

Additional specimens examined. ECUADOR. MORONA-SANTIAGO: road Plan de Milagro-Gualaquiza, Km 3, 1600 m, 10 Oct 1993, *Borchsenius 172* (AAU), cross road between Limón and Indanza, 1600–1700 m, 24 Apr 1985, *Harling & Andersson 24557* (AAU). NAPO: Cantón Archidona, road Hollín-Loreto, Rio Huataraco, 0° 43'S 77°32'W, 800–1000 m, 23–30 Aug 1989, *Cerón & Factos 7472* (MO).

Specimens of this taxon were identified by Skov (1989) and Borchsenius et al. (1998) as *Geonoma paradoxa* Burret, which it resembles in its spicate, long-pedunculate inflorescences, staminate flowers with diverging thecae borne on a short connective, and pistillate flowers with a digitately lobed staminodial tube. However, it differs from that species in its pinnate (vs. mostly simple) leaves with wider angles of basal pinna divergence (29–62° vs. 25–36°), and peduncular bracts longer than the prophylls (vs. shorter). It also differs in habitat. *Geonoma paradoxa* occurs at 60–400 m in lowland rainforest in coastal regions of southwestern Colombia and has recently been recorded also in northwestern Ecuador (*Beck 1757, 2251*); *G. ecuadoriensis* occurs at 800–1700 m in montane rainforest on eastern Andean slopes in Ecuador (Fig. 2B). It grows sympatrically with *G. macrostachys* Mart. var. *acaulis* (Mart.) A. J. Hend., from which, without staminate flowers, it is difficult to distinguish.

Geonoma hollinensis A. J. Hend., Borchsenius & Balslev sp. nov. Type: Ecuador. Napo: Hollín-Loreto road to Coca 27 km from take-off from Baeza-Tena road, 0°42'S 77°40'W, 1000–1100 m, 28 Sep 1995, *H. Balslev 6418* (holotype: AAU; isotype: QCA). (Fig. 4)

A *Geonoma triandra* differt foliis angustioribus, simplicibus, venis ad angulum angustius divergentibus et foveis floralibus spiralliter dispositis.

Stems clustered, 2–3 m tall, 0.9 cm diam., light brown, the internodes 0.4 cm at apex of stem. *Leaves* simple; sheaths 8.5 cm long; petioles 6–10.5 cm long; rachis 24.4–26.7 cm long, 2.9–3.4 mm wide at the base; veins diverging at an angle of 26–30° from the rachis; apical divisions 14.5–17.5 cm long, the veins diverging at an angle of 22–26°

from the rachis. *Inflorescences* interfoliar at anthesis, branched to two orders; prophyll 9.9–10 cm long, brown tomentose, longitudinally furrowed, splitting apically, persistent; peduncular bract not seen, inserted 0.9 cm from prophyll; peduncles 9.5 cm long, 2.6 mm wide at the first branch; rachilla 34, 8.2 cm long at base of inflorescence, 1.3 mm wide, sparsely covered with white, wooly, branched indument; flower pits spirally arranged, tricussately at apices of rachillae; upper lips hooded, without a central split, not ciliate, lower lips scarcely developed; staminate flowers 1.8 mm long; sepals free, imbricate, keeled, 1.8 mm long, ciliate; petals connate for ca. half their length, valvate above, 1.7 mm long; stamens 3; filaments united below for 1 mm, free above; thecae free, inflexed, borne on a short, bifid connective; pistillodes inconspicuous; pistillate flowers 1 mm long; sepals free, imbricate, keeled, 1 mm long; petals connate for ca. half their length, valvate above, 1 mm long; staminodial tube blunt at the apex; *fruits* not seen.

Local names and uses.—None recorded.

Distribution and habitat.—Ecuador (Napo), known only from the Hollín-Loreto-Coca road (Fig. 2C); montane rainforest on eastern Andean slopes at 1000–1200 m elevation.

Additional specimen examined. ECUADOR. NAPO entre el Rio Pucuno y el Caserío de Guamaní, carretera Hollín-Loreto-Coca, 0°46'S 77°26'W, 1200 m, 12 Dec 1987, *Cerón 2968* (AAU, MO).

Until now, the only known species of *Geonoma* with three stamens was *G. triandra* (Burret) Wess. Boer. This species, previously collected only from northwestern Colombia and adjacent Panama, has recently been found in northwestern Ecuador (*Bonifaz 3799, Rubio 1336* - Fig. 2C). *Geonoma hollinensis* resembles *G. triandra* in its staminate flowers with three stamens, but differs in its narrower, simple leaves with narrower angles of divergence, and in its spirally arranged rather than decussately arranged flower pits.

Geonoma lanata A. J. Hend., Borchsenius & Balslev, sp. nov. Type: Ecuador. Carchi:

Tulcan, Reserva Etnica Awá, Parroquia Chical, Centro Gualpi Medio, 1°02'N, 78°16'W, 900 m, 25 Feb 1993, *C. Aulestia* & *A. Grijalva 1200* (holotype: QCNE; isotypes: AAU, MO). (Fig. 5)

A. Geonoma spinescenti et *G. tenuissima* differt rachillis angulatis, dense lanatis et fructibus apiculatis.

Stems solitary or clustered, 0.5–2 m tall, 0.5–0.9 cm diam., light brown, the internodes 0.7–3.1 cm at apex of stem. Leaves 7–11, simple; sheaths 4–12.1 cm long; petioles 11–27.5 cm long; rachis 10.7–18.7 cm long, 1.2–2.5 mm wide at the base; veins diverging at an angle of 33–46° from the rachis at the base, 36–43° at apex, blade split at apex for 10.2–17 cm. Inflorescences interfoliar at anthesis, branched to one order; prophylls 9.6–10.5 cm long, splitting apically, persistent and tattering; peduncular bracts 7.8 cm long, inserted 1–6.9 cm above the prophyll; peduncles 4.4–15 cm long, 1.2–2.4 mm wide at the first branch; rachillae 2–5, 6–15.5 cm long at base of inflorescence, 1–2.4 mm wide, angular, densely covered with whitish-brown, woolly indument; flower pits spirally arranged; upper and lower lips continuous, forming a slightly raised cupule with irregular splits; staminate flowers 3 mm long; sepals free, imbricate, keeled, 3 mm long; petals connate for ca. half their length, valvate above, 2.4 mm long; stamens 6; filaments united below for 1 mm, free above; thecae free, inflexed, the connective scarcely developed; pistillodes inconspicuous; pistillate flowers 3.2 mm long; sepals free, imbricate, keeled, 3.2 mm long; petals connate for ca. half their length, valvate above, 3 mm long; staminodial tube blunt at the apex; fruits globose, 7–9.5 mm long, 5.4–6.8 mm diam., apiculate, black.

Local names and uses.—*Kerex, palmito, puntero*; no uses recorded.

Distribution and habitat.—Ecuador (Azuay, Bolivar, Carchi, El Oro, Esmeraldas) (Fig. 2D); lowland and montane rainforest on western Andean slopes at 216–1800 m elevation.

Additional specimens examined. ECUADOR. AZUAY: Naranjal-Machala road, 33 km from Machala and 6 km E along Rio Bonito, 3°04'S, 79°45'W, 400 m, 18 Nov 1987,

Skov et al. 64834 (AAU). BOLIVAR: Hacienda Changuil, Agua Clara, 2°06'S, 79°10'W, 450 m, 29 Sep 1995, *Cornejo 4524* (K, NY). CARCHI: Tulcan, Reserva Etnica Awá, Comunidad El Baboso, 1°02'N, 78°16'W, 1600 m, 20 Sep 1991, *Rubio et al. 2184* (AAU); San Marcos de los Coaquienses on trail to Gualpi Bajo, 1°06'N 78°17'W, 1000 m, 7 Feb 1985, *Ollgaard et al. 57518* (AAU); San Marcos de los Coaquienses on trail Chical-Tobar Donoso, 1°06'N, 78°16'W, 800 m, 8 Feb 1985, *Ollgaard et al. 57626* (AAU); Tulcan, Reserva Etnica Awá-Camumbi, 0°53'N 78°16'W, 1700–1900 m, 20–29 Jul 1991, *Quelal et al. 175* (AAU, MO). EL ORO: Sambotambo, along road going north 8 km W of Piñas, km 6, 3°35'S 79°49'W, 1200 m, 19 Dec 1992, *Borchsenius 42* (AAU), 6 Oct 1995, *Borchsenius & Pedersen 334* (AAU, NY). ESMERALDAS: road from Ibarra to Lita, 8–11 km beyond Lita, 0°5'N 78°27'W, 800–900 m, 14–16 May 1986, *Balslev et al. 62099* (AAU); Awá Reserve, between Community of Mataje and Tobar Donoso, 1°15'N, 78°40'W, 216 m, 1 Oct 1993, *Beck et al. 2218* (NY); Community of La Union, 1°00'N, 78°33'W, 380 m, 9 Jul 1994, *Beck et al. 2263* (NY); road from Lita to San Lorenzo, 14 km beyond Lita, 0°52'N 78°28'W, 740 m, 6 Jun 1988, *Bergmann & Laegaard 67236* (AAU); km 39, 0°50'N, 78°35'W, 500 m, 22 May 1993, *Borchsenius & Seeger 94* (AAU); 24 km from Lita, 0°51'N 78°35'W, 840 m, 12 Oct 1987, *Skov & Borchsenius 64741* (AAU); 13–15 km beyond Lita, 0°50'N 78°32'W, 900 m, 13 Oct 1987, *Skov & Borchsenius 64745* (AAU); Reserva Cotacachi-Cayapas, La Aguita, 0°48'N, 78°44'W, 190 m, 26 Jun 1998, *Cornejo & Bonifaz 3809* (AAU); 1 km from Rio Tigre, 0°35'N, 78°56'W, 500 m, 13 Sep 1998, *Cornejo & Bonifaz 6537* (AAU).

Specimens of this species were identified by Skov (1989) as *Geonoma* aff. *pauciflora* Mart., and were considered as a western Andean form of *G. leptospadix* Trail by Borchsenius et al. (1998). *Geonoma lanata* differs from both these species in its angular, densely woolly rachillae and apiculate fruits. It also differs in habitat. *Geonoma pauciflora* occurs at 50–770 m elevation in the Atlantic coastal forest of eastern Brazil, and *G. leptospadix* occurs at 140–850 m elevation in lowland Amazon rainforest.

In preliminary phylogenetic studies (Henderson, in prep.), *Geonoma lanata* appears most closely related to a group of species having narrow rachillae and cupular flower pit lips (*G. spinescens*, *G. tenuissima*, and two undescribed species from the Pacific coast of Colombia). It differs from these in its angular, densely woolly rachillae and apiculate fruits.

***Geonoma skovii* A. J. Hend., Borchsenius & Balslev sp. nov.** Type: Ecuador. Morona-

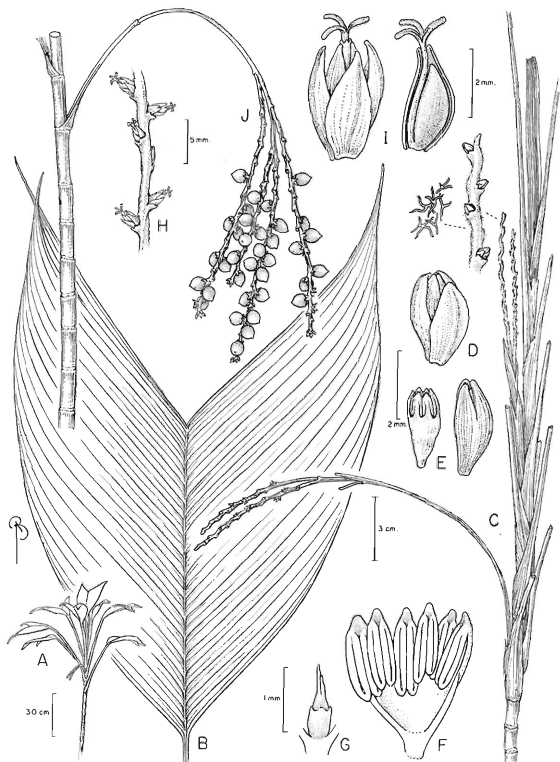


FIG. 5. *Geonoma lanata*. A. Habit. B. Leaf. C. Section of stem with leaves removed, showing inflorescences and detail of rachilla and woolly hairs from rachilla. D. Staminate flower. E. Staminate flower with petals removed (left) and petals (right). F. Internal view of staminate flower. G. Pistillate flower with perianth removed showing staminodial tube and stigmas. H. Section of rachilla with pistillate flowers. I. Pistillate flower and section of pistillate flower. J. Inflorescence. (A, C-G from Skov 64834, B, J from Balslev 62099, H, I from Rubio 2184.)