

bracts several; rachis longer than the peduncle; rachis bracts decreasing in size distally, tubular, rather loosely sheathing, with a broad, split, triangular limb, sometimes strongly keeled, densely covered in rusty tomentum; first-order branches crescent-shaped in cross-section, longer than the subtending bract, not bearing a prophyll, branching at the tip to produce a group of 3–9 radiating, catkin-like rachillae, rarely at the inflorescence tip the group reduced to a single branch; rachillae slightly sinuous, bearing a tight spiral of rounded, densely hairy, striate bracts, connate laterally and partially adnate to the axis to produce pits, densely filled with hairs. Staminate flowers unknown; pollen (found remaining among inflorescence bracts) ellipsoid in apertural or non-apertural view; monosulcate; tectum coarsely rugulate-fossulate, but smoother around the tectum. Fruit developing from a single carpel, globose, stigmatic remains basal; epicarp smooth, mesocarp not known, endocarp hard, woody, externally with broad anastomosing flanges, one principal flange forming a crest along the vertical axis of the endocarp, internally the endocarp smooth, lacking a basal intrusion and lacking a germination pore opposite the embryo. Seed globose, basally attached; endosperm ruminant, deeply and irregularly penetrated by integumental tissue, solid, embryo apical. Germination and eophyll unknown.

DISTRIBUTION. Madagascar, one species in east coast rain forest.

Satranala decussilvae *Beentje & J. Dransf.* sp. nov., palma insignis ad 15 m alta, foliis costapalmatis ad 2.6 m latis, fructu globoso endocarpio cristato ad 48 × 45 mm diametro, endospermio ruminato. Typus: Madagascar, Mananara Avaratra, April 1992, *Beentje, J. Dransfield & Andriampaniry* 4628 (holotypus K; isotypi BH, MO, P, TAN, WAG).

Solitary tree palm, trunk 8–15 m tall, d.b.h. 15–18 cm, hard, smooth, ± straight, obscurely ringed with scars, sometimes with aerial roots above the base of the trunk; internodes 8–10 cm, nodal scars 1.5 cm wide. Leaves (9 in young plants) 20–24 in the crown, porrect, rather stiff, with up to 6 marcescent old leaves; sheath 46–60 cm long, 35 cm diam., at the very base 70 cm wide, split from 14–44 cm, abaxially chestnut brown near the base, more distally pale brown with scattered scales, adaxially chestnut brown, glabrous; petiole 140–150 cm (190–270 cm in young plants), proximally 7–10 × 5–6 cm, distally 5 × 1.5 cm, abaxially with thin white tomentum and wax, adaxially brown near the base, distally green with elongate scales, shallowly channelled, the margins proximally with spines to 3 mm, distally with minute spines; adaxial hastula forming a flange 3–8 mm high, with a central lobe to 15 mm long; blade costapalmate, 110–180 cm from hastula to apex, 240–260 cm wide, with 54–57 segments, costa to 33 cm, abaxially c. 2 cm wide at the base; segments almost flat, apically bifid for 1–10 cm, with three main veins and numerous close sinuous transverse veinlets, abaxially with conspicuous white wax, both surfaces with many large lacinate scales near the base, distally with few small brown scales; outer folds 88–102 × 1.3–3.2 cm, unsplit in the basal 8–9 (outermost)–20 cm, intermediate folds 104–130 × 4.4–5.5 cm, unsplit in basal 50–52 cm, central folds 114–181 × 4.1–6 cm, unsplit in basal 80–100 (–137 in young plants) cm; for segment hang

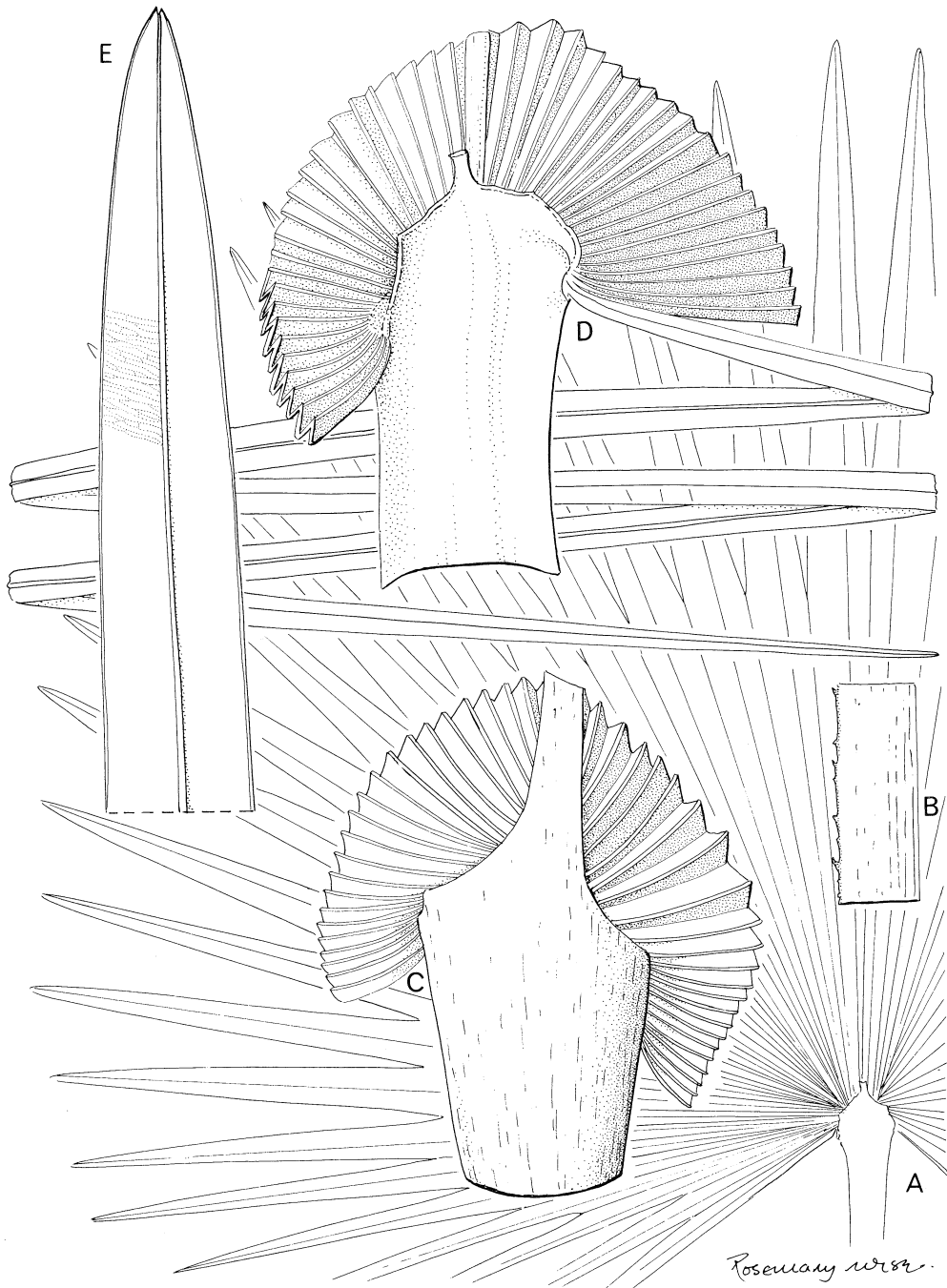
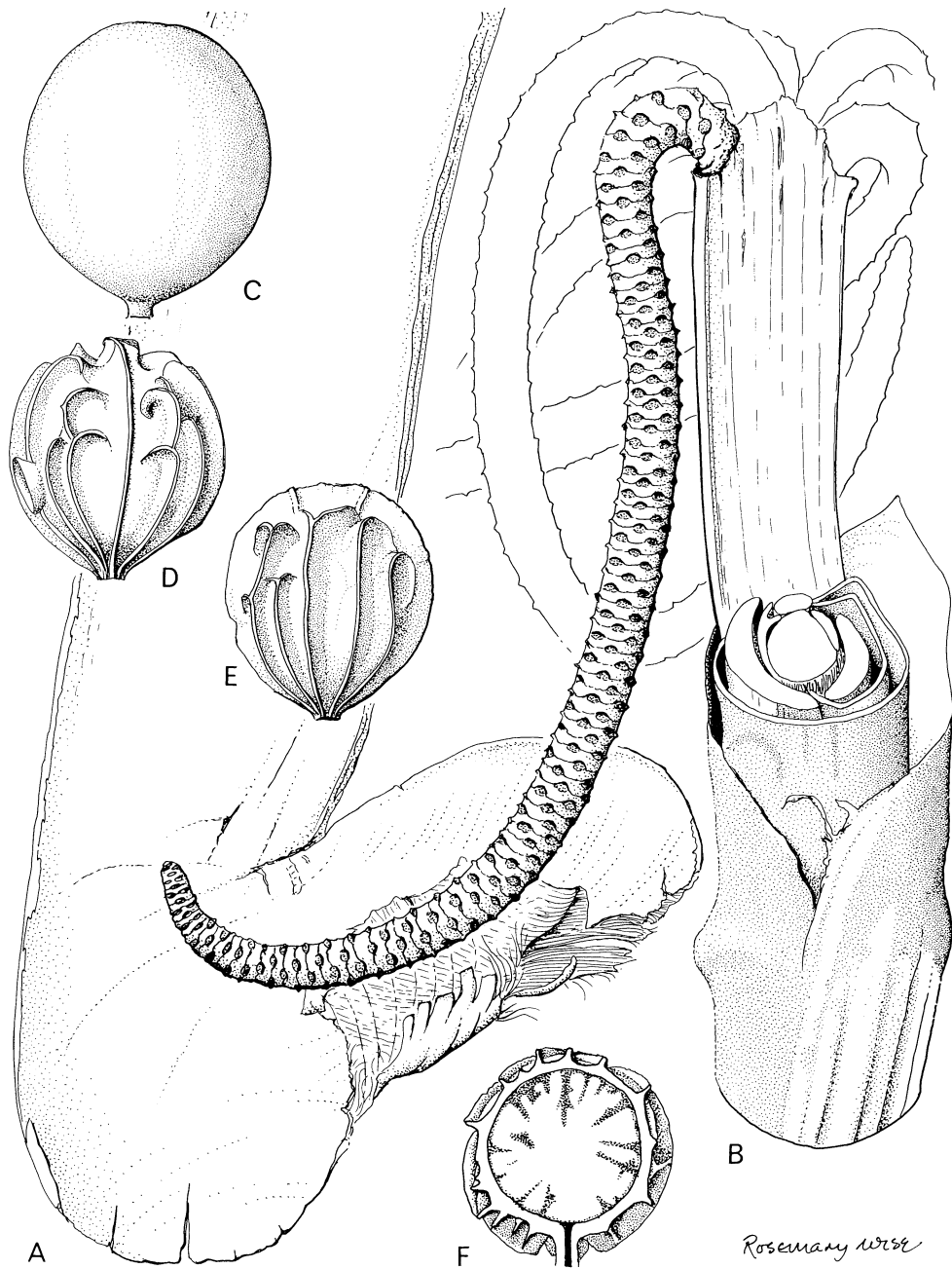


FIG. 1. *Satranala decussilvae*. **A** leaf, adaxial view $\times 1/10$; **B** petiole margin $\times 2/3$; **C** petiole/leaf blade interface, abaxial view $\times 2/3$; **D** idem, adaxial view $\times 2/3$; **E** leaf segment apex $\times 1/3$. All from *Beentje et al.* 4628. Drawn by Rosemary Wise.



Rosemary Wise

FIG. 2. *Satranala decussilvae*. **A** leaf sheath base, adaxial view of lateral half $\times 1/6$; **B** part of staminate inflorescence $\times 2/3$; **C** fruit (reconstruction) $\times 2/3$; **D** seed, meridional view $\times 2/3$; **E** idem, but turned 90° through vertical axis $\times 2/3$; **F** seed in cross-section $\times 2/3$. All from *Beentje et al.* 4628. Drawn by Rosemary Wise.

see illustrations. Staminate inflorescence interfoliar, arching, spreading, 230 cm long; peduncle to c. 45 cm long, $3-3.5 \times 2-2.8$ cm in section distally; prophyll and peduncular bracts not seen; rachilla bracts rusty-brown tomentose, the proximal 42–50 cm long, c. 6 cm diam., the distal 31 cm long, c. 1.5 cm diam.; first order branches 13, the proximal 46–50 cm long, $3-3.5 \times 0.6-0.8$ cm diam., with 6–9 rachillae, the distal 40–45 cm long, $0.6-0.7 \times 0.4-0.6$ cm diam., with 1–3 rachillae; basal rachillae 29–31 cm long, 1.1–1.4 cm diam., distal rachillae to 22 cm long and 1.1 cm diam. Pollen with the sulcus equalling the length of the long axis; long axis 43–50 μm ; short axis 34–40 μm ; exine in non-apertural region c. 2 μm thick; infratectum with short, regular, closely spaced columellae; tectum coarsely rugulate-fossulate, the fossulae perforate, but much smoother around the tectum. Pistillate inflorescence unknown. Fruit (reconstructed from fallen fruit) globose to ovoid, to 5.6×5 cm; epicarp smooth; mesocarp already disintegrated, probably c. 1 mm thick; endocarp \pm globose, $34-48 \times 33-45$ mm, the wall c. 1–2 mm thick, outer surface with conspicuous, mostly vertical flanges, radiating from the base, one forming a crest along one entire vertical circumference, thus forming two faces, the flanges on the two faces c. 6 on each face, branching and anastomosing, tending to end blindly and not joined to the main crest, the flanges 3–6 mm high; inner surface of endocarp smooth. Seed closely adherent to endocarp, to 30×32 mm, apparently considerably smaller in some individuals; endosperm solid, deeply ruminant; embryo apical, c. 6×2 mm. (Fig. 1).

DISTRIBUTION. Northeastern Madagascar, known from a single site.

MADAGASCAR. Mananara Avaratra, Oct. 1991 (vegetative, fruit), *Beentje* 4474 (K, TAN); April 1992 (old staminate infl.), *Beentje, J. Dransfield & Andriampaniry* 4628 (holotypus K; isotypi BH, MO, P, TAN, WAG).

LOCAL NAME. "Satranabe" (Betsimisaraka).

HABITAT. Wet forest on shallow soils overlying ultramafic rock, in steep-sided valley rich in pandans and palms, at 260–285 m above sea level.

The habitat of this palm is wet forest, hence the name ("satrana" is the Malagasy for *Hyphaene* and *Bismarckia nobilis*, "ala" is the Malagasy word for forest; "decussilvae", ornament of the woods, reflects its beauty). At the only known locality there is an abundance of rather unusual palms, such as *Ravenea albicans*, *Masoala madagascariensis*, *Marojejya insignis*, *Neophloga betamponensis*, new and so far undescribed species of *Dyopsis*, *Neodyopsis* and *Vonitra*, as well as *Pandanus* spp. occurring on a thin layer of humus overlying ultramafic rock (rock identified by M. W. Dransfield). About eight apparently mature trees of *Satranala decussilvae* have been seen at this site, together with a few stemless juvenile plants; however, the area is botanically not well explored and there could well be further populations. At present the area of forest where the palm occurs is within the UNDP (United Nations Development Programme) Biosphere Reserve and is thus, at least legally, protected. It is not of easy access. However, given the rapacity of palm seed collectors from within and outside Madagascar, it seems inevitable that the palm will be subjected to the collecting pressures that affect many of the unusual palms of Madagascar.