***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.