

ARTIFICIAL KEY TO THE MORE COMMON GENERA AND SOME SPECIES OF CALIFORNIA MOSSES, ESPECIALLY IN THE SAN FRANCISCO BAY AREA. By William C. Steere.

Pseudoceros
Pseudoceros
Tablet
Rhacopilum
hetero

Peat mosses of very characteristic appearance; branches in bunches; leaves composed of very large empty colorless cells surrounded by a network of narrow green cells; plants of peat bogs and wet places Sphagnum

Dendro
californicum

Branches arising individually, not in fascicles; leaves composed of uniform cells, never as in Sphagnum.

Rhacopilum

Leaves in only 2 opposite rows on the stem (some mosses have flattened stems or branches, but with more than 2 rows of leaves).

Leaves equitant, that is, with a pocket on the upper side that straddles the stem and usually the leaf next above.

Aquatic plants, floating in water Octodiceras fontanum

Not aquatic, although occasionally on wet soil or rocks Fissidens

Leaves not equitant, on stolon-like branches of plants whose leaves are normally 2-rowed.

Mnium

Leaves in more than 2 rows, usually 3-8 rows, arranged spirally on the stem.

Fissidens
lygocarpus

Sporophytes terminal on stem or branches; plants growing in cushions or tufts, the stems erect or nearly so, simple or forking, never pinnate; leaf cells usually short, rarely much elongated (Acrocarpous Mosses).

Leaves with thin parallel longitudinal plates of tissue (lamellae) projecting from upper surface of leaf. Key A

Orthoceros
umbellatum

Leaves without lamellae on upper surface.

Plants small and inconspicuous, some apt to be overlooked when without capsules; seta shorter than capsule, which is completely immersed in the uppermost leaves.

Capsules opening irregularly, without a differentiated lid . Key B

Capsules opening by means of a differentiated lid or operculum, which falls off when the spores are mature Key C

Plants larger, conspicuous even without capsules, which are raised above the plants on an elongated seta.

Leaf cells papillose on back of leaf Key D

Leaf cells smooth, not papillate Key E

Sporophytes lateral on stem or branches; plants forming mats or carpets, the stems usually creeping and elongated, with erect, spreading, or hanging branches, often regularly or irregularly pinnately branching; leaf cells usually much elongated, rarely short (Pleurocarpous Mosses).

Leaves lacking a costa, or the costa short and double Key F

Leaves with a distinct costa, reaching at least to the middle of the leaf.

Key G

Key A. Acrocarpous mosses with lamellae on upper surface of leaf.

- Leaves plainly crisped when dry; with thickened border; lamellae on costa only; calyptra not hairy Atrichum undulatum
Leaves pressed to stem when dry but not crisped; border not thickened; lamellae covering most of upper leaf surface; calyptra hairy.
Capsule cylindric, not angled in cross-section. Pogonatum alpinum
Capsule angled, square in section Polytrichum

Key B. Minute mosses with immersed and cleistocarpous capsules.

- Leaf cells papillose Phascum cuspidatum
Leaf cells smooth, not papillose.
Leaves linear-lanceolate; capsule ovoid Pleuridium
Leaves lanceolate to ovate, or broader; capsules globose.
Plants bud-like, the capsule completely enveloped by the leaves . . . Acaulon muticum
Plants not bud-like, capsule exposed, not completely covered by the leaves.
Stems lacking; leafy plants scattered over a conspicuous mat of protonema; leaves without costa Ephemerum serratum
Stems present; protonema not conspicuous if present at all; leaves costate. Physcomitrella patens

Key C. Small mosses with immersed capsules.

- Plants aquatic, long slender and floating; leaves distichous Octodiceras fontanum
Plants not aquatic, although occasionally in wet habitats; leaves not distichous.
Calyptra pleated, covered with conspicuous straight hairs Orthotrichum
Calyptra smooth, without hairs.
Leaves without costa Hedwigia ciliata
Leaves with distinct costa.
Capsules regularly and evenly 8-ribbed; peristome lacking Amphidium californicum
Capsules not 8-ribbed; peristome usually present Grimmia

Key D. Acrocarpous mosses with papillose leaf cells.

Papillae at ends of cells, caused by projection of cell angles.

Leaves lanceolate or broader; capsules inclined, curved, sub-sphaerical when moist; peristome double; plants of wet habitats Philonitis

Leaves linear to linear-lanceolate; capsules erect or nearly so, ovoid; peristome single; plants of dry habitats.

Capsules furrowed when dry; plants in dense tufts Bartramia stricta

Capsules not furrowed when dry; plants in loose tufts Anacolia menziesii

Papillae more or less central, over the cell cavity.

Plants with erect, leafless shoots (pseudopodia) bearing terminal clusters of gemmae.

Aulacomnium

Plants without gemmiferous branches.

Leaves without costa.

Seta very short; capsules enclosed by leaves Hedwigia ciliata

Capsule exerted on long seta Pseudobraunia californica

Leaves with well developed single costa.

Plants growing typically on dry, exposed trunks of trees, well above the ground level.

Leaves spatulate; costa sometimes excurrent into an awn; gemmae usually present on upper surface of costa, leaf blade, or on apex of stem Tortula

Leaves lanceolate to ovate, never spatulate, never awned.

Gemmae abundant in leaf axils; calyptra not hairy Zygodon viridissimus

Gemmae rarely present, then on leaf surface; calyptra covered with conspicuous straight hairs Orthotrichum

Plants growing on rock or soil, not on the trunks of trees, except at the very base.

Calyptra very large, neither plicate nor hairy, covering completely the whole long cylindrical capsule.

Encalypta

Calyptra not covering the whole capsule; if appearing to do so, then plicate and hairy.

Plants black or brown, except at the growing tips, forming dense cushions or tufts on rather dry exposed rock; firmly attached to the rock by means of rhizoids; leaf cells with very thick walls.

Calyptra pleated; with conspicuous straight hairs Orthotrichum

Calyptra not pleated; without hairs.

Capsule opening by 4-8 vertical slits; without operculum Andreaea

Capsule opening normally through the fall of an operculum.

Leaf cells sinuose-thickened throughout the leaf Racomitrium

Leaf cells sometimes sinuose-thickened at the base, but not throughout the leaf.

Grimmia

Plants usually some shade of green, growing in moister habitats than preceding; if on rock, then easily detached; leaf cells not greatly incrassate.

Alar cells distinctly enlarged or inflated, usually colored.

Capsule erect and symmetrical Orthodicranum strictum

Capsule inclined, curved, usually strumose Dicranum

Alar cells not distinctly modified in size or color.

(on next page; the rest of this key, D, goes to the left hand margin)

P
A

Key D. Acrocarpous mosses with papillose leaf cells (continued).

- Calyptra peated, with conspicuous straight hairs; leaves usually little changed in drying. Orthotricum
- Calyptra smooth, without hairs, or lacking; leaves usually twisted or crisped upon drying. Amphidium californicum
- Capsules regularly and evenly 8-ribbed; peristome lacking Amphidium californicum
- Capsules not ribbed; peristome usually present.
- Leaves narrowly lanceolate to oblong, rarely broader above than below; papillae not circular or c-shaped.
- Leaf margins strongly involute Weissia
- Leaf margins plane or revolute.
- Leaves of 2 layers of cells nearly throughout Timmia crassinervis
- Leaves only 1 layer of cells thick, except sometimes at the margins.
- Leaf margins plane.
- Plants very small and crowded, on moist or wet limestone, often encrusted with a limy deposit.
- Leaves entire; peristome lacking Gymnostomum calcareum
- Leaves serrulate near base Eucladium verticillatum
- Plants on soil Barbula
- Leaf margins revolute.
- Leaves in 3 rows, covered with high, sharp papillae; plants excessively rare. Triquetrella californica
- Leaves distinctly in more than 3 rows; papillae of moderate size to nearly lacking.
- Peristome teeth 16, short, straight, each tooth regularly or irregularly divided into 2 forks Didymodon
- Peristome teeth 16, long, strongly twisted at least 1 turn, divided to base into 32 hair-like filaments Barbula
- Leaves broadly ovate or oblong, lingulate or spatulate, always broader above than at the base; papillae usually circular or c-shaped.
- Upper surface of costa, near apex, covered with green filaments.
- Leaf margins strongly incurved, apex blunt Aloina rigida
- Leaf margins plane or revolute, leaf apex hair-pointed Crossidium
- Upper surface of costa without filaments (sometimes with gemmae).
- Plants very small, almost microscopic, bud-like; capsules cleistocarpous, enveloped by the leaves Phascum cuspidatum
- Plants of normal size; capsules operculate, with elongated seta.
- Leaves distinctly bordered with cells that are longer, thicker-walled, or of different size or color.
- Leaf margins bordered with elongated cells. Tortula
- Leaf margins bordered by 2-7 rows of thicker-walled, orange-colored cells.
- Plants growing on wet limestone at or below water level Merceya latifolia
- Plants growing on moist soil or rock Tortula
- Leaves not at all bordered with modified cells.

Key D. Acrocarpous mosses with papillose leaf cells (continued).

- Peristome lacking or consisting only of low membrane Pottia
- Peristome well-developed, of 16 divided or undivided teeth.
 - Peristome teeth conspicuously twisted at least 1 turn Tortula
 - Peristome teeth not or only very slightly twisted.
 - Peristome teeth long, split nearly to the base into 2-3 slender divisions.
 - Desmatodon
 - Peristome teeth very short, often irregular, undivided Pottia

Key E. Acrocarpous mosses with smooth leaf cells.

Plants small and inconspicuous, hardly noticeable to the naked eye; capsules completely or partly enveloped by the uppermost leaves.

Leaves linear-lanceolate, capsules ovoid Pleuridium

Leaves lanceolate to ovate or broader, capsules globose.

Plants bud-like, the capsules completely hidden in the leaves Acaulon muticum

Capsules exposed, not hidden by the leaves.

Stem lacking; leafy plants scattered over a mat of protonema; leaves without a costa.

Ephemerum serratum

Stem present; protonema not conspicuous if present; leaves with distinct costa.

Psycomitrella patens

Plants larger, conspicuous even without capsules, which are extended above the plants on an elongated seta.

Some stems with terminal leafy cups filled with oval gemmae; peristome teeth 4 . . . Tetraphis pellucida

Gemmae-filled leafy cups lacking; peristome teeth always more than 4; usually 16.

Alar cells plainly inflated, often colored.

Capsule erect and symmetric Orthodicranum strictum

Capsule nodding, curved, strumose Dicranum

Alar cells neither inflated nor colored.

Plants black or brown except at growing tips, in dense tufts or cushions firmly attached to rather dry exposed rocks; walls of leaf cells usually greatly thickened.

Leaves sharply serrate toward the apex Ptychomitrium gardneri

Leaves entire; rarely slightly serrulate.

Leaf cells sinuose-thickened throughout the leaf Rhacomitrium

Leaf cells not sinuose-thickened throughout.

Calyptra pleated, covered with straight hairs, usually persistent . Orthotrichum

Calyptra smooth, without hairs, not persistent Grimmia

Plants not usually black or brown, but some shade of green; on soil or tree trunks, if on rock then easily detached.

Leaves distinctly (sometimes rather obscurely) bordered with longer, narrower cells.

Leaf cells nearly as broad as long, or broader than long.

Margins of leaf serrate with spine-like teeth clearly set off from surrounding cells, sometimes in pairs.

Plants dendroid with numerous short terminal branches Leucolepis menziesii

Plant not at all dendroid; stems simple or little branched.

Leaves with lamellae on upper surface of costa; spine-like teeth present on

lower surface of leaf; capsules erect Atrichum undulatum

Leaves without lamellae; without spines on leaf surface; capsules inclined to hanging.

Mnium

Margins of leaf entire or serrate, but teeth never spine-like or paired.

Key E. Acrocarpous mosses with smooth leaf cells.(continued).

Capsules erect, symmetric.

Capsules broad and short; peristome completely lacking . . . Physcomitrium

Capsules elongated; peristome present.

Peristome single Entosthodon attenuatus

Peristome double Funaria californica

Capsules inclined to hanging, often asymmetric.

Leaves nearly round; border very conspicuous, more than 1 layer of cells thick,
without any teeth, Mnium glabrescens

Leaves ovate; border sometimes obscure, not thickened, usually more or less toothed.

Funaria

Leaf cells always distinctly longer than broad.

Leaf cells about twice as long as wide; leaves sometimes hair-pointed; margins entire.

Bryum

Leaf cells much longer than wide, usually more than 4 times as long as wide; leaves never
hair-pointed, usually somewhat toothed.

Leaves on upper side of sterile stems smaller than those on lower side;

plants very pale with pinkish tinge Epipterygium tozeri

Leaves not dimorphic; plants green Pohlia

Leaves not at all bordered.

Upper leaf cells hardly longer than wide.

Capsules erect and symmetric.

Cells very large, visible with a hand-lens, costa ending about the middle of the leaf;
margin not thickened Entosthodon

Cells small, not visible with a hand-lens; costa ending in leaf apex; margin of
leaf two layers of cells thick Dicranoweisia cirrata

Capsules inclined, curved, asymmetric.

Cells very large, visible with a hand-lens, seta much curved; capsules pear-shaped,
not strumose; peristome teeth not split Funaria

Cells small, not visible with a hand-lens; seta straight; capsules horizontal, cylindrical,
strumose; peristome teeth split Ceratodon purpureus

Upper leaf cells distinctly longer than wide.

Leaves very narrow, linear-lanceolate, with long acuminate or subulate apex.

Plants forming silky cushions on charred redwood stumps Orthodontium gracile

Plants not restricted to charred redwood, usually on soil.

Capsules erect, cylindrical; peristome of 32 threadlike filaments.

Ditrichum

Capsules inclined to hanging; peristome of 16 teeth.

Capsules pear-shaped; peristome double, the teeth not split, operculum rounded.

Leptobryum pyriforme

Capsules not pear-shaped, short and curved; peristome single, the teeth split
at the apex; operculum long-beaked Dicranella varia

Key E. Acrocarpous mosses with smooth leaf cells (continued).

Leaves lanceolate to ovate.

Upper leaf cells about twice as long as wide; leaf margins entire.

Upper leaf cells distinctly longer than wide, usually 4 or more Bryum times as long as wide.

Plants of very wet places; dull whitish; capsules as long when dry.

Mniobryum wahlenbergii

Plants of moist habitats; sometimes shining but not dull whitish; capsules distinctly longer than wide when dry Pohlia

Key G. Pleurocarpous mosses with costate leaves.

Stems covered with green paraphyllia.

Leafy stems and branches distinctly complanate-flattened; leaves undulate . . . Neckeradelphus menziesii

Leafy branches not flattened; leaves not undulate.

Leaf cells papillose; stems regularly branched in a tree-like manner; seta very short.

Dendroalsia abietina

Leaf cells smooth, not papillose on back of leaf; plants irregularly branched; seta elongated but sheathed by long, clasping leaves Alsia californica

Stems without paraphyllia.

Leaves papillose on back.

Papillae formed by projections of cell angles; leaves overlapping, not crisped when dry; seta smooth.

Costa short or nearly lacking Pterigynandrum filiforme

Costa reaching beyond the middle of the leaf, ending in a spine on the back. Pseudisothecium stoloniferum

Papillae central over cell cavity; leaves spreading, crisped or twisted when dry; seta rough.

Claopodium

Leaves smooth, not papillose on back.

Leaf margins fringed with long ciliate teeth Fabronia pusilla

Leaf margins toothed or entire, but not fringed.

Upper leaf cells short and relatively broad, usually rhomboidal, 2-5 times as long as wide.

Leafy stems or branches distinctly flattened.

Plants very glossy; leaves about 3 mm long; capsule inclined Porothamnium bigelovii

Plants not glossy; leaves not exceeding 2 mm; capsule erect or nearly so.

Bestia

Stems or branches not complanate, more or less round.

Leaves with large, sharp teeth at apex; leaves closely appressed when dry; the branches curved and julaceous.

Leaf margins revolute (rolled back); leaf cells very thick-walled; supplementary costae often present; some of the apical teeth recurved Antitrichia

Leaf margins reflexed but not rolled back; leaf cells thin-walled; supplementary costae lacking; apical teeth not recurved Bestia

Leaves entire or finely and regularly serrate, without a few conspicuous sharp apical teeth; leaves spreading; branches not julaceous.

Leaves regularly and evenly serrate; plants pinnately branched, often beautifully and regularly so; seta rough, operculum beaked; costa ending in a spine.

Eurhynchium

Leaves entire or nearly so, sometimes with inconspicuous teeth; plants not pinnately branched; seta smooth; operculum not beaked; costa not ending in a spine.

Amblystegium

Upper leaf cells very long and narrow, 5-20 times as long as wide.

Key G. Pleurocarpous mosses with costate leaves (continued).

Leaves conspicuously and regularly plicate.

Leaves narrowly lanceolate, gradually long acuminate.

Capsules erect and symmetric or nearly so Homalothecium nuttallii

Capsules inclined, more or less curved Camptothecium

Leaves ovate, usually abruptly acuminate Brachythecium

Leaves not or only slightly plicate.

Seta always smooth; leaves entire; costa not ending in a spine.

Leaves very widely spreading to squarrose; costa rather short . . . Campylium

Leaves spreading to appressed; costa long Leptodictyum riparium

Seta conspicuously papillose; leaves serrate; costa ending in a spine on back of leaf.

Plants very regularly pinnately branched; operculum long beaked . . Eurhynchium

Plants not regularly pinnately branched; operculum not long beaked.

Leaves closely overlapping, branches leaves very concave, occasionally blunt; the branches julaceous Scleropodium

Leaves not closely overlapping, never blunt, usually spreading; the branches not julaceous,

Leaves with conspicuous groups of small, thick-walled, rounded alar cells; somewhat papillose on back by projecting cell angles; seta smooth.

Pseudisothecium stoloniferum

Alar cells tending to be larger rather than smaller, not thick-walled; leaves not papillose on back; seta rough Brachythecium

(Rewritten in the form of an indented key by

John H. Thomas - fall, 1971.)