

New species of *Geonoma* (Palmae) from Ecuador

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Abstract. Five new species of *Geonoma* from Ecuador, *G. awaensis*, *G. ecuadoriensis*, *G. hollinensis*, *G. lanata*, and *G. skovii*, are described and illustrated and are compared to similar species. Their distributions are mapped.

Key Words: *Geonoma*, Ecuador, Palmae, Arecaceae.

Geonoma Willd. (Arecoideae; Geonomateae) is one of the three largest genera of neotropical palms. In the first revision of the genus, Burret (1930) recognized 172 species. In the second and most recent revision, Wessels Boer (1968) recognized 75 species. Since then, 11 new species have been described. This total of 86 currently recognized species makes *Geonoma* slightly larger than *Bactris* Jacq. and slightly smaller than *Chamaedorea* Willd. *Geonoma* species are widespread and abundant in lowland and montane tropical moist forests in Central and South America, and just reach the Caribbean, occurring from sea level to over 3000 m elevation. *Geonoma* species are usually rather small, understory palms, although some reach the canopy of montane forests.

Geonoma is generally regarded as a difficult genus taxonomically, mainly because of the presence of several species complexes (e.g., Borchsenius, 1999; Henderson & Martins, 2002). Such species, of which there are about five in the genus, may contain several distinct forms at one locality, but these are linked by intermediates at other localities. Henderson is currently carrying out a revision of the genus, and because of this complexity is using morphometric methods combined with application of the Phylogenetic Species Concept (see Henderson, 2005).

Although a relatively small country, Ecuador is rich in species of *Geonoma*, a consequence of the occurrence of three biogeographic regions in a restricted area – the Pacific coast, the Andes, and the western Amazon basin. In the two treatments of *Geonoma* for Ecuador, Skov (1989) and Borchsenius et al. (1998) recognized 27 and 25 species, respectively, about 30% of the total number in the genus. Two additional species were described by Borchsenius et al. (2001). Collecting in areas that have recently become accessible has revealed several new species, including only the second species in the genus to have staminate flowers with three stamens, as described below. A total of 33 species of *Geonoma* is now known from Ecuador, including the five described here.

Geonoma awaensis A. J. Hend., Borchsenius & Balslev *sp. nov.* Type. Ecuador. Esmeraldas: Awá Reserve, footpath to Río Mira, 1°15'N, 78°40'W, 216 m, 20 Sep 1993, H. Beck, A. Ortiz, H. Coantincuz & G. Contincuz 2176 (holotype: NY; isotype: QCNE). (Fig. 1)

A *Geonoma chococcola* differt inflorescentiis ramosis non spicatis et rhachillis tenuioribus, brevioribusque.

Stem branching pattern and height unknown, 3.5 cm diam., plants 2–4 m tall. *Leaves* 12–21, simple or with one division; sheaths 23 cm long; petioles 26 cm long; rachis 81–111 cm long, 5.2–7.1 mm wide at the base; pinnae 1 or 2, drying dark brown, the veins raised adaxially; veins diverging at an angle of 24–36° from the rachis; apical divisions 21.7–39.5 cm long, diverging at an angle of 23–30° from the rachis. *Inflorescences* interfoliar at anthesis, branched; prophylls and peduncular bracts not seen, the peduncular bracts inserted 2.2 cm above the prophyll; peduncles 55 cm long, 4.3–7.2 mm wide at the apex; rachillae 2–4, 16.5–20.5 cm long, 5.8–6.7 mm wide, covered with woolly, brown indument; flower pits spirally arranged; lower lips well-developed, with a central split, briefly overlapping the upper lip; upper lips well-developed; staminate flowers 4 mm long; sepals free, imbricate, keeled, 3.5–4 mm long; petals connate for ca. one third their length, valvate above, 3.6–4 mm long; stamens 6; filaments briefly united below, free above; thecae inflexed on a short connective; pistillodes obscure or absent; pistillate flowers 3 mm long; sepals free, imbricate, keeled, 3 mm long; petals connate for ca. one third their length, valvate above, 3 mm long; staminodial tube digitately lobed at the apex; *fruits* globose, 17.4–24.9 mm long, 15.4–17.8 mm diam., black, with a rough surface, splitting when mature.

Local names and uses.—*Santipava*; the leaves are used for thatching.

Distribution and habitat.—Ecuador, known only from extreme northwestern Ecuador (Esmeraldas) (Fig. 2A); in lowland rainforest on western Andean slopes at 200–500 m elevation. Dr. Rodrigo Bernal (pers. comm.) reports that this species also occurs in southwestern Colombia in Nariño (*Ramírez et al. 8263*, *Ramírez 9604*, both at PSO).

Additional specimens examined. ECUADOR. ESMERALDAS: San Lorenzo, Reserva Etnica Awá, Parroquia Ricaurte, Centro Pambilar, 1°08'N, 78°33'W, 200 m, 21 Sep 1992, *Aulestia et al. 322* (MO), 1°08'N, 78°36'W, 500 m, 11 Jan 1993, *Aulestia & Aulestia 1005* (AAU, MO), Mataje community, 1°15'N, 78°40'W, 200 m, 20 Jan 1993, *Beck et al. 1769* (NY), *Beck et al. 1769a* (NY), La Union community, 1°00'N, 78°33'W, 340 m, 9 Jul

1994, *Beck et al. 2271* (NY), Cañon del Rio Mira, 10 km al oeste de Alto Tambo, 1°02'N, 78°26'W, 250 m, 16–26 Mar 1991, *Rubio et al. 1258* (AAU, MO), San Francisco, Recinto Durang, 1°02'N, 78°36'W, 300 m, 16 Oct 1999, *Vilenzuela & Freire 407* (MO); Reserva Cotacachi-Cayapas, La Aguita, 0°48'N, 78°44'W, 200 m, 25 Jun 1998, *Cornejo & Bonifaz 6359* (AAU).

No specimens of this species were collected until 1993, and it was unknown to Skov (1989). The single specimen cited by Borchsenius et al. (1998) was determined as *Geonoma congesta* H. Wendl. ex Spruce. This, and some other specimens determined as *G. congesta*, rightfully belong to *G. calyptrogynoides* Burret, a name previously synonymized with *G. congesta* by Henderson et al. (1995). *Geonoma awaensis* occurs sympatrically with *G. calyptrogynoides*, but differs in its leaves drying dark brown (vs. light green), digitately lobed (vs. crenulate) staminodial tubes, and larger fruits (17.4–20.5 mm × 15.4–17.8 mm vs. 12–13.4 mm × 8.3–10.5 mm).

In preliminary phylogenetic studies based on morphological data (Henderson, in prep.), *Geonoma awaensis* appears most closely related to *G. chocoicola* Wess. Boer. Both species have leaves which dry a dark brown color; erect, long pedunculate spicate or digitate inflorescences; digitately lobed staminodial tubes; and rough fruits that split at maturity. *Geonoma awaensis* differs from *G. chocoicola* in its branched (vs. spicate) inflorescence and shorter, thinner rachillae (16.5–20.5 cm × 5.8–7.1 mm vs. 22–40 × 8.6–15.2 mm). The ranges of the two species do not overlap (Fig. 2A).

Geonoma ecuadoriensis A. J. Hend., Borchsenius & Balslev, *sp. nov.* Type: Ecuador. Napo: carretera Hollin-Loreto-Coca, km 40, entre Rio Guamani y Rio Pucuno, 0° 40'S 77°38'W, 1200 m, 11 Dec 1987, D. Neill, W. Palacios & C. Cerón 8073 (holotype: NY; isotypes: AAU, MO). (Fig. 3)

A *Geonoma paradoxa* differt foliis pinnatis non simplicibus, pinnis basalibus ad angulum latius divergentibus atque bracteis peduncularibus quam phophyllis longioribus non brevioribus.

Stems solitary, 0.1 m tall, 2.5 cm diam., light brown, the internodes not seen. *Leaves* irregularly pinnate with multi-veined pinnae;

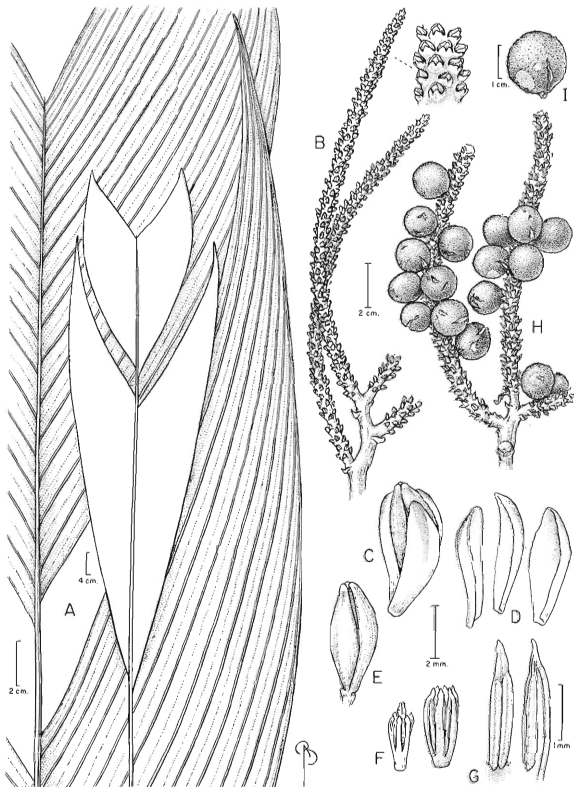


FIG. 1. *Geonoma rivaensis*. A. Outline of leaf and detail of lamina. B. Rachis and rachillae. C. Staminate flower. D. Sepals. E. Petals. F. Pistillate flower (left) showing digitate staminodial tube and stigma, and staminate flower (right) showing stamens. G. Stamens in ventral and lateral view. H. Rachillae with fruits. I. Fruit. (A, B, H-J from Beck 2277, C-G from Beck 1769a.)