***Skeleton to Freely Branched Mosses -- MidWest***

*Revised through 19 March 2010*

***Reminder****: a dagger* (†) *indicates that not all of the species within the given genus have the character(s) defining that Group.*

***Group P1 – Shoots strongly flattened (complanate) or angular***

Group P1

***Brachelyma Homalia Neckera***

***Brotherella Homaliadelphus*** *Neckeropsi****s***

***Callicladium Hookeria Plagiothecium***†

*Callicostella* ***Isopterygiopsis*** *Porotrichum*

*Cyclodictyon* ***Isopterygium Pseudotaxiphyllum***

***Entodon***†*Lepidopilum**Racopilum*

***Fontinalis***† ***Leptodictyum***† ***Steerecleus***

***Herzogiella***†*Metaneckera* ***Taxiphyllum***

Group P2 – Shoots julaceous (especially when dry) - shoots round with  
crowded, overlapping and appressed leaves

Group P2

*Antitrichia*† ***Leucodon*** *Pterogonium*

***Bryoandersonia Myurella***†*Scleropodium*†

***Cryphaea*** *Plagiobryum* ***Scorpidium***

***Entodon***† ***Pseudoscleropodium******Thelia***

***Hedwigia***

Group P3 – Leaves spreading at right angles (squarrose) or  
squarrose-recurved

Group P3

***Campylium***†***Rhytidiadelphus***

***Group P4 – Plants with erect branches from a creeping stem***

Group P4

*Bestia Groutiella Macromitrium*

***Drummondia*** *Jaegerina Neomacounia*

***Forsstroemia*** *Macrocoma Schlotheimia*

Group P5 – Plants with leaves distinctly sickle-shaped and  
turned to one side (falcate-secund)

Group P5

***Brachythecium***† ***Heterophyllum Pylaisiella***

***Brotherella Hygrohypnum***† ***Pylaisiadelpha***

***Ctenidium Hypnum Rhytidium***

***Dichelyma Limprichtia Sanionia***

***Drepanocladus***†*Loeskypnum*† ***Scorpidium***

*Gollania* ***Palustriella Warnstorfia***

***Hamatocaulis Ptilium***

***Group P6 – Plants with paraphyllia or tomentum on stem***

Group P6

***Abietinella Helodium Pseudoleskea***

*Alsia* ***Hylocomiastrum Rauiella***

***Bryohaplocladium Hylocomium*** *Rhytidiopsis*

***Climacium*** *Lescuraea* ***Thelia***

***Cratoneuron Loeskeobryum Thuidium***

***Cyrto-hypnum*** *Metaneckera* ***Tomentypnum***

*Dendroalsia* ***Palustriella***

***Group P7 – Plants with red stems***

Group P7

*Antitrichia* ***Hylocomium*** *Plagiobryum*

***Calliergonella Hypnum Pleurozium***

***Climacium Loeskeobryum Rhytidiadelphus***

***Hedwigia***

***Group P8 – Plants with shoots flat on top and appearing “braided”***

Group P8

***Brotherella Hypnum***† ***Ptilium***

***Ctenidium***

Group P9 – Leaves undulate or rugose (irregular undulations)

Group P9

*Metaneckera**Rhytidiopsis**Schlotheimia*†

***Neckera***† ***Rhytidium Scorpidium***

Group P10 – Leaves dimorphic (two forms on the same axis)

Group P10

*Hypopterygium Racopilum*

***Group P11 – Leaves with awns, hair-points, or hyaline apices***

Group P11

*Braunia* ***Hedwigia******Racomitrium***†

***Cirriphyllum*** *Iwatsukiella Wijkia*

*Claopodium*† *Pseudobraunia* *Zelometeorium*

Group P12 – Plants thread-like (leaves < 1mm)

**Group P12**

***Homomallium Platydictya Pseudoleskeella***

***Group P13 – Costa double and more than 1/3 leaf length***

**Group P13**

*Callicostella* ***Hylocomiastrum***†***Plagiothecium***†

*Cyclodictyon* ***Hylocomium******Pseudocalliergon***

***Heterocladium***† *Lepidopilum* ***Rhytidiadelphus***†

***Hygrohypnum***†***Loeskeobryum*** *Trachyxiphium*

***Group P14 – Costa single and narrow; leaves with distinct decurrencies***

**Group P14**

***Anomodon***† ***Bryhnia*** *Heterocladium*†

***Brachythecium***† ***Eurhynchium***†*Pleuroziopsis*

***Group P15 – Costa single and narrow; leaves with a distinct marginal border***

Group P15

***Brachelyma******Helodium****†* ***Platylomella***

*Daltonia Limbella* ***Thelia***

*Groutiella*

***Group P16 – Costa single and narrow; leaves with distinct alar cells***

**Group P16**

*Bestia* ***Drepanocladus*** *Loeskypnum*

***Brachythecium*** *Entodontopsis**Palamocladium*

***Calliergon Forsstroemia***† ***Palustriella***

***Campylium***† ***Hygrohypnum Pseudoscleropodium***

***Clasmatodon Isothecium*** *Sarmenthypnum*

***Cratoneuron Lindbergia*** *Stereophyllum*

***Group P17 – Costa short and double or none; leaves with  
distinct decurrencies***

**Group P17**

***Herzogiella***† *Heterocladium*†***Plagiothecium***

***Group P18 – Costa short and double, or none; leaves bordered***

**Group P18**

*Groutiella* ***Thelia***

***Group P19 – Costa short and double, or none; leaves with distinct alar cells***

**Group P19**

*Acroporium* ***Herzogiella***† ***Ptilium***

*Alsia* ***Heterophyllium Pylaisiadelpha***

***Brotherella Hygrohypnum Pylaisiella***

***Callicladium Hypnum Rhytidiadelphus***†

***Calliergonella Isopterygium Scorpidium***

***Campylium***†*Leptopterigynandrum* ***Sematophyllum***

*Donnellia* ***Leucodon*** *Taxiphyllum*†

***Entodon Platygyrium*** *Tripterocladium*

***Forsstroemia***† ***Pleurozium*** *Wijkia*

*Gollania**Pterogonium*

***Group P20 – Costa of uncommon or variable form***

**Group P20**

*Alsia* ***Hygrohypnum Platyhypnidium***†

*Antitrichia* ***Isothecium* *Pseudocalliergon***

***Calliergon*** *Jaegerina* ***Pseudoleskeella***†

***Drepanocladus***†*Leptopterigynandrum* ***Pseudoscleropodium***

*Donrichardsia* ***Myurella***† ***Taxiphyllum***

***Forsstroemia***†*Neomacounia* ***Thelia***†

***Heterocladium***† ***Plagiothecium***

***Note****: In the following Groups, all possible genera are listed to give perspective on the Freely branched mosses. Only the genera* ***NOT in brackets [--]*** *are keyed out in Groups P21-P28; the genera in brackets should be identifiable using the criteria characteristic of the previous Groups.*

***Reminder****: Definitions for cell length to breadth ratios are found in the Introduction, the Overview and at the end of this section.*

***Group P21 – Cells long (>8:1); distinctly papillose or prorulose***

**Group P21**

***Bryhnia***† ***Chryso-hypnum*** *Homalothecium*†

*[Hylocomium] [Rhytidium] [Taxiphyllum]*

***Group P22 – Cells long; smooth or indistinctly ornamented#;  
costa single (long and narrow)***

**Group P22**

***Brachythecium***† ***Homalotheciella*** *Scleropodium*†

***Conardia*** *Homalothecium*† ***Steerecleus***

***Dichelyma Leptodictyum***†*Stereophyllum*†

***Eurhynchium Platyhypnidium*** *Trachybryum*

*[Bryoandersonia] [Entodontopsis] [Pleuroziopsis]*

*[Calliergon] [Hamatocaulis] [Pseudoscleropodium]*

*[Campylium] [Hygrohypnum] [Sanionia]*

*[Cirriphyllum [Limbella] [Sarmenthypnum]*

*[Drepanocladus [Limprichtia] [Warnstorfia]*

*[Entodon] [Loeskypnum]*

# Cells indistinctly papillose, i.e., low papillae or projections.

***Group P23 – Cells long; smooth or indistinctly ornamented#;  
costa double (long or short) or none***

**Group P23**

**Costa long** and **double**

Loeskeobryum

*[Hylocomiastrum] [Rhytidiadelphus] [Trachyxiphium]*

**Costa short** and **double**, or **none**

***Fontinalis Isopterygium Pseudotaxiphyllum***

***Herzogiella*** *Orthothecium* ***Taxiphyllum***

***Isopterygiopsis***

*[Brotherella] [Hylocomium] [Pylaisiadelpha]*

*[Callicladium] [Hypnum] [Rhytidiadelphus]*

*[Calliergonella] [Plagiothecium] [Rhytidiopsis]*

*[Campylium] [Pleurozium] [Scorpidium]*

*[Gollania] [Ptilium] [Sematophyllum]*

*[Hygrohypnum]*

# Cells indistinctly papillose, i.e., low papillae or projections.

***Group P24 – Cells intermediate (3-8:1); distinctly papillose or prorulose***

**Group P24**

**Papillose**

*Barbella Papillaria Taxithelium*

*Henicodium*

*[Antitrichia] [Helodium]*

**Prorulose**

*Leptohymenium Pireella* ***Pterigynandrum***

*Lescuraea*†

*[Bryhnia] [Hylocomium] [Pterogonium]*

*[Ctenidium] [Isothecium] [Rhytidiadelphus]*

*[Dendroalsia] [Porotrichum] [Rhytidium]*

*[Helodium]*

***Group P25 – Cells intermediate; smooth or indistinctly ornamented#;  
costa single (wide or narrow)***

**Group P25**

**Costa wide**

*[Donrichardsia]*

**Costa narrow**

***Amblystegium***† ***Fabronia*** *Pseudocryphaea*

***Anacamptodon Hygroamblystegium***†*Sarmenthypnum*

***Brachythecium***† ***Leptodictyum***†*Scleropodium*

***Dichelyma*** *Myuroclada**Trachybryum*

***Eurhynchium*** *Pireella*

*[Brachelyma] [Hamatocaulis] [Plagiobryum]*

*[Calliergon] [Homalia] [Porotrichum]*

*[Campylium] [Hygrohypnum] [Pseudoleskeella]*

*[Climacium] [Jaegerina] [Sanionia]*

*[Conardia] [Limprichtia] [Tomentypnum]*

*[Cratoneuron] [Metaneckera] [Warnstorfia]*

*[Daltonia] [Palamocladium] [Wijkia]*

*[Drepanocladus] [Palustriella] [Zelometeorium]*

*[Forsstroemia]*

# Cells indistinctly papillose, i.e., low papillae or projections.

***Group P26 – Cells intermediate; smooth or indistinctly ornamented#;  
costa double (long or short) or none***

**Group P26**

**Costa long** and **double**

*Heterocladium*† *[Hylocomiastrum]*

**Costa short** and **double**, or **none**

*Acroporium**Iwatsukiella* ***Pseudocalliergon***

*Bryocrumia**Orthothecium**Vesicularia*

***Fontinalis***

*[Alsia] [Homomallium] [Platygyrium]*

*[Campylium] [Hygrohypnum] [Pseudoleskeella]*

*[Donnellia] [Hypnum] [Pylaisiella]*

*[Entodon] [Neckera] [Sematophyllum]*

*[Forsstroemia] [Neomacounia] [Tripterocladium]*

*[Heterocladium] [Plagiothecium] [Zelometeorium]*

*[Heterophyllium] [Platydictya]*

# Cells indistinctly papillose, i.e., low papillae or projections.

***Group P27 – Cells short (<3:1); distinctly papillose or prorulose***

**Group P27**

**Papillose**

***Anomodon Haplohymenium Lindbergia***†

*Braunia* ***Heterocladium***† ***Myurella***†

*Claopodium* ***Leskea***† ***Racomitrium***

*[Abietinella] [Cyclodictyon]*  *[Pseudoleskea]*

*[Hedwigia] [Cyrto-hypnum] [Rauiella]*

*[Bryohaplocladium] [Leptopterigynandrum] [Thelia]*

*[Callicostella] [Pseudobraunia] [Thuidium]*

**Prorulose**

*Heterocladium*† *Schwetschkeopsis*

*[Dendroalsia] [Porotrichum]*

***Group P28 – Cells short; smooth or indistinctly ornamented#***

**Group P28**

**Costa single**, **long** and **narrow**.

***Amblystegium***† ***Hygroamblystegium***† *Lindbergia*†

*Bestia Leptodon Myrinia*

***Clasmatodon*** ***Leskea***† ***Racomitrium***

***Cryphaea***† ***Leskeella*** *Stereophyllum*

***Herpetineuron***

*[Forsstroemia] [Macrocoma] [Pseudoleskeella]*

*[Groutiella] [Macromitrium] [Racopilum]*

*[Heterocladium] [Neckeropsis] [Schlotheimia]*

*[Hypopterygium] [Platylomella] [Thamnobryum]*

*[Isothecium] [Porotrichum]*

**Costa short** and **double**, or **none**.

*Iwatsukiella* *Myurella*† *Vesicularia*

*[Donnellia] [Hookeria] [Platydictya]*

*[Drummondia] [Lepidopilum] [Pseudoleskeella]*

*[Forsstroemia] [Leucodon] [Sematophyllum]*

*[Homaliadelphus]**[Neckeropsis]*

# Cells indistinctly papillose, i.e., low papillae or projections.

**Cells** = medial, laminal cells; cells ~2/3 of the way from insertion to apex, midway between the costa and the margin.

Length to breadth **ratios** of medial, laminal cells:

**Long** cells: >8:1; commonly termed linear or linear-flexuose.

**Intermediate** cells: 3-8:1; commonly termed elongated, oblong-rhomboidal, fusiform., or elliptical.

**Short** cells: <3:1; commonly termed isodiametric, quadrate, rounded-quadrate, or rhombic.

End.