

Revision of the Genus *Pandanus* Stickman. Part 40 The Fijian Species of the Section *Pandanus*¹

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THE FIJIAN ISLANDS are in part continental islands with igneous rocks, in part oceanic islands of volcanic origin. Probably because of the old continental connection four other sections of the genus, besides section *Pandanus*, are present in its flora. Most of these have as fruits small drupes without aerenchyma, non-

buoyant, not ocean-distributed. These were described in the author's part 38 (1975). Also present are the remaining species, all with compound ovaries, forming phalanges with aerenchyma. These are buoyant and regularly sea-dispersed. They are classified in the section *Pandanus*, and they are described in this paper.

KEY TO SPECIES

1. Phalange apex truncate or subtruncate,
2. Phalanges 6.2-8.7 cm long,
 3. Phalanges 6.2-8.7 cm long; central apical sinuses 3-6 mm deep; endocarp in the upper 3/7; stigmas 1.5-2.5 mm long, elliptic. Naitamba I. *P. elongatus*.
 3. Phalanges 6.2-7.4 cm long; central apical sinuses 2-3 mm deep; endocarp in the upper 1/3; stigmas 1.8-2.2 mm wide, suborbicular. Vatoa I. *P. alveatus*.
2. Phalanges 2.5-6.1 cm long,
 4. Phalanges 2.5-3 cm long; central apical sinuses 1.5-3 mm deep; endocarp median, 13-16 mm long; leaf middle 3.4 cm wide, and there with 52 parallel secondary veins in each half, and there the margins with prickles 1.9-2.2 mm long. Vanua Mbalavu I. *P. sinicola*.
 4. Phalanges 4.5-6.1 cm long,
 5. Central apical sinuses 8-10 mm deep; phalanges 5.3-6 cm long; carpels radial; endocarp nearly median; leaf middle 6.8 cm wide, and there with 72 parallel secondary veins in each half; marginal carpel apices oblate hemispheric. Moala I. *P. moalaensis*.
 5. Central apical sinuses 1-5 mm deep; carpels more or less parallel,
 6. Phalanges 4.5-5 cm long, central apical sinuses 3-5 mm deep; endocarp in the upper 2/5; leaf middle 4.4 cm wide, and there with 63 parallel secondary veins in each half, and there with marginal prickles 1.5-1.7 mm long. Viti Levu I. *P. Vandra*.
 6. Phalanges 4.9-6.1 cm long; central apical sinuses 1-2.5 mm deep,
 7. Phalanges 4.9-5.7 cm long; central apical sinuses 1-2 mm deep; leaf middle 3.7 cm wide, and there the margins with prickles 0.8-1.3 mm long, almost appressed ascending. Matuku I. *P. matukuensis*.
 7. Phalanges 5.8-6.1 cm long; central apical sinuses 1.5-2.5 mm deep; leaf middle 4.2-5.2 cm wide,
 8. Stigmas 1.8-2 mm long, broadly elliptic; leaf middle 4.2 cm wide, and there with marginal prickles 1.5-2.5 mm long. Moala I. *P. Smithii*.
 8. Stigmas 2-3.3 mm wide, broadly cordate to reniform; leaf middle 5-5.2 cm wide and with marginal prickles 1-1.3 mm long. Fulanga I. *P. Mbalawa*.

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1. Phalange apex convex,
 9. Phalanges 3.5–4.2 cm long,
 10. Central apical sinuses 2–4 (–5) mm deep; leaf middle 4–4.2 cm wide; phalanges 3.5–3.7 cm long. Waya I. *P. yasawaensis*.
 10. Central apical sinuses 5–8 mm deep; leaf middle 2.8 cm wide; phalanges 3.9–4.2 cm long. Waya I. *P. wayaensis*.
 9. Phalanges 4.7–9.7 cm long,
 11. Phalanges 7–9.7 cm long,
 12. Phalanges 9–9.7 cm long; central apical sinuses 9–18 (–28) mm deep; carpels radial; endocarp 35 mm long; leaf middle 7.2 cm wide. Vatoa I. *P. vatoaensis*.
 12. Phalanges 7–8.2 cm long,
 13. Central apical sinuses 3–7 mm deep,
 14. Central apical sinuses 5–7 mm deep; phalanges 6.7–7.4 cm long; endocarp 25–28 mm long; leaves near the base 10 cm wide. Vanua Levu I. *P. patulior*.
 14. Central apical sinuses 3–5 mm deep; phalanges 7.7–8.2 cm long; endocarp 18–19 mm long; leaves 5 cm wide near the base. Viti Levu I. *P. seruaensis*.
 13. Central apical sinuses 1.5–3 mm deep; phalanges 7–7.9 cm long; endocarp 29 mm long; leaves 7.5 cm wide near the base. Viti Levu I. *P. nandiensis*.
 11. Phalanges 4.7–7 cm long,
 15. Central apical sinuses 1–2.5 mm deep,
 16. Carpels narrowly radial; leaf middle 8 cm wide, and there with 78 parallel secondary veins in each half; central apical sinuses 1–2 mm deep. Vatoa I. *P. lauensis*.
 16. Carpels more or less parallel; leaf middle 4.2–6 cm wide, and there with 59–61 parallel secondary veins in each half; central apical sinuses 1.5–2.5 mm deep,
 17. Central apical sinuses 2–2.5 mm deep; apices of marginal carpels oblate pyramidal; leaf middle 6 cm wide. Viti Levu I. *P. swaensis*.
 17. Central apical sinuses 1.5–2.5 mm deep; apices of marginal carpels low convex and retuse with a concave distal platform; leaf middle 4.2 cm wide. Fulanga I. *P. Mbalawa*.
15. Central apical sinuses 2–7.5 mm deep, see part B.

Part B

18. Apices of marginal carpels hemispheric to broadly convex, and with concave distal platforms,
 19. Endocarp without shoulders, 22–23 mm long; leaf middle 5 cm wide, with 68 parallel secondary veins in each half; central apical sinuses 2–5 mm deep. Viti Levu I. *P. crassiaculeatus*.
 19. Endocarp with curved ascending shoulders; leaf middle 2.8–4.4 cm wide,
 20. Leaf middle 3.6–3.7 cm wide,
 21. Leaf middle with marginal prickles 1.2–1.5 mm long; central apical sinuses 4–6 mm deep; endocarp 13–16 mm long, rounded over the seeds. Vanua Levu I. *P. lambasuaensis*.
 21. Leaf middle with marginal prickles 1–1.3 mm long; central apical sinuses 3–4 mm deep; endocarp 24–25 mm long. Ovalau I. *P. Kraussii*.
 20. Leaf middle 4–8 cm wide,

22. Leaf middle 4.4 cm wide, and there with 57 parallel secondary veins in each half, and there with marginal prickles 2 mm long; central apical sinuses 3–5 mm deep; endocarp 19–20 mm long, conical over each seed. Ono-i-Lau I.
 *P. onoilauensis*.
22. Leaf middle 8 cm wide, and there with 81 parallel secondary veins in each half; central apical sinuses 5–7 mm deep; endocarp 25–28 mm long. Vanua Levu I. *P. patulior*.
18. Apices of marginal carpels ovoid, without, or with but tiny, distal platforms,
23. Phalanges 6.7–7 cm long,
24. Carpel apices without platforms; central apical sinuses 5–7 mm deep; leaf middle 6.4 cm wide, and there with marginal prickles 1.7–2 mm long. Totoya I. *P. pansus*.
24. Carpel apices with a distal platform; leaf middle 8 cm wide. Vanua Levu I. *P. patulior*.
23. Phalanges 5.2–6.6 cm long; marginal carpel apices with a concave distal platform; leaf middle 4.5–6 cm wide,
25. Phalanges 5.2–5.4 cm long; central apical sinuses 4–7.5 mm deep; endocarp without or with but short horizontal shoulders; basal mesocarp 13–17 mm long. Naitanba I. *P. subhumerosus*.
25. Phalanges 5.7–6.2 cm long; central apical sinuses 3–6 mm deep; endocarp with prominent curved ascending shoulders,
26. Leaf middle 5.8–6 cm wide, and there with 65–66 parallel secondary veins in each half; phalange apex convex,
27. Central apical sinuses 3–6 mm deep; leaf middle with marginal prickles 1.4–2 mm long; basal mesocarp 27 mm long; endocarp very oblate subglobose. Viti Levu I. *P. pyriformis*.
27. Central apical sinuses 5–7 mm deep; basal mesocarp 20–22 mm long; endocarp elliptic rhomboidal; leaf middle with marginal prickles 2.2–2.9 mm long. Ovalau I. *P. ovalauensis*.
26. Leaf middle 4.5–4.8 cm wide, and there with 56–62 parallel secondary veins in each half; central apical sinuses 3–5 mm deep; basal mesocarp 17–29 mm long,
28. Phalanges 2.8–3.5 cm wide; endocarp in the upper 1/3 and 17–19 mm long, the upper half convex; seeds all on the same level; leaf middle margins with prickles arcuate subulate, with reddish tips; basal mesocarp 27–29 mm long. Viti Levu I.
 *P. Parhamii*.
28. Phalanges 2.4–2.9 cm wide; endocarp median and 24–27 mm long, the upper half lanceoloid; inner seeds much higher up than the marginal ones; leaf margins with the prickles stramineous. Viti Levu I. *P. rhizophorensis*.

***Pandanus alveatus* sp. nov.** (sect. *Pandanus*)

Figure 364

NOM. VERN.: "vandra" (Fijian language)

DIAGNOSIS HOLOTYPE: Arbor 5 m alta est, trunco 18–20 cm diametro, radicibus suffulcibus paucis irregularibus, foliis 1.29 (+0.04–0.1?) m longis proxima basem 8–9 cm latis in

medio 5 cm latis coriaceis U-sulcatis 2-plicatis supra viridibus lucidis infra pallidioribus et licet glaucis in sectione mediali cum 57 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis subobliquis et infra proxima basem subevidentis et reticula breve rhombica formantibus, lamina gladiata ex basi in apice deminuenti (apice interito), ex 7 cm marginibus

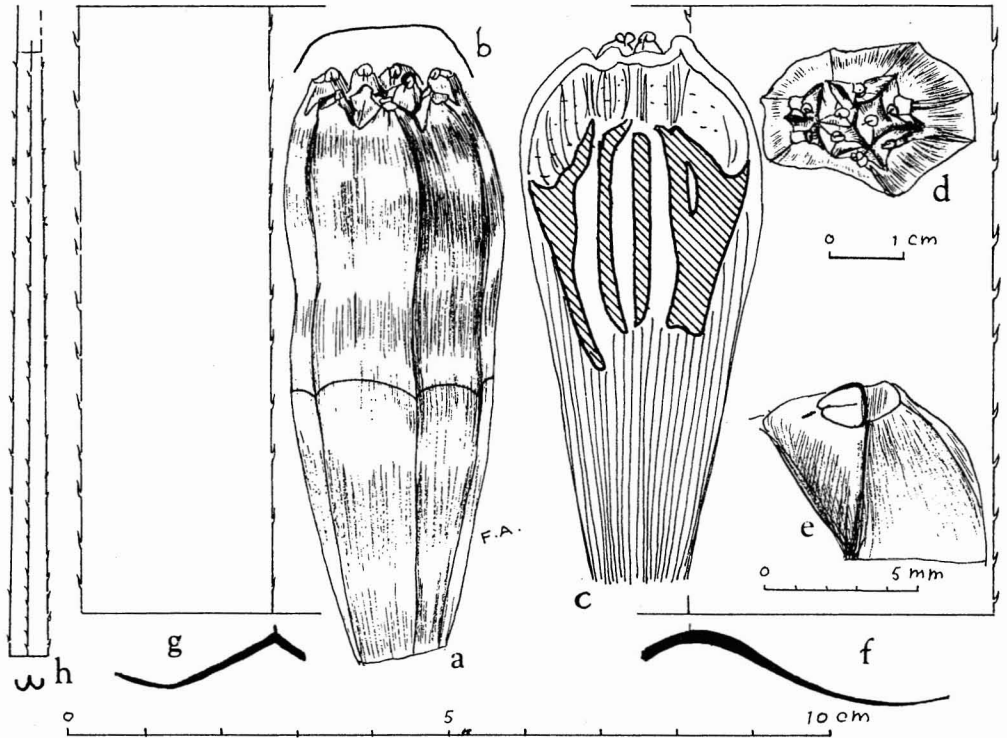


FIGURE 364. *Pandanus alveatus* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

cum aculeis 1.8–2.5 mm longis 5–12 mm separatis arcuatis subulatis compressis adscendentibus stramineis cum apicibus rubris, ex 9 cm midnervo infra cum aculeis 2.5–3 mm longis 8–25 mm separatis subulatis valde adscendentibus stramineis cum apicibus rubris, in sectione mediali marginibus cum aculeis 1.3–2 mm longis 6–18 mm separatis subarcuatis subulatis valde adscendentibus stramineis cum apicibus rubris, midnervo vicinali infra cum aculeis 1–1.5 mm longis 5–10 mm separatis subarcuatis subulatis compressis adpese adscendentibus stramineis cum apicibus rubris, syncarpio licet solitario nucleo cum cicatricibus 1–2 cm profundis ex fibris et carne formantibus phalangibus 6.2–7.4 cm longis 2.7–3.2 cm latis 1.6–2.6 cm crassis prismaticis 5–7-angulosis apice truncato lateribus inferis planis parte $\frac{1}{2}$ supera libera lateribus laevibus lucidis subconvexis vel subplanis sine angulis secundariis sinibus lateralibus nullis, carpelis 5–11 fere parallelis et cum apicibus sub-

aequalibus cum apicibus pyramidalibus erectis eis interioribus concinnis illis marginalibus cum areola concava obliqua 1–2 mm lata distali, stigmatibus 1.8–2.2 mm latis suborbicularibus obliquis brunneis papillosis, sinibus proximalibus cum labiis $\frac{1}{4}$ – $\frac{1}{2}$ ad fondam extensis et in lacuna terminanti, sinibus centralibus apicalibus 2–3 mm profundis V-formatis rectis, endocarpio in parte $\frac{1}{3}$ supera et 31–32 mm longo osseoso obscure rubri-brunneo corpore cuneiformato basi concava apice hemisphaerico et supra semines cum projectionibus lanceoloidis brevibus humeris in parte $\frac{1}{4}$ supera brevibus subadscendentibus lateribus lateralibus 2–4 mm crassis intra clariter rubri-brunneis lucidis sed spiraliter rugosis, seminibus 8–9 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 7–15 mm longam cum aerenchyma fibris longitudinalibus et parenchyma formanti, mesocarpio basali 31–37 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 5 m tall, 18–20 cm in diameter; prop roots small, irregular; leaves 1.29 (+0.04–0.1?) m long, 8–9 cm wide near the base, 5 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, green and shiny above, paler green, dull, and apparently glaucous below, at midsection with 57 parallel secondary veins in each half, the tertiary cross-veins slightly oblique, seen faintly below near the base, forming short rhombic meshes; blade sword-shaped, tapering from base to tip (the apex lost); the base unarmed, pale; beginning at 7 cm the margins with prickles 1.8–2.5 mm long, 5–12 mm apart, arcuate subulate, compressed, ascending, stramineous, with red tips; beginning at 19 cm the midrib below with prickles 2.5–3 mm long, 8–25 mm apart, subulate, strongly ascending, stramineous, with red tips; at midsection the margins with prickles 1.3–2 mm long, 6–18 mm apart, subarcuate subulate, strongly ascending, stramineous with red tips; the nearby midrib below with prickles 1–1.5 mm long, 5–10 mm apart, subarcuate subulate, compressed, appressed ascending, stramineous with red tips; syncarp apparently solitary; core covered by fruit scars, each with a socket 1–2 cm deep, formed by the surface tissues, fibers, and flesh detached from the lower sides of the phalange; phalanges 6.2–7.4 cm long, 2.7–3.2 cm wide, 1.6–2.6 cm thick, prismatic, 5–7-angled, the apex truncate, the lower sides flat, upper $\frac{1}{2}$ free, its sides smooth, shining, the sides gently convex or flattish, without secondary angles, lateral sinuses none; carpels 5–11, nearly parallel, their apices subequal, pyramidal, erect, the inner ones symmetrical, but the marginal ones with a concave oblique platform 1–2 mm wide, distal of the stigma; stigmas 1.8–2.2 mm wide, suborbicular, oblique, brown, papillose; proximal sinuses of bordering lips, ending in an open hole, running $\frac{1}{4}$ – $\frac{1}{2}$ way to valley bottom; central apical sinuses 2–3 mm deep, V-shaped, straight; endocarp in upper $\frac{1}{3}$ and 31–32 mm long, bony, dull reddish brown, the body cuneiform, the base concave, the apex hemispheric, with short lanceoloid projections over the seeds, shoulders at upper $\frac{1}{4}$, short, slightly ascending, lateral walls 2–4 mm thick, within brighter colored, shining, but spirally rugose; seeds 8–9 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern

7–15 mm long, with aerenchyma of longitudinal fibers and parenchyma; basal mesocarp 31–37 mm long, fibrous and fleshy.

HOLOTYPE: Fiji Islands, Lau Group, Vatoa Island, 28/X/68, *Yoshio Kondo* 3 (BISH).

DISCUSSION: The type specimen is quite ample, of several leaves and numerous fruits. The fruits are of two kinds, first mature, fallen ones, weathered, and some of them sprouting the first roots. These phalanges are 6–6.7 cm long, and some are square at the base, as if the fibers had all broken off evenly at the fruit scar on the core. Some have the base irregular, and others have it shortened, as if chewed off by animals. There is also a quarter of a core, with 8 attached phalanges, well preserved. The lateral ones are 7.3–7.5 cm long. As indicated in the diagnosis, these are shed in a very peculiar manner, falling off leaving the basal 1–2 cm of their lateral surface tissues, including the epidermis, several thicknesses of fibers, and the intervening flesh, attached to the core and forming a deep socket around the fruit scar. The inner flesh exposed by this exfoliation seems to be very soft and juicy. It seems that this basal part, nearly 1 cm long, either decays and falls away or is eaten off by animals, so that in some instances a flat, regular-appearing base is left. Consequently the 7.3–7.5 cm length is considered the actual one for the phalanges, and the 6–6.7 cm length the one due to postmaturity decay or to animal injury.

P. alveatus is a member of the section *Pandanus*, as is its closest relative, *P. lauensis* St. John, also of Vatoa Island, a species with the phalanges 6.1–6.7 cm long, 2.7–4.1 cm wide, cuneiform, the upper $\frac{1}{3}$ free; carpels narrowly radial; marginal carpels with apices hemispheric or oblatelately so, without a distal platform; central apical sinuses 1–2 mm deep; endocarp in upper $\frac{5}{13}$, and 25–26 mm long; basal mesocarp 22–30 mm long; leaves 1.7 m long, 8 cm wide at the middle, and there with 78 parallel secondary veins in each half, and there the margins with prickles 2.7–3 mm long, 7–10 mm apart, slender subulate, appressed ascending, madder. *P. alveatus* has the phalanges 7.3–7.5 cm long, 2.7–3.2 cm wide, prismatic, the upper $\frac{1}{2}$ free; carpels nearly parallel; marginal carpels with

apices pyramidal with a distal platform 1–2 mm wide; central apical sinuses 2–3 mm deep; endocarp in upper 1/3 and 31–32 mm long; basal mesocarp 31–37 mm long; leaves 1.3 m long, 5 cm wide at the middle, and there with 57 parallel secondary veins in each half, and there the margins with prickles 1.3–2 mm long 6–18 mm apart, subarcuate subulate, strongly ascending, stramineous with red tips.

The new epithet is the Latin adjective, *alveatus*, hollowed out or pitted, and it is given with reference to the sockets around the fruit scars on the core.

Pandanus crassiaculeatus sp. nov. (sect. *Pandanus*)

Figure 365

NOM. VERN.: “vadra” (= “vandra”), Fijian language.

DIAGNOSIS HOLOTYPI: Arbor 8–10 m alta cum radicibus suffulcientibus brevibus est (trunco ramis cortice syncarpioque incognitis), foliis 1.2–1.25 m longis proxima basem 6.5–7 mm latis in medio 5 cm latis coriaceis supra lucidis infra palliditer viridibus et licet glaucis V-sulcatis 2-plicatis in sectione mediali cum 68 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis supra ad basim evidentis lamina gladiata ex basi in apice trigono gracile subulato deminuenti eo in puncto 10 cm ex apice 2.5 mm lato basi inermi pallida ex fere 7–8 cm marginibus cum aculeis 1.8–2.5 mm longis 4–12 mm separatis arcuatis crasse subulatis adscendentibus stramineis, ex fere 9–10 cm midnervo infra cum aculeis 1.3–1.8 mm longis 14–21 mm separatis subarcuatis crasse subulatis adpresse adscendentibus stramineis, in sectione mediali marginibus cum aculeis 1.3–1.5 mm longis 3–11 mm separatis subarcuatis crasse subulatis compressis valde adscendentibus stramineis cum apicibus obscure rubris, in apice subulato marginibus et midnervo infra cum aculeis 0.2–0.4 mm longis 2–8 mm separatis crasse subulatis valde adscendentibus obscure rubris, phalangibus 6.1–6.3 cm longis 3.4–5.1 cm latis 2.6–3.2 cm crassis late obovoideis valde compressis 4–6 angulis principalibus et carpela quoque cum angulis 1–2 secundariis longitudinalibus apice lato convexo sinibus lateralibus

angustis vel medium descendentibus parte infera carnosa et in sicca deminuenta parte 1/2–3/5 supera libera laevi lucida, carpelis (7–) 9–12 plus minusve parallelis eis marginalibus cum apicibus oblate semiorbicularibus paululum pluriangulosis eis majoribus cum areola concava 2–4 mm lata distali, carpelis interioribus cum apicibus subaequalibus vel plerumque 2/3 tam grandibus quam marginalibus plus concinnis, sinibus apicalibus centralibus 2–5 mm profundis subrectis dimidio infero V-formato, stigmatibus 1.5–2 mm longis vel latis ellipticis ad reniformibus apicalibus obliquis et minime elevatis brunneis papillois, sinibus proximalibus oclusis vel in parte apertis et 1/2 ad fondam extensis, endocarpio in parte 2/5 supera et 22–23 mm longo transverse ellipsoideo sine humeris pallido osseoso lateribus lateralibus 4–6 mm crassis intra laevibus lucidis stramineis, seminibus 15–17 mm longis oblongi-ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 7–19 mm longam cum aerenchyma fibris longitudinalibus et membranis pallidis, mesocarpio basali 23–24 mm longo parte 2/3 supera fibrosa et carnosa parte 1/3 infera carnosissima et cum filamentis flexuosis.

DIAGNOSIS OF HOLOTYPE: Tree 8–10 m tall, with “short prop roots” (trunk, branches, bark, and syncarp not recorded); leaves 1.2–1.25 m long, 6.5–7 cm wide near the base, 5 cm wide at the middle, coriaceous, shining green above, pale green and apparently glaucous below, V-sulcate, 2-pleated, at midsection with 68 parallel secondary veins in each half, the tertiary crossveins visible above towards the base, forming short oblong meshes, the blade sword-shaped, tapering from the base to the trigonous slender subulate apex, this at the point 10 cm down 2.5 mm wide, the base unarmed, pale; beginning at about 7–8 cm the margins with prickles 1.8–2.5 mm long, 4–12 mm apart, arcuate stout subulate, ascending, stramineous; beginning at about 9–10 cm the midrib below with prickles 1.3–1.8 mm long, 14–21 mm apart, subarcuate stout subulate, appressed ascending, stramineous; at midsection the margins with prickles 1.3–1.5 mm long, 3–11 mm apart, subarcuate stout subulate, compressed, strongly ascending, stramineous but the tips dark red; the nearby midrib below with

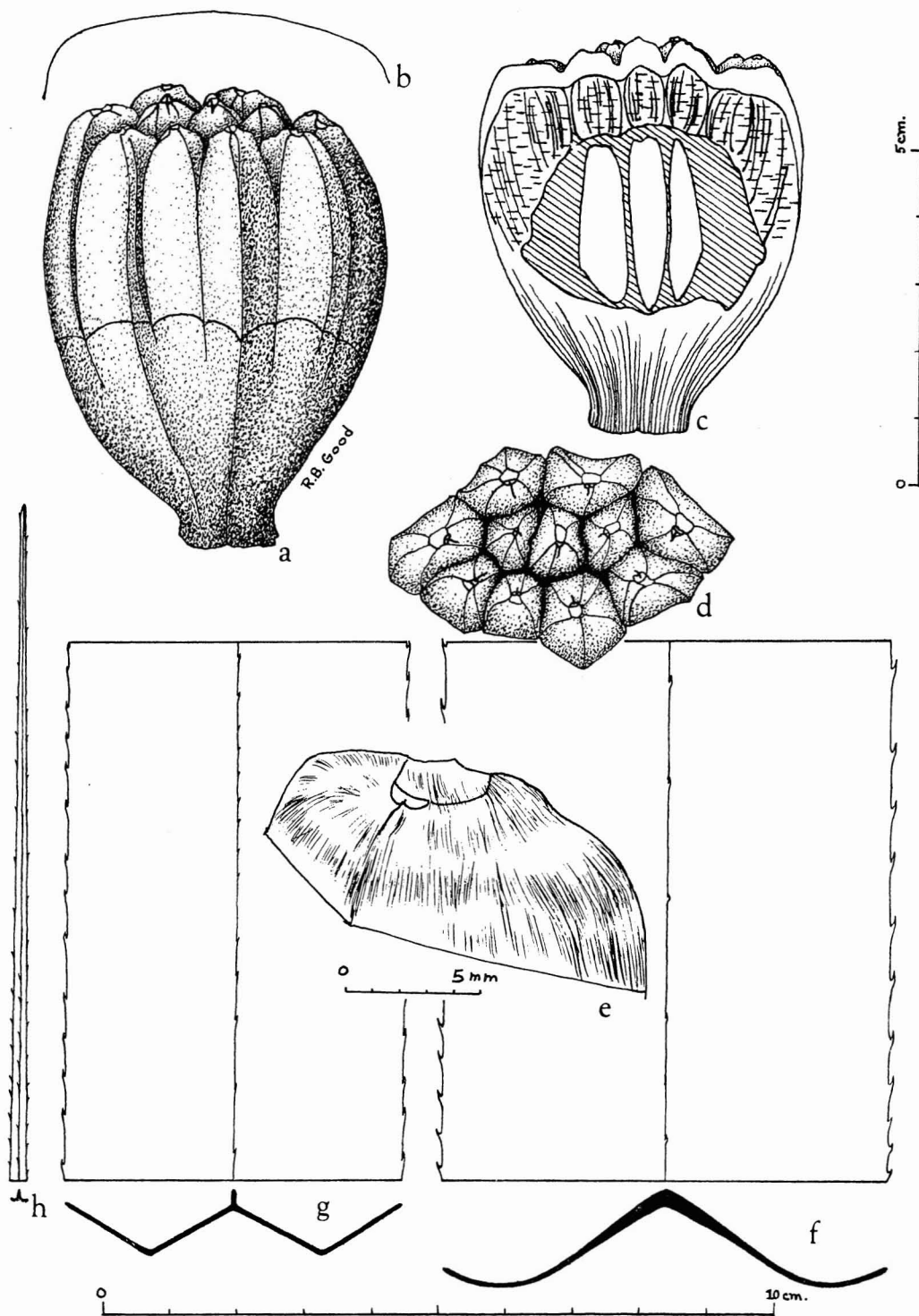


FIGURE 365. *Pandanus crassiaculeatus* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

prickles 0.3–0.7 mm long, 2–8 mm apart, stout subulate, strongly ascending, stramineous with dark red tips; on the subulate apex the margins and midrib with prickles 0.2–0.4 mm long, 2–8 mm apart, thick subulate, strongly ascending, dark red; phalanges 6.1–6.3 cm long, 3.4–5.1 cm wide, 2.6–3.2 cm thick, broadly obovoid, much compressed, with 4–6 major angles and each carpel with 1–2 secondary longitudinal angles, the broad apex convex, lateral sinuses narrow but distinct to below the middle, the lower part fleshy and much shrunken on drying, upper $\frac{1}{2}$ – $\frac{3}{5}$ free, the surface smooth, shining; carpels (7–) 9–12, more or less parallel, the apices of the marginal ones oblate semiorbicular, indistinctly several-angled, and all of the large ones with a concave platform 2–4 mm wide distal of the stigma; central carpel apices mostly $\frac{2}{3}$ as large, but a few as large, and all more symmetrical than the marginal ones; central apical sinuses 2–5 mm deep, nearly straight, the lower half V-shaped; stigmas 1.5–2 mm long or wide, elliptic to reniform, apical, oblique and slightly elevated, brown, papillose; proximal sinuses closed or partly open, running one-half way to valley bottom; endocarp in upper $\frac{2}{5}$ and 22–23 mm long, transversely ellipsoid, without shoulders, pale bony, the lateral walls 4–6 mm thick, within smooth, shining, stramineous; seeds 15–17 mm long, oblong-ellipsoid; mesocarp forming in the apex of each carpel a cavern 7–19 mm long, with aerenchyma of longitudinal fibers and pale membranes; basal mesocarp 23–24 mm long, the upper $\frac{2}{3}$ fibrous and fleshy, the lower $\frac{1}{3}$ very fleshy and with the fibers reduced to small pliant filaments.

HOLOTYPE: Fiji, Viti Levu, Nadi Prov., Queen's Road, near Korokula, swamp, 25.7.56, *D. Koroiveibau 10,277* (BISH). Isotype (SUA).

DISCUSSION: *P. crassiaculeatus* is a member of the section *Pandanus*, as is its closest relative, *P. odoratissimus* L. f., var. *Parksii* Martelli, a variety with the phalanges 5–5.2 cm long, 4–6-angled, the sides smooth; lateral sinuses none; central apical sinuses 2–3 mm deep; endocarp median, with ascending shoulders, the lateral walls 2–3 mm thick; basal mesocarp all equally fibrous and fleshy; leaves at midsection 6.4 cm wide, and there the margins with

prickles 1.3–1.8 mm long, 3–5 mm apart, slender subulate, almost straight, subappressed ascending, perceptibly of two kinds, large and small alternating. *P. crassiaculeatus* has the phalanges 6.1–6.3 cm long, with 4–6 major angles and each carpel with 1–2 secondary longitudinal angles; lateral sinuses narrow but distinct to below the middle; central apical sinuses 2–5 mm deep; endocarp in upper $\frac{2}{5}$, without shoulders, the lateral walls 4–6 mm thick; basal mesocarp with lower $\frac{1}{3}$ very fleshy and the fibers reduced to pliant filaments; leaves at midsection 5 cm wide, and there the margins with prickles 1.3–1.5 mm long, 3–11 mm apart, subarcuate stout subulate, compressed, strongly ascending.

The new epithet is from the Latin adjectives, *crassus*, thick, and *aculeatus*, with prickles, and it is given with reference to the stout prickles of the leaf margins.

Pandanus elongatus sp. nov. (sect. *Pandanus*)

Figure 366

NOM. VERN. "vadra" (= "vandra"), (Fijian language).

DIAGNOSIS HOLOTYPI: Radices caules folia syncarpiumque incogniti sunt, phalangibus 7.8–8.7 cm longis 2.7–3.6 cm latis 2.1–3.2 cm crassis anguste oblanceoloideis 5–6-angulosis apice truncato vel vadose convexiter subtruncato lateribus laevibus lucidis subcurvatis sine angulis secundariis sinibus lateralibus nullis, carpelis 6–11 arcuatis adscendentibus eis marginalibus incurvatis, apicibus marginalibus pyramidalis-lanceoloideis plerumque sine areola concava, stigmatibus 1.5–2.5 mm longis ellipticis valde obliquis brunneis papillosis, apicibus subaequalibus, sinibus proximalibus cum bordinis labiformatis et $\frac{1}{5}$ – $\frac{1}{3}$ ad fundam extensis, sinibus apicalibus centralibus 3–6 mm profundis subrectis anguste V-formatis, endocarpio in parte $\frac{3}{7}$ supera et 31–32 mm longo osseoso partibus exterioribus et medialibus stramineis fere ellipsoideis sed supra semines quaeque cum projectione conico humeris brevibus curvatis adscendentibus lateribus lateralibus 2–3 mm crassis intra obscure brunneis lucidis sed ad apicem spiraliter striatis, semine 13–15 mm longo ellipsoideo, mesocarpio in apice carpelae cuius-

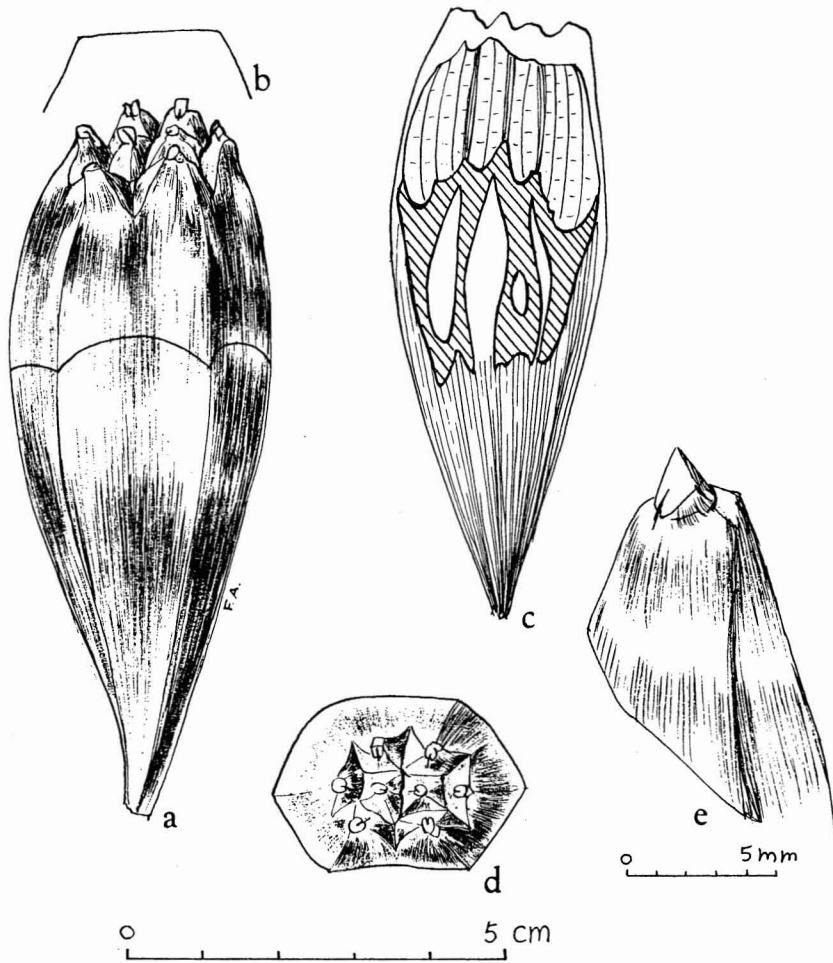


FIGURE 366. *Pandanus elongatus* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$.

que cavernam 13–23 mm longam cum aerenchyma fibris longitudinalibus et membranis albis pellucidis formanti, mesocarpio basali 28–36 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Roots, stems, leaves, and syncarp unknown; phalanges 7.8–8.7 cm long, 2.7–3.6 cm wide, 2.1–3.2 cm thick, narrowly oblanceoloid, 5–6-angled, the apex truncate or low convex subtruncate, the sides smooth, shining, gently convex, without secondary angles, lateral sinuses none; carpels 6–11, arcuate ascending and the marginal ones incurving; apices of the marginal carpels

pyramidal lanceoloid, mostly without a distal platform; stigmas 1.5–2.5 mm long, elliptic, very oblique, brown, papillose; apices of inner carpels subequal to the marginal ones; proximal sinuses with wide liplike margins, but running only $1/5$ – $1/3$ way to valley bottom; central apical sinuses 3–6 mm deep, nearly straight, narrowly V-shaped; endocarp in upper $3/7$ and 31–32 mm long, bony, the outer and median layers stramineous, nearly ellipsoid, but with a conic projection ascending over each seed, and with short, curved, ascending shoulders, lateral walls 2–3 mm thick and dark brown, within shining, smooth below but near the apex

spirally striate; seeds 13–15 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 13–23 mm long, containing aerenchyma of longitudinal fibers and white transparent membranes; basal mesocarp 28–36 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Lau Province, Naitanba (= Naitamba) Island, 13.8.56, *M. Miller 10,450* (BISH). Isotype (SUVA).

DISCUSSION: *P. elongatus* is a member of the section *Pandanus*, as is its closest relative, *P. infer* St. John, of Palawan Island, Philippines, a species with the phalanges 7.2–8.2 cm long, 2.1–3 cm wide, narrowly prismatic, the upper 1/9 free; central apical sinuses 7–8 mm deep; stigmas rounded to reniform, horizontal; endocarp in lower 1/3; and the seeds 6–7 mm long. *P. elongatus* has the phalanges 7.8–8.7 cm long, 2.7–3.6 cm wide, narrowly oblanceoloid, the upper 3/7 free; central apical sinuses 3–6 mm deep; stigmas elliptic, very oblique; endocarp in upper 3/7; seeds 13–15 mm long; and the leaves unknown.

The new epithet is the Latin participle *elongatus*, lengthened, and it is given with reference to the very long phalanges.

Pandanus Kraussii sp. nov. (sect. *Pandanus*)

Figure 367

DIAGNOSIS HOLOTYPI: Licet arbor est (statura radices truncus rami et infructescentia incongiti sunt), foliis 1.04 m longis proxima basem 5–6 cm latis in medio 3.7 cm latis coriaceis U-sulcatis 2-plicatis supra lucidis olivaceis infra pallide viridibus et glaucis in sectione mediali cum 54 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis infra in parte $\frac{1}{4}$ basali evidentis et reticula breve oblonga formantibus, lamina gladiata ex basi in apice trigono graciliter subulato deminuenti eo in puncto 10 cm ex apice 9 mm lato basi inermi pallida, ex 7 cm marginibus cum aculeis 0.7–1.4 mm longis 3–6 mm separatis subarcuatis subulatis compressis valde adscendentibus stramineis, midnervo infra per 35 cm basales inermi, in sectione mediali marginibus cum aculeis 1–1.3 mm longis 3–5 mm separatis arcuatis

subulatis fere adpresse adscendentibus stramineis, midnervo infra vicinali cum aculeis 0.7–1 mm longis 1–10 mm separatis arcuatis graciliter subulatis adpresse adscendentibus stramineis, plicis inermibus, in apice subulato marginibus et midnervo cum aculeis 0.3–0.6 mm longis 1–4 mm separatis arcuatis subulatis compressis valde adscendentibus stramineis, phalangibus 5.4–6.2 cm longis 3.7–4.1 cm latis 2.5–3 cm crassis obovoideis compressis 6-angulosis apice convexo lateribus inferis planis sinibus lateralibus fissuris angustis fere ad medium extensis parte 3/7 supera libera lateribus laevibus lucidis cum planis subcurvatis et cum nullis vel paucis angulis secundariis, carpelis 8–9 adscendentibus plus minusve parallelis (vel subradiatis) eis marginalibus cum apicibus oblate hemisphaericis et cum areola concava 3–6 mm lata distali, stigmatibus 1.5–2.5 mm latis suborbicularibus prostratis vel elevatis brunneis papillosis, sinibus proximalibus fissura angusta $\frac{1}{2}$ – $\frac{2}{3}$ ad fundam extensis, apicibus centralibus 1/3–2/3 tam grandibus quam illis marginalibus, sinibus centralibus apicalibus 3–4 mm profundis fere rectis V-formatis, endocarpio in parte 5/13 supera et 24–25 mm longo osseoso rubri-brunneo corpore subsphaerico apice cum projectione ovoideo parvo supra carpela quamque humeris medialibus et latis sed apicibus alatis curvatis adscendentibus lateribus lateralibus 4–7 mm crassis intra clariter rubri-brunneis lucidis sed supra rugosis, seminibus 8–11 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 6–17 mm longam cum aerenchyma fibris longitudinalibus et membranis pallidis formanti, mesocarpio basali 19–21 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Doubtless a tree (stature, habit, roots, trunk, branches, and infructescence unknown); leaves 1.04 m long, 5.6 cm wide near the base, 3.7 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, above shiny olive green, below pale green and glaucous, at midsection with 54 parallel secondary veins in each half, the tertiary crossveins seen below in the lower $\frac{1}{4}$, forming short oblong meshes, the blade sword-shaped, tapering from base to the trigonous slender subulate apex, this at the point 10 cm down 9 mm wide, the base

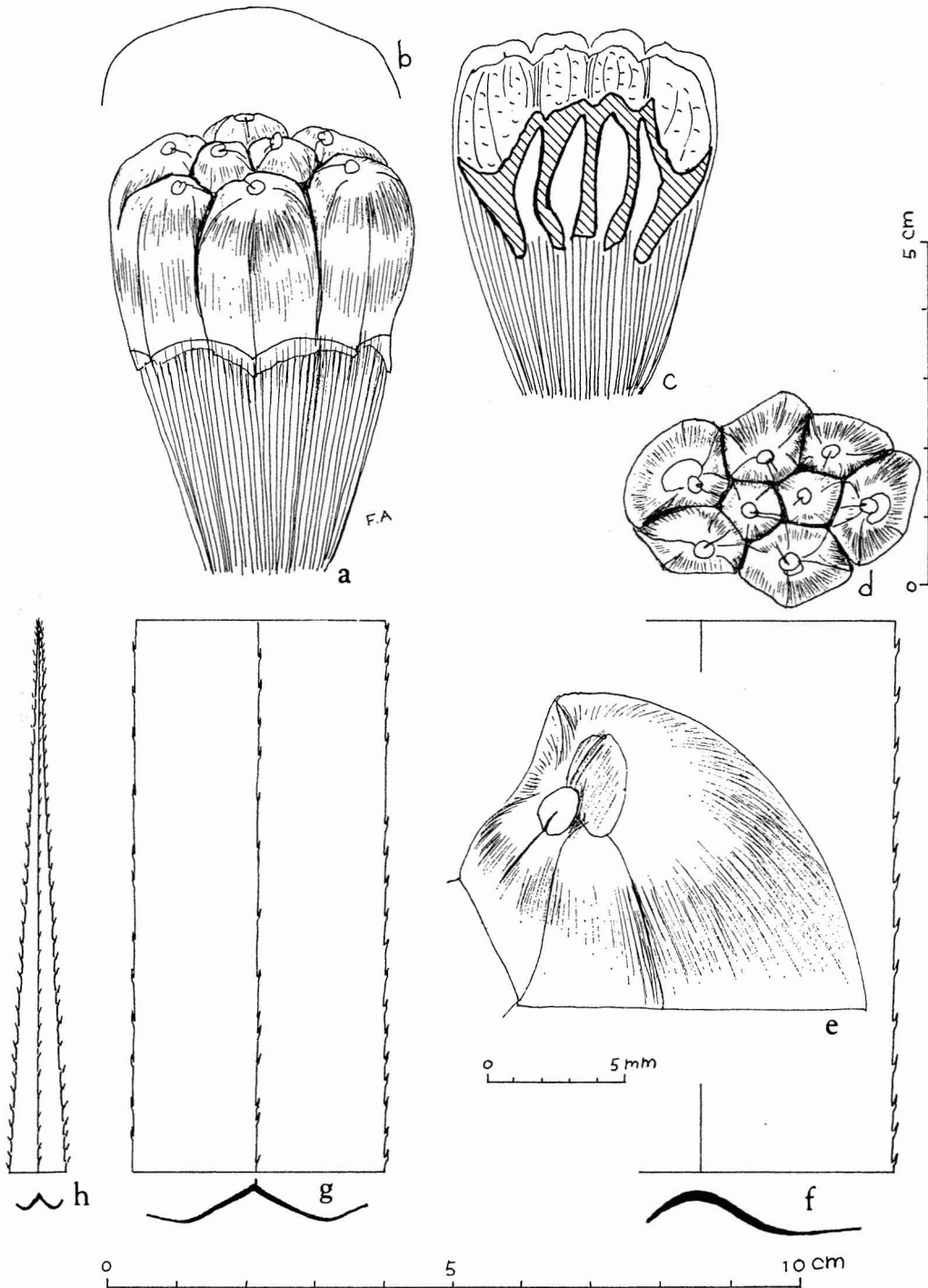


FIGURE 367. *Pandanus Kraussii* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpal apex with stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

unarmed, pale; beginning at about 7 cm the margins with prickles 0.7–1.4 mm long, 3–6 mm apart, subarcuate subulate, compressed, strongly ascending, stramineous; the midrib below unarmed for 35 cm; at midsection the margins with prickles 1–1.3 mm long, 3–5 mm apart, arcuate subulate, almost appressed ascending, stramineous; the nearby midrib below with prickles 0.7–1 mm long, 1–10 mm apart, arcuate slender subulate, appressed ascending, stramineous; on the subulate apex the margins and midrib below with prickles 0.3–0.6 mm long, 1–4 mm apart, arcuate subulate, compressed, strongly ascending, stramineous; the pleats unarmed; phalanges 5.4–6.2 cm long, 3.7–4.1 cm wide, 2.5–3 cm thick, obovoid, compressed, 6-angled, the apex convex, lower sides flat, lateral sinuses narrow cracks running down to about the middle, the upper 3/7 free, its sides smooth, shining, of gently curving planes and with no or few secondary angles; carpels 8–9, ascending, more or less parallel (or subradial), the marginal ones with apices oblate hemispheric and with a concave platform 3–6 mm wide, distal of the stigma; stigmas 1.5–2.5 mm wide, suborbicular, flush or elevated, pale brown, papillose; proximal sinuses a narrow crack running $\frac{1}{2}$ – $\frac{2}{3}$ way to valley bottom; central carpel apices hemispheric, $\frac{1}{3}$ – $\frac{2}{3}$ as large as the marginal ones; central apical sinuses 3–4 mm deep, nearly straight, V-shaped; endocarp in upper 5/13 and 24–25 mm long, bony, reddish brown, the body subspherical, the apex with a small ovoid projection over each seed, the shoulders median and wide, but the tips winglike, curved ascending, lateral walls 4–7 mm thick, within bright reddish brown, shining but rugose above; seeds 8–11 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 6–17 mm long, with aerenchyma of longitudinal fibers and pale membranes; basal mesocarp 19–21 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Ovalau Island, Levuka, sea-shore, 28-xii-1969, *N. L. H. Krauss 1,301* (BISH).

DISCUSSION: *P. Kraussii* is a member of the section *Pandanus*, as is its closest relative, *P. onoilauensis* St. John, of Ono-i-Lau Island, Lau

Group, Fiji, a species with the phalanges 2.3–3.7 cm wide; central apical sinuses 3–5 mm deep; stigmas 1.5–1.7 mm wide, orbicular to reniform; endocarp in upper 2/5 and 19–20 mm long, very oblate spherical; all carpel apices hemispheric or somewhat oblately so; leaf middle 4.4 cm wide, and there with 57 parallel secondary veins in each half, and there the margins with prickles 2 mm long, 4–7 mm apart, subarcuate stout subulate, compressed, very strongly ascending, stramineous, with dark reddish brown tips. *P. Kraussii* has the phalanges 3.7–4.1 cm wide; central apical sinuses 3–4 mm deep; stigmas 1.5–2.5 mm wide, suborbicular; endocarp in upper 5/13 and 24–25 mm long, subspherical; marginal carpels with apices oblate hemispheric; leaf middle 3.7 cm wide, and there with 54 parallel secondary veins in each half, and there the margins with prickles 1–1.3 mm long, 3–5 mm apart, arcuate subulate, almost appressed ascending, stramineous.

The specimen here described has leaves and mature phalanges, three of them 5.4–6.2 cm long, as here described. There is one other quite similar phalange, but it is 7 cm long. It may be of the same species, but because of this marked difference in size, it is not included in the description presented above.

The new epithet is chosen to honor the collector, Noel Louis Hilmer Krauss (1910–), who long served as exploratory entomologist, Hawaii Department of Agriculture.

Pandanus lambasaensis sp. nov. (sect. *Pandanus*)

Figure 368

NOM. VERN.: “vadra” (= “vandra”), (Fijian language).

DIAGNOSIS HOLOTYPI: Arbor 7–8 m alta est, proxima basem cum radicibus suffulcentibus paucis, foliis 1.12–1.13 m longis proxima basem 5 cm latis in medio 3.6–3.8 cm latis coriaceis supra olivaceis lucidis infra pallidioribus lucidis et licet glaucis V-sulcatis 2-plicatis in sectione mediali cum 62 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis in paginis ambis proxima basem paulum evidentis et reticula breve oblonga formantibus, lamina

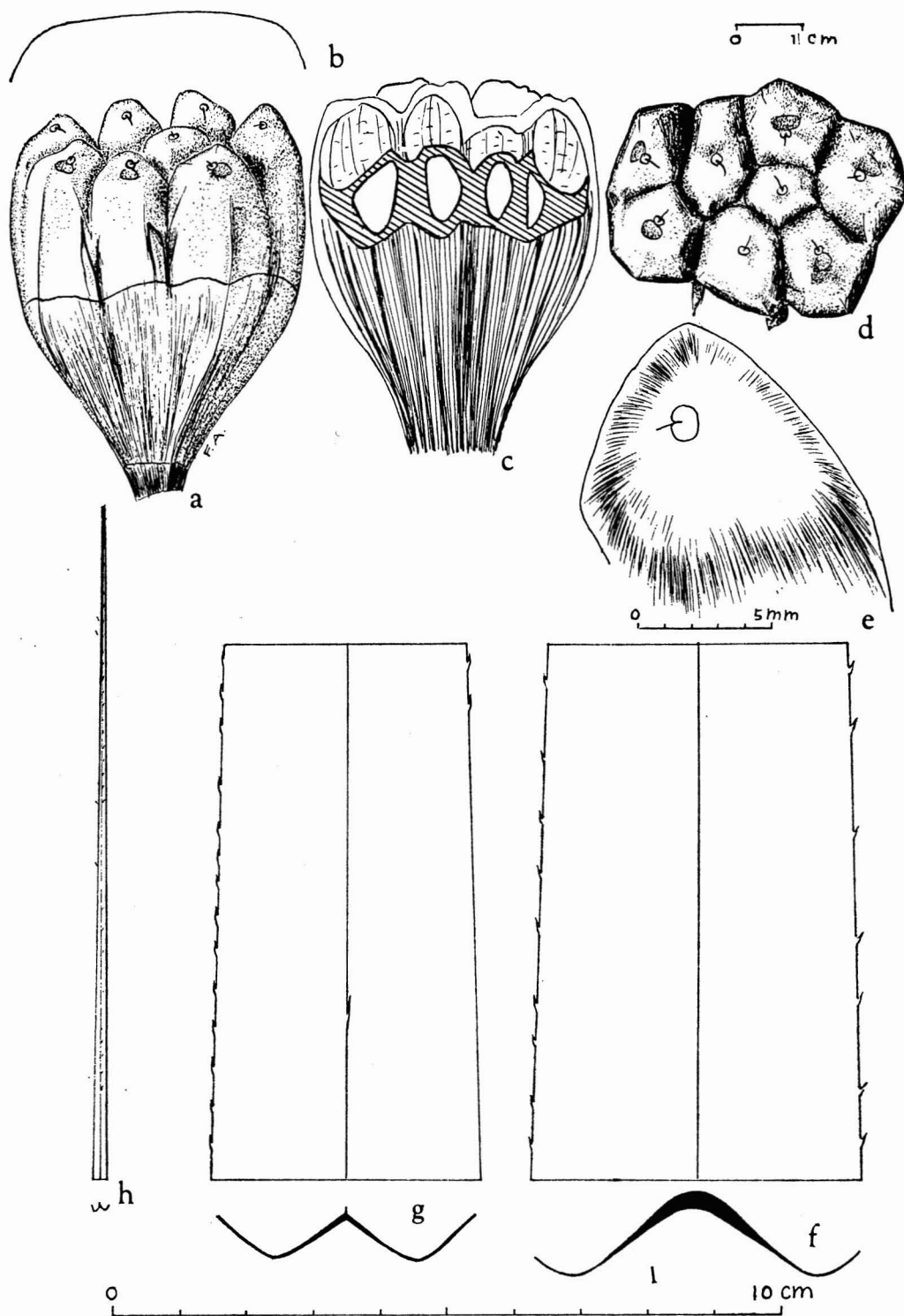


FIGURE 368. *Pandanus lambasaensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

gladiata ex basi ad apicem gracilem subulatum deminuenti eo in puncto 10 cm ex apice 2.5 mm lato basi inermi pallida, ex 6–8 cm marginibus cum aculeis 1–1.5 mm longis 3–12 mm separatis gracile subulatis adscendentibus ex basi conica stramineis eis inferis rectis illis sequentibus subarcuatis, ex 21–44 cm midnervo infra cum aculeis 1.5 mm longis 19–30 mm separatis crasse subulatis adpresse adscendentibus stramineis, in sectione mediali marginibus cum aculeis 1.2–1.5 mm longis 5–10 mm separatis arcuatis subulatis compressis subrubris adscendentibus fere adpressis, midnervo vicinali infra cum aculeis 1–1.2 mm longis 10–20 mm separatis arcuatis subulatis compressis adpresse adscendentibus stramineis, in apice subulato in parte infera marginibus et midnervo infra cum aculeis 0.2–0.4 mm longis 2–7 mm separatis arcuatis subulatis valde adscendentibus obscure rubris sed ad apicem aculeis paucis remotis, infructescencia non visa, phalangibus 5.3–6 cm longis (parte basali 5–7 mm longa molle carnosum cum fibris reductis solum filamentis et parte ea plerumque interita) 3.5–4.8 cm latis (in gemine cum 12 carpelibus 5.1 cm lato) 2.4–3.2 cm crassis late obovoidei-cuneatis 4–6-angulis apice convexo sinibus lateralibus nullis lateribus laevibus lucidis, carpelibus 6–8 et saepe cum 1–2 carpelibus feruliformatis accensis reductis exterioribus, carpelibus fertilibus adscendentibus plus minusve parallelis eis marginalibus cum apicibus vadosiore convexis et cum areola concava distali 3–5 mm lata, stigmatibus 1.3–1.5 mm diametro cordati-suborbicularibus horizontalibus prostratis brunneis papillois, sinibus proximalibus angustis $1/3$ – $2/3$ ad fundam extensis, carpelibus interioribus cum apicibus $1/3$ – $2/3$ tam grandibus quam exterioribus, sinibus centralibus apicalibus 4–6 mm profundis subrectis anguste V-formatis, endocarpio in parte $1/4$ supera et 13–16 mm longo osseoso plerumque stramineo late convexi-concavo cum humeris latis minime adscendentibus lateribus lateralibus 4–7 mm crassis intra obscure brunneis lucidis laevibus sed spiraliter striatis, seminibus 7–9 mm longis late ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 4–11 mm longam cum aerenchyma fibris longitudinalibus fortibus et membranis transversis firmis subbrunneis, mesocarpio basali cum parte supera principali 25–27 mm longa cum

fibris fortibus longitudinalibus multis et carne molle sed infra cum parte basali 5–7 mm longa plerumque carne molle et basibus fibrorum delicatis fragilibus.

DIAGNOSIS OF HOLOTYPE: Tree 7–8 m tall, and near the base with a few prop roots; leaves 1.12–1.13 m long, 5 cm wide near the base, 3.6–3.8 cm wide at the middle, coriaceous, above shiny olive green, below shiny slightly paler green and apparently glaucous, V-sulcate 2-pleated, at midsection with 62 parallel secondary veins in each half, the tertiary crossveins faintly seen near the base on both surfaces, forming short oblong meshes, blade sword-shaped, tapering from the base to the trigonous, slender subulate apex, this at the point 10 cm down 2.5 mm wide, the base unarmed, pale; beginning at 6–8 cm the margins with prickles 1–1.5 mm long, 3–12 mm apart, slender subulate from a conic base, ascending, stramineous, the lowest ones straight, the next ones subarcuate; beginning at 21–44 cm the midrib below with prickles 1.5 mm long, 19–30 mm apart, stout subulate, appressed ascending, stramineous; at midsection the margins with prickles 1.2–1.5 mm long, 5–10 mm apart, arcuate subulate, compressed, strongly ascending, almost appressed, reddish; the nearby midrib below with prickles 1–1.2 mm long, 10–20 mm apart, arcuate subulate, compressed, appressed ascending, stramineous; on the subulate apex the lower part with the margins and midrib with prickles 0.2–0.4 mm long, 2–7 mm apart, arcuate subulate, strongly ascending, dark red, but towards the tip these few and remote; infructescence not preserved; phalanges 5.3–6 cm long (the basal 5–7 mm soft fleshy, with the fibers reduced to mere filaments, and all mostly broken off and lost), 3.5–4.8 cm wide (5.1 cm wide in a twin with 12 carpels), 2.4–3.2 cm thick, broadly obovoid-cuneate, 4–6-angled, the apex convex, lateral sinuses none, lower sides flat, upper $2/5$ free, its sides smooth, shining; carpels 6–8, and often with 1–2 extra reduced splintlike ones attached at midsection on the sides, the fertile ones ascending, more or less parallel, the apices of the marginal ones very low convex, and with a shallow convex platform 3–5 mm wide, distal of the stigma; stigmas 1.3–1.5 mm in diameter, cordate suborbicular, horizontal,

flush, brown, papillose, the proximal sinuses narrow, running $1/3$ – $2/3$ way to valley bottom; inner carpel apices $1/3$ – $2/3$ as large as the marginal ones; central apical sinuses 4–6 mm deep, nearly straight, narrowly V-shaped; endocarp in upper $1/4$ and 13–16 mm long, bony, mostly stramineous, forming a broad convex-concave band, and with broad, slightly ascending shoulders, the lateral walls 4–7 mm thick, within dark brown, shining, smooth, but with spiral markings; seeds 7–9 mm long, broadly ellipsoid; mesocarp forming in the apex of each carpel a cavern 4–11 mm long, with aerenchyma of strong longitudinal fibers and firm transverse brownish membranes; basal mesocarp with the main upper part 25–27 mm long, with many strong longitudinal fibers and soft flesh, while below it is a basal section 5–7 mm long, mainly of soft flesh and the prolongation of the fibers mere delicate filaments that break off and fall with this soft basal part.

HOLOTYPE: Fiji, Vanua Levu Island, Macuata Prov., Namara, Lambasa, roadside, 20.8.56, *D. Koroveibau* 10,462 (SUV). On several other collections by the same man, his name is spelled Koroiveibau.

DISCUSSION: *P. lambasaensis* is a member of the section *Pandanus*, as is its closest relative, *P. brachypodus* Kanehira, of Enchabi Island (= Engebi Islet, Enewetak Atoll, Marshall Islands), a species with the phalanges 6.7–7.5 cm long, 4.5–5.3 cm wide; central apical sinuses 2–5 mm deep; carpels 5–6, the marginal ones with a concave platform 6–11 mm wide; leaves 1.8 m long, 6.5 cm wide near the base at midsection the margins and midrib below unarmed. *P. lambasaensis* has the phalanges 5.3–6 cm long, 3.5–4.8 cm wide; central apical sinuses 4–6 mm deep; carpels 6–8, the marginal ones with a concave platform 3–5 mm wide; leaves 1.1 m long, 5 cm wide near the base, at midsection the margins and midrib below armed with prickles.

The new epithet is the name of the type locality, Lambasa, plus *-ensis*, the Latin adjectival place suffix.

Pandanus lauensis sp. nov. (sect. *Pandanus*)

Figure 369

NOM. VERN.: “vandra” (Fijian language).

DIAGNOSIS HOLOTYPE: Arbores 6 m altae 25 cm diametro sunt, radicibus suffulcientibus multis et cum radicillis aereis, foliis 1.72 (+0.03–0.06?) m longis proxima basem 9 cm latis in medio 8 cm latis coriaceis U-sulcatis 2-plicatis supra viridibus lucidis infra pallidioribus exlucidis in sectione mediali cum 78 nervis parallelis secundariis in dimidio quoque sed nervis tertiis non evidentis, lamina gladiata ex basi in apice trigono gracile subulato deminuenti (apice interito) basi inermi pallida, ex 11 cm marginibus cum aculeis 2–2.5 mm longis 3–12 mm separatis arcuatis subulatis compressis adscendentibus stramineis, ex 21 cm midnervo infra cum aculeis 2–2.5 mm longis 20–35 mm separatis arcuatis crasse subulatis compressis adscendentibus stramineis cum apicibus obscure rubris, in sectione mediali marginibus cum aculeis 2.7–3 mm longis 7–10 mm separatis gracile subulatis adpresse obscuri-rubris, midnervo vicinali infra cum aculeis 1.5–1.8 mm longis 3–16 mm separatis subarcuatis subulatis compressis valde adscendentibus parte libera obscura rubra, syncarpio viridi, phalangibus 6.1–6.7 cm longis 2.7–4.1 cm latis 1.7–3.3 cm crassis cuneiformatis 5–6-angulosis apice vadose convexo lateribus inferis planis sinibus lateralibus nullis parte $1/3$ supra libera cum lateribus laevibus lucidis cum planis curvatis paucis, 8–12 carpelis adscendentibus anguste radiatis et proxima apicem latissimis, carpelis marginalibus cum apicibus hemisphaericis vel oblate hemisphaericis subangulosis cum stigmatibus 2.3–2.8 mm latis suborbicularibus apicalibus horizontalibus minime elevatis sinibus proximalibus cum marginibus incrassatis $1/2$ ad fondam extensis, sinibus centralibus apicalibus 1–2 mm profundis late V-formatis fere rectis, carpelis interioribus cum apicibus $1/3$ – $3/4$ tam grandibus quam illis marginalibus et simulantibus, endocarpio in parte $5/13$ supra et 25–26 mm longo pallide rubri-badio parte $2/3$ infera cuneata basi profunde concava apice hemisphaerico et supra semines cum projectionibus anguste lanceoloideis humeris supramedialibus concavis et minime adscendentibus lateribus lateralibus

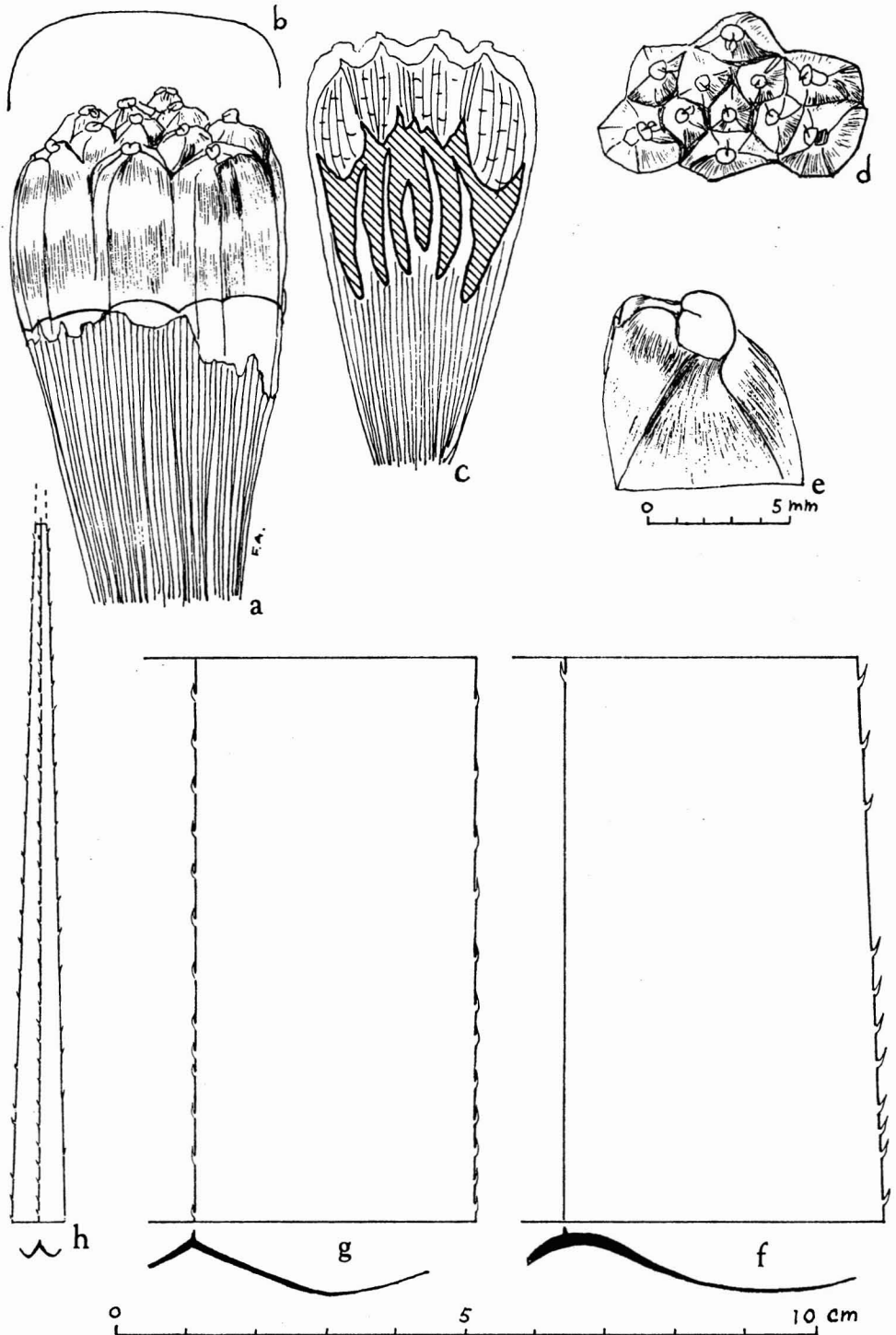


FIGURE 369. *Pandanus lauensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange, apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

2–4 mm crassis clare mahogani-coloratis intra lucidis sed rugosis, seminibus 6–8 mm longis anguste ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 11–18 mm longam cum aerenchyma fibris longitudinalibus et membranis albis, mesocarpio basali 22–30 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 6 m tall, 25 cm in diameter at 1.7 m from the ground; prop roots numerous and producing aerial rootlets; leaves 1.72 (+0.03–0.06?) m long, 9 cm wide near the base, 8 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, green and shiny above, paler and duller beneath, at midsection with 78 parallel secondary veins in each half, but no visible tertiary veins, the blade sword-shaped, tapering from base to the trigonous slender subulate apex (the tip lost), the base unarmed, pale; beginning at 11 cm the margins with prickles 2–2.5 mm long, 3–12 mm apart, arcuate subulate, compressed, ascending, stramineous; beginning at 21 cm the midrib below with prickles 2–2.5 mm long, 20–35 mm apart, arcuate stout subulate, compressed, ascending, stramineous with dark madder tips; at midsection the margins with prickles 2.7–3 mm long, 7–10 mm apart, slender subulate, appressed ascending, madder; the nearby midrib below with prickles 1.5–1.8 mm long, 3–16 mm apart, subarcuate subulate, compressed, strongly ascending, the free part madder; syncarp green; phalanges 6.1–6.7 cm long, 2.7–4.1 cm wide, 1.7–3.3 cm thick, cuneiform, 5–6-angled, the apex low convex, the lower sides flat, lateral sinuses none (or in postmaturity a few developing as cracks), the upper 1/3 free, its sides smooth, shining, of one or few gently curving planes; carpels 8–12, ascending, narrowly radial, hence the phalange widest nearly at the tip; marginal carpels with apices hemispheric or oblately so, faintly angled, their stigmas 2.3–2.8 mm wide, suborbicular, apical horizontal, slightly elevated; proximal sinuses with bordering thick lips running halfway to valley bottom and ending in a small round hole; central apical sinuses 1–2 mm deep, wide V-shaped, nearly straight; inner carpel apices 1/3–3/4 as large as the outer ones, similar; endocarp in the upper

5/13 and 25–26 mm long, bony, pale reddish brown, the lower two-thirds cuneate, the base deeply concave, the apex hemispheric, with narrowly lanceoloid projections over the seeds, shoulders suprmedian, concave and slightly ascending, the lateral walls 2–4 mm thick, bright mahogany-colored, within shining but rugose; seeds 6–8 mm long, narrowly ellipsoid; mesocarp forming in the apex of each carpel a cavern 11–18 mm long, with aerenchyma of longitudinal fibers and white membranes; basal mesocarp 22–30 mm long, fibrous and fleshy.

HOLOTYPE: Fiji Islands, Lau Group, Vatoa Island, Matanasiwa, 28.X.68, *Yoshio Kondo 1* (BISH).

SPECIMENS EXAMINED: Fiji Islands, Lau Group, Ono-i-Lau Island, Nukuni, 3 m elev., 24.II.1971, *N. L. H. Krauss 1,308* (BISH).

DISCUSSION: *P. lauensis* is a member of the section *Pandanus*, as is its closest relative, *P. suwaensis* (Martelli) St. John, a species with the phalanges pyriform, widest at 1/3 from the top, the central apical sinuses 2–2.5 mm deep; carpels 5–12, parallel; marginal carpel apices oblate pyramidal, the inner apices subequal to the marginal ones; stigmas 1.5–1.8 mm wide; leaves 6 cm wide at the middle, and there with 61 parallel secondary veins in each half, and there the margins with prickles 4–7 mm apart, subulate, appressed ascending, stramineous, of two kinds, more or less alternating, large ones 2–2.5 mm long, and small ones 1.3–2 mm long. *P. lauensis* has the phalanges cuneiform, widest near the top, the central apical sinuses 1–2 mm deep; carpels 8–12, narrowly radial; marginal carpel apices hemispheric or oblately so, the inner carpel apices 1/3–3/4 as large as the marginal ones; stigmas 2.3–2.8 mm wide; leaves 8 cm wide at the middle, and there with 78 parallel secondary veins in each half, and there the margins with prickles 2.7–3 mm long, 7–10 mm apart, slender subulate, appressed ascending, madder.

The new epithet is formed from the name of the island group, Lau, and *-ensis*, the Latin geographical, adjectival suffix.

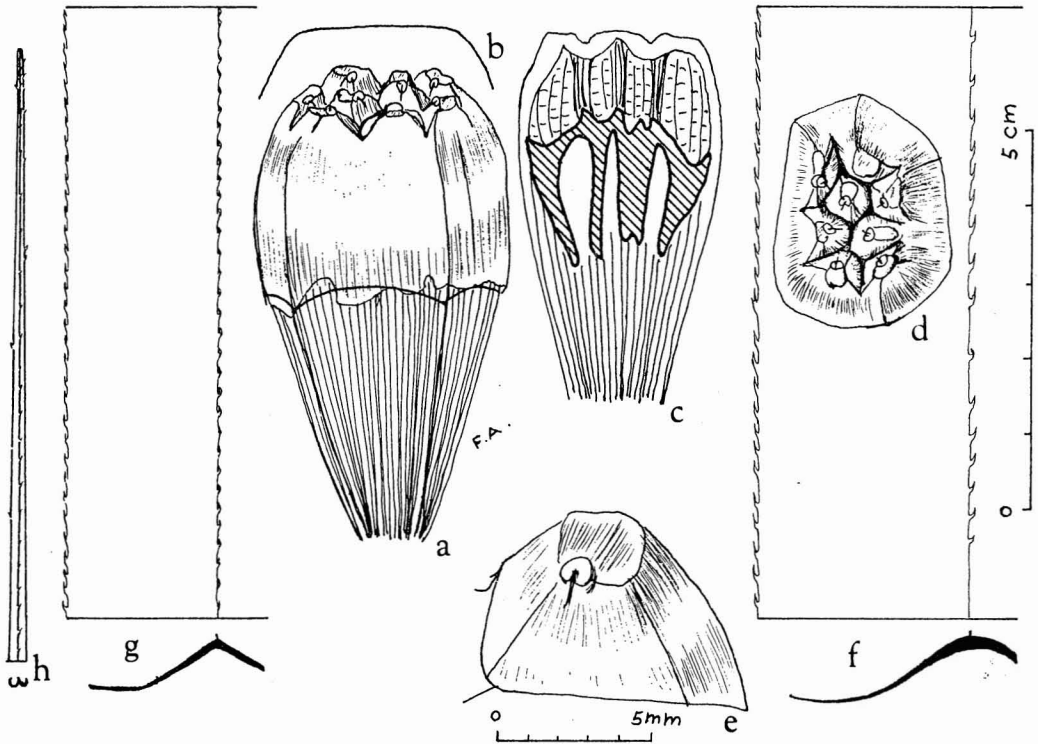


FIGURE 370. *Pandanus matukuensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

Pandanus matukuensis sp. nov. (sect. *Pandanus*)

Figure 370

NOM. VERN.: "vandra" (Fijian); "hala" (Tongan).

DIAGNOSIS HOLOTYPE: Arbor 5 m alta paucе ramosa cum radicibus suffulcientibus est, foliis 86 cm longis proxima basem 8 cm latis in medio 4 cm latis coriaceis supra viridibus lucidis infra pallidioribus et licet glaucis U-sulcatis 2-plicatis in sectione mediali cum 56 nervis parallelis secundariis in dimidio quoque sed nervis tertiis non evidentis lamina gladiata ex basi in apice trigono gracile subulato deminuenti eo in puncto 10 cm ex apice 2.5 mm lato basi inermi pallida, ex 9 cm marginibus cum aculeis 1.5–2 mm longis 2–5 mm separatis subarcuatis subulatis valde adscendentibus stramineis, ex 11 cm midnervo infra cum aculeis 1.7–2.2 mm longis

3–8 mm separatis subarcuatis gracile subulatis adscendentibus fere adpressis pallidis tum badiis, in sectione mediali marginibus cum aculeis 0.8–1.3 mm longis 1.5–3 mm separatis subarcuatis subulatis compressis fere adpresse adscendentibus basi straminea reliquo subrubro, midnervo vicinali infra cum aculeis 0.5–0.8 mm longis 2–3.5 mm separatis subarcuatis subulatis compressis adpresse adscendentibus infra stramineis apice subrubro, in apice subulato marginibus et midnervo infra cum aculeis 0.2–0.4 mm longis 2–15 mm separatis subarcuatis crasse subulatis adscendentibus obscure rubris, phalangibus 4.9–5.7 cm longis 2.6–3 cm latis 2.2–2.6 cm crassis oblancei- vel obovati-prismaticis 4–6-angulosis apice truncato lateribus inferis planis sinibus lateralibus nullis parte $\frac{1}{2}$ supera libera cum lateribus laevibus lucidis planis vel subconvexis sine valleculis, 6–8 carpelibus adscendentibus subparallelis, carpelibus marginalibus cum apicibus pyramidalibus sed

late truncatis areola concava 2–5 mm lata horizontali distali, stigmatibus 1.3–1.5 mm latis suborbicularibus badiis papillois obliquis in vel infra margini proximali, sinibus proximalibus fissura $\frac{1}{2}$ ad fondam extensa, carpelis interioribus cum apicibus $\frac{1}{2}$ – $\frac{2}{3}$ tam grandibus quam illis exterioribus sed concinnis, stigmatibus late ellipticis, sinibus centralibus apicalibus 1–2 mm profundis V-formatis, endocarpio in parte $\frac{3}{7}$ supera et 21 mm longo osseoso obscure badio late ellipsoideo apice rotundato sed supra semines cum projectionibus conicis humeris in parte $\frac{1}{3}$ supera crasse breve curvate adscendenti lateribus lateralibus 2.5–3.5 mm crassis intra obscure mahogani-coloratis laevibus lucidis, seminibus 8–9 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 8–14 mm longam cum aerenchyma fibris longitudinalibus et membranis transversis subbadiis, mesocarpio basali 17–20 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 5 m tall, few branched, with prop roots; leaves 86 cm long, 8 cm wide near the base 4 cm wide at the middle, coriaceous, shiny green above, paler and apparently glaucous beneath, U-sulcate, 2-pleated, at midsection with 56 parallel secondary veins in each half, but the tertiary veins not evident, the blade sword-shaped, tapering from base to the trigonous slender subulate apex, this at the point 10 cm down 2.5 mm wide, the base unarmed, pale; beginning at 9 cm the margins with prickles 1.5–2 mm long, 2–5 mm apart, subarcuate subulate, strongly ascending, stramineous; beginning at 11 cm the midrib below with prickles 1.7–2.2 mm long, 3–8 mm apart, subarcuate slender subulate, ascending, almost appressed, pale but turning brown; at midsection the margins with prickles 0.8–1.3 mm long, 1.5–3 mm apart, subarcuate subulate, compressed, almost appressed ascending, the base stramineous, the rest dull reddish; the nearby midrib below with prickles 0.5–0.8 mm long, 2–3.5 mm apart, subarcuate subulate, compressed, appressed ascending, stramineous below, the tip reddish; on the subulate apex the margins and midrib below with prickles 0.2–0.4 mm long, 2–15 mm apart, thick subarcuate subulate, ascending, dark red; phalanges 4.9–5.7 cm long, 2.6–3 cm wide, 2.2–2.6 cm thick,

oblance- to obovate-prismatic, 4–6-angled, the apex truncate, the lower sides flat, lateral sinuses none, the upper $\frac{1}{2}$ free, the sides smooth shining, flat, or gently convex, without valleys; carpels 6–8, ascending, nearly parallel; marginal carpels with apices pyramidal but the top broadly truncate, the concave horizontal platform 2–5 mm wide, distal of the stigma; stigmas 1.3–1.5 mm wide, suborbicular, brown, papillose, oblique on or below the rim of the proximal side; proximal sinuses a crack extending $\frac{1}{2}$ way to valley bottom; inner carpel apices $\frac{1}{2}$ – $\frac{2}{3}$ as large as the outer ones, similar but symmetrical, their stigmas broadly elliptic; central apical sinuses 1–2 mm deep, V-shaped; endocarp in the upper $\frac{3}{7}$, and 21 mm long, bony, dark brown, broadly ellipsoid, the apex rounded, but with conic projections over the seeds, the shoulders at the upper $\frac{1}{3}$, thick, shortly curved ascending, the lateral walls 2.5–3.5 mm thick, within dark mahogany-colored, smooth and shining; seeds 8–9 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 8–14 mm long, with aerenchyma of longitudinal fibers and brownish transverse membranes; basal mesocarp 17–20 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Lau Group, Matuku Island, 9/IX/68, *Yoshio Kondo* (BISH).

DISCUSSION: *P. matukuensis* is a member of the section *Pandanus*, as is its closest relative, *P. Smithii* St. John, of Moala Island, Fiji, a species with the phalanges 5.8–6.1 cm long; carpel 8–11; central apical sinuses 2–2.5 mm deep; basal mesocarp 24–28 mm long; leaves about 1.3 m long, at midsection 4.2 cm wide, and there the margins with prickles 1.5–2.5 mm long, 2–5 mm apart, subarcuate subulate, appressed ascending, stramineous, of two kinds, large and small alternating. *P. matukuensis* has the phalanges 4.9–5.7 cm long; carpels 6–8; central apical sinuses 1–2 mm deep; basal mesocarp 17–20 mm long; leaves 86 cm long, at midsection 3.7 cm wide, and there the margins with prickles 0.8–1.3 mm long, 1.5–3 mm apart, subarcuate subulate, compressed, uniform, almost appressed ascending, the base stramineous, the rest dull reddish.

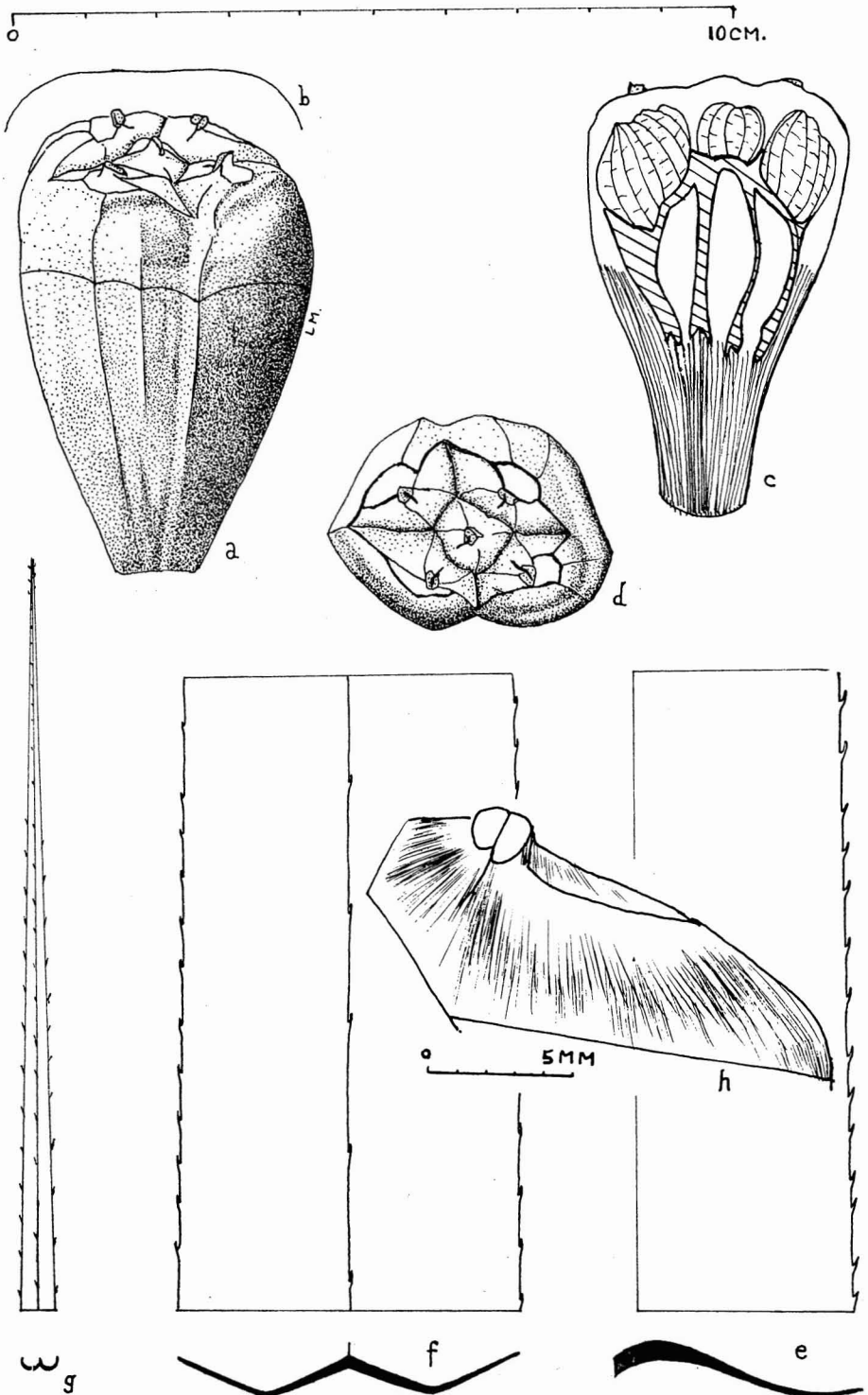


FIGURE 371. *Pandanus Mbalawa* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, half of leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$; *h*, carpel apex and stigma, oblique view, $\times 4$.

The new epithet is formed from the name of the type locality, Matuku, and *-ensis*, the Latin adjectival place suffix.

Pandanus Mbalawa sp. nov. (sect. *Pandanus*)

Figure 371

NOM. VERN.: "mbalawa," "vandra" (Fijian language).

DIAGNOSIS HOLOTYPE: Arbor 6 m alta ramosa est, foliis 1.34–1.48 m longis proxima basem 6.1–6.3 cm latis in medio 4.7–5.2 cm latis coriaceis supra viridibus lucidis infra pallidioribus et licet glaucis U-sulcatis 2-plicatis in sectione mediali cum 59–61 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis in quarto basali in paginis ambis evidentis et reticula breviter oblonga formantibus, lamina gladiata ex basi in apice trigono graciliter subulato deminuenti eo in puncto 10 cm ex apice 4 mm lato basi inermi pallida, ex 11–12 cm marginibus cum aculeis 1.5–2.3 mm longis 5–12 mm separatis subarcuatis subulatis compressis adscendentibus stramineis, midnervo infra per 35 cm basales inermi, in sectione mediali marginibus cum aculeis 1–1.3 mm longis 5–10 mm separatis subarcuatis subulatis adpresse adscendentibus immersis stramineis, midnervo vicinali infra cum aculeis 1–1.7 mm longis 14–18 mm separatis arcuatis subulatis crebre compressis adpresse adscendentibus stramineis, solum in apice subulato marginibus aculeatis tum per 6–7 cm infra inermibus, midnervo infra cum lancei-serrulis 0.4–0.6 mm longis 5–10 mm separatis stramineis, syncarpio terminali solitario globoso fere 13.5 cm diametro et fere 38 phalangibus ferrentibus, phalangibus 5.8–6 cm longis 3.7–4.9 cm latis 2.9–3.3 cm crassis cuneati-obovoideis compressis 5–6-angulosis apice subtruncato vel subconvexo lateribus inferis planis sinibus lateralibus nullis parte 2/5–1/2 supera libera cum lateribus convexis valleculis nullis vel minimis laevibus lucidis, carpelis 5 adscendentibus subparallelis eis marginalibus cum apicibus humiliter convexis subangulosis et cum areola concava polygonali distali, carpelis interioribus cum apicibus oblatissime pyramidalibus et 1/3–1/2 tam grandibus quam eis marginalibus, stigmatibus 2–3.3 mm latis late cordatis ad reniformibus brunneis

papillosis plerumque obliquis sinibus proximalibus latis et 1/3–1/2 ad fundam extensis, sinibus apicalibus centralibus 1.5–2.5 mm profundis in fondo anguste V-formatis tum lateribus divergentibus, endocarpio in parte 2/5 supera late ellipsoideo 28–30 mm longo osseoso obscure cerasi-rubro apice supra semines cum projectionibus conicis brevibus humeris in bordini supero curvatis adscendentibus lateribus lateralibus 3–4 mm crassis intra laevibus lucidis sed ad apicem spiraliter rugosis, seminibus 15–17 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 7–15 mm longam cum aerenchyma fibris fortibus longitudinalibus et membranis albis transversis formanti, mesocarpio basali 20–24 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 6 m tall, branching; leaves 1.34–1.48 m long, 6.1–6.3 cm wide near the base, 4.7–5.2 cm wide at the middle, coriaceous, above shining green, below paler green and apparently glaucous, U-sulcate, 2-pleated, at midsection with 59–61 parallel secondary veins in each half, the tertiary crossveins seen in the basal quarter on both sides, forming short oblong meshes; blade sword-shaped, tapering from the base to the trigonous slender subulate apex, this at the point 10 cm down 4 mm wide, the base unarmed, pale; beginning at 11–12 cm the margins with prickles 1.5–2.3 mm long, 5–12 mm apart, subarcuate subulate, compressed, ascending, stramineous; the midrib below unarmed for the first 35 cm; at midsection the margins with prickles 1–1.3 mm long, 5–10 mm apart, subarcuate subulate, appressed ascending, countersunk, stramineous; the nearby midrib below with prickles 1–1.7 mm long, 14–18 mm apart, arcuate subulate, very compressed, appressed ascending, stramineous; the apex prickly just at the summit, then the margins unarmed below for 6–7 cm; the midrib below with lance-serrulations 0.4–0.6 mm long, 5–10 mm apart, stramineous; the pleats above unarmed; the syncarp terminal, solitary, globose, about 13.5 cm in diameter, bearing about 38 phalanges; phalanges 5.8–6 cm long, 3.7–4.9 cm wide, 2.9–3.3 cm thick, cuneate obovoid, compressed, 5–6-angled, the apex subtruncate or very slightly convex, the lower sides flat;

lateral sinuses none; upper $2/5-1/2$ free, the sides gently convex, with no or very slight valleys, the surface smooth, shining; carpels 5, ascending, more nearly parallel than radial, the apices of the marginal ones very low convex, slightly angled, and with a polygonal concave platform distal of the stigma; apices of inner carpels very oblate pyramidal, and $1/3-1/2$ as large as the marginal ones; stigmas 2–3.3 mm wide, broadly cordate to reniform, brown, papillose, mostly oblique, proximal sinuses wide, running $1/3-1/2$ way to valley bottom; central apical sinuses 1.5–2.5 mm deep, the bottom narrow V-shaped, then the sides wide-spreading; endocarp in upper $2/5$, broadly ellipsoid, 28–30 mm long, bony, dark cherry red, the apex with short conic projections over the seeds, the upper rim with curved ascending shoulders, the lateral walls 3–4 mm thick, within smooth shining, but towards the tip spirally rugose; seeds 15–17 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 7–15 mm long, with aerenchyma of strong longitudinal fibers and white transverse membranes; basal mesocarp 20–24 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Fulanga Island, among palms near coast, limestone formation, 0–80 m. alt., Feb. 22–26, 1934, *A. C. Smith 1,164* (FI). Iso-types (BISH, K, NY, S, UC, US).

DISCUSSION: *Pandanus Mbalawa* is a member of the section *Pandanus*, as is its closest relative, *P. Smithii* St. John, of Moala Island, in the Lau Group, Fiji Islands, a species with the syncarp 16 cm in diameter; phalange apex truncate, the body pyriform; carpels 8–11, the marginal ones with apices oblate semiorbicular; stigmas 1.8–2 mm long, broadly elliptic; apices of central carpels $1/4-1/3$ as large as the marginal; endocarp 23 mm long; leaves 4.2 cm wide at the middle, and there the margins with prickles 1.5–2.5 mm long, 2–5 mm apart, subarcuate subulate, appressed ascending, stramineous, of two kinds, large and small alternating. *P. Mbalawa* has the syncarp about 13.5 cm in diameter; phalange apex subtruncate or very slightly convex, the body cuneate obovoid; carpels 5, the marginal ones with apices very low convex; stigmas 2–3.3 mm wide, broadly cordate to reniform;

apices of central carpels $1/3-1/2$ as large as the marginal; endocarp 28–30 mm long; leaves 5–5.2 cm wide at the middle, and there the margins with prickles 1–1.3 mm long, 5–10 mm apart, subarcuate subulate, appressed ascending, countersunk, stramineous.

The new epithet is the Fijian vernacular name of the species.

Pandanus moalaensis sp. nov. (sect. *Pandanus*)

Figure 372

DIAGNOSIS HOLOTYPE: Arbor est, foliis 1.65 m longis proxima basem 10 cm latis in medio 6.8 cm latis coriaceis U-sulcatis 2-plicatis supra viridibus lucidis infra pallide viridibus et licet glaucis in sectione mediali cum 72 nervis parallelis secundariis in dimidio quoque sed nervis tertiis non evidentis lamina gladiata ex basi in apice trigono graciliter subulato deminuenti eo in puncto 10 cm ex apice 2 mm lato basi inermi pallida, ex 9 cm marginibus cum aculeis 2.5–3.5 mm longis 2–7 mm separatis arcuatis subulatis compressis adscendentibus stramineis cum apicibus rubris eis inferis in medio geniculatis illis sequentibus solum curvatis, midnervo infra per 45 cm basales inermi, in sectione mediali marginibus cum aculeis 3 mm longis 4–8 mm separatis subarcuatis subulatis compressis adpresse adscendentibus immersis stramineis sed medio apicali rubri-brunneo, midnervo infra vicinali cum aculeis 2–2.2 mm longis 6–13 mm separatis arcuatis crasse subulatis compressis valde adscendentibus stramineis cum apicibus rubris, proxima apicem marginibus inermibus midnervo infra cum aculeis 0.2–0.3 mm longis 2–4 mm separatis arcuatis subulatis valde adscendentibus pallidis cum apicibus rubris, syncarpio solitario fere 20 cm longo 15 cm diametro ellipsoideo, phalangibus 5.4–6 cm longis 2.7–3.6 cm latis 1.8–2.7 cm crassis cuneiformatis 5–6-angulosis apice truncato vel subtruncato lateribus inferis planis parte $1/3$ supera libera sinibus lateralibus fissuris apertis in parte libera lateribus superis planis vel subcurvatis laevibus lucidis, carpelis 8–11 radiatis eis marginalibus cum apicibus ovoideis angulosis cum areola concava 2–4 mm lata distali, sinibus proximalibus fissuris profundis $1/3-1/2$ ad fondam

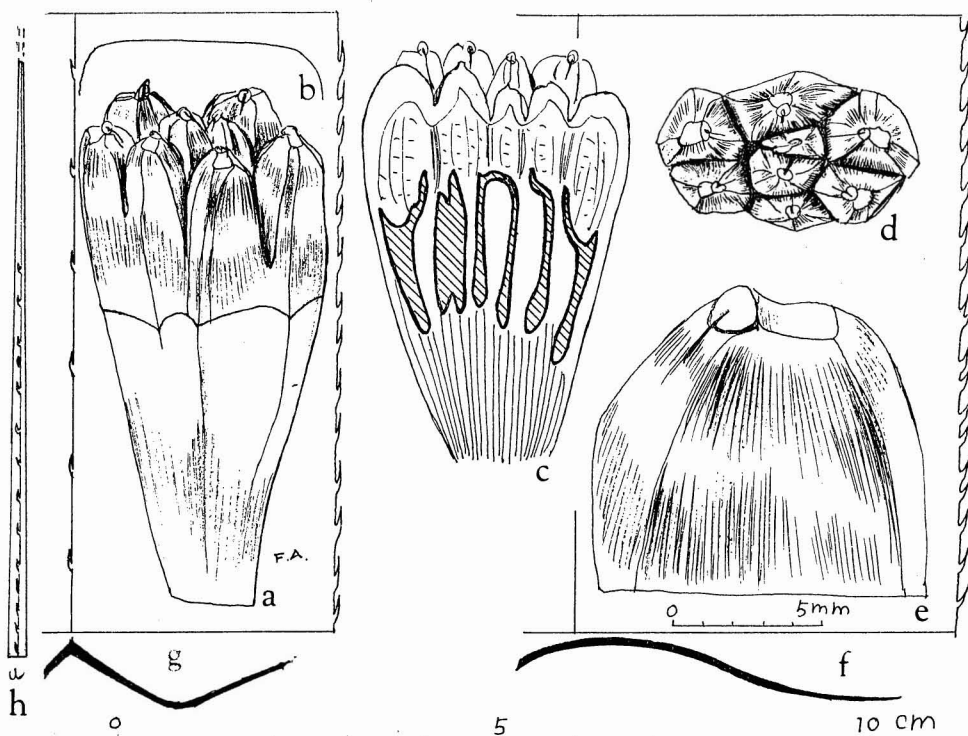


FIGURE 372. *Pandanus moalaensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

extensis, sinibus centralibus apicalibus 8–10 mm profundis angusioribus V-formatis rectis, carpelibus centralibus $\frac{1}{2}$ tam grandibus ad aequalibus cum illis marginalibus ovoideis ad lanceoloideis concinnis vel compressis, stigmatibus 1.8–2 mm longis obliquis eis exterioribus suborbicularibus illis interioribus ellipticis brunneis papillois, endocarpio fere mediali 21–22 mm longo osseoso obscure rubri-brunneo semiorbiculari-quadrato apice supra semines subrotundatis lateribus subdistentis sed sine humeris lateribus laterilibus 0.7–1 mm crassis intra aurantiaci-brunneis lucidis fere laevibus sed rugosis, seminibus 12–14 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 8–18 mm longam cum aerenchyma fibris longitudinalibus et membranis albis formanti, mesocarpio basali 18–20 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree; leaves 1.65 m long, 10 cm wide near the base 6.8 cm wide at

the middle, coriaceous, U-sulcate 2-pleated, above green, shining, below pale green and apparently glaucous, at midsection with 72 parallel secondary veins in each half, but no evident tertiary veins, the blade sword-shaped, tapering from base to the trigonous slender subulate apex, this at the point about 10 cm down 2 mm wide, the base unarmed, pale; beginning at 9 cm the margins with prickles 2.5–3.5 mm long, 2–7 mm apart, arcuate subulate, compressed, ascending, stramineous with red tips, the lower ones geniculate at the middle, the following ones merely curved; the midrib below unarmed for the first 45 cm; at midsection the margins with prickles 3 mm long, 4–8 mm apart, subarcuate subulate, compressed, appressed ascending, countersunk, stramineous, but the outer half red-brown; the nearby midrib below with prickles 2–2.2 mm long, 6–13 mm apart, arcuate thick subulate, compressed, strongly ascending, stramineous with red tips;

near the apex the margins unarmed, the midrib below with prickles 0.2–0.3 mm long, 2–4 mm apart, arcuate subulate, strongly ascending, pale, with red tips; syncarp solitary, about 20 cm long and 15 cm in diameter, ellipsoid; phalanges 5.4–6 cm long, 2.7–3.6 cm wide, 1.8–2.7 cm thick, cuneiform, 5–6-angled, the apex truncate or subtruncate, lower sides flat, upper 1/3 free, the lateral sinuses as open crevasses in the free upper part, the upper sides of flat or gently curving planes, smooth, shining; carpels 8–11, radial, the marginal ones with apices ovoid, angled, with a concave platform 2–4 mm wide, distal of the stigma; proximal sinuses deep and running 1/3–1/2 way to valley bottom; central apical sinuses 8–10 mm deep, very narrowly V-shaped, straight; central carpels from 1/4 as large to as large as the marginal ones, ovoid to lanceoloid, symmetric or compressed; stigmas 1.8–2 mm long, oblique, the outer ones suborbicular, the inner ones elliptic, brown, papillose; endocarp nearly median 21–22 mm long, bony, dark reddish brown, semiorbicular quadrate, the apex slightly rounded over the seeds, the sides bulging a little, but without shoulders, lateral walls 0.7–1 mm thick, within orange brown, shining, smoothish but rugose; seeds 12–14 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 8–18 mm long, with aerenchyma of longitudinal fibers and white membranes; basal mesocarp 18–20 mm long, fibrous and fleshy.

HOLOTYPE: Fiji Islands, Lau Group, Moala Island, Naroi, 4/X/68, *Yoshio Kondo* no. *M.B.* (BISH).

DISCUSSION: *P. moalaensis* is a member of the section *Pandanus*, as is its closest relative, *P. upoluensis* Martelli var. *angulosa* Martelli, of Savaii Island, Samoa, a variety with the phalanges 5.6–6.3 cm long, 1.8–2.9 cm wide, the lateral sinuses extending halfway down, central apical sinuses 4–11 mm deep; carpels 5–7; endocarp supramedian, 26 mm long, narrowly ellipsoid, the top with slender lanceoloid projections over the seeds; basal mesocarp 22–26 mm long; leaves unknown. *P. moalaensis* has the phalanges 5.4–6 cm long, 2.7–3.6 cm wide, the lateral sinuses extending one-third way down; central apical sinuses 8–10 mm deep; carpels

8–11; endocarp nearly median, 21–22 mm long, semiorbicular quadrate, the top merely rounded over the seeds; basal mesocarp 18–20 mm long; leaves 1.65 m long, 6.8 cm wide at the middle, and there with 72 parallel secondary veins in each half.

The new epithet is formed from the name of the type locality, Moala, and *-ensis*, the Latin adjectival place suffix.

Pandanus nandiensis sp. nov. (sect. *Pandanus*)

Figure 373

NOM. VERN.: “vadra” (pronounced “vandra”), (Fijian).

DIAGNOSIS HOLOTYPE: Arbor 5–7 m alta sine radicibus suffulcentibus est (cortice trunco ramis et syncarpi incognitis), foliis 0.9–0.96 m longis proxima basem 7.5 cm latis in medio 5 cm latis coriaceis supra lucidis viridibus infra paululum pallidioribus U-sulcatis 2-plicatis in sectione mediali cum 60 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis proxima basem praecipue supra evidentis et reticula breve oblonga formantibus, lamina gladiata ex basi in apice trigono subulato deminuenti (apice interito), basi inermi pallida, ex 4–5 cm marginibus cum aculeis 1.4–2 mm longis 3–9 mm separatis arcuatis crasse subulatis adscendentibus stramineis, midnervo infra per partem 2/3 inferam inermi, in sectione mediali marginibus cum aculeis 0.8–1.2 mm longis 2–4 mm separatis arcuatis subulatis valde adscendentibus fere adpressis plerumque rubri-brunneis, midnervo vicinali infra cum aculeis 0.3–0.8 mm longis arcuatis subulatis valde adscendentibus apicibus rubri-brunneis biformatis majoribus et minoribus alternantibus, phalangi-bus 7–7.9 cm longis 3.4–4.7 cm latis (sed 5.4 cm latis in gemine cum 20 carpelis) 2.7–3.5 cm crassis obovoideis compressis 5–6-angulosis apice lato vadose convexo lateribus fere planis laevibus parte 2/5 supra libera laevi lucida in sicca brunnea, plerumque sinibus lateralibus evidentis angustis per dimidium superum, carpelis 8–11 adscendentibus plus minusve parallelis, carpelis marginalibus cum apicibus semiorbicularibus subangulosis et paucis majoribus cum areola concava distali 1–2.5 mm lata omnibus apiculatis ex stigmate subelevato,

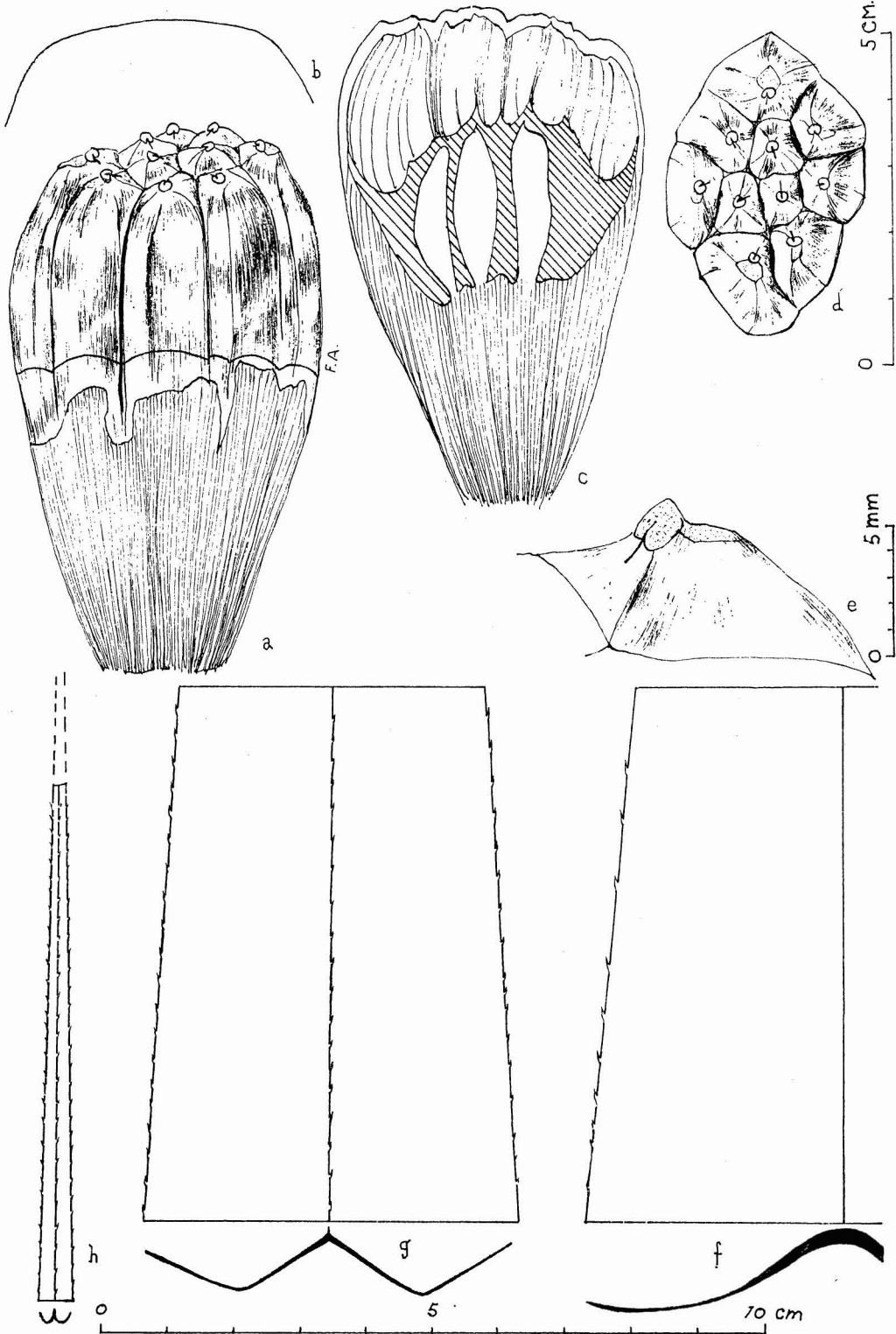


FIGURE 373. *Pandanus nandiensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

apicibus interioribus $\frac{1}{2}$ - $\frac{2}{3}$ tam grandibus quam exterioribus et angustioribus sed subangulosus hemisphaericis, sinibus centralibus apicalibus 1.5-3 mm profundis, stigmatibus 1-2 mm longis late ellipticis ad reniformibus subelevatis obliquis brunneis papillois, sinibus proximalibus $\frac{1}{2}$ - $\frac{2}{3}$ ad fondam extensis, endocarpio in parte $\frac{2}{5}$ supera et 29 mm longo osseoso extra pallido sed intra obscure brunneo transverse ellipsoideo apice cum projectionibus subconicis supra semines humeris aliformatis curvatis adscendentibus lateribus lateralibus 5-9 mm crassis intra lucidis sed spiralliter rugosis, seminibus 16-19 mm longis anguste ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 12-23 mm longam cum aerenchyma fibris longitudinalibus et membranarum transversis pallidis formanti, mesocarpio basali 30-32 mm longo fibroso et carnosus.

DIAGNOSIS OF HOLOTYPE: Tree 5-7 m tall, without prop roots (bark, trunk, branches and syncarp not recorded); leaves 0.9-0.96 m long, 7.5 cm wide near the base, 5 cm wide at the middle, coriaceous, shiny green above, slightly paler green below, U-sulcate 2-pleated, at midsection with 60 parallel secondary veins in each half, the tertiary crossveins evident near the base especially above, forming short oblong meshes, blade sword-shaped, tapering from the base to the trigonous subulate apex (the tip lost), the base unarmed, pale; beginning at 4-5 cm the margins with prickles 1.4-2 mm long, 3-9 mm apart, arcuate stout subulate, ascending, stramineous; the midrib below unarmed for the lower $\frac{2}{5}$; at midsection the margins with prickles 0.8-1.2 mm long, 2-4 mm apart, arcuate subulate, strongly ascending, almost appressed, mostly reddish brown; the nearby midrib below with prickles 0.3-0.8 mm long, arcuate subulate, strongly ascending, the tips reddish brown, distinctly of two kinds, large and small alternating; the subulate apex has the margins and midrib evidently with prickles; phalanges 7-7.9 cm long, 3.4-4.7 cm wide (but 5.4 cm wide in a twin with 20 carpels), 2.7-3.5 cm thick, obovoid, compressed, 5-6-angled, the broad apex low convex, the sides flattish, smooth, upper $\frac{2}{5}$ free, the surface smooth, shining, brown when dried, the majority of the lateral sinuses visible, narrow, and running about half-

way down; carpels 8-11, ascending and more or less parallel; marginal carpels with apices semi-orbicular, obscurely angled, and a few of the larger ones with a concave distal platform 1-2.5 mm wide, all apiculate by the slightly elevated stigma; inner apices $\frac{1}{2}$ - $\frac{2}{3}$ the size of the outer and narrower, but still slightly angled hemispheric; central apical sinuses 1.5-3 mm deep; stigmas 1-2 mm long, broadly elliptic to reniform, slightly elevated and oblique, brown, papillose; proximal sinuses running $\frac{1}{2}$ - $\frac{2}{3}$ way to valley bottom; endocarp in upper $\frac{2}{5}$ and 29 mm long, bony, pale without, but dark brown towards the seeds, transversely ellipsoid, the apex with slight conic projections over the seeds and the shoulders with prominent curved ascending wings, lateral walls 5-9 mm thick, within shining but spirally rugose; seeds 16-19 mm long, narrowly ellipsoid; mesocarp forming in the apex of each carpel a cavern 12-23 mm long, with aerenchyma of longitudinal fibers and with transverse transparent pale membranes; basal mesocarp 30-32 mm long, fibrous, and fleshy.

HOLOTYPE: Fiji: Viti Levu, Nadi Dist., Namulomulo Road, roadside, inland, 25.7.56, *D. Koroiveibau 10,288* (BISH). Isotype (SUVA).

DISCUSSION: *P. nandiensis* is a member of the section *Pandanus*, as is its closest relative, *Pandanus* sp., represented by *St. John 26,654* from Kauai, Hawaiian Islands, a species with the phalanges 6-6.5 cm long, 2.8-3.4 cm wide, the upper $\frac{1}{3}$ free; carpels 5-8; central carpel apices conic or oblately so; endocarp central, the lateral walls 2.5-3 mm thick; seed cavity smooth within; prop roots 30-50 cm long, 2-3 cm in diameter; leaves 1.4 m long, 6.8-7 cm wide at the middle, and there the margins with prickles 1-1.8 mm long, 4-6 mm apart, subarcuate subulate, strongly ascending, the base white, the rest brown. *P. nandiensis* has the phalanges 7-7.9 cm long, 3.4-4.7 cm wide, the upper $\frac{2}{5}$ free; carpels 8-11, the central carpel apices slightly angled hemispheric; endocarp in upper $\frac{2}{5}$, the lateral walls 5-9 mm thick; seed cavity spirally rugose within; prop roots wanting; leaves 0.9-1 m long, 5 cm wide at the middle, and there the margins with prickles 0.8-1.2 mm long 2-4 mm apart, arcuate sub-

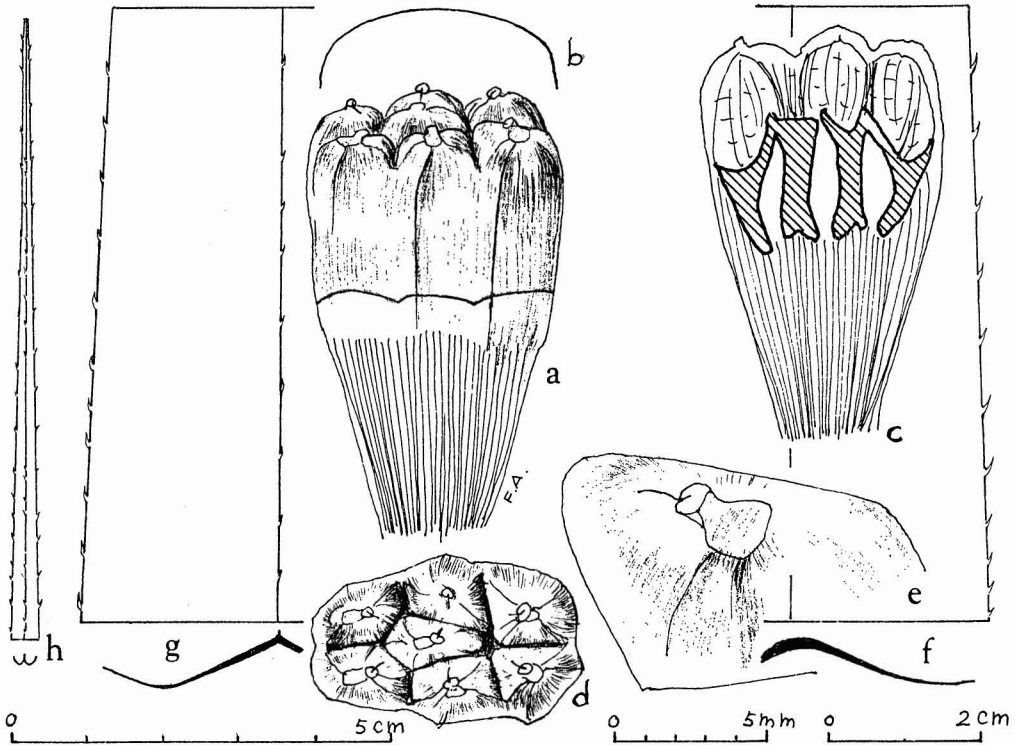


FIGURE 374. *Pandanus onoilauensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

ulate, strongly ascending, almost appressed, mostly reddish brown.

The new epithet is a geographic one, formed from the modern spelling of the province Nandi, and *-ensis*, the Latin adjectival place suffix.

Pandanus onoilauensis sp. nov. (sect. *Pandanus*)

Figure 374

DIAGNOSIS HOLOTYPI: Licet arbor est (habitu radicibus trunco ramis et infructescentia incognitis), foliis fere 90 cm longis et proxima basem 6 cm latis sed in medio 4.4 cm latis coriaceis U-sulcatis 2-plicatis in sectione mediali cum 57 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis infra proxima basem evidētis et reticula breve oblonga formantibus, lamini gladiatis ex basi in apice trigono graciliter subulato deminuenti eo in

puncto 10 cm ex apice 4 mm lato basi inermi pallida, ex 10 cm marginibus cum aculeis 2 mm longis 3–9 mm separatis arcuatis subulatis compressis adscendentibus stramineis cum apice obscure brunneo, midnervo infra per 23.5 cm basales inermi, in sectione mediali marginibus cum aculeis 2 mm longis 4–7 mm separatis subarcuatis crasse subulatis compressis crebre adscendentibus stramineis cum apicibus rubri-badiis, midnervo vicinali infra cum aculeis 1–1.3 mm longis 5–12 mm separatis subarcuatis subulatis compressis valde adscendentibus stramineis, in apice subulato marginibus et midnervo infra cum aculeis minimis crasse subulatis plerumque interitis, phalangibus 5.5–6 cm longis 2.3–3.7 cm latis 2.2–2.8 cm crassis cuneiformatis 4–6-angulosis apice humiliter convexo lateribus inferis planis sinibus lateribus nullis parte 1/3 supra libera lateribus laevibus lucidis subplanis vel subconvexis

laevibus lucidis sine angulis secundariis, carpelis 6–10 adscendentibus subparallelis omnibus cum apicibus subaequalibus hemisphaericis vel oblate hemisphaericis non vel minus angulosis eis marginalibus cum areola concava 2–4 mm lata distali, stigmatibus 1.5–1.7 mm latis vel longis cordatis orbicularibus vel reniformibus plerumque horizontalibus badiis papillois sed eis marginalibus obliquis et infra galeas, sinibus proximalibus fissuris $1/3-1/2$ ad fundam extensis, sinibus centralibus apicalibus 3–5 mm profundis infra V-formatis sed lateribus superis extra curvatis, endocarpio in parte $2/5$ supera et 19–20 mm longo osseoso mahogani-colorato oblate subsphaerico basi concava apice rotundato et supra semines cum projectionibus conicis humeris supramedialibus crassis curvatis adscendentibus lateribus lateralibus 2–2.5 mm crassis intra clare mahogani-coloratis lucidis sublaevibus spiraliter striatis sed ad apicem rugosis, seminibus 8–9 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 9–16 mm longam cum aerenchyma fibris longitudinalibus et parenchyma molle, mesocarpio basali 22–26 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Doubtless a tree (but the habit, roots, trunk, branches, and infructescence unknown); leaves about 90 cm long, and probably 6 cm wide near the base, actually 4.4 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, at midsection with 57 parallel secondary veins in each half, the tertiary cross-veins visible below near the base, forming short oblong meshes; the blade sword-shaped, tapering from base to the trigonous slender subulate apex, this at the point 10 cm down 4 mm wide, the base unarmed, pale; beginning at 10 cm the margins with prickles 2 mm long, 3–9 mm apart, arcuate subulate, compressed, ascending, stramineous, with dark brown tips; the midrib below unarmed for 23.5 cm; at midsection the margins with prickles 2 mm long, 4–7 mm apart, subarcuate stout subulate, compressed, very strongly ascending, stramineous, with dark reddish brown tips; the nearby midrib below with prickles 1–1.3 mm long, 5–12 mm apart, subarcuate subulate, compressed, strongly ascending, stramineous; on the subulate apex the margins and midrib below with tiny thick subulate prickles, but these

mostly broken off and lost; the pleats unarmed; phalanges 5.5–6 cm long, 2.3–3.7 cm wide, 2.2–2.8 cm thick, cuneiform, 4–6-angled, the apex low convex, the lower sides flat, lateral sinuses none; the upper $1/3$ free, its sides smooth, shining, flattish or gently convex, smooth, shining, without secondary angles; carpels 6–10, ascending, more or less parallel; all carpels with apices subequal, hemispheric or somewhat oblately so, not or but slightly angled, and the marginal ones with a concave platform 2–4 mm wide, distal of the stigma; the stigmas 1.5–1.7 mm wide or long, cordate to orbicular or reniform, mostly horizontal, brown, papillose, the marginal ones on one side oblique and with a bony visor; proximal sinuses a crack running $1/3-1/2$ way to valley bottom; central apical sinuses 3–5 mm deep, V-shaped below but the upper sides outcurving; endocarp in the upper $2/5$ and 19–20 mm long, bony, mahogany-colored, oblate subspherical, the base concave, the apex rounded and with conic projections over the seeds, the shoulders suprmedian, thick, curved ascending, lateral walls 2–2.5 mm thick, within brighter mahogany-colored, shining, smoothish and mostly spirally striate, but towards the apex rugose; seeds 8–9 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 9–16 mm long, with aerenchyma of longitudinal fibers and soft parenchyma; basal mesocarp 22–26 mm long, fibrous and fleshy.

HOLOTYPE: Fiji Islands, Lau Group, Ono-i-Lau, 22/VIII/68, *Yoshio Kondo* (BISH).

DISCUSSION: *P. onoilauensis* is a member of the section *Pandanus*, as is its closest relative *P. lambasaensis* St. John, of Vanua Levu Island, Fiji, a species with the phalanges 3.5–4.8 cm wide, the marginal carpels with apices very low convex; central apical sinuses 4–6 mm deep; endocarp in the upper $1/4$ and 13–16 mm long, forming a broad convex concave band, the lateral walls 4–7 mm thick; leaf middle 3.6 cm wide, and there with 62 parallel secondary veins in each half, and there the margins with prickles 1.2–1.5 mm long, 5–10 mm apart, arcuate subulate, compressed, strongly ascending, almost appressed, reddish. *P. onoilauensis* has the phalanges 2.3–3.7 cm wide, and all carpels with

apices hemispheric or somewhat oblatly so; central apical sinuses 3–5 mm deep; endocarp in the upper 2/5 and 19–20 mm long, subspherical, the lateral walls 2–2.5 mm thick; leaf middle 4.4 cm wide, and there with 57 parallel secondary veins in each half, and there the margins with prickles 2 mm long, 4–7 mm apart, subarcuate stout subulate, compressed, strongly ascending, stramineous, with dark reddish brown tips.

The new epithet is formed from the name of the type locality, Ono-i-Lau, and *-ensis*, the Latin adjectival geographic suffix.

Pandanus ovalauensis sp. nov. (sect. *Pandanus*)

Figure 375

NOM. VERN.: “vadra” (= “vandra”, Fijian language).

DIAGNOSIS HOLOTYPEI: Arboriformis 10–12 m alta est (radicibus trunco ramis infructescentia incognitis), foliis 1.2–1.5 m longis proxima basem 6.5–7.5 cm latis in medio 5.8 cm latis coriaceis supra viridibus lucidis infra pallide viridibus exlucidis glaucis U-sulcatis 2-plicatis in sectione mediali cum 66 nervis parallelis secundariis in dimidio quoque sed nervis tertiis non evidentis lamina gladiata ex basi in apice deminuenti (apice interito) basi inermi straminea, ex 6.5–9 cm marginibus cum aculeis 2.3–3 mm longis 2–8 mm separatis arcuatis crasse subulatis compressis adscendentibus stramineis, midnervo infra in parte 1/4 basali inermi, in sectione mediali marginibus cum aculeis 2.2–2.9 mm longis 2–8 mm separatis subarcuatis crasse subulatis compressis fere adpresse ascendentibus stramineis cum apicibus rubri-brunneis et plus minusve majoribus minoribus alternantibus, midnervo vicinali infra cum aculeis 1.6–2 mm longis 9–13 mm separatis simulantibus sed minus adpressis, phalangibus 6–6.5 cm longis 2.9–3.7 cm latis 2.1–3.1 cm crassis oblanceoloideis 4–5-angulosis apice humiliter convexus lateribus inferis planis sinibus lateralibus nullis vel paucis fissuris angustis ad medium descendentibus parte 1/3 supera libera lateribus laevibus lucidis planis curvatis adscendentibus, carpelis lateralibus cum 0–2 angulis secundariis debilibus, carpelis 6–9 radiatis eis marginalibus cum apicibus pyramidal-ovoideis vel late ita (rare lanceoloideis)

erectis plerumque cum areola concava 1–2 mm lata distali, stigmatibus 1.8–2 mm diametro suborbicularibus horizontalibus vel subobliquis nigris papillosis, sinibus proximalibus fissura brevi in loco 1/3 ad fondam, carpelis interioribus 1/3–2/3 tam grandibus quam exterioribus anguste pyramidal-ovoideis vel lanceoloideis cum stigmatibus 1.7–2 mm longis ellipticis obliquis, endocarpio in parte 3/7 supera et 29–31 mm longo osseoso pallido tum brunneo elliptici-rhomboideo apice ovoideo humeris medialibus concavis fere horizontalibus lateribus lateralibus 1.5–3 mm crassis intra pallide brunneis laevibus lucidis, seminibus 10–12 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 9–23 mm longam cum aerenchyma fibris longitudinalibus et membranis pallidis formanti, mesocarpio basali 20–22 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Treelike, 10–12 m tall (roots, trunk, branches, and infructescence unknown); leaves 1.2–1.5 m long, 6.5–7.5 cm wide near the base, 5.8 cm wide at the middle, coriaceous, above shiny green, below pale dull green and glaucous, U-sulcate, 2-pleated, at midsection with 66 parallel secondary veins in each half, but no visible tertiary veins, the blade sword-shaped, tapering from base to tip (the apex lost), the base unarmed, stramineous; beginning at 6.5–9 cm the margins with prickles 2.3–3 mm long, 2–8 mm apart, arcuate stout subulate, compressed, ascending, stramineous; the midrib below unarmed for the lower 1/4; at midsection the margins with prickles 2.2–2.9 mm long, 2–8 mm apart, subarcuate thick subulate, almost appressed ascending, stramineous compressed, with reddish brown tips, more or less alternately large and small; the nearby midrib below with prickles 1.6–2 mm long, 9–13 mm apart, similar but less appressed; phalanges 6–6.5 cm long, 2.9–3.7 cm wide, 2.1–3.1 cm thick, oblanceoloid, 4–5-angled, the apex low convex, the lower sides flat, lateral sinuses none or a few of them present as narrow creases extending down to the middle, upper 1/3 free, the sides smooth, shining, of planes curving upward, the sides of the lateral carpels with 0–2 weak secondary angles; carpels 6–9, radial, the marginal ones with apices pyramidal ovoid or broadly so (rarely lanceoloid), erect, mostly with a concave

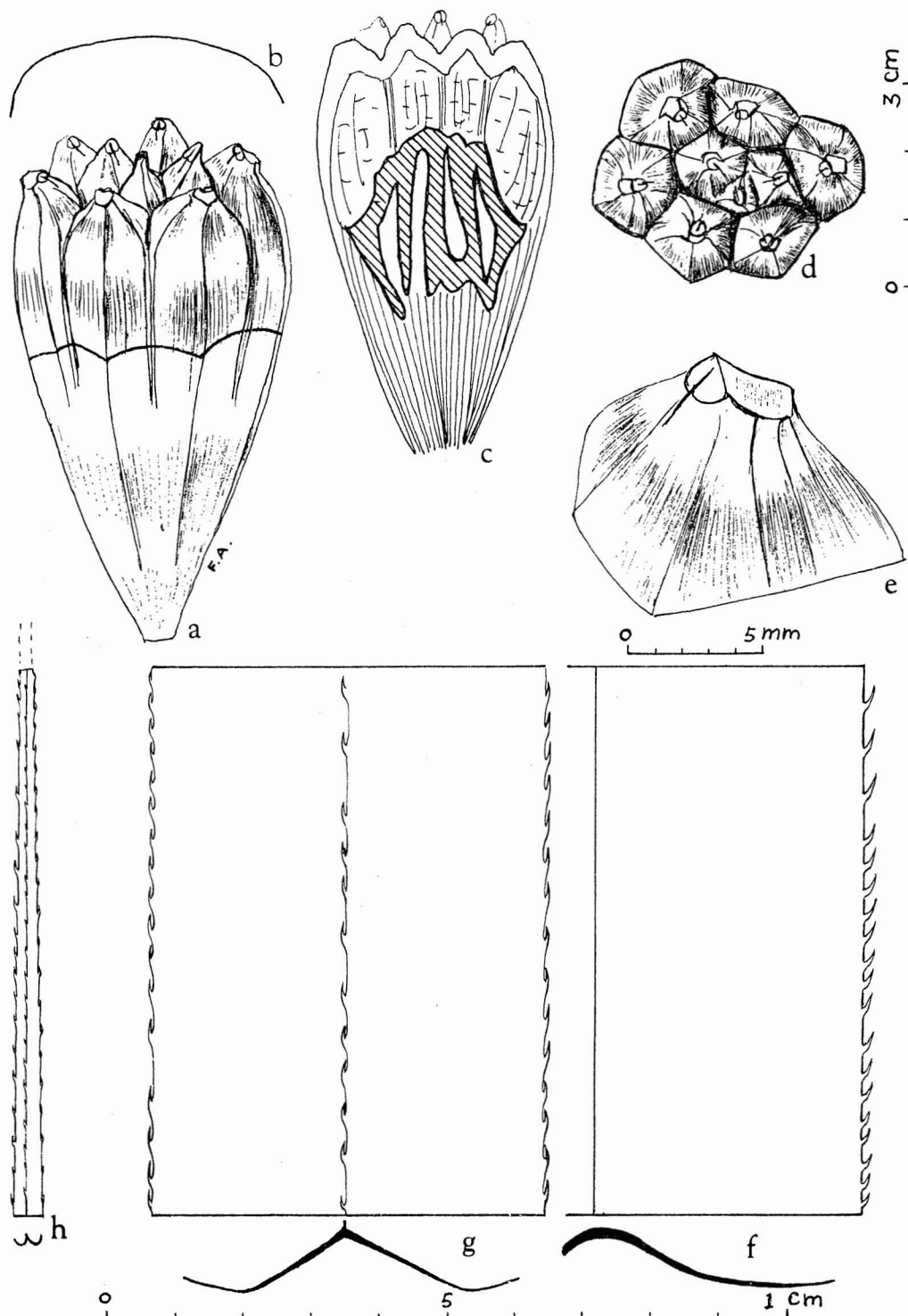


FIGURE 375. *Pandanus ovalauensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

platform 1–2 mm wide, distal of the stigma; their stigmas 1.8–2 mm in diameter, suborbicular, horizontal or slightly oblique, black, papillose; proximal sinuses a short crack at about 1/3 way towards the valley bottom; inner carpel apices 1/3–2/3 as large as the outer, pyramidal narrow ovoid or lanceoloid, their stigmas 1.7–2 mm long, elliptic, oblique; endocarp in upper 3/7 and 29–31 mm long, bony, pale, becoming brown, elliptic rhomboidal, the apex ovoid, the shoulders median, concave but nearly horizontal, lateral walls 1.5–3 mm thick, within pale brown, smooth, shining; seeds 10–12 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 9–23 mm long, with aerenchyma of longitudinal fibers and pale membranes; basal mesocarp 20–22 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Ovalau Island, near Wainiloka, roadside, sea level, 2.10.69, J. W. Parham & D. Koroiveibau 17,085 (BISH).

DISCUSSION: *P. ovalauensis* is a member of the section *Pandanus*, as is its closest relative *P. rhizophorensis* St. John of Viti Levu, a species with the phalanges 5.7–6.1 cm long, 2.4–2.9 cm wide, narrowly oblanceoloid, the upper 1/2–3/5 free; central apical sinuses 3–5 mm deep; endocarp median and 24–27 mm long, ellipsoid; leaf middle 4.8 cm wide, and there the margins with prickles 1.3–1.5 mm long, 3–6 mm apart, subarcuate subulate, compressed, strongly ascending, stramineous. *P. ovalauensis* has the phalanges 6–6.5 cm long, 2.9–3.7 cm wide, oblanceoloid, the upper 1/3 free; central apical sinuses 5–7 mm deep; endocarp in the upper 3/7 and 29–31 mm long, elliptic rhomboidal; leaf middle 5.8 cm wide, and there the margins with prickles 2.2–2.9 mm long, 2–8 mm apart, subarcuate thick subulate, compressed, almost appressed ascending, stramineous with reddish brown tips, more or less alternately large and small.

The new epithet is formed from the name of the type locality, Ovalau, and *-ensis*, the Latin adjectival place suffix.

Pandanus pansus sp. nov. (sect. *Pandanus*)

Figure 376

DIAGNOSIS HOLOTYPI: Arbor est, foliis 1.43 (+0.15–0.3?) m longis proxima basem 7 cm

latis in medio 6.4 cm latis coriaceis U-sulcatis 2-plicatis supra viridibus lucidis infra pallide viridibus gladiatis ex basi in apice deminuenti (apice interito) in sectione mediali cum 65 nervis parallelis secundariis in dimidio quoque nervis tertiis non evidentis basi inermi pallida, ex 8 cm marginibus cum aculeis 1.5–2.5 mm longis 5–13 mm separatis arcuatis subulatis adscendentibus stramineis cum apicibus rubris parvis, midnervo infra per 23 cm basales inermi, in sectione mediali marginibus cum aculeis 1.7–2 mm longis 3–7 mm separatis subarcuatis subulatis compressis adpresse adscendentibus obscure rubris excepta in basi straminea, midnervo vicinali infra cum aculeis 1.3–1.5 mm longis 9–16 mm separatis arcuatis subulatis compressis valde adscendentibus obscure rubris excepta in basi straminea (infructescentia incognita), phalangibus 6.7–7 cm longis 3.1–4.3 cm latis 2.3–3.1 cm crassis pyriformibus compressis 4–6-angulosis apice convexo vel humiliter convexo lateribus inferis planis sinibus lateralibus nullis parte 2/5 supra libera lateribus laevibus lucidis subplanis vel subcurvatis, carpelis 10–12 adscendentibus plus minusve parallelis eis marginalibus cum apicibus lanceoloideis ad lancei-ovoideis et saepe vel nonnumquam cum latere exteriori subplano verticali tum ad apicem extra curvato et cum stigmatibus apicali divergenti lateribus interioribus rotundatis sine angulis cum stigmatibus 2–2.8 mm latis suborbicularibus elevatis brunneis papillois, sinibus proximalibus profundis fissuris 2/5–1/2 ad fundam extensis, carpelis interioribus subaequalibus ad 1/2 minoribus quam exterioribus simulantibus sed non vel minus compressis, sinibus centralibus apicalibus 5–7 mm profundis V-formatis rectis, endocarpio in parte 2/5 supra et 23 mm longo osseoso rubri-brunneo oblatiore sphaerico basi humiliter concava apice rotundato et supra semines cum projectionibus brevis conicis humeris medialibus brevibus fere horizontalibus lateribus lateralibus 2–3 mm crassis intra clariter mahogani-rubris lucidis plerumque laevibus et spiraliter substriatis sed in apice rugosis, seminibus 12–15 mm longis ellipsoideis, mesocarpio in apice caperlae cuiusque cavernam 8–17 mm longam cum aerenchyma fibris longitudinalibus et parenchyma pallida formanti, mesocarpio basali 29–35 mm longo fibroso et carnoso.

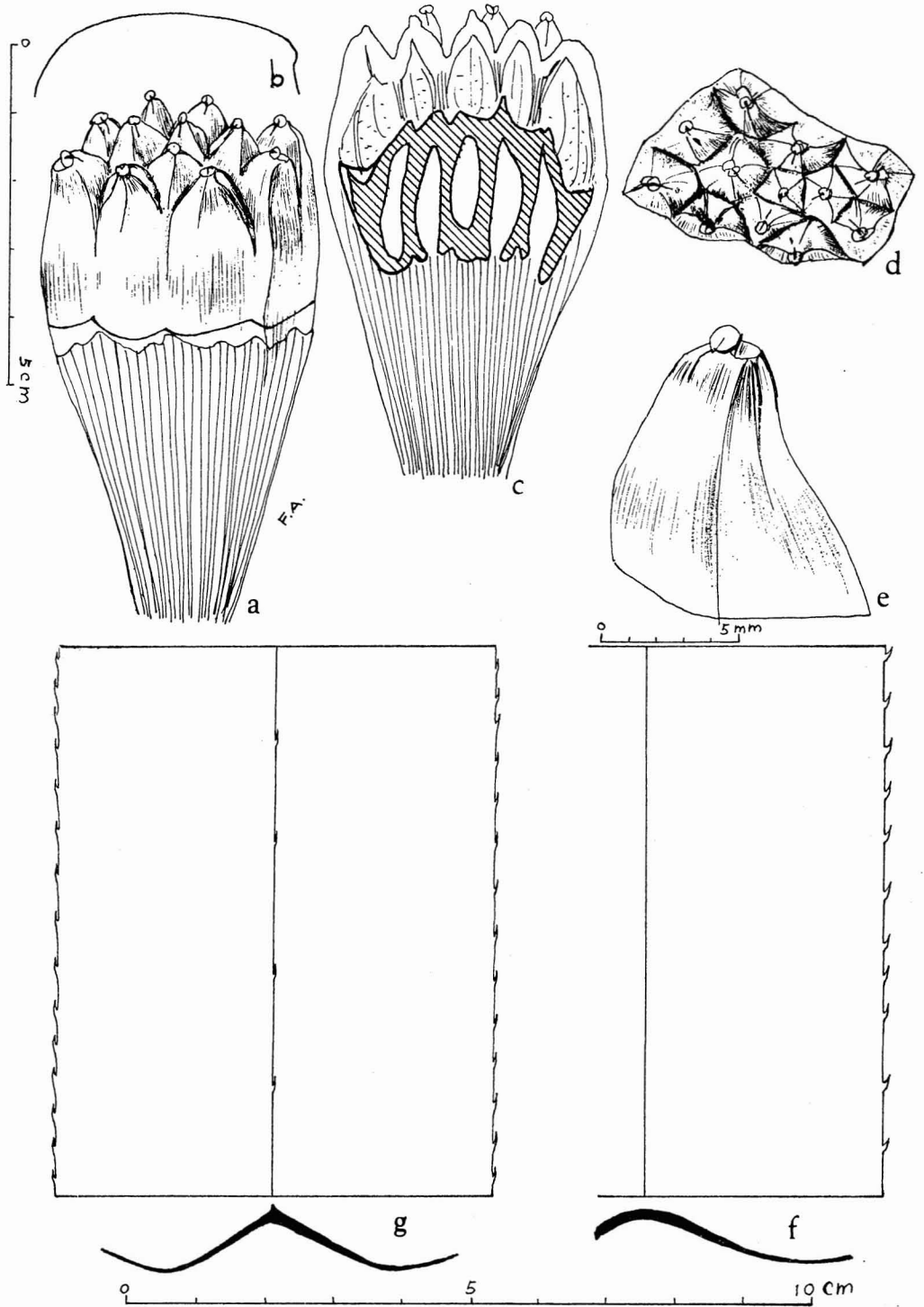


FIGURE 376. *Pandanus pansus* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$.

DIAGNOSIS OF HOLOTYPE: Tree; leaves 1.43 (+0.15–0.3?) m long, 7 cm wide near the base, 6.4 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, above green and shiny, below pale green, sword-shaped, tapering from base to tip (the apex lost), the base unarmed, pale; beginning at 8 cm the margins with prickles 1.5–2.5 mm long, 5–13 mm apart, arcuate subulate, ascending, stramineous with slight red tips; the midrib below unarmed for the basal 23 cm; at mid-section the margins with prickles 1.7–2 mm long, 3–7 mm apart, subarcuate subulate, compressed, appressed ascending, dark red except for the stramineous base; the nearby midrib below with prickles 1.3–1.5 mm long, 9–16 mm apart, arcuate subulate, compressed, strongly ascending, dark red except for the stramineous base (infructescence unknown); phalanges 6.7–7 cm long, 3.1–4.3 cm wide, 2.3–3.1 cm thick, pyriform, compressed, 4–6-angled, the apex convex or low convex, lower sides flat, lateral sinuses none, upper 2/5 free, its sides smooth, shining, flattish or gently curving; carpels 10–12, ascending, more or less parallel; the marginal ones with apices lanceoloid to lance-ovoid, and most or some of them with the flattish outer face vertical, then outcurving and with the diverging stigma at its apex, the inner sides rounded and lacking angles; their stigmas 2–2.8 mm wide, suborbicular, elevated, brown, papillose; proximal sinuses deep cracks running 2/5–½ way to valley bottom; inner carpel apices subequal to or as much as ½ smaller than the outer ones, similar but not or less compressed; central apical sinuses 5–7 mm deep, V-shaped, straight; endocarp in upper 2/5 and 23 mm long, bony, reddish brown, very oblate spherical, the base shallowly concave, the apex rounded and with short conic projections over the seeds, the shoulders median, short, almost horizontal lateral walls 2–3 mm thick, within bright mahogany red, shining, mostly smooth and slightly spirally striate, but at apex rugose; seeds 12–15 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 8–17 mm long, with aerenchyma of longitudinal fibers and pale parenchyma; basal mesocarp 29–35 mm long, fibrous and fleshy.

HOLOTYPE: Fiji Islands, Lau Group, Totoya Island, 21/IX/68, *Yoshio Kondo* (BISH).

DISCUSSION: *Pandanus pansus* is a member of the section *Pandanus*, as is its closest relative, *P. timoensis* St. John, of Timoe Atoll, Tuamotu Archipelago, a species with the phalanges with their lateral sinuses extending down to or beyond the middle; carpels 7–10; stigmas 4–5 mm long, suborbicular to obovate; endocarp 32 mm long, broadly ellipsoid, the wide shoulders shortly curved ascending; basal mesocarp 21–25 mm long; leaves about 1.1–1.2 m long 4.2 cm wide at the middle, and there with 50 parallel secondary veins in each half, and there the midrib below with prickles 1.2–1.5 mm long, 11–20 mm apart, subarcuate slender subulate, appressed ascending, stramineous with slight red tips. *Pandanus pansus* has the phalanges without lateral sinuses; carpels 10–12; stigmas 2–2.8 mm wide, suborbicular; endocarp 23 mm long, very oblate spherical, the shoulders short, almost horizontal; basal mesocarp 29–35 mm long; leaves about 1.5–1.7 m long, 6.4 cm wide at the middle, and there with 65 parallel secondary veins in each half, and there the midrib below with prickles 1.3–1.5 mm long, 9–16 mm apart, arcuate subulate, compressed, strongly ascending, dark red except for the stramineous base.

The new epithet is the Latin participle *pansus*, spread out, and it is given with reference to the spreading tips of the marginal carpel apices.

Pandanus Parhamii sp. nov. (sect. *Pandanus*)

Figure 377

DIAGNOSIS HOLOTYPE: Arbor 8.3 m alta multiramosa est, cortice griseo aculeato, radicibus incognitis, foliis 1–1.8 m longis proxima basem 6 cm latis in medio 4.5 cm latis coriaceis supra olivaceis sublucidis infra pallide viridibus et glaucis U-sulcatis 2-plicatis in sectione mediali cum 56 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis solum supra proxima basem evidenter et reticula breve oblonga formantibus, lamina gladiata ex basi in apice trigono gracile subulato deminuenti eo in puncto 10 cm ex apice 1 mm lato basi inermi pallida, ex 5 cm marginibus cum aculeis 2–2.2 mm longis 3–14 mm separatis arcuatis subulatis compressis adscendentibus stramineis, mid-nervo infra per 28 cm basales inermi in sectione mediali marginibus cum aculeis 1.2–1.4 mm

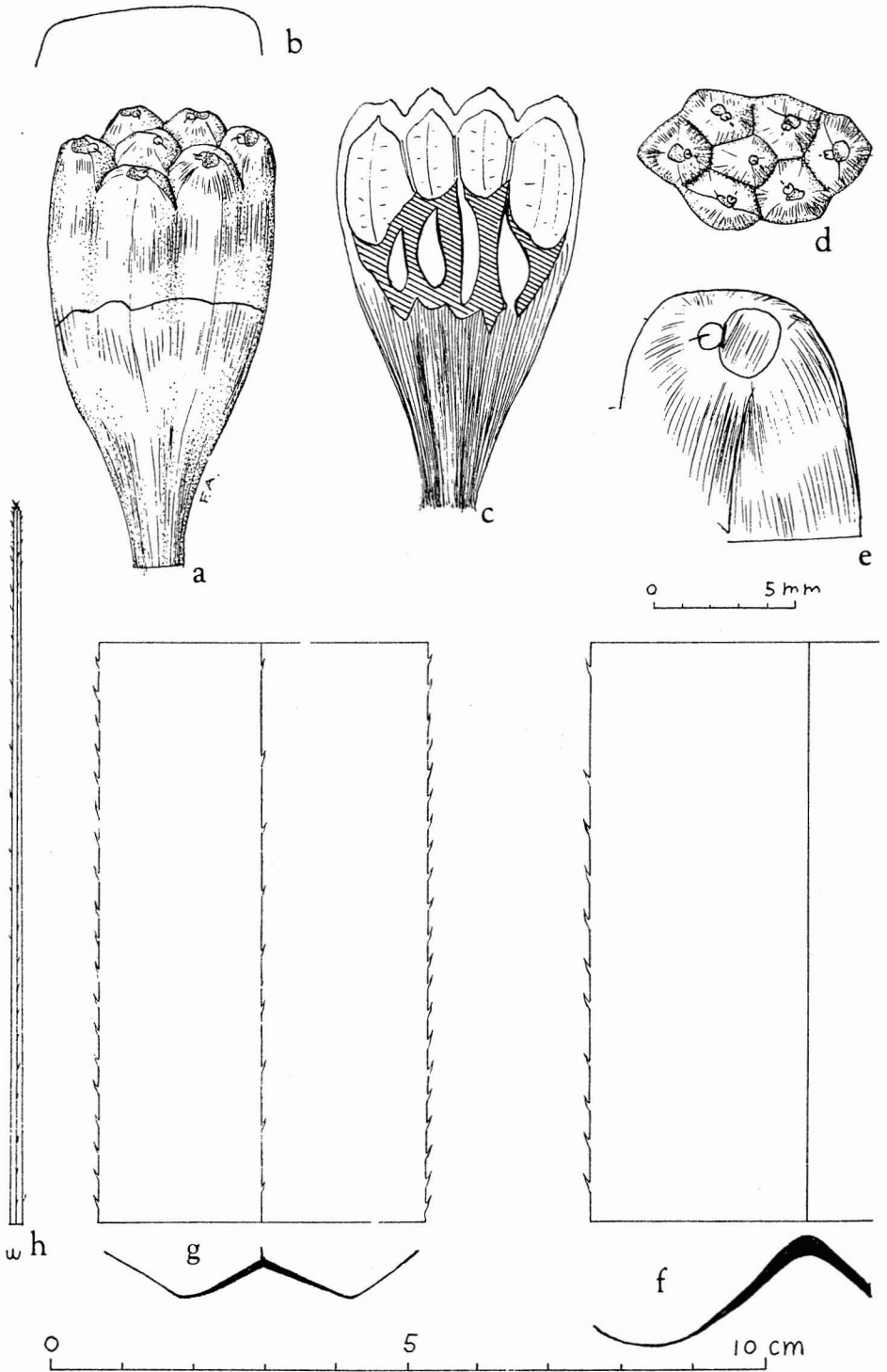


FIGURE 377. *Pandanus Parhamii* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange, apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

longis 3–5 mm separatis arcuatis subulatis ex basi lata compressis adscendentibus stramineis sed apicibus subrubris, midnervo vicinali infra cum aculeis 1–1.2 mm longis 4–7 mm separatis arcuatis subulatis compressis valde adscendentibus stramineis cum apicibus rosaceis, in apice subulato marginibus et midnervo infra cum aculeis 0.5–0.7 mm longis in marginalibus 1–4 mm separatis sed in midnervo remotis arcuatis subulatis valde adscendentibus stramineis cum apicibus rubris, syncarpio licet solitario 17.5 cm longo 15 cm diametro, phalangibus 5.7–6.2 cm longis 2.8–3.5 cm latis 1.9–2.5 cm crassis oblanceoloideis apice vadose convexo lateribus 4–5 (–6)-angulosis parte 2/5 supra libera lateribus subcurvatis laevibus lucidis sinibus lateralibus nullis, carpelis 5–8 adscendentibus fere parallelis eis marginalibus cum apicibus semiorbicularibus (vel paucis minoribus late ovoideis) apice cum areola concava profunda 1–2 mm lata distali, apicibus interioribus aequalibus vel ad $\frac{1}{2}$ tam grandibus quam illis marginalibus ovoideis ad semiorbicularibus concinnis subangulosis, stigmatibus 1–1.5 mm longis vel latis ellipticis ad reniformibus fere apicalibus et prostratis obliquis obscure brunneis papillois, sinibus proximalibus cum labiis inflatis $\frac{1}{4}$ ad fundam extensis, sinibus centralibus apicalibus 3–5 mm profundis rectis vel subcurvatis V-formatis, endocarpio in parte 1/3 supra et 17–19 mm longo osseoso subnigri-mahogani-colorato transverse ellipsoideo apice supra semines cum projectionibus breve conicis, lateribus cum humeris medialibus brevibus adscendentibus lateribus lateralibus 2–3 mm crassis intra laevibus lucidis, seminibus 9–12 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 9–17 mm longam cum aerenchyma fibris longitudinalibus paucis et membranarum albis transluscentibus, mesocarpio basali 27–29 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 8.3 m tall, much branched, bark gray and prickly; roots not recorded; leaves 1–1.8 m long, 6 cm wide near the base, 4.5 cm wide at the middle, coriaceous, olive green and somewhat shiny above, pale green and glaucous beneath, U-sulcate, 2-pleated, at midsection with 56 parallel secondary veins in each half, the tertiary crossveins seen only above near the base, forming short oblong

meshes, the blade sword-shaped, tapering from the base to the trigonous slender subulate apex, this at the point 10 cm down 1 mm wide, the base unarmed, pale; beginning at 5 cm the margins with prickles 2–2.2 mm long, 3–14 mm apart, arcuate subulate, compressed, ascending, stramineous; at midsection the margins with prickles 1.2–1.4 mm long, 3–5 mm apart, arcuate subulate from a broad base, compressed, ascending, stramineous but with reddish tips; the nearby midrib below with prickles 1–1.2 mm long, 4–7 mm apart, arcuate subulate, compressed, strongly ascending, stramineous, with pink tips; on the subulate apex the margins and midrib with prickles 0.5–0.7 mm long, 1–4 mm apart on the margins but remote on the midrib, arcuate subulate, strongly ascending, stramineous, with red tips; syncarp apparently solitary, 17.5 cm long, 15 cm in diameter; phalanges 5.7–6.2 cm long, 2.8–3.5 cm wide, 1.9–2.5 cm thick, oblanceoloid, the apex low convex, the sides 4–5 (–6)-angled, the upper 2/5 free, the sides gently convex, smooth, shining, lateral sinuses none; carpels 5–8, ascending, nearly parallel, the marginal ones with their apices semiorbicular (or a few smaller ones broadly ovoid), the apex with a deep concavity 1–2 mm wide, distal of the stigma; inner apices from $\frac{1}{2}$ to quite as large as the marginal ones, broadly ovoid to semiorbicular, symmetrical, faintly angled; stigmas 1–1.5 mm long or wide, elliptic to reniform, nearly apical and flush, oblique, dark brown, papillose; proximal sinuses running $\frac{1}{4}$ way to valley bottom, with swollen lateral margins; central apical sinuses 3–5 mm deep, straight or gently curved, V-shaped; endocarp in upper 1/3 and 17–19 mm long, bony, blackish mahogany-colored, transversely ellipsoid, the apex with short conic projections over the seeds, the sides with short median ascending shoulders, lateral walls 2–3 mm thick, within smooth and shining; seeds 9–12 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 9–17 mm long, with aerenchyma of a few longitudinal fibers and white transparent membranes; basal mesocarp 27–29 mm long, fibrous and fleshy.

EXPANDED DESCRIPTION: Tree 8.3–10 m tall; syncarp 15–17.5 cm long, 14–15 cm in diameter;

phalanges, when ripe bright orange, eaten by the Fijian people.

HOLOTYPE: Fiji, Viti Levu, Tailevu Prov., King's Road, between Naiborebore and Naimasimasi, roadside in swamp, probably tidal, 1–2 ft. alt., 15.2.56, *S. Nand & J. W. Parham 9.983* (BISH). Isotype (SUVA).

SPECIMENS EXAMINED: Fiji, Tailevu Prov., Matavatacou, Queen Victoria School Farm, bank of stream near coast, 15.2.55, *J. W. Parham 9.964* (BISH, SUVA).

DISCUSSION: *P. Parhamii* is a member of the section *Pandanus*, as is its closest relative *P. Smithii* St. John, of Moala Island, Lau Group, Fiji, a species with the phalanges 3.5–3.6 cm wide, 6-angled, obpyriform, the apex truncate; carpels 8–11; stigmas 1.8–2 mm long, broadly elliptic; central apical sinuses 2–2.5 mm deep; apices of central carpels $\frac{1}{4}$ – $\frac{1}{3}$ as large as the marginal ones; seeds 13–16 mm long; leaf middle with margins with prickles 1.5–2.5 mm long, 2–5 mm apart, subarcuate subulate, appressed ascending, stramineous, of two kinds, large and small alternating. *P. Parhamii* has the phalanges 2.8–3.5 cm wide, 4–5 (–6)-angled, oblanceoloid, the apex low convex; carpels 5–8; stigmas 1–1.5 mm long or wide, elliptic to reniform; central apical sinuses 3–5 mm deep; apices of central carpels half as large to quite as large as the marginal ones; seeds 9–12 mm long; leaf middle with margins with prickles 1.2–1.4 mm long, 3–5 mm apart, arcuate subulate from a broad base, compressed, ascending, stramineous with reddish tips.

The epithet is chosen to honor John Willoughby Parham (1929–), senior research officer and botanist of the Department of Agriculture, Fiji.

***Pandanus patulior* sp. nov. (sect. *Pandanus*)**

Figures 378–381

DIAGNOSIS HOLOTYPI: Arbor 5 m alta est (radicibus trunco ramique incognitis), foliis 1.68 m longis proxima basem 10 cm latis in medio 8 cm latis coriaceis U-sulcatis 2-plicatis supra olivaceis lucidis infra pallide viridibus et licet glaucis in sectione mediali cum 81 nervis parallelis secundariis in dimidio quoque sed nervis tertiis non evidentis lamina gladiata ex

basi in apice trigono gracile subulato deminuenti eo in puncto 10 cm ex apice 2 mm lato basi inermi pallida ex 8.5–9.5 cm marginibus cum aculeis 2.5–4 mm longis 4–8 mm separatis subarcuatis crasse subulatis adscendentibus ex basi geniculata stramineis, ex 13 cm midnervo infra cum aculeis 0.7–1.5 mm longis 22–48 mm separatis arcuatis crasse subulatis reflexis stramineis, in sectione mediali cum aculeis 4–9 mm separatis biformatis eis grandibus 2.5–3 mm longis arcuatis subulatis valde adscendentibus stramineis cum apicibus parvis subroseis et cum illis minoribus 1.5–1.7 mm longis simulantibus alternantibus, in apice subulato marginibus et midnervo infra cum aculeis 0.2–0.5 mm longis 3–7 mm separatis subarcuatis crasse subulatis adscendentibus viridibus cum apicibus subbrunneis, infructescentia cum syncarpio solitario, pedunculo 37 cm longo in apice 34 mm diametro clavato trilaterato cum bracteis deciduis compluribus, syncarpio 26 cm longo 20 cm diametro ellipsoideo et 90 phalanges ferrentibus, nucleo 12 cm longo 7.5 cm diametro ellipsoideo marginalibus fibrosis cum cicatricibus adamantosis, phalangibus 6.7–7.4 cm longis 4.3–6.7 cm latis 3.1–4.6 cm crassis biformatis eis numerosis obovoideis vel late obovoideis compressis 4–6-angulosis apice humiliter convexo lateribus inferis cum fugis et valleculis sinibus lateralibus plerumque fissuris angustis infra medium descendentibus parte $\frac{1}{2}$ supera libera et lateribus carpelarum cum 0–2 angulis secundariis eis brevibus et proxima medium evidentis superficie laevi lucido parte $\frac{1}{3}$ supera pallide lutea parte mediali rubri-aurantiaca parte $\frac{1}{3}$ infera lutea, carpelis 8–15 adscendentibus plus minusve parallelis apicibus erectis, carpelis marginalibus cum apicibus ovoideis (vel rare illa grande late ovoidea) angulosis et cum areola concava fere horizontali 2–4 mm lata distali, stigmatibus 1.7–2 mm latis cordatis ad suborbicularibus plerumque truncatis obliquis brunneis papillosis sinibus proximalibus fissura lata aperta $\frac{1}{2}$ – $\frac{2}{3}$ ad fondam extensis, sinibus centralibus apicalibus 5–7 mm profundis rectis V-formatis, carpelis interioribus cum apicibus $\frac{1}{3}$ – $\frac{2}{3}$ tam grandibus quam exterioribus lanceoloideis ad concinnis ovoideis cum stigmatibus 2.5–3 mm longis ellipsoideis, endocarpio mediali 25–28 mm longo osseoso pallide rubri-brunneo corpore oblate hemisphaerico apice supra seminem

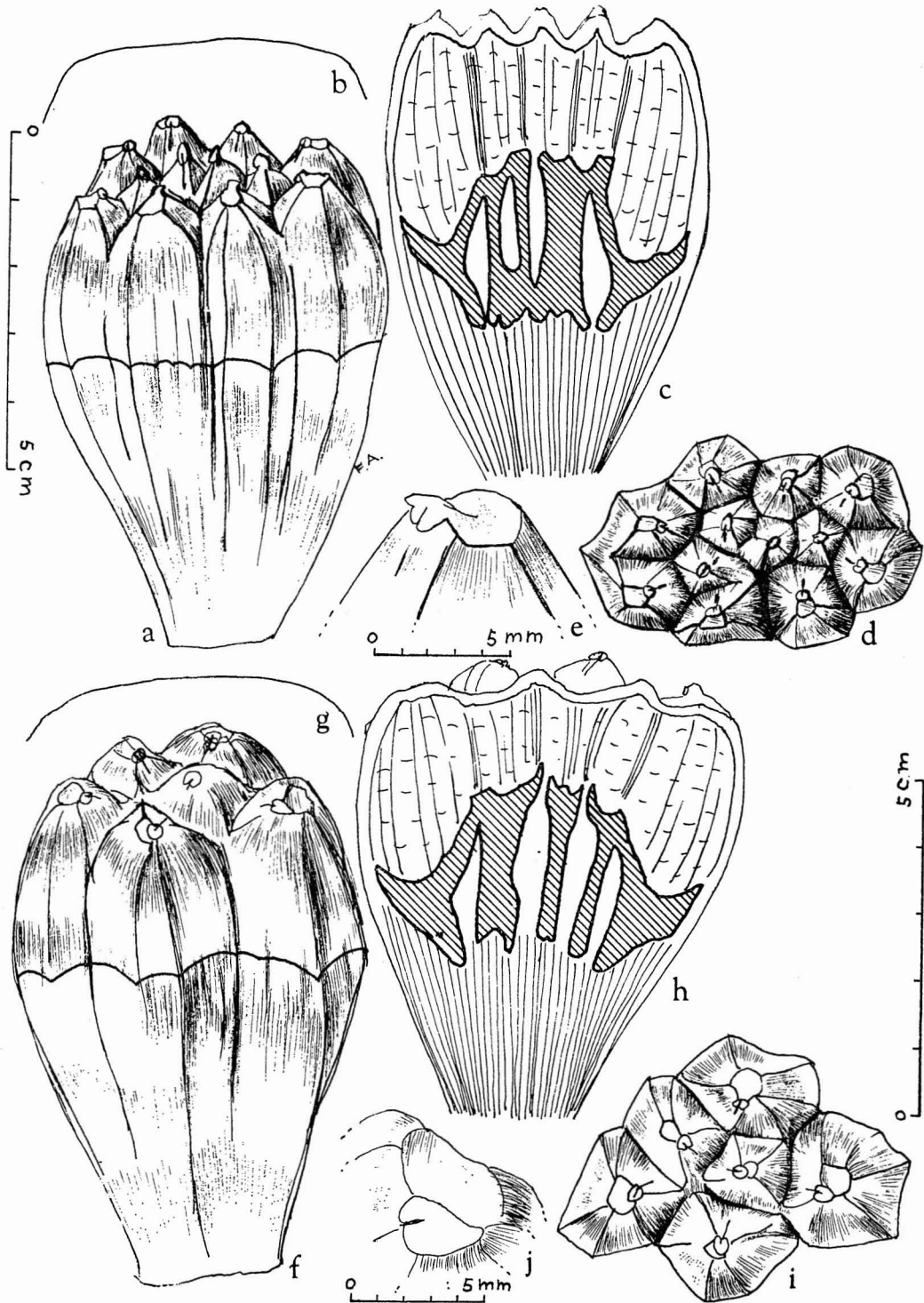


FIGURE 378. *Pandanus patulior* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpal apex and stigma, oblique view, $\times 4$; *f*, phalange, lateral view, $\times 1$; *g*, profile of phalange apex, $\times 1$; *h*, phalange, longitudinal median section, $\times 1$; *i*, phalange, apical view, $\times 1$; *j*, carpal apex and stigma, oblique view, $\times 4$.

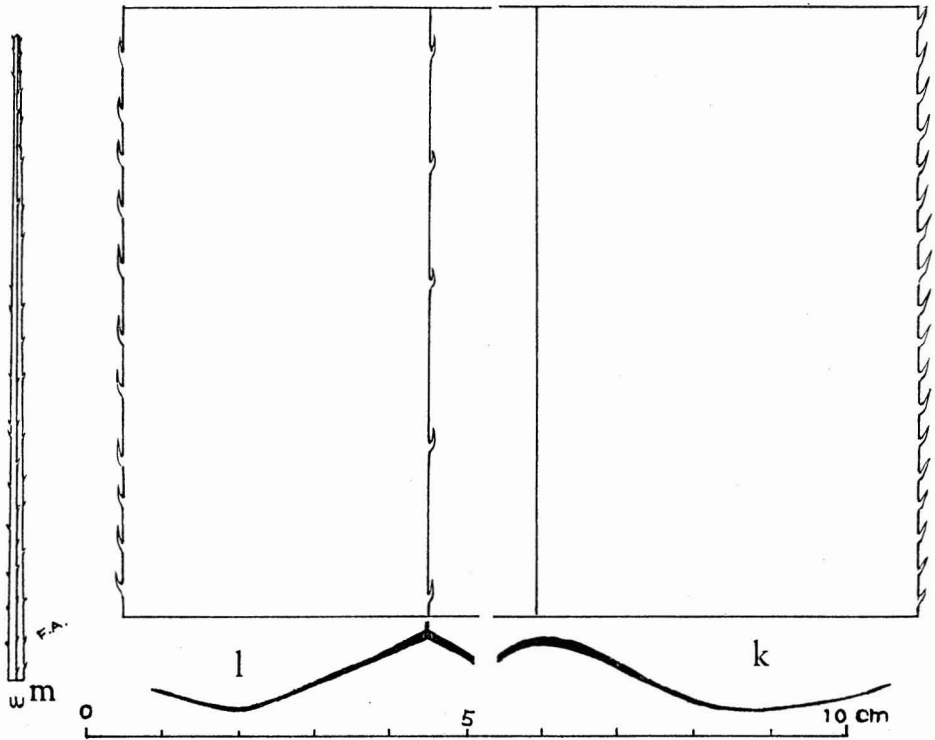


FIGURE 379. *Pandanus patulior* St. John, from holotype. *k*, half of leaf base, lower side, $\times 1$; *l*, half of leaf middle, lower side, $\times 1$; *m*, leaf apex, lower side, $\times 1$.

quamque cum projectione breve conico humeris inframedialibus latis aliformatis curvatis adscendentibus lateribus lateralibus supra humeres 2 mm crassis infra 3 mm crassis intra mahogani-coloratis lucidis dimidio infero laevis eo supero rugoso, seminibus 13–19 mm longis anguste ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 17–33 mm longam cum aerenchyma fibris longitudinalibus et membranis albis formanti, mesocarpio basali 22–27 mm longo fibroso et carnosio; phalangibus paucis latioribus cum 7–11 carpelibus et aliquibus subradiatis et eis marginalibus cum apicibus hemisphaericis sine vel cum areola 3–7 mm lata concava distali, sinibus centralibus apicalibus late V-formatis, carpelibus interioribus cum apicibus $\frac{1}{4}$ – $\frac{2}{3}$ tam grandibus quam exterioribus ovoideis ad hemisphaericis cum stigmatibus suborbicularibus, endocarpio simulanti sed humeris medialibus.

DIAGNOSIS OF HOLOTYPE: Tree 5 m tall; roots, trunk, and branches unknown; leaves 1.68 m

long, 10 cm wide near the base, 8 cm wide at the middle, coriaceous, U-sulcate, 2-pleated, olive green and shiny above, pale green and apparently glaucous below, at midsection with 81 parallel secondary veins in each half, but no evident tertiary veins, the blade sword-shaped, tapering from base to the trigonous slender subulate apex, this at the point 10 cm down 2 mm wide, the base unarmed, pale; beginning at 8.5–9.5 cm the margins with prickles 2.5–4 mm long, 4–8 mm apart, subarcuate stout subulate from a geniculate base, ascending, stramineous; beginning at 13 cm the midrib below with prickles 0.7–1.5 mm long, 22–48 mm apart, arcuate thick subulate, reflexed, stramineous; at midsection the margins with prickles 4–9 mm apart, of two kinds, large ones 2.5–3 mm long, arcuate subulate, strongly ascending, stramineous, with slight pink tips, alternating with small ones 1.5–1.7 mm long, similar; the nearby midrib below with prickles 2–2.5 mm long, 15–22 mm apart, arcuate slender subulate, appressed ascending, stramineous; on the subulate apex

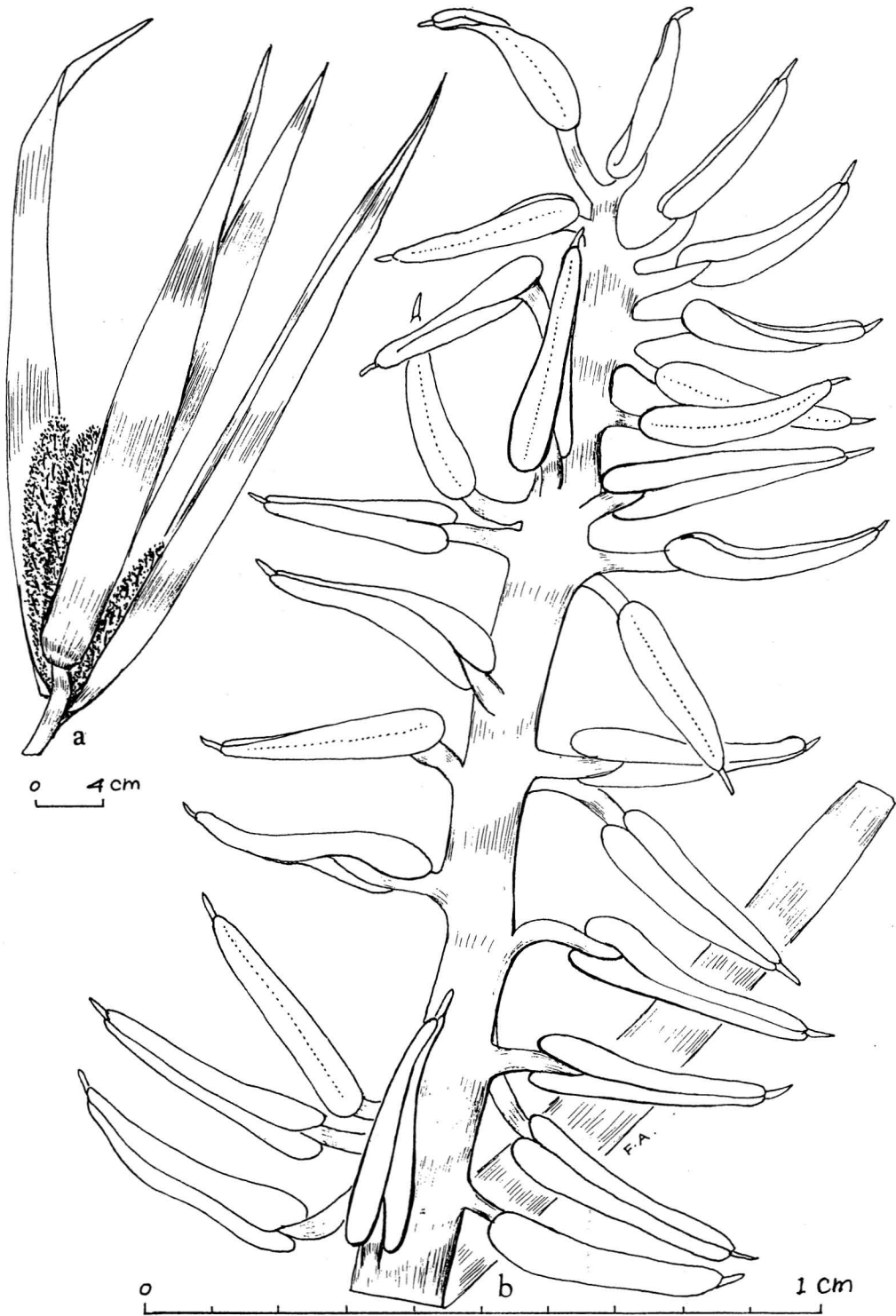


FIGURE 380. *Pandanus patulior* St. John, from staminate plant. *a*, staminate inflorescence, from Kodachrome photo, $\times \frac{1}{4}$; *b*, fascicle of stamens, $\times 10$.

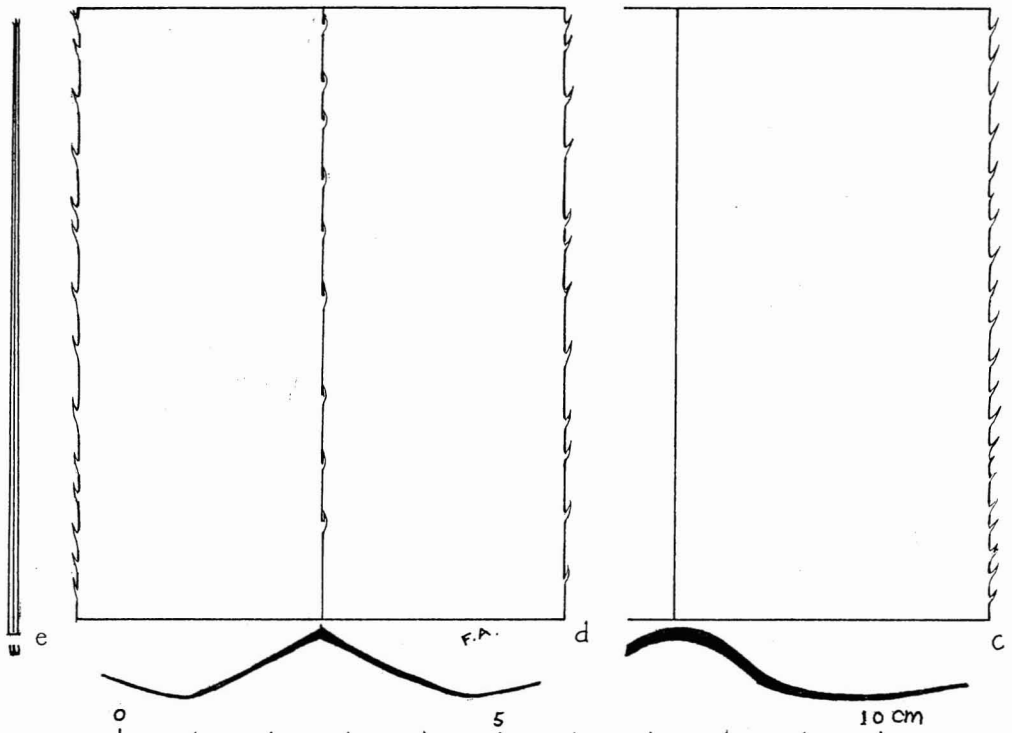


FIGURE 381. *Pandanus patulior* St. John, from staminate plant. *c*, half of leaf base, lower side, $\times 1$; *d*, leaf middle, lower side, $\times 1$; *e*, leaf apex, lower side, $\times 1$.

the margins and midrib below with prickles 0.2–0.5 mm long, 3–7 mm apart, subarcuate stout subulate, ascending, green with brownish tips; infructescence with a solitary syncarp; peduncle 37 cm long, 34 mm in diameter at apex, clavate, 3-sided, with several deciduous bracts; syncarp 26 cm long, 20 cm in diameter, ellipsoid, bearing 90 phalanges; core 12 cm long, 7.5 cm in diameter, ellipsoid, the rind fibrous, with diamond-shaped fruit scars; phalanges 6.7–7.4 cm long, 4.3–6.7 cm wide, 3.1–4.6 cm thick, of two kinds, the more numerous ones obovoid or broadly so, compressed, 4–6-angled, the apex low convex, the lower sides with ridges and valleys, lateral sinuses almost all present as narrow cracks, running down well below the middle, upper $\frac{1}{2}$ free, and there the marginal carpels with 0–2 secondary angles, these short and evident only near the midsection, the surface smooth, shining, upper $\frac{1}{3}$ pale yellow when ripe, the middle red-orange, the lower $\frac{1}{3}$ yellow; carpels 8–15, ascending, more or less

parallel, the tips erect, not divergent; marginal carpel apices ovoid (or rarely a large one is broadly ovoid), angled, and with a nearly horizontal concave platform 2–4 mm wide, distal of the stigma; stigmas 1.7–2 mm wide, cordate to suborbicular, mostly truncate, oblique, brown, papillose; proximal sinuses a wide open crack running $\frac{1}{2}$ – $\frac{2}{3}$ way to valley bottom; central apical sinuses 5–7 mm deep, straight, V-shaped; inner carpel apices $\frac{1}{3}$ – $\frac{2}{3}$ as large as the outer ones, lanceoloid to ovoid, symmetrical, their stigmas 2.5–3 mm long, ellipsoid; endocarp median, 25–28 mm long, bony, light reddish brown, the body oblate hemispheric, the apex with a short conic projection over each seed, the shoulders infra-median, wide, winglike and curved ascending, lateral walls above the shoulders 2 mm thick, below them 3 mm thick, within mahogany-colored, shining, the lower half smooth, the upper rugose; seeds 13–19 mm long, narrowly ellipsoid; mesocarp forming in the apex of each

carpel a cavern 17–33 mm long, with aerenchyma of longitudinal fibers and white membranes; basal mesocarp 22–27 mm long, fibrous and fleshy; the fewer broad phalanges with 7–11 carpels and some of these more radial than parallel, the marginal carpels with apices hemispheric, with or without a concave platform 3–7 mm wide; central apical sinuses widely V-shaped; inner carpel apices $\frac{1}{4}$ – $\frac{2}{3}$ as large as the outer ones, ovoid to hemispheric; their stigmas suborbicular.

STAMINATE PLANT (*Smith et al. 16,866*): Tree 5 m tall, branching (roots, trunk, and branches unknown); leaves 1.8 m long, 8.4 cm wide near the base, 6.4 cm wide at the middle, coriaceous, shining olive green above, pale green below, at midsection with 78 parallel secondary veins in each half, the blade sword-shaped, tapering from base to the trigonous slender subulate apex, this at the point 10 cm down 1 mm wide, the base unarmed, pale, beginning at 16 cm the margins with prickles mostly 1.8–2.7 mm long, 2–6 mm apart, arcuate subulate, ascending, stramineous, and intermingled and much fewer small similar ones 0.5–1 mm long; the midrib below unarmed for 33 cm; at midsection the margins with prickles 2–2.4 mm long, 2–8 mm apart, arcuate subulate, compressed, strongly ascending, stramineous; the nearby midrib below with prickles 5–12 mm apart, of two kinds, large ones 1.8–2 mm long, subarcuate slender subulate, appressed ascending, stramineous, alternating with similar small ones 0.7–1.3 mm long; on the subulate apex the margins and midrib below essentially unarmed for the last 12 cm; staminate inflorescence more than 41 cm long; peduncle not seen; rhachis 11 cm long, with white, thick chartaceous bracts; spikes about 6, and 7–10 cm long, 2–2.5 cm in diameter, cylindrical, dense; stamens in dendritic fascicles of 26–48; column 8–13 mm long; rhachis 14–17 mm long; free filament tips 1–2 mm long, divergent; anthers 2.5–5.5 mm long, 0.6–0.7 mm wide, linear lanceolate, deeply sagittate at base, bearing a 0.4–0.7 mm subulate projection of the connective.

HOLOTYPE: Fiji, Vanua Levu Island, Cakaudrove, Wairuku Plantation, on beach, sea level, 29.4.69, *A. C. Smith, J. W. Parham et al. 16,865* (BISH).

DISCUSSION: *P. patulior* is a member of the section *Pandanus*. Its few phalanges with broad-topped carpels are similar to those of *P. puka-pukaensis* St. John, of the Danger Islands, but the numerous narrower ones are closer to *P. seruaensis* St. John, of Viti Levu, Fiji, a species with the phalanges 7.7–8.2 cm long, 3.4–4.6 cm wide, oblanceoloid or broadly so; lateral sinuses closed; marginal apices with the platform 2–3 mm wide, when present; central apical sinuses 3–5 mm deep; endocarp in upper $\frac{3}{8}$ and 18–19 mm long, very oblate, the shoulders 3–4 mm wide; leaf near the base 5 cm wide, and there the margins with prickles 2–3 mm long, arcuate subulate, compressed, appressed ascending, stramineous, perceptibly large and small alternating. *P. patulior* has the phalanges 6.7–7.4 cm long, 4.3–6.7 cm wide, obovoid or broadly so, the lateral sinuses almost all as narrow cracks down to beyond the middle; marginal apices with the platform 2–7 mm wide when present; central apical sinuses 5–7 mm deep; endocarp median and 25–28 mm long, slightly oblate, the shoulders 8–9 mm wide; leaf near base 10 cm wide, and beginning at 8.5–9.5 cm the margins with prickles 2.5–4 mm long, 4–8 mm apart, subarcuate stout subulate, from a geniculate base, ascending, stramineous.

The new epithet is the comparative of the Latin adjective *patulus*, broad, hence broader, and it is given with reference to the broad leaves.

Pandanus pyriformis (Martelli) comb. nov.

Figure 382

P. odoratissimus L. f., var. *pyriformis* Martelli, Univ. Calif. Publ. Bot. 12: 332, pl. 40, 1930 (sect. *Pandanus*).

ORIGINAL DIAGNOSIS: "Arbor erecta, apicem versus ramosa. Syncarpium subglobsum, 20–22 cent. diam. Phalanges obpyriformes, inaequaliter pentagonae, vix compressae, 6 cent. longae, 3–3.5 cent. latae et 2.5–3 cent. crassae, lateribus levibus, subconvexis, nitidis (in sicco), acute angulosis et secundum loculis sulcis angustis, fere usque ad medium phalangis percursis, dimidia inferiore parte phalangis longiuscule angustatae, quasi caudatae (basi 10–13 mill. circiter crassae), in dimidia superiore

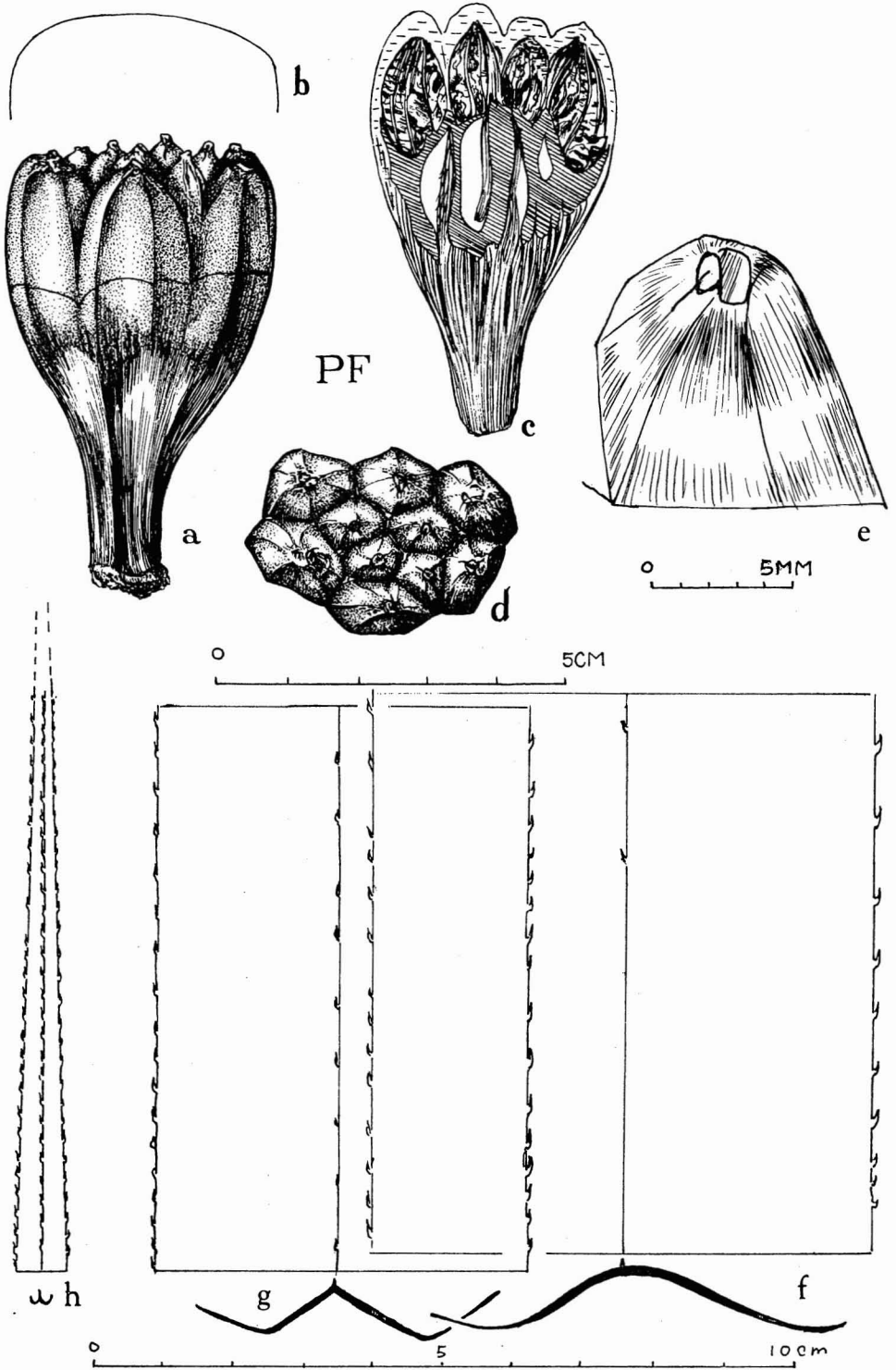


FIGURE 382. *Pandanus pyriformis* (Martelli) St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

parte liberae, leves, ambitu convexae, supra in toto subplanae; loculis plurimis, 9–11 subaequalibus, prominulis, acutis et acute angulosis, a sulcis angustis et profundis divisis. Stigma in vertice loculorum situm hippocrepiforme. Endocarpium osseum, in sectione longitudinale, 18 mill., spissum e fere medio phalangis apicem versus situm, superne rotundatum. Mesocarpium superum, valide lacunosum, medullosum; inferum fibrosum.”

EXPANDED DIAGNOSIS OF LECTOTYPE: Erect tree, branched above; leaves 1.13 (+0.1–0.2?) m long, 7 cm wide near the base, 5.5 cm wide near the middle, coriaceous, above olive green, below pale green and glaucous, U-sulcate, 2-pleated, at midsection with 65 parallel secondary veins in each half, the tertiary cross-veins seen near the base on both sides, forming short oblong meshes, blade sword-shaped, tapering from the base gradually into the long attenuate tip (the tip lost), the base unarmed, pale, beginning at 6 cm the margins with prickles 1.3–2 mm long, 2–8 mm apart, stout subulate, stramineous below, brown-tipped, ascending, the lower ones geniculate near the base, the others arcuate; beginning at 13 cm the midrib below with prickles 1.8–2 mm long, 10–23 mm apart, stout subulate, strongly ascending, mostly brown; at midsection the margins with prickles 1.4–2 mm long, 4–7 mm apart, subarcuate subulate, appressed ascending, wholly brown, or at least the tip brown; the nearby midrib below with prickles 1.3–1.5 mm long, 4–11 mm apart, similar but pale throughout except for the slight brown tips; fairly near the apex the margins and midrib below with prickles 0.4–0.5 mm long, 1.5–3 mm apart, appressed ascending, dark brown; infructescence with a solitary syncarp; peduncle 24 cm long, 2 cm in diameter, 3-sided, slightly curved, the upper half bearing numerous coriaceous leafy bracts, these shredded when the fruit is mature, core when dried 5 cm long, 4.3 cm wide, ovoid, 3-sided, with prominent phalange scars; syncarp 20–22 cm long, 20 cm in diameter, subglobose; phalanges 5.7–6.3 cm long, 3–3.9 cm wide, 2.4–2.8 cm thick, pyriform, 5-angled, the upper $\frac{1}{2}$ free, apex low convex, most lateral sinuses distinct part way and some all the way to the middle, the sides smooth, shining, with

slightly curving planes and with one or more secondary angles; carpels 8–11, parallel or slightly radial, their apices ascending, the outer ones ovoid, angled, those of the sides flattened on the outer side, the inner apices narrowly ovoid to lanceoid, $\frac{1}{2}$ – $\frac{2}{3}$ as large as the marginal; central apical sinuses 3–6 mm deep, nearly straight, V-shaped; stigmas 1.2–1.5 mm long, elliptic, oblique, sulcate, brown; proximal sinuses wide, but running only $\frac{1}{4}$ – $\frac{1}{3}$ way to valley bottom; endocarp 22 mm long, in upper $\frac{1}{3}$, bony, brown, very oblately subglobose, truncate below at the middle, the apex with conic projections and bands of fibers to the stigmas, lateral walls 2–3 mm thick, within shining but rugulose; seeds 10 mm long, ellipsoid; upper mesocarp forming in the apex of each carpel a cavity 11–17 mm long, with an aerenchyma with a few slender longitudinal fibers and many white, mostly transverse membranes; basal mesocarp 27 mm long, fibrous and fleshy.

LECTOTYPE: Fiji Islands, Viti Levu, shore near Suva, Sept. 2, 1926, *W. A. Setchell* 15,668 (UC). Type examined. Isotypes: (B, BISH, BM, G, K, MO, P. US).

SPECIMENS EXAMINED: Fiji, Viti Levu, Tavatu, Matavatathou, 0–20 m. alt., July 21, 1955, *H. S. McKee* 2,809 (us); Naluiniga, Seqaqa, Macuata Prov., roadside, tree 8–10 ft. tall; with prop roots; 21.8.56, *D. Koroveibau* (Fiji Dept. Agr. Herb. no.) 10,483 (BISH).

DISCUSSION: Setchell recorded that the leaf “awns deciduous, painful in the skin.” The leaf that he preserved still has most of its prickles, and they are not deciduous. If approached carelessly, the stiff prickles will penetrate and wound a person. That is true of the prickles of nearly all species of *Pandanus*, and there is nothing to indicate that this Fijian species is out of the ordinary. In the same publication (1930: 358, pl. 45, figs. 6–7) Martelli described a second time his var. *pyriformis*, with a different diagnosis, and based it upon a different collection, *Setchell & Parks* 15,644, from Tongatabu Island in the Tonga Islands. Either this or the Fijian collection is available for choice as a

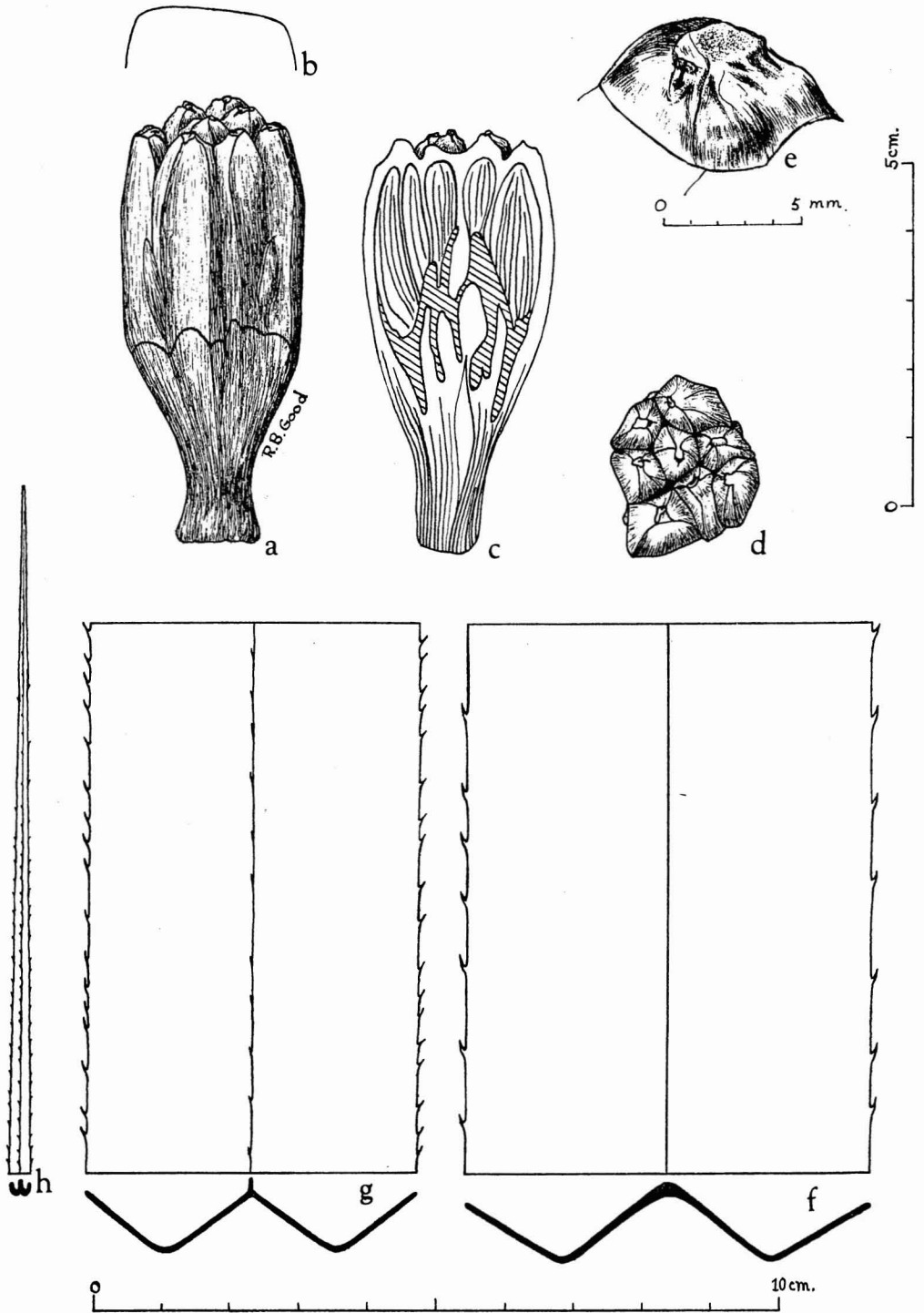


FIGURE 383. *Pandanus rhizophorensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

lectotype. The latter is here chosen, that is: Fiji, Viti Levu, *Setchell 15,668* (UC). The Tongan plant is being redescribed as *P. tongaensis* St. John.

Pandanus rhizophorensis sp. nov. (sect. *Pandanus*)

Figure 383

DIAGNOSIS HOLOTYPI: Arbor 4–5 m alta est, foliis 1.32 (+0.1–0.13?) m longis proxima basem 6.1–6.4 cm latis in medio 4.8 cm latis coriaceis supra viridibus lucidis infra pallidioribus et licet glaucis V-sulcatis 2-plicatis in sectione mediali cum 62 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis in paginis ambis in parte 1/3 basali evidentis et reticula breve oblonga formantibus lamina gladiata ex basi in apice trigono graciliter subulato deminuenti (apice interito), proxima basem marginibus cum aculeis 2–2.3 mm longis 8–15 mm separatis arcuatis crasse subulatis compressis valde adscendentibus stramineis, in sectione mediali marginibus cum aculeis 1.3–1.5 mm longis 3–6 mm separatis subarcuatis subulatis compressis valde adscendentibus stramineis, midnervo vicinali infra cum aculeis 0.8–1.1 mm longis 7–14 mm separatis arcuatis subulatis compressis adpresse adscendentibus stramineis, in apice per 4 cm marginibus inermibus sed infra cum aculeis 0.4 mm longis 3–6 mm separatis subtiliter subulatis valde adscendentibus cum apicibus rubris, midnervo infra cum aculeis 0.4–0.6 mm longis 1–3 mm separatis arcuatis subulatis adscendentibus cum apicibus rubris, infructescentia cum syncarpio solitario, pedunculo 2 cm diametro 11 cm plus longo trilaterato cum bracteis deciduis compluribus, nucleo siccato 5 × 3.5 cm ellipsoideo trilaterato margine duro fibroso cum cicatricibus obscuris, phalangibus 5.7–6.1 cm longis 2.4–2.9 cm latis (4.3 cm latis in gemine cum 15 carpelis) 1.7–2.4 cm crassis anguste oblanceoloideis 4–5-angulosis sinibus lateralibus plerumque vadosis sed angustis et ultra medium descendentes apice convexo parte $\frac{1}{2}$ – $\frac{3}{5}$ supera libera lateribus laevibus lucidis fere planis vel subconvexis et carpelis aliquibus cum 1–2 angulis secundariis vadosis, carpelis 7–10 adscendentibus plus minusve parallelis, phalangibus omnibus (excepta paucis angustis) cum carpelis secundariis sterilibus feruliferis in

medio affixis et dimidiis ad apicem extensis lanceoloideis ad anguste ellipticis compressis subdivergentibus et plerumque cum stigmatibus perfectis, carpelis marginalibus normalibus cum apicibus ovoideis vel late ovoideis pluriangulosis lateribus cum uno vel planis compluribus exterioribus, sinibus apicalibus centralibus 3–5 mm profundis plerumque rectis anguste V-formatis apicibus carpelis centralibus simulantibus sed $\frac{1}{2}$ – $\frac{2}{3}$ tam grandibus et concinnis pyramidalis-ovoideis, stigmatibus 1–2 mm longis apicalibus ellipsoideis obscure brunneis papillois obliquis, sinibus proximalibus angustis $\frac{1}{3}$ – $\frac{1}{2}$ ad fundam extensis, endocarpio mediali 24–27 mm longo osseoso obscure rubri-brunneo anguste ellipsoideo vel rhombico supra seminem omnem cum projectione conico humeris brevibus adscendentibus alatis lateribus lateralibus 1.5–2.5 mm crassis intra laevibus lucidis, seminibus 10–12 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 9–23 mm longam cum aerenchyma fibris longitudinalibus paucis et membranis albis delicatis formanti, mesocarpio basali 17–22 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 4–5 m tall; leaves 1.32 (+0.1–0.13?) m long, 6.1–6.4 cm wide near the base, 4.8 cm wide at the middle, coriaceous, above shiny green, below paler green and apparently glaucous, V-sulcate, 2-pleated, at midsection with 62 parallel secondary veins in each half, the tertiary cross-veins visible on both sides in the lower 1/3, forming short oblong meshes, blade sword-shaped, tapering from the base to the trigonous slender subulate apex, the base not seen; the margins near the base with prickles 2–2.3 mm long, 8–15 mm apart, arcuate stout subulate, compressed, strongly ascending, stramineous; the midrib below unarmed for the lower 1/3; at the midsection the margins with prickles 1.3–1.5 mm long, 3–6 mm apart, subarcuate subulate, compressed, strongly ascending, stramineous; the nearby midrib below with prickles 0.8–1.1 mm long, 7–14 mm apart, arcuate subulate, compressed, appressed ascending, stramineous; on the subulate apex the margins for the last 4 cm unarmed, below that with prickles 0.4 mm long, 3–6 mm apart, weak subulate, strongly ascending, red-tipped; the

midrib below with prickles 0.4–0.6 mm long, 1–3 mm apart, arcuate subulate, ascending, red-tipped; the pleats unarmed; infructescence with a solitary syncarp; peduncle 2 cm in diameter, more than 11 cm long, 3-sided, with several deciduous bracts; dried core of the syncarp 5 × 3.5 cm, ellipsoid, 3-sided, with a hard fibrous rind and obscure fruit scars; phalanges 5.7–6.1 cm long, 2.4–2.9 cm wide (or 4.3 cm wide in a twin with 15 carpels), 1.7–2.4 cm thick, narrowly oblanceoloid, 4–5-angled, most of the lateral sinuses superficial but narrow and running more than halfway down, the apex low convex, upper $\frac{1}{2}$ – $\frac{3}{5}$ free, the sides smooth, shining, flattish or gently convex and some of the carpal sides with 1–2 additional low angles; carpels 7–10, ascending, more or less parallel; all phalanges (except a very few of the narrowest ones) with 1–4 additional splintlike marginal, sterile carpels attached at midsection and extending halfway to the tip, lanceoloid to narrowly elliptic, compressed, slightly divergent, and most of them with well-formed stigmas; apices of the normal marginal carpels ovoid or broadly so, several-angled, with one or more flattened planes on the outer side, central apical sinuses 3–5 mm deep, mostly straight, narrowly V-shaped; apices of central carpels similar, but $\frac{1}{2}$ – $\frac{2}{3}$ as large as the outer ones and symmetrical pyramidal ovoid; stigmas 1–2 mm long, apical, elliptic, dark brown, papillose, oblique; proximal sinuses narrow, running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom; endocarp median, 24–27 mm long, bony, dark reddish brown, narrowly ellipsoid or rhombic, with conic projections above the seeds and short ascending winglike shoulders, the lateral walls 1.5–2.5 mm thick, within smooth and shining; seeds 10–12 mm long, ellipsoid; mesocarp forming in the apex of each carpal a cavern 9–23 mm long, with an aerenchyma of a few longitudinal fibers and white delicate membranes; basal mesocarp 17–22 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Viti Levu, Rewa Prov., near Suva Cemetery, mangrove swamp, 25.2.56, *D. Koriveibau 10,057* (BISH). ISOTYPE (SUVA).

SPECIMENS EXAMINED: Fiji, without data, no. 10,054 (SUVA).

DISCUSSION: *P. rhizophorensis* is a member of the section *Pandanus*, as is its closest relative, *P. tutuilaensis* (Martelli) Martelli, of Savaii, a species with the phalanges 6–7 cm long; carpels 5–9, all fertile; their apices oblate semiobicular; endocarp in the upper $\frac{2}{5}$; leaves at midsection 6.8 cm wide, near the base the margins with prickles 1.3–2 mm long, 4–15 mm apart, geniculate subulate, ascending, stramineous. *P. rhizophorensis* has the phalanges 5.7–6.1 cm long; fertile carpels 7–10, and with 1–4 short, marginal, sterile ones; apices of marginal fertile carpels ovoid or broadly so; endocarp median; leaves at midsection 4.8 cm wide, near the base the margins with prickles 2–2.3 mm long, 8–15 mm apart, arcuate stout subulate, compressed, strongly ascending, stramineous.

The new epithet is derived from *Rhizophora*, the generic name of the principal mangrove, and *-ensis*, the Latin place adjectival suffix, that is, growing in the mangrove swamps.

Pandanus seruaensis sp. nov. (sect. *Pandanus*)

Figure 384

NOM. VERN.: "vandra" (Fijian language).

DIAGNOSIS HOLOTYPI: Arbor 8 m alta irregulariter ramosa est (radicibus et trunco incognitis), foliis 1.2–1.5 m longis in medio 5 cm latis et licet 5 cm latis proxima basem sed immaturis, coriaceis supra olivaceis infra pallide viridibus et licet glaucis V-sulcatis 2-plicatis in sectione mediali cum 67 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis supra in dimidio apicali semievidentibus et reticula breviter oblonga formantibus lamina ligulata sed in parte $\frac{1}{3}$ apicali in apice trigono gracile subulato deminuenti eo in puncto 10 cm ex apice 1.5 mm lato basi inermi pallida, ex fere 5 cm marginibus cum aculeis (immaturis) 2–3 mm longis arcuatis subulatis compressis adpresse adscendentibus stramineis et majoribus minoribus alternantibus, midnervo infra cum aculeis immaturis sed ex 20 cm cum eis 1.5–2 mm longis 5–10 mm separatis subulatis compressis adpresse adscendentibus stramineis, infructescencia cum syncarpio solitario, pedunculo 23 mm diametro trilaterato ultra 10 cm longo, syncarpio 23 cm longo 19 cm diametro ellipsoideo trilaterato cum 82 phalangibus, nucleo siccato

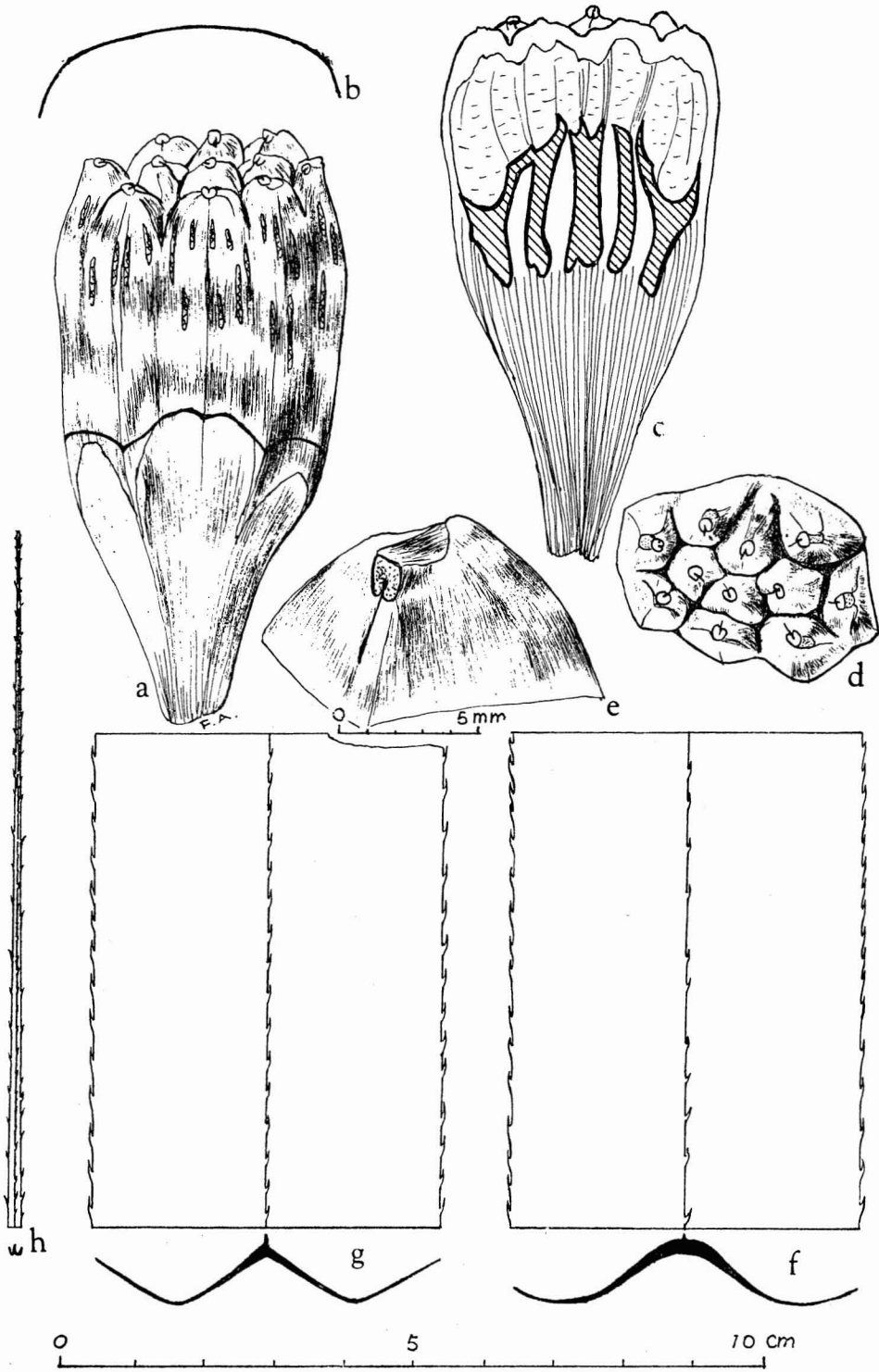


FIGURE 384. *Pandanus seruaensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, leaf base lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

13 cm longo 4.2 cm lato trilaterato fibroso duro et cum cicatricibus vadosis, phalangibus 7.7–8.2 cm longis 3.4–4.6 cm latis 2.3–3.6 cm crassis oblanceoloideis vel late oblanceoloideis compressis 4–6-angulosis apice convexo lateribus inferis planis parte $\frac{1}{2}$ supera libera laevi lucida licet lutea sed rubri-badi-ramosa sinibus lateralibus inapertis sed in parte $\frac{1}{3}$ – $\frac{1}{2}$ apicali evidentibus, carpelis 10–12 adscendentibus plus minusve parallelis eis marginalibus cum apicibus semiorbicularibus et plerumque cum areola concava 2–3 mm lata distali, carpelis marginalibus minoribus paucis cum apicibus late ovoideis illis interioribus late ovoideis et $\frac{2}{3}$ – $\frac{3}{4}$ tam grandibus quam illis marginalibus, stigmatibus apicalibus 1.5–2 mm longis vel latis eis marginalibus plerumque reniformibus vel cordatis sed a galea obliqua truncatis illis interioribus ellipticis subnigris papillosis, sinibus proximalibus latis $\frac{1}{3}$ – $\frac{1}{2}$ ad fundam extensis, sinibus centralibus apicalibus 3–5 mm profundis rectis vel subcurvatis V-formatis, endocarpio in parte $\frac{3}{8}$ supera et 18–19 mm longo et multo latiori convexi-concavo osseoso rubri-badio supra semines cum projectionibus conicis minimis humeris alatis brevibus lateribus lateralibus 4–5 mm crassis intra lucidis fere laevibus, seminibus 12–14 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 13–23 mm longam cum aerenchyma fibris longitudinalibus et membranibus albis formanti, mesocarpio basali 42–44 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 8 m tall, irregularly branched (roots and trunk not recorded); leaves 1.2–1.5 m long, 5 cm wide at the middle and apparently about the same near the base (this immature), coriaceous, olive green above, pale green and apparently glaucous below, V-sulcate, 2-pleated, at midsection with 67 parallel secondary veins in each half, the tertiary crossveins barely visible above in the outer half, forming short oblong meshes, the blade ligulate, but in the outer $\frac{1}{3}$ tapering into the trigonous slender subulate apex, this at the point 10 cm down 1.5 mm wide, the base unarmed, pale; beginning at about 5 cm the margins with prickles (immature) 2–3 mm long, arcuate subulate, compressed, appressed ascending, stramineous, perceptibly large and

small alternating; on the midrib below the lowest prickles immature and undeveloped, but from 20 cm up the prickles 1.5–2 mm long, 5–10 mm apart, subulate, compressed, appressed ascending, stramineous; infructescence of a solitary syncarp; peduncle 2.3 cm in diameter, 3-sided, more than 10 cm long; syncarp 23 cm long, 19 cm in diameter, 3-sided, bearing 82 phalanges; dried core 13 cm long, 4.2 cm wide, 3-sided, fibrous and hard, pitted with shallow fruit scars; phalanges 7.7–8.2 cm long, 3.4–4.6 cm wide, 2.3–3.6 cm thick, oblanceoloid or broadly so, compressed, 4–6-angled, the apex convex, the lower sides nearly flat, the upper $\frac{1}{2}$ free, smooth, shining, apparently yellowish, but scarred by numerous longitudinal reddish brown cracks, the lateral sinuses closed, but mostly visible down $\frac{1}{3}$ – $\frac{1}{2}$ way; carpels 10–12, ascending, more or less parallel, the outer ones with apices semiorbicular and mostly with a distal concave platform 2–3 mm wide, but a few of the smaller marginal apices merely broadly ovoid; inner carpel apices $\frac{2}{3}$ – $\frac{3}{4}$ as large as the marginal, broadly ovoid; stigmas apical 1.5–2 mm long or wide, the marginal ones mostly reniform or cordate but truncate by an oblique visor, the inner ones elliptic, blackish, papillose; proximal sinuses wide, running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom, central apical sinuses 3–5 mm deep, straight or gently curved, V-shaped; endocarp in the upper $\frac{3}{8}$ and 18–19 mm long, broadly convex-concave, transverse, bony, dull reddish brown, with slight conic projections over the seeds and short ascending winglike shoulders, the lateral walls 4–5 mm thick, within shining, nearly smooth; seeds 12–14 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 13–23 mm long, with aerenchyma of longitudinal fibers and white membranes; basal mesocarp 42–44 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Viti Levu, Queens Road, near Namelimeli, Serua Prov., swampy field, 28.3.56, *J. W. Parham 10,096* (SUVA). Isotype (BISH).

DISCUSSION: *P. seruaensis* is a member of the section *Pandanus*, as is its closest relative, *P. patulior* St. John, of Vanua Levu, Fiji, a species with the phalanges 6.7–7.4 cm long,

4.3–6.7 cm wide; lateral sinuses nearly all present; central apical sinuses 5–7 mm deep; endocarp 25–28 mm long; basal mesocarp 22–27 mm long; leaves 1.68 m long, at midsection 6.4 cm wide, and there with 78 parallel secondary veins in each half; and beginning at 8.5–9.5 cm the margins with prickles 2.5–4 mm long, 4–8 mm apart, subarcuate stout subulate from a geniculate base, ascending, stramineous. *P. seruaensis* has the phalanges 7.7–8.2 cm long, 3.4–4.6 cm wide, the lateral sinuses none; central apical sinuses 3–5 mm deep; endocarp 18–19 mm long; basal mesocarp 42–44 mm long; leaves 1.2–1.5 m long, at midsection 5 cm wide, and there with 67 parallel secondary veins in each half, and beginning at about 5 cm the margins with prickles 2–3 mm long, arcuate subulate, compressed, appressed ascending, stramineous, perceptibly large and small alternating.

The collector noted that he took one large and one small head of fruits. The large one is here described, on the assumption that it shows the normal, full development. The small one has similar phalanges, but they are only 5.7–6.5 cm long.

The new epithet is formed from the name of the type locality, Serua, and *-ensis*, the Latin adjectival place suffix.

Pandanus sinicola A. C. Sm. (as *sinicolus*), B. P. Bishop Mus., Bull. 141: 13, fig. 4, b, c, d, 1936 (sect. *Pandanus*).

Figure 385

NOM. VERN.: "mbalaka" (Fijian language).

ORIGINAL DIAGNOSIS: "Arbor parva, inter species mare Pacificum habitantes, syncarpio solitario subsessili subgloboso, phalangiis obovoideis angulatis 3 (vel 4)-locularibus, stigmatibus subobliquis distinguenda; *P. boninensis* Warburg affinis, phalangiis multo minoribus differt."

EXPANDED DIAGNOSIS OF HOLOTYPE: Branching tree 2–4 m tall (roots, trunk, and branches unknown); leaves 1–1.2 m long, 5.5–6.2 cm wide near the base, 4.6 cm wide at the middle, coriaceous, green and shiny above, paler green

and glaucous below, at midsection with 52 parallel secondary veins in each half, the tertiary crossveins visible above, forming short oblong meshes, the blade sword-shaped, tapering gradually from the base to the long trigonous subulate apex (the tip lost), the base unarmed, pale; beginning at 8–16 cm the margins with prickles 1.8–2.9 mm long, 4–9 mm apart, stout subulate, strongly ascending, brown-tipped; beginning at 13 cm the midrib below with prickles 1–1.5 mm long, 10–32 mm apart, subarcuate thick subulate, strongly ascending, stramineous below, brown-tipped; at midsection the margins with prickles 1.9–2.2 mm long, 5–11 mm apart, stout subulate, compressed, appressed ascending, the free part brown; the nearby midrib below with similar prickles 1–1.6 mm long, 6–13 mm apart; the pleats unarmed; infructescence with a solitary terminal subsessile or sessile syncarp; syncarp 9–12 cm in diameter, subglobose, bearing about 48 phalanges, these 2.5–3 cm long, 1.4–2 cm wide (2.3 cm wide in a twin with 8 carpels), 1.1–1.2 cm thick, narrowly oblong-obovoid, 5–6-angled (color unknown), the lower sides flat, the upper $\frac{1}{2}$ free, its sides gently convex or nearly flat, smooth, shining, lateral sinuses none, the apex flat or very low convex; carpels 3 (–4), ascending, nearly parallel, the apices all marginal and pyramidal hemispheric, and some of them with a concave distal platform 2–3 mm wide; stigmas 1–2 mm wide, suborbicular, apical, horizontal, flush, brown, papillose; proximal sinuses deep and running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom; central apical sinuses 1.5–3 mm deep, narrowly V-shaped below but the sides out-curving above; endocarp median, 12–14 mm long, bony, brown, funnelform, truncate at base, the apex low convex, the slight shoulders at the upper rim, lateral walls 1.5 mm thick, within reddish, shining, rugose; seeds 8 mm long, obovoid; mesocarp forming in the apex of each carpel an indistinct chamber 6–8 mm long, with strong longitudinal fibers and pale parenchyma; basal mesocarp 6 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Vanua Mbalavu, Bay of Islands, northern limestone section, on sea cliff, slightly above sea level, April 2, 1934, A. C. Smith 1,494 (BISH). Type examined. Isotypes (FI, GH, K, NY, P, UC, US).

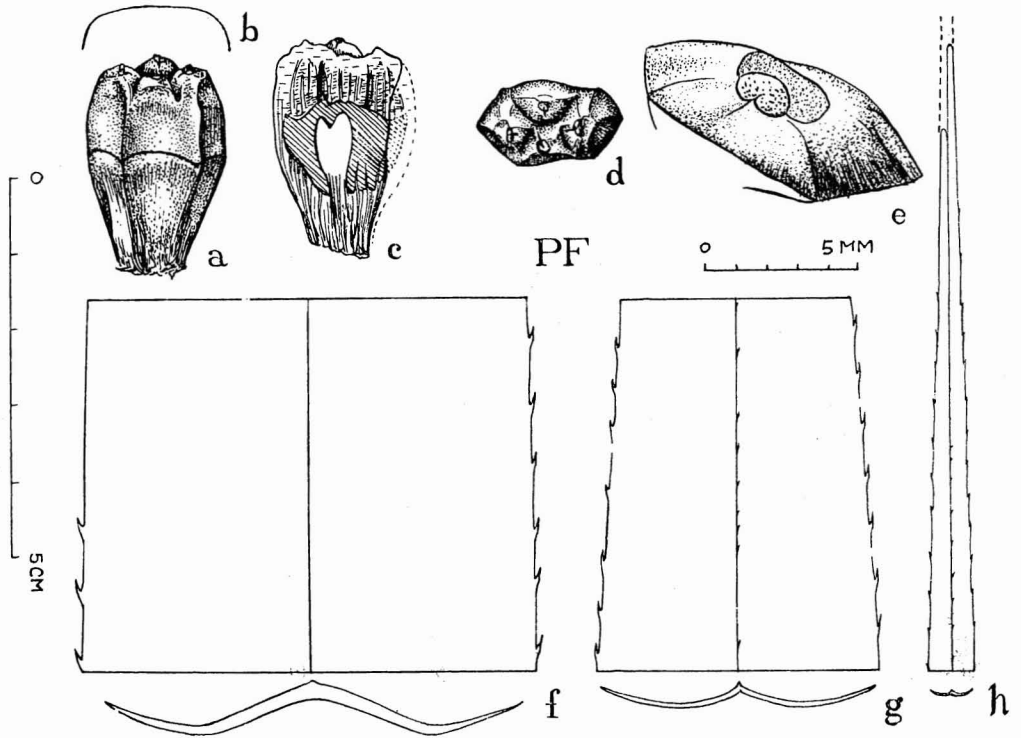


FIGURE 385. *Pandanus sinicola* A. C. Sm., from isotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

Pandanus Smithii sp. nov. (sect. *Pandanus*)

Figure 386

NOM. VERN.: "mbalawa" (Fijian language).

DIAGNOSIS HOLOTYPE: Arbor 4–5 m alta cum ramis divergentibus est (cortice et radicibus incognitis), foliis 1.28 (+0.04–0.1?) m longis proxima basem 6.2 cm latis in medio 4.2 cm latis coriaceis supra viridibus lucidis infra pallidioribus et licet glaucis V-sulcatis 2-plicatis in sectione mediali cum 57 nervis parallelis secundariis in dimidio quoque nervis tertiis obscuris lamina gladiata ex basi in apice trigono subulato deminuenti (apice interito) basi inermi pallida, ex 3–5 cm marginibus cum aculeis 1–2.5 mm longis 2–6 mm separatis arcuatis subulatis adscendentibus stramineis, ex 6.5 cm midnervo infra cum aculeis 1.5–2.5 mm longis 14–21 mm separatis subarcuatis subulatis valde adscendentibus stramineis, in sectione mediali marginibus cum aculeis 1.5–2.5 mm longis 2–5 mm

separatis subarcuatis subulatis adpresse adscendentibus stramineis biformatis grandibus et minoribus alternantibus, midnervo vicinali infra cum aculeis 1–1.8 mm longis 2.5–6 mm separatis arcuatis subulatis compressis adpresse adscendentibus biformatis grandibus minoribusque alternantibus, in apice subulato marginibus et midnervo licet cum serrulis, infructescentia cum syncarpio solitario subgloboso fere 16 cm diametro, pedunculo cum bracteis foliosis compluribus, phalangibus 5.8–6.1 cm longis 3.5–3.6 cm latis 2.3–2.4 cm crassis obpyriformibus 6-angulosis apice truncato parte $\frac{1}{2}$ supera libera lateribus inferis subplanis lateribus superis subconvexis laevibus lucidis sinibus lateralibus nullis, carpelis 8–11 adscendentibus fere parallelis, carpelis marginalibus cum apicibus oblate semiorbicularibus et cum areola concava profunda distali, stigmatibus 1.8–2 mm longis late ellipticis brunneis papillois infra marginem concavam sitis, sinibus centralibus

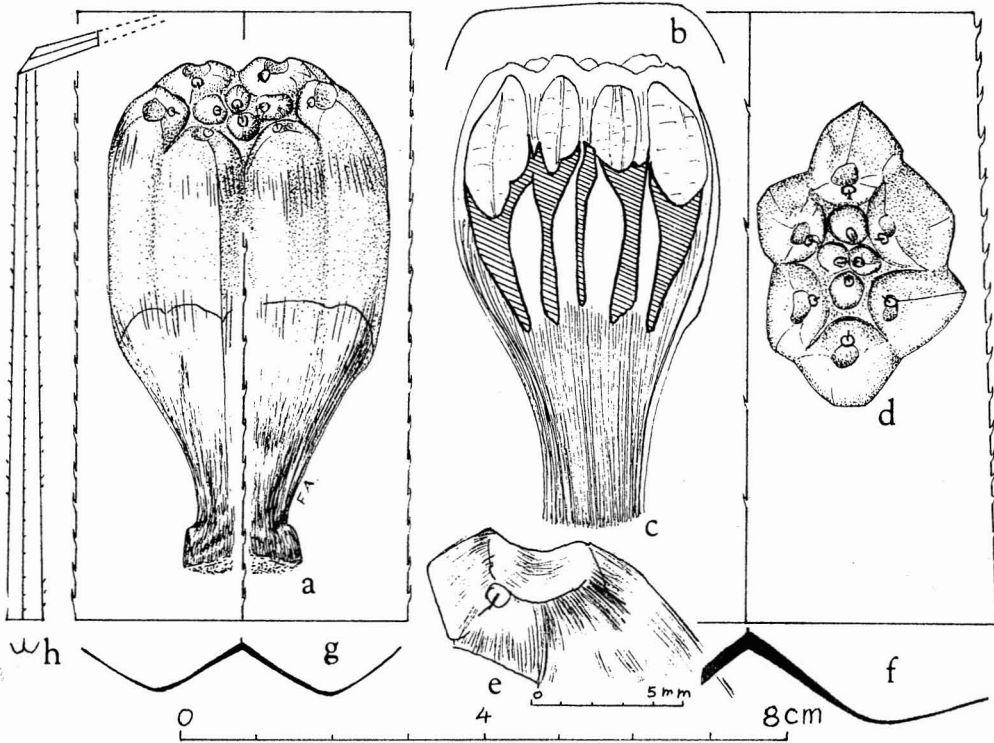


FIGURE 386. *Pandanus Smithii* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

apicalibus 2–2.5 mm profundis V-formatis subcurvatis, sinibus proximalibus inter labias latas et $\frac{1}{4}$ – $\frac{1}{2}$ ad fondam extensis, carpelibus interioribus cum apicibus $\frac{1}{4}$ – $\frac{1}{3}$ tam grandibus quam illis marginalibus pyramidalibus suborbicularibus, endocarpio in parte $\frac{2}{5}$ supra 23 mm longo osseoso obscure mahogani-colorato valde oblate sphaerico et supra semines cum projectionibus conicis minimis humeris aliformatis curvatis lateribus lateralibus 2.5–3 mm crassis intra laevibus lucidis, seminibus 13–16 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 10–17 mm longam cum aerenchyma fibris paucis longitudinalibus et membranibus albis transversis formanti, mesocarpio basali 24–28 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Divaricate branching tree 4–5 m tall; bark and roots not recorded; leaves 1.28 (+0.04–0.1?) m long, 6.2 cm wide

near the base, 4.2 cm wide at the middle, coriaceous, above shining green, below paler green and apparently glaucous, V-sulcate, 2-pleated, at midsection with 57 parallel secondary veins in each half, the tertiary veins obscure; blade sword-shaped, tapering from the base to the trigonous subulate tip (the apex lost), the base unarmed, pale; beginning at 3–5 cm the margins with prickles 1–2.5 mm long, 2–6 mm apart, arcuate subulate, ascending, stramineous; beginning at 6.5 cm the midrib below with prickles 1.5–2 mm long, 14–21 mm apart, subarcuate subulate, strongly ascending, stramineous; at midsection the margins with prickles 1.5–2.5 mm long, 2–5 mm apart, subarcuate subulate, appressed ascending, stramineous, of two kinds, large and small alternating; the nearby midrib below with prickles 1–1.8 mm long, 2.5–6 mm apart, arcuate subulate, compressed, appressed ascending, stramineous, more or less of two kinds, large and small alternating;

on the subulate apex the margins and midrib apparently with serrulations, but these mostly broken off; infructescence of a solitary subglobose syncarp, about 16 cm in diameter; peduncle with several leafy bracts; phalanges 5.8–6.1 cm long, 3.5–3.6 cm wide, 2.3–2.4 cm thick, obpyriform, 6-angled, the apex truncate, upper $\frac{1}{2}$ free, lower sides nearly flat, upper sides gently convex, smooth, shining, lateral sinuses none; carpels 8–11, ascending, more or less parallel, the apices of the marginal ones oblate semiorbicular, the actual apex occupied by a deep concave platform, distal of the stigma which is below its proximal rim, oblique and facing inward, 1.8–2 mm long, broadly elliptic, brown, papillose, central apical sinuses 2–2.5 mm deep, V-shaped, slightly curved; proximal sinuses a crack between two wide lips, extending $\frac{1}{4}$ – $\frac{1}{2}$ way to valley bottom; apices of inner carpels $\frac{1}{4}$ – $\frac{1}{3}$ as large as the marginal, pyramidal suborbicular; endocarp in upper $\frac{2}{5}$ and 23 mm long, bony, dark mahogany-colored, strongly oblate spherical, with slight conic projections over the seeds and curved winglike shoulders, the lateral walls 2.5–3 mm thick, within smooth and shining; seeds 13–16 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 10–17 mm long, with aerenchyma of a few longitudinal fibers and white transverse membranes; basal mesocarp 24–28 mm long, fibrous and fleshy.

EXPANDED DESCRIPTION: Phalanges 5.2–6.1 cm long; central apical sinuses 1–2.5 mm deep.

HOLOTYPE: Fiji, Lau Group, Moala Island, Ndelaimoala, in swamp in open place, 400 m. alt., March 20–24, 1934, *A. C. Smith 1,377* (BISH). Isotypes (K, NY, P, S, UC, US).

SPECIMENS EXAMINED: Fiji, Lau Group, Moala Island, Naro, 30 ft. alt., 4/X/68, *Y. Kondo* no. MA (BISH).

DISCUSSION: *P. Smithii* is a member of the section *Pandanus*, as is its closest relative, *P. swaensis* (Martelli) St. John, a species with the phalanges 6–6.8 cm long; carpel apices subequal, oblate pyramidal; stigma apical, horizontal, suborbicular or somewhat quadrate; leaves about 1.6 m long, 6 cm wide at the middle, the

midrib below beginning at 15 cm from the base with prickles 1.8–2 mm long, 8–12 mm apart, subulate, appressed ascending, stramineous. *P. Smithii* has the phalanges 5.8–6.1 cm long; apices of marginal carpels oblate semiorbicular, and with a concave distal platform, apices of inner carpels $\frac{1}{4}$ – $\frac{1}{3}$ as large as the marginal and pyramidal suborbicular; stigmas oblique on inner face of carpel apex; leaves about 1.3 m long, 4.2 cm wide at the middle, the midrib below beginning at 6.5 cm from the base with prickles 1.5–2.5 mm long, 14–21 mm apart, subarcuate, subulate, strongly ascending, stramineous.

The new epithet is chosen to honor Dr. Albert Charles Smith, explorer, collector, and writer on the botany of Fiji, professor of botany, University of Massachusetts.

Pandanus subhumerosus sp. nov. (sect. *Pandanus*)

Figure 387

NOM. VERN.: “vadra” (= vandra) (Fijian language).

DIAGNOSIS HOLOTYPI: Radices caules folia et syncarpium incogniti sunt, phalangibus 5.2–5.4 cm longis 2.3–3.7 cm latis 2.3–2.8 cm crassis oblanceoloideis ad obovoideis 4–6-angulos apice humiliter convexo ad subtruncato parte $\frac{2}{5}$ supra libera lateribus convexis laevibus lucidis sinibus lateralibus nullis, carpelis 6–11 adscendentibus plus minusve parallelis eis marginalibus cum apicibus pyramidali-ovoideis (vel -lanceoloideis) latere exteriori cum 2 vel 1 planis fere ad stigmatem adscendentibus eis majoribus cum areola concava vadosa horizontali distali 1–3 mm lata, stigmatibus 2–2.5 mm latis apicalibus vel in bordini proximali surborbicularibus ad reniformibus obliquis brunneis papillosis, sinibus proximalibus angustis $\frac{1}{3}$ – $\frac{1}{2}$ ad fondam extensis, illis interioribus plerumque lanceoloideis $\frac{1}{2}$ – $\frac{2}{3}$ tam grandibus quam marginalibus, sinibus centralibus apicalibus 4–7.5 mm profundis fere rectis V-formatis vel anguste V-formatis, endocarpio minime supramediali 25 mm longo osseoso brunneo transverse ellipsoideo et supra seminem quodcumque cum projectione conico lateribus lateralibus 1–2 mm crassis intra lucidis sublaevibus sed

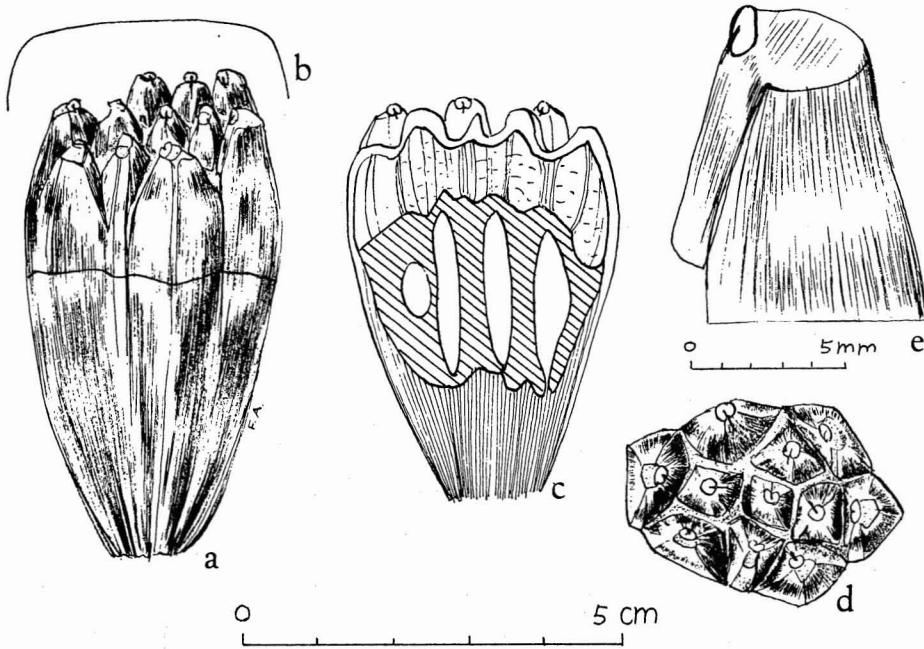


FIGURE 387. *Pandanus subhumerosus* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$.

spiraliter striatis, seminibus 14–17 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 9–15 mm longam cum aerenchyma fibris longitudinalibus et membranis pallidis formanti, mesocarpio basali 13–17 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Roots, stems, leaves, and syncarp unknown; phalanges 5.2–5.4 cm long, 2.3–3.7 cm wide, 2.3–2.8 cm thick, oblanceoloid to obovoid, 4–6-angled, the apex very low convex to subtruncate, upper $2/5$ free, the sides gently convex, smooth, shining, lateral sinuses none; carpels 6–11, ascending, more or less parallel, the apices of the marginal ones pyramidal-ovoid (or -lanceoloid), the outer side with two or one nearly plane surfaces ascending almost to the stigma, the apex of all large ones with a shallow concave platform 1–3 mm wide, horizontal and distal of the stigma; stigmas 2–2.5 mm wide, on the apex or its proximal rim, suborbicular to reniform, oblique, brown, papillose; proximal sinuses narrow, running $1/3$ – $1/2$ way to valley bottom; inner carpel apices mostly pyramidal lanceoloid, $1/2$ – $2/3$ as large as

the marginal ones; central apical sinuses 4–7.5 mm deep, nearly straight, V-shaped or narrowly so; endocarp slightly supramedian, 25 mm long, bony, dull brown, transversely ellipsoid, the apex with small conic projections over the seeds, the lateral walls 1–2 mm thick, within shining, smoothish but spirally striate; seeds 14–17 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 9–15 mm long, containing an aerenchyma of longitudinal fibers and pale membranes; basal mesocarp 13–17 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Lau Prov., Naitanba (Naitamba) Island, 13.8.56, *M. Miller 10,451* (BISH). Isotype (SUVA).

DISCUSSION: *P. subhumerosus* is a member of the section *Pandanus*, as is its closest relative, *P. pyriformis* (Martelli) St. John, of Fiji, a plant with the phalanges 5.7–6 cm long, 3–3.8 cm wide, 5-angled, the upper $1/2$ free; most lateral sinuses distinct part way and some all the way to the middle; apices of the marginal ones broadly ovoid; proximal sinuses broad, running

$\frac{1}{4}$ – $\frac{1}{3}$ way to valley bottom; endocarp with curved, winglike, ascending shoulders; basal mesocarp 27 mm long. *P. subhumerosus* has the phalanges 5.2–5.4 cm long, 2.3–3.7 cm wide, 4–6-angled, the upper $\frac{2}{5}$ free; lateral sinuses none; apices of the marginal ones pyramidal-ovoid (or lanceoloid); proximal sinuses narrow, running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom; endocarp with or without slight horizontal shoulders; basal mesocarp 13–17 mm long; leaves unknown.

The new epithet is formed from the Latin *sub-*, less so; *humerosus*, with shoulders, and it is given with reference to the slight shoulders of the endocarp.

Pandanus suwaensis (Martelli) comb. nov. (sect. *Pandanus*)

Figures 388–389

P. odoratissimus L. f., var. *suavensis* Martelli, Univ. Calif. Publ. Bot. 12: 332–333, pl. 41, 1930 (sect. *Pandanus*).

ORIGINAL DIAGNOSIS: "Syncarpium erectum pedunculo valido, acute trigono, brevi suffultum, et spathis confertis ad apicem pedunculi involutum. Spathae coriaceae, lanceolatonaviculares, acutissime carinatae, 8 cent. latae, apice acutae. Si iudicare possumus ab axe syncarpium, syncarpium est globoso-oblongum, fere 15 cent. Phalanges variabiles pyriformes, ambitu leviter convexo vel late cuneatae, 6–6.5 cent. longae, plus minusve compressae, 3–3.5 et etiam 4–5 cent. latae, 2.0–2.5 vel 3–5 cent. crassae, sensim usque ad basim \pm attenuatae, connatae, tantummodo in dimidia inferiore parte acute-pentagonae, faciebus inaequalibus, planis, secundum loculos sulcis longitudinalibus nullis, vel uno aut duobus interdum numerosissimis, angustis e medio ad apicem phalangis percurrentibus; apice convexo-plano, loculis 5–6, interdum 12, vel numerosissimis, etiam 20, parvulis vel mediocribus, subaequalibus, rotundatis, vel pyramidatis, acutis, plus minusve acute pentagonis, sulcis angustis divisis. Stigma ad verticem uniuicisque loculi, subhippocrepi-forme, parvum vel \pm crassum, prominens sicut papilla. Endocarpium osseum 2.5 cent. spissum, in medio vel in dimidia superiore parte phalangis situm; in sectione longitudinali interdum

triangulare apparet, vel potius in pyramidem productum, basi et vertice pyramidis latis, interdum ambitu supra plano-subrotundatum, infra truncatum. Duo cavernae mesocarpicae, exteriores magnae et longae, centrales multo minores, omnes medullosae; mesocarpium inferum, fibrosum."

EXPANDED DIAGNOSIS OF LECTOTYPE: Trunk, branches, roots, and leaves unknown; infructescence with a solitary syncarp; peduncle more than 16 cm long, 2 cm in diameter, trigonous, leafy bracted; upper bracts 18 cm long, 8 cm wide, lanceolate, sharply carinate, coriaceous; core 6.3 cm long, 3 cm wide, ellipsoid, with phalange scars; syncarp probably 17 cm long and 16 cm in diameter; phalanges 6–6.8 cm long, 3–3.6 cm wide, 2.3–3.1 cm thick (5.7 cm wide in a double), pyriform, 5–6-angled, without lateral sinuses, or with 1–2 slight ones running $\frac{1}{2}$ way down, the upper $\frac{2}{5}$ free, apex low convex, the sides smooth, shining, gently curving; carpels 5–12, parallel, erect, their apices subequal, oblate pyramidal, central apical sinuses 2–2.5 mm deep, broad V-shaped, straight; stigmas 1.5–1.8 mm in diameter, apical, horizontal, suborbicular or somewhat quadrate, reddish brown, papillose; endocarp in upper $\frac{2}{5}$ and 23 mm long, bony, in part stramineous, in part reddish brown, lateral walls 2–2.5 mm thick, within shining, somewhat rugulose; seeds 13–15 mm long, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern 10–22 mm long, filled with aerenchyma of a few longitudinal fibers and many white transverse membranes; basal mesocarp 25 mm long, fibrous and fleshy.

STAMINATE PLANT (*Parks 20,876a*): Tree 4 m tall, 12 cm in diameter; leaves unknown; staminate inflorescence more than 42 cm long; peduncle fleshy; lowest floral bract with expanded, colored, elliptic base 20 cm long, 6 cm wide, the apex about 30 cm long, lance-subulate, acuminate, foliaceous; median bract 25 cm long, 3 cm wide, not green, probably white, linear-lanceolate, with weak, pale, subulate serrulations on margins and midrib below; spikes about 17 and 4.5–6.5 cm long, 2–3 cm in diameter, cylindrical, dense; staminal fascicles 13–17 mm long, of about 23–30 stamens; column 5–6 mm

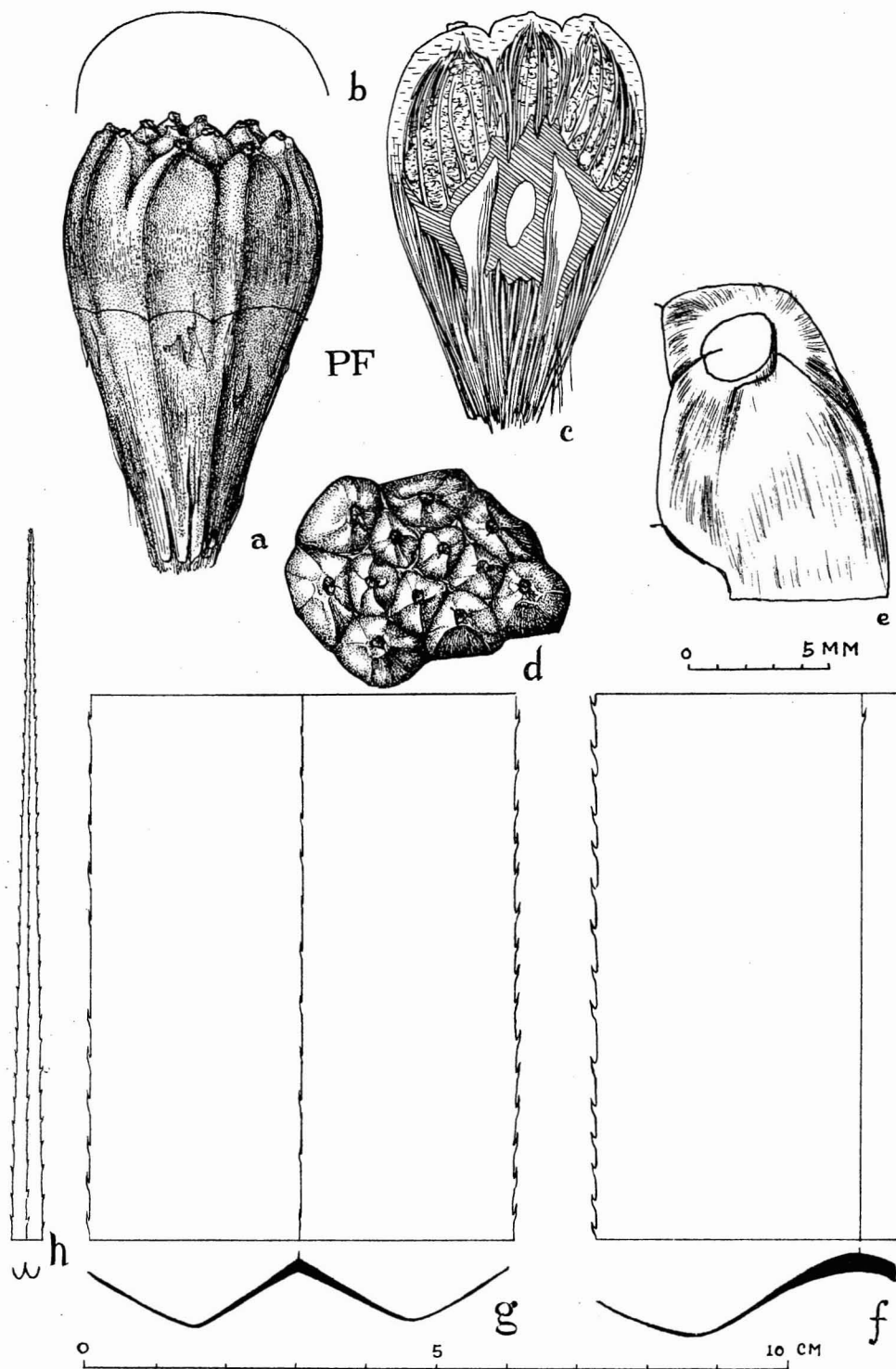


FIGURE 388. *Pandanus suvaensis* (Martelli) St. John, from lectotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

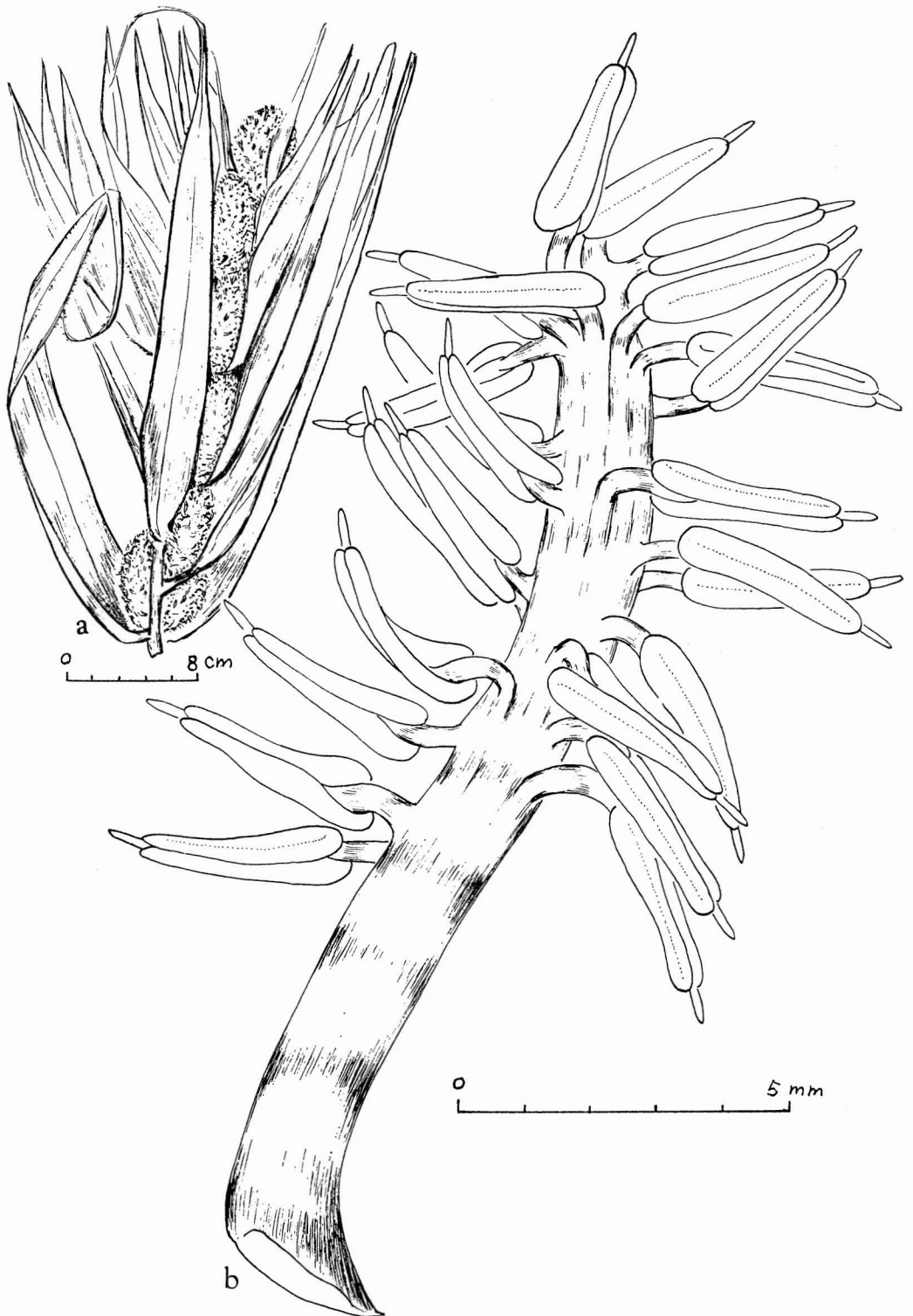


FIGURE 389. *Pandanus suvaensis* (Martelli) St. John, from *Parks* 20,876. *a*, staminate inflorescence, $\times \frac{1}{4}$; *b*, fascicle of stamens, $\times 10$.

long; free filament tips 0.5–1 mm long; anthers 2.8–3 mm long, narrowly lance-oblong, the base deeply bilobed, the apex bearing a subulate prolongation of the connective 0.6–0.7 mm long.

SUPPLEMENTARY DESCRIPTION OF PISTILLATE PLANT (*Koroveibau 10,445*): Tree 4–5 m tall, lacking prop roots; leaves 1.6–1.68 m long, 7 cm wide near the base, 6 cm wide at the middle, coriaceous, above shining green, below pale green and glaucous, U-sulcate, 2-pleated, at midsection with 61 parallel secondary veins in each half, the tertiary crossveins faintly seen above especially near the base, blade sword-shaped, tapering from the base into the trigonous subulate apex, this at the point 10 cm down 5 mm wide, the base unarmed, pale; beginning at 4 cm the margins with prickles 2–2.5 mm long, 2.5–8 mm apart, arcuate subulate from conic base, ascending, stramineous; beginning at 15 cm the midrib below with prickles 1.8–2 mm long, 8–12 mm apart, subulate, appressed ascending, stramineous; at midsection the margins with prickles 4–7 mm apart, subulate, appressed ascending, stramineous, of two kinds, more or less alternating, large ones 2–2.5 mm long, and small ones 1.3–2 mm long; the nearby midrib below with prickles 1–1.5 mm long, 5–8 mm apart, stout subulate, appressed ascending, stramineous, alternately large and small; on the subulate apex the margins and midrib below with prickles 0.3–0.7 mm long, 1–6 mm apart, compressed, subulate, ascending, red-tipped.

LECTOTYPE: Fiji Islands, Viti Levu, Suva, along strand, May, June, July, 1927, *H. E. Parks 20,876*, in fruit (κ). Type examined. Isotypes: (A, B, BISH, BM, FI, F, G, MO, NY, P, S, US, Z).

DISCUSSION: The original collection, *Parks 20,876*, contained fruiting syncarps and a staminate inflorescence. Martelli in his diagnosis included only details from the pistillate specimen, but cited this single number, containing both masculine and feminine plants. Under the international code of nomenclature, it is forbidden to designate as the holotype both sexes of a dioecious species. Hence, the staminate plant has been renumbered *20,876a*, and the pistillate, *20,876* (κ), has been selected as the lectotype.

An isotypic specimen of *P. swaensis* was kept by Martelli in his herbarium and was labelled as a new species.

***Pandanus Vandra* sp. nov.** (sect. *Pandanus*)

Figures 390–391

NOM. VERN.: “vandra” (Fijian language).

DIAGNOSIS HOLOTYPI: Truncus ramuli radices infructescentia incogniti, foliis 93 (+3–5?) cm longis proxima basem 6 cm latis in medio 4.4 cm latis coriaceis supra viridibus infra palliditer viridibus in sectione mediali cum 63 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis infra visibilibus et reticula squarosa vel breviter oblonga formantibus lamina V-sulcata et cum 2 plicis rotundatis gladiformatis in parte 1/3 ultima in apice validi subulato trigono deminuenti eo in puncto 10 cm ex apice 9 mm lato basi inermi sed ex plus minusve 3.5 cm marginibus cum aculeis 1–2 mm longis 1.5–8 mm separatis arcuati-subulatis adscendentibus pallidis, midnervo infra ex 15 cm cum aculeis 1.5 mm longis 1 cm separatis arcuati-subulatis adscendentibus pallidis cum apicibus brunnescentibus, in sectione mediali marginibus cum aculeis 1.8–2 mm longis 3–7 mm separatis subulatis valde adpresse adscendentibus pallidis cum apicibus brunnescentibus, midnervo infra cum aculeis 1.5–1.7 mm longis 8–15 mm separatis arcuati-subulatis adscendentibus pallidis cum apicibus brunnescentibus, in apice subulato marginibus et midnervo infra licet inermibus, phalangibus 4.5–5 cm longis 2.8–3.4 cm latis 1.9–2.3 cm crassis cuneato-obovoideis 4-angulosis et carpelibus marginalibus cum angulis secundariis (plerumque 2) lateribus subcurvatis vel subplanis laevibus lucidis suturis in parte 1/2 supera profundis parte 1/2 supera libera apice truncato vel subtruncato, sinibus apicalibus centralibus 3–6 mm profundis rectis vel curvatis in fondo anguste V-formatis, carpelibus 5–7 et saepe cum altero reducto, carpelibus marginalibus cum apicibus ovoideis vel latiter ovoideis et cum cavitate distali, apicibus centralibus ovoideis sine cavitate et 1/3–1/2 tam grandibus quam marginalibus, stigmatibus 1–1.5 mm latis reniformibus obliquis marginalibus ex latere cavitatis truncatis, sinibus proximalibus angustis et 1/2–2/3 ad

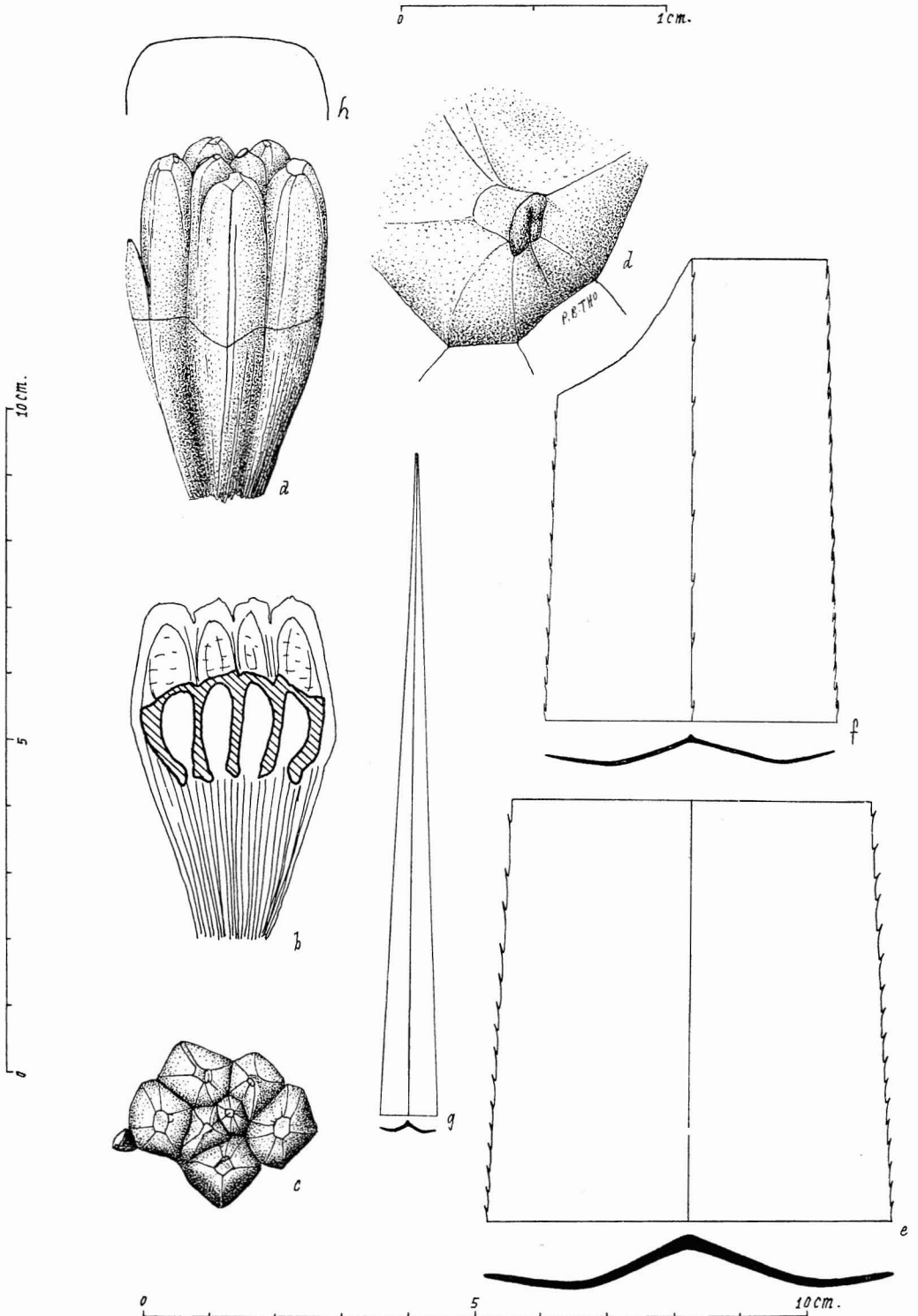


FIGURE 390. *Pandanus Vandra* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex and stigma, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$; *h*, profile of phalange apex, $\times 1$.

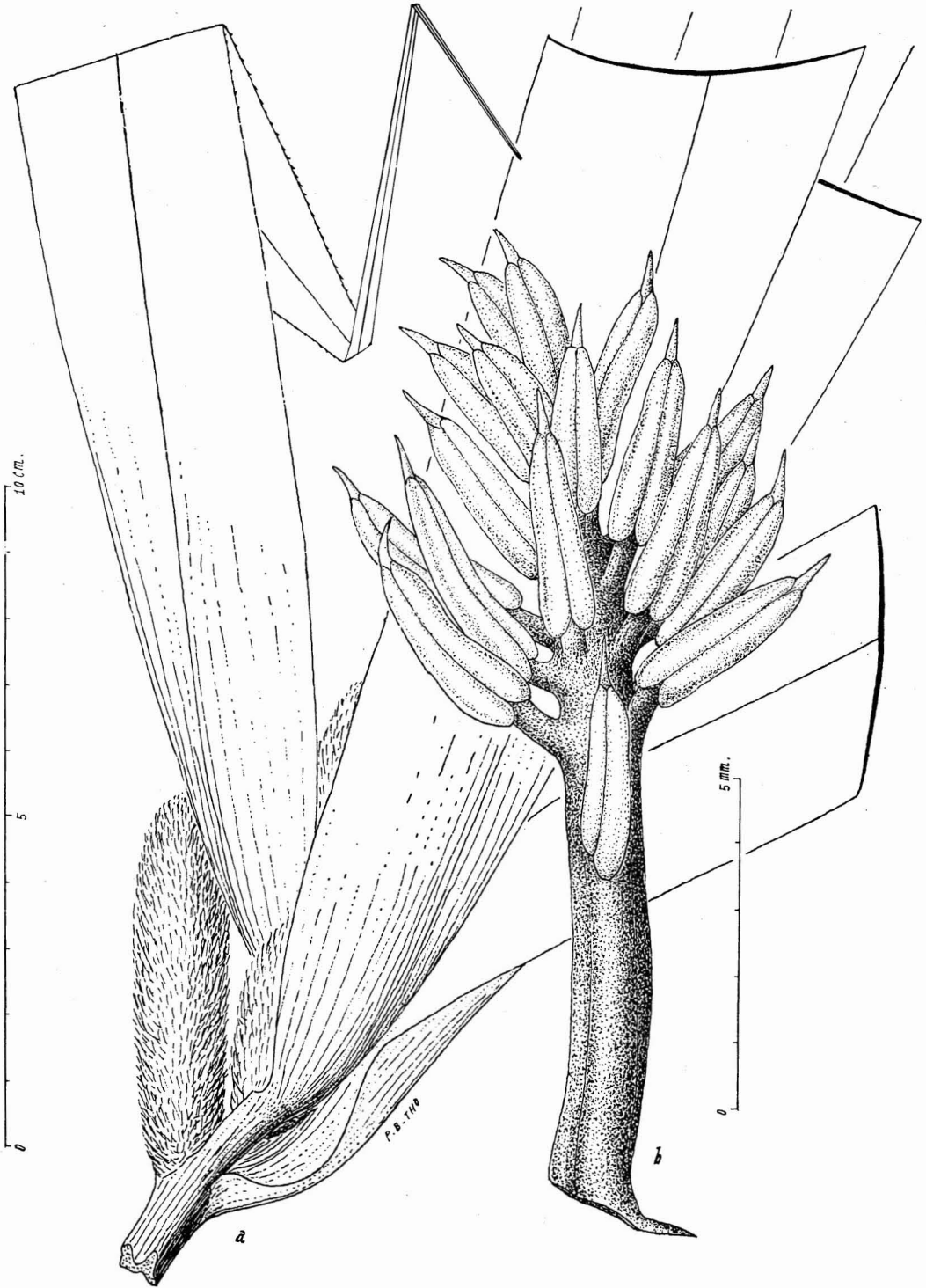


FIGURE 391. *Pandanus Vandra* St. John, from *Degener 15,456a*. *a*, staminate inflorescence, $\times 1$; *b*, fascicle of stamens, $\times 10$.

fondam extensis, endocarpio in parte 2/5 supera 15–17 mm longo osseoso obscure brunneo lateribus lateralibus 2.5–3 mm crassis intra laevibus lucidis, seminibus 9–12 mm longis oblongo-ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam cum aerenchyma membranarum albis transversis formanti, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Stature, roots, trunk, branches, infructescence unknown; leaves 93 (+3–5?) cm long, 6 cm wide near the base, 4.4 cm wide at the middle, coriaceous, green above, pale green below, at midsection with 63 parallel secondary veins in each half, tertiary crossveins visible below forming square or short oblong meshes, the blade V-sulcate and with 2 rounded pleats, sword-shaped, tapering in the outer third into the stout trigonous subulate apex, this at the point 10 cm down 9 mm wide, the base unarmed, but the margins beginning at about 3.5 cm up with prickles 1–2 mm long, 1.5–8 mm apart, arcuate subulate, ascending, pale; the midrib below beginning at 15 cm up with prickles 1.5 mm long, 1 cm apart, arcuate subulate, ascending, pale with brownish tips; at midsection the margins with prickles 1.8–2 mm long, 3–7 mm apart, subulate, closely appressed ascending, pale with brownish tips; the midrib below with prickles 1.5–1.7 mm long, 8–15 mm apart, arcuate subulate, ascending, pale with brownish tips; on the subulate apex the margins and midrib below apparently unarmed; phalanges 4.5–5 cm long, 2.8–3.4 cm wide, 1.9–2.3 cm thick, cuneate obovoid, 4-angled, and each marginal carpel with additional (usually 2) angles, the sides from gently curved to flattish, smooth, shining, lateral sutures deep in upper half, upper 1/2 free, the apex truncate or nearly so, apical central sinuses 3–6 mm deep, straight or curved, the bottoms narrow V-shaped; carpels 5–7 (and nearly half of the phalanges with an additional small, lateral, splintlike carpel), the apices of the marginal ones ovoid or broadly so, with a concave platform distal of the stigma, the inner apices ovoid, lacking the platform, 1/3–1/2 the size of the marginal ones; stigmas 1–1.5 mm wide, reniform, oblique, the marginal ones truncate by the hard edge of the platform; proximal sinus narrow, running 1/2–2/3 way to valley bottom;

endocarp in upper 2/5, and 15–17 mm long, bony, dark brown, the lateral walls 2.5–3 mm thick, within smooth, shining; seeds 9–12 mm long, oblong ellipsoid; mesocarp forming in the apex of each carpel a cavern in which white transverse membranes form an aerenchyma; basal mesocarp fibrous and fleshy.

STAMINATE PLANT (*Degener 15,456* in part): Inflorescence with bracts, apparently white; lower bract with colored base 23 cm long, 3.4 cm wide, ligulate, and a foliaceous tip 24 cm long, lance-linear, acuminate, subulate ciliate; median bract 30 cm long, 4.4 cm wide, narrowly elliptic, all, except the 5 cm subulate tip, herbaceous and colored; spikes numerous, 4–6 cm long, 1.5–1.7 cm in diameter, dense; stamens in fascicles of 40–50, these 7–8 mm long; column 3–4 mm long; free filament tips 0.2–1 mm long; anthers 1–1.2 mm long, oblong, bearing a subulate prolongation of the connective 0.2 mm long.

HOLOTYPE: Fiji, Viti Levu, Ra, vicinity of Rewasa, near Vaileka, Vatundamusewa, on grassy forehill, 50–200 m. alt., Cheng Ho Cruise, May 28–June 17, 1941, *O. Degener 15,456*, the pistillate part (s). Isotypes (BISH, K, L, MO, US).

SPECIMENS EXAMINED: Fiji, same data as above, *Degener 15,456a*, the staminate part (MO, s).

DISCUSSION: *P. Vandra* is a member of the section *Pandanus*, as is its closest relative, *P. caudatus* Merr. of Luzon, Philippines, a species with the phalanges 6 cm long, lacking lateral sinuses; carpels 10–15, their apices rounded; leaves 1.2–1.8 m long, 5 cm wide, at midsection the midrib below with prickles 0.1–0.2 mm long, 3–5 mm apart, subulate, appressed ascending, pale. *Pandanus Vandra* has the phalanges 4.5–5 cm long, having lateral sinuses; carpels 5–8, their apices with a distal concave platform; leaves 0.93 m long, 6 cm wide, at midsection the midrib below with prickles 1.5–1.7 mm long, 8–15 mm apart, arcuate subulate, ascending, pale with brownish tips.

The new epithet is the Fijian vernacular name of the species.

Pandanus vatoaensis sp. nov. (sect. *Pandanus*)

Figure 392

NOM. VERN.: "vandra" (Fijian language).

DIAGNOSIS HOLOTYPE: Arbor 8 m alta est, trunco 25 cm diametro et cum radicibus suffulcentibus grandibus multis, foliis 1.86 (+0.03–0.06?) m longis proxima basem 9.7 cm latis in medio 7.2 cm latis coriaceis laevibus et in paginis ambis lucidis gladiatis ex basi in apice trigono gracile subulato deminuenti (apice interito) U-sulcatis 2-plicatis in sectione mediali cum 74 nervis parallelis secundariis in dimidio quoque sed nervis tertiis non evidentis basi pallida inermi, ex 14 cm marginibus cum aculeis 1.5–2 mm longis 5–14 mm separatis arcuatis subulatis adscendentibus stramineis, midnervo infra per 31 cm basales inermi, in sectione mediali marginibus cum aculeis 2–2.3 mm longis 6–16 mm separatis subarcuatis subulatis compressis valde adscendentibus basi pallida parte reliqua obscure rubri-brunnea, midnervo vicinali infra cum aculeis 2 mm longis 13–42 mm separatis arcuatis subulatis compressis obscure rubri-brunneis, in apice subulato marginibus inermibus, midnervo infra cum aculeis minutis 2–4 mm separatis omnibus interitis (infructescentia incognita), phalangibus 9–9.7 cm longis 3.5–5.5 cm latis (6.7 cm latis in gemine cum 12 carpelis) 2.6–4 cm crassis cuneiformatis proxima apicem latissimis compressis apice convexo vel alte convexo lateribus inferis planis sinibus lateralibus angustis $\frac{1}{2}$ – $\frac{2}{3}$ ad fondam extensis parte $\frac{2}{5}$ supera libera lateribus laevibus lucidis carpelis lateralibus cum 1–3 angulis et planis sursum curvatis, carpelis 7–10 radiatis (rare cum carpela breviori sterili), eis marginalibus cum apicibus ovoideis vel late ovoideis (rare in phalangibus minoribus lanceoloideis) cum angulis compluribus laevibus lucidis, stigmatibus 3–5 mm longis (vel latis) suborbicularibus ad ellipticis horizontalibus vel inclinatis brunneis papillosis compluribus truncatis, sinibus proximalibus angustis $\frac{1}{4}$ – $\frac{1}{3}$ ad fondam extensis, carpelis centralibus cum apicibus lanceoloideis vel ovoideis, stigmatibus ellipsoideis valde inclinatis, sinibus centralibus apicalibus 9–18 (–28) mm profundis anguste V-formatis rectis, endocarpio in parte $\frac{1}{3}$ supera et 35 mm longis osseosis ferrugineis suborbi-

cularibus sed basi concava apice rotundato humeris medialibus breve curvatis adscendentibus lateribus lateralibus 5–7 mm crassis intra rubri-brunneis lucidis sublaevibus sed rugulosis, seminibus 13 mm longis ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 10–22 mm longam cum aerenchyma fibris longitudinalibus et membranis albis formanti, mesocarpio basali 42–50 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 8 m tall, at 1.6 m height 25 cm in diameter, with many big prop roots; leaves 1.86 (+0.03–0.06?) m long, 9.7 cm wide near the base 7.2 cm wide at the middle, coriaceous, smooth and shining on both sides, sword-shaped, tapering from base to the trigonous slender subulate apex (the tip lost), U-sulcate, 2-pleated, at midsection with 74 parallel secondary veins in each half, but no evident tertiary veins, the base pale, unarmed; beginning at 14 cm the margins with prickles 1.5–2 mm long, 5–14 mm apart, arcuate subulate, ascending, stramineous; the midrib below unarmed for the lower 31 cm; at midsection the margins with prickles 2–2.3 mm long, 6–16 mm apart, subarcuate subulate, compressed, strongly ascending, the base, pale, the rest dark reddish brown; the nearby midrib below with prickles 2 mm long, 13–42 mm apart, arcuate subulate, compressed, dark reddish brown; on the subulate apex the margins unarmed; the midrib with minute prickles 2–4 mm apart, all broken off and lost (infructescence not recorded); phalanges 9–9.7 cm long, 3.5–5.5 cm wide, (6.7 cm wide in a double with 12 carpels), 2.6–4 cm thick, cuneiform, widest near the tip, compressed, the apex convex or high convex, lower sides flat, lateral sinuses narrow, running $\frac{1}{2}$ – $\frac{2}{3}$ way down, upper $\frac{2}{5}$ free, the sides smooth, shining, the lateral carpels with 1–3 angles and flattish planes gently curving upward; carpels 7–10, radial (rarely there is one shorter, small, splintlike carpel), the marginal ones with their apices ovoid or broadly so (rarely lanceoloid in small phalanges), with several angles, smooth, shining; stigmas 3–5 mm long (or wide), suborbicular to elliptic, horizontal or inclined, brown, papillose, and some of them truncate; proximal sinuses narrow, running $\frac{1}{4}$ – $\frac{1}{3}$ way to valley bottom; central

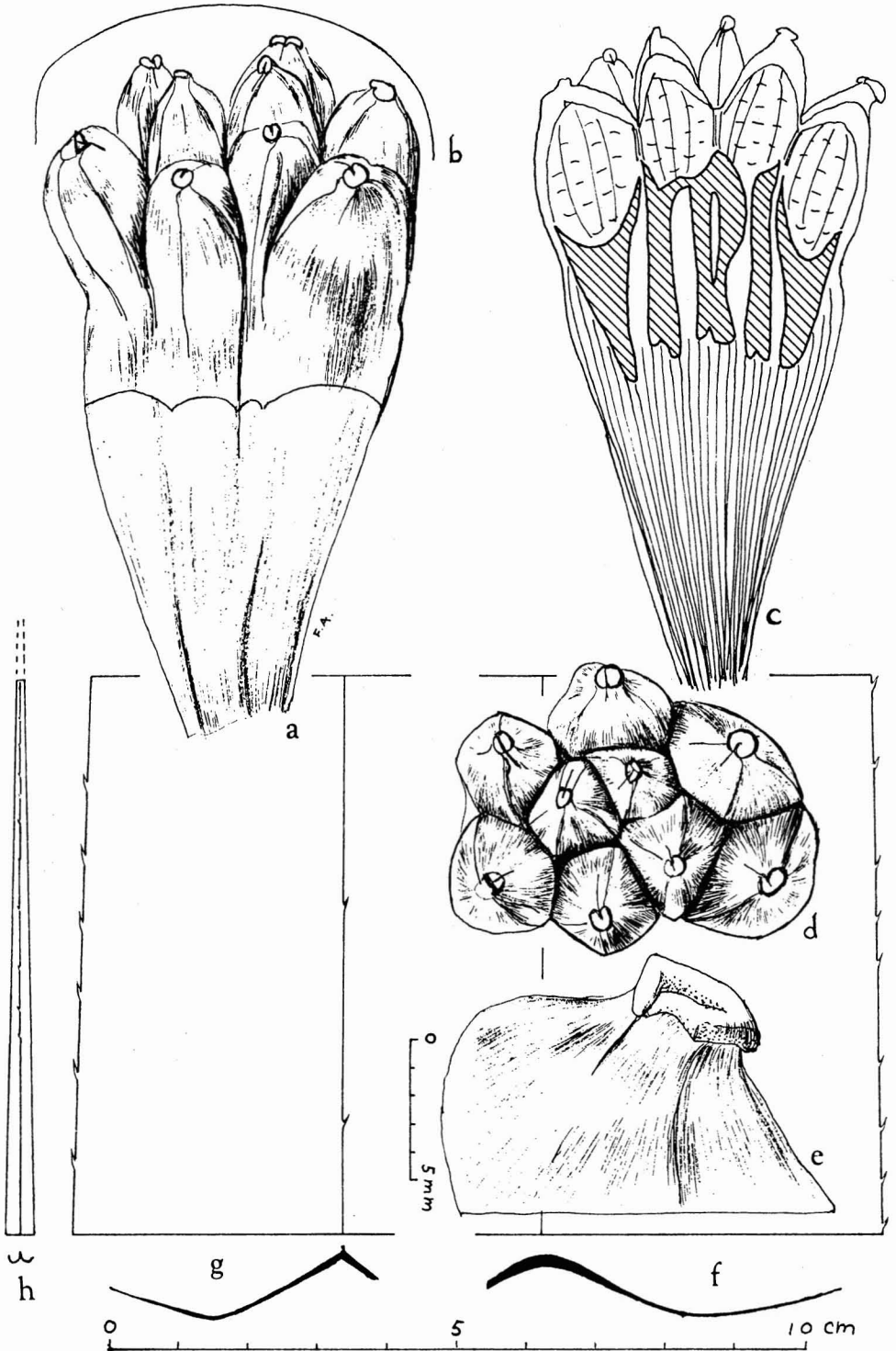


FIGURE 392. *Pandanus vatoensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

carpels with their apices lanceoloid or ovoid, their stigmas ellipsoid, strongly inclined; central apical sinuses 9–18 (–28) mm deep, narrowly V-shaped, straight; endocarp in upper 1/3 and 35 mm long, bony, ferruginous, suborbicular but the base concave, the apex rounded, the shoulders median, shortly curved ascending, lateral walls 5–7 mm thick, within reddish brown, shining, smoothish but rugulose; seeds 13 mm long, ellipsoid; mesocarp forming in the apex of each carpel a cavern 10–22 mm long, with aerenchyma of longitudinal fibers and white membranes; basal mesocarp 42–50 mm long, fibrous and fleshy.

HOLOTYPE: Fiji Islands, Lau Group, Vatoa Island, Matasuva, flat bordering low limestone ridge, 60 ft. alt., 28 Oct., 1968, *Yoshio Kondo* (Vatoa 2), (BISH).

DISCUSSION: *P. vatoensis* is a member of the section *Pandanus*, as is its closest relative, *P. polyacris* Martelli var. *beleios* St. John, of Malaita, Solomon Islands, a variety with the phalanges 9.5–9.8 cm long, 4.4–5 cm wide, the apex low convex, the upper 1/4 free; central apical sinuses 6–13 mm deep; stigmas 1.8–2.5 mm wide, reniform to suborbicular; leaves about 2.25 m long, 8.4 cm wide near the base, 6 cm wide at the middle, at the middle with 65 parallel secondary veins in each half, the margins beginning at 16 cm from the base with prickles 2.5–4 mm long, 4–11 mm apart, arcuate subulate, ascending, compressed, stramineous with red tips. *Pandanus vatoensis* has the phalanges 9–9.7 cm long, 3.5–6.7 cm wide, the apex convex or high convex, the upper 2/5 free; central apical sinuses 9–18 (–28) mm deep; stigmas 3–5 mm long (or wide), suborbicular to elliptic; leaves about 1.9 m long, 9.7 cm wide near the base, 7.2 cm wide at the middle, at the middle with 74 parallel secondary veins in each half, the margins beginning at 14 cm from the base with prickles 1.5–2 mm long, 5–14 mm apart, arcuate subulate, ascending, stramineous.

The new epithet is formed from the name of the type locality, Vatoa Island, and *-ensis*, the Latin adjectival place suffix.

Pandanus wayaensis sp. nov. (sect. *Pandanus*)

Figure 393

NOM. VERN.: “vandu” (Fijian language).

DIAGNOSIS HOLOTYPI: Arbor 6 m alta est, trunco 2 dm diametro, foliis fere 90 cm longis proxima basem 5.3 cm latis in medio 2.8 cm latis coriaceis supra lucidis viridibus infra palliditer viridibus et glaucis in sectione mediali cum 55 nervis parallelis secundariis in dimidio quoque nervis tertiis transversis infra ad basim semievidentis et reticula breve oblonga formantibus lamina gladiata ex basi ad apicem deminuenti (apice interito), ex 3.5–5 cm marginibus cum aculeis 1–1.8 mm longis 1–5 mm separatis subarcuatis crasse subulatis stramineis cum apicibus brunneis eis inferis subaequalibus illis sequentibus majoribus et minoribus alternantibus, ex fere 9 cm midnervo infra cum aculeis 0.5–2 mm longis 3.5–25 mm separatis stramineis valde adscendentibus apicibus brunneis eis inferis crasse subulatis arcuatis illis sequentibus subulatis arcuatis in sectione mediali marginibus cum aculeis 1–1.7 mm longis 2–7 mm separatis subulatis adpresse adscendentibus brunneis, midnervo vicinali cum aculeis 0.7–1 mm longis 2–5 mm separatis compressis arcuatis crasse subulatis adpresse adscendentibus basi straminea apice brunneo, phalangibus 3.9–4.2 cm longis 2.4–3.8 cm latis 1.8–2.7 cm crassis cuneatis subcompressis 4–5-angulosis parte 1/4 supera libera lateribus sublaevibus lucidis apice convexo vel humiliter convexo sinibus lateralibus angustis sed plerumque ad partem basalem evidentis, carpelis lateralibus cum (1–) 2 angulis distinctis sinibus apicalibus centralibus 5–8 mm profundis subrectis anguste V-formatis, carpelis 7–8 eis centralibus 1/2–2/3 tam grandibus quam illis marginalibus illis cum apicibus hemisphaericis vel oblate hemisphaericis et cum areola profunda concava distali 1–3 mm lata, carpelis centralibus cum apicibus ovoideis ad ovati-hemisphaericis acutis, stigmatibus 1.3–2 mm longis ovatis ad suborbicularibus vel truncatis apicibus obliquis brunneis papillosis, sinibus proximalibus profundis et 1/2–5/6 ad fondam extensis, endocarpio in parte 2/5 infera et 17–19 mm longo osseoso subbrunneo transverse ellipsoideo apice supra semines cum

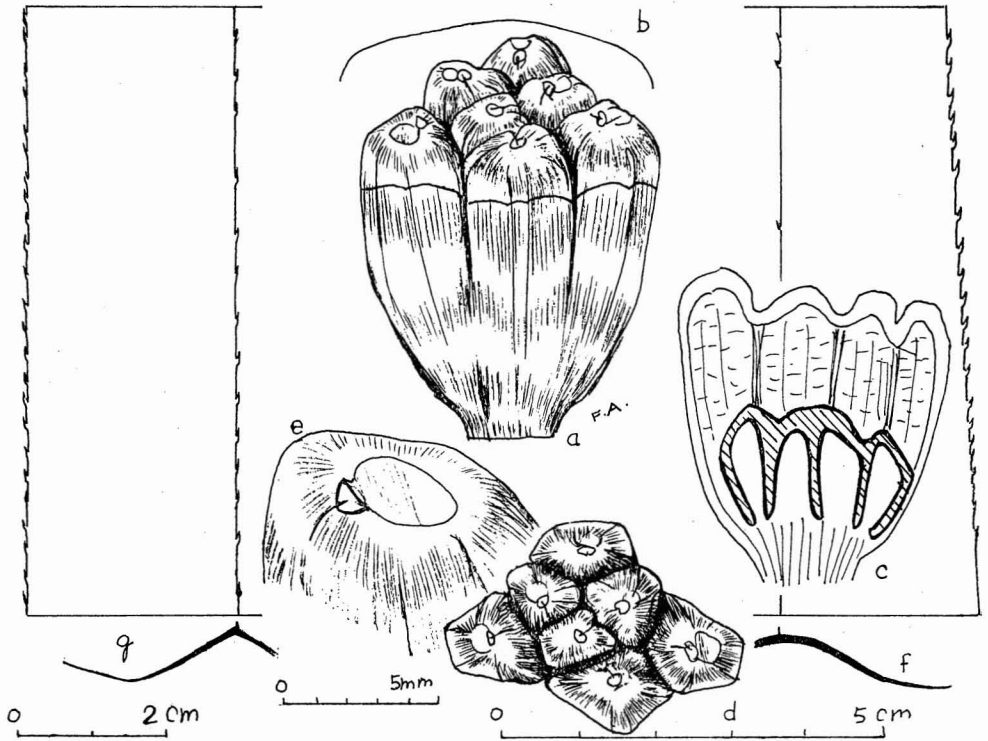


FIGURE 393. *Pandanus wayaensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, longitudinal median section, $\times 1$; *d*, phalange, apical view, $\times 1$; *e*, carpel apex and stigma, oblique view, $\times 4$; *f*, half of leaf base, lower side, $\times 1$; *g*, half of leaf middle, lower side, $\times 1$.

projectionibus lanceoloideis lateribus lateralibus 0.5–1 mm crassis intra laevibus lucidis, seminibus 10–12 mm longis late ellipsoideis, mesocarpio in apice carpelae cuiusque cum caverna 14–20 mm longa cum aerenchyma fibris longitudinalibus et membranis transversis, mesocarpio basali 5–6 mm longo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 6 m tall, 2 dm in diameter; leaves about 90 cm long, 5.3 cm wide near the base, 2.8 cm wide near the middle, coriaceous, shining green above, pale green and glaucous below, with 55 parallel secondary veins in each half, the tertiary crossveins faintly seen below near the base, forming short oblong meshes, blade sword-shaped, tapering from the base towards the tip (the apex not preserved in ours); beginning at about 3.5–5 cm the margins with prickles 1–1.8 mm long, 1–5 mm apart, subarcuate thick subulate, stramineous, with brown tips, the lowest ones nearly equal, the succeeding ones perceptibly large and

small alternating; beginning at about 9 cm the midrib below with prickles 0.5–2 mm long, 3.5–25 mm apart, stramineous, brown-tipped, strongly ascending, the lowest ones arcuate thick subulate, the succeeding ones arcuate subulate; at midsection the margins with prickles 1–1.7 mm long, 2–7 mm apart, subulate, appressed ascending, brown; the nearby midrib below with prickles 0.7–1 mm long, 2–5 mm apart, compressed, arcuate thick subulate, appressed ascending, the base stramineous, the apex brown; phalanges 3.9–4.2 cm long, 2.4–3.8 cm wide, 1.8–2.7 cm thick, cuneate, a little compressed, 4–5-angled, the upper $\frac{1}{4}$ free, the sides nearly smooth, shining, the apex convex or low convex, lateral sinuses narrow but distinct mostly $\frac{3}{4}$ way down, the lateral carpels with (1–) 2 distinct angles, central apical sinuses 5–8 mm deep, nearly straight, narrow V-shaped; carpels 7–8, the 1–2 central ones $\frac{1}{2}$ – $\frac{2}{3}$ as large as the marginal ones; marginal carpels with apices hemispheric to oblatly so,

with a deeply concave distal platform, this only 1–3 mm wide; central carpels with their apices ovoid to ovate-hemispheric, acute; stigmas 1.3–2 mm long, ovate to suborbicular, or with the apex truncate, apical, oblique, brown, papillose; proximal sinuses deep and running $\frac{1}{2}$ – $\frac{5}{6}$ way to valley bottom; endocarp in lower $\frac{2}{5}$ and 17–19 mm long, bony, brownish, transversely ellipsoid, the apex with lanceoloid projections over the seeds, lateral walls 0.5–1 mm thick, within smooth, shining; seeds 10–12 mm long, broadly ellipsoid; mesocarp forming in the apex of each carpel a cavern 14–20 mm long, containing aerenchyma of longitudinal fibers and transverse membranes; basal mesocarp 5–6 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Yasawa Group, Waya Island, Nakawa Gulch, west side of Batinareba, edge of woods, 1,100 ft. alt., July 20, 1937, *H. St. John* 18,132 (BISH).

DISCUSSION: *P. wayaensis* is a member of the section *Pandanus*, as is its closest relative, *P. vavauensis* (Martelli) Martelli, of Vavau Island, Tonga, a species with the phalanges 3.8–4 cm long, 1.8–2.4 cm wide, the upper $\frac{1}{2}$ free, the large ones with the apex truncate to very low convex, but the small ones with it truncate; outer carpel sides gently convex; central apical sinuses 2–4 mm deep; carpels 5–7 (–11); the marginal ones with apices broadly ovoid; endocarp slightly submedian; seeds narrowly ellipsoid; leaves 4.2 cm wide at the middle, near the base the margins with prickles 1.7–2 mm long, 5–10 mm apart, arcuate subulate, compressed, ascending, stramineous. *Pandanus wayaensis* has the phalanges 3.9–4.2 cm long, 2.4–3.8 cm wide, the upper $\frac{1}{4}$ free, the apex convex or low convex; carpel sides (1–) 2-angled; central apical sinuses 5–8 mm deep; carpels 7–8; the apices of the marginal ones hemispheric to oblately so; endocarp in lower $\frac{2}{5}$; seeds broadly ellipsoid; leaves 2.8 cm wide near the middle, near the base the margins with prickles 1–1.8 mm long, 1–5 mm apart, subarcuate thick subulate, stramineous with brown tips, the lowest ones nearly equal, but the succeeding ones perceptibly large and small alternating.

The new epithet is formed from the name of

the type locality, Waya, and *-ensis*, the Latin adjectival place suffix.

Pandanus wayaensis sp. nov. (sect. *Pandanus*)

Figure 394

NOM. VERN.: “vandra” (Fijian language).

DIAGNOSIS HOLOTYPI: Arbor est, foliis fere 1 m longis proxima basem 5–5.5 cm latis in medio 4–4.2 cm latis coriaceis viridibus lucidis infra pallidioribus in sectione mediali cum 57 nervis parallelis secundariis in dimidio quoque nervis tertiis obscuris laminis gladiatis ex basi in apice subulato deminuenti (apice interito) basi inermi pallida, ex 6–7 cm marginibus cum aculeis 1–2.3 mm longis 3–5 mm separatis arcuatis subulatis adscendentibus stramineis sensim grandibus minoribusque alternantibus, ex 14 cm midnervo infra cum aculeis 1.7–2 mm longis 14–22 mm separatis graciliter subulatis adpresse adscendentibus stramineis, in sectione mediali marginibus cum aculeis 1.5–2 mm longis 3–6 mm separatis subarcuatis crasse subulatis compressis crebre adscendentibus stramineis cum apicibus rubri-brunneis, midnervo vicinali infra cum aculeis 1–1.6 mm longis 4–7 mm separatis subarcuatis subulatis compressis valde adscendentibus stramineis et grandibus minoribusque alternantibus, phalangibus 3.3–3.7 mm longis 2–3.1 mm separatis 1.7–2.4 cm crassis cuneatis compressis parte $\frac{1}{4}$ supera libera 4–6-angulosis apice convexo lateribus laevibus lucidis convexis vel truncatis, sinibus lateralibus paucis vadosis et $\frac{1}{3}$ plo descendentibus sed illis multis nullis, sinibus apicalibus centralibus 2–4 (–5) mm profundis, carpelis 6–10 subradiatis eis marginalibus semiorbicularibus plerumque retusis et cum areola concava distali 1–2 mm lata, stigmatibus 2–3 mm latis reniformibus apicalibus horizontalibus prostratis brunneis papillosis, sinibus proximalibus angustis $\frac{1}{2}$ – $\frac{2}{3}$ ad fondam extensis, endocarpio mediali 15 mm longo osseoso obscure brunneo transverse ellipsoideo apice rotundato vel cum projectionibus conicis minimis lateribus cum humeris lateribus lateralibus 3–3.5 mm crassis intra laevibus lucidis, seminibus 9–11 mm longis late ellipsoideis, mesocarpio in apice carpelae cuiusque cavernam 8–12 mm longam

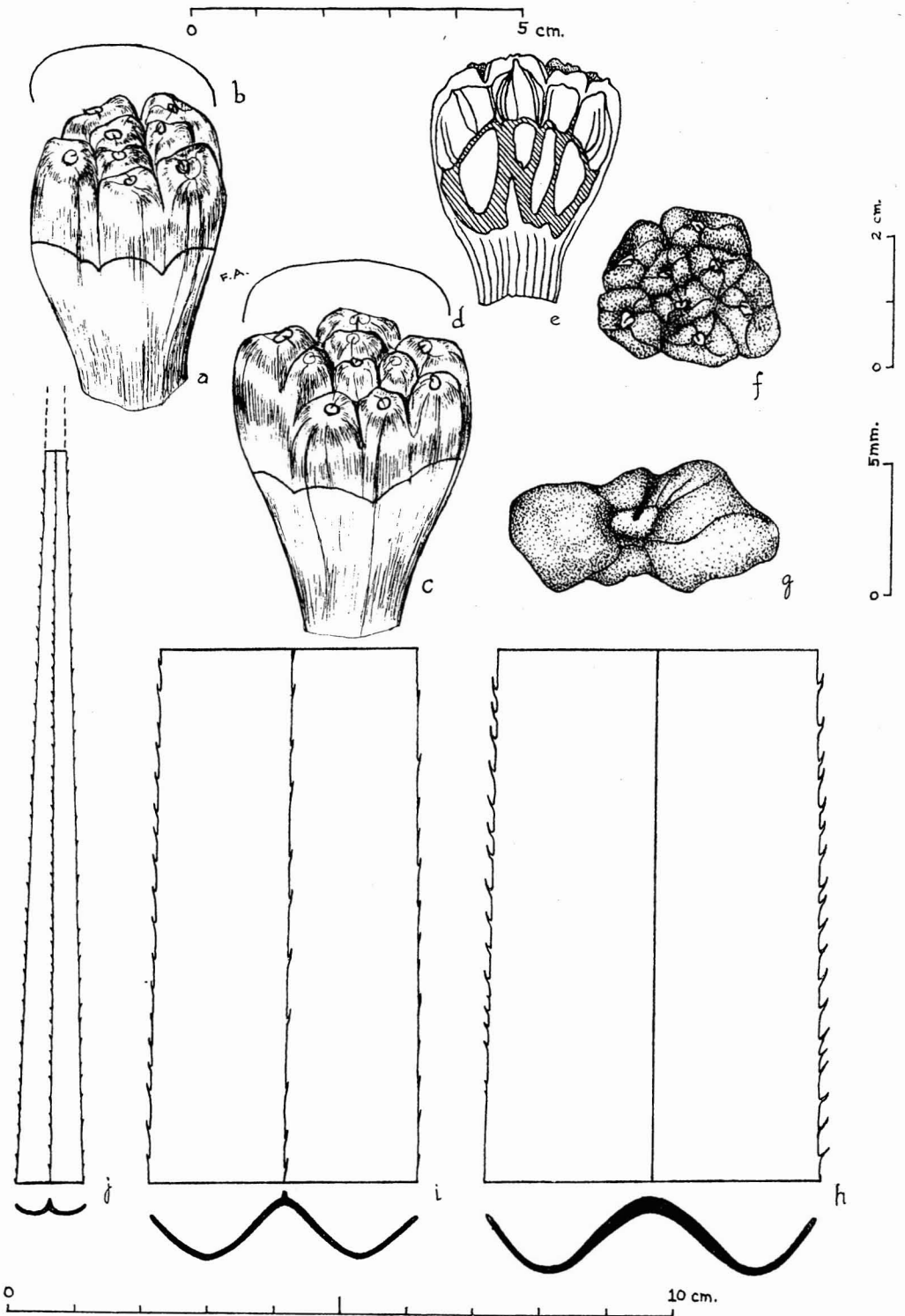


FIGURE 394. *Pandanus yasawaensis* St. John, from holotype. *a*, phalange, lateral view, $\times 1$; *b*, profile of phalange apex, $\times 1$; *c*, phalange, lateral view, $\times 1$; *d*, profile of phalange apex, $\times 1$; *e*, phalange, longitudinal median section, $\times 1$; *f*, phalange, apical view, $\times 1$; *g*, carpel apex and stigma, oblique view, $\times 4$; *h*, leaf base, lower side, $\times 1$; *i*, leaf middle, lower side, $\times 1$; *j*, leaf apex, lower side, $\times 1$.

cum aerenchyma fibris longitudinalibus et membranis pallidis, mesocarpio basali 10–12 mm longo fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree, leaves about 1 m long, 5–5.5 cm wide near the base, 4–4.2 cm wide at the middle, coriaceous, green, shining above, paler beneath, at midsection with 57 parallel secondary veins in each half, the tertiary veins obscure, blade sword-shaped, tapering from the base into the subulate tip (apex lost), base unarmed, pale; beginning at 6–7 cm the margins with prickles 1–2.3 mm long, 3–5 mm apart, arcuate subulate, ascending, stramineous, perceptibly large and small alternating; the midrib below unarmed for 14 cm, then with prickles 1.7–2 mm long, 14–22 mm apart, slender subulate, appressed ascending, stramineous; at midsection the margins with prickles 1.5–2 mm long, 3–6 mm apart, subarcuate stout subulate, compressed, strongly ascending, stramineous with reddish brown tips; the nearby midrib below with prickles 1–1.6 mm long, 4–7 mm apart, subarcuate subulate, compressed, strongly ascending, stramineous, alternately large and small; phalanges 3.3–3.7 cm long, 2–3.1 cm wide, 1.7–2.4 cm thick, cuneate, compressed, upper $\frac{1}{4}$ free, 4–6-angled, the apex convex, the sides smooth, shining, convex or flattened, of the lateral sinuses the minority shallow, running $\frac{1}{3}$ way down, the majority none; central apical sinuses 2–4 (–5) mm deep, nearly straight, narrowly V-shaped; carpels 6–10, subradiating, the marginal ones semiorbicular, mostly retuse and with a concave distal platform 1–2 mm wide; stigmas 2–3 mm wide, reniform, apical, horizontal, flush, brown, papillose; proximal sinuses narrow, running $\frac{1}{2}$ – $\frac{2}{3}$ way to valley bottom; endocarp median, 15 mm long, bony, dark brown, transversely ellipsoid, the apex rounded or with slightly conic projections, the sides with distinct shoulders, the lateral walls 3–3.5 mm thick, within smooth, shining; seeds 9–11 mm long,

broadly ellipsoid; mesocarp forming in the apex of each carpel a cavern 8–12 mm long, filled with aerenchyma of longitudinal fibers and pale membranes; basal mesocarp 10–12 mm long, fibrous and fleshy.

HOLOTYPE: Fiji, Yasawa Group, Waya Island, Nakawa Gulch, west side of Batinareba, open rocky slope, 900 ft. alt., July 20, 1937, *H. St. John 18,138* (BISH). Isotype (us).

DISCUSSION: *P. yasawaensis* is a member of the section *Pandanus*, as is its closest relative, *P. vavauensis* St. John, of Vavau Island, Tonga, a species with the phalanges 3.8–4 cm long, 1.8–2.4 cm wide, the upper $\frac{1}{2}$ free, the larger ones with the apex truncate to very low convex, the smaller ones truncate; carpels 5–7, the apices of the marginal ones broadly ovoid; endocarp 20 mm long, slightly submedian, lateral walls 0.5 mm thick; at midsection the leaf midrib below with uniform prickles 0.6–1.2 mm long, 4–8 mm apart, subulate, appressed ascending, stramineous. *P. yasawaensis* has the phalanges 3.3–3.7 cm long, 2–3.1 cm wide, the upper $\frac{1}{4}$ free, the apex convex; carpels 6–10, and the apices of the marginal ones semiorbicular; endocarp 15 mm long, median, lateral walls 3–3.5 mm thick; at midsection the leaf midrib below with prickles 1–1.6 mm long 4–7 mm apart, subarcuate subulate, compressed, strongly ascending, stramineous, alternately large and small.

The new epithet is formed from the geographic name, Yasawa, and *-ensis*, the Latin adjectival place termination.

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