Forest Ecology and Management, 55 (1992) 83–86
Elsevier Science Publishers B.V., Amsterdam

Leopoldinia piassaba Wallace (Arecaceae): a few biological and economic data from the Rio Negro region (Brazil)

Jean-Paul Lescure, Laure Emperaire and Carlos Franciscon
ORSTOM, INPA/Ecologia, CP 478, 69011 Manaus AM., Brazil

(Accepted 28 January 1992)

ABSTRACT

Lescure, J.-P., Emperaire, L. and Franciscon, C., 1992. *Leopoldinia piassaba* Wallace (Arecaceae): a few biological and economic data from the Rio Negro region (Brazil). *For. Ecol. Manage.*, 55: 83–86.

The piaçabeira (*Leopoldinia piassaba* Wallace) is an endemic palm species of the Rio Negro basin whose biology and ecology are poorly documented. Exploited for the fiber (piaçaba), the species is important for rural populations as a source of economic income through extractive activity. Two journeys in the middle Rio Negro region permit us to document more fully the biological and economic aspects of the species. Three populations were observed in the Rio Preto–Rio Negro interfluve (64°15′–64°28′W; 0°5′–0°15′S).

GEOGRAPHICAL DISTRIBUTION IN BRAZILIAN AMAZON

From the literature it appears that piaçabeira is restricted to the middle and upper Rio Negro and overlaps the distribution of the sandy soils vegetation known as caatinga (Spruce, 1860, 1908; Wallace, 1853). Our enquiries in the region and a review of unpublished economic data from CODEAMA (State of Amazonas Development Company) and IBGE (Brazilian Geographical and Statistical Institute) statistic volumes, show that, in Rio Negro, piaçabeira is found mostly on the left bank affluents, from the boundary with Venezuela down to the Araca river, and disappears on the Demini river. On the right bank, the species seems present only on the Xie and Curucuriari rivers. Economic statistics point out the collection of piaçaba in two disjuncted areas, one in the upper solimões in Santo Antonio da Içа, the other in the Eastern part of the State in the municipality of São Sebastião do Uatumã, but this production could involve another closely related species.

Correspondence to: J.-P. Lescure, ORSTOM, INPA/Ecologia, CP 478, 69011 Manaus AM., Brazil.

SOIL SPECIES RELATIONSHIPS

In the interfluve Rio Preto–Rio Negro (64°15′W–64°28′W; 0°5′S–0°10′S), we observed the species on different types of soils. The region is geomorphologically a depressed interfluve with a few little hills. Three types of soils are encountered: oxisols on the hills, hydromorphic white clay soils (gley) and podsols on the plain. This situation is similar to the one already described in the southern part of Venezuela by Gavaud et al. (1986), Jordan (1989) and Dubroeucq et al. (1991).

In oxisol and podsol situations, we studied the population within 100 m × 50 m plots. In gley soils we used the point-quarter technique with 31 points situated 20 m from one another on a 600 m line. Though observed in the rainy season, neither of those plots was flooded, but the water-table in gley and podsol soils was 20–40 cm deep. Height of the palm was measured at the level of the apical meristem. Distributions of height in gley and podsol conditions were compared using a Kolmogorov–Smirnov test (Table 1). Spatial pattern of the population was analyzed only on oxisol and podsol soils using a 10 × 10 m^2 subplots grid and the Greig-Smith (1964) dispersion index.

Piassabeira is not strictly linked with podsol soils but on oxisol soils, the species is poorly represented and the individuals do not grow well. Seedlings were not observed on the plots. The poor growth of the piaçabeira on oxisol soils has already been observed by us in a 20-year-old plantation in the region of the Demini River. Densities on gley and podsol are equivalent, demonstrating the link of the species with the water-table proximity. But height

TABLE 1

Distribution of height within the piaçabeiras populations and density of the piaçabeiras

Height (m)	N_i/N (%N)		
	Oxisols	Gley	Podsols
<0.1	45.0	2.4	20.1
0.1–0.9	55.0	30.6	47.4
1.0–1.9		26.7	16.2
2.0–2.9		5.6	2.6
3.0–3.9		4.8	1.9
4.0–4.9		3.2	3.2
5.0–5.9		4.8	1.3
6.0–6.9		4.8	1.9
7.0–7.9		2.4	1.3
8.0–8.9		2.4	1.9
9.0–9.9		1.6	0.0
>10		10.7	1.9
Density: $N\,ha^{-1}$	40	325	308

structure of the populations are quite different and gley obviously permits a better growth of the individuals ($K_d = 34.5$).

On oxisols the spatial pattern is random. On podsols, the pattern appears clustered when analyzing the total population, but on calculating the index for different classes of height, we found that adult populations (above 2 m height) are random ($I_d = 0.92$) and seedling populations are clustered ($I_d = 4.38$ for germination; $I_d = 1.56$ for young). This means that the germination spatial pattern is clustered but the selection that occurs during growth leads to a random pattern in the adult population.

ECONOMIC IMPORTANCE

Economic statistics from IBGE and CODEAMA computed for 1970–1989 show a very irregular production, (1294.5 Mg year^{-1}) ranging from 38 Mg (1984) to 2359 Mg (1974). Using the current price paid to the collector, piaçaba contributes to a total annual income in the region ranging from US$ 30 000 to US$ 700 000.

COLLECTION OF PIAÇABA

Our observations on the way of working piaçaba do not basically differ from those already described by Putz (1979). In Brazil, as in Venezuela, collectors take care to leave the two to four younger leaves on the palm. Our informants told us that 4–5 years have to be allowed between collections on the same palm to let new fiber grow. Human impact on the population is then very low and the fact that the studied populations have been exploited for more than 50 years demonstrates that exploitation is sustainable.

We documented the time consumption and the amount of fiber collected following four collectors for 1 day. One hundred eighteen kilograms of fiber were collected from 42 palms (mean weight per palm, 2.81 kg).

We observed collector activity for 28 h 55 min, from which 3 h 30 min was spent walking to the population, 17 h 15 min was spent cutting the fiber, 4 h was spent preparing the fiber for transport and 4 h 10 min was spent carrying the fiber back to the camp. Depending on the current price of the fiber (US$ 0.30 kg^{-1}), the wage of the collector can be calculated as US$ 1.2 h^{-1}.

CONCLUSION

In regard to the geographical extension of the species and to the amount of fiber collected, the resource is limited for the collector only because of accessibility to the remote populations. The collection is sustainable from an ecological point of view, but it is poorly paid. Meanwhile, the collector remains interested in this activity for it represents an alternative strategy to agricul-

ture and because it provides a good opportunity for hunting while providing an income. A more detailed socio–economic discussion has been developed by Pinton and Emperaire (1992).

ACKNOWLEDGMENTS

Field work was part of the project 'Extractivism in Central Amazonia, viability and improvement', worked out within the ORSTOM-CNPq cooperation agreement and supported by the UNESCO MAB, (Grant SC-218-201-0), the French Ministry of Environment (SOFT, Grant 90049) and Conservation International.

REFERENCES

Dubroeucq, D., Volkoff, B. and Pedro, G., 1991. La couverture du bouclier du nord de l'Amazonie (bassin du haut Rio Negro). Séquence évolutive des sols et son rôle dans l'aplanissement généralisé des zones tropicales perhumides. C.R. Acad. Sci. Paris, t. 312, Serie II: 663–671.

Gavaud, M., Blancaneaux, P., Dubroeucq, D. and Pouyllau, M., 1986. Les paysages pédologiques de l'Amazonie vénézuélienne. Cah. ORSTOM, Sér. Pédol. 23 (3): 265–284.

Greig-Smith, P., 1964. Quantitative Plant Ecology. Butterworths, London, 257 pp.

Jordan, C.F., 1989. An Amazonian Rain Forest. UNESCO-MAB, Parthenon Publishing Group, Paris.

Pinton, F. and Emperaire, L., 1992. L'extractivisme en Amazonie brésilienne: un système en crise d'identité. Cah. ORSTOM, Sci. Hum., 28: 685–709.

Putz, F.E., 1979. Biology and Human Use of *Leopoldinia piassaba*. Principes, 23 (4): 149–156.

Spruce, R., 1860. On *Leopoldinia piassaba* Wallace. J. Proc. Linn. Soc. (Botany), 4: 58–63.

Spruce, R., 1908. Notes of a Botanist on Amazon and Andes. McMillan, London.

Wallace, A.R., 1853. Palm Trees of the Amazon. John Von Voorst, London.