
**KEY TO THE LIVERWORTS RECOGNIZED IN THE SIXTH
EDITION OF GRAY'S MANUAL OF BOTANY.**

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This key was prepared for the purpose of making the work of determining the liverworts described in Gray's Manual more easy than it has been heretofore. Other characters have been added to the description of the perianth, here and there, that in case the perianth is wanting, it may be possible to find the name of the genus of the specimen in hand.

In the archegonial "flower" of the foliose liverworts the pedicel together with the capsule is usually surrounded by three envelopes—the involucre, the perianth, and the calyptra.

The external envelope, called the involucre, is formed by the uppermost leaves which surround the base of the perianth. They usually differ from the lower leaves by their size and shape and are sometimes more or less connate with the perianth.

The perianth, surrounded by the involucral leaves, is a sac-like envelope of oval or cylindrical form. It may be compressed or angular, smooth or folded and its orifice may be either entire or lobed, dentate or ciliate. Although usually present it is wanting in *Gymnomitrium* and most of the frondose liverworts.

After fertilization the capsule is formed in the interior of the archegonium and while developing ruptures the upper part of the same by the lengthening of its pedicel. The archegonium

thus modified and remaining at the bottom of the perianth represents the calyptra. It is soft and hyaline and in most cases shorter than the perianth and not connate with it.

It may be added that any suggestions in regard to the improvement of this key will be thankfully received.

All liverworts are usually divided into two artificial groups, the foliose and frondose, which are then subdivided as follows:

- Plant-body a leafy axis (Jungermanniaceae). 1
 Plant-body a thallus. 30.
1. Leaves incubous. 2.
 Leaves succubous. 13.
 2. Leaves complicate-bilobed or with a small lower lobe. 3.
 Leaves not complicate-bilobed or with a small lower lobe. 7.
 3. Lower lobe incurved-ventricose or saccate, seldom expanded. 4.
 Lower lobe quadrate or roundish. 6.
 4. Lower lobe incurved, more or less ventricose. *Lejeunia*.
 Lower lobe saccate, seldom expanded. 5.
 5. Branches intra-axillary, the leaves on either side free. *Frullania*.
 Branches lateral, a basal leaf borne partly on the stem, partly on the branch. *Jubula*.
 6. Lower leaf-lobe quadrate. *Radula*.
 Lower leaf-lobe roundish. *Porella*.
 7. Leaf-divisions numerous and capillary. 8.
 Leaf-divisions not numerous and capillary. 9.
 8. Leaves bilobed, lobes subdivided and with ciliate margins. Perianth present, terminating short branches, smooth, obovate, mouth connivent, plicate-denticulate. *Ptilidium*.
 Leaves 4-5-divided, divisions setaceously multifid and fringed. Perianth none or rather forming together with the calyptra and involucre a terminal or axillary, fleshy and hairy torus. *Trichocolea*.
 9. Leaves deeply bilobed and 3-ranked (underleaves being similar to leaves. *Herberta*.
 Leaves not bilobed and 3-ranked. 10.
 10. Leaves entire (sometimes retuse) or 2-3-toothed. 11.
 Leaves 2-4-cleft or parted. 12.
 11. Leaves entire (sometimes retuse). *Kantia*.
 Leaves 2-3-toothed. *Bazzania*.
 12. Leaves 3-(or seldom 4) parted; divisions capillary, formed by one row of cells. *Blepharostoma*.
 Leaves palmately 2-4-cleft or -parted; divisions formed by more than one row of cells. *Lepidozia*.
 13. Capsule opening irregularly into 4 irregular or dentate valves; plant-body pseudofoliaceous. *Fossombronia*.
 Capsule opening regularly into 4 regular valves; plant body foliaceous. 14.
 14. Perianth absent; leaves closely imbricate and 2-ranked on short julaceous stems. *Gymnomitrium*.
 Perianth present. 15.
 15. Perianth connate to the middle or more with the involucral leaves. 16.
 Perianth free or connate with calyptra. 17.
 16. Perianth connate to near the summit; leaves complicate-bilobed. *Marsupella*.
 Perianth connate to the middle; leaves entire or nearly so. *Nardia*.
 17. Perianth pendant, saccate; leaves bilobed, extending horizontally and at right angles from the stem; underleaves 2-cleft. *Geocalyx*.
 Perianth upright; underleaves none or ovate-lanceolate or 2-4-cleft. 18.

18. Leaves complicate-bilobed. 19.
Leaves not complicate-bilobed. 20.
19. Perianth oval, scarcely or not compressed, plicate; mouth denticulate. *Diplophyllum*.
Perianth dorsally compressed, mouth truncate, bilabiate, decurved. *Scapania*.
20. Underleaves present (Plagiochila and Cephalozia may be sought here). 21.
Underleaves none or usually none. (Odontoschisma may be sought here). 26.
21. Leaves bilobed, bidentate or emarginate. 22.
Leaves entire (sometimes retuse). 25.
22. Leaves emarginate; perianth connate with the calyptra. *Harpanthus*.
Leaves bilobed or bidentate; perianth free. 23.
23. Underleaves 2-4-cleft or parted. *Lophocolea*.
Underleaves entire or nearly so. 24.
24. Involucral leaves 2, connate at base, entire. Stems without runners.
Leaf-cells roundish, 5-7-angular, cell walls much thickened, each cell appearing as if surrounded by about 6 smaller, 3 (or more)-angular ones. *Mylia*.
Involucral leaves 3-ranked, bifid or bilobed. Stems with runners.
Leaf cells round, surrounded by much thickened walls. *Odontoschisma*.
25. Underleaves 2-4-parted. *Chiloscyphus*.
Underleaves subulate, fugacious. *Jungermannia*.
26. Leaves bifid or bilobed. 27.
Leaves entire (sometimes retuse) or spinulose-dentate. 28.
27. Perianth triangular, prismatic, the contracted mouth dentate. *Cephalozia*.
Perianth oval-oblong, plicate, mouth denticulate. *Jungermannia*.
28. Leaves entire (sometimes retuse). 29.
Leaves spinulose-dentate, rarely entire, the dorsal margin reflexed; perianth compressed. *Plagiochila*.
29. Perianth cylindrical, wider above, truncate, depressed, with orifice prominently umbilicate, ciliolate. *Liochlaena*.
Perianth compressed or terete, usually carinate, mouth entire or toothed. *Jungermannia*.
30. Capsule splitting into 4 regular valves (Jungermanniaceae). 31.
Capsule not splitting into 4 regular valves. 35.
31. Thallus with distinct costa. 32.
Thallus with indistinct costa or none. 34.
32. Thallus villous throughout or hairy (ciliate) on margin and midrib beneath. *Metzgeria*.
Thallus smooth. 33.
33. Perianth long tubular; thallus mostly simple with sinuate or undulate margins, transparent, without inside cavities. *Pallavicinia*.
Perianth none; thallus dichotomous or radiate with pinnatifid margins, opaque, with inside cavities filled with green cells. *Blasia*.
34. Thallus mostly simple or forked, with thick margin. Sporogonium rising from the underside near margin. Elaters persistent on tip of valves. *Aneuria*.
Thallus mostly palmatifid or pinnately lobed with thin margin (one layer of cells). Sporogonium rising from the upper surface. Elaters persistent in the centre of the capsule. *Pellia*.
35. Capsules solitary, more or less perfectly 2-valved (sometimes rupturing irregularly), linear (Anthocerotaceae). 36.
Capsules aggregate, pendant from the underside of a peduncled disk or cruciately arranged in 4 horizontal segments or sessile on the thallus or immersed in it. 37.

36. Capsule narrowly linear, pedicelled, 2-valved. Elaters present. *Anthoceros.*
 Capsule very short, sessile, not valved below middle. No elaters. *Notothylas.*
37. Capsule pendent from the underside of a peduncled disk or cruciately
 arranged into 4 horizontal segments (Marchantiaceae). 38.
38. Capsule sessile on the thallus or immersed in it (Ricciaceae). 45.
38. Thallus barely costate or ecostate. *Dumortiera.*
 Thallus plainly costate. 39.
39. Gemmae present on sterile stems. 40.
 Gemmae none. 41.
40. Gemmae in cup-shaped receptacles. Fertile receptacle 7-11-rayed. *Marchantia.*
 Gemmae in crescent-shaped receptacles. Fertile receptacles cruci-
 form. *Lunularia.*
41. Perianth present. 42.
 Perianth none. 43.
42. Perianth scarcely exerted; 4-5-lobed. Receptacle 2-4-lobed with as
 many alternate rib-like rays. *Preissia.*
 Perianth exerted half its length and cleft into 8-16 fringe-like seg-
 ments. Receptacle 4-lobed. *Fimbriaria.*
43. Thallus large; very indistinctly poröse, scaleless below. Receptacle
 hemispherical, acutely 4-8-lobed. *Asterella.*
 Thallus small or very large, poröse. 44.
44. Thallus very large, without scales below. Receptacle conical,
 membranous. *Conocephalus.*
 Thallus small with purple scales below. Receptacle conic, hemi-
 spherical, truncately 3-4-lobed. *Grimaldia.*
45. Capsule sessile on the thallus; involucre inflated-pyriform. *Sphaerocephalus.*
 Capsule immersed in the thallus; involucre none. *Riccia.*
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