

A KEY TO THE FAMILIES OF BRYOPHYTA IN TAIWAN

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The following key were prepared for the use of identifying the bryophytes found in Taiwan to their families. From the present record there are a total of 92 families, viz. 37 belonging to the Hepaticae along with the single hornwort family and 54 families of Musci (cf. Lai & Wang-Yang 1976) known to our area, but it is anticipated that many a new taxon may be discovered and added in the years ahead.

In constructing the key an effort has been made so that a family will key out once, rather than in a variety of places, but the extreme polymorphism of several families make it necessary to key them out two or more times.

The outline of the classification of the bryophytes, particularly the circumscription of families and the arrangement into orders, subclasses, followed here is essentially the schemes proposed by Schuster on hepatics and Brotherus on mosses. To Schuster the present key owes much to many of his earlier works on Hepaticae.

AN OUTLINE OF THE CLASSIFICATION ADOPTED

Class HEPATICAE.

Subclass JUNGERMANNIAE.

Order 1. *Calobryales*. Family Haplomitriaceae.

Order 2. *Jungermanniales*. Families Herbertaceae, Blepharostomaceae, Isotachidaceae, Ptilidiaceae, Lepicoleaceae, Trichocoleaceae, Lepidoziaceae, Calypogeaceae, Lophoziaceae, Jungermanniaceae, Marsupellaceae, Scapaniaceae, Schistochilaceae, Lophocoleaceae, Plagiochilaceae, Acrobolbaceae, Cephaloziaceae, Cephaloziellaceae, Adelanthaceae, Radulaceae, Porellaceae, Frullaniaceae, Lejeuneaceae, Pleuroziaceae.

Order 3. *Metzgeriales*. Families Treubiaceae, Fossombroniaceae (= Codoniaceae), Blasiaceae, Dilanaceae (= Pallaviciniaceae), Aneuraceae (= Riccardiaceae), Metzgeriaceae.

Subclass MARCHANTIAE.

Order 4. *Marchantiales*. Families Targioniaceae, Grimaldiaceae (= Rebouliaceae), Conocephalaceae, Marchantiaceae, Ricciaceae.

Class ANTHOCEROTAE.

Order *Anthocerotales*. Family Anthocerotaceae.

Class MUSCI.

Subclass SPHAGNIDAE.

Order 1. *Sphagnales*. Family Sphagnaceae.

Subclass ANDREAETIDAE.

Order 2. *Andreaeales*. Family Andreaeaceae.

Subclass BRYIDAE.

Order 3. *Fissidentales*. Family Fissidentaceae.

Order 4. *Dicranales*. Families Ditrichaceae, Bryoxiphiaceae, Dicranaceae, Leucobryaceae.

Order 5. *Pottiales*. Families Calymperaceae, Encalyptaceae, Pottiaceae.

Order 6. *Grimmiales*. Family Grimmiaceae.

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- Order 7. **Funariales.** Families Funariaceae, Splachnaceae.
 Order 8. **Tetraphidiales.** Family Geogiaceae.
 Order 9. **Eubryales.** Families Bryaceae, Mniaceae, Rhizogoniaceae, Hypnodendraceae, Bartramiaceae, Spiridentaceae.
 Order 10. **Isobryales.** Families: Erpodiaceae, Orthotrichaceae, Rhacopilaceae, Hedwigiaceae, Cryphaeaceae, Leucodontaceae, Ptychomniaceae, Prionodontaceae, Trachypodaceae, Myuriaceae, Pterobryaceae, Meteoriaceae, Phyllogoniaceae, Neckeraceae, Lembophyllaceae.
 Order 11. **Hookeriales.** Families: Hookeriaceae, Symphyodontaceae, Leucomiaceae, Hypopterygiaceae.
 Order 12. **Hypnobryales.** Families Theliaceae, Fabroniaceae, Leskeaceae, Thuidiaceae, Amblystegiaceae, Brachytheciaceae, Entodontaceae, Plagiotheciaceae, Sematophyllaceae, Hypnaceae, Rhytidiaceae, Hylacomiaceae.
 Order 13. **Buxbaumiales.** Families Buxbaumiaceae, Diphyssiaceae.
 Order 14. **Polytrichinales.** Family Polytrichaceae.

KEY TO THE FAMILIES KNOWN TO OUR AREA

1. Protonema much reduced, small and transitory, often forming only one plant; gametophyte generally dorsiventral and bilateral, either leafy with two lateral rows of leaves and a ventral row of underleaves or the vegetative body is thallose with more or less pronounced internal differentiation (often with ventral scales); stems composed of morphologically similar cells, mostly without differentiated central strand; leaves normally without costa (sometimes vitta present); rhizoids unicellular and mostly unbranched; oil-bodies of special and constant form; seta soft, not developing more quickly than the capsule; archegonia wall not forming a distinct calyptra; capsules simple, without the development of annulus, operculum, peristome and columella, also without stomata on the capsule wall (except in Anthocerotaceae), mostly dehiscent longitudinally at maturity; elaters present..... 2
1. Protonema usually strongly developed, conspicuous, filamentous or plate-like, relatively persistent, normally forming many plants; gametophyte generally radially symmetrical, or sometimes distichous-leaved, or dorsiventrally disposed and stems with smaller differentiated dorsal or ventral amphigastria; stems with simple, histologically differentiated conducting strand; leaves usually with 1-2 costa, sometimes lacking; rhizoids septate, mostly branched; oil-bodies lacking; seta firm and wiry, completing its development before the capsule, and the sporophyte breaking through the calyptra at an early stage (except in Sphagnaceae); archegonia wall forming vaginula and calyptra; capsules complex, with extraordinary degree of specialization, and with annulus, operculum, peristome, columella, as well as stomata on the capsule wall—usually developed, opening by a lid at maturity; elater absent..... Class MUSCI-49
2. Gametophytic chlorophyllose cells each with several to many chloroplasts, with or without oil-bodies; plants thallose or leafy, without stomata; sex organs exogenous, not embedded; capsules not linear, usually not 2-valved, without a columella, without stomata; seta present, elongate or short or vestigial..... Class HEPATICAE-3
2. Gametophytic cells (at least superficial cells) usually with a single, large chloroplast (in *Megaceros* 2-3 in number), without oil-bodies; plants prostrate, thallose, leafless, undersurfaces often with more or less distinct stomata, opening into slime chambers; archegonia embedded, and antheridia endogenous; sporophytes with linear capsulee splitting into 2 valves, with columella and stomata usually well developed; seta absent..... Class ANTHOCEROTAE-Anthocerotales-ANTHOCEROTACEAE ✓

3. Rhizoids if present all smooth; plants leafy or thallose, if thallose more or less delicate and translucent, scarcely internally differentiated and without air chambers or pores; chlorophyllose cells almost uniformly bearing several oil-bodies; capsule wall except in Calobryaceae, 2-8-stratose, dehiscing into 2-4 valves at maturity; seta usually elongate and extruding the sporophyte. **JUNGERMANNIAE-4**
3. Rhizoids of 2 kinds, partly tuberculate with peg-like thickening inside the cell wall; plants clearly thallose, opaque, bladelike and dichotomously branched, or forming rosettes, with internal differentiation into distinct pores and air chambers; cells usually dimorphic, a small minority of generally smaller isolated cells each with a single large oil-body, but no chloroplast, the large majority of cells with chloroplasts only; capsule wall unistratose, dehiscing irregularly or by an apical lid or by valves at maturity; seta short or vestigial. **MARCHANTIAE-Marchantiales-11**
4. Plants clearly leafy; archegonia terminal on branches or main axes, not becoming dorsal on plant; capsule 4-valved at maturity. **5**
4. Plants flattened, usually thallose, sometimes with leaf-like lateral lobes or with two rows of leaves; archegonia (and antheridia) scattered dorsally on surface or on branches of the plant; capsule 2-4-valved at maturity. **Metzgeriales-6**
5. Plants erect, radial, isophyllous, the three rows of unlobed leaves transversely inserted, one row may be slightly smaller than those of the other two; perianth and perigynium absent, the sporophyte sheltered by the calyptra, with capsule wall unistratose; rhizoids never developed; no asexual reproduction. **Calobryales-CALOBRYACEAE**
5. Plants usually prostrate to procumbent, rarely erect or pendent and triradial (then with lobed and/or ciliate leaves), usually bilaterally disposed with distinct division into antical and postical faces and normally anisophyllous, with two rows of lateral leaves and a third row of underleaves which are sometimes reduced or absent, rarely distichous-leaved; leaves, if unlobed, obliquely inserted; perianth or perigynium, or both, usually present and protecting the sporophyte; capsule wall 2-8-stratose; rhizoids usually present; often with asexual reproduction. **Jungermanniales-16**
6. Plants clearly thallose, without leaf-like lobes. **7**
6. Plants essentially leafy, or a thallus with dorsal lamellae. **10**
7. Sex organs dorsal on normal unmodified thalli; pseudoperianth present, often low; elater bearers absent, or in a tuft from base of capsule; elaters 2-4-spiral. **8**
7. Sex organs on short lateral branches; pseudoperianth absent; elater bearers in a tuft from apices of valves; elaters 1-spiral. **9**
8. Thallus margins coarsely scalloped, with blackish auricles near the bases of the scallops; cells without oil-bodies; pseudoperianth flap-like to short-tubular, without a fringe of scales surrounding it at base; capsule ovoid, 4-valved; elater bearers attached to base of capsule **BLASIIACEAE**
8. Thalli with margins unlobed, without auricles; oil-bodies present, small, numerous; pseudoperianth double, consisting of a high, tubular involucre, surrounded by a lacinate fringe of scales; capsule cylindrical-subovoid, 2-4-valved; without elater bearers. . . **DILAENACEAE**
9. Thalli lacking a sharply defined midrib, opaque, the wings pluristratose, not hairy at margins; rhizoids usually lacking; cells with distinct oil-bodies; sex organs on short lateral branches; capsule longly ovoid; asexual reproduction by 2-celled gemmae arising within epidermal cells. **ANEURACEAE**
9. Thalli with a sharply defined costa flanked by wholly unistratose wings; margins usually with free development of unicellular hairs; rhizoids usually present; oil-bodies absent, or merely represented by minute oil droplets; sex organs dorsal on very short postical branches;

- capsule spherical, asexual reproduction by thallose broodbodies arising from peripheral cells..... METZGERIACEAE
10. Plants vigorous, 8-20 mm wide, flattened, ocellate; the lateral lobes polystratose..... TREUBIACEAE
10. Plants smaller, no ocelli in leaves; lateral leaf-like lobes unistratose..... FOSSOMBRONIACEAE
11. Thalli (at least terrestrial) usually without ventral scales, but in aquatic forms often present; archegonia scattered singly on thallus or in irregular groups, immersed within the main thallus segments; cleistocarpous, sporophyte without seta; elaters absent.... RICCIACEAE
11. Thalli normally with ventral scales, rarely absent; archegonia united in groups that are elevated on archegoniophores (except in Targioniaceae); non-cleistocarpous, sporophyte with short seta; elaters present..... 12
12. Thalli without internal differentiation into pores and air chambers; ventral scales lacking..... MARCHANTIACEAE (*Dumortiera*)
12. Thalli usually with distinct differentiation into air chambers and pores dorsally; ventral scales usually present..... 13
13. Air chambers with compound pores, the peripheral cells in several overlying rings..... MARCHANTIACEAE (*Marchantia*)
13. Air chambers with simple pores, surrounded by cells oriented in a single layer..... 14
14. Thalli with air chambers in 2 to several layers, lacking chlorophyllose filaments..... 14
14. Thalli with air chambers in a single layer, with chlorophyllose filaments arising from plane floor of air chambers... *Reboulia* type..... GRIMALDIACEAE
14. Thalli with air chambers in a single layer, with chlorophyllose filaments arising from plane floor of air chambers... *Marchantia* type..... 15
15. Plants vigorous and forming extensive patches, upper surface of thalli with clearly visible hexagonal areolae; epidermal cells thin-walled; sporophytes in groups elevated above the thallus..... CONOCEPHALACEAE
15. Plants smaller, upper surface of thalli without visible areolae; epidermal cells with strong trigones; sporophytes occurring singly at anterior edge and sessile on the chief thalli, not united in archegoniophores..... TARGIONIACEAE
16. Vegetative branching terminal or intercalary in origin, if terminal the branch always replacing the ventral half of a leaf; leaf insertion transverse to oblique, in the later case may be succubous, succubous-complicate or simply incubous but never incubous-complicate; archegonia 12-20 per gynoeceum; seta usually elongate and exerting the sporogonium; perianth developed or often reduced and replaced by a perigynium..... 17
16. Vegetative branching entirely terminal in origin; leaf insertion oblique and incubous-complicate, the smaller ventral lobe folded over and hidden under the larger dorsal lobe; archegonia 1-4 or 8-10 per gynoeceum; seta normally very short, typically hardly exerting the capsule beyond perianth; perianth always well developed..... 43
17. Underleaves usually large; leaves incubous or transverse (succubous only in *Trichocolea*), divided into 3-4 lobes, rarely bifid or undivided; rhizoids restricted to underleaf bases... 18
17. Underleaves usually smaller, different in appearance from leaves, or entirely reduced and then absent; leaves transverse, succubous, or succubous-complicate, mostly bifid, rarely undivided or divided into 3-5 lobes; rhizoids arising from ventral side of stems..... 25
18. Leaves divided to base into 3-4 filiform segments or deeply lobed and fringed on the lobes with uniseriate cilia, the leaf lamina then strongly resolved into numerous cilia; underleaves similar to leaves, nearly as large as leaves, similarly lobed or fringed..... 19
18. Leaves entire, divided or deeply lobed, but never as above; underleaves similar to leaves or more or less smaller and different in shape..... 23

19. Coarse, robust, 1-3-pinnately branched plants; leaves and underleaves deeply lobed and fringed with cilia..... 20
19. Plants small to minute; leaves and underleaves divided to base into 2-4 filiform lobes or cilia..... 21
20. Plants brownish; leaf cells thick-walled, with bulging trigones, the cuticle smooth; perianth well developed..... PTLIDIACEAE
20. Plants whitish to yellowish-green; leaf cells thin-walled, without trigones, the cuticle striolate; perianth absent, replaced by a perigynium..... TRICHOCOLEACEAE
21. Plants minute, flagella absent; leaves typically 4-lobed almost to the base, the lobes uniseriate..... BLEPHAROSTOMACEAE
21. Plants slender, flagella often present; leaf lobes not uniseriate..... 22
22. Leaves 2-4-lobed to near base; perianth well developed..... LEPIDOZIACEAE (*Kurzia*)
22. Leaves deeply 2-repeatedly bilobed; perianth not developed..... LEPICOLEACEAE
23. Leaves transversely inserted, bifid, somewhat secund, with slightly to distinctly falcate lobes, each provided with a vitta; underleaves as large as leaves and similar to leaves in size and form..... *A. ... of ...* HERBERTACEAE
23. Leaves obliquely inserted, incubous, not secund, without vitta; underleaves smaller than or different in form with leaves..... 24
24. Plants freely, regularly terminally branched, producing flagella; leaves 3-4-lobed or dentate; perianth present but rarely developed.....
- LEPIDOZIACEAE (*Lepidozia*, *Acromastigum* & *Bazzania*)
24. Leafy shoots simple but bearing frequent postical, intercalary branches from the underleaf axils, lacking flagella; leaves entire or delicately bidentate at apex; perianth absent, but developing a postical, hairy perigynium..... CALYPOGEIACEAE
25. Gametophyte axis flattened, ribbon-like, without distinct leaves..... 26
25. Gametophyte not flattened nor ribbon-like, with distinct and widely spreading leaves.... 27
26. Stems with bilaterally ranked suborbicular fleshy leaves, entire, which are broadly attached along the margin and could hardly be distinct from the stem; rhizoids densely covered the ventral stem surface; underleaves lacking..... CEPHALOZIACEAE (*Schiffneria*)
26. Stems with vestigial 2-celled to oblong and rather few-celled leaves, always bilobed or bidentate; rhizoids arising from underleaf bases; underleaves vestigial, formed of 2 minute segments..... LEPIDOZIACEAE (*Zoopsis*)
27. Leaves complicate-bilobed, keeled along the folded ridge, the dorsal lobe smaller than the ventral; underleaves entirely lacking..... 28
27. Leaves various, but never complicate-carinate, the dorsal lobe is never smaller than the ventral lobe; underleaves usually present, sometimes absent..... 29
28. Keel between lobes usually with a broad wing; perianth not developed..... SCHISTOCHILACEAE
28. Keel between lobes abbreviated, rarely distinct; perianth well developed..... SCAPANIACEAE
29. Leaves opposite, usually slightly united at their dorsal bases.....
- PLAGIOCHILACEAE (*Plagiochilium*, *Szyziella*)
29. Leaves alternate, dorsal leaf bases not as above..... 30
30. Rhizoids confined to a small area at the base of underleaves..... 31
30. Rhizoids scattered on ventral surface of stems (except *Isotachidaceae*)..... 32
31. Leaves ovate or orbicular to quadrate, approximate, dorsal leaf margin flat; underleaves large, bilobed, often with 1-several marginal cilia..... LOPHOCOLEACEAE
31. Leaves not as above, distant, dorsal leaf base with margin more or less strongly reflexed; underleaves minute or lacking..... PLAGIOCHILACEAE

32. Leaves entire, at most occasionally retuse or sparsely dentate at the apex..... 33
32. Leaves 2-4, rarely 5-lobed, margin often dentate..... 35
33. Plant with free development of postical stolons; branches entirely or partially postical in origin; minute to small underleaves present, abundantly bearing slime-papillae; perianths on short postical shoots..... ADELANTHACEAE (*Odontoschisma*)
33. Plant without ventral stolons; branches arising laterally; underleaves absent, if present not margined with slime-papillae; perianths terminal on leafy shoots..... 34
34. Leaves usually orbicular to oblong; perianths terete or dorsiventrally compressed, usually narrowed to a conical or beaked mouth; sterile shoots with underleaves absent or vestigial; often with a distinct perigynium..... JUNGERMANNIACEAE
34. Leaves cuneate to obovate; perianths strongly laterally compressed, bilabiate, wide at mouth; sterile shoots usually with small lanceolate, or multifid or ciliate underleaves; perigynium uniformly lacking..... PLAGIOCHILACEAE
35. Leaves transversely or subtransversely inserted..... 36
35. Leaves obliquely inserted..... 39
36. Leaves uniformly bilobed; underleaves almost or entirely absent; perianth lacking, perigynium often present and well developed..... 37
36. Leaves 2-4-lobed; underleaves often present, occasionally reduced; perianth often developed, large..... 38
37. Leaves usually with marginal rhizoids (in our single species); perigynium (marsupium) large and pendent..... ACROBOLBACEAE
37. Leaves never with marginal rhizoids; perigynium erect..... MARSUPELLACEAE
38. Plants minute, less than 1 cm long; leaves distantly arranged, bilobed and lobes entire; underleaves small, sometimes absent..... CEPHALOZIACEAE
38. Plants coarse, 1-15 cm long; leaves approximately arranged, 3-4 deeply lobed, margin dentate; underleaves present, large..... LOPHOZIACEAE (*Chandonanthus*)
39. Leaves 2-4-lobed and lobes entire..... 40
39. Leaves not 2-4-lobed, margin often dentate or cleft..... 42
40. Leaves 2-4-lobed; female inflorescences terminal on main or lateral shoots..... 41
40. Leaves bilobed, usually very obliquely inserted (except *Nowellia*); female inflorescences (and perianths) on more or less short ventral branches..... CEPHALOZIACEAE
41. Leaf insertion succubous; underleaves absent; rhizoids arising from ventral side of stems; perianths well developed, elongate, projecting beyond bracts..... LOPHOZIACEAE
41. Leaf insertion incubous; underleaves nearly as large as leaves; rhizoids restricted to underleaf bases; perianth reduced and replaced by a perigynium..... ISOTACHIDACEAE
42. Plant with ventral stolons, branches postical in origin; ventral margin of leaves incurved; female and male inflorescences all on short ventral branches; perianths inflated, not laterally compressed..... ADELANTHACEAE
42. Plant without ventral stolons, dichotomously or dendritically branched; dorsal margin of leaves usually more or less reflexed; female inflorescences terminal on main or lateral shoots, male inflorescences intercalary on main shoots; perianths laterally compressed..... PLAGIOCHILACEAE
43. Underleaves lacking..... 44
43. Underleaves large and conspicuous..... 46
44. Purplish to brownish plants; leaf lobes bilobed and toothed, the lobule deeply concave and forming hooded water-holding sac; rhizoids absent on leafy stems, confined to reduced-leaved shoots..... PLEUROZIACEAE
44. Green to yellowish, rarely brownish plants, leaf lobes and lobules not as above; rhizoids present on leafy stems..... 45

45. Rhizoids only locally restricted to lobules of leaves; lobules more or less connate to stem, entire; perianths cylindrical, truncate at the wide mouth, dorsiventrally compressed..... RADULACEAE
45. Rhizoids scattered along ventral stem surface; apex of lobules with 2 teeth; perianths conical, narrowed at apex, 3-5-keeled..... LEJEUNEACEAE (Cololejeuneoideae)
46. Underleaf one per lateral leaf..... LEJEUNEACEAE (Diplosiolejeuneoideae)
46. Underleaf one per pair of lateral leaf..... 47
47. Lobules not inflated, similar in appearance to the undivided underleaves; perianths mostly conically pointed near the mouth which is ciliate and not beaked..... PORELLACEAE
47. Lobules typically inflated, very different in appearance from the underleaves; perianths 3-5-keeled, ending in a distinct beak..... 48
48. Leaves divided to base, lobules almost free from the lobes, helmet-shaped or galeate..... FRULLANIACEAE
48. Leaves not divided to base, lobules pouch-like..... LEJEUNEACEAE (Ptychanthoideae & Lejeuneoideae)
49. Leaves ecostate; capsules elevated at maturity on gametophytic pseudopodia which serve as function of the undeveloped setae; peristome lacking..... 50
49. Leaves costate or not; capsules sessile or on setae which are sporophytic; peristome usually present, rarely lacking..... BRYIDAE-51
50. Plants of bogs or extremely damp habitats, yellowish white or greenish gray, often tinged with purple or red; branches in fascicles, crowded at stem tip in dense heads; leaf cells of 2 kinds: the large hyaline cells with fibrils and pores in the meshes of a network of elongate chlorophyllose cells; capsules dark brown, subglobose, opening by a convex lid.. SPHAGNIDAE-SPHAGNACEAE
50. Plants of exclusively alpine, purplish black; leaf cells not dimorphous; capsules minute, dehiscent by 4 longitudinal slits..... ANDREAEIDAE-ANDREAEACEAE
51. Gametophytes rudimentary; protonemata persistent; capsules oblique.. BUXBAUMIACEAE
51. Gametophytes well-developed; protonemata ephemeral; capsules symmetrical or rarely asymmetrical..... 52
52. Leaves with vertical lamellae on the upper surface of the costa; calyptra densely pilose; peristome of 32 or 64 short teeth connected above with an epiphragm covering the mouth of the capsule..... POLYTRICHACEAE
52. Leaves not lamellate; calyptra smooth or scarcely hairy; peristome teeth 4, 16, 32 or none; epiphragm absent..... 53
53. Capsules asymmetrical, sessile; peristome double, inner peristome hyaline and conspicuously pleated..... DIPHYSCIACEAE
53. Capsules symmetrical, mostly exserted; peristome single or double, inner peristome if present not same as above..... 54
54. Peristome teeth 4, solid, not transversely barred..... GEORGIACEAE
54. Peristome teeth 16, 32 or absent, thin, transversely barred and articulate..... 55
55. Leaves distinctly equitant and distichous..... 56
55. Leaves in more than 2 rows, though plants of some genera may be apparently flattened..... 57
56. Leaves with vaginate lamina, not keeled; costa not long excurrent; peristome teeth 16.... FISSIDENTACEAE
56. Leaves without vaginate lamina, strongly keeled; costa long excurrent; peristome absent..... BRYOXIPHACEAE
57. Leaves with large hyaline basal cells (cancellinae) which sharply differentiated from the small chlorophyllose cells..... CALYMPERACEAE

57. Inner basal cells not conspicuously differentiated..... 58
58. Plants whitish or appearing somewhat green when fresh; lamina consisting nearly all of costa, made up of 3 or more layers of differentiated cells in which chlorocysts are sandwiched in leucocysts..... LEUCOBRYACEAE
58. Plants usually green, yellowish green, or blackish green; lamina consisting of 1 or rarely 2 layers of similar chlorophyllose cells, costa usually narrow or lacking..... 59
59. Stems usually erect, dichotomously branched; sporophytes terminal on stems of leafy branches with few exceptions (acrocarpous)..... 60
59. Stems creeping, often pinnate or copiously branched; sporophytes lateral, on special short branches (pleurocarpous)..... 79
60. Calyptra campanulate..... 61
60. Calyptra mitrate or cucullate, shorter than the capsule..... 63
61. Calyptra neither plicate nor hairy, extending to the base of the capsule and entirely covering it..... ENCALYPTACEAE
61. Calyptra plicate, usually not extending to the base of the capsule..... 62
62. Leaves with a single strong costa; setae usually long; calyptra naked or pilose..... ORTHOTRICHACEAE
62. Leaves ecostate; setae short; calyptra not hairy..... ERPODIACEAE
63. Capsules with a large swollen apophysis, which is usually larger and more conspicuous than urna..... SPLACHNACEAE
63. Capsules without swollen apophysis (some genera with slender necks)..... 64
64. Leaves with hyaline hair points; leaf cells papillose..... 65
64. Leaves without hyaline hair point; leaf cells smooth or papillose..... 66
65. Leaves costate; leaf cells often strongly sinuose..... GRIMMIACEAE
65. Leaves costate; leaf cells not sinuose..... HEDWIGIACEAE
66. Peristome present..... 67
66. Peristome absent..... 77
67. Peristome single..... 68
67. Peristome double..... 70
68. Peristome dicranoid, teeth broad at base, entire or cleft above, with longitudinal sculpturing or papillose; alar cells often differentiated..... DICRANACEAE
68. Peristome not dicranoid, teeth deeply divided nearly to base; alar cells never strongly differentiated from other leaf cells..... 69
69. Leaf cells smooth, elongate or quadrate..... DITRICHACEAE
69. Upper cells papillose, rounded, often obscure..... POTTIACEAE
70. Leaf margins thickened..... 71
70. Leaf margins not thickened..... 73
71. Plants robust, up to 40-50 cm tall, pendent on tree trunk; setae short..... SPIRIDENTACEAE
71. Plants up to about 10 cm, growing on soil, humus or on decayed logs, rarely epiphytic; setae elongate..... 72
72. Leaves linear-lanceolate, costa toothed on back, leaf cells rounded, incrassate; sporophytes arising from middle or near base of stem..... RHIZOGONIACEAE
72. Leaves oblong, costa not toothed on back, leaf cells hexagonal or isodiametric, thin-walled; sporophytes terminal..... MNIACEAE
73. Plants dendroid; leaf cells papillose..... HYPNODENDRACEAE
73. Plants not dendroid; leaf cells smooth or papillose..... 74
74. Leaf cells papillose; capsules subglobose, striate, plicate when dry..... BARTRAMIACEAE
74. Leaf cells smooth; capsules pyriform or elongate, smooth..... 75

75. Capsules erect, inclined, strongly asymmetrical with the mouth nearly on one side..... FUNARIACEAE
75. Capsules symmetrical, nodding or horizontal..... 76
76. Leaves often broadly ovate to obovate, leaf margins bordered with hyaline or colored, elongate cells, leaf cells hexagonal and isodiametric..... MNIACEAE
76. Leaves usually narrowly ovate or lanceolate, leaf margins usually not bordered, leaf cells elongate to narrowly hexagonal, rarely isodiametric..... BRYACEAE
77. Leaf cells smooth, very lax..... FUNARIACEAE (*Entostodon*, *Physcomitrium*)
77. Leaf cells papillose or verrucose..... 78
78. Leaves generally ovate, leaf cells distinctly lax..... SPLACHNACEAE (*Gymnostomiella*)
78. Leaves lanceolate to subulate, leaf cells not lax..... POTTIACEAE
79. Stems with smaller differentiated dorsal or ventral leaves (amphigastria)..... 80
79. Stems without amphigastria..... 81
80. Leaves bordered, amphigastria on ventral surface..... HYPOPTERYGIACEAE
80. Leaves not bordered, amphigastria on dorsal surface..... RHACOPILACEAE
81. Leaves uncostate..... 82
81. Leaves with double costa or ecostate..... 94
82. Leaves conspicuously bordered..... HOOKERIACEAE
82. Leaves not bordered..... 83
83. Leaf cells papillose..... 84
83. Leaf cells smooth..... 86
84. Stems prostrate, pinnate or bi- and tripinnate, covered with green paraphyllia..... THUIDIACEAE
84. Stems pendulous or ascending, irregularly branched..... 85
85. Slender plants, stems flexuose and pendulous..... METEORIACEAE
85. Robust plants, stems rigid..... TRACHYPODACEAE
86. Stems often regularly pinnate; leaves mostly very complanate..... NECKERACEAL
86. Stems irregularly branched; leaves not complanate..... 87
87. Upper leaf cells short, parenchymatous..... 88
87. Upper leaf cells elongate, prosenchymatous..... 89
88. Capsules immersed..... CRYPHAEACEAE
88. Capsules long-exserted..... LESKEACEAE
89. Stems covered with paraphyllia..... AMBLYSTEGIACEAE
89. Stems not covered with paraphyllia..... 90
90. Alar cells few, poorly differentiated..... 91
90. Alar cells numerous, well defined..... 93
91. Leaves short-pointed, deeply concave; stems julaceous..... LEMBOPHYLLACEAE
91. Leaves acuminate, slightly concave; stems not julaceous..... 92
92. Leaf cells incrassate, cell walls porous..... RHYTIDIACEAE
92. Leaf cells thin-walled, cell walls not porous..... BRACHYTHECIACEAE
93. Slender, delicate plants; costa faint; leaves long-acuminate..... FABRONIACEAE
93. Coarser plants; costa strong; leaves short-pointed..... PLAGIOTHECIACEAE
94. Leaves transversely undulate, strongly complanate..... NECKERACEAE
94. Leaves not transversely undulate..... 95
95. Leaves strongly plicate when fresh, ecostate..... LEUCODONTACEAE
95. Leaves mostly not plicate..... 96
96. Capsules densely spinulose..... SYMPHYDONTACEAE
96. Capsules not spinulose..... 97

97. Alar cells sharply defined, often large and inflated.....98
 97. Alar cells inconspicuous.....102
 98. Leaves deeply cochleariform, apex cucullate..... PTEROBRYACEAE
 98. Leaves more or less concave, apex not cucullate.....99
 99. Alar cells subquadrate, not colored; capsules cylindrical, erect..... ENTODONTACEAE
 99. Alar cells incrassate or colored; capsules otherwise.....100
 100. Stems covered with paraphyllia..... RHYTIDIACEAE
 100. Stems lacking paraphyllia.....101
 101. Primary stems stoloniferous; alar cells numerous, incrassate..... MYURIAEAE
 101. Primary stems not stoloniferous; leaves mostly ecostate, alar cells mostly few, large, often inflated..... SEMATOPHYLLACEAE
 102. Calyptra large, mitriform, often hairy; forks of costa usually long; mostly soft plants....
 HOOKERIAEAE
 102. Calyptra usually cucullate; forks of costa short.....103
 103. Leaves plicate..... PTEROBRYACEAE
 103. Leaves not plicate.....104
 104. Leaves cochleariform, abruptly short-pointed..... LEMBOPHYLLACEAE
 104. Leaves more or less concave, acuminate.....105
 105. Rigid woody plants; endostome rudimentary..... PTEROBRYACEAE
 105. Stems not woody; peristome perfect.....106
 106. Leaf cells very wide or rhomboidal.....107
 106. Leaf cells narrow, elongate.....109
 107. Leaf cells papillose..... THELIACEAE
 107. Leaf cells smooth.....108
 108. Lid finely subulate-rostrate; peristome teeth with a median furrow.... LEUCOMIACEAE
 108. Lid short, apiculate; peristome teeth not furrowed..... HYPNACEAE (*Vesicularia*)
 109. Leaves strongly complanate.....110
 109. Leaves not complanate.....111
 110. Leaves decurrent, cells smooth..... PLAGIOTHECIACEAE
 110. Leaves not decurrent, cells smooth or papillose at apical angles..... HYPNACEAE
 111. Robust rigid plants, stems copiously branched..... HYLOCOMIACEAE
 111. Smaller plants, stems often regularly pinnate..... HYPNACEAE

LITERATURE CITED

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A NEW NAME FOR *HYMENOPHYLLUM*
TAIWANENSE DEVOL

MING-JOU LAI

Hymenophyllum devolii, *nom. nov.*

Hymenophyllum taiwanense DeVol, Fl. Taiwan I: 120. pl. 40. 1975. non *H. taiwanense* (Tagawa) Morton in Contr. U. S. Nat. Herb. 35(5): 167. 1968 based on *Mecodium taiwanense* Tagawa in Acta Phytotax. Geobot. 9: 141. 1940. 棧氏膜蕨

TAIWAN: Chingshuiying, leg. Liew 45 (TAI, holotypus).