

# BRYOPHYTE PHYLOGENY POSTER

## Systematics and Characteristics of Nonvascular Land Plants (Mosses, Liverworts, Hornworts)



**BRYOPHYTE PHYLOGENY POSTER**

**TRACHEOPHYTE PHYLOGENY POSTER**

**ANGIOSPERM PHYLOGENY POSTER**

**Liverworts**

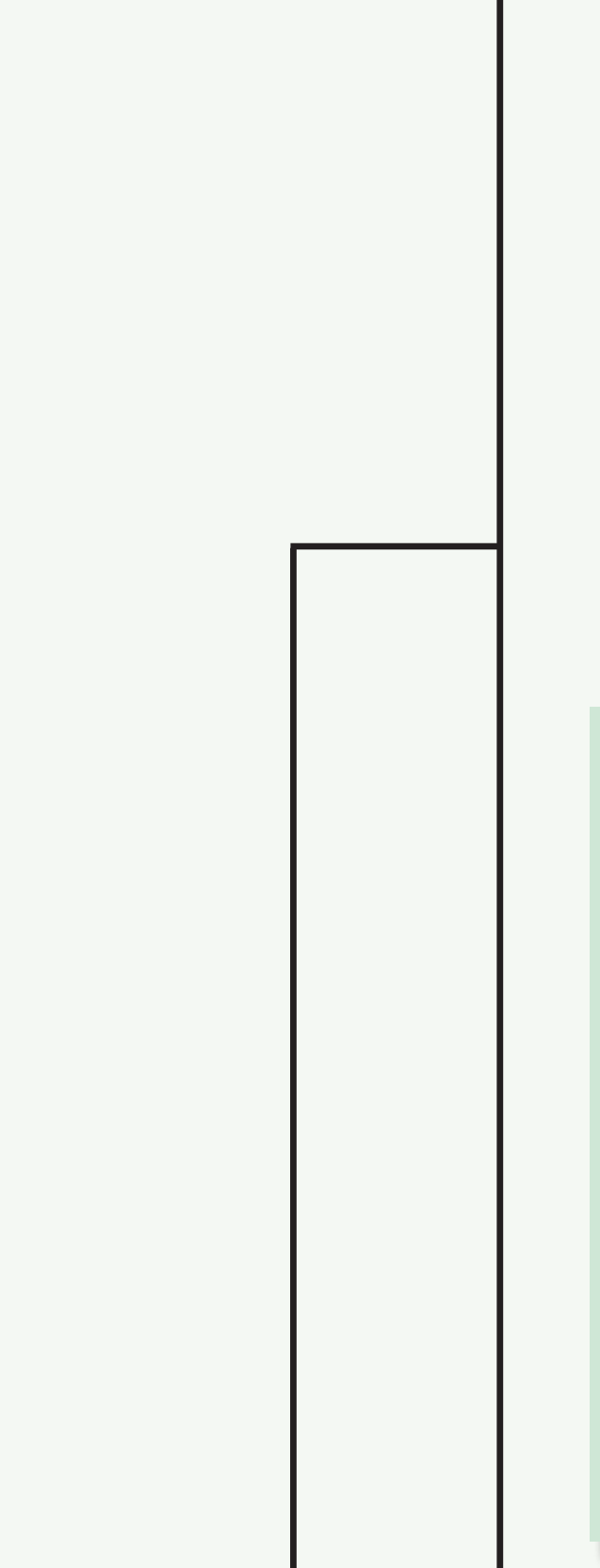
**MARCHANTIOPHYTA**

thallose or foliose rhizoids + oil bodies + perforated water-conducting cells + mycophilous with endophytic Glomeromycota + gametangial protective structures + gametangial ontogeny without apical cells + blepharoplast: plastid and associated posterior mitochondrion positioned at cell terminus + zygote division transverse; epi- and hypobasal cells + CAP without columella + elaters (unicellular) + stomata - ca. 5,000 spp. + lunularic acid

**Mosses**

**BRYOPHYTA**

protonema thallose; plant foliose + lvs cells parenchymatous + rhizoids multicellular + mycorrhiza - gametangial ontogeny with apical cells + blepharoplast: plastid and associated posterior mitochondrion positioned along inner nuclear surface + occurrence of stray microtubules + CAP with PS and columella + elaters - stomata on S ca. 13,000 spp.



**Anthocerotales**

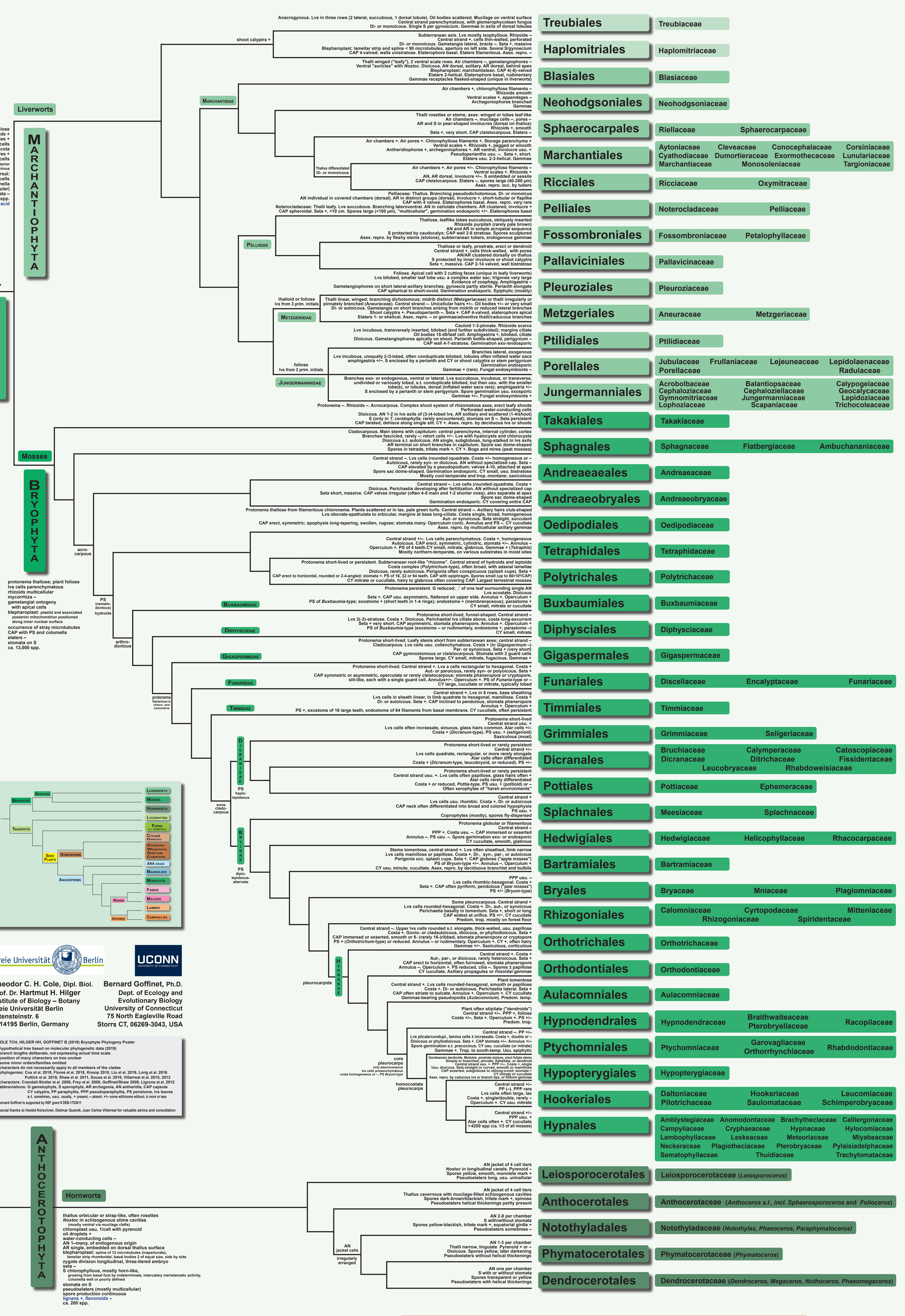
**Anthocerotophyta**

thallus orbicular or strap-like, often rosettes + Nostoc in schizogenous slime cavities (mostly ventral, mucilage ducts) + chloroplast usu. ficell with pyrenoid oil droplets + water-conducting cells - AN 1+ many, of endogenous origin + AR single, embedded on dorsal thallus surface + blepharoplast: spine of 12 microtubules (parapertine), lamellar strip monomodal, basal bodies 2 of equal size, side by side + zygote division longitudinal, three-tiered embryo + seta - S chlorophyllous, mostly horn-like, growing from basal foot by indeterminate, intercalary meristematic activity, columella well or poorly defined + stomata on S + pseudolaters (mostly multicellular) + spore production continuous + lignans +, flavonoids - ca. 200 spp.

**Hornworts**

thallus orbicular or strap-like, often rosettes + Nostoc in schizogenous slime cavities (mostly ventral, mucilage ducts) + chloroplast usu. ficell with pyrenoid oil droplets + water-conducting cells - AN 1+ many, of endogenous origin + AR single, embedded on dorsal thallus surface + blepharoplast: spine of 12 microtubules (parapertine), lamellar strip monomodal, basal bodies 2 of equal size, side by side + zygote division longitudinal, three-tiered embryo + seta - S chlorophyllous, mostly horn-like, growing from basal foot by indeterminate, intercalary meristematic activity, columella well or poorly defined + stomata on S + pseudolaters (mostly multicellular) + spore production continuous + lignans +, flavonoids - ca. 200 spp.

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COLE TCH, HILGER HH, GOFFINET B (2019) Bryophyte Phylogeny Poster

- hypothetical tree based on molecular phylogenetic data (2019)
- branch lengths deliberate, not expressing actual time scale
- position of many characters on tree unclear
- some minor orders/families omitted
- characters do not necessarily apply to all members of the clades
- phylogenies: Cox et al. 2010, Flores et al. 2018, Klopp 2010, Liu et al. 2019, Long et al. 2016
- Puttick et al. 2018, Shaw et al. 2011, Sousa et al. 2018, Villarreal et al. 2010, 2012
- characters: Crenaldi-Stotter et al. 2009, Frey et al. 2009, Goffinet-Shaw 2009, Lignone et al. 2012
- abbreviations: G gametophyte, S sporophyte, AR archegonium, AN antheridia, CAP capsule, CY calyptra, PP paraphysis, PPP pseudoparaphysis, PS peristome, lvs leaves s.l. sometimes, usu. usually, + present, - absent, +/- some with/without, 0 zero or less

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Vascular Plants See Tracheophyte and Angiosperm Phylogeny Posters