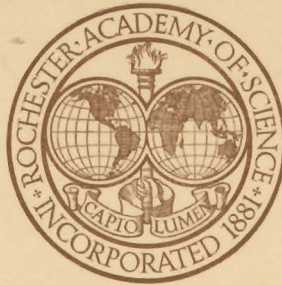


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THE VEGETATION OF BERGEN SWAMP

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- V. The Diatoms (Bacillariae) by Matthew H. Hohn
- VI. The Fungi by Clark T. Rogerson and Walter C. Muenscher
- VII. The Bryophytes by William T. Winne



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THE VEGETATION OF BERGEN SWAMP

IV. The Algae

ARLAND T. HOTCHKISS

*Cornell University*¹

INTRODUCTION

The algae are morphologically simple green plants without true roots, stems or leaves. They are separated from the bryophytes by the simplicity of their gametangia and sporangia and from the fungi by the fact that the algae contain pigments which enable them to produce their own food by means of photosynthesis.

Nearly all the large groups of algae are represented in Bergen Swamp except the Phaeophyceae, the brown algae. These groups can be included under the term "algae" because of its usefulness and convenience though none of them is closely related to another. The following groups of algae and "algae-like" organisms found in Bergen Swamp are included in this study: 1. Myxophyceae, 2. Chlorophyceae, 3. Rhodophyceae, 4. Heterokontae, 5. Chrysophyceae, 6. Dinophyceae, 7. Euglenophyceae, 8. Charophyta. The diatoms are treated separately by Hohn (1950).

Although the flora is rich and rewarding in algae, little work has been done previously on this group in Bergen Swamp. Stewart and Merrell (1937) mention *Chara* sp. as a contributor to the formation of marl; Muenscher (1946) discusses *Chara* sp. and also *Scytonema* sp., as marl formers; Brown (1948) lists *Protococcus viridis* among the epiphytic plants of Bergen Swamp. Extensive collecting for the present study was begun in 1946 and has continued to the present.

I wish to thank Professor Walter C. Muenscher of Cornell University who made many of the collecting trips possible and for his aid throughout the study. I am also indebted to Professor G. W. Prescott, Professor L. H. Tiffany, and Professor H. Skuja for their aid in determining certain species indicated in the catalogue. Financial assistance in carrying out the field work for the summer of 1949 was granted in the form of an honorarium by the New York State Science Service.

DISTRIBUTION OF ALGAE IN BERGEN SWAMP

Most algae are to be found in aquatic or subaerial situations. Aquatic habitats in Bergen Swamp range from small pools, ditches and brooks to large ponds, and streams. Other algae are aerial, growing on or in the

* Part I under this title, The Vascular Plants, by Walter C. Muenscher (Proc. Roch. Acad. Sci., 9: 64-117, 1946) includes a general discussion of Bergen Swamp, N. Y.

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soil, on moist rocks, on the bark of trees and similar places. Ten natural areas of Bergen Swamp have been designated by Muenscher (1946) according to the type of vegetation. This list of areas has been modified to more specifically indicate the habitat of certain algal species as follows: 1. Black Creek, 2. Spring Brooks, 3. The Pond, 4. Cattail Marsh, 5. *Carex riparia* Marsh, 6. Hardwood Swamp, 7. Thuja Swamp, 8. Open Marl area.

Each of these habitat areas is discussed briefly below to present its most distinctive aspects and to make clear its location in the general area of Bergen Swamp. These habitats differ from each other to the degree that the various environmental factors affecting plant growth are brought to bear upon them. Some of the more important of these environmental factors are topography, substratum, water, temperature, light and winds. It is obvious that these factors are interrelated and each must be considered in relation to the others.

1. *Black Creek*. Black Creek flows generally north down the slope of the Ontario Plain and along the western edge of Bergen Swamp where it strikes the east-west depression within which the swamp lies. Here it is turned eastward and flows along the northern edge of Bergen Swamp and thence to the Genesee River. During most of its course through Bergen Swamp it is a slow, sluggish, silt-laden stream with occasional riffles where the water splashes over gravel and cobbles. Better aeration of flowing water obtains where there are riffles or where the water rushes over boulders or logs. At the same time riffles usually improve the lighting conditions which are especially poor in turbid Black Creek; speed up the current whose washing effect prevents the accumulation of smothering debris and finally provide the substrate of rocks so useful for species of *Cladopora* and others.

During freshets, which may occur several times during a year, the water rises over its low, alluvial banks and floods the bordering woodlands and even some adjacent croplands. Upon receding the flood leaves behind silt and semi-permanent pools. *Botrydium granulatum* was found on exposed mudflats along Black Creek. The banks of the stream help retain the water in the Thuja swamp and open marl areas farther to the south. Sloughs and spring holes are also found along the creek. These contain species of *Vaucheria*, *Oedogonium*, *Spirogyra*, *Mougeotia* and *Zygnema*.

2. *Spring Brooks*. Flowing into Bergen Swamp from the south side are numerous clear, cold spring brooks remarkable for the constancy of their flow. Their number is not shown on the map but several flow under the railroad track along the south side of the swamp; others rise north of the railroad track. Most of the soils about Bergen Swamp are well supplied with lime, (Gustafson, 1933). As a result the waters are hard from the dissolved carbonates, and conditions are favorable for the depo-

sition of marl. Submerged twigs and plants may become heavily lime-incrusted. This alkalinity is probably unfavorable for the growth of desmids, some of which were rare. The spring brooks usually do not freeze over near their sources in the winter and do not show the extremes of high summer temperature found in shallow pools. The coolness of these brooks favors species of *Batrachospermum*, *Ulothrix*, *Draparnaldia*, *Tetraspora*, and *Cladophora* which grow in the swifter waters and species of *Spirogyra* and *Vaucheria* which grow in the quieter stretches. The brooks flow generally northward and supply water to the hardwood forest, Thuja swamp and open marl, sometimes disappearing underground and reappearing farther on.

Also worth mentioning are the low areas near spring brooks which are trampled by cattle making tracks that become filled with cool, quiet water enriched with manure and thus form ideal conditions for *Euglena* spp., *Chlamydomonas* spp., and other motile forms.

3. *The Pond*. Located at the southwest corner of the Bergen Swamp area is a small artificial pond formed by a dam in one of the small tributaries of Black Creek. The pond is about 400 yards long and 100 yards wide. Aquatic vegetation, both submersed and emersed, flourishes in the pond and about its edges. The stems and leaves of these plants, here as elsewhere, were often covered with algae. Several euplankton species were collected only from this pond as was the rare desmid *Cosmarium Seelyanum*. The sluice below the dam was usually covered with species of *Phormidium*. This area is referred to in the catalogue simply as "the pond".

4. *Cattail marsh*. This area is so named because of the dominant species *Typha latifolia*. It is not continuous but lies in scattered areas especially in the southwest end, in the region south of the sandy knoll and about the southeast portion of the swamp. In some areas the cattail marsh is comparatively open with pools or small ponds especially at the southwest end. Ditches have been dug in various parts of the cattail marsh in unsuccessful attempts to facilitate drainage of the land. These ditches have been fruitful sources of species of *Nostoc*, *Cylindrospermum*, *Oscillatoria*, desmids and many other genera. On the dead culms of the cattails are found *Chaetophora* spp., *Coleochaete* spp. and *Rivularia* spp.

5. *Carex riparia* marsh. *Carex riparia* var *lacustris* is the dominant species in this area which lies mainly on the north side between the alluvial area and the Thuja and alder thickets. During freshets in Black Creek this area is flooded under several feet of water, but at other times the water here is only one or two feet deep. Blue-green algae and sometimes *Cladophora* sp. are found in this standing water. The lack of light is a limiting factor in the growth of algae among the dense stands of sedges and where duckweeds cover the surface of the water.

6. *Hardwood Forest*. This forest of birch-maple-elm type forms an irregular zone almost around the outer edge of Bergen Swamp. Algae taken here in small pools include species of *Vaucheria*, *Tribonema*, *Zygnema*, *Spirogyra* and desmids. In some pools covered with a continuous blanket of *Lemna minor*, examination revealed no algae at all. Species of *Protococcus* and *Stichococcus* were found on damp bark while others as *Microcoleus* sp. and *Vaucheria* spp. were found on the damp earth.

7. *Thuja Swamp*. This area filled with a dense growth of arbor-vitae completely encircles the open marl to which it is adjacent. The soil is low, wet and exposed to dense shade beneath the thick canopy of tree tops. Algae such as species of *Vaucheria* and *Zygnema* are found on the damp ground and in shallow pools.

8. *Open marl area*. This is the most characteristic area of Bergen Swamp. It lies in a central location surrounded by the Thuja swamp and with occasional clumps of Thuja within its borders. The water here in spring and early summer lies in broad, shallow pools only a few inches deep. These pools may be colored green by masses of *Zygnema pachydermum*. Later many of the pools dry up or become only an inch or so deep. On bright sunny days the temperature of the water in these pools may be well above that of the air temperature, sometimes going as high as 36° C. in summer. Of interest in this connection is the discussion of *Zygnema pachydermum* in the annotated catalogue below. On the other hand, *Gymnodinium albulum* was found only in the melted ice water of the open marl pools in the middle of January.

On the surface of the grayish white marl are found in abundance small, dark, brown mats of *Scytonema myochrous*. This species with *Chara contraria* is actively engaged in changing the substrate by aiding the precipitation of carbonates in the open marl.

The open marl is especially rich in many species of blue-green algae which thrive in its comparatively stagnant waters.

EXPLANATION OF THE CATALOGUE

In this catalogue are listed the species of algae identified from many collections made in Bergen Swamp during the course of about four years. After each species is a statement of its frequency, habitat and distribution within the swamp. The arrangement within the larger groups, except in the Dinophyceae and the Charophyta, is that found in Smith (1933). The arrangement within the Dinophyceae is that found in Thompson (1947). There is only one species represented in the Charophyta. Within the families, genera and species are arranged in alphabetical order.

ANNOTATED CATALOGUE OF THE ALGAE OF
BERGEN SWAMP

CLASS I. — MYXOPHYCEAE

Order 1. Chroococcales

FAMILY 1. CHROOCOCCACEAE

Aphanocapsa Naeg., 1849.

Aphanocapsa elachista W. & G. West. Rare in open marl.

Aphanocapsa Grevillei (Hass.) Rabenh. Frequent in open marl, cattail marsh, Thuja swamp and the pond.

Aphanocapsa rivularis (Carmichael) Rabenh. Infrequent in open marl and cattail marsh.

Aphanothece Naeg., 1849.

(Note: Daily (1942) includes this genus and *Gloeothece* under *Anacystis* Menegh., 1837. Probably the three following species as well as *Gloeothece confluens* should be placed in *Anacystis marginata* Menegh.)

Aphanothece Castagnei (Breb.) Rabenh. Frequent in open marl.

Aphanothece microscopica Naeg. Infrequent in open marl.

Aphanothece Stagnina (Sprengel) A. Braun. Common in open marl.

Chroococcus Naeg., 1849.

Chroococcus dispersus (v. Keiss.) Lemmerman. Scarce in open marl.

Chroococcus limneticus Lemmerman. Occasional in the pond and open marl pools.

Chroococcus minutus (Kuetz.) Naeg. Occasional in open marl and cattail marsh.

Chroococcus pallidus Naeg. Scarce in open marl and cattail marsh.

Chroococcus rufescens (Breb.) Naeg. Occasional in open marl.

Chroococcus turgidus (Kuetz.) Naeg. Common in open marl, occasional in hardwoods and cattail marsh.

Chroothece Hansg., 1884.

Chroothece monococca (Kuetz.) Hansg. Occasional in open marl.

Coelosphaerium Naeg., 1849.

Coelosphaerium Kuetzingianum Naeg. Widespread and frequent.

Gloeocapsa Kuetz., 1843.

Gloeocapsa arenaria (Hassall) Rabenh. Rare in open marl.

Gloeocapsa fenestralis Kuetz. Rare in Thuja swamp.

Gloeothece Naegeli, 1849.(Note: see note under *Aphanothece*.)**Gloeothece confluens** Naeg. Infrequent in open marl.**Gomphosphaeria Kuetz., 1836.****Gomphosphaeria aponina** Kuetz. Common in open marl; frequent in Thuja swamp.**Merismopedia Meyen, 1839.****Merismopedia convoluta** Breb. Occasional in the pond.**Merismopedia elegans**. A. Braun. Occasional in the pond and cattail marsh.**Merismopedia glauca** (Ehr.) Naeg. Common in the open marl; occasional in the pond.**Merismopedia tenuissima** Lemm. Occasional in cattail marsh.**Microcystis Kuetz., 1833.**(Note: Daily (1942) gives convincing reasons for reverting to the use of *Polycystis* in place of *Microcystis*.)**Microcystis aeruginosa** Kuetz. Occasional in Black Creek, cattail marsh, Thuja swamp.**Microcystis ichthyoblabe** Kuetz. Rare in cattail marsh.**Microcystis flos-aquae** (Wittr.) Kirch. Occasional in cattail marsh and open marl.**Microcystis incerta** Lemm. Frequent in cattail marsh.**Microcystis marginata** (Meneghini) Kuetz. Occasional in open marl.**Microcystis pulverea** (Wood) De Toni. Locally abundant in cattail marsh, occasional in open marl.**Order 2. Chamaesiphonales****FAMILY 2. CHAMAESIPHONACEAE****Chamaesiphon** A. Braun and Grunow, 1865.**Chamaesiphon incrustans** Grun. Rare in streams.**Order 3. Hormogonales****Suborder Homocystineae****FAMILY 3. OSCILLATORIACEAE****Arthrospira** Stizenberger, 1852.**Arthrospira Gomontiana** Setchell. Infrequent in spring brooks.**Arthrospira Jenneri** Stizenberger. Infrequent in Black Creek.

Lyngbya Agardh, 1824.

- Lyngbya aestuarii** (Mertens) Liebman. Occasional in Thuja swamp, open marl and cattail marsh.
- Lyngbya aerugineo-caerulea** (Kuetz.) Gomont. Rare in Thuja swamp.
- Lyngbya Birgei** G. M. Smith. Occasional in Black Creek.
- Lyngbya Lagerheimii** (Mob.) Gomont. Occasional in Black Creek and open marl.
- Lyngbya major Meneghini.** Occasional in pools in hardwoods, Black Creek and cattail marsh.
- Lyngbya Martensiana** var. *calcarea* Tilden. Rare in open marl. This species appeared in a culture from this area.
- Lyngbya nana** Tilden. Frequent in the open marl.

Microcoleus Desmazieres, 1823.

- Microcoleus vaginatus** (Vauch.) Gomont. On a boulder, and on damp ground along railroad track.

Oscillatoria Vaucher, 1803.

- Oscillatoria amoena** (Kuetz.) Gomont. Occasional in pools.
- Oscillatoria amphibia** Agardh. Occasional in cattail marshes and in open marl.
- Oscillatoria brevis** Kuetz. Occasional in spring brooks and in cattail marshes.
- Oscillatoria chalybea** Mertens. Occasional in cattail marshes and the pond.
- Oscillatoria chlorina** Kuetz. Occasional in the Thuja swamp and the pond.
- Oscillatoria curviceps** Agardh. Occasional in open marl.
- Oscillatoria formosa** Bory. Occasional in spring brooks and cattail marshes.
- Oscillatoria geminata** Meneghini. Rare in the open marl.
- Oscillatoria cruenta** Grunow. Occasional in Black Creek.
- Oscillatoria limosa** Agardh. Widespread and common.
- Oscillatoria minnesotensis** Tilden. Rare in open marl.
- Oscillatoria Okeni** Agardh. Rare in pools.
- Oscillatoria princeps** Vaucher. Frequent in spring brooks, open marl and cattail marshes.
- Oscillatoria prolifica** (Greville) Gomont. Infrequent in cattail marsh.
- Oscillatoria sancta** Kuetz. Occasional in spring brooks, cattail marshes.
- Oscillatoria splendida** Greville. Frequent in Thuja swamp, Black Creek and the pond.
- Oscillatoria tenuis** var. *natans* (Kuetz.) Gomont. Frequent in Black Creek, spring brooks.

- Oscillatoria tenuis* var. *tergestina* Rabenh. Occasional in open marl.
Oscillatoria violacea (Wallroth) Hassall. Rare in cattail marsh.

Phormidium Kuetz., 1843.

- Phormidium ambiguum* Gomont. Occasional in cattail marsh.
Phormidium autumnale (Agardh) Gomont. Occasional in Black Creek and cattail marsh.
Phormidium favosum (Bory) Gomont. Infrequent in creek below the pond.
Phormidium laminosum (Agardh) Gomont. Infrequent in cattail marsh.
Phormidium papyraceum (Agardh) Gomont. Infrequent in creek below the pond.
Phormidium Retzii Gomont. Frequent in Black Creek and spillway below the pond.
Phormidium tenue (Meneghini) Gomont. Occasional in Thuja swamp.

Spirulina Turpin, 1827.

- Spirulina major* Kuetz. Occasional in open marl and Black Creek.
Spirulina princeps (W. & G. S. West) G. S. West. Occasional in open marl and Black Creek.
Spirulina subtilissima Kuetz. Rare in open marl. It has been recommended that this species be transferred to the genus *Arthrospira*. See Crow, (1927); Smith, (1933).

Suborder Heterocystineae

FAMILY 4. NOSTOCACEAE

Anabaena Bory, 1822.

- Anabaena laxa* (Rabenh.) Braun. Rare in Black Creek.
Anabaena oscillarioides Bory. Frequent in Black Creek.
Anabaena torulosa (Carmichael) Lagerh. Occasional in Black Creek.
Anabaena variabilis Kuetz. Occasional in the pond, cattail marsh, Thuja swamp and Black Creek.

Cylindrospermum Kuetz., 1843.

- Cylindrospermum majus* Wood. Frequent in cattail marsh and in *Carex riparia* marsh.
Cylindrospermum minutum Wood. Occasional in cattail marsh.

Nodularia Mertens, 1822.

- Nodularia spumigena* Mertens. Occasional in cattail marsh.

Nostoc Vaucher, 1803.

- Nostoc caeruleum* Lyngb. Occasional in cattail marsh.
Nostoc commune Vaucher. Frequent in cattail marsh and along farm roads.
Nostoc comminutum Kuetz. Occasional in the pond and cattail marsh.
 The material appeared to be rather immature.
Nostoc depressum Wood. Rare in spring brooks.
Nostoc ellipsosporum (Desmazieres) Rabenh. Frequent in cattail marsh.
Nostoc gelatinosum Schousboe. Occasional in cattail marsh.
Nostoc muscorum Agardh. Occasional in cattail marsh, open marl and Thuja swamp.
Nostoc pruniforme (Linn.) Agardh. Frequent in cattail marsh.

FAMILY 5. SCYTONEMATACEAE**Scytonema Agardh, 1824.**

- Scytonema Arcangelii* Born. & Flah. Rare in pools in hardwoods.
Scytonema Hofmanni Agardh. Frequent in open marl.
Scytonema myochrous (Dillwyn) Agardh. Abundant in open marl.

Tolypothrix Kuetz., 1843.

- Tolypothrix distorta* (Hofman-Bang) Kuetz. Occasional in open marl and cattail marsh.
Tolypothrix tenuis Kuetz. Rare in Thuja swamp.

FAMILY 6. STIGONEMATACEAE**Stigonema Agardh, 1824.**

- Stigonema informe* Kuetz. Occasional in open marl.
Stigonema mamillosum (Lyngbye) Agardh. Occasional in open marl.
Stigonema ocellatum (Dillw.) Thur. Rare in hardwoods.
Stigonema turfatum (Engl. Bot.) Cooke. Occasional in open marl.

FAMILY 7. RIVULARIACEAE**Calothrix Agardh, 1824.**

- Calothrix Braunii* Born. & Flah. Infrequent in open marl.
Calothrix epiphytica W. & G. S. West. Occasional in the pond and open marl.
Calothrix fusca (Kuetz.) Born. & Flah. Occasional in cattail marsh.

Calothrix Juliana (Menegh.) Born. & Flah. Rare in spring brooks growing on *Batrachospermum* sp. Material referred to this species may constitute a new species.*

Calothrix parietina (Naegeli) Thuret. Infrequent in open marl.

Dichothrix Zanardini, 1856.

Dichothrix compacta (Ag.) B. & F. Rare on damp cinders along railroad track.

Dichothrix gypsophila (Kuetz.) Born. & Flah. Rare in spring brook.

Dichothrix Orsiniana (Kuetz.) Born. & Flah. Infrequent in open marl.

Rivularia Roth, 1797.

Rivularia coadunata (Sommerfelt) Foslie. Infrequent in *Carex riparia* marsh.

Rivularia dura Roth. Sometimes abundant on dead culms of cattails.

CLASS II. — CHLOROPHYCEAE

Order 1. Volvocales

FAMILY 1. CHLAMYDOMONADACEAE

Carteria Diesing, 1866.

Carteria globosa Korsch. Occasional in open marl and cattail marsh.

Chlamydomonas Ehrenberg, 1833.

Chlamydomonas globosa Snow. Locally abundant in temporary pools in hardwoods.

Chlamydomonas gracilis Snow. Abundant in cow tracks near spring brook.

FAMILY 2. VOLVOCACEAE

Eudorina Ehrenberg, 1832.

Eudorina elegans Ehr. Occasional in the pond and open marl.

Gonium Mueller, 1773.

Gonium pectorale Muell. Rare in pools of open marl and cattail marsh.

Pandorina Bory, 1824.

Pandorina morum Bory. Rare in open marl pools.

Platydorina Kofoid, 1899.

Platydorina caudata Kofoid. Rare in open marl pools.

* *Homoeothrix Batrachospermorum* Skuja in a personal communication from Skuja.

Pleodorina Shaw, 1894.

Pleodorina californica Shaw. Infrequent in open marl pools and the pond.

Volvox Linnaeus, 1758.

Volvox globator L. Infrequent in the pond and cattail marsh.

FAMILY 3. SPHAERELLACEAE**Sphaerella Sommerfelt, 1824.**

Sphaerella lacustris (Girod.) Wittr. Occasional on boulders, in cattail marsh and open marl.

Order 2. Tetrasporales**FAMILY 4. PALMELLACEAE****Asterococcus Scherffel, 1908.**

Asterococcus limneticus G. M. Smith. Infrequent in cattail marsh.

Gloeocystis Naeg., 1849.

Gloeocystis fenestralis (Kuetz.) A. Braun. Infrequent in hardwoods.

Gloeocystis gigas (Kuetz.) Lagerh. Occasional in the pond and cattail marsh.

Gloeocystis Paroliniana (Menegh.) Naeg. Infrequent in open marl.

Palmella Lyngbye, 1819.

Palmella mucosa Kuetz. Infrequent in the pond and open marl.

Sphaerocystis Chodat, 1897.

Sphaerocystis Schroeteri Chod. Common in the pond.

FAMILY 5. TETRASPORACEAE**Tetraspora Link, 1809.**

Tetraspora gelatinosa (Vauch.) Desv. Occasional in spring brooks.

Order 3. Ulotrichales**FAMILY 6. ULOTRICHACEAE****Stichococcus Naeg., 1849.**

Stichococcus flaccidus (Kuetz.) Gay. Infrequent on a dead log near Black Creek.

Ulothrix Kuetz., 1832.

Ulothrix aequalis Kuetz. Abundant in one spring brook.

Ulothrix moniliformis Kuetz. Infrequent in spring brooks.

Ulothrix oscillarina Kuetz. Infrequent in stream below the pond.

FAMILY 7. MICROSPORACEAE

Microspora Thuret, 1850; emend., Lagerheim, 1888.

Microspora amoena (Kuetz.) Rabenh. Occasional in Black Creek.

Microspora pachyderma (Willie) Lagerheim. Occasional in Thuja swamp.

Microspora Willeana Lagerheim. Occasional in hardwoods.

FAMILY 8. CYLINDROCAPSACEAE

Cylindrocapsa Reinsch, 1867.

Cylindrocapsa geminella Wolle. Infrequent in cattail marsh.

FAMILY 9. CHAETOPHORACEAE

Aphanochaete A. Braun, 1851.

Aphanochaete repens A. Braun. Occasional as an epiphyte on *Cladophora* in spring brooks and larger streams.

Aphanochaete vermiculoides Wolle. Rare in streams as an epiphyte on larger algae. Cell diameter 8–10 microns, several setae per cell, filaments short and arching.

Chaetophora Schrank, 1789.

Chaetophora elegans (Roth) Agardh. Frequent in cold spring brooks and in the Thuja and hardwoods areas.

Chaetophora incrassata (Huds.) Hazen. Occasional in the *Carex riparia* marsh.

Chaetophora pisiformis (Roth) Agardh. Frequent in streams in the hardwoods and in the cattail marshes.

Draparnaldia Bory, 1808.

Draparnaldia acuta (Ag.) Kuetz. Occasional in Thuja swamp.

Draparnaldia glomerata (Vauch.) Agardh. Occasional in cold spring brooks.

Draparnaldia platyzonata Hazen. Occasional in cold spring brooks.

Draparnaldia plumosa (Vauch.) Agardh. Abundant in cold spring brooks.

FAMILY 10. PROTOCOCCACEAE

Protococcus Agardh, 1824.

Protococcus viridis Ag. Widespread and common especially on tree trunks.

FAMILY 11. COLEOCHAETACEAE

Coleochaete de Brebisson, 1844.

Coleochaete divergens var. *minor* Hansg. Occasional on *Cladophora* in spring brooks and in *Carex riparia* marsh.

Coleochaete scutata Breb. Frequent on submersed *Typha* leaves and culms in cattail marshes.

FAMILY 11a. TRENTEPOHLIACEAE

Leptosira Borzi, 1883.

Leptosira Mediciana Borzi. Rare in pools near Black Creek.

FAMILY 12. CLADOPHORACEAE

Cladophora Kuetz., 1843.

Cladophora callicoma Kuetz. Occasional in spring brooks.

Cladophora glomerata (L.) Kuetz. Common on stones in spring brooks and Black Creek. Occasional in the marl area.

Cladophora insignis (Ag.) Kuetz. In stream at west end of the swamp. This material was smaller than usual being about 42 microns in diameter whereas Collins (1905) gives a range of 75 to 120 microns for this species.

Rhizoclonium Kuetzing, 1843.

Rhizoclonium hieroglyphicum (Ag.) Kuetz. Apparently rare in spring brooks.

Order 4. Oedogoniales

FAMILY 13. OEDONGONIACEAE

Bulbochaete Agardh, 1817.

Bulbochaete Brebissonii Kuetz. Occasional in pools in the hardwoods and open marl.

Bulbochaete repanda Wittrock. Occasional in open marl.

Bulbochaete (sp. undetermined). Occasional in cattail marshes. Diameter of vegetative cells 10–12 microns.

Oedogonium Link, 1820.

- Oedogonium capilliforme** Kuetz. Wittrock. Occasional along Black Creek.
- Oedogonium capilliforme** var. **diversum** (Hirn) Tiffany. Occasional in Black Creek sloughs of quiet water.
- Oedogonium cardiacum** (Hass.) Wittr. Frequent along Black Creek.
- Oedogonium cryptoporum** var. **vulgare** Wittr. Occasional in cattail marshes.
- Oedogonium cymatosporum** Wittr. and Nordstedt. Occasional in the open marl.
- Oedogonium fragile** Wittr. Occasional in pools in hardwoods.
- Oedogonium grande** var. **majus** Hansg. Occasional in the *Carex riparia* marsh.
- Oedogonium landsboroughi** (Hass.) Wittr. Occasional in the *Carex riparia* marsh.
- Oedogonium oboviforme** Wittr. Infrequent along Black Creek in flowing water. This material was examined by Tiffany who placed it in the *grande* complex but indicated that it was a bit too immature to be sure of the species. However he advised that if the mature material kept the same oogonial shape, he would place it in this species. Unfortunately no further material has been collected. This species has not previously been reported from the United States. (Tiffany, 1930)
- Oedogonium pratense** Transeau. Occasional in pools in hardwoods.
- Oedogonium** sp. undetermined. Black Creek.

Order 5. Chlorococcales**FAMILY 14. CHLOROCOCCACEAE****Chlorococcum Fries, 1820.**

- Chlorococcum humicola** (Naeg.) Rabenh. Occasional on low damp ground; widespread.
- Chlorococcum infusionem** (Schrank) Menegh. Frequent on animal droppings in open marl pools in the cooler months.

FAMILY 15. ENDOSPHAERACEAE**Kentrosphaera Borzi, 1883.**

- Kentrosphaera Bristolae** G. M. Smith. Rare in the cattail marsh. Cells 110 microns broad by 135 microns long. Walls thick with an external process. Cells filled with starch grains.

FAMILY 16. CHARACIACEAE

Characium A. Braun, 1849.

Characium Braunii Bruegger. Rare in open marl.

FAMILY 17. HYDRODICTYACEAE

Hydrodictyon Roth, 1800.

Hydrodictyon reticulatum (L.) Lagerh. Abundant in pond and in the stream above and below it.

Pediastrum Meyen, 1829.

Pediastrum biradiatum Meyen. Frequent in cattail marsh.

Pediastrum Boryanum (Turp.) Menegh. Common in cattail marshes, the pond, Black Creek; rare in Thuja swamp and the open marl.

Pediastrum Boryanum var. *longicorne* Raciborski. Frequent in the pond.

Pediastrum duplex Meyen. Frequent in cattail marsh.

Pediastrum duplex var. *clathratum* (A. Braun) Lagerh. Rare in cattail marsh.

Pediastrum integrum Naeg. Rare in cattail marsh.

Pediastrum tetras (Ehrenb.) Ralfs. Common in the pond and cattail marsh.

Sorastrum Kuetzing, 1845.

Sorastrum americanum (Bohlin) Schmidle. Rare in the pond.

Sorastrum spinulosum Naeg. Frequent with submerged aquatics such as *Chara* sp. in open stretches of cattail marshes.

FAMILY 18. COELASTRACEAE

Coelastrum Naeg., 1849.

Coelastrum cambricum Archer. Rare in pools.

Coelastrum microporum Naeg. Frequent in the pond and open areas of cattail marsh.

Coelastrum proboscideum Bohlin. Frequent in cattail marshes: sixteen-celled coenobia were most frequent. Another form was observed which closely resembled a figure in Smith (1920)* but was peculiar in that each cell had two outwardly projecting truncate papillae.

* Part I, Plate 42, Fig. 7, p. 227.

FAMILY 19. OOCYSTACEAE

Ankistrodesmus Corda, 1838.

Ankistrodesmus falcatus (Corda) Ralfs. Occasional in cattail marshes.

Ankistrodesmus spiralis (Turner) Lemmermann. Occasional in cattail marshes.

Chlorella Beyerinck, 1890.

Chlorella vulgaris Beyerinck. Occasional near the pond.

Gloeotaenium Hansgirg, 1890.

Gloeotaenium Loitlesbergerianum Hansg. Frequent in the pond.

Kirchneriella Schmidle, 1893.

Kirchneriella obesa (W. West) Schmidle. Occasional in cattail marshes.

Nephrocytium Naeg., 1849.

Nephrocytium Agardhianum Naeg. Occasional in the pond.

Oocystis Naeg., 1845.

Oocystis elliptica W. West. Frequent in the pond and the cattail marshes.

Oocystis lacustris Chodat. Occasional in the cattail marshes.

Oocystis parva W. & G. S. West. Occasional in the cattail marshes.

Oocystis submarina Lagerh. Rare in the pond.

Palmellococcus Chodat, 1894.

Palmellococcus miniatus (Kuetz.) Chod. Infrequent in hardwoods.

Planktosphaeria G. M. Smith, 1918.

Planktosphaeria gelatinosa G. M. Smith. Frequent in the pond and cattail marshes.

Selenastrum Reinsch, 1867.

Selenastrum Bibraianum Reinsch. Rare in cattail marshes.

Selenastrum Westii G. M. Smith. Frequent in cattail marshes.

Tetraedron Kuetz., 1845.

Tetraedron minimum (A. Braun) Hansg. Occasional in cattail marshes.

Tetraedron regulare Kuetz. Rare in cattail marshes.

Tetraedron reticulatum (Reinsch) Hansg. Rare in cattail marshes.

Trochisia Kuetzing, 1845.

Trochisia granulata (Reinsch) Hansg. Frequent in cattail marshes.

Westella de Wildemann, 1897.

Westella botryoides (W. West) de Wildm. Occasional in cattail marshes.

FAMILY 20. SCENEDESMACEAE**Actinastrum Lagerheim, 1882.**

Actinastrum gracillimum G. M. Smith. Rare in the pond.

Crucigenia Morren, 1830.

Crucigenia irregularis Wille. Rare in cattail marsh.

Micractinium Fresenius, 1858.

Micractinium pusillum Fresenius. Rare in the pond.

Scenedesmus Meyen, 1829.

Scenedesmus armatus (Chod.) G. M. Smith. Rare on rocks in stream below the pond.

Scenedesmus bijuga (Turp.) Lagerh. Frequent in the pond, Black Creek and cattail marshes.

Scenedesmus brasiliensis Bohlin. Rare in woodland pools.

Scenedesmus denticulatus Lagerh. Rare in cattail marsh.

Scenedesmus dimorphus (Turp.) Kuetz. Frequent in cattail marsh, Black Creek.

Scenedesmus obliquus (Turp.) Kuetz. Common in cattail marshes and the pond.

Scenedesmus quadricauda (Turp.) Breb. Common in cattail marshes, the pond and *Carex riparia* marsh.

Order 6. Siphonales**FAMILY 21. VAUCHERIAEAE****Dichotomosiphon Ernst, 1902.**

Dichotomosiphon tuberosus (A. Braun) Ernst. Occasional in the Thuja swamp and open marl areas. This species is probably not as rare as the collecting records would indicate. Because it closely resembles species of *Vaucheria* it may be easily passed over in the field as just another piece of 'water felt'.

Vaucheria De Candolle, 1803.

Vaucheria geminata (Vauch.) De Candolle. Frequent in pools and on damp ground in hardwoods, Thuja swamp, spring brooks, *Carex riparia* marsh and cattail marsh. Not as common as the following variety with which it is often found.

- Vaucheria geminata* var. *racemosa* (Vauch.) Walz. Common in the same areas as the species.
- Vaucheria hamata* (Vauch.) De Candolle. Occasional in spring brooks and hardwood pools.
- Vaucheria ornithocephala* Agardh. Occasional in spring brooks and in pools and on damp ground in the hardwoods.
- Vaucheria ornithocephala* forma *polysperma* Heering. Occasional in the same areas as the species. This form is smaller than the species; the diameter of the filaments was 31 microns.
- Vaucheria repens* Hassall. Rare in pools in the hardwoods. Filaments 35-44 microns.
- Vaucheria sessilis* (Vauch.) De Candolle. Common in hardwoods pools, Thuja swamp, spring brooks and occasional in the marl area.
- Vaucheria terrestris* (Vauch.) De Candolle. Rare in Black Creek. The oogonia measured 147 microns in diameter.

Order 7. *Zygnematales*

FAMILY 22. ZYGNEMATACEAE

Mougeotia Agardh, 1824.

- Mougeotia genuflexa* (Dillw.) Agardh. Frequent in quiet pools along Black Creek.
- Mougeotia quadrangulata* Hass. Frequent in shallow pools in open marl.
- Mougeotia robusta* (De Bary) Wittr. Occasional in pools in Thuja swamp, open marl and spring brooks.

Spirogyra Link, 1920.

- Spirogyra affinis* (Hass.) Petit. Occasional in spring brooks. Vegetative cells 26 microns in diameter and zygospores up to 52 microns long.
- Spirogyra bellis* (Hass.) Cleve. Occasional in Black Creek.
- Spirogyra catenaeformis* (Hass.) Kuetz. Common in spring brooks, occasional in open marl, Thuja swamp and Black Creek.
- Spirogyra fallax* (Hansg.) Wille. Rare in hardwoods pools.
- Spirogyra Farlowii* Transeau. Occasional in Black Creek.
- Spirogyra fluviatilis* Hilse. Occasional in spring brooks.
- Spirogyra gracilis* (Hass.) Kuetz. Occasional in open marl.
- Spirogyra Grevilleana* Hass. Occasional in hardwoods and the pond.*
- Spirogyra insignis* (Hass.) Kuetz. Occasional in hardwoods ponds.*
- Spirogyra groenlandica* Rosenvinge. Occasional in open marl.*
- Spirogyra jugalis* (Fl. Dan.) Kuetz. Occasional in spring brooks.*

* Species determined from vegetative characters alone.

Spirogyra Lagerheimii Wittr. Occasional in spring brooks.

Spirogyra maxima (Hass.) Wittr. Frequent in the pond.*

Spirogyra porticalis (Muller) Cleve. Occasional in open marl.*

Spirogyra tenuissima (Hass.) Kuetz. Occasional in open marl.

Spirogyra varians (Hass.) Kuetz. Occasional in spring brooks and hardwoods pools.

Zygnema Agardh, 1824.

Zygnema pachydermum W. & G. S. West. Common in shallow pools in the open marl, frequent in pools in the Thuja swamp and cat-tail marshes. Collections were made of this species throughout the year and seasonal changes in growth were noted. It was present in the vegetation condition throughout the winter and became more abundant by May. Conjugation took place in very late May and early June and the zygospores were retained in the filaments until the middle of July. During July little could be seen of the vegetative material. By mid-September however and throughout the fall vegetative growth was renewed and became abundant. Measurements showed the vegetative cells to be almost invariably 19 microns in diameter. No rhizoidal branches were observed.

During the cooler parts of the year and at the time of conjugation the cell walls were thin and without any sheath. But gradually after the first of June some of the filaments acquired a thick gelatinous sheath until they had a diameter of forty or fifty microns. At the same time the zygospores, which when young were thin-walled, developed a thick membrane which later became lamellate. The zygospores which were at first globose sometimes became distorted into various irregular globular shapes. Meanwhile the empty gametangial cells retained their original shape and size of 19 microns in diameter.

It was noticed that filaments from the shallow pools in the open marl had the most extremely thickened sheaths and distorted spores. In these pools the water was often only an inch or two deep and on sunny days became excessively warm. The temperature of the water under these conditions exceeded that of the air by several degrees. Collins (1909) suggested that the thick-walled spores of this species might be the result of the thermal conditions of the water in which it grew. It would seem that there was such a correlation here between thick-walled spores and high temperatures. It would also appear that there was a correlation between high temperatures and the formation of thick sheaths around the vegetative filaments. There are two indications for this correlation: (1) sheaths did not develop anywhere during

* Species determined from vegetative character alone.

the cooler months, and (2) filaments collected from shaded, cooler pools in the Thuja swamp near the end of June had only a slight sheath development. It is apparent that this species can withstand extremes of temperature both high and low and it is possible that the production of thick sheaths on the filaments and thick-walled, irregular spores is the result of relatively high temperatures of the water during the summer.

Zygnema stellinum (Muller) Agardh. Occasional in cattail marshes.*

FAMILY 23. MESOTAENIACEAE

Cylindrocystis Meneghini, 1838.

Cylindrocystis crassa De Bary. Infrequent in open marl.

Gonatozygon De Bary, 1856.

Gonatozygon Brebissonii De Bary. Rare in the pond.

Mesotaenium Naeg., 1849.

Mesotaenium Endlicherianum Naeg. Rare in the pond.

Mesotaenium macrococcum (Kuetz.) Roy & Biss. (possibly var *micrococcum* (Kuetz.) West and West.) Det. by G. W. Prescott. Occasional in Thuja swamp.

FAMILY 24. DESMIDIACEAE

Arthrodesmus Ehrenberg, 1838.

Arthrodesmus convergens Ehrenb. Occasional in pools in hardwoods.

Arthrodesmus triangularis Lagerh. Rare in pools in hardwoods.

Cosmarium Corda, 1834.

Cosmarium abbreviatum forma *minor* W. & G. S. West. Frequent in the pond and cattail marshes.

Cosmarium abruptum Lund. Rare in cattail marshes. Because of the apex which is faintly undulate and not retuse this species is closer to *Cosmarium Blyttii* Wille than the figure in West and West (1908).

Cosmarium angulosum Breb. var. *concinnum* (Rabenh.) W. & G. S. West. Rare in cattail marshes.

Cosmarium Blyttii Wille. Frequent in the pond and cattail marshes.

Cosmarium circulare Reinsch. Occasional in cattail marshes.

- Cosmarium cymatopleurum* Nordst. Occasional in open marl and in pools in hardwoods. This species resembles the description in West & West (1908) except for its smaller size. Length of cells fifty-one microns, breadth forty-two microns, breadth of isthmus 14 microns.
- Cosmarium Etchachenense* Roy & Biss. Rare in pools in hardwoods.
- Cosmarium formosulum* Hoff. Occasional in the pond.
- Cosmarium granatum* Breb. Common in open marl and cattail marshes.
- Cosmarium granatum* var. *subgranatum* Nordst. Frequent in the pond.
- Cosmarium Holmiense* Lund. Occasional with *Chara* in open marl.
- Cosmarium Holmiense* var. *integrum* Lund. Rare in open marl.
- Cosmarium humile* (Gay) Nordst. Occasional in cattail marshes.
- Cosmarium humile* var. *danicum* (Borges) Schmidle. Frequent in cattail marshes.
- Cosmarium impressulum* Elfv. Common in cattail marshes, frequent in the pond and in Black Creek.
- Cosmarium laeve* Rabenh. Rare in open marl.
- Cosmarium laeve* var. *septentrionale* Wille. Frequent in cattail marsh.
- Cosmarium Logiense* Biss. Frequent in the pond. The cells were smaller than in the description in West & West (1908). The length of the cells was fifty-five microns, the breadth thirty-seven microns and the isthmus had a breadth of fifteen microns.
- Cosmarium Meneghinii* Breb. Common in the pond and cattail marshes.
- Cosmarium minimum* West & West. Occasional in pools in hardwoods.
- Cosmarium obtusatum* Schmidle. Frequent in the pond and cattail marshes.
- Cosmarium pachydermum* Lund. Occasional in the pond and cattail marshes.
- Cosmarium Pokornyanum* (Grun.) W. & G. S. West. Frequent in pools in hardwoods.
- Cosmarium protuberans* Lund. Rare in pools in hardwoods.
- Cosmarium pseudarctium* Nordst. Rare in pools in hardwoods.
- Cosmarium punctulatum* Breb. Frequent in the pond, open marl, and cold spring brooks.
- Cosmarium pygmaeum* Arch. Frequent in the pond.
- Cosmarium quadratum* (Gay) de Toni. Rare in pools in hardwoods.
- Cosmarium reniforme* (Ralfs.) Arch. Occasional in open marl and the pond.
- Cosmarium repandum* forma minor W. & G. S. West. Occasional in cattail marshes.
- Cosmarium Seelyanum* Wolle. Frequent in the pond; a rare species. Det. by G. W. Prescott.

- Cosmarium sexangulare* forma *minima* Nordst. Occasional in cold spring brooks.
- Cosmarium speciosum* var. *biforme* Nordst. Rare in open marl.
- Cosmarium speciosum* var. *simplex* Nordst. Rare in open marl.
- Cosmarium subcostatum* Nordst. Rare in Black Creek.
- Cosmarium subcostatum* forma *minor* W. & G. S. West. Frequent in the pond and cattail marshes, occasional in pools in hardwoods.
- Cosmarium subcrenatum* Hantzsch. Occasional in the pond, open marl and *Carex riparia* marsh.
- Cosmarium Subcucumis* Schmidle. Occasional in pools in hardwoods.
- Cosmarium subprotumidum* Nordst. forma. Occasional in cattail marshes. In granulation and form this species resembles Fig. 22, Plate 86, Volume III of West & West (1908).
- Cosmarium Turpinii* Breb. Frequent in cattail marsh and the pond.
- Cosmarium Turpinii* var. *podellicum* Gutw. Occasional in the pond.
- Cosmarium undulatum* var. *minutum* Wittr. Occasional in open marl.
- Cosmarium vexatum* West. Frequent in cattail marsh and occasional in Thuja swamp, in pools in hardwoods, and cold spring brooks.

Closterium Nitzsch, 1817.

- Closterium acerosum* (Schrank) Ehrenb. Frequent in the pond, Black Creek and in pools in hardwoods.
- Closterium Ehrenbergii* Menegh. Frequent in the pond.
- Closterium gracile* Breb. Rare in cattail marsh.
- Closterium intermedium* Ralfs. Rare in pools in hardwoods.
- Closterium lanceolatum* Kuetz. Rare in the pond.
- Closterium Leibleinii* Kuetz. Common in the pond, pools in hardwoods, cattail marshes and Black Creek.
- Closterium moniliferum* (Bory) Ehrenb. Common in the pond and scarcer in Black Creek and pools in hardwoods.
- Closterium parvulum* Naeg. Occasional in Black Creek, cattail marshes, and open marl.
- Closterium Pritchardianum* Arch. Rare in the pond.
- Closterium pronum* Breb. Rare in open marl.
- Closterium siliqua* W. & G. S. West. Rare in Black Creek. This species was twice as broad as the description in West & West (1904).
- Closterium strigosum* Breb. Rare in pools in hardwoods.
- Closterium striolatum* Ehrenb. Rare in pools in hardwoods.
- Closterium Venus* Kuetz. Frequent in pools in hardwoods and rare in Black Creek, cattail marshes and *Carex riparia* marsh.

Desmidium Agardh, 1825.

Desmidium Aptogonum Breb. Rare in pools in hardwoods.

Desmidium Swartzii Agardh. Infrequent in cattail marsh.

Euastrum Ehrenberg., 1832; emend., Ralfs., 1844.

Euastrum bidentatum Naeg. Rare in pools in hardwoods.

Euastrum binale forma *secta* Turn. Rare in pools in hardwoods.

Euastrum crassicolle Lund. Rare in pools in hardwoods.

Euastrum humerosum Ralfs. Rare in pools in hardwoods.

Euastrum sublobatum Breb. Rare in pools in hardwoods.

Euastrum pinnatum Ralfs. Rare in pools in hardwoods. This species resembles that figured in West & West (1905) but differs in the apical region. The apical sinus is deep and open and the two apical lobes are broad and retuse. The two outer angles are sharp and divergent while the two inner angles are broadly rounded. Length of cell 84 microns, breadth of cell 55 microns, breadth of isthmus 10 microns.

Gymnozyga Ehrenberg, 1841.

Gymnozyga moniliformis Ehrenb. Rare in pools in hardwoods.

Hyalotheca Ehrenberg, 1841.

Hyalotheca dissiliens (Smith) Breb. Rare in pools in hardwoods.

Micrasterias Agardh, 1827.

Micrasterias Sol (Ehrenb.) Kuetz. Rare in pools in hardwoods.

Penium de Brebisson, 1844.

Penium Libellula var. *intermedium* Roy & Biss. Rare in creek just below the pond.

Pleurotaenium Naeg., 1849.

Pleurotaenium Trabecula (Ehrenb.) Naeg. Rare in creek just below the pond.

Spondylosium de Brebisson, 1844.

Spondylosium tetragonum West. Rare in pools in hardwoods.

Staurastrum Meyen, 1829.

Staurastrum alternans Breb. Occasional in cattail marshes.

Staurastrum avicula Breb. Rare in pools in hardwoods.

Staurastrum gladiusum Turn. Rare in pools in hardwoods.

Staurastrum cyrtocerum Breb. Rare in pools in hardwoods.

Staurastrum dejectum Breb. Occasional in cattail marshes.

Staurastrum disputatum W. & G. S. West. Occasional in cattail marshes.

Staurastrum gracile var. *nanum* Wille. Occasional in pools in hardwoods and in cattail marshes.

Staurastrum furcigerum forma *eustephana* (Ehrenb.) Nordst. Infrequent in cattail marsh.

Staurastrum hirsutum Breb. Rare in pools in hardwoods.

Staurastrum inconspicuum Nordst. Rare in pools in hardwoods.

Staurastrum orbiculare Ralfs. (var.) Rare in pools in hardwoods.

This species corresponds to the description in West & West (1911) but is smaller.

Staurastrum polymorphum Breb. Occasional in the pond.

Staurastrum striolatum (Naeg.) Arch. Occasional in pond.

Xanthidium Ehrenberg, 1837.

Xanthidium cristatum Breb. Rare in pools in hardwoods.

CLASS III. — RHODOPHYCEAE

Order 1. Nemalionales

FAMILY 1. CHANTRANSIACEAE

Audouinella Bory, 1823.

Audouinella violacea var. *expansa* (Wood) G. M. Smith. Rare in the area but abundant on the sluice below the pond.

FAMILY 2. BATRACHOSPERMACEAE

Batrachospermum Roth, 1797.

Batrachospermum Boryanum Sirod. Occasional in spring brooks. Determined by H. Skuja.

Batrachospermum ectocarpoideum Skuja. With *B. boryanum* Sirod. in spring brooks.

Batrachospermum moniliforme Roth. Occasional in spring brooks.

CLASS IV. — HETEROKONTAE

Order 1. Heterococcales

FAMILY 1. CHLOROTHECIACEAE

Characiopsis Borzi, 1895.

Characiopsis pyriformis (A. Br.) Borzi. Rare in cattail marsh.

FAMILY 2. OPHIOCYTIACEAE**Ophiocytium Naeg., 1849.**

- Ophiocytium cochleare* (Eichw.) A. Braun. Occasional in Black Creek and the pond.
- Ophiocytium majus* Naegeli. Frequent in cattail marsh, the pond and hardwoods.
- Ophiocytium parvulum* (Perty) A. Braun. Occasional in cattail marsh.

Order 2. Heterotrichales**FAMILY 3. TRIBONEMATACEAE****Tribonema Derbes & Solier, 1856.**

- Tribonema bombycinum* (Ag.) Derbes & Solier. Common in cattail marsh and temporary pools.
- Tribonema minus* (Wille) Hazen. Frequent in spring brooks.
- Tribonema utriculosum* (Kuetz.) Hazen. Common in pools and hardwoods.

Order 3. Heterosiphonales**FAMILY 4. BOTRYDIACEAE****Botrydium Wallroth, 1815.**

- Botrydium granulatum* (L.) Grev. Infrequent along Black Creek.

CLASS V. — CHRYSOPHYCEAE**Order 1. Chryomonadales****FAMILY 1. OCHROMONADACEAE****Dinobryon Ehrenberg, 1835.**

- Dinobryon sertularia* Ehrenb. Infrequent in open marl.
- Dinobryon sociale* Ehrenb. Frequent and widespread in ponds and pools.

CLASS VI. — DINOPHYCEAE**Order 1. Gymnodiniales****FAMILY 1. GYMNODINIACEAE****Gymnodinium Stein, 1883; emend., Kofoid & Swezy, 1921.**

- Gymnodinium albulum* Lindem. Occasional but seasonal (January) in open marl pools.

FAMILY 2. HETERODINIACEAE

Ceratium Schrank, 1793.

Ceratium hirundinella (O. F. M.) Schrank. Common in the pond.

CLASS VII. — EUGLENOPHYCEAE

Order 1. Euglenales

FAMILY 1. EUGLENACEAE

Euglena Ehrenberg, 1838.

Euglena chlamydophora Mainx. Frequent in cow tracks near spring brook.

Euglena deses var. *tenuis* Lemmermann. Frequent in cow tracks near spring brook.

Euglena fundoversata L. P. Johnson. Occasional in cattail marsh.

Euglena granulata Klebs. Occasional in slough near Black Creek.

Euglena intermedia Klebs. Occasional in cow tracks near spring brook; cattail marsh, and open marl.

Euglena oxyuris Schmarida. Infrequent in cattail marsh.

Euglena pisciformis Klebs. Frequent in cow tracks near spring brook.

Euglena viridis Ehrenb. Frequent in cow tracks near spring brook.

Phacus Dujardin, 1841.

Phacus longicauda (Ehrenb.) Duj. Occasional in cattail marsh.

Phacus pleuronectes (O. F. M.) Duj. Occasional in cattail marsh and Black Creek.

Phacus pyrum (Ehrenb.) Stein. Occasional in cattail marsh.

Phacus sp. Occasional in cattail marsh. This material has smooth walls and closely resembles *P. orbicularis* Hubner but is much smaller.

Trachelomonas Ehrenberg, 1833.

Trachelomonas hispida var. *punctata* Lemm. Common in cattail marsh, *Carex riparia* marsh.

Trachelomonas volvocina Ehrenb. Common in cattail marsh, *Carex riparia* marsh.

CLASS VIII. CHAROPHYTA

Order 1. Charales

FAMILY 1. CHARACEAE

Chara Vaillant, 1753.

Chara contraria A. Br. Widespread and common in marl pools and spring brooks.

SUMMARY

This study in the algae of Bergen Swamp is based upon numerous collections from the various habitats represented in the swamp during the period 1946-1949. The diverse habitats found in Bergen Swamp favor the establishment there of species in many different genera of algae. Observations on some of the environmental factors which control the distribution of algae indicate the importance of temperature, light, topography, pH reaction, substratum and winds especially as they affect the water within which most of the algae grow. The number of species and varieties recorded from each habitat area in Bergen Swamp is as follows:

1. Black Creek	48
2. Spring Brooks	45
3. The Pond	71
4. Cattail Marsh	120
5. Carex riparia Marsh	12
6. Hardwood Swamp	63
7. Thuja Swamp	26
8. Open marl area	84

The larger genera, represented in Bergen Swamp by 10 or more species, are the following:

Cosmarium, 36	Closterium, 14
Oscillatoria, 18	Staurastrum, 13
Spirogyra, 16	Oedogonium, 10

These species are not necessarily those which make up the quantitative bulk of the algal flora. Some of the species of *Cosmarium*, for example, are represented by only a few individuals.

Some of the less common species found in Bergen Swamp include: *Platydorina caudata*, *Gloeotaenium Loitlesbergerianum*, *Dichotomosiphon tuberosus*, *Cosmarium Seelyanum*, and *Gymnodinium albulum*.

A total of 342 species of algae was found in Bergen Swamp. These represent 111 genera in 42 families. The various classes are unevenly represented as is indicated in the following summary.

Class	Families	Genera	Species
Myxophyceae	7	27	100
Chlorophyceae	25	72	214
Rhodophyceae	2	2	4
Heterokontae	4	4	8
Chrysophyceae	1	1	2
Dinophyceae	2	2	2
Euglenophyceae	1	3	14
Charophyta	1	1	1
Totals	43	112	345

To the above total may be added 240 species of diatoms (Hohn, 1950) making a grand total of 585 species of algae found in Bergen Swamp to date. Future collecting will undoubtedly disclose still other species in this area.

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THE VEGETATION OF BERGEN SWAMP*

V. The Diatoms (Bacillarieae)

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Diatoms are unicellular plants, either free or colonial, that have a world wide distribution in both salt and fresh water. Certain genera, especially those in the Centrales, are composed mostly of marine species while a great majority of the genera in the Pennales are found in fresh water. Marine forms may also be found in salt ponds, in brackish water, or in maritime marshes.

Diatoms may be found as free unicellular organisms, that are pelagic in habit, or they may be epiphytic on filamentous algae or on submerged parts of vascular plants. A large number of species are colonial and form gelatinous masses attached to submerged plants or other objects that may be present.

The walls of the diatom cells are quite durable and persist long after death. These dead walls—the frustules—may accumulate on the bottom of a pond as “diatomaceous earth”. The diatom walls are composed of two overlapping parts—the valves—which fit together somewhat like the two parts of a pill box. These valves are composed largely of siliceous material and are provided with markings—ridges, grooves, and punctae in definite patterns—the sculpturing.

Material, abundant with living diatoms, may most easily be collected in the early spring or late fall since these organisms grow most readily in cool water. Plants that are submerged in water and covered with a slimy gelatinous material or filaments of algae that may be present will yield a wealth of diatoms. Plankton material may most easily be collected by the use of a plankton net made of a No. 20 silk bolting cloth. The collected material may be preserved in a 5% solution of formalin for an indefinite period.

Since diatoms are identified by the characteristic markings of their silicified cell walls, everything except these cell walls must be removed; this is called cleaning of diatoms. The methods used for cleaning diatoms may be found by consulting Van Heurck (1896). The cleaned diatoms are then mounted in hyrax or some other medium that has a high index of refraction and examined under the microscope.

Collections have been made in Bergen Swamp from 1945 to 1949 by Dr. Walter C. Muenscher of Cornell University and by myself. It has been possible to visit the swamp frequently throughout the year and to secure

* Part I under this title, *The Vascular Plants*, by Walter C. Muenscher (Proc. Roch. Acad. Sci., 9:64-117, 1946) includes a general discussion of Bergen Swamp, N. Y.

many gatherings during each season. Collections were made and labeled according to the habitat in the swamp as described by Muenscher (1946). It is from these gatherings that the material for this study was taken.

Specimens of nearly all the species found were mounted on prepared slides and deposited in the Department of Botany at Cornell University, Ithaca, New York.

I wish to thank Dr. Walter C. Muenscher of Cornell University who made many of the collecting trips possible and for his aid throughout this study. I should like also to acknowledge the aid of Dr. Paul S. Conger of the Smithsonian Institution, Washington, D. C. for verifying the identification of certain specimens.

SUMMARY

This study has revealed a total of 240 species and varieties of diatoms representing 38 genera in 13 families. The Pennales are represented by 230 species and the Centrales by only 10 species.

The genera with the greatest number of representatives are as follows: *Navicula*, 33; *Nitzschia*, 24; *Pinnularia*, 20; *Gomphonema*, 19; *Cymbella*, 17; *Synedra*, 15. The remainder of the genera are represented by less than 10 species with *Coscinodiscus*, *Rhizosolenia*, *Asterionella*, *Tabellaria*, *Rhoicosphenia*, *Amphipecta*, *Frustulia*, *Tropidoneis*, *Achnanthis*, and *Campylodiscus* having only one representative each.

Several brackish water forms namely: *Tropidoneis lepidoptera* (Greg.) Cleve., *Navicula integra* (W. Smith) Ralfs., *Nitzschia tryblionella* var. *levidensis* (W. Smith) Grun., *Nitzschia tryblionella* var. *victoriae* Grun., *Cyclotella Kutziana* Thwaites., *Cyclotella striata* (Kutz.) Grun. were found in the marshy area at the head of the pond at the west end of the swamp. This is the only area in the swamp that shows any indication of a brackish water condition.

ANNOTATED CATALOGUE OF DIATOMS—
(BACILLARIEAE)* IN BERGEN SWAMP

CLASS — BACILLARIEAE

Order I — Centrales

Suborder 1 — Coscinodisceneae

FAMILY 1 — COSCINODISCACEAE

- Cyclotella Meneghiniana* Kütz. Common throughout the swamp.
Cyclotella Kützingiana Thw. Frequent in marsh near west end.
Cyclotella striata (Kütz.) Grun. Frequent in marsh near west end.
Melosira crenulata Kütz. Common in pools in hardwoods and *Carex riparia* swamp.
Melosira granulata (Ehr.) Ralfs. Widespread and common.
Melosira granulata var. *angustissima* Müll. Common in pond at west end.
Melosira italica (Ehr.) Kütz. Frequent in pools in hardwoods.
Melosira varians Ag. Widespread and common.
Coscinodiscus subtilis Ehr. Rare in arbor-vitae swamp.

Suborder 2 — Rhizosolenineae (Solenoidineae)

FAMILY 2 — RHIZOSOLENIACEAE

- Rhizosolenia eriensis* H. L. Smith. Rare in pond at west end of swamp, mainly plankton.

Order II — Pennales

Suborder 1 — Fragilarineae

FAMILY 1 — FRAGILARIACEAE

- Asterionella formosa* Hassell. Abundant in pond at the west end, mainly plankton.
Fragilaria capucina Desmaz. Frequent in Black Creek.
Fragilaria capucina var. *mesolepta* (Rabh.) Grun. Rare in marsh near west end.
Fragilaria crotonensis Kitton. Widespread and common.
Fragilaria Harrissonii (W. Smith) Grun. Frequent in pools in hardwoods and creek south of Torpy Hill.
Fragilaria Harrissonii var. *rhomboides* Grun. Rare in creek south of Torpy Hill.
Fragilaria lapponica Grun. Widespread and common.
Fragilaria nitzschioides Grun. Frequent in Black Creek.

* The arrangement here follows that used by Boyer (1926-27).

- Fragilaria parasitica* (W. Smith) Heib. Frequent in Black Creek.
Synedra actinastroides Lemm. Frequent in arbor-vitae swamp.
Synedra acus Kütz. Frequent in hardwood pools and Black Creek.
Synedra acus var. *angustissima* Grun. Frequent in pond at west end and in the *Carex riparia* and arbor-vitae swamps.
Synedra acus var. *radians* (Kütz.) Hust. Frequent in arbor-vitae swamp.
Synedra aequalis Hust. Common in Black Creek and arbor-vitae swamp.
Synedra affinis var. *fasciculata* (Kütz.) Grun. Common in Black Creek and marsh near west end.
Synedra amphicephala Kütz. Frequent in open marl and pond at west end.
Synedra berolinensis Lemm. Frequent in pools in hardwood.
Synedra biceps W. Smith. Frequent in open marl and pools in hardwoods.
Synedra capitata Ehr. Widespread and common.
Synedra nana Meister. Frequent in arbor-vitae swamp.
Synedra oxyrhynchus Kütz. Widespread and common.
Synedra pulchella (Ralfs.) Kütz. Common in swampy areas and creeks, attached to submerged plants, stones, sticks, etc.
Synedra rumpens Kütz. Common in cattail marsh and pond at west end.
Synedra ulna (Nitzsch.) Ehr. Widespread and common.

FAMILY 2 — TABELLARIACEAE

- Tabellaria fenestrata* (Lyngb.) Kütz. Frequent in arbor-vitae swamp.

FAMILY 3 — MERIDIONACEAE

- Meridion circulare* (Grev.) Ag. Widespread and common.
Meridion constricta Ralfs. Frequent in creeks and in pools in hardwoods.

FAMILY 4 — DIATOMACEAE

- Diatoma elongatum* (Lyngb.) Ag. Common in Black Creek, abundant in pond at west end.
Diatoma vulgare Bory. Widespread and common, forming gelatinous masses on submerged plants, sticks, stones, etc.
Diatoma vulgare var. *breve* Grun. Common in marsh near west end.
Diatoma vulgare var. *ovalis* (Fricke.) Hust. Frequent in pools in hardwoods and arbor-vitae swamp.
Diatoma vulgare var. *productum* Grun. Frequent in pond at west end.

FAMILY 5 — EUNOTIACEAE

- Eunotia arcus* Ehr. Widespread and common.
Eunotia arcus var. *bidens* Grun. Common in Black Creek and cattail marsh.
Eunotia formica Ehr. Frequent in arbor-vitae swamp.
Eunotia gracilis (Ehr.) Rabh. Widespread and common.
Eunotia kocheliensis O. Müll. Rare in marsh near west end.
Eunotia lunaris (Ehr.) Grun. Common in creeks and ponds at west end.
Eunotia parallela Ehr. Frequent in open marl and arbor-vitae swamp.

Suborder 2 — Achnanthineae

FAMILY 6 — ACHNANTHACEAE

- Achnanthes exigua* var. *heterovalvate* Krasske. Frequent in Black Creek.
Achnanthes hungarica Grun. Frequent in marsh near west end.
Achnanthes lanceolata (Breb.) Grun. Widespread and common.
Achnanthes lanceolata var. *rostrata* Hust. Frequent in pond at west end.
Achnanthes microcephala (Kütz.) Cleve. Common in arbor-vitae swamp.
Achnanthidium flexellum (Breb.) Kütz. Widespread and common.
Cocconeis pediculus Ehr. Widespread and common.
Cocconeis placentula Ehr. Widespread and common.
Cocconeis placentula var. *lineata* (Ehr.) Cleve. Frequent in Black Creek and pond at west end.
Rhoicosphenia curvata (Kütz.) Grun. Widespread and common.

Suborder 3 — Naviculineae

FAMILY 7 — NAVICULACEAE

- Amphipleura pellucida* Kütz. Frequent in *Carex riparia* swamp and creek south of Torpy Hill.
Frustulia vulgaris (Thw.) De Toni. Rare in creek south of Torpy Hill and marsh near west end.
Caloneis alpestris (Grun.) Cleve. Common in Black Creek and arbor-vitae swamp.
Caloneis amphibaena (Bory.) Cleve. Widespread and common.
Caloneis bacillum (Grun.) Mereschkowsky. Frequent in open marl area.
Caloneis formosa (Greg.) Cleve. Frequent in open marl area.

- Caloneis obtusa* (W. Smith) Cleve. Common in open marl areas, in pools in hardwoods and Black Creek.
- Caloneis Schumanniana* var. *biconstricta* Grun. Frequent in arbor-vitae swamp.
- Caloneis silicula* var. *alpina* Cleve. Frequent in arbor-vitae swamp.
- Caloneis silicula* var. *truncatula* Grun. Frequent in open marl area.
- Caloneis silicula* var. *tumida* Hust. Common in Black Creek and arbor-vitae swamp.
- Mastogloia Braunii* Grun. Widespread and common.
- Mastogloia Grevillei* W. Smith. Abundant in Black Creek.
- Mastogloia Smithii* Thwaites. Widespread and common.
- Mastogloia Smithii* var. *amphicephala* Grun. Common in Black Creek and arbor-vitae swamp.
- Diploneis elliptica* (Kütz.) Cleve. Common in *Carex riparia* and arbor-vitae swamps.
- Diploneis ovalis* (Hilse.) Cleve. Widespread and common.
- Anomoeoneis exilis* (Kütz.) Cleve. Frequent in arbor-vitae swamp.
- Anomoeoneis sculpta* (Cleve.) O. Müll. Widespread and common.
- Anomoeoneis sphaerophora* (Kütz.) Pfitzer. Common in Black Creek and cattail marshes.
- Anomoeoneis zellensis* (Grun.) Cleve. Rare in arbor-vitae swamp.
- Neidium amphigomphus* (Ehr.) Pfitzer. Frequent in open marl, Black Creek and marsh near west end.
- Neidium affine* var. *amphirhynchus* (Ehr.) Cleve. Common in creeks and pond at west end.
- Neidium iridis* (Ehr.) Cleve. Frequent in marsh near west end.
- Neidium iridis* fo. *vernalis* Reichelt. Frequent in marsh near west end.
- Navicula anglica* Ralfs. Frequent in *Carex riparia* and cattail marsh.
- Navicula bacilliformis* Grun. Frequent in pond at west end.
- Navicula bicapitellata* Hust. Frequent in arbor-vitae swamp and pond at west end.
- Navicula cryptocephala* Kütz. Common in marsh near west end.
- Navicula cuspidata* Kütz. Widespread and common.
- Navicula cuspidata* var. *ambigua* (Ehr.) Cleve. Widespread and common.
- Navicula dicephala* (Ehr.) W. Smith. Common in arbor-vitae swamp.
- Navicula elegans* W. Smith. Common in pools in hardwoods and Black Creek.
- Navicula falisiensis* Grun. Common in open marl areas and in pools in hardwoods.
- Navicula gracilis* Ehr. Frequent in marsh near west end.
- Navicula hasta* Pantocsek. Widespread and common.
- Navicula hungarica* Grun. Frequent in Black Creek.

- Navicula hungarica* var. *capitata* (Ehr.) Cleve. Frequent in Black Creek.
- Navicula integra* (W. Smith) Ralfs. Frequent in marsh near west end.
- Navicula lacustris* Greg. Rare in Black Creek.
- Navicula lanceolata* (Agardh.) Kütz. Frequent in pond at west end, cattail marsh, and Black Creek.
- Navicula minima* Grun. Common in arbor-vitae swamp.
- Navicula muralis* Grun. Rare in Black Creek.
- Navicula oblonga* Kütz. Widespread and common.
- Navicula peregrina* (Ehr.) Kütz. Frequent in marsh near west end.
- Navicula placentula* var. *Jenisseyensis* (Grun.) Meister. Widespread and common.
- Navicula pupula* Kütz. Frequent in Black Creek and arbor-vitae swamp.
- Navicula pupula* var. *capitata* Hust. Frequent in open marl area.
- Navicula radiosa* Kütz. Widespread and common.
- Navicula Reinhardtii* Grun. Frequent in creek south of Torpy Hill.
- Navicula rhynchocephala* Kütz. Frequent in marsh near west end.
- Navicula Rotaeana* var. *excentrica* Grun. Rare in pond at west end.
- Navicula salinarum* Grun. Frequent in creek south of Torpy Hill.
- Navicula salinarum* var. *intermedia* Grun. Frequent in marsh near west end.
- Navicula tuscula* (Ehr.) Grun. Frequent in Black Creek, open marl area and in pools in hardwoods.
- Navicula vercunda* Hust. Frequent in marsh near west end.
- Navicula viridula* Kütz. Widespread and common.
- Navicula vulpina* Kütz. Frequent in arbor-vitae swamp.
- Pinnularia acrosphaeria* Breb. Widespread and common.
- Pinnularia dactylus* Ehr. Widespread and common.
- Pinnularia fasciata* Lagerstedt. Frequent in Black Creek.
- Pinnularia gibba* var. *linearis* Hust. Frequent in open marl area.
- Pinnularia gibba* var. *subundulata* Meyer. Frequent in arbor-vitae swamp.
- Pinnularia gibbula* Cleve. Frequent in arbor-vitae swamp and cattail marsh.
- Pinnularia gracillima* Greg. Frequent in Black Creek.
- Pinnularia interrupta* W. Smith. Frequent in Black Creek, in pools in hardwoods, and marsh near west end.
- Pinnularia legumen* Ehr. Frequent in Black Creek and *Carex riparia* swamp.
- Pinnularia limosa* Kütz. Widespread and common.
- Pinnularia limosa* var. *gibberula* Grun. Frequent in arbor-vitae swamp and cattail marsh.
- Pinnularia limosa* var. *ventricosa* (Ehr.) Donk. Frequent in open marl area and pond at west end.

- Pinnularia major* Kütz. Widespread and common.
- Pinnularia microstauron* (Ehr.) Cleve. Frequent in *Carex riparia* swamp and cattail marsh.
- Pinnularia microstauron* var. *Brebessonii* (Kütz.) Hust. Frequent in open marl area and arbor-vitae swamp.
- Pinnularia molaris* Grun. Widespread and common.
- Pinnularia nobilis* Ehr. Frequent in arbor-vitae swamp.
- Pinnularia stomatophora* Grun. Frequent in pools in hardwoods, open marl area, and arbor-vitae swamp.
- Pinnularia viridis* (Nitzsch.) Ehr. Widespread and common.
- Pinnularia viridis* var. *rupestris* (Hantzsch.) Cleve. Frequent in marsh near west end and Black Creek.
- Gyrosigma acuminatum* (Kütz.) Cleve. Widespread and common.
- Gyrosigma attenuatum* (Kütz.) Cleve. Widespread and common.
- Gyrosigma Spencerii* (Quekett.) Cleve. Frequent in Black Creek and marsh near west end.
- Stauroneis acuta* W. Smith. Widespread and common.
- Stauroneis anceps* Ehr. Frequent in pond at west end, open marl area, and creeks.
- Stauroneis anceps* fo. *lineris* (Ehr.) Cleve. Frequent in open marl area.
- Stauroneis phoenicenteron* Ehr. Widespread and common.
- Stauroneis phoenicenteron* var. *amphilepta* (Ehr.) Cleve. Frequent in Black Creek.
- Stauroneis pygmaea* Krieger. Rare in pond at west end.
- Stauroneis Smithii* Grun. Frequent in Black Creek and open marl area.
- Tropidoneis lepidoptera* (Greg.) Cleve. Rare in marsh near west end.

FAMILY 8 — GOMPHONEMATACEAE

- Gomphonema acuminatum* Ehr. Frequent in pond at west end and cattail marsh.
- Gomphonema acuminatum* var. *Brebessonii* (Kütz.) Cleve. Common in marshy areas.
- Gomphonema acuminatum* var. *coronatum* (Ehr.) W. Smith. Widespread and common.
- Gomphonema acuminatum* var. *turris* (Ehr.) Cleve. Widespread and common.
- Gomphonema angustatum* (Kütz.) Rabh. Frequent in Black Creek and cattail marsh.
- Gomphonema augur* Ehr. Frequent in pond at west end.
- Gomphonema constrictum* Ehr. Common in Black Creek and pond at west end.

- Gomphonema constrictum* var. *capitatum* (Ehr.) Cleve. Widespread and common.
- Gomphonema gracile* Ehr. Common in marsh near west end.
- Gomphonema intricatum* Kütz. Widespread and common.
- Gomphonema intricatum* var. *pumila* Grun. Frequent in open marl area and cattail marsh.
- Gomphonema lanceolatum* Ehr. Frequent in marsh near west end.
- Gomphonema longiceps* fo. *gracilis* Hust. Frequent in pond at west end.
- Gomphonema longiceps* var. *subclavata* Grun. Common in arbor-vitae swamp.
- Gomphonema olivaceum* (Lyngbye) Kütz. Widespread and common, forms gelatinous masses on submerged plants, sticks, stones, etc.
- Gomphonema parvalum* Kütz. Widespread and common.
- Gomphonema parvalum* var. *micropus* (Kütz.) Cleve. Common in pools in hardwoods.
- Gomphonema sphaerophorum* Ehr. Common in Black Creek and pond at west end.
- Gomphonema vibrio* Ehr. Common in *Carex riparia* swamp and cattail marshes.

FAMILY 9—CYMBELLACEAE

- Amphora halsatica* Hust. Frequent in Black Creek.
- Amphora ovalis* Kütz. Widespread and common.
- Cymbella affinis* Kütz. Widespread and common.
- Cymbella amphicephala* Naegeli. Common in pools in hardwoods, *Carex riparia* swamp and open marl area.
- Cymbella angustata* (W. Smith) Cleve. Frequent in streams and open marl area.
- Cymbella aspera* (Ehr.) Cleve. Widespread and common.
- Cymbella austriaca* Grun. Frequent in open marl area and arbor-vitae swamp.
- Cymbella cistula* (Hemprich) Grun. Widespread and common.
- Cymbella delicatula* Kütz. Frequent in open marl area and arbor-vitae swamp.
- Cymbella Ehrenbergii* Kütz. Rare in marsh near west end.
- Cymbella laevis* Naegeli. Frequent in open marl area.
- Cymbella lanceolata* (Ehr.) V. Heurck. Common in Black Creek, *Carex riparia* swamp and pond at west end.
- Cymbella mexicana* Ehr. Widespread and common.
- Cymbella naviculiformis* Averswald. Common in pools in hardwoods and *Carex riparia* swamp.
- Cymbella parva* (W. Smith) Cleve. Frequent in arbor-vitae swamp and cattail marsh.

- Cymbella prostrata* (Berkeley) Cleve. Widespread and common.
Cymbella tumida (Breb.) V. Heurck. Widespread and common.
Cymbella turgida (Greg.) Cleve. Widespread and common, enclosed in gelatinous sheaths attached to submerged objects.
Cymbella ventricosa Kütz. Widespread and common.
Epithemia argus Kütz. Common in Black Creek, open marl area and arbor-vitae swamp.
Epithemia argus var. *longicornus* Grun. Frequent in Black Creek and pond at west end.
Epithemia Muellerii Fricke. Rare in open marl area.
Epithemia sorex Kütz. Abundant in pond at west end.
Epithemia turgida (Ehr.) Kütz. Widespread and common.
Epithemia turgida var. *granulata* (Ehr.) Grun. Rare in Black Creek.
Epithemia zebra (Ehr.) Kütz. Widespread and common.
Epithemia zebra var. *porcellus* (Kütz.) Grun. Frequent in pools in hardwoods and cattail marsh.
Epithemia zebra var. *saxonica* (Kütz.) Grun. Frequent in pools in hardwoods, Black Creek and *Carex riparia* swamp.
Rhopalodia gibba (Ehr.) O. Müll. Widespread and common.
Rhopalodia gibberula (Ehr.) O. Müll. Rare in marsh near west end.
Rhopalodia parallela (Grun.) O. Müll. Widespread and common.
Rhopalodia ventricosa (Kütz.) O. Müll. Widespread and common.

Suborder 4 — Surirellineae

FAMILY 10 — NITZSCHIACEAE

- Denticula elegans* Kütz. Widespread and common.
Denticula tenuis var. *frigida* (Kütz.) Grun. Frequent in open marl area.
Nitzschia acicularis W. Smith. Frequent in pond at west end.
Nitzschia acuminata (W. Smith) Grun. Frequent in Black Creek, pond at west end, and cattail marsh.
Nitzschia amphibia Grun. Widespread and common.
Nitzschia angustata (W. Smith) Grun. Frequent in marsh near west end.
Nitzschia apiculata (Greg.) Grun. Frequent in marsh near west end.
Nitzschia commutata Grun. Frequent in marsh near west end.
Nitzschia denticula Grun. Frequent in Black Creek and cattail marsh.
Nitzschia dissipata (Kütz.) Grun. Frequent in pond at west end and creek south of Torpy Hill.
Nitzschia flexa Schumann. Rare in Black Creek.
Nitzschia fonticola Grun. Common in pools in hardwoods, arbor-vitae swamp and pond at west end.

- Nitzschia gandersheimi* Krasske. Common in Black Creek, open marl area and creek south of Torpy Hill.
- Nitzschia gracilis* Hantzsch. Common in Black Creek and arbor-vitae swamp.
- Nitzschia hantzschiana* Rabh. Common in open marl area.
- Nitzschia holsatica* Hust. Frequent in *Carex riparia* swamp.
- Nitzschia hungarica* Grun. Common in marsh near west end.
- Nitzschia ignorata* Krasske. Rare in Black Creek.
- Nitzschia obtusa* var. *scalpelliformis* Grun. Frequent in Black Creek.
- Nitzschia recta* Hantzsch. Rare in Black Creek.
- Nitzschia sigma* (Kütz.) W. Smith. Frequent in marsh near west end.
- Nitzschia sigmoidea* (Ehr.) W. Smith. Widespread and common.
- Nitzschia spectabilis* (Ehr.) Ralfs. Widespread and common.
- Nitzschia thermalis* Kütz. Frequent in marsh near west end.
- Nitzschia tryblionella* var. *levidensis* (W. Smith) Grun. Frequent in marsh near west end.
- Nitzschia tryblionella* var. *victoriae* Grun. Frequent in marsh near west end.
- Hantzschia amphioxys* (Ehr.) Grun. Frequent in *Carex riparia* swamp, creek south of Torpy Hill, and marsh near west end.
- Hantzschia amphioxys* var. *major* Grun. Frequent in Black Creek.
- Hantzschia elongata* (Hantzsch.) Grun. Frequent in Black Creek.
- Hantzschia pseudomarina* Hust. Frequent in creek south of Torpy Hill.

FAMILY 11 — SURIRELLACEAE

- Campylodiscus noricus* Ehr. Common in pools in hardwoods and creek south of Torpy Hill.
- Cymatopleura elliptica* (Breb.) W. Smith. Frequent in Black Creek.
- Cymatopleura solea* (Breb.) W. Smith. Widespread and common.
- Surirella angustata* Kütz. Frequent in pools in hardwoods and creek south of Torpy Hill.
- Surirella didyma* Kütz. Common in creek south of Torpy Hill.
- Surirella elegans* Ehr. Frequent in arbor-vitae swamp.
- Surirella gracilis* (W. Smith) Grun. Rare in pond near west end.
- Surirella minuta* Breb. Frequent in pools in hardwoods and marsh near west end.
- Surirella ovata* Kütz. Frequent in pools in hardwoods.
- Surirella pinnata* W. Smith. Frequent in pools in hardwoods.
- Surirella rattrayi* A. Schmidt. Rare in Black Creek.

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THE VEGETATION OF BERGEN SWAMP

VI. The Fungi

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This, the sixth in a series of papers on the vegetation of Bergen Swamp in Genesee County, New York, consists of a report of the fungi. A general discussion of Bergen Swamp has been presented earlier (Muenscher, 1946). The Myxomycetes known from the Swamp have been reported elsewhere (Muenscher, 1948).

The diversity of habitats and hosts in the Swamp is reflected in the extensive annotated list of fungi and host index here reported.

Most of the collections upon which this report is based were made by the authors between 1944 and 1949. Trips were made into the Swamp during every month of the year. In presenting this first report on the fungi they are aware that future explorations will add other species to the list now known from this area covering approximately five square miles.

The following table presents the classification of fungi as used herein with a statistical summary of the number of genera, species and varieties included in the list. A total number of 616 species and varieties of fungi is recorded for Bergen Swamp in this survey.

The arrangement of the orders and families of the Phycomycetes is essentially that of Fitzpatrick (1930). The Ascomycetes are arranged in a system patterned basically on that in Engler & Prantl (1897), but modifications based on the more recent works of Miller (1941) and Nannfeldt (1932) have been utilized. The systematic arrangement of the Basidiomycetes follows that in Engler & Prantl (1900) with some modifications (Wolf & Wolf, 1947). The Fungi Imperfecti are arranged according to the system used in Clements & Shear (1931) and Engler & Prantl (1900).

Throughout the list the genera are arranged alphabetically under the families, and the species are arranged alphabetically under each genus. Following the species name, the substrate or host is given (in this list, the "host", living or dead, is provided whenever it could be determined), and following this is a citation of the herbarium number of the specimens.

Cited numbers not preceded by a letter indicate that the specimens collected by the authors are deposited in the herbarium of the Department of Plant Pathology, Cornell University. Numbers preceded by "R" are in the personal herbarium of Mr. C. T. Rogerson, and a few, preceded by "K", are in the personal herbarium of Mr. R. P. Korf.

CLASSIFICATION AND STATISTICAL SUMMARY

Class I. PHYCOMYCETES

Order 1. Chytridiales	Genera	Species	Varieties
Family 1. Synchytriaceae	1	2	
2. Cladochytriaceae	2	2	
2. Peronosporales			
3. Albuginaceae	1	4	
4. Peronosporaceae	3	11	
3. Mucorales			
5. Mucoraceae	1	1	
6. Pilobolaceae	1	3	
7. Endogonaceae	1	1	
Total Phycomycetes	10	24	—

Class II. ASCOMYCETES

Order 4. Taphrinales	Genera	Species	Varieties
Family 8. Taphrinaceae	1	2	
5. Gymnoascales			
9. Onygenaceae	1	1	
6. Pezizales			
10. Pezizaceae	19	48	
7. Helotiales			
11. Dermateaceae	6	10	
12. Phacidiaceae	4	6	
13. Orbiliaceae	1	2	
14. Hyaloscyphaceae	5	8	
15. Helotiaceae	6	11	
16. Geoglossaceae	4	5	
17. Sclerotiniaceae	1	1	
18. Patellariaceae	1	1	
8. Hysteriales			
19. Hysteriaceae	2	3	
9. Dothideales			
20. Dothideaceae	2	2	
21. Mycosphaerellaceae	1	1	
10. Pseudosphaeriales			
22. Pseudosphaeriaceae	11	15	1
11. Microthyriales			
23. Stigmateaceae	1	1	
24. Microthyriaceae	1	1	
12. Erysiphales			
25. Erysiphaceae	6	17	1
26. Englerulaceae	1	1	
13. Hypocreales			
27. Nectriaceae	2	9	
28. Hypocreaceae	4	6	
14. Sphaeriales			
29. Chaetomiaceae	1	2	
30. Sordariaceae	4	5	
31. Allantosphaeriaceae	3	4	
32. Diaporthaceae	2	7	
33. Phyllachoraceae	1	2	
34. Xylariaceae	4	14	
Total Ascomycetes	95	185	2

Class III. BASIDIOMYCETES

Order	Genera	Species	Varieties
Order 15. Ustilaginales			
Family 35. Ustilaginaceae	3	7	
36. Tilletiaceae	1	2	
16. Uredinales			
37. Melampsoraceae	7	14	
38. Pucciniaceae	7	40	12
17. Auriculariales			
39. Auriculariaceae	1	1	
18. Dacrymycetales			
40. Dacrymycetaceae	4	7	
19. Tremellales			
41. Tremellaceae	4	7	
20. Agaricales			
42. Exobasidiaceae	1	1	
43. Thelephoraceae	8	25	
44. Clavariaceae	2	13	
45. Hydnaceae	5	10	
46. Polyporaceae	8	48	
47. Boletaceae	6	7	
48. Agaricaceae	35	112	1
21. Hymenogastrales			
49. Melanogasteraceae	1	1	
22. Lycoperdales			
50. Lycoperdaceae	2	9	
51. Geastraceae	1	2	
23. Sclerodermatales			
52. Sclerodermataceae	1	1	
Total Basidiomycetes	96	306	13

Class IV. Fungi Imperfecti

Order 24. Sphaeropsidales			
Family 53. Sphaerioidaceae	18	38	1
54. Leptostromataceae	3	6	
25. Melanconiales			
55. Melanconiaceae	7	12	
26. Moniliales			
56. Moniliaceae	5	10	
57. Dematiaceae	7	12	
58. Stilbaceae	2	2	
59. Tuberculariaceae	5	5	
Total Fungi Imperfecti	47	85	1
Total	248	600	16

The authors wish to express their sincere thanks to Professor H. M. Fitzpatrick and Professor D. S. Welch, Department of Plant Pathology, Cornell University, for their aid in identification of several specimens, and especially to Mr. R. P. Korf who has identified or confirmed practically all of the discomycetes (Pezizales & Helotiales). Also, appreciation is expressed to other mycologists, C. Chupp, F. J. Czabator, J. W. Groves, H. S. Jackson, J. L. Lowe, G. W. Martin, P. Neergaard and R. Sprague, who have determined certain specimens referred to them.

The rest of the specimens have been identified by the authors. Every attempt has been made to use the more recent monographs and to compare most of the collections with authentic specimens of each species on deposit in the herbarium of the Department of Plant Pathology, Cornell University. The fleshy Agaricaceae, however, have been identified primarily by comparison with descriptions and illustrations (Atkinson, 1903 and Kauffman, 1918).

The earliest record of a fungus from Bergen Swamp as yet known to the authors is that of Peck (1905). Peck described *Phyllosticta pallidor* Pk. as a new species on *Smilacina* (Vagnera) *stellata*. This fungus is now considered to be a synonym of *Phyllosticta Convallariae* Pers. ex Seaver.

Dearness & House (1925) published *Pleospora herbarum* (Pers. ex Fr.) Rabenh. var. *Triglochinis* Dearn. & House on dead leaves of *Triglochin palustris*, based on a Peck collection from the Swamp.

House visited the area in 1918 and published (House 1921, 1923) three records of fungi from Bergen Swamp:

Didymosphaeria Parnassiae (Pk.) Sacc., *Peniophora Eichleriana* Bres. & *Phialea scutula* (Pers.) Gill. (*Helotium scutula* in this list). The latter has been recollected during this survey, but the others have not been seen in the Swamp nor have the herbarium specimens been seen.

H. H. Whetzel and H. S. Jackson accompanied by E. F. Hopkins and W. C. Muenscher visited the Swamp July 21–22, 1917. Some 41 species, all parasitic forms, were collected by them and deposited in the Cornell Plant Pathology Herbarium. All but 15 of these have been recollected during this survey. In the list, these 15 are cited with Whetzel & Jackson following the herbarium number.

No nomenclatorial changes are made in this paper. In a few cases where the authors feel that a species should belong in another genus, the following system has been adopted: *Pachyella* sp. (*Peziza clypeata* Schw.)

PHYCOMYCETES

Chytridiales

Synchytriaceae

Synchytrium aecidioides (Peck) Lagerh. On leaves and stems of *Amphicarpa bracteata*, 36486.

Synchytrium Vaccinii Thomas. On the lower leaves of *Vaccinium Oxycoccus*, 37820.

Cladochytriaceae

Physoderma vagans Schröter. On leaves and stems of *Sium suave*, 37621.

Urophlyctis pluriannulatum (Berk. & Curt.) Farl. On leaves, petioles and stems of *Sanicula marilandica*, 37663.

Peronosporales**Albuginaceae**

- Albugo Bliti** (Biv.-Bern) O. Kuntze. On leaves of *Amaranthus retroflexus*, 36726.
- Albugo candida** (Pers. ex Lév.) O. Kuntze. On leaves of *Capsella Bursa-pastoris*, 36615; *Dentaria diphylla*, R3045; and *Lepidium campestre*, 37629.
- Albugo Portulacae** (DC.) O. Kuntze. On *Portulaca oleracea* in cultivated field bordering the swamp, 36614.
- Albugo Tragopogonis** (Pers.) ex S. F. Gray. On *Cirsium arvense*, 9973. (Whetzel & Jackson)

Peronosporaceae

- Peronospora Arthuri** Farl. On *Oenothera biennis*, 9942. (Whetzel & Jackson)
- Peronospora Corydalis** De Bary. On *Dicentra canadensis*, 37613.
- Peronospora effusa** (Grev.) Rabenh. On *Chenopodium album*, 37630.
- Peronospora Hydrophylli** Waite. On *Hydrophyllum virginianum*, 37757.
- Peronospora parasitica** (Pers.) Fr. On *Dentaria laciniata*, 37614.
- Peronospora Potentillae** De Bary. On *Geum canadense*, 9959. (Whetzel & Jackson)
- Plasmopara Geranii** (Peck) Berl. & DeToni. On *Geranium maculatum*, 37628.
- Plasmopara Halstedii** (Farl.) Berl. & DeToni. On *Eupatorium rugosum*, 9984. (Whetzel & Jackson)
- Plasmopara pygmaea** (Ung.) Schröter. On *Anemone canadensis*, 36424.
- Plasmopara viticola** (Berk. & Curt. ex De Bary) Berl. & DeToni. On *Vitis vulpina*, 36434; and *Parthenocissus* sp., R2233.
- Sclerospora graminicola** (Sacc.) Schröter. On *Setaria viridis*, 36886.

Mucorales**Mucoraceae**

- Mucor hiemalis** Wehmer. On fox dung, 37386.

Pilobolaceae

- Pilobolus crystallinus** Tode. On deer dung, 37772.
- Pilobolus Kleinii** Van Tiegh. On horse dung, pasture along Black Creek, 37296.
- Pilobolus umbonatus** Buller. On deer dung, 37547.

Endogonaceae

- Endogone pisiformis** Link. Found only once in October at the tips of *Sphagnum fuscum* in the arbor-vitae woods, 37758.

ASCOMYCETES

Taphrinales

Taphrinaceae

- Taphrina Polystichi* Mix. On leaves of *Polystichum acrostichoides*, 37626.
Taphrina Robinsoniana Giesenhagen. On pistillate catkins of *Alnus incana*, 36406.

Gymnoascales

Onygenaceae

- Onygena equina* (Willd.) ex Pers. On old hoofs of cow skeleton, 35382.

Pezizales

Pezizaceae

- Aleuria aurantia* (Pers. ex Fr.) Fuckel. On the ground about maple stump, 37580.
Ascobolus immersus Pers. ex Fr. On deer dung, R2015.
Ascobolus viridulans Phill. & Plowr. On deer dung, R2464; on dung of grouse, R2972.
Ascophanus isabellinus Clem. On horse dung, 37291.
Ascophanus lacteus (Ck. & Phill.) Sacc. On deer dung, 37140.
Ascophanus ochraceus (Crouan) Boud. On deer dung, R2740.
Caloscypha fulgens (Pers. ex Fr.) Boud. On mossy ground under red maple, 37954.
Discina ancilis (Pers. ex Fr.) Sacc. On rotten log, 36959.
Galactinia brunneo-atra (Desm.) Boud. On the ground, mixed woods, K794.
Galactinia olivacea Boud. non Quélet sensu Grelet. On humus, mixed woods, 37429.
Galactinia praetervisa (Bres.) Boud. On burned-over soil, 37435.
Galactinia proteana (Boud.) Sacc. On burned hemlock duff, 37810.
Galactinia Saccardiana (Cooke) Boud. On the ground, mixed woods, 36449.
Galactinia subumbrina (Boud.) Boud. On the ground in open woods, 36632.
Galactinia succosella Le Gal & Romag. On soil in deciduous woods, 37522.
Galactinia sp. On the ground, mixed woods, K793.
Geopyxis carbonaria (Alb. & Schw. ex Fr.) Sacc. On burned hemlock duff, 37436.
Helvella crispa Scop. ex Fr. On the ground, moist woods, R1163.

- Helvella elastica* Bull. ex Fr. On the ground, mixed woods, 36629.
Helvella Klotschiana Corda. On the ground, mixed woods, R3088.
Helvella macropus (Pers. ex Fr.) Karst. On the ground, woods, 36631.
Helvella palustris Peck. On mossy ground, frondose woods, 36630.
Helvella sphaerospora Peck. On rotten log, 36935.
Helvella sp. On rotten log, R1256.
Humarina aggregata (Berk. & Br.) Seaver. On soil among mosses, R2855.
Humarina orthotricha (Cke. & Ell.) Seaver. Among mosses, 37438.
Humarina rufa (Pers.) Seaver (*Humaria rubricosa* (Fr.) Sacc.). On burned hemlock duff, 37811.
Lasiobolus longisetosus Povah. On deer dung, 37518.
Lasiobolus ruber (Quél.) Sacc. On deer dung, 37549.
Lasiobolus sp. On dung of large animal, 37439.
Morchella angusticeps Peck. On the ground, mixed woods, 37993.
Morchella crassipes Pers. ex Fr. On the ground, moist frondose woods, R1501.
Morchella esculenta Pers. ex Fr. On the ground, moist frondose woods, 37581.
Morchella semilibera Fr. On the ground, mixed woods, 37585.
Otidea grandis (Fr.) Rehm. On humus and mosses, 36532.
Pachyella sp. (*Peziza clypeata* Schw.) On rotten log of *Tilia americana*, 36692; and moss covered log of *Prunus serotina*, 37254.
Peziza repanda Pers. ex Fr. On rotten log, frondose woods, 36639.
Peziza sylvestris (Boud.) Sacc. & Trott. On rotten log of *Acer* sp., 37433; on the ground, under *Thuja*, R2327.
Peziza vesiculosa Bull. ex Fr. On the ground, moist woods, 36634.
Plectania coccinea (Scop. ex Fr.) Fuckel. On decaying twigs, among duff, 37548.
Pseudoplectania nigrella (Pers. ex Fr.) Fuckel. On log of *Tsuga canadensis*, R2322.
Rhizina undulata Fr. On burned hemlock duff. 38031.
Ryparobius sexdicimsporus (Crouan.) Sacc. On fox dung, R1986.
Scutellinia hemisphaerica (Weber ex Fr.) Kuntze. On the ground, under hemlock, R970.
Scutellinia Lusatieae (Cooke) Kuntze sensu Seaver non Le Gal. On rotten log, 36433.
Scutellinia scutellata (L. ex Fr.) Kuntze. On rotten frondose logs, R555.
Scutellinia setosa (Nees. ex Fr.) Kuntze. On rotten log, 36495.
Scutellinia sp. On rotten log of *Acer* sp., K1491.

Helotiales

Dermateaceae

- Belonium bryogenum* (Peck) Rehm. On mosses mixed with *Cladonia* sp., R3212.
Belonopsis sp. On dead stalks of *Leersia oryzoides*, 37521.
Dermea acerina (Peck) Rehm. On dead *Acer rubrum*, 37826.
Mollisia melaleuca (Fr.) Sacc. On decaying wood, 37550.
Mollisia sp. On rotten wood, K1504.
Pezicula carpinea (Pers.) Tul. On dead *Carpinus caroliniana*, 37881.
Pezicula cinnamomea (DC. ex Fr.) Sacc. On dead branch of *Quercus* sp., 37575. (Det. by J. W. Groves)
Tapesia fusca (Pers. ex Fr.) Fuckel. On wood and bark, 37520.
Tapesia melaleucoides Rehm. On rotten log, 37809.
Tapesia sp. On fallen twig, 37519.

Phacidiaceae

- Coccophacidium Pini* (Fr.) Rehm. On trunk of living *Pinus Strobus*, 37589.
Lophodermium nitens Darker. On fallen leaves of *Pinus Strobus* in sphagnum, 37882.
Lophodermium sphaerioides (Alb. & Schw. ex Fr.) Duby. On fallen leaves of *Ledum groenlandicum*, R2427.
Propolis faginea (Schröd.) Karst. On decorticated log, 36964.
Rhytisma acerinum Pers. ex Fr. On leaves of *Acer rubrum*, 36662; *Acer saccharinum*, R1300.
Rhytisma punctatum Pers. ex Fr. On leaves of *Acer spicatum*, 36655.

Orbiliaceae

- Orbilium xanthostigma* Fr. On dead branches of *Cephalanthus occidentalis*, 37288; on old sporophores of *Daedalea* sp., R2844.
Orbilium sp. On very rotted wood, K1489.

Hyaloscyphaceae

- Arachnopeziza aurata* Fuckel. On wood and bark, 37517.
Cistella sp. On decorticated wood, 37750.
Erinella miniopsis (Ellis) Sacc. On living trunk of *Acer rubrum*, 37590.
Hyaloscypha sp. On rotten wood, 37524.
Lachnum Britzelmayrianum (Rehm) Rehm. On rotten log. R3055.
Lachnum fuscescens (Pers.) Karst. On fallen leaves of *Ledum groenlandicum*, R2282.
Lachnum pudibundum (Quel.) Schröt. On herbaceous stem, 37523.
Lachnum virgineum (Batsch ex Fr.) Karst. On rotten log of *Acer* sp., 37817.

Helotiaceae

- Cenangium salicellum* Höhn. On dead twigs of *Salix discolor*, R2895.
(Det. by J. W. Groves.)
- Chlorociboria aeruginascens* (Nyl.) Kanouse. On rotten log, 37193.
- Chlorociboria aeruginosa* (Oed. ex Fr.) Seaver. On rotten log, 37290.
- Chlorociboria versiformis* (Pers. ex Fr.) Seaver. On rotten log, 37289.
- Coryne sarcoides* (Jacq. ex Fr.) Tul. On hardwood stump, 36633.
- Encoelia furfuracea* (Fr.) Karst. On dead branches of *Alnus incana*, 36902.
- Helotium citrinum* (Hedw. ex Fr.) Fr. On hardwood log, 36670.
- Helotium ?indepremsum* Bizz. On fallen leaves of *Thuja occidentalis*, K790.
- Helotium scutula* (Pers. ex Fr.) Karst. On dead stems of *Solidago* sp., 37287; on dead stems of *Polymnia canadensis*. (Reported by House, 1921.)
- Helotium caudatum* (Karst.) Vel. On fallen leaves of *Myrica pennsylvanica*, R2752.
- Holwaya leptosperma* (Peck) Durand. On log of *Tilia americana*, 36691.

Geoglossaceae

- Geoglossum glabrum* Pers. ex Fr. On moss-covered log, 36649.
- Geoglossum nigratum* (Fr.) Cooke. On the ground under *Thuja* and *Tsuga*, 36907.
- Leotia viscosa* Fr. On the ground, mixed woods, 37250.
- Microglossum rufum* (Schw.) Underw. On mossy ground, mixed woods, 37179.
- Trichoglossum hirsutum* (Pers. ex Fr.) Boud. On the ground under *Thuja* and *Tsuga*, 36909.

Sclerotiniaceae

- Sclerotinia sclerotiorum* (Lib.) De Bary. On the ground under *Cornus alternifolia*, 37434.

Patellariaceae

- Karschia lignyota* (Fr.) Sacc. On log of *Ulmus* sp., 37851.

Hysteriales**Hysteriaceae**

- Hysterium angustatum* (Alb. & Schw. ex Fr.) Chev. On decorticated branch of *Fraxinus nigra*, 37919.
- Hysterographium gloniopsis* (Gerard) Ell. & Ev. On decorticated wood, 37420.

Hysteroglyphium Mori (Schw.) Rehm. Quite common on decorticated logs, 36826; on decorticated portion of dead *Acer rubrum*, R2944.

Dothideales

Dothideaceae

Dothidea Linderae Gerard. On dead twigs of *Lindera Benzoin*, 37920.
Rosenscheldia Heliopsidis (Schw.) Höhn. On dead stems of *Aster novae-angliae*, R2214.

Mycosphaerellaceae

Mycosphaerella Sarraceniae (Schw.) House. On dead leaves of *Sarracenia purpurea*, 37584.

Pseudosphaeriales

Pseudosphaeriaceae

- Bertia moriformis* (Tode ex Fr.) De Not. On rotten log, 37377.
Cryptomycina Pteridis (Rebent. ex Fr.) Höhn. On leaves of *Pteridium aquilinum* var. *latiusculum*, 38021.
Dibotryon morbosum (Schw. ex Fr.) Theiss. & Syd. On branches of *Prunus virginiana*, 36448; and *Prunus domestica*, in field along north edge of swamp, R1277.
Didymosphaeria brunneola Niessl. On dead stems of *Apocynum cannabinum*, 37884.
Didymosphaeria Parnassiae (Pk.) Sacc. On dead stems of *Parnassia caroliniana*. (Reported by House, 1921.)
Lasiosphaeria hispida (Tode ex Fr.) Fuckel. On log of *Fagus grandifolia*, 37777.
Lasiosphaeria ovina (Pers. ex Fr.) Ces. & De Not. On log of *Fagus grandifolia*, 37778.
Leptosphaeria clavigera (Cke. & Ell.) Sacc. On dead stems of *Phytolacca americana*, 37990.
Leptosphaeria doliolum (Pers. ex Fr.) De Not. On dead stems of *Daucus Carota*, 37974.
Leptosphaeria Michotii (West.) Sacc. On dead culms of *Juncus balticus* var. *littoralis*, 37852.
Leptosphaeria sp. (*Diaporthe albocarnis* Ell. & Ev.). On dead twigs of *Cornus alternifolia*, R2925.
Melanomma pulvi-pyrius (Pers. ex Fr.) Fuckel. On canker of trunk of *Acer saccharum*, 37378.
Nitschkia Fuckelii Nitsche. On dead *Acer rubrum*, 37881.
Ophiobolus cariceti (Berk. & Br.) Sacc. On dead culms of *Elymus virginicus*, 38029.

Pleospora herbarum (Pers. ex Fr.) Rabenh. var. *Triglochinis* Dearn. and House. On dead leaves of *Triglochin palustris*. (Reported by House, 1921.)

Venturia inaequalis (Cooke) Wint. On leaves of *Pyrus Malus*, 36437 (conidial stage).

Microthyriales

Stigmataceae

Stigmatea Robertiani Fr. On the basal, overwintering leaves of *Geranium Robertianum*, 37537.

Microthyriaceae

Asterina Gaultheriae M. A. Curtis. On leaves of *Gaultheria procumbens*, 37885.

Erysiphales

Erysiphaceae

Erysiphe Cichoracearum DC. On *Ambrosia artemisiifolia*, R2742; *Aster macrophyllus*, 36709 (conidial stage); *Aster novae-angliae*, 36560 (conidial stage); *Aster prenanthoides*, 36542; *Aster umbellatus*, 36608 (conidial stage); *Eupatorium perfoliatum*, R1208 (conidial stage); *Eupatorium maculatum*, 36887 (conidial stage); *Helenium autumnale*, 36725 (conidial stage); *Inula Helenium*, 36592; *Mentha arvensis*, var. *canadensis*, R1305 (conidial stage); *Prenanthes alba*, 37787; *Rudbeckia hirta*, 36713 (conidial stage); *Rudbeckia laciniata*, 36609 (conidial stage); *Solidago canadensis*, 36559 (conidial stage); *Solidago serotina*, 36607; *Tanacetum vulgare*, R1195 (conidial stage); *Xanthium orientale*, 36710.

Erysiphe Galeopsidis DC. On *Chelone glabra*, 36623; *Stachys tenuifolia* var. *aspera*, 36711; *Verbena urticaefolia*, 36712.

Erysiphe lamprocarpa (Wallr.) Duby. On *Plantago major*, 36714.

Erysiphe Polygoni DC. On *Anemone canadensis*, 36604; *Aquilegia canadensis*, 36558 (conidial stage); *Ranunculus recurvatus*, 36438 (conidial stage); *Ranunculus septentrionalis*, 36606; *Trifolium pratense*, R1203 (conidial stage).

Microsphaera abbreviata Peck. On *Quercus bicolor*, 36708.

Microsphaera Alni (DC.) Wint. On *Alnus incana*, 37427; *Lonicera dioica*, 36535 (conidial stage); *Lonicera oblongifolia*, R576 (conidial stage); *Rhamnus alnifolia*, 37785; *Rhododendron nudiflorum* var. *roseum*, 36706; *Viburnum Lentago*, 36705.

Microsphaera Evonymi (DC.) Sacc. sensu Blumer. On *Evonymus atropurpureus*, 36603.

- Microsphaera Grossulariae* (Wallr.) Lév. On *Sambucus canadensis*, 36707.
- Microsphaera Vaccinii* (Schw.) Cooke & Peck. On *Gaylussacia baccata*, 36704.
- Phyllactinia corylea* Pers. ex Karst. On *Alnus incana*, 36717; *Celastrus scandens*, 36718.
- Podosphaera Oxyacanthae* (DC.) De Bary. On *Prunus virginiana*, 36727.
- Sphaerotheca Humuli* (DC.) Burr. On *Geum aleppicum* var. *strictum*, 38036.
- Sphaerotheca Humuli* (DC.) Burr. var. *fuliginea* (Schlecht.) Salmon. On *Bidens cernua*, 36715; *Veronica longifolia*, 36716.
- Sphaerotheca macularis* (Wallr.) Jacz. On *Agrimonia gryposepala*, 36605; *Rubus pubescens*, 36534.
- Uncinula circinata* Cooke & Peck. On *Acer spicatum*, 36654.
- Uncinula Clintonii* Peck. On *Tilia americana*, 37256.
- Uncinula necator* (Schw.) Burr. On *Parthenocissus quinquefolia*, 36702.
- Uncinula Salicis* (DC.) Wint. On *Populus candicans*, 36541; *Salix sericea*, 36540.

Englerulaceae

- Schiffnerula pulchra* (Sacc.) Petrak. On leaves of *Cornus stolonifera*, 36888.

Hypocreales

Nectriaceae

- Hypomyces aurantius* (Pers. ex Fr.) Tul. On pore surface of *Daedalea confragosa*, R2013.
- Hypomyces chrysospermus* (Bull. ex Fr.) Tul. On decaying *Boletus* sp., 37252 (sepedonium stage).
- Hypomyces viridis* (Alb. & Schw. ex Fr.) Berk. & Br. On gills of *Russula* sp., R2301.
- Nectria atrofusca* (Schw.) Ell. & Ev. On dead twigs of *Carpinus caroliniana*, 37808.
- Nectria cinnabarina* Tode ex Fr. On dead branches of *Rhus typhina*, 36905 (conidial stage); on dead twigs of *Ulmus americana*, R2914 (conidial stage).
- Nectria coccinea* Pers. ex Fr. On dead branch of *Fagus grandifolia*, 36734.
- Nectria episphaeria* Tode ex Fr. On *Diatrype stigma*, 37586; and on *Hypoxylon cohaerens*, R2869.
- Nectria Pezizae* Tode ex Fr. On decaying *Polyporus squamosus*, 38027.
- Nectria* sp. On mats of *Vaucheria* sp. in moist depressions, 37958.

Hypocreaceae

- Creopus gelatinosa* (Tode ex Fr.) Link. On a rotten log, mixed woods, 37195.
Claviceps nigricans Tul. On *Eleocharis rostellata*, 36613 (conidial stage).
Claviceps purpurea (Fr.) Tul. On *Agropyron repens*, 36612 (conidial stage).
Epichloe typhina (Pers. ex Fr.) Tul. On *Glyceria striata*, 36404.
Hypocrea aurantiaca Peck. On the pore surface of *Polyporus* sp., R2795.
Hypocrea patella Cooke & Peck. On rotten wood, 37194.

Sphaeriales**Chaetomiaceae**

- Chaetomium globosum* Kunze. Obtained on filter paper from fox dung, 37573.
Chaetomium murorum Corda. On deer dung. R2974.

Sordariaceae

- Bombardia arachnoidea* (Niessl.) R. F. Cain. On horse dung, R2332.
Hypocpra merdaria (Fries) Fr. On rabbit dung, R2960.
Sordaria appendiculata Auersw. On rabbit dung, R3020.
Sordaria fimicola (Rabenh.) Ces. & De Not. Obtained on filter paper from deer dung culture, R2202.
Sporormia americana D. Griffiths. On rabbit dung, R2014.

Allantosphaeriaceae

- Diatrype stigma* Hoffm. ex Fr. On dead branches of *Acer* sp., 36954; and *Fraxinus* sp., R1572.
Eutypa spinosa (Pers.) ex Tul. On rotten wood, 37591.
Eutypella cerviculata (Fr.) Sacc. On dead *Carpinus caroliniana*, 37887.
Eutypella Radula (Pers. ex Fr.) Ell. & Ev. On dead twigs of *Populus tremuloides*, 37542.

Diaporthaceae

- Gnomonia veneta* (Sacc. & Speg.) Kleb. On leaves of *Quercus bicolor*, 36510 (conidial stage); and on *Platanus occidentalis*.
Valsa ceratophora Tul. On dead *Acer rubrum*, 37923.
Valsa Cornina Peck. On dead twigs of *Cornus rugosa*, 37916.
Valsa leucostoma (Pers.) ex Fr. On dead twigs of *Prunus serotina*, 37888.
Valsa nivea (Hoffm.) ex Fr. On dead twigs of *Populus tremuloides*, 37544.
Valsa Pini Alb. & Schw. ex Fr. On dead trunk of *Pinus Strobus*, 37775.
Valsa translucens De Not. On dead twigs of *Salix Bebbiana*, 36825.

Phyllachoraceae

- Phyllachora graminis* (Pers. ex Fr.) Fuckel. On leaves of *Asprella Hystrix*, 36539; and *Elymus virginicus*, 36890.
Phyllachora vulgata Theissen & Syd. On leaves of *Muhlenbergia racemosa*, 36611.

Xylariaceae

- Daldinia concentrica* (Bolt. ex Fr.) Ces. & De Not. On dead branches of *Betula lutea*, 38016.
Hypoxyton coccineum Bull. ex Fr. On dead *Fagus grandifolia*, 37389; on dead branches of *Acer spicatum*, R2922.
Hypoxyton cohaerens Pers. ex Fr. On bark of dead *Fagus grandifolia*, 36417, R1247; and dead trunk of *Alnus incana*, R2863.
Hypoxyton marginatum (Schw.) Berk. On bark of dead frondose tree, 37588.
Hypoxyton multiforme. Fr. On log of *Betula lutea*, 37546.
Hypoxyton nummularium Bull. ex Fr. On fallen *Fagus grandifolia*, 37383.
Hypoxyton pruinaum (Klotsch.) Cooke. On dead *Populus tremuloides*, 37940.
Hypoxyton rubiginosum Pers. ex Fr. On dead hardwood, 37822.
Hypoxyton serpens Pers. ex Fr. On dead hardwood, R1248.
Hypoxyton ustulatum Bull. ex Fr. On log of *Quercus* sp., R543; and *Fagus grandifolia*, R1356.
Rosellinia aquila (Fr.) Ces. & De Not. On rotten log of *Ulmus* sp., 37850.
Rosellinia Clavariae (Tul.) Wint. On lower half of the fruit body of *Clavaria cristata*, 37258.
Rosellinia mutans (Cooke & Peck) Sacc. On rotten log, 37384.
Xylaria digitata L. ex Grev. On rotten logs, 36441 (conidial stage).

BASIDIOMYCETES***Ustilaginales*****Ustilaginaceae**

- Cintractia Caricis* (Pers.) Magn. In the ovaries of *Carex sterilis*, 37617.
Cintractia Junci (Schw.) Trel. In the ovaries of *Juncus macer*, 37771.
Schizonella melanogramma (DC.) Schroet. On the leaves of *Carex* sp. (perhaps *Woodii*), 37622.
Ustilago Heufleri Fuckel. On leaves of *Erythronium americanum*, 37538.
Ustilago longissima (Sow. ex Schlecht.) Meyen. On leaves and stems of *Glyceria grandis*, 36508.

Ustilago nuda (Jens.) Rostr. On inflorescences of *Triticum aestivum*, in cultivated field along edge of swamp, 36975.

Ustilago utriculosa (Nees.) Tul. On inflorescences of *Polygonum hydropiperoides*, 36509.

Tilletiaceae

Doassansia Alismatis (Nees.) Cornu. On leaves of *Alisma Plantago-aquatica*, 37620.

Doassansia deformans Setch. On leaves and petioles of *Sagittaria latifolia*, 37619.

Uredinales

Melampsoraceae

Chrysomyxa Ledi (Alb. and Schw.) DeBary. On leaves of *Ledum groenlandicum*, 37608.

Chrysomyxa Pyrolae (DC.) Rostr. On leaves of *Pyrola americana*, 37611.

Coleosporium Campanulae (Pers.) Lev. On leaves of *Campanula rapunculoides*, 37605.

Coleosporium Solidaginis (Schw.) Thum. On leaves of *Aster lateriflorus*, 36593; *Aster lucidulus*, 36659; *Aster paniculatus*, 36693; *Solidago arguta*, 37782; *Solidago canadensis*, R1316; *Solidago graminifolia*, R1200; *Solidago nemoralis*, 36658; *Solidago ohioensis*, 36697; *Solidago patula*, 36660; *Solidago rugosa*, 36602; *Solidago serotina*, 36601; *Solidago uniligulata*, 36600.

Cronartium Commandrae Peck. On leaves of *Commandra umbellata*, 36598.

Cronartium ribicola Fischer. On leaves of *Ribes cynosbati*, 36533; *Ribes hirtellum*, R2358; *Ribes triste* var. *albinervium*, 36487.

Hyalopsora Polypodii (Pers.) Magn. On fronds of *Cystopteris fragilis*, 36447.

Melampsora Abieti-capraearum Tubeuf. On leaves of *Salix discolor*, 36555; *Salix nigra*, 36701; *Salix purpurea*, 36695.

Melampsora Bigelowii Thum. On leaves of *Salix amygdaloides*, 36499.

Melampsora Medusae Thum. On leaves of *Populus balsamifera*, 36698; *Populus tremuloides*, 37812.

Pucciniastrum Myrtilii (Schum.) Arth. On leaves of *Gaylussacia baccata*, 36594.

Pucciniastrum pustulatum (Pers.) Diet. On leaves of *Epilobium hirsutum*, 36503.

Uredinopsis mirabilis (Peck) Magn. On fronds of *Onoclea sensibilis*, 9944 (Whetzel and Jackson).

Uredinopsis Struthiopteridis Stormer. On fronds of *Dryopteris Thelypteris*, 10062 (Whetzel and Jackson).

Pucciniaceae

- Gymnoconia Peckiana** (Howe) Trotter. On leaves of *Rubus allegheniensis*, 36418; and *Rubus occidentalis*, 36693.
- Gymnosporangium clavipes** Cooke and Peck. On fruits of *Amelanchier intermedia*, R2392; *Crataegus monogyna*, R2410; and *Crataegus punctata*, 36507.
- Gymnosporangium corniculans** Kern. On young branches of *Juniperus horizontalis*, 37818.
- Gymnosporangium globosum** Farl. On *Crataegus macracantha*, 36505; *Crataegus punctata*, 36506; *Juniperus horizontalis*, 36835; and *Juniperus virginiana*, 35168.
- Phragmidium Andersoni** Shear. On leaves of *Potentilla fruticosa*, 36595.
- Phragmidium Potentillae** (Pers.) Karst. On leaves of *Potentilla norvegica* var. *hirsuta*, R1357; and *Potentilla recta*, 37662.
- Pileolaria Toxicodendri** (Berk. and Ravel) Arth. On leaves and petioles of *Rhus Toxicodendron*, 36488.
- Puccinia Anemones-virginianae** Schw. On leaves of *Anemone virginiana*, 37600.
- Puccinia angustata** Peck. On leaves of *Lycopus uniflorus*, 9979 (Whetzel and Jackson); *Scirpus atrovirens*, 37991, and *Senecio aureus*, 37609.
- Puccinia Asteris** Duby. On leaves of *Aster novae-angliae*, 36554.
- Puccinia Bardanae** (Wallr.) Corda. On leaves of *Arctium minus*, 36504.
- Puccinia Calthae** Link. On leaves of *Caltha palustris*, 37178.
- Puccinia Caricis** Schroet. On *Carex riparia* var. *lacustris*, 37992.
- Puccinia Caricis** (Schum.), Schroet. var. **Grossulariata** Arth. On leaves of *Ribes americanum*, 36425; and *Ribes hirtellum*, 36420.
- Puccinia Caricis** (Schum.), Schroet. var. **uniporula** (Ort.) Arth. On leaves of *Carex pallescens*, 10039 (Whetzel and Jackson).
- Puccinia Caricis** (Schum.), Schroet. var. **Urticata** (Kern.) Arth. On leaves of *Urtica procera*, 36421.
- Puccinia Circaeae** Pers. On leaves of *Circaea latifolia*, 36490.
- Puccinia Cnici** Mart. On leaves of *Cirsium lanceolatum*, 9962 (Whetzel and Jackson).
- Puccinia coronata** Corda. On leaves of *Avena sativa*, cultivated fields along edge of swamp, 36494; and *Rhamnus alnifolia*, 36403.
- Puccinia Dayi** Clinton. On leaves of *Steironema ciliatum*, 36891.
- Puccinia Eleocharidis** Arth. On leaves of *Eupatorium maculatum*, 9930, 9956 (Whetzel and Jackson); *Eupatorium perfoliatum*, 36498; and *Eupatorium rugosum*, 36435.
- Puccinia extensicola** Plowr., var. **Asteris** (Thum.) Arth. On leaves of *Aster umbellatus*, 9980 (Whetzel and Jackson).
- Puccinia extensicola** Plowr., var. **Solidaginis** (Schw.) Arth. On leaves of *Solidago canadensis*, 9932 (Whetzel and Jackson); *Solidago graminifolia*, 36420; *Solidago ohioensis*, 9978 (Whetzel and Jackson).

- Puccinia graminis* Pers. On leaves of *Agropyron repens*, 36492; *Berberis vulgaris*, 36402; *Cinna arundinacea*, R2866; and *Poa compressa*, R2426.
- Puccinia graminis* Pers. var. **Phlei-pratensis** (Ericks. & Henn.) Stak. and Piem. On leaves of *Phleum pratense*, 36491.
- Puccinia Heucherae* (Schw.) Diet. On leaves of *Mitella nuda*, 37783, and *Tiarella cordifolia*, 38035.
- Puccinia Hieracii* (Schum.) Mart. On leaves of *Taraxacum officinale*, 36500.
- Puccinia Iridis* (DC.) Wallr. On leaves of *Iris versicolor*, R1317.
- Puccinia Lobeliae* Ger. On leaves of *Lobelia siphilitica*, 36656.
- Puccinia Malvacearum* Bert. On leaves of *Althaea rosea*, escaped near entrance to swamp, 37610; and *Malva neglecta*, 36536.
- Puccinia Menthae* Pers. On leaves of *Mentha spicata*, 36699; *Pycnanthemum flexuosum*, 37661; *Pycnanthemum Torreyi*, 37660; and *Pycnanthemum virginianum*, 36556.
- Puccinia obtegans* (Link.) Tul. On leaves of *Cirsium arvense*, 36422.
- Puccinia peridermiospora* (Ell. and Tracy) Arth. On leaves of *Fraxinus pennsylvanica*, 36432.
- Puccinia Podophylli* Schw. On leaves of *Podophyllum peltatum*, 36430.
- Puccinia Polygoni-amphibii* Pers., var. **Convolvuli** (Alb. and Schw.) Arth. On leaves of *Polygonum Convolvulus*, 36700.
- Puccinia Polygoni-amphibii* Pers., var. **Persicariae** (Str.) Arth. On leaves of *Polygonum coccineum*, 36597; and *Polygonum hydropiperoides*, 36694.
- Puccinia pygmaea* Erikss. On leaves of *Oryzopsis asperifolia*, 36538.
- Puccinia Pyrolae* Cooke. On leaves of *Polygala paucifolia*, 37989.
- Puccinia recedens* Syd. On leaves of *Senecio aureus*, 9941 (Whetzel and Jackson).
- Puccinia rubigo-vera* (DC.) Wint., var. **Agropyrina** (Erikss.) Arth. On leaves of *Agropyron repens*, 37607.
- Puccinia rubigo-vera* (DC.) Wint., var. **Impatientis** (Arth.) Mains. On leaves of *Impatiens pallida*, 36423.
- Puccinia rubigo-vera* (DC.) Wint., var. **Tritici** (Erikss. and Henn.) Carl. On *Triticum aestivum*, 9972 (Whetzel and Jackson).
- Puccinia sessilis* Schneid. On leaves of *Iris versicolor*, 36405.
- Puccinia tenuis* (Schw.) Burrill. On leaves of *Eupatorium rugosum*, R2234.
- Puccinia Violae* (Schum.) DC. On leaves of *Viola blanda*, 37612; *Viola incognita*, 9976 (Whetzel and Jackson); *Viola pubescens*, 36599; *Viola renifolia*, R2211.
- Tranzhelia Thalictri* (Chev.) Diet. On leaves of *Thalictrum polygamum*, 36502.
- Uromyces bicolor* Ell. On leaves of *Allium canadense*, 36427.

- Uromyces Caladii* (Schw.) Farl. On leaves and flower spathes of *Arisaema Dracontium*, 36501; and *Arisaema triphyllum*, 36401.
- Uromyces Fabae* (Pers.) DeBary. On leaves of *Vicia villosa* Roth., 36610.
- Uromyces Halstedii* DeToni. On leaves of *Trillium grandiflorum*, 36974.
- Uromyces Polygoni* (Pers.) Fuckel. On leaves of *Polygonum aviculare*, 37601.
- Uromyces Trifolii* (Hedw. f.) Lév. On leaves of *Trifolium pratense*, 36562.

Auriculariales

Auriculariaceae

- Herpobasidium deformans* Gould. On leaves of *Lonicera oblongifolia*, 37599 (conidial stage).

Dacrymycetales

Dacrymycetaceae

- Arrhytidia enata* (Berk. and Curt.) Coker. On dead branches of *Crataegus punctata*, R2294. (Det. by G. W. Martin.)
- Calocera cornea* (Fr.) Link. On rotten log, 38033.
- Dacrymyces deliquescens* Duby. On log of *Thuja occidentalis*, 36900; and *Tsuga canadensis*, 36963.
- Dacrymyces Ellisii* Coker. On dead *Tilia americana*, 37823.
- Dacrymyces minor* Peck. On decaying frondose log, 37540.
- Dacrymyces palmatus* (Schw.) Bres. Apud. Höhncl. On log of *Tsuga canadensis*, 36636.
- Dacryomitra nuda* (Berk. and Br.) Pat. On frondose log, R1804.

Tremellales

Tremellaceae

- Exidia nucleata* (Schw.) Burt. On log of *Betula* sp., 36648.
- Exidia repanda* Fr. On dead *Carpinus caroliniana*, 37779.
- Exidia spiculosa* (S. F. Gray) Somm. On log of *Fagus grandifolia*, 36899.
- Seismosarca alba* Lloyd. On frondose log, 37574; and log of *Tilia americana*, R2781.
- Tremella frondosa* Fr. On log of *Tilia americana*, 36512.
- Tremella tubercularia* Berk. On stromata of *Diatrype* sp., 37541.
- Tremellodon gelatinosus* (Pers.) Fr. On stump of *Tsuga canadensis*, 36638.

Agaricales**Exobasidiaceae**

Exobasidium Vaccinii (Fuckel) Wor. On leaves of *Gaylussacia baccata*, 36436; and *Vaccinium* sp., 37177.

Thelephoraceae

Aleurodiscus macrodens Coker. On bark of *Fraxinus americana*, 37587.

Aleurodiscus subgiganteus (Berk.) Höhn. On dead *Alnus incana*, 37385.

Coniophora alboflavescens (Ell. & Ev.) Höhn & Litsch. On rotten log, 37942. (Det. by H. S. Jackson.)

Coniophora puteana (Schum. ex Fr.) Karst. On log of *Thuja occidentalis*, 37773.

Corticium anceps (Syd. & Bres.) Gregor. On *Aralia nudicaulis*, 10057 (Whetzel & Jackson).

Corticium atrovirens Fr. On rotten log, R2835.

Corticium cremoricolor Berk. & Curtis. On dead branch of *Prunus virginiana*, 37821.

Cyphella fasciculata Berk. & Curtis. On dead branches of *Alnus incana*, 36688.

Cyphella minutissima Burt. On dead twigs, 37807.

Hymenochaete corrugata (Fr.) Lev. On rotten log, 37387.

Hymenochaete fuliginosa (Pers. ex Fr.) Bres. On dead twigs of *Betula lutea*, 37376.

Hymenochaete tenuis Peck. On decorticated log of *Thuja occidentalis*, 37776.

Peniophora cinerea (Pers. ex Fr.) Cooke. On dead branches of *Carpinus caroliniana*, 37379; *Corylus americana*, 36892; and *Prunus virginiana*, 37381.

Peniophora Eichleriana Bres. On fallen branches of *Acer rubrum*. (Reported by House, 1923.)

Peniophora incarnata (Pers. ex Fr.) Karst. On bark of deciduous tree, ?*Acer* sp., 37924.

Peniophora Sambuci (Pers.) Burt. On fallen branches, mixed woods, 37925.

Solenia anomala (Pers. ex Fr.) Fuckel. On dead *Betula lutea*, 37545; on twigs of *Salix discolor*, R2906.

Stereum fasciatum Schw. On frondose log, R2724.

Stereum hirsutum Willd. ex Fr. On trunk of *Betula lutea*, 36955; and log of *Tsuga canadensis*, 36893.

Stereum Pini (Schleich. ex Fr.) Fr. On young, dead, standing *Pinus Strobus*, 37936.

Stereum purpureum Pers. ex Fr. On dead *Alnus incana*, 37819.

Stereum rameale Schw. On dead branch of *Populus grandidentata*.

Stereum rufum Fr. On dead *Populus tremuloides*, 37973.

Stereum sericeum (Schw.) Morgan. On dead *Carpinus caroliniana*, 36619.

Stereum umbrinum Berk. & Curt. On frondose log, 37780.

Clavariaceae

Clavaria abietina Pers. ex Fr. On pine duff, R1178.

Clavaria cinerea Bull. ex Fr. On the ground, hemlock knoll, R1784.

Clavaria corniculata Schaeffer ex Fr. On the ground, mixed woods, R1156, R1785.

Clavaria cristata Holmsk. ex Fr. On rotten log of *Tsuga canadensis*, R1783; and on rich humus, mixed woods, R2409.

Clavaria fusiformis Sowerby ex Fr. On the ground, mixed woods, R1801; and under *Thuja occidentalis*, R2408.

Clavaria mucida Pers. ex Fr. On decorticated log covered with *Protococcus*, 36666; on log of *Ulmus americana*, R2902.

Clavaria Murrillii Coker & Couch. On duff under *Tsuga canadensis*, R1179.

Clavaria pistillaris L. ex Fr. On the ground under pine, R1180.

Clavaria rufipes Atk. On stump, mixed woods, R1800.

Clavaria stricta Pers. ex Fr. On decaying wood, R964.

Clavaria vermicularis Swartz ex Fr. On the ground under *Thuja* sp., R1142.

Clavicornia coronata (Schw.) Doty. On rotten log, 37579.

Clavicornia pyxidata (Fr.) Doty. On decaying logs, 36446.

Hydnaceae

Hericium coralloides Scop. ex S. F. Gray. On log of hardwood, 36642

Hericium laciniatum Leers ex Banker. On log of *Fagus grandifolia*, 36641.

Mycoacia fragilissima (Berk. & Curt.) Miller. On rotten log, R2341, R2721.

Mycoacia Himantia (Schw.) Miller. On rotten log, 37578.

Odontia arguta (Fr.) Qué. On rotten log, 37380. (Det. by F. J. Czabator.)

Odontia spathulata (Fr.) Litsch. On rotten log, 37380; and on dead *Tilia americana*, 37391.

Phlebia merismoides Fr. On log of *Acer* sp., 36901.

Phlebia radiata Fr. On log of *Betula lutea*, 36646.

Phlebia strigosa-zonata (Schw.) Lloyd. On dead *Populus* sp., R2850

Steccherinum ochraceum (Fr.) S. F. Gray. On rotten log, 37814.

Polyporaceae

Daedalea confragosa (Bolt) ex Fr. On log of *Ulmus americana*, 36443

Daedalea quercina (L.) ex Fr. On stump of *Quercus macrocarpa*, 37592

- Daedalea unicolor* (Bull.) ex Fr. On dead *Fagus grandifolia*, R1799.
- Favolus alveolaris* (DC. ex Fr.) Quél. On dead branches of *Fagus grandifolia*, 36416.
- Fomes connatus* (Weinm.) Gill. On log of *Acer rubrum*, 36530; and *Fagus grandifolia*, 36730.
- Fomes fomentarius* (L. ex Fr.) Kichx. On *Populus grandidentata*, 36408; and *Betula lutea*, R1173.
- Fomes fraxinophilus* (Peck) Sacc. On *Fraxinus pennsylvanica*, 37826; and *Salix alba*, var. *vitellina*, 37327.
- Fomes igniarius* (L. ex Fr.) Gill. On log of deciduous tree, R1172.
- Fomes pinicola* (Swartz ex Fr.) Cooke. On *Tsuga canadensis*, 36728.
- Fomes scutellatus* (Schw.) Cooke. On dead *Alnus incana*, 37618.
- Ganoderma applanatum* (Pers. ex Wallr.) Pat. On dead *Ulmus americana*, 36410.
- Ganoderma lucidum* (Leys.) Karst. On stump of *Tsuga canadensis*, 36407.
- Ganoderma sessile* Murr. On log of deciduous tree, 37789.
- Lenzites betulina* L. ex Fr. On dead hardwood, 36689.
- Lenzites saepiaria* Wulf. ex Fr. On logs of *Tsuga canadensis*; and on planks in trail, 36531.
- Lenzites trabea* Pers. ex Fr. On dry log, 36618.
- Merulius tremellosus* Schrad. ex Fr. On log of *Betula lutea*, 36653.
- Polyporus abietinus* (Dicks.) ex Fr. On log of *Thuja occidentalis*, 36518; and *Tsuga canadensis*, R1165.
- Polyporus albellus* Peck. On dead *Fagus grandifolia*, 37259; and *Fraxinus* sp., 37260.
- Polyporus arcularius* Batsch. ex Fr. On decaying twigs, 37593; on fallen branch of *Betula* sp., R2941.
- Polyporus betulinus* (Bull.) ex Fr. On dead *Betula lutea*, R1244.
- Polyporus bififormis* Klotsch. On dead frondose tree, 36895.
- Polyporus brumalis* (Pers.) ex Fr. On slash twigs of hardwoods, 36667.
- Polyporus cinnabarinus* (Jacq.) ex Fr. On logs, 36640.
- Polyporus cinnamomeus* (Jacq.) ex Fr. On burned hemlock duff, 38026.
- Polyporus conchifer* (Schw.) Fr. On dead branches of hardwoods, 36445.
- Polyporus croceus* Pers. ex Fr. On dead *Ulmus americana*, 36894.
- Polyporus delectans* Peck. On living *Carya ovata*, 36616; and on *Salix alba*, var. *vitellina*, 37297.
- Polyporus elegans* (Bull.) ex Fr. On decaying branches of *Fagus grandifolia*, 36415; and on *Ulmus americana*, 36440.
- Polyporus fumosus* (Pers.) ex Fr. On log of *Carpinus caroliniana*, R2785; *Tilia americana*, 37295; and *Ulmus americana*, 37294.
- Polyporus galactinus* Berk. On dead *Betula lutea*, R1138.

- Polyporus gilvus* (Schw.) Fr. On log of *Ulmus americana*, 36617.
Polyporus hirsutus (Wulf.) ex Fr. On dead branches of *Betula* sp., 36644.
Polyporus pargamenus Fr. On log of *Tilia americana*.
Polyporus radiatus (Sow.) ex Fr. On dead *Betula* sp., 37292.
Polyporus resinosus (Schrad.) ex Fr. On log of *Tilia americana*, 36687; and *Tsuga canadensis*, 36643.
Polyporus squamosus (Huds.) ex Fr. On stump of *Salix nigra*, 36414.
Polyporus sulphureus (Bull.) ex Fr. On stump of *Salix alba*, var. *vitellina*, 36686.
Polyporus tephroleucas Fr. On dead *Tilia americana*, 36645.
Polyporus tulipiferus (Schw.) Overh. On dead branches of deciduous tree, 36622.
Polyporus versicolor Fr. On dead *Betula lutea*, R542; *Prunus Avium*, 36412; and *Ulmus americana*.
Poria ferruginosa (Schrad. ex Fr.) Karst. On dead *Acer rubrum*, 37388; *Hamamelis virginiana*, 36960; and wood of deciduous tree, 37261.
Poria fissiliformis Pilat. On rotten log of *Ulmus* sp., 37854.
Poria nigrescens Bres. On dead *Betula lutea*, 36897. (Det. by J. L. Lowe.)
Poria punctata (Fr.) Karst. On log of hardwood, 36896. (Det. by J. L. Lowe.)
Poria spissa (Schw.) Cooke. On rotten log, 36668; and on dead *Tilia americana*, 37390.
Poria subacida (Peck) Sacc. On log, 36731.
Poria Vaillantii (Fr.) Cooke. On bark of conifer, 37813.

Boletaceae

- Boletinus pictus* (Peck) Peck. On the ground, hemlock knoll, R952; and in sphagnum under *Pinus Strobus*, R2735.
Gyrodon merulioides (Schw.) Singer. On the ground under *Fraxinus* sp., R1143.
Leccinum scabrum (Bull. ex Fr.) S. F. Gray. On the ground under *Thuja* sp., and *Tsuga* sp., R2736.
Porphyrellus gracilis (Peck) Singer. On rotten stump, R2398.
Suillus americanus (Peck) Singer. On the ground, mixed woods, R1715.
Tylopilus felleus (Bull. ex Fr.) Karst. On the ground under hemlock, R950; and in mixed woods, R2399.
Tylopilus ferrugineus (Frost) Singer. On the ground, mixed woods, R1716.

Agaricaceae

- Agaricus cretacella* Atk. On the ground, coniferous woods, R2395.
Agaricus silvicola (Vitt.) Sacc. On the ground, mixed woods, R954.

- Amanita flavaconica* Atk. On rich humus, mixed woods, R1166, R2394.
Amanita mappa Fr. On the ground, mixed woods, R1148, R1770.
Amanita rubescens Fr. On the ground, hemlock knoll, R951.
Amanita spissa Fr. On the ground, hemlock knoll, R958.
Armillaria mellea Fr. Abundant in September and October about stumps, mixed woods, R1164, R2773, R2796.
Claudopus nidulans Fr. On trunk of dead hardwood, 36903.
Clitocybe catina Fr. On the ground under hemlock, R957; and on fallen, decaying leaves, mixed woods, R2771.
Clitocybe dealbata Fr. On leaf mold, R960.
Clitocybe decora Fr. On log, coniferous woods, R1794.
Clitocybe infundibuliformis Fr. On the ground, woods, R1508.
Clitocybe monadelpha Morgan. On rotten log, R2315.
Clitocybe multiceps Peck. Cespitose on the ground, mixed woods, R1812, R2316.
Clitopilus albogriseus Peck. On the ground, woods, R1184.
Clitopilus abortivus Berk. & Curtis. Both the aborted and normal forms present on the ground about stumps, mixed woods, R1152.
Collybia albiflavida (Peck) Kauff. On the ground, woods, R1154.
Collybia atratoides Peck. On rotten log, R1510.
Collybia butyracea Fr. On the ground, under conifers, R1793; and in mixed woods, R2804.
Collybia hariolarum Fr. On the ground, under hemlock, R955.
Collybia platyphylla Fr. On the ground, woods, R1511.
Collybia radicata Fr. On the ground under hemlock, R956.
Collybia stipitaria Fr. Among fallen pine needles, R1147.
Collybia velutipes Fr. Cespitose on log of *Tilia americana*, R1796; and on rotten logs, R2034, R2772.
Coprinus atramentarius Fr. On and about decaying stumps, R2767.
Coprinus comatus Fr. Open roadside north side of swamp, R1811.
Coprinus ephemerus Fr. On cow dung, pasture adjoining swamp, R2314.
Coprinus fimetarius Fr. On manure, pasture adjoining swamp, R2722.
Coprinus micaceus Fr. On rotting stump of *Ulmus* sp.
Coprinus radiatus Fr. On deer dung, R2653.
Cortinarius albidipes Peck. On the ground, mixed woods, R1151.
Cortinarius violaceus Fr. On the ground under hemlock, R1776.
Crepidotus dorsalis Peck. On rotten log, R2309.
Crepidotus putrigenous Berk. & Curtis. On rotten log, R2308; and log of *Tilia americana*, R544.
Crepidotus versutus Peck. On horse dung, R3027.
Eccilia atrides Fr. On the ground, coniferous woods, R2395.
Eccilia griseo-rubella Fr. On the ground, mixed woods, R3083.
Flammula carbonaria Fr. On wood, R953.

- Flammula sapinea* Fr. On stump of *Thuja occidentalis*, R2806.
Galera Hypnorum Fr. On sphagnum, R1176.
Hygrophorus ceraceus Fr. On mossy ground, woods, R2311.
Hygrophorus conicus Fr. On the ground, mixed woods, R1149, R1714;
and coniferous woods, R1792.
Hygrophorus laetus Fr. On coniferous duff, R2401.
Hygrophorus miniatus Fr. On moss covered humus, mixed woods,
R2400; and in coniferous woods, R2312.
Hygrophorus puniceus Fr. On the ground, mixed woods, R3080.
Hypholoma incertum Peck. On decaying log.
Hypholoma incertum Peck, var. *silvestris* Kauffman. On the ground,
open woods, R2307.
Hypholoma sublateritium Fr. On stumps, R1170.
Inocybe asterospora Quel. On the ground, mixed woods, R2732.
Inocybe dstricta Fr. On humus, mixed woods, R2776.
Inocybe flocculosa Berk. On burned hemlock duff, R2729.
Inocybe rimosa Peck sensu Richen. On ground, mixed woods, R1774.
Laccaria laccata (Scop. ex Fr.) Berk. & Br. On the ground, mixed
woods, R1773; and on sphagnum, R1798.
Lactarius colorascens Peck. On the ground under hemlock, R963.
Lactarius controversus Fr. On the ground, mixed woods, R1150, R2723.
Lactarius deliciosus Fr. On the ground under *Thuja* sp., R1158.
Lactarius piperatus Fr. On the ground, mixed woods, R1175; under
hemlock, R949, R2725.
Lactarius subdulcis Fr. Scattered on the ground under *Thuja* sp.,
R1159, R2769.
Lactarius vietus Fr. On humus, mixed woods, R2770.
Lactarius volemus Fr. On the ground, mixed woods, R1771.
Lentinus lepideus Fr. On log of *Ulmus* sp., 36409.
Lentinus spretus Peck. On log of *Larix laricina*, R2303; and *Tsuga*
canadensis, R2302.
Lentinus vulpinus Fr. On dead *Ulmus* sp., 36442; and log of *Betula*
lutea, R1791.
Marasmius androsaceus Fr. On fallen twigs and pine needles, R1506.
Marasmius epiphyllus Fr. On fallen twigs and leaves, R1146.
Marasmius rotula Fr. On fallen twigs and leaves, R1505; and on rotten
logs, R2304.
Marasmius urens Fr. On humus, mixed woods, R2721.
Mycena alcalina (Fr.) Quél. On stumps and logs of *Thuja occidentalis*,
R2037.
Mycena corticola (Fr.) Quél. On bark of frondose tree, R2777.
Mycena delicatella (Peck) A. H. Smith. On fallen leaves of *Thuja*
occidentalis, R2799.
Mycena galericulata (Fr.) S. F. Gray. On rotten logs, R962, R1509,
R1778.

- Mycena gracilis* (Quél.) Kuhner. On moss and fallen logs under *Thuja* sp., R1797.
- Mycena haematopus* (Fr.) Quél. On rotten log, R2738.
- Mycena inclinata* (Fr.) Quél. On log of *Acer rubrum*, R966.
- Mycena Leaiana* (Berk.) Sacc. On log of *Acer* sp., R1512.
- Mycena rosella* (Fr.) Quél. On duff under *Pinus* sp., and *Thuja* sp., R2805.
- Mycena vitilis* (Fr.) Quél. On the ground, mixed woods, R1157.
- Naucoria semiorbiculatus* Fr. Scattered on mossy, sandy soil in the open, R2860.
- Omphalia campanella* Fr. On stumps and logs of *Tsuga canadensis*, R1160.
- Omphalia Gerardiana* Peck. On sphagnum, R2802.
- Omphalia onisca* Fr. On mossy ground, R2803.
- Panaeolus retirugis* Fr. On horse dung, R1167, R1760, R2036.
- Panaeolus solidipes* Peck. On dung, R2030.
- Panus torulosus* Fr. On rotting stump, R2305.
- Paxillus atrotomentosus* (Batsch. ex Fr.) Fr. On fallen log of *Tsuga canadensis*, R1772.
- Paxillus involutus* Fr. On the ground under hemlock, R2774.
- Pholiota adiposa* Fr. Cespitose on frondose log, R2768.
- Pholiota marginata* Batsch. ex Fr. On rotten log, R2737.
- Pholiota praecox* Fr. On the ground, open woods, R2200.
- Pleurotus applicatus* Fr. On log, 36647.
- Pleurotus circinatus* Fr. On rotten log, 36452.
- Pleurotus cyphellaeformis* Berk. On dead stems of *Carex riparia* var. *lacustris*, R1816.
- Pleurotus osteratus* Fr. On trunk of dead *Populus candicans*, 36411.
- Pleurotus petaloides* Fr. On rotten logs, R2310, R2798.
- Pleurotus sapidus* Kalchbr. On log, R2033.
- Pleurotus serotinus* Fr. On logs, 36690.
- Pleurotus ulmarius* Fr. On *Ulmus americana*, R2797.
- Pluteus cervinus* Fr. On rotten stump, R2306; and on sawdust pile, R2393.
- Pluteus tomentosulus* Peck. On rotten log, R3082.
- Psilocybe larga* Kauffman. On the ground, mixed woods, R2032.
- Psilocybe murcida* Fr. On mossy ground, woods, R2035.
- Russula alutacea* Fr. Gregarious along path, open woods, R3081.
- Russula fragilis* Fr. On the ground, mixed woods, R1775.
- Russula purpurina* Quél. & Schultz. On the ground under hemlock, R961; and in mixed woods, R1161.
- Russula sanguinea* Fr. sensu Kauffman. On the ground, mixed woods, R2397.
- Russula subdepallens* Peck. Under conifers, R1795.

- Russula variata* (Banning) Peck. On the ground under hemlock, R959.
Schizophyllum commune Fr. On dead branches, R971.
Stropharia albonitens Fr. Scattered, in open grassy pasture, R2801.
Stropharia semiglobata Fr. In open sandy field, on manure, R3043.
Tricholoma album Fr. On duff under pine and *Thuja* sp., 36451.
Tricholoma personatum Fr. On the ground, mixed woods, R1777.
Trogia crispa Fr. On dead *Betula lutea*, 36637.

Hymenogastreales

Melanogasteraceae

- Melanogaster variegatus* Vitt. A single fruit body was found on the ground in woods along Black Creek, 38022.

Lycoperdales

Lycoperdaceae

- Bovista pila* Berk. & Curt. Open field, 36908.
Lycoperdon Curtisii Berk. On the ground, woods, 36650.
Lycoperdon perlatum Pers. On the ground, woods, 36651.
Lycoperdon polymorphum Vitt. On the ground, mixed woods, 36652.
Lycoperdon pusillum Pers. Open pasture, R1395.
Lycoperdon pyriforme Pers. On hardwood stump, 36669; and on rotten logs, R1384.
Lycoperdon subincarnatum Peck. On rotten log, 36653.
Lycoperdon umbrinum Pers. On decaying stumps, R1403.
Lycoperdon Wrightii Berk. & Curt. Open field, 37788.

Geastraceae

- Geastrum pectinatum* Pers. On the ground under hemlock, 37255.
Geastrum triplex Jungh. On rich humus in mixed woods, 36620, R972, R1136.

Sclerodermatales

Sclerodermataceae

- Scleroderma aurantium* Pers. On humus about decayed stump, 36450.

FUNGI IMPERFECTI

Sphaeropsidales

Sphaerioidaceae

- Ascochyta Lycopersici* Brun. On *Solanum Dulcamara*, 9948 (Whetzel & Jackson).
Asteroma Tiliae Rud. On leaves of *Tilia americana*, 37786.

- Cicinnobolus Cesatii* De Bary. Parasitic on *Erysiphe cichoracearum* on *Solidago serotina*, 37426.
- Cytospora ceratophora* Sacc. On dead branches of *Fraxinus americana*, 36956.
- Cytospora chrysosperma* (Pers.) ex Fr. On dead *Acer rubrum*, R2942.
- Cytospora Salicis* (Corda) Rabenh. On dead branches of *Salix* sp., 37975.
- Cytospora* sp. On dead twigs of *Ulmus americana*, R2915.
- Darlucium filum* (Biv.-Bern.) Cast. Parasitic on *Melampsora Abieti-capraearum* on *Salix nigra*, 36497; on *Puccinia pygmaea* on *Oryzopsis asperifolia*, 36538; *Puccinia Menthae* on *Pycnanthemum flexuosum*, R2499 and on *Pycnanthemum Torreyi*, R2499; on *Uromyces Polygoni* on *Polygonum aviculare*, 37602.
- Dendrophoma Tiliae* Peck. On dead twigs of *Tilia americana*, 36904.
- Diplodia Linderae* Ell. & Ev. On dead twigs of *Lindera Benzoin*, 37921.
- Diplodina stenospora* (Berk. & Curt.) Sacc. On dead *Acer* sp., 36957.
- Gelatinosporium abietinum* Peck. On dead *Tsuga canadensis*, 37938.
- Micropera Drupacearum* Lév. On dead branches of *Prunus avium*, 37935.
- Phoma asclepiadea* Ell. & Ev. On dead stems of *Asclepias syriaca*, 37922.
- Phoma Corni* Fuckel. On dead twigs of *Cornus Amomum*, 37879.
- Phoma Phytolaccae* Berk. & Br. On dead stems of *Phytolacca americana*, 38028.
- Phoma polygramma* (Fr.) Sacc., var. *Plantaginis* Sacc. On peduncles of *Plantago lanceolata*, 36723.
- Phoma Solidaginis* Cooke. On dead stems of *Solidago* sp., 37934.
- Phomopsis linearis* Trav. On dead stems of *Solidago* sp., 37937.
- Phyllosticta Convallariae* Pers. ex Seaver. On leaves of *Smilacina stellata*, 36493.
- Phyllosticta cornicola* (DC. ex Fr.) Rabenh. On leaves of *Cornus alternifolia*, 36722.
- Phyllosticta fraxinicola* (Currey) Sacc. On leaves of *Fraxinus americana*, 36721.
- Phyllosticta minima* (Berk. & Curt.) Ell. & Ev. On leaves of *Acer rubrum*, 36557.
- Phyllosticta perforans* Ell. & Ev. On leaves of *Solanum Dulcamara*, 38019.
- Phyllosticta saccharini* Ell. & Mart. On leaves of *Acer nigrum*, 36720.
- Phyllosticta Tiliae* Sacc. & Spig. On leaves of *Tilia americana*, 36719.
- Phyllosticta ulmicola* Sacc. On leaves of *Ulmus americana*, R2420.
- Phyllosticta viticola* (Berk. & Curt.) Thum. On leaves of *Parthenocissus quinquefolia*, 36511, and *Vitis vulpina*, 38020.
- Septoria canadensis* Peck. On leaves of *Cornus canadensis*, 37539.

- Septoria conspicua** Ell. & Martin. On leaves of *Steironema ciliatum*, 37883.
- Septoria Davisii** Sacc. On the lower overwintering leaves of *Solidago* sp., 37806.
- Septoria Epilobii** Westd. On leaves of *Epilobium hirsutum*, 9939 (Whetzel & Jackson).
- Septoria malvicola** Ell. & Martin. On leaves of *Malva neglecta*, 37793.
- Septoria Mitellae** Ell. & Ev. On leaves of *Mitella diphylla*, 37616.
- Septoria musiva** Peck. On leaves of *Populus* sp., 38018.
- Sphaerographium Fraxini** (Peck) Sacc. On dead twigs of *Fraxinus* sp., 36961.
- Sphaeronema acerinum** Peck. On dead twigs of *Acer rubrum*, 37577.
- Sphaeropsis ulmicola** Ell. & Ev. On dead twigs of *Ulmus americana*, 37886.
- Stagonospora arenaria** Sacc. On dead culms of *Deschampsia caespitosa*, 37877.

Leptostromataceae

- Leptostroma Eupatorii** Allesch. On dead stems of *Eupatorium* sp., 37917.
- Leptostroma Pteridis** Ehrenbg. On dead stems and fronds of *Pteridium aquilinum*, var. *latiusculum*, 37918.
- Leptothyrium Periclymenii** (Desm.) Sacc. On leaves of *Lonicera oblongifolia*, 10055 (Whetzel & Jackson).
- Leptothyrium Pomi** (Mont. & Fr.) Sacc. On fruits of *Pyrus Malus*, 37293.
- Leptothyrium vulgare** (Fr.) Sacc. On dead stems of *Eupatorium rugosum*, 37583.
- Piggotia astroidea** Berk. & Br. On leaves of *Ulmus americana*, 37603.

Melanconiales

Melanconiaceae

- Cylindrosporium Iridis** Ell. & Halstead. On leaves of *Iris versicolor*, 37816.
- Cylindrosporium Padi** Karst. On leaves of *Prunus* sp., 9949 (Whetzel & Jackson).
- Gloeosporium Caryae** (Peck) Ell. & Dearn. On leaves of *Carya ovata*, 36665.
- Marssonina Delastrei** (Delacr.) Magn. On leaves of *Silene Cucubalis*, 38025.
- Marssonina Juglandis** (Lib.) Magn. On leaves of *Juglans nigra*, 37606.
- Marssonin Thomasiana** (Sacc.) Magn. On leaves of *Celastrus scandens*, 37784.

- Myxosporium nitidum* Berk. & Curtis. On dead twigs of *Cornus alternifolia*, 36732; on dead twigs of *Cornus Amomum*, 37880.
- Pestalotia funerea* Desm. On dead foliage of *Thuja occidentalis*, 36968.
- Septogloeum Convolvuli* Ell. & Ev. On leaves of *Convolvulus sepium*, 28023.
- Vermicularia coptina* Peck. On dead leaves of *Coptis trifolia* subsp. *groenlandica*, 37572.
- Vermicularia Dematium* (Pers.) ex Fr. On dead stems of *Eupatorium rugosum*, 37582; on *Iris versicolor*, R3053; on samaras of *Fraxinus americana*, 38030.
- Vermicularia punctans* Schw. On dead leaves of *Sorghastrum nutans*, 36537.

Moniliales

Moniliaceae

- Aspergillus ochraceus* Wilhelm. On dung of grouse, R2973.
- Botrytis cinerea* Pers. ex Fr. On leaves of *Acorus Calamus*, 37615.
- Botrytis Epichloes* Ell. & Dearn. Covering the stromata of *Epichloe typhina* on *Glyceria striata*, R2320, R2415, R2502.
- Didymaria didyma* (Ung.) Schröt. On leaves of *Anemone canadensis*, 37392.
- Ovularia obliqua* (Cooke) Oud. On leaves of *Rumex crispus*, 36724.
- Ramularia brunnea* Peck. On leaves of *Tussilago farfara*, 36889.
- Ramularia decipiens* Ell. & Ev. On leaves of *Rumex verticillatus*, 38032.
- Ramularia Impatiensis* Peck. On leaves of *Impatiens* sp., 37627.
- Ramularia Saururi* (Ell. & Ev.) Tharp. On leaves of *Saururus cernuus*, 38024.
- Ramularia Tulasnei* Sacc. On leaves of *Fragaris virginiana*, 37604.

Dematiaceae

- Alternaria tenuis* Auct. sensu str. Neergaard. On necrotic spots on the leaves of *Liriodendron Tulipifera*, 36657. (Det. by P. Neergaard.)
- Cercospora dubia* (Reiss.) Wint. On leaves of *Chenopodium album*, 38034. (Det. by C. Chupp.)
- Cercospora omphakodes* Ell. & Holw. On leaves of *Phlox divaricata*, 10073 (Whetzel & Jackson).
- Cercospora Sii* Ell. & Ev. On leaves of *Sium suave*, 9938 (Whetzel & Jackson).
- Cladosporium graminum* Cooke. On dead leaves of *Sorghastrum nutans*, R2859.
- Cladosporium herbarum* Link ex Fr. On the lower dead leaves of *Linnaea borealis*, var. *americana*, 37815; and on dead leaves of *Typha latifolia*, R2857.

- Cladosporium velutinum* Ell. & Tracy. On dead leaves of *Phalaris arundinacea*, 36513.
Ellisiella caudata (Peck) Sacc. On dead leaves of *Sorghastrum nutans*, 37878.
Gonatobotryum maculicola (Wint.) Sacc. On leaves of *Hamamelis virginiana*, 37941.
Helicoma olivaceum (Karsten) Linder. On rotten log, R2836.
Scolecotrichum maculicola Ell. & Kellerm. On leaves of *Phragmites communis*, 36663. (Det. by R. Sprague.)
Scolecotrichum typhae Ell. & Ev. On dead leaves of *Typha latifolia*, 38017.

Stilbaceae

- Isaria farinosa* Fr. On pupa of an insect. R1768.
Stilbum fimetarium (Pers.) Berk. & Br. On deer dung, R2698.

Tuberculariaceae

- Bactridium flavum* Kze. & Schm. On rotten log, 37824.
Epicoccum neglectum Desm. On leaves of *Lindera Benzoin*, 36664.
Exosporium Tiliae Link. On dead twigs of *Tilia americana*, 37543.
Trimmatostroma americanum Thüm. On dead twigs of *Salix discolor*, 37825.
Volutella ciliata Alb. & Schw. ex Fr., var. *stipitata* (Lib.) Sacc. On dung of deer, R2984.

HOST INDEX

- Acer nigrum* Michx. f.; *Phyllosticta saccharini*.
Acer rubrum L.; *Cytospora chrysosperma*, *Dermea acerina*, *Diplodina stenospora*, *Erinella miniopsis*, *Fomes connatus*, *Hysterographium Mori*, *Mycena inclinata*, *Nitschkia Fuckelii*, *Peniophora Eichleriana*, *Phyllosticta minima*, *Poria ferruginosa*, *Rhytisma acerinum*, *Sphaeronema acerinum*, *Valsa ceratophora*.
Acer saccharinum L.; *Rhytisma acerinum*.
Acer saccharum Marsh.; *Melanomma pulvi-pyrius*.
Acer spicatum Lam.; *Hypoxylon coccineum*, *Rhytisma punctatum*, *Uncinula circinata*.
Acer sp. indet.; *Diatrype stigma*, *Diplodina stenospora*, *Lachnum virgineum*, *Mycena Leaiana*, *Peniophora incarnata*, *Peziza sylvestris*, *Phlebia merismoides*, *Scutellinia* sp.
Acorus calamus L.; *Botrytis cinerea*.
Agrimonia gryposepala Wallr.; *Sphaerotheca macularis*.
Agropyron repens (L.) Beauv.; *Claviceps purpurea*, *Puccinia graminis*, *Puccinia rubigo-vera*, var. *Agropyrina*.

- Alisma plantago-aquatica* L.; *Doassansia Alismatis*.
Allium canadense L.; *Uromyces bicolor*.
Alnus incana (L.) Moench.; *Aleurodiscus subgiganteus*, *Cyphella fasciculata*, *Encoelia furfuracea*, *Fomes scutellatus*, *Hypoxylon cohaerens*, *Microsphaera Alni*, *Phyllactinia corylea*, *Stereum purpureum*, *Taphrina Robinsoniana*.
Althaea rosea (L.) Cav.; *Puccinia Malvacearum*.
Amaranthus retroflexus L.; *Albugo Bliti*.
Ambrosia artemesiifolia DC.; *Erysiphe cichoracearum*.
Amelanchier intermedia Spach.; *Gymnosporangium clavipes*.
Amphicarpa bracteata (L.) Fern.; *Synchytrium aecidioides*.
Anemone canadensis L.; *Didymaria didyma*, *Erysiphe Polygoni*, *Pero-
nospora pygmaea*.
Anemone virginiana L.; *Puccinia Anemones-virginianae*.
Apocynum cannabinum L.; *Didymosphaeria brunneola*.
Aquilegia canadensis L.; *Erysiphe Polygoni*.
Aralia nudicaulis L.; *Corticium anceps*.
Arctium minus (Hill) Benth.; *Puccinia Bardanae*.
Arisaema Dracontium (L.) Schott.; *Uromyces Caladii*.
Arisaema triphyllum (L.) Schott.; *Uromyces Caladii*.
Asclepias syriaca L.; *Phoma asclepiadea*.
Asprella hystrix (L.) Humb.; *Phyllachora graminis*.
Aster lateriflorus (L.) Britt.; *Coleosporium Solidaginis*.
Aster lucidulus (Gray) Wieg.; *Coleosporium Solidaginis*.
Aster macrophyllus L.; *Erysiphe Cichoracearum*.
Aster novae-angliae L.; *Erysiphe Cichoracearum*, *Puccinia Asteris*,
Rosenscheldia Heliopsidis.
Aster paniculatus Lam.; *Coleosporium Solidaginis*.
Aster prenanthoides Muhl.; *Erysiphe Cichoracearum*.
Aster umbellatus Mill.; *Erysiphe Cichoracearum*, *Puccinia extensicola*,
var. *Asteris*.
Aster sp. indet.; *Puccinia Asteris*.
Avena sativa L.; *Puccinia coronata*.
Berberis vulgaris L.; *Puccinia graminis*.
Betula lutea Michx.; *Daldinia concentrica*, *Fomes fomentarius*, *Hymenochaete fuliginosa*, *Hypoxylon multiforme*, *Lentinus vulpinus*,
Merulius tremellosus, *Phlebia radiata*, *Polyporus betulinus*, *Polyporus galactinus*, *Polyporus versicolor*, *Poria nigrescens*, *Solenia anomala*, *Stereum hirsutum*, *Trogia crispa*.
Betula sp. indet.; *Exidia nucleata*, *Hypoxylon multiforme*, *Polyporus arcularius*, *Polyporus hirsutus*, *Polyporus radiatus*.
Bidens cernua L.; *Sphaerotheca Humuli*, var. *fuliginea*.
Caltha palustris L.; *Puccinia Calthae*.
Campanula rapunculoides L.; *Coleosporium Campanulae*.

- Capsella Bursa-pastoris* (L.) Medic.; *Albugo candida*.
Carex pallescens L.; *Puccinia Caricis*, var. *uniporula*.
Carex riparia Curtis, var. *lacustris* (Willd.) Kueken.; *Pleurotus cyphelaeformis*, *Puccinia Caricis*.
Carex sterilis Willd.; *Cintractia Caricis*.
Carex sp. indet.; *Schizonella melanogramma*.
Carpinus caroliniana Walt.; *Eutypella cerviculata*, *Exidia repanda*, *Nectria atrofusca*, *Peniophora cinerea*, *Pezicula carpinea*, *Polyporus fumosus*, *Stereum sericeum*.
Carya ovata (Mill.) K. Koch.; *Gloeosporium Caryae*, *Polyporus delectans*.
Celastrus scandens L.; *Marssonina Thomasiana*, *Phyllactinia corylea*.
Cephalanthus occidentalis L.; *Orbilia xanthostigma*.
Chelone glabra L.; *Erysiphe Galeopsidis*.
Chenopodium album L.; *Cercospora dubia*, *Peronospora effusa*.
Cinna arundinacea L.; *Puccinia graminis*.
Circaea latifolia L.; *Puccinia Circaeae*.
Cirsium arvense (L.) Scop.; *Albugo Tragopogonis*, *Puccinia obtogens*.
Cirsium lanceolatum (L.) Hill.; *Puccinia Cnici*.
Convolvulus sepium L.; *Septogloeum Convolvuli*.
Commandra umbellata (L.) Nutt.; *Cronartium Commandrae*.
Coptis trifolia (L.) Salisb., subsp. *groenlandica* (Oeder) Hulten.; *Vermicularia coptina*.
Cornus alternifolia L. f.; *Leptosphaeria* sp., *Myxosporium nitidum*, *Phyllosticta cornicola*.
Cornus Amomum Mill.; *Myxosporium nitidum*, *Phoma Corni*.
Cornus canadensis L.; *Septoria canadensis*.
Cornus rugosa Lam.; *Valsa Cornina*.
Cornus stolonifera Michx.; *Schiffnerula pulchra*.
Corylus americana Walt.; *Peniophora cinerea*.
Crataegus macracantha Lodd.; *Gymnosporangium globosum*.
Crataegus monogyna Jacq.; *Gynosporangium clavipes*.
Crataegus punctata Jacq.; *Arrhytidia enata*, *Gymnosporangium clavipes*, *Gymnosporangium globosum*.
Cystopteris fragilis (L.) Bernh.; *Hyalopsora Polypodii*.
Daucus Carota L.; *Leptosphaeria Doliolum*.
Dentaria diphylla Michx.; *Albugo candida*.
Dentaria laciniata Muhl.; *Peronospora parasitica*.
Deschampsia caespitosa (L.) Beauv.; *Stagonospora arenaria*.
Dicentra canadensis (Goldie) Walp.; *Peronospora Corydalis*.
Dryopteris Thelypteris (L.) Gray; *Uredinopsis Struthiopteridis*.
Eleocharis rostellata Torr.; *Claviceps nigricans*.
Elymus virginicus L.; *Ophiobolus cariceti*, *Phyllachora graminis*.
Epilobium hirsutum L.; *Pucciniastrum pustulatum*, *Septoria Epilobii*.

- Erythronium americanum* Ker. ; *Ustilago* Heufleri.
Evonymus atropurpureus Jacq. ; *Microsphaera* Evonymi.
Eupatorium maculatum L. ; *Erysiphe* Cichoracearum, *Puccinia* Eleocharidis.
Eupatorium perfoliatum L. ; *Erysiphe* Cichoracearum, *Puccinia* Eleocharidis.
Eupatorium rugosum Houtt. ; *Leptothyrium vulgare*, *Plasmopara* Halstedii, *Puccinia* Eleocharidis, *Puccinia* tenuis, *Vermicularia* Dematium.
Eupatorium sp. indet. ; *Leptostroma* Eupatorii.
Fagus grandifolia Ehrh. ; *Daedalea unicolor*, *Exidia spiculosa*, *Favolus alveolaris*, *Fomes connatus*, *Heridium laciniatum*, *Hypoxylon coccineum*, *Hypoxylon cohaerens*, *Hypoxylon nummularium*, *Hypoxylon ustulatum*, *Nectria coccinea*, *Leptosphaeria hispida*, *Leptosphaeria ovina*, *Polyporus albellus*, *Polyporus elegans*.
Fragaria virginiana Duch. ; *Ramularia Tulasnei*.
Fraxinus americana L. ; *Aleurodiscus macrodens*, *Cytospora ceratophora*, *Phyllosticta fraxinicola*, *Vermicularia* Dematium.
Fraxinus nigra Marsh. ; *Hysterium angustatum*.
Fraxinus pennsylvanicus Marsh. ; *Fomes fraxinophilus*, *Puccinia peridermiospora*.
Fraxinus sp. indet. ; *Diatrype stigma*, *Fomes fraxinophilus*, *Polyporus albellus*, *Sphaerographium* Fraxini.
Gaultheria procumbens L. ; *Asterina* Gaultheriae.
Gaylussacia baccata (Wang.) K. Koch. ; *Exobasidium Vaccinii*, *Microsphaera Vaccinii*, *Pucciniastrum Myrtilli*.
Geranium maculatum L. ; *Plasmopara* Geranii.
Geranium Robertianum L. ; *Stigmatea Robertiani*.
Geum aleppicum Jacq. ; var. *strictum* (Ait.) Fern. ; *Sphaerotheca Humili*.
Geum canadense Jacq. ; *Peronospora* *Potentillae*.
Geum sp. indet. ; *Peronospora* *Potentillae*.
Glyceria grandis Wats. ; *Ustilago longissima*.
Glyceria striata (Lam.) Hitchc. ; *Epichloe typhina*.
Hamamelis virginiana L. ; *Gonatobotryum maculicola*, *Poria ferruginosa*.
Helenium autumnale L. ; *Erysiphe* Cichoracearum.
Hydrophyllum virginianum L. ; *Peronospora* *Hydrophylli*.
Impatiens pallida Nutt. ; *Puccinia rubigo-vera*, var. *Impatientis*.
Impatiens sp. indet. ; *Ramularia* *Impatientis*.
Inula Helenium L. ; *Erysiphe* Cichoracearum.
Iris versicolor L. ; *Cylindrosporium Iridis*, *Puccinia Iridis*, *Puccinia sessilis*, *Vermicularia* Dematium.
Juglans nigra L. ; *Marssonina* *Juglandis*.

- Juncus balticus* Willd., var. *littoralis* Engelm.; *Leptosphaeria* Michotii.
Juncus macer S. F. Gray; *Cintractia Junci*.
Juniperus horizontalis Moench.; *Gymnosporangium corniculans*, *Gymnosporangium globosum*.
Juniperus virginiana L.; *Gymnosporangium globosum*.
Larix laricina (DuRoi) Koch.; *Lentinus spretus*.
Ledum groenlandicum Oeder.; *Chrysomyxa* Ledi, *Lachnum fuscescens*,
Lophodermium sphaeroides.
Leersia oryzoides (L.) Sw.; *Belonopsis* sp.
Lepidium campestre (L.) R. Br.; *Albugo candida*.
Lindera Benzoin (L.) Bl.; *Diplodia Linderae*, *Dothidea Linderae*,
Epicoccum neglectum.
Linnaea borealis L., var. *americana* (Forbes) Rehder; *Cladosporium*
herbarum.
Liriodendron tulipifera L.; *Alternaria tenuis*.
Lobelia siphilitica L.; *Puccinia Lobeliae*.
Lonicera dioica L.; *Microsphaera* Alni.
Lonicera oblongifolia (Goldie) Hook.; *Herpobasidium deformans*,
Leptothyrium Periclymenii, *Microsphaera* Alni.
Lycopus uniflorus Michx.; *Puccinia angustata*.
Malva neglecta Wallr.; *Puccinia Malvacearum*, *Septoria malvicola*.
Mentha arvensis L., var. *canadensis* (L.) Briq.; *Erysiphe Cichoracearum*.
Mentha spicata L.; *Puccinia Menthae*.
Mitella diphylla L.; *Septoria Mitellae*.
Mitella nuda L.; *Puccinia Heucherae*.
Muhlenbergia racemosa (Michx.) BSP.; *Phyllachora vulgata*.
Myrica pennsylvanica Lois; *Helotium caudatum*.
Oenothera biennis L.; *Peronospora Arthuri*.
Onoclea sensibilis L.; *Uredinopsis mirabilis*.
Oryzopsis asperifolia Michx.; *Puccinia pygmaea*.
Parnassia caroliniana Michx.; *Didymosphaeria Parnassiae*.
Parthenocissus quinquefolia (L.) Planch.; *Phyllosticta viticola*, *Uncinula necator*.
Parthenocissus sp. indet.; *Plasmopara viticola*.
Phalaris arundinacea L.; *Cladosporium velutinum*.
Phleum pratense L.; *Puccinia graminis*, var. *Phlei-pratensis*.
Phlox divaricata L.; *Cercospora omphakodes*.
Phragmites communis Trin.; *Scolecotrichum maculicola*.
Phytolacca americana L.; *Leptosphaeria clavigera*, *Phoma Phytolaccae*.
Pinus Strobus L.; *Coccophacidium Pini*, *Lophodermium nitens*, *Stereum*
Pini, *Valsa Pini*.
Plantago lanceolata L.; *Phoma polygramma*, var. *Plantaginis*.
Plantago major L.; *Erysiphe lamprocarpa*.

- Platanus occidentalis* L.; *Gnomonia veneta*.
Poa compressa L.; *Puccinia graminis*.
Podophyllum peltatum L.; *Puccinia Podophylli*.
Polygala paucifolia Willd.; *Puccinia Pyrolae*.
Polygonum aviculare L.; *Uromyces Polygoni*.
Polygonum coccineum Muhl.; *Puccinia Polygoni-amphibii*, var. *Persicariae*.
Polygonum Convolvulus L.; *Puccinia Polygoni-amphibii*, var. *Convolvuli*.
Polygonum hydropiperoides Michx.; *Puccinia Polygoni-amphibii*, var. *Persicariae*, *Ustilago utriculosa*.
Polymnia canadensis L.; *Helotium scutula*.
Polystichum acrostichoides (Michx.) Schott.; *Taphrina Polystichi*.
Populus balsamifera L.; *Melampsora Medusae*.
Populus candicans Ait.; *Pleurotus ostreatus*, *Uncinula Salicis*.
Populus grandidentata Michx.; *Fomes fomentarius*, *Stereum rameale*.
Populus tremuloides Michx.; *Eutypella Radula*, *Hypoxyylon pruinaum*, *Melampsora Medusae*, *Stereum rufum*, *Valsa nivea*.
Populus sp. indet.; *Phlebia strigosa-zonata*, *Septoria musiva*.
Portulaca oleracea L.; *Albugo Portulacae*.
Potentilla fruticosa L.; *Phragmidium Andersoni*.
Potentilla norvegica L., var. *hirsuta* (Michx.) Lehm.; *Phragmidium Potentillae*.
Potentilla recta L.; *Phragmidium Potentillae*.
Prenanthes alba L.; *Erysiphe Cichoracearum*.
Prunus avium L.; *Micropera Drupacearum*, *Polyporus versicolor*.
Prunus domestica L.; *Dibotryon morbosum*.
Prunus serotina Ehrh.; *Pachyella* sp., *Valsa leucostoma*.
Prunus virginiana L.; *Corticium cremoricolor*, *Dibotryon morbosum*, *Peniophora cinerea*, *Podosphaera Oxyacanthae*.
Prunus sp. indet.; *Cylindrosporium Padi*, *Solenia anomala*.
Pteridium aquilinum Kuh., var. *latiusculum* (Desv.) Underw.; *Cryptomycina Pteridis*, *Leptostroma Pteridis*.
Pycnanthemum flexuosum (Walt.) BSP.; *Puccinia Menthae*.
Pycnanthemum Torreyi Benth.; *Puccinia Menthae*.
Pycnanthemum virginianum (L.) Dur. & Jackson; *Puccinia Menthae*.
Pyrola americana Sweet; *Chrysomyxa Pyrolae*.
Pyrus Malus L.; *Leptothyrium Pomi*, *Venturia inaequalis*.
Quercus bicolor Willd.; *Gnomonia veneta*, *Microsphaera abbreviata*.
Quercus macrocarpa Michx.; *Daedalea quercina*.
Quercus sp. indet.; *Hypoxyylon ustulatum*, *Pezicula cinnamomea*.
Ranunculus recurvatus Poir.; *Erysiphe Polygoni*.
Ranunculus septentrionalis Poir.; *Erysiphe Polygoni*.
Rhamnus alnifolia L'Her.; *Microsphaera Alni*, *Puccinia coronata*.

- Rhododendron nudiflorum* (L.) Torr., var. *roseum* (Lois.) Wieg.;
Microsphaera Alni.
Rhus Toxicodendron L.; *Pileolaria Toxicodendri*.
Rhus typhina L.; *Nectria cinnabarina*.
Ribes americanum Nutt.; *Puccinia Caricis*, var. *Grossulariata*.
Ribes Cynosbati L.; *Cronartium ribicola*.
Ribes hirtellum Michx.; *Cronartium ribicola*, *Puccinia Caricis*, var.
Grossulariata.
Ribes triste Pall., var. *albinervium* (Michx.) Fern.; *Cronartium ribi-*
cola.
Rubus allegheniensis Porter; *Gymnoconia Peckiana*.
Rubus occidentalis L.; *Gymnoconia Peckiana*.
Rubus pubescens Raf.; *Sphaerotheca macularis*.
Rudbeckia hirta L.; *Erysiphe Cichoracearum*.
Rudbeckia laciniata L.; *Erysiphe Cichoracearum*.
Rumex crispus L.; *Ovularia obliqua*.
Rumex verticillatus L.; *Ramularia decipiens*.
Sagittaria latifolia Willd.; *Doassansia deformans*.
Salix alba L., var. *vitellina* (L.) Koch.; *Fomes fraxinophilus*, *Polyporus*
delectans, *Polyporus sulphureus*.
Salix amygdaloides Anders.; *Melampsora Bigelowii*.
Salix Bebbiana Sarg.; *Valsa translucens*.
Salix discolor Muhl.; *Cenangium salicellum*, *Melampsora Abieti-*
capraearum, *Solenia anomala*, *Trimmatostroma americanum*.
Salix nigra Marsh.; *Melampsora Abieti-capraearum*, *Polyporus squa-*
mosus.
Salix purpurea L.; *Melampsora Abieti-capraearum*.
Salix sericea Marsh.; *Uncinula Salicis*.
Salix sp. indet.; *Cytospora Salicis*.
Sambucus canadensis L.; *Microsphaera Grossulariae*.
Sanicula marilandica L.; *Urophlyctis pluriannulatum*.
Sarracenia purpurea L.; *Mycosphaerella Sarraceniae*.
Saururus cernuus L.; *Ramularia Saururi*.
Scirpus atrovirens Muhl.; *Puccinia angustata*.
Senecio aureus L.; *Puccinia angustata*, *Puccinia recedens*.
Setaria viridis (L.) Beauv.; *Sclerospora graminicola*.
Silene Cucubalis Wibel.; *Marssonina Delastrei*.
Sium suave Walt.; *Cercospora Sii*, *Physoderma vagans*.
Smilacina stellata (L.) Desf.; *Phyllosticta Convallariae*.
Solanum Dulcamara L.; *Ascochyta Lycopersici*, *Phyllosticta perforans*.
Solidago arguta Ait.; *Coleosporium Solidaginis*.
Solidago canadensis L.; *Coleosporium Solidaginis*, *Erysiphe Cichora-*
cearum, *Puccinia extensicola*, var. *Solidaginis*.
Solidago graminifolia (L.) Salisb.; *Coleosporium Solidaginis*, *Puccinia*
extensicola, var. *Solidaginis*.

- Solidago nemoralis* Ait.; *Coleosporium Solidaginis*.
Solidago ohioensis Riddell.; *Coleosporium Solidaginis*, *Puccinia extensicola*, var. *Solidaginis*.
Solidago patula Muhl.; *Coleosporium Solidaginis*.
Solidago rugosa Mill.; *Coleosporium Solidaginis*.
Solidago serotina Ait.; *Coleosporium Solidaginis*, *Erysiphe Cichoracearum*.
Solidago uniligulata (DC.) Porter.; *Coleosporium Solidaginis*.
Solidago sp. indet.; *Helotium scutula*, *Phoma Solidaginis*, *Phomopsis linearis*, *Septoria Davisii*.
Sorghastrum nutans (L.) Nash.; *Cladosporium graminum*, *Ellisiella caudata*, *Vermicularia punctans*.
Stachys tenuifolia Willd., var. *aspera* (Michx.) Fern.; *Erysiphe Galeopsidis*.
Steironema ciliatum (L.) Raf.; *Puccinia Dayi*, *Septoria conspicua*.
Tanacetum vulgare L.; *Erysiphe Cichoracearum*.
Taraxacum officinale Weber; *Puccinia Hieracii*.
Thalictrum polygamum Muhl.; *Tranzchelia Thalictri*.
Thuja occidentalis L.; *Dacrymyces deliquescens*, *Coniophora puteana*, *Flammula sapinea*, *Helotium indepremsum*, *Hymenochaete tenuis*, *Mycena alcalina*, *Mycena delicatella*, *Pestalotia funerea*, *Polyporus abietinus*.
Tiarella cordifolia L.; *Puccinia Heucherae*.
Tilia americana L.; *Asteroma Tiliae*, *Collybia velutipes*, *Crepidotus putrigenous*, *Dacrymyces Ellisii*, *Dendrophoma Tiliae*, *Exosporium Tiliae*, *Holwaya leptosperma*, *Odontia spathulata*, *Pachyella* sp., *Phyllosticta Tiliae*, *Polyporus fumosus*, *Polyporus pargamenus*, *Polyporus resinosus*, *Polyporus tephroleucas*, *Poria spissa*, *Seismosarca alba*, *Tremella frondosa*, *Uncinula Clintonii*.
Trifolium pratense L.; *Erysiphe Polygoni*, *Uromyces Trifolii*.
Triglochin palustris L.; *Pleospora herbarum*, var. *Triglochinis*.
Trillium grandiflorum (Michx.) Salisb.; *Uromyces Halstedii*.
Triticum aestivum L.; *Puccinia rubigo-vera*, var. *Tritici*, *Ustilago nuda*.
Tsuga canadensis (L.) Carr.; *Clavaria cristata*, *Dacrymyces deliquescens*, *Dacrymyces palmatus*, *Fomes pinicola*, *Ganoderma lucidum*, *Gelatinosporium abietinum*, *Lentinus spretus*, *Lenzites saepiaria*, *Omphalia campanella*, *Paxillus atrotomentosus*, *Polyporus abietinus*, *Polyporus resinosus*, *Pseudoplectania nigrella*, *Stereum hirsutum*, *Tremellodon gelatinosus*.
Tussilago Farfara L.; *Ramularia brunnea*.
Typha latifolia L.; *Cladosporium herbarum*, *Scolecotrichum Typhae*.
Ulmus americana L.; *Clavaria mucida*, *Cytospora* sp., *Daedalea confragosa*, *Ganoderma applanatum*, *Nectria cinnabarina*, *Phyllosticta ulmicola*, *Piggotia astroidea*, *Pleurotus ulmarius*, *Polyporus cro-*

- ceus, *Polyporus elegans*, *Polyporus fumosus*, *Polyporus gilvus*,
Polyporus versicolor, *Sphaeropsis ulmicola*.
Ulmus sp. indet.; *Coprinus micaceus*, *Karschia lignyota*, *Lentinus*
lepideus, *Lentinus vulpinus*, *Poria fissiliformis*, *Rosellinia aquilla*.
Urtica procera Muhl.; *Puccinia Caricis*, var. *Urticata*.
Vaccinium Oxycoccus L.; *Synchytrium Vaccinii*.
Vaccinium sp. indet.; *Exobasidium Vaccinii*.
Verbena urticaefolia L.; *Erysiphe Galeopsidis*.
Veronica longifolia L.; *Sphaerotheca Humuli*, var. *fuliginea*.
Viburnum Lentago L.; *Microsphaera Alni*.
Vicia villosa Roth.; *Uromyces Fabae*.
Viola blanda Willd.; *Puccinia Viola*e.
Viola incognita Brainerd.; *Puccinia Viola*e.
Viola pubescens Ait.; *Puccinia Viola*e.
Viola renifolia Gray, var. *Brainerdii* Fern.; *Puccinia Viola*e.
Vitis vulpina L.; *Phyllosticta viticola*, *Plasmopara viticola*.
Xanthium orientale L.; *Erysiphe Cichoracearum*.

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THE VEGETATION OF BERGEN SWAMP

VII. The Bryophytes

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The present survey is intended to supplement the analyses of other plant groups in Bergen Swamp in Genesee County, N. Y., either completed (Muenscher, 1946, 1948, Brown, 1948) or now in progress. The work of collecting mosses and liverworts was begun in 1944 and carried forward to 1949. By then the number of bryophyte collections had risen to 1035 and these were held sufficient to warrant a summation to date. No implication is made, however, as to the exhaustiveness of this study; further careful collecting undoubtedly will yield additional species.

To a great extent the sampling error deriving from the work of a single collector has been overcome by a joint effort. The writer is indebted to several workers from the Department of Botany, Cornell University who have generously "picked mosses" while visiting the Swamp for other purposes. Chief among these is Professor W. C. Muenscher whose efforts account for more than half the collections and without whose inspiration there is little likelihood the survey would have been begun. Once undertaken the interest of the work has increased from the peculiar fascination of the Swamp and the associated plant species growing there.

In process of completion the report has benefited materially by the helpful criticism of Professor Muenscher and by the light shed on the analysis of certain critical species by Dr. A. L. Andrews. Dr. B. I. Brown has furthered the inclusiveness of the species list by the addition of four species representing recent collections.

The relative richness of the bryophyte flora of Bergen Swamp is best emphasized by comparing its area with that of North America north of Mexico and by following this with a comparison of the incidence of bryophyte taxonomic groups in the two areas. Such a comparison is summarized in the following table.

	Total	North America north of Mexico	Bergen Swamp	Percentage of Total in Bergen Swamp
Area		8,264,772 sq. mi.	5 sq. mi.	0.00006
Bryophyte Families		72	38	51.0
Bryophyte Genera		335	91	27.0
Bryophyte Species		1585	165	11.0

This relatively great concentration in so limited an area, 41 species representing 33 genera of Hepaticae and 122 species and 3 varieties representing 91 genera of Musci, could be realized only by a considerable diversity of ecologic factors within Bergen Swamp. These factors are summarized in the ten vegetation types postulated by Muenscher (1946).

It is the present purpose to add the bryophytic units to the ten vegetation types represented in the Swamp. The species occurring commonly on boulders mostly in areas 7, 8, 9 and 10 have been listed in group 11.

1. AQUATIC PLANTS

<i>Ricciocarpus natans</i>	<i>Hygroamblystegium irriguum</i>
<i>Riccia fluitans</i>	<i>Leptodictyum riparium</i>
<i>Fissidens Julianus</i>	<i>Fontinalis dalecarlica</i>
<i>Brachythecium acutum</i>	<i>Fontinalis Duriaei</i>
<i>Brachythecium rivulare</i>	<i>Fontinalis novae-angliae</i>
<i>Drepanocladus fluitans</i>	<i>Fontinalis novae-angliae</i> var. <i>latifolia</i>
<i>Hygroamblystegium fluviatile</i>	

2. CAREX RIPARIA SWAMP

<i>Leptodictyum riparium</i>	<i>Fontinalis novae-angliae</i> var. <i>latifolia</i>
<i>Fontinalis novae-angliae</i>	

3. ALLUVIAL SOIL PLANTS

Grimmia alpicola

4. OPEN MARL BOG

<i>Riccardia pinguis</i>	<i>Drepanocladus revolvens</i>
<i>Campylium stellatum</i>	<i>Scorpidium scorpioides</i>

5. SECONDARY MARL BOG

<i>Blepharostoma trichophyllum</i>	<i>Tortella fragilis</i>
<i>Dicranum Bonjeani</i>	<i>Tortella tortuosa</i>
<i>Dicranum fuscescens</i>	<i>Thuidium abietinum</i>

(A test plot in the secondary marl received an application of 5-10-5 fertilizer. *Funaria hygrometrica*, *Physcomitrium turbinatum*, and *Bryum bimum* appeared abundantly in this treated area.)

6. SPHAGNUM BOG

<i>Microlepidozia setacea</i>	<i>Riccardia pinguis</i>
<i>Cephalozia connivens</i>	<i>Sphagnum capillaceum</i>
<i>Cephalozia media</i>	<i>Sphagnum fuscum</i>
<i>Mylia anomala</i>	<i>Sphagnum Girgensohnii</i>
<i>Geocalyx graveolens</i>	<i>Sphagnum palustre</i>
<i>Pellia epiphylla</i>	<i>Dicranella varia</i>
<i>Pallavicinia Lyellii</i>	<i>Aulacomnium palustre</i>
<i>Riccardia latifrons</i>	<i>Bryum bimum</i>
<i>Riccardia palmata</i>	

7. ARBOR-VITAE SWAMP

<i>Lepidozia reptans</i>	<i>Sphagnum fimbriatum</i>
<i>Calyptogeia Neesiana</i>	<i>Sphagnum fuscum</i>
<i>Cephalozia connivens</i>	<i>Sphagnum Girgensohnii</i>
<i>Cephalozia media</i>	<i>Sphagnum palustre</i>
<i>Odontoschisma denudatum</i>	<i>Sphagnum Warnstorffii</i>
<i>Cephaloziella myriantha</i>	<i>Tetraphis pellucida</i>
<i>Geocalyx graveolens</i>	<i>Polytrichum juniperinum</i>
<i>Jamesoniella autumnalis</i>	<i>Fissidens adiantoides</i>
<i>Riccardia pinguis</i>	<i>Fissidens cristatus</i>
<i>Marchantia polymorpha</i>	<i>Dicranella heteromalla</i>
<i>Preissia quadrata</i>	<i>Dicranum flagellare</i>
<i>Sphagnum capillaceum</i>	<i>Dicranum fuscescens</i>

7.—continued.

<i>Dicranum montanum</i>	<i>Camptothecium nitens</i>
<i>Dicranum rugosum</i>	<i>Campyllum stellatum</i>
<i>Paraleucobryum longifolium</i>	<i>Entodon cladorrhizans</i>
<i>Leucobryum glaucum</i>	<i>Eurhynchium strigosum</i>
<i>Bryum bimum</i>	<i>Hypnum cupressiforme</i>
<i>Bryum caespiticium</i>	<i>Hypnum Patientiae</i>
<i>Bryum capillare</i>	<i>Hypnum reptile</i>
<i>Pohlia Wahlenbergii</i>	<i>Platygyrium repens</i>
<i>Mnium punctatum</i>	<i>Rhytidiadelphus triquetrus</i>
<i>Amblystegium varium</i>	<i>Thuidium delicatulum</i>
<i>Calliergonella cuspidata</i>	<i>Thuidium recognitum</i>
<i>Calliergonella Schreberi</i>	

8. ALDER SWAMP

<i>Ptilidium pulcherrimum</i>	<i>Porella platyphylla</i>
<i>Calypogeia Neesiana</i>	<i>Fissidens adiantoides</i>
<i>Cephalozia bicuspidata</i>	<i>Brachythecium salebrosum</i>
<i>Geocalyx graveolens</i>	<i>Climacium americanum</i>

9. PINE-HEMLOCK FOREST

<i>Ptilidium pulcherrimum</i>	<i>Tetraphis pellucida</i>
<i>Trichocolea tomentella</i>	<i>Atrichum undulatum</i>
<i>Calypogeia Trichomanis</i>	<i>Fissidens adiantoides</i>
<i>Cephalozia connivens</i>	<i>Dicranum flagellare</i>
<i>Cephalozia media</i>	<i>Dicranum scoparium</i>
<i>Nowellia curvifolia</i>	<i>Barbula unguiculata</i>
<i>Odontoschisma denudatum</i>	<i>Bryum bimum</i>
<i>Lophocolea heterophylla</i>	<i>Pohlia nutans</i>
<i>Geocalyx graveolens</i>	<i>Mnium spinulosum</i>
<i>Jungermannia lanceolata</i>	<i>Amblystegium Juratzkanum</i>
<i>Riccardia latifrons</i>	<i>Brotherella recurvans</i>
<i>Sphagnum capillaceum</i>	<i>Climacium americanum</i>
<i>Sphagnum fimbriatum</i>	<i>Cratoneuron commutatum</i>
<i>Sphagnum fuscum</i>	<i>Hypnum imponens</i>
<i>Sphagnum imbricatum</i> var. <i>affine</i>	<i>Hypnum molluscum</i>
<i>Sphagnum magellanicum</i>	<i>Hypnum Patientiae</i>
<i>Sphagnum palustre</i>	<i>Hypnum reptile</i>
<i>Sphagnum squarrosum</i>	<i>Plagiothecium denticulatum</i>
<i>Sphagnum Warnstorffii</i>	<i>Thuidium delicatulum</i>

10. BIRCH-MAPLE-ELM FOREST

<i>Bazzania trilobata</i>	<i>Ceratodon purpureus</i>
<i>Calypogeia Trichomanis</i>	<i>Seligeria campylopada</i>
<i>Cephalozia catenulata</i>	<i>Dicranella varia</i>
<i>Cephalozia media</i>	<i>Dicranum flagellare</i>
<i>Nowellia curvifolia</i>	<i>Dicranum scoparium</i>
<i>Odontoschisma denudatum</i>	<i>Acaulon rufescens</i>
<i>Lophocolea heterophylla</i>	<i>Encalypta ciliata</i>
<i>Chiloscyphus pallescens</i>	<i>Hedwigia ciliata</i>
<i>Geocalyx graveolens</i>	<i>Ulota crispa</i>
<i>Barbilophozia barbata</i>	<i>Aulacomnium heterostichum</i>
<i>Jamesoniella autumnalis</i>	<i>Bryum bimum</i>
<i>Porella platyphylloidea</i>	<i>Bryum caespiticium</i>
<i>Frullania eboracensis</i>	<i>Bryum capillare</i>
<i>Cololejeunea Biddlecomiae</i>	<i>Bryum cuspidatum</i>
<i>Pellia epiphylla</i>	<i>Rhodobryum roseum</i>
<i>Moerckia Flotowiana</i>	<i>Mnium affine</i>
<i>Conocephalum conicum</i>	<i>Mnium cuspidatum</i>
<i>Tetraphis pellucida</i>	<i>Mnium punctatum</i>
<i>Atrichum undulatum</i>	<i>Amblystegium Juratzkanum</i>
<i>Fissidens cristatus</i>	<i>Amblystegium serpens</i>

10.—continued.

Amblystegium varium
Brachythecium oxycladon
Brachythecium rutabulum
Calliergon cordifolium
Campylium chrysophyllum
Campylium hispidulum
Campylium polygamum
Climacium americanum
Cratoneuron filicinum
Entodon seductrix

Heterophyllum Haldanianum
Homomallium adnatum
Hypnum curvifolium
Hypnum imponens
Plagiothecium denticulatum
Plagiothecium sylvaticum
Platygyrium repens
Leskea polycarpa
Thelia hirtella

11. BOULDERS

Seligeria campylopoda c *
Encalypta ciliata g
Weisia viridula c
Grimmia hygrometrica g
Hedwigia ciliata g

Orthotrichum anomalum c
Bryum argenteum
Bryhnia nova-angliae
Campylium hispidulum

* c = calcareous; g = granitic

ANNOTATED LIST OF THE BRYOPHYTES
OF BERGEN SWAMP

The binomials used in the following list of 165 species correspond with those last published by the Sullivant Moss Society, Andrews (1940), Evans (1940), Grout (1940). Because of the number of collectors involved it has seemed desirable to note the times collected for each species. These are indicated by numbers concluding the note on each species. This figure will serve as a rough estimate of the species' abundance in most cases. Certain species as *Sphagnum capillaceum*, *Camptothecium nitens*, *Drepanocladus revolvens*, and *Drepanocladus aduncus* occur locally in great masses, so that the number of times collected is a poor criterion of their relative importance in the Swamp flora.

All identifications are based on microscopic examinations of leaf and stem water mounts. A compound microscope giving magnifications of 100 and 440 was used. Packets of dried material of each species have been deposited in the Wiegand Herbarium of Cornell University and also in the writer's herbarium at Union College.

Hepaticae — Liverworts

PTILIDIACEAE

- Blepharostoma trichophyllum* (L.) Dumort. On rotting wood about marl pools, 2.
Ptilidium pulcherrimum (Web.) Hampe. On bark of living tree trunks and on rotting logs, 23.
Trichocolea tomentella (Ehrh.) Dumort. On swampy humus under evergreens, 6.

LEPIDOZIACEAE

- Bazzania trilobata* (L.) S. F. Gray. On humus among hardwoods, 4.
Lepidozia reptans (L.) Dumort. On rotting *Thuja occidentalis*, 4.
Microlepidozia setacea (Web.) Joerg. On the base of sphagnum hummocks near the water table, 4.

CALYPOGEIACEAE

- Calyptogeia Neesiana* (Massal. & Carest.) K. Müll. Abundant on shaded humus or rotting wood, 8.
Calyptogeia Trichomanis (L.) Corda Abundant on humus, 15.

CEPHALOZIACEAE

- Cephalozia bicuspidata* (L.) Dumort. On sticks and tree bases, 5.
Cephalozia catenulata (Hüb.) Spruce On rotting wood, 3.
Cephalozia connivens (Dicks.) Lindb. On rotting wood, 6.

Cephalozia media Lindb. Abundant on humus, 15.

Nowellia curvifolia (Dicks.) Mitt. On rotting logs, 6.

Odontoschisma denudatum (Mart.) Dumort. Abundant on much rotted logs and stumps, 6.

CEPHALOZIELLIACEAE

Cephaloziella myriantha (Lindb.) Schiffn. Shaded *Thuja occidentalis* log, 1.

HARPANTHACEAE

Chiloscyphus pallescens (Ehrh.) Dumort. Shaded muck and rotted log, 2.

Geocalyx graveolens (Schrad.) Nees. Shaded humus, 18.

Lophocolea heterophylla (Schrad.) Dumort. On bark of living tree trunks and rotted wood, 29.

Mylia anomala (Hook.) S. F. Gray Sphagnum hummocks, 4.

PLAGIOCHILACEAE

Plagiochila asplenoides (L.) Dumort. On lower trunk of *Ulmus americana*, 1.

JUNGERMANNIACEAE

Barbilophozia barbata (Schmid.) Loeske. Near base of *Ulmus americana*, 1.

Jamesoniella autumnalis (DC.) Steph. Rotting wood, 6.

Jungermannia lanceolata L. Humus earth, 2.

PORELLACEAE

Porella pinnata (L.) Dumort. Common on base of *Acer rubrum*, 1.

Porella platyphylla (L.) Lindb. Base of *Salix amygdaloides*, 1.

Porella platyphylloidea (Schwein.) Lindb. Base of trees, 10.

RADULACEAE

Radula complanata (L.) Dumort. Common on bark of hardwood tree trunks, 24.

FRULLANIACEAE

Frullania eboracensis Gottsche On bark of tree trunks, 21.

LEJEUNEACEAE

Cololejeunea Biddlecomiae (Aust.) Evans. Common on bark of tree trunks, 14.

PELLIACEAE

Pellia epiphylla (L.) Corda Rotting logs, 3.

PALLAVICINIACEAE

Moerckia Flotowiana (Nees) Schiffn. In marly depression, 3.

Pallavicinia Lyellii (Hook.) S. F. Gray On debris of *Typha latifolia* at water level, 1.

RICCARDIACEAE

Riccardia latifrons Lindb. On sphagnum hummocks and moist wood in marly parts, 10.

Riccardia multifida (L.) Dumort. Shaded sphagnum tussocks over muck, 3.

Riccardia pinguis (L.) S. F. Gray Emergent on sphagnum about pools in marl area, 15.

MARCHANTIACEAE

Conocephalum conicum (L.) Dumort. On shaded wet soil and rotting wood, 8.

Marchantia polymorpha L. On humus in wet depression, 9.

Preissia quadrata (Scop.) Nees. On humus above marl water, 6.

REBOULIACEAE

Reboulia hemisphaerica (L.) Raddi. Moist sandy soil, 1.

RICCIACEAE

Riccia fluitans L. Floating among algae in cattail marsh, 3.

Ricciocarpus natans (L.) Corda On muck among *Cephalanthus occidentalis*, 7.

Musci* — Mosses*SPHAGNACEAE**

Sphagnum capillaceum (Weiss) Schrank Forming hummocks in marl pool area and in encircling forest, 14.

Sphagnum fimbriatum Wils. Swampy humus in coniferous zone, 7.

Sphagnum fuscum (Schimp.) H. Klinggr. Forming hummocks in sphagnum area. 10.

Sphagnum Girgensohnii Russow Forming hummocks in sphagnum area, 2.

Sphagnum imbricatum var. *affine* (Ren. & Card.) Warnst. On mucky humus in forest, 2.

Sphagnum magellanicum Brid. On muck in drying forest pool, 1.

- Sphagnum palustre* L. Over swampy forest humus, occasional in hummocks of sphagnum area, 9.
Sphagnum squarrosum Crome Humus depressions under *Thuja occidentalis*, 5.
Sphagnum Warnstorffii Russ. Forming tussocks in *Thuja occidentalis* zone, occasional in hummocks of sphagnum area, 4.

TETRAPHIDACEAE

- Tetraphis pellucida* Hedw. Common on shaded humus, 19.

POLYTRICHACEAE

- Atrichum angustatum* (Brid.) Bry. Eur. In cut-over area in cedar swamp, 1.
Atrichum undulatum (Hedw.) Beauv. Shaded humus soil, 2.
Polytrichum commune L. On open ridges, 2.
Polytrichum juniperinum Hedw. Humus soil, 4.
Polytrichum ohioense Ren. & Card. In swampy swale, 1.
Polytrichum strictum Banks On soil beside rotting logs, 2.

FISSIDENTACEAE

- Fissidens adiantoides* Hedw. Shaded humus, 15.
Fissidens cristatus Wils. Rotted wood, 4.
Fissidens Julianus (Mont.) Schimp. Immersed in pool attached to root of *Acer saccharinum*, 1.

DITRICHACEAE

- Ceratodon purpureus* (Hedw.) Brid. Soil, logs, sawdust pile, 6.

SELIGERiaceae

- Seligeria campylopoda* Kindb. On calcareous boulder, 1.

DICRANACEAE

- Dicranella heteromalla* (Hedw.) Schimp. Shaded humus soil, 3.
Dicranella varia (Hedw.) Calcareous earth, 2.
Dicranum Bonjeani DeNot. Dry humus marl, 2.
Dicranum flagellare Hedw. Rotting wood and bark of living trees, 17.
Dicranum fuscescens Turn. On trees and moist humus, 3.
Dicranum montanum Hedw. Rotting wood and bark of living trees, 12.
Dicranum rugosum (Hoffm.) Brid. On humus in drying pools, 2.
Dicranum scoparium Hedw. Rotting wood and humus, 5.
Paraleucobryum longifolium (Hedw.) Loeske Humus in marl area, 2.

LEUCOBRYACEAE

Leucobryum glaucum (Hedw.) Schimp. Shaded humus soil, 2.

ENCALYPTACEAE

Encalypta ciliata Hedw. Granite boulders, 2.

POTTIACEAE

Acaulon rufescens Jaeger. Earth at base of *Ulmus americana*, 1.

Barbula fallax Hedw. On log, subject to immersion, 1.

Barbula unguiculata Hedw. Decaying log, 1.

Didymodon tophaceus (Brid.) Jur. Rotting wood in marl water, 1.

Tortella fragilis (Hook. & Wils.) Limpr. On marly peat, 1.

Tortella tortuosa (Turn.) Limpr. On dry marl, 2.

Weisia viridula Hedw. Calcareous rock, 2.

GRIMMIACEAE

Grimmia alpicola Hedw. Granite boulders, 4.

Hedwigia ciliata Hedw. Granite boulders, 4.

FUNARIACEAE

Funaria hygrometrica Hedw. Soil and rocks, 5.

Physcomitrium turbinatum (Mx.) Brid. On fertilized plot in marl, 1.

ORTHOTRICHACEAE

Orthotrichum anomalum Hedw. On lime rocks, 2.

Orthotrichum strangulatum Sulliv. On trunks of living trees, 3.

Ulota crispa (Hedw.) Brid. Bark of living trees, 10.

AULACOMNIACEAE

Aulacomnium heterostichum (Hedw.) Bry. Eur. On humus, 2.

Aulacomnium palustre (Web. & Mohr) Schwaegr. Moist humus, 5.

BRYACEAE

Bryum argenteum (L.) Hedw. On rock, 1.

Bryum bimum Schreb. Humus and humus soils, 16.

Bryum caespiticium (L.) Hedw. Various humus substrates, 10.

Bryum capillare L. Base of trees, 2.

Bryum cuspidatum (Bry. Eur.) Schimp. Rotting sticks in muck, 1.

Bryum cernuum (Sw.) Lindb. On sawdust pile, 1.

- Pohlia nutans* (Hedw.) Lindb. Moist humus, 6.
Pohlia Wahlenbergii (Web. & Mohr) Andrews. Humus, 1.
Rhodobryum roseum (Bry. Eur.) Limpr. Humus soil, 7.

MNIACEAE

- Mnium affine* Bland. On moist humus at margin of forest pool, 2.
Mnium cuspidatum Hedw. Humus, 6.
Mnium punctatum Hedw. Various humus substrates, 7.
Mnium punctatum var. *elatum* Schimp. Over moist sticks in marshy spring, 1.
Mnium spinulosum Bry. Eur. Humus soil, 1.
Mnium stellare Reich. Rotted log, 1.

HYPNACEAE

- Amblystegiella subtilis* (Hedw.) Loeske Base of *Salix amygdaloides* in marshy spring area, 1.
Amblystegium Juratzkanum Schimp. Rotting logs, 2.
Amblystegium serpens (Hedw.) Bry. Eur. Wood and stones in moist places, 9.
Amblystegium varium (Hedw.) Lindb. On shaded humus, 21.
Brachythecium acutum (Mitt.) Sull. Immersed or emergent on sticks, 5.
Brachythecium oxycladon Jaeger & Sauerb. On living trees and humus soils, 25.
Brachythecium rivulare Bry. Eur. Emergent on soil, stones, and sticks, 9.
Brachythecium rutabulum (Hedw.) Bry. Eur. Humus, 4.
Brachythecium salebrosum (Web. & Mohr) Bry. Eur. On humus soil and sticks, 6.
Brotherella recurvans (Mx.) Fleisch. On living trees, humus soil and sticks, 15.
Bryhnia novae-angliae (Sull. & Lesq.) Grout On rock, 1.
Calliergon cordifolium (Hedw.) Kindb. Emergent in mucky pools, 5.
Calliergon trifarium (W. and M.) Kindb. Immersed on base of hummocks in marl pools, 1.
Calliergonella cuspidata (Brid.) Loeske On much rotted logs and humus swales, 5.
Calliergonella Schreberi (Bry. Eur.) Grout On humus hummocks, 3.
Camptothecium nitens (Schreb.) Schimp. Humus at margin of marly area, 3.
Campyllum chrysophyllum (Brid.) Bryhn Humus soil, living trees, and sticks in moist shaded places, 23.
Campyllum hispidulum (Brid.) Mitt. On rock, 1.
Campyllum polygamum (Bry. Eur.) Bryhn Immersed, attached to sticks, 2.

- Campylium stellatum* (Hedw.) Lange & C. Jens. Abundant over soil, sticks, other mosses, etc. in marl area of Swamp, 24.
- Climacium americanum* Brid. Humus and wet humus soils, 7.
- Cratoneuron commutatum* (Hedw.) Roth. Swampy humus, 1.
- Cratoneuron filicinum* (Hedw.) Roth. Partly flooded mucky soil, 7.
- Drepanocladus aduncus* var. *Kneiffii* (Bry Eur.) Warnst. Immersed in pools and sluggish streams, 10.
- Drepanocladus aduncus* var. *typicus* (Ren.) Wynne. Immersed and emergent, carpeting several acres of cattail swale at the west end of Swamp, 13.
- Drepanocladus exannulatus* (Gümb.) Warnst. Emergent from cool marly pools, 6.
- Drepanocladus fluitans* (Hedw.) Warnst. Immersed in swampy inlet, west end of Swamp, 6.
- Drepanocladus revolvens* (Turn.) Warnst. Abundant about the marl pools, 9.
- Entodon cladorrhizans* (Hedw.) C. Mull. Rotted wood, 1.
- Entodon seductrix* (Hedw.) C. Mull. Shaded humus, 4.
- Eurhynchium rusciforme* (Neck.) Milde. Humus soil, stream margin, 1.
- Eurhynchium strigosum* (Hoffm.) Bry. Eur. Shaded boulder and log, 2.
- Heterophyllum Haldanianum* (Grev.) Kindb. Rotted logs, 3.
- Homomallium adnatum* (Hedw.) Broth. Granite rocks and tree trunks, 7.
- Hygroamblystegium fluviatile* (Hedw.) Loeske. Spillway of dammed pond, west end of Swamp, 1.
- Hygroamblystegium irriguum* (Wils.) Loeske. Immersed and emergent, swamp pool, 2.
- Hypnum cupressiforme* Hedw. *Thuja occidentalis* log, 1.
- Hypnum curvifolium* Hedw. Rotted sticks and humus, 4.
- Hypnum imponens* Hedw. On tree trunks and humus, 9.
- Hypnum molluscum* Hedw. Rotted log of *Tsuga canadensis*, 1.
- Hypnum Patientiae* Lindb. Logs and humus soil in shaded wet places, 13.
- Hypnum reptile* Mx. On tree trunks and rotting wood, 6.
- Leptodictyum riparium* (Hedw.) Warnst. Immersed and emergent on sticks and rocks, 20.
- Plagiothecium denticulatum* (Hedw.) Bry. Eur. On tree trunks and shaded humus, 29.
- Plagiothecium turfatum* Lindb. On hummocks in woods, 1.
- Plagiothecium sylvaticum* (Brid.) Bry. Eur. Humus, 2.
- Platygyrium repens* (Brid.) Bry. Eur. Bark of living trees, 34.
- Pylaisia intricata* (Hedw.) Bry. Eur. On base of trees, 1.
- Rhytidiadelphus triquetrus* (Hedw.) Warnst. Over humus of drying pools, 1.

Scorpidium scorpioides (Hedw.) Limpr. Immersed in pools, open marl area, 3.

LESKEACEAE

- Anomodon attenuatus* (Hedw.) Hüben. On humus over rocks, 23.
Anomodon rostratus (Hedw.) Schimp. On moist humus, 2.
Leskea polycarpa Hedw. Logs and tree bases, 5.
Thelia hirtella (Hedw.) Sull. Over roots of *Acer rubrum*, 1.
Thuidium abietinum (Brid.) Bry. Eur. Humus and marly peat, 2.
Thuidium delicatulum (Hedw.) Mitt. On moist shaded humus, 17.
Thuidium recognitum (Hedw.) Lindb. Humus, 1.

LEUCODONTACEAE

Leucodon sciuroides (L.) Schwaeg. On exposed trunks of trees, 4.

FONTINALACEAE

- Fontinalis dalecarlica* Bry. Eur. Immersed on stones, Black Creek, 1.
Fontinalis Duriaei Schimp. Immersed in open pool, 1.
Fontinalis novae-angliae Sull. Swamp brooks and pools and Black Creek, 9.
Fontinalis novae-angliae var. *latifolia* Card. Black Creek and pools, 10.

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