna indica*	O					553
pochote	S	*Pachira quinata*	C					n.v.
prakprakya	M	*Desmodium incanum*	M	S				21
pukru	M	*Pachira aquatica*	M	C				30
pyuta saika	M	*Drymaria cordata*	M	S				385
quequisque	S	*Xanthosoma violaceum*	E					236
querosin	S	*Tetragastris panamensis*	F					90
rahstima	M	*Chamaecrista diphylla*	M					34
raiti tangni	M	*Catharanthus roseus*	M	S	O			37
receda I and II	S	*Lagerstroemia indica*	O					296

reumatis saika	M	*Philodendron hederaceum*	M			438
romero	S	*Rosmarinus officinalis*	M			n.v.
rosa	S	*Hibiscus rosa-sinensis*	M	S	O	528
san diego	M	*Tagetes erecta*	M	O	S	47
sandía	S	*Citrullus lanatus*	E			390
Santa María	S	*Calophyllum brasiliense* var. *rekoi*	C	H	F	25
sapote	S	*Pouteria sapota*	E			131
sargassum	R	*Sargassum* sp.	A			298
scroph II	R	*Lindernia crustacea*	M			495
sedge I	R	*Rhynchospora cephalotes*	M			344
sedge II	R	*Cyperus luzulae*	M	S		125
sedge III	R	*Cyperus aggregatus*	A			391
sedge IV	R	*Lagenocarpus guianensis*	A			140
sepol	S	-	M			n.v.
shrub II	R	*Hydrolea spinosa*	M			278
siaya	M	*Miconia ciliata*	M			354
siaya tangni	M	*Tibouchina aspera*	M			105
siaya wahya	M	*Clidemia sericea*	H			342
sina	M	*Senna* sp.	M			572
sirang saika	M	-	M			461
sironcontil	S	*Senna alata*	M	S	O	2
sirpi	M	*Polypodium* sp.	M	S		383
snaiya	M	*Pachyanthus lundellianus*	E			179
soft elephant's ear	E	*Elephantopus mollis*	M			58
sorosil	S	*Momordica charantia*	M			n.v.
spiny amaranth	R	*Amaranthus spinosus*	M			275
sukling waika	M	-	M			394
sundew	R	*Drosera capillaris*	M			520
susul	M	*Alibertia edulis*	E	H		17
swim kyama	M	-	M	E		429
syngonium sp	R	*Syngonium podophyllum*	M			355
tailo	M	*Xylopia aromatica*	H	F		35
tamarindo	S	*Tamarindus indica*	E	M	C	50
tatahku	M	*Mikania scandens*	M	A		14
ti	M	*Cymbopogon citratus*	E	M		241
tobacco	E	*Nicotiana tobacum*	M	S		n.v.
tomate	S	*Lycopersicon esculentum*	E			305
toronja	S	*Citrus paradisi*	E	M		41
tree of life	E	*Bryophyllum pinnatum*	M	P		20
tree, red flower	R	*Jatropha integerrima*	O			422
tuktukya II	M	*Physalis angulata*	M	S		273
tuktukya III	M	*Physalis pubescens*	M			96
tumtum I	M	*Nymphaea odorata*	M			387
tumtum II	M	*Nymphoides indica*	A			269
tumtum III	M	*Nymphaea ampla*	A			32
tumtum relative A	M	*Ludwigia sedoides*	A			55

tumtum relative C	R	*Sagittaria lancifolia*	M			57
turbinaria	R	*Turbinaria* sp.	A			535
usupum	M	*Quercus oleoides*	C	F	A	92
uva del mar	S	*Coccoloba uvifera*	E	M		370
vine I	R	*Ipomoea setifera*	M			302
vine II	R	*Calopogonium mucunoides*	M			568
vine III	R	*Cissus erosa*	M			303
wain	M	*Hibiscus sabdariffa*	E	M		539
waisala	M	*Renealmia alpinia*	P			182
wandering jew	R	*Tradescantia zebrina*	M			n.v.
wildflower II	R	*Polygala adenophora*	S			521
yellow oleander	E	*Thevetia peruviana*	O			425
yuca	S	*Manihot esculenta*	E	M	H	25
yul kyama	M	*Psychotria tomentosa*	M			104
zinnia	E	*Zinnia violacea*	O			529
zinza	M	*Zingiber officinale*	M			473
zonzapote	S	*Licania platypus*	M			316

Appendix 3: Tri-Lingual Directory of Common Names

This tri-lingual directory includes the common English, Miskito and Spanish names of plants documented in this study as compiled from a number of ethnobotanical sources. In some cases, only the definition of a foreign name is provided.[1]

Common Name	English	Miskito	Spanish
9-o'clock tangni	purslane	9-o'clock tangni	-
10-o'clock tangni	11-o'clock; moss-rose	10-o'clock tangni; tupido	verdolago rosa
achiote	annatto; lipstick tree	aulala; tmaring	achiote
afrika	knobweed	afrika	-
afrika II	-	dama; afrika	hierba de pollo
aguacate	avocado; alligator pear	sikya; butter pear	aguacate
ahsi	pingwing; pinguin	ahsi; ase	piñuela
ajo	garlic	gialik	ajo
ala blanca	touch-me-not; golden balsam	tnawa pihni	ala blanca
albahaca	sweet basil; barsley	sikakaira; kuma sirpi	albahaca
algodón	sea-island cotton	wahmuk; wamuk; puhula	algodón
algodón criollo	(red)silk cotton tree; kapok	sisin	algodón criollo; ceiba
almendra	Indian; tropical almond	amans	almendra; guayabon
anís	aniset; anise	-	anís
aras pata	jungle geranium; flame of the wood	aras pata; tininis tangni	flor de aveha
arroz	rice	rais	arroz
awas tangni	dog-fennel	awas tangni	flor de pino; altagracia
ayote	pumpkin; butternut squash	iwa; iba; punkin	ayote; calabaza
B-16		won lal kangbaika	-
bachelor's button	bachelor's button; globe amaranth	-	-
bambú	bamboo	kauru; kahru	bambú

[1] The sources for this directory were: Barrett (1993, 1994a, 1994b); Beckstrom-Sternberg, Duke and Wain (1994); Caldera, et al. (1995); Coe and Anderson (1996); Dennis (1988); Duke and Wain (2000); Elsberg, Blanco and Rodriguez (1992); Kays and Silva Dias (1995); Marx and Heath (1992); Terrell et al. (1986); Wiersema and Leon (1999); Ziock (1894).

Common Name	English	Miskito	Spanish
banano	banana	siksa; prangs; lakatan	banano; guineo; Gros Michel
banano de rosa	red banana	plas	banana rosa(do); guineo
batata	sweet potato; yam	tåwa	batata; camote; boniato
bayvine	bad man; bayvine	kaisni pata	casco de vaca
bejuco	vine	kiwa	bejuco
bejuco II	bleeding-heart vine; bagflower	-	bejuco
bejuco negro	black vine	kiwa tara	-
biuhu	-	bihu	hicaco; melastomo
bla	-	bla	ingible
bloodflower	bloodflower milkweed; redhead	won asmala dingkaia tangnika	yuquillo; viborana
boton	-	nakra; taplira; afrika	boton
bougainvillea	paper flower	-	bougainvillea
bredpru	breadfruit	bredpru; bredprut	fruta del pan
bredbred	acacia species; ice cream bean	bredbred; bribri(t); ?sangsang;	guajiniquil; cuajiniquil
bredbred II	-	yakitkit; tilba; takalka; tipalmuk	guajiniquil relative
brum	-	brum	escobillo
brum taplira II	Chinese motherwort	brum taplira	-
butterfly flower	devil bean	sinsinya	-
cacao	cocoa	kakau; uhrang	cacao
camotillo	-	-	camotheo; camotillo
caña	sugarcane	kayo; kayu; triku	caña de azucar
canela	cinnamon	sinamon	canela
caoba	mahogany	yulu	caoba
carau	stinking toe; horse cassia	stinkto; stinkingdo	carao
carpetgrass	caratao; carpetgrass	twi; ima	grama; zacate
cáscara	peel	?burburia; kira waintka	cáscara; guacimo de molenillo
cedro macho	bastard mahogany	sába; swa	cedro macho
cedro real	cedar; white cedar	wingkur; wingku	cedro real
chaparro	dwarf; scrub oak; rough leaf tree	yahal	chaparro; palo blanco
chile picante	chili pepper; red pepper	kuma	chile; chile picante
chiltoma	green pepper; bell pepper	kuma tara	chiltoma
cinco dedo	five fingers	-	cinco dedo
cinerut	-	chiny rut; chainey root	cinerut; kukulmeca
clavel	carnation; cape jasmine	clivil tangnika	clavel

Common Name	English	Miskito	Spanish
clover	Spanish clover; 3-flower beggarweed	-	hierba cuartillo
coco	coconut palm	kuku	coco
coco alto	coconut palm; tall cultivar	kuku yari or yeri	coco alto
coco enano	coconut palm; dwarf cultivar	kuku prahni	coco enano
cola de alacrán	vervain; blue-snakeweed	?tmisri waika; barbina	cola de alacrán; verbina
comida de lora	parrot food; garlic wood	rawa pata	comida de lora
córazon de María	caladium; elephant's ear	-	córazon de María or Jesus
cosmos	Mexican aster; cosmos	-	-
coyol de leche	krau-palm	karu; kru; silo; silal	coyol; coyol de leche
croto	garden croton	awalanak; tangni	croto; copalchi
cuadrado	plantain	-	cuadrado
culantro	cilantro; false coriander	kiasaura; kisawri; fits weed;	culantro
dasheen	dasheen; taro	badu	-
dayflower	dayflower	-	codillo
delta	Guinea hen weed	delta; bihlta; fitsy bush	raiz de congo; sorrillo
dinar II	devil weed	dinar	-
dinar pauni	midday red	dinar pauni	escoba lisa macho
dinar relative	broomweed; southern sida	dinar	-
dog's tongue	dog's tongue	puskan kangbaia	hierba de caballo
dormilona	sensitive/sleepy bush; Spanish needle	king aula; qwin mairin; sriri	dormilona
dwarf poinciana	pride of Barbados; dwarf poinciana	-	clavellina
Easter fern	Portugese fern	ispri; ?waisala	fern
escoba amarga	wild sage; sweet broom; wild rice	brum taplira; matispata; sirsaika	escoba amarga
escoba lisa	arrow-leaf sida; broomweed	dinar tangni; malva; aras kanka	escoba lisa
eucalípto	eucalyptus	-	eucalípto
flor de noche	bush-morning glory	-	flor de noche
flor de paloma	dove flower	butku tangni	flor de paloma
frijol	common bean	bins	frijol
frijol blanco	jack bean	bins pihni	frijol blanco
frijol II	bean	bins	-
frijol negro	black bean	bins siksa	frijol negro
grama del llano	field grass	-	grama del llano

Common Name	English	Miskito	Spanish
granadilla	giant passion fruit; maypop	drap tara; derrup	granadilla
grass II	grass	twi	grama; zacate
green tea	green tea	grin ti	te verde
guanábana	soursop	dwarsop; puntara; punu; sawasop	guanabana
guapinol	W. Indian locust tree; stinking toe	låka; laua(the resin)	guapinol
guayaba	guava	sikra; sigra	guayaba
guayaba acido	yellow strawberry guava	sidrak	guayaba acido
guayaba rosa	purple; red strawberry guava	-	guayaba rosa
guineafa	-	guineafa; knipaia	-
herb II	-	Caribbean 1; afrika	-
herb III	?chicken weed	-	-
hierba buena	"good herb"; mint	-	hierba buena
hombre grande	bitterwood; Spanish lime	bitta-wood	hombre grande
hunded finger	plantain cultivar	100 finger	-
ibu	-	ibu; ibo	almendro; ebo
icaco	beach plum; coco plum	tauwa; tawa	icaco; hicaco
iska dura	"painful urination	iska dura; iskadora	-
Jamaican voodoo medicine	Jamaican voodoo medicine	-	-
jícaro	gourd; calabash tree	ka(h)mi; ka(k)munt(a)ra; urus lal	jícaro; guacal
jocote	hog plum; red mombin	pahara; blums	jocote; ciruela
John's sails	John Charles	John's sails	escoba
joint bush	joint bush	-	-
kalila lal	cock's comb; chicken head	kalila lal	cresta de gallo
karastingni	century plant; silkgrass	karastingni	pita
kitkal	-	kitkal	-
kiwa	vine	kiwa	bejuco
krismis blossom II	Christmas blossom	krismis blosom	-
kru	Brazilian guava	kru	guayaba blanca or dulce
latawira	-	latawira	el mozote
latawira II	-	latawira (not prakprakya)	-
lengua de gallina	drymaria; West Indian chickweed	pyuta saika mairin; kalila twisa	lengua de gallina
lili tangni	wild lily	lili tangni; tumtum relación	-
liliura	beads; crab's eye; rosary pea	liliura; lilura; sari	-
limon agrio	sour lime; key lime	limon tara; laimus ahawa	limon agrio

Common Name	English	Miskito	Spanish
limon grande	big lime	laimus tara	limon grande
limon mandarina	sweet lime	meriki laimus; laimus damni	limon dulce; bergamota
limon merikano	American lime	limon merikano; meriki laimus	limon americano
limon miskito	Miskito lime	-	limon miskito
limon puro	pure lime	laimus	limon puro
limon real	true lemon	limon tara	limon real
limsi	naked Indian; gumbo-limbo	limsi; limpura; limpora	jinocuabo; jinocuao
liwa mukya	(silk) cotton tree	liwamukya; karskwaya; nari tangni	picaflor
lula bakbak(ya)	Spanish ela	lula-bak bak(ya)	-
lythrum II	-	-	navajuela
maíz	Indian corn	aya	maíz
mala	bad	mala	navajuela
malanga	yam; Indian yam	-	malanga
malinche	poinciana; maypole tree	duran; durang	malinche; el arbol mayo
mamón	Spanish lime	kinip; tyinip; genip	mamón; mamoncillo
Managua tangnika	little hogweed; purslane	Managua tangnika	flor de Managua; verdolago
mangle blanco	white mangrove; white buttonwood	laulo pahtang; pahtan; parting	mangle blanco
mangle roho	red mangrove	laulo pauni; wainka o mairin	mangle roho
mango	mango	alkaika; mangro	mango
mango #11	-	mango #11	-
mango, beep	probably big mango	beep mango	-
mango, caraña	-	mango kira	mango caraña
mango, chancho	pig mango	Kwerko, pwerko or auoha mango	mango chancho
mango, ihri	hairy mango	ihiri mango	-
mango, kidney	-	kidney mango	-
mango, liso	smooth mango	ahawa mango	mango liso
mango, manzana	apple mango	-	mango manzana
mango, manzanilla	small apple mango	-	mango manzanilla
mango, mechudo	-	-	mango mechudo
mango, peludo	hairy mango	-	mango peludo
mango, puro	pure mango	-	puro mango
mango, rosa	rose mango	-	mango rosa
mango, round	round mango	-	-
mango, sugar	sugar mango	suga mango	-

Common Name	English	Miskito	Spanish
mango, torkentime	turpentine mango	mango torkentime	-
manzanilla	chamomile	-	manzanilla
marañon	cashew	kasau	marañon
marañon amarillo	yellow cashew	marañon lalahni	marañon amarillo
marañon blanco	white cashew	marañon pahtang	marañon blanco
marañon de piña	pineapple cashew	-	marañon de piña
marañon roho	red cashew	marañon pauni	marañon roho
masra	-	masra	-
mihmi	buttonwood; button mangrove	mihmi; mimi	botoncillo
mozaica	painted nettle; coleus	kalila waika	mozaica; cola de gallo; flor de aveha
mozote	-	tilbaiskitka; brum prakprakya	mozote; orina de danto
muspuskan	beggar lice; strong back	muspuskan; latawira II	pega-pega; amor de campo
mustukra	-	mustukra	-
mutmutya	-	mutmutya; tmaring	-
nancite	nance; wild cherry	krabo; krabu	nancite
naranja dulce	sweet or naval orange	anris	naranja dulce
naranjagrio	sour orange	taitap; anris swahni	naranjagrio
nerves	-	-	-
níspero	nisberry; neesberry	iban	níspero; sapodilla; chicle
node weed	node weed; synedrella	-	cerbatana
paisagua	potato yam; air potato	paisagua; usi; paisawa; balyanta	camote morado; ñame del aire
palma africana	African palm; hone palm	ohom; uhum; ohung	palma africana; la yolilla
palmera	paurotis palm; saw cabbage palm	papta; kangko; bapta	palmera
palo de agua	water tree	?rawa pata; yamari	palo de agua
palo de culebra	snake wood	pyuta påta	palo de culebra
palo de leche amarillo	yellow milk tree; fustic	samu	palo de leche amarillo
palo de lora	parrot wood	ruaha påta	palo de lora
papaya	papaya	twas	papaya
pasta	loofah	-	pasta
patita de paloma	red leaf; calico plant	kwamu mina	patita de paloma
pejibaye	black palm; peach palm	supa	pejibaye
pera	Malay apple	apel	pera; Manzana de agua
piawat	wax myrtle; bayberry	piawat; yalam; yulu-maia	caoba

Common Name	English	Miskito	Spanish
pico de pájaro	pissabed; senna; antbush	sinsinya; singsingnia; slingslingya	pico de pájaro; frijolillo
pie del niño	redbird/slipper flower; milkbush	tangni	flor; pie de nino
piña	pineapple	pihtu	piña
pino	Caribbean or Nicaraguan pine	awas	pino; ocote
pisik shrub	wormseed; wild sage	pisik	-
pisik tree	trumpet tree; physic nut	pisik	tempate; piñon
pispis	bottle gourd	pispis; kahmontra sirpi; dimigyan	calabazo de perigrinos
plang	trumpet leaf or tree	plang; plam	Guarumo; mano de tigre
platano	plantain	platu; plato	platano
pelipink	plantain cultivar	pelipink	cuadrado duro
pelipita	pelipita	filipita	-
plato tangni	Indian canna; African arrowroot	plato or platu tangni	achera
pochote	spiny cedar	auil; kuri	(cedro) pochote
prakprakya	strong back; kaimi-clover	prakprakya; ispriri; kanbaya; blubus	mozote
pukru	provision tree	pukru	pochote
pyuta saika	whitesnow	pyuta saika mairin	-
quequisque	coco yam	duswa	quequisque; black malanga
querosin	sahkal wood	sahkal pauni or påta; kirosin	querosin
rahstima	-	rahstima	-
raiti tangni	rosy or Madagascar periwinkle	raiti tangni	primrosa
receda I & II	crepe myrtle	damni pura; risida	receda
reumatis saika	cow foot; snake vine	reumatis saika	-
romero	rosemary	-	romero
rosa	Chinese hibiscus	dinar tangni; ?kulang	flor de abel or avispa; rosa
san diego	(Aztec) marigold	san diego; pabola tangni	altamî
sandía	watermelon	raya pisa	sandía
Santa María	Maria	krasa	Santa María
sapote	sapote	kuri	sapote; zapote; mamey
sargassum	brown algae	siwaiwai	-
scroph II	-	-	-
sedge I	-	-	navajuela
sedge II	-	grama (grass)	navajuela
sedge III	-	-	navajuela
sedge IV	?cutting grass	tubal (sedge)	navajuela

Common Name	English	Miskito	Spanish
sepol	-	-	sepol
shrub II	-	-	-
sina	senna	sina	-
sirang saika	fright medicine	sirang saika	-
sironcontil	wild senna; cure-all; wingworm bush	krismis blosom; sinsinya	sironcontil; hoja de Elizabet; bajagua
sirpi	little	sirpi	-
siaya	-	siaya; pangpang; ya-ya	-
siaya tangni	-	siaya tangni	-
siaya wahya	-	siaya wahaiya	-
snaiya	-	snaiya	-
soft elephant's ear	soft elephant's ear; cow tongue	-	-
sorosil	(wild) balsam pear; bitter gourd	tasplira	sorosil; pepino montero; balsamo
spiny amaranth	pigweed	-	-
sukling waika	toot house	sukling waika	-
sundew	pink sundew	-	-
susul	-	susul; sulsul	?el chintorolo
swim kyama	devil's umbrella	swim kyama or kiama; swinkiama	flor de tierra
syngonium	arrowhead-vine	usnunu wahya	-
tailo	-	tailo; sihnak	mecate; fruta de burro
tamarindo	tamarind	slim; tambran; tandarink	tamarindo; palo verde
tatahku	climbing hemp weed	tatahku	guaco
ti	lemon or fever grass	limut yama; (ingles) ti	zacate de limon; te chino
tobacco	tobacco	twako	tabaco
tomate	tomato	tomatis	tomate
toronja	grapefruit; pomelo	sadik; greyfru	toronja
tree of life	tree of life	tuktukya; triafly; crist tali; frat dutki	crecil; hoja de aire
tree, red flower	-	-	-
tuktukya II	husk tomato	tuktukya	-
tuktukya III	husk tomato; ground-cherry	tuktukya	tomate verde
tumtum I	fragrant; white water lily	tumtum	-
tumtum II	banana plant; water-snowflake	tumtum	-
tumtum III	water lily	tumtum	-
tumtum relative A	-	tumtum relación	-

Common Name	English	Miskito	Spanish
tumtum relative C	arrowleaf	tumtum relación	-
turbinaria	brown algae	siwaiwai	-
usupum	oak	usupum; usapum	roble blnco; quebracho
uva del mar	sea-grape	waham	uva del mar
vine I	morning glory	-	-
vine II	calopo	prakprakya	frisolilla; rabo de iguana
vine III	climbing or trailing-begonia	-	-
wain	wine; sorrel	kahola; wain tangnika	Jamaico; vino; Rosa de Jamaica
waisala	-	waisaba; waisala; marid tanani	-
wandering jew	wandering jew; inch plant	-	espiritu santo
wildflower II	snakeroot relative	-	-
wiwi	-	wiwi	-
yellow oleander	trumpet flower; yellow oleander	tangni	flor
yuca	cassava; manioc	yaura	yuca
yul kyama	dog's ear	yul kyama	oreja del perro
zinnia	common zinnia	-	clavelon
zinza	ginger	zinza	ingible; jengibre
zonzapote	-	puramaira; kura maira	zonzapote

Appendix 4: Nicaraguan Geography and Demography

Introduction

White sand beaches lined with palm trees characterize the Mosquito Coast, located on the Atlantic Coast of Nicaragua. A mixture of dense rainforest and pine savannas creates a range of ecosystems that supports a wide variety of animal and plant life. This rural region retains a frontier atmosphere with a Caribbean air. This is in contrast to the more urban and industrialized Pacific Coast, which continues to reflect its Spanish colonial heritage. Natural topographical divisions within Nicaragua have contributed to the development of distinctive cultures on each coast.

The Setting

Located in the middle of Central America, Nicaragua lies between Costa Rica to the south and Honduras and El Salvador to the north, with oceanic boundaries on the western and eastern perimeters. Nicaragua is the largest Central American country, with territory spanning 130,700 km^2 (Keller, Brosnahan and Rachowiecki 1992; Nicaragua 1994; Ryan, et al. 1970). The population is estimated at 4.6 million people (Nicaragua 2000). The natural landscape of Nicaragua divides the country into three distinct regions: The Pacific Lowland, the Central Highland, and the Caribbean Basin. The geography and demography of these regions, with special emphasis on the Caribbean Basin, follows.

Pacific Lowlands

A broad, fertile plain dotted by some 40 volcanoes characterizes the Pacific Lowlands.[1] A depression, called The Great Rift, separates the volcanoes from the

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[1] Three volcanoes remain active, Cerro Negro, Masaya and Concepción (Lange et al, 1992). As of 1994, Volcano Masaya continued to spew sulfuric acid. Momotombo, showed increased signs of activity in 1992 and, in 1996, briefly spewed black smoke following an earthquake (Smithsonian Institution 2000).

mountain ranges to the east (Ryan, et al. 1970). Therein are located two large lakes, Lake Managua and Lake Nicaragua, the latter of which contains over 400 islands and is the largest freshwater lake in Central America (Keller, Brosnahan and Rachowiecki 1992). Both of these lakes drain into the Caribbean Ocean, on the opposite coast. The Pacific Lowlands have a wet-dry tropical climate (Ryan, et al. 1970).

This is the most urban region of the country. Harboring about 60% of the population, of which 55% is urban, the three largest cities in the country are located on the Pacific Coast. In addition to the five major ports located along this coast, the Pan-American Highway, which connects the countries throughout Central America to within 75 km of the Colombian border, also traverses the Pacific Coast. The population is dominated by Spanish-speaking ladinos (a term which connotes both admixing and "Hispanicization") made up of mestizos[2] and whites (Ryan, et al. 1970). Ninety percent of the population is practicing Roman Catholics (García 1996; Nicaragua 1994).

Central Highlands

The Central Highlands are a mountainous region in the north-central part of the country. The mountain range, called Las Cordilleras de Maribios, is an extension of the Central American Highlands, which originate in Chiápas, Mexico (Ryan, et al. 1970). The highest mountain, near the Honduran border, reaches 2103 meters (3,281 feet – fide Keller, Brosnahan and Rachowiecki 1992; Rodriguez 2000). These mountains, combined with Nicaragua's funnel-shaped landmass, create an effective hurdle separating the two coasts. The largest rivers in Nicaragua originate in this highland region and drain in the Caribbean (Rodriguez 2000).

Less populated than the Pacific Lowlands, this area is very fertile, supporting 25% of the country's agriculture (Keller, Brosnahan and Rachowiecki 1992). Ladino

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[2] Details on these ethnic groups are found under "East Coast Inhabitants" below.

cultural influences predominate, but there are remnant populations from three indigenous groups. The largest group, the Matagalpa, numbers between 10-18,000 (some figures go as high as 20,000 - Grimes 1996) and live primarily within the Department of Matagalpa. Believed to be descendants of South American Indians, they were fully "Hispanicized" during Spanish colonization. Today they exist only in a social sense, retaining few customs to distinguish them from the local ladino farmers (including speaking only the Spanish language - Ryan, et al. 1970).

Two other remnant populations of note are the Subtiaba and Monimbø. The Subtiaba number around 5000 and are concentrated on the western plains and western highland slopes. Their language is extinct. The Monimbø number around 10,000 and their language is also extinct (Grimes 1996). Both groups are almost completely assimilated into the ladino culture, speaking only Spanish, but retain some Indian customs, distinguishing them from their ladino neighbors (Ryan, et al. 1970).

Caribbean Basin

Comprising half of the country's territory, the Caribbean Basin harbors only 11% of the country's population (Dozier 1985).[3] The lowland plains, widest in all Central America, average 75-100 km in width and spanning more than 540 km of coastline (Keller, Brosnahan and Rachowiecki 1992; Nicaragua 1994). Sparsely settled, the East Coast is typified by areas of low hills "rarely exceed[ing] 600 feet in altitude" (Helms, 1971: 120), coastal plains, savannas, swamps, deciduous jungles and tropical rainforest (Ryan, et al. 1970).

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[3] With a population of 469,780 in an area approximating 61,479 km^2 (Población por Departamentos y Municipios 1995; Regiones Autónomas 1997), population density averages only 7.6 people/km^2 - compared to a national average of 32 people/km^2 (Olivares 2000).

Locally referred to as La Costa Atlántica, the Atlantic Coast, or simply La Costa, the East Coast is characterized by a wet tropical climate with an average temperature of 78° F (25.5° C). There are two seasons. Winter on the Coast is the rainy season with most rain falling between May and December (Helms, 1971). Annual rainfall averages 150 in (3810 mm) but as much as 250 inches have been recorded in a single year (Keller, Brosnahan and Rachowiecki 1992; Nicaragua 1994; Ryan, et al. 1970). Summer begins in January but a true dry season exists only from March through May (Keller, Brosnahan and Rachowiecki 1992; Nicaragua 1994). These conditions result in a year-round lush habitat in which both flora and fauna flourish.

East Coast Ecosystems

The riches of the Atlantic Coast begin offshore with the numerous islands, notably Corn Island off Bluefields in the south and a 60-island group called the Miskito Keys off Puerto Cabezas. Underwater, the Continental shelf extends some 30-40 miles seaward creating the largest shallow-water habitat in the region (World Wildlife Fund 2000). The clear Caribbean waters harbor chains of coral reefs and large seagrass pastures which provide shelter, feeding and breeding grounds for sea turtles, manatees, shrimp, lobster, scores of fish and all manner of waterfowl.

Land ecosystems range from pine savannas to wet tropical forest with a variety of habitats, from swampland to riverine and in between. The coconut tree-lined coast of white sand reflects the proximity of this region to the heart of the Caribbean. Mangle (including mangle blanco - *Laguncularia racemosa* and mangle rojo - *Rhizophora mangle*) and palmera (*Acoelorraphe wrightii*) border the maze-like system of rivers that snake inland along the coast creating an aqueous highway. The brackish waters in the lagoon system harbor a diverse but endangered sea life that includes manatees and gray river dolphins among other species (World Wildlife Fund 2000).

Twenty-three rivers emanating from the central highlands empty into the Pacific Ocean. The largest, the Río Coco, originates 485 miles (780 km) inland and forms most of the northeast border between Honduras and Nicaragua (Keller, Brosnahan and Rachowiecki 1992). To the south, the Río San Juan, originating on the West Coast in Lake Nicaragua, connects the two coastlines and forms the border between Nicaragua and Costa Rica. Fertile alluvial soils are deposited along the banks of these rivers make them ideal for agriculture; most riverbanks are either in cultivation or in various stages of regeneration (Helms, 1971).

Just inland begins the great Miskito savanna, extending continuously from Puerto Cabezas to Waspam (a village on the northern border with Honduras) and in less profusion south toward Bluefields (Regiones Autónomas 1997). On this seasonal plain plants grow rapidly in the rainy season and flower early in the dry season before the summer brush fires begin (Rodriguez 2000). The sábana, as it is called locally, is characterized by an occasional algodón criollo (*Ceiba pentandra*), nancite (*Byrsonima crassifolia*) or usupum (*Quercus oleoides*) and clumps of palmera along with numerous razor-edged grasses and sedges that grow well on relatively infertile, acidic soils (fide Rodriguez 1996, 2000).[4] Large stands of pine forest (pino - *Pinus caribaea* var. *hondurensis*) interrupt the vast savannas. Nicaragua is the southernmost point where pines grow naturally (Denevan 1961). This particular pine, known as Caribbean pine, is well adapted to the wet season and its wood is highly valued (Rodriguez 2000).

In drier areas, there are stands of dry scrub forests with stubby shrubs and a number of deciduous trees. Before new leaf growth begins, these trees put on a spectacular show when the multitude of brightly colored flowers appear upon their bare branches. Plants commonly encountered here include bromeliads (like kitkal -

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[4] Good descriptions of the savannas are found in Kricher (1989) and in Young (1842).

Tillandsia streptophylla), brum (*Hirtella racemosa* var. *hexandra*), limsi (*Bursera simaruba*), querosin (*Tetragastris panamensis*) and jícaro (*Crescentia alata*).

The Atlantic Coast also harbors the largest remaining contiguous tract of rainforest north of the Amazon (Bursey-Wyss 1992; Mirsky 1992; World Wildlife Fund 2000) yet only six of the estimated 20 million acres of rainforest that once stood on Nicaraguan territory remains today (Nicaragua 1994; Rodriguez 2000). This dense rainforest connects the rainforests of Honduras and Costa Rica[5] and includes such trees as cedro (*Cedrela odorata*) and caoba (*Swietenia macrophylla*). Epiphytic plants, such as cinerut (*Smilax domingensis*), send down lianas and vines to the forest floor creating the tangled jungle-like atmosphere associated with the rainforest.

Herein Lies Mosquitia

This region is known as "Mosquitia." The term Mosquitia has been used to describe various permutations of the area on the Atlantic Coast for more than one hundred years.[6] Popularly known as the Miskito Coast, it once included an area that spanned from Belize to Panama. Today, the term describes a transnational region traversing the coastlines of southeastern Honduras and eastern Nicaragua. Mosquitia proper covers an area greater than 52,000 km^2, approximately two-thirds of which is located in Nicaragua (Parent 2000).

Today, Nicaraguan Mosquitia, also known as the Department of Zelaya, is divided into two autonomous regions, called the Northern and the Southern

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[5] Conservationists hope to have the entire rainforest put under protection to create a rainforest corridor that runs the length of Central America. In honor of the panther's presence in this region, conservationists have dubbed this green corridor Paseo Pantera or the Path of the Panther (Royte 1992).

[6] Attempts have been made to explain the derivation of the term Mosquito Coast and the tribe for which the Coast is named (e.g., Incer 1985) the only consensus is that it is not related to the insect of that name. See "Regional Advantages for the Miskito," Appendix 5: History, for more information.

Autonomous Regions (RAAN and RAAS, respectively).[7] Mosquitia remains an isolated area, although less so than the corresponding area in Honduras (Parent 2000). The two largest cities on the East Coast, Bluefields and Puerto Cabezas, serve as the seats of government for the two autonomous regions. The history of these two cities is a reflection of the unique position that Mosquitia has had on Nicaraguan history.

Bluefields

Bluefields is the regional capital of RAAS and the provincial capital of the Department of Zelaya. A port town, it is located on the banks of the Río Escondído.[8] In addition, its proximity to the Río San Juan has given historical significance to the town beginning with European contact.[9] In the sixteenth and seventeenth centuries, privateers and pirates used the Río San Juan to reach the interior regions of western Nicaragua.[10] In the eighteenth and nineteenth centuries, Bluefields served as the seat of government for the kings of the Miskito Kingdom (Finnegan 1988). The nineteenth and twentieth centuries saw the establishment of mining, lumber and banana plantations with British, European, North American and, following the 1979 revolution, western Nicaraguan[11] company heads using Bluefields as a base of operations.

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[7] This is a recent designation, resulting from the division of the Department of Zelaya, a single department comprising the entire east coast region, in 1987 (Regiones Autónomas 1997). See Appendix 5: History for more information.

[8] The port is actually located across the bay at El Bluff because the waters immediately around Bluefields have always been too shallow to allow ships to enter (Finnigan 1988).

[9] For further information, see Appendix 5: History.

[10] Bluefields was named after one of these pirates, a Dutchman named Blewfeldt, who frequented the area in the early sixteenth century (Espy and Creamer 1970).

[11] The supplanting of business heads by ladinos has, in turn, meant there was more ladino influence in Bluefields in 1994 than in Puerto Cabezas (Ryan, et al. 1970; Vilas 1989).

In accordance with its historical importance in the region, Bluefields has traditionally sustained a higher population than Puerto Cabezas as seen in Table A4.1.[12] Aside from the ladino influence, the Creole has dominated the Bluefields population since the middle of the nineteenth century (Vilas 1989). This is a distinguishing factor from Miskito-dominated Puerto Cabezas.[13]

Table A4.1. Comparison of Population Figures: Bluefields and Puerto Cabezas

Town\Year	1971	1986	1995
Bluefields	25937	30000	36292
Puerto Cabezas	13466	25000	37854

Puerto Cabezas

Puerto Cabezas began as a Sumo village called Bilwi. The Miskito seized the village from the Sumo during their expansionist period (Wilson 1975).[14] Bilwi became the town known today as Puerto Cabezas due in large part to a single enterprise, the Standard Fruit Company. In the mid-nineteenth century, Standard Fruit turned the village into a company town, building most of the infrastructure, including the pier, which still exists today.[15] More recent improvements to infrastructure included an airstrip that received small planes (with flights every day of the week) and a road that connected Puerto Cabezas with the West Coast (Giraldez-Benard 2000; Regiones Autónomas 1997).[16]

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[12] Sources for Table A4.1 are Población por Departamentos y Municipios (1995) and Vilas (1989).

[13] For further information, see "East Coast Inhabitants" below.

[14] See Appendix 5: History for more information.

[15] The pier has proven a vital structure over the years. When Standard Fruit left, lumbermen exporting pine began utilizing the pier (Ryan, et al. 1970). Today, mainly locals bringing in their fresh lobster or turtle catch use the pier.

[16] Although fairly good, this road, which passes through the mining towns of Siuna and Rosita, requires four-wheel drive vehicles in the wet season (Giraldez-Benard 2000).

Increased accessibility to the town may be one reason for the almost threefold increase in population over the last twenty-five years. Growth has been so dramatic that Puerto Cabezas has actually surpassed the traditionally more populated city of Bluefields (See Table A4.1). This population increase also resulted from the Miskito-Sandinista war of the 1980's during which residents who did not flee the region altogether tended to migrate to the larger cities, including Puerto Cabezas (Vilas 1989).

As Puerto Cabezas was the base of operations for this study, the atmosphere of the town as it existed in 1993-1994, provides context for the study. At that time, the town had a frontier zone atmosphere reminiscent of America's Old West with twentieth century characteristics. Narrow dirt streets were the norm, though portions were paved with brick. The local bus service consisted mostly of a fleet of Russian surplus military trucks. Taxis were available but were used mostly only by foreigners. For locals, both in town and in outlying communities, the main mode of transportation was walking.

Even today, most buildings are wooden, clapboard structures, rarely more than two stories high. Homes are mostly wooden structures built on stilts; some people can afford to build cinder block houses, which seem to stay cooler in the hot climate. Outhouses are still the norm although the hotels catering to foreigners do have modern plumbing with flush toilets. In 1994-1995, power outages were not uncommon; but lighting was available to all city dwellers and a select few could afford a refrigerator. Private phones being rare during this period, calls could be placed at the local phone company office where an operator made the connection and directed the caller to one of the eight phone booths flanking the room. The Moravian Church remains prominent in this as well as other communities, Protestantism being the dominant religion on the East Coast.[17]

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[17] East Coast inhabitants are primarily Moravian. See <u>Appendix 10: Religion</u>.

Commerce and entertainment abound. The commercial district, lined with small shops selling everything from crackers and wrapping paper, to sugar and kerosene, was a bustle of activity. Truck-buses screeched in and out of the unmarked stops throughout the day. A small pharmacy sold a variety of pills, many of which in 1993-1994 would require a prescription in the United States. Open-air markets, selling a variety of produce, clothing and music were centers of activity throughout the day.

In the evenings, entertainment could be found in the ramshackle cinema house where movies, often English-speaking, were available for under a dollar and were well-attended. A variety of mostly good cuisine was available in the many Chinese, Italian and Spanish restaurants. And inasmuch as this was the mid-1990s, the night air was filled the sounds of reggae music emanating from the many neighborhood discos. Downtown, there was a friendly, small-town atmosphere and although foreigners frequent the region, they were often researchers and little was then done in the way of tourist development.

Clearly absent in Puerto Cabezas was the typical Spanish character found in other parts of Nicaragua. This was because the East Coast was a British protectorate until the mid-nineteenth century. The unique cultural development of this region has resulted in the formation of a Costeño identity that is not bound by racial, religious or ethnic ties, so much as by regional ties (fide García 1996).[18] Concomitant with this Costeño identity is a deep-rooted animosity between the Costeños and ladinos, the roots of which are discussed in Appendix 5: History (fide Ryan, et al. 1970).

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[18] A hierarchy amongst the different groups inhabiting the East Coast has been noted by Bourgois (1986) and Vilas (1989). They assert that these members of society have traditionally occupied positions based upon an ethnic labor hierarchy, with Creoles and mestizos occupying the upper rungs and the indigenous people at the bottom. This hierarchy was not detected within the study communities but may be more evident in RAAS, where the Miskito are not the dominant ethnic group.

East Coast Inhabitants

Group identity exists on many levels (see García 1996, for an in-depth discussion on self-recognition). Costeño identity, as mentioned above, is a regional identity. There also six distinguishable ethnic groups living on the East Coast,[19] three of which are the only extant indigenous populations in Nicaragua. In order of population size, they are the Mestizo, Miskito, Creole, Garífuna, Sumu and the Rama. The demographics of each group are discussed in turn.

Mestizos,[20] or ladinos, are the largest ethnic group on the East Coast and are descendants of the Spanish admixture with the original inhabitants of the Pacific Coast. Their numbers are estimated at between 200-250,000 (García 1996; Weinberg 1995). The mestizo began migrating to the East Coast (specifically to RAAS) in the 1880s with aspirations of starting their own banana plantations. Today, mestizos live all along the coast. Their mother tongue is Spanish, although quite a few mestizos in the northeast region also speak Miskito, and they are primarily Catholic (García 1996). Costeños regard ladinos with disdain, considering them foreigners to the region.

The Miskito, the largest indigenous group in Nicaragua, live mostly in RAAN. In 1960, their population was estimated at 20-30,000 people (Ryan, et al. 1970). The most recent estimates vary from 80,000 (Weinberg 1995) to 165,900 (Grimes 1996).[21] The origins of the Miskito are discussed in Appendix 5.

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[19] There are gray areas between the groups. Ethnic identity on the East Coast is not based on one factor, but on a combination of factors, including mother tongue (Dunbar Ortiz 1988), ancestry (García 1996) and, from my observations, religion.

[20] The term mestizo means "mixed blood."

[21] The latter figure includes almost 12,000 inhabitants of Honduran Mosquitia. There are also populations in Costa Rica and from 3000-5000 Miskito in Florida in the United States (Borland 2000). Large differences in population estimates result from a chronically inaccurate census and from the high degree of intermixing that makes it difficult to distinguish ethnicity.

The next largest ethnic group, the Creoles, has had the greatest influence on the language spoken throughout the Central American Eastern seaboard (Grimes 1996). While the number of ethnic Creoles in Nicaragua is estimated to be 30-40,000, many people identified with other ethnic groups speak Western Caribbean Creole English (García 1996; Grimes 1996).[22] Creoles are of African, Indian and European descent and live mainly in the Bluefields area as they have been since the mid-nineteenth century (García 1996; Vilas 1989). They are primarily Moravian, and were distinguished as the first ethnic group on the East Coast to convert to Protestantism.[23]

The Garífuna, also known as the Central American or Black Carib, number about 1500 in Nicaragua and live mainly in RAAS (RAAS - García 1996; Grimes 1996; Ryan, et al. 1970).[24] Garífuna are relative newcomers to the region. They originated on the island of St. Vincent and are descendants of African slaves[25] and Carib Indians. After a foiled rebellion against the British in 1797, approximately 5000 Garífuna were relocated to Eastern Honduras whence they migrated to their present day coastal locations (Anonymous 1997; Carib 1994). The Garífuna are Christians and, having adopted Spanish and Creole English, their native language is extinct (García 1996).

The Sumu[26] also inhabit portions of Nicaragua and Honduras. Conservative estimates put their numbers around 6,700, with about 500 more living in Honduran

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[22] Creole English is further discussed in Appendix 9.

[23] More information on religion is found in Appendix 10.

[24] There are also Garífuna populations in Belize, Guatemala, and Honduras. The largest population, in Honduras, includes 200,000 (Anonymous 1997; Grimes 1996).

[25] African ancestry can be traced to include plantation escapees and survivors from a slave ship that went aground off St. Vincent (Anonymous 1997).

[26] The Sumu have recently begun referring to themselves as Mayangna (Benedicto 2000; Dana 2000; Elsberg, Blanco and Rodriguez 1992). "Sumu" will be used in this paper as that was the terminology used at the time this study was made.

territory (Grimes 1996); other estimates are nearer to 10,000 between the two countries (Benedicto 2000).[27] Formerly coastal dwellers, today they live inland on the Río Coco and its tributaries (in RAAN). While this group is being assimilated into the ladino culture (many speak only Spanish - Ryan, et al. 1970) and the majority are Moravian (García 1996), Sumu is still considered a living language (Grimes 1996).

The smallest indigenous and ethnic group on the Atlantic Coast of Nicaragua is the Rama. There are between 649-800 people who count themselves as Rama but only 24 of them still speak the Rama language; the rest speak Creole English (García 1996; Grimes 1996; Ryan, et al. 1970). They are the descendants of displaced South American tribes that occupied the Río San Juan area (Ryan, et al. 1970).[28] Today, the Rama, who are also Moravians, live in the southeastern-most corner of RAAS on the Rama Cay, a small island in the Bay of Bluefields (García 1996; Vilas 1989).

Along with diverse cultural groups, there are a plethora of animals and insects. Fauna includes the puma, white-tailed deer, foxes, armadillos, monkeys, alligators and boas. Birds such as toucans, horned owls, parrots, macaws, sparrow hawks and vultures dominate the sky. Personal observations confirm that grasshoppers, chiggers, mosquitoes and sand flies are among the most prominent bugs as suggested by Rodriguez (2000). Also observed in most of the settlements were such typical domesticates as pigs, cattle, horses, chickens, dogs as well as parrots and monkeys.

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[27] Ryan, et al. (1970) stated that only 750 Sumu remained; this figure may have been based solely on the Honduran populations. Confusion may also arise because the Sumu are actually made up of a number of tribes (such as Twahkas and Ulwas) but are referred to collectively as Sumu (Incer 1985).

[28] No mention of the Rama people is made in sixteenth and seventeenth century accounts of the region. However, there are references to their ancestors, the Voto from the region that is today known as Costa Rica.

Appendix 5: History of the East Coast of Nicaragua

Introduction

As discussed in Appendix 4, Nicaragua's natural topography divides the country in two. Its geographic location has also meant that Nicaragua has historically been the site of diverse cultural interactions, between North and South American Indians in pre-Columbian times and between competing colonial powers on the east and west coasts in the post-Columbian era. This chapter discusses the major political, economic and social events in the history of the East Coast that have shaped Miskito society and contributed to a dichotomous cultural development of the two coasts of Nicaragua.[1]

North–South Migrations (Tenth Century AD-1492)

There are conflicting accounts as to the pre-Columbian history of the Miskito people. Some archeological evidence is available but not well studied and some experts believe that other archeological findings may have been misinterpreted (see Werner 1993). Artifacts point to a pre-Columbian Indian influxes from the north and from the south. Ancient stone carvings of life-size gods, both human and animals, weaving and pottery remnants and the pattern of shifting (or slash-and-burn) agriculture are South American traits. Other evidence, suggests a North American Indian influence, namely the existence of Nahuatl place names in the region. For example, Managua is Nahuatl for "where the water is retained" (Finnegan 1988).

Between the tenth and sixteenth centuries, the region was along a commonly used migratory route for Indian cultures from both the south and the north. The first

[1] Miskito history has been portrayed in two lights. Some chronicles portray the Miskito as a fierce, independent people who have taken their destiny by the reins (Incer 1985; Olien 1983; Wilson 1975). Others depict an extensive history of domination and manipulation by foreign powers (Peck 1947; Vilas 1989). Nicaraguan history has been a tumultuous one and that turbulence is evident in the manuscripts written at different periods in history. Acceptance of one version or the other appears to depend upon the author's political affiliation.

evidence of these migrations dates to around the tenth century when waves of Indians from the Mexican (Aztecs) and Guatemalan (Mayans) Indians entered the region (Keller, Brosnahan and Rachowiecki 1992; Ryan, et al. 1970). Around 964 AD, the Nicarao, arrived along the western shores of what today is known as Lake Nicaragua displacing a group of people already living there (Mueller 1932).[2] The displaced group, believed to be ancestral Miskitos, moved to the eastern shores of Lake Nicaragua, remaining there throughout the eleventh century. Later population pressures forced them to the East Coast of Nicaragua (Incer 1985). The question is whence did the Miskito hail?

The Miskito share most traits with South American Indians and appear to have migrated to the western shores of Nicaragua at some point prior to 964 AD (Ryan, et al. 1970). There is little consensus on the exact South American tribe from which the Miskito sprang (Roberts 1940; Ryan, et al. 1970; Weinberg 1995). Theories include the Chibcha (of Colombia) and the Caribs (of Paraguay).

Weinberg asserted the Miskito originated from the Chibcha of Colombia. The most highly developed of the Colombian tribes, this group of Indians was characterized by a highly organized, matrilineal culture (Gomez 2000; Historia 1997). Like the Chibcha, the Miskito follow matrilocal traditions (fide Helms 1971; Nietschmann 1973). Moreover, the Miskito belong to the Chibcha language group (Grimes 1996). The Chibcha are believed to have migrated eastward where they differentiated into three tribes, the Matagalpa, the Sumu and the Miskito (Ryan, et al. 1970).[3]

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[2] Closely related to the Aztecs, the Nicarao exhibited traits typical of Mexican tribes: An elaborate society structure, complete with nobility and a prosperous agricultural society, based on shifting maize cultivation supplemented by fish and game (Mueller 1932; Ryan, et al. 1970).

[3] The Miskito do share a many traits with the Matagalpa, of the Nicaraguan Central Highlands. As Ryan, et al. (1970) noted, the Matagalpa inhabiting the Central

However, two significant aspects of Chibcha society do not resemble the Miskito. Chibcha practiced maize-based agriculture and had a highly organized culture (Gomez 2000; Historia 1997). This is contrary to even the earliest accounts concerning pre-Columbian Miskito. Dampier (1699) noted that Miskito agriculture was based on tubers, such as manioc (*Manihot esculenta*) and sweet potatoes (*Ipomoea batatas*). The other disparity lies in the Miskito's lack of a political hierarchy.[4] In Miskito society, all community members are considered equals amongst each other, assisting equally with farming endeavors (fide Nietschmann 1973). That these two important aspects of Chibcha society are missing amongst the Miskito implies the Miskito are either not descendants of the Chibcha or are only distantly related.

Another theory is that the Miskito descended from the Caribs, who around the tenth century, forged their way from Paraguay up through the Antillean islands, pushing back the Arawâk Indians who lived there (Roberts 1940).[5] Similarities between the Miskito and the Carib include tuber-based agriculture, renowned seafaring skills,[6]

Highlands were hunter-gatherers and practiced slash-and-burn agriculture, both South American tribal traits. The Sumu language is also of Chibchan origin (Grimes 1996) and Sumu folktales depict the Miskito as having been related (Incer 1985). Unfortunately, their tales do not coincide with existing migratory information.

[4] Dampier (1699: 10-11) noted that "they have no form of Government among them." See also Ryan, et al. (1970).

[5] The Arawâk were pushed back to the Bahamas and the Greater Antilles which is where they were encountered by the Spanish. Harsh treatment and foreign illness led to the decimation of these people within a few short generations. Their legacy to the region remains in the words derived from their language: hammock (of which they were the first to devise), potato, buccaneer, canoe, guava and tobacco (Roberts 1940).

[6] The Carib were experts with the canoe and the Caribbean Sea is named after them (Carib 1994; Rogozinski 1992). As noted in <u>Chapter 3: Edibles</u>, the Miskito are well-known seamen.

expansionist tendencies[7] and a similar societal structure.[8] According to Miskito tradition, they were originally called "Karibi" (Mueller 1932; Wilson 1975). A major difference between these two groups is that the Caribs practiced cannabilism; as a religious rite they would kill and eat the bravest warriors whom the Caribs had vanquished (Carib 1994; Rogozinski 1992). This practice has never been documented with reference to the Miskito.[9] Thus, Miskito ancestors are possibly of South American origin, but not necessarily of either Chibchan or Carib stock.

East-West Interactions (1492-Present)

The flow of north-south migrations to Nicaragua came to a halt after 1492 with Columbus' arrival in the Caribbean area. The area became a wrestling ground for European powers. The Spanish, Dutch, French and British all sparred for a foothold in the region. Colonization efforts wreaked havoc in and around Caribbean Islands.[10]

Spanish Inroads in the Region (1502-1527)

Columbus reached the northeast tip of Nicaragua in 1502, giving the land its name of Cabo Gracias a Dios.[11] But Spanish exploration of Nicaragua did not begin

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[7] The Caribs were expansionists in the pre-Hispanic era and the Miskito, in conjunction with the British, in the seventeenth century. Caribs are also known for being fierce warriors (Carib 1994; Rogozinski 1992).

[8] As with the Miskito, Carib society was loosely structured and communities followed matrilineal lines (Carib 1994; Nietschmann 1973; Rogozinski 1992).

[9] It is possible that the Caribs and Miskito may have had an historical, though brief, encounter as suggested by an obscure reference to the transitory presence of cannibals on the East Coast during the eleventh century (Mueller 1932).

[10] For instance, the Arawâk Indians were wiped out by the Spanish, "virtually in a single generation" (Roberts 1940: 59).

[11] Barraged by a terrible storm at sea, the men aboard Columbus' ships feared that they might be shipwrecked. The storm's winds blew the ships toward a cape and the weather suddenly calmed. Thankful to have found land, Columbus named this Cape Gracias a Díos, a name retained to this day (Olivares 2000).

for another twenty years, and, even then, Spaniards concentrated their efforts on exploring and settling the Pacific region.[12] They encountered little resistance as two major Indian chiefs in the region, Nicaro and Nicoya, willingly converted to Catholicism and employed their people to aid the Spaniards in conquering other Indian tribes (Roberts 1940; Ryan, et al. 1970). The first permanent Spanish colonies on the West Coast, Granada and Leon, were founded by Hernández Cordoba in 1524 (Keller, Brosnahan and Rachowiecki 1992; Ryan, et al. 1970). Cacao (*Theobroma cacaos*) plantations on the western shores of the lakes and cattle ranching in the drier areas dominated the economy. The Spanish were discouraged from entering the disease-ridden jungles and swamps to the East (Finnegan 1988; Roberts 1940; Ryan, et al. 1970). "The coastal marshlands to the south of Cape Gracias a Dios were left to the Mosquito Indians" (Roberts 1940: 124).[13]

Privateers and Buccaneers Enter the Scene (1527-1630)

The British, Dutch and French began traversing the Caribbean in privateering and pirating operations against Spain in the sixteenth century (Rogozinski 1992). The earliest account of privateering in the region dates back to 1527.[14] In 1563, an English

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[12] Emanating from their strongholds in Panama, the first Spanish raiding party, led by Gil Gonzalez de Avila, traveled up the West Coast in 1522 (Roberts 1940).

[13] The Spanish ambivalence toward the Mosquito Coast was similar to their attitude toward other holdings in the Caribbean. The Spanish laid claim to all of the Caribbean islands from Trinidad to the Isthmus of Panama (the area known as the Spanish Main) but they concentrated their efforts on colonizing the South American mainland. For the existing colonies, the Spanish Crown mandated a closed economy to be supplied by a fleet system with goods originating from Spain, creating a captive market in the New World holdings (Roberts 1940; Rogozinski 1992). This closed economy system eventually worked against the Spanish.

[14] This first privateer was a roving merchant who dropped anchor at Santo Domingo, a Spanish holding. He claimed to have lost one of his supply ships at sea and feigned the need for supplies to continue onward. Despite the ban against trading outside the Spanish economy, the people were compelled to barter with him (Roberts 1940).

trader, Sir John Hawkins, began realizing his privateering dreams and by the next year had established trade along the coast between Venezuela and Hispaniola. Once Queen Elizabeth openly condoned privateering operations, the British privateers were encouraged to continue their roving, ship-to-shore trade operations (Roberts 1940). Rogozinski (1992) described the colonists' attitudes toward privateers as outwardly antagonistic but inwardly grateful. The fleet system established to maintain a closed market economy between Spain and the colonies had eroded and colonists, in dire need of supplies, secretly welcomed the privateers and their illegal goods.

The privateers made a dent in Spain's control on the coast and the buccaneers came to finish the job. The seventeenth century saw the rise of the buccaneers, groups of lawless drifters who originally came to inhabit the western tip of Hispaniola. Often referred to as French pirates (Peck 1947), they also included English, Dutch, Irish and Welsh fugitives and political or religious refugees (Roberts 1940).[15] A run-in between the Spanish and buccaneers led the former to oust the latter from Hispaniola and set the buccaneers off on a tirade throughout the entire region. They moved to the Island of Tortuga (off the northern coast of Hispaniola) and became known as The Brethren of the Coast (Peck 1947; Roberts 1940). No settlement or ship in the area was exempt from their forays and, by the eighteenth century, they brazenly sailed under a black flag with the trademark skull and crossbones in defiance of any attempts to stop them (Roberts 1940). The East Coast of Nicaragua became a favorite haunt of The Brethren. They found that "the isolation, obscurity, and good natural harbors of

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[15] Although lawless in the eyes of the Spanish, there was order to their society with a series of proscribed life styles to be adhered to. They lived in small groups, trading with locals for their needs. They obtained their name from the Indian word, boucan, meaning smoked meat for, once this group learned the art of smoking meat from the Arawâk Indians, this became their mainstay. Their craving for meat earned them a reputation as bloodthirsty carnivores (Roberts 1940) - as though they were cannibals.

the Mosquito Coast" had distinct advantages (Ryan, et al. 1970: 54) and they used the labyrinthine coast as a hiding place from which to attack and subsequently escape from Spanish ships (Helms 1971; Roberts 1940).

The Rise of Miskito-British Relations (1631-1821)

A trading region for privateers and a safe haven for pirates, many foreigners, if not the Spanish, frequented the Mosquito Coast. Through these contacts, the Miskito became closely affiliated with the British, but they did not develop close ties with either the French[16] or Dutch.[17] Dampier noted this amicable relationship during his travels in the region beginning in 1681. He found the "Moskito," as he called them, to be "in general very civil and kind to the English, of whom they receive a great deal of respect, both when they are aboard their Ships, and also ashore" (Dampier 1699: 10). It is possible to explain the good relationship the British and the Miskito because the relationship was mutually fulfilling, both nations realizing reciprocal advantages.

The British had two goals in the Caribbean: To establish trade outposts (Romero, 1992; Vilas 1989) and to disrupt the Spanish holdings. The Miskito, being willing trading partners and having a common enemy in the Spanish, satisfied both of these desires. At the same time, the Miskito obtained ascendancy and autonomy, in

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[16] French buccaneers were the first to make contact with the Miskitos in Cabo Gracias a Dios (Wilson 1975). Yet Dampier noted, in 1681, that the Miskito "...do not love the French" (Dampier 1699: 8). One reason may be that, in 1537, a French pirate ship plundered the coast in an area that is probably modern day Honduran Mosquitia (Roberts 1940). In addition, the notoriously cruel Brethren of the Coast (who were often characterized as French pirates) earned a reputation as cannibals amongst the Indians along the eastern shores of the Central American Coast (Roberts 1940).

[17] The Dutch had little direct influence on the Miskito as their interests lied in the outlying Caribbean islands and South America (Roberts 1940). In the 1620s, the Dutch were prevalent in the region but their effect on the Miskito was secondary. In their pursuit of Spanish holdings, they kept the Spanish occupied making it easier for the British to establish their trading posts in eastern Nicaragua (Rogozinski 1992). They did leave their mark on the region, however. As mentioned in Appendix 4: Geography, Bluefields is named after a Dutch pirate (Espy and Creamer 1970).

addition to cementing a relationship that promised to satisfy their newly acquired desire for European goods. All of these benefits presented mutual advantages for both parties; neither group was forced to make disagreeable or difficult lifestyle changes in order to benefit from this relationship. This is in direct contrast to other colonial situations in which the indigenous inhabitants were subdued, relegated to the lower echelons and badly mistreated, as occurred with the Arawåk.

Advantages for the British

Trade with the British grew from small beginnings. The first sustained contact between the British and Miskito came around 1631, when a British Puritan colony established off the east coast of Nicaragua began trading with the surrounding region, especially the Miskitos.[18] The Providence Island Company established their first permanent mainland trading post at Cape Gracias a Dios in 1634. Eventually the British expanded the number of trading posts to other areas along the Coast, much to Spain's consternation (Helms 1971; Roberts 1940; Vilas 1989).[19]

The Miskito became trading middlemen between the British and other Indian populations and even with other Europeans in the region (Vilas 1989). In addition to trading local animal and plant resources, the Miskito traded their loot (from raids on other tribes and on the Spanish) and they also became slave traders. Miskito kidnapped Indians during their raids (most often the Sumus from the interior) who were sent to work on those Jamaican plantations considered too small to justify the cost of

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[18] The colony began in 1625 (Helms, 1971; Roberts 1940) and, by 1631, it included 540 British, a handful of North Americans, African slaves (Vilas 1989) and Jamaican Negroes who were shipped in by the British to tend plantations (Roberts 1940).

[19] After several attempts, the Spanish finally destroyed the Providence Island settlement in 1641 and the trading post at Cape Gracias a Dios was subsequently closed (Helms 1971; Roberts 1940; Vilas 1989).

importing African slaves (Helms 1971; Vilas 1989).[20] In exchange, the Miskito obtained European goods such as cloth and machetes, and eventually ammunition and guns.

In addition to obtaining willing trading partners, the British gained the necessary Miskito manpower to repel Spanish attempts at eastward expansion. The latter helped to bolster England's control in the Caribbean. Not only were the Miskito familiar with the landscape, but they were also fierce and brave warriors, attacking Spanish settlements as far west as Granada (Keller, Brosnahan and Rachowiecki 1992). "They behave themselves very bold in fight, and never seem to flinch nor hang back...they will never yield nor give back while any of their party stand" (Dampier 1699: 8).[21]

Advantages for the Miskito

Miskito-British association served a twofold advantage for the Miskito. Through their position as British trading partners, they gained ascendancy in the region. The most important commodities that the Miskito received were firearms.[22] Acquisition of firearms allowed the Miskito to obtain hegemony over the region.[23] Helms' (1971) assertion that the Miskito became expansionist seems an understatement.

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[20] At the turn of the seventeenth century, the slave trade in Jamaica was among the largest of such operations in the world (Jamaica 1994).

[21] Besides fighting Spanish territorial expansion, the Miskito also helped the English quell a rebellion by Jamaican Cimarrones in 1730 (escaped African slaves from Spanish colonies). Miskito fought the eight-year battle alongside regular British troops and freedmen from Jamaica, finally ending with a peace agreement between the British government and the Cimarron leader (Incer 1985; Rogozinski 1992; Vilas 1989).

[22] In fact, the first British trading post in Cape Gracias was under orders not to provide guns to the Indians; it was the pirates who delivered those items (Helms 1971). Dampier also noted that, "when they come among Privateers they get the use of Guns" (1699: 8). The British may not have provided the first guns to the Miskito, but they clearly provided firearms and ammunition thereafter (Vilas 1989).

[23] Vilas (1989) and others beg to differ with this, claiming the Miskito agreed to "domination by consent," which outsiders have viewed erroneously as hegemony.

From two small settlements in Dampier's time (1699), Miskito territory remained stable until 1750, at which point they still only occupied a small area mainly within Honduras (between the Río Tinto and the Río Coco – Helms 1971).[24] Being the only Indian group with guns, the Miskito easily subdued other indigenous groups in the area, especially the Sumu who were forced to withdraw inland.[25] Miskito territorial expansion progressed to the north and to the south along the coast (but not inland to any extent) until, at the height of their expansion, they controlled the entire coast stretching from Belize to Bocas del Toro in Panama (Helms 1971; Incer 1985).[26] Although today, the Miskito are concentrated in the northeast regions of Nicaragua, they left their legacy of control behind them in the form of Miskito place names along the entire coast.[27]

Together with their dominance of the coast, the Miskito enjoyed political autonomy over the region (Helms 1971). The British used their brief history of trade

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[24] Miskito tradition states that at one time the group was nothing more than a warrior tribe living in, what is today, Honduran Mosquitia (Incer 1985). In search of better land, the tribe migrated southward (Incer 1985; Mueller 1932). Reaching a large bay teeming with fish (Cabo Viejo, the headwaters of the Río Coco), they separated into two groups. The first group, called Miskut Kiamka ("Miskut's family and relatives") continued moving southward and settling along the coast. Group two, Miskut Uplika Nanni ("Miskut's people") went inland along the rivers, making settlements along the way. This is one theory on the origin of the tribal name, Miskito (Incer 1985).

[25] The Miskito had a history of dominance over the Sumu. Upon initially colonizing the East Coast, the Miskito encountered the Sumu, whom they nicknamed Laltantas (in essence, "stupid heads"), and forced them to leave their habitations (Incer 1985). The Miskito often conserved the Sumu place names of a village (especially along the upper branch of the Río Coco - Helms 1971; Wilson 1975). As mentioned in Appendix 4: Geography, Bilwi (also known as Puerto Cabezas) was originally inhabited by the Sumu and, according to Marítza Urbína (Puerto Cabezas), two of the study communities were founded by Sumu families (see Appendix 7: Study Communities).

[26] In addition, they raided far-off areas like the Yucatán in Mexico (Helms 1971).

[27] Miskito place names have suffixes such as -laya, -bila, -wala, -pura, -kira and -tara (Wilson 1975). The sea just offshore from Bocas del Toro today is still called the Golfo de los Mosquitos.

with the East Coast as a basis for their political claim over the area (Roberts 1940). In the eighteenth century, the Mosquito Coast became a British dependency and the remainder of the eighteenth century saw war after war in the Caribbean between Britain, France and the Dutch in attempts to dominate control of the islands and territories therein (Nicaragua 1994). All the while, a Miskito king ruled Miskito territory.[28] Miskito sovereignty of their region was a major contributor to the Miskitos' "positive reaction to culture contact" (Helms 1971: 228). A modern day effect of the positive cultural interactions between the British and Miskito is reflected in the fact that English remains a prestige language on the coast to this day (Olien 1983).[29]

The Road to Independence (1821-1849)

On September 5, 1821, Nicaragua gained independence from Spain but began a series of affiliations with other countries. First they became part of the Mexican Empire. When that collapsed in 1823, they became a federated republic forming the Central American Union (Roberts 1940). The Union dissolved in 1839, at which time each state was free to govern itself (Ryan, et al. 1970). Through all this, the British

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[28] There is some debate as to the legitimacy of these kings. It has been purported that the kingship was a phony institution established by the British as a gesture to foster good relations between the British and the Miskitos (Helms 1971; Vilas 1989). Believing it a sham, Peck (1947: 247) noted, "British officers staged a farcical ceremony in which a big Negro chief was made king of Mosquitia. Bursting out of a major's uniform with glittering epaulets on the shoulders, and childishly pleased with his finery, King Robert was solemnly crowned by an English bishop." Indeed many of the later kings were educated in Jamaica or Britain and the Miskito came to associate British recognition of the king as a legitimacy factor (Olien 1983; Rushdie, 1987). Contrary to these assumptions, the lineage of Miskito Kings appears to have originated in 1655, 32 years prior to the first coronation in Jamaica in 1687 (Dennis and Olien 1984; Olien 1983). Olien (1983) presents a fascinating paper that demonstrates an orderly and heritable succession to the Miskito throne, staying within a single family throughout the 239-year existence of the kingdom.

[29] Miskitos are eager to impress English-speaking visitors with their command of the English language, although it is sometimes difficult to understand, being a form of Creole English. See Appendix 9: Language for more information.

remained firmly ensconced on the East Coast. In 1847, they created an official flag for the Kingdom and the name "Mosquitia" was formally adopted for the region (Vilas 1989). The British also announced to the Nicaraguan government that they were extending the official territory of Mosquitia to include the port town of San Juan del Norte at the mouth of the San Juan River, which they renamed Greytown, after the governor of Jamaican (Olien 1983). Until this point in time, the Nicaraguan government had managed to retain control over this strategic port.

Around this time, the 1848 California Gold Rush spurred the United States to consider two possible locations for a trans-isthmian canal: Nicaragua and Panama.[30] The Río San Juan had been known as an interoceanic route since the early days in the sixteenth century when pirates conducted their raiding expeditions up this river. American entrepreneur Cornelius Vanderbilt used this information to devise a more expedient method of reaching the west coast of the United States. He created the Accessory Transit Company (Espy and Creamer 1970) to transport gold seekers from coast to coast via Nicaragua. It was made up of three companies: A shipping company, a riverboat company and a stagecoach company. The shipping company brought passengers down from New York to San Juan del Norte, the port at the headwaters of the Río San Juan. Passengers then transferred to a riverboat and traversed the Río San Juan westward until reaching Lake Nicaragua where they disembarked and traveled overland by stagecoach to San Juan del Sur on the West Coast. Here, they boarded an ocean liner for San Francisco. The operation was a

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[30] There had been earlier talk of an interoceanic canal in Nicaragua. The Gold Rush provided a new impetus for renewed debate. Gold seekers from the eastern seaboard of the United States had only two options for reaching California during the mid-1800s - via land which was treacherous due to the American Indian threat, or via Cape Horn which was long and equally treacherous (Espy and Creamer 1970).

huge success.[31] The subsequent race between Britain and the United States to construct and control a permanent canal along the Vanderbilt Road, as the route was dubbed, (Espy and Creamer 1970) would ultimately lead to Miskito independence.

Mosquitia Gains Autonomy (1850-1894)

With both the United States and British having interests in the region and the American Revolution only recently resolved, the two nations signed the Clayton-Bulwer Treaty of 1850. This preemptive measure to avoid conflict or war contained a stipulation that had direct bearing on the East Coast of Nicaragua: That neither power would colonize nor control the region (Chávez and Acosta 1994c).[32] This spelled the

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[31] It is estimated that during the twenty-two year period (the total number of years - including the brief gap in service during William Walker's antics – see below - that the Vanderbilt Road was in operation), approximately 125,000 people used the route (Vilas 1989). That translates to about 16 passengers through the region on a daily basis!

[32] The British and Americans also agreed in the Clayton-Bulwer Treaty that any canal constructed would be neutral and both countries were given one year to come up with plans and financing for such a canal (Chávez and Acosta 1994c). The United States came up with the winning plans for the trans-isthmian route and Vanderbilt was granted the contract to build the canal in 1851. But a series of events delayed and eventually quelled the idea (Vilas 1989). During the development and planning phases of the canal, Vanderbilt Road remained in operation but was brought to an abrupt halt in 1855 by William Walker, an infamous United States "filibusterer" (which is Spanish for buccaneer). Nicaraguan Liberals invited Walker to Nicaragua to help overthrow their opponents, the Conservatives. With his band of mercenaries, Walker attacked the Conservative stronghold of Granada but rather than turn the government over to the Liberals, he elected himself president in 1856. This was unpopular with the Nicaraguan liberals, with surrounding Central American countries, and with British and American officials (especially Vanderbilt). Walker was soon ousted from the country and, upon attempting re-entry via the East Coast, he was "turned over to a Honduran firing squad" (Espy and Creamer 1970: 43). The canal was further delayed when Congress began wavering on its decision as to the best location of the interoceanic canal (Nicaragua or Panama). Then the canal became obsolete for the purposes of the gold rush (in 1868, the transcontinental railroad was completed and Vanderbilt Road was closed - Vilas 1989). As history reveals, Panama was ultimately selected. The canal through Panama was less expensive because the United States bought the land from a defunct French company that had abandoned a Panamanian canal project in 1887. Nicaragua was also considered a security risk because news of an active volcano had alarmed Congress members who were to make a decision on the matter. It is rumored that a simple stamp is to blame: Members of Congress supposedly

end to British control of the Miskito Coast; the region remained a British protectorate until it was officially ceded to the governments in Honduras and Nicaragua with the Treaty of Managua in 1860 (Vilas 1989). Nicaragua claimed sovereignty over the area, renaming it the Mosquito Reserve (Dunbar Ortiz 1988).

Yet the region remained relatively autonomous for the next thirty years as a consequence of two stipulations in the Treaty of Managua (Keller, Brosnahan and Rachowiecki 1992). First, it settled the decades-old point of contention between Mosquitia and Nicaragua over the port of Greytown or San Juan del Norte by declaring it a free port under the authority of the national government (Chávez and Acosta 1994h). Second, Miskitos' were given the right to govern the residents within the Reserve according to their own customs as long as they also conformed to the national government (Keller, Brosnahan and Rachowiecki 1992). Thus, the government of Nicaragua had control of the strategically located port at San Juan del Norte and the Miskito enjoyed autonomy in their region. With people on both sides of the Atlantic contented, the region remained virtually overlooked by the Nicaraguan government until it was officially annexed to Nicaragua in 1894. And, while a Nicaraguan trans-isthmian canal never came to fruition,[33] the Clayton-Bulwer Treaty effectively removed

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received some Nicaraguan correspondence on which the postage stamp pictured an active volcano (Espy and Creamer 1970; Helms 1971).

[33] Still, the United States remained interested in the possibility of a Nicaraguan canal. In 1914, they signed a treaty with the Nicaraguan government which, in exchange for $3 million, gave the United States exclusive rights to build a canal if ever such a project were undertaken (Chávez and Acosta 1994d). In 1970 when the United States still had not taken any action towards such construction, it was mutually agreed to annul the treaty of 1914 (Chávez and Acosta 1994a).

Britain from the East Coast and opened the first diplomatic talks between the Miskito on the East Coast and the national government to the west.[34]

Transformation to Modern-Day Mosquitia (1894-present)

The transformation from post-protectorate Mosquitia to the autonomous regions of today has been a long and convoluted one. Incorporation has done more to define modern day social issues than any other event in history. Many ramifications of incorporation continue to be sources of contention today, more than a century later.[35] For most of the nineteenth century, a governing body that ruled from afar determined the fate of the East Coast.

The first notable episode occurred at the close of the nineteenth century when Liberal president Jose Santos Zelaya was elected in 1893. During his second year in office, he officially annexed the Mosquito Coast (called the reincorporation), renaming it the Department of Zelaya and bringing it squarely under national control. One of the justifications for reincorporation was to prevent foreign extraction of natural resources (Chávez and Acosta 1994f).[36] Zelaya was briefly successful. First, he took control of resources and concessions for himself. Second, he significantly raised tariffs on exports. Both moves contributed to Zelaya's downfall in 1912.[37]

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[34] The first diplomatic visit by the national government to the region was in 1887. Government representatives came to the East Coast and began official dialogues Mosquito Reserve government (Vilas 1989).

[35] Two specifically contentious issues concern acquiring land titles and controlling natural resources. These are discussed in Appendix 6: Resources and Livelihood.

[36] Most banana operations (95%) were American-controlled (Weinberg 1995). A number of authors believe that the United States used Nicaragua as their backyard plantation, exploiting the resources and taking the proceeds out of the country (Burgois 1986; Vilas 1989).

[37] When a group of rebels in the Bluefields area declared their opposition to Zelaya, the United States, disliking Zelaya's threats to American economic interests, backed the rebel group which overthrew Zelaya (Gillock 1995).

A period of political chaos followed Zelaya's ouster. Over the next twenty years, acting presidents requested the assistance of U.S. Marines for peacekeeping purposes (Espy and Creamer 1970; Ryan, et al. 1970). While the request came from the seat of government on the West Coast, the Marines used Bluefields as their base of operations. This put the East Coast in the middle of the clash between the Conservatives in favor of foreign assistance and the Liberals who were against American involvement.

The political infighting culminated in a six-year war in the East Coast jungles. Begun in 1927, the war was led by General César Augusto Sandíno. He wanted all foreign influence off Nicaraguan soil, and especially sought to oust the Marines from the East Coast. The Marines withdrew in 1932 and Sandíno was assassinated in 1933 ending this chapter in West Coast politics affecting East Coast life.

The next significant development on the East Coast occurred in 1960 when the International Court of Justice in The Netherlands settled a long-standing border dispute between Honduras and Nicaragua. The Court designated the Río Coco as the official boundary between the two countries. The creation of this artificial demarcation through the heart of Miskito territory demonstrated the general disregard for the indigenous populations and created new problems within Miskito society. The Nicaraguan government began a policy of relocation, termed traslado, to move Miskito settlements from the Honduran side of the Río Coco to the Nicaraguan side.[38] The inability to travel freely through the region meant a loss of livelihood for the locals in the region.[39]

Tensions re-emerged in the early 1980s with the advent of the Sandinista-Contra War. This recent war reemphasized the strong differences in opinion that exist between people of the west and east coasts of Nicaragua. Initial efforts by the nationalistic Sandinista government to reassert authority on the East Coast were effected with complete disregard for the indigenous people of the region (Dunbar Ortiz 1988; Vilas 1989; Walker 1985; Weinberg 1995). Many Costeños fled to Honduras and Costa Rica fearing conscription (or worse - Oliver, 1991) and joined the counterrevolutionary army, known as the Contras.[40] As a result of skirmishes along the border with Honduras, the Nicaraguan government affected another traslado in 1982.[41] This traslado was as badly received as the one 25 years previous. In 1985, a peace agreement was reached and refugees began repatriating (Chávez and Acosta 1994g; Dunbar Ortiz 1988). Despite isolated reports of problems, the treaty continues to hold.

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[38] This sparked bitter resentment on the part of the Miskito. The government argued that the traslado was made "for the good of the populace" (Helms 1971: 42) to ensure their continued access to the hospital in Bilwaskarma and other commercial facilities found on the Nicaraguan side. Government-built homes and schools for the traslados did little to pacify them. To add insult to injury, the traslados were then required to obtain permits to farmland which they considered their traditional farmland and to which they had previously had free access.

[39] Most timber on the Nicaraguan side of the river had already been harvested. The Honduran side was replete with harvestable timber but became inaccessible when the new border was drawn, putting most local loggers out of work.

[40] Many tales of bloody battles within the communities and outlying areas in the northeastern region of the Coast have been told, the horrors being blamed variously on the Contras or the Sandinistas depending on the narrator.

[41] Forty-four villages from the Río Coco region were moved (Wilde 1985). The government claimed that these border villages were moved for their own safety against the Contras, the rebel army composed mainly of Miskito and backed by the United States CIA, who had been "attacking communities in the area" (Gordon 1986: 168).

It was during this time that the East Coast experienced another series of political reorganizations. In 1982, the Department of Zelaya was divided into two regions, Special Zone 1 and Special Zone 2 (Vilas 1989). Autonomy was granted in 1985 and, concomitant with the 1987 autonomy law, which officially delineated the terms of autonomy, the two zones were renamed the South Atlantic Autonomous Region (RAAS) and the North Atlantic Autonomous Region (RAAN – Regiones Autónomas 1997).

The Cultural Dichotomy

The cultural dichotomy that exists today between the two coasts of Nicaragua was established long ago. In 1681, Dampier noted "...the Spaniards they [Miskitos] hate mortally" (Dampier 1699: 8). Miskito animosity toward the Spanish was validated through their association with the British, Spain's colonial adversary. The lasting enmity between East versus West Coast dwellers is exemplified by a missionary's account of an incursion by Sandino's men in the Sumu village of Masawas (RAAN) on April 22, 1931.[42] In a letter to his superiors, the missionary noted that, as Sandino's men approached, the Sumus cried, "The Spaniards are coming" (Bregenzer 1931).

Today, more than 170 years after the Spanish granted independence to their Central American colonies, Costeños continue to refer to people from the West Coast as "Spaniards."[43] This reflects not only the long-established adversarial political relationship between the two coasts but also the cultural and social dissociation that Costeños continue to feel relative to their western countrymen.

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[42] Sandino focused on the East Coast because the U.S. Marines were located there, but his dislike of Americans extended to the Moravian missionaries, who he believed were American spies.

[43] The terms mestizo and ladino are considered equally derogatory.

Appendix 6: Resources and Livelihood

Introduction

> At present, I am sorry to say, that every thing left to the native is wasted, and the advantages offered by nature, however easy the attainment, however abundant the supply, are refused...Without the skill and perseverance of the white man, the natural resources of this fine country will never be brought to light (Young 1842: 16-17).

The attitude expressed in 1842 by Young toward the exploitation of natural resources wreaked havoc along the East Coast. Greater awareness of environmental destruction and resource degradation today, however, is finding its way into even the most remote communities, and a brighter future may be possible. The following information represents an abbreviated history of the past extractive efforts that have been undertaken on the East Coast and an idea of where this issue is headed today.

History of Extractive Industries on the East Coast

Past extractive efforts in this region have included rubber extraction, mining, chicle, fishing, oil prospecting, lumber and banana plantations. Extractive enterprises experienced two boom and bust cycles on the East Coast in the nineteenth and twentieth centuries (Helms 1971; Romero 1992; Vilas 1989). The first began near the end of the nineteenth century and the second around World War II. Most of the enterprises were foreign-owned so profits from these ventures rarely stayed in the country (Vilas 1989). To provide some perspective as to the development and influence of various extractive industries on the region, two important enterprises will be discussed: The banana and lumber industries.

Bananas

The first banana boom lasted from about 1860 to 1930. An American, J.O. Thomas, moved to the East Coast in 1859 and began the first plantation in 1860 (Romero 1992). In 1872, Minor C. Keith began the first banana plantation in Costa Rica (Anonymous 1929; Peck 1947). This successful entrepreneur expanded his operation into Nicaragua and established general stores from Limón (in Costa Rica) to Bluefields (in Nicaragua) to Belize City (Belize).[1]

By 1898, Keith was the largest banana grower in Central America (Anonymous 1929). The following year, he joined with Boston Fruit Company to create the United Fruit Company. United established a base in Bluefields and took over all banana operations in Nicaragua in 1899 (Romero 1992; Ryan, et al. 1970; United Fruit Company 2000). Ultimately, United held land in Costa Rica, Nicaragua, Honduras and Guatemala.[2]

Smaller, less organized and with less internal infrastructure built to support the industry, Nicaraguan plantations were slow in expanding (Ryan, et al. 1970). Banana plantations had turned into a big business by the early twentieth century. Standard Fruit Company operated banana plantations in northern Zelaya and the Cayumel Company was in central Zelaya (Vilas 1989). Political unrest during the 1920s and 1930s, waves of banana disease (such as Black Sigatoka and Panama diseases) and decreased soil fertility all contributed to a sharp decline in production within two decades (Ryan, et al. 1970; Vilas 1989). Banana production went from close to three million bunches per year in 1927-1929 to slightly more than 1000 in 1940 (Vilas 1989).

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[1] Two steamers traveled along the coast from town to town with goods to stock stores and also to pick up items such as tortoise shells and rubber, which Keith exported (Peck 1947).

[2] At his death, Keith had organized, owned or presided over the Guatemalan Railways, the Guatemala & Salvador Railway, St. Andrew's Bay Lumber Company, Abangarez Gold Fields of Costa Rica, the Polochic Banana Company, Premier Gold Mining Company (Long Island), International Products Corporation and General Lead Batteries Company (Anonymous 1929). Despite this apparent local popularity, United Fruit Company is presented today as the penultimate example of the evils of American "economic colonization" in Central America during the twentieth century. United Fruit Company's use of American political and military power to protect its holdings in Guatemala, which were apparently linked to a coup there in 1954, put a permanent blemish on the success of this man's impressive life (Filreis 2000).

The disruption of world trade caused by the outbreak of World War II led United Fruit Company to close its Nicaraguan operations in the 1940s (Ryan, et al. 1970; Vilas 1989).[3] A local company began producing bananas on a reduced scale but ceased operations in 1961.[4] By 1971, even local traders were hardly buying any fruit from native planters (Ryan, et al. 1970).

Logging

The lumber industry came to Nicaragua, specifically, the Río Wawa, in 1892, and by 1893, large amounts of wood were being exported to the United States (Vilas 1989). The profound influence which this extractive enterprise had on the region might best be understood by examining the impact of one lumber company, the Bragman's Bluff Lumber Company, a subsidiary of the Standard Fruit Company. In 1921, Bragman's began harvesting pine on a large-scale near an Indian village known as Bilwi.[5] Bilwi grew into a company town as the infrastructure that supported Bragman's enterprise was built. This included a large pier which is still in use today, railroad tracks that extended up the Wawa River for 100 miles, many bridges, an electric plant, an ice factory and a sawmill which at the time was the largest in Central America (Vilas 1989). Today, this town is the main port town of the Northern Autonomous Region.

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[3] The Río Coco Miskito still think of The Standard Fruit Company's banana operations during the 1920s and 1930s as the most significant business undertaking in the recent past (Ryan, et al. 1970).

[4] This date coincides with the settlement of a border dispute between Nicaragua and Honduras that led to the relocation of a number of Miskito villages based on the redrawn border. This event, called the traslado, caused a considerable economic upheaval (Espy and Creamer 1970; Ryan, et al. 1970). For more information on this subject, see Appendix 5: History.

[5] This word is a derivation of the Sumo word Bilwas, meaning "snake river" (Incer 1985). Many of the locals continue to refer to Puerto Cabezas by this indigenous name and, as of the year 2000, the indigenous name has been reinstated (Dana 2000).

Many smaller lumber companies also came into the region just after the turn of the century: Mengol (1908-1935) on the Escondido River; Waddell's Prinzapolka (founding date unknown) also on the Escondido; and Dietrick (founding date unknown) on the Coco River (Vilas 1989).

The second boom period occurred during World War II. The Nicaraguan Long Leaf Pine Lumber Company (NIPCO) was established in 1945 in Puerto Cabezas (Vilas 1989).[6] NIPCO closed in 1963 after clearing more than 700,000 acres of pineland so that, for the first time in Nicaragua's history, the country had become a net importer for wood products (Vilas 1989). NIPCO's legacy to the region: Thousands of acres of stumps.

Six years later, the Atlantic Chemical Company (ATCHEMCO), a subsidiary of Wrigley's, found a use for even the stumps: resin- and oil-extraction (Vilas 1989). This elaborate and ingenious operation was established in Tronquera, in the heart of the felled region of pine savanna. A completely self-contained and ecologically sound (given the time period) operation, the entire process was steam driven by rainwater siphoned from a huge outdoor cement-lined reservoir and heated from the burning stumps. As the products from each step (resins, ethane and other chemicals) were collected, the byproducts were reincorporated into ensuing processes. Over a ten-year period, the operation consumed all of the stump land within Nicaraguan Mosquitia and

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[6] As has been noted by other authors on the region (e.g., Ryan, et al. 1970), many locals remember fondly the big businesses that have since departed the region. Castillo Penare (Wawa) recalled that, during the Standard Fruit Company era, a private company used to produce pine siding, harvesting pine from la sábana (the savanna) about five kilometers inland. Castillo was probably referring to NIPCO.

had begun to import stumps from the Honduran side of Mosquitia. The company ceased operations in 1979 (Vilas 1989) when it literally ran out of stumps.[7]

Modern-Day Issues

Land use and resource management issues have been sources of contention between the locals on the East Coast and the government on the West Coast since Mosquitia was reincorporated in 1893. In fact, two of the most divisive issues stem from reincorporation: Land tenure and control over natural resources.[8] While both issues are inter-related, they will be briefly addressed under separate headings.

Land Tenure

With reincorporation, there was an increase in migration to the area by people from the West. Costeños resented this ladino influx that also brought about the first real land disputes between locals and the newcomers. Zelaya's solution to this problem was to create a uniform, though unrealistic, system of land titles (Vilas 1989). Land titles that existed prior to 1894 were honored. Those who did not hold titles to their property were issued a title to an amount of land that was much smaller than that which locals would have traditionally used and that did not include all the land that historically belonged to most communities (Chávez and Acosta 1994c).

For the majority of Miskito, the latter situation applied. Traditionally, Miskito had built homes and sown plantations on communal holdings and did not hold individual titles to these parcels of land (fide Dana 2000).[9] As was exemplified in the study

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[7] The Sandinista revolution may have been the final impetus to close the business (Vilas 1989).

[8] See Appendix 5: History for more information on the reincorporation of Mosquitia.

[9] In contrast, indigenous populations in RAAS tend to hold title to their land, private property being the norm (Dana 2000).

communities by the lack of property-bounding fences (see Chapter 3: Edibles), the concept of private property is not practiced amongst the Miskito.

To settle land disputes and make decisions concerning titles, the government established the síndico system within the communities. Each village chose a community member to act in a mayoral role as a negotiator between the government and the community. The system was rife with problems, as the síndicos did not, apparently, take their role seriously (Vilas 1989).[10]

For most indigenous people, an obstacle to obtaining land tenure was the lack of accurate maps showing their traditional land holdings. Today, in an effort to rectify these problems, global positioning satellite (GPS) technology is being employed to generate maps in regions where indigenous people lack titles to communal holdings (such as Honduras, Costa Rica and Paraguay).[11] This remarkable use of high-tech resources should endow indigenous populations with the means to obtain tenure over their natural resources.

An on-going mapping project on the East Coast of Nicaragua using GPS technology has resulted, as of 1998, in the generation of maps for more than one hundred communities.[12] Inhabitants of each community were trained to record the information themselves. In addition, inhabitants provided historical and current land

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[10] Today, the role still exists and a síndico is considered part of the village leadership although, in some villages, the síndico is still regarded by some villagers with disdain.

[11] The global positioning system (GPS) is a radionavigation system that operates using a remote sensor in conjunction with numerous satellites orbiting the earth. Thus, it is available worldwide. The GPS records community boundaries and land use areas and, using computerized geographic information systems (GIS), the information is transformed into a map (Dana 2000).

[12] This is a joint project between the Central American Research Council (CACRC – a consortium of Nicaraguan and University of Texas anthropologists and geographers) and the Center for Investigation and Documentation of the Atlantic Coast (CIDCA – a local non-governmental organization).

use information that was denoted on the maps using land use symbols.[13] These maps will be useful for the Miskito who are still in the midst of the land tenure issue.

<u>Control of Natural Resources</u>

Another issue also raised in the 1893 reincorporation that continues to be a problem today is control over regional resources. This issue concerns not only concession rights but also fair compensation. Over the last twenty years, the government has made many overtures regarding the control of concessions but has not put them into practice.

In 1981, the fledgling Sandinista government declared that all resources on Nicaraguan soil were the property of the state to be exploited as the state saw fit (Chávez and Acosta 1994f). When the Miskito Coast was granted autonomy in 1985, specific stipulations were made concerning resource control. Articles 9 and 10 in the 1985 Autonomy Law gave the indigenous populations of the East Coast the right to exploit the resources within the areas that they have traditionally inhabited (Chávez and Acosta 1994h). This was reiterated in the 1987 Autonomy Law that added the requirement for the government to consult the indigenous regarding the exploitation of their areas' resources (Cooke 1987; U.S. Department of State 1997). The 1985 Autonomy Law stated that a portion of the proceeds gained from exploitation of regional resources shall be reinvested in the region as the communities see fit (Chávez and Acosta 1994f).

As of 1995, resources continued to be extracted from the East Coast and profits, rather than being reinvested in the East Coast, were being returned to the

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[13] Symbols were devised for the following land use areas: mineral resources, forest products, fishing, agriculture, hunting, livestock grazing, historically or culturally significant lands, sacred or religious places, social or recreational areas, and transportation or communication infrastructure (Dana 2000).

central government's environmental branch, the Ministerio del ambiente y recursos naturales (MARENA),[14] for redistribution throughout the country (Weinberg 1995). The situation has not radically changed even as of July, 2000.

Still, isolated projects have been undertaken that were funded by the national government (presumably with dividends from resource exploitation). For example, in Puerto Cabezas the reconstruction of a major bridge washed away by floods and in Karatá, the construction of a raised bridge to an essential pathway within the community. Regionally, the government is funding the upkeep of the highway to Managua.

Reinvesting remains sorely needed in the area of health services. As mentioned in Chapter 2: Medicinals communities continue to lack needed supplies. Also schools lack funding for facilities, supplies and teachers. Certain communities have incurred economic hardships as a direct result of resource exploitation in their environs. During this study, a number of shrimp buyers were making frequent trips to Bismona, arriving several times a month with trucks loaded down with the ice they required to keep the shrimp fresh. During the wet season, the ice-laden trucks gouged deep potholes into the unpaved road that ran through the heart of the community. This hardship was further deepened when repeated repair requests to the government by community elders fell on deaf ears. Finally, the community levied a "road tax" (that amounted to a bribe) on all trucks entering town and, with the proceeds, they began maintaining the Bismona town road themselves.

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[14] The Ministerio del ambiente y recursos naturales (MARENA), which changed from the Instituto del ambiente y recursos naturales (IRENA) in 1994, controls all issues regarding natural resources.

Effects of Past Exploitation of Resources: Occupational Shifts

The effects of past exploitation can be seen in the changing roles of men and women in Miskito society. The informant list for this study (Appendix 8) provided a sampling of a cross-section of the job opportunities available to the Miskito Coast residents as of 1994. Several occupations on the East Coast were suitable for both men and women. The health and education fields are two notable examples. Other occupations remain distinctly linked to sex. Men are fishermen, carpenters and many hold positions as ancianos. Aside from education and health fields, the bulk of women in this study were housewives.

Helms (1971) argued that this disparity in job opportunities was caused by commercial exploitation by foreign interests. One of the main effects this had on the East Coast was a dependency on wage-earning jobs (Helms 1971; Nietschmann 1973). Men have more opportunities than women do to earn cash and they focus on seeking wage-earning employment with, for example, fisheries (Helms 1971). The desire for foreign goods traces back to the first contact between Miskito and foreigners.[15]

Effects of Current Exploitation of Resources: Protected Areas

Resource protection has been a struggle for the East Coast. A 1991 executive decree attempted to redress the rampant nationwide destruction, extraction and exploitation of natural resources by designating three large protected areas (Stocks 2000). These were Bosawás, a subtropical humid forest reserve, Si-A-Paz, a tropical forest reserve, and the Miskito Cays Protected Area, a coastal reserve (Stocks 2000; World Wildlife Fund 2000). Each reserve is briefly described.

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[15] For more information, see Chapter 5: Household Use, Chapter 6: Construction and Appendix 5: History.

Bosawás

Bosawás, a.k.a. the Bosawás International Biosphere Reserve, is located in the Central Highland region along the northern border of Nicaragua (in the middle Río Coco area) and is contiguous with the Honduran humid tropical forest. The Nicaraguan portion covers 740,000 hectares and includes one of the most extensive tracts of tropical forest remaining in Central America (Mirsky 1992; Stocks 2000). Preserve inhabitants, estimated at 25,000, are 52% indigenous (including half of the extant Sumu population and 13 % of the total Nicaraguan Miskito population) and 48% mestizo.

Miskito Cays Protected Area

The Miskito Cays Protected Area (MCPA), a 1.3 million hectare biological reserve (World Wildlife Fund 2000), was established on the Northeast Coast of Nicaragua. It includes 160 miles of coastline, extending 20 miles inland, and is wholly located within the Northern Autonomous Region. The management plan for this reserve has been created to include, not exclude, the indigenous population living there.

Si-A-Paz

Si-A-Paz, or the International Peace Park, is a tropical rainforest preserve along the Río San Juan of southeastern Nicaragua (Govorchin 1991). As the name implies, the park area crosses the southern Nicaraguan border with Costa Rica (Salick 1992). Research indicates that reserve inhabitants exploit the region on a sustainable level (Salick 1992) and, with preserve status, expectations are that encroachment and habitat destruction will be minimized (Govorchin 1991).

Managing Protected Areas

As of 1994, Nicaragua had established 71 protected areas, amounting to 17% of Nicaragua's land surface (De Armas 1994). These protected areas were created to preserve natural resources and indigenous homelands. But preserve management has proven difficult. Low governmental priority is conferred upon the preserve areas due mainly to their rural nature. The Nicaraguan government perceives Pacific Coast resources as more vulnerable and their depletion more imminent (due to the greater population pressure and higher degree of urbanization). Hence, government efforts have concentrated in the western regions (De Armas 1994). Moreover, these three protected areas described above are isolated and the oversight agency (MARENA) is located on West Coast. Being remote, resource protection laws are not well enforced (Vilas 1989). Nor are the laws easily enforced in the interior regions and on the water without the proper equipment (i.e., boats, cars and fuel). Budget constraints result in insufficient allocations of manpower and equipment and have give resource pirates the upper hand (Stocks 2000).

Alarmingly, resource pirates have also been linked to drug trafficking on the East Coast (Chamorro, 1994; Weinberg 1995). Lobsters are swapped for drugs and then both items proceed overland or by water to the United States. Bundles of drugs have been known to wash ashore, presumably after an exchange went awry. And the locals sometimes take a share for themselves before turning it over to authorities (Weinberg 1995). As a result, drugs are a problem in many communities along the coast, small (Krukira[16]) and large (Sandy Bay).

Piracy has even extended to minions of the Nicaraguan government. Preserve inhabitants have become proactive in protecting their land. In 1980, when state logging crews began felling trees in Bosawás, the Sumo inhabitants armed themselves with machetes and axes and forced the crews to cease activities (Weinberg 1995).

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[16] Recall that Krukira is the community where my colleagues had a physical altercation with the residents. See Chapter 3: Edibles.

Appendix 7: Study Communities: Geography and Demography

The study communities were chosen in consultation with Mr. Stern Robinson (Caribbean Conservation Corporation (CCC) In-Country Director), Mr. Nelbert Taylor and Mr. Norton Chavarría (CCC Project Coordinators), and MIKUPIA staff members, all of whom are native to the region. Selected as a cross-section of the ecosystems found within the Northern Autonomous Region, Table 1 lists each community and presents the critical geographic information of interest to this study. In this table, the letters "PC" stand for Puerto Cabezas. See also Glossary 3: Place Names.

Table A7.1. Community Geography

Community Name	Location/ Distance From PC	Eco-System	Soil Type	Dominant Vegetation
Bismona	85 air km NNW of PC	riverine/ savanna	loam/ sand	Large trees (especially mango, coconut and breadfruit); many open areas
Haulover	40 air km SW of PC	coastal/ bush	sandy/ loam	Beach front with large coconuts; ocean on one side, lake on other; "bush" behind houses; open areas confined to school and main pathways through village
Karatá	20 air km SW SW of PC	riverine/ savanna	loam/ sand	Savannah, coastal mangrove, upland pine forest, salt grass meadows
Lamlaya	3.5 km by rd; 5 air km SW of PC	lowland swamp	loam/ clay/ sand	Savanna; open fields and marshland
Puerto Cabezas (PC)	14°00'07"N 83°15'30"W	coastal/ savanna	sandy/ loam	Savanna vegetation; some trees, rarely in large stands; many coconut trees
Tuapí	22 km by rd; 10 air km NE of PC	riverine/ savanna	clay/ sand	Large trees (especially mango); plenty of close-cropped open areas
Wawa	10 miles by water; 12-13 walking; 18 air km SW of PC	coastal/ bush	sandy	Large trees (especially mango); some close-cropped open areas; ocean front vegetation

The following demographic information from 1994-1995 (Table 2) reveals that all of the study communities were fairly large with the smallest population in Haulover. Information on the community's founding is given, where provided by local sources.

Table A7.2. Community Demographics

Community	Population[1]	Area	Founding Information
Bismona	997 people[a] 1800 people[c]	10,421Ha[a]	?
Haulover	439 people[a] 600 people[b] 93 families[c]	180 km^2[b]	1773 - By three Sumo families[b]
Karatá	672 people[a] ~700 people[b] 25 houses[c]	321 km^2[b]	Around 1875[b]
Lamlaya	489 people[a] 480 people[c] 800 people[b]	107 km^2[b]	1885 - By the Wilson family from Karatá [b]
Puerto Cabezas	24,786 people[a]	5787 km^2[d]	? year - Founded by people from Karatá
Tuapí	824 people[a] ~900 people[c] 157 families[c] 91 houses[c]	4100Ha[a] 21 km long, 1.5 km wide[c]	Began as the Moravian mission headquarters
Wawa	1287 people[a] 1260 people[c] 1750 people[b] 126 houses[c]	180km2[b]	? year - First families were Sumos from Wasakin and Awastingni

Population figures from different sources vary widely. The population figures obtained from MIKUPIA were generally greater than (in some cases double) the figures from community members or the preliminary management plan (Foster, et al. 1995). The census data in the management plan is undated but and therefore may reflect older population figures.[2]

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[1] Sources: (a) Foster, et al. 1995; (b) Maritza Urbina, MIKUPIA member, 1995; (c) various community members, personal communication 1994; (d) Población por Departamentos y Municipios 1995.

[2] In addition, some studies report collective population estimates for some communities. For example, because Karatá owns the land on which both Lamlaya and Puerto Cabezas are located, the figures may represent a total of all three populations.

Appendix 8: Informants in This Study

The informants mentioned throughout this study are alphabetized here by their last names. Informants for whom the last names are unknown are alphabetized by their first names. The "Cmty" column denotes the village in which the plant use was documented. The final column, "Taught By," details from whom the informant learned the plant use (primarily with regard to medicinal plant usage); in some cases remedies are purchased (as signified by the term "bought" in this column). Within the table, all references to communities are abbreviated according to the following legend.

Legend:
A = Awastara; B = Bismona; BL = Bluefields; CGD = Cabo Gracias a Dios; CV = Cabo Veijo; D = Dakban; G = Granada (Pacific Coast); H = Haulover; K = Karatá; KA = Karawala; KR = Krukira; KW = Kwiwitingni; L = Lamlaya; LN = León (Pacific Coast); LY = Layasiksa; M = Managua (Pacific Coast); MN = Maniwatla; MS = Masaya (Pacific Coast); P = Pacific Coast; PC = Puerto Cabezas; PL = Pearl Lagoon; PR = Prinzobila; PZ = Prinzapolka; RC = Río Coco; RG = Río Grande; S = Sisin; SB = Sandy Bay; SC = San Carlos; SI = Siuna; SP = Saupuka; T = Tuapí; TS = Tasbapauni; W = Wawa; WS = Waspam; Y = Yulu

Name (Last, First Middle)	Cmty	Born	Age	Sex	Occupation	Taught By
Acklin, Leonora	W	?	?	F	undetermined	
Alfred, Berta	T	?	>60s	F	housewife	
Angus, Robert	K	K	66	M	carpenter/fisherman	father
Archibold, Ralph	T	?	30s	M	undetermined	
Arguello, Aura	PC	G	50s	F	hotel owner	grandmother
Artola, Polenso	K	?	>60s	M	undetermined	
Bell, Lumberto	B	CV	55	M	healer	self-taught/bought
Blexley, Carlos	PC	KW	23	M	vendor (market)	
Budier, Katrin Flores	H	H	>40s	F	housewife	
Budier, Orlando	H	?	66	M	farmer	
Castillon, Nena	L	L	32	F	housewife	mother/brother
Chapin, Chepita	PC	H	38	F	vendor (market)	
Chevarria, Laurel	K	K	40s	F	women's assn.	
Chevarria, Myrtle	K	KA	69	F	housewife	daughter
Chow, Alfredo	H	?	55	M	undetermined	
Chow, Emiliano Molina	H	LY	30	M	undetermined	
Chow, Lenzo Reynaldo	H	H	1909	M	anciano	
Coban, Hilberto Thomas	B	WS	30s	M	voter registration	friend
Conrado, Elida	H	?	50s	F	housewife	
Cordoba, Leonardo	K	P	50s	M	farmer	
Cordoba-Tathum, Yoneda	K	K	30	F	teacher	

Name (Last, First Middle)	Cmty	Born	Age	Sex	Occupation	Taught By
Crawford, Paunino Dimus	B	?	>30s	M	school director	
Daniel, Vernon	H	H	45	M	fisherman/healer	father
de Lawrence, Lloyda	W	W	30	F	housewife	woman
de Levy, Fredolina Harkin	T	L	>50s	F	midwife	mother
Dennis, Ayda	L	?	50s	F	housewife	
Dennis, Jaime Homer	L	L	15	M	student	father
Dennis, Salvarita	T	?	?	F	undetermined	
Dennis, Zeledon	L	L	> 60s	M	anciano	
Diaz, Leticia	H	PZ	29	F	housewife	
Dixon, Alman	W	W	>50s	M	judge	
Dixon, Lena	H	W	54	F	housewife	cousin
Dublon, Francisco	B	?	60s	M	undetermined	
? Eddy	PC	?	30s	M	CCC employee	
? Edilmira	K	K	30s	F	housewife	
? Elvie	W	W	16	F	student	
English, Alvin	L	L	70s	M	fisherman	father
? Ernesto	K	K	?	M	undetermined	
Flores, Marcia	L	L	24	F	vendor (market)	
Forbes, Michaela	H	?	30s	F	housewife	
Fox, Yunita	H	?	30s	F	nurse's aid	
Francis, Clipton	L	L	84	M	healer	friends
Francis, Francisco	K	K	> 20s	M	student	mother
Francis, Lydiana	K	K	40s	F	housewife	
Franklins, Eldeponso	T	T	67	M	healer/driver	in-laws
Garcia, Leticia	PC	MS	50	F	vendor (market)	
Garson, Morly	A	A	70	F	vendor (market)	
George, Lorenzo	H	TS	1914	M	healer	man
Gonzalez, Mauricio	PC	MS	28	M	vendor (market)	
Grandmother, Jenny Regional	W		80s	F	housewife	
Hendy, Eduardo	H	H	54	M	sindico	various people
Herman, Amanda	L	L	32	F	vendor (market)	
Hodgson, Fernando	L	?	40s	M	farmer	
Howard, Isolina	T	?	30s	F	housewife	
Hudson, Herman Flores	H	?	69	M	undetermined	
Humphries, Faustinia	PC	PC	25	F	vendor (market)	
Ignacio, Victoria	H	H	36	F	undetermined	grandmother
Ignacio, Waldiman	H	H	72	M	undetermined	learned in dream
? Ilona	W	?	?	F	undetermined	
Ingley, Gregorio	B	?	50s	M	fisherman	
Ingly, Lurkina	B	B	>20s	F	undetermined	
Isaiah, Carolina	T	T	60	F	midwife/healer	mother
Jacobo, Ernestina Lopez	H	?	60	F	midwife	father/foreign doctor
Jacobo, Thomason	PC	?	30	M	carpenter (7 yrs)	
Johnson, Facundo	T	?	>30s	M	farmer	
Johnson, Isabel	T	?	30s	F	housewife	

Name (Last, First Middle)	Cmty	Born	Age	Sex	Occupation	Taught By
Jorge, Marlin	H	?	?	M	undetermined	
Jorge, Rumilda	H	?	50	F	midwife (~10 yrs)	doctor
Joseph, Pablo	L	L	43	M	carpenter/metal repair	father
Julias, Filiberto	T	PL	73	M	healer	bought
Kakarias, Narsa Yamira	T	T	9	F	student	
Kelton, Mary	T	?	30s	F	housewife	
Lacayo, Rosa	L	L	>50s	F	housewife/midwife	parents
Lacot, Christina	L	?	>30s	F	housewife	
Langos, Paulina	H	H	> 80	F	housewife	
Lavonte, Mildred	T	?	>50s	F	housewife	
Lemon, Wyman	W	W	70s	M	healer (43 yrs)	man
Lewis, Porcien	PC	S	30's	M	vendor (market)	
Lopez, Adinia	H	SB	70	F	housewife	daughter bought
Lopez, Mariana	B	B	60	F	midwife	self-taught
Martin, Sam	T	?	50s	M	leader/ex-judge	
Martin-Schultz, Basilicia	T	?	50s	F	housewife	
McDonald, Carmela Regional	W	W	40	F	midwife	mother
McDonald, Septimo	PC	K	72	M	CCC night watchman	self-taught
Mendozo, Erminio	PC	SI	30-32	M	vendor (market)	
Menocal, Nelsys	PC	G	30s	F	pediatrician	
Molina, Janis	H	RC	50s	M	undetermined	
Molina, Jorge	H	H	32	M	teacher	
Molina, Juliana Forbes	H	H	>40s	F	housewife	
Molina, Maira	H	H	25	F	housewife	
Molina, Willy	H	?	70s	M	anciano	
Montoya, Juan Carrasco	PC	?	30s	M	internist	
Mueller, Carl	H	SI	32	M	fisherman/healer	cousin
Mybeth, Thomas	L	L	30s	M	ex-leader/farmer	
Mybith, Richaina	L	L	>60s	F	housewife	mother
Narcisso, Harry	B	?	?	M	undetermined	
Ojeda, Feliciano	PC	PC	31	M	undetermined	mother/self-taught
? Olmita	PC	KR	47	F	vendor (market)	
Parquar, Eberto	B	MN	35	M	undetermined	bought
Pasquier, Sevana	M	MN	45	F	vendor (market)	
Patterson, George	W	?	?	M	undetermined	
Penare, Castillo	W	?	70s	M	carpenter	
Penare, Jacob	W	W	70s	M	wood cutter	
Peralta, Asteria Francis	PC	D	29	F	vendor (market)	
Pereda, Lastenia	H	H	27	F	housewife	mother-in-law
Perera, Kristilina	H	H	56-58	F	midwife	
Perera, Plorencia	H	H	42	F	housewife	parents
Perez, Glen Forbes	H	H	58	M	healer	father/uncle
Perez, Salvador	K	LN	38	M	fisherman	parents
Peter, Pormilita	H	H	33	F	housewife	woman

Name (Last, First Middle)	Cmty	Born	Age	Sex	Occupation	Taught By
? Piquiti	W	W	18	M	undetermined	mother
Pudis, Melida	PC	S	31	F	vendor (market)	
Regional, Delman	K	K	44	M	judge	
Regional, Jenny Albertina	W	W	40	F	housewife	grandmother
Regional, Madelma	K	K	49	F	midwife (15 yrs)	midwife
Regional, Mark	W	W	40s	M	farmer	grandmother/friends
Regional, Nicholas	K	K	33	M	undetermined	various people
Ricardo, Artun	B	?	?	M	undetermined	
Ricardo, Cinbilin	B	B	61	M	healer (25+ yrs)	self-taught/bought
Ricardo, Jon	B	B	53	M	carpenter	carpenters
Ricardo, Raphael Ingley	B	B	22	M	healer	a spirit
Rodriguez, Salonia	H	PR	29	F	housewife	father
Romero, Elva	W	W	36	F	housewife	friend
Romero, Harry	W	W	7	M	student	mother
Rosales, Nalia	PC	S	39	F	vendor (market)	
Sinclair-Beach, Maurina	T	T	7	F	student	
Sinclair-Zamora, Elmer	T	T	9	M	student	grandmother
Smith, Donisio	L	L	54	M	repairman/driver	friend
Smith, James	K	?	> 40s	M	undetermined	
Solaris, Philipe	K	LY	51	M	fisherman/farmer	father/woman
Spellman, Edwardo	B	?	>60s	M	fisherman	
Spellman, Ledwina Bell	B	CV	67	F	midwife	mother/grandmother
Taylor, Erwin	T	?	60s	M	carpenter	various people
Tenglas, Rosa	L	L	20s	F	undetermined	
Tevas, Claudia Isabel	W	M	10	F	student	friends
Urbina, Maritza	PC	PC	19	F	MIKUPIA employee	
Urbina, Maritza	PC	PC	20	F	MIKUPIA employee	
Vayes, Felix Paz	B	SC	34	M	undetermined	father
Vegamin, Chaparro	K	?	40s	M	farmer	
Vegamin, Katrina Alfred	K	K	44	F	healer/farmer	father
Velázquez, Zoila	W	W	44	F	MIKUPIA rep	mother friends
Vigil, Cepriano	T	?	30s	M	reverend	
Walter, Chavela	L	L	60s	F	vendor (L)/midwife	
Walter, Juan Picado	L	?	>40s	M	undetermined	
Walter, Juanita	L	L	40s	F	healer	self-taught
Warman, Libios	K	K	48	M	fisherman	wife
Warman, Virginia	K	K	60	F	housewife	
Warman-Artola, Amalia	K	K	33	F	teacher	
Washington, Nils Philipe	K	SC	39	M	farmer	grandparents/parents
Webb, Lydia	PC	WS	30s	F	social worker	
Webster, Allen	L	L	18	M	student	
Wellington-Angus, Jerry	PC&L	K	31	M	MIKUPIA employee	
William, Paulo	PC	H	44	M	undetermined	mother
Williams, Charlie	W	W	69	M	vendor (W)/fisherman	friends
Williams, Elena Fisher	W	W	67	F	midwife's assistant	mother/midwives

Name (Last, First Middle)	Cmty	Born	Age	Sex	Occupation	Taught By
Wong, Delia Molina	H	H	63	F	housewife	
Zacarias, Anelia	T	?	30s	F	housewife	
Zacarias, Aristan Bons	PC&B	SP	33	M	MIKUPIA employee	friends
Zacarias, Eduardo	T	T	14	M	student	aunt
Zacarias-Zamora, Delia	T	L	50	F	housewife	grandmother
Zamora, Luzila	H	H	26	F	housewife	mother
Zamora, Maria Luiza	H	H	91	F	housewife	father
Zamoro, Alfred	T	T	9	M	student	
Zamorra, Celia	K	K	30s	F	housewife	
Zamorra, Embristo	K	CGD	60s	M	farmer	father/self-taught
Zelaya, Amyllo	W	?	60s	M	fisherman/carpenter	
Zelaya, Marta	K	Y	29	F	housewife	

Appendix 9: Language on the East Coast

Introduction

Miskito is a living language, spoken and understood by every Miskito community member, young or old. Miskito belongs to the Chibcha language group (Grimes 1996) but has been modified extensively by English, African and Spanish influence resulting in what is known today as Miskito Coast Creole (Belize 2000).[1] This appendix summarizes the historical development of the Miskito language to provide insight as to the language spoken in the study communities.

The First Transliteration

As in other aspects of Miskito life, the Moravians played a pivotal role in recording and preserving the Miskito language;[2] missionaries were first to transliterate this language. The Reverend G. Grunewald wrote the first Miskito dictionary in 1855 with the assistance of a native Miskito helper (Hutton 1922). Prior to this, Miskito was not a written language (Mueller 1932). Ensuing missionaries have written later editions, including Ziock (1894), Heath (1927) and Marx and Heath (1992).[3]

In 1900, Grunewald prepared a Miskito language New Testament, translated many psalms and improved the hymnbook (Hutton 1922). It is strongly believed amongst the missionaries that these translations made possible the overwhelmingly successful conversion of the Miskito (Hutton 1922; Mueller 1932). Hutton explained that "by conducting the services in English...[it] gave people the impression that he [the missionary] was preaching about a foreign God" (p. 324). When a 1900 law decreed

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[1] Also called Miskito Creole-English, the term is simplified to Miskito throughout this dissertation, except where special emphasis is necessary.

[2] The influence of the Moravian missionaries on the northeast coast of Nicaragua has been mentioned several times throughout this dissertation and in Appendix 10.

[3] This dictionary is currently in its fourth printing.

that only the Spanish language could be used in schools, with fines levied to any teacher breaking this law, the Moravian day schools were forced to close. With Grunewald's translations, however, the mission could continue teaching in the Sunday schools, thereby circumventing the language restrictions (Hutton 1922).

Phonetically-Based Language

Because the Miskito language was transliterated and Moravian missionaries were of different origins (mainly of Germanic and American), phonetic interpretations differ from document to document. For example, the Miskito term for "witch doctor" is variously spelled soukia, sookeah and sukia in different publications. Still, the language has remained much the same as it was a century ago as is evidenced by Young's (1847) account of the East Coast. Written some 150 years ago, it includes a sample list of pertinent vocabulary. Young lists the English word "snake" as "pewter" in Miskito; this is written "pyuta" today. Though the spelling differs, the words are familiar to a native speaker when spoken aloud. There are two "silent" letters, "h" and "p" that are occasionally confounding. The Marx and Heath (1992) dictionary lists no entries for words beginning with c, f, q, x or z. Because the language continues to be written phonetically, it is easy to read and write once the spoken words are understood.

Multi-Lingual Society

Many Miskito are fluent in Spanish or Creole English in addition to Miskito. Which of these two languages are spoken appears to be related to age, schooling and occupation. Miskitos over 50 years of age tend to speak Creole English as a second language in large part due to isolation from the Spanish-speaking West Coast. The North American enterprises that operated in the region during this generations' upbringing also served to maintain the practice of speaking English.

Those who speak Spanish as a second language are generally younger, 30 at most. According to government documents, the official language of Nicaragua is

Spanish although indigenous languages within the autonomous regions are recognized (Chavez and Acosta 1994f). Despite laws allowing bilingual education (including indigenous languages),[4] the public school curriculum is taught exclusively in Spanish (Ryan, et al. 1970; Wilson 1975). The Miskito Creole English that is spoken by younger people has been learned at home. And despite the fact that schooling is conducted in Spanish, literacy rates exceed 50% (Grimes 1996).

Spanish is the language of commerce in the region today. Spanish-speaking people originating from the West Coast run many stores in Puerto Cabezas. Businessmen buying shrimp and other goods from the communities are also Spanish-speaking. Thus, people involved in extra-community business, be they farmers, vendors or wage laborers, often need to learn Spanish to conduct business.

Clues to Cultural Origin

Linguistic studies are useful in determining cultural origin. As discussed in the history section, there is conflicting evidence as to Miskito cultural origins. The Miskito language appears to be related to the Chibchan-speaking people of Colombia (Helms 1971). There is some disagreement as to whether the Miskito are truly South American in origin, but the Chibchan language influence points in that direction.[5]

As with most languages, the Miskito language reveals cultural relationships. A number of dialects spoken amongst the Miskito are distinguishing factors between

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[4] The 1993 language law specified that children would be taught about their mother tongue, but not in their mother tongue (Ley de Lenguas 1993).

[5] If the Miskito did not originate from the Chibchan, they may still have been influenced linguistically by them. By the Spanish conquest, the Chicbha population had grown to some 500,000 people and was concentrated in the Central Highlands and the eastern regions of Colombia and Central America. Their sphere of influence could have extended to the east coast of Nicaragua and the Miskito may have picked up similar language characteristics through a commercial relationship with the Chibcha as the Miskito tend to adopt words of their trading partners (see "Foreign Acculturation").

groups of Miskito living in different geographic locations. Grimes (1996) suggested there are five dialects, offering no information as to where the dialects are spoken, but only that they "are all intelligible with each other." Marx and Heath (1992) stated that there are four tribes of Miskito living in different geographical locations and that three of the tribes have different dialects. Other authors agree that there are three dialects (Helms 1971; Wilson 1975) and that are the result of geographic isolation.

Miskito living on the eastern coast of Honduras, known as Honduran Mosquitia, speak and are referred to as the Mam. Wangki is spoken along the Río Coco (the river is referred to by local people as the Río Wangki). Tawira is spoken in coastal-, ocean-, and lagoon-based villages along the northeast coast from the Río Coco to Sandy Bay (Helms 1971; Marx and Heath 1992; Wilson 1975). This group is also known as Kabo (Parent 2000). A fourth tribe of people, called the Baldam, lives in the region from south of Sandy Bay to Tasbapauni and while they "pronounce certain words strangely" (Wilson 1975: 46) they are not considered to have a distinct dialect.

<u>Foreign Acculturation</u>

While the language of commerce today is Spanish, the language of commerce from the mid-sixteenth to the mid-nineteenth centuries was English. Modern Miskito is an admixture of several languages and language influences, including Creole English, African languages and Spanish. English words that have been adopted include the days of the week (Sunde, Monde, Tiusde, Wensde, Tausde, Praide, Satade), quantities (paund, kop, prias), basic food words (sukar, bred, bredprut) and other words of interest such as promis (Marx and Heath 1992). For some words, there is no evidence of a Miskito equivalent. For example, the Miskito word for business is "bisnis," obviously taken from English.

Language is a gauge by which the extent of external influences on Miskito culture can be measured. The Miskito readily adopted foreign words for a number of reasons. First, adopting British words was essential to communicate, work and trade with the English (Helms 1971). And Miskito likely had contact with Creole-speaking people prior to their encounters with the British because an account from 1681 noted that the Miskitos "speak good English" (Dampier 1699: 9).

Second, certain adaptations simplified matters. For instance, the Miskito system of numeration is a logical, cumulative system that one can learn quickly. There are certain "base numbers," for example 1 through 6, 10, and 20. These base numbers are used to describe other numbers which are some multiple and/or additive of the base numbers. The number "47" in Miskito literally translates to "twenty times two plus six plus one." This cumulative nature of numeration is logical but verbally daunting to the speaker. It is much easier to say portisebm (Miskito) than the Miskito version, aiwanaiska wal pura matlalka-abi pura kumi.

Finally, some words have no Miskito equivalent because the item or concept is also an introduction. Obviously, words associated with the Christian religion are Creole-English. The days of the week were also Moravian introductions, thus the pidgin-English names. Because the concept was new to the culture, there were no words in the Miskito language to describe the situation.[6]

The foreign words have been so well assimilated that most young people do not realize they are using an adopted word. For instance the Miskito response for "Nakisma?" ("What's up?") is "yamni" but an equally acceptable response is "pain" (pronounced "pine", a bastardization of "fine"). Most teenagers believe this is just another way of responding in Miskito.

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[6] A point of interest here is that the earliest Moravians spoke German. Only later, during World War I, did English-speaking Americans come to the Coast. Realizing that Miskito spoke some English, the German-speaking Moravians may have used English terminology in their religious education.

Appendix 10: Religion on the East Coast

Introduction

Any encyclopedic description of the Miskito mentions their practice of the Moravian religion; it is decidedly a Miskito characteristic. In 1970, there were about 65,000 Protestants in Nicaragua, half of them were Moravian (Ryan, et al. 1970).[1] Figures from 1988 put the number of Protestants at 230,000 people, although the numbers of Moravians are not specified (Nicaragua 2000). The Nicaraguan mission is the largest Moravian mission in the world (Sawyer 1990) and is headquartered in Puerto Cabezas.[2]

The Moravian religion is the primary religious influence in most every Miskito village (Wilde 1985), including those surveyed here in this study. In five of the seven survey communities (Lamlaya, Bismona, Karatá, Wawa, and Haulover), the Moravian Church is the sole church in the community. Tuapí has three churches. About 20 residents belong to the Catholic Church and about 15 people[3] are with the Assemblies of God (Evangelical). Each of these churches is run out of a parishioner's home (Anelia Zacarías/Tuapí). The remainder of the approximately 900-member population is Moravian, attending services in a large church.[4]

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[1] Other Protestant groups on the East Coast include: Episcopal Church, American Baptists, Seventh Day Adventists, the Assemblies of God, the Church of the Nazarene, and the Evangelical Lutherans (Nicaragua 2000; Ryan, et al. 1970).

[2] There is one Moravian congregation on the West Coast. Catholicism is a West Coast religion. Approximately 85-95% of the population in Nicaragua follows the Catholic faith (Nicaragua 2000; Nicaraguan Economic Data 1996; Rodriguez 1996b).

[3] To quote the informant, exactly "three houses" belong to the Asamblea de Díos (Anelia Zacarías/Tuapí).

[4] For information on the construction of Moravian Churches, see Chapter 5.

An Invitation to the Moravians

In 1841, Miskito King Robert Charles Frederic (a.k.a. King Robert II) gave two British sea captains a large tract of land, covering an area approximately 108 square miles in the region north of Cabo Gracias a Díos (Wilson 1975).[5] The King's motivation may have been to encourage colonization, although other motives have been hypothesized.[6] Without means for developing a colony themselves, the seamen returned to England in search of buyers for their acquisition, finally peaking the interest of Prince Karl of Prussia. Prince Karl sent three emissaries to determine the suitability of colonizing the region (Hutton 1922; Schattschneider 1990; Wilson 1975). The emissaries' report suggested that conditions were not suited to colonizers but that there was a need for missionaries (Wilson 1975). Prince Karl suggested to the Moravian Mission Board that they establish a mission to the Miskito Indians (Hutton 1922; Schattschneider 1990).[7]

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[5] Robert Charles Frederic ruled from 1824-1842. More information on Miskito royalty is found in Appendix 5: History and extensively in Olien (1983).

[6] It is purported that King Robert II was a toper and the land in question was traded for alcohol (Wilson 1975). Indeed, "the stereotype of the Miskito kings...as drunks who signed away vast tracts of land to private individuals while intoxicated...seems to have been based mainly on the figure of Robert Charles Frederic" (Olien 1983: 224). This practice of exchanging land for alcohol began with King Robert II's predecessor, George Frederic (1816-1824). And kings George William Albert Hendy (1884-1888) and Jonathan Charles Frederic (1889-1890) succumbed to alcohol-related deaths (Dennis and Olien 1984; Olien 1983). Another interpretation is that the King, while enjoying his liquor, did not condone the activity amongst his people. Believing the British to be teetotalers, King Robert II hoped that British settlers "would teach his people the dangers of mischla [alcohol]" (Hutton 1922: 322).

[7] The Moravan Church originated in 1415 in Bohemia and Moravia in opposition to the Hapsburg Empire (Dunbar Ortiz 1989; Sawyer 1990). There was a revival in 1722, led by Count Nicholas Louis von Zinzendorf of Saxony. He was responsible for the establishment of "Moravian centers" in Europe and America and had over 200 missionaries working on all continents when he died in 1760 (Sawyer 1990).

Moravian Beginnings in Nicaragua

Two missionaries from Jamaica accepted the Miskito King's invitation, arriving in Bluefields in 1847.[8] The British consul received the missionaries and introduced them to the Miskito King, a position then held by King George Frederic (Hutton 1922; Olien 1983; Schattschneider 1990; Vilas 1989).[9] The missionaries spoke before the Miskito council, which happened to be in session, and the Moravians were invited to become the first organized religious presence on the coast.

Three Prussian missionaries arrived in Bluefields in 1849 to organize a school.[10] The missionaries had concentrated first on Bluefields and specifically on converting the Royal Family residing in Bluefields, wrongly assuming that their conversion would facilitate the conversion of the masses (Hutton 1922). The first Moravian Church was dedicated within three years of the missionaries' arrival (Schattschneider 1990) but the Creoles were the first converts (Dunbar Ortiz 1989).

From Bluefields, the missionaries made their way up the coast enlisting local assistants, whom they called "helpers," as they went along (Helms 1971; Schattschneider 1990). The missionaries started schools and began preaching in the communities, but school was poorly attended and the Miskito were generally apathetic toward the missionaries (Dunbar Ortiz 1989; Kushnig, 1888).[11] To make matters

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[8] The two missionaries were Andrew Reinke and Henry Pfeiffer (Hutton 1922) who became well-known Miskito missionaries (see Hutton 1922 and Wilson 1975).

[9] The region was still a British protectorate.

[10] Accounts from the Moravian Church indicate 1849 as the inaugural year of the Moravian Mission to Nicaragua (Hutton 1922; Mueller 1932; Wilson 1975). However, Olien (1983) noted that the arrival of the first missionary on the Coast actually preceded this date by 85 years! A Polish missionary arrived during the reign of King George I, in 1764 and lived in Bluefields for 20 years.

[11] Neither did the missionaries express much interest in the Miskito people. In a missionary diary from Ephrata (known today as Haulover), Brother Kuschnig (1888)

worse, the missionaries endured many personal hardships, including sickness and death.[12] Although reticent, the Miskito were responsive to acts of kindness and so the three Moravians made small advances here and there (Hutton 1922; Mueller 1932).

<u>Outlying Moravian Missions</u>

A Dane, Jean Paul Jürgensen, began the first outlying station in 1855. Called Magdala, it was located by Pearl Lagoon. Three days after the missionary's arrival, a cholera epidemic broke out. Disregarding the perilous nature of the disease, he visited the sick and administered what medicine he had, thus ingratiating himself to the people who eagerly converted (Hutton 1922; Schattschneider 1990).

Missionaries continued to move up the Coast. To reach the northern sectors of Mosquitia, they spread the word by sea (Wilson 1975).[13] The mission in Haulover (called Ephrata[14]) was established in 1860, Karatá in 1875 and Tuapí in 1886.[15]

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refers to the Miskito as "heathens;" no effort was made to learn Miskito customs or acknowledge the people themselves until they converted.

[12] In Haulover, there remains a testimonial to this hardship. A square plot, no larger than five feet across and enclosed by a low white picket fence, marks the final resting place of four missionary family members. The oldest grave is that of a child with the surname Siebörger who died at the age of two in 1877 of unknown causes. A missionary named Siebörger was stationed in nearby Quamwatla in 1878 (Wilson 1975). The other three graves are those of missionary wives. One inscription describes a 30 year-old woman bearing the surname Ziock; this could very well be the belated wife of H. Ziock. Brother Ziock was stationed in nearby Karatá (Kuschnig 1888) and wrote the first large-scale English-Miskito dictionary in 1894 (See <u>Appendix 8</u>). The final two gravestones bear the surname of Kushnig and his diary, located in the Moravian Church Archives, Bethlehem, PA, relates the sad tale. Kuschnig lost his first wife six days after childbirth at the age of 34 (in 1888). He left Ephrata, remarried and returned in 1891, only to lose his second wife to unknown causes in that same year (she was 38).

[13] Missionaries used schooners to traverse the coast. Specifics on the first two schooners are unknown but, by 1865, East Coast missionaries were on their third schooner, the second having been destroyed in a hurricane (Wilson 1975). Next, the Messenger of Peace was used from 1869 until it wrecked 1874 (Mueller 1932). Next came the Meta. Then this ship survived a hurricane in 1876 but wrecked off the Coast of Bluefields in 1888 (Kuschnig 1888; Wilson 1975). That three schooners were lost from 1965 to 1888 exemplifies the treacherous conditions endured by missionaries.

These missions were not quick to obtain converts. Almost thirty years after Ephrata was established, Brother Kuschnig complained, "Ich sehe mehr und mehr, dass die Leute für die Mission nicht viele Interesse haben" (Kuschnig 1888).[16] This would soon change when "the entire area was swept by a revival" (Schattschneider 1990: 75). From 1881 to 1896, there was a sudden increase in membership beginning in the south and moving up the Coast (Hutton 1922; Wilson 1975). Within two generations, the mission had become an integral part of Costeño identity (Vilas 1989).

Mission Stores

The schooners used by missionaries to spread the word were also put to commercial use. Beginning in 1855, mission stores called German Houses were established to sell imported goods. Ships traveling regularly up and down the Coast supplied the stores. The ships were the primary means of communication between missions and their arrival was much anticipated in communities (Kuschnig 1888).

Vilas (1989) saw these stores as the capitalist scourge of the nineteenth century but Hutton (1922) considered them differently. Jürgensen, (the Dane who established the first mission outside Bluefields) distinguished himself again when he helped the Rama Indians extricate themselves from a circle of debt. The Indians made money by selling pork in Bluefields but then spent their earnings on alcohol. Thus, they spiraled into debt. Jürgensen asked the Bluefields pork buyers to pay the Rama with goods instead of money. He then established a mission store (probably the first

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[14] Ephrata is the original name designated by the missionary for the community known by locals today as Haulover. According to Mueller (1932), the founding missionaries were of the old school and gave a biblical name to their mission.

[15] The seat of the mission was Tuapí until 1925 when it was moved to Puerto Cabezas (Vilas 1989).

[16] Translation: "I see more and more that the people do not have much interest in the Mission."

one, in Bluefields) where he accepted goods in exchange for household needs. In this way, he freed the Rama from debt within eight years.

By the end of the nineteenth century, six stores had been established; the largest were located in Bluefields, Pearl Lagoon, Tuapí and Wounta-Haulover. The name changed to Commercial House when Americans replaced German missionaries during World War I (Wilson 1975). The last store closed in 1922 after 68 years of business (Vilas 1989).

Mission Handover

As conversion took hold, the face of the Church began to change. During World War I, administration of the Church changed from German missionaries to their American counterparts from Bethlehem, Pennsylvania (Ryan et al. 1970). And changes occurred within Nicaragua as "nativization"[17] began. "Helpers" were trained to be lay pastors. Today, lay pastors, while not ordained, often work in villages without a reverend (Madeheim 1995; Helms 1971). The first Nicaraguan Moravian minister was ordained in 1896 (Schattschneider 1990). In time, native Nicaraguans began holding positions of power on the Church council. In 1962, the first Nicaraguan bishop (of Creole origin) was elected and, in the same year, the Moravian Mission became the Moravian Church in Nicaragua. By 1974, the entire Directive Board was composed of Nicaraguans (Vilas 1989; Wilson 1975).

Conversion Ethic

A number of modern authors suggest the Moravians sought to destroy Miskito culture and beliefs (Dunbar Ortiz 1989; Vilas 1989). Missionaries espoused a set of social values, commensurate with the conversion process, which led to change among

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[17] Nativization was the process by which management of the Nicaraguan Mission was gradually appropriated to members of the Nicaraguan congregation (Vilas 1989).

the converts. Integral to this process was the attitude espoused by the missionaries that non-converts were uncivilized heathens. Brother Kuschnig (1888) mentioned in his diary that a "heathen" girl brought items by for his children to put on their mother's grave. Early mission papers located in the Moravian Archives depict drawings of Miskito, Rama and Sumu families with captions referring to them as "heathens." Conversion to Christianity became a status symbol (Dunbar Ortiz 1989) and, to this day, village elders refer to their conversion as the "civilization" of their people.

Two aspects of Miskito culture to which the Moravians were ardently opposed were the practices of the obeahs[18] and the consumption of alcohol (Vilas 1989). Moravians discouraged both of these aspects that were intimately tied in with Miskito culture. Indeed, the Moravians successfully suppressed the practice of bush medicine although it has not been obliterated; and the same can be said about drinking alcohol.

There were many positive consequences of the Miskito-Moravian relationship. For example, the mission espoused the Protestant work ethic. This included promotion of agriculture, abstinence, monogamy, hard work and the importance of family life (Mueller 1932). In addition, the Moravians influenced Miskito architecture, raising the standard of living by introducing new construction practices (Helms 1971).[19]

Thus, Miskito culture has been irrevocably changed because of the Moravian influence. In some cases, that change has been for the better. But, to prevent the complete loss of positive aspects of traditional Miskito culture, such as medicinal plant usage and folklore, documentation has proven the best tool for preservation.

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[18] Obeah is the Creole word for shaman; the Miskito equivalent to this word is sukia.

[19] For more information, see <u>Chapter 5: Construction</u>.

Appendix 11: Miskito Myths

This appendix is an expanded look at the superstitions documented during this study and found in other literature, some of which have already been mentioned in Chapter 7: Superstition. While all myths do not involve plant usage, knowledge of these superstitions allows a greater understanding of the Miskito culture. Superstitions abound with regard to affectations of the mind and body that can not be controlled by tangible means – literally, in matters of life and death.

Life Myths

Myths pertaining to the living earth cover a wide range of subjects. For example, a sneeze, smaya in Miskito, is a harbinger that signals the imminence of some foreboding event (Marx and Heath 1992; Heath 1927). A rainbow is called the devil's banner, debil plaginka (Marx and Heath 1992). But where myths abound are in the area of pregnancy and childbirth.

Superstitions involving pregnancy are frequently encountered. Pregnant women frequently are contraindicated during treatment for certain illnesses. There are also many superstitions regarding pregnancy from the point of conception to the health and maturation of the child itself. Pregnancy superstitions range from light-hearted to disturbing.

Two anecdotes are pregnancy indicators. There is a certain lizard, locally called lupalila, which announces an expectant mother if it walks upon her dress (Marx and Heath 1992). Another sure sign that a woman is pregnant is if she eats the unripe fruit of guava or mango (Zoila Velázquez/Wawa). This is certainly logical as the high concentration of vitamin C quells the discomfort of morning sickness. Certain foods are avoided during and after pregnancy, including beans, breadfruit, coconuts, pineapples, ripe fruits, shrimp and certain turtles (Nietschmann 1973).

During gestation, a child's beauty or health can be directly influenced by the mother's observations. If she looks upon an ugly or malformed person, her child will thusly be ugly or malformed. The only way to neutralize this curse is for the pregnant woman to quickly turn her back, and while bending over, look between her legs to watch the person walk away (Aristan Zacarías/Bismona). A similar anecdote is found in Marx and Heath (1992). The wasaki is a creature who, if looked upon by a pregnant woman, "attacks" the infant. To cure, strands of the mother's hair or raveled thread must be tied onto the infant's hand or foot upon birth.

An overdue baby is considered no act of nature. Such situations are deemed to be curses or veneno. One informant blamed his daughter's overdue baby on a jinx that did not allow the mother to have the baby on time (Cinbilin Ricardo/Bismona).

Supernatural explanations are given for pregnancies that result in abnormal children. Albino children and false pregnancies (where a tumor grows inside the womb) are believed to be the products of a sexual union between a human female and the liwa (Aristan Zacarías/Bismona; Dennis, 1981)[1]. One informant gave the following account: "In Walpa Siksa [another Miskito village], a woman had three albino children and, after much questioning by the priest, finally admitted to having sexual relations with a male liwa" (Aristan Zacarías/Bismona).

Another illness is caused when the child itself views something harmful. Siakwani, or blue diarrhea, principally affects newborns and infants[2] (Lastenia Perera/Haulover; Waldiman Ignacio/Haulover). According to Marx and Heath (1992) it was once considered to manifest itself after the victim beheld a sabanera (Spanish for

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[1] Liwa mairin, although often considered female (hence the word mairin, Miskito for "woman"), may also be male.

[2] This illness is discussed in Chapter 2: Medicinals because informants no longer attribute this ailment to supernatural causes.

a type of non-poisonous snake). Their cure, siakwani saika, is a decoction of herbs administered as a bath. Other cures obtained from two informants in this study are the ingested bark or leaf decoctions made from an unidentified plant (Lastenia Perera/Haulover; Waldiman Ignacio/Haulover). This ability to produce illness through vision is reminiscent of mal de ojo, although this term was not mentioned in this study.

An interesting superstition that does involve plants is that the healthy maturation of a child can be influenced by the growth habit of the plant. Sirpi, a climbing plant that grows up the trunks of trees, is used in a remedy for kukra – the puffing baby disease. According to the informant, Filiberto Julias (Tuapí), if one "bathe[s] baby with [sirpi]... baby grows right up like plant" as straight and tall as it grew on the tree. It is also believed that giving the leaf of tuktukya (an unknown palm species) to a child will result in the child learning to walk (Marx and Heath 1992).

Finally, preventing pregnancy altogether has its array of superstitions. Informants do not readily discuss this subject but one offered the following as a method of birth control. Although she professed never to have tried it, Rosa Lecayo (a midwife from Lamlaya) explained that future pregnancies could be avoided by burying in the ground the placenta upside down, with "the red side up".

Death Myths

A great array of superstitions involve death, the handling of the dead, life after death and haunting by spirits of the dead. When a person dies, they are covered with a sheet, locally called limlim. It is believed that the soul of the dead, kwaltaya, makes an impression upon and is adhered to the cloth. This cotton cloth is buried with the dead to scare away the large moths that attack the dead body. A sukia ceremony called yapam puhbaia, involves blowing smoking rubber, presumably above the dead body, so that people around can view the soul of the dead (Marx and Heath 1992).

Oblong mausoleum-like structures made of cement and painted white are erected above the graves in most communities.[3] Huge cement slabs cover a hollow interior large enough to hold a coffin. Another striking aspect of these "mausoleums" is that they are all facing the same direction – north. On a sunny day, the white mausoleums seem to glow, making this sight even more impressive. When asked the history behind these structures, an informant claimed no knowledge simply saying it was the way it was done (Nena Castillon/Lamlaya).

Information from other sources did reveal a use for these mausoleum-like structures. According to a tradition documented in the 1850's, Miskito believed in an afterlife. The souls of those who were greedy in life would either "die" in a cauldron, called sakaldakawa, or reside in pititauwan (or pittitaun), Miskito for Hell (Marx and Heath 1992; Ziock 1894). But, for those who were good in life, it is believed that one's spirit would ride with toads in a boat called sukling dwarka (the "toad boat") to reach Yaptimisri or Japtimisire, Queen of the Spiritual World (Marx and Heath 1992).[4] Food, rifles and other provisions would be needed to make this long, dangerous journey to the spirit world. Consequently, relatives of the departed would build a small wooden hut over the grave wherein such provisions would be left (Hutton 1922).

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[3] Graveyards appear to be well tended in all communities except Karatá. In 1994-1995, there were no cement housings and, where there were gravestones, they were mostly fallen over. Salvador Perez (Karatá) claimed that they do not really know where all the bodies are.

[4] Garcia (1996) noted this more detailed version of the journey to Yapti Misri: The soul's journey begins by crossing a large savanna to reach a wide river, which can only be crossed atop the back of a huge turtle laying in wait. A successful river crossing reveals that the soul was good in life; bad souls will sink to the depths of the river along with the turtle. After crossing another large savanna, the soul comes upon two large pine trees, through which he (or she) must pass. Successful passage is granted to all but those who murdered in life, in which case the two pines will snap together at the moment that the soul stands between them and the soul will be crushed.

When asked about the various plants found in the cemetery, a range of information was obtained from different informants. One said that plants are taken from around the deceased's dwelling and planted near the grave "to make them feel at home" (Nena Castillon/Lamlaya). Another stated that no special plantings were made in the cemetery, "what grows there is there" (Yoneda Cordoba Tathum/Karatá). Still another advised that raiti tangi (*Catharanthus roseus*) be planted in graveyards to prevent the souls of the dead from haunting the living. Hauntings are well known in the communities. Pruan lilkara wataukisni, is the Miskito phrase describing the return of a dead soul which roams around like a phantom (Marx and Heath 1992). Dead people are responsible for causing illnesses such as extreme sadness and kukra (the latter is elaborated upon in Glossary 6: Supernatural Illnesses).

Aside from planting raiti tangni in graveyards, cures against haunting by the spirits involve hiding the victim so the offending spirit can no longer find or see the person. Nils Philipe Washington (Karatá) mentioned a sirena remedy to "take you away." Rosa Lecayo (Lamlaya) used the term raiti pukwaika to describe a remedy for someone plagued with dreams of the dead. Won lilka pukni takisa is described as the moment during the curing process when the illness-afflicting demon can no longer "see the patient's image...[because] the essence of the herbs has been absorbed" (Dennis, 1981: 470). A pukni, which translates from Miskito as dark or shadowy, is "put upon" the person being haunted by the spirit of the dead, rendering that person invisible to the spirit (García 1996). This was accomplished using an herbal remedy.[5]

Like the Miskito, the Garífuna believe that hauntings by deceased relatives can cause severe illnesses. Among the Garífuna it is believed that such illnesses require

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[5] Although not mentioned in this study, García (1996: 61) noted that the existence of a vine, that, when tied around the head, rendered a person invisible.

an elaborate healing ritual, called walagayo (Barrett 1994b; Dennis 1988; Elsberg, Blanco and Rodriguez 1992). The walagayo takes place over three days and ends successfully when the ailing person recovers and joins in the dance along with the other participants (Barrett 1993).

Although different in intent, the walagayo is similar to descriptions of a Miskito rite called sikro. The sikro is a celebration of the dead that is usually performed on All Soul's Day, November 2.[6] This celebration includes eating, drinking and dancing (Marx and Heath 1992). The presiding sukia uses dolls with faces painted to resemble the dead in his celebratory dance. Similar rituals have been documented in Europe as far back as the fourth century that describe pagan rituals in which crowds of people, naked, frenzied and armed with swords, danced in graveyards (Illich 1976).

From the ecclesiastical perspective, All Soul's Day is seen as a day to pray for the souls of the dead, as a way of interceding on behalf of the dead to ensure their ascension to heaven (Krueger 2000). From the lay person's perspective, it is seen as a time of mourning, a celebration of life and a reminder of how easily one might find themselves on the other side (Mexico City All Soul's Day 1999). The holiday is listed as one of the "primary sacred times for world religions" (Krueger 2000).[7] All Soul's Day celebrations are held throughout Latin America.[8]

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[6] García (1996) noted that the ceremony was performed on the one year anniversary of the person's death.

[7] This celebration also evolved into modern-day Halloween. A concise explanation of this evolution can be found on the internet at [http://members.tripod.com/~bdavis/story/halloween.html].

[8] In Ecuador, All Soul's Day is an official public holiday (Ecuador Public Holidays 1999). In Mexico, it is celebrated over two days (November 1 and 2) and is known as All Saint's Day (Mexico City All Soul's Day 1999; Interfaith Calendar 2000).

Glossary 1: Plant Components and Active Ingredients

This glossary lists the known constituents of all the plants documented in this study and is especially useful for those detailed in chapters 2 (Medicinal), 3 (Edibles) and 7 (Superstition). Unless another species is specified, the content information regards the species listed in bold. Similarly, unless a specific plant part is named, content information refers to the whole plant. Where known, mammal, fish, insect poisons are listed as a precaution. Words followed by an asterisk (*) are defined in Glossary 2: Plant Constituents.[1]

9:00 tangni (*Portulaca pilosa*): Toxic SEED oil; *P. oleracea*: source of omega-3 fatty acids*, vitamin E*

10:00 tangni (*Portulaca grandiflora*): *P. pilosa*: Toxic SEED oil; *P. oleracea*: source of omega-3 fatty acids*, vitamin E*

achiote (*Bixa orellana*): ENTIRE: flavonoids*, tannins*, vitamin D*; SEED: carotenoids* (bixine, norbixine), proteins*; FRUIT/PULP: vitamin A*; SEED: toxic alkaloid* (tomentosic acid)

afrika (*Hyptis capitata*): volatile oils; *Hyptis* spp.: betulinic acid

afrika II (*Lindernia diffusa*): no content information

aguacate (*Persea americana*): mammal poison; carotenoids*, folic acid*; glucosides*; lipids*, proteins*, vitamins A*, C* and F*; LEAVES: essential oil, flavonoids*, hydrocyanic acid*; FRUIT: minerals*, vitamins A*, B* and E*; UNRIPE FRUIT poisonous

ahsi (*Bromelia pinguin*): ROOT/STEM: vitamin C*, vitamin A*, calcium*, fiber, riboflavin*, niacin*, lipids*, flavonoids*, lignans*, terpenes*; FRUIT: pinguinain*

ajo (*Allium sativum*): B vitamins*, allicin*, hormones*, phosphorus, potassium*, protein*, selenium*, vitamin C*; antibacterial, anti-fungal activity

ala blanca (*Impatiens balsamina*): anti-fungal activity; SEEDS: Unnamed alkaloid

[1] Glossary sources: Adams (1976); Arvigo and Balick (1993); Beckstrom-Sternberg and Duke (1994); Bremness (1994); Duke (1981, 1992, 1997); Johnson (2000); Kricher (1989); Lewis (1992); Lewis and Elvin-Lewis (1977); Martin and Fennema (2000); Morton (1981); Nietschmann (1973); Pickering (1879); Robineau (1991); Smith, et al. (1992); Sumita, Gupta and Sen (1987); Wiersema and Leon (1999); Woodroof (1970).

albahaca (*Ocimum basilicum*): chemistry varies with variety and location; numerous glucosides; volatile oils (may include eucalyptol, cineol, pinene, camphor, eugenol) show antibacterial, insecticidal, anti-fungal and anti-ascariasis activity; avoid oil on sensitive skin and during pregnancy

algodón (*Gossypium barbadense*): mammal poison; catechin*, gossypol*; LEAF: citric acid*, malate; ROOT: resin*, vitamin E*; SEED: flavonoids*, highest gossypol* concentrations; ROOT BARK: Acidic resin*, volatile oils*, phenolic acid*

algodón criollo (*Ceiba pentandra*): lipids*; LEAF: caffeic acid, quercetin*, camphorol*, caffeic acid (see caffeine), resin*; BARK: hydrocyanic acid*, tannin*; extract has curare-like action on nerves of animals; SEED: carbohydrates*, fat, fiber

almendra (*Terminalia catappa*): benzenoids*, coumarins*, lipids*, saponins* and tannins*; UNRIPE FRUITS have 20% tannin; ROOT, BARK, LEAVES: High tannin content; SEED: 54% oil, 27% protein

anis (*Pimpinella anisum*): phenolic ether volatile oils

aras pata (*Ixora coccinea*): no content information

arroz (*Oryza sativa*): GRAIN (with bran intact) high in starch* and fat, low protein*; easily digested

awas tangni (*Eupatorium capillifolium*): *E. odoratum*: SEED: fat, protein*; LEAF: iron*, tannin*

ayote (*Cucurbita moschata*): *C. moschata*: FRUIT: citric*, fumaric*, succinic* and malic* acids; vitamin C*; citrulline*; SEED: cucurbitine; vitamins A* and C*; high in oil and protein*; *C. pepo*: phenylalanine*, folic acid*; alanine*; thiamine*, zinc*

B-16 (*Mecardonia procumbens*): no content information

bachelor's button (*Gomphrena globosa*): terpenoids

bambú (*Bambusa* sp.): no content information

banano (*Musa acuminata*): tryptophan*, thiamine*; whole plant: tannins*; LEAVES: citric acid*, malate*, glutamate* and other organic acids*; FRUIT: potassium*, sodium*; carbohydrates*, vitamin C*, pyridoxine*, starch*; PLANT and UNRIPE FRUIT: high tannin* content; antibiotic activity; RIPE FRUIT/PEEL: serotonin*, dopamine*

batata (*Ipomoea batatas*): mammal poison; potassium*; vitamin A*; TUBER (raw or cooked): sugar, starch* and some fat; starch*, vitamin C*

bayvine (*Sphagneticola trilobata*): numerous terpenes*, sulfur compounds*

bejuco (*Hippocratea volubilis*): no content information

bejuco II (*Clerodendrum thomsoniae*): no content information

bejuco negro (unidentified): no content information

biuhu (*Chrysobalanus icaco* var. *ellipticus*): *C. icaco*: poison; gum; tannins*; KERNEL: 20-22% oil; FRUIT: vitamin C*, calcium*, carbohydrates*

bla (*Philodendron radiatum*): no content information

bloodflower (*Asclepias curassavica*): active ingredient: calotropin (cardiac glycoside*); hormones*; milky SAP poisonous

boton (*Drymaria villosa*): no content information

bougainvillea (*Bougainvillea x buttiana*): no content information

bredbred (*Inga edulis*): no content information

bredbred II (*Inga thibaudiniana*): tannins*

bredpru (*Artocarpus altilis*): FRUIT: starch*; carbohydrate*-rich; LEAF: quercetin*, hydrocyanic acid*, camphorol*; SEED: argenine*, vitamin C*, glutamate*, protein*; LATEX: cerotic acid

brum (*Hirtella racemosa* var. *hexandra*): no content information

brum taplira II (*Leonurus japonicus*): *L. cardiaca:* alkaloids*, tannin*; SEED: fat, protein*

butterfly flower (*Crotalaria retusa*): mammal poison; monocrotaline (active compound)

cacao (*Theobroma cacao*): arginine*; caffeine*, theobromine*; SEED contains 3% theobromine*; SEED: 45-50% fatty oil, containing linalool; LEAF, ROOT, SEED: caffeine*, theobromine*; ROOT BARK: tannins*

camotillo (unidentified): TUBER: hydrocyanic compounds

canela (*Cinnamonum verum*): camphor*, tannins*, coumarins*; anti-fungal, antibacterial properties; numerous essential oils*, i.e. eugenol

caña (*Saccharum officinarum*): JUICE as piscidal; sucrose, tannins*, anthocyanins*, glucose, fructose, organic acids*; COLORED STEMS high in tannins* and anthocyanins*

caoba (*Swietenia macrophylla*): swietenine, swietenolide, swietenolid diacetate

carau (*Cassia grandis*): tannins*, anthraquinones*, flavonoids*, lignans*; SEEDS: poisonous (camphorol*)

carpetgrass (*Axonopus fissifolius*): no content information

cascara (*Peltaea ovata*): no content information

cedro macho (*Carapa guianensis*): SEEDS: organic acids*, fat, poisonous; BARK and SEEDS: unnamed alkaloids; BARK: tannin

cedro real (*Cedrela odorata*): tannins*, essential oils*; SEED: protein*, fat

chaparro (*Curatella americana*): LEAF: silica; BARK: high tannin* content and antibiotic activity

chile picante (*Capsicum frutescens*): FRUIT: capsaicin*, vitamin C*, carotenoids*; LEAVES: 4-6% protein*

chiltoma (*Capsicum annuum*): FRUIT: vitamin C*, carotenoids*, capsaicin*, protein*

cinco dedo (*Syngonium angustatum*): many species contain calcium oxalate crystals

cinerut (*Smilax domingensis*): starch*; ROOT: piscidal; *Smilax* spp.: diosgenin, sarsaparilla

clavel (*Gardenia jasminoides*): FRUIT: arsenic (trace), calcium*, tannin*; SEED: fat, protein*, potassium*

clover (*Desmodium triflorum*): tannins*

coco (*Cocos nucifera*): high fat content; IMMATURE COCONUT contains 92% water, 5% carbohydrates*, 1% protein*, 1% mineral, 1% oil; WATER: sugars, malic acid*, amino acids*; COPRA (mature nut white meat) nutritious, 51% water, 32% oil, 63-65% fat; dry COPRA: carbohydrates*, proteins*, lipids*; 12% water, 60% oil; COCO MILK (squeezed from grated coconut meat) contains 86% water, 4-5% oil, 3-4% protein*, 4-5% carbohydrate and 1% mineral (similar to cow's milk!); anti-fungal activity; ROOTS and HUSK FIBER: tannins*

cola de alacrán (*Stachytarpheta cayennensis*): PLANT: salicylic acid*

comida de lora (*Henriettella seemannii*): no content information

córazon de María (*Caladium bicolor*): mammal poison; PLANT: calcium oxalate; TUBER: starch*

cosmos (*Cosmos bipinnatus*): no content information

coyol de leche (*Attalea cohune*): no content information

croto (*Codiaeum variegatum*): ROOT and BARK: acrid; SAP: tannins (6-8%)

cuadrado (*Musa acuminita*): starch*; PLANT and UNRIPE FRUIT: High tannin content; antibiotic activity; RIPE FRUIT/PEEL: serotonin* and dopamine*

culantro (*Eryngium foetidum*): flavonoids*, sterols*, terpenes*, essential oil; ROOTS: saponins*AERIAL PARTS: rich in calcium*, iron*, riboflavin* and carotene*; anticonvulsant and antimalarial activity

dasheen (*Colocasia esculenta*): more carbohydrates* and protein* than a potato; starch*, vitamin C*; mammal poison

dayflower (*Commelina diffusa*): *C. elegans*: SEED: lectins

delta (*Petiveria alliacea*): steroids, saponins*, polyphenols (phenols*), terpenes*

dinar II (*Chromolaena odorata*): LEAF: essential oil (with eupatenol derivatives); ENTIRE: acacetine, veultine, tamarixetine, mikanine, flavonones and one flavone

dinar pauni (*Melochia villosa*): no content information

dinar relative (*Sida acuta*): LEAF/STEMS: saponin*; ROOTS: aspargine, ephedrine; LEAF/ROOT/SEED: unnamed alkaloid*

dog's tongue (*Pseudelephantopus spicatus*): saponins*

dormilona (*Mimosa pudica*): tannins*; antiviral, antibacterial activity; avoid if pregnant; protein; mimosine (a toxic alkaloid*); ROOT excretions allelopathic*; CAUTION: harmful if used for prolonged periods; pregnant women should avoid using any form - causes abortion

dwarf poinciana (*Caesalpinia pulcherrima*): LEAF: 7% tannin*, hydrocyanic acid*; LEAF/WOOD: tannin*; FLOWER: quercetin*

Easter fern (*Lycopodiella cernua*): no content information

escoba amarga (*Scoparia dulcis*): ENTIRE: alkaloid, salicylic acids, central nervous system depressant

escoba lisa (*Sida rhombifolia*): alkaloids*; vasicine; cryptolepine; ENTIRE: ephedrine*; LEAF: high saponin* content; LEAF/STEM: antibiotic activity

eucalípto (*Eucalyptus* sp.): quercitrin*, rutin; LEAF: terpenoid volatile oils* (cineol, eucalyptol, citronellal, citronellal), tannin*; BARK: tannin*

flor de noche (*Ipomoea carnea* subsp. *fistulosa*): *I. batatas*: LEAF: vitamin c*, carbohydrates*, protein*, cat, calcium*

flor de paloma (*Impatiens balsamina*): an unnamed alkaloid*

frijol (*Phaseolus vulgaris*): *P. lunatus*: Inositol*, alanine*, lysine*, phenylalanine*; LEAVES/SHOOTS contain ~7.5% protein*; mammal poison

frijol II (*Cleome serrata*): no content information

frijol blanco (*Canavalia ensiformis*): protein*, starch*; SEEDS: antibiotic source; LEAF/ROOT: cyanogenetic heterosides; toxic substances (concanavalin A, canavanine, canatoxine); LEAF: rutin* and quercitrin*; mammal poison

frijol negro (*Phaseolus vulgaris*): *P. lunatus*: Inositol*, alanine*, lysine*, phenylalanine*; LEAVES/SHOOTS contain ~7.5% protein*

grama del llano (*Rhynchospora brachychaeta*): no content information

granadilla (*Passiflora quadrangularis*): harmala alkaloids*, harmine; LEAF, RIND, immature SEED: hydrocyanic acid*; ROOT: passiflorine (poisonous alkaloid*)

grass II (*Agalinis albida*): no content information

green tea (*Lippia alba*): terpenes*, alkenes, vitamins*

guanábana (*Annona muricata*): alkaloids*, steroids, flavonoids*, phenolic compounds (phenols*); FRUIT: vitamins B* and C*, phosphorus, malic acid*, riboflavin*, niacin*; LEAF and BARK: tannins*; LEAF and RESIN: terpenes*

guapinol (*Hymenaea courbaril*): tannins*

guayaba (*Psidium guajava*): LEAVES: essential oil, triterpenoids (terpenes*), tannins*; ROOTS: leucocyanidins, sterols* and gallic acid (organic acid*); ripe FRUIT: high in vitamin C*; one guava contains 2-5 times more vitamin C* than an orange; ENTIRE: tannin* (up to 30% in bark); LEAF and FLOWER show antibiotic activity

guayaba acido (*Psidium cattleianum* var. *littorale*): *P. guajava*: anti-*Staphylococcus*, anti-fungal activity; LEAVES: essential oil, triterpenoids (terpenes*), tannins*; ROOTS: leucocyanidins, sterols* and gallic acid (organic acid*); FRUIT: vitamin C*; one guava contains 2-5 times more vitamin C* than an orange

guayaba rosa (*Psidium cattleianum*): *P. guajava*: anti-*Staphylococcus*, anti-fungal activity; LEAVES: essential oil, triterpenoids (terpenes*), tannins*; ROOTS: leucocyanidins, sterols* and gallic acid (organic acid*); FRUIT: vitamin C*; one guava contains 2-5 times more vitamin C* than an orange

guineafa (unidentified): no content information

herb II (*Chamaecrista kunthiana*): tannins*

herb III (*Chamaesyce thymifolia*): Unnamed alkaloid* (similar to quercitrin*); essential oil* (containing cymol, limonene); LATEX: irritant

hierba buena (*Mentha spicata*): ENTIRE: volatile oil* (borneol, menthol); protein*; LEAF: vitaminA*, tryptophan*

hombre grande (*Quassia amara*): WOOD: unknown alkaloid*

ibu (*Dipteryx oleifera*): coumarin*, essential oils*, tannins*

icaco (*Chrysobalanus icaco*): poison; gum; tannins*; KERNEL: 20-22% oil; FRUIT: vitamin C*, calcium*, carbohydrates*

iska dura (*Acisanthera quadrata*): no content information
Jamaican voodoo medicine (unidentified): no content information

jícaro (*Crescentia alata*): PULP: hydrocyanic acid; WOOD: naphthoquinone derivatives; SEEDS: oleic acid; FRUIT: alkaloids*, polyphenols (phenols*)

jocote (*Spondias purpurea*): SHOOTS: ~5.5% protein*; LEAF: 81% water, 3.5% protein*, .3% fat, 13.4% carbohydrate, 1.8% ash, calcium*, phosphorus, iron*, carotene*, thiamine*, vitamin C*; LEAF and BARK: tannins*

John's sails (*Hyptis verticillata*): lignan* (podophyllotoxin); anticancer activity; *Hyptis* spp.: betulinic acid

joint bush (*Miconia albicans*): LEAF: .2% caffeine*

kalila lal (*Celosia argentea var. cristata*): FLOWER: arsenic, iron*, potassium*; SEED: fat, protein*

karastingni (*Bromelia karatas*): peeled, seeded, ripe FRUIT: niacin*, nitrogen, potassium*, ascorbic acid*

kitkal (*Tillandsia streptophylla*): no content information

kiwa (unidentified): no content information

krismis blossom II (*Senna undulata*): tannins*; *Fabaceae* family: UNDRIED SEEDS: poisonous; ROOT BARK: quinine*; BARK: tannins*; LEAF: piscidal

kru (*Psidium* guineense): *P. guajava*: anti-*Staphylococcus*, anti-fungal activity; LEAVES: essential oil, triterpenoids (terpenes*), tannins*; ROOTS: leucocyanidins, sterols* and gallic acid (organic acid*); FRUIT: vitamin C*; one guava contains 2-5 times more vitamin C* than an orange

latawira (*Hyptis conferta var. angustata*): *Hyptis* spp.: betulinic acid

latawira II (*Desmodium incanum*): tannins*

lengua de gallina (*Hemidiodia ocymifolia*): no content information
lili tangni (*Crinum augustum*): no content information

liliura (*Abrus precatorius*): tannins*, sweet glycyrrhizin (found in licorice); RAW SEED: abrin*, fatally poisonous; mammal posion

limon agrio (*Citrus aurantiifolia*): alkaloids*, resins*; LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*; SEEDS: alkaloids*, histamines*; ROOT BARK and FRUIT: casimiroedine (shows carcinostatic activity)

limon mandarina (*Citrus reticulata*): alkaloids*, resins*; LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*

limon merikano (*Citrus* sp.): alkaloids*, resins*; LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*

limon miskito (*Citrus* sp.): alkaloids*, resins*; LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*

limon puro (*Citrus limon*): alkaloids*, resins*; LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*

limon real (*Citrus* sp.): vitamins A* and C*; alkaloids*, resins*; LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*

limsi (*Bursera simaruba*): burseran, lignans*; gum; resin*

liwa mukya (*Cochlospermum religiosum*): resin*; gum

lula bakbak (*Piper jacquemontianum*): *Piper* spp.: crotepoxide; piscidal; *P. peltatum*: LEAF: rich in vitamin C*, minerals*

lythrum II (*Cuphea carthagenensis*): no content information

maíz (*Zea mays*): carbohydrates*, phosphorus, niacin*; terpenes*, alkaloids*, saponins*, salicylic acid*, allantoin, salts of potassium*; SEEDS: an unnamed alkaloid, rich in starch*; young STALKS have antibiotic principals; SILK: saponin, potassium, tannin, sterols*, allantoin; LEAVES alkaloid (hordenine); highly pigmented HUSKS, SILKS and OTHER PARTS: high in tannins* and phenols*; SEEDLINGS: cyanogenic glycoside

mala (*Dalechampia scandens*): mammal poison

malanga (*Dioscorea trifida*): starch*, protein*

malinche (*Delonix regia*): no content information

mamon (*Melicoccus bijugatus*): FRUIT: vitamin C*, carbohydrates*, fat, fiber, protein*, tannin*

Managua tangnika (*Portulaca oleracea*): good source of omega-3 fatty acids*, rich in minerals, protein, vitamin E*; vitamin C*; hypoglycemic, antibacterial activity; norepinephrine (alkaloid*), urea, potassium*

mangle blanco (*Laguncularia racemosa*): tannins*

mangle roho (*Rhizophora mangle*): BARK: gum, anti-fungal activity, tannins*: dry BARK (10-40%), AERIAL ROOTS (10%); LEAF: high carbohydrates*, tannin*

mango (*Mangifera indica*): flavonoids*, vitamin A*, vitamin B* and vitamin C*; BARK: phenolic acid* (including tannins* and anacardol acid*), gum; FRUIT SKIN sometimes contains anacardol acid*; SAP: Caustic; BARK: 13-20% tannin*; quercetin; SEED KERNEL: 8-9% tannin*, gallic acid, starch; LEAF: benzoic acid, tannin*; FRUIT resin* contains mangiferene

manzanilla (*Matricaria recutita*): FLOWER: essence of chamomile*; camazulene (antiviral activity against polio and herpes viruses); antibacterial and antifungal

marañon (*Anacardium occidentale*): NUT (SEED): nutritious; high fat, protein*, alanine*, anacardol*, arginine*; SEED INTEGUMENTS: cardol*; "APPLE"[2] (FRUIT): vitamin A*, vitamin C*, tannins*; BARK and TRUNK: glucose-containing GUM

masra (*Salacia impressifolia*): no content information

mihmi (*Conocarpus erectus*): BARK: tannins* (16-18%)

mozaica (*Solenostemon scutellarioides*): no content information

mozote (*Pavonia schiedeana*): *P. spinifex*: alkaloids*, tannins*

muspuskan (*Desmodium adscendens*): tannins*; potassium oxide

mustukra (*Pera arborea*): no content information

mutmutya (*Acalypha arvensis*): WHOLE PLANT: acalyphine (alkaloid*); cyanogenic glycosides*; mammal poison

nancite (*Byrsonima crassifolia*): FRUIT: protein*, rich in vitamin C*; BARK: high tannin* content, piscidal

naranja dulce (*Citrus sinensis*): LEAF, FLOWER, RIND: essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*

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[2] The swollen pedicel that attaches the nut to the tree (Allaby 1929; Duke 1981; Smith, et al. 1992).

naranjagrio (*Citrus aurantium*): antibacterial, anti-fungal activity; LEAF, TWIG, FLOWER, RIND: high in essential oils* (limonene, linaool, nerol); PULP: citric* and malic* acids, vitamin C*; PEEL: citrin*; LEAF: vitamin C*; green PEEL: up to 14% neohesperidin*

nerves (*Coccocypselum hirsutum*): no content information

níspero (*Manilkara* sp.): *M. zapota*: gum, latex, resin

node weed (*Synedrella nodiflora*): no content information

paisagua (*Dioscorea bulbifera*): TUBER: tannins*, carbohydrates*, glutamate*, aspartate, starch*; aerial bulbs and tuber poisonous; TUBER nutritious

palma africana (*Elaeis oleifera*): FRUIT: fat, linoleic acid; SEED: oleic acid, fat

palmera (*Acoelorraphe wrightii*): no content information

palo de agua (*Bravaisia* sp.): no content information

palo de culebra (*Matayba apetala*): no content information

palo de leche amarillo (*Maclura tinctoria*): tannins*, fustic*

palo de lora (*Amanoa guianensis*): no content information

papaya (*Carica papaya*): FRUIT/LEAF:potassium*; protein*; vitamin C*; vitamin A*, papain*; RIPE PULP: 90% water, rich in vitamin A*; chymopapain; SEED: protein*, mustard-flavor; avoid when pregnant/breastfeeding, believed to induce abortion and colic; LATEX: papain*

pasta (*Luffa quinquefida*): FRUIT: saponin*; VINE: strongly hemolytic saponin*; SEED: numerous organic acids*

patita de paloma (*Alternanthera bettzickiana*): no content information

pejibaye (*Bactris gasipaes*): FRUIT: carbohydrates*; rich in vitamin A*, vitamin C*, contains more protein* than most root crops (3-18% dry-weight); can contain significant amounts of oil; FRUITS: most amino acids*; calcium*; SEED: starch*

pera (*Syzygium malaccense*): *S. aromaticum*: (clove) FLOWER BUDS: essential oil rich in eugenol; ENTIRE PLANT: triterpenic acids, crateologic acids, ellagic tannin (tannins*), eugenin

piawat (*Myrica cerifera*): FRUIT: wax, fiber; LEAF, ROOT BARK and BARK: tannins*; SEED: protein*

pico de pájaro (*Senna occidentalis*): flavonoid* glucosides*; anthraquinones*; tannins*; anti-fungal activity; UNDRIED SEEDS: poisonous; ROOT BARK: quinine* substitute; SEEDS: chrysophenol; ROOT: phytosterols*

pie del niño (*Pedilanthus tithymaloides*): mammal poison; acrid, caustic LATEX; SEEDS: violent emetic

pino (*Pinus caribaea* var. *hondurensis*): resin*; volatile oils (especially turpentine)

piña (*Ananas comosus*): FRUIT: source of bromelain*, vitamin C*, argenine*, alanine*, sugars

pisik shrub (*Cordia curassavica*): no content information

pisik tree (*Jatropha curcas*): jatropham, tannins*, flavonoids*; piscidal, insecticidal, mammal poison; NUTS: poisonous; cyanogenic glycosides*; SEEDS poisonous; latex; lipids*; LEAVES and TWIGS: steroids*; show anti-leukemia acitivity; SEEDS: purgative oil; curcin (toxic protein); BARK: steroidal sapogenin*

pispis (*Lagenaria siceraria*): SEEDS: high oil and protein*; FRUIT low nutritional value; mammal poison; *Lageneria* sp.: RIPE FRUIT: poisonous

plang (*Cecropia peltata*): anti-fungal activity; YOUNG LEAVES: tannins* highly concentrated; decreasing in older leaves; SAP: caustic

platano (*Musa x paradisiaca*): supposed source of deadly dart poison; tryptophan*, thiamine*; LEAVES: citric acid*, malate, glutamate* and other organic acids*; FRUIT: potassium*, sodium*, carbohydrates*, high concentrations of vitamin A*, starch*; WHOLE PLANT and UNRIPE FRUIT: High tannin* content; antibiotic activity; RIPE FRUIT/PEEL: serotonin* and dopamine*

plato tangni (*Canna indica*): ROOT: vitamin C*, calcium*, carbohydrates*, fiber; SEED/ROOT: fat, protein*

pochote (*Pachira quinata*): *P. aquatica*: BARK: tannin*

prakprakya (*Desmodium incanum*): tannins*

pukru (*Pachira aquatica*): SEED: oleic acid, narcotic, high fat content; BARK: tannin*; yellow dye; shows antibiotic activity

pyuta saika (*Drymaria cordata*): no content information

quequisque (*Xanthosoma violaceum*): *X. sagitifolium*: ROOT: starch*, calcium oxalate, carbohydrates*, protein*

querosin (*Tetragastris panamensis*): no content information

rahstima (*Chamaecrista diphylla*): tannins*

raiti tangni (*Catharanthus roseus*): Active ingredients (anti-cancer drugs): akuammine, leurosine, vinblastine, vincamine, vincristine, vindoline; cockroach poison

receda varieties I and II (*Lagerstroemia indica*): LEAF: steroids; SEED: fat, protein*; FLOWER: gallic acid (organic acid*)

reumatis saika (*Philodendron hederaceum*): mammal poison

romero (*Rosmarinus officinalis*): LEAF: terpenoid volatile oils* (camphor, cineol); tannins*, organic acids*, essential oil* (including pinene, limonene, eucalyptol); insecitcidal

rosa (*Hibiscus rosa-sinensis*): antiestrogenic effects

san diego (*Tagetes erecta*): *T. minuta*: crude extracts have activity but as yet unnamed; non-vertebrate poison; FLOWER: xanthophyll esters; ROOT and PETALS: alpha-terthienyl (inhibits proliferation of rootknot nematodes)

sandia (*Citrullus lanatus*): SEED/FRUIT: alanine*, arginine*, glutamate*, many other amino acids*

Santa Maria (*Calophyllum brasiliense* var. *rekoi*): latex; SEED: oil

sapote (*Pouteria sapota*): vitamin C*; SEED: amygdalin (cyanogenic glycoside*), sugars, proteins*, tannins*; SEED COAT: central nervous system depressant activity; latex

sargassum (*Sargassum* sp.): no content information

scroph II (*Lindernia crustacea*): no content information

sedge I (*Rhynchospora cephalotes*): no content information

sedge II (*Cyperus luzulae*): Cyanogenetic properties; *C. rotundus*: ROOT: essential oils*, alkaloids*, trace arsenic, sugar

sedge III (*Cyperus aggregatus*): *C. luzulae*: Cyanogenetic properties; *C. rotundus*: ROOT: essential oils*, alkaloids*, trace arsenic, sugar

sedge IV (*Lagenocarpus guianensis*): no content information

sepol (unidentified): no content information

shrub II (*Hydrolea spinosa*): no content information

siaya (*Miconia ciliata*): *Miconia* sp.: 0.2% caffeine*

siaya tangni (*Tibouchina aspera.*): no content information

siaya wahya (*Clidemia sericea*): no content information

sina (*Senna* sp.): tannins*

sirang saika (unidentified): no content information

sironcontil (*Senna alata*): chrysophanic acid; antibacterial, anti-fungal activity; may be piscidal; insecticidal; ROOT extract causes abortion; LEAF: chrysarobin, tannin*, dihydroxymethylanthraquinone

sirpi (*Polypodium* sp.): RHISOME: caffeic acid (see caffeine*), catechins*, citrate, sugars, starch*

snaiya (*Pachyanthus lundellianus*): LEAVES: 0.2% caffeine*

soft elephant's ear (*Elephantopus mollis*): Active ingredients: *E. elatus*: elephantopin, elaphantin

sorosil (*Momordica charantia*): Mammal poison; AERIAL PORTIONS: terpenes*; FRUIT and SEED: amino acids* and derivatives, poisonous; GREEN FRUIT: saponins*, terpenes*; PERICARP OF FRUIT: carotenoids*; FRUIT: charantin (a hypogycemic principle); unripe FRUIT: luteolin, momordicin (a bitter alkaloid*); ROOTS: antibiotic activity

spiny amaranth (*Amaranthus spinosus*): LEAVES: 3-6% protein*, nitrates, vitamin C*, calcium carbonate, riboflavin*, thiamin*

sukling waika (unidentified fungus): no content information

sundew (*Drosera capillaris*): *D. rotundifolia*: LEAVES: proteolytic enzymes, plumbagin*; acrid caustic; proteolyitc activity

susul (*Alibertia edulis*): no content information

swim kiama (unidentified fungus): no content information

syngonium (*Syngonium podophyllum*): many species contain calcium oxalate crystals

tailo (*Xylopia aromatica*): no content information

tamarindo (*Tamarindus indica*): vitamin C*, calcium*, phosphorus, iron*; FRUITS: sugars, pectin*s; antiviral, anti-fungal, antibacterial activity; yellow dye; PULP: 11-15% tartaric acid (may be responsible for purgative action); acetic*, citric*, malic*, succinic acids*; sugars; pectin*; SEED: high tannin content

tatahku (*Mikania scandens*): rich in vitamin K*

ti (*Cymbopogon citratus*): triterpenoids (terpenes*); lipids*; FRESH AERIAL PARTS: essential oils* with antibacterial activity; DRIED PLANT: anti-fungal activity; *Cymbopogon* sp.: citronella; insecticidal; cyanogentic; OIL: Antiseptic

tobacco (*Nicotiana tobacum*): malate*, citric acid*, phenolic acids*, flavonoids*; PLANT: alkaloids* (esp nicotine and anabasine - highly toxic)

tomate (*Lycopersicon esculentum*): rich in minerals*, vitamins A*, B*, C*, P*, phosphorus, potassium*, selenium*, tomatine, steroidal alkaloids*; FRUIT: lignans*, narcotine, tryptamine, organic acids*, volatile compounds (acetylaldehyde, benzaldehyde, acetone, ethanl), flavonoids*, vitamin C*; PEEL: carbides, sterols*; SEED: a steroidal saponin* causes the bittersweet taste; GREEN PARTS: toxic, cockroach deterrent

toronja (*Citrus paradisi*): vitamins A* and C*; essential oils*; mammal poison

tree of life (*Bryophyllum pinnatum*): flavonoids*, phenolic* compounds; calcium chloride; malic*, citric* and succininc acid*; glycosides*; phenols*; heated LEAF juice shows antibacterial acitivity

tree, red flower (*Jatropha integerrima*): no content information

tuktukya II (*Physalis angulata*): FRUIT: calcium*, carbohydrates*, protein*

tuktukya III (*Physalis pubescens*): FRUIT: fisaline (alkaloid); when ripe, high in niacin; ROOT: hygrine (alkaloid)

tumtum I (*Nymphaea odorata*): no content information

tumtum II (*Nymphoides indica*): no content information

tumtum III (*Nymphaea ampla*): narcotic

tumtum relative A (*Ludwigia sedoides*): no content information

tumtum relative C (*Sagittaria lancifolia*): no content information

turbinaria (*Turbinaria* sp.): no content information

usupum (*Quercus oleoides*): ACORNS: harmful to sheep

uva del mar (*Coccoloba uvifera*): tannins* (up to 25% in BRANCHES, ROOTS, BARK; 41% in concentrated SAP)

vine I (*Ipomoea setifera*): no content information

vine II (*Calopogonium mucunoides*): tannins*

vine III (*Cissus erosa*): *C. verticillata* L.: FRUIT: anthocyanins*; antibacterial activity; flavonoids*, phenols*

wain (*Hibiscus sabdariffa*): CALYCES: vitamin C*, anthocyanins*, pectin*, sucrose

waisala (*Renealmia alpinia*): no content information

wandering jew (*Tradescantia zebrina*): no content information

wildflower II (*Polygala adenophora*): *Polygala* sp.: methyl salicylate*, ROOT: saponins*, steroid terpenoids

yellow oleander (*Thevetia peruviana*): Mammal poison; SEEDS: poisonous (thevetin); WOOD: piscidal; ENTIRE: latex, resin*, quercetin*

yuca[3] (*Manihot esculenta*): mammal poison; acetone, oxalic acid, saponin*, tryptophan*, vitamin A*, starch*; ROOTS: hydrocyanic acid; LEAVES: 7% fresh-weight protein*, high in zinc; STEMS/LEAVES: insecticidal; TUBER: linamarin (a cyanogenic glycoside*);

yul kyama (*Psychotria tomentosa*): no content information

zinnia (*Zinnia violacea*): no content information

zinza (*Zingiber officinale*): essential oils* (terpenes*, zingerone, shogaol, gingerol cineol, borneol, geraniol, linalool); RHIZOME: carbohydrates*, protein*, potassium*, fiber, starch*

zonzapote (*Licania platypus*): FRUIT: vitamin C*, fiber, protein*

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[3] It was once erroneously believed that sweet, nonbitter types were harmless, some are more toxic than bitter types (Miskito call the latter yaura tapla – sour yuca).

Glossary 2: Plant Constituents

This glossary defines a number of the constituents of the plants detailed in this study, as reported in the regional literature and as noted in Glossary 1. Words followed by an asterisk (*) are defined within this glossary.[1]

Abrin: A protein-based poison; one of the most virulent of all plant poisons; must enter bloodstream to cause harm; boiling destroys the poison; found in liliura

Antioxidant: A substance that slows the oxidation of oils, fats, etc., thus slowing deterioration; often added to foods; see vitamin E, beta carotene

Alanine: A water-soluble amino acid that is a constituent of many proteins*

Alkaloids: Any of a number of colorless, bitter organic substances that contain nitrogen; obtained primarily from plants; they often have physiological activity in humans (including toxicity); e.g.: caffeine*, capsaicin*, nicotine and quinine

Allicin: A strong-smelling sulfur compound that is a potent antibiotic; inhibits the growth of various bacteria and fungi; found in ajo

Allelopathic: Release of chemical substances (usually alkaloids*, terpenes* and phenolics*) from the root of one plant that inhibits the growth or germination of another organism

Amino acids: A group of nitrogenous organic compounds that serve as the basic units of proteins*; essential to human metabolism; see: arginine, lysine, tryptophan and essential amino acids

Anacardol Acid: Causes severe blisters on the skin and mucous membranes; found in mango bark and fruit skin, marañon seed integuments; see also cardol

Anthocyanins: A soluble reddish-blue pigment in flowers and other plant parts

Anthraquinones: A substance that aids in passing colonic contents; also used in dyes

Arginine: An essential amino acid* obtained; increases secretions of insulin

Ascorbic Acid: See vitamin C

Benzenoids: An aromatic compound containing two or more benzene rings; poisonous; found in varnishes, lacquers and many dyes; i.e. naphthaline

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[1] The sources for this information include Beckstrom-Sternbreg and Duke (1994), Bellamy and Pfister (1992), Bremness (1994), Duke (1981, 1997); Guralnik (1978), Johnson (2000), Kostermans (1993), Lewis (1992), Lewis and Elvin-Lewis (1977), Martin and Fennema (1997), Pearsons (1992), Robineau (1991), Salisbury and Ross (1985), Smith et al. (1992) and Tyler (1994).

Beta carotene: Most abundant form of carotene*; converted to vitamin A by the body

Bioflavonoids: See vitamin P

Bixine: See carotenoids

Bromelain: An protein-digesting enzyme obtained from piña; used as meat tenderizer

Caffeine: A bitter alkaloid* present in coffee and tea; heart and central nervous system stimulant

Calcium: Needed for the development of strong bones and teeth

Camazulene: Part of the essential oil chamomile*; has antiviral activity against polio and herpes viruses

Camphor: A volatile, pleasant-smelling terpene* derived from plants that has stimulant and counterirritant properties

Camphorol: A white, crystalline terpene* alcohol resembling camphor; used in perfumery and as an astringent

Capsaicin: A bitter, strongly irritant alkaloid* causing inflammation and watery eyes; obtained from species of *Capsicum*; stimulates circulation; has counterirritant and analgesic properties; used to combat muscle aches and arthritis

Carbohydrates: Organic compounds, including sugars and starches; produced by plants during photosynthesis; important in supplying energy to the body of animals

Cardiac glycoside: Stimulates cardiac action; see glycosides

Cardol: A caustic oil; removed by heat; see also anacardol acid

Carotene: Any of three red or orange compounds; found in carrots and certain other plants; changed into vitamin A in the body; see vitamin A, beta carotene

Carotenoids: Any of several red and yellow plant and animal pigments related to and including carotene*; also includes bixine and norbixine

Catechin: A yellow, powdery compound used in tanning; helps relieve nausea

Chamomile: An essential oil that contains camazulene*

Chymopapain: An enzyme capable of digesting protein*; used in modern medicine as a spinal injection to treat spinal disc dislocations

Citrate: See citric acid

Citric acid: An organic acid derived from various species of *Citrus*; used in flavoring extracts and dyes; necessary in metabolism (producing energy)

Citrin: A crystalline glucoside* found in unripe citrus fruits; anti-hypotensive activity; a form of vitamin P*; a.k.a.: hesperidin

Citrulline: An amino acid* abundant in sand!a; an intermediary in urea cycle

Coumarin: An amino acid*; used in perfumery and as a fixative

Cyanocobalamin: A vitamin of the B complex* (vitamin B12); found in liver, kidney and brain; essential for the maturation of red blood cells, normal growth and neurological function; used to treat pernicious anemia and depression

Cyanogenic glycosides: Glycosides* that yield hydrocyanic acid (cyanide) upon hydrolysis; amygdalin is probably the most widely distributed (found in Rosaceae, i.e. apple seeds)

Dopamine: An amine essential for normal brain activity

Ephedrine: An alkaloid*; relieves nasal congestion, asthma and acts as a vasoconstrictor

Essential amino acids: Humans can manufacture all but eight amino acids*; known as essential amino acids, they must be obtained by ingestion; includes: leucine, isoleucine, valine, lysine*, methionine, tryptophan*, phenylalanine* and threonine

Essential oils: Volatile oils that act as counter-irritants; gives distinctive odor or flavor to a plant, flower or fruit; includes: eucalyptol, estragol, cineol; limonene, linaool, nerol, eugenol; aka volatile oils

Flavonoids: Carbon-based compounds found throughout the plant kingdom; over 200 have been identified in plants; its sweet flavor makes it a sugar substitute; includes: anthocyanins*, flavonols and flavones

Folic acid: A water-soluble vitamin of the B complex; must be obtained in the diet; found in green plants, fresh fruit, liver, and yeast; deficiency causes anemia; used to treat anemia;

Fumarate: See fumaric acid

Fumaric Acid: Occurs in plants or produced synthetically; an intermediary in plant respiration; used in making resins* or plastics

Fustic: Yellow dye extracted from the wood of palo de leche amarillo

Glucoside: A natural or synthetic compound that yields glucose upon hydrolysis

Glutamate: An amino acid* prepared by the hydrolysis of plant proteins*

Glycosides: A compound that yields two substances upon hydrolysis: sugar(s) called glycones, and injurious compounds called aglycones; includes cyanogenic glycosides*, cardioactive glycosides* and others

Gossypol: A sesquiterpene that is poisonous to farm animals and can be an allergen to susceptible people; toxic; possible use as male birth control; see terpenes

Hesperidin: See citrin

Histamines: Found in all organic matter; lowers blood pressure and stimulates gastric secretions

Hormone: A substance formed in the human body or a plant that has a specific effect on another organ or part of the plant

Hydrocyanic Acid: Cyanide; see also cyanogenic glycosides

Inositol: An alcohol especially found in plant and animal tissue (including lima beans) classified as a member of the vitamin B complex; may effect cholesterol metabolism; see vitamin B

Iron: A compound that is vital to plant and animal life; building block of hemoglobin

Lignans: An organic substance that acts as a cellulose binder in wood and in certain herbaceous plants, adding strength and stiffness to the cell walls

Lipids: Organic compound consisting of fats and similar substances; insoluble in water but soluble in alcohol; certain lipids are precursors to vitamin D; good for candle and soap making; see vitamin D

Lysine: An essential amino acid* derived from the hydrolysis of proteins* and required by the body for optimum growth

Malate: See malic acid

Malic acid: An organic acid found in apples and other fruits

Methyl salicylate: A known anti-inflammatory

Minerals: Inorganic substances obtained from food; essential to plant and animal physiology; i.e.: iron*, calcium* and phosphorus

Neohesperidin: See citrin

Niacin: A vitamin of the B complex; found in whole grains, liver, yeast; deficiency causes digestive disorders, skin lesions; see vitamin B

Norbixine: See carotenoids

Omega-3 fatty acids: Thought to keep heart disease in check even when consuming high fat, high cholesterol diet

Organic acids: Any of a number of carbon-based compounds containing a carboxyl group that dissociates in water yielding a hydrogen ion; see citric, malic and succinic acids

Papain: An enzyme capable of digesting protein*; obtained from the juice of unripe papaya fruit; used as a meat tenderizer; used in modern medicine as a digestive aid and applied to tissues and incisions after certain surgical procedures

Pectin: This soluble fiber soothes the lining of the intestines and adds bulk to stool; helping to alleviate diarrhea

Phenolic acid: A skin irritant causing blisters that take weeks to heal; see phenols

Phenols: A strong corrosive poison; used medicinally as a disinfectant and astringent; see cardol and anacardol acids

Phenylalanine: An essential amino acid* produced by plants

Phytosterol: A sterol* that occurs in plants

Pinguinain: A proteolytic enzyme with medicinal properties

Plumbagin: Demonstrates an antibiotic effect against certain bacteria

Potassium: A waxlike chemical element that oxidizes rapidly when exposed to air; occurs abundantly in nature in the form of salts; essential in metabolism and for maintenance of normal fluid balance; used in fertilizers

Protein: Nitrogenous substances, composed of amino acids* in conjunction with carbon, hydrogen, nitrogen and oxygen (and other elements); essential to plant and animal diets

Pyridoxine: Vitamin B6; whole grains, yeast, liver, fish; deficiency causes dermatitis and nervous disorders; treats asthma, depression, infertility and carpal tunnel syndrome; see vitamin B

Quercetin: A crystalline dye extracted from bark of some trees

Quercitrin: Has anti-viral properties; See vitamin P

Quinine: An alkaloid* first extracted from the bark of certain species of *Cinchona* to battle malaria

Resins: Viscous, water-insoluble, organic substances exuded from various plants; usually occur in mixtures with volatile oils, gums and sugars; used in varnishes and lacquers; can be used medicinally although toxic

Retinol: See vitamin A

Riboflavin: Vitamin B2; found in milk, eggs, liver, kidney, grass, fruits, leafy vegetables, etc.; deficiency causes stunted growth and hair loss; see vitamin B

Rutin: See vitamin P

Salicylic acid: An active compound first isolated from willow bark; used as food preservative and as precursor to aspirin

Saponins: Glucosides* found in certain plants that foam when dissolved in water; used in detergents and soap

Selenium: A chemical element of the sulfur group; conducts electricity

Serotonin: A complex amine, found in the blood, that constricts blood vessels, contracts smooth muscle tissues and is involved in mental activity

Sodium: A soft, alkaline chemical element found naturally only in combined form; required to maintain normal fluid balance in the body and other physiological functions; extremely chemically active

Starch: A white, tasteless, odorless complex carbohydrate found in potatoes, rice, corn, wheat, cassava, etc.; used in medicines, cosmetics, adhesives

Steroidal sapongenin: A skin irritant that is toxic internally

Sterols: A group of unsaturated alcohols found in plant and animal tissue; i.e. cholesterol

Succinate: See succinic acid

Succinic acid: A colorless, crystalline acid found in amber and many plants; used in medicine

Sulfur compounds: Nonmetallic elements that burn with a blue flame and emit a characteristic odor; used in vulcanizing rubber, making matches, paper, insecticides, etc.

Tannins: Yellowish astringent substances derived from plants; used in tanning; medicinally, they are used to treat diarrhea by acting as astringents (binding proteins* to make them resistant to proteolytic enzymes) and have anti-viral properties

Terpenes: Hydrocarbons found in resin* and essential oils* in many forms (including mono-, di-, tri-, sesquiterpenes); used in perfumes and medicines; can be poisonous; includes vitamins A*, E* and K* and carotenoids*

Theobromine: A bitter alkaloid* extracted from leaves of the cacao plant; used in medicine as a medium-strength diuretic and nerve stimulant

Thiamine: Vitamin B1; found in meat, yeast, whole grains; necessary for carbohydrate metabolism and normal neural activity; deficiency results in beriberi (characterized by nerve disorder and swelling of the body) and certain nervous disorders; see vitamin B

Tryptophan: An essential amino acid* formed from proteins* during the digestive process

Vitamins: Complex organic substances found in food, or synthesized in the body; essential for the regulation of metabolism, normal cell growth and functioning of the body; see vitamin A, vitamin B, vitamin C, folic acid*, inositol*, thiamine*, retinol, vitamin D, vitamin E, vitamin F, vitamin P

Vitamin A: A fat-soluble vitamin; found in fish-liver oils, milk, green or yellow vegetables (i.e. carotene* in carrots), fruits; function in maintenance of visual pigments and of epithelial structure; deficiency causes hardening and roughening of the skin, night blindness, susceptibility to infections and degeneration of mucous membranes; a.k.a.: retinol; see also beta carotene

Vitamin B Complex: A group of unrelated water-soluble substances found in liver and yeast; includes thiamine* (B1), riboflavin* (B2), folic acid*, inositol*, niacin*, pyridoxine* (B6), and cyanobobalamin* (B12)

Vitamin B1: See Thiamine

Vitamin B2: See riboflavin

Vitamin B6: See pyridoxine

Vitamin B12: See cyanocobalamin

Vitamin C: A water-soluble vitamin; found in citrus fruits, tomatoes and leafy vegetables; deficiency causes scurvy and connective tissue disorders; helps prevent cataracts, treats allergies, asthma, infertility and tonsilitis, among other ailments; a.k.a.: ascorbic acid

Vitamin D: A fat-soluble vitamin; found in fish oils, liver or produced by the action of sunlight on lipids in the skin; required for normal growth of teeth and bones; deficiency causes rickets (bone malformations); a.k.a. calciferol; see lipids

Vitamin E: A fat-soluble vitamin; found green leafy vegetables; used to treat sterility and various abnormalities of the muscles, red blood cells, liver, and brain; helps prevent cataracts; an antioxidant* thought to fight the aging process; deficiency causes muscular dystrophy, blood fragility and sterility; a.k.a.: tocopherol

Vitamin K: Essential for blood clotting; made by colon bacteria or found in green leafy vegetables, rice; deficiency causes failure of blood clotting; a.k.a. naphthoquinone

Vitamin P: A water-soluble, yellow compound found in citrus fruits and other plants; promotes capillary resistance to hemorrhaging and has anti-hypotensive activity; a.k.a.: bioflavonoid; includes citrin*, quercitrin, rutin

Volatile Oils: See essential oils

Zinc: A bluish-white, metallic chemical element; used in medicines

Glossary 3: Descriptions of Place Names on the East Coast

This glossary contains a brief description of many of the villages and rivers mentioned throughout the text. For villages, the autonomous region to which they belong is given. In addition to geographic information, translations are provided.[1]

Agua La Pura: A plantation site used by Tuapí (less than 3 hrs away).

Andris Tara: A riverine village deep inland up the Río Coco (RAAN). The word means "great orange."

Asang: A riverine village in RAAN, located about 200 miles inland along the Río Coco. The name is a Sumu term meaning "hilly land covered with forest." This community was the focus of Helms' (1971) study.

Auastara/Awastara: This name designates both a town and a sandbar situated between Laguna Páhara and the Caribbean Sea, near Honduras (RAAN). The word means "great pines."

Awastingni: An inland community in RAAN, located to the north along Río Okanwás (which river originates from the Río Wawa). The closest commercial center is Waspam.

Bibiskira: A large lagoon north of Wounta (RAAN). Also a plantation site used by Haulover (1 1/2 hr north by boat, less with motor). This Miskito term means "that which is dry."

Bilatara: Located along the lagoon system connecting Karatá and Puerto Cabezas (RAAN). Also a lagoon in the Prinzapolka delta (RAAS). Also known as Biltara.

Bilwi: See Puerto Cabezas

Bismona/Bihmuna: A community that took part in this study. This name also describes a large lagoon situated south of Cabo Gracias a Dios (RAAN). The Miskito village is situated on the southern bank of the lagoon; this lagoon, one of the largest in the region, is a refuge for water fowl and marine life. Bismona is named after the abundant biuhu (*Chrysobalanus icaco* var. *ellipticus*) plants that grow there (Aristan Bons Zacarias/Puerto Cabezas-Bismona); it is a shortening of the two Miskito words "bihu" and "muna" and means "to the east of the biuhu." Also written Bémuna.

Bluefields: Bluefields is the capital of the Southern Autonomous Region (RAAS). It lies on the banks of the Río Escondído.

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[1] In addition to information gathered from this study, sources cited in this glossary include Heath (1927); Helms (1971); Marx and Heath (1992); Nietschmann (1973); Rabella and Pallais (1994); Vilas (1989); Wilson (1975); Ziock (1894).

Bosawás: A Nicaraguan rain forest reserve located on the border with Honduras in the Central Highlands of Nicaragua (see Appendix 6).

Dakban: A town and lagoon close to where the Río Wawa meets the sea (RAAN). Word means "separated", "divided."

Ephrata: The name given to the Moravian mission established in Haulover in 1860.

Francia Sirpi: More than 100 miles inland, this savanna village in RAAN is located midway between the Río Coco, to the north, and Río Wawa, to the south.

Gung-Gung: A plantation site used by the community of Tuapí (3 hrs away). The term is Miskito for "Congo monkey."

Haulover: A community that took part in this study. The word haulover actually describes a topographical characteristic, namely a sand bar or piece of land that separates the sea from a lagoon. There is more than one haulover site along the East Coast[2] and early references (especially in Moravian publications) to this village specify "Wounta-Haulover," being the haulover for the Laguna Wounta. This information was important to early travelers of the region (e.g., missionaries). Today, villagers refer to this community simply as Haulover.

Iban Tara: A plantation site used by Bismona (1 1/2 hr west with motor).

Kahami: A hill in the delta of the Río Ulang. Also a plantation site used by Haulover (about 6 miles north). The Miskito terms means "the jícaro fruit."

Kambla: Fields and a settlement north of Puerto Cabezas, about 20 kilometers from Tuapí. Also written Kamla.

Karatá: A community that took part in this study. This village is located to the south of Puerto Cabezas (RAAN) next the large Laguna Karatá (also a refuge for water fowl and marine life). The name means "punta de la pita" in Spanish, or "pita point" in English. This name stems from a plant (*Bromelia karatas*) that once grew in abundance on the point (see Chapter 5).

Karisal: A village on the Río Coco (RAAN), located just beyond Asang.

Klingna: Located about 20 kilometers inland from Wawa; accessible by river.

Krukira: Town, field and lagoon situated south of Páhara (RAAN). The word is Miskito for "where there are coyol palms."

Kua Awas: A plantation site near Bismona. Miskito term means "pine basket."

Kukudakura: A plantation site used by the village of Haulover. This Miskito term means "coconut grove."

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[2] Further to the south, by the Pearl Lagoon, is another village called Haulover.

Kukulaya: A village located about 20 kilometers inland from Haulover (RAAN). Also a lagoon and river located inland from Haulover. The word means "coconut water."

Kung-Kung: A stream south of Río Prinzapolka (RAAS).

Kuiwitingni: The exact location of this village is unknown.

Lamlaya: A community that took part in this study. The term is Miskito for "agua de delfines" (water of the dolphins); apparently dolphins once thrived in the vicinity of this village.

Landin: A plantation site used by Karatá (1/2 hr away).

Lapan: A savanna village near Río Kukalaya (inland from Haulover; RAAN).

Layasiksa: This is the name of a river running parallel to Río Kukulaya, which empties into the Laguna Wounta (RAAN). Also the name of a village and lagoon along the river, located inland from Haulover.

Magdala: This was the first Moravian mission outside of Bluefields (RAAS). Established by a Dane named Jean Paul Jürgensen in 1855, it is located by in Pearl Lagoon.

Maniwatla: A savanna town located inland from Puerto Cabezas in the Río Wawa basin (RAAN). The word means "the house of summer."

Miskito Cays Protected Area (MCPA): A Nicaraguan coastal reserve composed mostly of the northern autonomous region. This ethnobotanical survey was conducted inside the MCPA (see also Appendix 6).

Musawas: A Sumo settlement in Northeastern Nicaragua (RAAN). This is the infamous site of the murder of Moravian missionary Brother Bregenzer (See Appendix 5).

North Atlantic Autonomous Region (RAAN): A Department (regional subdivision) comprising the northern portion of the East Coast of Nicaragua. This ethnobotanical study is located within this region. Also called the Northern Autonomous Region or RAAN in Spanish (Region Autonomía Atlántico Norte).

Pearl Lagoon: An area located about halfway up the southern autonomous region (RAAS). This name refers to a lagoon and the region around it. This area is the subject of Coe & Anderson's (1996) study.

Pnata Parida: A plantation used by Lamlaya; located about 1 hr away. The term is Miskito for "without end."

Posa Verde: A plantation used by Tuapí ("very far by boat"). The term is "green well."

Puerto Cabezas: A community that took part in this study. The local name for this town, Bilwi, has been officially reinstated. Bilwi is derived from the Sumo "Bilwas", meaning "river of the snakes".

RAAS: See South Atlantic Autonomous Region

RAAN: See North Atlantic Autonomous Region

Río Coco: Also known as the Wangks or Wangki River. This river forms the northern border between Nicaragua and Honduras. A number of Miskito villages are located along both sides of this river. Those living along this river and the dialect they speak are referred to as Wangki.

Río Escondido: This river originates in the Central Highlands and empties into the Atlantic Ocean at the village of Bluefields.

Río San Juan: This river forms a large portion of the border between Nicaragua and Costa Rica.

Si-A-Paz: A Nicaraguan biosphere reserve along the border with Costa Rica, located along the Río San Juan (RAAS - see Appendix 6).

Sisin: Town near the Río Likus on the highway to Puerto Cabezas (RAAN). The word is Miskito for "ceiba."

Sisin Pura: A plantation site used by Bismona. This Miskito term means "ceiba-covered."

South Atlantic Autonomous Region (RAAS): A Department (regional subdivision) comprising the southern portion of the East Coast of Nicaragua. Also called the Southern Autonomous Region or RAAS in Spanish (Region Autonomía Atlántico Sur).

Sukat Pin: Another name for the Río Sabria, which drains into the Río Warkwark.

Tasbapauni: A Miskito village located near Pearl Lagoon (RAAS). This community was the focus of Nietschmann's (1973) study.

Tasina: A plantation used by Lamlaya (about 1 1/2 hr away). The term means "breast-shaped hill."

Tronquera: A village located well inland, near Waspam (RAAN). An elaborate chemical extraction factory was built here by a subsidiary of Wrigley's around 1969. Designed to extract resins and oils from pine stumps dotting the savanna (the product of a previous lumber company's devastation), the operation continued there for ten years. The factory remains standing today (see Chapter 6).

Tuapí/Twappi: A community that took part in this study. River and village northeast of Puerto Cabezas (RAAN). The word may either mean "where one eats papayas" or "where one eats in tranquillity." The Moravian mission was once headquartered in this village.

Tumtum: The name of a plantation used by Lamlaya; located about 1 1/2 hr away. The term is Miskito for "water lily."

Warkwark: The name of a plantation used by people of Lamlaya (about 3 hr away) and south of Karatá (1 hr 40 min away – with outboard motor), located along Río Warkwark, which river connects Laguna Yulú and Laguna Karatá with Río Kukulaya (RAAN).

Wasakin: A community located far inland from Wawa, along the Río Bambana (RAAN). The founding families of Wawa hailed from here (see Appendix 7).

Waspam/Waspán: A commercial center near the Nicaragua-Honduran border, located about 100 miles inland along the Río Coco. The second largest town center in RAAN, after Puerto Cabezas.

Wawa/Huahua: A community that took part in this study. The name given to a principal river, a village located at the mouth of that river and to a sandbar on the East Coast (RAAN). The word means is Sumo for "suspendido" or "inflado" (meaning, "hanging" or "floating").

Wounta: Lagoon south of Karatá where the Río Kukulaya opens onto the coast (RAAN). The town is located where the lagoon meets the sea.

Yulu: Town west of Wawa and Dakban whose lagoon connects with the Laguna Karatá.

Yun Yun: A plantation site directly across the river from Wawabar (reached by dory).

Glossary 4: Tri-Lingual Glossary of Medical Illnesses

Common illnesses reported in this study are listed here according to the local name used most often with English, Spanish and Miskito translations, where available.[1] Known local beliefs and medical explanations regarding the origin and symptoms of illnesses are noted. Plant cures for illnesses, as documented in this study, are given.

ANEMIA, SANGRE POBRE (Spanish)
ANEMIA (English)
TALA APU (Miskito)
Symptoms: Sleepiness, pallor, weakness and heavy breathing after high activity.
Medical Explanation: Blood disease.
Cure: cinerut, hombre grande, limsi, pukru

AUYA HUMBUG (Miskito)
LIVER PROBLEMS (English)
HIGADO (Spanish)
Symptoms: Pain in upper stomach accompanied by the sensation of feeling full.
Medical Explanation: Varies from hepatitis to alcohol-related illness.
Cure: sirpi

BLA (Miskito)
LIGHTHEADEDNESS, MALAISE (English)
MAREADO, MAREO (Spanish)
Symptoms: Dizziness and malaise that may be accompanied by nausea and vomiting.
Medical Explanation: Possibilities range from inadequate diet to excess menstruation.
Cure: afrika, albahaca, algodón, algodón criollo, bla, sironcontil

CATARRO (Spanish)
CATARRH (English)
SIAHKA (Miskito)
Symptoms: Severe coughing.
Medical Explanation: Excess secretions of inflamed mucous membranes (Duke 1981).
Cure: albahaca, boton, carau, culantro, liliura, pico de pajaro

DIRTY TONGUE, THRUSH (English)
Symptoms: White pustules on cheeks and tongue.
Local Belief: Excessive nursing.
Medical Explanation: Any of various infections caused by fungi of the genus *Candida*; occurring most often in mouth, vagina and respiratory tract.
Cure: herb II, rahstima

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[1] The language from which terms are derived is indicated in parentheses. The following sources were used in addition to informants in this study: Barrett (1993, 1994a); Dennis (1988); Elsberg, Blanco and Rodriguez (1992).

DOLOR/REFRIO DE VIENTRE, MATRIZ (Spanish)
PLAUAIA/PLAUYA TROBIL (Miskito)
Symptoms: Uterine, vaginal, womb or menstrual pain in lower abdomen.
Local Belief: From washing excessively (two-three times per day - fide nurse at Hospital Amenacer/Puerto Cabezas).
Medical explanation: Used to describe anything from menstrual cramps to labor pain.
Cure: carau, clover, carpetgrass, iska dura, manzanilla, pico de pajaro, sorosil

FLUJO (Spanish)
DISCHARGE (English)
Symptoms: Various types of vaginal discharge.
Medical Explanation: Terms used to describe any of the following vaginal secretions: Yellow secretions due to yeast infection; white secretions due to fungal infection; chocolate-colored secretions due to bacterial infection; other secretions due to a protozoan infection (*Tildomona*) or menstrual flow.
Cure: pyuta saika, sedge I, dog's tongue

GRANO (Spanish)
SORE (English)
?SUKWANKA (Miskito)
Symptoms: A sore; skin problem with pus and scabs.
Medical Explanation: Dermal infection, insect bite or allergic reaction to something that has become infected.
Cure: dormilona, liwa mukia, mangle rojo, nancite, pino, prakprakya, pukru

ISKA DORA (Miskito)
GONORREA or SIFILIS (Spanish)
GONORRHEA or SYPHILIS (English)
Symptoms: Gonorrhea - Blood in urine, painful urination, purulent discharge, backache, lower abdominal pain; Syphilis – Three stages: 1) hard, black painless canker, 2) skin eruptions, 3) rubbery lesions, nerve and cardiovascular damage.
Medical explanation: Gonorrhea - contagious infection by the *Gonococcus* bacterium causing inflammation of the urethra or vagina; Syphilis – Chronic *Spirochete* infection that can manifest itself in any body organ.
Cure: iska dora, sedge II

KAKMAPARA (Miskito)
Local belief: Skin disease contracted from a parasite living in pools of standing water (Dennis 1988); See "dolor de vientre."
Medical Explanation: Type of arthritis that precedes gonorrhea (Marx and Heath 1992); See "iska dora" and "likia."
Cure: ?iska dura

LIKIA (Miskito)
LEUCORREA (Spanish)
LEUCORRHEA (English)
Symptoms: Any vaginal discharge or liquid.
Medical explanation: Venereal disease (fide nurse at Hospital Amenacer/Puerto Cabezas).
Cure: lythrum II, sedge II

MANCHAS (Spanish)
CHLOASMA, MASK OF PREGNANCY (English)
Symptoms: Darkened blotches on the forehead, nose and cheek of pregnant women.
Local Belief: Associated with childbirth and caused by eating bananas during pregnancy (Duke 1981) or by blood problems or debilidad (weakness).
Medical Explanation: Hormonal changes during pregnancy lead to excess pigmentation of the skin that subsides following delivery; may be related to folic acid deficiency (Eisenberg, Murkoff and Hathaway 1988: 154).
Cure: achiote, pico de pajaro, sukling waika, sundew, tobacco

MAREADO, MAREO (Spanish)
See bla

MATRIZ = womb **(Spanish)**
See dolor/refrio de vientre

NERVIOS, SUSTO (Spanish)
SIRANG (Miskito)
NERVES (English)
Symptoms: Lightheadedness, attacks, depression and despair.
Local Belief: Barrett (1993) described this condition as being caused by "fright." Dennis (1988) also noted the existence of this "fright illness."
Medical Explanation: Numerous possibilities.
Cure: afrika, dinar pauni, John's Sails, nerves, sirang saika, san diego, sirpi

PARASITOS, LOMBRICES (Spanish)
LIWA, WAKSMA (Miskito)
TAPEWORMS (English)
Symptoms: Continuous hunger, weight loss and diarrhea.
Medical Explanation: Parasitic infection.
Cure: ?almendra, papaya
- Only these two cures are specifically noted for anti-parasitic action. Other plants used as purgatives may also serve as vermifuges.

PLAUYA IWAN (Miskito)
PROLAPSED UTERUS, FALLEN VAGINA (English)
Symptoms: Pain in the uterine region.
Medical Explanation: Occurs rarely when stretched ligaments can not support uterus properly.
Cure: escoba lisa, dog's tongue

PRESION (Spanish)
HYPERTENSION, PRESSURE (English)
Symptoms: Headache, lightheadedness, debility, suffocation, high blood pressure nervousness and heart palpitations.
Medical Explanation: Often refers to high blood pressure but sometimes to chest or abdominal pressure.
Cure: limon agrio, tamarindo, toronja

REFRIO, RESFRIADO (Spanish)
COLD OR FLU (English)
Symptoms: Aches, pains, headache, tired and cough a lot at night.
Medical Explanation: Allergic reaction to change in temperature (Juan Carrasco Montoya/doctor at Hospital Amenacer/Puerto Cabezas).
Cure: bayvine, boton, chaparro, green tea, sirpi, ti, wain

REFRIO DE VIENTRE (Spanish)
See dolor/refrio de vientre

SIAKWAN (Miskito)
BLUE DIARRHEA (English)
Symptoms: Newborns are sometimes born with this.
Local Belief: Caused by viewing a non-poisonous snake that inhabits the savanna (Marx and Heath 1992).
Medical Explanation: May be a reference to myconium, the first bowel movements of all newborns. Myconium is thick and oily and could be construed as diarrhea.
Cure: kiwa

SUCIEDAD, CALOR INTERIOR (Spanish)
"DIRTY INSIDES"
Symptoms: No appetite, excessive drooling and fever; typically affecting children.
Medical Explanation: Undetermined although this often portends the onset of teething
Cure: afrika I

TOPA, PAPERAS, AMIGDOLITIS (Spanish)
MUMPS, TONSILLITIS (English)
KARMA, AIKAMA, PUSKANKA (Miskito)
Symptoms: Inflammation below ear, fever, headache and general malaise lasting 1-2 weeks.
Medical Explanation: Swelling of parotid gland (mumps) or tonsils (tonsillitis).
Cure: banano, lythrum II, muspuskan, platano

ULCERA/CANCER (Spanish)
ULCER (English)
SIWRIRA (Miskito)
Symptoms: A sore that spreads.
Medical Explanation: May be "lepra de montaña" (bush leprosy).
Cure: uva del mar

YUKRI (Miskito)
FURUNCULO (Spanish)
BOIL (English)
Symptoms: Tumor or boil.
Medical Explanation: Painful skin inflammation, with a pus-filled inner core usually caused by a local infection of *Staphylococcus aureus*.
Cure: pisik tree

Glossary 5: Medical Terms

This glossary provides definitions for many of the medical terms used in Chapter 2: Medicinals and Chapter 3: Superstition. This is not an exhaustive list of medical terms.[1]

ADJUVANT: An immunological agent that increases the antigenic response

ALEXERITIC: Substance that counteracts infection or poison

ALTERATIVE: Tends to restore to normal health

ANALGESIC: Reduces or eliminates pain

ANODYNE: Soothes or eliminates pain

ANTHELMINTHIC: Kills certain types of worms

ANTIDYSMENORRHEIC: Substance that relieves painful menstruation

ANTIPHLOGISTIC: Reduces inflammation or fever

ANTISCORBUTIC: Substance used to prevent scurvy

ANTISEPTIC: Prevents infection by inhibiting the growth of microorganisms

APERIENT: A mild laxative

ASTRINGENT: A mildly binding substance that draws together or constricts tissues

CARIES: Decay, as in tooth cavities

CARMINATIVE: Aids in release of gas from the stomach and intestines

CATAPLASM: See Poultice

CATHARTIC: Purges the bowels; a laxative

COLLYRIUM: Eye medication or eyewash

DECOCTION: Decoctions involve cooking the relevant plant parts. See also infusion.

DEMULCENT: Soothes or softens; used especially to relieve pain in inflamed or irritated mucous membranes

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[1] Glossary sources: Duke (1982); Foster and Duke (1990); Pearsons (1992).

DENTIFRICE: Tooth cleaners/polishers containing abrasive, binding, detergent and flavoring compounds

DEPURITIVE: A substance that purifies/cleanses

DIAPHORETIC: Produces or increases perspiration

DISCUTIENT: Substance for removing skin or skin growths

DISINFECTANT: Destroys or otherwise inhibits growth of disease-carrying microorganisms

DIURETIC: Increases urine flow

DYSPEPSIA: Indigestion

DYSURIA: Painful urination

ECBOLIC: Promoting birth or abortion by increasing uterine contractions

EMMENOGOGIC: Stimulates menstrual flow

EMOLLIENT: Having the power to soften or soothe, especially the skin

FEBRIFUGE: Reduces fever

HEMOSTATIC: Substance that controls bleeding

HYPOGLYCEMIC: Decreases blood sugar

INFUSION: Hot infusions are made by soaking plant parts in hot water for a short period of time; cold infusions are made by soaking plant parts in cold water.

LACTOGOGUE: Stimulates milk flow

LENITIVE: Capable of easing pain or discomfort

LEUKOPENIC: Cause of abnormally low number of leukocytes in the circulating blood

MENORRHAGIA: Excessive menstrual discharge

METRORRHAGIA: Non-menstrual discharge of blood from the uterus

NARCOTIC: Reduces pain, alters mood and behavior, usually inducing sleep or stupor

PECTORAL: Alleviates chest conditions

PEDICULICIDE: Kills or expels head lice

POULTICE: A soft mass of plant parts that have been macerated or mashed and are applied to the affected area while hot

SOPORIFIC: Tending to cause sleep

STOMACHIC: Beneficial to the stomach

STYPTIC: Tends to check bleeding by contracting the tissues or blood vessels; homeostatic

SUDORIPHIC: Substance that induces sweating

SUPPURATIVE: Substance that draws out infections

UNGUENT: An ointment for burns

VERMIFUGE: Substance that expels worms

VULNERARY: Heals wounds

Glossary 6: Supernatural Illnesses

The list of maladies attributed to supernatural causes today is limited to a handful of illnesses. Some illnesses continue to be referred to by the spirit responsible for the affectation while others are referred to by their symptoms. Ulasa, the host of spirits once thought responsible for all illnesses, now appears to describe only one specific illness. The following glossary contains descriptions of illnesses ascribed to supernatural causes (whether spirit- or sukia-induced) by informants in this study and in the regional literature. The folk names used most commonly in the study are retained in this glossary; synonyms are also given. Following each entry, in parentheses, is the language from which the term is derived. Symptoms and local beliefs about the illnesses are also given. Due to the Miskito habit of naming an illness after the affecting spirit more information may be found in Glossary 7: Spirits and Demons.

BAD SPIRITS (English)
Synonyms: Duende (Spanish), liwa mairin siknis (Miskito), monte demon (Spanish)
Symptoms: Flu-like illness including general malaise, fever, loss of appetite and cold extremities, vomiting and eye rolling.
Local Belief: A catch-all phrase that describes both an illness and possession by any one of the spirits of the bush (duende), water (liwa) or air (prahaku), depending on the person's whereabouts immediately preceding the onset of the illness. See also "bad spirits" and Chapter 7: Superstition, "Bad Spirits."
Medical Explanation: Influenza or the common cold.
Cure: afrika II, albahaca, dinar pauni, Jamaican voodoo medicine, John's sails, joint bush, pico de pajaro, prakprakya, pyuta saika, san diego, tuktukya II; see also the cures listed under duende and liwa

COLIC (English)
See kukra

COLICO (Spanish)
See kukra

CRAZY SICKNESS (English)
See grisi siknis

DUENDE (Spanish)
Synonyms: Monte demon (Spanish)
Local Belief: This demon causes a flu-like illness that begins after a day in the bush (Elsberg, Blanco and Rodriguez 1992). See "bad spirits" above, "duende" in Glossary 7: Spirits and Demons, and Chapter 7: Superstition, "Bad Spirits."
Medical Explanation: No known medical basis.
Cure: afrika II, albahaca, boton, lengua de gallina, mutmutya, san diego, sirpi

EVIL EYE (English)
See mal de ojo

FITS (English)
See lasa

GRISI SIKNIS (Miskito)
Synonyms: crazy sickness (English)
Symptoms: A culture-bound syndrome that can sweep through communities like a contagion. Characterized by uncontrollable behavior, including the removal of clothes, wielding of weapons and running wildly through communities. Victims sometimes speak languages that they never knew before and must often be physically restrained (Dennis 1981).
Local Belief: Possession by a devil. Though the devil's name is not always given, nil, chipil and liwa have been variously implicated (See Glossary 7: Spirits and Demons).
Medical Explanation: This illness bear resemblance to the manifestations of liwa mairin siknis and lasa. Dennis (1981) has suggested the illness is a method of stress release. See also Chapter 7: Superstition, "Further Thoughts."
Cure: This illness was not mentioned in this study. Information on cures can be found in Dennis (1981, 1988).

HUMBUGGING (English)
See veneno

KUKRA (Miskito)
Literal Miskito Translation = gas
Synonyms: Colic (English), Puffing Baby (English), Colico (Spanish)
Symptoms: Stomach inflammation, acrid breath, stinky diarrhea; pain in stomach and filling with air; frequent in children, worsens at night
Local Belief: Caused by the spirits of the dead. When a beloved person dies, they smell of death and this can affect some people. A child who looks upon the face of a dead person can become afflicted with kukra. According to Barrett (1993), the ghosts or spirits of the dead that are responsible for this illness are called Isigni (see Glossary 7: Spirits and Demons).
Medical Explanation: May be a tumor, an ulcer or any number of gastrointestinal problems, including gas.
Cure: dormilona, mutmutya, plang, sirpi

LASA (Miskito)
Literal translation = demon
Synonyms: Pits (Creole English), Fits (English)
Symptoms: Characterized by fits and tantrums; especially in children; whites of eye show big; wrists and ankles get cold
Local Belief: The person is possessed by a devil. In this study, lasa is used as a name that specifies both a specific set of symptoms and the devil responsible for the symptoms. The term lasa is a derivation of the ancient demons known collectively as Ulasa (Hutton 1922 - see Glossary 7: Spirits and Demons).
Medical explanation: Epileptic seizures. May be grisi siknis as documented by Dennis (1981); See also Chapter 7: Superstition, "Further Thoughts."
Cure: ajo, albahaca, boton, culantro, guayaba acido, lengua de gallina, pico de pajaro, yul kyama

LIWA MAIRIN SIKNIS (Miskito)
Synonyms: bad spirits
Local Belief: Illness caused by liwa, spirit of the water (see Glossary 7: Spirits and Demons), strikes people while in or on the water causing a flu-like illness and troubling thoughts a sexual nature. See also "bad spirits" and Chapter 7: Superstition, "Further Thoughts."
Medical Explanation: No known medical basis.
Cure: albahaca, John's sails, mutmutya, pico de pajaro, rosa, sirpi

LIWA SIKSA (Miskito)
Literal Miskito Translation: black mermaid
Synonyms: No known synonyms
Symptoms: A skin rash or skin "stains."
Local Belief: You get this skin rash from the water when the sirena "gets in you" and causes problems. Women are especially susceptible during their menstrual cycle; miscarriage and sterility are attributed to this affliction.
Medical Explanation: Possibly a fungal infection of the dermis; may also be chloasma, thus the gynecological association.
Cure: chili picante, John's sails

MAL DE OJO (Spanish)
Synonyms: Evil Eye (English)
Symptoms: Other unexplainable Illness; children are especially susceptible.
Local Belief: When an angry, drunken or otherwise agitated person looks upon someone (especially a child) it leads to severe illness (Barrett 1993). Popular medicine studies from the southeastern region of Nicaragua and throughout Latin America have noted this affliction (Barrett 1993; Elsberg, Blanco and Rodriguez 1992), although informants in this study did not mention it by name.
Medical Explanation: No known medical basis.
Cure: This illness was not mentioned in this study. Information on cures can be found in Barrett (1993) and Elsberg, Blanco and Rodriguez et al. (1992).

MONTE DEMON (Spanish)
See duende

PAÑO BLANCO (Spanish)
Synonyms: Pihini (Miskito), Shifting Cloud (English)
Literal Translation: white cloth
Symptoms: Itchy skin rash causing light-colored blotches up to 2cm in diameter
Local Belief: Considered a type of veneno. The afflicted person is believed to have wronged someone, who has, in turn, enlisted a sukia to exact revenge. A fine powder is sprinkled over the victim's food. The food must be cold as heat renders the powder ineffective. Within a few days, the victim breaks out in white spots on all visible parts of the body. "It is not only unsightly, but visible evidence that one has fallen foul of the Indian" (Tweedy 1953: 103). This condition can be exacerbated by eating "meat, spotted fish or spotted animals" (Nena Castillon/Lamlaya). According to Tweedy (1953) the powder's origin was uncertain but may have been from a toad and the antidote, of course, is a secret.

A similar illness in southeast Nicaragua, known as bulpis but not mentioned by informants in this study, is characterized by whitening of the skin and is also believed to be a veneno made from toad urine or plant extracts (Barrett 1993; Elsberg, Blanco and Rodriguez 1992; Ziock 1894). Mueller (1932) mentioned that "bulbus" is a disease "that destroys the pigment of the skin, leaving it with many white spots, which never take on the natural color again" (page 42). Early mentions of bulpis equates the disease to leprosy, with the affected skin turning white or blue and scabbing (Young 1842). One informant in this study appeared to have this affectation although neither the illness nor a cure were suggested (Paulina Langos/Haulover).

Medical Explanation: Paño blanco is a dermal fungal infection common in humid climates caused by *Tinia versicolor*. Bulpis is a similar skin infection, often diagnosed as *Traponema carateum* (Barrett 1993). Leprosy is attributed to the bacteria, *Mycibacterium leprae*, and results only after long, close contact with the bacteria.
Cure: chili picante, escoba amarga, John's sails

PIHINI (Miskito)
See paño blanco

PITS (English)
See lasa

PUFFING BABY (English)
See kukra

PUISIN (Miskito)
See veneno

SHIFTING CLOUD (English)
See paño blanco

SIKA SAURA (Miskito)
See veneno

SUMTHIN' (Miskito)
Synonyms: No known synonyms
Symptoms: The victim will feel no symptoms per se because he/she will be unaware that a spell has been cast upon him/her
Local Belief: Based upon interviews in this study, these mind control spells are usually cast as love potions. Anyone with the proper incantation can cast the spell. One particular plant, dormilona (*Mimosa pudica*), is associated almost exclusively with every spell. See also Chapter 7: Superstition, "Casting Spells."
Medical Explanation: No known medical basis.
Cure: As mentioned, no cures are given for these spells. The following plants are used to effect spells: dormilona, nancite, wildflower II

VENENO (Spanish)
Synonyms: puisin (Miskito), humbugging (English), sika saura (Miskito)
Symptoms: Symptoms may vary from headache to maniacal manifestations.
Local Belief: These harmful or deadly spells are cast by sukias who are hired to do so to exact revenge for someone. See also Chapter 7: Superstition, "Casting Spells."
Medical Explanation: No known medical basis.
Cure: afrika II, boton, prakprakya, san diego

YUMO (Miskito)
Synonyms: yumu (Miskito)
Symptoms: Strong abdominal pains, pulsating stomach, diarrhea, shivering, nausea (Nena Castillon/Lamlaya); pulsating feeling below belly button, pain, vomiting (Clipton Francis/Lamlaya); a tumor (Myrtle Chevarría/Karatá); symptoms vary with gender and age: males experience blood in urine, painful urination and a swollen penis that exudes pus[1]; women get inflamed ovaries, back and abdominal pain, dizziness; children vomit and are feverish (García 1996).
Local belief: This disease is transmitted by an animal (García (1996) referred to yumukka as the spirit owner of the animals) in the service of a bad spirit or a spirit that hides in the body of or takes the form of an animal (such as that which is described as the duende). The victim might cross the path of or bump into the animal and the otherworld being enters the victim's body (Nena Castillon/Lamlaya; Clipton Francis/Lamlaya; Myrtle Chevarría/Karatá). If a doctor tries to operate, the person dies (Elsberg, Blanco and Rodriguez 1992). This ailment befalls both men and women. Even drinking from the glass of someone who has it can transmit the disease (Nena Castillon/Lamlaya).
Medical Explanation: Enteritis. An intestinal infection causing the normally indiscernible abdominal pulse to become more pronounced due to intestinal inflammation (Juan Carrasco Montoya/Puerto Cabezas).
Cure: coco, dinar pauni, mango, mozote, palma africana, prakprakya, sedge II, sirpi

YUMU (Miskito)
See yumo

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[1] This condition sounds like gonorrhea or iska dora (see Glossary 4).

Glossary 7: Spirits and Demons

This glossary contains a list of spirits and demons encountered in this study and in the regional literature. Some spirit names and illnesses are intertwined and the reader is referred to Glossary 6: Supernatural Illnesses. A brief discussion at the end of this glossary considers possible, but as yet unrecognized, pseudonyms for the duende. An examination of the regional literature referring to a number of different spirits and their apparent relation to each other is presented.

ALWONI (Miskito)
Synonyms: No known synonyms
Local Beliefs: References to this god are scant. Alwoni, a term reminiscent of won aisa, is described as the thundergod (García 1996; Heath 1927). Almost seventy years later, Marx and Heath (1992) define alwoni as "thunder" with no reference to a god.

AUBIA (Miskito)
Synonyms: aubiya (Miskito), demon of the savanna (English), unta dawan (Miskito), unta dukia (Miskito), ?duende (Miskito)
Local Belief: According to Elsberg, Blanco and Rodriguez (1992), this demon inflicts illness by way of cold winds blowing across a field. García (1996) attributes to seemingly different roles to this spirit: owner of the grassland foothills and owner of the mountain. See also the discussion at the end of this glossary.

BAD SPIRITS (English)
Synonyms: duende (Spanish), liwa mairin (Miskito), monte demon (Spanish)
Local Belief: A catch-all phrase indicating possession by any one of the spirits of the bush (duende), water (liwa) or air (prahaku), depending on the person's whereabouts immediately preceding the onset of illness. See also "bad spirits" in Glossary 6: Supernatural Illnesses and the discussion at the end of this glossary.

DAWAN (Miskito)
Synonyms: dawanka (Miskito), master (English)
Local Belief: A nondescript term that refers to a spirit master. All elements of nature have a master or owner called a dawan (García 1996). For instance, li dawan is the master of the water.

DEMON OF THE BUSH (English)
See duende and swinta

DEMON OF THE SAVANNA (English)
See aubia

DUENDE (Spanish)
Synonyms: demon of the bush (English), duhindo or duhin-duhin (Miskito), monte demon (Spanish), waiwan (Miskito)
Local Belief: One of the two most often mentioned "bad spirits" in this study. Duende, whose domain is the bush, causes illness (as noted under "duende" in Glossary 6: Supernatural Illnesses) and may be referred to by a number of names depending on the community. See also "bad spirits" in this glossary and the discussion at the end of this glossary.

DUHIN-DUHIN (Miskito)
See duende

DUHINDO (Miskito)
See duende

GOD (English)
See won aisa

ILMUYA (Miskito)
Synonyms: Spirit owner of lightning (English)
Local Belief: No further information is given in the single reference to this spirit (see García 1996)

ISINGNI (Miskito)
Synonyms: Spirits owner of the dead (English)
Local Belief: García (1996) gives a detailed description of the manifestations of these spirits. In summary, every person has two spirits. Upon death, one spirit goes to heaven and the other stays in the ground. After nine days, the spirit leaves the ground and returns to his (or her) old house to haunt those still living there. This spirit can cause various illnesses, especially affecting children (i.e., kukra - Barrett 1993). See also Glossary 7: Spirits and Demons.

KISWA (Miskito)
Synonyms: Owner of the swamps (English)
Local Belief: No further information is given in the single reference to this spirit (see García 1996)

KUMADORA (Miskito)
Synonyms: Spirit owner of the rainbow (English)
Local Belief: No further information is given in the single reference to this spirit (see García 1996)

LI LAMIA (Miskito)
Synonyms: No known synonyms
Local Belief: An aquatic tiger said to be large enough to consume a horse; a threat to seafarers (Marx and Heath 1992).

LIWA (Miskito)
See liwa mairin

LASA (Miskito)
Literal translation = demon
Synonyms (Miskito): Oulasser, Ulasa, Wlasa or Woolsaw (Miskito)
Local Belief: A devil that causes illness (see "lasa" in Glossary 6: Supernatural Illnesses). Wlasa pihni is described as a harmless phantom and wlasa siksa as a malignant devil (Marx and Heath 1992). This term is probably derived from the ancient term Ulasa that once described the collection of bad spirits responsible for all illness (Hutton 1922). See also Chapter 7: Superstition, "The Spirit World."

LIWA MAIRIN (Miskito)
Synonyms: liwa or li dawan (Miskito), sirena (Spanish), spirit of the water (English)
Local Belief: Liwa is a spirit that attacks people usually while in contact with water causing liwa mairin siknis (See Glossary 6: Supernatural Illnesses). See also "bad spirits" in this glossary and Chapter 7: Superstition, "Further Thoughts."

MASTER OF THE COTTON TREE (English)
See sisin dawanka

MONTE DEMON (Spanish)
See duende and swinta

OKULI (Miskito)
Synonyms: Okulli
Local Belief: This special servant to alwoni[1] is "chosen" by surviving a lightning strike. According to legend, only one okuli occurs in each generation (Heath 1927; Marx and Heath 1992). The okuli is the highest ranking sukya (Garcia 1996). There are indirect references indicating the continued belief in the okuli today. Barrett (1993) interviewed a healer who survived a lightning strike and awoke with a spirit guide and the power to heal. Elsberg, Blanco and Rodriguez (1992) mentioned a famous coastal healer – no name given - who obtained his power through dreams that occurred after a lightning strike. See also Pasa Yapti.

PASA YAPTI (Miskito)
Literal Miskito Translation = mother of the wind
Synonyms: No known synonyms
Local Belief: This is the name of a "famous" prophet who served as okuli to alwoni (García 1996; Heath 1927).[2] Pasa Yapti is endowed with the power to control hurricanes (Marx and Heath 1992). See also okuli.

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[1] There is some confusion as to whom pasa yapti serves. Heath (1927) mentioned that it might have been alwoni, aubiya (aubia) or liwa.

[2] Ibid.

PATA (Miskito)
Synonyms: dwarf or goblin of the savanna
Local Belief: García (1996) referred to this demon as a spirit that emits a sulphur-like odor (reminiscent of the wahwan). No other mentions of this name were found.

PRAHAKU (Miskito)
Synonyms: spirit of the air (English), spirit of the wind (English)
Local Belief: This spirit of the air causes fever via cold, blowing winds (Barrett, 1992; Elsberg, Blanco and Rodriguez 1992; García 1996). Marx and Heath (1992) defined prako merely as "the devil". Dennis (1981) suggested it "lives above the clouds." Nietschmann (1973) considered this spirit to be similar to the liwa and responsible for such mischief as tipping dories. Prahaku was not mentioned by name in this study. However, informants described veneno as being sent with the breeze (Septimo McDonald/Karatá). This was called puisin wauaia by Marx and Heath (1992). While veneno is considered the work of a sukia, it is possible that it has its origins with this spirit. (Veneno and sukias are discussed in further detail in <u>Chapter 7: Superstition</u>).

SIRENA (Spanish)
See liwa mairin

SISIN DAWANKA (Miskito)
Synonyms: master of the cotton tree (*Ceiba pentandra* - English), sisin dusa (Miskito)
Local Belief: Mentioned by Barrett (1994b) and by García (1996); the significance is unknown.

SPIRIT OF THE AIR (English)
See prahaku

SPIRIT OF THE WATER (English)
see liwa mairin

SWIM (Miskito)
Synonyms: ?duende, ?swinta
Local Belief: This being wears a large hat and tends ~~to~~ herds of boars (Marx and Heath 1992). See the discussion at the end of this glossary.

SWINTA (Miskito)
Synonyms: ?duende, ?swim
Local Belief: Characterized as an entity that is short in stature and wears a broad-rimmed hat; also called the demon of the bush (Dennis 1981). See the discussion at the end of this glossary.

ULAH (Miskito)
Synonyms: spirit of the grassland foothills (English)
Local Belief: This spirit is noted by García (1996) without further elucidation; she also made a reference to <u>aubiya</u> as the spirit of the grassland foothills

ULASA
See lasa

UNTA DAWAN (Miskito)
See aubia

UNTA DUKIA (Miskito)
See aubia

WAIWAN
Synonyms: ?duende (Miskito)
Local Belief: A devil (Ziock 1894), invisible spirit (Nietschmann 1973) or legendary animal (Barrett 1993; Marx and Heath 1992) that wanders the savanna causing illness (Barrett 1993; Dennis 1981). See also the discussion at the end of this glossary.

WAMUNA (Miskito)
Synonyms: No known synonyms
Local Belief: This name is given to a phantom animal that causes carbuncles, commonly referred to as granos (Spanish) in Chapter 2: Medicinals, on the soles of one's feet (Marx and Heath 1992).

WAULA TARA (Miskito)
Literal Miskito translation = large boa
Synonyms: No known synonyms
Local Belief: A legendary boa constrictor that devours boats (Marx and Heath 1992) and lowers the water level by swallowing the water (Nietschmann 1973).

WAWAL (Miskito)
Synonyms: No known synonyms
Local Belief: This dragon spirit traverses the rivers leading to the sea. Along the way, it beats the water with its wings causing a flood tide (Marx and Heath 1992).

WLASA (Miskito)
See lasa

WON AISA (Miskito)
Synonyms: God (English), Von Aisa (?Miskito)
Local Belief: This term was once used to refer to the head of the Miskito spirit world (Hutton 1922) and today refers to God (Marx and Heath 1992). See also Chapter 7: Superstition, "The Spirit World" and "Further Thoughts."

YULSWIN (Miskito)
Synonyms: No known synonyms
Local Belief: A phantom or ghost. This word also describes a howling noise that is a premonition of something bad (Marx and Heath 1992).

Discussion: Possible Pseudonyms for the Duende

In their publication on the spirits of southeastern Nicaragua, Elsberg, Blanco and Rodriguez (1992) distinguish between two land demons, aubia, demon of the savanna, and unta dukia, demon of the bush. According to Marx and Heath (1992) these two demons may be one in the same. Neither aubia nor unta dukya are in the Marx and Heath dictionary but both are referred to under the equivalent name of, unta dawan. Dawan translates as "master" and unta means "bush". Thus, both unta dawan and unta dukya refer to the master, or spirit, of the bush and the two separate demons recognized by Elsberg, Blanco and Rodriguez (1992) are considered synonymous.

The spirit of the bush was referred to in past publications as waiwan tara (Hutton 1922). Ziock (1894) noted that "in old heathen times," waiwan was believed to be the devil. The term waiwan was encountered both in this study and in the established literature. Nietschmann (1973) noted that this invisible spirit lives everywhere, be it water or land, but not so in this study. Rosa Lecayo (Lamlaya) specifically noted its location as in the bush: "When go to bush, if breathe air of waihwin, a bad animal you can't see, you get sick." In García's (1996) reference to aubiya as the owner of the mountain, she might have erroneously translated the Spanish word "monte," because she also referred to aubiya as the spirit of the grassland foothills.

Miskito belief dictates that demons have the ability to disguise themselves as animals tc fool their victims[3]. Marx and Heath (1992) described waiwan as a legendary animal appearing in various forms. Barrett (1993) described waiwan as a pig-like spirit that causes illness. Dennis (1981) offered more detail: This demon wanders the savanna under cover of darkness. It is marked by an unpleasant odor that is the cause of the illness. For this reason, clothing must be brought in at night for if wahwan's

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[3] Other demons that take the form of animals are mentioned in Marx and Heath (1992). Wahsu, who can take the form of a tiger, among others, is said to devour cadavers. Bottles of magic water (wahsu saika) can be left in the cemetery to prevent the wahsu from bothering the dead. Another demon, called wakumbai or karswaki, takes the form of a cow or horse that is either one- or three-legged. This animal appears if someone kills a raven.

scent is imparted on the clothing, the owner will become ill at the next wearing. Infants are especially susceptible.

The demon-animal association is similar to other references to the bush demon[4]. Marx and Heath (1992) referred to unta dawan as synonymous with aubia (as well as unta dukya) and characterized this spirit as the "protector of the boars." The reference to boars resembled informant descriptions of another term used in this study. Swim, a Miskito term, was used by one informant (Janis Molina/Haulover). According to Marx and Heath (1992), swim is an entity with a large hat that watches over herds of boars. Barrett (1994b) stated that duwindo or duende is the keeper of deer and that he rides through the forest on the back of a boar[5].

Dennis' (1981) description of swinta as the demon of the bush, "a short figure with a broad-rimmed hat" (p. 471) is identical to the physical description of duende. As noted above, duende is described as a little person with a big hat that lives in the bush (Aristan Bons Zacarías/Bismona; Barrett 1994b[6]). It was also described as a small man with a big umbrella (Anelia Zacarías/Tuapí).

In sum, the descriptions of aubia, swim, unta dawan, unta dukia and waiwan found in all of these sources appear to depict the same demon referred to in this study as duende. The differing names in use today are likely attributable to a combination of the many dialects that once existed along the Coast as well as influences from other languages that have affected the region.

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[4] Nietschmann (1973) noted the Miskito belief that some animals have keepers.

[5] The demons wari dawan and sula dawan are keepers of the white-lipped peccary (similar to a boar) and the white-tailed deer, respectively (Nietschmann 1973).

[6] Barrett (1994b) also mentioned that duende knows medicinal plants and will give this information to those he desires to teach. No other references to this information have been found.

Glossary 8: Miskito Recipes

Recipes documented on the East Coast of Nicaragua during this study are presented here. This glossary is divided into three sections: Ingredients, recipes from the study (food and beverages) and recipes from other sources. Another consideration with regard to food involves prohibitions during pregnancy or certain illnesses; this is discussed in Chapter 7: Superstition, "Restrictions During Treatment".

Both Jamaican and Spanish cooking have influenced Miskito cuisine. The ingredients (i.e. coco milk) and types of food and beverages (i.e. wain) that are considered Miskito reflect a Jamaican influence. Consumption traditions also mirror Jamaican customs; wain is considered a Christmas libation by both Miskito and Jamaicans. Spanish adaptations include rice and beans using local ingredients to suit the Miskito palate. Dietary differences also depend on the location of the village; coastal communities tend to use more coconut in their cooking than do riverine villages (Nietschmann 1973).

Ingredients

Miskito cuisine in the study communities is distinctive not necessarily because of how it is cooked, but because of what goes into it. The following list is only a sample of the many herbs, colorings and extracts commonly used in Miskito cooking. While many ingredients can be purchased, some are still prepared in the traditional fashion. Based on information obtained from the study communities, the following is a list of the use, preparation or source of some of the most common ingredients used in cooking.[1]

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[1] Except for sugar, salt, pepper, yeast and baking soda, which were exclusively purchased at the market, botanical information for these ingredients is available in Chapter 4: Edibles, under "The Foods."

aceite de coco (coconut oil): Grate coco meat and strain. Put in a kettle or pot to boil. Cool and remove liquid off the top. Cook this liquid until it thickens. Cool and put in a clean, sealed bottle (Nena Castillon and Richaina Mybith/Lamlaya). This preparation method is similar to that in other accounts (Woodroof, 1970). A dry coconut, not a young one, must be used to make aceite de coco (Zoila Velázquez/Wawa). Older coconuts that fall from the tree by themselves are said to contain more oil (Nietschmann 1973).

achiote: Seeds are ground and stored in a sealed container. The flavorless powder is added to meats and soups for its yellow-orange color. Achiote is available in the market and is frequently encountered in communities.

ajo: Used in various dishes and exclusively purchased from the market in this study.

albahaca: Leaves are used to flavor meat and rice.

baking soda: Known in Spanish as bicarbonato de sodio, routinely purchased from the market.

black pepper: Used to flavor almost any dish (except sweets). In this study, exclusively purchased from the market.

canela: Used in various dishes, usually in conjunction with sugar. In this study, exclusively purchased from the market.

chile picante: Fruits are used to flavor a variety of dishes.

chiltoma: Fruits are used to flavor a variety of dishes.

corn meal: Corn kernels (either homegrown or purchased) are dried in the sun for 1/2 hour. Then, they are ground in a mortar, yielding flour.

culantro: Leaves are used to flavor meat and rice.

cumin: This spice is available from the market but is not mentioned as an ingredient in the dishes documented in this study.

flour: Miskito once made flour from bananas (Nietschmann 1973), but not so today. Duke (1972) describes making plantain flour, noting its long shelf life. In this study only bleached, white flour purchased from the market was used, although one described making starch from platano; see Chapter 5: Household Use.

leche de coco: Open the coconut. Discard the water. Remove rind, wash and grate meat into a bowl and add 1 cup of water. Squeeze coco meat about 1 minute to express the milk. Remove meat by hand, squeezing out excess milk before discarding, leaving only the coco milk in the bowl (Celia Zamorra/Karatá; Edilmira ?/Karatá;[2] Laurel Chevarría/Karatá; Yoneda Cordoba Tathum/Karatá).

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[2] The last name of the informant Edilmira was not obtained.

limon puro: Juice used to clean meat before cooking.

naranjagrio: Juice used to clean meat before cooking.

tomate: Fruits are used to flavor meat dishes.

sugar: Used in beverages, main dishes and confections. In this study, exclusively purchased from the market.

salt: At one time, salt was obtained from the sea (Orlando Budier/Haulover). Boiling seawater to extract the salt was documented by (Young 1842). This time-consuming, low-yield process is no longer performed. In this study, salt is purchased from the market.

yeast: Used in bread-making and baking recipes, this is purchased from the market.

Recipes in this Study

The following recipes are transcribed from the original field notes for this study. Many recipes are imprecise in the amounts of ingredients to be used. Both cookbooks and conventional measuring implements are rare. Consumption particulars and informant sources are provided where available. Recipes for meals are presented first, followed by beverage recipes.

The Food

Atol: See wabul

Budín: This dish is also referred to as pudding. Grate 3 large yuca tubers and cool in coco milk. Add a pinch of canela, pinch nutmeg (or one small nut), 1 bar of butter, salt, 1 cup sugar and some vanilla. Bake in pan until spongy in consistency (Basilicia Zamorra Martin-Schultz/Tuapí; Nena Castillon/Lamlaya).

Caheta de coco: Similar to budín. Peel a dry coco and cut meat into small pieces. Add sugar, cinnamon stick, and cook. Pour into cup (Yoneda Cordoba Tathum and Nicholas Regional/Karatá).

Chew beans wit dumplin': Mix together flour, salt, baking soda and enough water to make it pasty. Drop small handfuls into pre-cooked (and still hot) beans. Cook some more (Edilmira ?/Karatá).

Empanadas: Make dough for leavened bread (see the recipe for pan de coco). Roll out the entire ball of dough. Spread on the following: oil, grated cheese, cinnamon, nutmeg and sugar. Cut into squares of desired size and fold over to form triangles. Bake until golden brown (Elena Fisher Williams/Wawa).

Johnny cake: Made with flour, baking soda and leche de coco (Zoila Velázquez/Wawa).

Pan de coco: You need: Yeast (purchased in pre-measured packets), 10 pounds flour, milk from one coco, ¼ cup oil (or milk from 2nd coco), 1 pound sugar, small handful salt. Put yeast in warm water. Knead all other ingredients together. When yeast is foamy, add to flour mixture. Add more water/flour as needed; dough will not rise if it is too stiff. Cover with cloth and allow to rise for 20-30 minutes. Cut and shape into individual breads, the size of one's hand. Start fire. Place large metal bowl atop stove, cover to preheat. Put bread in on bottom surface of bowl in one layer (can bake 6-7 at a time). Turn over when first side browned; edges will brown (Zoila Velázquez/Wawa).

Pan de coco (variation): In a bowl, add the milk of one coco (1 cup of water may be substituted if coco milk is not available). To bowl with milk, add 3 cups flour, 2 soup spoons sugar, big pinch salt, and 1 tablespoon baking soda. Mix. Make a well in center. Add 1/3 cup oil. Combine ingredients and knead. If dough sticky, add flour. Form into oblong ball. Remove any large coco chunks. If needed, add water to moisten. Cut dough into thirds. Work with 1/3 of the dough at a time. Knead ball into a disk about 4 inches across and about ½ inch thick. Bake tortillas, turning once. When tortilla is crusty, remove from baking pan and allow to brown on all sides directly in fire (Celia Zamorra/Karatá; Laurel Chevarría/Karatá; Yoneda Cordoba Tathum/Karatá).

Queque: Wash 2 pounds corn kernels and grind. Pass through sifter; sift with the aid of the wind. What does not pass through can be used to make wabul. Make leche de coco (using one big coco or two small). You need about 4 cups. Cook corn flour in 4-5 cups of water over high flame, stirring continuously until thickens. Add 3 cups leche de coco, little at time, mixing well between additions. At this point, it should have the consistency of pea soup. Cook 10 minutes. Break up 1½ tablespoons of canela; smash and add to pot. Add 1 cup leche de coco. Cook for 30 minutes, stirring occasionally. Add a little oil to baking pan (enough to coat). Heat pan. Add 1 cup of sugar and ½ teaspoon salt to pot. Bake for 2 hours (Edilmira ?/Karatá).

Rice and Beans: The addition of coco milk again distinguishes this dish from the traditional gallopinto of the West Coast. The beans are soaked in water starting the night before. The next morning rice and salt are added and left to simmer. Coco milk is added just before the meal is finished cooking (Celia Zamorra/Karatá; Laurel Chevarría/Karatá; Yoneda Cordoba Tathum/Karatá).

Ron Don: This dish is also known as "run-down" (Nietschmann 1973). Vegetables and tubers of any kind are piled into the bottom of a deep pot with water in the bottom. Fish or meat, which has been seasoned with lemon and spices, is placed on top. The dish is boiled over a medium heat and, halfway through, coco milk is added giving it that distinctive Atlantic Coast taste.

Torta: You need: 4 pounds flour, 2 pounds sugar, 3 tablespoons milk, nutmeg, ½ cup oil, vanilla and 1 stick butter. Mix together, shape into tortes and bake (Zoila Velázquez/Wawa).

Tortilla de harina: This is the same recipe as pan de coco, but it is fried instead of baked. Follow the steps in the first two paragraphs for making pan de coco. When starting the final kneading, start heating oil in pan. Fry each piece of bread in oil, turning once (Celia Zamorra/Karatá; Laurel Chevarría/Karatá; Yoneda Cordoba Tathum/Karatá). Coco milk is the secret ingredient that distinguishes the variation of a Pacific Coast dish.

Wabul: The recipes for atol or wabul are consistent across communities. The following recipes demonstrate using a starch base and the other, a sweet fruit. These porridge-like preparations are consumed from a large cup; thus, the reference to "drinking" it. For banano, cuadrado, or platano: Cook 6 mature fruits and mash. Add coco milk, a pinch of salt, sugar and cinnamon. Cook 10 minutes (Laurel Chevarría/Karatá). Using mango chancho: Cook fruit, mash and add milk and sugar; "it's ready to drink" (Anelia Zacarías/Tuapí).

<u>The Beverages</u>

Agua de coco: Liquid inside a freshly cracked open coco. Agua de coco is consumed as a beverage and should not be confused with leche de coco, used in baking.

Anivel: Many fruits can be used to make this, including icaco, jocote, mango, marañon, papaya or piña. Peel and cook the fruit with sugar, canela and nutmeg. Simmer. This drink is consumed around Semana Santa[3] or taken on trips because you can "drink [it] like water," meaning at room temperature (Anelia Zacarías/Tuapí).

Cacao: Cacao beans are ground to a paste and diluted with water. This is a special treat when fresh milk is available to use instead of water.

Chicha: See misla.

Fresco: This drink is made from the seeds of palma Africana or tamarindo, from the fruits of carau, granadilla, guapino, guanabana, guayaba, various limones, mangos and marañon, or the calyces of the wain plant. The fruits or calyces are mashed with water. Seeds are usually cooked first, then ground and mixed with water. Fresco is consumed hot (Yoneda Córdoba Tathum/Karatá) or cooled (Salvador Perez[4]/Karatá).

Jugo: Marañon, toronja or guanábana fruits are squeezed or mashed and consumed as is, without the addition of water or sugar.

Misla: Informatnts also refer to this drink as chicha [Spanish] and it is considered a Christmas libation (Salvador Perez/Karatá). Misla [Miskito] is made by extracting juice from stems of caña. The juice is put into a container with sugar and left in the sun for 4 days. The key to this alcoholic concoction is to add a fermenting agent, which is found in saliva. The vegetable matter is chewed and put thusly into a container to

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[3] This is the week between Palm Sunday and Easter Sunday.

[4] Perez recommends to "add ice."

ferment. The material begins to ferment after only a few hours. This method of alcohol production has long been noted amongst indigenous tribes in Central and South America (Roberts 1827; Schultes and Raffauf 1992). A number of other plants can be used as the base for this alcohol, including banano, platano, maíz and yuca; the latter two are said to produce a more intoxicating beverage (Roberts 1827; Salvador Perez/Karatá). Nietschmann (1973: 210) mentioned an alcoholic drink made from caña, called kasusa, which was introduced from the Black Caribs. Coe and Anderson (1996) called this kususu. This drink was not encountered in this study.

Tea: Grated zinza root, limon real leaves or ti leaves are steeped in water. Sugar may be added. Many more teas are used as remedies (See Chapter 2: Medicinals).

Wain: Wain [Miskito] or vino [Spanish] is made using the calyces of the plant with the same name. The calyces are boiled or steeped in hot water and then sealed into a container and left in the sun for 2-3 days. Sugar and spices may be added. This is another Christmas libation (Nena Castillon/Lamlaya).

Recipes from Other Sources

Following are additional sources that can be consulted to find more recipes typical to Nicaragua and Central America. The citations for these sources are listed in the Bibliography of this report.

- Borland 2000 – This website mentions many frequently eaten foods and Florida establishments that serve them.
- Duke 1981 – His glossary includes most of the plants in this survey, including many details on maíz and coco.
- Hedrick 1972 – Mentioned a fermented Miskito dish called bisbire.
- Helms 1971 – Mentions a number of recipes in her study of Asang.
- Marx and Heath 1992 – Many dishes are found in this dictionary, including tulis and ulang.
- Mueller 1932 – Discussed food plants and some preparation methods, i.e.: wabul (pages 18-20)
- Nietschmann 1973 - Mentioned wabul, along with many other foods (especially on and around pages 107 and 209)
- Woodroof 1970 – Discussed various coconut products.
- Young 1842 – This historical account of life on the Miskito Coast mentioned a number of recipes.

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