Traditional knowledge hiding in plain sight – twenty-first century ethnobotany of the Chácobo in Beni, Bolivia

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Abstract

Background: The Chácobo are a Panoan speaking tribe of about 1000 members (300+ adults) in Beni, Bolivia. Originally nomadic, the Chácabo were relocated to their current main location in the 1960s. Researchers have visited the Chácabo since 1911. A first more detailed anthropological report exists from the late 1960s, and ecological–ethnobotanical studies were conducted in the 1980s and 1990s. The presented work represents a complete ethnobotanical inventory of the entire adult Chácobo population, with interviews and plant collection conducted directly by Chácobo counterparts.

Methods: Based on previous reports and our preliminary studies, we hypothesized that twenty-first century Chácobo plant use centered on income generation, and that traditional plant use related to household utensils, medicine and traditional crop varieties had almost disappeared. To test this hypothesis, we started the "Chácobo Ethnobotany Project," training 10 indigenous Chácobo participants in ethnobotanical interview and plant collection techniques, in order to more fully document Chácobo knowledge and avoid the influence of foreign interviewers.

Results: Our study found 331 useful plant species in 241 genera of 95 plant families, with leaves, roots and bark being the most commonly used plant parts. The comprehensive documentation that these methods enabled completely nullified our initial hypothesis of knowledge loss. Traditional crop varieties are still widely grown and traditional knowledge is alive. Moreover, it is being actively recuperated in certain domains by the younger generation. Most Chácobo know, and can name, traditional utensils and tools, although only the older generation has still the skills to manufacture them. While many Chácobo still know the names and uses of medicinal species, the younger generation is however often unsure how to identify them.

Conclusions: In this paper we illustrate the complexity of perspectives on knowledge at different ages, and the persistence of knowledge over almost a century. We found that traditional knowledge was only partially affected by the processes of exposure to a market economy, and that different knowledge domains experienced different trends as a result of these changes. Overall knowledge was widely distributed, and we did not observe a directional knowledge loss. We stress the importance to not directly conclude processes of knowledge loss, cultural erosion or acculturation when comparing the knowledge of different age groups.

Keywords: Traditional knowledge, Knowledge loss, Conservation, Indices
Background

The Chácobo tribe, living in Northeastern Bolivia, were first visited by the European traveler Erland Nordenskjöld in 1911 [1], followed by an anthropologist only in 1956, who published the last account of Chácobo life before the tribe came under the influence of American Evangelist missionaries [2]. The Summer Institute of Linguistics (SIL) worked with Chácobo communities from 1953 to 1980, and produced the first account of Chácobo linguistics [3], and an unpublished work on Chácobo customs, with a strong focus on evangelist development [4]. This account is in interesting juxtaposition to the writings of German anthropologist Kelm [5], who visited the Chácobo in 1970, in the middle of SIL rule. The SIL finally was replaced in 1980 by the Swiss Protestant mission. Missionary rule led to a profound change of lifestyle, and a permanent process of acculturation [6]. From 1983 to 84, Brian Boom (New York Botanical Garden) led the first ethnobotanical study of Chácobo, documenting their knowledge after almost 30 years of cultural change [7]. Boom did however base his work on the plants collected from a single 1 ha forest plot. In 1995 the Institut Franjáis d’Études Andines financed a re-survey of Boom’s plot, but the results were never released to the public, and a planned publication [8] existed in a single volume in the Institute’s main library in Lima. Muñoz et al. [9] published a study on anti-malarial plants used by the Chácobo. Given the availability of previous studies, the Chácobo are an outstanding possibility to study traditional knowledge over time.

Traditional knowledge (TK) has been recognized for its importance for the protection of ecosystem services and biodiversity [10, 11]. However, researchers and policymakers have equally expressed concern about its possible loss as societies modernize. A growing number of studies have reported changes and losses in TK (e.g. medical TK [12–15], nutritional TK [16], and agricultural TK [17–19]. The hypothesis that TK systems are able to adapt to external changes and internal pressures has discussed for some time (e.g., [20]).

Traditional knowledge is also seen as an important component in improving the management of natural resources [10, 20, 30] and practices relating to the protection of ecosystems and species [11]. Factors such as gender, age, ethnicity, birthplace, and level of education have been identified as important on an individual level [31–34]. Family size, integration into the market economy (e.g. sale of animals and agricultural products), or amount of material goods at family level (e.g., possessions of farm animals, tools, and transport) have been linked to the household levels [35, 36]. Access to commercial centers, and to health, education, electricity or water, as well as land tenure systems and settlement history have shown a greater relevance at the community level [37–39]. In the absence of a unifying theory or common research methods, it is however difficult to clearly recognize whether or not these patterns exist at broader scales [40]. Several studies have used literature metadata to analyze large-scale usage patterns of plants [41–43]. In many cases, however, comparisons are difficult to make, given the diversity of the objectives and methods employed.

Based on previous reports mentioned, and our own preliminary studies [44], we hypothesized that twenty-first century Chácobo plant use centered on income generation through collection of forest products and agricultural production, and that traditional plant use related to household artifacts and medicine, as well as traditional crop varieties, had almost disappeared. We also hypothesized that the “missionary generation” – the first age group growing up under restrictive evangelist rule, would report less TK than other age groups. Because access to markets and services has been reported as a major cause for TK loss [28], we also hypothesized that in villages most distant from the main market center (Riberalta), knowledge about the use of plants, and the number of useful species would be more homogeneously distributed through the generations [25], and expected that this TK distribution show different patterns when analyzing the different domains of knowledge about the use of plants [29].

To test our hypotheses, we started the “Chácobo Ethnobotany Project,” training 10 indigenous Chácobo participants in ethnobotanical interview and plant collection techniques, to comprehensively document contemporary Chácobo TK and avoid the limiting influence of foreign interviewers.
Methods
The study area — The Chácobo and Pacahuara
The Chácobo belong to the Panoan linguistic group, which includes about twelve tribes (Chácobo, Pacahuara, Matis, Matses, Yaminahua, Ese Eja and others). At the end of the 1890s, the Chácobo lived as semi–nomadic hunters and cassava and maize cultivators, probably in two groups, one with six families and one with four, in north Bolivia, between Lake Roguagnado and the river Mamore, south of their current territory. During the rubber boom in the early 1900s, they were forced by more aggressive tribes to move north, where rubber tappers, who also brought disease and epidemics to the tribe, threatened them. While other tribes were enslaved to work in rubber stations, the Chácobo managed to avoid most of the outside influences. Their first permanent contact with the outside world occurred only in 1953 with members of the Tribes Missions, and in 1954 the Bolivian government established an agency about 15 km from the current location of Puerto Limones. The missionary linguist Gilbert Prost arrived in 1955 under the auspices of the Summer Institute of Linguistics (SIL). According to [4] there were four Chácobo groups living between the Benicito and Yata rivers at that time, numbering about 200 people [7]. Prost and his wife continued to live among the Chácobo until 1980. In addition to translating the New Testament into Chácobo, they made some observations on cultural
Table 1: Plant species used by the Chácobo

| FAMILY / SCIENTIFIC NAME | USES                                                                 | VERNACULAR NAMES (Ch-Chácobo, Sp-Spanish) | Coll # |
|--------------------------|----------------------------------------------------------------------|--------------------------------------------|--------|
| Amaranthaceae            |                                                                      |                                            |        |
| Chenopodium ambrosioides L. | MEDVET: Digestive system (Appendicitis, Leaf; Diarrhea, Leaf); General Ailments with Unspecific Symptoms (Chest pain, Leaf); Respiratory system (Bronchitis, Leaf) | Caré (Ch)                                  | GOS 44, JSM 13, ORC 5 |
| Amaryllidaceae           |                                                                      |                                            |        |
| Allium cepa L.           | HUMFOOD: Food (Edible, Root); MEDVET: Infections and infestations (Tuberculosis, Root); Respiratory system (Cold and flu, Root) | Cebolla (Sp)                               |        |
| Allium sativum L.        | MEDVET: Cultural diseases and disorders (Bad air and scare - Ratéaina, Root); General Ailments with Unspecific Symptoms (Chest pain, Root); Infections and infestations (Malaria and fever, Root); Reproductive system and sex health (Menstrual pain, Root); Snakebites and Ray stings (Sankebites, Root) | Ajo (Sp)                                   |        |
| Anacardiaceae            |                                                                      |                                            |        |
| Anacardium occidentale L. | HUMFOOD: Food (Edible, Fruit); MEDVET: Dental health (Toothache, Seeds); Digestive system (Diarrhea, Bark, fruit, leaf and young leaf; Stomach ache, Leaf); Endocrine system (Diabetes, Bark; Liver pain, Leaf); General Ailments with Unspecific Symptoms (Vomit, Bark, fruit and young leaf); Skin and subcutaneous tissue (Puchichi, Leaf); Urinary system (Kidney infection, Bark) | Cayú (Sp)                                  | BCM 1, GOS 14 |
| Astronium sp.            | FUEL: Firewood (Firewood - Caro, Trunk)                             | Mérabí (Ch)                                | MOV 38 |
| Mangifera indica L.      | HUMFOOD: Food (Edible, Fruit); MEDVET: Infections and infestations (Malaria and fever, Bark); UTEN&TOOL: Labour tools (Shovel, Trunk) | Manga (Sp)                                 |        |
| Spondias venosa C. Martius ex Colla | HUMFOOD: Food (Edible, Fruit)                                        | Cedrillo (Sp)                              | CH1    |
| Spondias venulosa C. Martius ex Colla | MEDVET: Musculo-skeletal system (Fractures, Bark)                    | Conserbilla de cuchi (Sp)                  | CH2    |
| Tapirira guianensis Aubl. | CONST: Houses (Frame house, Trunk; House post-Jilibéri, Trunk); MEDVET: Digestive system (Diarrhea, Bark, Stomach ache, Bark); Endocrine system (Gaillbladder, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark); Infections and infestations (Malaria and fever, Bark); Skin and subcutaneous tissue (Caracha, Bark; Skin fungus, Skin) | Chaxo nihi / Tarari / Xaba cano (Ch)       | JSM 8, MSM 5, RBU 17827 |
| Annonaceae               |                                                                      |                                            |        |
| Annona hypoglauca Mart.  | HUMFOOD: Food (Edible, Fruit); MEDVET: Musculo-skeletal system (Blows, Bark; Bone pain, Bark; Rheumatism, Bark); Respiratory system (Cold and flu, Bark) | Roho nësëbi / Rononopa (Ch); Bejúco (Sp)   | GOS 23 |
| Annona montana Macfad.   | CONST: Houses (Frame house, Trunk); HUMFOOD: Food (Edible, Fruit)   | Têto / Têto chopishi (Ch); Biriibá de monte (Sp) | MOV 20 |
| Annona sp.               | HUMFOOD: Food (Edible, Fruit)                                        | Jénéë Biriibá (Ch)                         | CH3    |
| Cymbopopetalum brasiliense (Vell.) Benth. ex Baill. | HUMFOOD: Food (Edible, Fruit and seeds); MEDVET: Infections and infestations (Leishmaniasis, Root); Skin and subcutaneous tissue (Wounds and cuts, Root); Snakebites and Ray stings (Sankebites, Root) | Béromo (Ch); Mauro (Sp)                    | CH4    |
| Dugetia quitensis Benth.  | HUMFOOD: Food (Edible, Fruit)                                        | Ahuabaca (Ch)                              | CH5    |
| Guatteria discolor R. E. Fries | CONST: Houses (Frame house, Trunk; To tie house, Bark)              | Xahuisi (Ch); Piraquina negra (Sp)          | CH6    |
| **Table 1** Plant species used by the Chácobo (Continued) |
|---------------------------------------------------------|
| **Guatteria hyposericea** Diels | CONST: Houses (Muchacho - Ninoti, Trunk; Tie - Xahui, Bark); Thatch (To tie roof, Bark); FUEL: Firewood (Firewood - Caro, Trunk) | Huaubaca (Ch); Pavo (Sp) | CH7 |
| **Xylopia ligustrifolia** Humb. & Bonpl. ex Dunal | CONST: Houses (Tie - Xahui, Bark; Tirante corto - Cano Bësëcamë, Trunk; To tie house, Bark); Other constructions (Huaraacha, Trunk); Thatch (To tie roof, Bark); FUEL: Firewood (Firewood - Caro, Trunk) | Xahuuisi (Ch); Tëtëmëtsisi / Xahui (Ch); Piraquina / Pancho (Sp) | MSM 14, SCO 2, MOV 37 |
| **Xylopia peruviana** R.E. Fr. | CONST: Houses (Frame house, Trunk; Hedge - Panë, Trunk; House post - Jibarnë, Trunk, Ijuixaca, Trunk, Muchacho - Ninoti, Trunk; Nasëcamëti, Trunk; Pasa ratón - Xoya jabatl, Trunk; Ridgepole - Maracatí, Trunk; Roof beam - Canoxoco, Trunk; Solera - Chitao, Trunk; Tie - Xahui, Bark; Tirante - Cano bépotó, Trunk; Tirante corto - Cano Bësëcamë, Trunk; Tirante largo - Cano pixquëna, Trunk; To tie fence, Bark; To tie house, Bark); Other constructions (Huaraacha, Trunk); Thatch (Techo - Xëhuahacacató, Bark; To tie roof, Bark); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit and root); MEDVET: Musculo-skeletal system (Bone pain, Seeds); Skin and subcutaneous tissue (Haemorrhage, Leaf); UTEN&TOOL: Domestic utensils (Basket - Chichabëcasa, Bark; Basket - Chichama, Bark; Basket - Nishicacano, Bark; Basket - Purupachi, Bark; Hammock - Nishi, Bark); Hunting & fishing tools (Arrow - Paca, Trunk; Rope (Rope - Rischipi, Bark) | Tëtëmëtsisi / Xahui (Ch); Piraquina / Pancho (Sp) | MOV 37 |
| **Xylopia polyantha** R.E. Fr. | CONST: Houses (Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabatl, Trunk; Roof beam - Canoxoco, Trunk; Tirante corto - Cano Bësëcamë, Trunk); Thatch (To tie roof, Bark); FUEL: Firewood (Firewood - Caro, Trunk) | Xahuireia (Ch) | CH8 |
| **Xylopia sp.** | CONST: Houses (Frame house, Trunk; Hedge - Panë, Ijuixaca, Trunk, Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabatl, Trunk; Ridgepole - Maracatí, Trunk; Roof beam - Canoxoco, Trunk; Tie - Xahui, Bark; Tirante - Cano bépotó, Trunk; Tirante corto - Cano Bësëcamë, Trunk; Tirante largo - Cano pixquëna, Trunk); FUEL: Firewood (Firewood - Caro, Trunk) | Capëtërëbó (Ch) | ORC 7 |
| **Apiaceae** | **Daucus carota** L. | HUMFOOD: Food (Edible, Root); MEDVET: Sensory system (Inflammation of eyes, Root) | Zanahoria (Sp) |
| **Apocynaceae** | **Aspidosperma excelsum** Benth. | FUEL: Firewood (Firewood - Caro, Trunk) | Tiorcorihua (Ch) | SCO 37 |
| **Aspidosperma megalocarpon** Müll. Arg. | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Endocrine system (Gallbladder, Bark); Infections and infestations (Malaria and fever, Bark and root); Respiratory system (Cold and flu, Bark and seeds); Skin and subcutaneous tissue (Caracha, Bark); UTEN&TOOL: Domestic utensils (Basket - Chichama, Bark; Pestle of Tacu, Trunk; Tacu - Arusatimati, Trunk); Labour tools (Axe - Maquë poroma, Trunk; Planting stick - Xësati, Trunk) | Poroma Jihui / Cháchama (Ch); Gabetillo (Sp) | CH9 |
| **Geissospermum reticulatum** (Jacq.) K. Schurn. | MEDVET: Infections and infestations (Malaria and fever, Bark) | Jihui Moca (Ch) | GOS 22, SCO 20 |
| **Hancornia speciosa** Gomes | HUMFOOD: Food (Edible, Fruit); MEDVET: Endocrine system (Liver, Bark) | Xabá motoha (Ch); Magaba (Sp) | GOS 16, RBU 17833 |

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Table 1 Plant species used by the Chácobo (Continued)

| Plant Species                        | MEDVET: Treatment                                                                 | CULT: Use                                                                 | DOA | MOV | ESR |
|--------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----|-----|-----|
| Himatanthus sucuuba (Spruce ex Müll. Arg.) Woodson | Cultural diseases and disorders (Bad air and scare - Râteaina, Trunk); Digestive system (Appendicitis, Bark, and exudate; Diarrhea); Endocrine system (Gallbladder, Exudate; Pancreas, Exudate); General Ailments with Unspecific Symptoms (Body pain, Bark and exudate; Chest pain, Bark; Headache, Bark); Infections and infestations (Anthrhemintic, Bark; Boro, Exudate; Malaria and fever, Exudate); Musculo-skeletal system (Blows, Exudate; Fractures, Bark; Hernia, Exudate; Rheumatism, Leaf) | Personal adornment (Ornament - Maxëití, Seeds; Ornament - Mënëxëtí, Seeds; Ornament - Shinoxëta, Seeds); FUEL: Firewood (Firewood - Caro, Trunk) | Bahua Quëxti (Ch) | MOV 54, RBU 17863 | CH10 |
| Tabernaemontana linkii A. DC.         | Infections and infestations (Malaria and fever, Bark, leaf and root)             |                                                          |     |     |     |
| Woytkowskia spermatochorda Woodson    |                                                                                   |                                                          |     |     |     |
| Araceae                              |                                                                                   |                                                          |     |     |     |
| Anthurium sp.                        |                                                                                   |                                                          |     |     |     |
| Philodendron bipinnatifidum SCOtt     |                                                                                   |                                                          |     |     |     |
| Philodendron quinquelobum K. Krause   |                                                                                   |                                                          |     |     |     |
| Xanthosoma sagittifolium L. Scott     |                                                                                   |                                                          |     |     |     |
| Xanthosoma striolatum Mart. ex Scott  |                                                                                   |                                                          |     |     |     |
| Araliaceae                           |                                                                                   |                                                          |     |     |     |
| Schefflera morototoni (Aubl)          |                                                                                   |                                                          |     |     |     |
| Maguire, Steyerm. & Frodin           |                                                                                   |                                                          |     |     |     |
| Arecaaceae                           |                                                                                   |                                                          |     |     |     |
| Acrocomia aculeata (Jacq) Lodd. ex Mart. |                                                                                   |                                                          |     |     |     |
| Allagoptera leucocalyx (Drude) Kurtze |                                                                                   |                                                          |     |     |     |
| Astro Caryum aculeatum G. Mey.       |                                                                                   |                                                          |     |     |     |

**Note:** All plant species used by the Chácobo are native to the Amazon region and are used for a variety of medicinal, cultural, and practical purposes. The MEDVET column lists the diseases and disorders treated, while the CULT column provides information on personal and public adornment, fuel, and domestic utensils. The DOA, MOV, and ESR columns indicate the location of the research or collection site.
### Table 1 Plant species used by the Chácobo (Continued)

| Plant Species | Natural Uses and Medical Uses |
|---------------|-------------------------------|
| **Astrocaryum oelei** (Burret) | CONST: Houses (Hedge - Panë, Trunk); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Domestic utensils (Basket - Chichama, Young leaf; Fan - Huliéqëti, Young leaf) |
| **Attalea butyracea** (Mutis ex L.f.) Wess. Boer | CONST: Thatch (Roof - Xëhuahacacató, Leaf); UTEN&TOOL: Domestic utensils (Basket - Cano bëpotó, Leaf; Planting stick - Xësati, Trunk); Labour tools (Axe - Maquë poroma, Trunk; Machete handle, Trunk; Planting stick - Xësati, Trunk) |
| **Attalea maripa** (Aubl.) Mart. | CONST: Houses (Frame house, Leaf; Ridgepole - Maracatí, Trunk; Tie - Xahui, Young leaf; Tirante - Cano bëpotó, Leaf; To tie house, Young leaf); Thatch (Huaraicha roof, Leaf; Ridgepole - Xobomapatí, Leaf; Roof - Xëhuahacacató, Leaf; To tie roof, Young leaf); CULT: Recreational (Toys, Trunk); FUEL: Other fuel (Ceramics - Chomo, Leaf); HUMFOOD: Food (Edible, Palm heart and fruit); MEDVET: Digestive system (Diarrhea); UTEN&TOOL: Domestic utensils (Basket - Cano bëpotó, Leaf; Planting stick - Xësati, Trunk); Labour tools (Axe - Maquë poroma, Trunk; Machete handle, Trunk; Planting stick - Xësati, Trunk) |
| **Attalea phalerata** Mart. ex Spreng | CONST: Houses (Frame house, Trunk; Tirante - Cano bëpotó, Leaf; To tie house, Young leaf); Thatch (Huaraicha roof, Leaf; Ridgepole - Xobomapatí, Leaf; Roof - Xëhuahacacató, Leaf; To tie roof, Young leaf); CULT: Recreational (Toys, Trunk); FUEL: Other fuel (Ceramics - Chomo, Leaf); HUMFOOD: Food (Edible, Fruit); MEDVET: Blood and Cardiovascular system (Anemia, Root); Dental health (Toothache, Seeds); Digestive system (Diarrhea, Fruit); Infections and infestations (Amoebas, Root; Anthelmintic, Root); Metabolic system and nutrition (Vitamin, Root; Sensory system (Earache, Seeds); Urinary system (Kidneys, Root); UTEN&TOOL: Domestic utensils (Asalle, Young leaf; Basket - Bano, Leaf; Basket - Chichabécasas, Young leaf; Basket - Chichama, Young leaf; Basket - Nishicacano, Young leaf; Basket - Purupachi, Young leaf; Basket - Yarnach, Young leaf; Fan - Huëquétti, Young leaf; Knife, Trunk; Mat, Leaf; Pestle of Batan - Chapi, Leaf); Hunting & fishing tools (Arrow - Quëspini, Trunk; Fishing bait, Seeds); Labour tools (Axe - Maquë poroma, Trunk; Machete handle, Trunk; Planting stick - Xësati, Trunk; Rope (Rope - Rispichi, Young leaf) |
| **Attalea speciosa** Mart. ex Spreng. | CONST: Houses (Frame house, Trunk; Tirante - Cano bëpotó, Leaf; Thatch (Ridgepole - Xobomapatí, Leaf; Roof - Xëhuahacacató, Leaf); HUMFOOD: Food (Edible, Fruit); MEDVET: Infections and infestations (Leishmaniasis, Seeds); Musculo-skeletal system (Bone pain, Seeds); Skin and subcutaneous tissue (Puchichi, Seeds) |
### Table 1

Plant species used by the Chácobo (Continued)

| Species | CONST: | HUMFOOD: | UTEN&TOOL: | HUNTING & FISHING TOOLS: | LABOUR TOOLS: | FUEL: | MEDVET: | OTHER |
|---------|--------|----------|------------|--------------------------|--------------|-------|--------|-------|
| Bactris acanthocarpa Mart. | Thatch (Huaracha roof, Trunk); | Food (Edible, Fruit); | Domestic utensils (Basket - Chichama, Young leaf; Bow to clean cotton, Trunk; Hammock - Nishi, Young leaf; Knife, Trunk; Needle, Spine; Spinning wheel - Ihui béro, Trunk; Spinning wheel - Ihui, Trunk; Tacú - Arusa timati, Trunk); Fishing tools (Arrow - Bicobi, Trunk; Arrow - Notsi, Trunk; Arrow - Paca, Trunk; Arrow - Pio, Trunk; Arrow - Quërëquë, Trunk; Arrow - Quëspini, Trunk; Arrow - Tahu Quëspini, Trunk; Arrow - Tiopi, Trunk; Arrow - Xëña, Trunk; Arrow, Trunk; Bow - Canatí, Trunk); Labour tools (Bake, Leaf; Shovel, Trunk) | | | | |
| Bactris gasipaes Kunth. | Thatch (Huaracha roof, Trunk); | Food (Edible, Fruit); | Domestic utensils (Basket - Chichama, Young leaf; Basket - Chichama, Young leaf; Hunting & fishing tools; Bow - Canatí, Trunk); Labour tools (Axe - Maquë poroma, Trunk) | | | | |
| Bactris gasipaes var. chichagui (H. Karst.) A.J. Hend. | Thatch (Roof - Xëhuahacacató, Young leaf); | Food (Edible, Fruit); | Domestic utensils (Basket - Chichabëcasa, Young leaf; Basket - Chichama, Young leaf; Hunting & fishing tools; Bow - Canatí, Trunk); Labour tools (Axe - Maquë poroma, Trunk) | | | | |
| Chelyocarpus chuco (Mart.) H.E. Moore | Thatch (Roof - Xëhuahacacató, Young leaf); | Food (Edible, Fruit); | Domestic utensils (Basket - Chichama, Young leaf; Fan - Huëquéti, Young leaf; Knife, Petiole); Labour tools (Axe - Maquë poroma, Young leaf; Machete handle, Young leaf) | | | | |
| Cocos nucifera L. | Thatch (Huaracha roof, Leaf); | Food (Edible, Fruit); | Domestic utensils (Basket - Bano, Leaf); | | | | |
| Euterpe oleracea Mart. | Thatch (Roof - Xëhuahacacató, Leaf); | Food (Edible, Fruit); | Domestic utensils (Basket - Bano, Leaf); | | | | |
| Euterpe precatoria Mart. | Houses (Frame house, Trunk; Hedge - Panë, Trunk; Ridgepole - Maracatí, Trunk); Other constructions (Huaracha, Trunk, Food); Thatch (Huaracha roof, Leaf; Roof - Xëhuahacacató, Leaf); | Food (Edible, Fruit); | Domestic utensils (Basket - Bano, Leaf); | | | | |
| Geonoma deversa (Poit.) Kunth | Thatch (Roof - Xëhuahacacató, Leaf) | Food (Edible, Fruit); | Domestic utensils (Basket - Bano, Leaf); | | | | |
| Geonoma juruana Dammer | Houses (Hedge - Panë, Trunk); Other constructions (Huaracha, Trunk); Thatch (Roof - Xëhuahacacató, Leaf); | Food (Edible, Fruit); | Domestic utensils (Basket - Bano, Leaf); | | | | |
| Plant species               | Uses                                                                 | Reference         |
|-----------------------------|----------------------------------------------------------------------|-------------------|
| Geonoma macrostachys Mart.  | CONST: Thatch (Roof - Xëhuahacacató, Leaf); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Hunting & fishing tools (Weapons, Trunk) | Shinibix (Ch) JSM 24, MOV 27 |
| *Mauritia flexuosa* L. f.  | CONST: Thatch (Roof - Xëhuahacacató, Leaf); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Domestic utensils (Basket - Chichama, Young leaf; Sieve - Toa, Young leaf); Labour tools (Axe - Maquë poroma, Trunk; Machete handle, Trunk) | Palma Real (Sp) CH22 |
| Oenocarpus balickii F. Kahn | HUMFOOD: Food (Edible, Fruit)                                        | Xoquéitsama (Ch); Majillo del Tucán (Sp) RBU 17835 |
| Oenocarpus batasa Mart.    | CONST: Houses (Ridgepole - Maracatí, Trunk); Other constructions (Huaracha, Trunk); Thatch (Ridgepole - Xobornapatí, Leaf; Roof - Xëhuahacacató, Leaf); CULT: Cosmetic (Hair oil, Fruit); Personal adornment (Ornament - Maxëití, Seeds; Ornament - Mênëxëití, Seeds; Ornament - Shinoxëta, Seeds); HUMFOOD: Beberages (Beberage - Chicha, Fruit; Beberage - Milk, Fruit); Food (Edible - Larvae, Trunk - Larvae; Edible, Fruit); MEDVET: Endocrine system (Gallbladder, Trunk - Larvae); General Ailments with Unspecific Symptoms (Chest pain, Trunk - Larvae); Infections and infestations (Leishmaniasis, Fruit); Respiratory system (Bronchitis, Trunk - Larvae); Sensory system (Barache, Fruit and trunk larvae); Skin and subcutaneous tissue (Puchichi, Fruit); Snakebites and Ray stings (Sankebites, Fruit); UTEN&TOOL: Domestic utensils (Basket - Bano, Leaf; Basket - Chichama, Young leaf; Basket - Purupachi, Young leaf) | Itsama (Ch); Majo (Sp) CH23 |
| Oenocarpus mapora H. Karst | CONST: Houses (Muchacho - Ninoti, Trunk; Ridgepole - Maracatí, Trunk); HUMFOOD: Beberages (Beberage - Milk, Fruit); Food (Edible - Larvae, Trunk; Edible, Fruit); MEDVET: Snakebites and Ray stings (Sankebites, Trunk - Larvae); UTEN&TOOL: Domestic utensils (Basket - Bano, Leaf; Basket - Purupachi, Young leaf; Tacú - Arusa timati, Trunk); Hunting & fishing tools (Arrow - Quëspiní, Trunk; Bow - Canatí, Trunk) | Quèbo itsama (Ch); Majillo (Sp) CH24 |
| Socratea exorrhiza (Mart.) H. Wendl. | CONST: Houses (Ceiling roof, Trunk; Frame house, Trunk; Hedge - Panë, Trunk; Jaxca Jaxca, Trunk; Tie - Xahui, Young leaf; Tiranante largo - Cano piquéña, Trunk); Other constructions (Chapapa, Trunk; Chicken coop, Trunk; Huaracha, Trunk; Shelves, Trunk; Store corn, Trunk); Thatch (Roof - Xëhuahacacató, Leaf; Roof - Xëhuahacacató, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Appendicitis, Bark; Diarrhea, Trunk; Stomach ache, Bark); Endocrine system (Liver pain, Bark); General Ailments with Unspecific Symptoms (Headache, Bark; Vomit, Bark) | Onipa (Ch); Pachuba (Sp) DOA 34 |
| Aristolochiaceae            | MEDVET: Digestive system (Appendicitis, Bark; Diarrhea, Trunk; Stomach ache, Bark); Endocrine system (Liver pain, Bark); General Ailments with Unspecific Symptoms (Headache, Bark; Vomit, Bark) | Maca Huatiapi (Ch) SCO 32 |
| Asteraceae                  | MEDVET: General Ailments with Unspecific Symptoms (Inflammation, Trunk) | Ceka de caballo (Sp) DOA 45 |
| Asteraceae                  | MEDVET: Respiratory system (Cold and flu, Leaf)                       | Bahua Réxa (Ch) DOA 29 |
| Bignoniaceae                | CULT: Personal adornment (Ornament - Shinoxëta, Seeds); MEDVET: Digestive system (Diarrhea, Bark; | Corama / Nishi Raixo (Ch); Paquio (Sp) ESR 1, GOS 7, JSM 16, RBU 17866 |
### Table 1: Plant species used by the Chácobo (Continued)

| Plant Species | Uses and Conditions | Human Uses | Comments |
|---------------|---------------------|------------|----------|
| **Arrabidaea platyphylla DC.** | MEDVET: Infections and infestations (Boro, Root); Malaria and fever, Root | Bahia Quêixti (Ch) | CH25 |
| **Arrabidaea sp.** | MEDVET: Sensory system (Inflammation of eyes, Root) | Yoquira (Ch) | CH26 |
| **Cerastophyllum tetragonolobum** (Jaqc.) Sprague & Sandwith | MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Leaf); General Ailments with Unspecific Symptoms (Body pain, Body pain, Trunk; Headache, Leaf; Vomit, Whole plant); Infections and infestations (Malaria and fever, Trunk); Musculo-skeletal system (Rheumatism, Leaf) | Boá Nishi / Boá / Bua (Ch); Ajo del monte / Bejuc (Sp) | MOA 4, MOV 65 |
| **Clytostoma sp.** | CONST: Houses (Tie - Xahui, Bark); To tie house, Bark); UTEN&TOOL: Domestic utensils (Basket - Chichama, Bark; Basket - Nishicacano, Bark) | Shino joxotaë / Shino yáquishi (Ch) | CH26 |
| **Crescentia cujete (Aubl.) D. Don.** | FuEL: Firewood (Firewood - Caro, Trunk; Firewood, Trunk); Other fuel (Ceramics - Paití, Bark); MEDVET: Infections and infestations (Scabies, Leaf); Musculo-skeletal system (Ankle pain; Hip pain); Not specified at all; Respiratory system (Cold and flu); Skin and subcutaneous tissue (Caracha; Wounds and cuts, Leaf) | Pitsopi (Ch) | DOA 20, GOS 35, MOV 49 |
| **Jacaranda copaia** (Aubl.) D. Don. | FuEL: Firewood (Firewood - Caro, Trunk); Other fuel (Ceramics - Tiesto - Pitéiti, Bark); MEDVET: Skin and subcutaneous tissue (Caracha, Bark) | Tutuma (Sp) | |
| **Mussatia hyacinthina** (Standl.) Sandw. | CONST: Houses (Tie - Xahui, Bark); MEDVET: Digestive system (Diarrhea, Bark; Stomach ache, Bark and leaf); General Ailments with Unspecific Symptoms (Headache, Bark ); Musculo-skeletal system (Bone pain, Bark); Urinary system (Kidneys, Bark) | Xoqué Rapotó (Ch); Chamaro / Chamaro negro (Sp) | CH27 |
| **Pyrostegia dichotoma** Miers ex K. Schum. | MEDVET: General Ailments with Unspecific Symptoms (Vomit, Whole plant) | Nana Nihi (Ch) | CH28 |
| **Tabebuia chrysantha (Jacq.) Nicholson** | CONST: Houses (House post- Jibamë, Trunk) | Tajibo amarillo (Sp) | CH29 |
| **Tabebuia ochracea** (Cham.) Standl. | CONST: Houses (Frame house, Trunk; House post-Jibamë, Trunk; Muchacho - Niniti, Trunk; Tirante - Cano bëpotó, Trunk; Thatch (Roof - Xëhuahacacató, Trunk); MEDVET: Infections and infestations (Scabies); Skin and subcutaneous tissue (Blisters ); Urinary system (Kidneys); UTEN&TOOL: Domestic utensils (Gavel to make dress, Trunk; Pestle of Tacu, Trunk) | Nishó (Ch); Tajibo negro (Sp) | GOS 4 |
| **Tabebuia serratifolia** (Vahl) G. Nicholson | CONST: Houses (Frame house, Trunk; House post-Jibamë, Trunk); HUMFOOD: Food (Edible, Trunk); UTEN&TOOL: Domestic utensils (Batán - Xaxo, Trunk; Tacú - Arusa timatí, Trunk) | Tajibo (Sp) | CH30 |
| **Tabebuia sp.** | CONST: Houses (Frame house, Trunk; Muchacho - Niniti, Trunk; Pasa ratón - Xoya jabati, Trunk; Solera - Chitao, Trunk; Tie - Xahui, Bark; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano xipixúena, Trunk); FuEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Endocrine system (Gallbladder, Root, seeds and trunk; Liver pain, Bark, root and seeds); Sensory system (Inflammation of eyes, Bark, leaf, and root; Conjunctivitis, Root; Earache, Root) | Toromuca (Ch); Yuquilla (Sp) | MSM 6, 9 |

**Bixaceae**
### Table 1 Plant species used by the Chácobo (Continued)

| Plant Species | Cultivation (CULT): | Human Food (HUMFOOD): | Medicinal Use (MEDVET): | Reference |
|---------------|---------------------|-----------------------|------------------------|------------|
| *Bixa orellana* L. | Personal adornment (Ornament - Maxëití, Seeds; Ornament - Xapo, Seeds); Cultural diseases and disorders (Evil eye, Trunk); Digestive system (Stomach ache, Young leaf); Endocrine system (Liver pain, Young leaf); General Ailments with Unspecific Symptoms (Headache, Leaf; Inflammation); Infections and infestations (Leishmaniasis, Young leaf; Malaria and fever, Exudate and leaf); Respiratory system (Cold and flu); Sensory system (Inflammation of eyes, Exudate and seeds); Skin and subcutaneous tissue (Haemorrhage, Root and young leaf; Puchichi, Young leaf); Urinary system (Kidneys) | Food (Edible, Seeds) | Blood and Cardio-vascular system (Heartache); Cultural diseases and disorders (Evil eye, Trunk); Digestive system (Stomach ache, Young leaf); Endocrine system (Liver pain, Young leaf); General Ailments with Unspecific Symptoms (Headache, Leaf; Inflammation); Infections and infestations (Leishmaniasis, Young leaf; Malaria and fever, Exudate and leaf); Respiratory system (Cold and flu); Sensory system (Inflammation of eyes, Exudate and seeds); Skin and subcutaneous tissue (Haemorrhage, Root and young leaf; Puchichi, Young leaf); Urinary system (Kidneys) | GOS 13 |
| *Boraginaceae* | | | | |
| *Cordia alliodora* (Ruiz. & Pav.) Oken. | House (Frame house, Trunk) | | | JSM 7, 44 |
| *Cordia ucayaliensis* (I.M. Johnst.) I.M. Johnst. | House (To tie house, Bark); FUEL: Firewood (Firewood - Caro, Trunk) | | | MOV 33, SCO 36 |
| *Bromeliaceae* | | | | |
| *Ananas comosum* (L.) Merr. | Cultural (Fragile children, Leaf); Food (Edible, Fruit); Digestive system (Diarrhea, Leaf); General Ailments with Unspecific Symptoms (Vomit, Fruit) | | | |
| *Indet. sp. 1* | Food (Edible, Fruit); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Seeds) | | | MOV 4 |
| *Burseraceae* | | | | |
| *Protium aracouchini* (Aubl.) Marchand | Cultural diseases and disorders (Difficulty speaking, Leaf) | | | DOA 10 |
| *Protium sagotianum* Marchand | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | | | CH31 |
| *Cannabaceae* | | | | |
| *Celtis schippii* Standl. | FUEL: Firewood (Firewood - Caro, Trunk) | | | CH32 |
| *Trema micrantha* (L.) Blume | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | | | JSM 61 |
| *Capparaceae* | | | | |
| *Capparis corinbrana* Cornejo & Iltis | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Endocrine system (Gallbladder, Bark); Infections and infestations (Malaria and fever, Bark) | | | GOS 1, MOV 24 |
| *Caricaceae* | | | | |
| *Carica papaya* L. | Cultural (Fragile children, Leaf); Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Exudate); Infections and infestations (Amoebas, Leaf and seeds; Anthelmintic, Leaf and seeds); Insect and arthropod bites (Insectbite, Seeds); Respiratory system (Cold and flu, Exudate); Sensory system (Earache, Exudate); Snakebites and Ray stings (Sankebites, Root) | | | GCM 10 |
| *Jacaratia digitata* (Poep. & Endl.) Solms | HUMFOOD: Food (Edible, Fruit); MEDVET: Dental health (Toothache, Root); General Ailments with Unspecific Symptoms (Body pain, Trunk; Headache, Leaf); Musculo-skeletal system (Bone pain, Trunk); Not | | | GOS 31 |
| Family                  | Common Name                      | Uses                                                                 |
|-------------------------|----------------------------------|----------------------------------------------------------------------|
| **Caryocaraceae**       |                                  |                                                                      |
| Caryocar dentatum       | *Caryocar denatum*               | Specified at all (Not specified, Fruit); Snakebites and Ray string   |
| Gleason                 |                                  | (Sankebites, Root)                                                   |
|                         |                                  | Jëné carama (Ch)                                                     | DOA 57, GOS 54 |
| Celastraceae            |                                  |                                                                      |
| Salacia elliptica       | *Salacia elliptica*              | Fuel: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food              |
| (Mart. ex Schult.) G.   |                                  | (Edible, Fruit); MEDVET: Digestive system                           |
| Don.                    |                                  | (Diarrhea, Leaf); Urinary system (Kidneys, Root)                    |
| Salacia gigantea        | *Salacia gigantea*               | CONST: Houses (Tie - Xahui, Bark); HUMFOOD: Food                    |
| Loes.                   |                                  | (Edible, Fruit); MEDVET: Endocrine system                           |
| Tantalea ovalifolia     | *Tantalea ovalifolia*            | HUMFOOD: Food (Edible, Fruit); MEDVET: Endocrine system             |
| subsp. richardi (Peyr.)|                                  | (Liver pain, Fruit)                                                  |
| Görts & Mennega         |                                  |                                                                      |
|                         |                                  |                                                                      |
| Chrysobalanaceae        |                                  |                                                                      |
| Hirtella gracilipes     | *Hirtella gracilipes*            | MEDVET: Skin and subcutaneous tissue (Caracha, Bark)                 |
| (Hook. f.) Prance       |                                  | Xaba chana (Ch)                                                     | MSM 4, RBU 17832 |
| Hirtella pilosissima    | *Hirtella pilosissima*           | CONST: Houses (House post - Jibarnë, Trunk); CULT: Clothes &         |
| Mart. & Zucc.           |                                  | accessories (Dress - Moro, Bark); FUEL: Firewood (Firewood - Caro, |
|                         |                                  | Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Musculo-skeletal      |
|                         |                                  | system (Fractures, Bark); Skin and subcutaneous tissue              |
|                         |                                  | (Caracha, Bark); UTEN&TOOL: Domestic utensils (Gavel to make dress,  |
|                         |                                  | Trunk; Pestle of Tacu, Trunk; Tacú - Arusa timati, Trunk; Labour   |
|                         |                                  | tools (Machete handle, Trunk; Planting stick - Xësati, Trunk; Spade  |
|                         |                                  | handle, Trunk)                                                      |
| Licania intrapetiolaris | *Licania intrapetiolaris*        | CONST: Houses (Frame house, Trunk; Hedge - Panë, Trunk; House post-  |
| Spruce ex. Hook f.      |                                  | Jibarnë, Trunk; Jhuxaca, Trunk; Manipoati, Trunk; Muchacho - Ninoti, |
|                         |                                  | Trunk; Pasa ratón - Xoya jtabati, Trunk; Ridgepole - Maracati, Trunk;|
|                         |                                  | Roof beam - Canoxoco, Trunk; Sabrillo, Trunk; Solera - Chitao, Trunk;|
|                         |                                  | Tirante largo - Cano pixquëna, Trunk); Other constructions (Huara-  |
|                         |                                  | cha, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); Other fuel     |
|                         |                                  | (Ceramics - Chomo, Bark; Ceramics - Comëno, Bark; Ceramics - Palls,  |
|                         |                                  | Bark; HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with   |
|                         |                                  | Unspecific Symptoms (Chest pain, Seeds); Insect and arthropod bites  |
|                         |                                  | (Insectbite, Bark); Musculo-skeletal system (Bone pain, Seeds);    |
|                         |                                  | UTEN&TOOL: Domestic utensils (Pestle of Tacu, Trunk)                |
| Licania octandra        | *Licania octandra*               | CONST: Houses (Hedge - Panë, Trunk; Xano, Trunk); FUEL: Firewood     |
| subsp. pallida (Hook. f.)|                                  | (Firewood - Caro, Trunk); Other fuel (Ceramics - Chomo, Bark;      |
| Prance                  |                                  | Ceramics - Comëno, Bark; Ceramics - Palls, Bark; Ceramics - Tiesto - |
|                         |                                  | Pëtëxti, Bark); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Domestic  |
|                         |                                  | utensils (Basket - Chichabëcasa, Bark; Basket - Chicharna, Bark;    |
|                         |                                  | Batán - Xaxo, Trunk)                                                |
| Clusiaceae              |                                  |                                                                      |
| Garcinia madrura        | *Garcinia madrura*               | ANIMFOOD: Fodder (Edible, Fruit); HUMFOOD: Food (Edible, Fruit);    |
| (Kunth) Hammel          |                                  | Food additives (Additive coca chewing, Fruit); MEDVET: Digestive      |
|                         |                                  | system (Diarrhea, Bark; Stomach ache, Bark); Skin and subcutaneous   |
|                         |                                  | tissue (Puchichi, Young leaf)                                        |
| Tovomita sp.            |                                  | FUEL: Firewood (Firewood - Caro, Trunk)                             | Áhuara Macha (Ch) | MOV 28 |

*Note: DOA = Domingo Affonso; GOS = Guaro; MOA = Monte Aripõ; CH = Chácobo; Sp = Spanish; MSM = Media Social Movil; RBU = Rute de Bambu.*
| Table 1 | Plant species used by the Chácobo (Continued) |
| --- | --- |
| **Indet. sp. 1** | **CONST:** Houses (Frame house, Trunk; Hedge - Panë, Trunk; House post - Jibamë, Trunk; Muchacho - Ninotí, Trunk; Ridgepole - Maracatí, Trunk; Roof beam - Canoxoco, Trunk; Solera - Chitao, Trunk; Tie - Xahui, Bark; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano pixquëna, Trunk); **HUMFOOD:** Food (Edible, Fruit); **UTEN&TOOL:** Domestic utensils (Tacú - Arusa timatí, Trunk) |
| **Bacuri (Ch); Motoa (Sp)** | **CH36** |
| **Cochlospermaceae** | **Cochlospermum orinocense** (H.B.K.) Steudel |
| **CONST:** Houses (Tie - Xahui, Bark) | **Algodoncillo (Sp)** | **CH37** |
| **Combretaceae** | **Terminalia amazonica** (Gmel.) Exell |
| **MEDVET:** Skin and subcutaneous tissue (Wounds and cuts, Bark and leaf) | **Verdolago (Sp)** | **CH38** |
| **Connaraceae** | **Connarus ruber** (Poepp. & Endl.) Planch. |
| **CULT:** Recreational (Toys, Fruit and leaf) | **Pitso tapa (Ch)** | **GCM 6, MSM 15** |
| **Convolvulaceae** | **Ipomoea batatas** Lam. |
| **HUMFOOD:** Beberages (Beberage - Chicha, Root); Food (Edible, Root); **MEDVET:** Digestive system (Appendicitis, Leaf; Stomach ache, Flower); Endocrine system (Gallbladder, Seeds); General Ailments with Unspecific Symptoms (For bathing sick children, Whole plant; Headache, Root); Infections and infestations (Malaria and fever, Leaf); Respiratory system (Bronchitis, Leaf and root; Cold and flu, Leaf and root) | **Cari (Ch); Camote (Sp)** |
| **Costaceae** | **Costus scaber** Ruiz. & Pav. |
| **MEDVET:** Blood and Cardio-vascular system (Heartache, Trunk); Cultural diseases and disorders (Bad air and scare - Ratiaina, Root); Dental health (Toothache, Root and seeds); Digestive system (Appendicitis, Whole plant; Diarrhea, Fruit, root, trunk and young leaf; Stomach ache, Trunk); Endocrine system (Gallbladder, Whole plant and root; Pancreas, Trunk); General Ailments with Unspecific Symptoms (Headache, Root; Vomit, Fruit, leaf, root, seeds, trunk and whole plant); Infections and infestations (Hepatitis, Whole plant); Musculo-skeletal system (Swelling, Trunk); Skin and subcutaneous tissue (Burns, Leaf); Urinary system (Kidney infection, Trunk; Kidney pain, Leaf and trunk; Kidneys, Leaf and trunk; Yellow urine, Trunk) | **Bushishí (Ch); Cahuasha / Caña / Caña agria (Sp)** | **DOA 48, GOS 45, MOA 6, SCO 29, JSM 56** |
| **Crassulaceae** | **Bryophyllum sp.** |
| **MEDVET:** Infections and infestations (Leishmaniasis, Leaf); Musculo-skeletal system (Blows, Leaf; Swelling, Leaf); Skin and subcutaneous tissue (Puchichi, Leaf) | **Bai Ati (Ch); Fortuna (Sp)** | **CH39** |
| **Cucurbitaceae** | **Citrullus vulgaris** Schrad. |
| **HUMFOOD:** Food (Edible, Fruit); **UTEN&TOOL:** Domestic utensils (Container, Fruit) | **Sanía (Ch); Sandía (Sp)** |
| **Cucumis sativus** L. | **Pepino (Sp)** |
| **Cucurbita moschata** Duchesne | **Zapallo (Sp)** |
| **Cucurbita sp.** | **Mate / Mate bejuco (Sp)** |
| Table 1 Plant species used by the Chácobo (Continued) |
|---------------------------------------------------|
| **Indet. sp. 1**                                  |
| Cyperaceae                                        |
| *Cyperus* sp.                                    |
| HUMFOOD: Food (Edible, Fruit)                     |
| MEDVET: Digestive system (Appendicitis, Whole plant; Diarrhea, Root and trunk; Stomach ache, Trunk); Endocrine system (Liver pain, Root); General Ailments with Unspecific Symptoms (Inflammation, Leaf; Vomit, Root, seeds and trunk); Infections and infestations (Malaria and fever, Root) |
| Tsanoná (Ch); Cahuasha (Sp)                       |
| Cyperaceae                                        |
| *Diapsis karatifolia* Rich.                       |
| MEDVET: Digestive system (Constipation, Trunk); Pregnancy, birth and puerperal (Birth, Root) |
| Cortadera (Sp)                                    |
| Dennstaedtiaceae                                 |
| *Pteridium* sp.                                  |
| MEDVET: Digestive system (Stomach ache, Root); Endocrine system (Gallbladder, Root) |
| Jasini huitalhuo (Ch)                            |
| Dichapetalaceae                                  |
| *Dichapetalum spruceanum* Baill.                 |
| FUEL: Firewood (Firewood - Caro, Trunk)          |
| Nishi cobo (Ch)                                  |
| Dilleniaceae                                     |
| *Curatella americana* L.                         |
| FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Digestive system (Diarrhea); Endocrine system (Liver); General Ailments with Unspecific Symptoms (Chest pain, Bark); Infections and infestations (Malaria and fever, Bark); Respiratory system (Cough, Bark) |
| Xaba tampahuá (Ch)                               |
| Dioscoreaceae                                    |
| *Dioscorea latifolia* Benth.                     |
| HUMFOOD: Beverages (Beberage - Chicha, Root); Food (Edible - Chive, Root; Edible, Root) |
| Chaxo Poa (Ch); Bachi (Sp)                       |
| Erythroxylaceae                                  |
| *Erythroxylum coca* Lam.                         |
| FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratéainà, Leaf); Digestive system (Stomach ache, Leaf); Endocrine system (Liver pain, Leaf); UTEN&TOOL: Labour tools (Awl, Trunk) |
| Huara huara (Ch); Coca (Sp)                      |
| Euphorbiaceae                                    |
| *Alchornea* sp.                                  |
| CONST: Houses (House post- Jibamë, Trunk; Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabati, Trunk; Tirante - Cano biépotó, Trunk; Tirante corte - Cano Bélicesamë, Trunk; Tirante largo - Cano pixiquéna, Trunk); Other constructions (Huara, Trunk); CULT: Ritual (Fragile children, Leaf); FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Skin and subcutaneous tissue (Caracha, Bark) |
| Manahuita (Ch); Cara (Sp)                        |
| Cleidion sp.                                     |
| ANIMFOOD: Fodder (Edible, Fruit); CONST: Houses (Hedeg - Panë, Trunk); FUEL: Firewood (Firewood - Caro, Trunk) |
| Huacaxapó (Ch)                                   |
| Croton lechleri Müll. Arg.                       |
| MEDVET: Skin and subcutaneous tissue (Puchichi, Exudate; Wounds and cuts) |
| Sangre de Grado (Sp)                             |
| Croton matourensis Aublet                         |
| CONST: Houses (Hedeg - Panë, Trunk; Muchacho - Ninoti, Trunk; Tirante largo - Cano pixiquéna, Trunk); Other constructions (Huara, Trunk); UTEN&TOOL: Domestic utensils (Batán - Xaho, Trunk; Cramps, Seeds; Pestle of Batan - Chapí, Trunk; Pestle of Tacu, Trunk; Tacú - Arusa timatí, Trunk) |
| Aliso (Sp)                                       |
| Paniagua Zambrana et al. Journal of Ethnobiology and Ethnomedicine (2017) 13:57 |
Table 1  Plant species used by the Chácobo (Continued)

| Plant Species | Use(s)                                                                 | Taxa | Material | Source |
|---------------|------------------------------------------------------------------------|------|----------|--------|
| Croton trinitatis Millsp. | MEDVET: Veterinary (Distemper) | Taxa Bahuetti (Ch); Malvillia (Sp) | DOA 1 |
| Croton sp. | MEDVET: Endocrine system (Gallbladder); General Ailments with Unspecific Symptoms (Headache, Leaf); Infections and infestations (Malaria and fever, Leaf); Musculo-skeletal system (Haematoma, Whole plant); Not specified at all (Insomnia in children); Respiratory system (Cold and flu, Whole plant); Sensory system (Inflammation of eyes, Leaf); UTEN&TOOL: Domestic utensils (Broom, Whole plant) | Matséti (Ch); Malva (Sp) | MOV 64 |
| Hevea brasiliensis (Willd. ex A. Juss.) Müll. Arg. | CULT: Clothes & accessories (Rubber shoes, Exudate); Personal adornment (Ornament - Shinoxëta, Seeds); FUEL: Firewood (Firewood - Caro, Trunk); Other fuel (Ceramics - Comëno, Bark); MEDVET: Infections and infestations (Boro, Exudate; Malaria and fever, Leaf); Musculo-skeletal system (Bone pain, Bark); Skin and subcutaneous tissue (Facila blemishes, Bark); SALE: Sale (Sirina, Exudate) | Carama (Ch); Cauro / Siringa (Sp) | CH45 |
| Jatropha curcas L. | MEDVET: Infections and infestations (Malaria and fever, Leaf) | Piñon (Sp) | CH46 |
| Jatropha gossypifolia L. | HUMFOOD: Food (Edible, Fruit); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Leaf); Insect and arthropod bites (Centipede bite, Bark and leaf); Musculo-skeletal system (Bone pain, Seeds; Cramps, Seeds; Fractures, Seeds; Rheumatism, Seeds); Reproductive system and sex health (Contraceptive, Seeds); Respiratory system (Cramps, Seeds and seeds); Skin and subcutaneous tissue (Wounds and cuts, Seeds; Snakebites and Ray stings (Sankebites, Bark and leaf); Urinary system (Kidneys, Bark, leaf and seeds) | Raë (Ch); Copaiba / Piñón morado (Sp) | DOA 43, GCM 9, GOS 51 |
| Mabea fistulifera Mart. | ANIMFOOD: Fodder (Edible, Fruit); MEDVET: Infections and infestations (Anthelmintic, Exudate; Boro, Exudate); Insect and arthropod bites (Insectbite, Exudate); UTEN&TOOL: Hunting & fishing tools (Barbasco - Axa, Fruit) | Piri (Ch); Leche leche (Sp) | DOA 5, JSM 35 |
| Manihot esculenta Crantz | HUMFOOD: Beverages (Beberage - Chicha, Root); Food (Edible - Chive, Root; Edible, Root); MEDVET: Dental health (Toothache, Seeds); Endocrine system (Liver pain, Leaf); Musculo-skeletal system (Swelling, Root); Skin and subcutaneous tissue (Puchichi, Root; Wounds and cuts, Root); Urinary system (Kidney pain, Root; Kidneys, Root ) | Atsa / Atsa Chëquë / Atsa Hosho / Atsa Nasisi / Atsa Noa / Atsa Pohi Quinihua / Atsa Raaxa / Atsa Shini / Atsa Tocha / Kaniaki / Rox tëtoya / Rono Atsa / Shoshapo / Xëto ita / Xoya atsa (Ch); Rama blanca / Rama morada / Yuca / Yuca de rama choca o café / Yuca piraquina (Sp) | |
| Omphalea diandra L. | CULT: Personal adornment (Ornament - Chimo, Bark) | Chimo / Jianati (Ch); Bejuco (Sp) | |
| Ricinus communis L. | CULT: Personal adornment (Ornament - Maxëiti, Seeds); MEDVET: Musculo-skeletal system (Bone pain, Leaf; Fractures, Leaf); Respiratory system (Cold and flu, Leaf) | Ranë (Ch); Macororo / Matapalo (Sp) | ESR 22, MOA 2 |
| Fabaceae | | | |
| Acacia lorentensis J.F. Macbr. | CONST: Houses (House post- Jibarnë, Trunk; Tie - Xahu, Bark; Tirante - Cano bépotë, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); Other fuel (Ceramics - Chomo, Bark); MEDVET: Respiratory system (Cough, Bark); Skin and subcutaneous tissue (Caracha, Bark; Empeine, Bark) | Caxcono / Capé Caxcono / Isnëpa (Ch); Cari cari (Sp) | BCM 11, DOA 23 |
| Acacia sp. | CONST: Houses (Frame house, Bark); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Stomach ache, Bark); Endocrine system (Diabetes, Bark; Gallbladder, Bark); Reproductive system and sex health (Vaginal douche, Bark); Respiratory system | Sipamë (Ch), Tipa (Sp) | GOS 53 |
| Plant Species | Uses and Properties |
|---------------|---------------------|
| **Amburana cearensis** (Allemão) A.C. Sm. | CONST: Houses (Tie - Xahui, Bark); Other constructions (Huaracha, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Bark and leaf); General Ailments with Unspecific Symptoms (Headache, Bark); Infections and infestations (Malaria and fever, Bark); Skin and subcutaneous tissue (Facia blemishes ); Veterinary (Diistermper, Bark ); UTEN&TOOL: Domestic utensils (Batán - Xahui, Bark; Pestle of Tacu, Trunk; Spoon, Trunk; Tacú - Arusa timatí, Trunk); Transportation (Canoe, Trunk) |
| **Apuleia leiocarpa** (Vogel) J.F. Macbr. | CONST: Houses (Frame house, Trunk; Hedge - Panë, Trunk; House post- Jibamë, Trunk; Muchacho - Ninoti, Trunk; Roof beam - Canoxoco, Trunk; Tirante - Cano bëpotó, Trunk; Xano, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); Other fuel (Ceramics - Paítí, Bark); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Bark fruit and root); Endocrine system (Liver pain, Leaf); Sensory system (Inflammation of eyes, Bark); Skin and subcutaneous tissue (Haemorrhage, Seeds; Wounds and cuts, Bark and fruits); UTEN&TOOL: Domestic utensils (Batán - Xahui, Trunk; Pestle of Batan - Chapi, Root; Pestle of Batan - Chapi, Trunk; Pestle of Tacu, Trunk; Tacú - Arusa timatí, Trunk); Labour tools (Planting stick - Xësati, Trunk) |
| **Bauhinia guianensis** Aubl. | MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Root); Digestive system (Diarrhea, Trunk); Endocrine system (Diabetes, Leaf); General Ailments with Unspecific Symptoms (Vomit, Bark and seeds); Infections and infestations (Amoebas, Trunk; Leishmaniasis, Trunk); Musculo-skeletal system (Hip pain, Trunk); Respiratory system (Cold and flu, Trunk); Sensory system (Eyes, Trunk); Urinary system (Kidneys, Trunk) |
| **Bauhinia sp.** | CULT: Ritual (To make hunting dogs, Leaf); MEDVET: Endocrine system (Diabetes, Trunk) |
| **Bauhinia straussiana** Harms | CULT: Clothes & accessories (Dress - Moro, Bark); HUMFOOD: Food (Edible, Fruit); MEDVET: Insect and arthropod bites (Buna bite, Exudate); Skin and subcutaneous tissue (Burns, Exudate) |
| **Chamaecrista nictitans** (L.) Moench | CULT: Ritual (Crying children, Leaf); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Bark and leaf) |
| **Deguelia amazonica** Killip | MEDVET: Infections and infestations (Leishmaniasis, Trunk); UTEN&TOOL: Hunting & fishing tools (Barbasco - CapëItsa, Root and trunk) |
| **Derris amazonica** (Benth.) Ducke | UTEN&TOOL: Hunting & fishing tools (Barbasco - Axa, Trunk and root) |
| **Derris floribunda** (Benth.) Ducke | UTEN&TOOL: Hunting & fishing tools (Barbasco - Axa, Bark, leaf and root) |
| **Dipteryx alata** Vogel | MEDVET: Skin and subcutaneous tissue (Caracha, Bark) |
| **Dipteryx adorata** (Aubl.) Willd. | CONST: Houses (Frame house, Trunk); CULT: Personal adornment (Ornament - Maxëití, Seeds) |
| **Hymenaea courbarii** L. | CONST: Houses (Frame house, Trunk; Solera - Chitao, Trunk; FUEL: Firewood (Firewood - Caro, Trunk); Other fuel (Ceramics - Cornelio, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system |
| Plant Species | Uses and Cures |
|---------------|----------------|
| Inga edulis Mart. | CONST: Houses (Xano, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Hunting & fishing tools (Arrow, Trunk) |
| Inga fagifolia G. Don. | HUMFOOD: Food (Edible, Fruit) |
| Inga marginata Willd. | HUMFOOD: Food (Edible, Fruit); MEDVET: Not specified at all (Not specified, Leaf) |
| Inga sp. 1 | HUMFOOD: Food (Edible, Fruit) |
| Inga sp. 2 | MEDVET: Infections and infestations (Anthemintic, Fruit) |
| Inga sp. 3 | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) |
| Inga sp. 4 | CONST: Houses (Tie - Xahui, Bark); Thatch (To tie roof, Bark) |
| Inga sp. 5 | CONST: Houses (Muchacho - Ninoti, Trunk; Pasa raton - Xoya jabati, Trunk; Roof beam - Canoxoco, Trunk; Solera - Chitao, Trunk) |
| Inga sp. 6 | HUMFOOD: Food (Edible, Fruit) |
| Inga sp. 7 | HUMFOOD: Food (Edible, Fruit) |
| Machaerium acutifolium Vogel | MEDVET: Infections and infestations (Malaria and fever, Root) |
| Ormosia nobilis Tul. | ANIMFOOD: Fodder (Edible, Fruit); CULT: Personal adornment (Ornament - Shinoxëta, Seeds); MEDVET: Infections and infestations (Malaria and fever, Bark); Reproductive system and sex health (Menstrual pain, Bark and seeds); Skin and subcutaneous tissue (Haemorrhage, Seeds; Puchichi, Bark) |
| Poeppigia procera C. Presl. | CONST: Houses (House post- Jibarnë, Trunk); Other constructions (Huaracha, Trunk); FUEL: Firewood (Firewood - Caro, Trunk) |
| Pithocellobium corymbosum (Rich.) Benth. | CONST: Houses (House post- Jibarnë, Trunk; Roof beam - Canoxoco, Trunk); MEDVET: Digestive system (Diarrhea, Bark); Skin and subcutaneous tissue (Wounds and cuts); UTEN&TOOL: Domestic utensils (Batam - Xaho, Trunk; Pestle of Batan - Chapi, Trunk; Pestle of Tacu, Trunk; Tacú - Arusa timati, Trunk) |
| Platymiscium stipulare Benth. | MEDVET: Digestive system (Diarrhea, Leaf); General Ailments with Unspecific Symptoms (Vomit, Leaf); Skin and subcutaneous tissue (Acne, Leaf) |
| Samanea tubulosa (Benth.) Barneby & J.W. Grimes | MEDVET: General Ailments with Unspecific Symptoms (Headache, Bark) |
| Sclerolobium radiliferi Rusby | MEDVET: Skin and subcutaneous tissue (Caracha, Bark) |
| Senna herzogii (Harms) H.S. Irwin & Barneby | CONST: Houses (To tie house, Bark); FUEL: Firewood (Firewood - Caro, Bark) |

DOA 51, JSM 1

CHS2

GOS 38

CHS5

GOS 36

CHS4

GOS 37

CHS9

CHS6
| Table 1  | Plant species used by the Chácobo (Continued) |
|----------|---------------------------------------------|
| **Senna occidentalis** (L.) Link. | HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea); General Ailments with Unspecific Symptoms (Vomit, Fruit) | Ihui pisi (Ch); Carachupa (Sp) | MOV 48, SCO 34 |
| **Strychnodendron guianense** (Aubl.) Benth. | FUEL: Firewood (Firewood - Caro, Trunk) |  |
| **Strychnos** fruticosa Spreng. | CONST: Houses (Frame house, Trunk; House post- Jihamë, Trunk) | Canamashia (Ch) | CH53 |
| **Tamarindus indica** L. | HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Stomach ache, Seeds) | Tamarindo (Sp) | CH54 |
| **Vataireopsis speciosa** Ducke | FUEL: Firewood (Firewood - Caro, Trunk) | Ihui pisi (Ch) | CH55 |
| **Vigna unguiculata** (L.) Walp. |  |
| **Zornia latifolia** Sm. | CULT: Ritual (Crying children) | Hoxa Nihi (Ch); Mujer Yoxa (Sp) | CH57 |
| Indet. sp. 1 | CULT: Ritual (Good luck, Leaf) | Tëtëmabaspá (Ch) | CH58 |
| Flacourtiaceae |  |
| Indet. sp. 1 | CONST: Houses (Frame house, Trunk; Jihuixaca, Trunk; Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabati, Trunk; Ridgepole - Maracati, Trunk; Roof beam - Canoxoco, Trunk; Solera - Chitao, Trunk; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano pixquëna, Trunk; Xano, Trunk); Thatch (Roof - Xëhuahacacató, Bark); UTEN&TOOL: Domestic utensils (Batán - Xaxo, Trunk) | Xasso atí (Ch); Canelon (Sp) | CH59 |
| Gesneriaceae |  |
| **Codonanthe calcarata** (Miq.) Hanst. | MEDVET: Digestive system (Diarrhea, Trunk) | Chixopa (Ch) | CH60 |
| Heliconiaceae |  |
| **Heliconia hirsuta** L.f. | UTEN&TOOL: Domestic utensils (Pestle of Tacu, Trunk) | Tsacahuico (Ch) | RBU 17852, SCO 11 |
| **Heliconia** sp. | CONST: Thatch (Roof - Xëhuahacacató, Leaf); MEDVET: Digestive system (Diarrhea, Trunk) | Tsacahuico (Ch) | CH61 |
| Hernandiaceae |  |
| **Sparattanthelium amazonum** Mart. | MEDVET: Digestive system (Stomach ache, Trunk) | Nishi Tsanóna (Ch) | CH62 |
| Hippocrateaceae |  |
| **Cheloclinum cognatum** (Miers.) A.C. Smith | MEDVET: Digestive system (Diarrhea, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark and root); Musculo-skeletal system (Bone pain, Bark; Rheumatism, Bark); Respiratory system (Cold and flu, Bark) | Chuchuasa (Sp) | CH63 |
| Hypericaceae |  |
| **Vismia glaziovii** Ruhland | CONST: Houses (Muchacho - Ninoti, Trunk; Ridgepole - Maracati, Trunk; Tirante - Cano bëpotó, Trunk) | Bisatamanë (Ch) | CH64 |
| **Vismia macrophylla** Kunth | CONST: Houses (Chira Xahui, Trunk; Frame house, Bark; House post- Jihamë, Trunk; Jënë Jabati, Trunk; Jihuixaca, Trunk; Manipoati, Trunk; Muchacho - Ninoti, Trunk; Nasëcamëti, Trunk; Pasa ratón - Xoya jabati, Trunk; Ridgepole - Maracati, Trunk; Roof beam - Canoxoco, Trunk; Solera - Chitao, Trunk; Tirante corto - Cano Bësécamë, Trunk; Tirante largo - Cano pixquëna, Trunk; To tie house, Bark); Other constructions (Huaracha, Trunk); Thatch (To tie roof, | Bisatamanë / Sipó / Sirari / Sisi (Ch); Palo Santo (Sp) | GS 48 |
| Table 1 Plant species used by the Cháçobo (Continued) |
|------------------------------------------------------|
| **Plant species** | **CONST** | **FUEL** | **MEDVET** | **UTEN&TOOL** |
| Vismia pozuzoensis Engl. | Houses (Jihuixaca, Trunk; Muchacho - Ninoti, Trunk; Ridgepole - Maracati, Trunk; Tirante - Cano bépotó, Trunk; Tirante largo - Cano pixquëna, Trunk) | Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Bark, fruit and leaf; Stomach ache, Leaf); General Ailments with Unspecific Symptoms (Vomit, Bark, fruit and leaf); Respiratory system (Cold and flu, Leaf); Skin and subcutaneous tissue (Puchichi, Leaf); Urinary system (Kidney infection, Bark) | Bisataranë / Jihui bapia (Ch); Leche leche / Piraquina (Sp) | |
| Clerodendrum tessmannii Moldenke | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Bark, fruit and leaf; Stomach ache, Leaf); General Ailments with Unspecific Symptoms (Vomit, Bark, fruit and leaf); Respiratory system (Cold and flu, Leaf); Skin and subcutaneous tissue (Puchichi, Leaf); Urinary system (Kidney infection, Bark) | Guayagua (Ch); Guayaba (Sp) | BCM 9 |
| Vitex triflora Vahl | FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Sensory system (Earache, Bark) | Chaxo paoqui / Chaxo romë (Ch) | DOA 25, JSM 27 |
| Vitex sp. | MEDVET: Veterinary (Distemper, Bark) | Iene carama (Ch) | MOV 62 |
| Nectandra sp. | FUEL: Firewood (Firewood - Caro, Trunk) | Xanë Yobini (Ch) | MOV 40 |
| Ocotea diospyrifolia aff. (Melis.) Mez | HUMFOOD: Food (Edible, Fruit); MEDVET: Skin and subcutaneous tissue (Caracha, Bark) | Nahuelshí (Ch) | CH65 |
| Persea americana Mill. | HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Vomit, Leaf); Infections and infestations (Leishmaniasis, Young leaf); Musculo-skeletal system (Hip pain, Leaf); Urinary system (Kidney pain, Leaf, root and seeds; Kidneys, Fruit, leaf, seeds and trunk) | Xane yubini cuota (Ch); Palta (Sp) | JSM 29 |
| Bertholletia excelsa Bonpl. | CONST: Houses (Hedge - Panë, Trunk; Jihuixaca, Trunk; Muchacho - Ninoti, Trunk; Ridgepole - Maracati, Trunk; Solera - Chitao, Trunk; Tirante - Cano bépotó, Trunk; Tirante largo - Cano pixquëna, Trunk); Other constructions (Huaracha, Trunk); CULT: Dyes (Dye, Seeds); Personal adornment (Ornament - Maxëití, Seeds); HUMFOOD: Beberages (Beberage, Bark); Food (Edible, Seeds); Oils (Oil, Seeds); MEDVET: Digestive system (Appendicitis, Seeds; Diarrhea, Seeds; Stomach ache, Seeds); Pregnancy, birth and puerperal (I-Haemorrhage after childbirth, Seeds; Skin and subcutaneous tissue (Caracha, Seeds; Haemorrhage, Bark, leaf and seeds; Wounds and cuts, Seeds); Urinary system (Gallstones, Seeds); UTEN&TOOL: Domestic utensils (Batán - Xaxo, Trunk) | Tapa / Tapa rísti / Tsixo (Ch); Almendro (Sp) | SCO 16 |
| Eschweileria albiflora L. | CONST: Houses (To tie house, Bark); Thatch (Roof - Xëhuahacacató, Trunk; To tie roof, Bark); FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Musculo-skeletal system (Fractures, Bark); UTEN&TOOL: Domestic utensils (Basket - Chichamba, Bark; Hammock - Nishi, Bark) | Maquë Tashi (Ch); Bitumumbo de bajio / Bitumumbo / Campanilla / Cuchi / Piraquina (Sp) | MOV 58 |
| Eschweileria sp. | HUMFOOD: Food (Edible, Fruit) | Tapa (Ch); Almendro (Sp) | MOV 51 |
| Plant family | Species | Uses | Common Names
|--------------|---------|------|------------------|
| Plant family | Species | Uses | Common Names |
| **Gustavia hexapetala (Aubl.) Sm.** | CONST: Houses (Frame house, Trunk; Hedge - Pané, Trunk; House post- Jibamë, Trunk; Jihuixaca, Trunk; Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabati, Trunk; Ridgepole - Maracati, Trunk; Roof beam - Canoxoco, Trunk; Sabrillo, Trunk; Solera - Chita, Trunk; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano pixquëna, Trunk); Other constructions (Huaracha, Trunk); Thatch (Roof - Xëhuahacacató, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Sensory system (Inflammation of eyes, Root); UTEN&TOOL: Domestic utensils (Batán - Xaxo, Trunk; Pestle of Batan - Chapi, Trunk; Pestle of Tacu, Trunk; Spinning wheel - Ihui, Bark; Tacu - Arusa timatï, Trunk; Labour tools (Hammer, Trunk; Planting stick - Xësati, Trunk) | Yunishi (Ch); Itauba (Sp) | CH66 |
| **Lecythis serrata S.A. Mori** | CULT: Ritual (Santeria, Seeds); MEDVET: Digestive system (Diametha, Seeds); Skin and subcutaneous tissue (Haemorrhage, Seeds) | Tapa (Ch); Almendro (Sp) | MSM 7 |
| **Lecythis sp.1** | HUMFOOD: Beberages (Beberage - Milk, Fruit); Food (Edible, Fruit); Oils (Oil, Fruit); MEDVET: Skin and subcutaneous tissue (Haemorrhage, Fruit) | Almendro (Sp) | ESR 18 |
| **Lecythis sp.2** | MEDVET: Not specified at all (Not specified, Fruit); Skin and subcutaneous tissue (Puchichi, Fruit) | Tapa (Ch) | GOS 34 |
| **Loganiaceae** | **Strychnos sp.** | HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Headache, Leaf); Urinary system (Kidneys, Leaf) | Huani Kuhuësa (Ch) | GOS 28 |
| **Loranthaceae** | **Phthirusa pyrifolia (Kunth) Eichler** | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Endocrine system (Liver, Bark and leaf); Musculo-skeletal system (Fractures, Bark and leaf) | Nishi moishi (Ch); Suelda con suelda (Sp) | DOA 41, 58, GOS 60, JSM 31 |
| **Lythraceae** | **Physocalymma scaberrimum (Jacq.) Kunth** | UTEN&TOOL: Domestic utensils (Batán - Xaxo, Trunk) | Chaquillo (Sp) | JSM 46, RBU 17851 |
| **Malpighiaceae** | **Bunchosia glandulifera (Jacq.) Kunth** | HUMFOOD: Food (Edible, Fruit) | Mermelada (Sp) | ESR 21 |
| **Malvaceae** | **Byronima crista A. Juss.** | FUEL: Firewood (Firewood - Caro, Trunk) | Xëchi (Ch) | CH67 |
| **Heteropterys coriacea A. Juss.** | CONST: Houses (Hedge - Panë, Trunk; House post-Jibamë, Trunk); Other constructions (Huaracha, Trunk) | Xaba yunishi (Ch) | JSM 2, RBU 17808 |
| **Mascagnia macrophylla Rusby** | UTEN&TOOL: Domestic utensils (Bow to clean cotton, Trunk) | Ascana (Ch) | CH68 |
| **Malvaceae** | **Apeiba tibourbou Aubl.** | CONST: Houses (Frame house, Bark; Hedge - Panë, Trunk; Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabati, Trunk; Ridgepole - Maracati, Trunk; Roof beam - Canoxoco, Trunk; Tie - Xahui, Bark; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano pixquëna, Trunk; To tie fence, Bark); Other constructions (Huaracha, Trunk); Thatch (To tie roof, Bark); CULT: Clothes & accessories (Dress - Moro, Bark); FUEL: Firewood (Firewood - Caro, Trunk); Other fuel (Ceramics - Chomo, Bark); HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Headache, Bark); Sensory system (Earache, Young leaf); Skin and subcutaneous tissue (Caracha, Bark); | Bitumbo (Sp) | DOA 44, GOS 25, JSM 60, RBU 17867 |
| Table 1 | Plant species used by the Chácobo (Continued) |
|---------|---------------------------------------------|
| **Eriotheca sp.** | UTEN&TOOL: Domestic utensils (Basket - Bano, Bark; Basket - Cacahuqueñia, Bark; Basket - Chichama, Bark; Basket - Nishicacano, Bark; Basket - Purupachi, Bark; Basket - Yamachi, Bark; Hammock - Nishi, Bark); Hunting & fishing tools (Bow - Canatí, Trunk); Rope (Rope - Rispichi, Bark) |
| **Gossypium barbadense L.** | MEDVET: Infections and infestations (Malaria and fever, Bark); UTEN&TOOL: Domestic utensils (Pestle of Tacu, Trunk; Tacú - Arusa timatí, Trunk) |
| **Eriotheca sp.** | Iso nareja (Ch) |
| **Gossypium barbadense L.** | Algodón (Sp) |
| **Lueheopsis schultesii Cuatrec.** | CULT: Personal adornment (Ornament - Huaxmënëhua, Seeds) |
| **Ochroma pyramidale (Cav. ex Lam.) Urb.** | CONST: Houses (Hedge - Panë, Trunk; Tie - Xahui, Bark; To tie house, Bark; Other constructions (Huaracha, Trunk); Thatch (To tie roof, Bark); CULT: Recreational (Toys, Trunk; Zampoña - Bistó, Bark); HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Chest pain, Seeds); Infections and infestations (Scabies); Skin and subcutaneous tissue (Caracha, Bark; Skin fungus, Bark); UTEN&TOOL: Domestic utensils (Basket - Nishicacano, Bark; Hammock - Nishi, Seeds); Hunting & fishing tools (Arrow, Seeds; Fishing lines, Seeds); Labour tools (Planting stick - Xësati, Trunk); Rope (Rope - Rispichi, Seeds; Rope, Seeds) |
| **Pseudobombax septenatum (Jacq.) Dugand** | FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: General Ailments with Unspecific Symptoms (Headache, Leaf); Infections and infestations (Malaria and fever, Leaf) |
| **Theobroma grandiflorum (Willd. ex Spreng.) K. Schum.** | HUMFOOD: Food (Edible, Fruit) |
| **Theobroma speciosum (Willd. ex Spreng.) K. Schum.** | ANIMFOOD: Fodder (Edible, Fruit); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Seeds); MEDVET: Infections and infestations (Malaria and fever, Leaf); Not specified at all (Not specified, Fruit); Sensory system (Earache, Flower) |
| **Marantaceae** | Chocolate / Chocolatillo (Sp) |
| **Calathea sp.** | FUEL: Firewood (Firewood - Caro, Trunk); UTEN&TOOL: Wrappers (Wrappers, Leaf) |
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| Table 1 Plant species used by the Chácobo (Continued) |
|-----------------------------------------------------|
| **Melastomataceae**                                |
| *Bellucia acutata* Pilg.                           | HUMFOOD: Food (Edible, Fruit) | Guayabilla (Sp) | BCM 5, ESR 15, MOV 6 |
| *Miconia albicans* (Sw.) Triana                    | FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Infections and infestations (Malaria and fever); Respiratory system (Cold and flu) | Blanquillo (Ch) | JSM 3, MOV 17, RBU 17818 |
| *Miconia argyrophylla* DC.                         | HUMFOOD: Food (Edible, Fruit) | | MSM 2 |
| *Miconia nervosa* (Sm.) Triana                     | ANIMFOOD: Fodder (Edible, Fruit); CONST: Houses (Tirante largo - Cano pixquëna, Trunk) | | DOA 26 |
| *Miconia tiliifolia* Naudin                        | HUMFOOD: Food (Edible, Fruit) | Nigua (Ch) | ESR 2, RBU 17819, 17838 |
| *Miconia sp.*                                       | MEDVET: Skin and subcutaneous tissue (Puchichi, Fruit) | Pao (Ch) | DOS 60 |
| *Mouriri guianensis* Aubl.                         | CULT: Ritual (Good luck, Leaf and whole plant); HUMFOOD: Food (Edible, Fruit); MEDVET: Respiratory system (Cold and flu, Flower); Skin and subcutaneous tissue (Puchichi); UTEN&TOOL: Domestic utensils (Pestle of Tacu, Trunk); Hunting & fishing tools (Arrow - Bicobi, Trunk; Arrow, Trunk; Bow - Canatí, Trunk); Labour tools (Planting stick - Xësati, Trunk) | Llave (Sp) | DOA 37 |
| **Meliaceae**                                       |
| *Cedrela fissilis* Vell.                            | CONST: Other constructions (Huaracha, Trunk); CULT: Personal adornment (Ornament - Mënëxëtí, Bark); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Leaf); Digestive system (Diarrhea, Bark; Stomach ache, Bark); Endocrine system (Liver pain, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark); Infections and infestations (Malaria and fever, Bark); UTEN&TOOL: Domestic utensils (Chair - Taburete, Trunk; Pestle of Tacu, Trunk; Spoon, Trunk; Table, Trunk); Other utensils (Boxes, Trunk) | Cedro (Sp) | CH71 |
| **Menispermaceae**                                 |
| *Abuta grandifolia* (Mart.) Sandwich                | HUMFOOD: Food (Edible, Fruit) | | ESR 7 |
| **Moraceae**                                        |
| *Brosimum gaudichaudii* Trécul                       | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Not specified at all (Not specified, Bark); UTEN&TOOL: Domestic utensils (Tacú - Arusa timatí, Trunk) | Apta (Ch) | DOA 4, MOV 2 |
| *Brosimum guianense* (Aubl.) Huber                  | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | | CH72 |
| *Brosimum utile* subsp. *avatifolium* (Ducke) C.C. Berg | CONST: Other constructions (Huaracha, Bark); CULT: Clothes & accessories (Dress - Pio, Bark); UTEN&TOOL: Domestic utensils (Raití, Bark); Tacú – Arusa timati, Trunk (Hunting & fishing tools) | Pio (Ch); Bibosi (Sp) | CH73 |
| *Chlorophora tinctoria* (L.) Gaudich. ex Benth.      | ANIMFOOD: Fodder (Edible, Fruit); CONST: Houses (Tirante largo - Cano pixquëna, Trunk) | Nibosa (Ch) | CH74 |
| *Ficus gomelleira* Kunth & C.D. Bouché              | CULT: Clothes & accessories (Dress - Isaca pohi, Bark; Dress - Moro, Bark); Recreational (Coméno, Bark); MEDVET: Musculo-skeletal system (Fractures, Bark; Fractures, Exudate); Skin and subcutaneous tissue (Wounds and cuts, Bark); UTEN&TOOL: Domestic | Matapalo (Sp) | CH75 |
| **Table 1** Plant species used by the Chácobo (Continued) |
|---------------------------------------------------------|
| **Ficus gomelleria** Kunth & C.D. Bouché | CULT: Clothes & accessories (Dress - Xóa, Bark) | Xoá (Ch); Bibosi blanco (Sp) | CH76 |
| **Ficus mathewsii** (Miq.) Miq. | CULT: Clothes & accessories (Dress - Isaca pohi, Bark); MEDVET: Insect and arthropod bites (Buna bite, Bark); CONST: Houses (To tie house, Bark); Other constructions (Huaracha, Trunk); CULT: Clothes & accessories (Dress - Moro, Bark; Dress - Mororia, Bark); Personal adornment (Ornament - Amënoxëta, Seeds; Ornament - Rësëti; Ornament - Shinoxëta, Bark; Ornament - Xapo, Bark); FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Dental health (Toothache, Exudate); Infections and infestations (Malaria and fever, Bark); Musculo-skeletal system (Fractures, Bark and exudate); Skin and subcutaneous tissue (Wounds and cuts, Trunk); UTEN&TOOL: Domestic utensils (Basket - Yamachi, Bark; Batán - Xaxo, Trunk; Chair - Taburete, Trunk; Hammock - Nishi, Bark); Hunting & fishing tools (Bow - Canati, Bark); Rope (Rope - Rischi, Bark; Rope, Bark) | Isaca Pohni (Ch); Bibosi (Sp) | GOS 50, MOA 7 |
| **Ficus sphenophylla** Standl. | CULT: Clothes & accessories (Dress - Isaca pohi, Bark); MEDVET: Insect and arthropod bites (Buna bite, Exudate); CONST: Other constructions (Huaracha, Bark); CULT: Clothes & accessories (Dress - Moro, Bark); Personal adornment (Ornament - Xapo, Bark); MEDVET: Musculo-skeletal system (Fractures, Exudate) | Moro (Ch); Bibosi (Sp) | CH77 |
| **Ficus trigona** L.f. | CONST: Other constructions (Huaracha, Bark); CULT: Clothes & accessories (Dress - Moro, Bark); Personal adornment (Ornament - Xapo, Bark); MEDVET: Musculo-skeletal system (Fractures, Exudate) | || JSM 51 |
| **Ficus sp.** | CONST: Houses (To tie house, Bark); Other constructions (Huaracha, Trunk); CULT: Clothes & accessories (Dress - Moro, Bark; Dress - Mororia, Bark); Personal adornment (Ornament - Amënoxëta, Seeds; Ornament - Rësëti; Ornament - Shinoxëta, Bark; Ornament - Xapo, Bark); FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Dental health (Toothache, Exudate); Infections and infestations (Malaria and fever, Bark); Musculo-skeletal system (Fractures, Bark and exudate); Skin and subcutaneous tissue (Wounds and cuts, Trunk); UTEN&TOOL: Domestic utensils (Basket - Yamachi, Bark; Batán - Xaxo, Trunk; Chair - Taburete, Trunk; Hammock - Nishi, Bark); Hunting & fishing tools (Bow - Canati, Bark); Rope (Rope - Rischi, Bark; Rope, Bark) | Mororia (Ch); Bibosi (Sp) | CH78 |
| **Helicostylis tomentosa** (Poepp. & Endl.) Rusby | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Insect and arthropod bites (Buna bite, Exudate; Insectbitbe, Exudate); Skin and subcutaneous tissue (Wounds and cuts, Exudate) | Nui (Sp) | DOA 15, MOV 42, SCO 26 |
| **Perebea angustifolia** (Poepp. & Endl.) C. C. Berg | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | | CH79 |
| **Perebea mollis** (Poepp. & Endl.) Huber | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Insect and arthropod bites (Buna bite, Bark) | Patai Perro (Ch); Patarmichi (Sp) | SCO 27, DOA 33 |
| **Pseudolmedia macrophylla** Trécul | CONST: Houses (To tie house, Bark); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | Maca Nui (Ch); Nui (Sp) | |
| **Pseudolmedia sp.** | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | Roble de Pajo (Sp) | MOV 63, SCO 40 |
### Table 1 Plant species used by the Chácobo (Continued)

| Plant Species          | Uses                                                                 | Source |
|------------------------|----------------------------------------------------------------------|--------|
| Sorocea guilleminiana  | CONST: Houses (Tie - Xahui, Bark; To tie house, Bark); HUMFOOD: Food (Edible, Fruit) |        |
| Sorocea muriculata     | CULT: Personal adornment (Ornament - Maxëití, Fruit); Ritual (Marriage ceremony; Symbology; Trunk) |        |
| Musaceae               |                                                                       |        |
| Musa x paradisiaca     | HUMFOOD: Beberages (Beberage - Chicha, Fruit; Beberage , Fruit); Food (Edible - Chipilo, Fruit; Edible - Chive, Fruit; Edible, Fruit); MEDVET: Dental health (Blisters mouth, Fruit; Toothache, Root); Digestive system (Diarrhea, Exudate); Skin and subcutaneous tissue (Burns, Fruit, Empéine, Fruit); UTEN&TOOL: Domestic utensils (Basket - Bano, Leaf) |        |
| Iryanthera juruensis   | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Dental health (Thrush, Exudate); Skin and subcutaneous tissue (Caracha, Exudate) |        |
| Iryanthera sp.         | CONST: Houses (Tie - Xahui, Bark); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Insect and arthropod bites (Insectibite) |        |
| Virola flexuosa A.C.   | MEDVET: Musculo-skeletal system (Fractures, Bark and leaf)            |        |
| Virola sebifera Aubl.  | CULT: Cosmetic (Hair oil, Exudate)                                    |        |
| Myrtaceae              |                                                                       |        |
| Eugenia sp. 1          | HUMFOOD: Food (Edible, Fruit)                                         | RBU 17824 |
| Eugenia sp. 2          | MEDVET: Skin and subcutaneous tissue (Caracha)                        | JSM 12  |
| Myrcia mollis (Kunth)  | FUEL: Firewood (Firewood - Caro, Trunk)                               | BCM 8   |
| Myrcia regnelliana O.  | MEDVET: Skin and subcutaneous tissue (Caracha, Bark and fruit; Wounds and cuts, Bark and root) | CH83    |
| Myrtus floribunda (H. West ex Willd.) O. Berg | MEDVET: General Ailments with Unspecific Symptoms (Chest pain, Bark; Musculo-skeletal system (Cramps, Bark, Rheumatism, Bark) | CH84    |
| Psidium guajava L.     | MEDVET: Infections and infestations (Malaria and fever, Bark)         | BCH10, OVC 1 |
| Ochnaceae              |                                                                       |        |
| Ouratea angulata Tiegh.| MEDVET: Musculo-skeletal system (Rheumatism, Bark)                    | ESR 8   |
| Ouratea sp.            | FUEL: Firewood (Firewood - Caro, Trunk)                               | JSM 10  |
| Olacaceae              |                                                                       |        |
| Minquartia guianensis AUBL. | CONST: Houses (House post- Jibamë, Trunk); MEDVET: Skin and subcutaneous tissue (Hand blisters, Bark) | GOS 9   |
| Oxalidaceae            |                                                                       |        |
| Agonandra brasiliensis | HUMFOOD: Food (Edible, Fruit)                                         | CH85    |
| Averrhoa carambola L.   | HUMFOOD: Food (Edible, Fruit)                                         | CH86    |
| Plant family | Common name | Scientific name | Uses | Other Uses |
|--------------|-------------|-----------------|------|------------|
| Passiflora coccinea | UTEN&TOOL: Hunting & fishing tools (Barbasco - Iscoró, Trunk) | Aubl. | Pachio fuerte (Sp) | MOV 10, SCO 21 |
| Passiflora miniata | HUMFOOD: Food (Edible, Fruit) | Aubl. | Tumbo (Sp) | CH87 |
| Passiflora tripartita (Juss.) Poir. | UTEN&TOOL: Domestic utensils (Basket - Nishicacano, Trunk) | | |
| Piperaceae | Peperomia pellucida (L.) Kunth | | MEDVET: General Ailments with Unspecific Symptoms (Chest pain, Fruit) | CH88 |
| | Piper bartlingianum (Miq.) C. DC. | | MEDVET: Skin and subcutaneous tissue (Caracha, Root); UTEN&TOOL: Domestic utensils (Basket - Bano) | JSM 34, MSM 8 |
| | Piper hispidum Sw. | MEDVET: Dental health (Toothache, Root); Not specified at all (Operations, Trunk); Skin and subcutaneous tissue (Burns, Leaf; Caracha, Leaf, root, trunk and whole plant; Wounds and cuts, Leaf and trunk) | SCO 10, GOS 12 |
| | Piper nigrispicum Sw. | MEDVET: Digestive system (Stomach ache, Bark); Endocrine system (Liver pain, Trunk); Sensory system (Inflammation of eyes) | Nishipara / Yunquilla (Ch) | CH89 |
| | Piper peltatum Sw. | MEDVET: General Ailments with Unspecific Symptoms (Vomit, Leaf); Respiratory system (Cold and flu, Bark and leaf); Sensory system (Earache, Root) | Boca de Hombre (Sp) | GOS 43, MOV 60 |
| | Piper piscatorum Sw. | MEDVET: Dental health (Toothache, Exudate, root and trunk); Digestive system (Diarrhea, Trunk); Musculo-skeletal system (Bone pain, Root); Not specified at all (Not specified, Root); Skin and subcutaneous tissue (Caracha, Leaf) | Nucaperi (Ch) | DOA 7 |
| | Piper sp. | MEDVET: Respiratory system (Cold and flu, Whole plant); Urinary system (Kidney pain, Whole plant) | Matico (Sp) | MOA 9 |
| Poaceae | Cymbopogon citratus (DC.) Stapf | | MEDVET: Digestive system (Stomach ache, Leaf); General Ailments with Unspecific Symptoms (Vomit, Leaf); Infections and infestations (Malaria and fever, Leaf and root); Pregnancy, birth and puerperal (Accelerator for birth, Root; Birth, Leaf; Haemorrhage after childbirth, Leaf); Reproductive system and sex health (Menstrual pain, Leaf); Respiratory system (Cold and flu, Leaf); Sensory system (Inflammation of eyes, Leaf); Skin and subcutaneous tissue (Haemorrhage, Leaf) | Cédron (Sp) |
| | Guadua sp. 1 | UTEN&TOOL: Domestic utensils (Chair - Taburete, Trunk) | | DOA 22 |
| | Guadua sp. 2 | CULT: Recreational (Zampoña - Bistó, Trunk); MEDVET: Pregnancy, birth and puerperal (To cut umbilical cord, Trunk); UTEN&TOOL: Domestic utensils (Knife, Trunk) | | MOV 57 |
| | Gynerium sagittatum (Aubl.) P. Beauv. | CONST: Houses (Hedge - Panë, Trunk); CULT: Clothes & accessories (Comb, Trunk); Personal adornment (Ornament - Maxëiti, Seeds; Ornament - Résëti, Trunk); Recreational (Zampoña - Bistó, Trunk); MEDVET: Musculo-skeletal system (Fractures); Snakebites and Ray stings (Sankebites, Trunk); UTEN&TOOL: Domestic utensils (Mat, Leaf); Hunting & fishing tools (Arrow - Bicobi, Trunk; Arrow - Notsi, Trunk; Arrow - Pio, Trunk; Arrow - Quirequé, Trunk; Arrow - Quësipini, Trunk; Arrow - Tahua Quësipini, Trunk; Arrow - Tiopi, Trunk; Arrow; Fruit; Bow - Canatí, Trunk; Weapons, Trunk) | Tacuara (Ch); Chuchío / Paja corona (Sp) | CH90 |
| | Gynerium sp. | UTEN&TOOL: Domestic utensils (Knife, Trunk) | | MOV 30 |
Table 1  Plant species used by the Chácobo (Continued)

| Plant species                  | CULT: Recreational (Zampoña - Bistó, Trunk); MEDVET: Dental health (Blisters mouth, Fruit) | Tacuarilla (Ch) | CH91 |
|--------------------------------|-------------------------------------------------------------------------------------------------|-----------------|------|
| Lasiacis ligulata Hitchc. & Chase. | CULT: Personal adornment (Ornament - Matsamitài, Trunk; Ornament - Rësëti, Trunk); Recreational (Zampoña - Bistó, Trunk); FUEL: Other fuel (Ceramics - Corinó, Trunk); UTEN&TOOL: Hunting & fishing tools (Arrow - Bicobi, Trunk; Arrow - Notsi, Trunk; Arrow - Quéréqué, Trunk; Arrow - Quëspini, Trunk; Arrow - Tahua Quëspini, Trunk; Arrow - Tiopi, Trunk) | Tacuarilla (Ch) | CH92 |
| Olyra micrantha Kunth          | CULT: Personal adornment (Ornament - Matsamitài, Trunk; Ornament - Rësëti, Trunk); Recreational (Zampoña - Bistó, Trunk); FUEL: Other fuel (Ceramics - Corinó, Trunk); UTEN&TOOL: Hunting & fishing tools (Arrow - Bicobi, Trunk; Arrow - Notsi, Trunk; Arrow - Quéréqué, Trunk; Arrow - Quëspini, Trunk; Arrow - Tahua Quëspini, Trunk; Arrow - Tiopi, Trunk) | Tacuarilla (Ch) | CH92 |
| Oryza sativa L.                | CULT: Personal adornment (Ornament - Matsamitài, Trunk; Ornament - Rësëti, Trunk); Recreational (Zampoña - Bistó, Trunk); FUEL: Other fuel (Ceramics - Corinó, Trunk); UTEN&TOOL: Hunting & fishing tools (Arrow - Bicobi, Trunk; Arrow - Notsi, Trunk; Arrow - Quéréqué, Trunk; Arrow - Quëspini, Trunk; Arrow - Tahua Quëspini, Trunk; Arrow - Tiopi, Trunk) | Tacuarilla (Ch) | CH92 |
| Pharus latifolius L.           | CULT: Personal adornment (Ornament - Matsamitài, Trunk; Ornament - Rësëti, Trunk); Recreational (Zampoña - Bistó, Trunk); FUEL: Other fuel (Ceramics - Corinó, Trunk); UTEN&TOOL: Hunting & fishing tools (Arrow - Bicobi, Trunk; Arrow - Notsi, Trunk; Arrow - Quéréqué, Trunk; Arrow - Quëspini, Trunk; Arrow - Tahua Quëspini, Trunk; Arrow - Tiopi, Trunk) | Tacuarilla (Ch) | CH92 |
| Saccharum officinarum L.       | CONST: Houses (House post- Jibamë, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Beberages (Beberage , Trunk); Food (Edible, Trunk); MEDVET: Urinary system (Kidneys, Trunk) | Shita chëque / Shita sihoyá / Shitaria / Shitatë (Ch); Caña (Sp) | CH92 |
| Streptogyna americana C.E. Hubb | CONST: Houses (Frame house, Trunk); MEDVET: Endocrine system (Liver pain, Root); General Ailments with Unspecific Symptoms (Vomit, Root); Urinary system (Kidney infection, Root; Kidneys, Root); Veterinary (Distemper, Root) | Huasimapoa (Ch); Sujo (Sp) | CH93 |
| Zea mays L.                    | ANIMFOOD: Fodder (Edible, Seeds); HUMFOOD: Beberages (Beberage - Chicha, Seeds; Beberage - Wiñapo, Seeds); Food (Edible - Chive, Seeds; Edible - Flour, Seeds; Edible - Tamales, Seeds; Edible - Seeds) | Cahuayo Xëqui / Canashibati / Chitoco / Itëma / Jimi Xëqui / Xëqui / Xëqui betërëni / xëqui joxo / Xëquiria / Xino xëqui (Ch); Maž / maz bíarëllo / Maž blanco / Maž colorado / Maž corto / Maž cubano / Maž negro (Sp) | CH93 |
| Polygalaceae                   | Bredemeyera myrtifolia Spruce ex A.W. Benn. | Bahuino Nihi (Ch) | BCM 4, ESR 3 |
| Polygonaceae                   | Triplaris americana L.                         | Janina (Ch); Palo Diablo (Sp) | GOS 47, JSM 58, MOA 5, MOV 59, ORC 2 |
| Polypodiaceae                  | Phlebodium decumanum (Willd.) J. Sm.           | Roho jina (Ch); Cola de maneche (Sp) | DOA 9, ORC 4 |
| Proteaceae                     | Roupala sp.                                     | Mahi No Nihi (Ch) | CH94 |
| Pteridaceae                    | Adiantum latfolium Lam.                        | Mitaïsa (Ch); Bejuco (Sp) | MOV 67 |
|                               | Adiantum lucidum (Cav.) Sw.                    | Mtsisi (Ch) | CH95 |
|                               | Adiantum obtliquum Wild.                       | Mtsisi (Ch) | CH96 |
|                               | Adiantum petiolatum Desv.                      | Mtsisi (Ch) | CH97 |
| Plant species | Use | Chácobo | Sp. | DOA | Notes |
|--------------|-----|---------|-----|-----|-------|
| Pteris sp.   | MEDVET: Urinary system (Kidney infection, Trunk) | Bushshi (Ch); Shico (Sp) | | CH98 | |
| Rosaceae     | CONST: Houses (Hedge - Panê, Trunk; Roof beam - Canoxoco, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); UTEN&TOOL: Hunting & fishing tools (Bow - Canatí, Trunk); Labour tools (Planting stick - Xësati, Trunk; Shovel, Trunk) | Jihui (Ch) | | |
| Prunus      | HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Fruit and leaf); General Ailments with Unspecific Symptoms (Vomit) | Tosa (Ch); Guayabilla / Tutumilla (Sp) | | ESR 12, MOV 1, 15 | |
| guianensis  | Amaioua guianensis Aubl. | Cai Osho (Ch) | | DOA 32 | |
| Rubiaceae   | Capirona decorticans Spruce | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Infections and infestations (Scabies, Bark); Insect and arthropod bites (Buna bite, Bark; Insectbite, Bark); Not specified at all (Cepta, Bark); Reproductive system and sex health (Contraceptive, Bark); Respiratory system (Cold and flu, Bark and flower); Skin and subcutaneous tissue (Burns, Bark; Caracha, Bark; Haemorrhage, Bark; Wounds and cuts, Bark); Snakebites and Ray stings (Sankebites, Bark); UTEN&TOOL: Domestic utensils (Pestle of Tacu, Trunk); Labour tools (Planting stick - Xësati, Trunk; Shovel, Trunk) | Batahua (Ch); Guayabocho (Sp) | DOA 28, ESR 14, JSM 22, MOV 36, RBU 17823, SCO 39 | |
| Coutarea hexandra | MEDVET: Digestive system (Diarrhea, Bark, leaf and root; Stomach ache, Bark); Endocrine system (Gallbladder, Bark); Infections and infestations (Malaria and fever, Bark); Reproductive system and sex health (Abortive, Leaf) | Jihui Moça (Ch) | | CH99 | |
| Genipa americana | CULT: Personal adornment (Ornament - Maxëití, Seeds); HUMFOOD: Food (Edible, Fruit) | Nani (Ch); Bii (Sp) | | JSM 6 | |
| Geophila cordifolia | MEDVET: Infections and infestations (Amoebias, Leaf; Anthelmintic, Leaf) | Mai yochi (Ch) | | DOA 35 | |
| Ladenbergia oblongifolia | HUMFOOD: Food (Edible, Fruit) | Muela (Sp) | | CH100 | |
| Palicourea rigida | HUMFOOD: Food (Edible, Fruit); MEDVET: Skin and subcutaneous tissue (Canoxoco, Trunk) | Áhuara Macha (Ch) | | MOV 13 | |
| Psychotria deflexa | CONST: Houses (To tie house, Bark) | Yotabi (Ch) | | CH101 | |
| Psychotria iadotricha | HUMFOOD: Food (Edible, Fruit) | Bimi Chëxë (Ch) | | CH102 | |
| Psychotria lupulina | MEDVET: Infections and infestations (Boro, Bark) | Aihuara Nihi (Ch) | | CH103 | |
| Psychotria prunifolia (Kunth) | MEDVET: Digestive system (Diarrhea, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark) | Bimi Chëxë (Ch) | | CH104 | |
| Randia armata cf. | CULT: Personal adornment (Ornament - Matsamiti, Seeds); FUEL: Other fuel (Ceramics - Chomo, Trunk) | Bimi Chëxë (Ch) | | JSM 25, DOA 14 | |
| Uncaria guianensis | MEDVET: Urinary system (Kidney infection, Trunk) | Bushshi (Ch); Shico (Sp) | | CH98 | |
| J.F. Gmel. | | | | | |
Table 1 Plant species used by the Chácobo (Continued)

| Plant Species | Use by | MEDVET | HUMFOOD | UTEN&TOOL |
|---------------|--------|--------|---------|-----------|
| Rutaceae | | | | |
| Citrus aurantiifolia (Christm.) Swingle | | | | |
| | | | | |
| Citrus limetta Risso | | | | |
| | | | | |
| Citrus paradisi Macfadyen | | | | |
| | | | | |
| Citrus reticulata Blanco | | | | |
| | | | | |
| Citrus × sinensis (L.) Osbeck | | | | |
| | | | | |
| Metrodorea flavida K. Krause | | | | |
| | | | | |
| Moniera trifolia L. | | | | |
| | | | | |
| Zanthoxylum rhoifolium Lam. | | | | |
| | | | | |
| Salicaceae | | | | |
| Casearia arborea (Rich.) Urb. | | | | |
| | | | | |
| Casearia corymbensis Tul. | | | | |
| | | | | |

Indet. sp. 1 CONST: Houses (To tie house, Bark); Thatch (To tie roof, Bark)

Rutaceae

Citrus aurantiifolia (Christm.) Swingle

| Use by | MEDVET | HUMFOOD | UTEN&TOOL |
|--------|--------|---------|-----------|
| FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Dental health (Toothache, Seeds); Digestive system (Diarrhea, Root; Stomach ache, Fruit and root); Endocrine system (Liver pain, Fruit); General Ailments with Unspecific Symptoms (Chest pain, Fruit; Headache, Fruit; Vomit, Root); Infections and infestations (Malaria and fever, Bark); Musculo-skeletal system (Bone pain, Bark; Fractures, Bark; Hip pain, Bark); Respiratory system (Cold and flu, Fruit and leaf); Sensory system (Inflammation of eyes, Seeds); Urinary system (Kidneys, Fruit) | | | |
| | | | |
| Citrus limetta Risso | MEDVET: Infections and infestations (Malaria and fever, Root) | | |
| | | | |
| Citrus paradisi Macfadyen | CONST: Houses (To tie house, Bark); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Fruit; Stomach ache, Bark and leaf); General Ailments with Unspecific Symptoms (Vomit, Root); Infections and infestations (Malaria and fever, Bark); Skin and subcutaneous tissue (Caracha, Root; Wounds and cuts, Root); UTEN&TOOL: Domestic utensils (Basket - Chichama, Bark) | | |
| | | | |
| Citrus reticulata Blanco | HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Stomach ache, Leaf) | | |
| | | | |
| Citrus × sinensis (L.) Osbeck | | | |
| | | | |
| Metrodorea flavida K. Krause | CONST: Houses (House post- Jibamë, Trunk; Muchacho - Ninotí, Trunk; Pasa raton - Xoya jabati, Trunk; Roof beam - Canoxoco, Trunk; Tie - Xahui, Bark; Tirante - Cano bêpotó, Trunk; Tirante largo - Cano pixquêna, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Domestic utensils (Pestle of Batan - Chapi, Trunk; Pestle of Tacu, Trunk) | | |
| | | | |
| Moniera trifolia L. | CULT: Ritual (Fragile children, Leaf); MEDVET: Cultural diseases and disorders (Bad air and scare - Râtëaina, Leaf); Sensory system (Earache, Leaf) | | |
| | | | |
| Zanthoxylum rhoifolium Lam. | FUEL: Firewood (Firewood - Caro, Trunk) | | |
| | | | |
| Salicaceae | | | |
| Casearia arborea (Rich.) Urb. | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Beverages (Beverage - Chicha, Seeds) | | |
| | | | |
| Casearia corymbensis Tul. | HUMFOOD: Food (Edible, Fruit) | | |

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### Table 1 Plant species used by the Chácobo (Continued)

| Species | Medicinal Uses | Common Names | Code |
|---------|----------------|--------------|------|
| Lunania parviflora Spruce ex Benth. | MEDVET: Digestive system (Diarrhea, Bark; Stomach ache, Bark); Endocrine system (Liver pain, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark and fruit); Musculo-skeletal system (Rheumatism, Bark) | Nishi Tsanona (Ch); Bejuco / Chacaka (Sp) | DOA 13 |
| Sapindaceae | | | |
| Matayba scrobiculata (H.B.K.) Radkl. | FUEL: Firewood (Firewood - Caro, Trunk) | Sama negra (Sp) | CH107 |
| Paullinia sp. | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Hunting & fishing tools (Barbasco - Axa, Trunk) | Shoshapo (Ch); Barbasco / Muela (Sp) | DOA 27 |
| Sejania lethalis A. St. Hill | CONST: Houses (Frame house, Trunk; Tirante - Cano bëpotó, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Bark; Stomach ache, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark); UTEN&TOOL: Hunting & fishing tools (Barbasco - Axacoro, Trunk); Labour tools (Sandpaper, Leaf) | Axa Coro / Carahina Nihi (Ch); Barbasco (Sp) | CH108 |
| Sejania pyramidata Radkl. | CULT: Personal adornment (Ornament - Maxëiti, Fruit) | Capë Itsa (Ch) | CH109 |
| Sejania sp. | UTEN&TOOL: Hunting & fishing tools (Barbasco - Axacoro, Trunk) | Axa Coro (Ch); Barbasco (Sp) | DOA 6, SCO 33 |
| Talisia acutifolia Raddl. | HUMFOOD: Food (Edible, Fruit); UTEN&TOOL: Labour tools (Shovel, Trunk) | Pitón (Sp) | CH110 |
| Sapotaceae | | | |
| Chrysophyllum sparsiflorum Klotzsch ex Miq. | FUEL: Firewood (Firewood - Caro, Trunk) | Quishpi (Ch); Quispi (Sp) | CH111 |
| Micropholis guyanensis (A.DC.) Pierre | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | Toro Quirihua (Ch) | MDV 61 |
| Micropholis guyanensis cf. (A.DC.) Pierre | HUMFOOD: Food (Edible, Fruit) | Coquino (Ch) | CH112 |
| Micropholis lanceolata (C. Martius & Eichler) Pierre | HUMFOOD: Food (Edible, Fruit) | Bimi Muishi (Ch) | CH113 |
| Pouteria caimito (Ruiz & Pav.) Radlk. | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | Quëo (Ch) | CH114 |
| Pouteria lucuma (Ruiz & Pav.) Radlk. | HUMFOOD: Food (Edible, Fruit) | Quëo (Ch); Lucuma (Sp) | CH115 |
| Pouteria macrophylla (Lam.) Eyma | HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Vomit, Bark); Skin and subcutaneous tissue (Puchichi) | Yahë (Ch) | CH116 |
| Pouteria nemorosa Baehni | HUMFOOD: Food (Edible, Fruit); MEDVET: Infections and infestations (Scabies); Insect and arthropod bites (Insectbite); UTEN&TOOL: Domestic utensils (Basket - Nishicacano, Bark) | Bata Jihui / Batabí (Ch); Coquino (Sp) | CH117 |
| Pouteria ramiflora (Mart.) Radlk. | CONST: Houses (House post - Jibamë, Trunk; Xano, Trunk); FUEL: Firewood (Firewood - Caro, Trunk); UTEN&TOOL: Domestic utensils (Basket - Xaxo, Trunk); Transportation (Canoe, Trunk) | Xanë Yobini (Ch); Tajibo blanco / Almendrillo blanco (Sp) | MOV 12 |
| Simaroubaceae | | | |
| Simarouba amara Aubl. | CONST: Houses (To tie house, Bark); MEDVET: Digestive system (Diarrhea, Bark; Stomach ache, Bark) | Tarari (Ch); Palo Amargo (Sp) | GOS 6, GCM 2 |
| Plant Family | Plant Species | Use by the Chácobo | MEDVET | UTEN&TOOL |
|-------------|--------------|--------------------|--------|-----------|
| **Siparunaceae** | Siparuna guianensis Aubl. | CULT: Ritual (Fragile children, Bark) | Digestive system (Diarrhea, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark); Infections and infestations (Malaria and fever, Leaf); Insect and arthropod bites (Buna bite, Bark; Insect bite, Bark); Respiratory system (Cold and flu, Leaf); Skin and subcutaneous tissue (Caracha, Bark); Snakebites and Ray stings (Sankebites); UTEN&TOOL: Domestic utensils (Smoke to mosquito repelent) | Shisho Itsa / Xaba ghishu itsa / Xabá shishohitsa (Ch) | BCM 13, GCM 4, GOS 5, MOA 8, MSM 3, 11, SCO 8 |
| | Siparuna krukovii A.C. Sm. | FUEL: Firewood (Firewood - Caro, Trunk) | Infections and infestations (Smallpox, Bark); Insect and arthropod bites (Buna bite, Bark; Insect bite, Bark) | Shisho Itsa / Xêto itsa (Ch) | DOA 19, MOV 32, RBU 17829 |
| | Siparuna sp. | MEDVET: Urinary system (Kidneys, Root) | | Xabá shishohitsa (Ch) | BCM 3 |
| **Smilacaceae** | Smilax flavicaulis Rusby | MEDVET: Digestive system (Diarrhea) | | Cayû (Sp) | RBU 17861 |
| | Smilax poeppigii Kunth. | MEDVET: Digestive system (Diarrhea, Young leaf) | | Patiari jomoxa (Ch); Guayaba (Sp) | CH118 |
| | Smilax sp. | MEDVET: Urinary system (Kidneys, Leaf, root and whole plant) | | Yahuaxë (Ch) | JSM 18 |
| **Solanaceae** | Capsicum annuum L. | HUMFOOD: Food (Edible, Fruit); MEDVET: Skin and subcutaneous tissue (Puchochi, Leaf) | | Aji / Aji dulce / Aji rojo (Sp) | |
| | Cestrum strigillatum Ruiz & Pav. | MEDVET: Skin and subcutaneous tissue (Caracha, Bark) | | Yahua taho (Ch) | CH119 |
| | Lycianthes glandulosa (Ruiz. & Pav.) Bitter | CULT: Personal adornment (Ornament - Maxëití, Fruit; Ornament - Shinoxëta, Fruit); HUMFOOD: Food (Edible, Fruit) | | Bimi Chëxë (Ch) | CH120 |
| | Lycopersicon esculentum Mill. | HUMFOOD: Food (Edible, Fruit) | | Tomate (Sp) | |
| | Nicotiana rustica L. | MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina, Leaf); Infections and infestations (Boro, Leaf); Reproductive system and sex health (Menstrual pain, Leaf); Sensory system (Earache, Leaf); Skin and subcutaneous tissue (Caracha, Leaf); Snakebites and Ray stings (Sankebites, Leaf) | | Romë / Rumë (Ch); Tabaco (Sp) | RBU 17864 |
| | Solanum betaceum Cav. | MEDVET: Infections and infestations (Malaria and fever, Bark) | | | BCM 12, GOS 24, MOV 19 |
| | Solanum lorentzii Bitter | MEDVET: Dental health (Toothache, Root); General Ailments with Unspecific Symptoms (Headache, Leaf); Vomit, Whole plant (Infections and infestations); Anthelmintic, Bark (Respiratory system); Cold and flu, Bark (Cold and flu, Leaf); Sensory system (Earache, Leaf); Urinary system (Kidney infection, Leaf) | | Jimi nihi / Nohini jihui / Nohini nhi (Ch); Uvita (Sp) | Popotoa (Ch); ManSilla (Sp) |
| | Solanum mammosum L. | MEDVET: Infections and infestations (Smallpox, Leaf); Skin and subcutaneous tissue (Caracha, Bark) | | | Popotoa (Ch); ManSilla (Sp) |
| | Solanum pensile Sendtn. | CULT: Ritual (Good luck in fishing) | | | Cashixopá (Ch) | CH120 |

Table 1 Plant species used by the Chácobo (Continued)
### Table 1 Plant species used by the Chácobo (Continued)

| Plant Family | Scientific Name | Uses and Medicinal Uses                                  | Location      |
|--------------|-----------------|----------------------------------------------------------|---------------|
| **Solanum**  | *Solanum placitum* C.V. Morton | MEDVET: Cultural diseases and disorders (Bad air and scare - Ratëaina) | CH122         |
|              | *Solanum proteanthum* Bohs | CONST: Houses (Tirante - Cano bépotó, Trunk); FUEL: Shia (Ch) |               |
|              |                  | FIREWOOD: Firewood (Firewood - Caro, Trunk); MEDVET: Digestive system (Diarrhea, Trunk); General Ailments with Unspecific Symptoms (Vomit, Trunk) |               |
|              | *Solanum tuberosum* L. | HUMFOOD: Food (Edible, Root); MEDVET: General Ailments with Unspecific Symptoms (Vomit, Root and whole plant); Infections and infestations (Amoebas, Seeds) | Papa (Sp)     |
| **Staphyleaceae** |             |                                                          |               |
|              | *Turpinia occidentalis* subsp. *breviflora* Croat | HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Body pain, Root); Headache, Leaf, Pain, Root; Skin and subcutaneous tissue (Haemorrhage) | Jihui Xoco / Strelziaceae (Ch); Huallabilla de pampa / Papaya (Sp) CH123 |
| **Strelziaceae** |             |                                                          |               |
|              | *Phenakospermum guianensis* Aubl. | CONST: Houses (Hedge - Panë, Trunk; Tie - Xahuj, Leaf; Xapocoti, Leaf); Thatch (Huaracha roof, Leaf; Ridgepole - Xobomapati, Leaf; Roof - Xëhuahacacató, Leaf); CULT: Clothes & accessories (Skirt woman, Leaf); Personal adornment (Ornament - Matsamití, Leaf; Ornament - Maxëitií, Leaf; Ornament - Mënëxetíí, Leaf); FUEL: Firewood (Firewood - Caro, Bark); Other fuel (Ceramics - Chomo, Bark); MEDVET: Digestive system (Diarrhea, Exudate; Stomach ache, Exudate); Endocrine system (Liver pain, Exudate); General Ailments with Unspecific Symptoms (Vomit, Exudate); Infections and infestations (Infections, Exudate; Leishmaniasis, Exudate); Respiratory system (Cold and flu, Exudate; Cough, Exudate); Skin and subcutaneous tissue (Burns, Exudate; Caracha, Exudate; Skin fungus, Leaf; Wounds and cuts, Exudate); Snakebites and Ray stings (Sankebites, Exudate); Urinary system (Kidney pain, Exudate; Kidneys, Exudate); UTEN&TOOL: Domestic utensils (Basket - Chichama, Bark; Basket - Nishicacano, Bark; Basket - Purupachi, Bark; Basket - Yamachi, Bark; Fan - Huëquëti, Leaf; Rope (Rope - Rispichi, Leaf); Wrappers; Wrappers, Leaf) | Mani Coro / Manihua (Ch); Patujú (Sp) CH123 |
| **Styracaceae** |             |                                                          |               |
|              | *Styrax sp.* | HUMFOOD: Food (Edible, Fruit) Ahua Tishi (Ch); Ahuai (Sp) | CH124         |
| **Talinaceae** |             |                                                          |               |
|              | *Talinum paniculatum* (Jacq.) Gaertn. | MEDVET: Endocrine system (Liver pain, Leaf); General Ailments with Unspecific Symptoms (Headache, Trunk); Musculo-skeletal system (Swelling, Trunk); Respiratory system (Cold and flu, Leaf); Sensory system (Earache, Leaf) | Nohini (Ch)   |
| **Tectariaceae** |             |                                                          |               |
|              | *Triplophyllum protensum* (Azel. ex. Sw.) Holttum | MEDVET: Cultural diseases and disorders (Bad air and scare - Rateáina, Leaf) | Toria huitaxo (Ch); Piñón morado (Sp) CH125 |
| **Thelypteridaceae** |             |                                                          |               |
|              | *Thelypteris abrupta* (Desv.) Proctor | MEDVET: Sensory system (Earache, Leaf) | Xëqui jahêhua (Ch) CH126 |
| **Trigoniacae** |             |                                                          |               |
|              | *Trigonia killipii* J.F. Macbr. | MEDVET: Digestive system (Diarrhea, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark); Infections and infestations (Malaria and fever, Bark) | Cashiapá (Ch) CH127 |
| Table 1 | Plant species used by the Chácobo (Continued) |
|---------|---------------------------------------------|
| **Ampelocera edentula Kuhl.** | CONS: Houses (Muchacho - Ninotí, Trunk; Pasa ratón - Xoya jabatí, Trunk; Ridgepole - Maracatí, Trunk; Roof beam - Canoxoco, Trunk; Tie - Xahui, Bark; Tirante - Cano bèpotó, Trunk; Tirante corto - Cano Bësëcamë, Trunk; Tirante largo - Cano pixquëna, Trunk) | Palo Yodo (Sp) | CH128 |
| **Celtis iiguanea (Jacq.) Sarg.** | CONS: Thatch (Roof - Xèhuahacacató, Trunk) | Chichipa (Sp) | CH129 |
| **Urticaceae** | | | |
| **Cecropia ficiifolia Warb. ex Snethl.** | CONS: Houses (Hedge - Panê, Trunk; Tie - Xahui, Bark); Thatch (To tie roof, Bark); CULT: Personal adornment (Ornament - Amënoxëta, Leaf; Ornament - Tirispi, Bark); Recreational (Zampoña - Bistó, Bark); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Vomit, Bark); Infections and infestations (Scabies); UTEN&TOOL: Domestic utensils (Hammock - Nishi, Bark; Festle of Tacu, Trunk); Hunting & fishing tools (Arrow - Bicobi, Bark; Arrow - Quërëquë, Bark; Arrow - Tahua Quëspini, Bark; Arrow - Tiopi, Bark; Bow - Canati, Bark); Labour tools (Planting stick - Xësati, Trunk); Rope (Rope - Rispichi, Bark) | Bocobi / Tiopi (Ch); Ambaibo (Sp) | CH130 |
| **Cecropia sciadophylla Mart.** | MEDVET: Respiratory system (Cold and flu) | Bocobi (Ch); Hierba de loro (Sp) | CH131 |
| **Cecropia strigosa Trécul** | FUEL: Firewood (Firewood - Caro, Trunk) | Bocobi (Ch) | JSM 14 |
| **Pourouma cecropiifolia Mart.** | UTEN&TOOL: Labour tools (Planting stick - Xësati, Trunk) | Quëxqui xaquiini (Ch) | CH132 |
| **Pourouma guianensis Aubl.** | CONS: Houses (Frame house, Trunk; Jhuxaca, Trunk; Ridgepole - Maracatí, Trunk; Tirante - Cano bèpotó, Trunk; To tie fence, Bark; To tie house, Bark; Thatch (To tie roof, Bark); HUMFOOD: Food (Edible, Fruit) | Xaquini (Ch); Piraquina (Sp) | DOA 21, SCO 23 |
| **Pourouma minor Benoist** | ANIMFOOD: Fodder (Edible, Fruit); FUEL: Firewood (Firewood - Caro, Trunk); UTEN&TOOL: Hunting & fishing tools (Bow - Canati, Trunk); Labour tools (Sandpaper, Leaf) | Xaquini / Yahë (Ch) | DOA 31, MOV 34 |
| **Urea baccifera (L.) Gaudich ex Wedd.** | MEDVET: Blood and Cardio-vascular system (Heartache, Bark, leaf and root); Infections and infestations (Malaria and fever); Musculo-skeletal system (Rheumatism, Leaf); Respiratory system (Cold and flu, Bark and leaf); Sensory system (Inflammation of eyes, Bark and leaf) | Nahua Shishahua / Pia nihi (Ch); Pega pega / Pica pica (Sp) | DOA 49, GOS 46, JSM 55, MOV 56 |
| **Verbenaceae** | | | |
| **Aloysia triphylla Royle** | MEDVET: Digestive system (Stomach ache, Leaf) | Toronjil (Sp) | |
| **Lantana cujabensis Schauer** | CONS: Houses (Frame house, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: General Ailments with Unspecific Symptoms (Headache, Leaf); Infections and infestations (Malaria and fever, Bark and leaf); Respiratory system (Cold and flu, Flower and leaf) | Bahua Rëxa (Ch); Hierba de loro (Sp) | JSM 19 |
| **Lantana trifolia L.** | MEDVET: Infections and infestations (Malaria and fever, Bark) | Urn (Ch) | CH133 |
| **Lantana sp.** | CONS: Houses (Frame house, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Stomach ache, Fruit and trunk); Endocrine system (Liver pain, Seeds); Skin and subcutaneous tissue (Haemorrhage, Root) | Capëtërëbó (Ch); Biribá / Condura (Sp) | ESR 27 |
Table 1 Plant species used by the Chácobo (Continued)

| Plant species                  | Uses                                                                 | Other Uses and Values                                                                 |
|--------------------------------|----------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| **Petrea sp. 1**               | MEDVET: Digestive system (Diarrhea, Bark and leaf; Stomach ache, Bark); General Ailments with Unspecific Symptoms (Vomit, Bark) | Ponochi (Ch); Bejuco (Sp)                                                          |
| **Petrea sp. 2**               | MEDVET: Digestive system (Diarrhea, Trunk); General Ailments with Unspecific Symptoms (Vomit, Trunk) | Ponochi (Ch)                                                                        |
| **Stachytarpheta cayennensis** | CULT: Ritual (Crying children); FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Infections and infestations (Malaria and fever, Leaf) | Camanó Nihi (Ch); Cola de rata (Sp)                                                |
| Wahl                           |                                                                       | ESR 24, GOS 2                                                                      |
| **Vitex cymosa Bert. ex Spreng.** | HUMFOOD: Food (Edible, Fruit)                                          | Tarumá (Sp)                                                                        |
| **Leonia cymosa** Mart.        | FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | Mai Rao (Ch)                                                                        |
| **Rinorea guianensis**         | FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Infections and infestations (Hepatitis, Trunk) | Mai Rao (Ch)                                                                        |
| (Melch.) Ducke                 |                                                                       | CH135                                                                               |
| **Rinoreocarpus ulei**         | CONST: Houses (Muchacho - Ninotí, Trunk); Other constructions (Floor - Machimbre, Trunk); CULT: Recreational (Toys, Seeds); FUEL: Firewood (Firewood - Caro, Trunk); MEDVET: Infections and infestations (Malaria and fever, Bark); Reproductive system and sex health (Abortive, Bark); Skin and subcutaneous tissue (Acne); UTEN&TOOL: Domestic utensils (Furniture, Trunk; Tacú - Arusa timati, Trunk) | Jihui Joxo / Shihuë / Tapa risti / Xoqué xëquëërë (Ch); Blanquillo / Cafesillo / Toco (Sp) |
| (Melch.) Ducke                 |                                                                       | MOV 39, SCO 24                                                                      |
| **Indet. sp. 1**               | FUEL: Firewood (Firewood - Caro, Trunk)                               | Bëpasti (Ch)                                                                        |
| **Vitaceae**                   |                                                                       | CH136                                                                               |
| **Cissus erosa** Rich.         | CONST: Houses (Frame house, Trunk; Hedge - Pané, Trunk; Jihuixaca, Trunk; Roof beam - Canoxoco, Trunk; Tirante - Cano bëpotó, Trunk; To tie house, Bark); FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Diarrhea, Seeds) | Nai Nishi (Ch); Sirari (Sp)                                                        |
| **Cissus sicyoides L.**        | HUMFOOD: Food (Edible, Fruit); MEDVET: Snakebites and Ray stings (Sankebites) | Carabó Coatí (Ch)                                                                  |
| **Vochysiaceae**               |                                                                       | CH138                                                                               |
| **Qualea acuminata** Spruce ex Warm. | CULT: Personal adornment (Ornament - Maxëití, Fruit)                   | Omaca Bëro (Ch)                                                                    |
| **Qualea grandiflora** Mart.   | CONST: Houses (Frame house, Trunk; Jihuixaca, Trunk; To tie house, Bark); HUMFOOD: Food (Edible, Seeds); MEDVET: Skin and subcutaneous tissue (Acne, Seeds) | Almendro (Sp)                                                                       |
| **Qualea paraensis** Ducke     | CONST: Houses (Hedge - Panë, Trunk; Muchacho - Ninoti, Trunk; Pasa ratón - Xoya jabi, Trunk; Ridgopede - Maracatí, Trunk; Roof beam - Canoxoco, Trunk; Tie - Xahui, Bark; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano pixquëna, Trunk; FUEL: Firewood (Firewood - Caro, Trunk); HUMFOOD: Food (Edible, Fruit) | Jihui Sama / Jihui Xoco (Ch); Chocolate / Chocolatillo (Sp) |
| **Qualea sp.**                 | MEDVET: Skin and subcutaneous tissue (Caracha, Bark; Caracha, Root; Puchichi, Bark; Skin infection, Bark) | Métëqué (Ch)                                                                       |
| **Vochysia vismiifolia** Spruce ex Warm. | CONST: Houses (Muchacho - Ninotí, Trunk; Pasa ratón - Xoya jabi, Trunk; Roof beam - Canoxoco, Trunk; Tirante - Cano bëpotó, Trunk; Tirante largo - Cano pixquëna, Trunk); CULT: Other cultural (Crafts, Trunk); HUMFOOD: Food (Edible, Fruit); MEDVET: Digestive system (Stomach ache, Bark) | Canú / Jihui Coshi / Cano (Ch); Cedro (Sp)                                          |

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Table 1 Plant species used by the Chácobo (Continued)

| Family         | Species | Use                                                                 |
|----------------|---------|----------------------------------------------------------------------|
| Zingiberaceae  | Renalema brevissima Poepp. & Endl. | FUEL: Firewood (Caro, Trunk); HUMFOOD: Food ( Edible, Flower); MEDVET: Insect and arthropod bites (Insectbite, Exudate) |
| Roscoe         | Zingiber officinale | HUMFOOD: Food (Edible, Fruit); MEDVET: Cultural diseases and disorders (Bad air and scare - Ratelaina, Root); Dental health (Toothache, Root and trunk); General Ailments with Unspecific Symptoms (Headache, Trunk; Vomit, Whole plant); Skin and subcutaneous tissue (Haemorrhage, Young leaf); Snakebites and Ray stings (Sankebites, Root) |

and linguistic practices [3, 4]. In 1964, Prost managed to buy a territory in the north of the Chácobo’s ancestral lands, forming the community of Alto Ivón, and most of the remaining population moved there. In 1965, the Bolivian government finally assigned 43,000 ha of land to the Chácobo, although this area was less than 10% of their original territory. The influence of the SIL caused profound cultural change among the Chácobo, including the reported abandonment of traditional costume and dances in 1969 [4].

The official indigenous organization of the Chácobo (Central Indígena de la Región Amazónica de Bolivia (CIRABO) estimates a current population of the Chácobo community of about 1000 people (350+ adults), with Alto Ivón as the largest settlement. The current territory of the tribe according to CIRABO encompasses 450,000 ha, and is roughly equivalent to the original extent of the tribe’s ancestral lands (Fig. 1). The elevation of the territory is about 200 m, and much of the vegetation can be classified as humid tropical Amazon rainforest. However, the territory encompasses also large tracts of periodically inundated savannas, dominated by *Mauritiella armata*, and large, drier, savanna areas with forest islands. The average annual temperature is 26.8 °C, with an average annual rainfall of 1560 mm. A distinct dry season lasts from June to November [7]. Today the Chácobo are governed by two indigenous organizations: The Capitanía Mayor Chácobo, closely linked to the evangelists, and the Chácobo—Pacahuara Association, recognized by the Central Indígena de la Región Amazónica de Bolivia (CIRABO), and supported by the Central de Pueblos Indígenas del Beni (CPIB) and the Confederación de Pueblos Indígenas de Bolivia (CIDOB).

Ethnobotanical and botanical collection

Our project explored the current traditional knowledge (TK) on plant use of the Chácobo and Pacahuara in Beni, Bolivia and had three goals: 1) to discover and document current traditional plant knowledge through interviews and surveys, 2) to inventory the current flora of the region, and 3) to repatriate the acquired knowledge as well as previous data to the community.

After obtaining consent from CIRABO, and before starting fieldwork, we conducted a community meeting in May 2013, involving representatives of all 27 villages in the Chácobo Territory, in order to obtain prior informed consent from all communities. This session included the repatriation of the results of previous studies [45–47]. In addition, during the project all available material on Chácobo plant use was translated to Spanish and repatriated [48]. The Chácobo community itself choose 12 local counterparts to be trained as ethnobotanical interviewers and plant collectors. In September 2013 we conducted a two–week workshop on ethnobiological methods and plant collection, training the 12 selected counterparts, 10 of which finally acted as interviewers. Training was conducted directly in the field in the central village of Alto Ivón, and involved theoretical exercises (overview on methodology of interviews, collection and herbarium techniques), as well as extensive practical exercises (structuring and testing of questionnaires, test interviews among the participants, field interviews with local community members, plant collection in the field, preparation of herbarium specimens, plant and artifact collection in the local community, data–basing, and initial data analysis).

From November 2013 to May 2015, Chácobo interviewers collected ethnobotanical information from 301 Chácobo participants (150 women, 151 men, representing almost the entire adult Chácobo population), and over 1500 plant samples were collected. Prior to starting the interviews, every interviewer obtained prior oral informed consent from each participant. Chácobo participants were divided into five age classes (18–30 years old: 58 men, 52 women; 31–40 years old: 31 men, 36 women; 41–50 years old: 35 men, 36 women; 51–60 years old: 15 men, 7 women; and >60 years old: 12 men, 19 women). Because the study attempted to interview the whole adult Chácobo population, there was originally no emphasis on achieving a balanced age or gender distribution. All interviews were conducted at the homes of the participants by asking participants to freelist their plant knowledge following [49]. All plant uses were categorized following [49]. All interviews were preferably...
conducted in Chácobo. In a few cases where participants were not fully fluent in Chácobo, interviewers used Spanish as common language. The plant material was collected under permission from the Ministry of Environment and Water of the Plurinational State of Bolivia, and was identified and deposited at the National Herbarium of Bolivia (LPB) under the collection numbers of the Chácobo collectors. Nomenclature follows www.TROPICOS.org. Use descriptions were coded after the fact into subcategories and, for some analyses, into six major categories: fodder, fuel, medical, cultural, construction, tool, and food.

All work was carried out following the International Society for Ethnobiology Code of Ethics [50], and under the framework provided by the Nagoya Protocol on Access to Genetic Resources and Fair and equitable sharing of benefits arising from their use of the Convention on Biological Diversity, the Chácobo community retains the copyright of the traditional knowledge of all informants. Any commercial use of any of the information requires prior consensus with informants and communities, and an agreement on the distribution of benefits.

Data analysis
The total number of unique species reported and unique uses reported for each use category were compared across communities, genders, and age groups (16–30, 31–40, 41–50, 51–60, and 61–82) for 292 informants (dropping for this analysis 8 informants for whom age was not indicated).

To gain a more nuanced look at how these qualities affected not only the number of reports but which species or uses were reported, we ordered informants using non–metric multi–dimensional scaling on distance matrices for plants and uses, and tested how well vectors (age) and factors (gender, ethnicity, community) fit the location of informants in the ordination, using the R package vegan [51]. We used similar methods with plant family fit onto an ordination from distance matrices of plant–use combinations to test whether plant family explains the uses to which plants are put.

We used Indicator Value [52], as implemented in the R package labdsv [53] to combine occurrence frequency and mean abundance of species and uses to elucidate species and uses that had higher fidelity to and/or relative abundance in certain age groups or genders. For this analysis, the $P$ value is the probability of finding an equally high indicator value in random permutations. Species with significantly high indicator values had higher fidelity and relative abundance in certain age groups / genders (were ‘indicators’). We

![Fig. 2](image-url)
Fig. 3 Number of uses (a) and species (b) reported per interview reported in each use category for each age group (N: 16–30 = 110, 31–40 = 65, 41–50 = 68, 51–60 = 25, 61–81 = 24)

Fig. 4 Number of uses (a) and species (b) reported per interview in each use category for men (N = 154) and women (N = 138)
further compared age and gender groups by informant consensus factor (ICF) for each use category, calculated as the number of use reports minus the number of taxa over the number of use reports minus one: \((N_{ur} - N_{t})/(N_{ur} - 1)\). We also measured consensus on species uses by quantifying what proportion of each species’ mentions fall within a specific use category.

Plant species and plant family importance was ranked by four metrics: Community and Informant Cultural Importance (Clcom/Clinf) — the sum within species across all plant–uses of the number of informants (for Clinf) or communities (for Clcom) reporting a plant–use over the number of informants/communities reporting the plant; Diversity of Uses (Du) — the Shannon Index of uses [51]; and Use Value (UV), the number of reports of a species over total number of informants asked in a region [54].

To test whether greater knowledge of Chácobo language was associated with a more similar set of knowledge and/or a larger knowledge set of plants and uses, we used the ordination based on uses to examine whether interviewees who reported more Chácobo names tended to report a more similar set of uses, and used linear regression to test whether the number of Chácobo names reported was significantly greater for those who reported more species or more uses.

Results
The availability of previous field data gives the unique opportunity to study the long–term change in knowledge of an indigenous group in the age of globalization. Our study found 331 useful plant species in 241 genera of 95 plant families, with leaves, roots and bark being the most commonly used plant parts (Table 1).

The larger Chácobo communities showed very similar patterns in the number of species used, with differences within communities usually greater than between, although Nueva Unión stood out in reporting more food species (Fig 2a). Likewise, all communities were similar in plant–uses (use descriptions for a species within each use category), although in this case Nueva Unión reported fewer use descriptions within the Utensils and tools and Cultural categories, while Motacuzal and Alto Ivón reported more medical uses (Fig. 2b). Within these categories, number of species and uses was fairly consistent across age groups, though we observed a trend for some categories of more species and uses known with

![Fig. 5](image-url) Reports by community for plant species (a) and uses (b)
increasing age. The age group between 51 and 60 years (i.e. the first age group growing up under missionary rule), showed a slightly lower knowledge, especially evident in the medical and cultural categories but also in food plants (Fig. 3). These metrics are also quite similar across gender, although across most categories the average number of species and uses reported by women was slightly higher (Fig. 4).

Who uses what and how?

Despite the similarities among communities in total species and uses reported, we found that informant community significantly influenced both which plants and which uses individual informants reported (Table 2 a&b). In contrast, and in accord with the results above, age and gender did not significantly influence either. Ethnicity of the participants influenced which plant species they used, but did not explain what they were used for. Given the very low r^2 values, it is clear that much variety in uses was not explained by any demographic and environmental variables explored (Table 2 a&b). In the ordination, we can see this effect more clearly: although there was much overlap, the communities clearly structure which plants were reported. This difference was however much driven by the reports Nueva Unión (Fig. 5).

While age did not in itself explain the ordination well, we did find certain plants to be associated with age categories. In this we found no indicator plants or uses among the first three age groups (16–30, 31–40, 41–50), which suggests to some extent that plants and uses reported by these groups are less distinct than that of the second two age groups (51–60, >60). The 51–60 age group was associated with Styrax sp., Iryanthera juruensis, Xylopia ligustrifolia, Hirtella pilosissima, Inga sp. 1, and Piper nigrisipum, while the >60 group was indicated by Gustavia hexapetala, Astrocarum aculeatum, Phenakospermum guianensis, Attalea phalerata, Apuleia leiocarpa, Bixa orellana, Han-cornia spectosa, Zingiber officinale, and Eriotheca sp. Like-wise, the use subcategory Firewood was associated with the 51–60 age group while the medicinal use subcategories: Skin and subcutaneous tissue, Sensory system, Respiratory system and Muscu-lo–skeletal system all were associated with the >60 age group.

Likewise, although gender did not fit to the overall ordinations, there was a large number of plants...
associated with female, and a much smaller one with male respondents (Table 3).

Interestingly, all indicator uses were exclusively associated with women (Table 4).

Informant consensus factors (ICF)
Looking at specific use categories we found broadly similar trends across age categories and genders: tool, construction and food uses usually had the most use reports. We found a lower number of medicinal use reports, although the same number of respondents reported medicinal uses. Food uses consistently had less ICF than tool and construction uses, and medicinal uses even less. Cultural uses, while often reported by fewer informants and with fewer uses, show disproportionately high ICF (Table 5).

Plant relative importance metrics did show a different picture underlining the problems of using diversity indices. The Cultural Importance Index yielded wildly different species sets for Community and Individuals, and both Use Value Index and Use−diversity Index again yielded different sets as species as most important (Table 6).

Because the Cultural Importance Index tends to prioritize species with few informants, we highlighted the species that had both high index values in general, and also a large number of reports to elucidate species that were of high importance in all indices. As result, *Visnia macrophylla*, *Xylopia peruviana*, *Attalea phalerata*, *Gossypium barbadense*, *Attalea maripa* and *Phenakospermum guianensis* were elucidated as the most important species in the daily life of the Chácobo community (Fig. 6). Overall, however, informant consensus was very high in across all age groups and across all use categories (Fig. 7). Arecaceae, Fabaceae, Malvaceae and Rubiaceae were found to be the most important plant families used across most indices, although Moraceae did yield a higher ranking in Use Value (Table 7).

Results also indicated that qualities of plants did to a certain extent explain which uses they were put to. A large number of plant families had specifically Medicinal uses, while other sets of plant families were specifically

| Table 4 Indicator uses and gender association |
|-----------------------------------------------|
| Use subcategory | gender | indicator value | probability |
|------------------|--------|------------------|-------------|
| Domestic utensils | f      | 0.53             | 0.01        |
| Personal adornment | f      | 0.51             | 0.00        |
| Other fuel       | f      | 0.44             | 0.02        |
| Clothes & accessories | f   | 0.43             | 0.01        |
| Skin and subcutaneous tissue | f   | 0.42             | 0.00        |
| Snakebites and Ray stings | f | 0.28             | 0.01        |
| Dental health    | f      | 0.27             | 0.02        |
| Cultural diseases and disorders | f | 0.25             | 0.00        |
| Insect and arthropod bites | f | 0.24             | 0.02        |
| Endocrine system | f      | 0.24             | 0.04        |

| Table 5 Who uses what, and how: informant consensus factor |
|----------------------------------------------------------|
| age gender Nur use reports | informants species mean ICF across use categories ICF sd across use categories |
|-----------------------------|-----------------|-------------------|-------------------|------------------|
| 16–30 male 3517 55 | 213 0.90 0.06 |
| 16–30 female 3571 44 | 188 0.92 0.04 |
| 31–40 male 1834 29 | 181 0.83 0.07 |
| 31–40 female 2529 31 | 176 0.89 0.06 |
| 41–50 male 2314 32 | 192 0.86 0.06 |
| 41–50 female 2317 31 | 180 0.88 0.06 |
| 51–60 male 1146 15 | 167 0.77 0.10 |
| 51–60 female 562 8 | 123 0.68 0.12 |
| 61–82 male 747 10 | 142 0.72 0.13 |
| 61–82 female 1150 14 | 147 0.80 0.09 |

| Table 6 Plant importance metrics |
|---------------------------------|
| Top species by CIcom CIcom UV CIinf Du |
|---------------------------------|
| Euterpe precatoria 4.78 1.37 1.89 1.97 |
| Gossypium barbadense 3.86 2.54 1.98 1.26 |
| Attalea phalerata 3.82 2.64 2.14 1.48 |
| Xylopia peruviana 3.77 2.97 2.12 1.23 |
| Phenakospermum guianensis 3.76 1.77 1.76 1.60 |
| Top species by UV UV CIcom CIinf Du |
|---------------------------------|
| Visnia macrophylla 4.20 2.73 1.55 0.59 |
| Xylopia peruviana 2.97 3.77 2.12 1.23 |
| Attalea phalerata 2.64 3.82 2.14 1.48 |
| Gossypium barbadense 2.54 3.86 1.98 1.26 |
| Bactris gasipaes 2.50 1.91 1.24 0.39 |
| Astrocaryum aculeatum 2.28 2.96 1.44 1.02 |
| Attalea maripa 1.96 3.33 1.87 1.46 |
| Gynernium sagittatum 1.95 2.41 1.57 0.87 |
| Phenakospermum guianensis 1.77 3.76 1.76 1.60 |
| Licania octandra subsp. pallida 1.73 1.81 1.25 0.45 |
| Top species by Du Du CIcom CIinf UV |
|---------------------------------|
| Cedrela fissilis 2.10 3.17 1.24 0.16 |
| Citrus aurantifolia 2.05 2.40 1.06 0.13 |
| Croton sp. 1 2.02 1.57 1.10 0.04 |
| Jatropha gossypifolia 2.00 2.17 1.64 0.08 |
| Euterpe precatoria 1.97 4.78 1.89 1.37 |
| Hymenaea courbaril 1.82 3.00 1.17 0.32 |
| Top species by CIinf CIinf CIcom UV Du |
|---------------------------------|
| Piper peltatum 3.00 3.00 0.01 1.10 |
| Attalea phalerata 2.14 3.82 2.64 1.48 |
| Xylopia peruviana 2.12 3.77 2.97 1.23 |

Most important species in each index in bold
Fig. 6 Species sized by number of reports (Npr) plotted against four metrics of importance: Community Cultural Importance (a), Informant Cultural Importance (b), Use Value (c), and Diversity of Uses (d). The most important species (top right quadrant) are labelled with their names, and the six shared across all four metrics are numbered.

Fig. 7 Informant consensus factor (ICF) for each use category, among male and female respondents of each age group. Points are sized by the number of use reports (UR) per respondent.
used for Food, Utensils and tools, and Construction. Not surprisingly, data also revealed that plant families with high importance in all indices calculated (Arecaceae, Fabaceae, Malvaceae and Rubiaceae) had uses in all categories (Fig. 8).

Different use categories also had different levels of fidelity in the species that were reported for them. For instance, relatively few mentions in the construction and tool categories were of species that are uniquely associated with those categories. In contrast, a much greater proportion of mentions for medical uses were of species that were only used for medical uses. This pattern was also true of food plants (Fig. 9).

Does language influence use knowledge?
Intervieewees who reported more Chácobo names did indeed tend to report more similar sets of knowledge, and knew more species and uses (Fig. 10). In addition, the number of plants or number of uses reported strongly increased with the number of Chácobo names participants knew (Fig. 11). Although in some degree this was a feature of the study (there was no way to informants to report more names than species), it was clear that very few of those participants with great knowledge of species or uses failed to report a large number of Chácobo names.

Discussion
While other studies found indecisive patterns of the influence of age, or accessibility to markets on traditional knowledge (negative [17, 23, 44, 55]; positive [25, 56, 57]), our study did not reveal any pattern that would link differences in plant–use knowledge to age or accessibility of a location, but simply to specific location and associated flora in each of the communities. In most communities the contact with nature still remains vital to the acquisition of knowledge [58, 59], and the facility to observe and identify the useful plants clearly adds to this.

The observation that local and indigenous languages often package rich traditional ecological knowledge has led to the question in many studies of whether indigenous language abilities influence plant knowledge, i.e. if native language speakers have a higher knowledge than participants only speaking a mainstream language [44, 60]. In our study, the link between language proficiency and other metrics of traditional knowledge (plants and uses reported) does support at least the correlation of these variables, and suggest the possibility of simultaneous language and knowledge retention (or erosion).

The general trend found in relation to the difference in intergenerational knowledge suggests that any patterns are most likely a result of both knowledge transmission, as well as in situ learning, and be related to the time during which people acquire and use knowledge, with the older informants taking more responsibility in their households, who have a need to learn and apply their knowledge [27, 54, 61]. The knowledge of older people might not have been affected by the need to find new subsistence activities, and was thus

| Table 7 What is used? (plant relative importance metrics by family) |
|---------------------------------|
| Family | CIinf | CIcom | UV | Du |
|--------|-------|-------|----|----|
| Arecaceae | 5.1  | 8.7  | 14.5 | 1.9 |
| Fabaceae | 3.4  | 6.9  | 5.0  | 2.0 |
| Malvaceae | 3.1  | 6.9  | 5.0  | 1.9 |
| Rubiaceae | 3.0  | 6.4  | 2.9  | 2.3 |
| Poaceae | 2.5  | 5.5  | 3.9  | 1.6 |
| Moraceae | 2.5  | 4.8  | 5.1  | 1.3 |
| Annonaceae | 2.3  | 4.1  | 3.5  | 1.4 |
| Chrysobalanaceae | 1.9  | 3.4  | 2.6  | 1.2 |
| Euphorbiaceae | 1.9  | 4.4  | 2.0  | 1.9 |
| Strelitziaceae | 1.8  | 3.8  | 1.8  | 1.6 |
| Apocynaceae | 1.7  | 3.4  | 1.2  | 1.9 |
| Taliparitiaceae | 1.7  | 2.0  | 0.0  | 1.3 |
| Lecythidaceae | 1.6  | 3.8  | 1.6  | 1.3 |
| Urticaceae | 1.6  | 3.2  | 1.2  | 1.4 |
| Hypericaceae | 1.6  | 2.7  | 4.2  | 0.6 |
| Bignoniaceae | 1.5  | 3.4  | 1.2  | 1.8 |
| Caryocaraceae | 1.5  | 1.5  | 0.0  | 1.1 |
| Sapotaceae | 1.4  | 2.2  | 1.0  | 1.0 |
| Simaroubaceae | 1.3  | 2.0  | 0.2  | 1.3 |
| Rutaceae | 1.3  | 3.2  | 1.1  | 1.7 |
| Anacardiaceae | 1.3  | 3.1  | 0.8  | 1.3 |
| Meliaceae | 1.2  | 3.2  | 0.2  | 2.1 |
| Costaceae | 1.2  | 2.3  | 0.3  | 1.5 |
| Lamiaceae | 1.2  | 2.6  | 0.3  | 1.3 |
| Aristolochiaceae | 1.2  | 2.0  | 0.2  | 1.1 |
| Verbenaceae | 1.2  | 2.3  | 0.4  | 1.6 |
| Piperaceae | 1.2  | 2.1  | 0.4  | 1.0 |
| Burseraceae | 1.2  | 1.4  | 0.1  | 0.5 |
| Melastomataceae | 1.2  | 1.7  | 0.6  | 0.7 |
| Myrsinaceae | 1.2  | 1.7  | 0.2  | 1.1 |
| Solanaceae | 1.1  | 2.4  | 0.3  | 1.4 |
| Sapindaceae | 1.1  | 1.8  | 0.5  | 0.7 |
| Flacourtiaaceae | 1.1  | 1.3  | 0.1  | 0.9 |
| Cyperaceae | 1.1  | 1.9  | 0.2  | 0.9 |
| Crassulaceae | 1.1  | 1.6  | 0.2  | 0.5 |
| Zingiberaceae | 1.1  | 1.6  | 0.1  | 1.3 |
| Malpighiaceae | 1.1  | 1.3  | 0.0  | 1.2 |
| Amaryllidaceae | 1.1  | 1.8  | 0.0  | 1.9 |

Most important species in each index in bold
preserved without external influence [62]. The fact that the only generation that did show decrease of traditional knowledge (albeit slight) was the generation of 41–50-year old participants, who had grown up under restrictive missionary rule, is noteworthy.

The hypothesis that people who are relatively isolated from the market economy share more traditional knowledge than people who live close to cities or larger towns [25], was not met in our study, because in most places the contact to nature still remains vital to the acquisition of knowledge [58, 59]. The predominance of the use for Human food in the more widely shared knowledge can be explained as a long and constant learning process that begins in early childhood, and is common in the more remote locations [26, 54].

There is no doubt that Chácobo daily life has changed in the course of the last century. Early accounts of the Chácobo all indicate the wide use of bark-cloth, and little enthusiasm for the rather conservative clothing style which missionaries tried to introduce [2, 5]. Boom [7] mentions however the complete disappearance of this custom. However, while the Chácobo use western style clothing available in the markets of Riberalta, traditional bark cloth is still widely used for cultural purposes, and most participants knew how to make it.

Changes in the use of traditional implements were very subtle. Most households still use large pounding tubs, as well as the large wooden boards used to pound food, which have not changed over time. Large clay pans for roasting jibe (*Manihot* flour), and smaller ceramic pots are also widely used. Even little stools from the petioles of *Mauritia flexuosa* and balsa wood (*Ochroma* sp.), first documented by Nordenskjöld [1] are still found in many houses, although they were completely missed in all previous studies. The production of burden baskets has not changed since [1], and the same species are still used today. However, only a few older women in the communities still have the skills to weave baskets, and modern implements like backpacks are clearly replacing traditional materials. Similarly, canoes are still a n important means of transportation. However, while Nordenskjöld, Haenke and Kelm described canoes made from bark [1, 2, 5], the modern variety is made of hollowed out tree trunks, which is already indicated in [7]. House construction and roofing have however not changed much in the last 100 years. Bows and arrows are still maintained as...
hunting implements, especially for fishing, and all arrow types found in previous studies are still used among the population, although 22 caliber rifles and 20 gauge shotguns are favored for hunting.

Based on previous reports, we originally hypothesized that many household artifacts as well as traditional clothing had disappeared from Chácobo life. Many of these artifacts were mentioned in the 1922–1970 accounts, but not in later studies. Boom [7] and Bergeron [8] in particular indicate that traditional tools and clothing had disappeared. This turned out to be an interview artifact. Early anthropologists, who focused on Chácobo daily life [2, 5], while Boom and Bergeron focused only on plants collected from one 1 ha forest plot [7, 8]. Our combined study indicates that in fact most artifacts of the Chácobo are still known, and also used, by a large part of the population. This includes traditional clothing that is still being prepared and used on important occasions, as well as hunting and household implements. In daily life however, no traditional clothing and ornaments are found anymore, and the large monkey tooth breast–plates mentioned by [1] and [2] have indeed disappeared.

In case of food, market access has indeed had an influence in Chácobo life. In the 1980’s cassava (Manihot esculenta, Euphorbiaceae) was clearly the most important food for Chácobo, and seven varieties were planted (Boom 1987). Maize (Zea mays), was planted on 18% of the land, and upland rice (Oryza sativa) was only planted on 7% of the land [7]. Nowadays rice has become the staple food of the Chácobo, leaving cassava and maize in a more secondary role. However, all original traditional maize and cassava varieties, as well as traditional banana varieties, are still grown. In our work we also found all edible species mentioned by Boom (1987) as planted in home– and forest–gardens, but the Chácobo had incorporated many additional species, e.g. lemon (Citrus sinensis, Rutaceae) in home gardens, and Psidium, Myrica sp. and Eugenia sp. in the forest gardens. One noteworthy exception was the palm Huanimá (Bactris gasipaes var. chichagui, Arecaceae), actively sown formerly in abandoned clearings to collect palm fruits [7]. In 2015 the palm was only found rarely around the villages, and was no longer planted.

The Chácobo keep using a large number of plants for medicinal purposes although missionaries of the Summer Institute of Linguistics tried to eradicate traditional medicinal plant use and traditional agricultural practices, because they regarded this as pagan [4]. Early anthropological and missionary accounts mentioned hardly any medicinal species [2, 4, 5], but this was clearly an interview artifact. Of the 360 plant species collected by Boom, 174 species were of medicinal value [7]. Bergeron recorded 399 useful plant species, of which 166 were classified as medicinal [8]. This compares favorably to the over 331 useful plant species elucidated in the current study. The Chácobo still favor the preparation of remedies by boiling the leaves, bark or fruits to cure diseases. While Boom did not find a true “healer” among the Chácobo [7], several Chácobo healers were identified in the present study. The knowledge of medicinal plants was particularly alive among older informants interviewed, but younger participants still retained much of such knowledge. The use of plant poisons, especially for fishing was mentioned as highly important by [7], and is still practiced today.

One of the most profound changes in Chácobo life seems to be a return to nomadic patterns, now mostly linked to commerce and income generation. The production of oil from the seeds of Brazil nuts (Bertholletia excels) was reported by Boom [7], but is little practiced nowadays – all nuts are now sold to large companies in Riberalta. The Brazil nut harvest takes place from January and March, and during that time now almost the entire Chácobo population migrates to the South of the territory where the largest concentration of Bertholletia is encountered. During the rest of the year Alto Ivón remains the main population center. However,
many Chácobo have “second” homes in Tokyo, where most of the fields are located at present, or in Triangulo, closer to their main fishing sources, and conveniently located at the road to Riberalta.

Conclusions
In this paper we illustrate the complexity of perspectives on knowledge at different ages, and the persistence of knowledge over almost a century. We found that traditional knowledge was only partially affected by the processes of exposure to a market economy, and that different knowledge domains experienced different trends as a result of these changes. Overall knowledge was widely distributed, similar to [63]. However, we did not observe a directional knowledge loss, contrasting [64].

We stress the importance to not directly conclude processes of knowledge loss, cultural erosion or acculturation when comparing the knowledge of different age groups. These results should be treated with caution, because they cannot rule out the role of other variables affecting knowledge, including changes in the composition of other important factors that might be affected by the influence of access to a market.
economy. It is important to remember that learning, and accumulating experiences, require time. For this reason, the alternative explanation that the knowledge of older people tends to have accumulated over time, compared to the younger generation, should also be considered. It also needs to be taken into account that older generations might have different perceptions of their environment, because their points of reference are different from those of younger people. The ability to generate and apply knowledge in human populations enables actions and adjustments in response to current and future changes. Similarly, the ability to generate and apply knowledge, and not the knowledge itself, helps to increase the resilience of socio-ecological systems.

The analysis presented here clearly suggests that perceived knowledge “loss” might easily be an artifact of the researcher’s presence, of limited time, and of a very limited number of participants. Training local interviewers provides an excellent tool yield more reliable information on traditional knowledge and its potential loss in the future.

In compliance with the Nagoya Protocol, the original field notebooks, as well as the complete dataset, and a guide on useful plants of the Chácobo was repatriated to the Chácobo [65]. All members of the tribe have access to the compiled interview data for purposes of learning and education. The data collected are a valuable resource to the community as a tool to preserve their traditional knowledge, and will encourage the launch of research projects and community activities so the information does not become static. Species identified as being most important to the community can be targeted for conservation and restoration activities.

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Availability of data and materials
The raw data contain the names of all participants, and cannot be shared publicly. Data without participant data can be obtained upon request after an access and benefit sharing agreement agreement with CIRABO.

Authors’ contributions
NYPZ and RBU designed the study; NYPZ, RBU, ALHM, GOS, MOV, DOA, JSM, MSM, SC, BCM, GCM and ES conducted the fieldwork; ALMH curated and identified the collections and entered the original data; NYPZ and RBU analyzed the data and NYPZ, RBU and NPZ wrote the manuscript; REH conducted the statistical analysis; all authors read, corrected and approved the manuscript.

Ethics approval and consent to participate
Before conducting interviews, both the permission of CIRABO, and individual prior informed consent was obtained from all participants. No further ethics approval was required. All work conducted was carried out under the stipulations of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity. The right to use and authorship of any traditional knowledge of all participants is maintained, and any use of this information, other than for scientific publication, does require additional prior consent of the traditional owners, as well as a consensus on access to benefits resulting from subsequent use.

Consent for publication
This manuscript does not contain any individual person’s data and further consent for publication is not required.

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