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SUPPLEMENT TO A MONOGRAPHIC STUDY OF THE
WEST INDIAN SPECIES OF PHYLLANTHUS

GRADY L. WEBSTER

WITH THE AID OF A GRANT from the National Science Foundation, the work on the West Indian species of *Phyllanthus* (Euphorbiaceae) earlier published in this journal (1956-1958) is now being expanded by use of various analytical techniques such as chromosome counts. During the summer of 1959, an extended tour through the West Indies made it possible to obtain more information on populations of a number of taxa. Certain species, especially those in sect. *Xylophylla*, will be treated in a future study dealing with intraspecific variation patterns. However, it seems appropriate to present here the observations that have accumulated on other species, as well as to note a few corrections. The numbers in brackets refer to the volume and page numbers of the monographic study in previous issues of this journal. Herbarium collections are those in the Stanley Coulter Herbarium, Purdue University (PUR), unless otherwise noted.

[38: 51.] Sect. 2. *Floribundi*.

4. *Phyllanthus tenellus* Roxb. Add the following locality record: PUERTO RICO: Bosque Estatal de Maricao, Hoconuco trail, weedy cleared area, Webster *et al.* 8901. This is the first record of this weedy species from Puerto Rico; it was not found elsewhere on the island. It may be expected to reach Cuba and Hispaniola, but thus far no specimens have been observed from either island.

[38: 56.] Sect. 3. *Kirganelia*.

According to Article 22 of the International Code of Botanical Nomenclature (1956 ed.), *Anisonema* cannot be retained as the epithet of this section, since it contains the type species of subgenus *Kirganelia*. The type species, when the section is given the epithet *Kirganelia*, must be *P. casticum* Willem. instead of *P. reticulatus*. This ruling is unfortunate, in my opinion, since it fallaciously assumes a parallel between typification of a genus or species with that of a subgenus. The subgenus does not appear in the name of a species and is a purely intercalary category, as is the section. That the new rule does not really contribute to stability is shown in the present case. If subgenera are recognized in *Phyllanthus*, the epithet of this section must be *Kirganelia*; but if one chooses not to recognize subgenera then the same section *must* take the epithet *Anisonema*.

[38: 297.] Sect. 11. *Phyllanthus*.

The synoptic key to taxa of sect. *Phyllanthus* requires two corrections: (1) the calyx lobes of *P. amarus* (no. 20) could often be described as apiculate, rather than acute; they are, in any event, distinctly more pointed than those in *P. debilis* or *P. fraternus*. (2) A misprint has occurred in lead 5 under the second lead 3. It should read as follows: "5. Style-branches not unusually modified; branchlets mostly with 15-30 leaves. . . ."

[38: 299.] Sect. 11. *Phyllanthus*, subsect. a. *Niruri*.

17. *Phyllanthus mimicus* Webster. The following additional collection has been recorded: TRINIDAD: without specific locality, *Fendler 680 ex p.* (BM). This collection resembles *P. niruri* in having only 20-25 leaves per branchlet rather than 35-45 as in the type collection of *P. mimicus*. However, the leaves are mostly only 4.5-5.5 mm. long, the male flowers are solitary and with calyx lobes 0.6-0.7 mm. in length, and the capsule is only c. 2 mm. broad. Since in all these respects Fendler's collection agrees with *P. mimicus*, the breakdown in the leaves-per-branchlet character does not efface the distinctions between *P. mimicus* and *P. niruri*. Further collections of *P. mimicus* are highly desirable, and it was quite disappointing that the plant was not located on the expedition trip to Tobago.

[38: 306.] Sect. 11. *Phyllanthus*, subsect. b. *Swartziani*.

18. *Phyllanthus debilis* Klein ex Willd. This species was recollected at Petit Bourg, Guadeloupe, after a 20-year interval (*Webster et al. 8986*), and, in fact, was locally common. It may therefore be considered as established, at least on Guadeloupe. So far, however, it has not been found on any other island.

21. *Phyllanthus stipulatus* (Raf.) Webster. Add the following locality record: ST. LUCIA: along trail, red clay soil, southeast slope of Piton Flor, *Webster et al. 9291*. This collection of *P. stipulatus*, the first recorded from St. Lucia, was interesting because of its small seed size. The mean of 30 seeds measures only 0.95 mm., and the range is from 0.93-1 mm. This is much smaller than measurements of a collection from Puerto Rico and two from Trinidad (*Webster et al. 8954, 9888, 9924*), which yielded mean seed lengths of 1.14, 1.06, and 1.12 mm. respectively. A collection of *P. caribaeus* (*Webster et al. 9677*) gave a mean seed length of only 0.9 mm. and a range of 0.85-0.95 mm. The St. Lucia collection is thus intermediate between the two species in seed size, but is closer to *P. caribaeus* and smaller than any collections of *P. stipulatus* seen elsewhere in Latin America. Nevertheless, in floral characters the St. Lucia collection conforms closely to *P. stipulatus*. It is possible that we are dealing here with an instance of introgressive hybridization. Although *P. caribaeus* has not been collected on St. Lucia, it might be expected to be

there, for it occurs on both Dominica and St. Vincent. Further field studies of this interesting species-pair on all the central Lesser Antilles are most desirable.

[38: 363.] Sect. 13. *Conami*.

As with sect. *Anisonema* (see above), the epithet of this section must be changed from *Nothoclema* to *Conami* in order to conform with the current rules of nomenclature.

[39: 50.] Sect. 15. *Botryanthus*.

For the same reason, sect. *Elutanthos* must be replaced by sect. *Botryanthus*.

45a. *Phyllanthus nutans* Sw. ssp. *nutans*. Additional field studies of this widespread Jamaican plant have only confirmed its previous systematic disposition. Better material obtained of the population in the John Crow Mountains (*Webster et al.* 8297) shows decisively that it cannot be given specific status. This population from the Ecclesdown area is distinguished by persistent stipules, tenuous pendent fruiting thyrses, and particularly by the large seeds. In this it resembles the population in the Cockpit country, as may be seen from the following table.

COLLECTION	LOCALITY	NO. SEEDS MEASURED	MEAN	<i>s</i>
<i>Howard et al.</i> 14769 (A)	John Crow Mts.	8	6.29 mm.	0.42
<i>Webster et al.</i> 8297	" " "	15	6.22	0.25
8402	Cockpit Country	15	6.11	0.18
8477	" "	5	6.83	0.26
8575	Seacoast near Lucea	4	4.39	0.16

The number of seeds available is small, so that a statistically satisfactory analysis cannot yet be made, but it would appear that populations of *P. nutans* at higher altitudes and in areas of greater rainfall tend to have larger seeds than those near the seacoast. A collection from Discovery Bay (*Hunnewell* 18844 [OH]) had seeds only about 4.1 mm. long, but the number of measurements was unfortunately not recorded. Collections from intermediate situations may have intermediate seed sizes (e.g., 5.29 mm. in *Webster & Proctor* 5516 from Big Level).

Such variation as this in the Jamaican populations of *P. nutans* is perhaps correlated with ecotypic differences. It seems possible that in dried, open habitats there is a selection for smaller seed size than in moister, closed ones, as suggested by Salisbury in "The Reproductive Capacity of Plants" (1942).

[39: 153.] Sect. 21. *Epistylum*.

Field studies in Jamaica have clarified to some extent the differences in

inflorescence between the three species of this section. Although *Phyllanthus cauliflorus* could not be located, collections of *P. cladanthus* (Webster et al. 8279) and *P. axillaris* (Webster et al. 8464, 8472) were most helpful toward a better understanding of the morphology of these species. It now appears that the inflorescence difference is more absolute than was previously mentioned. In *P. cladanthus* the flowers are strictly cauliflorous, while in *P. axillaris* they are strictly axillary. Only in *P. cauliflorus* do both types of distribution occur. Each of the three species, therefore, has a distinct pattern of flower production.

[39: 179.] Sect. 24. *Xylophylla*.

Extensive collections of members of this group were made in Jamaica, Puerto Rico, and Guadeloupe. However, the analysis of several of the species (such as *P. arbuscula* and *P. epiphyllanthus*) is still not complete



FIG. 1. Vegetative branch of *Phyllanthus eximius*.

and must be deferred to a separate paper. At this time the only addition to record is the following previously undescribed species.

During a botanical trip to Jamaica in the summer of 1954, Mr. George Proctor guided Dr. Kenneth Wilson and the author on a hike into the little-explored John Crow range in the eastern end of the island. About halfway up the rugged slopes of this precipitous limestone massif we discovered in the rain forest what was obviously an undescribed species of *Phyllanthus* sect. *Xylophylla*. Unfortunately the plants were entirely barren, and publication of the species had to be deferred until flowering material could be obtained. During a return trip to the original locality in the summer of 1959, we were fortunate to encounter a considerable number of flowering individuals in the cloud-swept scrubby forest on the

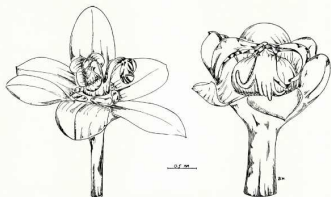


FIG. 2. Male flower and female flower of *Phyllanthus eximius*.

upper edge of the plateau at an altitude of somewhat over 2000 feet. Plants previously sent to the Harvard University greenhouses by Mr. Proctor also came into flower in 1959, so that there is no longer a shortage of fertile specimens.

84. *Phyllanthus eximius* Webster & Proctor, sp. nov.

Frutex vel arbuscula monoecia glabra 2-4 m. alta; phyllocladiis simplicibus rigidis spathulatis vel oblanceolatis 8-17.5 cm. longis, 1-4.5 cm. latis, costa venisque conspicuis, marginibus ora cinctis. Floribus ochroleucis vel rufidulis; flore masculo laciniis calycis plerumque 6, c. 1.1-1.6 mm. longis, staminibus 3 filamentis ad basin connatis; flore femineo pedicello crasso c. 1.3-2.2 mm. longo, 0.4-0.6 mm. diametro, laciniis calycis 6, c. 1-1.2 mm. longis; disco inconspicuo; stylis dilatatis subliberis c. 1 mm. longis, c. 4-6-lobis; capsula c. 3.3-3.7 mm. lata.

Glabrous shrub or small tree becoming c. 2-4 m. high; branches of current year's growth 3-7 mm. thick, reddish brown or often greyish or glaucous, smooth. Apical scaly cone irregular in outline, 8-12 mm. long, 5-10 mm. broad. Cataphylls persistent on current year's growth but subsequently deciduous, pale (stramineous or light brown), indurate; stipules and blade free from each other, lanceolate, acuminate (sometimes attenuately so), mostly 3-6 mm. long, tips erect or squarrose. Phylloclades (modified branchlets) unbranched, becoming somewhat rigid, spatulate to oblanceolate, c. (8-) 10-15(-17.5) cm. long, 1-4.5 cm. broad, obtuse or rounded to emarginate at the tip, with (25-)35-55 conspicuously notched nodes, gradually tapering to a petiole-like base c. 1-2 cm. long; midrib prominent on both sides, lateral veins straight, conspicuous, each ending at a marginal notch; margins with distinctly differentiated rim running between the notches. Foliage leaves (euphylls) not seen; cataphylls of phylloclades blackish brown, trifid, the tips soon breaking off, less than 1 mm. long.

Monoecious; cymules mostly bisexual, each with one female and several male flowers; flowers yellowish- or greenish-white, or reddish-tinged.

Male flower: pedicel slender, c. 1-2 mm. long. Calyx-lobes 6 (rarely 5), thin, more or less unequal, spreading, elliptic to obovate, the inner larger ones c. 1.1-1.6 mm. long and 0.9-1.3 mm. broad, the outer smaller ones c. 0.8-1.1 mm. long and 0.6-1 mm. broad; lobes obtuse or rounded (occasional ones apiculate) at the tip, midrib unbranched. Disk-segments 6, not very massive, roundish or ellipsoidal, mostly 0.3-0.5 mm. long. Stamens 3; filaments 0.5-0.8 mm. high, united only at the very base (up to 0.1-0.2 mm.) into a massive pedestal, ascending-spreading, the anthers horizontal or deflexed; anthers emarginate, 0.3-0.4 mm. long, 0.4-0.6 mm. broad.

Female flower: pedicel stout, straight, in fruit becoming 1.3-2.2 mm. long and 0.4-0.6 mm. thick. Calyx-lobes 6, stiff (subcoriaceous), ascending or spreading, unequal, c. 1-1.2 mm. long and nearly as broad, tips acute or obtuse, midrib not conspicuous. Disk inconspicuous, annular, not enclosing any part of the ovary. Ovary smooth; styles c. 1 mm. long, free except at the very base, spreading at anthesis (later more or less ascending), dilated distally, the style-tips cut into 4-6 slender subterete lobes.

Capsule oblate, rounded-trigonous, c. 3.3-3.7 mm. long; cocci c. 2.5 mm. long, reddish brown, not veiny; well-developed seeds not observed.

TYPE COLLECTION: Jamaica, Portland Parish, John Crow Mountains, 2-2.5 miles SW of Ecclesdown, rain forest on top of plateau, alt. c. 2000-2500 ft., 17 June 1959, *Webster, Miller, Ellis, & Proctor 8320* (Holotype, PUR; isotypes to be distributed). An additional collection from the same locality but a lower altitude (c. 1500 ft.) is *Webster & Wilson 5140* (PUR, GR).

This striking and attractive species (whence the epithet *eximius*, extraordinary) appears to be strictly endemic to the rain forest on the middle and upper slopes of the John Crow Mountains. Ecologically,

the plant belongs to that sizable class of endemic species of the John Crows adapted to growing on limestone rock almost bare of soil and under nearly continuous rainfall. The two collections cited are similar in most respects and are surely conspecific, but the phylloclades of the type collection are strikingly narrower than those of *Webster & Wilson 5140*, as appears from the following table.

	COLLECTION	NUMBER OF SPECIMENS	RANGE	MEAN	<i>s</i>
Phylloclade length	5140	25	88-173 mm.	125.8 mm.	40.0
	8320	50	81-165 mm.	130.4 mm.	25.1
Phylloclade width	5140	25	20-45 mm.	29.3 mm.	6.3
	8320	50	11-25 mm.	18.7 mm.	4.2
Number of nodes	5140	25	25-56	43.4	8.1
	8320	50	35-55	45.2	8.7

In order to accommodate *Phyllanthus eximius* in the treatment of sect. *Xylophylla* (Jour. Arnold Arb. 39. 1958), the key to the species of that section (p. 182) need be modified only at the last lead as follows:

1. Phylloclades each representing an entire branchlet, borne scattered directly on main stems.
 6. Cataphylls on main stem persistent, with stipules and blade fused (at least basally); phylloclades with indistinct lateral veins. 83. *P. epiphyllanthus*.
 6. Cataphylls on main stem more or less deciduous, stipules and blade free; lateral veins of phylloclades conspicuous. 84. *P. eximius*.

Although it keys out next to *Phyllanthus epiphyllanthus* because of its unbranched phylloclades, *P. eximius* is much more closely related to *P. arbuscula* and probably represents a highly specialized local population derived from that species. The resemblance to *P. arbuscula* is especially marked in the long, pale cataphylls forming an irregular apical cone and in the prominent lateral veins and distinct marginal rims of the phylloclades. However, in addition to having simple rather than compound phylloclades, *P. eximius* also differs from *P. arbuscula* in having a shorter, thicker fruiting pedicel and in the lesser degree of fusion of filaments in the male flower.

The description of *Phyllanthus eximius* rounds out the preliminary descriptive work in sect. *Xylophylla*; it is almost certain that all the species in the group have now received names. There remains much work of interest to do, however, in analyzing the taxonomic complexities of three species (*P. angustifolius*, *P. arbuscula*, and *P. epiphyllanthus*). From an evolutionary point of view *P. eximius* is most interesting as a demonstration that the reduction of compound to simple phylloclades has occurred twice and independently within the section, the simple phylloclades of *P.*

epiphyllanthus representing a reduction from those of *P. angustifolius*, while the simple phylloclades of *P. eximius* have been derived from compound ones such as those of *P. arbuscula*.

Field work during the summer of 1959 was supported by a grant from the National Science Foundation. Aid in obtaining collections was given by Mr. George Proctor on Jamaica; Mr. Roy Woodbury, of Río Piedras, on Puerto Rico; Dr. Henri Stehlé on Guadeloupe; Mr. Peter Paul on St. Lucia; and the staff of the Imperial College of Tropical Agriculture (including P. T. Richards, W. D. Richardson, and N. W. Simmonds) on Trinidad. The illustrations of *Phyllanthus eximius* (Figs. 1 and 2) were drawn by Barbara Webster from the author's preliminary sketches.

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