Revision of the Genus Pandanus Stickman, Part 12
Queensland Pandanus

HAROLD ST. JOHN

In 1958, under a grant from the National Science Foundation, the writer made an expedition in search of Pandanus in New Guinea and in Queensland, Australia. Most of the following novelties were collected on that trip, in company with Dr. Stanley T. Blake of the Botanic Museum, Brisbane.

SECTION Pandanus

Pandanus angulatus sp. nov. (sect. Pandanus)
Figs. 107B, 109a

Diagnosis: Holotyp: Arbor 7 m alta 2 dm diametro, radicibus fulturosis nullis, cortice cum radicillis adspresse adscendentibus, foliis 1.60–1.62 m longis 6.5–7 cm latis coriaceis in secrione mediali cum 63–65 nervis secundariis in quaque latere, glaiformibus ex base in apice subulato diminuentibus eo in puncto 10 cm ex apice 2 mm lato in secrione M-formatis basi amplexicauli inermi sed ex 22–25 cm marginibus cum aculeis 2.8–3.5 mm longis 8–14 mm distantis graciliter subulatos adscendentibus apice brunneo, midnervo infra per partem 4/5 inferiorem inermi, in secrione mediali margini uno cum aculeis 1.8–2 mm longis 6–19 mm distantis adspresse adscendentibus, margine alter inermi, proxima apicem marginibus inermibus sed midnervo infra cum serris 0.2 mm longis 5–8 mm distantis, phalangibus 5–5.6 cm longis 4.7–6.1 cm latris 3.9–5.1 cm crassis luteoaurantiacis late ellipsoideis basi truncata apice depresse convexo, parte ½ supera libera, suturis lateralis profundis et V-formatis, lateribus dense papillosis et 7–9-angulatis et carpella quaque cum 3–8 angulis secundariis, suturis lateralis evidentis angustis, sinibus apicalibus centralibus 7–12 mm profundis V-formatis, carpellis 9–14 apicibus centralibus pyramidalibus et multiangulatis, apicibus marginalibus pyramidalibus compressis et angulatis, in apice cum regione concava cartilaginea lucida et sub margine hoc stigmati 1.5–2.5 mm longo suborbiculari ad oblatum cordato obscuro sulcato obliquo, sinibus proximalibus ½–¾ ad fondam extentis, endocarpio submediiali 2.5–3 cm longo solido osseoso brunneo lateribus 4–5 mm crassis, seminibus 15 mm longis 3 mm diametro ellipsoideo, mesocarpio apicali 8–20 mm longo cavernoso cum fibris membranisque, mesocarpi basali fibroso et carnoso.

Diagnosis of Holotype: Tree 7 m tall, 2 dm in diameter; no prop roots; bark with appressed ascending rootlets; leaves 1.60–1.62 m long, 6.5–7 cm wide, coriaceous, at midsection with 63–65 secondary veins on each side, swordlike, tapering from the base to the subulate tip which about 10 cm down is 2 mm wide, 1-ribbed, but in section flattened M-shaped, the base amplexicaul and unarmed but beginning 22–25 cm from the base the margins with slender subulate prickles 2.8–3.5 mm long, 8–14 mm apart, ascending, brown tipped; the midrib below unarmed for lower 4/5 part; at the midsection one margin with prickles 1.8–2 mm long, 6–19 mm apart, closely appressed ascending, the other margin unarmed; near the apex the margins unarmed but the midrib below with serrae 0.2 mm long, 5–8 mm apart; phalanges 5–5.6 cm long, 4.7–6.1 cm wide, 3.9–5.1 cm thick, yellow-orange, broadly ellipsoid with a broad truncate base and a broad, low convex apex, upper ½ free, lateral sutures deep and V-shaped, the sides closely minutely papillose, with 7–9 principal angles and on each carpel with 3–8 secondary ridges and valleys; lateral sutures pronounced, narrow; apical central sinuses 7–12 mm deep, V-shaped; carpels 9–14, the apices of the central ones pyramidal but with numerous longitudinal ridges and valleys and mortised with the neighboring ones, the

Fig. 107B. *Pandanus angulatus* St. John, holotype.  

- *a*, phalange, lateral view, × 1;  
- *b*, phalange, longitudinal median section, × 1;  
- *c*, phalange, apical view, × 1;  
- *d*, carpel apices and stigmas, oblique view, × 4;  
- *e*, leaf base, lower side, × 1;  
- *f*, leaf middle, lower side, × 1;  
- *g*, leaf apex, lower side, × 1.
marginal ones pyramidal but flattened distally, similarly ridged, the apex with a cartilaginous, shiny concavity, under the proximal edge of which is the centripetal, steeply oblique stigma 1.5–2.5 mm long, suborbicular to oblate cordate, dark brown, creased; proximal crease in a narrow valley, running \( \frac{1}{2} \) to \( \frac{3}{4} \) way to the mortised valley bottom; endocarp inframedian, 2.5–3 cm long, massive, bony, brown, the lateral walls 4–5 mm thick; seeds 15 mm long, 3 mm in diameter, ellipsoid; apical mesocarp cavernous in each carpel, 8–20 mm long, with numerous strong, longitudinal fibers and white medullary membranes; basal mesocarp fibrous and fleshy.

**HOLOTYPUS:** Australia, North Queensland, 10 miles s.s.e. of Cooktown, towards Archer Point savanna, 20 ft. alt., Feb. 1, 1958, H. St. John 293 (BISH).

**DISCUSSION:** *P. angulatus* is a member of the section *Pandanus,* and finds there its closest relative, *P. Solms-Laubachii* F. Müll. of Queensland, which has the phalanges 5–7 cm long, 2.5–4 cm wide, and the carpel apices semiorbicular-conic. In contrast, *P. angulatus* has the phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, 4.1–5.4 cm thick, and the carpel apices pyramidal and deeply many sulcate.

The new epithet is the Latin adjective meaning angled, in reference to the angled sides of the phalange and carpels.

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

Figs. 108, 109b–d

**DIAGNOSIS OF HOLOTYPE:** Arbor 13 m tall, 2 dm in diameter, sparsely forked to form an open crown; bark with abundant appressed ascending branching rootlets 3–4 cm long, bearing moss and ferns as epiphytes; prop roots none; leaves 1.84–2.27 m long, 7.5–8 cm wide, coriaceous, at midsection with 68–72 secondary veins on each side, in section low M-shaped, swordlike, tapering from base to the subulate apex which 10 cm down is 3 mm wide, the base amplexicaul and unarmed, but beginning at 25–28 cm the margins with prickles 1.5–2.5 mm long, 4–11 mm apart, arcuate, stout subulate, ascending, pale below, the tips red-brown; midrib below unarmed except at very tip; at midsection the margins unarmed; near the tip the margins with serrations 0.1 mm long, 2–10 mm apart, and the midrib below with several, remote similar serrations; syncarp not seen; phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, 4.1–5.4 cm thick,
FIG. 108. Pandanus australiensis St. John, holotype. a, Phalange, lateral view, × 1; b, phalange, longitudinal median section, × 1; c, phalange, apical view, × 1; d, carpel apex and stigma, oblique view, × 4; e, leaf base, lower side, × 1; f, leaf middle, lower side, × 1; g, leaf apex, lower side, × 1.
rounded obovoid, with 5–7 obscure angles, when dried brown but with traces of dark red, the sides gently convex but with many longitudinal ridges, the surface papillose and wrinkled, rather dull, upper \( \frac{1}{2} \) free, the apex low convex; lateral sutures well marked but narrow; central apical sinuses 5–8 mm deep, broad V-shaped; carpels 7–10, usually 8, the apices semiorbicular-pyramidal, angled and ridged on all sides, above the surface punctate and dull, below wrinkled and a little shiny, the distal sides of each with 2–8 angles and valleys, mortised with the neighbors, on the apex a prominent horizontal concavity leading to a visor over the stigma which is 1.5–3 mm long, oval to suborbicular, black, steeply oblique to perpendicular, creased, centripetal, the marginal ones mostly truncate; proximal sinus prominent and with protruding lips, running \( \frac{1}{4} \)–\( \frac{1}{2} \) way to valley bottom; endocarp centering in lower \( \frac{2}{5} \), bony, massive, brown, the lateral margins 8–10 mm thick; seeds 20–22 mm long, 2 mm in diameter, almost linear; apical mesocarp cavernous, with numerous strong fibers and some medullary membranes and hairs; basal mesocarp of small extent, fibrous and fleshy.

**HOLOTYPE:** Australia, North Queensland, 10 miles s.s.e. of Cooktown, towards Archer Point, rainforest in gully, 100 ft. alt., Feb. 1, 1958, H. St. John 26,243 (BISH).

**DISCUSSION:** *P. australiensis* is a member of the section *Pandanus*. Its closest relative, *P. Whitei* Martelli of Queensland has the phalanges 7–7.3 cm long, 6–6.5 cm wide, the surface not punctate or rough, central apical sinuses 3–5 mm deep, the carpel apices obscurely pentagonal, rounded pyramidal; and the stigmas apical. On the other hand, *P. australiensis* has the phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, the surface papillose and wrinkled, the central apical sinuses 5–8 mm deep, the carpel apices sharply angled, semiorbicular-pyramidal, with the apex concave; and the stigma on the distal face.

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

**Fig. 110**

**DIAGNOSIS HOLOTYPE:** Arbor 6 m alta 18 cm diametro, cortice sparse muricatuli, radicibus fulturosus 1 m longis 4 cm diametro sparse muricatulis, foliis 1.45–1.5 m longis 8–8.5 cm latis coriaceis supra viridibus infra pallidis in sectione depresse M-formatis in apice subulato longe diminuentibus eo in puncto 10 cm ex apice 3.5 mm lato, basi inermi sed ex 6 cm marginibus cum aculeis 2–2.5 mm longis 3–20 mm distantibus pallidis subulatis ascendentibus, midnervo infra inermi ex basi et ultra medium, in sectione mediali marginibus cum aculeis 1.5–2 mm longis 3–8 mm distantibus simulantibus adpressis vel in regionibus aliquis nullis, proxima apicem marginibus et midnervo infra cum serrulis 0.2–0.3 mm longis 2–6 mm distantibus, pedunculo 34 cm longo trigono bracteoso, syncarpio terminali solitario 20 cm longo 15 cm diametro ellipsoidae obtuse trigono cum 79 phalangibus eis 5.1–5.5 cm longis 3.2–4.6 cm latis 2.2–3.5 cm crassis (sed in geminis 5.5 cm latis) obovoideis subcompressis basi cuneata 5–6-angulosis lateribus sublucidis subcurvatis parte \( \frac{1}{2} \) supera libera apice oblato-convexo, suturis lateralibus nullis, sinibus centralibus apicalibus 1.5–3 mm profundiis, carpellis 9–12 apicibus oblato-pyramidalibus ad pyramidalibus eis marginalibus minime majoribus valleculis latis vel angustis et V-formatis, stigmatibus 1–1.5 mm longis ovalibus ad obovato-sulcatis obliquis centripetalibus pallide brunneis, suturis proximalibus profundiis et \( \frac{1}{2} \) ad fundam extentis, endocarpio mediali 2 cm longo osseoso obscure brunneo lateribus 3–4 mm crassis, seminibus 11–13 mm longis 4–5 mm diametro ellipsoidae vel obliquiter ellipsoidae, mesocarpio supero in carpella quaque cavernam rotundatam cum fibris paucis et membranis albis medullosis formatos, mesocarpio basali fibroso et carnoso.

**DIAGNOSIS OF HOLOTYPE:** Tree 6 m tall, 18 cm in diameter; bark sparingly muricate; prop roots 1 m long, 4 cm in diameter, sparingly muricate; leaves 1.45–1.5 m long, 8–8.5 cm wide, coriaceous, green above, pale beneath, in section perceptibly M-shaped, long tapering to the subulate apex, the tip 10 cm down 3.5 mm wide, the base unarmed for 6 cm, then the margins with prickles 2–2.5 mm long, 3–20 mm apart, pale, subulate, ascending; the midrib below unarmed near the base and essentially so to beyond the middle; at the midsection the mar-
FIG. 109.  
a, Pandanus angulatus St. John, holotype, habit.  
b, P. australiensis St. John, holotype, branches and crown; 
c, trunk with epiphytes, and portrait of S. T. Blake;  
d, trunk covered by appressed ascending, adventitious rootlets.
FIG. 110. Pandanus Blakei St. John, holotype. a, Phalange, lateral view, \( \times 1 \); b, phalange, longitudinal median section, \( \times 1 \); c, phalange, apical view, \( \times 1 \); d, marginal carpel apex and stigma, oblique view, \( \times 4 \); e, narrower central 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, \( \times 1 \); i, secondary veins at midsection, lower side, \( \times 4 \).
FIG. 111. *Pandanus citraceus* St. John, holotype. *a*, phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apices and stigmas, oblique view, × 4; *e*, leaf base, lower side, × 1; *f*, leaf middle, lower side, × 1; *g*, leaf apex, lower side, × 1.
gins with prickles 1.5–2 mm long, 3–8 mm apart, similar, appressed or for some distance wanting; near the tip the margins and midrib below with serrations 0.2–0.3 mm long, 2–6 mm apart; peduncle 34 cm long, trigonous, leafy bracted; syncarp terminal, solitary, 20 cm long, 15 cm in diameter, ellipsoid, 3-sided, bearing 79 phalanges, these 5.1–5.5 cm long, 3.2–4.6 cm wide, 2.2–3.5 cm thick, (in a double 5.5 cm wide), obovoid, somewhat compressed, the base cuneate, 5–6-angled, the sides smooth, somewhat shining, gently curved, upper 1⁄2 free, apex low convex, lateral sutures none, apical central sinuses 1.5–3 mm deep; carpels 9–12, their apices from low pyramidal to pyramidal, the marginal ones a little the larger, the valleys broad or narrow V-shaped; stigmas 1–1.5 mm long, oval to obovate, sulcate, oblique, centripetal, light brown; proximal crease deep, running 1⁄2 way to valley bottom; endocarp median, 2 cm long, bony, dark brown, the lateral margins 3–4 mm thick; seeds 11–13 mm long, 4–5 mm in diameter, ellipsoid or obliquely so; apical mesocarp forming in each carpel a rounded cavern with a few longitudinal fibers and filled with white, medullary membranes; basal mesocarp fibrous and fleshy.

**HOLOTYPE:** Australia, North Queensland, Yule Point, 27 miles n. of Cairns, top of sea beach with Scaevola frutescens, Clerodendron inerme, Vitex trifolia var. ovalifolia, Ipomoea pes-caprae ssp. brasiliensis, Feb. 5, 1958, H. St. John 26,260 (BISH).

**DISCUSSION:** *P. Blakei* is a member of the section *Pandanus*. Its closest relative is *P. somersetensis* St. John, of Queensland, which has the phalanges 4–5.1 cm wide, upper 1⁄4 free, the apical central sinuses 0.5–1 mm deep; carpels 7–9, the apices of the marginal almost flat; by the central perceptibly depressed conic; stigmas 1.5–3 mm long; leaves 6.8–7.2 cm wide, and at midsection unarmed, the leaf tip 10 cm down 7 mm wide. In contrast, *P. Blakei* has the phalanges 3.2–4.6 cm wide, upper 1⁄4 free, the apical central sinuses 1.5–3 mm deep; carpels 9–12, their apices from low pyramidal to pyramidal; stigmas 1–1.5 mm long; leaves 8.3–8.5 cm wide, and at midsection the margins armed with prickles 1.5–2 mm long, and the leaf tip 10 cm down 3.5 mm wide.

This species is named in honor of Dr. Stanley T. Blake, of the Brisbane Botanic Gardens.

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

Figs. 111, 139Aa–c

**DIAGNOSIS HOLOTYPI:** Arbor 10–15 m alta 25–28 cm diametro, cortice cum radicillis multis adpresse ascedentibus, radicibus fulturosis nullis, foliis 2.3–2.85 m longis 7–8 cm latis coriaceis in sectione mediali cum 67–70 nervis secundariis in quoque latere, gladiformibus ex basi in apice subulato circa 30 cm longo diminuentibus eo in puncto 10 cm ex apice 2 mm lato, basi amplexicauli et inermi sed 12–26 cm ex basi marginibus cum aculeis 3–5 mm longis 6–12 mm distantis subulatis arcuatibus ascedentibus dimidio externo mahogani-brunneo, midnervo infra plerumque inermi, regioni medi ali marginibus cum aculeis 3–3.5 mm longis 5–8 mm distantis, simulantibus, midnervo infra acute salienti et cum aculeis 2.5–3 mm longis ascedentibus simulantibus, proxima apicem marginibus et midnervo infra cum aculeis 0.5–0.7 mm longis 2–6 mm distantis subulatis ascedentibus, folio juvenali 2.7 m longo 10 cm lato et spinosiori marginalibus basalibus cum spinis 4–5.5 mm longis 4–11 mm distantis subrectis crasse subulatis mahogani-brunneis inferioribus reflexis alteris ascedentibus; inflorescentia foeminea terminali cernua, syncarpio solitario 23 cm longo 17 cm lato late ovoido, phalangibus 6–7 cm longis 2.8–4.1 cm latis 2.2–3 cm crassis cuneatis vel oblanco-cuneatis 5–6–angulatis in sicco rubro-brunneis, lateribus subcurvatis sed cum dorsis multis papillosis sublucidis et cutis Citri simul antibus, parte 3⁄5 supera libera apice truncato simulante sed in verite vadose concava, suturis lateralis angustis in dimidia supera notatis, sinibus centralibus apicilibus 6–9 mm profundis anguste V-formatis, carpellis 9–16 (in geminis 19) apicibus anguste pyramidalibus eis centralibus symmetricalibus sed marginalibus distalter compressis et cum apice concavo parvo inflexo, lateribus cum dorsis et valleculis pluribus, stigmatibus 1.5–2 mm longis ellipticis subnigris papillosis sulcatis valde obliquis ad verticalibus
centripetalibus, sinibus proximalibus \( \frac{3}{2} \) distantia ad fondam extentis, endocarpio minime submediali 25–30 mm longo osseo obscure mahogani-colorato paginis interioribus lucidis lateribus 3–4 mm crassis, seminibus 17–22 mm longis 3–4 mm diametro ellipsoideis, mesocarpio supero in carpella quaque cavernam cum in lateribis fibris et in centro membranis medulloso transversis, mesocarpio basali fibroso et carnoso.

**Diagnosis of Holotype:** Tree 10–15 m tall, 25–28 cm in diameter; bark with many pressed ascending rootlets; prop roots none; leaves 2.3–2.85 m long, 7–8 cm wide, coriaceous, at midsection with 67–70 secondary veins on each side, swordlike, tapering from base to the subulate apex about 30 cm long, and about 10 cm down 2 mm wide, the base amplexicaul and unarmed but beginning 12–26 cm up the margins with prickles 3–5 mm long, 6–12 mm apart, subulate, arcuate, ascending, the outer half mahogany brown; the nearby midrib below mostly unarmed; at midsection the margins with prickles 3–3.5 mm long, 5–8 mm apart, similar; the midrib sharply salient below and with similar ascending prickles 2.5–3 mm long; near the apex the margins and midrib below with subulate ascending prickles 0.5–0.7 mm long, 2–6 mm apart; the leaf of a juvenile sprout is 2.7 m long, 10 cm wide, and in general with more spiny margins, those near the base being 4–5.5 mm long, 4–11 mm apart, nearly straight, stout subulate; and the midrib below beginning 30 cm from the base has prickles 3–4 mm long, 6–16 mm apart, subulate, wholly dark mahogany brown; the lower ones reflexed, the others ascending; pistillate inflorescence terminal, nodding, leafy bracted; syncarp solitary, 23 cm long, 17 cm wide, broadly ovoid; phalanges 6–7 cm long, 2.8–4.1 cm wide, 2.2–3 cm thick, cuneate or ob lance-cuneate, 5–6-angled, when dried reddish brown, the sides gently curving but with many longitudinal ridges, papillose, almost shiny, resembling Citrus skin, upper 3/5 free, apex appearing truncate but actually usually shallowly concave, lateral sutures narrow, distinct at least in upper free part, central apical sinuses 6–9 mm deep, narrow V-shaped; carpels 9–16 (in a double 19), the apices narrowly pyramidal, the central ones symmetric, the lateral ones laterally compressed and with a small, oblique, concave apex slanting inward, the sides ridged and mortised with adjacent ones, the outer side of each with 3–9 secondary sharp ridges and valleys; stigmas 1.5–2 mm long, elliptic, blackish, papillose, creased, sharply oblique to vertical, centripetal; proximal sinus running \( \frac{3}{2} \) to all the way to the valley bottom; endocarp slightly submedian, 25–30 mm long, bony, dark mahogany colored, the inner surfaces shining, the lateral margins 3–4 mm thick; seeds 17–22 mm long, 3–4 mm in diameter, ellipsoidal; upper mesocarp forming in the apex of each carpel a cavern with on the sides longitudinal fibers and within transverse medullary membranes; basal mesocarp fibrous and fleshy.

**Holotypus:** Australia, North Queensland, \( \frac{1}{2} \) mile w. of Trinity Beach, n. of Cairns, by small creek in Eucalyptus forest with Melaleuca viridiflora, Dillenia alata, Eucalyptus alba, 15 ft. alt., grove of Pandanus, Feb. 6, 1958, H. St. John 26,265 (BISH).

**Discussion:** *P. citraceus* is a member of the section *Pandanus*. Its closest relative is *P. mossmanicus* St. John. For a statement of the characteristic differences, see the treatment of that species.

The new epithet is from the generic name *Citrus*, plus the Latin adjectival ending -aceus, meaning citrus-like, in reference to the surface of the phalanges which is rugose, half shiny, appearing glandular, like the skin of an orange fruit.
FIG. 112. *Pandanus endeavourensis* St. John, holotype. *a*, Phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apex, stigma, and proximal sinus, × 4; *e*, leaf base, lower side, × 1; *f*, leaf middle, lower side, × 1; *g*, leaf apex, lower side, × 1.
mibus, phalangibus 5–5.8 cm longis 4.1–4.8 cm latis 3.7–4.5 cm crassis, lateribus punctatis et subscabris exlucidis sensim convexis sed cum angulis mulitis, parte ¼ supera libera, apice oblato convexo vel enim truncato, sutoris lateralis distinctis, sinibus apicalibus centralibus 2–4 mm profundis curvatis vel sinuosis, carpellis 11–14 plerumque 12 apicibus subaequalibus oblato-pyramidibus et cum concaviitate horizontali, stigmatibus 1–1.5 mm longis ovatis vel reniformibus brunneis obliquis centripetalibus, sinibus proximalibus ½–¾ ad fondamentum, endocarpio minime supramedian 3.5 cm longo solido osseoso mahogani-brunneo intra lucido lateribus 8–9 mm crassis, seminibus 20 mm longis 4–5 mm diametro elliptoideis, mesocarpio in apice carpella quaque cavernam cum fibris et medulla formanti, mesocarpio basali fibroso et carnoso.

**DIAGNOSIS OF HOLOTYPE:** Tree 7 m tall, 2 dm in diameter; bark densely covered with appressed ascending rootlets; prop roots none; leaves 1.6–1.79 m long, 6–7.5 cm wide, coriaceous, at midsection with 59–61 secondary veins on each side, depressed M-shaped in section, sword-shaped, tapering from the base to the subulate apex which is slender but the tip not preserved, the base amplexicaul and unarmed, but the margins beginning 15–40 cm up with prickles 2.5–4 mm long, 7–13 cm apart, slender subulate, brown, appressed ascending; midrib unarmed throughout; at the midsection and from there to the tip the margins unarmed; inflorescence and syncarp not seen; phalanges 5–5.8 cm long, 4.1–4.8 cm wide, 3.7–4.5 cm thick, broadly obovoid, 5–6-angled, when dried brown, the sides punctate and slightly roughened, dull, gently convex but with many angles, upper ½ free, the apex very low convex or even truncate; lateral sutures distinct; central apical sinuses 2–4 mm deep, wide, curved or sinuous; carpels 11–14, mostly 12, the apices subequal, much depressed pyramidal, the actual apex with a mostly horizontal concavity, the distal sides with 4–8 sharp angles and valleys, running almost to the apex and thus morrisied with the adjacent ones; stigmas 1–1.5 mm long, ovate to reniform, brown, creased, oblique, centripetal; proximal sinus in a valley, running ½–¾ way to the bottom; endocarp slightly supramedian, 3.5 cm long, massive, bony, mahogany-brown, the seed cavities shining, the lateral walls 8–9 mm thick; seeds 20 mm long, 4–5 mm in diameter, ellipsoid; upper mesocarp forming in each carpel apex a cavity with stout fibers and pith; basal mesocarp fibrous and fleshy.

**HOLOTPUS:** Australia, North Queensland, by airstrip, 5 miles W.n.W. of Cooktown, savanna, 10 ft. alt., Feb. 1, 1958, H. St. John 26,251 (BIH).

**DISCUSSION:** *P. endeavourensis* is a member of the section *Pandanus*. Its closest relative is *P. orbicularis* St. John, of Queensland, which has the leaves 1.15–1.3 m long, 5.5–5.6 cm wide, the marginal prickles near the base 1.3–1.8 mm long; phalange 5.4–6.5 cm wide, subglobose, the sides almost smooth, a little shiny, the apex rounded; central apical sinuses 5–8 mm deep; and the carpels 7–12. In contrast, *P. endeavourensis* has the leaves 1.6–1.79 m long, 6–7.5 cm wide, the marginal prickles near the base 2.5–4 mm long; phalange 4.1–4.8 cm wide, broadly obovoid, the sides punctate and roughened, dull, the apex very low convex or even truncate; central apical sinuses 2–4 mm deep; and the carpels 11–14.

The species is named for the type locality, which is within a few miles of the Endeavour River, a name reminiscent of the ship commanded by Captain James Cook on his first world voyage. After stoving in its hull on the Great Barrier Reef, he managed to make the shore and beach his craft, H.M.S. "Endeavour," in the bay watered by the river that he named after the ship.

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

**DIAGNOSIS HOLOTYPE:** Arbor 9 m alta 20 cm diametro, cortice cum radicillis adpresse adscendentibus, radicibus fulturosis nullis, foliis 2.1 m longis 7.6–8.4 cm latis coriaceis in sectione mediali cum 62–65 nervis secundaris in quaque lateri, in sectione depressa M-formatis gladiiformatis et inermi sed ex 24–41 cm marginibus cum aculeis 1.5–3 mm longis 6–25 mm distantibus, midnervo toto inermi, ex medio ad apicem margini-
bus inermibus, inflorescentia et syncarpio invisa, phalangibus 5.1–5.5 cm longis 3.1–4.8 cm latis 3.5–4.5 cm crassis late obovoideis 5–6-angulosis in sicco bruno-ee gradatim curvatis laevibus et lucidis in partibus expositis, apice subconvexo parte ½ supera libera suturis later-aliibus angustis sed evidenter plerumque ad basam, sinibus apicalibus centralibus 7–10 mm profundis V-formatis exinterosetas, carpellis 8–11, plerumque 9 apicibus centralibus ovoideopyramidalis eis marginalibus semiiorbiculari-pyramidalis in laterere distali compresso et cum 3–7 angulis et valleculis solum in parte medialis et cum apice subdivergenti, stigmatibus 2–3 mm longis ellipsoidalis sulcatis brunneis obliquis. H. St. John 26,250 (BISH).

DISCUSSION: P. exarmatus is a member of the section Pandanus. Its closest relative is P. australiensis St. John, of Queensland, which has the phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, the sides with many longitudinal ridges running to the tip, the upper ½ free; central apical sinuses 5–8 mm deep, mortised; apices of the central carpels semiiorbicular-pyramidals, the outer ones erect, and all bearing an apical concavity. P. exarmatus has the phalanges 5.1–5.5 cm long, 3.1–4.8 cm wide, the sides with longitudinal ridges only near the middle, upper ½ free; central apical sinuses 7–10 mm deep, straight or curving; apices of the central carpels ovoid-pyramidal, the outer ones somewhat divergent, all acute or obtuse.

The new epithet is the Latin word exarmatus, unarmed, chosen because of the nearly spineless leaves.

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

**Fig. 114**

**DIAGNOSIS HOLOTYPI: Arbor 7 m alta 15 cm diametro, cortice cum papillis ascendentibus, foliis 1.5–1.65 m longis 5–5.3 cm latis in sectione depressa sinuose M-formatis in sectione mediiali cum 50 nervis secundariis in quoque laterale, gladiiformatis ex basi in apice sublato diminuentibus eo circa 10 cm ex puncto 4 mm lato basi amplexicauli et inermi sed ex 28–34 cm marginibus cum aculeis 2–2.5 mm longis 11–21 mm distantibus graciliter subulatis ascendentibus adpressis bruneis in margine uno per 1 dm productis, in altero per 2 dm productis, midnervo toto inermi, marginibus ex sec-
FIG. 113. Pandanus exarmatus St. John, holotype. a, Phalange, lateral view, × 1; b, phalange, longitudinal median section, × 1; e, phalange, apical view, × 1; d, carpel apex and stigma, oblique view, × 4; e, leaf base, lower side, × 1; f, leaf middle, lower side, × 1; g, leaf apex, lower side, × 1; h, bark with appressed ascending adventitious rootlets, × 1.
tione medi ali ad apicem inermibus, phalangibus 4.5–5 cm longis 5.8–7.4 cm lat is 4.2–5.3 cm crassis late turbinatis subcompressis basi lata et truncata in sicco brunneis 4–6–angulosis apice alto–convexo lateribus subrugosis et cum rimosis longitudinalibus brunneis pluribus parte ½ supera libera, suturis lateralis angustis in dimidia supera distinctis, sinibus centralibus apicalibus 1–2 mm profundis lat is subcurvatis vel rectis, carpellis 8–11 (in geminis 16 et phalangio 8 cm lato) apicina carpellarum centralium ob lato–pyramidalibus cum concavite apicali parvo, eis marginalium cum apicibus tantum projectionibus laterum phalangium apicibus subangulatis et cum concavite majore, stigmatibus 1.5–2 mm longis obdeltoides vel obovoides et multis truncatis obscuris scopulis lateralis eis centralibus obliti et inflexis illis marginalibus plumrumque in concavite sitis et divergentibus, sinibus proximalibus ¾ vel tota ad fondam extensis, endocarpio 3 cm longo medi ali solido osseo obscure mahogany–brunneo intra lucido lateribus lateralisibus 7–8 mm crassis, sem inibus 15–18 mm longis 4–5.5 mm diametro ellipsoides, mesocarpio supera in apice carpella quaque cavernoso cum fibris foribus et mem bran is pallidis medullosis, mesocarpio basali parvo fibroso et carnoso.

**DIAGNOSIS OF HOLOTYPE:** Tree 7 m tall, 15 cm in diameter; bark with ascending papillae; leaves 1.5–1.65 m long, 5–5.3 cm wide, in section low sinueus M-shaped, at midsection with 50 secondary veins on each side, swordlike, tapering from the base to the subulate apex, this about 10 cm down 4 mm wide, the base amplexicala and unarmed, but beginning at 28–34 cm the margins with prickles 2–2.5 mm long, 11–21 mm apart, slender subulate, ascending, closely appressed, brown, produced for about 1 cm on one side, and 2 dm on the other; midrib unarmed throughout; from the midsection to the tip the margins unarmed; phalanges 4.5–5 cm long, 5.8–7.4 cm wide, 4.2–5.3 cm thick, broad turbinate, a little compressed, the wide base truncate, when dried brown, 4–6–angled, the apex high convex, the sides slightly rough and with several longitudinal, brown cracks, upper ½ free, lateral sutures narrow, distinct in upper half; central apical sinuses 1–2 mm deep, wide, gently curved or straight; carpels 8–11 (16 in a double and its phalange 8 cm wide), apices of central carpels flattened pyramidal, with a small apical concavity, those of the marginal carpels having the apices mere curved continuations of the sloping sides and not clearly separable from them, the sinuses no deeper, the apex slightly angled and with a larger concavity; stigmas 1.5–2 mm long, obdel toid to ovoid, many truncate, dark, creased, centripetal, the central ones oblique and canted inwards, the marginal ones mostly in the concavity and canted outwards; proximal sinus running ¾ way to all the way to the valley bottom; endocarp 3 cm long, median, massive, bony, dark mahogany brown, the inner surfaces shining, the lateral walls 7–8 mm thick; seeds 15–18 mm long, 4–5.5 mm in diameter, ellipsoid; upper mesocarp forming in each carpel apex a small cavern with heavy fibers and pale medullar membranes; basal mesocarp sparse, fibrous and fleshy.

**HOLOTYPUS:** Australia, North Queensland, Six Mile Creek, 6 miles w. of Cooktown, fringing forest on small creek in Eucalyptus forest, 20 ft. alt., Jan. 3, 1958, H. St. John 26,239 (BISH).

**DISCUSSION:** *P. medialisernis* is a member of the section Pandanus. In that section is its closest relative, *P. somersetensis* St. John, of Queensland, which has the bark muricate; leaves 0.95 m long, 6.8–7.2 cm wide, near the tip the midrib below with ascending prickles 0.3 mm long; phalanges 5–5.5 cm long, 4–5.1 cm wide, narrowly obpyramidal, upper ¼ free, apex low convex, lateral sutures mostly none, central apical sinuses 0.5–1 mm deep, almost imperceptible; carpels 7–9, the apices depressed conic; and the endocarp walls 2–3 mm thick. *P. medialisernis* has the bark with ascending papillae; leaves 1.5–1.6 m long, 5–5.3 cm wide, midrib unarmed throughout; phalanges 4.5–5 cm long, 5.8–7.4 cm wide, broad turbinate, upper ½ free, apex high convex, lateral sutures distinct in upper half, central apical sinuses 1–2 mm deep; carpels 8–11, the apices with a terminal concavity; and the endocarp lateral walls 7–8 mm thick.

The new epithet is from the Latin *medialis*, middle; *inermis*, unarmed, in reference to the unarmed midrib.
FIG. 114. *Pandanus media* St. John, 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, apical view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$. 
FIG. 115. Pandanus mossmanicus St. John, holotype. a, Phalange, lateral view, × 1; b, phalange, longitudinal median section, × 1; c, phalange, apical view, × 1; d, carpel apex, stigma, and proximal sinus, oblique view, × 4; e, leaf base, lower side, × 1; f, leaf middle, lower side, × 1; g, leaf apex, lower side, × 1.
**Pandanus mossmanicus** sp. nov. (sect. *Pandanus*)

Figs. 115, 116a

**DIAGNOSIS HOLOTYPIE:** Arbor 13 m alta 22 cm diametro, trunco per 8–9 m singulo, cortice cum radicillis adpresso adscendentibus dense ob­
tecto, radicibus fulturosis nullis, foliis 2.43–2.50 m longis 9.5–10 cm latiss coriaceis in sectione mediali cum 67–74 nervis secundaritis in quoque
latere, gladiformibus ex basi in apice lango subulato diminuientibus eo in puncto approximato 10 cm ex apice 3–4 mm lato, basi amplexicauli
inermi sed ex 20–25 cm marginibus cum aculeis 1.5–3 mm longis 3–11 mm distantibus validis subulatis adscendentibus apice bruneaeo, midnervo infra inermi sed in regione basali et medi­
ali, in regione mediali marginibus cum aculeis 2–2.2 mm longis 5–12 mm distantibus crassiter
subulatis subadpressis adscendentibus, proxima apicem marginibus cum sarris 0.2–0.5 mm
longis 2–5 mm distantibus, midnervo infra cum
sarris simulantibus sed gracilioribus, infloresc­
tia foemineae terminali cernua foliosa, syncarpio
unico globose, phalangibus 7.3–7.8 cm longis
3.7–4.7 cm latiss 2.5–4.2 cm crassiter elliptico­obovoideis in basi cuneatis 4–5 angulosis, dimi­
dia supera mahogani-rubra lateribus subcurvatis
papillosis et dense plicatis sublucidis et cuti. Citri simulantibus parte ½ supera libera apice
truncato vel rare paene convexo-truncato, su­
turis lateralis distinctis sed angustis, sinibus
centralibus apicalibus 6–12 mm profundis V-
formatis, carpellis 7–11 plerumque 8–9 apicibus
anguste angulosis marginalibus semiorbiculari­
pyramidalibus et pluribus in lateribus distalibus
compressis, marginibus exterioribus cum 5–12
dorsis angustis longitudinalibus, lateribus inte­
ierioribus item cum dorsis valleculisque, apice
minime truncato vel concavo, apicibus centrali­
bis plerumque lanceolato-pyramidalibus sym­
metricalibus, stigmatibus 1.5–2 mm longis sul­
catis subnigris ovalibus vel marginalibus ceteri­
bus in apice truncatis centripetalibus obliquis
vel verticalibus proximalibus, sinibus proximali­
bus ad fondam extentis, endocarpio minime
supramediali solido osseo mahogani-olorato
35–38 mm longo summibus interioribus lucidis
lateribus lateralibus 6–8 mm crassis, seminibus
13–15 mm longis 4 mm diametro ellipsoides,
mesocarpio supero in carpella quaque cavernam
apicalem cum fibris plerumque marginalibus et
cum membranis pallidis medullosis formanti,
mesocarpio basali fibroso et carnoso.

**DESCRIPTION OF ALL SPECIMENS EXAMINED:**
Tree 13 m tall, 22 cm in diameter; the trunk unbranched for 8–9 m; bark densely covered with appressed ascending rootlets; prop roots none; leaves 2.43–2.50 m long, 9.5–10 cm wide, coriaceous, at middle with 67–74 secondary
veins on a side, swordlike, tapering from the base to the long subulate apex, this about 10
cm down 3–4 mm wide, the base unarmed, amplexicaul, but beginning 20–25 cm up the mar­
gins with prickles 1.5–3 mm long, 3–11 mm
apart, stout subulate, ascending, brown tipped;
the midrib below unarmed till well beyond the
middle; at midsection the margins with prickles
2–2.2 mm long, 5–12 mm apart, stout subulate,
subappressed ascending; near the apex the mar­
gins with serra 0.2–0.5 mm long, 2–5 mm
apart; the midrib below with similar but more

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**Fig. 116a. Pandanus mossmanicus** St. John, holo­
type, habit and habitat, with S. T. Blake.
FIG. 116b–d.  

b, *P. plurianangulatus* St. John, holotype, habit; c, foliage and syncarp.  
d, *P. punctatus* St. John, holotype, habit.
slender serrae; pistillate inflorescences terminal, nodding, leafy bracted; syncarp single, when half grown green, globose; ripe, fallen phalanges 7.3–7.8 cm long, 3.7–4.7 cm wide, 2.5–4.2 cm thick, elliptic-obovoid, cuneate towards the base, 4–5-angled, upper half deep mahogany-red, the sides gently curved, papillose and closely wrinkled, somewhat shiny, somewhat resembling the skin of a *Citrus* fruit, free in upper ⅓, the apex truncate, or rarely slightly convex-truncate, lateral sutures distinct but narrow; central apical sinuses 6–12 mm deep, V-shaped below; carpels 7–11, mostly 8–9, their apices sharply angled, the marginal ones semiorbicular-pyramidal and some of them flattened on the distal side, the outer margins with 5–12 sharp, longitudinal ridges, thus mortised with their neighbors, the inner sides also with sharp angles and valleys, and mortised, and at the apex with a small area truncate or shallowly concave, the central carpel apices mostly lanceoloid-pyramidal, symmetric; stigmas 1.5–2 mm long, creased, blackish, oval or some of the marginal ones truncate at summit, centripetal and oblique to vertical on proximal face of tip; proximal sinus running to valley bottom; endocarp slightly supramedian, massive, bony, mahogany-colored, 35–38 mm long, the inner surfaces shining, the outer lateral walls 6–8 mm thick; seeds 13–15 mm long, 4 mm in diameter, ellipsoid; upper mesocarp forming in apex of each carpel a cavern with the longitudinal fibers mostly marginal and with pale medullary membranes; basal mesocarp fibrous and fleshy.

**HOLOTYPUS:** Australia, North Queensland, Drovandi Bridge, 3½ miles n. of Mossman, swamp forest with *Dillenia alata*, *Melaleuca*, *Stenochlaena scandens*, 20 ft. alt., common 2nd. story tree, Feb. 5, 1958, H. St. John 26,261 (BISH).


**DISCUSSION:** *P. mossmanicus* is a member of the section *Pandanus*. Its closest relative is *P. citraceus* St. John, from Queensland. The latter species has the leaves 7–8 cm wide, near the base the margins with prickles 3–5 mm long, at midsection the midrib below with ascending prickles 2.5–3 mm long; phalanges 6–7 cm long, 2.8–4.1 cm wide, the apex shallowly concave; carpels 9–16, the apices narrowly pyramidal; and the endocarp 25–30 mm long, the lateral walls 3–4 mm thick. On the other hand, *P. mossmanicus* has the leaves 9.5–10 cm wide, near the base the margins with prickles 1.5–3 mm long, from the base to well beyond the middle the midrib unarmed; phalanges 7.3–7.8 cm long, 3.7–4.7 cm wide, the apex truncate; carpels 7–11, the marginal apices semiorbicular-pyramidal, the central ones mostly lanceoloid-pyramidal; endocarp 35–38 mm long, the lateral walls 6–8 mm thick.

The new epithet is an adjective formed from the name of the type locality.

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

Fig. 117

**DIAGNOSIS HOLOTYPI:** Arbor 8 m alta 12 cm diametro, cortice verruculoso, radicibus fulturosis 1 m longis 3–4 cm diametro sparse verruculosis, foliis 1.7 m longis 5.7–6.5 cm latis subcoriaceis in sectione mediali cum 57 nervis secundariis in quoque latere, in sectione depresso sinuosaliter M-formatis gladiiformatis ex basi in apice subulato diminuientibus basi amplexicaulis inermis sed ex 9–12 cm marginibus cum aculeis 2–3 mm longis 5–14 mm distantiis subulatis adscendentibus abrinneo, midnervo infra ex 12–15 cm cum aculeis 1.5–2.5 mm longis 8–27 mm distantiis simulantiis sed reflexis, in regione mediale marginibus cum serris subulatis 1–1.3 mm longis 8–15 mm distantiis, midnervo infra cum aculeis 1.3–1.5 mm longis 8–25 mm distantiis adscendentibus subulatis, circa apicem marginibus cum serris 0.2 mm longis 4–6 mm distantiis, midnervo infra cum aculeis 0.6–0.8 mm longis 3–6 mm distantiis subulatis adscendentibus, syncarpio inviso, phalangibus 3.8–4.3 cm longis 2–3 cm latis 1.6–2.6 cm crassis cuneato-obovoides vel oblanceoloides compressis in sicco palide brunneis 5–6-angulosis lateribus gradatim curvatis vel planatis laevibus lucidis parte ⅓ supra libera apice convexo, suturis lateralis in media vel totis partibus liberis, sinibus centralibus apicalibus 2–4 mm profundis parte basali an-
gusto recto vel subcurvato, carpellis 8–15 ple- 
turque 11–12 apicibus subaequalibus oblato- 
semioccultibus marginalibus plerumque asymentricalibus et latere distali complanato 
sed paucis majoribus cum concavite distali 
subterminali vadoso, stigmatibus 1–1.5 mm 
longis subcircularibus vel late ellipticis sulcatis 
apicalibus elevatis obliquis centripetalibus vel 
apaucis marginalibus extra inclinatis, sinibus 
proximalibus stigmati aequalibus, endocarpio 
minime supramediali 18–19 mm longo obscure 
brunneo osseoso lateribus lateralibus 1 mm 
crassis, seminibus 10–12 mm longis 3–5 mm 
diametro obliquiter ellipsoidis, mesocarpio 
apicali in carpella quaque cavernam cum fibris 
apaucis longitudinalibus et membranis albis me- 
dullosis formanti, mesocarpio basali fibroso et 
carnoso.

**DIAGNOSIS OF HOLOTYPE:** Tree 8 m tall, 12 
 cm in diameter; bark warty; prop roots 1 m 
 long, 3–4 cm in diameter, sparsely warty; 
leaves 1.7 m long, 5.7–6.5 cm wide, subcori- 
aceous, at midsection with 57 secondary veins 
on each side, in section low, sinuous M-shaped, 
sword-shaped, tapering from the base to the 
subulate apex, the base amplexicaul and 
unarmed, but beginning at 9–12 cm the margins 
with prickles 2–3 mm long, 5–14 mm apart, 
subulate, ascending; the midrib below beginning 
at 12–15 cm up with prickles 1.5–2.5 mm long, 8–27 mm apart, similar but 
reflexed; at the midsection the margins with 
prickles 1–1.3 mm long, 8–15 mm apart, sub- 
ulate serrae; the midrib below with prickles 
1.3–1.5 mm long, 8–25 mm apart, ascending, 
subulate; near the apex the margins with serrae 
0.2 mm long, 4–6 mm apart; the midrib below 
with prickles 0.6–0.8 mm long, 3–6 mm apart, 
subulate, ascending; synarp not seen; phalanges 
3.8–4.3 cm long, 2–3 cm wide, 1.6–2.6 cm 
thick, cuneate-obovoid or -oblanceoloid, com- 
pressed, when dried pale brown, 5–6-angled, 
the sides gently curved or plane, smooth, shin- 
ing, free in upper ⅓, the apex convex; lateral 
 sutures distinct in half or all of the upper free 
portion; central apical sinuses 2–4 mm deep, 
the lower part narrow, straight or gently curved; 
carpels 8–15, mostly 11–12, the apices subequal, 
oblate semioccubular, the marginal ones mostly 
 asymmetric and flattened distally, but a few of 
the larger ones with a nearly terminal, distal, 
shallow concavity; stigmas 1–1.5 mm long, sub- 
circular to broad elliptic, creased, apical, raised, 
oblique, centripetal or a few of the marginal 
ones slanted outwards; proximal sinus not 
longer than the stigma; endocarp slightly supra- 
median, 18–19 mm long, dark brown, bony, the 
lateral walls 1 mm thick; seeds 10–12 mm long, 
3–5 mm in diameter, obliquely ellipsoid; upper 
mesocarp forming in each carpel apex a cavern 
with a few longitudinal fibers and with white 
medullary membranes; basal mesocarp fibrous 
and fleshy.

**HOLOTYPUS:** Australia, North Queensland, 
Green Island, off Cairns, in forest at top of 
beach, with *Scaevola frutescens*, *Theopsea po-
pulnea*, *Planchonella obovata*, *Mimusops parvi-

**DISCUSSION:** *P. oblatiapicalis* is a member of 
the section *Pandanus*. Its closest relative is *P. 
duriocarpus* Martelli, of Palau, a species which 
has the leaves 7.8 cm wide; phalanges 4.5–4.8 
 cm long, 2.5–4 cm wide; carpel apices acutely 
narrow pyramidal; apical central sinuses 5–7 
 mm deep; and the endocarp in the upper third. 
*P. oblatiapicalis* has the leaves 5.7–6.5 cm wide; 
phalanges 3.8–4.3 cm long, 2–3 cm wide; car- 
pel apices oblate-semiorbicular; apical central 
sinuses 2–4 mm deep; and the endocarp slightly 
supramedian.

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

Figs. 118, 139Ad

**DIAGNOSIS HOLOTYPI:** Arbor 8 m alta 15 cm 
diametro pauciter ramosa in corona laxa, cortice 
cum radicillis adpresse adseendentibus, radicibus 
fulturosis nullis, foliis 1.15–1.3 m longis 5.5–5.6 
 cm latis coriaceis in sectione mediiali cum 50 
nervis secundariis in quoque latere, in sectione 
oblatiater M-formati gladiiformatis ex basi in 
apice subulato diminuentibus ex 10 cm ex apice 
6 mm lato basi amplexicauli et inermi sed ex 
10–28 cm marginibus cum aculeis 1.3–1.8 mm 
longis 5–15 mm distantibus valde subulatis ad- 
scedentibus bruneis, midnervo toto inermi, in 
sectione mediiali et ad apicem marginibus in- 
ermis, phalangibus 5.4–6.5 cm longis 5.4–6.5 
 cm latis 4.3–4.8 cm crassis subglobosis com- 
pressis 5–6-angleatis in sicco brunneo et pau- 
citer subrubro lateribus sublaevibus et sublu-
FIG. 117. *Pandanus oblatiapicalis* St. John, holotype. *a*, Phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apices, stigmas, and proximal sinuses, oblique view, × 4; *e*, leaf base, lower side, × 1; *f*, leaf middle, lower side, × 1; *g*, leaf apex, lower side, × 1.
cidis subcurvatis sed cum dorsis multis parte ½ supera libera apice rotundato, suturis lateralisibus profundis et conspicuis, sinibus centralibus apicalibus 5–8 mm profundis late V-formatis curvatis vel subsinuosis, carpellis 7–12 plurumque 9–10 (sed geminis cum 14 et 8.2 cm latis) apicibus pyramidalis-semiorbicularibus subequalibus angulis in apice concavitate parva, stigmatibus 2–3 mm longis obdeltoides vel oblanceolatis sulcasti obliquis centripetalibus, sinibus proximalibus ½ ad fondam extentis, endocarpio 3.4 cm longo solido mediali osseoso mahogani-colorato intrà lucido lateribus 9–11 mm crassi, seminibus 20–23 mm longis 5–6 mm diametro ellipsoides, mesocarpo supero in apicé carpellae quaæque cavernam cum fibrís longitudinalibus forribus et membranis albis medullosis formantì, mesocarpo basali sparso fibroso carnosoque.

**DIAGNOSIS OF HOLOTYPUS**: Tree 8 m tall, 15 cm in diameter, few branched to form an open crown; bark with appressed ascending rootlets; prop roots none; leaves 1.15–1.3 m long, 5.5–5.6 cm wide, coriaceous, at midsection with 50 secondary veins on each side, in section low M-shaped, swordlike, tapering from the base to the subulate tip, this about 10 cm down 6 mm wide, the base amplexicaul and unarmed, but beginning at 10–28 cm the margins with prickles 1.3–1.8 mm long, 5–15 mm apart, stout subulate, ascending, brown; the midrib unarmed throughout; at midsection the margins unarmed and likewise from there to the tip; inflorescence and syncarp not seen; phalanges 5.4–6.5 cm long, 5.4–6.5 cm wide, 4.3–4.8 cm thick, subglobose, compressed, 5–6-angled, when dried brown with a trace of pink, the sides almost smooth, a little shiny, gently sloping but cut by numerous longitudinal ridges, upper ½ free; apex rounded; lateral sutures deep and prominent; central apical sinuses 5–8 mm deep, wide V-shaped, curved or slightly sinuous; carpels 7–12, mostly 9–10 (but in a twin 14 and the phalange 8.2 cm wide), the apices pyramidal semiorbicular, subequal, angled, the actual apex with a small concavity; stigmas 2–3 mm long, obdeltoid to oblancoelate, creased, oblique, centripetal; proximal sinus running ½ way to valley bottom; endocarp 3.4 cm long, massive, median, bony, mahogany-colored, the inner surfaces shining, the lateral margins 9–11 mm thick; seeds 20–23 mm long, 5–6 mm in diameter, ellipsoid; upper mesocarp forming in each carpel apex a cavern with strong longitudinal fibers and white medullary membranes; basal mesocarp sparse, fibrous and fleshy.

**HOLOTYPUS**: Australia, North Queensland, south bank of Annan River, 4 miles s.s.w. of Cooktown, savanna with *Eucalyptus alba, E. leptophleba*, Feb. 3, 1958, H. St. John 26,252 (BISH).

**DISCUSSION**: *P. orbicularis* is a member of the section *Pandanus*. Its closest relative is *P. Whitei* Martelli, of Queensland, which has the leaves more than 1.5 m long, 8 cm wide; phalanges 7–7.3 cm long, 6–6.5 cm wide; central apical sinuses 3–5 mm deep, zigzag and adjacent carpels strongly mortised. In contrast, *P. orbicularis* has the leaves 1.1–1.3 m long, 5.5–5.6 cm wide; phalanges 5.4–6.5 cm long, 5.4–6.5 cm wide; central apical sinuses 5–8 mm deep, and gently curved or slightly sinuous.

The new epithet is the Latin adjective *orbicularis*, orbicular, given in reference to the nearly orbicular phalanges of this species.

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

**DIAGNOSIS HOLOTYPUS**: Arbor 10 m alta 2 dm diametro, trunco cum radicillis adspresse ascendentiis obrecto, radicibus fulturosis nullis, foliis 1.75–1.83 m longis 8 cm latis coriaceis in quoque latere cum 71 nervis secundariis in sectione depresse M-formatis gladiiformatis ex basi in apice licet subulato sensim diminuentibus, basi amplexicaulis et inermi sed ex 12–14 cm marginibus cum aculeis 3–4 mm longis 5–9 mm distantibus valide arcuate subulati adspendentibus in apice brunneo, midnervo affini inermi, in sectione mediali marginibus cum subulato-sterris 1–1.5 mm longis 3–8 mm distantibus, midnervo infra cum aculeis 1.5–2 mm longis 6–18 mm distantibus graciliter subulati adspresse adspendentibus, circa apicem marginibus et midnervo infra cum sterris 0.2–0.4 mm longis 1.5–3 mm distantibus, phalangibus 4.3–4.8 cm longis 2.3–2.9 cm latis 2.1–2.4 cm crassi late cuneatis parte ½ supera libera apice truncato (vel minime convexo) suturis lateralisibus dis-
FIG. 118. *Pandanus orbicularis* St. John, holotype. *a*, Phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apex with stigma and proximal sinus, × 4; *e*, leaf base, lower side, × 1; *f*, leaf middle, lower side, × 1; *g*, leaf apex, lower side, × 1.
tinctis sed angustis, lateribus densiter minute papillosis cum 4-7 angulis majoribus et carpella quaque cum 3-10 dorsis et valleculis secundariis angustis, sinibus centralibus apicalibus 5-12 mm profundis anguste V-formatis, carpellis 5-7 apicibus pyramidalibus eis marginalibus omnibus truncatis, stigmatibus 1.5-2 mm longis distalis obliquis centripetalibus ovatis vel deltoideis sulcatis nigris, sinibus proximalibus vel in dorso ½ ad fondam vel in vallecula tota ad fondam extensis, endocarpi mediali 3-3.3 cm longo osseo obscure brunneo lateribus lateralis 2 mm crassis, seminibus 20-25 mm longis 4 mm diametro fusiformibus, mesocarpi supero in apice carpella quale cavernoso cum fibris fortibus paucis et membranis albis medullosis multis, mesocarpi basali fibrosi et carnosi. 

**DIAGNOSIS OF HOLOTYPE:** Tree 10 m tall, 2 dm in diameter; trunk covered with appressed rootlets; prop roots none; leaves 1.75-1.83 m long, 8 cm wide, coriaceous, on each side with 71 secondary parallel nerves, in section low M-shaped, sword-shaped, tapering gradually from the base to the apparently subulate apex, the base amplexicaul and unarmed, but beginning 12-14 cm up the margins with prickles 3-4 mm long 5-9 mm apart, stout subulate arcuate ascending, brown-tipped; the nearby midrib unarmed; at midsection the margins with prickles 1.5-2 mm long, 6-18 mm apart, slender subulate, appressed ascending; near the tip the margins and midrib below with serrae 0.2-0.4 mm long, 1.5-3 mm apart; phalanges 4.3-4.8 cm long, 2.3-2.9 cm wide, 2.1-2.4 cm thick, broad cuneate, upper ½ free, apex truncate (or very low convex), lateral sutures distinct narrow cracks, the sides closely and minutely papillose, with 4-7 principal angles and on each carpel with 3-10 sharp secondary ridges and valleys, apical central sinuses 5-12 mm deep, narrow V-shaped; carpels 5-7, their apices pyramidal, and all the marginal ones with an apical horizontal or slightly oblique truncate plane, then on the distal face is the oblique, centripetal stigma 1.5-2 mm long, ovate to deltoid, creased, black; proximal crease if on a ridge running ½ way, if in a valley running quite to the valley bottom; endocarp median, 3-3.3 cm long, bony, dark brown, the lateral walls 2 mm thick; seeds 20-25 mm long, 4 mm in diameter, fusiform; apical mesocarp cavernous in each carpel, with a few strong fibers and many white medullary membranes; basal mesocarp fibrous and fleshy.

**HOLOTYPUS:** Australia, North Queensland, 9 miles w.s.w. of junction of McIvor and Morgan Rivers, fringing forest along swampy creek, with *Dillenia, Cassia, Planchonella*, 100 ft. alt., Feb. 1, 1958, H. St. John 26,249 (BISH).

**DISCUSSION:** *P. papillosus* is a member of the section *Pandanus*. Its closest relative is *P. ferrimontanus* St. John, of Queensland. The latter has the leaves 5.8 cm wide; phalanges 4.2 cm wide, 3.4-3.5 cm thick, the apex rounded; central apical sinuses 3.5-4.5 mm deep; carpels 8-12, and their apices semiobtuse. *P. papillosus* has leaves 8 cm wide; phalanges 2.3-2.9 cm wide, 2.1-2.4 cm thick, the apex truncate; central apical sinuses 5-12 mm deep; carpels 6-8, and their apices conic.

The new epithet is the Latin adjective *papillosus*, with papillae, in reference to the papillose surface of the phalanges.

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

**DIAGNOSIS HOLOTYPI:** Arbor 7 m alta 2 dm diametro, corona vadosa lata 2 dm aperto, coriice cum radicillis multis adpresse adscendentibus, radicibus fulturosis nullis, foliis 1.5 m longis 7 cm latis coriaceis in sectione depresse M-formatis in quoque latere cum 63-65 nervis secundariis, gladiformatis in apice subulato diminuentibus basi amplexicauli inermi marginibus et midnervo infra tota inermibus, infrascientia foeminea 5 dm longa, syncarpio ½ maturo 18 cm longo subgloboso, phalangibus 5.7-6.5 cm longis 4-5 cm latis 3.7-4.3 cm crassis late ellipsoideis 4-6-angulosis in sicco brunneis sed pauce rubris, lateribus subcurvatis papillosis rugosis exlucidis parte ½ supera libera, apice depressa convexo, suturis lateribus distinctis sed angustis, sinibus centralibus apicalibus 4-7 mm profundis V-formatis angulosos et interobseratis, carpellis 9-12 apicibus subaequalibus eis centralibus lanceoloides vel lanceo-ovoideis acute angulosus lateribus cum 3-7 dorsis et valleculis longitudinalibus angustis, apicibus mar-
Fig. 119. *Pandanus papillosus* St. John, holotype. *a*, phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apex, stigma, and proximal sinus, oblique view, × 4; *e*, leaf base, lower side, × 1; *f*, leaf middle, lower side, × 1; *g*, leaf apex, lower side, × 1.
FIG. 120. *Pandanus pluriangulatus* St. John, holotype. *a,* Typical phalange, lateral view, × 1; *b,* phalange, longitudinal median section, × 1; *c,* typical phalange, apical view, × 1; *d,* carpel apex, stigma, and proximal sinus, × 4; *e,* one of the few broader phalanges, lateral view, × 1; *f,* carpel apex of *e,* × 4; *g,* leaf base, lower side, × 1; *h,* leaf middle, lower side, × 1; *i,* leaf apex, lower side, × 1.
ginalibus lanceo-ovoideis vel semiorybiculari-
pyramidalibus et multis a latere compressis et
subdivergentibus, enim phalangibus paucis cum
apicibus carpellarum oblate-pyramidalibus, stig-
matibus 2–3.5 mm longis ellipsoideis sulcatis,
eis marginalis plerumque obliquis truncatis cen-
tripetalibus apicalibus vel in aliquid marginali-
bus subapicalibus et distalibus regionis truncatae
vel convexae, sinibus proximalibus 

bony, slightly inframedian, mahogany-colored,
the inner surfaces shining, the lateral walls 5–7
mm thick; seeds 22 mm long, 5.5 mm in diam-
eter, ellipsoid, upper mesocarp forming in the
apex of each carpel a cavern with strong fibers
and delicate, pale, medullary membranes; basal
mesocarp thin, fibrous and fleshy.

**HOLOTYPUS:** Australia, North Queensland,
9.3 miles n. of Mossman, open forest near sea
beach, with *Terminalia, Acacia aulaeocarpa,
Hibiscus tiliaceus*, Feb. 5, 1958, H. St. John
26262 (BISH).

Also observed by the writer on the same ex-
pedition, in open forest near the sea shore, Port
Douglas, Queensland.

**DISCUSSION:** *P. pluriangulatus* is a member
of the section *Pandanus*. In that section is its
closest relative, *P. angulatus* St. John, of Queens-
land, which has its leaves with the margins near
the base with prickles 2.8–3.5 mm long, 8–14
mm apart, slender subulate; near the tip the
midrib below with serrae 0.2 mm long, 5–8 mm
apart; phalanges 5–5.6 cm long, 4.7–6.1 cm
broad, yellow-orange, lateral sutures deep, apical
central sinuses 7–12 mm deep; and the seeds 3
mm in diameter. *P. pluriangulatus* has the leaves
unarmed throughout; phalanges 5.7–6.5 cm
long, 4–5 cm wide, when dried reddish brown,
lateral sutures distinct but narrow, apical cen-
tral sinuses 4–7 mm deep; and the seeds 5.5
mm in diameter. For comparison with the few
phalanges with low, broad carpel apices, the
most similar species is *P. endeavournensis* St.
John, of Queensland, which has the leaves
sparsely prickly; phalanges 5–5.8 cm long, cen-
tral apical sinuses 2–4 mm deep; and the stig-
mas 1–1.5 mm long. *P. pluriangulatus* has the
leaves wholly unarmed; phalanges 5.7–6.5 cm
long, central apical sinuses 4–7 mm deep; and
the stigmas 2–3.5 mm long.

The new epithet is from the Latin *pluris*, of
many; *angulatus*, angled, in reference to the
numerous, prominent, lateral angles of the phal-
anges.

**Pandanus punctatus** sp. nov. (sect. *Pandanus*)
Figs. 121, 122, 116d, 123a

**DIAGNOSIS HOLOTYPi:** Arbor 17 m alta 25
cm diametro, cortice cum radicillis adpressae ad-
scendentibus obtecro, radicibus fulturosis 5–10 dm longis 1–3 cm diametro muricatis, foliis 2.2–2.33 m longis 10–12 cm latis coriaceis in sectio M-formatis in sectione mediali in quoque latere cum 78–82 nervis secundariis ligulatis sensim ex basi in apice longe subulato diminuuntibus eo in puncto 10 cm ex apice 1 mm lato basi amplexicauli inermi sed ex 15–40 cm marginibus inaequaliter cum aculeis 2–3 mm longis 3–15 mm distantis adscendentibus subulatis arcuatis apice bruneo, midnervo inermi, in sectione mediali marginibus cum aculeis 2.5–3.5 mm longis 4–8 mm distantis simulabantibus ad adpressae adscendentibus, midnervo infra cum aculeis 1.5–2 mm longis 15–45 mm distantis simulabantibus adpressis, proxima apicem marginibus cum aculeis 0.3–0.7 mm longis 2–4 mm distantis simulabantis adscendentibus vel subadpressae brunneis, midnervo inermi, inflorescentiis foemineis terminalibus, pedunculo 25 cm longo 15 mm crasso subdeltoideo folioso, syncarpio terminali 25 cm longo 20 cm diametro ovoideo, phalangibus 5.8–6.2 cm longis 3.2–4.2 cm latis 2.6–3.1 cm crasso sububris oblongo-ovoideis lateribus papillosis in sicco rubro-mahogany-coloratis apice pallide subviridibus lateribus 4–6-angulosis et carpella quaque cum 2–6 angulis et valleculis parvis et interobsoletatis parte ½ supera libera apica valde plano-truncato suturis lateralius angustis sed ad basilin distinctis, sini- bus apicalibus centralibus 3–6 mm profundis angustis, carpellis 8–10 apicibus plerunque sub- truncatis et eis marginalis valde truncatis et cum concavius apicali et stigmatic apici apicibus cum angulis pluribus supra rotundatis infra prominentibus et interobsoletatis, apicibus centralibus pyramidalius cum concavius minori- bus vel nullis, stigmatibus 1.5–2 mm latis cor- datis vel subcircularibus apice saepe truncato papillosis nigris sulcatis obliquis centripetalibus, sini- bus proximalibus ½ ad fondam extensis, endocarpio mahogani-colorato osseo solo 3.2 cm longo lateribus lateralius 3–4 mm crassiss, seminibus 15 mm longis 4 mm diametro ellip- soideo, mesocarpio apicali in carpella qualque cum cavana cum membranis medullosis, meso- carpio basali fibroso et carnoso.

**DESCRIPTION OF ALL SPECIMENS EXAMINED:** Tree 13–17 m tall, 20–25 cm in diameter, erect; bark covered with appressed ascending rootlets; prop roots absent or 5–10 dm long and 1–3 cm in diameter, muricate; leaves 1.7–2.33 m long, 8.5–12 cm wide, sword-shaped, coriaceous, in cross section M-shaped, in middle part with 78– 82 secondary parallel veins on each side, gradually tapering to a long subulate apex, this 10 cm from the tip 1 mm wide, the base slightly widened and amplexicaul and unarmed, but begin- ning 15–40 cm up and at unequal distances the margins with prickles 2–3 mm long, 3–15 mm apart, ascending arcuate subulate, brown-tipped; the midrib below unarmed for 95–120 cm; near the midsection the margins with prickles 2.5–3.5 mm long, 4–8 mm apart, similar but appressed ascending, the midrib below with prickles 1.5–2 mm long, 15–45 mm apart, appressed, similar; near the tip the margins with teeth 0.3–0.7 mm long, 2–4 mm apart, subulate, ascending or subappressed, brown; the nearby midrib unarmed; pistillate inflorescences terminal; peduncle 25–60 cm long, 15 mm thick, slightly 3-sided, leafy bracted; syncarp solitary, terminal, 24–25 cm long 20 cm in diam- eter, ovoid; the core when dried 14 cm long, 4.5 cm in diameter, deltoid, bearing 117 phalan- langes 5.3–6.3 cm long, 2.6–4.2 cm wide, 2.3–3.2 cm thick, oblong-ovooid to oblance- oloid, compressed, the surface papillosate, when ripe the apices greenish yellow, the sides to the middle burnt Sienna, the lower half yellow, the sides when dry reddish-mahogany colored, the apex pale green, the sides 3–9-angled and each carpel with 2–6 low angles and shallow valleys and thus mortised with their neigh- bors, upper ½ free, apex conspicuously flat truncate, or in a few of the largest ones very slightly convex, lateral sutures narrow but dis- tinct to the base, apical central sinuses 2–6 mm deep, narrow; carpels 7–14, mostly 9, the apices rounded conic or mostly subtruncate, and the marginal ones markedly so with a prominent concavity (or plane) on the proximal side of which is the stigma, the apices with several an- gles ending in rounded shoulders, the angles prominent below and mortised with their neigh- bors, the central apices with smaller concavities or even none and pyramidal; stigmas 1–2 mm wide, cordate to subcircular to oblate reniform, the apex often truncate, papillosate, blackish,
FIG. 121. *Pandanus punctatus* St. John, holotype.  

- **a**, Phalange, lateral view, × 1;  
- **b**, phalange, longitudinal median section, × 1;  
- **c**, phalange, apical view, × 1;  
- **d**, occasional carpel apex with stigma lateral on the proximal sinus, × 4;  
- **e**, typical carpel apex with stigma and proximal sinus, × 4;  
- **f**, leaf base, lower side, × 1;  
- **g**, leaf middle, lower side, × 1;  
- **h**, leaf apex, lower side, × 1.
**FIG. 122.** *Pandanus punctatus* St. John, from *St. John 26,248*. 

- **a**, Staminal column with anthers, \( \times 10 \); 
- **b**, leaf base, lower side, \( \times 1 \); 
- **c**, leaf middle, lower side, \( \times 1 \); 
- **d**, leaf apex, lower side, \( \times 1 \).
Fig. 123. *a*, *Pandanus punctatus* St. John, holotype, young and mature pistillate inflorescence. *b*, *P. radiificerus* St. John, holotype, habitat and habit; *c*, trunk with adventitious ascending rootlets; *d*, young and mature syncarps, with foliage.
Fig. 124. *Pandanus radiciferus* St. John, holotype. *a*, phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apex, stigma, and proximal sinus, × 4; *e*, leaf base, lower side, × 1; *f*, leaf middle, lower side, × 1; *g*, leaf apex, lower side, × 1.
creased, centripetal, oblique; the proximal crease running about half way to the valley bottom; endocarp median or slightly inframedian, mahogany-colored, bony, massive, 2.5–3.2 cm long, the lateral margins 2–4 mm thick; seeds 13–15 mm long, 4 mm in diameter, ellipsoid; apical mesocarp forming in each carpel a cavern, these somewhat confluent and filled with white, medullary membranes; basal mesocarp fibrous and fleshy, the pulp fruity but astringent. Staminate trees appearing similar; staminate inflorescence 1.05 m long; peduncle 23 cm long, fleshy; lowest bracteal leaf (the one illustrated) 1.53 m long, 7 cm wide ½ from the base, narrowing to the base and tapering to the long subulate apex which 10 cm down is 1.2 mm wide; at midsection the margins with prickles 1.5–2 mm long, 2–8 mm apart, pale arcuate ascending, flattened subulate; the nearby midrib with similar prickles 1.3–1.5 mm long, 6–10 mm apart; near the apex the margins and midrib below with prickles 0.5–0.8 mm long, 2–7 mm apart, subulate, ascending, this bracteal one here described, as no true foliage one was preserved; floral part about 75 cm long, with 17–20 spikes, these 5–8 cm long, 2 cm in diameter, dense; staminal columns 12–18 mm long, with about 20 stamens, borne on the upper half; free filament tips 1–1.5 mm long; anthers 2.2–3.2 mm long, narrowly lanceoloid, bearing at the apex a subulate projection of the connective 0.7–0.9 mm long.

**DISCUSSION:** *P. punctatus* is a member of the section *Pandanus*. In that section its closest relative is *P. rivularis* St. John, of Queensland, a species which has prop roots none; leaves 1.68–1.81 m long, 6–7.6 cm wide, the apex acute and 10 cm down 16 mm wide, at midsection the margins with prickles 1–2 mm long, 6–13 mm apart; phalanges 5.1–5.3 cm long, the side of each carpel with 2–4 angles; apical central sinuses 4–7 mm deep; and the endocarp with lateral walls 4–6 mm thick. *P. punctatus* has prop roots 5–10 dm long, 1–3 cm in diameter, or none; leaves 1.7–2.53 m long, 8.5–12 cm wide, the apex long subulate and 10 cm down 1 mm wide, at midsection the margins with prickles 2.5–3.5 mm long, 4–8 mm apart; phalanges 5.3–6.3 cm long, the side of each carpel with 2–6 angles; apical central sinuses 3–6 mm deep; and the endocarp with, lateral walls 2–4 mm thick.

The new epithet is the Latin adjective *punctatus*, with points or dots, given in reference to the roughened surface of the sides of the phalanges.

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

*Figs. 124, 125, 123b–d, 126a, b*

**DIAGNOSIS HOLOTYPI:** Arbor 13 m alta 20 cm diametro, corona late ellipsoidea, cortice ex radicillis 2–3 cm longis adpressae adscendentibus plerunque furcatis clausi, radicibus fulturosis nullis, foliis 1.6–2.1 m longis 7.5–8 cm latis coriaceis in sectione mediali cum 74 nervis secundaris in quaque latere, gladiformatis et ex basi in apice subulato 40 cm longo diminuendibus eo in puncto 10 cm ex apice 1.3 mm lato, basi amplexicauli et inermi sed ex 16–32 cm marginibus cum aculeis 1.5–2 mm longis 4–10 mm distantiis subulatis arcuatibus adscendentibus brunneis, midnervo infra inermi in parte ¾ infera, in sectione mediali uno margine cum aculeis 2–2.3 mm longis 4–9 mm distantiis simulantibus sed gracilibus et adpressae adscendentibus brunneis, basi amplificaux et inermi sed ex 16–32 cm marginibus cum aculeis 1.5–2 mm longis 4–10 mm distantiis subulatis arcuatibus adscendentibus brunneis, midnervo infra inermi in parte ¾ infera, in sectione mediali uno margine cum aculeis 2–2.3 mm longis 4–9 mm distantiis simulantibus sed gracilibus et adpressae adscendentibus brunneis, basi amplificaux et inermi sed margine altero inermi vel subinermi, proxima apicem marginibus et midnervo infra cum aculeis 0.3–0.4 mm longis 3–5 mm distantiis subulatis adscendentibus brunneis, inflorescentia foeminea terminali, pedunculo 27 cm longo 15–20 mm diametro trigono folioso, syncarpio solitario 20–30 cm diametro globoso cum 127 phalangibus eis 4.4–4.7 cm longis 1.6–2.5 cm latis 1.6–2.1 cm crassis oblanceolateis apice truncato 5–6-angulosius quando submaturis apicibus viridibus lateribus...
FIG. 125. *Pandanus radiciferus* St. John, from *St. John 26,253*. a, Staminate column with anthers, × 10; b, leaf base, lower side, × 1; c, leaf middle, lower side, × 1; d, leaf apex, lower side, × 1.
Fig. 126. a, Pandanus radiciferus St. John, staminate tree, habit from St. John 26,255, with S. Ernest Stevens; b, staminate inflorescence and foliage of same. c, P. stoloniferus St. John, from St. John 26,273, habit, with S. T. Blake; d, trunk with scorched bark.
exponitis cinnamoni-coloratis papillosis sed sublucidis gradatim convexis parte \( \frac{1}{2} \) supera libera, suturis lateralis in parte \( \frac{1}{2} - \frac{3}{4} \) supera distinctis, sinibus centralibus apicilibus 2–5 mm profundis V-formatis, carpellis 5–10 plerunque 8–9 (sed in geminis 14–21 et phalangio 2.8–4.1 cm lato), apicibus ovoideis cum concavitate vel plana terminali lucido, stigmatibus 1–2 mm longis ellipticis vel obovatis sulcatis apice sape truncato obliquis proximis, sinibus proximalibus \( \frac{1}{2} \) vel tota ad fondam extensis, endocarpio mediiali 18–20 mm longo osseoso obscure brunneo lateribus 1–2 mm crassis, seminibus 15 mm longis 3 mm diametro ellipsoides, mesocarpio supero in carpe Ia quoque cavernam cum fibris marginalibus et membranis pallidis medullosis formantium, mesocarpio basali fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED:

Tree 13 m tall, 20 cm in diameter; crown broadly ellipsoid, of few branches; bark concealed by abundant, appressed ascending rootlets, these often forked, 2–3 cm long; prop roots absent or present and 2–4 dm long, 2–4 cm in diameter, muricate; leaves 1.6–2.1 m long, 7–8 cm wide, coriaceous, at midsection with 59–74 secondary veins on each side, swordlike, tapering from the base to the 40 cm subulate apex, this at the point 10 cm down 1.3 mm wide, the base amplexicaul and unarmed, but beginning 16–32 cm up the margins with prickles 1.5–2 mm long, 4–10 mm apart, stout subulate, arcuate ascending, brown; the midrib below unarmed for the lower \( \frac{1}{2} \) s; at midsection the margins with prickles on one side 2–2.3 mm long, 4–9 mm apart, similar but slender and appressed ascending, and pale at base, but on the other margin few or none; near the apex the margins and midrib below with prickles 0.3–0.4 mm long, 3–5 mm apart, subulate, ascending, brown; pistillate inflorescence terminal; peduncle 27 cm long, 15–20 mm in diameter, trigonoons, leafy bracted; syncarp solitary, 20–30 cm in diameter, globose, or subglobose and 14 cm long, 13 cm in diameter, bearing 90–127 phalanges, these 4.4–4.7 cm long, 1.6–2.9 cm wide, 1.6–2.7 cm thick, oblongeloid with the apex truncate, 5–6-angled, when slightly immature the apices green, the exposed sides cinnamon, papillose but almost shiny, gently convex, upper \( \frac{1}{2} \) free, lateral sutures distinct down \( \frac{1}{2} - \frac{3}{4} \) way, central apical sinsuses 2–5 mm deep, V-shaped; carpels 5–10, mostly 8–9 (but in doubles 14–21, and the phalanges 2.8–4.1 cm wide), the apices ovoid, with shallow, shining concavity or plane on the apex, distal of the stigma; stigmas 1–2 mm long, elliptic to obovate, creased, the apex often truncate, very oblique, on the proximal face of the carpel apex; proximal sinus wide, running half to all the way to the valley bottom; endocarp median, 18–20 mm long, bony, dark brown, the outer lateral walls 1–2 mm thick; seeds 15 mm long, 3 mm in diameter, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern outlined by fibers, crossed by delicate, pale, medullary membranes; basal mesocarp fibrous and fleshy. Staminate trees (no. 26,255) 10 m tall, 20 cm in diameter; prop roots none, but with a few spiny drop roots; at midsection the leaves with prickles 2–3 mm long, 5–13 mm apart on both margins; stamine inflorescences terminal, nodding, 60 cm long; peduncle 10 cm long, fleshy, leafy bracted; lowest floral bract 96 cm long, 6 cm wide, the lower fifth elliptic, white, mostly unarmed, the upper part swordlike, the margins and midrib below prickly, the apex long subulate; floral bracts white, the median one 30 cm long, 4 cm wide, chartaceous below, lanceolate, the exposed parts having on margins and midrib below prickles 0.5–1 mm long, simple or double; flowering spikes 20–25, crowded, 5–8 cm long, 2–2.5 cm in diameter, dense; staminal clusters 10–16 mm long, the naked base of the column longer than the tip; free filament tips 0.6–1.3 mm long; the anthers 1.8–2.4 mm long, linear-lanceolate, tipped by a subulate prolongation of the connective 0.6–0.8 mm long.

HOLOTYPUS: Australia, North Queensland, Black Mountain Road, junction with Morgan Smith Lookout Road, open forest by creek, with Casuarina litoralis, Eucalyptus tereticornis, 1,300 ft. alt., Feb. 4, 1958, H. St. John 26,256 (BISH).

SPECIMENS EXAMINED: Australia, North Queensland, same locality and date, fringing forest, stamine tree, H. St. John 26,255 (BISH); Quarantine Bay, top of granite boulder beach, with Cerbera Mangha, Calophyllum Inophyllum, Feb. 1, 1958, H. St. John 26,244 (BISH); and ditto, stamine, H. St. John 26,245 (BISH);
FIG. 127. Pandanus sinuvadosus St. John, holotype. a, Phalange, lateral view, × 1; b, phalange, longitudinal median section, × 1; c, phalange, apical view, × 1; d, carpel apex, apical view, × 4; e, leaf base, lower side, × 1; f, leaf middle, lower side, × 1; g, leaf apex, lower side, × 1; h, occasional phalange with low conic carpel apices, lateral view, × 1.
Archer Point, 8 miles s.e. of Cooktown, fringing forest by stream, with Melaleuca, Eucalyptus leptophlebus, E. intermedia, Tristania suaveolens, Feb. 1, 1958, H. St. John 26,246 (BISH).

DISCUSSION: P. radiciferus is a member of the section Pandanus. Its closest relative, P. punctatus St. John, of Queensland, has the leaves 2.2-2.3 m long, 8.5-12 cm wide, the lower margins with prickles 2-3 mm long, 3-15 mm apart, and the midrib below prickly at the midsection; syncarp ovoid; phalanges 5.3-6.3 cm long, 2.6-4.2 cm wide; endocarp 2.5-3.2 cm long, the lateral walls 2-4 mm thick; and the anthers 2.2-3.2 mm long. On the other hand P. radiciferus has the leaves 1.6-2.1 m long, 7-8 cm wide, the lower margins with prickles 1.5-2 mm long, 4-10 mm apart, the midrib below unarmed for the lower 6-11 cm; syncarp globose or subglobose; phalanges 4.4-4.7 cm long, 1.6-2.9 cm wide; endocarp 1.8-2 cm long, the lateral walls 1-2 mm thick; and the anthers 1.8-2.4 mm long.

The new epithet is from the Latin radix, root, ferre, to produce, because of the conspicuous production of rootlets which blanket the bark of the trunk.

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

Fig. 127

DIAGNOSIS HOLOTIPI: Arbor 8 m alta 18 cm diametro, cortice verrucoso, radicibus fulvosis 1 m longis 3 cm diametro verrucosum, foliis 1.2 m longis 6 cm latis coriaceis in sectione depressa sinuosus M-formatis in sectione mediiali cum 55 nervis secundaribus in quoque laterete, basi amplexicaulis inermi sed ex 6-11 cm marginibus cum aculeis 1.7-3 mm longis 3-8 mm distantiis subulatis adscendentibus brunneoapicalibus, midnervo infra ex 11-15 cm aculeis simulantis arcuatis adscendentibus 11-30 mm distantiis in sectione mediiali marginibus cum aculeis 2-2.5 mm longis 4-10 mm distantiis proxime adpresso adscendentibus, circa apicem marginibus et midnervo infra cum serris 0.5 mm longis 3-8 mm distantiis adpressis, syncarpio inviso, phalangibus 3.7-4.6 cm longis 2.9-4.1 cm latis 2.4-3.1 cm crassis in sicco brunneis late tubinatis compressis lateribus laevibus lucidis subconvexis 5-6-angulosis parte ½ supera libera suturis lateralibus nullis, sinibus centralibus apicalibus 0-0.9 mm profundis plerumque olim tessellatis, carpellis 8-15 apicibus inaequalibus eis marginalibus duplo majoribus plerumque et semper in majoribus apicibus olim subconvexis et aegre distinctis, stigmatibus 1-1.5 mm longis ellipticis sulcatis obliquis centripetalibus, sinibus proximalibus ½/2 ad fondam extensis, endocarpio paene supramediali osseo intrà lucido lateribus lateralibus 4-5 mm crassis, seminis 9-10 mm longis 4 mm diametro late ellipsoideis, mesocarpio supero in apice carpellae quaeque late cavernoso cum fibrís longitudinalibus et membranis albis medullois, mesocarpio basali fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 3–8 m tall, 18 cm in diameter; bark warty, gray; prop roots 1 m long, 3 cm in diameter, warty; leaves 1.2 m long, 6 cm wide, coriaceous, at midsection with 55 secondary veins on each side, in section depressed, sinuous M-shaped, the base amplexicaul, unarmed, but beginning at 6-11 cm the margins with prickles 1.7-3 mm long, 3-8 mm apart, subulate, ascending, brown-tipped; the midrib below beginning at 11-15 cm with similar arcuate ascending prickles 11-30 mm apart; at midsection the margins with prickles 2.2-3.5 mm long, 4-10 mm apart, closely appressed ascending; near the subulate apex the margins and midrib below with appressed sereae 0.5 mm long, 3-8 mm apart; peduncle short, erect; syncarp 23-30 cm long, 13-15 cm in diameter, ellipsoid-oblong; phalanges 3.7-4.6 cm long, 2.9-4.1 cm wide, 2.4-3.1 cm thick, when dried brown, broadly turbinate, compressed, yellowish above, below orange, the sides smooth, shining, gently convex, 5-6-angled, upper ½ free; lateral sutures none; central apical sinuses from 0.9 mm deep, usually merely a brown tessellate ruling but on some with low conic apices the sinuses perceptibly deep; carpels 8-15, the apices unequal, the marginal ones about twice as large as the inner ones, commonly and on all the large ones the apices only slightly convex, their profile scarcely distinguishable from that of the convex phalange apex, a few phalanges with the carpell apices depressed conic and the central sinuses almost 1 mm deep; stigmas 1-1.5 mm long, elliptic, creased, oblique, centripetal; proximal sinus...
FIG. 128. *Pandanus stoloniferus* St. John, holotype. *a*, Phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, phalange, median transverse section, × 1; *e*, carpel apex, stigma, and proximal sinus, oblique view, × 4.
running ⅓–⅓ way to valley bottom; endocarp slightly supramedian, bony, brown, the inner surfaces shining, the lateral walls 4–5 mm thick; seeds 9–10 mm long, 4 mm in diameter, broad ellipsoid; upper mesocarp forming in the apex of each carpel a short, broad cavern with longitudinal fibers and white, glistening medullary membranes; basal mesocarp fibrous and fleshy. 

HOLOTYPUS: Australia, North Queensland, Green Island, off Cairns, forest on coral sand, Feb. 9, 1958, H. St. John 26,268 (BISH).


DISCUSSION: P. sinuvadosus is a member of the section Pandanus. In that section is its closest relative, P. tectorius Soland. var. timorensis Martelli, of Timor Island, which has the phalanges almost truncate, the central apical sinuses apparently 2 mm deep; carpel apices subequal; stigmas broad reniform; and the endocarp slightly submedian. P. sinuvadosus has the phalanges markedly convex at apex, the central apical sinuses too shallow to measure; carpel apices unequal, the marginal ones twice the larger; stigmas elliptic; and the endocarp slightly supramedian.

The new epithet is from the Latin sinus, sinus, vadosus, shallow, in description of the very shallow central apical sinuses of the phalanges. 

Pandanus stoloniferus sp. nov. (sect. Pandanus) 

Figs. 128, 129, 130, d, 132c, d, 132c, d, 132a

DIAGNOSIS HOLOTYPE: Arbor 7 m alta 15 cm diametro erecta gracilis in 3 m ex terra furcatus paucis ramosis, cortex pallide brunneo et cum radicibus 3–8 mm longis remotis adpressis adscendentibus, radicibus fultisiosum 5 dm longis 3 cm diametro sparse muriculatis, foliis 1–1.89 m longis 5.2–6.2 cm latis coriaceis in sectione mediali cum 65 nervis secundariis in quoque latere, sensim ex basi in apice subulato diminuuntibus eo in puncto 10 cm ex apice 6–7 mm lato, basi amplexicauli inermi, sed ex 12.5–14 cm marginibus cum aculeis 2.5–3.5 mm longis 7–15 mm distantis subulatis rectis vel arculatis adscendentibus apice rubro, midnervo toto inermi, in sectione mediali marginibus cum aculeis 2–2.5 mm longis 11–21 mm distantis subulatis gracilibus subulatis adscendentibus adpressioribus, tertia supra et apice cum marginibus inermibus, pedunculo 15–25 cm longo terminali folioso, syncarpio solitario 20–25 cm longo 17.5–20 cm diametro ovoideo incarnato 39–50 phalangibus ferrentibus eis 5.7–6.5 cm longis 5.2–7.5 cm latis 4–6.7 cm crassis late obovoideis quadratis 4–6 angulis, lateribus papillosis et punctatis sublucidis parte ⅓ supra libera, apice depresso-convexo, suturis lateralis distinctis ⅓–⅓ distantia, lateribus distalibus carpellarum marginalorum cum 2–6 angulis et valleculis, sinibus centralibus apicalibus 4–6 mm profundis late V-formatis, carpellis 12–15 apicibus pyramidaliis vel marginalibus obo-latypyramidaliis, stigmatibus 2.5–4 mm longis subcircularibus ad ellipticos bruneis sulcatis obliquis centripetalibus, sinibus proximalibus ⅓ vel tota ad fondam extentibus, endocarpio minime submediali solido 3.5 m longo osseo mahogani-colorato paginis interioribus lucidis marginibus lateralis 7–10 cm crassis, seminibus 20–25 mm longis 7–8 mm diametro ellipsoido, mesocarpio apicali in carpella quaque caverno parte fibris et membranis medulloso, mesocarpio basali parvo sed fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 7–12 m tall, 15–20 cm in diameter, erect, slender, first forking 3 m from the ground, few branched and the obovoid crown sparse; bark pale brown (when not blackened by the annual bush fires), with remote, appressed ascending rootlets 3–8 mm long; prop roots 5 dm long, 3 cm in diameter, sparsely muriculate; leaves 1–1.89 m long, 5.2–6.2 cm wide, coriaceous, at midsection with 65 secondary veins on each side, gradually tapering from the base to the subulate apex which 10 cm down is 6–7 mm wide, the very base amplexicaul and unarmed for 12.5–14 cm, then the margins with prickles 2.5–3.5 mm long, 7–15 mm apart, subulate, straight or arculate, ascending, red-tipped; the midrib unarmed throughout; at midsection the margins with prickles 2–2.5 mm long, 11–21 mm apart, slender subulate, ascending, closely appressed, the upper third and apex of the leaf with the margins unarmed; peduncle 15–25 cm long, terminal, leafy; syncarp solitarius, 20–25 cm long, 17.5–20 cm in diameter, ovoid, vermilion, with 39–50 phalanges, these 5.7–6.5 cm
long, 5.2–7.5 cm wide, 4–6.7 cm thick, broadly obovoid, quadrate, 4–6-angled, with a broad median band about 2 cm wide of deep vermillion color, the rest pale vermillion, the sides papillose and punctate, a little shiny, upper 1/2 free, apex low convex, lateral sutures distinct 1/2–2/3 way, the outer side of each carpel with 2–6 prominent secondary ridges and valleys and hence mortised with the adjacent phalanges; central apical sinuses 4–6 mm deep, wide V-shaped; carpels 12–15, the apices pyramidal or the outer ones oblate pyramidal; stigmas 2.5–4 mm long, subcircular to elliptic, brown, creased, oblique, centripetal; proximal sinus running from half to all the way to the valley bottom; endocarp slightly submedian, massive, 3.5 cm long, bony, mahogany-colored, the inner surfaces polished, the lateral margins 7–10 mm thick; seeds 20–25 mm long, 7–8 mm in diameter, ellipsoid; apical mesocarp forming in each carpel a cavern with strong longitudinal fibers and white medullary membranes; basal mesocarp sparse, but fibrous and fleshy, the pulp with fruity odor, dry, mealy, the taste like that of a sweet potato then tardily slightly acrid. Staminate trees similar, but the leaves with the apex more slenderly long subulate, and 10 cm down only 2 mm wide, at the midsection the blade unarmed on one margin; in the upper third the midrib below with serrulations 0.2 mm long, 5–20 mm apart; staminate inflorescences terminal, cernuous, 70 cm long, with strong, sweet

Fig. 129. *Pandanus stoloniferus* St. John, a depauperate syncarp from holotypic tree. *a*, Phalange, lateral view, × 1; *b*, phalange, longitudinal median section, × 1; *c*, phalange, apical view, × 1; *d*, carpel apex, with stigma, and proximal sinus, oblique view, × 4.
FIG. 130. *Pandanus stoloniferus* St. John, from *St. John* 26.273. *a*, Bark with adventitious ascending rootlets, and bundle scars, × 1; *b*, leaf base, lower side, × 1; *c*, leaf middle, lower side, × 1; *d*, leaf apex, lower side, × 1.
*a*, Staminal column with anthers, $\times$ 10;  
*b*, leaf base, lower side, $\times$ 1;  
*c*, leaf middle, lower side, $\times$ 1;  
*d*, leaf apex, lower side, $\times$ 1.
Pandanus, 12. Queensland—St. John

FIG. 132a. Pandanus stoloniferus St. John, from St. John 26,275, showing buried stolon connecting mature staminate trees.

fragrance, and with many white bracts, the lower bracts foliaceous, the median ones 40 cm long, 3.4 cm wide, linear-lanceolate, long acuminate, the margins sparsely serrulate; the 18–20 spikes 5–7 cm long, 2 cm in diameter, dense; staminal columns 1–1.8 cm long, the lower half naked; free filament tips 1–1.5 mm long; anthers 3–4 mm long, linear-lanceoloid, beaked by the projecting, subulate apex of the connec­tive 0.5 mm long.

HOLOTYPE: Australia, North Queensland, 15 miles w. of Mareeba, deep sandy soil, scrubby open forest with Eucalyptus polycarpa, and Melaleuca nodosa, 1,290 ft. alt., Feb. 10, 1958, H. St. John 26,274A (BISH).

SPECIMENS EXAMINED: Australia, North Queensland, same locality and data, and from the type tree, but a depauperate syncarp, H. St. John 26,274 (BISH); same locality and data, but from a different tree, H. St. John 26,273 (BISH); same data, staminate tree, with underground stolons to other trees in the grove, H. St. John 26,275 (BISH).

DISCUSSION: P. stoloniferus is a member of the section Pandanus. It is closely related to another Queensland species, P. Whtiei Martelli, which has the leaves 8 cm wide, the margins in the lower third unarmed; phalanges 7–7.3 cm long, the apical central sinuses 3–5 mm deep; carpels 9–11; and the seeds 16–18 mm long, 3–5.5 mm in diameter. In contrast, P. stoloniferus has the leaves 5.2–6.2 cm wide, the margins near the base with prickles 2.5–3.5 mm long, 7–15 mm apart, subulate, red-tipped; phalanges 5.7–6.5 cm long, the apical central sinuses 4–6 mm deep; carpels 12–15; and the seeds 20–25 mm long, 7–8 mm in diameter.

There are evident differences between the pistillate and the staminate trees, in leaf shape, apex, and toothing. The staminate trees are stoloniferous and colony-forming. This character was not detected among the pistillate trees, and if these trees have stolons they must be at a much deeper level in the soil. None such were found.

One branch of the tree from which no. 26,274A was collected, was a lower, weak branch. From this branch was collected no. 26,274. This syncarp was only 9 cm long and 7 cm in diameter. All parts were like a smaller edition of the normal. The phalanges are 4.4–4.8 cm long, 4.3–4.9 cm wide, 3.8 cm thick. These details are not included in the description of the species, since they do not represent the normal. Though rarely so, the same type of depauperate heads with smaller phalanges has been found in a few other species. These smaller syncarps are produced on weak, lower branches, or more often as a secondary syncarp, lateral on the peduncle of the main and terminal syncarp. If collected without good data they could be the basis of a faulty classification.

The color of the ripe phalanges can be given in reference to the Royal Horticultural Society Color Chart, as follows: basal third, Saturn Red, (chart 13); middle band, Mandarin Red, (chart 17); the top, Brick Red, (chart 16). The new epithet is formed from the Latin stolo, a stolon, fero, to bear, with reference to the stoloniferous habit of the male trees, a very unusual growth habit in the genus.

Pandanus subinermis sp. nov. (sect. Pandanus)

DIAGNOSIS HOLOTYPI: Arbor 7–9 m alta 15 cm diametro pauciter furcata in corona aperta ellipsoida, cortice cum radicillis adipresse ad­scendentibus, radicibus fulturosis nullis, foliis 1.4–1.5 m longis 6.3–6.6 cm latis coriaceis in sectione mediiali cum 64 nervis secundariis in quoque latere, gladiiformibus in medio 4.3–4.5 cm latis ex basi in apice longe subulato gradatim diminuentibus eo in puncto 10 cm ex apice 3.5–4 mm lato, basi amplexicauli et inermi sed ex 20 cm marginibus cum aculeis 1–2.3 mm longis.
7–14 mm distantibus arcuato-subulatis adscendentibus toto brunneis vel cum apicibus luteis, midnervo toto inermi, marginibus per parte ⅔ ultima inermibus, pedunculo 35 cm longo ad apicem 2 cm diametro incrassatem obscure trigono folioso terminali, syncarpio solitario ca. 22 cm longo et 17 cm diametro ovoideo 35–40 phalangibus ferentibus centro ellipsoideo trigono in sicco multo contracto, phalangibus 5–5.7 cm longis 4–5.3 cm latis 2.7–4.5 cm crassis late obovoideis subcompressis 5–7-angulosus in sicco brunneo lateribus subconvexis sublaevibus parte ⅓ supera libera, apice alte convexo vel semiorbiculari suturis lateralibus enim ad mediam profundis et distinctis, sinibus centralibus apicibus 2.5–5 mm profundis in basi angustis, carpellis 9–15 plerumque 13 apicibus depresso rotundato-pyramidalis inferioribus subaequalibus vel minime minoribus, stigmatibus 1–2 mm longis suborbicularibus vel cordatis obscure brunneis papillosis obliquoribus centripetalibus sulcatis, sinu proximali tota vel fere ad fondam extento, endocarpio mediali 2.5 cm longo osseo obscure brunneo intra brunneo et lucido lateribus lateralibus 5–6 mm crassis, seminibus 16 mm longis 6 mm diametro ellipsoideis, mesocarpio apicali in carpella quaque cum fibris longitupinalibus fortibus et membranis albis medullosis, mesocarpio basali fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED:
Tree 7–9 m tall, 15 cm in diameter, loosely few forked into an open, ellipsoid crown; bark with appressed ascending rootlets; prop roots none; leaves 1.4–1.5 m long, 6.3–6.6 cm wide, at midsection with 64 secondary veins on each side, gradually tapering from the base to the long subulate tip, this at about 10 cm down only 3.5–4 mm wide, the very base amplexicaul and unarmed, but beginning 20 cm up the margins with prickles 1–2.3 mm long, 7–14 mm apart.
arcuate subulate, ascending, brownish throughout or with yellow tips; the midrib unarmed throughout; the margins for the outer $\frac{3}{4}$ unarmed; peduncle 35 cm long, increasing in width towards the apex which is 2 cm in diameter, obtusely trigonous, leafy bracted, terminal; syncarp solitary, about 22 cm long and 17 cm in diameter, ovoid with 35–40 phalanges; the core ellipsoid, trigonous, much shrunken on drying; phalanges 5–5.7 cm long, 4–5.3 cm wide, 2.7–4.5 cm thick, broadly obovoid, somewhat compressed, 5–7-angled, when dried brown, the sides gently convex, nearly smooth, upper $\frac{1}{2}$ free, the apex high convex to semiorbicular; lateral sutures distinct and deep at least down to the middle; central apical sinus 2.5–5 mm deep, the lower part narrow; carpels 9–15, mostly 13, the apices low rounded pyramidal, the inner ones subequal or slightly the smaller; stigmas 1–2 mm long, suborbicular to cordate, dark brown, papilllose, very oblique, centripetal, creased; proximal sinus running all or nearly all the way to the valley bottom; endocarp median, 2.5 cm long, bony, dark brown, the inner surfaces brown and shining, the outer lateral walls 5–6 mm thick; seeds 16 mm long, 6 mm in diameter, ellipsoid; apical mesocarp in each carpel cavernous with strong longitudinal fibers and white medullary membranes; basal mesocarp fibrous and fleshy. Staminate tree (no. 26,259) 7 m tall, 15 cm in diameter; leaves 52–75 cm long, 5–5.5 cm wide, coriaceous, gladiate, tapering from the base into the acute tip, this 10 cm down 11–15 mm wide, in section M-shaped, at midsection with 53 secondary parallel veins in each half, appearing unarmed, but actually near the base on one margin with prickles 0.9–1.2 mm long, 4–7 mm apart, subulate, brown, appressed ascending; midrib unarmed throughout; at the midsection almost unarmed; near the tip unarmed; staminate inflorescence terminal, 40–50 cm long; peduncle 10 cm long, bracts numerous, the outer foliaceous and acuminate, blending to the reduced, whitish lanceolate ones 10–20 cm long, 2–3 cm wide, that subend the spikes; lateral rhachises axillary, 5–7 cm long, densely flowered to the base; staminal columns numerous, crowded, 1.7–2.2 cm long, the lower half naked, the upper half bearing 25–28 racemose stamens, these with the free filament tip 1–2 mm long; anthers 4–6.5 mm long, linear, white, bipartite at base, at apex the subulate prolongation of the connective 0.7–1 mm long.

**HOLOTYPUS:** Australia, North Queensland, 6 miles s. of White Cliff Point, and 18 miles n. of Cairns, grove in savanna on granite boulder point, with *Eucalyptus tesselaris, Albizia procera,* and *Heteropogon triiceps,* 10–50 ft. alt., Feb. 5, 1958, H. St. John 26,258 (BISH).

**SPECIMENS EXAMINED:** Australia, North Queensland, same locality and data as above, staminate tree, H. St. John 26,259 (BISH).

**DISCUSSION:** *P. subinermis* is a member of the section *Pandanus.* Its close relative is *P. ferrimontanus* St. John, of Queensland, a species which has the leaves of the pistillate trees 5.8 cm wide, from the midsection to the tip the margins and midrib below prickly; phalanges 4.5–4.7 cm long, 3.4–3.5 cm wide; carpels 8–12,
FIG. 133. Pandanus subinermis St. John, holotype. a, Phalange, lateral view, × 1; b, phalange, longitudinal median section, × 1; c, phalange, apical view, × 1; d, carpel apex, stigma, and proximal sinus, oblique view, × 4; e, leaf base, lower side, × 1; f, leaf middle, lower side, × 1; g, leaf apex, lower side, × 1.
the apices with an oblique concavity distal of the stigma; endocarp stramineous; and the apical mesocarp 5–9 mm long. In contrast, *P. subinermis* has the leaves of the pistillate trees 6.3–6.6 cm wide, the midrib unarmed and the margins in the outer 2/3 unarmed; phalanges 5–5.7 cm long, 4–5.3 cm wide; carpels 9–15, mostly 13, the apices without concavity; endocarp dark brown; and the apical mesocarp 12–16 mm long.

The new epithet is the Latin adjective, *subinermis*, almost unarmed, in reference to the leaves which are almost unarmed.

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

Fig. 136

**DIAGNOSIS HOLOTYPI**: Arbor 8 m alta 20 cm diametro, cortice verruculoso, radicibus fulturosisis 1.5 m longis 4 cm diametro, foliis 1.2–1.4 m longis 6 cm latis coriaceis in sectione depresse M-formatis gladiformatis sensim ad apicem licet
Fig. 135. *Pandanus subinermis* St. John, staminate tree, from *St. John* 26,259. Staminal column with anthers, X 10.
Fig. 136. *Pandanus viridinsularis* St. John, holotype. 

- Panel 1, Basal phalange, lateral view, × 1; 
- Panel 2, same, apical view, × 1; 
- Panel 3, basal phalange, apical view, × 1; 
- Panel 4, typical middle or upper phalange, lateral view, × 1; 
- Panel 5, same, longitudinal median section, × 1; 
- Panel 6, carpel apex, stigma, and proximal sinus, oblique view, × 4; 
- Panel 7, leaf base, lower side, × 1; 
- Panel 8, leaf middle, lower side, × 1; 
- Panel 9, leaf apex, lower side, × 1; 
- Panel 10, secondary veins at midsection, lower side, × 4.
subulatum diminuentibus basi amplexicauli et inermi sed ex 5–6 cm marginibus cum aculeis 2.5–4 mm longis 3–13 mm distantibus arcuato-subulatis adscendentibus apice brunneo, midnerv infra ex 17 cm cum aculeis 2 mm longis 13–28 mm distantibus arcuato-subulatis inferioribus reflexis, in regioni mediæ marginibus cum serrulis 1 mm longis 5–40 mm distantibus, midnerv infra cum aculeis 1.3–1.8 mm longis 16–32 mm distantibus graciliter subulatis adpresse adscendentibus, circa apicem marginibus et midnerv infra cum serrulis 0.1 mm longis 2–4 mm distantibus, syncarpio viso, phalangiis 4.6–5.1 cm longis 2.3–3.2 cm latis 1.9–2.8 cm crassis eis mediâlibus et superius oblanceoloides (aliquis basalibus brevioribus, latioribus et late oblanceoloidis) 5–6-angulatis lateribus laevibus sublucidis convexis parte supera libera apice convexo, dimidia suturis lateralis ad medium distinctis, sinibus centralibus apicibus 3–5 mm profundis (in eis basalibus 2–4 mm) V-formatis gradatim curvatis, carpelliis 7–11 (in geminis 17, in triplo 30, et 4.3–6 cm latis) apicibus aequalibus vel subaequalibus lanceoloides, eis centralibus symmetricalibus, eis marginalibus asymmetricalibus et apicibus divergentibus (in basalibus apicibus ovoideis acutis), stigmatibus 1.5–2 mm longis ellipticis ad subcircularis brunneis sulcatis valde obliquis proximalibus centripetalibus, sinibus proximalibus profundis ½–¾ ad fondam extensis, endocarpii mediâli 17–18 mm longo obscure brunneo intra lucido lateribus 2–2.5 mm crassis, seminibus 11–13 mm longis 3.4–5.5 mm diametro ellipsoides, mesocarpium apicali in carpella quaque cavernam cum fibris paucis et membranis albis medullosis formant, mesocarpium basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 8 m tall, 20 cm in diameter; bark warty; prop roots 1.5 m long, 4 cm in diameter; leaves 1.2–1.4 m long, 6 cm wide, coriaceous, in section low M-shaped, swordlike, tapering gradually to the apparently subulate tip, the base amplexicaul and unarmed, but beginning 5–6 cm up the margins with prickles 2.5–4 mm long, 3–13 mm apart, arcuate subulate, ascending, brown-tipped; the midrib below beginning at 17 cm with prickles 2 mm long, 13–28 mm apart, arcuate subulate, the lower ones reflexed; at midsection the margins with serrulations 1 mm long, 5–40 mm apart; the nearby midrib below with prickles 1.3–1.8 mm long, 16–32 mm apart, slender subulate, appressed ascending; near the tip the margins and midrib below with serrulations 0.1 mm long, 2–4 mm apart; syncarp not seen; phalanges 4.6–5.1 cm long, 2.3–3.2 cm wide, 1.9–2.8 cm thick, the middle and upper ones oblancoioioid, (some of the basal ones shorter and broader, broadly oblancoioioid), 5–6-angled, the sides smooth and somewhat shiny, gently convex, upper ¼ free, the apex convex; about half of the lateral sutures perceptible half way down, but the other half invisible; central apical sinuses 3–5 mm deep (in the broad basal phalanges 2–4 mm), V-shaped, the sutures gently curving; carpels 7–11 (in a double 17, in a triple 30, and 4.3–6 cm wide), the apices equal or the central slightly smaller, lanceoloid, the central ones symmetric, the marginal ones asymmetric and the tips diverging, (in the basal phalanges the carpel apices ovoid, acute); stigmas 1.5–2 mm long, elliptic to subcircular, brown, creased, very oblique from apex down proximal side, centripetal; proximal sinus deep, running ½–¾ way to valley bottom; endocarp median, 17–18 mm long, dark brown, bony, the inner surfaces shining, the lateral walls 2–2.5 mm thick; seeds 11–13 mm long, 3.4–5.5 mm in diameter, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern with a few fibers and with white medullary membranes; basal mesocarp fibrous and fleshy.


DISCUSSION: P. viridinsularis is a member of the section Pandanus. Its closest relative is P. tectorius Soland. var. surigaensis Martelli, which has the phalanges with the upper ½ free, the apices of the central carpels pyramidal suborbicular, and those of the marginal ones erect; stigmas of marginal carpels horizontal. On the other hand, P. viridinsularis has the phalanges with the upper ¼ free, the apices of the central carpels lanceoloid, but of the marginal ones
FIG. 137. *Pandanus yorkensis* St. John, holotype. *a*, phalange, lateral view, $\times$ 1; *b*, phalange, longitudinal median section, $\times$ 1; *c*, phalange, apical view, $\times$ 1; *d*, carpel apex, stigma, and proximal sinus, apical view, $\times$ 4; *e*, leaf base, lower side, $\times$ 1; *f*, leaf middle, lower side, $\times$ 1; *g*, margin of leaf at midsection, $\times$ 4; *h*, leaf apex, lower side, $\times$ 1.
divergent; and the stigmas of all carpels oblique.

It is less closely related to the specimens from the Loyalty Islands illustrated by Martelli and merged by him with the Australian *P. pedunculatus* R. Br.

The new epithet is formed from the Latin words *viridis*, green, and *insularis*, of the island, in allusion to its type locality on Green Island.

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

Figs. 137, 138b

**DIAGNOSIS HOLOTYPi:** Arbor 5–8 m alta valde remoteque ramosa, trunco ramisque cum umbonibus brevibus sparse armatis, foliis 117 cm longis 6.7 cm latis subcoriaceis glaucis gladiiformatis ex basi in apice longiter subulata diminiuentibus, in puncto 10 cm ex apice 4 mm latis, basi inermi sed ex 4.5–5.5 cm marginibus cum aculeis 1.5–3 mm longis 3–7 mm distantibus crassiter subulatis luteis adscendentibus basi arcuata, midnervo infra inermi sed in puncto 20 cm ex basi cum aculeis 1.5 mm longis remotis adpressi-adscendentibus, in sectio medi-alis marginibus in uno latere inermi sed in altero cum aculeis 2 mm longis 11–32 mm distantibus, midnervo inermi, in parte apicale marginibus

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**Fig. 138a. Pandanus subinermis** St. John, from St. John 26,259, staminate inflorescence.

**Fig. 138b. Pandanus yorkensis** St. John, holotype, syncarp.
Fig. 139A. *a*, *Pandanus citraceus* St. John, holotype, trunk, leafy branch with syncarp in flower, and an old one with the phalanges shed from the core; *b*, tree habit, with S. T. Blake; *c*, trunk with appressed ascending adventitious rootlets. *d*, *P. orbicularis* St. John, holotype, tree habit, with S. T. Blake.
cum serris 0.2–0.3 mm longis 5–20 mm distantibus, midnervo inermi, pedunculo 15 cm longo sparse folioso-bracteato, syncarpio terminali solitario 15 cm longo 12 cm diametro late ovoideo triangulato cum circa 50 phalangibus eis 4.2–4.5 cm longis 3.1–4.9 cm latis 2.4–3 cm crassis late cuneiformibus 5–7-angulatis in sicco bruneis, lateribus laevibus lucidisque cum planis vel lateribus subcurvatis pluribus, in parte ¼ supera libera, apice late rotundato, suturis lateraliibus angustis sed in quarto supero distinctis et rarer infra, sinibus centralibus apicalibus 6.5–8 mm profundis anguste V-formatis, carpelis 10–17 (sed in geminis 25 et phalangio 6.1 cm lato), apicibus ovoideis vel oblato-ovoideis minute papillosis, stigmatibus 2–3 mm longis subbircularibus vel late ellipticis obscure sulcatis centripetalibus eis interioribus obliquis, sinu proximo ¼–½ ad profundum exento, endocarpio paene submediiali 2 cm longo osseo pallido excepto partibus brunneis circum seminis, lateribus exterioribus lateraliibus 1–2 mm crassis, seminibus 13–17 mm longis 4–5 mm diametro ellipsoidicis vel oblongo-ellipsoidicis, mesocarpio supero in carpelis omnibus cavernam fibrosam et medulosam formant.

**DIAGNOSIS OF HOLOTYPE:** Tree 5–8 m tall, freely and openly branched; trunk and branches "sparsely armed with short, stout bosses"; prop roots not mentioned; leaves 117 cm long, 6.7 cm wide, subcoriaceous, glaucescent, swordlike, tapering from the base to the long subulate tip, this at 10 cm down only 4 mm wide, the very base unarmed, but beginning 4.5–5.5 cm up the margins with prickles 1.5–3 mm long, 3–7 mm apart, stout subulate, yellowish, ascending, the base arcuate; the nearby midrib below unarmed, but beginning 20 cm up a few remote prickles 1.5 mm long, ascending, appressed; at the midsection the margin on one side unarmed, on the other with prickles 2 mm long, 11–32 mm apart; the midrib unarmed; near the apex the margins with serrations 0.2–0.3 mm long, 5–20 mm apart; the midrib below unarmed towards the apex, but below 9 cm from the tip with similar serrations 3–4 mm apart; peduncle at least 15 cm long sparsely leafy bracted; syncarp terminal, solitary, 15 cm long, 12 cm in diameter, broadly ovoid, 3-angled, with about 50 phalanges, these 4.2–4.5 cm long, 3.1–4.9 cm wide, 2.4–3 cm thick, broad cuneiform, 5–7-angled, when dried brown, the sides smooth and shiny, of several planes or gently curving surfaces, free in upper ¼, the apex broadly rounded; lateral sutures narrow but distinct in free upper quarter, rarely further down; central apical sinuses 6.5–8 mm deep, narrow V-shaped; carpels 10–17 (but in a double 25 and the phalange 6.1 cm wide), the apices equal or somewhat unequal, fully ovoid or oblate-sessile, dull and minutely papillos; stigmas 2–3 mm long, subcircular to broadly elliptic, dark, creasped, centripetal, the inner ones oblique and slightly the smaller; proximal sinus running ¼–½ way to the valley bottom; endocarp slightly submedian, 2 cm long, bony, pale except for the brown portions near the seed cavities, the outer lateral walls 1–2 mm thick; seeds 13–17 mm long, 4–5 mm in diameter, ellipsoid to oblong-ellipsoid; upper mesocarp forming in each carpel apex a cavern crossed by numerous longitudinal fibers and with delicate, medullary membranes.

**HOLOTYPE:** Australia, Queensland, Cape York Peninsula, Newcastle Bay, 2½ miles s. of Somerset, May 12, 1948, L. J. Brass 18,787 (BRI).

**DISCUSSION:** *P. yorkensis* is a member of the section Pandanus. The most similar known species is *P. duriocarpus* Martelli, of the Palau Islands. This has the phalanges 4.5–4.8 cm long, 2.5–4 cm wide; carpel apices pyramidal, lacking any concavity; and the apical central sinuses 5–7 mm deep. In contrast, *P. yorkensis* has the phalanges 4.2–4.5 cm long, 3.1–4.9 cm wide; carpel apices with an oblique, distal concavity adjacent to the stigma; and the apical, central sinuses 3.5–4.5 mm deep.

The new epithet is the geographic name York, plus -ensis, the Latin adjectival place ending.