

OHIO BRYOLOGY AND THE MOSS ATLAS: HISTORY AND PROGRESS

The publication of *A Catalog and Atlas of the Mosses of Ohio* (Snider and Andreas, 1996; hereafter referred to as the “Atlas”) instigated a new interest in Ohio bryology. Dr. Jerry Snider, Professor of Biology, University of Cincinnati, and perhaps the modern “father” of Ohio bryology, provided guidance and encouragement to undergraduate and graduate students, and a group of professional and amateur Ohio bryologists. A few of the Ohio group, including me, have carried on Jerry’s interest in Ohio bryophytes. Jim Toppin and Janet Traub continue to collect in northwest Ohio, and until his death in 2009, Donn Horschler (along with his collecting companion Roger Troutman) made significant collections from central Ohio.

The publication of the Atlas tied much information together. It briefly summarized a history of Ohio moss investigations, including a list of important scientific works completed to date. Many of the non-herbarium based county records cited in the Atlas came from these, especially from Bob Geisy’s (1957) checklist. The Atlas provided a list of Ohio mosses, updated nomenclature, nomenclatural synonymy, and county distribution maps. After Geisy’s 1957 checklist, much field work had been achieved (for instance, Allen, 1983; Snider and He, 1993). These works resulted in additional Ohio-based herbarium specimens as well as published checklists for specific sites that were incorporated into the 1996 Atlas. Finally, the Atlas provided motivation and passion that fueled the modern renaissance in Ohio bryology. From just a handful of professional and amateur cryptogamic botanists in 1996, there are now dozens of individuals exploring Ohio ecosystems in search of species new to Ohio or to Ohio counties. Cryptogams are now part of Ohio’s rare plant list (www.dnr.state.oh.us/dnap), and new and noteworthy collections are presented at the Ohio Botanical Symposium.

Immediate Results after the Publication. The maps in the Atlas provided a county-by-county distribution of moss species showing that some very common mosses had been overlooked in otherwise well-collected counties, and that some counties had been entirely overlooked.

Beginning in 1996, Diane Lucas and I began visiting Ohio natural areas, parks, and private properties in order to “fill in the blanks.” For example, the Atlas had no moss records from Jefferson County, so we concentrated on that county and produced a bryophyte flora consisting of 115 mosses, 17 liverworts, and 1 hornwort (Andreas and Lucas, 2006). Diane and others increased the moss flora of Erie County from 99 to 156, and Lorain County from 89 to 161. John Atwood and Carl Chuey (2004) collected in counties in the vicinity of Youngstown State University, and provided a total of 271 new county records.

After the publication of the Atlas, I began to track down literature-based records that seemed inconsistent. I visited, or requested specimen loans from, herbaria at Missouri Botanical Garden, University of Michigan, New York Botanical Garden, and Duke University. An example of a “stray dot” was *Paraleucobryum longifolium*, reported as growing in Tuscarawas County. This species is typical of northern boreal forests or high elevation areas. That herbarium specimen was located at the Missouri Botanical Garden and had been annotated as *Dicranum scoparium*.

Additional taxa were added to the Ohio moss flora. Some came from field work (such as *Brachythecium velutinum*, *Pohlia bulbifera*, and *Trematodon longicollis*). A few new taxa

were added from Volume 27 of the *Flora of North America North of Mexico* (2007). For example, *Dicranum undulatum* had been collected by Floyd Bartley in Jackson County, and the record was located in an out-of-state herbarium. All new county records, new species, and updated records (from literature citations to actual herbarium specimens) were recorded by placing new dots on a “master set” of the distribution maps. In addition, all changes were kept in a notebook where information for each taxon was recorded (for instance, the herbarium where the specimen was housed, any literature citation, and any relevant herbarium label information). Diane Lucas eventually converted these records to a database.

New Bryological Herbaria. When the Atlas was published, the University of Cincinnati was the most active Ohio bryophyte herbarium. In 1998, under the curatorship of John Freudenstein, I started a bryophyte herbarium at Kent State University (KE). Early entries were from material collected while working at the University of Michigan Biological Station, and from collections made while surveying Ohio peatlands (Andreas and Bryan, 1990). A small but historically important bryophyte collection by Almon Rood, an amateur botanist in northeastern Ohio, that had been stored in shoeboxes on top of herbarium cases, was included.

From 1998 to 2011, the Kent State University Bryophyte Herbarium grew to about 12,000 specimens. Specimens came from material collected on regional forays such as the Andrews and Blomquist Forays, exchange programs with the Missouri Botanical Garden, participation in the ABLS moss exchange, acquisition of exsiccatae, and donations by Diane Lucas, Sam Mazzer, Rob Curtis and others.

About the same time, Diane Lucas began organizing the bryophyte collection at the Cleveland Museum of Natural History (CLM). This collection includes primarily her donations, an historical collection by Edo Claassen, and collections by Jim Bissell and others. There are approximately 3,300 bryophyte specimens at the Cleveland Museum of Natural History.

Formation of the Ohio Moss and Lichen Association. With the publication of *The Macrolichens of Ohio* (Showman and Flenniken, 2004), Ohio had county dot distributions for mosses and lichens. Ray and I discussed the formation of a group that would continue to add information to the cryptogamic collections of Ohio. At the Ohio Botanical Symposium of 2004, an announcement was made about an organizational meeting for the Ohio Moss and Lichen Association (OMLA) at the Gorman Nature Center (Lexington, OH) on June 3, 2004. The first annual foray was held October 22-24, 2004 at the Edge of Appalachia Preserve System in Adams County (Andreas, Showman and Zloba (2005)). Since then, OMLA has conducted two forays a year which concentrate on under-collected counties. OMLA members alternate organizing forays.

Don Flenniken started the OMLA newsletter, *OBELISK*, in 2005. Its name is based on the obelisk-style tombstone over the grave of William Starling Sullivant, perhaps Ohio’s best known bryologist. Don was editor of the newsletter until 2007 when Ray Showman joined him as co-editor. Don stepped down as co-editor in 2010 and was replaced by Janet Traub. *OBELISK* contains four regular columns: 1) Left Hand Corner (a forum for ideas, opinions and editorials), 2) Moss Musings (featuring bryophytes and written by me), 3) Wanted Alive (featuring rare or extirpated lichens and bryophytes and authored by various members), and 4) News and Notes, in which announcements and small informational items are placed. The newsletter also contains articles by members including reports of that year’s forays.

In 2008, Brian Gara and Bob Klips, with technical assistance from Steve McVey, developed a website (www.ohiomosslichen.org) for OMLA. This site maintains an on-going history of the organization, meeting announcements, moss and lichen information relevant either to Ohio or the organization's members, and archived issues of *OBELISK*.

The Combined Crum and Tuckerman Workshops. In 2006, Ray Showman and I organized a joint meeting of the Crum and Tuckerman Workshops in Ohio. It was the 13th meeting of the Tuckerman Workshop, and the 3rd meeting of the Crum Workshop. This combined workshop brought non-Ohio professional and amateur cryptogamic botanists to the state. The end result was the re-discovery of three presumed extirpated mosses (*Anomodon viticulosus*, *Weissia sharpii*, and *Thuidium allenii*), and three new Ohio species of macrolichens, *Heterodermia pseudospeciosa*, *Parmotrema gardneri*, and *Physcia pumilior* (Andreas, Showman and Lendemer, 2007).

The Ohio State University Input. In 2006, Cynthia Dassler became Curator of Cryptogams at the Museum of Biological Diversity, The Ohio State University. She organized the bryophyte collection by repackaging some of the historical collections and by updating nomenclature. Diane Lucas, Jeff Rose and I are surveying the bryophyte collection, and have found new county records through annotating the specimens.

Bob Klips, Jeff Rose and Cynthia are adding new collections to the herbarium, especially from a private natural area in Hocking County, OH. Jeff Rose, and Carole and Bill Schumacher are concentrating on collecting specimens from central and northwestern Ohio.

The Museum of Biological Diversity has become the unofficial “headquarters” for OMLA. Cynthia plans and hosts the annual meeting and identification workshops.

The Mapping Process. The database originally created by Diane Lucas is currently being converted to digital maps by a committee of OMLA members. Bill Schumacher is creating dot maps using GIS software. Bob Klips is adding scientific and family names using Photoshop. Jim Toppin and Janet Traub are creating 88 separate county species lists using Microsoft Excel. When this process is finished there will be available on the OMLA website a clean, printable copy in Portable Document Format (pdf), and a clickable Ohio map that will bring up county lists and range maps.

All additions to the Ohio moss distribution maps are specimen-based. In order to maintain its accuracy, a process similar to that used by the Ohio Rare Plant Council will be adopted. All changes will be presented in writing to the OMLA membership at its annual meeting. The information required will be the location of the herbarium specimen.

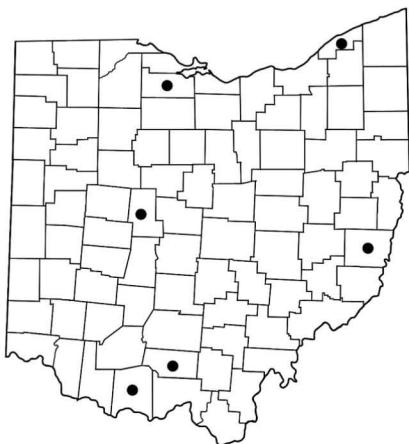
Summary. The history of Ohio bryology probably began with William Starling Sullivant, considered by some to be the “father” of American bryology (Snider and Andreas, 1996). He began collecting around 1840 and a copy of his “*Musci alleghanienses*” is housed in the Rare Book Room at The Museum of Biological Diversity, The Ohio State University. Several of Sullivant’s Ohio collections (for example, *Scorpidium scorpioides* and *Platydictya minutissima*) have never been re-collected. These remain a mystery.

It might seem that, with more than 170 years of collecting, the Ohio moss checklist would be complete. Yet each year something new is added to the checklist. In 1996 the Atlas contained 385 species and 15 varieties. Today there are approximately 420 moss species reported from Ohio. At the end of the Atlas, Jerry Snider included 30 blank maps. I think he meant that as a challenge to future Ohio bryologists.

- Barbara K. Andreas, 2011, in *OBELISK* Vol. 8, No. 1, pp. 9-12.

Literature Cited

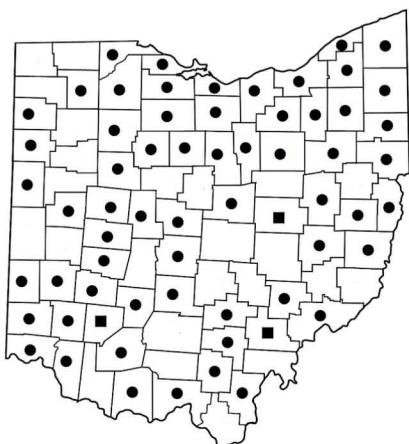
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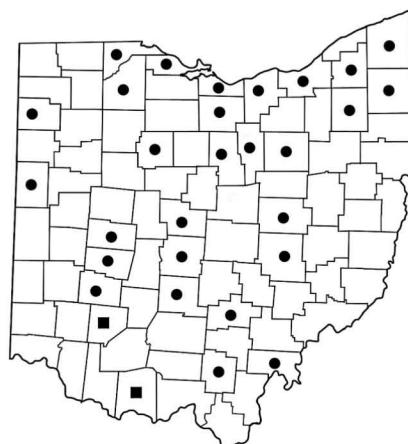
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THUIDIACEAE



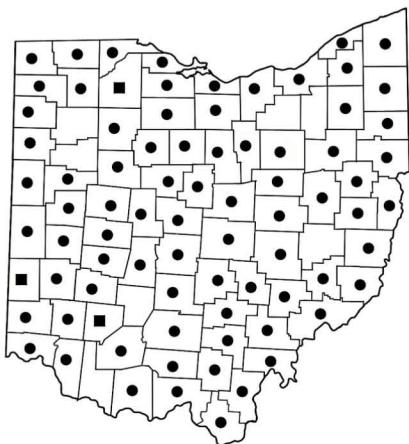
Acaulon muticum (Scherbius ex Hedwig) Müller
Hal. var. *rufescens* (A. Jaeger) H.A. Crum
POTTIACEAE



Amblystegium serpens (Hedwig) Schimper
AMBLYSTEGIACEAE



Amblystegium serpens var. *juratzkanum*
(Schimper) Rau & Hervey
AMBLYSTEGIACEAE



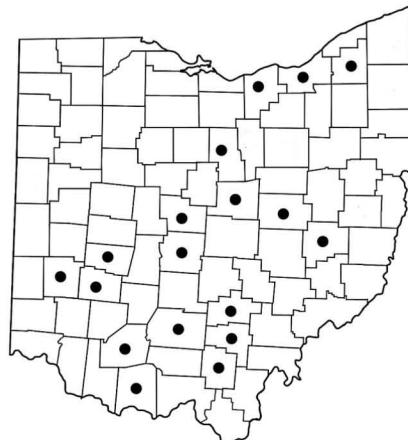
Amblystegium varium (Hedwig) Lindberg
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Amphidium lapponicum (Hedwig) Schimper
ORTHOTRICHACEAE



Amphidium mougeotii (Bruch & Schimper) Schimper
ORTHOTRICHACEAE



Anacamptodon splachnoides
(Froelich ex Bridel) Bridel
FABRONIACEAE



Andreaea rothii F. Weber & D. Mohr
ANDREAEACEAE



Andreaea rupestris Hedwig
ANDREAEACEAE



Anoectangium aestivum (Hedwig) Mitten
POTTIACEAE



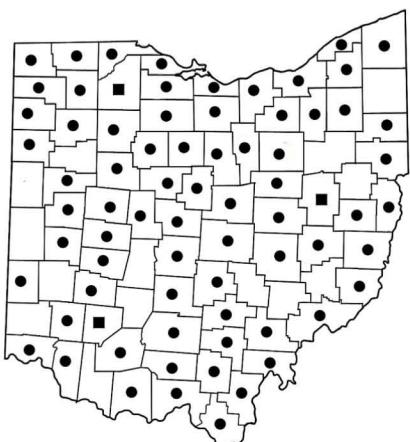
Anomobryum filiforme (Griffith) A. Jaeger
BRYACEAE



Anomodon attenuatus (Hedwig) Huebener
THUIDIACEAE



Anomodon minor (Hedwig) Lindberg
THUIDIACEAE



Anomodon rostratus (Hedwig) Schimper
THUIDIACEAE



Anomodon rugelii (Müller Hal.) Keissler
THUIDIACEAE



Anomodon viticulosus (Hedwig) Hooker & Taylor
THUIDIACEAE



Aphanorrhegma serratulum (Wilson & Hooker)
Sullivant in A. Gray
FUNARIACEAE



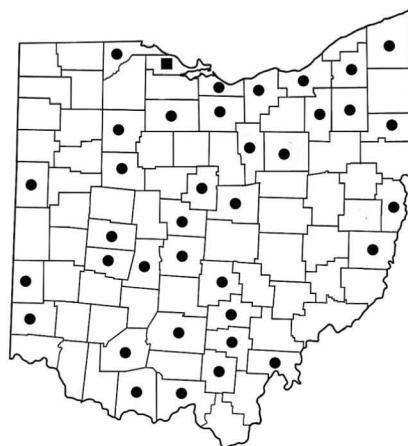
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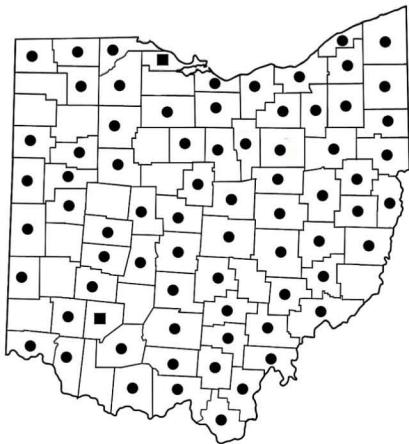
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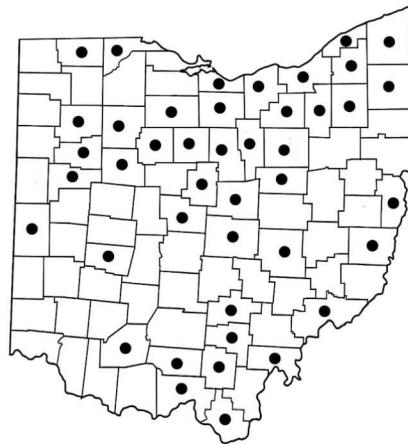
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ARCHIDIACEAE



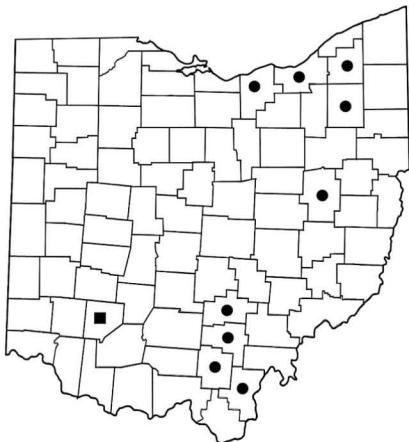
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B.B. Symth & L.C.D. Symth
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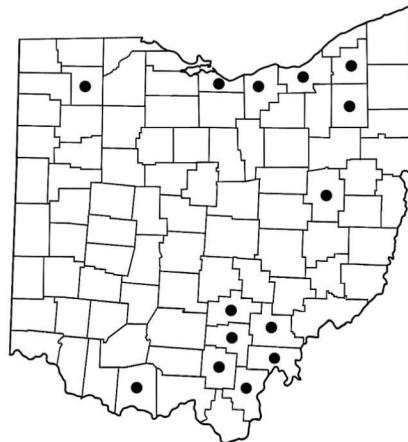
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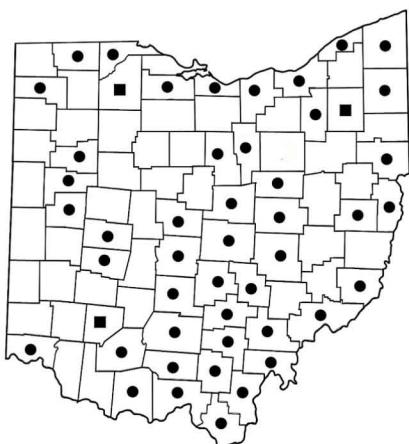
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(*Atrichum oerstedianum*)
POLYTRICHACEAE



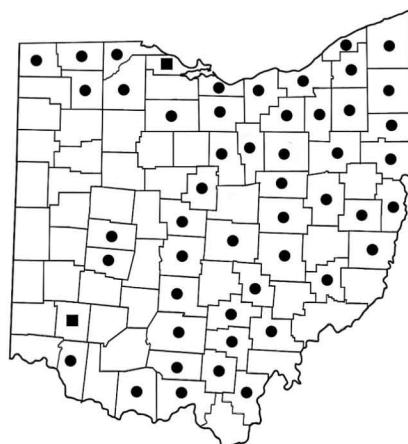
Atrichum crispum (James) Sullivant in A. Gray
POLYTRICHIACEAE



Atrichum tenellum (Röhling) Bruch & Schimper
POLYTRICHACEAE



Aulacomnium heterostichum
(Hedwig) Bruch & Schimper
AULACOMNIACEAE



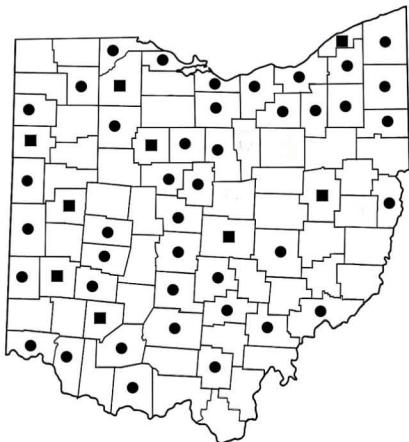
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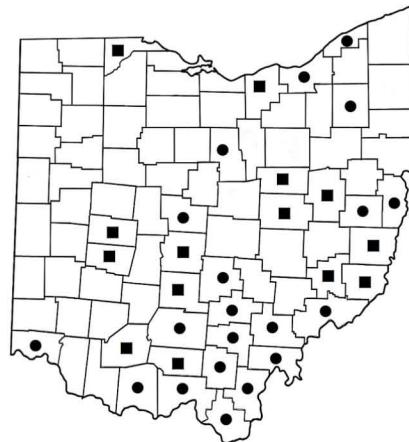
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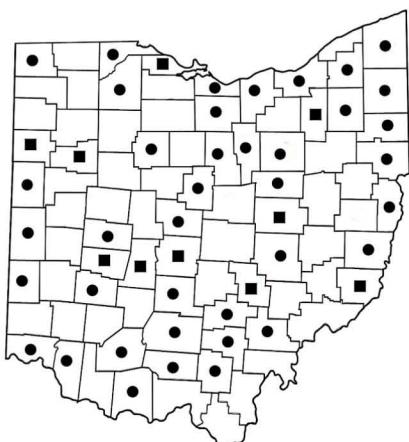
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POTTIACEAE



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Bartramiaceae



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BRACHYTHECIACEAE



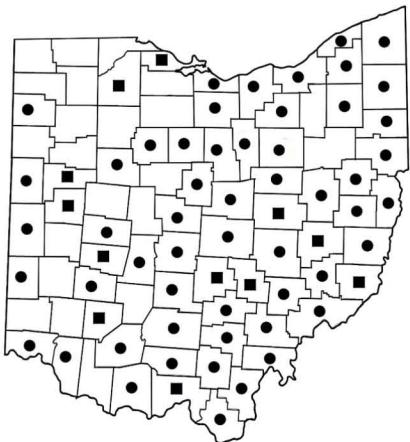
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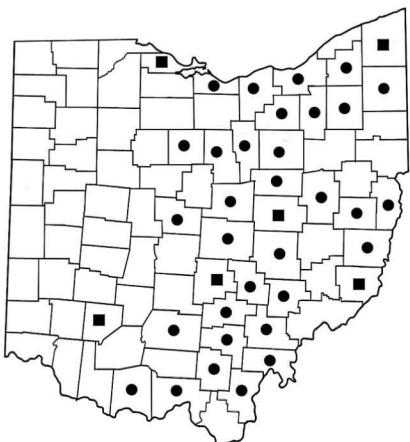
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Brachythecium laetum (Bridel) Schimper
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BRACHYTHECIACEAE



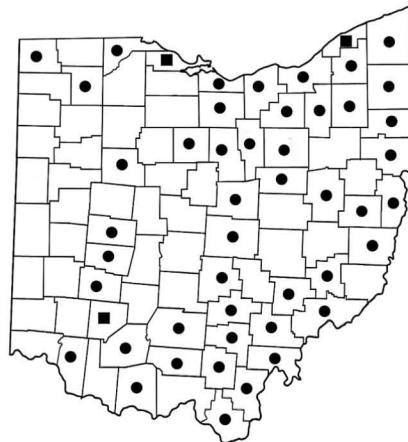
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BRACHYTHECIACEAE



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BRACHYTHECIACEAE



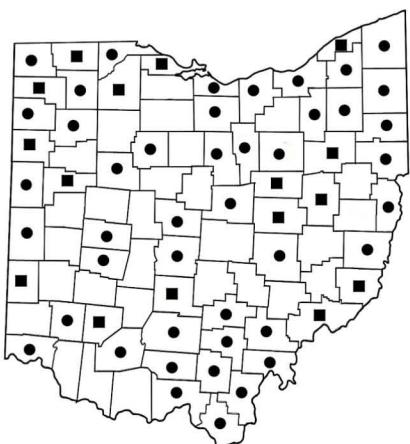
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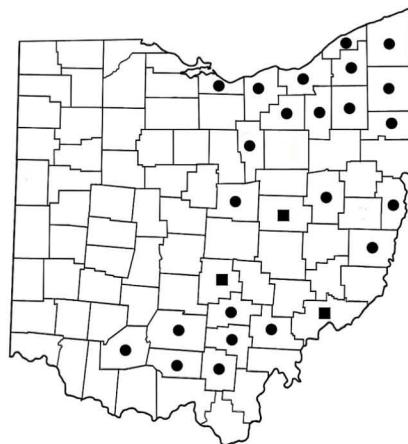
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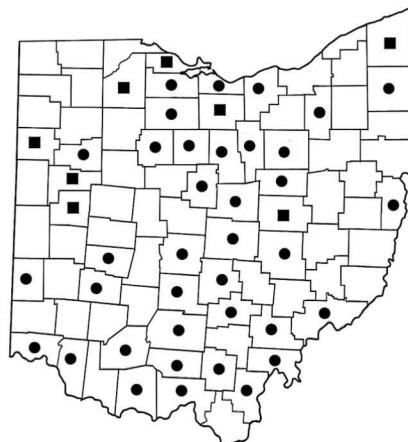
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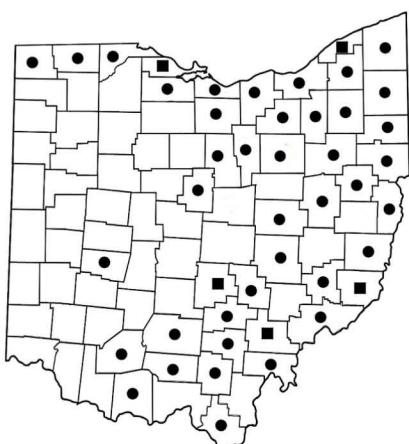
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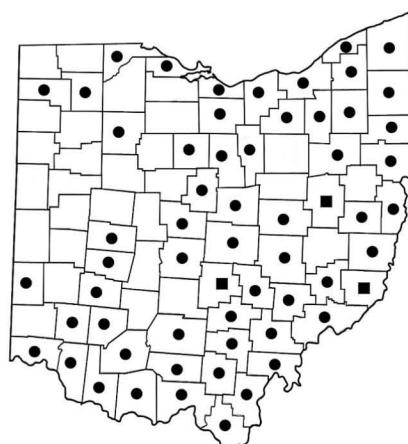
Bruchia flexuosa (Schwägrichen) Müller Hal.
BRUCHIACEAE



Bryhnia graminicolor (Bridel) Grout
BRACHYTHECIACEAE



Bryhnia novae-angliae (Sullivant & Lesquereux) Grout
BRACHYTHECIACEAE



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BRACHYTHECIACEAE



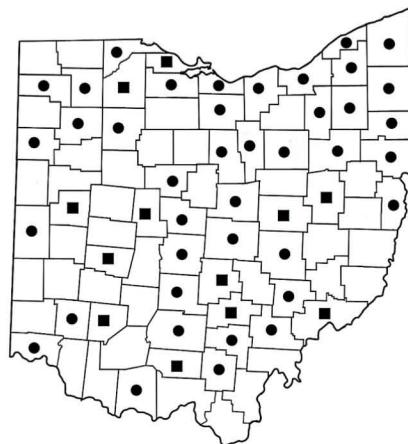
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POTTIACEAE



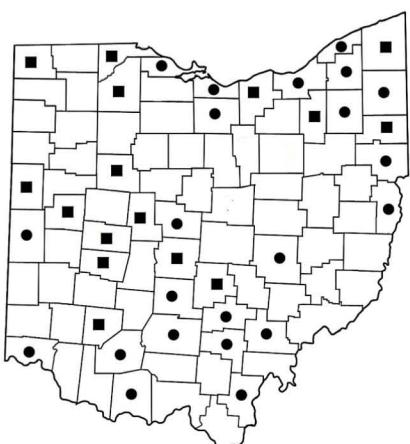
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BRYOXIPHIACEAE



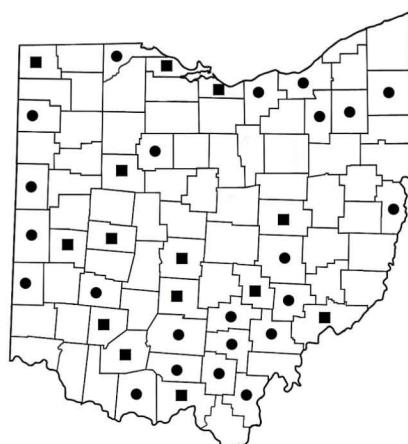
Bryum algovicum Sendtner ex Müller Hal.
BRYACEAE



Bryum argenteum Hedwig
BRYACEAE



Bryum caespiticium Hedwig
BRYACEAE



Bryum capillare Hedwig
BRYACEAE



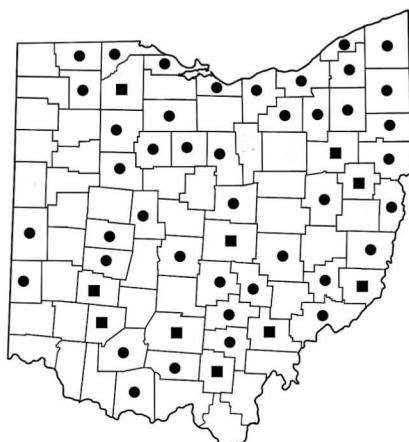
Bryum cyclophyllum
(Schwägrichen) Bruch & Schimper
BRYACEAE



Bryum dichotomum Hedwig
BRYACEAE



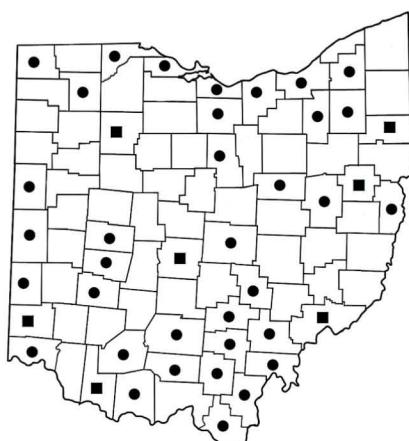
Bryum flaccidum Bridel
BRYACEAE



Bryum lisae De Notaris var. *cuspidatum*
(Bruch & Schimper) Margadant
BRYACEAE



Bryum pallescens Schleicher ex Schwägrichen
BRYACEAE



Bryum pseudotriquetrum
(Hedwig) P. Gaertner, B. Meyer & Scherbius
BRYACEAE



Bryum uliginosum (Bridel) Bruch & Schimper
BRYACEAE



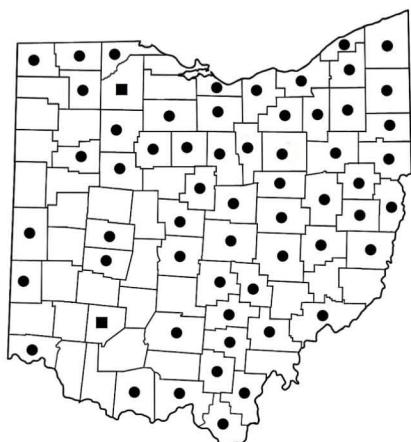
Bucklandiella heterosticha
(Hedwig) Bednarek-Ochyra & Ochyra
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GRIMMIACEAE



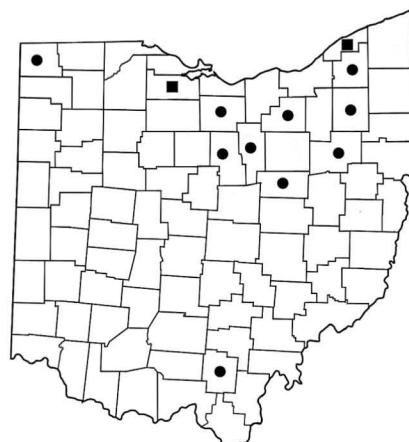
Buxbaumia aphylla Hedwig
BUXBAUMIACEAE



Buxbaumia minakatae Okamura
BUXBAUMIACEAE



Callicladium haldanianum (Greville) H.A. Crum
HYPNACEAE



Calliergon cordifolium (Hedwig) Kindberg
AMBLYSTEGIACEAE



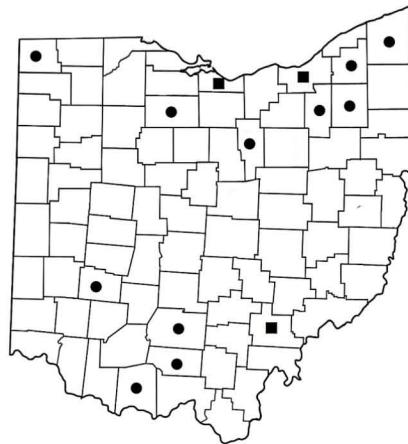
Calliergon giganteum (Schimper) Kindberg
AMBLYSTEGIACEAE



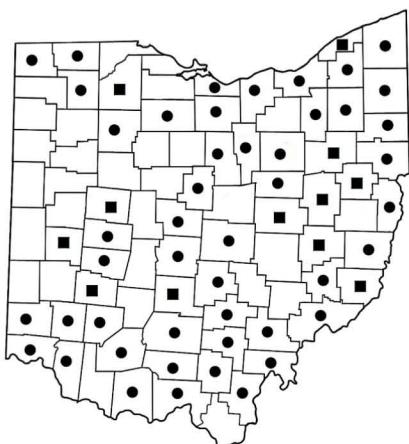
Calliergon stramineum (Dickson ex Bridel) Kindberg
AMBLYSTEGIACEAE



Calliergon trifarium (F. Weber & D. Mohr) Kindberg
AMBLYSTEGIACEAE



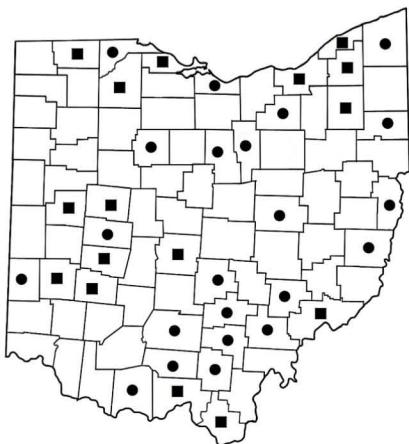
Calliergonella cuspidata (Hedwig) Loeske
AMBLYSTEGIACEAE



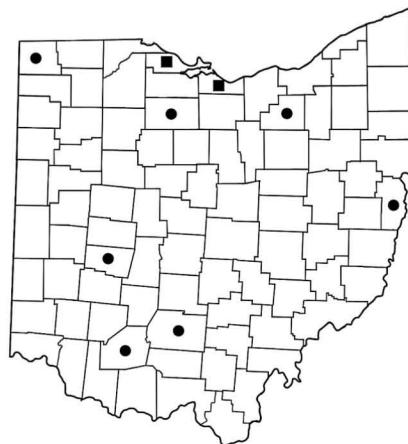
Calliergonella lindbergii (Mitten) Hedenas
(*Hypnum lindbergii*)
AMBLYSTEGIACEAE



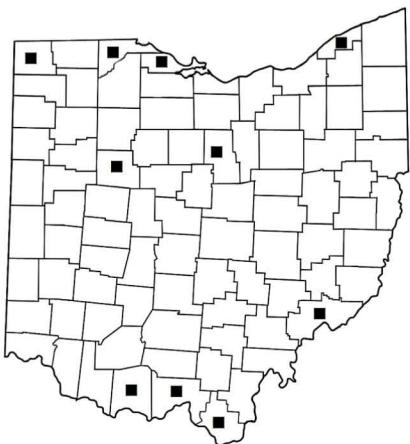
Campylium chrysophyllum (Bridel) J. Lange
AMBLYSTEGIACEAE



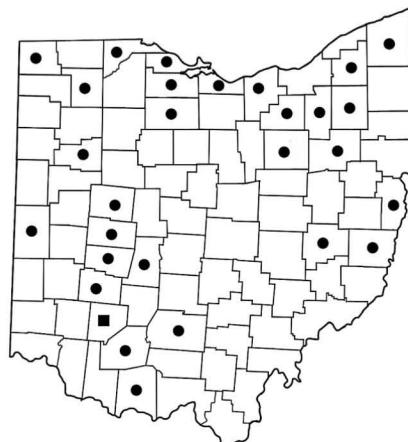
Campylium hispidulum (Bridel) Mitten
AMBLYSTEGIACEAE



Campylium polygamum (Schimper) C.E.O. Jensen
AMBLYSTEGIACEAE



Campylium radicale (P. Beauvois) Grout
AMBLYSTEGIACEAE



Campylium stellatum (Hedwig) C.E.O. Jensen
AMBLYSTEGIACEAE



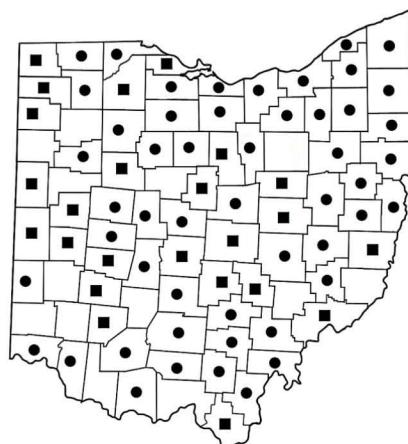
Campylopus pilifer Bridel
DICRANACEAE



Campylopus tallulensis Sullivant & Lesquereux
DICRANACEAE



Campylostelium saxicola
(F. Weber & D. Mohr) Bruch & Schimper
PTYCHOMITRIACEAE



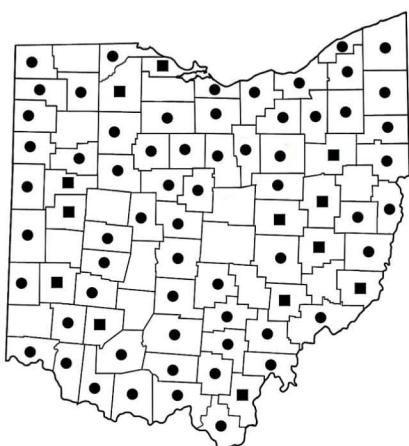
Ceratodon purpureus (Hedwig) Bridel
subsp. *purpureus*
DITRICHACEAE



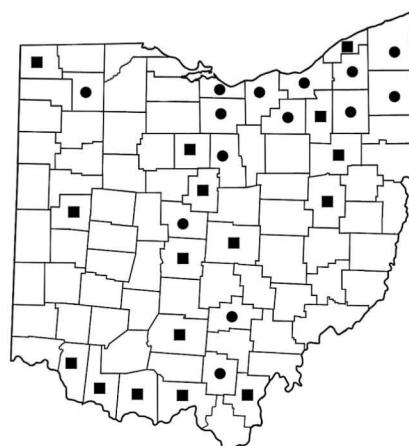
Cirriphyllum piliferum (Hedwig) Grout
BRACHYTHECIACEAE



Clasmatodon parvulus (Hampe) Sullivant
FABRONIACEAE



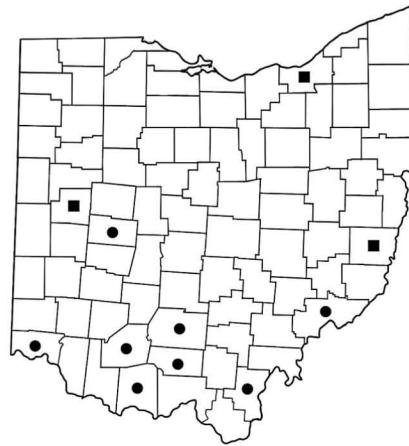
Climacium americanum Bridel
CLIMACIACEAE



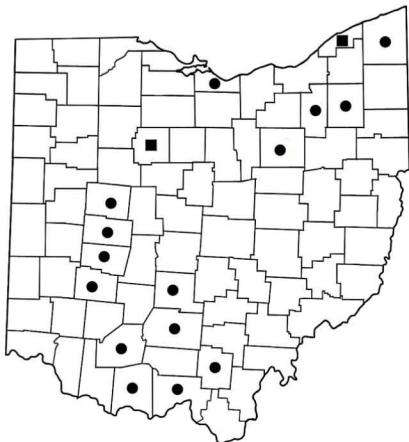
Climacium kindbergii (Renauld & Cardot) Grout
CLIMACIACEAE



Codriophorus aciculare (Hedwig) P. Beauvois
(*Racomitrium aciculare*)
GRIMMIACEAE



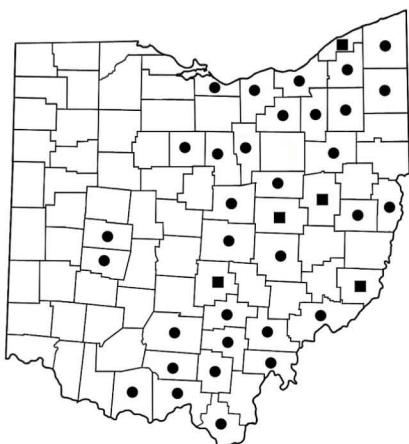
Conardia compacta (Müller Hal.) H. Robinson
(*Amblystegium compactum*)
AMBLYSTEGIACEAE



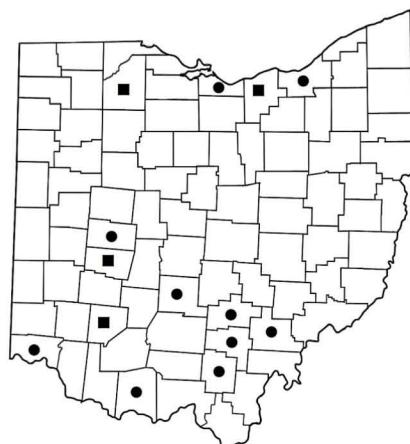
Cratoneuron filicinum (Hedwig) Spruce
AMBLYSTEGIACEAE



Cryphaea glomerata Schimper ex Sullivant
CRYPHAEACEAE



Ctenidium molluscum (Hedwig) Mitten
(*Ctenidium malacodes*)
HYPNACEAE



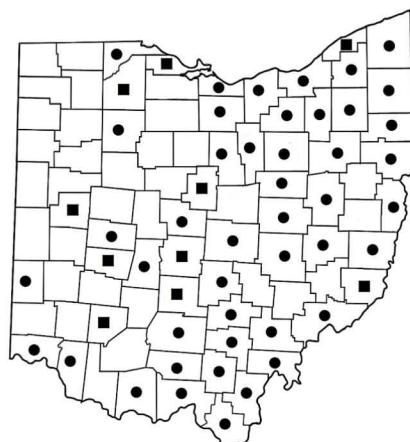
Cyrtosmia minutulum (Hedwig)
W.R. Buck & H.A. Crum
THUIDIACEAE



Cyrtosmia pygmaea (Schimper)
W.R. Buck & H.A. Crum
THUIDIACEAE



Cyrtomnium hymenophylloides
(Huebener) T.J. Koponen
MNIACEAE

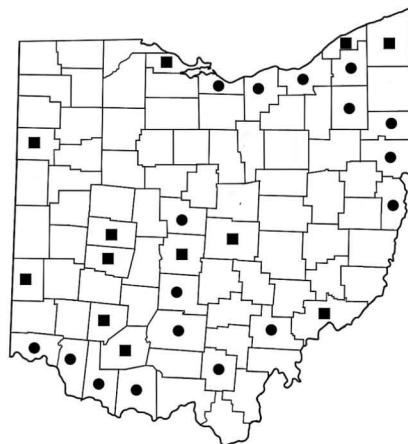


Dicranella palustris (Dickson) E.F. Warburg
DICRANACEAE





Dicranella schreberiana
(Hedwig) Hilferty ex H.A. Crum & L.E. Anderson
DICRANACEAE



Dicranella varia (Hedwig) Schimper
DICRANACEAE



Dicranodontium denudatum (Bridel) E. Britton
DICRANACEAE



Dicranum bonjeanii De Notaris
DICRANACEAE



Dicranum condensatum Hedwig
DICRANACEAE



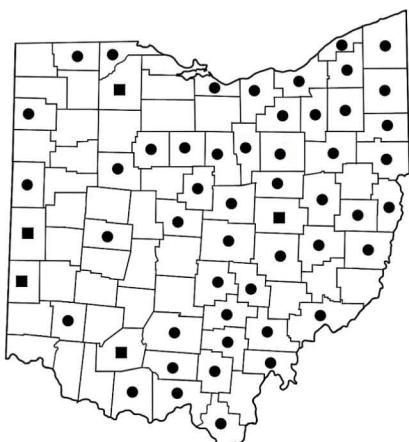
Dicranum flagellare Hedwig
DICRANACEAE



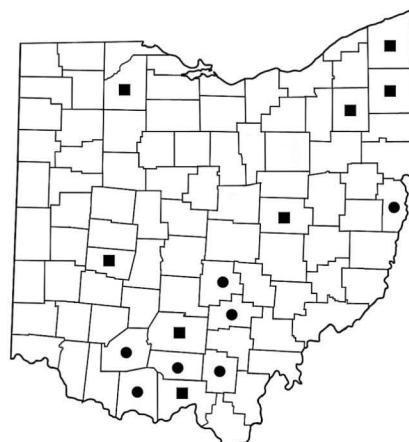
Dicranum fulvum Hooker
DICRANACEAE



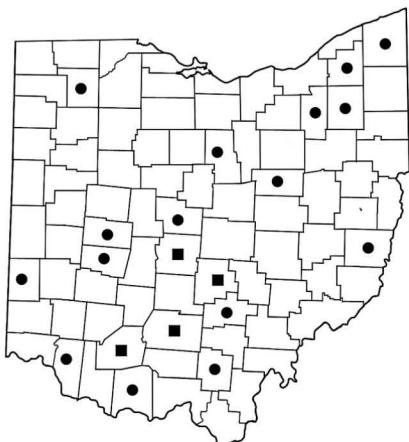
Dicranum fuscescens Turner
DICRANACEAE



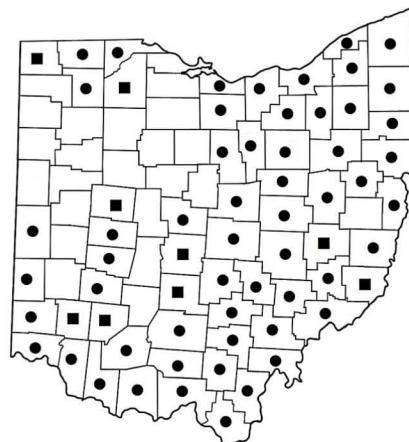
Dicranum montanum Hedwig
DICRANACEAE



Dicranum ontariense W.L. Peterson
DICRANACEAE



Dicranum polysetum Swartz
DICRANACEAE



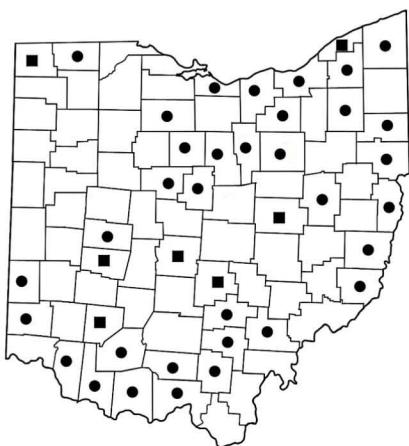
Dicranum scoparium Hedwig
DICRANACEAE



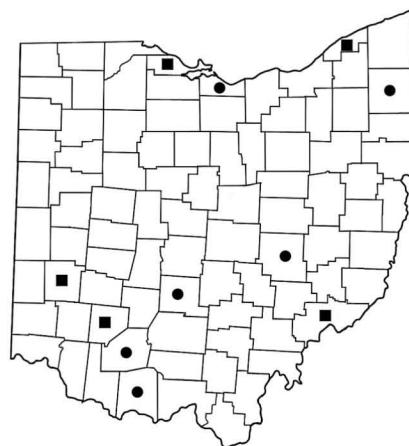
Dicranum spurium Hedwig
DICRANACEAE



Dicranum undulatum Bridel
DICRANACEAE



Dicranum viride (Sullivant & Lesquereux) Lindberg
DICRANACEAE



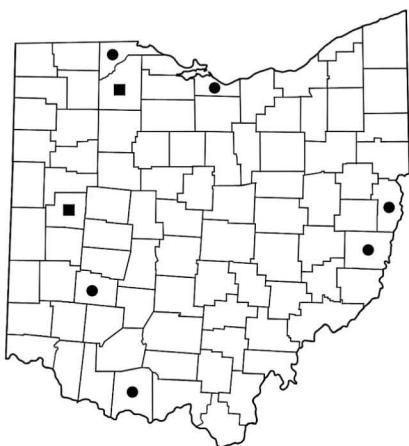
Didymodon fallax (Hedwig) R.H. Zander
(*Barbula fallax*)
POTTIACEAE



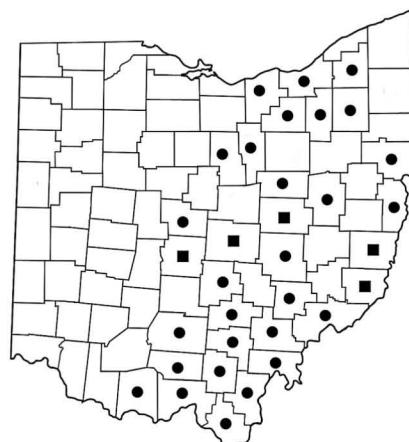
Didymodon ferrugineus
(Schimper ex Bescherelle) M. O. Hill
(*Didymodon fallax* var. *reflexus*)
POTTIACEAE



Didymodon rigidulus Hedwig
POTTIACEAE



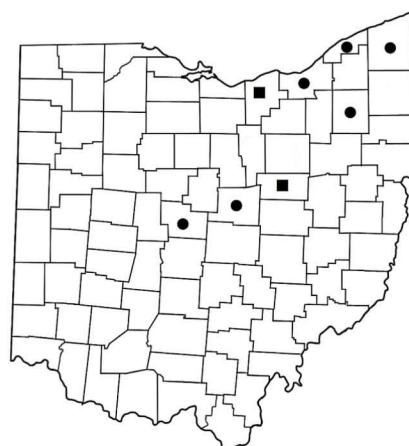
Didymodon tophaceus (Bridel) Lisa
POTTIACEAE



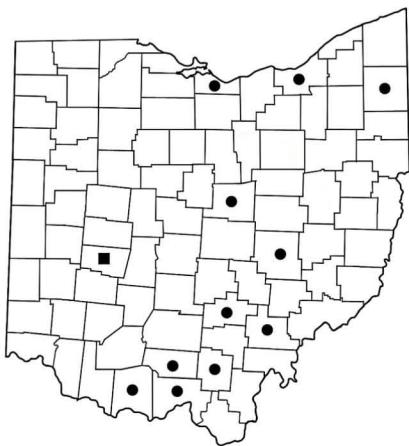
Diphyscium foliosum (Hedwig) D. Mohr
DIPHYSIACEAE



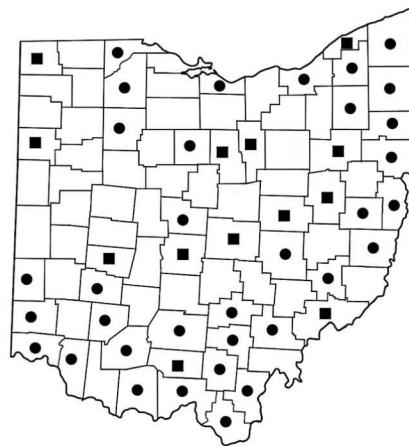
Diphyscium mucronifolium
Mitten in F. Dozy & J.H. Molkenborer
(*Diphyscium cumberlandianum*)
DIPHYSIACEAE



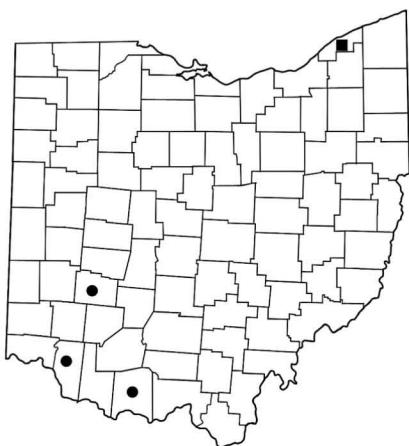
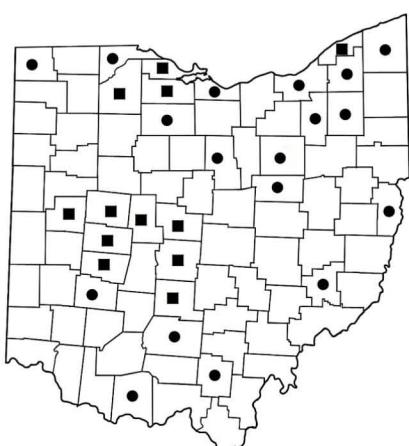
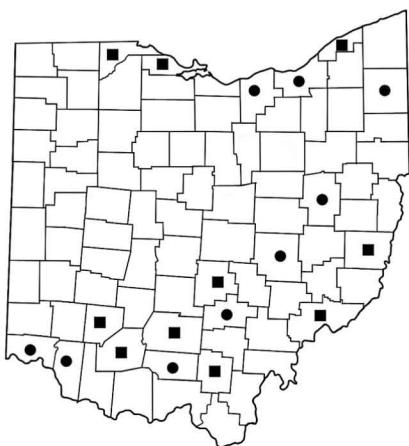
Disclerium nudum (Dickson) Bridel
DISCELIACEAE



Ditrichum lineare (Swartz) Lindberg
DITRICHACEAE

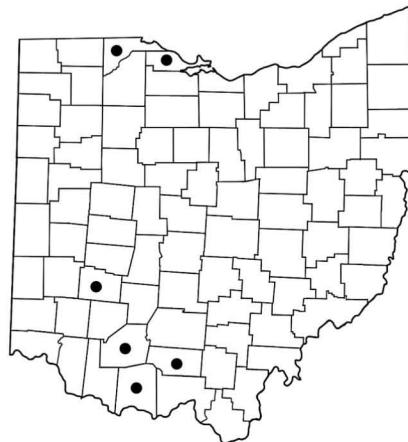


Ditrichum pallidum (Hedwig) Hampe
DITRICHACEAE





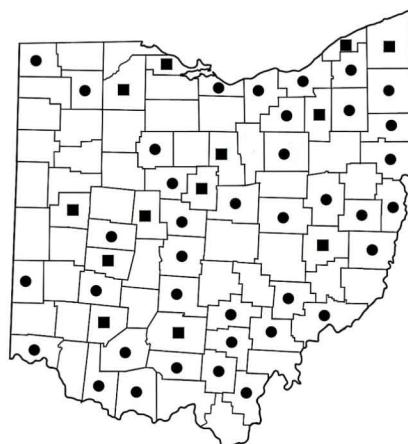
Encalypta ciliata Hedwig
ENCALYPTACEAE



Encalypta procera Bruch
ENCALYPTACEAE



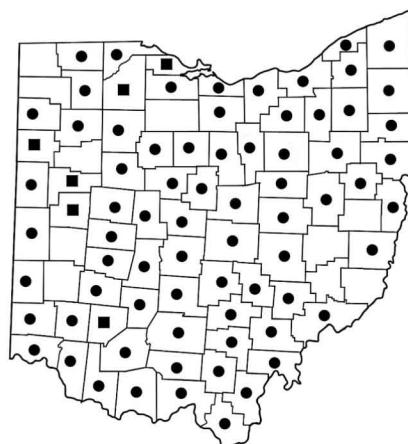
Entodon brevisetus (Hooker & Wilson) Lindberg
ENTODONTACEAE



Entodon cladorrhizans (Hedwig) Müller Hal.
ENTODONTACEAE



Entodon compressus (Hedwig) Müller Hal.
ENTODONTACEAE



Entodon seductrix (Hedwig) Müller Hal.
ENTODONTACEAE



Ephemerum cohaerens (Hedwig) Hampe
EPHEMERACEAE



Ephemerum crassinervium
(Schwägrichen) Hampe (*sensu lato*)
EPHEMERACEAE



Ephemerum crassinervium
(Schwägrichen) Hampe var. *crassinervium*
EPHEMERACEAE



Ephemerum crassinervium var. *texanum*
(Grout) V. S. Bryan & L. E. Anderson
EPHEMERACEAE



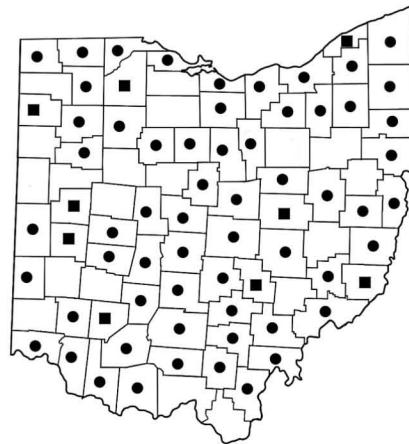
Ephemerum serratum (Hedwig) Hampe
EPHEMERACEAE



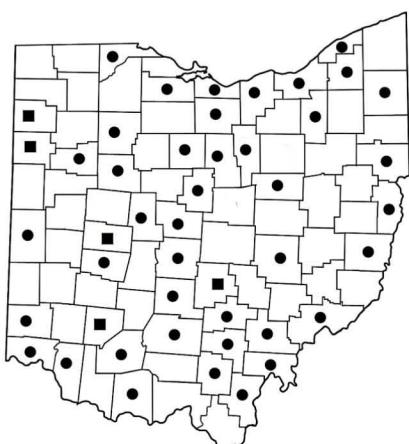
Ephemerum spinulosum
Bruch & Schimper in W. P. Schimper
EPHEMERACEAE



Eucladium verticillatum (Bridel) Bruch & Schimper
POTTIACEAE



Eurhynchium hians (Hedwig) Sande Lacoste
BRACHYTHECIACEAE



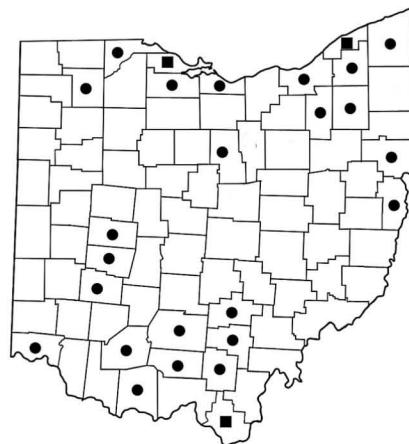
Eurhynchium pulchellum (Hedwig) Jennings
BRACHYTHECIACEAE



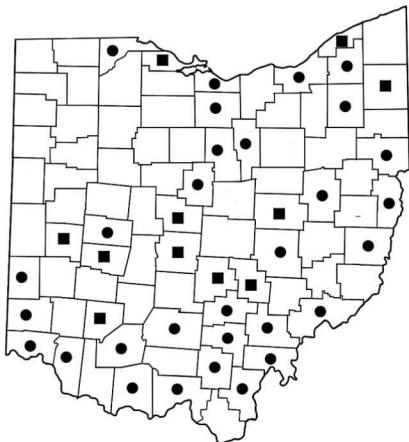
Fabronia ciliaris (Bridel) Bridel
FABRONIACEAE



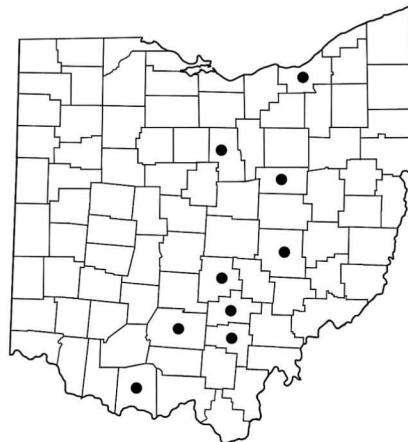
Fabronia ciliaris var. *polycarpa* (Hooker) Buck
FABRONIACEAE



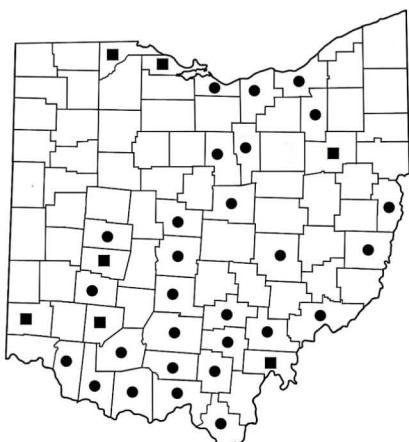
Fissidens adianthoides Hedwig
FISSIDENTACEAE



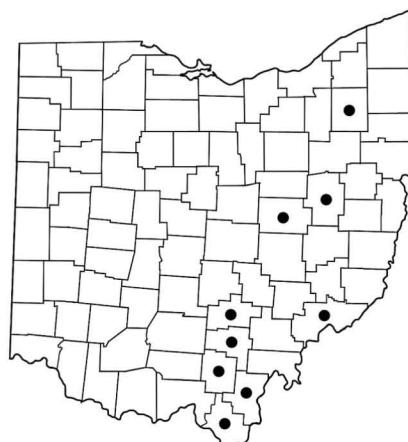
Fissidens bryoides Hedwig
FISSIDENTACEAE



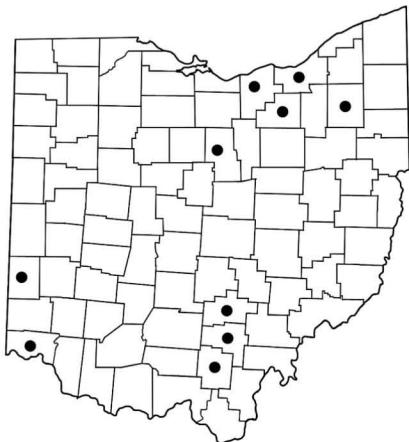
Fissidens bushii (Cardot & Thériot) Cardot & Thériot
FISSIDENTACEAE



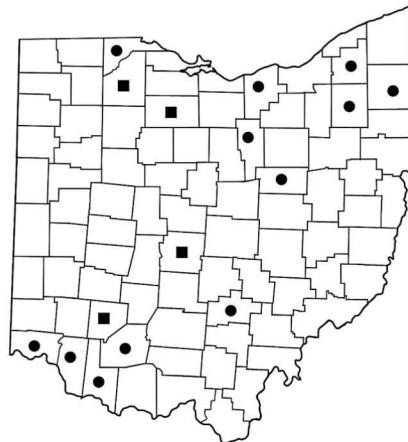
Fissidens dubius P. Beauvois
FISSIDENTACEAE



Fissidens elegans Bridel
(*Fissidens ravenellii*)
FISSIDENTACEAE



Fissidens exilis Hedwig
FISSIDENTACEAE



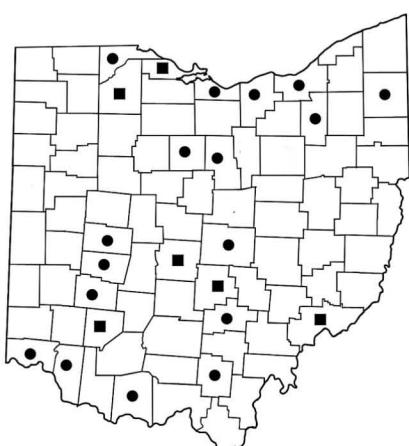
Fissidens fontanus (Bachelot de la Pylaie) Steudel
FISSIDENTACEAE



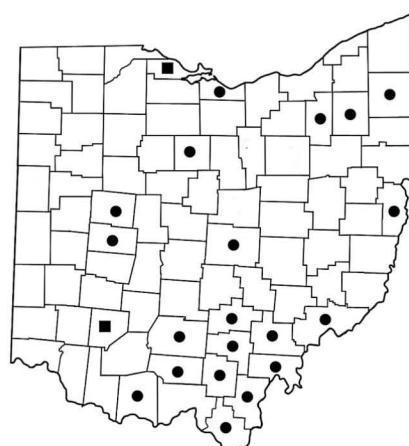
Fissidens hyalinus Wilson & Hooker
FISSIDENTACEAE



Fissidens minutulus Sullivant
FISSIDENTACEAE



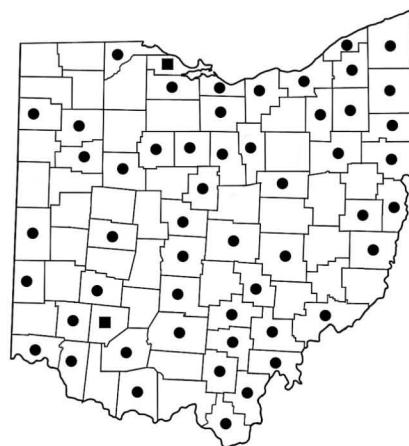
Fissidens obtusifolius Wilson
FISSIDENTACEAE



Fissidens osmundioides Hedwig
FISSIDENTACEAE



Fissidens subbasilaris Hedwig
FISSIDENTACEAE



Fissidens taxifolius Hedwig
FISSIDENTACEAE



Fontinalis antipyretica Hedwig
var. *gigantea* (Sullivant) Sullivant
FONTINALACEAE



Fontinalis dalecarlica Bruch & Schimper
FONTINALACEAE



Fontinalis filiformis Sullivant & Lesquereux
FONTINALACEAE



Fontinalis flaccida Renauld & Cardot
FONTINALACEAE



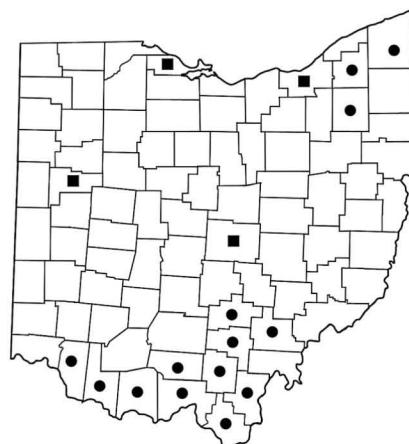
Fontinalis hypnoides var. *duriæi* (Schimper) Husnot
FONTINALACEAE



Fontinalis hypnoides Hartman var. *hypnoides*
FONTINALACEAE



Fontinalis missourica Cardot
FONTINALACEAE



Fontinalis novae-angliae Sullivant
FONTINALACEAE



Fontinalis novae-angliae
var. *cymbifolia* (Austin) W. H. Welch
FONTINALACEAE



Fontinalis sphagnifolia (Müller Hal.) Wijk & Margadant
FONTINALACEAE



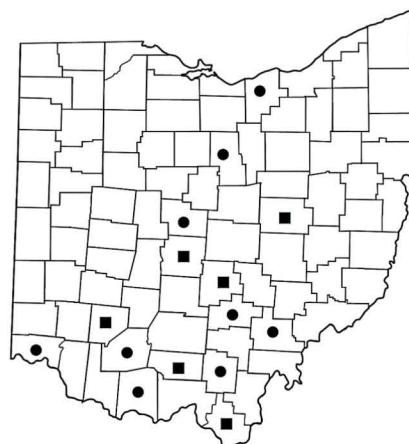
Fontinalis sullivantii Lindberg
FONTINALACEAE



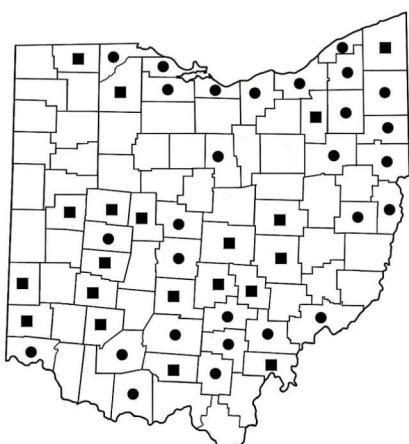
Forsstroemia producta (Hornschuch) Paris
LEUCODONTACEAE



Forsstroemia trichomitria (Hedwig) Lindberg
LEUCODONTACEAE



Funaria flavicans Michaux
FUNARIACEAE



Funaria hygrometrica Hedwig
FUNARIACEAE



Grimmia anodon Bruch & Schimper
GRIMMIACEAE



Grimmia laevigata (Bridel) Bridel
GRIMMIACEAE



Grimmia olneyi Sullivant
GRIMMIACEAE



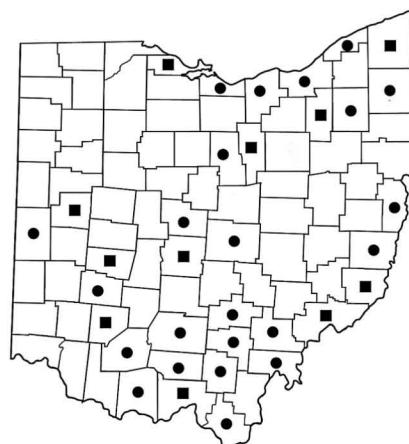
Grimmia pilifera P. Beauvois
GRIMMIACEAE



Grimmia plagiopodia Hedwig
GRIMMIACEAE



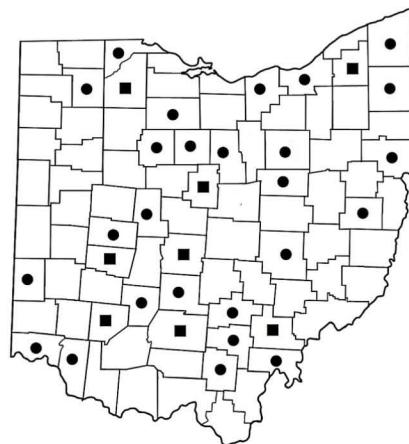
Grimmia pulvinata (Hedwig) Smith in J.E. Smith et al.
GRIMMIACEAE



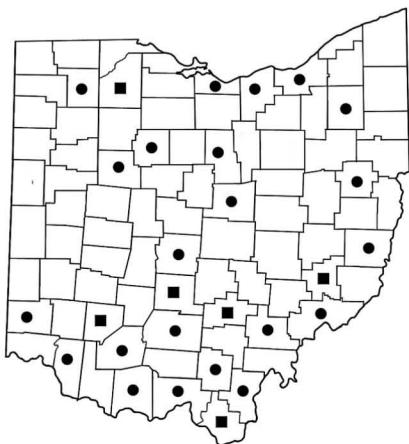
Gymnostomum aeruginosum Smith
POTTIACEAE



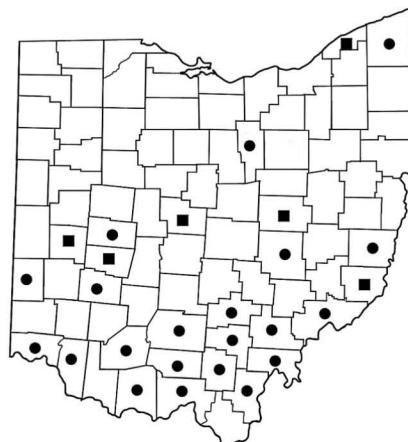
Hamatocaulis vernicosus (Mitten) Hedenas
AMBLYSTEGIACEAE



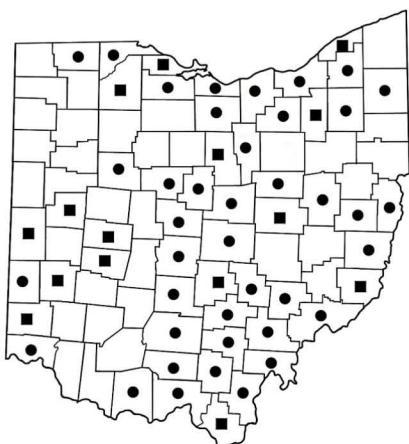
Haplocladium microphyllum
(Hedwig) R. Watanabe & Z. Iwatsuki
LESKIACEAE



Haplocladium virginianum
(Bridel) R. Watanabe & Z. Iwatsuki
LESKIACEAE



Haplohymenium triste (Cesati) Kindberg
THUIDIACEAE



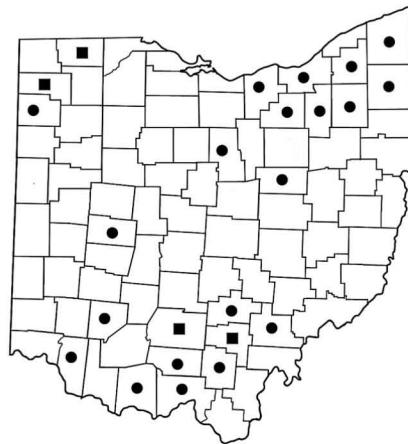
Hedwigia ciliata (Hedwig) P. Beauvois
HEDWIGIACEAE



Helodium blandowii
(F. Weber & D. Mohr) Warnstorf var. *blandowii*
THUIDIACEAE



Helodium blandowii var. *heliodioides* (Renauld &
Cardot) Crum, H.A. Steere & L.E. Anderson
THUIDIACEAE



Helodium paludosum (Austin) Brotherus
THUIDIACEAE



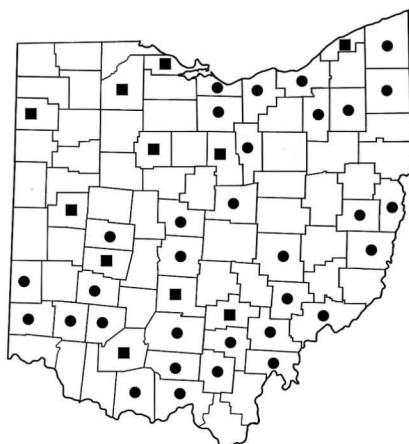
Herzogiella striatella (Bridel) Z. Iwatsuki
HYPNACEAE



Herzogiella turfacea (Lindberg) Z. Iwatsuki
HYPNACEAE



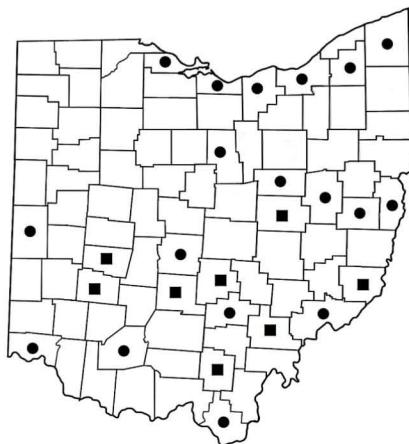
Homalotheciella subcapillata (Hedwig) Brotherus
HYPNACEAE



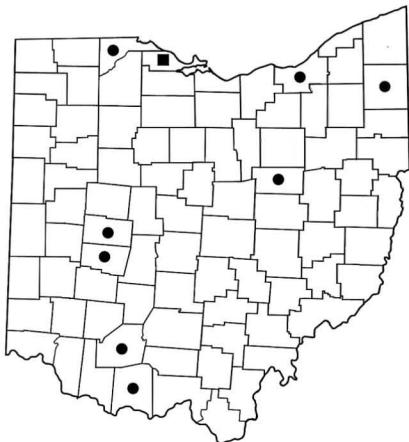
Homomallium adnatum (Hedwig) Brotherus
HYPNACEAE



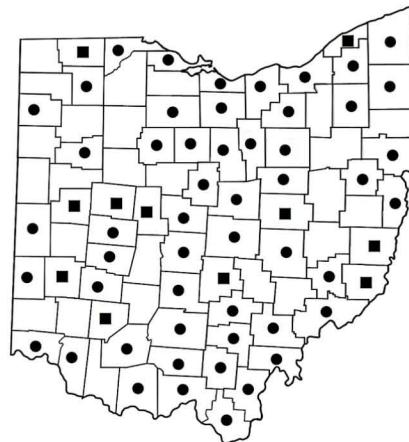
Hookeria acutifolia Hooker & Greville
HOOKERIACEAE



Hygroamblystegium fluviatile (Hedwig) Loeske
AMBLYSTEGIACEAE



Hygroamblystegium tenax var. *spinifolium*
(Schimper) Jennings
AMBLYSTEGIACEAE



Hygroamblystegium tenax
(Hedwig) Jennings var. *tenax*
AMBLYSTEGIACEAE



Hygrohypnum closteri (Austin) Grout
AMBLYSTEGIACEAE



Hygrohypnum eugyrium (Schimper) Brotherus
AMBLYSTEGIACEAE



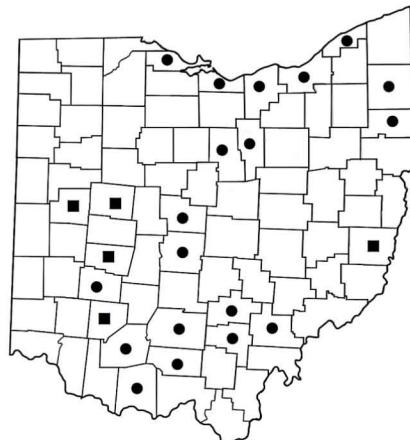
Hygrohypnum luridum (Hedwig) Jennings
AMBLYSTEGIACEAE



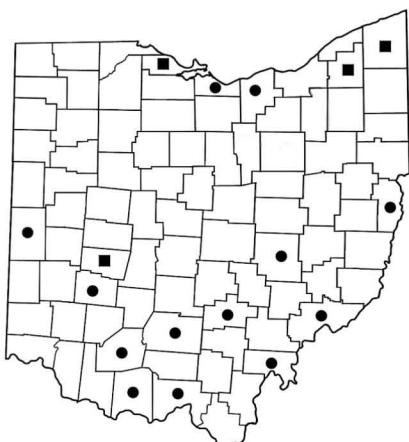
Hygrohypnum ochraceum (Turner ex Wilson) Loeske
AMBLYSTEGIACEAE



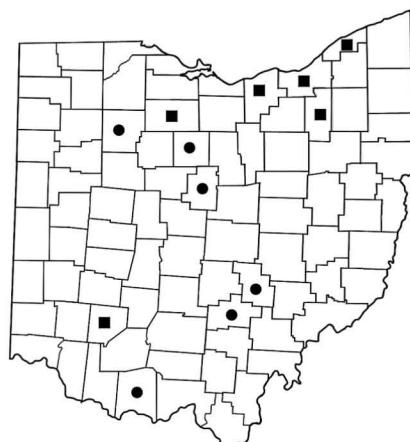
Hylocomium splendens (Hedwig) Schimper
HYLOCOMIACEAE



Hymenostylium recurvirostre (Hedwig) Dixon
POTTIACEAE



Hyophila involuta (Hooker) A. Jaeger
POTTIACEAE



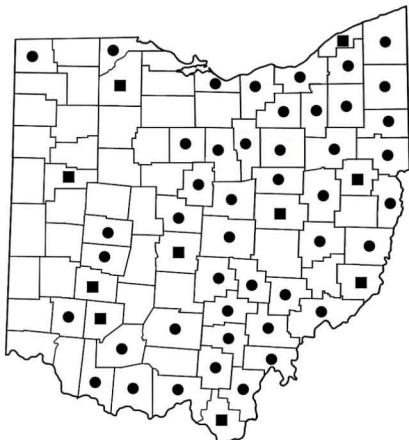
Hypnum cupressiforme Hedwig var. *cupressiforme*
HYPNACEAE



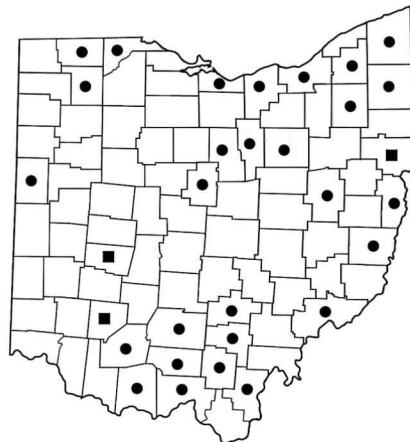
Hypnum cupressiforme Hedwig var. *filiforme* Bridel
HYPNACEAE



Hypnum curvifolium Hedwig
HYPNACEAE



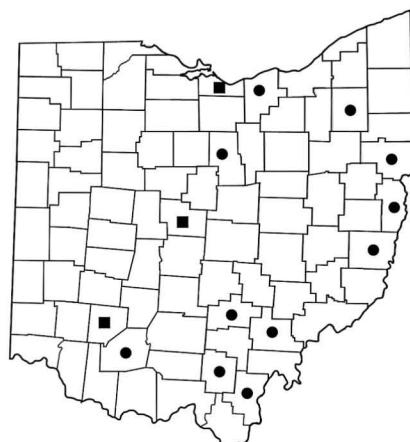
Hypnum imponens Hedwig
HYPNACEAE



Hypnum pallescens (Hedwig) P. Beauvois
HYPNACEAE



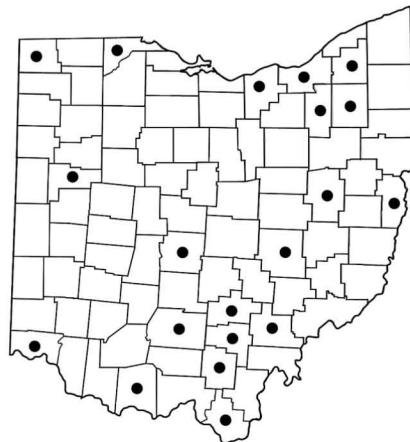
Hypnum pratense Koch ex Spruce
HYPNACEAE



Isopterygiopsis muelleriana (Schimper) Z. Iwatsuki
PLAGIOTHECIACEAE



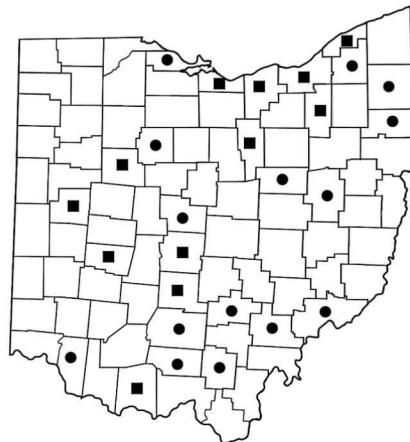
Isopterygiopsis pulchella (Hedwig) Z. Iwatsuki
PLAGIOTHECIACEAE



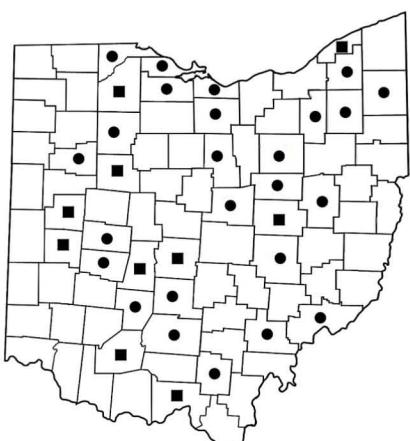
Isopterygium tenerum (Swartz) Mittén
HYPNACEAE



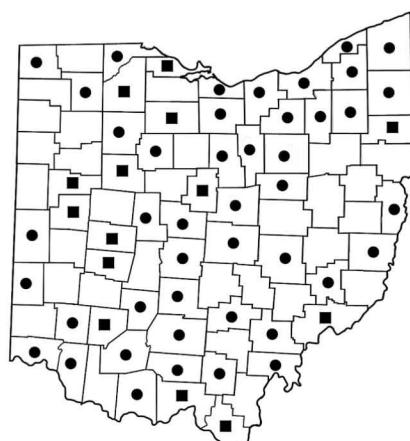
Jaffueliobryum wrightii (Sullivant) Thériot
GRIMMIACEAE



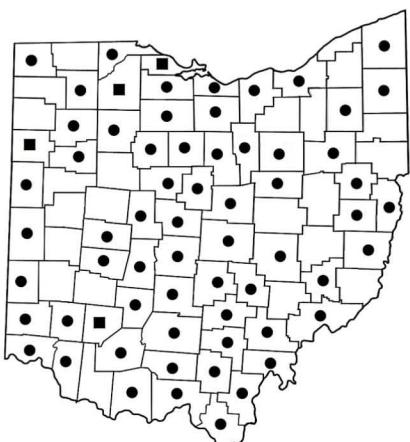
Leptobryum pyriforme (Hedwig) Wilson
BRYACEAE



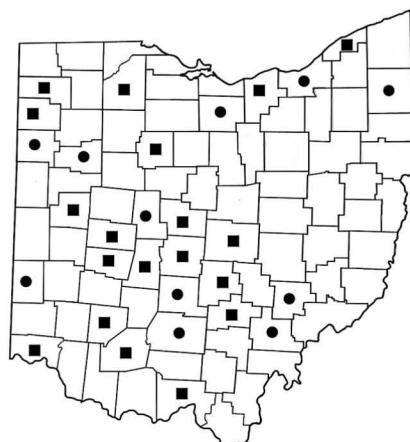
Leptodictyum humile (P. Beauvois) Ochyra
AMBLYSTEGIACEAE



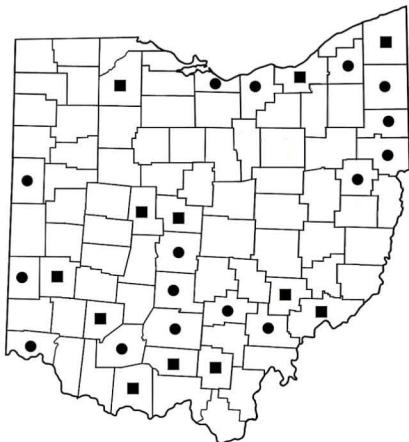
Leptodictyum riparium (Hedwig) Warnstorf
AMBLYSTEGIACEAE



Leskeia gracilescens Hedwig
LESKEACEAE



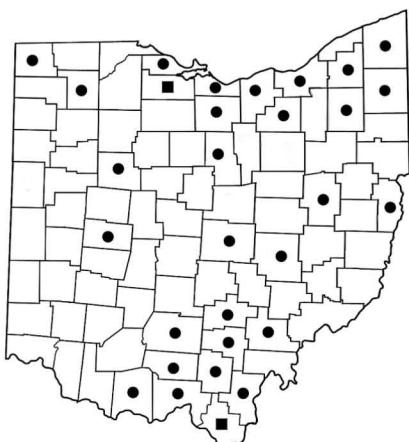
Leskeia obscura Hedwig
LESKEACEAE



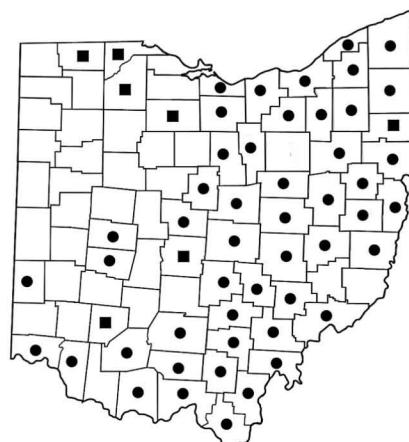
Leskeia polycarpa Ehrhart ex Hedwig
LESKEACEAE



Leskeella nervosa (Bridel) Loeske
LESKEACEAE



Leucobryum albidum (P. Beauvois) Lindberg
LEUCOBRYACEAE



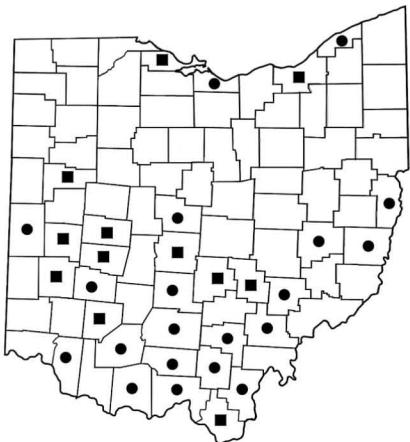
Leucobryum glaucum
(Hedwig) Ångström in E.M. Fries
LEUCOBRYACEAE



Leucodon andrewsianus (H.A. Crum & L.E. Anderson)
W.D. Reese & L.E. Anderson
LEUCODONTACEAE



Leucodon brachypus Bridel
LEUCODONTACEAE



Leucodon julaceus (Hedwig) Sullivant
LEUCODONTACEAE



Limprichtia cossoni
(Schimper) L.E. Anderson, H.A. Crum & W.R. Buck
AMBLYSTEGIACEAE



Limprichtia revolvens (Swartz) Loeske
AMBLYSTEGIACEAE



Lindbergia brachyptera (Mitten) Kindberg
LESKEACEAE



Loeskeobryum brevirostre (Bridel) M. Fleischer
HYLOCOMIACEAE



Meesia longiseta Hedwig
MEESIACEAE



Micromitrium synoicum (James) Austin
EPHEMERACEAE



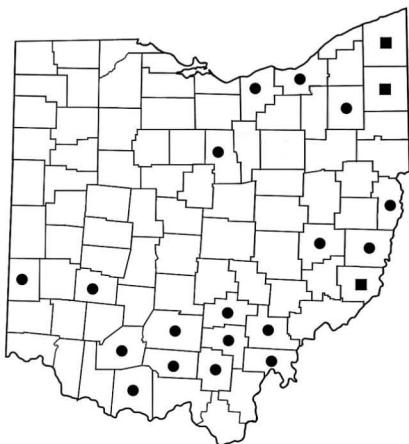
Micromitrium tenerum Bruch & Schimper
(*Micromitrium austini*)
EPHEMERACEAE



Mnium ambiguum Müller Hal.
(*Mnium affine* var. *rugicum*)
MNIACEAE



Mnium hornum Hedwig
MNIACEAE



Mnium marginatum
(Dickson ex Withering) P. Beauvois
MNIACEAE



Mnium spinulosum Bruch & Schimper
MNIACEAE



Mnium stellare Reichard ex Hedwig
MNIACEAE



Mnium thomsonii Schimper
MNIACEAE



Myurella sibirica (Müller Hal.) Reimers
THELIACEAE



Neckera pennata Hedwig
NECKERACEAE



Oncophorus wahlenbergii Bridel
DICRANACEAE



Orthotrichum anomalum Hedwig
ORTHOTRICHACEAE



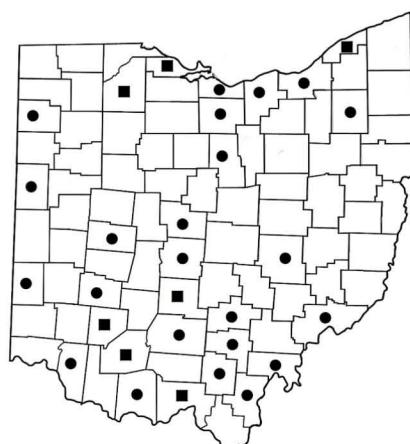
Orthotrichum diaphanum Schrader ex Bridel
ORTHOTRICHACEAE



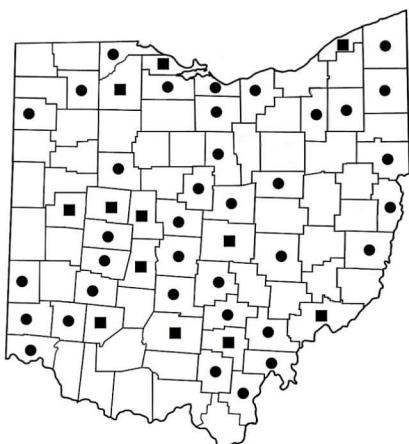
Orthotrichum elegans Hooker & Greville
ORTHOTRICHACEAE



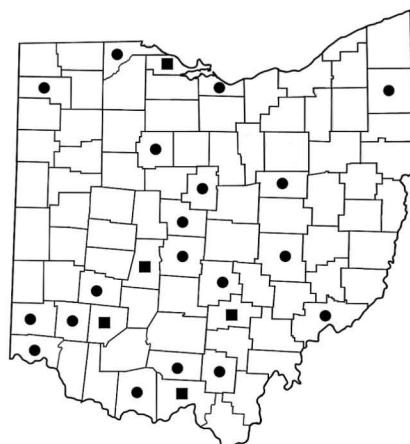
Orthotrichum obtusifolium Bridel
ORTHOTRICHACEAE



Orthotrichum ohioense Sullivant & Lesquereux
ORTHOTRICHACEAE



Orthotrichum pumilum Swartz
ORTHOTRICHACEAE



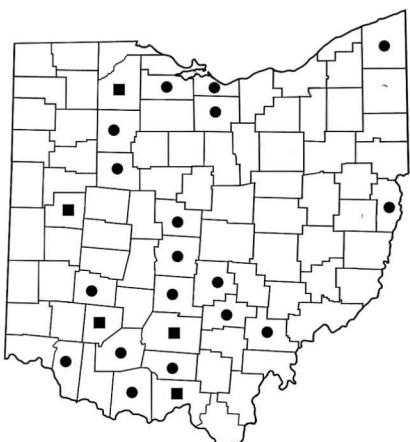
Orthotrichum pusillum Mitten
ORTHOTRICHACEAE



Orthotrichum sordidum Sullivant & Lesquereux
ORTHOTRICHACEAE



Orthotrichum stellatum Bridel
ORTHOTRICHACEAE



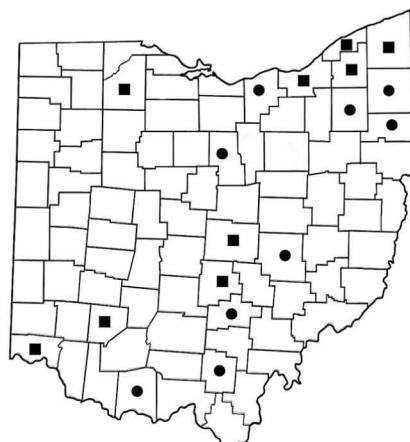
Orthotrichum strangulatum P. Beauvois
ORTHOTRICHACEAE



Palustriella commutata (Bridel) Ochyra
AMBLYSTEGIACEAE



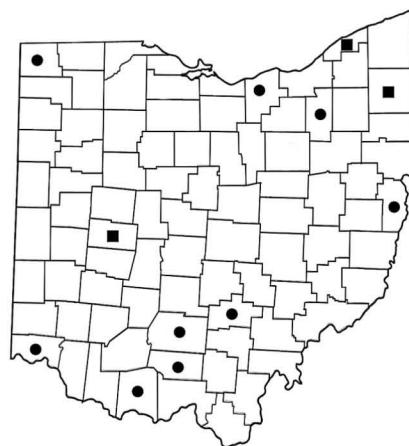
Philonotis fontana var. *caespitosa*
(Juratzka) Limprecht
BARTRAMIACEAE



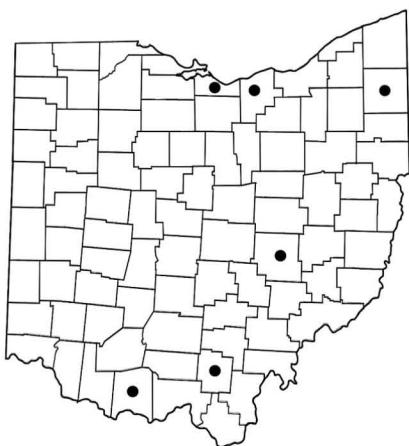
Philonotis fontana (Hedwig) Bridel var. *fontana*
BARTRAMIACEAE



Philonotis longiseta (Michaux) E. Britton
BARTRAMIACEAE



Philonotis marchica (Hedwig) Bridel
BARTRAMIACEAE



Philonotis muhlenbergii (Schwägrichen) Bridel
BARTRAMIACEAE



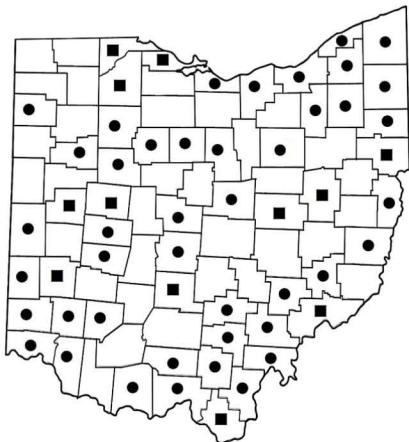
Physcomitrella patens (Hedwig) Bruch & Schimper
(*Aphanorrhegma patens*)
FUNARIACEAE



Physcomitrium hookeri Hampe
FUNARIACEAE



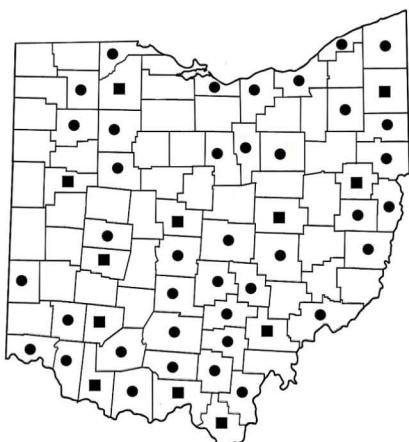
Physcomitrium immersum Sullivant
FUNARIACEAE



Physcomitrium pyriforme (Hedwig) Hampe
FUNARIACEAE



Plagiomnium affine
(Blandow ex Funck) T. J. Koponen
MNIACEAE



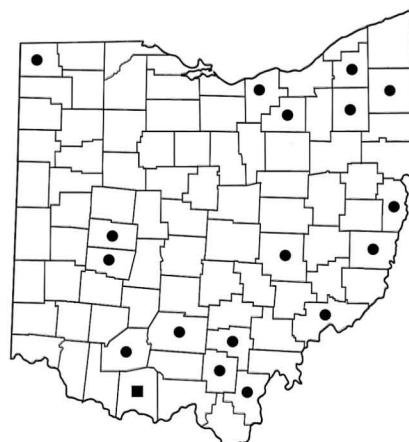
Plagiomnium ciliare (Müller Hal.) T. J. Koponen
MNIACEAE



Plagiomnium cuspidatum (Hedwig) T. J. Koponen
MNIACEAE



Plagiomnium drummondii
(Bruch & Schimper) T. J. Koponen
MNIACEAE



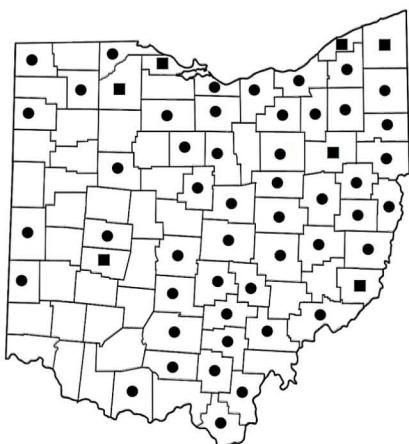
Plagiomnium ellipticum (Bridel) T. J. Koponen
MNIACEAE



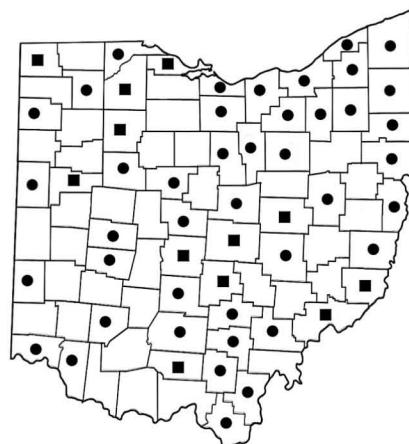
Plagiomnium medium
(Bruch & Schimper) T. J. Koponen
MNIACEAE



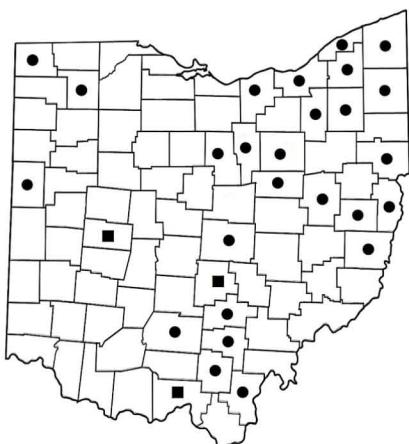
Plagiomnium rostratum (Schrader) T. J. Koponen
MNIACEAE



Plagiothecium cavifolium (Bridel) Z. Iwatsuki
PLAGIOTHECIACEAE



Plagiothecium denticulatum (Hedwig) Schimper
PLAGIOTHECIACEAE



Plagiothecium laetum Schimper
PLAGIOTHECIACEAE



Plagiothecium latebricola Schimper
PLAGIOTHECIACEAE



Platydictya confervoides (Bridel) H.A. Crum
AMBLYSTEGIACEAE



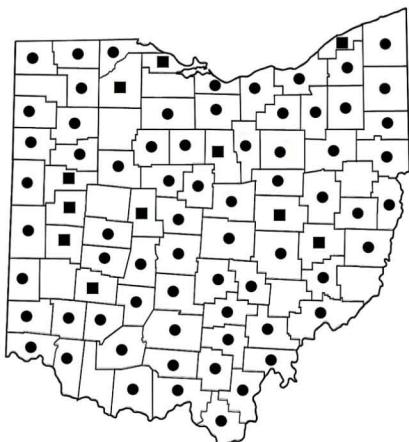
Platydictya jungermannioides (Bridel) H.A. Crum
AMBLYSTEGIACEAE



Platydictya minutissima
(Sullivant & Lesquereux) H.A. Crum
AMBLYSTEGIACEAE



Platydictya subtilis (Hedwig) H.A. Crum
AMBLYSTEGIACEAE



Platygyrium repens (Bridel) Schimper
HYPNACEAE



Platyhypnidium ripariooides (Hedwig) Dixon
BRACHYTHECIACEAE



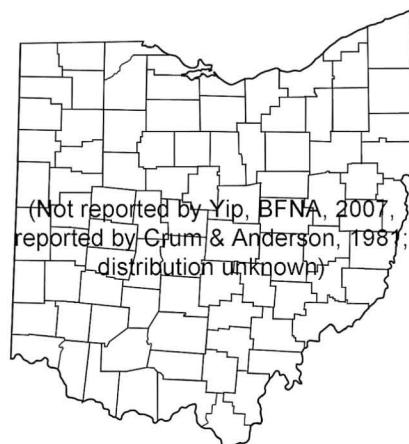
Platylomella lescurii (Sullivant) A.L. Andrews
AMBLYSTEGIACEAE



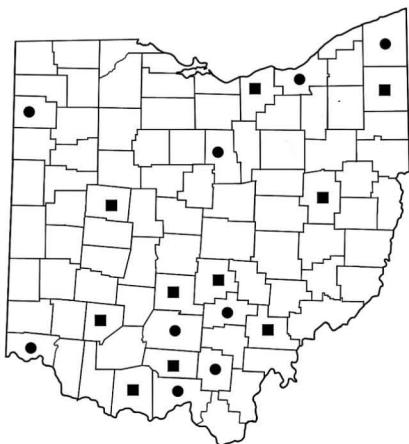
XPleuriditrichum marylandicum Andrews & Herman
(*Pleuridium subulatum* x *Ditrichum pallidum*)
DITRICHACEAE



Pleuridium acuminatum Lindberg
DITRICHACEAE



Pleuridium ravenelii Austin
DITRICHACEAE



Pleuridium subulatum (Hedwig) Rabenhorst
DITRICHACEAE



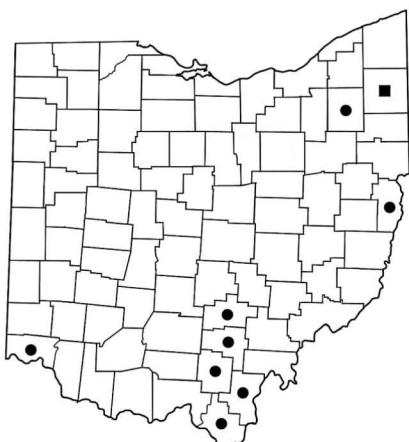
Pleurozium schreberi (Willdenow ex Bridel) Mitten
HYLOCOMIACEAE



Pogonatum brachyphyllum (Michaux) P. Beauvois
POLYTRICHACEAE



Pogonatum pensylvanicum (Hedwig) P. Beauvois
POLYTRICHACEAE



Pohlia annotina (Hedwig) Lindberg
BRYACEAE



Pohlia atropurpurea (Wahlenberg) H. Lindberg
BRYACEAE



Pohlia bulbifera (Warnstorf) Warnstorf
BRYACEAE



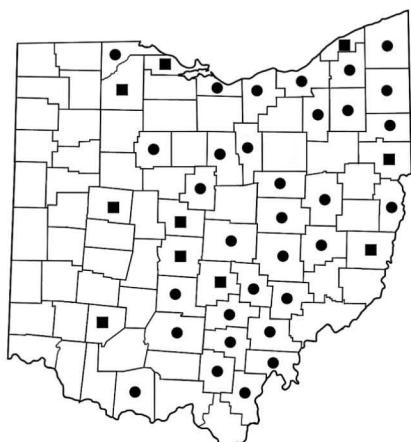
Pohlia elongata Hedwig
BRYACEAE



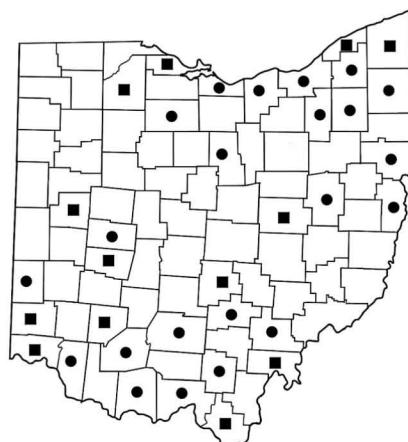
Pohlia lescuriana (Sullivant) Ochi
BRYACEAE



Pohlia melanodon (Bridel) A.J. Shaw
BRYACEAE



Pohlia nutans (Hedwig) Lindberg
BRYACEAE



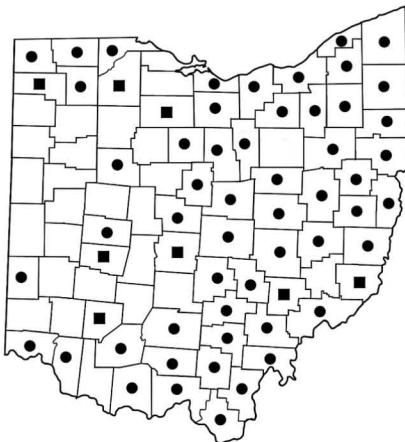
Pohlia wahlenbergii
(F. Weber & D. Mohr) A.L. Andrews
BRYACEAE



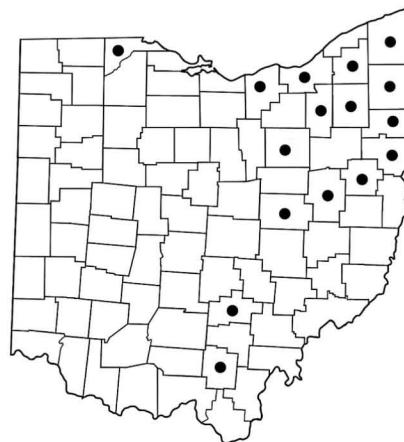
Polytrichastrum formosum (Hedwig) G.L. Smith
(*Polytrichum formosum*)
POLYTRICHACEAE



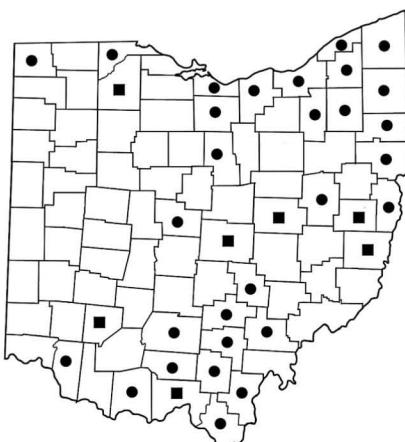
Polytrichastrum longisetum (Bridel) G.L. Smith
(*Polytrichum longisetum*)
POLYTRICHACEAE



Polytrichastrum ohioense
(Renauld & Cardot) G. L. Smith
(*Polytrichum ohioense*)
POLYTRICHACEAE



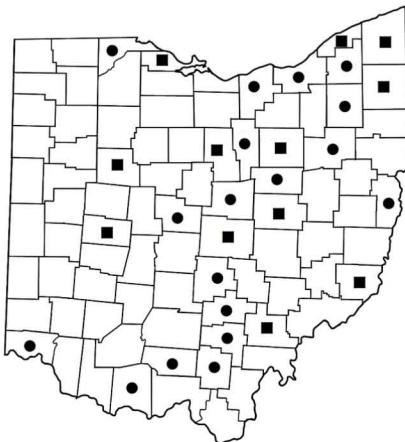
Polytrichastrum pallidisetum (Funck) G. L. Smith
(*Polytrichum pallidisetum*)
POLYTRICHACEAE



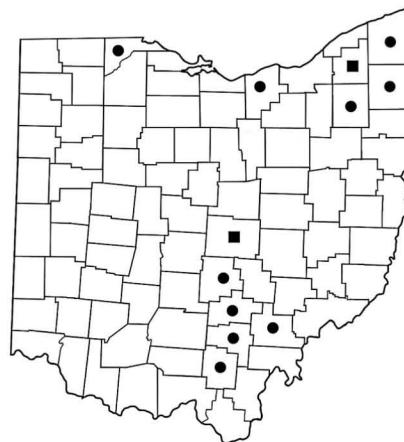
Polytrichum commune Hedwig
POLYTRICHACEAE



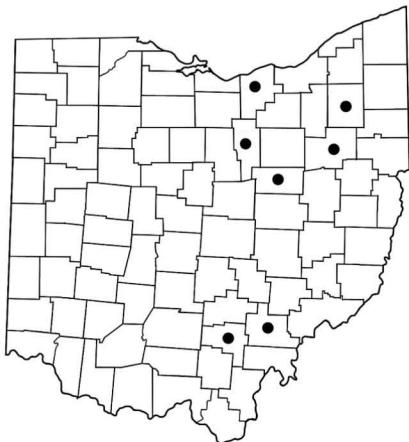
Polytrichum commune var. *perigonale*
(Michaux) Hampe
POLYTRICHACEAE



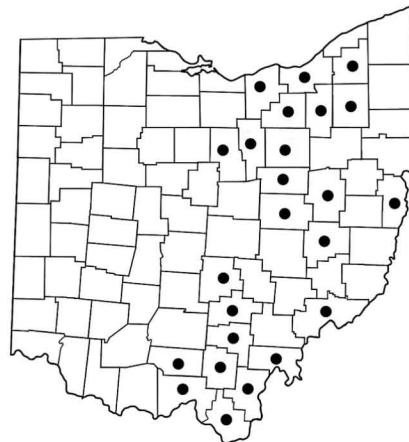
Polytrichum juniperinum Hedwig
POLYTRICHACEAE



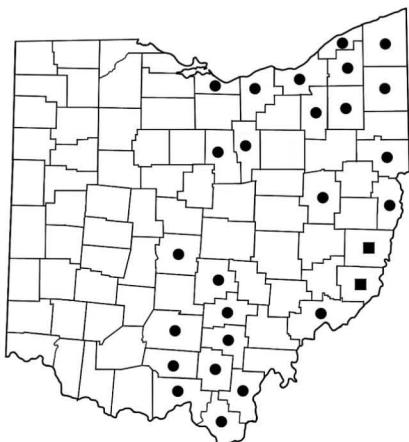
Polytrichum piliferum Hedwig
POLYTRICHACEAE



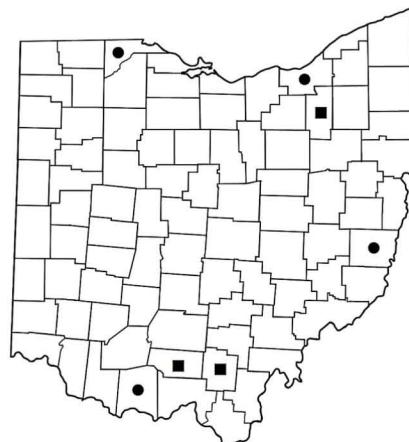
Polytrichum strictum Bridel
(*Polytrichum juniperinum* var. *affine*)
POLYTRICHACEAE



Pseudotaxiphyllum distichaceum (Mitten) Z. Iwatsuki
PLAGIOTHECIACEAE



Pseudotaxiphyllum elegans (Mitten) Z. Iwatsuki
PLAGIOTHECIACEAE



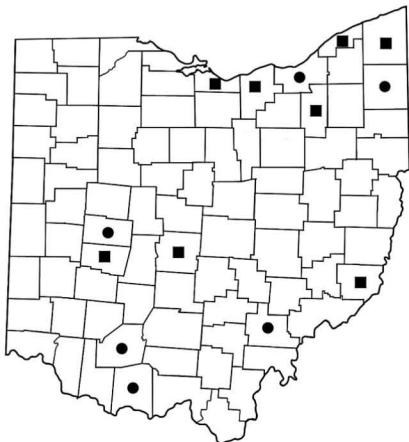
Ptilium crista-castrengensis (Hedwig) De Notaris
HYPNACEAE



Ptychomitrium drummondii (Wilson) Sullivant
PTYCHOMITRIACEAE



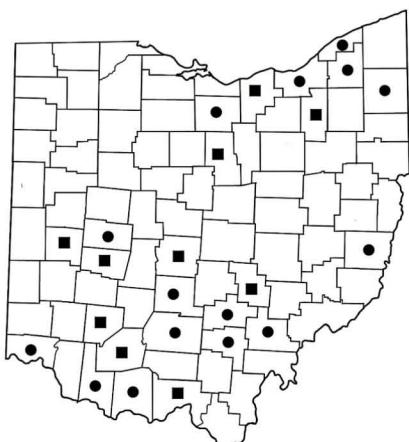
Ptychomitrium incurvum (Schwägrichen) Spruce
PTYCHOMITRIACEAE



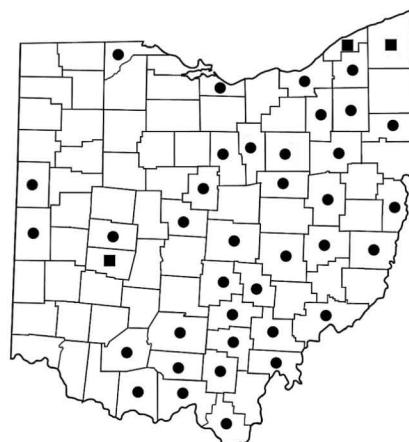
Pylaisia intricata (Hedwig) Schimper
(*Pylaisiella intricata*)
HYPNACEAE



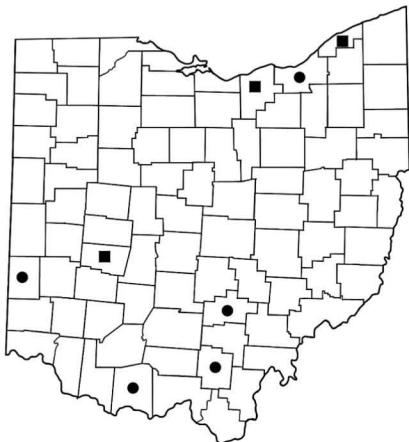
Pylaisia polyantha (Hedwig) Schimper
(*Pylaisiella polyantha*)
HYPNACEAE



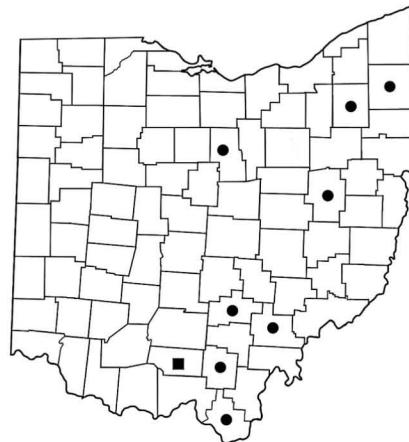
Pylaisia selwynii Kindberg
(*Pylaisiella selwynii*)
HYPNACEAE



Pylaisiadelta tenuirostris
(Bruch & Schimper) W.R. Buck
HYPNACEAE



Rauiella scita (P. Beauvois) Reimers
THUIDIACEAE



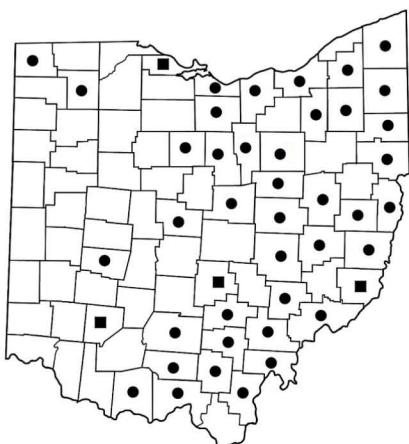
Rhabdoweisia crispata
(Dickson ex Withering) Lindberg
DICRANACEAE



Rhizomnium appalachianum T. J. Koponen
MNIACEAE



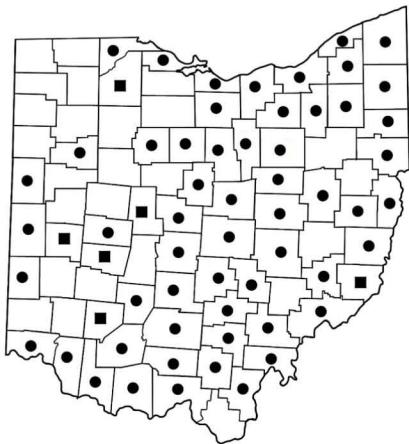
Rhizomnium magnifolium (Horikawa) T. J. Koponen
MNIACEAE



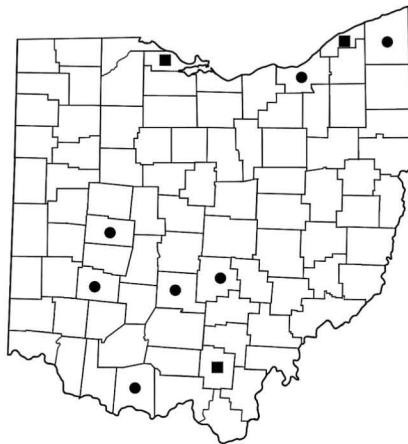
Rhizomnium punctatum (Hedwig) T. J. Koponen
MNIACEAE



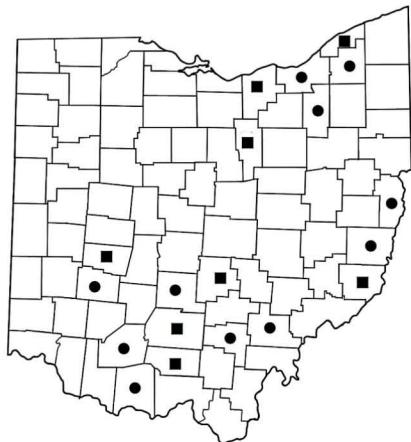
Rhodobryum ontariense (Kindberg) Paris
BRYACEAE



Rhynchosstegium serrulatum (Hedwig) A. Jaeger
(*Steereclerus serrulatus*)
BRACHYTHECIACEAE



Rhytidadelphus triquetrus (Hedwig) Warnstorf
HYLOCOMIACEAE



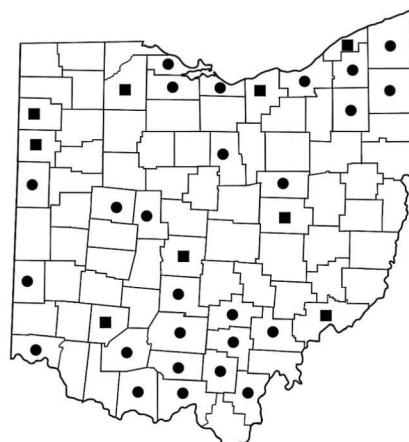
Rhytidium rugosum (Ehrhart ex Hedwig) Kindberg
HYLOCOMIACEAE



Saelania glaucescens (Hedwig)
Brotherus in O.J. Bormansson & V.F. Brotherus
DITRICHACEAE



Sanionia uncinata (Hedwig) Loeske
AMBLYSTEGIACEAE



Schistidium apocarpum (Hedwig) Bruch & Schimper
GRIMMIACEAE



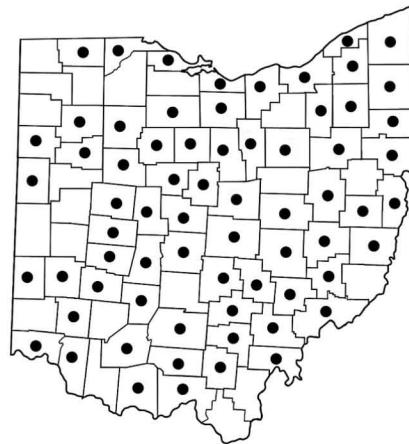
Schistidium crassithecium H.H. Blom ex B.H. Allen
GRIMMIACEAE



Schistidium lancifolium (Kindberg) H. H. Blom
GRIMMIACEAE



Schistidium papillosum Culmann in J. Amans
GRIMMIACEAE



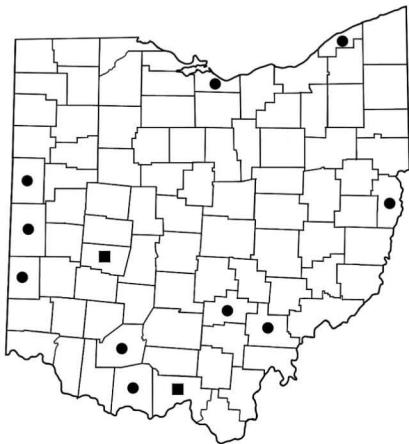
Schistidium rivulare (Bridel) Podpera
GRIMMIACEAE



Schistidium viride H.H. Blom & Darigo
GRIMMIACEAE



Schistostega pennata (Hedwig) F. Weber & D. Mohr
SCHISTOSTEGACEAE



Schwetschkeopsis fabronia
(Schwägrichen) Brotherus
FABRONIACEAE



Scorpidium scorpioides (Hedwig) Limpricht
AMBLYSTEGIACEAE



Seligeria calcarea (Hedwig) Bruch & Schimper
SELIGERIACEAE



Seligeria campylopoda
Kindberg in Macoun & Kindberg
SELIGERIACEAE



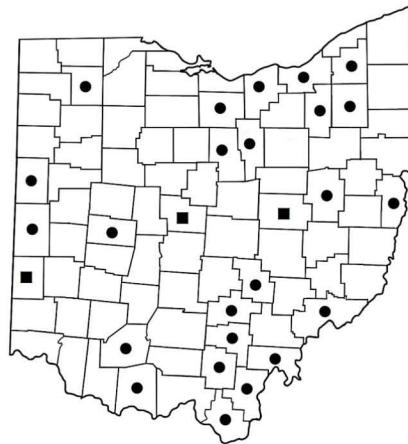
Seligeria donniana (Smith) Müller Hal.
SELIGERIACEAE



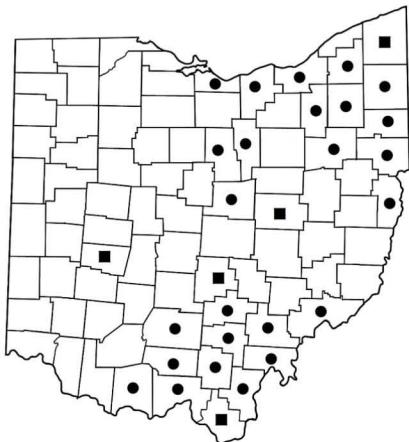
Seligeria pusilla (Hedwig) Bruch & Schimper
SELIGERIACEAE



Seligeria recurvata (Hedwig) Bruch & Schimper
SELIGERIACEAE



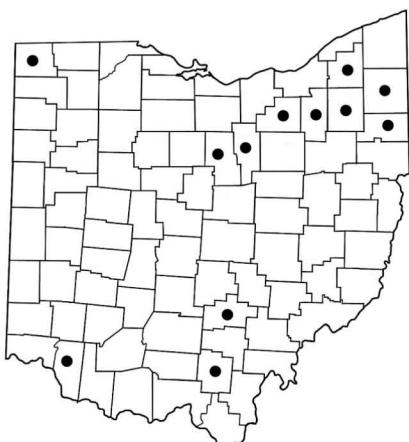
Sematophyllum adnatum (Michaux) E. Britton
SEMATOPHYLLACEAE



Sematophyllum demissum (Wilson) Mitten
SEMATOPHYLLACEAE



Sematophyllum marylandicum (Müller Hal.) E. Britton
SEMATOPHYLLACEAE



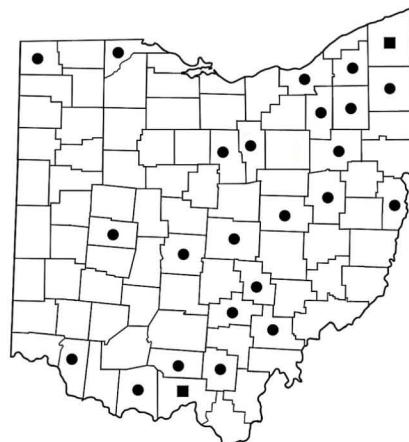
Sphagnum affine Renauld & Cardot
SPHAGNACEAE



Sphagnum angustifolium (Warnstorf) C.E.O. Jensen
SPHAGNACEAE



Sphagnum bartlettianum Warnstorf
SPHAGNACEAE



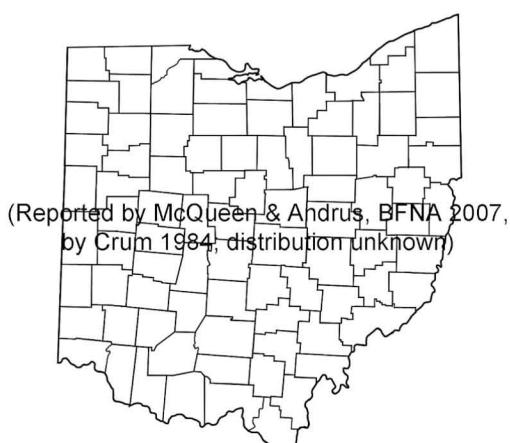
Sphagnum capillifolium (Ehrhart) Hedwig
SPHAGNACEAE



Sphagnum centrale C.E.O. Jensen
SPHAGNACEAE



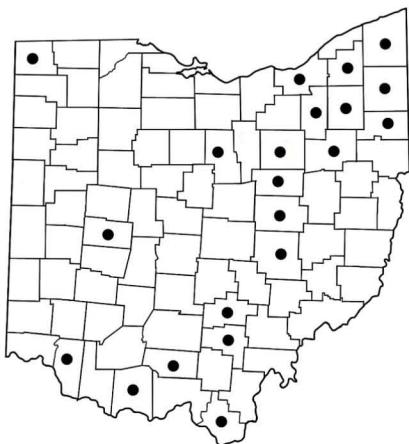
Sphagnum compactum Lamarck & de Candolle
SPHAGNACEAE



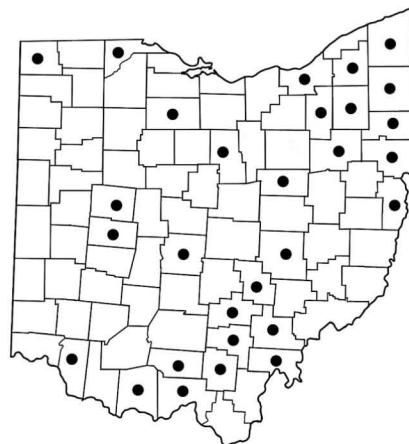
Sphagnum contortum Schultz
SPHAGNACEAE



Sphagnum cuspidatum Hoffmann
SPHAGNACEAE



Sphagnum fallax (H. Klinggräff) H. Klinggräff
SPHAGNACEAE



Sphagnum fimbriatum
Wilson & Hooker in J.D. Hooker
SPHAGNACEAE



Sphagnum fuscum (Schimper) H. Klinggräff
SPHAGNACEAE



Sphagnum girgensohnii Russow
SPHAGNACEAE



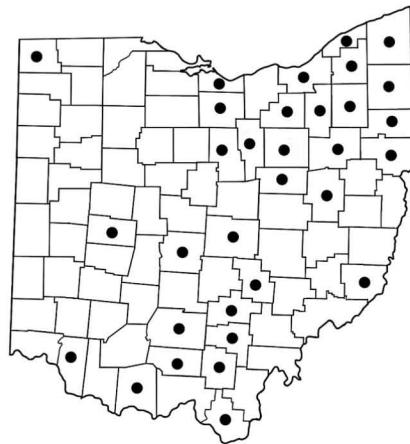
Sphagnum inundatum Russow
SPHAGNACEAE



Sphagnum lescurii Sullivant in A. Gray
SPHAGNACEAE



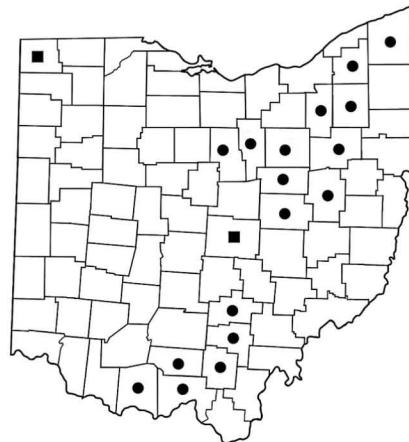
Sphagnum magellanicum Bridel
SPHAGNACEAE



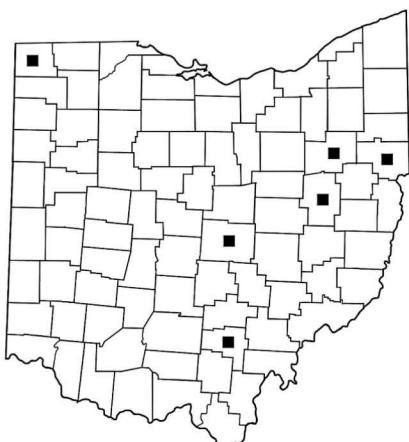
Sphagnum palustre Linnaeus
SPHAGNACEAE



Sphagnum papillosum Lindberg
SPHAGNACEAE



Sphagnum recurvum P. Beauvois
SPHAGNACEAE



Sphagnum recurvum P. Beauvois (*sensu lato*)
SPHAGNACEAE



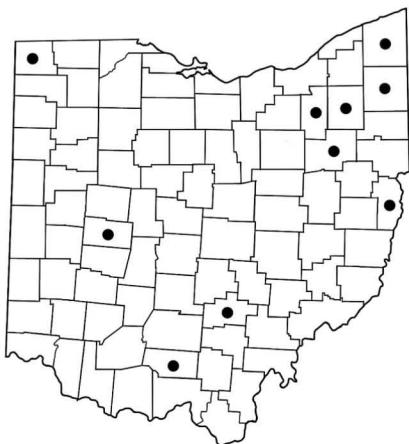
Sphagnum riparium Ångström
SPHAGNACEAE



Sphagnum rubellum Wilson
SPHAGNACEAE



Sphagnum russowii Warnstorf
SPHAGNACEAE



Sphagnum squarrosum Crome
SPHAGNACEAE



Sphagnum subsecundum Nees
SPHAGNACEAE



Sphagnum subsecundum Nees (*sensu lato*)
SPHAGNACEAE



Sphagnum teres (Schimper) Ångström
SPHAGNACEAE



Sphagnum warnstorffii Russow
SPHAGNACEAE



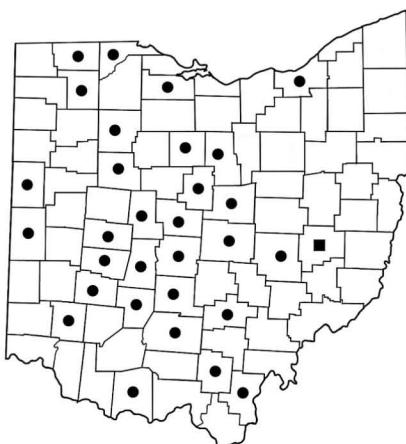
Sphagnum wulfianum Gиргенсоhn
SPHAGNACEAE



Splachnum ampullaceum Hedwig
SPLACHNACEAE



Syntrichia laevipila Bridel
(*Tortula pagorum*)
POTTIACEAE



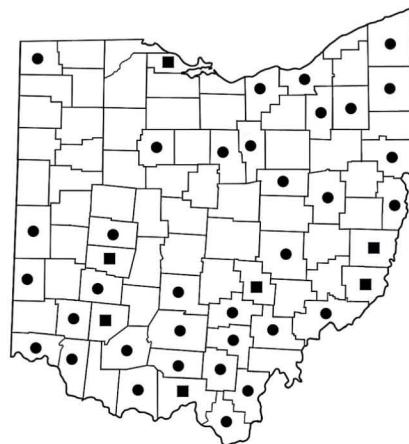
Syntrichia papillosa (Wilson) Juratzka
(*Tortula papillosa*)
POTTIACEAE



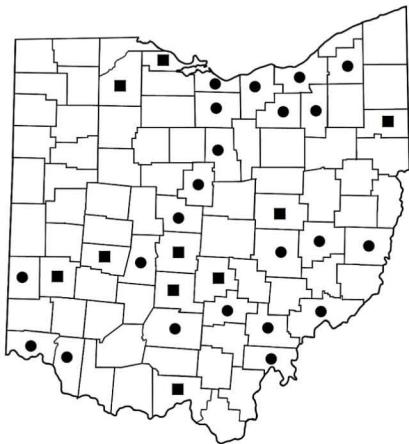
Syntrichia ruralis (Hedwig) F. Weber & D. Mohr
(*Tortula ruralis*)
POTTIACEAE



Syrrhopodon texanus Schwägrichen
CALYMPERACEAE



Taxiphyllum deplanatum
(Schimper ex Müller Hal.) M. Fleischer
HYPNACEAE



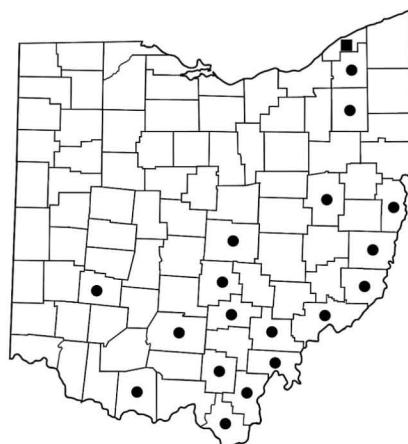
Taxiphyllum taxirameum (Mitten) M. Fleischer
HYPNACEAE



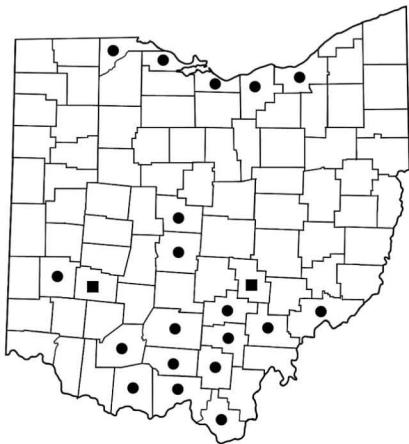
Tetraphis pellucida Hedwig
TETRAPHIDACEAE



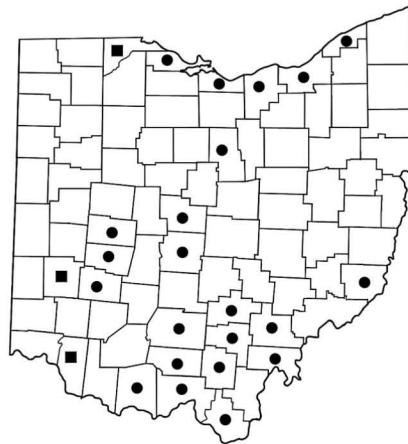
Tetrodontium brownianum (Dickson) Schwägrichen
TETRAPHIDACEAE



Thamnobryum alleghaniense
(Müller Hal.) Nieuwland ex Gangulee
NECKERACEAE



Thelia asprella (Schimper) Sullivant & Lesquereux
THELIACEAE



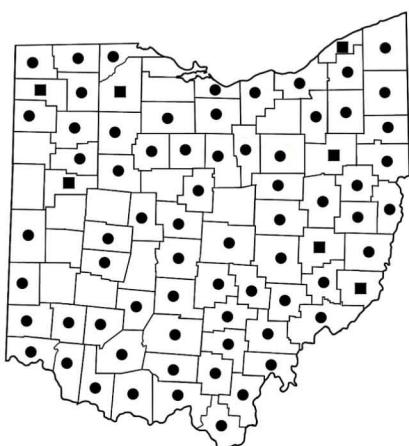
Thelia hirtella (Hedwig) Sullivant & Lesquereux
THELIACEAE



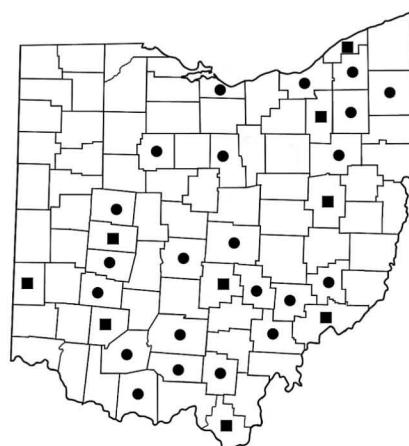
Thelia lescurii Sullivant & Lesquereux
THELIACEAE



Thuidium allenii Austin
THUIDIACEAE



Thuidium delicatulum (Hedwig) Schimper
THUIDIACEAE



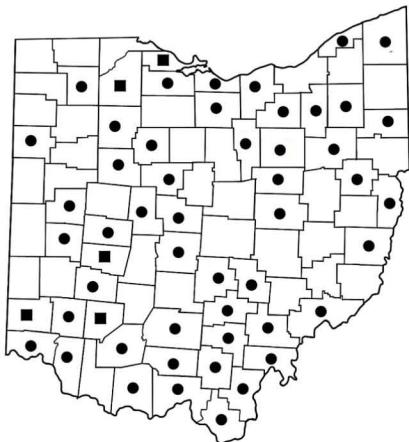
Thuidium recognitum (Hedwig) Lindberg
THUIDIACEAE



Timmia megapolitana Hedwig
TIMMIACEAE



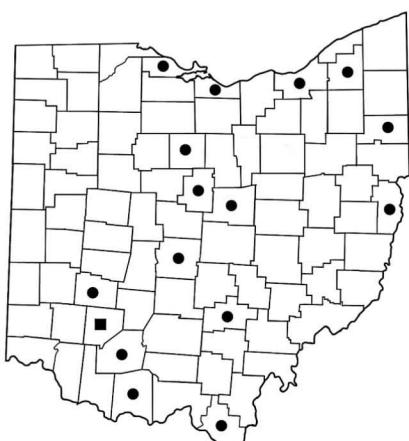
Tomentypnum nitens (Hedwig) Loeske
BRACHYTHECIACEAE



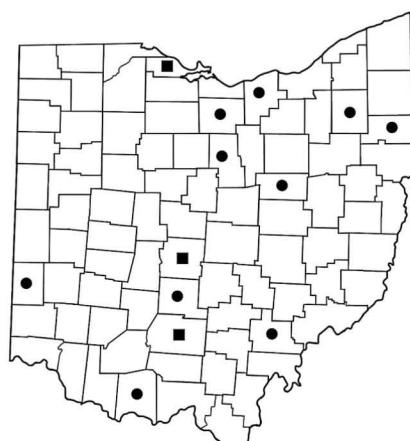
Tortella humilis (Hedwig) Jennings
POTTIACEAE



Tortella inclinata (Hedwig) Limpricht
POTTIACEAE



Tortella tortuosa (Hedwig) Limpricht
POTTIACEAE



Tortula acaulon (Withering) R. H. Zander
(*Phascum cuspidatum*)
POTIACEAE



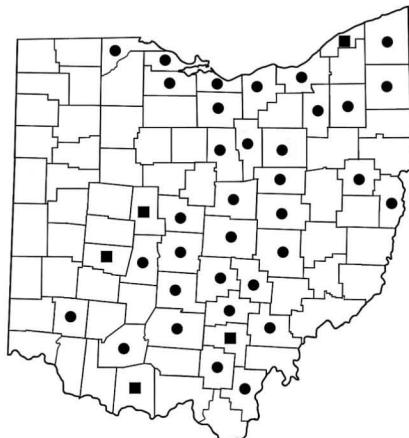
Tortula cernua (Huebener) Lindberg
(*Desmatodon cernuus*)
POTTIACEAE



Tortula mucronifolia Schwägrichen
POTTIACEAE



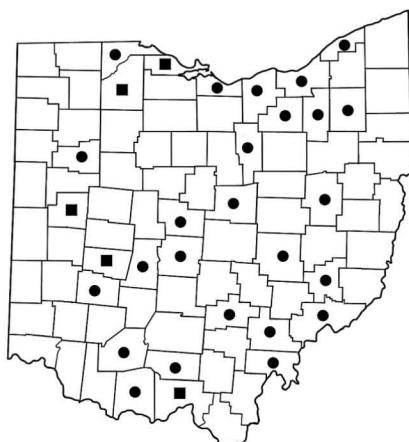
Tortula muralis Hedwig
POTTIACEAE



Tortula obtusifolia (Schwägrichen) Mathieu
(*Desmatodon obtusifolius*)
POTTIACEAE



Tortula plinthobia
(Sullivant & Lesquereaux) Brotherus
(*Desmatodon plinthobius*)
POTTIACEAE



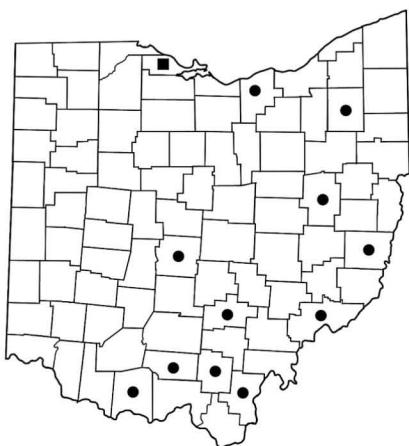
Tortula porteri (James) Brotherus
(*Desmatodon porteri*)
POTTIACEAE



Tortula truncata (Hedwig) Mitten in F. D. Godman
(*Pottia truncata*)
POTTIACEAE



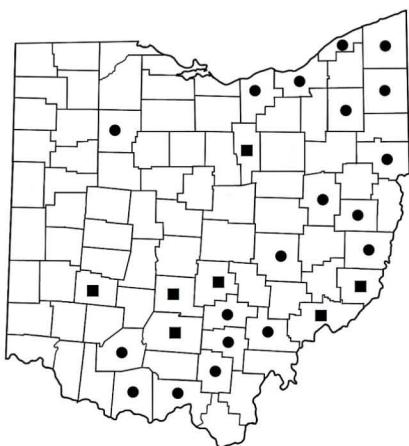
Trematodon longicollis Michaux
BRUCHIACEAE



Trichostomum tenuirostris
(Hooker & Taylor) Lindberg
(*Oxystegus tenuirostris*)
POTTIACEAE



Ulota coarctata (P. Beauvois) Hammar
ORTHOTRICHACEAE



Ulota crispa (Hedwig) Bridel
ORTHOTRICHACEAE



Ulota curvifolia (Wahlenberg) Liljeblad
ORTHOTRICHACEAE



Ulota hutchinsiae (Smith) Hammar
ORTHOTRICHACEAE



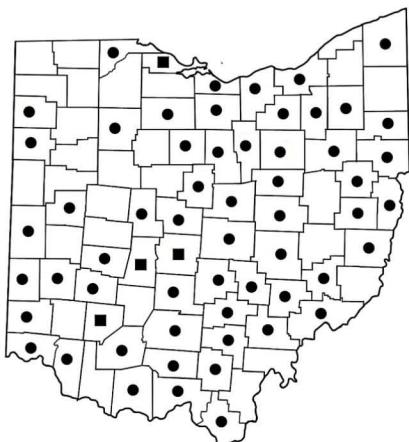
Warnstorffia exannulata (Schimper) Loeske
AMBLYSTEGIACEAE



Warnstorfia fluitans (Hedwig) Loeske
AMBLYSTEGIACEAE



Weissia brachycarpa (Nees & Hornschuch) Juratzka
(*Weissia hedwigii*)
POTTIACEAE



Weissia controversa Hedwig
POTTIACEAE



Weissia ludovicianum
(Sullivant) W.D. Reese & B.A.E. Lemmon
(*Astomum ludovicianum*)
POTTIACEAE



Weissia muehlenbergiana
(Swartz) W.D. Reese & B.A.E. Lemmon
(*Astomum muehlenbergianum*)
POTTIACEAE



Weissia phascopsis R. H. Zander
POTTIACEAE



Weissia sharpii L.E Anderson & B.A.E. Lemmon
POTTIACEAE



Zygodon viridissimus (Dickson) Bridel
ORTHOTRICHACEAE

