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Raphia taedigera in the Amazon Estuary

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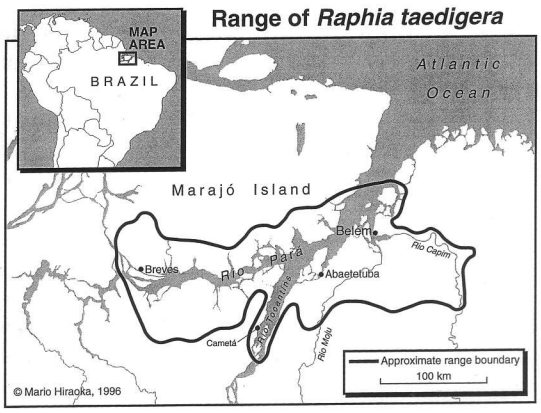
Of the 28 species of the genus *Raphia*, all are confined to Africa with the exception of *Raphia taedigera*, which occurs in tropical America (Uhl and Dransfield 1987). It occupies a disjunct distribution in inundated riverine habitats of Central America (Nicaragua, Costa Rica, Panama) as well as in the estuaries of the Atrato and Amazon rivers of Colombia and Brazil (Bailey 1935, Allen 1965a, Henderson 1995) (Fig. 1). Scientific research on *R. taedigera* has focused on three principal concerns: (1) the palm's biogeographic distribution in tropical America (Allen 1965b, Moore 1973, Uhl and Dransfield 1987); (2) ecological studies of *Raphia* in specific localities (Bailey 1935; Allen 1965a; Anderson and Mori 1967; Myers 1981, 1984; Devall and Kiester 1987); and (3) whether *R. taedigera* is indigenous to the Americas or an historically recent introduction (Otedoh 1977, Gentry 1993, Urquhart, in press). Yet, no research to date addresses the role of *Raphia* in wider cultural and socio-economic systems, despite growing scientific interest in this issue.

Amazonian palms are prominently featured in recent studies that point out the importance of their products for income generation among the rural poor as well as their potential for alternative and sustainable tropical land use systems (Hecht et al. 1988; Hiraoka 1992, 1995; Nepstad and Schwartzman 1992; Redford and Padoch 1992). Emphasis, however, remains on those palms with products directly consumed in local and regional markets, such as acaí (*Euterpe oleracea*), the peach palm (*Bactris gasipaes*), babassu (*Orbignya phalerata*), tucumã (*Astrocaryum aculeatum*), and buritĺ (*Mauritia flexuosa*). The research emphasis on marketable products, however, fails to bring into relief the important role of other Amazonian palms such as *R. taedigera*, whose products are not directly consumed, but figure prominently in household economic strategies.

The objective of this article, consequently, is to link botanical studies *R. taedigera* to its use among peasant farmers in the Amazon estuary, the region where the palm reaches its broadest extent in tropical America. Divided into two sections, the first provides an overview of the palm's biogeographic range and the ecological conditions that favor its establishment, while the second section discusses *Raphia*'s role in regional subsistence and livelihood strategies.

Distribution and Habitat

Scientific interest in the American *Raphia* dates to 1824 when the Prussian botanist, Martius, identified the species along the Amazon estuary (Bailey 1935:40). Naturalist Henry Bates, writing at midcentury, advanced understanding of the palm's biogeographic distribution and habitat, calling attention to its establishment along inundated floodplains to the west and south of Marajó Island (1975:104–117). Two features of the palm repeatedly drew the attention of botanists: its egg-sized fruit that strikingly resembles a pine cone, and the palm's long, sweeping fronds. *R. taedigera* is a sister species to the world's longest-leafed palm (*R. regalis*) and its pinnate leaves often reach 15–20 m (Correia 1928, Allen 1965b, Hallé 1977, Henderson 1995). The leaves rise from a central base of three to five trunks that arch to a height of 10–20 m (Bailey 1935, Anderson and Mori 1967). Each individual trunk typically yields five inflorescences, which flower and fruit throughout the year, the fruits weighing as much as 50 kg (Allen 1965a, Devall and Kiester 1987; exhibit at Museu Goeldi Herbarium in Belém) (Fig. 2). As the bare seeds do not float (Urquhart, in press), *Raphia* propagation relies upon either the fruits drying prior to flotation so they can be transported by water, or upon vegetative reproduction. The mature stems die after inflorescence formation, but the life of the plant is extended by suckers that spring from its base (Bailey 1935). The pollinators of *R. taedigera* are as yet unknown (Francis Kahn, personal communication).



1. Range of *Raphia taedigera*.

One of the least collected of Amazonian palms, *Raphia taedigera* is established on imperfectly drained soils along tidal river channels (furos), where currents constantly change direction and favor alluvial deposition (Richards 1952, Huber 1959). *Raphia* vegetation formations extend along the River Pará from Breves on the southwestern portion of Marajó Island to east of Belem along the River Capim and south of Cametá on the River Tocantins (Huber 1959) (Fig. 1). The palm occurs in dense stands on geologically recent alluvial deposits along low-lying tidal (várzea) floodplains and tolerates a degree of salinity (Bouillenne 1930, Allen 1965b, Moore 1973, Henderson 1995) (Fig. 3). Fieldwork indicates that the palm thrives along floodplains of black- and clear-water rivers characterized by slightly to strongly acid water (such as the Tocantins and Capim rivers) and when appropriate drainage conditions exist, in imperfectly drained inland swamps.

R. taedigera (jupatí) is frequently found in association with mangroves (*Rhizophora* and *Avicennia* spp.) as well as with other economically valuable palms, such as *Mauritia flexuosa* (buritĺ) and *Manicaria saccifera* (bussu). A recent study suggests that *Raphia taedigera* represents a climax rather than a pioneer plant community (Devall and Kiester 1987, viz Anderson and Mori 1967), a research question that proved important for examining Otedoh's (1977) hypothesis of the palm's introduction from Africa as food on slave ships. As Iltis and others subsequently argued, *Raphia*'s crucial role as a pioneer species on imperfectly drained soils would have facilitated within just a few hundred years the palm's establishment and distribution over the broad area it now occupies (quoted in Anderson and Mori 1967). The hypothesis for a recent introduction of *Raphia* to the Americas, however, is not supported by palynological data from eastern Nicaragua where Urquhart (in press) establishes the presence of *R. taedigera* in vegetation formations more than 2 000 years ago.

2. Fruits of *R. taedigera*.

Use of Jupatí in the Regional Economy

An account by a Jesuit priest, José Vieira, written in 1654, provides an early reference to uses

3. *R. taedigera* on várzea floodplain.

of *Raphia* in the Amazon region. Vieira describes the palm's petioles being split and woven into the cylindrical tube (tipití) used to express the juice from grated manioc tubers, an important step in rendering the bitter varieties safe for human consumption (Azevedo 1928 (i):373–74). In 1853 the importance of jupatí in regional livelihood systems drew the attention of the English botanist Alfred Russel Wallace. Noting the use of the *Raphia* petiole for house construction, window shutters, boxes, baskets, bird cages, and bottle stoppers, Wallace's expedition even found it admirably suited for lining insect boxes (Wallace 1971:44). A half century later Barbosa Rodrigues (1903: xxvi) mentioned two additional features of jupatí: the use of the palm's fronds for thatch and the fact that the fruits were not consumed. Based upon his botanical investigations earlier this century, Correia (1928) recorded the medicinal properties of jupatí fruit, the oil serving as a balm against rheumatism and paralysis. Even though he noted that West Africans prepared a fermented drink with *Raphia* fruit, Correia (1928 iv:573) did not observe similar uses of the fruit juice in the Amazon estuary. To the list of uses for the palm, Correia added the making of musical instruments from the petiole. Surprisingly, none of the uses of jupatí within the Amazon estuary today was identified by these authors.

Both the fruits and petiole of jupatí are used in the contemporary period. Women in the Breves region (Fig. 1) still extract cooking oil from the fruit pulp, the fruit is also fed to pigs, and the petiole is made into toys that are sold in Belém. However, the most widespread and economically important use of jupatí in the Amazon estuary today is to make shrimp traps and fishing weirs from the petiole (Figs. 4,5). Table 1 summarizes both past and present uses of *Raphia taedigera* within the region.

Next to acaí (*Euterpe oleracea*) extraction, shrimping provides the second-most important source of on-farm income to peasant families (ribeirinhos) dwelling along the rivers. Surveys within the *R. taedigera* zone indicate incomes from shrimping that annually average between US $250 and $300. *Raphia* petioles are split and then formed into a shrimp trap (matapí), a cylinder about 60 cm long and 30 cm across with conical ends (Fig. 6). A meal, made from rice bran, grated coconut or babassu (*Orbignya phalerata*), is wrapped in a perforated leaf (*Theobroma cacao, Ischnosiphon* spp., *Genipa americana,* or *Montrichardia* spp.) and placed inside the cylinder, the smell enticing the shrimp to enter the conical end from which there is no exit.

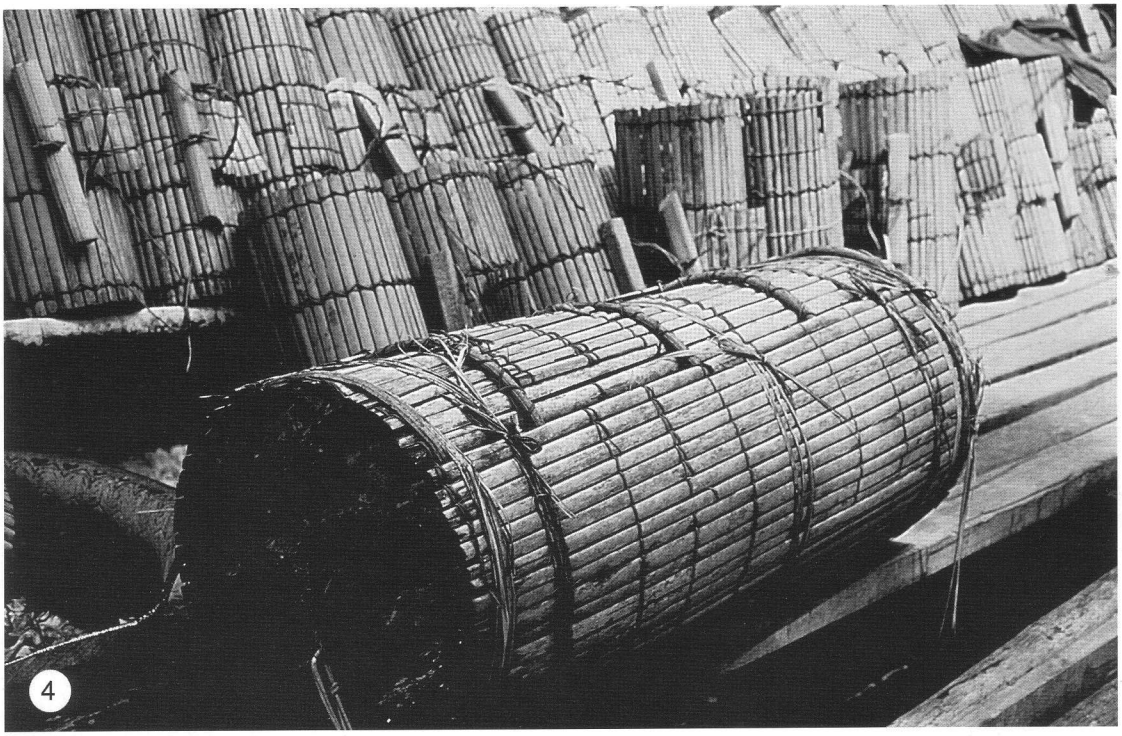
While households occasionally make the matapís for shrimping, more frequently they are purchased from individuals who specialize in supplying the regional market. In the estuary region, demand is such that some households may produce between 800 to 1 000 traps for sale per year (Hiraoka 1993:154).

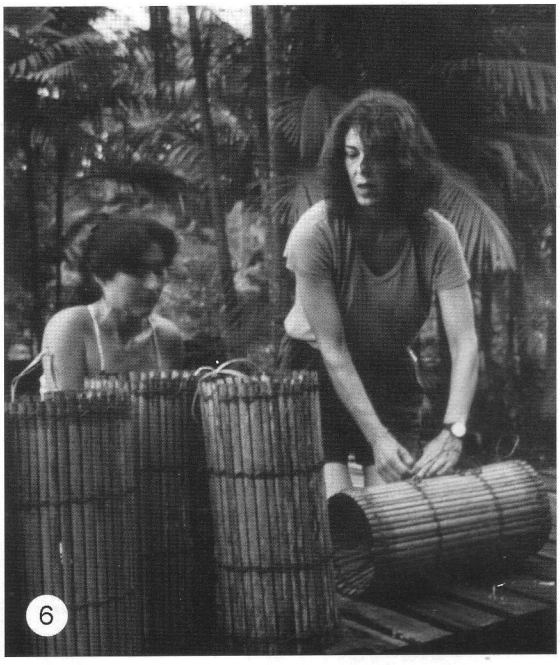
The matapí traps are set from canoes at sunset and attached to plants or poles along the river's edge. In the mornings the shrimp are retrieved and "corralled" in larger holding pens (viveiros), also fashioned from jupatí. The shrimp can thus be kept alive for two to three days after capture, time which enables peasant households to prepare them for sale either fresh, partially dried, or salted. Both men and women are involved in shrimping and marketing, the main harvest season occurring from March to June. While the customary common property resource system recognizes shrimping rights of individual ribeirinho households, the locations of the traps along the river are a carefully guarded secret due to fears of matapí theft from passers-by and the growing incursion of commercial fishermen in the lower Amazon as a response to rising urban demand for shrimp (McGrath et al. 1993).

Conclusion

Among the palms most utilized in contemporary peasant livelihood strategies within the Amazon estuary, *Raphia taedigera* ranks in importance with *Euterpe oleracea, Mauritia flexuosa,* and *Manicaria saccifera.* Yet despite its regional significance, *Raphia* has received little research attention. While this paper clarifies the palm's biogeographical range, crucial ecological features, such as its pollinators, remain unknown.

One additional issue raised in this study of *R. taedigera* also merits attention. The fact that the present uses of *Raphia* for shrimp traps and fishing weirs was not recorded by earlier observers is puzzling given the longstanding significance of aquatic resources in Amazonian livelihood systems. If these uses are indeed recent, it reveals the depth of local knowledge of the properties of specific palms, which facilitates their adjustment to changing markets and subsistence needs. But if *Raphia* has long been used for fishing practices, it indicates that research has largely concentrated





4. Fish trap (matapí).
5. Fishing weir.
6. Preparing the matapí meal for shrimping.

Table 1. Uses of Raphia taedigera *in the Amazon Estuary.*

Part of Palm	Use
Trunks	house construction
Leaves	thatch
Petiole	house construction, shrimp traps, fishing weirs, manioc processing, baskets, bird cages, window shades, musical instruments, toys
	inner soft tissue of petiole: bottle corks, wrapping material for ceramic/glass bottles
Fruit	cooking oil, medicine, pig feed

on directly marketed palm products. Given the increasing interest in the cultural and socio-economic role of palms in the Amazon (Schultes 1974, Balick 1988, Hecht et al. 1988), this study argues for additional research on the indirect role of palm products in providing trade items of value to local economies. These items include not only the fruits, oil, and hearts of palms that are traded but also the use of the petiole for making the traps and weirs for capturing marketed shrimp and fish.

Acknowledgments

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CHAPTER NEWS AND EVENTS (*Continued from p. 124*)

Southern California Chapter News

I've received nothing but praise about the new format and size of the *Palm Journal.* What a great job our editor is doing! Thanks to Don Tollefson for his suggesting the change.

We had a great meeting in Palm Desert on March 15. The Southern California Chapter board of directors met in the shade of a huge old native grove of *Washingtonia filifera* near 1000 Palms, and after touring the Coachella Preserve there, the 50 or so members who were in attendance drove a few miles to the garden of Don Nelson in Palm Desert where we were treated to a tour of his well-maintained garden. An interesting feature of Don's garden is that he has all his fan palms in the front yard, and all his feather palms in the back yard. After filling ourselves on his collection, we traveled only a few blocks to the garden of Allen Valley where we spent the rest of the afternoon. Allen has many wonderful palms growing in his garden, but three in particular took my breath away. He has the largest clump of *Serenoa repens* I've seen in California. It must be six feet (1.9 meters) tall and 12 feet (3.7 meters) across. He has the most beautiful *Livistona inermis* I've ever seen. Although his tree is only three or four feet (1–1.2 meters) tall, it is a sight to behold, with it full head of wispy leaflets (I heard more "oohs and aahs" over this plant than any other palm we saw this day). There was a fruiting *Hyphaene* in his front yard that must be over 12 feet (3.7 meters) tall (that makes it about the biggest one in California). He had many other unusual palms in his garden that love the desert heat, and everyone who came certainly enjoyed the fruits of his labor.

Our auction and raffle netted the chapter $676. Thanks to all the donors and those who bought the plants, and thanks to Don Nelson and Walt Frey for running the auction. And thanks to Sue Rowlands for arranging everything for this great meeting!

Our next meeting was at Quail Botanical Gardens in Encinitas on Saturday, May 31, featuring our first annual palm sale. Many growers arranged to bring some of their finest palms to the sale.

This issue of the *Palm Journal* was devoted to the genus *Trithrinax.* While there are only three currently accepted species of this genus, they are all very desirable palms and are well adapted for our Southern California Mediterranean-type climate.

The next issue of the *Palm Journal* will be devoted to the Australian genera with only one species each, such as *Carpentaria, Hedyscepe, Laccospadix, Lepidorrhachis, Normanbya, Oraniopsis,* and *Wodyetia.* Many of us are growing specimens of these palms in our gardens, so a wealth of information is expected.

GARY WOOD
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News from the Sunshine Coast Branch, PACSOA

The first 1997 Annual General Meeting was held on February 3. After the close of the business section of the meeting, members were entertained by Peter Heibloem with a descriptive talk and fascinating slides of his recent trips to Saraburi and Takfar in Northern Thailand and Zaire, Uganda, Southern Sudan, Zambia, Tanzania, and Kenya where Peter photographed some of the little known Central African *Encephalartos* species.

(*Continued on p. 137*)