

OBELISK

Ohio Bryology et Lichenology, Identification, Species, Knowledge

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Ray Showman and Janet Traub, Editors

ray.showman@gmail.com, j.traub@att.net

This issue of OBELISK is dedicated to Don Flenniken, who passed away on October 20, 2012 after a short illness. Don was a charter member of the OMLA and was the originator of OBELISK. He was the author of *The Macrolichens in West Virginia* and co-author of *The Macrolichens of Ohio*. He submitted numerous articles as well as clever poems to OBELISK. Don will be remembered for his friendship, generosity and willingness to help anyone who was interested in lichens. Don was always a teacher. He had already submitted several articles for this issue of OBELISK before his death, including the following LEFT HAND CORNER. It seems very appropriate.

LEFT HAND CORNER

One may never know of the influence we have on another somewhere in the days gone by. Some of us have been lucky... even after several years have passed. And so it was with me.

For several years after graduating high school, I was a substitute milk truck driver in Steubenville, allowing regular drivers to have a weekly day off and an annual vacation. Among the regular customers were parents of a young lad, about 11 years old at the time that always seemed interested in bugs (insects) of some kind.

I had long enjoyed the out of doors and the natural world, so one Sunday I picked up this young fellow and brought him to my house to see my collections: salamanders in olive bottles, squatty frogs and toads in jelly glasses, coiled snakes in Mason jars, mammal skins and skulls in cardboard boxes, insects and butterflies in cigar boxes, and plants in loose-leaf notebooks. So it was back in 1956, or thereabout.

No more thought was given to that incident until 2001 when, spending the summer in Rhode Island, I received an e-mail asking if I had ever driven milk truck in Steubenville, Ohio in the 1950's. It went on to reiterate what is described above that one Sunday afternoon.

Longer story, shorter.... That e-mail was from the Director of The Ohio Academy of Science -- Brian Armitage -- who was that 11 year old, and he wanted me to know how I had influenced his life over the years.

Let this be a lesson to each of us.

- **Don Flenniken**

Equipped with his five senses, man explores the universe around him and calls the adventure Science. ~Edwin Powell Hubble, *The Nature of Science*, 1954

***HYPERPHYSICIA CONFUSA* -
NEW LICHEN FOUND IN OHIO**

Then we gather, as we travel
bits of moss and dirty gravel,
and we chip off little specimens of stone;
And we carry home as prizes,
funny bugs of handy sizes,
just to give the day a scientific tone.

-Charles Edward Carryl-

And so it was that day in June 2011 during the OMLA Summer Foray into Defiance County, Ohio that I brought home lichen specimens 'just to give the day a scientific tone' from several cemetery headstones and trees.

Among those identified I set aside two samples of what I called, with some reservation, *Hyperphyscia adglutinata*. I later determined each needed a second opinion to be sure of their identity before adding to the list of species to be submitted to OBELISK. Dr. Theodore L. Esslinger, specialist in the lichen family Physciaceae, North Dakota State University, agreed to examine them.

His response expressed his interest since he and two colleagues were currently studying the species in the genus *Hyperphyscia* and he found these Ohio specimens matched their newly described species named *Hyperphyscia confusa* Essl.

Hyperphyscia adglutinata is a fairly common species found from New England to Florida, westward into the central prairies (with a disjunction, to California). *Hyperphyscia confusa* appeared to be mostly confined to the central prairies from Texas northward into Canada and eastward to only western Michigan, Iowa, and Missouri. The Ohio material extended this range, at least, into western Ohio.

Hyperphyscia adglutinata is a closely attached, gray-brown species, with mostly laminal, orbicular soralia, usually found on twigs and smooth bark where it easily blends in with its substrate and is often overlooked. *Hyperphyscia confusa*, on the other hand, is less closely attached, often with lobe tips ascending, usually lighter in color, with mostly marginal, crescent or lip-shaped soralia (if laminal, the soralia are more irregular in shape than that of *H. adglutinata*), and usually found on rough bark.

Voucher specimens of *H. confusa* are being deposited in the Herbarium at the Museum of Biological Diversity (OSU). I wish to thank Dr. Esslinger for his determinations and Cynthia Dassler for deposition the vouchers.

- Don Flenniken

**OMLA 2012 SUMMER FORAY –
FAYETTE COUNTY**

The 2012 Summer Foray was held in Fayette County on June 9. The outing was attended by 17 members, including 5 students (see the last page of this OBELISK for a group photo). Fayette County lies wholly within the glaciated portion of Ohio and land use is mostly agricultural with only scattered woodlots. Like most of Ohio's agricultural counties, Fayette has been rather sparsely collected, with only 21 macrolichens and 13 bryophytes reported.

Two areas were visited on the Foray. In the morning, the group collected along Paint Creek at Rockbridge Road. This was a disturbed, wooded riparian corridor with some groundwater seeps. Fairly mature trees at the edge of the woods provided good lichen habitat.

The afternoon site was a portion of Eyman Woods, a fairly mature Elm-Ash swamp forest with some burr oak. A remnant oak savanna was also visited. Lichen habitat consisted of sunny trees along the west and south edge of the woods. In addition to these sites, lichens were also collected at Eyman Park in Washington Court House, and at several area cemeteries.

A total of 33 lichen species were recorded for Fayette County during this Foray. This included 24 new county records. Most were common species, but one deserves note. *Punctelia borreri* is a rare lichen, recorded in only 4 counties since 1965. This was seen in relative abundance on White Ash trees on the south edge of Eyman woods.

A total of 33 mosses and two liverworts were recorded for Fayette County. Twenty-three of these are new county records. Of the 13 previously reported mosses, only *Leptodictyum humile* was not recollected during the foray.



Punctelia borreri closely resembles *Punctelia caseana* (formerly called *P. subrudecta*), but with a black undersurface. Photo by Ray Showman

Lichens Observed in Fayette County **N = New County Record**

Caloplaca feracissima N
Candelaria concolor N
Canoparmelia crozalsiana N
Flavoparmelia caperata
Flavopunctelia soledica N
Hyperphyscia adglutinata N
Hyperphyscia confusa N
Lecanora dispersa N
Myelochroa aurulenta N
Parmelia sulcata N
Parmotrema hypotropum N
P. stuppeum N
Phaeophyscia cernohorskyi N
P. ciliata
P. hirtella
P. pusilloides N
P. rubropulchra N
Physcia adscendens
P. americana
P. millegrana
P. stellaris
Physciella chloantha N
Physconia detersa N
Punctelia bolliana N
P. borreri N
P. caseana N
P. missouriensis N
P. rudecta
Pyxine subcinerea N
Scoliciosporum umbrinum N
Trapeliopsis flexuosa N
Xanthomendoza ulophyllodes
X. weberi N

Mosses Collected in Fayette County **N = New County Record**

Mosses
Amblystegium serpens
Amblystegium varium
Anomodon attenuatus N
Anomodon minor N
Atrichum angustatum N
Atrichum altecristatum N
Barbula unguiculata N

Brachythecium laetum N
Brachythecium salebrosum N
Bryum argenteum N
Climacium americanum N
Entodon seductrix
Eurhynchium hians
Eurhynchium pulchellum N
Fissidens bryoides N
Fissidens taxifolius N
Haplocladium microphyllum
Haplohymenium triste N
Hygroamblystegium tenax N
Leptodictyum riparium
Leskea gracilescens
Leucodon julaceus N
Orthotrichum ohioense N
Orthotrichum pusillum N
Physcomitrium pyriforme N
Plagiomnium cuspidatum
Platygyrium repens
Rhynchostegium serrulatum
Schistidium apocarpum N
Sematophyllum adnatum N
Syntrichia papillosa
Taxiphyllum taxirameum N
Thuidium delicatulum

Liverworts

Frullania eboracensis N
Lophocolea heterophylla N

- Barbara K. Andreas and Ray Showman

WANTED (ALIVE)!

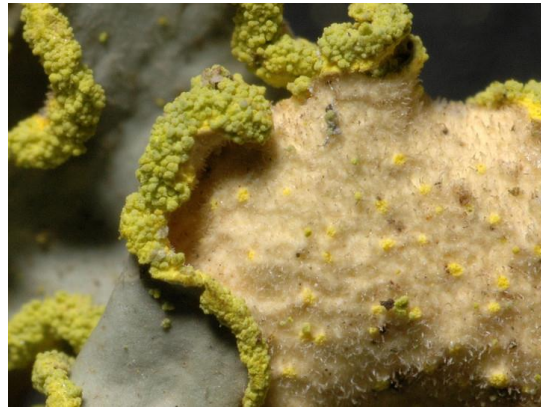
SPECKLEBELLY LICHEN

There are two species of *Pseudocyphellaria*, Specklebelly Lichen, which could be present in Ohio. The common name refers to the pseudocyphellae dotting the lower surface. There is a very old Ohio record (Lea collection, Hamilton County, 1839) for *Pseudocyphellaria aurata*. This is a large, chocolate-brown (bluish-green when wet) lichen with a bright yellow

medulla and yellow soredia. If you see this, you know it is something unusual! Its distribution is the southeastern US where it is uncommon. It is considered extirpated from Ohio.



Pseudocyphellaria aurata. Photo by Leif Stridvall



The lower surface of *P. aurata*, showing the yellow pseudocyphellae. Photo by Leif Stridvall

A close relative, *Pseudocyphellaria crocata*, also has yellow soredia, but has a white medulla and different chemistry. Its distribution is the eastern boreal forest, Smoky Mountains and the western coastal forest. Both species prefer moist, mature forest and are probably good indicators of old growth forest.

To locate either of these in Ohio would be a major find. So be on the lookout, you never know what you might see.

- Ray Showman

WHERE MOSSES GROW

In cracks in cement, plants of *Bryum argenteum* grow; its silvery sheen and small size make it easy to know.

Nutrients carried by water dripping down tree trunks nourish *Platygyrium repens* hiding in bark fissures where it flourishes.

Under oaks in dry soil, *Leucobryum glaucum* abounds, and with it dark green tufts of *Dicranum scoparium* are found. *Anomodon attenuatus* skirts hardwood tree trunks up three feet, while a cousin *A. minor* and others make the bark flora complete.

Hedwigia, *Schistidium*, and more, prefer sunny dry rocks, either sandstone or limestone but usually slump blocks. Identifying mosses using keys can sometimes be strenuous, but learning mosses by habitat makes identification less treacherous.

- **Barbara K. Andreas**

CRUSTOSE LICHENS IN OHIO

Most OMLA members are aware of the macrolichens, those foliose and fruticose species found on bark, rock and soil throughout the state. However, there is a more obscure group of lichens – the crustose lichens, sometimes also called the microlichens.

These lichens are crust-like and are very tightly appressed to the substrate. Morphologically, they have an upper surface, but no lower surface. The lower part of the crustose thallus is an integral part of the substrate. Some species have a stratified arrangement of upper cortex, photobiont layer and medulla, while others may lack these definable layers. Some species are leprose, consisting entirely of powdery particles or granules.

Some species of microlichens are surrounded by a prothallus, a ring of unlichenized fungi which grows slightly ahead of the lichen.



Mosaic of crustose lichens on a tombstone. Photo by Ray Showman

While only a few species of macrolichens routinely exhibit apothecia, the opposite is true for almost all of the microlichens. The leprose species are a major exception (see THE DUST LICHENS, by Don Flenniken in the 2011 OBELISK). For nearly all the others, the taxonomy is based primarily on characteristics of the apothecia and spores.

Microlichens typically grow on tree bark, old wood, native rock and most types of masonry. Almost all sidewalks more than several years old are densely populated with two or more crustose species. These are so tiny as to be almost invisible, but they are more apparent when the sidewalk is wet. In extreme environments, for instance Antarctica, some microlichens are almost wholly contained within rocks. These are called endolithic lichens. Microlichens are rare on soil, which is generally not a stable enough substrate for the lichen to develop.



Crustose lichen and moss competing for space on a sandstone boulder. Photo by Ray Showman

The microlichens are admittedly more difficult to work with than the macrolichens. Specimens must be taken as a portion of the substrate with the crustose lichen *in situ*. This pretty well eliminates collection of specimens from buildings, monuments and tombstones. It also leads to the curation of large and awkward packets for the preservation of a very tiny lichen.

Identification requires hand sections of the tiny apothecia and examination and measurement of the ascospores with a compound microscope. However, with study and practice the identification of microlichens can be mastered. One of us (Don) has been working on the microlichens since about 2001 when he took a course on microlichen identification from Ernie Brodo at Humboldt Institute at Eagle Hill, ME.

John Wolfe did some early work with Ohio crustose lichens (ca. 1940) but they have been largely neglected until Don took up the reins recently. The Tuckerman Workshop held in southern Ohio in 2006 also added a number of new microlichen records.

Don has prepared a microlichen checklist (Crustose Lichens Reported from Ohio – An Ongoing Compilation, April, 2009) which is available on the OMLA website. This lists 247 crustose, squamulose and dwarf fruticose species and the counties where they have been found. The distributions of these species are still very poorly known, but the checklist serves as a base for future work.

So the next time you are out looking for mosses or macrolichens, keep an eye out for the crustose lichens. You might be surprised what you find!

- **Ray Showman and Don Flenniken**

TO THE OHIO MOSS AND LICHEN ASSOCIATION!

In Ohio we have a little group,
we meet several times a year;
we look at lichens and bryophytes,
or other things that might appear!

Our needs are fairly simple,
a place to walk and see;
a lens, a scope, some chemicals,
and a taxonomic key!

We come from varied walks of life,
a few from centers of learning;
but most are simply amateurs,
who quench their desire burning!

We've found many county records,
a few new for the state;
we always have a lot of fun,
can't wait for the next Foray date!

Our name is very descriptive,
but too long to put in rhyme;
so we simply say O-M-L-A,
or Ohm-La most of the time!

- **Ray Showman**

USING BRYOPHYTES TO ASSESS WETLAND QUALITY

We have had an opportunity to start a bryophyte project as part of our work in wetland ecology research in the Division of Surface Water, Ohio Environmental Protection Agency (Ohio EPA). The bryophyte work is included within the larger National Wetland Condition Assessment (NWCA) project. As part of this larger project, Ohio EPA is looking at 50 wetlands over a 4 year period (2011-2014). Funding is through a couple of US EPA grants. The purpose of the study is to prepare a scorecard of wetland condition for Ohio.

The study is looking at different aspects of wetlands including: vegetation, soils, water quality, and wetland buffer analysis. Along with the NWCA field sampling protocols, each wetland is also being assessed using Ohio EPA's wetland monitoring procedures. The Ohio Rapid Assessment for Wetlands (ORAM) is a level 2, or rapid field procedure for placing a wetland in one of three broad categories of ecological quality (category 1 = poor, category 2 = fair to good, and category 3 = excellent). A more detailed level 3 analysis of the plant community (the Vegetation Index of Biotic Integrity [VIBI]) is also being performed to evaluate the ecological integrity of each wetland. The VIBI assigns a score between 0 and 100 to each wetland, based on 10 separate metrics related to the overall ecological quality of the plant community.

In addition to the above, we have had the opportunity to include bryophytes in the study. We are exploring what additional information bryophytes can tell us about wetlands. More specifically we are seeing if bryophytes can also be used as indicators of different types of wetlands similar to how vascular plants are currently used. If so, that would be quite useful, as vascular plants have only a small window (~mid-June to mid-September) when they can be evaluated vs. bryophytes which can be looked at and collected essentially the entire year.

A preliminary look at the literature shows that bryophytes have been considered as biological indicators in other ecological settings (e.g. old growth forests, small headwater streams). There also has been some literature discussing bryophytes as an indicator for whether an area is a wetland or not.

At each wetland site there are five 100 m² plots set up for collecting data (plants and soil). These plots are also used to study bryophytes. Different substrates are identified for each plot and then each substrate is carefully studied with different bryophytes collected and coverage estimated for each substrate.

In Ohio, we are fortunate to have a state Floristic Quality Assessment Index (FQAI) document for the moss flora, in addition to the vascular plant species. The FQAI is an index that uses characteristics of a plant community for a given area and provides an estimate of the quality of the plant community. A key component of the FQAI is the Coefficient of Conservatism (C of C) values assigned to different species. The C of C value is a number between 0 and 10 assigned to individual plant species by a panel of experts with knowledge of the native flora. Plant species with high C of C values typically occur in high quality habitats, while species with low C of C values occur in a

wide variety of conditions and generally are highly tolerant of disturbance. The FQAI is determined by summing the sensitivity, or Coefficient of Conservatism values for each species and dividing by the square root of the total number of species. For further details refer to: *Andreas, Barbara K., John J. Mack, and James S. McCormac. 2004. Floristic Quality Assessment Index (FQAI) for vascular plants and mosses for the State of Ohio. Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus, Ohio. 219 p.* One can view it on line at: http://www.epa.ohio.gov/portals/35/wetlands/Ohio_FQAI.pdf.

Since the Ohio FQAI manual provides us a means to generate a site Moss FQAI score as well as a vascular FQAI score (because it contains C of C scores for mosses as well as vascular plants) it can potentially be used to determine the quality of the moss community in the same way as it is done for vascular plants. We are also collecting liverworts, although at this time, we do not have C of C scores for them, as we do for mosses. So far 30 sites have been studied. To date, the bryophyte identification is complete for six of these sites. Results are shown below:

Site	ORAM Score	VIBI Score	No. Moss Spp.	Moss FQAI
NWCA-OH-3020 ¹	21.5	13	0	0
NWCA-OH-3005 ²	31	17	7	6.80
NWCA-OH-3057 ³	58	23	12	9.00
NWCA-OH-3003 ⁴	42	40	15	11.10
NWCA-OH-3019 ⁵	64	61	22	15.35
NWCA-OH-3014 ⁶	76	77	23	16.47

1-Medina Co., 2-Fairfield Co., 3-Wayne Co., 4-Tuscarawas Co., 5-Richland Co., 6-Jefferson Co.

Our results for bryophyte sampling are still preliminary, as we only have the mosses identified for the 6 sites I have displayed in this table. For each site, you can see ORAM (a rapid assessment method for showing class of wetlands), and VIBI (vegetative index of biological integrity, which is indicative of the wetland quality), as well as what has been determined for the bryophyte community.

Preliminary results show that degraded wetlands are often dominated by a few bryophyte species that are pioneering in nature and have low C of Cs, whereas higher quality, more mature wetland systems have significantly higher numbers of bryophyte species, as well as species with higher C of Cs. This is indicative of much more stable habitat. Even though only 6 of our 50 random assessment areas have been completed for the bryophyte portion of the study, it is interesting to note that moss diversity seems to be corresponding relatively closely to the VIBI score (which is an index of the vascular plant community, in which the FQAI is a major component). Whether or not this holds up as the study continues remains to be seen. However, with bryophytes having a considerably different growth pattern and morphology than vascular plants in wetlands, and occupying many niches not colonized by vascular plants, it is very likely that studying them will provide ecologically important insights into the nature of wetlands that we would not otherwise recognize.

The biggest constraint for this project is time. In our work in wetland ecology, we have four or five projects in different phases at the same time. That leaves us in somewhat of a

bind in finding enough time for proper literature review, specimen identification, results analysis, etc. Fortunately, we've had some very good interns doing some of the basic sample preparation and data entry. We think this is a very worthwhile project, and we don't know of anyone else doing similar work. If any members of OMLA are interested in assisting with the specimen identification portion of the project, we would love to hear from them! Bryophytes are a ubiquitous part of wetland ecosystems, but their study in wetland ecology has been largely neglected. This study is valuable in addressing this situation.

We would like to thank Barb Andreas and Cynthia Dassler for assistance in working through some of the details of setting up this study.

- Brian Gara and Bill Schumacher

IS THIS A PINK LICHEN?

Pink is for bubble gum, Barbie dolls and lipstick, but a pink lichen?? The genus *Dibaeis* has two species in North America and both are found in Ohio. These are fruticose lichens with a cladoniform structure. They have a primary thallus which is crustose and upright podetia (the fruticose part) which bear the pink apothecia.



Dibaëis baeomyces growing on clay soil with moss. Photo by Ray Showman

Dibaëis baeomyces (Pink Earth Lichen) has been reported from 15 counties scattered in southern Ohio with a couple old records in northeastern counties. It grows on clay banks along roadsides or in open woods and is not common or abundant anywhere. The podetia are usually around 1 cm tall with bright pink, spherical apothecia. The whitish

gray primary thallus is crustose and somewhat granular.

Dibaëis absoluta (Pink Dot Lichen) is recorded from 6 counties in southeastern Ohio and has been placed on the Ohio Rare Plant List. Brodo (Lichens of North America) considers it a rare East Temperate species. This lichen grows on moist sandstone in open forest or sometimes along roadsides. The crustose primary thallus is a light greenish color and the flattened apothecia are borne on stalks so short that the entire lichen appears to be crustose.



Dibaëis absoluta on sandstone. Photo by Ray Showman

So the next time you are out botanizing, look for these interesting lichens and maybe find a new county record.

- Ray Showman

WANTED – (ALIVE)!

Pogonatum brachyphyllum

Pogonatum (Polytrichaceae) is a genus that includes mosses that have persistent protonemal mats, with seasonally appearing leafy plants and sporophytes. It's best recognized in the spring of the year. The most common species in Ohio is *Pogonatum pensilvanicum*, which is common on clayey, shaded road and stream banks, upturned root-balls of downed trees, and a variety of shady habitats that have been recently disturbed by erosion or disturbance. The plant is about 2-3 mm high, and has a slightly reddish appearance.



Pogonatum brachyphyllum on substrate

In Ohio, there are three historical collections. The first record is from 1940, collected by Robert Wareham in Neotoma (now Clear Creek Metro Park) in Hocking County. It was collected again in Hocking County in 1960 by Floyd Bartley at Conkle's Hollow. Bartley had also collected it in Jackson County in 1950. The label reads "collected in an old field 1/2 mile W of Big Rock, Liberty Twp."

In 2011, when Ray Showman and I were collecting along a moist, open, sunny, SW-facing sandstone cliff paralleling a township road in Vinton County, we found *Pogonatum brachyphyllum*. It

was scattered randomly on the rock surface.



Pogonatum brachyphyllum individual plants

Pogonatum brachyphyllum should be sought throughout southeastern Ohio on similar cliffs. It would be easy to ignore it, thinking that it is a small, isolated rosette of a young *Atrichum*.

- **Barb Andreas**

2012 FALL FORAY: MONROE COUNTY, OHIO

Monroe County, "the Switzerland of Ohio," is located in the southeast part of the state, along the Ohio River. It comprises 457 square miles of rolling land, mostly wooded, with altitudes up to 1,400 feet. The bedrock is from the Permian and Pennsylvanian periods, and consists largely of shale, siltstone, mudstone, sandstone and limestone. Our foray to the county was held October 6 and 7, 2012. We visited three main sites. In addition, lichens were collected at several area cemeteries throughout the weekend.

We started our day Saturday at Lamping Homestead, part of the Marietta Unit of the Wayne National Forest, located off

scenic State Route 537, between Graysville and Marr. The site includes a 2-acre pond, deciduous forest, pine plantations, and some hollows with nice biodiversity.

We lunched at Piatt Park, east of the county seat, Woodsfield. Piatt is a 119-acre park with picnic shelter house and camping area, as well as trails. After lunch, our exploration included the beautiful cave/gorge areas of the park. After some scope work Saturday evening at our hotel across the river in Martinsville, WV, we wound up the foray Sunday morning at Rothenbuehler Woods of The Nature Conservancy. These mature woods lie on a steep slope on the south side of Sunfish Creek. Our foray also included the flood plain area on the north side of the creek.

Lichens Found

Earlier work in Monroe County has resulted in a species list of 53 macrolichens, most reported before 1965. A total of 49 lichen species were found during our fall 2012 foray, of which 22 are new records for Monroe County. Uncommon species include *Myelochroa metarevoluta*, *Parmotrema arnoldii*, *Parmotrema chinense*, and *Usnea mutabilis*, all found at the Lamping Homestead area of the Wayne National Forest. A complete list of the species found follows:

Lichen Name N=New County Record
<i>Caloplaca feracissima</i> N
<i>Candelaria concolor</i>
<i>Canoparmelia crozalsiana</i> N
<i>Cladonia chlorophaea</i> (complex)
<i>Cladonia coniocraea</i>
<i>Cladonia cylindrica</i>
<i>Cladonia furcata</i>
<i>Cladonia macilenta</i>

<i>Cladonia subcariosa</i> N
<i>Cladonia subtenuis</i>
<i>Dermatocarpon luridum</i>
<i>Evernia mesomorpha</i> N
<i>Flavoparmelia baltimorensis</i> N
<i>Flavoparmelia caperata</i>
<i>Flavopunctelia flaventior</i>
<i>Heterodermia speciosa</i>
<i>Lecanora dispersa</i> N
<i>Lepraria lobificans</i> N
<i>Leptogium juniperinum</i> N
<i>Melanelia subaurifera</i> N
<i>Myelochroa aurulenta</i>
<i>Myelochroa metarevoluta</i> N
<i>Parmelia squarrosa</i>
<i>Parmelia sulcata</i> N
<i>Parmelinopsis minarum</i>
<i>Parmotrema arnoldii</i> N
<i>Parmotrema chinense</i> N
<i>Parmotrema hypotropum</i> N
<i>Phaeophyscia adiastrata</i>
<i>Phaeophyscia ciliata</i>
<i>Phaeophyscia hirtella</i> N
<i>Phaeophyscia pusilloides</i> N
<i>Phaeophyscia rubropulchra</i>
<i>Phycitis petraea</i> N
<i>Physcia adscendens</i>
<i>Physcia aipolia</i>
<i>Physcia millegrana</i>
<i>Physcia stellaris</i>
<i>Physciella chloantha</i>
<i>Physconia detera</i>
<i>Physconia leucoleiptes</i> N
<i>Punctelia caseana</i> N
<i>Punctelia rudecta</i>
<i>Pyxine sorediata</i>
<i>Pyxine subcinerea</i>
<i>Usnea mutabilis</i> N
<i>Usnea strigosa</i> N
<i>Xanthomendoza weberi</i>
<i>Xanthoparmelia plittii</i> N
Total = 49, 22 new for Monroe

Mosses Found

Earlier work in Monroe County has

resulted in a species list of 58 mosses. A total of 57 moss species were found during our fall 2012 foray, of which 30 are new records for Monroe County.

MOSS Name N=New County Record
<i>Anomodon attenuatus</i>
<i>Anomodon minor</i>
<i>Anomodon rostratus</i>
<i>Atrichum angustatum</i> N
<i>Atrichum crispulum</i> N
<i>Aulacomnium heterostichum</i>
<i>Barbula unguiculata</i> N
<i>Brachythecium laetum</i>
<i>Brachythecium plumosum</i>
<i>Brachythecium rivulare</i> N
<i>Brotherella recurvans</i> N
<i>Bryoandersonia illecebra</i>
<i>Bryum capillare</i> N
<i>Callicladium haldanianum</i> N
<i>Calliergonella lindbergii</i>
<i>Campylostelium saxicola</i> N
<i>Climacium americanum</i>
<i>Conardia compacta</i> N
<i>Ctenidium molluscum</i>
<i>Cyrto-hypnum pygmaeum</i> N
<i>Dicranella heteromalla</i>
<i>Dicranodontium denudatum</i> N
<i>Dicranum flagellare</i> N
<i>Dicranum fulvum</i>
<i>Dicranum montanum</i> N
<i>Dicranum scoparium</i>
<i>Entodon seductrix</i> N
<i>Eurhynchium pulchellum</i> N
<i>Fissidens minutulus</i> N
<i>Fissidens osmundioides</i> N
<i>Fissidens taxifolius</i> N
<i>Gymnostomum aeruginosum</i>
<i>Haplocladium microphyllum</i> N
<i>Haplohymenium triste</i>
<i>Hedwigia ciliata</i>
<i>Homalotheciella subcapillata</i>

<i>Hygroamblystegium fluviatile</i>
<i>Hygroamblystegium tenax</i>
<i>Hyophila involuta</i> N
<i>Hypnum curvifolium</i>
<i>Leskea gracilescens</i> N
<i>Leucobryum glaucum</i> N
<i>Mnium hornum</i> N
<i>Mnium marginatum</i>
<i>Plagiomnium ciliare</i> N
<i>Plagiomnium cuspidatum</i>
<i>Platygyrium repens</i> N
<i>Pogonatum pensilvanicum</i> N
<i>Pseudotaxiphyllum elegans</i>
<i>Pylaisiadelphina tenuirostris</i> N
<i>Rhynchostegium serrulatum</i>
<i>Schistidium apocarpum</i> N
<i>Schistidium rivulare</i> N
<i>Sematophyllum demissum</i> N
<i>Taxiphyllum deplanatum</i>
<i>Thamnobryum allegheniense</i>
<i>Thuidium delicatulum</i>
Total = 57, 30 new for Monroe

Besides species listed above, member Jeff Rose had found the following 10 species, 5 new for Monroe County, during a scouting trip to the county in the spring of 2012.

<i>Atrichum crispum</i> N
<i>Campylium chrysophyllum</i>
<i>Diphyscium foliosum</i>
<i>Isopterygiopsis muelleriana</i> N
<i>Plagiothecium laetum</i> N
<i>Platyhypnidium riparioides</i>
<i>Pohlia annotina</i> N
<i>Rhizomnium punctatum</i>
<i>Sematophyllum adnatum</i> N
<i>Tetraphis pellucida</i>

This brings our 2012 Monroe County moss count to 67 species, with 35 of them new for the county.

In addition to the lichens and mosses, the following species of liverworts were identified. Based on Miller (1964), the only published list of Ohio liverworts, all are new county records.

LIVERWORT Name
<i>Bazzania trilobata</i> N
<i>Blepharostoma trichophyllum</i> N
<i>Cephalozia lunulifolia</i> N
<i>Cololejeunea biddlecomiae</i> N
<i>Frullania eboracensis</i> N
<i>Metzgeria furcata</i> N
<i>Nowellia curvifolia</i> N
<i>Pallavicinia lyellii</i> N
<i>Plagiochila porelloides</i> N
<i>Scapania nemorea</i> N

That gives a grand total of 125 identified bryophyte & lichen species for Monroe County in 2012, 66 of them new county records. I'd say that qualifies as a *great* success. Thanks to all who participated, and I hope you can join us for our next foray! - **Carole Schumacher**

MOSS MUSINGS – What is the range of *Plagiomnium cuspidatum*?

One evening, over a glass of wine, Diane Lucas and I discussed the distribution of Ohio mosses. Diane wondered if *Plagiomnium cuspidatum* had been collected from all 88 Ohio counties. Thanks to Bob Klips and his committee, it was easy to find the answer to that question. Diane went to the OMLA website and clicked on “Mosses”, then “Moss Atlas Map”. From there she clicked the link to the “All Ohio Moss List” and found *Plagiomnium*

cuspidatum. By clicking on the name, a distribution map appeared indicating that it was known from 87 counties – no record for Butler County. Diane’s response was “We need to plan a trip to Butler County and collect it!”

By clicking directly on the county, the OMLA webpage also provided a list of the 33 mosses collected from Butler County. Like most Ohio counties, moss records from there are scarce.

What if we wanted to know more information about *Plagiomnium cuspidatum* in Ohio? Habitat, substrate, and more specific information may be found at herbarium.kent.edu. The entire Kent State University Bryophyte Herbarium, consisting of more than 12,000 specimens, is available at that site. Macroscopic and microscopic images are available at the Floyd Bartley Herbarium at Ohio University, Bryophyte Homepage. Currently its searchable Bryophyte Index is off-line. A searchable database with excellent photos is also available at herbarium.duke.edu.

Plagiomnium cuspidatum was formerly called *Mnium cuspidatum*. The currently accepted name, other nomenclatural combinations, its taxonomic hierarchy, distribution, images, and much more are available at TROPICOS.org, (Missouri Botanical Gardens), or at the New York Botanical Garden Virtual Herbarium (nybg.org). At the Global Biodiversity Information Facility website (gbif.org), a world map illustrates that *Plagiomnium cuspidatum* has a northern hemisphere distribution. It’s common in North America and Europe, but absent from South America, Africa, and Australia.

Plagiomnium cuspidatum is such an ordinary Ohio species. By sitting in Diane's living room, and using our laptops, we discovered an enormous wealth of information about it. Just a few of these resources are mentioned here. – **Barbara K. Andreas**

In a purely technical sense, each species of higher organism—beetle, moss, and so forth, is richer in information than a Caravaggio painting, Mozart symphony, or any other great work of art.

— Edward O. Wilson

MOSS POEM IN FITS AND STARTS

Scoparium swept, Triste wept,
Repens crept, while Hypnum slept.

Barbula is quite a chore,
getting to couplet four-forty-four!

Mosses are incredible –
completely inedible.

What noble moss would even claim
to have a merely common name?

Smallness is a virtue:
mosses can't hurt you.

A Leuco-tuft, quite overstuffed,
making a pillow beneath a willow.

Not far from the Bryums,
used to live the Mniums.
But Plagio then Rhizo parted,
leaving Hornum broken-hearted.

-Jim Toppin

I view great cities as pestilential to the morals, the health and the liberties of man. – Thomas Jefferson

ODE TO A MOSSY LOG



Oh mossy, mossy log,
what tales you could tell;
of lichens, birds and squirrels,
in the time before you fell.

But things are different now,
you're lying on the ground;
where mice and snakes and chipmunks,
and centipedes abound.

You gather spores around you,
and fungi start to toil;
extracting all the nutrients,
you borrowed from the soil.



Now beetles and termites and worms,
other species too numerous to mention;
all live their life in the old mossy log,
you'd think it's a critter convention!

You were habitat for many,
as the circle turned around;
and now that it's complete,
you end as a mossy mound.

But a fertile place to start,
for another seedling tree;
and so the circle starts again,
life to the n'th degree!

- Ray Showman



AMERICAN BOTANICAL SOCIETY VISITS DEEP WOODS

Four OMLA members hosted a field trip to Deep Woods Farm, a 280-acre private parcel owned by the Blyth family, located about a mile south of South Bloomingville in Hocking County, Ohio, on July 7, 2012. The field trip was arranged in conjunction with the American Botanical Society at the National Botanical meetings, "Botany 2012." Twelve participants from around the country joined the adventure. Barbara Andreas and Cynthia Dassler hosted the moss and liverwort-oriented participants, while Ray Showman and Janet Traub hosted those interested in lichens.

The day began at 8:00 am with an hour and an half trip to Deep Woods on a non-air-conditioned school bus. Temperatures for the day were projected in the high nineties, thus morning temperatures were not far behind. Sweaty from the bus ride, participants unloaded gear and lunch into the utility building at Deep Woods. Al Blyth and his daughter Lauren kindly had agreed to host the party and were on site to open facilities (including the all-important bathroom) and participate in the hikes.

This area of Ohio, the Hocking Hills, which includes Deep Woods, is noted for deep, moist hemlock-tulip-tree ravines, waterfalls, sandstone outcrops, and rockhouses. Appalachian oaks and sunny rock exposures dominate the surrounding uplands. The hikes involved moderate to difficult off-trail collecting, and were destined to be hot, hot, hot. Those interested in lichens visited and collected from an upland oak savanna, while learning about lichen natural history and identification from Ray and

Janet. The lichen group retired to the utility building at lunchtime, bringing their specimens with them for observation and remained there until 3:00 pm when the bus returned to Columbus. They were the smart ones.

The bryologists on the other hand, being gluttons for punishment by nature, elected to remain in the field and cover as much ground as possible, to find as many bryophytes as possible. Deep Woods possesses many exceptional bryophytes including, *Asterella tenella*, *Brothera leana*, *Bryoxiphium norvegicum*, *Cyrto-hypnum pygmaeum*, and *Hookeria acutifolia*. To the group's delight, most of these were located, as well as a few new to Deep Woods. Close to 3:00 pm, dragging, exhausted, and hot, the bryologists limped into the utility building for some much needed shade and water, only to look forward to the hot bus ride home.

The field trip was a success on all accounts. The lichenologists learned loads about lichens, and the bryologists returned home with a bounty of specimens and pictures of mosses and liverworts. For the OMLA hosts, pride glowed because they were able to show off the bryophytes and lichens of a special part of Ohio. **-Cynthia Dassler**

MONITORING MOSS ESTABLISHMENT IN A WET PRAIRIE RESTORATION

To improve the ecological integrity of the nationally recognized Darby Creek watershed, resource managers at Battelle Darby Creek Metro Park have recently undertaken substantial wetland/prairie restoration projects on two sites at the western edge of Franklin County that were, until now, farmland. One of these

areas, called “Darby Dan Farms” is a 700-acre plot on the east side of Darby Creek Drive, just south of Kuhlwein Road. In autumn 2010, after blocking drainage tiles to recreate natural wetland hydrology on the 500-acre southern portion of the tract, park managers sowed seeds of more than 30 species of prairie forbs and about a dozen graminoids.

One year later, several OMLA members, impressed at how well the restoration had taken hold, visited the area in an enthusiastic search for mosses typically found on recently cultivated land, particularly the especially fast-growing, short-lived ones often referred to as “ephemerals.” Everywhere we walked, there were mosses at our feet. We were amazed at their abundance and diversity.



Darby Dan wetland restoration. December, 2011. Photo by Bob Klips

In many places the proportion of ground covered by mosses well exceeds the bare soil patches. As is typical in open transitory environments, essentially all of them are acrocarps (cushion mosses). The predominant species here is *Barbula unguiculata* (Pottiaceae), a very common moss that forms distinctive light-colored clumps on neutral to calcareous soil in a variety of situations. *Barbula* is dioicous, i.e., having unisexual gametophytes. It is noteworthy that some clumps abundantly

bear sporophytes, while others do not; these “sterile” clumps may be either male, or non-expressing with respect to gametangia.

Following published experiments performed by desert researchers working in the southwestern U.S., it would be interesting to perform a detailed survey of the *Barbula* population at these wetland restoration sites, to ascertain the apparent sex ratio, and see whether there is any environmental correlation with sex expression, such as shading or soil moisture. Other members of the Pottiaceae found here are *Tortula acaulon*, *T. truncata*, and *Weissia controversa*.



Barbula unguiculata in December. Photo by Bob Klips

Members of the genus *Bryum* (family Bryaceae) are frequently found in disturbed places. At Darby Dan we see abundant small patches of what is perhaps the only easily identified one, the “silvery *Bryum*,” *B. argenteum*. Like *Barbula*, this grows as separate male and female individuals, but unlike many such dioicous species it frequently carries out a complete sexual life cycle, producing sporophytes. This may be because low wet areas are conducive to the transport of sperm from one plant to another. Consequently the sexes may not be as isolated from one another as they

are in deserts, where mosses are also often predominant, but may be forced to reproduce mainly by asexual means such as fragmentation, or the production of gemmae.



Bryum argenteum in November. Photo by Bob Klips

One of the few mosses in this meadow that does produce specialized asexual propagules is an uncommon species we provisionally identified as *Bryum klinggraeffii*. It bears abundant tiny raspberry-shaped rhizoidal tubers in the soil.



Tuber-bearing *Bryum* in December. Photo by Bob Klips

The family Funariaceae is an important element of the bryoflora here. There are two principal species. One is a fall-fruiting ephemeral, *Aphanorrhagma serratum*, distinguished by having capsules that are “immersed,” i.e., hidden from view by the uppermost leaves because the seta is very short.



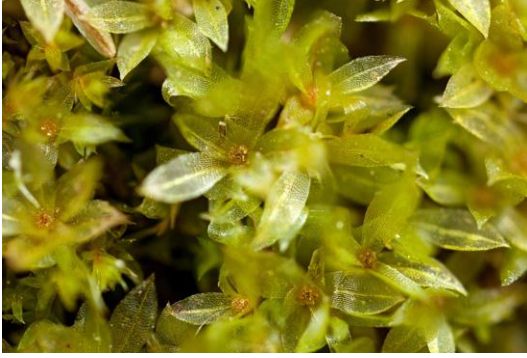
Aphanorrhagma serratum, December. Photo by Bob Klips

The other abundant funariaceous species is strikingly similar gametophytically to *Aphanorrhagma*: the spring-fruiting *Physcomitrium pyriforme*.



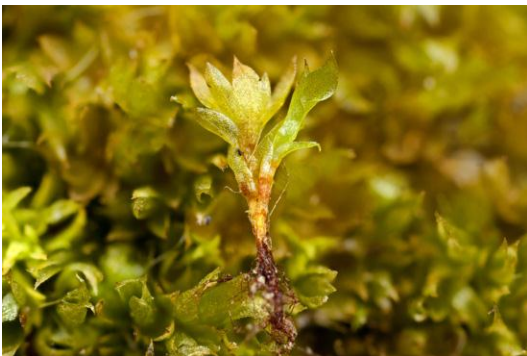
Physcomitrium pyriforme, April. Photo by Bob Klips

When sporophytes are present *Physcomitrium* is easily distinguished from *Aphanorrhagma* by its exserted capsules, but at this time of year ID is a little tricky, as there are only mature gametangia. The male inflorescences are somewhat conspicuous under a hand lens, showing the tops of a cluster of club-shaped sterile cells (paraphyses) that are mixed with the antheridia, surrounded by a rosette of perigonal leaves. They look like little flowers.



Physcomitrium pyriforme, November.
Photo by Bob Klips

The sexual system had by both *Aphanorrhagma* and *Physcomitrium* is described as “autoicous,” i.e., with archegonia and antheridia in separate inflorescences on the same plant. Specifically, they are cladautoicous, with the male inflorescence on a separate branch.



Physcomitrium plant, showing male (left) and female (right) branches. Photo by Bob Klips

Because these mosses are hermaphroditic and have the male and female gametangia in close proximity, it seems likely the prevailing breeding system is intra-gametophytic selfing. In analogous fashion to weedy annual angiosperms, which are predominantly self-pollinating, this would be an adaptive trait enabling reproductive assurance for short-lived organisms living in transitory environments.

However, as these sites are often pounded by puddle-forming rainstorms, sperm might in fact be readily transported quite some distance, and so effect outcrossing. Details of the breeding system may be discernible using fairly simple DNA fingerprinting techniques, thanks to the recent development by a German research laboratory of the necessary details to enable the use of “simple sequence repeat” (SSR) markers that are likely to be useful for these species. These markers are regions of the genome wherein the same 2-6 nucleotide “letters” are repeated over and over many times. When reproductive cells are produced, DNA-copying enzymes are especially prone to making errors in the number of times the simple sequences are repeated. Thus these are hypervariable regions of the genome, quite handy for distinguishing individual plants (DNA fingerprinting).

These potentially useful DNA “primers” (sequences flanking the SSRs that serve as targets for their isolation and measurement) were actually designed for, as luck would have it, a closely related member of the Funariaceae, *Physcomitrella patens*. That little moss is one of an elite handful of genetic “model organisms” that, like the gut bacterium *E.coli*, the fruit fly *Drosophila melanogaster*, and *Homo sapiens*, have had their entire genome sequenced.

DNA fingerprinting might also help us study another aspect of moss reproduction: hybridization. Some mosses are known to occasionally hybridize. However, because in bryophytes the sporophyte generation -- the only life stage that can be a true hybrid -- is relatively simple and

uniform, an intermediate morphology indicative of likely hybridization is apparent only in cases where the putative parental species have markedly different sporophytes.

Not surprisingly, many of the instances of suspected or confirmed moss hybrids are between members of the Funariaceae that differ in their seta length. We found one instance of a possible hybridization event at Batelle Darby: a somewhat elevated sporophyte arising from an *Aphanorrhegma* female, suggesting *Physcomitrium* as its male parent. Molecular markers could confirm this suspicion. OMLA student member Ryan McCarthy is presently working with me to screen SSR primers for use in studying the reproductive dynamics of *Physcomitrium* at Batelle Darby.



Apparent hybrid moss sporophyte. Photo by Bob Klips

Other members of the Funariaceae are present here. One is an Ohio rarity collected only once here despite many hours of searching, *Physcomitrium collenchymatum* (reported in last year's OBELISK). The other is *Funaria hygrometrica*, a common Ohio moss that is sparse at this site. Its spring-fruiting phenology and cladautoicous sexual architecture are identical to that of *Physcomitrium*, from which it can be

distinguished by its more deeply concave leaves.



Funaria hygrometrica with developing sporophytes in January. Photo by Bob Klips

Adequate rainfall during the summer and fall of 2011 fostered the development of an especially rich moss cover. This included some of our smallest and most transitory species: members of the aptly-named genus *Ephemerum* (Ephemeraceae). These include the regionally scarce *E. cohaerens* and the more common, but nonetheless easily overlooked *E. crassinervium*.



Ephemerum cohaerens in December. Note immersed capsules that rupture irregularly. Photo by Bob Klips

The site also yielded another addition to the small but growing list of Ohio stations for “long-necked moss,” *Trematodon longicollis* (Ditrichaceae). In early spring, the crowded sporophytes looked like a clump of grass.



Trematodon longicollis in April. Photo by Bob Klips

The importance of mosses in wetland restoration may be underappreciated and not fully understood. At the annual meeting of the Botanical Society of America in July, Dr. Linda Fuselier (Antioch College) described a fascinating study of bryophyte assemblages in both restored and natural wetlands in the prairie pothole region. She found fairly low diversity, dominated by pleurocarps in the Amblystegiaceae, principally *Leptodictium riparium* along with, in the natural marshes, *Drepanocladus aduncus*.

That study, which focused on long-established marshes, cemented the interest of several of us at OSU in exploring the role of bryophytes in the very early stages of wet prairie restoration. After being advised by OEPA wetlands specialist and fellow OMLA member Bill Schumacher of concrete plans by the Park to perform similar restorations on the remaining 200-acre northern portion of the Darby Dan site (immediately adjacent to Kuhlwein Road) and also at a site approximately 5 km north-northwest, at the “Morgan Headwaters” portion of Prairie Oaks Metro Park, fellow OSU botanist and OMLA member Cynthia Dassler and I applied for and received

Metro Parks approval to perform a monitoring study.

We are now setting up plots to follow site-level succession where mosses will be sampled in randomly chosen points, and point-level succession where mosses will be observed at the same exact spots again and again. We anticipate this project will elucidate aspects of the role played by bryophytes in ecosystem restoration and thus may aid those efforts. - **Bob Klips**

WHITE SCRIPT LICHEN New Species Discovered in Ohio

We sit in the shade of trees
We did not plant. –Peter Raible

Nearly 35 years ago, Ray Showman did a sampling of lichens from several southern Ohio counties. He included the crustose species, hoping eventually to become familiar with them while concentrating on the macrolichens. Unfortunately, this never happened and the specimens were deposited, without names, in the Herbarium of the Museum of Biological Diversity (OSU).

During 2011, I had occasion to examine several of the “unknowns” from the Herbarium; among those collected by Showman. One sample collected was a small piece of bark (white oak) on which *Lecanora hybocarpa* was found; a fairly common crustose species with orange to brown apothecia over a light-colored stain-like thallus. As often happens, the substrate (bark in this case) may provide room for additional species, incidental to the main one collected and unnoticed at the time of collection. Such was the situation with the *Lecanora hybocarpa*. Also found was a small area, about 0.5

cm square on which was found a rather distinctive, white, Script Lichen in the family Graphidaceae.

One of our most common Script Lichens is *Graphis scripta*, looking much like black pencil marks over a thin, pale stain, usually on smooth bark. However, the one just discovered lacked the black carbonized margins on the linear apothecia (the pencil marks) and appeared nearly white, with a pale yellowish cast. It lacked all traces of "black." There are species of pale Graphidaceae found in the tropics and subtropics and into Florida. However, Ohio is far out of range for any of these.



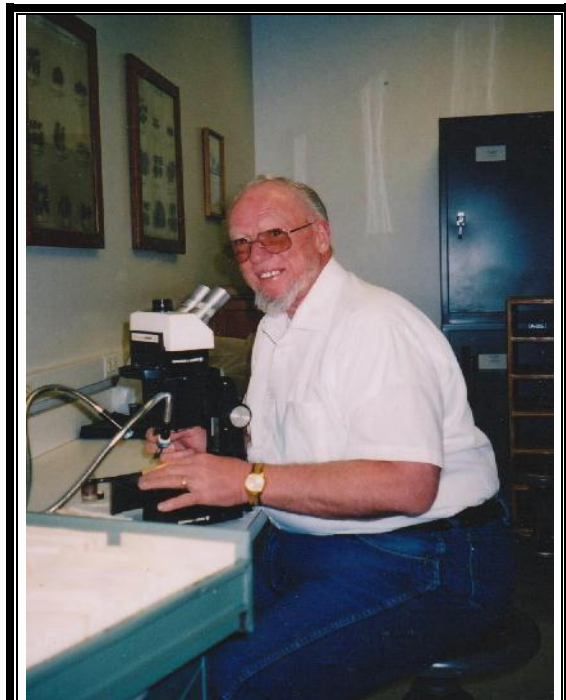
As yet unnamed white script lichen.

Recognizing that this was, indeed, a rare find here in Ohio, the specimen was sent to Dr. Robert Lucking, Collections Manager and Curator, The Field Museum, Chicago for his review. Lucking replied, in part, "...this specimen is interesting... [and] ...might be a new thing." He further suggested that it be sent to James Lendemer, New York Botanical Garden, who was doing some recent work with the Graphidaceae. Subsequent contact with Lendemer is best summarized by him on 17 March 2012; "The species does not appear to be anything I've seen before. Robert [Lucking] and I both agree that the specimen is too small to formally

describe and that further investigation is needed."

Specimen Cited: #8116 Hb Flenniken. Ohio; Gallia County; Greenfield Township; Section 13; On oak in sparse, dry woods (S-facing). Ray Showman, collector. 31 October 1977. Deposited at New York Botanical Garden (NY).

- Don Flenniken



Don G. Flenniken 1933 – 2012

Photo by Ray Showman

We'll miss you Don, for your love of knowledge, for those great Foray times; we'll miss your LICHENS license plate, we'll miss your clever rhymes.

We'll miss your help with lichens, your ever present cheer; we'll miss your home-made lichen Christmas cards, and your friendships far and near.

We'll miss you Don.

NEWS AND NOTES

In addition to Don Flenniken, we lost two other members of OMLA this past year.

Mike Kangas of University Heights, OH, died on April 6, 2012. Mike joined OMLA in 2010 to learn lichen identification skills. His goal was to volunteer at the Cleveland Museum of Natural History as a lichenologist. Mike worked as an environmental consultant, and taught at Cuyahoga Community College.

Bob Burrell of Morgantown, WV, passed away on July 23, 2012. Bob joined OMLA in 2009 and each year since then wrote at least one article on lichens for OBELISK. Bob was trained in bacteriology and taught at Carnegie Institute of Technology and West Virginia School of Medicine.

ANNOUNCING THE FLENNIKEN AWARD

In remembrance of Don Flenniken, an award of \$100 has been established for the best article submitted to OBELISK each year by a student member of the Ohio Moss and Lichen Association. Articles should be about some aspect of bryology or lichenology with a text of at least one single-spaced page. Accompanying photographs are encouraged, and priority will be given to original research. Articles may be in the informal style (see recent issues of OBELISK) or in the more formal style of a journal paper. Articles should be submitted by November 1 to allow judging before the OBELISK deadline. Good luck students!

The **2013 Crum Bryological Workshop** will be held July 1-6, 2013, in Parc national de la Gaspésie of Quebec. To attend the Crum Workshop, participants need to provide their own microscopes. For more information, e-mail Bill Buck at bbuck@nybg.org.

Book recommendation – If you like to hunt mushrooms, eat mushrooms or read about mushrooms this book is for you: **Mycophilia (Revelations from the Weird World of Mushrooms)** by Eugenia Bone, 2011, Rodale Books. This book is full of mycological information but is written in a style that is easy and fun to read.

Lichens in Art



John James Audubon is well known for his paintings of North American birds and perhaps lesser so for his animals. His paintings were true to life in great detail. This picture of a gray squirrel also shows both foliose and fruticose lichens on the branch. Unfortunately, I couldn't do chemical spot tests to confirm any species.

The OMLA annual meeting will be held on March 2, 2013, 9:00-4:00 at the OSU Museum of Biological Diversity. Please plan to attend and bring a friend!



2012 Summer Foray. From left: Ryan Thomas, Bob Klips, Ryan McCarthy, Jessie Wallace, Ray Showman, Robin Bautista-Jimenez, Jeff Rose, Barb Andreas, Diane Lucas, Jim Toppin, Carole Schumacher, Don Flenniken, Naomi Mathew, Janet Traub, Bill Schumacher. Photo by Bob Klips.



2012 Fall Foray. From left: Naomi Mathew, Don Flenniken, Ryan McCarthy, Janet Traub, Bill Schumacher, Jim Toppin, Carole Schumacher, Ray Showman, Ed Fuchs, Scott Schuette, Barb Andreas, Cynthia Dassler, Diane Lucas, Brian Dolney, Jessie Wallace, Bob Klips. Photo by Bob Klips.