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ETHNOBOTANY OF THE MISKITU OF EASTERN NICARAGUA

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ABSTRACT.—The Miskitu are one of the three indigenous groups of eastern Nicaragua. Their uses of 353 species of plants in 262 genera and 89 families were documented in two years of fieldwork. Included are 310 species of medicinals, 95 species of food plants, and 127 species used for construction and crafts, dyes and tannins, firewood, and forage. Only 14 of 50 domesticated food species are native to the New World tropics, and only three to Mesoamerica. A majority of plant species used for purposes other than food or medicine are wild species native to eastern Nicaragua. Miskitu medicinal plants are used to treat more than 50 human ailments. Most (80%) of the medicinal plants are native to eastern Nicaragua, and two thirds have some bioactive principle. Many medicinal plants are herbs (40%) or trees (30%), and leaves are the most frequently used plant part. Herbal remedies are most often prepared as decoctions that are administered orally. The Miskitu people are undergoing rapid acculturation caused by immigration of outsiders. This study is important not only for documenting uses of plants for science in general, but also because it provides a written record in particular of the oral tradition of medicinal uses of plants of and for the Miskitu.

RESUMEN.—Los Miskitus son uno de los tres grupos indígenas del oriente de Nicaragua. Los usos por parte de éste grupo de 353 especies de plantas comprendidas en 262 géneros y 89 familias fueron documentados durante dos años de trabajo de campo. Están incluídas 310 especies medicinales, 95 especies de plantas alimenticias, y 127 especies empleadas para construcción y artesanías, colorantes y taninos, leña y forraje. Solamente 14 de 50 especies alimenticias domesticadas son nativas del neotrópico y sólo tres se originan en Mesoamérica. La mayoría de las especies de plantas empleadas para otros propósitos que alimento y medicina son especies silvestres nativas del este de Nicaragua. Las plantas medicinales miskitus son usadas para tratar más de 50 padecimientos humanos. La mayoría (80%) de las plantas medicinales son nativas del Oriente Nicaragüense, y dos tercios de ellas tienen algún principio bioactivo. Muchas de las plantas medicinales son hierbas (40%) o árboles (30%), y las hojas son la parte de la planta usada con mayor frecuencia. Los remedios de origen vegetal son preparados la mayoría de las veces como decocciones que son administradas oralmente. La gente miskitu está siendo aculturada rápidamente por causa de la inmigración de fuereños. Este estudio es importante no solamente por documentar usos de las plantas para la ciencia en general, sino también porque proporciona

un registro escrito en particular de la tradición oral de usos medicinales de plantas por y para los miskitus.

RÉSUMÉ.—Les Miskitu sont un des trois groupes autochtones de l'est du Nicaragua. Deux années de recherche ont permis d'inventiorer 353 espèces utilisées réparties en 262 genres et 89 familles. Les plantes médicinales des Miskitu interviennent dans le traitement de plus de 50 maladies humaines. La majorité (80%) des plantes médicinales sont indigènes à l'est du Nicaragua et la plupart (65%) contiennent des principes bioactifs. Ces plantes sont surtout des herbes (40%) ou des arbres (30%) et les feuilles sont l'élément le plus utilisé. Les remèdes à base de plantes sont absorbés surtout sous forme de breuvages. La plupart des plantes comestibles sont cultivées, mais seulement 14 des 50 espèces les plus importantes pour les Miskitu sont indigènes aux tropiques du Nouveau Monde et uniquement trois à l'Amérique centrale. L'acculturation des Miskitu augmente rapidement à cause d'une forte immigration. Cette étude est donc importante: elle permet de documenter l'utilisation des plantes pour des besoins scientifiques et préserve les connaissances orales relatives à l'exploitation des plantes médicinales par les Miskitu.

INTRODUCTION

The present geographical distribution of the Miskitu people encompasses southeastern Honduras, the northeastern coast of Costa Rica, and eastern Nicaragua. The Miskitu, Rama, and Sumu are more closely related culturally to groups in the lowlands of South America than to cultures of Mexican and Mayan affinity. This association is based on a number of Miskitu cultural features reminiscent of South American groups. These traits include a hunting and fishing economy with little emphasis on agriculture; manioc (104 *Manihot esculenta* [the numbers are a guide to finding the species in the Appendix, which also includes the Miskitu names]) rather than maize (350 *Zea mays*), is the principal cultigen; emphasis on canoe travel; excessive intoxication during rituals; use of low wooden seats and hammocks; and the manufacture of bark cloth (Adams 1956; Conzemius 1932; Kidder 1940; Mason 1962; Stone 1962, 1966). The languages spoken by the Miskitu and their neighbors, the Rama and Sumu, belong to the Macro-Chibcha linguistic group of Columbia and northern Ecuador (Kidder 1940; Mason 1962; Stone 1966).

Before the arrival of Europeans in eastern Nicaragua, the Miskitu were a small group of about 1,600 people living between the Rio Coco and the Krukira (Conzemius 1932) (Figure 1). However, their demography and political organization changed dramatically during the 17th and 18th centuries, following contact with buccaneers and traders from whom they obtained firearms (Dozier 1985; Helms 1971; Smutko 1985). The Miskitu name is derived from the word musket given to them by buccaneers and traders (Smutko 1985). The Miskitu used these newly acquired firearms to subdue neighboring groups enabling them to extend their territory to the north into Honduras, and to the south into the Pearl Lagoon area north of Bluefields (Bell 1989; Conzemius 1932; Smutko 1985). The Miskitu population is currently estimated at over 75,000, greater than the combined population of all other indigenous groups in eastern Nicaragua (Buvollen and Buvollen 1994; CIDCA 1982; Hale and Gordon 1987). However, most still live in small vil-

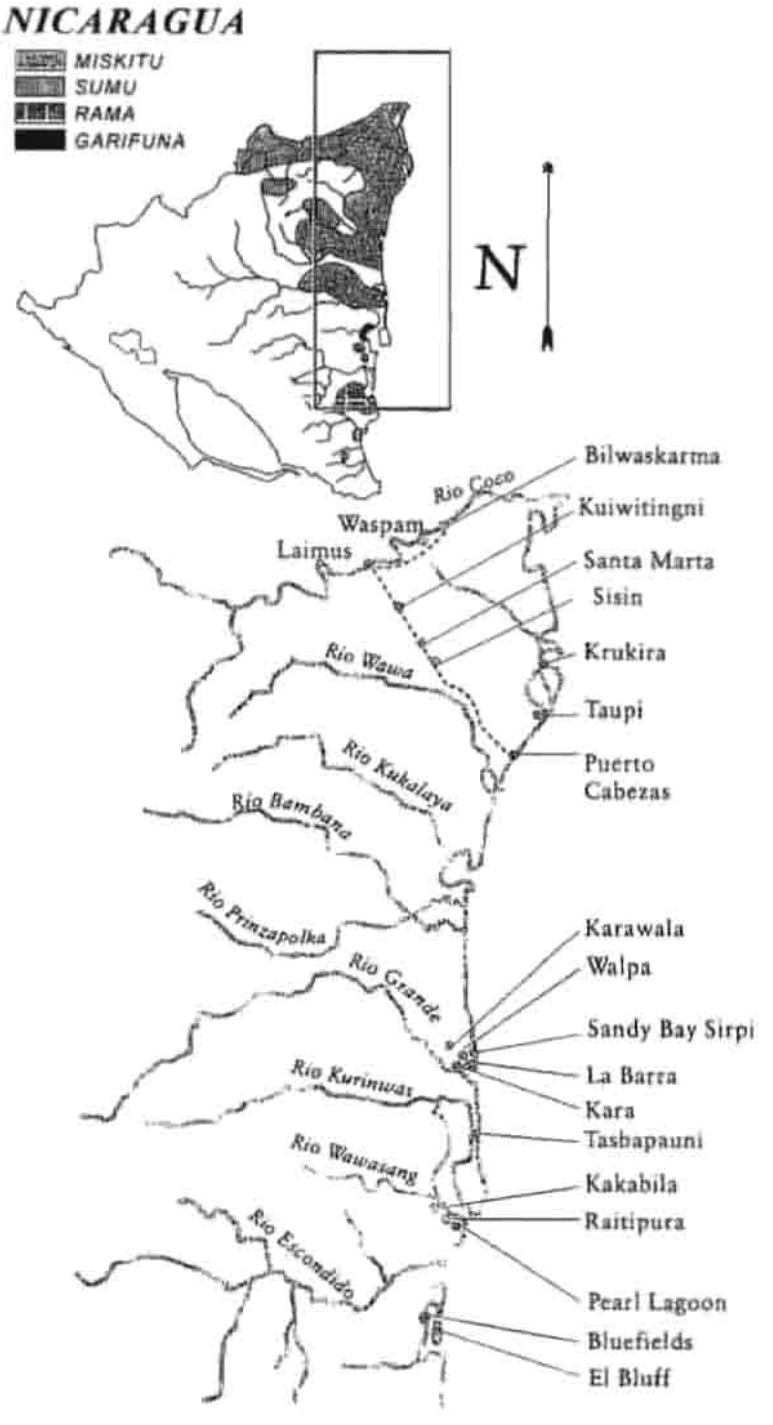

FIGURE 1.—Indigenous groups and Miskitu settlements in eastern Nicaragua.

FIGURE 2.—The Miskitu village of Tasbapauni with coconut palms, *kuku* (*Cocos nucifera*), growing in dooryard gardens.

lages of 200 to 300 inhabitants, usually located along rivers and the coast. The largest Miskitu settlement in southeastern Nicaragua is Tasbapauni (Figure 2) with about 1,000 persons (Hale and Gordon 1987; Nietschmann 1972, 1979). In recent times, many Miskitu have migrated to larger communities (e.g., Bluefields, El Bluff, Managua, and Puerto Cabezas) seeking wage work.

The traditional Miskitu lifestyle seems to be disappearing almost as fast as that of the Rama, the most highly acculturated group of eastern Nicaragua. However, many aspects of Miskitu culture remain in place. Their primary occupations remain fishing and hunting, supplemented by subsistence agriculture and gathering of wild resources. However, many work for wages in the extraction of timber, exploitation of ores, and in the fishing industries owned by Westerners. They participate in the regional market economy, speak "Creole" (English spoken in eastern Nicaragua), Miskitu, and Spanish. Most are Christians.

Studies of Miskitu culture in eastern Nicaragua have been primarily in anthropology and ethnohistory (Conzemius 1932; Dennis 1981, 1984; Helms 1971; Nietschmann 1969, 1972, 1973, 1979, 1990). Other than general observations by traders and travelers (Bell 1989; Roberts 1827), Miskitu plant use has been recorded for only a select group of medicinal plants (Barrett 1994a, 1994b; Dennis 1988). To better document the plant use heritage of these people, an ethnobotanical study was conducted in Miskitu areas of eastern Nicaragua. This study occurred at a time when the loss of traditional Miskitu customs was greater than at any other time in history. Our objective was to document as many Miskitu traditional plant use practices as possible before this knowledge was lost through acculturation.

STUDY AREA AND ENVIRONMENT

Eastern Nicaragua, locally referred to as the Atlantic Coast, was formerly known as the department of Zelaya. It is now divided into the Región Autónoma Atlántico Norte (RAAN) and Región Autónoma Atlántico Sur (RAAS). It covers an area of 56,430 km^2, approximately 56% of the national territory. It is located between 11° and 15° N latitude and 83° and 85° W longitude. The area has a tropical climate, with a rainy season of six-eight months (May-November), but with no well defined dry season. The average annual rainfall is 3,810 mm (Sutton 1989). The dominant vegetation types are pine forest and broadleaf evergreen forest, the latter including swamp forest. Pine forests of Caribbean pine (6 *Pinus caribaea*), cover an area of about 3,806 km^2. The largest tract of pine forest is located in the northeast between the Rio Coco and Puerto Cabezas. Other areas with pine savannas are found around Karawala and Pearl Lagoon. The broadleaf evergreen forest contains important timber species such as mahogany (*191 Swietenia macrophylla*), Spanish cedar (189 *Cedrela odorata*), and rosewood (125 *Dalbergia hypoleuca*).

The Eastern Lowlands remain essentially undeveloped and isolated from the rest of the country due to the abundance of rivers, high density of forest, and high rainfall. Although access roads to some areas have been built recently, transportation is still primarily by boat and airplane. The largest cities are Bluefields and Puerto Cabezas.

METHODS

This study involved interviews with traditional medicine practitioners (e.g., bonesetters, herbalists, midwives, and shamans) and other knowledgeable individuals among the general populace. To document and supplement data gathered indirectly over decades by Coe (a native of the region), extensive field work was conducted during 1992 and 1993. This included ethnobotanical surveys of markets and open-ended interviews of nine traditional medical practitioners. Sixteen locations (El Bluff, Kakabila, Kara, Krukira, Kuiwitingni, La Barra, Pearl Lagoon, Puerto Cabezas, Raitipura, Rio Grande, Sandy Bay Sirpi, Santa Marta, Sinsin, Tasbapauni, Tuapi, and Walpa [Figure 1]) were visited. Voucher specimens were collected to document the species cited.

Techniques used for gathering ethnobotanical data are described in more detail in Coe and Anderson (1996a). Interviews were conducted in "Creole," Miskitu, and Spanish. An interpreter was employed to help with interviews conducted in Miskitu. Since curing is considered a profession among the Miskitu, practitioners expect to receive payment for their services, thus, informants were paid a nominal fee or given other materials requested (e.g., cooking utensils, fishing hooks, food, machetes) in exchange for their time and information.

Voucher specimens were deposited at the Herbarium of the Atlantic Coast of Nicaragua (HACN) in Bluefields (established by Coe in 1992), the Herbario Nacional Managua Nicaragua (HNMN), the Missouri Botanical Garden (MO), and the University of Connecticut (CONN). The majority of voucher specimens were identified at The University of Connecticut, Storrs, and at the Missouri Botanical

TABLE 1.—Taxonomic rank and plant-use category of plant species used by the Miskitu in eastern Nicaragua.

	Food	*Medicinal*	*Other*	*Total*
Families	46	85	43	89
Genera	76	234	103	262
Species	95	310	127	353

TABLE 2.—Status of ethnobotanical plant species used by the Miskitu in eastern Nicaragua.

Status	*Total*	*%*
Wild	278	79
Semi-domesticated	48	14
Domesticated	15	4
Purchased	12	3
Totals	353	100

Garden, St. Louis. Voucher specimens in doubt were sent to specialists at the Missouri Botanical Garden and the New York Botanical Garden (NY). Names of localities and common names of plants were verified to the extent possible using published sources (CIDCA 1985, 1986, 1989; Duke 1972; Guerrero and Soriano de Guerrero 1985; Heath and Marx 1961; Howes 1974; Incer 1985; Martinez 1991; Morton 1981; Smutko 1985; Uphof 1968).

RESULTS

The Miskitu use a taxonomically diverse group of plants, including 353 species among 262 genera and 89 families (Appendix; Table 1). Some 310 of these are medicinals, 95 are food plants, and 127 are for other uses such as beverages, construction and crafts, dyes and tannins, firewood, forage, and spices and condiments (these totals include plants with multiple uses).

The Miskitu obtain plant materials from agricultural fields, dooryard gardens, forests, and markets ("purchased" in Table 2). The degree of dependence on these sources is cyclic because of the boom-or-bust economy of eastern Nicaragua. When wage labor in Western enterprises is readily available, reliance on market goods increases. When wage employment is scarce, however, the reliance on market goods decreases and the dependence on traditional subsistence harvests (agricultural fields, dooryard garden, and the forest) increases. One positive aspect of this economic instability has been that traditional plant use information has been preserved; to survive lean economic times the Miskitu have had to continue to use and, therefore, to remember, traditional plant-use practices.

Agricultural fields.—Until recently, Miskitu agriculture was practiced strictly for subsistence, with production primarily for household or local consumption (Helms 1971). However, after European contact, some crops such as banana (325 *Musa paradisiaca* var. *sapientum*), common beans (148 *Phaeolus vulgaris*), *cacao* (274

Theobroma cacao), and rice (342 *Oryza sativa*), became commercially important, especially during the late 1800s and early 1900s. These cash crops attracted men to agricultural work (Helms 1971). Before that time, men engaged mostly in fishing and hunting, with women responsible for agricultural work (Helms 1971; Kerns 1982).

The Miskitu agricultural cycle starts with the planting of common beans in January and ends with the harvest of rice in November. Crops may be cultivated as monocultures (one species per field, e.g., common beans or rice), or as multiple crops (e.g., banana, cush-cush yam *Dioscorea trifida* [317], or manioc [104]; also dasheen *Colocasia esculenta* [298], maize [350], annatto *Bixa orellana* [51], *yautia Xanthosoma sagittifolium* [302], pineapple *Ananas comosus* [310], and sugar cane *Saccharum officinarum* [348]), or as a sequence of crops (cultivation of several crops in the same field at different times during the agricultural cycle, e.g., common beans, followed by maize, squash *Cucurbita moschata* [87], and watermelon *Citrullus lanatus* [86]).

The particular crop and the manner in which it is cultivated depends on soil quality. Soils of eastern Nicaragua are predominantly alluvial, with quartzite dominant in the north and laterite in the south (Incer 1975; Taylor and Salas 1959). Agricultural practices consist of crop rotation and field fallowing. Fields are cleared in February or March and burned in early May. Most planting is done with the coming of rain in late May and early June. Planting, weeding, and harvesting are done manually with planting sticks and machetes. Agriculture is practiced by individuals or family units, except in the cultivation of common beans and rice for which group labor is involved. A community effort in the cultivation and harvesting of these two crops is emphasized because of their economic importance. The system of sharing or exchanging labor within the community is known in Miskitu as ***pana-pana*** or "you help me and I help you."[1] The Miskitu practice slash-and-burn agriculture on plots of one-two hectares known as ***insla***. These fields are generally located inland from the less fertile coastal areas. Domesticates grown in these fields are the major food and cash sources. Agricultural production for the Miskitu is more closely tied to the regional market economy than is true for the Garífuna and the other indigenous groups of eastern Nicaragua (Coe and Anderson 1996a). When jobs are not available in Western enterprises, only about 30% of the foods produced by the Miskitu are sold in regional markets, the vast majority being used for household or local consumption. When such jobs are readily available, the vast majority of agricultural goods produced are sold in regional markets (Coe, personal observation). The cash earned is used to purchase desired Western goods, but redirection of work from subsistence activities can cause a shortfall in the local food supply. To compensate for these shortages, foods that under normal circumstances are considered supplementary (mostly semi-domesticates and wild species – see list below) are consumed as staples. These food shortages can have a major impact on Miskitu dietary intake of carbohydrates, protein, minerals, and vitamins (Cattle 1976).

The most important Miskitu food plants are field crops that come from both the New World (NW) and Old World (OW) tropics (including Africa, the southeast Asia and the Pacific islands) (Table 3), including: manioc (104) (NW), banana

TABLE 3.—Origin and status of food plants used by the Miskitu in eastern Nicaragua.

Origin	Status					
	Domesticate	*Purchased*	*Semi-domesticate*	*Wild*	*Total*	%
Native to Nicaragua	3	0	7	35	45	47
Introduced	9	8	20	0	37	39
Naturalized	0	0	11	2	13	14
Total	12	8	38	37	95	100
%	13	8	40	39	100	

(325) (OW), plantains (324 *Musa paradisiaca*) (OW), rice (342) (OW), common beans (148) (NW), *yautia* (302) (NW), dasheen (298) (OW), maize (350) (NW), pineapple (310) (NW), and sugar cane (348) (OW). The first six are the mainstays of the Miskitu diet. Pineapple, sugar cane, and maize are cultivated as supplements to staple foods with surpluses sold in regional markets. Common beans and rice are produced primarily for sale in regional markets and are the most important cash crops. Common beans are native to Mesoamerica and have been a staple food for centuries for many indigenous groups; thus, it is surprising that the use of common beans among the Miskitu is fairly recent, first documented at the turn of the century (Conzemius 1932). Rice, on the other hand, is an Old World crop introduced in the 1780's, that is cultivated more extensively due to favorable soil conditions in the area (Conzemius 1932; Helms 1971). Only after the decline of the banana plantations in the early 1940s did common bean and rice production become commercially important to the Miskitu (Helms 1971).

Dooryard gardens.—Species grown in dooryard gardens are used for food or medicine (Table 4). Most dooryard garden food plants are domesticates. Only six of the 20 most important dooryard garden food plants are the same as those grown in agricultural fields. The primary function of these dooryard gardens is for quick and easy access to foodstuffs. A secondary function is to provide medicinals used to treat day-to-day illnesses.

Markets.—The use of market goods by the indigenous people of eastern Nicaragua is determined primarily by the availability of cash, secondly by proximity to Western retail outlets/stores in rural and urban areas, and thirdly by their history of contact with Western culture. Miskitu access to and dependence on Western goods is due to a long history of contact and acceptance of Western culture, facilitated by the fact that many of the natural resources sought by Europeans (e.g., ore, rubber, timber) were found on Miskitu owned land. Even though the Miskitu participate in a market economy and work sporadically for wage labor, the traditional skills of hunting, fishing, gathering, and agriculture are still maintained. During market recessions, traditional activities cushion the economic impact of lost wages and provide subsistence and material necessities until outside jobs are again available.

The Miskitu purchase only 12 plant species from markets (Table 2). These species are important because they are the major source of spices and condiments. Eight of these 12 are used as spices and condiments and 11 for medicine (obvi-

TABLE 4.—Species grown in dooryard gardens.

Species[1]	Life Form[2]	Status[3]	Origin[4]
Most Important Foods			
Anacardium occidentale (9)	T	D	NW
Annona muricata (15)	T	D	NW
Artocarpus altilis (193)	T	D	OW
Carica papaya (63)	T	D	NW
Chrysophyllum cainito (255)	T	SD	NW
Capsicum chinensis (263)	S	D	NW
Capsicum frutescens (264)	S	D	NW
Citrus aurantifolia (245)	T	D	OW
Citrus paradisi (247)	T	D	NW
Citrus sinensis (248)	T	D	OW
Cocos nucifera (307)	T	D	OW
Colocasia esculenta (298)	H	D	OW
Mangifera indica (10)	T	D	OW
Melicoccus bijugatus (253)	T	SD	NW
Musa paradisiaca var. sapientum (325)	H	D	OW
Musa paradisiaca (324)	H	D	OW
Persea americana (161)	T	D	NW
Tamarindus indica (151)	T	SD	OW
Theobroma cacao (274)	T	D	NW
Xanthosoma sagittifolium (302)	H	D	NW
Less Important Foods			
Bixa orellana (51)	S	SD	NW
Chrysobalanus icaco (68)	T	W	NW
Coccoloba uvifera (221)	T	W	NW
Hibiscus sabdariffa (175)	S	SD	OW
Manilkara zapota (256)	T	D	NW
Spondias purpurea (12)	T	SD	NW
Syzygium malaccensis (203)	T	SD	OW
Medicinals			
Asclepias curassavica (30)	H	W	NW
Blechum brwonei (7)	H	W	NW
Cassia alata (114)	S	W	NW
Cassia occidentalis (118)	S	W	NW
Kalanchoe pinnata (85)	H	W	OW
Momordica charantia (91)	V	W	OW
Turnera ulmifolia (281)	S	W	NW

[1] Numbers in parenthesis () are the index numbers used in the Appendix
[2] T = tree, S = shrub, V = vine, H = herb
[3] D = domesticate, SD = semi-domesticate, W = wild
[4] NW = New World, OW = Old World

ously, a number of these are used both as spices and medicinals). Species purchased include: cinnamon (160 *Cinnamomum zeylanicum*), cloves (202 *Syzygium aromaticum*), coffee (229 *Coffea arabica*), garlic (320 *Allium sativum*), ginger (353 *Zingiber officinale*), nutmeg (195 *Myristica fragrans*), and onion (319 *Allium cepa*) of the Old World; and maize (350), potato (272 *Solanum tuberosum*), and tobacco (265 *Nicotiana tabacum*) of the New World. Only three species native to eastern Nicaragua were documented as being used as spices; they are: barsley (158 *Ocimum micranthum*), *mejorana* (156 *Hyptis capitata*), and false thyme (289 *Lippia micromera*). These are obtained from disturbed sites and from the wild.

TABLE 5.—Status and life form of medicinal plants used by the Miskitu in eastern Nicaragua.

	Life Form					
Status	*Tree*	*Shrub*	*Vine*	*Herb*	*Total*	%
Wild	58	31	45	105	239	77
Semi-Domesticates	7	4	1	1	13	4
Domesticates	23	7	5	12	47	15
Purchased	4	2	0	5	11	4
Total	92	44	51	123	310	100
%	30	14	16	40	100	

Forest.—The Miskitu use native forest products for food, medicine, fiber, construction materials, and crafts. Like the Garífuna (Coe and Anderson 1996a), the Miskitu obtain most (77%) of their medicinals from the forest ("wild" in Table 5). Most of these medicinal species are herbs and forest trees. As described above, agricultural fields and dooryard gardens provide most of the materials used for sustenance and to earn money. However, foods obtained from the forest can play an important nutritional role by providing minerals, lipids, and vitamins (Cattle 1976). Therefore, knowledge and use of forest resources are vital to good health, even though the forest is a much less important source of calories. Of the 37 native forest species that provide food, the four most important are peach palm (304 *Bactris gasipaes*), American oil palm (309 *Elaeis oleifera*), Tonka bean (136 *Dipteryx oleifera*), and sapodilla (256). The uses of these species are discussed in more detail in the section dealing with foods and medicines.

PLANT PROCESSING AND USE

Plant materials used by the Miskitu are often processed to prolong their storage life and/or to make them edible or usable. Processing is by dehydration, frying, boiling, roasting, toasting, and/or parching. The preferred methods are boiling and dehydration. Food crops most frequently treated by these methods are banana (325), coconut (307), maize (350), manioc (104), peach palm (304), and plantain (324). Processing of these foodstuffs is done primarily by women. Medicinal plants are processed by practitioners or their apprentices. For purposes of discussion, the species the Miskitu use are presented in the following use categories: bever-

age, construction and craft, dye and tannin, firewood, food, forage, medicine, and spice and condiment. Many species have multiple uses.

Beverages.—Both Old World and New World species are used to prepare alcoholic and non-alcoholic beverages. The four most popular beverages are ***mishla***, ***sitsa*** or ***bisbaia***, ***bunya***, and ***wabul***. The first two are alcoholic beverages; the last two non-alcoholic (more detail below). Beverages are made from banana (325), cush-cush yam (317), dasheen (298), and plantain (324), of the Old World; and maize (350), manioc (104), peach palm (304), sweet potato (80 *Ipomoea batatas*), and Tonka bean (136), of the New World. Other beverages of lesser importance are made from lime (245) and sweet orange (248), of the Old World; and *huiscoyol* (305 *Bactris major*), cashew (9), grapefruit (247), *nancite* (169 *Byrsonima crassifolia*), and pineapple (310), of the New World. Six of 16 species used for making beverages are Old World domesticates, introduced by Europeans during the 16th and 17th century. Prior to this, beverages were made from native or introduced New World species. Today, with a few exceptions, traditional beverages are being replaced by Western beverages.

Mishla is prepared by peeling and boiling the roots of manioc after which the water is poured off and the roots allowed to cool. Once cooled, the women (generally men do not participate) chew the manioc into a thick paste, and then spit mouthfuls into wooden bowls. Filled bowls are emptied into large clay or wooden vessels or Western made containers to which warm water is added. The mash is then stirred, and covered with leaves of *cola de gallo* (306 *Calyptrogene ghiesbreghtiana*) or banana. Fermentation starts in four to six hours and continues for 48-72 hours before the brew is drunk. Sugar cane juice is sometime added to the mash to accelerate fermentation. This last practice is fairly recent among the Miskitu because sugar cane was not introduced until 1633 into eastern Nicaragua (Conzemius 1932; Smutko 1985). Another alcoholic beverage is a *chicha* made from maize (350), locally called in Miskitu ***sitsa*** or ***bisbaia*** depending on how it is prepared. Like ***mishla***, ***sitsa*** is prepared by chewing the maize to accelerate fermentation. ***Sitsa*** is the only beverage distilled by the Miskitu. Prior to European contact, Amerindians were not familiar with the process of distillation (Belt 1874). ***Bisbaia*** is made by placing maize mixed with water in large containers that are buried until the contents ferment.

The most popular non-alcoholic beverage is the ***îbu*** drink. This beverage is made from the seeds of the Tonka bean (136) tree. The cotyledons are removed from the seeds and boiled in water for softening and extraction of aromatic oil. The oil is skimmed off while boiling and is used as a hair tonic. Once softened, the cotyledons are mashed with a mortar and pestle (***unu mihta***) into a thick paste. The drink is made by mixing the paste with water or coconut milk and sugar.

Wabul is a beverage prepared from green or ripe banana or plantain (324). The peeled fruits are boiled in water until thoroughly cooked, then mashed into a paste with a wooden mortar and pestle made from Tonka bean wood, after which either water or coconut milk is added. Sometimes banana or plantain are cut in lengthwise slices then sun dried and stored as is or pulverized for later use. ***Bunya***, on the other hand, is made mostly from root crops such as manioc, *yautia* (302), dasheen (298), sweet potato (80), or cush-cush yam (317). On occasion, ***wabul*** is made with

peach palm (304) fruits. These are boiled and mashed into a paste with a mortar and pestle then rolled into leaves of banana, plantain, *cola de gallo* (306), or swamp lily (322 *Thalia geniculata*) and stored for later use. For consumption the paste is removed from the leaves, then mixed with water and drunk. The paste used in preparing this beverage is always taken when traveling long distances, especially on hunting expeditions and during timber cutting. The mash keeps well and can be easily prepared into a beverage.

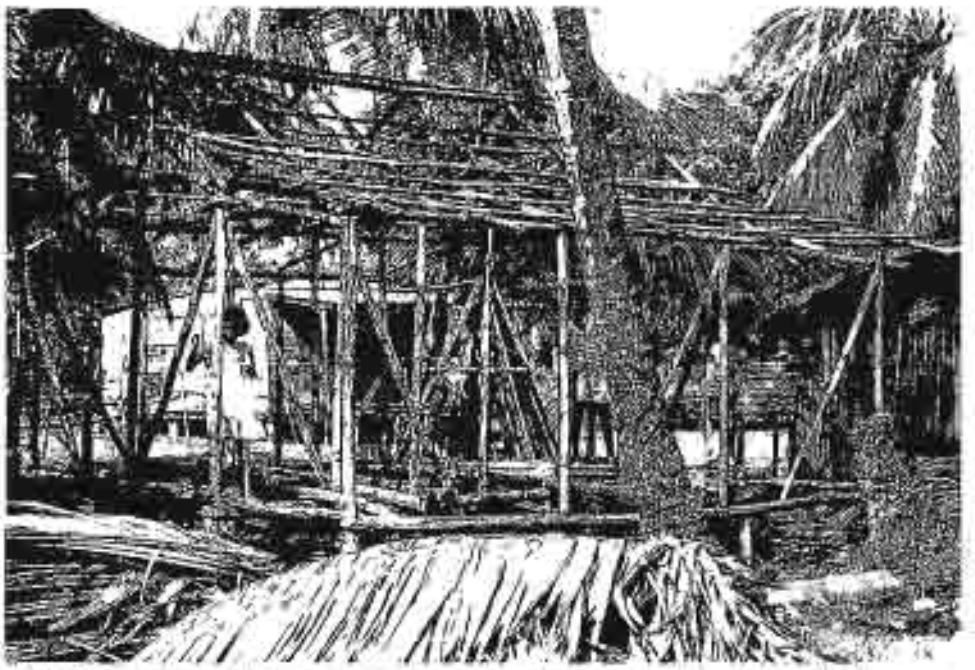

FIGURE 3.—Dwelling being built with traditional materials in the village of Tasbapaum (includes structural logs of leche amarilla, **samu** [*Symphonia globulifera*], and thatch of American oil palm, **kutana** [*Elaeis oleifera*]).

Construction and crafts.—The Miskitu still rely on traditional materials for building of dwellings and other structures (Figure 3). However, in larger communities Western building materials are becoming more and more popular especially for the construction of homes and boats (e.g., galvanized metal sheet). In this study, 68 species were documented as still being used in construction and crafts. Prior to the arrival of missionaries in the 17th and 18th centuries, Miskitu dwellings consisted of one room dirt floor units with sidewalls made from bamboo (331 *Bambusa vulgaris*) and roofs made from palm thatch (Conzemius 1932). Subsequently, structures were built on wooden stilts and consisted of a living area and a kitchen (Conzemius 1932, Roberts 1827). An elevated structure serves to keep the house drier and cleaner, and discourages livestock from wandering through homes. Sidewalls of dwellings are made from bamboo (331) stems, wood of Caribbean pine (6) (the most popular wood for this purpose), mahogany (191), *Santa María* (70 *Calophyllum brasiliense*), and Spanish cedar (189). The major supports for homes

such as corner poles, roof support poles, and stilts are made of the hard, durable wood of the Tonka bean (136) tree. Other popular species used are *nancitón* (99 *Hyeronima alchorneoides*), *cedro macho* (188 *Carapa guianensis*), *leche amarilla* (72 *Symphonia globulifera*), *laurel* (55 *Cordia alliodora*), and *San Juan* (296 Vochysia ferruginea). Roofs are thatched with a variety of palm leaves, the most important being saw cabbage palm (303 *Acoelorraphe wrightii*). Sometimes entire roofs are thatched solely with these leaves. Other palm leaves of less importance used for thatch are African oil palm (308 *Elaeis guineensis*), coconut, American oil palm (309), and *cola de gallo* (306). Increasingly homes have roofs made entirely or partly from galvanized sheets, known in Creole as "zinc" (Figure 2).

The house framework and roof thatch are frequently held together with cordage made from the fibrous inner bark of balsa (53 *Ochroma pyramidale*), *guácimo* (278 *Luehea seemannii*), *mahoe* (176 *Hibiscus tiliaceus*), *peine de mico* (277 *Apeiba aspera*), trumpet tree (65 *Cecropia peltata*), and *mariposa* (174 *Hibiscus bifurcatus*). Other species used to a lesser extent for securing the house frame are snakeroot (29 *Aristolochia trilobata*), *bija* (47 *Arrabidaea chica*), and *hoja chigüe* (93 *Davilla kunthii*).

Household utensils used by the Miskitu are similar to those of the other indigenous groups of eastern Nicaragua (Coe and Anderson 1996a). These are made from traditional and Western materials. Traditional materials include fibers obtained from the fruits of the kapok tree (52 *Ceiba pentandra*) used for making mattresses and pillows. Other traditional materials include the wood of Tonka bean (136), mahogany (191), rosewood (*Dalbergia brownei* [124], [125], *D. tucurensis* [126]), *cedro macho* (188), *santa maría* (70), Caribbean pine (6), and Spanish cedar (189). A popular Miskitu household utensil is the mortar and pestle (Figure 4) used for grinding grains and food preparation; these are usually carved out of Tonka bean (136) logs or other hardwood. Another popular household item is the ***kubus*** (Figure 5), a rectangular table used as a "stove" for cooking. The frame of the ***kubus*** is built from Tonka bean (136) wood and filled with clay and sand.

Gourd drinking utensils are used in many households, but these are slowly being replaced by Western containers. Traditional drinking vessels are made from split and hollowed-out fruits of bottle gourd (89 *Lagenaria siceraria*) and tree gourd (48 *Crescentia cujete*). Most kitchen utensils, especially vessels for holding liquids, are Western-made and are obtained as gifts or purchased in regional markets. However, in some instances the stems of bamboo (331) are still used as vessels for carrying water. Traditional cooking utensils are made from bamboo, mahogany (191), rosewood (124, 125, 126), and Spanish cedar (189). Today, however, Western wares made from aluminum, iron, and plastic, especially pots and pans, largely serve this purpose.

The Miskitu are very skilled dugout builders and handlers. During the 18th and 19th centuries they were employed by European traders as dugout handlers (Conzemius 1932; Roberts 1827). Today, dugouts are still the main means of transportation. The dugout canoe, locally called ***duri*** or ***pitpan,*** is carved out of logs from trees of *cedro macho* (188), kapok tree (52), mahogany (191), *nancitón* (99), *palo de sangre* (196 *Virola koschnyi*), *Santa María* (70), and Spanish cedar (189). *Nancitón* is preferred for its resistance to rot and marine borers or barnacles. On the other hand, mahogany and Spanish cedar, though less resistant to rot and marine borers, are much lighter.

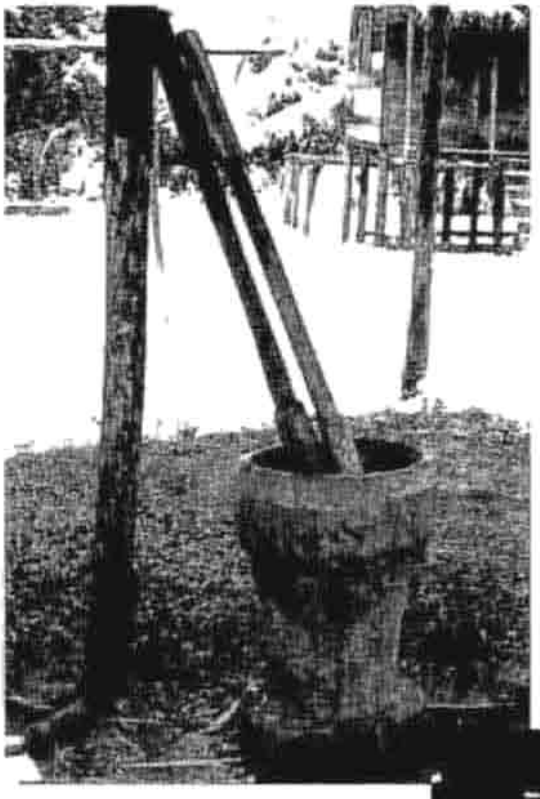

FIGURE 4.—Mortar and pestle (made from the wood of Tonka bean, ***ibu*** [*Dipteryx oleifera*]) used for grinding grains and in food preparation.

FIGURE 5.—The ***kubus*** is a rectangular table made from the wood of Tonka bean, ***ibu*** (*Dipteryx oleifera*). It is used for cooking; on its surface a mixture of clay and sand holds fires above the floor.

The Miskitu make baskets, guitars, hammocks, wood carvings, and other crafts mostly for household use. Carvings and other crafts are made from balsa (53), *cedro macho* (188), kapok tree (52), *laurel* (55), *mahoe* (176), mahogany (191), rosewood (124, 125, 126), and Spanish cedar (189). Fibers used for cordage, fishing line, and threads for sowing and weaving are obtained from *guácimo* (278), *mahoe* (176), *peine de mico* (277), trumpet tree (65), and wild pine (311 *Bromelia pinguin*). Bark cloth is obtained by retting the bark of wild fig (194 *Ficus insipida*) and subsequently bleaching it with the juice of sour orange (246 *Citrus aurantium*). Craft items are sold locally to visitors and are also taken to regional markets.

Dyes and tannins.—Prior to the introduction of synthetic dyes to eastern Nicaragua, the Miskitu relied on several native species as sources of dyestuff (Roberts 1827; Smutko 1985). The two most popular dyes were annatto (51) (NW) and indigo (141 *Indigofera suffruticosa*) (NW) used by the natives for dying bark cloth made from the inner bark of wild fig (194). Indigo is used for its blue pigment and annatto for its red, orange, or yellow dye, the color depending on the concentration of pigment. Annatto dye is also used as an insect repellent and/or body paint during rituals. Indigo dye is painted on the forehead of newborn babies and over windows and doors to ward off evil spirits. Today, these natural dyes remain in use, mostly by people living in isolated areas; Miskitu living in and around Western settlements use mostly synthetic dyes and fabrics. Dyes still in use include the following colors and their sources: black obtained from *leche amarilla* (72), brown from mahogany (191), gray from *guayabón* (77 *Terminalia oblonga*), red from *bija* (47), and yellow from annatto. These dyes are used primarily for coloring of clothing, crafts, and foods.

Tannins are obtained from the bark of black mangrove (282 *Avicennia germinans*), button mangrove (74 *Conocarpus erectus*), cocoplum (68 *Chrysobalanus icaco*), *guayabón* (77), *hoja chigüe* (93), *nancite* (169), red mangrove (224 *Rhizophora mangle*), and sapodilla (256). These extracts are used primarily for the curing of hides into leather.

Firewood.—Relatively few species are used for firewood (only 6% of all the species) considering that most tree species are potential fuel. Selection of firewood is based on properties such as burning time and moisture content, as well as availability. These selection criteria may explain the low number of species used for firewood. The Miskitu recognize certain species as possessing superior burning qualities for certain applications. The species with the best burning qualities are Caribbean pine (6), *guayabón* (77), locust (140 *Hymenaea courbaril*), *nancite* (169), pigeon bush (147 *Pentaclethra macroloba*), provision tree (54 *Pachira aquatica*), red mangrove (224), sapodilla (256), and Tonka bean (136). These are used when fires of high temperatures and long-burning times are required, such as in the making of sugar, distillation of alcohol, frying, and preservation of foods. Also, foods that are fried or prepared for long term storage require high temperatures to assure that they are thoroughly cooked to prevent spoilage. The five most widely used firewood species include Caribbean pine, red mangrove, pigeon bush, *nancite*, and provision tree. These five not only have good burning properties but are ubiquitous. Some species with inferior burning qualities are used as substitutes during emergencies, such as fiddlewood (*294 Vitex kuylenii*), *guácimo* (278), *indio desnudo* (60 *Bursera simaruba*), *leche amarilla* (72), *peine de mico* (277), and wild fig (194).

TABLE 6.—Food plants of the Miskitu of eastern Nicaragua arranged by origin and status.

Origin	Status					
	Domesticate	*Purchased*	*Semi-domesticate*	*Wild*	*Total*	%
New World Tropics	14	0	4	25	43	46
Old World Tropics	19	5	0	1	25	27
Mesoamerica	3	0	0	4	7	7
South America	4	2	1	0	7	7
Caribbean	4	0	1	1	6	6
Asia	3	0	0	0	3	3
Africa	2	1	0	0	3	3
Pantropical	1	0	0	0	1	1
Total	50	8	6	31	95	100
%	53	8	6	33	100	

Foods: Origin, dispersal, and systematics.—In spite of the fact that 66% of the food plants used by the Miskitu are species native to the New World tropics, most are not native to Nicaragua (Table 6). Prior to the introduction of domesticates, the Miskitu diet consisted mostly of wild collected root crops, game, and seafood (Bell 1989; Conzemius 1932; Exquemelin 1993; Roberts 1827). The most important staple foods are a select group of domesticates (see below), only three of which are native to Mesoamerica. The Miskitu were encouraged to adopt Old World crops by European settlers who considered native staple foods less desirable for consumption (Bell 1989).

The main staples of the Miskitu diet, with the exception of manioc (104), are Old World domesticates that include banana, breadfruit (193 *Artocarpus altilis*), coconut, dasheen (298), rice, and sugar cane. The arrival in the Americas of these six Old World food crops is fairly well understood, with the exception of coconut and dasheen (Crosby 1973; Heiser 1990; Hobhouse 1986; Sauer 1993). The first record of sugar cane in eastern Nicaragua is 1633 when it was introduced by the British as a gift to the Miskitu king. Subsequently the British went on to establish sugar cane (348) plantations at Cabo Gracias A Dios and Bluefields (Conzemius 1932; Smutko 1985).

Miskitu food plants are distributed among 46 plant families (Table 1). The family with the most species used is the Fabaceae (Table 7). The most important species in this family is the common bean which, along with root crops, are mainstays of the Miskitu diet. The remaining eight food plants of the Fabaceae are minor and are used only as incidental or famine foods. However, the Euphorbiaceae is actually the most important by virtue of the great dependence on manioc (104). The Miskitu are not unusual, however, given that manioc may be the most widely used root crop of indigenous groups of the New World lowland tropical forest (Heiser 1990; Schultes 1988).

TABLE 7.—The 17 plant families with the most species used by the Miskitu in eastern Nicaragua (rank ordered by total).

Family	Food	Medicinal	Other	Total
Fabaceae	9	38	28	75
Poaceae	4	10	21	35
Rubiaceae	3	20	2	25
Euphorbiaceae	3	13	4	20
Verbenaceae	2	13	4	19
Arecaceae	5	6	7	18
Solanaceae	5	11	2	18
Asteraceae	0	16	0	16
Malvaceae	2	8	5	15
Anacardiaceae	4	4	4	12
Apocynaceae	1	10	1	12
Malpighiaceae	2	7	3	12
Cucurbitaceae	4	4	2	10
Rutaceae	4	6	0	10
Musaceae	3	3	3	9
Piperaceae	2	6	0	8
Araceae	2	3	0	5

Palms are widely used, but do not constitute a major part of the dietary consumption of the Miskitu. The most important Miskitu palm species (Arecaceae) are the coconut, American oil palm (309), and peach palm (304). Coconut (307) endosperm is used for food, fodder, and cooking oil. Prior to the introduction of coconut, American oil palm and peach palm were the most important species of the palm family to the Miskitu (Conzemius 1932; Bell 1989; Roberts 1827). American oil palm was a very important source of food, fodder, and oil (Conzemius 1932; Bell 1989). American oil palm (309) extract is still used, though to a lesser extent than formerly, as cooking oil, lamp fuel, hair tonic, and medicine. Peach palm fruit is used primarily as an incidental food and also for making a beverage and medicine. African oil palm (308) and *huiscoyol* (305) are also used for food, beverage, and oil.

The Poaceae ranks second in overall species use and third in number of species utilized as food (Table 7). Among these are maize and rice; the latter is the most important as both a cash and food crop. As previously discussed, maize is cultivated primarily for making *chicha* and to a lesser extent for food, forage, and fodder. Maize was and still is considered a "foreign" crop identified with Spanish culture (Conzemius 1932; Helms 1971; Roberts 1827), but has lately gained wider acceptance among the Miskitu.

The Solanaceae is second (tied with the Arecaceae) in number of species utilized for food and sixth in overall species use. Nevertheless, this family is not a major food source for the Miskitu. Its importance is due to chile peppers (bird pepper [264] *Capsicum frutescens*, gourd pepper [263] *C. chinensis*, and sweet pepper [262] *C. annuum* var. *glabriusculium*), all used primarily as spices.

The Rutaceae (number three in species used for food) includes the citruses (grapefruit [247], lime [245], sour orange [246], and sweet orange [248]). Most are

native to southeast Asia and were introduced from the Canary Islands to Haiti by the Spaniards in 1516 and later to the American mainland (Sauer 1993) — and thus presumably to Nicaragua. Though citruses are seasonal foods, they contribute vitamins and minerals to the Miskitu diet, especially because the staple foods are nutritionally deficient in vitamins and minerals, but very high in protein and carbohydrates (Cattle 1976). Citruses are also cash crops of minor importance.

Forage.—The Miskitu use a variety of plants for animal feed. Forage plants used include both wild and domesticated species of the New World and Old World tropics. Feeding of small livestock (e.g., chickens, goats, pigs) around the compounds is done mostly by women. Large livestock (e.g., cattle, horses), on the other hand, are mostly fed by men. Most animals are fed ground copra, locally called "bran" in Creole, made from the dried endosperm of coconut, the ripe fruits of American oil palm (309), dried maize, and the grain and husks of rice. Large animals are allowed to graze openly during most of the day but are corraled in the evening and fed bran. Cattle are fed mostly maize and several other species of grasses (carpet grass *Axonopus compressus* [329], jungle rice *Echinochloa colonum* [335], *Ischaemum timorense* [338], dropseed *Sporobolus virginicus* [349], and guinea grass *Panicum maximum* [343]). Other species sometimes used for forage are banana, manioc, peach palm (304), plantain (324), and yams (*yautia* [302], cush-cush yam [317], dasheen [298]).

FIGURE 6.—Mr. Florentine Joseph, the most highly regarded Miskitu shaman in eastern Nicaragua.

FIGURE 7.—Mrs. Midora Christian, a Miskitu midwife from the village of Tasbapauni collecting leaves of *chasmol, **tataku*** (*Operculina pteripes*), a medicinal plant.

Medicines.—Ethnomedicinal information was obtained from shamans (Figure 6), midwives (Figure 7), and the general populace. Information gathered included the type of plant material used in the preparation of remedies, the affliction treated, the mode of preparation, and the mode of administration (Appendix). The Miskitu herbal pharmacopoeia consists of 310 species (Table 8). In contrast to most of the previous categories, about 80% of the medicinal plants are native to eastern Nicaragua. The majority of the medicinal plants are herbs (39%) and trees (29%) (Table 9). Almost two thirds of medicinals have some bioactive principle, including alkaloids (59%) and glycosides (5%) (Appendix). Materials used in medicinal preparations included bark, flowers, fruits, leaves, roots, sap, seeds, and stems (wood). In some instances the entire plant was utilized, root included. The most frequently utilized plant part was the leaf (218 species), followed by the bark (59 species; Table 10). These results are similar to those documented among the Garífuna by Coe and Anderson (1996a).

TABLE 8.—Origin and status of medicinal plants used by the Miskitu in eastern Nicaragua.

Origin	Status					
	Domesticated	*Purchased*	*Semi-domesticated*	*Wild*	*Total*	*%*
Native to Nicaragua	9	2	6	231	248	80
Introduced	27	9	6	4	46	15
Naturalized	11	0	1	4	16	5
Total	47	11	13	239	310	100
%	15	4	4	77	100	

TABLE 9.—Origin and life form of medicinal plants used by the Miskitu in eastern Nicaragua.

Origin	Life Form					
	Tree	*Shrub*	*Vine*	*Herb*	*Total*	*%*
Native to Nicaragua	66	34	44	102	246	80
Introduced	18	10	5	12	45	14
Naturalized	5	2	3	8	18	6
Total	89	46	52	122	309	100
%	29	15	17	39	100	

TABLE 10.—Parts used of medicinal plants of the Miskitu of eastern Nicaragua. Numbers tabulated from citations in column 5 of the Appendix.

Parts Used	Total
Leaf	218
Bark	59
Whole Plant	52
Root	50
Fruit	43
Stem	27
Sap	22
Seed	18
Flower	3

Herbal remedies are prepared as decoctions, poultices (mashed, crushed or

chopped plant part), infusions (steeping plant parts in hot water), juice (extract of any plant part), baths (plant parts are placed in hot water or boiled until steam is obtained), and syrups (plant part boiled to a thick paste). The two most frequently cited modes of preparation of herbal remedies are decoctions and poultices (Table 11). Decoctions are prepared by boiling plant parts in water then decanting the liquid. When cooled, the decoctions are presented to patients for them to drink. In other cases, the decoctions are used hot or cold to wash the afflicted area. In addition, on certain occasions the patient is bathed in the decoction. Poultices are also effective because they are made from plant exudates or plant parts that are placed directly on the afflicted area. Poultices allow direct delivery of the bioactive principle to the body. Materials prepared as decoctions or poultices are mixed with a variety of foods, spices, and pharmacological agents prior to being administered as medicinals.

TABLE 11.—Mode of preparation of medicinals used by the Miskitu of eastern Nicaragua. Numbers tabulated from citations in column 6 of the Appendix.

Mode	Total
Decoction	273
Poultice	63
Infusion	24
Juice	21
None	12
Bath	10
Syrup	3

TABLE 12.—Mode of administration of medicinal preparation of the Miskitu of eastern Nicaragua. Numbers tabulated from citations in column 7 of the Appendix.

Mode	Total
Oral	263
Topical	134
Bath	15
Inhalation	1

The most frequently encountered modes of administration are oral (263 species), and topical (134 species; Table 12). These two modes of administration may be preferred because they are most effective in delivering bioactive compounds to the body (Coe and Anderson 1996b).

Survey information indicated that the 12 most popular medicinal species used by the Miskitu were Christmas blossom (114 *Cassia alata*) (Figure 8), cowfoot (216 *Piper auritum*), fever grass (333 *Cymbopogon citratus*), *bejuco guaco* (39 *Mikania*

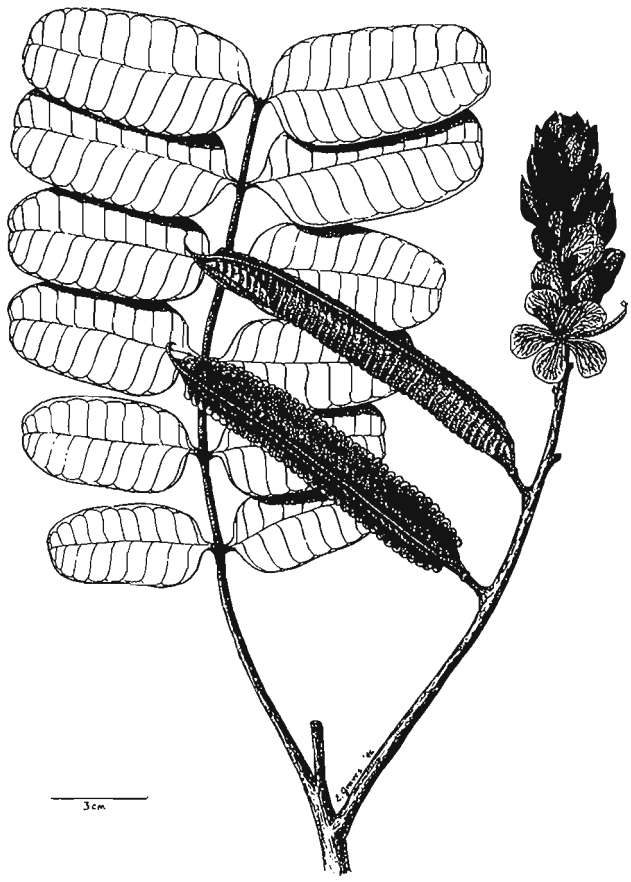

FIGURE 8.—Christmas blossom, ***kislin***, (*Cassia alata*, Fabaceae), the most widely used medicinal plant in the Miskitu pharmacopoeia.

cordifolia), fitsy bush (212 *Petiveria alliacea*), jackass bitters (41 *Neurolaena lobata*), John Charles (157 *Hyptis verticillata*), piss-a-bed (118), red head (233 *Hamelia patens*), balsam pear (91), vorvine (292 *Stachytarpheta jamaicensis*), and wild rice (259 *Scoparia dulcis*).

Spices and condiments.—The Miskitu use very few species for spices and condiments. Only 16 species were so documented, of which eight are wild; two are domesticates of the New World tropics, and six are domesticates of the Old World tropics. The native spices and condiments include annatto (51), barsely (158), catnip (288 *Lippia alba*), cowfoot (216), *culantro* (18 *Eryngium foetidum*), false thyme (289), *mejorana* (156), wild sage (56 *Cordia curassavica*), bird pepper (264), and gourd pepper (263) (the latter two are domesticates). The introduced Old World spices and condiments include cinnamon (160), cloves (202), garlic (320), ginger (353), nutmeg (195), and onion (319). Miskitu use of Old World spices and condiments is probably attributable to their extended contact with British and other Europeans. Of course, it is also true that the vast majority of spices used anywhere in the world are of Old World origin (Heiser 1990). Five of the 10 native spices and con-

diments used are collected from disturbed sites and the remaining five are grown in dooryard gardens. All of the Old World spices and condiments are purchased either from traveling (usually by boat) mestizos merchants or from markets.

DISCUSSION

The Miskitu are highly acculturated, but maintain many aspects of traditional plant use. The conservation of botanical knowledge has played an important role in Miskitu culture. When wage labor is no longer available, traditional agricultural practices serve as a source of food and money. Plants used by the Miskitu are diverse, including 353 species of which 310 are medicinals and 95 are food plants. As with the Garífuna (Coe and Anderson 1996a), the largest plant-use category by the Miskitu is as medicinals.

Not surprising, given that they live nearby to one another, the Miskitu and Garífuna use many of the same species (70% overlap) and exchange a considerable amount of ethnobotanical knowledge. This is attributable not only to the proximity of the groups (particularly around Pearl Lagoon) but also to the recent arrival of the Garífuna into eastern Nicaragua. That is, many Garífuna practitioners (i.e., herbalists, midwives, shamans) learned the use of this new flora as apprentices under Miskitu mentors. The 30% of species exclusive to the Miskitu are mostly species of pine savannas and the upland tropical moist forests absent from the lowland swamp forest ecosystem where the Garífuna reside. The greatest similarities in plant use between the two groups are among the food plants (Coe and Anderson 1996a). On the other hand, medicinal plant uses are very different. The similarity of food plants used by the Miskitu and Garífuna can be attributed to their equal dependence on a relatively small group of introduced domesticates. The differences in medicinals is determined primarily by the availability of the species, a factor promoted by the different habitats in which each group is centered.

An effect of acculturation is the widespread substitution of Western goods and medicines for native products and traditional healing. This has caused a decline in the number of local craftsmen and herbalists skilled in the use of local plant resources. For example, vessels made from gourds have been replaced by empty tin cans and plastic pails. Hand woven fish nets (Figure 9) and traps have been replaced by nylon gill nets and galvanized wire fish traps.

Ethnomedicine.—Miskitu plant lore is a blend of Amerindian and European knowledge passed from generation to generation by oral tradition (Conzemius 1932). The Miskitu were the first indigenous group of eastern Nicaragua to be introduced to Western medicine (in 1935 by the Moravian missionaries; Wenger 1945). In spite of this, they continue to rely on traditional medicine as a major source of health care, especially for non-life threatening illnesses. Western medicine is used mostly to treat serious illnesses (Helms 1971; Roberto Hodgson, personal communication, 1993).

The continued reliance of the Miskitu on herbal remedies for curing is reflected in the wide variety of plants used in their pharmacopoeia (Appendix). These uses remain despite the introduction of Western medicine and the negativity of missionary groups towards traditional cures. Healing with herbal medicine or Western

FIGURE 9.—Miskitu fisherman weaving a nylon net.

medicine among the Miskitu is generically called ***sika***. Those who cure with herbal remedies are collectively known as ***sika uplika***, or medicine people. A herbalist is referred to as a ***daktar*** in Miskitu. A ***daktar*** treats illnesses of natural origin such as cold, dysentery, fever, malaria, pain, and snakebite. Practitioners specialized in treating supernatural illnesses — believed to be caused by spirits — are called ***sukia***. Supernatural illness are treated with a combination of herbal remedies and rituals. ***Sukias*** are viewed as evil heathens by Christian Miskitu and Westerners in general. Today, only a few ***sukia*** are still practicing because of persecution by missionaries. However, ***daktars*** can be found in most communities and are widely respected for their abilities.

Miskitu healers protect their ethnomedicinal knowledge for several reasons. Some believe that sharing their herbal knowledge with others will result in the loss of their healing powers. Others believe that medicinals are owned by a supernatural being called ***dawan***, from whom consent is needed and monetary tribute must be paid for the use of medicinals. Consent from ***dawan*** is requested through prayers, and tributes are made by burying money at the base of a plant prior to its collection. Some healers claim that herbal remedies are private property and charge large sums of money for information. These are indigenous concepts of intellectual property rights.

Herbal remedies are sometimes mixed with Western pharmaceuticals to increase their efficacy. On several occasions Coe witnessed practitioners mixing aspirin with juice extracted from tree of life (85) for treatment of pain. Field data indicate that the Miskitu make the most use of modern pharmaceuticals in their herbal remedies (Coe, personal observation). This is perhaps due to comparatively early exposure to Western medicine (Wenger 1945), and to their continued contact with Western culture.

The two most feared illnesses among the Miskitu are ***bulpis*** — loss of skin pigmentation — and ***grisi siknis*** — possession of females by evil spirits. ***Bulpis*** afflicts almost everyone living in the rural areas of eastern Nicaragua. Coe observed victims afflicted with ***bulpis*** among the Garífuna, Mestizo, Miskitu, Rama, and Sumu of southeastern Nicaragua. However, it is more prevalent among the Miskitu of northeastern Nicaragua (Conzemius 1932; Coe, personal observation). The disease is first evidenced as a small area of skin depigmentation that eventually spreads over the entire body. Western trained physicians believe ***bulpis*** is caused by a bacterial infection that destroys skin melanin (Roberto Hodgson, personal communication, 1992). However, no Western medical treatment or cure has been found for this illness. Although I was not able to document a traditional cure for ***bulpis***, some healers allege to have cured victims in the early stages of the disease. Generally, once contracted, the disease remains for life. People that contract this disease are treated like lepers. Due to the social stigma associated with ***bulpis***, victims usually remain secluded, especially in advanced stages of depigmentation. Most people believe the disease is transmitted by food or beverages. For this reason, extreme care is taken not to ingest foodstuffs from unknown sources. Each healer has a unique herbal remedy for treatment of ***bulpis***. Remedies are administered orally and/or topically as decoctions and poultices. Medicinals most frequently cited as ingredients in remedies are balsam pear (91) leaves, bamboo (331) leaves and stem, Christmas blossom (114) leaves, dodder (79 *Cuscuta americana*), jackass bitters (41) leaves, *leche amarilla* (72), *nancite* (169) bark, red mangrove (224) bark, and sea beans (137 *Entada gigas*) cotyledons.

The victims of ***grisi siknis*** are believed to be possessed by evil spirits or by the devil. While growing up in eastern Nicaragua, Coe had several opportunities to observe women afflicted by this illness. Though ***grisi siknis*** is a gender biased illness (Dennis 1981), no evidence of cultural bias exist (i.e., afflicting only Miskitu females); the victims Coe observed were of several ethnic backgrounds (i.e., Creole, Miskitu, Sumu). The afflicted woman is in a state of hysteria characterized by periods of convulsions and trances during which she speaks to the spirits in tongues. Depending on the severity, it takes four-six men to restrain an afflicted person. In the worst cases, victims are tied up to prevent them from self-injury. Coe observed a ***sukia*** prepare a treatment for ***grisi siknis*** that consisted of a decoction and a poultice made from *culantro* (18), fitsy bush (212), garlic (320), and rubbing alcohol. The victim was given a bath and the decoction was rubbed over the entire body. Also a poultice is tied to the victims head or held over the nose for inhalation of vapors. The treatment is usually given for four to six days, but in severe cases the treatment continues for up to two weeks.

CONCLUSION

Miskitu individuals retain a broad-based knowledge of plants used for food, medicine, and other use. Older individuals are more knowledgeable than younger individuals regarding medicinal plant use. On the other hand, younger individuals are more knowledgeable than older individuals regarding food plants used as incidental foods. Overall, men are more knowledgeable than women with regard to the use of wild species — mostly trees, shrubs, and vines. On the other hand, women are more knowledgeable than men regarding the uses of species grown in dooryard gardens and around households; these are primarily herbaceous species. The passage of botanical knowledge from generation to generation among the Miskitu underscores the importance of plant resources in Miskitu culture for both subsistence and well-being.

Eastern Nicaragua remains largely unknown in terms of the flora, and consequently the potential for the discovery of foods and medicines. Wild edible crops and medicinal species require further evaluation of their nutritional and pharmacological properties. Also, investigations are needed to determine the productivity, harvestability, and regenerability of plants used by the Miskitu. The protection and long term conservation of the forest in eastern Nicaragua can only be achieved, we believe, by integrating the needs and concerns of the indigenous population into plans for the exploitation and conservation of these resources.

The way people perceive and use the resources of their environment is directly related to their culture (Anyinam 1995). Once cultural belief systems are disrupted by external forces, attitudes and behavior of peoples toward a positive relationship with nature erode rapidly (Anyinam 1995). The Miskitu culture continues to be fragmented and threatened by development pressures. Traditional medicine acquired over thousands of years is steadily disappearing. We believe that the preservation of Miskitu culture can contribute to the preservation and conservation of the remaining less-disturbed forests in eastern Nicaragua because of the close relationships between native peoples and their environment.

NOTES

[1] According to CIDCA (1985) the Miskitu alphabet consists of the following letters: ***a, â, b, d, g, h, i, î, k, l, m, n, p, r, s, t, u, û, w, y***; vowels with diacritical marks are pronounced with a long duration, e.g., ***kâpi*** is pronounced "kaapi," ***sîka*** is pronounced "siika," and ***kûka*** is pronounced "kuuka".

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APPENDIX: MISKITU PLANTS AND THEIR USES

Key:
[1]Scientific name of the angiosperm families follows Cronquist (1981); the order within dicots and monocots of families, genera, and species is alphabetical
[2]Common Names: c = Creole; m = Miskitu; s = Spanish; spelling follows CIDCA (1985, 1986, 1989), Heath (1913, 1927, 1950), Heath and Marx (1961), and Smutko (1985)
[3]Uses: F = Food; M = Medicine; O = other (construction, crafts, fiber, dye)
[4]Medicinal Applications: A = Aches and Pains; B = Bites and Stings (snake, scorpion, insects); C = Childbirth and Pregnancy; D = Diarrhea; E = Emetic; F = Fever; G = Digestive; (stomach ache, ulcers, etc.); H = Hypertension; I = Infections; J = Diabetes; K = Diuretic; L = Respiratory & Pulmonary Disorders (cold, coughs, etc.); M = Malaria; N = Burns; O = Abortifacient; P = Worms and Intestinal Parasites; Q = Astringent; R = Rituals; S = Skin Rashes and Sores; T = Tonic and Anemia (blood fortifier); U = Cuts and Hemorrhage; V = Venereal Diseases; W = Female Disorders (Menstruation, Hemorrhage); X = Purgative and Laxative; Y = Constipation; Z = Tooth Extraction
[5]Material Used: B = Bark; C = Flower; E = Seed; F = Fruit; L = Leaf; M = Stem; P = Whole Plant; R = Root; S = Sap
[6]Mode of Preparation: (See section on medicinals for further explanation.) B = Bath; D = Decoction; I = Infusion; J = Juice of crushed parts; N = None; P = Poultice; S = Syrup
[7]Mode of Administration: (See section on medicinals for further explanation). B = Bath; I = Inhalation; O = Oral; T = Topical
[8]Alkaloid/Glycoside Test. Alkaloid tests: N = not tested and no literature search; -L = none in literature; +L = Alkaloids reported in the literature; + (present) or 0 (absent) in Coe tests (see Methods and Materials). Glycoside tests: A limited literature search for glycoside was conducted only for those species that tested negative for alkaloids; /+L = present, /0 = none reported
[9]Voucher Number: C = common, introduced and or naturalized, one or no voucher collected; N = common native, only one voucher collected for all groups; NV = No voucher; P = Purchased in regional markets and stores in larger towns, not grown in eastern Nicaragua; # = F.G. Coe accession numbers
a=Cambie and Ash 1994; b=Duke 1994; c=García-Barriga 1992; d=Hegnauer 1962-1994; e=Morton 1981, 1987; f=Raffauf 1996; g=Tyler, Brady, and Robbers 1985; h=Willaman and Hui-Lin Li 1970; i=Willaman and Shubert 1961

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
MICROPHYLLOPHYTA, GLOSSOPSIDA								
SELAGINELLACEAE								
1. Selaginella sertata Spring	***waha bîbi (m)***	M	F,I	P	D	O	+	4267
PTERIDOPHYTA, FILICOPSIDA								
ADIANTHACEAE								
2. Acrostichum aureum L.	***limi dusa (m)***	M,O	A,F,Y	L,R	D	O	+,+La	3537

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
POLYPODIACEAE								
3. Pityrogramma calomelanos (L.) Link	***waha pihni (m)***	M,O	F	L,R	D	O	0/0	4059
SCHIZAEACEAE								
4. Lygodium heterodoxum Kuntze	***unta kyuca (m)***	M,O	B,S	L	D	O,T	0/0	2770
5. L. venustum Sw.	***watawa (m)***	M,O	B,S	L,M	D	O.T	0/0	4459
CONIFEROPHYTA, CONIFEROPSIDA								
PINACEAE								
6. Pinus caribaea Morelet	***awas (m)***	M,O	A,L	S	P	I,T	N/0	4430
MAGNOLIOPHYTA, MAGNOLIOPSIDA (DICOTS)								
ACANTHACEAE								
7. Blechum brownei Juss.	***inma paskaia (m)***	M	B,D	L,P	D	O	+	3706
AMARANTHACEAE								
8. Amaranthus spinosus L.	***auia kiaka (m)***	M	A,F,I	L,P	D	O	+Lb	3932
ANACARDIACEAE								
9. Anacardium occidentale L.	***kasuh, kasau (m)***	F,M,O	A,D,S	B,L	D	O,T	+	4460
10. Mangifera indica L.	***manggu, mankru (m)***	F,M,O	A,D,S	B,L	D	O,T	+	4461
11. Spondias mombin L.	***pahara (m)***	F,M,O	D,F,I,S	B,L	D	O	0/0	2274
12. S. purpurea L.	***pahara (m)***	F,M,O	D,F,S	B,L	D	O	0/0	2924
ANNONACEAE								
13. Annona sp.	no local name	M	D	L	D	O	0/0	2133
14. A. glabra L.	***punu (m)***	F,M	A,C,L	B,E,L	D,P	O,T	+Lh	2914
15. A. muricata L.	***Saput (m)***	F,M	C,D,F	B,E,L	D	O	+Lh	2900
16. Cananga odorata L.	***ilang-ilang (m)***	M,O	R	B,C,R	B,D,I	B,T	+La	2905
17. Guatteria amplifolia Triana & Planch.	***pispis (m)***	M	D,V	B,L	D	0	+	2915
APIACEAE								
18. Eryngium foetidum L.	***bilta, kiasaura (m)***	F,M	D,G,L,P,R	L	D,I	B,O	0/+Le	3454

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
APOCYNACEAE								
19. Allamanda cathartica L.	*tangni lalahni (m)*	M,O	E,X	F,L,S	D	O	+,+Ld	2823
20. Echites umbellata Jacq.	*bins unta kyuka (m)*	M	B	R	D	O	+	3490
21. Lacmellea standleyi (Woodson) Monach.	*utbaia utbaia (m)*	F,M	D	L	D	O	+	3412
22. Mandevilla hirsuta (A. Rich.) Schum.	*sitan inma (m)*	M	F,I,V	L	D	O	0/0	3367
23. M. villosa (Miers) Woodson	*unta kyuka (m)*	M	F	L	D	O	0/0	2208
24. Odontadenia puncticulosa (Rich.) Pull.	*latawira (m)*	M	B	L	D	O	+	2142
25. Rhabdadenia biflora (Jacq.) Müll. Arg.	*tataku (m)*	M	F,S	L	D	O,T	0/0	4066
26. Tabernaemontana arborea Rose ex Donn. Sm.	*aras mahbra (m)*	M	F,X	L,S	D	O	+Lc	3296
27. T. chrysocarpa Blake	*buhksa mahbra (m)*	M	F,I	L,S	D	O	+	4462
28. Thevetia gaumeri Hemsl.	*yul mahbra (m)*	M	A,F,I	E,L,S	D	O	+	4451
ARISTOLOCHIACEAE								
29. Aristolochia trilobata L.	*kuntribu (m)*	M,O	B,G,H,L,T	L,P	D,I	O	+,+Ld	2661
ASCLEPIADACEAE								
30. Asclepias curassavica L.	*piuta saika (m)*	M	B,F,P,S	L	D,P	O,T	+,+Lh	2677
ASTERACEAE								
31. Bidens pilosa L.	*lalahni tangni (m)*	M	L	L	D	O	+Lh	2652
32. B. riparia HBK	*sîka tara (m)*	M	L	L	D	O	+	3231
33. Clibadium pittieri Greenm.	*inma saura (m)*	M	S,T	L,P	D	O,T	0/0	4346
34. Elephantopus spicatus Juss. ex Aubl.	*aktar, aras inma (m)*	M	A,F	L	D	O,T	+	3564
35. Eleutheranthera ruderalis (Sw.) Schltdl.	*upla saura (m)*	M	F,S	L	D	O,T	+	4189
36. Florestina latifolia (DC.) Rydb.	*lilia sara (m)*	M	P	L,P	D	O	0/0	4349
37. Matricaria chamomilla L.	*twî (m)*	M	G	P	D	O	+Lg	2653
38. Melampodium divaricatum (Rich. ex Pers.) DC.	*pianka (m)*	M	D,G	P	D	O	+	4135
39. Mikania cordifolia (L.f.) Willd.	*guahku (m)*	M	A,B,F	L,M,P	D,P	O,T	+,+Lh	+3315
40. Milleria quinqueflora L.	*mairin tangni (m)*	M	F,S	L,P	D	O	+	4351
41. Neurolaena lobata (L.) R. Br	*yâkal satka (m)*	M	F,H,M,P,S	L	D	O,T	+Ld	2552
42. Pluchea odorata (L.) Cass.	*pusa pain (m)*	M	L,P	L,M	D	O	+Lg	2042
43. P. purpurascens (Sw.) DC.	*piaka pauni (m)*	M	L,P,R	L,P	B,D	B,O	+	4165
44. Synedrella nodiflora (L.) Gaertn.	*sabatana (m)*	M	D,L,U	L,P	D	O	+Lh	3651
45. Tagetes erecta L.	*pabula tangni (m)*	M	A,L,W	L,P	D	O	+Lg	2762
46. Wedelia trilobata (L.) Hitchc.	*kaisinpata (m)*	M	B,F,I,L,W	F,L,M	D	O	0/0	4208

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
BIGNONIACEAE								
47. Arrabidaea chica (Humb. & Bonpl.) Verl.	*sirisiri (m)*	M,O	D,Q,S,T	L	D	O	+Lc	3760
48. Crescentia cujete L.	*kahmi, kramuta (m)*	M	D,F,L	F,L	D,S	O	0/+Lc	2654
49. Macfadyena unguis-cati (L.) A.H. Gentry	*pûs asmala (m)*	M,O	F,U	L,M	D	O	+	2368
50. Tabebuia rosea (Bertol.) DC.	*auka (m)*	M,O	D,F	B	D	O	N/0	2672
BIXACEAE								
51. Bixa orellana L.	*aulala, tmariñ (m)*	F,M	D,L,N,S	E,L	D,I	O,T	+Lb	2855
BOMBACACEAE								
52. Ceiba pentandra (L.) Gaertn.	*sinsin (m)*	M,O	E,K,Q	B	D	O	0/0	2868
53. Ochroma pyramidale (Cav. ex Lam.) Urb.	*puhlak (m)*	O	–	–	–	–	–	2916
54. Pachira aquatica L.	*pukru (m)*	F,M	D,S,T	B	D	O	0/0	2881
BORAGINACEAE								
55. Cordia alliodora (Ruiz & Pav.) Oken	*tât auhya (m)*	M,O	S,T	E,L	D,P	O,T	-L/0	2922
56. C. curassavica (Jacq.) Roem. & Schult.	*riskupata (m)*	F,M	A,D,F,H	L	D	O,T	+	2890
57. C. inermis (Mill.) I.M. Johnst.	*kiasaika (m)*	M	A,F	L	D	O	0/0	4340
58. C. spinescens L.	*riskupata*	M	A,C,F,H	L	D	O	+	3875
59. Heliotropium indicum L.	*misri wâika (m)*	M	B,D,S	L,P	D	O	+Lh	4123
BURSERACEAE								
60. Bursera simaruba (L.) Sarg.	*limsi, daktar (m)*	M,O	I,S,T	B	D	B,O	0/0	3545
61. Protium panamense (Rose) I.M. Johnst.	*dus mâ damni (m)*	M	A,P	B	D,P	O,T	0/0	2475
62. Tetragastris panamensis (Engl.) Kuntze	*sahkal (m)*	O	–	–	–	–	–	4383
CARICACEAE								
63. Carica papaya L.	*tawas, tuas, twas (m)*	F,M	P,S,U,Y	F,L,S	D,J	O,T	+Lg	NV
CARYOPHYLLACEAE								
64. Drymaria cordata (L.) Willd. ex Roem. & Schult.	*ispara saika, sumu mairen (m)*	M	A,L	P	D	O,T	+Ld	4437
CECROPIACEAE								
65. Cecropia peltata L.	*plan, plang (m)*	M	A,F,W	L	D	O	+Lc	3462
CELASTRACEAE								
66. Salacia belizensis Standl.	*lasap (m)*	F,M	A,T	P	D	O,T	0/0	3366
CHENOPODIACEAE								
67. Chenopodium ambrosioides L.	*inma tahpla (m)*	M	P	L	J	O	+Lb	4452

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
CHRYSOBALANACEAE								
68. Chrysobalanus icaco L.	*bihu, tawa (m)*	F,M,O	D,Q	B,R	D	O	0/0	2925
69. C. pellocarpus G. Mey.	*bihun (m)*	F,M	D,Q	B,R	D	O	0/0	3041
CLUSIACEAE								
70. Calophyllum brasiliense Cambess	*krasa (m)*	M,O	A,L	B,S	D	O,T	-L/0	3048
71. Garcinia mangostana L.	*mangosteen (c)*	F,M	A	B,S	N,P	T	+Le	NV
72. Symphonia globulifera L.f.	*samu (m)*	M,O	A,S	B,S	D,P	T	+	3075
COMBRETACEAE								
73. Combretum fruticosum (Loefl.) Stuntz	*kalila kûm (m)*	M	D,Q	B,F,L	D	O	0/0	2393
74. Conocarpus erectus L.	*mankru sirpi (m)*	M,O	D,Q	B,L	D	O	0/0	4355
75. Laguncularia racemosa (L.) Gaertn.	*mankru pihni (m)*	M,O	D	B	D	O	0/0	2678
76. Terminalia catappa L.	*amans (m)*	F,O	–	–	–	–	–	2708
77. T. oblonga (Ruiz & Pav.) Steud.	*labina (m)*	O	–	–	–	–	–	4388
CONNARACEAE								
78. Connarus lambertii (DC.) Sagot	*tuktuk (m)*	M,O	D,Q	B,L	D	O	+	3801
CONVOLVULACEAE								
79. Cuscuta americana L.	*unta kyuka (m)*	M	S	L,M	D,P	T	+	2918
80. Ipomoea batatas (L.) Lam.	*tawa (m)*	F,M	U	L	D	T	+	3637
81. I. mauritiana Jacq.	*latawira (m)*	M	B,S	L	D,P	O,T	0/0	4061
82. I. pes-caprae (L.) R.Br.	*kâbu unplâplapra (m)*	M	F,S,T	L	D,P	O,T	+,+Lg	2907
83. Merremia discoidesperma (Donn. Sm.) O'Donell	*wail amans (m)*	M	S,U	L,M	D	T	+	2850
84. Operculina pteripes (G. Don) O'Donnell	*bitta tataku, latawira, tataku (m)*	M	B,U	L	P	T	+	2884
CRASSULACEAE								
85. Kalanchoe pinnata (Lam.) Pers.	*bradutki (m)*	M	A,L	L	D,P	O,T	0/+Lb	3434
CUCURBITACEAE								
86. Citrullus lanatus (Thunb.) Mansf.	*raiapisa, rayapisa (m)*	F	–	–	–	–	–	2717
87. Cucurbita moschata (Duchesne ex Lam.) Duchesne ex Poir.	*iwa (m)*	F	–	–	–	–	–	2746
88. Fevillea cordifolia L.	*mukula (m)*	M	A,B,E,G	E	I,P	O,T	0/0	3920
89. Lagenaria siceraria (Molina) Standl.	*pispis (m)*	M,O	G,S,X	L	D	O,T	0/0	2732
90. Luffa cylindrica (L.) M. Roem.	*kahmi (m)*	M,O	A,P	L	D,P	O,T	+,+Ld	3402

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
91. Momordica charantia L. M,S,T	*tasplira,twasplira (m)*	F,M	A,C,H,I,J,L,	L,M	D	O,T	+,+Lh	3633
92. Sechium edule (Jacq.) Sw.	*makula (m)*	F	–	–	–	–	–	2721
DILLENIACEAE								
93. Davilla kunthii A. St. Hil.	*yahal (m)*	M,O	D,Q	B,L,M	D	O	0/0	2706
EUPHORBIACEAE								
94. Acalypha arvensis Poepp. & Endl.	*blâ sîka (m)*	M	B,S	L,P	D	O,T	0/+Ld	3642
95. Amanoa potamophila Croizat	*siuli saura (m)*	M,O	X	F	D	O	0/0	4093
96. Croton punctatus L.	*riskupata (m)*	M	F,I	F,L,R	D	O	+Lg	4059
97. Euphorbia hyssopifolia L.	*bla saika (m)*	M	A,C,I	L,P	D	O	0/0	4038
98. E. thymifolia (L.) Millsp.	*mahkira, talalaya (m)*	M	A,C,I	L,P	D	O	+Lg	2903
99. Hyeronima alchorneoides Allemão	*nancitón (s)*	O	–	–	–	–	–	4364
100. Jatropha curcas L.	*pisik (m)*	M	D,F,P,V,X	L,S	D	O	+Lh	2749
101. J. gossypiifolia L.	*twis twis (m)*	M	D,I,S,X	L	D	O	+Lh	4360
102. J. hastata Jacq.	*pisik (m)*	M,O	F,X	L	D	O	0/0	5322
103. J. urens L.	*pisik (m)*	M,O	C,I,U	L,R	D	O	0/0	2789
104. Manihot esculenta Crantz	*yauhra (m)*	F,M	A,D,F	L,R	D	O	0/+La	3269
105. Pedilanthus tithymaloides (L.)Poit.	*birdflower (c)*	F,M	A,O,W,X	L,R,S	D,N	O	-L/0	2783
106. Phyllanthus acidus (L.) Skeels	*kumpira waitni (m)*	F,M	F,T	L	D	O	+Ld	2751
107. Ricinus communis L.	*sîka tara (m)*	M	A,F,X	E,L	D,P	O,T	+Lh	3507
FABACEAE								
108. Abrus precatorius L.	*bins silbyara (m)*	M	F	F,L	D	O	+Lh	4033
109. Andira inermis (Wright) HBK	*piuta lang lang (m)*	M	F,P,X	B	D	O	+Lh	2786
110. Arachis hypogaea L.	*pinda (c)*	F	–	–	–	–	–	2752
111. Bauhinia guianensis Aubl.	*urus mina-mangka (m)*	M	T	B,M	D	O,T	0/0	2734
112. Cajanus cajan (L.) Millsp.	*bins tikbus (m)*	F,M	L,S	F,L	D	O,T	+,+Lc	3363
113. Canavalia maritima (Aubl.) Thouars	*tangni kâbu un(m)*	M	F,X	E,L,R	D	O	+,+Lg	4229
114. Cassia alata L.	*kislin, krismis tangni sus saika (m)*	M	D,H,I,P,S,T,X	F,L	B,D,J,P	B,O,T	+,+Lh	3204
115. C. fistula L.	*bisbaia dapa (m)*	M	L	F	D,N	O	+Lg	2787
116. C. grandis L.f.	*bisbaira mina (m)*	F,M	P,S,T,X	F,L	D,J,S	O,T	0/+Lb	3440
117. C. hirsuta L.	*tasma (m)*	M	F,W	E,L	D	O	+Lc	3586
118. C. occidentalis L.	*singsingya (m)*	F,M	F,G,I,L	L,P,R	D,J	O,T	+,+Lg	3627

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
119. C. reticulata Willd.	*sus saika (m)*	M	A,B,I,S	L,R	D	O	+	2799
120. C. tora L.	*bins sirpi (m)*	F,M	F,X	L	D	O	0/0	3404
121. C. undulata Benth.	*cuscus (m)*	M	F,X	L,R	D	O	0/0	3291
122. Crotalaria retusa L.	*saihka inma (m)*	M	S,U,X	L	D,P	O,T	+Lh	4227
123. C. verrucosa L.	*pyuta bastar (m)*	M	S,X	L	D	O,T	+Lh	3720
124. Dalbergia brownei (Jacq.) Urb.	*rusul (m)*	M,O	D,Q,S	B,L,M	D	O,T	0/0	4082
125. D. hypoleuca Pittier	*rusul (m)*	O	–	–	–	–	–	4325
126. D. tucurensis Donn. Sm.	*rusul (m)*	O	–	–	–	–	–	4391
127. Desmodium adscendens (Sw.) DC.	*dusa karnira (m)*	M	A,G,I,S	L,P,R	D,I	O	+	4118
128. D. barbatum (L.) Benth. & Oerst.	*latawira (m)*	M	A,I,S,V	L,R	D	O	0/0	3310
129. D. canum (J.F. Gmel.) Schinz & Thell.	*latawira saika (m)*	M	A,F,I,S,V	L,R	D	O	+	4043
130. D. glabrum (Mill.) DC.	*latawira, latawira saika (m)*	M	A,F,I,S	L,R	D	O	0/0	2535
131. D. triflorum (L.) DC.	*latawira (m)*	M	A,I	L,R	D	O	+	2767
132. Dialium guianense (Aubl.) Sandwith	*slim (m)*	M,O	D,Q,S	B,L	D	O,T	-L/0	4392
133. Dioclea sp.	*sûla nâkra (m)*	M	A,S	L	D,P	T	+	2865
134. D. megacarpa Rolfe	*inma bylyanhta (m)*	M,O	A,S	L	D,P	T	+	3243
135. D. reflexa Hook. f.	*aras nâkra (m)*	M	A,S	L	D,P	T	+Lh	2840
136. Dipteryx oleifera (Benth.) Taub.	*ebu, îbu (m)*	F,M,O	A,Q,Z	B,F	D,P	O,T	+Ld	2326
137. Entada gigas (L.) Fawc. & Rendle	*sûla nâkra (m)*	M	A,S	F	P	T	0/0	4356
138. Enterolobium cyclocarpum Griseb.	*tuburus (m)*	O	–	–	–	–	–	4374
139. Gliricidia sepium (Jacq.) Steud.	*lulakira, pispis (m)*	M,O	I,S	B,L	D,P	T	0/+Lb	4253
140. Hymenaea courbaril L.	*laka, lawa (m)*	M,O	A,D,F,L	B,S	D,P	O,T	0/0	3417
141. Indigofera suffruticosa Mill.	*blû (m)*	M,O	B,F,R	P,S	D	O,T	+Lg	2773
142. Inga edulis G. Martens	*bribri (m)*	F,O	–	–	–	–	–	2776
143. Lonchocarpus latifolius (Willd.) HBK	*yul tât (m)*	M,O	S	F,R	D	T	0/0	4070
144. L. pentaphyllus (Poir.) DC	*lî tât (m)*	O	–	–	–	–	–	2567
145. Mimosa pudica L.	*king aula (m)*	M	A,G,P,W	L,M,P,R	D	O	+,+Lh	2254
146. Mucuna urens DC.	*kuakua, kwakwa (m)*	M	A,B,G,S	S	D,P	T	+Lh	2870
147. Pentaclethra macroloba (Willd.) Kuntz	*krikaika (m)*	M,O	B,F,S	B	D	O,T	+	2446
148. Phaseolus vulgaris L.	*bins, snek, snik (m)*	F	–	–	–	–	–	2758
149. Pithecolobium dulce (Roxb.) Benth.	*twitwi (m)*	M,O	D,Q	B	D	O	+Lh	3766
150. P. recordii (Britton & Rose) Standl.	*siksa mâ (m)*	M,O	D,Q	B	D	O	0/0	4076

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151. Tamarindus indica L.	*ambran (m)*	F,M,O	I,P,X	B,F,L	D	O	+Lb	2783
152. Vigna luteola (Jacq.) Benth.	*liwa saika (m)*	M	L	P	D	O	0/0	4171
FLACOURTIACEAE								
153. Casearia aculeata Jacq.	*pyuta piaia (m)*	M,O	S	L	D,P	T	+	3859
GENTIANACEAE								
154. Coutoubea spicata Aubl.	*liwa sâkaia (m)*	M	A,F	L	D	O	0/0	2587
GESNERIACEAE								
155. Solenophora tuerckheimiana Donn. Sm.	*asdura pata (m)*	M	A,S	L,P	D,P	T	0/0	3940
LAMIACEAE								
156. Hyptis capitata Jacq.	*kua mahbra (m)*	M	G,L	L,P	D	O	0/0	3561
157. H. verticillata Jacq.	*wahiwin saika (m)*	M	H,I,L,S	L,R	D,I	O,T	+	2671
158. Ocimum micranthum Willd.	*sîka kaira (m)*	F,M	A,F,G,I,R	L	D,I	O,T	0/0	2234
LAURACEAE								
159. Cassytha filiformis L.	*wiak wani (m)*	M	A,P	P	D,P	O,T	+Lh	4174
160. Cinnamomum zeylanicum Blume	*cinnament (c)*	F,M	D,G,T	B,M	D	O	0/0	2763
161. Persea americana Mill.	*sikia (m)*	F,M	D,L,O,W	B,E,L	D	O	+Lg	3356
162. Phoebe sp.	*no local name*	M	A	F,L	D	O	+	4179
LOGANIACEAE								
163. Spigelia anthelmia L.	*liwa sâkaia (m)*	M	P	P	D	O	+,+Lh	2820
LORANTHACEAE								
164. Struthanthus cassythoides Millsp. ex Standl.	*tati sau (m)*	M	A,B,L,S	L,P	D,P	O,T	+	3850
LYTHRACEAE								
165. Cuphea mimuloides Cham. & Schltr.	*mâia (m)*	M	D,T	P	D	O	0/0	4055
MALPIGHIACEAE								
166. Banisteriopsis argentea C.B. Rob. ex Small	*samu (m)*	M,O	S	B,L,M	D	T	+Lc	2896
167. B. cornifolia C.B. Rob. ex Small	*sîka wani (m)*	M	B,S	B,L,M	D	T	+	3311
168. Brysonima sp.	*krabu (m)*	F,M,O	Q	B	D	O	+	3376
169. B. crassifolia (L.) HBK	*krabu (m)*	F,M,O	A,D,Q	B	D	O	+	2857
170. Heteropteris multiflora (DC.) Hochr.	*twisa târa (m)*	M	L,Q	L	D	O	+	3481
171. Hiraea quapara (Aubl.) Morton	*bibi rakaika (m)*	M	S,U	L	D	T	+	2139
172. Stigmaphyllon pseudopuberum Nied.	*pyuta wâkia (m)*	M	Q,V,Z	L	D	O,T	0/0	3796

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MALVACEAE								
173. Abelmoschus esculentus (L.) Moench	*kataramas (m)*	F,M	C	L	D	O	+Lg	4440
174. Hibiscus bifurcatus Cav.	*dinar tangni (m)*	M,O	C,F,L,S,W	F,L	D	O	+	3475
175. H. sabdariffa L.	*suril (m)*	F	–	–	–	–	–	2745
176. H. tiliaceus L.	*sani (m)*	M,O	F,Y	B,L	D	O	+	2189
177. Kosteletzkya pentasperma (Bertol.) Griseb.	*mairin tangi (m)*	M,O	S,U	L	D,P	T	+	3529
178. Pavonia rosea Schltr.	*tangni sirpi (m)*	M	I,V,W	R	D	O	+	4151
179. Sida acuta Burm. f.	*aras kauka, dinar, yu tangni (m)*	M,O	A,C,L,W	L,P	D	O	+Lh	3977
180. S. rhombifolia L.	*brum sirpi, dinar (m)*	M,O	A,C,F,L	L	D	O	+Lh	3587
181. S. spinosa L.	*yu tangi sirpi (m)*	M	D,I,S	L	D	O,T	+Lh	2251
MELASTOMATACEAE								
182. Acisanthera quadrata Pers.	*asdura pata, sari sirpi (m)*	M	F	L,M	D	O	0/0	3245
183. Miconia albicans (Sw.) Triana	*blú sirin (m)*	F,M,O	S	L	D	T	0/0	2656
184. M. laevigata (L.) DC.	*sirin (m)*	M,O	S	L	D	T	0/0	4309
185. Nepsera aquatica (Aubl.) Naudin	*siri (m)*	M	S	F,L	D	T	+	3375
186. Tibouchina aspera Aubl.	*sari (m)*	M	L	F,L	D	O	0/0	4144
187. Tococa guianensis Aubl.	*waha plît (m)*	O	–	–	–	–	–	2833
MELIACEAE								
188. Carapa guianensis Aubl.	*swa (m)*	M,O	D,F	B	D	O	+,+Lg	2803
189. Cedrela odorata L.	*wiñkur, yalam (m)*	M,O	A,F,T	B	D	O	-L/0	4365
190. Melia azedarach L.	*paradis (m)*	M,O	A,D,S	B,L	D	O,T	+Ld	4453
191. Swietenia macrophylla King	*yulu (m)*	M,O	F	B	D	O	+Lg	4413
MENYANTHACEAE								
192. Nymphoides humboldtianum (HBK) Kuntze	*liwa sâkaia (m)*	M	F,P,S	L,P	D	O,T	0/0	2118
MORACEAE								
193. Artocarpus altilis (Parkinson) Fosberg	*breadfruit (c)*	F,M	A,H	L,S	D,P	T	0/+La	3423
194. Ficus insipida Willd.	*tatalaya (m)*	M,O	A,G	S	I,P	O,T	+	3482
MYRISTICACEAE								
195. Myristica fragrans Houtt.	*nutmeg (c)*	F,M	G	F	D	O	+Lc	2753
196. Virola koschnyi Warb.	*bahnak (m)*	M,O	A,D,F	B,L,S	D,P	O,T	+Lg	2398
MYRSINACEAE								
197. Stylogyne guatemalensis Blake	*butku plun (m)*	F,M,O	G,L	L	D	O,T	0/0	2583

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
MYRTACEAE								
198. Calyptranthes chytraculia var. americana McVaugh	*kiaka (m)*	F,M	G,L	L	D	O	0/0	4075
199. Eugenia acapulcensis Steud.	*manani (m)*	M	F,G	L	D	O	0/0	3916
200. E. axillaris (Sw.) Willd.	*tablira (m)*	M	D,T	L	D	O	0/0	3990
201. Psidium guajava L.	*kru, sikra (m)*	F,M,O	D,G,H,I,P,S	B,L	D,I	B,O	+Lb	3441
202. Syzygium aromaticum (L.) Merr. & Perry	*cloves (c)*	F,M	A,C,G,O	C	D	O	0/0	4442
203. S. malaccensis (L.) Merr. & Perry	*apil (m)*	F,M	A,S	B,L,S	D,P	T	+	3452
NYCTAGINACEAE								
204. Neea stenophylla Standl.	*no local name*	M	G	L	P	T	0/0	3782
OCHNACEAE								
205. Ouratea nitida (Sw.) Engl.	*tubana (m)*	M	L	L,P	D,P	T	0/0	4170
206. Sauvagesia erecta L.	*lilia sara (m)*	M	A,B,F,G,L	P	D,P	O,T	0/0	4201
ONAGRACEAE								
207. Ludwigia octovalvis (Jacq.) Raven	*slilma sirpi (m)*	F,M	F,G,L	F	D	O	0/0	3223
OXALIDACEAE								
208. Averrhoa bilimbi L.	*mimbru (m)*	F,M	D,F	F,L	D,J	O	-L/0	2784
209. A. carambola L.	*dusmâ tahpla (m)*	F	–	–	–	–	–	2754
PASSIFLORACEAE								
210. Passiflora biflora Lam.	*drap sirpi (m)*	M	F,I,K	L,P	D	O	0/0	4104
211. P. quadrangularis L	*drap, tutbuñ (m)*	F,M	A,F,J,P	L	D,J	O,T	+Lh	3511
PHYTOLACCACEAE								
212. Petiveria alliacea L.	*kiski, sabatkira (m)*	M	A,D,R	L,P,R	I,P	O,T	+Ld	3959
213. Phytolacca rivinoides Kunth & Bouché	*tilba pata (m)*	F,M	E,X	L,R	D	O	+Lc	3422
PIPERACEAE								
214. Peperomia pellucida (L.) HBK	*sumu mairen (m)*	M	B,I,V,W	P	D	O	0/0	3750
215. P. peltata C. DC.	*upla kalula (m)*	M	B,I,V,W	P	S	O	0/0	3525
216. Piper auritum HBK	*kauput, sîka tara(m)*	F,M	A,C,F,G,L	L	I,J,P	O,T	+,+Lg	2719
217. P. hispidum Sw.	*lulubak bak (m)*	M	A,F,G	L	B,I	B,O	+,+Ld	2457
218. P. jacquemontianum (Kunth) DC.	*lulubakbak, lula sara, bakbak ya (m)*	M	A,F,G	L	B,I	B,O	+	3956
219. P. peltatum L.	*sikatara, bulput (m)*	F,M	A,F,G	L	D,P	B,O,T	+,+Ld	3931

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
POLYGONACEAE								
220. Antigonon leptopus Hook. & Arn.	*unta kyuka (m)*	F,M,O	V	R	D	O	0/+La	2766
221. Coccoloba uvifera (L.) L.	*waham (m)*	F,M	D,G,S	B,L	D	O	0/0	3446
222. Polygonum punctatum Elliott	*pyâwira inma (m)*	M	S	P	D	T	0/0	3419
PORTULACACEAE								
223. Portulaca oleracea L.	*tital tangni (m)*	M	P	P	D	O	+Lb	2786
RHIZOPHORACEAE								
224. Rhizophora mangle L.	*mankru (m)*	M,O	D,S	B	D	O	0/+La	2097
RUBIACEAE								
225. Alibertia edulis (Rich.)	*liwa dus mâ*	F,M	A,C,Q	B,L	D	O,T	0/0	4352
226. Borreria laevis (Lam.) Griseb.	*kalila, li dukya saika, twisa (m)*	M	B,L,S,U,W	P	D,P	O,T	+	3265
227. Chiococca alba (L.) Hitchc.	*sriri (m)*	M	G,S,Y	R	D	O	+	4176
228. Cinchona pubescens Vahl	*quina, quinina (h)*	M	D,F,M	B,M	D	O	+Lh	2740
229. Coffea arabica L.	*kâpee, kâpi (m)*	F,M	F,U	E	D,N	O,T	+Lf	NV
230. Guettarda elliptica Sw.	*lasat (m)*	M,O	T	L	D	O	0/0	4195
231. Hamelia axillaris Sw.	*silbyara (m)*	M	B,I,S	L,P	D,P	O,T	+	2503
232. H. barbata Standl.	*silbyara (m)*	M	B,I,S	L,P	D,P	O,T	+	2588
233. H. patens Jacq.	*yamni sîka (m)*	M	B,F,I,M,S,U,W	L,P	D,P	O,T	+	2768
234. H. rovirosae Wernham	*silbyara (m)*	M	B,F,I,S,U	F,L,M	D	O,T	+	4236
235. Hemidiodia ocimifolia (Willd.) Schum.	*kanabala (m)*	M	G	L	D	O	+	4002
236. Morinda citrifolia L.	*kwirku apil (m)*	M	A,N	L	P	T	+Lh	2769
237. M. panamensis Seem.	*kwirku apil (m)*	M,O	D,X	B,L	P	T	0/0	2596
238. Posoqueria latifolia (Rudge) Roem. & Schult.	*kuramaira,*	F,M	D,Q	B,L	D	O	+	4315
239. Psychotria sp.	*dus mâ pauni (m)*	M	A,S	L	B,P	O,T	0/0	2416
240. P. capitata Ruiz & Pav.	*wail kâpi (m)*	M	T,U	L,M	D,P	O,T	0/0	2414
241. P. elata (Sw.) Hammel	*inma pauni (m)*	M	F,S	F,L,M	D	O,T	+	2477
242. P. ipecacuanha (Brot.) Stokes	*wâkia (m)*	M	D,E,F,L	R	D	O	+Lh	4447
243. P. poeppigiana Muell.	*tangni pauni (m)*	M	I,S,U	F,L,M	D	T	+	3984
244. Richardia scabra L.	*pulpul (m)*	M	D,E,F,L,S	P,R	D	O,T	0/0	4156
RUTACEAE								
245. Citrus aurantifolia (Christm.) Swingle	*laimus, leimus (m)*	F,M	C,D,F,G,I,L,P	F,L,R	D,J	O	+Lc	3677
246. C. aurantium L.	*arins tahpla (m)*	F,M	D,F,G,H,I,K,L	F,L,R	D,I,J	B,O	+Lh	4449

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247. C. paradisi Macfad.	***sadik (m)***	F,M	D,F, H	F	J	O	+Ld	3681
248. C. sinensis (L.) Osbeck	***arins, andris (m)***	F,M	D,F,H,L	F,L	D,J	O	+Lh	4450
249. Murraya paniculata (L.) Jack	***limonaria (s)***	M	A	L	N	O	+Lh	4338
250. Ruta graveolens L.	***kiski sakbatkira (m)***	M	A,P,R	L,M	D,I	O,T	+Lh	4454
SAPINDACEAE								
251. Cupania rufescens Triana & Planch.	***bila bila (m)***	M,O	A,D,S	L	B,D	B,O	0/0	4275
252. C. scrobiculata Rich.	***kaliltara wâika (m)***	M,O	A,D,S	L	B,D	B,O	0/0	2488
253. Melicoccus bijugatus Jacq.	***suksuk (m)***	F,M	D,Q	E,L	D	O	0/0	3435
254. Sapindus saponaria L.	***sniwawa (m)***	O	–	–	–	–	–	2771
SAPOTACEAE								
255. Chrysophyllum cainito L.	***apil (m)***	F,M	D,F,Q	F,L	D,N	O	+Le	3353
256. Manilkara zapota (L) P. Royen	***eban, îban (m)***	F,M	A,S	S	P	T	+Le	2792
SCROPHULARIACEAE								
257. Bacopa procumbens (Mill.) Greenm.	***bibi rakaika (m)***	M	A,X	L	D,J	O,T	0/0	4441
258. Lindernia diffusa (L.) Wettst.ex Dugand & Jacks.	***arbustabul,***	M	X	P	D	O	+	4158
259. Scoparia dulcis L.	***haraspata (m)***	M	B,C,T,W	L,P,R	D	O	+,+Lh	3976
SIMAROUBACEAE								
260. Quassia amara L.	***wanabaka (m)***	M	B,F,M,T	M	D	O	+,+Lh	3824
261. Q. simarouba L.f.	***sinsira (m)***	M,O	D,M,S,T,W	B	B,D	B,O	0/+Le	4404
SOLANACEAE								
262. Capsicum annuum var. glabriusculium (Dunal) Heiser & Pickersgill	***anmak, kuma (m)***	F,M	A,L,S	E,F,L	D,N	O,T	+Lh	4330
263. C. chinensis Jacq.	***anmak, kuma (m)***	F,M	A,L,S	E,F,L	D,N	O,T	+	3605
264. C. frutescens L.	***anmak, kuma (m)***	F,M	I,L	F,L	D,J	O,T	+Lh	2748
265. Nicotiana tabacum L.	***twâhko, twâku (m)***	M,O	A,B	L	N	O,T	+Lh	NV
266. Physalis angulata L.	***pyâwira dus mâ (m)***	M	F,I,M	L,P	I	O	+Lh	3700
267. P. cordata Mill.	***bilta (m)***	M	I,K	L,P	I	O	+	3700
268. Solanum asperum Rich.	***susul (m)***	M,O	S	L	D	T	+Lh	3258
269. S. lycopersicum L.	***tumatis (m)***	F,M	S	L	J	T	+Lh	2831
270. S. mammosum L.	***kuswa mahbra (m)***	M	A,I,L,S	E,F,L	D,P	O,T	+Lh	2913
271. S. torvum Sw.	***dusmâ kyayá (m)***	M	A,B,F,S	L	D,P	T	+Lh	2892
272. S. tuberosum L.	***pitita (m)***	F,M	G	R	J	O	+Lh	NV

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STERCULIACEAE								
273. Melochia villosa (Mill.) Fawc. & Rendle	*yuma saika (m)*	M	A,G,L	L,R	D	O	+	4331
274. Theobroma cacao L.	*kakai, kakao, kakay (m)*	F,M	S,U	E,L	P	T	+Lh	2815
275. Waltheria americana L.	*wiwi saika (m)*	M	D,F,Q,S,T,U	L	D	O,T	+Lh	4131
276. W. glomerata Presley	*alwani saika (m)*	M	D,Q,T,U	L	D	O,T	0/0	2609
TILIACEAE								
277. Apeiba aspera Aubl.	*urus bamba (m)*	M,O	L,Q,S	B,L	D	O,T	0/0	2377
278. Luehea seemannii Triana & Planch.	*wiwi saika (m)*	M,O	Q	B,L	D	O	0/0	2785
TURNERACEAE								
279. Turnera odorata L.	*sukwan (m)*	M	A,L,T	L	D	O	0/0	4140
280. T. pumilea L.	*saika rakaia (m)*	M	A,L	L	D	O	0/0	4332
281. T. ulmifolia L.	*klua tangni (m)*	M	A,F,L,X	L	D	O	+Lh	3896
VERBENACEAE								
282. Avicennia germinans (L.) L.	*mankru siksa (m)*	M,O	D	B	D	O	0/0	2824
283. Callicarpa acuminata HBK	*pulkin (m)*	M	D	L	I	O	+	3284
284. Citharexylum caudatum L.	*dama (m)*	M,O	L	L	D	O	+	2203
285. Clerodendrum thomsoniae Balf.	*rice and beans (c)*	M,O	S	L	P	T	0/0	2292
286. Lantana camara L.	*butku plun (m)*	M	S	L	D,P	T	+Lc	NV
287. L. trifolia L.	*butku plun (m)*	M	A	L	P	T	+Lc	1002
288. Lippia alba (Mill.) N.E. Br. ex Britton & Wilson	*sîka siahka (m)*	F,M	C,F,G,I,W	L	D,I	O	0/+Lc	3912
289. L. micromera Schauer	*waha sirpi (m)*	M	C,G,I,K,L,W	L	D,I	O	0/+Lc	2920
290. Phyla nodiflora (L.) Greene	*las las (m)*	M	R,S	P	D,P	O,T	+Lg	2778
291. Stachytarpheta cayennensis (Rich.) Vahl	*sîka tahpla (m)*	M	G,P,X	L	D	O	+Lc	2898
292. S. jamaicensis (L.) Vahl	*sîka tahpla (m)*	M	F,P,X	L	D	O	+Lg	2875
293. Tamonea spicata Aubl.	*kiaya (m)*	F,M	F,G,L	L	D	O	+	4162
294. Vitex kuylenii Standl.	*blû tangni (m)*	M,O	I,S	B,L	D,P	B,T	0/0	2312
VITACEAE								
295. Cissus sicyoides L.	*karas wihta (m)*	M	A	L,M,R	D	T	0/0	3869
VOCHYSIACEAE								
296. Vochysia ferruginea G. Martens	*yamari (m)*	O	–	–	–	–	–	4336

Scientific Name[1]	Common Names[2]	Uses[3]	Medicinal[4]	Part[5]	Prep.[6]	Adm.[7]	A/G[8]	Sp.#[9]
LILIOPSIDA (MONOCOTS)								
ALOEACEAE								
297. Aloe vera L.	*kyurtakaia sut (m)*	M	B,N,S,X	L	J	O,T	+Lg	2743
ARACEAE								
298. Colocasia esculenta (L.) Schott	*balyanhta (m)*	F	–	–	–	–	–+	2788
299. Philodendron scandens K. Koch & Sello	*kura siaka (m)*	M	B,S	L,M	D,P	O,T	+	3416
300. Syngonium angustatum Schott	*piuta saika (m)*	M	A,S	L,P	D	T	-L/0	2711
301. Xanthosoma mexicanum Liebm.	*wail duswa (m)*	M	S	L	D	T	0/0	4345
302. X. sagittifolium (L.) Schott	*duswa (m)*	F	–	–	–	–	–	2791
ARECACEAE								
303. Acoelorraphe wrightii (Griseb. et. H. Wendl.) H. Wendl. ex Becc.	*papta dusa (m)*	M,O	D	R	D	O	0/0	2782
304. Bactris gasipaes Kunth	*supa (m)*	F,M,O	G	F	D	O	0/0	2772
305. B. major Jacq.	*papta dusa kyayal (m)*	F,M,O	P,X	R	D	O	0/0	3725
306. Calyptrogene ghiesbreghtiana (Linden & H. Wendl.) H. Wendl.	*kalita wâika (m)*	O	–	–	–	–	–	NV
307. Cocos nucifera L.	*kuku (m)*	F,M,O	D,P	F	D,I	O	+Lc	NV
308. Elaeis guineensis Jacq.	*batana (m)*	M,O	G,X	F	D	O	N/0	NV
309. E. oleifera (Kunth) Cortés	*ohon,uhun (m)*	F,M,O	G,X	F	D	O	N/0	NV
BROMELIACEAE								
310. Ananas comosus (L.) Merr.	*pihtu (m)*	F,M	B,I,U	F,L	D	O	+Lg	2727
311. Bromelia pinguin L.	*ahsi (m)*	O	–	–	–	–	–	2737
COMMELINACEAE								
312. Commelina erecta L.	*butku sirpi (m)*	M	S	L,M	J	T	0/0	4360
CYPERACEAE								
313. Cyperus luzulae (L.) Retz.	*kukra saika (m)*	M,O	D	R	D	O	0/0	3691
314. Kyllinga tibialis Ledeb.	*twîkâbu (m)*	M	F	R	D	O	+	4114
315. Rhynchospora barbata (Vahl.) Kunth	*twî kusni (m)*	O	–	–	–	–	–	2635
316. R. ciliata Vahl.	*krikri (m)*	O	–	–	–	–	–	4199
DIOSCOREACEAE								
317. Dioscorea trifida L.	*usi (m)*	F	–	–	–	–	–	2844

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HAEMODORACEAE								
318. Xiphidium caeruleum Aubl.	*swilawan (m)*	M	A,B,S,W	L	D	O,T	0/+Ld	4439
LILIACEAE								
319. Allium cepa L.	*inyan (m)*	F,M	L,P	R	J	O	N	NV
320. A. sativum L.	*gyalik,kyalik (m)*	F,M	A,H,P	R	J	O	N	NV
321. Hypoxis decumbens L.	*anansi (m)*	M,O	D	R	D	O	0/0	4443
MARANTACEAE								
322. Thalia geniculata L.	*waha (m)*	O	–	–	–	–	–	4446
MUSACEAE								
323. Musa sp.	*plâs (m)*	F,M,O	B,D,U	F,S	N,P	O,T	+Lg	NV
324. M. paradisiaca L.	*plâtu (m)*	F,M,O	B,D,U	F,S	N,P	O,T	+Lg	NV
325. M. paradisiaca var. sapientum (L.) Kuntze	*siksa (m)*	F,M,O	B,D,U	F,S	N,P	O,T	+Lh	NV
POACEAE								
326. Acroceras zizamioides (HBK) Dandy	*twî (m)*	O	–	–	–	–	–	2493
327. Andropogon leucostachyus HBK	*twî (m)*	O	–	–	–	–	–	2695
328. A. virgatus Desv.	*twî (m)*	M,O	F,S	L,R	D	O	0/0	2055
329. Axonopus compresus (Sw.) P. Beauv.	*twî (m)*	O	–	–	–	–	–	4271
330. A. poiophyllus Chase	*twî (m)*	O	–	–	–	–	–	2621
331. Bambusa vulgaris Schrad. ex Wendl.	*klar (m)*	M,O	D,F,S	R	D,P	O,T	+Lg	2711
332. Coix lacryma-jobi L.	*twî ma (m)*	M,O	A,I,S	E,R	D	O	+La	2646
333. Cymbopogon citratus (Nees) Stapf	*twî rih (m)*	F,M	F,G,L	L	I	O	+Lg	3682
334. Dichanthelium sphaerocarpon var. floridanum (Vasey) Davidse	*twî (m)*	O	–	–	–	–	–	2686
335. Echinochloa colonum (L.) Link	*twî (m)*	O	–	–	–	–	–	4258
336. Eleusine indica (L.) Gaertn.	*twî (m)*	M	F,I,W	R	D	O	+Lh	4329
337. Gynerium sagittatum (Aubl.) P. Beauv.	*yauhrus (m)*	M,O	B,I,K,S,V	R	D	O	0/0	3870
338. Ischaemum timorense Kunth	*twî (m)*	O	–	–	–	–	–	3325
339. Leptocarpydium lanatum (HBK) Nees	*twî (m)*	O	–	–	–	–	–	4321
340. Mesosetum blakei Swallen	*twî (m)*	O	–	–	–	–	–	4323
341. Olyra latifolia L.	*twî (m)*	M	S	L,R	D	T	0/0	3428
342. Oryza sativa L.	*rais (m)*	F,M	D,S	E	B,I	B,O	+Lh	2756
343. Panicum maximum Jacq.	*twî târa (m)*	O	–	–	–	–	–	2759
344. P. mertensii Roth	*twî (m)*	O	–	–	–	–	–	2538

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345. P. pilosum Sw.	*twî (m)*	O	–	–	–	–	–	2600
346. P. purpurascens Raddi	*twî para (m)*	O	–	–	–	–	–	2761
347. Paspalum punchellum Kunth	*twî (m)*	O	–	–	–	–	–	2082
348. Saccharum officinarum L.	*kayu (m)*	F,M,O	D,I,L	L,M	D,J	O,T	-L/0	2764
349. Sporobolus virginicus (L.) Kunth	*twî (m)*	O	–	–	–	–	–	2027
350. Zea mays L.	*aya (m)*	F,M,O	I	C	D	O	+Lh	2766
SMILACACEAE								
351. Smilax spinosa Mill.	*chiny, tá wâkia (m)*	M	B,S,T	R	D	O	0/+Lc	2735
XYRIDACEAE								
352. Xyris ambigua Beyr. ex Kunth	*rati (m)*	M	G,S	P	D	O,T	0/0	2632
ZINGIBERACEAE								
353. Zingiber officinale Roscoe	*marid tangni, sinsa (m)*	F,M	G,L	R	D	O	0/+La	2826