Sub-Guide to Hornworts & "Complex" Thalloid Liverworts

*Revised through 17 May 2010*

***Group H – Hornworts***

 **Group H**

Thalli **large** (2-6 cm) & +**dichotomous** with **fimbriate**/erose margins; on **rocks** in **streams**; SC, TN *Megaceros*

Thalli **smaller** & **rosette**-like; usually **not** on rocks in streams.

 Sporophytes **short**, **fusiform**, **horizontal**, & **scarcely** exserted, thalli **small** (~1 cm); E *Notothylas*

 Sporophytes **linear**, **erect**, **exserted**; thalli **larger** (>1 cm).

 Spores **black**; thalli with +crenate-**crispate** margins, dorsal **lamellae** & **cavities**; WS *Anthoceros* Spores **yellow**; thalli with +**entire** margins; **lacking** lamellae & interior cavities; WS *Phaeoceros*

***Group C1 – Thalli rosette-like with embedded sporophytes***

 **Group C1**

Epidermal pores **conspicuous** & **stellate**; ventral scales **long**, **projecting** & **hyaline**; *Oxymitra*

 sporophytes in a dorsal, sessile, pyriform **involucre**; TX, OK, KS

Epidermal pores **obscure** & **simple**; sporophytes deeply **sunken** in the thallus.

 Plants typically **floating** with **purplish**, sword-like, serrulate ventral **scales** (**lacking** when *Ricciocarpos*

 stranded); thallus midline **distinct** to base of thallus; **oil** **cells** in epidermis; WS

 Plants **terrestrial**; thallus midline +**restricted** to apices of thalli; oil cells **lacking**; WS *Riccia*†

***Group C2 – Thalli rolled into a purple tube when dry***

 **Group C2**

Epidermis with strongly **elevated** pores & **bulging** trigones; ventral scales with a **single**, **lanceolate** *Targionia*

 appendage; air chambers in **one** **layer** with filaments; involucres apical & **clam**-**like**; W

Epidermis commonly **smooth** & **lacking** bulging trigones; ventral scales **various**; air chambers of

 thalli in **multiple** layers; carpocephala **elevated**.

 Archegonia & carpocephala arising from an **dorsal** crypt **behind** the apex; stalk of *Plagiochasma*

 carpocephala **short** & **lacking** a rhizoidal furrow; involucres +**spherical** &

 opening via a **vertical slit**; SW, TX, OZ, NC

 Archegonia & carpocephala arising from an **apical** notch; stalk of carpocephala **long** &

 with a rhizoidal **furrow**.

 Epidermal pores surrounded by **4**-**5** concentric rings of cells; thallus margins *Reboulia*

 **crenulate**; carpocephala distinctly **lobed**; WS

 Epidermal pores surrounded by **1**-**2** concentric rings of cells.

 Sporophytes **enclosed** in lanceolate, hyaline **scales** (pseudoperianth remnants); *Asterella*†

 antheridia **adjacent** to archegonia in most species; WS

 Sporophytes **not** enclosed in scales; antheridia **distant** from archegonia in most *Mannia*†

 species (often on separate thallus branches); WS

***Group C3 – Thalli with gemmae receptacles***

 **Group C3**

Gemmae receptacles **cup**-**shaped**; pores of dorsal epidermis **compound** (barrel-shaped); WS *Marchantia*

Gemmae receptacles **crescent**-**shaped**; pores of dorsal epidermis **simple**; greenhouse weed; WS\* *Lunularia*

***Group C4 – Thalli with protruding scales***

 **Group C4**

Thalli usually in **rosettes** or hemi-rosettes & with an impressed, dorsal **midline** (at least

 apically); sporophytes **sessile** or **embedded**.

 Epidermal pores **conspicuous** & **stellate**; sporophytes in a dorsal, sessile, pyriform *Oxymitra*

 **involucre**; TX, OK, KS

 Epidermal pores **obscure** & **simple**; sporophytes deeply **sunken** in the thallus; WS *Riccia*†

Thalli **not** in rosettes & **lacking** a dorsal midline; sporophytes in an **elevated** carpocephalum.

 Archegonia & carpocephala arising from an **apical** notch; epidermal pores **simple**;

 **oil cells** present.

 Sporophytes **enclosed** in lanceolate, hyaline **scales** (pseudoperianth remnants); *Asterella*†

 antheridia **adjacent** to archegonia in most species; WS

 Sporophytes **not** enclosed in scales; antheridia **distant** from archegonia in most *Mannia*†

 species (often on separate thallus branches); WS

 Archegonia & carpocephala arising from an **dorsal** crypt **behind** the apex; epidermal *Athalamia*

 pores +strongly **stellate**; oil cells **lacking**; A/A, AZ, TX

***Group C5 – Thalli with dorsal air pores***

 **Group C5**

Polygonal surface areolation strikingly **obvious** to the naked eye; pores **simple** & on *Conocephalum*

 **elevated**, **white** cones composed of **4-5** rings of cells; **2** rows of ventral scales with

 a **kidney**-shaped appendage; carpocephala **cone**-shaped; WS

Polygonal surface areolation **evident** with a hand-lens.

 Ventral scales in **4** rows & appendiculate; pores **barrel**-shaped & composed of *Marchantia*

 **4-7** rings of cells; antheridial disk **stalked**; carpocephala deeply **lobed**;

 **circular** gemmae **cups** common; WS

 Ventral scales in **2** rows.

 Ventral scales **purple** & **appendiculate**.

 Pores **barrel**-shaped, composed of **4-5** rings of cells & **cruciate**.

 Air chambers of thallus **multilayered** & **lacking** filaments; NW *Bucegia*

Air chambers of thallus in **one** layer with **filaments**; WS *Preissia*

 Pores **stellate** & surrounded by **1** ring of cells; carpocephala **lobed**; A/A *Peltolepis*

 Ventral scales **hyaline**.

 Ventral scales **appendiculate**; pores **simple** & surrounded by **4-6** rings of cells.

 Thallus wing **thin**, **undulate** & **plane** (dry); carpocephala +**flat**; WC *Cryptomitrium*

 Thallus wing **thick**, **plane** & +**incurved** (dry); **crescent** shaped *Lunularia*

 gemmae **cups** common; escapes from **greenhouses**; WS\*

 Ventral scales **lacking** appendages; pores **stellate** & surrounded by *Sauteria*

 **1** ring of cells; carpocephala deeply **lobed**; A/A

 Ventral scales **scattered**, **small** & with a **filamentous**, **ephemeral** appendage; *Corsinia*

 pores **simple** & surrounded by **1-2** rings of **slightly** modified cells;

 sporophytes **sessile** on thallus; TX, LA

Polygonal surface areolation **indistinct**; ventral scales in **2** rows, **appendiculate** & +**purple**.

 Archegonia & carpocephala arising from an **dorsal** crypt **behind** the apex; stalk of *Plagiochasma*

 carpocephala **short** & **lacking** a rhizoidal furrow; involucres +**spherical** &

 opening via a **vertical slit**; SW, TX, OZ, NC

 Archegonia & carpocephala arising from an **apical** notch; stalk of carpocephala **long** &

 with a rhizoidal **furrow**.

 Pores simple & surrounded by **4-5** rings of cells with +**thickened** radial walls; *Reboulia*

 thallus margins **crenulate**; carpocephala divided into **discrete** lobes; WS.

 Pores simple & surrounded by **1-2** rings of cells with **thin** radial walls;

 carpocephala +**unlobed**.

 Capsules surrounded by a **pendant**, **white** skirt of **lanceolate** segments; WS *Asterella*

 Capsules **lacking** a white skirt; WS *Mannia*

***Group C6 – Thalli lacking the above characteristics***

 **Group C6**

Plants primarily **floating** (may be stranded); thalli **linear** & freely **dichotomous**; epidermal *Riccia*†

 pores, air chambers & ventral scales usually **present**; WS

Plants **terrestrial**; thalli **leathery** & broadly **strap**-**shaped** with stiff marginal **hairs**; epidermal *Dumortiera*

 pores, air chambers & ventral scales vestigial to **lacking**; E

End.