

# Hookeriaceae Species and Distribution in South America

WINONA H. WELCH, DePauw University

## Abstract

This paper is the second in the series on the distribution of the Hookeriaceae in the world. The first and second studies pertain, especially, to North, Central, and South America, and to the West Indies. Apparently the center of distribution is in northern South America, particularly in the NW portion of the continent. The greatest endemism occurs in northern South America. North America and southern South America have the smallest number of species and endemics, the former having the least. There is evidence that the Hookeriaceae is chiefly a tropical family, in the Americas, although species occur from Alaska to the southern tip of South America. East-West as well as North-South distribution are shown by species of the Hookeriaceae. *Hookeria acutifolia* occurs in Hawaii, Canada, United States, Mexico, Central America, South America, West Indies, and Asia. Other species occur in South America, Australia, Tasmania, New Zealand, and on islands near South Africa.

This paper is the second in the series on the distribution of the Hookeriaceae, based largely upon epithets and distribution areas cited in Index Muscorum. It is assumed that the introductory pages of the first paper (9) will be reviewed before reading this report.

The following islands have been included with South America: Hermite, Falkland, Galapagos, Trinidad, and Tobago. The area is that of the Index Muscorum.

For reference, the areas in the first paper are repeated: **America 1.** North America (Canada, United States, Mexico), Greenland, Aleutian Islands, Bermudas; **America 2.** Central America and Cocos Island; **America 3.** West Indian Islands (Greater and Lesser Antilles, Bahamas) except Trinidad and Tobago. The three distribution divisions of South America numerically follow those of North and Central America: **America 4.** Venezuela, Colombia, Peru, Bolivia, Ecuador, Galapagos Islands; **America 5.** Brazil, Paraguay, Guiana, Trinidad, Tobago; and **America 6.** Chile, Argentina, Uruguay, Falkland Islands, and Hermite Island.

As assumed in the beginning of this project, as monographic work progresses in the family and as collectors publish their papers on new records of species, often extending the distribution range, changes are necessary to keep the information up-to-date. Differences since the first paper (9) follow.

*Actinodontium portoricense* Crum & Steere, Am 3, 4, not Am 3 endemic; *A. sprucei* (Mitt.) Jaeg., Am 2, 4, *Callicostella grossiretis* Bartr., Am 2 endemic; *C. subpallida* Ren. & Card., Am 3 endemic. *Crossomitrium herminieri* (Besch.) Jaeg., Am 3 endemic instead of Am 2; *C. oerstedianum* C. Muell., Am 2, 4, not Am 2 endemic; *C. orbiculatum* C. Muell., Am 3, 5, not Am 3 endemic. *Hookeriopsis diffusa* (Mitt.) Jaeg., Am 2, 4, not Am 2 endemic; *H. guadalupensis* (Brid.) Jaeg., Am 2, 3, not Am 3 endemic; *H. websteri* Crum & Bartr., Am 3 endemic. *Hypnella cymbifolia* (Hampe) Jaeg., Am 3, 4, 5, not Am 3 endemic; *H. jamesii* H. Robins.,

Am 2 endemic. *Lepidopilum apollinairei* Broth. & Paris, Am 2, 4, not Am 2 endemic; *L. tortifolium* Mitt., Am 1, 2, 3, 4. *Thamniopsis pendula* (Hook.) Fleisch., Am 2, 4. Species, varieties, and forms reduced to synonymy: *Crossomitrium heterodontium* Ren. & Card., Am 2 = *C. patrisiae* (Brid.) C. Muell.; *Cyclodictyon blandum* (Lor.) Kuntze, Am 3 = *C. varians* (Sull.) Kuntze; *Lepidopilum cubense* (Sull.) Mitt. f. *integrifolia* Thér., f. *latifolia* Thér., and f. *robusta* Thér., Am 3 = *L. cubense* (Sull.) Mitt.; *L. genuflexum* C. Muell., Am 2 = *Rhynchostegiopsis flexuosa* (Sull.) C. Muell.; *L. polytrichoides* (Hedw.) Brid. var. *pellucens* Besch. (not var. *pallescens*) = *L. polytrichoides*.

Three genera, *Callicostellopsis*, *Helicoblepharum*, and *Stenodesmus*, occur in South America, only. *Callicostellopsis* is a genus composed of one species, *meridiensis*, which has been recorded only in NW South America. The genus, *Helicoblepharum*, consists of four species, all occurring in northern South America, one in the NE and three in the NW. Two species, *latifolius* and *tenuicuspis*, comprise the genus, *Stenodesmus*, and are known only from NW South America.

Two genera, *Amblytropis* and *Philophyllum*, are chiefly, but not totally, South American genera. One of the five species of *Amblytropis*, *A. denticulata*, is endemic in the West Indies. The other four species, *A. gemmacea*, *A. hispidula*, *A. ovata*, and *A. setosa*, have been reported only from NW South America. The genus, *Philophyllum*, is composed of four species, all of which occur in NE South America. One species, *P. tenuifolium*, has a more general distribution, occurring in Central America and northern South America.

In the lists of Hookeriaceae in Am 4, 5, 6, the asterisk indicates the endemic species, varieties, and forms. These plants presently are not known to occur in geographical areas other than the ones cited. The species of additional areas follow.

Steere (4) stated that many species of mosses of the eastern slopes of the Andes and the headwaters of the Amazon extend from eastern Peru to the West Indies, and that the Andean highlands of the sierra are much wetter in the north and are most closely related to the wet montane and alpine forests of Colombia and Central America. Steere also points to the relationship between the genera of Ecuador, Peru, and Bolivia, and those of Mexico.

In the distribution patterns of the Hookeriaceae species, the following have been noted by the author.

*Callicostella pallida* has been recorded from northern South America, Central America, Mexico, southern United States, and the West Indies.

*Lepidopilum polytrichoides* occurs throughout South America, in Central America, Mexico, Florida, and the West Indies.

*Lepidopilum scabrisetum* has been reported from the three distribution areas of South America, from Central America, Mexico, and the West Indies.

*Adelothecium bogotense*, *Crossomitrium patrisiae*, *Cyclodictyon albicans*, *Hookeriopsis cruegeriana*, *Isodrepanium lentulum*, and *Lepidopilum radicale* have been recorded from northern South America, Central America, Mexico, and the West Indies.

*Cyclodictyon roridum*, *Daltonia longifolia*, and *Lepidopilum tortifolium* occur in NW South America, Central America, Mexico, and the West Indies.

*Daltonia gracilis* is known from three distribution areas of South America, Central America, and from Mexico.

The distribution ranges of *Cyclodictyon rubrisetum*, *Lepidopilum brevipes*, and *L. carneum* follow the Cordilleran pattern, in NW South America, Central America, and Mexico.

*Callicostella scabriseta* and *Hookeriopsis incurva* may be collected throughout South America, in Central America, and in the West Indies.

The following species have been cited from northern South America, Central America, and the West Indies: *Cyclodictyon cuspidatum*, *Daltonia stenophylla*, *Hemiragis aurea*, and *Hookeriopsis undata*.

*Hookeriopsis falcata* and *Leskeodon andicola* occur in NW South America, Central America, and the West Indies.

The distribution range for *Callicostella depressa*, *Hookeriopsis acicularis*, and *Leskeodon cubensis* is NE South America, West Indies, and Central America.

*Hookeriopsis crispa*, *H. variabilis*, *Hypnella pilifera*, *Neohypnella chrysophyllopodia*, *Philophyllum tenuifolium*, and *Thamniopsis pendula* have been recorded in northern South America and in Central America.

*Crossomitrium oerstedianum*, *C. wallisii*, *Daltonia lindigiana*, *D. tenuifolia*, *Hookeriopsis diffusa*, *H. subfalcata*, *Lepidopilum apollinairei*, *L. semi-laeve*, *Leskeodon pusillus*, and *Thamniopsis pendula* are species of NW South America and Central America.

*Hypnella cymbifolia*, *H. diversifolia*, *H. leptorrhyncha*, and *Lepidopilum intermedium* are species in the distribution area of northern South America and the West Indies.

The following species have been collected in NW South America and the West Indies: *Actinodontium portoricense*, *Callicostella colombica*, *C. rivularis*, *C. subpallida*, *Cyclodictyon denticulatum*, *C. lindigianum*, *C. ulophyllum*, *Lepidopilum aureo-fulvum*, *L. muelleri*, and *L. robustum*.

Species reported from NE South America and the West Indies are: *Crossomitrium cruegeri*, *C. orbiculatum*, *Cyclodictyon olfersianum*, *Distichophyllum cubense*, *Lepidopilidium portoricense*, *Lepidopilum subaurifolium*, *Leskeodon auratus*, and *L. cubensis*.

The following species are known, presently, from northern South America only: *Callicostella aspera*, *C. martiana*, *C. merkelii*, *C. microcarpa*, *C. paulensis*, *C. rufescens*, *Cyclodictyon limbatum*, *C. regnellii*, *Hookeria viridula*, *Hookeriopsis asprella*, *H. hypnacea*, *H. parkeriana*, *Hypnella pallescens*, *Lepidopilidium divaricatum*, *Lepidopilum affine*, *L.*

*ambiguum*, *L. biductulosum*, *L. nanothecium*, *L. subflexifolium*, and *Thamniopsis killipii*.

Three South American species are known only from distribution areas four and six: *Callicostella scabriuscula*, *Daltonia trachyodonta*, *Hookeria lorentzii*, *H. uliginosa*, *Lepidopilum erectiusculum*, and *Pterygophyllum rigidum*.

*Lepidopilum plebejum* has been collected in S and NE South America.

*Hookeria acutifolia* has been recorded from islands of the Pacific or in Oceania (Hawaii), in Canada (British Columbia), the United States (from Washington to Alabama, Georgia, and Connecticut), in Mexico, Central America (Guatemala, Costa Rica), South America (Ecuador, Bolivia, Brazil), West Indies (Cuba, Jamaica, Haiti, Porto Rico, Guadeloupe), and in Asia (Japan, India, Nepal, Ceylon, North and Central Vietnam, Sumatra, Java). It is evident that this species shows an extensive north and south as well as east and west distribution range. However, *H. acutifolia* may not be regarded as a cosmopolitan species.

The following species have east-west or lateral distribution instead of north-south or vertical. The method of distribution may be clarified as additional localities are discovered. *Distichophyllum assimile* and *Pterygophyllum obscurum* have been collected in southern South America, in Australia, and Tasmania.

*Distichophyllum rotundifolium*, *Eriopus apiculatus*, *Pterygophyllum dentatum*, *Sauloma tenella*, and *S. tenella f. propagulifera* have been reported from southern South America, Australia, Tasmania, and New Zealand.

*Eriopus flexicollis* has been collected in southern South America and New Zealand.

*Eriopus cristatus* is known from southern South America, Oceania, Australia, Tasmania, New Zealand, Madagascar, Maritius, and Réunion.

It would seem that this east-west distribution has been due to continental drift, using Wegener's explanation (6); that is "to the process of relative movements among continents." Wegener (5) assumed that all the continents had been united, comprising adjacent parts of a large supercontinent. The latter broke up into the present continents which drifted apart. Since fossil remains of identical animals and plants have been found in the widely separate continents of Africa and South America, it seems plausible that there can be like species of mosses living today on these distant continents.<sup>1</sup>

Creer (2) proposed that the southern hemisphere supercontinent started to break up about 150-200 million years ago, to form the continents of South America, Africa, Australia, and Antarctica; and the subcontinents of India and Madagascar.

---

<sup>1</sup>The author is indebted to Dr. James A. Madison, Professor of Geology, DePauw University, for the helpful geological references.

Dietz (3) states that "most paleontologists claim that it is easier to explain the occurrence of similar species on continents widely separated by the ocean on the basis of transfer of living creatures by rafting on flotsam, by easy moves along ancient island chains, or by long subsided land bridges, rather than by continental drift." The paleontologists also explain that a "supposedly simpler method than continental drift, would be dispersion of living creatures over isthmian links (like the Isthmus of Panama today), which included narrow land bridges between Africa and South America, for instance."

Axelrod (1) reviewed the paleontological evidence for the late Paleozoic and Mesozoic, and concluded that the fossil floras suggested stable, not drifting continents. One of his conclusions was that the vegetation-climatic zones display a symmetrical arrangement from northern to southern hemispheres consistent with continental stability.

Whichever theory one accepts, the evidence of these species of the Hookeriaceae on such distant land bodies is a challenge to a bryologist.

#### America 4: Venezuela, Colombia, Peru, Bolivia, Ecuador, Galapagos Islands

*Actinodontium portoricense* Crum & Steere, *A. sprucei* (Mitt.) Jaeg. *Adelothecium bogotense* (Hampe) Mitt. *Amblytropis gemmacea* (Mitt.) Broth., *A. hispidula* (Mitt.) Broth., *A. ovata* (Mitt.) Broth., *A. setosa* (Mitt.) Broth. *Callicostella acutifolia* Thér., *C. aspera* (Mitt.) Jaeg., *C. colombica* Williams, *C. galipanoana* (C. Muell.) Broth., *C. integri-  
folia* (C. Muell.) Broth., *C. martiana* (Hornsch.) Jaeg., *C. merkelii* (Hornsch.) Jaeg., *C. microcarpa* Aongstr., *C. pallida* (Hornsch.) Aongstr., *C. paulensis* Broth., *C. plicatula* Thér., *C. rivularis* (Mitt.) Jaeg., *C. rufescens* (Mitt.) Jaeg., *C. saxatilis* (Mitt.) Jaeg., *C. scabripes* (C. Muell.) Broth., *C. scabriseta* (Hook.) Jaeg., *C. scabriuscula* (C. Muell.) Jaeg., *C. strumulosa* (Hampe & Lor.) Jaeg., *C. subpallida* Ren. & Card. *Callicostellopsis meridensis* (C. Muell.) Broth. *Crossomitrium epiphyllum* (Mitt.) C. Muell., *C. goebelii* C. Muell., *C. oerstedianum* C. Muell., *C. patrisiae* (Brid.) C. Muell., *C. phragmidaceum* C. Muell., *C. rotundifolium* Herz., *C. saprophyllum* Broth., *C. splendens* Broth., *C. spruceanum* C. Muell., *C. tenellum* C. Muell., *C. wallisii* C. Muell. *Cyclodictyon aeruginosum* (Mitt.) Kuntze, *C. albicans* (Hedw.) Kuntze, *C. allionii* Broth., *C. annigenum* (C. Muell.) Broth., *C. angustirete* Herz., *C. bakeri* (Britt.) Par., *C. benoistii* Thér., *C. bombonasicum* (Mitt.) Kuntze, *C. breve* Herz., *C. caespitosum* (Mitt.) Kuntze, *C. capillatum* (Mitt.) Kuntze, *C. castaneum* (Mitt.) Kuntze, *C. chimborazense* (Mitt.) Kuntze, *C. cuspidatum* Kuntze, *C. denticulatum* Kuntze, *C. fendleri* (C. Muell.) Broth., *C. flexicuspis* Broth., *C. humile* (Mitt.) Kuntze, *C. jagianum* (C. Muell.) Kuntze, *C. krauseanum* (Hampe & Lor.) Kuntze, *C. latifolium* Kuntze, *C. limbatum* (Hampe) Kuntze, *C. lindigianum* (Hampe) Kuntze, *C. mittanii* (Jaeg.) Kuntze, *C. nivale* (C. Muell.) Kuntze, *C. obscurifolium* (Mitt.) Kuntze, *C. obscurum* Herz., *C. pandurifolium* (Mitt.) Kuntze, *C. plicatulum* (C. Muell.) Broth., *C. pusillum* Herz., *C. regnellii* (Aongstr.) Kuntze, *C. rori-*

*dum* (Hampe) Kuntze, *C. rubrisetum* (Mitt.) Kuntze, \**C. rugulosum* (Mitt.) Kuntze, \**C. skillicaiense* (Mitt.) Kuntze, \**C. stephanii* Herz., \**C. tocoraniense* Herz., *C. ulophyllum* (Besch.) Broth. \**Daltonia bilimbata* Hampe, \**D. brevinervis* Bartr., \**D. cucullata* Hampe, *D. gracilis* Mitt., \**D. jamesonii* Tayl., \**D. jamesonii* var. *laevis* Herz., \**D. latolim-bata* Broth. in Herz., *D. lindigiana* Hampe, *D. longifolia* Tayl., \**D. macrotheca* Mitt., \**D. ovalis* Tayl., \**D. pellucida* Herz., \**D. peruviana* Mitt., \**D. pulvinata* Mitt., *D. stenophylla* Mitt., *D. tenuifolia* Mitt., *D. trachydonta* Mitt. \**Distichophyllum elongatum* Mitt. \**Eriopus deflexus* C. Muell., \**E. mniadelphus* Spruce, \**E. nutans* (Hampe) Mitt., \**E. papillatus* Herz. \**Helicoblepharum daltoniaceum* (Hampe) Broth., \**H. fusciculatum* (Mitt.) Broth., \**H. venustum* (Mitt.) Broth. *Hemiragis aurea* (Brid.) Ren. & Card. *Hookeria acutifolia* Hook. & Grev., *H. lorentzii* C. Muell., \**H. orbignyana* Mont., *H. uliginosa* C. Muell., *H. viridula* Mitt. \**Hookeriopsis acuminata* (Mitt.) Jaeg., \**H. adunca* (Mitt.) Jaeg., \**H. armata* Broth., *H. asprella* (Hampe) Broth., \**H. brunneophylla* (C. Muell.) Fleisch., \**H. cavifolia* (Mitt.) Jaeg., *H. crispa* (C. Muell.) Jaeg., *H. cruegeriana* (C. Muell.) Jaeg., \**H. curvifolia* (Mitt.) Jaeg., \**H. cuspidata* Jaeg., \**H. cuspidatissima* (Hampe) Broth., *H. diffusa* (Mitt.) Jaeg., \**H. exigua* (Mitt.) Jaeg., *H. falcata* (Hook.) Jaeg., \**H. glandulifera* (Hampe) Jaeg., \**H. gracilis* (Mitt.) Jaeg., *H. hypnacea* (C. Muell.) Jaeg., *H. incurva* (Hornsch.) Broth., \**H. lepidopiloides* Herz., \**H. longiseta* Williams, \**H. pachydictyon* Herz., \**H. papillidioides* (C. Muell.) Broth., *H. parkeriana* (Hook. & Grev.) Jaeg., \**H. pernutans* (C. Muell.) Broth., \**H. plumicaulis* (C. Muell.) Broth., \**H. ptari-tepuiensis* Bartr., \**H. purpureophylla* (Britt.) Broth., \**H. scabrella* (Mitt.) Jaeg., \**H. sinuata* (Mitt.) Jaeg., \**H. steyermarkii* Bartr., *H. subfalcata* (Hampe) Jaeg., \**H. subscabrella* Fleisch. ex Broth., \**H. subsecunda* (Mitt.) Jaeg., \**H. taylorii* (C. Muell.) Wijk & Marg., \**H. tenuis* (Mitt.) Jaeg., \**H. terrestris* (Mitt.) Jaeg., *H. undata* (Hedw.) Jaeg., \**H. undatula* (C. Muell.) Broth., \**H. vaga* (Mitt.) Jaeg., *H. variabilis* (Mitt.) Jaeg., \**H. velutina* (Hampe) Jaeg., \**H. viridissima* (Mitt.) Jaeg., \**H. williamsii* Herz. \**Hypnella brotheri* Herz., *H. cymbifolia* (Hampe) Jaeg., *H. diversifolia* (Mitt.) Jaeg., \**H. pallescens* (Hook.) Jaeg., \**H. philonotula* (C. Muell.) Kindb., *H. pilifera* (Hook. & Wils.) Jaeg., \**H. recurvula* (C. Muell.) Broth., \**H. sigmatelloides* (C. Muell.) Broth. *Isodrepanium lentulum* (Wils.) Broth. *Lepidopilidium divaricatum* (Doz. & Molk.) Broth., \**L. purpurissatum* (C. Muell.) Broth., \**L. synoicum* Herz., \**Lepidopilum acutum* Mitt., *L. affine* C. Muell., \**L. allionii* Broth., *L. ambiguum* Broth., \**L. anceps* Mitt., \**L. angustifrons* Hampe, *L. apollinairei* Broth. & Par., \**L. arcuatum* Mitt., \**L. argutidens* Broth., \**L. armatum* Mitt., \**L. aubertii* Thér., *L. aureofulvum* C. Muell., \**L. auriculatum* Herz., \**L. aurifolium* Mitt., \**L. ballivianii* Herz., *L. biductulosum* (P. Beauv.) Wijk & Marg., \**L. brachyphyllum* Broth. in Herz., \**L. brevifolium* Mitt., *L. brevipes* Mitt., \**L. calvum* Mitt., *L. carneum* Bartr., \**L. caudatum* C. Muell., \**L. caviusculum* Mitt., \**L. chloroneuron* (Tayl.) Hampe & Lor. \**L. convallium* (Brid.) Mitt., \**L. crispum* Herz. \**L. curvifolium* Mitt., \**L. curvirameum* (C. Muell.) Par., \**L. cuspidans* Mitt., *L. erectiusculum* (Tayl.) Mitt., *L. erubescens* C. Muell., \**L. excelsum* C. Muell., \**L. filosum* Herz., \**L.*

*frondosum* Mitt., \**L. gertrudis* Herz., \**L. goniothecium* C. Muell., \**L. gracile* Mitt., \**L. herzogii* Broth. in Herz., \**L. huallagense* Broth., \**L. imbricatifolium* Mitt., \**L. inflexum* Mitt., \**L. integerrimum* Mitt., \**L. intermedium* (C. Muell.) Mitt., \**L. krauseanum* C. Muell., \**L. leiomitrium* C. Muell., \**L. leucomioides* Broth., \**L. longifolium* Hampe, \**L. maculatum* C. Muell., \**L. malachiticum* Herz. \**L. mniaceum* C. Muell., \**L. mnioides* C. Muell., \**L. muelleri* (Hampe) Spruce, \**L. nanothecium* C. Muell., \**L. nudum* Mitt., \**L. ovatifolium* Herz., \**L. pallido-nitens* (C. Muell.) Paris, \**L. pectinatum* Mitt., \**L. pergracile* C. Muell., \**L. perlaxum* Thér., \**L. permarginatum* Williams, \**L. phyllophilum* Broth., \**L. polytrichoides* (Hedw.) Brid., \**L. pumilum* Mitt., \**L. radicale* Mitt., \**L. robustum* Mitt., \**L. scabrisetum* (Schwaegr.) Steere, \**L. semi-laeve* Mitt., \**L. spendens* Broth., \**L. steyermarkii* Bartr., \**L. stillicidiorum* Mitt., \**L. subflexifolium* C. Muell., \**L. subgracile* Broth., \**L. subpolytrichoides* C. Muell., \**L. tenuifolium* Mitt., \**L. tenuissimum* Herz., \**L. tortifolium* Mitt., \**L. wallisii* C. Muell. *Leskeodon andicola* Spruce ex Mitt., \**L. palmarum* (Mitt.) Broth., \**L. pungens* (Mitt.) Broth., \**L. pusillus* (Mitt.) Broth., \**L. wallisii* (C. Muell.) Broth. *Neohynella chrysophyllipodia* (C. Muell.) Bartr. *Philophyllum tenuifolium* (Mitt.) Broth. *Pterygophyllum rigidum* (Schwaegr.) Brid. \**Rhynchoslegiopsis complanata* C. Muell., \**R. tunguraguana* (Mitt.) Broth. \**Stenodesmus latifolius* Bartr. & Herz., \**S. tenuicuspis* (Mitt.) Jaeg. \**Stenodictyon nitidum* (Mitt.) Jaeg., \**S. saxicola* Williams. *Thamniopsis killipii* (Williams) Williams, *T. pendula* (Hook.) Fleisch.

#### America 5: Brazil, Paraguay, Guiana, Trinidad, Tobago.

*Adelothecium bogotense* (Hampe) Mitt. \**Callicostella apophysata* (Hampe) Jaeg., \**C. aspera* (Mitt.) Jaeg., \**C. circinata* (Broth.) Broth., \**C. cruegeri* (C. Muell.) Broth., \**C. daltoniaecarpa* (C. Muell.) Broth., \**C. depressa* (Hedw.) Jaeg., \**C. diatomophila* (C. Muell.) Fleisch., \**C. glabrata* Broth., \**C. irrorata* (C. Muell.) Broth., \**C. jungermannioides* Herz., \**C. juruensis* Broth., \**C. limosa* (Broth.) Broth., \**C. lorifolia* (Hampe) Jaeg., \**C. martiana* (Hornsch.) Jaeg., \**C. merkelii* (Hornsch.) Jaeg., \**C. microcarpa* Aongstr., \**C. mollis* (Wils.) Jaeg., \**C. monofaria* (Geh. & Hampe) Broth., \**C. mosenii* (Broth.) Broth., \**C. pallida* (Hornsch.) Aongstr., \**C. paludicola* Broth., \**C. paulensis* Broth., \**C. pellucida* (Mitt.) Jaeg., \**C. perpallida* (Broth.) Broth., \**C. pilotrichidioides* Broth., \**C. rufescens* (Mitt.) Jaeg., \**C. rufescens* var. *demerarae* Richs., \**C. scaberrima* Broth., \**C. scabriseta* (Hook.) Jaeg., \**C. sellowiana* (Hampe) Jaeg., \**C. spurio-pallida* (Broth.) Broth., \**C. subdepressa* (Besch.) Broth., \**C. submicrocarpa* (Geh. & Hampe) Broth., \**C. submonofaria* Broth., \**C. torrentium* (Broth.) Broth., \**Chaetephora perrinii* (Spreng.) Brid., \**Crossomitrium cruegeri* C. Muell., \**C. patrisiae* (Brid.) C. Muell., \**C. paulense* Broth. & Sébille, \**C. radulaeforme* C. Muell., \**C. ramulicola* C. Muell., \**C. sellowii* C. Muell., \**C. splitgerberi* (Mont.) C. Muell., \**C. ulei* C. Muell. \**Cyclodictyon aciculifolium* (C. Muell.) Broth., \**C. albatum* (C. Muell.) Kuntze, \**C. albicans* (Hedw.) Kuntze, \**C. chloroleucum* (Broth.) Broth., \**C. cuspidatum* Kuntze, \**C. glareosum* (Broth.) Broth., \**C. glaucifolium* (C. Muell.) Broth., \**C. iporangeanum*

(Geh. & Hampe) Broth., \**C. laxifolium* Herz., \**C. leucomitrium* (C. Muell.) Broth., \**C. limbatum* (Hampe) Kuntze, \**C. longifrons* (Broth.) Broth., \**C. marginatum* (Hook. & Wils.) Kuntze, \**C. minarum* (Aongstr.) Kuntze, \**C. minor* (Aongstr.) Kuntze, \**C. molliculum* (Broth.) Broth., \**C. olfersianum* (Hornsch.) Kuntze, \**C. pallens* (Mitt.) Kuntze, \**C. pergracile* Broth., \**C. regnellianum* (C. Muell.) Fleisch., \**C. regnellii* (Aongstr.) Kuntze, \**C. rivale* (C. Muell.) Broth., \**C. submarginatum* (Aongstr.) Kuntze, \**C. viridissimum* Kuntze. \**Daltonia androgyna* Geh. & Hampe, \**D. aristata* Geh. & Hampe, \**D. brasiliensis* Mitt., \**D. gracilis* Mitt., \**D. stenophylla* Mitt. \**Distichophyllum densirete* Broth., \**D. gracile* Aongstr., \**D. minutum* C. Muell., \**D. minutum* var. *perlimbatum* C. Muell. \**Eriopus albescens* (Hampe) Jaeg., \**E. flexicaulis* (Hampe) Paris, \**E. lorifolius* (Hampe) Paris, \**E. monilodontius* (Hampe) Paris, \**E. setigerus* Mitt. \**Helicoblepharum brasiliense* Herz. *Hemiragis aurea* (Brid.) Ren. & Card. *Hookeria acutifolia* Hook. & Grev., \**H. commutata* Paris, \**H. janeirensis* Paris, \**H. viridula* Mitt. *Hookeriopsis acicularis* (Mitt.) Jaeg., \**H. asprella* (Hampe) Broth., \**H. beyrichiana* (Hampe) Broth., \**H. brachypelma* (C. Muell.) Broth., \**H. caldensis* (Aongstr.) Broth., \**H. cirrhosa* (Hampe) Jaeg., \**H. corcovadensis* (Reichdt.) Jaeg., \**H. crista* (C. Muell.) Jaeg., \**H. cruegeriana* (C. Muell.) Jaeg., \**H. cruegeriana* var. *dimorpha* (C. Muell.) Jaeg., \**H. drepanophylla* (Geh. & Hampe) Broth., \**H. exesa* (C. Muell.) Broth., \**H. fluminensis* (Geh. & Hampe) Broth., \**H. glaziovii* (Hampe) Jaeg., \**H. hornschuchiana* (Jaeg.) Broth., \**H. hydrophila* (C. Muell.) Broth., \**H. hypnacea* (C. Muell.) Jaeg., \**H. incurva* (Hornsch.) Broth., \**H. latifrondea* (C. Muell.) Broth., \**H. leucomioides* (Broth.) Broth., \**H. lonchopelma* (C. Muell.) Broth., \**H. luteo-viridis* (Besch.) Broth., \**H. minutiretis* (C. Muell.) Broth., \**H. negrensis* Broth. ex Thér., \**H. parkeriana* (Hook. & Grev.) Jaeg., \**H. perfulva* (C. Muell.) Fleisch., \**H. planiuscula* (Hampe) Jaeg., \**H. puiggarii* (Geh. & Hampe) Broth., \**H. rhynehostegioides* (Broth.) Broth., \**H. rubens* (C. Muell.) Broth., \**H. saprophila* (Broth.) Broth., \**H. saprophila* var. *major* C. Muell., \**H. schiffneri* Broth., \**H. serrata* (Aongstr.) Jaeg., \**H. subaurescens* (Geh. & Hampe) Broth., \**H. tenera* (Hampe) Jaeg., \**H. undata* (Hedw.) Jaeg., \**H. variabilis* (Mitt.) Jaeg., \**H. vesicularia* (C. Muell.) Broth. *Hypnella cymbifolia* (Hampe) Jaeg., \**H. diversifolia* (Mitt.) Jaeg., \**H. leptorrhyncha* (Hook. & Grev.) Jaeg., \**H. pallescens* (Hook.) Jaeg., \**H. pilifera* (Hook. & Wils.) Jaeg., \**H. punctata* Broth., \**H. verrucosa* (Hampe) Jaeg. *Isodrepanium lentulum* (Wils.) Britt. \**Lepidopilidium aureo-purpureum* (Geh. & Hampe) Broth., \**L. brevisetum* (Hampe) Broth., \**L. brevisetum* var. *purpurascens* Broth., \**L. caudicaule* (C. Muell.) Broth., \**L. divaricatum* (Doz. & Molk.) Broth., \**L. entodontella* (Broth.) Broth., \**L. gracilifrons* (C. Muell.) Broth., \**L. laevisetum* (Hampe) Broth., \**L. nitens* (Hornsch.) Broth., \**L. nitens* var. *latisetum* Geh. & Hampe, \**L. portoricense* (C. Muell.) Crum & Steere, \**L. rupestre* (C. Muell.) Broth., \**L. tenuisetum* (C. Muell.) Broth., \**L. wainioi* (Broth.) Broth. *Lepidopilum affine* C. Muell., \**L. ambiguum* Broth., \**L. biductulosum* (P. Beauv.) Wijk & Marg., \**L. flavescens* Geh. & Hampe, \**L. glaziovii* Hampe, \**L. intermedium* (C. Muell.) Mitt., \**L. latifolium* (C. Muell.) Mitt., \**L. laxirete* C. Muell.,



\**L. leptoloma* Broth., \**L. michelianum* Broth. & Par., \**L. mittenii* C. Muell., \**L. mosenii* Broth., *L. nanothecium* C. Muell., \**L. oblongifolium* Mitt., \**L. obtusulum* C. Muell., \**L. ovalifolium* (Dub.) Broth., \**L. plebejum* C. Muell., *L. polytrichoides* (Hedw.) Brid., \**L. pyenodictyum* C. Muell., *L. radicale* Mitt., \**L. rupestre* Broth., *L. scabrisetum* (Schwaegr.) Steere, *L. subaurifolium* Geh. & Hampe, *L. subflexifolium* C. Muell., \**L. subfuscum* Mitt., \**L. subobtusulum* Broth., \**L. subsubulatum* Geh. & Hampe, \**L. subulatum* Mitt., \**L. surinamense* C. Muell. \**Leskeodon aristatus* (Geh. & Hampe) Broth., \**L. aristatus* var. *tenuilimbatus* Broth., *L. auratus* (C. Muell.) Broth., *L. cubensis* (Mitt.) Thér., \**L. densiretis* (Broth.) Broth., \**L. longicaulis* Broth., \**L. minusculus* (C. Muell.) Fleisch. *Neohypmella chrysophyllipodia* (C. Muell.) Bartr. \**Philophyllum bromeliophilum* C. Muell., *P. tenuifolium* (Mitt.) Broth. \**Rhynchostegiopsis brasiliensis* Broth. *Thamniopsis killipii* (Williams) Bartr., *T. pendula* (Hook.) Fleisch.

**America 6: Chile, Argentina, Uruguay, Falkland Islands, Hermite Island.**

*Callicostella scabriseta* (Hook.) Jaeg., *C. scabriuscula* (C. Muell.) Jaeg. *Crossomitrium patrisiae* (Brid.) C. Muell. \**Cyclodictyon sublimbatum* (C. Muell.) Kuntze. *Daltonia gracilis* Mitt., *D. trachyodonta* Mitt. *Distichophyllum assimile* Broth. in Skotts., \**D. cavifolium* (Card.) Card., \**D. dicksonii* (Hook. & Grev.) Mitt., \**D. ellipticum* Herz., \**D. eremita* (Jaeg.) Paris, \**D. fernandezianum* Broth. in Skotts., \**D. flaccidum* (Hook. f. & Wils.) Mitt., \**D. nanospathulatum* Herz., \**D. nigricans* Besch., \**D. patagonicum* Besch., *D. rotundifolium* (Hook. f. & Wils.) C. Muell. & Broth., \**D. subelimbatum* Broth. in Skotts. *Eriopus apiculatus* (Hook. f. & Wils.) Mitt., \**E. apiculatus* var. *platyloma* Card. & Broth., *E. cristatus* (Hedw.) Brid., *E. flexicollis* (Mitt.) Jaeg., \**E. grandiretis* Broth. in Skotts., \**E. leptoloma* Broth. in Skotts. *Hookeria lorentzii* C. Muell., \**H. magellanica* (P. Beauv.) Arnott, *H. uliginosa* C. Muell. *Hookeriopsis incurva* (Hornsch.) Broth. \**Lamprophyllum splendissimum* (Mont.) Broth. \**Lepidopilum aurescens* C. Muell., *L. erectiusculum* (Tayl.) Mitt., *L. plebejum* C. Muell., *L. polytrichoides* (Hedw.) Brid., *L. scabrisetum* (Schwaegr.) Steere. \**Pterygophyllum anomalum* (Schwaegr.) Mitt., *P. anomalum* var. *pallidum* Card. & Broth., \**P. chonoticum* Mitt., *P. dentatum* (Hook. f. & Wils.) Dix., \**P. fragile* Mitt., \**P. magellanicum* Besch., *P. obscurum* Mitt., \**P. obscurum* f. *thermalis* Herz., *P. rigidum* (Schwaegr.) Brid., \**P. tenuinerve* Broth. in Skotts. *Sauloma tenella* (Hook. f. & Wils.) Mitt., *S. tenella* f. *propagulifera* Sainsb.

A summary of the Hookeriaceae species, varieties, and forms, and the endemics, based upon data presently known, in North, Central, and South America follows: Am 1: 36 species, 8 of which are endemic; Am 2: 96 species, 39 of which are endemic; Am 3: 107 species, 54 of which are endemic; Am 4: 255 species, 173 of which are endemic; Am 5: 192 species, 137 of which are endemic; Am 6: 47 species, 23 of which are endemic. The greatest endemism occurs in northern South America as shown by a total of 310 endemics. The largest number of species and endemics occurs in Am 4 or northwestern portion of South America and decreases to the east, north, and south. North America and southern

South America have the smallest number of species and endemics, the former having the least. It is also evident that the family Hookeriaceae is chiefly a family of tropical mosses in the Americas, although species occur from Alaska to the southern tip of South America, Hermite Island, and the Falkland Islands.

#### Literature Cited

1. AXELROD, D. I. 1963. Fossil Floras suggest stable, not drifting Continents. *J. Geophys. Res.* **68**:3257-3264.
2. CREER, KENNETH M. 1966. Continents on the Move. *Sea Frontiers* **12**(3): 148-151.
3. DIETZ, ROBERT S. 1967. More about Continental Drift. *Sea Frontiers* **13**(2): 66-82.
4. STEERE, WILLIAM C. 1948. Mosses of Ecuador I. *The Bryologist* **51**(3): 65-167.
5. WEGENER, A. 1912. Die Entstehung der Kontinente. *Geol. Rundsch.* **3**(4): 276-292.
6. WEGENER, A. 1924. *The Origin of Continents and Oceans.* (English translation by J. G. A. Skerl. Methuen, London.) 212 p.
7. WELCH, WINONA H. 1962. The Hookeriaceae of the United States and Canada. *The Bryologist* **65**(1):1-24.
8. ————. 1966. The Hookeriaceae of Mexico. *The Bryologist* **69**(1): 1-68.
9. ————. 1968. Hookeriaceae Species and Distribution in North and Central America and West Indies. *Proc. Indiana Acad. Sci.* **77**:351-356.
10. ————. 1969. The Hookeriaceae of Cuba. *The Bryologist* **72**(2). In press.
11. WIJK, R. van der, W. D. MARGADANT, and P. A. FLORSCHÜTZ. 1959, 1962, 1964, 1967. *Index Muscorum.* Vol. 1-4. Utrecht, The Netherlands.