***Overview – Hornworts & Liverworts***

*Revised through 23 July 2012*

Plants a +**flat** **plate** or **sheet** of tissue, i.e., "**thalloid**"; typically **strap**-shapedor **rosette**-like.

 Plants deep **blue**-**green** from symbiotic cyanobacteria; **1**(2) chloroplasts per cell Group H

 (except *Megaceros*); sporophytes **long** **cylindrical** with stomata & a columella

 – the "**Hornworts"**

 Plants **opaque** with internal **air** chambers or **air**-**channels**; rhizoids often "**pegged**"; Groups C1 on

 setae very **short** or **lacking** – the "**Complex** thalloid"liverworts.

Plants **translucent** and +**thalloid** (some with **irregular** leaf-like lobes); **lacking** air chambers, Groups S1 on

 air-channels or pegged rhizoids; setae very **long** – the "**Simple** thalloid" liverworts.

Plants with a distinctive **stem**, and **leaves** of a **regular** shape – the "**Leafy"** liverworts. Groups L1 on

***The "Complex" Thalloid Liverworts***

Thalli a **rosette** (or hemi-rosette) with **dichotomous** lobes; sporophytes **embedded** in thallus. Group C1

Thalli rolled into **blackish**-**purple**, **worm**-**like** tubes when dry. Group C2

Thalli with **gemmae** receptacles. Group C3

Thalli with **scales** distinctively **protruding** from below. Group C4

Thalli with air **pores** on the dorsal surface (distinct to indistinct). Group C5

Thalli **lacking** any of the above unique characteristics. Group C6

***The "Simple" Thalloid Liverworts***

Thalli an aquatic **vertical** axis with a **stair-step** like(helicoidal) **wing**; CA, NM, SD, TX *Riella*

Thalli with distinct dorsal "**flaps**"; TX *Petalophyllum*

Thalli a lobed rosette +totally **covered** with vase or urn-shaped **involucres**; WS *Sphaerocarpos*

Thalli with a distinct **midrib** & **unistratose** wings. Group S1

Thalli with a **indistinct** midrib & **multistratose** wings **thinning** to the margin. Group S2

Thalli with distinctly **wavy** or **irregular** margins. Group S3

Thalli **narrow** with **irregular**, leaf-like **lobes**. Group S4

***The "Leafy" Liverworts***

Leaves with **ciliate lobes** (+one cell in diameter) to near base or with distinctly **ciliate margins**. Group L1

Leaves **3**-**4** lobed or **toothed**. Group L2

Leaves **complicate**-**bilobed** (leaves folded into differentiated dorsal & ventral halves).

 **Dorsal** half larger (appearing incubous).

 Underleaves **readily** evident. Group L3

 Underleaves vestigial or **lacking**. Group L4

 **Ventral** half larger (appearing succubous); underleaves **lacking**. Group L5

Leaves distinctly **bilobed**, but **not** folded, i.e., plane with two similar lobes.

 Leaves with distinctly **succubous** insertion.

 Underleaves **readily** evident. Group L6

 Underleaves vestigial or **lacking**. Group L7

 Leaves with sub-transverse to **transverse** insertion.\* Group L8

 \*Lower leaves may show trend towards succubous insertion,
except for *Herbertus* which may show trend towards incubous insertion.

Leaves **unlobed** to emarginate.

 Leaves with distinctly **incubous** insertion. Group L9

 Leaves with distinctly **succubous** insertion.

 Underleaves **readily** evident. Group L10

 Underleaves obscured by rhizoids, minute or **lacking**. Group L11

 Leaves with sub-transverse to **transverse** insertion. Group L12

End.