



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.

3. *Pinanga declinata*, showing spreading, branched inflorescences with distichously arranged flowers and fruits.



Leaves 5–7; sheaths closed, forming crownshafts, 43–57 cm long, yellowish with reddish-brown scales; petioles 19–52 cm long, yellowish; rachis 105–111 cm long; pinnae linear, contracted at the bases, 20–21 per side of rachis, middle pinna 38–69 cm long, 3.5–5 cm wide at the middle, apical pinna 6.5–21 cm long, 3.5–5 cm wide at the middle, lobed; veins prominent adaxially. Inflorescences infrafoliar, spreading; peduncles 2.5–3 cm long, 0.5–1 wide; prophylls 14–17 cm long; rachis 3.5–4 cm long; rachillae 4–8, 15–22 cm long, glabrous, triangular in cross-section, with one flat surface with no triads, the triads arranged along the other two surfaces; triads distichously arranged, occasionally spirally

arranged; staminate flowers not known; pistillate flowers 2 mm long; sepals 3, 2 mm long, imbricate, the margins ciliate, acuminate; petals 3, 2 mm long, imbricate, the margins ciliate, not acuminate; ovary 2.5 mm long; fruits 1.5–2 cm long, 0.5–0.7 cm diameter, narrowly ellipsoid, color unknown; endosperm ruminant.

Local names and uses: *cau chuot, cao cuo chuoc, cau rung.*

Distribution and habitat: Endemic to south-central Vietnam in Dak Lac, Khanh Hoa, Kon Tum, Lam Dong, and Ninh Thuan, in primary, evergreen, broad-leaved, montane forest, or pine forest, at 1100–1900 m.



4. *Pinanga humilis*, showing a spicate inflorescence pushing through the persistent leaf sheath and distichously arranged flowers.

Notes: *Pinanga* specimens from south-central Vietnam were identified as *Pinanga duperreana* Pierre by both Magalon (1930) and Gagnepain and Conrard (1937). This name is now regarded as a synonym of the widespread *P. sylvestris* (Lour.) Hodel, which occurs in Cambodia, China, India, Myanmar, Lao, and Thailand. *Pinanga declinata* is similar to *P. sylvestris* but differs in its yellow (versus green) sheaths and petioles and pinnae which are strongly contracted at the bases. It can be distinguished from the similar *P. annamensis* by its 20–21 linear (versus 8–12 falcate) pinnae which are contracted at the bases (versus not contracted), and spreading (versus pendulous) rachillae.

Additional specimens examined. VIETNAM. DAK LAK: Krong Bong District, Cu Pui Commune, from Dak Tour village to main peak of Chu Yang Sinh mountain, 12°30'N, 108°30'E, 8 May 2000, *Averyanov et al.* VH 6230 (HN); 12 May 2000, *Averyanov et al.* VH 6439 (HN, MO). KHANH HOA: Khanh Son Distr., 42 km NE from Da Lat, upper reaches of Lieng Ly river, 12°12'N, 108°44'E, 1100–1300 m, 22 Apr 1997, *Averyanov et al.* VH 4157 (HN, K, MO); 24 Apr 1997, *Averyanov et al.* VH 4327 (HN, K, MO). KON TUM: N slope of Ngoc Linh mountain, 1200 m, 12 Mar 1995, *Averyanov* VH 693 (GH, K); Dak Gley Distr., about 12 km N of Dak Gley near Mang Khen village, 1100–1200 m, 14 Nov 1995, *Averyanov et al.* VH

1625 (K); Kon Plong Distr., Hieu Commune, Mang La Forest Enterprise, 14°39'N, 108°25'E, 1100–1200 m, 24 Apr 2000, *Averyanov et al.* *VH 5696* (HN); 25 Apr 2000, *Averyanov et al.* *VH 5725* (HN). LAM DONG: 14 km NNW of Da Lat city, 12°05'N, 108°22'E, 1740–1760 m, 11 Mar 1997, *Averyanov et al.* *VH 2550* (HN, K, MO); Lac Duong Distr., Da Chay Commune, 30 km NE of Da Lat city, 12°08'N, 108°39'E, 1700–1900 m, 24 Mar 1997, *Averyanov et al.* *VH 3171* (HN, K, MO); Lac Duong District, Bi Dup-Nui Ba National Park, new road DT 723 from Da Lat to Nha Trang, 12°10'N, 108°41'E, 1483 m, 30 May 2007, *Henderson et al.* *3414* (HN, NY). NINH THUAN: Ninh Hai Distr., Vinh Hai Commune, E slopes of Nui Chua, 11°43'N, 109°08'E, 600–700 m, 27 Mar 2004, *Regalado et al.* *HLF 4183* (HN).

Pinanga humilis Henderson, N.K. Ban & N. Q. Dung, *sp. nov.*, a speciebus omnibus *Pinangae* Vietnamensis vaginis foliorum persistentibus reclusis, inflorescentiis interfoliaribus et triadibus distiche dispositis differt. Typus. Vietnam. Da Nang City: Hoa Vang District, Ba Na-Nui Chua Nature Reserve, road to summit, 16°00'N, 108°02'E, ca. 350 m, 19 Apr 2007, *A. Henderson, Nguyen Quoc Dung, Nguyen Canh, & Le Van Bo 3298* (Holotypus: HN! Isotypi: K! NY!). (Fig. 4)

Stems clustered, forming small clumps, to 0.9 m tall, 1 cm diameter, green with reddish-brown scales. Leaves 5; sheaths open, not forming crownshafts, 7–13 cm long, covered with reddish-brown scales; ocreas 1–2.5 cm long, early deciduous; petioles 59–78 cm long, green; rachis 38–39 cm long; pinnae 5–7 per side of rachis, linear, contracted at the bases, middle pinna 32–33 cm long, 2 cm wide at the middle, apical pinna 15.5–21 cm long, 2 cm wide at the middle, lobed; veins scarcely raised adaxially. Inflorescences interfoliar, pushing through the persistent, disintegrating, subtending leaf sheaths, erect; peduncles 0.5–0.8 cm long, 0.3 cm wide; prophylls 3–4.5 cm long; rachis absent; rachillae 1–3, 4–4.5 cm long, rectangular in cross-section, glabrous; triads distichously arranged; staminate flowers 6.5 mm long; sepals forming a 3-lobed, flat, membranous calyx 1.5 mm long; petals 3, 6 mm long, triangular, fleshy, acute; stamens 9–13; pistillate flowers 2.5 mm long; calyx 2.5 mm long with 3, free, imbricate, ciliate, non-acuminate sepals; corolla similar to the calyx; ovary 2.5 mm long. Fruits 1.7 cm long, 0.5 cm diameter, ellipsoid, color unknown; endosperm ruminant.

Local names and uses: *cay nui*.

Distribution and habitat: Endemic to central Vietnam in Quang Nam and near Da Nang City, in lowland forest on steep slopes at 350 m elevation.

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

Additional specimen examined. VIETNAM. QUANG NAM: Ta Bhing Commune, Song Thanh River, 16 Oct 2005, *N.K. Ban PA 164* (HN).

Pinanga kontumensis Henderson, N.K. Ban & N.Q. Dung, *sp. nov.*, a *P. cupulari* inflorescentiis erectis atque perianthio florum pistillatorum libero imbricato late patenti differt. Typus. Vietnam. Kon Tum: Kong Plong District, Hieu Commune, Mang La Forest Enterprise, 14°39'N, 108°25'E, 1000–1200 m, 15 Apr 2000, *L. Averyanov et al.* *VH 5136* (Holotypus: HN! Isotypus: MO!).

Palm to 3 m tall. Stems 0.7 cm diameter, height and branching unknown, densely covered with reddish-brown scales. Sheaths closed, forming crownshafts, 7.5–8.5 cm long, densely covered with reddish-brown scales; ocreas 3 mm long; petioles 2–3.5 cm long, scaly as the sheaths; rachis 14.5–23.5 cm long; pinnae 3 per side of rachis, falcate, not contracted at the bases, middle pinna 15–18 cm long, 5.5–6 cm wide at the middle, apical pinna 5.5–7 cm long, 3–4 cm wide at the middle, praemorse; veins prominent and raised adaxially. Inflorescences infrafoliar, erect; peduncles 2–3 cm long, 0.2 cm wide; prophylls not known; rachis absent; rachilla 1, 9–10.5 cm long, ± rectangular in cross-section, glabrous; triads distichously arranged; staminate flowers not known; pistillate flowers (post-anthesis) 3 mm high; sepals 3, 2 mm long, widely spreading, not closely imbricate, not acuminate, minutely ciliate; petals 3, 3 mm long, widely spreading, not closely imbricate, acuminate, minutely ciliate; immature fruits 1.5 cm long, 0.4 cm diameter, ellipsoid, slightly curved, white or yellowish; endosperm homogeneous.

Local names and uses: None recorded.

Distribution and habitat: Endemic to south-central Vietnam in Kon Tum, in primary,