

A review of the American species of *Daltonia*

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(WITH PLATES 3, 4)

The genus *Daltonia* was established by Hooker and Taylor in memory of their friend, the Rev. James Dalton, Rector of Croft, in Yorkshire, whose keen interest in botany and bryology is reflected by a number of noteworthy discoveries of rare mosses and flowering plants from this district.

Curiously enough the type species, *D. splachnoides* (Sm.) Hook. & Tayl., is isolated in a few scattered localities in Ireland, while elsewhere the group is almost entirely confined to elevated tropical regions. In America the center of distribution seems to be in Cordilleran regions of Colombia and Ecuador, with extensions northward to Mexico and the West Indies, eastward to southeastern Brazil and southward to Bolivia and Chile. The reported occurrence of *D. splachnoides* in Mexico and the Antilles is probably the result of a rather hazy understanding of the type species and its American associates. *D. gracilis*, one of the most widely distributed of the American species, is undoubtedly very close to *D. splachnoides*, but the European plant should be, and I think is, clearly separable through the more incrassate upper leaf cells, the stronger, more cartilaginous border, shorter leaves, and reduced size throughout: at least no transitional forms with clearly correlated characters have been observed in any of the American collections that would tend to narrow the gap.

With a few notable exceptions the American species are closely inter-related and naturally fall into several well marked groups. No obvious distinctions have been found in either the perigonal or perichaetial leaves, the peristome, lid or calyptra, all of which seem to be fairly constant throughout the genus. Unfortunately the vegetative characters, which have been extensively relied upon to differentiate the species, are rather unstable, and although there are undoubtedly reasonable limits within which these variations can be accommodated, the question of establishing these limits and of evaluating the distinctions has often proved a delicate and tedious one.

Four species are obviously distinct: *D. macrotheca* by the elongated, almost filiform stems with distantly imbricated leaves; *D. Jamesoni* by the large, pellucid quadrate leaf cells and almost percurrent costa; *D. lato-limbata* by the rounded, incrassate upper leaf cells and the band of long, narrow juxta-costal cells extending from mid-leaf to the insertion; and *D. brevinervis* by the linear, incrassate upper leaf cells extending in a central

wedge-shaped band to the insertion. Of the remaining species, one group, comprising *D. longifolia*, *D. pulvinata*, *D. braziliensis*, *D. aristata*, and *D. androgyna*, may be defined by the essentially flat leaf margins and rounded leaf cells. In this group the lamina is occasionally broadly reflexed here and there and very rarely narrowly recurved, but never regularly and consistently revolute as in all but one or two of the remaining species. The leaves of *D. stenophylla* and *D. gracilis* are sometimes nearly plane, but their smaller size and angular or elongated areolation easily distinguish them from those of *D. longifolia* and its allies, in which the leaf cells are oval and rounded.

Mitten's key, based on the leaf outline, is helpful as far as it goes; the treatment by Brotherus in both editions of Engler and Prantl by subdivisions into arbitrary groups does not do much to clarify the situation. It was at the friendly suggestion of Mrs. Britton, (who had already made a chronological list of all the American species and studied the West Indian collections) and also by means of the loan of the types not represented in the herbarium of the New York Botanical Garden, that this revision was undertaken. All the Antillean specimens and their manuscript names have been referred to South American species. Needless to say this study would have been utterly impracticable without the use of the collections which Mrs. Britton so graciously placed at my disposal. Dr. Herzog has very generously loaned his Bolivian collections, including the types of several species, together with several Brazilian specimens and a limited but highly interesting series of unnamed collections from Colombia and Bolivia, all of which have been incorporated in the present study. Through the kindness of Dr. Reimers it has been possible to examine portions of the Mueller types which rest in the Botanical Museum at Berlin-Dahlem and Dr. Lindberg has very kindly loaned type material of several South American species from the Brotherus herbarium. Such friendly coöperation is deeply appreciated and leaves a lasting sense of gratitude.

KEY TO SPECIES

Leaf margin flat

Upper leaf cells short, oval-rhomboidal, 1:2 or less, seta stout, propagulae present. .

1. *D. pulvinata*

Upper leaf cells oval, 1:3 or more, often more or less pitted, seta slender, propagulae wanting

Leaves oblong-ligulate, up to 3.5 mm. long. 2. *D. longifolia*

Leaves lanceolate, 2.5–3 mm. long

Areolation dense, upper cells up to $7 \times 18\mu$, border wide

Seta 6–12 mm. long. 3. *D. braziliensis*

Seta 4–5 mm. long. 4. *D. aristata*

Areolation lax, upper cells up to $10 \times 30\mu$, border narrow 5. *D. androgyna*

Leaf margin revolute

Leaves laxly imbricated, stems slender and elongated. 6. *D. macrotheca*

Leaves densely imbricated, stems shorter

Costa ending about mid-leaf, upper cells linear. 7. *D. brevinervis*

Costa ending $\frac{3}{4}$ or more up, upper cells not linear

Leaves ovate, costa nearly percurrent. 8. *D. Jamesoni*

Leaves lanceolate, costa shorter

Basal leaf cells linear, firm, border indistinct below

Leaves lanceolate, 0.4–0.5 mm. wide, propagulae present. . . . 9. *D. Lindigiana*

Leaves linear-lanceolate, 0.3 mm. wide or less, propagulae usually wanting

10. *D. stenophylla*

Basal cells oblong, border distinct to insertion

Robust plants, leaves 3–4 mm. long, border wide

Seta smooth

Border 10–15 rows wide at base. 11. *D. bilimbata*

Border 7–9 rows wide at base. 12. *D. pellucida*

Seta rough above

Juxta-costal basal cells not differentiated. 13. *D. peruviana*

Juxta-costal basal cells long linear, similar to border cells.

14. *D. latolimbata*

Slender plants, leaves less than 3 mm. long, border narrow

Seta smooth

Leaves oblong-ligulate, basal cells short oblong, firm and pellucid.

15. *D. trachydontia*

Leaves linear-lanceolate, basal cells linear-oblong, delicate and hy-

aline. 16. *D. tenuifolia*

Seta rough above

Leaves linear-lanceolate, basal cells up to 50μ long, linear-oblong. . . .

17. *D. gracilis*

Leaves lanceolate, basal cells 35μ or less long, oblong. . . . 18. *D. ovalis*

1. DALTONIA PULVINATA Mitt. Jour. Linn. Soc. Bot. 12: 398. 1869.

Autoicous. Plants densely tufted, yellowish green, glossy. Stems up to 1.5 cm. high, simple, about 2 mm. wide with leaves, radiculose at base, with clusters of spindle shaped, septate propagulae in the leaf axils. Leaves densely imbricated, erect spreading, spirally contorted when dry, flexuose when moist, carinate with a broad median fold, oblong-ligulate, sharply acuminate, 2.5 to 3 mm. long by 0.6 mm. wide at base, margin flat, often broadly reflexed toward base but not revolute, entire or very minutely denticulate at apex, border pellucid, sharply defined, 7–10 rows wide at base, 3–4 rows at mid-leaf and 2 rows at apex; costa ending about $\frac{4}{5}$ up, 35μ wide at base, channelled; cells of apical blade short, oval-rhomboidal, $6-8\mu$ wide by $12-14\mu$ long, hardly incrassate, median cells similar, basal cells short-rectangular, hyaline. Seta

stout, scarcely twisted, 5–6 mm. long, reddish, scabrous above; capsule erect, short oval, 1 mm. high by 0.7 mm. broad, exothecal cells strongly collenchymatous; peristome yellowish, densely papillose; lid erect, rostrate; calyptra slightly scabrous above, copiously fringed, spores minutely roughened, 22–25 μ in diameter.

Type Locality: Andes Bogotenses, near Bogota, Colombia.

Distribution: Colombia, Ecuador, Bolivia.

Material seen: COLOMBIA: Andes Bogotenses, prope Bogota, *Weir* (type); on branches of stunted trees by the way from Tipiguira to Pacho, 8000 ft., *Weir* (propagulae abundant).—ECUADOR: Guayrapata ad ramulos, *Spruce* (No. 566?).—BOLIVIA: Incacorral, alt. 2200 m., *Herzog 4950* in part.

Remarks: This species closely resembles both *D. longifolia* and *D. braziliensis* but appears to be distinct in the shorter, less incrassate leaf cells, the stout, short seta and larger spores. The occurrence of axillary propagulae may also be a distinctive feature. They have been found in all the specimens studied, and are especially abundant in the specimens from near Pacho, Colombia.

2. DALTONIA LONGIFOLIA Tayl. Lond. Jour. Bot. 7: 284. 1848.

D. crispata Schimper ex Besch. Mem. Soc. Sci. Cherbourg 16: 228. 1872. *D. robusta* Ångstr. Öfvers. K. Vet. Akad. Föerhand. 1873⁵: 117. 1873. *D. Dussii* Broth. Symb. Ant. 3: 426. 1903.

Autoicous. Plants in rather lax tufts, yellowish green, glossy. Stems up to 2.5 cm. high, simple or sparingly branched, 2–3 mm. wide with leaves, radicle below. Leaves closely imbricated, erect spreading and rather spirally contorted when dry, flexuose when moist, carinate with a broad median fold, oblong-ligulate, sharply acuminate, 3 to 3.5 mm. long by 0.6 mm. wide at base; margin flat, minutely denticulate toward apex; border pellucid, sharply defined, 8–15 rows wide at base, about 4 rows at mid-leaf and 2 rows at apex; costa ending about 4/5 up, 45 μ wide at base, channelled; cells of apical blade oval-oblong, 6–7 μ wide by 15–25 μ long, median cells similar, often arranged in oblique rows, basal cells narrowly oval to linear-rhomboidal, rather incrassate and pellucid and often lightly pitted. Seta slender, twisted to left when dry, up to 10 or 12 mm. long, reddish, scabrous above; capsule erect, oval-cylindrical, up to 1.5 mm. long by 0.8 mm. wide, exothecal cells strongly collenchymatous; peristome yellowish, densely papillose; lid erect, rostrate, about 1 mm. long, yellowish; calyptra slightly scabrous above, copiously fringed; spores minutely roughened, 12–15 μ in diameter.

Type Locality: Mt. Pichincha near Quito, Ecuador.

Distribution: Mexico, Guatemala, Haiti, Martinique, Colombia, Ecuador, Galapagos Islands, Bolivia.

Material seen: MEXICO: Huatusco, Vera Cruz, *Liebmann*; on oaks, Honey Station, Hidalgo, *Pringle 10487*.—GUATEMALA: Alta Verapaz, Cubilguitz, *Turckheim 6660*,

6661; Alta Verapaz, prope Coban, *Turckheim* 6662.—HAITI: vicinity of Furcy, *Leonard* 4620b.—MARTINIQUE: Ajoupa Bouillon, *Pere Duss* 345.—COLOMBIA: Magana, Cordillera Central, *Killip & Hazen* 12092a.—ECUADOR: Pichincha near Quito, *Jameson* (type); Autombos, *Spruce* 565; Tunguragua, *Spruce*.—GALAPAGOS ISLANDS: Chaves Island, *N. J. Anderson*; James Island, *Alban Stewart* 6046a.—BOLIVIA: Rio Pelichucho, *R. S. Williams* 2751; Santa Barbara, *R. S. Williams* 1816; Talschlucht von Tablas, *Herzog* 4650; Bergwald von Tocorani, *Herzog* 4040, 4081d in part; auf Baumasten beim Sillar, *Herzog* 2696a; Incacorral, *Herzog* 5091a in part.

Remarks: I have endeavored in all fairness to find some characters that might distinguish the various collections comprised in the synonymy of this species, but without success. *D. longifolia* is apparently an unstable type, but the variations are only relative, and may be included in the outline of a conservative specific concept. Indeed *D. pulvinata*, *D. longifolia*, *D. brazilinensis*, *D. androgyna*, and *D. aristata* form a very closely united group well defined from the other species by the essentially flat leaf margins and rounded leaf cells but not distinguished from each other by any salient characters. From a radical viewpoint the entire group might be subordinated to *D. longifolia*, but as this might tend to obscure rather than clarify our understanding of the elements involved, I have followed a middle course and tried to group the plants according to their natural affinities and geographical distribution, not, however, without considerable mental reservation. The leaf margins in the plants comprising this group are essentially flat, but occasionally the lamina is broadly reflexed, and very rarely narrowly recurved, but never consistently enough to be confused with the much larger group of species in which the margin is usually plainly and narrowly revolute.

3. DALTONIA BRAZILIENSIS Mitt. Jour. Linn. Soc. Bot. 12: 399. 1869.

D. leucoloma Hampe, Vidensk. Medd. Nat. Foren. Kjöb. 1874: 152. 1875.

Autoicous. Plants fulvous green, glossy. Stems up to 1.2 cm. high, more or less branched, 2–3 mm. wide with leaves, radiculose below. Leaves closely imbricated, erect and slightly spirally contorted when dry, flexuose when moist; carinate with a median fold, lanceolate, sharply acuminate, 2.5 mm. long by 0.6 mm. wide at base; margin flat, entire or very minutely denticulate above; border yellowish pellucid, 7–14 rows wide at base, about 4 rows at mid-leaf and 2 rows above; costa ending about 2/3 up, 45 μ wide at base, channelled; cells of apical blade oval-rhomboidal, 6–7 μ broad by 14–18 μ long, median cells similar often oblique, basal cells rectangular and rhomboidal, all slightly incrassate. Seta slender, 6–12 mm. long, reddish, scabrous above; capsule erect, oval, up to 1.5 mm. high by 0.8 mm. broad, exothecal cells strongly colenchymatous; peristome yellowish, densely papillose, teeth strongly trabeculate on inner side; lid erect, about 1 mm. long, yellowish; calyptra slightly scabrous above, fringed; spores minutely roughened, 14–18 μ in diameter.

Type Locality: Province of Minas Geraes, Brazil.

Distribution: Brazil.

Material seen: Sierra de Piedade, Minas Geraes, Brazil, *Gardner* 78 (type); woods near Corritaba, *Weir*; Rio, *Glaziou* 5820; Rio Janeiro, *Glaziou* 5620.

Remarks: Leaves from the type collection of *D. braziliensis* show a variable border from 5 to 12 rows wide at the base while those from the type collection of *D. leucoloma* show a border from 7 to 14 rows wide at the base. The setae in *D. leucoloma* are rather shorter, but neither of these characters appear to be stable enough to warrant a specific distinction.

4. DALTONIA ARISTATA Geheeb & Hampe, Vidensk. Meddel. Kjøb. 1879–80: 121. 1879.

D. Uleana C. Müll. Bull. Herb. Boiss. 6: 111. 1898.

Autoicous and synoicous. Plants loosely tufted, yellowish green, glossy. Stems up to 1.5 cm. high, simple or branched, about 3 mm. wide with leaves, radiculose below. Leaves erect spreading, flexuose and lightly twisted when dry, flexuose when moist, ovate-lanceolate, sharply acuminate, up to 2.75 mm. long by 0.7 mm. wide at base; margin flat, entire or minutely denticulate above; border pellucid, 7 to 10 rows wide at base, 4–6 rows wide at mid-leaf and 1 or 2 rows wide above; costa ending about $\frac{3}{4}$ up, 45μ wide at base, channelled; cells of apical blade oval-rhomboidal, $6\text{--}7\mu$ wide by $16\text{--}18\mu$ long, median cells similar and often obliquely arranged on one side, basal cells oblong and rhomboidal, all slightly incrassate. Seta short, 4–5 mm. long, reddish, scabrous above; capsule short oval, erect, about 0.6 mm. high by 0.5 mm. wide, exothecal cells strongly collenchymatous; peristome not seen; lid conic subulate, yellowish (ex desc.); spores unknown.

Type: Prope Apiahy, San Paulo, Brazil.

Distribution: Endemic.

Material seen: BRAZIL: prope Apiahy, San Paulo, *Puiggari* (type); Catharina, Serra Geral, *E. Ule* 865.

Remarks: There is little beyond the shorter setae to separate these plants from *D. braziliensis*, and I am very doubtful if they represent anything more than a form of this species.

5. DALTONIA ANDROGYNA Geheeb & Hampe Flora 64: 405. 1881.

Autoicous. Plants yellowish green, glossy. Stems up to 1 cm. high, simple, about 2 mm. wide with leaves, radiculose below. Leaves closely imbricated, erect and lightly spirally contorted when dry, flexuose when moist, carinate with a median fold, ovate-lanceolate, sharply acuminate, 2.5 mm. long by 0.6 mm. wide at base, margin flat, entire or very minutely denticulate above; border pellucid, 4–5 rows wide at base, about 3 rows wide at mid-leaf and 1–2 rows wide above; costa ending about $\frac{2}{3}$ up, 40μ wide at base, channelled; cells of apical blade oblong-rhomboidal, up to 10μ wide by $20\text{--}30\mu$ long, median

cells similar, basal cells oblong and rhomboidal becoming narrower toward costa, all rather incrassate and slightly pitted. Seta slender, about 10 mm. long, reddish, very scabrous above and rough half way down; capsule erect or inclined, oval, 1.5 mm. high by 0.9 mm. wide, exothecal cells strongly colenchymatous; peristome yellowish, densely papillose; lid erect, 0.65 mm. high, yellowish; spores minutely roughened, 15–17 μ in diameter.

Type Locality: prope Apiahy, San Paulo, Brazil.

Distribution: Endemic.

Material seen: Brazil: prope Apiahy, San Paulo, *Puiggari 985b* (type).

Remarks: This plant appears to be distinct from *D. braziliensis* in the larger, pitted leaf cells and the narrower border and from *D. aristata* by the longer seta, larger areolation and narrower border.

6. *DALTONIA MACROTHERCA* Mitt. Jour. Linn. Soc. Bot. 12: 402. 1869.

Autoicous. Plants pale, yellowish green, slightly glossy. Stems dark red, up to 4 cm. long, slender and flexuous, simple, about 1 mm. wide with leaves, radiculose at extreme base. Leaves laxly imbricated, erect, flexuose and slightly twisted when dry, erect spreading and flexuose when moist, carinate with a median fold, narrowly lanceolate, long and slenderly acuminate, 2.5 mm. long by 0.5 mm. wide at base; margin narrowly revolute on one or both sides from base nearly to apex, usually flat for a short distance below point, entire; border pellucid, 7–9 rows wide at base, 4–5 rows wide at mid-leaf and 2–3 rows wide above, confluent at apex, sharply defined below; costa ending about 2/3 up, 40 μ wide at base, channelled; cells of apical blade oval-rhomboidal, up to 7 μ wide by 20–28 μ long, median cells similar, basal cells rectangular and rhomboidal, rather lax, all lightly incrassate. Seta slender, 12–14 mm. long, dark red, scabrous above; capsule inclined, oval-cylindrical, 2.1 mm. long by 1 mm. wide, dark brown; peristome yellowish, densely papillose, the teeth with several narrow slits along the median line; lid not seen; calyptra smooth above, copiously fringed; spores slightly rough, 10–12 μ in diameter.

Type Locality: Chimborazo, Ecuador.

Distribution: Endemic.

Material seen: Ecuador: cinchona forest, Chimborazo, *Spruce* (type).

Remarks: The slender, elongated stems, laxly imbricated leaves and large capsule characterize this species clearly. It is easily segregated from *Lepidopilum chloroneuron*, with which it is entangled in the type collection, by the dark red, almost black stems, and the erect flexuose narrow leaves.

7. *Daltonia brevinervis* sp. nov.

Autoicous, male flowers about 0.7 mm. long, of 5 or 6 ovate, acute, entire perigonal bracts, the inner ecostate, the outer faintly nerved in the lower half, enclosing 2 or 3 antheridia without paraphyses. Plants in rather lax tufts, pale

green and glossy at the tips, brown below. Stems robust, up to 3 cm. long, simple or fasciculately branched, about 2 mm. wide with leaves, radiculose toward the base and often denuded of leaves in the older parts. Leaves closely imbricate, erect appressed and straight when dry, erect spreading when moist, carinate-concave without a median fold, oblong-ligulate, acute, 2 mm. long by 0.5 mm. wide at base; margin narrowly revolute from just below apex to insertion, entire; border yellowish pellucid, sharply defined at base, merging with the lamina cells about 1/3 up and indistinct above, 6–8 rows wide at base; costa slender, flat and indistinct, about 30 μ wide at base, blending with the elongated lamina cells about mid-leaf; cells of apical blade linear, about 5 μ wide by 40–50 μ long, yellowish pellucid and rather obscure, slightly incrassate, shorter toward the margins and extreme apex, median cells similar and extending in a V shaped band to the base of the costa, basal cells between the median band and margin oval and short rectangular with rounded ends, 6–8 μ wide by 12–24 μ long, pellucid to hyaline. Seta slender, about 12 mm. long, usually scabrous throughout; capsule erect or slightly inclined, short oval, about 1 mm. high by 0.8 mm. wide, dark brown; peristome yellowish, densely papillose (fruit all old); lid not seen; calyptra conical, smooth above, copiously fringed; spores roughened, about 15 μ in diameter.

Type: an der Rinde von Vorpostenbaumchen, Paramo El Boqueron near Bogota, Colombia, 3300 meters, *K. Troll 2176* in 1929. Com. Herzog.

Distribution: Known only from the type locality.

Remarks: This very interesting species was received from Dr. Herzog with other specimens of *Daltonia* from the same region. It seems to have no close affinity with any other known species, and is unique in the short nerve and linear areolation of the upper lamina, which converges in a wedge-shaped band to the base of the nerve. The area of short, hyaline cells between this band and the border is clearly differentiated, and ends above in a somewhat acute angle near the border. The type is deposited in the herbarium of the writer.

8. *DALTONIA JAMESONI* Tayl. Lond. Jour. Bot. 7: 283. 1848.

Autoicous. Plants in compact tufts, yellow, slightly glossy. Stems robust, stiffly erect, up to 5 cm. long, simple or with few erect branches, about 1 mm. wide with leaves, densely radiculose and matted together in lower parts. Leaves closely imbricated, appressed and lightly twisted when dry, closely appressed with flexuose tips when moist, carinate with a broad median fold, broadly ovate, sharply acuminate, 2 mm. long by 0.8 mm. wide, margin narrowly revolute, entire; border yellowish pellucid, narrow, sharply defined, 3–5 rows wide at base, about 3 rows at mid-leaf and 2 rows wide above; costa faint, usually obscured by the median fold, about 30 μ wide at base, flat, ending in acumen just below point; upper and median leaf cells quadrate and short rectangular, pellucid, somewhat incrassate, about 15 μ wide by 15–25 μ long,

basal cells more elongate up to 50μ long. Seta dark red, 8–12 mm. long, scabrous above; capsule erect, oval-cylindrical, 1.4 mm. high by 0.5 mm. wide, dark red, exothecal cells strongly collenchymatous; peristome pale yellow, densely papillose; lid erect, rostrate, 1 mm. long, yellowish; calyptra scabrous above, copiously ciliate; spores roughened, 20–25 μ in diameter.

D. JAMESONI var. *LAEVIS* Herzog, *Bibl. Bot.* 87: 128. 1926.

Distinguished from the type by the seta almost smooth throughout.

Type Locality: Ecuador, Mt. Pichincha.

Distribution: Ecuador, Bolivia (var.).

Material seen: ECUADOR: summit of Mt. Pichincha on hillocks of *Bolax Jameson* in 1847 (type).—BOLIVIA: an feuchten felsen der Cerros de Malaga, ca. 4000 m., *Herzog 4415* (var.).

Remarks: The broad leaves, large subquadrate, pellucid leaf cells and almost percurrent costa separate this plant unmistakably from any of its associates.

9. *DALTONIA LINDIGIANA* Hampe, *Ann. Sci. Nat. Bot.* V. 4: 363. 1866.

D. irrorata Mitt. *Jour. Linn. Soc. Bot.* 12: 399. 1869. *D. Stewartii* R. S. Williams, *Bryologist* 27: 38. 1924.

Autoicous. Plants in rather compact tufts, golden brown, glossy. Stems usually robust, erect or ascending, up to 3 cm. long, usually branched, about 2 mm. wide with leaves, sparingly radiculose below, with axillary, spindle shaped, septate propagulae. Leaves closely imbricated, erect and straight or slightly flexuose when dry, erect-spreading when moist, carinate with a median fold, narrowly lanceolate, acuminate, up to 4 mm. long by 0.5 mm. wide at base; margin narrowly revolute on one or both sides, entire; border pellucid, rather indistinct, blending with the elongated basal cells below, 8–10 rows wide at base, 4–5 rows wide at mid-leaf and 1–2 rows wide above; costa about 40μ wide at base obscured by the median fold, ending about $4/5$ up; cells of apical blade narrowly rhomboidal or lenticular, up to 8μ wide by 25–45 μ long, median cells similar but rather narrower, basal cells linear, up to 60μ long, rather incrassate throughout with firm, pellucid walls. Seta 10–12 mm. long, shorter in reduced forms, dark red, scabrous above and sometimes roughened to or below the middle; capsule erect, short oval, 1–1.25 mm. long by 0.7 mm. wide, dark brown, exothecal cells rounded, hexagonal, thick walled but not strongly collenchymatous except near the rim; peristome yellowish, densely papillose, teeth usually with several apertures along the median line; lid erect, rostrate, 0.75 mm. long, yellowish; calyptra slightly scabrous above, copiously fringed; spores roughened, 12–18 μ in diameter.

Type Locality: Colombia, Boqueron.

Distribution: Colombia, Galapagos Islands, Ecuador.

Material seen: COLOMBIA: Boqueron, 2100 m., *Lindig 2023* (type); Boqueron prope Bogota, *Weir 193, 294, 336, 338*; Paramo El Boqueron bei Bogota, *K. Troll*

2180d, 2185.—GALAPAGOS ISLANDS: Chatham Island, *Alban Stewart* 2782.—ECUADOR: Andes Quitenses, Cayembe, *Spruce*.

Remarks: Evidently Mitten was unaware of Hampe's species, as there is no reference to it in his *Musc. Austro-Am.* published in 1869. Lindig's type collection and the subsequent collections of Weir and Troll all come from the Paramo Boqueron near Bogota, and are identical in every essential particular. *Weir* 336 and *Troll* 2180d seem to be only stunted forms without any structural differences, and the plants collected by Stewart in the Galapagos Islands are likewise inseparable from those of the type locality. The species may be recognized by the elongated, firm basal cells blending with the border, which is consequently ill-defined below, and by the axillary propagulae. *D. stenophylla* is a smaller plant with narrower leaves. Some forms of *D. Lindigiana* are uncomfortably close to *D. gracilis*, in fact the four species *D. stenophylla*, *D. gracilis*, *D. Hampeana* and *D. ovalis* form a rather compact group of closely related forms that are often difficult to delimit sharply, but for the present it does not seem that any constructive result will be gained by further condensation.

10. DALTONIA STENOPHYLLA Mitt. Jour. Linn. Soc. Bot. 12: 402. 1869.

D. aristifolia Bartr. Cont. U. S. Nat. Herb. 26: 99. 1928; *D. Fendleri* C. Müller Linnaea 42: 491. 1879; *D. tenella* Broth. Act. Soc. Sci. Fenn. no. 5. 1897.

Autoicous. Plants in small tufts, pale green, glossy. Stems short and slender, simple or branched, 5–12 mm. high, 1–2 mm. broad with leaves, radiculose below. Leaves closely imbricated, straight or lightly twisted when dry, carinate with a narrow median fold, narrowly linear-lanceolate, subulate acuminate, up to 3 mm. long by 0.3 mm. wide at base; margin narrowly revolute, entire; border pellucid, rather indistinct below, 5–8 rows wide at base, 4–6 rows wide at mid-leaf and 2 rows wide above; costa about 40 μ wide at base channelled, ending about 4/5 up; cells of apical blade lenticular, about 7 μ wide and up to 45 μ long, median cells similar, basal cells linear-oblong, up to 70 μ long, firm throughout with slightly thickened, pellucid walls. Seta up to 9 mm. long, often shorter, reddish, slightly scabrous above; capsule erect, narrowly oval, up to 1.2 mm. high by 0.5 mm. wide, dark brown, exothecal cells strongly collenchymatous; peristome yellowish, densely papillose; lid erect, rostrate, 0.75 mm. long, yellowish; calyptra nearly smooth above, fringed; spores minutely roughened, 10–12 μ in diameter.

Type Locality: Mt. Tunguragua, Ecuador.

Distribution: Jamaica; St. Vincent; Costa Rica; Venezuela; Ecuador; Brazil.

Material seen: JAMAICA: Dollwood, St. Catharine's Peak, *Nichols* 94; Blue Mt. Peak, *Jaderholm* 7420.—ST. VINCENT: *Guilding*.—COSTA RICA: Volcan de Turrialba, *Standley* 35156a.—VENEZUELA: Valencia, *Fendler* 131.—BRAZIL: Caraca, Minas Geraes, *Wainio*; Alto de Serra, San Paulo, *A. Gehrt* 466, 469, com. Herzog.—ECUADOR: Mt. Tunguragua, *Spruce* 568 (type); Llalla, *Spruce* 567.

Remarks: The plants included here vary in the degree of robustness and length of setae but they all have in common the nearly erect, subulate-acuminate leaves, elongated pellucid leaf cells and rather narrow, poorly defined border below. Axillary, septate propagulae, similar to those found in *D. Lindigiana* but small, occur sparingly in no. 466 from Brazil, but otherwise the plants of this collection are indistinguishable from those included in the specific concept of *D. stenophylla*.

11. DALTONIA BILIMBATA Hampe Linnaea 32: 151. 1863.

D. compressa Mitt. Jour. Linn. Soc. Bot. 12: 400. 1869.

Autoicous. Plants densely tufted, yellowish green above, brown below, glossy. Stems up to 1.5 cm. high, rather robust, simple, about 5 mm. wide with leaves, radiculose below. Leaves crowded, erect-spreading, slightly flexuose, carinate with a median fold, oblong-lanceolate, acuminate, 4 mm. long by 0.5 mm. wide at base; margin narrowly revolute on one or both sides, entire; border pellucid, very broad and distinct in the lower half and occupying 1/2 or more of the leaf base, 12–15 rows wide at base, 7–9 rows wide at mid-leaf and 2–3 rows wide above; costa about 45μ wide at base, ending about $4/5$ up; cells of apical blade oval-hexagonal to oval-rhomboidal, about 8μ wide by $25\text{--}30\mu$ long, median cells similar, basal cells rather lax, rectangular and linear-oblong, all rather thin walled and hyaline. Seta slender, reddish, up to 14 mm. long, indistinctly roughened or smooth above; capsule inclined, narrowly oval, about 2 mm. long by 0.9 mm. wide, dark brown, exothecal cells collenchymatous in upper half of urn, uniformly thickened below; peristome normal; lid erect, rostrate, 1.5 mm. long, yellowish; calyptra slightly rough above, fringed; spores roughened, $20\text{--}25\mu$ in diameter.

Type Locality: Bogota, Colombia.

Distribution: Colombia, Ecuador.

Material seen: COLOMBIA: Bogota, Monserate, *Lindig* (type); Grenze der 'Ceja' gegen den Paramo, *K. Troll* 2028; Andes Bogotenses, *Weir* 349.—ECUADOR: Mt. Pichincha, *Spruce* 563.

Remarks: The robust habit, long leaves and wide border clearly distinguish this species from any others in the group with revolute leaf margins. The margin in this species varies somewhat, being sometimes narrowly revolute on one side and broadly recurved on the other or even flat toward the base, but never plane throughout as in *D. longifolia* and its allies.

12. DALTONIA PELLUCIDA Herzog, Bibl. Bot. 87: 128. 1916.

Autoicous. Plants in small, dense tufts, yellowish green above, brown below, glossy. Stems up to 2.5 cm. high, about 2.5 mm. wide with leaves, simple or branched, densely radiculose below. Leaves crowded, erect and spirally twisted when dry, erect-flexuose when moist, carinate with a median fold,

oblong-ligulate, up to 4 mm. long by 0.75 mm. wide at base; margin narrowly revolute, more broadly so on one side than the other, entire; border pellucid, well defined, 7-9 rows wide at base, 5-7 rows wide at mid-leaf and 2 rows wide above; costa 40μ wide at base, ending about $4/5$ up; cells of apical blade oval-hexagonal, scarcely incrassate, $7-8\mu$ wide by $15-25\mu$ long, median cells similar but more oblong, basal cells oblong and linear-oblong, all pellucid. Seta up to 1 cm. long, slender, reddish, smooth; capsule oval, 1.5 mm. high by 1 mm. wide, dark brown; peristome, lid and calyptra unknown; spores roughened, about 15μ in diameter.

Type Locality: Comarapa, Bolivia.

Distribution: Endemic.

Material seen: Bolivia: Auf Baumästen im Nebelwald über Comarapa, ca. 2600 m., Herzog 4214 (type).

Remarks: This plant together with *D. peruviana* and *D. bilimbata* form a natural little group characterized by the robust habit and broadly bordered leaves. *D. pellucida* may be distinguished from *D. peruviana* by the smooth seta, and from *D. bilimbata* by the narrower border and shorter, broader capsules.

13. DALTONIA PERUVIANA Mitt. Jour. Linn. Soc. Bot. 12: 401. 1869.

Autoicous. Plants densely tufted, pale yellowish green above, brown below, slightly glossy. Stems rather robust, up to 2.5 cm. high, about 2 mm. wide with leaves, cuspidate at the tips, radiculose below. Leaves crowded, erect, flexuose and twisted when dry, carinate with a median fold, oblong-lanceolate, acuminate, up to 3 mm. long by 0.8 mm. wide at base; margin narrowly revolute, entire; border pellucid, broad and well defined, 12-15 rows wide at base, 7-9 rows wide at mid-leaf and 2-3 rows wide above; costa 35μ wide at base, ending about $4/5$ up; cells of apical blade oval-hexagonal, 7μ wide by $15-20\mu$ long, not incrassate, pellucid, median cells similar but more hyaline, basal cells oblong, hyaline. Seta slender, 8 mm. long, reddish, rough above; capsule erect or inclined, oval, 1 mm. high by 0.5 mm. wide, brown; peristome, lid and calyptra unknown (capsules all old).

Type Locality: Cordillera de Raneo, Sachapata, Peru.

Distribution: Endemic.

Material seen: Peru: Cordillera de Raneo, Sachapata, Lechler (type).

Remarks: The wide border and hyaline areolation suggest an approach to *D. bilimbata*, but that species is even more robust with longer, more broadly bordered leaves and in addition has an almost smooth seta and much larger capsules.

14. DALTONIA LATOLIMBATA Broth. Bibl. Bot. 87: 129. 1916.

Autoicous? Plants in small tufts, golden green above, pale brown below, glossy. Stems rather robust, about 2 cm. high, simple or branched, 3-4 mm.

wide with leaves, radiculose below. Leaves crowded erect-spreading and lightly twisted when dry, more widely spreading and somewhat flexuose when moist, carinate with a small median fold, oblong-lanceolate, gradually acuminate, up to 4 mm. long by 0.9 mm. wide at base; margin narrowly revolute, often merely reflexed or even flat in acumen, entire; border pellucid, rather indistinct, 12–15 rows wide at base, 7–9 rows wide at mid-leaf and 2–3 rows wide above; costa 45μ wide at base, ending about $4/5$ up; cells of apical blade with oval lumens, incrassate, pellucid, about 7μ wide by 20μ long, median cells similar but more elongated becoming linear toward costa, basal cells between border and central band linear-oblong and linear-rhomboidal, incrassate and pellucid, a band 8 or 10 rows wide on either side of costa very long and narrow, similar to the border cells. Seta about 7 mm. long, slender, reddish, slightly rough above; capsule erect, oval, about 1.1 mm. high; peristome, lid and calyptra unknown; spores (ex desc.) 25μ in diameter.

Type Locality: Incacorral, Bolivia.

Distribution: Endemic.

Material seen: Bolivia: Incacorral, 2200 m., *Herzog 4950a* (type).

Remarks: The rounded, incrassate cells of the upper lamina distinguish this species at once from any others in the group of robust plants with broadly bordered leaves and revolute margins. The band of long, narrow cells next to the costa extending from the base to above mid-leaf is a very marked character shared by only one other species, *D. brevinervis*, which is distinguished at a glance from *D. latolimbata* by the linear upper leaf cells, short nerve and narrow border.

15. DALTONIA TRACHYDONTIA Mitt. Jour. Linn. Soc. Bot. 12: 400. 1869.

D. subirrorata Broth. Bibl. Bot. 87: 129. 1916. *D. Valdiviae* Herzog, Hedwigia 64: 15. 1923.

Autoicous. Plants in small tufts, fulvous green, glossy. Stems up to 1 cm. high, about 1 mm. wide with leaves, radiculose below. Leaves crowded, erect flexuose and twisted when dry, erect-spreading and flexuose when moist, carinate with a broad median fold, oblong-ligulate, acuminate, up to 3 mm. long by 0.4 mm. wide at base; margin narrowly revolute, often more broadly so on one side, entire; border pellucid, narrow but well defined, 3–5 rows wide at base, 2–3 rows wide at mid-leaf and 1–2 rows wide above; costa slender, obscured by median fold, 30μ wide at base, ending about $3/4$ up; cells of apical blade oval-hexagonal, not incrassate, rather pellucid, about 7μ wide by 14 – 18μ long, median cells similar, more rhomboidal, basal cells oblong, up to 25μ long. Seta up to 1 cm. long, reddish, smooth or nearly so; capsule erect, oval, up to 1.5 mm. long by 0.5 mm. wide, peristome yellowish, densely papillose; lid rostrate, erect, 0.75 mm. long, yellowish; calyptra smooth above; spores roughened, 12 – 16μ in diameter.

Type Locality: Cayembe, Andes Quitenses, Ecuador.

Distribution: Ecuador, Bolivia, Chile.

Material seen: ECUADOR: Cayembe, Andes Quitenses, cum *D. ovalis*, Jameson (type).—BOLIVIA: Sorata, 2500 m., Williams 2942; Aucoma, Cordillera Real, ca. 4000 m., K. Troll 27.—CHILE: Arique, Isla de Tejas, bei Valdivia, Herzog 5268.—BOLIVIA: Incacorral, Herzog 5091a in part.

Remarks: Distinguished from *D. tenuifolia* by the broader, more ligulate leaves, wider capsule and especially by the rather incrassate, pellucid leaf cells which are short and firm at the base. Having been unable to separate the Bolivian plants described by Brotherus from those representing the type collection of *D. trachydontia* I have no alternative but to include them under the older specific name. I have also been tempted to refer *D. Valdiviae* to synonymy, as it seems to be only a reduced form differing from the type in no important particular but the shorter seta. This is a variable factor at best, and hardly strong enough alone to merit a specific distinction.

16. DALTONIA TENUIFOLIA Mitt. Jour. Linn. Soc. Bot. 12: 402. 1869.

Autoicous. Plants in small tufts, sordid to bright green, glossy. Stems slender, up to 7 mm. high, simple or branched, 1–1.5 mm. wide with leaves, radiculose below. Leaves crowded, erect, flexuose and lightly twisted when dry, erect-spreading and flexuose when moist, carinate, linear-lanceolate, slenderly acuminate, up to 2.5 mm. long by 0.3 mm. wide at base; margin narrowly revolute on one or both sides toward base, usually flat in acumen, entire; border pellucid, rather narrow, 4–6 rows wide at base, 3–4 rows wide at mid-leaf and 1–2 rows wide above; costa 40 μ wide at base, obscured by the narrow median fold, ending about 4/5 up; cells of apical blade oval-hexagonal, lax, not incrassate, up to 12 μ wide by 25 μ long, median cells more rhomboidal, basal cells linear-oblong, thin walled, delicate and hyaline. Seta up to 6 mm. long, reddish, smooth; capsule erect, oval-cylindrical, 1–1.5 mm. high by 0.5 mm. wide, peristome yellowish, densely papillose; lid rostrate, erect, 0.6 mm. long, yellowish; calyptra smooth above, copiously fringed; spores roughened, 10–12 μ in diameter.

Type Locality: Pallatanga, Andes Quitenses, Ecuador.

Distribution: Costa Rica, Ecuador, Bolivia.

Material seen: COSTA RICA: San Jose, Prov. San Jose, M. Valerio 205a.—ECUADOR: Pallatanga, ad arbores, 6000 ft., Spruce 561 (type).—BOLIVIA: Quebrada de Pacona, 2800 m., Herzog 5149.

Remarks: For distinctions between this species and *D. trachydontia* refer to notes under the latter plant.

17. DALTONIA GRACILIS Mitt. Jour. Linn. Soc. Bot. 12: 402. 1869.

D. Wallisii C. Müll. Flora 58: 550. 1875; *D. ocanniana* C. Müll. Flora 58:

551. 1875; *D. lorifolia* C. Müll. Flora 58: 550. 1875; *D. minutifolia* C. Müll. Nuov. Giorn. Bot. Ital. 4: 148. 1897; *D. Hampeana* Geheeb, Vidensk. Meddel. Kjøb. 1879-1880: 122. 1879; *D. curvicauspis* C. Müll. Hedwigia 39: 268. 1900; *D. Krauseana* C. Müll.

Autoicous and synoicous. Plants in small tufts, yellowish or fulvous green, glossy. Stems slender, up to 1 cm. high, about 1 mm. wide with leaves, radicle below. Leaves crowded, erect, flexuose-twisted when dry, flexuose when moist, carinate with a narrow median fold, linear-lanceolate, up to 2.5 or 3 mm. long by 0.4 mm. wide at base; margin narrowly revolute on one or both sides, sometimes flat toward base, entire; border pellucid, well defined, 6-8 rows wide at base, 3-4 rows wide at mid-leaf and 2 rows wide above; costa 30 μ wide at base, ending about 4/5 up; cells of apical blade lenticular or narrowly rhomboidal up to 7 μ wide by 24 μ long, slightly incrassate, pellucid, median cells similar, rhomboidal and linear rhomboidal, basal cells linear-oblong, hyaline. Seta slender, about 6 mm. long, reddish, scabrous above and sometimes rough half way down; capsule erect or inclined, oval-cylindrical, up to 1.1 mm. high by 0.5 mm. wide, dark brown, exothecal cells strongly collenchymatous; peristome yellowish, densely papillose; lid erect, rostrate, 0.75 mm. long, yellowish; calyptra slightly rough above, fringed; spores roughened, 12-14 μ in diameter.

Type Locality: Canelos, Andes Quitenses, Ecuador.

Distribution: Costa Rica, Panama, Colombia, Ecuador, Peru, Bolivia, Chile, Brazil.

Material seen: COSTA RICA: Candelaria in foliis arboreum inter Hepaticas, Oersted.—PANAMA: Humid forest between Alto de las Palmas and top of Cerro de la Horqueta, Chirique, Pittier 3252 in part.—COLOMBIA: Sibati to El Penon, Rusby & Pennell; Ocanna and Santa Isabel, Wallis.—ECUADOR: in sylvia Canelos, Andes Quitenses, 3000 ft., Spruce 560 (type).—PERU: Tatanara, Lechler.—BOLIVIA: Bergwald von Tocarani, Herzog 4042; Incacorral, Herzog 5021; Prov. Cochabamba prope Choquecamata, Germain; Rio Tocarani, Herzog 4081d in part; Incacorral Herzog 18; Estradillas, Prov. Cochabamba, Herzog.—CHILE: Valdivia, Krause.—BRAZIL: prope Apiahy, San Paulo, Puiggari; Serra Ouro Preto, Minas Geraes, Ule 1438.

Remarks: The plants referred here vary considerably in size but there are no structural differences that can be correlated with the smaller forms described by Müller under the names of *D. lorifolia* and *D. minutifolia* and it seems highly probable that all these collections are merely variants of one specific type. The margins are sometimes flat but not consistently so, as leaves with plane margins and others with one or both margins narrowly revolute are found on the same plant. There is nothing to distinguish either *D. Wallisii* or *D. ocanniana* from each other or from the type, and although *D. minutifolia* is a smaller plant more nearly resembling *D. splachnoides* of Europe, I have been unable to satisfactorily separate it from *D. gracilis*. This species has a broad distribution, and no doubt includes

D. Hampeana and *D. curvicauspis* of Brazil, in which the upper leaf cells are more elongated and the seta not quite so rough, but not uniformly enough to establish any satisfactory separation.

18. DALTONIA OVALIS Tayl. Lond. Jour. Bot. 5: 66. 1846.

Autoicous. Plants up to 12 mm. high, about 1.5 mm. wide with leaves, radiculose below. Leaves crowded, erect-flexuose and slightly twisted when dry, flexuose when moist, carinate with a median fold, lanceolate, up to 1.75 mm. long by 0.27 mm. wide at base; margin narrowly revolute on one or both sides, sometimes flat toward base, entire; border pellucid, rather narrow, 4-5 rows wide at base, 3-4 rows wide at mid-leaf and 2 rows wide above; costa 30μ wide at base, ending about $3/4$ up; cells of apical blade oval and oval-rhomboidal, 7μ wide by about 20μ long, slightly incrassate, pellucid, median cells similar, basal cells oblong and rhomboidal, about 1: 3. Seta slender, up to 14 mm. long, reddish, roughened above; capsule inclined, oval, dark brown, 1.1 mm. high by 0.5 mm. wide, exothecal cells collenchymatous near the rim and uniformly thickened below; peristome yellowish, densely papillose; lid rostrate, erect, 0.8 mm. long, yellowish; calyptra slightly rough above; spores roughened, $17-20\mu$ in diameter.

Type Locality: Cayembe, Andes Quitenses, Ecuador.

Distribution: Endemic.

Material seen: Ecuador: Cayembe, Andes Quitenses, on shrubs, 1400 meters, Jameson (type).

Remarks: This species is known only from the type collection and may be distinguished from *D. gracilis*, which it approaches very closely, by the broader leaves, shorter basal cells and longer seta.

DOUBTFUL AND EXCLUDED SPECIES

DALTONIA CUCULLATA Hampe Linnaea 32: 151. 1863. It is impossible to locate this species definitely from the description and no specimens have been available for comparison.

DALTONIA SERICEA Schimper, Ms. The specimen under this name in the herbarium of the New York Botanical Garden is mostly *Leucomnium attenuatum* Mitt., with some strands of *Taxithelium planum*. No *Daltonia* plants were found.

DALTONIA LONGICUSPIDATA C. Müll. Bull. Herb. Boiss. 5: 201. 1897. What is supposed to be a part of the type collection, ex Hb. Brotherus, in the herbarium of the New York Botanical Garden does not agree with the description or the type locality cited by Müller. As no further material is available for comparison it seems best to exclude this species until its status can be definitely determined.

ALPHABETICAL LIST OF SPECIES

- Daltonia androgyna* Geh. & Hampe
Daltonia ariquensis Schimper = *D. gracilis* Mitt.
Daltonia aristata Geh. & Hampe
Daltonia aristifolia Bartr. = *D. stenophylla* Mitt.
Daltonia bilimbata Hampe
Daltonia binervis Hampe = *Lepidopilum daltoniacum* Ann. Sci. Nat. Bot. V. 4: 364. 1866.
Daltonia braziliensis Mitt.
Daltonia brevinervis Bartr.
Daltonia brevicuspidata Broth. = *D. longifolia* Tayl.
Daltonia compressa Mitt. = *D. bilimbata* Hampe
Daltonia crispata Schimper = *D. longifolia* Tayl.
Daltonia cucullata Hampe, excluded
Daltonia curvipes C. Müll. = *D. gracilis* Mitt.
Daltonia Dussii Broth. = *D. longifolia* Tayl.
Daltonia Fendleri C. Müll. = *D. stenophylla* Mitt.
Daltonia gracilis Mitt.
Daltonia Hampeana Geh. = *D. gracilis* Mitt.
Daltonia irrorata Mitt. = *D. Lindigiana* Hampe
Daltonia Jamesoni Tayl.
Daltonia Krauseana C. Müll. = *D. gracilis* Mitt.
Daltonia latolimbata Broth.
Daltonia leucoloma Hampe = *D. braziliensis* Mitt.
Daltonia Lindigiana Hampe
Daltonia longifolia Tayl.
Daltonia longicuspidata C. Müll. excluded
Daltonia lorifolia C. Müll. = *D. gracilis* Mitt.
Daltonia macrotheca Mitt.
Daltonia minutifolia C. Müll. = *D. gracilis* Mitt.
Daltonia ocanniana C. Müll. = *D. gracilis* Mitt.
Daltonia ovalis Tayl.
Daltonia pellucida Herz.
Daltonia peruviana Mitt.
Daltonia pulvinata Mitt.
Daltonia robusta Ångstr. = *D. longifolia* Tayl.
Daltonia sericea Schimper, excluded.
Daltonia stenophylla Mitt.
Daltonia Stewartii R. S. Williams = *D. Lindigiana* Hampe
Daltonia subirrorata Broth. = *D. trachydontia* Mitt.
Daltonia tenella Broth. = *D. stenophylla* Mitt.
Daltonia tenuifolia Mitt.
Daltonia trachydontia Mitt.
Daltonia Uleana C. Müll. = *D. aristata* Geh. & Hampe
Daltonia Valdiviae Herz. = *D. trachydontia* Mitt.
Daltonia Wallisii C. Müll. = *D. gracilis* Mitt.

BUSHKILL, PIKE COUNTY
 PENNSYLVANIA

Explanation of plates 3, 4

The figures in the following plates are all drawn from plants representing the type collections. The following symbols are used uniformly throughout the plates:

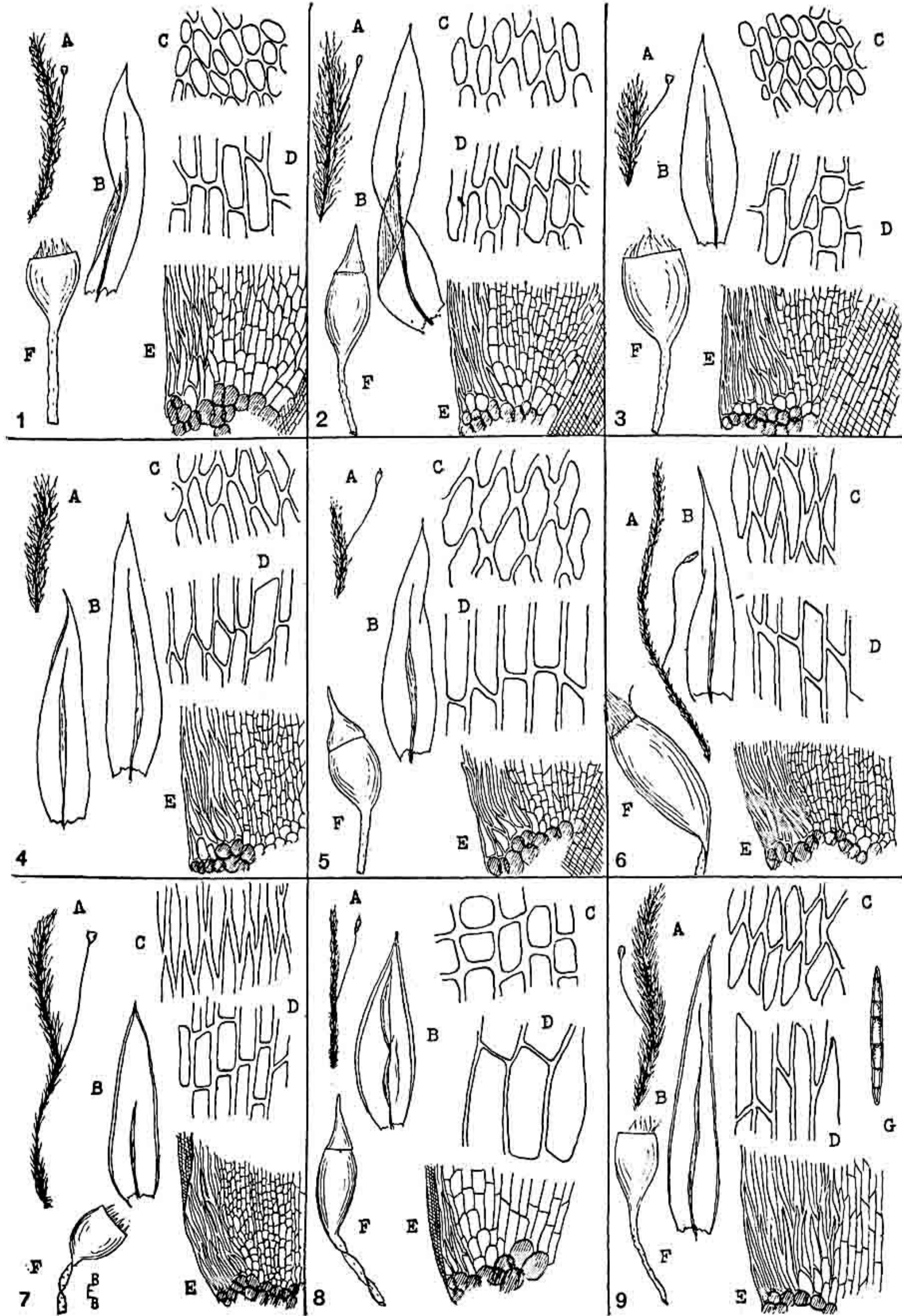
- | | |
|-----------------------------------|--|
| A—Plant $\times 2$. | E—One side of leaf base $\times 160$. |
| B—Leaf $\times 18$. | F—Capsule $\times 12$. |
| C—Upper leaf cells $\times 400$. | G—Propagula $\times 160$. |
| D—Basal leaf cells $\times 400$. | |

PLATE 3

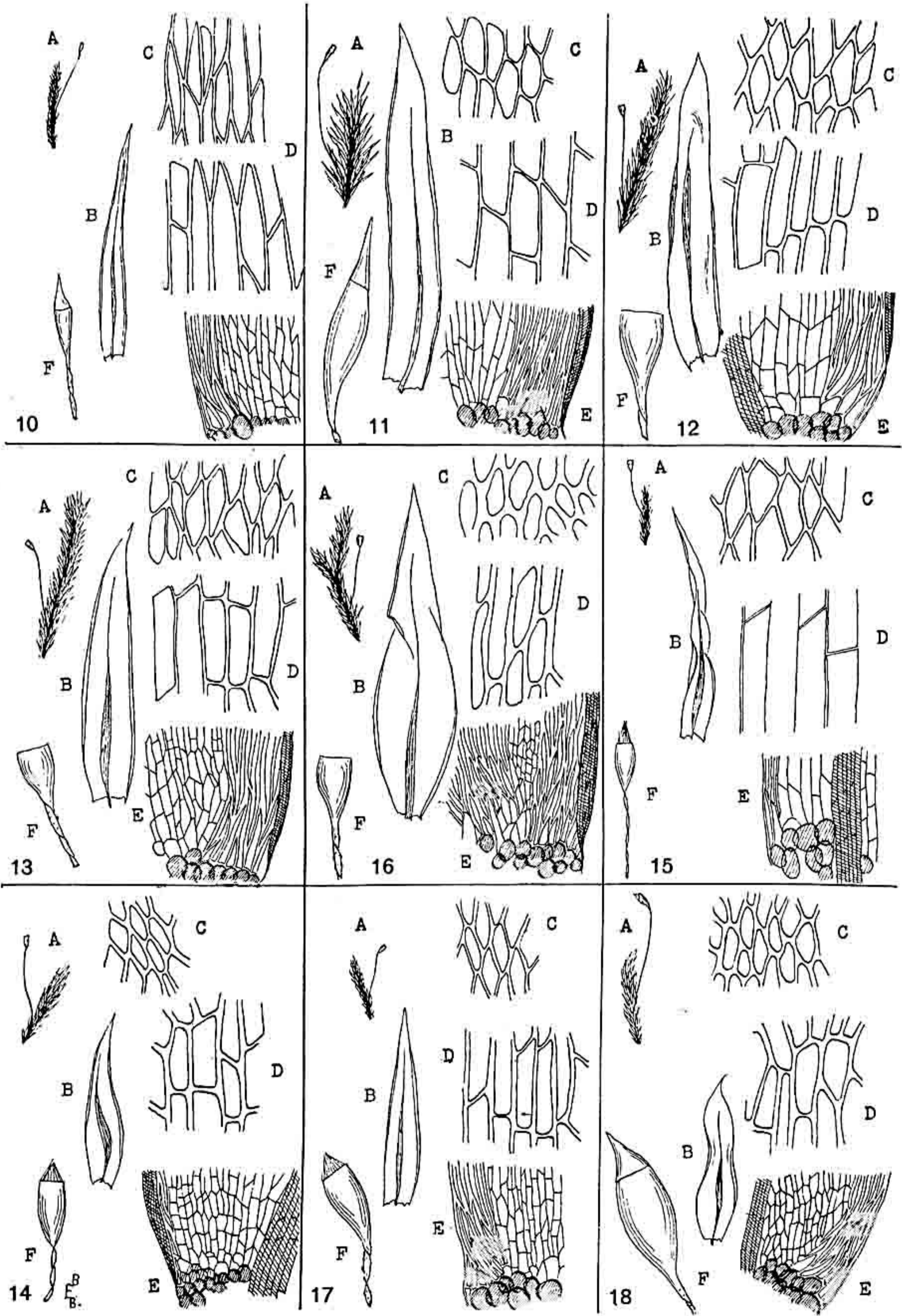
- Fig. 1. *Daltonia pulvinata* Mitt.
- Fig. 2. *Daltonia longifolia* Tayl.
- Fig. 3. *Daltonia braziliensis* Mitt.
- Fig. 4. *Daltonia aristata* Geheeb & Hampe
- Fig. 5. *Daltonia androgyna* Geheeb & Hampe
- Fig. 6. *Daltonia macrotheca* Mitt.
- Fig. 7. *Daltonia brevinervis* Bartram
- Fig. 8. *Daltonia Jamesoni* Tayl.
- Fig. 9. *Daltonia Lindigiana* Hampe

PLATE 4

- Fig. 10. *Daltonia stenophylla* Mitt.
- Fig. 11. *Daltonia bilimbata* Hampe
- Fig. 12. *Daltonia pellucida* Herz.
- Fig. 13. *Daltonia peruviana* Mitt.
- Fig. 14. *Daltonia latolimbata* Broth.
- Fig. 15. *Daltonia trachydontia* Mitt.
- Fig. 16. *Daltonia tenuifolia* Mitt.
- Fig. 17. *Daltonia gracilis* Mitt.
- Fig. 18. *Daltonia ovalis* Tayl.



BARTRAM: DALTONIA



BARTRAM: DALTONIA