

lar, borne in masses in the axils of the leaves, on branched rhizoids in the axils of the leaves or very rarely, on the ventral side of the costa, spherical, ovoid or elliptical, green brown or brown, smooth. Dioicous. Perigonia terminal, perigonial leaves generally concave, smaller and wider than vegetative leaves. Perichaetia terminal on main branches or on short lateral branches, perichaetial leaves similar to vegetative leaves. Seta yellowish to reddish brown, spirally twisted to left throughout, occasionally twisted to right in the upper part. Capsule stegocarpous, erect or lightly inclined, cylindrical, oblong, ovoid or elliptical, brown or red. Annulus generally revoluble or deciduous in pieces, composed of 1–3 rows of hexagonal cells, usually vesiculose. Peristome of 32 or 16 teeth grouped in pairs, very rarely rudimentary or absent, filiform, papillose, straight or spirally twisted, sometimes cleft or perforated, yellow to reddish brown, basal membrane absent or more rarely differentiated. Operculum rostrate to long rostrate, sometimes rostellate. Calyptra cucullate. Spores smooth or papillose, yellowish brown, yellowish green or brown.

## KEY TO SPECIES

1. Plants with deciduous flagelliform innovations; leaves dimorphic. . . . . 1. *D. subandraeoides*
1. Plants without deciduous flagelliform innovations; leaves monomorphic. . . . . 2
  2. Leaf apices caducous. . . . . 3
  2. Leaf apices not caducous. . . . . 5
3. Leaves crisped when dry; apices not swollen; margins in the upper third of the leaf sinuous, papillose-crenulate and often denticulate . . . . . 2. *D. sinuosus*
3. Leaves not crisped when dry; apices swollen; margins entire . . . . . 4
  4. Transverse section of the costa with 2 layers of guide cells; upper and middle laminal cells 4–8  $\mu\text{m}$  wide. . . . . 3. *D. anserinocapitatus*
  4. Transverse section of the costa with 1 layer of guide cells; upper and middle laminal cells 8–12.5(15)  $\mu\text{m}$  wide. . . . . 4. *D. johansenii*
5. Leaves margins markedly erose above midleaf; plants with rhizoidal tubers . . . . . 5. *D. erosus*
5. Leaves margins entire or papillose-crenulate above midleaf; plants with or without rhizoidal tubers . . . . . 6
  6. Basal laminal cells clearly differentiated from the rest, hyaline (very rarely, *D. rigidulus* has lightly hyaline basal cells). . . . . 7
  6. Basal laminal cells not differentiated, not hyaline. . . . . 9
7. Leaf margins unistratose . . . . . 6. *D. glaucus*
7. Leaf margins bistratose above midleaf. . . . . 8
  8. Stems with hyalodermis; leaves long-lanceolate; marginal basal cells clearly differentiated, long-rectangular to elongate in 2–6 rows . . . . . 7. *D. umbrosus*
  8. Stems without hyalodermis or occasionally present in patches; leaves oblong-lanceolate to lanceolate, ovate or triangular; marginal basal cells not or weakly differentiated, quadrate to shortly rectangular. . . . . 8. *D. australasiae*
9. Costa strongly spurred above midleaf, transverse section with bulging ventral epidermis . . . . . 9. *D. revolutus*
9. Costa not spurred, transverse section without bulging ventral epidermis . . . . . 10
  10. Ventral cells of the costa elongated in upper leaf . . . . . 11
  10. Ventral cells of the costa quadrate to shortly rectangular in upper leaf. . . . . 17
11. Plants with gemmae in the leaf axils; leaves catenulate when dry . . . . . 10. *D. maschalogenae*

11. Plants without gemmae in the leaf axils; leaves appressed to twisted when dry . . . . . 12
12. Leaves lingulate to oblong-lanceolate, usually with obtuse or rounded apex; costa generally ending several cells below the apex, very rarely percurrent or excurrent . . . . .  
 . . . . . 11. *D. tophaceus*
12. Leaves lanceolate, with apex generally acute; costa ending at the apex or just below the apex . . . . . 13
13. Leaves strongly recurved to squarrose when moist . . . . . 14
13. Leaves erect-patent to spreading, very rarely lightly recurved when moist . . . . . 15
14. Transverse section of the costa without ventral stereids, with 2–3(4) guide cells; plants generally to 3 cm high; upper leaves generally to 2 mm long. . . . . 12. *D. ferrugineus*
14. Transverse section of the costa with 1–3 layers of ventral stereids, with (3–)4–8(–9) guide cells; plants generally more than 3 cm high; upper leaves more than 2 mm long. . . . .  
 . . . . . 13. *D. maximus*
15. Plants generally more than 4 cm high; leaves undulate when moist; upper and middle laminal cells strongly sinuous, basal cells pitted. . . . . 14. *D. giganteus*
15. Plants to 4 cm high; leaves not undulate when moist; upper and middle laminal cells not or very lightly sinuous; basal cells not pitted . . . . . 16
16. Leaf margins recurved from base to 1/2 or 3/4 of the leaf; transverse section of the costa with (2–)3–5(–6) guide cells; peristome spirally twisted, more than 400  $\mu\text{m}$  long. . . . .  
 . . . . . 15. *D. fallax*
16. Leaf margins recurved below midleaf; transverse section of the costa with (4–)5–9(–10) guide cells; peristome straight, generally less than 450  $\mu\text{m}$  long . . . . . 16. *D. spadiceus*
17. Plants with rhizoidal tubers . . . . . 17. *D. tomaculosus*
17. Plants without rhizoidal tubers . . . . . 18
18. Leaf margins revolute up to or near the apex . . . . . 18. *D. cordatus*
18. Leaf margins recurved. . . . . 19
19. Lamina or margins bistratose (sometimes to tetrastratose) in the upper part. . . . . 20
19. Lamina and margins unistratose . . . . . 26
20. Lamina regularly bistratose at least in the upper third . . . . . 21
20. Lamina unistratose, sometimes bistratose in or below the apex or irregularly bistratose . . . . . 22
21. Lamina green to yellowish with KOH; transverse section of the costa with (0)1–3 layers of ventral stereids; sometimes with gemmae in the axils of the leaves. . . . . 19. *D. rigidulus*
21. Lamina red with KOH; transverse section of the costa without ventral stereids; without gemmae in the axils of the leaves . . . . . 20. *D. bistratosus*
22. Leaf margins regularly bi- to tetrastratose. . . . . 23
22. Leaf margins irregularly bistratose . . . . . 24
23. Transverse section of the costa with 2 layers of guide cells, without ventral stereids . . . . .  
 . . . . . 21. *D. nicholsonii*
23. Transverse section of the costa with 1 layer of guide cells, with (0)1–3 layers of ventral stereids. . . . . 19. *D. rigidulus*
24. Leaves ovate; lamina yellowish green with KOH . . . . . 27. *D. sicculus*
24. Leaves lanceolate, triangular or longly linear-lanceolate; lamina reddish brown or red with KOH . . . . . 25
25. Leaves crisped when dry, upper leaves longly linear-lanceolate, margins slightly recurved below midleaf; dorsal cells of the costa elongate or rectangular . . . . . 29. *D. insulanus*
25. Leaves appressed to slightly twisted when dry, upper leaves lanceolate to triangular; margins re-

- curved from base to middle or near the apex; dorsal cells of the costa quadrate or shortly rectangular. . . . . 30. *D. vinealis*
26. Costa excurrent and without a band of translucent cells below the apex on the ventral surface . . . . . 27
26. Costa excurrent and with a band of translucent cells below the apex on the ventral surface, or costa ending below the apex or percurrent, with or without a band of translucent cells . . . . . 29
27. Costa generally long-excurrent as a subula; upper and middle laminal cells quadrate, subquadrate or shortly rectangular, papillose; plants without gemmae in the axils of the leaves . . . . . 22. *D. icmadophilus*
27. Costa short or long-excurrent but never as a subula; upper and middle laminal cells oval, rounded or subquadrate, smooth; plants with or without gemmae in the axils of the leaves . . . . . 28
28. Leaves appressed when dry, (0.6)0.8–1.8(2) mm long; costa shortly excurrent, ventral stereids in 0–1 layer; plants without gemmae in the axils of the leaves. . . . . 23. *D. acutus*
28. Leaves twisted or incurved when dry, at least the upper leaves, (1.2)1.6–2.7(3.2) mm long; costa long-excurrent, ventral stereids in 1–3 layers; plants with or without gemmae in the axils of the leaves . . . . . 24. *D. validus*
29. Leaves recurved to squarrose when moist, keeled . . . . . 25. *D. asperifolius*
29. Leaves appressed to spreading, more rarely slightly recurved, not keeled. . . . . 30
30. Costa without a band of translucent cells below the apex on the ventral surface . . . . . 31
30. Costa with a band of translucent cells below the apex on the ventral surface. . . . . 33
31. Leaves gradually narrowed in an acuminate apex; costa generally excurrent; peristome more than 200  $\mu\text{m}$  long. . . . . 23. *D. acutus*
31. Leaves not gradually narrowed to the apex, apex rounded, obtuse or acute; costa ending below the apex or percurrent; peristome, if present, less than 200  $\mu\text{m}$  long. . . . . 32
32. Upper and middle laminal cells smooth (rarely with inconspicuous papillae); lamina red with KOH . . . . . 26. *D. luridus*
32. Upper and middle laminal cells with conspicuous papillae; lamina yellowish green with KOH. . . . . 27. *D. sicculus*
33. Costa ending below the apex; plants generally with gemmae in the axils of the leaves. . . . . 28. *D. brachyphyllus*
33. Costa percurrent or shortly excurrent; plants without gemmae in the axils of the leaves . . . . . 34
34. Leaves crisped when dry, upper leaves longly linear-lanceolate; margins slightly recurved below midleaf; dorsal cells of the costa elongate or rectangular . . . . . 29. *D. insulanus*
34. Leaves appressed to slightly twisted when dry, upper leaves lanceolate to triangular; margins recurved from base to middle or near the apex; dorsal cells of the costa quadrate or shortly rectangular. . . . . 30. *D. vinealis*

1. *Didymodon subandreaeoides* (Kindb.) R. H. Zander, Phytologia 41: 23. 1978.  
*Barbula subandreaeoides* Kindb., Rev. Bryol. 32: 36. 1905. Type: "Canada, Brit. Columbia, Joho valley" 6.8.1904, Macoun s.n. [Lectotype: S!, designated by Kučera & Köckinger (2000)]. Figs. 1; 3A–C.
- Grimmia andreaeoides* Limpr., Laubm. Deutschl. 1: 776. 1888. Type: [Austria] "Tirol, Kitzbühler Horn, Thonschiefer, 1990 m" 13.8.1882, Breidler s.n. [Lectotype: BP!, designated by Kučera & Köckinger (2000)].
- Andreaea kashyapii* Dixon ex Vohra & Wadhwa, Bull. Bot. Surv. India 6: 321. 1964. Type: [China] "Manasarowar, W Tibet, 15000 ft" 18.7.1926, Kashyap s.n. [Holotype: BM!].