



FIG. 2. A–D. *Oenocarpus makeru*. A. Eophylls (scale bar = 3 cm). B. Fruit. C. Seed with fibers. D. Fruit in longitudinal section (scale bar for B–D = 2 cm).

it grows in the understory of mature forest. It was also observed in mature forest near the mouth of the Río Miriti-paraná. Although several individuals were seen, none of them had pinnate leaves, which suggests that simple leaves are a constant character in this species.

2. *Oenocarpus makeru* Bernal, Galeano & Henderson, sp. nov. (Fig. 2)

TYPE: COLOMBIA. Amazonas: Río Caquetá, near the Chorro Córdoba, trail to the savanna, ca 250 m, 13 Mar 1990, G. Galeano, R. Bernal, A. Henderson, N. Espejo, & S. Churchill 2070 (HOLOTYPE: COL!; ISOTYPES: AAU!, BH!, HUA!, K!, NY!).

Palma solitaria. Pinnae eodem plano insertae, subtus indumento tenui laxo cereo laniformi obsitae. Fructus ovoideus. Seminis endospermum ruminatum.

Stem solitary, 5–8 m tall, 7–8 cm diam, grayish, longitudinally fissured. Leaves 12; sheath 65–68 cm long, purplish, coarsely fibrous; petiole 15–25 cm long, covered with a gray, scaly indumentum, the latter more or less persistent adaxially, more or less deciduous abaxially; rachis 2.43 m long, with scaly indumentum like that of the petiole; pinnae 65 on each side, regularly arranged and in 1 plane, linear-lanceolate, acuminate, strongly plicate along secondary veins, concolorous, glabrous adaxially, covered abaxially with a thin, loose, wool-like, waxy indumentum, and sparsely beset with minute, white trichomes; basal pinnae 46.5–50.4 × 0.8–1.5 cm; middle pinnae 73–75.5 × 5–5.3 cm; apical pinnae 29 × 1 cm. Inflorescence interfoliar; prophyll not seen; peduncular bract inserted 2.5–3 cm above prophyll, covered (at least in young bud) with purplish scales; peduncle 6.2–7.5 cm long, the distance between scars of prophyll and peduncular bract 2.8–3 cm, the axis 9.5–16 cm long from the scar of peduncular bract (i.e., distal part of peduncle + rachis), circular in transverse section; rachillae 107–125, the longest ones 56–60 cm; flowers seen only in early bud; staminate flowers with sepals connate at base, the lobes triangular, carinate; petals free; stamens 6; pistillate flowers not seen; fruits ovoid, with apical stigmatic residue, 2.2–2.6 × 1.4–1.7 cm, the epicarp smooth, purplish-black at maturity, the fibers ca 0.2 mm wide; seed slightly ovoid to almost ellipsoid, 1.8–1.9 × 1.4–1.5 cm; endosperm white, with abundant brown ruminations; embryo well-developed, to ca 1.4 cm long; eophyll with 4 narrow pinnae palmately radiating from a very short rachis.

Common name: makeru (Yukuna).

*Oenocarpus makeru* can be distinguished from all other species in the genus through its ruminant endosperm. It can be recognized also by the combination of a solitary stem, regularly arranged pinnae with an abaxial thin, wool-like, waxy indumentum, and ovoid fruits.

*Oenocarpus makeru* is known only from a population at the type locality where it is an abundant palm growing in the forest bordering an area of caatinga. Although the dried specimen available for study lacks developed flowers, we have described it as a new species since it is quite different from any other taxon in the group notably through its ruminant endosperm. Within the *Jessenia-Oenocarpus* complex ruminant endosperm is known only in *Jessenia bataua*; all hitherto known species of *Oenocarpus* (sens. strict.) have homogeneous endosperm. In fact, the nature of the endosperm has been used by Balick (1986) as one of the main features distinguishing the genera. Since in all other respects the described plant is a typical *Oenocarpus* (sens. strict.), it might be thought that this population represents a hybrid between *Jessenia* and *Oenocarpus*. Although hybrids have been reported to occur in this complex (Balick, 1988), this does not seem to be the case for this species as there is no morphological character in this population that appears to be of hybrid nature. Indumentum on the undersurface of pinnae lacks the typical sickle-shaped scales characteristic of *Jessenia bataua*; eophylls are not bifid as in *Jessenia*, but they have four slender pinnae radiating from a very short rachis, as in all species of *Oenocarpus* subgenus *Oenocarpus*; and the number of stamens is six, typical of *Oenocarpus* (sens. strict.). Furthermore, known hybrids involving *Jessenia bataua* have a reduced endosperm and a small embryo (M. Balick, pers. comm.), whereas *O. makeru* has a large, well-developed embryo within the ruminant endosperm. Seedlings were abundant under the palm from which the specimens were collected.

The finding of *Oenocarpus makeru* is of great significance in understanding the relationships between *Jessenia* and *Oenocarpus*. Species in this group were initially

placed in one genus by Martius (1837), who first described *Oenocarpus*, and named five of the species currently recognized in the complex. Later, Karsten (1857) established the genus *Jessenia*, and described *J. polycarpa*, which he compared with *Oenocarpus*, particularly *O. bataua* C. Martius. He distinguished *Jessenia polycarpa* through the larger number of stamens, the apical (vs eccentric) stigmatic residue, and the trilobate (vs tripartite) calyx of the male flowers. Two species of *Jessenia* were added by later workers in the nineteenth century (Grisebach, 1864; Engel, 1865). Burret (1928) reappraised the group and accepted two genera, transferring Martius' *O. bataua* to *Jessenia*. Thus, Burret was the first author to clearly contrast both genera, which he distinguished in a few characters, viz the endosperm, the vestiture of the undersurface of pinnae, the number of stamens, and the projection of the connective beyond the anther.

Recognition of two genera in this complex was questioned by Wessels Boer (1965, 1972, 1988), but he was not followed by other students of palms. Balick (1986), in a monographic study of these genera, continued to keep them separate, mostly following the same criteria used by Burret, and also including some information on the chromatographic patterns of flavonoids. An additional difference used were eophylls, which are bifid in *Jessenia bataua*, and have four pinnae radiating from a short rachis in all species of *Oenocarpus* for which seedlings were known prior to this study. In Table I, morphological characters of *Jessenia*, subgenus *Oenocarpus*, and the species *O. simplex*, *O. circumtextus*, and *O. makeru* are contrasted.

Data now available from these two new species as well as observations on *Oenocarpus circumtextus*, show that some of the character states used to define *Jessenia* also occur in species of *Oenocarpus*, thus obscuring the distinction. Ruminant endosperm occurs in *Oenocarpus makeru*; bifid eophylls are now known to characterize subgenus *Oenocaropsis*; and undulate filaments and a produced connective occur in *Oenocarpus simplex*. However, it should be noted that the nature of the connective is not consistent. In both *O. simplex* and *O. circumtextus* individual flowers can contain anthers with and without a projected connective. The remaining differences, while fully meaningful at the specific level, could scarcely be used to separate two genera. The number of stamens is variable in many genera throughout the family, and even in genera with mostly six-staminate flowers, there occur species with different number of stamens, e.g., *Geonoma triandra* (Burret) Wessels Boer (Wessels Boer, 1968), *Astrocaryum triandrum* Galeano, Bernal and Kahn (Galeano-Garcés et al., 1988). Finally, the difference between "wiry" and "knitting needle-like" fibers or between apically inflexed and apically curved filaments, and the shape of trichomes do not seem to justify distinction at the generic level. In conclusion, we consider that *Jessenia bataua*, the only species currently recognized in the genus, must be treated under *Oenocarpus*, as originally postulated by Martius (1837).

### 3. OENOCARPUS MINOR C. Martius

*Oenocarpus minor* C. Martius, Hist. Nat. Palm. 2: 25-26, t. 27. 1823. TYPE: BRAZIL. Amazonas: Manaus, [1819-1820], *C. Martius 3121b* (HOLOTYPE: M!).

Specimens examined: COLOMBIA. Amazonas: Río Caquetá, near Chorro Córdoba, ca 250 m, 12 Mar 1990, G. Galeano et al. 2051 (COL, NY); Río Mirití-paraná, near the mouth, ca 200 m, 14 Mar 1990, G. Galeano et al. 2081 (COL, NY).

This species was described from the Manaus area in the Brazilian Amazon and it has been subsequently reported (Balick, 1986) from several localities in the northwestern Amazon of Brazil. Literature records from the Amazon basin in