A New Species of *Zamia* (Zamiaceae) from Ecuador

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ABSTRACT. A new species in the genus *Zamia* (Zamiaceae), *Z. gentryi*, from northwestern Ecuador is described. This arborescent species appears to be most closely allied to *Z. roezlii* Linden, with which it grows sympatrically along the margins of the populations. *Zamia gentryi* is occasionally found growing as an epiphyte. Character states that distinguish the two species are presented.

The genus *Zamia* is restricted to the tropics and subtropics of the Western Hemisphere, where about 55 species are recognized as valid. Another five (or more) species are recognized but have not been formally described. Four species have been reported from Ecuador with *Z. amplifolia* Hort ex Masters, *Z. lindenii* Regel ex Andre, and *Z. roezlii* Linden known from the western side, and *Z. ulei* Dammer vel aff. from the Amazon drainage. *Zamia poeppigiana* Martius & Eichler has been reported from southeastern Ecuador but no specimens have been seen. Some cycad specialists consider *Z. lindenii* to be synonymous with *Z. poeppigiana*. I do not consider them to be the same.

Zamia gentryi Dodson, sp. nov. TYPE: Ecuador. Esmeraldas: km 18 Lita to San Lorenzo, near Alto Tambo, 78°30′W, 00°47′N, (male plant), 800 m, 19 July 1988, *C. H. Dodson & A. H. Gentry 17520A* (holotype, QCNE; isotypes, AAU, MO, NY, RPSC, SEL, U). Figure 1A–F.

Haec species *Z. roezlii* affinis sed foliolis flavovirentibus, venatione infra glabra nonprotuberanti, microstrobilo rubiginoso, pedunculo decumbenti, megastrobilo cupiformi, megasporphyllis extus villosis differt.

Stems to 1 m or more long, recumbent if terrestrial, U-shaped if epiphytic, to 12 cm diam., in cultivation to 25 cm diam. Leaves 5 to 9 (to 13 in cultivation), stiffly erect to arching; emerging bright reddish green, turning pale yellow-green on both sides with age, to 2.5 m long; petiole 45–90 cm long, armed with stout, terete spines to 1 cm long; leaflets opposite to subopposite, narrowly ovate, somewhat oblique, lightly falcate, to 40 cm long, 3.5 to 6 cm wide, apex acute, margin entire, base attenuate; veins obvious, parallel, sunken into the surface on both sides of the leaflet; cataphylls fleshy, elongate-triangular, those preceding cone formation with a long, twisted, acuminate apex, to 12 cm long. Microsporangiate strobili 1–7, peduncle decumbent, flattened-cylindrical, to 25 cm long, fertile portion erect, wine-red, to 35 × 3.8 cm; microsporophylls hexagonal, spirally arranged, with smooth, quadrate, dome-shaped, wine-red apices; sporangia all located on the abaxial surface. Megasporangiate strobili 1 per plant, red-brown, barrel-shaped, to 30 cm long and 15 cm diam. when mature; megasporophylls hexagonal with a short, apical, hexagonal annulus, completely red-brown-villose over the exposed surface, arranged in 7–10 overlapping ranks, with 12–30 per row. Seeds obovoid, sometimes slightly 3-lobed, to 3.5 × 1.7 cm, sarcotesta pink to reddish at maturity.

Named to honor the late Alwyn H. Gentry, who participated in the collection of the type specimen. Dr. Gentry was a close friend whose knowledge and capacity for imparting his enthusiasm are sorely missed.

Distribution and ecology. *Zamia gentryi* appears to be restricted to extremely wet, premontane pluvial forest in the Provinces of Carchi and Esmeraldas in northwestern Ecuador at elevations from 300 to 1800 m. The region is poorly known botanically, and the distribution of the species is probably much more extensive, entering into similar habitat in southwestern Colombia. The soils around Alto Tambo are almost pure kaolin, extremely compact, and nonabsorbent. Some plants are encountered growing as epiphytes. Those growing on the surface of this soil do not have the trunk extended into the kaolin but rather are lying on the surface with the roots disseminated into the thin topsoil covering the kaolin. Plants growing on the forest floor are in dense shade. Rainfall at Alto Tambo has been recorded at 6500 mm per year.

Plants of *Zamia gentryi* and *Z. roezlii* occur sympatrically between km 35 (400 m) and km 41 (300 m) on the road from Lita to San Lorenzo. No suggestion of hybridization was encountered. Cones begin to emerge in both species in December with the beginning of heavy rains. Male cones take about 90 days to mature and female cones become receptive by spreading of the megasporophylls about 90

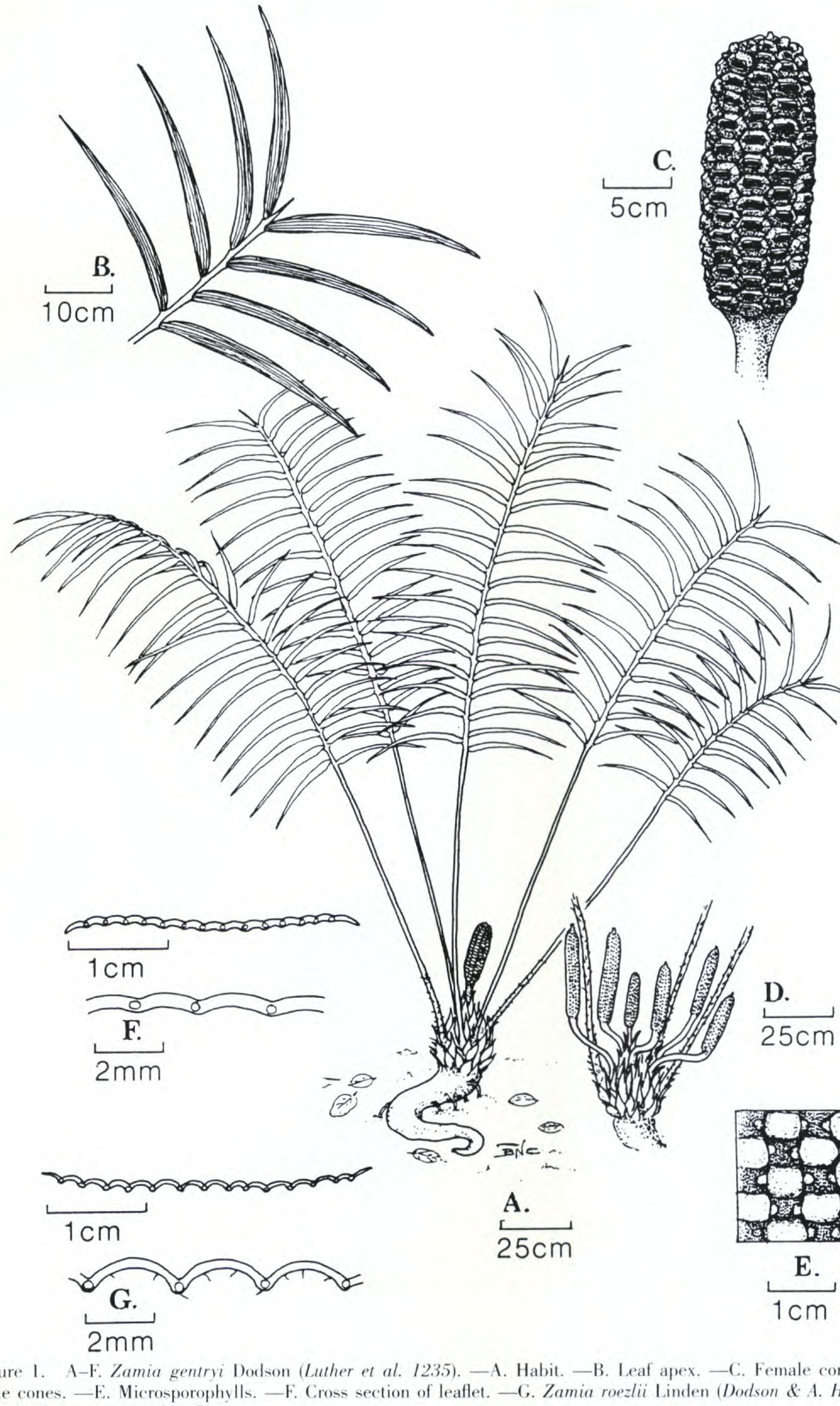

Figure 1. A–F. *Zamia gentryi* Dodson (*Luther et al. 1235*). —A. Habit. —B. Leaf apex. —C. Female cone. —D. Male cones. —E. Microsporophylls. —F. Cross section of leaflet. —G. *Zamia roezlii* Linden (*Dodson & A. H. Gentry 19048*). Cross section of leaflet.

days after emergence. Seed ripens in about a year. No noticeable fragrance was emitted from either male or female cones of either species at anthesis. No beetles were found visiting male cones of plants cultivated at the Rio Palenque Science Center. Beetles are common at that site visiting the powerfully fragrant cones of *Z. lindenii* Regel produced by plants natural to the locality.

Paratypes. ECUADOR. **Carchi:** Canton Tulcan, Tobar Donoso, Reserva étnica Awá, 78°25′W, 00°53′N, (female plant), 1800 m, 17–27 Aug. 1992, *G. Tipaz, M. Tirado, C. Aulestia, N. Gale & P. Ortiz 1878* (QCNE). **Esmeraldas:** Km 18, Lita to San Lorenzo, 78°30′W, 00°47′N, (plant sterile), 800 m, 12 Jan. 1991, *B. Øllgaard, J. Korning & K. Krogstrup 98726* (AAU, QCNE), km 16, (female plant), 750–850 m, *C. Dodson, H. van der Werff & W. Palacios 17107* (QCNE), (female plant), 3 Sep. 1993, *C., P. M. & T. Dodson 19098* (QCNE), (female plant), 22 Feb. 1988, *H. Luther, J. Kress & Roesel 1235* (SEL).

Features that Distinguish *Z. gentryi* and *Z. roezlii*

DISTRIBUTION

Zamia gentryi: Northwestern Ecuador at elevations from 300 m to 1800 m. *Zamia roezlii:* Coastal Colombia south to northwestern Ecuador at elevations from sea level to 300 m (in Ecuador).

PLANT HABIT

Zamia gentryi: In wild plants the stem reaches 1 m long and 12 cm in diameter, but lies on the surface of the ground or if epiphytic has a characteristic U-shape. In cultivated plants growing in open sunlight the stems may be partially erect, to 70 cm tall and 25 cm in diameter. *Zamia roezlii:* Stiffly erect to 5 m tall (occasionally recumbent after falling over) and 30 cm in diameter.

LEAVES

Zamia gentryi: From 5 to 13 on mature plants, stiffly erect-spreading. *Zamia roezlii:* From 15 to 45 on mature plants, erect-spreading to slightly curved.

LEAFLETS

Zamia gentryi: Leaflets pale yellow-green on both surfaces. Veins evident but immersed in the tissue of the leaflet surface, completely glabrous (Fig. 1F). *Zamia roezlii:* Dark green on the upper surface, pale green on the under surface. Veins on the under surface prominent and well-protuberant, with scattered red-brown trichomes to 0.5 mm long on the veins and occasionally between the veins (Fig. 1G).

MALE CONES

Zamia gentryi: Peduncles recumbent, produced from the trunk apex, to 20 cm long; the fertile portion erect, to 35 cm long and 3.8 cm in diameter, wine-red. Microsporophylls with a wine-red exposed outer surface. *Zamia roezlii:* Erect from the trunk apex, the peduncle straight or only slightly curved, to 30 cm long; the fertile portion to 40 cm long and 6 cm in diameter, pale pinkish gray. Microsporophylls pinkish gray on the exposed outer surface.

FEMALE CONES

Zamia gentryi: Barrel-shaped to cylindrical to 30 cm long when mature, red-brown. Megasporophylls completely covered with dense, villose, red-brown trichomes on the exposed outer surface, the hexagonal, slightly-raised margin villose. Seeds covered in a pink to red, fleshy sarcotesta, the seeds to 3.5 cm long and to 1.7 cm in diameter. *Zamia roezlii:* Cylindrical to 90 cm long when mature, red-brown. Megasporophylls with the hexagonal, raised margin glabrous and the concave cavity in the center hirsute. Seeds covered in an orange-red, fleshy sarcotesta, the seeds to 3.3 cm long and to 1.5 cm in diameter.

Specimens of Zamia roezlii *studied:* COLOMBIA. Near Buenaventura, cultivated at Fairchild Tropical Gardens, 3 plants grown at RPSC, *Dodson 19453* (RPSC). ECUADOR. **Esmeraldas:** near San Lorenzo, 4 plants cultivated at RPSC, *Dodson 19622* (RPSC); km 41, Lita to San Lorenzo, (male plant), 78°31′W, 00°47′N, 300 m, 6 May 1993, *Dodson & T. Neudecker 19083* (QCNE, RPSC), km 35, (female plant), 400 m, *Dodson & A. H. Gentry 19048* (RPSC); Eloy Alfaro, Reserva Ecológica Cotacachi-Cayapas, Paroquia Luis Vargas Torres, Río Santiago, Estero Angostura, (female plant), 78°45′W, 00°49′N, 250 m, 28–31 Oct. 1883, *M. Tirado, P. Asimbaya, M. Oroso & J. Arroyo 646* (QCNE); San Lorenzo, Reserva Étnica Awá, Centro Ricaurte, (sterile plant), 78°32′W, 01°10′N, 300 m, 28 Oct. 1992, *G. Tipaz, C. Aulestia & F. Pascal 2242* (QCNE); Eloy Alfaro, Comuna Corriente Grande, Río Chimbagal, (sterile plant), 78°50′W, 00°41′N, 300 m, 7 Aug. 1993, *A. Yanez, M. Chapiro & M. de la Cruz Añapa 1413* (QCNE).

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