

**LEAFLETS OF
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LEO FRANCIS KOCH	

SAN FRANCISCO, CALIFORNIA

FEBRUARY 24, 1950

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MOSSES OF CALIFORNIA: AN ANNOTATED LIST OF SPECIES¹

BY LEO FRANCIS KOCH

The information acquired about the mosses of California in the nineteenth century is largely the result of the efforts of two men: Henry N. Bolander, who first collected them systematically, and Leo Lesquereux, who first studied Bolander's material. The results of their work appeared in two articles written by Lesquereux (1865, 1868). "A Catalogue of Pacific Coast Mosses," the later of the two papers, reported 215 species from California. H. N. Bolander (1870), Sereno Watson (1880), and Lesquereux and James (1884) obviously based their reports for mosses in California almost entirely upon these two contributions.

Next in importance are the field work and publications of Marshall A. Howe (1894, 1896, 1897). In Marin Co. alone, he collected such rarities as *Acaulon muticum*, *Camptothecium alsoides*, *Fissidens pauperculus*, and *Triquetrella californica*. Since his time, only incidental collections have been made, and a few miscellaneous papers have been published on the mosses of California.

The "Moss Flora of North America North of Mexico" (Grout, 1928-40) contains 265 species with ranges including California. The present work lists 317 species.

In the remarks about distribution within California, the following terminology is adopted:

1. *Northern California* extends from the Oregon boundary to Mendocino Co. and Lake Tahoe inclusive.

2. *Central California* is the area south of Mendocino Co. and Lake Tahoe, as far as and including the Santa Lucia and the Tehachapi Mts.

3. *Southern California* includes the remainder of the state south to the Mexican boundary and the desert areas as far north as the northern boundary of Inyo Co.

4. *Sierras* includes all the high mountain ranges in the northern two-thirds of the state as well as the Sierra Nevada.

¹Paper from the Herbarium and Department of Botany, University of Michigan, Ann Arbor, Michigan.

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5. *Redwoods* represents the range of the Coast Redwood, *Sequoia sempervirens*, from southern Oregon south along the coast to the Santa Lucia Mts., Monterey Co., California.

6. *Bay area* includes Marin Co., Sonoma Co., Solano Co., Contra Costa Co., Alameda Co., San Francisco Co., and San Mateo Co.

The distribution of widespread species is indicated by one of the following designations:

1. *Cosmopolitan*, species that are reported from every continent;

2. *Bipolar-montane*, species that are known from both hemispheres, and in most instances are reported also from isolated stations in the higher mountain ranges of the Temperate and Torrid zones;

3. *Circumboreal*, species that are found in all the boreal continents, their range extending southward in elevated regions, but not into the southern hemisphere;

4. *Arctic-montane*, species that have their greatest concentration in the Arctic, but are also known from disjunct mountains southward in the northern hemisphere;

5. *Europe-North America*, species that are common to Europe and North America;

6. *North Pacific Basin*, species that are common to the oceanic areas of eastern Asia and western North America;

7. *Boreal America*, species that are restricted to the North American continent north of Mexico; they may have a trans-continental range or be limited to the Rocky Mts. westward;

8. *Sonora*, species that inhabit the desert areas of the southwestern United States and northern Mexico. A number of so-called "endemic" species are known only from sections of this region such as Southern or Central California, Southern California and Baja California, Southern California and Arizona, etc.

Anomalous species that cannot be classified in any of the defined categories are *Orthodontium pellucens*, *Tortula princeps*, and *Vesicularia amphibola*.

The arrangement of families is essentially that of Brotherus (1924-25). A concerted effort has been made to conform with the International Rules of Botanical Nomenclature. When a binomial is used that was not accepted by Grout (1928-40), the

requisite synonymy and its page reference in the "Moss Flora" are given.

Unless otherwise stated, a question mark indicates that the author has not seen a specimen of the species from California. A name preceded by two asterisks (**) indicates a new record for California, while a name preceded by one asterisk (*) indicates a plant reported from California but not included in the range given in the "Moss Flora."

Acknowledgments. I am indebted to the following institutions and individuals for the loan of herbarium specimens: California Academy of Sciences (CAS), Duke University (Grout Herbarium, AJG, and Herbarium of the American Bryological Society, ABS), New York Botanical Garden (Elizabeth Gertrude Britton Moss Collection, EGB), Stanford University at Stanford, California (DS), University of California at Berkeley (UCB), at Los Angeles (UCLA), University of Michigan at Ann Arbor (UMAA), Dr. H. S. Conard (HSC), and Dr. E. B. Bartram (EBB). Important private collections which were studied are those made by D. G. Catcheside, W. B. Cooke, I. M. Haring, G. J. Ikenberry, J. M. Linsdale, E. E. Morse, and H. K. Wagnon. Bryologists who determined specimens in certain genera and families are A. L. Andrews, E. B. Bartram, H. S. Conard, Seville Flowers, Geneva Sayre, A. J. Sharp, W. C. Steere, E. C. Wallace, W. H. Welch, and F. E. Wynne-Hillier. Many valuable references to the literature were received from W. C. Steere and E. V. Watson.

SPHAGNACEAE

*SPHAGNUM CAPILLACEUM*² (Weiss) Schrank, Baier. Fl. 2: 435 (1789). Upper Tuolumne Canyon, *Bolander* (Lesq., 1868)³; a second collection, *Bolander* 6, in the Lesq. herbarium (Andrews, pers. comm.). Bipolar-montane.

SPHAGNUM FIMBRIATUM Wils. in Hook., Crypt. Bot. Antarct. Voy. 92 (1845). Mt. Brewer at 11,000 ft., *Brewer* (Lesq., 1868); Mt. Dana, *Bolander* (Lesq., 1868)³; type specimens of *S. microphyllum* and *S. Bolanderi* (Warnstorf, 1891) acc. Andrews (1913). Bipolar-montane.

SPHAGNUM MAGELLANICUM Brid., Musco. Recent. 2(1):24 (1798). California, *James* 71 (EGB). Bipolar-montane.

SPHAGNUM MENDOCINUM Sull. & Lesq. in Sull., Icon. Musc. Suppl. 12 (1874). Near Mendocino City, Mendocino Co., *Bolander*, first described as *S. subsecundum* var. *longifolium* by Lesq. (1868); near Kings River at 8000-9000 ft., Fresno Co., *Brewer* (Lesq., 1868, as *S. auriculatum*); North Fork, Little River, Mendocino Co., *Howe* 607, 688. Pacific Coast.

²California was not included in the range of this species by Andrews (1913).

³The Mt. Dana collection cited by Lesq. (1868), under *S. acutifolium*, was determined by Andrews (pers. comm.) as "poorly developed *S. fimbriatum*."

SPHAGNUM PALUSTRE L., *Sp. Pl.* 2:1106 (1753). Mendocino Co., northward; remarkably enough not reported from the Sierra Nevada. Brotherus (1924) said "... fast kosmopolitisch, nicht in Afrika."

SPHAGNUM PLUMULOSUM Roell, *Flora* 69:89 (1886). California, *Bolander* 211 (EGB, as *S. subnitens*). Bipolar-montane.

*SPHAGNUM SQUARROSUM*⁴ Cromie in Hoppe, *Bot. Zeit. (Regensb.)* 2:324 (1803). Abundant on Lassen Peak at 5000 ft., *Brewer* (Lesq., 1868); Yosemite Nat. Park, *Byxbee, Eastwood* 339; Tehama Co., *Butler* 5. Circumboreal.

SPHAGNUM SUBSEGUNDUM Nees in Sturm, *Deut. Fl., Crypt.* 5(17) tab. 3 (1819). Mendocino swamps and near Mariposa Big Trees, *Bolander* (Lesq., 1868); Sierra Nevada at 9000 ft., *Brewer* (Sull. & Lesq., 1865); probably the same collection, *Brewer* 2794 (CAS), labelled: "in Sierras near Camp 167, Tulare Co."; Spanish Peak at 6500 ft., Plumas Co., *Leiberg* 5437. Circumboreal, south to Guatemala (Bartram, 1949).

SPHAGNUM TERES (Schp.) Aongstr. in Hartm., *Skand. Fl. (ed. 8)* 417 (1861). Near Lassen Peak at 5000 ft., *Brewer* (Lesq., 1868); Mt. Shasta, *Brown* 659 (EGB); Willow Lake, Plumas Co., *Austin* (EGB), *Bruce* 2398 (UCB); Eldorado Co., *Stebbins* (LFK 2315). Circumboreal.

EXCLUDED SPECIES

SPHAGNUM COMPACTUM Lamk. & DC. Specimens from Yosemite Valley and Mt. Dana, *Bolander* (Lesq., 1868) are *S. squarrosus* or *S. teres* (Andrews, pers. comm.).

SPHAGNUM PAPILLOSUM Lindb. I have been unable to substantiate the report by Lepage (1947) of California in the range of this species.

ANDREAEACEAE

ANDREAEA BLYTTII Schp., *Bryol. Eur.* 6(62-64) M:25, tab. 635 (1855). California, *Bolander* (EGB, annotated "an unusual collection" by Sharp). Arctic-montane.

?*ANDREAEA RUPESTRIS* Hedw., *Sp. Musc.* 47 (1801). In California acc. Britton and Emerson (1913), and Sharp (1936). Bipolar-montane.

GEORGIACEAE

TETRAPHIS PELLUCIDA Hedw., *Sp. Musc.* 45 (1801). Redwoods, near Big River City (Mendocino Co.), *Bolander* (Lesq., 1865); near Eureka, Humboldt Co., *Howe* 459, 912; near Trinidad, Humboldt Co., *Tracy* 15257 (UCB); Sisson, Siskiyou Co., *Howe* 101. Circumboreal.

DITRICHACEAE

CERATODON PURPUREUS (Hedw.) Brid., *Bryol. Univ.* 1:480 (1826). Common everywhere. Cosmopolitan.

DISTICHUM CAPILLACEUM (Hedw.) Br. & Schp., *Bryol. Eur.* 2(29-30) M:4, tab. 193 (1846). Frequent in the high Sierras, south to Tulare Co., *R. R. Koch* (LFK 2170). Bipolar-montane.

⁴A specimen (CAS) labelled: "Santa Barbara, California; H. A. Warne, 1878" is doubtful. Confirmation of this unlikely station is desirable.

DITRICHUM INCLINATUM (Hedw.) Br. & Schp., Bryol. Eur. 2(29-30) M:5, tab. 194 (1846). Soda Springs, Upper Tuolumne, Yosemite Nat. Park, *Bolander* (Lesq., 1868); a specimen at New York (EGB), merely labelled "California" is presumably this collection. Arctic-montane.

DITRICHUM AMBIGUUM Best, Torr. Bot. Club Bull. 20:117 (1893). Humboldt Co. to Santa Cruz Co. and inland to Placer Co. and Tuolumne Co. Pacific Coast, south to Guatemala (Bartram, 1919).

DITRICHUM HETEROMALLUM (Hedw.) Britt., No. Am. Fl. 15:61 (1913). Humboldt Co., *Howe*; San Benito Co., *R. R. Koch* (LFK 1329). Europe-North America.

DITRICHUM SCHIMPERI (Lesq.) Paris, Index Bryol. 396 (1896). Northern California, south to Marin Co. and Yosemite Valley. Pacific Coast.

?*PLEURIDIUM ACUMINATUM* Lindb., Svenska Vet.-Akad. Stockh. Oefv. 20:406 (1863). Near San Rafael, *Bolander* (Lesq., 1868). The Californian moss known by this name does not seem identical with the European and eastern North American species; its relation to *P. Bolanderi* is not clear to me. Circumboreal.

PLEURIDIUM BOLANDERI C. Muell.⁵ in Jaeger, St. Gall. Nat. Ges., Ber. 1869:91 (1869). Common in Central California, south to San Luis Obispo Co., *Allen*, *Ikenberry*. Pacific Coast.

PLEURIDIUM CALIFORNICUM Grout, Moss Fl. No. Am. 1:31 (1936). Foothills, Altadena, *Kingman* (type, Holz. exs. No. 330 as *P. Bolanderi*). A number of specimens from Central California resemble the type of this species, but also contain plants matching *P. Bolanderi*, and are probably that species. Unfortunately, I have not been able to do the field work necessary to solve this taxonomic riddle. California only.

EXCLUDED SPECIES

DITRICHUM PUSILLUM (Hedw.) Britt. was listed for California doubtfully by Grout (1928-40). Specimens seen, so named, are *D. ambiguum*.

DITRICHUM TORTULOIDES Grout was reported from Marin Co., *Howe* 92 (EGB) by the author (Grout, 1927). The two plants that Grout segregated from this collection appear to me to belong with the rest of the specimen to *D. ambiguum*.

SELIGERIACEAE

***BLINDIA ACUTA* (Hedw.) Br. & Schp., Bryol. Eur. 2(33-36) M:3, tab. 114 (1846). Cisco to Summit (Placer Co.), *Bolander* 359, 373 (EGB); vicinity of Echo Lake, Eldorado Co., *Conard* (HSC); near Vernal Falls, Yosemite Nat. Park, Mariposa Co., *MacFadden* 17448; Lower Soldier Lake, Tulare Co., *Howell* (LFK H151b). Arctic-montane, south to Guatemala (Bartram, 1919).

DICRANACEAE

ANISOTHECIUM VARIUM (Hedw.) Mitt., Linn. Soc. Lond., Journ. Bot. 12:40 (1869). *Dicranella varia* (Hedw.) Schp.; MFNA 1:56. Common at low altitudes in Central California; south to Santa Catalina Id., *Millspaugh* 4872 (Williams in Millsp. & Nutt., 1923). Circumboreal, south to Guatemala (Bartram, 1919).

⁵A report by Roth (1911) for this species "bel Chicago," must surely be a misidentification.