

# *Pinanga* in Java and Bali

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1. *Pinanga javana*. (Photo J. Dransfield)

In this taxonomic account of *Pinanga* in Java and Bali three species are recognized. Two, *P. javana* and *P. arinasae*, are single-stemmed. The latter is described as new. A third species, *P. coronata*, is clustered. The well known *P. kuhlii* is shown to be a synonym of *P. coronata*.

*Pinanga* consists of about 120 species, occurring from the Himalayas and south China to New Guinea, with the greatest diversity in the wet areas of the Sunda Shelf and very poorly represented in Papuasia (Uhl & Dransfield 1987). In Indonesia, the genus is represented by about 40 species, at least 14 of which are endemic.

*Pinanga* is found throughout Java, from sea level to montane forests, but the taxonomy of Javanese *Pinanga* has been interpreted variously in the botanical literature. Scheffer (1876) recorded three species on the island, i.e. *P. javana* (Fig. 1), *P. kuhlii* and *P. coronata*. Beccari (1886) added *P. noxa* of Blume to the Javanese list. In contrast, Koorders (1911) mentioned that Java has only two species, i.e. *P. javana* and *P. kuhlii*, while he considered *P. coronata* to be synonymous with *P. kuhlii*. According to Backer & Bakhuizen van den Brink, Jr. (1968), *Pinanga* is represented by only one taxon in Java, namely *P. coronata* (Blume ex Mart.) Blume. *Pinanga globulifera* (non Blume) Merr., *P. kuhlii* Blume and *P. noxa* Blume were all cited as synonyms. In their note, they mentioned that the poorly known *P. javana* Blume may be conspecific with *P. coronata*. However, there was no detailed taxonomic justification for the reduction in the number of species.

On the island of Bali, Dransfield and Mogege collected an unidentified species of *Pinanga* in 1973; this was recently referred to by Whitten (1994) and Whitten et al. (1996) but was not studied in detail. The Balinese taxon is described herein as new.

#### *Pinanga* Blume

Blume, Bull. Sci. Phys. Nat. Néerl. 1: 65. 1838. Lectotype: *Pinanga coronata* (Blume ex Mart.) Blume.

*Cladosperma* Griff., Not. Plant. Asiaticas 3: 165. 1851. Type: *C. paradoxa* (Griff.) Griff. (*Areca paradoxa* Griff.) (= *Pinanga paradoxa* (Griff.) Scheff.).

*Ophiria* Becc., Ann. Jard. Bot. Buit. 2: 128. 1885. Type species: *O. paradoxa* (Griff.) Becc. (*Areca paradoxa* Griff.) (= *Pinanga paradoxa* (Griff.) Scheff.).

*Pseudopinanga* Burret, Notizb. Bot. Gart. Berlin-Dahlem 13: 188. 1936. Type: *P. insignis* (Becc.) Burret (= *Pinanga insignis* Becc.)

#### Description of the genus based on Javanese and Balinese material

Small to robust, solitary or clustered, erect, unarmed, pleonanthic, monoecious palms. Stem slender to moderate, with elongate internodes and conspicuous leaf scars. Leaves pinnate; sheaths tubular, forming a well defined crownshaft; petiole

present, adaxially rounded or channelled, abaxially rounded, glabrous or variously indumentose; leaflets with one to several folds, regularly to irregularly arranged, acute, acuminate, or lobed, the lobes corresponding to the folds, the apical leaflets almost always lobed, blade occasionally mottled, sometimes paler beneath, often with a wide variety of scales and hairs, transverse veinlets usually obscure. Inflorescence infrafoliar, usually rapidly becoming pendulous, occasionally erect, protogynous, branching to 1 order only; peduncle short, dorsiventrally flattened, glabrous or tomentose in bud, quickly splitting to expose the flowers; peduncular bracts absent; rachis bracts triangular, inconspicuous; rachillae bearing spirally or distichously arranged triads throughout their length; floral bracteoles minute. Staminate flower asymmetrical, sessile; calyx cupular with 3 triangular lobes; petals 3, triangular, joined briefly basally, valvate in bud, much exceeding the calyx lobes; stamens 12–68; filaments short, anthers linear; pistillode absent. Pistillate flower usually globose, symmetrical, much smaller than the staminate; sepals 3, membranous, striate, imbricate, distinct; petals 3, distinct, imbricate, membranous; staminodes absent; gynoecium unilocular, uniovulate, globose, stigma often brightly colored (reddish to orange). Fruit globose or ellipsoidal, orange to black, stigmatic remains apical; epicarp smooth, shiny, mesocarp thin, fleshy, endocarp of longitudinal fibers, usually adhering to the seed, becoming free at the basal only, fruit without a solid beak. Seed conforming to the fruit shape, basally attached; endosperm deeply ruminant; embryo basal or lateral near the base.

#### Key to *Pinanga* in Java and Bali

1. a. Small clustering palm . . . . . *P. coronata*
- b. Robust solitary palm . . . . . 2
2. a. Crownshaft purplish-green, covered with silvery indumentum; leaflets 35–45; inflorescence silvery indumentose at the base and verruculose; rachillae 20–30, spirally arranged on the rachis; fruit obovoid . . . . . *P. arinasae*
- b. Crownshaft brownish-green, covered with scaly brown indumentum; leaflets 10–15, inflorescence glabrous; rachillae 8–14, arranged distichously and alternate on the rachis; fruit ovoid to ellipsoid . . . . . *P. javana*

#### *Pinanga arinasae* J. R. Witono, sp. nov.

*P. javanae* affinis sed caudice solitario, vaginis foliorum sublepidotis, frondibus pinnatisectis, segmentis utroque latere 35–45 lineare-lanceolatis acuminatis, inflorescentiis lepidotis et verruculosis, ramis (20–30) spiralibus, fructibus obovoideis.

Typus: INDONESIA. Bali, Bedugul, Bukit Tapak, 1973, *Dransfield et al. JD3512* (holotypus BO; isotypi BH, K, L).

Robust, solitary palm. Stem erect, 12–15 cm diam., 10–12 m tall, medium brown to gray brownish; internodes 10–25 cm, scars to 3 cm. Crownshaft slightly swollen, 130–180 cm long, 14.0–17.5 cm diam., yellow when young and purplish green when adult, covered with silvery indumentum. Leaves 7–10 in the crown, pinnate, whole leaf 250–330 × 240 cm; leaf-sheath to 110 cm, inside white and smooth, petiole 16–40 cm, deeply oblique, convex abaxially, silvery indumentose below; rachis to 215 cm, silvery indumentose below, concave then flattened adaxially, convex abaxially, terete near the apex; leaflets 35–45 on each side of rachis, entire, regularly arranged, linear to lanceolate, basal leaflets 50–58 × 1.0–1.8 cm, ribs 2, middle leaflets 90–120 × 4–5 cm, ribs 2, apical leaflets 30–48 × 0.6–3 cm, ribs 2–4, indumentose on lower ribs, the surfaces discoloured, upper dark green, lower pale green when fresh, on drying becoming pale brown on lower surface and dark brown on upper surface. Inflorescence infrafoliar, arcuate, eventually pendulous, branched to one order only, silvery indumentose at the base and verruculose, 50–55 cm long, base very stiff; prophyll pale yellow distally and greenish yellow near base when fresh, brownish yellow when dry, papery, smooth, 37 × 8 cm; peduncle erect, flattened, 11–18 × 1.6–2.5 cm, rachis 18–27 × 1 cm, rachillae 20–30, spirally arranged on the rachis; rachillae bearing 16–28 triads on each side, basal rachillae longer than apical rachillae. Staminate flowers sessile, calyx with 3 subulate sepals, 7 × 3.5 mm; corolla with 3 petals, longer than sepals, ovate, 10 × 6 mm; stamens 45–68, pale yellow, 2–4 × 0.3–0.5 mm. Pistillate flowers sessile; calyx cup-shaped, pale yellow, 4 mm diam. with 3 triangular imbricate orbicular sepals, lobes 5.5–6 × 4 mm, ciliate at margins, striate, apex mucronate; corolla with 3 cucullate free rounded, orbicular, ciliate pale yellow petals, similar to sepals in size, striate, apex mucronate-obtuse; ovary rounded, 3 × 2 mm. Fruit obovoid, 12–17 × 8–12 mm. Young fruit green, mature fruit red blackish. Seed obovoid, deeply ruminant. (Figs. 2, 3, 7, 8)

**DISTRIBUTION:** Endemic to Bali at Bukit Tapak near Eka Karya Botanic Garden. We did not find this species in nearby Bukit Lesung and Bukit Pohen. A long time ago, *P. arinasae* was probably present there, but the habitat is now highly degraded.

**SPECIMENS EXAMINED:** BALI. Bukit Tapak, Apr 1973, *Dransfield JD3512* (Holotype BO); sterile,

Mar 1992 *Afriastini 163* (BO); seedling, May 1998 *Witono 74* (BO); flower, May 1998 *Witono 75* (BO).

**ECOLOGY:** Occurring on a very steep hill slope on rocky outcrops in *Casuarina* and *Engelhardtia* forest at altitudes of 1100–1400 m above sea level.

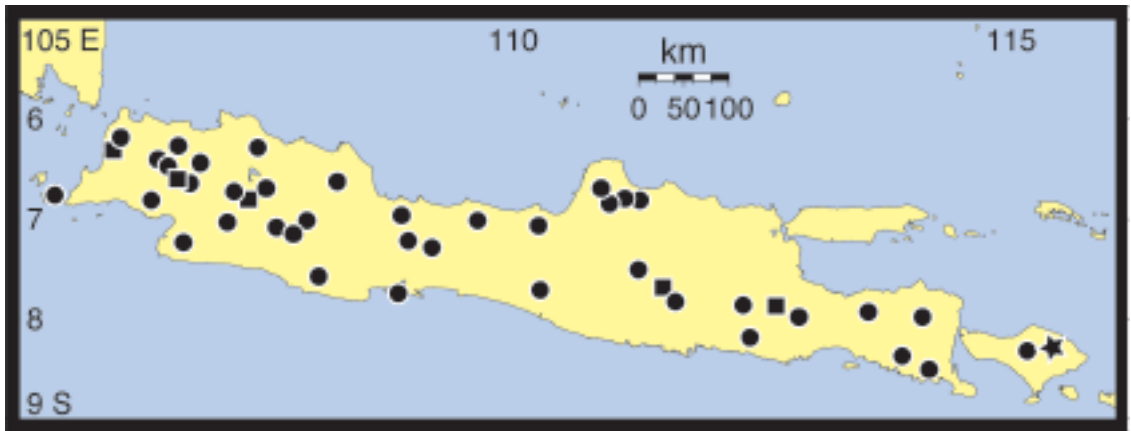
**LOCAL NAMES:** *Nyabah*, *jabah* or *pinang jawa*.

**USES:** A highly ornamental palm, popular with local people near the botanic garden. Young fruits are used as a substitute for betel nut (*Areca catechu*), young leaves (cabbage or *umbut*) can be eaten. Stems are used for traditional cremation ceremonies (“*ngaben*”), and leaf-sheaths are used for making a “*cukup*” (a Balinese umbrella).

This handsome “pinang” is named for Mr. I.B.K. Arinasa who assisted us in the field. *Pinanga arinasae* is closely related to the single-stemmed *P. javana* from Java, *P. insignis* from the Philippines and to *P. punicea* from Papua and Maluku. The major differences between *P. arinasae* and the above mentioned species are presented in Table 1.

**2. *Pinanga javana*** Blume, Bull. Sci. Phys. Nat. Néerl. 1: 65. 1838 and Rumphia 2: 81. 1839. Type: Java, *Blume s.n.* (holotype L!).

Robust, solitary palm. Stem erect, 4–10 m tall, 10–15 cm diam., internodes to 10–30 cm, stem surface green brownish, smooth, slightly fissured longitudinally. Crownshaft elongate, 150–200 cm long, 25 cm diam., swollen, purplish brown, with brown scales. Leaves 10 in crown, pinnate; whole leaf (including leaf-sheath, petiole, and rachis) 250–300 cm with silvery indumentum on petiole and rachis, very massive; leaf-sheath to 100 cm; petiole to 30 cm, concave adaxially, convex abaxially; rachis 3 cm diam.; leaflets 10–15 on each side of rachis, regularly arranged, slightly arcuate, elongate linear-lanceolate, falcate-sigmoid, equidistant, basal leaflets 65–95 × 1–6 cm, ribs 1–3, middle leaflets 70–115 × 2.7 cm, ribs 1–3, apical leaflets 19–55 × 1.5–7.5 cm, ribs 2–7. Inflorescence infrafoliar, hand-like, spreading pendulous, 40–50 cm long, peduncle erect at base, flattened, 9–16 cm long, 0.8–1.5 cm thick; prophyll not known; rachillae 8–13, arranged distichously alternate, at the base 23–35 cm with 19–21 triads, at the apex 18–27 cm with 15–17 triads, peduncle, rachis, and rachillae green when young, pinkish red with age. Triads distichous, alternate. Pistillate flower (calyx and corolla) cream, ovary green; calyx cup-shaped, sepals 3, imbricate, broadly orbicular, 6–8 × 4–4.5 mm, smooth, thick at the middle, thin at side, with ciliate margins, apex mucronate; corolla with 3 cucullate rounded ciliate petals, 4–6 × 3–4 mm, apex mucronate-obtuse. Fruit ovoid to ellipsoid, 20–26 × 11–14 mm, pale pinkish yellow when



2. Distribution of *Pinanga* in Java and Bali. Circles = *P. coronata*. Squares = *P. javana*. Star = *P. arinasae*.

young, when ripe turning dark red then black, pericarp densely fibrous, endocarp thin, membranous. Seed ovoid to ellipsoid, 18–21 × 10–13 mm, deeply ruminant. (Figs. 1, 2, 5, 6)

**DISTRIBUTION:** Endemic to Java, now confined to the mountains of West Java. This species was recorded on Mt. Slamet (Central Java) (Whitten et

al. 1994) but was not found when we searched for it in 1999. Specimens collected by Backer in 1914 from Mt. Wilis and by Kobus from Mt. Tengger indicate that it once grew in East Java; however, during field observation in 1998, no *P. javana* was found in either locality. It is possible that this species is extinct (extirpated) at these locations.

3 (left). *Pinanga arinasae*, Bukit Tapak, Bali, habit. 4 (right). *Pinanga coronata*, detail of infructescence. (Photos: Joko Witono)



**SPECIMENS EXAMINED:** JAVA. West Java. Mandalawangi, Mt. Pulasari, Apr 1974, *Dransfield JD4185* (BO); Bogor, Mt. Salak, Apr 1971, *Dransfield JD1358* (BO); Mt. Salak, Jul 1971 *Dransfield JD1758* (BO); Cibodas, Oct 1970, *Dransfield JD951* (BO); East Java. Kediri, Mt. Wilis, Feb 1914, *Backer 11491* (BO); Mt. Tengger, *Kobus 204* (BO).

**ECOLOGY:** Occurring on very steep hillsides in moist lower montane forest and damp montane forest in deep soil at altitudes of 800–1,700 m above sea level, but not on ridgetops. Dransfield collected *P. javana* in 1973 on Mt. Pulasari, Mandalawangi, West Java, where this species is abundant in summit mossy forest at altitude 800 m asl. In its morphology, *P. javana* is quite different from *P. coronata*. It is a robust palm, always solitary, and the arrangement of the rachillae is always alternate and distichous. On the other hand, *P. coronata* is a small and clustered palm, and the arrangement of its rachillae is always spiral. The distribution of these species is also different. *Pinanga javana* is very restricted, found only in lower montane forest (800–1,700 m asl) in West and East Java, while *P. coronata* is more widespread,

and is found from Sumatra, Java, to Lesser Sunda Islands, from sea level to montane forest.

**LOCAL NAMES:** *Pinang hanyawar*, *pinang panyawar* (West Java), *palem barong* (East Java), *pinang jawa*.

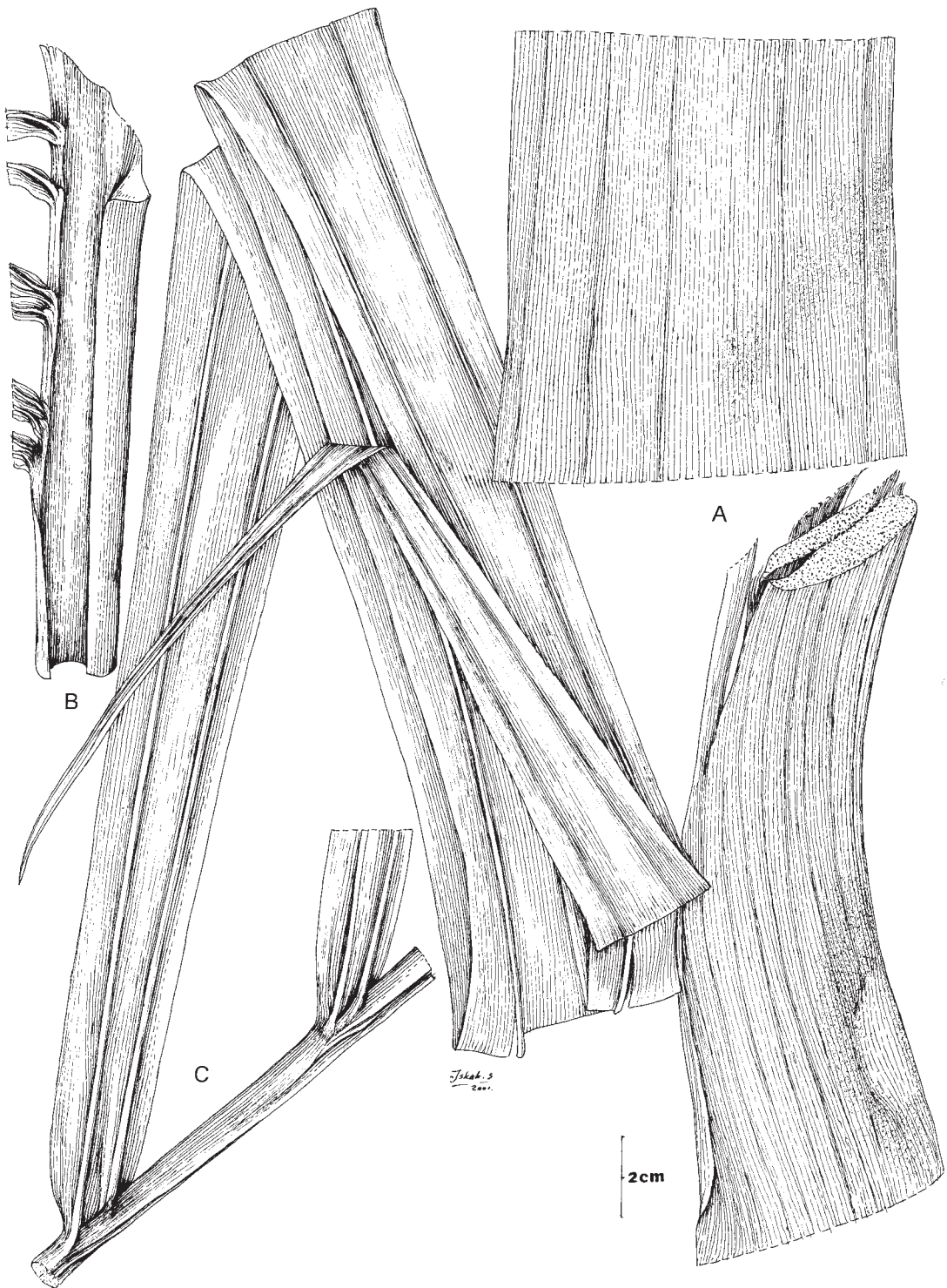
**3. *Pinanga coronata*** (Blume ex Mart.) Blume, Bull. Sci. Phys. Nat. Néerl. 1: 65. 1838 (*nomen*); Blume, Rumphia 2: 83. 1839. *Areca coronata* Blume ex Mart., Hist. Nat. Palm. 3: 179. 1838. *Seaforthia coronata* (Blume ex Mart.) Mart., Hist. Nat. Palm. 3: 185. 1845. *Ptychosperma coronata* (Blume) Miq., Fl. Ned.-Indie 24. 1855. Type: Java, *Blume s.n.* (holotype L!).

*Pinanga kuhlii* Blume, Bull. Sci. Phys. Nat. Néerl. 1: 65. 1838 (*nomen*); Blume, Rumphia 2: 82. 1839. *Seaforthia kuhlii* (Blume) Mart., Hist. Nat. Palm. 3: 185. 1845. *Ptychosperma kuhlii* (Blume) Miq., Fl. Ned.-Indie 21. 1855. Type: Java, *Blume s.n.* (holotype L!).

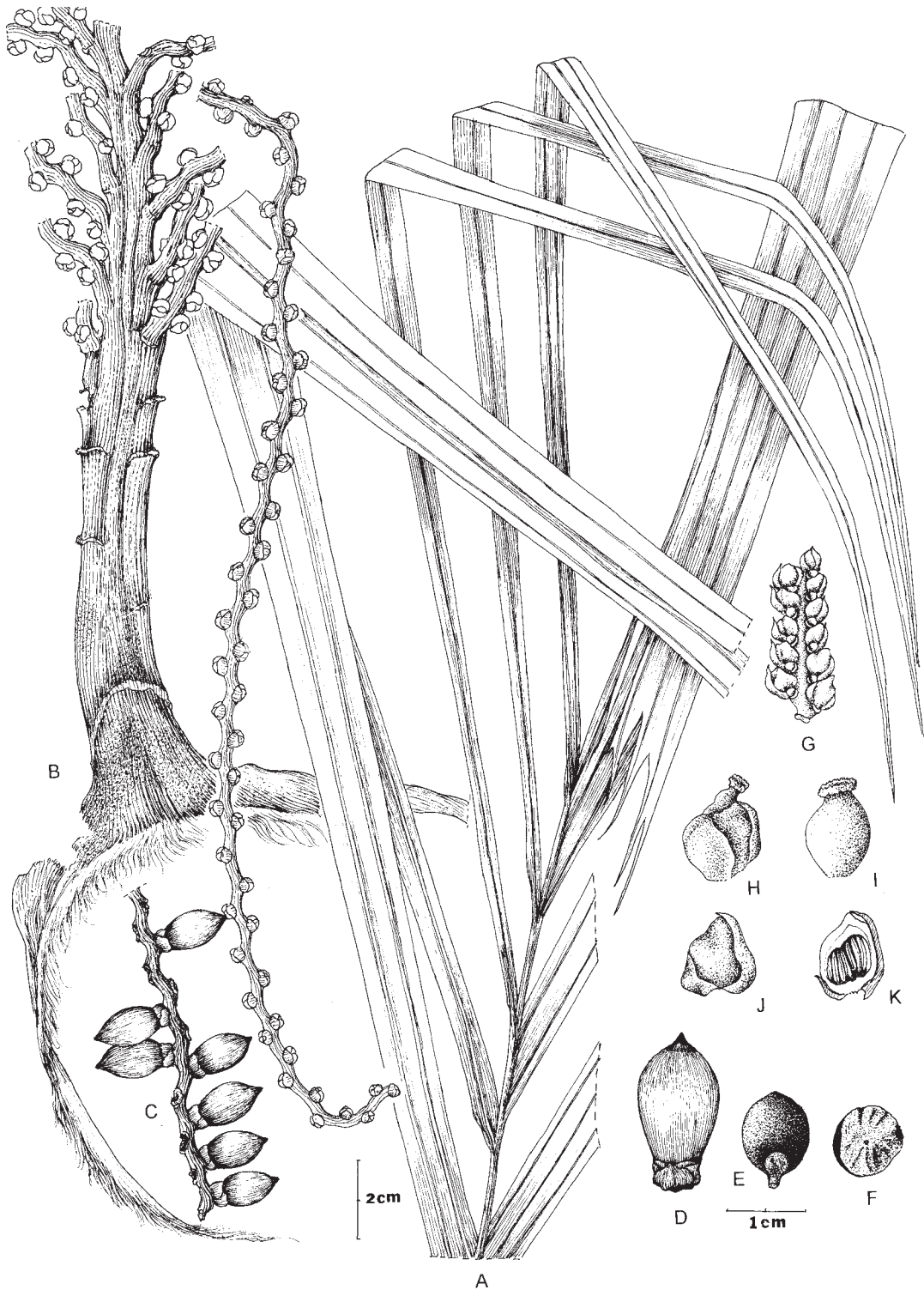
*Pinanga costata* Blume, Bull. Sci. Phys. Nat. Néerl. 1: 65. 1838 (*nomen*); Blume, Rumphia 2: 80. 1839; *Ptychosperma costata* (Blume) Miq., Fl. Ned.-Indie 25. 1855. Type: Java, *Blume s.n.* (holotype L!).

5 (left). *Pinanga javana*, cultivated in Cibodas, West Java. 6 (right). *Pinanga javana*, detail of infructescences, cultivated in Cibodas, West Java. (Photos: J. Dransfield).





7. *Pinanga arinasa*: A leaf sheath, two views; B tip of petiole; C mid section of leaf. All from *Dransfield et al. JD3512*. Drawn by Iskak Samsudin.



8. *Pinanga arinasae*: A leaf tip; B base of inflorescence just past staminate anthesis; C part of rachilla in fruit; D fruit; E seed; F seed in cross section; G part of rachilla showing triads of flowers; H pistillate flower; I gynoecium; J petal of pistillate flower; K staminate bud in vertical section. All from *Dransfield et al. JD3512*. Drawn by Iskak Samsudin.

**Table 1. The major differences between *Pinanga arinasae* and closely related species. Data from Scheffer (1876), Beccari (1907) and Moore and Fosberg (1956).**

	<i>P. arinasae</i>	<i>P. insignis</i>	<i>P. punicea</i>
<b>Outer surface of crownshaft</b>	covered with silvery indumentum	covered in appressed radiate scales of a chestnut brown color	covered in brown scaly indumentum
<b>Width of leaves</b>	to 240 cm	to 150 cm	160–200 cm
<b>Length of petiole</b>	16–40 cm	very short or obsolete	80 cm
<b>Apical leaflets</b>	2–4 ribs	10 ribs	6–7 ribs
<b>Inflorescence</b>	50–55 cm	100 cm	50–60 cm
<b>Length of rachillae</b>	22–32 cm	40–50 cm	16–27 cm
<b>Arrangement of fruit on rachillae</b>	distichous	distichous	spiral
<b>Fruit</b>	obovoid (1.2–1.7 cm long by 0.8–1.2 cm diam.)	ovoid (2.4–2.5 cm long by 1.3–1.4 cm diam.)	ellipsoid (1.7 cm long by 0.9 cm diam.)

*Pinanga noxa* Blume, Bull. Sci. Phys. Nat. Néerl. 1: 65. 1838. (*nomen*) Blume, Rumphia 2: 81. 1839. *Ptychosperma noxa* (Blume) Miq., Fl. Ned.-Indie 23. 1885. Type: Java, *Blume s.n.* (holotype L!).

Small, clustered, undergrowth palm. Stems erect, unbranched, 2–8 (10) m tall, 1.5–7 (10) cm diam., with internodes 4.5–12 (20) cm, scars 0.5–1.2 cm; stem surface green to brownish green. Crownshaft swollen elongate, 50–100 cm long, 2.5–10 cm diam., slightly wider than the stem, green, yellowish or brownish green, or brownish to reddish yellow when adult, with brown scales, ligule poorly developed. Leaves 4–7 in the crown; whole leaf including leaf-sheath 150–300 cm; leaf-sheath 35–80 cm; petiole 20–100 cm, deeply oblique adaxially, convex abaxially; rachis 90–180 cm, petiole and rachis smooth or silvery indumentose below, flattened adaxially, convex abaxially, sharp near the apex; leaflets 6–30 on each side of rachis, entire, regularly arranged, elongate linear-lanceolate, falcate-sigmoid, basal leaflets 22–85 × 0.5–6.5 cm, with 1–5 ribs, middle leaflets 32–90 × 0.8–9 cm, with 1–7 ribs, apical leaflets 16–45 × 1.5–10 cm, with 2–13 ribs, notched to deeply cuneate to dentate, indumentose on lower ribs, the surfaces discolorous, upper pale green, lower dark green when fresh, on drying becoming pale brown to pale greenish brown on lower surface and dark brown to dark greenish brown on upper surface. Inflorescence infrafoliar, pendulous or erect then pendulous, green when young, becoming yellow pink to red, base very stiff; peduncle flattened, 1–6.5 × 0.5–2 cm; prophyll 20–28 × 4.5–8 cm, pale yellow when fresh, light brown when dry, smooth; rachis 2–9 × 0.2–1 cm, smooth; rachillae 5–22, glabrous,

straight, spreading to parallel, not in same plane, basal rachillae with 19–51 triads on each side, apical rachillae with 15–36 triads. Staminate flower sessile, creamy white, stamens 12–16 (28), pale yellow, about 3–3.5 × 0.2–0.4 mm. Pistillate flower creamy white, sessile, calyx cup-shaped, sepals orbicular to very broad orbicular, 2.5–5 × 2–3.5 mm, membranous, striate, imbricate, acuminate-mucronate-obtuse at the apex, ciliate at margins; petals usually smaller than sepals, orbicular to very broad orbicular, 2–4.5 × 2–3.5 mm, membranous, striate, imbricate, acuminate-mucronate-obtuse at the apex; ovary rounded, about 1–2 × 1 mm. Fruit obovoid, ellipsoid to ovoid, 11–15 × 6–10 mm, green when young becoming yellow pink, red to brownish red, stigmatic remains apical; epicarp smooth, shiny; mesocarp thin, fleshy; endocarp with longitudinal fibers. Seed conforming to the fruit, 7.5–12 × 5–7.5 mm; endosperm deeply ruminant. (Figs. 2, 4)

**DISTRIBUTION:** Sumatra, Java, to Lesser Sunda Islands.

**SPECIMENS EXAMINED.** JAVA. West Java. Mandalawangi, Mt. Pulasari, Apr 1974, *Dransfield JD4182* (BO); Pandeglang, Ujung Kulon National Park, Sept 1951, *Waalkes 406* (BO); Apr 1971, *Dransfield JD1448* (BO); Apr 1971, *Dransfield JD1464* (BO); May 1992, *McDonald & Afriastini 3325* (BO); Oct 1998, *Witono 79* (BO); Depok, Dec 1894, *Hallier 1894* (BO); Nov 1896, *Hallier s.n.* (BO); *Hallier 1899* (BO); Aug 1898, *Koorders 31041* (BO); Apr 1903, *Koorders 40185* (BO); Apr 1904, *Koorders 40191* (BO), *Koorders 40192* (BO), *Koorders 40193* (BO); Oct 1898, *Backer 26279* (BO); Mar 1921, *Backer 31254* (BO); May 1939, *Van Steenis 11236* (BO), *Van Steenis 11237* (BO); Bogor, Oct



1910, *Scheffer 16317* (BO); Aug 1935, *Frank 35* (BO); Mt. Salak, Apr 1971, *Dransfield JD1352* (BO), *Dransfield JD1359* (BO); Jul 1974, *Yoshida 1576* (BO); Ciampea, Jul 1898, *Koorders 30778* (BO); Jul 1914, *Backer 15124* (BO); *Burck s.n.* (BO); Ciapus, Jun 1896, *Hallier s.n.* (BO); *Hallier s.n.* (BO); Cipancar, Jun 1896, *Scheffer s.n.* (BO); Jasinga, Oct 1970, *Dransfield JD1012* (BO); Cibodas, Jul 1895, *Hallier 412* (BO); Oct 1898, *Koorders 32072* (BO); May 1914, *Lörzing 1831* (BO); June 1941 *Bloembergen 115* (BO); May 1948, *Main 136* (BO); March 1952, *Meijer 35* (BO); Jan 1971, *Dransfield JD1135* (BO); Mar 1979, *Mogea 1715* (BO); *Boerlage s.n.*; Cianjur, Jun 1900, *Koorders 33369* (BO); Sukabumi, Lengkong, Nov 1970, *Dransfield JD1058* (BO); Apr 1980, *Mogea 865* (BO), *Mogea 866* (BO), *Mogea 867* (BO); *Ploem s.n.* (BO); Jampang Kulon, Aug 1974, *Yoshida 1888* (BO); Mt. Halimun, June 1980, *Balagooy & Wiriadinata 2902* (BO); Karawang, *De Monchy 126* (BO); Bandung, Apr 1911, *Smith 121* (BO); Oct 1918, *Backer 26236* (BO); Aug 1941, *Popta 31* (BO); Feb 1971, *Dransfield JD1277* (BO); Aug 1976, *Mogea 811* (BO); Oct 1976, *Mogea 821* (BO), *Mogea 822* (BO); Garut, Jan 1897, *Koorders 26673* (BO); Bukit Himalaya Nature Reserve, Feb 1999, *Witono 89* (BO); Feb 1999, *Witono 90* (BO); Tasikmalaya, Aug 1913, *Backer 8987* (BO); Aug 1913, *Backer 9044* (BO); Jul 1917, *Koorders 44345* (BO); Jan 1971, *Dransfield JD1153* (BO); Jan 1971, *Dransfield JD1212* (BO); Cirebon, Mt. Ciremai, Oct 1912, *Backer 5059* (BO); Mt. Beser, Jun 1917, *Backer 22611* (BO); Jun 1917, *Smith 726* (BO); Mt. Cikukur, Mar 1914, *Backer 12899* (BO); Mt. Hiyang, Oct 1913, *Backer 9652* (BO); Mt. Masigit, Mar 1914, *Lörzing 1241* (BO); Mt. Windu, Apr 1909, *Soegandiredja 233* (BO); West Java, Apr 1938, *Franck 121* (BO); *Mausjet 581* (BO); *Raap 484* (BO); Central Java, Cilacap, Nusa Kambangan Island, Nov 1907, *Legign* (BO); Nov 1938, *Kostermans 92* (BO); Purwokerto, Mt. Slamet, Pancuran Tujuh, Feb 1999, *Witono 85* (BO); Purbalingga, Mt. Slamet, Goa Lawa, Feb 1999, *Witono 89* (BO); Tegal, Jan 1919, *Beumée 3699* (BO); Pekalongan, Mt. Prabata, Sept 1914, *Backer 15970* (BO); Kendal, Kaliwungu, *Cordes s.n.* (BO); Yogyakarta, *Teysmann s.n.* (BO); Kudus, Mt. Muria, Nov 1951, *Kostermans 6265* (BO); Jepara, Ngarengan, May 1899, *Koorders 33226* (BO); May 1899, *Koorders 33619* (BO), *Koorders 33620* (BO); May 1916, *Beumée 587* (BO); Rembang, Apr 1904, *Koorders 36522* (BO); Feb 1914, *Koorders 42260* (BO); East Java. Madiun, Mt. Wilis, Oct 1892, *Koorders 6132* (BO); May 1896, *Koorders 23153* (BO); Nov 1900, *Koorders 38635* (BO); Kediri, Jun 1896, *Koorders 22959* (BO); Mt. Wilis, Feb 1914, *Backer 11836* (BO); Dec 1998, *Witono 82* (BO); Dec 1998, *Witono 83* (BO); *Witono 84* (BO); Malang, Mar 1971, *Dransfield JD1330* (BO); Jul 1980, *Mogea 2538* (BO); Besuki, Mt. Ijen,

7 Nov 1893, *Koorders 14649* (BO); Feb 1896, *Koorders 21686* (BO); Jul 1916, *Koorders 42924* (BO); Apr 1920, *Backer 30620* (BO); Jul 1938, *Van Steenis 10717* (BO); Mar 1971, *Dransfield JD1282* (BO); *Kobus s.n.* (BO); Jember, Meru Betiri National Park, Oct 1998, *Witono 80* (BO); Situbondo, Mt. Argopuro, Apr 1914, *Backer 13258* (BO); Banyuwangi, Meru Betiri National Park, May 1973 *Dransfield JD3529* (BO); Oct 1998, *Witono 81* (BO); Madura, Bawean Isl., Mt. Tinggi, May 1928, *Karta 117* (BO). Bali. Bedugul, Bukit Tapak, May 1973, *Dransfield JD3515* (BO); Bukit Lesung, Mar 1992, *Afriastini 92* (BO); Bratan Lake, Jun 1976, *Meijer 10538* (BO); Mt. Kelatakan, Jul 1918, *Maier 64* (BO).

**ECOLOGY:** Occurring on very steep hillsides in montane forest and flat areas in lowland forest, from sea level to 1800 m above sea level.

**LOCAL NAMES:** *Bing-bin* (West Java), *piji* (Central Java, East Java, and Bali), *pinang rante* (East Java).

**USES:** Frequently cultivated as an ornamental and sometimes used for building material.

**NOTES:** Blume described *P. kuhlii* based on a specimen apparently from West Java (Java Occidentalis). Beccari (1886) mentioned that the type locality of *P. kuhlii* was Cisoka, West Java. This locality is in Lebak District, Pandeglang Regency, Banten Province. Index Kewensis says that the type locality of *P. kuhlii* is Malaya. This information is incorrect, and indeed no specimen or record has ever been documented from Malaya.

*Pinanga coronata* was described based on a specimen from Megamendung, on the slopes of Mt. Gede-Pangrango, to the south-east of Bogor in West Java. Again Index Kewensis incorrectly cites the type locality of *P. coronata* as Celebes; however, *P. coronata* has so far never been found in Celebes.

Blume (1839) separated *P. kuhlii* and *P. coronata* primarily based on leaves and growth of the inflorescence. The rachis of *P. kuhlii* is covered with small scales on the abaxial surface, the leaflets are broad (lanceolate to falcate), 10–13 in number and the inflorescence is pendulous. Characters of *P. coronata* are rachis smooth, leaflets narrow (linear to elongate), numerous, and inflorescence erect then pendulous. Specimens that were collected from lowlands usually have characters similar to *P. kuhlii*, but specimens from montane forest (>1000 m above sea level) usually have characters similar to *P. coronata*. In fact, between *P. kuhlii* and *P. coronata*, there are intermediate forms. Based on this evidence we conclude that the clustered *Pinanga* of Java and Bali represents a single species.

*Pinanga costata* and *P. noxa*, are reduced to *P. coronata* because they have similar characters and are indistinguishable in the field and in the herbarium.

*Pinanga coronata* was chosen by Beccari and Pichi-Sermolli (1955) as the type of the genus *Pinanga*, because *Pinanga* was first published by Blume, not in Rumphia (1838–1843), but in *Bulletin des Sciences Physiques et Naturelles en Néerlande* vol. 1 (1838). Although the genus *Pinanga* was described in the *Bulletin*, the species were merely listed and are *nomina nuda*. Before Rumphia 2 was published, Martius published *Historia Naturalis Palmarum*, vol. 3 (1838), in which he made the combination *Areca coronata*, which is the first validly published name for this species. The valid name of the clustered *Pinanga* in Java and Bali is thus *P. coronata* (Blume ex Mart.) Blume.

Other names for clustered *Pinanga* in Java are *P. nenga* which was published by Blume (1838–1843), and *P. neglecta* which was published by Burret (1940). *Pinanga nenga* is the type of the genus *Nenga*. At present, the correct name for it is *Nenga pumila*. *Pinanga neglecta* is synonymous with *Nenga pumila* (Fernando 1983).

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