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Biology and Human Use of Leopoldinia piassaba

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The diversity of ways in which people employ palm products is often astounding. This is certainly true in the upper Río Negro and Orinoco drainages of Venezuela, Brazil, and Colombia (Fig. 1), where one of the most versatile and economically valuable species is *Leopoldinia piassaba* Wallace. Naturalists long ago made note of this unusual palm (Wallace, 1853; Spruce, 1860) but little about its biology has been reported.

The genus *Leopoldinia* Mart. (named by Martius in 1824 to honor Leopoldina, Empress of Brazil) contains four de-

1. Map of South America with detailed inset showing distribution of *Leopoldinia piassaba*.

scribed species, all of which are limited to the Río Negro and Upper Orinoco regions of north-central South America. The species that has attracted the most attention from biologists is *L. piassaba*. A mature *L. piassaba* tree exceeds 10 m in height and supports a crown of about 25 leaves. Excavation of several individuals revealed that the stem first grows horizontally along the ground before growing upright and roots arise along the horizontal portion. The leaves are approximately 4 m long, including a leaf sheath 0.3 m long, 1.5 m of petiole, and 2.2 m of rachis with pinnae. The sheath of each leaf is fringed by a beard of fibrovascular bundles. Strands in this beard are initially fused into ribbons 3 cm wide but in time shred into individual strands 1.5 m long. The bearded leaf sheaths are persistent and clothe the entire stem of all but the tallest individuals. The shaggy brown, bearded masses of half-grown trunks have been likened to the appearance of rampant bears. The palms are truly an impressive sight, growing as they do in nearly pure stands up to several hectares in extent in secluded parts of dense forest. Sunlight filtering through the interlacing crowns in these palm groves takes on unusual, almost preternatural qualities (the author claims no objectivity in making this observation).

Leopoldinia piassaba displays a distribution pattern that intrigued Wallace (1853) and is as yet unexplained. The species is mainly limited to sandy soils associated with black-water rivers, soils of which are extremely poor in plant nutrients. There are, however, populations in drainage basins of white-water rivers (which carry higher sediment loads and correspondingly more nutrients) adjoining the Casiquiare (Fig. 1). Trees are generally found in scattered patches far from rivers but always seem to be in areas subject to flooding by seasonally high waters. Stands of *L. piassaba* are found along tributaries of the Río Negro as far south as the Padauiri River, some 1000 km above Manaus, Brazil. The Río Negro itself and many of its tributaries lack this species until much farther upstream in the area near the Venezuelan border. From this point upward to the source of the Río Negro, *L. piassaba* is abundant. Populations are also found in the upper reaches of the Orinoco drainage.

The palm is used in a great variety of ways, but outside the area where it is native, it is best known for the fibers it produces. The common name for the species in the Lingoa Geral of Brazil is *piassába* (in Venezuela it is known by its Barre name *chíquechíque*). Unfortunately the Brazilian name is also used for an array of palm fibers, including those from *Attalea funifera* Mart. as well as *Leopoldinia piassaba*. Here only products of the latter species will be considered. These are sometimes called *Pará piassába* in contrast to *Bahia piassába* which refers to *A. funifera*.

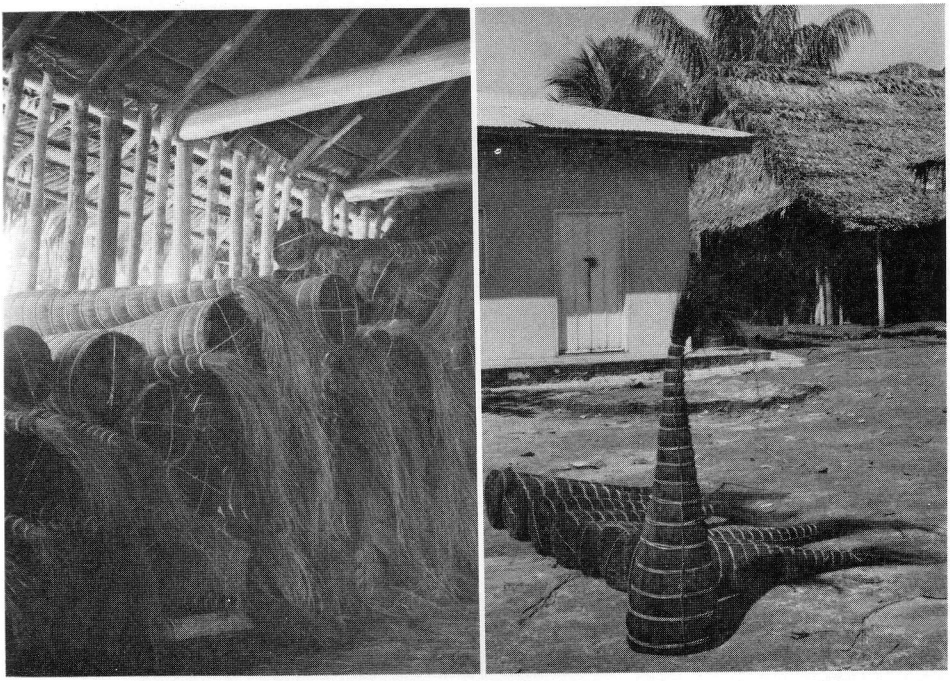
Leopoldinia piassaba is not cultivated, fibers being collected from natural stands. Before cutting, the tangle of fibers is first straightened (Fig. 2). To accomplish this a tree sapling is prepared as a bat. The fibrous mass is then beaten until the fibers are untangled and hang down freely. Resident snakes, rats, birds, insects, and other creatures living in the fibers retreat from the beating, which thus serves two important purposes. Only fibers less than approximately five years old and borne 15 cm or less down from the lowest living leaf are used because older ones become brittle and hard to work. If a tree hasn't been divested of its fibrous mantle in more than five years, a band of the old fibers below the ones being collected is removed to ease straightening operations. Once straight, the fibers are

2. An untrimmed *Leopoldinia piassaba* tree, San Carlos de Río Negro, Venezuela.

3. Fibers fringing leaf sheaths being cut with a small knife, Solano (on the Casiquiare), Venezuela.

cut near the trunk with a short-bladed knife (Fig. 3). Handfuls of these meter-and-a-half long fibers are neatly stacked on a cleared piece of ground. When a sufficient pile has accumulated, the fibers are lashed together near their base into a bundle referred to as a *bahote*. Later these *bahotes* are lashed together into the familiar cone-shaped bundles of commerce (Fig. 4). Split aerial roots of epiphytic aroids called *mamure* are used for lashing. The bundles are then carried to the nearest stream and henceforth transported by dugout canoe. Fibers are sold by the cutters for approximately $0.10 U.S./kg, but the price depends on fiber quality (age) and apparently fluctuates considerably from year to year.

Because fiber cutting does nothing to

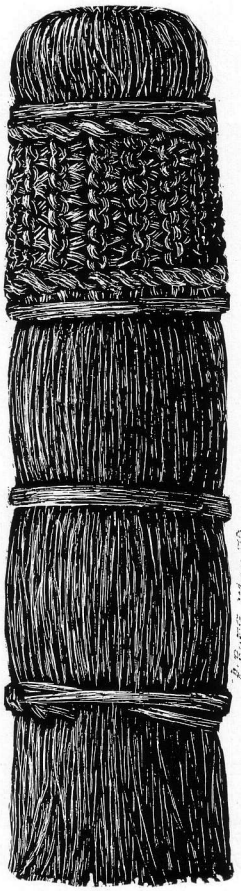


4. Fibers are lashed together into bundles for transportation, Boca Casiquiare, Colombia.

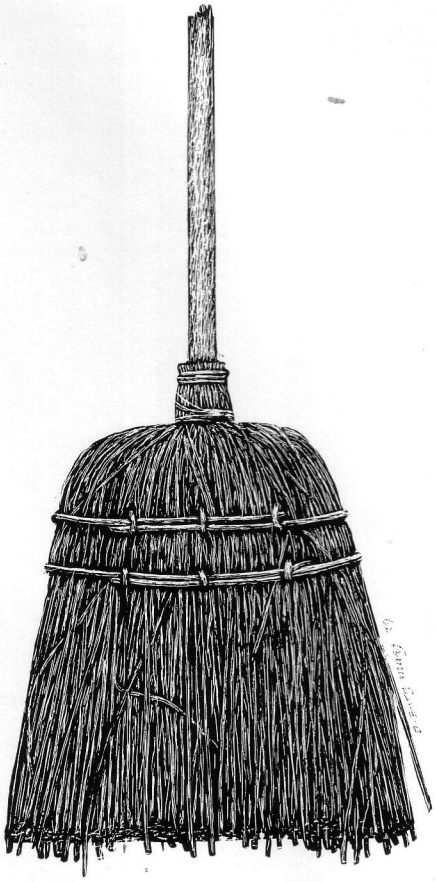
damage the terminal bud, sustained yield of fiber is guaranteed. A mature tree produces approximately 1 kg of fiber per year but cutting is generally delayed for two or three years. Only a few minutes are required to collect the fibers from a tree: one man can harvest 25 or 30 trees in a day. When demand for fibers and leaves is high, trees too tall for the usual collecting operations are cut down. Generally there are sufficient small individuals around to replace the cut mature palms. Cutting of dicotyledenous saplings for fiber bats also reduces competition and serves in time to increase the growing stock of palms.

Fibers from *L. piassaba* are used in making strong and light ropes called *mecate* that are particularly well suited to marine use because they are durable and float. The fibers are light in weight, rough-surfaced, and twist easily into cables. Rope making in this region resembles a maypole dance: generally six men take part, each twisting together his own strand of fibers while threading his way through the strands of his associates. Prices of standard lengths are determined by the rope's diameter, which can exceed 15 cm.

In addition to their use in rope making, fibers of *L. piassaba* are extensively used in broom (*escobar*) manufacture. Two styles of broom are made locally: the first style (Fig. 5) is entirely hand made, while elaborate machines are employed in assembling the second style (Fig. 6). Machines in the broom "factory" in Solano, Venezuela (on the Casiquiare) are constructed of spare parts from bicycles and automobiles with a liberal assortment of parts from unidentifiable sources. When in full operation, the whir, clang, buzz, and twang of the machines amidst the flying fibers would have made Rube Goldberg proud.



5. A small handmade broom from fibers of *Leopoldinia piassaba*.



6. A broom made in the "factory" at Solano, Venezuela.

Where available, fronds of *L. piassaba* are the preferred roofing material. The leaves are unarmed and thus easy to handle, and are extremely durable: a roof of *L. piassaba* lasts for 15 to 20 years in an area receiving more than 2000 mm of rain per year. In town, galvanized aluminum sheeting is slowly replacing palm thatch as the major roofing material even though thatched houses are much cooler and make no deafening din during the frequent tropical cloudbursts. Part of the reason for this change may be governmental urging for abandonment of thatch as a measure to control the reduvid bug that carries Chagas disease and hides in palm roofs during daylight hours.

Cutting of fronds for roofing proceeds during the week of the full moon. It is believed that fronds cut at any other time of the month are full of water and subject to rapid deterioration. A tree is never left with less than four mature or maturing leaves. Trees with fewer than four leaves are thought not to recover from removal of their other leaves. Cut fronds are woven into bundles of 12 to 18 fronds apiece (Fig. 7). The number of fronds in a bundle has superstitious

7. Bundles of *Leopoldinia piassaba* leaves and the house frame to which they are to be lashed, Río Negro, Venezuela.

significance; but, everyone interviewed specified a different propitious number of leaves.

Upon reaching the home site, the bundles are opened and the fronds spread and lashed down three or four fronds thick on slender roof beams. Unlike palm roof construction in other parts of the world, pinnae are not woven together or manipulated in any particular way. Fronds are simply piled thick enough to prevent rain from entering while still allowing smoke from cooking fires to filter out from inside the house.

Small groves of *L. piassaba* trees found near houses and villages often have resulted from seeds discarded after preparation of a *refresco* or refreshing drink from the fruits. Flesh of the fruits is thin and removed by soaking and agitating in water. The resulting much-relished liquid bears (with some imagination) "great resemblance to cream both in colour and taste" (Spruce, 1860).

Thus, *L. piassaba* is employed for its fibers, fronds, and its fruits. When a house needs a new roof the residents go into the forest and cut the necessary fronds. Nearly everyone enjoys the drink prepared from *L. piassaba* fruits and participates in its preparation. Fiber cutting on the other hand is a trade practiced by only a few people. The industry itself has waxed and waned during the last few decades. At present, fiber prices are reasonably good and many people are cutting, but when alternative employment is available fiber cutters readily abandon their trade. This may be due to the hard work and low pay, but no one seems particularly to like cutting fibers no matter what the pay. Fiber cutting is especially avoided during months of high water (July–August) when a greater-than-usual assemblage of terrestrial animals, sometimes dangerous ones, seeks refuge in the fibers. Dangers are real enough and probably underlie myths about *curupira*, the evil spirit inhabiting *L. piassaba* groves (Schultes, 1974). Regardless of the hardships and dangers involved in fiber cutting, the trade lives on wherever this unusual palm grows.

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PALM BRIEFS

Sommieria affinis (Palmae) in Papua New Guinea

Sommieria is a clinostigmatoid genus of three species confined to the western part of New Guinea. Until recently, the genus was not known to occur east of Mamberamo, the type locality for *Sommieria affinis*, in West Irian. In 1975, however, a specimen agreeing with this species was collected at Pagei, in the West Sepik District of Papua New Guinea (*K. J. White P/1*, January 1975, specimen at LAE). This is significant as more than just a range extension. It means that this rare and unusual palm genus is accessible from Papua New Guinea, where botanists can work more freely than they presently can in West Irian. The specimen was marked as voucher for a seed collection, but it is not known whether seedlings have been established anywhere in cultivation.