***Overview***

*Revised through 30 June 2010*

***Initial Groups ("naked-eye" characters)***

Plants essentially **leafless**, consisting of strongly **inclined**, highly **asymmetric** capsules on a *Buxbaumia*

stout **papillose** seta; the "**bug-on-a-stick**" mosses; WS\*

Plants scattered on a bed of abundant, **persistent** **protonemata**; plants & leaves small to **minute**. Group A

Plants small to **minute** (mostly <5 mm high) with +**immersed** capsules growing on bare **soil**, Group B

usually as winter **annuals**; the "**pygmy ephemerals**" as defined here.

Plants **rosulate** (leaves in a tight rosette at stem apex) and **large** (diameter 1-2 cm); WS *Rhodobryum*

Plants erect with clusters of branches (**fascicles)** along the stem & at the apex (**capitulum**); WS *Sphagnum*†

† *In part, i.e., not all of the species within this genus will key to this Group.  
 The other species will key to an appropriate Group.*

Plants from an erect, unbranched **stipe**, and either **dendroid** (tree-like) or **frondose** (fern-like). Group C

**Note** - the several mostly prostrate "fern-mosses" lacking a stipe are NOT included here,  
 but will be found in the pleurocarpous Groups below.

Plants with **pendulous** branches hanging loosely from tree branches. Group D

Plants projecting **horizontally** from vertical surfaces or with **upturned**/**curled** branch tips. Group E

Plants growing on **dung**, decaying animal matter, or other highly nitrogenous materials; Group F

the "**dung** **mosses**".

Plants **lacking** any of the above unique “growth forms”; Continued below at left margin.

Plants f**reely branched**, i.e., with leafy stems & branches; usually prostrate in wefts or mats. Groups P1 on

Mostly pleurocarpous or cladocarpous mosses, but also including an occasional  
acrocarpous moss, e.g., *Plagiobryum, Racomitrium*, *Schlotheimia* & etc.

Plants **rarely branched**, i.e., lacking obvious branching; usually erect in tufts, cushions  
or turfs. Groups A1 on

Mostly acrocarpous mosses, but also including an occasional pleurocarpous or  
cladocarpous moss, e.g., *Hedwigia*.

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

***Plant Characters Section*** *(naked eye)*

Plants strongly **flattened** (complanate) or **angular**. Group P1

Plants **julaceous** both **wet** & dry (shoots round; leaves crowded, overlapping, and appressed).# Group P2

Leaves spreading at right angles (**squarrose**) or squarrose-recurved; leaf tips often **channeled**. Group P3

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

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

Plants or leaves **lacking** any of the above unique characters; Continued below at left margin.

# ***Note*** *- many other taxa have leaves crowded & appressed when dry, but spreading when wet.*

***Leaf and Stem Characters Section*** *(hand lens)*

Plants with **paraphyllia** or **tomentum** on stems. Group P6

Plants with **red** stems. Group P7

Plants appearing “**braided**” (shoots flat on top & bilaterally symmetric; leaves falcate-secund). Group P8

Leaves **undulate** or **rugose** (irregular undulations). Group P9

Leaves **dimorphic** (2 different forms [size and/or shape] on the **same** axis).# Group P10

Leaves with **awns** or **hair points**. Group P11

Plants **thread**-**like** (stems little branched; leaves <1 mm). Group P12

Plants or leaves **lacking** any of the above unique characters; Continued below at left margin.

# ***Note*** *- many other taxa have stem leaves differing from branch leaves.*

***Costa Characters Section*** *(dissecting scope)*

Costa **double** & **more than 1/3** leaf length. Group P13

Costa **single** & **narrow**.

Leaves with distinct **decurrencies**. Group P14

Leaves with a distinct marginal **border**. Group P15

Leaves with distinct **alar cells**. Group P16

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

Leaves with distinct **decurrencies**. Group P17

Leaves with a distinct marginal **border**. Group P18

Leaves with distinct **alar cells**. Group P19

Costa of **uncommon** or **variable** form (**Y**-**shaped**; **forked**; with **lateral** spurs or Group P20  
 **supplementary** costae).

Costa **neither** double & long, **nor** of an uncommon form; leaves **lacking** any of the above unique characters; Continued below at left margin.

***Leaf Cell Ratio Section*** *(compound microscope)*

Leaf cells **long** (>8:1).

Cells distinctly **papillose** or **prorulose**. Group P21

Cells **smooth** or indistinctly ornamented.#

Costa **single**. Group P22

Costa **double** (long or short), or **none**. Group P23

Leaf cells **intermediate** (3-8:1).

Cells distinctly **papillose** or **prorulose**. Group P24

Cells **smooth** or indistinctly ornamented.#

Costa **single** (narrow or wide). Group P25

Costa **double** (long or short), or **none**. Group P26

Leaf cells **short** (<3:1).

Cells distinctly **papillose** or **prorulose**. Group P27

Cells **smooth** or indistinctly ornamented.# Group P28

# ***Note*** *- cells indistinctly papillose, i.e., low papillae or projections. An expanded explanation of the difference between "Distinct" and "Indistinct" surface ornamentation is found in the Introduction*.

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

Cell length to breadth **ratio**:

**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.

***Rarely Branched (mostly acrocarpous) Mosses***

***"Naked-eye" Characters***

Shoots **flattened** or **angular** (**2-5 ranked**) in cross-section, i.e., not round. Group A1

Shoots **julaceous** both **wet** and dry (catkin-like; leaves crowded, overlapping and appressed).#Group A2

Stems **tomentose** (densely covered by rhizoidaltomentum to near the apex). Group A3

Stems **red**. Group A4

Leaves **squarrose**-**recurved** (spreading at right angles with down-turned tips; shoots **brush-like**). Group A5

Leaves **falcate-secund** (sickle-shaped & turned to one side; shoots **broom**-**like**). Group A6

Leaves **subulate**-**setaceous** (awl, bristle, or needle-like; length to breadth 8:1 or greater). Group A7

Shoots, stems or leaves **lacking** any of the above unique characters; Continued below at left margin.

# ***Note*** *- many species have leaves crowded and appressed when dry, but spreading when wet.*

***"Hand-lens" Characters***

Leaves **finger-like** and irregularly inserted; NW. *Takakia*

Leaves **dimorphic** (2 different forms [size and/or shape] on the **same** axis). Group A8

Leaves with a distinct hyaline **hair-point** or awn on vegetative leaves.# Group A9

Leaves with **lamellae**, **ridges**, or **filaments** on their laminae or costae. Group A10

Leaves **undulate** (distinct transverse waves or ridges). Group A11

Leaves **involute** (margins distinctly incurved, inrolled, spirally inrolled or inflexed). Group A12

Leaves **lacking** any of the above unique characters; Continued below at left margin.

# ***Note*** *- some species have these hair-points only on the upper leaves; species with hair-points*

*on perichaetial leaves only will be found in other Groups.*

***"Dissecting microscope" Characters***

Leaves +**all costa**, lacking laminae; multistratose. Group A13

Leaves with a **broad**, **single** costa (>1/3 the leaf width). Group A14

Leaves with a **narrow**, **single** costa.

Leaves with bases distinctly **incurved** to **expanded** & **sheathing**. Group A15

Leaves with long, pronounced **decurrencies**. Group A16

Leaves with a defined group of **hyaline** cells that stand in distinct Group A17

contrast to densely papillose or chlorophyllose cells.

Leaves with distinct marginal **border** of differentiated cells Group A18

(ciliate; cells long, short, pale, hyaline, or thick-walled).

Leaves with distinctly differentiated **alar cells** Group A19

(cells enlarged, inflated, quadrate, thick-walled, or colored).

Leaves with **costae** extremely **reduced** to **lacking**. Group A20

Leaves **lacking** any of the above unique characters; Continued below at left margin.

***"Compound microscope" Characters***

Leaf cells **long** (>5:1).

Cells **smooth**. Group A21

Leaf cells **intermediate** in length (2-5:1).

Cells distinctly **papillose**. Group A22

Cells distinctly **prorulose**. Group A23

Cells **smooth** or indistinctly ornamented.# GroupA24

Leaf cells **short** (<2:1).

Cells distinctly **papillose**. Group A25

Cells **smooth** or indistinctly ornamented.# Group A26

# ***Note*** *- Cells bulging, mammillose (both bulging and papillose) or indistinctly papillose, i.e., low papillae. An expanded explanation of the difference between "Distinct" and "Indistinct" surface ornamentation is found in the Introduction.*

Cell length to breadth **ratio**:

**Long** cells: >5:1; commonly termed linear.

**Intermediate** cells: 2-5:1; commonly termed elongated, rectangular, hexagonal, or rhomboidal.

**Short** cells: <2:1; commonly termed isodiametric, quadrate, rounded-quadrate, or sub-quadrate.