SOME PROBLEMS IN AMERICAN BRYOLOGY [1]

By AARON J. SHARP

RESUMEN *

Algunos problemas de la briología americana. — En este trabajo se estudian 142 de los musgos discutidos por Grout (1928-40) que viven en las regiones australes de los Estados Unidos. A las especies indicadas se agregan sus datos geográficos.

Se hace una nueva combinación, *Bryoxiphium norvegicum* var. *mexicanum* (Besch.) Sharp y muchas especies son reducidas a sinónimos.

Para hacer más efectivos los estudios briogeográficos en las Américas es indispensable : 1° que los coleccionistas anoten los datos necesarios completos ; 2° que es necesario el estudio monográfico de muchos géneros y 3° realizar más colecciones.

Introduction

The discovery of a number of tropical bryophytes in the Southern Appalachian highlands was announced by Sharp (1937). Subsequently questions were raised regarding the moss species which are common to the areas both south and north of the Mexican-United States boundary. A hasty survey indicated that there existed much confusion in the literature dealing with the bryology of the Americas. Consequently, the writer spent a portion of the summer of 1938 at the New York Botanical Gar-

[1] Contributions from the Botanical Laboratory, The University of Tennessee, n. ser. 69.

* Resumen prepared by the courtesy of Dr. Gerald E. Wade. The University of Tennessee.

den [1] studying their collections of mosses from the Americas south of the United States.

While not all of the specimens collected in these areas were studied critically, special attention was given all those which bore the names of species reported from North America by Grout (1928-40). Also, examined in detail were a large number of specimens which, although labeled with the names of exotic species, superficially resembled North American mosses. Some of these were found to be identical with North American species.

From the herbarium material in the New York Botanical Garden, an attempt was made to formulate a preliminary annotated list of mosses which occur in the Americas, both south and north of the Mexican-United States boundary. Literature, other than Grout's Moss Flora (1928-40), was ignored because of the difficulties of verifying the identities of the mosses listed therein. It is admitted that, without longer, involved studies, the following catalogue can be neither entirely accurate nor complete. It is hoped that the list will be revised and extended.

It is regretted that the notes on distribution accompanying the list are not more complete. Original intentions included the giving of more detailed geographical information for each species. However, it soon became evident that before this could be done, more extensive collections would have to be made in the Latin Americas, and collection data would have to be more specific. Many of the packets examined listed nothing but very general political or geographical divisions. Therefore it seems advisable in the present list only to give very brief and general distribution data.

Occasional notes of taxonomic importance are included where the material seems to warrant it. In several cases, where comparison of type specimens was possible, plants passing under different names were found to be conspecific and several

[1] The writer is indebted to the New York Botanical Garden for financial assistance during this study. He also received the valuable help of Mrs. Lazella Schwarten in checking references; however, he assumes all responsabilities for errors. He was aided also by the advice and suggestions of Mr. E. B. Bartram.

names are here relegated to synonymy. In other instances, reductions are suggested but can not be confirmed until types are again available for study. Written suggestions left on herbarium sheets by Mrs. E. G. Britton and Mr. R. S. Williams in the Moss Herbarium of the New York Botanical Garden have been interesting and very useful in solving certain taxonomic problems.

Annotated list of Mosses ocurring both South and North of the Mexican-United States boundary

The order is the same as that in the Moss Flora of Grout (1928-40), and the general geographic distribution of these species north of Mexico is described in the same work.

ANDREAEACEAE

Andreaea rupestris Hedw. — Mexico, Central America and western South America; Alaska to Greenland, southward along the mountains, Newfoundland. The variety, *acuminata* B. S. B. — western South America, as well as arctic North America. *A. turgescens* Schimp. of Mexico seems to be a robust form of this species.

POLYTRICHACEAE

Pogonatum pensilvanicum (Hedw.) Paris (*P. brevicaule* Beauv.) — Mexico; Ontario to Newfoundland and southward to Louisiana. *P. abbreviatum* Mitt. from western South America is closely related to the northern *P. pennsilvanicum* and *P. brachyphyllum* (Rich.) Beauv.

Polytrichum commune Hedw. — Brazil, British Guiana, Ecuador, Colombia and Mexico; Arctic America, Canada and southward in the mountains.

Polytrichum juniperinum Hedw. — Chile, Argentina, Venezuela, Bolivia, Perú, Colombia, Mexico and the West Indies; North American distribution similar to that of the previous species.

Polytrichum piliferum Hedw. — Chile and the Falklands; Alaska to Greenland and southward in the mountains. *P. noduliferum* Dus. from eastern Patagonia certainly resembles this species and its taxonomic status should be investigated.

FISSIDENTACEAE

Bryoxiphium norvegicum (Brid.) Mitt. var. **mexicanum** (Besch.) Sharp, comb. nov. — The Mexican collections of *Bryoxiphium* so much resemble the northern (Steere, 1937). *B. norvegicum* that it is here reduced to a variety. The only difference that could be noted in the specimens examined was that in *B. norvegicum* the differentiated marginal cells of the leaves were consistently longer than the laminal cells, while in the Mexican species these marginal cells were not so strongly and consistently differentiated. *Bryoxiphium Savatieri* Husn. from Japan, the only other species known in this genus, is quite distinct in that the leaves are short-piliferous to long-cuspidate, while the above two forms lack this characteristic.

DITRICHACEAE

Trematodon longicollis Michx. *Fl. Bor. Am.* **2**: 289. 1803. — This seems to be rather generally distributed throughout the South and Central Americas, Mexico and the West Indies as well as in southern and eastern United States. It passes under a variety of names; type material of the following upon examination seems to be conspecific with *T. longicollis:*

T. aureus C. Müll. in Ule E. *Bryoph. Brasil.* n° 15. 1898.
T. cubensis C. Müll. *Hedwigia* **37**: 228. 1898.
T. Fendleri C. Müll. *Linnaea* **42**: 470. 1878-79.
T. reflexus C. Müll. *Synop.,* I. pp. 459, 460. 1849.
T. squarrosus C. Müll. *Bot. Zeit.* **15**: 381. 1857.
T. uncinatus C. Müll. *Linnaea* **38**: 628. 1874.
Trichodon flexifolius Ren. et C. *Rev. Bryol.* **15**: 70. 1888.

Material similar to the types of the species listed above may be found in a single, large collection from one station. The species is extremely variable with many ecological forms. Variations in the size of spores, height of sporophytes and even in the morphology of the teeth are so common in a single collection that they have little diagnostic value. For instance, the age of the teeth has much to do with their appearance, e. g., they may be only perforated when young but split upon aging. Further reductions are sure to be made in this genus when collections of species from other areas in the world are compared with material of *T. longicollis* (See Bartram, 1939). *T. humilis* Mitt. of Ecuador may be tentatively considered as a good species because of the extremely large leaf-cells.

Distichium capillaceum (Sw.) B. S. G. — Mexico and Bolivia; Arctic America, Canada, south to Arizona in the Rocky Mountains.

Ceratodon stenocarpus B. S. G. — Venezuela, Columbia and Mexico; Arizona.

DICRANACEAE

Dicranella varia (Hedw.) Schimp. — Cuba and Mexico; widely distributed in North America.

D. Hilariana (Mont.) Mitt. — Brazil and Columbia; southern coast of United States.

D. Herminieri Besch. — Central America; coastal region of southeastern United States.

Dicranum flagellare Hedw. — Mexico; southern Canada and southward.

D. rugosum Brid. (*D. undulatum* Hoffm.) — Mexico; southern Canada south to Oregon, Minnesota and Tennessee. *D. frigidum* C. M. of Mexico is closely related to this species.

D. scoparium Hedw. — Mexico; widely distributed in temperate North America.

Dicranodontium denudatum (Brid.) E. G. Britt. — Mexico; Alaska to New England and shouth to Florida.

Campylopus gracilicaulis Mitt. — northern Brazil, British Guiana and Peru; southern coastal plain of United States.

C. fragilis B. S. G. — Colombia; Florida.

C. introflexus (Hedw.) B. S. G. seems to have a rather general distribution in the Americas south of the United States; limited to Arizona and southeastern mountains in United States. The genus, *Campylopus*, is very much confused and monographic revision of it is imperative!

Octoblepharum albidum Hedw. — West Indies, Central and South Americas; Florida.

Leucobryum albidum (Brid.) Lindb. — Central America; Connecticut and southward to Florida and Texas.

L. antillarum Schimp. — West Indies, Mexico, Central America and northern South America; Florida.

CALYMPERACEAE

Syrrhopodon incompletus Schwaegr. seems to have a wide distribution south of the United States; Florida.

S. ligulatus Mont. — British Guiana; Florida.

S. parasiticus (Sw.) Besch. — Haiti, Brazil and Ecuador; Florida.

Calymperes Richardi C. M. — Brazil and Dutch Guiana; Florida.

C. emersum C. M. — Guatemala; Florida.

ENCALYPTACEAE

Encalypta ciliata Hedw. — Mexico; Canada and northern United States.

E. procera Bruch — Colombia; Arctic America and southward to Ontario and Idaho.

POTTIACEAE

Anoectangium euchloron (Schwaegr.) Mitt. seems rather generally distributed south of the United States, although limited northward to North Carolina.

Weisia controversa Hedw. (*W. viridula* Hedw.) — South America; common in North America.

W. jamaicensis (Mitt.) Grout — West Indies; Oklahoma and Arizona.

Gymnostomum calcareum N. et H. — South America; Newfoundland to California and southward to Tennessee and Arizona.

G. recurvirostrum Hedw. — Patagonia, Ecuador, Central America and the West Indies; Alaska to Labrador and southward to California and South Carolina.

Timmiella anomala (B. S. G.) Limpr. — Mexico; Arizona and California.

Tortella humilis (Hedw.) O. E. Jenn. (*T. caespitosa* (Schwaegr.) Limpr.) — Paraguay, Brazil, Bolivia, Central America and Mexico; Canada and southward to the Gulf and Arizona.

Leptodontium Orcuttii Barfr. — Mexico, Costa Rica; North Carolina.

L. excelsum (Sull.) E. G. Britt. (*Zygodon Sullivantii* C. M.) from the mountains of southeastern United States is similar to material from Mexico and Central America passing under several specific names. (See the suggestions of Dixon (1927) concerning *L. squarrosum* (Hook.) Par.). Comparative studies are necessary when types are again available.

Hyophila Tortula (Schwaegr.) Hampe *Bot. Zeit.* 4: 267. 1846. This seems widely distributed south of the United States; northward from Florida to New York and Ontario. It is rather variable in regard to width and shape of the leaves, serrations of margins and mammillosity of the cells. It has been described under several names and placed in several genera. The following are suggested as synonyms:

Hyophila reflexifolia (C. Müll.) Paris *Ind. Bry. Suppl.* 191. 1900.

Pottia reflexifolia C. Müll. *Bull. herb. Boissier* 5: 190. 1897.

Hyophila Bescherellii C. Müll. *Flora* 58: 533. 1875.

Trichostomum Bescherellii Schimp. *Prodrom. Bryol. Mex.* in *Mem. Soc. Sci. Cherbourg* 16: 177. 1872, where *Didymodon macromitrium* Schimp. is cited as a synonym.

Hyophila denticulata Schimp. mss. which was published as *Pottia denticulata* C. Müll. *Bull. herb. Boissier* 5: 190. 1897.

Hyophila subdenticulata Card. *Rev. Bryol.* **36**: 76. 1909.
Hyophila dentata Card. *Rev. Bryol.* **40**: 36. 1913.
Hyophila subconiermina Ren. et Card. *Bull. Soc. Roy. Bot. Belg.* I, p. 154. 1892.
Hyophila subcrenulata (C. Müll.) Par. *Ind. Bryol. Suppl.* 191. 1900.
Pottia subcrenulata C. Müll. *Bull. herb. Boissier* **5**: 190. 1897.

Types of the above have been seen with the exception of *H. subdenticulata* Card., in which case material from the type locality determined by Cardot was examined. Further reductions are to be anticipated; and for more synonyms see Grout (1928-40).

Barbula unguiculata Hedw. — Argentina and Mexico; common from Newfoundland to North Carolina, less so west to Montana and New Mexico.

B. Cruegeri Sond. seems to be rather widely distributed south of the United States; New Jersey to Missouri and southward.

Rhexophyllum subnigrum (Mitt.) Ther. et Hilp. — Mexico; Arizona and New Mexico.

Husnotiella revoluta Card. — Mexico; Texas, Arizona and California.

H. torquescens (Card.) Bartr. — Mexico; Texas and Arizona.

H. Pringlei (E. G. Britt.) Groutt — Mexico; Oklahoma to Arizona and Santa Catalina Islands.

Desmatodom Sprengelii (Schwaegr.) Williams — West Indies; Florida.

Tortula muralis Hedw. — Chile, Argentina and Brazil; New England to the Gulf and westward to California.

T. fragilis Tayl. — Mexico, Central America, Colombia and Ecuador; Virginia, West Virginia and southwestern United States.

T. caroliniana Andrews — Mexico and Costa Rica; Virginia to North Carolina and Tennessee.

T. papillosa Wills. — Falklands; New England to Illinois and Tennessee.

GRIMMIACEAE

Grimmia gracilis Schleich. — Mexico; Nova Scotia to British Columbia and southward to Tennessee and Arizona.

G. Wrightii (Sull.) Aust. — Mexico; southwestern United States.

G. commutata Hueben. — Venezuela, Colombia and Mexico; British Columbia to Arizona, eastward to Quebec and Greenland.

Hedwigia ciliata Hedw. — Bolivia, Perú, Ecuador, Venezuela, Colombia and Mexico; widely distributed in North America.

Before much can be done in comparing the grimmiaceous flora of South and North America, most of the genera in the family will have to be carefully revised.

FUNARIACEAE

Funaria hygrometrica Hedw. seems widely distributed in the Americas.

F. calvescens Schwaegr. seems to be a common species in southern United States and southward.

Both *Entosthodon* and *Funaria* need monographic revision before satisfactory comparisons can be made between the species of South and North America.

ERPODIACEAE

Erpodium domigense (Brid.) C. M. — West Indies, Mexico and Central America; Texas.

ORTHOTRICHACEAE

Drummondia prorepens (Hedw.) O. E. Jenn. is very closely related to *D. obtusifolia* C. M. of Chile and types of the two should be critically compared.

Zygodon Reinwardtii (Hornsch.) A. Br. seems to be rather widely distributed south of the United States, but northward limited to North Carolina.

Schlotheimia Sullivantii C. M., originally described from the mountains of southeastern United States, has also been collected in Mexico and Honduras as *S. Sartorii* Schimp. The type for this name has been examined and, as has been suggested by Bartram (1934), it is only a form of *S. Sullivantii*. Types of *S. Mohrii* C M. and *S. Oerstediana* C. M. should be compared with the above when it is again possible to do so.

Macromitrium mucronifolium Hook et Grev. — the West Indies; Florida.

M. Didymodon Schwaegr. *Suppl.* II^2, p. 138-190. 1827. — Brazil, Ecuador, Central America, Mexico and the West Indies; Florida. It has been reported under the following names: *Macromitrium rhabdocarpum* Mitt. *Musci Aust.-Amer.* p. 199. 1869. *Macromitrium tenellum* Card. *Rev. Bryol.* 36: 109. 1909. Types of the above have been carefully compared. There is evidence that *M. Richardi* Schwagr. *Suppl.* II. p. 70-173. 1826. is a synonym, although the type has not been studied.

M. Sullivantii C. Müll. *Bot. Zeit.* 20: 361. 1862 has been found in Brazil, Ecuador, Central America and Mexico; Georgia and North Carolina. It is also to be found under the name: *Macromitrium paraphysatum* Mitt. *Musci Aust. Amer.* p. 198. 1869. This species proved to be conspecific upon comparison of the type with North American material. It is probable that *M. Leiboldtii* Hampe *Bot. Zeit.* 28: 50. 1870 and *M. Gisbreghtii* Besch *Mem. Soc. Soc. Sci. Cherbourg* 16: 188. 1872, both from Mexico, are synonyms. Types should be compared as soon as conditions permit it.

BARTRAMIACEAE

Anacolia laevisphaera (Tayl.) Flowers — Mexico and South America; Arizona.

Bartramia microstoma Mitt. — Guatemala; Arizona.

B. glauca Lorentz — Mexico; Arizona.

Philonotis gracillima Angstr. seems widely distributed south of the United States; northward through Texas to Kansas.

P. sphaericarpa (Sw.) Brid. seems rather common south of the United States, but there it is limited to Florida.

P. longiseta (Rich.) E. G. Britt. — Mexico, Central America and the West Indies; north through Louisiana and Oklahoma to Ohio.

BRYACEAE

Orthodontium pellucens (Hook.) B. S. G. — West Indies, Central America and northern South America; California and Tennessee.

Leptobryum pyriforme Schimp. — Bolivia and Brazil; widely distributed in North America.

Pohlia cruda Lindb. — Argentina, Chile, Guatemala and Mexico; from Arctic America to Tennessee and Arizona along the mountains.

P. nutans Lindb. — Colombia and the Falklands; from Arctic America southward along mountains to Tennessee and Arizona.

P. Wahlenbergii (W. et M.) Andrews (*Mniobryum albicans* Limpr.) seems widely distributed south of the United States and throughout North America.

P. filiformis (Dicks.) Andrews — Chile, Uruguay, Bolivia, Peru, Ecuador, Colombia and Mexico; Arctic America and southward, in the east to Virginia.

P. Cruegeri (Hpe.) Andrews is much more common south of the United States than it is Florida.

Brachymenium systylium (C. M.) Jaeg. — Mexico, the West Indies, Central and South America; Arizona.

B. mexicanum Mont. — Mexico; Texas.

B. macrocarpum Card. — Mexico; Florida.

Bryum pendulum (Hornsch.) Schimp. — Bolivia; Arizona to Delaware and northward.

B. coronatum Schwaegr. — Mexico, Central America and the West Indies, south to Colombia; Florida.

B. argenteum Brid. is almost ubiquitous in the Americas.

B. capillare Hedw. is widely distributed in the Americas.

B. truncorum Brid. has been collected frequently south of the United States; Arizona, Texas and Tennessee.

Mnium rostratum Schrad. is found south of the United States and there is evidence that *M. ligulatum* C. M. from Bolivia is only a form of this species. *M. rostratum* is widely distributed in North America.

RHIZOGONIACEAE

Rhizogonium spiniforme Bruch is common south of the United States; Georgia to Louisiana.

RHACOPILACEAE

Rhacopilum tomentosum (Hedw.) Brid. is widely distributed in the Latin Americas but limited to Florida northward.

BRACHYTHECIACEAE

Eurhynchium riparioides (Hedw.) Richards *(E. rusciforme* Milde)—Brazil and Central America; widely distributed from southern Canada southward. *Rhynochostegium obtusifolium* Besch. from Mexico is probably conspecific with this species. The Mexican material closely matches plants from the Southern Appalachians. In general, the plants from both these areas have leaves mores obtuse and shorter with a weaker costal spine than do those from northern United States and Canada.

E. serrulatum (Hedw.) Kindb.—West Indies and Central America; southward from southern Canada. It should be sought in more southern latitudes.

Brachytecium rutabulum B. S. G. — Chile and at Cape Horn; New England to Montana and southward to Missouri and Tennessee.

B. plumosum B. S. G. — Ecuador and Colombia; New England to British Columbia and south to Florida.

Homalothecium Bonplandii (Hook.) J. et S. is rather generally distributed southward to the central portion of South America; Texas and Tennessee.

AMBLYSTEGIACEAE

Leptodictyum riparium (Hedw.) Warnst. — Argentina, Peru and Cuba; widely distributed in temperate North America.

Amblystegium serpens (Hedw.) B. S. G. — Haiti; widely distributed in temperate North America.

A. varium (Hedw.) Lindb. — Argentina, Brazil, Peru and Bermuda; widely distributed in temperate North America.

Hygroamblystegium irriguum (Wils.) Loeske — Peru; southern Canada and south to Georgia, Arkansas and California.

Cratoneuron filicinum (Hedw.) Roth — Peru and Ecuador; from northern Canada to Alabama and New Mexico.

Campylium hispidulum (Brid.) Mitt. — Northwesterns South America; southern Canada to Florida and Texas.

C. chrysophyllum (Brid.) Bryhn — West Indies and Mexico, Canada and south to Georgia and Texas.

C. polygamum (B. S. G.) Bryhn — Uruguay; Arctic North America and south to Virginia.

C. radicale (P. B.) Grout — Mexico; eastern North America from Canada to Florida.

Scorpidium scorpioides (Hedw.) B. S. G. — Bolivia; Canada and south to New Jersey and Montana.

Calliergonella cuspidata (Brid.) Loeske — Jamaica; Canada and south to New Jersey and Iowa. It seems to include *Plagiothecium magellanicum* Schimp. from the Magellan Straits.

C. Schreberi (B.S.G.) Grout — Costa Rica, Colombia, Ecuador, Peru, Bolivia and Argentina; Alaska and Canada, south to Tennessee in the eastern mountains.

Rhytidium rugosum (Hedw.) Kindb. — Bolivia; Canada and south to Tennessee and Arizona in the mountains.

Hylocomium splendens (Hedw.) B. S. G. — Jamaica; from Alaska and northern Canada to Tennessee and California in the mountains.

Hypnum cupressiforme Hedw., including all its forms and va-

rieties, is known from the Magellan Straits, Chile, Bolivia, Peru and Colombia; widely distributed in North America.

H. molluscum Hedw. — Ecuador; Newfoundland to western Canada, south to Georgia and Oklahoma.

Brotherella recurvans (Mx.) Fleisch. — Mexico and Central America; Newfoundland to Manitoba, south to Georgia.

Heterophyllium affine (Hook.) Fleisch. *Laubm. v. Java* 4: 1177. 1919. is here reported from Brazil, Colombia, Mexico and Jamaica. The types of *Hypnum affine* Hooker, Kunth, *Syn. Pl. Aequinoct.* I. pp. 63-64. 1822 and *H. Mohrianum* Carl Müll. *Linnaea* 38: 656. 1874 show them to be the same species, and material from the Southern Appalachians called *Heterophyllium nemorosum* (Koch) Kindb. is not different. Examination of the type will probably permit the reduction of this last name to a synonym.

Sematophyllum caespitosum (Hedw.) Mitt. *(S. Kegelianum* Mitt.) appears to be widely distributed southward to central South America; Florida.

S. carolinianum (C. M.) E. G. Britt. var. **admixtum** (Sull.) Grout. — West Indies, British Guiana and Brazil; Massachusetts to Florida; inland to Indiana.

Taxithelium planum (Brid.) Mitt. — The West Indies, Central America, Venezuela, Peru, Brazil, British and French Guianas; Florida.

Microthamnium diminutivum (Hampe) E. G. B. — South to Brazil and Bolivia; Florida.

Vesicularia vesicularis (Schwaegr.) Broth. is widely distributed southward to central South America; Florida.

V. amphiloba (Spruce) Broth. as about the same range as the previous species.

V. crassicaulis (Mitt.) Broth. — West Indies and Central America; Florida.

STEREOPHYLLACEAE

Stereophyllum Wrightii (S. et L.) R. et C. — West Indies, Mexico, Honduras and Guatemala; Florida, Texas and New Mexico.

PLAGIOTHECIACEAE

Plagiothecium micans (Sw.) Paris — West Indies; Long Island, New York; south to Florida, west to Missouri.

ENTODONTACEAE

Entodon Drummondii (B. S. G.) J. et S. will probably have to be reduced to a synonym of *E. macropodus* (Hedw.) Mitt. The types of *E. Hampeanus* C. Müll. *Linnaea* **18**: 705. 1844 can not be distinguished from herbarium material of the above two species, nor from isotype material of *E. flaviusculus* C. Müll. (*Bull. herb. Boiss.* **5**: 209. 1897). The collectively have been found in the West Indies, Mexico, Guatemala, Colombia, Venezuela and Brazil; southeastern United States north to Tennessee.

THUIDIACEAE

Thuidium delicatulum (Hedw.) Mitt. — south of United States to Bolivia and Brazil; widely distributed in North America except for the Pacific coast.

T. recognitum (Hedw.) Lindb. — Mexico, Labrador to British Columbia, south to Florida and New Mexico.

T. minutulum (Hedw.) B. S. G. should include *T. minutulum* Mitt. *Journ. Linn. Soc.* **12**: 577. 1869, *T. exasperatum* Mitt. *loc. cit.*, p. 576 and *T. pauperum* (C. Müll.) Mitt. *l. c.* The species has been found in the West Indies, Mexico, Central America, Colombia, Venezuela, Bolivia and Brazil; New Brunswick to Minnesota and south to Florida.

T. microphyllum (Hedw.) Best. — West Indies and Mexico; southern Canada and southward to the Gulf of Mexico.

THELIACEAE

Thelia hirtella (Hedw.) Sull. — Mexico; New Brunswick and south to the Gulf of Mexico.

ANOMODONTACEAE

Herpetineurum toccoae (S. et L.) Card. (*Anomodon braziliense* Hampe) — Mexico and Brazil; North Carolina to Arkansas and southward.

A. attenuatus (Hedw.) Hueben., as has been suggested by Bartram (1936), seems to include *A. Wrightii* C. M., and is indigenous in the West Indies; southward from southern Canada.

Anomodon rostratus (Hedw.) Schimp. — Mexico and the West Indies; southward from southern Canada.

HOOKERIACEAE

Hookeria acutifolia Hook. — West Indies, Costa Rica, Ecuador and Peru; Connecticut to Ohio and south to Georgia.

Cyclodictyon varians (Sull.) Broth. — West Indies, Colombia and Brazil; Florida.

Callicostella scabriseta (Hook.) J. et S. seems to be widely distributed south of the United States to central South America; Florida.

NECKERACEAE

Neckera disticha Hedw. is widely distributed as far south as Brazil; Florida.

N. undulata Hedw. has a range extending beyond that of the preceding species into Paraguay; Florida and Texas.

METEORIACEAE

Tricholepis nigrescens (Sw.) Grout (*Papillaria nigrescens* (Sw.) J. et S.) — very common as far south as Bolivia and Brazil; Florida and Louisiana.

Meteoropsis patula (Hedw.) Broth. has a range similar to that of the preceding species; Florida.

PTEROBRYACEAE

Jaegerinopsis squarrosa E. G. B. — Cuba; Florida.

Pireella cymbifolia (Sull.) Card. — West Indies, Mexico and Honduras. It should be sought farther south.

LEUCODONTACEAE

Leucodontopsis floridana (Aust.) E. G. B. — West Indies, Costa Rica, Panama, Venezuela and Brazil; Florida.

Pseudocryphaea flagellifera (Brid.) E. G. B. is rather widely distributed south of the United States to South America; Florida.

Discussion

The preceding list indicates that there are more mosses (142 species) common to both North and Latin Americas than has been generally recognized. However, an examination of other collections, critical comparison of types and a careful analysis of bryological literature will undoubtedly reveal many additional species which range both north and south of the Mexican-United States border.

It was planned at the initiation of this investigation to list the geographical affinities of each moss as has been done for certain North American species (Sharp, 1939). Examination of collection data soon revealed that this would be impossible. But enough information on distribution was found to indicate that the species listed might be divided into at least three groups. First, there are the nearly ubiquitous mosses exemplified by *Bryum argenteum* Hedw. and *Funaria hygrometrica* Hedw. Second, others extend into South America but at present there is no evidence of them being even nearly ubiquitous; *Herpetineurum toccoae* (S. et L.) Card., *Cyclodictyon varians* (Sull.) Broth., and *Tortula fragilis* Tayl. are examples. The third group exhibits a distribution which does not include

South America; *Weisia jamaicensis* (Mitt.) Grout, *Leptodontium Orcuttii* Bartr., and *Husnotiella revoluta* Card. are not known south of the West Indies and Central America. Further studies will undoubtedly show that these three groups may be subdivided.

It would not be surprising if types of distribution similar to that of the mosses should be found among other groups of plants. The work of Camp (1939) on *Chimaphila* may mark the first step in demonstrating the similarities existing between certain seed plants in eastern United States and those of Mexico and Central America. Mains (1939) has shown that certain fungi, e. g., *Cordyceps dipterigena* Berk. et Br. and *C. sphecocephala* (Klatzsch) Massee, occur both in the tropics and in the north temperate zones of the Americas. Ferns are found extending from northern United States to Mexico and the West Indies; *Asplenium resiliens* (Mart. et Gal.) Kunze is an example.

In view of the fact that future solutions of many fascinating problems in American bryology will involve the correlations of the distribution of bryophytes with that of other plants and also with climatic and geologic factors, it is imperative not only that much more collecting should be done in southern North America and the Latin Americas but also that collectors record *the exact locality, the nature of the substratum* and the *approximate altitude for each collection.*

It is pertinent here to point out that the necessity is acute for monographic revision of certain genera, such as *Acrocryphaea, Brachymenium, Cryphaea, Callicostella, Entodon, Macromitrium, Raphidostegium, Schlotheimia, Sciaromium, Sematophyllum* and many others, on an American or worldwide basis. Such monographs would do much to enhance the future study of American bryogeography.

Summary

One hundred and forty-two of the mosses discussed by Grout (1928-40) are listed as occurring south of the United States. General geographic data accompany the listed species.

One new combination, *Bryoxiphium norvegicum* var. *mexica-*

num (Besch.) Sharp, is made. Several specific names are reduced to synonyms.

To make bryogeographic studies among the Americas really effective, it is concluded: (1) that the recording of sufficient data by collectors is absolutely imperative; (2) that the monographing of many genera is necessary; and (3) that further collecting is desirable.

BIBLIOGRAPHY

BARTRAM, E. B. 1934. *Additional Costa Rican mosses, III. Journ. Wash. Acad. Sci.* **24**: 467-480.

— . 1936. *New and noteworthy mosses from Jamaica. Journ. Wash. Acad. Sci.* **26**: 13.

— . 1939. *Mosses of the Philippines. Philipp. Journ. Sci.* **68**: 28-30.

CAMP, W. H. 1939. *Studies in the Ericales* IV. *Notes on Chimaphila, Gaultheria and Pernettya in Mexico and Adjacent Regions. Bull. Torr. Bot. Club* **66**: 7-28.

DIXON, H. N. 1927. *Miscellanea Bryologica.* X. *Journ. Bot.* **65**: 5, 6.

GROUT, A. J. 1928-40. *Moss flora of North America, north of Mexico.* 3 vols. Newfane, Vermont.

MAINS, E. B. 1939. *Cordyceps from the mountains of North Carolina and Tennessee. Journ. Elisha Mitchell Soc.* **55**: 117-129.

SHARP, A. J. 1937 (1938). *Tropical bryophytes in the Southern Appalachians. Ann. Bryol.* **11**: 141-144.

— . 1939. *Taxonomic and ecologic studies of eastern Tennessee bryophytes. Amer. Midl. Nat.* **21**: 267-354.

STEERE, W. C. 1937. *Bryoxiphium norvegicum, the Sword Moss, as a preglacial and interglacial relic. Ecology* **18**: 346-358.

The University of Tennessee Knoxville, Tennessee.