Grammitis succinea, the First New World Fern Found in Amber

LUIS DIEGO GÓMEZ P.*

Although Dominican ambers are known for their arthropod fauna, no systematic examination has ever been attempted of the plants they contain, even though plant remains usually are well preserved in ambers (Czeczott, 1960). Non-vascular cryptogams (mosses and lichens) also are commonly preserved, but apparently only two vascular cryptogams have ever been reported, both ferns from Baltic ambers (Caspary & Klebs, 1907; Magdefrau, 1957). The present report is the first record of a fern from New World amber and is the first species of the genus *Grammitis* to be found in amber.

There are several deposits of amber in Central and South America, but the most famous New World deposits are at Simojovel, Chiapas, Mexico, and in the Dominican Republic on the Caribbean island of Hispaniola. The latter, considered like the Chiapas deposits to be late Oligocene in age, has been known since Columbus reported on it in the account of his second voyage to the West Indies (Langenheim, 1964). Dominican amber contains many well preserved arthropods and some fragmentary, little-studied plant materials. This has led to extensive exploitation of these fossil resins, which are sold as elaborate jewelry or in bulk, but almost always without precise data as to their location on the island.

The plants from which the Dominican amber originated was for many years unknown. Sanderson and Farr (1960) suggested *Pinus* as a possible source because of the strong, turpentine-like odor obtained from freshly sawed or filed amber. Recently, Langenheim (pers. comm., 1980) has indicated that Dominican amber is the fossilized resin of *Hymenaea* trees (Leguminosae).

The fragment of Dominican amber containing the fern described in this paper was donated to the Museo de Entomología, Universidad de Costa Rica, where it was polished by abrasion with carborundum and water on rotating, leather-covered wooden disks. The amber was photographed on a light table. All microscopic observations and measurements were made under a dissecting microscope using transmitted light, reducing refraction by immersing the amber in a 95% solution of ethanol. Two small samples of amber were chipped from the specimen in an unsuccessful attempt to find spores of the fern. No attempt was made to extract the fern from the amber because of the scarcity of the material, although extraction is possible using Voigt's (1936) method. The reconstruction was traced from a photographic print, correcting for curvature in the material.

Grammitis succinea L. D. Gomez, sp. nov. **Figs. 1–2.**

Rhizome and stipe unknown. Fronds of unknown length, probably ca. 35 cm long, ca. 60–70 mm wide near the apex, pinnate, herbaceous. Rachis dark brown, terete, without scales, densely hairy; hairs unicellular, setose, stiff, 1–1.8 mm long, ca. 0.3 mm in diameter at the widest point. Pinnae 30–40 mm long, 4–6 mm wide, lanceolate, opposite, entire except shallowly crenate towards the apex, rounded to

*Museo Nacional de Costa Rica, Apartado 749, San José, Costa Rica.

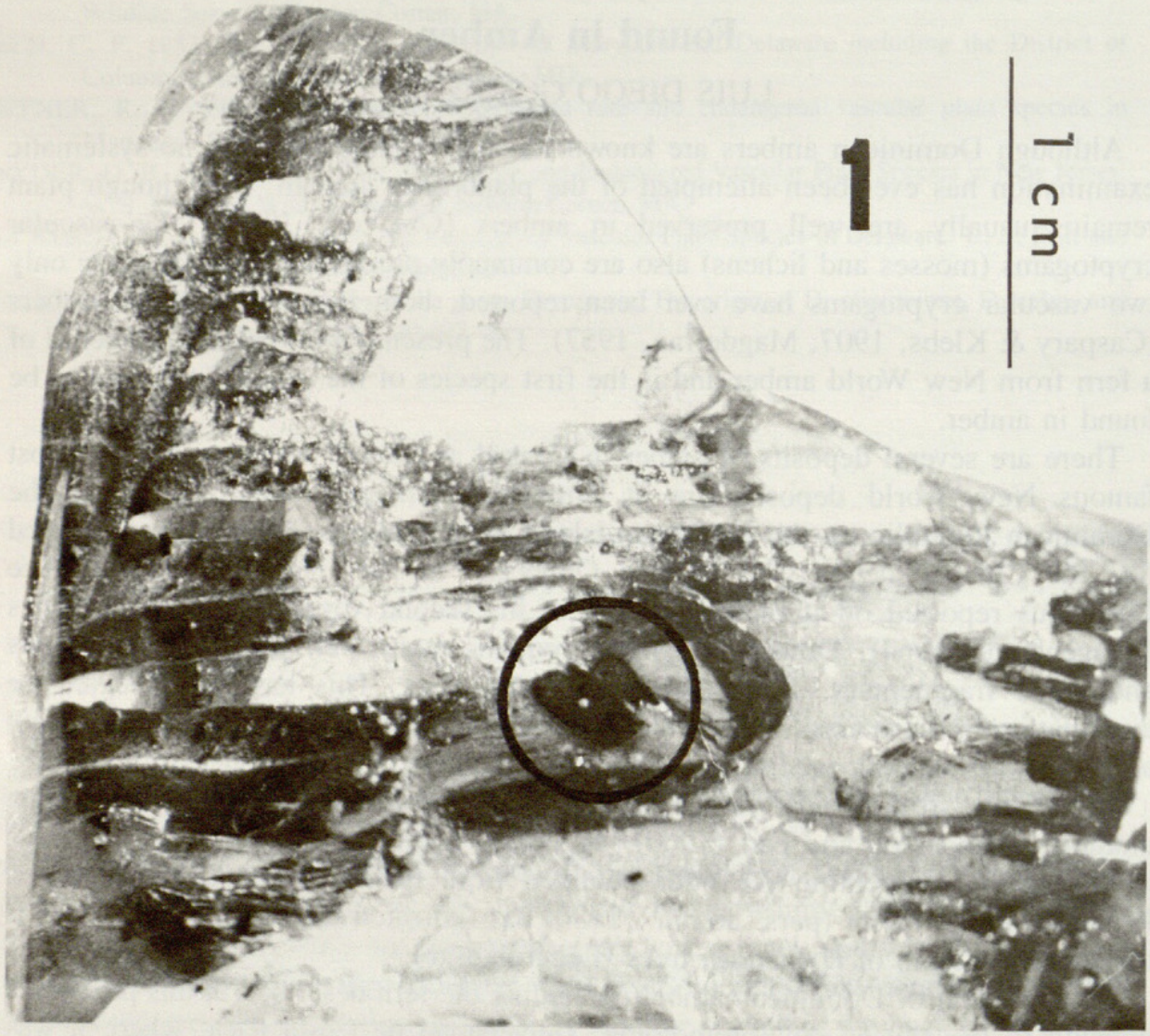

FIG. 1. Fragment of amber bearing *Grammitis succinea;* an embedded insect is circled, × 3.6.

obtuse at the apex, inequilateral at the base, the upper base rounded, subauriculate, truncate, the lower base decurrent. Laminae and costae pilose on both surfaces, the hairs similar to those of the rachis. Costae prominent dorsally, straight in the proximal two-thirds, flexuose and tenuous near the apex. Veins free, 1-forked, never reaching the margin, slightly curved towards the pinna apex. Sori discrete, 12–14 per pinna, medial, subalternate to opposite, round, small, exindusiate, terminal on the acropetal branch of the vein, usually 1 per vein pair, exceptionally 2. Spores unknown.

TYPE: Without precise locality, Dominican Republic, *Monge 80–12*, deposited in the Museo de Entomología, Universidad de Costa Rica.

Because of the presence of setose, stiff hairs (rather than scales along the rachis) and sporangium stalks of only one column of cells, this fern is readily placed in the Grammitidaceae, rather than the Polypodiaceae, which is the other fern family to which it could belong. (The free, forked veins are found in both families, particularly in species of the *Polypodium pectinatum-plumula* complex, but setose hairs are

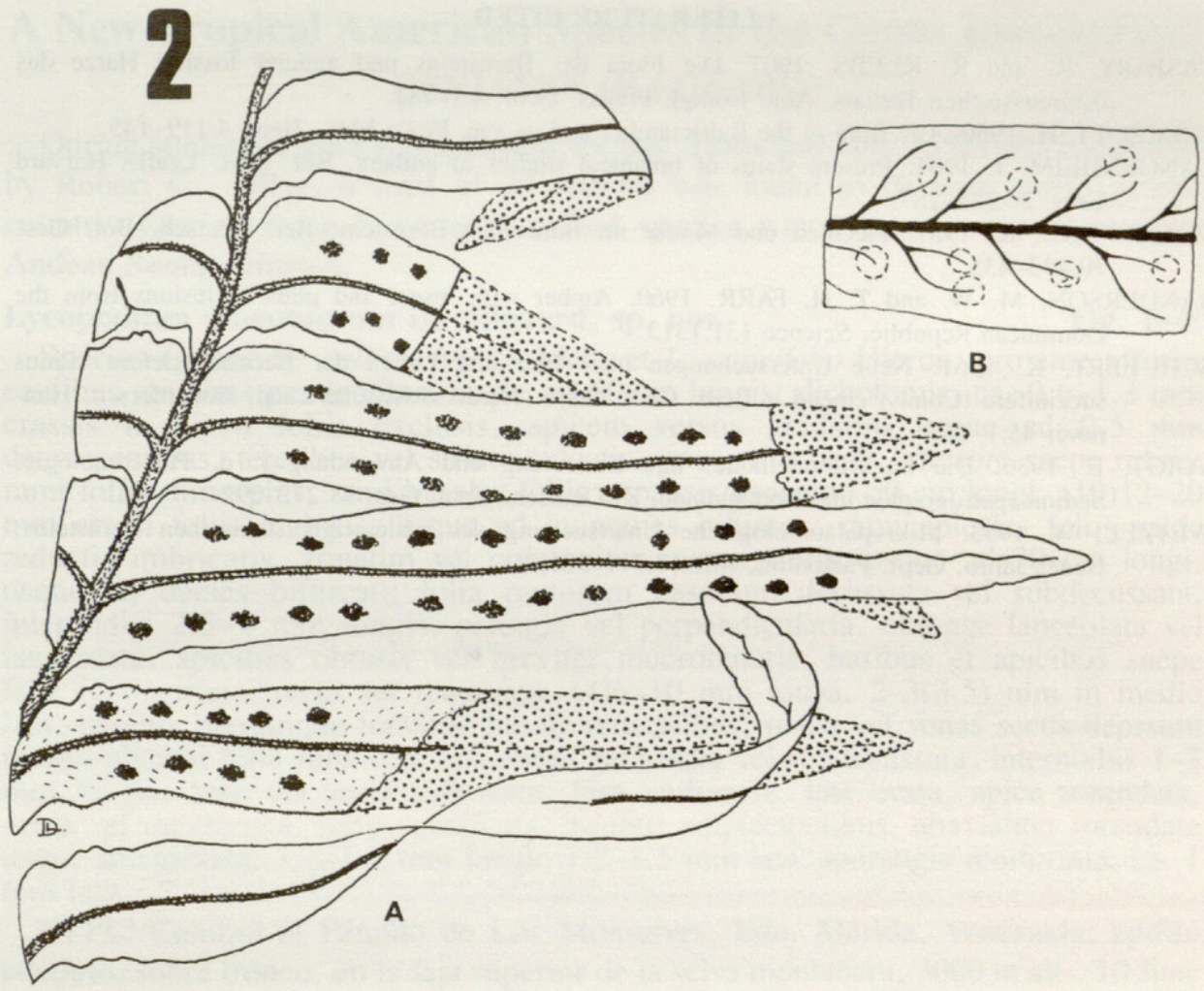

FIG. 2A. Reconstructed apical portion of *Grammitis succinea* frond, ×3.6. FIG. 2B. Pattern of venation and soriation, × 6.3.

unknown in Caribbean species of the Polypodiaceae.) Spores, which are monolete in the species of Polypodiaceae but trilete in those of the Grammitidaceae, would be useful to confirm the placement of the species, but unfortunately have not been recovered from the amber, an absence previously reported in some European ambers (Schubert, 1961), but not others (Wetzel, 1953). Among the New World genera of Grammitidaceae, the plant is obviously referable to *Grammitis* sect. *Cryptosorus*, which has pinnatisect laminae bearing several sori on each elongate lobe, rather than to any other genus of the family.

Other plant remains known from Dominican ambers need systematic study to develop information on the age of the deposits, as well as to provide floristic data for use in comparing them with plant remains found in Chiapas, Haiti, and Cuba. It is likely that such data would be useful in solving biogeographical problems in the Caribbean area.

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REVIEW

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