

THE LICHEN FLORA OF ILLINOIS STATE BEACH PARK

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ABSTRACT

Eighty-six species of lichens are reported from Illinois Beach State Park, in Zion, Illinois. Forty-one lichens are of the crustose growth form, 24 are foliose, 17 are fruticose, 3 are squamulose and 1 is calicialian. Forty-five lichens are considered rare, 30 are occasional, 3 are frequent and 8 are common. The most commonly occupied corticolous substrate in Illinois Beach State Park is *Quercus velutina*, weathered concrete is the most common saxicolous substrate and weathered wood is the most common lignicolous substrate. Several rare lichens are also found on arenicolous substrates (sand or sandy humus). A key to the lichen flora of Illinois Beach State Park is provided as well as information on their habitats, abundance and distribution.

Seventeen lichens are listed as new to Lake County Illinois: *Acarospora glaucocarpa* (Ach.) Körber, *Acarospora veronensis* A. Massal., *Amandinea dakotensis* (H. Magn.) P. May & Sheard, *Arthonia punctiformis* Ach., *Bacidia circumspecta* (Nyl. ex Vain.) Malme, *Caloplaca cf. crenulatella* (Nyl.) Oliv., *Cladonia arbuscula* (Wallr.) Flotow, *Lecanora strobilina* (Sprengel) Kieffer, *Parmotrema reticulatum* (Taylor) M. Choisy, *Parmotrema submarginale* (Michaux) DePriest & B. Hale, *Phaeophyscia hirsuta* (Mereschk.) Essl., *Polysporina simplex* (Davies) Vězda, *Ramalina americana* Hale, *Sarcogyne privigna* (Ach.) A. Massal., *Thelocarpon laureri* (Flotow) Nyl., *Xanthomendoza fulva* (Hoffm.) Söchting, Kärnefelt & S. Kondr., *Xanthomendoza ulophyllodes* (Gyelnik) Söchting, Kärnefelt & S. Kondr.

The crustose lichen, *Pyrenocarpon flotowianum* (Hepp) Trevis., described from river margins in Switzerland, represents a new addition to the lichen flora of North America.

INTRODUCTION

A suggestion to conduct a formal lichen survey of Illinois Beach State Park was initially made to the author in November of 2006 by Debra Nelson, then Illinois Department of Natural Resources (IDNR) District 8 Natural Heritage Biologist, when she became concerned that a proposal to allow hunting on sensitive areas of the State Park could damage the rare flora. A field trip by the author and Ms. Nelson was conducted on November 29, 2006 and confirmed the existence of many rare lichens at the State Park, especially where the hunting was proposed.

On March 8, 2007 a letter was sent to the Wildlife Preservation Fund Review Committee of the IDNR outlining the major points of a lichen study at Illinois Beach State Park. The goals of this lichen study were to 1.) Identify the lichen flora at Illinois Beach State Park and determine their vulnerability to proposed activities including deer hunting, 2.) Verify the presence of a rare lichen, *Ceraria arenaria*, 3.) Document and collect voucher specimens of the lichen flora of Illinois Beach State Park, 4.) Develop an identification key to the lichen flora there, and 5.) Provide information on their habitats, abundance and distribution.

Information gathered on rare lichens, their locations and habitats at this site, is expected to help the IDNR District Natural Heritage Staff make informed management decisions relating to prescribed burns, exotic

species control, deer management and visitor use.

The vascular flora, which numbers some 650 species at Illinois Beach State Park and surrounding beach area (a.k.a. Dunesland or Waukegan moorlands), has been described in previous publications (Gates 1912), (Jones 1971), (Lunn 1982), (Pepon 1927), (Ross 1963). No previous work however, has been devoted to the lichen flora of Illinois Beach State Park.

DESCRIPTION OF THE STUDY AREA

According to Lunn (1982), Illinois Beach State Park (IBSP) is located about 6.4 km (4 miles) north of Waukegan north to the Wisconsin line and from the Chicago and Northwestern Railroad on the west to Lake Michigan on the east in the northeast corner of Illinois. It has a land area of approximately 1,683 hectares (4,160 acres) and includes 10.5 km (6.5 miles) of Lake Michigan shoreline, which the largest single tract of undeveloped coastal habitat left in Illinois. The width of the area varies from 8 km (1/2 mile) to 1.6 km (1 mile). Natural features of IBSP consist of sand dune, sandy prairie, oak woodland and sand savanna, all providing suitable habitat for lichens. Marsh, fen, panne, sedge meadow, pond, a river and the Lake Michigan Beach are also present, but they proved to be poor habitat for lichens here.

The terrain is generally level throughout IBSP, but it also features a topography of ridge and swale. Elevations range from a low of 178 meters above sea level (584 feet) at the Lake Michigan shoreline, to a high of 182 meters (600 feet) along the western boundary of the State Park. According to Swink and Wilhelm (1994), IBSP is in the Lake Plain Natural Division: Illinois Dunes Section.

The climate is considered continental with fairly cold winters and warm summers. The average temperatures in January range from a maximum of -2.2° C (28.0° F) to a minimum of -11.7° C (10.9° F). The average July temperatures range from a maximum of 27.2° C (81.0° F) to a minimum of 16.2° C (61.2° F). The average annual precipitation (This is the mean yearly precipitation, including rain, snow, hail etc.) is 868.6 mm (34.2") (www.worldclimate.com, 2008).

Lunn (1982) illustrates vascular plant communities in a "walk" from the lakeshore west to the prairie, and notes the difference in the habitats and in the kind of plants that are found in these communities. The presence of lichen in these communities is noted below:

Water's edge - in this community wave action prevents even vascular plants from establishing a foothold - no lichens were found here.

Upper beach - in this community with its lack of humus, excessive exposure to the sun, wind and blowing sand, even the best adapted plants won't survive - no lichens were found here.

Foredunes - in this community, grasses, sand binders that stop blowing sand, provide some protection from sun and blowing sand for a few plants - no lichens were found here.

Rear dunes - in this community over the edge of the dunes more protection is offered from the elements (wind and waves), but lack of humus, high summer temperatures and cold winter winds present formidable problems to plants. - lichens were present in this community.

Zone of oak trees - in this community oak trees stabilize the dunes - lichens were present on the trunks and limbs of trees here.

Dry sandy prairie swells and wet marshy prairie or sloughs - in this community prairie plants prevail with a few scattered trees – few lichens were found here especially on stumps or bark at the base of trees.

Two other natural areas, not owned by the IDNR also lie within the boundaries of IBSP: Spring Bluff Fen (Forest Preserve District of Lake County, Illinois) and Hosah Prairie (Zion Park District). Spring Bluff Fen is located at the north end of IBSP at the Winthrop Harbor entrance. A species list of lichens for Spring Bluff Fen has been provided in this paper (Appendix III). Hosah Prairie lies midway between the north and south units. A species list of lichens for Hosah Prairie has been provided in this paper (Appendix IV). Both natural areas have habitats and a lichen flora similar to IBSP.

Two dedicated Illinois Nature Preserves also lie within the IBSP and are owned by the IDNR: Illinois Beach Nature Preserve and North Dunes Nature Preserve.

The boundaries of the North Unit & North Dunes Nature Preserve (Figure 1) run from .4 km (¼ mile) north of Shiloh Blvd., north to the northern boarder at the Wisconsin line, and Lake Michigan on the east, west to the Chicago and Northwestern Railroad tracks. The North Dunes Nature Preserve is 81 hectares (200 acres) in size. The boundaries of the South Unit & Illinois Beach Nature Preserve (Figure 2) run from 29th street on the north, south to the southern boarder, .8 km (½ mile) north of Greenwood Dr., and Lake Michigan on the east, west to the Chicago and Northwestern Railroad tracks. Illinois Beach Nature Preserve is 335 hectares (829 acres) in size.

MATERIALS AND METHODS

Between November of 2006 and October of 2008, 13 trips were taken to do field work at IBSP. An attempt was made to collect and identify lichens from as many types of habitats as possible. Surveys were conducted by walking random sample locations for 2 hours with all lichens found identified in that period. This technique was repeated at forty locations throughout IBSP. Special searches for rare lichens were conducted around the vicinity of Dead River.

The abundance information of the lichen flora was determined by counting the number of times each lichen species was found during the 2 hour survey and assigning that species an abundance category. Assignment of abundance categories was based on the following criteria: rare (found on 1-10 surveys), occasional (11-20 surveys), frequent (21-30 surveys) and common (31-40 surveys). These abundance categories refer to values relative to IBSP and not the rest of Illinois.

To assist in lichen identification, tests for chemical substances produced by lichens were made on specimens with two chemical reagents: calcium hypochlorite [$\text{Ca}(\text{ClO})_2$, abbreviated as C] and potassium hydroxide [KOH, abbreviated as K] and follow Hale (1973). Some species of lichens contain acids, which react to these reagents, resulting in color changes of their upper cortex (upper fungal layer) or medulla (middle fungal layer). The presence or absence of reactions between these acids and these reagents were used to identify some lichen species. Thin-layer chromatography following Culberson (1972) was also used to verify secondary-product chemistry.

The growth form of each lichen was determined: fruticose (shrub-like), foliose (leaf-like), squamulose (scale-like) and crustose (crust-like; sterile, or with perithecia, or with apothecia) as well as the substrate upon which it was found: saxicolous (growing on concrete, dolomite or granite), corticolous (growing on the bark of trees or shrubs), fungicolous (growing on fungi), muscicolous (growing on mosses), lignicolous (growing on wood or decorticate logs), arenicolous (growing on sand or sandy humus) or other (growing on rusted steel.). Nomenclature and species concepts for trees or shrubs identified as substrates follow Swink and Wilhelm (1994).

All lichen collections by the author have been deposited in the herbarium at the Morton Arboretum, Lisle, Illinois, with duplicates donated to The Field Museum of Natural History, Chicago, Illinois and the Chicago Botanic Garden, Skokie, Illinois.

Collections made by the author are identified in the annotated species list (Appendix I) as follows: the substrate upon which the collection was made is listed first, followed by the first letter of the author's last name (H), followed by the author's accession number, followed by the acronym of the herbaria where it is housed. (Due to space restraints the Chicago Botanic Garden is listed as "C", The Field Museum is listed as "F" and The Morton Arboretum is listed as "M"):

Bacidina egenula (Nyl.) Vezda
Rare on wooden posts (H-2542 CFM)...

In searches of the lichen herbarium at The Morton Arboretum, Lisle, IL the author found that IBSP had been collected from in years past. Dr. Elizabeth T. Lunn had made several collections between the years 1967 and 1972. Dr. Gerould Wilhelm, formerly of The Morton Arboretum, had also made collections between the years 1985 and 1987. Dr. Wilhelm made collections with other lichenologists as well, including Bill McKnight and Doug Ladd. A few of the structures these older collections were taken from are no longer present at IBSP, including an ice house and lookout tower west of Dead River.

Collections by Lunn, Wilhelm or Wilhelm et. al. are also identified in the annotated species list (Appendix I) as follows: the substrate upon which the collection was made is listed first, followed by the first letter of the collector's last name(s): Lunn (L), Wilhelm (W), Wilhelm & McKnight (WM) or Wilhelm & Ladd (WL), followed by the collector's accession number, followed by the acronym of The Morton Arboretum (M) where it is housed, followed by the date of the collection:

Herbarium specimen:

Cladonia robbinsii A. Evans
On sandy soil (L-3022 M) 16 March 1969.

While every attempt was made to locate species collected by Lunn, Wilhelm or Wilhelm et. al. in field surveys of IBSP, some species could not be found, but are included in this paper as historical records. In the following example, a note has been added to the species in the annotated species list where this situation occurs:

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On *Juniperus horizontalis* north of the lookout tower (W-13854 M) 12 May 1986.

RESULTS AND DISCUSSION

Eighty-six species of lichens are reported from Illinois Beach State Park, in Zion, Illinois. Forty-one lichens (48%) are of the crustose growth form, 24 (28%) are foliose, 17 (20%) are fruticose, 3 (3%) are squamulose and 1 (1%) is calicialian. Forty-five lichens (52%) are considered to be rare, 30 (35%) are occasional, 8 (9%) are common and 3 (4%) are frequent (Appendix I).

The following lichens represent new records for Lake County, Illinois: *Acarospora glaucocarpa* (Ach.) Körber, *Acarospora veronensis* A. Massal., *Amandinea dakotensis* (H. Magn.) P. May & Sheard, *Arthonia punctiformis* Ach., *Bacidia circumspecta* (Nyl. ex Vain.) Malme, *Caloplaca cf. crenulatella*

(Nyl.) Oliv, *Cladonia arbuscula* (Wallr.) Flotow, *Lecanora strobilina* (Sprengel) Kieffer, *Parmotrema reticulatum* (Taylor) M. Choisy, *Parmotrema submarginale* (Michaux) DePriest & B. Hale, *Phaeophyscia hirsuta* (Mereschk.) Essl., *Polysporina simplex* (Davies) Vězda, *Ramalina americana* Hale, *Sarcogyne privigna* (Ach.) A. Massal., *Thelocarpon laureri* (Flotow) Nyl., *Xanthomendoza fulva* (Hoffm.) Søchting, Kärnefelt & S. Kondr., *Xanthomendoza ulophyllodes* (Gyelnik) Søchting, Kärnefelt & S. Kondr.

The crustose lichen, *Pyrenocarpon flotowianum* (Hepp) Trevis., described from river margins in Switzerland, represents a new addition to the lichen flora of North America.

The most commonly occupied corticolous substrate in Illinois Beach State Park is *Quercus velutina*. A total of 46 lichens were found on corticolous substrates. Weathered concrete is the most common saxicolous substrate. A total of 25 lichens were found on saxicolous substrates. Weathered wood is the most common lignicolous substrate. A total of 16 lichens were found on lignicolous substrates. Nineteen lichens were also found on sand or sandy humus; arenicolous substrates. One lichen was fungicolous; growing over another lichen, and one was found on rusted steel.

The most common lichens here included *Candelaria concolor*, *Physcia millegrana* and *P. stellaris*. These three foliose lichens are generally pollution tolerant and usually thrive in disturbed situations. A few broad lobed lichens, *Flavoparmelia caperata*, *Flavopunctelia flaventior*, *Parmelia sulcata* and *Punctelia rudecta* were also common and grew to large diameters. The only common crustose lichen observed was *Candelariella reflexa*, which grew on *Quercus velutina* in the savannas.

No lichens found here are threatened or endangered in Illinois, but the fruticose lichen, *Cetraria arenaria* Kärnefelt, is found here where it is rare on sand, growing under the shelter of *Arctostaphylos uva-ursi* branches near Dead River. According to Thomson (2003) this species is “certainly endangered in Wisconsin” and is found in only five counties presently. Showman and Flenniken (2004) report collections from two northern Ohio counties from the years 1894 and 1962 respectively. They say it may be extirpated from the State. In Illinois, Illinois Beach State Park, is the only place it is found. GPS location data of *Cetraria arenaria* has been provided in this report (Appendix II). A total of 13 populations were found here.

The North Unit & North Dunes Nature Preserve

Substrates available for lichen colonization in the North Dunes Nature Preserve (NDNP) and parcels around the Camp Logan Multi-use and Day Use Area included weathered concrete and limestone or trees such as *Fraxinus pennsylvanica* var. *subintegerrima*, *Quercus rubra* and *Q. velutina* on ridges, in savanna, or scattered about the prairie. *Populus deltoides* and *P. tremuloides* grew along the shoreline. Generally, wetland and prairie at NDNP did not have many lichens, although there were a few species on *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus deltoides*, *P. tremuloides* and *Salix* sp. that occurred in marshy swales or in scattered openings throughout the oak savanna here. These species were *Amandinea dakotensis*, *Arthonia caesia*, *Candelaria concolor*, *Candelariella reflexa*, *Flavoparmelia caperata*, *Flavopunctelia flaventior*, *Lecanora symmicta*, *Parmelia sulcata*, *Phaeocalicium polyporaenum*, *Physcia adscendens*, *P. millegrana*, *Physciella chloantha*, *Physconia leucoleiptes*, *Xanthomendoza fallax*, *X. fulva* and *X. ullophyloides*.

Although no fire management occurred while IBSP was being surveyed for lichens, in the prairie area at Sand Prairie Day Use Area there was evidence of a recent burn. On several oaks lichens were absent on trunks that had been in prairie fires; especially on the side facing the burn. In some cases lichens were found at least 12 feet up the trunks; the lower part of the trunk having been burned in flames that reached that high. Some lichens that grew in the protection of furrows and crevices of bark do survive prairie fires.

Some remnants of lichens in these protected areas of bark included *Candelaria concolor*, *Physcia millegrana* and *P. stellaris*. Wetmore (1981) suggests that frequent fire reduces lichen abundance, which may account for the lack of lichen diversity on trees prone to fires here.

On the concrete and limestone revetments acting as shore protection along Lake Michigan, various lichens were found including *Acarospora strigata*, *Endocarpon pallidulum*, *Lecanora dispersa*, *Physcia adscendens*, *Physciella chloantha*, *Phaeophyscia ciliata*, *Pyrenocarpon flotowianum*, *Sarcogyne privigna* and *S. regularis*.

The beach communities and panne had a few lichens on flat beach stones that were found on sand including *Acarospora glaucocarpa*, *Endocarpon pallidulum*, *Lecanora dispersa* and *Verrucaria calkinsiana*.

In picnic areas *Acer* sp. and *Tilia americana* were found with the lichens *Amandinea punctata*, *Arthonia caesia*, *Candelaria concolor*, *Flavoparmelia caperata*, *Hyperphyscia adglutinata*, *Parmelia sulcata*, *Physcia millegrana*, *P. stellaris* and *Xanthomendoza fallax*. These trees may have been planted for landscaping, and it is not known if the lichens on their trunks were naturally occurring populations, or brought in on the trees when they came from the nursery, which is often the case.

The South Unit & Illinois Beach Nature Preserve

At the Wadsworth Road entrance to IBSP the natural features surveyed were wet prairie and marshes. A few trees, mainly *Acer* sp., *Populus deltoides* and *Quercus* spp., grew on ridges and in prairie openings. Lichens were mainly found on the trunks of these trees and included *Arthonia caesia*, *Candelaria concolor*, *Flavoparmelia caperata*, *Lecanora symmicta*, *Lepraria lobificans*, *Phaeophyscia rubropulchra* and *Physcia millegrana*. Some lichens growing on the bark of young, smooth, twigs and stems of *Populus* and *Quercus* spp. included *Amandinea dakotensis*, *Arthonia punctiformis*, *Caloplaca cerina*, *C. holocarpa* and *Lecanora strobilina*. No lichens were found on the wet prairie and marsh plants.

On the ridges west of the Visitors Center, and in the campground area, lichens such as *Arthonia caesia*, *Candelaria concolor*, *Candelariella reflexa*, *Flavoparmelia caperata*, *Lecanora strobilina*, *L. symmicta*, *Melanelixia subaurifera*, *Parmelia sulcata*, *Physcia millegrana* and *P. stellaris* grew on the trunks and lower limbs of *Quercus velutina*. *Trapeliopsis flexuosa* was found on charred wood in the oak savanna.

In the oak ridges south of the Nature Center, and east of Dead River, the following lichens were found on *Quercus macrocarpa* and *Q. velutina*: *Arthonia caesia*, *Caloplaca microphyllina*, *Candelaria concolor*, *Candelariella reflexa*, *C. xanthostigma*, *Parmelia sulcata*, *Physcia millegrana*, *P. stellaris*, *Punctelia bolliana*, *P. rudecta* and *Xanthomendoza fulva*. A few large foliose lichens, *Parmelia sulcata*, *Punctelia bolliana* and *P. rudecta*, grew up to 17.8 cm (7") in diameter; eventually growing into colonies as much as .9 meters (3 feet) in length down the limbs of *Quercus velutina*.

In the vicinity of the mouth of Dead River, and just west of the shoreline, a very interesting type of plant community referred to as the rear dunes is present. The lichens here grew in the presence of characteristic dunes plants such as *Arctostaphylos uva-ursi*, *Arabis lyrata*, *Carex richardsonii*, *Carex umbellata*, *Draba reptans*, *Euphorbia corollata*, *Helianthus occidentalis*, *Juniperus horizontalis*, *Opuntia humilis*, *Smilacina stellata*, *Solidago speciosa* and *Sorghastrum nutans*. Several species of *Cladonia* were present, as well as *Diploschistes muscorum* subsp. *muscorum*, *Placidium lachneum* and *Psora decipiens*; lichens that serve as sand binders. The rare fruticose lichen, *Cetraria arenaria* was also found here and had last been collected in 1986 "north of Dead River, west of the old lookout tower".

In the region south of Dead River all the way south to the southern boundary, thickets of grasses, mainly

Sorghastrum nutans and sedges (Cyperaceae), were the main vascular flora, along with groves of *Pinus nigra*. Many grasses grew so thick that very little open sand was present for lichen colonization. Occasionally *Antennaria neglecta* and *Hypericum kalmianum* were present in open sand with the lichen *Cladonia peziziformis* growing on grass roots or animal droppings. More open sand areas south of Dead River were inhabited with *Bryum argentium* and *Brachythecium* sp., both mosses, rather than lichens. In the Austrian Pine plantings, *Cladonia cristatella*, *Cyphelium tigillare*, *Diploschistes muscorum* subsp. *muscorum* and *Trapeliopsis flexuosa* were found mostly on stumps or bark at the base of these trees.

The following section lists the lichens that were found on specific substrates.

Saxicolous habitats - 25 species

Saxicolous substrates examined included concrete, limestone, granite and beach stones. These substrates were generally man-made and included concrete curbs in parking lots as well as foundation remnants from old buildings. A few granite boulders were found north of the Nature Center and may have been some sort of landscaping decoration. Concrete and limestone were also used in creating the revetments along the lakeshore south of Winthrop Harbor for erosion control. The only naturally occurring saxicolous substrates were the flat beach stones found along the beaches and dunes.

<i>Acarospora glaucocarpa</i>	<i>Phaeophyscia ciliata</i>
<i>Acarospora strigata</i>	<i>Phaeophyscia hirsuta</i>
<i>Acarospora veronensis</i>	<i>Physcia adscendens</i>
<i>Caloplaca cinnabarina</i>	<i>Physciella chloantha</i>
<i>Caloplaca crenulatella</i>	<i>Pyrenocarpon flotowianum</i>
<i>Caloplaca cf. feracissima</i>	<i>Sarcogyne privigna</i>
<i>Caloplaca flavovirescens</i>	<i>Sarcogyne regularis</i>
<i>Candelaria concolor</i>	<i>Verrucaria calkinsiana</i>
<i>Candelariella aurella</i>	<i>Verrucaria furfuraceae</i>
<i>Endocarpon pallidulum</i>	<i>Verrucaria muralis</i>
<i>Lecanora dispersa</i>	<i>Xanthomendoza fallax</i>
<i>Lecanora muralis</i>	<i>Xanthomendoza ulophyllodes</i>
<i>Parmelia sulcata</i>	

Corticolous habitats - 46 species

Corticolous substrates examined included the following trees and shrubs: *Acer negundo*, *A. saccharinum*, *Betula nigra*, *Betula papyrifera*, *Fraxinus pennsylvanica* var. *subintegerrima*, *Juniperus communis*, *J. horizontalis*, *Lonicera maackii*, *Morus alba*, *Picea* sp., *Pinus nigra*, *P. resinosa*, *P. sylvestris*, *P. strobus*, *Populus alba*, *P. deltoides*, *P. tremuloides*, *Prunus serotina*, *Prunus* sp., *Quercus macrocarpa*, *Q. rubra*, *Q. velutina*, *Rhamnus frangula*, *Robinia pseudoacacia*, *Salix babylonica*, *Salix pumila*, *Ulmus pumila* and *Vitis riparia*.

<i>Amandinea dakotensis</i>	<i>Candelariella reflexa</i>
<i>Amandinea punctata</i>	<i>Candelariella xanthostigma</i>
<i>Arthonia caesia</i>	<i>Cladonia cylindrical</i>
<i>Arthonia punctiformis</i>	<i>Cladonia macilenta</i> var. <i>bacillaris</i>
<i>Bacidia circumspecta</i>	<i>Cladonia subulata</i>
<i>Caloplaca cerina</i>	<i>Cyphelium tigillare</i>
<i>Caloplaca holocarpa</i>	<i>Evernia mesomorpha</i>
<i>Caloplaca microphyllina</i>	<i>Flavoparmelia caperata</i>
<i>Candelaria concolor</i>	<i>Flavopunctelia flaventior</i>

Flavopunctelia soledica
Hyperphyscia adglutinata
Lecanora sambuci
Lecanora strobilina
Lecanora symmicta
Lecanora thysanophora
Lepraria lobificans
Melanelixia subaurifera
Parmelia sulcata
Parmotrema reticulatum
Parmotrema submarginale
Phaeophyscia ciliata
Phaeophyscia hirsuta
Phaeophyscia rubropulchra

Physcia adscendens
Physcia millegrana
Physcia stellaris
Physciella chloantha
Physconia leucoleiptes
Punctelia bolliana
Punctelia rudenta
Ramalina americana
Thelocarpon laureri
Usnea strigosa subsp. *major*
Xanthomendoza fallax
Xanthomendoza fulva
Xanthomendoza ulophyllodes
Xanthoria polycarpa

Lignicolous habitats - 18 species

Lignicolous substrates examined included decorticate logs, saw-off tops of stumps, charred wood, a telephone pole, picnic tables, weathered wood railings and fencing.

Amandinea punctata
Bacidina egenula
Caloplaca microphyllina
Candelaria concolor
Candelariella reflexa
Cladonia cristatella
Cladonia macilenta var. *bacillaris*
Cladonia peziziformis
Cladonia subulata

Lecanora hagenii
Lecanora hypopta
Lecanora saligna
Lecanora symmicta
Physcia adscendens
Physcia millegrana
Physciella chloantha
Placynthiella icmalea
Trapeliopsis flexuosa

Arenicolous habitats - 19 species

Arenicolous substrates examined included sand and sandy humus.

Cetraria arenaria
Cladonia arbuscula
Cladonia chlorophaea
Cladonia coniocraea
Cladonia cristatella
Cladonia cryptochlorophaea
Cladonia cylindrica
Cladonia grayi
Cladonia homosekikaica
Cladonia humilis

Cladonia macilenta var. *bacillaris*
Cladonia peziziformis
Cladonia robbinsii
Cladonia subcariosa
Cladonia subulata
Diploschistes muscorum subsp. *muscorum*
Peltigera didactyla
Placidium lachneum
Psora decipiens

Fungicolous habitats - 1 species

Fungicolous substrates were lichens (*Cladonia peziziformis*) growing over other lichens.

Diploschistes muscorum subsp. *muscorum*

Rusted steel - 1 species

Lecanora dispersa

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Figure 1.

North Dunes Nature Preserve

Map curiosity: Department of Natural Resources. 2008.
dnr.state.il.us/INPC/Directory/Sitefiles/Area2/norla.htm

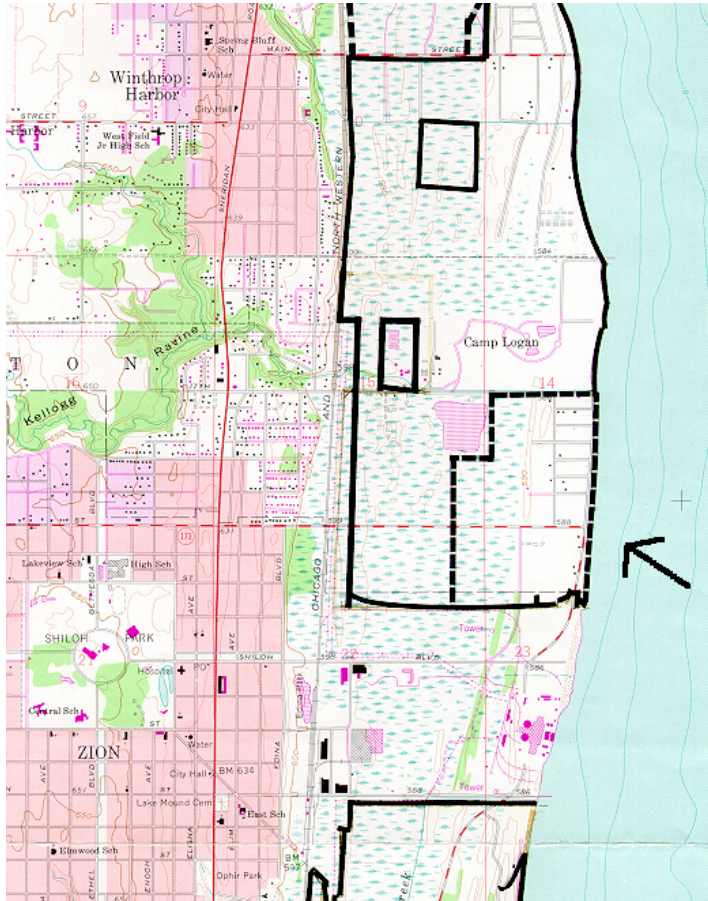
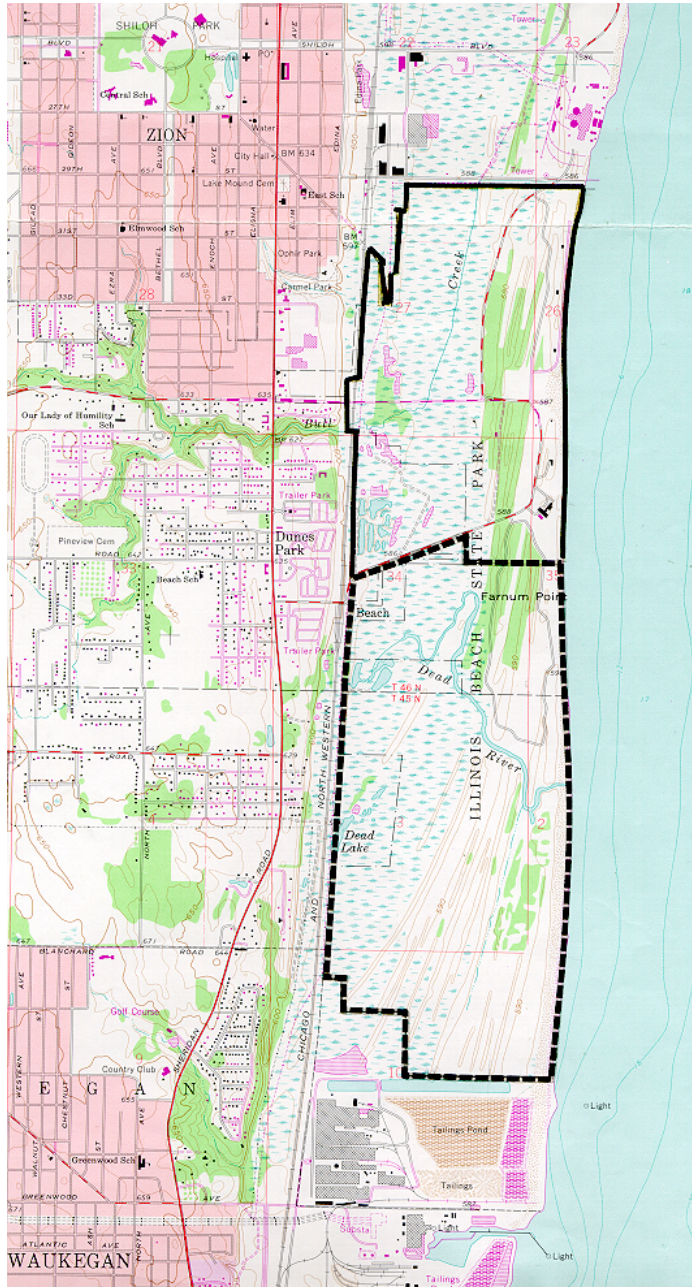


Figure 2.

Illinois Beach Nature Preserve

Map curiosity: Department of Natural Resources. 2008.
dnr.state.il.us/INPC/Directory/Sitefiles/Area2/illla.htm



Appendix I.

KEY TO GROUPS & GENERA

This is a key to the groups of the lichens found at Illinois Beach State Park. It is arranged by growth form. Following this key is an annotated lichen species list with abundance information and a brief description of habitat. Nomenclature and authority follow Esslinger (2008).

When more than one species occurs under a genus an additional key to species has been provided.

KEY TO GROUPS

1. Fruiting body at the terminal end of a slender stalk..... *Phaeocalicium polyporaenum*
1. Fruiting body sessile to immersed, not at the end of a stalk..... 2.
 - 2(1). Thallus shrub-like or scale-like, of ascending squamules; apothecia, if present, terminating cups or pointed or club-like podetia..... I - FRUTICOSE LICHENS
 2. Thallus and fruiting bodies not as above..... 3.
- 3(2). Thallus leaf-like, loosely attached to substrate by rhizines; with both an upper and lower cortex..... II - FOLIOSE LICHENS
3. Thallus not as above..... 4.
 - 4(3). Thallus squamulose, of adnate or ascending squamules. III – SQUAMULOSE LICHENS
 4. Thallus crust like, tightly attached to substrate, lacking a lower cortex..... 5.
- 5(4). Fruiting bodies absent..... IV - STERILE CRUSTOSE LICHENS
5. Fruiting bodies present..... 6.
 - 6(5). Fruiting body flask-like, embedded in thallus with only apex visible, opening by an apical pore; a perithecium..... V - CRUSTOSE LICHENS WITH PERITHECIA
 6. Fruiting body elongated, round or disk-like, sessile with upper cortex; an apothecium..... VI - CRUSTOSE LICHENS WITH APOTHECIA

I - FRUTICOSE LICHENS

1. Thallus erect or prostrate; on sandy soil..... 2.
1. Thallus pendant; on trees..... 3.
 - 2(1). Thallus whitish to grayish green, with round branches; squamules present or not..... CLADONIA
 2. Thallus brown (green when wet), flat, with inrolled margins; squamules lacking..... *Cetraria arenaria*
- 3(1). Thallus branches and lobes flattened..... *Ramalina americana*
3. Thallus branches somewhat rounded..... 4.
 - 4(3). Thallus with a dense, thread-like medulla; branches smooth, terete; fibrils present..... *Usnea strigosa* subs. *major*
 4. Thallus medulla loose and cotton-like; branches wrinkled, angular; fibrils absent..... *Evernia mesomorpha*

II - FOLIOSE LICHENS

1. Thallus some shade of orange, yellow, or yellowish green..... 2.
1. Thallus some shade of brown or gray..... 6.
 - 2(1). Thallus K+ violet..... 3.

2. Thallus K-..... 4.
- 3(2). Thallus esorediate..... *Xanthoria polycarpa*
3. Thallus sorediate..... XANTHOMENDOZA
- 4(2). Thallus lemon yellow to greenish yellow, lobes up to 1 mm wide... *Candelaria concolor*
4. Thallus yellow green, lobes 3-8 mm wide..... 5.
- 5(4). Medulla C-; upper surface without pores..... *Flavoparmelia caperata*
5. Medulla C+ red; upper surface with pores..... FLAVOPUNCTELIA
- 6(1). Thallus brown, brownish gray, greenish gray, or dark gray, K-..... 7.
6. Thallus whitish gray to bluish gray, K+ yellow or rarely K-..... 11.
- 7(6). Lower surface tomentose, fibrous or cottony, with raised veins; lobes broad, 10mm or more wide..... *Peltigera didactyla*
7. Lower surface usually with rhizines, not tomentose, veins lacking; thallus with broad or narrow lobes..... 8.
- 8(7). Medulla C+ red..... *Melanelixia subaurifera*
8. Medulla C-..... 9.
- 9(8). Thallus lobes white pruinose..... *Physconia leucoleiptes*
9. Thallus lobes epruinose..... 10.
- 10(9). Rhizines rare to nearly absent, thallus tightly attached to substrate.....
..... *Hyperphyscia adglutinata*
10. Rhizines present, thallus loosely attached to substrate..... PHAEOPHYSCIA
- 11(6). Lower surface brown to black..... 12.
11. Lower surface white to pale tan..... 13.
- 12(11). Upper surface without pores; margins of lobes ciliate, lobes 6-20 mm wide, wide marginal zone without rhizines..... PARMOTREMA
12. Upper surface with pores; margins of lobes eciliate; lobes 2-6 mm wide; rhizines to margins..... *Parmelia sulcata*
- 13(11). Thallus K-..... *Physciella chloantha*
13. Thallus K+ yellow..... 14.
- 14(13). Upper cortex without pores; medulla C-..... PHYSCIA
14. Upper cortex with pores; medulla C- or C+ red..... PUNCTELIA

III - SQUAMULOSE LICHENS

1. Fruiting body a perithecium..... 2.
1. Fruiting body an apothecium, or thallus sterile..... 3.
- 2(1). Squamules 1-3 mm wide; spores 8 per ascus, simple, hyaline..... *Placidium lachneum*
2. Squamules 0.5-3.5 mm wide; spores 2 per ascus, muriform, brown.....
..... *Endocarpon pallidulum*
- 3(2). Squamules pink; apothecia along margins of squamules..... *Psora decipiens*
3. Squamules green upper surface, white lower surface; apothecia absent..... sterile CLADONIA

IV - STERILE CRUSTOSE LICHENS

1. Thallus consisting of subsquamulose, sorediate areoles; K+ violet..... *Caloplaca microphyllina*
1. Thallus sorediate or not; K-..... 2.
- 2(1). Thallus without a cortex, sorediate throughout..... 3.
2. Thallus not entirely sorediate, partly corticate..... 4.
- 3(2). Thallus bright yellow..... *Candelariella reflexa*
3. Thallus not yellow..... *Lepraria lobificans*
- 4(2). Thallus black or brown; photobiont a blue-green alga, C+ pink..... *Placynthiella icmalea*
4. Thallus not black or brown; photobiont a green alga, C+ or C-..... 5

- 5(4). Thallus bright yellow, C-..... *Candelariella xanthostigma*
 5 Thallus greenish gray, C+ pink..... *Trapeliopsis flexuosa*.

V - CRUSTOSE LICHENS WITH PERITHECIA (or Perithecia-like Fruiting bodies)

1. Thallus lignicolous or corticolous; asci with >50 simple spores, thallus bright yellow.....
 *Thelocarpon laureri*
 1. Thallus saxicolous; asci with 8 simple spores, thallus not bright yellow..... VERRUCARIA

VI - CRUSTOSE LICHENS WITH APOTHECIA

1. Algal component blue-green..... 2.
 1. Algal component green..... 3.
 2(1). Thallus C+ pink; lignicolous *Placynthiella icmalea*
 2. Thallus C-; saxicolous..... *Pyrenocarpon flotowianum*
 3(1). Apothecia irregular, round or elongated; thallus a thin crust or a discoloration of the substrate, or thallus leprose, entirely sorediate..... ARTHONIA
 3. Apothecia round or disk-like; thallus well developed to absent..... 4.
 4(3). Apothecial rim thalloid, with algal cells (lecanorine)..... 5.
 4. Apothecial rim without algae (lecideine)..... 12.
 5(4). Spores muriform, polarilocular or 1-3 septate..... 6.
 5. Spores non-septate..... 10.
 6(5). Spores muriform..... *Diploschistes muscorum* subs. *muscorum*
 6. Spores polarilocular or 1-3 septate..... 7.
 7(6). Spores polarilocular..... CALOPLACA
 7. Spores 1-3 septate..... 8.
 8(7). Spores hyaline..... *Candelariella aurella*
 8. Spores gray or brown..... 9.
 9(8). Asci dissintegrating, not evident with mature spores..... *Cyphellum tigillare*
 9. Asci evident..... *Amandinea dakotensis*
 10(5). Thallus and apothecia yellow..... *Candelariella aurella*
 10. Thallus and apothecia not yellow (may have yellowish tints)..... 11.
 11(10). Spores 8(12) per ascus..... LECANORA
 11. Spores more than 32 per ascus..... ACAROSPORA
 12(4). Asci with more than 8 spores..... 13.
 12. Asci with 8 spores..... 14.
 13(12). Disc with carbonaceous ridges..... *Polysporina simplex*
 13. Disc without carbonaceous ridges..... SARCOGYNE
 14(12). Spores brown, ellipsoid, 1-septate..... *Amandinea punctata*
 14. Spores hyaline, acicular or oblong ellipsoid, >3 septate..... 15.
 15(14). Epithecium green in K; spores curved, acicular, 3-7 septate, 20-43 µm x 1.5-2.5 µm.....
 *Bacidina egenula*
 15. Epithecium not green in K; spores straight, oblong ellipsoid, 3 septate, 14(17) µm x 3-4 µm.....
 *Bacidia circumspecta*

ANNOTATED SPECIES LIST

ACAROSPORA A. Massal.

Reference: Knudson (2007).

1. Algal layer uneven, jagged, interrupted by hyphal bundles..... *Acarospora glaucocarpa*
1. Algal layer even, not interrupted by hyphal bundles 2.
 2. Thallus white pruinose, areolate..... *Acarospora strigosa*
 2. Thallus epruinose dark brown, rarely olive green, of overlapping, scale-like, squamules.....
..... *Acarospora veronensis*

Acarospora glaucocarpa (Ach.) Körber

Rare on flat beach stones in full sun along the Lake Michigan shoreline (H-2301CM), (H 2314 CFM).

Acarospora strigata (Nyl.) Jatta

Rare on weathered concrete erosion control blocks along the Lake Michigan shoreline (H-2560 M).

Acarospora veronensis A. Massal.

Rare on concrete and on granite boulders along the north side of entrance road at the Nature center. (H-2528 CFM).

AMANDINEA M. Choisy ex Scheid. & H. Mayrh.

Reference: Sheard & May (1997).

- Thallus continuous, greenish to gray; apothecia with a thalloid margin (lecanorine); spores ovoid, constricted at septum 10(12.5) x 5(7.5) μm *Amandinea dakotensis*
Thallus thin and gray, or lacking; apothecia lacking a thalloid margin (lecidine); spores elliptical, not constricted at septum 10(15) x 4(7.5) μm *Amandinea punctata*

Amandinea dakotensis (H. Magn.) P. May & Sheard

Occasional on the smooth, young branches of *Fraxinus pennsylvanica* var. *subintegerrima* (H-2364 CF), *Populus deltoides* (H-2402 C), *Quercus rubra*, *Q. velutina* (H-2290 CF) and *Tilia americana*.

Amandinea punctata (Hoffm.) Coppins & Scheid.

Occasional on weathered wooden telephone poles, a wooden plank (H-2556 CFM), wood picnic tables (H-2316 CF) wood railings (H-2303 CFM) and on *Acer saccharinum* (H-2373 C), *Juniperus horizontalis* (H-2565 CFM) and *Quercus velutina* (H-2377 C).

ARTHONIA Ach.

Reference: Brodo (1968), Thomson (2003).

1. Photobiont chlorococcoid; thallus green, granulose-leprose, entirely sorediate; apothecia irregular to round, blue-gray, pruinose; spores 3-5 septate..... *Arthonia caesia*
1. Photobiont absent; thallus smooth, thin, silvery gray, esorediate; apothecia round to elongated, black, but occasionally appearing pruinose; spores 1 septate..... *Arthonia punctiformis*

Arthonia caesia (Flotow) Körber

Frequent on the lower branches of *Acer saccharinum*, *Betula papyrifera*, *Fraxinus pennsylvanica* var.

subintegerrima, *Juniperus communis*, *Picea* sp., *Populus deltoides* (H-2403 C), *P. tremuloides*, *Prunus serotina*, *Prunus* sp. (H-2336 CF), *Quercus macrocarpa*, *Q. rubra*, *Q. velutina* (H-2376 C), *Rhamnus frangula*, *Salix* sp., *Tilia americana* and *Vitis riparia*.

The blue-gray, pruinose apothecia and green granulose-leprose thallus are good diagnostic features of this lichen.

Herbarium specimen:

On Quercus velutina (W-13860 M) 12 May 1986.

***Arthonia punctiformis* Ach.**

Occasional on the smooth young twigs and branches of *Populus deltoides* (H-2404 M) and *Quercus velutina* (H-2607 CFM).

The thin, silvery gray thallus is a good indicator of this lichen. Brodo (1968) and Thomson (2003) describe a morphologically similar species they also call *Arthonia punctiformis*, but say it has 3(5)-septate spores. The spores of our specimens are 1 septate.

BACIDIA De Not.

***Bacidia circumspecta* (Nyl. ex Vain.) Malme**

Rare on the smooth bark of *Populus tremuloides* (H-2516 CM), (H-2535 CM) in marshy openings in the oak woods.

BACIDINA Vězda

***Bacidina egenula* (Nyl.) Vězda**

Rare on wooden posts (H-2542 CFM) at entrance to Dunes Trail at south part of Nature Center parking lot.

CALOPLACA Th. Fr.

References: Harris, R.C. and D. Ladd (2005), Thomson, J.W. (2003), Wilhelm, G. S. (1998).

1	Thallus corticolous.....	2.
1.	Thallus saxicolous.....	4.
	2(1). Thallus consisting of subsquamulose, sorediate areoles.....	<i>Caloplaca microphyllina</i>
	2. Thallus esorediate.....	3.
3(2).	Thallus dark gray; disk lemon yellow; margins of apothecia gray.....	<i>Caloplaca cerina</i>
3.	Thallus pale to light gray; disk and margins of apothecia yellow-orange; margins paler than disks.....	<i>Caloplaca holocarpa</i>
	4(1). Thallus a thin black crust, or absent, K-.....	<i>Caloplaca cf. feracissima</i>
	3. Thallus yellow or orange, K+ violet.....	5.
5(4).	Thallus pale yellow, thin and poorly developed, mostly around apothecia.....	<i>Caloplaca cf. crenulatella</i>
5.	Thallus well developed.....	6.
	6(5). Thallus orange, placoid to subsquamulose.....	<i>Caloplaca cinnabarina</i>
	6. Thallus pale yellow, thin, continuous to rimose.....	<i>Caloplaca flavovirencens</i>

***Caloplaca cerina* (Ehrh. ex Hedwig) Th. Fr.**

Frequent on the lower trunks and twigs of *Populus deltoides*, *P. tremuloides* (H-2390 F), (H-2392 F), (H-2536 CM), *Salix* species and *Ulmus pumila*.

This lichen colonizes rough lenticels, or old bud remnants, of the otherwise smooth barked *Populus* species. It has a dark gray thallus with K- reaction which can grow to 25 mm (1”) in diameter. The lemon yellow apothecia are K+ violet.

Caloplaca cinnabarina (Ach.) Zahlbr.
Rare on weathered concrete.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:
On concrete (W-13847 M) 12 May 1986.

Caloplaca cf. crenulatella (Nyl.) Oliv
Rare on weathered concrete (H-2558 CF).

Caloplaca cf. feracissima H. Magn.
Rare on concrete, sandstone and other HCl+ cobble.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimens:
On HCl+ cobble (W-13834 M), (W-13843b M) 12 May 1986.

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth.
Rare on weathered concrete ice house foundation (H-2555 CFM).
Typically associating with the lichen *Lecanora dispersa*.

Herbarium specimen:
On concrete (W-13839 M) 12 May 1986.

Caloplaca holocarpa (Hoffm. ex Ach.) M. Wade
Occasional on *Populus deltoides*, *P. tremuloides* (H-2387 C), (H-2390 CF), (H-2515 M), (H-2539 CM), *Pinus resinosa* bark (H-2433 CM) and *Ulmus pumila*.

This lichen colonizes rough lenticels, or old bud remnants, of the otherwise smooth barked *Populus* species.

Herbarium specimen:
On *Populus deltoides* (W-13849 M) 12 May 1986.

Caloplaca microphyllina (Tuck.) Hasse
Rare on base of a sawed *Pinus nigra*, *Prunus* sp. and on *Quercus velutina* (H-2548 M).
Only small, pumpkin colored thalli were found here.

CANDELARIA A. Massal.

Candelaria concolor (Dickson) Stein
Common on charred wood, decorticate logs, weathered concrete and on the trunks and lower limbs of *Acer negundo*, *Betula nigra*, *Betula papyrifera*, *Fraxinus pennsylvanica* var. *subintegerrima*, *Juniperus communis*, *Lonicera maackii*, *Morus alba*, *Pinus resinosa*, *P. strobus*, *Populus alba*, *P. deltoides* (H-2322 CF), *P. tremuloides* (H-2534 CFM), (H-2609 F), *Prunus serotina*, *Quercus rubra*, *Q. velutina*, *Rhamnus frangula*, *Robinia pseudoacacia*, *Salix babylonica*, *Salix* species (H-2367 CF), *Tilia americana*, *Ulmus pumila* and *Vitis riparia*.

Totally sorediate forms of this lichen, referred to as *Candelaria concolor* var. *effusa* (Tuck.) Burnham may intergrade with this species. This lichen may also be mistaken for the crustose lichen, *Candelariella reflexa* (Nyl.) Lettau., which appears as small, finely sorediate areoles. The thallus color of *C. concolor* can range from mustard yellow to gray or greenish yellow depending on whether it was growing in shaded or sunny conditions. The finely divided thallus is usually smooth with sorediate edges.

Herbarium specimen:

On *Quercus velutina* (L-5078 M) 9 November 1969.

CANDELARIELLA Müll. Arg.

Reference: Harris, R.C. and W.R. Buck (1978).

1. Thallus lacking or not evident (growing within substrate); apothecia common, spores 8 per ascus; saxicolous..... *Candelariella aurella*
1. Thallus sorediate, or consisting of spheroid corticate granules; apothecia rare; corticolous..... 2.
 - 2 (1). Thallus consisting of small areoles which break into fine soredia..... *Candelariella reflexa*
 2. Thallus consisting of round corticate granules..... *Candelariella xanthostigma*

Candelariella aurella (Hoffm.) Zahlbr.

Rare on weathered concrete from remnants of the old ice-house (H-2366 CF), (H-2567 CFM) and on limestone.

Herbarium specimen:

On concrete (W-13843a M) 12 May 1986.

Candelariella reflexa (Nyl.) Lettau.

Common on a weathered wood fence and on the trunks of *Juniperus communis*, *Populus deltoides*, *Quercus velutina* (H-2291 CF) and *Salix* sp. (H-2308 CF).

Candelariella reflexa is a western species that has 8 spores per ascus. *C. efflorescens* R. C. Harris & W. R. Buck, is an eastern species with 32 spores per ascus. Based on thallus characters alone, the two species are virtually indistinguishable in their sterile conditions. Since fertile specimens from most of Illinois have 8 spores per ascus all sterile collections are defaulted to *C. reflexa*.

Herbarium specimen:

On *Quercus velutina* (W-13862 M) 12 May 1986.

Candelariella xanthostigma (Ach.) Lettau

Occasional on *Quercus velutina* (H-2541 CFM), (H-2547 M) just outside of the Park Office in the south unit of the park.

While most collections are typically sterile, a few apothecia were present.

Herbarium specimen:

On *Quercus velutina* (L-4096 M) 24 August 1969.

CETRARIA Ach.

Cetraria arenaria Kärnefelt

Rare on sand and *Arctostaphylos uva-ursi* branches (H-2544 CFM).

This lichen grows with the following vascular plant associates: *Arctostaphylos uva-ursi*, *Arabis lyrata*, *Carex richardsonii*, *Carex umbellata*, *Draba reptans*, *Euphorbia corollata*, *Helianthus occidentalis*, *Juniperus horizontalis*, *Opuntia humilis*, *Smilacina stellata*, *Solidago speciosa* and *Sorghastrum nutans*,

and rarely, the lichen *Cladonia subcariosa*.

It has also been found at Hosah Prairie (Zion Park District) on sand. Here it grows with *Coreopsis lanceolata*, *Euphorbia corolata*, *Lezpedeza capitata*, *Liatris aspera*, *Poa compressa* and *Rosa* sp.

This deceptive little lichen often resembles the small, leathery, russet or bronze-colored leaves of bearberry (*Arctostaphylos uva-ursi*), that fell during the previous fall. You need to look close as you may actually be looking at bearberry leaves, and not a lichen. The bearberry leaves have entire edges and prominent, raised veins while the lichen thallus has small fibrils along margins and a smooth surface.

It seems to grow best under the protection of small shrubs: *Arctostaphylos uva-ursi* and *Rosa* species. Due to its' thallus shape, it seems to grow in such a way as to tangle itself around small wood branches, twigs or grasses. Rarely found in open situations and only once with *Cladonia subcariosa*.

Herbarium specimen:

On sand north of Dead River, west of old lookout tower (W-13855 M) 12 May 1986.

CLADONIA P. Browne

References: Ahti, (2000), Hale (1979), Showman, R.E. and D. G. Flenniken (2004), Thomson (2003).

1. Primary squamules absent; podetia abundantly branched; outer surface of cortex lacking, appearing dull and fibrous.....*Cladonia arbuscula*
1. Primary squamules present; podetia, if present, simple to sparingly branched; outer surface of cortex present, appearing smooth and shiny..... 2.
 - 2(1). Squamules strap-shaped, 5mm long, greenish yellow upper side, pale yellow underside and KC+ yellow/orange; podetia rare..... *Cladonia robbinsii*
 2. Squamules short and rounded, white lower surface, upper surface grayish green to brownish or olive and KC-; podetia usually present..... 3.
- 3(2). Podetia forming cups..... 4.
3. Podetia not forming cups..... 7.
 - 4(3). Podetia esorediate; homosekikaica acid present..... *Cladonia homosekikaica*
 4. Podetia sorediate..... 5.
- 5(4). Grayanic acid present..... *Cladonia grayi*
5. Grayanic acid absent..... 6.
 - 6(5). Cryptochlorophaeic acid present..... *Cladonia cryptochlorophaea*
 6. Cryptochlorophaeic acid absent..... *Cladonia chlorophaea*
- 7(3). Podetia sorediate..... 8.
7. Podetia esorediate..... 11.
 - 8(7). Apothecia red; squamules less than 2 mm long, sorediate, entire to lobed; podetia with farinose soredia..... *Cladonia macilenta* var. *bacillaris*
 8. Apothecia brown; squamules and podetia not as above..... 9.
- 9(8). Podetia 35-100 mm long..... *Cladonia subulata*
9. Podetia under 35 mm long..... 10.
 - 10(9.) Squamules less than 2.5 mm long; podetia covered with coarse isidioid granules..... *Cladonia cylindrica*
 10. Squamules more than 2.5 mm long; podetia covered with farinose soredia..... *Cladonia coniocraea*
- 11(7). Apothecia red..... *Cladonia cristatella*
11. Apothecia brown..... 12.
 - 12(11). Squamules well developed, K+ yellow turning to red..... *Cladonia subcariosa*
 12. Squamules small, poorly developed, K-..... *Cladonia peziziformis*

Cladonia arbuscula (Wallr.) Flotow

Rare on sand in the antedunal region. (H-2363 CFM).

Ultimate branches are oriented in one direction, usually in groups of 3's and 4's at each terminal node, and the axils of the branches are open. This lichen was formerly known as *Cladina arbuscula*. Found

only once with several *Cladoniae* species.

Cladonia chlorophaea (Flörke ex Sommerf.) Sprengel
Occasional on sandy humus.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimens:

- On sandy humus (L-925) 28 April 1967.
- On sandy humus (L-958) 14 May 1967.
- On sandy humus (L-1642) 14 October 1967.
- On sandy humus (L-1651) 2 December 1967.
- On sandy humus L-3015) 2 November 1968.
- On sandy humus (L-3028, L-3030) 16 March 1969.
- On sandy humus (L-3040) 6 April 1969.
- On sandy humus (W-13101 M) 28 September 1985.
- On sandy humus (WM-13838 M), (WM-13857 M) 12 May 1986.
- On sandy humus (WL-15822 M) 5 November 1987.

Cladonia coniocraea (Flörke) Sprengel
Rare on sand in antedunal area (H-2379 C) and on a moss covered log.

Cladonia cristatella Tuck.
Occasional on sandy soil, on decorticate logs (H-2296 CF), (H-2302 CF) in an oak savanna, on a wooden post (H-2361 C) and on sawed *Pinus* tree stumps. This is the familiar "British Soldier" lichen.

Herbarium specimens:

- On ground (L-1641 M), (L-1647 M) 2 December 1967.
- On ground (L-3023 M) 16 March 1969.
- On ground (L-5408 M) 31 May 1972.
- On a tree stump (W-13107 M) 28 September 1985.

Cladonia cryptochlorophaea Asahina
Rare on sandy humus.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimens:

- On sandy humus (L-3025 M) 16 March 1969.
- On sandy humus (L-3036 M) 6 April 1969.

Cladonia cylindrica (A. Evans) A. Evans
Rare on sand (H-2312 C) and on a weathered branch in sand (H-2304 CM).

Herbarium specimen:

- On sand in the antedunal area (W-13103 M) 28 September 1985.

Cladonia grayi G. K. Merr. ex Sandst.
Rare on sand.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On sand in the antedunal area (W-13105 M) 28 September 1985.

Cladonia homosekikaica Nuno

Rare on sand.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimens:

On sand in the antedunal area (WM-13856 M) 12 May 1986.

On sand in the antedunal area (WL-15823 M) 15 November 1987.

Cladonia macilenta var. ***bacillaris*** (Genth) Schaerer

Occasional on a *Pinus* log (H-2527 CM), decorticate logs, sand in the antedunal region and on bark and soil.

Cladonia peziziformis (With.) J. R. Laundon

Occasional on sawed *Pinus* tree stumps and on sandy humus (H-2305 CM), (H-2434 C).

C. peziziformis is often parasitized by the crustose lichen ***Diploschistes muscorum*** (Scop.) R. Sant. subsp. ***muscorum***. The latter species eventually becomes an independent thallus.

Herbarium specimens:

On sandy soil (L-3016 M) 2 November 1968

On gravel (L-3047 M) 20 April 1969

On sandy humus (W-13858 M) 12 May 1986.

Cladonia robbinsii A. Evans

Occasional on sand (H-2612 M) in the antedunal region.

Growing with the following vascular associates: *Arctostaphylos uva-ursi*, *Arenaria stricta*, *Euphorbia corollata*, *Helianthus occidentalis* and *Opuntia humilis*.

Herbarium specimens:

On sandy soil (L-3022 M) 16 March 1969.

On sandy soil (L-907 M) 28 April 1967.

On sandy soil (L-924 M) 1 May 1967.

On sandy soil (L-934 M) 7 May 1967.

On sandy soil (L-991 M) 20 May 1967.

On sand (W-13106 M) 28 September 1985.

Cladonia subcariosa Nyl.

Occasional on sand in antedunal region (H-2330 CF).

Cladonia subulata (L.) F. H. Wigg.

Occasional on sawed Pine tree stumps, bark and soil (H-2439 F), a weathered branch in sand (H-2306 CM), (H-2307 CM), a decorticate oak log (H-2312 CM) and sand in antedunal region.

Herbarium specimens:

On sand (W-13102 M) 28 September 1985.

On sandy humus (W-13837 M) 12 May 1986.

CYPHELIUM Ach.

Cyphelium tigillare (Ach.) Ach.

Rare on decorticate *Pinus resinosa* branches (H-2309 CF). Found only once here.

DIPLOSCHISTES Norman

Diploschistes muscorum (Scop.) R. Sant. subsp. *muscorum*

Occasional on lichens (lichenicolous), mosses (muscolous) and sand (arenicolous) (H-2613 M) in the antedunal region.

This lichen is parasitic on the lichen genus *Cladonia* and eventually becomes independent. Also known from sandy soils in 13 counties scattered throughout Wisconsin (Thomson 2003). Harris and Ladd (2005) report it as locally frequent in Missouri on lichen and moss. Also found at Braidwood Dunes and Savanna Nature Preserve in Will County on the same substrates.

Chemical reactions: cortex K+ yellow; medulla K+ violet.

Herbarium specimens:

On ground (L-3032 M) 6 April 1969.

On humus at low dunes slope (W-13859 M) 12 May 1986.

ENDOCARPON Hedwig

Endocarpon pallidulum (Nyl.) Nyl.

Occasional on weathered concrete (H-2530 M) and beach stones. This species, which lack rhizines, is similar to *E. pusillum* Hedw., a species with rhizines on the lower surface.

Herbarium specimens:

On weathered concrete (W-13841 M) 12 May 1986.

On HCl+ cobble (W-13836 M) 12 May 1986.

EVERNIA Ach.

Evernia mesomorpha Nyl.

Rare on a branch of *Juniperus horizontalis* with the lichen *Physcia adscendens*.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On *Juniperus horizontalis* north of the lookout tower (W-13854 M) 12 May 1986.

FLAVOPARMELIA Hale

Flavoparmelia caperata (L.) Hale

Common on the trunks and upper branches of *Juniperus communis*, *Picea* species, *Populus alba*, *Prunus serotina*, *Quercus macrocarpa*, *Q. velutina* (H-2295 CF) and *Tilia americana*.

Although this species has pseudocyphellae on thallus lobes, the medulla is C-, separating it from *Flavopunctelia flaventior*.

Herbarium specimen:

On *Quercus velutina* (W-13098 M) 28 September 1985.

FLAVOPUNCTELIA (Krog) Hale

References: Hale, M.E., Jr. (1979), Thomson, J.W. (2003).

- 1. Upper cortex with white pores (pseudocyphellae); soralia laminal and marginal, rounded..... *Flavopunctelia flaventior*
- 1. Upper surface with sparse and inconspicuous white pores; soralia marginal and crescent shaped... *Flavopunctelia soledica*

Flavopunctelia flaventior (Stirton) Hale

Common on lower branches of *Populus alba*, *P. deltoides*, *Quercus macrocarpa* (H-2378 C) and *Q. velutina* (H-2319 CF), (H-2324 CF), (H-2399 C).

Herbarium specimen:

On *Quercus velutina* (W-13093 M) 28 September 1985.

Flavopunctelia soledica (Nyl.) Hale

Rare on *Quercus velutina*.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On *Quercus velutina* (W-13096 M) 28 September 1985.

HYPERPHYSICIA Müll. Arg.

Hyperphyscia adglutinata (Flörke) H. Mayrh. & Poelt

Occasional on the lower trunks and branches of *Betula* species, *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus alba* (H-2326 CF), *P. deltoides*, *P. tremuloides* (H-2608 CM), *Quercus velutina* (H-2333 CF), *Salix* species, *Tilia americana* and *Ulmus pumila*.

This sorediate, tightly adnate lichen often resembles a crustose lichen. In cold weather the upper cortex can be nearly black in color.

LECANORA Ach.

References: Brodo (1995), Harris et al. (2000), Wilhelm, G. S. (1998).

- 1. Thallus saxicolous (or on rusted steel)..... 2.
- 1. Thallus corticolous or lignicolous..... 3.
- 2(1). Thallus areolate, with lobed margins, yellow green; apothecia 0.5-2 mm in diameter, disk yellow or brown, margin concolorous with thallus..... *Lecanora muralis*
- 2. Thallus thin, whitish gray or lacking; apothecia 0.5-1.2 mm in diameter, disk brownish, margin white..... *Lecanora dispersa*
- 3(1). Thallus with yellowish tints; usnic or isousnic acid present..... 4.
- 3. Thallus without yellowish tints; usnic and isousnic acid absent..... 7.
- 4(3). Thallus leprose, entirely sorediate; a white fibrous prothallus usually present; apothecia rare..... *Lecanora thysanophora*
- 4. Thallus esorediate, fibrous prothallus lacking; apothecia common..... 5.
- 5(4). Apothecial margin irregular, disappearing with age..... *Lecanora symmicta*

- 5. Apothecial margin well developed..... 6.
- 6(5). Apothecial margin round, ecorticate, appearing sorediate or granular; usnic acid.....
..... *Lecanora strobilina*
- 6. Apothecial margin smooth; isousnic acid *Lecanora saligna*
- 7(3). Asci with 12-32 spores..... *Lecanora sambuci*
- 7. Asci with 8 spores..... 8.
- 8(7). Apothecia small, less than .25 mm diameter; spores 3 x 5(6) μm long..... *Lecanora hypopta*
- 8. Apothecia larger, more than .25 mm diameter; spores 10(12) x 5 μm long..... *Lecanora hagenii*

Lecanora dispersa (Pers.) Sommerf.

Occasional on weathered concrete (H-2557 CFM), limestone (H-2397 C), flat beach stones (H-2315 CF) and rusted steel.

Herbarium specimen:

On concrete (W-13842 M) 12 May 1986.

Lecanora hagenii (Ach.) Ach.

Rare on an old stump (H-2553 CM).

Lecanora hypopta (Ach.) Vainio

Rare on old wood.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On bark (W-15819 M) 15 November 1987.

Lecanora muralis (Schreber) Rabenh.

Rare on concrete. This species was growing tightly appressed to a vertical concrete wall near a drain pipe. (NOTE: no collection was made here).

There is a collection representing Lake County, IL, by Richard D. Hyerczyk (H-1980 M) collected on 24 April 2005 from a brick at Ryerson Woods, near Riverwoods. This is the representative sample of this lichen for Lake County, Illinois.

Lecanora saligna (Schrader) Zahlbr.

Rare on weathered wood with the lichen *Amandinea punctata*.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimens:

On weathered wood (W-15817 M), (W-15818 M), (W-15820 M) 15 November 1987.

Lecanora sambuci (Pers.) Nyl.

Rare on *Pinus sylvestris* and on the smooth bark of *Populus tremuloides* (H-2537 CFM), (H-2538 M) in openings in the oak woods.

Herbarium specimen:

On *Pinus sylvestris* bark (W-15821 M) 18 October 1987.

Lecanora strobilina (Sprengel) Kieffer

Occasional on the lower trunk of *Acer saccharinum* (H-2371 CF), *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus tremuloides* (H-2389 C), *Prunus pumila*, *Quercus rubra* and *Q. velutina* (H-2398 C)

Lecanora symmicta (Ach.) Ach.

Occasional on a weathered wood fence, fallen branches, *Pinus strobus*, *Populus deltoides* (H-2375 C), *P. tremuloides*, *Prunus pumila*, *Quercus velutina* (H-2380 C), (H-2603 M) and *Salix* species.

Herbarium specimens:

On *Juniperus horizontalis* (W-13852 M), (W-13853 M) 12 May 1986.

On *Populus deltoides* (W-13850 M) 12 May 1986.

Lecanora thysanophora Harris

Rare on the lower branches and trunk of *Populus tremuloides* in openings in oak woods and on *Quercus velutina* (H-2551 M) in oak savannas.

This distinct, green sorediate lichen is said to be easily recognized in the field by its' white prothallus, which was lacking on our flora.

LEPRARIA Ach.

Lepraria lobificans Nyl.

Rare at the base of *Quercus rubra* (H-2602 M).

MELANELIXIA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Melanelixia subaurifera (Nyl.) O. Blanco *et al.*

Rare on the lower trunks and branches of *Acer saccharinum* and *Quercus velutina* (H-2293 CF).

The thallus is shiny, brownish or olive brown, usually sorediate and isidiate. Often overlooked, as it matches the color of the bark it is growing on.

PARMELIA Ach.

Parmelia sulcata Taylor

Common on weathered rocks and on the trunks and branches of *Acer saccharinum* (H-2372 C), *Fraxinus pennsylvanica* var. *subintegerrima*, *Juniperus communis*, *Populus deltoides*, *P. tremuloides*, *Prunus* sp., *Quercus macrocarpa*, *Q. velutina* (H-2292 CF), (H-2294 CF), *Salix interior* and *Tilia americana*.

Thallus color ranges from whitish mineral gray to bluish gray. Lobes linear, 2-5 mm broad, with square ends, often turning brownish. Angular or elongated white makings on lobe tips. Soredia forming on ridges, often linear, marginal or laminal. Chemistry: cortex K+ yellow; medulla K+ yellow to red.

Herbarium specimens:

On bark (L-911 M), (L-916 M), (L-920 M) 28 April 1969.

On oak (L-1646 M) 2 December 1969.

On *Quercus macrocarpa* (W-13092 M) 8 September 1985.

On *Quercus velutina* (W-13095 M) 8 September 1985.

PARMOTREMA A. Massal.

References: Hale, M.E., Jr. (1979), Harris, R.C. and D. Ladd (2005).

1. Thallus esorediate, upper surface smooth; medulla KC red, K-..... *Parmotrema submarginale*

1. Thallus soresiate, upper surface with reticulate cracks; medulla K+ yellow to red.. *Parmotrema reticulatum*

Parmotrema reticulatum (Taylor) M. Choisy

Rare on *Quercus velutina* (H-2329 CF).

A pink colored medulla was found in a few spots on this collection. This may be a chemical reaction due to the presence of salazinic acid and some other compound in the normally white medulla.

Parmotrema submarginale (Michaux) DePriest & B. Hale

Rare on *Quercus velutina* (H-2450 M).

PELTIGERA Willd

Peltigera didactyla (With.) J. R. Laundon

Rare on sand.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On sand (L-3035 M) 6 April 1969.

PHAEOCALICIUM A. F. W. Schmidt

Phaeocalicium polyporaenum (Nyl.) Tibell

Rare on the polyporous fungus, *Trichaptum biforme* (Fr.) Ryvardeen, which was growing on *Populus tremuloides* (H-2604 CM) in a marshy opening in the oak woods.

PHAEOPHYSCIA Moberg

Reference: Esslinger, T.L. (1978).

- | | | |
|-------|---|-----------------------------------|
| 1. | Thallus esorediate..... | <i>Phaeophyscia ciliata</i> |
| 1. | Thallus soresiate..... | 2. |
| 2. | Medulla white; thallus margins lined with pale cortical hairs..... | <i>Phaeophyscia. hirsuta</i> |
| 2(1). | Medulla orange-red; thallus margins not lined with pale cortical hairs..... | |
| | | <i>Phaeophyscia. rubropulchra</i> |

Phaeophyscia ciliata (Hoffm.) Moberg

Occasional on limestone boulders and on the lower trunks of *Acer negundo*, *Populus deltoides* (H-2386 CF), *P. tremuloides* (H-2540 CM), *Quercus velutina* and *Ulmus pumila*

The thallus color can range from very dark gray to light gray and may resemble *Physcia stellaris*, a species that is K+ yellow with white/tan lower surface.

Herbarium specimen:

On *Populus deltoides* (W-13848 M) 12 May 1986.

Phaeophyscia hirsuta (Mereschk.) Essl.

Occasional on weathered concrete foundation (H-2533 CM), *Populus deltoides* (H-2374 CF) (H-2388 C), *Quercus macrocarpa* and *Q. velutina*.

The thallus color can range from very dark gray to light gray and may resemble a *Physcia*. The pale, cortical hairs along the edge of the thallus are good field characteristics of this lichen.

Phaeophyscia rubropulchra (Degel.) Essl.

Occasional on the lowermost trunks of *Acer negundo*, *A. saccharinum*, *Betula papyrifera*, *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus alba*, *P. deltoides*, *P. tremuloides*, *Prunus serotina*, *Quercus macrocarpa*, *Q. velutina* (H-2317 CF), *Salix babylonica* and *Salix* species.

This species grows on tree trunks in a zone from ground level to up to 1/3 meter (12 inches) high. The thallus color can range from greenish gray to gray. Although the orange-red medulla of this lichen is distinctive, some parts are occasionally white.

PHYSICIA (Schreber) Michaux

Reference: Thomson, J.W. (1963).

1. Thallus esorediate..... *Physcia stellaris*
1. Thallus soresiate..... 2.
 - 2(1). Thallus lobes narrow and finely branched; lobes up to 1 mm wide, eciliate; soredia terminal and marginal..... *Physcia millegrana*
 2. Thallus lobes broader, not finely branched; tips of lobes inflated and hood-shaped, ciliate; soredia present beneath the inflated lobe tips..... *Physcia adscendens*

Physcia adscendens (Fr.) H. Olivier

Occasional on charred wood, weathered wood fencing, weathered concrete foundation (H-2529 CM), limestone boulder and beach stones, and on the lower trunks and branches of *Betula nigra* (H-2332 CF), *Juniperus horizontalis*, *Populus deltoides* (H-2360 CF), *P. tremuloides* (H-2382 C), *Prunus*, *Quercus rubra*, *Q. velutina* (H-2335 CF) and *Salix* species

Herbarium specimen:

On *Salix* species (W-13094 M) 28 September 1985.

Physcia millegrana Degel.

Common on charred wood, decorticate logs, weathered wood fencing and on the lower trunks and branches of *Acer negundo*, *A. saccharinum*, *Betula nigra*, *Fraxinus pennsylvanica* var. *subintegerrima*, *Lonicera maackii*, *Morus alba*, *Picea* species, *Pinus resinosa*, *P. strobus*, *Populus alba*, *P. deltoides*, *P. tremuloides*, *Prunus serotina*, *Quercus macrocarpa*, *Q. rubra* (H-2311 CF), *Q. velutina*, *Salix babylonica*, *Salix* species. (H-2369 CF), *Tilia americana*, *Ulmus pumila* and *Vitis riparia*.

Herbarium specimens:

On *Quercus velutina* (L-915 M), (L-917 M), (L-918 M), (L-919 M) 28 April 1967.

On *Quercus velutina* (L-2054 M) 31 August 1968.

On *Quercus velutina* (L-3014 M) 2 November 1968.

On *Populus deltoides* (L-3017 M), (L-3018 M) 2 November 1968.

On *Quercus velutina* (L-3043 M), (L-3046 M) 6 April 1969.

On mossy bark (L-3059 M), (L-3060 M) 11 May 1969.

Physcia stellaris (L.) Nyl.

Common on the lower trunks and branches of *Acer negundo*, *A. saccharinum* (H-2370 C), *Betula papyrifera*, *Betula pumila*, *Fraxinus pennsylvanica* var. *subintegerrima* (H-2401 C), *Morus alba*, *Pinus resinosa*, *Populus alba*, *P. deltoides*, *P. tremuloides* (H-2395 FC), *Prunus pumila*, *Rhamnus frangula*, *Robinia pseudoacacia*, *Salix babylonica*, *Salix* species (H-2368 CF), *Tilia americana*, *Quercus macrocarpa*, *Q. rubra*, *Q. velutina*, *Ulmus pumila* and *Vitis riparia*.

Rarely found on tree trunks except where it develops on lenticels, especially as seen on *Quercus velutina*. More common on horizontal branches. Some thalli were large, growing up to 38 mm (1.5") in diameter.

Herbarium specimen:

On *Quercus velutina* (W-13097 M) 28 September 1985.

PHYSICIELLA Essl.

Physciella chloantha (Ach.) Essl.

Occasional on a limestone boulder, charred wood, weathered concrete foundation (H-2531CFM) and on the lower trunks and branches of *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus tremuloides*, *Quercus rubra*, *Q. velutina* and *Salix* species.

In winter weather the upper cortex can be nearly black in color.

Herbarium specimen:

On *Populus alba* (WM-13851) 12 May 1986.

PHYSCONIA Poelt

Physconia leucoleiptes (Tuck.) Essl.

Rare on the lower bases of *Populus alba* (H-2323 CF), *P. deltoides* (H-2381 C), *P. tremuloides* and *Quercus velutina*.

This lichen is gray to brown when dry, but can be green when wet. The lower surface is black with tan margins. It was usually found growing less than .6 meters (2') up from the base of trees in open situations. Calcium oxalate crystals form pruina along the lobes.

PLACIDIUM A. Massal. (Breuss)

Placidium lachneum (Ach.) Breuss

Occasional on gravel and sand (H-2327 CF), (H-2435 C).

This lichen associates with a vascular flora consisting of *Arctostaphylos uva-ursi*, *Artemisia caudata*, *Coreopsis lanceolata*, *Euphorbia corollata*, *Liatris aspera*, *Panicum implicatum* and *Solidago nemoralis* in a community referred to as the rear dunes.

Although this lichen usually grows as a flat crust upon the upper surface of the sand here, it was occasionally found growing in small mounds measuring 25 mm (1") high x 63 mm (2-1/2") long. It seems to grow over heaps of mosses, eventually completely covering them and forming these mounds.

Herbarium specimens:

On sand (L-3055 M) 27 April 1969.

On sand (W-13104) 28 September 1985.

PLACYNTHIELLA Elenkin

Placynthisella icmalea (Ach.) Coppins & P. James

Rare on decorticate *Pinus* species logs (H-2526 CM) and *Quercus* species logs (H-2552 CFM).

The thallus consists of brown isidioid granules that react C+ pink. Spores are simple, hyaline and measure 5 x 12.5 µm w/oil droplets.

POLYSPORINA Vězda

Polysporina simplex (Davies) Vězda

Rare on a granite rock (H-2563 M) amongst various beach stones on sand along beach west of dunes.

Spores measured 1.25 x 3.125 µm.

PSORA

Psora decipiens (Hedwig) Hoffm.

Rare on stable sand (H-2448 CF), (H-2449 CF) north of Dead River along the beach in a community referred to as the rear dunes. Associating with a vascular flora consisting of *Arctostaphylos uva-ursi*, *Artemisia caudata*, *Solidago graminifolia* and *Schizachyrium scoparium* and the lichen *Placidium lachneum*.

The squamules are pinkish to flesh-colored, with white edges and round, black marginal apothecia.

Herbarium specimen:

On stable sandy soil (L-3054 M) 27 April 1969.

PUNCTELIA Krog

Reference: Wilhelm, G. and D. Ladd (1992).

1. Thallus without isidia; medulla C-..... *Punctelia bolliana*
1. Thallus isidiate; medulla C+ red..... *Punctelia rudecta*

Punctelia bolliana (Müll. Arg.) Krog

Occasional on the lower trunks and branches of *Populus deltoides*, *Quercus macrocarpa* and *Q. velutina* (H-2321 CF), (H-2550 M).

Herbarium specimens:

On *Quercus velutina* (W-13099 M) 28 September 1985.

On *Quercus velutina* (L-932 M) 7 May 1967.

On *Quercus velutina* (L-1652 M) 2 December 1967.

On *Quercus velutina* (L-3034 M) 6 April 1969.

Punctelia rudecta (Ach.) Krog

Common on the lower trunk of *Quercus velutina* (H-2318 CF), (H-2320 CF), (H-2549 M).

Herbarium specimens:

On *Quercus velutina* (W-13100 M) 28 September 1985.

On *Quercus velutina* (L-4095 M) 24 August 1969

PYRENOCARPON Trevis.

Pyrenocarpon flotowianum (Hepp) Trevis.

Rare on limestone revetments along the lakeshore at Winthrop Harbor (H-2400 M), (H-2545 CFM).

According to Dr. Matthias Schultz, University of Hamburg, Hamburg, Germany, pers. comm., one should "look for sessile apothecia with finally expanded (and here and there even umbonate) disks and a small-areolate crustose thallus". "The small areoles may sometimes be dissolved into granules and sometimes encrusted by silt making it hard to discern. The ecology fits very well." *Pyrenocarpon flotowianum* has been described from river margins in Switzerland. These collections represent a new addition to the lichen flora of North America.

RAMALINA Ach.

Ramalina americana Hale

Rare on the lower trunks of *Populus deltoides* (H-2427 C), (H-2564 M) and *P. tremuloides*.

Small thalli were found here measuring up to 1 cm (3/8") in length. This lichens associates with with *Candelaria concolor*, *Physcia stellaris* and *Physciella chloantha* on Cottonwoods (*Populus deltoides*).

Similar sized thalli were found just north of this location at Spring Bluff (Forest Preserve District of Lake County) on *Populus deltoides* trunk. The esorediate thallus is grayish green in color.

SARCOGYNE Flotow

Reference: Harris, R.C. and D. Ladd (2005).

- 1. Apothecia pruinose..... *Sarcogyne regularis*
- 1. Apothecia epruinose..... *Sarcogyne privigna*

Sarcogyne privigna (Ach.) A. Massal.

Rare on a concrete wall along the lakefront (H-2561 CM)

Sarcogyne regularis Körber

Rare on a concrete wall along the lakefront (H-2559 CM), (H-2566 CM).

The pruinose disks are bluish colored, the result of a thin layer of calcium oxalate crystals. Some populations have what appears to be part of the thallus "pulling up" alongside of the proper margin. This gives this collection the appearance of a lecanorine apothecia. The thallus is epruinose which suggests it may be *Sarcogyne privigna* (Ach.) A. Massal., an species which is usually found on non-calcareous rocks. Since it grows amongst *Sarcogyne regularis*, I have defaulted it to *S. regularis* and consider it to be some kind of intermediate species between the two.

Herbarium specimen:

On gravel (WL-15824) 15 November 1987.

THELOCARPON Nyl. *ex* Hue

Thelocarpon laureri (Flotow) Nyl.

Rare on burnt wood and lignin and on *Pinus* bark (H-2523 CM).

Found only once here.

TRAPELIOPSIS Hertel & Gotth. Schneider

Trapeliopsis flexuosa (Fr.) Coppins & P. James

Occasional on burnt wood and lignin, sawed Pine tree stumps, weathered wood (H-2436 C), decorticate logs (H-2298 CF), (H-2299 CF) and on *Populus tremuloides*.

USNEA P. Dill. *ex* Adans.

Usnea strigosa (Ach.) Eaton subsp. ***major*** (Michaux) I. Tav.

Rare on a dead limb of *Quercus macrocarpa*, on the east side of Dead River. (With usnic and squamatic acids.)

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimen:

On *Quercus macrocarpa* (W-13091 M) 28 September 1985.

VERRUCARIA Schrader

Reference: Breuss (2007).

1. Thallus tan to brown, areolate to subsquamulose, with isidia-like protuberances along margins; usually sterile..... *Verrucaria furfuracea*
1. Thallus pale white or gray, thin, continuous to areolate, developing mostly around the perithecia, or thallus absent; isidia-like protuberances lacking; usually fertile 2.
 - 2(1). Exciple colorless, clypeus black, dome-shaped; perithecial wall lacking at base.....
..... *Verrucaria muralis*
 2. Exciple and clypeus black, forming an entire perithecial wall..... *Verrucaria calkinsiana*

Verrucaria calkinsiana Servít

Occasional on HCl+ rocks.

This species is included here as a herbarium specimen only; its' presence could not be verified by the author during fieldwork.

Herbarium specimens:

On flat beach stones (WM-13835 M) 12 May 1986.

On concrete (WM-13844 M) 12 May 1986.

Verrucaria furfuraceae (de Lesd.) Breuss

Rare on a concrete wall along the lakeshore (H-2568 FM).

According to Breuss in this species is the isidioid counterpart of *Verrucaria macrostroma* Dufour ex DC.

Herbarium specimen:

On flat beach stones (WM-13846 M) 12 May 1986.

Verrucaria muralis Ach.

Rare on flat beach stones (H-2313 CF).

XANTHOMENDOZA S. Kondr. & Kärnefelt

References: Harris, R.C. and D. Ladd (2005), Lindblom, L. (2006).

1. Thallus lobes narrow, 0.3-0.5 mm wide; soredia formed at tips and lower surfaces of lobes.....
.....*Xanthomendoza fulva*
1. Thallus lobes broader, 0.8-1.4 mm wide; soredia marginal or labriform..... 2.
 - 2(1). Soredia formed in marginal crescent-shaped slits between the upper and lower cortex; lobes closely adnate with appressed lobe tips; soredia farinose..... *Xanthomendoza fallax*
 2. Soredia marginal or beneath lobe tips; lobes loosely adnate to raised; soredia blastidiate, granular with a cortical surface..... *Xanthomendoza ulophylloides*

Xanthomendoza fallax (Hepp) Söchting, Kärnefelt & S. Kondr.

Occasional on weathered concrete and the lower trunks of *Acer negundo*, *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus alba*, *P. deltoides* (H-2300 CF), *P. tremuloides* (H-2394 CF), *Quercus macrocarpa*, *Q. velutina*, *Salix babylonica*, *Salix pumila*, *Tilia americana* and *Ulmus pumila*.

The color of this species can vary, ranging from pumpkin-orange to yolk yellow depending on whether it was growing in sunny or shaded conditions. The crescent-shaped soralia are good field indicators of this species.

Xanthomendoza fulva (Hoffm.) Söchting, Kärnefelt & S. Kondr.

Occasional on the lower trunks and branches of *Fraxinus pennsylvanica* var. *subintegerrima*, *Lonicera maackii*, *Populus alba*, *P. deltoides* (H-2384 C), *P. tremuloides* and *Quercus velutina* (H-2437 F).

This lichen has narrower lobes than the former and latter species found here, and is usually more orange in color.

Xanthomendoza ulophyllodes (Gyelnik) Søchting, Kärnefelt & S. Kondr.

Occasional on weathered concrete (2532 CM), (H-2365 F) and the lower trunks and branches of *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus deltoides* (H-2334 CF), (H-2383 C), *P. tremuloides*, *Quercus velutina* (H-2438 F), *Salix babylonica* and *Salix* species.

The color of this species ranges from gray to yolk yellow. The blastidiate soredia originate from marginal, rarely laminal or labriform, soralia.

XANTHORIA (Fr.) Th. Fr.

Xanthoria polycarpa (Hoffm.) Rieber

Frequent on the trunks and lower branches of *Acer negundo*, *Fraxinus pennsylvanica* var. *subintegerrima*, *Populus deltoides* (H-2385 C), *P. tremuloides* (H-2391 C), (H-2393 CF), *Quercus velutina*, *Salix* species and *Ulmus pumila*.

This lichen seems to prefer habitats along Lake Michigan where it is frequently found, even on trees along Chicago's lakefront (Hyerczyk, 2005). It can also be found further inland, but it is rare. The thallus is typically yellow-orange, but can range from dingy yellow to gray. The apothecial disk is orange, but the margin is usually concolorous with the thallus. The abundant apothecia can often obscure the entire thallus.

Appendix II.

G.P.S. coordinates for locations of populations of *Cetraria arenaria* Kärnefelt at Illinois Beach State Park. A total of 13 populations were found.

42.41432 N, -87.80504 W

42.41102 N, -87.80505 W

42.40899 N, -87.80572 W

42.41160 N, -87.80492 W

42.40948 N, -87.80558 W

42.41324 N, -87.80505 W

42.41020 N, -87.80557 W

42.41478 N, -87.80485 W

42.41310 N, -87.80577 W

42.41745 N, -87.80476 W

42.41078 N, -87.80506 W

42.42055 N, -87.80515 W

42.42136 N, -87.80795 W

Appendix III.

**SPRING BLUFF FEN – 26 species in 18 genera
Forest Preserve District of Lake County, Illinois**

AMANDINEA M. Choisy *ex* Scheid. & H. Mayrh.

Amandinea dakotensis (H. Magn.) P. May & Sheard

Amandinea punctata (Hoffm.) Coppins & Scheid.

ARTHONIA Ach.

Arthonia caesia (Flotow) Körber

BACIDINA Vězda

Bacidina egenula (Nyl.) Vězda

CALOPLACA Th. Fr.

Caloplaca cerina (Hedwig) Th. Fr.

Caloplaca holocarpa (Hoffm. *ex* Ach.) M. Wade

CANDELARIA A. Massal.

Candelaria concolor (Dickson) Stein

CANDELARIELLA Müll. Arg.

Candelariella aurella (Hoffm.) Zahlbr.

Candelariella reflexa (Nyl.) Lettau.

FLAVOPARMELIA Hale

Flavoparmelia caperata (L.) Hale

HYPERPHYSICIA Müll. Arg.

Hyperphyscia adglutinata (Flörke) H. Mayrh. & Poelt

LECANORA Ach.

Lecanora symmicta (Ach.) Ach.

MELANELIXIA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Melanelixia subaurifera (Nyl.) O. Blanco *et al.*

PARMELIA Ach.

Parmelia sulcata Taylor

PHAEOPHYSCIA Moberg

Phaeophyscia hirsuta (Mereschk.) Essl.
Phaeophyscia pusilloides (Zahlbr.) Essl.
Phaeophyscia rubropulchra (Degel.) Essl.

PHYSCIA (Schreber) Michaux

Physcia adscendens (Fr.) H. Olivier
Physcia millegrana Degel.
Physcia stellaris (L.) Nyl.

PHYSCIELLA Essl.

Physciella chloantha (Ach.) Essl.

PHYSCONIA Poelt

Physconia leucoleiptes (Tuck.) Essl.

RAMALINA Ach.

Ramalina americana Hale

XANTHOMENDOZA S. Kondr. & Kärnefelt

Xanthomendoza fallax (Hepp) Søchting, Kärnefelt & S. Kondr.
Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr.

XANTHORIA (Fr.) Th. Fr.

Xanthoria polycarpa (Hoffm.) Rieber

Appendix IV.

**HOSAH PRAIRIE – 38 species in 24 genera
Zion Park District
Zion, Illinois**

ACAROSPORA A. Massal.

Acarospora strigata (Nyl.) Jatta
Acarospora veronensis A. Massal.

AMANDINEA Choisy *ex* Scheid. & H. Mayrh.

Amandinea punctata (Hoffm.) Coppins & Scheid.

ARTHONIA Ach.

Arthonia caesia (Flotow) Körber.

CALOPLACA Th. Fr.

Caloplaca cerina (Ehrh. *ex* Hedwig) Th. Fr.
Caloplaca cf. feracissima H. Magn.
Caloplaca microphyllina (Tuck.) Hasse.

CANDELARIA A. Massal.

Candelaria concolor (Dickson) Stein.

CANDELARIELLA Müll. Arg.

Candelariella aurella (Hoffm.) Zahlbr.
Candelariella reflexa (Nyl.) Lettau.

CETRARIA Ach.

Cetraria arenaria Kärnefelt.

CLADONIA P. Browne

Cladonia cristatella Tuck.
Cladonia grayi G. K. Merr. *ex* Sandst.
Cladonia peziziformis (With.) J. R. Laundon.
Cladonia robbinsii A. Evans
Cladonia subcariosa Nyl.
Cladonia subulata (L.) F. H. Wigg

DIPLOSCHISTES Norman

Diploschistes muscorum (Scop.) R. Sant. subsp. *muscorum*

ENDOCARPON Hedwig

Endocarpon pallidulum (Nyl.) Nyl.

FLAVOPARMELIA Hale

Flavoparmelia caperata (L.) Hale.

FLAVOPUNCTELIA (Krog) Hale

Flavopunctelia flaventior (Stirton) Hale

HYPERPHYSICIA Müll. Arg.

Hyperphyscia adglutinata (Flörke) H. Mayrh. & Poelt.

LECANORA Ach.

Lecanora dispersa (Pers.) Sommerf.

Lecanora sambuci (Pers.) Nyl.

Lecanora symmicta (Ach.) Ach.

MELANELIXIA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch

Melanelixia subaurifera (Nyl.) O. Blanco *et al.*

PARMELIA Ach.

Parmelia sulcata Taylor.

PHAEOPHYSCIA Moberg

Phaeophyscia pusilloides (Zahlbr.) Essl.

Phaeophyscia rubropulchra (Degel.) Essl.

PHYSICIA (Schreber) Michaux

Physcia adscendens (Fr.) H. Olivier

Physcia millegrana Degel.

Physcia stellaris (L.) Nyl.

PLACIDIUM A. Massal. (Breuss)

Placidium lachneum (Ach.) Breuss

PSORA

Psora decipiens (Hedwig) Hoffm.

PUNCTELIA Krog

Punctelia rudecta (Ach.) Krog

VERRUCARIA Schrader

Verrucaria calkinsiana Servit.

XANTHOMENDOZA S. Kondr. & Kärnefelt

Xanthomendoza fallax (Hepp) Søchting, Kärnefelt & S. Kondr.

XANTHORIA (Fr.) Th. Fr.

Xanthoria polycarpa (Hoffm.) Rieber