

BOTANY.—*Additional Costa Rican mosses, II.*<sup>1</sup> EDWIN B. BARTRAM,  
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Since the last paper on this subject was published the continued interest of Professor Manuel Valerio in the Costa Rican mosses has resulted in an accumulation of about 155 numbers, among which are some items of unusual scientific value.

The appended list includes only the species not recorded in the two previous publications (1, 2), to which has been added the description of a unique moss collected by Mr. Standley, which not only adds a new genus to the moss flora of North America but at the same time again emphasizes the close connection between the mosses of Costa Rica and those of the Cordilleran regions to the southward.

A complete series of specimens, including the types of the species described as new, has been deposited in the National Herbarium at Washington, D. C., and in the herbarium of the writer.

#### DICRANACEAE

##### DICRANELLA SUBINCLINATA Lor.

Chitaría, Province of Cartago, alt. 700 m., Dec. 20, 1928, M. Valerio no. 239.  
Previously known from Florida, the Antilles, Mexico and Panama.

##### SYMBLEPHARIS HELICOPHYLLA Mont.

Syn.—*Symbblepharis Oerstediana* C.M.

Volcán Irazú, alt. 3300 m., April 7, 1929, M. Valerio no. 297.

This is a decidedly more robust form than the plants I am familiar with in the southwestern United States and the leaf cells of the upper half of the blade are frequently in two layers. These characters are, however, by no means constant and it seems doubtful if the Costa Rican collections can be segregated from the type.

##### CAMPYLOPUS DONNELLII (Aust.) Lesq. & James.

La Hondura, Province of San José, alt. 1400 m., Jan. 15, 1929, M. Valerio no. 261.

There is no record of this species outside of Florida, as far as I am aware, so that its occurrence in Costa Rica is of uncommon interest. A single fruiting plant in the above collection is worthy of a brief description, as the sporophyte has, until now, been unknown.

Sporophyte-bearing plant 2.5 cm. high; stem leaves erect-appressed, comose at summit; seta solitary, 5–6 mm. long, sinuose, smooth; capsule (immature) erect, symmetrical, 1 mm. long, slightly furrowed when dry; lid erect or slightly oblique, about 0.65 mm. high; peristome and calyptra unknown.

<sup>1</sup> Received April 25, 1931.

## POTTIACEAE

## MERCEYA AGOYANENSIS (Mitt.) Broth.

Volcán Barba, alt. 2500 m., Dec. 16, 1930, M. Valerio no. 343.

So far as I know, this is the first species of *Merceya* to be recorded from tropical North America. The plants are somewhat larger than those of the type collection of *M. agoyanensis*, of Ecuador, which I have seen through the kindness of Mr. R. S. Williams, but the shape and structure of the leaves are identical in every particular.

## RHAMPHIDIUM MACROSTEGIUM (Sull.) Mitt.

Chitaría, Province of Cartago, alt. 700 m., Dec. 20, 1928, M. Valerio no. 229a.

Previously known from the Antilles and South America but new to Costa Rica.

*Leptodontium Orcutti* Bartr., sp. nov.

Figures 8-12

Dioicous? male flowers not seen. Stems up to 1.5 cm. long, densely caespitose, yellowish-green above, pale-brown below, more or less pale-tomentose except at the tips, flexuose, simple or branched; leaves crowded toward the tips, more distant below, appressed with incurved slightly crisped points when dry, spreading to squarrose-recurved when moist, oblong-ligulate, sheathing at the base, carinate-concave above, abruptly acute, about 2 mm. long by 0.5 mm. wide; margin slightly reflexed in the middle, crenulate with projecting papillae, flat and spinulose-serrate above; costa pale-yellow, about 75 $\mu$  wide, vanishing just below the apex, convex and minutely papillose on the back above; basal leaf cells rectangular, smooth with yellowish pellucid walls, shorter and subquadrate at the margins, quickly becoming shorter and papillose upward, upper cells rounded-hexagonal, 7-10 $\mu$  in diameter, rather obscure, densely papillose with numerous low papillae, not or hardly incrassate except toward the margins where 4-6 rows are rather strongly incrassate with irregularly thickened pellucid walls; perichaetial leaves similar to the stem leaves, about 3 mm. long, the inner erect and strongly sheathing; seta about 12 mm. long, pale yellow; capsule erect or slightly inclined, cylindrical, 1.5-2 mm. long, stramineous, exothecal cells rectangular, thin-walled, delicate and pale except 5-7 rows around the mouth which are subhexagonal or transversely rectangular with dark, reddish-brown incrassate walls; peristome about 0.2 mm. long, of 16 pale, obliquely papillose-striate teeth, divided to the base into 2 linear, somewhat confluent forks; lid erect, conic-rostrate, 0.5 mm. long; calyptra not seen; spores greenish-brown, granulose, 14-18 $\mu$  in diameter.

Type: Mineral del Chico, State of Hidalgo, Mexico, May 16, 1925, C. R. Orcutt no. 6731.

Other collections: Mexico: Pont de la Venta, Valle de Mexico, Bro. Arsène no. 1391. North Carolina; Chestnut Bald, Holz. Musc. Ac. Bor.-Amer. no. 264. Costa Rica; Volcán Irazú, alt. 3300 m., M. Valerio no. 293.

This species approaches *L. flexifolium*, of Europe, very closely but seems to be consistently distinct in several important particulars. The leaves are

more broadly bordered with thick-walled cells often 5-6 rows wide, the capsule is paler in color, the exothecal cells are thin-walled, and the peristome teeth are obliquely papillose-striate. The plants collected by Dr. Grout in North Carolina, and issued by Holzinger as no. 264 of his exsiccati, under the name *Didymodon flexifolius*, while sterile, are indistinguishable from the Mexican and Costa Rican collections, and I am satisfied that they should be referred here rather than to the European species, which does not seem to occur in North America.

Sterile plants of this species were received from my good friend M. Thériot as an undescribed species of *Leptodontium*, from Bro. Arsène's Mexican collections, but as Orcutt's specimen was in good fruiting condition M. Thériot generously suggested that his own name be suppressed.

**Leptodontium filescens** (Hampe) Mitt. var. **denticulatum** Bartr., var. nov.  
 Figures 1-7

More robust than the species, with longer, more sharply denticulate leaves, more rounded upper leaf cells, and setae up to 18 mm. long.

Type: Southern slope of the Volcán de Turrialba, near the Finca del Volcán de Turrialba, Costa Rica, alt. 2000-2400 m., Feb. 22, 1924, Paul C. Standley no. 35160a. c. fr.

Other collections: near the type locality, Standley no. 34953; near Finca la Cima, above Los Lotes, north of El Copey, Standley no. 42777; Volcán Poás, alt. 2500 m., M. Valerio nos. 284 & 285a.

These Costa Rican specimens do not seem to differ structurally from the species but they are uniformly coarser. The stem leaves are up to 2.5 mm. long, sharply denticulate toward the apex, and the setae are about twice as long as in the type collection of the species from Colombia. Numerous axillary claviform or cylindrical, septate gemmae occur in all of the collections representing both the type and the variety.

TORTULA MINIFOLIA (Sull.) Mitt.

Chitaría, Province of Cartago, alt. 700 m., Dec. 20, 1928, M. Valerio no. 221. Previously known from Cuba, Bolivia and Peru but new to Costa Rica.

BRYACEAE

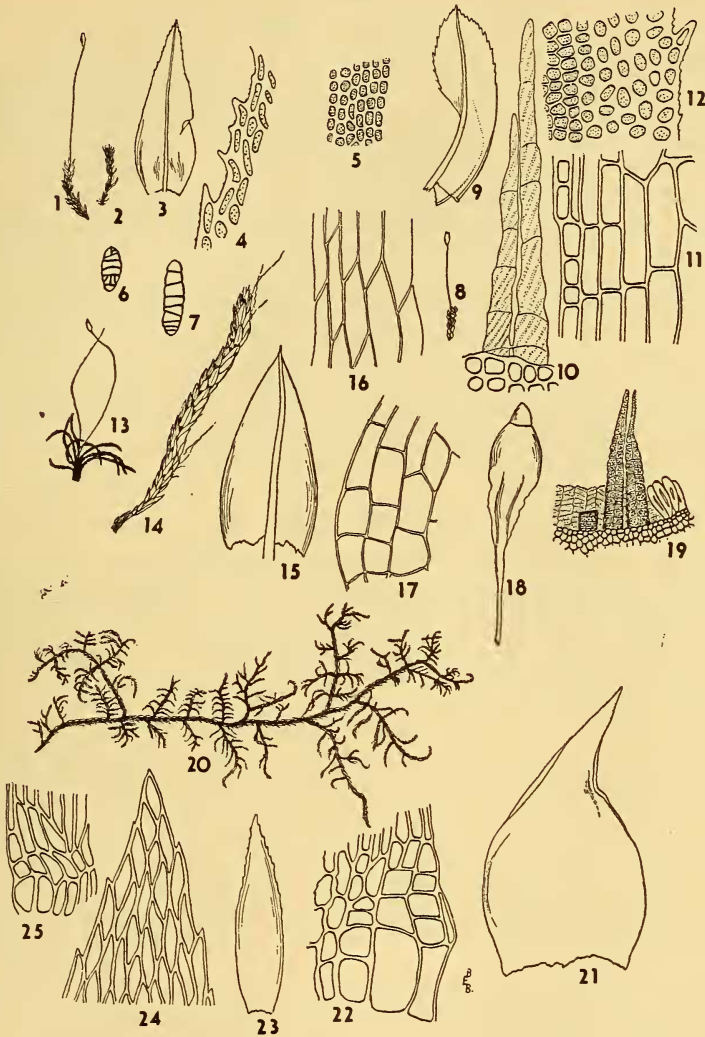
STABLERIA OSCULATIANA (DeNot.) Broth.

Volcán Irazú, alt. 3300 m., April 7, 1929, M. Valerio nos. 302 & 307.

I have referred these collections to the above species rather than to *S. tenella* (Mitt.) Broth. as the setae are all decidedly longer than the leaves. Specimens of the latter species in the writer's herbarium and in the herbarium of the New York Botanical Garden show considerable variation in this respect and it may, eventually, be necessary to reduce them to one species, in which event, *S. osculatiانا*, being the older name, would be retained.

MIELICHHOFFERIA PRATICOLA Card.

Volcán Irazú, alt. 3300 m., April 7, 1929, M. Valerio no. 303. Previously known only from Mexico.



Figures 1-7. *Leptodontium filescens* (Hampe) Mitt. var. *denticulatum* Bartr., var. nov. 1.—Fertile plant  $\times 1$ . 2.—Sterile stem  $\times 1$ . 3.—Stem leaf  $\times 9$ . 4.—Upper leaf margin  $\times 240$ . 5.—Upper leaf cells  $\times 240$ . 6 and 7.—Gemmae  $\times 40$ .

Figures 8-12. *Leptodontium Orcutti* Bartr., sp. nov. 8.—Fertile plant  $\times 1$ . 9.—Stem leaf  $\times 17$ . 10.—Part of peristome  $\times 240$ . 11.—Lower leaf cells  $\times 240$ . 12.—Upper leaf cells and margin  $\times 240$ .

Figures 13-19. *Brachymenium filescens* Bartr., sp. nov. 13.—Plants  $\times 1$ . 14.—Innovation  $\times 5$ . 15.—Leaf of innovation  $\times 40$ . 16.—Upper leaf cells  $\times 240$ . 17.—Basal angle of leaf  $\times 240$ . 18.—Capsule  $\times 12$ . 19.—Part of peristome  $\times 80$ .

Figures 20-25. *Acanthocladium costaricense* Dix and Bartr., sp. nov. 20.—Plant  $\times 1$ . 21.—Stem leaf  $\times 40$ . 22.—Basal angle of stem leaf  $\times 240$ . 23.—Branch leaf  $\times 40$ . 24.—Apex of branch leaf  $\times 240$ . 25.—Basal angle of branch leaf  $\times 240$ .

**Brachymenium filscens** Bartr., sp. nov.

Figures 13-19

Dioicous? male flowers not seen. Plants slender, loosely caespitose, sordid yellowish-green, slightly glossy. Stems short, radiculose below, with slender flexuose innovations up to 1 cm. long; leaves of the innovations appressed, ovate-oblong, acute, concave, 0.6-0.7 mm. long by 0.3 mm. or less wide; upper leaf cells linear-rhomboidal, thin walled, 60-75  $\mu$  long by 12-15  $\mu$  wide, narrower toward the margins but not forming a distinct border, shorter toward the base, several rows just above the insertion subquadrate; margin erect, entire below, usually minutely denticulate toward the apex; costa lutescent, percurrent or minutely excurrent; perichaetial leaves similar but slightly longer; seta red, slender, flexuose, about 14 mm. long; capsule erect or slightly inclined, 1.5-1.8 mm. long, claviform, reddish, gradually contracted to a slightly sulcate neck; peristome double, the inner a yellowish papillose tube without segments, about one third the height of the linear, papillose, well spaced teeth, annulus present; lid obtusely conic, about 0.3 mm. high; calyptra unknown; spores smooth, 10-12  $\mu$  in diameter.

Type: Cebadilla, Province of Alajuela, Costa Rica, alt. 700 m., Nov. 14, 1928, M. Valerio no. 209.

This species is probably nearest *B. murale* Schp. and *B. vinulosum* Card. from Mexico, in the Section *Dicranobryum*, but differs from both in the long flexuose innovations with closely appressed leaves. The percurrent or excurrent costa is also a distinctive character as compared with *B. murale* while the longer areolation and longer marginal cells preclude any confusion with the other species.

## BRYUM CRUGERI Hampe

Chitaría, Province of Cartago, alt. 700 m., Dec. 20, 1928, M. Valerio no. 222.

## EUSTICHIACEAE

## EUSTICHIA SPRUCEANA (C.M.) Par.

Piedra Blanca, Province of San José, alt. 2100 m., April 28, 1929, M. Valerio no. 310.

This unique moss has very much the appearance of a *Fissidens* to the naked eye. Although it has been found in Ecuador and Bolivia, this seems to be the first record for North America. A critical comparison with *E. miradorica* (C. M.) Par. would be very desirable but Dr. Reimers has informed me that, unfortunately, no specimen of the Mexican plant can be located in the herbarium of the Botanical Museum in Berlin-Dahlem.

## BARTRAMIACEAE

## BARTRAMIA COSTARICENSIS C.M.

Volcán Irazú, alt. 3300 m., April 7, 1929, M. Valerio nos. 305-308.

Both collections are sterile but the vegetative characters correspond very well with Müller's description.

## PHILONOTIS CRASSINERVIA Broth. &amp; Par.

Santa Cruz, Province of Guanacaste, alt. 50 m., Dec. 24, 1928, M. Valerio no. 243; La Estrella, Province of Cartago, alt. 1700 m., in water, Jan. 26, 1929, Valerio no. 260.

Previously known only from Colombia.

## HOOKERIAACEAE

## DALTONIA TENUIFOLIA Mitt.

San José, Province of San José, alt. 1135 m., Nov. 30, 1928, M. Valerio no. 205a.

An interesting northward range extension of a rare South American species.

## BRACHYTHECIAACEAE

## BRACHYTHECIUM LAXIRETICULATUM Card.

Volcán Irazú, alt. 3300 m., April 7, 1929, M. Valerio nos. 300 & 301.

These collections match very closely the Mexican species to which they have been provisionally referred.

## FABRONIACEAE

## FABRONIA FLAVINERVIS C.M.

Santa Ana, alt. 900 m., June 15, 1929, M. Valerio nos. 325, 326, 327, 328.

## PLAGIOTHECIAACEAE

## STEREOPHYLLUM CULTELLIFORME Sull.

Chitaría, Province of Cartago, alt. 700 m., Dec. 20, 1928, M. Valerio no. 238  
New to Costa Rica.

In this connection an opportunity is offered to correct a signal error which Mrs. Britton has kindly called to my attention. The Honduras plants described under the name of *Rhynchostegium patulum* Bartr. (3) undoubtedly belong in *Stereophyllum* and are exceedingly close to and probably identical with *S. cultelliforme*. The inflorescence of this species is clearly autoicous and not dioicous as given by Brotherus in both editions of the *Natürlichen Pflanzenfamilien*.

## STEREOPHYLLUM LEUCOSTEGIUM (Brid.) Mitt.

Santa Cruz, Province of Guanacaste, alt. 50 m., Dec. 24, 1928, M. Valerio no. 242.

## SEMATOPHYLLACEAE

## APTCHELLA AMERICANA (Card.) Broth.

Volcán Barba, alt. 2700 m., Dec. 16, 1930, M. Valerio no. 350.

Cardot originally described this species from Mexico. It was subsequently collected by Mrs. Britton in Jamaica and Prof. Valerio's collection now extends its known range to Costa Rica. The characteristic propagulae at the tips of the branches are very abundant in the Costa Rican plants but the sporophyte is still unknown.

*Acanthocladium costaricense* Dix. & Bartr., sp. nov.

Figures 20–25

Plants in extensive, pale yellowish-brown glossy mats. Stems elongate, wiry, prostrate, proliferously branched; branches ascending, bipinnate, the ultimate branches somewhat flattened, curved and crisped when dry; leaves dimorphous, stem leaves erect-appressed with slightly curved or subfalcate points, ovate, short-acuminate, entire or minutely denticulate, about 1 mm. long by 0.5 mm. wide; margin more or less narrowly reflexed, branch leaves rather complanate, much smaller than the stem leaves, oblong-lanceolate, bluntly acute, denticulate above the middle, 0.4–0.5 mm. long by about 0.13 mm. wide; leaf cells smooth, echlorophyllose, the upper linear, 35–40 $\mu$  long by 3–4 $\mu$  wide, a few rows at the extreme base shorter, slightly incrassate and porose, alar cells few, oblong, golden-brown or hyaline, supra-alar cells smaller, subquadrate to oblong, hyaline or colored, nerve very short and double or wanting.

Type: On tree, vicinity of Santa María de Dota, Province of San José, Costa Rica, alt. 1500–1800 m., Dec. 26, 1925–Jan. 3, 1926, Paul C. Standley & Juvenal Valerio no. 43395.

Although the fruit of this moss is unknown the general habit and vegetative characters correspond very closely to those of the genus *Acanthocladium*. If this inference is correct the extension of such a purely austral genus into the range of the North American moss flora is especially noteworthy. *A. subnitidum* (Hampe) Broth., from Colombia, suggested a likely comparison and I am indebted to Mr. H. N. Dixon for the following comments which were made after comparing the Costa Rican moss with the type collection of the Colombian species in the Hampe herbarium.

"*H. subnitidum* is much more robust and rigid, both in branches and leaves. Nearly all the branches taper to a straight, rigid, narrow, cuspidate, microphyllous flagellum. The leaves are considerably larger, broader below, longly and finely acuminate and scarcely glossy. Branches all straight."

## SEMATOPHYLLUM CUSPIDIFERUM Mitt.

La Hondura, Province of San José, alt. 1400 m., Jan. 15, 1929, M. Valerio no. 270.

The robust habit and filiform-acuminate leaves distinguish this collection from any of the *S. caespitosum* group.

## HYPNACEAE

## ISOPTERYGIUM FECUNDUM R. &amp; C.

Volcán Poás, alt. 2500 m., Feb. 7, 1929, M. Valerio no. 285.

## LITERATURE CITED

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