

tum. Mature fruit one-seeded, somewhat irregularly ellipsoid, tipped with a short beak and stigmatic remains; epicarp purplish-brown, densely covered with brown scaly indumentum; mesocarp with an outer fibrous zone just below the epicarp, and an inner fleshy zone; endocarp  $\pm$  ellipsoid, apically pointed, basally truncate, very heavily thickened, pale brown when fresh, becoming grey with age, very deeply and irregularly longitudinally grooved, with 3 very deep basal impressions each with a central germination pore, in section the body of the endocarp traversed by longitudinal irregular vertical canals and fibres, inner surface of the endocarp with numerous irregular rounded excrescences intruding into the cavity. Seed irregularly ellipsoid, filling the endocarp cavity, laterally attached with a narrow irregular hilum, endosperm homogeneous but irregularly intruded by the endocarp protuberances, very hard, white, with a narrow, irregular central lacuna; embryo basal, top-shaped, positioned opposite an endocarp pore. Germination remote-tubular; eophyll entire, lanceolate.

**Voanioala gerardii** *J. Dransf.* sp. nov. Palma insignis solitaria trunco conspicue articulato, foliis magnis ad 5 m longis regulariter pinnatis, foliolis ad 1.5 m longis concoloribus. Inflorescentia ad 1.5 m longa, rachillis c. 60, floribus masculis c. 10–12  $\times$  7–9 mm, femineis 18–20  $\times$  10 mm. Fructus 7–8  $\times$  4–5 cm, endocarpio 10–15 mm crasso. Typus: Madagascar, Masoala, *J. Dransfeld et al.* JD6389 (holotypus K; isotypi AAU, BH, MO, NY, P, TAN, US).

Robust, solitary, tree palm. Stem erect, 15–20 m tall, d.b.h. c. 35 cm, basally with a large root boss to 1 m diam., distally the stem bare, very conspicuously 'stepped' and ringed with oblique leaf scars, c. 10 cm distant, the distal portion of the internodes projecting c. 5 cm outwards from the proximal part of the following internode.

Leaves c. 15–20 in the crown, c. 5 m long; leaf base elongate rectangular, apparent petiole c. 150  $\times$  30 cm, c. 8–10 cm thick, with sparsely fibrous margins, abaxially densely covered with caducous brown indumentum; rachis in cross section in the mid leaf region, c. 4  $\times$  3 cm; leaflets numerous, c. 70 on each side of the rachis, regularly arranged, rather stiff, scarcely pendulous, very coriaceous, shining mid-green when fresh, drying pale, concolorous, c. 150  $\times$  7 cm, unevenly bilobed at the tips, mid vein prominent adaxially, abaxially bearing a few brown rammenta near the base, c. 8 longitudinal veins besides the mid vein, transverse veinlets obscure but lamina minutely transversely striate, portion of leaflet exposed in the sword leaf bearing caducous chocolate scales, thin wax also present on both surfaces.

Inflorescences c. 1.5 m long, erect in bud, later horizontal; prophyll c. 70  $\times$  13 cm, bearing caducous brown scales; peduncular bract c. 120  $\times$  18 cm, abaxially deeply (c. 2.5 mm) and closely longitudinally grooved, bearing scattered brown scales on the ridges between the grooves; peduncle c. 90 cm long, c. 4–5 cm diam.,  $\pm$  circular in cross section, pale cream-coloured at staminate anthesis, becoming bright green in fruit, brown scaly when newly emerged, becoming glabrous; rachis c. 60 cm long; rachillae c. 60 in number, those near the base the longest to c. 50 cm, decreasing in length towards the inflorescence tip, most with a basal bare portion, 2–5 cm long, c. 7 mm diam. near the base, decreasing to 1.5 mm diam. near the tip, the rachillae somewhat zig-zag due to close packing, especially near the base, and bearing 0–7

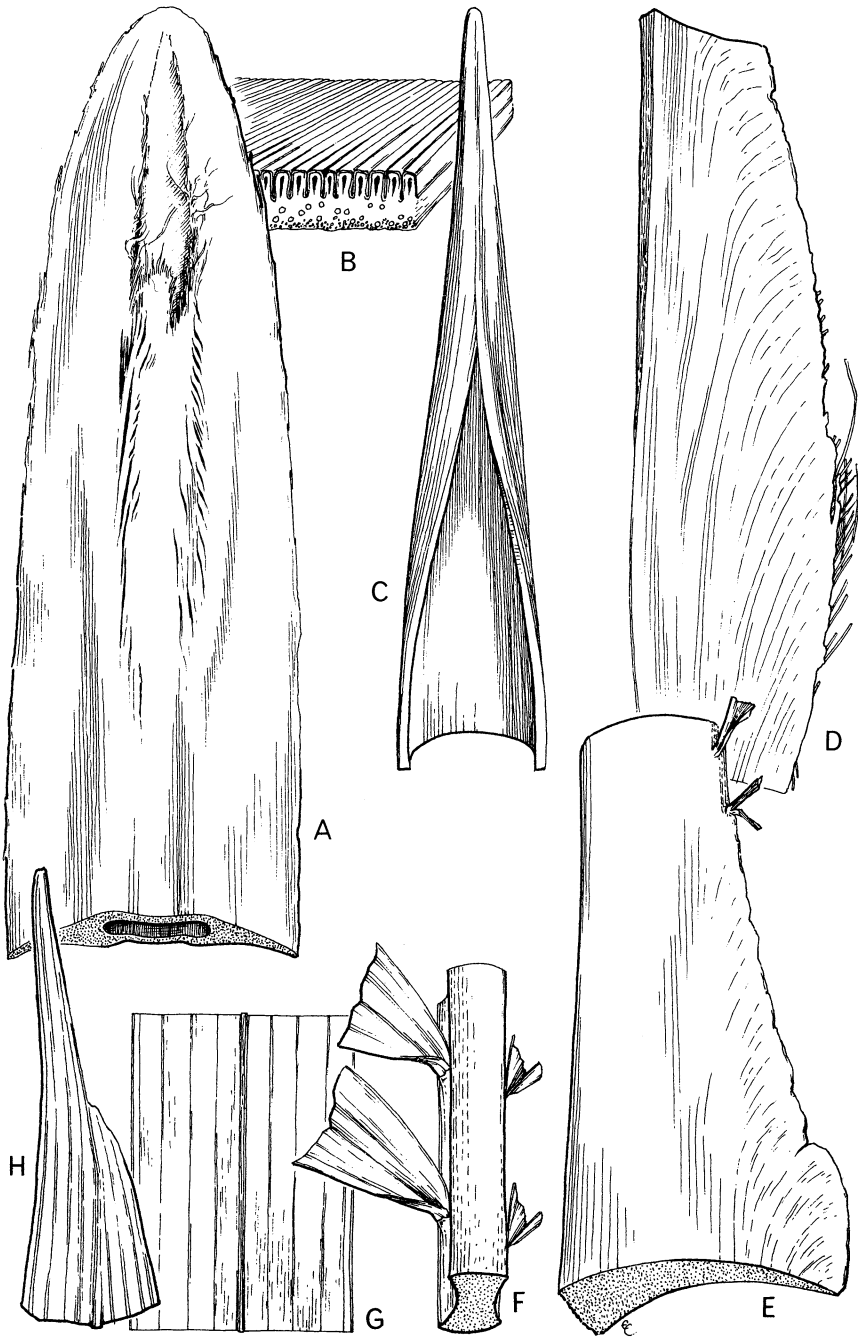


FIG. 1. *Voanioala gerardii*. A prophyll, abaxial view  $\times \frac{1}{2}$ ; B detail of peduncular bract to show deep grooves  $\times 1\frac{1}{2}$ ; C tip of peduncular bract  $\times \frac{1}{2}$ ; D portion of leaf base  $\times \frac{1}{2}$ ; E leaf base and insertion of lowermost leaflets  $\times \frac{1}{2}$ ; F mid section of rachis with leaflet bases, abaxial view  $\times \frac{1}{2}$ ; G detail of leaflet  $\times \frac{1}{2}$ ; H leaflet tip  $\times \frac{1}{2}$ . All from *Dransfield et al.* JD6389. Drawn by E. Catherine.

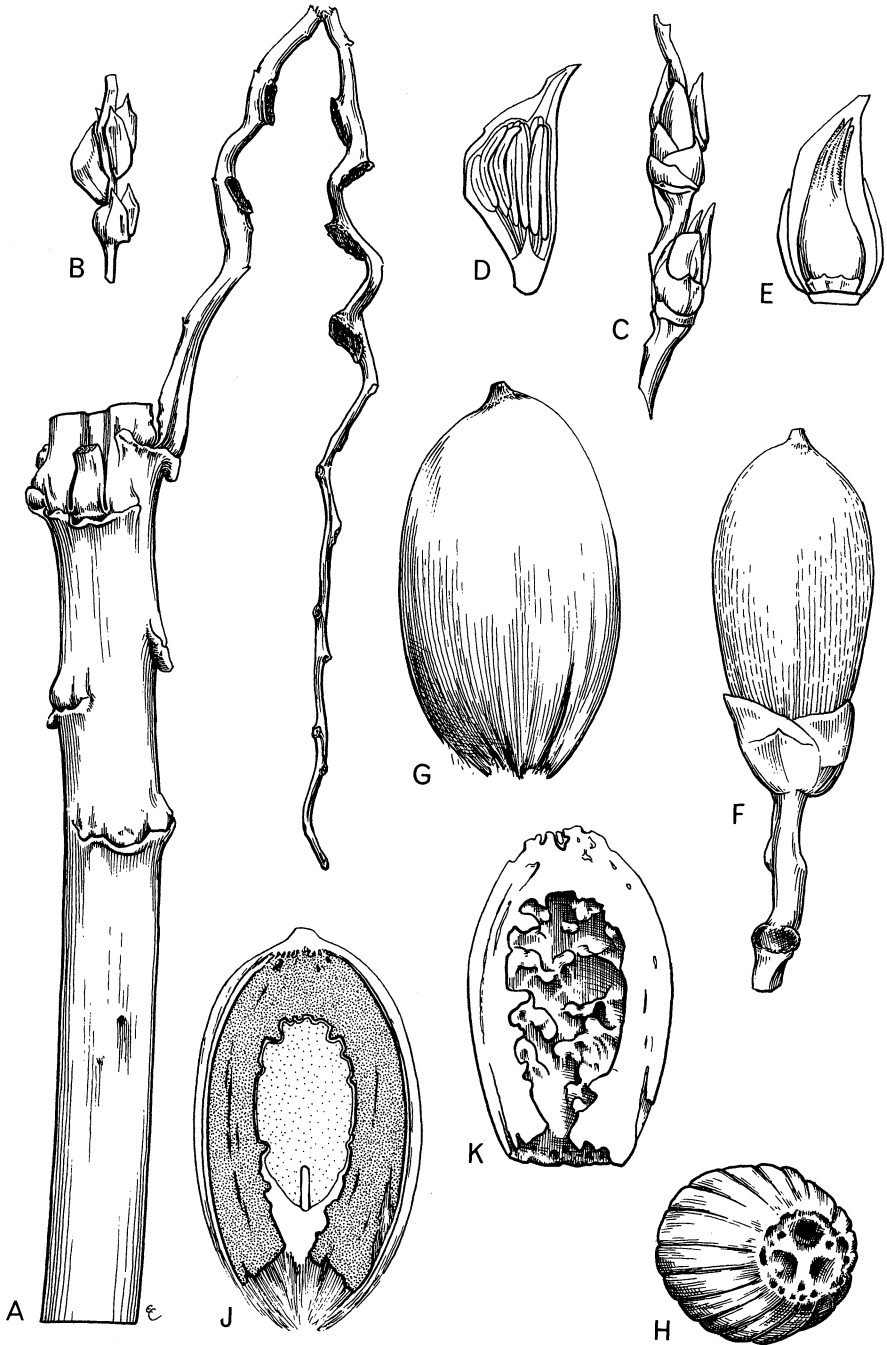


FIG. 2. *Voanioala gerardii*. **A** distal part of peduncle and first rachilla of infructescence  $\times \frac{2}{3}$ ; **B** distal part of flowering rachilla with triads  $\times \frac{2}{3}$ ; **C** proximal part of flowering rachilla with triads  $\times \frac{2}{3}$ ; **D** staminate flower bud, one petal removed  $\times 1\frac{1}{2}$ ; **E** pistillate flower bud, part of calyx and corolla removed  $\times 1\frac{1}{2}$ ; **F** young fruit  $\times \frac{2}{3}$ ; **G** mature fruit  $\times \frac{2}{3}$ ; **H** bare endocarp viewed from proximal end to show three pores  $\times \frac{2}{3}$ ; **I** mature fruit in vertical section  $\times \frac{2}{3}$ ; **J** endocarp sectioned to show irregular intrusions into the locule  $\times \frac{2}{3}$ ; **K** bare endocarp viewed from proximal end. All from *Dransfield et al.* JD6389. Drawn by E. Catherine.



PLATE I.

*Voanioala gerardii*. **A** the tree from which type material was prepared; **B** unopened inflorescence; **C** young inflorescence removed from peduncular bract; **D** close up to show deep grooves on the peduncular bract and staminate and pistillate flower buds; **E** immature fruit; **F** mature fruit whole, with mesocarp removed and variously sectioned. **A–E** J. Dransfield; **F** T. Harwood.

triads near the base and paired or solitary staminate flowers distally, the flower groups 5–10 mm distant, spirally arranged, or becoming somewhat distichous by close-packing. Staminate flowers, asymmetrical, broadly or narrowly triangular in outline, c. 10–12 × 7–9 mm, creamy yellow just before anthesis, the whole inflorescence in bud smelling of 'ylang-ylang' (*Cananga odorata*); sepals c. 3–4 × 4 mm; petals 9–19 × 3–6 mm; stamens 12 (–13), filaments 0.5–2.5 × 0.1 mm, anthers c. 9 × 1 mm. Pistillate flowers (buds) c. 18 × 10 mm; sepals c. 8–12 × 10 mm, the margins minutely toothed; petals 15 × 8 mm; staminodial ring c. 1.2 mm high with 9 irregular, triangular teeth, 0.1–0.5 mm; gynoecium syncarpous, tricarpellate, triovulate, ovary c. 4 mm diam., stigmas 3, angled, c. 5 × 1 mm, papillose and scaly.

Mature fruit 7–8 × 4–5 cm, tipped with a short beak to 4 × 7 mm and stigmatic remains; endocarp c. 6.5 × 4 cm, ellipsoid, apically ± pointed, basally truncate, very heavily thickened, c. 10–15 mm thick, pale brown when fresh, becoming grey with age, very deeply and irregularly longitudinally grooved, with 3 very deep basal impressions each with a central germination pore, in section the body of the endocarp traversed by longitudinal irregular vertical canals and fibres, inner surface of the endocarp with numerous irregular rounded excrescences intruding into the locule. Seed c. 4 × 2 cm; embryo c. 3 × 2 mm, positioned opposite an endocarp pore. Germination remote-tubular; eophyll and leaves 2 (and 3) entire, lanceolate, c. 30 × 7 cm, leaves (3 and) 4 bifid, concolorous. (Plate 1, Figs. 1 & 2).

MADAGASCAR. Maroantsetra, Masoala Peninsula, Antalavia, swampy valley bottom at c. 400 m, primary forest rich in palms and pandans, 17 Oct. 86, *J. Dransfield, D. N. Cooke & Gerard Jean* JD6389 (holotype K; isotypes AAU, BH, MO, NY, P, TAN, US) & JD6391 (BH, K, MO, NY, P, TAN) (seedling).

Seed collected in October 1986 germinated at Kew in February 1987.

*Voanioala gerardii* seems to be a very rare palm. Unless the superb primary rain forests of the Masoala Peninsula can be effectively protected against further destruction and palms in particular safeguarded from destructive exploitation for palm cabbage then the chances of survival for this remarkable and beautiful palm are slim indeed.

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