

Patterns of Medicinal Use of Palms Across Northwestern South America

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Published online: 23 May 2015

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Abstract We carried out a comprehensive literature review of the medicinal use of palms in northwestern South America and complemented it with a large number of field interviews. We investigated patterns of medicinal use across three ecoregions (Amazon, Andes, Chocó), four countries (Colombia, Ecuador, Peru, Bolivia), and three human groups (indigenous, mestizos, and Afro-Americans). Overall, we reviewed 129 references with medicinal palm data and conducted 1956 field interviews, which yielded 93 medicinal palm species, 924 uses for the treatment of 157 diseases and ailments, and 1553 use-reports. The Amazon ecoregion showed the highest incidence of medicinal use, but overall use patterns were similar to those in the Andes and the Chocó. Ecuador was the most intensively studied country, whereas our fieldwork demonstrated that the Andes of all countries, and the Chocó of Colombia could still yield more information. The most common medicinal uses were associated to Digestive system, Skin and subcutaneous tissue, Infections and infestations, and Respiratory system. The medicinal use of palms was clearly more prominent among the indigenous than amongst mestizos and Afro-Americans. Medicinal palm use was not random, but rather showed similar patterns across ecoregions and countries, covering the livelihoods and needs of primary health care, often unmet by Western health systems.

Keywords Arecaceae · Folk medicine · Indigenous people · Traditional medicine · Medical ethnobotany · Traditional knowledge

Introduction

The use of medicinal plants is one of the most widely known ecosystem services from the field of ethnobotany, as it provides primary health care, contributes to local livelihoods, and has prominent potential value as a source of new pharmaceuticals (Macía et al., 2005; Millennium Ecosystem Assessment, 2005; Busmann & Sharon, 2006, 2007; Busmann & Glenn, 2011). Traditional medicine is a set of empirical practices embedded in the knowledge of a social group and it is often transmitted orally

from generation to generation with the intent to solve health problems (Vandebroek et al., 2004; Mathez-Stiefel & Vandebroek, 2012). More than 80 % of the developing world continues to rely on traditional medicines for primary health care. Most traditional medicines are from plants, which are often the only available and affordable treatment for rural and indigenous populations (Farnsworth & Soejarto, 1991; World Health Organization, 1999, 2002).

During the 1970's the World Health Organization (WHO) called for the integration of traditional medicine into public health programs in Third World Countries, with the argument that the dependence of local populations on natural resources for health care could no longer be ignored (World Health Organization, 1978). Since then, it has been recognized that the traditional use of medicinal plants is not limited to indigenous communities but is practiced by a large segment of society (Moerman et al., 1999; Campos & Ehringhaus, 2003; Mathez-Stiefel & Vandebroek, 2012). In Latin American countries, herbal medicine is deeply rooted, practiced extensively by indigenous groups, and frequently used by a broad cross-section of the larger society (Macía et al., 2005; Bussmann et al., 2007; De la Torre et al., 2008; Molares & Ladio, 2009; de Medeiros et al., 2013; Cámara-Leret et al., 2014a).

Many ethnobotanical studies have documented the use of medicinal plants for different communities but just a few works have compared that medicinal uses and species can be similar between different cultures and regions (Moerman et al., 1999; Ghimere et al., 2004; Albuquerque et al., 2007; Molares & Ladio, 2009). However, the lack of large-scale comparisons in medicinal plant ethnobotany has limited the possibility of recognizing these patterns across different scales. The analysis of the published information complemented with fieldwork is a promising approach for assessing use patterns (Macía et al., 2011; Albuquerque & de Medeiros, 2012; de Medeiros et al., 2013).

Palms (Arecaceae) are one of the most important families in the Neotropics, both in terms of abundance and diversity of use (Prance et al., 1987; Pinedo-Vasquez et al., 1990; Phillips & Gentry, 1993; Galeano, 2000; Macía et al., 2001; Lawrence et al., 2005). Their wide range of uses has been documented in several publications at the national level (e.g., Balslev & Barfod, 1987; Bernal, 1992; Borchsenius et al., 1998) and in numerous ethnobotanical studies with indigenous groups (e.g., Boom, 1986; Kronik, 2001; Macía, 2004), mestizos (e.g., Mejía, 1988a; Stagegaard et al., 2002; Balslev et al., 2008), and Afro-Americans (e.g., Duke, 1970; Galeano, 1995, 2000). In addition, palms taxonomy, diversity, and distribution are well known (Henderson, 1995; Borchsenius et al., 1998; Moraes, 2004; Pintaud et al., 2008; Galeano & Bernal, 2010; Balslev et al., 2011).

Since Plotkin and Balick (1984) highlighted the importance of palm species as a source of active compounds, interest in palm properties has been growing, and numerous pharmacological studies have bridged the gap between ethnobotanical data and clinical trials, often confirming the beneficial effects on human health of palms (Esquenazi et al., 2002; Marinho et al., 2003; Mendonca-Filho et al., 2004). In a recent review, Sosnowska and Balslev (2009) found that 106 palm species, out of a total of 730 species growing in the Americas were used as medicines. Digestive system disorders, pain ailments and skin tissue disorders were found to be the most frequent diseases treated with palms. This revision showed that the number of American palm species with known uses had increased from 48 to 106 over the quarter century following the initial work of Plotkin and Balick (1984). The efficacy of many of the

species was confirmed in ethnopharmacological studies, while some uses appear not to have a strong physiological basis, and others simply have not been investigated yet (Sosnowska & Balslev, 2009).

Despite the large number of pharmacological studies about palms, to our knowledge this is the first work that assesses how traditional knowledge varies within and among ecoregions, countries, and the human groups in tropical South America. Contrasting these patterns at different scales, it could permit a much broader application of pharmacologically proven medicinal palm uses and improve the therapeutic use of traditional medicine, which could allow the development and application of less expensive treatments in many areas with limited resources, especially with respect to diseases outlined in the Millennium Development Goals (Holveck et al., 2007).

In this paper, we present a comprehensive review of the medicinal use of palms in northwestern South America. We surveyed the relevant literature published over the last 60 years and made an effort to collect existing local references of limited distribution. We then supplemented these data with selective fieldwork in areas where little information about palm use was available. The specific objectives of this study were to compare palm medicinal uses across: A) ecoregions (Amazon, Andes, and the Chocó) and countries (Colombia, Ecuador, Peru, and Bolivia); B) medicinal subcategories and types of diseases; C) human groups (indigenous, mestizos, and Afro-Americans) D) indigenous groups ($n=55$); and E) to identify the most important medicinal palm species for local people living in the tropical forests of the study region.

Materials and Methods

Study Region

We compiled ethnobotanical information on medicinal uses of palms from the bibliography (see below) and later carried out complementary fieldwork in 24 localities and 59 communities inhabited by indigenous, Afro-American, and mestizo groups throughout the Amazon and Andes of Colombia, Ecuador, Peru, and Bolivia, and the Chocó ecoregion of Colombia and Ecuador (Fig. 1). The Amazon ecoregion was defined as the lowlands to the east of the Andes below 1000 m elevation (e.g., Renner et al., 1990; Jørgensen & León-Yáñez, 1999). The Andes ecoregion was defined as the humid montane forests on both slopes of the Andes above 1000 m, including the forests of the inter-Andean valleys of Bolivia that receive less precipitation (Beck et al., 1993). The Chocó ecoregion was defined as the humid forests along the Pacific coast of Colombia and northern Ecuador below 1000 m elevation.

Bibliographical Search

A thorough bibliographic revision was performed to search international and national publications for each of the four countries, including ethnographical references with data on the medicinal uses of palms, when species identification was clear. Three categories of publications were selected. The first included references based on original data gathered from fieldwork, including scientific papers, books, monographs, book chapters, and graduate, master and doctoral theses. The second category included

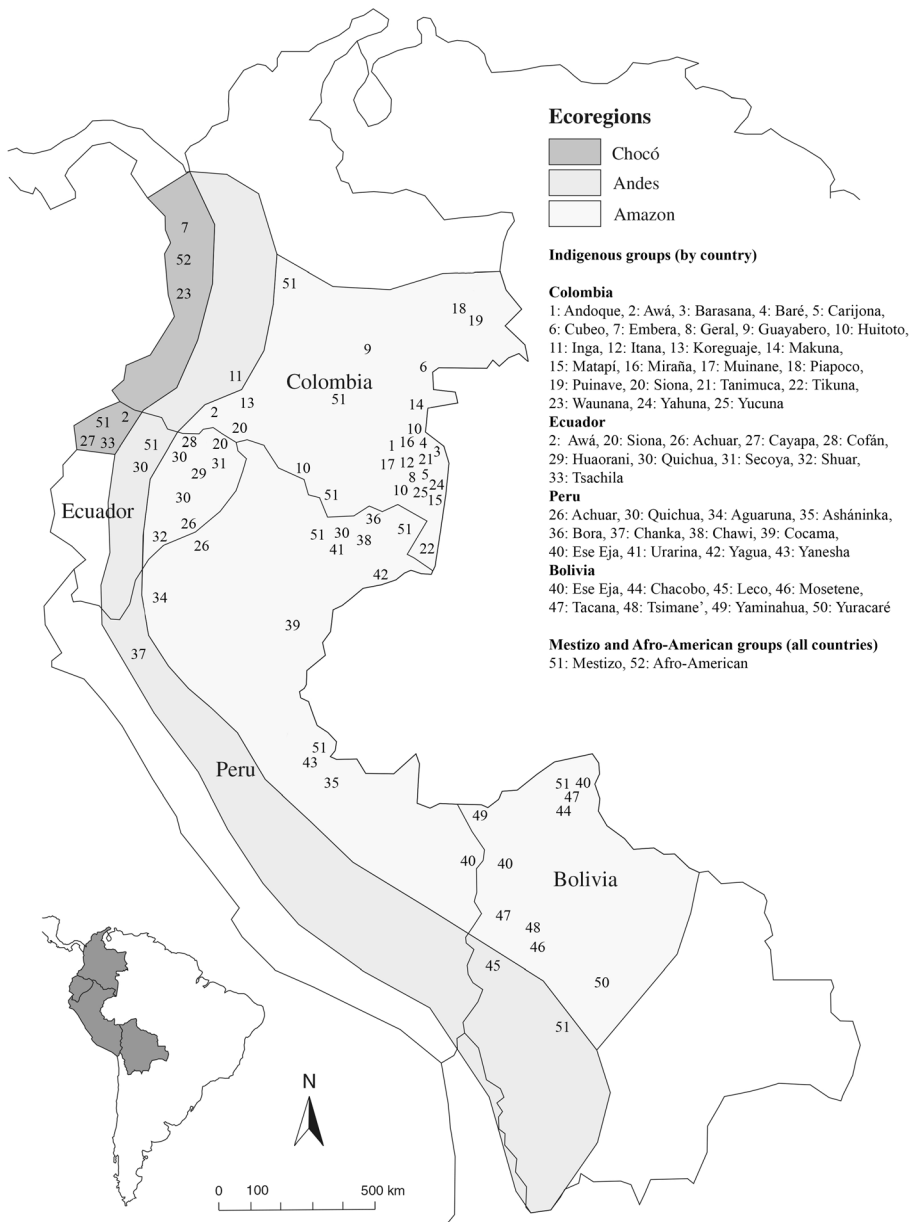


Fig. 1 Map of the study area in northwestern South America showing ecoregions (Amazon, Andes, Chocó), countries (Colombia, Ecuador, Peru, Bolivia) and human groups (indigenous, Afro-Americans, and mestizos) where medicinal palm ethnobotanical data were recorded

review publications for which we checked that the data had not been previously published, in order to avoid duplication of information. The third type included publications based on herbarium material, which included ethnobotanical information that was not included in any other publications (Borchsenius et al., 1998; Moraes, 2004; Moreno Suárez & Moreno Suárez, 2006).

Data Collection During Fieldwork

Between March 2010 and December 2011, we conducted 1956 structured and semi-structured interviews in 59 communities (Appendix 1) following a standardized protocol (Paniagua-Zambrana et al., 2010; Cámara-Leret et al., 2012). The first step in each community was to obtain the necessary permits and establish prior informed consent with the communities and informants. The interview work only started after all permits were obtained. We interviewed 5–7 expert informants within each community ($n=171$). A “walks in the woods” approach was used to search for palm species growing near the communities, and to record their local names, which were later used in the community interviews. Then, we conducted semi-structured interviews with the general informants ($n=1785$), visiting them in their homes. Interviews were conducted in Spanish and in cases where an informant did not speak Spanish, with the help of local interpreters. All informants were at least 18 years old. We stratified informants into five age classes (18–30, 31–40, 41–50, 51–60, and >60 years) to approximate an equal representation of all ages. Within each age class approximately 50 % of the interviewees were women and 50 % were men. The interviews were designed to obtain information about all palm uses, including medicinal ones.

Data Organization

For each publication, the following information was included (when available): scientific name of the species as it was published, country, ecoregion, human group, assignation to subcategories of use, description of use, and plant part used. We followed the World Checklist of Palms to unify nomenclature (Govaerts & Dransfield, 2005; Govaerts et al., 2006), and lumped the three broad habitat types of the Amazon ecoregion (terra-firme, floodplain, and swamp) because most bibliographical references did not specify any of them.

Three human groups were recognized: A) Indigenous, the original population of a particular geographic region; B) Mestizo, the population of mixed origin, born from a father and mother of different race, generally white-indigenous; and C) Afro-Americans, the population of black race descendant of African slaves brought to America and which is the dominant population in the Chocó of Colombia and Ecuador. Those use-reports where no indication of human group was mentioned were classified as “Not identified.” We included human “mixed group” membership as a distinct ethnic group when this was mentioned in the reference (Fig. 1).

To systematize the medicinal use information obtained during the interviews in the field, all communities were grouped into 24 localities (Appendix 1), according to their ethnic background, and each of these locations was used as a unit of information. For each locality, the following information about medicinal use was included: scientific name of the species, country, ecoregion, human group, assignation to medicinal subcategories of use, description of medicinal use, processing, administration, and palm part used.

Data Analysis

All medicinal uses recorded from the literature and from the interviews were classified in 20 medicinal subcategories following the Economic Botany Data Collection

Standard (Cook, 1995) with some modifications proposed by Macía et al. (2011). When a medicinal use description contained insufficient information to assign the use to one of the described subcategories, it was assigned to the subcategory “Not specified.”

All data analyses were performed at the species level and thus the ethnobotanical information obtained for infraspecific taxa (i.e., subspecies or varieties) were lumped with the corresponding species. To analyze the medicinal uses of palms in different ecoregions, countries and human groups, we defined a “medicinal palm use” as the use of a palm part from a given species that is associated with a medicinal subcategory and a specific ailment/disease. To analyze the abundance of medicinal palm uses, the term “medicinal use-report” was defined as the medicinal palm use described previously in one bibliographical reference or reported in one of our 24 localities. To quantify the importance of the different medicinal subcategories, the number of useful species, ailments and diseases treated, and the numbers of use-reports for each subcategory per ecoregion or country were used.

In order to estimate the ethnobotanical knowledge that exists in both different countries and ecoregions with respect to the total number of palm species, we calculated the percentage of useful species following Pintaud et al. (2008). To have an estimation of the number of indigenous groups with ethnobotanical information with respect to the existing total number of indigenous groups in the study area, the percentage of indigenous groups was calculated following Lewis (2009). In these latter calculations, the linguistic variants for the denomination of the same indigenous group were not considered.

To identify the most important useful species in each ecoregion, the Relative Importance (RI) index was calculated: $RI = \frac{NMUS + NT}{N}$, where NMUS = number of medicinal use subcategories in which a given species is used, divided by the total number of medicinal use subcategories of the most versatile species; NT = number of total diseases and ailments in which the cited species is found, divided by the total number of diseases and ailments that the most versatile species obtained (Bennett & Prance, 2000; Albuquerque et al., 2006; Macía et al., 2011). The maximum RI value that a species could obtain was 2. This index indicates the importance of the different species as a function of their versatility, without considering data relative to the number of bibliographic citations or reports from different localities (Cartaxo et al., 2010).

Results

Medicinal Palm Uses by Ecoregion and Country

A total of 1553 use-reports represented 924 medicinal palm uses from 93 palm species for the treatment of 157 different ailments and diseases (Table 1, Appendix 2). These species represented 30 % of the species potentially existing in northwestern South America. The average number (\pm SD) of medicinal uses per palm species was 9.9 (\pm 17.8). Information on the medicinal use of palms was recorded for 55 indigenous groups, which represent 50 % of the total number of indigenous groups in the study area. Our fieldwork filled important gaps, since 22 % of the medicinal palm species, 34 % of medicinal uses and 14 % of the ailments and diseases reported in the interviews

Table 1 Medicinal palm uses documented in the Amazon and Andes ecoregions of Colombia, Ecuador, Peru and Bolivia, and in the Chocó ecoregion of Colombia and Ecuador

A. Total	Country/Ecoregion	Useful species (Percentage of useful species/ Total species)	Medicinal uses (Ailments and diseases)	Medicinal use-reports	Average ± SD of medicinal uses per specie	Indigenous groups with medicinal information (Percentage of indigenous groups with medicinal palm uses/Total indigenous groups)
	All countries	93 (30.3)	924 (157)	1553	9.9±17.8	55 (49.6)
	Amazon	74 (49.7)	766 (140)	1308	8.2±15.8	48 (48.0)
	Andes	22 (17.1)	114 (53)	125	1.2±3.5	5 (55.6)
	Chocó	25 (23.6)	106 (56)	120	9.9±17.9	5 (83.3)
	Colombia	56 (25.3)	278 (94)	407	3.0±5.9	26 (60.0)
	Amazon	46 (44.2)	218 (75)	325	2.3±5.2	23 (59.0)
	Andes	4 (4.4)	7 (5)	7	0.1±0.4	1 (25.0)
	Chocó	20 (22.7)	66 (41)	75	0.7±2.2	2 (75.0)
	Ecuador	36 (27.7)	187 (66)	223	2.0±5.1	10 (83.3)
	Amazon	28 (41.2)	128 (49)	152	1.4±4.1	7 (87.5)
	Andes	9 (14.3)	24 (16)	26	0.3±0.9	2 (100.0)
	Chocó	10 (14.9)	43 (30)	45	0.5±1.9	3 (75.0)
	Peru	41 (32.3)	288 (84)	472	3.1±6.9	13 (27.7)
	Amazon	38 (35.8)	273 (82)	446	2.9±6.8	12 (25.5)
	Andes	12 (27.3)	26 (17)	26	0.3±1.0	1 (50.0)
	Bolivia	27 (32.1)	307 (85)	451	3.3±9.9	11 (61.1)
	Amazon	24 (38.1)	260 (74)	385	2.8±8.5	10 (62.5)
	Andes	12 (40)	63 (36)	66	0.7±2.4	1 (33.3)

Table 1 (continued)

B. Bibliographical references		Useful species	Medicinal uses	Medicinal uses (Ailments and diseases)	Medicinal use-reports	Indigenous groups with medicinal information	Bibliographical references (Palm monographs)
All countries	73	135	620 (135)	950	42	129 (45)	
Amazon	64	123	554 (123)	870	36	107 (36)	
Andes	11	26	38 (26)	38	4	12 (6)	
Chocó	16	30	41 (30)	42	5	14 (6)	
Colombia	40	61	144 (61)	179	16	39 (11)	
Amazon	35	48	120 (48)	151	14	31 (8)	
Andes	-	-	-	-	-	-	
Chocó	13	21	27 (21)	28	2	10 (4)	
Ecuador	31	53	143 (53)	167	9	34 (13)	
Amazon	25	42	112 (42)	134	6	26 (9)	
Andes	9	12	19 (12)	19	2	6 (4)	
Chocó	4	12	14 (12)	14	3	4 (2)	
Peru	34	69	200 (69)	314	12	32 (8)	
Amazon	33	68	194 (68)	308	11	29 (8)	
Andes	3	6	6 (6)	6	1	3 (0)	
Bolivia	19	72	205 (72)	290	9	26 (13)	
Amazon	19	68	194 (68)	277	9	23 (11)	
Andes	4	12	13 (12)	13	1	3 (2)	

Table 1 (continued)

Country/Ecoregion	Useful species (Percentage of new useful species register by fieldwork)	Medicinal uses (Percentage of new medicinal uses register by fieldwork)	Ailments and diseases (Percentage of new ailments and diseases register by fieldwork)	Medicinal use-reports	Indigenous groups with medicinal information (Percentage of new indigenous groups with medicinal palm use information register by fieldwork)	Number of interviews (Number of communities)
All countries	64 (21.5)	387 (32.9)	85 (14.0)	603	27 (22.4)	1956 (59)
Amazon	46 (12.2)	271 (27.0)	77 (11.4)	438	22 (25.0)	1114 (40)
Andes	17 (22.7)	80 (45.6)	38 (7.5)	87	3 (20.0)	528 (12)
Chocó	22 (28.0)	66 (52.8)	40 (12.5)	78	2 (0)	314 (7)
Colombia	40 (19.6)	151 (40.6)	59 (14.9)	228	16 (34.8)	466 (12)
Amazon	29 (8.7)	112 (36.2)	49 (13.3)	174	14 (39.1)	205 (9)
Andes	4 (25.0)	7 (28.6)	5 (0)	7	1 (100.0)	87 (2)
Chocó	17 (30.0)	40 (53.0)	25 (9.8)	47	2 (0)	174 (3)
Ecuador	17 (5.6)	46 (19.8)	30 (6.1)	56	3 (0)	460 (12)
Amazon	11 (3.6)	16 (11.7)	11 (4.1)	18	1 (0)	147 (6)
Andes	2 (0)	7 (12.5)	6 (6.3)	7	-	173 (2)
Chocó	9 (10.0)	29 (51.2)	23 (10.0)	31	1 (0)	140 (4)
Peru	22 (14.6)	111 (25.3)	46 (7.1)	158	4 (7.7)	592 (14)
Amazon	20 (10.5)	98 (23.5)	43 (6.1)	138	3 (8.3)	502 (12)
Andes	10 (25.0)	20 (42.3)	12 (5.9)	20	1 (0)	90 (2)
Bolivia	23 (11.1)	126 (31.6)	40 (4.7)	161	4 (18.2)	438 (19)
Amazon	20 (4.2)	83 (23.8)	28 (2.7)	108	3 (20.0)	260 (13)
Andes	11 (16.7)	50 (58.7)	27 (5.6)	53	1 (0)	178 (6)

were new records. The Chocó was the ecoregion where fieldwork documented the highest number of new records, in relation to the number of useful species (28 %), medicinal uses (53 %) and ailments and diseases (12 % new records). In Colombia and Peru, fieldwork also yielded much novel information on medicinal species (20 and 15 % new records, respectively) and on ailments and diseases (15 and 7 %, respectively). Colombia was the country with more new records (40 %), followed by Bolivia (31 %).

The Amazon had the highest values in all analyzed variables, with 74 species (50 % of species potentially present), and an average (\pm SD) of 8.2 (\pm 15.8) uses per species (Table 1). The Amazon had 89 % of all the reported uses, 89 % of ailments and diseases, and 84 % of use-reports and the largest proportion of the data (83 % of the references and 57 % of the interviews). Medicinal use information was found for 48 % of the indigenous groups living in the area. In the Colombian Amazon we found the highest number of medicinal species of palms, the highest percentage of useful species in relation to the potential species available, the highest number of indigenous groups with information, and the largest number of references. In the Peruvian Amazon, we found the highest number of different medicinal uses and ailments and diseases, the highest number of use-reports, the highest number of medicinal uses per species and the largest number of interviews. In the Bolivian Amazon we found the second highest number of medicinal uses, ailments and diseases and medicinal uses per species, but the lowest number of useful species. The Ecuadorian Amazon had the lowest number of medicinal uses per species, and the lowest values of medicinal uses and ailments and diseases treated, use-reports and interviews, although this country had the highest percentage of studied indigenous groups in the ecoregion.

The Andes and Chocó showed a more uniform pattern across all four countries (Table 1). In the Andes, Bolivia had the highest values in most of the variables analyzed, except for the number of bibliographical references and the number of indigenous groups studied which peaked in Ecuador, where information in turn mostly came from references. The Colombian Andes showed the lowest values for all variables since no bibliographic references about medicinal use were available for this ecoregion, and interviews were conducted in only two communities. Similar to Bolivia, Peru had the highest number of useful species, but the lowest percentage of useful species in relation to the overall species number. Within the Chocó, Colombia had the highest values in most of the variables analyzed, except for the number of indigenous groups studied, which peaked in Ecuador, where information in turn mostly came from references. In general terms, the Chocó was more important than the Andes in Colombia and Ecuador.

Colombia was the country with the largest number of palms species used (56), different ailments and diseases treated (94), indigenous groups studied (26), number of references available (40), and second in the number of interviews conducted (466) (Table 1). Ecuador had the highest proportion of indigenous groups studied with respect to the total number of indigenous groups in the country (83 %) but had the lowest values for most variables. Peru presented the highest proportions of useful species in relation to the total number of species for the country (32 %, although it had not the highest palm diversity), number of use-reports (472), and the largest number of interviews (592), but had the least number of references available (32). Bolivia showed the highest value in the number of different medicinal uses (307), average number of

uses per species (3.3 ± 9.9), but had the lowest number of useful species (27) and references (26).

Palms in Medicinal Use Subcategories and Different Medicinal Uses

We found medicinal uses for palms in all the 20 medicinal subcategories (Table 2). The five most important subcategories with the greatest number of palm species were: Digestive system (49 % of medicinal species), Skin and subcutaneous tissue (46 %), Infections and infestations (40 %), Respiratory system (39 %), and General ailments with unspecific symptoms (29 %). In the case of the use-reports, the order is different however, and the subcategory Digestive system holds the first place with 19 % of total use-reports. The subcategory “Not specified at all” was also among the highest values reported for useful species (37 %), and use-reports (8 %).

At the ecoregion level, the proportion of palms used for medicinal purposes was higher in the lowlands (the Amazon and Chocó) than in the Andes for most medicinal subcategories (Table 2). In the Amazon, the relative importance of each subcategory was similar to the pattern previously described, except for the category General ailments, which was replaced by Not specified at all. The Chocó had a different usage pattern than the Amazon. Only two of the major subcategories in the Amazon were of importance in the Chocó: Skin and subcutaneous tissue (36 % of medicinal species), and Digestive system (32 %). Cultural diseases and disorders (32 %), Urinary system (32 %), and Reproductive system and sexual health (32 %) rounded out the list of the top five most important categories. Digestive system only appeared among the important subcategories when considering the percentage of use-reports (17 %).

In the Andes, we also found a different pattern. In five of the 20 subcategories of medicinal use of palms, no uses were reported (Table 2). Only two of the major subcategories identified in the general pattern were also important in the Andes: Digestive system (59 % of medicinal species) and Infections and infestations (46 %). In contrast, Cultural diseases and disorders (36 %), General ailments with unspecific symptoms (27 %), and Urinary System (32 %) ranked among the five most important subcategories. Interestingly, in the Andes the subcategory Not specified at all occupied the third place of importance (36 %). Respiratory systems only appeared among the important subcategories considering the percentage of use-reports (9 %).

At the country level, the proportion of use of palms for medicinal purposes was higher in Bolivia and Peru than in Ecuador and Colombia (Table 2). However, in all countries there was a correspondence between the number of useful species and use-reports. At least four of the five subcategories with greater relative importance in the overall pattern appear as the most important in all four countries, although one cannot differentiate a general pattern. The subcategory Digestive system ranked most important in three countries, Peru (61 % of medicinal species), Bolivia (52 %), and Ecuador (44 %), but occupied second place in Colombia (37 %). Skin and subcutaneous tissue was the most important subcategory in Colombia (48 %), with lower importance in other countries (5th in Ecuador and Bolivia, 7th in Peru). General ailments with unspecific symptoms was among the top two in Bolivia (52 %) and Peru (34 %), but not among the five most important in Colombia (11th) and Ecuador (8th), although in the latter case they appeared important considering the number of use-reports (7 %). Respiratory system was more important in Ecuador (36 %, 3rd) and Bolivia (48 %, 4th).

Table 2 Medicinal palm species and use-reports in 20 medicinal subcategories in northwestern South America, broken down by ecoregions and countries. Data came from two sources: bibliography and fieldwork

Medicinal subcategories	Total	Ecoregions					Countries									
		Amazon		Andes		Chocó	Colombia		Ecuador		Peru		Bolivia			
		Medicinal species	Use-reports species	Medicinal species	Use-reports species	Medicinal species	Use-reports species	Medicinal species	Use-reports species	Medicinal species	Use-reports species	Medicinal species	Use-reports species			
Digestive system	46	295	39	250	13	24	8	21	21	64	16	40	25	129	14	62
Skin and subcutaneous tissue	43	126	37	107	5	7	9	12	27	42	9	12	11	13	12	59
Infections and infestations	37	175	32	157	10	13	3	5	19	46	9	17	18	70	13	42
Respiratory system	36	201	31	181	6	11	7	9	16	65	13	42	13	27	13	67
General ailments with unspecific symptoms	27	119	26	107	6	9	2	3	7	14	5	16	14	32	14	57
Cultural diseases and disorders	24	46	16	27	8	10	8	9	8	11	4	6	5	8	12	21
Poisonings	22	71	22	70	1	1	-	-	16	34	3	3	7	10	6	24
Muscular-skeletal system	21	70	19	60	4	6	3	4	8	10	6	9	6	25	8	26
Blood and cardiovascular system	21	56	17	48	2	2	5	6	6	9	4	4	9	22	8	21
Urinary system	20	72	13	44	7	12	8	16	10	18	4	14	8	27	5	13

Table 2 (continued)

Medicinal subcategories	Total	Ecoregions						Countries									
		Amazon			Andes			Chocó		Colombia		Ecuador		Peru		Bolivia	
		Medicinal species	Use-reports	Medicinal species	Use-reports	Medicinal species	Use-reports	Medicinal species	Use-reports	Medicinal species	Use-reports	Medicinal species	Use-reports	Medicinal species	Use-reports	Medicinal species	Use-reports
Reproductive system and sexual health	19	56	13	40	4	4	7	8	9	10	16	4	4	8	22	6	14
Pregnancy, birth and puerperium	16	52	15	41	4	4	8	2	3	6	11	3	4	11	29	5	8
Dental health	12	24	10	20	1	1	1	2	3	5	11	6	10	-	-	3	3
Sensory system	8	16	7	11	1	1	2	2	3	3	3	2	6	4	6	1	1
Metabolic system and nutrition	6	12	3	8	-	-	-	3	4	1	1	3	4	0	-	2	7
Endocrine system	6	14	6	14	-	-	-	-	1	1	1	-	-	6	11	2	2
Nervous system and mental health	4	6	2	4	1	1	1	1	1	1	1	1	1	3	4	-	-
Veterinary	3	8	2	7	-	-	-	1	1	2	4	-	-	1	1	1	3
Other medicinal uses	8	13	6	11	-	-	-	2	2	4	4	1	1	4	5	1	3
Not specified at all	34	121	30	101	8	11	5	9	13	42	15	30	15	31	8	18	18

3rd), than in Colombia (29 %, 4th) and Peru (32 %, 5th). Colombia was the only country that reported the use of palms in all subcategories evaluated.

Both in general, and in terms of ecoregion and country, there was a clear correspondence between the number of species reported as useful and use-reports for the 157 reported medicinal conditions in the 20 medicinal subcategories described below (Table 3). Most reported ailments and diseases were reported both in the literature and current fieldwork, and 22 (14 % of total) were only found in recent fieldwork.

Medicinal uses were reported for all palm parts. The root was the most frequently used part, with records in all 20 subcategories, and 38 % of the use-reports (Table 4). The fruits and seeds were also important, and were used to treat ailments and diseases in 18 and 19 subcategories, and 19 and 17 % of the use-reports, respectively. About 5 % of the use-reports found in literature did not specify the palm part.

1. Blood and cardio-vascular system

In this subcategory, there were five reported ailments and illnesses (4 % of total), all gathered only from the lowlands (the Amazon and Chocó) (Table 3). Anemia was the most important condition, with the largest percentage of useful species and use-reports. This was especially important in the Amazon and at the country level in Bolivia. Blood purification was the second most important use, reported in the Amazon and Chocó, and in all countries except Bolivia. The fruits and roots were the palm parts mostly used (Table 4). *Euterpe precatoria* was the most important species in this subcategory, particularly in the Amazon, and in Peru, where it was used to treat three different ailments (Appendix 2).

2. Cultural diseases and disorders

Ten ailments and different disorders (6.7 % of total) were reported for this subcategory (Table 3). These were mainly distributed in the Amazon of the four countries. Using palms to treat Fright was the most important use, although this was reported only in the Amazon and the Andes of Bolivia and Peru. Warding off evil spirits, Strengthening the spirit, or Calling good spirits were also important, especially in the Colombian Chocó. Using palms to cure Witchcrafts, Bad air, and Evil eye, had a greater importance in Amazonia and the Chocó, although the importance differed between countries. Seeds, spines, leaves and roots were the most often used palm parts (Table 4). *Bactris gasipaes* and *Iriarteia deltoidea* (with three conditions each) were the most important species in this subcategory. While the first species was more important in the Andes and the Chocó, the second was more important in the Amazon, mostly of Ecuador and Peru (Appendix 2).

3. Dental health

Five different conditions (3 % of the total) were reported for this subcategory, with 38 % of the use-reports unspecified (Table 3). The Amazon at the ecoregional, and Colombia at the country level had the greatest number of reported ailments. Peru had no reports in this subcategory. Toothache treatment was the most important use in all three ecoregions, but with greater importance in the Amazon, and in Ecuador at country

Table 3 Medicinal palm species and use-reports in 20 medicinal subcategories and for different ailments and diseases in northwestern South America, broken down by ecoregions and countries, combining data from bibliography and fieldwork

Subcategories/ Ailments and diseases	Ecoregions																
	Total	Amazon				Andes				Chocó				Countries			
		Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Colombia	Ecuador	Peru	Bolivia
Blood and cardiovascular system	21	56	17	48	2	2	5	6	6	9	4	4	4	9	22	8	21
Anemia	14	39	10	34	2	2	3	3	4	6	1	1	6	13	7	19	
Blood purification	6	7	5	6	-	-	1	1	1	1	3	3	2	3	-	-	
Circulatory problems	3	3	3	3	-	-	-	-	-	-	-	-	-	1	1	2	2
Blood pressure	2	2	1	1	-	-	1	1	1	1	-	-	-	1	1	-	-
Hemorrhoids	1	4	1	4	-	-	-	-	-	-	-	-	-	1	4	-	-
Goiter	1	1	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-
Cultural diseases and disorders	24	46	16	27	8	10	8	9	8	11	4	6	5	8	12	21	
Freight	12	21	7	12	7	9	-	-	-	-	-	-	-	4	10	17	
Psychosomatic	5	5	1	1	-	-	4	4	3	3	2	2	-	-	-	-	
Witchcraft	4	4	2	2	-	-	2	2	1	1	1	1	-	-	2	2	
Bad air	3	4	3	3	1	1	-	-	-	-	2	3	1	1	-	-	
Evil eye	3	4	1	1	-	-	2	3	2	3	-	-	-	-	1	1	
Angry women	1	3	1	3	-	-	-	-	1	3	-	-	-	-	-	-	
Strengthen health	1	2	1	2	-	-	-	-	-	-	-	-	-	1	2	-	

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries							
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia	
	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species
Freight in children	1	1	1	-	-	-	-	-	-	-	-	-	1	1
Insanity	1	1	1	-	-	-	1	1	-	-	-	-	-	-
Physically strengthen	1	1	1	-	-	-	-	-	-	-	1	1	-	-
Dental health	12	10	20	1	1	2	3	5	11	6	10	-	3	3
Toothache	6	4	4	1	1	1	2	1	2	3	3	-	2	2
Unspecified	4	3	8	-	-	1	1	2	5	2	3	-	1	1
Caries	3	4	4	-	-	-	-	2	2	2	2	-	-	-
Tooth care	1	2	2	-	-	-	-	-	-	1	2	-	-	-
Dental floss	1	1	1	-	-	-	1	1	1	-	-	-	-	-
Gum health	1	1	1	-	-	-	1	1	1	-	-	-	-	-
Digestive system	46	39	250	13	24	8	21	21	64	16	40	25	129	14
Hepatitis	22	21	87	4	5	-	6	6	16	2	2	18	73	1
Diarrhea	17	15	55	4	5	1	5	8	20	5	13	7	12	6
Purgative	17	31	21	3	3	4	7	11	17	6	6	4	7	1
Intestinal pain	12	22	11	1	1	1	1	1	1	5	6	5	5	10
Stomach pain	11	21	9	5	5	2	2	3	3	4	4	4	7	6
Liver pain	8	19	7	16	1	2	2	1	1	2	3	5	10	3
Vomiting	8	10	8	10	-	-	-	3	3	-	-	3	4	2
Gallbladder	6	6	8	8	-	-	-	-	-	-	-	2	2	4

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries									
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia			
	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports		
Total																
Unspecified	4	4	3	3	-	-	1	1	-	1	1	1	1	2	2	
Gastritis	3	4	1	2	-	-	2	2	2	2	2	-	-	-	-	
Inguinal hernia	3	4	2	2	2	-	-	-	-	-	2	2	2	2	2	
Abdominal pain	3	3	3	3	-	-	-	-	-	-	1	1	2	2	2	
Colic	3	3	2	2	1	1	-	-	2	2	-	-	1	1	1	
Nausea	2	3	2	3	-	-	-	-	-	-	2	3	-	-	-	
Colic in babies	2	2	1	1	1	1	-	-	-	-	1	1	1	1	1	
Appendicitis	1	1	1	1	-	-	-	-	-	-	-	-	1	1	1	
Astringent	1	1	-	-	-	-	1	1	1	1	-	-	-	-	-	
Digestion (children)	1	1	1	1	-	-	-	-	-	-	1	1	1	-	-	
Jaundice	1	1	1	1	-	-	-	1	1	-	-	-	-	-	-	
Endocrine system	6	14	6	14	-	-	-	1	1	-	6	11	2	2	2	
Diabetes	6	14	6	14	-	-	-	1	1	-	6	11	2	2	2	
General ailments with unspecific symptoms	27	119	26	107	6	9	2	3	7	14	5	16	14	32	14	57
Fever	22	61	20	55	4	4	2	2	5	9	1	1	9	18	13	33
Headache	12	19	11	18	1	1	-	-	-	-	2	5	3	3	8	11
Body pain	9	17	8	14	3	3	-	-	-	-	4	6	2	2	5	9
Body weakness	2	5	2	5	-	-	-	-	-	-	-	2	4	1	1	1

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecotregions												Countries									
	Amazon			Andes			Chocó			Colombia			Ecuador			Peru			Bolivia			
	Medicinal reports	Use- species	Use- reports	Medicinal reports	Use- species	Use- reports	Medicinal reports	Use- species	Use- reports	Medicinal reports	Use- species	Use- reports	Medicinal reports	Use- species	Use- reports	Medicinal reports	Use- species	Use- reports	Medicinal reports	Use- species	Use- reports	
Unspecified	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4
Indisposition	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Rehydration	1	6	1	4	1	4	1	1	1	1	1	1	2	1	3	1	1	1	1	1	1	1
Lack of appetite	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3	1	3
Shivers	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tiredness	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Inflections and infestations	37	175	32	157	10	10	13	3	3	5	19	46	9	17	18	70	13	42	42	42	42	42
Malaria	19	62	17	58	3	3	4	4	4	9	9	16	2	2	14	44	4	42	42	42	42	42
Anthelmintic	12	31	10	24	5	5	5	2	2	2	4	8	4	9	2	2	4	12	12	12	12	12
Amoebas	10	22	10	22	2	2	2	2	2	2	2	4	2	2	2	2	2	18	18	18	18	18
Yellow Fever	6	17	6	16	1	1	1	1	1	1	3	3	3	3	4	14	9	18	18	18	18	18
Unspecified	6	8	5	7	1	1	1	1	1	1	1	1	1	1	3	4	2	2	2	2	2	2
Lice	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Tuberculosis	4	11	3	10	1	1	1	1	1	1	1	5	1	2	2	3	1	1	1	1	1	1
Leishmaniasis	2	6	2	5	1	1	1	1	1	1	1	2	1	1	1	1	1	3	3	3	3	3
Smallpox	2	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Itch	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Aids	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Chickenpox	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cholera	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Dengue	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries							
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia	
	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species
Total	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Measles	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Tonsillitis	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Warts	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Metabolic system and nutrition	6	12	3	8	3	4	1	1	1	3	4	2	2	7
Vitamin	5	11	3	8	2	3	1	1	1	2	3	2	2	7
Cholesterol	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Muscular- skeletal system	21	70	19	60	4	6	3	4	8	10	6	9	6	25
Rheumatism and arthritis	9	20	8	19	1	1	1	1	4	4	1	3	4	6
Muscular pain	7	9	6	7	1	1	2	2	2	2	2	3	1	1
Back pain	5	20	5	19	1	1	1	1	1	1	1	3	3	9
Hematomas	4	4	3	3	1	1	1	1	1	1	1	1	1	2
Fractures	3	5	2	4	1	1	1	1	1	1	1	2	2	4
Bone pain	3	4	1	2	2	2	1	1	1	1	1	2	2	3
Hernia	3	3	2	2	1	1	1	1	1	1	2	2	1	1
Hip pain	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Inflammations	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Knee pain	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Edema	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries							
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia	
	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports
Sprains	1	1	1	1	-	-	-	-	1	1	-	-	-	-
Nervous system and mental health	4	6	2	4	1	1	1	1	1	1	3	4	-	-
Epilepsy	1	3	1	3	-	-	-	-	1	1	1	2	-	-
Psychosomatic	1	1	-	-	-	1	1	1	1	-	-	-	-	-
Seizures	1	1	-	-	1	1	-	-	-	-	1	1	-	-
Soporific	1	1	1	1	-	-	-	-	-	-	1	1	-	-
Poisonings	22	71	22	70	1	1	-	-	16	34	3	7	10	6
Snake bit	13	32	13	31	1	1	-	-	8	15	2	6	7	4
antidote														
Insect bit	9	23	9	23	-	-	-	-	4	8	1	2	2	4
Scorpion stings	4	6	4	6	-	-	-	-	4	5	-	1	1	-
Antidote	4	4	4	4	-	-	-	-	4	4	-	-	-	-
Worms poisonous bites	2	4	2	4	-	-	-	-	-	-	-	-	-	2
Antidote for poisonous plants	1	1	1	1	-	-	-	-	1	1	-	-	-	-
Ray stings	1	1	1	1	-	-	-	-	1	1	-	-	-	-

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries									
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia			
	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species		
Pregnancy, birth and puerperium	16	52	15	41	4	8	2	3	6	11	3	4	11	29	5	8
Galactagogue	9	15	9	13	1	2	-	-	1	1	3	4	7	9	1	1
Childbirth problems	8	14	8	12	2	2	-	-	2	3	-	-	5	7	3	4
Postpartum	5	5	1	1	3	3	1	1	1	1	-	-	1	1	3	3
Antibiotic	4	10	4	9	-	-	1	1	2	3	-	-	4	7	-	-
Abortive	4	6	4	5	-	-	1	1	2	2	-	-	3	4	-	-
Mastitis	1	1	-	-	1	1	-	-	-	-	-	-	1	1	-	-
Pregnancy vomiting	1	1	1	1	-	-	-	-	1	1	-	-	-	-	-	-
Reproductive system and sexual health	19	56	13	40	4	7	8	9	10	16	4	4	8	22	6	14
Fertility	12	19	7	10	1	1	7	8	8	10	1	1	4	8	-	-
Menstrual problems	7	11	7	10	1	1	-	-	2	4	1	1	2	2	3	4
Contraceptive	4	7	4	5	1	2	-	-	-	-	1	1	2	2	2	4
Uterus infections	3	13	2	10	2	3	-	-	-	-	-	-	2	7	3	6
Gonorrhea	3	3	3	3	-	-	-	-	1	1	-	-	2	2	-	-
Emmenagogue	1	1	1	1	-	-	-	-	-	-	-	-	1	1	-	-

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries							
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia	
	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports
Inflammation of ovaries	1	1	-	-	-	1	1	-	-	1	1	-	-	-
Veneral diseases	1	1	1	-	-	-	1	1	-	-	-	-	-	-
Respiratory system	36	201	31	181	6	11	7	16	65	13	42	13	27	67
Cough	21	47	18	42	3	3	1	8	21	8	11	8	4	11
Cold	18	51	18	46	3	5	-	2	2	8	13	5	6	30
Pneumonia	12	32	12	30	1	1	1	5	9	1	1	7	10	12
Flu	10	29	10	29	-	-	-	6	19	3	6	1	1	3
Respiratory infections	6	13	6	12	1	1	-	3	4	1	2	1	1	6
Throat ache	6	7	5	6	-	-	1	2	3	3	3	1	1	-
Bronchitis	4	10	4	9	-	-	1	2	2	1	2	2	4	2
Asthma	3	5	1	3	-	-	2	1	1	3	4	-	-	-
Asphyxia	2	2	-	-	-	-	2	2	2	-	-	-	-	-
Pertussis	2	2	2	2	-	-	-	2	2	-	-	-	-	-
Chest pain	1	1	1	1	-	-	-	-	-	-	-	-	-	1
Sudorific	1	1	-	-	1	1	-	-	-	-	-	-	-	1
Unspecified	1	1	1	1	-	-	-	-	-	-	-	-	-	1
Sensory system	8	16	7	11	1	2	2	3	3	2	6	4	6	1
Earache	4	10	4	7	1	2	1	2	2	1	4	3	4	-

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries									
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia			
	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species	Medicinal reports	Use- species		
Eye inflammation	3	4	2	3	-	-	1	1	1	1	1	1	1	2	-	-
Cataracts	1	1	1	1	-	-	-	-	-	-	-	-	-	-	1	1
To clear the vision	1	1	-	-	-	-	1	-	-	1	1	-	-	-	-	-
Skin and subcutaneous tissue	43	126	37	107	5	7	9	27	42	9	12	11	13	12	59	
Extraction of spines	19	37	17	32	1	1	4	15	27	4	4	-	-	4	6	
Wounds	12	18	9	14	1	1	3	4	4	2	2	1	1	5	11	
Skin infections	8	14	7	13	-	-	1	2	2	1	2	4	6	2	4	
Abscesses	7	14	7	12	2	2	-	-	-	1	1	1	1	5	12	
Burns	6	10	5	8	2	2	-	-	-	2	3	3	3	3	4	
Psoriasis	4	9	2	7	1	1	1	1	1	-	-	-	-	3	8	
Swellings	4	6	4	6	-	-	-	-	-	-	-	-	-	4	6	
Hemorrhage	3	5	2	3	-	-	1	3	4	-	-	-	-	1	1	
Skin spots	3	4	3	4	-	-	-	1	1	-	-	1	1	2	2	
Dandruff	1	2	1	2	-	-	-	-	-	-	-	-	-	1	2	
Empeine	1	2	1	2	-	-	-	-	-	-	-	-	-	1	2	
Botfly infection	1	1	1	1	-	-	-	1	1	-	-	-	-	-	-	
Callus	1	1	1	1	-	-	-	-	-	-	-	-	-	1	1	
Cicatrizing	1	1	-	-	-	-	1	1	1	-	-	-	-	-	-	

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions						Countries							
	Amazon		Andes		Chocó		Colombia		Ecuador		Peru		Bolivia	
	Medical reports	Use- species	Medical reports	Use- species	Medical reports	Use- species	Medical reports	Use- species	Medical reports	Use- species	Medical reports	Use- species	Medical reports	Use- species
Dry skin	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rash	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Urinary system	20	13	44	7	12	8	16	10	18	4	14	8	27	5
Inflammation of kidneys	15	8	28	7	10	6	9	5	9	3	8	7	21	3
Urinary problems	7	6	7	1	1	2	2	4	5	2	3	2	2	2
Prostate	5	4	6	1	1	1	1	2	3	2	2	4	1	1
Diuretic	3	4	—	—	—	3	4	1	1	2	3	—	—	—
Urinary infections	2	3	3	2	—	—	—	—	—	—	—	2	2	1
Veterinary	3	8	2	7	—	1	1	2	4	—	—	1	1	3
Scabies	1	3	1	3	—	—	—	—	—	—	—	—	—	1
Bottle infection	1	2	1	2	—	—	—	1	2	—	—	—	—	—
Anthelmintic	1	1	1	1	—	—	—	1	1	—	—	—	—	—
Purgative	1	1	—	—	—	1	1	1	1	—	—	—	—	—
Unspecified	1	1	1	1	—	—	—	—	—	—	—	1	1	—
Other medicinal uses	8	13	6	11	—	2	2	4	4	1	1	4	5	1
Cancer	6	8	4	6	—	2	2	3	3	—	—	4	5	—
Hair loss	2	3	2	3	—	—	—	—	—	1	1	—	—	1

Table 3 (continued)

Subcategories/ Ailments and diseases	Ecoregions					Countries						
	Amazon	Andes	Chocó	Colombia	Ecuador	Peru	Bolivia	Use- reports	Medicinal species	Use- reports	Medicinal species	Use- reports
Total	1	1	1	1	1	1	1	101	30	15	31	18
Alcoholism	1	1	1	1	1	1	1	1	1	1	1	1
Unspecified	1	1	1	1	1	1	1	1	1	1	1	1
Not specified at all	34	121	30	101	8	11	5	9	13	15	42	30

Table 4 Use-reports for the different palm parts used in each medicinal subcategory, combining data from bibliography and fieldwork

Subcategories	Bract	Flower	Fruit	Leaf entire	Leaf petiole	Leaf rachis	Leaf sheath	Leaf spear	Palm heart	Root	Seed	Spine	Stem	Unspecified
Blood and cardiovascular system	-	-	16	-	-	-	-	-	9	29	2	-	-	-
Cultural diseases and disorders	2	1	2	6	1	-	-	3	2	6	10	9	3	1
Dental health	-	1	3	-	-	-	-	1	9	7	1	1	-	1
Digestive system	-	12	30	2	1	-	-	2	10	48	29	-	3	1
Endocrine system	-	-	4	-	-	-	-	-	-	8	2	-	-	-
General ailments with unspecific symptoms	-	5	39	1	-	-	-	-	7	25	36	-	5	1
Infections and infestations	-	8	40	5	2	-	1	-	46	182	42	-	2	4
Metabolic System and nutrition	-	-	4	-	-	-	-	-	-	7	-	-	1	-
Muscular-skeletal system	-	-	16	2	-	-	1	-	6	35	9	-	-	1
Nervous system and mental health	-	-	-	2	-	-	-	-	-	1	-	1	1	1
Poisonings	-	4	1	3	1	-	-	-	26	27	4	-	4	1
Pregnancy, birth and puerperium	-	2	10	1	1	-	-	-	4	25	8	-	-	1
Reproductive system and sexual health	-	2	13	-	1	-	-	-	2	31	3	-	1	3
Respiratory system	-	7	65	9	1	-	-	-	13	59	44	-	3	-
Sensory system	-	-	4	1	-	-	-	2	2	3	4	-	-	-
Skin and subcutaneous tissue	2	-	24	5	-	1	-	-	1	17	29	38	5	4
Urinary system	-	-	4	-	-	-	-	1	-	42	23	-	1	1
Veterinary	-	-	-	-	-	-	-	-	-	6	1	-	1	-
Other medicinal uses	-	1	3	-	1	-	-	-	-	6	2	-	-	-
Not specified at all	-	1	18	8	-	-	-	1	6	31	9	-	5	42
Total	4	44	256	45	9	1	2	10	143	595	248	49	35	62

level. Second in importance was the use of palms for the prevention/treatment of Cavities, with reports only in the Amazon of Colombia and Ecuador. The palm heart and roots were the most cited palm parts (Table 4). The most important species related to dental health were *Euterpe precatoria* (three ailments), *Hyospathe elegans* and *Cocos nucifera* (two ailments each); the first two species were more important in the Amazon and in Ecuador, and *C. nucifera* in the Colombian Chocó (Appendix 2).

4. Digestive system

This subcategory included the highest number of complaints and/or diseases, with 18 different ailments (12 % of total) (Table 3). The largest number of complaints was found in the Amazon, and in Peru and Bolivia. In all ecoregions and countries, most species were used to treat Hepatitis, and this use was more important in the Amazon and Peru. Diarrhea, Purgative, Intestinal disorders (only reported in field work), Digestive problems, and Stomach pain were the next five major ailments for which palms were used. All of these ailments had high importance in the Amazon: the first two in Colombia, and the second two in Ecuador, Peru and Bolivia. The roots, fruits, and seeds were the palm parts mostly used (Table 4). The most important species to treat ailments related to the digestive system were *Euterpe precatoria* (11 ailments), *Cocos nucifera* and *Oenocarpus bataua* (nine ailments each); the same three species were more important in the Amazon. *E. precatoria* was more important in Colombia and Peru, *C. nucifera* in Colombia and Ecuador, and *O. bataua* in Peru and Bolivia (Appendix 2).

5. Endocrine system

The only disease found for this subcategory was Diabetes, which was reported in the Amazon of Colombia, Peru, and Bolivia, being Peru the country with the highest number of species used for this purpose (Table 3). The roots of the palms were the most used palm parts (Table 4). Six species were reported to treat this ailment: *Euterpe precatoria*, *E. oleracea*, *Oenocarpus bataua*, *O. mapora*, *Phytelephas macrocarpa* and *Socratea exorrhiza*, all were reported in the Amazon of Peru (Appendix 2).

6. General ailments with unspecific symptoms

For this subcategory, nine different diseases were found (6 % of total) (Table 3). All ailments were reported in the Amazon, and Peru and Bolivia had the highest number of use-reports. The most important uses of palms were to treat Fever, which was reported in all ecoregions and countries. However, the importance was higher in the Amazon, and in Peru and Bolivia. Headache and Body pain were the next most important ailments and both were reported in the Amazon and the Andes of all countries, except Colombia. The eight remaining conditions had minor importance and were reported mainly in the Amazon of Peru and Bolivia. The seeds and roots were the palm parts mostly used (Table 4). *Oenocarpus bataua* was the most important species, particularly in the Amazon, and in Bolivia, where it was used to treat five different ailments (Appendix 2).

7. Infections and infestations

For this subcategory, 16 different ailments were reported (11 % of total), making it the sub-category with the third largest number of diseases and illnesses reported (Table 3). Most afflictions were reported in the Amazon and in Colombia. Treatment of Malaria, was the most important use, and was most important in Amazonia, Peru and Colombia. Using palms as Anthelmintic and to treat infections caused by Amoebas was important in the Amazon. Anthelmintic use was less important in Peru and Amoebas was much more important in Bolivia. The remaining 13 illnesses and other diseases were less important, although they had higher importance values in the Amazon and in Colombia. The seeds and roots were the palm parts most used (Table 4). The most important species to treat ailments related to infections and infestations were *Oenocarpus bataua* (eight ailments), *Euterpe precatoria* (seven ailments), *Bactris gasipaes* and *Attalea phalerata* (six ailments each); all four species were more important in the Amazon, while at the country level *O. bataua* was so in Ecuador, Peru and Bolivia, *E. precatoria* and *B. gasipaes* in Peru and Colombia, and *A. phalerata* in Bolivia (Appendix 2).

8. Metabolic system and nutrition

Two complaints (1 % of the total) were reported in this subcategory, both only from the lowlands (the Amazon and Chocó), and were absent in Peru (Table 3). The use of palms as a source of Vitamins or vitamin supplement was the most important use, particularly in the Amazon, and in Ecuador and Bolivia. Cholesterol-lowering treatments were reported only from the Ecuadorian Chocó. The roots were the palm parts most used (Table 4). Six species fall in this subcategory: *Attalea phalerata*, *Oenocarpus bataua*, *Euterpe precatoria* in the Amazon, and *Bactris gasipaes*, *Euterpe oleracea*, and *Wettinia aequalis* in the Chocó (Appendix 2).

9. Muscular-skeletal system

Twelve illnesses and diseases were reported in this subcategory (8 % of total), most in the Amazon, and at the country level in Ecuador in Bolivia (Table 3). The use of palms in the treatment of Rheumatism and arthritis, to relieve Muscle aches (only reported in fieldwork), and to treat Back pain, were the three most important uses in this subcategory. In all three cases their importance was greater in Amazonia, and at the country level in Ecuador and Bolivia. The nine remaining ailments were of minor importance and were in all cases more important in the Amazon. Only the treatment of Bone pain was more important in the Andes, while Inflammations was so in the Chocó. No clear pattern was observed among the four countries. The roots were the palm part most used (Table 4). The most important species for treating the Muscular-skeletal system were *Attalea phalerata* and *Euterpe precatoria*, with seven ailments each (Appendix 2). Both species were more important in the Amazon, with *A. phalerata* most important in Bolivia and *E. precatoria* in Peru.

10. Nervous system and mental health

In this subcategory we found four conditions (3 % of total), each requiring a different species for treatment, and only six use-reports (Table 3), which were only reported in fieldwork. This subcategory had among the lowest number of medicinal species and use-reports. In Amazonia, two ailments were reported, the treatment of Epilepsy and the use for Soporific purposes. The first use was reported in Ecuador and Peru, and the second only in Peru. In the Peruvian Andes, palms were used to treat Seizures and in the Colombian Chocó to treat Psychosomatic conditions and ailments related to the nervous system (e.g., stuttering). The entire leaves were the palm part most used for treating these conditions (Table 4). Four species fall in this subcategory: *Bactris gasipaes*, *B. simplicifrons*, *Desmoncus cirrhiferus*, and *Roystonea regia* (Appendix 2). The first two were reported for the Amazon and the rest for the Chocó and Andes, respectively.

11. Poisoning

Seven different ailments fell into poison and related illnesses (5 % of total) (Table 3). Most complaints were reported in the Amazon, and only one in the Andes. There were no reported uses for the Chocó. Among the countries, Colombia had the highest number of applications. The use of palms as Snake bite antidote, and to treat Insect bites were the most important uses, mainly in the Amazon, and at the country level in Ecuador and Colombia, respectively. The five remaining conditions were much less important, and were reported almost entirely from the Colombian Amazon. The only exception was the treatment of Poisonous bites reported only in Bolivia. The roots and palm hearts were the palm parts used for treatment (Table 4). The most important species to treat ailments related to poisoning were *Socratea exorrhiza* (four ailments), *Attalea maripa* and *Chamaedorea angustisecta* (three ailments each); all species were more important in the Amazon, and in Colombia and Bolivia (Appendix 2).

12. Pregnancy, birth, and puerperium

Seven ailments fell in this subcategory (5 % of total), most of them reported in the Amazon, and at the country level in Colombia and Peru (Table 3). The use of palms as Galactagogue and in the treatment of Childbirth problems was the most important use, with greater importance in the Amazon, and in Peru. The use of palms in Post-partum treatments was the third most important use, and was the only important one in the Andes and Bolivia. The use of palms as an Abortificant was mentioned only in the lowlands (the Amazon and Chocó) and in Colombia and Peru. In Peru, this was the most important use. Mastitis and vomiting caused by pregnancy were less important conditions. The roots were the most commonly palm part used (Table 4). The most important species reported were *Bactris gasipaes* and *Cocos nucifera* (with six ailments each), both important in the Amazon, and at country level in Ecuador, Colombia and Peru (Appendix 2).

13. Reproductive system and reproductive health

Eight illnesses and diseases (5 % of total) fell in this subcategory most of them were reported for the Amazon, Ecuador and Peru (Table 3). Using palms for Fertility treatments was the most important use, mainly in the lowlands and in Colombia. The use in the treatment of Menstrual problems and as Contraceptives was also important, especially in the lowlands of Bolivia and Peru. The five remaining conditions were less important, with greater importance in the Amazon, except Inflammation of the ovaries, which was reported only in the Ecuadorian Chocó. The roots were the most widely used palm part (Table 4). *Bactris gasipaes* and *Euterpe precatoria* were the most important species, which were used to treat five and four different ailments respectively, mainly in the Amazon in Colombia and Peru (Appendix 2).

14. Respiratory system

For this subcategory, 12 complaints were reported (8 % of total), most of them from the Amazon and Colombia (Table 3). The use of palms in the treatment of Cough and Cold were the two most important uses. In both cases, their importance was greater in the Amazon. At the country level, Cough treatment was equally important in Colombia, Ecuador, and Bolivia, but Cold treatment was more important in Bolivia. The use of palms in the treatment of Pneumonia and Flu was next in importance, mainly in the Amazon, and at the country level in Peru and Colombia. The eight remaining conditions were less important with a general importance greater in the lowlands (the Amazon and Chocó), but with no identifiable pattern at the country level. The fruits and roots were the most used palm parts (Table 4). The most important species were *Euterpe precatoria* and *Oenocarpus bataua* (with nine ailments each), both more important in the Amazon, while across countries *E. precatoria* was more important in Bolivia and *O. bataua* in Colombia (Appendix 2).

15. Sensory system

Four conditions are included in this subcategory (3 % of total), most reported in the lowlands (the Amazon and Chocó) and at the country level in Ecuador (Table 3). Using palms to treat Earache was the most important use, with greater importance in the Amazon and Peru. Treatment of Eye inflammation was the second most important use in the lowlands of Colombia, Ecuador, and Peru. Palms were also used to treat Cataracts and Clear the vision, although the prevalence of this use was not very high. The fruits and seeds were the palm parts most used (Table 4). *Bactris gasipaes* was the most important species, used to treat two different diseases, and was more important in Chocó and in Ecuador (Appendix 2).

16. Skin and subcutaneous tissue

A total of 16 different ailments were reported for this subcategory (11 % of total), making it the second most important with the highest number of complaints reported (Table 3). Most illnesses were reported from the Amazon, and Bolivia reported the highest usage levels at the country level. Using palms spines for the Extraction of

thorns was the most important use, mainly in the Amazon, and Colombia. The treatment of Wounds in general (e.g., immediate cleaning, general damages, minor infections) was the second most important use, especially in the Amazon and Bolivia. The treatment of Skin infections (e.g., fungi, rashes, allergies, dermatosis), Abscesses and Burns were also important, especially in the Amazon and in Bolivia and Peru. The 12 remaining ailments were less important and most were reported only from the Amazon and from all countries except Ecuador. The spines of the stem and leaves (mainly from the petioles), and fruits were the palm parts most used (Table 4). *Attalea phalerata* and *Oenocarpus bataua* were the most important species in the Amazon, and at country level in Bolivia and Peru, which were used to treat eight and six different ailments respectively (Appendix 2).

17. Urinary system

In this subcategory, five different ailments were reported (3 % of total), mainly in Amazonia and the Chocó, and at the country level in Colombia and Bolivia (Table 3). The treatment for Inflammation of kidneys was the most important use, and mainly in Peru. Palms were also used to treat Urinary problems in general (e.g., Bladder pain and Urinary tract problems), Prostate problems, as a Diuretic, and to treat Urinary infections. In all cases these uses were more important in the Amazon and in Colombia, except Diuretic, which was only reported in the Chocó. The roots and seeds were the palm parts most often used for treating these conditions (Table 4). *Euterpe precatoria* and *Cocos nucifera* (with four ailments each) were the most important species, the first one more important in the Chocó and in Ecuador, and the second one in the Amazon and in the Peru (Appendix 2).

18. Veterinary

For this subcategory, four different conditions were reported (3 % of total), all in the lowlands (the Amazon and Chocó), and each reporting one useful species (three species in total), with only eight use-reports (Table 3). Three complaints were reported from the Amazon. The treatment of Scabies in animals had the highest importance, and was only reported from Bolivia in fieldwork. Palms for the treatment of Botfly infection and as an Anthelmintic were reported only from Colombia whereas as Purgatives were only reported from the Colombian Chocó. The roots were the most widely used palm part (Table 4). The most important species was *Socratea exorrhiza*, used to treat three different ailments in the Amazon and in Colombia (Appendix 2).

19. Other medicinal uses

Three complaints and diseases (2 % of total) could not be assigned to any of the subcategories listed above (Table 3). The use of palms in the treatment of Cancer was the most important use, mainly in the Amazon and Peru. The treatment to Prevent hair loss was reported in the Amazon of Bolivia and Ecuador, and as remedy for Alcoholism only in the Bolivian Amazon. The roots were the most widely used palm part for treating these conditions (Table 4). The most important species were *Attalea phalerata* and *Euterpe precatoria* (two ailments each), both more important in the

Amazon and at the country level in Ecuador, with *A. phalerata* more important in Bolivia and *E. precatória* in Colombia, Ecuador, and Peru (Appendix 2).

20. Not specified medicinal uses

We found 34 medicinal palms species (37 % of all species reported) and 121 use-reports (8 % of all use-reports) in this subcategory (Table 3). The Amazon contained the highest number of species, and among countries Ecuador and Peru. Thirty-four percent of the use-reports did not specify the plant part used, and most referred to the roots as the part used (Table 4).

Medicinal Palm Uses in Different Human Groups

Indigenous people clearly used medicinal palms more prominently than non-indigenous groups (Table 5). They had the highest medicinal use values in the number of useful species (82), different ailments and diseases treated (123), use-reports (1060), and average number of uses per species (12.8 ± 31.2). Indigenous populations were also the best-studied human group. The Amazon was the ecoregion with the highest values in all countries and for all groups except for the mestizos in Ecuador. In the Chocó, indigenous groups accounted for the highest values in the number of medicinal palm species and in the average number of uses per species, but the number of different ailments and diseases treated, and use-reports were higher among Afro-Americans. In the Andes, indigenous people had the highest values for all variables, although lower when compared to the Chocó of Colombia and Ecuador. Overall, mestizos were the second group in terms of different ailments and diseases treated.

Peru was the country with the greatest number of references and interviews. No use-reports were registered for mestizos in the Chocó and the Andes in Colombia, or in Amazonian Ecuador. Afro-Americans reported only uses in the Colombian Chocó (no fieldwork carried out in Ecuador), and had the lowest values of all groups in all countries. However, it is important to note that all ecoregions in all countries had high values for unidentified human groups, because the bibliographical information was not accurate. Thus, the unidentified group ranked second in all variables, except in the average number of uses per species.

All human groups showed different patterns in the distribution of knowledge for the medicinal subcategories (Table 6). Among the indigenous populations, the main subcategories corresponded closely to the ones that were also important in the general regional pattern described above: Digestive system, Skin and subcutaneous tissue, Respiratory system, Infections and infestations, and Cultural diseases and disorders. This sequence also corresponds to the categories that showed the highest values in the number of reported ailments and use-reports.

Mestizos had a different medicinal use pattern than indigenous people (Table 6). Although the major subcategories were the same, the order of importance was strikingly different, and mestizos did not report three medicinal subcategories (Metabolic system and nutrition, Nervous system and mental health, and Veterinary). Digestive system (70 % of total species) was the most important subcategory, followed by General ailments with unspecific symptoms (44 %), Infections and infestations (37 %), Respiratory system (33 %) and Urinary system (30 %). Skin and subcutaneous

Table 5 Medicinal uses of palms broken down by different human groups, countries and ecoregions in northwestern South America, combining data from bibliography and fieldwork

Human groups/countries	Ecoregions	Useful species	Ailments and diseases	Medicinal use-reports	Average±SD of medicinal uses per species	Bibliographical references	Interviews
Indigenous	Total	82	123	1060	12.8±31.2	87	1264
	All ecoregions	49	74	322	6.4±12.4	27	380
	Amazon	41	66	289	6.9±12.7	25	205
	Andes	4	5	7	1.8±0.8	0	87
	Chocó	14	19	26	1.9±1.6	3	88
Ecuador	All ecoregions	33	61	194	5.9±9.5	31	199
	Amazon	27	49	151	5.6±9.5	26	147
	Andes	7	6	10	1.4±0.7	3	—
	Chocó	9	23	33	3.7±1.8	3	52
	All ecoregions	29	56	218	7.5±12.1	15	335
Peru	Amazon	27	55	197	7.3±11.3	14	245
	Andes	11	13	21	1.9±1.7	1	90
	All ecoregions	23	73	326	14.2±21.2	16	350
	Amazon	20	63	266	13.3±18.6	15	172
	Andes	11	32	60	5.5±5.0	1	178
Mestizo	Total	27	53	208	8.0±10.9	17	606
	All ecoregions	5	2	7	1.4±0.5	6	—
	Amazon	5	2	7	1.4±0.5	6	—
	Andes	—	—	—	—	—	—
	Chocó	—	—	—	—	—	—
Ecuador	All ecoregions	3	8	13	4.3±2.9	1	261

Table 5 (continued)

Human groups/countries	Ecoregions	Useful species	Ailments and diseases	Medicinal use-reports	Average±SD of medicinal uses per species	Bibliographical references	Interviews
Peru	Amazon	—	—	—	—	—	—
	Andes	2	6	8	4.0±0.0	1	173
	Chocó	2	5	5	2.5±1.5	0	88
	All ecoregions	21	44	132	6.6±10.1	8	257
	Amazon	21	43	130	6.5±10.0	7	257
	Andes	1	2	2	2.0±0.0	1	—
Bolivia	All ecoregions	16	27	56	3.5±2.4	2	88
	Amazon	15	23	51	3.4±2.4	1	88
	Andes	2	5	5	2.5±1.5	1	—
	Total	12	27	41	3.4±4.0	4	86
Afro-American Colombia	All ecoregions	12	27	41	3.4±4.0	4	86
	Amazon	—	—	—	—	—	—
	Andes	—	—	—	—	—	—
	Chocó	12	27	41	3.4±4.0	4	86
Ecuador	All ecoregions	—	—	—	—	—	—
	Amazon	—	—	—	—	—	—
	Andes	—	—	—	—	—	—
	Chocó	—	—	—	—	—	—
Not identified Colombia	Total	40	67	244	6.1±8.4	34	—
	All ecoregions	10	24	37	3.7±4.1	10	—
	Amazon	8	18	29	3.6±3.9	5	—

Table 5 (continued)

Human groups/countries	Ecoregions	Useful species	Ailments and diseases	Medicinal use-reports	Average±SD of medicinal uses per species	Bibliographical references	Interviews
Ecuador	Andes	—	—	—	—	—	—
	Chocó	5	7	8	1.6±0.8	6	—
	All ecoregions	7	14	16	2.3±2.1	3	—
	Amazon	1	1	1	1.0±0.0	1	—
	Andes	5	7	8	1.6±0.8	2	—
	Chocó	1	6	7	7.0±0.0	1	—
Peru	All ecoregions	29	40	122	4.2±4.1	12	—
	Amazon	28	38	119	4.3±4.1	11	—
	Andes	1	3	3	3.0±0.0	1	—
	All ecoregions	13	28	69	5.3±6.0	9	—
Bolivia	Amazon	13	28	68	5.2±5.9	8	—
	Andes	1	1	1	1.0±0.0	1	—

Table 6 Medicinal palm species, different medicinal uses and use-reports in 20 medicinal subcategories for different human groups in northwestern South America, combining data from bibliography and fieldwork.

Subcategories	Indigenous			Mestizo			Afro-American			Not identified		
	Useful species	Ailments and diseases	Use-reports	Useful species	Ailments and diseases	Use-reports	Useful species	Ailments and diseases	Use-reports	Useful species	Ailments and diseases	Use-reports
Digestive system	39	13	181	19	10	48	2	3	6	25	14	60
Skin and subcutaneous tissue	34	14	109	6	3	7	2	2	2	7	5	8
Infections and infestations	28	13	110	10	7	19	2	2	2	19	7	44
Respiratory system	32	11	147	9	5	16	3	3	3	14	8	35
General ailments with unspecific symptoms	17	10	67	12	6	29	1	1	1	12	2	22
Cultural diseases and disorders	22	10	41	4	1	4	1	1	1	-	-	-
Poisonings	20	7	62	2	2	3	-	-	-	6	3	6
Muscular-skeletal system	15	11	55	5	2	5	1	2	2	8	4	8
Blood and cardiovascular system	17	3	34	5	4	11	2	3	3	5	4	8
Urinary system	15	5	44	8	3	18	4	3	6	2	2	4
Reproductive system and sexual health	13	7	36	3	3	4	4	1	5	8	6	11
Pregnancy, birth and puerperium	14	6	28	5	5	15	2	2	2	3	4	7
Dental health	11	5	21	1	1	1	1	1	1	1	1	1
Sensory system	7	3	12	1	1	1	-	-	-	2	2	3
Other medicinal uses	4	4	5	3	1	4	2	1	2	1	1	2
Metabolic system and nutrition	5	2	6	-	-	-	1	1	1	2	1	5
Endocrine system	2	1	5	5	1	7	-	-	-	2	1	2
Nervous system and mental health	2	2	4	-	-	-	-	-	-	2	2	2
Veterinary	2	4	7	-	-	-	-	-	-	1	1	1
Not specified at all	28	1	86	10	1	16	3	1	4	9	1	15

tissue, which was very important to indigenous people, was replaced by the use to treat ailments related to Urinary system. Cultural uses, which ranked 5th in importance among indigenous groups, ranked 12th among the mestizos.

Afro-Americans had no use-reports for five of the 20 subcategories (Table 6). Overall, only two of the most important subcategories were important for the Afro-Americans: Respiratory system (25 % of total species), and Digestive system (17 %). These were, however, not the most important subcategories for this group, since Urinary system (33 %) and Reproductive system and sexual health (33 %) topped the list.

The human groups classified as “unidentified” showed a similar pattern as the indigenous groups (Table 6). The first five most important subcategories were identical, except uses related to Skin and subcutaneous tissue, which was replaced by treatments for Muscular-skeletal system and Reproductive system and sexual health. In contrast to all other groups, no Cultural uses were reported for the “unidentified” groups.

Medicinal Palm Uses by Indigenous Groups

Medicinal uses of palms were reported for 55 indigenous groups: 48 in the Amazon, five in the Andes, and five in the Chocó (Table 1), some of them in more than one country and in more than one ecoregion. There was a large variation in the traditional knowledge of the medicinal palms among different indigenous groups in the three studied ecoregions, but most of them came from the Amazon (Table 7). The Tikuna and Miraña in Colombia, the Huaorani in Ecuador, and the Quichua and Urarina in Peru reported the highest number of medicinal palm species and among the highest number of use-reports. The Tacana in Bolivia reported the highest number of different ailments and diseases treated, with the second highest number of medicinal uses (after the Tikuna in Colombia) and average number of uses per species (6.6 ± 6.7). The Yaneshas in Peru had the highest average number of uses per species (7.5 ± 5.5) among all groups, but reported only two useful species. The Quichua in Ecuador had the largest number of bibliographical references (more than 50 % of all groups), but their knowledge was not the highest.

In the Andes the Leco in Bolivia and the Chanka in Peru, reported the highest number of medicinal species, although the number of different ailments and diseases treated, medicinal uses, use-reports, average number of uses per species was higher for the in Bolivian group. The Quichua in Ecuador had the highest number of references, but their overall knowledge was the lowest amongst all groups. In the Chocó, the Emberá in Colombia and the Tsa'chila in Ecuador reported the highest medicinal knowledge. In contrast to the Amazon, we found in the Andes and Chocó that the knowledge of medicinal palm use corresponded clearly with the groups that had been best studied, in particular in our fieldwork.

Outstanding Medicinal Palm Species by Ecoregions and Countries

In general, and both at the ecoregion and country level, the species with the highest relative importance value (RI) were also those that had a high number of use-reports, literature references, and most recent fieldwork (Table 8).

Table 7 Medicinal use palms by the different indigenous groups in northwestern South America

Indigenous groups	Countries	Useful species	Ailments and diseases	Medicinal uses	Medicinal use-reports	Average±SD of medicinal uses per species	Bibliographical references	Interviews
Amazon		67	122	566	903	6.1±12.7	78	765
Tikuna	Colombia	21	31	84	97	4.1±4.0	5	88
Huorani	Ecuador	17	17	57	62	3.4±3.9	7	—
Miraña	Colombia	16	19	30	33	1.9±2.0	5	22
Quichua (also in Ecuador)	Peru	15	10	32	32	1.6±1.6	1	—
Urarina	Peru	15	10	32	32	2.1±1.5	1	—
Aguanuna	Peru	14	8	22	22	1.6±0.8	—	69
Makuna	Colombia	13	17	23	23	1.8±2.4	—	37
Chacobo	Bolivia	12	15	37	37	3.1±1.8	2	88
Muinane	Colombia	12	10	21	21	1.5±1.7	5	—
Carjona	Colombia	12	7	16	16	1.2±0.8	—	5
Tacana	Bolivia	11	40	73	95	6.6±6.7	3	—
Asháninka	Peru	11	22	30	30	2.7±1.7	2	—
Quichua (also in Andes)	Ecuador	9	21	28	33	1.5±2.9	10	—
Yucuna	Colombia	9	14	26	26	2.6±2.5	2	22
Tsimane'/Mosetene	Bolivia	8	23	34	39	4.3±3.4	3	—
Ese Eja (also in Bolivia)	Peru	8	18	26	31	3.3±3.3	2	89
Secoya	Ecuador	7	8	14	15	1.7±0.5	4	—
Matapí	Colombia	7	7	10	10	1.4±0.7	—	5
Yuracaré	Bolivia	6	12	23	23	3.8±2.4	—	66
Cocama	Peru	6	12	17	17	2.8±2.4	1	87
Cofán	Ecuador	6	8	8	10	1.3±0.5	1	82

Table 7 (continued)

Indigenous groups	Countries	Useful species	Ailments and diseases	Medicinal uses	Medicinal use-reports	Average±SD of medicinal uses per species	Bibliographical references	Interviews
Achuar (also in Peru)	Ecuador	6	5	9	9	1.3±0.9	—	65
Shuar (also in Andes)	Ecuador	6	1	7	7	0.7±0.5	2	—
Quechua/Tacana	Bolivia	5	9	12	13	2.4±1.5	1	—
Yuracaré/Tritiario	Bolivia	5	8	13	15	2.6±1.4	1	—
Huitoto	Colombia	5	8	10	10	1.7±0.7	5	3
Siona (also in Colombia)	Ecuador	5	5	5	5	0.8±0.4	3	—
Tsimane'	Bolivia	4	13	18	18	4.5±3.5	1	—
Mosetene	Bolivia	4	9	14	15	3.5±2.1	3	—
Cubeo	Colombia	4	8	8	8	2.0±1.2	2	3
Tanimuca	Colombia	4	4	5	5	1.0±0.0	—	4
Ese Eja	Bolivia	4	4	4	4	0.5±0.5	1	—
Piapoco	Colombia	4	2	4	4	1.0±0.0	2	—
Yaminahua	Bolivia	3	6	7	7	2.3±1.2	—	18
Yagua	Peru	3	4	4	4	1.3±0.5	1	—
Bora	Peru	3	3	3	3	1.0±0.0	2	—
Yanesha	Peru	2	14	15	22	7.5±5.5	2	—
Siona	Colombia	2	6	6	6	0.7±1.1	2	—
Geral	Colombia	2	3	3	3	1.5±0.5	—	3
Awá	Colombia	2	2	3	3	1.0±0.8	2	—
Barasana	Colombia	2	2	2	2	1.0±0.0	—	2
Puinave	Colombia	2	2	2	2	1.0±0.0	2	—
Yahua	Colombia	2	2	2	2	1.0±0.0	—	3

Table 7 (continued)

Indigenous groups	Countries	Useful species	Ailments and diseases	Medicinal uses	Medicinal use-reports	Average±SD of medicinal uses per species	Bibliographical references	Interviews
Bora/Okaina/Huitoto	Peru	2	1	2	2	1.0±0.0	1	—
Baré	Colombia	1	2	3	3	3.0±0.0	—	2
Koreguaje	Colombia	1	2	2	2	2.0±0.0	1	—
Guayabero	Colombia	1	1	2	2	1.0±0.0	2	—
Achuar	Peru	1	1	1	1	1.0±0.0	1	—
Andoque	Colombia	1	1	1	1	1.0±0.0	1	—
Chawi	Peru	1	1	1	1	1.0±0.0	1	—
Itana	Colombia	1	1	1	1	1.0±0.0	—	2
Siona-Secoya	Colombia	1	1	1	1	1.0±0.0	1	—
Andes		19	45	91	98	1.0±3.0	5	355
Leco	Bolivia	11	32	57	60	5.2±4.6	1	178
Chanka	Peru	11	13	21	21	1.9±1.7	1	90
Inga	Colombia	4	5	7	7	1.8±0.8	—	87
Shuar	Ecuador	4	1	5	5	0.4±0.5	1	—
Quichua	Ecuador	3	5	5	5	0.3±0.7	2	—
Chocó		19	35	56	59	0.6±1.7	5	140
Emberá	Colombia	13	18	24	24	1.8±1.6	1	88
Tsa chila	Ecuador	8	22	29	30	3.6±1.7	1	52
Awá	Ecuador	1	1	2	2	0.7±0.9	1	—
Cayapa	Ecuador	1	1	1	1	1.0±0.0	1	—
Waunana	Colombia	1	1	1	1	1.0±0.0	1	—

Of all ecoregions, the Amazon had the highest number of the most versatile species ($RI > 1$) (Table 8). *Euterpe precatoria* was the most important species ($RI = 2$), followed by *Oenocarpus bataua*, *Attalea phalerata*, *Bactris gasipaes*, *Cocos nucifera*, and *Socratea exorrhiza*. In the Andes, we found that four of the five species with the highest value of relative importance were the same species found in the Amazon: *B. gasipaes* was the most important species ($RI = 2$), followed by *A. phalerata*, *Chamaedorea angustisecta*, *C. nucifera* and *S. exorrhiza*. *Oenocarpus bataua* and *E. precatoria*, both important in the Amazon were also important in the Andes and ranked 5th and 6th. Only two of the most important species in the other ecoregions were also important in the Chocó: *C. nucifera* was the most important species, followed by *Manicaria saccifera* and *B. gasipaes*.

In Amazonia and the Chocó, the most versatile species were used in all countries, while in the Andes the most important species did not have a wide geographic range, and only one species, *S. exorrhiza*, was recorded in all four countries. Two species showed a greater diversification of medicinal uses in all ecoregions: *B. gasipaes* and *C. nucifera* (Table 8, Appendix 2). The most important use subcategories, which were similar in the Amazon and the Andes, were related to the Digestive system, which remains the most important use, followed in different order by Infections and infestations, Pregnancy, birth and puerperium, Reproductive system and General ailments with unspecific symptoms, depending on the species and ecoregion. In the Chocó both species were used for different species purposes. The most important use of *B. gasipaes* was to treat ailments related to Pregnancy, birth and puerperium, as well as Sensory system, while *C. nucifera* was used for conditions of the Digestive system.

At the country level, Peru and Bolivia presented the highest number of the most versatile species ($RI > 1$) (Table 8). *Euterpe precatoria* was the most useful species in Colombia ($RI = 2$) and Peru ($RI = 2$), while *O. bataua* was the most important species in Ecuador ($RI = 2$) and *A. phalerata* in Bolivia ($RI = 2$). In Ecuador, Bolivia and Peru, the most versatile species were used in all ecoregions (Appendix 2). In contrast, in Colombia the most useful species did not have such wide geographic amplitude and only *O. bataua* was found in all ecoregions. We did not find any important useful species with $RI > 1$ common in all countries (Table 8). *Cocos nucifera* however was common in Colombia, Ecuador and Peru, and *B. gasipaes* and *O. bataua* were common in Ecuador, Peru and Bolivia. In all these countries the most important use of these palms was to treat Digestive disorders (Appendix 2). Some species were only important in one country, e.g. *M. saccifera* in Colombia and *Aiphanes ulei* in Ecuador (Table 8, Appendix 2).

Discussion

Use Patterns in Relation to Ecoregions and Countries

Our comparative ethnobotanical study at a regional geographic scale draws attention to the many medicinal uses that different species consistently share across countries and human groups throughout western Amazonia, the Andes, and the Chocó. The great importance of palms in the traditional medicine of the Amazon can be explained by factors that act in a complementary manner. On the one hand, the high species diversity

Table 8 Medicinal palms with the highest relative importance value index in different ecoregions and countries of northwestern South America

Species	Relative importance	Medicinal uses	Medicinal ailments and diseases	Medicinal use-reports	Relative importance by ecoregions				Relative importance by countries				Bibliographical references	Use-reports from fieldwork		
					Amazon		Andes		Chocó		Peru				Bolivia	
<i>Euterpe precatoria</i>	2.0	87	66	288	2.0	0.8	-	2.0	0.9	2.0	1.4	48	150			
<i>Oenocarpus bataua</i>	1.5	95	53	209	1.6	1.0	0.5	0.9	2.0	1.5	1.4	52	42			
<i>Attalea phalerata</i>	1.2	75	51	131	1.5	1.8	-	-	-	0.8	2.0	21	33			
<i>Bactris gasipaes</i>	1.1	69	48	110	1.4	2.0	1.5	0.8	1.6	1.5	1.1	30	59			
<i>Cocos nucifera</i>	1.0	57	44	105	1.2	1.2	1.8	1.6	1.2	1.1	0.7	20	50			
<i>Socratea exorrhiza</i>	0.7	44	29	82	1.1	1.1	-	0.8	0.5	1.1	0.9	24	33			
<i>Chamaedorea angustisecta</i>	0.6	36	26	47	0.9	1.2	-	-	-	0.3	1.2	14	13			
<i>Euterpe oleracea</i>	0.4	23	22	27	0.8	-	0.7	0.9	-	1.0	0.1	2	19			
<i>Oenocarpus mapora</i>	0.4	23	20	31	0.8	0.1	0.4	0.6	-	0.9	0.4	10	7			
<i>Iriartea deltoidea</i>	0.4	22	19	30	0.8	0.6	0.8	0.3	0.6	0.9	0.1	11	12			
<i>Attalea butyracea</i>	0.4	18	17	28	0.7	-	0.6	0.4	-	0.4	0.6	8	15			
<i>Attalea maripa</i>	0.3	21	17	25	0.8	-	-	0.9	0.1	0.2	0.2	7	8			
<i>Mauritia flexuosa</i>	0.3	20	17	22	0.8	-	-	0.4	0.4	0.8	0.3	10	6			
<i>Astrocaryum murumuru</i>	0.3	19	14	34	0.6	0.6	-	-	-	0.6	0.7	7	7			
<i>Astrocaryum chambira</i>	0.3	16	14	32	0.7	-	-	0.6	0.2	0.7	-	10	11			
<i>Manicaria saccifera</i>	0.3	16	16	22	0.1	-	1.9	1.3	-	-	-	3	16			
<i>Phytelephas macrocarpa</i>	0.3	17	16	19	0.8	-	0.4	0.4	-	1.0	0.1	7	6			
<i>Lepidocaryum tenue</i>	0.2	12	11	17	0.6	-	-	0.6	-	0.4	-	4	9			
<i>Aiphanes ulei</i>	0.2	16	11	16	0.6	-	-	-	1.0	-	-	5	3			
<i>Astrocaryum aculeatum</i>	0.2	13	9	16	0.4	-	-	0.4	-	-	0.4	3	12			
<i>Hyospathe elegans</i>	0.2	10	9	15	0.4	-	-	0.3	0.3	0.3	-	5	5			

Table 8 (continued)

Species	Relative importance	Medicinal uses	Medicinal ailments and diseases	Medicinal use-reports	Relative importance by ecoregions				Relative importance by countries				Bibliographical references	Use-reports from fieldwork
					Amazon		Chocó		Peru		Bolivia			
					Andes	Andes	Chocó	Chocó	Ecuador	Peru	Ecuador	Bolivia		
<i>Attalea speciosa</i>	0.2	9	8	11	0.5	-	-	-	-	-	-	0.6	5	5
<i>Phytelaphas tenuicaulis</i>	0.2	7	7	14	0.5	-	-	-	0.2	0.4	-	-	5	-

enables access to a wide range of potential resources (Begossi, 1996; De la Torre et al., 2009; Brokamp et al., 2011). On the other hand, the diversity of indigenous groups favors a highly distinctive ethnobotanical knowledge (Campos & Ehringhaus, 2003; Macía, 2004; Cámara-Leret et al., 2014c). External factors, such as geographic isolation, lack of communication, and limited access to markets (Byg et al., 2007; Godoy et al., 2009), as well as services (e.g., health centers) (Benz et al., 2000), foster an increased dependence on, and increased use of local resources for subsistence. These factors are more pronounced in the Colombian Amazon, where indigenous communities are more isolated and maintain their traditional way of life.

In the Chocó, one of the most diverse ecoregions in South America (Bjorholm et al., 2005), the diversity of species of palms could be a factor in determining the levels of knowledge found. Furthermore, the presence of indigenous groups with large traditional knowledge, together with the long history of contact between Amerindians and Afro-Americans, has favored the exchange of knowledge (Caballero, 1995). The lesser degree of knowledge found in the Andes is likely related to the decrease in the number of palm species with increasing elevation, but also to the rapid disappearance of forest cover, with remaining palm communities restricted to remote areas (De la Torre et al., 2012). Most importantly, however, we suspect that the changes generated in the Andean communities as a result of forests destruction, growing populations, and increased access to trade and service centers, lead to the use of alternative resources like western medicine, instead of the ones used traditionally (Ladio & Lozada, 2001; Macía et al., 2005; Byg et al., 2007; De la Torre et al., 2009). This is most evident in the Ecuadorian Andes, where communities are more densely populated, with widespread development of infrastructure, and easier access to markets and services like hospitals. Although the Amazon is clearly the best studied ecoregion, and could potentially yield additional information (Cámara-Leret et al., 2014a), our fieldwork demonstrated the high potential of new information held in the Andes, where ethnobotanical studies on palms have been much more piecemeal (Macía et al., 2011).

We found that Ecuador was the best-studied country and most of the records obtained during the fieldwork were already reported in the literature (De la Torre et al., 2008b; Macía et al., 2011). When compared to the other countries, the medicinal use of palms is clearly better documented there. This might be due to the small geographical size of the country, and the associated better development of road infrastructure, which could have facilitated botanical expeditions (Jørgensen & León-Yáñez, 1999; Jørgensen et al., 2006). In addition, ethnobotanical studies have a long tradition in Ecuador (De la Torre & Macía, 2008), dating back to the 18th century (De Velasco, 1978; Estrella, 1991). Based on current fieldwork and literature review, Colombia and Peru are the countries where much additional information can potentially be found. A small fraction of palm useful species was found in Colombia, despite the fact that this country has the greatest palm species richness (Galeano & Bernal, 2010). This could be related to the fact that many areas with multiethnic indigenous communities are virtually inaccessible due to problems of political isolation and guerilla activity, which has likely limited the development of research, including ethnobotanical studies (Sánchez-Cuervo & Mitchell Aide, 2013). In addition, few studies have been conducted with Afro-Americans, and the information we report comes from a small number of available references and mostly from recent fieldwork (Ledezma, 2011). In Peru, the large contribution of our fieldwork to the overall information, coupled with

the low percentage of indigenous groups with associated studies (Macía et al., 2011), indicate that the ethnobotanical study of new indigenous groups will yield much new information (Albán et al., 2008). Bolivia was the country with the highest number of palms used for medicinal purposes, and with the highest number of uses per species. While this may be influenced by the high number of monographs of palms available for this country, it could also be due to the lower diversity of palms, forcing people to use their resources more intensively. Any case, there is a clear necessity for further studies to complement palm ethnobotanical knowledge in all three ecoregions (Cámara-Leret et al., 2014a). This is particularly true for the Chocó, which has reported a wealth of potentially useful species (Galeano & Bernal, 2010), but also for the Andes, which, having the lowest palm diversity, had the lowest percentage of useful species reported. Additionally, still no information is available for c. 50 % of the indigenous groups that are found in the region, and many of the existing studies were conducted in very few communities, and with few informants, which limits the amount of available information.

Subcategories of Health Disorders Treated With Palms

Our results confirm that the medicinal use of palms is clearly not random, because their most important uses are the same in different ecoregions and countries. Palms were primarily used to treat primary health problems such as Diarrhea (Digestive system), Fever (General ailments with unspecific symptoms), Cough and Cold (Respiratory system), Anemia (Blood and cardiovascular system), and as Anthelmintic (Infections and infestations), which were the most important conditions reported in our review, mainly from the Amazon. But palms are also used to treat illnesses, ailments, and diseases in all the proposed subcategories (Cook, 1995; Macía et al., 2011, Gruca et al., 2014), and such use has been supported and supplemented by our fieldwork. The frequent treatment of ailments related to Skin and subcutaneous tissue, like Wounds, Skin infections and Abscesses, as well as the other most important illnesses like a Headache and Body pain (General ailments with unspecific symptoms), Rheumatism and arthritis, Muscular pain and Back pain (Muscular-skeletal system) and as Snake bite antidote and Insect bite (Poisonings), show their importance in response to immediate health needs associated with common human activities, while working in the fields, hunting and fishing, and gathering resources. Such uses could be related to the fact that palms are common resources around communities, easily accessible (Stepp & Moerman, 2001; Albuquerque & Lucena, 2005; de Medeiros et al., 2013), and often managed in different ways (Bernal et al., 2011). This shows the importance of a traditional knowledge that has been developed and maintained in response to the needs of local communities (Heinrich, 2000).

Palms are often used to treat diseases considered most prevalent in the region, and therefore receiving greater attention from public health systems (Holveck et al., 2007; Organización Panamericana de la Salud-OPS, 2012). Most use-reports of palms for the treatment of Hepatitis (Digestive systems), and Malaria (Infections and infestations) come from recent publications (Forero, 2005; Balslev et al., 2008; Prado, 2008; Sosnowska et al., 2010; Cerón et al., 2011), and our own fieldwork (Appendix 2). This might explain the use of palms like *Euterpe precatoria*, whose anti-inflammatory (Deharo et al., 2004) and antiplasmodial activity (Jensen et al., 2002; Kvist et al., 2006)

has only recently been reported, and which has only recently been planted more widely in the region in order to market its fruits and palm-hearts (Bussmann & Paniagua Zambrana, 2012).

Palms were also used to treat popular and cultural ailments such as Freight (*Susto*), Witchcraft (*Hechicería*), Bad air (*Mal aire*), and Evil eye (*Mal de ojo*), although these are not diseases sensu-stricto under western medicinal nomenclature (Gruca et al., 2014). However, these conditions are considered diseases within the local classification of diseases and form part of the local cosmivision. In the case of Peru and Bolivia, they are clearly based on Spanish influence (Bussmann & Sharon, 2009), which extends both to the Amazon and the Andes in Colombia and Ecuador, where it is influenced by African beliefs (Voeks, 2009).

Medicinal Palms Uses by Different Human Groups

Previous studies have suggested that indigenous people of northwestern South America possess more knowledge about the uses of palms than mestizos (Campos & Ehringhaus, 2003; Byg & Balslev, 2004; Byg et al., 2007; Macía et al., 2011, Cámara-Leret et al., 2014b) and our results reinforce this conclusion. This situation is the result of a complex series of interactions of several factors, including a) history, since a long period of occupation of an area facilitates the development of an extensive knowledge and practical use of plants (Caballero, 1995; Campos & Ehringhaus, 2003; Paniagua-Zambrana et al., 2007); b) culture, based on hundreds of years of traditional knowledge transmitted orally (Balée, 1988; Zarger & Stepp, 2004; Eyssartier et al., 2008); c) economy, in particular the limited degree of market access, which means limited access to alternative resources and services such as those offered at health centers, and therefore greater reliance on traditional medicine (Byg & Balslev, 2004; Byg et al., 2007; Perry & Gesler, 2000).

The traditional knowledge of the mestizo population should not be underestimated, because it is as diverse as the knowledge of the indigenous groups. Mestizos often have a long history that has enabled them to develop a deep understanding of their ecological environment, which may in some cases be similar or complementary to indigenous groups (Paniagua-Zambrana et al., 2007; De la Torre et al., 2008b). Our study probably underestimates the number of palms used by mestizos, because many publications (e.g. Acosta-Solís, 1971; García Barriga, 1974; Proctor et al., 1992; Gutiérrez-Vásquez & Peralta, 2001; Byg & Balslev, 2004; Moraes, 2004; Balslev et al., 2008), do not explicitly mention the human group studied and it is likely that many of these use-reports also concern mestizos. If this is the case, the knowledge of both human groups would probably be much more similar. Afro-Colombians, who have been better studied than Afro-Ecuadorians, had a similar level of knowledge of medicinal palms as indigenous groups in the Chocó. This can be explained by the long history of residence of these groups and prolonged contact with the indigenous people of this region (Mendoza et al., 1995).

Medicinal Palm Uses by Indigenous Groups

We found that indigenous knowledge in folk medicine is highly differentiated, even between ethnic groups that occupy neighboring regions, and share similar resources

(Campos & Ehringhaus, 2003; Shepard, 2004; Collins et al., 2006; Paniagua-Zambrana et al., 2014). This might be explained by the different cultural traditions, customs and practices, mode of subsistence, provenance, and history of contact with western society (Thomas, 2012). This underscores the need for more focused ethnobotanical studies of more indigenous groups, since information for more than 50 % of indigenous groups in northwestern South America is still nonexistent (Macía et al., 2011; Cámara-Leret et al., 2014a), or limited due to the scarcity of monographic works documenting the plant use of indigenous groups in detail. In addition, many studies focus only on few species (e.g. economically important ones) or record only very generalized or little structured information.

Outstanding Medicinal Palm Species

Only a small number of palms are of great importance regionally, due to their high number of different medicinal uses across countries and ecoregions. This is a clear expression of their local importance, strongly influenced by ecosystem (de Medeiros et al., 2013) and indicates a large convergence of the use of these species (Moerman et al., 1999, Cámara-Leret et al., 2014c). However, hardly any studies exist that would support their pharmacological efficacy.

These species are often trees that are relatively abundant in the different habitats due to their ecological amplitude (Macía & Svenning, 2005; Pitman et al., 2013, Cámara-Leret et al., 2014b) and plant parts such as fruits, seeds and roots that are easily collected (de Medeiros et al., 2013). Additionally, in some cases the preference for these species may also be linked to their proven efficacy, e.g. in case of the roots of *Euterpe precatoria*, which are used to treat different types of diseases, which could be linked to the species' pharmacological properties (Jensen et al., 2002; Deharo et al., 2004).

The widespread and extensive use of *Bactris gasipaes* in 18 of the 20 subcategories analyzed, both in all ecoregions and countries, could be due to the fact that this species is one of the most widespread domesticated Neotropical palms (Clement, 1988). Initially selected for its wood, especially for making tools, it was later preferred for its fruits due to high oil content and starch suitable for fermentation, which more recently has gained it for commercial importance as a source of palm hearts (Clement et al., 2009, 2010).

The occurrence of exotic species, as important resources in local medical systems has already been mentioned elsewhere (Albuquerque, 2006; Eyssartier et al., 2008). The common frequent medicinal use of *Cocos nucifera* in different ecoregions and countries might be a result of its wide versatility and easy to be cultivated (Macía et al., 2011), which, coupled with its proven antimicrobial effect against multiresistant bacteria (Alanís et al., 2005; Calzada et al., 2007; Koschek et al., 2007) would have enhanced its inclusion in the local pharmacopoeia (Bennett & Prance, 2000).

Finally, some studies have suggested that people tend to prefer (but not exclusively) plants that grow, either spontaneous or cultivated, close to their settlements, and that more common species are more likely to be used (Johns et al., 1990; Parada et al., 2009). This may be the main driver of the widespread use of these species in all ecoregions and countries.

Conclusions

Our results highlight the role of palms in meeting basic subsistence needs of rural indigenous and peasant populations in northwestern South America, such as primary health care, and indicate that the differences in the cultural, ecological, and socio-economic context have a considerable influence on the selection of medicinal plants. The large numbers of references and field interviews, linking the different variables analyzed (ecoregions, countries, human and indigenous groups) with palm use, support this conclusion. We provide information that, in cooperation with ethnopharmacological research, could improve the therapeutic use of traditional medicine. This could potentially help to inform communities where the same species grow, but where medicinal potential is so far unknown. Additionally, it could allow the development and application of less expensive treatments in many areas with limited resources and limited access to allopathic medicine. A multidisciplinary scientific validation of traditional medicine is relevant for modern societies, and can help to maintain local healthcare practices, especially with respect to diseases and conditions whose prevention, control and elimination are outlined in the Millennium Development Goals (Holveck et al., 2007). These diseases are regarded as sustainable development issues due to the high cost of long-term treatment, productivity loss, and the large social costs associated with these conditions, which go beyond the simple analysis of economic health.

Acknowledgments We kindly thank Joaquina Albán, Pedro Armesilla, Rodrigo Bernal, Roxanna Castañeda, Lucía de la Torre, Gloria Galeano, Carolina Isaza, Eva Ledezma, Laura Mesa and Manuel Pardo-de-Santayana for their help in searching the bibliographical references and to all the people who agreed to share their time and palm knowledge with us. The collaboration of regional and local organizations of the 59 communities visited was essential to obtain work permits. Special thanks to Erika Blacutt, Carolina Tellez, Carlos Vega, Juan Carlos Copete, Marybel Soto, Lina Camelo, and Mateo Jaimes for their invaluable assistance in data collection in the field, and special thanks to Dr. Rainer Bussmann for their helpful comments and suggestions throughout the development of the manuscript. This study was funded by European Union 7th Framework Programme (contract 212631), the Russell E. Train Education for Nature Program of the WWF, the William L. Brown Center at Missouri Botanical Garden, and the Anne S. Chatham Fellowship of the Garden Clubs of America, for which we are grateful.

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Appendix 1

Characteristic of the 59 communities and 24 localities where 1956 people were interviewed about their medicinal knowledge of palm use in northwestern South America (Colombia, Ecuador, Peru, and Bolivia)

Locality	N°	Community	Ecoregion	Country	Geographic coordinates	Elevation (m)	Ethnic group	Number of informants
1	1	Angostura	Amazon	Colombia	1°17'42.12"S, 69°38'10.38"W	66	Multiethnic indigenous	16
1	2	Camaritagua	Amazon	Colombia	1°20'20.99"S, 69°35'3.76"W	81	Multiethnic indigenous	10
1	3	Centro Providencia	Amazon	Colombia	1°3'39.72"S, 70°14'24.15"W	105	Makuna	33
1	4	Curare	Amazon	Colombia	1°18'38.51"S, 69°43'18.83"W	86	Multiethnic indigenous	19
1	5	Loma Linda	Amazon	Colombia	1°13'45.63"S, 69°46'37.47"W	69	Multiethnic indigenous	8
1	6	Los Ingleses	Amazon	Colombia	1°22'32.89"S, 69°57'47.77"W	110	Multiethnic indigenous	5
1	7	San Francisco	Amazon	Colombia	1°6'35.38"S, 71°6'19.22"W	143	Miraña	7
1	8	Yucuna	Amazon	Colombia	1°18'11.42"S, 69°34'47.25"W	89	Multiethnic indigenous	19
2	9	San Martín de Amacayacu	Amazon	Colombia	3°46'29.85"S, 70°18'10.39"W	101	Tikuna	88
3	10	Dureno	Amazon	Ecuador	0°2'31.92"N, 76°41'42.54"W	241	Cofan	55
3	11	Pacuya	Amazon	Ecuador	0°19'21.09"S, 75°45'28.49"W	215	Cofan	13
3	12	Zábaló	Amazon	Ecuador	0°21'22.53"S, 75°40'46.31"W	210	Cofan	14
4	13	Kapawi	Amazon	Ecuador	2°32'24.17"S, 76°50'19.37"W	257	Achuar	34
4	14	Kusutkau	Amazon	Ecuador	2°30'47.03"S, 76°53'49.29"W	250	Achuar	10
4	15	Wayusentisa	Amazon	Ecuador	2°26'29.87"S, 76°55'7.16"W	260	Achuar	21
5	16	San Martín	Amazon	Peru	4°41'27.00"S, 74°24'4.00"W	116	Cocama	87
6	17	El Chino	Amazon	Peru	4°18'14.80"S, 73°13'6.00"W	94	Mestizo	79
7	18	Santa Ana	Amazon	Peru	4°3'25.57"S, 73°8'5.60"W	98	Mestizo	89
8	19	Cusu Chico	Amazon	Peru	5°4'33.40"S, 78°18'3.00"W	295	Aguaruna	13
8	20	Nueva Samaria	Amazon	Peru	4°57'43.40"S, 78°19'43.60"W	370	Aguaruna	20

(continued)

Locality	N°	Community	Ecoregion	Country	Geographic coordinates	Elevation (m)	Ethnic group	Number of informants
8	21	Yamayakat	Amazon	Peru	5°3'19.90"S, 78°20'16.50"W	338	Aguaruna	36
9	22	San Juan	Amazon	Peru	12°44'11.44"S, 69°31'42.22"W	254	Mestizo	4
9	23	Santa Rosa	Amazon	Peru	12°54'15.75"S, 70°6'26.58"W	356	Mestizo	24
9	24	Santo Domingo	Amazon	Peru	12°42'14.94"S, 69°27'7.05"W	229	Mestizo	7
9	25	Unión Progreso	Amazon	Peru	12°46'50.73"S, 69°35'53.54"W	232	Mestizo	14
9	26	Villa Santiago	Amazon	Peru	13°0'57.40"S, 70°20'56.50"W	331	Mestizo-Amakaeri	40
10	27	Palma Real	Amazon	Peru	12°30'39.79"S, 68°46'35.16"W	208	Ese Eja	89
11	28	Puerto Yaminahua	Amazon	Bolivia	10°56'27.40"S, 69°25'39.80"W	289	Yaminahua	18
12	29	26 de Octubre	Amazon	Bolivia	11°08'55.04"S, 60°01'02.44"W	156	Mestizo	38
12	30	El Hondo	Amazon	Bolivia	11°02'9.60"S, 65°46'37.40"W	179	Mestizo	9
12	31	Santa María	Amazon	Bolivia	11°07'9.90"S, 65°56'19.04"W	176	Mestizo	41
13	32	Alto Ivón	Amazon	Bolivia	11°52'24.90"S, 66°21'0.60"W	148	Chácobo	56
13	33	Motaucuzal	Amazon	Bolivia	11°51'42.29"S, 66°44'44.25"W	151	Chácobo	24
13	34	Puerto Tujure	Amazon	Bolivia	11°50'21.44"S, 66°20'31"W	156	Chácobo	1
13	35	Tokyo	Amazon	Bolivia	11°48'7.67"S, 66°0'24.92"W	173	Chácobo	7
14	36	Nuevo San Juan del Isiboro	Amazon	Bolivia	16°34'5.78"S, 65°32'14.99"W	224	Yuracaré	6
14	37	San Antonio	Amazon	Bolivia	16°23'55.66"S, 65°54'44.45"W	296	Yuracaré	14
14	38	San Benito	Amazon	Bolivia	16°32'32.81"S, 65°30'22.22"W	216	Yuracaré	17
14	39	Sanandita	Amazon	Bolivia	16°31'43.8"S, 65°28'35.3"W	207	Yuracaré	13
14	40	Secejsama	Amazon	Bolivia	16°32'36.4"S, 65°30'58.9"W	217	Yuracaré	16
15	41	Juisanoy	Andes	Colombia	1°8'45.10"N, 77°0'14.82"W	2200	Camsá-Inga	11
15	42	Santiago	Andes	Colombia	1°8'45.10"N, 77°0'14.82"W	2100	Inga	76
16	43	Nanegalito	Andes	Ecuador	0°3'43.83"N, 78°40'30.81"W	1600	Mestizo	86

(continued)

Locality	N°	Community	Ecoregion	Country	Geographic coordinates	Elevation (m)	Ethnic group	Number of informants
17	44	Mindo	Andes	Ecuador	0°2'45.33"S, 78°45'51.42"W	1280	Mestizo	87
18	45	Aviación	Andes	Peru	6°21'50.80"S, 76°29'12.60"W	1041	Chanka	22
18	46	Lamas Wayku	Andes	Peru	6°25'26.86"S, 76°31'21.30"W	782	Chanka	68
19	47	Irimo	Andes	Bolivia	15°5'59.02"S, 68°14'6.20"W	1010	Leco	50
19	48	Munaypata	Andes	Bolivia	15°1'5.10"S, 68°14'6.20"W	1157	Leco	18
19	49	Pucasucho	Andes	Bolivia	14°47'56.60"S, 68°14'2.00"W	1553	Leco	21
20	50	Correo	Andes	Bolivia	14°53'17.82"S, 68°29'0.85"W	1275	Leco-Mestizo	32
20	51	Illipanayuyo	Andes	Bolivia	14°57'10.11"S, 68°30'50.96"W	1053	Leco	24
20	52	Santo Domingo	Andes	Bolivia	14°46'50.60"S, 68°35'55.95"W	1420	Leco	33
21	53	Puerto Povel	Chocó	Colombia	5°23'44.29"N, 76°42'58.22"W	63	Afro-American	86
22	54	Aguaate	Chocó	Colombia	5°12'2.51"N, 77°10'17.19"W	109	Emberá	44
22	55	Villanueva	Chocó	Colombia	5°6'15.23"N, 77°11'46.13"W	49	Emberá	44
23	56	Puerto Quito	Chocó	Ecuador	0°7'21.00"N, 79°15'55.02"W	145	Mestizo	88
24	57	Chiguitipe	Chocó	Ecuador	0°15'41.70"S, 79°6'14.17"W	437	Tsa'chila	33
24	58	El Poste	Chocó	Ecuador	0°15'35.64"S, 79°12'21.57"W	450	Tsa'chila	2
24	59	Peripa	Chocó	Ecuador	0°15'35.64"S, 79°12'21.57"W	450	Tsa'chila	17

Appendix 2

Medicinal palm uses documented in the bibliography and fieldwork in the tropical rainforests of northwestern South America, broken down by ecoregion, country, and human groups

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Acrocomia aculeata</i> (Jacq.) Lodd. ex Mart.	Digestive system	Gallbladder	Fr	B	Am	M		12
		Hepatitis	Rt	B	Am	Ni	89	
	General ailments with unspecific symptoms	Fever	Fr	B	Am	M		12
	Respiratory system	Cold	Rt	B	Am	I	101	
<i>Aiphanes horrida</i> (Jacq.) Burret	Sensory system	Cough	Fr	B	Am	Ni	60	
	Cultural diseases and disorders	Cataracts	Fr	B	Am	Ni	60	
		Freight	Sp	B	An	I		19
	Urinary system	Inflammation of kidneys	Rt	P	An	I		18
<i>Aiphanes ulai</i> (Dammer) Burret	Blood and cardiovascular system	Blood purification	Ph	E	Am	I		4
	Dental health	Toothache	Ph	E	Am	I		4
	Digestive system	Colic	Rt	E	Am	I	34	
	General ailments with unspecific symptoms	Body pain	Ph	E	Am	I	18, 77	
		Headache	Rt	E	Am	I	77	
		Shivers	Rt	E	Am	I	77	
	Not specified at all	Unspecified	Rt	E	Am	I	33	
	Respiratory system	Cold	Ph, Rt	E	Am	I	77	
		Cough	Ph, Rt, Sd	E	Am	I	77, 88	
		Flu	Rt, Sd	E	Am	I	88	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Ammandra decasperma</i> O.F. Cook	Skin and subcutaneous tissue Digestive system	Extraction of spines Diarrhea	Sp Sd	E	Am	I	77	4
<i>Asterogyne martiana</i> (H. Wendl.) H. Wendl. ex Drude	Not specified at all	Intestinal pain Unspecified	Sd Fr	E C	Am Ch	I A	77	21
<i>Astrocaryum aculeatum</i> G. Mey.	General ailments with unspecific symptoms Infections and infestations	Fever Amoebas Unspecified	Fr Ph, Rt, Sd Ph	B B, C C	Am Am Am	I, M I I, M	68 68	1, 13
	Respiratory system	Cold Cough	Fr Lf	B C	Am Am	I, M I	107, 117	12, 13 1
	Sensory system	Pneumonia Eye inflammation	Fr, Sd Sd	B, C C	Am Am	I, Ni I	107, 117	2
	Skin and subcutaneous tissue	Abscesses Extraction of spines	Fr, Sp Sp	B B	Am Am	I, M I	107, 117	12, 13 13
<i>Astrocaryum chambira</i> Burret	Dental health Digestive system	Dental floss Diarrhea	Sl Sd	C C	Am Am	I I	14, 100	1 1, 2
	General ailments with unspecific symptoms Infections and infestations	Hepatitis Fever Malaria Measles Unspecified	Fr, Ph Ph Fr Sd Rt	P C P E P	Am Am Am Am Am	I, M, Ni I Ni I Ni	14, 100 2 14 26 14	2

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Astrocaryum ciliatum</i> F. Kahn & B. Millán	Muscular-skeletal system	Yellow Fever	Rt	P	Am	I, M, Ni	14, 100	
		Rheumatism and Arthritis	Lf	P	Am	Ni	83	
	Not specified at all	Unspecified	Ns	C	Am	I, M	24, 25, 55	
	Poisonings	Snake bit antidote	Ph, Sd	C, P	Am	I	106	8
	Pregnancy, birth and puerperal	Galactagogue	Sd	P	Am	I		8
	Respiratory system	Flu	Ph	P	Am	I	38	
	Skin and subcutaneous tissue	Extraction of spines	Sp	C, E	Am	I	77	1
	Digestive system	Purgative	Pt	C	Am	I		1
	Poisonings	Snake bit antidote	Ph	C	Am	I	72, 106	1
	Respiratory system	Flu	Pt	C	Am	I		1
<i>Astrocaryum ferrugineum</i> F. Kahn & B. Millán	Skin and subcutaneous tissue	Extraction of spines	Sp	C	Am	I		1
	Infections and infestations	Amoebas	Pt	C	Am	I	49, 106	
	Cultural diseases and disorders	Witchcraft	Sp	B	Am	I	19	
		Back pain	Rt	B	Am	I	19	
	Muscular-skeletal system	Extraction of spines	Sp	B	Am	I	19	
	Respiratory system	Cold	Lf	C	Am	I	117	
	Skin and subcutaneous tissue	Pneumonia	Sd	C	Am	I		1
	Skin and subcutaneous tissue	Extraction of spines	Sp	C	Am	I		1
	Skin and subcutaneous tissue	Abscesses	Sp	P	Am	M		5
	Urinary system	Prostate	Sl	P	Am	M		6
Digestive system	Hepatitis	Rt	P	An	I		18	
<i>Astrocaryum gynacanthum</i> Mart.								
<i>Astrocaryum huaiti</i> Mart.								

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Astrocarium huicungo</i> Dammer ex Burret	Pregnancy, birth and puerperal	Galactagogue	Sd	P	Am	I		8
<i>Astrocarium jauari</i> Mart.	Digestive system	Hepatitis	Ph	P	Am	I, M, Ni	14, 100	
<i>Astrocarium murumuru</i> Mart.	Skin and subcutaneous tissue	Extraction of spines	Sp	C, E	Am	I		1, 4
	Blood and cardiovascular system	Anemia	Fr	B	An	I		19
	Cultural diseases and disorders	Freight	Sp	B	An	I		19
	Dental health	Witchcraft	Sp	B	Am	I	78	
<i>Astrocarium scitophilum</i> (Miq.) Pulle	Digestive system	Toothache	Sp	B	Am	I	78	
	General ailments with unspecific symptoms	Hepatitis	Ph, Rt	P	Am	I, M, Ni	14, 100, 120	
	Infections and infestations	Stomach pain	Sd	B	An	I		19
	Muscular-skeletal system	Fever	Fr, Rt, St	B, P	Am	M, Ni	14	12
<i>Astrocarium scitophilum</i> (Miq.) Pulle	Not specified at all	Amoebas	Rt	B	Am	I		13
	Reproductive system and sexual health	Malaria	Ph, Rt, St	P	Am	I, M, Ni	14, 100	
	Skin and subcutaneous tissue	Back pain	Ph	P	Am	I, M, Ni	14, 100	
	Dental health	Unspecified	Ns	P	Am	M	96	
<i>Astrocarium scitophilum</i> (Miq.) Pulle	Poisonings	Fertility	Ns	P	Am	Ni	118	
		Callus	Fr	B	Am	I	3	
		Extraction of spines	Sp	B	Am, An	I	78	13, 19
		Purgative	Lf	C	Am	I	68	
	Snake bit antidote	Lf	C	Am	I	71		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Astrocaryum standleyanum</i> L.H. Bailey	Cultural diseases and disorders	Psychosomatic	Sp	C	Ch	I	49	
	Respiratory system	Asthma	Sp	E	Ch	I		24
	Skin and subcutaneous tissue	Extraction of spines	Fr	C	Ch	I		22
<i>Astrocaryum urostachys</i> Burret	Cultural diseases and disorders	Bad Air	Sp	E	Am, An	I	9, 13	
	Respiratory system	Cold	Lf, St	E	Am	I	77	
<i>Attalea allenii</i> H.E. Moore	Cultural diseases and disorders	Evil eye	Sd	C	Ch	I		22
	Urinary system	Inflammation of kidneys	Lf, Sl	C	Ch	A		21
<i>Attalea bassleriana</i> (Burret) Zona	Poisonings	Antidote	Sd	C	Am	I	68	
<i>Attalea butyracea</i> (Mutis ex L. f.) Wess. Boer	Blood and cardiovascular system	Goiter	Ns	C	Ch	Ni	39	
	Cultural diseases and disorders	Freight	Sd	B	Am	I, M		12, 13, 14
	Digestive system	Diarrhea	Br, Sd	B, P	Am	I	5	
		Hepatitis	Rt	P	Am	I, M, Ni	14, 100	
		Unspecified	Rt	P	Am	M	96	
	General ailments with unspecific symptoms	Body pain	Rt	B	Am	M		12
		Fever	Sd	B	Am	M		12
		Headache	Sd	B	Am	I		13
	Infections and infestations	Amoebas	Sd	B	Am	I		11, 13, 14
		Itch	Rt	B	Am	I		14
	Muscular-skeletal system	Rheumatism and Arthritis	Sd	B	Am	M		12

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Not specified at all	Unspecified	Sd	C	Am	Ni	102	
	Reproductive system and sexual health	Fertility	St	C	Ch	Ni	16	
	Respiratory system	Bronchitis	Sd	B, C	Am, Ch	Ni	16, 60	
		Cold	Sd	B, P	Am	I		10, 14
		Cough	Sd	B	Am	Ni	60	
	Skin and subcutaneous tissue	Burns	Sd	P	Am	I		10
	Digestive system	Purgative	Sd	E	Ch	I	32	
	Respiratory system	Asthma	Fr	E	Ch	I		24
	Not specified at all	Unspecified	Fr	P	Am	Ni	14	
	Blood and cardiovascular system	Anemia	Rt	B	Am	I		13
<i>Attalea colenda</i> (O.F. Cook) Balslev & A.J. Hend.	Cultural diseases and disorders	Angry women	Rt	C	Am	I	68	
	Digestive system	Diarrhea	Fr, Ph, St	P	Am	Ni	14	
		Hepatitis	Fr	P	Am	I, M, Ni	14, 100	
		Purgative	Ph	C	Am	I		1
	General ailments with unspecific symptoms	Lack of appetite	Fr	C	Am	I	68	
	Not specified at all	Unspecified	Fr, Ph, St	P	Am	Ni	14	
	Poisonings	Antidote	Rt	C	Am	I	68	
		Antidote for poisonous plants	Ph	C	Am	I	116	
		Snake bit antidote	Lf	C	Am	I		1

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Attalea phalerata</i> Mart. ex Spreng.	Pregnancy, birth and puerperal	Galactagogue	St	C	Am	I		1
	Reproductive system and sexual health	Fertility	Fr	C	Am	I		2
	Respiratory system	Cold	Fr	E	Am	I	18	
		Cough	Fr	B	Am	M		12
		Pneumonia	Fr	C	Am	I		1
		Respiratory infections	Fr	C	Am	I	49	
	Skin and subcutaneous tissue	Rash	Sd	C	Am	I	84	
		Anemia	Lf	B	Am	I	3, 19, 122, 123	
	Blood and cardiovascular system	Evil eye	Rt	B	Am	I	3	
		Cultural diseases and disorders	Fr, Sd	B	Am	I, M		12, 14
	Digestive system	Diarrhea	Br, Sd	B	Am	I	3, 19, 123	
		Gallbladder	Rt, Sd	B	Am	M, Ni	97	12
		Hepatitis	Rt, Sd, St	P	Am	I	120	
		Inguinal Hernia	Rt	B	An	I		19
		Intestinal pain	Rt	B	Am	I	19	
		Purgative	Rt, Sd	P	An	I		18
General ailments with unspecific symptoms	Unspecified	Sd	B	Am	I	17		
	Fever	Lf	B	Am	I, M, Ni	19, 91, 97, 122	12, 14	
	Headache	Fr, Rt, Sd	B	Am	I	19		
Infections and infestations	Unspecified	Sd	P	Am	I, M	100		
	Amoebas	Sd	B	Am	I, M, Ni	97, 122	12, 13, 14	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
		Anthelmintic	Rt, St	B	Am, An	I, Ni	3, 7, 78, 90	19
		Itch	Rt	B	Am	I		14
		Lice	Sd	P	Am	I		10
		Smallpox	Sd	B	Am	I	123	
		Unspecified	Sd	B	Am	I	123	
	Metabolic System and nutrition	Vitamin	Sd	B	Am	I, Ni	19, 97	
	Muscular-skeletal system	Back pain	Rt, St	B	Am	I	19, 78, 123	
		Bone pain	Rt, Sd	B	An	I		19
		Fractures	Rt	B	An	I		20
		Hematoma	Rt	B	Am	I	78	
		Hernia	Sd	B	An	I	87	
		Hip pain	Rt	B	Am	I	123	
		Muscular pain	Sd	B	Am	Ni	90	
	Not specified at all	Unspecified	Fr	B, P	Am, An	I, M, Ni	14, 60, 61, 89	18
	Other	Alcoholism	Fr, Lf, Rt, Sd, Ns	B	Am	I	78	
		Hair loss	Fl	B	Am	Ni	89, 91	
	Poisonings	Snake bit antidote	Fr	B, P	Am	I, M		8, 12
	Pregnancy, birth and puerperal	Childbirth problems	Pt, Ph	B	Am, An	I	87, 122	
		Postpartum	Fr, Rt	B	An	I		19
	Reproductive system and sexual health	Contraceptive	Rt	B	Am	I	123	
		Uterus infections	Ns	B	Am, An	I, Ni	97, 98	19

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Attalea plowmanii</i> (Glassman) Zona <i>Attalea speciosa</i> Mart.	Respiratory system	Bronchitis	Rt, St	B	Am	I	19	10, 12, 13, 14, 19
		Cold	Sd	B, P	Am, An	I, M	98, 101	
		Cough	Rt, Sd	B	Am, An	I	19, 87, 123	
	Skin and subcutaneous tissue	Flu	Sd	B	Am	I	123	12, 14, 19
		Pneumonia	Sd	B	Am, An	I, Ni	19, 87, 90	
		Respiratory infections	Fr, Sd	B	Am	Ni	99	
		Abscesses	Fr, Sd	B	Am, An	I	3, 19, 62, 78, 87	
		Burns	Rt, Sd	B	Am, An	I	19	
		Dandruff	Sd	B	Am	Ni	89, 91	
	Urinary system	Psoriasis	Fr	B	Am	I, M	3, 19, 62, 101	12, 14, 19
		Skin infections	Sd	B	Am	I	19	
		Skin spots	Sd	B, P	Am	I	120, 122	
Swellings		Fr, Sd	B	Am	I	19, 78		
Wounds		Sd	B	Am, An	I	19, 87		
Pregnancy, birth and puerperal	Inflammation of kidneys	Fr, Sd	B	Am, An	I, M		12, 14, 19	
	Prostate	Rt, Sd	B	An	I	87		
	Childbirth problems	Rt	C	Am	I	106		
Cultural diseases and disorders	General ailments with unspecific symptoms	Freight	Fr	B	Am	M	12	
	Body pain	Sd	B	Am	M	M		
	Fever	Sd	B	Am	M, Ni	M, Ni		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b	
<i>Bactris acanthocarpa</i> Mart.	Infections and infestations	Amoebas	Sd	B	Am	I		13	
	Muscular-skeletal system	Rheumatism and Arthritis	Rt	B	Am	M		12	
	Not specified at all	Unspecified	Sd	B	Am	I, Ni	89, 92, 98		
	Respiratory system	Pneumonia	Fr, Sd	B	Am	Ni	107		
<i>Bactris barronis</i> L.H. Bailey	Respiratory system	Respiratory infections	Sd	B	Am	Ni	99		
		Digestive system	Unspecified	Sd	Am	I	17		
		Infections and infestations	Malaria	Fr	P	Am	Ni	14	
		Skin and subcutaneous tissue	Extraction of spines	Rt	B	Am	I		1, 13
<i>Bactris bidentata</i> Spruce	Skin and subcutaneous tissue	Extraction of spines	Sp	C	Ch	I		22	
		Extraction of spines	Sp	C	Am	I		1	
<i>Bactris brongniartii</i> Mart.	Blood and cardiovascular system	Anemia	Sp	P	Am	I		8	
		Sensory system	Earache	Ph	C, P	Am	I	84	
<i>Bactris coloradensis</i> L.H. Bailey	Reproductive system and sexual health	Fertility	Sl, Ph	C	Ch	I		22	
		Digestive system	Purgative	Fr	C	Am	I	46	
<i>Bactris concinna</i> Mart.	Infections and infestations	Malaria	Rt	C	Am	I	46		
		Respiratory system	Cold	Rt	E	Am	I	77	
		Skin and subcutaneous tissue	Cough	Rt	E	Am	I	77	
		Urinary system	Extraction of spines	Rt	C	Am	I		1
		Urinary problems	Sp	C	Am	I	46		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Bactris corrossilla</i> H. Karst.	Blood and cardiovascular system	Blood purification	Rt	E	Am	I		4
	Digestive system	Diarrhea	Ph	E	Am	I	28	
	Infections and infestations	Intestinal pain	Ph	E	Am	I	28	
		Anthelmintic	Ph	E	Am	I	28	
		Unspecified	Ph	E	Am	I	10	
	Not specified at all	Extraction of spines	Ns	C	Am	I		1
	Skin and subcutaneous tissue	Anemia	Sp	B	An	I		19
	Blood and cardiovascular system	Freight	Ph	B, P	An	I, M	36	20
	Cultural diseases and disorders	Psychosomatic	Sp	E	Am	I	65	
		Witchcraft	Ph	E	Ch	I		24
Digestive system	Diarrhea	Sp	E	Am	I	65, 79		
	Gallbladder	Rt, Ns	B	Am	M		12	
	Hepatitis	Fr	C, P	Am, An	I, M, Ni	14, 100	2, 18	
	Inguinal Hernia	Rt	B, P	Am, An	I, M		19	
	Intestinal pain	Rt	P	Am	Ni	14		
<i>Bactris gasipaes</i> Kunth	Stomach pain	Stomach pain	Rt	B, C, E	Am, An, Ch	I		2, 20, 24
	General ailments with unspecific symptoms	Body pain	Ph, Rt, Sd	B, E	Am, An	I, M	64	12, 14, 19
		Fever	Fr, Rt, Ns	B	Am	I, M	78	12
		Headache	Fr	B	Am	M		12
	Infections and infestations	Anthelmintic	Fr	P	Am	I	76	
		Chickenpox	Ns	C	Am	I		1

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
		Malaria	Ph	C, P	Am	I, M, Ni	14	2, 7, 10
		Tuberculosis	Rt	B	Am	I		20
		Unspecified	Fr	E	Am	Ni	21	
		Yellow Fever	Ph	C	Am	I		2
		Vitamin	Rt	E	Ch	I		24
	Metabolic System and nutrition	Muscular pain	Rt	E	Am, Ch	I		4, 24
	Muscular-skeletal system	Epilepsy	Fr, Rt	E, P	Am	I	111, 124	
	Nervous system and mental health	Unspecified	Lf, Rt, Sp	B, E, P	Am, An	I, M, Ni	10, 30, 62, 96, 99, 113, 126	8
	Not specified at all							
	Other	Cancer	Fr, Lf, Sl, Ph, Ns	C	Ch	A		21
	Poisonings	Snakebite antidote	Sd	P	Am	I		8
	Pregnancy, birth and puerperium	Abortive	Ph	C, P	Am, Ch	I, Ni	14	22
		Antiabortive	Rt	C, P	Am, Ch	A, M	69, 74	6
		Childbirth problems	Rt	C, P	Am	I, M	56	2, 5, 7
		Galactagogue	Rt	B, E, P	Am, An	I, M, Ni	14, 57, 65	8, 18
		Mastitis	Fr, Ph, Rt, Ns	P	Am	I		18
		Postpartum	Rt	B	An	I		19
	Reproductive system and sexual health	Contraceptive	Rt	E, P	Am	I	4, 65	
		Fertility	Rt	C, P	Am, An, Ch	A, I, M, Ni	14, 100, 104	18, 21
		Gonorrhea	Fr, Rt, Ns	P	An	I		10
		Menstrual problems	Rt	C	An	I	56, 84, 121	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Respiratory system	Uterus infections	Rt	B, P	Ch	I		18, 19
		Cold	Rt	B, P	Am, An	I, M		6, 20
		Cough	Fr, Rt	B	Am	I	123	
		Pneumonia	Fr	P	Am	M		7
Sensory system	Earache	Rt	E	Am, An, Ch	I, Ni	21	4, 24	
	Eye inflammation	Fr, Lf, Ph, Rt	E	Ch	I		24	
Skin and subcutaneous tissue	Extraction of spines	Fr	C, E	Am, Ch	I	77	1, 22	
	Psoriasis	Sp	B	An	I		19	
	Swellings	Fr	B	Am	I	78		
Urinary system	Inflammation of kidneys	Fr	P	Am, An	I, M	36	5	
	Urinary infections	Rt	P	Am	I	120		
Veterinary	Urinary problems	Rt	B	Am	I	109		
	Unspecified	Rt	P	Am	Ni	14		
Sensory system	Earache	Rt	P	Am	I		8	
	Extraction of spines	Sl	C	Am	I		1	
Cultural diseases and disorders	Freight	Sp	B	An	I		19	
	Diarrhea	Sp	B	An	I		19	
Digestive system	Purgative	Sd	C	Am	Ni	50		
	Anthelmintic	Fr	C	Am	Ni	50		
Poisonings	Antidote	Fr	C	Am	Ni	50		

Bactris hirta Mart.

Bactris macrocarantha Mart.

Bactris major Jacq.

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Bactris maraja</i> Mart.	Blood and cardiovascular system	Blood purification	Fr	E	Am	I		4
	Digestive system	Purgative	Ph	C	Am	I	46	
	Infections and infestations	Malaria	Rt	C	Am	I	46	
	Respiratory system	Cough	Rt	E	Am	I	77	
		Throat ache	Rt	E	Am	I	77	
	Skin and subcutaneous tissue	Extraction of spines	Rt	C	Am, Ch	I		1, 22
	Urinary system	Urinary problems	Sp	C	Am	I	46	
<i>Bactris riparia</i> Mart.	Reproductive system and sexual health	Menstrual problems	Rt	P	Am	Ni	14	
	Skin and subcutaneous tissue	Extraction of spines	Rt	C	Am	I		1
<i>Bactris setulosa</i> H. Karst. <i>Bactris simplicifrons</i> Mart.	Not specified at all	Unspecified	Sp	E	Am	I	30	
	General ailments with unspecific symptoms	Fever	Fr	P	Am	Ni	14	
	Nervous system and mental health	Soporific	Fr	P	Am	I	52	
<i>Ceroxylon parvum</i> Galeano <i>Ceroxylon quindiuense</i> (H. Karst.) H. Wendl.	Not specified at all	Unspecified	Ns	E	Am	I	10	
	Cultural diseases and disorders	Freight	Ns	B	An	I		20
	Infections and infestations	Malaria	Sl	P	An	I		18
	Dental health	Toothache	Rt	B	An	I		19
<i>Chamaedorea angustisecta</i> Burret	Digestive system	Abdominal pain	Fl	B	Am	I	19	
		Appendicitis	Fl	B	Am	Ni	107	
		Colic in babies	Fl	B	An	I		19
		Diarrhea	Fl	B	Am, An	I, Ni	19, 78, 89, 90	19

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
		Intestinal pain	Fl	B	Am	I	19, 78	
		Stomach pain	Fl	B	Am, An	I, M		12, 19
		Vomiting	Fl	B	Am	I	19, 78	
	General ailments with unspecific symptoms	Body pain	Fl	P	Am	I		10
		Fever	Fl	B	An	I		20
		Headache	Fl	B	An	I		19
		Indisposition	Fr	B	Am	I	7	
	Infections and infestations	Anthelmintic	Fl	B	An	I		19
	Muscular-skeletal system	Hematoma	Fl	B	Am	I	123	
	Not specified at all	Unspecified	Ph	B, P	Am, An	I	119	18
	Poisonings	Insect bit	Fl, Ns	B	Am	I	3, 7, 109	
		Snakebite antidote	Fl, Ph, Rt, St	B	Am	I, Ni	19, 99	
		Worms poisonous bites	Fl, Lf	B	Am	I	3, 109	
	Pregnancy, birth and puerperium	Childbirth problems	Fl, Ph, St	B	Am	I	19	
	Reproductive system and sexual health	Contraceptive	Fl	B	Am, An	I	123	19
		Menstrual problems	Fr, Ph	B	Am	I	7, 19	
	Respiratory system	Cold	Fl, Ph	B	Am	I, Ni	98, 99, 101	
		Cough	Fl	B	An	I		19
		Flu	Fl	B	Am	I	7	
	Skin and subcutaneous tissue	Skin infections	Fl	P	Am	I	120	
		Wounds	Fr	B	Am	I	109	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b	
<i>Chamaedorea pauciflora</i> Mart. <i>Chamaedorea pinnatifrons</i> (Jacq.) Oerst.	Infections and infestations	Lice	Lf, St	E	Am	I	77		
	Digestive system	Stomach pain	Fl	B	An	I		20	
	Poisonings	Vomiting	Sd	B	Am	I		14	
	Respiratory system	Insect bit	Sl	B	Am	I	7		
<i>Cocos nucifera</i> L.	Respiratory system	Cold	Ph, Rt	B	Am	I	101		
		Cough	Fl	B	Am	I		14	
	Blood and cardiovascular system	Anemia	Fl	C		Ch	Ni	102	
		Hemorrhoids	Fr	P		Am	I, M, Ni	14, 100	
	Dental health	Gum health	Fr	C		Am	Ni	50	
		Toothache	Rt	C		Ch	A, I		
	Digestive system	Abdominal pain	Fr	B		Am	Ni	60	
		Astringent	Fr	E		Ch	Ni	1	
		Diarrhea	Fl	B, C, E, P	Am, An, Ch		A, I, M, Ni	50, 57	2, 7, 11, 17, 21, 22, 23
		Intestinal pain	Fr, Rt, Sd	B, C		Am, An	I, M, Ni	7, 50, 47	
	Jaundice	Fr, Sd	C		Am	Ni	50		
	Liver pain	Sd	E		An, Ch	I, Ni	1, 67		
	Purgative	Sd	C, E		Am, Ch	A, I, Ni	50, 129	21, 22, 24	
	Stomach pain	Fr, Sd	E, P		Am, Ch	M, Ni	1	6	
	Vomiting	Sd	C		Am	I		2	
	Fever	Sd	B, E, P			I, M, Ni	1, 7, 14	5, 6, 11, 18	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	General ailments with unspecific symptoms				Am, An, Ch			
		Headache	Rt, Sd	B	Am	I	3, 7	
		Rehydration	Fr, Sd	C, E, P	Am, An, Ch	I, M		1, 3, 6, 17, 23
	Infections and infestations	Anthelmintic	Sd	B, C, E	Am, An, Ch	I, M, Ni	50, 60	16, 24
		Cholera	Fr, Sd	C	Ch	Ni	22	
		Dengue	Sd	E	Ch	M		23
		Malaria	Sd	P	Am	Ni	14	
	Not specified at all	Unspecified	Fr, Sd	C, E	Am, Ch	A, I	104	1, 21, 24
	Poisonings	Antidote	Fr, Sd	C	Am	Ni	50	
	Pregnancy, birth and puerperium	Abortive	Rt	P	Am	M	119	5
		Antiborbive	Fr	C, P	Am	I	58, 84	5
		Childbirth problems	Fr, Lf, Pt	B, P	Am, An	M, Ni	14, 57	
		Galactagogue	Fr, Sd	P	Am	Ni	83	
		Postpartum	Sd	P	Am	M		6
		Vomiting	Sd	C	Am	Ni	50	
	Reproductive system and sexual health	Contraceptive	Sd	P	Am	Ni	118	
		Gonorrhea	Fr	C	Am	Ni	50	
		Menstrual problems	Rt	B, E	Am, An	I, Ni	60, 67	
	Respiratory system	Pneumonia	Fr	P	Am	Ni	14	
		Sudorific	Fr	B	An	M	57	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Skin and subcutaneous tissue	Throat ache	Fr	C	Ch	A	74	
		Burns	Lf	P	Am	I	38	
		Hemorrhage	Sd	C	Am	I	1	
		Psoriasis	Fr	C	Ch	I	22	
		Skin infections	Sd	C	Ch	I	22	
		Wounds	Sd	E	Ch	Ni	1	
	Urinary system	Diuretic	Fr	E	Ch	Ni	1	
		Inflammation of kidneys	Fr, Sd	E, P	Am, An, Ch	I, M	67	5, 7, 16, 23, 24
		Prostate	Sd	C	Am	I	2	
		Urinary problems	Fr	B, E	Am, Ch	I	7	24
	Veterinary	Purgative	Sd	C	Ch	I	22	
	Blood and cardiovascular system	Circulatory problems	Sd	B	Am	Ni	89	
<i>Copernicia alba</i> Morong	Muscular-skeletal system	Rheumatism and Arthritis	Rt	B	Am	Ni	89	
	Infections and infestations	Tonsillitis	Rt	C	Ch	A	21	
<i>Desmoncus cirrhiferus</i> A.H. Gentry & Zardini	Nervous system and mental health	Psychosomatic	Ph	C	Ch	Ni	74	
	Skin and subcutaneous tissue	Wounds	St	C	Ch	A	21	
<i>Desmoncus giganteus</i> A.J. Hend.	Blood and cardiovascular system	Circulatory problems	Ph	P	Am	Ni	14	
	Digestive system	Liver pain	Fr	P	Am	M	6	
	Muscular-skeletal system	Hernia	St	E	Am	Ni	18	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b	
<i>Desmoncus mitis</i> Mart.	Not specified at all	Unspecified	Ph	P	Am	Ni	14	6	
	Urinary system	Inflammation of kidneys	St	P	Am	M			
	Cultural diseases and disorders	Bad Air	St	E	Am	I	12		
	General ailments with unspecific symptoms	Body pain	Rt	E	Am	I	77		
	Muscular-skeletal system	Hemia	Lf, St	E	Am	I	79		
	Respiratory system	Cold	Ns	E	Am	I	77		
	<i>Desmoncus orthacanthos</i> Mart.	Skin and subcutaneous tissue	Abscesses	Lf, St	E	Am	I	79	1
			Extraction of spines	Ns	C	Am	I		
		Digestive system	Colic	St	E	Am	I	34	
			Hepatitis	Ph	P	Am	Ni	14	
<i>Elaeis guineensis</i> Jacq.	Intestinal pain		Fr	E	Am	I	12	23	
	Digestive system	Unspecified	Rt	E	Ch	M			
	Infections and infestations	Anthelmintic	Fr	C	Am	Ni	50		
	Skin and subcutaneous tissue	Skin infections	Fr	C	Am	Ni	50		
	General ailments with unspecific symptoms	Fever	Ns	C	Ch	A			
									21
<i>Elaeis oleifera</i> (Kunth) Cortés	Infections and infestations	Anthelmintic	Fr	C	Am, Ch	A, Ni	49, 74		
	Not specified at all	Unspecified	Sd	P	Am	I, M, Ni	14, 100		
	Respiratory system	Asphyxia	Lf	C	Ch	Ni	51		
	Skin and subcutaneous tissue	Wounds	Sd	C	Am	M	45		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b	
<i>Euterpe catinga</i> Wallace	Blood and cardiovascular system	Anemia	Ns	C	Am	I		2	
	Digestive system	Diarrhea	Rt	C	Am	I		2	
	Infections and infestations	Hepatitis	Rt	P	Am	Ni	14		
		Malaria	Rt	C, P	Am	I, Ni	14, 106	2	
	Respiratory system	Yellow Fever	Fr, Rt	P	Am	Ni	14		
		Cough	Rt	C	Am	I	106		
		Pneumonia	Rt	P	Am	Ni	14		
	<i>Euterpe oleracea</i> Mart.	Blood and cardiovascular system	Anemia	Rt	B, C	Am, Ch	A, I, M		2, 12, 21
			Blood purification	Fr, Rt	C	Ch	A	110	
		Digestive system	Diarrhea	Fr	C	Am	I		2
		Gallbladder	Rt	P	Am	M		6	
	Hepatitis	Rt	C	Am	I		1, 2		
	Liver pain	Rt	P	Am	M	119			
	Stomach pain	Rt	C	Am	I		2		
Endocrine system	Diabetes	Rt	P	Am	M	119			
General ailments with unspecific symptoms	Body weakness	Rt	P	Am	M		6		
	Unspecified	Fr	P	Am	M		6		
Infections and infestations	Aids	Rt	P	Am	M	119			
	Malaria	Rt	C	Am	I		2		
Metabolic System and nutrition	Yellow Fever	Rt	C	Am	I		2		
	Vitamin	Rt	C	Ch	A		110		
	Unspecified	Fr	C, P	Am	I, M		1, 6		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Euterpe precatoria</i> Mart.	Other	Cancer	Rt	P	Am	M	119	
	Pregnancy, birth and puerperium	Galactagogue	Rt	P	Am	I		8
	Reproductive system and sexual health	Fertility	Rt	C	Ch	A	110	
	Respiratory system	Cough	Fr	C	Am	I		2
		Flu	Rt	C	Am	I		1
		Pneumonia	Rt	P	Am	M		7
	Urinary system	Inflammation of kidneys	Rt	P	Am	M		6
	Blood and cardiovascular system	Anemia	Rt	B, C, P	Am	I, M, Ni	3, 19, 43, 92, 107, 109	1, 2, 5, 6, 9, 10, 11, 12, 13
		Blood pressure	Fr, Rt	P	Am	M		5
		Blood purification	Rt	P	Am	I	20, 124	
		Circulatory problems	Rt	B	Am	Ni	60	
	Dental health	Tooth care	Rt	E	Am	I		3
		Toothache	Rt	E	Am	I		3
	Unspecified	Rt	C	Am	I	106	1	
Digestive system	Colic in babies	Rt	P	Am	M		6	
	Diarrhea	Rt	B, C, P	Am	I, M	7, 71, 78, 98, 106	1, 2, 6, 10, 11, 12	
	Gallbladder	Fr, Rt	P	Am	M		6	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
		Gastritis	Rt	C, E	Am	I	111	1
		Hepatitis	Ph, Rt	C, E, P	Am, An	I, M, Ni	14, 34, 68, 100, 127	1, 2, 6, 8, 10, 15, 18
		Inguinal Hernia	Rt, Ns	P	Am	M		7
		Intestinal pain	Rt	B, P	Am	I, Ni	3, 7, 14, 78	
		Liver pain	Rt	B, P	Am	I, M, Ni	3, 19, 82, 98, 124, 127	5, 6, 9
		Purgative	Rt	C	Am	I	46	
		Stomach pain	Rt	C, P	Am	I, M	100	2, 7
		Vomiting	Rt	C	Am	I		2
		Diabetes	Rt	B, C, P	Am	I, M	19	2, 5, 6
	Endocrine system	Body pain	Fr, Rt	P	Am	M		6
	General ailments with unspecific symptoms	Body weakness	Rt	B, P	Am	I, M		6, 9, 10, 13
		Fever	Fr, Rt	C, P	Am, An	I, M		1, 5, 18
	Infections and infestations	Amoebas	Ph, Rt	B	Am	I, M		12, 13
		Anthelmintic	Rt	B	Am	I	3, 7, 73, 98	14
		Leishmania	Rt	C	Am	I		1
		Malaria	Rt	C, E, P	Am, An	I, M, Ni	14, 34, 46, 58, 70, 100, 106	1, 2, 5, 6, 10, 15, 18
		Tuberculosis	Fr, Rt	P	Am	I	20, 124	
		Unspecified	Rt	P	Am	I, Ni	103	10
		Yellow Fever	Rt	C, P	Am, An	I, M, Ni	14, 100	2, 18

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Metabolic System and nutrition	Vitamin	Rt	B	Am	I, Ni	19, 60, 99, 107	
	Muscular-skeletal system	Back pain	Fr, Rt	B, C, P	Am, An	I	5, 19, 20, 98, 120, 122, 124	2, 20
		Bone pain	Fr, Rt	P	Am	I	120	6
		Fractures	Rt	P	Am	I	20, 124	
		Hematoma	Rt	P	Am	I	20	
		Muscular pain	Rt	B	Am	Ni	92	
		Edema	Rt	P	Am	I	20	
		Rheumatism and Arthritis	Rt	B, C, P	Am	I, M	78, 122	1, 5, 6, 10
	Not specified at all	Unspecified	Fr, Rt	B, C, E, P	Am, An	I, M	4, 33, 24, 25, 61, 63, 84, 95, 100, 108, 112, 126	1, 2, 6, 18
	Other	Cancer	Fr, Rt, St, Ns	C, P	Am	I, M		1, 6
		Hair loss	Rt	E	Am	I	105	
	Poisonings	Insect bit	Rt	C	Am	I		1
		Snakebite antidote	Rt	B, C	Am	I, Ni	92	1, 11, 13
	Pregnancy, birth and puerperium	Abortive	Rt, St	C	Am	I		2
		Antiabortive	Rt	P	Am	M		5, 6
		Childbirth problems	Rt	P	Am	I, M	20	1
	Reproductive system and sexual health	Gonorrhea	Rt	P	Am	I		6
		Menstrual problems	Rt	C	Am	I		1

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
		Uterus infections	Rt	B, P	Am	I, M	98, 120, 124	6, 9, 10
		Veneral diseases	Rt	C	Am	I		2
		Bronchitis	Rt	P	Am	M		6
		Chest pain	Rt	B	Am	I	92	
		Cold	Lf	B, E	Am	I, Ni	3, 77, 99	
		Cough	Rt	C, E	Am	I	77, 106	1, 2
		Flu	Ph, Rt	C, E	Am	I	28, 84, 88	1, 2
		Pneumonia	Lf, Rt	B, C, P	Am	I, M	3, 109, 124	1, 6, 13
		Respiratory infections	Rt, St	B	Am	Ni	89, 90	
		Throat ache	Lf	E	Am	I	77	
		Unspecified	Rt	B	Am	I	17	
		Earache	Lf	C, P	Am	I, M		1, 5
		Empeine	Fr, Rt	B	Am	I	101	
		Hemorrhage	Fr	B, C	Am	I	3	
		Swellings	Fr, Rt	B	Am	I	3	
		Inflammation of kidneys	Rt	B, C, P	Am, An	I, M, Ni	7, 20, 78, 82, 101, 120, 124, 127	1, 2, 5, 6, 9, 10, 11, 15, 18
		Prostate	Rt, Ns	P	Am	I, M	20	6, 9
		Urinary infections	Rt	B, P	Am	I	5, 20	
		Urinary problems	Rt	C	Am	I	46	1

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Geonoma cuneata</i> H. Wendl. ex Spruce	Digestive system	Intestinal pain	Rt	E	Ch	I	18	
	Not specified at all	Unspecified	Ns	E	Ch	I	29	
<i>Geonoma deversa</i> (Poit.) Kunth	Cultural diseases and disorders	Freight in children	Lf, St	B	Am	I	3	
	Other	Unspecified	Lf	C	Am	I	84	
	Respiratory system	Cough	Pt	E	Am	I	77	
<i>Geonoma divisa</i> H.E. Moore	Cultural diseases and disorders	Psychosomatic	Fr	C	Ch	I	49	
<i>Geonoma interrupta</i> (Ruiz & Pav.) Mart.	Cultural diseases and disorders	Strengthen health	Pt	P	Am	I	120	
<i>Geonoma macrostachys</i> Mart.	Digestive system	Vomiting	Lf, Rt	P	Am	Ni	14	
	General ailments with unspecific symptoms	Fever	Fl	P	Am	Ni	14	
	Reproductive system and sexual health	Menstrual problems	Fl	P	Am	Ni	14	
<i>Geonoma poeppigiana</i> Mart.	Not specified at all	Unspecified	Pt	C	Am	I	68	
<i>Geonoma stricta</i> (Poit.) Kunth	Dental health	Caries	Ns	E	Am	I	18	
<i>Geonoma trianae</i> (Burret) Wess. Boer	Muscular-skeletal system	Muscular pain	Ph	C	Ch	I		22
<i>Hyospathe elegans</i> Mart.	Dental health	Caries	Lf	C, E	Am	I	12, 48	
	Digestive system	Unspecified	Ph	C, E	Am	I	106, 117	2, 3
		Intestinal pain	Ph, Ns	P	Am	Ni	14	
		Nausea	Fl	P	Am	Ni	14	
		Stomach pain	Rt	E	Am	I		3
		Vomiting	Rt	P	Am	Ni	14	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Iriarteia deltoidea</i> Ruiz & Pav.	General ailments with unspecific symptoms	Headache	Rt	P	Am	Ni	14	
	Respiratory system	Flu	Rt	C	Am	I	48, 106	
	Skin and subcutaneous tissue	Wounds	Ph	C	Am	I		2
	Blood and cardiovascular system	Anemia	Lf	P	Am	I		8
	Cultural diseases and disorders	Bad Air	Ph	P	Am	I	76	
		Freight	Ns	P	Am	I	120	
		Psychosomatic	Fl	E	Ch	I		24
	Digestive system	Hepatitis	St	P	Am	Ni	14	
		Liver pain	Rt	P	Am	I	120	
		Purgative	Ph	E	Am	Ni	21	
	Infections and infestations	Malaria	Ph	E	An	Ni	21	
	Muscular-skeletal system	Fractures	Ph	P	Am	I	120	
		Rheumatism and Arthritis	Rt	P	An	I	114	
	Not specified at all	Unspecified	Rt	E, P	Am, An, Ch	I, M	100, 112, 113	24
	Poisonings	Insect bit	Ph, Rt, Ns	B	Am	I	122	
		Snakebite antidote	Ph, Rt	C	Am	I		1
Pregnancy, birth and puerperium	Childbirth problems	Rt	P	Am	M		6	
Reproductive system and sexual health	Fertility	Rt	C	Am, Ch	A, I	74, 106		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Iriartella setigera</i> (Mart.) H. Wendl.	Respiratory system	Cold	Rt	P	Am	I		10
	Skin and subcutaneous tissue	Cicatrizing	Rt	C	Ch	I		22
		Skin infections	St	P	Am	I		10
	Urinary system	Diuretic	Rt	E	Ch	I		24
	Infections and infestations	Lice	Rt	C	Am	I	48	
		Warts	Lf	C	Am	I		2
	Poisonings	Insect bit	Ls	C	Am	I, Ni	84	1
	Skin and subcutaneous tissue	Skin spots	Ph	C	Am	I	49	
	Digestive system	Hepatitis	Lf	P	Am	Ni	14	
	Infections and infestations	Lice	Rt	C	Am	I	49	
<i>Iriartella stenocarpa</i> Burret		Malaria	Lf	P	Am	Ni	14	
		Tuberculosis	Rt	P	Am	Ni	14	
	Digestive system	Hepatitis	Rt	C	Am	I		1
		Liver pain	Ph	C	Am	Ni	84	
<i>Lepidocaryum tenue</i> Mart.	General ailments with unspecific symptoms	Fever	Fr	C, P	Am	I, Ni	14	1
		Headache	Fr, Ph	P	Am	Ni	14	
	Infections and infestations	Malaria	Rt	P	Am	Ni	14	
	Not specified at all	Unspecified	Rt	C	Am	I	95	
	Poisonings	Insect bit	Ns	C	Am	I	68	
	Respiratory system	Cough	Ph	C	Am	I		1
		Flu	Ph	C	Am	I		1
		Throat ache	Ph	P	Am	Ni	14	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Manicaria maritana</i> Burret	Skin and subcutaneous tissue	Dry skin	Rt	P	Am	Ni	14	
	Muscular-skeletal system	Rheumatism and Arthritis	Fr	C	Am	I		1
<i>Manicaria saccifera</i> Gaertn.	Blood and cardiovascular system	Blood pressure	Sd	C	Ch	A		21
	Cultural diseases and disorders	Evil eye	Sd	C	Ch	A		21
	Dental health	Caries	Lf	C	Am	I		1
	Digestive system	Gastritis	Ph	C	Ch	A		21
		Purgative	Sd	C	Ch	A		21
	Muscular-skeletal system	Hematoma	Sd	C	Ch	A	129	
		Inflammations	Fr	C	Ch	A	129	
	Not specified at all	Unspecified	Fr	C	Ch	A, I		22, 22
	Other	Cancer	Sd	C	Ch	A		21
	Pregnancy, birth and puerperium	Postpartum	Sd	C	Ch	A	74	
	Reproductive system and sexual health	Fertility	Fl	C	Ch	A		21
	Respiratory system	Asphyxia	Sd	C	Ch	Ni	51	
	Cough	Fr	C	Ch	A, I		22, 22	
Skin and subcutaneous tissue	Hemorrhage	Sd	C	Ch	A, I		2	
Urinary system	Inflammation of kidneys	Br	C	Ch	A, I	74	21, 22	
	Prostate	Sd	C	Am, Ch	A, I		1, 21	
<i>Mauritia flexuosa</i> L. f.	Digestive system	Hepatitis	Sd	C, P	Am	I, Ni	14, 68	
		Liver pain	Rt, Ns	B	Am	M		12

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Mauritiella aculeata</i> (Kunth) Burret	General ailments with unspecific symptoms	Fever	Fr	C	Am	I	54	
		Headache	St	P	Am	Ni	14	
	Infections and infestations	Malaria	Fl	P	Am	Ni	14	
	Muscular-skeletal system	Muscular pain	Fr	E	Am	I		4
		Rheumatism and Arthritis	Fr	C	Am	I	54	
	Not specified at all	Unspecified	Rt	C, E	Am	I	25, 59, 112	
	Other	Cancer	Fr, Ns	P	Am	M	119	
	Poisonings	Snake bit antidote	Rt	P	Am	I		8
	Pregnancy, birth and puerperal	Abortive	Ph	P	Am	Ni	118	
		Galactagogue	Sd	E, P	Am	I, Ni	14, 93	
Reproductive system and sexual health		Emmenagogue	Ph, Rt	P	Am	Ni	118	
		Fertility	Sd	P	Am	I	120	
		Menstrual problems	Fr	B	Am	M		12
		Abscesses	Fr	B	Am	M		12
Skin and subcutaneous tissue		Wounds	Fr	B	Am	I, M		12
		Sprains	Fr	C	Am	I	117	
<i>Mauritiella armata</i> (Mart.) Burret	Not specified at all	Unspecified	Fr	P	Am	I	4	
	Cultural diseases and disorders	Insanity	Ns	C	Am	I		1
<i>Oenocarpus bacaba</i> Mart.	Digestive system	Diarrhea	Rt	C	Am	I		1
	Skin and subcutaneous tissue	Wounds	Fr	E	Am	I		3
	Digestive system	Purgative	St	C	Am	I	46	
	Infections and infestations	Malaria	Rt	C	Am	I	46	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b	
<i>Oenocarpus balticii</i> F. Kahn	Poisonings	Insect bit	Rt	P	Am	I	38		
	Respiratory system	Scorpion stings	Ph	C, P	Am	I	38, 46		
		Respiratory infections	Ph	C	Am	I	84		
	Urinary system	Urinary problems	Fr	C	Am	I	46		
	General ailments with unspecific symptoms	Fever	Rt	B	Am	I		13	
	<i>Oenocarpus bataua</i> Mart.	Infections and infestations	Headache	Fr	B	Am	I		13
			Amoebas	Fr	B	Am	I		13
		Respiratory system	Cold	Rt	B	Am	I		13
			Anemia	Fr	E	Ch	I		24
		Cultural diseases and disorders	Blood purification	Fr	P	Am	M	11	
Freight			Fr	B	Am, An	I		14, 20	
Digestive system		Colic	Fr, Sd	B	An	I		19	
		Diarrhea	Fr	C, E, P	Am	I, M, Ni		2, 14, 18, 40, 59, 2, 9 65, 100, 106	
		Digestion (children)	Fl, Fr, Rt, Sd	P	Am	Ni	11		
		Gallbladder	Fr	B	Am	M		12	
Digestive system	Hepatitis	Fr	P	Am	I, M, Ni		14, 100		
	Intestinal pain	Ph, Rt	B, E, P	Am	I, Ni		2, 14, 78		
	Liver pain	Fr, St	B, E, P	Am, Ch	I		19, 120		
	Purgative	Fr, Ph, Sd	B, C, E, P	Am	I, M, Ni		6, 11, 15, 66, 84, 6, 12 128		

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Endocrine system	Stomach pain	Fr, Sd	B, E	Am	I, Ni	40, 107	
	General ailments with unspecific symptoms	Diabetes	Fr, Rt	B, P	Am	I, Ni	60, 120	
		Body pain	Fr, Rt	B, E	Am, An	I, M	66	12, 14, 19
		Fever	Fr, Rt	B, P	Am, An	I, M, Ni	14, 19, 99, 107, 122	9, 12, 13, 14, 19
		Headache	Fr, Ph, Rt, Sd	B, E	Am	I	18, 19, 40, 59, 77	13
		Indisposition	Fr, Rt, Sd	B	Am	I	19	
		Tiredness	Sd	B	Am	I	19	
	Infections and infestations	Amoebas	Sd	B	Am	I, Ni	60	13
		Anthelmintic	Fr, Rt	E	Am	I	18, 40, 59, 88	
		Lice	Fr, Rt	B	Am	I	123	
		Malaria	Sd	C, P	Am	I, M, Ni	14, 100, 106, 120	
		Smallpox	Fr, Ph, Rt, Sd	B	Am	I	19	
		Tuberculosis	Sd	C, E	Am	I, Ni	53, 66, 84, 102, 105, 115	
		Unspecified	Fr, Sd	B, P	Am	I, Ni	98, 103	
		Yellow Fever	Sd	P	Am	I, M, Ni	14, 100	
	Metabolic System and nutrition	Vitamin	Rt	E	Am	I	2	
	Muscular-skeletal system	Muscular pain	Fr	B, P	Am	I, Ni	37, 78	
		Rheumatism and Arthritis	Fr	B, C, E, P	Am	I, M	11, 59, 66, 123	1, 14
	Not specified at all	Unspecified	Fr, Sd	B, C, E	Am, An	I, M, Ni	21, 24, 25, 27, 31, 33, 47, 55, 61, 86, 94, 113	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Other	Cancer	Fr, Lf, Rt, Sd, Ns	P	Am	I	120	
	Poisonings	Scorpion stings	Fr	C	Am	I		2
	Pregnancy, birth and puerperium	Snakebite antidote	Ph, Sd	E, P	Am	I	11, 34	
		Childbirth problems	Rt, Sd	P	Am	M	11	
	Reproductive system and sexual health	Galactagogue	Fr	E	Am	I	66	
		Postpartum	Ph	B	An	I		20
		Fertility	Rt	E	Ch	I		24
	Respiratory system	Asthma	Fr	C, E	Am	I	56, 59, 66	
		Bronchitis	Fr, Sd	C, E, P	Am	I, M, Ni	11, 15, 50, 59, 66	
		Cold	Fr	B, C, E, P	Am, An	I, M, Ni	19, 50, 59, 66, 77, 101, 107	10, 12, 19
		Cough	Fr, Rt	B, C, E, P	Am	I, M, Ni	2, 7, 11, 15, 75, 98, 106	2
	Respiratory system	Flu	Fr, Rt, Sd	B, C, E	Am	I, Ni	2, 50, 123	2
		Pertussis	Fr, Sd	C	Am	I	106	
		Pneumonia	Sd	B, C, E, P	Am, Ch	A, I, M, Ni	14, 15, 19, 44, 50, 74, 84, 85, 107, 123	9
	Respiratory system	Respiratory infections	Fr, Rt, Sd	B, C, E, P	Am, An	I, Ni	2, 14, 84, 59, 99	15
		Throat ache	Fr, St	C	Am	I	6, 84	
	Skin and subcutaneous tissue	Abscesses	Fr, Sd	B	Am	I	19	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b	
<i>Oenocarpus mapora</i> H. Karst.		Burns	Sd	B, E, P	Am	I	19, 111	3, 10	
		Skin infections	Fr, Sd, Ns	E	Am	I	66		
		Skin spots	Fr	B	Am	I	122		
		Swellings	Fr	B	Am	I	19		
		Wounds	Sd	B	Am	I, M	19	12	
		Inflammation of kidneys	Fr, Sd	B	Am	I		14	
		Anemia	Rt	P	Am	I		8	
		Psychosomatic	Ph	C	Ch	I	22		
		Cultural diseases and disorders	Lf	C, P	Am	I, Ni	14, 106		
		Digestive system	Hepatitis	P	Am	I, M, Ni	14, 100		
			Intestinal pain	P	Am	Ni	14		
			Purgative	Fr	P	Am	I	11	
		Endocrine system	Diabetes	Fr	P	Am	M	119	
		General ailments with unspecific symptoms	Fever	Rt	B	Am	I	78	13
	Infections and infestations	Headache	Fr	B	Am	I		13	
		Amoebas	Fr	B	Am	I			
		Malaria	Rt	C, P	Am	I, Ni	14, 84		
	Muscular-skeletal system	Back pain	Fr, Rt	P	Am	Ni	14		
		Bone pain	Ls	P	An	I		18	
	Not specified at all	Unspecified	Rt	B, P	Am	I	17	8	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Poisonings	Scorpion stings	Ph, Ns	C	Am	I	106	
	Pregnancy, birth and puerperal	Antiabortive	Ph	P	Am	I		8
	Respiratory system	Cough	Fr	C, P	Am	I, Ni	14, 84, 106	
		Pertussis	Fr, Rt	C	Am	I	106	
	Skin and subcutaneous tissue	Burns	Sd	B	Am	Ni	107	
	Urinary system	Inflammation of kidneys	Fr	C	Ch	A		21
<i>Pholidostachys dactyloides</i> H.E. Moore	Skin and subcutaneous tissue	Wounds	Fr	C	Ch	I		22
<i>Pholidostachys synanthera</i> (Mart.) H.E. Moore	Skin and subcutaneous tissue	Burns	Lf	E	An	Ni	18	
<i>Phytelphas aequatorialis</i> Spruce	Digestive system	Gastritis	Lr	E	Ch	I	32	
		Purgative	Sd	E	Ch	I		24
	Reproductive system and sexual health	Inflammation of ovaries	Sd	E	Ch	I	32	
	Respiratory system	Cough	Fr	E	An	M		17
	Sensory system	To clear the vision	Sd	E	Ch	I	32	
	Urinary system	Inflammation of kidneys	Sd	E	An, Ch	I, M	125	17, 24
<i>Phytelphas macrocarpa</i> Ruiz & Pav.	Cultural diseases and disorders	Urinary problems	Sd	E	An, Ch	I, M		17, 24
		Freight	Sd	P	Am	I	120	
		Witchcraft	Sd	C	Ch	I		22
	Dental health	Unspecified	Sd	B	Am	M		12
	Digestive system	Stomach pain	Sd	P	Am	I	120	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	Endocrine system	Vomiting	Sd	C	Am	I		2
	General ailments with unspecific symptoms	Diabetes	Sd	P	Am	M, Ni	80, 81, 119	
	Not specified at all	Fever	Fr, Sd	P	Am	M		7
	Poisonings	Unspecified	Sd	P	Am	I	4	
	Pregnancy, birth and puerperal	Scorpion stings	Ns	C	Am	I	106	
	Reproductive system and sexual health	Snake bit antidote	Ph	C	Am	I	106	
		Galactagogue	Sd	P	Am	I		8
		Fertility	Sd	P	Am	I	120	
	Sensory system	Eye inflammation	F1	P	Am	I	120	5
	Skin and subcutaneous tissue	Wounds	Sd	P	Am	I	120	
	Urinary system	Diuretic	Rt	C	Ch	A	74	
		Inflammation of kidneys	Rt	P	Am	I	120	
	Digestive system	Abdominal pain	Sd	P	Am	Ni	14	
	General ailments with unspecific symptoms	Hepatitis	Sd	P	Am	I, M, Ni	14, 100	
	Infections and infestations	Fever	Ph	P	Am	Ni	14	
	Not specified at all	Malaria	Sd	P	Am	I, M, Ni	14, 100	
	Poisonings	Unspecified	Ph	E	Am	I	27, 33	
		Insect bit	Rt	E	Am	I	34	

Phytelephas tenuicaulis (Barfod) A.J. Hend.

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Prestoea acuminata</i> (Willd.) H.E. Moore	Skin and subcutaneous tissue	Skin infections	Rt	P	Am	Ni	14	
	Not specified at all	Unspecified	Sd	C	An	I		15
	Urinary system	Inflammation of kidneys	Rt	C	An	I		15
<i>Prestoea schultzeana</i> (Burret) H.E. Moore	Dental health	Toothache	Rt	E	Am	I	34	
	Digestive system	Hepatitis	Rt	E	Am	I	34	
	Not specified at all	Unspecified	Rt	E	Am	I	30, 33	
	Respiratory system	Cold	Ph, Rt	E	Am	I	77	
		Cough	Rt	E	Am	I	77	
<i>Roystonea regia</i> (Kunth) O.F. Cook	Digestive system	Throat ache	Rt	E	Am	I	77	
	Infections and infestations	Diarrhea	Rt	P	An	Ni	41	
	Nervous system and mental health	Anthelmintic	Lf	P	An	Ni	41	
	Blood and cardiovascular system	Seizures	Lf	P	An	Ni	41	
	Cultural diseases and disorders	Anemia	Lf	B, P	Am	I, M		8, 12
<i>Socratea exorrhiza</i> (Mart.) H. Wendl.		Freight	Ph, Rt	B, P	Am, An	I	120	19
		Physically strengthen	Sl, Rt	P	Am	I	120	
	Digestive system	Hepatitis	Rt	C, P	Am, An	I, M, Ni	8, 14, 100	15
		Nausea	Ph, Rt	P	Am	Ni	14	
		Purgative	Ph, Rt	E, P	Am, An	I	35	18
	Stomach pain	Ph, Rt	B, P	Am, An	I		8, 20	
	Vomiting	Sl, Rt	P	Am	Ni	14		
Endocrine system	Diabetes	Ph, Rt	P	Am	M		6	

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
	General ailments with unspecific symptoms	Body pain	Rt	B	An	I		19
		Fever	Rt	B	Am	Ni	89	
	Infections and infestations	Leishmania	Fr, St	B, P	Am, An	I, M	19	5, 12, 19
	Muscular-skeletal system	Knee pain	Rt	E	Am	I	77	
		Muscular pain	Rt	C	Am	I		1
	Not specified at all	Unspecified	Rt	B, C, E, P	Am, An	I, M	17, 23, 52, 55, 75, 109, 112, 113	
	Poisonings	Insect bit	Fr, Ph, Rt, St, Ns	B, C, P	Am	I, M	122	1, 5
		Ray stings	Ph, Rt	C	Am	I		1
		Snake bit antidote	Rt	B, C, E, P	Am, An	I, M, Ni	19, 21, 70	1, 8
		Worms poisonous bites	Ph, Rt	B	Am	I	73	
	Reproductive system and sexual health	Fertility	Rt	C	Am	I	106	
	Respiratory system	Pneumonia	Rt	P	Am	I		10
	Skin and subcutaneous tissue	Abscesses	Rt	B	Am, An	I	19, 78	8, 12
		Botfly infection	Rt	C	Am	I		1
		Psoriasis	Rt	B	Am	I	19	
		Skin infections	Rt	B, P	Am	I	5	10
		Wounds	Rt, St	B	Am	I	19, 101	
	Veterinary	Anthelmintic	Rt	C	Am	I		1
		Botfly infection	St	C	Am	I		1

(continued)

Scientific name	Use subcategories	Ailments and diseases	Palm parts	Countries	Ecoregions	Human groups	References ^a	Fieldwork localities ^b
<i>Syagrus sancona</i> (Kunth) H. Kanst.	Blood and cardiovascular system	Scabies Anemia	Rt Rt	B P	Am Am	I I	19, 78	8
<i>Wettinia aequalis</i> (O.F. Cook & Doyle) R. Bernal	Dental health Metabolic System and nutrition	Unspecified Cholesterol	Ph Fr	P P	Ch Ch	I I		24 24
<i>Wettinia angusta</i> Poepp. & Endl.	Urinary system	Inflammation of kidneys	Fr	P	Ch	I		24
<i>Wettinia maynensis</i> Spruce	Infections and infestations Infections and infestations Not specified at all	Lice Anthelmintic Unspecified	Fr Lf Fr, Ph	C P P	Am Am, An Am	I I I	48 13, 39 30	

^a 1: Acosta-Solis 1971; 2: Aguilar 2006; 3: Aguirre 2006; 4: Albán 1994; 5: Alexiades 1999; 6: Antolínez 1999; 7: Armesilla 2006; 8: Ayala 1984; 9: Báez 1998; 10: Báez and Backevall. 1998; 11: Balick 1986; 12: Balslev and Barrfod. 1987; 13: Balslev et al. 1997; 14: Balslev et al. 2008; 15: Barriga 1994; 16: Bernal et al. 2010; 17: Boom 1986; 18: Borchsenius et al. 1998; 19: Bourdy 1999; 20: Bourdy et al. 2008; 21: Byg and Balslev. 2004; 22: Caballero 1995; 23: Cárdenas and Ramirez. 2004; 24: Cárdenas et al. 2002; 25: Castaño-Arboleda et al. 2007; 26: Cerón 1995; 27: Cerón 2003; 28: Cerón and Montalvo 1998; 29: Cerón and Montalvo 2002; 30: Cerón and Reyes 2007a; 31: Cerón and Reyes 2007b; 32: Cerón et al. 2004; 33: Cerón et al. 2005; 34: Cerón et al. 2011; 35: Cerón et al. 2012; 36: Cerro et al. 2003; 37: Chávez 1996; 38: Corneo 1998; 39: Cruz et al. 2009; 40: Davis and Yost 1983; 41: Defeo 1992; 42: Denevan and Treacy 1987; 43: Desmarchelier et al. 1996; 44: Dugand 1961; 45: Etipiñan-González and Jimenez-Escobar 2010; 46: Forero 2005; 47: Frausin et al. 2010; 48: Galeano 1992; 49: Galeano and Bernal 2010; 50: García Barriga 1974; 51: García Cossio et al. 2002; 52: García et al. 1996; 53: Garzón 1985; 54: Garzón and Macurtoffe 1992; 55: Giraldo-B 2004; 56: Giraldo-Tafur 1995; 57: Girault 1987; 58: Glenboski 1983; 59: Gomez et al. 1996; 60: Gutiérrez-Vásquez and Peralta 2001; 61: Henkemans 2001; 62: Himojosa 1991; 63: Huertas 2007; 64: Iglesias 1987; 65: Iglesias 1989; 66: Játiva and Alarcón 1994; 67: Kothari 1993; 68: Kronik 1999; 69: Kvist et al. 1998; 70: Kvist et al. 2001; 71: La Rotta et al. 1987; 72: La Rotta et al. 1989; 73: Langevin 2002; 74: Ledezma 2011; 75: López et al. 1998; 76: Luzziatelli et al. 2010; 77: Macía 2004; 78: Macía, unpubl.; 79: Marles et al. 1998; 80: Mejía 1983; 81: Mejía 1988b; 82: Mejía 1992; 83: Mejía and Rengifo 2000; 84: Mesa 2011; 85: Miller 2002; 86: Miranda et al. 2009; 87: Mollinedo 2000; 88: Mondragon and Smith 1997; 89: Moraes et al. 2005; 91: Moraes et al. 1996; 92: Moreno Suárez and Moreno Suárez 2006; 93: Ojeda 1994; 94: Ortiz Gómez 1989; 95: Ortiz 1994; 96: Pacheco et al. 1998; 97: Paniagua Zambrana 1998; 98: Paniagua Zambrana 2001; 99: Paniagua Zambrana 2005a; 100: Paniagua Zambrana 2005b; 101: Paniagua Zambrana et al., unpubl.; 102: Pérez-Arbelaiz 1956; 103: Pérez 2002; 104: Pino and Valois 2004; 105: Ponce 1992; 106: Prado 2008; 107: Proctor et al. 1992; 108: Programa de Desarrollo Alternativo en Colombia 1995; 109: Quintana and Vargas 1995; 110: Restrepo 1996; 111: San Sebastián 1995; 112: Sánchez 2005; 113: Santín Luna 2004; 114: Sanz-Biset et al. 2009; 115: Schultes 1951; 116: Schultes 1974; 117: Schultes and Raffauf 1990; 118: Seoane and Soplin 1999; 119: Silva and García 1997; 120: Sosnowska et al. 2010; 121:

Telléz 1979; 122: Thomas and Vandebroek 2006; 123: Triona 2001; 124: Valadeau et al. 2010; 125: Van den Eynden et al. 2004; 126: Vargas 1997; 127: Vásquez 1992; 128: Vásquez and Vásquez 1998; 129: Zuluaga 2003

^b Numbers of localities follow Appendix 1

Plant parts: *Br* Bract, *F1* Flower, *F_r* Fruit, *L_f* Entire leaf, *L_s* Leaf sheath, *L_r* Leaf rachis, *Ph* Palm heart, *Pt* Petiole, *Rt* Root, *Sd* Seed, *Sf* Spear leaf, *Sp* Spine, *St* Stem, *Ms* Not specified
Ecoregions: *Am* Amazon, *An* Andes, *Ch* Chocó

Countries: *B* Bolivia, *C* Colombia, *E* Ecuador, *P* Peru. Human groups: *A* Afro-American, *I* Indigenous, *M* Mestizo, *Ni* Not identified