

Bryophyte Identification: 5-day Course

July 25 – 29, 2022 Highlands Biological Station

Synopsis

The Southern Appalachians are an area of high bryophyte diversity, and this workshop will introduce students to common and some rare mosses, liverworts, and hornworts of the region. The class will survey bryophyte diversity by visiting and sampling from a variety of habitats in the vicinity around Highlands, NC. Laboratory work will involve extensive use of microscopes, and identifications will rely on microscopic characters and use of dichotomous keys. Students will explore diagnostic features for bryophyte identification and learn common taxa in the field and closeup using microscopes. Lectures will cover differences among mosses, liverworts, and hornworts as well as morphological features used to distinguish bryophyte taxa. No prior bryology experience or studies are necessary to take the course, though students should be willing to work with microscopes and use diagnostic keys for identification in the lab. The course is geared towards botanists, natural resource professionals, naturalists, and students. Prerequisites: a botany, plant science, or plant taxonomy course or permission of instructor.

Course learning objectives: Students will...

- Become familiar with bryophyte structures and morphology
- Distinguish liverworts, mosses, and hornworts
- Identify common bryophyte taxa in the field and lab
- Practice bryophyte ID skills and microscopy
- Use dichotomous keys to make generic level determinations
- Explore the Southern Appalachian bryophyte diversity by visiting several distinct habitats

What to bring

10X hand lens or better is a must. Please come prepared for field trips and some moderate hiking. Equipment such as a broad-brimmed hat, raingear, sturdy shoes or hiking boots, and a water bottle will be necessary. A day pack for carrying collecting materials, samples, and all the stuff above will be very useful too. A pocket knife or blade is extremely helpful for collecting tightly appressed bryophyte specimens. Bring along anything else you will need during field outings to make you safe and comfortable, including bug spray, sunscreen, extra clothing, and snacks. Students are responsible for lunches and should be prepared to bring their own lunch for long field trips. We will have a break for lunch while working at HBS.

Reference Materials

Students will be provided handouts that cover bryophyte taxonomy, comparative morphology and structures, taxa lists, and dichotomous keys. We will have at least two copies of essential taxonomic references: *Mosses of Eastern North America* (Crum and Anderson 1981) and *Guide to the Liverworts of North Carolina* (Hicks 1992) for use in class and lab. Students are encouraged to explore field guides and use them to supplement course materials. Several online reference are available for free on the internet and are listed below along with suggestions for printed reference materials.

Suggested Online References

Dr. Paul Davison produced A Trailside Guide to Mosses and Liverworts of the Cherokee National Forest. <http://www.southernappalachianbryophytes.org/filespdf/ATrailsideGuidetoMossesandLiverwortsoftheCherokeeNationalForest2008.pdf>

Dr. Davison has also created a website that highlights an array of rare Southern Appalachian bryophytes and shows diagnostic features with excellent photographs.

<http://www.southernappalachianbryophytes.org/About.html>

The Flora of North America project has been making great headway with a complete flora of North American bryophytes north of Mexico. Volume 27 and 28 cover mosses, and Volume 29 is in prep and covers liverworts. Both Volume 27 & 28, and the completed portions of Volume 29 are available at the website below: <http://www.mobot.org/plantscience/BFNA/SUMMARY.htm>

In-print

Many printed references are available for mosses and liverworts and are essential materials for those seriously considering bryophyte identification. There are several comprehensive works that cover the eastern U.S. and even a few works specifically for our southeastern region. Some regional guides outside the southeast are also useful for identifying Southern Appalachian bryophytes given their broad ranges and the overlap between the regions' floras.

- Mosses of Eastern North America (Crum and Anderson 1981)
- Guide to the Liverworts of North Carolina (Hicks 1992)
- Common Mosses of the Northeast and Appalachians (Karl B McKnight, Joseph R. Rohrer, Kirsten McKnight Wards and, Warren J. Perdrizet 2013)
- Mosses of the Great Lakes Forest (H. Crum 1983)
- Maine Mosses: Sphagnaceae-Timmiaceae (Memoirs of the NYBG) (Bruce Hampton Allen 2006)

Course Schedule – subject to change depending on weather and access

July 25 – Introduction to bryophytes: The class will review the phylogeny of bryophytes and examine the three groups and their differences: Musci, Hepaticae, and Anthocerotae. We will examine bryophyte morphology and anatomical structure and familiarize ourselves with relevant terminology by working with specimens in the lab. Introductory field collecting and species ID in lab at HBS.

July 26 – Field exploration of significant habitats on HBS grounds – potential collecting sites include wetlands, moist outcrops, mature trees, and stream banks. Work on ID of collected material in the lab.

July 27 – Visit Glen Falls Natural Area – We will visit rocky creeks, spray cliffs, moist acidic outcrops, and grottoes. As time allows, we will collect material and review specimens in lab following the field trip.

July 28 – Morning: field/lab exercise – arboreal bryophytes --- Afternoon: field trip to Scaly Mountain. Key habitats include rocky seeps and granitic outcrops.

July 29 - Morning: Lab exercises & ID practice quiz – Afternoon field trip to see *Nothoceros (Megaceros) aenigmaticus* – rare hornwort