***Skeleton to Freely Branched (mostly pleurocarpous) Mosses***

*Revised through 23 July 2012*

***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 Homaliadelphus Neckera*

*Brotherella Hookeria Neckeropsis*

*Callicladium Hypopterygium Plagiothecium*†

*Callicostella Isopterygiopsis Porotrichum*

*Cyclodictyon Isopterygium Pseudotaxiphyllum*

*Entodon*† *Lepidopilum Racopilum*

*Fontinalis*† *Leptodictyum*† *Steerecleus*

*Herzogiella*† *Metaneckera Taxiphyllum*

*Homalia*

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

Group P2

*Antitrichia*† *Leptopterigynandrum Pterogonium*

*Bryoandersonia Leucodon*† *Scleropodium*†

*Cryphaea Myurella*† *Scorpidium*

*Entodon*† *Plagiobryum Thelia*

*Hedwigia Pseudoscleropodium*

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 Ptilium*

*Brotherella Hygrohypnum*† *Pylaisiadelpha*

*Ctenidium Hypnum Rhytidium*

*Dichelyma Limprichtia Sanionia*

*Drepanocladus*† *Loeskypnum*† *Scorpidium*

*Gollania Palustriella Warnstorfia*

*Hamatocaulis*

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

Group P6

*Abietinella Helodium Pseudoleskea*

*Alsia Hylocomiastrum Rauiella*

*Climacium Hylocomium Rhytidiopsis*

*Cratoneuron Lescuraea Thelia*

*Cyrto-hypnum Loeskeobryum Thuidium*

*Dendroalsia Metaneckera Tomentypnum*

*Haplocladium Palustriella*

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

Group P7

*Antitrichia Hedwigia Loeskeobryum*

*Calliergonella Hylocomiastrum Plagiobryum*

*Climacium Hylocomium Pleurozium*

*Dendroalsia Hypnum Rhytidiadelphus*

***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 Iwatsukiella Racomitrium*†

*Cirriphyllum Pseudobraunia Wijkia*

*Claopodium*† *Pseudoleskea*† *Zelometeorium*

*Hedwigia*

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*† *Calliergon*† *Hygrohypnum*†

*Brachythecium*† *Eurhynchium*† *Pleuroziopsis*

*Bryhnia Heterocladium*†

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

Group P15

*Brachelyma Helodium† Platylomella*

*Daltonia Hypopterygium Thelia*

*Groutiella Limbella*

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

**Group P16**

*Bestia Forsstroemia*† *Palamocladium*

*Brachythecium Hygrohypnum*† *Palustriella*

*Calliergon Isothecium Pseudoleskeella*†

*Campylium*† *Leptopterigynandrum Pseudoscleropodium*

*Clasmatodon Lescuraea Rhytidium*

*Cratoneuron Leskeella Sarmenthypnum*

*Drepanocladus Lindbergia Stereophyllum*

*Entodontopsis Loeskypnum*

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

**Group P17**

*Herzogiella*† *Hygrohypnum*† *Plagiothecium*

*Heterocladium*†

***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 Heterophyllium Pterogonium*

*Alsia Homomallium Ptilium*

*Brotherella Hygrohypnum Pylaisiadelpha*

*Callicladium Hypnum Pylaisiella*

*Calliergonella Isopterygium Rhytidiadelphus*†

*Campylium*† *Leptopterigynandrum Scorpidium*

*Donnellia Leucodon Sematophyllum*

*Entodon Platygyrium Taxiphyllum*†

*Forsstroemia*† *Pleurozium Tripterocladium*

*Gollania Pseudoleskeella*† *Wijkia*

*Herzogiella*†

***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* *Pireella*

*Anacamptodon Hygroamblystegium*† *Pseudocryphaea*

*Brachythecium*† *Leptodictyum*† *Sarmenthypnum*

*Dichelyma Lescuraea Scleropodium*

*Eurhynchium Myuroclada Trachybryum*

*[Brachelyma] [Hamatocaulis] [Palustriella]*

*[Calliergon] [Helodium] [Plagiobryum]*

*[Campylium] [Homalia] [Porotrichum]*

*[Climacium] [Hygrohypnum] [Sanionia]*

*[Conardia] [Jaegerina] [Tomentypnum]*

*[Cratoneuron] [Limprichtia] [Warnstorfia]*

*[Daltonia] [Metaneckera] [Wijkia]*

*[Drepanocladus] [Palamocladium] [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] [Platydictya]*

*[Campylium] [Hygrohypnum] [Platygyrium]*

*[Donnellia] [Hypnum] [Pylaisiella]*

*[Entodon] [Neckera] [Sematophyllum]*

*[Forsstroemia] [Neomacounia] [Tripterocladium]*

*[Heterocladium] [Plagiothecium] [Zelometeorium]*

*[Heterophyllium]*

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

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

**Group P27**

**Papillose**

*Anomodon Haplohymenium Myurella*†

*Braunia Heterocladium*† *Pseudoleskea*†

*Claopodium Leskea*† *Racomitrium*

*Haplocladium Lindbergia*†

*[Abietinella] [Cyclodictyon] [Rauiella]*

*[Hedwigia] [Cyrto-hypnum] [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*† *Myrinia*

*Bestia Leptodon Pseudoleskea*†

*Clasmatodon* *Leskea*† *Pseudoleskeella*

*Cryphaea*† *Leskeella* *Racomitrium*

*Herpetineuron Lindbergia*† *Stereophyllum*

*[Forsstroemia] [Leptopterigynandrum] [Porotrichum]*

*[Groutiella] [Macrocoma] [Racopilum]*

*[Heterocladium] [Macromitrium] [Schlotheimia]*

*[Hypopterygium] [Neckeropsis] [Thamnobryum]*

*[Isothecium] [Platylomella]*

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

*Iwatsukiella* *Pseudoleskeella* *Vesicularia*

*Myurella*†

*[Donnellia] [Hookeria] [Neckeropsis]*

*[Drummondia] [Lepidopilum] [Platydictya]*

*[Forsstroemia] [Leptopterigynandrum] [Sematophyllum]*

*[Homaliadelphus]**[Leucodon]*

# 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.