emerging, bumpy from the numerous, subepidermal, tangential, short fibers present, these coming to a point at fruit apices; locular epidermis without operculum, smooth, without pores.

Taxonomic notes:—*Geonoma longivaginata* is a member of a group of three species within the *G. sutricta* clade, the other two being *G. divisa* and *G. ferruginea*. It differs from *G. divisa* in its crenulate or shallowly lobed staminodial tube; and from *G. ferruginea* in its rachillae with short, transverse ridges.

Subspecific variation:—Two traits vary within this species (stem branching, adaxial veins). The species is distributed in Panama and Costa Rica and just reaches Nicaragua. It is divided into several disjunct populations. The state distribution of one trait (adaxial veins) together with geography suggest several subgroups.

Specimens with raised adaxial veins occur in Panama (San Blas) and are treated as a separate subgroup. Specimens with non-raised adaxial veins occur in five areas: Atlantic slope in Costa Rica and adjacent Nicaragua and Panama; Pacific slope in Costa Rica; El Copé, Llano Grande, and Cerro Tife in Panama; El Valle in Panama; and the Santa Rita Ridge in Panama. Specimens from the Atlantic and Pacific slopes in Costa Rica do not differ significantly from each other in any quantitative variable, and these are treated as one subgroup. There are thus five potential subgroups, but there are only three specimens of one of these, from the Santa Rita Ridge in Panama, too few to test for differences. Four potential subgroups are tested for differences.

ANOVA shows that for pair wise comparison probabilities, all variables except leaf number and fruit length differ significantly ($P<0.05$) between at least one pair of subgroups, although no variable differs amongst all four subgroups. Based on these results and geography, the four subgroups are recognized as subspecies. Specimens from Santa Rita Ridge in Panama are included with those from the Atlantic and Pacific slopes in Costa Rica (see below) (subspp. *copensis, longivaginata, sanblasensis, vallensis*).

Key to the subspecies of *G. longivaginata*

1 Veins raised and rectangular in cross-section adaxially; Panama (San Blas) ..... subsp. *sanblasensis*
- Veins not raised or slightly raised and triangular in cross-section adaxially; Nicaragua, Costa Rica, and Panama..... 2
2 Rachis 67.2(42.0–101.0) cm long; rachillae 7(4–18), 25.7(10.0–42.0) cm long..... subsp. *longivaginata*
- Rachis 24.9(16.5–37.5) cm long; rachillae 3(2–5), 17.5(14.0–25.2) cm long..... 3
3 Peduncles 5.2(3.8–7.5) cm long: El Copé, Llano Grande, Cerro Tife..... subsp. *copensis*
- Peduncles 9.2(7.4–12.1) cm long; El Valle..... subsp. *vallensis*

35a. *Geonoma longivaginata* subsp. *longivaginata*

Leaves veins not raised or slightly raised and triangular in cross-section adaxially; rachis 67.2(42.0–101.0) cm long. *Inflorescences* peduncles 9.5(5.0–16.0) cm long; rachillae 7(4–18), 25.7(10.0–42.0) cm long.

Distribution and habitat:—From 8°40'–11°30'N and 79°40'–84°25'W in Nicaragua, Costa Rica (Atlantic and Pacific slopes) and Panama at 185(5–1000) m elevation in lowland tropical rainforest (Fig. 24). The outlying specimens from the Santa Rita Ridge in Panama (*de Nevers 10649, Hammel 14498, Porter 4741*) have fewer pinnae, wider basal pinnae, and fewer rachillae than the others, but there are too few specimens to test for differences. Three specimens (*Cooper 493, de Nevers 6864, Lewis2162*) from western Panama are smaller than others and resemble *Geonoma deversa* subsp. *deversa* (although this subspecies does not occur in the area). They may be hybrids and are not included in the above description and analysis.

35b. *Geonoma longivaginata* subsp. *copensis* Henderson, *subsp. nov.* (Appendix IV, Plates 40 & 41)

A subspeciebus aliis venis haud prominentibus atque pedunculis brevioribus differt.

Type: PANAMA. Coclé: continental divide above El Copé, 8°38'N, 80°39'W, 650–750 m, 27 November 1985, *G. de Nevers, A. Henderson, H. Herrera, G. McPherson & L. Brako 6392* (holotype PMA!, isotypes NY!, MO!).

Leaves veins not raised or slightly raised and triangular in cross-section adaxially; rachis 23.5(16.5–30.0) cm long. *Inflorescences* peduncles 5.2(3.8–7.5) cm long; rachillae 3(2–4), 17.0(14.0–20.5) cm long.

Distribution and habitat:—From 8°37'–8°47'N and 80°28'–80°39'W in central Panama (Cerro Tife, El Copé, Llano Grande) at 721(200–1200) m elevation in lowland to montane tropical rainforest (Fig. 24).

35c. *Geonoma longivaginata* subsp. *sanblasensis* Henderson, *subsp. nov.* (Appendix IV, Plates 42–44)

A subspeciebus aliis venis prominentibus differt.

Type: PANAMA. San Blas: El Llano-Carti road, km 17–19, 9°19'N, 78°55'W, 19 June 1986, *C. de Nevers & H. Herrera 7957* (holotype NY!, isotype MO, *n.v.*).

Leaves veins raised and rectangular in cross-section adaxially; rachis 52.8(42.0–64.0) cm long. *Inflorescences* peduncles 11.4(8.0–14.0) cm long; rachillae 6(4–8), 27.7(22.3–37.0) cm long.

Distribution and habitat:—From 9°19'S–9°24'N and 78°48'–79°08'W in San Blas, Panama at 322(80–450) m elevation in lowland rainforest (Fig. 24).

One specimen (*de Nevers 4959*—excluded from the above analyses and descriptions) is considerably smaller than the others and) may be a hybrid with *Geonoma deversa*.

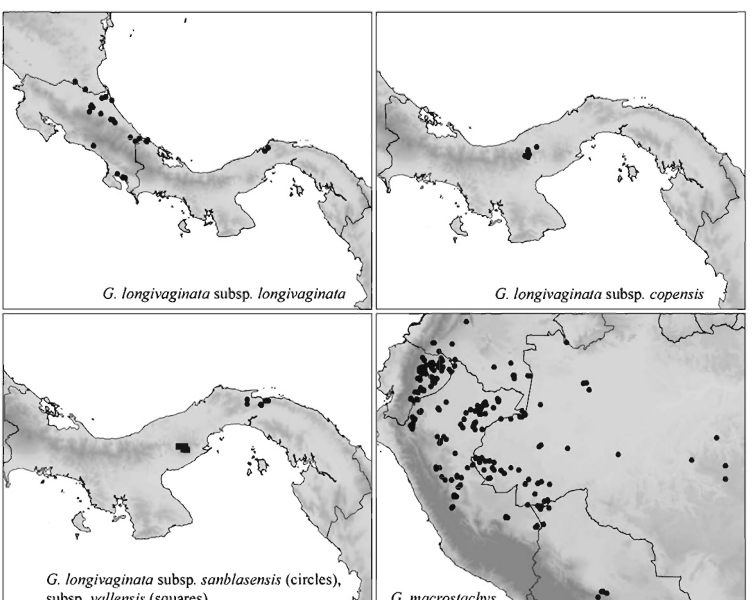

FIGURE 24. Distribution maps of *Geonoma longivaginata* subsp. *longivaginata*, *G. longivaginata* subsp. *copensis*, *G. longivatinata* subsp. *sanblasensis*, *G. longivatinata* subsp. *vallensis*, and *G. macrostachys*.