

Multiplicity in palm uses by the Huaorani of Amazonian Ecuador

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An ethnobotanical study of the palms used by the Huaorani in the Yasuní National Park and Huaorani Ethnic Reserve in Amazonian Ecuador was carried out. In this inventory, 37 palm species were found; all were used by the Huaoranis. One hundred and ninety-one different uses were recorded in eight ethnobotanical categories. Most species (64.9%) were used for house construction and human food. More than half of the species were used for domestic utensils (59.4%) and hunting and fishing implements (54%). A comparison is made between these data and past studies for the other six indigenous communities from Amazonian Ecuador. This paper shows the highest diversity of useful palm species and the highest number of different uses ever recorded for an indigenous group in Amazonian Ecuador. The data combine quantitative and qualitative approaches. © 2004 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2004, **144**, 149–159.

ADDITIONAL KEYWORDS: Arecaceae – ethnobotany – indigenous knowledge – non-timber forest products – Palmae – tropical rainforest.

INTRODUCTION

Palms are the most useful plants for the rural and indigenous people in Amazonia (e.g. Balick, 1979, 1984; Plotkin & Balick, 1984; Galeano, 1992; Chávez, 1996; Borchsenius, Borgtoft & Balslev, 1998; Kahn & Henderson, 1999; Narvaez, Stauffer & Gertsch, 2000). They provide edible fruits, oils, palm-heart, fibres, thatch, housing materials and shelter, domestic artefacts, tools for traditional hunting and fishing, medicines and other minor products. Palms also have a key importance for the cultural identity of some indigenous people (e.g. Schultes, 1974; Bodley & Benson, 1979; Davis & Yost, 1983a; Balée, 1988) and cross-cultural comparisons can be made among the different native groups (Bates, 1988).

In Amazonian Ecuador there are six indigenous groups (Achuar, Cofán, Huaorani, Quichua, Shuar and Siona-Secoya) and palms are an important resource for them all (Balslev & Barfod, 1987; Barfod, 1994; Gomez *et al.*, 1996; Borchsenius *et al.*, 1998). The Huaoranis have an extraordinary knowledge of

the biology of the tropical rainforest, and they use more than 1000 vascular plants for a variety of purposes (Davis & Yost, 1983a; Cerón & Montalvo, 1998; Macía, Romero-Saltos & Valencia, 2001). In the first ethnobotanical study of the Huaoranis, Davis & Yost (1983a,b) identified 13 useful palm species. Later Mondragón & Smith (1997) and Cerón & Montalvo (1998) recorded 18 and 19 useful species, most of them with several different uses. Mendoza (1994) reported seven edible palm species. In a Huaorani quantitative ethnobotanical study, Arecaceae was the most useful family and 11 palm species showed the highest use-values within the 30 more valued woody plants (Macía *et al.*, 2001).

Palms are highly diverse in western Amazonia (Gentry, 1988; Kahn & de Granville, 1992; Henderson, 1995). There are 59 species in the Amazonian forests of Ecuador (Borchsenius *et al.*, 1998) and probably 45 species exist in the Yasuní National Park and Huaorani Ethnic Reserve (M. J. Macía, unpubl. data; J. C. Svenning, pers. comm.).

In this study, the ethnobotany of palms by the Huaorani indigenous group is presented and compared with the uses of palms among the other six indigenous groups in Amazonian Ecuador.

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MATERIAL AND METHODS

STUDY AREA

Fieldwork was carried out from April 1997 to May 1998 in the nearby mature forests of two Huaorani communities in the eastern lowlands of Ecuador: Dicaro ($0^{\circ}56'S$, $76^{\circ}12'W$) included in the Huaorani Ethnic Reserve, and Tiputini ($0^{\circ}36'S$, $76^{\circ}27'W$), within the Yasuní National Park (Fig. 1). The area is located in the Andean basin and receives an average of 2860 mm of annual rainfall, with an average monthly temperature of $25.5^{\circ}C$; the altitude of the study area varies from 200 to 300 m (Romero-Saltos, Valencia & Macía, 2001). Most of the area is covered by *tierra firme* tropical evergreen rainforest with high tree alpha-diversity (Romoleroux *et al.*, 1997; Pitman, 2000; Romero-Saltos *et al.*, 2001). Three broad forest types can be recognized in the region: well-drained

upland forest or *tierra firme*, well-drained floodplain forest and swamp forest dominated by the palm *Mauritia flexuosa*.

The Huaorani ethnic group was first contacted at the end of the 1950s (Yost, 1991; Cabodevilla, 1994; Rival, 1996). They were nomadic hunters and fruit-gatherers, and remained very isolated from other Amazonian native groups (Blomberg, 1996; Smith, 1996; Fuentes, 1997). Their traditional knowledge is still alive in middle- and old-aged people (Macía, 2001). Today the group comprises about 2000 people. During our fieldwork, 80 people were living in the community of Dicaro and around 30 in Tiputini. The families who constituted these two communities came independently from different remote areas. At present, their traditional lifestyle is changing rapidly, but they are still completely dependent on the forest, with hunting and fruit gathering their

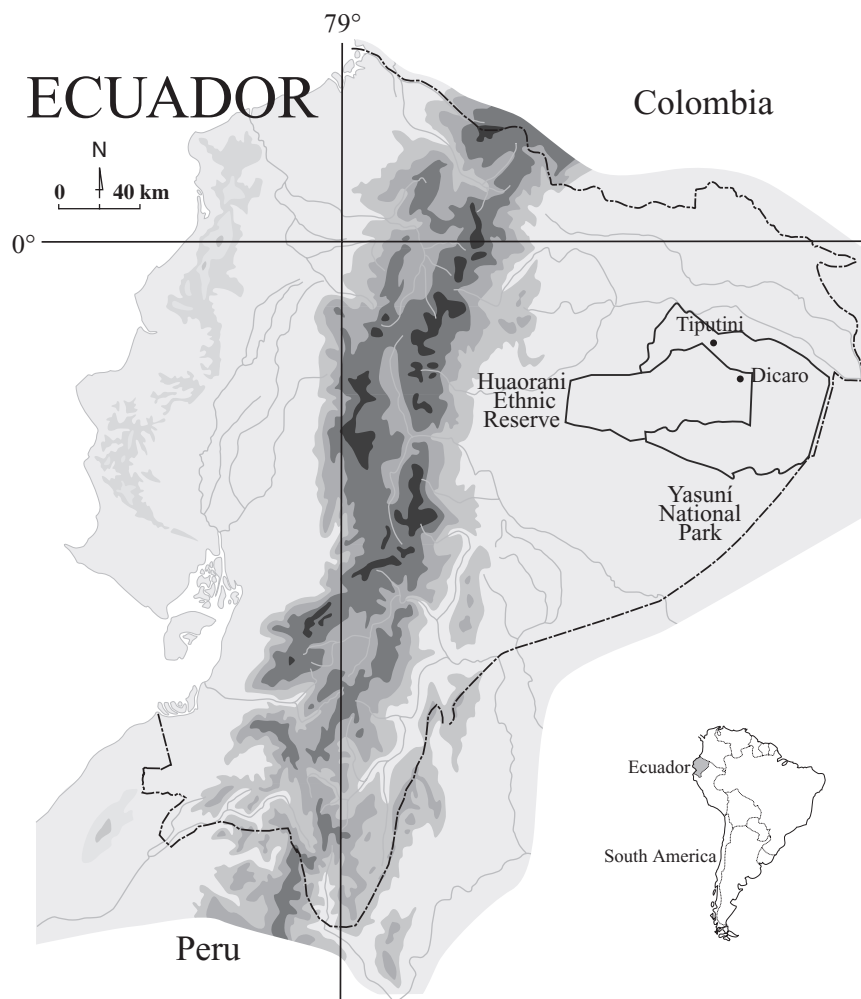


Figure 1. Map of Ecuador showing the location of the Yasuní National Park, the Huaorani Ethnic Reserve and the two Huaorani communities cited in the text. The more heavily shaded areas indicate land over 500 m.

main activities. Sometimes the men work for an oil company.

DATA COLLECTION

Quantitative and qualitative data were recorded from the field. The uses of palms were annotated in 25 plots of 0.1 ha (50 × 20 m): 14 plots (five in *tierra firme*, five in floodplain and four in swamp forests) in the proximity of the Tiputini community and 11 plots (five in *tierra firme*, three in floodplain and three in swamp) in the area of Dicaro community (see Romero-Saltos *et al.*, 2001, for details about establishment of plots). Eight palm species were found only outside the plots, and therefore their uses were recorded in their habitats. One species (*Bactris gasipaes*) was recorded in gardens and another (*Cocos nucifera*) in the villages. Seven experienced male informants (>40 years old) from the Huaorani communities of Dicaro and Tiputini (Fig. 1) were interviewed in the field following a semistructured ethnobotanical interview (see Alexiades, 1996). Each plot was inventoried with one informant: four of these people came from Tiputini and three from Dicaro. All uses were classified in eight ethnobotanical categories: construction, cultural, domestic utensils and tools, edible, tools for hunting and fishing, fuel, medicinal and other uses (see Macía *et al.*, 2001, for a specific description of the categories). Taxonomic nomenclature for palms follows Borchsenius *et al.* (1998). Vouchers have been deposited in AAU, MA, QCA and QCNE herbarium, acronyms according to Holmgren, Holmgren & Barnett (1990).

DATA ANALYSIS

The uses of palms by the Huaoranis of Yasuní were compared with palm uses among the six indigenous groups in Amazonian Ecuador as reported in the literature: Achuar (Bianchi *et al.*, 1982; Descola, 1989; Cerón, 1993b); Cofán (Cerón *et al.*, 1994; Cerón, 1995); Huaorani (Davis & Yost, 1983a,b; Mendoza, 1994; Mondragón & Smith, 1997; Cerón & Montalvo, 1998); Quichua (Alarcón, 1988; Marles, Neill & Farnsworth, 1988; Ponce, 1992; Cerón, 1993a; Játiva & Alarcón, 1994; Ojeda, 1994; Balslev *et al.*, 1997; Rios & Caballero, 1997; Báez, 1998; Iglesias, nd.); Shuar (Mundo-Shuar, 1977; Bianchi *et al.*, 1982; Cerón, 1993b; Báez & Backevall, 1998; Van den Eynden, Cueva & Cabrera, 1999; Bennett, Baker & Gómez-Andrade, 2002); Siona-Secoya (Vickers & Plowman, 1984; Borchsenius *et al.*, 1998). This last reference is a monographic study for the Siona-Secoya, because many uses cited come from their own vouchers. Most of the palms cited as useful species in ethnological (Bianchi *et al.*, 1982) and anthropological papers (Descola, 1989) could be identified from their vernac-

ular names because they were well-known and widely used species for the Ecuadorian Amazon. General papers for Ecuador of non-specific ethnic group (Balslev & Barfod, 1987; Borgtoft & Balslev, 1990; Borchsenius *et al.*, 1998), for a province (Gomez *et al.*, 1996) or for a species or a group of them (Borgtoft, 1992; Barfod, 1994; Holm-Jensen & Balslev, 1995) were also considered in the analysis.

RESULTS

HUAORANI ETHNOBOTANICAL DATA

The Huaorani indigenous people used for very different purposes all the palm species (canopy, understory and liana) that were found during fieldwork in the Yasuní area (Appendix). From the 37 useful species reported in the region, 35 were wild and two cultivated: *Bactris gasipaes* and *Cocos nucifera*. Thirty-one palm species were recorded in the area of Tiputini community, and 25 species in the nearby of Dicaro community. Of all these species, 23 were reported for both sites and 55.8% of different uses were shared among the two villages. All palms, including seedlings and juvenile stages, were well known to the Huaorani and their vernacular names were consistent among the informants. *Euterpe precatoria* and *Socratea exorrhiza* had uses included in all ethnobotanical categories except for 'other uses'.

The uses of palms showed a broad spectrum of activities. For the ethnobotanical categories construction and edible, 24 palm species (64.9%) were recorded. For these two categories, coincident uses and species between the two communities had the highest values. The leaf blade of 23 canopy and understory species were used for thatch in their traditional houses and temporary constructions, with *Geonoma macrostachys* and *Oenocarpus bataua* being the most employed in both communities. Ten species were coincident in the two communities for roofing thatch. The stems of eight species were used for poles and posts in their houses and *Iriartea deltoidea* was the favourite species. Fifteen species and 65.5% of their uses were shared among the communities for this usage category. The endosperm, mainly immature or from germinating seeds, and the mesocarp of the fruits were edible for 23 species. Most of them were occasionally eaten, but the mesocarp of *Bactris gasipaes*, *Mauritia flexuosa* and *Oenocarpus bataua* was highly appreciated for all informants. Fourteen species and 63.6% of their different edible uses were shared among the villages.

In the category of domestic utensils and tools, the Huaorani employed 22 palm species (59.4%) for a wide range of uses in their daily lives: broom, grater, funnel, basket, fibre, tablecloth, napkin, mats, etc. The use of young unopened spear leaves of *Astrocaryum chambira* for fibre was outstanding and commonly used in

the two communities for carrying bags, hammock, fishing net and line, twine, thread for necklace, comb and wick. Some of these products were occasionally commercialized. Temporary baskets from palm leaves were used for carrying fruits or firewood and for packing whichever material from the forest or gardens to their communities. The leaves of five species were used for temporary baskets and wrapping. Ten species and 51.6% of their uses were shared among the communities. In Huaorani traditional hunting, palms had a key importance and 20 species (54%) were used. The blowguns and their darts were made from the stems and the petioles or leaf rachis of five different species. Improvised hunting spears were made from the stem of ten species, and seven of them were coincident between the communities. According to the informants, palms represented high-quality materials for these mentioned purposes in both communities. Eleven species and 56.5% of different uses were coincident among the two villages for this usage category.

Twelve species (32.4%) were used for several medicinal uses and nine of them to cure colds, bad coughs and related illnesses. Adventitious roots from six species were always used for this purpose. Only two species (*Aiphanes ulei* and *Euterpe precatoria*) and 18.2% of uses were shared between the communities. In the cultural category, 12 species (32.4%) were employed, most of them to adorn the people and carve spears for their feasts. This last use was coincident for six species among the villages. Palms were only occasionally used for firewood (24.3%). In the other uses category (18.9%), the larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks of six species, were edible. Four species were coincident between the communities for this last use.

COMPARISONS IN AMAZONIAN ECUADOR

The palm ethnobotany by the Huaorani of Yasuní was highly diverse: the present data showed the highest number of useful palm species and the highest number of different uses for these species in the Ecuadorian Amazon (Table 1). More than 45% of different uses of palms recorded for the region were coincident with this study, and more than 60% for the indigenous groups Achuar, Cofán and the past studies of the Huaorani. *Attalea insignis* is for the first time reported as a useful species in Amazonian Ecuador. *Bactris riparia*, *B. simplicifrons*, *Chelyocarpus ulei* and *Cocos nucifera*, only once recorded in the literature, were useful for different purposes for the Huaorani. The Siona-Secoya, Shuar, Quichua and the present study of the Huaorani had more than 30 useful species but the average of different uses per species was higher for the Huaorani than in any other indigenous group. The palm ethnobotany of the Huaorani has been more

Table 1. Comparison between the uses of palms by the Huaorani indigenous community and other indigenous groups in Amazonian Ecuador

Indigenous group	Useful species	Useful species not found in this study	Different uses	Coincident uses with this study	Not coincident uses with this study	Average uses/species	Standard deviation uses/species	Monographic papers per indigenous group
Achuar	19	2	47	31	16	2.47	1.78	3
Cofán	25	3	79	48	31	3.16	2.3	2
Huaorani, past studies	25	1	134	84	50	5.36	3.63	4
Quichua (Napo and Pastaza)	31	6	145	66	79	4.68	4.92	10
Shuar	33	6	126	64	62	3.82	3.31	6
Siona-Secoya	34	6	61	31	30	1.79	1.09	2
Not-identified group	17	1	50	36	14	2.94	2.61	7
Huaorani, present study	37		191			5.16	3.53	

intensively studied in comparison with the Cofán and the Siona-Secoya, but more studies are reported for the Quichua and Shuar.

If past studies are compared with the present data, the most useful species (three or more different uses and recorded in three or more indigenous groups) were mainly canopy palms: *Astrocaryum chambira*, *Euterpe precatoria*, *Iriartea deltoidea*, *Mauritia flexuosa*, *Oenocarpus bataua* and *Wettinia maynensis*, and three more subcanopy species, *Aphandra natalia*, *Bactris gasipaes* and *Oenocarpus mapora*, were also outstanding useful species. In the use categories of edible and construction, the highest number of species and uses were reported for Amazonian Ecuador. The most common use was as edible fruits (mesocarp and immature endosperm), of which 13 species were widely consumed and also the palm heart of six species. For the edible mesocarp of *Mauritia flexuosa*, *Bactris gasipaes* and *Oenocarpus bataua* the highest number of reports in this category were recorded and were quoted for all groups. In addition, a drink made from these mesocarps (*chicha*) was recorded for most ethnic groups. For roofing thatch, *Phytelephas tenuicaulis*, *Wettinia maynensis*, *Iriartea deltoidea* and *Hyospathe elegans* were reported for all groups. However, *Geonoma macrostachys* had the highest number of reports. The use of *Iriartea deltoidea* for poles and posts was also recorded for all the groups.

For hunting implements, there are six species widely used to make spears, and these were sometimes also used in their traditional feasts. From these species, *Bactris gasipaes*, *Iriartea deltoidea* and *Wettinia maynensis* were further used to make blowguns. The petiole and leaf rachis of *Attalea maripa* was the best quality material for blowgun darts, and was used for all groups. Most medicinal species were used to cure colds, bad cough and related illnesses. The adventitious roots of *Euterpe precatoria* and *Oenocarpus bataua* were recorded in all past Huaorani studies, but it is uncommon for other groups. For domestic utensils, the fibre extracted from *Astrocaryum chambira* was a multipurpose resource and was also recorded for the six indigenous groups. The leaf base fibre of *Aphandra natalia* to make brooms was recorded for four groups.

DISCUSSION

The fact that the Huaorani community had nomadic habits and were living as isolated hunters and fruit-gatherers until recent years explains the high richness of palm utilization and the great number of different uses reported. Besides this peculiarity of the Huaorani culture, this study has reported both high numbers of species and high numbers of different uses: seven informants were questioned for the same

species in the three broad forest types and these data were compared between two different localities. Furthermore, the taxonomy of the Amazonian palm species is quite clear (Henderson, 1995; Henderson, Galeano & Bernal, 1995; Borchsenius *et al.*, 1998), so an easy identification of the species in the field made the ethnobotanical work easier.

Few studies have compared ethnobotanical knowledge between indigenous communities: the value of 55.8% of ethnobotanical knowledge shared between the two Huaorani villages is a lower than the 62% between communities or the 83% within these communities for the 'Tsimane' indigenous people of Bolivia (Reyes-García *et al.*, 2003); further comparative studies are needed. All use-coincidence percentages for the eight use categories were 50% higher, except for medicinal purposes (18.2%), but very few medicinal palms had also been reported for this ethnic group (Davis & Yost, 1983b; Cerón & Montalvo, 1998).

Most palm products are of great economic importance for the Huaorani and other indigenous people in Amazonian Ecuador, as they replace products that otherwise have to be purchased with money. For house construction, palms are still indispensable: they provide poles and leaf material for thatching, and all are fairly durable, easy to find in the forest, and with no economic cost (López-Parodi, 1988). For poles and posts, *Iriartea deltoidea* was the most valuable species to the Huaorani and also for all other ethnic groups. There are many high-quality thatch species used by the six ethnic groups, both for permanent and temporary construction, but some species, i.e. *Geonoma macrostachys*, have become scarce in some areas (Gomez *et al.*, 1996; Svenning & Macía, 2002). Most edible species are eaten as 'snack-food' but the fruits of *Mauritia flexuosa*, *Oenocarpus bataua* and the domesticated *Bactris gasipaes* were highly appreciated for all ethnic groups and have an important role in their diet during the season when the fruits ripen (see also Játiva & Alarcón, 1994; Ojeda, 1994; Soria, 1994; Gomez *et al.*, 1996).

Most traditional hunting implements are of reduced importance, and today are only occasionally used for these purposes. However, they have a strong cultural importance, e.g. spears are still used in their traditional feasts, and blowguns are sometimes used for hunting by the village elders among the Huaorani. Replicas of these tools, from different indigenous groups, are sometimes sold as souvenirs for tourists (my personal observations). The use of Huaorani medicinal palms to cure colds, bad coughs and related illnesses is by far the most common use recorded from all groups. This seems to be a new use, as none of these medicinal uses was reported in initial ethnobotanical studies (Davis & Yost, 1983b). The use of adventitious

roots for these medicinal purposes is a valuable resource and requires further study. Many palms are used as domestic utensils and tools; some uses are specific for a species and others rather general. The Huaorani employed many more species for multiple purposes than the other groups; however, the fibre extracted from *Astrocaryum chambira* is a resource employed by all indigenous groups (Holm-Jensen & Balslev, 1995; Holm-Jensen, 1996). Cultural uses are today maintained, especially in the feast celebrating the annual harvest of *Bactris gasipaes* (see Davis & Yost, 1983a) and palms have a key importance in adornment.

The ethnobotanical papers cited for information concerning the six indigenous groups of Amazonian Ecuador are heterogeneous in their methods, so the number of studies is not a sign of more profound ethnobotanical knowledge or a higher number of useful species for a group. Furthermore, these previous papers were not in-depth palm studies. The combination of quantitative and qualitative methods has revealed more useful palm species and uses than any other past study. For example, earlier Huaorani studies showed much lower palm utilization numbers than that here because of the methods employed. Thus it must be anticipated that, if similar methods are employed to other groups, numbers of palm uses would be substantially enhanced. The palm ethnobotany of Quichua or Shuar is fairly well known for the eastern lowlands but future quantitative ethnobotanical studies will reveal new useful palm species and tens of different uses for these and other indigenous groups.

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REFERENCES

- Alarcón R. 1988.** Etnobotánica de los Quichuas de la Amazonia ecuatoriana. *Miscelánea Antropológica Ecuatoriana, Serie Monográfica* **7**: 1–183.
- Alexiades MN. 1996.** Collecting ethnobotanical data: an introduction to basic concepts and techniques. In: Alexiades MN, ed. *Selected guidelines for ethnobotanical research: a field manual*. New York: The New York Botanical Garden, 53–94.
- Báez S. 1998.** Dictionary of plants used by the Canelos-Quichua. In: Borgtoft H, Skov F, Fjeldsá J, Schjellerup I, Øllgaard B, eds. *People and biodiversity – two case studies from the Andean foothills of Ecuador*. Århus: Centre for Research on Cultural and Biological Diversity of Andean Rainforests (DIVA), Technical Report no. 3, 64–70.
- Báez S, Backevall Å. 1998.** Dictionary of plants used by the Shuar of Makuma-Mutints. In: Borgtoft H, Skov F, Fjeldsá J, Schjellerup I, Øllgaard B, eds. *People and biodiversity – two case studies from the Andean foothills of Ecuador*. Århus: Centre for Research on Cultural and Biological Diversity of Andean Rainforests (DIVA), Technical Report no. 3, 125–133.
- Balée W. 1988.** Indigenous adaptation to Amazonian palm forests. *Principes* **32**: 47–54.
- Balick MJ. 1979.** Amazonian oil palms of promise: a survey. *Economic Botany* **33**: 11–28.
- Balick MJ. 1984.** Ethnobotany of palms in the Neotropics. *Advances in Economic Botany* **1**: 9–23.
- Balslev H, Barfod A. 1987.** Ecuadorean palms – an overview. *Opera Botanica* **92**: 17–35.
- Balslev H, Rios M, Quezada G, Nantipa B. 1997.** *Palmas útiles en la Cordillera de los Huacamayos*. Quito: Probona.
- Barfod A. 1994.** Usos pasados, presentes y futuros de las palmas Phyllocladaceae (Arecaceae). In: Rios M, Borgtoft H, eds. *Las plantas y el hombre- Memorias del Primer Simposio Ecuatoriano de Etnobotánica y Botánica Económica*. Quito: Ediciones Abya-Yala, 23–46.
- Bates DM. 1988.** Utilization pools: a framework for comparing and evaluating the economic importance of palms. *Advances in Economic Botany* **6**: 56–64.
- Bennett BC, Baker MA, Gómez-Andrade P. 2002.** Ethnobotany of the Shuar of Eastern Ecuador. *Advances in Economic Botany* **14**: 1–299.
- Bianchi C, Rovere F, Clemente T, Broseghini S, Palacios A, Espinosa G, Fruci S, Bottasso J. 1982.** *Artesanías y técnicas Shuar*. Quito: Ediciones Mundo Shuar.
- Blomberg R. 1996.** *Los Aucas desnudos*. Quito: Ediciones Abya-Yala.
- Bodley JH, Benson FC. 1979.** *Cultural ecology of Amazonian palms. Reports of Investigations 56. Laboratory of Anthropology*. Pullman: Washington State University.
- Borchsenius F, Borgtoft H, Balslev H. 1998.** Manual to the palms of Ecuador. *AAU Reports* **37**: 1–217.
- Borgtoft H. 1992.** Uses and management of *Aphandra natalia* (Palmae) in Ecuador. *Bulletin del'Institute Française d'Études Andines* **21**: 741–753.
- Borgtoft H, Balslev H. 1990.** Ecuadorean palms for agroforestry. *AAU Reports* **23**: 1–122.

- Cabodevilla MA. 1994.** *Los Huaorani en la historia de los pueblos del Oriente*. Coca: Cicame.
- Cerón CE. 1993a.** Etnobotánica Quichua en la vía Hollín-Loreto, provincia del Napo. *Hombre y Medio Ambiente (Ecuador)* **25**: 131–170.
- Cerón CE. 1993b.** Manejo florístico Shuar-Achuar (Jívaro) del ecosistema amazónico en el Ecuador. *Hombre y Medio Ambiente (Ecuador)* **25**: 173–197.
- Cerón CE. 1995.** *Etnobiología de los Cofanes de Dureno*. Quito: Publicaciones del Museo Ecuatoriano de Ciencias Naturales, Conservation International and Ediciones Abya-Yala.
- Cerón CE, Montalvo CG. 1998.** *Etnobotánica de los Huaorani de Quehueiri-Ono, Napo-Ecuador*. Quito: Ediciones Abya-Yala.
- Cerón CE, Montalvo CG, Umenda J, Chica-Umenda E. 1994.** *Etnobotánica y notas sobre la diversidad vegetal de la comunidad Cofán Sinangüé, Sucumbíos, Ecuador*. Quito: Ecociencia.
- Chávez F. 1996.** Estudio preliminar de la familia Arecaceae (Palmae) en el Parque Nacional del Manu (Pakitzta y Cocha Cashu). In: Wilson DE, Sandoval A, eds. *Manu: the biodiversity of southeastern Peru*. Lima: Editorial Horizonte, 141–168.
- Davis EW, Yost JA. 1983a.** The ethnobotany of the Waorani of Eastern Ecuador. *Botanical Museum Leaflets* **29**: 159–217.
- Davis EW, Yost JA. 1983b.** The ethnomedicine of the Waorani of Amazonian Ecuador. *Journal of Ethnopharmacology* **9**: 273–297.
- Descola P. 1989.** *La selva culta -Simbolismo y praxis en la ecología de los Achuar*. Quito: Ediciones Abya-Yala.
- Fuentes B. 1997.** *Huaomoni, Huarani, Cowudi -Una aproximación a los Huaorani en la práctica política multi-étnica ecuatoriana*. Quito: Ediciones Abya-Yala.
- Galeano G. 1992.** *Las palmas de la región de Araracuara*. Bogotá: Tropenbos-Colombia.
- Gentry AH. 1988.** Tree species richness of upper Amazonian forests. *Proceedings of the National Academy of Sciences, USA* **85**: 156–159.
- Gomez D, Lebrun L, Paymal N, Soldi A. 1996.** *Palmas útiles en la provincia de Pastaza, Amazonia ecuatoriana - Manual práctico*. Quito: Fundación Omaere.
- Henderson A. 1995.** *The palms of the Amazon*. New York: Oxford University Press.
- Henderson A, Galeano G, Bernal R. 1995.** *Field guide to the palms of the Americas*. New Jersey: Princeton University Press.
- Holmgren PK, Holmgren NH, Barnett LC. 1990.** *Index Herbariorum, Part 1: The Herbaria of the world. 8 ed., Regnum Vegetabile 120*. New York: The New York Botanical Garden.
- Holm-Jensen O. 1996.** Use and economic potential of the palm *Astrocaryum chambira* (Arecaceae): a quantitative approach. Masters Thesis. Aarhus: University of Aarhus.
- Holm-Jensen O, Balslev H. 1995.** Ethnobotany of the fiber palm *Astrocaryum chambira* (Arecaceae) in Amazonian Ecuador. *Economic Botany* **49**: 309–319.
- Iglesias G. no date.** *Sacha Jambi. El uso de las plantas en la medicina tradicional de los Quichuas del Napo*. Quito: Ediciones Abya-Yala.
- Játiva MI, Alarcón R. 1994.** Sobre la etnobotánica y comercialización de la unguirahua *Oenocarpus bataua* (Arecaceae) en la zona del Alto Napo, Ecuador. In: Alarcón R, Mena PA, Soldi A, eds. *Etnobotánica, valoración económica y comercialización de recursos florísticos silvestres en el Alto Napo, Ecuador*. Quito: Ecociencia, 53–89.
- Kahn F, de Granville JJ. 1992.** *Palms in forest ecosystems of Amazonia*. Berlin: Springer-Verlag.
- Kahn F, Henderson A. 1999.** An overview of the palms of the várzea in the Amazon region. *Advances in Economic Botany* **13**: 187–193.
- López-Parodi J. 1988.** The use of palms and other native plants in non-conventional, low cost rural housing in the Peruvian Amazon. *Advances in Economic Botany* **6**: 119–129.
- Macía MJ. 2001.** Los Huaorani de la Amazonía ecuatoriana. In: Duivenvoorden JF, Balslev H, Cavelier J, Grandez C, Tuomisto H, Valencia R, eds. *Evaluación de recursos vegetales no maderables en la Amazonía noroccidental*. Amsterdam: IBED, Universiteit Van Amsterdam, 53–57.
- Macía MJ, Romero-Saltos H, Valencia R. 2001.** Patrones de uso en un bosque primario de la Amazonía ecuatoriana: comparación entre dos comunidades Huaorani. In: Duivenvoorden JF, Balslev H, Cavelier J, Grandez C, Tuomisto H, Valencia R, eds. *Evaluación de recursos vegetales no maderables en la Amazonía noroccidental*. Amsterdam: IBED, Universiteit Van Amsterdam, 225–249.
- Marles RJ, Neill DA, Farnsworth NR. 1988.** A contribution to the ethnopharmacology of the lowland Quichua people of Amazonian Ecuador. *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales* **16**: 111–120.
- Mendoza P. 1994.** Identificación de los frutos comestibles silvestres recolectados por los indígenas huaorani de la comunidad de Toñampari en la Amazonia del Ecuador. Tesis de Licenciatura. Quito: Departamento de Ciencias Biológicas, Pontificia Universidad Católica del Ecuador.
- Mondragón ML, Smith R. 1997.** *Bete Quiwiguimamo -Salvando el bosque para vivir sano*. Quito: Ediciones Abya-Yala.
- Mundo-Shuar. 1977.** Las plantas. *Mundo Shuar (Ecuador)* **5**: 1–90.
- Narvaez A, Stauffer FW, Gertsch J. 2000.** Contribución al estudio de la etnobotánica de las palmas del estado Amazonas, Venezuela. *Scientia Guaianae* **10**: 20–37.
- Ojeda P. 1994.** Diagnóstico etnobotánico y comercialización del morete *Mauritia flexuosa* (Arecaceae) en el Alto Napo, Ecuador. In: Alarcón R, Mena PA, Soldi A, eds. *Etnobotánica, valoración económica y comercialización de recursos florísticos silvestres en el Alto Napo, Ecuador*. Quito: Ecociencia, 90–109.
- Pitman NCA. 2000.** A large-scale inventory of two Amazonian tree communities. PhD Dissertation. Durham: Department of Botany, Duke University.
- Plotkin MJ, Balick MJ. 1984.** Medicinal uses of South American palms. *Journal of Ethnopharmacology* **10**: 157–179.
- Ponce M. 1992.** *Etnobotánica de palmas de Jatun Sacha. Memorias del Tercer Simposio Colombiano de Etnobotánica*. Colombia: INCIVA.

- Reyes-García V, Godoy R, Vadez V, Apaza L, Byron E, Huanca T, Leonard WR, Pérez E, Wilkie D. 2003.** Ethnobotanical knowledge shared widely among Tsimané' Amerindians, Bolivia. *Science* **299**: 1707.
- Rios M, Caballero J. 1997.** Las plantas en la alimentación de la comunidad Ahuano, Amazonía ecuatoriana. In: Rios M, Borgtoft H, eds. *Las plantas y el hombre- Memorias del Primer Simposio Ecuatoriano de Etnobotánica y Botánica Económica*. Quito: Ediciones Abya-Yala, 235–254.
- Rival L. 1996.** *Hijos del sol, padres del jaguar -Los Huaorani de ayer y de hoy*. Quito: Ediciones Abya-Yala.
- Romero-Saltos H, Valencia R, Macía MJ. 2001.** Patrones de diversidad, distribución y rareza de plantas leñosas en el Parque Nacional Yasuní y la Reserva Étnica Huaorani, Amazonía ecuatoriana. In: Duivenvoorden JF, Balslev H, Cavellier J, Grandez C, Tuomisto H, Valencia R, eds. *Evaluación de recursos vegetales no maderables en la Amazonía noroccidental*. Amsterdam: IBED, Universiteit Van Amsterdam, 131–162.
- Romoleroux K, Foster R, Valencia R, Condit R, Balslev H, Losos E. 1997.** Árboles y arbustos (dap>1 cm) encontrados en dos hectáreas de un bosque de la Amazonía ecuatoriana. In: Valencia R, Balslev H, eds. *Estudios sobre diversidad y ecología de plantas- Memorias del II Congreso Ecuatoriano de Botánica realizado en la Pontificia Universidad Católica del Ecuador, Quito, 16–20 Octubre. 1995*. Quito: Pontificia Universidad Católica del Ecuador, 189–215.
- Schultes RE. 1974.** Palms and religion in the Northwest Amazon. *Principes* **18**: 3–21.
- Smith R. 1996.** *Drama bajo el manto amazónico -El turismo y otros problemas de los Huaorani en la actualidad*. Quito: Ediciones Abya-Yala.
- Soria J. 1994.** El 'chontaduro' (*Bactris gasipaes* H.B.K., Arecaceae), especie promisoría de usos múltiples. In: Rios M, Borgtoft H, eds. *Las plantas y el hombre- Memorias del Primer Simposio Ecuatoriano de Etnobotánica y Botánica Económica*. Quito: Ediciones Abya-Yala, 313–321.
- Svenning JC, Macía MJ. 2002.** Harvesting of *Geonoma macrostachys* Mart. leaves for thatch: an exploration of sustainability. *Forest Ecology and Management* **167**: 251–262.
- Van den Eynden V, Cueva E, Cabrera O. 1999.** *Plantas silvestres comestibles del sur del Ecuador*. Quito: Ediciones Abya-Yala.
- Vickers WT, Plowman T. 1984.** Useful plants of the Siona and Secoya Indians of eastern Ecuador. *Fieldiana, Botany* **15**: 1–63.
- Yost JA. 1991.** Los Waorani: un pueblo de la selva. In: *Ecuador a la sombra de los volcanes*. Quito: Ediciones Libri Mundi, 95–115.

APPENDIX

Uses of palms by the Huaorani of the Yasuní National Park and Huaorani Ethnic Reserve in Amazonian Ecuador. The uses are grouped in the following categories: construction (CO), cultural (CU), domestic utensils (D), edible (E), fuel (F), hunting and fishing implements (HF), medicinal (M) and other uses (O).

Aiphanes ulei (Dammer) Burret

Vernacular name: Titequiwe (adult). Vouchers: Macía *et al.* #385; Macía *et al.* #634. Uses. **CU**: The stem is used to make personal war spears for their dances in traditional feasts and rituals. **HF**: The stem is used to make improvised hunting spears. Blowgun darts are carved from the stem in lack of other materials. **M**: Decoction of the adventitious roots is drunk against colds, headache, body pain and shaking. A decoction of the crushed palm-heart is drunk to cure colds and bad cough.

Ammandra dasyneura (Burret) Barfod

Vernacular names: Tubebe (adult and leaves); tubebo, tubeba (fruits). Vouchers: Macía *et al.* #458; Yanez, Macía *et al.* #2493. Uses. **CO**: The weaved pinnae of the leaves are used for thatch. **D**: Leaves are used to make temporary baskets. Fibres from the leaf base of juvenile plants are used to make brooms. **E**: The mesocarp, preferably mature, is edible. The endosperm is also edible when immature in a liquid or jelly-like state. **M**: The endosperm is eaten to cure diarrhoea and stomach ache.

Aphandra natalia (Balslev & An. Hend.) Barfod

Vernacular names: Wamowe (adult), wamoma (leaves), wamomo, wamunca (fruits). No voucher was taken. Uses. **CO**: The weaved pinnae of the leaves are used for thatch. **D**: Fibres from the leaf base are used to make brooms. Leaves are used for improvised beds and seats in the forest. **E**: The endosperm is edible when immature in a liquid or jelly-like state. The mesocarp is also edible.

Astrocaryum chambira Burret

Vernacular names: Opiyencawe, ompuguenca (adult), onemba (juvenile plants), one (fibre), opiyenca (fruit). Vouchers: Macía *et al.* #572; Macía *et al.* #600. Uses. **CO**: Leaves are occasionally used for thatch in lack of other materials. **CU**: Immature leaf rachis is used for ceremonial forehead bands and to adorn their arms and legs in feasts. Twine fibre extracted from the epidermis of young spear leaf-pinnae is used to decorate their chest and back in ceremonial activities and as a pelvic band. **D**: Twined fibre is used to make carrying bags, hammocks, twine and string, thread for necklaces, combs, wicks and to tie many domestic objects. Leaf-pinnae is used to make small baskets for their houses. **E**: The liquid endosperm of young fruits and that of germinating seeds are edible. The raw palm-heart is edible, and sometimes boiled to soften. **F**: The residues of the spear leaf-pinnae from fibre extraction are used for kindling. **HF**: Twined fibre is used to make fishing nets and fishing lines. Petiole leaves are used to carve blowgun darts in lack of other materials. **O**: The spines of the stem are used to take

remove thorns. Larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks, are eaten. Note: bags and hammocks are eventually sold.

Astrocaryum urostachys Burret

Vernacular names: Iiba (adult), emetugawe (juvenile plant), iica (fruit). No voucher was taken. Uses. **CO**: Leaves are used for improvised thatch when there is a lack of better material. The stem is used for posts in house construction. **E**: The immature endosperm and that of germinating seeds are edible. **M**: The young liquid endosperm is eaten to cure colds.

Attalea butyracea (Mutis ex L. f.) Wess. Boer

Vernacular names: Cadawe, carawe (adult), cadaba, caraba (leaves). Voucher: Macía *et al.* #1615. Uses. **CO**: Leaves are used for thatching the outer covering of traditional houses. The split stem is used as flexible planks for floors in modern houses. **E**: The endosperm, preferably immature, is edible. **F**: The dried stem is eventually used for fuel. **O**: Larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks, are eaten.

Attalea insignis (Mart. ex H. Wendl.) Drude

Vernacular name: Gumancuwe (adult). Voucher: Montúfar, Macía *et al.* #97416. Uses. **D**: Mats to sleep in the forest are made from petioles and leaf rachis. **HF**: Petioles and leaf rachis are used to carve blowgun darts.

Attalea maripa (Aubl.) Mart.

Vernacular names: Gaibawe (adult), wencayapa, namba (juvenile plant), gaibamo (fruit). Vouchers: Macía *et al.* #410; Macía *et al.* #513. Uses. **D**: Petioles and leaf rachis are used to make mats to sleep in the forest. Dried petioles are used for torches, and the pinnae for kindling. **E**: The mesocarp is edible. **F**: The dried stem is eventually used for fuel. **HF**: The petioles and leaf rachis are used to carve high-quality blowgun darts.

Bactris concinna Mart.

Vernacular name: Dabayuwe (adult). Voucher: Macía *et al.* #755. Uses. **E**: The mesocarp is edible. **M**: A decoction of adventitious roots is drunk to cure colds and bad cough.

Bactris corossilla H. Karst

Vernacular names: Dabayuwe (adult), dabayo (leaves), dabayumo (fruit). Vouchers: Macía *et al.* #597; Macía *et al.* #1995. Uses. **D**: Leaves are used for wrapping and packing materials. **E**: The mesocarp and the endosperm are edible. **HF**: The stem is used to make improvised hunting spears.

Bactris gasipaes Kunth

Vernacular names: Daguencawe, tewé (adult), daguencá, tewenca (fruit). No voucher was taken. Uses. **CO**: The stem is used as poles in traditional and modern houses. **CU**: The stem is used to make war spears for their dances at traditional feasts. In the peak of the harvest an annual feast is celebrated: fruits are eaten and a drink is made from the fruits. **D**: The stem is used to make 'wood' machetes. **E**: The raw or boiled mesocarp is edible. A drink is made from grated fruits (*chicha*). The palm-heart is also edible. **HF**: The stem is used to make blowguns. **O**: The spines are used to remove thorns. Larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks, are edible. Note: This is a traditionally cultivated species. Some adult individuals have spiny stems and others lack them. According to the informants, both varieties have good quality fruits and similar yields.

Bactris maraja Mart. var. *maraja*

Vernacular names: Daguemuwe, emetugawe (adult). Vouchers: Macía *et al.* #1551; Macía *et al.* #3003. Uses. **E**: The mesocarp is edible. **HF**: The stem is used to make improvised hunting spears. The stem is used to carve blowgun darts if there is nothing better. The outer layer of the stem is used as a wadding for gun cartridges. **M**: A decoction of adventitious roots is drunk to cure bad coughs and sore throats.

Bactris riparia Mart.

Vernacular name: Nanguemuwe (adult). No voucher was taken. Uses. **D**: Combs are made from thin strips of the stem. **E**: The palm-heart is edible. **HF**: The stem is used to make improvised hunting spears and harpoons.

Bactris schultesii (L.H. Bailey) Glassman

Vernacular names: Dabayuwe bengana, boyiguentiwe (adult). Vouchers: Yanez, Macía *et al.* #2099; Yanez, Macía *et al.* #2136. Uses. **CO**: Leaves are used for thatch in traditional houses when there is a lack of *Geonoma* species. **HF**: The stem is used to make improvised hunting spears and harpoons.

Bactris simplicifrons Mart.

Vernacular name: Boyegontiwe (adult). Voucher: Yanez, Macía *et al.* #2249. Use. **D**: Leaves are used for wrapping and packing materials.

Chamaedorea pauciflora Mart.

Vernacular names: Menga (adult), mengame (inflorescence). Voucher: Macía *et al.* #1374. Uses. **CO**: Leaves are used for thatch in the traditional houses. **CU**: The inflorescence is used as perfume. **D**: Leaves are used for packing. **M**: The inflorescence tied to the forehead is used to avoid lice in the hair.

Chelyocarpus ulei Dammer

Vernacular names: Gaban (adult), gabamo (fruit). Voucher: Macía *et al.* #412. Uses. **CO**: Leaves are used for temporary thatch where there is a lack of other materials. **CU**: Immature leaf rachis is used for ceremonial forehead bands and to adorn their arms and legs at traditional feasts. **E**: The immature endosperm is edible.

Cocos nucifera L.

Vernacular name: coco (fruit). No voucher was taken. Use: **E**: The endosperm and the liquid when young are edible and drinkable. Note: This is a cultivated species for the Quichua indigenous people. The fruits were exchanged with them.

Desmoncus giganteus An. HEND.

Vernacular names: Orcame, yeyerucaime. Vouchers: Macía *et al.* #545; Macía *et al.* #948; Macía *et al.* #1196. Uses. **E**: The mesocarp is occasionally eaten. **HF**: The flexible stem is used as a frame for fishing nets. The terminal pinnae transformed into climbing hooks are used for hunting young birds from nest holes. These climbing hooks are also used as hooks for fishing. **O**: The spines are used to remove thorns.

Desmoncus mitis Mart.

Vernacular name: Nawañcapuyo. Voucher: Macía *et al.* #3166. Use. **M**: A decoction of the stem and crushed pinnae is drunk against body pain and colds.

Desmoncus orthacanthos Mart.

Vernacular name: Yeyerucaime. Voucher: Macía *et al.* #2469. Uses. **D**: The stem is used as a frame for baskets. **HF**: The flexible stem is used as a frame for fishing nets.

Euterpe precatoria Mart.

Vernacular names: Yimawe (adult), yimaba (leaves), yimamo (fruit), yimaguinto (adventitious roots). Vouchers: Macía *et al.* #316; Macía *et al.* #1595. Uses. **CO**: Leaves are used for thatch in the absence of other materials. The stem is used for poles in house construction. **CU**: Immature leaf rachis is used for ceremonial forehead bands and to adorn their arms and legs at feasts. The stem is used to make personal war spears for their dances at traditional feasts and rituals. **D**: Crushed young leaves that produce 'foam-soap' in water are used as shampoo. **E**: The mesocarp is occasionally eaten. The palm-heart is edible. **F**: The dried stem is eventually used for fuel. **HF**: The stem is used to make high-quality blowguns. **M**: A juice obtained from chewed or crushed adventitious roots is drunk to cure bad coughs, sore throats and colds. For children a decoction of these roots is drunk for the same ailments. For babies, the juice is mixed with maternal milk.

Geonoma brongniartii Mart.

Vernacular name: Paguman bengana. Voucher: Macía *et al.* #2806. Uses. **CO**: Leaves are used for thatch.

Geonoma deversa (Poit.) Kunth

Vernacular names: Omawe, Teñipawe (adult). Vouchers: Macía *et al.* #707; Yanez, Macía *et al.* #2340. Uses. **CO**: Leaves are used for thatch in traditional houses. **D**: Thin strips from the stem are used to make combs. **HF**: The stem is used to make improvised hunting spears. **M**: The fruits are chewed against bad coughs.

Geonoma interrupta (Ruiz & Pav.) Mart.

Vernacular name: Ewenparen. Voucher: Macía *et al.* #505. Uses. **CO**: Leaves are used for thatch in traditional houses. **D**: Leaves are used for packing and as a napkin at feasts.

Geonoma macrostachys Mart.

Vernacular names: Mo, mo bengana. Vouchers: Macía *et al.* #468; Macía *et al.* #726; Macía *et al.* #728. Uses. **CO**: Leaves are used for high-quality thatch in traditional houses. **CU**: Leaves to make 'spears' for their dances and rituals at traditional feasts. **D**: Leaves are used for packing, as temporary umbrellas, seats and beds in the forest, as a tablecloth, napkin, funnel to prepare curare and to cover hunted meat. Note: There are two varieties: *G. macrostachys* var. *acaulis* (Macía *et al.* #1561) and *G. macrostachys* var. *macrostachys* (vouchers cited above) have the same uses.

Geonoma maxima (A. Poit.) Kunth

Vernacular name: Omawe (adult). Vouchers: Macía *et al.* #483; Yanez, Macía *et al.* #2035. Uses. **CO**: Leaves are used for thatch. **CU**: The stem is used to make personal war spears for their dances at traditional feasts and rituals. **D**: Combs are made from thin strips of the stem. **E**: The mesocarp is occasionally eaten. **HF**: The stem is used to make improvised hunting spears.

Geonoma triglochis Burret

Vernacular name: Mo bengana. Voucher: Yanez, Macía *et al.* #2198. Use. **CO**: Leaves are used for thatch.

Hyospathe elegans Mart.

Vernacular names: Mengawe, omawe (adult). Voucher: Macía *et al.* #1199. Uses. **CO**: Leaves are used for thatch. **HF**: The stem is used for improvised hunting spears.

Iriartea deltoidea Ruiz & Pav.

Vernacular names: Tapa, tepacawe (adult), pentigui (juvenile plant), tepamo (fruit). Vouchers: Macía *et al.* #374; Macía *et al.* #663. Uses. **CO**: Stems are used for poles in traditional houses. Split stems are used as

flexible planks for floors in modern houses. Leaves are used for thatch in the absence of better material. **CU**: The stem is used to make personal war spears for dances at traditional feasts and rituals. The growing stilt root, penis-shaped, is used for female masturbation. The vernacular name *Tepa* is used as a woman's name. **E**: The endosperm and the palm-heart are edible. The endosperm of germinating seeds is also edible. **HF**: The stem is used to make blowguns. A long and thin sharp stick from the stem is used to make the central hole in blowguns. **O**: Larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks, are edible.

Mauritia flexuosa L. f.

Vernacular names: Nontuwe (adult), nontuca (fruit), nontuwentí (broad forest type). Voucher: Macía *et al.* #1569. Uses. **CU**: Immature leaf rachis is used for ceremonial forehead bands. **D**: Fibre extracted from young leaves is used to make bags and twines in the absence of *Astrocaryum chambira* fibre-palm. The fallen dried petioles are used for beds and seats in the forest. **E**: The boiled mesocarp is edible and rarely eaten raw. A drink is made from grated fruits (*chicha*). The grated mesocarp is used for flavouring cassava *chicha*. **F**: Dried stems are eventually used for fuel. **HF**: The fibre from young leaves is used for fishing nets in the absence of *Astrocaryum chambira*. **O**: Larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks, are eaten.

Oenocarpus bataua Mart.

Vernacular names: Petuwe (adult), petuba (juvenile plant, leaves), petomo (fruit). No voucher was taken. Uses. **CO**: Leaves are used for high-quality outer covering thatch in traditional houses. The stem is used for poles. **D**: Leaves are used to make temporary baskets. **E**: The mesocarp after boiling the fruits is edible. The grated fruits are used for flavouring cassava *chicha*. The raw palm-heart is edible, and sometimes boiled to soften. **F**: The dried stem is eventually used for fuel. **M**: A juice obtained from chewed or crushed adventitious roots is mixed with cassava *chicha* and drunk to cure bad coughs, colds and headaches. After boiling the fruits, the mesocarp is eaten to cure colds. **O**: Larvae of the beetle *Rhyncophorus palmarum*, living in rotting trunks, are eaten.

Oenocarpus mapora H. Karst.

Vernacular name: Yemiwe. Voucher: Macía *et al.* #1584. Uses. **CO**: Leaves are used for outer covering thatch. **D**: Temporary baskets are made from leaves. The stems are used as poles for grills at their feasts. **E**:

After boiling the fruits, the mesocarp is edible. The palm-heart is also edible.

Phytelephas tenuicaulis (Barfod) An. Hend.

Vernacular names: Omaqewe (adult), tubeta (juvenile plant), omacabo, tubeca (fruit). Vouchers: Macía *et al.* #515; Macía *et al.* #552. Uses. **CO**: Leaves are used for outer covering thatch in traditional houses. The stems are used for posts and temporary bridges. **D**: Leaves are used for temporary baskets. The stems are used as poles for grills at their feasts. **E**: The endosperm is edible when immature in a liquid or jelly-like state. The mesocarp is also edible. The palm-heart is edible. **F**: The dried stem is occasionally used for fuel.

Prestoea schultzeana (Burret) H.E. Moore

Vernacular names: Guiyicawe, yemiwe (adult). Vouchers: Macía *et al.* #539; Yanez, Macía *et al.* #2450. Uses. **CO**: The weaved pinnae of the leaves are used for thatch. **D**: The stem is used as a stick to make holes in the ground for cultivating. Leaves are used for temporary baskets. **E**: The mesocarp is edible. Boiled fruits are used to flavour *chicha* drink. **HF**: Green fruits are used as pellets for hunting birds. **M**: A decoction of the adventitious roots is drunk to cure colds, bad coughs and sore throats.

Socratea exorrhiza (Mart.) H. Wendl.

Vernacular names: Yarewe, yaremba (adult). Vouchers: Macía *et al.* #352; Macía *et al.* #592. Uses. **CO**: The stems are used for posts. Leaves are used for outer covering thatch in traditional houses. **CU**: The stem is used to make personal war spears for their dances at traditional feasts and rituals. **D**: Crushed young leaves that produce 'foam-soap' in water are used as shampoo. The spiny stilt roots are used as graters. **E**: The palm-heart is edible. **F**: The dried stem is eventually used for fuel. **HF**: The stem is used to make blowguns. The stems are used for improvised hunting spears. **M**: The growing stilt roots are boiled to soften and applied as a poultice to cure knee ache.

Wettinia maynensis Spruce

Vernacular names: Caguñibewe, cayeyibewe (adult), caguñibeba (leaves). Voucher: Macía *et al.* #876. Uses. **CO**: The stems are used for poles. Leaves are used for outer covering thatch in traditional houses. **CU**: The stem is used to make personal war spears for dances at traditional feasts. **E**: The mesocarp and the palm-heart are edible. **HF**: The stem is used to make blowguns and improvised hunting spears.