

Pinanga is a genus of 132 recognized species (Govaerts & Dransfield 2005), occurring from India through Indo-China, Malaysia and Indonesia to Papua New Guinea. There is no revision of the whole genus. The most recent taxonomic treatment of the Indochinese species was that of Gagnepain and Conrard (1937), based on previous works by Beccari (1910) and Magalon (1930). Gagnepain and Conrard recognized six species from Vietnam – excluding *Pinanga banaensis*, which is now placed in *Nenga*. Of these six species, we currently recognized three (*P. annamensis* Magalon, *P. baviensis* Becc. and *P. quadrijuga* Gagnep.).

Recent field work in Vietnam has revealed an additional five new species of *Pinanga*, which are described here, bringing the total number of species for the country to eight. Herbarium acronyms follow Holmgren et al. (1990), and the acronym VNM is used for the herbarium of the Institute of Tropical Biology in Ho Chi Min City.

Pinanga cattienensis Henderson, N.K. Ban & N.Q. Dung, **sp. nov.**, a speciebus omnibus *Pinangae* Vietnamensibus cognitis vaginis foliorum persistentibus reclusis, inflorescentiis interfoliaribus et triadibus spiraler dispositis differt. Typus. Vietnam. Dong Nai: Cat Tien National Park, road along Dong Nai river, 11°26'N, 107°26'E, 150 m, 27 May 2007, A. Henderson, Bui Van Thanh, Vu Van Duy, Nguyen Ngoc Quynh, & Phan Van Phuc 3401 (Holotypus: HN! Isotypi: K! NY!). (Fig. 1)

Stems clustered, forming dense clumps of short stems to 0.5 m tall, sometimes to 1.5 m tall, 2 cm diam., green, covered with reddish-brown scales. Sheaths open, not forming crownshafts, 27–28 cm long, green with reddish-brown scales; ocreas present; petioles 87–116 cm long, green; rachis 90–95 cm long; pinnae 9–13 per side of rachis, linear, contracted at the bases, middle pinna 42 cm long, 2.5–3 cm wide at the middle, apical pinna 16.5 cm long, 5 cm wide at the middle, lobed; veins scarcely prominent adaxially. Inflorescences interfoliar, pushing through the persistent, disintegrating, subtending leaf sheaths, spreading; peduncles 0.5 cm long, 0.9 cm wide; prophylls 9–14 cm long, persistent and erect, splitting abaxially; rachis absent; rachillae 3–4, 9–13 cm long, rectangular in cross-section, glabrous; triads spirally arranged; staminate flowers 6 mm long; sepals forming a 3-lobed, flat, membranous calyx 1.5 mm long; petals 3, 6

mm long, triangular, fleshy, acute; stamens 20–22; pistillate flowers 2.5 mm long; calyx 2.5 mm long with 3, free, imbricate, scarcely ciliate, non-acuminate sepals; corolla similar to the calyx; ovary 2.5 mm long. Fruits 1.8–2 cm long, 0.5–0.6 cm diam., ellipsoid, red-pink; endosperm ruminant.

Local names and uses: None recorded.

Distribution and habitat: Endemic to Vietnam and known only from Dong Nai, growing in seasonally flooded lowland forest at low elevations.

Notes: *Pinanga cattienensis* differs from all previously described species of *Pinanga* from Vietnam by its leaf sheaths which do not form distinct crownshafts and inflorescences which are not infrafoliar. Instead the inflorescences push through the persistent, disintegrating, subtending leaf sheaths. In this it is similar to *P. humilis*, also described here. *Pinanga cattienensis* differs from *P. humilis* in its spirally (versus distichously) arranged triads, 90–95 cm long (versus 38–39 cm long) rachis and 9–13 (versus 5–7) pinnae per side of the rachis.

Additional specimens examined. VIETNAM. DONG NAI: Cat Tien National Park, road along Dong Nai river, 11°26'N, 107°26'E, 150 m, 28 May 2007, Henderson et al. 3410 (HN, NY). Possible additional specimen. Vietnam. Lam Dong: Bao Loc, Loc Lam, no date, Anon 1246 (LE).

Pinanga cupularis Henderson, N.K. Ban & N.Q. Dung, **sp. nov.**, a speciebus omnibus *Pinangae* Vietnamensibus petalis florum staminatorum apice pilos longos ferentibus, staminibus 4, perianthio florum pistillatorum cupulari et endospermio homogeneo differt. Typus. Vietnam. Da Nang City: Hoa Vang District, Ba Na-Nui Chua Nature Reserve, near summit, 15°59'N, 107°59'E, ca. 1100 m, 20 Apr 2007, A. Henderson, Nguyen Quoc Dung, Nguyen Canh, & Le Van Bo 3308 (Holotypus: HN! Isotypi: K! NY!). (Fig. 2)

Stems clustered, rarely solitary, to 2 m tall, 0.4–0.8 cm diam., densely covered with reddish-brown scales. Sheaths closed, forming a crownshaft, 6.5–12 cm long, densely covered with reddish-brown scales; ocreas 1.5–2 cm long; petioles 3.5–6 cm long, green with whitish scales; rachis 11.5–40 cm long; pinnae 2–4 per side of rachis, falcate, not contracted at the bases, middle pinna 10–15 cm long, 1–3 cm wide at the middle, apical pinna 4.5–5 cm long, 2–4 cm wide at the middle, lobed, rarely



2. *Pinanga cupularis*, showing pendulous, spicate inflorescence with distichously arranged flowers.

blade undivided, then blade 21 cm long and 8 cm wide at the middle; veins only slightly raised adaxially. Inflorescences infrafoliar, pendulous; peduncles 0.1–0.2 cm long, 0.2 cm wide; prophylls 5–6.5 cm long; rachis absent; rachilla 1, 3–6.4 cm long, rectangular in cross-section, glabrous; triads distichously arranged; staminate flowers 11 mm long; sepals forming a 3-lobed, flat, membranous calyx, 1.5 mm long; petals 10 mm long, irregularly lobed at the apices, one petal larger than the other two, fleshy, with 2 mm long, hyaline hairs at the apices; stamens 4; pistillate flowers 2.5 mm long; calyx 2.5 mm long, cupular, not split into 3 sepals, ciliate at the apices; corolla

similar to the calyx; ovary 2.5 mm long; fruiting calyx briefly and irregularly split at the apices; fruits 1.2–2 cm long, 0.2–0.4 cm diameter narrowly ellipsoid, slightly curved, color unknown; endosperm homogeneous.

Local names and uses: *cay cau rung se, ca nui*.

Distribution and habitat: Vietnam in Kon Tum and Thua Thien-Hue and near Da Nang City, in lowland or montane rainforest at 200–1400 m elevation.

Notes: This species was identified as *Pinanga paradoxa* Scheff. by both Magalon (1930) and Gagnepain and Conrard (1937), who also recorded it from Lao. It differs from that species, occurring in Thailand and West Malaysia, in its cupular (versus imbricate) pistillate perianth and narrow fruits 0.2–0.4 cm (versus 1 cm) diameter. It is an unusual species of *Pinanga* in its staminate petals with long hairs on the apices, 4 stamens, cupular pistillate perianth, and homogeneous endosperm. Amongst Vietnamese species it most resembles *P. kontumensis*. It differs from this in its pendulous (versus erect) inflorescences, and cupular (versus free and imbricate) pistillate perianth.

Additional specimens examined. VIETNAM. DA NANG CITY: “Ba Na, près Tourane” [Hoa Vang District, Ba Na-Nui Chua Nature Reserve], 8 Jul 1923, *Chevalier 6969* (VNM), no date, *Magalon 8* (NY, VNM); Hoa Vang District, Ba Na-Nui Chua Nature Reserve, near summit, 15°59'N, 107°59'E, ca. 1100 m, 23 Apr 2007, *Henderson et al. 3313* (HN, NY). **KON TUM:** Dak Gley, about 12 km to N of Dak Gley town, near Mang Khen village, 1000–1200 m, 13 Nov 1995, *Averyanov et al. VH 1655* (MO). **THUA THIEN-HUE:** Nam Dong Distr., Huong Son Commune, 16°09'N, 107°36'E, 300–450 m, 24 Mar 2005, *Averyanov et al. HAL 6843* (HN); Phu Loc, Huong Loc, 2 Sep 1980, *N. H. Nhan 880* (HN).

Pinanga declinata Henderson, N.K. Ban & N. Q. Dung, *sp. nov.*, a *P. sylvestri* vaginis petiolisque luteis atque pinnis basaliter valde contractis differt. Typus. Vietnam. Lam Dong: Lac Duong District, Bi Dup-Nui Ba National Park, new road DT 723 from Da Lat to Nha Trang, 12°07'N, 108°37'E, 1670 m, 30 May 2007, A. Henderson, Bui Van Thanh, Ton Thien An, & Duong Thanh Tuyet 3411 (Holotypus: HN! Isotypi: K! NY!). (Fig. 3)

Stems clustered, to 5 m tall, 3–5.5 cm diameter, densely covered with reddish-brown scales.