

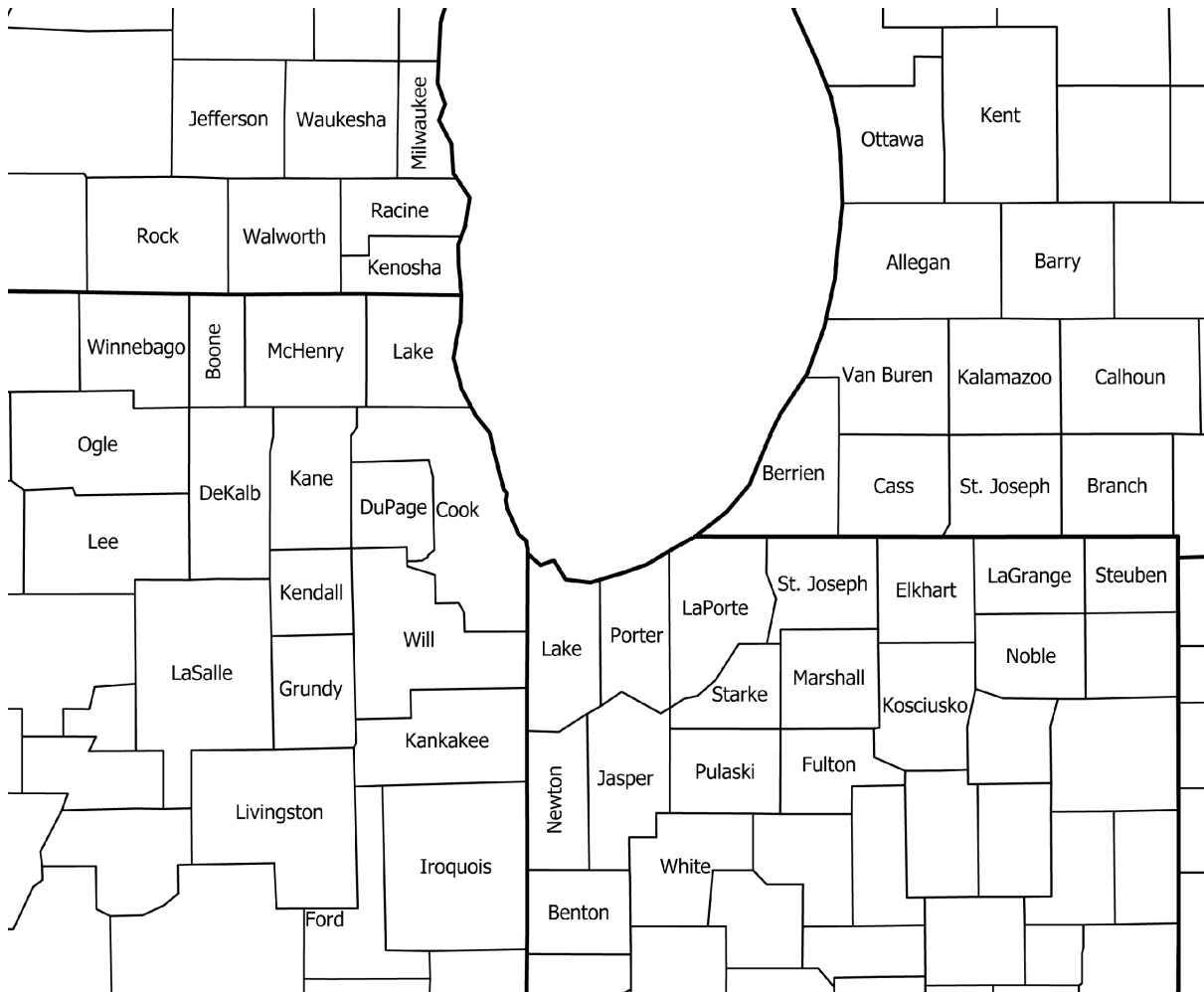


LICHENS

OF THE

SOUTHERN LAKE MICHIGAN REGION

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The botanist who engages in this pursuit finds winter also a season of flowers and the snow cannot hide the tree lichens or the inhabitants of the exposed tops of old fences; and if he keeps indoors, his woodpile is rich in species. Another pleasure is added to his walks and to his hours of study, and he attains through these humble plants a yet firmer hold on these satisfying charms of Nature.

Edward Tuckerman-1841¹

INTRODUCTION

This flora presents an annotated catalogue of the lichenized fungi currently known from in and around the 53-county Southern Lake Michigan Region. This region includes the Michigan counties of Allegan, Barry, Berrien, Branch, Calhoun, Cass, Kalamazoo, Kent, Ottawa, St. Joseph, and Van Buren; Jefferson, Kenosha, Milwaukee, Racine, Rock, Walworth, and Waukesha, counties in Wisconsin; Boone, Cook, DeKalb, DuPage, Ford, Grundy, Iroquois, Kane, Kankakee, Kendall, Lake, LaSalle, Lee, Livingston, McHenry, Ogle, Will, and Winnebago counties in Illinois; and Benton, Elkhart, Fulton, Jasper, Kosciusko, Lake, LaGrange, LaPorte, Marshall, Newton, Noble, Porter, Pulaski, St. Joseph, Starke, Steuben, and White counties in Indiana. These 53 counties in four states circumscribe an area about the size of state of Maine or the country of Portugal—about 35,000 miles² (90,650 kilometers²).

¹Shared with the author by the American lichenologist, Robert Egan, at a luncheon at the Field Museum upon reception of the donation of his first-class herbarium, which he had created at the University of Nebraska, Omaha, but for which said university was no longer interested in providing support.

This region is somewhat larger than the 22-county area circumscribed by Wilhelm & Rericha (2017) for the Chicago Region, which region has been the area included in previous unpublished iterations of this effort. Within the Southern Lake Michigan Region is a great metropolitan district that includes the city of Chicago as well as several smaller cities and numerous suburbs. Ambient to the metropolitan portions, the landscapes are largely corporate-scale agricultural districts. The lichen substrates are much under the influence of air pollution from both urban and agricultural districts. At the southern end of Lake Michigan, there are significant concentrations of aeri-ally dispersed toxicants, particularly those such as lead and a mixture of polycyclic aromatic hydrocarbons that originate from coke oven emissions. The whole region is laced by express ways that are incessantly burdened with high-speed trucks and passenger cars. Probably as significant as their exhaust emissions is the entrained dusts and toxicants that blow off the road as a result of high-speed traffic (Wilhelm *et al.* 1986).

Although most of the shoreline areas of Lake Michigan are visited from time to time with such air pollution, the winds prevail out of the west and southwest and drift over into northern Indiana and Michigan, which may be one reason why in windward counties² such as St. Joseph County, Indiana, and Berrien County Michigan we experience bathos in lichen richness and fecundity. No doubt the massive agricultural districts, which characterize particularly the western and southern portions of the region, contribute nitrogenous pollutants long known to be inimical to lichen growth. Virtually all of our lichen substrates are chronically overlaid by this pall of potential toxicants, both organic and inorganic.

Geographically, the region lies in an area a degree or two along the line of 41 degrees of north latitude—in the same general latitude as northwestern Spain, central Italy, Bulgaria, Georgia, Uzbekistan, and Hokaido. The Southern Lake Michigan Region is entirely within the area covered by the latter stages of the continental glacier that had receded fully from the landscape after the last emptying of the remnants of Glacial Lake Chicago, Lake Algoma, about 3,000 years ago. The oldest landscape in the region is in the far wester region, which has been without ice for a little more than 100,000 years. Illinois Beach State Park, was fully formed in its present condition fewer than 2,000 years ago. Most of the region has been without ice for less than 15,000 years.

Aboriginally, the region includes the western fringes American Beech forests, eastern and northern fringes of the prairies, and southern reaches of the boreal forests. The species generally have affinities with the lichens of the northeastern United States. Nested within these districts are bogs with northern affinities, lake plains and beach-ridge plains with Atlantic coast affinities, and prairie with western affinities.

With regard to saxicolous habitats, lichen substrates include siliceous and base-rich boulders, a few breaks and pavements of mostly Silurian-age dolomite; particularly in our western sector are outcrops of Ordovician sandstone and limestone. Our most common saxicolous substrates are

²These counties lie within the geographic meteorological zone known colloquially as the Michiana Snow Belt.

various base-rich aggregates of brick and mortar as well as flagstone construction materials. There is a diverse array of corticolous substrates, with trees probably far more diverse and frequently disposed than was the case at the time of settlement. Very little of this presettlement landscape has survived to the present day.

Much of the area south of the region was grassland, far remote from the southern forests and the significant districts of rock outcrop so characteristic of unglaciated regions. At the present time, there are far more trees per unit area, which potentially provide a linkage to the corticate substrates than existed through past millennia. For this reason, in part at least, we have noticed some lichen species that not long ago were restricted to districts in the vicinity of the Ohio River watershed.

In comparison with many areas of north America, the Southern Lake Michigan Region hardly could be described as the garden spot of the world's lichens. Nowhere do lichens festoon every possible substrate such as one can see in parts of south of the glacial boundaries in Illinois and Indiana, and those boreal districts north of the transition zone in Michigan and Wisconsin. Perhaps this is why the lichens of this region are so poorly collected—no sex appeal! Historically, most lichenologists have focused on the delicious array of lichens found just north, south, east, and west of the region.

The Southern Lake Michigan Region at the time of settlement was prevailingly perennial grassland with inclusions of savanna, open woods, and dune land. There are large guilds of southern and southeastern species that are missing from our flora as well as large guilds of boreal and northeastern species. Nevertheless, Calkins (1896),³ who first provided a compendium on the lichens of "Chicago and Vicinity" noted that "this territory might be . . . sufficiently large to furnish an attractive field and ample material for the investigation and study of lichens, . . ." He lamented, however, that:

" . . . with the exception of the most common species, a few of which are cosmopolitan in their habits, the explorer will meet with a disappointment not to be experienced further south and west in regions where the conditions of the soil, the geological features of the country, and the climate favor a larger development of species . . . However, . . . enough varieties occur [locally] to form an excellent preliminary course of study [when the student] has become familiar with the Parmelias and Physcias which are so abundant on oaks and other trees along the lake shore and in the 'wooded islands of the prairies.'"

The Southern Lake Michigan Region by 1896, of course, had come to include one of the great metropolitan regions of North America, replete with the ubiquitous combustion of coal and its sulfur-rich effusions. Tillage agriculture and heavy grazing dominated the purlieus to urban

³William Wirt Calkins (1842–1914) was born in Farm Ridge Township in LaSalle County, Illinois. He worked in the lumber business and served as a Justice of the Peace. He wrote a well-regarded history of the 104th Illinois Regiment, a volunteer unit during the American Civil War. He was a founder of the Ottawa Academy of Sciences, and his interest in natural history yield the only early lichenological treatment for this region.

edifice and structure. Much tree planting had occurred throughout the rural populated districts. Calkins was compelled to apologize for the ostensibly depauperate nature of the Chicago lichen flora, having believed it once to have been notably richer:

“Localities in and around Chicago formerly rich in lichenose vegetation are now destitute of it. The species were and are mostly corticolous, with a few on rocks, where exposed, and even on the boulders of the prairies. But the tidal waves of civilization have changed the conditions under which lichens grow, and to find them abundantly we must seek the country where the air on which they feed is pure and substrates suitable.”

Chicago and vicinity, as Calkins described, included significantly less area than this flora encompasses. It comprised all of Cook and DuPage counties, a sliver of Kane County, and the northern 8 townships of Will County, all in Illinois, as well as the northern half of Lake County, Indiana. Wilhelm (1998), one hundred years later, as best as one could given the changes in taxonomy and nomenclature that had occurred, compared the flora as he recorded it from the same region described by Calkins.⁴

As Wilhelm interpreted it, Calkins had reported 125 species in 1896 and that 147 species had been discovered in the same area during the last decade of the Twentieth Century. Of the contemporary coterie of species, only 71 species were in the area at the turn of the previous century. Wilhelm concluded that while simple diversity had not declined over the century, there were definite indications that significant changes had occurred in composition and thallus physiognomy. Many species were no longer evident; some others appeared to have entered the flora in more recent times. Larger foliose and fruticose lichens, which were considered common by Calkins, had been replaced by small-foliose and crustose species, although these forms have made a bit of a comeback over the last several years; lichenized fungi with cyanobacterial photobionts also appeared to have much diminished over the century, particularly in the era following World War II.

Calkins also provided an annotated list of the lichens of LaSalle County which J. W. Huett included in his comprehensive “Natural History of LaSalle County, Illinois”, which he produced in two volumes; the lichens appeared in part 2 (Calkins & Huett 1898). There, he presented 128 lichen species, of which 16 were not included by Calkins in his Flora of Chicago and Vicinity. Lichens from LaSalle County are also included among the exsiccatae.

⁴ Calkins left several sets of *exsiccatae* and miscellaneous specimens to which he had applied names. Wilhelm examined at that time those housed at the Field Museum (F), the University of Illinois (ILL), the Chicago Academy of Science (CACS), and the New York Botanical Garden (NY). In 1985, the Late Richard C. Harris provided the author with an annotated list of the *exsiccatae* and specimens of Illinois at NY along with the names originally deployed by Calkins. About half of these preserved specimens out-lived the nomenclature and species concepts of the 19th century and enabled one to construct a flora of the region at that time that is comparable to today’s nomenclature and understanding. Without specimens, of course, it would be impossible to understand the lichen flora as documented in Calkins’s time or to develop any real understanding of population and species composition changes.

Due to rather intensive surveys over the last 35 years or so, many more lichens have been collected in those same counties. In 1987 Wilhelm & Lampa (1987) presented 60 species of macrolichens (those with a lower cortex) from DuPage County. Since then, 41 additional macrolichen species have been documented from DuPage County, most of which cannot be attributed to having been overlooked or from taxonomic confusion. Hyerczyk (1997a) produced a flora of Livingston County, listing 61 species, which effort has not been enhanced through contemporary surveys.

Although the statistics continue to change as more archival specimens are examined and more contemporary specimens are discovered and preserved, it is quite clear that the species richness has increased markedly since the 1998. Currently, there are 276 species known from Cook and DuPage counties alone. A comparison between the two counties represents of coefficient of similarity between the two $[(2C/A+B)*100]$ of 81.

In 1998, Hyerczyk (1998a, 1998b, 1998c, & 1998d) surveyed the lichens in four of the major divisions of the Cook County Forest Preserves. Sixty-five species were recorded from 29 of the forest preserves in the Palos Division, with an average of 18 ± 6 species per preserve. He recorded 77 species from the Sag Division, its 19 preserve units with 18 ± 9 species. In the North Branch Division, he recorded 27 species, with an average of 11 ± 4 species from its 9 preserves. The 12 preserves in the Skokie Division, from which he recorded a total of 55 species, averaged 18 ± 8 species per preserve. While this survey has not been redone, one can be fairly certain that the number of species discovered today in the forest preserves has increased notably.

Surveys of several individual preserves, parks, and natural areas also have been surveyed in recent years (Hyerczyk 1997b, 1998b, 2005, 2008a, and 2008b; Wetmore 1986), but until 25 years or so ago, many if not most of the counties in the Southern Lake Michigan Region had never been visited in any systematic or intensive way by a lichenologist.

Some of the specimens discovered in recent years vindicate earlier reports of Calkins, but many others reflect a more recent origin in the region. The species composition of the lichen flora continues to change. Indeed, since Wilhelm published in 1998 a comparison of the contemporary flora with Calkins's flora, the inhabitancy and diversity of lichens has increased notably. At that time [25 years ago], for example, the large shield lichens such as *Flavoparmelia caperata*, *Parmotrema reticulatum*, and *Punctelia rudecta* were seen only infrequently; *Parmotrema austrosinense*, unreported by Wilhelm (1998) is now frequent. While air quality has changed for the better in recent years, lichen species richness remains inversely proportional to toxic emissions, such as levels of NO_2 (Perlmutter *et al.* 2018). Lichenologists and biologists born after the mid-1980's, however, may not realize the progress that has been made with regard to air quality—to which lichens are known to

be quite sensitive.⁵ There are simply too few studies with which to ascertain changes and young botanists have no life experience even to have formed and undisciplined impression.

THE SOUTHERN LAKE MICHIGAN REGION FLORA

This flora of the 53-county region, a much larger area that Calkins (1896) and Wilhelm (1998) discussed, presents 626 species of prevalingly lichenized ascomycetous fungi recognized at present time. Lichenized basidiomycetes have yet to be discovered regionally.

The central Midwest states have been poorly collected so it is yet unclear as to which species known from neighboring districts are here but unknown. For this reason, we are including species reported from ambient areas to alert local students of their local significance should they encounter them. Such species have been keyed out and included with short descriptions. Evidence of residency in the region is characterized four ways. Those species in the first three categories are rendered in **bold**, standard typeface:

- Three hundred ninety-three (393) lichens are represented by at least one record in the herbarium at the Morton Arboretum (MOR) from at least one of the 53 counties of the Southern Lake Michigan Region, most of which were collected within the last 35 years. We believe that several of these are yet to be described and some have given “herbarium names.” There remain numerous specimens that are so unknown to the literature that they are not mentioned here. To a large extent, lichenology in North America is still on the frontiers of understanding.
- Another 67 are reported only from some other herbarium, and likely to be correct; these are appended in the county distribution summaries for each species by its Index Herbariorum acronym. For those herbaria where I have personally examined a specimen for the record, other than those at MOR, the herbarium acronym is codified with asterisk (*).
- Yet another 20 are reasonably reliable literature records for which voucher specimens have not yet been discovered.
- One hundred thirty-nine (139) species from just outside the region are included in order to alert students of the flora of their presence should they discover them locally and to make the flora a little more useful to other Midwestern lichenologists. These species are rendered in ***bold italic*** typeface.

⁵According to the Energy Information Administration, sulfur dioxide emissions from U.S. power plants, for example, were reduced by 82 percent between 2007 and 2017, and nitrite emissions were reduced by 58 percent—evidently as a result of the Clean Air Act of 1970 and its amendments. Carbon monoxide and ozone concentrations have also decreased. Also, compared to 1970 vehicle models, new cars, SUVs and pickup trucks are roughly 99 percent cleaner for common pollutants (hydrocarbons, carbon monoxide, nitrogen oxides and particle emissions), while annual vehicle miles traveled have dramatically increased. If I might say, as someone who lived through the 1950's and '60's, prior to the battery of legislative initiatives of the 1970's, whatever one's philosophy generally on government environmental regulation, I can assure you that we do not want to go back to that time! Sadly, it is not clear what impact agricultural biocides and fertilizers, dispersed at the industrial scale, are having on the lichen populations, but the lichen flora of corporate-scale agricultural districts is disappointingly depauperate, given their remoteness from the city and suburbs.

At this writing, I have seen specimens for only three species representing all 53 counties: *Candelaria concolor*, *Flavoparmelia caperata* and *Punctelia rudecta*. The known occurrence of lichens locally is uneven, based at this point on the fact that the visitation by lichenologist is greatly uneven. While DuPage and Cook counties each have at least 211 species documented, thirteen counties have fewer than one fourth that number, with an overall average of about 78 records per county, so there clearly is a need for more floristic work locally. The more frequently vouchered lichens include *Athallia feracissima*, *Candelaria concolor*, *Candelariella efflorescens*, *Candelariella*, *Chrysothrix caesia*, *Flavoparmelia caperata*, *Flavopunctelia soledica*, *Hyperphyscia adglutinata*, *Hyperphyscia confusa*, *Myriolecis dispersa*, *Parmelia sulcata*, *Parmotrema reticulatum*, *Phaeophyscia ciliata*, *Phaeophyscia pusilloides*, *Phaeophyscia rubropulchra*, *Physcia adscendens*, *Physcia millegrana*, *Physcia stellaris*, *Physciella chloantha*, *Physconia leucoleiptes*, *Punctelia bolliana*, *Punctelia rudecta*, *Squamulea subsoluta*, *Xanthomendoza fallax*, and *Xanthomendoza fulva*.

Of the 480 species documented with at least one archival or contemporary specimen from the 53-county region, with the exception of about 35 species (8%) that can be described as frequent or common; most of our lichens can be said to be uncommon or rare. Some of these uncommon species, such as *Arthonia granosa*, *Canoparmelia texana*, *Parmotrema austrosinense*, *Parmotrema arnoldii*, *Teloschistes exilis*, and *Xanthoria parietina* are likely to be wholly adventive in the region. Frye, Muscavitch, & Goffinet (2021) are convinced, for example, that *Parmotrema austrosinense* and *Teloschistes chrysophthalmus* are newcomers to Connecticut.

Other species, such as *Canoparmelia texana*, *Crespoa crozalsiana*, *Pyxine soledata*, and *Pyxine subcinerea* may be adventive as well. It is known that certain common species, such as *Xanthocarpia crenulatella* and *X. feracissima*, are found locally almost exclusively on weathered concrete and flagstone, and that others, such as *Vilophora microphyllina* and *Amandinea punctata*, have exploited weathered fence rails and old wood. They are probably far more common in the Southern Lake Michigan region today than they were in the pre-settlement era. With the exception of a few obvious species such as *Arthonia granosa*, which is fairly clearly adventive from Europe (Brodo 1967), we will not speculate at this time as to which species represent allochthonous elements; such a designation is risky, given the quality of our baseline information.

Several non-lichenized ascomycetous genera are included here because they are regularly collected with lichens, look like lichens, and generally are not treated as a group elsewhere in the popular fungal literature: *Didymosphaeria*, *Hysterium*, *Hysterobrevium*, *Hysterographium*, *Julella*, *Kirschsteiniethelia*, *Mycocalicium*, *Mycoglaena*, *Mycomicrothelia*, *Mycoporum*, *Myriangium*, *Naetrocymbe*, and *Phaeocalicium*. Indeed some ascomycetous genera, such as *Arthonia*, have both lichenized and non-lichenized species; all of the local species of facultatively lichenized genera are treated here, so lichenization itself seems to be an artificial, polyphyletic organizational taxonomic feature. This treatment also includes a few of the better known lichenicolous fungi.

Organization of the Flora

The floristic treatment begins with an artificial key to the families and is followed by an even more artificial key to the genera. The latter is followed by an alphabetical catalog of the genera and their species; keys to the species immediately follow the genus entry. Family keys to genera are intercalated alphabetically within the text. For each genus, the family is listed, along with the known photobiont. For many species, a brief description is provided, although the presentation of descriptive features, like everything else, is in progress.

For each species, there is a list of regional counties from which the lichen is known. Counties for which there are either herbarium records or literature citations are shown in lower case and underscored; those known only from literature reports are rendered without underlining. In the instances where Calkins (1896) did not mention a county location, but described a lichen's distribution as "common throughout our area" or something to that effect, we have taken the liberty of assuming that he at least had seen the alleged lichen in Cook or LaSalle counties.

The NY code refers to the New York Botanical Garden, wherein there is set of Calkins's *exsiccati*, which the late Richard Harris examined in 1992 during his review of an early version of this flora; all NY designations represent his determinations. None of the *exsiccatae* sets that we have seen have specimen numbers that correlation to any other. Each set appears to be a unique assembly. The set at ILL still needs contemporary inspection.

Lichens known to us from districts near the Southern Lake Michigan Region, but not known to be within the 53-county region, have their names presented in *bold italics*. We have not generally included species confined to the unglaciated districts of southern Illinois or Indiana, those from the boreal districts of Wisconsin or Michigan, nor those from the Great Plains.

Nomenclature

Generally, the nomenclature approximates that provided by Esslinger (2021), although there are some genera where molecular segregates are too poorly correlated with phenotypical differences to render certain segregates as helpful. Generally, we have deployed the various *Caloplaca* segregates of recent years where the molecular results seem to correlate with morphological features; this is an effort to help organize our understanding of this remarkably complex genus.

In addition to the valid lichen names⁶ applied to greater Southern Lake Michigan Region lichens, there are numerous synonyms, misapplied names, and orthographic anomalies that we have, perhaps too cavalierly, subsumed under a more valid name or closely allied taxon. In some

⁶Given the state of our science, with very few exceptions, we suspect that nomenclatural validity is still up in the air. There have been recent treatments for a few genera, but most are awaiting critical reevaluation in North America.

instances, these names may be misidentifications or legitimate older names that are known now to have narrower distributions or species circumscriptions. In other instances they may be related species or names relevant to taxonomic problems that are discussed. All of these names appear in the "Index of Synonyms and Misapplied Names" section and are indexed to the species under which they are discussed.

For each taxon, we have attempted to provide an etymology. Such information on lichen names is scant in the literature. Rarely do lichenologists explain the origin of epithets when they name a species. Yet, very often the epithet is descriptive of the lichen so knowing the linguistic roots can be interesting as well as informative. Frequently, notable lichenologists have been honored in a lichen name, but if no one notes who the person was, the honor is empty. In some cases, the epithet might even seem nonsensical, or its origin ambiguous. To wit, for quite a while we had blithely assumed that for *Cladonia rei*, the epithet was the genitive singular of some recondite derivation of the Latin 3rd declension noun *res, rei*, a word of such complexity that it used to give the author fits in Latin translation. Actually it is an honorific derivative of an Italian botanist by the name of Giovanni Re! Necessarily, our interpretations of epithet origin are sometimes fanciful, derived from a certain experience with the lichen and a limited knowledge of Greek and Latin. Except for obvious cases where the meaning seems certain, we must assure the reader that we have had no more access to the mind of the one who named it than readily available sources can provide. The etymological remarks are offered with the idea that fellow lichenologists will proffer suggestions or emendations.

Lichen Substrates and Habitats

Locally, lichenized fungi are prevalingly corticolous and lignicolous species, but there are significant occurrences of saxicolous species on both siliceous and base-rich native stone as well as weathered concrete. Less frequent are terricolous species that grow on sand and clayey till. Rather rare are muscicolous, lichenicolous, and fungicolous species. A very few species, mostly in the genus *Verrucaria*, grown on inundated or regularly wet rocks. Not foliicolous lichens have been discovered, but we have also seen some Quixotic lichens with facultative occurrences on old clothing, iron, and other unlikely substrates.

CORTICOLOUS AND LIGNICOLOUS LICHENS

Tree Bark is the most abundant habitat for lichens locally. Ubiquitous on small, smooth-barked branches one encounters *Amandinea dakotensis*, *Candelaria concolor*, *Chrysothrix caesia*, *Hyperphyscia adglutinata*, *Phaeophyscia ciliata*, *Phaeophyscia pusilloides*, *Physcia millegrana*, *Physcia stellaris*, *Physciella chloantha*; *Candelariella efflorescens*, *Flavoparmelia caperata*, *Parmelia sulcata*, *Parmotrema reticulatum*, *Phaeophyscia rubropulchra*, *Physconia leucoleiptes*, *Punctelia rudecta*, *Xanthomendoza fallax*, and *Xanthomendoza fulva* are more likely on the larger branches and boles.

Frequent species include *Amandinea punctata*, *Arthonia dispersa*, *Arthonia granosa*, *Flavopunctelia flaventior*, *Flavopunctelia soledica*, *Hyperphyscia confusa*, *Lecanora strobilina*, *Lecanora symmicta*,

Phaeophyscia hirsuta, *Phaeophyscia kairamoi*, *Physcia adscendens*, *Physcia aipolia*, *Punctelia rudecta*, *Punctelia bolliana*, *Scoliciosporum chlorococcum*, *Xanthomendoza ulophyllodes*, and *Xanthomendoza weberi*. Infrequent corticolous species include *Coppinsidea croatica*, *Evernia mesomorpha*, *Hyperphyscia syncolla*, *Lecanora hybocarpa*, *Lepraria caesiella*, *Lepraria finkii*, *Myelochroa aurulenta*, *Physcia americana*, *Punctelia missouriensis*, *Traponora varians*, and *Xanthomendoza hasseana*. At the bases of trees in wooded areas, often among mosses such as *Anomodon attenuatus*, frequent inhabitants include *Cladonia caespiticia*, *Cladonia cryptochlorophaea*, *Cladonia grayi*, *Cladonia ochrochlora*, *Cladonia ramulosa*, *Cladonia rei*, and *Phaeophyscia rubropulchra*.⁷

Decorticate and decaying logs in wooded areas are frequently inhabited by *Cladonia chlorophaea*, *Cladonia cristatella*, *Cladonia grayi*, *Cladonia macilenta bacillaris*, and *Cladonia rei*; less frequently by *Cladonia beaumontii*, *Cladonia coniocraea*, *Cladonia cryptochlorophaea*, *Cladonia cylindrica*, *Cladonia didyma*, *Cladonia fimbriata*, *Cladonia ochrochlora*, *Cladonia parasitica*, *Cladonia ramulosa*, *Placynthiella icmalea*, *Trapeliopsis flexuosa*, and *Trapeliopsis granulosa*.

Frence Rails, untreated, and weathered wood made, usually either of *Juniperus virginiana* or *Maclura pomifera*, are inhabited frequently by *Amandinea punctata*, *Athallia holocarpa*, *Candelaria concolor*, *Cladonia cristatella*, *Cladonia macilenta bacillaris*, *Cyphelium tigillare*, *Flavoparmelia caperata*, *Hyperphyscia adglutinata*, *Hyperphyscia confusa*, *Lecanora saligna*, *Lecanora strobilina*, *Lecanora symmicta*, *Melanelixia subaurifera*, *Myriolecis hagenii*, *Placynthiella icmalea*, *Parmelia sulcata*, *Phaeophyscia ciliata*, *Phaeophyscia pusilloides*, *Physcia millegrana*, *Physcia stellaris*, *Physciella chloantha*, *Trapeliopsis flexuosa*, *Trapeliopsis granulosa*, *Villoghora microphyllina*, and *Xanthomendoza hasseana*; less frequently by *Micarea byssacea*, *Parmotrema reticulatum*, *Ramalina americana*, *Thelocarpon laureri*, and *Traponora varians*.

Generally, lignicolous species are early sere species locally. On an untreated piece of pine board situated in partial shade, the following species were present after 8 years, their thallus size shown in parentheses: *Candelaria concolor* (to 0.5 cm), *Hyperphyscia confusa* (to 0.5 cm), *Phaeophyscia pusilloides* (to 1 cm), *Physcia millegrana* (to 0.6 cm), *Physcia stellaris* (to 1 cm), *Physciella chloantha* (to 0.5 cm).

Locally, some lichens have shown a proclivity for certain trees. For example we have only seen *Arthothelium spectabile*, *Julella fallaciosa*, and *Lithothelium septemseptata* on *Acer saccharum*, with *Julella fallaciosa* regularly on *Quercus alba*. *Constrictolumina cinchonae* and *Leptorhaphis epidermidis* have only be taken from species of *Betula*. *Carya ovata* regularly is inhabited by *Arthonia radiata*, *Graphis scripta*, and *Pertusaria pustulata*; less often by *Lecanora thysanophora*, *Pertusaria macounii*, *Rinodina freyi*, and *Strigula americana*. *Anisomeridium biforme*, *Anisomeridium polypori*, *Arthonia atra*, *Hypocenomyce scalaris*,

⁷Will-Wolf et al. (2015) regards to following corticolous species as “tolerant” of acidic air pollution the region of New York and New England: *Candelaria concolor*, *Cladonia cristatella*, *Flavopunctelia flaventior*, *Hyperphyscia adglutinata*, *Parmelia sulcata*, *Phaeophyscia pusilloides*, *Phaeophyscia rubropulchra*, *Physcia millegrana*, *Physciella chloantha*, *Physconia leucoleiptes*, *Xanthomendoza fallax*. While no such disciplined studies have been conducted in the Southern Lake Michigan Region, one might infer that those species that are common or ubiquitous here exhibit some degree of tolerance for poor air quality.

Lecanora thysanophora, and *Punctelia caseana* are most often on *Quercus alba* or *Quercus macrocarpa*; *Arthonia dispersa*, *Arthonia radiata*, *Candelariella efflorescens*, *Candelariella*, *Lecanora thysanophora*, and *Pertusaria pustulata* are characteristic of the bark of *Quercus rubra* or *Quercus velutina*. Several species are denizens of *Populus* species: *Athallia pyracea*, *Caloplaca ahtii*, *Caloplaca cerina*, *Caloplaca ulmorum*, *Leptorhaphis atomaria*, and *Myrolecis sambuci*.

SAXICOLOUS LICHENS

The prevailing saxicolous substrates locally are exposed or shaded dolomitic exposures, flagstone, and weathered concrete; other base-rich substrates include pebbles. Less frequent are sandstone outcrops and granitic erratics.

Concrete, weathered for several years, is our commonest base-rich substrate. The more ubiquitous lichens include *Bacidia egenula*, *Candelariella aurella*, *Endocarpon petrolepideum*, *Myrolecis dispersa*, *Physcia adscendens*, *Protoparmeliopsis muralis*, *Squamulea subsoluta*, *Xanthocarpia crenulatella*, *Xanthocarpia feracissima*, *Verrucaria calkinsiana*, *Verrucaria muralis*, *Verrucaria furfuracea* and *Verrucaria schindleri*. Commonly, these are accompanied by erstwhile corticolous species, including *Candelaria concolor*, *Phaeophyscia pusilloides*, *Physcia millegrana*, and *Physciella chloantha*. Less frequent lichens on concrete include *Caloplaca atroalba*, *Gyalolechia flavovirescens*, *Rusavskia elegans*, *Thelidium zwackhii*, and *Verrucaria muralis*.

Limestone, prevailingly dolomite, is the more frequent aboriginal substrate locally for saxicolous species. In addition to the species mentioned for concrete, the more frequent lichens on exposed surfaces include *Acarospora strigata*, *Dermatocarpon muhlenbergii*, *Phaeophyscia kairamoi*, *Placynthium nigrum*, *Polysporina simplex*, *Sarcogyne regularis*, *Verrucaria fayettensis*, *Verrucaria nigrescentoidea*, and *Verrucaria sordida*. Lichens of more shaded carbonate rock include *Bilimbia sabuletorum*, *Botryolepraria lesdainii*, *Dermatocarpon muhlenbergii*, *Dermatocarpon multifolium*, *Flavoplaca citrina*, *Phaeophyscia adiaastola*, and *Psorotichia schaeereri*. Much less frequent species include *Circinaria contorta*, *Enchylium bachmanianum*, *Endocarpon pallidulum*, *Leptogium cyanescens*, *Scytinium dactylinum*, and *Willeya diffractella*.

Related to lichens of base-rich rock are those that grow on pebbles, associated with exposed dolomite and usually admixed with calcareous sand in dry prairies where vascular vegetation is sparse. These lichens include *Dermatocarpon dolomiticum* and *Endocarpon pallidulum*, with *Heppia conchiloba*, *Placidium squamulosum*, and *Psora decipiens*, on the intervening soils. A unique variant of this community is the lake plain prairies at Illinois Beach State Park, in Lake County, Illinois, where, on stable sand and gravel grow *Cetraria arenaria*, *Cladonia cylindrica*, *Cladonia homosekikaica*, *Cladonia robbinsii*, *Cladonia subcariosa*, *Diploschistes muscorum*, *Heppia conchiloba*, *Placidium squamulosum*, and *Psora decipiens*.

Granitic Erratics with lichens are usually exposed to full sun, with the more common species being *Acarospora fuscata*, *Acarospora veronensis*, *Caloplaca sideritis*, *Circinaria caesiocinerea*, *Dimelaena oreina*, *Physcia dakotensis*, *Physcia thomsoniana*, *Protoparmeliopsis muralis*, *Trapelia coarctata*, and *Xanthoparmelia*

cumberlandia. Less frequent are *Acarospora americana*, *Lichenothelia scopularia*, *Physcia subtilis*, *Rinodina cana*, *Rinodina destituta*, *Rufoplaca oxfordensis*, *Scoliosporum umbrinum*, *Trapelia glebulosa*, *Xanthoparmelia mexicana*, and *Xanthoparmelia plittii*.

Sandstone with exposed surfaces, largely confined to our western sector, are most frequently inhabited by *Acarospora fuscata*, *Trapelia coarctata*, and *Xanthoparmelia cumberlandia*; less frequently by *Buellia badia*, *Cladonia beaumontii*, *Diploschistes scruposus*, *Endocarpon pallidulum*, *Lepraria neglecta*, *Porpidia crustulata*, *Porpidia subsimplex*, *Stereocaulon saxatile*, *Rhizoplaca subdiscrepans*, *Rinodina cana*, *Trapelia glebulosa*, *Xanthoparmelia australasica*, *Xanthoparmelia mexicana*, and *Xanthoparmelia plittii*. More shaded surfaces are inhabited by *Dermatocarpon muhlenbergii*, *Lepraria hodkinsoniana*, *Cladonia dimorphoclada*, and *Phaeophyscia insignis*; much less so by *Lepraria vouauxii*, *Psilolechia lucida*, and *Sarcogyne simplex*.

TERRICOLOUS AND MUSCICOLOUS LICHENS

Sandy Soil is the habitat for numerous species of lichens, most commonly *Cladonia subtenuis*, *Cladonia chlorophaea*, *Cladonia cristatella*, *Cladonia cryptochlorophaea*, *Cladonia furcata*, *Cladonia grayi*, *Cladonia rei*, *Cladonia subcariosa*, and *Peltigera praetextata*. Less frequent are *Cladonia arbuscula*, *Cladonia mitis*, *Cladonia rangiferina*, *Cladonia beaumontii*, *Cladonia conista*, *Cladonia piedmontensis*, *Cladonia pleurota*, *Cladonia pyxidata*, *Cladonia robbinsii*, *Cladonia sobolescens*, *Cladonia strepsilis*, *Cladonia symphycarpa*, *Diploschistes scruposus*, *Peltigera didactyla*, *Peltigera evansii*, *Peltigera rufescens*, and *Placynthiella uliginosa*.

Clayey Soils of the till plain, well leached and in areas where vascular vegetation is sparse, inevitably associated with the grass *Danthonia spicata*, include commonly *Cladonia chlorophaea*, *Cladonia cristatella*, *Cladonia cryptochlorophaea*, *Cladonia furcata*, *Cladonia grayi*, *Cladonia peziziformis*, *Cladonia rei*, *Cladonia subcariosa*, and *Peltigera praetextata*. Less frequent lichens include *Cladonia subtenuis*, *Cladonia fimbriata*, *Diploschistes scruposus*, and *Placidium squamulosum*. One might imagine that grassland fires would burn these species out, and we have seen it do that in areas that burn in three-year intervals or less frequently. In such cases the duff packed down from several seasons of growth can create a virtual crematorium for terricolous species. In high-quality areas that receive annual, especially autumnal fires, the flames burn well above the ground and scud through the dry, still-standing fine fuels of the season. In such areas, lichens thrive on both base-rich soils and exposed bedrock.

Mosses are uncommonly inhabited by *Bacidia bagliettoana*, *Bilimbia sabuletorum*, and much less so by *Bryobilimbia hypnorum*.

Photobionts of the Lichens of the Southern Lake Michigan Region

With respect to the taxonomy of lichenized fungi, little attention has accrued to the photobiont, inasmuch as lichen taxa are organized prevalingly around the morphology of the fungal ascoma, spores, and thallus. Most lichens that have amyloid hymenia are associated with *Trebouxia* species;

most of those with non-amyloid hymenia are lichenized with species of *Trentepohlia*. Both genera are Chlorophycean algae. Frequently, the identification of algae associated with lichenized fungi is difficult, because the morphologies of algal species, although fairly distinct when cultured on agar, are frequently modified significantly when in association with a lichenized fungus. For instance, cells of filamentous genera frequently become solitary, and sometimes the chromatophore takes on quite a different aspect. In many apothecial or algal layer sections, several genera of algae other than the known photobiont can be observed, but a physical association with the fungal hyphae is difficult to verify. More than one genus of photobiont may be noted for a lichen genus. This does not mean that this is the case for all species in the genus or that it is routinely applicable for Southern Lake Michigan Region species. Neither does it mean that there are no other gonidia [photobionts] involved. The following is a key to the photobiont genera known from lichens presented here; it is adapted from Ahmadjian's (1967) descriptions, although we are in the process of bringing the photobiont delineations up to date. For a recondite treatment of photobionts in the Verrucariaceae see Thüs *et al.* (2011). For a breakdown of the *Trentepohlialean* genera see Hametner (2014).

1. Photobiont blue-green.
 2. Cells in paired or gelatinous clusters
 3. Cells in uniformly paired units.
 - Units simply 2-celled *Chroococcus*
 - Units in multiples of paired cells *Chroococciopsis*
 3. Cells not uniformly paired.
 - Gelatinous envelopes yellowish brown *Xanthocapsa*
 - Gelatinous envelopes hyaline *Gloeocapsa*
 2. Cells end-to-end in filaments or chains.
 4. Cells spherical, in beadlike chains *Nostoc*
 4. Cells cylindrical, in filaments.
 5. Filaments mostly 2–4 cells thick *Stigonema*
 5. Filaments 1 cell thick.
 - Heterocysts basal, branches tending to attenuate from base to apex *Dichothrix*
 - Heterocysts within the filaments, branches not much attenuate *Scytonema*
1. Photobiont green.
 6. Larger cells more than 16 μm long.
 - Droplets of orange red pigment usually apparent in the chromatophore; cells irregularly cylindric to ovoid (incl. *Printzina*) *Trentepohlia*
 - Reddish pigments absent; cells spherical to oval (incl. *Myrmecia* & *Asterochloris*) *Trebouxia*
 6. Larger cells up to 16 μm long (chlorococoid).
 7. Cells elongate, sausage-shaped (incl. *Diplosphaera*) *Stichococcus*
 7. Cells spherical to ovoid.
 8. Cells mostly 2–4 in packets *Protococcus*
 8. Cells solitary or in short filaments.
 9. Cells rarely more than 5 μm in diameter *Hyalococcus*
 9. Cells mostly more than 5 μm in diameter.
 10. Chromatophore irregularly folded *Myrmecia*
 10. Chromatophore lining the cell wall, cup-shaped or platelike.
 11. Chromatophore lining most of the inner cell wall Chlorococoid; *Chlorella*
 11. Large portions of the inner cell wall exposed.
 - Chromatophore cup-shaped *Coccomyxa*
 - Chromatophore platelike or bowl-like *Pseudochlorella*

NOTES ON TERMINOLOGY

Over the last thirty or so, significant changes have occurred in the description of lichenized fungi, particularly with respect to the ascocarp. Earlier literature generally described a disk-shaped apothecium as either lecideine or lecanorine, the former with no algae in the exciple (sterile tissue around the hymenium), the latter with algae in the exciple—the presence of which tends to make the exciple appear as part of the thallus cortex, at least in those species with a surface thallus. More recently, descriptions of the exciple in its broadest sense have become more fine-tuned. Consequently, students attempting to understand the morphology of a specimen for identification purposes encounter apparent discrepancies in descriptions of apothecia from one literature source to the next. Herein, we have tried to deploy a consistent terminology more in line with contemporary literature—even as we know that it is changing as we write this. To wit, we have used the following terms:

Amphithecium. That portion of the apothecial margin, outside of the **proper exciple** and below the **hypothecium**, which contains algae, usually associated with a **zeorine** or **lecanorine** rim.

Apothecium. Disk-shaped or lirellate ascocarp.

Arthonioid. Without an **exciple** or discernible margin, the apothecium not nested in a theca of sterile tissues.

Biatorine. Describes a disk-shaped apothecium with a non-**carbonized**, hyaline or pigmented proper exciple; lacking an **amphithecium**.

Carbonized. Said of sterile tissues around an ascocarp that are black and usually brittle.

Cryptolecanorine. Said of apothecia that are imbedded in the thallus and usually flush with it, the exciple evidently fully thalline; also called “*aspicilioid*.”

Epihymenium. The upper zone or surface of the **hymenium**—formed from the tips of sterile filaments of the **hamathecium**). This is also called the epithecium.

Exciple. An area of sterile tissue that surrounds or encloses the ascus-bearing tissues of the **hymenium**.

Hamathecium. Includes all of the sterile hyphae (**paraphyses**) intermingled among the asci.

Hymenium. Sporogenous-bearing tissue of an ascocarp, including both asci and sterile hyphae.

Hypothecium. An area of hyaline to pigmented or even carbonized tissue in the apothecium situated below the **hymenium**, commonly difficult to distinguish from the **proper exciple**.

Hysterothecium. An irregular to linear, simple or branched, ascocarp typified by a carbonized **exciple**.

Interthecial hyphae. Sterile filamentous tissue between and among the asci in a pyrenocarp. The include “*paraphysoids*” which are attached only at the base of the **perithecium** and “*pseudoparaphyses*,” which connect both to the base and the ceiling of the **perithecium**.

Involucrellum. A black, usually carbonized outer layer of a perithecium, commonly concealing the exciple.

Lecanorine. Describes a disk-shaped **apothecium** which can appear to lack a **proper exciple** and in which the margin contains algae, at least in the **amphithecium**.

Lecideine. Describes a disk-shaped apothecium that lacks algae in the margin and lacks an **amphithecium**, and has a margin formed from a carbonized **proper exciple**.

Lirella. And elongate, simple or branched **apothecium**, usually with a black or pigmented, but not carbonized exciple.

Paraphyses. The sterile hyphae of the sporogenous portion of the ascocarp.

Perithecium. A flask-shaped ascocarp with a terminal opening or pore (ostiole).

Proper exciple. An area of apothecial margin that lacks algae and is the first or only area of sterile tissue around the **hymenium**, colored similarly to the **epihymenium** of the disk or a little lighter or darker. Some authors call this the "true exciple."

Zeorine. Describes disk-shaped ascocarps with **proper exciples** but that also display an algae-filled **amphithecium**, often with a more or less complete outer rim of thalline tissue.

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ARTIFICIAL KEY TO THE FAMILIES

The following key attempts to help the reader organize lichen genera into related or seemingly related groups. Natural ordinations of lichen phylogeny, particularly with regard to morphological features, remains elusive, so the families presented here must be regarded as representing provisional relationships, although they approximate those as classified by Lücking *et al.* (2016). For specimens with mature ascocarps, however, it represents an alternative approach to the keys to the genera. For sterile specimens, we refer the user to the latter key, though our local flora has produced many unidentifiable (to us) collections. Such is the state of the art at the floristic level.

- A. Ascospores too numerous to count; or the apothecium long-stalked and the asci 8-spored. (Sterile and lichenicolous lichens are more likely to be identified through use of the key to genera—including anamorphic basidiomycetes in the **CORTICIACEAE**)
 - B. Asci disintegrating into a mazaedial mass.
 - Mazaedial mass black; spores notably longer than wide **CALICIACEAE**
 - Mazaedial mass not black; spores nearly or quite globose **CONIOCYBACEAE**
 - B. Asci not forming a mazaedium (or asci disintegrating in age, but evident early on).
 - C. Ascospores curved, or if not then the ascocarps parasitic
 - Ascoma a parasitic in the apothecia of Teloschistaceous lichens **VERRUCARIACEAE**
 - Ascoma not parasitic **PARMELIACEAE**
 - C. Ascospores not curved, never parasitic.
 - D. Exciple not thalloid, without algae
 - Apothecium stalked. **MYCOCALICIACEAE**
 - Apothecium sessile **BIATORELLACEAE**
 - D. Exciple thalloid, with an algal component.
 - Thallus absent; apothecium bright yellow, opening by a tiny pore **THELOCARPACEAE**
 - Thallus present, or if not evident then apothecium not bright yellow . . **ACAROSPORACEAE**
- A. Ascospores no more than 64 per ascus; apothecium never long-stalked.
 - E. Ascocarp opening through a distal pore, usually a perithecium.
 - F. Paraphyses, absent, unbranched, or very coarse and difficult to discern.
 - G. Paraphyses distinctly unbranched or very loosely branched, or soon reduced to a hymenial gel.
 - Paraphyses present **STRIGULACEAE**
 - Paraphyses absent **VERRUCARIACEAE**
 - G. Paraphyses obscure in structure, but neither distinctly unbranched or gelatinous.
 - Hymenium interspersed with large droplets, mostly multi-chambered **MYCOPORACEAE**
 - Hymenium not interspersed, a single chamber **NAETROCYMBACEAE**
 - F. Paraphyses present, slender, and at least sparingly branched.
 - H. Ascocarps imbedded in thalloid warts or heaps of powdery soredia concolorous with the thallus.
 - Ascospores septate. **TRYPETHELIACEAE**
 - Ascospores simple **PERTUSARIACEAE**
 - H. Ascocarps not imbedded in thalloid warts or heaps of powdery soredia-like masses.
 - I. Ascospore walls notably thickened **PYRENULACEAE**
 - I. Ascospore walls not notably thickened.
 - J. Ascospores becoming brown.
 - K. Ascospores several-septate to muriform **DECAMPIACEAE**

- K. Ascospores 1-septate.
 - Ascospores notably constricted at the septum, the cells usually unequal in size **PLEOSPORACEAE**
 - Ascospores not notably constricted at the septum, the cells subequal in size **DIDYMOSPHAERIACEAE**
- J. Ascospores persistently hyaline.
 - L. Ascospores muriform; photobiont absent
 - Ascomata black throughout **TRYPETHELIACEAE**
 - Ascomata with blue-green walls **MICROPELTIDACEAE**
 - L. Ascospores not muriform; photobiont usually present.
 - M. Photobiont blue-green or absent
 - Photobiont absent **ARTHOPYRENIACEAE**
 - Photobiont blue-green **XANTHOPYRENIACEAE**
 - M. Photobiont green.
 - N. Spores simple **THROMBIACEAE**
 - N. Spores septate.
 - Ascospores commonly more than 3-septate **PORINACEAE**
 - Ascospores 1–3 septate. **MONOBLASTIACEAE**
- E. Ascocarps diskiform (obscurely so in the STICTIDACEAE, which has elongate, vermiform ascospores with contractions at the septa), Most sterile species are in families found here.
 - O. Photobiont blue-green.
 - P. Thallus filamentous suffruticose.
 - Photobiont *Stigonema*; filamentous branches not pubescent. **COCCOCARPIACEAE**
 - Photobiont not *Stigonema*; filamentous branches pubescent. **LOBARIACEAE**
 - P. Thallus not filamentous suffruticose.
 - Q. Thallus crustose, squamulose, or fruticose
 - Thallus crustose, black, with a blue-green hypothallus; ascospores 1–3 septate **PLACYNTHIACEAE**
 - Thallus variously squamulose, fruticose, or crustose, but without a blue-green hypothallus; ascospores simple **LICHINACEAE**
 - Q. Thallus foliose.
 - R. Thallus gray or nigrescent, gelatinous when wet **COLLEMATACEAE**
 - R. Thallus brown, not gelatinous when wet.
 - Medulla with secondary metabolites, either K+ yellow or C+ rose . . . **LOBARIACEAE**
 - Medulla without secondary metabolites, K– and C– **PELTIGERACEAE**
 - O. Photobiont green or absent. [sterile specimens are more likely to be determined through use of the Artificial Key to the Genera.]
 - S. Thallus foliose and rhizinate or distinctly squamulose, with an upper and lower cortices, or fruticose with simple or branched podetia or branches; never yellow or orange, or thallus black and minutely fruticose.
 - T. Ascospores simple, hyaline.
 - U. Thallus foliose or with fruticose branches with a medullary core, or thallus black and minutely fruticose
 - Thallus black and minutely fruticose **RACODIACEAE**
 - Thallus variously colored, but not minutely fruticose **PARMELIACEAE**
 - U. Thallus squamulose, any podetia with a hollow core
 - V. Squamules lying flat upon the substrate an imbricate over others, the margins with labriform soralia [see also the PSORACEAE] **OPHIOPARMACEAE**
 - V. Squamules erect or ascending, the margins esorediate or with poorly delimited soralia.
 - W. Podetia hollow; thallus squamulose **CLADONIACEAE**

- W. Podetia solid; thallus not squamulose.
 - Thallus lobate; medulla K+ yellow, stictic acid present **BAEOMYCETACEAE**
 - Thallus not lobate; medulla K-, stictic acid absent **ICMADOPHILACEAE**
- T. Ascospores septate, often hyaline or brown.
 - X. Thallus fruticose.
 - Thallus of flattened lobes or branches..... **RAMALINACEAE**
 - Thallus lobes not distinctly flattened **STEREOCAULACEAE**
 - X. Thallus foliose.
 - Y. Lower surface a close, felt-like indument **PELTIGERACEAE**
 - Y. Lower surface without a felt-like indument.
 - Lower cortex white; medulla orange or salmon **CALICIACEAE**
 - Lower cortex white, brown ,or black; medulla white or red ... **PHYSICIACEAE**
- S. Thallus neither foliose nor distinctly squamulose or fruticose, or if so then the thallus distinctly yellow or orange.
 - Z. Thallus or apothecial disks distinctly yellow or some shade of orange; exciple thalloid.
 - A1. Thallus bright yellow; fruticose **PARMELIACEAE**
 - A1. Thallus yellow or some shade of orange, fruticose or not.
 - B1. Apothecial disks and/or the thallus K+ deep purple [anthraquinones] ascospores thick-walled..... **TELOSCHISTACEAE**
 - B1. Apothecial disks and thallus not K+ deep purple; ascospores thin-walled.
 - C1. Soredia granular, organized into soralia, or soredia absent
 - Ascospores hyaline **CANDELARIACEAE**
 - Ascospores brown **CALICIACEAE**
 - C1. Soredia fine, diffuse, not in organized soralia.
 - Rhizocarpic acid present **PSILOLECHIACEAE**
 - Rhizocarpic acid absent **CHRYSOTHRICACEAE**
 - Z. Neither thallus nor apothecial disks distinctly yellow or orange, or if the apothecium rarely so then the exciple not thalloid.
 - D1. AscoHpores simple, hyaline.
 - E1. Exciple thalloid, with an algal component.
 - F1. Ascospore walls thick **PERTUSARIACEAE**
 - E1. Ascospore walls thin.
 - G1. Ascospores less than 15 μm long **LECANORACEAE**
 - G1. Ascospores more than 15 μm long. [fertile *Ochrolechia* might key here although none are known locally]
 - Apothecial disk flat or concave, the surface at or below the surface of the thallus..... **MEGASPORACEAE**
 - Apothecial disks adnate, sessile, set well above the surface of the thallus **TRAPELIACEAE**
 - E1. Exciple not thalloid, without an algal component.
 - H1. Thallus of appressed squamules, or if crustose then the apothecium K+ deep purple **PSORACEAE**
 - H1. Thallus not of appressed squamules, the apothecium not K+ purple.
 - I1. Axis of ascus apex not notably amyloid **LECANORACEAE**
 - I1. Axis of ascus apex strongly amyloid.
 - IJ. Photobionts in cell packets of 2, 4 or 6.
 - Apothecial pigments brown **FUSCIDEACEA**
 - Apothecial pigments not brown **TRAPELIACEAE**

- IJ. Photobionts generally not in multicellular packets.
 - K1. Thallus not saxicolous.
 - Ascus Micarea type; thallus UV + white
 - **STEREOCAULACEAE**
 - Ascus not Micarea type; thallus UV-- **LECIDEACEAE**
 - K1. Thallus saxicolous.
 - Larger apothecia more than 0.5 mm across . . . **LECIDEACEAE**
 - Apothecia less than 0.5 mm across **PILOCARPACEAE**
- D1. Ascospores septate to muriform, hyaline, gray, or brown.
 - L1. Ascospores gray, brown or muriform, or both, or if hyaline then the apothecia elongate or irregular with a black exciple.
 - M1. Apothecia round, the exciple black or otherwise.
 - N1. Ascospores less than 17 μm long, submuriform or merely septate.
 - Ascospore walls thickened, polaribilocular **PHYSICIACEAE**
 - Ascospore wall thin throughout **CALICIACEAE**
 - N1. Ascospores prevailingly more than 17 μm long, muriform.
 - L1. Apothecia integrated into a stroma **MYRIANGIACEAE**
 - L1. Apothecia not integrated into a stroma.
 - Thallus C+ red **THELOTREMATAACEAE**
 - Thallus C-- **RHIZOCARPACEAE**
 - M1. Apothecia elongate or irregular, the exciple black.
 - P1. Ascospores with lenticular cells, the walls of the septa much thicker near the spore wall; apothecia irregular, often branched or elongating; hymenium IKI-; ascospores usually IKI+ bluish black **GRAPHIDACEAE**
 - P1. Ascospores with cylindrical cells; apothecia more or less circular to oblong, to simply forked; hymenium IKI+; ascospores IKI+ blue to orange.
 - Q1. Thallus thin to evanescent, smooth, but not lichenicolous; ascospores 3-septate.
 - Ascospores brown, at least in two of the cells . . . **HYSTERIACEAE**
 - Ascospores colorless **ARTHONIACEAE**
 - Q1. Thallus thin to obscurely chinky or pulverulent, or lichenicolous; ascospores 3–15 septate.
 - Ascospores less than 5 μm wide, not including the outer hyaline sheath (perispore), if present; thallus lichenicolous or not
 - **OPEGRAPHIDACEAE**
 - Ascospores more than 5 μm wide; thallus not lichenicolous
 - **LECANOGRAPHACEAE**
- L1. Ascospores hyaline, never muriform.
 - R1. Asci nearly as long as wide; paraphyses indistinct or absent.
 - Thallus leprose or finely granular **CHRYSOTHRICACEAE**
 - Thallus not leprose; apothecia nor or only weakly pruinose
 - **ARTHONIACEAE**
 - R1. Asci notably longer than wide; paraphyses evident, distinct or intertwined.
 - S1. Spore walls thickened differentially, at least at the septa.
 - Ascospores vermiform, multi-septate with constrictions as the septa . . .
 - **STICTIDACEAE**
 - Ascospores 2-celled, polaribilocular **TELOSCHISTACEAE**
 - S1. Spore walls thin throughout.
 - T1. Paraphyses distinct.
 - U1. Apothecia pale, flesh-colored, the paraphyses hyaline

- **COENOGONIACEAE**
- U1 Apothecia dark, the paraphyses nigrescent at the tip
 Apothecia biatorine; paraphyses abruptly expanded distally into
 nigrescent globose cells **CATILLARIACEAE**
 Apothecia lecanorine; paraphyses without abruptly expanded
 and nigrescent globose cells **LEPROCAULACEAE**
- T1. Paraphyses intertwined and anastomosed.
- V1. Ascospores notably coiled in the ascus ... **SCOLICIOSPORACEAE**
- V1. Ascospores straight in the ascus.
- W. Ascospores 1-septate, or if rarely 3-septate, then the ascus tip
 strongly amyloid or the hypothecium K+ purple.
 **PILOCARPACEAE**
- W. Ascospores 1-several septate, the ascus tip weakly to strongly
 amyloid; hypothecium K-/
 X. Asci *Bacidia*-type **RAMALINACEAE**
 X. Asci not *Bacidia*-type.
 Asci Porpidia-type **LECIDEACEAE**
 Asci not Porpidia-type. **RAMBOLDIACEAE**

ARTIFICIAL KEY TO THE GENERA

The following key is a wholly artificial key to the genera, which means the associated groupings suggest no foundational morphological features, other than descriptive terms to describe them are similar. In recent years there has been a fair amount of DNA work that attempts to express phylogenetic relationships, but correlative morphological features are uncommonly presented. Those interested in such relationships must pursue that literature with a fairly robust level of experience in the anatomy and morphology of lichenized fungi.

1. Thallus subcrustose with marginal lobes to foliose, squamulose, umbilicate, or fruticose, usually with a well defined lower cortex **GROUP I**
1. Thallus crustose, tightly adnate or enmeshed with the substrate, without defined lobes, podetia, or a lower cortex.
 2. Ascomata chronically absent, lichenicolous or notably stalked, or the thallus and apothecia black throughout, or asci with more than 32 spores (or asci disintegrating and not evident)
 - Thallus or apothecia not free-living; obligate to the thalli of lichens or other fungi **Group II**
 - Thallus and or apothecia free-living, not lichenicolous **GROUP III**
 2. Ascomata evident, not stalked, the thallus and apothecia not black throughout; asci with 1–32 spores.
 3. Ascoma a perithecium, the spores released through a small pore **GROUP IV**
 3. Ascoma an apothecium, the spores in asci imbedded in a disk.
 4. Apothecia irregular to elongate, never flesh-colored; thallus rudimentary, often little more than a discoloring of the substrate around the apothecia **GROUP V**
 4. Apothecia mostly rounded, or if somewhat irregular then flesh-colored; thallus rudimentary to well-developed.
 - Exciple appearing thalloid, with an algal component, or the apothecia K⁺ purple, or the apothecia imbedded in thalloid wart. **GROUP VI**
 - Exciple without algae, or exciple absent; apothecia K⁻, never in thalloid warts **GROUP VII**

GROUP I

THALLUS SUBCRUSTOSE WITH MARGINAL LOBES TO FOLIOSE, SQUAMULOSE, UMBILICATE,
OR FRUTICOSE, USUALLY WITH A WELL DEFINED LOWER CORTEX.

1. Thallus gelatinous when wet, dark brown to black or dark slate gray; medulla absent.
2. Thallus pulvinate or umbilicate, usually attached at only a central point; photobiont *Gloeocapsa* or *Chroococcus*.
 - Thallus fruticose, the lobes long and strap-like; usually pruinose **THYREA**
 - Thallus more or less umbilicate, the lobes about as long as broad; usually epruinose **LICHINELLA**
2. Thallus attached to the substrate at several locations; photobiont *Nostoc*.
 3. Thallus with a layer of more or less isodiametric cortical cells; upper surfaces usually smooth to sublustrous, slate gray to brown.
 - Thallus lobes less than 2.5 mm across, gray or brown **SCYTINIUM**
 - Thallus lobes broader, gray **LEPTOGIUM**
 3. Thallus lacking an organized cortex, the hyphae interwoven; upper surfaces dull, usually olivaceous to black.
 4. Thallus dwarf fruticose; apothecia very rare.
 - Thallus branches filamentous **DENDRISCOCAULON**
 - Thallus branches not filamentous **LEMPHOLEMMA**
 4. Thallus various but not dwarf fruticose; apothecia present or absent.
 5. Thallus lobes large, flat, neither thickened nor wrinkled, the larger more than 4 mm long
. **COLLEMA**
 5. Thallus lobes small, thickened, wrinkled, or warty isidiate, less than 4 mm long.

- 20. Podetia not hollow.
 - Thallus lobate; medulla K+ yellow, stictic acid present BAEOMYCES
 - Thallus not lobate; medulla K-, stictic acid absent DIBAEIS
- 20. Podetia hollow.
 - Podetia with a fibrous, dull surface..... CLADINA
 - Podetia with a corticate, smooth, lustrous surface CLADONIA
- 19. Stalks or branches of thallus with a central medullar core, not hollow; podetia absent.
 - 21. Thallus whitish gray, bushy-branched, the branches decorticate in some areas, otherwise covered with tiny corticate granules or squamules. . . . STEREOCAULON
 - 21. Thallus yellow green, or yellow, neither bushy-branched nor beset with a granular cortex.
 - 22. Thallus bright yellow LETHARIA
 - 22. Thallus yellow-green.
 - Fibrils evident; branches smoothly terete USNEA
 - Fibrils absent; branches irregularly wrinkled..... EVERNIA
- 6. Thallus adnate to loosely appressed, but distinctly foliose or umbilicate.
 - 23. Thallus orange, yellow, yellowish green, or yellowish gray.
 - 24. Cortex K+ deep purple.
 - 25. Thallus placodioid and effigurate to subcrustose, without a lower cortex Group III
 - 25. Thallus foliose to subcrustose, but with a lower cortex at least evident under distal lobes.
 - 26. Thallus sorediate XANTHOMENDOZA
 - 26. Thallus esorediate.
 - 27. Thallus saxicolous.
 - Thallus lobes very elongate, convex, of verrucose segments XANTHOMENDOZA
 - Thallus lobes about as long a wide, more or less flat, not verrucose RUSAVSKIA
 - 27. Thallus corticolous.
 - Rhizines abundant XANTHOMENDOZA
 - Rhizines absent XANTHORIA
 - 24. Cortex K- or K+ yellow.
 - 28. Thallus with granular or powdery soredia.
 - 29. Thallus bright lemon yellow or yellow green; lobes small, less than 1 mm wide CANDELARIA
 - 29. Thallus yellow green; lobes more than 1 mm wide.
 - 30. Lobes to 3 mm across.
 - Soralia capitate; divaricatic acid present PARMELIOPSIS
 - Soralia not capitate; divaricatic acid absent..... USNOCETRARIA
 - 30. Larger lobes more than 3 mm across.
 - Medulla C+ red..... FLAVOPARMELIA
 - 28. Thallus esorediate.
 - 31. Larger lobes more than 1 mm wide.
 - Isidia fine, all of nearly equal size XANTHOPARMELIA
 - Isidia coarse, of various sizes, sometimes breaking into granular pustules FLAVOPARMELIA
 - 31. Lobes less than 1 mm wide.
 - 32. Apothecial disk bright yellow..... CANDELARIA

32. Apothecial disk brown or black.
 Apothecial disk brown; spores colorless PROTOPARMELIOPSIS
 Apothecial disk black; spores brown DIMELAENA
23. Thallus without yellowish tints.
33. Thallus brown or brownish gray (rarely pale gray and umbilicate); cortex K-.
34. Lower cortex covered by a dense tomentum or matted appressed hairs, or lower cortex absent.
35. Apothecia infrequent, elongate, marginal or terminal; medulla C- PELTIGERA
35. Apothecia usually evident marginal or laminal, round or nearly so; medulla C- or C+ rose.
36. Apothecia common, in deep surficial pits SOLORINA
36. Apothecia marginal or on isidiate ridges on the lamina, or absent, not in deep surficial pits.
 Upper surface of lobes conspicuously foveolate-ridged; apothecia marginal; medulla C- LOBARIA
 Upper surface of lobes smooth; apothecia laminal; medulla C+ pink RICASOLIA
34. Lower cortex smooth or sparsely to densely rhizinate, but not concealed by a dense tomentum.
37. Lobe surfaces abundantly pruinose; soralia marginal PHYSCONIA
37. Lobe surfaces smooth, or if pruinose, then esorediate.
38. Lobes erect or suffruticose, or thallus umbilicate.
39. Thallus umbilicate with imbedded perithecia DERMATOCARPON
39. Thallus foliose; perithecia absent.
 Thallus abundantly and conspicuously beset with granular pseudocyphellae TUCKERMANELLA
 Thallus without pseudocyphellae TUCKERMANNOPSIS
38. Lobes appressed.
40. Thallus margins and rims of apothecia dissected into isidioid lobules ANAPTYCHIA
40. Thallus without isidioid lobules.
41. Medulla C+ red
 Thallus without isidia or soredia MELANOHALEA
 Thallus isidiate, many of the isidia breaking down into soredia MELANELIXIA
41. Medulla C-.
42. Rhizines absent; lobes discrete or appearing to flow together, tightly adnate HYPERPHYSCIA
42. Rhizines present; lobes discrete, loosely appressed but not tightly adnate.
 Thallus light to dark tan, with numerous imbedded black dots (pycnidia) PLACIDIUM
 Thallus brownish gray to dark gray; pycnidia absent PHAEOPHYSCIA
34. Thallus mineral gray, whitish gray, or greenish gray, never umbilicate; cortex K+ yellow or K-.
43. Either the upper cortex with small white pores or the medulla C+ red, or both . . . PUNCTELIA
43. Upper cortex without white pores; medulla C-.
44. Lower cortex white, light tan, or absent.
45. Thallus isidiate.
 Cortex K+ pale yellow HETERODERMIA
 Cortex K+ deep yellow IMSHAUGIA
45. Thallus without isidia.
46. Soredia in marginal soralia; medulla K+ yellow HETERODERMIA
46. Soredia absent or laminal, or if marginal, then medulla and cortex K-.

- 47. Cortex K-..... PHYSCIELLA
- 47. Cortex K+ yellow.
 - 48. Larger lobes 3 mm or more across; lower cortex tan PUNCTELIA
 - 48. Lobes less than 3 mm across; lower cortex white.
 - 49. Thallus margins either long-ciliate or lobulate . HETERODERMIA
 - 49. Thallus margins neither ciliate nor lobulate.
 - Lower surface ecorticate POLYBLASTIDIUM
 - Lower surface corticate PHYSCIA
- 44. Lower cortex brown or black (occasionally pale near the margins).
 - 50. Medulla distinctly tinted orange or salmon. PYXINE
 - 50. Medulla white or pale yellow.
 - 51. Medulla K-.
 - 52. Thallus sorediate.
 - Thallus lobes inflated, hollow HYPOGYMNIA
 - Thallus lobes flat, not hollow CANOPARMELIA
 - 52. Thallus esorediate; lobes solid.
 - Medulla KC-; lower cortex with a thick tomentum; lobes appearing inflated ANZIA
 - Medulla KC+ rose; lobes flat, merely rhizinate HYPOTRACHYNA
 - 51. Medulla K+ yellow or red.
 - 53. Lobes broad, usually 4 mm or more wide, typically with a rhizine-free zone near the margins; medulla K+ red PARMOTREMA
 - 53. Lobes narrower; rhizines typically distributed throughout on the lower surface; medulla K+ yellow or red.
 - 53. Upper cortex without white markings; medulla pale but distinctly yellow near the soralia MYELOCHROA
 - 53. Upper cortex reticulate or with distinct white markings, at least toward the lobe tips.
 - Upper cortex reticulate-alveolate; medulla K+ deep yellow, stictic acid. CRESPOA
 - Upper cortex, not reticulate-alveolate, with distinct white markings; medulla K+ yellow to red, salazinic acid PARMELIA

GROUP II

LICHENICOLOUS OR FUNGICOLOUS LICHENS

1. Thallus present or represented by a stalk; ascomata and pycnidia present or absent.
 2. Ascoma stipitate PHAEOCALICIUM
 2. Ascoma sessile or absent.
 3. Thallus whitish; parasitic on *Cladonia* DIPLOSCHISTES
 3. Thallus not white; not parasitic on *Cladonia*.
 4. Thallus gray or nigrescent; parasitic on *Spilonema revertens* PSORULA
 4. Thallus not at all gray; mostly parasitic on members of the Physciaceae or Parmeliaceae.
 - Thallus pinkish MARCHANDIOMYCES
 - Thallus yellowish ERYTHRICIUM
1. Thallus absent; ascomata or pycnidia present.
 5. Ascomata or pycnidia, immersed in the apothecium of the host, not an apothecium.
 - Ascomata absent; pycnidia present; parasitic in the apothecia of *Lecanora* and lichens of the Teloschistaceae LICHENODIPLIS
 - Ascoma a perithecium present, parasitic in the apothecia of lichens of the Teloschistaceae MUELLERELLA
 5. Ascoma an apothecium, parasitic on cortical tissues.
 6. Parasitic on the cortex of Parmeliaceous genera PHACOPSIS
 6. Parasitic on the lower cortex of Verrucariaceous genera
 7. Parasitic on the lower cortex of *Dermatocarpon* TONINIA
 7. Parasitic on the upper cortex of Endocarpon or Staurothele
 8. Spores to 17 μm long OPEGRAPHA
 8. Spores prevailingly longer than 17 μm OPEGRAPHOIDEA

GROUP III

ASCOMATA CHRONICALLY ABSENT, NOTABLY STALKED, OR THE THALLUS AND APOTHECIA BLACK THROUGHOUT, OR ASCI WITH MORE THAN 32 SPORES (OR ASCI DISINTEGRATING AND NOT EVIDENT).

1. Ascomata evident.
 2. Apothecia stalked; thallus rudimentary or not evident.
 3. Stalks and exciples not black.
 - Thallus bright yellow and leprose; spores subglobose CHAENOTHECA
 - Thallus neither bright yellow nor leprose; spores various SCLEROPHORA
 3. Stalks and exciples black.
 4. Spores septate CALICIUM
 4. Spores simple.
 5. Thallus fungicolous on *Trichaptum bifforme* PHAEOCALICIUM
 5. Thallus corticolous.
 - Thallus from *Quercus* bark MYCOCALICIUM
 - Thallus from cortical *Rhus exudate* CHAENOTHECOPSIS
 2. Apothecia not stalked; thallus absent or evident.
 6. Spores no more than 16 per ascus.
 7. Thallus well defined, with a distinctly blue green prothallus evident at the margins, or thallus arenicolous.
 - Thallus arenicolous PLACYNTHIELLA
 - Thallus saxicolous PLACYNTHIUM
 7. Thallus effuse, granular, without an evident prothallus, never arenicolous.
 8. Paraphyses absent or unbranched; photobiont with a reddish, K+purple sheath.
 - Apothecia 1-3 per areole CRYPTOTHELE
 - Apothecia 1 per areole PYRENOPSIS
 8. Paraphyses present, branched; photobiont with yellowish, K- sheaths.
 - Proper exciple rather evident between the thallus and the hymenium .PYRENOCARPON
 - Proper exciple absent or inconspicuous PSOROTICHIA
 6. Spores more than 16 per ascus.
 9. Apothecia biatorine.
 - Thallus terricolous BIATORELLA
 - Thallus corticolous STRANGOSPORA
 9. Apothecia not biatorine.
 10. Apothecia yellow, without and evident yellow thallus.
 - Spores simple THELOCARPON
 - Spores septate CYPHELIUM
 10. Apothecia not yellow, or if so then with sumptuous yellow thallus.
 11. Thallus epilithic.
 12. Mature apothecia with the hymenium mostly closed to the surface of the thallus, exposed only through a small reddish brown pore; thallus epruinose TRIMMATOTHELOPSIS
 12. Mature apothecia with the hymenium fully exposed at the surface; thallus pruinose or not.
 - Cortex K+ red MYRIOSPORA
 - Cortex K- ACAROSPORA
 11. Thallus nearly or quite endolithic.
 13. Disk with greenish pruina CAERULEUM

13. Disk epruinose or with white pruina.
 Disk notably beset with carbonaceous ridges or bumps POLYSPORINA
 Disk free of carbonaceous intrusions. SARCOGYNE
1. Apothecia chronically absent or rare.
14. Thallus K+ deep purple.
15. Thallus saxicolous.
 Thallus margins effigurate; soredia in soralia confined to the ends of the interior lobes
 LEPROPLACA
 Thallus not effigurate; soredia in poorly delimited soralia FLAVOPLACA
15. Thallus lignicolous or corticolous.
16. Thallus esorediate; pycnidia abundant GYALOLECHIA
16. Thallus sorediate; pycnidia rare.
 Thallus chromate yellow SOLITARIA
 Thallus orange VILLOPHORA
14. Thallus K- or K+ yellow or red.
17. Thallus nearly or quite sorediate throughout, or if soredia discrete, then atranorin present.
18. Thallus bright yellow.
19. Soredia granular, in delimited, often scattered soralia CANDELARIELLA
19. Soredia fine, diffuse, unorganized into soralia.
 Rhizocarpic acid present PSILOLECHIA
 Rhizocarpic acid absent CHRYSOTHRIX
18. Thallus granules without yellowish tints or with faint yellow in *Lepraria vouauxii*.
20. Prothallus evident at the margin, or the margin with scattered corticate areoles; zeorin present;
 usnic acid present or absent; atranorin, if present, occasionally the sole secondary metabolite
 LECANORA
20. Prothallus absent; usnic acid absent, zeorin present or absent; atranorin, if present, not as the sole
 secondary metabolite.
 Thallus with terpenes only, grayish green BOTRYOLEPRARIA
 Thallus with secondary metabolites other than or in addition to terpenes; variously
 tintured. LEPRARIA
17. Thallus not sorediate throughout, or if abundantly sorediate then atranorin absent.
21. Thallus black throughout; photobionts usually blue-green.
22. Photobiont blue-green or absent.
 Thallus well developed, with a distinctly blue green prothallus evident at the margins . .
 PLACYNTHIUM
 Thallus effuse, granular, without an evident prothallus LICHENOTHELIA
22. Photobiont green.
23. Thallus not saxicolous, dark to greenish PLACYNTHIELLA
23. Thallus saxicolous, nigrescent and thread-like
 Hyphal cells in parallel, elongate, longitudinal rows RACODIUM
 Hyphal cells in irregularly disposed, often knobby arrays CYSTOCOLEUS
21. Thallus not black throughout; photobionts green.
24. Thallus C- and K-.
25. Thallus yellow or with yellowish tints.
 Thallus yellow, of notably corticate granules or granular soredia CANDELARIELLA
 Thallus yellowish green, the soredia in discrete soralia COPPINSIDEA
25. Thallus without yellowish tints.
26. Thallus corticolous or arenicolous PLACYNTHIELLA
26. Thallus saxicolous.
 Thallus white pruinose. ACAROSPORA

- Thallus epruinose FUSCIDEA
24. Thallus C+ or K+
27. Thallus UV+ yellow (lichexanthone) or K+ yellow.
- Thallus UV+ yellow; C+ pink OCHROLECHIA
- Thallus UV-, or if so, then also K+ deep yellow; C- LOXOSPORA
27. Thallus UV-, K-
28. Thallus esorediate PLACYNTHIELLA
28. Thallus sorediate.
- Soredia erupting from verrucae or cortical warts TRAPELIOPSIS
- Soredia not erupting from verrucae. TRAPELIA

GROUP IV

ASCOMA A PERITHECIUM, THE SPORES RELEASED THROUGH A SMALL PORE.

1. Thallus saxicolous or terricolous.
 2. Spores abundantly muriform.
 3. Spores 4-8 per ascus WILLEYA
 3. Spores 2 per ascus.
 - Spores hyaline in the ascus ENDOCARPON
 - Spores brown in the ascus STAUROTHELE
 2. Spores either without septa, or with only transverse septa (rarely somewhat muriform in *Thelidium*).
 4. Spores septate.
 5. Photobiont blue-green..... PYRENOCOLLEMA
 5. Photobionts green.
 6. Thallus on base-rich rock..... THELIDIUM
 6. Thallus on siliceous rock.
 - Spores 2-celled, less than 15 μm long PLACIDIOPSIS
 - Spores more than 2-celled, more than 15 μm PSEUDOSAGEDIA
 4. Spores non-septate.
 7. Thallus crustose.
 - Perithecia deeply imbedded in the substrate, to 0.3(4) mm across BAGLIETTOA
 - Thallus thin to thick, evidently epilithic and corticate, sordid to grayish or olive green, or brownish to black. VERRUCARIA
 7. Thallus either squamulose or membranaceous and subgelatinous.
 8. Thallus membranaceous; hamathecium of persistent, scarcely branched paraphyses THROMBIUM
 8. Thallus squamulose; hamathecium evanescent.
 - Thallus pale grayish-brown..... CATAPYRENIUM
 - Thallus brown..... PLACIDIUM
 1. Thallus corticolous or lichenicolous.
 9. Thallus of thick, brown, rounded squamules or thallus lichenicolous PLACIDIUM
 9. Thallus not of thick, rounded squamules.
 10. Spore walls notably thickened.
 11. Ascomata embedded in a thalloid wart or pseudostroma.
 - Ascospores simple PERTUSARIA
 - Ascospores septate..... TRYPETHELIUM
 11. Ascomata not embedded in a thalloid wart or pseudostroma.
 - Spores brown, 3-septate or occasionally 4-7 septate or even imperfectly muriform PYRENULA
 - Spores 7-9 septate, or colorless and 3-septate TRYPETHELIUM
 10. Spores walls not notably thickened.
 12. Perithecium with more than one hymenium, with than one ostiole or with one ostiole asymmetrically disposed.
 - Perithecia with more than 1 ostiole MYCOPORUM
 - Perithecia with one, asymmetrically disposed ostiole LITHOTHELIUM
 12. Perithecium with only one ostiole.
 13. Spores becoming brown.
 14. Photobiont present; spores septate to muriform EOPYRENULA
 14. Photobiont absent; spores 1-septate.
 15. Thallus restricted to the bark of *Betula papyrifera* MYCOMICROTHELIA
 15. Thallus on tree bark other than *Betula papyrifera*.

- Spores notably constricted at the septum, the larger more than 19 μm long
 KIRSCHSTEINIOTHELIA
 Spores not constricted at the septum, no more than 19 μm
 DIDYMOSPHERIA
12. Spores persistently hyaline.
16. Interthecial hyphae unbranched or absent.
 Perithecia pale or darkening, but not black; interthecial hyphae absent
 PSOROGLAENA
 Perithecia black; interthecial hyphae evident STRIGULA
16. Interthecial hyphae loosely to densely branched.
17. Spores muriform, with both transverse and longitudinal septa.
 Ascumata black, HNO_3^- , to 0.3 mm in diameter JULELLA
 Ascumata blue green, HNO_3^+ reddish, the larger ones more than 0.3 mm across .
 MYCOGLAENA
17. Spores not muriform, with transverse septa only.
18. Thallus restricted to *Betula* and *Populus*; spores much elongate, nearly or quite as long as the asci LEPTORHAPHIS
18. Thallus of a diversity of corticolous substrates; spores oblong to oval, much shorter than the asci.
19. Spores more than 30 μm long and 12 μm wide, with granular ornamentation ACROCORDIA
19. Spores less than 30 μm long and 12 μm wide, without granular ornamentation.
20. Septum of spores eccentric, the cells notably unequal in volume; asci more than 3 times as long as wide ANISOMERIDIUM
20. Septum of spores not eccentric, the cells about equal; asci less than three times as long as wide.
21. Spores notably constricted at the septum . CONRICTOLUMINA
21. Spores not notably constricted at the septum.
22. Paraphyses loosely branched STRIGULA
22. Paraphyses notably branched and anastomosed.
 Larger spores more than 6 μm wide . . . ARTHOPYRENIA
 Spore to 6 μm wide NAETROCYMBE

GROUP V

APOTHECIA IRREGULAR TO ELONGATE, NEVER FLESH-COLORED; THALLUS RUDIMENTARY,
OFTEN LITTLE MORE THAN A DISCOLORING OF THE SUBSTRATE AROUND THE APOTHECIA.

1. Spores muriform, with 1–5 longitudinal septa, or simple with parasitic apothecia.
 2. Spores simple and hyaline or brown and muriform HYSTEROGAPHIUM
 2. Spores septate to muriform.
 - Spores more than 27 μm long ARTHOTHELIUM
 - Spores less than 27 μm long ARTHONIA
1. Spores merely septate, with 3–11 transverse septa only.
 3. Spores with lenticular cells, the walls of the septa much thicker near the spore wall; apothecia irregular, often branched or elongating; hymenium IKI–; spores usually IKI+ bluish black GRAPHIS
 3. Spores with cylindrical cells; apothecia more or less circular to oblong, to simply forked; hymenium IKI+; spores IKI+ blue to orange.
 4. Thallus thin to evanescent, smooth, not lichenized; spores 3-septate.
 - Spores brown, at least in two of the cells HYSTERIUM
 - Spores colorless ARTHONIA
 4. Thallus thin to obscurely chinky or pulverulent, lichenized; spores 3–15 septate.
 5. Spores less than 5 μm wide, not including the outer hyaline sheath (perispore), if present; thallus lichenicolous or not OPEGRAPHA
 5. Spores more than 5 μm wide; thallus not lichenicolous.
 - Spores more than 7-septate, the larger more than 40 μm long ZWACKHIA
 - Spores 4–6 septate, less than 40 μm long ALYXORIA

GROUP VI

APOTHECIA REGULAR, THE EXCIPLE THALLOID, WITH AN ALGAL COMPONENT, OR THE APOTHECIA K+ PURPLE, OR THE APOTHECIA IMBEDDED IN THALLOID WARTS.

1. Spores simple (usually absent in the soresiate warts of some *Leptra* species).
 2. Apothecia immersed in thalloid warts or in heaps of powdery soresia; spores very large.
 - Thallus areolate; disks black, pruinose, the ostiole white-bordered and often opening wide CIRCINARIA
 - Thallus continuous; ascomata not as above, hidden by a dense veil of soresia LEPTRA
 2. Apothecia adnate or immersed, but not as above; spores of various sizes.
 3. Thallus yellow. CANDELARIELLA
 3. Thallus not yellow.
 4. Spore walls thick.
 - Thallus saxicolous; medulla C+ red VARICELLARIA
 - Thallus corticolous; medulla C- PERTUSARIA
 4. Spore walls thin.
 5. Apothecia adnate, the disks orange, some of them 2 mm or more across; thallus saxicolous, of scattered to aggregated, smooth, convex areoles. RHIZOPLACA
 5. Apothecia and thalli various, but not as above.
 6. Thallus absent or scarcely evident near the apothecium MYRIOLECIS
 6. Thallus thick or thin but generally evident.
 7. Thallus or apothecia corticolous or muscicolous, or if saxicolous, then with spores less than 14 μm long.
 - Spores more than 20 μm long MEGASPORA
 - Spores less than 20 μm long LECANORA
 7. Thallus or apothecia saxicolous and the spores more than 14 μm long.
 8. Apothecial disk distinctly adnate, the surface elevated well above the surface of the thallus TRAPELIA
 8. Apothecial disk flat or concave, the surface at or below the surface of the thallus.
 - Thallus K+ yellow or yellow turning red; spores ellipsoid, rarely more than 15 μm wide. ASPICILIA
 - Thallus K- spores subglobose, mostly more than 15 μm wide CIRCINARIA
 1. At least some spores septate, muriform, or polaribilocular.
 9. Spores either muriform or with 20 or more transverse septa.
 10. Ascocarps imbedded in a stroma MYRIANGIUM
 10. Ascocarps not imbedded in a stroma.
 - Spores muriform, with 1-3 longitudinal septa. DIPLOSCHISTES
 - Spores without longitudinal septa STICTIS
 9. Spores 1-3 septate or polaribilocular.
 11. Spores merely septate, or if somewhat polaribilocular, then brown; apothecia and thallus K- or K+ yellow or red.
 12. Spores gray or brown.
 - Spore walls thin and evenly developed, the lumina cylindrical AMANDINEA
 - Spore walls unevenly thickened, the lumina often angled RINODINA
 12. Spores hyaline.
 13. Apothecia yellow or yellowish or orange.
 - Apothecia K- CANDELARIELLA
 - Apothecia K+ purple PROTOBLASTENIA
 13. Apothecia black, brown, or whitish pruinose

- Ascus tip staining solid throughout, *Catillaria*-type HALECANIA
 Ascus tip with the central axial mass not stained blue, *Bacidia*-type LECANIA
11. Spores polaribilocular; spores not brown; apothecia or thallus or both often K⁺ deep purple.
14. Apothecia black or brown, K⁻ or K⁺ violet; thallus white or gray.
15. Apothecia without pruina.
 Epihymenium K⁻ CALOPLACA
 Epihymenium K⁺ violet HUNECKIA
15. Apothecia at least thinly pruinose.
 Thallus saxicolous PYRENODESMIA
 Thallus corticolous PHAEOPLACA
14. Apothecia black, or orange and K⁺ red; thallus absent or not white, or if so then the apothecial disk orange or pale.
16. Thallus margins distinctly effigurate.
 Cortex orange or with white pruina away from the lobe tips CALOGAYA
 Cortex pale orange, fully invested with pinkish-white pruina SQUAMULEA
16. Thallus margins not or only weakly effigurate.
17. Rims of apothecia white, gray, or nigrescent, not yellow or orange; thallus sorediate or not.
 Soredia distinct, cup-like grayish to yellowish green COPPINSIELLA
 Soredia various, dark to nigrescent, or soredia absent CALOPLACA
17. Rims of apothecia yellow or orange; thallus esorediate.
18. Thallus K⁻ or absent (rarely with scant yellow, appressed patches); spore isthmus rarely more than 4 μm long.
19. Thallus lignicolous or corticolous.
 Spore isthmus prevailingly less than 4 μm wide; rims lecanorine CALOPLACA
 Spore isthmus prevailingly more than 4 μm wide; rims not lecanorine ATHALLIA
19. Thallus saxicolous.
20. Spore septum prevailingly less than 2.5 μm long XANTHOCARPIA
20. Spore septum prevailingly more than 2.5 μm long.
 Thallus absent or poorly developed; apothecia yellow or orange ATHALLIA
 Thallus abundant, or if absent then the apothecia reddish brown RUFOPLACA
18. Thallus present, K⁺ purple (or if absent then the spore septum mostly more than 4 μm) long; apothecia variously yellow or orange.
21. Thallus distinctly orange-tinged, or K⁻.
22. Thallus corticolous or lignicolous BLASTENIA
22. Thallus saxicolous.
 Apothecia stipitate PACHYPELTIS
 Apothecia sessile SQUAMULEA
21. Thallus distinctly yellow or yellow orange, notably paler than the orange or brownish apothecia, or absent.
23. Thallus of scattered areoles ATHALLIA
23. Thallus obvious, more or less continuous.
24. Thallus sorediate SOLITARIA
24. Thallus esorediate
 Spore isthmi less than 4 μm wide; thalline exciple scant or absent at maturity CALOPLACA
 Spore isthmi more than 4 μm wide; thalline exciple usually well

developed at maturity GYALOLECHIA

GROUP VII

APOTHECIA REGULAR, THE EXCIPIE WITHOUT ALGAE, OR EXCIPIE ABSENT; APOTHECIA K-.

1. Spores minute and numerous, more than 16 per ascus.
 2. Thallus corticolous.
 - Spores simple, more than 32 per ascus STRANGOSPORA
 - Spores septate, 16–32 per ascus AMANDINEA
 2. Thallus saxicolous.
 - Disk notably beset with carbonaceous ridges and lumps POLYSPORINA
 - Disk nearly or quite without carbonaceous intrusions SARCOGYNE
1. Spores few to 16 per ascus.
 3. Spores prevailingly non-septate, though sometimes with 2 large polar vacuoles.
 4. Thallus C+ pink, gyrophoric acid present.
 5. Thallus saxicolous TRAPELIA
 5. Thallus terricolous or lignicolous.
 - Thallus greenish gray or grayish, soredia erupting from verrucae TRAPELIOPSIS
 - Thallus dark brown or blackish, without verrucae and cortical tissues PLACYNTHIELLA
 4. Thallus C-, gyrophoric acid absent.
 6. Thallus granules often more than 0.5 mm across, diffuse, greenish to brown when dry and greener when wet, or thallus terricolous, or both.
 - Thallus UV+ white HERTELIDEA
 - Thallus UV- PLACYNTHIELLA
 6. Thallus not granular, or granules up to 0.5 mm across, dense, dark brown to black when wet, never terricolous.
 7. Thallus wholly saxicolous.
 8. Apothecia nearly all less than 0.5 mm across; spores less than 12 μ m long.
 - Apothecia bright yellow PSILOLECHIA
 - Apothecia not yellow LEIMONIS
 8. Larger apothecia more than 0.5 mm across; spores mostly more than 12 μ m long.
 9. Apex of ascus strongly amyloid; apothecial margin and disk concolorous; stictic acid absent LECIDELLA
 9. Apex of ascus not or only weakly amyloid around the tholus amyloid; apothecial margin black, contrasting with the disk, or if concolorous then stictic acid present.
 - Larger spores more than 15 μ m long, usually with a halo when young PORPIDIA
 - Spores nearly all less than 15 μ m long, never halonate LECIDEA
 7. Thallus not wholly saxicolous.
 10. Thallus saxicolous BRYOBILIMBIA
 10. Thallus lignicolous or corticolous.
 11. Apothecia flesh-colored to darkening, usually irregular in shape, with a difficult-to-define margin LECANORA
 11. Apothecia pale to nigrescent, the margin prevailingly round, not particularly irregular.
 12. Apothecia nearly all less than 0.4 mm across TRAPONORA
 12. Many of the apothecia more than 0.4 mm across.
 13. Paraphyses separating in water; apex of ascus strongly amyloid; thallus on the lignin or cortex of hardwoods LECIDELLA
 13. Paraphyses remaining coherent in water; apex of ascus not or only weakly amyloid; thallus on the lignin of conifers.

- Epiphloeic thallus evident RAMBOLDIA
Epiphloeic thallus not evident LECIDEA
3. Spores septate.
14. Spores brown, or muriform, or both.
15. Spores muriform, at least in one cell of many spores.
- Thallus brown or grayish; spores mostly more than 17 μm long RHIZOCARPON
Thallus white; spores prevailingly less than 17 μm long DIPLOTOMMA
15. Spores not muriform.
- Thallus absent or very thin; conidia curved-filiform [if from bark in a bog, see also *Buellia schaeferi*
. AMANDINEA
Thallus thin to thick, but well developed; conidia short-ellipsoid BUELLIA
14. Spores hyaline, never muriform.
16. Paraphyses indistinct or absent.
17. Thallus leprose; apothecia densely pruinose CHRYSOTHRIX
17. Thallus not leprose; apothecia nor or only weakly pruinose
- Thallus epiphloeideal, dark to olivaceous; apothecia round, convex; spores 1-septate, with
one cell larger than the other BRYOSTIGMA
Thallus scant or endoploeideal; otherwise without the above combination of characters . .
. ARTHONIA
16. Paraphyses evident, distinct or intertwined or coherent.
18. Spores strictly 2-celled .
19. Spores polaribilocular.
20. Apothecia without pruina.
- Epihymenium K-- CALOPLACA
Epihymenium K + violet HUNECKIA
20. Apothecia at least thinly pruinose.
- Thallus saxicolous PYRENODESMIA
Thallus corticolous PHAEOPLACA
19. Spores merely septate.
21. Paraphyses distinct.
- Apothecia dark, the paraphyses nigrescent at the tip CATILLARIA
Apothecia pale, flesh-colored, the paraphyses hyaline COENOGONIUM
21. Paraphyses intertwined and anastomosed.
22. Substrate wet or inundated rock BRYOBILIMBIA
22. Substrate not saxicolous, or if so then the rock dry.
- Hypotheceum hyaline; axial portion of the ascus apex strongly amyloid,
notably more so than the tholus MICAREA
Hypotheceum dark brown; axial portion of the ascus apex concolorous with
the tholus in IKI MYCOBILIMBIA
18. Spores mostly 4 to many-celled.
23. Spores acicular, more than 30 μm long
24. Spores no more than 2.5 μm wide BACIDINA
24. At least the larger spores more than 2.5 μm wide
- Thallus minutely but distinctly squamulose TONINIA
Thallus crustose, not squamulose BACIDIA
23. Spores fusiform to elliptic or oblong, less than 30 μm long, or if more then notably coiled in
the ascusd.
25. Thallus terricolous or muscicolous.
- Spores no more than 4-celled; axial portion of the ascus apex strongly amyloid,

- notably more so than the tholus MICAREA
 Spores more than 4-celled; axial portion of the ascus apex concolorous with the
 tholus in IKI BILIMBIA
25. Thallus saxicolous or corticolous.
26. Ascomata with elevated rims and deeply sunken hymenia STICTIS
26. Ascomata with exposed, surficial hymenia.
27. Spores mostly more than than 5 μ m wide LECANIA
27. Spores to 5 μ m wide.
28. Thallus saxicolous; spores not coiled in the ascus BACIDIA
28. Thallus not saxicolous; spores coiled or not in the ascus.
29. Spores notably coiled in the ascus SCOLICIOSPORUM
29. Spores not coiled in the ascus.
30. Spores bacilliform, curved TONINIA
30. Spores fusiform, not curved.
- Paraphyses clavate dilated distally AQUACIDIA
- Paraphyses not dilated distally FELLHANERA

ACAROSPORA A. Massal. ACAROSPORACEAE [Photobiont: chlorococcoid. Gr. *akari*, mite + *spora*, seed, evoking the image of the numerous, tiny, mite-like spores. This genus bewilders me; do not presume that the names used below surely apply to your specimen.] ~ Thallus crustose, areolate to subsquamulose, saxicolous; apothecia cryptolecanorine to lecanorine; paraphyses unbranched; spores simple, minute, hyaline, numerous.

1. Thallus yellow or yellow green
 Medulla KC- A. CHRYSOPS
 Medulla KC+ A. TUCKERA
1. Thallus without yellowish tints.
2. Apothecia absent; nigrescent soredia present A. MOENIUM
2. Apothecia present, usually 1 or more per areole; esorediate
3. Substrate HCl+.
- Spores fewer than 100 per ascus, more than 7 μ m long A. MACROSPORA
 Spores more than 100 per ascus, less than 7 μ m long A. STRIGATA
3. Substrate HCl-.
4. Gyrophoric acids present (most reliably determined through TLC) A. FUSCATA
4. Gyrophoric acid absent.
5. Thallus at least thinly white-pruinose A. AMERICANA
5. Thallus brown, epruinose.
6. Apothecia deeply immersed in a dimple-like opening, one per areole A. ELEVATA
6. Apothecia usually pale brown, neither convex, areolate nor rimose; apothecia not immersed in a dimple-like opening, 1 or more per areole.
- Apothecia mostly more than 0.5 mm across, with a distinctly black margin
 A. BADIOFUSCA
 Apothecia mostly less than 0.5 mm across, without a black margin ... A. VERONENSIS

Acarospora americana H. Magn. (of America) This species is known locally only from siliceous rocks and weathered lignin locally. The type specimen (Fink, MIN) was collected in 1895 in Kane

County. Knudsen et al. (2011) explain why *Acarospora cinereoalba* (Fink) H. Magn., which was described from the same type specimen as *A. americana*, is conspecific with it and why the name *A. americana* has priority. Magnusson (1929) described the habitat of this as "granitic rocks." ~ Cortex brown to nigrescent, but at least thinly pruinose; apothecia cryptolecanorate, 1–3 per areole; spores broadly oblong, $3\text{--}5 \times 1.5\text{--}3 \mu\text{m}$.

Berrien-MOR, Grundy-MOR, Jefferson-MOR, Kane-ILL,MICH,MIN,NY, Kenosha-MOR, Will-MOR

Acarospora badiofusca (Nyl.) Th. Fr. (L. *badius*, chestnut-colored + *fuscus*, brown; from the color of the thallus) Our only record for this species, which is more frequent farther south, is from a granitic boulder at Nachusa Grasslands. ~ Thallus mostly endophloeic, generally evident only in the lecanorine rims of the apothecia, brown or reddish brown, usually a little paler than the disk; apothecia 1 per areole; paraphyses 2–3 μm thick proximally, expanded to 4–5 μm thick distally; spores ellipsoid, $3\text{--}6 \times 1\text{--}2.5 \mu\text{m}$.

Ogle-MOR

Acarospora chrysops (Tuck.) H. Magn. (Gr. *chrysos*, gold + *ops*, eye, face; from the appearance of the thalli as golden eyes) Yet unknown from the Southern Lake Michigan Region, this species is known from as nearby as Jo Daviess County, Illinois, where it was collected from a limestone outcrop in full sun to semi-open prairie. A similar species with more squamulose, uplifted lobe margins, is *A. socialis* H. Magn. (L. *socialis*, the condition of being allied or in association with others), which occurs rarely in the Midwest. ~ Thallus bright greenish-yellow, of scattered or contiguous areoles, patchy-pruinose or not; medulla KC–; apothecia cryptolecanorine, the disk brown; spores broadly ellipsoid, $3.5\text{--}4.2 \times 2.5\text{--}2.7 \mu\text{m}$. [rhizocarpic acid \pm epanorin]

Acarospora elevata H. Magn. (L. *elevatus*, raised up or above; perhaps from the rims of the pore, seemingly elevated above the apothecium) Our only record for this largely western species is from a granitic boulder, just south of the Waukesha County line, north of LaGrange, Wisconsin. Associates included *Acarospora americana*, *Amandinea punctata*, *Physcia thomsoniana*, and *Protoparmeliopsis muralis*. ~ Thallus of scattered, convex or nipple-like areoles, each bearing a cryptolecanorine apothecium, brown to nigrescent; spores narrowly ellipsoid, $4\text{--}6 \times 1.3\text{--}3 \mu\text{m}$.

Walworth-MOR

Acarospora fuscata (Schrader) Arnold (L. *fuscatus*, brownish; from the color of the thallus) Our only records for this species are from igneous boulders and sandstone outcrops. ~ Thallus areolate, the margins commonly a little lifted of the substrate, yellowish to reddish-brown, each bearing a more or less cryptolecanorine, nigrescent apothecium; cortex K–, C+ pink; spores bacilliform, $4\text{--}6 \times 1.0\text{--}1.5 \mu\text{m}$. A specimen from Noble County produces atranorin well as gyrophoric acid. [gyrophoric acid]

Allegan-MOR, Kane-MICH*,UC,US, Kenosha-MOR, LaSalle-MICH*,MOR, Lee-MOR, McHenry-MOR, Noble-MOR, Ogle-MOR, Waukesha-WIS*

Acarospora macrospora (Nyl.) Bagl. (Gr. *makros*, long, large + *spora*, seed; from the relatively few number of spores) This rare species is known locally only from a calcareous hill prairie in Cook County, where it grows on a base-rich pebble among *Heppia conchiloba*, and *Psora decipiens*. ~ Thallus pale brown to reddish brown or grayish, areolate to subsquamulose; apothecia mostly one per areole, initially small and pore-like, eventually larger flat to more or less convex, with a

sumptuous proper exciple; spores spherical to broadly ellipsoid, mostly more than 60, 5.4–8.2 μm in diameter.

Cook-MOR

Acarospora moenium (Vainio) Räsänen (L. *moenia*, fortress wall, perhaps from its inhabitancy on mortar and base-rich walls in Europe) A northern and western species in North America, our only records is from a pebble in an old quarry and from weathered limestone blocks. ~ Thallus areolate, densely white pruinose, one side of the areole lifted and bearing a blackish soralium; apothecia rare.

Kenosha-MOR, VanBuren-MOR

Acarospora oligospora (Nyl.) Arnold (Gr. *oligos*, few, small + *spora*, seed; from the relatively few number of spores). This species, evocative of *A. macrospora*, grows on gravel hill prairies, but on HCl– pebbles. ~ Very similar in appearance to *A. macrospora*, but rarely with more than 60 spores per ascus.

McHenry-MOR, Walworth-MOR

Acarospora strigata (Nyl.) Jatta (L. *striga*, swath, windrow, bristly; + *-atus*, adjective ending; perhaps from the white pruina evocative of an unshaven face) = *A. cervina* of some local authors. A western species, most of our material is from carbonate rock or weathered concrete. Hyerczyk's (2008a) report of *Acarospora glaucocarpa* (Ach.) Körb. is referable here; it has a more dispersed-areolate thallus, the latter commonly obscured by irregularly shaped, lecanora-like apothecia. ~ Thallus mostly or aggregated areoles, these usually white pruinose in contrast to the 1–several nigrescent, cryptolecanorine apothecia; apothecia 1–several per areole; spores ellipsoid, 3–7 \times 2.5–4.0 μm .

DeKalb-MOR, DuPage-MOR, Kane-FH, Kenosha-MOR, Lake IL-F*,MOR, Lee-MOR, McHenry-MOR, VanBuren-MOR, White-MOR, Will-MOR

Acarospora tuckerae K. Knudsen (in honor of the American botanist, Shirley Cotter Tucker, 1927–, much beloved professor and student of lichens at Louisiana State University) Including local reports for *Acarospora schleicheri* (Ach.) A. Massal., which is now known to be a purely terricolous species. The only record for this species in the Southern Lake Michigan region is as an associate of *A. americana*, the Fink, 1895, specimen from Kane County. It was taken from what appears to have been a granitic erratic. ~ Very similar to *A. chrysops* but with a KC+ red medulla; spores, ellipsoid, with an evident perispore, 4–6 $\mu\text{m} \times$ 2.0–2.5 μm . [acaranic acid, gyrophoric acid, rhizocarpic acid, lecanoric acid]

Kane-ILL

Acarospora veronensis A. Massal. (after Verona, Italy, wherein resided several Italian lichenologists at the Verona Lyceum) Our only local specimens are from granitic and basaltic boulders and HCl– pebbles. As we are interpreting the complex, many local reports of *A. americana*, which see, are referred here. *Acarospora veronensis* rarely has areoles more than 0.5 mm across and rarely produces pruina; *A. americana* has the larger apothecia more than 0.5 mm across and nearly always produces pruina. ~ Spores ellipsoid, 3.5–5 \times 1–2.1 μm .

DuPage-MOR, Kane-FH,MOR, Kendall-MOR, Lake IL-MOR, McHenry-MOR, Walworth-MOR

ACAROSPORACEAE

- A. Thallus epilithic.
 - B. Mature apothecia with the hymenium mostly closed to the surface of the thallus, exposed only through a small reddish brown pore; thallus epruinose **Trimmatothelopsis**
 - B. Mature apothecia with the hymenium fully exposed at the surface; thallus pruinose or not.
 - Cortex K+ red..... **Myriospora**
 - Cortex K--..... **Acarospora**
- A. Thallus nearly or quite endolithic.
 - C. Disk with greenish pruina **Caeruleum**
 - C. Disk epruinose or with white pruina.
 - Disk notably beset with carbonaceous ridges or bumps **Polysporina**
 - Disk free of carbonaceous intrusions **Sarcogyna**

ACROCORDIA A. Massal. MONOBLASTIACEAE [Photobiont: *Trentepohlia*. Gr. *akrochordon*, a wart; from the relatively large perithecia evocative of warts or blisters. ~ Thallus crustose, endophloidal; ascocarp a perithecium, the interthelial hyphae at least sparsely branched and anastomosed; asci long-cylindric, spores 8, uniseriate, hyaline with granular ornamentation, 1-septate, broadly fusiform, the median septum thick.]

- 1. Spores less than 30 μm long A. CAVATA
- 1. Spores more than 30 μm long A. MEGALOSPORA

Acrocordia cavata (Ach.) R. C. Harris (*L. cavatus*, hollow out) This species is rather frequent on bark in the districts just north and west of our region, with collections from as nearby as Dane County, Wisconsin. ~ Thallus endophloeic; perithecia with the ostioles centrally disposed; spores usually 11–17 \times 6–10 μm .

Acrocordia megalospora (Fink) R. C. Harris (Gr. *megas*, large, great + *spora*, seed; from the large spores) = *Arthopyrenia finkii* Zahlbr. According to Harris (1973), this species ranges throughout Illinois and the Southern Lake igan region, although the only specimen we can locate is from *Quercus alba* in Kalamazoo County. It evidently prefers elms and white oaks. Wetmore (1988) recognizes Calkins's report of *Arthopyrenia gemmata* as *Acrocordia gemmata* (Ach.) A. Massal., which Calkins reported from "oaks and hickories at River Forest and in all our territory." Another Calkins specimen at NY, however, named *Acrocordia gemmata*, is a non-lichenized pyrenomycete with muriform spores. *Acrocordia cavata* (Ach.) R. C. Harris (*L. cavatus*, hollow, excavated), which occurs just north of our region, has notably smaller spores. ~ Thallus endophloeic, the inhabited bark discolored white or sordid, gonidia abundant; perithecia immersed to partially exposed, to 0.1 mm broad, black, the ostiole notably necked and eccentric; interthelial hyphae sparsely branched; asci long-cylindric, 150–250 μm \times 15–25 μm .; mature spores 4–8 per, uniseriate, usually 33–60 \times 15–23 μm .

Kalamazoo-MS

AGONIMIA Zahlbr. VERRUCARIACEAE [Photobiont: *Chlorococcoid*. Perhaps from an Urdu name or place. ~ Thallus squamulose, granular; perithecia not seen locally; spores

2–8, muriform, brownish in age.]

Agonimia opuntiella (Buschardt & Poelt) Vězda (L. *Opuntia* + *-ella*; from its appearance as a tiny *Opuntia* cactus) Our only record for this species are from a sandy or mossy soil over dolomite in dry-mesic prairie. Elsewhere, it is said to grow at the bases of trees with the pleurocarpous moss, *Anomodon*. ~ Thallus squamulose, greenish-gray, its tiny, brown, bud-like scales evocative of an *Opuntia* with its cortical hairs is quite distinctive; spores 2 per ascus, 60–70 × 25–28 μm.

Boone-MOR, Walworth-MOR

ALYXORIA Ach. LECANOGRAPHACEAE [Photobiont: *Trentepohlia*. Gr. *alyxos*, an eye disfigurement + *-oria*, evocative of or belonging to; perhaps from the nigrescent eye-like apothecium. ~ Thalli crustose, endophloeic; apothecia disk-like to lirellate, the disk exposed; spores mostly 8, hyaline to brown, mostly 4–6 septate.]

Alyxoria varia (Pers.) Ertz & Tehler (L. *varius*, different; probably from the variability in the openness of the apothecia) = *Opegrapha varia* Pers., *O. pulicaris* (Hoffm.) Schrad. Calkins reported it simply from "various trees." Our only modern records are from *Acer saccharum*, *Populus* spp., *Quercus alba*, *Quercus macrocarpa*, *Quercus rubra*, and punky lignin from a fallen branch. ~ Hysterothecia disk-like to irregularly elongate, the epihymenium epruinose or pruinose; spores 19–32 × 5–7 μm.

Cook-F*,MOR,NY,DuPage-MOR,Kane-MOR,Lake IL-MOR,LaSalle-F*,MOR,Lee-MOR,Milwaukee-MOR,Rock-MOR,VanBuren-MOR,Winnebago-MOR

AMANDINEA Scheid. & H. Mayrh. CALICIACEAE [Photobiont: *Trebouxia*. In honor of one A. Maniere, evidently known to Maurice Gustave Benoit Choisy, "*Dedie a Madame A. Maniere (1937) en gage d'amitie.*" Her name, we assume, was Amandine, a diminutive of Amanda. ~ Thallus crustose, dark to endophloedial; apothecia biatorine or lecanorine, immersed to sessile; paraphyses capitate; hypothecia pale to brown spores 8–32, brown, 1-septate, the walls usually thin; conidia filiform.]

1. Apothecia biatorine.

Asci 12+ spored; spores prevailing less than 12 μm and 4.5 μm wide A. POLYSPORA
Asci 4–8 spored; spores commonly more than 12 μm long and 4.5 μm wide A. PUNCTATA

1. Apothecia lecanorine.

2. Thallus pale gray, rugose, rimose; spores not notably constricted at the septum, more than 1.8 times as long as wide, mostly less than 6 μm wide; epihymenium bluish-green A. MILLIARIA

2. Thallus pale gray to dark gray-green or brownish, verruculose or areolate; spores more or less constricted at the septum, to 1.8 times as long as wide, mostly more than 6 μm wide; epihymenium brown, without tinctures of bluish-green A. DAKOTENSIS s.l.

3. Hypothecium hyaline.

4. Thallus ashy to brownish-gray, K+ yellow var. *dakotensis* s.s.

4. Thallus distinctly greenish gray, K–.

Thallus areoles angular or undulate, well-developed, without verrucae or surface disturbances; spores scarcely constricted at the septum var. *subplumbea*

- Thallus furfuraceous to verrucose, without well-developed and defined areolae; spores notably constricted at the septum var. *finkii*
3. Hypothecium pale brown to dark.
 5. Thallus rather thick, the apothecia more or less immersed, the rim K– or K+ yellow

Thallus K+ yellow, the thalline margin corticate var. *dakotensis* s.s.

Thallus K–, the thalline margin ecorticate var. *pyriniformis*
 5. Thallus very thin, the apothecia sessile, the rim K+ yellow

Thalline margin thin, effuse, more or less verrucose, with a blue-gray hypothallus; spores distinctly constricted at the septum; tips of paraphyses no more than 3.5 μm wide; spores more than 6.5 μm wide var. *pennsylvanica*

Thalline margin thick; spores scarcely constricted at the septum; larger tips of paraphyses to more than 3.5 μm wide; spores to 6.5 μm wide var. *inequalis*

Amandinea dakotensis (H. Magn.) P. May & Sheard (after the state of North Dakota) Common southward, this lichen is relatively frequent locally. We have specimens from the branches and branchlets of *Acer rubrum*, *Acer saccharum*, *Betula papyrifera*, *Malus* spp. *Quercus alba*, *Quercus macrocarpa*, *Pinus strobus*, *Prunus serotina*, *Pyrus calleryana*, *Rhamnus cathartica*, *Rhus typhina*, *Tilia americana*, and *Tilia cordata*. Associates include *Amandinea punctata*, *Chrysothrix caesia*, *Phaeophyscia ciliata*, *Physcia millegrana*, and *Physcia stellaris*. There is a Calkins specimen (#167, NY) of this species from Cook County, which he called *Buellia alboatra*. ~ Thallus rather variable, effuse to granulose, areolate, or verreuculose, pale to grayish or greenish, K– or K+ yellow; apothecie immersed to sessile, lecanorine, the margins corticate or ecorticate, smooth the crenulate; epihymenium dark brown; hypothecium pale to brown; spores thin-walled, commonly constricted at the septum, 10–14 \times 5–8 μm . [\pm atranorin]

The following key to Magnusson's varieties is a distillation of the presentation by Ryan 1997.

Var. *dakotensis* Magn. (after the state of North Dakota) Apothecia gregarious, to 0.5 mm across; hymenium 70–80 μm high; spores constricted, 11–13 \times 6–7 μm .

Var. *finkii* Magn. (in honor of the prominent American lichenologist, Bruce Fink, 1861–1927) Apothecia dispersed, to 3.5 mm across; hymenium 50–60 μm high; spores constricted at the septum, 10–13 \times 5.5–6.5 μm .

Cook-MOR, DuPage-MOR

Var. *inaequalis* Magn. (L. *inaequalis*, unequal) Apothecia more or less gregarious; hymenium 65–75 μm high; spores constricted at the septum, 10–13 \times 5.0–6.5 μm .

Var. *pennsylvanica* Magn. (of Pennsylvania) Apothecia to 0.4 mm across; hymenium 65–75 μm high; spores constricted at the septum, 12–14 \times 7.0–8.0 μm .

Var. *pyriniformis* Magn. () Apothecia gregarious, mostly more than 3 mm across; hymenium 65–75 μm high; spores constricted at the septum, 10–13 \times 5.5–6.5 μm .

Var. *subplumbea* Magn. (L. *sub*, beneath, below, almost + *plumbeus*, leaden) Apothecia gregarious, to 0.5 mm across; spores slightly constricted, 11–14 \times 5–6 μm .

Allegan-MOR, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-MOR, NY, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Iroquois-MOR, Jasper-MOR, Kane-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, LakeIL-F*, MOR, Lake-IN-MOR, Lee-MOR, McHenry-MOR, Ottawa-MSC, Racine-MOR, Rock-MOR, St. Joseph MI-MOR, Steuben-MOR, VanBuren-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Amandinea milliaria (Tuck.) P. May & Sheard (*L. mill*, a thousand-*arius*, like or connected with, perhaps for the countless aggregated apothecia) An east coast species, it is rare in the Great Lakes region, known from as nearby as Dane County, Wisconsin. ~ Thallus pale gray, K+ yellow; apothecia sublecanorine, with erumpent, pseudothalline margins; epihymenium usually bluish-green, at least in age; hypothecium light to dark brown, the subhymenium portion usually infused with bluish-green; spores notably thick-walled rarely constricted at the septum, mostly 11–12 × 5.5–7 μm.

Amandinea polyspora (Willey) E. Lay & P. May (Gr. *poly*, many + *spora*, seed; from the many-spored asci) Frequent to common just to the west and south of the Southern Lake region, where it grows on twigs and branches of open-grown trees. Infrequent with us, our specimens are from *Alnus glutinosa*, *Carya cordiformis*, *Malus pumila* and *Prunus serotina*. Associates include *Amandinea punctata*, *Chrysothrix caesia*, and *Physcia millegrana*. ~ Thallus thin, more or less contiguous, the medulla I–; apothecia biatorine, the interior of the exciple pale; spores 8.5–10.2 × 3.2–4.2 μm. [± atranorin]

Allegan-MOR, MSC, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Kankakee-MOR, Livingston-MOR, VanBuren-MOR, Walworth-WIS*, Winnebago-MOR

Amandinea punctata (Hoffm.) Coppins & Scheid. (*L. punctatus*, bespeckled, dotted; perhaps from the appearance of numerous tiny black apothecia) = *Buellia punctata* (Hoffm.) A. Massal. ; includes early specimens that Calkins labeled *Buellia schaeereri* and *B. turgescens*. *Amandinea punctata* is characteristic of weathered lignin, where it often grows with, *Candelaria concolor*, *Chrysothrix caesia*, *Physcia adscendens*, *Physcia millegrana*, and *Villoglyphora microphyllina*. There are also specimens from *Acer negundo*, *Acer saccharinum*, *Juniperus horizontalis*, *Quercus macrocarpa*, *Quercus rubra*, *Salix fragilis*, and *Ulmus americana*. It occurs rarely on siliceous rock. *Buellia schaeereri* and *B. parasema* (in part) of Calkins, who reported it from Cook and Grundy counties, noting that it grew on weathered rails and once on an old stump. He does not mention *Buellia punctata*. The fact that Imshaug (1951) cited specimens from Cook and Grundy counties suggests strongly that Calkins' reports are referable here. See also the notes under *Buellia schaeereri*. ~ As we understand it, the thallus is quite variable, from scant to consisting of grayish, often aggregated areoles or even verrucae, the medulla I–; apothecia biatorine, the exciple poorly differentiated, without a distinctly pale inner layer, mostly 0.2–0.5 mm across; spores 11–15 × 4–7 μm.

Allegan-MOR, Berrien-MOR, Branch-MOR, Calhoun-MICH*, Cass-MOR, Cook-F*, MOR, NY, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-CACS*, F*, MOR, WIS*, Jefferson-WIS*, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, LaGrange-MOR, LakeIL-F*, MOR, LakeIN-MOR, LaSalle-CACS*, F*, ILLS*, MICH*, NY, WIS*, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Ogle-ILLS*, WIS*, Porter-INDU, MIN, Rock-WIS*, St. JosephIN-F*, St. JosephMI-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-F*, MOR.

AMUNDSENIA Søchting, Arup & Frödén TELOSCHISTACEAE [Photobiont: mostly "*Pseudotreboxia*." Presumably in honor of Roald E. Amundsen (1872–1928), who explored the arctic regions in the early decades of the twentieth century. ~ Thallus crustose, mostly endolithic; spores 8, hyaline, polaribilocular, the isthmus

less than 2 μm long. Anthraquinones, particularly parietin.]

Amundsenia approximata (Lyngé) Søchting, Arup & Frödén (L. *approximatus*, vague, near, close, ballpark; a name that could be applied to many of our *Caloplacae!*) = *Caloplaca approximata* (Lyngé) Magn. This species occurs on siliceous rocks in the Great Plains, west of our region. I am including it to be aware of it just in case it has been overlooked in the Midwest. ~ Thallus endolithic or poorly developed with a black prothallus; apothecia biatorine, bright orange, scattered, persistently flat, with an elevated proper exciple; spores oblong 9–13 \times 3–5 μm , the isthmus less than 1.5 μm long.

ANAPTYCHIA Körb. PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *ana-* throughout + *ptychia*, fold or layer; probably from the interwoven hyphae of the algal and medullary layers of the upper cortex. ~ Thallus foliose, narrowly lobed and lobulate, pale beneath with a poorly developed cortex; apothecial rim usually crenulate; spores 8, brown, 1-septate.]

Anaptychia palmulata (Michaux) Vainio (L. *palma*, the palm of the hand + *-ulatus*, diminutive adjective ending; from the small finger-like lobules) = *Physcia aquila* var. *detonsa* of an early Calkins specimen. The only record I have seen is one from LaSalle County (Calkins #6026, CACS), which he recorded from "trees and rocks," in Illinois, presumably LaSalle County. Includes Thomson's (1963) report of *Physcia pulverulenta* (Schreb.) Hampe from Wauconda [1908, Wright (BSAL)]. Hale (1979) restricts *P. pulverulenta* [now known as *Physconia distorta* (With.) J. R. Laundon] to the western United States. He refers all the eastern material to *Anaptychia "palmatula"* (Michaux) Vainio. Thomson referred the Lake County, Illinois, specimen to the forma *pulverulenta*, and the St. Joseph County, Indiana, specimen to the forma *venusta* (Ach.) Sandst. The St. Joseph County, Indiana, specimen is from the base of a hardwood in a swamp; the Waukesha County record is from *Acer saccharum*. Some early reports of this species are referable to *Physconia leucoleiptes*, which see, so it is possible or even probable that these reports are referable to *A. palmulata* as well. In southern Illinois and Missouri, where this species is occasional, it grows on shaded sandstone and at the bases of old-growth trees in natural areas. ~ Thallus grayish green or brownish, sometimes pruinose, K–, the narrowly linear lobes radiate-flabelliform, commonly minutely lobulate, as are the robust lecanorine rims of the apothecia; lower surface pale to tan, scarcely corticate, the rhizines simple to forked or even coalesced; spores brown, thin-walled, or septum somewhat thickened. [zeorin]

Lake IL-BSAL, LaSalle-CACS*, St. Joseph IN-MICH, Waukesha-WIS*

ANISOMERIDIUM (Müll. Arg.) M. Choisy MONOBLASTIACEAE [Photobiont: *Trentepohlia* and/or Chlorococcoid. Gr. *an-*, not, + *isos*, equal + *meridos*, part or portion, from the unequal cells in some species. The descriptions here are distilled from Harris (1973 & 1975). ~ Thallus usually corticolous and endophloedeal; interthecial hyphae branched and interwoven, the hymenium IKI–; asci long-

cylindric; spores usually 8, hyaline, 1–3 septate. According to Harris (1990), this is the oldest name for this genus; pycnidia often short-beaked.]

1. Spores about 3 times as long as wide, sometimes becoming 4-celled; microconidia elliptical A. POLYPORI
1. Spores notably less than twice as long as wide, remaining 2-celled; microconidia globose.
 - Asci to 80 μm long. A. LEUCOCHLORUM
 - Asci more than 80 μm long. A. BIFORME

Anisomeridium biforme (Borrer) R. C. Harris (L. *biformis*, of two forms; from the two unequal cells of the spores) = *Arthopyrenia biformis* (Borrer) A. Massal. *A. gemmata* of North American authors, not (Ach.) A. Massal., but see also *Eopyrenula intermedia* and *Acrocordia megalospora*; *Ditremis biformis* (Borrer) R. C. Harris; *Pyrenula gemmata* of Calkins. Infrequent, our only specimens are from the bark of *Populus deltoides*, *Quercus alba*, *Quercus rubra*, and *Tilia americana*. Harris (1973) says that this species is rare in the Great Lakes region and cites a Calkins specimen (FH & MICH) from Cook County. ~ Perithecia separate or fused, remaining at least partly immersed, prevailing 0.3–0.6 mm broad, black, colorless below; asci cylindric-clavate, 100–115 \times 11–13 μm ; spores uniseriate to irregularly biseriate in the ascus, not constricted at the weakly eccentric septum, 12–16 \times 4.5–7.5 μm .

Cass-MOR, Cook-FH,MICH*,MIN,NY,WIS*, DuPage-MOR, McHenry-MOR, Porter-INDU,MIN,US

Anisomeridium leucochlorum (Müll. Arg) R. C. Harris (Gr. *leukos*, white + *chloros*, green, greenish yellow; probably an allusion to the color of the thallus) This species is known from as nearby as McLean County, Illinois, where it was collected on *Juglans nigra* at Funk's Grove. ~ Perithecia prevailing immersed, 0.2–0.3 mm broad, black, colorless below; asci narrowly-obovate 53–77 $\mu\text{m} \times$ 12–20 μm ; spores irregularly arranged in the ascus, 12–18 \times 5.0–7.5 μm . Harris (1975) wonders about the distinctness of this species from *A. biforme*.

Anisomeridium polypori (Ell. & Everh.) M. E. Barr (Gr. *poly*, many + *poros*, pore, passage, way; the allusion unclear) = *Arthopyrenia willeyana* R. C. Harris; *Anisomeridium willeyanum* R. C. Harris) R. C. Harris; *A. juistense* (Erichs.) R. C. Harris; *A. nyssaegenum* (Ell. & Ev.) R. C. Harris, *Ditremis nyssaegenum* (Ell. & Ev.) R. C. Harris. Very common on the bark of *Crataegus* spp., *Fraxinus*, *Juglans nigra*, *Quercus alba*, *Q. macrocarpa*, *Populus deltoides*, *Tilia americana*, and *Ulmus americana*. There are several Cook County records from *Crataegus* that represent, according to Richard Harris (pers. comm.), the conidial state of this lichen. The macroconidia are held together by a colorless mucilage in packets that resemble polysporous asci filled with 1-septate spores, such as the Kenosha County specimen (Hyerczyk #2647, WIS). This has been called *Sarcinulella banksiae* Sutton & Alcorn, an anamorphic form known from Australia. ~ Perithecia immersed, becoming superficial, to 0.25 mm broad, black, colorless below; asci cylindric-clavate, 55–90 $\mu\text{m} \times$ 12–15 μm ; spores biseriate in the ascus, asymmetrically 1-septate or rarely some 2–3,-septate, 14–20 \times 4.5–6 μm .

Barry-MICH*,MIN,MSC, Berrien-MSC, Cass-MSC, Cook-F*,MOR,NY, DeKalb-MOR, DuPage-MOR, Ford-MOR, Kalamazoo-F*,MICH*,MSC, Kane-MOR, Kankakee-MOR, Kenosha-MOR,WIS, LakeIN-MOR, LaSalle-MOR, Livingston-MOR, McHenry-MOR, Porter-MOR, Will-MOR, Winnebago-MOR

ANZIA Stizenb. PARMELIACEAE [Photobiont: *Trebouxia*. In honor of Martino Anzi, 1812–1883, an Italian cryptogamist. ~ Thallus foliose, thick-lobed, the lower surface black-tomentose; apothecia laminal, lecanorine, the disk usually concave; spores numerous, minute, curved, hyaline, simple.]

Anzia colpodes (Ach.) Stizenb. (Gr. *kolpos*, bosom, breast, womb + *-ode*, like, resembling; only Acharius knows for sure, but the small, sessile, brown apothecia may have reminded him of nipples) = *Parmelia colpodes* of Calkins (1896), who reported it from "oaks near Lemont and there is a specimen at CASC from LaSalle County [Calkins #6011] from "various trees." In the Missouri Ozarks, this species is usually found on *Quercus velutina* in natural areas. ~ Upper cortex K+ yellow; medulla UV+ white. [atranorin, divaricatic acid]

Branch-CAS, Cook, LaSalle-CASC*

AQUACIDIA Aptroot PILOCARPACEAE [Photobiont: Chlorococcoid. Evidently a syncopation of the genus *Bacidia* with the Greek word for water. ~ Thallus granular to soorediate, usually sterile, but often with open-ostiole pycnidia; apothecia biatorine, the proper exciple well developed, the disk flat; paraphyses branched, dilated-clavate distally; hypothecium and exciple K+ purple or xanthones otherwise present; spores hyaline, 8, 2–5 septate, bacilliform; conidia narrowly bacilliform, usually constricted medially.

Aquacidia trachona (Ach.) Aptroot (?) = *Biatoria trachona*, *Bacidia trachona* Ach. Although I have yet to see a specimen, Aptroot *et al.* (2018) indicate that the genus is known from North America as well as Europe and that it is largely on siliceous rock in shaded ravines and valleys. The lichen portal indicates that there are specimens from Illinois, Indiana, and Wisconsin and list base rich rock as a common substrate, which causes one to wonder if the reference is not actually based upon specimens of *Bacidia granosa* under the cognomen of *B. trachona*. Indeed, we have historically, treated the name under *Bacidia granosa*, largely on the speculations of the late Richard Harris, who believed it to be a European species. All of the local specimens we have seen with name *Bacidia trachona* are, indeed, referable to *Bacidia granosa*. ~ Thallus skiophilous, granular to more or less soorediate, thin, greenish of pale brownish, UV–; apothecia often absent, to 0.5 mm across, the proper exciple well developed; epihymenium greenish; hymenium to 50 μm high, K+ purple; paraphyses slender, branched, mostly dilated and clavate distally.

ARTHONIA Ach. ARTHONIACEAE [Photobiont: *Trentepohlia* or Chlorococcoid, or absent. Perhaps from Gr. *arthron*, a joint + *onos*, diminutive; after the tiny, irregularly rayed, jointed-looking apothecia of some species. The species names presented here must be regarded as placeholders until the genus is much better understood in North America. An even less than casual glance at the treatment in Harris & Ladd (2018) is enough to humble anyone who pretends authority here; the user must regard all of the names presented here as provisional. ~ Thallus crustose,

endophloedeal, lichenized or not; ascocarp an arthonioid apothecium or a hysterothecium, immersed or superficial, flat or convex, without an exciple; interthecial hyphae indistinct; asci subglobose; spores 8, hyaline or brownish, 1–7 septate, often clavate. In older specimens the red chromatophores are often blanched in cells of *Trentepohlia*, but they remain generally irregular in shape, with many of the longer dimensions more than 15 μm across; the cells of Chlorococcoid algae are circular in shape and rarely exceed 15 μm in diameter]

1. Thallus saxicolous. A. LAPIDICOLA
1. Thallus corticolous.
 2. Ascocarps with distinct tinctures of red; ascospores 4–6 septate A. CINNABARINA
 2. Ascocarps brown to nigrescent, often with fewer than 4 septa.
 3. Spores muriform. A. SUSA
 3. Spores not muriform.
 4. Spores 1-septate.
 5. Spores prevailingly more than 16 μm long and 6 μm wide A. GRANOSA
 5. Spores prevailingly less than 16 m long and 6 μm wide.
 6. Hypothecium and epihymenium K+ red A. SPADICEA
 6. All tissues K-.
 - Spores with equal cells A. PATELLULATA
 - Spores with one cell larger than the other A. DISPERSA
 4. Spores 2 or more septate.
 7. Ascomata with thick, carbonized walls, opening by a narrow slit A. ATRA
 7. Ascomata without thickened wall, not opening by a narrow slit.
 8. Photobiont absent.
 9. Cells of spores subequal in size A. PUNCTIFORMIS
 9. End cell notably larger than the others
 - Spores prevailingly 5-septate A. QUINTARIA
 - Spore prevailingly 3-septate A. "CRESTVIEWENSIS"
 8. Photobiont present.
 10. Apothecia at least thinly pruinose.
 - Spores 2-septate A. DIFFUSA
 - Spores 3–5 septate A. BYSSACEA
 10. Apothecia not pruinose.
 - Spores macrocephalic A. PYRRHULIZA
 - Spores not notably macrocephalic A. RADIATA

Arthonia atra (Pers.) A. Schneider (L. *atra*, black; from the color of the apothecia) = *Opegrapha atra* Pers. Infrequent, our few species are from *Quercus* species. Many specimens cited from Illinois are based upon misidentifications of the non-lichenized *Hysterium pulicare* or *Hysterium angustatum*; the spores of these *Hysterium* species are usually wider than 5 μm and with at least two cells pale brown—at least outside the ascus. ~ Photobiont *Trentepohlia*. Thallus endophloeic; hysterothecia scattered in clusters, variable, simple or frequently branched; disk a slit, rarely opening, the exciple black, not pruinose, continuous under the hyaline hypothecium; epihymenium brown or greenish-brown, K+ olive-green; interthecial hyphae septate, branched and often anastomosed; asci

short-cylindric, clavate, 39–47 μm \times 15 μm , the spores 3-4 septate, hyaline, 17–25 \times 3.7–5.0 μm .

Berrien-MOR, Calhoun-MOR, Jasper-MOR

Arthonia byssacea (Weigel) Almq. (Gr. *bussos*, flax or linen fibers + *-aceus*, of or pertaining to; the allusion here unclear) Yet unknown locally, this species is known from as nearby as Fulton County Ohio. Thomson (2003) reports it from North Wisconsin on *Betula* and *Abies*. It is also known from Europe. A similar species, *A. lecideella* Nyl. (*Lecidea* + *-ella*, diminutive; a little *Lecidea*) is known from north of our region; it differs in having a pale hymenium. This is Thomson's (2009) concept, which he notably segregates from *A. caesia*; Lendemer (2008), however includes *A. lecideella* species with *Chrysothrix caesia*, which see. ~ Thallus white or pale gray, granulose, but not leprose; apothecia dark, but well beset with pruina, round or elongate, flat or shallowly convex; hypothecium nigrescent; hymenium reddish brown; spores 3–5 septate, megacephalous, 12–24 \times 5–9 μm .

Arthonia cinnabarina (DC.) Wallr. (*L. cinnabarina*, vermillion, from the color of the ascocarp) = *A. gregaria* (Weigel) Körb. ; *A. tumidula* (Ach.) Ach. There is a Calkins specimen (F) from "Illinois" that, presumably, is the Southern Lake Michigan region. It is similar to *A. pyrroliza* and *A. radiata*, but the apothecia are notably pruinose and dark reddish brown; the spores are 4-5 celled and about 12 μm long. There are two Hall specimens (F) from downstate that are similar, though the older spores are tinted gray or brown. One (Hall *s.n.*, MOR) from Menard County, resembles most closely what Harris & Ladd (2018) call *Arthonia* sp. #17128; the ascomata are dendritic, dark red when wet, heavily pruinose. Ryan (1994) restricts this species to the east and west coasts of North America. ~ Thallus endophloeic, forming a gray to pinkish stain on the bark, often bordered by a thin, brown prothallus; ascomata arthonioid, irregularly ellipsoid, brown, usually with dark red or red-orange, K⁺ red pruina at least near the edges; spores 5–6 celled, strongly tapered and megacephalous, 18–28 μm \times 7–10 μm . [anthraquinones]

"*Arthonia crestviewensis*" This specimen is from the ravine at Crestview, Wisconsin, which area is known for it particularly interesting boreal disjunct species. Its small, large-headed spores are evocative of what Purvis, *et al.* (1992) describe for *Arthonia anombrophila* Coppins & James. *A. diffusella* Fink (*L. diffusa* + *ella* small, a diminutive of *A. diffusa*) is known a little north of our region; it is similar but has broader spores. ~ Ascocarps arthonioid; spores 3-4 septate, 12–13 \times 5–6 μm .

Racine-MOR

Arthonia diffusa Nyl. (*L. diffusus*, spread out, extensive; for reasons known only to Nylander) There is a Calkins specimen (#307) from "Illinois," presumably from in or near the Southern Lake Michigan region, which has 2–4 celled spores 15–22 μm long \times 6–10 μm wide, distinct paraphyses, round black apothecia that are somewhat pruinose, and a rather thick thallus. It has been annotated as *A. polymorpha* Ach. Until disabused of the idea, we are including here the report (Thomson 2003) of *A. willeyi* Tuck from Rock County. Harris & Ladd (2018) describe *A. diffusa* thus: ". . . abundant, superficial pycnidia which are usually white pruinose and often oozing conidia. Further distinctive characters are the pruinose \pm lecideoid ascomata and Chlorococcoid photobiont."

Rock

Arthonia dispersa (Schrad.) Nyl. (*L. dispersus*, scattered; perhaps for its general distribution)

Naevia dispersa (Schrad.) Thiyagaraja, Lücking & K. D. Hyde is a nomenclatural if not taxonomic synonym for our plants. Yet unknown locally, we have specimens of this species from as nearby as Champaign County, Illinois. This is the name we are applying to those species with 2-celled spores with little or no constriction at the septum, usually with a Trentepohlioid photobiont, sometimes non-lichenized, and IKI- ascomatal tissues. The student may wish to consult Thiyagaraja *et al.* (2020); I am not certain how *A. dispersa*, so called, fits into *Naevia*. ~ Thallus corticolous, pale to grayish, sublustrous, in irregular patches; apothecia 0.09–0.4 mm across, longer than wide, reddish brown to brown or grayish pruinose, scattered or in parallel line, more or less branched; hypothecium hyaline or pale brown; pores 11–16 × 4–5 μm, one end slight wider than the other; photobiont *Trentepohlia*.

Arthonia granosa B. de Lesd. (L. *granosus*, full of seeds; possible from the broadly obovoid asci with their “bag” full of spores) First reported from North America by Brodo (1967), who collected in it Iowa County, Wisconsin. It is a non-lichenized European species that is most evident on the smooth bark of trees, commonly young ones in suburban landscapes, commonly with *Amandinea dakotensis*, where it is now quite frequent. We have it from *Acer saccharinum*, *Acer saccharum*, *Prunus serotina*, *Quercus rubra*, *Quercus velutina*, and *Rhus glabra*. ~ Thallus represented by a pale stain on smooth bark; apothecia immersed or barely erumpent; epihymenium reddish brown; asci broadly obovoid to subglobose, stipitate; spores 1-septate, 15–30 × 8–14 μm) with equal cells. One might be inclined to separate forms with spores mostly more than 18 μm from those with shorter spores.

Benton-MOR, Berrien-MOR, Boone-MOR, DuPage-MOR, Kenosha-MOR, Kosciusko-MOR, LakeIL-F*, MOR, LakeIN-MOR, Livingston-MOR, Porter-MOR, Racine-MOR, St.JosephMI-MOR, Will-F*, MOR

Arthonia lapidicola (Taylor) Branth & Rostrup (L. *lapis*, stone + *-idicola*, a third declension adjective for inhabiting) Photobiont protococcoid. Yet unknown locally, there are specimens from as nearby as Dubuque, Iowa, where it grew on limestone with species otherwise frequent locally: *Bacidia granosa*, *Caloplaca atroalba*, *Gyalolechia flavovirescens*, *Protoblastenia rupestris*, *Squamulea subsoluta*, *Verrucaria muralis*, *Verrucaria nigrescens*. ~ Thallus saxicolous on both limestone and mortar, and even on sandstone; apothecia round, nigrescent, 0.1–0.3 mm across, lecidea-like; hypothecium hyaline or brownish; spores 8–14 × 2–4 μm, the cells subequal.

Arthonia patellulata Nyl. (L. *patella*, a small pan or dish + *-ulatus*, diminutive) Often reported from Illinois, we have yet to discover it locally. ~ Thallus corticolous thin, whitish, commonly mealy or rough; apothecia 0.15–0.5 mm across, round, black; hypothecium pale brown; spores 1-septate, ovoid or oblong, the cells subequal, 9–15 μm × 3–5 μm.

Arthonia punctiformis Ach. (L. *punctus*, dotted + *forma*, the shape of; probably from the minutely dotted, slightly bleached, appearance of the apothecia on the twig) = *Naevia punctiformis* (Ach.) A. Massal. This is the name we are using for those non-lichenized fungi with 3-septate spores, minute apothecia scattered in the surface cortex of scarcely bleached twigs. It rarely produces ascospores, so we cannot be certain that sterile material is not the more southern, *Arthonia quintaria*, which see. Our specimens are probably not *A. punctiformis*, but until the non-lichenized species with minute roundish apothecia, and 3-5 septate spores is revised, we are left with little choice for a name. Whatever its name, it is frequent on the smooth bark of twigs,

branches, and young boles. See also the discussion under *A. quintaria*. ~ Thallus corticolous, ashy or disappearing; apothecia 0.1–0.2 mm across, round or nearly so, black, epruinose; hymenium I+ dark red; spores prevailingly 3-septate, $13\text{--}23 \times 4.5\text{--}7.5 \mu\text{m}$; photobiont absent.

DuPage-MOR

Arthonia pyrrhuliza Nyl. (Gr. *pyrrhos*, purplish + L. *-iza*, finch; perhaps the dark red apothecia reminded Nylander of the color of the purple finch) Calkins described his specimen as "*Thallus white, thin; apothecia reddish, slender, much divided, ramose.*" Calkins noted that it was rare on oaks in Will County, but Fink (1935) doubts Illinois reports. We have seen, however, a specimen from LaSalle County, originally under that name, that we have placed here [Calkins #67, F]. There is also a specimen from Menard County, Illinois. (F: 1073785). ~ Apothecia sessile upon the substrate, with much-branched, irregularly fissured units; spores 4-celled, $13\text{--}19 \times 4.0\text{--}7.0 \mu\text{m}$, more or less macrocephalic, becoming brown in the ascus; photobiont *Trentepohlia*.

LaSalle-F*,Will

Arthonia quintaria Nyl. (L. *quintaria*, of or relating to five, evoking the 5-septate spores) Frequently there are specimens with silver-gray thalli, non-punctiform ascocarps, globose but sterile asci, and without a photobiont, but we have rarely been able to find spores. Our only local record is from the smooth bark of small twigs on a dead tree. There is a Calkins specimen of this species at the Field Museum from "Illinois, on oaks"; presumably this is from the Southern Lake Michigan region. In his book he listed hickories and maples as the substrates. There is a recent record for Champaign County, Illinois (Ladd #23767, NY). See also the notes under *A. pyrrhuliza*. ~ Ascocarps sparingly branched to roundish; spores 6-celled, one end cell notably the larger, $17\text{--}25 \times 6\text{--}10 \mu\text{m}$.

Livingston-MOR

Arthonia radiata (Pers.) Ach. (L. *radiatus*, rayed; from the branched apothecia) The Walworth and Winnebago county specimens were collected on *Tilia americana*, the Berrien on *Quercus rubra*. The Kendall and Racine county specimens were from *Carya ovata* and the DuPage County specimen was collection on open-grown *Gleditsia triacanthos*. Calkins reported having found it "on oaks near Elgin and elsewhere." All of the specimens we are including here (that we have seen) have oblong-clavate to clavate-cylindric asci and oblong, equal-celled spores $14\text{--}17 \times 2.9\text{--}6.0 \mu\text{m}$. ~ Photobiont *Trentepohlia*.

Allegan-MS, Berrien-MIN, MOR, Cook-F, Kendall-MOR, Walworth-MOR, Winnebago-MOR, WIS

Arthonia spadicea Leighton (L. *spadiceus*, light brown) Yet unknown from our region, this species is known from districts all around us, where it grows on bark and allegedly on wood. *Arthonia didyma* Körber (Gr. *didymos*, double, twofold; evidently from the 2-celled spores), another species with K+ red ti, is known from north of our region; its spores are similar in size, but the cells are not or only weakly megacephalous. ~ Epiphloeic thallus greenish gray to whitish; apothecia to 0.4 mm across, round to a little misshapen, nigrescent, flat to convex; epihymenium and hypothecium K+ red; spores 1-septate, with one of the cells notably larger, $10\text{--}15 \times 4\text{--}6 \mu\text{m}$.

Arthonia susa R. Harris & Lendemer (L. designation of the region of the type locality, the Southeastern United States [of] America) = *Arthonia taediosa* of Calkins, who reported it from "maples in the Des Plaines valley; also found on oaks." ~ Photobiont Chlorococcoid, the cells

mostly 8–15 μm ; apothecia rare longer or broader than 0.6 mm, the hymenium standing a bit above the surface of the substrate; spores mostly 7 septate, each cell 1-3 muriform, 24–33 \times 12–15 μm . Compare with *Arthothelium spectabile*.

Cook-F

ARTHONIACEAE

- A. Ascoma circular to misshapen, but with the epihymenium continuous; spores muriform **Arthothelium**
 A. Ascoma indistinctly shaped, with portions of the epihymenium incompletely exposed at the surface; spores septate to muriform.
 Thallus epiphloedal, dark to olivaceous; apothecia round, convex; spores 1-septate, with one cell larger than the other **Bryostigma**
 Thallus scant or endoploedal; otherwise without the above combination of characters **Arthonia**

ARTHOPYRENIA A. Massal. ARTHOPYRENIACEAE [Photobiont: *Trentepohlia* or absent. Perhaps from Gr. *arthron*, a joint + *pyren*, kernel; presumably after the kernel-like perithecia, in a lichen that otherwise resembles a thallus of *Arthonia*. ~ Thallus immersed; spores typically 8, hyaline, 1-septate, not particularly constricted at the septum.]

Arthopyrenia analepta (Ach.) A. Massal. (Gr. *ana*, up, against, back + *lepta*, small or narrow, especially with regard to coins of low value or size; perhaps the tiny perithecia evoked relatively small coins, compared, say, to some *Pyrenulae*) Not yet known from the Southern Lake Michigan region, this species is known from nearby Grant County, Wisconsin, where it grows on white-bark birches. ~ Spores 16–20 \times 6–7 μm .

ARTHOPYRENIACEAE

1. Spores less than 24 μm long and 7.6 μm wide; asci prevailingly less than 100 μm long **Arthopyrenia**
 1. Spores mostly more than 24 μm long and 7.6 μm wide; asci mostly more than 100 μm long . . . **Constrictolumina**

ARTHOTHELIUM A. Massal. ARTHONIACEAE [Photobiont: *Trentepohlia*. Perhaps from Gr. *arthron*, a joint + *thele*, nipple; after the apothecia, which superficially resemble pyrenocarps, but are actually like those of *Arthonia*. *Arthothelium* is no better known. Spores 8, hyaline or brownish, muriform.]

1. Spores 2–5 septate longitudinally, mostly more than 26 μm long A. SPECTABILE
 1. Spores 1-2 septate longitudinally, to 26 μm long
 Spores more than 21 μm long A. RUANUM
 Spores less than 21 μm long A. "SUBHALLI" I

Arthothelium ruanum (A. Massal.) Körber (After Mount. Rua near Toreglia in the Euganean Hills of Italy, the summit from which the type was collected) The only record we have seen locally is from *Rhus typhina* at Springbrook Prairie Forest Preserve, DuPage County. Fink (1935), does not treat this species, but presents *Arthothelium hallii* (Tuck.) Zahlbr. (after Elihu Hall, 1822–1882,

American botanist from Athens, Illinois, and one of the organizers of the Illinois Natural History Society at Bloomington) which he describes as having an obvious nigrescent prothallus, which our specimens do not display except to scant degree. He also gives the spore size as $20\text{--}32\ \mu\text{m} \times 7\text{--}10$. If care isn't taken to note the photobiont, one might confuse this species with *Arthonia susa*, which see, with spores mostly more than $27\ \mu\text{m}$ long. ~ Epithymenium nigrescent, persistent and adherent to the distal end of the obpyriform to clavate asci; hypothecium dark red-brown, K+ green; spores $22\text{--}26 \times 7\text{--}8\ \mu\text{m}$.

DuPage-MOR

Arthothelium spectabile (Flotow) A. Massal. (*L. spectabilis*, remarkable, visible; probably from the fact that its apothecia are much larger than those of its relatives) = *Arthonia spectabilis* of Calkins (1896), who noted that it grew on "maples at Glencoe, Riverside and elsewhere." The Berrien County record is from *Acer saccharum* at Warren Woods State Park. ~ Apothecia flat and flush with the substrate, mostly 0.6–1.5 mm in diameter or long; spores $33\text{--}45 \times 15\text{--}23\ \mu\text{m}$. Compare with *Arthonia susa*.

Berrien-MS, Cook-F*,MOR,NY

Arthothelium "subhallii" (Evocative of *A. hallii*) Our only record for this species is from the smooth bark of *Prunus serotina*. If the absence of a photobiont is overlooked, it would resemble *A. hallii*, but with smaller spores, some of which have only one cell with a longitudinal septum while others are merely five septate. It might belong to the genus *Arthonia*, but given the placement of *A. susa* in *Arthonia*, I still have no firm idea as to how *Arthonia* and *Arthothelium* are distinct as genera. It does not have the adherent epithymenium persistent on the apices of the asci. A specimen from *Acer saccharum* in Effingham County, Illinois, was annotated *A. hallii* in 1993. ~ Spores $17\text{--}20\ \mu\text{m} \times 6\text{--}8\ \mu\text{m}$.

DuPage-MOR

ASPICILIA A. Massal. MEGASPORACEAE [Photobiont: *Trebouxia*. *L. aspicilia*, "eyes of the viper"; probably from the round, lidless "eyes" or apothecia. ~ Thallus saxicolous; apothecia immersed, the paraphyses filiform; spores 2–8, hyaline, simple, large, ovoid.]

- .
1. Thallus K+ yellow turning red, norstictic acid A. CINEREA
 1. Thallus K+ persistent yellow, stictic acid
 - Thallus thin, smooth, continuous to rimose A. LAEVATA
 - Thallus thick, verrucose to subareolate A. VERRUCIGERA

Aspicilia cinerea (L.) Körber (*L. cinereus*, ash-colored; from the color of the thallus) This species occurs frequently on granitic boulders in our western sector. ~ Thallus K+ red; spores $11\text{--}21 \times 7\text{--}12\ \mu\text{m}$. [norstictic acid, ± atranorin]

DuPage-MOR, Grundy-MOR, Jefferson-MOR, Lee-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Aspicilia laevata (Ach.) Arnold (*L. laevis*, smooth + *-atus*, provided with; from the smooth upper surface of the thallus) Our only records for this species are from granite boulders in an open woods. ~ Thallus K+ deep yellow; spores $13\text{--}23 \times 9\text{--}13\ \mu\text{m}$. [stictic acid, ± norstictic acid, ± some

triterpenoid]

LaSalle-MOR, McHenry-MOR

Aspicilia verrucigera Hue (L. verruca, wart + *gero*, to carry, bear) Our only records are from sandstone exposure in our western sector. ~ Thallus K+ deep yellow; spores 16–19 × 10–13 μm. [stictic acid, fatty acids around 6-7 in solvent C. Our LaSalle County specimen appears to produce chloroatranorin.]

LaSalle-MOR, Lee-MOR

ATHALLIA Arup, Frödén, & Söchting TELOSCHISTACEAE [Photobiont: mostly "*Pseudotrebouxia*." Gr. *a-*, without + *thallos*, green shoot, or originally the vegetative portion of a plant. Out of desperation, we are attempting to understand this group attending to the concepts laid out in Arup (2009). ~ Thallus crustose, mostly endophloedeal; spores 8, hyaline, polaribilocular, the isthmus usually more than 4.0 μm long. Anthraquinones, particularly parietin.]

1. Apothecia to 0.3 mm in diameter; spores 12–16 A. CERINELLA
- 1.. Larger apothecia usually more than 0.3 mm in diameter; spores 8.
 2. Exciple concolorous with the disk; thallus and amphithecium absent, or the apothecium scarcely zeorine; prevailing lignicolous A. HOLOCARPA
 2. Exciple usually paler than the disk; amphithecium evident, at least as a thin rim of thalline tissue; thallus yellowish, thin but evident; rarely lignicolous.
 - Thallus saxicolous A. VITELLINULA
 - Thallus corticolous A. PYRACEA

Athallia cerinella (Nyl.) Arup, Frödén & Söchting (L. *cerina*, yellow + *ella*, diminutive; a little yellow thing, but probably meant to evoke an allusion to a tiny *Caloplaca cerina*) A European species, our only record is from the branch of a planted specimen of Tree Lilac (*Syringa* sp.). There is another North American record (Morse19508b), collected in 2009 on the branches of *Prunus angustifolia* in a degraded pasture in South Dakota. ~ Thallus ecorticate, K–, scant or immersed; apothecia aggregated, to 0.3 mm across, the proper exciple well-developed, concolorous with the disk; epihymenium without granules or oil droplets; hymenium to about 60 μm, the ends of the paraphyses often much dilated; asci with 12–16 spores; spores 10–11 × 6–8 μm, the septum 2–5 μm.

DuPage-MOR

Athallia holocarpa (Hoffm.) Arup, Frödén & Söchting (Gr. *holos*, whole, all + *karpos*, fruit) = *Caloplaca holocarpa* (Hoffm.) A. E. Wade. This species, as we are presenting it here, is prevailing lignicolous, although we have referred a few specimens here from bark and base-rich rock or concrete. They may represent more than one species. The name "*Caloplaca holocarpa*" has been so ubiquitously deployed in the Midwest, however, that we are truly at sea as to how it might legitimately be applied. Although the type is from lignin, in Europe it is considered largely a saxicolous species of siliceous rock (Arup 2009). If the thallus of *Squamulea subsoluta* is overlooked, that species might key here; such specimens are usually those variants with closely aggregated apothecia deformed by compaction. ~ Thallus absent; apothecia rather variable, 0.3–0.7 mm across, yellow to yellow-orange, appearing biatorine, typically crowded and of various sizes, the discs

mostly flat; proper exciple narrow, concolorous with the granular-inspersed epihymenium; spores $13\text{--}16 \times 5\text{--}8 \mu\text{m}$, the septum $3.5\text{--}5.5 \mu\text{m}$.

Cook-F*,MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Iroquois-MOR, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, Koskiusko-MOR, LakeIN-MOR, LaSalle-F*,MOR, Livingston-MOR, McHenry-MOR, Noble-MOR, Racine-MOR, White-MOR, Will-MOR

Athallia pyracea (Ach.) Arup, Frödén, & Søchting (Gr. *pyr-*, fiery + *-aceus*, having a resemblance to, from the fiery orange apothecia.) = *Caloplaca pyracea* (Ach.) Zwackh. Frequent on the bark of *Populus*. Rarely, we have seen it growing on a young *Fraxinus lanceolata*. Unless there is zeorine margin evident, the only way we can distinguish this species is by the spores, which have septa prevalingly more than $4 \mu\text{m}$ long. Specimens of *Gyalolechia flavorubescens* might key here, but it is easily distinguished by its larger spores and oily hypothecium. If the scattered, excavate, yellow-green soralia of *Coppinsiella ulcerosa* are overlooked, it might key here, but with it the apothecia are far less likely to aggregate in discrete groups. There is a specimen from LaSalle County (Calkins F), which was originally named *Placodium cinnabarinum*. ~ Thallus absent or, more commonly, poorly developed and represented by prevalingly discontinuous gray to yellowish areoles; apothecia zeorine, orange, gregarious in discrete aggregations, $0.3\text{--}1.0 \text{ mm}$ across, yellow-orange to orange, the outer ones typically smaller than the central ones and usually with a paler, more or less ecorticate amphithegium; proper exciple prominent, concolorous and mostly flush with the flat or flattish, disk; paraphyses clavate, expanded to $5 \mu\text{m}$; hypothecium without oil droplets; epihymenium granular; spores $8\text{--}14 \times 3.5\text{--}8 \mu\text{m}$, the septum $3.5\text{--}6 \mu\text{m}$.

Berrien-MOR, Cook-MOR, DuPage-MOR, Elkhart-MOR, Grundy-MOR, Jefferson-WIS*, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, LakeIL-F*,MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-F* (with *Phaeophyscia hirtella*), Livingston-MOR, McHenry-MOR, Porter-MOR, Steuben-MOR, White-MOR, Winnebago-MOR

Athallia vitellinula (Nyl.) Arup, Frödén, & Søchting (L. *vitellus*, egg yolk + *-inus*, pertaining to, *-ulus*, diminutive.) = *Caloplaca vitellinula* (Nyl.) H. Olivier. We may not be using the right name for this lichen—if it is even one species; most of our material is from weathered concrete or dolomite. It differs from *Squamulea subsoluta* in that the thallus lacks tinctures of orange; the proper exciple is robust in the latter species and usually is associated with thalline tissues. With our specimens the thallus areoles or squamules grade from grayish and evidently K– to yellowish gray or even yellow and K+, the variation much as we think we have seen in *Gyalolechia flavovirescens*, which has consistently longer isthmi and a much less pronounced proper exciple. We have seen populations grade from bright orange apothecia evocative of *A. holocarpa*, but with bits of yellow thallus to smaller more pallid apothecia with a pale yellow to grayish thallus on less exposed faces of the concrete. Vondrak *et al.* (2016) include *A. vitellinula* with *A. holocarpa*, which might be true; if so, however, our specimens must belong elsewhere, because the thallus development and zeorine apothecia make them uncomfortable bedfellows phenotypically; apothecia of the latter species has the proper exciple concolorous with the disk and appears biatorine. Another name that has been applied to some of these specimens is *Caloplaca schaeferi* (Arnold) Zalbr. (in honor of the Swiss cryptogamist, Ludwig Emanuel Schaefer, 1785–1853) (Wilhelm 1998). ~ Thallus scant to composed of scattered tiny grayish to yellow-orange, sometimes minutely lobulate squamules; apothecia zeorine or appearing biatorine in age with a scarcely evident amphithegium; proper

exciple always robust, concolorous with or paler than the disk; amphithecium the color of the thallus; spores $9-14 \times 4.0-7.0 \mu\text{m}$, the septum $2.5-5 \mu\text{m}$.

Boone-MOR, Cook-MOR, DuPage-MOR, Ford-MOR, Kane-MOR, LaPorte-MOR, LaSalle-MOR, Rock-MOR, Will-MOR, Winnebago-MOR

BACIDIA De Not. RAMALINACEAE [Photobiont: green. *L. bacidium*, little rod; from the elongate spores. Serious students of the genus will want to digest Ekman (1996). ~ Thallus crustose; apothecia without a thalline margin, exciple prosoplectenchymatous, thick-walled; ascus *bacidia*-type, with a relatively broad axial mass; spores narrowly elliptic to acicular, 8, hyaline, 3–several septate; conidia filiform, curved.]

1. Thallus terricolous, muscicolous, or saxicolous.
 - Thallus saxicolous B. GRANOSA
 - Thallus not saxicolous B. BAGLIETTOANA
1. Thallus corticolous or lignicolous, neither terricolous, muscicolous, nor saxicolous.
 2. Apothecia pale, reddish, or pruinose.
 3. Apothecia pruinose throughout B. SUFFUSA
 3. Apothecia epruinose or with pruina only marginal.
 4. Apothecia pale to flesh-colored or brown; hypothecium colorless or pale brownish, K– B. RUBELLA
 4. Apothecia darker, hypothecium yellowish to brown, K+ purple-red under the compound microscope.
 - Thallus distinctly granular B. DIFFRACTA
 - Thallus smooth, wrinkled or warty B. POLYCHROA
 2. Apothecia black or nearly so, or becoming hyaline when wet
 5. Spores bacilliform to fusiform, to $45 \mu\text{m}$ long, or hypothecium K+ purple.
 - Hypothecium K–; apothecia mottled when wet B. CIRCUMSPECTA
 - Hypothecium K+ purple-red; apothecia not mottled when wet B. SUBINCOMPTA
 5. Spores acicular, mostly more than $45 \mu\text{m}$ long.
 - Hypothecium pale to yellowish B. LAUROCERASI
 - Hypothecium dark reddish-brown. B. SCHWEINITZII

Bacidia bagliettoana (A. Massal. & De Not.) Jatta (after Francesco Baglietto, 1826–1916, Italian physician and lichenologist) = *Bacidia muscorum* (Sw.) Mudd; *Biatoria sanguineo-atra* of an early Calkins specimen. Muscicolous or terricolous; infrequent, one record is from thin soil over dolomite with *Placidium squamulosum*; another is from landscape fabric over soil. The Kane County specimen was reported by Fink (1906). ~ Apothecium flat or low convex, many with an evident proper exciple; hypothecium dark brown; spores acicular, straight, $25-55 \times 1.5-3 \mu\text{m}$.

DuPage-MOR, Kane, LaSalle-CACS*, Will-MOR

Bacidia circumspecta (Vainio) Malme (*L. circum*, near, around + *specto*, seen or noted, perhaps noted in the neighborhood) = *Scutula circumspecta* (Vainio) Kistenich, Timdal, Bendiksbj & S. Our only record for this species is from lignin of a post at Illinois Beach State Park (Hyerczyk #2542, F). Harris & Ladd (2018) allude to the affinity this species has with the genus *Lecania*. Certainly, the apothecia (if not the spores) are evocative of those we see in *L. naegelii*. ~ Apothecia brownish to black, mottled when wet; proper exciple rarely colorless, usually greenish to nigrescent, without crystals; hypothecium hyaline to pale yellow or brownish orange, K–; paraphyses clavate, the end

cells scarcely swollen; spores straight or nearly so, bacilliform to clavate 3-7 septate, straight or slightly curved, $11-45 \times 1.6-3.3 \mu\text{m}$.

Lakeill-F*

Bacidia diffracta S. Ekman (L. *dis*, apart + *frangere*, to break; to break apart, such as light as it passes the edges of various opaque areas) Yet unknown from the region it has been collected in nearby Piatt County on an old-growth *Quercus rubra*, though it characteristically grows on *Carya ovata* and *Juniperus virginiana*. ~ Proper exciple with brownish or orange tinctures, the disk similarly colored; hypothecium pale brown or orange, K+ purple-red; hymenium without a distinct epithecium; spores acicular, 3-11 septate, $32-69 \times 2-4 \mu\text{m}$. [atranorin ± zeorin]

Bacidia granosa (Tuck.) Zahlbr. (L. *granosus*, full of seeds; from the granulose thallus) *Biatora trachona* of Calkins. This species is infrequent on dolomitic outcrops and HCl+ boulders. Many local specimens recently have been named *Bacidia coprodes* (Körb.) Lett., but Ekman (2014) excludes that species from the western Great Lakes and most of North America, referring our material to *B. granosa*; he leaves room for the possibility, however, that it has been overlooked in North America. The hypothecium of *B. granosa* is lighter in color than the exciple, usually with tinctures of orange or red, while that of *B. coprodes* is darker, almost black and concolorous with the exciple. A similar species, *B. cupreorosella* (Nyl.) A. Schneid., grows on limestone farther south; it has a hyaline hypothecium, while the hypothecium of *B. granosa* is at least weakly colored. This species also has been called *B. trachona* (Ach.) Lett. by many North American authors. According to Richard Harris (pers. comm.), that is a European species, and our material is referable here; but see *Aquacidia trachona*. ~ Thallus scant to more often rather sumptuous, pale brown and areolate to rimose, smooth or, particularly around the apothecia, more or less blastidiate; apothecia biatorine, the exciple black when wet, passing beneath the pale to brownish, K- hypothecium, the disk less so when wet; paraphyses simple, nor or only scarcely dilated distally; spores fusiform, 3(4)-septate, $13-18 \times 2.5-3.5 \mu\text{m}$.

Boone-MOR, Cook-F*, MOR, DuPage-MOR, Grundy-MOR, Kane-MOR, Kankakee-MOR, LaSalle-CACS*, F*, MICH*, Rock-MOR, Will-MOR

Bacidia laurocerasi (Duby) Zahlbr. (of *Prunus laurocerasus*, the Cherry Laurel) This species is rather well known from just north of our region, where it has been collected on *Fraxinus* in a swamp in Newaygo County, Michigan. Just south of our region it has been collected on *Cercis canadensis*. Our only record (Calkins #86b, F) is from *Tilia americana*, where it grew on the same bark and admixed with *Phaeophyscia hirtella* (Calkins #86a, F) in LaSalle County in 1896. ~ Apothecia blackish brown to black, concolorous with the proper margin, soon convex, becoming slightly reddish when wet; hypothecium pale yellow to yellowish brown; spores straight to slightly curved or weakly coiled, $50-100 \times 1.9-4.5 \mu\text{m}$.

LaSalle-F*

Bacidia polychroa (Th. Fr.) Körber (Gr. *poly*, many + *chroa*, superficial color; probably from the apothecia that may vary from pale to reddish or blackish) = *B. fuscorubella* (Hoffm.) Bausch; *Biatora fusco-rubella* of Calkins. Calkins (1896) stated that this species grew on substrates similar to those of *rubella*, which see. Actually, all of the Calkins material we have seen that he called *B. rubella* is referable to *B. polychroa*. Generally said to be a saxicolous species, the only three local

specimens we have seen are from *Acer saccharum* or from "bark". ~ Apothecia brownish orange to brown, the proper exciple usually a little paler; hypothecium brownish orange, K+ purple-red; spores acicular, 2–15 septate, $31\text{--}74 \times 2\text{--}5 \mu\text{m}$.

Cook, LaSalle-MOR, Winnebago-MOR

Bacidia rubella (Hoffm.) A. Massal. (*L. rubeo*, to be red, *-ellus*, diminutive; from the tiny reddish apothecia) = *Biatora rubella* of Calkins; *Bacidia luteola* (Schrad.) Mudd. Calkins reported that "This widely diffused species occurs in our county on hickories and oaks. It is variable, and a number of varieties, fourteen or more, have been created species." Generally said to be a corticolous species, the only local contemporary specimens we have seen are from partly shaded limestone. According to Ekman (1996) a Calkins record from Cook County was filed with *B. suffusa* at NY; he also cites a Calkins specimen from Deer Park, which was in LaSalle County. ~ Thallus usually coarsely granular and continuous; pale gray to greenish gray; apothecia pale to brownish orange, concolorous with the proper exciple; hypothecium hyaline to pale yellowish or orange; spores acicular, 5–11 septate, $45\text{--}75 \times 3\text{--}4 \mu\text{m}$. [\pm atranorin]

Cook-NY, Kane-MICH*, LaSalle-NY, Ogle-MOR

Bacidia schweinitzii (Tuck.) A. Schneid. (after Ludwig David von Schweinitz, 1780–1834, the German botanist) Known from all around the Southern Lake Michigan region, this species of shaded corticolous habitats has yet to be discovered locally. A Calkins specimen (#6, F) from Illinois is presumed to be collected either in Cook or LaSalle counties. See also notes under *B. subincompta*. ~ Thallus of continuous or discontinuous granules or low areoles; mostly grayish to grayish green; apothecia brown to brownish black or black, concolorous with or darker than the proper exciple; hypothecium pale orange-brown to brown, K+ reddish; spores acicular to slenderly clavate, straight or curved, when the latter in the ascus, evocative of *Scoliciosporum*, which has broader spores, 3–15 septate, $32\text{--}88 \times 2\text{--}4$.

Bacidia subincompta (Nyl.) Arnold (*L. sub-*, near or below + *incomptus*, untidy, messy; probably an allusion to its too variable spore-morphology) A corticolous species known from districts to the north and west of our region, we have yet discover a local specimen. For a discussion on the differences between this species and *B. schweinitzii*, see Ekman (1996), who points out that the spores can run from 4-celled and fusiform to acicular. The most reliable difference is that the hypothecium is evenly and darkly pigmented in the latter and brown in a distinct zone and much paler below in *B. subincompta*. ~ Apothecia brown to black, nearly or quite concolorous with the proper exciple; hypothecium pale to reddish brown, K+ purple-red; spores variously fusiform, bacilliform, or acicular, straight or slightly curved, 3–13 septate, $20\text{--}60 \times 2\text{--}6 \mu\text{m}$.

Bacidia suffusa (Fr.) A. Schneid. (*L. suffundere*, to pour into or under; perhaps from apothecia suffused with pruina) = *Biatora suffusa* Fr. In southern Illinois, this species is rare on *Carya* and *Liquidambar*. Calkins (1896) noted it from *Carya* in Will County. See note under *B. rubella*. ~ Apothecia thinly to abundantly pruinose; hypothecium yellowish, K–; spores acicular, 3–17 septate, $38\text{--}91 \times 2.5\text{--}4 \mu\text{m}$. [\pm atranorin]

Cook-F*, NY, MOR, Will

BACIDINA Vězda RAMALINACEAE [Photobiont: green, in goniocysts. + *-ina*,

pertaining to; depicting an obvious similarity to *Bacidia*. ~ Thallus crustose; apothecia without a thalline margin; ascus similar to , but with a very narrow axial mass; spores acicular, 8, hyaline, 3–several septate, needle-like, rarely more than 2.5 μm ; conidia filiform, curved.]

1. Apothecia black or nearly so B. EGENULA
 1. Apothecia sordid to flesh-colored B. DELICATA

Bacidina delicata (Leight.) V. Wirth & Vězda (L. *delicatus*, dainty) = *Bacidia delicata* (Leight.) Coppins We have one specimen from sandstone in LaSalle County; the others are from the base of *Quercus* species. We are using this name provisionally to apply to *e* with acicular spores, colorless apothecial tissues, and pycnidia with filiform conidia. ~ Apothecia flat, sordid to beige or with tinctures of pink, the proper exciple persistent, hyaline; paraphyses slender, simple or rarely forked, often dilated distally; spores acicular, 3–7 septate, 25–45 \times 1.1–1.8 μm ; conidia 29–35 $\mu\text{m} \times 1 \mu\text{m}$ wide, curved.

Kane-MOR, LaSalle-ILLS*, Porter-MOR

Bacidina egenula (Nyl.) Vězda (L. *egenus*, needy or destitute + *-ulus*, diminutive; perhaps from a perception that it appears depauperate, as tiny black dots, often on small rocks) = *Bacidia egenula* (Nyl.) Arnold. Frequent on calcareous and non-calcareous rocks, we have it from dolomitic outcrops, glacial erratics, flagstone, and concrete, and small pebbles; there is one specimen from rusty metal. This species has been misidentified routinely in North America as *Bacidia inundata* (Fr.) Körb. or *Biatora inundata* Fr. It differs in having a K+ green epihymenium. The late Richard C. Harris struggled with the taxonomic disposition of this lichen, and concluded that our material probably is *B. egenula*, a European species. Some specimens Calkins called "*Verrucaria aethiobola*" are referable here; another (Calkins #6062, CACS) was called "*Pyrenopsis schaeferi*." ~ Thallus of dispersed or confluent areoles; apothecia black, biatorine, the exciple nigrescent, the margin often slightly raised, the disk flat or convex; hypothecium pale to brownish; paraphyses simple, not much expanded distally or many expanded to 5.5 μm distally, with a greenish margin; spores acicular, 3–4 septate, 19–43 \times 1.3–2.5 μm .

Boone-MOR, Branch-MOR, Cook-F*MOR, DuPage-MOR, Kane-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-CACS*,ILLS*,MOR, Livingston-MOR, McHenry-MOR, Ogle-MOR, Porter-MOR, Pulaski-MOR, Starke-MOR, Will-MOR

BAEOMYCES Pers. BAEOMYCETACEAE [Photobiont: chlorococcoid. Gr. *baeo*, little + *myces*, fungus. ~ Thallus crustose to sub-foliose, without squamules or with appressed squamules; apothecia convex to swollen, brownish to reddish brown, stalked, the podetia slender, solid; spores 8, fusiform, 1-celled.]

Baeomyces placophyllus Ach. (Gr. *plax*, a flat round plate, dish + *phyllos*, leaf; evidently from the flat, lobate margins of the thallus. Although rare in the central United States, this species was reported from a sandy prairie, where "one small patch was noted" in Zanders Woods (Armstrong 1963). A more likely member of this family is *Dibaeis baeomyces*, which see, but that species is not usually associated with sandy soils. Unfortunately, no specimens have been found. ~ Thallus pale

greenish gray, usually with appressed flat lobes, the margins with pale blastidia or isidia; apothecia reddish brown, convex or swollen; podetia narrower than the apothecia, to 2 mm in diameter, to 5 mm long; spores $8-14 \times 2-4 \mu\text{m}$. [stictic acid]

Cook

BAEOMYCETACEAE

One local genus BAEOMYCES

BAGLIETTOA A. Massal. VERRUCARIACEAE [Photobiont: chlorococcoid. In honor of the Italian lichenologist Franseco Baglietto 1826–1919. ~ Thallus saxicolous; perithecia immersed in pits on the substrate; spores 8, simple, hyaline or nearly so; involucrellum present or absent; hamathecium gelatinized.] For a comprehensive treatment of this genus see Halda (2003).

1. Purlieus of perithecia stained violet B. MARMOREA

1. Violet stains absent.

Exciple hyaline to brownish around the perithecium, the perithecium capped by a flat involucrellum marked by distinct, radiate fissures around the ostiole; exciple hyaline or sordid B. BALDENSIS

Exciple black all around the perithecium; involucrellum, without radiate fissures, indistinct from the black exciple B. CALCISEDA

Bagliettoa baldensis (A. Massal.) Vězda (Perhaps after Castelbaldo, Padua, Italy) = *Verrucaria baldensis*. Farther south, this species is rare on hard limestones in glades and along bluffs ~ Asci narrowly clavate, $43-60 \times 5-15 \mu\text{m}$, the spores $16-30 \times 6-15 \mu\text{m}$.

Bagliettoa calciseda (DC.) Gueidan & Cl. Roux (L. *calx*, lime + *sedeo*, to sit; probably from the tendency of the perithecia to seat themselves in depressions in limey rock) = *Verrucaria calciseda*. Rare locally, our only specimens are from dolomite exposures and landscape boulders. There are several specimens from calcareous rock in La Salle County at the Field Museum and the New York Botanical Garden; most of them were called *V. integrella*, one was annotated *V. submuralis* by Fink, another was called *Staurothele diffractella*, and yet another was called *Lecidea albocaerulescens* var. *immersa*. Specimens with perithecia somewhat emergent may be confused with *Verrucaria illinoisensis*, which has smaller spores. ~ Thallus endolithic, the rock chalky white within its purlieus; perithecia largely imbedded in the substrate; asci narrowly clavate, $50-70 \times 15-20 \mu\text{m}$, the spores $18-25 \times 9-13 \mu\text{m}$.

DuPage-MOR, Kankakee-MOR, Kendall-MOR, LakeIN-MOR, LaSalle-CACS*,F*,NY, Will-F*,MOR

Bagliettoa marmorea (Scop.) Gueidan & Cl. Roux (L. *marmor*, marble; probably from the substrate of type collections) = *Verrucaria marmorea*. An interesting and uncommonly distinct species, our only record for this lichen is from a dolomite prairie near Wilmington, Illinois. It is a characteristic species of limestone glades farther south. According to Thüs *et al.* (2011) this species is unusual in the Verrucariaceae in having *Trebouxia* as a photobiont. ~ Asci oblong, $30-40 \times 10-15 \mu\text{m}$, the spores $18-28 \times 10-12 \mu\text{m}$.

Will-MOR

BIATORELLA De Not. BIATORELLACEAE. [Photobiont Chlorococcoid. Perhaps from Gr. *biator*, small + L. *-ellus*, diminutive; after the minute, numerous spores. ~ Thallus crustose, terricolous; apothecia yellowish or orange; spores numerous, hyaline, simple.]

Biatorella fossarum (Dufour) Th. Fr. (L. *fossa*, ditch or dug earth; presumably from its terricolous habitat) Yet unknown from the Southern Lake Michigan Region, this species was collected as nearby as Athens, Illinois, in Menard County, where it grew on sterile clay. Evidently rare today, or overlooked, the specimen at the Farlow Herbarium reads, it would appear in Tuckerman's hand, "Not a rare sp. here on sterile clays" Athens, Illinois E. Hall and on the outside of the packet "On the earth 'not rare on sterile clays' Illinois, 14. 1. Hall. 1866." Caleb Morse (personal communication) is of the opinion that Wolf and Hall specimens from Illinois labeled *Biatorella hemispherica* Anzi are referable here; Brodo (2016) considers the latter species to be Arctic/Alpine. According to Morse & Lendemer (2019) *B. fossarum* has spores most more than 8 μm long and apothecia no more than 1 mm across; *B. hemispherica* has spores no more than 8 μm long and larger apothecia more than 1 mm across. ~ Spores oblong-cylindric, 8–13 μm \times 3 μm .

BIATORELLACEAE

- | | |
|------------------------------|---------------------|
| 1. Thallus terricolous | Biatorella |
| 1. Thallus corticolous | Strangospora |

BILIMBIA De Not. RAMALINACEAE [Photobiont: green. L. *bi*, double + *limbus*, in reference to the perispore. ~ Thallus muscicolous; apothecia brown to nigrescent, the hypothecium dark-colored; spores 8, hyaline, 3–7 septate; tholus uniformly weakly amyloid; *Bacidia*-type.]

Bilimbia sabuletorum (Schreber) Arnold (L. *sabulum*, sandy; from its supposed frequent occurrence in sandy habitats) = *sabuletorum* (Schreb.) Lett.; *Mycobilimbia sabuletorum* (Schreb.) Hafellner; *Biatora hypnophylla* of some Calkins. All of the specimens we have are from shaded ravines with dolomitic outcrops, usually growing on mosses over the rock. A Calkins specimen (*s.n.*, F) from "Illinois" was labeled *Biatora sanguineo-atra*. ~ Apothecia strongly convex, often numerous, pale dull orange, brown or nigrescent, 0.25–0.9 mm across, the proper exciple scarcely or not at all evident; hypothecium pale to brown; spores fusiform, 3–6 septate, 18–35 \times 5–8 μm .

Cass-MIN, MSC, DuPage-MOR, Jefferson-MOR, Kankakee-MOR, LaSalle-CACS*, Walworth-MOR, Winnebago-MOR

BLASTENIA Th. Fr. TELOSCHISTACEAE [Photobiont: mostly "*Pseudotreboxia*." Gr. + *blastos*, a germ, bud, shoot + *-enos*, pertaining to. ~ Thallus crustose, very thin, white or sordid, corticolous or lignicolous; apothecia dome-shaped, orange, without a thalline margin; spores polaribilocular; anthraquinones.]

Blastenia ferruginea (Hudson) Th. Fr. (L. *ferrugo*, rust + *-ineus*, denotes a similar color or material; from the reddish brown apothecia, evocative of the color of rust) = *Caloplaca ferruginea*

(Huds.) Th. Fr. *Placodium ferrugineum* (Huds.) Hepp. Our only contemporary record is from the wood of a rail fence. Calkins noted this species from "oaks along the Des Plaines river and near Elgin on hickories . . . plentiful." We have seen a specimen, properly identified (Calkins #318, NY) from "oaks, Illinois;" which he had named *Placodium cerinum*. This former specimen was later annotated *Caloplaca pollinii* by Rudolph, we believe erroneously. Another specimen (Calkins #6088, CACS), listed from LaSalle County (Calkins & Huett, 1898), is also referable to *Huneckia pollinii*, as is one from Cook County (Calkins #6085, CACS). See also notes under *Caloplaca oregona*. ~ Apothecia rusty or reddish orange; spores ellipsoid, 11–20 × 6–10 μm, the septum 4–8 μm. [parietin, fallacinal, emodin, and teloschistin]

Cook-ILL, MOR, Will-ILL

BOTRYOLEPRARIA Canals VERRUCARIACEAE⁸ [Photobiont: Chlorococcoid. Gr. *botry*, a bunch or cluster, as in grapes + *lepra*, leprosy + *-arius*, like or connected with; from the shrubby clusters of hyphae and algal cells said to resemble a cluster of grapes. ~ Thallus leprose, lacking cortical development; spores not seen.]

Botryolepraria lesdainii (Hue) Canals (after Maurice Bouly de Lesdain, 1869–1965, French lichenologist) = *Lepraria lesdainii* (Hue) R. C. Harris. Our specimens are from shaded dolomitic cliff faces, in areas sheltered from direct wetting, as are all of our Illinois collections. ~ Thallus blue-green. [lesdainin, a triterpene with RF value just above zeorin]

Cook-MOR, DuPage-MOR, Kankakee-MOR, Kane-MOR, LaSalle-MOR, Lee-MOR, Winnebago-MOR

BRYOBILIMBIA Fryday, Printzen, & Ekman LECIDEACEAE [Photobiont: *Trebouxia*-like, Chlorococcoid. Gr. *bryon*, moss + the genus *Bilimbia*, which see; an allusion to its mossy substrate and affinity to *Bilimbia*. ~ Thallus crustose, more or less granular; apothecia nigrescent; spores 8, hyaline, simple or occasionally 1-septate; axis of ascus apex strongly amyloid, *Porpidia*-type.]

- | | |
|--------------------------|-------------|
| 1. Spores simple..... | B. AHLESII |
| 1. Spores 1-septate..... | B. HYPNORUM |

Bryobilimbia ahlesii (Körber) Fryday, Printzen & S. Ekman (in honor of the German botanist and mycologist, Wilhelm Elias von Ahles, 1829–1900) = *Lecidea virginensis* Calk. & Nyl. Known from districts all around the Southern Lake Michigan Region on wet or even dripping siliceous rock, but yet unknown locally. One might expect it to be in our western sector, most like in LaSalle County. ~ Thallus continuous, greenish-gray, not granular, K–; apothecia 0.3–0.8 μm across, red-brown to nigrescent, the exciple pale marginally; hymenium 75–115 μm high; spores simple, 8–13 × 3.5–6.5 μm.

⁸Lücking *et al.* 2016. Place this genus in the Verrucariales *genera certae sedi*, but demure on its placement in the Verrucariaceae.

Bryobilimbia hypnorum (Lib.) Fryday, Printzen, & S. Ekman. (Gr. *hypnon*, a term for certain mosses among the Classical Greeks, Latinized to *Hypnum*, a contemporary genus of moss, + the genitive plural, of the mosses; an allusion to its substrate) = *Mycobilimbia hypnorum* (Lib.) Kalb & Hafellner. Our only record for this species is from LaSalle County where it grew among mosses over base-rich rock. ~ Thallus scant to continuous, not granular, dark greenish to grayish or brownish; apothecia pale to black, the exciple black, usually disappearing in age; spores 1-septate, $11-17 \times 5-7.5 \mu\text{m}$.

LaSalle-F,MOR

BRYORIA Brodo & D. Hawksw. PARMELIACEAE [Photobiont: *Trebouxia*. A syncopation of the two genera: *BRYopogon* and *AlectORIA*. ~ Thallus fruticose, pendent or bushy; spores 2–8, hyaline to brownish, simple.]

Bryoria furcellata (Fr.) Brodo & D. Hawksw. (*L. furca*, fork + *-ella*, diminutive, + *-atus*, adjective ending; meaning minutely forked) The only local specimens we know of were collected in Pennfield Bog northeast of Battle Creek, in Calhoun County in 1965 and on *Larix* in a bog near Otis Lake, Michigan. Brodo & Hawksworth (1977) report it from St. Joseph County, Indiana. This species characteristically has groups of isidia-like spinules on the soralia. [fumarprotocetraric acid]

Barry-MSc, Calhoun-MSc, St.JosephIN

BRYOSTIGMA Poelt & Döbbeler ARTHONIACEAE⁹ [Photobiont: Chlorococcoid. Gr. *bryon*, moss + *stigma*, point, dot, or tattoo; from the scattered, corticate, yellow, spherical granules; evidently from its appearance on mosses. ~ Thallus crustose, epiphloedal; apothecia round, convex, immersed or superficial; black; asci broadly clavate, pale blue in IKI when pretreated with KOH; interthelial hyphae indistinct; asci broadly clavate; spores 8, hyaline, 1-septate, one cell slightly larger than the other.]

Bryostigma muscigenum (Th. Fr.) Frisch & G. Thor (*L. muscus*, moss + *-gena*, born; from its appearance on mosses) Generally said to be confined to *Populus*, particularly *P. tremuloides*, our only record is from a smooth-barked landscape trees in corporate parks, with *Amandinea dakotensis*, *Hyperphyscia confusa*, *Hyperphyscia syncolla*, *Lecanora carpinea*, *Physcia millegrana*, *Physcia stellaris*, *Physciella chloantha*, and *Xanthoria parietina*. ~ Thallus scant, grayish or darker, the apothecia notably convex, round to slightly misshapen; epihymenium dark brown, about a fourth the height of the hymenium; hypothecium dark brown; spores 2-celled at maturity, one cell larger than the other, $8-12 \times 3.5-5 \mu\text{m}$. We are not truly certain that this is the proper name for our material, or if even our material represents a single entity. Generally our spores range a little larger than is usually given, particularly if the larger cell and not the septum is the metric.

⁹Lücking *et al.* 2016. Place this genus in the Arthoniales *genera certae sedi*, but demure on its placement in the Arthoniaceae.

Boone-MOR, Cook-MOR, DeKalb-MOR

BUELLIA De Not. CALICIACEAE [Photobiont: *Chlorococcoid*. After Esuperanzo Buelli (d. 1840), friend of De Notaris. ~ Thallus crustose, usually well developed, with or without secondary metabolites; apothecia without a thalline margin in age; spores 8, brown, 1(3)-septate; conidia elliptical to bacilliform.]

1. Apothecia and thallus K-.
 - Thallus usually saxicolous; larger spores more than 5 μm wide. B. BADIA
 - Thallus corticolous or lignicolous; spores less than 5 μm wide B. SHAERERI
1. Apothecia and thallus notably K+ yellow or red.
 2. Spores more than 16 μm long; thallus K+ yellow or red.
 - Hymenium well interspersed with oil droplets B. disciformis
 - Hymenium without oil droplets B. curtisii
 2. Spores less than 16 μm long; thallus K+ yellow turning red.
 - Thallus corticolous B. ERUBESCENS
 - Thallus saxicolous B. MACULATA

Buellia badia (Fr.) A. Massal. (*L. badius*, bay, reddish or dull brown,) = *Monerolechia badia* (Fr.) Kalb This species resembles the tumescent *B. maculata*, but it reacts K- instead of K+ red. Infrequent, we have one specimen from weathered wood and three from an HCl- boulders in full sun. Some local reports of *Buellia turgescens* are referred here. According to Elix, this species is usually parasitic on a range of foliose and crustose lichen genera. ~ Thallus thick, areolate, brown, more or less verrucose, sometimes pruinose; spores 10–14 \times 5.0–7.5 μm .

Jefferson-MOR, McHenry-MOR, Walworth-MOR, Will-MOR

Buellia curtisii (Tuck.) Imshaug (Presumably in honor of the American mycologist, Reverend Moses Ashley Curtis, 1808-1872, who taught for years at the University of North Carolina) = *Buellia parasema* of Calkins, in part; *Baculifera curtisii* (Tuck.) Marbach. Our only record for this species is from the cortex of a woody plant collected in LaSalle County (Calkins #6399, CACS). This is a species of the southeastern United States, not heretofore reported from the upper Midwest. Calkins collected quite a lot in the southeast, so we may be dealing with a label mixup. The large spores, K+ yellow to red thallus, unispersed hymenium, make it difficult to place this specimen elsewhere with named taxa. Richard Harris (pers. comm.) believes that Calkins's report of *B. disciformis* is likely to be based upon material of *B. erubescens*, a theory reinforced by the fact that Imshaug (1951) cited a Cook County specimen of *B. stillingiana* and excluded *B. disciformis* from the Southern Lake Michigan region. Marbach (2000) places this species within the genus *Baculifera* Marbach & Kalb (*L. baculum*, walking stick + *fero*, to bear; the allusion unclear to me). ~ Thallus thin, pale gray, K+ red; apothecia black, mostly 0.4–0.6 μm across; hypothecium dark brown; epihymenium brown, the paraphyses with swollen black tips; hymenium without oil droplets; spores 16–23 \times 6–9 μm . [norstictic acid \pm atranorin]

LaSalle-CACS*

Buellia disciformis (Fr.) Mudd (*L. diskos*, platter + *formus*, shape, appearance; evidently an

allusion to the apothecia) This species has been reported from all around the Southern Lake Michigan Region, but we have yet to prove a local collection. See also the note under *B. curtisii*. ~ Thallus thin, pale gray, K+ yellow; apothecia black, mostly 0.4–0.6 mm across; paraphyses simple or branched distally, with a swollen black tip; hymenium inspersed with oil droplets; spores 18–26 × 6–13 μm . [atranorin]

Buellia erubescens Arnold (*L. erubescens*, blushing, reddening, as if from shame, perhaps from its reaction to the K spot test) = *Buellia stillingiana* J. Steiner, according to Bungartz, *et al.* (2007); *Buellia parasema* of Calkins, in part. This is a frequent lichen on corticolous substrates just south of the Southern Lake Michigan region, but it is infrequent locally. Our contemporary specimens are from *Gleditsia triacanthos*, *Quercus velutina*, and *Rhamnus cathartica*. ~ Thallus K+ red, rather thin; apothecia sessile, flat or becoming convex or a little misshapen; proper exciple concolorous with the disk; paraphyses simple or branched distally, with dark swollen tips; hymenium without oil droplets; spores 11–15 × 6.5–8.0 μm . [norstictic acid, \pm atranorin]

Cook-F*, DuPage-MOR, Jefferson-WIS, LaSalle-F*,NY, Ogle-MOR, Walworth-MOR

Buellia maculata Bungartz (*L. maculatus*, spotted; perhaps from the appearance of numerous tiny black apothecia) = *Buellia stigmaea* Tuck. Our only record for this species is from a sandstone cliff at Castle Rock State Park. ~ Thallus K+ red; spores 9–14 × 3.5–6.0 μm . [norstictic acid, atranorin]

Ogle-MOR

Buellia schaeferi De Not. (in honor of Swiss cryptogamist, Ludwig Emanuel Schaerer, 1785–1853) Most frequent on *Larix laricina* in bogs, our only records are from *Salix* bark in a bog southwest of Dousman and a decorticate fence rail in DuPage County. ~ Similar in many respects to *Amandinea punctata* but with a paler thallus, generally smaller apothecia, and with smaller spores: 6–10 × 2.5–4.5 μm .

DuPage-MOR; Rock-MOR, Waukesha-MOR,WIS*

CAERULEUM A. Massal. ACAROSPORACEAE [Photobiont: Chlorococcoid. *L. caeruleus*; pertaining to the sea or sky, especially with the blended tinctures of blue and green; probably from the greenish pruina. ~ Thallus crustose, saxicolous, minutely areolate; apothecia with greenish pruina; spores numerous, minutely bacilliform, simple.]

Caeruleum immersum (Fink) K. Knudsen & L. Arcadia (*L. immersus*, immersed; from the apothecia immersed in the thallus) = *Acarospora immersa* Fink. The Porter County specimen was collected at Howes Prairie, on HCl+ rock in open oak woodland. ~ Thallus scant or absent; apothecia disk usually greenish pruinose; spores 6–10 × 2.5–4.0 μm .

Porter-MIN*

CALICIACEAE

A. Ascospores numerous

Apothecia stalked..... **Calicium**
Apothecia sessile..... **Cyphelium**

- A. Ascospores no more than 64 per ascus.
- B. Thallus foliose **Pyxine**
- B. Thallus crustose.
- C. Thallus yellow or white, more or less placodioid.
- Thallus white; spores 3-septate to submuriform **Diplotomma**
- Thallus yellow; spores 1-septate **Dimelaena**
- C. Thallus neither yellow nor white, not placodioid.
- Thallus well-developed, usually with secondary metabolites, or poorly developed and the spores less than 10.5 μm long; apothecia without a thalline rim **Buellia**
- Thallus scant to thinly areolate, without secondary metabolites; apothecia with or without a thalline rim, the spores mostly more than 10.5 μm long **Amandinea**

CALICIUM Pers. CALICIACEAE [Photobiont *Trebouxia*. Gr. *kalyx*, a cup; + -icius, in the form of; from the cup-shaped apothecia. ~ Thallus corticolous or lignicolous; apothecia stipitate, nigrescent, urceolate to cylindrical, disintegrating into a mazaedium; spores numerous, ellipsoid, 1-septate, brown, ornamented; conidia broadly ellipsoid.]

1. Apothecial capitulum at least sparsely white pruinose on the exciple C. GLAUCELLUM
1. Apothecial capitulum without pruina C. ABIETINUM

Calicium abietinum Pers. (L. inhabiting the fir tree, *Abies*) Our only record is from a "dead tree" at Hope Lake Bog, on lignin with *Chrysothrix caesia*. ~ Thallus endophloedeal; apothecia not pruinose. ~ Spores smooth to ornamented with cracks and ridges, 11–15 \times 5–7 μm .

Jefferson-WIS*

Calicium glaucellum Ach. (L. *glaucus*, pale blue or whitish + *-ellus*, diminutive) Our only record for this species is from *Quercus alba* in "Waldron, Illinois," which village is now known as Aroma Park. ~ Thallus endophloedeal; apothecia at least thinly white-pruinose on the edge of the capitulum and on the distal portion of the stalk. ~ Spores ornamented with cracks and ridges, 9–13 \times 4–6.5 μm .

Kankakee-F

CALOGAYA Arup, Frödén, & Søchting TELOSCHISTACEAE [Photobiont: mostly "*Pseudotrebouxia*." Gr. *kalos*, beautiful + *Gaya*; in honor of the contemporary Spanish lichenologist and student of the Teloschistaceae, Ester Gaya (birthday undisclosed!), of the Royal Botanical Gardens, KEW, and who has done revisionary work in the *Caloplaca saxicola* group. The species concepts we have applied here attempt to follow those presented in Gaya (2009) ~ Thallus placodioid, K+ purple.]

1. Thallus ochraceous to yellowish, at least sparsely pruinose near the apothecia C. PUSILLA
1. Thallus ochraceous to orange, epruinose.
- Marginal lobes clearly longer than wide C. BIATORINA
- Marginal lobes poorly developed to scarcely longer than wide C. SAXICOLA

Calogaya biatorina (A. Massal.) Arup, Frödén, & Søchting (Evocative of the genus *Biatora*, which lacks a thalline exciple and has a proper exciple concolorous with the disk) Yet unknown from our region, this species grows on exposed limestone in districts west of our region. ~ Thallus bright orange, generally epruinose, those with a dull cortex; margins effigurate, the lobes generally longer than wide; apothecia abundant, the rim slightly lighter than the shiny proper exciple, which is concolorous with the disk; spores $11-14 \times 6-7 \mu\text{m}$, the septum $2-4 \mu\text{m}$. [anthraquinones]

Calogaya pusilla (A. Massal.) Zahlbr. (*L. pusillus*, very small) Our only local records for this species are from a dolomitic outcrop above the Des Plaines River, in DuPage County. Otherwise, the next nearest known record is from a limestone outcrop in Stephenson County, Illinois. A common associate is *Flavoplaca citrina*. Most earlier local reports of *Caloplaca saxicola* (Hoffm.) Nordin are referable here. *Calogaya decipiens* (Arnold) Arup, Frödén, & Søchting (*L. decipiens*, beguiling or cheating), sorediate species, usually lacking apothecia, is otherwise similar in form to *C. biatorina*; it ranges west of our region. Also farther west is a similar species, *Xanthomendoza trachyphylla* (Tuck.) Frödén, Arup & Søchting, (*Gr. trachys*, rough + *phyllos*, leaf; in reference to the verruculose-roughened marginal lobes), but with the convex elongate marginal lobes decidedly crimped into increments. ~ Thallus yellowish salmon orange, conspicuously and coarsely pruinose, particularly around the apothecia; margins effigurate, the lobes generally convex, 0.3 – 1.7 mm long; spores $10-15 \times 4-8 \mu\text{m}$, the septum $3-5 \mu\text{m}$. [anthraquinones]

DuPage-MOR

Calogaya saxicola (Hoffm.) Vondrák (*L. saxum*, stone + *colo*, to inhabit; from its inhabitancy of rocks) This is another western species known from both base-rich and siliceous rocks. Squamulose-lobed specimens of *Squamulea subsoluta*, which see, may key here, but the rims of the apothecia are lighter than the disk and concolorous with the thallus. ~ Thallus ochraceous to yellowish-orange, concolorous with the apothecial disk, placodioid but loosely attached to the substrate, epruinose; margins at least weakly lobulate, the lobes not notably longer than wide; spores $10-17 \times 5-7 \mu\text{m}$, the septum $2-5 \mu\text{m}$. [anthraquinones]

CALOPLACA Th. Fr. TELOSCHISTACEAE [Photobiont: mostly "*Pseudotreboouxia*." *Gr. kalos*, beautiful + *plax*, a flat round plate, dish; from the attractive, round, yellow apothecia, resembling plates, of some species. This is a genus, along with related segregate genera in the Teloschistaceae, in which it can be distinctly ungratifying to name specimens. Much of the contemporary literature is at variance in interpretation and there is no comprehensive monograph for North American taxa. With a few exceptions, most of the following names should be regarded as provisional and we are quite certain that so of the bedfellow species still included in *Caloplaca s.l.* will be separated before too long. It sometimes seems as though God was distracted when he was creating *Caloplaca*! Or, lichenologists are sufficiently lacking in moral fiber as to deserve a hellish challenge. ~ Thallus immersed or evident, K– or K+ purple; apothecia with a proper margin and/or thalline margin; spores 8, hyaline, polaribilocular.

1. Thallus, yellow, K+ purple C. PSEUDOFULGENSIA
1. Thallus absent or if present, then not yellow, K-.
 2. Apothecial disks brown to black, K-.
 3. Thallus corticolous C. BRUNNEOLA
 3. Thallus saxicolous.
 - Spores to 14 μm long and 6.5 μm wide C. CONVERSA
 - Spores longer and wider C. ATROALBA
 2. Apothecial disks yellow to orange, notably K+ deep red or reddish, the epihymenium K+ red to red-violet.
 4. Apothecia usually rare, not at all in discernable groups or arrays; thallus sorediate.
 - Thallus dark gray; soralia marginal on the areoles C. LIGNICOLA
 - Thallus pale to smokey gray; soredia in roundish, excavated soralia C. AHTII
 4. Apothecia common, usually in discernable groups or arrays; thallus esorediate.
 5. Thallus saxicolous.
 6. Thallus granular isidiate C. CHLORINA
 6. Thallus not granular isidiate.
 - Thallus smooth dark gray, squamulose with broadly lobulate margins C. PELLODELA
 - Thallus pale gray to sordid, without distinct lobulate margins C. SIDERITIS
 5. Thallus corticolous or lignicolous.
 7. Proper exciple evident.
 - Spores more than 9 μm wide and 17 μm long C. OREGANA
 - Spores smaller C. "PSEUDOCERINA"
 7. Proper exciple absent or fully obscured by the thalline rim.
 - Apothecial margins white, coarsely white pruinose, the disk sometimes with yellow pruina C. ULMORUM
 - Apothecial margins sordid or gray, the disk not usually pruinose C. CERINA

Caloplaca ahtii Sochting (in honor of the Finnish lichenologist, Teuvo Ahti, 1934–, Research Associate in the Botanical Museum, Finnish Museum of Natural History) As we understand it, this species is rare with us, mostly on *Populus*. At first glance it might be passed off as *Athallia pyracea*, at least as we have presented it for this region, but the apothecia of that species are zeorine rather than biatorine, more deeply orange, and the spore septum is usually more than 4.0 μm . ~ Thallus epiphloeic, scant to well developed, pale to smoky gray, areolate, often with dark blue or blue-gray soredia in erosive to cupuliform, frequent to scant soralia; apothecia biatorine, scattered to aggregated, K+ purple, yolk yellow with the proper exciple concolorous with or slightly paler than the epihymenium, 0.1–0.4 mm across; amphithecium absent or nearly so; spores 10–13 \times 5.5–7.0 μm , the septum 3–4 μm . [thalloidima green]

DuPage-MOR

Caloplaca atroalba (Tuck.) Zahlbr. (*L. ater*, black + *albus*, white; probably from the dark disks and pale-colored rims) There are contemporary records of this species from the Southern Lake Michigan region, in Livingston and Will Counties, where it grows on base-rich bedrock, often within the zone of stream fluctuation. A Calkins specimen (#1752 NY) from Will County was originally named *Lecanora aipospila*; another, from LaSalle County (#145, F) was distributed as *Biatora inundata*. Yet another was distributed as *Lecanora fuscata* [Calkins #19b,F]. Many early specimens of this species were labeled "*Lecanora [Lecania] perproxima*," such as a Calkins specimen (#6094, CACS; #2, 19B, & s.n.,F) from LaSalle County. ~ Thallus crustose, areolate to more or less

rimose-areolate, gray to olivaceous, often with a necral layer that can suggest pruina; apothecia lecanorine to cryptolecanorine, the disk flat, epruinose, nigrescent when dry, brownish when wet; epihymenium K+ violet; spores $14\text{--}17 \times 7\text{--}9.4 \mu\text{m}$, the septum $1.5\text{--}3 \mu\text{m}$. [thalloidima green]

Cook-NY, LaSalle-CACS*,F*,MOR,PH,NY, Livingston-MOR, Will-F*,MOR,NY

Caloplaca brunneola Wetmore (*L. brunneus*, dark brown + *-olus*, diminutive; from the color of the apothecial disks) Our only record for this species is from the bark of an open-grown tree of *Quercus rubra*. It is occasional farther south on a wide variety of deciduous trees and on *Juniperus virginiana*. ~ Thallus K-, gray-green, usually thickest and uneven away from the margins, more or less continuous to areolate near the margins; apothecia dark brown to nigrescent, 0.3–0.6 mm across, the proper margin concolorous with the epruinose disk; thalline margin absent; epihymenium K-; paraphyses 1–3 branched, the branches mostly filiform; spores $10\text{--}14 \times 4\text{--}7 \mu\text{m}$, the septum $4\text{--}6 \mu\text{m}$.

DuPage-MOR

Caloplaca cerina (Hedwig) Th. Fr. (*L. cerinus*, yellowish, the color of yellow wax; from the color of the apothecia) Most of our specimens are from the bark of *Populus*, but we also have specimens from planted specimens of *Carpinus caroliniana virginiana* and *Ginkgo biloba*, and weathered wood. Early Cook County specimens at F and ILL were named *Placodium ferrugineum* by Calkins. Our specimens are quite variable with respect to thallus morphology and spores sizes; what holds them together are the lecanorine, thallus-colored exciples and epruinose orange apothecia. This species, along with *C. ulmorum*, which see, seem to comprise a genus of their own. It is actually the type species for the genus *Caloplaca*, so I suspect, give current trends in the Teloschistaceae, that it is only a matter of time when all the other elements included here will be placed elsewhere. *Caloplaca cerina* itself admittedly includes a duke's mixture of phenotypic and molecular variation, to the extent that Wetmore (2007) concluded that it was quite variable and suggested that there are at least two unnamed species in North America. Šoun *et al.* (2011) states that the complex "is a polyphyletic taxon . . . possible [including] cryptic or semi-cryptic species." Certain specimens of *Athallia pyracea* with pale zeorine thallus margins might key here, but that species has a well developed proper exciple. Specimens with a thick, pale gray, verrucose thallus and a blue hypothallus have been called *C. gilva* (Hoffm.) Zahlbr. (*L. gilvus*, pale yellow, dun colored), but it does not appear to be a strongly distinctive feature locally. Old specimens of *Gyalolechia flavorubescens* can have darkened thalli and scant concentrations of anthraquinones in the cortex and might key here; such specimens rarely have spores less than $15 \mu\text{m}$ long and present a yellow thalline margin. ~ Thallus pale to dark gray, thin and continuous to verrucose or blastidiate, the thalline margins of the apothecia with similar tinctures; apothecia persistently lecanorine, the thalline margin white or grey; proper exciple absent or inconspicuous; disks orange, epruinose, K+ purple; larger rims rarely more than 0.8 mm wide; spores $12\text{--}14 \times 5\text{--}8 \mu\text{m}$, the septum $5\text{--}7 \mu\text{m}$.

Allegan-MS, Barry-MS, Berrien-MIN*,MOR, Cook-F*,ILL*,MOR, DuPage-MOR, Jefferson-MOR, Kane-MICH*,MOR, Kent-MOR, Lake IL-F*,MOR, Livingston-MOR, McHenry-MOR, Ottawa-MOR, Porter-MIN*, Walworth-MOR, Waukesha-MOR

Caloplaca chlorina (Ach.) J. R. Laundon (Gr. *chloros*, green, greenish yellow + *-inus*, pertaining

to). Our only record for this species is from an exposed granite boulder in full sun. We are, however, under no illusions that we have the right name for this species, which is a member of the *C. sideritis* group, in the sense of Wetmore (1996). He, himself, demurs the impression that this species is understood and points out that, since the type description is so scant the concept differs among authors. Our specimen is notably pale gray with an indument of granular isidia. Specimens with lobulate isidia or blastidia might be referable to *C. isidigera* Vězda (L. isidia + + *gero*, to carry, bear)—which we do think we have seen locally. ~ Thallus gray, granular; spores $11\text{--}15 \times 5.5\text{--}7.0 \mu\text{m}$, the septum $3.0\text{--}5.5 \mu\text{m}$.

DuPage-MOR, Grundy-MOR

Caloplaca conversa (Kremp.) Jatta (L. *conversus*, converted, turn around) A rare species known from well north and south of our region, where it inhabits sandstone and igneous rocks. ~ Thallus continuous to rimose-areolate, gray, K–, with an uneven necral layer; apothecia black, epruinose, adnate to immersed, to 0.5 mm across, the proper margin concolorous with the disk; spores $10\text{--}14 \times 4\text{--}5.5 \mu\text{m}$, the septum $3\text{--}4 \mu\text{m}$.

Caloplaca lignicola Wetmore (L. *lignum*, wood + -*colo*, to inhabit; from its habitat on tree bark) Frequent, all of our specimens are from lignin. This is a species of the Great Plains, which might yet be discovered in our western sector. ~ Thallus lignicolous, lead-gray, the areolae characterized by soralia along the areole margins, the soredia concolorous with the thallus; apothecia rare, biatorine to weakly zeorine, the amphithecium absent or usually evident beneath the margin; spores $11.0\text{--}13.8 \times 5.5\text{--}7 \mu\text{m}$, the septum $3\text{--}4 \mu\text{m}$. [thalloidima green]

Caloplaca oregona H. Magn. (of Oregon) This is a species known primarily from the western coastal districts of North America. A Calkins specimen from “LaSalle Co., Ill.” (#6079, CACS), which he called this *Placodium cerinum*, is *C. oregona*. Calkins collected in Oregon and even collected specimens from there that he call *Placodium cerinum* but have been referred to *C. oregona* by later workers. We would imagine that in his preparation of exsiccatae for “N. Am. Lichens” he confused the location. The white thallus, large spores, and apothecia that resemble *Athallia pyracea*, leave little doubt as to the identity. ~ Thallus corticolous, white or sordid; apothecia $0.5\text{--}12.0$ mm across, the proper exciple evident and nearly excluding the white amphithecium; spores $16\text{--}22 \times 9\text{--}13 \mu\text{m}$, the septum $5\text{--}9 \mu\text{m}$.

LaSalle-CACS*

Caloplaca pellodela (Nyl.) Hasse (The orthography of the specific epithet has such a confusing history, that it is difficult to know what Nylander was meaning. Wetmore 1996 speculates that the word may come from the Greek *pellos* meaning dark colored, which would confound the suffix as a diminutive) We have a record of this western species from a exposed siliceous boulder in a fen. ~ Thallus dark gray, squamulose, the lobules blunt and rather convex, the cortex with a thin necral layer, K–; apothecia sessile to adnate, the disk more or less flat, $0.2\text{--}0.8$ mm across, rusty orange to nigrescent, K+ purple, the proper exciple scarcely discernable, overwhelmed by the lecanorine rim, the latter concolorous with the thallus; spores $10\text{--}15 \times 5.5\text{--}8 \mu\text{m}$, the septum $3\text{--}5 \mu\text{m}$. [anthraquinones, thalloidima green]

McHenry-MOR

Caloplaca “pseudocerina” Our only local specimen is from the limb of an old-growth *Rhus*

glabra. These specimens go to *C. cerina* in all available literature, including Wetmore (2007), but they fit none of the species described. The apothecia are always described as lecanorine, the proper exciple absent or not evident. Its zeorine apothecia and visible proper exciple are evocative of *Athallia pyracea*, but that species has scant thallus or a thin one with at least some portions bearing anthraquinones. Its grayish, K- amphithecium and substipitate apothecia are evocative of the western species, *C. stipitata* Wetmore, but the amphithecium is K- and concolorous with the thallus. Another California species, *C. stanfordensis* H. Magn. has more oval, shorter spores, and pycnidia with orange ostioles. ~ Thallus pale gray, sumptuous, bullate, K-; pycnidia not seen; apothecia substipitate, zeorine, the amphithecium concolorous with the thallus or pallescent near the well developed proper exciple; disk orange, 0.3–0.8 mm across, flat to low-convex, not pruinose; spores 13–16 × 5.8–6.6 μm, the septum 4–6 μm.

Waukesha-MOR

Caloplaca pseudofulgensia Gaya & Nav.-Ross (Gr. *pseudēs*, false, given to impersonation or sham + *fulgensia*, L. *fulgentum*, bright, shiny, dazzling; from its pretensions as a member of the genus, *Fulgensia*.) Poorly known in North America, Gaya (2009) cites specimens from districts west of our region; she notes that it is characteristic of base-rich, nitrophilous rocks and that it “always” grows with *Calogaya pusilla*. Our record is from weathered concrete in the dune area of Illinois Beach State Park; it grew with *Myriolecis dispersa*. It is unlikely that this species will last long in the genus, *Caloplaca*. ~ Thallus yellow to ochraceous, thick and sumptuous, the lobes poorly developed to branched and imbricate; apothecia deep brownish orange the proper exciple concolorous with the disk, the lecanorine margin nearly concolorous with the thallus; spores 9–13 × 5–7 μm, the septum 2–5 μm. [anthraquinones]

Lake-IL-MOR

Caloplaca sideritis (Tuck.) Zahlbr. (Gr. *sideros*, iron or things made from iron + *-ites*, belonging to or having to do with; from the iron to greenish gray thallus) This species is occasional on siliceous rocks of either granite or sandstone, as well as base-rich substrates. A Calkins specimen [#282, F] was distributed as *Placodium ferrugineum*. ~ Thallus pale gray or brownish, areolate to continuous or rimose, K- ; apothecia zeorine, sessile to adnate, the disk more or less flat, 0.2–0.8 mm across, rusty orange to nigrescent, K+ purple, the proper exciple black or with tinctures of black; spores 11.0–14.5 × 5–8 μm, the septum 3–5 μm. [anthraquinones, thalloidima green]

Boone-MOR, Cook-MOR, DuPage-MOR, Kane-MOR, Kendall-MOR, Lake-IN-MOR, LaSalle-F*, ILLS*, MIN*, MOR, NY, Lee-MOR, McHenry-MOR, Milwaukee-WIS*, Ogle-MOR, Rock-MOR, Walworth-WIS*, Will-MOR, Winnebago-MOR

Caloplaca ulmorum (Fink) Fink (L. *ulmus*, the elm; of elm trees) Our only contemporary local records are from the bark of *Juniperus virginiana*, *Populus* spp., *Ulmus americana*, and base-rich rock, generally a broader array of substrates than its sister species, *C. cerina*. There is a specimen from just west of the Southern Lake Michigan region, which grew on the trunk of *Juglans nigra* in a partly open mowed area. There are several Calkins specimens of this species at F and NY, all of which Calkins had called *Placodium aurantiacum*. Wetmore (2007) includes this species with *C. cerina*, which see, a position for which we can find some empathy. While most of our material sorts well into one or the other, there is one specimen, from *Populus*, which displays a full thallus,

replete with dark prothallus, which as the younger, outer ring of apothecia determinable as *C. ulmorum*, those in the middle *C. cerina*. Alas! *Caloplaca ulmorum*, so called, locally displays a much broader array of substrates and bear apothecial rims 0.1 mm across. Given the burden of variability already borne by *C. cerina*, we will sustain them as separate elements for floristic purposes. For our specimens, Fin's (1910) type treatment as a variety of *C. cerina* seems comfortable; Malone (1972), who looked only at Iowa material, based upon a detailed description and comparison of the exciple anatomy and epihymenium, sustained them as separate species. Specimens of *C. ahtii* that have gregarious apothecia and few soralia may key here; its spores have an isthmus no more than 4 μm long and an apothecium with a yolk yellow disk. ~ Thallus gray to grayish brown, K-, areolate to verrucose or blastidiate; thalline margin of the apothecia notably white pruinose, without tinctures of gray, the disk yellowish orange, K+, sometimes with white or even yellow pruina; larger margins at least 0.1 mm wide; spores 8–18 \times 5–10 μm , the septum 5–7 μm . [anthraquinones]

Barry-MOR,WIS*(on specimen with *Diplotomma alboatrum*), Cook-NY, Ford-MOR, Kane-MICH, Kankakee-MOR, LakeIL-F*, LaSalle-NY, Lee-MOR, Rock-MOR

CANDELARIA A. Massal. CANDELARIACEAE [Photobiont: *Trebouxia*. *L. candela*, candle + *-arius*, belonging to; from the yellow color, like the glow of a candle. ~ Thallus foliose, yellow, K-, small-lobed; apothecia yellow concolorous with the thalline margin; lower cortex white; spores small, usually more than 32, hyaline, simple or rarely 1-septate; all species contain calycin and pulvinic dilactone.]

1. Thallus esorediate..... C. FIBROSA
 1. Thallus soorediate..... C. CONCOLOR

Candelaria concolor (Dicks.) Stein (*L. concolor*, the same color; from the fact that the apothecia and, perhaps, the soredia, are the same color as the thallus) = *Theloschistes concolor* of Calkins. This species, with the possible exception of *Physcia millegrana*, is the most common lichen in the Southern Lake Michigan region. It accounts for most of the yellow swatches that are so characteristic of suburban trees such as *Acer negundo*, *Fraxinus lanceolata*, *Populus deltoides*, and *Ulmus americana*. Other trees from which we have local specimens include *Aesculus sylvatica*, *Betula papyrifera*, *Carya cordiformis*, *Carya ovata*, *Celtis occidentalis*, *Crataegus* spp., *Fraxinus americana*, *Juglans nigra*, *Juniperus virginiana*, *Maclura pomifera*, *Populus alba*, *Populus deltoides*, *Prunus serotina*, *Quercus alba*, *Quercus velutina*, *Salix nigra*, and *Ulmus pumila*. It also grows on fence posts and rails, concrete, dolomitic erratics and outcrops, and tombstones. It commonly produces small thalli on *Phaeophyscia ciliata*, *Phaeophyscia pusilloides*, and *Physcia stellaris*. Sometimes the thallus is so profusely covered by soredia that nearly concealed, some of the granules scattered on the substrate and even on other lichens. Such lichens have been cal var. "*effusa*," and are perhaps distinct at the varietal level, but the type of var. *effusa* is a *Candelariella*, so there is no legitimate name for the variety, which seems to be more frequent in our eastern sector. See also *Candelariella efflorescens* as well as the discussion in Lendemer & Westberg (2011). ~ Principal thallus flat,

sparsely to abundantly granular-soresiate, distinctly fine-lobed, bright yellow, but the pigment fading in shaded specimens; apothecia without a fringe of white rhizines uncommon, but prevailingly present under well-lit conditions.

Allegan-MOR,MSC, Barry-MOR,MSC, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MICH,MOR, Cass-MOR, Cook-CACCS*,F*,MOR,WIS*, DeKalb-MOR, DuPage-ILLS*,MOR, WIS*, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-ILLS*, MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR,WIS*, Kent-MOR,MSC, Kosciusko-MOR,NY,MICH*, LaGrange-MOR, LakeIL-F*,ILLS*,MOR,WIS*, LakeIN-MIN, LaPorte-MOR, LaSalle-MOR,WIS*, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR-NY, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-WIS*, Ottawa-MOR, Porter-INDU,MOR, Pulaski-MOR Racine-MOR, Rock-F*1,MOR,WIS*, Steuben-MOR, St.JosepIN-F*,MOR, St.JosephMI-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR,WIS*, White-MOR, Will-F*,ILLS*,MOR, Winnebago-MOR

Candelaria fibrosa (Fr.) Müll. Arg. (L. *fibra*, a fiber or filament + *-osus*, denotes abundance or fullness; probably from the dense ring of white fibers that invests many apothecia) Calkins did not know this species. He collected it, however, in Cook and LaSalle Counties and used the names *Theloschistes lycneus*, *T. concolor* and *T. polycarpus*. Wheatland (#52 F) collected it in Kendall County on the bark of *Robinia pseudoacacia* in 1855 and used the name *Teloschistes parietinus*.¹⁰ Today, this species is rather abundant on canopy branches farther west; until its recent appearance on *Acer negundo* and *Gleditsia triacanthos* in DuPage County, it had not been collected in Illinois since the 1800's. ~ Principal thallus flat, esorediate, more or less lobulate, fine-lobed, bright yellow; apothecia common, with a fringe of retrorsely oriented white rhizines.

Cook-CACCS*,F*,FH,NY, DuPage-MOR, Kane-MOR, Kendall-F*, LaSalle-F*, Waukesha-WIS* (in Packet with *Candelaria concolor*)

CANDELARIACEAE

- A. Thallus crustose; spores usually simple, 8–32 per ascus. **Candelariella**
 A. Thallus foliose; spores 1-septate; more than 30 per ascus **Candelaria**

CANDELARIELLA Müll. Arg. CANDELARIACEAE [Photobiont: Chlorococcoid. Diminutive of *Candelaria*. ~ Thallus crustose, yellow, dispersed granular or minutely squamulose, K–; Spores 8–32, hyaline, simple or rarely appearing 1-septate by a plasma septum. All species contain calycin, pulvinic dilactone, and pulvinic acid.]

1. Thallus notably soresiate or of corticate granules no more than 0.15 mm in diameter; apothecia uncommon; corticolous or lignicolous.
 Thallus of scattered, globose, distinctly corticate, more or less evenly distributed granules C.
 Thallus soresiate, with ecorticate granules more or less clustered into soralia C. EFFLORESCENS
1. Thallus absent or of small squamules, areoles, or granules more than 0.15 mm in diameter; apothecia usually present; corticolous, lignicolous, or saxicolous.
 2. Spores 16–32 per ascus.

¹⁰Wilhelm and Rericha (2017) credited Babcock (*s.n.* F) with the earliest collection for *Robinia pseudoacacia* as 1868, so this report is notably earlier. Had they been aware of this report, they may have decided to consider Black Locust as native to the region, perhaps from along the Fox River.

- Thallus granulose to verrucose C. VITELLINA
 Thallus of branched, coralloid granules C. CORALLIZA
2. Spores 8 per ascus.
 Spores prevailingly more than 3 times as long as wide C. ROSULANS
 Spores no more than 3 times as long as wide C. AURELLA

Candelariella aurella (Hoffm.) Zahlbr. (*L. aurum*, gold + *-ella*, diminutive; from the tiny yellow apothecia) = *Placodium vitellinum* var. *aurellum* of Fink (1906). Most of our specimens are from weathered wood or concrete or some other HCl+ substrate. We have seen one specimen from a granitic boulder, but the spore shape and size preclude *C. rosulans* (Muell. Arg.) Zahlbr., which has spores at least 3 times longer than wide and grows on HCl- rock west of the Mississippi River. There are two specimens from lignin that are evocative of *Candelariella antennaria* Räsänen, but the thallus consists of gray, convex areoles. See the article by Yakovchenko *et al.* (2017). ~ Thallus endolithic or lignicolous, with or without the scant development of flattish areoles, epihymenium yellow with brownish granules; asci clavate; spores 8, 12–17 × 4–6 μm.

Barry-MOR, Boone-MOR, Branch-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, WIS*, Kent-MOR, LaGrange-MOR, LakeIL-F*, MOR, LakeIN-MOR, Lee-MOR, Livingston-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, MSC, Racine-MOR, Rock-MOR, St.JosepIN-MOR, St.JosephMI-MOR, Steuben-MOR, VanBuren-MOR, Waukesha-MOR, Will-F*, MOR, Winnebago-MOR

Candelariella coralliza (Nyl.) H. Magn. (*L. corallium* coral + *izo*, to become or to be made to appear as) A rare species in North America, but known from nearby Dane County. It grows on nutrient-rich substrates, including rocks, wood, and even shingles where birds perch regularly. ~ Thallus of coralloid-branched areoles, forming pulvinate arrays to 2 mm high; spores 12–16, 10–14 × 4.5–6 μm.

Candelariella efflorescens R. C. Harris & W. R. Buck (*L. efflorescens*, very rarely flowering) More than half of the Southern Lake Michigan region specimens are from the bark of *Crataegus* species and *Quercus rubra* and *Q. velutina*, though we also have it from *Q. macrocarpa*, *Juglans nigra*, *Prunus serotina*, *Tilia americana*, and weathered fence rails. The only Southern Lake Michigan region specimen that we have seen with apothecia was from a Bur Oak; it bore asci with 32 spores. Harris & Buck (1978) map it from areas all around the Southern Lake Michigan region, particularly north and east of us. Our lower Midwestern specimens infrequently produce apothecia, but all that we have seen have 8-spored asci and are referable to *C. xanthostigmoides* (Müll. Arg.) R. W. Rogers, which locally also has been called *C. efflorescens* (Nyl.) Lett. All local reports of "*C. reflexa*" are referred here. For a discussion on these two taxa see Lendemer & Westberg (2010). Very sorediate species of *Candelaria concolor* may key here as var. "*effusa*," but the soredia originate from tiny areoles and lack even small lobes.

Allegan-MOR, MSC, Barry-MOR, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MSC, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, Kent-MOR, LaGrange-MOR, LakeIL-F*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, Milwaukee-MOR, Newton-MOR, Ogle-MOR, Porter-F*, INDU, MIN, MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, St.JosepIN-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR

Candelariella rosulans (Müll.Arg.) Zahlbr. (*L. rosulans*, becoming rose like; an allusion to the rosette arrays of areoles) = *C. dispersa* of Thomson (2003). A lichen of siliceous rock, this species is frequent from Dane County, west and to be expected on the sandstone outcrops of our western sector. ~ Thallus of convex, lobulate areoles, aggregated in gregarious arrays; spores 8, simple, $13\text{--}25 \times 4\text{--}7 \mu\text{m}$.

Candelariella vitellina (Hoffm.) Müll. Arg. (*L. vitellus*, egg yolk + *-inus*, pertaining to; from the tiny yellow apothecia) = *Placodium vitellinum* of Calkins. Most northern Illinois specimens are from sandstone exposures, but the only Southern Lake Michigan region saxicolous specimens we have seen are from igneous boulders. We also have specimens from *Quercus alba* and *Q. macrocarpa*. On wood or bark it could be mistaken for *C.* , but the thallus granules of *C.* are smaller, more spherical, and not as coalesced. Known from districts all around our region is the polysporous, *C. lutella* (Vainio) Räs. (*L. luteus*, yellow + *-ella*, diminutive; little yellow one) a corticolous and lignicolous species is said to have spores no more than $5 \mu\text{m}$ wide $12 \mu\text{m}$ long, septate capitate paraphyses, and apothecia to 0.4 mm across. *Candelariella lutella* is also occasional on lignin, such as old fence rails and wood, from which substrate it is reported by Calkins; we have seen a lignicolous specimen locally that could be interpreted as *C. lutella* if certain size dimensions are ignored. ~ Apothecia to 1.5 mm across, the epihymenium yellow with brownish granules; hymenium to $90 \mu\text{m}$ high, the paraphyses simple, rarely septate, not capitate; asci clavate, the spores 16-24, simple, $9\text{--}15 \times 4.5\text{--}6.5 \mu\text{m}$.

Cass-MOR, Cook-CASC*, DuPage-MOR, WIS*, Ford-MOR, Jasper-MOR, Jefferson-MOR, WIS*, Kane-MOR, LaSalle-ILLS*, MOR, WIS*, Lee-MOR, McHenry-MOR, Ogle-ILLS*, MOR, Racine-MOR, St. Joseph IN-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Candelariella xanthostigma (Ach.) Lettau (Gr. *xanthos*, the various shades of yellow + *stigma*, point, dot, or tattoo; from the scattered, corticate, yellow, spherical granules) *Placodium vitellinum* of Calkins, in part. Seventy-five percent of Southern Lake Michigan region specimens are from species of *Quercus*, but there are also specimens from *Tilia americana*, *Juglans nigra*, *Carya ovata*, *Populus grandidentata*, and weathered fence rails. A Calhoun specimen is on a collection (Harris 9785, MICH) of *Amandinea punctata*.

Barry-MS, Berrien-MIN*, Branch-MICH*, MOR, Calhoun-MICH*, Cass-MOR, Cook-CACS*, MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-F*, MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, LaGrange-MOR, Lake II-MOR, WIS*, Lake IN, MIN*, LaPorte-MIN*, MOR, LaSalle-F*, ILL, MOR, Lee-MOR, Livingston-MOR, McHenry-MOR, Newton-MOR, Ogle-MOR, Porter-INDU, MIN*, Pulaski-MOR, Racine-MOR, Rock-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, WIS*, Waukesha-WIS*, White-MOR, Will-MOR

CANOPARMELIA Elix & Hale PARMELIACEAE [Photobiont: *Trebouxia*. *L. canus*, gray; a gray *Parmelia*, which see. ~ Thallus foliose, gray to blue-gray above, the lower cortex dark, rhizinate with simple to forked rhizines; spores 8, hyaline, simple.]

Canoparmelia texana (Tuck.) Elix & Hale (of Texas) = *Pseudoparmelia texana* (Tuck.) Hale. The earliest record for this southern species locally is based upon two collection made in Jefferson

County, on *Larix laricina* at Hope Lake Bog, near Cambridge, Wisconsin. (Thomson 1963, #10921, WIS), a native habitat. Unknown to Wilhelm (1998), it is now rather frequent on trees in cultural landscapes, on *Acer saccharinum*, *Gleditsia triacanthos*, *Pinus banksiana*, *Prunus serotina*, and *Tilia cordata*. The Kosciusko record is from weathered fence rail. Based upon other records from the Midwest, there is evidence that appears to have been moving northward in recent years. ~ Lower cortex black, brown at the nearly rhizine-free edges; upper cortex smooth, not at all foveolate or reticulate, the lobe axils without cilia; soralia appearing pustular, scattered or aggregated; medulla UV+ bright white. [divaricatic acid].

Berrien-MOR, DuPage-MOR, Jefferson-WIS*, Kosciusko-MOR, St.JosepIN-MOR

CARBONICOLA Bendiksby & Timdal OPHIOPARMACEAE¹¹ [Photobiont: *Trebouxia*. L. *carbo*, coal + *-colo*, to inhabit; from its habitat on charcoal. ~ Thallus squamulose, grayish to greenish-brown, the squamules concave to convex; apothecia biatorine, brown to reddish, the margin obscure in age; spores 8, hyaline, simple; conidia bacilliform to ellipsoid.]

Carbonicola anthracophila (Nyl.) Bendiksby & Timdal (Gr. *anthrakitis*, a kind of coal + *philo*, love; from its propensity to grow on charred wood. = *Biatora anthracophila* (Nyl.) Hafellner; *Hypocenomyce anthracophila* (Nyl.) Bendiksby & Timdal. This species is known just to our northeast and in Missouri, but we have yet to see it locally. characteristically grows on charred wood. ~ Squamules K-, C-, KC-, convex, esorediate; apothecia black, usually abundant; spores narrowly ellipsoid, 7–13 × 1.5–2.5 μm.

CATAPYRENIUM Flot. VERRUCARIACEAE [Photobiont: Chlorococcoid. Gr. *kata*, downward, inferior + *pyren*, kernel; apparently from the sunken perithecia. Ascoma a perithecium, the ostiole at the center; hymenium gelatinized; spores 8, hyaline, simple.]

Catapyrenium cinereum (Pers.) Körb. (L. *cinereus*, ash-colored; from the color of the thallus) This is a western terricolous or humuscolous species of base-rich soils, known from scattered locations all around the Southern Lake Michigan Region, from as nearby as Iowa County, Wisconsin, and Fulton County, Illinois. ~ Thallus squamulose, chinky between the adnate squamules, gray-brown, palef brownish-gray, initially with whitish pruina; the squamules 0.2-0.4 mm broad, often a little longer; hypothallus black; perithecia immersed, brown to nigrescent, to 0.2 mm-broad warts; hymenium IKI+ pale violet proximally, bluish near the base; spores ellipsoid, 16–23 × 6–7 μm.

¹¹This genus is placed in the Carbonicolaceae by Lücking et al. 2016.

CATILLARIA A. Massal. CATILLARIACEAE [Photobiont: Chlorococcoid. L. *catillus*, a small dish or plate + *-arius*, belonging to or resembling; possibly from the small dish-like apothecia. Apothecia biatorine, spores 8, hyaline, 1-septate.]

1. Thallus corticolous; apothecia nigrescent C. NIGROCLAVATA
 1. Thallus saxicolous; apothecia brown.
 Thallus on siliceous rocks; apothecia black, the exciple dark throughout C. CHALYBEIA
 Thallus on base-rich rocks; apothecia brown, the exciple pale marginally C. LENTICULARIS

Catillaria chalybeia (Borrer) A. Massal. (L. *chalybeius*, of iron; the allusion unclear unless it relates to the often steel-gray thallus) Yet unknown from the region, this species grown on siliceous rocks nearby. ~ Paraphyses mostly simple, swollen and nigrescent distally; hypothecium hyaline to brown; spores 9–13 × 3–4.5 μm.

Catillaria lenticularis (Ach.) Th. Fr. (L. *lenticularis*, lens-shaped) Our only record is from Galena dolomite along the Fox River, growing with *Caloplaca atroalba* (Wilhelm & Young #16708 MOR). Apothecia brown, the exciple pale marginally. ~ Paraphyses mostly simple, swollen and nigrescent distally; hypothecium pale; spores 7–10 × 2.4–4 μm.

Kendall-MOR

Catillaria nigroclavata (Nyl.) Schuler (L. *niger*, black + *clavatus*, club-shaped; probably from the dark-pigmented club-shaped paraphyses tips and the dark epihymenium) Probably more frequent than the records indicate, this tiny lichen grows on the smooth round twigs of trees, usually in natural areas, including *Juglans nigra*, *Populus deltoides*, *Prunus serotina*, *Quercus alba*, and *Q. rubra*. ~ Often growing with *Amandinea dakotensis*, it would be easy to pass this species off as *A. punctata* if one were to be too lazy to look at the spores. When viewed from above, the black clavate tips of the paraphyses give the epihymenium a minutely granular appearance. ~ Thallus endolithic, apothecia 2.4–3.0 mm across; asci long-clavate, 26–33 × 5–7 μm; spores becoming 1-septate, 7–12 × 2.1–3.6 μm; swollen tips of paraphyses 3–4.5 μm in diameter.

Berrien-MIN*, Cook-MOR, DuPage-MOR, Porter-MOR

CATILLARIACEAE

One local genus **Catillaria**

CETRARIA Ach. PARMELIACEAE [Photobiont: *Trebouxia*. L. *caetra*, a leather shield + *-arius*, like or connected with; from the shape and texture of the thallus. ~ Thallus fruticose to more or less foliose, the branches flattened or folded, commonly with pseudocyphellae; spores 8, hyaline, simple.]

Cetraria arenaria Kärnefelt (L. *arena*, sand + *-arius*, like or connected with; from its sandy soil habitat) The only record for this boreal species in the region of southern Lake Michigan is at Illinois Beach State Park, where it grows in sand prairie near the lake, with *Helianthus occidentalis*, *Andropogon scoparius*, *Arctostaphylos uva-ursi coactilis*, *Arabis lyrata*, *Juniperus horizontalis*, *Solidago speciosa*, *Smilacina stellata*, *Opuntia humifusa*, *Carex umbellata*, *C. richardsonii*, *Sorghastrum nutans*,

Draba reptans, and *Arenaria stricta*. ~ Thallus brown or olivaceous, somewhat lighter beneath, the lobes forked, folded or incurled, with marginal spinules and pseudocyphellae. [protolichesterinic acid, lichesterinic acid]

Lake IL-F*, ILLS*, LSU, MOR

CHAENOTHECA Ach. CONIOCYBACEAE [Photobiont: *Stichococcus* or *Trebouxia*.

Gr. *chainein*, gaping + *theke*, box or receptacle; the allusion not singularly evident.

~ Thallus leprose to inconspicuous; ascoma stipitate, a mazaedium, the spores hyaline to yellowish or brownish, simple, globose; conidia ovoid.]

Chaenotheca furfuracea (L.) Tibell (L. *furfures*, bran; perhaps from the scattered sugary or bran-like appearance of the pruinose apothecia) Photobiont: *Stichococcus*. Yet unknown from the Southern Lake Michigan Region, this species is known from districts nearby all around us. It is characteristic of shaded open soil, particularly on tip-up mounds. ~ Thallus leprose, bright yellow; apothecia yellowish pruinose; spores 2.5–3 μm in diameter. [vulpinic acid]

CHAENOTHECOPSIS Ach. MYCOCALICIACEAE [Photobiont: absent.

Chaenotheca + Gr. *-opsis*, resembling; the allusion evident. ~ Ascoma stalked, black, the capitulum obovoid or lenticular; asci 8-spored, not forming a mazaedium; spores simple or 1-septate, pale to brown.]

Chaenothecopsis perforata Rikkinen & Tuovila (L. *per*, through + *forare*, to pierce; pierced through) Our only records for this species are those cited by Gockman, *et al.* (2019), who note that many “exudate flows on which *C. perforata* occurs, appear to originate from “frost cracks” or ruptures in the bark [of *Rhus*]. . . Others appear to originate from damaged bark caused by insects, birds, or mechanical damage. One collection of *C. perforata* was made from bud scars on older branches of *R. typhina*, which may be a regular niche for the species. *Chaenothecopsis perforata* occurs on the shiny black resin that forms in chambers under damaged portions of bark as well as on dull/matte brown to tan . . . resin that accumulates on the outside of the bark.” ~ Stalk and capitulum black; asci cylindrical, the spores uniseriate, simple, grayish to brownish, 5–7 \times 2–3.5 μm .

Allegan-MIN, VanBuren-MIN

CHRYSOTHRICACEAE

One local genus **Chrysothrix**

CHRYSOTHRIX Mont. CHRYSOTHRICACEAE [Photobiont: *Chlorella*. Gr.

chrysos, gold + *thrix*, the hair; perhaps from the tangled yellow hyphae. ~ Thallus leprose yellow to yellowish green, without cortical development; apothecia, if present, subimmersed, flat or low-convex; interthelial hyphae obscure, the epihymenium brown, several layers of hyphae; asci clavate, pale blue in IKI when

pretreated with KOH, the tholus evident; spores 8, 3-septate.]

1. Thallus bright yellowish; apothecia absent C. XANTHINA
1. Thallus without significant tinctures of yellow; apothecia present, usually pruinose C. CAESIA

Chrysothrix caesia (Flotow) Ertz & Tehler (*L. caesius*, bluish gray; from the pruinose apothecia) = *Arthonia caesia* (Flotow) Körb., *A. lecideella* Willey This is a very distinctive lichen, characterized by a protococcoid photobiont and a sub-leprose, yellowish green thallus bespeckled with whitish or bluish frosted [triterpenoid crystals] apothecia. This species is common on a wide variety of corticolous substrates, particularly *Carya ovata*, *Populus deltoides*, *Quercus alba*, *Q. velutina*, *Tilia americana*, and the smooth bark of young saplings. It is occasional on old wood. Many of the thalli in the metropolitan Chicago area lack apothecia, which are most evident in the more remote rural areas. Some specimens labeled "*Arthonia lecideella*" are referable here. ~ Asci clavate, 31–35 μm \times 12–16 μm ; spores 8, 3-septate, constricted at the middle, 1 pair usually slightly the larger, 20–24 μm \times 5.8–7.2 μm . Occasional specimens are epruinose. [triterpenes, usnic acid]

Allegan-MOR, MSC, Barry-MSC, Berrien-MOR, Boone-MOR, Branch-MICH*, MOR, Calhoun-MOR, MSC, Cass-MOR, Cook-CACS*, F*, ILL, MOR, NY, WIS*, DeKalb-MOR, DuPage-ILLS*, MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, WIS, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, WIS*, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, Lake IL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, NY, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, MSC, Porter-MIN, MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, WIS, St. JosephIN-MOR, St. JosephMI-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, WIS*, Waukesha-MOR, WIS*, White-MOR, Will-MOR, Winnebago-MOR

Chrysothrix xanthina (Vainio) Kalb (Gr. *xanthos*, the various shades of yellow + *-inus*, pertaining to; an obvious allusion to the yellow granular thallus) = *Chrysothrix candelaris* of local authors, but Harris and Ladd (2018), which see, finally realizing that size matters, exclude this species from North America. *Chrysothrix xanthina* is known from as nearby as Stephenson County, Illinois, where it grew at the base of an open-grown *Quercus alba*. Elsewhere, it also grows on siliceous rocks. ~ Apothecia unknown. [pinastric acid only]

CIRCINARIA Link MEGASPORACEAE [Photobiont: *Trebouxia*. *L. circinatus*, of or relating to a coil + *arius*, like or connected with. ~ Thallus crustose, saxicolous, continuous to areolate; apothecia immersed, the paraphyses moniliform; spores 4–8, hyaline, simple, ovoid.]

1. Thallus areolate or not, but without heavily pruinose thalline rims around sunken apothecia; on HCl– rock C. CAESIOCINEREA
1. Thallus areolate, many areoles with deeply seated apothecia surrounded by heavily pruinose thalline rims; on dolomite.
Thallus white or pale greenish white or gray, the areoles more or less contiguous; spores 8 . . . C. CALCAREA
Thallus grayish, the areoles discontinuous or scattered; spores 4–6 C. CONTORTA

Circinaria caesiocinerea (Malbr.) A. Nordin, Savić, & Tibell (*L. caesius*, bluish gray + *cinereus*, ash-colored; from the color of the thallus) Infrequent locally on weathered, usually nutrient-rich

granite boulders, this species is not uncommon just to the west of the Southern Lake Michigan region, where it occurs on sandstone in Lee and Ogle counties. ~ Thallus thick, K–, the areoles continuous, rather warty; apothecia black, generally epruinose; spores 17– 30 μm \times 20–25 μm . [aspicilin]

Cook-MOR, DuPage-MOR, Kane-MOR, Kendall-MOR, Lee-MOR, McHenry-MOR, Ogle-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR

Circinaria calcarea (L.) A. Nordin, Savić, & Tibell (*L. calcarius*, pertaining to or of lime; from the carbonate-rich substrate) = *Lecanora calcarea* of Calkins (1896), who reported this species from "calcareous rocks at Joliet;" *Aspicilia calcarea* (L.) Mudd. One cannot help but wonder if the report is based upon the much more locally frequent, *Circinaria contorta*, although he made a distinction by reporting "var. *contorta*" as well. ~ Spores 15– 27 μm \times 9–22 μm . [aspicilin]

Will

Circinaria contorta (Hoffm.) A. Nordin, Savić, & Tibell (*L. contortus*, full of twists and turns; perhaps from the irregular, centrally elevated and marginally depressed areoles) = *Lecanora contorta* (Hoffm.) J. Steiner; *L. calcarea* var. *contorta* of Calkins, *Verrucaria nigrescens* of Calkins; *Aspicilia contorta* (Hoffm.) Kremp. Our only specimens of this species are from dolomitic outcrops in dry prairie. ~ Spores 16– 30 μm \times 12–20 μm . [aspicilin]

Boone-MOR, Cook-MOR, Kane-MOR, LaSalle-NY, Will-F*, ILL, MOR, NY, Winnebago-MOR

CLADINA (Nyl.) Harm. CLADONIACEAE [Photobiont: *Trebouxia*. Gr. *kladion*, a small branch; from the finely branched podetia. Some authorities have placed *Cladina* back into *Cladonia*, but the squamule-free and completely decorticate, much-branched thallus are too consistent and morphologically foundational to ignore its generic distinction. For an alternative view one may wish to consult Stenroos *et al.* (2002), who admit that, in spite of their cladistic work, the placement of *Cladina* remains unsolved. We'll endure the slings and arrows and sustain the genus for the sake of phenotypic rationality. ~ Thallus fruticose, much branched, the podetia hollow, ecorticate, often pycnidiate distally; squamules absent; apothecia very rare, the spores 8, hyaline, simple.]

1. Podetia white, usnic acid absent, K+ yellow C. RANGIFERINA
1. Podetia yellow green or grayish, usnic acid present, K–.
 2. Fumarprotocetraric acid absent (P–) C. MITIS
 2. Fumarprotocetraric acid present (P+ red).
 - Ultimate branches with a strong tendency to be swept in one direction C. ARBUSCULA
 - Ultimate branches not notably oriented in one direction C. SUBTENUIS

Cladina arbuscula (Wallr.) Hale & W. L. Culb. (*L. arbuscula*, a small tree, from the many-branched thallus) = *Cladonia arbuscula* (Wallr.) Rabenh. Our only records for this species are from an open to partly shaded sandy savannas and pastures. [usnic acid, fumarprotocetraric acid]

Barry-MIN*, MSC, Berrien-MOR, Kalamazoo-MSC, Kankakee-MOR, LaSalle-CACS*, MICH*, MOR, Pulaski-MOR, White-FH

Cladina mitis (Sandst.) Mong. (*L. mitis*, harmless, without spines; probably from the softness

of moistened thalli) = *Cladonia arbuscula* subsp. *mitis* (Sandst.) Ruoss. *Cladonia sylvatica* of Calkins. The Berrien County specimen was from soil in open sandy scrub at the Robinson Preserve, where it is common; the Porter County specimen was from sand prairie southwest of the visitor center of the Indiana Dunes National Lakeshore, along the horse trail. [usnic acid, ± rangiformic acid]

Allegan-MOR, MSC, Berrien-MOR, MSC, Kalamazoo-MIN*, MSC, LaSalle-NY, Ottawa-MOR, Porter-MIN*

Cladina rangiferina (L.) Nyl. (L. *rangifer*, a reindeer + *-inus*, pertaining to; from the branched thallus reminiscent of reindeer) = *Cladonia rangiferina* (L.) F. H. Wigg. Our Porter County specimen was from behind the visitor center of the Indiana Dunes National Lakeshore. The Berrien and St. Joseph County, Indiana, specimens were from open sand scrub. Thomson (1943) reports it from Walworth County based upon a specimen collected in 1893. The Milwaukee County record is reported by Thomson (2003); he referred an early Umbach (#20573, WIS) collection from LaSalle County, Illinois to f. *setigera*. ~ Tips of the branches K+ pale yellow. [atranorin, fumarprotocetraric acid]

Allegan-MOR, MSC, Barry-MSC, Berrien-MOR, Lake IL-MOR, Jefferson-WIS*, LaSalle-WIS*, Milwaukee WIS*, Ottawa-CACS*, Porter-MIN*, Pulaski-MOR, St. Joseph IN-MOR, Walworth-WIS*

Cladina subtenuis (Abbayes) Hale & W. L. Culb. (L. *sub-* below, slightly, imperfectly, nearly; from its strong resemblance to *Cladina tenuis*) Probably = *Cladonia subtenuis* (Abbayes) Mattick, *Cladonia rangiferina* var. *sylvatica* of Calkins; note that Calkins did not mention any other *Cladina*. Locally, this species is rare on sandy open soil, or on eroded, well leached clayey till or loess, typically with other terricolous lichens and *Danthonia spicata*. The Rock County record is reported by Thomson (2003). [usnic acid, fumarprotocetraric acid]

Calhoun-MOR, Cook-MOR, DuPage-MOR, Jefferson, Kankakee-MOR, LaSalle-NY, Lee-MOR, Ogle-ILLS*, MOR, Porter-MOR, St. Joseph-MOR, Will-MOR

CLADONIA P. Browne CLADONIACEAE [Photobiont: *Trebouxia*-like. Gr. *kladion*, a small branch; from shape of the podetia. ~ Thallus fruticose from primary squamules; podetia hollow, branched or unbranched, usually at least partly corticate, cupped or attenuate distally; apothecia distally disposed, often present; spores 8, hyaline, simple.]

1. Podetia much branched and elongated; basal squamules few or absent; apothecia absent.
 2. Podetia gray green, UV-, P+ red (fumarprotocetraric acid) C. FURCATA
 2. Podetia yellow green, UV+/-, P- or P+ yellow (usnic acid).
 - Ends of the branches lustrous, obviously areolate; squamatic acid present C. UNCIALIS
 - Branches more or less dull throughout, areoles obscure or absent; squamatic acid absent C. DIMORPHORCLADA
1. Podetia simple or only sparingly branched; basal squamules usually well developed; apothecia conspicuous.
 3. Squamatic, grayanic, or homosekikaic acids present; thallus UV+ bright white [short-wave], at least on the ecorticate portions of the squamules and podetia.
 4. Thallus greenish or yellowish gray; squamule margins soresciate; usnic acid present . . . C. INCRASSATA
 4. Thallus without greenish or yellowish tinctures; squamules esoresciate; usnic acid absent.
 5. Squamatic acid absent.
 6. Homosekikaic acid present.
 - Podetia slender, terminated by small cups; finely soresciate throughout. C. REI

- Podetia short and stout, the cups deep and bowl-shaped; not finely soresciate throughout C. HOMOSEKIKAIKA
6. Homosekikaic acid absent.
Podetia slender, terminated by small cups; finely soresciate throughout C. CYLINDRICA
Podetia short and stout, the cups deep and bowl-shaped; not finely soresciate throughout C. GRAYI
5. Squamatic acid present.
7. Podetia esoresciate, the cortex persistent, with or without squamules C. CRISPATA
7. Podetia soresciate, the cortex absent or poorly developed, usually abundantly squamulose.
8. Podetia with cups open to the hollow interior C. CENOTEIA
8. Podetia without cups or with small cups not open to the interior.
Squamatic acid only present C. SQUAMOSA
Squamatic acid with either baeomycesic acid and/or barbatic acids present C. BEAUMONTII
3. Squamatic acid, grayanic, and homosekikaic acids all absent; thallus not bright white under UV light.
9. Podetia forming cups (scyphae) that flare distally, their diameter larger than that of the podetia, or if only equal to the podetia in diameter, the cup open to the hollow interior.
10. Podetia and cups esoresciate, or with rounded corticate areoles, at least in the proximal portions..
11. Central portions of the cups proliferating, producing secondary and tertiary cups.
Proximal portions of the podetia distinctly nigrescent C. PHYLLOPHORA
Podetia concolorous throughout. C. VERTICILLATA
11. Scyphae not proliferating, or proliferating from their margins only.
12. Scyphae with membranes irregularly perforated C. MULTIFORMIS
12. Scyphae without perforations.
13. Podetia tall, olive green, with the scyphae usually proliferating at their margins.
Cortex dull, areolate distally, the podetia often nigrescent proximally C. PHYLLOPHORA
Cortex shiny, not areolate, podetia not nigrescent proximally C. GRACILIS TURBINATA
13. Podetia short, gray green, the scyphae not or only rarely proliferating.
14. Thallus K+ yellow, atranorin present C. MAGYARICA
14. Thallus K-, atranorin absent.
Primary squamules divided and separate from each other . C. PYXIDATA
Primary squamules united and confluent C. POCILLUM
10. Podetia and or scyphae nearly or quite covered by fine to coarse soresdia.
15. Podetia very elongate, terminated by small scyphae, finely soresciate, nearly or quite to the base.
Scyphae dilated well beyond the diameter of the podetia C. FIMBRIATA
Scypha dilation scarcely exceeding the diameter of the podetia C. CONIOCRAEA
15. Podetia stout, the scyphae often deep and flaring, sometimes partly corticate.
16. Apothecia and/or pycnidia red; thallus yellowish green; usnic acid present.
Podetia finely soresciate, the larger more than 2.5 cm high C. DEFORMIS
Podetia granular soresciate, the larger less than 2.5 cm high C. PLEUROTA
16. Apothecia and/or pycnidia brown or absent; thallus grayish or whitish; usnic acid absent.
17. Cryptochlorophaeic or merochlorophaeic acid present; UV+ pale blue or yellow.
Cryptochlorophaeic acid present; UV+ pale yellowish C. CRYPTOCHLOROPHAEA

- Cryptochlorophaeic acid absent: UV+ pale blue *C. MEROCHLOROPHAEA*
17. Cryptochlorophaeic acid and merochlorophaeic acid absent; UV-.
18. Thallus K+ yellow *C. DIGITATA*
18. Thallus K-.
- Soredia coarse and granular, extending below the flare of the cup;
scyphae stout, not generally deep and expanded; bourgeanic acid absent
. *C. CHLOROPHAEA*
- Soredia fine, generally confined the region at or above flare of the cup;
scyphae thin, deep and expanded; bourgeanic acid present . *C. CONISTA*
9. Podetia not forming scyphae, or podetia absent, or with very shallow scyphae no wider than the podetia.
19. Apothecia red and/or pycnidia (rarely black); barbatic acid present.
20. Podetia esorediate, at least below the middle
- Podetia granular isidiate or sorediate above the middle *C. FLOERKEANA*
- Podetia corticate throughout *C. CRISTATELLA*
20. Podetia sorediate or with ecorticate or corticate granules.
- Squamules incised, esorediate; podetia scarcely sorediate, beset with granular or isidioid squamules except in ecorticate areas that turn brown and translucent
. *C. DIDYMA*
- Squamules occasionally lobed but not incised, sorediate; podetia with patches of fine soredia *C. MACILENTA BACILLARIS*
19. Apothecia tan or brown to nigrescent, or absent; barbatic acid absent, or if present in *C. robbinsii*, then the apothecia absent.
21. Podetia and or squamules K+ yellow or yellow turning red.
22. Squamules K+ yellow turning red.
- Atranorin present *C. SYMPHYCARPA*
- Atranorin absent *C. SUBCARIOSEA*
22. Squamules K+ yellow, at least below).
23. Primary squamules commonly more than 3 mm long; podetia absent
. *C. APODOCARPA*
23. Primary squamules less than 3 mm long; podetia often present.
- Primary squamules, K+ deep yellow, minute granular, similar to those that densely clothe any developed podetia *C. PARASITICA*
- Primary squamules, K+ yellow, strap-like, commonly 1 mm or more long, simple or lobulate *C. CARIOSA*
21. Podetia K- and squamules K- or podetia absent or less than 4 mm long.
24. Primary nearly or quite wholly comprised of tiny granular soredia; podetia, if present, ecorticate. *C. IGNATI*
24. Primary squamules entire to deeply and complexly divided and sorediate, but some laminar cortical surface usually evident; podetia with or without cortical tissues, or podetia absent.
25. Podetia absent or less than 4 mm long.
26. Apothecia well-developed, sessile or on short slender podetia *C. CAESPITICIA*
26. Apothecia rare, the podetia minute and pointed or absent; squamules various.
27. Squamules yellowish, C+ green, or C- and KC+ golden or yellow and with apothecia absent.
- Squamules C+ green *C. STREPSILIS*
- Squamules C-- *C. ROBBINSII*
27. Squamules without any tinctures of yellow, C- and KC-.
28. Larger squamules more than 2.5 mm or more long . *C. SOBOLESCENS*

28. All squamules less than 2 mm long.
 Primary squamules, not deeply divided, UV+bright white;
 sphaerophorin present. C. PETROPHILA
 Primary squamules deeply divided to abundantly sorediate,
 UV-, sphaerophorin absent C. RAMULOSA
25. Podetia manifest, 4 mm or more long, or if less than the apothecia pale flesh-colored.
29. Podetia sorediate, at least above the middle.
30. Primary squamules finely divided and scarcely discernable among the soredioid granules; podetia verruculose-corticate to well beset with microsquamules, usually without large smoothly corticate or farinose areas. C. RAMULOSA
30. Primary squamules entire to divided but with evident laminar surfaces; podetia without verruculose corticate areas, commonly with large areas of either smooth corticate or sorediate areas.
31. Podetia with the proximal portion farinose sorediate or with a short basal ring of corticate tissue C. CONIOCRAEA
31. Podetia with the proximal portions well invested with cortical tissue.
 Primary squamules inconspicuous; podetia commonly more than 1.5 cm long C. CORNUTA
 Primary squamules well developed; podetia rarely more than 1.5 cm long C. OCHROCHLORA
20. Podetia esorediate or largely so.
32. Thallus yellowish green; usnic acid present C. PIEDMONTENSIS
32. Thallus grayish green or gray; usnic acid absent.
33. Podetia P+ yellow (psoromic acid) C. BREVIS
33. Podetia P + red (fumarprotocetraric acid)
 Apothecia tan; squamules less than 1.5 mm long
 C. PEZIZIFORMIS
 Apothecia brown; many squamules more than 1.5 mm long . .
 C. SOBOLESCENS

Cladonia apodocarpa Robbins (Gr. *a-*, without, absent, away + *podos*, foot + *karpos*, fruit; from the typically sessile apothecia) Our only record for this species is from a bluff top and the Seneca Hill Prairie. ~ Primary squamules well-developed; upper medulla K+ yellow. [fumarprotocetraric acid, atranorin]

LaSalle-MOR

Cladonia beaumontii (Tuck.) Vainio (In honor of J. F. Beaumont, 1825–1865,, of Alabama, who collected the type material) Most of our specimens are all from sandstone exposures or stable sandy open areas. The Kane County material was collected on a decorticate log in open woods. All of our specimens, like so much Midwestern material, contain what appears to be barbatic acid rather than baeomycesic acid, and perhaps should be treated as a chemical race of *C. squamosa*. Frankly the morphological differences, as articulated in the literature are difficult in which to find consistent strength of identity among these two taxa. Dick Harris (personal communication) calls all the squamatic acid specimens with either barbatic or baeomycesic acids in the Missouri Ozarks *C. beaumontii*. It would seem to us that this complex could use some serious evaluation. ~ Primary squamules usually well-developed; podetia

usually quite squamulose, UV+ bright white [squamic acid, baeromycesic acid, or barbatic]
Berrien-MOR, Jasper-MOR, Kane-MOR, Ogle-MOR, Walworth-MOR

Cladonia brevis (Sandst.) Sandst. (*L. brevis*, short; from the podetia, which are shorter than those of *C. peziziformis*) A terricolous species, our only records are from Allegan and Barry counties. ~ Primary squamules well-developed; podetia smooth, rather stout, not seemingly contorted; apothecia brown, about as broad as the podetia; K- or K+ pale yellow. [psoromic acid]

Allegan-MS, Barry-MS

Cladonia caespiticia (Pers.) Flörke (*L. caespiticius*, forming a turf; from the turf-like development of the squamules) The substrate is quite variable, though this species is most often found at the bases of *Quercus velutina* or *Q. palustris*. There is a specimen from the base of *Tsuga canadensis*, one from HCl+ rock, one from a decorticate log, and one from shaded stable sands along the foredunes at Indiana Dunes State Park. Fink's Kane County specimen (ILL) is from an old cedar log in the *Thuja* swamp at Elgin. ~ Primary squamules well-developed; podetia nearly or quite ecorticate, to 4 mm high, much narrower than and dwarfed by the yellowish to reddish-brown apothecia. [fumarprotocetraric acid]

Allegan-MIN*, Barry-MOR, Berrien-MOR,MS, Cook-CACS*,MOR, DuPage-MOR, Jasper-MOR, Kane-ILL,NY,US, Lake IL-MOR, LaPorte-MOR, Newton-MOR, Ogle-MOR, Ottawa-CACS*, Porter-MIN*,MOR,MS, VanBuren-MOR

Cladonia cariosa (Ach.) Spreng. (*L. cariosus*, much decayed; perhaps from the often nigrescent or brownish tinge of older, typically persistent squamules) = *C. "cariota"* of some authors. Rather frequent a little farther north, Calkins & Huett (1898) report this species from La Salle County; the only Illinois specimens we have seen are from southern Illinois. A strictly terricolous species, it is probable that this local report is based upon some other species. ~ Primary squamules well-developed, the ecorticate portions K+ yellow. [atranorin ± fumarprotocetraric acid ± homosekikaic acid]

LaSalle

Cladonia cenotea (Ach.) Schaerer (*Maya cenote*, a deep well or sinkhole; an allusion to the deep hollow scyphae) Yet unknown from our region, this mostly northern species occurs as nearby as Eaton County, Michigan. ~ Primary squamules absent or soon evanescent; podetia UV+ bright white. [squamic acid]

Cladonia chlorophaea (Sommerf.) Spreng. (*Gr. chloros*, green, greenish yellow + *phaios*, dusky, dark, gray; from the greenish gray color of the podetia and squamules) Probably = *C. pyxidata* and *C. pyxidata* var. *pocillum* of Calkins. Including *C. chlorophaea* f. *carphophora* (Flörke) Anders.; *C. chlorophaea* f. *simplex* (Hoffm.) Arnold. Usually, this species grows on weathered clayey till or spoil, or weathered sandy fields, sand prairies, and black oak savannas. It is occasional at the bases of trees, particularly *Quercus*, but there are also specimens from burnt wood, decorticate logs, and stumps, and even pyrite. It is far more frequent in our western sector than *C. grayi*. A Calkins specimen from Cook County (#1891 NY) was originally named *C. fimbriata simplex*; another specimen (Calkins 9 CACS) was called *C. pyxidata*. Note that Calkins did not mention this species and, of course, was unaware of the importance of

secondary metabolites in species segregation. ~ Thallus UV-; primary squamules well-developed, divided or lobulate; podetia usually less than 1 cm high, granular-sorediate, often with corticate granules admixed, with broadly expanded, sorediate, usually pycnidiate scyphae to 0.8 cm across; apothecia uncommon, but borne at the ends of branches from the cup edges. [fumarprotocetraric acid]

Allegan-ASU, BYU, MICH*, MOR, MSC, Barry-MOR, Berrien-MOR, Cook-CACS*, F*, ILL, NY, DuPage-MOR, Grundy-MOR, Jasper-MOR, Kalamazoo-MSC, Kane-MOR, Kendall-MOR, Kenosha-MOR, LaGrange-MOR, Lake IL-MOR, NY, LakeIN-MOR, LaSalle-MOR, NY, WIS*, Lee-MOR, McHenry-ILL, MOR, Ogle-MOR, WIS*, Porter-MOR, Racine-MOR, St. Joseph In-MOR, Starke-MOR, Van-Buren-MOR, Walworth-MOR, Waukesha-MOR, Winnebago-MOR

Cladonia coniocraea (Flörke) Sprengel (Gr. *konios*, point, top + *craer*, dusty; perhaps from the sorediate podetia) Including *C. coniocraea* f. *ceratodes* (Flörke) Dalla Torre. *Cladonia coniocraea* is characteristic of corticate and decorticate logs in shaded woods, often with *C. macillenta bacillaris*, but it is occasional at the bases and along the lower trunks of trees, particularly *Quercus*. There is one specimen from a stable, partly shaded foredune at Indiana Dunes State Park. Herre (1934) reports it from LaPorte and Porter counties; Thomson (1942) reports it from Walworth County. Also included here are previous local reports for *C. subulata*. See also notes under *C. ochrochlora*. There is a possibility that our interpretation of this species is not congruent with that of Flörke or even other American authors. It is our opinion, for example, that the photograph in Brodo *et al.* (2001) said to be this species is *C. ochrochlora*; rarely do any of our specimens have primary squamules 2–5 mm long as presented in Hale (1979). Our specimens, whatever they are, have evenly sorediate, elongate conic to slender podetia, and fumarprotocetraric acid. The discomfiting variability in the primary squamules suggest that critical work might reveal other species. The reasoning may be circular, but the primary squamules of related horned *Cladoniae* with fumarprotocetraric acid only seem to us much less variable. ~ Primary squamules persistent, often divided; podetia often sorediate, pointed, usually without squamules, occasionally with narrow scyphi, at the tips. [fumarprotocetraric acid]

Allegan-MOR, Barry-MOR, Berrien-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Kalamazoo-MOR, Kane-MOR, Kendall-MOR, Kent-MOR, LaGrange-MOR, LakeIN-MOR, LaSalle-CACS*, MOR, Livingston-MOR, Marshall-MOR, Newton-MOR, Ogle-MOR, Porter-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Cladonia conista (Nyl.) Robbins (L. *con-* together, with + *iste*, that one near at hand; the allusion not evident if I have the word broken down properly) Including local reports of *C. humilis* (With.) J. R. Laundon (L. *humilis*, small, dwarfish, on the ground; probably from its low habit), which is similar but contains atranorin as well as fumarprotocetraric acid; *C. conista* f. *simplex* Robbins. This species is infrequent with us, known from just a few sandy prairies and savannas. A Calkins specimen from Cook County (#1991 NY) was originally called *C. fimbriata simplex*; several others at CACS were called *C. pyxidata*. Thomson (1942) reports it from Walworth County. According to Nash *et al.* (2002), this species is similar to *C. chlorophaea* and *C. fimbriata*, with which it could be confused if the fatty acid, bourgeanic acid, is overlooked. While some North American authors regard the two elements to be conspecific, with *C. conista*

being the older name, Raquel *et al.* (2012) believe that the two elements are distinct species and that most of the North American material is *C. conista*, a view elaborated upon by Raquel *et al.* (2013) who map at least one record of *C. humilis* for the Midwestern United States. The latter is the only species in the *C. chlorophaea* complex that produces atranorin in addition to fumarprotocetraric acid. The podetial cortex of *C. conista* is persistent, gray and smooth, and may continue past the flaring base of the relatively wide cup. Students north and east of our region may encounter *Cladonia carneola* (Fr.) Fr. (*L. carno*, meat or flesh, an allusion to the color of the apothecia) with is similar but is notably yellow-green and contains usnic acid and zeorin, which is evocative of the red-podetiate *Cladonia pleurota*, which see. ~ Podetia to 2 cm high, never proliferous, smoothly corticate except for the farinose-soresiate, deeply expanded scyphae, the margins commonly pycnidiate, squamules and phyllidia absent. [fumarprotocetraric acid, bourgeanic acid]

Allegan-ASU,BYU,MICH*,MOR,MSC, Barry-MS, Cook-CACS*,MOR,NY, DuPage-MOR, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, Kent-MOR, Lake IL-MOR, Lake IN-MOR, Porter-US, VanBuren-MOR, Walworth-WIS*, Will-MOR

Cladonia cornuta (L.) Hoffm. (*L. cornuta*, a horned animal; an allusion to the horn-like appearance of the podetia) Yet unknown from our region, this terricolous, mostly northern species occurs as nearby as Eaton County, Michigan. ~ Primary squamules small to evanescent; podetia tall and long-tapering, commonly more than 25 mm high, soresiate distally, largely corticate below the middle. [fumarprotocetraric acid]

Cladonia crispata (Ach.) Flotow (*L. crispata*, to curl) This species is rather frequent just north of our region, particularly in Michigan, but is yet unknown locally. ~ Primary squamules minute and lobulate; evocative of *Cladonia furcata*, the thallus with tinctures of brown or olive, UV+ bright white. [squamic acid]

Cladonia cristatella Tuck. (*L. crista*, a crest + *tellus*, earth; from the soil-inhabiting, red-crested podetia, or perhaps from the diminutive of *cristatus*, crested) This is the common "British Soldiers" lichen. It grows on just about any substrate that will support *Cladonia*, though it is most frequent on decorticate logs and old wood; it is also frequent as a terricolous species in black oak savannas and in sandy prairies. Occasionally it is found on shingled roofs, fence posts, and even on weathered cinders along railroads. This species is characterized by red apothecia and non-soresiate corticate podetia; otherwise it varies markedly in squamule development on the podetia and the podetia rarely can be tan or orange. ~ Primary squamules well-developed and finely lobulate; podetia vary variable, from smooth and corticate to heavily squamulose, simple with large apothecia to finely branching distally with minute apothecia or pycnidia. [barbatic acid, didymic acid, ± usnic acid]

Allegan-ASU,F*,MICH*,MOR,MSC, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR,MSC, Cass-MICH*, Cook-MOR,NY, DuPage-MOR, Grundy-BALT,MOR, Elkhart-MOR, Iroquois-MOR, Jasper-MOR, Kalamazoo-MSC, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, LaGrange-MOR, Lake IL-F*,MOR,NY, Lake IN-MOR, LaPorte-MOR, LaSalle-CACS*,MOR,NY, Lee-ILLS*,MOR, Marshall-MOR, McHenry-ILL, Milwaukee-FH, Newton-MOR, Ogle-MOR, Ottawa-CACS*,MICH*,MOR,MSC, Porter-INDU,MOR, Pulaski-MOR, Racine-UWSP, Rock-MOR, St. Joseph IN-MOR, Starke-MOR, Steuben-IU, VanBuren-FLAS,MOR, Walworth-MOR, Waukesha-ILLS*,MOR, Will-F*,ILLS*,MOR, Winnebago-MOR

Cladonia cryptochlorophaea Asahina (Gr. *kruptos*, hidden; from its hidden, chemical, distinction from *C. chlorophaea*) Thomson (1984) mapped this species from extreme southeastern Wisconsin. It grows in habitats similar to those of *C. chlorophaea*, though it is less common. A Calkins specimen from Cook County (#1991) was originally called *C. fimbriata simplex*. Wilcer (1984) reports it from Starke County. ~ Similar to *C. chlorophaea*, but with the thallus UV+ pale yellowish; podetia to about 1.2 cm high, the scyphae to 0.5 cm across, the surface coarsely corticate with granules or phyllidia, squamules absent, infrequently proliferating from the often pycnidiate, margins. [cryptochlorophaeic acid, ± fumarprotocetraric acid, ± atranorin]

Allegan-MIN*, MOR, Berrien-MOR, Boone-MOR, Calhoun-MSC, Cass-MICH*, Cook-MOR,NY, DuPage-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kankakee-MOR, Lake IL-MOR, LaPorte-MIN*, LaSalle-MOR, Lee-MOR, Livingston-MOR, Newton-MOR, Ogle-MOR, Porter-MIN*, Pulaski-MOR, VanBuren-MOR, Waukesha-MOR, Winnebago-MOR

Cladonia cylindrica (A. Evans) A. Evans (Gr. *kyliandros*, a cylinder; from the somewhat cylindrical shape of the podetia) = *C. borbonica* (Del.) Nyl. f. *cylindrica* Evans. Except for one specimen that grew on humus over sand at Illinois Beach State Park, all Southern Lake Michigan region material is from shaded decorticate logs and old stumps. Calkins's specimens from Cook County (#1849 and #1991) were originally called *C. fimbriata simplex*. ~ Thallus UV+ white; primary squamules small, finely lobulate; podetia granular-sorediate, particularly proximally, often bluntly tipped, the apothecia very rare. [grayanic acid, fumarprotocetraric acid]

Allegan-MOR, Cook-MOR,NY, DuPage-MOR, Lake IL-MOR, LaPorte-MOR,US, LaSalle-MOR,NY, Milwaukee-MOR, Newton-MOR, Ottawa-CACS*, Porter-MOR, Steuben-MOR, St. Joseph IN-MOR, Walworth-MOR, Will-MOR, Waukesha-MICH*, Winnebago-MOR

Cladonia deformis (L.) Hoffm. (*L. deformato*, to disfigure or to alter the shape) Yet unknown from our region, this mostly northern species occurs as nearby as Eaton County, Michigan; it grows on shaded humus, often on logs, commonly among mosses. ~ Primary squamules minute to evanescent; podetia often 2.5 cm or more high, KC+ golden. [usnic acid, zeorin]

Cladonia didyma (Fée) Vainio (Gr. *didymos*, double, twofold; only Fée knows why he named it thus) Including *C. didyma* f. *subulata* Sandst.; *C. pulchella* Schwein. Infrequent locally, this species is confined to decorticate logs. ~ Primary squamules lobulate, commonly granular-sorediate; podetia slender, coarsely granular sorediate or with corticate granules, the stereome showing exposed and brownish in ecorticate or eroded areas; apothecia red and commonly present. [barbatic acid, didymic acid]

Barry-MOR, Berrien-MOR, Cook-MOR, DuPage-MOR, LaPorte-MOR, Livingston-MOR, McHenry-MOR, Newton-MOR, Walworth-US

Cladonia digitata (L.) Hoffm. (*L. digitatus*, with fingers or toes) Yet unknown locally, this species occurs as nearby as Ozaukee County, Wisconsin, where it grows on soil in an old quarry. ~ Primary squamules mostly more than 4 mm long, not much divided, often dilated distally; podetia with deep scyphae, farinose sorediate, K+ deep yellow. [thamnolic acid]

Cladonia dimorphoclada Robbins (Gr. *di*, twice + *morphe* + form or shape, *kladion*, a small branch) Our only records for this species are from our western sector, where it grows on

shallow soil over partly shaded sandstone exposures with *Bouteloua curtipendula*, *Hedeoma hispida*, *Hypericum gentianoides*, *Ionactis linariifolia*, *Koeleria macrantha*, *Liatris aspera intermedia*, *Liatris cylindracea*, *Phemeranthus rugospermus*, *Schizachyrium scoparium*, and *Tephrosia virginiana*. Most Illinois material has podetia less than 3 mm in diameter, which could place them within *C. dimorphoclada* Robbins. Many of our specimens display a fine cloud of needle-like crystals at the distal portions of the podetia (triterpenes), a feature never supposed to occur in *C. uncialis*, which see. All local reports of *Cladonia caroliniana* Tuck. are referable here. ~ Primary squamules absent; podetia KC+ golden, much-branched, usually rather spreading-ascending [triterpenes, usnic acid]

Allegan-MOR, Kalamazoo-MOR, Lee-MOR, Ogle-ILLS*,MOR, VanBuren-MOR

Cladonia fimbriata (L.) Fr. (*L. fimbriatus*, fibrous, fringed with hairs; from the fringed appearance of the evenly spaced podetia on decorticate logs) This species is occasional on weathered wood, decorticate logs and stumps, rare on weathered till. Calkins (1896) reports it from Will County. ~ Primary thallus minutely squamulose to granular; podetia rather slender, to 3 cm high, with deeply expanded scyphae to 0.8 cm across, farinose sorediate throughout or rarely corticate at the base. [fumarprotocetraric acid]

Branch-MOR, Cook-CACS*,MOR, DeKalb-MOR, DuPage-MOR, Jasper-MOR, Kane-MOR, Kendall-MOR, Kenosha-MOR, Koskiusko-MOR, Lake IL-MOR, LakeIN-INDU, LaSalle-MOR, Newton-MOR, Ottawa-CACS*, Porter-MOR, VanBuren-MOR

Cladonia floerkeana (Fr.) Flörke (in honor of German lichenologist and botanist, Heinrich Gustav Flörke, 1764–1835, professor of natural history at the University of Rostock) Yet unknown from our region, this species is recorded from districts just to our east and north. It resembles *Cladonia cristatella*, from which it differs in having the distal portions of the podetia granular-sorediate/isidiate. As with *C. cristatella*, the presence of usnic acid is facultative. ~ Primary squamules nearly or quite without lobes and lacking soredia or granules; podetia corticate proximally, coarsely granular sorediate distally; apothecia red, always present. [barbatic acid, ± didymic acid, ± usnic acid]

Cladonia furcata (Huds.) Schrad. (*L. furcatus*, forked; from the branched podetia tips) Locally, weathered till in natural areas is the most common habitat, but there is one record from black oak savanna on sand, and another from high, stable mesophytic dune forest in Berrien County. The Waukesha County record is reported by Thomson (2003). ~ Primary squamules soon evanescent; podetia much branched, corticate, smooth to copiously beset with squamules. [fumarprotocetraric acid]

Barry-WIS, Berrien-MOR, Cass-MICH*, Cook-F*,MOR, DuPage-MOR, Jasper-MOR, Kalamazoo-WIS*, Kane-MOR, Lake IL-MOR,WIS*, LaSalle-CACS*,F*,ILLS*,MOR,NY,WIS*, Livingston-MOR, McHenry-MOR, Ogle-MOR, Porter-MOR, Racine-MOR, St.JosepIN-MOR, Walworth-MOR, Waukesha-ILLS*,MOR,WIS*, Will-MOR,WIS*, Winnebago-MOR

Cladonia gracilis (L.) Willd. ssp. **turbinata** (Ach.) Ahti (*L. gracilis*, slender, simple; from the slender podetia; *L. turbinatus*, cone- or top-shaped; from the shape of the podetia that typically flare distally) = *C. gracilis* of Calkins; including reports of var. *dilacerata* Flörke and var. *dilatata* (Hoffm.) Vain. It is likely that his report is referable to some other species. *C. gracilis* var. *verticillata* of Calkins may be referable here, because at least one specimen with that

name, in his bound *Lichenes Exsiccati* at ILL, is this species. All the specimens we have seen locally are from stable sandy soil or sandstone outcrops. See also notes under *C. pyxidata*. ~ Primary squamules usually well-developed; podetia rather slender, usually cup-forming, the cortex shiny and not nigrescent proximally, often proliferating from the cup margin. [fumarprotocetraric acid]

Allegan-MOR, Berrien-MOR, Cook-ILL, LakeI-F*, Ogle-MOR, Waukesha-MOR

Cladonia grayi Sandst. (after Rev. Fred Gray, of West Virginia, an amateur botanist) Including *C. grayi* f. *aberrans* Asah. Some of Calkins's reports of *C. pyxidata* may be referable here. This species is probably the commonest cup lichen in the eastern sector of our region, growing on weathered till, decorticate logs, tree bases, and in sandy prairies and savannas. Wilcer (1984) reports it from Starke County. Podetia to 3 cm high, the surface granular-sorediate, the scyphae warty to granular or phyllidiate, pycnidiate along the margins. [grayanic acid, ± fumarprotocetraric acid]

Allegan-MOR, MSC, Barry-MOR, Berrien-MOR, Cass-MICH*, Cook-MOR, DuPage-MOR, Iroquois-MOR, Jasper-MOR, Kalamazoo-MSC, Kankakee-MOR, Lake IL-MOR, LakeIN-MOR, LaPorte-MOR, US, LaSalle-MOR, Lee-MOR, Newton-MOR, Noble-NY, Ogle-MOR, Ottawa-MOR, MSC, Porter-INDU, MOR, Pulaski-MOR, St. JosephIN-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-US, Waukesha-MOR, White-FH, Will-MOR, Winnebago-MOR

Cladonia homosekikaica Nuno (A chemical species related to *C. pyxidata*, identified by the presence of homosekikaic acid) This is a poorly known species throughout the northern hemisphere, our only specimens from prairies of the beach ridge plain at Illinois Beach State Park. Elsewhere in North America there are records from Alaska, British Columbia, and Mexico. Stenroos *et al.* (2002) suggest that the *C. pyxidata* group is still in need of better understanding. Podetia to 1.8 cm high, more or less corticate below the middle and farinose-sorediate distally, the scyphae not usually proliferous, to 0.4 cm across; pycnidia often absent. Both it and *C. grayi* are UV+ bright white, so the only way to discriminate them is through TLC. [homosekikaic acid, atranorin, fumarprotocetraric acid]

Lake IL-MOR

Cladonia ignatii Ahti, Pino-Bodas, & J. W. McCarthy (Names for the type locality, a Silver Maple swamp owned by the Ignatius Jesuit Centre, a Jesuit college in Guelph Ontario, as well as in honor of St. Ignatius of Loyola, 1491–1556, the founder of the Society of Jesus) As we understand this newly described species, we have one local collection from a rotten log in a woods and one from nearby Jo Daviess County, Illinois. Ahti *et al.* (2018) cite a specimen from nearby Dane County, Wisconsin. Some specimens of *C. ramulosa* that have scant podetia appear similar, but their primary squamules are manifested by highly blastidiate-soredioid, much divided squamules. ~ Primary squamules virtually reduced to masses of tiny soredioid granules, most scarcely more than 0.05 mm in diameter; podetia wholly decorticate, fully invested with farinose soredia. [fumarprotocetraric acid]

DuPage-MOR

Cladonia incrassata Flörke (*L. incrassatus*, thickened, stout; probably from the relatively thickened squamules) In the Southern Lake Michigan region, this species is confined to ombrotrophic bogs, where it grows at the bases of *Larix laricina* or on the old stumps. Thomson

(1942) reports it from Walworth county. [squamic acid, usnic acid, rhodocladonic acid]

Berrien-MOR, LaPorte-MOR

Cladonia macilenta Hoffm. var. **bacillaris** (Ach.) Schaerer (L. *baculus*, staff, rod + *-aris*, pertaining to; from the resemblance of the podetia to little rods) Including *C. bacillaris* f. *clavata* (Ach.) Vainio. It is probable that Calkins's (1896) report of *C. macilenta* is referable here inasmuch as he did not list *C. bacillaris*, and noted that *C. macilenta* and *C. cristatella* were easily told by their scarlet apothecia. This species is characteristic of decorticate logs, stumps, and weathered farm wood, where it often covers large areas and sometimes, especially on corticate logs, grows with mosses such as *Platygyrium repens* and *Entodon seductrix*. Lichen associates often include *Cladonia coniocraea*, *C. cylindrica* and *C. cristatella*. There are also specimens from the bases of *Pinus*, *Prunus serotina*, and *Quercus velutina*. In our eastern sector, it sometimes grows on stable sandy soil, and there is one specimen from a shaded vertical sandstone cliff. Calkins & Huett (1898) reported *C. floerkeana* from La Salle County, and Mueller (1989) reported it from Lake County, Indiana; we are referring reports of that eastern species here pending examination of voucher material. Typical *C. macilenta* has thamnolic acid (K+ deep yellow, which we have yet to discover locally. In rare specimens with usnic acid, if the pycnidia are absent this species would be difficult to separate from *Cladonia bacilliformis* (Nyl.) Glück (L. *baculus*, staff, rod + *forma*, shape, appearance; from the resemblance of the podetia to little rods), which was reported from the Indiana Dunes National Lakeshore (Wetmore 1988); that specimen, at MIN, appears to lack usnic acid. [barbatic acid, ± didymic, ± usnic]

Allegan-MOR, MSC, Barry-MOR, WIS*, Berrien-MOR, Branch-MOR, Cook-MOR, NY, US, DuPage-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Kane-ILL, MOR, Kankakee-MOR, Kent-MOR, Lake IL-MOR, LaPorte-MOR, LaSalle-CACS*, MOR, NY, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-ILL, MOR, Newton-MOR, Ogle-MOR, Ottawa-MSC, Porter-INDU, MOR, Pulaski-MOR, Racine-MOR, St. Joseph IN-MOR, Starke-MOR, Walworth-MOR, US, Will-MOR, Winnebago-MOR

Cladonia magyarica Vainio (of Hungary, from where it is peculiarly restricted in central Europe) A species of the northern Great Plains, this species is known from as nearby as southwestern Wisconsin, where it grows on base-rich soil. [atranorin, fumarprotocetraric acid]

Cladonia merochlorophaea Asahina (Gr. *meros*, a part of; a variant of *C. chlorophaea*) Our only records for this northern species is one collected at Mount Baldhead near Saugatuck, and another from a sandy barren at a cemetery in Warsaw. [merochlorophaeic acid, fumarprotocetraric acid.]

Allegan-MSC, Kosciusko-MOR

Cladonia multiformis G. Merr. (L. *multus*, many + *forma*, shape, appearance) Our only records of this northern species are from weathered till, where it grows with *C. peziziformis*. [fumarprotocetraric acid]

DuPage-MOR, Will-MOR

Cladonia ochrochlora Flörke (Gr. *okhros*, pale yellow + *khloros*, green) Frequent on lignin, often in shaded, or most areas. There is a specimen from Cook County (Calkins #1897 NY) that Calkins labeled *C. fimbriata* var. *coniocraea* and indicated that it had grown on an exposed "cedar" root [probably *Thuja occidentalis*] near Glencoe. Most of our specimens are on decaying logs or stumps in woods, or at the bases of trees. Virtually none of our specimens display

scyphae at the ends of the podetia. ~ Primary squamules esorediate; podetia notably corticate in the proximal areas. [fumarprotocetraric acid]

Allegan-MOR, Barry-MOR, Cook-F*, MOR, NY, DuPage-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Lake IL-MOR, LaPorte-MOR, LaSalle-MOR, Livingston-MOR, McHenry-MOR, Newton-MOR, Ottawa-CACS*, Porter-MOR, Will-MOR, Winnebago-MOR

Cladonia parasitica (Hoffm.) Hoffm. (Gr. *para*, beside, near + *sition*, grain, food; from its presumed habitat on its nutrient source) = *C. delicata* of Calkins, who noted that was "found near Elgin on old stumps, near Lemont, and elsewhere." ~ Primary squamules K+ deep yellow finely granular-divided, resembling the coralloid-branched and granular squamules of the podetia; often sterile but occasionally with short podetia with several clusters of small apothecia. [thamnolic acid, decarboxythamnolic acid]

Cook-NY, LaSalle-CACS*, F*, NY

Cladonia petrophila R. C. Harris (Gr. *petra*, a rock, particularly a rock ledge + *philos*, loving, having an affinity for; from its fidelity to rock substrates) Yet unknown from the Southern Lake Michigan region, this species is known from nearby Marshall County, Illinois, where it grows on shaded sandstone in a mesophytic ravine along Tomahawk Bluff. Although a species that ranges largely south of our region, there is a specimen from Richland County, Wisconsin (Lendemer & Hodkinson 2009). This species was called *C. subapodocarpa* by Hale (1979). ~ UV+ blue white; primary squamules diminutive, esorediate; podetia absent. [sphaerophorin, fumarprotocetraric acid (locally), ± atranorin]

Cladonia peziziformis (With.) J. R. Laundon (*L. pezica*, a sessile mushroom + *forma*, shape, appearance; from the supposed mushroom-like appearance of the small, flesh-colored apothecia atop stipe-like podetia) = *C. capitata* (Michaux.) Spreng.; *C. leptophylla* (Ach.) Flörke; *C. mitrula* Tuck. Including *C. mitrula* f. *squamulosa* G. Merr. With the possible exception of *C. subcariosa*, this species is the weediest of our *Cladoniae*. It is characteristic of weathered clay tills and bluffs, often along worn paths and compacted soils, particularly where *Danthonia spicata* grows. It also grows in sandy prairies and savannas, and we even have a specimen from an old rag. *Cladonia botrytes* (Hag.) Willd. (Gr. *botry*, a bunch or cluster, as in grapes + *-ites*, having to do with, like; from the grape-like clusters of apothecia) has been reported from as far south as Ozaukee County, Wisconsin; it is similar to *C. peziziformis*, but the podetia rarely exceed 5 mm high, are commonly sparingly branched above the middle, and produce usnic and barbatic acids. ~ Primary squamules well-developed; podetia verruculose, often seemingly twisted, the pale brown or tan apothecia clearly much broader than the podetia. [fumarprotocetraric acid]

Allegan-MSC, Berrien-MIN*, MOR, Cook-CACS*, F*, MOR, NY, DuPage-MOR, Grundy-BALT, MOR, WIS*, Jasper-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, WIS*, LakeIL-MOR, LakeIN-INDU, MOR, LaSalle-CACS*, F*, ILL, MOR, NY, WIS*, Livingston-MOR, McHenry-ILL, Milwaukee-WIS*, Newton-MOR, Ogle-MOR, Porter-MIN*, MOR, St. JosephIN-MOR, VanBuren-MOR, Walworth-US, WIS*, Will-MOR, Winnebago-MOR

Cladonia phyllophora Hoffm. (Gr. *phyllos*, leaf + *phoros*, a bearing; probably from the scaly podetia) Locally infrequent, this species occurs on exposed sandy to clayey soil. The Waukesha County record originally was identified as *C. rappi*. ~ It differs from both *C. gracilis turbinata* and *C. verticillata* in that the podetia bases, usually quite slender, are characteristically

nigrescent. [fumarprotocetraric acid]

Barry-MICH*,MSC, DuPage-MOR, Kalamazoo-MOR, Ottawa-MOR, Waukesha-ILLS*

Cladonia piedmontensis G. Merr. (of the Piedmont) Although we have a couple of specimens from weathered clay till, most of the Southern Lake Michigan region material comes from our eastern sector, where it grows in sandy prairies and black oak savannas. [usnic acid; the Will County specimen (Wilhelm & Wetstein #20353 MOR) contains fumarprotocetraric acid, as do a couple of specimens from the Florida panhandle]

Berrien-MOR, Cass-MICH*, Cook-MOR, DuPage-MOR, LaSalle-MOR, Newton-MOR, Ogle-MOR, Porter-MOR, St.JosephIN-MOR, Will-MOR

Cladonia pleurota (Flörke) Schaerer (Gr. *pleuron*, a rib, the side + *ota*, the ear; perhaps from the often imperfectly shaped scyphae evocative of the ear) Although we have a couple of specimens from weathered clay till, most of the Southern Lake Michigan region material comes from our eastern sector, where it grows in sandy prairies, black oak savannas, and even on long-stabilized sand in old sand pits and along road shoulders. One specimen is from a decorticate log. See also notes under *Cladonia conista*. ~ Primary squamules usually evident and well-developed, lobed but without granules; podetia to 2.5 cm high, granular-sorediate. [usnic acid, zeorin]

Berrien-MOR, Calhoun-MSC, Cook-MOR, DuPage-MOR, Kankakee-MOR, Kent-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Newton-MOR, Ogle-MOR, Porter-INDU,MIN*,MOR, St.JosephIN-MOR, VanBuren-MOR

Cladonia pocillum (Ach.) O. J. Rich. (L. *pocillum*, at little cup or small cupful, obviously from the small, cup-bearing podetia) Yet unknown locally, it was collected in nearby Dane County, Wisconsin, growing on base-rich soil in a prairie remnant. ~ Distinct among cladoniae in that the thallus consists of confluent squamules evocative of an effigurate foliose thallus; scyphae esorediate, but with circular, corticate areoles. [fumarprotocetraric acid]

Cladonia pyxidata (L.) Hoffm. (L. *pyxidatus*, boxlike, cubical; presumably from the boxlike depressions formed by the cupped podetia) Incl. var. *neglecta* Schaer. Thomson (1984) mapped this species from extreme southeastern Wisconsin. A rare species here, the Lake County, Illinois, specimen is from weathered clay till on the south face of a pastured slope. The Lake County, Indiana, specimen was collected from "Miller Woods," where it no doubt grew in sandy black oak savanna. A Milwaukee County record is reported by Thomson (2003), but most of the podetia remaining in the packet (Kaclingen #7, WIS) look like *C. chlorophaea*. *Cladonia conista* might key to this species if the soredia in and around the scyphae are missed, because the podetia are smoothly corticate below the scyphae. ~ Primary squamules distinct; scyphae esorediate, but with circular, corticate areoles; apothecia produced on short areolate branches from the cup margins, which forms may be evocative of *C. gracilis turbinata*. [fumarprotocetraric acid]

Allegan-MIN*,MICH*,MSC, Barry-MSC, Berrien-BYU,MIN*, Cook-CACS*,F*,ILL, Kalamazoo-MOR, Kent-MOR, Lake IL-MIN*,MOR, LakeIN-ILL,MOR, McHenry-ILL, Ottawa-MOR, Porter-INDU,MIN*, Waukesha-MOR,WIS*

Cladonia ramulosa (With.) J. R. Laundon (L. *ramulus*, a little branch + *-osus*, denoting full of or prone toward; from the occasional small branchlets at the tips of the podetia) = *C. pityrea* (Flörke) Fr. Including *C. pityrea* var. *zwackhii* Vainio f. *squamulifera* Vainio.; *C. pityrea* var. *zwackhii* f. *subacuta* Vainio. Some recent authors have used the name *C. anomaea* (Ach.) Ahti &

P. James. This species is characteristic of corticate and decorticate fallen logs in partly shaded areas, where it often grows with *C. macillenta bacillaris*. It also grows at the bases of trees in oak woodlands and occasionally on weathered wood. There is a common squamulose, epodetiate, fumarprotocetraric acid-producing species that occurs at the bases of trees throughout the Midwest; it may be referable here. ~ Primary squamules much divided, with the branches usually well beset with blastidia or soredioid granules, nearly all less than 0.1 mm in diameter; podetia verruculose corticate, often sorediate distally, and often well invested with microsquamules. [fumarprotocetraric acid]

Allegan-MOR, Cook-MOR, DuPage-MOR, Jasper-MOR, Jefferson-MO, Koskiusko-MOR, Lake IL-MOR, LaSalle-MOR, Livingston-MOR, Newton-MOR, Porter-MIN*, Pulaski-MOR, Starke-MOR, VanBuren-MOR, Walworth-US, Waukesha-MOR, Will-MOR

Cladonia rei Schaerer (after Giovanni Re, 1773–1833, Italian botanist and physician) Skorepa's (1970) report of *C. decorticata* (Flörke) Spreng. [Skorepa & Vermoch #5225 (SIU)] is referable here; some early specimens with the name *C. nemoxyna* (Ach.) Nyl. are also referable here. This species occupies a wide variety of substrates, in waste ground and in natural areas. It grows on such things as charcoal, burnt wood, corticate and decorticate logs, tree bases, humus, weathered till, sand, and spoil banks. [homosekikaic acid ± fumarprotocetraric acid]

Allegan-ASU,MOR,MSC, Barry-MOR, Berrien-MOR, Cass-MICH*, Cook-MOR, DuPage-MOR, Elkhart-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, Koskiusko-MOR, Lake IL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, McHenry-ILL,MOR, Newton-MOR, Ogle-MOR, Ottawa-CACS*, Porter-INDU,MOR, Pulaski-MOR, St.JosepIN-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Will-ILLS*,MOR, Winnebago-MOR

Cladonia robbinsii A. Evans (after William Jacob Robbins, 1890–1978, American botanist) Infrequent, evidently confined to the moist stable sands of the antedunal region of Illinois Beach State Park, stable dunes and black oak savannas near Lake Michigan, and sandy soil generally in our western sector; the Lee County and Winnebago county records are from poor prairie on a gravel hill. [usnic acid, barbatic acid]

Allegan-MSC, Lake IL-MOR, LaSalle-MOR, Lee-MOR, Ogle-MOR, Porter-MOR, Waukesha-MOR, Winnebago-MOR

Cladonia sobolescens (Nyl.) Vainio (L. *soboles*, sprout, shoot + *-escens*, beginning, becoming, slightly; from appearance of the podetia as sprouts) = *C. clavulifera* Vainio. This species is occasional on disturbed but stable sands in power line rights-of-way and roadsides. Some authorities consider this element a mere chemical variant of *C. subcariosa*. [fumarprotocetraric acid]

Barry-MSC, DuPage-MOR, Grundy-MOR, Kankakee-MOR, Porter-MOR, Pulaski-MOR, St.JosepIN-MOR

Cladonia squamosa (Scop.) Hoffm. (L. *squamosus*, scaly; from the squamulose podetia) Calkins (1896) reported it from "earth and rotten logs in Will County and the western part of Cook." See also the comments under *C. beaumontii*. All of our Illinois specimens are from southern Illinois. There are extant populations in Ogle County, where it grows on both partly shaded lignin and sandstone. [squamatic acid]

Cook, Ogle-MOR, Will

Cladonia strepsilis (Ach.) Grognot (Gr. *strepsis*, a twist + *-ilis*, denoting a quality or capacity; from what aspect we have yet to imagine) Our only specimens are from stable sandy

soil. [strepsilin, baeomycesic acid]

Lee-MOR, Ottawa-MS, Porter-MIN*,MOR

Cladonia subcariosa Nyl. (*L. sub-* below, slightly, imperfectly, nearly; from its resemblance to *P. cariosa*) = *C. polycarpoides* Nyl. Most local reports of *C. symphycarpa* identified without TLC probably should be referred here; it reacts K⁺ red, but also has atranorin. Though not quite as "weedy" as *C. peziziformis*, *C. subcariosa* is as widespread and will grow here on almost any terricolous substrate suitable for lichens. [norstictic acid]

Allegan-MS, Berrien-MOR, Calhoun-MOR, Cass-MICH*, Cook-MOR, DuPage-MOR, Iroquois-MOR, Kalamazoo-MOR, Kane-MOR, Kendall-MOR, Kent-MOR, Lake IL-MOR, LakeIN-MOR, Laporte-MOR, LaSalle-MOR, Lee-MOR, Newton-MOR, Ogle-MOR, Porter-INDU,MOR, Rock-MOR, St.JosepIN-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Will-MOR, Winnebago-MOR

Cladonia symphycarpa (Ach.) Fr. (*Gr. symphyo*, to glue together + *karpos*, fruit; from the often united or coalesced apothecia atop a podetium) The few specimens we have are from sandy prairies, black oak savannas, a gravelly hill prairies. [atranorin, norstictic acid]

Allegan-MS, Berrien-MOR, Calhoun-MOR, DuPage-MOR, Jasper-MOR, Kankakee-MOR, Livingston-MOR, McHenry-MOR, Porter-MOR, VanBuren-MOR

Cladonia uncialis (L.) F. H. Wigg. (*L. uncialis*, the twelfth part of anything; from what we have no idea) Calkins & Huett (1898) reported this species from La Salle County, and we have a modern record from Ogle County, where it grows in prairie at the mouth of Anne's Canyon, at Castle Rock State Park. According to Brodo (2016) this species may or may not possess squamatic acid; such specimens may be difficult to distinguish from *C. Cladonia uncialis* is said to have the inner podetial wall smooth, without striations; *C. dimorphoclada* has the inner walls marked by striations or cartilaginous thickenings. [squamatic acid, usnic acid]

Ogle-MOR

Cladonia verticillata (Hoffm.) Schaerer (*L. verticillatus*, whorled; presumably from the position of the apothecia along the rims of the flares at the tips of the podetia) = *C. gracilis* var. *verticillata* of Calkins; *C. cervicornis* (Ach.) Flot. ssp. *verticillata* (Hoffm.) Ahti. Some of our specimens are from weathered clayey till, often with *C. cristatella*, *C. peziziformis*, and *Danthonia spicata*; most are from sand prairies or black oak savannas, others from sandstone exposures, but one is from cinders in a railroad yard! [fumarprotocetraric acid]

Allegan-ASU,MS,USU, Barry-MS, Berrien-MOR,MS, Calhoun-MOR, Cass-MICH*,MS, Cook-MOR, DuPage-MOR, Grundy-BALT, Kenosha-MOR, Kent-MOR, Lake IL-MOR, Laporte-MOR, LaSalle-CACS*,F*,MOR, McHenry-ILL, Ogle-MOR, Ottawa-CACS*, Porter-INDU,MIN*,MOR, Pulaski-MOR, St.JosepIN-MOR, VanBuren-MOR, Waukesha-MOR, Will-ILLS*,MOR

CLADONIACEAE

- A. Podetia with a fibrous, dull surface **Cladonia**
 A. Podetia with a corticate, smooth, lustrous surface.
 Squamules well developed **Cladonia**
 Squamules reduced to crustose granules **Pycnothelia**

COCCOCARPIACEAE

- One local genus **Spilonema**

COENOGONIACEAE

One local genus **Coenogonium**

COENOGONIUM Ehrenb. COENOGONIACEAE [Photobiont: *Printzina*. Gr. *koinos*, shared, in common, + *gonio*, angle; perhaps from the tiny 2-celled spores. Asci *Catillaria*-type; spores 8, hyaline, 1-septate.]

1. Apothecia prevailingly more than 4 mm across, with distinct tinctures of yellow or pale brown . C. LUTEUM
 1. Apothecia less than 0.4 mm across, very pale to nearly white C. PINETI

Coenogonium luteum (Dicks.) Kalb & Lücking (*L. luteus*, saffron yellow or sallow; from the yellowish apothecia) More common farther south, this species is infrequent in districts north and south of our region. ~ Apothecia 0.4–2 mm in diameter, pale yellow; paraphyses 1.5–2.6 μm in diameter, the distal swellings to 4.5 μm ; spores 7–11 $\mu\text{m} \times 2.5$ –3.5 μm .

Coenogonium pineti (Ach.) Lücking & Lumbsch (*L. pineti*, growing on pines) = *Dimerella pineti* (Ach.) Vězda This is a rare species in Illinois; our only local record is from a shaded, charred log, growing on moss, at the Danada Forest Preserve. ~ Apothecia 0.1–0.4 mm in diameter, generally concave; pale to albescent; paraphyses 1.0–2.0 μm in diameter, the distal swellings to 3.5 μm ; spores 9–14 $\mu\text{m} \times 2.3$ –4.5 μm .

DuPage-MOR

COLLEMA F. H. Wigg. COLLEMATACEAE [Photobiont: *Nostoc*. Gr. *kollema*, that which is glued; from the gelatinous thallus. ~ Thallus gelatinous, brown to black, undifferentiated, flat throughout or pustulate, the larger lobes more than 4 mm wide; apothecia with a thalline margin, at least when young, the spores 8, hyaline, 3–14 septate, long-fusiform to bacilliform or acicular; hamathecium gelatinized; secondary metabolites absent.]

1. Apothecia abundant; isidia absent C. NIGRESCENS
 1. Apothecia rare; isidia present.
 2. Thallus saxicolous C. FLACCIDUM
 2. Thallus corticolous.
 Lobe surfaces dull, subtly but distinctly pustular; spores 5–6 celled, 40–80 μm long, elongate fusiform C. FURFURACEUM
 Lobe surfaces smooth and sublustrous; spores 3–5 celled, 26–45 μm long, short fusiform C. SUBFLACCIDUM

Collema flaccidum (Ach.) Ach. (*L. flaccidus*, relaxed, flaccid; from the limber thallus) Our only record for this species is one known from Lee County, on an exposed limestone cliff in a pasture off Grand Detour Road. See comments under *C. subflaccidum*. ~ Isidia flattened, subsquamulose; spores 3–5 septate, not constricted at the septa, 25–35 $\mu\text{m} \times 6.0$ –6.5 μm .

Lee-MOR

Collema furfuraceum (Arnold) Du Rietz (*L. furfur*, bran + *-aceus*, of or pertaining to;

perhaps from the scaly appearance of the dried thallus) Yet unknown from the Southern Lake Michigan region, it has been collected from nearby Montgomery County, Indiana, where it grew on *Carya cordiformis*. Farther south in Illinois it is frequent on partly shaded oak trunks. ~ Isidia globular to terete-elongate, often branching in age; spores 4–5 septate, often curved, 40–80 μm \times 3.0–7.0 μm .

Collema nigrescens (Huds.) DC. (*L. nigrescens*, blackening; from the dark thallus) Calkins & Huett (1898) reported this species from "elms and limestones" in La Salle County. ~ Isidia globular to oblong or flattened; spores 5–12 septate, often curved, 50–100 μm \times 3.0–4.5 μm .

LaSalle

Collema subflaccidum Degel. (*L. sub-* below, slightly, imperfectly, nearly; from its close relationship to *C. flaccidum*) Calkins (1896) reported "*C. flaccidum*" from oaks and elms, and stated that it was rare locally. He noted also that *C. flaccidum* grew on rocks, but such reports are best referred to *C. flaccidum*, which see. In Calkins's bound volumes of *Lichenes Exsiccati* (#6069, CACS) a specimen from La Salle County labeled *C. flaccidum* is referable here. ~ Isidia globular; spores 5–7 septate, 42–65 μm \times 4.0–6.5 μm .

Cook, LaSalle-CACS*, ILL, Will

COLLEMATACEAE

- A. Cortex present, the thallus with a layer of more or less isodiametric cortical cells; upper surfaces usually smooth to sub-lustrous, slate gray to brown.
 - Larger thallus lobes less than 2.5 mm across, gray or brown **Scytinium**
 - Larger thallus lobes broader, gray **Leptogium**
- A. Cortex absent, the thallus lacking an organized cortex, the hyphae interwoven; upper surfaces dull, usually olivaceous to black.
 - B. Thallus minutely fruticose, the lobes terete, appressed to erect and irregularly branched; apothecia rare, the spores simple **Lempholemma**
 - B. Thallus subfoliose to foliose, the lobes not terete and branched; apothecia rare or common; spores septate to muriform.
 - C. Thallus lobes large, flat, neither thickened nor wrinkled, the larger more than 4 mm long; spores septate, more than 4.5 times as long as wide **Collema**
 - C. Thallus lobes small, thickened, wrinkled, or, warty isidiate, usually less than 4 mm long; spores septate to muriform, less than 4.5 times as long as wide.
 - Apothecia rare or infrequent on the thallus **Lathagrium**
 - Apothecia usually present and frequent on the thallus **Enchylium**

CONIOCYBACEAE

- 1. Thallus bright yellow, leprose; spores smooth, brownish **Chaenotheca**
- 1. Thallus neither leprose nor bright yellow; spores often warty, hyaline **Sclerophora**

CONSTRICHTOLUMINA Lücking, M. P. Nels. & Aprt. ARTHOPYRENIACEAE

[Photobiont: *Trentepohlia* or absent. *L. constringere*, to draw together + *lumin*, light, or space through which light shines, such as the hyaline cells of the spores). ~ Thallus immersed; ostioles apical, solitary, spores typically 4–8, hyaline, 1-septate, more or less constricted at the septum.]

Constrictolumina cinchonae (Ach.) Lücking, M. P. Nels. & Aptroot (from the host of the type collection, *Cinchona officinalis*) = *Arthopyrenia cinchonae* (Ach.) Müll. Arg. Our only record of this Southeastern species is based upon a specimen at US (#6623) that was said by Calkins, who collected it in 1890, to have grown in "Illinois, Kane County, Elgin." He had called it *Pyrenula glabrata*. This is otherwise a species of the southeastern states and the Atlantic coast up to New Jersey. One cannot help but suspect the validity of the label data. ~ Ascomata 0.4–0.6 mm in diameter; asci narrowly obovate, 90–125 μm \times 17–22 μm , the spores with a well developed perispore, 20–30 μm \times 7–11 μm .

Kane-US

COPPINSIDEA S. Y. Kondr., E. Farkas & L. Lőkös RAMALINACEAE
[Photobiont: Chlorococcoid. With the appearance of genus, *Coppinsia*, which was named in honor of the British lichenologist, Brian Coppins, of the Royal Botanic Garden Edinburgh. ~ Thallus crustose, thin, yellowish green; apothecia rare, asci -type, the spores 8, hyaline, simple or 1-septate]

Coppinsidea croatica (Zahlbr.) S. Y. Kondr., E. Farkas & L. Lőkös (of Croatia) = *Lecania croatica* (Zahlbr.) Kotlov Occasional on bark in wooded remnant areas, our specimens from *Acer saccharum*, *Carya cordiformis*, *Fraxinus nigra*, *Juglans nigra*, *Populus deltoides*, *Quercus alba*, *Quercus rubra*, *Tilia americana*, *Tsuga canadensis*, and *Ulmus rubra*. This is the species we have long known as "*Lecidea* sp. #4", following the speculation of Harris (1978). For an updated account, see Harris & Lendemer (2010), who cite it from Will County. ~ Thallus epiphloeic, the areoles dispersed to continuous, abundantly sorediate, tan to dark-green, the soralia flat to weakly capitate, pale green, at least when fresh; apothecia very rare (not seen locally); spores narrowly fusiform to fusiform, colorless, 0–1septate, 12–17 \times 3–4.5 μm ; photobiont 6–10 μm across. [no substances]

Berrien-MOR, Cass-MOR, DeKalb-MOR, DuPage-MOR, Kane-MOR, Kenosha-MOR, LaPorte-MOR, LaSalle-MOR, McHenry-MOR, Porter-MOR, Rock-MOR, St.Joseph IN-MOR, Waukesha-MOR, Will-NY, Winnebago-MOR

COPPINSIELLA Lumbsch & Heibel TELOSCHISTACEAE [Photobiont: mostly "*Pseudotrebouxia*." A diminutive of the monotypic genus, *Coppinsia*, which was named in honor of the British lichenologist, Brian Coppins, of the Royal Botanic Garden Edinburgh. ~ Thallus crustose, pale gray, thinly continuous, farinose-sorediate, the soralia discrete, gray-green to yellowish, K–, arising from low, erumpent pustules forming craters in the thallus.]

Coppinsiella ulcerosa (Coppins & P. James) S. Y. Kondr. & L. Lőkös (*L. ulcus*, sore, wound, a break in the skin or lesion; from the cup-like soralia) = *Caloplaca ulcerosa* Coppins & James. Evidently this western species is rare locally, our only records being from the cortex of *Acer rubrum*, *Populus* spp. and *Robinia pseudoacacia*. It is also known from as nearby at Vermilion County, Illinois, where it was collected at the base of *Juglans nigra* at Kickapoo State Park. ~

Thallus K–, endophloeic to pale gray or grayish tan, the soralia cupuliform or irregular, with yellow-green, discrete soralia; apothecia K+ violet, to 0.6 mm across, scattered; proper margin flush to slightly rim-forming, nearly concolorous with the orange or scarlet-orange disk, the thalline margin usually present and concolorous with the thallus; paraphyses terminal cells expanded to 6 μm across; spores broadly ellipsoid, 8–12 μm \times 4–8 μm wide, the septum mostly 3–6 μm across.

Kent-MOR, Ogle-MOR, Pulaski-MOR, VanBuren-MOR

CORTICIACEAE

1. Thallus pinkish **Marchandiomyces**
 1. Thallus yellowish **Erythricium**

CRESPOA (D. Hawksw.) Lendemer & Hodkinson PARMELIACEAE [Photobiont: *Trebouxia*. In honor of the Spanish lichenologist, Ana Crespo, 1948–, student of the lichens of the Mediterranean region. ~ Thallus foliose, gray to blue-gray above, the upper cortex notably reticulate-foveolate, the lobes finely white-reticulate distally, the lower cortex rhizinate, dark, paler at the margins; spores 8, hyaline, simple.]

Crespoa crozalsiana (Harm.) Lendemer & Hodkinson (in honor of the French mycologist, André de Crozals, 1861–1932) = *Canoparmelia crozalsiana* (Harm.) Elix & Hale; *Pseudoparmelia crozalsiana* (Harm.) Hale. Frequent in southern Illinois, our only northern records is from the bark of *Crataegus mollis*, *Gleditsia triacanthos*, and *Quercus alba*. ~ Thallus blue-gray, the lobes to 5 mm across, sometimes pruinose; soredia usually present, farinose, initially round, generally confined to the cortical ridges; medulla K+ deep yellow. [atranorin, stictic acid, \pm constictic acid]

Berrien-MOR, DuPage-MOR, Fulton-MOR, Jasper-MOR, LaPorte-MOR, Pulaski-MOR, VanBuren-MOR, White-MOR

CRYPTOTHELE Th. Fr. LICHINACEAE [Photobiont: Cyanobacterial with a reddish sheath. Gr. *kryptos*, hidden, secret + *thele*, nipple. ~ Thallus crustose, perithecia with pseudoparaphyses; spores 8, hyaline, simple.]

Cryptothele permiscens (Nyl.) Th. Fr. (L. *permisceo*, to mix up or throw into confusion—an easy condition to occupy when studying the Lichinaceae) Our only record for this species locally is from a specimen collected on “calcareous and arenaceous rock” in LaSalle County (Calkins #67, WIS). Evidently this is the lichen that was called “*Pyrenopsis phylliscina* Tuck.” by Fink (1935). Calkins himself used the name “*Pannaria nigra*,” a name which he has also used locally for *Placynthium nigrum* and *Rhizocarpon reductum*. Aino Hensson annotated the specimen in 1963, but demurred on a specific epithet. See also comments under *Pyrenopsis fuscoatra*. ~ Spores 9–18 μm \times 5–8 μm .

LaSalle-MOR

CYPHELIUM Ach. CALICIACEAE [Photobiont: *Trebouxia*. Possibly from Gr. *kypellon*, beaker, goblet, or perhaps *kypella*, the hollow of the ears; from its hymenium sunken into the warty thallus, resembling a cup; we wonder if it should be spelled with two l's? ~ Thallus crustose, gray to grayish-yellow or yellowish green, corticolous; apothecia black, more or less immersed, mazaedial, the spores numerous, brown, 1-septate to muriform; conidia ellipsoid.]

Cyphelium tigillare (Ach.) Ach. (*L. tigillaris*, pertaining to a bit or tuft of wool; probably from the fact that the warts appear to be stuffed with soot or wool) = *Calicium tigillare* (Ach.) Pers. This species is occasional on old fence posts and rails, but we have one specimen from a decorticate stump of *Larix laricina*, one from the bark of *Prunus serotina*, and another from *Gleditsia triacanthos*. There is a specimen of *Acolium inquinans* (Sm.) A. Massal. [Calkins #21, F] on the same bark as *Calicium viride* Pers. Both are known only from far western North America, to it is likely that Calkins' assertion that it grew in Cook County is based upon a label mix-up—particularly inasmuch as it was distributed as *Placodium aurantiacum*!. ~ Thallus areolate to granular, with tinctures of yellow, at least when fresh; apothecia imbedded in the thallus, the proper exciple not or only scarcely evident; spores broadly ellipsoid, constricted at the septum, 17–21 μm \times 9–11 μm . [rhizocarpic acid, epanorin, + two unknowns]

Branch-MOR, Cook-F*, MOR, DeKalb-MICH, DuPage-MOR, Ford-MOR, Grundy-MOR, Jasper-MOR, Jefferson-WIS*, Kane-MICH*, MOR, Kendall-MOR, Kenosha-MOR, LaGrange-MOR, Lake IL-F*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-F*, MICH*, MOR, Lee-ILLS*, MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Newton-MOR, Ogle-MOR, Porter-MOR, St. JosephIN-MOR, White-MOR, Will-F*, MOR, Winnebago-MOR

CYSTOCOLEUS Thwaites CYSTOCOLEACEAE [Photobiont: *Trentepohlia*. Gr. *cystos*, bladder, sac + *coleos*, sheath, regarding the sheath of fungal hyphae around the photobiont cells. ~ Thallus in minutely thread-like fruticose or filamentous wefts or mats, black or blue-black, the hyphae irregularly disposed around the algal filaments.

Cystocoleus ebeneus (Dillwyn) Thwaites (Gr. *ebenos*, with the color of ebony) This rather rare species is known from Portland Arch in nearby Fountain County, where it grew on an exposed sandstone cliff face along Bear Creek. ~ In general aspect this species resembles *Racodium rupestre*, but the hyphal cells are irregularly disposed around the photobiont and somewhat knobby.

CYSTOCOLEACEAE

One local genus **Cystocoleus**

DECAMPIACEAE

One local genus **Eopyrenula**

DENDRISCOCAULON Nyl. LOBARIACEAE [Photobiont: *Scytonema* or *Nostoc*. Gr. *dendrisco*, tree-like + L. *caulis*, stem; from the densely branched suffruticose habit. ~ Thallus tiny, suffruticose, coralloid-branched, grayish or brownish, the sterile, the branches pubescent, muscicolous, terricolous, or lichenicolous; medulla present, white.

Dendriscoaulon intricatum (Nyl.) Henssen. (L. *intricatus*, entangled + *ulus*, diminutive; the little entangled one) Our only record for this species is based upon a specimen collected by Calkins (s.n., F) in "Illinois", which probably means either Cook or, more likely, LaSalle County; it was collected "on wood." Labeled initially "*Leptogium bolacinum*", Sierk annotated it *Dendriscoaulon umhausense* in 1963, which determination was seconded by Buschbom in 2000. Most contemporary authors consider North American material *D. intricatum*.

DERMATOCARPON Eschw. VERRUCARIACEAE [Photobiont: *Trebouxia*, with *Protococcus*, *Stichococcus*, and *Hyalococcus*. Gr. *dermatos*, of skin or leather + *karpos*, fruit; from the leathery-looking thallus with its interspersed perithecia. For good illustrations of the various diagnostic features in our Dermatocarpons see Amtoft *et al.* (2008) ~ Thallus umbilicate to subfoliose or squamulose; rhizines usually absent; perithecia immersed, the hamathecium gelatinous; spores 8, hyaline, simple; pycnidia immersed.]

1. Thallus on HCl- rock.
 2. Spores mostly more than 15 μm long D. LURIDUM
 2. Spores to 15 μm long.
 - Lower cortex yellow-gold and foveolate reticulate, the lobes generally attached by more than 1 holdfast perithecia rarely more than 0.3 mm D. ARENOSAXI
 - Lower cortex with various tinctures of brown, but not regularly yellow-gold and foveolate reticulate, the thallus units umbilicate, with a single holdfast; perithecia more than 0.3 mm across D. MUHLENBERGII
1. Thallus on HCl+ rock.
 3. Thallus lobes nearly all less than 1 cm across, the margins with a well defined, black, raised margin; thallus lobes commonly with more than one holdfast; lower cortex usually smooth and tan D. MULTIFOLIUM
 3. Thallus lobes variously sized, but the margins, though sometimes dark, not distinctly raised and well defined, or if so then the some of the lobes more than 1 cm long or across; principal thallus units with a single holdfast; lower cortex various.
 - Thallus brittle, distinctly chocolate brown, at least in the non-pruinose margins; perithecia wholly contained within the medulla, not producing bulges on the lower cortex; ostioles black; lower cortex regularly foveolate-ridged or verrucose D. DOLOMITICUM
 - Thallus leathery, pale brown to silvery gray; ostioles of perithecia brown, at least in part; perithecia, being rather large, with a tendency to push out bulges on the lower cortex; ostioles usually brownish; lower cortex various but often smooth and not usually foveolate D. MUHLENBERGII

Dermatocarpon arenosaxi Amtoft (L. *arena*, sand + *saxum*, rock, from its regular occurrence on sandstone) Yet unknown from our region, this species is known from districts all around us, where it grows on HCl- rocks. ~ Perithecia 0.2–0.3 mm across; spores 8.0–15.0 μm \times 5.0–10.5 μm .

Dermatocarpon dolomiticum Amtoft (NL. *dolomiticus*, an unambiguous allusion to its carbonate-rich substrate, the word originally from the French geologist, Déodat de Dolomieu, 1750–1891, who discovered this form of limestone) Our only records are from dolomite prairies in Boone and Will County, where it grows on dolomitic bedrock fully exposed to the sun. ~ Thallus umbilicate, appearing silvery and finely pruinose, the actual cortex a deep brown; lower surface strongly folveolate-ridged; perithecia 0.13–0.33 mm across, the ostiole usually sunken to flush with the upper cortex; spores 12–13 μm \times 4.5–7.0 μm .

Boone-MOR, Will-F*,MOR

Dermatocarpon luridum (With.) J. R. Laundon (L. *luridus*, pale green, the color of bruises; from its tendency to appear green rather than gray when saturate) Wide-spread in North America on acidic rock, but all the local specimens purported to be that species are usually referable to *D. muhlenbergii*. ~ Thallus umbilicate, with a single holdfast, immediately turning distinctly green when wet; perithecia 0.25–0.45, typically extending sufficiently in the thallus to form bulges on the lower cortex, immersed or flush with the upper cortex; spores 15–19 μm \times 4.0–7.0 μm .

Dermatocarpon muhlenbergii (Ach.) Müll. Arg. (in honor of Gotthilf Henry Ernest Mühlenberg, American botanist and clergyman) = *Bachmanianum miniatum*, *Endocarpon miniatum*, including *E. m.* var. *complicatum* and *E. m.* var. *muhlenbergii* of Calkins. This species is occasional on exposed or shaded basalt, sandstone, or dolomite, often in canyons or on rocky cobbles in woodland streams. Until specimens are discovered, it is presumed that the records of *D. miniatum* reported from Jasper County by Herre (1943) and Harris (1988) are referable here. See also the notes under *Toninia tecta*. ~ Thallus umbilicate, with a single central holdfast, epruinose gray to gray-brown, remaining pale grayish brown wet hydrated; perithecia 0.35–0.6.9 mm across, the ostiole usually raised above the upper cortex and extending sufficiently in the thallus to form bulges on the lower cortex; spores prevailingly 12–15 μm \times 5.0–7.0 μm .

Boone-MOR, Cook-F*,MOR, DuPage-MOR, Grundy-MOR, Kankakee-MOR, Kendall-MOR, LaSalle-CACS*,F*,MOR, Lee-MOR, Ogle-MOR, Will-DUKE,ILL,MOR, Winnebago-MOR

Dermatocarpon multifolium Amtoft (L. *multa*, many + *folium*, leaf; an allusion to the clustered array of small squamules form a rosette or matt) This species is infrequent on dolomitic erratics, cliff faces, and HCl+ rocks, often where moist and usually partly shaded. ~ Thallus of several small lobes with multiple holdfasts, margins discretely nigrescent and raised; perithecia 0.25–0.5 mm across, the ostiole usually raised above the upper cortex; spores prevailingly 9.7–14 μm \times 4.5–6.0 μm .

Boone-MOR, Kane-MOR, Kendall-MOR, LaSalle-MOR, Will-MOR, Winnebago-MOR

DIBAEIS Clem. ICMADOPHILACEAE [Photobiont: chlorococcoid. Gr. ? I am not certain of the etymology. ~ Thallus crustose, smooth to granulose or verrucose; apothecia convex to swollen, pink, stalked, the podetia slender, solid; spores 8, fusiform, 1-celled.]

Dibaeis baeomyces (L. f.) Rambold & Hertel (evocative of *Baeomyces*, which see) We have yet to discover this species locally, but it has been collected from as nearby as Clark County, Illinois. It is primarily a lichen of clayey soil or even of humus. ~ Thallus smooth to granulose, verruculose; apothecia convex, pink; podetia to 1 mm in diameter, much narrower than the apothecia, to 5 mm long; spores 12–26 μm \times 2.5–3.0 μm . [baeomycic acid, squamatic acid]

DIDYMOSPHAERIA Fuckel DIDYMOSPHAERIACEAE [Photobiont: absent. Gr. *didymos*, double, twofold+ *sphaera*, ball or globe; probably from the constricted septate spores of some species. ~ Thallus endophloedeal; cells of the perithecial walls not isodiametric; hamathecium much anastomosing beyond the asci; asci IKI–; spores ellipsoid to fusiform in a single series in the ascus, 8, brown, 1-septate with subequal cells.]

Didymosphaeria oblitescens (Berk. & Broome) Sacc. (L. *oblitero*, blot out + *-escens*, becoming; disappearing) Our only records are from the bark of *Carya ovata* and *Populus tremuloides* in our northwestern sector. ~ Spores ellipsoid, brown, not constricted at the septum, 13–19 μm \times 5–7 μm .

Rock-MOR, Winnebago-MOR

DIDYMOSPHAERIACEAE

- A. Restricted to *Betula papyrifera* **Mycomicrothalia**
 A. On bark other than *Betula papyrifera*. **Didymosphaeria**

DIMELAENA Norman CALICIACEAE [Photobiont: *Trebouxia*. Gr. *di-*, two, double + *melaina*, black; probably from the presence of black apothecia and a black margin on the squamules. ~ Thallus crustose, yellow-green, saxicolous, rimose to lobulate; apothecia immersed; spores 8, brown, 1-septate; conidia bacilliform.]

Dimelaena oreina (Ach.) Norman (Gr. *oreinos*, hilly, mountainous; perhaps from its frequency in rocky, hilly areas) Hale (1952) mapped a P–, C– record for extreme southeastern Wisconsin, though we have seen no supporting vouchers. Most of our specimens have gyrophoric acid and present at least weakly positive C reactions on the cortex. See also Hale (1979). Locally, it is infrequent on granitic boulders in pastures or prairie remnants, commonly with *Candelariella vitellina*. [usnic acid, \pm fumarprotocetraric acid, \pm gyrophoric acid, \pm stictic and norstictic acids]

Cook-MOR, Grundy-MOR, Kane-MOR, Lee-MOR, McHenry-MOR, Ogle-ILLS*,MOR, Walworth-MOR, Will-MOR

DIPOLOSCHISTES Norman THELOTREMATACEAE¹² [Photobiont: *Trebouxia*.
Gr. *diploos*, double + *schistos*, divided, cleft; from the muriform spores. ~ Thallus crustose, pale gray, continuous to rimose; spores 4–8, brown, muriform; conidia bacilliform.]

1. Thallus saxicolous; spores commonly more than 8 per ascus D. SCRUPOSUS
1. Thallus terricolous, muscicolous, or lichenicolous; spores 4 per ascus D. MUSCORUM

Diploschistes muscorum (Scop.) R. Sant. (*L. muscus*, moss; from its common inhabitancy over mosses) = *Urceolaria scruposa*, in part, of Calkins. This species is locally frequent on mosses and lichens over sand at Illinois Beach State Park and Sand Ridge Savanna. The Porter County material, evidently lumped with *Diploschistes scruposus* by Wetmore, was lichenicolous on *Cladonia*, growing in oak woodland at West Beach. Calkins (1896) described the habitat as "calcareous earth" in Will County. The Berrien County specimen was on stabilized dunes at Warren Dunes State Park. In Cass County, it was rather frequent on mosses in a high-water-table flat of sand and gravel. A Calkins specimen from La Salle County was collected on the lignin of *Juniperus virginiana* with *Hunekia pollinii*. ~ Spores ellipsoid, 18–32 μm \times 6–15 μm . [lecanoric acid, diploschistesic acids]

Berrien-MIN*, Cass-MOR, Lake IL-MOR, LaSalle-CACS*,F*,ILL,MOR,NY, Ogle-MOR, Ottawa-MOR, Porter-INDU,MIN, Will-MOR

Diploschistes scruposus (Schreb.) Norman (*L. scruposus*, rough, stony; from its gray, unevenly wart-like thallus) This species is infrequent on sandstone exposures in our western sector. ~ Spores ellipsoid, 25–40 μm \times 10–20 μm . [lecanoric acid, diploschistesic acids]

Lee-MOR, Ogle-MOR, Rock-WIS*

DIPLATOMMA Flotow CALICIACEAE [Photobiont: Chlorococcoid. Gr. *diploos*, two-fold + *omma*, eye. ~ Thallus crustose, continuous to rimose or subsquamulose, pale gray to grayish-brown, without diaspores; apothecia immersed to sessile, biatorine; apothecial disk black, usually white pruinose, the hymenium not inspersed; spores 8, sordid to brown, septate to submuriform.]

Diplotomma alboatrum (Hoffm.) Flotow (*L. albus*, white + *atrus*, black; perhaps from the white thallus in contrast to the black apothecia) = *Buellia alboatra* Th. Fr. Our only records for this species are *Ulmus*. There is a Calkins specimen (#6402, CACS) from "elm", LaSalle County; his number (#307, F), although not mentioned on the label, that may well have been collected LaSalle County, although it is not mentioned in either Calkins (1896) nor Calkins & Huett

¹²Lücking places this genus in the Graphidaceae.

(1898). See also the notes under *Amandinea dakotensis*. A Barry County specimen (Mazzer #1416, MICH) was from a dead *Ulmus americana*; TLC revealed no substances. ~ Thallus chalky to sordid; apothecia immersed, biatorine but flush with the surface of the thallus, black or pruinose; epithecium brown; hypothecium brown; spores 3-septate, with some at least once-muriform, ellipsoid, 12–18 μm \times 6–10 μm . [\pm connorstictic acid \pm norstictic acid]

Barry-MICH*, WIS*, LaSalle-CACS*, F*, MOR

ENCHYLIUM (Ach.) Gray COLLEMATACEAE [Photobiont: *Nostoc*.
Etymology known only to Acharius. ~ Thallus gelatinous, brown to black, undifferentiated, the lobes wrinkled or warty, the larger lobes less than 4 mm wide; apothecia with a thalline margin, at least when young, the spores 4–8, hyaline, septate to muriform, hamathecium gelatinized; secondary metabolites absent.]

1. Spores 4 per ascus, 3–7 septate, 0–3 muriform; lichen of leached clayey soils E. LIMOSUM
1. Spores 8 per ascus, 1–5 septate, 0–2 muriform; lichens of carbonate-rich soils or rock, often among mosses.
 2. Thallus isidiate or warty-papillose; spores hyaline, 1 septate E. CONGLOMERATUM
 2. Thallus generally without isidia or warty papules; spores usually 2 or more septate and often submuriform.
 3. Thallus on bare calcareous rock; spores simply 2–4 celled E. POLYCARPON
 3. Thallus on rock among mosses; spores prevailingly sub muriform.

Margins of apothecia and often the thallus lobes lobulate or verruculose; spores not constricted at the center septum. E. BACHMANIANUM

Margins of the apothecia smooth and thallus without verrucae; spores usually constricted at the center septum E. TENAX

Enchylium bachmanianum (Fink) Otálora, P. M. Jørg. & Wedin (in honor of the German medical practitioner and naturalist, Franz Ewald Theodor Bachmann, 1850–1937, who, as it were, spelled his name with 2 n's!) = *Collema bachmanianum* Fink. Our only records are from the vertical faces of dolomitic canyons. ~ Spores 8, ellipsoid, becoming pale brown, 4–5 septate, not constricted at the septa, acute to obtuse, sub muriform, 24–34 μm \times 8.5–15 μm .

Cook-MOR, DuPage-MOR, Kankakee-MOR, LaSalle-MOR, Winnebago-MOR

Enchylium conglomeratum (Hoffm.) Otálora, P. M. Jørg. & Wedin (L. *con-*, with + *glomeratus*, wound up; from the appearance of the apothecia all wound up together) = *Collema conglomeratum* Hoffm., including var. *crassiusculum* (Malme) Dodge; *C. Cyrtaspis*, *C. pycnocarpum* of Calkins (1896), who noted it from "elms and shrubs in Will County," and regarded it as rare. We have seen two of his specimens from LaSalle County (Calkins #6065, #6067, CACS). ~ Spores 8, fusiform, hyaline, 1-septate, not usually constricted at the septa, acute to obtuse, 9–25 μm \times 3–6 μm .

LaSalle-CACS*, ILL, Will

Enchylium limosum (Ach.) Otálora, P. M. Jørg. & Wedin (L. *limosus*, full of mud, slime; from the dark wet thallus) = *Collema limosum* (Ach.) Ach. Calkins (1896) reported this species as rare on clay soil in Will County. Our only contemporary record is from a sand prairie near

Beloit, where vascular plant associates included *Artemisia campestris caudata*, *Minuartia michauxii*, and *Schizachyrium scoparium*. ~ Thallus with a strong tendency to be quite thin and membranaceous between the apothecia; spores 4, ellipsoid to ovoid, 3–7 septate transversely, 0–3 septate longitudinally, 24–35 μm \times 9–16 μm .

Rock-MOR, Will

Enchylium polycarpon (Hoffm.) Otálora, P. M. Jørg. & Wedin (Gr. *poly*, many + *karpos*, fruit; from the numerous apothecia) = *Collema polycarpon* Hoffm. Our only records for this species is from sandstone breaks on the DuPage River. ~ Thallus foliose, with radiate lobes to 2.5 mm broad, commonly lobulate; spores 8, fusiform, hyaline, mostly 3-septate, 15–30 μm \times 6.0–8.5 μm .

Will-MOR

Enchylium tenax (Ach.) Gray (L. *tenera*, to hold or grasp; evidently from its proclivity for attachment to mosses) Yet unknown from the Southern Lake Michigan Region, this species grows in districts ambient to us, where it clings to mosses that grown on carbonate-rich rock. ~ Thallus subcrustose to foliose, notably swollen when wet; spores 8, hyaline, straight, fusiform to ovoid, mostly 3-septate, more or less constricted at the septa, submuriform, 17–27 μm \times 8.5–11 μm .

ENDOCARPON Hedwig VERRUCARIACEAE [Photobiont: *Stichococcus*. Gr. *endon*, within, inside + *karpos*, fruit; from the immersed perithecia. “Like *Endocarpon* the genus *Staurothele* is characterized by the presence of algal cells within the fruiting bodies. These algal cells are small (<7 μm) and either cube- or rod-like, whereas algal cells from the thallus are larger (usually >10 μm) and spherical.” (Thüs *et al.* 2011) ~ Thallus squamulose, brown to grayish; perithecium with tiny photobiont cells in the gelatinous hamathecium; spores muriform, 2, hyaline to tardily brownish]

1. Thallus prevailing of aggregate areoles, often somewhat lobed with or without overlapping lobules; lower surface black, except at the margins E. PALLIDULUM
1. Thallus largely of dispersed or scarcely aggregated areoles, the margins neither lobulate nor overlapping, the lower surface pale. E. PETROLEPIDEUM

Endocarpon pallidulum (Nyl.) Nyl. (L. *pallida*, pale + *-ulus*, diminutive; presumably from the tiny squamules) Much less frequent than the following species, and most commonly on weathered concrete, carbonate or siliceous rock; a specimen from a limestone canyon in Cook County is growing off the rock among mosses; it also is known from bryophyte detritus over dolomite in full sun in a prairie in Walworth County, where it also grew on HCl- rock. A specimen from Will County was collected on bark at the base of *Ulmus*. Other associates include *granosa*, *Sarcogyne regularis*, *Verrucaria calkinsiana*, *V. nigrescentoidea* and *V. sordida*. A Fink specimen (s.n., MICH, 1895) was named *Endocarpon hepaticum*; it grew on “calcareous earth”, but, as Thompson noted in 1986, the spores are muriform and algae are present in the perithecia. ~ Spores 25–35 μm , or even longer \times 11–17 μm ; hymenial algal cells globose, 3.4–3.8

μm.

Berrien-MOR, Boone-MOR, Cook-F*,MOR, DuPage-MOR, Ford-MOR, Jasper-MOR, Kane-MICH*, Rock-MOR, Walworth-MOR, Will-F*

Endocarpon petrolepideum (Nyl.) Nyl. (Gr. *petros*, stone or rock + *lepidion*, diminutive for scale or flake; an allusion to the dispersed, scale-like areoles) Most previous local reports of *Endocarpon pusillum* Hedwig, including *E. pusillum* Hedwig var. *garovaglii* Kemp., as rendered by Fink (1900) or of *Bachmanianum pusillum* of Fink (1906), are referable here; it is now known to be a terricolous species of arid soils in areas remote from our region. *Endocarpon petrolepideum* is a ubiquitous species locally, growing with *Myriolecis dispersa*, *Myriolecis hagenii*, *Verrucaria calkinsiana*, *Verrucaria furfuracea*, *Verrucaria nigrescens*, and *Xanthocarpia feracissima* on weathered concrete and flagstone. It also grows on gravel and on both granitic and dolomitic erratics, weathered bricks, mosses over dolomite, and even on weathered lignin and rusty metal. ~ Oil droplets in the hymenium; spores 25–35 μm, or even longer × 10–13 μm.

Boone-MOR, Cook-F*,MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Iroquois-MOR, Kalamazoo-MOR, Kane-ILL-MOR, Kankakee-MOR, Lake IL-MOR, LakeIN-MOR, LaSalle-CACS*,F*,MOR, Livingston-MOR, Newton-MOR, Ogle-MOR, Porter-MOR, Pulaski-MOR, Starke-MOR, Walworth-MOR, White-MOR, Will-MOR, Winnebago-MOR

EOPYRENULA R. C. Harris DECAMPIACEAE¹³ [Photobiont: *Trentepohlia*.

Gr. *eos*, dawn, early; meaning a primitive or inchoate relative of the genus *Pyrenula*, which see. ~ Thallus crustose, endophloedeal, white; perithecia black, pale in the immersed portion, the spores 8, brown, 3–6 septate, the central cell the larger, constricted at the septa, microconidia elongate, hyaline, simple; macroconidia brown, septate.]

Eopyrenula intermedia Coppins (L. *inter*, between, among + *medius*, middle; from its equivalent similarities to two related species) = *Eopyrenula leucoplaca* of North American authors. Most commonly associated with *Acer saccharum*, and *Quercus alba*, the Cook County specimen (Calkins #216, F) was identified as *Pyrenula gemmata* by Calkins; Another Cook County specimen by that name is a non-lichened fungus. See also *Anisomeridium bifforme*, which has uniformly hyaline spores. There are also records from nearby Fulton County, Illinois (Haines *s.n.*, NY), annotated by R. C. Harris ~ Thallus white or pale, endophloeic; perithecia black or dark brown, colorless below, shiny or pruinose, sometime immersed to the point of appearing pruinose; ascus cylindrical, 90–100 μm × 10–12 μm; spores 8, more or less uniseriate, tapered at both ends, rather thick-walled, mostly 5-septate, not much constricted at the septa, 18–24 μm × 5–9 μm; macroconida 3-septate, dacryode.

Cook-F*

ERYTHRICIUM J Erikss. & Hjortstam CORTICIACEAE [Gr. *erythros*, reddish

¹³Lücking et al. (2016) moves this genus from the Dothidiomycetes to an altogether different subphyllum with genera of uncertain familial affinities, Pezizomycotina.

+ *-icius*, in the form of; perhaps for the reddish color presented by some species.
 ~ Thallus anamorphic; parasitic on lichens, mostly those of the Parmeliaceae and Physciaceae.]

Erythricium aurantiacus (Lasch) D. Hawksw. & A. Henrici (*L. aurantiacus*, orange) Yet, unknown locally, this species is rarely found in districts near our region. ~ A parasitic anamorph, the thallus comprised of yellowish or orange, ecorticate globules, occurring singly or in groups in areas of cortical degradation of macrolichens such as *Physcia stellaris*.

EVERNIA Ach. PARMELIACEAE [Photobiont: Chlorococcoid. Gr. *evernes*, sprouting well; probably from its often sumptuous, branched thalli. ~ Thallus yellow-green, fruticose, branched, with a cottony medulla, the branches flattened, pliable; spores small, 8, hyaline, simple.]

1. Principle branches strongly flattened, the lower surface distinctly paler than the upper; divaricatic acid absent E. PRUNASTRI
1. Branches irregularly terete or flattened, the any discernable lower surface concolorous with the upper; divaricatic acid present E. MESOMORPHA

Evernia mesomorpha Nyl. (Gr. *mesos*, middle, intermediate + *morphe*, form, shape; perhaps from a supposed appearance intermediate between related genera) This species is most abundant on *Larix laricina* in bogs where the trees are open-grown. At one such location in Kenosha County, the lower larch branches are virtually covered with lichens in association with this *E. mesomorpha*, including *Candelariella efflorescens*, *Flavoparmelia caperata*, *Flavopunctelia soledica*, *Lecanora strobilina*, *Melanelixia subaurifera*, *Ochrolechia arborea*, *Parmelia sulcata*, *Parmotrema hypotropum*, *Physcia millegrana* and *Punctelia rudecta*; also frequent at that locality is *Teloschistes chrysophthalmus*. The thalli of the larger shield lichens are often so twisted, contorted, congested or otherwise dwarfed that they hardly seem like the same species. Some of our material appears to be adventive in that it is found on planted trees, upon which it usually is represented only by tiny thalli. A northern species, we have one specimen from *Juniperus horizontalis* at Illinois Beach State Park. ~ Medulla UV+ white. [divaricatic acid, usnic acid]

Allegan-MOR, MSC, Barry-MICH*, MSC, WIS*, Berrien-DUKE, Branch-MOR, Cook-MOR, DuPage-MOR, Kalamazoo-MSC, Kenosha-MOR, Lake IL-ILLS*, MOR, McHenry-MOR, Milwaukee-MOR, Ottawa-MSC, Porter-MIN*, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, WIS*, Will-MOR

Evernia prunastri (L.) Ach. (Etymology remains elusive.) Not common in the Midwest, this species is rather well known from districts in the upper lower peninsula of Michigan. Although we have not yet seen the specimen, there is one purported to be this species at FLAS (McFarlin *s.n.*, 1933), collected in a bog in Berrien County. ~ Medulla UV-. [evernic acid, usnic acid ± atranorin]

Berrien-FLAS

FELLANERA Vězda PILOCARPACEAE [Photobiont: Chlorococcoid. Vězda

coined the name *Fellhanera* as an anagram of Hafellner. He wrote "*Anagramm zu Hafellner. Die Neue Gattung ist Herrn Dr. J. Hafellner gewidmet in Anerkennung seiner Verdienste in der Systematik der Flechten.*" ~ Thallus crustose, usually foliicolous; apothecia dark, without a thalline margin; asci with and I+ apical dome; spores small, 8, hyaline, prevailing 1-3 septate; conidia asymmetrically short-fusiform.]

Fellhanera minnisinkorum R. C. Harris & Lendemer (in remembrance of the Minnisink people, a group of Native Americans whose territory included the type locality and surrounding Delaware Water Gap National Recreation Area) Our only record for this species is a specimen collected at Glencoe, Cook County, (Calkins #173) on a "clay bluff" in 1905. Calkins had named this specimen *Lecidea flavidolivens*. ~ Thallus sordid, isidioid-granular near the margin, commonly with a cottony hypothallus; apothecia brown, hypothecium brown, epihymenium nearly hyaline; spores ca 17 μm long, 4.5 μm wide.

Cook-NY

FLAVOPARMELIA Hale PARMELIACEAE [Photobiont: *Trebouxia*. L. *flavus*, yellow; a yellow *Parmelia*, which see. ~ Thallus foliose, yellow-green, broad-lobed, the lower cortex black, but brown at the margins, rhizines simple; apothecia rare, lecanorine; spores 8, hyaline, simple; conidia tapered at both ends and in the middle.]

1. Thallus with finely granular soredia in rather evenly dispersed soralia F. CAPERATA
1. Thallus with largely corticate, isidioid pustules, without finely granular soredia F. BALTIMORENSIS

Flavoparmelia baltimorensis (Gyeln. & F6riss) Hale (after Baltimore, Maryland) = *Pseudoparmelia baltimorensis* (Gyeln. & F6riss) Hale. Southward this species is characteristic on exposed to partly shaded rocks, but our only local specimen is from an exposed sandstone break along the Rock River; it bears gyrophoric acid in the medulla. Another specimen (Thomson #22654, WIS), from *Quercus alba*, appears to be this species; it reacts C- in the medulla. [protocetraric acid, \pm gyrophoric acid]

Ogle-MOR, Walworth-WIS*

Flavoparmelia caperata (L.) Hale (L. *caperatus*, wrinkled, drawn into folds; probably from the more or less wrinkled upper cortex) = *Parmelia caperata* (L.) Ach.; *Pseudoparmelia caperata* (L.) Hale. Although this species is nowhere near as common as it appears to have been in Calkins's day, it grows on a wide variety of corticolous substrates, including fallen logs and old stumps. It is most frequent locally on *Quercus alba* and *Q. velutina*, probably because these species are more likely to be found in open woods. As woods close in from fire suppression, most of our regional broad-lobed lichens disappear, so it is rare on *Q. rubra*, *Tilia americana*, and *Fraxinus americana*. We also have specimens from *Acer platanoides*, *Acer saccharum*, *Carya ovata*, *C. cordiformis*, *Q. palustris*, *Q. macrocarpa*, and *Populus deltoides*. It is much less common on granitic

erratics, tombstones, and weathered wood. [protocetraric acid, usnic acid, caperatic acid, and atranorin]

Allegan-MOR, MSC, Barry-MOR, MSC, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MICH*, MOR, Calhoun-MOR, MSC, Cass-MOR, Cook-CACS*, F*, ILL, MOR, NY, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, MSC, Kane-MICH*, MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, MSC, Kosciusko-MOR, LaGrange-MOR, Lake IL-MOR, Lake IN-MIN*, LaPorte-MOR, LaSalle-ILLS*, MOR, NY, Lee-ILLS*, MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, WIS*, Newton-MOR, Noble-MOR, Ogle-ILLS*, MOR, Ottawa-MICH, MOR, MSC, Porter-MIN*, MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, St. Joseph IN-MOR, St. Joseph MI-MOR, Starke-MOR, US, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, WIS*, White-MOR, Will-ILL, MOR, Winnebago-MOR

FLAVOPLACA Arup, Söchting & Frödén TELOSCHISTACEAE [Photobiont: *Trebouxia*-like, mostly "*Pseudotrebouxia*." *L. flavus*, pale yellow + Gr. *plax*, a flat round plate, dish; a disconcerting mixture of Greek and Latin roots. ~ Thallus crustose, yellow, granular-sorediate, typically with some corticate areoles; spores not seen; anthraquinones.]

1. Thallus of scattered areoles or squamules, the soredia in discrete soralia F. FLAVOCITRINA
1. Thallus of dispersed granular soredia, the areoles poorly developed among the granules F. CITRINA

Flavoplaca citrina (Hoffm.) Arup, Frödén & Söchting (*L. citrinus*, lemon-colored; from the color of the soredia) = *Caloplaca citrina* (Hoffm.) Th. Fr. This species is typically found on dolomitic cliff faces, weathered quarry walls, and even concrete, usually in partly shaded situations. It is characterized by isidiate or sorediate granules scattered over the surface. [parietin, fallacinal, emodin, teloschistin, and parietinic acid]

Cook-F*, MOR, DuPage-MOR, Jasper-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kosciusko-MOR, Lake IN-MOR, LaSalle-MOR, Milwaukee-MOR, Ogle-MOR, Racine-MOR, Rock-WIS*, Will-MOR, Winnebago-MOR

Flavoplaca flavocitrina (Nyl.) Arup, Frödén & Söchting (*L. flavus*, pale yellow + *citrinus*, lemon-colored) Our only record for this species is from an base-rich brick, where it occurred with *Verrucaria furfuracea*, upon which thallus it can be seen to grow. ~ Thallus yellow, areolate, the areoles usually placodioid, sorediate, the soredia usually in discrete elongate to round soralia. [presumably with the same secondary metabolites as the previous species]

Ford-MOR

FLAVOPUNCTELIA (Krog) Hale PARMELIACEAE [Photobiont: *Trebouxia*. *L. flavus*, yellow; a yellow *Punctelia*, which see. ~ Thallus foliose; yellow green, the lower cortex brown to black; rhizines simple or forked; apothecia rare, lecanorine; spores 8, hyaline, 1-septate; conidia tapered in the middle and at both ends.]

1. Soredia coarse, subsidioid, in largely laminal soralia; thallus with white, conspicuous pores and maculae on the upper surface F. FLAVENTIOR
1. Soredia in fine, marginal, crescent-shaped soralia; thallus without white pores, maculae infrequent on the

upper cortex F. SOREDICA

Flavopunctelia flaventior (Stirt.) Hale (*L. flaventior*, yellow) = *Parmelia flaventior* Stirt.; *P. andreana* Müll. Arg.; *Punctelia flaventior* (Stirt.) Krog. This is a northern species that may have extended its range southward into the Midwest with the immense increase in corticolous substrate that has occurred since settlement. It is difficult to describe a habitat for it other than to note that it grows on trees in parks and pastures throughout the area. We have specimens fairly evenly distributed among the following trees: *Acer negundo*, *A. saccharinum*, *Fraxinus*, *Juglans nigra*, *Larix laricina*, *Quercus macrocarpa*, *Q. palustris*, *Q. Rubra*, *Q. velutina*, and *Salix* spp. It is infrequent on lignin. Both this species and the next commonly grow together, particularly on *Populus deltoides*, just north of our region. [lecanoric acid, usnic acid]

Allegan-MOR, MSC, Barry-MOR, MSC, Berrien-MOR, Boone-MOR, Calhoun-MSC, Cass-MSC, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kendall-MOR, Kenosha-MOR, WIS*, Kent-MOR, Kosciusko-MOR, Lake IL-ILLS*, MOR, LakeIN-MIN*, MOR, LaSalle-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Porter-MIN*, MOR, Racine-WIS, Steuben-MOR, St. JosephIN-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, WIS*, Will-MOR, Winnebago-MOR

Flavopunctelia soledica (Nyl.) Hale (Gr. *soredion*, a little heap (soredium) L + *-icus*, belonging to, or emphasis on a certain character; from its production of soredia) = *Parmelia ulophyllodes* (Vainio) Sav.; *P. soledica* Nyl.; *Punctelia soledica* (Nyl.) Krog. This species appears to have an autecology similar to that of *F. flaventior*, though it is less frequent. We have specimens evenly distributed among the following species: *Acer rubrum*, *Acer saccharum*, *Carya cordiformis*, *Crataegus mollis*, *Fraxinus americana*, *F. lanceolata*, *Gleditsia triacanthos*, *Populus deltoides*, *Prunus americana*, *Quercus macrocarpa*, *Q. palustris*, *Q. rubra*, *Q. velutina*, *Salix nigra*, and weathered wood. [lecanoric acid, usnic acid]

Allegan-MOR, Barry-MOR, MSC, Benton-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-WIS*, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIL-MOR, Laporte-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Ottawa-MOR, MSC, Porter-MIN*, Racine-MOR, Steuben-MOR, St. JosephIN-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, WIS*, Waukesha-MOR, Will-MOR, Winnebago-MOR

FUSCIDEA V. Wirth & Vězda. FUSCIDEACEAE [Photobiont: chlorococcoid, in multicellular packets. *L. fuscus*, grayish brown + *-idea*, with the appearance or pattern; evidently an allusion to the gray-brown verrucae of the thallus. ~ Thallus crustose; apothecia sessile or more or less immersed, but often absent in our species; asci I+ blue distally; spores 8, hyaline, 0-1 septate; pycnidia immersed, the ellipsoid to bacilliform conidia. [divaricatic acid]

Fuscidea recens (Stirton) Hertel, V. Wirth, & Vězda (*L. recens*, reviewed, enumerated; perhaps from a reassessment of some *Lecidea* species by Stirton) This species is known from nearby Warren County, Indiana, where it grows on sandstone at Fall Creek Gorge. ~ Thallus pale gray to brownish, usually sorediate, the nigrescent apothecia epruinose; spores curved, 9–12 μm \times 4–5 μm .

FUSCIDEACEAE

One local genus **Fuscidea**

GRAPHIDACEAE

One local genus **Graphis**

GRAPHIS Adanson GRAPHIDACEAE [Photobiont: *Printzina*. *Gr. graphis*, of line drawings; from the elongate, often branched apothecia that resemble written markings. ~ Thallus crustose, corticolous, endophloedeal, apothecia elongate or branched, carbonized, the paraphyses unbranched and notably aligned with each other, the distal cells much enlarged, the epihymenium dark; hypothecium pale; spores 4–8, hyaline to brownish, 3-many septate with lenticular cells.]

1. Ascoma largely unbranched and vermiform, the rims remaining closed; pruina absent G. LINEOLA
1. Ascoma simple or branched, linear to ovate, the rims soon relaxed to expose the epihymenium; pruina scant to abundant G. SCRIPTA

Graphis lineola Ach. (*L. linea*, line + *-olus*, diminutive) = *G. comma* Ach, of Calkins, which some authorities regard as a variant of *G. lineola*. R. C. Harris annotated a specimen (Calkins #195, NY) of this species which had been collected in 1900 on *Acer saccharum* at Glencoe, in Cook County. One might have suspected that the specimen was mislabeled except that we have seen similar specimens, one from *Acer saccharum*, another from *Carya ovata*, in natural landscapes in Berrien County and Lake County, Illinois. ~ Spores hyaline, 8–11 septate, 30–45 $\mu\text{m} \times 7\text{--}9 \mu\text{m}$.

Berrien-MOR, Cook-NY, Lake IL-MOR

Graphis scripta (L.) Ach. (*L. scriptus*, written; from the appearance of the apothecia) According to Calkins, this species was common in the region, but it is now only occasional on the smooth plates of *Quercus* species, particularly in the red oak group, but there are also specimens from *Acer saccharum*, *Carya cordiformis*, *Carya ovata*, *Celtis occidentalis*, *Quercus alba*, *Quercus rubra*, *Quercus velutina*, and *Tilia americana*. Calkins's report of *Graphis* (*Phaeographis*) *dendritica* is almost certainly referable here inasmuch as specimens of his at the Field Museum and at the Chicago Academy of Sciences that he called *G. dendritica* are actually *G. scripta*. Another specimen of this species (CACS) here used was *Opegrapha varia*. *G. scripta* is quite similar to *G. elegans*, except that the latter contains norstictic acid in the thallus and typically has furrowed apothecial margins; both species vary tremendously in their appearance, from small aster-like forms to simple or branched, or even long connecting semicircular lirellae. There is a *Phaeographis* specimen of Calkins's from Cook County at the New York Botanical Garden, but the associated species, *Graphina abaphoides*, on the same chink suggests that the specimen came from Florida. ~ Spores hyaline, 7–10 septate, 24–45 $\mu\text{m} \times 7\text{--}9 \mu\text{m}$.

Allegan-MICH, MSC, Barry-MSC, Berrien-MOR, Boone-MOR, Calhoun-MSC, Cass-MOR, Cook-

CACS*,F*,MOR,NY, DeKalb-MOR, DuPage-MOR, Ford-MOR, Jasper-MOR, Jefferson-MOR,WIS*, Kane-MICH*,MOR, Kendall-MOR, Kenosha-MOR, Kent-MSC, LaGrange-MOR, LakeIN-MOR, Laporte-MOR, LaSalle-MOR,NY, Lee-MOR, Livingston-MOR, McHenry-MOR, Ogle-MOR, Ottawa-CACS*, Porter-F*,MOR, Racine-MOR, Rock-MOR, Walworth-MOR, Waukesha-MOR,WIS*, Will-MOR, Winnebago-MOR

GYALOLECHIA A. Massal. TELOSCHISTACEAE [Photobiont: mostly "*Pseudotreboxia*." Gr. *gyalo-*, brushed, polished, sanded + *lechos*, couch, bed, nest. ~ Thallus crustose, pale yellow, surficial; apothecia orange; spores polaribilocular, the isthmus more than a third of the length of the spore. Anthraquinones, particularly parietin. Occasional specimens of this genus have in their hymenia parasitic lichens with polysporous asci bearing brown, septate spores mostly 4–6 μm long. These may be *Muellerella lichenicola*, which see.]

1. Thallus corticolous G. FLAVORUBESCENS
 1. Thallus saxicolous G. FLAVOVIRESCENS

Gyalolechia flavorubescens (Hudson) Søchting, Frödén & Arup (L. *flavus*, yellow + *rubescens*, becoming red; perhaps from the emergence of orange apothecia from a yellow thallus) = *Caloplaca aurantiaca* of American authors, not (Lightf.) Th. Fr.; *Placodium aurantiacum* of Calkins. The Newton County specimen is from *Quercus velutina* in black oak savanna; the DuPage County records are from *Populus*. Calkins (1896) listed it from "elms and poplars at Glencoe; on hickories and other trees along the Des Plaines River." The Allegan County records are from *Tilia americana* at Mount Baldhead near Saugatuck. Curiously, Calkins noted that it grew on "rocks at Lemont and elsewhere;" we wonder if these latter reports might have referred to what is now known as *Gyalolechia flavovirescens*. Our specimens are mostly pycnidiate, infertile, and are UV+ salmon orange. Fertile specimens, which are far more frequent farther south, react UV– or UV+ whitish with greenish or blueish tincture or pale creamy. ~ Thallus more or less continuous, rather thin, cream to pale or chromate yellow; apothecia lecanorine, the disk orange orange, the thalline tissues much lighter-yellow to almost white; rim mostly elevated above the disk; paraphyses often forked, the apices expanded to 4 μm ; hypothecium with abundant oil droplets; spores 15–18 μm \times 6–10 μm , the septum 5–9 μm ; conidia bacilliform, ~ 3.5 \times 1.0 μm . [unknown/unidentified anthraquinone(s)]
Allegan-MSC, Berrien-MOR, Cook-CACS*,F*,MIN, DeKalb-MOR, DuPage-MOR, LaSalleMICH*, Newton-MOR, Winnebago-MOR

Gyalolechia flavovirescens (Wulfen) Søchting, Frödén & Arup (L. *flavus*, yellow + *virescens*, becoming green or flourishing; perhaps from the fecundity and tumescence of the apothecia) = *Caloplaca flavovirescens* (Wulfen) Dalla Torre & Sarnth. Locally, this species is infrequent on dolomitic erratics, canyon walls, old quarries, and less frequent on weathered concrete, usually in association with the humidity provided by a stream or the shores of Lake Michigan. Outside the region we have specimens from chert and sandstone. Depauperate or pallid specimens of *Athallia vitellinula* and *Squamulea subsoluta* might key here, but those species rarely produce spores with isthmi longer than 4.5 μm long and both usually have zeorine

apothecia. The latter has a thallus with tinctures of orange; the former has a rather thick and robust proper exciple. ~ A disturbingly variable species as traditionally understood, the thallus usually has tinctures of pale yellow, at least near the margins, where there is sometimes a blue prothallus; thallus and continuous to areolate or rimose, and even pulvinate, features inevitably associated with a saturated yellow coloration; apothecia prevailingly appearing biatorine or oven arthonioid, or weakly zeorine initially, sessile, the disk usually burnt orange; proper exciple concolorous with the disk and flush with it; disk orange or yellow orange; spores 11–17 μm \times 4–9 μm , the septum 4–7 μm . [parietin, fallacinal, emodin, teloschistin]

Cook-F*,MOR, DuPage-MOR, Ford-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, LakeIL-MOR, LaSalle-F*,MOR, Racine-MOR, Rock-MOR, Will-MOR, Winnebago-MOR

HALECANIA M. Mayrhofer. LEPROCAULACEAE [Photobiont: Chlorococcoid. In honor of the American lichenologist and educator, Mason Ellsworth Hale, 1929-1990, prolific student of the Parmeliaceae and creative observer of secondary metabolites, a syncopated combination of Hale and the genus *Lecania*, which *Halecania* resembles superficially. ~ Thallus crustose; apothecia lecanorine; asci *Catillaria*-type; spores 8, hyaline, 1-septate; conidia bacilliform.]

Halecania pepegospora (H. Magn.) van den Boom (Gr. *pepego*?, something to do with ice + spora, seed) ~ A species of siliceous rock, wide spread in districts east of us and reported for Wisconsin, we have yet to see it locally. Thallus dark-greenish to nigrescent, blastidiate or isidiate in patches; spores halonate, ellipsoid, 13–15 μm \times 3–4 μm . [argopsin]

HEPPIA Näegli LICHINACEAE [Photobiont: *Scytonema*. After Johann Adam Philipp Hepp, 1797–1867, German physician, lichenologist, and political activist, exiled in Switzerland. ~ Thallus squamulose, brown, terricolous, adnate; apothecia reddish, immersed in deep pit; spores 8, hyaline, simple; conidia bacilliform to fusiform.]

Heppia conchiloba Zahlbr. (L. *concha*, shell, or shell cavity + *lobus*, lobe, evidently from the deeply hollowed lobes bearing an apothecium) = *H. despreauxii* of Calkins; *H. lutosa* auct., non (Ach.) Nyl. Our specimens of this species are from dry gravelly hill prairies, where it grows on thin soil among base-rich pebbles where vascular vegetation is spare. Consistent lichen associates are *Placidium squamulosum* and *Psora decipiens*. Vascular vegetation is characterized by *Andropogon gerardii*, *A. scoparius*, *Arenaria stricta*, *Artemisia campestris caudata*, *Bouteloua curtipendula*, *Comandra richardsiana*, *Dalea purpurea*, *Euphorbia corollata*, *Liatris cylindracea*, *Lithospermum incisum*, *Scutellaria parvula* var. *leonardii*, *Silphium terebinthinaceum*, and *Solidago nemoralis*. It also grows in shallow soil over dolomite with *Bacidia bagliettoana*, *Placidium squamulosum*, and *Placynthium nigrum*. Thomson (2003) indicates that only *Heppia lutosa* (Ach.) Nyl. *sensu lato* grows in Wisconsin, where he cites it from Dane and Iowa counties. He

indicates however that all Wisconsin material he has seen “fits under” *H. conchiloba*. *Heppia lutosa sensu stricto* (L. *lutosus*, muddy, possibly from its sordid appearance and evident association with soil), a largely western species, is said to have a small, scarcely squamulose, more or less gelatinous, rarely lobed thallus, mostly no more than 2 mm across, and spores prevalingly no more than 18 μm long (Brodo 2016, McCune 2017). Previous reports of *H. adglutinata* (Kremp.) A. Massal. (L. *ad*, to or toward + *gluten*, glue + *-atus*, adjective ending) (Wilhelm 1998) are referable here; it has an epruinose, smoothish thallus and its hymenium is IKI- throughout, whereas our specimens have a scabrous thallus, are usually at least sparingly pruinose, and bear hymenia that are at least partially IKI+ blue. Another related species with a mostly IKI+ blue hymenium, said to be mostly southwestern, is *H. despreauxii* (Mont.) Tuck. (in honor of the French botanist Jean-Marie Despréaux, 1794–1843) differs in having upper cortex overlain by a cracked epinecral layer, the absence of a lower cortex, yellowish-olive thallus color and pale superficial dots (Schulz 2007). ~ Thallus squamulose, 1.5–8.0, with sordid pruina, the edges eroded and ecorticate, rhizines absent; spores ellipsoid to fusiform, 18–24 μm \times 8–13 μm .

Cook-MOR, Iroquois-ILLS*, Kane-MOR, McHenry-MOR, Rock-MOR, Will-DUKE, MOR

HERTELIDEA Printzen & Kantvilas STEROCAULACEAE [Photobiont: Chlorococcoid, not in multicellular packets. In honor of the German botanist and lichenologist Hannes Hertel (1939 –), of the Botanische Staatssammlung München. For abstruse reasons understood only by the DNA jockies, *Hertelidea* is placed within the Stereocaulaceae. ~ Thallus crustose; apothecia minute, lecideine; epihymenium granular; asci *Micarea* type; spores 8, usually simple; perlatolic acid usually present (UV+ white)]

Hertelidea botryosa (Fr.) Printzen & Kantvilas (Gr. *botry*, a bunch or cluster, as in grapes + *osus*, with the appearance of.) This species has been reported from as nearby as Mecosta County, Michigan (Printzen & Kantvilas 2004) and from other districts south, east and west of our region. More common southward is *Hertelidea pseudobotryosa* R. C. Harris, Ladd, and Printzen. It differs in lacking granules or crystals in the exciple and in having a greenish to grayish brown hypothecium. ~ Thallus rather thick, tan to dark gray, mostly of scattered convex squamulose verrucae; soredia not clearly delimited, usually confluent to form a cracked leprose crust; apothecia 0.15–0.5 mm across; exciple containing KOH-soluble granules or crystal; hypothecium dark brown; asci 28–33 μm \times 6–10 μm ; spores 7–12 μm \times 3–4.5 μm . [perlatolic acid]

HETERODERMIA Trevisan PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *heteros*, other, different + *derma*, skin, leather; from the complex algal and medullary layers in the upper cortex. ~ Thallus foliose, white to sordid, the principal lobes narrow, generally longer than wide, very often ciliate; upper cortex with elongate cells; lower cortex corticate or ecorticate, white or with

tinctures of color; apothecia, if present, lecanorine; this disks brown; spores *pachyspora*-type, 8, brown, 1-septate, thick-walled.]

1. Thallus loosely ascending, subfruticose, the margins long-ciliate H. ECHINATA
1. Thallus appressed, the margins not long-ciliate.
 2. Thallus beset with granular isidia over the surface; medulla K+ yellow turning red . . . H. GRANULIFERA
 2. Thallus without isidia; medulla K+ yellow.
 3. Thallus without soredia H. HYPOLEUCA
 3. Thallus sorediate with fine, marginal soralia.
 3. Lower surface with distinct yellowish, K+ purple tinctures H. OBSCURATA
 3. Lower surface white throughout.
 - Thallus K+ yellow H. SPECIOSA
 - Thallus K+ red H. PSEUDOSPECIOSA

Heterodermia echinata (Taylor) W. L. Culb. (L. *echinatus*, prickly; from the stiff marginal cilia) Calkins & Huett (1898) cited this species from *Juniperus* in nearby La Salle County, Illinois, under the name *Physcia comosa*, which report may be referable here. We have seen specimens as far north as Union County, Illinois, where it does indeed grow on *Juniperus*, but it is hard to imagine what other species Calkins & Huett may have had in hand. Sterile specimens of *Physcia adscendens* or *Physcia tenella*, both with projecting rhizines might key here, but they have a smooth lower cortex, and the upper cortex is duller than *H. echinata* and usually more scabrid. ~ Thallus loosely adnate, to subfruticose, the lobes elongate, well beset with marginal white cilia; lower surface ecorticate, the white medullary tissue evident; apothecia, if present, substipitate, more or less concave, ciliate. [atranorin, zeorin]

Heterodermia granulifera (Ach.) W. L. Culb. (L. *granulus*, a small grain + *fero*, to bear, carry; from the numerous granulose isidia borne on the thallus) = *Physcia granulifera* of Calkins (1896), who reported this species from "hickories near Elgin and at Lemont." Another Calkins specimen (s.n., F) From LaSalle County, also called *Physcia granulifera*, is referable to *Physcia stellaris*. This is a species that is frequent a little farther south. ~ Thallus lobes rarely more than 0.7 mm across, about as long, the upper cortex commonly pruinose; diaspores granular-isidiate, to coralloid or blastidiate, occasionally erupting and soralia-like; lower surface corticate, white to tan, the rhizines brownish, simple or branched; apothecia rare; medulla K+ red. [salazinic acid, atranorin, ± zeorin]

Heterodermia hypoleuca (Ach.) Trevis. (Gr. *hypo*, under, beneath, less than usual + *leukos*, white; from its white, cottony lower surface) Our only record for this species is from an early Calkins specimen (Calkins s.n., F) from LaSalle County, which he had called *Physcia speciosa*. Thallus without diaspores, but the margins at least sparingly lobulate and the inrolled apothecial margins usually rimmed with tiny lobules; medulla K+ yellow; lower surface ecorticate. [atranorin]

LaSalle-F*

Heterodermia obscurata (Nyl.) Trevisan (L. *obscura*, dark, shady, indistinct + *-atus*, likeness; perhaps from its surficial similarities to other sorediate species.) Rare, our only records are from the bark of *Populus deltoides*, *Prunus serotina*, and *Tilia*. ~ Thallus lobes rarely

more than 1.5 mm across, the soralia farinose and labriform, strongly associated with the marginal lobe tips; lower surface corticate but with orange, K+ purple ecorticate areas; apothecia rare; white portions of the medulla K+ yellow. The LaSalle County record (Calkins #6024, CACS) is a mixed, collection originally labeled *Physcia obscura*, with *Physcia millegrana*. [anthraquinones, atranorin, chloroatranorin, zeorin]

DuPage-MOR, LakeIN-MOR, LaSalle-CACS*

Heterodermia pseudospeciosa (Kurok.) Culb. (Gr. *pseudos*, false + *speciosa*; an allusion to its deceptively similar appearance to *H. speciosa*) This species is known from both north and south of the Southern Lake Michigan Region. ~ Thallus lobes short, to 1.5 mm wide; sorediate, the soralia capitate at the lobe tips; lower surface corticate, white except near the center; apothecia rare, the margins flexuous, crenulate, even becoming sorediate. [atranorin, zeorin, norstictic acid]

Heterodermia speciosa (Wulf.) Trevisan (L. *speciosus*, showy, beautiful; from the attractive thallus) = *Physcia speciosa* of Calkins (1896), who reported it from Cook County. Our only contemporary record of this species is from the base of *Quercus alba* on a grazed kame near LaFox in Kane County. The LaSalle County record is from shaded mossy sandstone. There is a record from 1945 collected on *Acer saccharum* in Waukesha County. ~ Thallus lobes to about 1.5 mm across, the soralia farinose, generally produced on the lobe tips; lower surface more or less corticate, white, K+ yellow; rhizines white; apothecia rare; medulla K+ yellow. See also notes under *Heterodermia hypoleuca*. [atranorin, zeorin]

Cook, Kane-MOR, Lake IL-MIN*, LaSalle-MOR, McHenry-ILL, Pulaski-MOR, Waukesha-WIS*

HETEROPLACIDIUM Breuß [Photobiont: chlorococcoid. Gr. *heteros*, other, different + *Placidium*, which see. Thallus crustose to squamulose, with a lower cortex and rhizohyphae, the squamules or areoles rounded, incised to sublobate, all tissues paraplectenchymatous; perithecia immersed, only the ostiole evident; involucrellum absent; exciple hyaline to brown; hymenium IKI+ reddish or blue; spores biserial in the ascus, broadly elliptic to subglobose.]

Heteroplacium compactum (A. Massal.) Guedan & Cl. Roux. (L. *compactus*, crowded together) Yet unknown from our region, it is rather frequent in districts just to the west. ~ Thallus thick, the upper cortex brown to nigrescent, the areoles mostly more than 1 mm broad, more or less tapered proximally, without distinctly blackened margins; rhizohyphae hyaline; perithecia to 0.4 mm across; exciple hyaline below the middle; hymenium IKI+ reddish; spores 13–16 × 8–10 μm.

HUNECKIA S. Y. Kondr., Kärnef., Elix, A. Thell, Jung Kim, A.S. Kondr. & Hur
TELOSCHISTACEAE [Photobiont: mostly "*Pseudotreboxia*. In honor of the German lichenologist Siegfried Huneck (1928–2011), who devoted his studies to secondary metabolites. ~ Thallus crustose; apothecia with a proper margin, the thalline margin absent, the disk brown or nigrescent; spores 8, hyaline,

polaribilocular, with thick end walls.]

Huneckia pollinii (A. Massal.) S. Y. Kondr., Kärnef., Elix, A. Thell, Jung Kim, A.S. Kondr. & Hur (after Ciro Pollini, 1782–1833, Italian physician and botanist) = *C. pollinii* (A. Massal.) Jatta; *Placodium ferrugineum* of early local collectors. Farther south, this species grows on *Juniperus virginiana* in natural areas. The Cook (Calkins #53, MICH “on *Carya*”; Calkins #6085, CACS “on oaks”) and Kane (Fink #3080, 1895, MICH) county specimens were confirmed by Wetmore (1992). The LaSalle County records (Calkins #277, F; Calkins #6088, CACS) were collected on *Juniperus virginiana* along the Illinois River. The Rock County record is reported by Thomson (2003). ~ Thallus pale to dark gray; apothecia brown or dull brownish orange to black, the rim essentially concolorous with the disk, K–, although the epihymenium is K+violet and produces an ambient colored solution, which feature if missed might lead to confusion with the more reddish-orange *Blastenia ferruginea*; spores 14–20 $\mu\text{m} \times 6\text{--}12 \mu\text{m}$; septum 4–7 μm .

Cook-CACS*, MICH*, Kane-MICH*, LaSalle-CACS*, F*, Rock

HYPERPHYSICIA Müll. Arg. PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *hyper*, beyond, over, very; evidently meaning quite a *Physcia*, which see. ~ Thallus subcrustose, effigurate, the lowers surface adnate but corticate, pale to black, with rhizines essentially absent; apothecia, if present, lecanorine, the spores 8, brown to gray, 1-septate.]

1. Thallus esorediate; lobes confluent; apothecia nearly also present H. SYNCOLLA
1. Thallus soresdiate; lobes somewhat discrete; apothecia very rare.
 2. Soralia prevailingly marginal, labriform or irregular H. CONFUSA
 2. Soralia nearly all surficial on the lamina, largely circular.

Thallus asymmetrically branched, olivescens with nigrescent lobes, the latter about as long as wide H. L#19022

Thallus more or less symmetrically branched, gray to nigrescent but not differentially so, the lobes ultimate lobes generally longer than wide H. ADGLUTINATA

Hyperphyscia adglutinata (Flörke) Mayrh. & Poelt (L. *ad*, to or toward + *gluten*, glue + *-atus*, adjective ending; from the thallus lobes that appear glued to the bark) = *Physcia adglutinata* of Calkins, in part, but see notes under *Rinodina ascociscana*; *Physciopsis adglutinata* (Flörke) M. Choisy. Small and inconspicuous, this species is ubiquitous on all manner of trees growing in open settings or in parks and landscaped areas; it is occasional on weathered lignin.

Allegan-MOR, Barry-MOR, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Jasper-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kosciusko-MOR, LaGrange-MOR, Lake IL-F*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ottawa-MOR, Porter-MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, St. JosephIN-MOR, St. JosephMI-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-F*, MOR, Winnebago-MOR

Hyperphyscia confusa Essl., C. A. Morse, & S. Leavitt (L. *confusus*, with mixed up thoughts; probably from its long over-looked status in *H. adglutinata*, where one might be seduced into thinking it was a depauperate *Physciella chloantha*) Though a little more frequent in central Illinois, our only record local records for this western species are from corticolous

substrates, to wit *Ace saccharum*, *Celtis occidentalis*, *Juglans nigra*, *Pyrus calleryana*, and *Tilia cordifolia*. A specimen at the Field Museum (Leavitt #11-356, F), is said to have been collected in DuPage County, in Aurora, which city is wholly within Kane County.

Barry-MOR, Benton-MOR, Boone-MOR, Calhoun-MOR, Cook-MOR, DeKalb-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kent-MOR, Kosciusko-MOR, Newton-MOR, Lake-IN-MOR, LaPorte-MOR, LaSalle-MOR, Racine-MOR, St. JosephIN-MOR, St. JosephMI-MOR, Steuben-MOR, VanBuren-MOR, White-MOR, Winnebago-MOR

Hyperphyscia syncolla (Nyl.) Kalb (Gr. *syn-*, combined + *kolla*, glue; from the thallus lobes that appear stuck together) = *Physciopsis syncolla* (Nyl.) Poelt. This species is much commoner from farther south. Our specimens are from *Carya ovata*, *Morus alba*, *Populus deltooides*, *Pyrus calleryana*, and *Salix nigra*, not necessarily from remnant areas.

Boone-MOR, Cook-MOR,NY, DeKalb-MOR, DuPage-MOR, Grundy-MOR, Iroquois-MOR, Kane-MOR, Kosciusko-MOR, Lee-MOR, McHenry-MOR, Racine-MOR, White-MOR, Will-MOR, Winnebago ILLS*

Hyperphyscia L19022 Evidently very rare and perhaps a new species. Our only record is from the partly decorticate bark of a Bur Oak that fell in a remnant woods at Greene Valley Forest Preserve. ~ The apothecia are rare, but the few spores that were mature were distinctly *Mischoblastia*-like (see *Rinodina*).

DuPage-MOR

HYPOCENOMYCE M. Choisy OPHIOPARMACEAE [Photobiont: *Trebouxia*.

Gr. *hypo*, under, beneath, less than usual + *Cenomyce*, an old generic name; from its apparent resemblance to *Cenomyce*. ~ Thallus squamulose, greenish-brown, the squamules areolate or attached at one end and soresiate below or at the distal margin; apothecia biatorine, usually dark, the margin obscure in age; spores not seen; conidia bacilliform to ellipsoid.]

Hypocenomyce scalaris (Lilj.) M. Choisy (L. *scalaris*, pertaining to a ladder; perhaps from the imbricate lobes evocative of ladder rungs) = *Psora scalaris* (Ach.) Hook. f. The only records of this northern species we have seen are from the trunk and lower limbs of a large *Quercus macrocarpa* at the Middle Fork Savanna, in Lake County, Illinois, and on *Larix laricina* in a bog northwest of East Troy, Walworth County. ~ Squamules K-, C+ red, KC+ red, flattish to convex, imbricate, usually soresiate marginally. [lecanoric acid]

Calhoun-MSC, Lake IL-MOR, Porter-DUKE, Walworth-MOR

HYPOGYMNIA (Nyl.) Nyl. PARMELIACEAE [Photobiont: *Trebouxia*. Gr.

hypo, under, beneath, less than usual + *gymnos*, naked, lightly clad; from the smooth, rhizine-free lower cortex. ~ Thallus foliose, pale to greenish-gray or sordid, loosely attached, the lobes longer than wide, tube-like, commonly perforate at the tip, the lower cortex black, hollow, tube-like, without rhizines; apothecia usually broadly stipitate, lecanorine, the disc usually concave; spores 8, hyaline, simple.]

Hypogymnia physodes (L.) Nyl. (Gr. *physa*, an air bladder, bubble + *-ode*, like, resembling; from the inflated appearance of the thallus) = *Parmelia physodes* (L.) Ach. Rare, our few specimens of this common northern species are represented by small thalli about 2 cm in diameter. The Barry and Walworth county specimen are from *Larix laricina* in bogs; the La Porte County material is from *Fraxinus pennsylvanica* var. *subintegerrima* at Pinhook Bog. The Du Page County specimens are both from "bark" at the West Du Page Woods Forest Preserve. Calkins (1896) reported that it grew on "oaks in Cook and Du Page counties, and elsewhere." Farther north, in Allegan County, Michigan, we have collected it on scrubby trees of *Quercus velutina*. ~ Thallus lobes inflated, without perforations, the black lower surface visible only from beneath; soredia granular, on the lower surface of bursted open lobe tips; apothecia usually absent. [atranorin, physodic acid, physodalic acid, 3-hydroxyphysodic acid, protocetraric acid]

Allegan-MOR, MSC, Barry-MICH*, MSC, WIS*, Calhoun-MSC, Cook-CACS*, DuPage-MOR, Laporte-MOR, Ottawa-MSC, Walworth-MOR

HYPOTRACHYNA (Vainio) Hale PARMELIACEAE [Photobiont: *Trebouxia*.

Gr. *hypo*, under, beneath, less than usual + *trachyno*, to roughen; probably from the somewhat roughened appearance of the densely squarrose-rhizinate lower surface. ~ Thallus foliose, the lobes and lobules typically truncate, pale gray, the lower cortex black, brown distally, lustrous, with branched rhizines; apothecia thalline, the disks brown, usually concave; spores 8, hyaline, simple.]

Hypotrachyna livida (Taylor) Hale (L. *lividus*, blue, bluish, leaden color; from?) = *Parmelia tiliacea* of Calkins and Berry. Berry (1941) reported it from Lake County, Illinois, but Culberson (1961) showed no specimens north of Peoria. Calkins (1896) reported it from "oaks at Riverside, Lemont and Hanover." Two LaSalle County specimens (Calkins #6014, CACS; *s.n.*, F) were labeled "*Parmelia borreri* var. *rudecta*." [lividic acid, atranorin, 4-0-methylphysodic acid]

Cook, Lake IL, LaSalle-CACS*, F*

HYSTERIACEAE

These non-lichenized fungi are included because they are regularly mistaken for *Graphis* in the field. For a key to the Hysteriaceae fungi see www.eboehm.com.]

1. Spores merely septate; stromata less than 0.5 mm wide **Hysterium**
1. Spores muriform; stromata more than 0.5 mm wide.
 - Spores less than 30 μm long, mostly 3-6 septate, with 1 longitudinal septum, or perhaps 2 vertical septa in the middle cells **Hysterobrevium**
 - Spores more than 30 μm long, mostly 7-9 septate, with 2-3 longitudinal septa **Hysterogaphium**

HYSTERIUM Pers. HYSTERIACEAE [Photobiont: absent. Gr. *hysteros*, womb; evidently an allusion to the female pudenda. ~ Thallus crustose, endophloedeal. Apothecia elongate, navicular, carbonaceous, superficial, with a pronounced

longitudinal slit; hamathecium of filiform pseudoparaphyses; spores, 8, septate, usually with at least 2 brown cells.]

1. Only the two middle cells brown, the end cells hyaline or nearly so H. PULICARE
 1. All four cells brown, the end cells no less brown than the middle ones H. ANGUSTATUM

Hysterium angustatum Alb. & Schwein. (L. = *angusto*, crowd together, constrict, limit; perhaps an allusion to the gregarious nature of the hysterothecia) Frequent on a wide array of branches and branchlets, but under represented in herbaria. ~ Stromata 0.3–2 mm long × 0.15–0.3 mm wide; spores 16–30 μm × 4–9 μm.

Cook-CACS*, Grundy-MOR, Kendall-MOR, Lake-IN-MOR

Hysterium pulicare (Lightf.) Pers. (L. *pulicarius*, of or having fleas; probably from the appearance of the small, somewhat irregularly shaped, black apothecia) Occasional locally, but also under collected. Our only specimen is from the bole of *Quercus rubra*. ~ Stromata 0.3–2 mm long × 0.15–0.3 mm wide; spores 23–25 μm × 8–9 μm.

Cook-MOR, DuPage-MOR, Ford-MOR, Kane-MOR, Livingston-MOR, McHenry-MOR, Will-MOR

HYSTEROBREVIUM (Schwein.) E. W. A. Boehm & C. L. Schoch
 HYSTERIACEAE [Photobiont: absent. A combination of *Hysterium* + L. *brevis*, short ~ Thallus crustose, endophloedal Apothecia mostly longer than wide, navicular, carbonaceous, superficial, with a pronounced longitudinal slit; hamathecium of filiform pseudoparaphyses; spores 8, brown, muriform, with the longitudinal septa usually two or three and mostly not in the end cells.]

Hysterobrevium mori (Schwein.) E. W. A. Boehm & C. L. Schoch (presumably from its occurrence on the genus *Morus*. The only records we have is from *Catalpa speciosa*, *Celtis occidentalis*, *Quercus rubra*, *Quercus velutina* and *Tilia americana*. ~ Stromata 1.2–2 mm long × 0.6–0.9 mm wide; spores 3–6 septate, 18–26 μm × 8–11 μm. Some of our specimens have spores that measure at the extreme end of the size range, but we have nowhere where else to go with them.

Barry-MOR, Berrien-MOR, DuPage-MOR, Ford-MOR, Fulton-MOR, Jefferson-MOR, Kane-MOR, LaPorte-MOR, St.JosephIN-MOR

HYSTEROGRAPHIUM Corda HYSTERIACEAE [Photobiont: absent. A combination of *Hysterium* and *Graphis*. ~ Thallus crustose, endophloedal Apothecia mostly longer than wide, navicular to irregular, carbonaceous, superficial, with a pronounced longitudinal slit; hamathecium of filiform pseudoparaphyses; spores 8, brown, muriform, with the longitudinal septa usually two or three in all the cells]

Hysterographium fraxini (Pers.) De Not. (of *Fraxinus*) Our only records for this widespread species are from the bark of *Quercus alba* and *Quercus macrocarpa*. ~ Stromata 1–1.6

mm long × 0.5–0.8 mm wide; spores 41–45 μm × 14–16 μm.

DuPage-MOR, Kankakee-MOR, Walworth-MOR

ICMADOPHILACEAE

One local genus DIBAEIS

IMSHAUGIA S. F. Meyer PARMELIACEAE [Photobiont: *Trebouxia*. After Henry A. Imshaug (b. 1925), American lichenologist recently retired from Michigan State University. Thallus foliose, narrow-lobed, pale gray, the lower cortex corticate, white to pale, the rhizines simple; apothecia, if present, lecanorine, the disks concave; spores small, 8, hyaline, simple; thamnolic acid.]

1. Isidia abundant; apothecia rare I. ALEURITES
 1. Isidia absent; apothecia common I. PLACORODIA

Imshaugia aleurites (Ach.) S. F. Meyer (Gr. *aleuron*, wheaten flour + *-ites*, having to do with, like; probably from the appearance of the tiny isidia, like the aleuron grains in certain wheat cells) = *Cetraria aleurites* of Calkins; *Parmeliopsis aleurites* (Ach.) Nyl. Calkins (1896) reported this species from "old rails near Lemont and Joliet." There is a specimen at MSC from near Goose Lake, in Calhoun County. [thamnolic acid, atranorin]

Calhoun-MS, Cook, Will

Imshaugia placorodia (Ach.) S. F. Meyer (Gr. *plax*, a flat round plate, dish + *rodos*, flower, rose; perhaps it reminded Acharius of a flattened flower) This corticolous species occurs rather regularly just north of our region. ~ Apothecia tan, short stipitate. [thamnolic acid]

JULELLA Fabre TRYPETHELIACEAE [Photobiont: absent. *L. iulus*, catkin + *-ella*, diminutive; probably from the shape of the ascus. The descriptions below are gleaned from Harris (1973). ~ Thallus crustose, endophloedeal, whitish; perithecia immersed; asci cylindric-clavate; ascospores 4–8, hyaline, muriform.]

1. Spores less than 30 μm long J. FALLACIOSA
 1. Spores more than 30 μm long J. LACTEA

Julella fallaciosa (Arnold) R. C. Harris (*L. fallax*, fallacious) = *Polyblastiopsis fallaciosa* (Arnold) Zahlbr. Our modern records are prevailing from *Acer saccharum*, *Carya ovata*, *Quercus alba*, and *Q. rubra* in mesic woods. Although we have vouchers from only a few counties, this species and *Anisomeridium polypori* are quite common locally on trees in savannas and closed woodlands, although the latter is conspicuously associated with photobionts and has more elongate asci. Until I have a better understanding in this genus, I am including here local reports of *Julella sericea* (A. Massal.) Coppins (*L. sericeus*, silky). It is said to have ellipsoid to ovoid spores, evidently less narrowly so. ~ Perithecia scattered, dull or sublustrous, orbicular, becoming flat-topped or even depressed at the center in age; hymenium IKI–; asci clavate to cylindric, a little thickened distally, 50–105 μm × 15–25 μm; mature spores generally

4 per ascus, with 5-7 transverse septa, 1-2 muriform, constricted at the septa, 17–25 × 7–10 μm .

Allegan-MIN*,MSC, Berrien-MOR, Calhoun-MOR, Cass-MOR, Cook-MOR,NY, DuPage-MOR, Fulton-MOR, Kalamazoo-MIN*,MSC, Kendall-MOR, Kenosha-MOR, Lake IL-MOR, McHenry-MOR, Milwaukee-MOR, Rock-MOR, Waukesha-MOR, White-MOR, Will-MOR

Julella lactea (A. Massal.) M. E. Barr. (L. *lacteus*, milky; probably from the white smears of thallus on bark) This species is known from districts north and south of the Southern Lake Michigan Region, but we have yet to document it locally. ~ Perithecia scattered, dull or sublustrous, orbicular, hemispherical to conic, immersed to sessile; hymenium IKI–; asci clavate to cylindrical, a little thickened distally, ca. 50 μm × 15–20 μm ; mature spores generally 4 per ascus, with 6-8 transverse septa, 2-3 muriform, constricted at the septa, 37–39 × 12–15 μm .

KIRSCHSTEINIOTHELIA D. Hawksw. PLEOSPORACEAE [Photobiont: absent. *Kirschsteinia* + Gr. *thele*, nipple; a pyrenocarpous lichen evocative of *Kirschsteinia*, a Sphaerialian fungus named after Wilhelm Kirschstein, 1863–1946, German mycologist. ~ Thallus crustose, endophloedeal, white; perithecia with the paraphyses much intertwined; spores 8, brown, 1-septate, not uniseriate in the ascus.]

Kirschsteiniothelia aethiops (Berk. & Curtis) D. Hawksw. (Gr. *aethiops*, appear unusual or irregular; perhaps from the spores with the constricted septum) The Cook County specimen, Calkins #162, "Ill., on oaks, etc. Glencoe," was identified by Calkins as *Pyrenula punctiformis*. This specimen has brown, 1-septate spores 21–34 μm long constricted at the septum and with the cells mostly unequal in the larger spores; the interthecial hyphae are massed and intertwined and not deliquescent; spores are arranged more or less biserially in the asci. From what we can tell, this more or less fits the description of *Microthelia micula* Körb., as *per* Harris (1973), which name Esslinger (2016) refers here. We do not actually think that this specimen is *Kirschsteiniothelia*, but the oversized spores take it out of any *Mycomicrothelia* described by Hawksworth (1985). Probably, we should just leave the thing out altogether since it is not even lichenized, as far as we can tell, but we are including it here under *K. aethiops* as a kind of "place holder" for the relatively large, brown-spored, specimens constricted at the septum. Indeed Harris (1975) demurred treatment altogether. We have seen a specimen from Will County, on *Populus deltoides*, which we are referring here; some of the spores have incipient cells at one or both ends, but rarely produce a definitive septum. There are other non-lichenized pyrenocarps that might key here, particularly those with very rounded end cells, which are probably some other genus. Harris (1973) described "*Microthelia micula*": Perithecia scattered to gregarious, dull, black, colorless below, hemispherical 0.2–0.3 mm broad; hymenium IKI+ bluish or IKI–, the interthecial hyphae much branched; asci cylindrical, clavate; spores 8 more or less biserially, brown, 1-septate, constricted at the septum with slightly unequal cells, 12–30 × 5.0–12 μm .

Calhoun-MSC, Cook-F, Kalamazoo-MSC, Will-MOR

KUETTLINGERIA I. V. Frolov, Vondrák & Arup TELOSCHISTACEAE

[Photobiont: mostly "*Pseudotreboxia*." Named presumably in honor of Johann Friedrich Küttlinger, 1744 – 1811, German physician, botanist, and cryptogamist, who collected most in the area around Zurich, Switzerland. ~ Thallus endolithic to epilithic, K–, cortical layer replaced by crystalline cells and a necral layer; apothecia K+ purple, biatorine or zeorine; spores 8, hyaline, polaribilocular.

1. Substrate HCl+, concrete or limestone K. SORALIFERA
 1. Substrate HCl–, siliceous K. ATROFLAVA

Kuettlingeria atroflava (Turner) I. V. Frolov, Vondrák & Arup (L. *ater*, black + *flavus*, yellow; probably from the yellow apothecia and the gray or nigrescent thallus) Evidently a largely western species in North America, although evidently a poorly understood species or species complex, we have a specimen from sandstone in a river at Fall Creek Gorge, near Williamsport, Indiana. ~ Thallus dark gray or nigrescent, smooth, areolate, the cortex indistinct; apothecia biatorine, the proper margin distinct, usually raised above the dirty orange disk and concolorous with it, or a little lighter; spores (in our specimen larger than those given by Wetmore (1996): 16–18 × 8.0–9.6 μm, the septum 4.0–5.6 μm.

Kuettlingeria soralifera (Vondrák & Hrouzek) I. V. Frolov, Vondrák & Arup (L. *sorus*, stack of spores, from Gr. *soros*, stack, pile heap + *-alius*, other than, different + *-fera*, bearing; spore-bearing in a different manner than seen in cryptogamic sori) = *Caloplaca soralifera* Vondrák & Hrouzek This is a species of the Great Plains, where it is most commonly encountered on base-rich rock but occasionally on weathered wood. We have records from each. The Lake County, Illinois specimen is on a specimen with *Candellariella aurella* (Hyerczyk #2567, F). For a discussion concerning the differences *K. soralifera* and related species, see Vondrák & Hrouzek (2006) and Wilk & Śliwa (2012). ~ Thallus K–, areolate, white to sordid, often at least thinly white pruinose, commonly with dark blue soralia on the areole margins, the cortex usually concealed by hyaline crystals, which give the thallus a chalky, ecorticate appearance; apothecia zeorine, infrequent, K+ violet, to 0.8 mm across, the proper margin well-developed, orange, raised above the disk, the thalline margin concolorous with the thallus, usually pruinose as well; spores 12–16 × 5.0–9.0 μm, the septum 3.4–6.0 μm.

Berrien-MOR, LakeIL-F*, Noble-MOR, VanBuren-MOR, White-MOR

LATHAGRIUM (Ach.) Gray COLLEMATACEAE [Photobiont: *Nostoc*. Etymology known only to Acharius. ~ Thallus congested foliose, loose attached, irregularly lobed, olivaceous to nigrescent; lobes rounded, wrinkled and abundantly isidiate, the latter globose when wet; apothecia rare, the spores subglobose to ellipsoid, submuriform.]

1. Thallus lobes striate when dry; isidia thickly globose when wet L. AURIFORME
 1. Thallus lobes verrucose-ridge with dry; isidia small and scurfy when wet L. FUSCOVIRENS

Lathagrium auriforme (With.) Otálora, P. M. Jørg., & Wedin (L. *auris*, an ear + *forma*, shape,

appearance; from the folded thallus resembling an ear) = *Collema granosum* of Calkins (1896), who reported it from mossy rocks near the Des Plaines River. ~ Thallus foliose, the lobes to 1 cm broad, thick and swollen when wet, well beset with globose isidia; apothecia rare, the spore ellipsoid to ovoid, submuriform, $25\text{--}35 \times 8\text{--}13 \mu\text{m}$.

Will

Lathagrium fuscovirens (With.) Otálora, P. M. Jørg., & Wedin (*L. fuscus*, grayish brown + *virens*, becoming green) Yet unknown locally, this species is known from districts all around our region, where it grows on periodically moistened rocks or on mosses over rocks. ~ Thallus foliose, the lobes irregularly rounded to lobulate, usually not more than 5 mm broad; isidia numerous, subglobular to scurfy; spores $14\text{--}24 \times 6.5\text{--}14 \mu\text{m}$.

LECANIA A. Massal. RAMALINACEAE [Photobiont: Chlorococcoid. Gr. *lekane*, dish, pot; from the shape of the apothecia. ~ Thallus crustose, thin, greenish to olivaceous; apothecia biatorine or lecanorine; asci -type, the spores 8, hyaline, 1–3 septate; conidia filiform, commonly curved.]

1. Thallus saxicolous.
 2. Apothecia without pruina; spores 1-septate L. ERYSIBE
 2. Apothecia at least thinly white pruinose; spores 2–3 septate.
 - Apothecia thinly pruinose, many more than 1 mm across L. SPADICEA
 - Apothecia heavily pruinose, rarely to 1 mm across L. NYLANDERIANA
1. Thallus corticolous.
 3. Spores 1-septate. L. CYRTELLA
 3. Spores 2-3-septate.
 - Apothecia biatorine, epruinose; spores 8 per ascus. L. NAEGELII
 - Apothecia lecanorine, usually pruinose; spore 8-16 per ascus L. FUSCELLA

Lecania cyrtella (Ach.) Th. Fr. (Gr. *cyрто-*, bent, curved + *-ella*, diminutive; perhaps from the tiny curved spores) Yet unknown locally, this species is known from corticolous or lignicolous substrates as nearby as Green County, Wisconsin. ~ Thallus very thin or absent; apothecia epruinose, zeorine, to 0.5 mm across, much aggregated, pale to pinkish or nigrescent, the margin rather thin, smooth to crenulate, becoming scant or disappearing, 0.2–0.4 mm across; spores narrowly ellipsoid to fusiform, mostly 1-septate, curved, $9\text{--}15 \times 3\text{--}5 \mu\text{m}$.

Lecania erysibe (Ach.) Mudd (Gr. *erysibe*, ergot; the purple-staining hymenium evidently evocative of the fruiting bodies of ergot) = *Lecaniella erysibe* (Ach.) Mudd; *Lecanora erysibe* Ach. This species is occasional on dolomitic outcrops, and on weathered concrete. Calkins stated that this species grew on "calcareous rocks at Joliet and elsewhere." A Calkins specimen (*s.n.*, F) is overgrown by *Squamlea subsoluta*. ~ Thallus areolate to rimose, at least weakly blastidiate, greenish to sordid; apothecia zeorine, to 0.4 mm across, usually diffusely disposed, the thalline exciple ecorticate; paraphyses weakly clavate distally; spores simple to 1-septate, $13.3\text{--}16.0 \times 3.9\text{--}4.8 \mu\text{m}$.

Boone-MOR, DeKalb-MOR, Iroquois-MOR, Kankakee-MOR, Kenosha-MOR, LaSalle-CACs*,F*,MICH*,MOR,NY, Lee-MOR, Ogle-MOR, Walworth-MOR, Will-F*,MOR

Lecania fuscella (Schaer.) Körb (L. *fuscus*, brown + *-ellus*, diminutive; from the color of the thallus) Known from just north of our region, this corticolous species has yet to be discovered locally. ~ Thallus thin, effuse, granular, pale, imbedded with clusters of coarse crystals Apothecia zeorine, mostly 0.5–0.8 mm across, usually at least thinly pruinose; paraphyses scarcely swollen distally; spores straight or curved, ellipsoid to fusiform, mostly 3-septate, curved, 12–22 × 4–6 μm.

Lecania naegelii (Hepp) Diedr. & van den Boom (in honor of the Swiss lichenologist, Carl Wilhelm von Nägeli, 1817-1891) = *naegelii* (Hepp) Zahlbr., *Lecaniella naegelii* (Hepp) Diederick & van den Boom. Evidently uncommon, our only records are from the bark of *Acer saccharum*, *Populus* and *Prunus serotina*, in full sun. ~ Thallus thin, pale grayish green, continuous to minutely granular; apothecia biatorine, epruinose, variously colored to nigrescent, to 0.7 mm across, in delimited aggregations; paraphyses commonly swollen distally; spores mostly 8, 2-3 septate, 13–25 × 4–6 μm.

Allegan-MOR, MSC, DuPage-MOR, LakeIL-MOR, McHenry-MOR, Ottawa-MOR, VanBuren-MOR, Waukesha-MOR

Lecania nylanderiana A. Massal. (in honor of the Finnish lichenologist, William Nylander, 1822–1899, longtime professor at the University of Helsinki) A species of carbonate rock, this lichen is known from north and south of our region, though yet undocumented locally. ~ Thallus areolate to subsquamulose, rather sharply angled, pale gray to brownish; apothecia zeorine, the disk black but notably pruinose; paraphyses characteristically with swollen cells distally, the latter commonly tintured black; spores 3-septate, 12–17 × 4–5 μm.

Lecania spadicea (Flotow) Zahlbr. (L. *spadiceus*, deep reddish brown, date-colored; perhaps from the color of the moist epihymenium) Not yet known from the Southern Lake Michigan region, it has been collected on shaded limestone in Jo Daviess County, Illinois. ~ Thallus conspicuous, nearly or quite effigurate; apothecia zeorine, 1.5–1.8 mm in diameter, thinly pruinose; spores thin-walled, weakly curved, 2-septate, thin-walled, 10–14 × 3–6 μm.

LECANOGRAPHACEAE

- A. Spores 4–6 septate, less than 40 μm long **Alyxoria**
 A. Spores more than 7-septate, more than 40 μm long **Zwackhia**

LECANORA Ach. LECANORACEAE [Photobiont: *Trebouxia*. Gr. *lekane*, dish, pot + *horos*, margin, limit; from the rimmed apothecia. ~ Thallus crustose, powdery, granular, areolate or continuous, margins not effigurate; apothecia lecanorine; ascus Lecanora-type; spores 8, hyaline, simple; conidia filiform to bacilliform.]

1. Thallus or apothecia saxicolous.
 2. Thallus K-.
 - Thallus placodioid, heavily pruinose L. VALESIIACA
 - Thallus dispersed areolate, epruinose L. POLYTROPA
 2. Thallus K+.
 3. Hymenium not interspersed L. SUBIMMERSIS

3. Hymenium interspersed with coarse granules.
 - Pannarin present L. SAXIGENA
 - Pannarin absent L. CENISIA
1. Thallus or apothecia corticolous, lignicolous, or apothecia absent.
 4. Apothecia absent; thallus sorediate, more or less leprose or granular.
 5. Thallus with a white, dense, conspicuous prothallus L. THYSANOPHORA
 5. Thallus without a conspicuous prothallus.
 6. Stictic acid present L. LAYANA
 6. Stictic acid absent.
 - Soredia emerging from a thin endophloedeal, often silvery thallus, frequently edged by a dark prothallus L. NOTHOCAESIELLA
 - Soredia emerging from rather robust, corticate areoles, without a prothallus or with a white fibrous one L. APPALACHENSIS
 4. Apothecia present.
 7. Usnic or isousnic acid present; thallus generally with yellowish tints.
 8. Thalline apothecial rim scant or disappearing..
 - Thallus C+ orange L. EXPALLENS
 - Thallus C- L. SYMMICTA
 8. Thalline apothecial rim well developed.
 9. Thallus coarsely sorediate-granular; fumarprotocetraric acid present; larger spores more than 6.0 μm wide L. CONIZAEOIDES
 9. Thallus sorediate or not, areolate-granular, ecorticate, to scant or absent; fumarprotocetraric acid absent; spores to 6.0 μm wide, or if wider then the thallus C+ deep yellow to orange.
 10. Thallus scant or absent, with usnic acid only; apothecial rims with a dull, subpruinose inner ring contrasted with a shinier outer rim L. LAXA
 10. Thallus scant to evident, with or without usnic acid, but if with then zeorin or psoromic acids also present.
 11. Thallus granular-areolate to subsorediate, yellowish green to whitish gray, the apothecial rims concolorous with the thallus; zeorin present.
 - Thallus C- L. STROBILINA
 - Thallus C+ orange L. EXPALLENS
 11. Thallus scant to variously smooth to granular or areolate, but usually corticate, the apothecial rims concolorous with or lighter than the thallus; zeorin absent.
 12. Thallus well developed, with psoromic acid; cortex of apothecial rim more than 40 μm thick. L. varia
 12. Thallus poorly developed, psoromic acid absent; cortex of apothecial rim less than 40 μm thick.
 - Apothecial rims evident, at least a first, becoming obscure in age as the disk becomes more convex, concolorous with the thallus; paraphyses simple or slightly branched; spores narrowly ellipsoid, to 4.5 μm wide .
..... L. ALBELLULA
 - Apothecial rims persistently evident, lighter than the thallus; paraphyses evidently branched; larger spores broadly ellipsoid, more than 4.5 μm wide L. SALIGNA
 7. Usnic acid and isousnic absent, the thallus distinctly without yellowish-green tints; apothecial rim K- or K+ yellow.
 13. Apothecia decidedly pruinose, whitish, yellowish, or buff to light brown or roseate.
 14. Apothecium K+ red at the base L. ALBELLA
 14. Apothecium K-.
 - Disks C+ yellow L. CARPINEA

- Disks C-. L. CAESIORUBELLA CAESIORUBELLA
13. Apothecia epruinose or only slightly frosted, buff, grayish, or reddish brown to nigrescent, or apothecia absent.
15. Amphithecium with numerous small, KOH-insoluble crystals.
 Apothecia less than 0.8 mm across; spores less than 13 μm long LECANORA GLABRATA
 Larger apothecia more than 0.8 mm across; spores more than 13 μm long . . L. ALLOPHANA
15. Amphithecium with large, angular, KOH-insoluble crystals, or with crystals lacking altogether in *L. wisconsinensis*.
16. Epithymenium clear, without crystals or granules L. ARGENTATA
16. Epithymenium notably beset with granules.
17. Granules distributed down into the hymenium along the paraphyses.
 Apothecial disks reddish brown to nigrescent; spores broadly ovoid; fumarprotocetraric acid present L. PULICARIS
 Apothecial disks pale to reddish brown; spores ellipsoid; fumarprotocetraric acid absent L. HYBOCARPA
17. Granules limited to the epithymenium, not extending into the hamathecium
18. Apothecial margin strongly beaded or irregularly formed, the cortex less than 15 μm thick. L. CINEREOFUSCA
18. Apothecial margin smooth or nearly so, the cortex more than 15 μm thick.
19. Apothecia completely sessile, the disks usually yellowish
 L. WISCONSINENSIS
19. Apothecia constricted below the rim, the disks not yellowish.
 Apothecia to 0.8 mm across; spores to $14 \times 7.5 \mu\text{m}$ L. CHLAROTERA
 Apothecia and spores generally larger L. RUGOSELLA

Lecanora albella (Pers.) Ach. (*L. albus*, white + *-ella*, diminutive; little white one) This corticolous species is known from districts all around our region, but has yet to be discovered locally. ~ Thallus scant to rimose areolate, white or whitish; apothecia to 1.5 mm across, sessile, pale brown to pinkish, notably pruinose, the thalline margins soon becoming obscure; paraphyses simple or slightly branched, not pigmented nor much dilated distally; spores narrowly ellipsoid, $9.0\text{--}14. \mu\text{m} \times 6.0\text{--}9.0 \mu\text{m}$. [atranorin, norstictic acid, stictic acid, protocetraric acid]

Lecanora albellula Nyl. (*L. albus*, white + *-ella*, diminutive + *-ula*, diminutive; little white one, or more likely a diminutive allusion to *L. albella* (Pers.) Ach.) = *L. piniperda* Körb. This species is reported from as nearby as Dane County, Wisconsin, where it grows oak bark. We have specimens that fit various attribute attributed to *L. albellula*, but the spores of those specimens are prevailingly broadly elliptic, inevitably with some broadly ellipsoid and more than 4.5 μm broad. See notes under *L. saligna*. At first glance it might be passed of as a depauperate *Amandinea dakotensis*, which of course has brown septate spores. ~ Thallus scant to grayish-green; apothecia no more than 0.5 mm across, sessile or becoming slightly constricted at the base in age, the margin ecorticate, soon scant, the disk convex, reddish to brown or blackish; paraphyses simple or slightly branched, usually swollen and darkened at the tips; spores narrowly ellipsoid, $9.0\text{--}14.5 \mu\text{m} \times 3.0\text{--}4.5 \mu\text{m}$. [usnic acid]

Lecanora allophana (Ach.) Nyl. (Gr. *allos*, other, different + *phana*, to appear; an evident allusion to its different appearance from related species) *Lecanora subfusca* of early collectors,

in part. Well known from neighboring districts, our only record from a specimen with substrate data are given is from the smooth bark of a young *Acer rubrum*. It is especially frequent on *Fraxinus* and *Populus* elsewhere. The Kane county specimen (Fink #1921, MICH) appears to have been named by Ernie Brodo, along with a note that "*L. pseudochlarotera*" is on the same piece of Bark. There three Calkins specimens (#83, 336, & 338, MICH) from "Illinois", which means either from Cook or LaSalle counties. Dick Harris annotated these as *L. allophana*; they had been called *L. subfusca*. ~ Apothecia 0.5–2.5 mm across, epruinose; spores 12–21 × 7–11 μm. [atranorin, triterpenoides other than zeorin]

Kane-MICH*, VanBuren-MOR

Lecanora appalachensis Lendemer & R. C. Harris (from the Appalachian Mountains of eastern North America, the type locality) Our few records are from *Quercus macrocarpa* in open, often mowed areas, though it grows on the boles of other deciduous trees elsewhere. See also notes under *Lecanora nothocaesiella*. [atranorin, zeorin]

Boone-MOR, Cook-MOR, Newton-MOR, St.JosephMI-MOR, White-MOR, Winnebago-MOR

Lecanora argentata (Ach.) Malme (*L. argentatus*, silvery) Our only records for this species are from the bark of *Quercus velutina*, with *Buellia erubescens* and *Pertusaria pustulata*, *Carya ovata* with *Chrysothrix caesia* and *Traponora varians*, and from a landscape tree of *Pyrus calleryana* with *Candelaria concolor* and *Hyperphyscia adglutinata*. Thallus pale gray, K+ yellow; apothecia 0.4–1.5 mm across, epruinose; spores 10–16 × 5.5–9.0 μm. [atranorin, gangaleoidin]

Kent-MOR, Walworth-MOR, Will-MOR

Lecanora caesiorubella Ach. ssp. ***caesiorubella*** (*L. caesius*, light gray + *rubeo*, to be red + *-ellus*, diminutive; from the reddish apothecia) Our only record is one from Milwaukee County, collected in 1869 (Lapham *s.n.* WIS) and annotated by Imshaug & Brodo; disks C–, apothecia margin PD+red, KOH+ yellow. A Calkins specimen of this species is cited from Illinois (Imshaug & Brodo 1966), so it likely was collected in or near the Southern Lake Michigan region. It is probable that Calkins's (1896) report of *Lecanora pallida* from Will County is referable here, the name used during the same era by Lapham. ~ Apothecia 0.8–3.0 mm across, heavily pruinose, the margin concolorous with the thallus; spores 12–15.5 × 5.0–9.5 μm. [atranorin, ± norstictic acid, ± protocetraric acid, ± virensic acid]

Milwaukee-WIS*, Will

Lecanora carpinea (L.) Vainio (L. = of the hornbeam tree) Our only specimens are from the smooth bark of *Carya cordiformis* and young maples and elms, usually planted specimens. Local reports of *Lecanora caesiorubella* ssp. *prolifera* (Fink) R. C. Harris may be referable here. ~ Apothecia 0.5–1.3 mm across, heavily pruinose, the rim thin or thick; epihymenium brownish and beset with granules, both the pigment and granules dissolving in KOH; spores 10–14 × 5.5–8.5 μm. [atranorin, sordidone]

Barry-MOR, Berrien-MOR, Cook-MOR, DuPage-MOR, Kalamazoo-MOR, Kane-MOR, Kendall-MOR, Marshall-MOR, Noble-MOR, St.JosephMI-MOR, Steuben-MOR, Waukesha-MOR

Lecanora cenisia Ach. (presumably from the Cenischia district of the Western Alps) Our only record is from a sandstone pebble at McDowell Grove Forest Preserve. A northern related species, *L. argentea* Oksner & Volkova (*L. argentum*, silver; from the white thallus), also of rock, has no trace of pruina on the apothecia. ~ Thallus whitish, areolate, thick, verrucose; apothecia

0.5–2 mm in diameter, usually at least thinly pruinose, rather crowded, the epihymenium granular, yellowish-brown, the pigment disappearing in KOH; hymenium shallowly interspersed; spores $11.0\text{--}16.0 \times 7.0\text{--}8.0 \mu\text{m}$. [atranorin, roccellic acid]

DuPage-MOR

Lecanora chlarofera Nyl. (Gr. *klaros*, exultant + *teros*, fiefdom, temple, sacred district; the allusion unclear, but the type locality, Jena, Thuringia, was the site of the German Confederation, Friedrich Schiller University, and home to many exalted German Romanticists) *Lecanora subfusca* of Calkins, in part. Our only record, as we interpret this species, is from an open-grown *Ptelea trifoliata*. It is said to be frequent to common in districts ambient to the Southern Lake Michigan region on the bark of deciduous trees. ~ Apothecia 0.4–0.8 mm across, epruinose, the rim smooth; epihymenium reddish or orange-brown and beset with granules, both the pigment and granules dissolving in KOH; spores $9.5\text{--}15.5 \times 5.5\text{--}7.5 \mu\text{m}$. [atranorin, gangaleoidin, ± californin, ± nephrosteranic acid]

Cook-F*, DeKalb-MOR, LaSalle-CACS* (growing with *Lecanora cinereofusca*)

Lecanora cinereofusca H. Magn. (*L. cinereus*, ash-colored + *fuscus*, brown; perhaps from the color of the apothecia) *Lecanora subfusca* of Calkins, in Part. Our only contemporary collection is from the bark of an open-grown *Prunus serotina*. There are old Calkins specimens from LaSalle County, including one from *Tilia americana* (CACS, Calkins #6363), which was growing with a more abundant, small, biatorine species, which Calkins had called (erroneously), *Biatora rubella*, and from which I could discern no spores. Brodo (1984) cites a Calkins (#61) specimen also from La Salle County; he described the apothecia as: "*immersed in thallus, finally becoming sessile, 0.7–1.5 mm diameter; disks reddish orange, deep red, darkening to dark reddish brown or reddish black; margins at first thick, verrucose to ridged and rough, becoming discontinuous and thin in many specimens.*" This specimen is referable to the typical variety; it grew with *Lecanora hybocarpa*. Another specimen from LaSalle County (Calkins #6095a), which he had called *Lecanora subfusca*, is also referable here, but it was on the same card as *Lecanora chlarofera*, which see (Calkins #6095b). ~ Apothecia 0.7–1.5 mm across, rather scattered, the margin beaded; spores $10\text{--}15 \times 7\text{--}8.5 \mu\text{m}$. [atranorin, pannarin, usually placodialic acid]

DuPage-MOR, LaSalle-CACS*, NY

Lecanora conizaeoides Crombie (Resembling *L. coniza*, which comes from Gr. *konis*, dust + *-izein*, to make; probably from the dusty-granular thallus) This is one species that is almost certainly adventive from Europe. One of our records for this species is on the bark of *Pseudolarix kaempferi* at the Morton Arboretum; another is from a weathered rail near Hartland, Wisconsin. There is also a specimen from *Acer rubrum* in a remnant area near South Haven, Michigan. ~ Thallus thick, granular to verrucose, becoming sorediate; apothecia 0.5–1.5 mm across, the lecanorine margin thick, with a gelatinous cortex at the base, without zeorin crystals, lighter than to concolorous with the thallus; paraphyses distinctly branched; spores $6\text{--}12 \times 6\text{--}8 \mu\text{m}$. [fumarprotocetraric acid, usnic acid]

DuPage-MOR, VanBuren-MOR, Waukesha-MOR

Lecanora expallens Ach. (*L. ex*, out of, utterly, thoroughly + *pallens*, becoming pale yellow; decidedly pale yellow, or perhaps an allusion to a similar appearance to *Biatora pallens*) Our

only record for this species is from Barry County, Michigan, where it was collected on the bark of *Gleditsia triacanthos*. ~Thallus abundantly sorediate-granular, ecorticate, usually with a white prothallus; apothecia absent or infrequent, the margin sorediate, concolorous with the thallus, in which it sometimes is immersed, 0.5–1.0 mm across; spores 6–9 × 3–4.5 μm . [thiophanic acid, usnic acid, zeorin]

Barry-MS

Lecanora glabrata (Ach.) Malme (L. = *smooth*; from the smooth clear epihymenium) Our only records are from the bark of open-grown trees of *Celtis occidentalis*, *Prunus serotina*, and *Tilia cordata*, though it is said to be particularly frequent on *Acer* and *Fagus* elsewhere. ~Apothecia 0.3–0.6 mm; spores 9.5–14 × 5.5–8.0 μm . [atranorin]

Boone-MOR, DuPage-MOR, Ogle-MOR

Lecanora hybocarpa (Tuck.) Brodo (Gr. *hybos*, hump-backed + *karpos*, fruit; from the tumescent apothecia) Including *L. subfusca*, in part, *L. s. var. allophana*, *L. s. var. argentata*, and *L. s. var. distans* of Calkins. Now rare on oaks, hickories, and ashes, Calkins (1986) indicated that it was a common corticolous species. There is a sterile specimen from DuPage County that is characterized by “apothecia-like” pycnidia with filiform curved conidiospores. ~Apothecia 0.4–1.0 mm across, epruinose, with a lecanorine margin; epihymenium reddish or orange-brown and beset with granules, both the pigment and granules dissolving in KOH; spores 10.5–14.5 × 5.5–8.5 μm . [atranorin, \pm roccellic acid]

Allegan-MOR, Benton-MOR, Cook-NY, DuPage-MOR, Kane-MICH, Kenosha-MOR, Lake IL-F*, MOR, LaSalle-NY, McHenry-ILL, Ogle-MOR, Walworth-MOR, Winnebago-MOR

Lecanora laxa (Śliwa & Wetmore) Printzen (L. *laxus*, relaxed, not tense, released; perhaps from the scant thallus) = *Lecanora vara* (Hoffm.) Ach. var. *laxa* Śliwa & Wetm. Our only record for this species is from weathered wood in LaSalle County. According the Śliwa & Wetm. (2000) *Lecanora varia* is strictly European and that var. *laxa* is the eastern North American element. Unlike our other species in the *Lecanora vara* group, *L. laxa* is known only from lignin. ~Thallus scant or absent; apothecia 0.5–1.5 mm across, sessile, becoming constricted at the base in age, the margin with a dull, subleprose inner ring and a shinier outer ring; paraphyses simple, not swollen or darkened distally; spores 6.0–9.0 × 3.0–4.5 μm . [usnic acid]

LaSalle-F

Lecanora layana Lendemer (in honor of the New England lichenologist, Elisabeth Lay, a founding member of the Tuckerman Lichen Workshop) This species is known from districts all around our region, but yet unknown locally. It is nearly identical to *Lecanora nothocaesiella*, but produces stictic acid in addition to atranorin and zeorin.

Lecanora nothocaesiella R. C. Harris & Lendemer (L. *nothus*, false, mongrel, cross-bread + *caesiella*; an allusion to the superficial similarity to *Lepraria caesiella*) Our local records are all from open-grown oaks, commonly in rather disturbed areas. It is generally sympatric with *Lecanora appalachensis*, both of which species are discussed by Lendemer *et al.* (2013). The differences are nuanced between the two species and take some experience to get one’s mind around the differences. The latter generally has larger soredia. *Lecanora nothocaesiella* could be confused with the wholly leprose *Lepraria caesiella*, which bears its soredia on the surface of the

substrate, without even a thin or endophloedal thallus. Also, the soredia of *L. nothocaesiella* tend to erode into more or less gelatinized masses and there is commonly a darkened area near the edge of the thallus. Note that *L. thysanophora* has a strong white prothallus, which might lead the student here if it is overlooked or the specimen is too depauperate; its thallus is more finely sorediate, with granules no more than 0.04 millimeters in diameter, while those of *L. nothocaesiella* are coarser and commonly exceed 0.04 millimeters. ~ [atranorin, zeorin]

Barry-MOR, Boone-MOR, Calhoun-MOR, Cass-MOR, Iroquois-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, LaSalle-MOR, Newton-MOR, Ottawa-MOR, Porter-MOR, Rock-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, White-MOR

Lecanora polytropa (Hoffm.) Rabenh. (Gr. *poly*, many + *tropo*, change, turn; perhaps evoking its variable thallus development) This species occurs frequently just to the north of our region on granitic boulders, particularly those that are commonly visited by perching birds. Our only records are from a granitic or quartzite erratics. ~ Apothecia 0.3–1.2 mm across, pale yellow to brownish, with or without pruina, the lecanorine margin paler than the disk, becoming thin or disappearing in age; epihymenium with granules dissolving in KOH; spores 10–14 × 5–8 μm. [usnic acid, zeorin, ± rangiformic acid, and fatty acids]

Allegan-MOR, Barry-MICH*, DuPage-MOR

Lecanora pulicaris (Pers.) Ach. (*L. pulicaris*, with or bearing fleas, the allusion here unclear) Rather frequent just north and east of southern Lake Michigan, our only record is from the bark of *Rhamnus cathartica*. ~ Apothecia 0.3–1.5 mm across, epruinose, with a lecanorine margin; epihymenium reddish or brown and beset with granules, both the pigment and granules dissolving in KOH; spores 9.5–14.5 × 7–10 μm. [atranorin, fumarprotocetraric acid, ± roccellic acid]

DuPage-MOR

Lecanora rugosella Zahlbr. (*L. rugosus*, wrinkled + *-ella*, diminutive; little wrinkled one) Our only record of this segregate from *L. chlarotera* is from the trunk of a landscape tree of *Acer platanoides*, which may have come from a Wisconsin nursery. It is said to occur as near as Ingham and Lake counties, Michigan as well, from where it grew on *Cephalanthus occidentalis* and *Thuja occidentalis*. Various authors disagree with the attributes that define this species; our interpretation relies on simply on the decidedly warty or verrucose apothecial margin, which superficially at least can distinguish it from *L. chlarotera*. ~ Thallus verruculose to granular-areolate, corticate; apothecia sessile to substipitate, 0.5–3.0 mm across, the rims paler than to concolorous with the thallus and notably warty; spores 12–17 μm × 7.0–11 μm. [atranorin, gangaleoidin, roccellic acid, ± californin]

Cook-MOR

Lecanora saligna (Schrader) Zahlbr. (*L. salignus*, like or of willow; from a supposed frequency of occurrence on willow) Most of our specimens are from old wood; Wetmore's specimen from Lake County, Indiana, was from *Quercus rubra*, and the St. Joseph County, Indiana, specimen is from *Carya ovata*. Skorepa's (1970) report of *L. symmicta*, which see, from Will County is referable here. The *Lecanora saligna* group, including *L. albellula* and *L. subintricata* could use some critical work in the Midwest. Indeed, Ivanovich *et al.* (2021) suggest strongly that North American material may represent some other species. Most of our material

has broadly ellipsoid spores more than 4.5 μm wide, but the morphology and color of the apothecia is disturbingly variable—even to the point of having very convex disks. ~ Epiphloeic thallus absent or poorly developed; apothecia 0.4–1.0 mm across, epruinose or appearing somewhat pruinose when wet, the disk flat, brown to yellow-brown; lecanorine margin corticate, paler than the disk, strong at first, becoming less so in age; paraphyses distinctly branched, slightly swollen and darkened distally; epihymenium reddish or orange-brown and beset with granules, the latter dissolving in KOH; spores broadly ellipsoid 9.0–13.5 \times 3.0–6.0 μm . [isousnic acid, \pm terpenes other than zeorin]

Allegan-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Kane-MOR, Kent-MOR, Lake IL-MOR, LakeIN-INDU,MIN*, LaSalle-MOR, McHenry-MOR, Newton-MOR, Porter-MIN, St. JosepIN-MOR, Will-ILLS*,MOR

Lecanora saxigena Lendemer & R. C. Harris (L. *saxum*, stone + *gena*, born, arising from rock; from its saxicolous habitat) = *Lecanora cinereofusca* H. Magn. var. *appalachensis* Brodo. This southeastern species of the Interior Low Plateaus and Appalachian Mountains is known from nearby Warren County, Indiana, where it grew on siliceous rock. ~ Apothecia 0.7–1.5 mm across, closely aggregated, the margin beaded; disks orange to reddish-brown, epruinose; hymenium shallowly inspersed with coarse granules; spores 10–15 \times 7–9 μm . [atranorin, pannarin, roccellic acid]

Lecanora strobilina (Spreng.) Kieffer (Gr. *strobilos*, anything twisted + *inus* pertaining to; derivation uncertain) *Lecanora varia* of some early collections. This species is characteristic of weathered fence rails, often with *Chrysothrix caesia*, *Lecanora symmicta*, and *Villophora microphyllina*. We have specimens from planted trees of *Betula pendula*, *Gleditsia triacanthos*, and *Liriodendron tulipifera*. There are also specimens from *Acer saccharinum*, *Carya ovata*, *Quercus alba*, *Quercus macrocarpa*, *Quercus rubra*, and *Rhus typhina*. A similar species, *L. confusa* Almb. (L. *confusus*, mixed up, disoriented) is known from districts around our region; its thallus and apothecia react C+ orange. ~ Thallus thick, granular to verrucose, becoming soredate or scurfy, greenish to yellowish-gray, characteristically beset with zeorin crystals; apothecia commonly aggregated, weakly constricted at the base and without a gelatinous cortex, 0.4–0.9 mm across; paraphyses simple, straight; spores 10.5–15.0 \times 3.0–4.5 μm . (thiophaninic acid). [usnic acid, zeorin, \pm squamatic]

Allegan-MOR, Benton-MOR, Branch-MOR, Cass-MOR, Cook-F*,MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, Lee-MOR, Lake-IL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Livingston-MOR, Marshall-MOR, Milwaukee-MOR, Newton-MOR, Ogle-MOR, Pulaski-MOR, St. JosepIN-MOR, St. JosephMI-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR,WIS*, White-MOR, Will-MOR, Winnebago-MOR

Lecanora subimmergens Vainio (L. *sub-*, somewhat + *immergo*, to immerse; from the somewhat immersed younger apothecia) This species is not infrequent in regions ambient to the Southern Lake Michigan region where it grows on siliceous rock, although we have yet to secure a local record. ~ Thallus pale gray, continuous to more or less rimose-areolate, usually with a white or black prothallus; apothecia scattered or aggregated centrally, the rim concolorous with the thallus, 0.4–1.4 mm across; disk reddish to orange-brown; epihymenium

without granular crystals, the pigment not dissolving in KOH; spores 10–15 × 5–8 μm . [atranorin, zeorin]

Lecanora symmicta (Ach.) Ach. (Gr. *syn-*, combined + *miktos*, mixed, thrown together; from the irregular aggregations of apothecia) = *L. varia* var. *symmicta* of Calkins. Calkins reported that there were "numerous varieties" in the region; it contains usnic acid \pm psoromic or fumarprotocetraric acids. Most early Illinois specimens called *L. varia* are referable either to *L. laxa* or *L. strobilina*. Our entity is fairly frequent on a wide variety of corticolous and lignicolous substrates, particularly in disturbed or landscaped areas. Some specimens called "*Lecanora varia saepinicola*" by Calkins are referable here. ~ Thallus pale yellowish-green to grayish or bluish, verrucose-areolate to rimose, generally ecorticate; albescent marginally and around the areoles; apothecia yellowish-beige, nearly or quite without a thalline margin, 0.5–1.5 mm across; epihymenium granular; spores 9–10.5 μm × 3–4.5 μm . [usnic acid, zeorin, \pm xanthones]

Allegan-MOR, Barry-MSc, Berrien-MOR, Branch-MICH*, MOR, Calhoun-MSc, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Jasper-MOR, Jefferson-MOR, Kane-MOR, Kenosha-MOR, Kent-MOR, LakeIL-MOR, LakeIN-MOR, LaGrange-MOR, LaPorte-MOR, McHenry-MOR, Milwaukee-MOR, Racine-MOR, Rock-MOR, St. JosephIN-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, WIS*, White-MOR, Will-MOR, Winnebago-MOR

Lecanora thysanophora R. C. Harris (Gr. *thysanos*, a fringe, tassel + *phoros*, a bearing; from the possession of a white fibrous prothallus that emerges at the margins of the thallus resembling a fringe) This is a lichen of cool, mesophytic forests where we have specimens from *Carya cordiformis*, *C. ovata*, *Fraxinus americana*, *Quercus alba*, *Q. rubra*, and *Ulmus americana*. It is abundant at the Wayne Grove Forest Preserve in northwestern DuPage County. A similar species, with usnic acid, zeorin, and thiophaninic acid, *Lecanora expallens* Ach., has also been reported from the western Great Lakes region. See also notes under *L. nothocaesiella*. [atranorin, zeorin, usnic acid \pm porphyritic acid]

Barry-MOR, Berrien-MOR, Cass-MOR, DuPage-MOR, Kane-MOR, Kent-MOR, LakeIL-MOR, McHenry-MOR, Porter-MIN*, MOR, Pulaski-MOR, Rock-MOR, VanBuren-MOR, Waukesha-MOR, Winnebago-MOR

Lecanora valesiaca (Müll. Arg.) Stizenb. (from Valesia, the Latin name of the Canton Valais in Switzerland) Known from just outside the region where it grows on carbonate rock; It is evocative of *Protoparmeliopsis muralis*, but it lacks pruina and produces. ~ Thallus placodioid, heavily pruinose; apothecia tan to pale orange, with a pruinose rim; spores 9–11 × 5–6 μm . [usnic acid, roccellic acid]

Lecanora varia (Hoffm.) Ach. (*L. varia*, of different kinds or of various sorts) This species is known from districts all around the Southern Lake Michigan Region, but we have yet to pick up a local record. ~ Thallus well developed, white or nearly so, smooth to rimose; apothecia constricted proximally, the rim well-developed and with a sumptuous cortex; spores 10.5–12.5 × 5.0–5.5 μm . [usnic acid, psoromic acid]

Lecanora wisconsinensis H. Magn. (of Wisconsin) This species is found just to the north of our region and again in the Appalachians. ~ Thallus grayish or with tinctures of yellowish; continuous, more or less verrucose; apothecia sessile, flat to convex in age, brownish to yellowish, epruinose; epihymenium granular only at the surface; amphithecial crystals large, often rare or absent; spores 12–17 μm × 7–12 μm . [atranorin, chloratranorin, roccellic acid]

LECANORACEAE

- A. Exciple not thalloid, without an algal component.
 Thallus UV+ faint orange [lichexanthone] **Traponora**
 Thallus UV-, without lichexanthone **Lecidella**
- A. Exciple thalloid, with algae an algal component.
 B. Thallus placodioid, with lobed margins
 Thallus heavily pruinose **Lecanora**
 Thallus epruinose **Protoparmeliopsis**
- B. Thallus not placodioid, without lobed margins.
 C. Apothecia adnate, the disks flesh-colored, some of them 2 mm or more across; thallus saxicolous, of scattered to aggregated, smooth, convex areoles **Rhizoplaca**
- C. Apothecia and thalli various, but not as above.
 Thallus absent or scarcely evident near the apothecium; apothecia without isousnic acid, usnic acid, or atranorin **Myriolecis**
 Thallus thick or thin but generally evident, or if absent then the apothecia with usnic acid, isousnic acid, or atranorin **Lecanora**

LECIDEA Ach. LECIDEACEAE [Photobiont: *Trebouxia*-like. Gr. *likos*, dish; the Latinized diminutive, an allusion to the small dish-like apothecia. ~ Thallus crustose, thin and continuous, rimose to areolate; apothecia biatorine; paraphyses remaining coherent in water; epihymenium brown or greenish, the hypothecium hyaline to brown, the spores 8, hyaline, simple; apex of ascus IKI-, *Lecidea*-type; conidia bacilliform.]

1. Thallus saxicolous L. LAPICIDA
 1. Thallus not saxicolous L. PLEBEJA

Lecidea lapicida (Ach.) Ach. (*L. lapis*, stone + *caedere*, to cut; stonecutter) Widespread in northern and western North American, this species of siliceous rock grows as nearby as Iowa County, Wisconsin. ~ Thallus endolithic to more commonly distinct and areolate to rimose, pale gray to rufescent, often with a nigrescent hypothallus, K+ yellow or red; medulla IKI + violet; apothecia to 1.5 mm across, black the disk concolorous with the exciple; epihymenium greenish to nigrescent; paraphyses usually simple, with swollen apical cells; hypothecium hyaline to brownish; spores 9.0–14.5 μm \times 4.5–7.3 μm . [stictic acid or norstictic acid]

Lecidea plebeja Nyl. (*L. plebeius*, one among the common people, Nylander's allusion abstruse—as is often the case) A specimen Calkins called "*Biatora myriocarpoides*" (Calkins #391, F) is referable here. Probably more frequent than our records suggest, we have it from conifer lignin. This species looks rather similar to *Ramboldia elabens*, but lacks an evident thallus. ~ Thallus endophloeic or scant and granular around the apothecium, the latter with a nigrescent, usually convex disk, rarely more than 0.5 mm across; paraphyses capitate; hypothecium brown to nigrescent; spores 5–9.5 μm \times 2.5–3.5 μm ; epihymenium greenish brown to nigrescent.

LaSalle-F

LECIDEACEAE

- A. Thallus not on mosses, corticolous or saxicolous.
 Apex of ascus IKI- **Lecidea**
 Apex of ascus IKI+ deep blue or black **Porpidia**
- A. Thallus on mosses or humus, often over rock; K-
 Spores 0–2 celled; tholus well marked with IKI **Bryobilimbia**
 Spores most 3–4 celled; tholus not developed **Mycobilimbia**

LECIDEELLA Körber LECANORACEAE [Photobiont: *Chlorella*-like. *Lecidea* + *-ella*, diminutive; evidently appears like a little *Lecidea*. Thallus crustose, thin, gray or grayish; apothecia black, biatorine; paraphyses separating in water; spores 8, hyaline, simple; apex of ascus strongly amyloid, *Lecanora*-type; conidia filiform.]

1. Thallus corticolous L. EUPHOREA
 1. Thallus saxicolous L. STIGMATEA

Lecidella euphorea (Flörke) Hertel (Gr. *euphoros*, healthy; perhaps from the relatively large, tumescent apothecia, appearing as though quite healthy) Our only records for this species are from two Willey specimens (#47 & #51, ILL, as *Lecidea enteroleuca*), one collected on poplar bark, the other on sumac, both at Algonquin, Illinois; another is from the bark of *Carya ovata* in open woods. Another specimen (Calkins #6434, F), also originally called *Lecidea enteroleuca*, is from “maples.” It is also said to grow on lignin. We are including here a similar species, *L. elaeochroma* (Ach.) M. Choisy (Gr. *elaion*, oil + *khroma*, color of the body, color; probably from the oil droplets investing the hymenial tissue), which differs largely in having oil droplets in the hymenium—a feature of the Rock County collection. If we are interpreting the literature correctly, this species complex is a hot mess. The local specimens we have referred do not have an interspersed hymenium, which is permanently IKI+ blue, and the thallus reacts K+ yellow, C-. ~ Thallus white, verrucose, continuous; apothecia black, circular or irregular, the rim appearing lecideine, but usually disappearing in age; paraphyses slender, not much branched, with or without oil droplets; epihymenium blue-green; hypothecium yellow-brown; spores mostly 10–16 $\mu\text{m} \times 6.0\text{--}10 \mu\text{m}$. Cortex is K+ yellow, \pm KC+ yellow, and \pm C+orange, UV+ creamy white. [atranorin, \pm isoarthothelin, \pm thiophanic acid, \pm 5,7-dichloro-3-O-methyllichexanthone].

LaSalle-F*, McHenry-ILL*, Rock-MOR

Lecidella stigmatea (Ach.) Hertel & Leuckert (Gr. *stigma*, a mark made by a pointed instrument, dot, a Latinized plural alluding to the numerous “dots” or apothecia) Our only record for this species is one collected in on a sandstone outcrop in LaSalle County. ~ Cortex is K+yellow, C+yellow, KC+ yellowish red; hymenium without oil droplets, the paraphyses not coherent in water of KOH; hypothecium hyaline; spores 11–17 $\mu\text{m} \times 6.0\text{--}9.0 \mu\text{m}$. [atranorin, chloroatranorin, hopane-6a,22diol, lichexanthone]

LaSalle-MOR

LEIMONIS R. C. Harris PILOCARPACEAE [Photobiont: Chlorococcoid. Gr.

Leimon, Hesiod's word for field in the Poem, Theogony, in which he describes the genealogy of the gods, the allusion here in reference to the common occurrence of this lichen in open areas, especially old fields often in early stages of succession. ~ Thallus crustose, dark gray, saxicolous; apothecia numerous, small, black; spores 8, hyaline, simple; apex of ascus strongly amyloid.]

Leimonis erratica (Körber) R. C. Harris & Lendemer (*L. erraticus*, wandering to and fro; perhaps from its frequent occurrence on glacial erratics) = *Lecidea erratica* Körb; *Micarea erratica* (Körb) Hertel, Rambold & Pietschmann. Our only record for this species is from a boulder in an old field near Portage. ~ Generally, the apothecia appear to have the tincture of blue-black near the rim with the epihymenium showing a pale brown. A Calkins & Huett (1898) report of *Lecidea cyrtidia* Tuck., from rocks in LaSalle County, may be referable here. Previous reports of "*Brianaria sylvicola*" are referable here. ~ Spores 6–11 μm long, 2.5–4.5 μm wide.

Kalamazoo-MSc, St. Joseph- MOR

LEMPHOLEMMA Körber LICHINACEAE [Photobiont: *Nostoc*. Gr. *lemphos*, putrescent carcasses + *lemma*, that which is peeled off, rind; probably an allusion to its appearance as small crusts of rotting rind. ~ Thallus gelatinous, squamulose or dwarf fruticose with terete branches, black; apothecia tiny, scarcely lecanorine, the spores hyaline, simple, subglobose.]

Lempholemma cladodes (Tuck.) Zahlbr. (Gr. *kladion*, a small branch; from its resemblance to a small *Cladonia*) We have one record from a dry, sandy prairie, about 15 cm off of a limestone trail and another from the soil between cracks on a massive dolomitic exposure. There is also a specimen from LaSalle County [Calkins *s.n.*, F] on the same specimen as *Lichinella cribellifera*, which see. ~ Spores 15–20 μm in diameter.

DuPage-MOR, LaSalle-F*, Will-MOR

LEPRA Scop. PERTUSARIACEAE [Photobiont: Chlorococcoid. Gr. *lepra*, leprosy; evocative of the sorediate warts of some species. ~ Thallus crustose, often thinning to a paler margin, the apothecia in thalloid warts, sorediate or pruinose; spores large, thick-walled, 1–8, hyaline, simple]

- | | |
|--|--------------------|
| 1. Medulla K+ deep yellow | L. TRACHYTHALLINA |
| 1. Medulla K- or weakly yellow eventually | |
| Warts KC+ violet, picrolichenic acid present | L. AMARA |
| Warts KC-, picrolichenic acid absent | L. MULTIPUNCTOIDES |

Lepra amara (Ach.) Hafellner (*L. amarus*, raw, doleful, dire; the allusion not immediately discernable) = *Pertusaria amara* (Ach.) Nyl. Known from districts all around our region, our only record is a Calkins specimen (#6182, CACS) from LaSalle County "on maples," which he had named *Pertusaria multipuncta*. Spores said to be one per ascus, although we know of no

observations. Some authorities place this species in the genus *Variolaria* Ach. (*L. variola*, smallpox; of which it can be construed as evocative. ~ Sorediate warts 0.3–0.8 mm across. [picrolichenic and protocetraric acid]

LaSalle-CACS*

Lepra multipunctoides (Dibben) Lendemer & R. C. Harris (*L. multus*, many + *punctum*, dot, spot + *-oideus*, form of, type; from the appearance caused by the numerous tiny warts) = *Pertusaria multipuncta* of Calkins (1896), who reported it from oaks and hickories, stating that it was not rare. See also the notes under *Lepra amara*. ~ Thallus gray to bluish-gray, continuous; warts abundant, sorediate, corticate initially, 0.2–0.5 mm across; spore 1 per ascus, smooth. [fumarprotocetraric and succinprotocetraric acids, ± protocetraric acid]

Cook

Lepra trachythallina (Erichsen) Lendemer & R. C. Harris (*Gr. trachys*, rough + *thallinus*, in reference to the body of a thallus) Our only record for this species is from a mesophytic forest. = *Pertusaria trachythallina* Erichs. ~ Thallus gray, generally densely and subsidiate with minute verruculose with corticate pustules, the warts gregarious but distinct, but irregularly formed; spores 2 per ascus, smooth. Other than medulla chemistry, this species differs from the former in that the apothecia are heavily pruinose rather than sorediate. [thamnolic acid]

Kalamazoo-NY

LEPRARIA Ach. STEREOCAULACEAE [*Trebouxia* and *Stichococcus*. *Gr. lepra*, leprosy + *-arius*, like or connected with; from the scurfy appearance of the thalli. ~ Thallus crustose, leprose, the sorediate units wholly ecorticate, surficial; ascomata and pycnidia not seen.]

1. Divaricatic acid present; thallus bluish gray; thallus UV+ blue-white L. HODKINSONIANA
1. Divaricatic acid absent: thallus bluish gray or not; thallus UV-.
 2. Alectorialic acid present.
 - Thallus with placodioid margins, the granules ecorticate L. EBURNEA
 - Thallus without placodioid margins, the granules largely corticate L. NEGLECTA
 2. Alectorialic acid absent.
 3. Thallus with distinct tinctures of yellow, K+ red in pigmented areas; zeorin absent; . . . L. VOUAUXII
 3. Thallus without yellowish tinctures, K+ yellow; zeorin present.
 4. Thallus with stictic acid, thick, typically pale greenish gray L. FINKII
 4. Thallus without stictic acid, thick or thin, bluish gray to white.
 5. Thallus with protocetraric acid, P+ orange. L. NORMANDINOIDES
 5. Thallus without protocetraric acid, P-.
 - Thallus margins placodioid, the granules with rhizohyphae evident on the surfaces L. HARRISIANA
 - Thallus margins not placodioid, the granules without rhizohyphae . . . L. CAESIELLA

Lepraria caesiella R. C. Harris (*L. caesius*, pale blue + *ella*, small) This species generally includes many local reports referred to as sp. #1 based upon MOR specimens. Most of our specimens are from *Quercus* species, but it is also known locally from the bases of *Acer saccharum* and *Fraxinus americana*. See also notes under *Lecanora nothocaesiella*. ~ Rhizohyphae

absent. [zeorin, atranorin, ± pallidic acid]

Berrien-MOR, Cook-MOR, DuPage-MOR, Iroquois-MOR, Jasper-MOR, Kane-MOR, Kenosha-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MOR, Newton-MOR, Porter-MOR, Rock-MOR, St.JosephMI-MOR, VanBuren-MOR, Walworth-MOR, White-MOR, Will-MOR

Lepraria eburnea J. R. Laundon (*L. eburneus*, the color of ivory) Known from districts east and west of our region, there is a report of this species on the portal from a partly shaded sandstone outcrop at Magnolia Bluff County Park (Kithsun #5132102-10, WIS), in Rock County, but the secondary metabolites presented on the label, “atranorin, alectorialic acid, zeorin (trace), contaminant” do not ring true for this species. The morphology of the granules and the odd chemistry ring compel one to consider *L. neglecta.*, which see. Rhizohyphae uncommon. [alectorialic acid, ± barbatolic acid, ± protocetraric acid]

Lepraria finkii (B. De Lesd.) R. C. Harris (in honor of the prominent American lichenologist, Bruce Fink, 1861–1927) Older reports of *Pannaria lanuginosa* Ach. inevitably turn out to be some species of *Lepraria*, and specimens so named from this region usually are *L. finkii*. Half of our material is from the bases of *Quercus* in partly shaded to fully shaded areas. Other corticolous substrates include *Tilia americana*, *Thuja occidentalis*, *Acer saccharinum*, and *Tsuga canadensis*. It also grows on shaded dolomite and on cliff faces, as well as on fallen logs, on soil, or among mosses in moist humid areas. ~ Rhizohyphae usually present. Occasional thalli have portions with inspersion reacting UV+ white. [stictic acid, constictic acid, zeorin, atranorin, often a trace of norstictic acid]

Allegan-MOR, Berrien-MOR, Boone-MOR, Calhoun-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-CACS*,MOR,NY, Lee-MOR, McHenry-MOR, Milwaukee-WIS*, Ogle-MOR, Porter-MOR, Pulaski-MOR, Racine-MOR, Rock-MOR,WIS*, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Lepraria harrisiana Lendemer (in honor of the foremost American botanist, Richard Clinton Harris, 1939–, peerless authority on the pyrenocarpous fungi) Known from districts ambient to our region, our only record is from *Quercus alba* at a cemetery in South Haven, Michigan. ~ The chemistry is identical to that of *Lepraria caesiella*, but the margins are thick and placodioid; rhizohyphae present. [zeorin, atranorin, pallidic acid]

VanBuren-MOR

Lepraria hodkinsoniana Lendemer (in honor of the American lichenologist, Brendan Paul Hodkinson, 1983 –) Many of our specimens equate to name *L. incana* as used by McKnight, Wilhelm & Whiteside (1987). Most of our specimens are from the bases of *Quercus*; many others are from a sandstone exposures. Most local reports of “*L. incana*” are referable here. Rhizohyphae abundant. Another species that produces divaricatic acid and reacts UV+ blue-white is *Lepraria cryophila* Lendemer, which grows as nearby as Clark County, Illinois. It produces nordivaricatic acid and lacks zeorin, however, and reacts C+ pink; also, it is notably placodioid, while *L. hodkinsoniana* has an “aggregate” thallus. [divaricatic acid, zeorin]

Boone-MOR, Cook-MOR, Jasper-MOR, Jefferson-MOR, LaSalle-MOR, Lee-MOR, McHenry-MOR, Ogle-MOR, Winnebago-MOR

Lepraria neglecta (Nyl.) Erichsen (*L. neglectus*, neglected, not chosen; perhaps from its nondescript appearance) Our only records for this species are from exposed sandstone in our

western sector. Rhizohyphae absent. Our specimens are all *L. neglecta* s.s. Included in *L. neglecta* by Lendemer (2013) is *L. caesioalba* (B. de Lesd.) J. R. Laundon; it has atranorin and fumarprotocetraric acid, but is morphologically similar to *L. neglecta* in its more or less corticate granular soredia. In Illinois, it is known only from the Shawnee hills. [alectorialic acid, ± atranorin, ± roccellic/angardianic acid, ± zeorin]

Lee-MOR, Ogle-MOR

Lepraria normandinoides Lendemer & R. C. Harris (resembling the genus *Normandina*; particular with regard to the rounded, thickened, placodioid marginal lobes) Our few records are from both tree bases and from siliceous dolomitic outcrops. Previous reports of *Lepraria lobificans* Nyl. are referable here. [atranorin, roccellic/angardianic acid, protocetraric acid]

Cook-MOR, Livingston-MOR, Pulaski-MOR, Will-MOR, Winnebago-MOR

Lepraria vouauxii (Hue) R. C. Harris (In honor of the French mycologist, Father Leo Vouaux, 1870–1914.) Our only record for this species is from shaded sandstone outcrops at Castle Rock State Park. [pannaric acid 6-methylester, oxypannaric acid 6-methylester, ± atranorin, ± roccellic/angardianic acid]

Ogle-MOR

LEPROCAULACEAE

One local genus **Halecania**

LEPROPLACA (Nyl.) Hue TELOSCHISTACEAE [*Trebouxia*. Gr. *lepra*, leprosy + *plax*, a flat round plate, dish; from the scurfy thalli with rounded margins. Photobiont: mostly "*Pseudotrebouxia*." ~ Thallus crustose, yellow or brownish-yellow, leprose, or corticate and effigurate; ascomata and pycnidia not seen. anthraquinones, particularly parietin.]

1. Thallus wholly leprose; apothecia absent L. CHRYSODETA
1. Thallus corticate, effigurate, with discrete soralia L. CIRROCHROA

Leproplaca chrysodeta (Vainio) Ahti There is a specimen of what appears to be this species from a dolomitic cliff face along Cedarville Bluff in Stephenson County. It contains a substance that is 7, 7, 7 in TLC. ~ Thallus is composed of yellowish-gray, pulverulent, wholly ecorticate spherical granules (compare with the granules of *Flavoplaca citrina*, which are at least partly corticate.

Leproplaca cirrochroa (Ach.) Arup, Frödén & Søchting (*L. cirrhus*, yellowish, tawny orange + Gr. *chroa*, superficial color; perhaps from yellow thallus lobes) Our only records for this species are from dry limestone exposures in our western sector. The Winnebago County specimen is admixed with *Flavoplaca citrina*. ~ *Caloplaca* species with which it might be confused lack soredia and usually bear apothecia.

LaSalle-MOR, Winnebago-MOR

LEPTOGIUM (Ach.) Gray COLLEMATACEAE [Photobiont: *Nostoc*. Gr. *leptos*, peeled, slender, thin, weak + *ge*, the earth, land; perhaps from the thallus

lobes that appear as thin shavings on the ground in terricolous species. ~
Thallus foliose, gelatinous, lead-gray to nigrescent, the upper surface with a cellular cortex, the lower various, with or without a pubescent indument; apothecia lecanorine, the spores 4–8, hyaline, septate to muriform.]

- 1. Lower surface of lobes whitish tomentose. L. HIRSUTUM
- 1. Lower surface without tomentum.
 - 2. Thallus without isidia L. CORTICOLA
 - 2. Thallus isidiate.
 - Upper surface of thallus strongly wrinkled, the lobes becoming fused L. MILLIGRANUM
 - Upper surface of thallus smooth, the lobes distinct L. CYANESCENS

Leptogium corticola (Taylor) Tuck. (*L. cortex*, bark, cork + *colo*, to inhabit; from its habitat on tree bark) = *L. pulchellum* of Calkins (1896), who reported that it grew on calcareous rocks in Will County and on elms in Cook County, and noted that it was "better developed" farther south in Illinois.

Cook, LaSalle-ILL, Will

Leptogium cyanescens (Rabenh.) Körber (Gr. *kyaneos*, dark blue + *-escens*, meaning beginning to, slightly; from the not quite dark blue thallus) Uncommon, our only specimens of this species are from shaded dolomitic cliffs and from shaded base-rich boulders in streams. Calkins (1896) did not mention it.

Cook-MOR, DuPage-MOR, Kankakee-MOR, LaSalle-MOR, Livingston-MOR, Will-MOR, Winnebago-MOR

Leptogium hirsutum Sierk (*L. hirsutus*, hairy; from the tomentose lower surface) = *L. myochroum* of Calkins, a name that currently is synonymous with *L. saturninum* (Dicks.) Nyl., which grows farther north. Sierk (1964) mapped *L. hirsutum* Sierk from extreme northwestern Indiana but cited no specimens, although there is a specimen at (Calkins *s.n.*, F) from "Illinois", which is likely to be either from Cook or LaSalle counties; it was annotated by Sierk himself. Calkins (1896) reported the habitat as the same as for *L. milligranum*, which see. Previous reports of *Leptogium burnetiae* C. W. Dodge are referable here. Similar is *Leptogium saturninum* (Dicks.) Nyl. (*L. saturninus*, gloomy, dull, depressed), which occurs just north of our region; it is olivaceous to nigrescent with the lobe tips thickened and abundantly beset with isidia. ~ Thallus prevailing steel-gray, the lobes thin throughout, with large areas free of isidia that are even beset with fine hairs.

Will

Leptogium milligranum Sierk (*L. mille*, a thousand + *granum*, a seed; from the numerous seed-like isidia. The specific epithet is sometimes spelled "millegranum.") We are referring Calkins's (1896) report of *L. chloromelum* here inasmuch as *L. chloromelum* (Ach.) Nyl. is now considered to be confined to the outer coastal plain of the southeastern United States. His mention of apothecia is disturbing, however, inasmuch as fruiting structures are rare on *L. milligranum*. Calkins described his plant as: "*Thallus small to large; orbiculate, rigid; plumbeo-virescent, lobate, plicate, rugose; apothecia medium size, lecanorine, plane, rufous, the thalline margin granulate. Spores ovoid . . . On elms . . . The varieties are found further south.*"

Cook, Will

LEPTORHAPHIS Körber NAETROCYMBACEAE [Photobiont: unknown, though ascomata sometimes associated with *Trentepohlia*. Gr. *leptos*, peeled, slender, thin, weak + *rhaphis*, a needle, pin; from the acicular spores. ~ Thallus crustose, endophloedal, white or sordid; perithecia partly immersed; pseudoparaphyses largely unbranched, not anastomosing, the hamathecium not interspersed; spores 4–8, hyaline, fusiform to bacilliform, often curved, 3–7 septate.]

1. Spores with pointed ends; hymenium IKI–; restricted to *Betula* L. EPIDERMIDIS
1. Spores with blunt ends; hymenium IKI+ orange or bluish; restricted to *Populus* L. ATOMARIA

Leptorhaphis atomaria (Ach.) Szatala (L. *atomarius*, covered with atoms or spots; from the bespeckled appearance caused by the numerous black perithecia on the white thallus) Two records for this species are known from *Populus deltoides* along the edge of a cultivated field; others are from a planted specimen of *Populus maximowiczii* at the Morton Arboretum and *Populus tremuloides*; in a more natural habitat it grew on *Populus tremuloides* in Kalamazoo County. ~ Perithecia widely scattered, partly immersed to sessile, 0.1–0.2 mm broad, black, usually colorless below; hymenium IKI+ orange or pale blue, the interthecial hyphae much interwoven; asci short-clavate, 40–50 μm \times 8–15 μm ; spores 8, in 1 or 2 bundles, elongate fusiform, often falcate, 1-3 septate, 20–28 μm \times 2.5–3.5 μm .

DuPage-MOR, Kalamazoo-MOR, Kane-MOR, LakeIL-MOR

Leptorhaphis epidermidis (Ach.) Th. Fr. (Gr. *epi*, on, over + *derma*, skin, leather; probably in reference to its inhabitation of the outer papery bark of birch) = *Sagedia oxyspora* of Calkins, who reported this species from *Betula papyrifera* along the lake shore near Glencoe; he noted further that the "few native birch will soon disappear and with them this species." There are still a couple of trees in the ravine near Fort Sheridan, and we have searched them in vain for fertile pyrenocarps. ~ Perithecia widely scattered, hemispherical or somewhat oblate, about 0.2 mm broad, with a narrow ring of nigrescent hyphae; black, colorless below; hymenium IKI–, the interthecial hyphae much interwoven; asci short-clavate, often subtruncate, 32–45 μm \times 10–15 μm ; spores 8, in one bundle, acicular, falcate or twisted, not contracted at the solitary septate, 20–28 μm \times 2.5–3.5 μm . spores 20–30 μm \times 2.0–4.0 μm .

Cook-CACS*,FH

LETHARIA (Th. Fr.) Zahlbr. PARMELIACEAE [Photobiont: *Trebouxia*. L. *lethale*, lethal, deadly; presumably after its effect on foxes, as implied in the name of the type species, *Letharia vulpina*. ~ Thallus deep yellow, fruticose, much branched, the branches irregularly ridged and pitted, not hollow; apothecia lecanorine, the disks brown; spores 8, simple, hyaline, ellipsoid.]

Letharia columbiana (Nutt.) J. W. Thomson (L. of Columbia) Our only record for this species is based upon a collection (Higginson *s.n.*, F) made in "Chicago, Illinois" in 1894. One

cannot help but wonder if there was a label mix up somewhere along the line. The herbarium of Storrow Higginson included specimens from the Pacific Northwest at the Chicago Natural History Museum. [atranorin, vulpinic acid]

Cook-F

LICHENODIPLIS Dyko & D. Hawksw. VERRUCARIACEAE [Photobiont unknown. Gr. *leichen*, a lichen + *diploos*, doubled or folded, the allusion here unclear to me. ~ Thallus absent; ascomata absent; pycnidia immersed in apothecia of Teloschistaceae ant *Lecanora*; conidia brown, 1-septate, narrowly ellipsoid, obtuse at one end, truncate at the other.]

Lichenodiplis lecanorae (Vouaux) Dyko & D. Hawksw. (of *Lecanora*) Yet unknown locally, this parasite is recorded from all around our region. ~ Conidia 4.0–7.5 μm \times 2.0–3.0 μm .

LICHENOTHELIA D. Hawksw. LICHENOTHELIACEAE [Photobiont unknown. Gr. *leichen*, a lichen + *thele*, nipple; a peritheciate lichen. ~ Thallus crustose, saxicolous, extremely thin but evidently epilithic; perithecia rare; spores 1–3 septate to submuriform.]

Lichenothelia scopularia (Nyl.) D. Hawksw. (*L. scopulus*, rugged rock or cliff + *-aria*, of or pertaining to) Our only collections of this species are from a granitic boulders, commonly shaded. *Lichenothelia* remains a poorly understood genus, largely because so many specimens, including all of ours are sterile. ~ The thallus is composed of compacted, pseudoparenchymatous brown cells 5–9 μm in diameter, which form a black stain on shaded or moist rock. Locally we have seen only green algae associated with it—if not actually hook up with it. Hawksworth (1981) discusses two species: *L. metzleri* (Lahm) D. Hawksw., with mainly 1-septate spores 21–24 μm long \times 9–11 μm wide, and *L. scopularia* (Nyl.) D. Hawksworth, with mainly 3-septate spores 14–18 μm long and mostly less than 10 μm wide. The former is unknown from the eastern United States; there are several others in the North America, evidently restricted to California.

Cook-MOR, DuPage-MOR, Kane-MOR, Livingston-MOR, McHenry-MOR, Will-MOR

LICHINACEAE

- A. Thallus squamulose or fruticose.
 - B. Thallus brown, squamulose; photobiont *Nostoc* **Heppia**
 - B. Thallus not brown, more or less fruticose; photobiont not *Nostoc*.
 - Thallus fruticose, the lobes long and strap-like; usually pruinose; photobiont *Chroococcus* . . **Thyrea**
 - Thallus more or less umbilicate, the lobes about as long as broad; usually epruinose; photobiont *Xanthocapsa* **Lichinella**
- A. Thallus crustose
 - C. Thallus sterile, thin, the photobiont unknown **Lichenothelia**
 - C. Thallus fertile; photobiont evident.
 - D. Paraphyses absent; photobiont with a reddish, K+purple sheath; photobiont cyanobacterial, with a reddish sheath

- Apothecia 1-3 per areole **Cryptothele**
 Apothecia 1 per areole **Pyrenopsis**
 D. Paraphyses present, branches; photobiont with yellowish, K-sheaths; photobiont *Chroococciopsis*.
 Proper exciple rather evident between the thallus and the hymenium; disk brownish, not
 particularly reddish **Pyrenocarpon**
 Proper exciple absent or inconspicuous; the disk with tinctures of red **Psorotichia**

LICHINELLA Nyl. LICHINACEAE [Photobiont: *Xanthocapsa*. L. *Lichina*, a genus largely of tidewater rocks, considered by Agardh to be a lichenose alga, + *-ella*, diminutive; evocative of a little *Lichina*. Thallus gelatinous, fruticose, the lobes commonly thickened at the margins; apothecia immersed; spores 16-32, hyaline, simple, broadly ellipsoid.]

1. Lobes flat, to 2.5 mm broad, the older ones granulose on the surface; more or less fruticose . . . L. NIGRITELLA
 1. Lobes notably convex, the larger more than 2.5 mm broad, not granulose on the surface; more or less umbilicate
 L. CRIBELLIFERA

Lichinella cribellifera (Nyl.) P. P. Morena & Egea (*L. cribellum*, a small sieve + *fero*, to bear; the allusion obscure) = *Gonohymenia cribellifera* (Nyl.) Henssen. Our only record for this saxicolous species is a Calkins (*s.n.*, F) specimen from base-rich rock in LaSalle County; it was determined by Clifford Wetmore in 1985—when he dared examining the “little black crusts;” it was inhabiting base-rich rock; the specimen was originally distributed as *Omphalaria pulvinata*. On the same specimen is a growth of *Lempholemma cladodes*, which see. ~ Apothecia imbedded in the thallus, appearing at the surface as globular swellings; spores 16-32 per ascus, 6–8 $\mu\text{m} \times 3\text{--}4 \mu\text{m}$.

LaSalle-F*, MOR

Lichinella nigritella (Lett.) P. P. Morena & Egea (*L. nigritus*, blackened + *ellus*, diminutive; from the tiny blackened thalli) = *Gonohymenia nigritella* (Lett.) Henssen. Our two specimens, both from base-rich rock, are from shaded, argillaceous, silty dolomitic of the Des Plaines River, south of Darrien and a limestone cliff along the Vermillion River, in LaSalle County (Calkins #276, F), the latter determined by Clifford Wetmore in 1985—we do not have the wisdom to disagree; on one of the same rock fragments is a specimen of *Rinodina bischoffii*, which see. ~ Apothecia imbedded in the thallus, appearing at the surface as globular swellings; spores 16-24 per ascus, 6–9 $\mu\text{m} \times 2.5\text{--}5 \mu\text{m}$.

DuPage-MOR, LaSalle-F*

LITHOTHELIUM Müll.Arg. PYRENULACEAE [Photobiont: *Trentepohlia*. Gr. *lithos*, stone + *thele*, a nipple; probably from the hard, carbonaceous perithecia. The descriptions below are gleaned from Harris (1973). ~ Thallus crustose, thinly disposed, grayish to greenish; perithecia more or less immersed, somewhat carbonaceous, the ostioles asymmetrical disposed; Spores 4–8, hyaline to brown, 3–7 septate, more or less fusiform.]

1. Spores colorless, 3-septate; on *Acer saccharum* L. HYALOSPORUM

1. Spores dark brown, 7-septate; usually on *Fraxinus* L. SEPTEMSEPTATUM

Lithothelium hyalosporum (Nyl.) Aptroot (Gr. *hyaleos*, glassy + *spora*, seed; from the colorless spores) = *Plagiocarpa hyalospora* (Nyl.) R. C. Harris. *Pyrenula thelaena* of Calkins, although one specimen so named (Calkins #6561, CACS) is a non-lichenized fungus. Harris (1973) cited a specimen he collected at Warren Woods, presumably in beech-maple woods. There is a Cook County specimen (Calkins #215, MICH) that the Late Richard Harris annotated as *L. hyalosporum*, noting that it is mixed with "*Anisomeridium willeyanum*." ~ Perithecia scattered, subglobose, dull, immersed to sessile; hymenium IKI+ bluish-green to red-orange; asci clavate, thickened distally, 65–90 μm \times 19–21 μm ; spores 8, more or less biserial, hyaline, 3-septate, constricted at the septa, 18–30 μm \times 7–12 μm .

Berrien-MSC, Cook-MICH*

Lithothelium septemseptatum (R. C. Harris) Aptroot (L. *septem*, seven + *saeptum*, wall, hedge, partition + *-atus*, adjective ending; from the 7-septate spores) = *Plagiocarpa septemseptata* R. C. Harris. Harris (1973) cited a specimen he collected at Warren Woods, presumably in beech-maple woods; his Cass County specimen is from "maple." *Lithothelium phaeosporum* R. C. Harris) Aptroot (Gr. *phaios*, dusky, dark gray + *spora*, seed) with only 4-celled, dark brown spores, is known from districts all around the Southern Lake Michigan Region, where it has been collected on *Fraxinus*. ~ Perithecia scattered, flask-shaped to subglobose, dull, immersed to sessile; hymenium IKI+ bluish-green to red-orange, interspersed with oil droplets; asci subcylindric, clavate, thickened distally, 100–150 μm \times 25–40 μm ; spores 8, more or less biserial, brown, 7-septate, not constricted at the septa, the distal cells the smaller, 30–45 μm \times 12–18 μm .

Berrien-MSC, Cass-MSC

LOBARIA Schreber LOBARIACEAE [Photobiont: *Nostoc* or *Scytonema* or green and *Trebouxia*-like or *Myrmecia* (*Dictyochloropsis*). *L. lobus*, a lobe + *-arius*, belong to; from the notably lobed thalli. ~ Thallus foliose, broad-lobed, commonly with cephalodia; lower surface tan, usually with a brownish tomentum or sparse indument of hairs; apothecia, if present, on the upper surfaces or margins lecanorine, the disks brown; spores 8, hyaline to brownish, 1–3 septate, fusiform)

Lobaria pulmonaria (L.) Hoffm. (L. *pulmo*, lung + *aria*, like or connected with; evocative of the alveolate reticulation of the lobes. Our only record for this species locally is from an historic collection made in Milwaukee County (Lapham #50, NY). ~ Thallus containing *Myrmecia*, sorediate with tiny soralia along the lobe margins and the crests of the ridges of the foveolate upper surface; cephalodia tiny usually evident on the lower surface, bearing cyanobacterial photobiont; apothecia rather rare, associated with the lobe margins. [stictic and norstictic acid]

Milwaukee-NY

LOBARIACEAE

1. Thallus fruticose **Dendriscoaulon**
 1. Thallus foliose.
 Upper surface of lobes conspicuously foveolate-ridged; apothecia marginal; medulla C- **Lobaria**
 Upper surface of lobes smooth; apothecia laminal; medulla C+ pink **Ricasolia**

LOXOSPORA A. Massal. SARRAMEANACEAE [Photobiont: *Trebouxia*. Gr. *loxo*, oblique + *spora*, seed; from the twisted and curved spores of some species. ~ Thallus crustose, thin to thick, gray to yellowish gray, often with a fibrous or web-like prothallus; apothecia, if present, lecanorine, the disks brown or pruinose; spores 8, hyaline, 3–7 septate, fusiform, characteristically curved and twisted; thamnolic acid.]

Loxospora pustulata (Brodo & W. L. Culb.) R. C. Harris (*L. pustulatus*, blistered; from the hollow, isidioid warts) = *Lepra pustulata* (Brodo & W. L. Culb.) Lendemer & R. C. Harris. *Variolaria pustulata* (Brodo & W. L. Culb.) Lendemer, Hodkinson & R. C. Harris. Yet unknown from the Southern Lake Michigan Region, this species is rather frequent in remnant wooded areas farther south and is known from as nearby as Warren County, Indiana. It grows on fallen logs as well as lightly shaded siliceous rocks. This species is evocative of a *Pertusaria* (*Lepra*), into which genus it has been placed by Lendemer & Harris (2017). - Thallus pale, continuous, with numerous hollow pustules; prothallus well-developed. [thamnolic acid, ± atranorin, ± elatinic acid, ± squamatic acid]

MARCHANDIOMYCES Dieder & D. Hawksw. CORTICIACEAE [In honor of the French mycologist, André Marchand, 1916–1988: Marchand's fungus ~ Thallus anamorphic; parasitic on lichens, mostly those of the Parmeliaceae and Physciaceae.]

Marchandiomyces corallinus (Roberge) Diederich & D. Hawksw. Relatively frequent all around our region, we have documented it only from the Amboy Marsh Wildlife Sanctuary in our western sector, where it grew on a necrotic thallus *Phaeophyscia ciliata*. ~ Thalli of ecorticate, distinctly pinkish, branched globular masses on the upper cortex of lichens.

Lee-ILLS*

MEGASPORA (Clauz. & Cl. Roux) Hafellner & V. Wirth MEGASPORACEAE [Photobiont: Chlorococcoid. Gr. *mega*, large + *spora*, seed. ~ Thallus crustose, muscicolous, continuous; apothecia subimmersed, the disk black; tholus IKI+ pale blue; spores 8, simple.]

Megaspora verrucosa (Ach.) Hafellner & V. Wirth (*L. verrucosus*, more warty) Yet unknown from our region, this species is rather frequent just north and west of us, where it grows on the lower boles of trees. ~ Thallus grayish or whitish, notably verrucose; disk concave, appearing ostiolate initially, eventually with a pale thalloid rim; spores 30–65 μm × 16–36 μm .

MEGASPORACEAE

1. Thallus muscicolous; spores mostly more than 30 μm long **Megaspora**
 1. Thallus saxicolous; spores to 30 μm long.
 Thallus K-; spores subglobose, prevailingly more than 15 μm wide **Circinaria**
 Thallus K+ yellow or yellow turning red; spores ellipsoid, to 15 μm wide **Aspicilia**

MELANELIXIA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch
 PARMELIACEAE [Photobiont: *Trebouxia*. Gr. *melaina*, black, or more literally
 a root of the genus *Melanelia* + Elix, in honor of the Australian lichenologist,
 John Alan Elix, 1941- , student of the Parmeliaceae and secondary metabolites)
 ~ Thallus foliose, brown to olivaceous, without pseudocyphellae, the upper
 cortex with tiny pores; apothecia, if present, lecanorine; spores usually 8,
 hyaline, simple; lecanoric or gyrophoric acids.]

Melanelixia subaurifera (Nyl.) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. &
 Lumbsch (L. *sub-* below, slightly, imperfectly, nearly + *auris*, ear + *fero*, to bear; from its ear-like
 appearance) = *Parmelia olivacea* Nyl. var. *sorediata* (L.) Ach., *Parmelia subaurifera* Nyl. = *Melanelia*
subaurifera (Nyl.) Essl. There is a McHenry County specimen at ILL (Willey #48) named
Parmelia olivacea; as is a specimen from LaSalle County (Calkins 6008 CACS). They are referable
 here. It is probable that Berry's (1941) report of the same species from Racine County is based
 upon a misidentification of *Melanelixia subaurifera*, particularly since he did not report this more
 common subsorediate species from the Southern Lake Michigan region. This lichen occurs on
 a wide variety of corticolous substrates locally including *Acer saccharinum*, *Carya cordiformis*,
Cephalanthus occidentalis, *Fraxinus americana*, *Gleditsia triacanthos*, *Quercus alba*, *Quercus*
macrocarpa, *Prunus americana*, *Rhus typhina*, *Salix*, and *Toxicodendron vernix*. ~ This species is
 characterized by tiny, much aggregated, unbranched isidia that break down into granular
 soredia. [lecanoric acid, subauriferin]

Allegan-MOR, MSC, Barry-MSC, Berrien-MOR, Calhoun-MSC, Cook-MOR, DeKalb-MOR, DuPage-MOR,
Kenosha-MOR, Kent-MOR, LakeIL-F*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-CACS*, McHenry-MOR, Ogle-
MOR, Ottawa-MSC, Porter-MIN*, Racine-MOR, St. JosephIN-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR,
Waukesha-MOR, WIS*, Will-MOR, Winnebago-MOR

MELANOHALEA O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. &
 Lumbsch PARMELIACEAE [Photobiont: *Trebouxia*. Gr. *melaina*, black, or more
 literally a root of the genus *Melanelia* + Hale, in honor of the American
 lichenologist and educator, Mason Ellsworth Hale, 1929-1990, prolific student
 of the Parmeliaceae and creative observer of secondary metabolites) ~ Thallus
 foliose, brown to olivaceous, the lobes flat, typically with pseudocyphellae on
 the isidia tips or warts, without tiny pores; apothecia, if present, lecanorine;
 spores 8, hyaline, simple. [\pm fumarprotocetraric acid, otherwise lacking
 secondary metabolites.]

Melanohalea septentrionalis (Lyngé) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch (L. *septentrionalis*, of the north region) = *Parmelia septentrionalis* Lyngé; *Melanelia septentrionalis* (Lyngé) O. Blanco, A. Crespo, Divakar, Essl., D. Hawksw. & Lumbsch. Our only record (Thomson #23691, WIS), collected in 1945, for this species is from the bark of *Carya ovata*, growing with *Melanelixia subaurifera*. ~ Thallus much folded and lobulate, without diaspores; medulla C-; apothecia numerous, often robust and aggregated, the disks lustrous yellowish-brown, largely sunken. [fumarprotocetraric acid]

Waukesha-WIS*

MICAREA Fr. PILOCARPACEAE [Photobiont: green, often of paired cells. L. *mica*, a crumb, morsel + *area*, a space; perhaps from the scattered appearance of the tiny apothecia over the area of the thallus. ~ Thallus crustose, smooth to granular, grayish to olivaceous to sordid or endophloedeal; apothecia biatorine, convex, gregarious, the disks pale to nigrescent; paraphyses branched; spores 8, hyaline, simple or septate; apex of ascus amyloid, particularly the axial tube.]

1. Spores 3-septate; thallus C+ red..... M. PELIOCARPA
 1. Spores 0-1 septate; thallus C- M. BYSSACEA

Micarea byssacea (Th. Fr.) Czarnota, Guzow-Krzemińska & Coppins (Gr. *bussos*, flax or linen fibers + *-aceus*, of or pertaining to; the allusion here unclear) Our records are all from weathered lignin. Until recently, this species has been considered *M. prasina* Fr. (L. *prasinus*, leek green; from the usually greenish color of the thallus) by local authors. Recent studies by Vidi Konoreva & Chesnokov (personal communication), however, have shown that all of our Midwestern specimens have methoxymicareic acid; *M. prasina* has been shown to produce micareic acid. Another species reported from the Midwest, *Micarea micrococca* (Körb.) Coppins (Gr. *micros*, small + *coccus*, berry; probably from the small pale goniocysts), also has methoxymicareic acid; its spores are mostly 10-12 μm long \times 3-4.5 μm wide. Methoxymicareic acid reacts UV+ orange under the long-wave, while micareic acid reacts UV+ blueish. Another species, *M. misella* (Nyl.) Hedl. (L. *misellus*, little poor or wretched one; evidently from its scanty thallus), is similar morphologically but has a thin, non-granular, mostly immersed thallus and is known from decorticate *Juniperus*. ~ Thallus notably granular and at least partly epiphloedeal; hypothecium hyaline; epithelial pigment K+ purple (thalloidima green); spores 8-12 μm long \times 2.7-3.5 μm wide. [methoxymicareic acid]

Berrien-MOR, DuPage-MOR, Porter-MIN*, VanBuren-MOR

Micarea peliocarpa (Anzi) Coppins & R. Sant. (Gr. *pelios*, dark or olive gray + *karpos*, fruit; from the gray apothecia) Yet unknown from the Southern Lake Michigan region, this species is recorded from districts ambient to the region, where it grows on siliceous rocks and on mosses over siliceous rocks. ~ Hypothecium hyaline, the hamathecium reacts C+ red; spores 14-20 μm long \times 3.5-5.5 μm wide. Compare with *Placynthiella icmalea*, which has a pale brown hypothecium. [gyrophoric acid, 5-0-methylhiassic acid]

MICROPELTIDACEAE

One local genus **Mycoglaena**

MONOBLASTIACEAE

- A. Ascospores strictly uniseriate in the ascus, more than 25 μm long **Acrocordia**
 A. Ascospores often not strictly uniseriate in the ascus, less than 25 μm long **Anisomeridium**

MUELLERELLA Müll. Arg VERRUCARIACEAE [Parasitic in the apothecia of Teloschistaceous lichens. Literally, *Muelleria*, a Fabaceous genus + -ella, diminutive; the illusion nonsensical, probably in honor of the German botanist, Ferdinand von Mueller, 1825-1896; more than likely it was an awkward attempt by Johann Hepp, 30 years his senior, to honor the Swiss lichenologist, Johannes Müller Argoviensis, 1828-1896, in 1862; the latter being a rather young man and the younger of the two Müllers may be the reason for the diminutive suffix. ~ Thallus parasitic in apothecia; perithecia globose to pyriform, evident but immersed, the wall brown, the lower portion grayish brown; asci clavate, with more than 64 spores; spores brownish or grayish, not hyaline, mostly 1-septate, broadly ellipsoid.]

Muellerella lichenicola (Fr.) D. Hawksw. (L. lichen + -cola, inhabiting; from its parasitic association with lichens.) Generally not infrequent in the Midwest, our only record is from Kankakee County, where it was collected in the apothecia of *Gyalolechia flavovirescens* growing on dolomite at Kankakee River State Park, along David Creek. ~ Asci clavate to broadly clavate, 50–65 μm \times 14–20 μm , the spores 4.5–7.0 μm \times 2.5–3.5 μm .

Kankakee-MOR

MYCOBILIMBIA Rehm LECIDEACEA [Photobiont: green. Gr. *mykes*, fungus + L. *bi*, double + *limbus*, in reference to the perispore; perhaps its appearance as a fungus. ~ Thallus muscicolous; apothecia brown to nigrescent; hypothecium dark; spores narrowly fusiform; 8, hyaline, 0–3 septate; tholus uniformly weakly amyloid; *Lecidea*-type.]

Mycobilimbium tetramera (De Not.) Haffelner & Türk (Gr. *tetreres*, four + *meros*, part; perhaps from the 4-celled spores) Yet unknown locally this species is rather frequent just north of our region, where it occurs on mosses, organic-rich soil, and decayed wood. A little east of our region one may encounter *Mycobilimbium berengeriana* (A. Massal.) Haffelner & V. Wirth, which is similar but the spores are only 2-celled. *M. tetramera* is evocative of *Bilimbium sabuletorum*, but has flatter apothecia. ~ Spores 3-septate, 16–34 μm \times 6–8 μm .

MYCOCALICIACEAE

1. Thallus fungicolous; spores septate **Phaeocalicium**

1. Thallus corticolous or lignicolous; spores simple.

Thallus from *Quercus* bark **Mycocalicium**
 Thallus from cortical *Rhus* exudate. **Chaenothecopsis**

MYCOCALICIUM Vainio MYCOCALICIACEAE [Photobiont: absent. Gr. *mykes*, a fungus + *kalyx*, a cup; the allusion unclear to me. ~ Thallus crustose, the apothecia nigrescent, stipitate; hamathecium not forming a mazaedium but the asci disintegrating at maturity; spores 8, brownish, simple; conidia short, curved.]

Mycocalicium subtile (Pers.) Szatala (*L. subtilis*, fine, thin, delicate; from the fragile stipes of the apothecia) Yet unknown from the Southern Lake Michigan Region, it occurs in districts all around, and is known from as nearby as Warren County, Indiana, where it was collected on *Quercus rubra*. Much scarcer, but also in the vicinity is *Mycocalicium albonigrum* (Nyl.) Fink (*L. albus*, white + *nigrum*, black; perhaps from the contrasting black-stiped apothecia and pale thallus), which differs in having very large isodiametric cells in the exciple (ca. 10 μm across), those of *M. subtile* being notably smaller. ~ Asci linear-cylindric, the spores, uniseriate, dark brown, 7.0–8.0 μm \times 3.5–4 μm .

MYCOGLAENA Höhnelt MICROPELTIDACEAE [Photobiont: absent. Gr. *mykes*, a fungus + *glenos*, the eyeball; probably from the perithecia, which have the appearance of a black pupil surrounded by a blue-green iris, after the manner of an eye. The description below are gleaned from Harris (1973). ~ Thallus crustose, corticolous, pale; perithecia with blue-green walls, the asci truncate distally; paraphyses rather thick, weakly to notably branched, typically truncate at the apex; spores hyaline, without a perispore, 8, 3–5 septate to 0–1 muriform.]

Mycoglaena meridionalis (Zahlbr.) Szatala (*L. meridionalis*, southern, or of a meridian; probably from the longitudinal septum, which distinguishes it from other merely septate species, though it also has a generally more southern distribution) Known from districts all around the Southern Lake Michigan region, our only local specimen is from DuPage County, where it grew on *Prunus serotina*. Elsewhere it grows commonly on *Gleditsia triacanthos*. ~ Spores submuriform. A rare Midwestern species yet unknown locally, *Mycoglaena quercicola* R. C. Harris (*L. Quercus* + *-cola*; inhabiting oaks) has 3–5 septate, non-muriform spores and is confined to oaks. ~ Perithecia scattered, circular to elliptical, sunken in the center, 0.4–0.6 mm broad; hymenium IKI–; asci cylindrical, truncated distally, 74–130 μm \times 15–20 μm ; spores uniseriate to weakly biserial, elliptical, 3–6 septate, at least 1 of the cells longitudinally septate, constricted at the septa, 18–26 μm \times 7–10 μm .

DuPage-MOR

MYCOMICROTHELIA Keissler DIDYMOSPHAERIACIAE (This may not be

the proper familial disposition for this genus, but other than spore size and substrate, we are inclined to place it here rather than the Pleosporaceae). We shall be happy to be corrected by an evolutionary mycologist.) [Photobiont: absent. Gr. *mykes*, a fungus + *micros*, small + *thele*, nipple; an allusion to the tiny ascocarps of the fungus. ~ Thallus crustose, corticolous, pale; ascocarp hemispherical or conical, the basal hyphae IKI+ violet; interthelial hyphae much branched; spores brown, 1-septate, not constricted at the septum]

Mycomicrothelia wallrothii (Hepp) D. Hawksw. (in honor of the German mycologist and botanist, Karl Friedrich Wilhelm Wallroth, 1792–1857, student of the cryptogams of Germany) = *Microthelia wallrothii* Hepp. Yet unknown locally, this species is known from districts east, west, and north of our region, where it is confined to the bark of *Betula papyrifera*. ~ Perithecia scattered, black, sublustrous, hemispherical to oblate, often depressed centrally, encircled by a well-developed dark hyphal ring; hymenium IKI–; asci clavate, 40–50 μm \times 14–18 μm ; spores 10–17 μm \times 6–7 μm ,

MYCOPORACEAE

One local genus **Mycoporum**

MYCOPORUM Nyl. MYCOPORACEAE [Photobiont: absent or of thinly distributed cells of *Trentepohlia*. Gr. *mykes*, a fungus + *poros*, callus; from the callus-like clusters of fungal ascomata. The descriptions below are gleaned from Harris (1973). ~ Thallus crustose, endophloedeal, sordid; ascocarp with more than one chamber, each with its own ostiole; spores large, 8, hyaline to brown, septate to muriform.]

1. Spores with 1 or rarely 2 transverse septum, hyaline M. ESCHWEILERI
1. Spores with 7–10 transverse septa, hyaline to brown M. COMPOSITUM

Mycoporum compositum (A. Massal.) R. C. Harris (*L. compositus*, put together, united; from the aggregated hymenial chambers) = *M. pycnocarpum* Nyl. Harris (1973) mapped this species from just south and east of the Southern Lake Michigan region, collected most commonly on *Acer rubrum*. ~ Stromata scattered, more or less lustrous, carbonaceous, elliptical, 0.2–1.0 mm long, with as many as 10 hymenial chambers; hymenia IKI–; asci clavate, saccate, notably thickened distally, 70–85 μm \times 30–50 μm ; spores 8, irregularly disposed, brown, muriform with 7–10 transverse septa, constricted only at the median septum, 30–50 μm \times 12–20 μm .

Mycoporum eschweileri (Müll. Arg.) R. C. Harris (in honor of the German botanist and physician, Franz Gerard Eschweiler, 1796–1831, author of *Systema Lichenum*) = *Tomasellia eschweileri* (Müll. Arg.) R. C. Harris. Our only record for this species is one identified by R. C. Harris at NY (Calkins #181), which had been distributed as *Arthonia taediosa*; it said to have occurred on oak. ~ Stromata scattered, more or less lustrous, carbonaceous, orbicular to

irregular, 0.2–0.8 mm across, with several hymenial chambers; hymenia IKI–; asci narrowly ovate, 42–65 μm \times 30–50 μm ; spores 8, irregularly disposed, hyaline, 1–2 septate, 17–20 μm \times 5–7 μm .

LaSalle-NY

MYELOCHROA (Asahina) Elix & Hale PARMELIACEAE [Photobiont: *Trebouxia*. Gr. *myelos*, marrow + *chroa*, superficial color; from the yellow-tinted medulla. ~ Thallus foliose, largely adnate, pale gray or bluish-gray; lower cortex black with a brown marginal zone, rhizines densely disposed, simple or branched; apothecia, if present, lecanorine, concave initially, flat in age; spores 8, hyaline, simple, ellipsoid.]

1. Thallus isidiate, usually saxicolous M. OBSESSA
 1. Thallus not isidiate, corticolous
 Thallus soresdiate; apothecia very rare M. AURULENTA
 Thallus esoresdiate; apothecia common M. GALBINA

Myelochroa aurulenta (Tuck.) Elix & Hale (L. *aurum*, gold + *oulos*, woolly, curly + *entos*, within, inside; from the yellow medulla) = *Parmelina aurulenta* (Tuck.) Hale. Hale (1958) mapped this species from extreme southeastern Wisconsin as *Parmelia aurulenta* Tuck., but he does not cite specimens. Occasional, this species grows on a variety of open-grown trees or the upper trunks of forest-grown trees; we also have a specimen from shaded wooden roof shingles. This species was evidently unknown to Calkins. ~ The otherwise white medulla is characteristically pale yellow beneath the soresdia; soresdia laminal, often coalescing; apothecia and pycnidia rare. [atranorin, \pm zeorin]

Berrien-MOR, Boone-MOR, Cass-MOR, MSC, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Jasper-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, LakeIL-ILLS*, MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, Newton-MOR, Ogle-ILLS*, Pulaski-MOR, Rock-MOR, WIS*, St. Joseph IN-MOR, St. Joseph MI-MOR, Starke-US, VanBuren-MOR, Walworth-MOR, Will-MOR, Winnebago-MOR

Myelochroa galbina (Ach.) Elix & Hale (L. *galbinus*, yellowish; from the color of the medulla) = *Parmelia tiliacea*; *P. tiliacea* var. *sulphurosa* of Calkins; *Parmelina galbina* (Ach.) Hale, *Parmelia subquercifolia* Hue. Calkins's specimen (#6012, CACS) from LaSalle County, which he called *Parmelia tiliacea*, is referable here. Berry (1941) restricted the var. *sulphurosa* to Louisiana and Florida, though we now have specimens from as far north as central Illinois, and there is a specimen, collected by Willey in 1883, at ILL (called *Parmelia tiliacea*) from McHenry County. The Rock County record is from the bark of *Prunus serotina*. The Lake County, Illinois specimen is from an oak at Lake Bluff; the DuPage County specimen is from the cortex of an old *Rhus typhina*. Farther south, this species is characteristic of canopy branches rather than the boles of trees. ~ Thallus pale gray; apothecia abundant; medulla white but with regular tinctures of pale yellow, particularly beneath the apothecia; pycnidia common. [galbinic acid, atranorin, zeorin]

Cook-CACS*, NY, DuPage-MOR, LakeIL-F*, LaSalle-CACS*, McHenry-ILL, Rock-WIS*

Myelochroa obsessa (Ach.) Elix & Hale (L., *obsessus*, remain, grip firmly; perhaps from its

rather tight adherence to the substrate.) = *Parmelina obsessa* (Ach.) Hale. Yet unknown locally, it grows as nearby as Iowa County, Wisconsin, on shaded St. Peters Sandstone. There is a specimen, so named, from Berrien County, Michigan (ASU 535086), but it unlikely to be this species; the substrate is given as *Quercus rubra*. ~ Thallus gray, often sordid near the margins, the lobes rarely more than 1 mm broad, abundantly isidiate, the medulla white with tinctures of yellow. [secalonic and galbinic acids]

MYRIANGIACEAE

One local genus Myriangium

MYRIANGIUM Berk. & Mont. MYRIANGIACEAE [Photobiont: absent. Gr. *myrio-*, countless + *angion*, vessel; perhaps from the several, if not many, ascocarps in the stroma. ~ Thallus corticolous, grayish to nigrescent, forming a stroma, with the ascocarps developed on the surface or on surface processes; ascocarp of globose asci dispersed within an apothecium shaped mass; spores 8, hyaline, muriform, constricted at the primary septum.]

Myriangium duriaei Mont. & Berk. (in honor of ?) Calkins (1896) listed this species from *Corylus americana* in River Forest, Cook County, noting that he considered it common farther south. There is a specimen at the Chicago Academy of Science (CACS, Calkins #6197) that he collected on *Hamamelis* and another in the mycology Collection (F, Harper & Harper #1960b) from *Crataegus*. This species is a non-lichenized fungus that is parasitic on scale insects and becomes attached to the surface cortex of the host plant, but it is yet to be discovered on non-living bark, even though the cortex appears not to husband hyphae. If one is curious about entomogenous fungi, he may wish to consult Petch (1924). ~ Thallus (stroma) nigrescent, more or less orbicular, to 0.5 mm across the sunken surface of the cup-shaped pseudo-apothecium brown, the rim black; spores 14-28 × 8-13 μm.

Cook-CACS*,F

MYRIOLECIS Clem. LECANORACEAE [Photobiont: *Trebouxia*, Chlorococcoid. Gr. *myrio-*, countless + *lekis*, dish, pot, or urn, from the numerous scattered apothecia over the substrate. ~ Thallus, in ours, not or only scarcely evident; apothecia lecanorine, the rims much paler than the brown to nigrescent disks; paraphyses filiform, at least sparsely branched and anastomosing; ascus tips amyloid, I+; spores 4-32, hyaline, simple.]

1. Thallus not saxicolous.
 - Apothecia polysporous, often at least thinly pruinose M. SAMBUCCI
 - Apothecia 8-spored, not pruinose M. HAGENII
1. Thallus saxicolous.
 - Apothecia and margins without pruina M. DISPERSA
 - Apothecia and/or the margins pruinose.

Apothecial disk C+ yellow or orange M. SEMIPALLIDA
 Apothecial disk C- M. CRENULATA

Myriolecis crenulata Hooker. (*L. crenulata*, having small rounded teeth) A northern and western species, our only record is Calkins specimen from "Illinois" (CACS, Calkins #6096, *supra saxa calcarea*), which he called *Lecanora calcarea*, and all known Illinois Calkins specimens from Illinois are either from Cook or LaSalle Counties. ~ Apothecia pruinose, the disk C-; spores 8 per ascus, ellipsoid, 8.5–12.5 μm \times 4.5–6.3 μm .

Myriolecis dispersa (Pers.) Śliwa, Zhao Xin & Lumbsch (*L. dispersus*, scattered; from the numerous, but often remote apothecia) = *Lecanora dispersa* (Pers.) Sommerf. This species is the common associate of *Endocarpon petrolepideum*, *Xanthocarpia crenulatella* and *X. feracissima* on limestone, flagstone, and weathered concrete; it is rare on siliceous rock. Calkins included this species with what called *Lecanora hagenii*; another name he used was *Lecanora subfusca*. ~ Spores 8 per ascus, ellipsoid, 8–12 μm \times 5–6 μm . [β -sitosterol]

Barry-MICH*, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Cass-MOR, Cook-CACS*,F*,MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MIN,MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, Porter-MIN*,MOR, Racine-MOR, Rock-MOR, St.Joseph IN-MOR, St.Joseph MI-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Myriolecis hagenii (Ach.) Śliwa, Zhao Xin & Lumbsch (after Mark Gottfried Hagen, 1749–1829, Prussian botanist and pharmacist) = *Lecanora hagenii* (Ach.) Ach. Rather frequent on weathered lignin. Some previous reports of "*Lecanora umbrina*" are referable here. ~ Apothecia usually at least thinly pruinose; spores 8 per ascus, ellipsoid, 9–13 μm \times 5–6 μm . [no substances]

Benton-MOR, Cook-F*,MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Kalamazoo-MOR, Kenosha-MOR, Kent-MOR, Iroquois-MOR, Kosciusko-MOR, LakeIL-MOR, LakeIN-MIN*,MOR, LaPorte-MOR, Livingston-MOR, Noble-MOR, Porter-INDU,MIN*, Racine-MOR, Starke-MOR, Steuben-MOR, White-MOR, Will-MOR

Myriolecis sambuci (Pers.) Clem. (*L.* Of the genus *Sambucus*; from it supposed inhabitation on elderberry) = *Lecanora sambuci* (Pers.) Nul. *L. hageni* var. *sambuci* of Calkins (1896), who listed this species as rare on elms and poplars in Will County. The Allegan County record is from *Populus*; the Barry County records are from *Populus tremuloides*, as are the specimens from Illinois Beach State Park. ~ Spores 12–32 per ascus, ovoid, 6–9 μm \times 4–7 μm . [no substances]

Allegan-MSA, Barry-MSA, DeKalb-MOR, LakeIL-MOR, Racine-MOR,

Myriolecis semipallida (H. Magn.) Śliwa, Zhao Xin & Lumbsch (*L. semi-*, half + *pallidus*, white or pale) Our only record is from a shaded cliff face near Lemont, with *Flavoplocia citrina*. ~ Spores 4–8 per ascus, ellipsoid, 8–13 μm \times 5–7 μm . [5-chloro-3-O-methylnorlichexanthone]
Cook-MOR

MYRIOSPORA Uloth ACAROSPORACEAE [Photobiont: Chlorococcoid. Gr. *myrio-*, countless + *spora*, seeds, the numerous spores. ~ Thallus yellowish to reddish brown, K+ red, of scattered or aggregated areoles, each with 2–several brownish or nigrescent cryptolecanorine apothecia; spores numerous]

Myriospora smaragdula (Ach.) Uloth (Gr. *smaragdo*, greenish + *-ula*, diminutive; an allusion to the appearance of small greenish gemstones, although the color of the cortex is generally a more brownish cast) = *Acarospora smaragdula* Ach. Yet unknown locally, this species grows as nearby as Dane County, where it was collected from sandstone, which substrate occurs in our western tier of counties. Purvis et al. (2018) presents a worldwide key to the species. ~ Areoles flattish, forming red, needle-shaped crystals in KOH; apothecia punctiform, the disc smooth; pores bacilliform, 3–4.5 μm \times 1.0–1.5 μm . [norstictic acid]

NAETROCYMBACEAE

- A. Ascospores nearly or quite as long as the ascus, filiform **Leptorhaphis**
 A. Ascospores notably shorter than the ascus, oblong **Naetocymbe**

NAETROCYMBE Körber NAETROCYMBACEAE [Photobiont: absent. (Gr. *naetr-* ? + Gr. = *cymba*, boat or vessel. ~ Thallus crustose, endophloedeal; perithecia black, superficial, hyaline beneath, the pseudoparaphyses unbranched but slimy and ambiguously evident; spores hyaline, mostly 2-celled.)]

Naetrocymbe punctiformis (Pers.) R. C. Harris (L. *punctum*, a prick, puncture, or dot + *-formis*, denoting taking the shape of; from the appearance of the tiny perithecia as little dots) = *Pyrenula punctiformis* auct; *Arthopyrenia padi* Rabenh; *Santessoniolichen punctiforme* (Pers.) Tomas & Cif. Our only record of this species is a specimen (Calkins #211, NY), originally named *Pyrenula analepta*, from Elgin, Illinois, where it was collected "on shrubs." ~ Spores 8, irregularly arranged in the pyriform ascus, clavate, 18–22 μm \times 5–6 μm , with a thin gelatinous sheath.

Kane-NY

OCHROLECHIA A. Massal. OCHROLECHIAEAE [Photobiont: Chlorococcoid. Gr. *ochros*, pale, sallow + *lechos*, couch, bed, nest; probably from the cushion-like apothecia. ~ Thallus crustose, well-developed, white or pale gray; apothecia usually present (but not in ours), lecanorine; spores 8, very large, hyaline, simple; conidia cylindrical.]

Ochrolechia arborea (Kreyer) Almb. (L. *arboreus*, of trees; from its habitat) The only Southern Lake Michigan region records for this species were collected on open-grown specimens of *Cornus racemosa*, *Populus tremuloides*, *Prunus serotina*, *Quercus macrocarpa*, *Q. velutina*, *Rhus typhina*, and *Ulmus americana*. the former in a dry, gravel-filled glacial crevice near Harmony Hills, the other in savanna at Illinois Beach State Park. One can infer from the distribution map in Brodo (1991), that it is frequent just north of the Southern Lake Michigan region, with a few disjunct records in the southern Appalachians. We also have a few records from southern Illinois. ~ Thallus pale gray, thinning at the edges, the soredia in discrete soralia, C+ red, the medulla UV + vivid yellow orange. [lichexanthone, lecanoric acid,

gyrophoric acid]

Allegan-MOR, MSC, Calhoun-MSC, DuPage-MOR, Kenosha-MOR, LaGrange-MOR, LakeIL-MOR, Rock-MOR, VanBuren-MOR, Walworth-MOR

OCHROLECHIACEAE

One local genus **Ochrolechia**

OPEGRAPHA Ach. OPEGRAPHIDACEAE [Photobiont: *Trentepohlia*. Gr. *ope*, a hole, chink, opening + *graphis*, of line drawings; from the partly open apothecia, rather than closed as in *Graphis*, which see. ~ Thallus crustose, corticolous or lichenicolous; apothecia often branched; spores mostly 8, hyaline to brown, 3–several septate.]

1. Spores 3-septate, becoming brown; thallus parasitic on *Willeya* O. PULVINATA
1. Spores more than 3-septate, hyaline; thallus corticolous O. VULGATA

Opegrapha pulvinata Rhem (L. *pulvinatus*, like a cushion) Yet unknown from the Southern Lake Michigan Region, it this parasite is known from the thallus of *Willeya diffractella* as nearby as Carroll County, Illinois. ~ Ascomata aggregated into dense clusters to 4 mm or so across; spores 8, straight, hyaline to brownish, 4-celled, 19–25 × 6–7 μm.

Opegrapha vulgata Ach. (L. *vulgatus*, common; from a local ubiquity) There is a Calkins specimen of this corticolous species from La Salle County at the New York Botanical Garden. ~ Ascomata scattered to clustered, simple or forked to stellate; spores 8, straight or somewhat curved, hyaline, 5–9 celled, 19–35 × 2.5–4.5 μm.

LaSalle-NY

OPEGRAPHOIDEA Fink. OPEGRAPHIDACEAE [Photobiont: *Trentepohlia*. Gr. *ope*, a hole, chink, opening + *graphis*, of line drawings + *-oideus*, resembling; evocative of *Opegrapha*. ~ Thallus crustose, parasitic on genera of the Verrucariaceae; apothecia short and narrow, solitary or more often in pulvinate stromatoid clusters; spores mostly mostly 6–8, pale brown, 3–several septate, one end a little more attenuate than the other.]

Opegraphoidea staurothelicola Fink (*Staurothele* + L. *-icolus*, inhabiting; growing on *Staurothele*) Our only records for this species are Calkins specimen (336b, CACS; 339b), one from the Baldwin Farm, Deer Park, in LaSalle County, the other from Sag, Cook County. Both grew on *Endocarpon petrolepideum* limestone, with *Verrucaria muralis*. ~ Stroma 0.1–0.4 mm across; asci 31–60 × 16–19 μm; spores 13–16 × 4.5–6 μm.

Cook-MOR, LaSalle-CACS

OPEGRAPHIDACEAE

1. Spores to 17 μm long and 5 μm **Opegraphoidea**
1. Spores prevailingly longer than 17 μm and 5 μm **Opegrapha**

OPHIOPARMACEAE

1. Squamules soresdiate beneath or along the margins, C+ red; apothecia uncommon **Hypocenomyce**
1. Squamules esoresdiate, C-; apothecia common.
 - Apothecia black; spores to 7.5 μm long and mostly more than 2.5 μm wide **Xylospora**
 - Apothecia brown; larger spores more than 7.5 μm long and no more than 2.5 μm wide
 **Carbonicola**

PARMELIA Ach. PARMELIACEAE [Photobiont: *Trebouxia*. Gr. *parme*, a small round shield or buckler + *-elia*, a generic ending, probably from Gr. *eilo*, to roll up or collect, as in a collection or group; perhaps from the large coterie of shield lichens known to Acharius. ~ Thallus foliose bluish-gray, adnate, the lobes rather truncate at the tips, commonly with white angular reticulations, which can develop into pseudocyphellae; lower cortex black, the rhizines simple, branched or least forked; apothecia lecanorine, rare; spores 8, hyaline, simple.]

1. Thallus not isidiate, usually soresdiate **P. SULCATA**
1. Thallus isidiate.
 - All but the marginal rhizines squarrose branched, **P. SQUARROSA**
 - Rhizines all unbranched or merely forked **P. SAXATILIS**

Parmelia saxatilis (L.) Ach. (*L. saxatilis*, of rocks) Calkins (1896) reported this species from ". . . trees in Cook County near Elgin and on recent sandstones and boulders at Lemont." *Parmelia squarrosa* had not been named at that time, so the corticolous report may be referable to the same. There is, however, a specimen at ILL (Calkins LE-325) from Cook County called *Parmelia saxatilis* that is actually *P. sulcata*. His report from "sandstones and boulders" may represent *P. saxatilis*, since it is prevailingly a saxicolous species, *P. squarrosa* known rarely from rocky substrates. Hinds (1998) maps no specimens from the Southern Lake Michigan Region. [salazinic acid, lobaric acid, atranorin]

Cook-ILL

Parmelia squarrosa Hale (*L. squarrosus*, rough with stiff scales, bracts, leaves, or processes; from rough appearance of the short-branched rhizines) Our only record for which we have seen specimens is from corticate and decorticate limbs. Hinds (1998) maps a record from northwestern Indiana. [salazinic acid, atranorin]

Berrien-MOR, MSC, DuPage-MOR

Parmelia sulcata Taylor (*L. sulcus*, furrow, groove + *-atus*, provided with; from the lined markings on the upper cortex) = *Parmelia saxatilis* var. *sulcata* of Calkins; *Parmelia saxatilis* of Calkins, in part. A common substrate, especially in our Indiana counties, is *Quercus velutina*, but it is frequent on a wide variety of trees, including cultivated specimens in suburbs. We also have specimens from sandstone. In 1991 at the Morton Arboretum, a blue-gray gnatcatcher built its nest in *Syringa reticulata* exclusively of *Parmelia sulcata* fragments—with the upper cortex comprising the outer surface. *Punctelia rudecta* is a similar foliose species common throughout the region, but it is usually found low on the trunks of large oaks where gnatcatchers are seldom seen. *Parmelia sulcata* grows more often on the upper surfaces of

branches where gnatcatchers are more likely to forage. [salazinic acid, atranorin]

Allegan-MOR, MSC, Barry-MOR, MSC, WIS*, Berrien-MOR, Boone-MOR, Branch-MICH*, Calhoun-MOR, MSC, Cass-MOR, Cook-CACS*, F*, ILL, MOR-NY, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, MSC, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, MSC, Kosciusko-MOR, LaGrange-MOR, LakeIL-F*, ILLS*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-F*, ILL, MOR, NY, Lee-ILLS*, MOR, Marshall-MOR, McHenry-MOR, NY, Milwaukee-MOR, Newton-MOR, Ogle-MOR, Ottawa-MOR, MSC, Porter-F*, INDU, MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, WIS*, St. JosephIN-MOR, St. JosephMI-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-ILLS*, MOR, WIS*, Will-ILLS*, MOR, Winnebago-MOR

PARMELIACEAE

- A. Thallus fruticose, with erect or pendent branches, generally originating from a single hold-fast.
 - B. Thallus yellow-green.
 - Fibrils evident; branches smoothly terete **Usnea**
 - Fibrils absent; branches irregularly wrinkled **Evernia**
 - B. Thallus brown or bright yellow.
 - C. Thallus bright yellow [See also *Phacopsis*.] **Letharia**
 - C. Thallus brown.
 - Thallus branches flattened and involute. **Cetraria**
 - Thallus branches terete **Bryoria**
- A. Thallus foliose.
 - D. Thallus with yellowish-green; usnic acid usually present.
 - E. Thallus finely isidiate **Xanthoparmelia**
 - E. Thallus with granular or powdery soredia or pustular isidia.
 - F. Lobes to 3 mm across.
 - Soralia capitate; divaricatic acid present **Parmeliopsis**
 - Soralia not capitate; divaricatic acid absent **Usnocetraria**
 - F. Larger lobes more than 3 mm across.
 - Medulla C+ red **Flavopunctelia**
 - Medulla C- **Flavoparmelia**
 - D. Thallus without tinctures of yellow; usnic acid absent.
 - G. Thallus brown or brownish gray (rarely pale gray and umbilicate); cortex K-.
 - H. Lobes erect or suffruticose.
 - Thallus abundantly and conspicuously beset with granular pseudocyphellae **Tuckermanella**
 - Thallus without pseudocyphellae **Tuckermannopsis**
 - H. Lobes appressed.
 - Thallus without isidia or soredia **Melanohalea**
 - Thallus isidiate, many of the isidia breaking down into soredia **Melanelixia**
 - G. Thallus mineral gray, whitish gray, or greenish gray, never umbilicate; cortex K+ yellow or K-.
 - I. Lower cortex white, light tan, or absent.
 - Upper cortex K+ pale yellow, commonly with small white pores **Punctelia**
 - Cortex K+ deep yellow, without pores **Imshaugia**
 - I. Lower cortex brown or black (occasionally pale near the margins).
 - J. Medulla K-.
 - K. Thallus sorediate
 - Thallus lobes inflated, hollow **Hypogymnia**
 - Thallus lobes flat, not hollow **Canoparmelia**
 - K. Thallus esorediate; lobes solid.
 - Medulla KC-; lower cortex with a thick tomentum; lobes appearing inflated . . .

- **Anzia**
 Medulla KC+ rose; lobes flat, merely rhizinate **Hypotrachyna**
- J. Medulla K+ yellow or red.
- L. Lobes broad, usually 4 mm or more wide, typically with a rhizine-free zone near the margins; medulla K+ red **Parmotrema**
- L. Lobes narrower; rhizines typically distributed throughout on the lower surface; medulla K+ yellow or red.
- M. Upper cortex without white markings; medulla pale but distinctly yellow near the soralia **Myelochroa**
- M. Upper cortex reticulate or with distinct white markings, at least toward the lobe tips.
 Upper cortex reticulate-alveolate; medulla K+ deep yellow, stictic acid
 **Crespoa**
 Upper cortex, not reticulate-alveolate, with distinct white markings; medulla K+ yellow to red, salazinic acid **Parmelia**

PARMELIOPSIS (Stizenb.) Nyl. PARMELIACEAE [Photobiont: *Trebouxia*. *Parmelia* + Gr. *opsis*, aspect, view, appearance; a segregate of *Parmelia*, which see. ~ Thallus foliose, greenish gray, usually sorediate; apothecia rare, lecanorine; spores 8, hyaline, simple.]

Parmeliopsis ambigua (Wulf.) Nyl. (*L. ambiguus*, interchangeable, uncertain, doubtful; perhaps from an uncertainty as to its taxonomic position) The only record of this species is Calkins's *Lichenes Exsiccati* #88 at ILL. The specimen label states that it was collected on old fence rails in Cook County. [usnic acid, atranorin, divaricatic acid]

Cook-ILL

PARMOTREMA A. Massal. PARMELIACEAE [Photobiont: *Trebouxia*. *L. pamos*, cup + *trema*, a hole, especially the female pudendum; probably after the perforated, cup-like apothecia of *Parmotrema perforatum*. ~ Thallus foliose, loosely adnate, the lobes broad and round, often with marginal cilia; lower cortex brown to black, becoming browner or even white at margins; rhizines largely unbranched, often absent or much reduced distally; apothecia, when present, lecanorine, concave, sometimes perforate, the disks brown; spores 8, hyaline, simple; pycnidia laminal, the conidia elongate bacilliform to filiform.]

1. Thallus without isidia or soredia.
 2. Medulla K- P. SUBMARGINALE
 2. Medulla K+ red.
 - Lower surface with a broad bare white zone near the margins P. PERFORATUM
 - Lower surface black or brown and mostly rhizinate to the margins P. CETRATUM
1. Thallus with either isidia or soredia.
 3. Medulla C+ red P. AUSTROSINENSE
 3. Medulla C-.
 4. Thallus esorediate.
 - Medulla K+ yellow P. CRINITUM

- Medulla K+ yellow turning red P. SUBTINCTORIUM
4. Thallus sorediate.
5. Medulla K- or K+ yellow; alectoronic or stictic acids present
- Medulla K-, KC+ red; alectoronic acid present P. ARNOLDII
- Medulla K+ yellow, KC-; alectoronic acid absent P. PERLATUM
5. Medulla K+ yellow turning red; alectoronic and stictic acids absent.
6. Salazinic acid absent; lower cortex with white blotches or zones near the margins; upper cortex without cracks or maculae P. HYPOTROPUM
6. Salazinic acid present; lower cortex brown to black, without white blotches or zones near the margins; upper cortex often reticulate-cracked or maculate.
7. Lower cortex bearing at least short rhizines nearly or quite to the margins, rarely with more than 3 mm completely rhizine-free P. RETICULATUM
7. Lower cortex free of rhizines in large areas near the margins, the bare zones mostly more than 3 mm.
- Soralia on the upper surface near the margins, but not confined to the lobe margins P. MARGARITATUM
- Soralia confined to the lobe margins P. STUPPEUM

Parmotrema arnoldii (Du Rietz) Hale (in honor of the Bavarian lawyer and lichenologist, Ferdinand Christian Gustav Arnold, 1828–1901, who had a particular interest in the lichens of western Austria) Most of our records are from old-growth trees, including *Acer saccharum*, *Fagus grandifolia*, *Fraxinus lanceolata*, *Pyrus calleryana*, and *Quercus velutina*. This species was reported for Illinois Beach State Park under the name, *Parmotrema submarginale* by Hyerczyk (2008a). [atranorin, alectoronic acid, *a*-collatolic acid]

Calhoun-MOR, Cass-MOR, LakeIL-MOR, LaPorte-MOR, Lee-MOR, Racine-MOR, St.JosephIN-F*,MOR

Parmotrema austrosinense (Zahlbr.) Hale (L. *auster*, south, the wind out of the south + *Sinae*, the Chinese; from southern Asia) Our only local records for this species are from an landscape trees in parking lots, all of which places are much disjunct from its otherwise Appalachian/Ozarks distribution. ~ The DuPage County specimen has protocetraric acid! [lecanoric acid, atranorin]

Berrien-MOR, Calhoun-MOR, Cook-MOR, DuPage-MOR, Kent-MOR, Livingston-MOR, Marshall-MOR, Ottawa-MOR, White-MOR, Will-MOR

Parmotrema cetratum (Ach.) Hale (L. *cetra*, a sort of leather shield + *-atus*, an adjective ending; from the form of the thallus) = *Parmelia cetrata* Ach., *Rimelia cetrata* (Ach.) Hale & A. Fletcher. I would inclined to refer local reports of this species to *Parmotrema reticulatum*, which is similar in having a reticulate upper cortex, lacking only the soredia. The Marshall County specimen is in the same packet at *P. stuppeum*, which see. How one would distinguish the two with a young thallus is difficult to say, except that *P. cetratum* is more likely to have more lacinate lobes. [salazinic acid, atranorin]

DuPage-MOR, Marshall-WIS*, Pulaski-MOR

Parmotrema crinitum (Ach.) M. Choisy (L. *crinitus*, with long hair; from the marginal cilia) = *Parmelia crinita* of Calkins. Most early reports of this species from Illinois are referable either to *Rimelia reticulata* or to *R. cetrata*, but Calkins (1896) described isidia on the Southern Lake Michigan region specimens, and reported this lichen from oaks in Hanover Township and on a detached rock near Lemont; Berry (1941) reports it from Walworth County. See also

comments below under *Parmotrema margaritatum*. [stictic acid, atranorin]

Cook, Walworth

Parmotrema hypotropum (Nyl.) Hale (Gr. *hypo*, under, beneath, less than usual + *tropos*, a turn, turning, direction; probably from the often turned up lobes exposing the under surface) More common farther south, our records are from *Crataegus mollis*, *Fraxinus*, *Gleditsia triacanthos*, *Pinus strobus*, *Prunus serotina*, *Quercus palustris*, and weathered fence rails. [norstictic acid, atranorin]

Allegan-MOR, Benton-MOR, Berrien-MOR, Branch-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Jasper-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, LakeIL-MOR, LaPorte-MOR, Marshall-MOR, McHenry-MOR, Ogle-MOR, Pulaski-MOR, St.Joseph IN-MOR, VanBuren-MOR, Walworth-MOR, WIS*, Will-MOR

Parmotrema margaritatum (Hue) Hale (Gr. *margarites*, pearl + *-atus*, provided with; probably from the appearance of the smooth white cortex) Our only contemporary records are from *Acer saccharinum* and *Quercus macrocarpa*. There is a Calkins specimen at the New York Botanical Garden, collected at Glencoe and another from LaSalle County (#6015, CACS), both of which he call *Parmotrema crinitum*. There is a specimen collected at Riverside, Cook County [Blatchford s.n., F] and another [Blatchford s.n., F] collected at Glencoe, also in Cook County. The former is esorediate except for one soralium. Had this soralium been overlooked, the specimen may well have been called either *P. despectum* or *P. eurysacum* (Hue) Hale, which are frequent farther south; the former has irregular, eciliate lobe margins, while the latter has rounded, ciliate lobe margins. If the maculae of the cortex are overlooked, *Rimelia reticulata*, which is sorediate, would key here. [salazinic acid, atranorin]

Benton-MOR, Cook-F*,NY, LaSalle-CACS*, Kenosha-MOR, McHenry-MOR

Parmotrema perforatum (Jacq.) A. Massal. (L. *perforatus*, perforated; from the perforated apothecia) = *Parmelia perforata* of Calkins. A southern species, this lichen was collected on landscape trees in Berrien and White counties. One might speculate that it is adventive, but Calkins (1896) described the plant from the Chicago Region and reported it as a common species on "various trees in Cook and Will counties." The veracity of this report is enhanced by his specimen from LaSalle County (Calkins #6017 CACS). The recent collections are infertile and have few cilia, while the LaSalle County specimen is typical of those seen much farther south. ~ Lower cortex with a broad bare, at least mottled white zone; apothecia with a central perforation; conidia 10.6 – 13.0 μm . [norstictic acid, atranorin]

Berrien-MOR, Cook, LaPorte-MOR, LaSalle-CACS*, White-MOR, Will

Parmotrema perlatus (Hudson) M. Choisy (L. *perlatus*, carried, conveyed, presented) = *Parmotrema chinense* (Osbeck) Hale & Ahti. Our only for this species is from a Tamarack Bog near Goose Lake, Michigan. [stictic acid, atranorin]

Calhoun-MS

Parmotrema reticulatum (Taylor) M. Choisy (L. *reticulatus*, made like a net; from the connected cracks in the upper cortex) = *Rimelia reticulata* (Taylor) Hale & A. Fletcher. Including Calkins's report of *Parmelia perlata*. Calkins (1896) report of *Parmelia cetrata* must also be included here inasmuch as he described his specimens as having "sorediferous" lobes; he considered it common; a century later, Wilhelm (1998) considered it quite rare in the Chicago

Region. Today it is frequent to common on lichenose trees and weathered fence rails. If the rare soralium is overlooked, this species would key to *P. cetratum*. ~ Upper cortex characteristically reticulate-maculate, particularly on the lobes and even cracked near the center of the thallus, K+ yellow; lower cortex black, brown at the margins, the rhizines simple and much diminished within 5 mm of the edge; cilia often present; medulla K+ red; apothecia rare; soredia farinose, more or less capitate; lobes generally smaller than in many other *Parmotrema* species. [salazinic acid, atranorin]

Barry-MOR, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-ILL,MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Porter-MOR, Pulaski-MOR, Racine-MOR, St. JosepIN-MOR, St. JosephMI-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Waukesha-MOR, White-MOR,US, Will-MOR, Winnebago-MOR

Parmotrema stuppeum (Taylor) Hale (*L. stuppeus*, made of or consisting of tow, the coarse portion of flax; the allusion here unclear to me) This species is known from districts all around the Southern Lake Michigan Region, but our only record is a specimen (Ritting #10, WIS) collected in Bourbon, Indiana, in 1889, in the same packet as a specimen of *P. cetratum*, which see. [atranorin, salazinic acid]

Marshall-WIS*

Parmotrema submarginale (Michaux) DePriest & B. Hale (*L. sub*, under or close to + *marginalis*, of or pertaining to the edge or margin; I presume their once was a *Parmelia marginale*) Our only records for this species are from an old collection (Calkins *s.n.*, F) made in LaSalle County and a contemporary collection (Kobal *s.n.*) from and open-grown tree of *Acer saccharinum*. [atranorin, protocetraric acid]

DuPage-MOR, LaSalle-MOR

Parmotrema subtinctorium (Zahlbr.) Hale (similar to *P. tinctorium*, *L. tinctorium*, used for dyeing) Our only record is from a decorticate tree branch along Grant Creek near Wilmington. [atranorin, norlobaridone, salazinic acid]

Will-MOR

PELTIGERA Willd. PELTIGERACEAE [Photobiont: *Nostoc* and *Coccomyxa*. *L. pelta*, small shield + *gero*, to carry, bear; apparently from the apothecia borne on the lobe margins. When attempting to determine a *Peltigera* specimen, the student will need to examine the full expanse of the lower lobe surfaces with regard to venation. the distal veins are often long, slender, and white in most species and unfortunately it is these that are most readily presented in dried specimens. Even in dried specimens on cards, lobes can be re-hydrated and easily lifted up for examination. The concepts presented here are my interpretation of the treatments by Brodo (2016) and Goffinet & Ross (1994). ~ Thallus foliose, brown or grayish, the lobes appressed or erect, the lower surface with a tight tomentum, usually veiny; apothecia on the lobes or substipitate on modified lobes, lecanorine, sometimes obscurely so, flat or convex, when present; spores acicular, 8, hyaline to brownish, 3–7 septate.]

1. Larger thallus lobes more than 2 cm across; diaspores absent.
 2. Photobiont green; appressed, scale-like, cephalodia present and darker than the upper cortex.
 - Margins flat or weakly undulate; lower surface with low, usually darkened, flat veins anastomosing to form a pattern of light and dark P. APHTHOSA
 - Margins scalloped; lower surface with distinct veins, darkening toward the center P. LEUCOPHLEBIA
 2. Photobiont blue-green; cephalodia absent.
 - Upper lobe surfaces shiny, without tomentum P. NEOPOLYDACTYLA
 - Upper upper lobe surfaces dull, tomentose at least distally P. CANINA
1. Thallus lobes less than 2 cm across; diaspores present or absent.
 3. Thallus less than 5 cm across, with strongly ascending, concave sterile lobes; upper surface usually with patches of soralia; lower surface white with indistinct or low flattish veins P. DIDACTYLA
 3. Thallus more than 5 cm across, the sterile lobes neither strongly ascending nor particularly concave; upper surface never sorediate; lower surface usually veiny, some usually darkened.
 4. Thallus lobes bearing diaspores: isidia, soredia, lobules (phyllidia), or peltate scales.
 5. Upper surface of lobes shiny throughout, the isidia confined to the cortical cracks; tenuiorin and triterpenoids present.
 - Lower lobe surfaces conspicuously veiny, with rhizines distributed along the veins; apothecia saddle-shaped P. PHYLLIDIOSA
 - Lower lobe surfaces not conspicuously veiny, but with an abrupt transition from white to dark; apothecia not saddle-shaped P. ELIZABETHAE
 5. Upper surface dull, the lobes with at least a thin tomentum distally, the isidia variously disposed; secondary metabolites absent.
 6. Diaspores largely confined to the lobe margins or along fractures in lobe cortex P. PRAETEXTATA
 6. Diaspores largely on the lobes surfaces.
 - Diaspores of flattened peltate scales P. LEPIDOPHORA
 - Diaspores of granular or erect clavate or flattened isidia P. EVANSIANA
 4. Thallus lobes without diaspores.
 7. Upper lobe surfaces dull and tomentose, at least distally; secondary metabolites absent.
 8. Lower lobe surfaces with short, densely tufted, usually dark rhizines, these usually coalescing and even anastomosing, becoming notably longer; medial and basal veins usually nigrescent. P. RUFESCENS
 8. Lower lobes surfaces with simple or weakly tufted, often white rhizines more than 1 mm long, not coalescing and anastomosing.
 - Veins of lower surface prevailing white, strongly raised, about as high as wide P. PONOJENSIS
 - Veins white or darkened, indistinct or distinct and flattish, prevailing wider than high P. PRAETEXTATA
 7. Upper lobe surfaces smooth and glossy throughout, with or without distal pruina; secondary metabolites present, usually tenuiorin and triterpenoides.
 9. Rhizines in concentric lines P. HORIZONTALIS
 9. Rhizines not in discernable concentric lines.
 - Veins brownish, distinct to the base of the lobes; apothecia brown, at the ends of canaliculate lobes; gyrophoric acid present P. POLYDACTYLON
 - Veins nigrescent, broad and anastomosing, apothecia black, short-stalked; gyrophoric acid absent. P. NECKERI

Peltigera aphthosa (L.) Willd. (Gr. *aphthos*, with ulcers; presumably from the cephalodia)

This species is known from as nearby as Ozaukee County, Wisconsin, where it was collected

in a dense wet cedar swamp at east end of Huiras Lake. This species is usually notably larger than our other grass-green species, *P. Leucophlebia*. ~ Thallus lobes prevailing more than 2 cm across, the margins entire to undulate; upper surface without tomentum, the distal margins glabrous or weakly pubescent, with scattered, low-convex, weakly lobulate, darker green cephalodia; lower surface with a broad white margin abruptly darkened proximally with the veins broadly anastomosed producing small light areas; rhizines usually dark, densely tufted and even branching; apothecia deep chestnut brown; spores mostly 3-septate. [phlebic acid A, zeorin]

Peltigera canina (L.) Willd. (L. caninus, of or pertaining to dogs; from the fang-shaped apothecia evocative of dog's teeth) This species has been reported locally from the Southern Great Lakes Region, but all the specimens I have seen called such are attributable to some other species—as I currently have the genus organized. Local members of the *P. canina* group include *P. didactyla*, *P. ponojensis*, *P. praetextata*, and *P. rufescens*. *P. canina* is still regularly reported from just north of our region and may yet be discovered here. ~ Thallus lobes 2 cm or more across, flat or concave, the margins entire, prevailing down turned; upper surface well beset with tomentum, even on the internal surfaces of the lobes where it is sometime crusty or pruinose; lower surfaces white distally, the veins turning darker distally, the veins distinct but broad and flat, not tomentose; rhizines prevailing dark and bushy tufted; apothecia deep brown; spores 3-septate.

Peltigera didactyla (With.) J. R. Laundon (Gr. *di*, two, double + *daktylos*, a finger, toe; apparently from the strongly ascending lobes) = *P. spuria* (Ach.) DC. Rare, this species is confined to stable, dry to moist, well-lit sands in natural areas, commonly with *Ceratodon purpureus*. Thomson (2003) related that some “norther Wisconsin roadbanks become invaded by abundant small cochleate thali of a lichen which was called *P. spurea*. It has the tomentose upper surface of the *P. canina* group. If one follows marked thalli through time in the field they soon form the round sorediate patches on the upper surface. . . . These [thalli] persist as such for one or two years but then the soredia gradually disappear and the lobes begin to grow more horizontally, . . .” He alleged the transformed thallus to resemble *P. rufescens*, but I think, given the venation, it fits more easily into what we here are calling those forms of *P. praetextata* without diaspores. One of the drawbacks to this observation is that the latter species grows commonly in areas where *P. didactyla* is unknown. *P. didactyla* does not produce secondary metabolites, but just the east and west of our region there are populations of *P. extenuata* (Vain.) Lojka (L. *extenuatus*, made thin) which is similar but produces floccose rhizines and gyrophoric acid. ~ Thallus rarely more than 5 cm, the sterile lobes less than 1 cm across, strongly erect, concave, and well beset with tomentum on the upper surface; upper surface typically with round or expanded soralia of isidioid or granular soredia; lower surface white, the veins indistinct or flattish; rhizines simple or nearly so, rare distally; apothecia deep brown, at the ends of erect, narrow, elongate lobes; spores 3-septate.

Allegan-MSC, Jasper-MOR, Kankakee-MOR, Kent-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-MOR, Ogle-MOR, Porter-MOR, VanBuren-MOR, Will-MOR

Peltigera elisabethae Gyelnik (Perhaps a chivalrous commemoration of an acquaintance

of Gyelnik's) Rare just outside the Southern Lake Michigan region, particularly northward, we have seen only one historic collection from Cook County. ~ Thallus lobes mostly 1 cm or more wide, notably thick, often well disposed with cortical cracks that expose the deeper portions of the medulla, the margins entire; upper lobe surfaces shiny, without tomentum even distally, but with isidioid granular verrucae (regeneration lobules) or verrucae along the cracks; lower surface nearly or quite veinless, whitish distally, changing abruptly to dark proximally; rhizine dark, tufted, often more than 1 mm long, and appearing to form more or less concentric zones; apothecia brown to nigrescent, generally flattish, not saddle-shaped; spores 3-septate. [tenuiorin, triterpenoids, zeorin]

Cook-CACS*NY

Peltigera evansiana Gyelnik (after Alexander William Evans, 1868–1959, American bryologist and lichenologist) Not uncommon just north of our region, our only records are from a Black Oak Savanna at Indiana Dunes State Park, in Porter County, under *Pinus strobus* in LaSalle County, and the base of a tree near Big Bend in Waukesha County. ~ Thallus lobes to 2 cm across, the margins entire, usually flat or a little upturned; upper surfaces tomentose, and sometime pruinose distally, well beset with globular to erect and simple to weakly branched isidia, some often clavate or flattened distally; lower surface with low, narrow, white or darkened veins; rhizines simple, sometime weakly floccose, many more than 1 mm long; apothecia not seen locally, but said to be brown and slightly saddle-shaped; spores mostly 3-septate.

LaSalle-F*,MOR, Porter-F*,MOR, Waukesha-WIS*

Peltigera horizontalis (Hudson) Baumg. (*L. horizontalis*, like the horizon, flat; an allusion to the disposition of the apothecia) Our only record for this species is based upon a collection (Imshaug 27392, MSC) collected at Warren Dunes State Park and on the sand dunes at Old Baldy near Saugatuck. ~ Thallus lobes to 2 cm across, rather thin, without tomentum; upper surface smooth or with low depressions that represent points of insertion by the rhizines; lower surface distinctly veiny and anastomosing proximally, white distally, darkening proximally; rhizines mostly more than 1 mm long, tufted, the array forming concentric zones; apothecia deep brown, disposed in a horizontal plane; spores 3-septate. [tenuiorin, triterpenoides]

Allegan-MSC, Berrien-MSC

Peltigera lepidophora (Vainio) Bitter (Gr. *lepidos*, scale + *phoros*, a bearing; from the flattened, scalelike isidia) Our only records for this species are from a sandy interdunal prairie east of Ogden Dunes and from the dunes at Mount Baldhead near Saugatuck. ~ Thallus to 3 cm across, the lobes concave, with entire margins; upper surface tomentose, well beset with peltate corticate scales; lower surface white distally, brown proximally, the veins low and flat, weakly anastomosing; rhizine less than 2 mm long, simple to floccose; apothecia not seen but said to be small on extended lobules.

Allegan-MSC, Porter-MOR

Peltigera leucophlebia (Nyl.) Gyelnik (Gr. *leukos*, white + *phleb*, of or relating to veins) Our only record for this northern species is from Allegan County, where it grows on soil at Saugatuck and in a Tamarack swamp in Calhoun County. ~ Thallus lobes commonly more than 2 cm across, the margins scalloped or crisped; upper surface apple green to greenish-grey,

without tomentum, but occasionally minutely hirsute distally; cephalodia to 2 mm across, more or less cerebriform, not easily dislodged; lower surface with evident but low and anastomosing veins; rhizine more than 1 mm long, much branched, prevailingly dark; apothecia deep brown, at the ends of narrow lobes, with revolute margins; spores mostly 3-septate; primary photobiont *Coccomyxa*, the cephalodia with *Nostoc*.

Allegan-ASU, Calhoun-MSU

Peltigera neckeri Müll. Arg. (In honor of Belgian botanist and mycologist, Noël Martin Joseph de Necker, 1730-1793) Characteristically a corticolous species of tree bases, the only specimens we have seen locally were growing in partial shade over clay or sand with mosses. ~ Thallus lobes mostly adnate to the substrate, entire, without tomentum, easily broken when dehydrated; upper surface shiny, the lobes occasionally pruinose distally; lower surface white distally, abruptly nigrescent proximally, with low anastomosing veins, the background tomentum showing as disparate light areas; rhizines infrequent, more than 1 mm long, simple or weakly tufted, mostly dark; apothecia black, on short lobes; spores prevailingly 3-4 septate. [tenuiorin, triterpenoides]

Branch-MOR, LaSalle-MOR, Livingston-MOR

Peltigera phyllidiosa Goffinet & Miadl. (Gr. *phyllidia*, little leaves + *ose*, pertaining to;) This is a southern species, our nearest record being from Fayette County, Illinois, but included here because it is a newly described species and its distribution perhaps poorly known. ~ Thallus lobes to 2 cm across, flattish to concave, the margins plane or erect, without tomentum; upper surface well beset with globular or flattened isidia, both along cortical cracks and on the lamina, sometime forming discrete "squamulose" cushions; lower surface white distally, brown proximally, the veins distinct; rhizines simple or sparingly fasciculate, many more than 1 mm long; photobiont *Nostoc*; up to 75 μ m thick, medulla up to 120 μ m thick, and veins up to 150 μ m thick. Pycnidia not seen; apothecies black, revolute or saddle-shaped, on short elongate lobes; spores 3-septate. [tenuiorin, zeorin, \pm gyrophoric acid]

Peltigera polydactylon (Necker) Hoffm. (Gr. *poly*, many + *daktylos*, a finger, toe; from the numerous lobes) This is a widespread but evidently rare species in North America. It has been reported from our area several times, but all the local specimen I have see so called are referable to some other species, usually *P. neckeri*. ~ Thallus rather firmly adnate to the substrate, easily cracked when dehydrated; upper surface shiny, without pruina or crust, without isidia or phyllidia; lower surface with the veins distinct, white distally, abruptly turning brown proximally, the background tomentum presenting a light-dark pattern; apothecia deep brown, on ascending, revolute lobes; spores 3-septate. [tenuiorin, triterpenoids, gyrophoric acid]

Peltigera ponojensis Gyelnik (after the Ponoj River on the Kola peninsula in Russia) = *P. canina* of Calkins, in part. The only specimens we have seen are from shaded sand woods and sandstone outcrops. Shaded sandstone bluff, sandy woods. This species lacks the dark, tufted, coalescing rhizines of *P. rufescens* and differs from *P. praetextata* in have narrow, well raised veins and lacking phyllidia or isidia. ~ Thallus generally adnate to the substrate, the lobe margins entire, shallowly branched; upper surface tomentose, most densely so distally; lower

surface with distinct, smoothish veins about as wide as high, prevailing white, but often browning proximally; rhizines simple, sparingly fasciculated, most more than 1 mm long, not coalescing; apothecia brown or reddish, flat or weakly revolute on short lobes; spores 3-septate.

Allegan-MSC, Cook-F*, Jasper-MOR, Kent-MOR, VanBuren-MOR

Peltigera praetextata (Sommerf.) Zopf (L. *prae-*, before, very + *textus*, weave + *-atus*, provided with; from the tight tomentum) = *P. rufescens* of Calkins, in part; *P. canina*. var. *rufescens* (Weis.) Mudd f. *innovans* (Körb.) J. W. Thomson. This is our most frequently encountered member of the *P. canina* group. It characteristically grows on shaded sandy slopes or in cemeteries it occurs with *Arenaria serpyllifolia*, *Cardamine hirsuta*, *Danthonia spicata*, *Antennaria plantaginifolia*, *Stellaria media*, and *Veronica arvensis*. The Umbach specimen (#7238, WIS) from Magician Lake, Michigan, may have been collected in Van Buren County inasmuch as it shares a small shore line of the lake. Those who wonder whether those specimens with marginal squamules represent specifically distinct characteristics from *P. rufescens*, may find kindred consideration in the studies of Thomson (1948). As we have presented the small-lobed members of the *P. canina* group here, *P. rufescens*, which is characterized by dark, short, tufted, coalescing rhizines, rarely produces marginal regenerative verrucae or true phyllidia. ~ Thallus rather firmly adnate to the substrate, to lobes to 2 cm across, tomentose, at least distally; upper surface usually at least sparingly beset with isidia or phyllidia along the cortical cracks; lower surface with anastomosing flattish pubescent veins prevailing wider than high; rhizines mostly well over 1 mm long, more or less concolorous with the veins, simple or sparingly fasciculate, not coalescing; apothecia brown to dark brown; spores 3-septate.

Allegan-MICH, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MSC, Cass-WIS*, Cook-F*, MOR, DuPage-MOR, Grundy-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIL-MOR, LaSalle-MOR, Lee-MOR, McHenry-MOR, Newton-MOR, Ottawa-CACS*, Racine-WIS*, Walworth-WIS*, Waukesha-WIS*, Winnebago-MOR

Peltigera rufescens (Weiss) Humb. (L. *rufus*, reddish + *-escens*, beginning to; from the reddish brown thallus) = *P. canina* var. *rufescens* (Weis.) Mudd. This species is occasional in well-drained partly shaded areas over clay or siliceous soils, but inevitably with mosses. ~ Thallus adnate to the substrate, commonly strongly ascending or erect; upper surface tomentose distally and often nearly throughout the thallus; lower surface with numerous, dark, dense tufts of rhizines prevailing no more than 1 mm high, elongating and coalescing in the proximal portions of the thallus; apothecia dark brown, saddle-shaped, commonly on erect elongate lobes; spores mostly 3-septate.

Allegan-MSC, Berrien-MIN*, MOR, Cook-CACS*, MOR,NY, DuPage-MOR, LaSalle-ILLS*, MOR,NY, Lee-MOR, Livingston-MOR, Porter-INDU, MIN*, MOR, Will-MOR

PELTIGERACEAE

- A. Apothecia infrequent, elongate, marginal or terminal; spores hyaline **Peltigera**
 A. Apothecia usually evident marginal or laminal, round or nearly so; spores becoming brownish . . . **Solorina**

PERTUSARIA DC. PERTUSARIACEAE [Photobiont: Chlorococcoid. L. *pertusus*, perforated, punctured + *-arius*, belonging to; from the punctured appearance of the thallus caused by the ostiolate warts. ~ Thallus crustose,

corticate, more or less continuous; apothecia, when present, a thalloid wart with a perithecium-like pore; spores large, thick-walled or double-walled, 1–8, hyaline, simple; secondary metabolites and species concepts those presented by Dibben 1980.]

1. Norstictic acid present; stictic acid absent; medulla K+ red.
 2. Thallus saxicolous P. PLITTIANA
 2. Thallus corticolous.
 - Spores 1 or 2. P. NEOSCOTICA
 - Spores 4, 6, or 8 P. PROPINQUA
1. Norstictic acid absent; stictic acid present; medulla K– or K+ yellow.
 3. Cortex C+ deep yellow, particularly around the ostioles.
 4. Spores 2; ostioles without yellow rims. P. PUSTULATA
 4. Spores 8; ostioles yellow rimmed or margined
 - Medulla K+ yellow; spores mostly biseriolate in the ascus P. TEXANA
 - Medulla K–; spores uniseriate in the ascus. P. EPIXANTHA
 3. Cortex C– or weakly yellow
 5. Spores 2.
 - Ostioles black, K+ violet; inner spore wall not corrugated P. CONSOCIANS
 - Ostioles not black, usually pale, K–, inner spore wall corrugated P. MACOUNII
 5. Spores prevailingly 3–6 per ascus.
 - Spores with the outer surface of the inner wall smooth; thallus without tinctures of yellow; borders of ostioles concolorous with the verrucae. P. LEIOPLACA
 - Spores with the outer surface of the inner wall roughened; thallus generally with tinctures of yellow-gray; borders of ostioles typically paler than the cortex of the verrucae P. TETRATHALAMIA

Pertusaria consocians Dibben (L. *consocio*, to form a gathering, the allusion unclear) Yet unknown locally, this species has been recorded as nearby as Dane County, Wisconsin, where it was collected on *Acer*, but it is said mostly to grow on conifers in most of its range. ~ Thallus C– throughout, UV– or UV+ orange-pink; spores usually 2, 95–210 μm \times 35–55 μm , the wall 2-layered. [stictic acid, 4, 5-dichlorolichexanthone, constictic acid (minor).]

Pertusaria epixantha R. C. Harris (Gr. *epi-*, above or upon + *xanthos*, various shades of yellow) Our only record for this southeastern species is from corporate landscape trees of *Ginkgo biloba* and *Tilia cordata*. ~ Thallus grayish with yellows tints, UV+ red-orange; the verrucae mostly separate but aggregated, well defined, C+ yellow; medulla K–, spores 8, uniseriate in the ascus, in our specimen 50–56 μm \times 20–126 μm . [variolaric acid]

Berrien-MOR, Ottawa-MOR

Pertusaria leioplaca DC. (Gr. *leios*, smooth + *plax*, a flat round plate, dish; apparently from its smooth cortex) = *P. leucostoma* A. Massal. Our only record is the report by Calkins (1896), who reported this species from "oaks near Elgin and elsewhere." ~ Thallus pale gray green, UV+ pale pink; spores usually 4, 40–130 μm \times 25–50 μm , the wall 2-layered. [\pm stictic acid, \pm constictic acid, 4,5–dichlorolichexanthone]

Kane

Pertusaria macounii (I. M. Lamb) Dibben (after John Macoun, 1831–1920, Irish-born

Canadian naturalist and botanist) = *P. pertusa* of some authors; *P. communis* of Calkins, in part. There are two specimens of *Pertusaria* from Cook County in Calkins's *Lichenes Exsiccati* at ILL named *P. communis*. His #128 looks more like *Lepra trachythallina*, which see, while #285 resembles *Pertusaria. paratuberculifera* Dibben. He annotated two collections from Mahomet, Illinois, (ILL) as *P. communis*, but both are referable to *P. velata*. There are specimens (Calkins #78, NY, #6177, CACS) that he called *P. communis*; they are *P. macounii*; one was collected in Glencoe, on oak, the other from Cook County, but without location. The Rock and Waukesha county records were from the bark of *Carya ovata*; that from Lake County, Illinois is from *Carya cordiformis*. In Allegan County it grew on *Platanus occidentalis*. ~ Thallus grayish or bluish, UV+ orange, usually weekly C+ yellow around the ostioles; medulla K+ yellow; spores 2, 100–200 $\mu\text{m} \times 30\text{--}65 \mu\text{m}$, the two walls mostly 5–8 μm , the inner wall notably with rounded radiating ridges, K+ dull purple. [stictic acid, constictic acid, 2,7-dichlorolichexanthone, un1, un2, un3]
Allegan-MOR, Cook-CACS*, NY, Jefferson, LakeIL-F*, MOR, Rock-WIS, Waukesha-WIS

Pertusaria neoscotica I. M. Lamb. (after Nova Scotia) Our only record of this species is from the trunk of a Bur Oak along Carpenter Creek. [norstictic acid, connorstictic acid, \pm planaic acid] ~ Thallus pale gray or with tinctures of brown, thinning into an indistinct margin; apothecial warts gregarious and often crowded, the ostioles obscure; spores 2, smooth, [norstictic acid]

Jasper-MOR

Pertusaria plittiana Erichsen (In honor of the American botanist and lichenologist, Charles Christian Plitt, 1869–1933) This southeastern species is known from as nearby as Warren County, Indiana, where it grew on a sandstone cliff face. Spores 80 μm –200 $\mu\text{m} \times 25 \mu\text{m}$ –70 μm , the inner walls rough. [norstictic acid, connorstictic acid, perlatolic acid, and stenosporic acid]

Pertusaria propinqua Müll. Arg. (*L. propinquus*, near; alluding to what I do not know) Our only record for this species is from a specimen collected on *Quercus velutina*. ~ Thallus gray or greenish, rugulose, the warts sometime crowded but distinct, UV+ orange-red; spores usually 8, smooth, generally biserial in the ascus. [norstictic acid, connorstictic acid]

LaGrange-MOR

Pertusaria pustulata (Ach.) Duby (*L. pustulatus*, blistered; from the corticate warts) This appears to be the most common *Pertusaria* in the region today, most eastern species evidently missing from the “prairie peninsula”. Most of our specimens are from *Carya*, but the Walworth County record was on *Quercus rubra*. ~ Thallus pale to bluish-gray K+ yellow, UV+ orange, C+ yellow, particularly near the ostioles; warts distinct or coalescing; spores 2, the inner walls without radiating ribs, K–. Depauperate specimens with weakly C+ yellow verrucae might be confused with *P. macounii*, which see. Spores 45 μm –160 $\mu\text{m} \times 25 \mu\text{m}$ –50 μm , the inner wall smooth. [stictic acid, constictic acid, \pm un1, \pm un2, \pm un3, \pm un5]

Allegan-MS, Barry-WIS*, Boone-MOR, Cook-NY, Jasper-MOR, Jefferson-MOR, Kane-MOR, Kendall-MOR, LakeIL-MOR, LaSalle-CACS*, Lee-MOR, Livingston-MOR, McHenry-MOR, Ogle-MOR, Ottawa-MOR, Racine-MOR, Rock-MOR, Walworth-MOR, Waukesha-MOR, Winnebago-MOR

Pertusaria tetralthalamia (Fée) Nyl. (Gr. *tetra-*, four of something + *thalamos*, the hidden chamber; an allusion to the often 4-ostiolate verrucae) Known from districts north and south

of the Southern Lake Michigan Region, this species has been cited from as nearby as Montgomery County, Indiana (Dibben 1980). ~ Thallus UV+ pale pink-orange; spores $75\ \mu\text{m}$ – $150\ \mu\text{m} \times 30\ \mu\text{m}$ – $50\ \mu\text{m}$, the inner wall rough. [stictic acid, constictic acid, thiophaninic acid \pm un1, \pm un2, \pm un3.]

Pertusaria texana Müll. Arg. (of Texas) A prevailingly southern and eastern species, this lichen is known from as nearby as Warren County, Indiana. ~ Thallus UV+ orange. The 8-spored asci are characteristically biseriate proximally and uniseriate distally. Spores $35\ \mu\text{m}$ – $90\ \mu\text{m} \times 20\ \mu\text{m}$ – $45\ \mu\text{m}$, the inner wall smooth. [stictic acid, constictic acid, thiophaninic acid \pm un1, \pm un2, \pm un3.]

PERTUSARIACEAE

- A. Apothecia in poriform warts, perithecia-like, the pores sometimes closed **Pertusaria**
 A. Apothecia lecanorine, often obscured by pruina or soredia-like masses.
 Thallus C+ red (lecanoric acid) **Varicellaria**
 Thallus C-, without lecanoric acid **Lepra**

PHACOPSIS Tul. PARMELIACEAE [Parasitic on *Letharia*. Gr. *phaco*, lens-shaped + *opsis*, looks like. Parasitic on cortex; spores 8, simple, hyaline, elliptic.]

Phacopsis vulpina Tul. (*L. vulpinus*, like a fox, but no doubt named for one of its hosts, *Letharia vulpina*) Extirpated, if it was ever here; our only record based upon the improbable record for *Letharia columbiana*, which see. ~ Spores $13\ \mu\text{m}$ – $15\ \mu\text{m} \times 5\ \mu\text{m}$ – $7\ \mu\text{m}$.

Cook-F

PHAEOCALICIUM A. F. W. Schmidt MYCOCALICIACEAE [Photobiont absent. Gr. *phaios*, dusky, dark gray + *kalyx*, a cup; from the cup-shaped apothecia. ~ Thallus crustose, the apothecia long-stipitate; asci disintegrating in age, but not a mazaedium; spores, uniseriate in the ascus, simple to 1-septate, brown.]

Phaeocalicium polyporaum (Nyl.) Tibell (*Polyporus*, a genus of fungus + L. *-eum*, denoting a place or source area; from its inhabitancy of polyporous fungi) Frequent in remnant wooded areas, where it grows on polyporous fungi, particularly *Trichaptum biforme* (Fr.) Ryvarden. The latter grows on a variety of dead trees, but the more frequent substrate with *Phaeocalicium polyporaum* is *Prunus serotina*. ~ Spores narrowly to broadly ellipsoid, $11\ \mu\text{m}$ – $14\ \mu\text{m} \times 3\ \mu\text{m}$ – $4\ \mu\text{m}$.

Barry-MOR, Boone-MOR, Cook-F*, MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Jasper-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, LakeIL-MOR, LakeIN-MOR, McHenry-MOR, Porter-MOR, Racine, Rock-MOR, Walworth-ILLS*, MOR, VanBuren-MOR, Waukesha-ILLS*, MOR, Will-F*, MOR

PHAEOPHYSCIA Moberg PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *phaios*, dusky, dark gray + *Physcia*, which see; from the brownish gray thallus. ~ Thallus foliose, small to minutely lobed, adnate, brownish gray to nigrescent; lower

cortex black or pale paraplectenchymatous; rhizines simple; apothecia, when present, lecanorine; spores 8, brown, 1-septate, ellipsoid.]

1. Medulla red or deep orange nearly or quite throughout
 - Soredia present P. RUBROPULCHRA
 - Soredia absent P. ENDOCOCCINIOIDES
1. Medulla white.
 2. Thallus esorediate.
 3. Margins notably beset with lobules or phyllidia P. SQUARROSA
 3. Margins without lobules or phyllidia.
 - Margins of apothecia and lobe margins without stiff spreading hairs P. CILIATA
 - Margins of many of the apothecia and often the lobe margins with stiff spreading hairs P. HIRTELLA
 2. Thallus sorediate.
 4. Thallus beset with colorless cortical hairs on the lobe tips or soredia.
 - Cortical hair prevailing on the lobe tips; soralia both laminal and marginal, pale to brown, few to none cortical hairs, the soredia fine to granular P. HIRSUTA
 - Cortical hairs prevailing in the soralia; soralia marginal, soon nigrescent, abundantly beset with cortical hairs, the soredia granular to subsidioid or even lobular and corticateP. KAIRAMOII
 4. Thallus without colorless cortical hairs, though white-tipped rhizines may project profusely along the lobe margins.
 5. Soredia granular, somewhat diffused in poorly delimited soralia.
 - Soredia black, subsidioid; lobes prevailing less than 0.5 mm across P. SCIASTRA
 - Soredia not black, more or less granular; larger lobes more than 0.5 mm across P. ADIASTOLA
 5. Soredia fine, farinose, confined to rounded soralia.
 6. Soralia strongly capitate, almost stipitate, primarily terminal on main or secondary lobes P. PUSILLOIDES
 6. Soralia orbicular, but not capitate.
 - Lower cortex usually pale or tan; thallus lobes prevailing less than 0.3 mm wide .. P. INSIGNIS
 - Lower cortex black; lobes prevailing more than 0.3 mm wide P. ORBICULARIS

Phaeophyscia adiastrata (Essl.) Essl. (Gr. *adiastolos*, mixed, joined, not separated; probably from the more or less coalesced soralia) *Physcia obscura* of Calkins, in part. This species is characteristic of shaded dolomitic erratics, cliff faces and ledges; the Rock County record is from exposed sandstone; it is much less common on shaded lignin. ~ Thallus greenish gray to gray-brown or brownish, the larger lobes prevailing more than 0.5 mm across, sorediate with granular soredia usually in marginal soralia; lower cortex black, the rhizines numerous and white-tipped; apothecia rare.

Boone-MOR, Cass-MOR, Cook-F*, MOR, DuPage-MOR, Jefferson-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, LakeIN-MOR, LaSalle-F*, MOR, Lee-MOR, Racine-MOR, Rock-WIS*, St. JosephMI-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Phaeophyscia ciliata (Hoffm.) Moberg (L. *ciliatus*, furnished with cilia; from the projecting marginal rhizines) = *Physcia obscura* of Calkins, or perhaps some other *Phaeophyscia* inasmuch as he described the lower surface a black. Specimens at NY that he called *Parmelia obscura* are referable either to *Phaeophyscia ciliata* or *P. adiastrata*. Commoner southward, this is an

occasional species locally on open-grown trees, often in disturbed areas. Nearly a third of our specimens are from *Populus deltoides*, and we have three from dolomitic boulders in open areas. It almost always grows with *Candelaria concolor*, *Phaeophyscia pusilloides*, *Physcia millegrana*, and *Physcia stellaris*. We have even seen it growing on *Ramalina americana*.

Allegan-MOR, Barry-MSC, Benton-MOR, Berrien-MOR, Boone-MOR, Cass-MOR, Cook-F*, MOR, , DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, WIS*, Kent-MOR, Kosciusko-MOR, LakeIL-F*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-CACS*F*, Livingston-MOR, Marshall-MOR, McHenry-MOR, Newton-MOR, Ogle-MOR, Porter-MIN*, MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, WIS*, St. Joseph IN-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Phaeophyscia endococcinioides (Poelt) Essl. (Gr. *endon*, within + *kokkinia*, scarlet + *-oides*, resembling) Yet unknown locally this species was collected from a granitic boulder in nearby Vermilion County, Illinois (KU).

Phaeophyscia hirsuta (Mereschk.) Essl. (L. *hirsutus*, with bristly hairs; from the cortical hairs on the apothecial margins) Including *P. cernohorskyi* (Nádv.) Essl., which is described as having labriform or capitate soralia, while *P. hirsuta*, in the strict sense, is said to have linear, mostly marginal soralia. As understood here, this species, *sensu lato*, is occasional on open-grown trees, usually in disturbed or cultural areas. It is just as likely to grown on weathered concrete, wood, and infrequently on both carbonate and siliceous rock. None of our specimens are fertile. Occasional, small specimens may have to few soralia to make the distinction between it and *P. kairamoi*, but the latter has very few cortical hairs on the distal lobe surfaces, while that is where such hairs are concentrated in *P. hirsuta*. See also notes under *P. kairamoi*.

Benton-MOR, Berrien-MOR, Calhoun-MOR, Cook-F*, MOR, DuPage-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kankakee-MOR, Kenosha-MOR, LaGrange-MOR, LakeIL-F*, MOR, LaPorte-MOR, LaSalle-MOR, Porter-MIN*, Rock-WIS*, St. Joseph MI-MOR, Starke-MOR, VanBuren-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Phaeophyscia hirtella Essl. (L. *hirtus*, stiffly hairy + *-ellus*, diminutive; from the small hairs around the rim of the apothecium) This species, which is weedy southward in the Midwest and common in Missouri, although we have seen only two specimens locally. The LaSalle County specimen, originally called *Physcia obscura*, (Calkins #86a, F) was collected in 1896 on *Tilia Americana*; admixed with the specimen was *Bacidia laurocerasi* as well as *Athallia pyracea*, both of which see. ~ If the younger apothecia of the thallus are overlooked, *P. hirtella* might be mistaken for *P. ciliata* inasmuch as the older apothecia often appear to have lost the cortical hairs.

Kenosha-MOR, LaSalle-F*

Phaeophyscia insignis (Mereschk.) Moberg (L. *insignis*, unique, well marked; probably from the pale lower cortex that is rare in *Phaeophyscia*) This species is not infrequent to our west and south, but our only local records are from a shaded siliceous and carbonate rocks, as well as weathered wood and the upper branches of *Populus deltoides*, *Quercus alba* and *Q. rubra*, where a frequent associate is *P. pusilloides*, which has notably capitate soralia. The soralia are similar to those of *P. orbicularis*, but the latter has broader lobes and a black lower cortex. See also notes under *Physciella melanchra*.

Boone-MOR, DuPage-MOR, Elkhart-MOR, LakeIN-MOR, McHenry-MOR, Milwaukee-MOR

Phaeophyscia kairamoi (Vainio) Moberg (in honor of the Finnish botanist and industrialist, Alfred Oswald Kairamo, 1858-1858, who of the Botanical Museum in Helsinki, was also a senator and diplomat) Our records for this infrequent but overlooked species are from *Fraxinus lanceolata*, *Juglans nigra*, *Populus deltoides*, *Quercus alba*, headstones, a decorticate log, and among mosses over shaded dolomite, and both dolomitic and igneous erratics. Although we have seen only one fertile specimen locally, it is not uncommon for *P. kairamoi* to be fertile, the apothecia often bearing fine cortical hairs as seen in *P. hirsuta*.

Barry-MOR, Benton-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, DuPage-MOR, Fulton-MOR, Iroquois-MOR, Jefferson-MOR, Kendall-MOR, Kent-MOR, LaGrange-MOR, LakeIN-MOR, Livingston-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Porter-MIN*, Pulaski-MOR, Racine-MOR, Rock-MOR, St.JosephMI-MOR, Steuben-MOR, White-MOR

Phaeophyscia orbicularis (Necker) Moberg (*L. orbiculus*, a small circle + *-aris*, pertaining to; from the discrete circular soralia) Our only records for this species are from a marble tombstone, a dolomitic cliff face, and the bark or decorticate surfaces of *Acer saccharum*, *Carya ovata*, *Fagus grandifolia*, and *Quercus alba*. See also comments under *P. rubropulchra*.

Berrien-MOR, Calhoun-MOR, Cook-F*, DuPage-MOR, Elkhart-MOR, Kalamazoo-MOR, Kent-MOR, LaGrange-MOR, LaPorte-MOR, Livingston-MOR, Ogle-MOR, Porter-MOR, Rock-MOR, Walworth-MOR

Phaeophyscia pusilloides (Zahlbr.) Essl. (from its original name, *Physcia pusilla*, an illegitimate name to which Zahlbruckner added *-oides*, like or resembling, to create a replacement name) Locally this species is ubiquitous on open-grown, usually fast-growing trees. In open areas it is occasional on boulders and fallen logs.

Allegan-MOR, Barry-MOR, Berrien-MOR, Branch-MOR, Calhoun-MOR, MSC, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, MSC, Kosciusko-MOR, LaGrange-MOR, LakeIL-ILLS*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Ogle-MOR, Ottawa-MOR, Porter-MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, St. JosepIN-MOR, St. JosephMI-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Phaeophyscia rubropulchra (Degel.) Essl. (*L. ruber*, red + *pulcher*, beautiful; from the attractive red medulla) = *Physcia orbicularis* of Armstrong (1977); all of her voucher material is referable to this species. This species is very common on the bases of trees in open or partly shaded areas, where it often grows with associates such as *Physcia millegrana*, and in shaded woods, where it often is the only lichen. Some specimens have weakly disposed portions of red medulla and may be mistaken for *P. orbicularis*. A few of our specimens with red medullae have soralia more like *P. pusilloides*. [rhodophyscin]

Allegan-MOR, MSC, Barry-MOR, MSC, WIS*, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, MSC, LaGrange-MOR, LakeIL-F*, ILLS*, MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-ILLS*, MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-ILLS*, MOR, Ottawa-MOR, Porter-F*, INDU-MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, St. JosepIN-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Phaeophyscia sciastra (Ach.) Moberg (*L. sci-*, knowledge + *astrus*, abstruse or complex; perhaps mean poorly known or understood by Acharius) Our only records for this mostly

northern and Cordilleran species are from a granitic boulders in remnant areas. ~ Thallus dark greenish gray to grayish or even black, the lobes less than 0.5 mm across, the soredia coarsely granular, nigrescent, usually in marginal soralia; lower cortex black, the rhizines usually thinly disposed, usually black; apothecia rare.

Kalamazoo-MOR, LakeL-MOR

Phaeophyscia squarrosa Kashiwadani (L. *squarrosus*, rough with stiff scales, bracts, leaves, or processes; from rough appearance of the numerous lobules and marginal phyllidia) = *Phaeophyscia imbricata* (Vain.) Essl. Evidently rare locally but rather well known south, east, and north of our region. Our only record is from "oak" in LaSalle County, based upon a collection made in 1900 [Calkins #46, F] was originally named "*Physcia tribacea*"; it is uncommon in that it is fertile. ~ Thallus dull greenish or brownish gray, the lower surface white marginally but black otherwise; apothecia rare, the margins with deflexed white hairs beneath; rhizine black, rather thinly disposed.

LaSalle-F*

PHAEOPLACA Söchting, Arup, & Bungartz TELOSCHISTACEAE

[Photobiont: mostly "*Pseudotreboxia*." Gr. *phaeios*, dusky, dark gray + *plax*, a flat round plate, dish; from the brown apothecial disk. ~ Thallus crustose, Epiphloedeal; apothecia with a white proper margin and brown disk; spores 8, hyaline, polaribilocular.]

Phaeoplaca camptidia (Tuck.) Söchting, Arup, & Bungartz (Gr. *kampto*, to bend + L. *-idus*, diminutive; perhaps from the sometimes flexuous margins) = *Caloplaca camptidia* (Tuck.) Zahlbr. Yet unknown from the Southern Lake Michigan region, this species occurs farther south, where it is rare on both hardwoods and junipers. ~ Thallus continuous to areolate, grayish; apothecia tan to brown, K-, pruinose, 0.5–1.5 mm across; epihymenium K-, spores 10–14 $\mu\text{m} \times 5\text{--}7 \mu\text{m}$, the septum 4–7 μm .

PHYSICIA (Schreb.) Michaux PHYSCIACEAE [Photobiont: *Treboxia*. Gr. *physke*, a blister, wart, sausage; from the well developed thalline apothecia. ~ Thallus foliose, small to minutely lobed, gray, the upper cortex always with atranorin; lower cortex white, usually corticate, rhizines simple to forked; apothecia lecanorine, the disks nigrescent, the hypothecium pale; spores 8, brown, 1-septate, thick-walled; pycnidia immersed, the conidia bacilliform.]

1. Long marginal cilia conspicuous.
 - Tips of lobes hooded, the soralia nearly or quite concealed P. adscendens
 - Tips of lobes with lip-shaped, exposed soralia P. tenella
1. Marginal cilia absent.
 2. Thallus without isidia or soredia; apothecia common.
 3. Medulla K-, or if K+ yellow, then the lobes less than 0,4 mm wide; zeorin absent
 - Lobes to 0.4 mm wide P. HALE
 - Larger lobes more than 0.4 mm wide P. STELLARIS

3. Medulla K+ yellow; zeorin present.
 4. Lobes up to 1 mm wide P. PUMILIOR
 4. Lobes prevailingly more than 1 mm wide.
 - Thallus saxicolous P. PHAEA
 - Thallus corticolous P. AIPOLIA
2. Thallus sorediate or isidiate.
 5. Soredia fine and powdery, in delimited soralia.
 6. Lower surface pale brown; soralia grayish; thallus saxicolous P. CAESIA
 6. Lower surface white; soralia white; thallus saxicolous or corticolous
 - Thallus usually corticolous; soralia laminal, circular P. AMERICANA
 - Thallus usually saxicolous, soralia mostly associated with the lobe tips, mostly crescent-shaped P. DUBIA
 5. Soredia granular to subsidiate, not in delimited soralia.
 7. Thallus loosely appressed, the lobes about as broad as long; corticolous or saxicolous P. MILLEGRANA
 7. Thallus tightly appressed to placodioid, the lobes notably longer than broad; saxicolous.
 8. Thallus placodioid, even the lobe tips appressed; lobes distinct but flowing close together P. DAKOTENSIS
 8. Thallus not placodioid, the lower cortex discernable in many areas, particular at the tips; lobes distinct, commonly with the substrate quite visible between them, at least distally.
 - Thallus rather easily detached from the substrate, the principal lobes flabelliform branched distally into the ultimate lobules P. THOMSONIANA
 - Thallus closely fixed to the substrate, difficult to detached from the substrate, the principal lobes linear to the tip P. SUBTILIS

Physcia adscendens (Fr.) H. Olivier (L. *adscendens*, ascending; from the elevated thallus lobes) This northern species is frequent on a wide variety of corticolous substrates, as well as weathered concrete and dolomitic boulders. Saxicolous thalli are usually discrete, but are often admixed on corticolous substrates with *Candelaria concolor*, *Hyperphyscia adglutinata*, *Physcia millegrana*, *Physcia stellaris*, *Physciella chloantha*, and other species such that often only the cucullate ciliate lobes emerge from the melange. [atranorin]

Allegan-MIN*,MOR,MSC, Barry-MOR,MSC,WIS*, Berrien-MIN*,MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-F*,MOR, DeKalb-MOR, DuPage-MOR,WIS*, Elkhart-MOR, Ford-MOR, Grundy-MOR, Iroquois-MOR, Kalamazoo-MOR, Kane-MIN,MOR, Kendall-MOR, Kenosha-MOR,WIS*, Kent-MOR,MSC, LakeIL-MOR, LakeIN-MOR, LaPorte-MIN*,MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Noble-MOR, Porter-INDU,MIN*,MOR, Racine-MOR, Rock-WIS*, St. JosephIN-MOR, St. JosephMI-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Physcia aipolia (Humb.) Hampe (Gr. *aei*, ever, always + *polios*, hoary, gray; perhaps from the whitish gray maculae present throughout the upper cortex) = *P. stellaris* var. *aipolia* of Calkins; *Physcia granulifera* of Calkins, in part. Widespread but rather infrequent, half of our specimens are from *Quercus alba*; the others are from *Acer platanoides*, *Ulmus americana*, *Populus deltoides*, *Juglans nigra*, and even *Rhamnus cathartica*. Curiously, Calkins listed the habitat as "boulders of the prairies and on stones at Lemont." [atranorin, zeorin ± other triterpenoides]

Allegan-MSC, Barry-MSC, Benton-MOR, Berrien-MIN*, Boone-MOR, Cass-MOR, Cook-MICH*,MIL, DeKalb-MOR, DuPage-MOR, Grundy-MOR, Ford-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kane-MICH*,MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-F*,MOR,NY, Lee-MOR, Livingston-MOR, McHenry-MOR, Newton-MOR, Ogle-ILLS*,MOR, Porter-DUKE, Racine-

MOR, Rock-MOR, WIS*, St. Joseph IN-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-ILLS*, MOR

Physcia americana G. Merr. (of America) *Physcia caesia* of some early Fink specimens. Farther south, this is a common corticolous species; locally it is uncommon, known from *Fraxinus americana*, *Juglans nigra*, and *Quercus velutina*; two of our specimens are from shaded dolomitic cliff faces. [atranorin, unknown terpene]

Allegan-MS, Cook-MOR, DuPage-MOR, Fulton-MOR, Kendall-MOR, Jefferson-WIS*, Kane-MICH*, MOR, US, Kendall-MOR, Newton-MOR, Ogle-MOR, Rock-WIS*, Will-MOR, Winnebago-MOR

Physcia caesia (Hoffm.) Fürnr. (L. *caesia*, bluish gray; from the color of the soralia) Our only records for this species from dolomitic boulders that line the entrance road to Magnolia Bluff County Park in Janesville and from a granitic boulder at River Bluff Park in Saugatuck. This species occurs just to the north of our region on granitic boulders, particularly those that, as with *Lecanora polytropa* and *Physcia dubia*, are commonly visited by perching birds. ~ Medulla K+ yellow; soralia mostly laminal. [atranorin, zeorin]

Allegan-MOR, Rock-WIS*,

Physcia dakotensis Essl. (of the Dakotas) Occasional of granitic or basaltic erratics in full sun. Many local reports of *Physcia subtilis* Degel. are referable either here or to *P. thomsoniana*, two species recently segregated by Esslinger (2004, 2017). [atranorin]

Cook-MOR, DuPage-MOR, Grundy-MOR, Kane-MOR, Kendall-MOR, McHenry-MOR, Ogle-MOR, Will-MOR, Winnebago-MOR

Physcia dubia (Hoffm.) Lett. (L. *dubius*, doubtful) Our only records for this mostly northern but widespread species are from a granitic erratic at a cemetery in Kendallville, Indiana, where it grows with *Acarospora veronensis*, on a black iron rail, also in a cemetery, where it grows with *Physcia millegrana* and *P. stellaris*, and on a concrete tombstone base—also in a cemetery. ~ Medulla K–; soralia on the lobe tips, mostly on the lower surfaces.

Berrien-MOR, Noble-MOR, St. Joseph MI-MOR, VanBuren-MOR

Physcia halei J. W. Thoms. (In honor of the American lichenologist and educator, Mason Ellsworth Hale, 1929-1990, prolific student of the Parmeliaceae and creative observer of secondary metabolites) Rare, our only record is from a exposed granite boulder on a hill prairie, where it occurred with *Buellia badia*, *Candelariella vitellina*, and *Dimelaena oreina*. ~ Thallus small, the lobes elongate, usually congested; upper cortex white, usually darkening distally, K+ yellow; lower cortex pale or sordid; medulla K+ yellow, although this can be difficult to discern in a spot test.

Jefferson-MOR

Physcia millegrana Degel. (L. *mille*, a thousand + *granum*, a seed; from the numerous seed-like soredia) = *P. tribacia* of Calkins. A specimen a CACS of this species was called *P. astroidea* by Calkins. This is the commonest lichen in the Southern Lake Michigan region. It grows on virtually all corticolous substrates, often without associates, but more often with *Candelaria concolor*. It also grows on weathered concrete, marble, and flagstone. A similar species *P. tribacia* (Ach.) Nyl. (L. *tri-*, three + *baca*, berry; possibly from the few granular blastidia associated with erumpent soralia), with convex, down-turned lobes rather than flat, more elevated lobes, is a saxicolous western species that has been attributed to our region in the past.

P. tribacia might be confused with *P. thomsoniana*, but many of the lower cortical cells have lumina exceeding 4 μm . [atranorin]

Allegan-MICH*,MIN*,MOR,MSC, Barry-MOR, Benton-MOR, Berrien-MIN*,MOR, Boone-MOR, Branch-MOR,WTU,Calhoun-MICH*,MSC,MOR,Cass-MOR,Cook-CACS*,F*,MIL,MOR,NY,WIS*,DeKalb-MOR,DuPage-ILLS*,MOR,WIS*,Elkhart-MOR,Ford-MOR,Fulton-MOR,Grundy-MOR,Iroquois-MOR,Jasper-MOR,Jefferson-MOR,Kalamazoo-MOR,MSC,Kane-MICH*,MOR,Kankakee-F*,MOR (see *Amandinea punctata*),Kendall-MOR,Kenosha-MOR,WIS*,Kent-MOR,MSC,Kosciusko-MOR,LaGrange-MOR,LakeIL-F*,ILLS*,MOR,WIS*,LakeIN-F*,MOR,LaSalle-F*,WIS*McHenry-MOR,NY,Milwaukee-MOR,WIS*,Newton-MOR,Ogle-ILLS*,MOR,Ottawa-MOR,Porter-DUKE,INDU,MIN*,MOR,OSU,Pulaski-MOR,Racine-MOR,Rock-MOR,St.JosephIN-F*,MOR,WIS*,St.JosephMI-MOR,Starke-MOR,US,Steuben-MOR,VanBuren-ASU,MOR,Walworth-MIL,MOR,OSU,WIS*,Waukesha-ILLS*,MOR,WIS*,White-MOR,Will-F*,ILLS*,MOR,Winnebago-ILLS*,MOR

Physcia phaea (Tuck.) J. W. Thomson (Gr. *phaios*, dark, dusky; a seemingly inappropriate epithet for the whitish gray lichen) Our only record for this species is from a collection made on a sandstone outcrop west of Covil Creek in La Salle County. [atranorin, zeorin]

LaSalle-MOR

Physcia pumilior R. C. Harris (L. *pumilus*, dwarfish + *-ior*, a comparative ending; from the tiny lobes, much narrower than those of its closest relative, *Physcia aipolia*) Rare, our only specimens are from *Populus deltoides*, *Fraxinus americana*, and from a limestone tombstone. The Lake County, Illinois specimen is from a specimen of *Myelchroa galbina* [Calkins #100a, F], which see. This is the *P. alba* of Midwestern authors. [atranorin, zeorin]

DeKalb-MOR,DuPage-MOR,Ford-MOR,LakeIL-F*,Ogle-ILLS*,Walworth-MOR

Physcia stellaris (L.) Nyl. (L. *stellaris*, starry, speckled; perhaps from the often radiate silver thallus lobes) Including *P. stellaris* f. *tuberculata* (Kernst.) DT. & S. Specimens at CACS and F were called *Physcia granulifera* by Calkins; he also correctly call some specimens, *P. stellaris*. Thomson (1963) refers a Lake County, Illinois, specimen to *P. stellaris* f. *stellaris*. First collected locally in 1894 (Higginson s.n., F), this species is ubiquitous on a wide variety of corticolous and lignicolous substrates, though nearly half of our specimens are from *Fraxinus lanceolata*, *Populus deltoides*, and *Quercus velutina*. Frequent associates include *Candelaria concolor*, *Chrysothrix caesia*, *Hyperphyscia adglutinata*, *Phaeophyscia pusilloides*, and *Physcia millegrana*. It is frequent on fallen branches, the source trees of which are sometimes difficult to determine. [atranorin]

Allegan-MOR,MSC,Barry-MSC,Benton-MOR,Berrien-MIN*,MOR,Boone-MOR,Branch-MOR,Calhoun-MOR,MSC,Cass-MOR,Cook-CACS*,F*,MOR-NY,DeKalb-MOR,DuPage-F*,ILLS*,MOR,WIS*,Elkhart-MOR,Ford-MOR,Fulton-MOR,Grundy-MOR,Iroquois-MOR,Jasper-MOR,Jefferson-MOR,WIS*,Kalamazoo-MOR,MSC,Kane-MOR,Kankakee-MOR,Kendall-MOR,Kenosha-MOR,WIS*,Kent-MOR,MSC,Kosciusko-MOR,LaGrange-MOR,LakeIL-F*,ILLS*,MIN*,MOR,LakeIN-MIN*,MOR,LaPorte-MOR,LaSalle-F*,MOR,NY,Lee-ILLS*,Livingston-MOR,Marshall-MOR,McHenry-MOR,NY,Milwaukee-MOR,UWSP,Newton-MOR,Noble-MOR,Ogle-MOR,Ottawa-CACS*,MOR,MSC,Porter-F*,ILLS*,MIN*,MOR,Pulaski-MOR,Racine-MOR,Rock-MOR,WIS*,St.JosephIN-F*,MOR,St.JosephMI-MOR,Starke-MOR,Steuben-MOR,VanBuren-ASU,MOR,Walworth-MOR,WIS*,Waukesha-ILLS*,MOR,WIS*,White-MOR,Will-ILLS*,MOR,Winnebago-ILLS*,MOR

Physcia subtilis Degel. (L. *subtilis*, slender, minute, delicate; from the very narrow thallus lobes) Rare on partly shaded granitic erratics. The Jefferson County record is on a specimen of *Candellariella vitellina* (Thomson 1933, F) See also the note under *P. dakotensis*. [atranorin]

Berrien-MOR,Cook-MOR,DuPage-MOR,Jefferson-F*,Kane-MOR,LaSalle-MOR,McHenry-MOR,Waukesha-MOR

Physcia tenella (Scop.) DC. (L. *tenellus*, delicate, tender; from the slender, erect or ascending, fragile-looking thallus lobes) Our only record of this largely western species is from a rock in Galesburg, Michigan, although it commonly grows on *Populus*. Thalli without soralia would be difficult to distinguish from similarly sterile forms of *Physcia adscendens*.

Kalamazoo-YMP

Physcia thomsoniana Essl. (In honor of the Wisconsin lichenologist, John Walter Thomson, 1913-2009, founder of the Botanical Club of Wisconsin and mentor to many aspiring lichenologists) This species is rare on granitic erratics in pastures and old fields; there is also a specimen from nearby Lee County, Illinois, from the cortex of *Quercus velutina*. See also notes under *P. dakotensis* and *P. millegrana*. [atranorin]

Barry-MOR, Fulton-MOR, Jefferson-MOR, LaSalle-MOR, Lee-MOR, Ogle-MOR, Walworth-MOR, Waukesha-MOR

PHYSICIACEAE

- A. Thallus crustose, fully adherent to the substrate.
 - Thallus lobed **Hyperphyscia**
 - Thallus not lobed **Rinodina**
- A. Thallus foliose.
 - B. Thallus mineral or whitish gray, cortex K+ yellow
 - C. Cells of upper cortex isodiametric; lower cortex corticate **Physcia**
 - C. Cells of upper cortex elongate and aligned with the lobes; lower cortex corticate or ecorticate.
 - Thallus lacking either isidia or soredia, the margins eciliate **Polyblastidium**
 - Thallus either isidiate or sorediate, or if with out diaspores, then the margins long-ciliate **Heterodermia**
 - B. Thallus brown or brownish gray; cortex K-.
 - D. Lobe surfaces abundantly pruinose; soralia linear and marginal **Physconia**
 - D. Lobe surfaces epruinose; soralia usually laminal.
 - E. Thallus margins and rims of apothecia dissected into isidioid lobules **Anaptychia**
 - E. Thallus and apothecia without isidioid lobules.
 - Lower cortex paraplectenchymatous **Phaeophyscia**
 - Lower cortex prosoplectenchymatous **Physciella**

PHYSICIELLA Essl. PHYSICIACEAE [Photobiont: *Trebouxia*. *Physcia*, which see + L. *-ellus*, diminutive; supposedly smaller than many *Physcia* species. ~ Thallus foliose, adnate, narrowly lobed, pale gray, the upper cortex and medulla K-; lower cortex white, prosoplectenchymatous; spores not seen, but presumably like those of *Phaeophyscia*.]

- 1. Many of the soredia in crescent-shaped soralia at the lobe tips P. CHLOANTHA
- 1. Soredia all, or nearly all in laminal soralia P. MELANCHRA

Physciella chloantha (Ach.) Essl. (Gr. *chloanthos*, budding; perhaps from the abundant sorediate lobe tips) = *Physcia chloantha* Ach.; *Phaeophyscia chloantha* (Ach.) Moberg. This is a ubiquitous corticolous species of disturbed and landscaped areas on fast-growing species such as *Acer saccharinum*, *Celtis occidentalis*, *Gleditsia triacanthos*, *Populus alba* and *Malus species*. In

natural habitats it occurs on open-grown trees of *Quercus alba*. It also grows on tombstones with *Physconia leucoleiptes* and *Xanthomendoza* species and on concrete with *Endocarpon petrolepideum*, *Myriolecis dispersa*, and the like. It would not be difficult to confuse this species with *Phaeophyscia pusilloides*, particularly if admixed with other species, if care is not taken to determine the white color of the lower cortex and the prevailing crescent-shaped soredia.

Allegan-MOR, Barry-MOR, Benton-MOR, Berrien-MIN*, MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, MSC, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kent-MOR, Kenosha-MOR, WIS*, Kosciusko-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MIN*, MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, Porter-MIN*, MOR, Racine-MOR, Rock-MOR, WIS*, Steuben-MOR, St. JosephIN-MOR, St. JosephMI-MOR, Starke-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Physciella melanchra (Hue) Essl. (Gr. *melaina*, black + *chroa*, color of the skin, superficial color; perhaps from the darkened color of the upper cortex) Infrequent, our only specimens are from weathered fence rails, *Acer rubrum* and *Platanus occidentalis* as well as on weathered concrete. There is a specimen from a small boulder in the flood plain of the Illinois River in LaSalle County, which had been filed at ILLS as *Phaeophyscia imbricata*. A report of *Phaeophyscia imbricata* from DuPage County (Wilhelm & Lampa 1987) is referred here. See also note under *Phaeophyscia squarrosa*. This species might be confused with *Phaeophyscia insignis*, which is similar, with orbicular soralia, but much smaller lobed and with a paraplectenchymatous lower cortex; the lobes of the *Physciella* are commonly more than 0.3 mm wide and the lower cortex is prosoplectenchymatous.

Boone-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Kosciusko-MOR, LaSalle-ILLS*, Lee-MOR, McHenry-MOR, Milwaukee-MOR, Ogle-MOR, Porter-MOR, Winnebago-MOR

PHYSCONIA Poelt PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *physcion*, paunch, belly; evidently derived from *Physcia*, which see. ~ Thallus foliose, adnate, narrowly lobed, brownish gray to brown, often pruinose at or near the lobe tips; lower cortex black but pale at the margins; rhizines usually squarrose; medulla K- or K+ yellow, C- or C+ rose; spores not seen, but presumably like *Physcia*.]

1. Soredia absent P. MUSCIGENA
1. Soredia present.
 2. Soredia K-.
 - Lower lobe tip surfaces ecorticate, sometimes with nigrescent striations; at least the older soralia with the soredia lacking or admixed with simple to coralloid isidia P. PERISIDIOSA
 - Lower lobe surfaces corticate, without nigrescent striations; soralia finely sorediate, confined to the lobe margins, but not isidiate P. DETERSA
 2. Soredia K+ yellow.
 - Medulla yellowish, K+ yellow P. ENTEROXANTHA
 - Medulla white, K-.
 - Medulla C+ red P. KUROKAWAE
 - Medulla C- P. LEUCOLEIPTES

Physconia detersa (Nyl.) Poelt (*L. detersus*, cleansed, removed; the application here uncertain) Our only record for this species is from the bole of *Tilia americana* near the shore of Lake Michigan. ~ Thallus corticolous or saxicolous, or among mosses over rock, the lobes flattish to shallowly concave, and usually up-turned, pruinose; soralia strictly marginal, more or less continuous proximally, usually interrupted distally, finely to granular-soresiate; upper cortex scleroplectenchymatous, with notably thick walled; lower cortex more or less prosoplectenchymatous, pale to sordid, usually nigrescent proximally; rhizines squarrose, black; medulla white or weakly sordid. [\pm variolaric acid]

Racine-MOR

Physconia enteroxantha (Nyl.) Poelt (Gr. enteron, gut, intestine + *xanthos*, the various shades of yellow; an allusion to the yellow medulla) Evidently rare locally, our only record is from the upper branches of *Populus deltoides* along the Fox River.. ~ Thallus corticolous or saxicolous the lobes flattish or weakly concave, nearly always pruinose; soralia prevailingly marginal, not consistently lip-shape; upper cortex paraplectenchymatous; lower cortex more or less prosoplectenchymatous, palescent to tan or sordid to sordid, nigrescent proximally; rhizines squarrose, black; medulla prevailingly with tinctures of yellow. [secalonic acid A]

Kendall-MOR

Physconia kurokawae Kashiw. (In honor of the beloved Syo Kurokawa, 1926–2010, of the Botanic Gardens of Toyama, Toyama, Japan). Most contemporary floristicians include this taxon with *P. leucoleiptes*, of the opinion that it is a mere chemotype. It may be but it does appear to be a little more conservative, most often seen in ramnant landscapes. We are treating it separately, however, on the chance that it may eventually prove to have distribution or habitat differences along the line, for example, of *Protoparmeliopsis gyrophorica* (Lendemer) S. Y. Kondr. Locally, it is still unknown from both *Crataegus* and the weathered concrete—which comprise nearly 30% of the known substrates for *P. leucoleiptes* in the same region. We have records from *Acer saccharinum*, *Fraxinus americana*, *Malus pumila*, *Populus deltoides*, *Prunus serotina*, *Quercus alba*, *Quercus macrocarpa*, and *Quercus velutina*, as well as lignin, dolomite, and sandstone. ~ Morphologically very similar to *P. leucoleiptes*, which see. [gyrophoric acid; secalononic acid A]

Allegan-MOR, DuPage-MOR, Kankakee-MOR, Kenosha-MOR, Kent-MOR, Koskiusko-MOR, Lee-MOR, Livingston-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, VanBuren-MOR, White-MOR

Physconia leucoleiptes (Tuck.) Essl. (Etymology unknown to me; perhaps a Greek allusion to the white pruina. = *Physcia grisea* (Lam.) Zahlbr. f. *grisea* of Thomson (1963). Though not nearly so common, this species grows on substrates similar to those of *Candelaria concolor* and *Physcia millegrana*, which are its nearly constant associates. This plant was long included by American authors with *Physconia detersa* (Nyl.) Poelt, which see. *Physconia grisea* (Lam.) Poelt has been reported from our region, most of those reports are referable here, the latter being a largely European species with simple, grayish rhizine. A very variable species, *P. leucoleiptes*, some thalli can have the finely soresiate lobe margins evocative of *P. detersa* and others the isidia evocative of *P. perisidiosa*, but the K⁺ yellow reaction of the soralia tell tale on the presence of secalononic acid A. ~ Thallus corticolous or saxicolous the lobes flattish and usually

up-turned, nearly always pruinose, sometimes with marginal phyllidia; soralia both laminal and lip-shaped along the margins, finely to granular sorediate or even isidioid near the center of the thallus and along the lobes; upper cortex scleroplectenchymatous, with notably thick walled; lower cortex more or less prosoplectenchymatous, pale to sordid, usually nigrescent proximally; rhizines prevailing squarrose, black, or some penicillate and pale, particularly distally; medulla white. [secalonic acid A (particularly in the soralia); ± gyrophoric acid]

Allegan-MOR, MSC, Barry-MOR, MSC, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-FH, WIS*, Kalamazoo-MOR, Kane-MOR, Kendall-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-ILLS*, Livingston-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-ILLS*, MOR, Porter-MOR, Pulaski-MOR, Rock-MOR, WIS*, St. JosephIN-MOR, St. JosephMI-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

Physconia muscigena (Ach.) Poelt. (L. *muscus*, moss + *gena*, born; from its common inhabitancy over mosses) Yet unknown this species is known from areas just west and north of this region, where it grows among mosses over soil or rock. ~ Thallus muscicolous, the lobes generally at least shallowly concave and up-turned, nearly always pruinose; upper cortex paraplectenchymatous; lower cortex prosoplectenchymatous, pale to sordid, usually nigrescent proximally; rhizines squarrose, black; medulla usually white, but rarely yellowish. [± secalonic acid A, ± variolaric acid]

Physconia perisidiosa (Erichsen) Moberg (L. *per-*, thoroughly, utterly + *isidium*, corticate outgrowth + *-osa*, condition) Rare, our only records are from weathered rails and the boles of *Populus deltoides*, *Quercus alba* and *Salix nigra*, though in our western purlieu there is a specimen from a limestone boulder. ~ Thallus corticolous or saxicolous, or among mosses over rock, the lobes flattish to convex, often with marginal phyllidia, nearly always pruinose; soralia lip-shaped, primarily on upturned margins; upper cortex scleroplectenchymatous, with notably thick walled; lower cortex largely absent, the surface, pale, usually nigrescent proximally; rhizines squarrose, black; medulla white.

Berrien-MOR, Elkhart-MOR, Jasper-MOR, Winnebago-MOR

PILOCARPACEAE

- A. Apothecia without any evident proper margin; hypothecium hyaline **Micarea**
- A. Apothecia biatorine, with a thin but evident proper margin; hypothecium brown.
 - B. Spores simple, less than 15 μm long **Leimonis**
 - B. Spores 1-3 septate, more than 15 μm long.
 - Hypothecium K+ purple **Aquacidia**
 - Hypothecium K- **Fellhanera**

PLACIDIOPSIS Beltr. VERRUCARIACEAE [Photobiont: *Trebouxia*. With the appearance of *Placidium*. ~ Thallus minutely squamulose, gray, saxicolous; perithecia black; spores 8, hyaline, 1-septate, ellipsoid.]

Placidiopsis minor R. C. Harris (L. *minor*, smaller, less) Yet unknown from the Southern Lake Michigan region, this minute, squamulose, areolate pyrenocarp grows on siliceous rocks,

particularly pebbles in sandy areas, often with or over *Leimonis erratica* and *Trapelia glebulosa* (Harris 1979). ~ Thallus of dark grey-brown, flat to concave, adnate, dispersed to aggregate areoles to 0.5 mm in diameter, the latter thinly greyish pruinose with a darker margin; spores $8.5\ \mu\text{m}$ – $10\ \mu\text{m} \times 4.5\ \mu\text{m}$ – $5\ \mu\text{m}$.

PLACIDIUM Flot. VERRUCARIACEAE [Photobiont: *Trebouxia* and *Myrmecia*.
Gr. *plax*, a flat round plate, dish + *-idion*, diminutive; from the planar squamules. ~ Thallus squamulose, adnate, brown; perithecia immersed, the hamathecium evanescent; spores 8, hyaline, simple. Some authorities place those forms with rhizines in the genus *Clavascidium* Breuß.]

1. Thallus corticolous, squamulose and adnate to foliose with the lobes densely rhizinate below . P. ARBOREUM
1. Thallus terricolous, squamulose or crustose, tightly adnate; rhizines present or absent.
 2. Lower surface of squamules with broad bare black zones; rhizohyphae aggregated in disparate patches P. LACHNEUM
 2. Lower surface of squamules with out bare zones, the lower cortex brown; rhizohyphae uniformly distributed.
 3. Rhizines absent, only fine rhizohyphae present P. SQUAMULOSUM
 3. Rhizines present, coarse, intermixed with the brownish rhizohyphae.
 - Spores in 2 rows in the ascus; rhizines brown P. UMBRINUM
 - Spores in 1 row in the ascus; rhizines pale P. LACINULATUM

Placidium arboreum (E. Michener) Lendemer (*L. arboreus*, of trees)) Our only record for this species is a Calkins specimen from La Salle County at the University of Illinois in the bound volumes of *Lichenes Exsiccati*. Calkins called it *Endocarpon arboreum*. Farther south, this species is occasional on old-growth, open-grown ashes and oaks of the white oak group. ~ Spores uniseriate in the ascus, $9\ \mu\text{m}$ – $12\ \mu\text{m} \times 4.5\ \mu\text{m}$ – $5.5\ \mu\text{m}$.

LaSalle-ILL

Placidium lachneum (Ach.) B. de Lesd. (Gr. *lachnos*, woolly hair, down; from the dense fibrous prothallus) Including, part, local reports of *Catapyrenium lachneum* (Ach.) R. Sant., *Dermatocarpon lachneum* (Ach.) A. L. Sm., *Endocarpon hepaticum* Ach.; probably also including *E. rufescens* Ach. Allo of our records are from dolomite prairies in Will and Boone counties and outwash prairies in McHenry and northwestern Cook counties. It often grows with *Heppia conchiloba* and *Psora decipiens* and prairie species such as *Andropogon gerardii*, *A. scoparius*, *Artemisia campestris caudata*, *Comandra richardsiana*, *Dalea purpurea*, *Euphorbia corollata*, *Liatris cylindracea*, *Schizachyrium scoparium*, *Silphium terebinthinaceum*, and *Solidago decemflora*. It occurs occasionally with *Placidium squamulosum*. ~ Spores uniseriate in the ascus, $14\ \mu\text{m}$ – $18\ \mu\text{m} \times 6\ \mu\text{m}$ – $8\ \mu\text{m}$.

Boone-MOR, Cook-MOR, Kenosha-MOR, McHenry-MOR, Rock-WIS*, Walworth-MOR, Will-MOR

Placidium lacinulatum (Ach.) Breuß (*L. lacinulatus*, with small flaps or divisions)
= *Clavascidium lacinulatum* (Ach.) M. Prieto. Our only record is from a morainic prairie ridge at LuLu Lake, near Troy Center, outwash gravel in Walworth County. ~ Spores uniseriate in the ascus, $12\ \mu\text{m}$ – $16\ \mu\text{m} \times 6\ \mu\text{m}$ – $7.5\ \mu\text{m}$.

Walworth-WIS*

Placidium squamulosum (Ach.) Breuß (L. *squamulosus*, covered with small scales; from the aggregated scale-like thalli) Occasional in our western sector in areas of base-rich soil where the soil is shallow and or competition from vascular vegetation is scant. In Grows on thin soil over dolomite, gravelly hill prairies, and sand prairies near Lake Michigan. There are a few specimens from compacted clay and old gravel quarries, where it is obviously adventive. In sand prairie near the lake vascular vegetation associates include *Andropogon gerardii*, *Artemisia caudata campestris*, *Coreopsis lanceolata*, *Euphorbia corollata*, *Liatris aspera intermedia*, *Lithospermum croceum*, *Minuartia michauxii*, *Oligoneuron album*, *Schizachyrium scoparium*, *Smilacina stellata*, *Solidago decemflora*, *Solidago speciosa*, *Symphotrichum ericoides*, and *Symphotrichum oolentangiense*. ~ Spores uniseriate in the ascus, 12 μm –16 μm \times 5.5 μm –7.5 μm .

Cook-MOR, DuPage-MOR, Kane-MOR, Kenosha-MOR, LakeIL-MOR, LakeIN-MOR, Lee-MOR, McHenry-MOR, Ogle-MOR, Rock-MOR, Will-MOR, Winnebago-MOR

Placidium umbrinum (Breuß) M. Prieto & Breuß (L. *umbros*, full of shade + *-inus*, pertaining to; from the dark color of the apothecia) = *Clavascidium umbrinum* (Breuß) M. Prieto. Our only record for this species is the report from Jefferson County by Thomson (2003). ~ Spores biseriate in the ascus, 13 μm –17 μm \times 6 μm –8 μm .

Waukesha-WIS

PLACYNTHIACEAE

One local genus **Placynthium**

PLACOPYRENIUM Breuß VERRUCARIACEAE [Photobiont: *Diplosphaera*, *Myrmecia*, and *Protococcus*. Gr. *plax*, a flat round plate, dish + *-idion* + *pyren*, kernel, the allusion not quite clear. We have little confidence that the specimens upon which the following names are based look much like their type material. ~ Thallus crustose, saxicolous, epilithic, thickly rimose, the medulla very thick, without a carbonaceous hypothallus; perithecia immersed, the ostiole not evident at the surface; hamathecium with the interthecial hyphae evanescent, the hymenial gel I+ bluish, becoming reddish; spores 8, hyaline to brownish, simple, ellipsoid.]

Placopyrenium fuscillum (Turner) Guido & Cl. Roux (L. *fuscus*, brown + *-ellus*, diminutive; from the color of the thallus) This species, if we are interpreting it properly, is rare, our only record being from exposed dolomite bedrock in full sun in a dolomite prairie, where it grew on the same specimen as *Bagliettoa calciseda* (Hyerczyk #2344). There is a report by Fink (1906), from an esker in Kane County. We have seen a few specimens from farther south in Illinois, all on limestone outcrops. The student may wish to consult Navarro-Rosines *et al.* (2007) for more on this species. Locally, it is most likely to be confused with *V. fayettensis* and all other such alleged specimens we have seen are thereto referred. The latter has a black involucrellum and a black endolithic hypothallus. Our Illinois specimens have pale-brown to brownish areoles with a single ostiole per unit and corticate lower marginal surfaces. A

similar but pruinose species, *P. canellum* (Nyl.) Gueidan & Cl. Roux (*L. canus*, pale + *-ella*, diminutive perhaps an allusion to the pale areoles in contrast to the black jugae) has been reported from the Midwest. ~ Thallus areolate to subsquamulose, the margins elevated or appressed, but corticate and without rhizohyphae, rarely with more than 1 ostioles per areole, often lobulate at the margin; lacking an endolithic hypothallus or black basal area, although the medulla can be darkly pigmented; involucrellum absent; asci clavate, 40–50 $\mu\text{m} \times 14$ –17 μm , the spores 12–17 $\mu\text{m} \times 5$ –7 μm ; L/W: 2.3–3.0.

Will-F*(on specimen of *Bagliettoa calciseda*)

PLACYNTHIELLA Elenkin TRAPELIACEAE [Photobiont: *Chlorella?*, in multicellular packets. The genus *Placynthium* + *-ellus*, diminutive; from the minute dark-colored, isidioid thallus. ~ Thallus crustose, brownish, of minute coralloid-isidiate granules; apothecia, biatorine, the ascus tip amyloid, I+; spores 8, hyaline, simple to 1-septate, ellipsoid.]

1. Thallus C+ pink; thallus corticolous or lignicolous *P. ICMALEA*
1. Thallus C-; thallus arenicolous or lignicolous.
 - Wet thallus granules dark brown to black, less than 0.1 mm across *P. ULIGINOSA*
 - Wet thallus granules distinctly greenish, mostly more than 0.1 mm across *P. OLIGOTROPHA*

Placynthiella icmalea (Ach.) Coppins & P. James (Gr. *icmas*, moisture + *aleo*, warmed or exposed to the sun; perhaps from the dark color of the thallus on weathered wood that gives the appearance of a moist stain) = *Saccomorpha icmalea* (Ach.) Clauzade & Roux. Skorepa's report of *Lecidea uliginosa* from Will (his #5217, SIU) is referable here. It is occasional on dead limbs, decorticate logs, and old wood. Even though this species contains gyrophoric acid, which typically reacts C+ pink, it is a fast-fading pink, and sometimes difficult to discern from a simple C test. Negative results should be confirmed with TLC before concluding the specimen is not *P. icmalea*. Wetmore (1988) reports it from Porter County. Not too distant from our region, north and south, is *P. dasae* (Stirt.) Tønsberg (etymology obscure), which also produces gyrophoric acid, has extremely fine granules, scarcely 0.02 mm in diameter; those of *P. icmalea* usually run 0.025 mm or more in diameter. ~ Spores 8 μm –12 $\mu\text{m} \times 4$ μm –5 μm . [gyrophoric acid, \pm lecanoric acid]

Cook-MOR, DuPage-MOR, Jasper-MOR, LakeIL-MOR, LakeIN-MIN,MOR, LaPorte-MOR, Ottawa-MSC, Porter-MIN*, Walworth-MOR, Will-ILLS*, MOR

Placynthiella oligotropha (J. R. Laundon) Coppins & P. James (Gr. *oligos*, few, small + *trophis*, well nourished; from its tendency to grow in areas where nutrients are scarce, such as on sand) = *Saccomorpha oligotropha* (J. R. Laundon) Clauzade & Roux. Wetmore (1988) reported this species for Porter County, collected on sand north of Furnessville Road along the horse trail south of the visitor center at the Indiana Dunes National Lakeshore, but our interpretation of the specimen places it with *P. uliginosa*. It is known from districts farther north and east of our region. ~ Spores 9 μm –15 $\mu\text{m} \times 4.5$ μm –7.5 μm . [no substances]

Placynthiella uliginosa (Schrad.) Coppins & P. James (*L. uliginosus*, full of moisture;

perhaps the dark thallus appears soaked from a distance) Locally this species is a rather common sand binder, but apothecia are rarely noted. Most of our local records for this species are in Black Oak savannas, but it is a frequent sand binder in sandy prairies farther south and will certainly be documented more regularly in our sand counties. We have several specimens from weathered lignin. ~ Spores $7\ \mu\text{m}$ – $15\ \mu\text{m} \times 5\ \mu\text{m}$ – $7\ \mu\text{m}$. [no substances]

Allegan-MOR, Berrien-MOR, Cook-MOR, Elkhart-MOR, Kankakee-MOR, LaSalle-F, Porter-MIN*, Pulaski-MOR, VanBuren-MOR, Will-MOR

PLACYNTHIUM (Ach.) Gray PLACYNTHIACEAE [Photobiont: *Dichothrix* and *Scytonema*. Etymology evidently known only to Acharius. Thallus crustose to dwarf-foliose, black, gelatinous; apothecia biatorine; spores 8, hyaline, 1–3 septate.]

Placynthium nigrum (Hudson) Gray (L. *niger*, black; from the color of the thallus) = *Pannaria nigra* of Calkins. This species is rare on weathered dolomitic erratics and outcrops. The Rock County specimen is from a weakly base-rich sandstone outcrop along a prairie bluff. ~ Prothallus present and visible at the margins, blue-black; thallus isidiate throughout, dark brown; spores $8\ \mu\text{m}$ – $20\ \mu\text{m} \times 3.5\ \mu\text{m}$ – $6.0\ \mu\text{m}$.

Boone-MOR, Cook-MOR, DuPage-MOR, Kane-MOR, Kankakee-MOR, LaSalle-CACs*, Ogle-MOR, Rock-MOR, Will-MOR

POLYBLASTIDIUM Trevisan PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *poly*, many + *blastos*, sperm, germ, seed + adjectival ending; evidently from the 1–3 subcavities in the spores, ~ Thallus foliose, white, the principal lobes narrow; upper cortex with elongate cells; lower cortex absent the surface cobwebby and without large pigmented patches; apothecia, if present, lecanorine; this disks brown; spores 8, brown, 1-septate, with 1–3 smaller subsidiary cells (sporoblastidia).]

Polyblastidium hypoleucum (Ach.) Kalb (Gr. *hypo*, under, beneath, less than usual + *leukos*, white; from the white lower surface) = *Heterodermia hypoleuca* (Müll.) Trev. Yet unknown locally, this species is well documented from all around the Southern Lake Michigan Region, where it grows on a wide variety of corticolous substrates. ~ Thallus without isidia or soredia; apothecia becoming deeply incavate, the margins minutely lobulate.

PLEOSPORACEAE

One local genus **Kirschsteiniothelia**

POLYSPORINA Vězda ACAROSPORACEAE [Photobiont: *Trebouxia* and *Myrmecia*. Gr. *poly*, many + *spora*, seed + L *-inus*, pertaining to; from the numerous spores in each ascus. ~ Thallus crustose, saxicolous, endolithic or obscure; apothecia lecideine, the disks commonly with carbonaceous inclusions;

paraphyses much branched and anastomosed; asci I- but much thickened at the tips; spores numerous, minute, bacilliform, simple.]

1. Apothecia lichenicolous or seemingly nested in a lichenized thallus P. SUBFUSCENS
1. Apothecia not lichenicolous, with the thallus wholly endolithic P. SIMPLEX

Polysporina simplex (Taylor) Vězda (L. *simplex*, simple; perhaps from its simple form, having tiny apothecia and no thallus) = *Acarospora privigna* (Ach.) Schneider. Our only records of this species are from granitic boulders, often with *Lecanora polytropa*. *Polysporina urceolata* (Anzi) Brodo (L. *urceolus*, a little urn or pitcher) has been reported from "dolomitic gravel on a hill prairie near Elgin," but no specimen can be found. ~ Spores 3 μm –5 μm \times 1.5 μm –1.9 μm .

Cook-MOR, DuPage-MOR, Grundy-MOR, LakeIN-MOR, LaSalle-ILL,MOR, Ogle-ILLS*,MOR

Polysporina subfuscescens (Nyl.) K. Knudsen & Kocourk. (L. *sub-*, below or not quite, *fuscatus*, brownish + *-escens*, becoming; not really brown) This species is well known from districts east and west of our region, but evidently rare in the Midwest. We have a record from southwestern Michigan, where it appears to be growing on *Kuettlingeria soralifera*; other lichens growing on the same hard limestone include *Candelariella aurella*, *Myriolecis dispersa*, *Physcia adscendens*, *Verrucaria furfuracea*, and *Xanthocarpia feracissima*. This species can grow seemingly as an endolithic species, which would make it difficult to separate from *P. simplex*, which, however, would have a well-developed algal layer beneath the apothecium. ~ Apothecia black and remaining so when wet, strongly comprised of carbonaceous ribs; Spores 3.5 μm –5.5 μm \times 1.5 μm –2.5 μm .

VanBuren-MOR

PORINACEAE

One local genus **Pseudosagedia**

PORPIDIA Körber LECIDEACEAE [Photobiont: *Trebouxia*-like. Gr. *porpe*, a buckle or pin, a brooch + *-idion*, diminutive; conceivably from the apothecia, evocative of little pins or brooches. ~ Thallus crustose, white to grayish, saxicolous; apothecia immersed or nearly so, lecideine; spores 8, hyaline, simple, ellipsoid, halonate; axis of ascus apex strongly amyloid, *Porpidia*-like.]

1. Apothecia densely gray pruinose P. ALBOCAERULESCENS
1. Apothecia epruinose, black.
 2. Apothecial rim finely but distinctly radiately cracked or wrinkled P. SUBSIMPLEX
 2. Apothecial rim smooth or essentially so.
 - Apothecia to 1.2 mm across P. CRUSTULATA
 - Larger apothecia more than 1.2 mm across P. MACROCARPA

Porpidia albocaerulescens (Wulfen) Hertel & Knoph (L. *albus*, white + *caeruleus*, dark blue + *-escens*, beginning, becoming, slightly; from the color of the apothecia) Our only record for this species is from a granitic boulder Serena, in La Salle County. ~ Thallus epilithic, grayish green to whitish; apothecia immersed, 0.5–1.5 mm across, heavily pruinose; spores 17–25 \times

6–10 μm . [stictic acid, norstictic acid]

LaSalle-MOR

Porpidia crustulata (Ach.) Hertel & Knoph (Gr. *crustulatus*, burnt or charred; from the black apothecia) = *Lecidea crustulata* (Ach.) Sprengel Our only records for this species are from dry sandstone exposures. Armstrong (1977) reported this species (as *Lecidea crustulata*) from the Morton Arboretum in Du Page County, but her specimen was sterile and collected from oak. Another lichen with black, lecideine apothecia 0.5 mm or more wide is *Carbonea latypizodes* (Nyl.) Knopf & Rambold; it is reported from nearby Green County, Wisconsin, on sandstone. It differs in having atranorin in the thallus. Also compare with *Lecidella stigmatea* and *Bryobilimbia ahlesii*. ~ Thallus mostly endolithic; apothecia not pruinose, 0.5–1.2 mm across, the margin neither brittle nor radially cracked, but remaining black; hymenium to 80 μm high; spores 11–20 \times 5–9 μm . [stictic acid, \pm norstictic acid]

LaSalle-MOR, Ogle-MOR

Porpidia macrocarpa (DC.) Hertel & A. J. Schwab (L. macro-, large + Gr. karpos, fruit; an allusion to the large apothecia) = *Lecidea macrocarpa* (DC.) Steudel; *Lecanora privigna* of some Calkins specimens. Our only record for this species is from Calkins collection (#6118, CACS) on sandstone in LaSalle County. ~ Thallus partly epilithic, continuous to rimose or areolate, white or sordid; apothecia black, convex, the proper margin often excluded, 0.5–2 mm across; epihymenium brownish or black; hymenium hyaline, hypothecium brown, the paraphyses coherent distally; spores 15–26 \times 6–12 μm . [stictic acid, \pm cryptostictic acid]

LaSalle-CACS*

Porpidia subsimplex (H. Magn.) Fryday (L. *sub*, a little like, nearly + *simplex*, simple; the allusion unclear, though possibly Magnusson was impressed by a superficial resemblance to *Polysporina simplex*) = *P. tahawasiana* Gowan; *Lecanora privigna* var. *revertans*, of Calkins. Our only records for this species are from sandstone in our western sector. It is very similar in appearance to *P. crustulata*, and there are some specimens that are discouragingly ambiguous in their identity. In some cases, unlike with *P. crustulata*, the hymenium of *P. subsimplex* reddens a bit with moisture. ~ Thallus endolithic; apothecia, the margin notably brittle and radially cracked; spores 12–18 \times 6–8 μm .

LaSalle-CACS*,F*, Lee-MOR

PROTOBLASTENIA (Zahlbr.) J. Steiner PSORACEAE [Photobiont: Chlorococ-
coid. Gr. *protos*, first, primary + *blastos*, a germ, bud, shoot + *-enos*, pertaining
to; from the simple spores. Notwithstanding the K+ purple apothecium, which
is evocative of *Caloplaca*, the anatomy of the ascoma and spores are more *Psora*-
like. ~ Thallus crustose, endolithic to epilithic, white to grayish, K–; apothecia
sessile, orange, K+ magenta in the epihymenium, without an evident margin;
spores 8, hyaline, simple, ellipsoid; parietin.]

Protoblastenia rupestris (Scop.) J. Steiner (L. *rupestris*, growing on rocks; from its habitat)
Our only records of this species are from exposed dolomitic bedrock. Calkins & Huett (1898)

reported *Biatora calcivora* (= *Clauzadea immersa*) from nearby La Salle County, but Richard Harris (pers. comm.) believes this report is likely to be referable here. ~ Thallus rather well-developed, white or sordid, rimose-areolate; spores $10\ \mu\text{m}$ – $15\ \mu\text{m} \times 5.5\ \mu\text{m}$ – $8.5\ \mu\text{m}$.

Boone-MOR, Cook-MOR, DuPage-MOR, Will-MOR

PROTOPARMELIOPSIS M. Choisy LECANORACEAE [Photobiont: *Trebouxia*. Gr. *proto-*, first, original, chief + *parmelia* + Gr. *opsis*, aspect, view, appearance, evidently evocative of a nascent *Parmelia*. ~ Thallus crustose, yellow-green, the margins effigurate; apothecia common, lecanorine the rims paler than the disks; spores 8, hyaline, simple or rarely 1-septate, ellipsoid.]

Protoparmeliopsis muralis (Schreber) M. Choisy (*L. muralis*, growing on walls; from its frequent occurrence on walls) = *Lecanora muralis* (Schreb.) Rabenh. This species is characteristic of dolomitic outcrops and erratics in pastures and prairies, but can in habit weathered concrete and even siliceous rocks, such as granite or basalt. Evidently a species native to the area, it is interesting that Calkins did not report it. Farther south and west, specifically on siliceous or sandstone substrates, one may encounter specimens with gyrophoric acid in the cortex, which specimens may be called *P. gyrophorica* Lendem. [usnic acid, triterpenoides, ± fumarprotocetraric acid]

Boone-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Grundy-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, LakeIL-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, McHenry-MOR, Ogle-MOR, Racine-MOR, Rock-MOR, WIS, Walworth-MOR, WIS, Will-MOR, Winnebago-MOR

PSEUDOSAGEDIA (Müll. Arg.) M. Choisy PORINACEAE [Photobiont: *Trentepohlia*. Gr. *pseudo-* false + *sagedia*, evocative of the genus *Sagedia*. ~ Thallus crustose, continuous to rimose; perithecia black, the ostiole pale; hamathecium not interspersed, the pseudoparaphyses nearly unbranched, not anastomosing; spores 8, hyaline, 4-several celled, fusiform.]

Pseudosagedia chlorotica (Ach.) Hafellner & Kalb (Gr. *khloros*, greenish-yellow, perhaps from the color of the hypothecium) = *Porina chlorotica* (Ach.) Müll.-Arg.; *Trichothelium chloroticum* (Ach.) R. C. Harris. Our only records are from granitic erratics. ~ Thallus rather well-defined, brownish or greenish; spores not ornamented, $16\ \mu\text{m}$ – $25\ \mu\text{m} \times 4\ \mu\text{m}$ – $6\ \mu\text{m}$.

DuPage-MOR, LaSalle-F, Will-MOR

PSILOLECHIA A. Massal. PSILOLECHIACEAE [Photobiont: *Trebouxia*. Gr. *psilos*, tall, high + *lechos*, couch, bed, nest; the allusion unclear. ~ Thallus crustose, vivid yellow-green, leprose, without a prothallus; apothecia yellow, without a thalline margin; spores 8, hyaline, simple.]

Psilolechia lucida (Ach.) M. Choisy (*L. lucida*, bright, shining) Our only record for this

species is from a shaded sandstone cliff with a northeast exposure. ~ Compare with *Chaenotheca furfuracea*, which is similar vegetatively but produces pulvinic acid instead of rhizocarpic acid; its apothecia are stalked with a mazaedium, while those of *Psilolechia* are sessile and with 8-spored asci. ~ Spores, $4\ \mu\text{m}$ – $5\ \mu\text{m}$ \times $1\ \mu\text{m}$ – $1.5\ \mu\text{m}$. [rhizocarpic acid]

LaSalle-MOR

PSILOLECHIACEAE

One local genus **Psilolechia**

PSORA Hoffm. PSORACEAE [Photobiont: *Trebouxia* and *Myrmecia*. Gr. *psora*, the itch, scurvy; from the scurvy or scab-like thalli. ~ Thallus squamulose, adnate, saxicolous or terricolous, brownish or pinkish; apothecia convex, without a discernable margin, the epihymenium colored, K⁺ magenta, the hypothecium pale; spores 8, hyaline, simple, ellipsoid.]

1. Thallus saxicolous; squamules brown; apothecia, rusty red, centrally disposed P. PSEUDORUSSELLII
 1. Thallus terricolous; squamules pink; apothecia nigrescent, marginally disposed P. DECIPIENS

Psora decipiens (Hedwig) Hoffm. (L. *decipiens*, deceiving; perhaps from its superficial resemblance to another species) = *Biatora decipiens* of Fink (1906). Our specimens are without substances, which circumstance refers them to "strain I" of Timdal (1986). He places those specimens with norstictic acid into "strain II" and those with hyposalazinic acid into "strain III". Most of our specimens are from open kames and other prairies where dolomite is exposed and shallow pockets of calcareous soils have developed in cracks or among the pebbles. We have one specimen from the calcareous stable sands of the lake plain prairies of Illinois Beach State Park. The pinkish, white-farinose margins are in strong contrast to the chestnut-brown thalli of *Placidium lachneum* or *P. squamulosum*, usually one of which is an associate.

Boone-MOR, Cook-MOR, Kane-MOR, LakeIL-MOR, Lee-MOR, McHenry-MOR, Ogle-MOR, Rock-WIS* (in packet with *Placidium lachneum*), Walworth-MOR,WIS, Will-MOR, Winnebago-MOR

Psora pseudorussellii Timdal (Gr. *pseudos-*, false, deceptive + *russellii*; resembling *Psora russellii*, named after John Lewis Russell, 1808–1873, American cryptogamist and naturalist) Our only records of this species are from exposed dolomitic bedrock in our western sector.

Boone-MOR, Winnebago-MOR

PSORACEAE

- A. Thallus crustose, not of adnate squamules; apothecium K⁺ purple **Protoblastenia**
 A. Thallus of adnate squamules; apothecia K⁻.
 Squamules gray to nigrescent **Psorula**
 Squamules not gray or nigrescent **Psora**

PSOROGLAENA Müll. Arg. VERRUCARIACEAE [Photobiont: *Chlorococcoid*. Gr. *psora*, the itch, scurvy + *glenos*, the eyeball. ~ Thallus crustose-filamentous, the cortical cells papillate; perithecia, pale, partly immersed, without

pseudoparaphyses, the hymenial gel I+ blue or orange; spores 8, hyaline, 1-several septate to muriform.]

Psoroglaena dictyospora (Orange) H. Harada (Gr. *diktuon*, net + *spora*, seed; the allusion unclear to me) This species is known from as nearby as Vermilion County, Illinois, where it was collected at the base of a *Catalpa* at the headquarters area of Kickapoo State Park.

PSOROTICHIA A. Massal. LICHINACEAE [Photobiont: *Chroococcidiopsis*. Gr. *psora*, the itch, scurvy + *teichos*, wall around a city; probably from its frequency on concrete walls and rails. ~ Thallus crustose to subsquamulose, black, saxicolous, gelatinous; apothecia lecanorine or zeorine, the proper exciple usually evident at the edge of the disk, with a granular margin and brown disk; asci I-, without apical structures; spores 8, hyaline, simple, ellipsoid.]

Psorotichia schaeferi (A. Massal.) Arnold (after Ludwig Emanuel Schaefer, 1785–1853, Swiss clergyman and lichenologist) Our only records of this species are from an HCL-sandstone boulder along the old E. J. & E. Railroad right-of-way in a strip mine area south of Dell Abbey, from limestone, “shale and rocks” and from base-rich pebbles. The latter are from sand prairie of the Beach Ridge Plain, with *Arabidopsis lyrata*, *Arctostaphylos uva-ursi*, *Andropogon gerardii*, *Ceratodon purpurea*, *Coreopsis lanceolata*, *Dalea purpurea*, *Helianthus occidentalis*, *Minuartia michauxii*, and *Schizachyrium scoparium*. ~ Thallus dispersed areolate to more or less gregarious, brown the areoles largely filled by a perithecium; hyenium filled with oil droplets; involucrellum covering about half of the upper part of the exciple, the latter of which is complete beneath; spores 19–26 μm \times 11–16 μm . See also *Pyrenocarpon thelestomum*. ~ Thallus granular-verruculose to areolate, granular-isidiate; apothecia more or less immersed, usually 1 per areole, to 0.5 mm across, poriform to plane with a reddish disk when moist; spores 11 μm –19 μm \times 5 μm –9 μm .

Grundy-MOR, Lake-IL-MOR, LaSalle-MOR, PH, WIS

PSORULA Gotth. Schneid. PSORACEAE [Photobiont: *Chlorococcoid*. Gr. *psora*, the itch, scurvy + *-ula*, diminutive; probably from its resemblance to *Psora*. Lichenicolous on *Spilonema*. ~ Thallus squamulose, greenish, gregarious; apothecia marginal, black, flat to convex, the margin scarcely discernable; spores 8, hyaline, simple, ellipsoid.]

Psorula rufonigra (Tuck.) Gotth. Schneid. (L. *rufo*- reddish + *nigra*, a black object) Our only record for this species is siliceous rocks at Magnolia Bluff, associated with *Spilonema revertens*, which see. ~ Spores 10 μm –14 μm \times 5 μm –7 μm .

Rock-WIS

PUNCTELIA Krog PARMELIACEAE [Photobiont: *Trebouxia*. L. *punctum*, a

prick, puncture, or dot + *-elia*, a generic ending, probably from Gr. *eilo*, to roll up or collect, as in a collection or group; from the numerous pseudocyphellae. ~ Thallus foliose, rather large, gray, the upper cortex usually pseudocyphellate, always with atranorin, the lower cortex brown to white, with simple rhizines; apothecia, when present, sessile, lecanorine, with a brown disk; spores 8, hyaline, simple, ellipsoid; conidia narrowly bacilliform to uncinata.]

1. Thallus lacking isidia and soredia; medulla C- or C+ red
 - Medulla C- P. BOLLIANA
 - Medulla C+ red P. GRAMNICOLA
1. Thallus with either isidia or soredia; medulla C+ red.
 2. Thallus isidiate P. RUDECTA
 2. Thallus sorediate.
 - Soredia coarse and pustular, often coalescing into large areas and becoming lobulate P. MISSOURIENSIS
 - P. MISSOURIENSIS
 - Soredia farinose, in round delimited soralia P. CASEANA

Punctelia bolliana (Müll. Arg.) Krog (after Ernst Friedrich August Boll, 1817–1868, German botanist who collected the type in Texas) = *Parmelia bolliana* Müll. Arg., *P. frondifera* G. Merr. Culberson & Culberson (1956) map several dots from the Chicago area. Specimens of *Parmelia borreri*, from Cook and Kane counties (Calkins LE #323 ILL, #6002 CACS; Fink #2442, MICH) are referable here. In our Indiana counties, *Quercus velutina* is usually the substrate of choice; elsewhere *Q. alba*, *Q. macrocarpa*, and *Q. rubra* are the preferred substrates. Other frequent substrates include *Carya ovata* and *Juglans nigra*. In most cases the trees are open-grown and relatively large. [atranorin, protolichesterinic acid]

Allegan-MSC, Barry-MSC, Benton-MOR, Berrien-MIN*, MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-CACS*, ILL, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, WIS, Kalamazoo-MOR, Kane-MICH*, MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MIN*, MOR, LaSalle-ILL, MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, NY, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-ILLS*, MOR, Porter-MIN*, MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, StJoseph IN-MOR, St. Joseph MI-MOR, Starke-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, WIS, White-MOR, Will-MOR, Winnebago-MOR

Punctelia caseana Lendemer & Hodkinson (in honor the professor of botany at the College of William , Mary, Martha A. Case, 1959-) = *Parmelia subrudecta* and *Punctelia subrudecta* of local authors, not Nylander; *Parmelia borreri* of most local authors, not Turner. Most of our specimens are from *Quercus alba*, though there is one from an open-grown tree of *Prunus serotina*. Calkins (1896) regarded this species as common in the region at the turn of the century, but more than likely he was referring to *Punctelia bolliana*. [lecanoric acid, atranorin]

Benton-MOR, Branch-MOR, Calhoun-MOR, DeKalb-MOR, DuPage-MOR, Iroquois-MOR, Jefferson-MOR, Kane-MOR, Marshall-MOR, Newton-MOR, St. Joseph IN-MOR, Steuben-MOR, VanBuren-MOR

Punctelia graminicola (B. de Lesd.) Egan (L. *gramen*, grass + *cola*, dwell; the allusion lost on me) = *Punctelia semansiana* (Culb. & C. Culb.) Krog; early reports of *Punctelia hypoleucites* (Nyl.) Krog. Much more frequent farther south, our only records for this species is from *Acer*

saccharum and *Tilia americana*. [lecanoric acid, atranorin]

Allegan-MSC, DeKalb-MOR, Ogle-ILLS*, Porter-MIN*, Steuben-MOR

Punctelia missouriensis G. Wilh. & Ladd (after the state of Missouri) The prevailing substrate from which we have documented this species locally is *Quercus* bark, but farther downstate in Illinois and Indiana and across southeastern United States, in general, it grows on a wide variety of trees. [atranorin, lecanoric acid]

Barry-MOR, Benton-MOR, Berrien-MOR, Branch-MOR, Cook-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Iroquois-MOR, Jasper-MOR, Kane-MOR, LaGrange-MOR, LakeIL-MOR, LaPorte-MOR, Lee-MOR, Livingston-MOR, McHenry-MOR, Newton-MOR, Ogle-ILLS*, Ottawa-MOR, Porter-MOR, Pulaski-MOR, St. JosephIN-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR

Punctelia rudecta (Ach.) Krog (L. *rudis*, rough, raw, wild + *ecto-*, out of, from; probably from the rough appearance of the upper cortex caused by the pseudocyphellae) = *Parmelia rudecta* and *P. borreri* var. *rudecta* of Calkins. Three-fourths of our specimens are from open-grown oaks, but we have specimens from *Juglans nigra*, *Larix laricina*, *Maclura pomifera*, and *Ostrya virginiana*; there is also a specimen from a basaltic boulder in an open pasture. The isidia are quite variable, ranging from fine, uniform, and simple to coralloid-branched and even sublobulate, with or without nigrescent apices. When growing on small branches on *Larix laricina* in bogs or on weathered lignin, the lobes can be disarmingly tiny and the isidia minute and simple for a *Punctelia rudecta*. [lecanoric acid, atranorin]

Allegan-MICH*,MIN*,MOR,MSC, Barry-MSC, Benton-MOR, Berrien-MIN*,MOR, Boone-MOR, Branch-MICH*,MOR, Calhoun-MOR,MSC, Cass-MOR,MSC, Cook-F*,ILL,MOR,NY, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR,MSC, Kosciusko-MOR, LaGrange-MOR, LakeIL-ILLS*,MOR, LakeIN-MIN*,MOR, LaPorte-MIN*,MOR, LaSalle-ILLS*,MOR, Lee-ILLS*,MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR,WIS, Newton-MOR, Noble-MOR, Ogle-ILLS*,MOR, Ottawa-MICH*,MOR,MSC, Porter-INDU,MIN*,MOR, Pulaski-MOR, Racine-MOR, Rock-MOR,WIS, St. JosephMI-MOR, Starke-MOR,US, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR,WIS, White-MOR, Will-MOR, Winnebago-ILLS*,MOR

PYCNOTHELIA Dufour CLADONIACEAE [Photobiont: Chlorococcoid. Gr. *pyknos*, dense, thick + *thele*, nipple; from the tiny, clustered apothecia atop the podetia. ~ Thallus fruticose, the papillae (pseudopodetia) arising from a persistent granular primary thallus, corticate, simple to branched, with a brown or nigrescent tip; apothecia rare, but with 8, hyaline, simple to 1-septate spores.]

Pycnothelia papillaria Dufour (L. *papilla*, nipple, teat + *-arius*, belonging to; probably from the swollen, apothecia-tipped podetia) Our only record for this species is from sandy soil on a sandstone cliff at the Nachusa Grassland. [usually atranorin, ± fatty acids, such as protolichesterinic acid]

Ogle-MOR

PYRENOCARPON Trevisan LICHINACEAE [Photobiont: *Chroococcidiopsis*. Gr. *pyren*, kernel + *karpos*, fruit. ~ Thallus crustose to subsquamulose, black,

saxicolous, gelatinous; apothecia at first punctiform, becoming exposed, the reddish brown disk surrounded by a whitish proper exciple as well as a thalline exciple; epihymenium brownish, the hyaline hymenium of branched, anastomosing paraphyses; asci I–, without apical structures; spores 8, hyaline, simple, ellipsoid.]

Pyrenocarpon thelostomum (J. Harriman) Coppins & Aptroot (Gr. *thele*, nipple + L. *stoma*, mouth) = *Pyrenocarpon flotowianum*, of Hyerczyk. Our only records are from weathered concrete, limestone, and pebbles in the splash zone of Lake Michigan and from nearby sand prairie in the Beach Ridge Plain, where it grows with *Psorotichia schaeferi*, *Verrucaria calkinsiana*, and *V. macrostoma*. Dillman *et al.* (2012) report the Lake County record (Hyerczyk #2545 F*,MOR) as the first record for North America, which he had collected in 2008, but they erroneously list the location as Michigan. The Cook County record was collected in 2003 (Hyerczyk #1854 MOR), but filed under the name "*Psorotichia frustulata*."

Cook-F*,MOR, LakeIL-MOR

PYRENOCOLLEMA Reinke XANTHOPYRENACEAE¹⁴ [Photobiont: *Gloeocapsa*. Gr. *pyren*, kernel + *Collema*, which see; because of the perithecia on an otherwise collemataceous thallus. ~ Thallus crustose, obscure, saxicolous; perithecia nigrescent, interthecial hyphae evident, the spores 8, hyaline, asymmetrically 1–2 septate; conidia bacilliform to ellipsoid.]

Pyrenocollema prosperellum (Nyl.) R. C. Harris (L. *prospergo*, to sprinkle + *-ellus*, diminutive; probably in reference to the well scattered, non-aggregated perithecia) = *Verrucaria prosperella* Nyl.; *Arthopyrenia prosperella* (Nyl.) Zahlbr. Fink (1935) lists this species as a northern Illinois endemic. The type description (Calkins #250, F) reads: *Thallus interruptedly whit or scattered, becoming chinky with age reaction; apothecia pyrenoid, wholly black, small (breadth, 0.15 mm), somewhat globose, rather prominent. Spores 8, colorless, oviform, 1 septate, 0.018–22 by 0.008 mm. The paraphyses few or scarcely any. Hemenia gelatinous-reaction. Occurs on siliceous rocks near Chicago. (Calkins). This speies seems to approach V. inconspicuam, Lahm, from which it differs by its larger spores. Likewise near to V. saxicola, Mass. The calcicolous species, V. ruderella, Nyl. Also occurs in the same locality. . . First found at Riverside.*" Harris (1975) described it as: "*Thallus gray, continuous to rimose, epilithic. Photobiont with cells blue green in color, in small groups but without an obvious sheath. Ascocarps globose, 0.2–0.25 mm in diameter. Asci slightly ovate to elliptical. Spores 17–23 × 8–11 μm. Habitat on calcareous rocks, possibly more or less aquatic. It is known from a Belgian collection in addition to the type locality.*" Tucker & Harris (1980) cite the type 16 km from Chicago (H-NYL 991) and list the substrate in Louisiana as "sandstone outcrops." Both the type (F) and an isotype (Calkins #6550, CACS) are from base-rich, finely siliceous rock, in spite of the fact

¹⁴Lücking *et al.* (2016) moves this genus to a subphyllum with genera of uncertain familial affinities, Pezizomycotina.

that the label reads "*supra saxum siliceum*," the latter description suggesting HCl- rock, to the point made by Nylander in his type description where he contrasts it with *V. ruderella*. ~ Thallus largely endolithic, the gonidia blue-green; perithecia largely sessile, subglobose, to 0.2 mm in diameter; spores 1-septate; 17–23 × 8–11 μm.

Cook-F*,CACs*,MICH*,MOR,NY

PYRENODESMIA A. Massal. TELOSCHISTACEAE [Photobiont: mostly "*Pseudotrebouxia*." Gr. *pyren*, kernel + *desmos*, a bond or fastening. ~ Thallus white or gray, with a black prothallus; apothecia lecanorine, the disks flat, black, the margin concolorous with the thallus, the epihymenium K+ violet; hymenium pale; spores 8, hyaline, polaribilocular.]

1. Thallus with blue-gray soredia; apothecia epruinose P. PRATENSIS
 1. Thallus esorediate; apothecia pruinose P. VARIABILIS

Pyrenodesmia pratensis (Wetm.) Frolov & Vondrák (L. *pratensis*, of the meadows) = *Caloplaca pratensis* Wetm. This western species has been collected from as nearby as Piatt County (KU), where it grew on the sandstone-mortar of a retaining wall. A similar species, *C. concreticola* Vondrák & Kodosovtsev (L. *concretere*, to grow together, concrete + *cola*, inhabiting) has narrower spores; it is a European species but has been documented in the upper Midwestern United States. ~ Thallus thick, areolate whitish to pale gray, with blue-gray sorediate on the surfaces and at the margins; apothecia nigrescent, rare; spores 17–19 × 10–12 μm, septum 1.0–3.0 μm wide.

Pyrenodesmia variabilis (Pers.) A. Massal. (L. *variabilis*, variable; perhaps from the variable size and appearance of the apothecia) = *Caloplaca variabilis* (Pers.) Müll. Arg. Rudolph (1955) listed this species from LaSalle County. Interestingly, there is a Calkins specimen (F1177718) at the Field Museum referable to *Caloplaca atroalba*, in which the spore septum rarely exceeds 3.0 μm. Our only record for *Pyrenodesmia variabilis* is from a dolomitic boulder in a pasture at the Des Plaines Fish & Wildlife Area, near Wilmington. ~ Thallus grayish to pallescent, smooth, often pruinose; apothecia lecanorine, dark brown to black, pruinose, the thalline exciple concolorous with the thallus; epihymenium weakly K+ purple; spores 12 μm–16 μm × 7 μm–10 μm; septum 3–4 μm. [thalloidima green]

LaSalle, Will-MOR

PYRENOPSIS (Nyl.) Nyl. LICHINACEAE [Photobiont: Cyanobacterial the cells with a reddish sheath. Literally Gr. *pyren*, kernel + *-opsis*, resembling; more than likely from the ascocarps that initially appear pyrenocarpous. ~ Thallus crustose, granulose to minutely verrucose or coralloid, without differentiated layers, usually saxicolous; apothecia minute, the disk closed at least initially, the exciple thalloid; paraphyses unbranched or indistinct;; spores 8, hyaline, simple.]

Pyrenopsis fuscoatra Fink. (*fuscus*, brown + *atra*, dark, black; dark brown) The type specimen for this evidently rare species was collected in nearby Montgomery County, Indiana, on limestone (Fuson #111, FH, MICH, US, WIS). ~ Thallus of brownish-black granules, forming a scattered or irregularly broken crust; apothecia to 0.3 mm across, closely adnate, becoming open with a black disk, the exciple becoming scant, entire; spores $13\ \mu\text{m}$ – $20\ \mu\text{m} \times 7\ \mu\text{m}$ – $10\ \mu\text{m}$. *Cryptothele permiscens* is similar by has a well developed, disk-obscuring exciple.

PYRENULA A. Massal. PYRENULACEAE [Photobiont: *Trentepohlia*. Gr. *pyren*, kernel + *-ulus*, diminutive; from the perithecia that are thought to resemble small kernels or grains. The descriptions below are gleaned from Harris (1973). ~ Thallus crustose, corticolous, mostly endophloedeal; perithecia immersed; spores 8, brown, mostly 3-septate to submuriform; conidia filiform.]

1. Thallus UV+ yellow-orange; P. PSEUDOBUFONIA
 1. Thallus UV–.
 Thallus with tinctures of yellow; hymenium IKI+ pinkish-orange or bluish, inspersion . . P. SUBELLIPTICA
 Thallus white or grayish, without yellowish tinctures; hymenium IKI–, not inspersion . . . P. LAEVIGATA

Pyrenula laevigata (Pers.) Arnold (L. *laevigatus*, made smooth) This is an eastern species, known from all around our region, but we have yet to turn up a local specimen. Harris (1973), however, asserted that *P. laevigata* is rare in the Great Lakes region, and that it occurs mostly on *Betula* and occasionally on *Fraxinus*. The reports of *P. glabrata* (= *P. laevigata* of Calkins) are referable here inasmuch as Calkins described the thallus as whitish and thin, features that do not suggest either *P. subelliptica* or *P. pseudobufonia*. ~ Thallus white or grayish or a little greenish, UV–; perithecia scattered or with a few fused, subglobose, 0.3–0.6 mm broad, prevailingly immersed; ostiole flush of slightly extruded; hymenium IKI–, not inspersion; asci cylindrical, clavate 40 – $70\ \mu\text{m} \times 10$ – $15\ \mu\text{m}$; spores generally biseriata, brownish or lavender, mostly 3-septate by the endospore, 15 – $21\ \mu\text{m} \times 8$ – $11\ \mu\text{m}$.

Pyrenula pseudobufonia (Rehm) R. C. Harris (Gr. *pseudos*, false, deceptive + ?) = *P. neglecta* R. C. Harris; *P. nitida* of North American authors, not (Weigel) Ach. Harris (1973) lists trees of mesophytic forests as the substrate for this species; it is common south and east of the Chicago region. See also comments under *Arthopyrenia cinchonae*. This is one of the many species Calkins called *Pyrenula gemmata*. ~ Thallus with tinctures of yellow or gray-green, UV+ yellow; perithecia mostly scattered, subglobose to hemispheric, , 0.4–0.6 mm broad, usually at least partially emergent, open beneath or with a thin black wall; ostiole flush of slightly extruded; hymenium IKI+ greenish-blue, at least proximally, much- inspersion with oil droplets; asci cylindrical, not thickened distally, 70 – $85\ \mu\text{m} \times 15$ – $18\ \mu\text{m}$; spores 8, generally biseriata, brownish, mostly 3-septate, usually with a small papilla at each end, 13 – $24\ \mu\text{m} \times 7$ – $12\ \mu\text{m}$. [lichexanthone]

Cook-CACS*,MSU,NY

Pyrenula subelliptica (Tuck.) R. C. Harris (L. *sub*, below, almost, near + *ellipsis*, lack, imperfection + *-icus*, belonging to or emphasizing a character; from the elongate or imperfectly-

formed median lumina of the spores) = *P. imperfecta* (Ell. & Ev.) R. C. Harris. Harris (1973) mapped this species from just south of the Southern Lake Michigan region; he listed its substrates as *Carpinus*, *Fagus*, *Fraxinus*, and *Quercus*. The only local specimen we have seen is an old one from Cook County (Calkins *s.n.*, *n.d.* MOR). ~ Thallus olive or yellowish, UV-; perithecia scattered, gregarious, or with a few fused, subglobose to oblate, prevailing immersed, 0.4–0.8 mm broad; ostiole flush of slightly extruded; hymenium IKI+bluish to pinkish orange, interspersed with small granules or oil droplets; asci cylindrical, clavate 100–115 $\mu\text{m} \times 23\text{--}35 \mu\text{m}$; spores generally biseriate, brown, mostly 3-septate, submuriform with several oddly divided cells, 24 μm –40 $\mu\text{m} \times 10 \mu\text{m}$ –16 μm .

Cook-MOR

PYRENULACEAE

- A. Spores brown, 3-septate or occasionally 4–7 septate or even imperfectly muriform **Pyrenula**
 A. Spores 7–9 septate, or colorless and 3-septate **Lithothelium**

PYXINE Fr. CALICIACEAE [Photobiont: *Trebouxia*. L. *pyxis*, a box + *-inus*, pertaining to; probably the apothecia reminded Fries of coin boxes. ~ Thallus foliose, rather small, gray to bluish-gray, sorediate, the small rounded lobes pruinose and with narrow, white, pseudocyphellae; lower cortex black, the rhizines simple to forked; medulla white but usually with tinctures of yellow to orange; apothecia not seen locally; spores 8, brown, 1–3 septate, ellipsoid; conidia narrowly bacilliform.]

1. Medulla pale yellow; cortex K- and UV+ bright yellow; lobes typically with a more or less continuous or plaque-like patch of pruina just back from of the tip **P. SUBCINEREA**
 1. Medulla salmon orange; cortex K+ yellow and UV-; lobes usually pruinose, the pruina granular-appearing and diffusely disposed near the tips **P. SOREDIATA**

Pyxine soredata (Ach.) Mont. (Gr. *soredion*, a little heap + *-atus*, an adjective ending; from the numerous soredia) Evidently unknown to both Calkins (1896) and Calkins & Huett (1898), there nevertheless is a specimen from "Illinois" [either Cook or LaSalle counties] (Calkins *s.n.*, NY) by this name. There are two other specimens of this species, one from "Illinois" (Calkins #6033, CACS) and one from LaSalle County (Calkins #48, F) collected in 1897, both of which he had called "*Pyxine cocoes*." Unaware of these specimens at the time, Wilhelm (1998) regarded this species as possibly adventive. It is becoming, however, notably more frequent locally today. [atranorin]

Berrien-MOR, DuPage-MOR, LaSalle-F*, Newton-MOR, Waukesha-WIS, Will-MOR

Pyxine subcinerea Stirton (L. *sub*, below, almost, near + *cinereus*, ash-colored; from the grayish thallus) = *P. caesiopruinosa* of previous North American authors, not Nylander. Unknown to Calkins (1896) and considered rare and adventive in the Chicago region by Wilhelm (1998), this species is infrequently but regularly encountered as of this writing. *P. caesiopruinosa* (Nyl.) Imsh. is confined to the southeastern coastal plain, from where we have numerous specimens. It differs in that the medulla is K+ purple. [atranorin, lichexanthone]

Benton-MOR, Boone-MOR, Cook-MOR, DuPage-MOR, Kent-MOR, Marshall-MOR, Pulaski-MOR, White-MOR

RACODIACEAE

One local genus **Racodium**

RACODIUM Pers. RACODIACEAE [Photobiont: *Trentepohlia*. Gr. *rachion*, a worn-out or torn garment, perhaps from its unwoven or threadbare. ~ Thallus minutely thread-like fruticose, black or blue-black, the hyphae lying parallel longitudinally over the surface of the photobiont; apothecia unknown.]

Racodium rupestre Pers. (*L. rupestre*, of rocks) This rather rare species is known from Rock Branch Nature Preserve in nearby Fountain County, Indiana, where it presumably grew on shaded siliceous rock. ~ Hyphae elongate, unbranched, 4-6 in parallel rows.

RAMALINA Ach. RAMALINACEAE [Photobiont: *Trebouxia*. L. *ramus*, a branch + *linum*, thread, rope; perhaps from the cord-like or lined appearance of the surface of the thallus branches. A genus in great need of revision, our position on the species delineated below is wholly provisional. ~ Thallus fruticose, bushy or pendant, the branches flattened; apothecia lecanorine, sessile to substipitate, the disks tan, the spores 8, hyaline, 1-septate, ellipsoid to fusiform; conidia bacilliform.]

1. Thallus soresiate (sometimes sparsely so).
 - Thallus saxicolous, the soresia granular R. INTERMEDIA
 - Thallus corticolous, the soresia very fine R. FARINACEA
1. Thallus esoresiate.
 2. Principal thallus lobes usually more or less expanded distally, more than 4 mm broad, smooth, pseudocyphellae rare or flush with the cortex; apothecia regularly laminal in disposition.
 - Divaricatic acid present R. COMPLANATA
 - Divaricata acid absent R. SINENSIS
 2. Principal thallus lobes not or scarcely expanded distally, less than 4 mm broad, smooth to often somewhat warty with pseudocyphellae; apothecia largely disposed on the lobe tips.
 3. Apothecia abundant, prevalingly disposed on the thallus surfaces R. CELASTRI
 3. Apothecia rare or disposed at or near the lobe tips.
 4. Usnic acid only R. AMERICANA
 4. Usnic acid + divaricatic acid and/or lecanoric acid.
 - Thallus lobes inflated, angular, sometime perforated R. DILACERATA
 - Thallus lobes solid, flat, not perforated R. CULBERSONIURUM

Ramalina americana Hale (of America) Including *R. calicaris* and *R. calicaris* var. *fastigiata* of Calkins. Uncommon locally, our records are from *Acer negundo*, *Juglans nigra*, and *Populus deltoides*. ~ Thallus fruticose, bushy, solid, disconcertingly variable, esoresiate, smooth to ribbed or verrucose, the lobes tapering from the base, smooth or weakly canaliculate; apothecia terminal or lateral; spores straight. [usnic acid (often not detected in TLC)]

Allegan-MOR, Branch-MOR, Calhoun-MOR, Cook-CACS*, MOR, DeKalb-MOR, DuPage-MOR, Kalamazoo-

MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, LakeIL-MOR, LaPorte-MOR, Livingston-MOR, Marshall-MOR, WIS, Milwaukee-FH,MIL,MOR, Racine-MOR, VanBuren-MOR, Waukesha-MOR, White-MOR

Ramalina celastri (Spreng.) Krog & Swinscow (Gr. *kelastros*, holly; the genitive, suggesting the substrate of the type) A southern species, our only record is from the trunk of a rather large *Acer saccharum* in a landscape setting. [usnic acid]

LaPorte-MOR, White-MOR

Ramalina complanata (Sw.) Ach. (*L. complanare*, to make level or in one plane) Evidently very rare locally, this largely southern species was collected on a planted specimen of *Cornus florida* in a cemetery in Kendallville, Indiana. [usnic acid, divaricatic acid]

Noble-MOR

Ramalina culbersoniorum LaGreca (in honor of the American lichenologists, Chicita Frances Forman, 1931–, and her husband, William Louis Culberson, 1929–2003, both of whom pioneered modern lichen taxonomy and are especially known for providing us with the techniques of thin-layer chromatography) Our only record for this species are from landscape trees: *Acer rubrum* and *Pyrus calleryana*. ~ As currently delineated this species is similar morphologically to *Ramalina americana*, produces secondary metabolites in addition to usnic acid. [usnic acid, ± 4-0-methylhypoprotocetraric, ± norbarbatic, ± lecanoric/evernic, ± divaricatic, ± stenosporic]

Branch-MOR, Elkhart-MOR, Kent-MOR, Ottawa-CACS*, Will-MOR

Ramalina dilacerata (Hoffm.) Hoffm. (Gr. *di-*, two + *L. laceratus*, jagged wound or cut) Known from just north of our region, this is a species of twigs and bark. ~ Thallus fruticose, bushy, rarely more than 1.0 cm high, the lobes inflated, often perforate; apothecia more or less terminal. [usnic acid, divaricatic acid]

Ramalina farinacea (L.) Ach. (*L. farina*, mealy + *-aceus*, resembling) Rare locally, our only specimens are from the bark of small branches. Our specimens are much less beset with soralia than those we have seen from out west, where, by the way, I am certain there are more than 1 species involved in the complex. [usnic acid, ± protocetraric acid, ± norstictic acid]

DuPage-MOR, Kenosha-MOR, Pulaski-MOR

Ramalina intermedia (Nyl.) Nyl. (*L. inter*, between, among + *medius*, middle; from its resemblance to two similar species) Not known from the 53-county Southern Lake Michigan region, there is a population of this rare lichen in Apple River Canyon State Park, in Jo Daviess County, where it grows on a limestone cliff near the center of the park. [usnic acid]

Ramalina sinensis Jatta (of China) = *R. calicaris* var. *fraxinea* of Calkins; *R. fastigiata* var. *subampliata* Nyl. Calkins reported it from oaks and old fences near Lemont. A Calkins Cook County specimen (*Lichenes Exsiccati* I-2), called *R. calicaris* var. *fastigiata* is referable here. (Thomson 1990) described *R. unifolia* J. W. Thomsom as a “prairie-forest” border species with the branches much dilated distally, which appears fairly distinctive in that it has curved spores and strong longitudinal ridges intercalated with decorticate zones abaxially; it is known only from extreme northwestern Wisconsin, which evidently is at the eastern edge of its range. *Ramalina unifolia* differs from the southwestern species, *R. complanata* (Sw.) Ach., which see, in lacking divaricatic acid. Hale (1969) noted that there is a northern Great Lakes form with broad lobes that has been referred to as *R. subampliata*, but does not speculate as to what its

valid name might be, although it is not mentioned in his later treatment; this latter epithet is what we have used in some earlier treatments. Bowler & Rundel (1973) noted that Nylander originally described *R. fastigiata* var. *subampliata* as having lobes 6–12 mm wide, but they did not explain why there "is no question that North American reports of *R. subampliata* are incorrect," or even how it differs from similar broad-lobed North American species. Lacking a decisively better name, we are exploiting the name *R. sinensis* for the rather smooth, broad-lobed species with usnic acid only. All of the Southern Lake Michigan region material we have seen has laminal apothecia, straight spores, and lacks the decorticate zones and longitudinal ridges as seen in more northern or western material. [usnic acid]

Cook-ILL, DuPage-MOR, Kane-MICH, McHenry-ILL, Waukesha-MOR

RAMALINACEAE

- A. Thallus either fruticose, squamulose, or parasitic on *Dermatocarpon* or spores curved.
 - Thallus either squamulose or with the apothecia parasitic on the lower cortex of *Dermatocarpon* or spores curved **Toninia**
 - Thallus fruticose, the apothecia on flattened branches **Ramalina**
- A. Thallus not fruticose; spores never notably curved.
 - B. Thallus muscicolous; apothecia strongly convex to hemispherical, masking the exciple.
 - **Bilimbia**
 - B. Thallus not muscicolous, or if so, the apothecia flat, many with a proper exciple evident.
 - C. Spores fusiform to acicular, rarely to 4 μm wide.
 - Spores acicular, to 2.5 μm wide **Bacidina**
 - Spores acicular to fusiform, the larger more than 2.5 μm wide **Bacidia**
 - C. Spores ellipsoid to fusiform, usually at least 4 μm wide.
 - Apothecia absent; thallus sorediate **Coppinsidea**
 - Apothecia present; thallus not sorediate **Lecania**

RAMBOLDIA Kantvilas & Elix **RAMBOLDIACEAE** [Photobiont: Trebouxioid.

In honor of the German lichenologist and mycologist, Gerhard Walter Rambold (1956–), of Universität Bayreuth. ~ Thallus crustose, epiphloeic, lacking isidia, occasionally sorediate, often well developed; apothecia red-orange to black, seemingly imperfectly formed, often complex, usually with anthraquinones, soon without a discernable margin; hypothecium hyaline to brownish; paraphyses gelatinized, but with expanded distal ends in the darkened epihymenium; asci *Lecanora*-type; spores simple, 1–8, hyaline to colored]

Ramboldia elabens (Fr.) Kantvilas & Elix (*L. elabens*, slipping away, disappearing; probably evoking the soon disappearing proper exciple) Our only record for this species is from conifer wood used in the structure of a rail fence at Potato Creek State Park, Indiana. This species seems a little uncomfortable in *Ramboldia*, since most other species produce anthraquinones in the apothecia. ~ Thallus pale to dark gray, rather verrucose, K–, C–, KC–; apothecia black, more or less imperfectly, circular, soon convex; paraphyses gelatinized, coherent in the darkened epihymenium, but evidently expanded distally; spores 8–11 \times 3–4 μm . [atranorin \pm fumarprotocetraric acid]

St. Joseph IN-MOR

RAMBOLDIACEAE

One local genus **Ramboldia**

RHIZOCARPACEAE

One local genus **Rhizocarpon**

RHIZOCARPON DC. RHIZOCARPACEAE [Photobiont: Chlorococcoid. Gr. *rhiza*, root + *karpos*, fruit; from what feature of the ascocarp is unclear. ~ Thallus crustose, epilithic, rimose to areolate; apothecia marginal or associated with the hypothallus, without a discernable margin; spores 1–8, hyaline to colored, septate to muriform.]

1. Spores 1 per ascus R. DISPORUM
 1. Spores 8 per ascus R. REDUCTUM

Rhizocarpon disporum (Hepp) Müll. Arg. (Gr. *di-* + *spora*, seed; in spite of the single-spored asci) This species is known from nearby Ozaukee County, Wisconsin, where it was collected on rock on a rocky bank in an old field. ~ Thallus gray, areolate, with a black hypothallus; areoles convex to bullate; apothecia black, immersed but usually with a narrow concolorous rim; spores 1, brown, weakly to evidently muriform, $45\ \mu\text{m}$ – $70\ \mu\text{m} \times 20\ \mu\text{m}$ – $35\ \mu\text{m}$.

Rhizocarpon reductum Th. Fr. (L. *reductus*, restored, reformed, brought back to a previous condition) = *R. obscuratum* of local authors. A species of siliceous or base-poor rocks, our only record is from HCl– rock (Calkins #6060, CACS, under the name *Pannaria nigra*). There is another specimen (Calkins #43, NY), without location, but collected presumably in northeastern Illinois; it was also originally called *Pannaria nigra*. ~ Thallus thin, pallescent to dark grayish-brown, usually rimose; apothecia at least partly immersed, more or less pruinose, irregularly shaped, not particularly aggregated, the rim concolorous with the disk; spores 8, hyaline or lightly sordid in age, weakly to evidently muriform, $18\ \mu\text{m}$ – $30\ \mu\text{m} \times 9\ \mu\text{m}$ – $14\ \mu\text{m}$.
LaSalle-CACS*

RHIZOPLACA Zopf LECANORACEAE [Photobiont: *Trebouxia*. Gr. *rhiza*, root + *plax*, a flat round plate, dish; perhaps from the roundish thallus sometimes attached by a short "root," or umbilicus. ~ Thallus areolate, to squamulose or umbilicate, yellow-green; the lower surface without rhizines; apothecia lecanorine, rather sumptuous and often crowded, the disks tan; spores 8, hyaline, simple, ellipsoid.]

Rhizoplaca subdiscrepans (Nyl.) R. Sant. (Gr. *sub-* below, slightly, imperfectly, nearly + *discrepans*, in disagreement; probably an allusion to the various opinions regarding its

distinctness from *R. chrysoleuca* (Sm.) Zopf—which is more decidedly umbilicate and tends to have flatter thallus surfaces) Including local reports of *Lecanora rubina*. Our only specimens are on sandstone breaks in our western sector. The thalli of all of our material, including that from southern Illinois, are characterized by crowded, stalked, bullate areoles (McCune, 1987), and are therefore referable to *R. subdiscrepans* (Nyl.) R. Sant. [pseudoplacodiolic acid and usnic acid]

LaSalle-MOR, Lee-MOR, Ogle-ILLS*, MOR

RICASOLIA De Not. LOBARIACEAE [Photobiont: *Nostoc* or *Scytonema* or green and *Trebouxia*-like or *Myrmecia* (*Dictyochloropsis*). In honor of the Italian politician and soldier, Vincenzo Ricasoli, 1814–1891, who had a strong interest in horticulture and botany. ~ Thallus foliose, broad-lobed, commonly with cephalodia; lower surface tan, usually with a brownish tomentum or sparse indument of hairs; apothecia, if present, on the upper surfaces or margins lecanorine, the disks brown; spores 8, hyaline to brownish, 1–3 septate, fusiform]

Ricasolia quercizans (Michaux) Stizenb. (*Quercus* + L. *-izans*, resembling; from its supposed similarity to oak leaves) = *Sticta quercizans* Michaux; *Lobaria quercizans* Michaux. Calkins & Huett (1898) cited this species from an oak tree at Deer Park in La Salle County. There is an old record from Ottawa County. The name *Lobaria amplissima* (Scop.) Forss., a European species has been applied to American species in the past; all such specimens are referable here. (Hale 1957). ~ Thallus with a green photobiont, gray, not foveolate, wrinkled in age, without diaspores; apothecia common, the disks reddish-brown, evenly margined; cephalodia infrequent, internal, seen as low bumps on the lower surface. [gyrophoric acid, atranorin]

LaSalle, Ottawa-F

RINODINA (Ach.) Gray PHYSCIACEAE [Photobiont: *Trebouxia*. Gr. *rhine*, a file or rasp + *dinos*, rotation, eddy, a large round goblet or cup; perhaps from the apothecia and their often dry or rough-appearing disks. ~ Thallus crustose, obscure to continuous or areolate; apothecia sessile or subsessile, the margin thalline to not discernable; spores 8, brown, 1–2 septate; ellipsoid. As *Rinodina* spores pass maturity, they become very brown and much like *Buellia* spores. Look for the grayer spores that still display the characteristic lumen development. There is much variability in spore morphology in the genus *Rinodina*. *Physcia*-type spores have strongly colored double-walled septum and thickened end walls; *Physconia*-type spores are similar but lack the notably thickened end walls; *Bischoffii*-type spores resemble *Physconia*-type spores, but are characterized by a bulge at the septum; *Mischoblastia*-type spores are characterized by anvil-shaped lumina in the cells and lack a darkened band at the septum; *Pachysporaria*-type spores are similar to the latter, but the quite

rounded and lack the distinctive anvil shape. These spore types are nicely illustrated by Sheard (2010).

1. Thallus corticolous.
 2. Spores mostly 16 or more per ascus R. POPULICOLA
 2. Spores 8 per ascus.
 3. Spores more than 25 μm long R. ASCOCISCANA
 3. Spores more than 25 μm long.
 4. Spores *Physcia*-type or *Physconia*-type, with a darkened septum.
 - Spore walls of cells uneven thickness when mature R. FREYI
 - Spore walls of cells thickened evenly R. PYRINA
 4. Spores *Pachysporaria*-type, without a darkened septum.
 - Spores prevailingly less than 17.5 μm long; thallus rugose, dull, continuous, without blastidiate margins R. PACHYSPERMA
 - Spores prevailingly more than 17.5 μm long; thallus smooth, shiny, areolate, often blastidiate at the areole margins R. PAPPILLATA
1. Thallus saxicolous.
 5. Substrate HCl+; spores bulging and thick-walled at the septum, characterized by a pigmented band around the middle.
 - Thallus endolithic or very scant; spores elliptic, with a well developed darkened band at the septum; R. BISCHOFFII
 - Thallus notably epilithic; spores parallel-sided, the band at the septum poorly developed R. CASTANOMELODES
 5. Substrate HCl-; spores not bulging at the septum, without a notably darkened band.
 6. Cortex K+ yellow (atranorin)
 - Areoles less than 1 mm in diameter; spores prevailingly less than 20 μm long and 12 μm wide R. OXYDATA
 - Areoles mostly more than 1 mm in diameter; spores mostly more than 20 μm long and 12 μm wide R. MOZIANA
 6. Cortex K-
 - Apothecia with a well-developed lecanorine margin; thallus often C+, KC+ pink R. TEPHRASPIS
 - Apothecia immersed or lecanorine margin; thallus C-, KC-. R. CANA

Rinodina ascociscana (Tuck.) Tuck. (L. *ascos*, strong, nauseating + *cis*, the same side as + *canus*, gray or hoary; the allusion, if I have the word broken down properly, beyond me; possibly an allusion to its similarity to *R. cana*.) Our only record for this species is from a Calkins specimen (#6022 CACS, #88 NY) collected in LaSalle County "on trees," which he had called *Physcia adglutinata*. ~ Thallus shiny, olivaceous to brown, spores; spores 8 per ascus, lacking a pigmented band at the septum, 23–41 μm \times 11–17 μm . [no substances]

LaSalle-CACS*, NY

Rinodina bischoffii (Hepp) A. Massal. (after Gottlieb Wilhelm Bischoff, 1797–1854, German botanist, lexicographer, and glossographer) Our only contemporary specimen is from a dolomitic outcrop in Boone County, where it grows with *Caloplaca sideritis*, *Circinaria contorta*, and *Verrucaria fayettensis*. Calkins (1896) reported this species from "calcareous rocks at Joliet and Lemont" and described it as a little-known species that occurred more abundantly farther south and west. A specimen at NY from La Salle County was identified accurately by Calkins as *R. bischoffii*, and it is indeed more frequent farther south and west, where it grows in

limestone glades and on outcrops It also occurs on a specimen of *Lichinella nigritella* from LaSalle County, which see. ~ Thallus mostly endolithic; apothecia to 0.5 mm in diameter, the disc becoming convex and excluding the thalline margin; hymenium inspersed; spores 8 per ascus, *Bischoffii*-type, with a distinctive, pigmented band at the septum, sometimes producing a bulge, $14\ \mu\text{m}$ – $20\ \mu\text{m} \times 8\ \mu\text{m}$ – $13\ \mu\text{m}$. [no substances]

Boone-MOR, Cook, LaSalle-F*, MOR, NY, Will

Rinodina cana (Arnold) Arnold (L. *canus*, gray, hoary, white, or appearing as if aged; probably from the color of the thallus) Occasional on granitic or sandstone boulders, or sometimes on chert in glades. Calkins (1986) reported a lichen he called *R. sophodes* (Ach.) Nyl. from boulders near Lemont and stated that he had never "met with it elsewhere so far north." He described it thus: "*Thallus gray or cinereo-fuscescent; apothecia small, appressed; disc flat, fuscous black; margin entire.*" He may well have been referring to this species. John Sheard has annotated a specimen from central Illinois at NY, originally labeled as *R. sophodes*, as *R. cana*. ~ Thallus brownish to gray, areolate; apothecia essentially immersed; spores 8 per ascus, *Physcia*-type, $18\ \mu\text{m}$ – $22\ \mu\text{m} \times 9\ \mu\text{m}$ – $12\ \mu\text{m}$. [no substances]

Cook, DuPage-MOR, LaSalle-MOR, Will-MOR

Rinodina castanomelodes H. Mayrhofer & Poelt (Evocative of *R. castanomela*—a western species—, the etymology of which I am uncertain) Yet unknown locally, this species was collected on concrete of a retaining wall (KU). ~ Thallus epilithic, areolate to subsquamulose; apothecia to 0.9 mm in diameter, with a persistent thalline margin; spores 8 per ascus, parallel-sided, *Bischoffii*-type, with a poorly developed band at the septum, $16\ \mu\text{m}$ – $21\ \mu\text{m} \times 9\ \mu\text{m}$ – $13\ \mu\text{m}$. [no substances]

Rinodina freyi H. Magn. (in honor of the German lichenologist, Eduard Frey, 1888-1974, student of the lichen flora of the Alps) = *Rinodina glauca* Ropin. Our only records are from *Carya ovata* and *Populus tremuloides*. ~ Thallus granular-areolate, greenish-gray to brownish; apothecia sessile, generally crowded; spores 8 per ascus, *Physcia*-type, 14 – $20\ \mu\text{m} \times 6$ – $9\ \mu\text{m}$, the septum very dark, but not bulging. [no substances]

Barry-MSC, Cook-MOR

Rinodina moziana (Nyl.) A. Zahlbr. (of Moji, Japan, from its type locality on the Island of Kyushu, which seems rather disjunct from its principle populations in the eastern United States and Australia). According to Sheard (2017) North American material, which we have been calling *R. destituta* (Nyl.) Zahlbr. (L. *destitutus*, forsaken, impecunious), is referable to here. Infrequent locally on granitic boulders in pastures, this species is widespread in the Midwest on numerous HCl– rocks. ~ Thallus epilithic, whitish, areolate, K+ yellow; apothecia subimmersed, generally lacking a lecanorine margin; spores 8 per ascus, *Mischoblastia*-type, 20 – $25\ \mu\text{m} \times 10$ – $14\ \mu\text{m}$. [atranorin]

Grundy-MOR, Kendall-MOR, LaSalle-MOR, McHenry-MOR

Rinodina oxydata (A. Massal.) A. Massal. (Gr. *oxys*, sharp + *dateomai*, to divide; from the sharply divided spore lumina) Yet unknown from the Southern Lake Michigan region, it is well known in ambient districts on shaded HCl– rocks. ~ Thallus pale, rimose to areolate, smooth and discontinuous on rough surfaces, K+ yellow; apothecia prevailingly immersed; spores 8 per ascus, *Mischoblastia*-type, 19 – $23\ \mu\text{m} \times 9\ \mu\text{m}$ – $12\ \mu\text{m}$. [atranorin]

Rinodina pachysperma H. Magn. (Gr. *pachus*, thick + *sperma*, seed) Our only record for this species is from a planted street tree, about 7" in diameter, of *Tilia cordifolia*. ~ Thallus grayish to brownish, continuous, dull, rugose or verrucose, not blastidiate, occasionally soreciate; apothecia prevailingly sessile; spores 8 per ascus, *Pachysporaria*-type, 15–18 μm \times 8 μm –11 μm .

Boone-MOR

Rinodina papillata H. Magn. (L. *papilla*, nipple, pimple + *atus*, an adjective ending; from the isidioid thallus) All of our records are from open-grown oak species in our western sector. ~ Thallus areoles shiny, more or less discontinuous, the margins with short-ciliate blastidia; apothecia rare; spores, 8 per ascus, *Pachysporaria*-type, 16 μm –19 μm \times 9 μm –10 μm .

Lee-MOR, Walworth Winnebago-MOR

Rinodina populicola H. Magn. (*Populus* + *-cola*, dwell; from its frequent occurrence on *Populus*) This largely western species is known from as nearby as Champaign County, where it was collected on *Carya*. ~ Thallus areolate, grayish to brownish; apothecia aggregated, 0.4–0.7 mm across, the margins thick; spores 16–32 per ascus, *Physconia*-type, 11 μm –19 μm \times 6 μm –9 μm .

Rinodina pyrina (Ach.) Arnold (Gr. *pyren*, stone or pit; the allusion here not known to me) Known from nearby Dane County, Wisconsin, this species is easily overlooked growing on the bark of fallen twigs, where it resembles the small-apotheciata *Lecanora albellula*. ~ Thallus minutely areolate, the areoles much taken up by the lecanorine, dark-disked apothecia; spores *Physcia*-like or *Physconia*-like, 11–14 μm \times 5.0–6.5 μm .

Rinodina tephraepis (Tuck.) Herre (Gr. *tephros*, ash gray + *aspis*, heavy wooden, usually round shield or buckler) This species is infrequent on HCl- rock. ~ Thallus dull, verruculose to rimose-areolate, grayish to brownish; apothecia sessile, with a well-developed lecanorine margin; spores *Physcia*-type, 17 μm –24 μm \times 8 μm –14 μm . [zeorin, \pm 5-0-methylhiasic acid, lecanoric acid.]

Grundy-MOR, Kendall-MOR, LaSalle-MOR

RUFOPLACA Arup, Söchting & Frödén TELOSCHISTACEAE [Photobiont: mostly "*Pseudotreboxia*." L. rufus, reddish + Gr. *plax*, a flat round plate, dish; from the reddish apothecia, resembling plates; an unusually mixture of Latin and Greek roots. ~ Thallus crustose, rather dark, K-, saxicolous; apothecia yellow-orange, including the biatorine rim, K+ magenta; spores 8, hyaline, polaribilocular, ellipsoid.]

- | | |
|---------------------------------|----------------|
| 1. Thallus absent | R. ARENARIA |
| 1. Thallus well developed | R. OXFORDENSIS |

Rufoplaca arenaria (Pers.) Arup, Söchting & Frödén (L. *arena*, sand + *-arius*, like or connected with; perhaps from its affinity to sandstone, one of its siliceous substrates) Our only record for this species is from a granitic boulder, where it grew with *Acarospora americana*. There is a specimen from base-rich rock in Pike County, Illinois, which is similar and evokes *Xanthocarpia marmorata* (Bagl.) Frödén, Arup & Söchting. ~ Thallus absent; apothecia 0.3–0.7

mm across, scattered or crowded and misshapen by compression, the disk orange to brownish, the margin paler, lighter; spores 10–14 μm \times 5–7 μm , the septum 2–3 μm wide. [thalloidima green].

Walworth-MOR

Rufoplaca oxfordensis (Fink) Arup, Søchting & Frödén (Probably of Oxford, Ohio) = *Caloplaca oxfordensis* Hedr. Our only records of this species are from siliceous rocks in open meadows or pastures, almost all from the northern half of the region. Wetmore (1996) maps this species in several counties just to the north and east of the Southern Lake Michigan region, as well as from Kalamazoo County, Michigan. At least one of our specimens fit more comfortably in the description below for *R. subpallida* (H. Magn.) Arup, Søchting & Frödén (*L. sub-*, below, not quite + *pallidus*, pale, pasty; probably an allusion to the grayish, not quite pale thallus), which, according to Szczepańska *et al.* (2013), has a rather thick and robust thallus, while that *R. oxfordensis* is “extremely thin and almost invisible.” Wetmore (1996) admits to not having seen the type of *R. subpallida* as do Szczepańska *et al.* (2013); both based their understanding of the latter on specimens at UPS named by Magnusson. Many, but not all, of our specimens have notably robust gray thalli and spores with isthmi more than 3.0 μm long; they all have linear to slightly clavate paraphyses, all of which features suggest *R. subpallida*. Specimens of *Gyalolechia flavovirescens* with a weathered, K– thallus may key here, but the spore septi are notably wider and there is usually some remnant of thallus with tinctures of yellow. ~ Thallus gray, rimose to rough-areolate, commonly invested with blue-green algae; apothecia 0.3–0.7 mm across, gregarious and sometimes misshapen by compression, the disk orange to brownish, concolorous with the proper margin, occasionally with a grayish thalline outer margin in some apothecia; spores 11 μm –15 μm \times 5–7 μm , the septum 2–3 μm wide. [thalloidima green]

Berrien-MOR, Boone-MOR, Cook-MOR, DuPage-MOR, Elkhart-MOR, Jefferson-MOR, Kalamazoo-MICH, Kane-MOR, LaSalle-MOR, McHenry-MOR, Rock-MOR, St.JosephIN-MOR, Walworth-MOR, Winnebago-MOR

RUSAVSKIA S. Y. Kondr. & Kärnefelt TELOSCHISTACEAE [Photobiont: *Trebouxia*. In honor of Anna Ivanivna Rusavska, mother of the Ukrainian lichenologist, Sergey Yakovich Kondratyuk (1959 –), the latter a student of *Xanthoria* and its relatives. ~ Thallus foliose, saxicolous, adnate, orange, the upper cortex K+ magenta, forming rosettes, with elongate often branched lobes; lower cortex white with white hapters; apothecia, if present, concolorous with the thallus; spores 8, hyaline, polaribilocular, ellipsoid; anthraquinones, particularly parietin.]

1. Thallus esorediate; apothecia abundant R. ELEGANS
1. Thallus soreciate; apothecia absent R. SOREDIATA

Rusavskia elegans (Link) S. Y. Kondr. & Kärnefelt (*L. elegans*, neat, elegant; from its comely appearance) = *Xanthoria elegans* (Link) Th. Fr. Commoner in northwestern Illinois, our only local records are from weathered concrete and dolomitic boulders.

Boone-MOR, Dekalb-MOR, Kane-MOR, Kenosha-MOR, Kent-MOR, Ogle-MOR, Rock-MOR, WIS

Rusavskia soreliata (Vainio) S. Y. Kondr. & Kärnefelt (Gr. *soredion*, a little heap + *-atus*, an adjective ending; from the conspicuous soredia) = *Xanthoria soreliata* (Vainio) Poelt. Yet unknown from the region, this western species has been collected as near as Rock Island County, Illinois, where it grows on a limestone cliff north of Hillsdale, and Iowa County, Wisconsin (Lindblom 1997).

SARCOGYNE Fée ACAROSPORACEAE [Photobiont: *Trebouxia* and *Myrmecia*. Gr. *sarx*, flesh + *gyne*, a woman; probably from the tendency of a moistened hymenium to turn red. ~ Thallus saxicolous, mostly endolithic, grayish; apothecia sessile, biatorine of lecideine, the paraphyses unbranched; asci much thickened at the tip, the spores numerous, hyaline, simple, bacilliform.]

1. Thallus epilithic, white or sordid S. ARENOSA
1. Thallus endolithic, or if epilithic then black.
 2. Thallus on carbonate-rich rock or concrete; apothecia usually at least thinly pruinose.
 - Apothecia biatorine S. REGULARIS
 - Apothecia lecanorine S. CANADENSIS
 2. Thallus on non-carbonate rock; apothecia epruinose.
 3. Many of the apothecia more than 1 mm across, round but many proliferating forming clusters with more angular shared borders; apothecia biatorine S. SIMILIS
 3. Apothecia or less than 1 mm across, round or angular, but not notably proliferous; apothecia lecideine.
 - Apothecia mostly more than 0.8 mm in diameter; hypothecium nigrescent S. CLAVUS
 - Apothecia generally asymmetrical or angular, prevailingly less than 0.8 mm in diameter; hypothecium hyaline S. HYPOPHAEA

Sarcogyne arenosa (Herre) Knudsen & S. M. Standley (L. *arena*, sand + *-osus*, denoting full of or prone toward; evidently with a propensity to sand) Our only record for this western species is from a chert pebble on an eroded slope in full sun. ~ Thallus epilithic, continuous to areolate, brown to gray or pallescent; apothecia 1 per areole, immersed, round, 0.4–1.2 mm across, the disk black, reddish when wet, plane to convex, the margin disappearing in age; spores 3.5–4.9 μm \times 1.0–1.5 μm .

DuPage-MOR

Sarcogyne canadensis (H. Magn.) K. Knudsen, J. N. Adams, Kocourk. & Y. Wang (Of Canada) = *Acarospora canadensis* H. Magn. Our only local specimens are from weathered concrete. Armstrong (1977) reported a "brown *Acarospora*" from carbonate rock; if it was an *Acarospora*, it may be referable to this species. *Acarospora fuscata* is brown, but it inhabits non-carbonate rock and is distinctive in containing gyrophoric acid. Attempting to follow Brodo (2016) here, we may not have the right name for this species. The student may wish to consult Reeb *et al.* (2004). ~ Thallus endophloeic, the apothecia lecanorine, pruina rare on the rims.

DeKalb-MOR, Kenosha-MOR

Sarcogyne clavus (DC.) Kremp. (L. *clava*, club; from the shape of the ascus) Yet unknown from the Southern Lake Michigan region, it is occasional in ambient districts. This is our only

species with a dark-colored hymenium. ~ Thallus endolithic; apothecia black, reddish when wet, the carbonized margin thick, verrucose to wavy; spores 4–6 $\mu\text{m} \times 1.0\text{--}1.5 \mu\text{m}$.

Sarcogyne hypophaea (Nyl.) Arnold. (Gr. *hypo*, under, beneath + *phaios*, dusky, dark gray) = *Lecanora privigna* (Ach.) Nyl. The *Lecanora cervina* of Calkins (1896) probably should be referred here inasmuch as he said it was scarcely distinguishable from *L. privigna* and that it grew on siliceous rocks. Calkins, however, attributed the pruinose forms of *privigna* to siliceous rocks, an observation that is contrary to what is generally observed. ~ Thallus endolithic or with pallescent fragments associated with the apothecia; apothecia, lecideine, irregularly shape 0.3–0.7 mm across, the disk reddish to nigrescent, redder when wet, the margin flexuous, undulate, often split or compressed; spores 3–5 $\mu\text{m} \times 1.0\text{--}2.0 \mu\text{m}$.

Cook, Will

Sarcogyne regularis Körber (*L. regularis*, regular; perhaps regarded by Körber to occur routinely) = *Biatorella pruinosa* Ach. Probably including *Lecanora privigna* var. *pruinosa* of Calkins. Occasional on a wide variety of carbonate-rich substrates, including tufa rock, gravel, concrete, shale, and exposed dolomite. Some specimens called "*Lecanora cervina*" by Calkins are referable here. ~ Thallus endolithic, or rarely more or less areolate; apothecia biatorine, abundant, occasionally immersed in the substrate, subcircular 0.2–1.0 mm across, the disk plane or convex, black, reddish when wet, usually blueish to blue-gray pruinose, the margin black, thin, persistent, often pruinose; spores 3–5 $\mu\text{m} \times 1.5\text{--}2.2 \mu\text{m}$.

Barry-MICH*, Cass-MOR, Cook-F*,MOR, DuPage-MOR, Grundy-MOR, Jasper-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-CACS*,F*,MOR,NY, McHenry-MOR, Racine-MOR, Rock-MOR, VanBuren-MOR, Walworth-MOR, White-MOR, Will-MOR

Sarcogyne similis H. Magn. (*L. similis*, similar or resembling, an adjective usually used to modify nouns in the genitive or dative cases) Our only record for this species is from a collection made on exposed sandstone at Castle Rock. It has an unfortunate resemblance to *Porpidia crustulata*, which see, from which it must be distinguished by the numerous tiny spores and the fact that the disk, as in all *Sarcogyne*, turns vinaceous when wet. ~ Thallus endolithic; apothecia, biatorine, nigrescent, 0.5–2.0 mm across, the disk, black, reddish when wet, plane or convex, the margin black, smoothish to rough, crenulate, or splitting, tending to disappear as the disk becomes convex; spores 4–6 $\mu\text{m} \times 1.1\text{--}2.3 \mu\text{m}$.

Ogle-MOR

SCLEROPHORA Chevall. CONIOCYBACEAE [Photobiont: *Trentepohlia*. Gr. *skleroun*, to harden + *phoros*, a bearing; the allusion not clear. ~ Thallus crustose, endophloedeal; apothecia stipitate, mazaedial, the spores numerous, hyaline, globose, often warty.]

Sclerophora nivea (Hoffm.) Tibell (*L. nivea*, snow white) Our only record is from "trees" in LaSalle County, where represented by an undated specimen of Calkins (#370), which he called *Coniocybe pallida*. Generally it grows in the crevices of dry bark.

LaSalle-CUP

SCOLICIOSPORACEAE

One local genus **Scoliciosporum**

SCOLICIOSPORUM A. Massal. SCOLICIOSPORACEAE [Photobiont: Chlorococcoid, often forming goniocysts. Gr. *skolekos*, of a worm + *spora*, seed; from the elongate, curved spores. ~ Thallus crustose, obscure; apothecia rather small, becoming convex, brown to nigrescent, weakly biatorine; exciple paraplectenchymatous, thin-walled; epihymenium blue-green to brownish, the paraphyses narrowly clavate or not expanded; spores 8, hyaline, 3–7 septate, acicular, coiled in the ascus; conidia bacilliform to filiform.]

1. Thallus corticolous S. CHLOROCOCCUM
 1. Thallus saxicolous S. UMBRINUM

Scoliciosporum chlorococcum (Stenh.) Vězda (Gr. *chloros*, green + *kokkos*, a kernel, grain; from the green granular thallus) = *chlorococca* (Stenh.) Lettau. Infrequent on various corticolous substrates, including *Acer rubrum*, *Larix laricina*, *Pinus banksiana*, *Pinus strobus*, *Quercus rubra*, *Rhus typhina*, *Tilia americana*, and *Vaccinium corymbosum*. Armstrong (1977) reported *chlorantha* (as "*B. chlorocantha*") from Du Page County, but her specimen is referable to this species. *B. chlorantha* (Tuck.) Fink is similar, but has more than 8 spores per ascus and conspicuous oil droplets in the hymenium. ~ Thallus dark green or greenish, granular, convex, the margin soon disappearing; spores slenderly clavate, 4–7 septate, 18–40 μm \times 3–5 μm .

Allegan-MSC, Barry-MSC, Berrien-MIN*, MOR, MSC, Calhoun-MSC, Cook-MOR, DuPage-MOR, Jasper-MOR, Kalamazoo-MIN*, MSC, LaPorte-MIN*, MOR, LaSalle-MOR, Ottawa-MSC, Porter-MIN*, MOR

Scoliciosporum umbrinum (Ach.) Arnold (L. *umbros*, full of shade + *-inus*, pertaining to; probably from the dark color of the nigrescent thallus granules) Our only records for this species are from a granitic erratics in open pastures and on old stone walls. ~ Thallus grayish green, thin, continuous, verruculose; apothecia 0.2–0.7 mm across, soon convex, epruinose; spores acicular, mostly 3-septate, spirally coiled in the ascus, strongly curved outside the ascus, 17–40 μm \times 2–3 μm .

Barry-MSC, Jefferson-WIS, Kane-MOR, Winnebago-MOR

SCYTINIUM (Ach.) Gray COLLEMATACEAE [Photobiont: *Nostoc*. Gr. *skytos*, leather; + *-inus*, pertaining to; perhaps from the texture of the thallus. ~ Thallus subcrustose to minutely foliose or fruticose, gelatinous, lead-gray to brownish; apothecia lecanorine, laminal, sessile, the asci I+ blue at the tip; spores 8, hyaline, 2–11 septate, 1–3 muriform.]

1. Thallus minute, to 1 mm across, subcrustose S. FRAGRANS
 1. Thallus usually larger, more or less fruticose or foliose.
 2. Thallus lobes narrow, the margins finely dissected into dense isidioid or coralloid branches; lobe surfaces longitudinally wrinkled S. LICHENOIDES
 2. Thallus without coralloid branches; lobes smooth.
 4. Thallus olivaceous to nigrescent, isidiate S. DACTYLINUM

4. Thallus dark gray to nigrescent, without isidia.

Thallus olivaceous, the apothecia commonly broader than the linear lobes on which they are located. S. APALACHENSE

Thallus dark gray to dark green, the apothecia sitting well within the area of the more or less broad lobes S. JUNIPERINUM

Scytinium apalachense (Tuck.) Otálora, P. M. Jørg. & Wedin (Of the Appalachian Mountains) = *Leptogium apalachense* (Tuck.) Nyl. Not yet known from our region, Lendemer & Harris (1916) map this largely southern species from as nearby as Fayette County, Iowa, where it grew on calcareous rock. ~ Thallus 1–3 cm across, comprising dichotomously branched, narrowly radiating lobes (0.4–1.0 cm ± 0.5–1.0 cm), the latter flat but notably thickened distally; apothecia abundant, immersed to sessile, 0.1–0.6 mm across, the rim concolorous with the thallus, the disk usually browner or redder; spores ellipsoid, 15–25 μm × 6–14 μm , 3–5 septate, 1-muriform.

Scytinium dactylinum (Tuck.) Otálora, P. M. Jørg. & Wedin (Gr. *daktylos*, a finger, toe + *-inus*, pertaining to; from the flattened isidioid marginal lobules that supposedly resemble fingers) = *Leptogium dactylinum* Tuck. Our only records for this species are from shaded, often mossy dolomitic exposures. There is a Calkins specimen at ILL (LE-175) from "Illinois" that he called *L. myochroum*, but it looks to us like *L. dactylinum*. ~ Thallus 2–3 cm across, the lead-gray to brownish or olivaceous, the squamuliform lobes 1–4 mm wide, the margins entire to isidiate, the surfaces isidiate; apothecia frequent, on the lobe surfaces, 0.2–1.2 mm across, the disk brown to reddish; spores 13–20 μm × 5–8 μm , 2–3 septate, 0–1 muriform.

Boone-MOR, DuPage-MOR, Kane-MOR, Kankakee-MOR

Scytinium fragrans (Sm.) Ach. (*L. fragrans*, sweet-smelling; an inexplicable epithet) = *Collema microphyllum* of Calkins, who recorded it from "elm bark; Cook and Will counties," and regarded it as rare. ~ Thallus minute, olivaceous to nigrescent, irregularly lobulate, the lobes minute, ascending, more or less imbricate, granulose near the center; apothecia 0.15–0.25 mm across, numerous, often more than one on each lobule, the disk concave to flat, reddish, the lecanorine margin thick; spores spheroidal to ellipsoid, 10–21 μm × 7–11 μm , 1–3 septate, 1–2 muriform.

Cook, Will

Scytinium juniperinum (Tuck.) Otálora, P. M. Jørg. & Wedin (*Juniperus*, juniper + *-inus*, pertaining to; perhaps from a resemblance of the thallus folds to the imbricated juniper leaves) = *Leptogium juniperinum* Tuck. Rare throughout the state, one local record is from shaded, argillaceous, silty dolomite in a canyon along the Des Plaines River. The McHenry County record is admixed with *Peltigera rufescens* (Hyerczyk #2745, MOR) collected on gravelly soil alongside a hill prairie. The La Salle County collection is from moss patches on a wooded slope under *Pinus strobus*. ~ Thallus to 4 cm across, lead-gray to olivaceous or brown, paler beneath, attached to substrate by a tuft of hairs, the lobes imbricate, entire to lacerate or lobulate; apothecia frequent, on the surface, the disk brown to reddish, 0.2–2.0 mm across; spores 17–23 μm × 11–16 μm , 3-septate, 0–1 muriform.

DuPage-MOR, LaSalle-MOR, McHenry-MOR

Scytinium lichenoides (L.) Otálora, P. M. Jørg. & Wedin (Gr. *leichen*, a lichen + *-oideos*, form of, type; with the form of a lichen) = *Leptogium lichenoides* (L.) Zahlbr.; *L. lacerum* of Calkins, who reported it from elms, although elsewhere in the Midwest, this species typically occurs on carbonate rocks, often with the moss, *Anomodon minor* or *A. rostratus*. Our only contemporary records are from a dolomitic outcrop on a north slope along the east bank of the Fox River and from partially shaded rocks in canyons. ~ Thallus grayish above, usually lighter beneath, 1–5 cm across, comprising numerous elongate to orbicular lobes (1.0–4.0 mm wide), the margins entire to lobulate; apothecia infrequent, sessile, 0.2–0.7 mm across, the disk concave, brownish to reddish, the rim lobulate to isidioid, concolorous with thallus; spores 18–45 μm \times 11–16 μm , 5–9 septate, 1–3 muriform.

Cook-MOR, Kane-MOR, LaSalle-CACS*, F*, ILL, Rock-WIS

SOLITARIA Arup, Söchting & Frödén TELOSCHISTACEAE [Photobiont: *Chlorococcus*-like, not *Trentepohlia*. *L. solitarius*, solitary, only one. ~ Thallus crustose, corticolous, continuous to areolate, chromate-yellow to grayish, K+ magenta, soresiate; apothecia rare, spores not seen; anthraquinones]

Solitaria chrysophthalma (Degel.) Arup, Söchting & Frödén (Gr. *chrysos*, gold + *ophthalmos*, the eye; probably from the deep golden orange apothecia on a pale yellow background) = *Caloplaca chrysophthalma* Degel. This attractive species is known from as far north in Illinois as Woodford County and as far south in Minnesota as Winona County, but it is yet unknown from the Southern Lake Michigan region. ~ Thallus yellow-green to grayish, the areoles flat to convex; soralia finely soresiate, yellowish-green to orange; apothecia flat, 0.3–0.7 mm across, the disk dark orange, with a thalline margin the color of the thallus; spores 12–17 μm \times 6–8.5 μm , the septum 5–7.5 μm .

SOLOLINA Ach. PELTIGERACEAE [Photobiont: *Chlorococcus*-like, and or *Trebouxia*. Possibly from the Indonesian, volcanic island of Solor, or from the Latin verb, *solor*, which evokes feelings of comfort and ease; allusion to either theory is abstruse. ~ Thallus foliose, the lobes suberect, not adnate, greenish to brownish or gray; apothecia reddish to black, deeply sunken in the upper cortex; spores brown, 1-8, 2-celled; ellipsoid to fusiform.]

Solorina saccata (L.) Ach. (*L. saccatus*, having the form of a sack) Known from as nearby as Ozaukee County, Wisconsin, where it grows on carbonate-rich soil, or soil over limestone or dolomite, it is yet unknown from the Southern Lake Michigan region. ~ Apothecia nigrescent, the spores 4, very large.

SPIILONEMA Bornet COCCOCARPIACEAE [Photobiont: *Stigonema*. Gr. *spilos*, spot or blemish + *nema*, a slender thread or tube. ~ Thallus minutely fruticose, nigrescent, the branches fruticose; apothecia black, concave, biatorine, the asci

I+ blue at the tip, the spores 8, hyaline, simple, ellipsoid; conidia narrowly ellipsoid.]

Spilonema revertens Nyl. (*L. revertens*, returning, turning back; the allusion unclear) Our only record for this easily overlooked lichen is on a specimen in association with *Psorula rufonigra*, which is said to be lichenicolous upon it. Both grew together on a siliceous, exposed rock at Magnolia Bluff in nearby Rock County, Wisconsin. The minute much-branched thallus filaments, no more than 0.3 mm long, are black to dark brown, sometimes with a bluish black hypothallus evident.

SQUAMULEA Arup, Søchting & Frödén TELOSCHISTACEAE [Photobiont: mostly "*Pseudotrebouxia*." *L. squamula*, small lobe, lodicule. ~ Thallus and apothecia orange, K+ magenta; apothecia lecanorine, the rim nearly concolorous with the thallus, the disk often a little more orange; spores polaribilocular, the isthmus more than 1/3 as long as the spore. Anthraquinones, particularly parietin.]

1. Thallus pinkish-white pruinose..... S. GALACTOPHYLLA
 1. Thallus epruinose S. SUBSOLUTA

Squamulea galactophylla (Tuck.) Arup, Søchting, & Frödén (Gr. *galactos*, milk + *phyllos*, leaf; perhaps from the creamy pruinose thallus) This is largely a species of the eastern Great Plains region, known from as nearby as Sauk County, Wisconsin. ~ Thallus effigurate, the lobes flattish; cortex pale to orange, heavily invested with pinkish-white pruina; apothecia much darker orange than the thallus, with a thalline margin; spores 9.5–12.5 μm long, 5.5–7.0 μm wide with isthmi 3–4 μm long.

Squamulea subsoluta (Nyl.) Arup, Søchting & Frödén (Gr. *sub-* below, slightly, imperfectly, nearly + *solutus*, unbound, free; from the more or less dispersed areoles) = *Caloplaca subsoluta* (Wedd.) Zahlbr. *Placodium cinnabarinum* of Calkins. As it was in Calkins's day, this is a frequent species of a variety of carbonate rocks, including concrete; it also can grow on HCl– rocks. It grows in weedy areas as well as on rocks in natural contexts. We have one specimen from Berrien County that looks like this species growing on the bark of a horizontal root among concrete rubble. Occasional asci will be found with 1 or 2 spores that are larger than normal, but typically the 8-spored asci contain broadly ellipsoid spores 10–11 μm long, with isthmi 3–4 μm long. The apothecia rarely exceed 0.5 mm across, and mostly run about 0.2–0.3 mm across. This species was long known locally as *Caloplaca cinnabarina* (Ach.) Zahlbr. (*L. cinnabaris*, red, vermilion), which is a more distinctly reddish and placoid species with a southwestern distribution. Local specimens also have been called *C. velana* (A. Massal.) Du Rietz, a name that might apply to another species. Wetmore (2003) restricts *S. squamosa* (B. de Lesd.) Arup, Søchting & Frödén to the southwestern United States, noting that *S. subsoluta* is very variable particularly in the eastern states, where he reports that the thallus is poorly developed and even more so on base-rich rock—which accounts for most of our material; he

notes that specimens with thin thalli have been called *Caloplaca irrubescens* and that those with thicker, even lobulate thalli are more typically *S. subsoluta*. Wetmore also notes that the apothecia of *S. subsoluta* often lack a thalline margin, but our specimens are largely zeorine. While *S. subsoluta*, *sensu stricto*, is rather widespread in our experience, the afore-described variant is known to us only from districts north of the northern half of Illinois. Our suspicion is that this species is still poorly understood in the east and certainly remains problematic, at least in my own mind—a common characteristic of the crustose Teloschistaceous species in general! Please see also notes under *Athallia holocarpa*, *Athallia vitellinula*, and *Gyalolechia flavovirescens*. I am certain that there are more than one species represented in our account here; clearly there is more work to be done. See also notes under *Lecania erysibe*. ~ Prothallus black, often present; thallus scant to squamulose, of scattered, sometimes lobulate areoles; apothecia thinly biatorine to zeorine, to 0.6 mm across, the proper margin well developed and often paler than the disk, the amphithecium quite evident and yellow—the color of the thallus; spores 9.5–13 μm long, 5.5–7.0 μm wide with isthmi 3–4.5 μm long.

Barry-MOR, Boone-MOR, Cook-F*, MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Koskiusko-MOR, LaGrange-MOR, LakeIL-MOR, LaSalle-CACS*, CUP, F*, MICH*, MIN*, MOR, Lee-MOR, Livingston-MOR, McHenry-MOR, Noble-MOR, Ogle-MOR, Pulaski-MOR, Racine-MOR, Steuben-MOR, St. JosepIN-MOR, VanBuren-MOR, Walworth-MOR, Will-MOR, Winnebago-MOR

STAUROTHELE Norman VERRUCARIACEAE [Photobiont: *Stichococcus*. Gr. *stauros*, a cross + *thele*, a nipple) ~ Thallus endolithic to surficial; perithecium with endohymenial algae; spores muriform, brown, 2 per ascus.]

1. Thallus endolithic, on carbonate rocks S. ELENKENII
1. Thallus surficial, areolate-rimose to rimose, on siliceous rocks S. FISSA

Staurothele elenkenii Oxner (presumably after A. A. Elenken, about whom more information would be welcome) ~ Possibly overlooked, this is a western species of dry carbonate rocks. It was reported by (Thomson 1991) from Union County, Illinois. At first glance it might be passed off as a *Verrucaria*. ~ Thallus endolithic; spores 32–62 μm \times 18–33 μm . ~ Thallus scant or absent; perithecia 1 per verruculose areole, 0.5 mm in diameter, the involucrellum carbonaceous; hymenium I+ blue; spores 8 septate, 3-muriform, 33–62 μm \times 18–33 μm .

Staurothele fissa (Taylor) Zwakh (L. *findere*, to split; possibly from the rimose thallus) A species of siliceous rocks, it is yet unknown from our region, but occurs all around the Southern Lake Michigan Region with specimens from as nearby as Fulton County, Illinois. ~ Thallus epilithic, black, verrucose-rimose; perithecia 0.3–0.5 mm in diameter, the hymenium I+ blue turning violet; spores many-celled, 30–50 μm \times 14–25 μm .

STEREOCAULACEAE

- A. Thallus leprose *Lepraria*
- A. Thallus fruticose *Stereocaulon*

STEREOCAULON Hoffm. STEREOCAULACEAE [Photobiont: *Trebouxia* in the algal layer; *Gloeocapsa*, *Nostoc*, *Scytonema*, and *Stigonema* in the cephalodia. Gr. *stereos*, solid, firm + *kaulos*, stalk, stem; from the solid podetia. ~ Thallus white to pale gray, fruticose, with a granular but evanescent primary thallus; pseudopodetia with a cartilaginous core, erect, gregarious, well beset with verrucae, or pustular isidia-like granules, often secondarily coralloid-branched; apothecia biatorine brown to nigrescent; spores acicular, 8, hyaline, 3–7 septate, needle-like.]

Stereocaulon saxatile H. Magn. (L. *saxatilis*, among the rocks; from its rocky habitat) Our only contemporary records for this species are from a sandstone exposure in a grazed prairie east of Pine Rock Nature Preserve. [lobaric acid, atranorin]

Barry-MSC, Ogle-MOR

STICTIDACEAE

One local genus **Stictis**

STICTIS Pers. STICTIDACEAE [Photobiont: *Trebouxia* or absent. Gr. *stictos*, dotted. The reader may wish to consult Wedin *et al.* (2005) concerning the generic alignment. ~ Thallus crustose, corticolous, continuous to rimose; apothecia immersed in a pit in the thallus; spores large, acicular, vermiform, 8, hyaline, more than 25-septate.]

Stictis urceolatum (Ach.) Gilenstam (L. *urceolus*, a pitcher + *-atus*, adjective ending; from the appearance of the apothecium) = *Conotrema urceolatum* (Ach.) Tuck., which is probably the better name for whatever this Stictidaceous thing is. Calkins (1896) stated that this species was found on "maples and poplars in Cook and Will counties," And we have an old specimen (Calkins *s.n.* MOR) from LaSalle County. Farther east, this species forms characteristic white patches on *Acer saccharum* in old growth forests (Wong & Brodo, 1992). The few specimens we have seen near our region appear to be non-lichenized. The DuPage County record is contemporary, taken from *Acer saccharum*. ~ Spores, constricted at the septa, 100–160 μm \times 3.0–5.5 μm .

Cook, DuPage-MOR, LaSalle-CACS, *ILL, MICH*, MOR, NY, Will

STRANGOSPORA Körber BIATORELLACEAE¹⁵ [Photobiont: Chlorococcoid. Gr. *strangalan*, choke, twist + *spora*, seed; the allusion is not clear to me. ~ Thallus crustose, thin to obscure; apothecia biatorine, the asci apically thickened and I+ blue; spores numerous, hyaline, simple, subglobose.]

¹⁵Lücking *et al.* (2016) place this genus in the monotypic family, Strangosporaceae.

Strangospora cyphalea (Tuck.) C. A. Morse & Lendemer (Perhaps from Gr. *kyphos*, humped, curved + *aleo*, exposed to the sun; perhaps after the tiny convex apothecia on open-grown trees) = *Biatora cyphalea* Tuck.; *Biatorella cyphalea* (Tuck.) Zahlbr. Magnusson (1934) cited a Wolf specimen from elm bark, and he also cited a Calkins specimen from elms, "Chicago: Fox River." Actually, Calkins (1896) reported it as "rare on elms near the Fox River," a location that is more likely in Kane County. We have seen a specimen from nearby Sangamon County, Illinois (E. Hall #146, F), growing on what looks like *Ulmus* bark. Fink (1935) restricted this species to Illinois, but for a comprehensive treatment of the polysporous biatorine lichens, see Morse & Lendemer (2019). ~ Thallus pale to grayish, granular to verrucose; apothecia 0.5–0.8 mm across, the disk reddish to brown, the proper exciple darker, soon disappearing; hypothecium yellowish; spores about 100, 3–4 μm long \times 2–3 μm wide.

Kane

STRIGULA Fr. STRIGULACEAE [Photobiont: *Trentepohlia*. *L. strigula*, a scraper, flesh brush; perhaps from the brushlike appearance of the hymenium. ~ Thallus crustose, immersed; perithecia black, the pseudoparaphyses unbranched; spores 8, hyaline, 1–8 septate to submuriform. Compare with *Anisomeridium*.]

- | | |
|-------------------------------|------------------|
| 1. Spores 6–8 celled..... | S. SUBMURIFORMIS |
| 1. Spores fewer than 6-celled | |
| Spores 2-celled | S. AMERICANA |
| Spores 4-celled | S. JAMESII |

Strigula americana R. C. Harris (of America) *Arthopyrenia tenuis* R C. Harris. Harris (1975) mapped this species from just west and south of the Southern Lake Michigan region. Evidently uncommon locally, we have specimens from *Gleditsia triacanthos*, *Juglans nigra*, and *Carya cordiformis*. A specimen at CACS (Calkins #6418), named originally, *Arthonia taediosa*, includes *S. americana* as well as an *Arthonia* with immature spores and broadly elliptic asci. In neither case were photobionts noted. Our Kankakee County specimen has somewhat broader spores (5.6–7.4 μm) than those given by Harris 1975. We have a specimen from farther south in Illinois growing on *Quercus velutina*. ~ Perithecia scattered to gregarious or even 2-3 fused, subconical, 0.4-0.5 mm broad, to 0.35 mm high; asci cylindrical 70–130 μm \times 6–12 μm ; ascospores uniseriate to more or less biseriata, tapered at both ends, symmetrical or weakly falcate, 1-septate, slightly constricted at the septum; 16–25 μm \times 4.5–5.5 μm . Macroconidia cylindrical.

DuPage-MOR, Kankakee-MOR, LaSalle-CACS*

Strigula jamesii (Swinscow) R. C. Harris (in honor of the British lichenologist, Peter James, 1930–2014, once a fixture at the Natural History Museum in London) *Arthopyrenia affinis* of many North American authors. Rather rare, corticolous. ~ Perithecia crowded to 2-3 fused together, subglobose to hemispheric, mostly sessile, 0.2–0.3 mm broad, black, colorless below;

interthecial hyphae rare branched distally; asci cylindrical, clavate, 50–90 $\mu\text{m} \times 5\text{--}12\mu\text{m}$; spores 8, biseriate to irregularly disposed in the ascus, 3-septate, 15–21 $\mu\text{m} \times 4.5\text{--}7 \mu\text{m}$.

DuPage-MOR

Strigula submuriformis (R. C. Harris) R. C. Harris (L. *sub*, below, almost, near + *muriformis*, having the appearance of brick walls; from the occasional 1–2 muriform spores) = *Arthopyrenia submuriformis* Our only records for this species are from the bark of *Ulmus* and *Gleditsia* in park-like settings. Similar species, *Strigula stigmatella* (Ach.) R. C. Harris (Gr. *stigma*, mark or brand, dot or point + *-ellus*, diminutive; possibly from the tiny ascocarps), with mostly longer spores, is known from just north of our region and elsewhere not too distant; its spores are symmetrical, while those of *S. submuriformis* have a tendency to be a bit curved. ~ Perithecia scattered to gregarious or partly fused, nigrescent, colorless below; asci long-cylindrical, clavate; spores more or less biseriate, 5–7 septate, 20–27 $\mu\text{m} \times 6\text{--}6.5 \mu\text{m}$, usually with one or two cells longitudinally septate; macroconidia cylindrical.

Ogle-MOR, Winnebago-MOR

STRIGULACEAE

One local genus **Strigula**

TELOSCHISTACEAE

Among the more frustrating aspects of contemporary taxonomy is the drift away from morphological similarity as a principal paradigm for generic and species delineation accompanied by a drift toward ITS clades as the arbiter of relationships. Vondrák *et al.* (2016) lay out the situation quite grimly (from the standpoint of a Linnaean taxonomist) on of their treatments of the family: “*The Teloschistaceae. . . exhibit numerous morphotypes (often recognized as morphospecies) and numerous alleles in sequenced loci. Their large genetic variability is distributed within numerous clades that often do not have distinct morphological or other phenotypic characters. . . [which] calls for a new taxonomic concept, not one focused on ‘searching for congruencies between phenotypic and genotypic groups of specimens.’*” To quote an old Rolling Stones song: “I am waiting, I am waiting. Oh yeah, oh yeah!”

- A. Thallus fruticose to foliose or subcrustose, but at least the lobe tips elevated or loosely adnate or at least with a lower cortex.
 - B. Thallus saxicolous.
 - Lobes notably longer than wide, strongly convex, verrucose **Xanthomendoza**
 - Lobes not much longer than wide, flattish, not verrucose **Rusavskia**
 - B. Thallus corticolous.
 - C. Rhizines or hapters evident **Xanthomendoza**
 - C. Rhizines absent or quite scarce.
 - Thallus fruticose **Teloschistes**
 - Thallus foliose **Xanthoria**
- A. Thallus placodioid and effigurate to crustose, all portions tightly adnate; lower cortex absent.
 - D. Apothecia scarce or absent, or if widely scattered then the thallus saxicolous, whitish and without a distinct cortex; thallus sorediate.
 - E. Thallus lignicolous or corticolous.
 - F. Thallus neither yellow nor orange, K–.
 - Soredia distinct, cup-like grayish to yellowish green **Coppinsiella**
 - Soredia various, dark to nigrescent, or soredia absent **Caloplaca**
 - F. Thallus yellow or orange, K+ magenta.
 - Thallus chromate yellow **Solitaria**

- Thallus orange **Villophora**
- E. Thallus saxicolous.
- G. Thallus K-.
- Soralia originating on the margins of the areoles **Pyrenodesmia**
- Soralia prevailing on the surface. **Kuettlingeria**
- G. Thallus K+ purple.
- Thallus margins effigurate; soredia in soralia confined to the ends of the interior lobes ...
..... **Leproplaca**
- Thallus not effigurate; soredia in poorly delimited soralia **Flavoplaca**
- D. Apothecia frequent; esorediate.
- H. Apothecia black or brown, K- or K+ violet; thallus white or gray.
- I. Apothecia at least thinly pruinose **Phaeoplaca**
- I. Apothecia without pruina; thallus esorediate.
- Epihymenium K-; septum to 3 μm wide **Caloplaca**
- Epihymenium K+ violet; septa prevailingly longer **Huneckia**
- H. Apothecia orange or yellowish and K+ red; thallus absent or not white, or if so then the apothecial disk orange or pale.
- J. Thallus margins distinctly effigurate.
- Cortex orange or with white pruina away from the lobe tips **Calogaya**
- Cortex pale orange, fully invested with pinkish-white pruina **Squamulea**
- J. Thallus margins not or only weakly effigurate (see also, *Caloplaca pseudofulgensia*).
- K. Thallus lignicolous or corticolous.
- L. Thallus present, thin, K+.
- Thallus thin. **Gyalolechia**
- Thallus thick and spongy. **Caloplaca**
- L. Thallus K- or absent.
- M. Spores prevailingly more than 8 μm wide.
- Apothecia orange **Caloplaca**
- Apothecia with distinct tinctures or rusty red **Blastenia**
- M. Spores less than 8 μm wide.
- Apothecia at least weakly zeorine **Caloplaca**
- Apothecia biatorine **Athallia**
- K. Thallus saxicolous.
- N. Thallus K- or absent, the isthmus rarely more than 3 μm long.
- O. Thallus well developed.
- Spores prevailingly more than 6 μm wide with the isthmus prevailingly more than 3.0 μm long **Kuettlingeria**
- Spores prevailingly less than 6 μm wide, the isthmus prevailingly less than 3.0 μm **Rufoplaca**
- O. Thallus absent or nearly so.
- Spores less than 14 μm long; substrate not or only weakly base-rich
..... **Amundsenia**
- Spores more than 14 μm long; substrate notably base-rich ... **Xanthocarpia**
- N. Thallus K+ magenta (or if absent then the spore septum mostly more than 3 μm long.
- P. Thallus distinctly orange-tinged **Squamulea**
- P. Thallus distinctly yellow or yellowish gray, notably paler than the orange or brownish apothecia, or absent.
- Q. Thallus sorediate **Solitaria**
- Q. Thallus esorediate.
- Thallus more or less continuous **Gyalolechia**

Thallus of discontinuous areoles or squamules **Athallia**

TELOSCHISTES Norman (TELOSCHISTACEAE Photobiont: *Trebouxia*. Gr. *telos*, end + *schistos*, split, divided; from the polaribilocular spores, the two end cells divided and rendered remote by an isthmus. ~ Thallus fruticose, bushy from a central hapter, orange, K+ magenta, the branches flattened to terete; apothecia terminal, deep orange, abruptly flared, lecanorine; spores 8, hyaline, polaribilocular, ellipsoid.)

1. Apothecial margins ciliate T. CHRYSOPHTHALMUS
 1. Apothecial margins eciliate T. EXILIS

Teloschistes chrysophthalmus (L.) Th. Fr. (Gr. *chrysos*, gold + *ophthalmos*, eye; from the deep yellow or orange apothecia, particularly primordial ones, against the grayish background of the thallus) = *Theloschistes chrysophthalmus* of Calkins. There is an early specimen at the Chicago Academy of Sciences, collected at Lemont by Calkins. He reported it from "Lemont, on old rails in woods" (Calkins 1896). Also on old oak trees near the lake shore, Lake View." Very rare today, there have been recent collections made on an open grown trees in both aboriginal and cultural landscape situations. ~ Thallus branches flattened, often branched and fringed; apothecial margins fringed or ciliate. [parietin]

Allegan-MOR, Cook-CACS*,F*, DeKalb-MOR, DuPage-MOR, Kane-MOR, Kenosha-MOR, LaSalle-ILL,NY, Marshall-MOR

Teloschistes exilis (Michaux) Vainio (L. *exilis*, small, undersized) A rather improbable disjunction from farther south, it was collected locally on a small branch of a dead, cultivated tree *Pinus banksiana*. ~ Thallus branches narrowly flattened to terete; apothecial margins without cilia [parietin]

DuPage-MOR

THELIDIUM A. Massal. VERRUCARIACEAE [Photobiont: *Trebouxia* and *Protococcus*. Gr. *thele*, a nipple + *-idion*, diminutive; from the tiny perithecia. ~ Thallus crustose, saxicolous, on base-rich substrates, sordid to pale gray; perithecia superficial or immersed in pits, the asci I-; involucrellum present or absent; hamathecium of short to long periphyses; hymenium gelatinous, IKI+ red; spores 8, hyaline, 1-3 septate, ellipsoid.]

1. Spores 1-septate T. MINUTULUM
 1. Spores 3-septate T. ZWACKII

Thelidium minutulum Körber (L. *minutus*, small + *-ulus*, diminutive; tiny little one) This species is known from all around the Southern Lake Michigan Region and from as nearby as Peoria County, where it grows on in a sandstone ravine at Rocky Glen. There are specimens (Hyerczyk #2487, 2491, 2496, MOR) on HCl- sandstone that have larger spores [#2491 avg. = $32.0 \pm 1.5 \times 11.0 \pm 0.13$; #2496 avg. = $24.9 \pm 1.4 \times 11.1 \pm 0.8$; # 2497 avg. = avg. = $23.9 \pm 2.4 \times 11.4$

± 0.7] than given by Brodo (2016) [15–21 × 6–9 μm] but they lack an involucrellum, which pulls them out of the larger-spored *Thelidium pyrenophorum* (Ach.) Mudd (Gr. *pyren*, stone or pit, + *phoros*, a bearing; probably an allusion the thallus and its burden of “stones”); perithecia 0.15–0.20 mm in diameter; with the clypeus included, the perithecia of *T. pyrenophorum* run to as large as 0.4 mm in diameter. Another specimen (Hyerczyk #2465 MOR), also from Peoria County, collected on a base-rich pebble, is similar in that the exciple is colorless below and lacks an involucrellum, but the spores are smaller (avg. = 12.0 ± 0.9 × 4.7 ± 0.3) than given by Brodo for *T. minutulum* and the thallus is nearly absent; the perithecia are less than 0.15 mm in diameter. We are probably dealing with more than one species here. Purvis *et al.* (1992) admits that thallus development and spore size is quite variable in what they call *T. minutulum*. ~ Thallus thin, brownish; perithecia sessile, to 0.2 mm in diameter, without an involucrellum; hymenium IKI+ red, not inspersed; exciple colorless below the middle; spores 1-septate, 11–33 × 4–12 μm.

Thelidium zwackhii (Hepp) A. Massal. (In honor of the German lichenologist Philipp Franz Wilhelm von Zwach-Holzhausen, 1826-1903) = Local reports of *Thelidium microcarpon*. Rather frequent on a variety of base-rich substrates, including concrete, mortar, and pebbles; there is one specimen from HCl– asphalt rubble. If our specimens are interpreted as having no involucrellum, which I think is the case, they would key to *T. microcarpum* (Leight.) A. L. Sm. in Orange (1991), who does not treat *T. Zwackhii*. In all likelihood, the specimen that Calkins called *Verrucaria pyrenophora* is referable here; although there is a specimen in Calkins's bound *Lichenes Exsiccati*, we have not examined it. There is also a specimen at F, that was distributed by Calkins (#199) as *Verrucaria prosperella*, which is referable here. ~ Thallus olivaceous to pale, epilithic, thin, continuous to dispersed-areolate; perithecia 0.1-0.3 mm in diameter, superficial, with no evident involucrellum; hymenium IKI+ red, not inspersed, exciple more or less black throughout; spores 23–36 × 10–15 μm, slightly constricted at the septa, rarely 1 or 2 cells longitudinally septate.

Cook-MOR, DeKalb-MOR, DuPage-MOR, Jefferson, Kane-MOR, LakeIN-MOR, Ogle-MOR, Walworth-MOR, Will-MOR

THELOCARPACEAE

One local genus..... ***Thelocarpon***

THELOCARPON Hue THELOCARPACEAE [Photobiont: Chlorococcoid. Gr. *thele*, a nipple + *karpos*, fruit; from the tiny yellow apothecia evocative of nipples. ~ Thallus crustose, manifesting yellow or yellows globose warts; ascoma perithecia-like, opening at the distal end by a pore; paraphyses present or absent; asci subglobose to pyriform, with numerous, hyaline, simple, spores.]

Thelocarpon laureri (Flotow) Nyl. (after Johann Friedrich Laurer, 1798–1873, German pharmacist, physician, and lichenologist) = *Sagestria laureri* of Calkins. One of our records is from a granitic erratic on a gravelly kame, another is from an old fence rail at the Lockport

Prairie. The Porter County record was collected from a log of *Populus deltoides*. ~ Spores subglobose, 1.5–4.0 μm long \times 1.5–2.0 μm wide. [pulvinic acid derivatives]

Cook-F*,MOR, Kane-MOR, LakeIL-MOR, LaSalle-F*,ILL, Livingston-MOR, Porter-INDU,MIN*, Will-MOR

THELOTREMATACEAE

One local genus **Diploschistes**

THROMBIACEAE

One local genus **Thrombium**

THROMBIUM Wallr. THROMBIACEAE [Photobiont: Chlorococcoid. L. *thrombus*, a blood clot or curd of milk; from the gelatinous, membranaceous form of the sprawling thallus. ~ Thallus crustose, scarcely discernible; perithecia immersed, globose, the wall black throughout, with persistent paraphyses; asci I+ blue apically; spores 8, hyaline, simple, ellipsoid.]

Thrombium epigaeum (Pers.) Wallr. (Gr. *epi*, above + *ge*, earth; from its membranous growth on the ground) Yet unknown from our area, it occurs in immediate districts all around the Southern Lake Michigan Region, where it grows upon compact soil, mosses, and associated detritus. ~ Asci subcylindric, 130–170 μm \times 17–25 μm , the spores 18–26 μm \times 7–10 μm .

THYREA A. Massal. LICHINACEAE [Photobiont: *Chroococcus*. Gr. *thyreos*, a large, oblong, door-shaped shield; from the form of the thallus. ~ Thallus fruticose to subfoliose, gelatinous, dark gray, with strap like branches or lobes; apothecia uncommon, immersed, generally marginal; spores 8, hyaline, simple, subglobose to ellipsoid; conidia ellipsoid to bacilliform.]

Thyrea confusa Henssen (L. *confusus*, confused) = *Omphalaria pulvinata* Nyl. Our only record is from thin soil over dolomite, in full sun, in a dolomite prairie. Calkins & Huett (1898) reported it from La Salle County. ~ Apothecia rare locally; spores, 7.5–10 μm long \times 5–7.5 μm wide.

Will-MOR

TONINIA A. Massal. RAMALINACEAE [Photobiont: *Chlorococcoid* or absent. In honor of Carlo Tonini (1803-1877) a pharmacist in Verona, Italy, and friend of Abramo Bartolommeo Massalongo. ~ Thalli independent or lichenicolous; apothecia arthonioid or biatorine, black; spores 8-16, 0-7 septate, bacilliform.]

1. Thallus corticolous T. POPULORUM
1. Thallus either squamulose or parasitic on *Dermatocarpon*.
2. Thallus parasitic on *Dermatocarpon* T. TECTA
2. Thallus terricolous, not parasitic T. SQUALIDA

Toninia populorum (A.Massal.) Kistenich, Timdal, Bendiksby & S.Ekman (L. of *Populus* trees) = *Arthrosporium populorum* A Massal. Easily overlooked because of its *Buellia*-like appearance, this species is known from all around our region; we have failed to pick it up. ~ Apothecia arthonioid to weakly biatorine, black, convex, usually in separate but aggregated groups; hypothecium reddish brown; spores often curved, mostly 4-septate.

Toninia squalida (Ach.) A. Massal. (L. *squalidus*, rough or dirty; perhaps an allusion to its terricolous substrate, the specimen often dusted with the silty soil) If the label is to be believed and our identification is correct, our only record for this species is from "LaSalle Co., Ill. Terricola", a Calkins specimen (*s.n.*, F-28942), originally distributed as *Biatora uliginosa*. According to McCune (2017), this is a western species with disjunct populations in the Great Lakes region. ~ Thallus squamulose, the upper cortex brown or brownish, perhaps a little lighter along the margins, with hyphae well admixed with the silty soil; apothecia soon convex, the exciple obscured, black, even when wet; hypothecium brownish; epihymenium nigrescent, the tips of the paraphyses expanded; spores 3-7 septate, acicular to slightly tapered, $23-42 \times 2.5-4.5 \mu\text{m}$, with an evident perispore.

LaSalle-F*

Toninia tecta C. A. Morse & Ladd (L. = hidden, covered; from its ignominious position beneath the thallus of its host, *Dermatocarpon*). A species primarily of the Great Plains, our only record is from the lower surface of a specimen of *Dermatocarpon muhlenbergii* at Kankakee River State Park, which represents the northern and eastern-most range extension limit. ~ The apothecia are characterized by their prevailing 3-septate spores, greyish epihymenium, and rufous hypothecium. ~ Spores 1-3-septate, $14.0-18.7 \times 3.7-5.0 \mu\text{m}$.

Kankakee-MOR

TRAPELIA M. M. Choisy TRAPELIACEAE [Photobiont: Chlorococcoid, or with *Protococcus* and *Chlorella*, in multicellular packets. Gr. *trapelos*, easily turned, changeable; perhaps from the variable, irregular morphology of the exciple. ~ Thallus crustose, saxicolous, pale gray, areolate; apothecia sessile, brown to nigrescent, weakly lecanorine; asci I+ bluish apically; spores 8, hyaline, simple; ellipsoid.]

1. Thallus soresciate; apothecia rare T. PLACODIOIDES
1. Thallus esorediate; apothecia usually present though rarely gregarious.
 - Thallus thick, with rounded areoles or deeply rimose section, often more or less lobulate . T. GLEBULOSA
 - Thallus thin, continuous to rimose, without lobules our rounded areoles..... T. COARCTATA

Trapelia coarctata (Turner) M. Choisy (L. *coarctatus*, confined, drawn close together, perhaps from the commonly cohering areoles) = *Biatora coarctata*. Most of our specimens are from granitic erratics or sandstone cobbles or outcrops, sometimes partly shaded. Calkins reported it from both calcareous and arenaceous rocks. ~ Thallus continuous to rimose or with flattish areoles; apothecia 0.3-0.6 mm across, occasionally more or less stipitate upon a hyaline

base, the margins ragged or incomplete; spores 14–25 × 7–13 μm. [gyrophoric acid, lecanoric acid]

Berrien-MOR, Cook-F*,MOR, DuPage-MOR, Jasper-MOR, LaSalle-CACS*,F*,ILL, Porter-MOR, St. JosephIN-MOR, Will-MOR

Trapelia glebulosa (Sm.) J. R. Laundon (L. *glebulosus*, with rounded elevations, or clods) = *Trapelia involuta* (Taylor) Hertel Our records are all from granitic erratics or sandstone, sometimes partly shaded. Wetmore (1986) reports it from Porter County. ~ Thallus areolate, with discontinuous, usually convex areoles, or with some coalesced to appear continuous, the margins not erumpent-ragged, soon disappearing as to make the ascoma appear biatorine; spores 14–28 × 7–13 μm. The LaSalle County specimen (Calkins #111, NY) is cited by Brodo & Lendemer. [gyrophoric acid, lecanoric acid, ± 5-*O*-methylhiassic acid]

Barry-MICH*, LaSalle-NY, McHenry-MOR, Porter-MIN*, Will-MOR

Trapelia placodioides Coppins & P. James (*Placodium* + *-oideos*, form shape; probably from a superficial resemblance to *Placodium*) Our only local records are from partly shaded igneous boulders in remnant savannas. ~ Thallus generally thick, continuous, white or with tinctures of pink, smooth to rimose or areolate, weakly placodioid in some specimens, the soralia at the margins of areoles on the surface, reacting C+ red; apothecia not seen locally. [gyrophoric acid]

Berrien-MOR, Cass-MOR, Cook-MOR, DuPage-MOR, Kendall-MOR, LakeIL-MOR, LaSalle-MOR, McHenry-MOR

TRAPELIACEAE

- A. Thallus saxicolous. **Trapelia**
 A. Thallus not saxicolous.
 Thallus greenish gray or grayish, with soredia erupting from verrucae **Trapeliopsis**
 Thallus greenish to nigrescent, esorediate, minutely granular, without verrucae and cortical tissues . . .
 **Placynthiella**

TRAPELIOPSIS Hertel & Gotth. Schneid. TRAPELIACEAE [Photobiont: Chlorococcoid and *Pseudochlorella*, in multicellular packets. ~ Schmitt and Lumbsch (2001) report the photobiont as *Chlorella ellipsoidea* Gerneck. *Trapelia* + *Gr. opsis*, aspect, view, appearance; a segregate of *Trapelia*, which see. ~ Thallus crustose, granular or areolate, gray or grayish green; apothecia biatorine; spores 8, hyaline, simple, ellipsoid; conidia bacilliform.]

1. Apothecia plane, with persistent margins; thallus gray-green to dark green T. FLEXUOSA
 1. Apothecia typically convex, the margins soetimes disappearing; thallus whitish to gray, thick and convex to leprose.
 Soralia farinose sorediate, covering the thallus; apothecia black, typically conglomerate, the exciple not usually evident T. VIRIDESCENS
 Soralia coarsely sorediate, usually with corticate surfaces of the thallus evident; apothecia pink to brown, generally flattish, often solitary, the exciple evident T. GRANULOSA

Trapeliopsis flexuosa (Fr.) Coppins & P. James (L. *flexuosus*, with many bends, winding; from forms of the thallus that sometimes passes into a wrinkled, areolate crust, a rare

manifestation in the Southern Lake Michigan region and perhaps no longer attributable to this species) = *Lecidea flexuosa* (Fr.) Nyl.; *L. aeruginosa* Borrer. This species is occasional on decorticate logs, dead limbs, old wood, fence rails, burnt wood, and over moss; we have several records from the limbs of trees, including willows. ~ Thallus verruculose-areolate, sorediate, grayish green to olivaceous; apothecia 0.3–0.7 mm across, nigrescent; spores $6\ \mu\text{m} - 10\ \mu\text{m} \times 3\ \mu\text{m} - 4.5\ \mu\text{m}$. [gyrophoric acid]

Cook-F*,MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Kane-MOR, Kendall-MOR, Kenosha-MOR, LakeIL-MIN,MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Newton-MOR, Porter-MIN, Walworth-MOR, Will-ILLS*,MOR, Winnebago-MOR

Trapeliopsis granulosa (Hoffm.) Lumbsch (*L. granulus*, a small grain + *-osus*, having the nature or quality of; from the granular thallus) = *Lecidea granulosa* (Ehrh.) Ach. This species grows on substrates similar to those of the preceding entry. It is also known locally from stable sand in sand prairies. Without seeing the specimens, of course, it is difficult to know where to dispose of Calkins's report of *L. enteroleuca* from Will County. From his description, however, it is probable that some of the material is referable here. Esslinger (2017)) noted that reports of *L. enteroleuca* often refer to what are now recognized as various species of *Lecidella*. ~ Thallus verruculose-areolate, sorediate, grayish to grayish-green; apothecia 0.4–10 mm across, variously pink to brown, or nigrescent; spores $14\ \mu\text{m} - 14\ \mu\text{m} \times 4\ \mu\text{m} - 7\ \mu\text{m}$. [gyrophoric acid]

Allegan-MICH,MSC, Barry-MSC, Berrien-MOR, DuPage-MOR, Jasper-MOR, Kalamazoo-MSC, Kane-MOR, LakeIL-MOR, LaPorte-MOR, McHenry-MOR, Porter-MOR, St.JosephIN-MOR, Starke-MOR, Waukesha-MOR, Will

Trapeliopsis viridescens (Schrad.) Coppins & P. James (*L. viridis*, green + *-escens*, beginning, becoming, slightly; possibly from the color of the fresh thallus, which tends to whiten in age) Common north of Southern Lake Michigan Region, this species is known from all around us. The only record we have seen is an early specimen (Calkins #6000, CACS) from LaSalle County, where he collected it on detritus over sandy soil. He had called it *Biatora uliginosa*. ~ Thallus thin, effuse, utterly covered by farinose soredia, appearing leprose; apothecia black, convex, usually conglomerate, the exciple not usually evident; spores $9\ \mu\text{m} - 13\ \mu\text{m} \times 3.5\ \mu\text{m} - 6\ \mu\text{m}$. [gyrophoric acid]

LaSalle-CACS*

TRAPONORA Aptroot LECANORACEAE [Photobiont: *Trebouxia*. Evocative of the genus *Trapelia*, which see + Gr. horos, margin or limit; an allusion to the variability seen in the shape of the apothecia. ~ Thallus crustose, corticolous, grayish, granular; apothecia brown or with orange or reddish tinctures, the margin scarcely evident or obsolete; spores 8, hyaline, simple, ellipsoid; xanthone in the apothecia and usually in the thallus.]

Traponora varians (Ach.) J. Kalb & Kalb (*L. varians*, changing; perhaps from the various shapes and degrees of confluence of the apothecia) = *Biatora varians* of Calkins (1896), who reported it from oaks and hickories; *Lecidea varians* Ach., of Fink, = *Pyrrhospora varians* (Ach.) R. C. Harris (Harris 1995), who agreed with Hafellner (1993) that this species poorly belonged and *Pyrrhospora* but was uncomfortable placing it into *Lecidea*, the only other available genus.

Kalb & Kalb (2017) appear to have settled the issue for now. Locally frequent on a variety of twigs and branches, our specimens are from *Gleditsia triacanthos*, *Juglans nigra*, *Populus grandidentata*, *Prunus serotina*, *Ptelea trifoliata*, *Rhus typhina* and weathered lignin. This species is commonly weedy in southern portions of the Midwest. Local reports of *Lecidea hypopta* Ach. are referable here. ~ Thallus granular to continuous, often KC+ orangish, often with a black prothallus; apothecia scattered and round or more typically aggregated and deformed in small clusters of 3-5, 0.2–0.4 mm across, pale brown to nigrescent; spores broadly ellipsoid $9\ \mu\text{m}$ – $13\ \mu\text{m}$ \times $5.5\ \mu\text{m}$ – $7\ \mu\text{m}$. [xanthones]

Cook, DeKalb-MICH*, MOR, DuPage-MOR, Iroquois-MOR, Kent-MOR, Lake-II, MOR, LaPorte-MOR, Will-MOR

TRIMMATOTHELOPSIS Zschacke ACAROSPORACEAE [Photobiont: Chlorococcoid. (Gr. *trimmatos*, something crushed + *thele*, nipple + *opsis*, appears as something; from the perithecium-like apothecium. ~ Thallus subsquamulose, saxicolous, brown; apothecia generally exposed through a shallow, nipple-like pore in the areoles; spores numerous, hyaline, simple.)]

1. Spores globose or nearly so. T. SPHAEROSPERMA
 1. Spores ellipsoid, at least twice as long as wide T. DISPERSA

Trimmatothelopsis dispersa (H. Magn.) K. Knudsen & Lendemer (*L. dispersa*, scattered, dispersed) = *Acarospora dispersa* H. Magn. Rather frequent farther south, our only record is from the south exposure of a granitic boulder at the Nachusa Grasslands. ~ Spores cylindrical 5 – $5.5\ \mu\text{m}$ \times 2.0 – $2.3\ \mu\text{m}$.

Ogle-MOR

Trimmatothelopsis sphaerosperma (K. Knudsen & R. C. Harris) K. Knudsen & Kocourk Our only record for this recently named, evidently poorly understood species is from a base-rich pebble at a high-quality remnant hill prairie near Hoffman Estates. Our specimen has spores that run a little smaller than the 7 – $10\ \mu\text{m}$ in diameter given in the original descriptions, which species is otherwise known only from districts south of Indianapolis, Indiana. ~ Spores sphaeroid, 5.5 – $6.6\ \mu\text{m}$ in diameter.

Cook-MOR

TRYPETHELIACEAE

- A. Ascomata aggregated in raised warts. **Trypethelium**
 A. Ascomata solitary, not aggregated in raised warts **Julella**

TRYPETHELIUM Spreng. TRYPETHELIACEAE [Photobiont: *Trentepohlia*. (Gr. *trypa*, hole + *thele*, nipple; from the perithecia imbedded in the pseudostroma. ~ Thallus crustose, corticolous, thin but continuous, greenish gray or yellowish gray; perithecia black, aggregated in warty pseudostromata; spores 8, hyaline, 3–several septate, fusiform; conidia bacilliform.]

Trypethelium virens Michener. (*L. virens*, becoming green; from the color of the green, endophloeic thallus) = *Viridothelium virens* (Michener) Lücking, M. P. Nels., & Aptroot. We have yet to voucher mature ascocarps from the Southern Lake Michigan region, but we believe we have seen thalli on beech trees and on *Carpinus* in Berrien County. Harris (1973) cites specimens from as nearby as Tippecanoe County, Indiana, and there are specimens from Ozaukee County, Wisconsin. ~ Thallus greenish or yellowish-gray or brownish, endophloeic, the gonidia abundant; perithecia tightly clustered few to several in pseudostroma to 5 mm broad or more, the connecting tissues concolorous with the thallus; perithecia black, 0.4–0.6 μm high, notably narrower; asci long-cylindric, clavate, 100–125 μm \times 15–17 μm ; spores irregularly biseriate, 7–9 septate, not constricted at the septa, 38–52 μm \times 7–10 μm .

TUCKERMANELLA Essl. PARMELIACEAE [Photobiont: *Trebouxia*. Evidently an awkward derivation of Tuckermannopsis, which see, but with the wise choice to deploy only a single *n*. ~ Thallus foliose, brown, more or less adnate, the lobes short and branched, the upper cortex with elongate pseudocyphellae along the margins; lower cortex tan, sparsely rhizinate; apothecia laminal, lecanorine, the disks brown with warty margins; spores small, 8, hyaline, simple, ellipsoid; conidia bifusiform]

Tuckermanella fendleri (Nyl.) Essl. (in honor of Augustus Fendler, 1813–1883, Prussian born American collector of natural history collections, noted for his fine specimens, many of which perished either by fire or flood) Yet unknown from the Southern Lake Michigan region, this species is frequent in nearby districts ambient to Chicago.

TUCKERMANNOPSIS Gyelnik PARMELIACEAE [Photobiont: *Trebouxia*. An awkward attempt to honor Edward Tuckerman, 1817–1886, the noted American botanist. There being no genus “Tuckermannia,” however, the *-opsis* suffix suggests that these lichens offer a resemblance to Dr. Tuckerman, which assertion may offend his relatives. Brodo (2016) provides only 1 *n*, while most authorities add an *n* to the name, perhaps to keep the antepenultimate syllable short. ~ Thallus foliose, most often with erect, folded, or ruffled lobes, brown, olivaceous, or greenish, pseudocyphellae sparse or absent; apothecia lecanorine, the disks brown, developed ventrally on the lobe margins; spores small, 8, hyaline, simple, ellipsoid; conidia bifusiform.]

- | | |
|--------------------------|-------------|
| 1. Medulla C+ pink | T. CILIARIS |
| 1. Medulla C- | T. ORBATA |

Tuckermannopsis ciliaris (Ach.) Gyelnik (*L. ciliatus*, furnished with cilia + *-aris*, beset with) *Cetraris ciliaris* of Calkins, in part. The only records we have seen for this species are from Barry (Mazzur #1409, MICH), Cook (Calkins #5657, CACS), and LaSalle (Calkins *s.n.*, F) counties. The Barry County collection was made from the branches of *Larix laricina*; the

Calkins specimens were both from "old rails." A report of *Tuckermannopsis americana* (Spreng.) Hale by Wilhelm (1998) is being referred here until an authentic specimen is discovered. It differs from both *T. ciliaris* and *T. orbata* in having a UV+ blue-white medulla (alectoronic acid). ~ Thallus olivaceous to greenish, abundantly long ciliate, without ascending lobules, the margins notably pycnidiate or even subsidiate; lower cortex pale brown, with pale scattered rhizines, rugose. [atranorin, olivetoric acid]

Barry-MICH*, MSC*, Calhoun-MS, Cook-CACS*, Jefferson-WIS, Kalamazoo-MS, LaSalle-F*

Tuckermannopsis orbata (Nyl.) M. J. Lai (*L. orbatus*, deprive of, of which feature I am not certain) All local reports of this species for which we have seen specimens are referable to *Tuckermannopsis ciliaris*. Thomson (2003) maps it from as nearby as Jefferson County, Wisconsin, but there are no specimens sustained at WIS under that name; we have seen an Illinois specimen from Effingham, from where it grew on *Quercus imbricaria*. ~ Thallus olivaceous to greenish, with ascending lobulate lobes, the margins notably pycnidiate; lower cortex pale brown, with pale scattered rhizines, rugose. [atranorin, protolichesterinic acid]

USNEA Adanson PARMELIACEAE [Photobiont: *Trebouxia*. Ar. *oshnah*, moss; from its superficial resemblance to mosses. ~ Thallus fruticose, prevailing yellowish green, bushy or pendent, the branches terete or angled, often isidioid, soredioid, or with fibrillose excrescences, with a medullary core and cartilaginous central axis; apothecia lecanorine, the disks tan; spores small, 8, hyaline, simple, ellipsoid.]

1. Branches angular or ridged in cross-section.
 - Branches appearing cracked and segmented throughout; medulla K+ red U. ANGULATA
 - Branches not appearing segmented or cracked; medulla K- U. HIRTA
1. Branches terete in cross-section.
 2. Branches notably pendulous, beset with abundant white-topped warts U. CERATINA
 2. Branches more or less tufted, without white-topped warts.
 3. Branches without isidia or soredia, notably bristly with perpendicular fibrils; apothecia commonly present.
 4. Main stems abundantly papillose; salazinic acid present U. SUBFUSCA
 4. Main stems without papillae or with scattered, broadly based verrucae; salazinic acid absent.
 - Norstictic acid present; larger spores more than 9 μm long and 6 μm wide U. STRIGOSA
 - Norstictic acid absent; spores smaller U. RUBIGINEA
 3. Branches isidiate or sorediate or both, flexuous, without perpendicular fibrils; apothecia absent.
 5. Medulla red in most areas, K-, UV- U. MUTABILIS
 5. Medulla white throughout, K- or K+, UV- or UV+.
 6. Cortex yellow-green throughout or with tinctures of red; medulla K+ yellow or red UV-
Thallus yellow-green throughout, nigrescent basally U. DASYPOGA
 - Thallus distinctly stained with red or orange, not nigrescent basally U. RUBICUNDA
 6. Cortex nigrescent proximally; medulla K-, UV+ bright white.
 - Soredia fine, without isidia; main stems densely papillose U. SUBSTERILIS
 - Soredia coarse or isidioid, with abundant isidia, the branches strongly finely isidiate
. U. SUBFLORIDANA

Usnea angulata Ach. (*L. angulatus*, with corners or sharp angles) Our only records are old, collected prior to 1900 (Underwood *s.n.*, NY—Fulton Co., IL; Calkins *s.n.*, CACS). According to Allen *et al.* 2019, the known distribution of this species has contracted notably since 1940. ~ Thallus corticolous, pendulous, the principle branches strongly ridged and characterized by frequent segments as a result of cortical cracks; papillae frequent; cortex yellow-green throughout; isidia and soredia absent; medulla white, K+ red, UV–; apothecia absent. [usnic acid, norstictic acid]

LaSalle-CACS*,F

Usnea ceratina Ach. (*L. ceratinus*, horny, or with horn-like projections) This species, sometime bushy, but often pendent occurs in districts ambient to the Southern Lake Michigan region, but we have seen no specimens. ~ Thallus corticolous, loosely tufted to more or typically pendulous, the branches terete, abundantly tuberculate, the warts soon whitish on top; papillae frequent; cortex yellow-green throughout; isidia or subsidiolate soredia usually abundant; fibrils often present; medulla usually with tinctures of red or pink, K–, C–; apothecia absent. [usnic, diffractaic acid]

Usnea dasypoga (Ach.) Nyl. (Gr. *dasus*, hairy, dense + *pogon*, beard; the allusion obvious) = *U. filipendula* Stirt. This is a northern species that has been reported from districts all around our region, although we have yet to document it locally. ~ Thallus corticolous, tufted to more or less pendulous, the main stem strongly papillose, the branches terete, filiform; cortex yellow-green throughout, but blackened at the base; isidia in small clusters or isidioid soralia; medulla white, K+ red, UV–; apothecia absent. [usnic acid, salazinic acid]

Usnea hirta (L.) F. H. Wigg. (*L. hirtus*, stiffly hairy; from the isidiose soredia) The only contemporary record we have seen is from a shrub of *Prunus americana* at Kankakee River State Park. There is a specimen from a Tamarack swamp at Pennfield Bog northeast of Battle Creek, Michigan. Thomson (2003) reports it from Walworth County. ~ Thallus corticolous, densely tufted, the branches strongly ridged and angular, abundantly isidiate; papillae absent; cortex yellow-green throughout; isidia usually abundant; medulla white, K–, UV–; apothecia absent. [usnic acid]

Barry-WIS, Calhoun-MSC, Kalamazoo-MSC, Kent-MSC,, Marshall-WIS, Walworth, Will-MOR

Usnea mutabilis Stirt. (*L. mutabilis*, changeable) This species occurs in districts ambient to the Southern Lake Michigan region, but we have seen no specimens. ~ Thallus corticolous, tufted to more or less pendulous, the branches terete, smooth to papillose; cortex yellow-green throughout; fibrils rarely developed; isidia usually abundant; medulla with tinctures of red, K–, UV–; apothecia absent. [usnic acid]

Usnea rubicunda Strirton (*L. = rubicundus*, red, ruddy) There are specimens from as nearby as Dane County, Wisconsin, as well as from Illinois and Indiana farther south, but we have yet to discover it locally. ~ Thallus corticolous, tufted to more or less pendulous, the main stem strongly papillose, the branches terete, slender and flagelliform; cortex yellow-green but with strongly tinctures of red or orange; isidia commonly present and often abundant; medulla white, K+ yellow or red, UV–; apothecia absent. [usnic acid, stictic acid, ±norstictic acid, ±salazinic acid]

Usnea rubiginea (Michx.) A. Massal. (L. *rubigo*, rust + *-ineus*, denotes a similar color or material; presumably from the fact that some specimens have a reddish medulla) = *U. strigosa* ssp. *rubiginea* (Michx.) I. Tav. Infrequent, we have specimens from *Quercus palustris* in remnant flatwoods and from young trees of *Cornus florida* and *Tilia cordata* in landscape settings. Most of our material is infertile, so discriminating such specimens from *U. strigosa* can be problematic. ~ Similar to *U. strigosa*, but usually without norstictic acid and with psoromic acid; rarely with usnic acid only; spores than 7–9 μm long \times 5–6 μm wide. [usnic & \pm psoromic acid, \pm fumarprotocetraric acid, \pm norstictic acid]

Berrien-MOR, DuPage-MOR, Jasper-MOR, Noble-MOR, VanBuren-MOR

Usnea strigosa (Ach.) Eaton (L. *strigosus*, thin, lean, meager; from the slender, stringy thallus) Calkins & Huett (1898) reported *Usnea barbata* and *Usnea barbata* var. *florida* from La Salle County, the latter at least is referable here. ~ Thallus corticolous, tufted, the branches terete; cortex yellow-green throughout, papillose or not; fibrils present and often abundant; medulla white or red or mixed, K+ red or K–, UV–; apothecia usually present, the rims long-fibrillose; spores than 9–11 μm long \times 6–7 μm wide. [usnic acid, norstictic acid, \pm connorstictic acid]

LaPorte-MOR, LaSalle-F*,MOR, Marshall-WIS, White-MOR, Will-MOR

Usnea subfloridana Stirt. (resembling *U. floridana*) Our only records for this species are from the branches of a large tree of *Quercus macrocarpa* and *Prunus serotina*. ~ Thallus corticolous, tufted, the branches terete; cortex yellow-green throughout, but strongly nigrescent at the base; isidia present and abundant; medulla white, UV+ bright white; apothecia absent. [usnic acid, squamatic acid]

Cook-MOR, Kenosha-MOR, LakeIL-MOR, Winnebago-MOR

Usnea subfusca Stirton (L. *sub*, near or below + *fuscus*, brown; perhaps an allusion to the blackened or sordid base) This species has been reported from districts all around our region, less so west of us. Also reported from throughout the eastern United States is *U. florida* (L.) Weber ex F. H. Wigg. (L. *floridus*, flower or beautiful), which is nearly identical but has smaller spores. ~ Similar to *U. strigosa*, but with notably papillose main branches nigrescent at the base and the presence of salazinic acid; spores ellipsoid, 10–11 μm \times 6–7 μm . [usnic acid; salazinic acid]

Usnea substerilis Motyka (L. *sub*- below, slightly, imperfectly, nearly + *sterilis*, infertile) A largely western species, the only record we are referring here is one from the branches of *Larix laricina* in a bog near Silver Lake., where it is no doubt native. The DuPage County specimen is from a discarded Christmas Tree. Taxonomically, we are not certain that this is where it belongs and share the misgivings of Thomson (1984), *faut de mieux*. Morphologically it resembles *U. subfloridana* in that the thallus is nigrescent at the base, but is utterly lacking in isidia, has strongly papillose main branches, and contains salazinic acid. A related species, *U. perplexans* Stirt., an eastern and northern species differs in having notably excavate soralia—which specimens have also been called *U. lapponica* Vainio. Another species, *U. parafloridana* K. Mark, Will-Wolf & Randlane, known from northern Wisconsin, is similar, but produces norstictic acid \pm salazinic acid. The student may wish to consult Mark *et al.* (2016).

~ Thallus nigrescent at the base, the main branches soon papillose; soralia common, not excavate in the cortex, the soredia farinose. [usnic acid, salazinic acid]

DuPage-MOR, Kenosha-MOR

USNOCETRARIA Nyl. PARMELIACEAE [Photobiont: Chlorococcoid. Evoking the idea of a *Cetraria* with usnic acid. ~ Thallus yellowish green, adnate, the lobes narrow, appearing more or less parallel and more or less concave, without pseudocyphellae, the medulla C-; lower cortex pale to white, sparsely rhizinate; apothecia rare; soredia elongate, along the lobe margins]

Usnocetraria oakesiana (Tuck.) M. J. Lai & J. C. Wei (In honor of the American lawyer and botanist, William Oakes, 1799–1848, who died young when he fell off a ferry boat between Boston and East Boston) Our only record for this species is from the bark of an adventive Lonicera shrub at English Prairie southeast of Kempton, Illinois. ~ Soralia farinose. This species resembles *Flavopunctelia*, but the medulla of the latter is C+ red. [caperatic acid, lichesterinic acid, protolichesterinic acid, usnic acid]

Ford-ILLS

VARICELLARIA Nyl. PERTUSARIACEAE¹⁶ [Photobiont: Chlorococcoid. L. *varius*, pustule or pox + *-cella*, diminutive; evocative of small pox. ~ Thallus pale gray verruculose; apothecia lecanorine, wart-like; spores large, thick-walled, 1–8, hyaline, simple]

Varicellaria velata (Turner) Schmidt & Lumbsch (L. *vellus*, a veil, covering + *-atus*, adjective ending; from the apothecia covered by soredia) = *Pertusaria velata* (Turner) Nyl. Calkins (1896) reported this species from both rocks and trees; one specimen (Calkins #71, MIN) was collected on *Carya* and originally named *Pertusaria communis*. Most of our specimens from southern Illinois are from oaks; all lack lichexanthone. ~ Thallus gray, with a narrow pale margin; apothecia with the disks heavily pruinose; spores 130–210 μm \times 30–64 μm , the inner wall smooth. [lecanoric acid]

Allagan-MIN*, MSC, Cook-MIN*, NY, WIS, LaGrange-MOR, LaSalle-CACS*, Milwaukee-MIL, Winnebago-MOR

VERRUCARIA Schrader VERRUCARIACEAE [Photobiont: *Diplosphaera*, *Myrmecia*, and *Protococcus*. L. *verruca*, wart + *-arius*, like or connected with; from the wart-like appearance of the ascoma. We have little confidence that the specimens upon which the following names are based look much like their type material, so do not bask here under the illusion that this treatment is authoritative. Our treatment is a desperate attempt to fit our specimens in the amalgam of descriptions and keys, often conflicting, provided by Ryan (1999),

¹⁶Lücking *et al.* (2016) place this genus in the Ochrolechiaceae.

Nash *et al.* (2007), McCune (2017) and scraps from elsewhere. Inasmuch as *Verrucaria* is so poorly described from the Midwest, the species included in this treatment include specimens from southern Illinois, Missouri, and elsewhere to give the user a sense of the broader variation and to provide the local user with a heads up in case they discover a heretofore unknown element. Measurements of the perithecia span the full diameter of the involucrellum. Where possible, we have tried to derive our spore measurements from outside the ascus, but this is not always possible and might explain some of the variation noted. The size ranges in are those given in the literature; those in brackets [] after each species are the averages based upon local specimens. When testing your specimen against these, use the average of several spores. ~ Thallus crustose, prevailing saxicolous, endolithic to epilithic, thin and continuous to areolate or thickly rimose, without any lower marginal cortex; perithecia usually with exposed ostioles, black, usually with and involucrellum; hamathecium with the interthecial hyphae evanescent, the hymenial gel I+ bluish, becoming orange; spores 8, hyaline to brownish, simple, ellipsoid.]

1. Thallus endolithic to epilithic and white or off-white when wet, on base-rich substrates. [Those specimens incrustated by blue-green algae might trick you into taking the next lead.]
 2. Hymenial gel IKI+ blue.
 - Exciple pale; spores more than 23 μm long V. RUPESTRIS
 - Exciple black; spores less than 23 μm long V. "PSEUDORUPESTRIS"
 2. Hymenial gel IKI+ reddish, or with portions blue at first.
 4. Exciple hyaline below the involucrellum, or with only discontinuous nigrescent pigments.
 5. Perithecia commonly 2–3 or more with fused involucrella to form a pseudostroma V. CONFLUENS
 5. Perithecia scattered to tangent with each other, but without regularly fused involucrella.
 6. Perithecia to 0.2 mm in diameter; involucrellum not much adnate below the middle of the exciple V. ILLINOISENSIS
 6. Larger perithecia more than 0.2 mm in diameter; involucrellum adnate to the exciple to at or below the middle.
 - Thallus on base-rich rock V. MURALIS
 - Thallus on siliceous (HCl-) rock V. "MUREALOIDES"
 4. Exciple black throughout.
 7. Involucrellum adnate to the exciple nearly all the way to the base.
 8. Perithecia commonly 2–3 or more with fused involucrella to form a pseudostroma V. CONFLUENS
 8. Perithecia scattered to tangent with each other, but without regularly fused involucrella.
 - Spores prevailing more than 7.5 μm wide V. AMYLACEA
 - Spores less than 7.5 μm wide V. DOLOSA
 7. Involucrellum adnate to spreading, but not usually extending all the way to the base of the perithecium.
 9. Spores prevailing 22 μm long or longer; perithecia commonly 0.4 mm across V. PAPILLOSA
 9. Spores rarely more than 22 μm long; perithecia often less than 0.4 mm across.
 - Thallus rimose to areolate, rather thick, grayish-white, roughened to farinose; involucrellum spreading, adnate only to the distal portions of the exciple

- V. SCHINDLERI
 Thallus indistinct, or grayish to tawny, continuous to verrucose; involucrellum not spreading, adnate to below the middle of the exciple V. CALKINSIANA
1. Thallus thin or thick, brown to greenish, or black, at least basally, but not whitish, on various substrates.
 10. Thallus corticolous or lignicolous or, if saxicolous, then the areoles prevailing sterile and marginally sorediate/isidiate.
 11. Thallus saxicolous, often largely sterile.
 12. Thallus tan and remaining so when wet, the areoles commonly more than 0.25 mm across, prevailing beset with marginal isidia/soredia a little lighter than the areole surfaces V. TECTORUM
 12. Thallus deep brown, tending to turn olivaceous wet, the areoles rarely more than 0.25 mm across; soredia nigrescent, usually darker than the areoles V. FURFURACEA
 11. Thallus corticolous or lignicolous, fertile.
 13. Spores rarely more than 24 μm long; perithecia partly emergent V. BREUSSII
 13. Spores prevailing longer; perithecia deeply set into the thallus or substrate.
 Thallus effuse, more or less continuous but dissipating marginally V. QIERCINA
 Thallus areolate, with flat or shallowly convex areoles V. PHLOEOPHILA
 10. Thallus saxicolous, without diaspores, or if subsidiate, then the areoles fertile.
 14. Thallus with a black medulla or at least with a thin black basal, sometimes endolithic basal area, with or without marginal soredia or isidia.
 15. Thallus continuous, not cracked or with only desultory cracks here and there near the verrucae; perithecia wholly immersed, their presence inferred from the scattered verrucae.
 Spores prevailing more than 10 μm wide V. ELAEOMELAENA
 Spores rarely more than 10 μm wide V. FUNCKII
 15. Thallus distinctly cracked, areolate to rimose; perithecia at least partly emerged.
 16. Spores prevailing more than 24 μm long; hymenium usually notably interspersed with oil droplets V. AETHIOBOLA
 16. Spores rarely as much as 24 μm long, or if so then the substrate base-rich; hymenium not or only weakly interspersed.
 17. Perithecia rare, fully immersed, the areoles with black medullary columns appearing as punctae or reticulations at the surface, these often obscure in nigrescent portions of the thallus.
 Thallus rimose, the areoles brown to nigrescent with sharp, often rimlike black edges, the upper cortex with few to several punctae, these sometime aggregated into irregular markings V. FAYETTENSIS
 Thallus rimose, the areoles blunt margins, nearly or quite without punctae, the upper surface with a discontinuous array of tan or darker cortical pads or patches V. GLAUCINA
 17. Perithecia usually evident, at least partly emergent, the areoles not punctate, or if absent then the thallus sterile.
 18. Thallus smooth, the areoles green when wet, confined to permanently wet rocks; perithecia to 0.2 mm in diameter V. PRAETERMISSA
 18. Thallus smooth to rough, the areoles brown to nigrescent, not green when wet, or if so, then the perithecia more than 0.2 mm in diameter, usually of dry rocks.
 19. Perithecia situated primarily between the areoles rather than within them.
 Spores prevailing less than 17 μm long V. DACRYODES
 Spores longer V. FRAUDULOSA
 19. Perithecia nested away from the areole margins; spores larger.
 20. Thallus areoles grey to dark brown or black.
 Thallus greyish, more or less pruinose, the perithecia usually partly emergent V. FINKIANA

- Thallus areoles dark brown to black, the perithecia immersed.
 V. NIGRESCENS
20. Thallus areoles tan to brown, or only blackening in age.
 Areoles more granular-roughened or scaberulous. V. ASPERULA
 Areoles smooth, but with subdivided smaller areoles, interrupting
 the smoothness of the cortex. V. GLAUCOVIRENS
14. Thallus without a black basal or black medullary layer.
21. Thallus of siliceous (HCl-) rock.
22. Spores prevailingly more than 24 μm long; hymenium IKI+ violet.
 Perithecia wholly immersed V. AETHIOBOLA
 Perithecia at least partly emergent. V. MARGACEA
22. Spores rarely more than 24 μm long; hymenium IKI+ reddish.
23. Exciple hyaline or brownish in age, at least below
 Involucrellum thick, adnate to the base V. FLOERKEANA
 Involucrellum thin, wide-spreading V. HYDRELA
23. Exciple black throughout.
 Spores often more than 2.2 times as long as wide V. NIGRESCENTOIDEA
 Spores rarely more than 2.2. times as long as wide V. UMBRINULA
21. Thallus of base-rich rock.
24. Length/width ratio of spores averaging at least 2.2.
25. Spores prevailingly more than 12 μm wide; thallus thin to more or less continuous, but
 not notably areolate or rimose. V. ELAEOMELAENA
25. Spores narrower, or if not then the thallus areolate; thallus areolate to rimose,.
26. Spores prevailingly more than 24 μm long; at least some of the areole margins
 raised blastidiate subsidiate V. MACTROSTOMA
26. Spores shorter; areoles of aggregated, smaller adnate areoles or lobules, but lacking
 evident diaspores.
27. Perithecia immersed; involucrellum absent
 Spores less than 7 μm wide V. OTHMARI
 Spores more than 7 μm wide. V. GLAUCOVIRENS
27. Perithecia at least partly emerged; involucrellum present.
 Spores to 18.5 μm long V. DOLOSA
 Spores prevailingly larger V. PINGUICULA
24. Length/width ratio of less than 2.2.
28. Spores less than 14 μm long. V. CEUTHOCARPA
28. Spores longer.
29. Thallus thin, subgelatinous to filmy.
30. Exciple black throughout. V. CALKINSIANA
30. Exciple hyaline to pale brown below.
 Perithecia to 0.2 mm in diameter V. SORDIDA
 Larger perithecia more than 0.2 mm in diameter V. MURALIS
29. Thallus well-developed, thicker, at least centrally, or if obscure, then the exciple
 and involucrellum indistinguishable.
31. Involucrellum and exciple adnate all the way to the base.
 Spores prevailingly more than 12 μm wide V. VIRIDULA
 Spores less than 12 μm wide V. FUSCA
31. Involucrellum and exciple partly adnate, but distinguishable, at least
 proximally.
 . Thallus with at least thinly developed medullary tissue in the areoles or
 squamules. V. MACROSTOMA
 Thallus very thin, nearly or quite without a medullary tissue

Verrucaria aethiobola Wahlenb. (Gr. *aetho*, burnt, blackened + *bolos*, clod or lump; the allusion open to the imagination) There are several alleged records of this species from rocks in streams in LaSalle County, which we have not yet seen. The only specimen we have seen from that county labeled *V. aethiobola* by Calkin (#6552 CACS), we are referring to *V. hydrela*, which is from HCl- shale. The labels from FH, MICH, and WIS, which lists “black shale” or “slate” as the substrate, perhaps belies the fact that some of shales of Calkin’s specimens from LaSalle County are on highly reactive substrates. McCune (2017) notes that this species can grow on either siliceous or calciferous substrates. Other than the halonate condition of many of the spores, I am unclear how I would separate it from *V. elaeomelaena* on a base-rich substrate. Until we can see the specimens, we must regard the occurrence of this species locally as provisional.¹⁷ ~ Thallus grayish or brownish, not green, rimose to areolate, with a thin black basal layer; perithecia mostly immersed; involucrellum not reaching the base of the exciple, the latter nigrescent to hyaline proximally; hymenium IKI+ violet, much-inspersed with oil droplets; asci clavate, the spores often halonate, 25–30 × 10–12 µm.

LaSalle-FH, MICH, WIS

Verrucaria amyloacea Hepp (L. *amylum*, starch; presumably an allusion to the indistinct, starchy-appearing thallus) Infrequent, our records are from small base-rich pebbles or rocks, with *Bacidina egenula*, *Candelariella aurella*, and *Endocarpon petrolepideum*. ~ Thallus endolithic to thinly granulose or incipiently rimose, white or grayish, subgelatinous; perithecia partly immersed in the substrate, to 0.45 mm across; exciple black throughout; involucrellum adpressed to the exciple nearly or quite to the base of the perithecium; hymenial gel IKI+ reddish or with blueish reactions proximally; spores 14–21 × 7–10 µm [16.85 ± 1.4 × 8.6 ± 0.8 L/W 1.9 ± 0.1 (n=10)]

Boone-MOR, Cook-CACS*, DuPage-MOR, Ford-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Walworth-MOR

Verrucaria asperula Servít (L. *asper*, harsh, rough + *-ulus*, diminutive; little rough one, an allusion the scaberulous areoles). A poorly described species and evidently little known, the few local specimens we are referring here are from siliceous or scarcely base-rich rock; those from farther south are from siliceous dolomite. ~ Thallus rimose, brownish, the areoles notably scaberulous on the surface, with a black, partly endolithic hypothallus; perithecia largely filling the areole, 0.10–0.20 mm in diameter; hymenium IKI+ reddish, usually inspersed with oil droplets; spores 14.5–23.4 × 7.2–12.7 µm [18.7 ± 1.6 × 9.0 ± 0.9 L/W 2.1 ± 0.1 (n=6)]

Kane-MOR, Lee-MOR, Racine-MOR, Winnebago-MOR

Verrucaria breussii Diederich & van den Boom (in honor of the contemporary Austrian lichenologist, Othmar Breuß, student of the Verrucariaceae) Yet unknown locally, this species has been recorded from as nearby as Piatt County, Illinois, where it was collected on a large *Quercus alba*. According to Diederich & van den Boom (2011), at least in Europe this is the

¹⁷I would not like to suggest by this that I have a good understanding of any *Verrucaria* species!

better name for *V. sorbinea* Breuß, which appears to have larger spores. The following description is adapted from McCune (2017). ~ Thallus corticolous, brown, areolate, verrucose; perithecia at least partly emergent, about 0.25 mm across; exciple black, or paler below; involucrellum indistinct; hymenium IKI+ reddish; spores 18–23 × 9–12 µm.

Verrucaria calkinsiana Servít (after Col. William Wirt Calkins, 1842–1914, American amateur mycologist and lichenologist) This is a frequent species, particularly in western sector, of all manner of base-rich rocks, such as dolomite, limestone, weathered concrete, calcareous pebbles and cobbles, and even bone and tufa rock. Common associates on the same rock include *Bacidina egenula*, *Myriolecis dispersa*, *Physciella chloantha*, *Sarcogyne regularis*, *Squamulea subsoluta*, and *Verrucaria glaucovirens*. The thallus can vary from appearing wholly endolithic to thinly epilithic, creamy or sordid, but a few cuts through the perithecia reveal a black, globular exciple and adnate involucrellum. ~ Thallus endolithic to thinly epilithic and white or sordid, often rimed with minute brown to nigrescent, lichineous granules to 0.01 mm in diameter; perithecia 0.25–0.4 mm across, usually partly imbedded in the substrate; involucrellum adnate to below the middle of the wholly black exciple; hymenial gel IKI+ reddish; asci clavate, 70–80 × 15–25 µm; spores 18–25 × 9–12 µm [20.3 ± 1.2 × 11.1 ± 0.9; L/W 1.8 ± 0.1 (n=30)]

Boone-MOR, Cook-CACs*,MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Grundy-MOR, Kane-MOR, Kenosha-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-CACs*,NY, McHenry-MOR, Will-MOR

Verrucaria ceuthocarpa Wahlenb. (Gr. *keuthos*, hidden + *carpa*, fruit; from the deeply imbedded perithecia) A species of base-rich rock along streams, this species is known from scattered locations all around our region and from as nearby as Putnam County, Indiana. ~ Areoles black or dark reddish-brown, plane to weakly convex, less than 1 mm across; spores ellipsoid to subglobose 7.5–13 × 5.5–7.5 µm.

Verrucaria confluens A. Massal. (L. *con-* together, united + *fluens*, flowing, streaming; from the united perithecia) Evidently rare, our only local records are from base-rich rock, usually very siliceous concrete or base-rich sandstones without a smooth surface; the perithecia can appear chasmocolous if the substrate allows it. Our concept here is inspired by McCune (2017) and conforms to the concept presented in Nash *et al.* (2007). This species is most likely to be confused either with *V. muralis* or *V. calkinsiana*, depending upon the nigrescence of the exciple, which can be rather variable. The spores can also be quite variable, even within the same perithecium. The fused nature of many of the perithecia, however, coupled with the more carbonized involucrellum are distinctive features of *V. confluens*. ~ Thallus endolithic or thinly epilithic and pale; perithecia sessile, to 0.4 mm in diameter, but many perithecia fused into pseudostromata involving 2-several carbonaceous, perithecia, the ostiole usually quite obvious; involucrellum thick, carbonaceous, adnate, commonly splitting in age; exciple black throughout or thinning to nearly hyaline proximally; hymenium IKI+ reddish; spores 18–23 × 8–12 µm [20.0 ± 1.8 × 11.2 ± 0.6; L/W 1.9 ± 0.1 (n=6)]

LakeIL-MOR, LaSalle-F*(on specimen of *Sarcogyne regularis*), Lee-MOR, Rock-MOR

Verrucaria dacryodes Nyl. (Gr. *dacryon*, tear + *-odes*, evocative of; from the often tear-shaped spores) Evidently a are lichen in eastern North America. Infrequent in our western sector, on base-rich rock in full sun. This species is rather consistent in its morphology, but

spore width is quite variable with regard to its length/width ratio. ~ Thallus areolate, nigrescent when dry, the areoles brown when wet, with a thin, sometimes discontinuous black or dark brown basal layer; perithecia prevailingly nested between and among the areoles rather than imbedded within them, flush with the surface of the thallus, to 0.2 mm in diameter; hymenium IKI+ reddish, not inspersed; spores 12–16 × 5–8 μm [$14.1 \pm 1.6 \times 6.8 \pm 0.8$ L/W 2.2 ± 0.4 (n=10)].

Cook-MOR, DuPage-MOR, McHenry-MOR, Ogle-MOR, Will-MOR

Verrucaria dolosa Hepp (L. *dolosus*, deceitful, crafty, cunning–poster species for *Verrucaria* in general) Our only records for this species are from shaded carbonate rock. It has been reported from districts east and west of us on both siliceous and base-rich rocks. ~ Thallus scarcely evident to continuous, rimose, or areolate, sordid to brown; perithecia numerous, gregarious, to 0.2 mm across, immersed to nearly sessile, usually 2 or more per areole; exciple hyaline to brownish in age; involucrellum more or less spreading; periphyses to 25 μm long; asci to 55 μm long and 20 μm wide; spores 12–17 × 5–7 μm [$16.0 \pm 2.5 \times 7.0 \pm 1.8$ L/W 2.3 ± 0.3 (n=5)].

Kane-MOR, Racine-MOR, Rock-MOR, Will-MOR

Verrucaria elaeina Borrer (Gr. *elaion*, oil; from oil droplets in the perithecium) Evidently uncommon, this species is known from districts east and west of the Southern Lake Michigan Region, where it is said to grow on base-rich rock. ~ Thallus gray-green to greenish brown, smooth, continuous to rimose or disparately cracked, thinner at the margins; perithecia immersed, the ostiole flush with the thallus; exciple subglobose, 0.2–0.3 mm in diameter, much inspersed with oil droplets; involucrellum extending nearly to the base, loosely adpressed to spreading; periphyses 30–40 μm , mostly simple; asci 65–75 × 20–25 μm ; spores 15–25 × 7–10 μm .

Verrucaria elaeomelaena (A. Massal.) Arnold (Gr. *elaion*, oil + *melaina*, black; from the black perithecia heavily inspersed with oil droplets) Our only record is from a base-rich rock in a minerotrophic rivulet issuing from a fen near South Elgin, Illinois. Several herbaria (FH, MICH, WIS) have posted specimens of *Verrucaria aethiobola* Wahlenb., another semi-aquatic species, from LaSalle County—all Calkins specimens from slate or shale near Deer Park, at least one of which is referable to *V. praetermissa*. The surface of the pebble, when at first is exposed to HCl, presents a negative reaction, the “fizz” appearing to emerge from the deeper portions after a minute or so. One cannot help but wonder if the carbonates had been leached from the rock such that it serves as a *de facto* siliceous substrate. ~ Thallus nearly absent to brown or grayish, with a black basal area, subgelatinous, continuous; perithecia largely immersed; hymenium IKI+ red, weakly inspersed; spores 18–30 μm × 12–16 μm ; L/W: 2.1.

Kane-MOR, LaSalle-FH,WIS

Verrucaria fayettensis Servít (after Fayette County, Iowa) = *V. iowensis* Servít. This species is uncommon locally on weathered limestone or base-rich sandstone. It was most commonly called *V. fuscella* by early collectors, although Calkins called a Cook County specimen *V. viridula*. This species frequently grows with *Willeya diffractella* and is similar with respect to thallus thickness and areole development, but the areoles of the latter usually contain only one immersed perithecium with a rather large ostiole. Other associates on the same rock include

Athallia vitellinula, *circumspecta*, *Candelaria concolor*, *Dermatocarpon multifolium*, *Flavoplaca citrina*, *Gyalolechia flavovirescens*, *Leptogium dactylinum*, *Myriolecis dispersa*, *Phaeophyscia kairamoi*, *P. pusilloides*, *Squamulea subsoluta*, and *V. glaucovirens*. Farther west, a similar species, *V. alutacea* Wallr. (*L. aluta*, a soft, mineral-tanned leather + *-aceus*, having a resemblance to) occurs on poor sandstone or granite. ~ Thallus thick, rimose; the medulla black, at least in part, with a black, endolithic hypothallus; areoles tan to white-pruinose, the intervening cracks distinctly black-sided; perithecia several per areole, only the tiny ostioles evident at the surface it at all; involucrellum evident; hymenium IKI+ blue, soon turning to red; spores $11\text{--}14 \times 6\text{--}7 \mu\text{m}$ [$12.0 \pm 1.2 \times 5.2 \pm 0.2$ L/W 2.4 ± 0.2 (n=3)].

Boone-MOR[with *Rinodina bischoffii*, which see], Cook-CACS*, F, DuPage-MOR, McHenry-MOR, Ogle-MOR, Will-MOR,NY

Verrucaria finkiana Servít (in honor of the prominent American lichenologist, Bruce Fink, 1861–1927) Our only local records for this evidently poorly understood species is from a calcareous pebble in a hill prairie near Lake in the Hills, Illinois; farther south it grows on base-rich sandstone and dolomite, also in full sun. ~ Thallus areolate, with a thin but well-developed medulla, at least in part with with a thin black prothallus; areoles smooth, grayish, rimose; perithecia to 0.5 mm across, immersed, the ostiole more or less flush with the surface of the thallus or slightly emergent; exciple brownish to black; involucrellum adnate to the exciple extending to the proximal portions of the conceptual and usually curving beneath it; spores $14\text{--}23 \times 9\text{--}12 \mu\text{m}$ [$19.7 \pm 1.3 \times 8.6 \pm 0.8$ L/W 2.3 ± 0.3 (n=3)].

McHenry-MOR

Verrucaria floerkeana Dalla Torre & Sarnth. (In honor of the German lichenologist and natural historian, Heinrich Gustav Flörke, 1764–1835, who took a great interest in *Cladonia*) Our only local specimen is from an HCl- pebble in an old quarry southeast of Augusta, Michigan. Farther south, we have specimens from chert and quartzite. It resembles *V. hydrela* to some extent, but the spores are generally smaller and the involucrellum is rather thick and adnate to exciple all the way to the substrate. Our spores run a little wider than the range given by Nash *et al.* (2007)—if we are even dealing with the same species! ~ Thallus thin, finely rimose, grayish or brownish, often with a fimbriate, brown prothallus; perithecia more or less emersed, 0.2–0.33 mm across; exciple thick, adnate to the exciple all the way to the base; exciple hyaline to brownish; hymenial gel IKI+ reddish; spores $15\text{--}22 \times 6\text{--}9 \mu\text{m}$ [$18.9 \pm 2.0 \times 9.8 \pm 1.3$ L/W 1.9 ± 0.1 (n=3)].

Kalamazoo-MOR

Verrucaria fraudulosa Nyl. (*L. fraus*, a cheating or deception + *ulosus*, diminutive) The only local specimen we have placed here is from a dolomitic out crop along a stream near Polo, Illinois, where it might from time to time be inundated. Its relationship to the better known western species, *Verrucaria lecideoides* (A. Massal.) Trevis., is evident in that some authorities consider it a variety of the latter—a species that some place in the genus *Verruculopsis* Gueidan, Nav.-Ros. & Cl.Roux. We would be happy to do so as well, except that an obvious relative, *Verrucaria dacryodes*, which see, has not been given a combination in that genus. *Verrucaria fraudulosa* differs from both species in having longer spores and from the former, *sensu stricto*, in having an epruinose thallus. Spore sizes in the literature are generally said to be a little

larger than those presented in this description. ~ Thallus rimose-areolate, the upper surface brownish, with a thin black hypothallus, at least in part; perithecia flush with the surface, offset from the areoles and between and among them; hymenial gel IKI+ reddish; spores $18.0\text{--}23.4 \times 7.2\text{--}9.9 \mu\text{m}$ [$19.6 \pm 1.1 \times 8.6 \pm 0.8$ L/W 2.3 ± 0.3 (n=2)].

Ogle-MOR

Verrucaria funckii (Sprengel) Zahlbr. (In honor of Heinrich Christian Funck, 1771–1839, German pharmacist, botanist, and bryologist in Wunsiedel, Bavaria) This species has been reported from disparate locations throughout North America, though have seen no local specimens. It is said to grow only on wet siliceous rocks. ~ Thallus dark brown to brownish green, continuous or disparately cracked particularly near the verrucae; perithecia largely wholly immersed, to 0.5 mm in diameter; involucrellum adnate to the hyaline or brownish exciple all the way to the black basal area; spores $17\text{--}26 \times 7\text{--}10 \mu\text{m}$.

Verrucaria furfuracea (B. de Lesd.) Breuß (L. *furfures*, bran; an allusion to the granular isidia) Evidently a poorly known species, which we probably do not have right, but the specimens for which we are using this name are all from concrete or base-rich rock. Most authorities associate the name *V. furfuracea* with *V. macrostoma* Dufour, including Nash (2007), but others call the sorediate morph of *V. macrostoma*, *V. tectorum*, which see. We do not know who is right, but we do know that there are two distinct species of sorediate *Verrucaria* in the Midwest, which is reflected in our lame treatment here. ~ Thallus areolate to subsquamulose or rimose, the areoles dark brown, to 0.3 mm across, usually turning greenish when wet; soredia nigrescent, darker than the areoles—not to be confused with incrustations of filamentous and packeted cyanobacteria that obfuscate some species; all of our specimens are sterile.

Elkhart-MOR, Ford-MOR, Kenosha-MOR, Kosciusko-MOR, LakeIL-MOR, LakeIN-MOR, Rock-MOR

Verrucaria fusca Pers. (L. *fusca*, brown) This is largely a western species, included here in comparison with the larger spored *V. viridula*, on the off chance we may be overlooking it in the Midwest. Out of desperation, we are referring a Berrien County record here, which is from an HCl+ pebble in partial shade; the thallus is a little more brown than Nash *et al.* (2007) describe, certainly not concolorous with the perithecia, and the spores run a little larger: from 9.8 to $11.7 \mu\text{m}$ wide. We are happy to be disabused of our fallacy by more knowledgeable authorities! ~ Thallus thin, rimose to granular-areolate, more or less gelatinous when wet, brownish; perithecia hemispherical, the involucrellum thick, adnate to the brownish exciple all the way to the base, where more or less spreading or broadened; hymenium IKI+ reddish; Spores $17\text{--}22 \times 8\text{--}10 \mu\text{m}$.

Berrien-MOR

Verrucaria glaucina Ach. (L. *glaucus*, pale blue or whitish + *-inus*, of or pertaining to) Evident quite rare, in eastern North America, as we understand it. The only specimens we have seen are from limestone outcrops or from cobble in prairie. It might be passed off as *Placopyrenium fuscillum* if the black endolithic thallus is over-looked, or as *Verrucaria fayettensis* if the exposed black medulla and disparate array of cortical patches are interpreted as a reticulated cortex. We probably have not got the lichen that Acharius had in mind, but it is probably not equivalent to *Verrucaria caerulea* DC. as suggested by Esslinger 2021. What we are

certain of is that our specimen is a *Verrucaria sensu stricto* (*pro tempore esse*) and it is not *V. fayettensis*. ~ Thallus thick, rimose, the medulla black, exposed at the surface, beset with slightly elevated, brownish areolulae in solitary or aggregated arrays, with a carbonaceous endolithic hypothallus; we have not been able to discover spores.

Cook-MOR

Verrucaria glaucovirens Grumman (*L. glaucus*, pale blue or whitish + *virens*, greenish; perhaps from the sometimes greenish brown color of the thallus) This is a rather frequent species on various kinds of base-rich rock. ~ Thallus rimose, with large tan to nigrescent areoles, characterized by aggregations of smaller areoles or lobules, the edges of the whole sometimes lifted at the margins; perithecia flush with the surfaces, sometimes more than 1 per areole, but often scant; black hypothallus thin or absent, the medulla white to nigrescent; perithecia immersed, only the ostiole evident, the involucre absent; hymenial gel IKI + reddish; spores $17\text{--}22 \times 8\text{--}10 \mu\text{m}$ [$19.7 \pm 1.2 \times 8.3 \pm 0.9$ L/W 2.4 ± 0.2 (n=16)].

Cook-MOR, DuPage-MOR, Grundy-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Rock-MOR, Will-MOR

Verrucaria hydrela Ach. (*L. hydra*, a small water organism + *-ela*, an infrequently deployed variant of + *-ella*, diminutive) Our only local record for this species is one from (Calkins #6552 CACS) "Deer Park" in LaSalle County, where it was collected on HCl- shale and another from a weakly reactive pebble on the north side of a building, under the drip line of the roof. Otherwise the specimens are quite similar. See also notes under *V. aethiobola*. ~ Thallus very thin continuous to irregularly rimose, subgelatinous when wet, tan to grayish or brownish; perithecia prevailingly 1.5–0.2 mm across, immersed in verrucae, but exposed distally; exciple hyaline to brownish; involucrellum adnate only distally, spreading out from the exciple nearly or quite to the base of the perithecium; hymenium IKI+ reddish; spores $18\text{--}30 \times 7.5\text{--}12 \mu\text{m}$ [$19.9 \pm 0.5 \times 10.0 \pm 1.3$ L/W 2.0 ± 0.3 (n=2)].

Cass-MOR, LaSalle-CACS*

Verrucaria illinoisensis Servít (after the state of Illinois) Infrequent locally, this species was described from calcareous rocks in La Salle County by Servít (1950). A LaSalle County specimen (Calkins #1998, NY) was confirmed in 2015 by Juha Pykälä. The only other specimens we have seen are from near the western shore of Lake Michigan on baserich rocks. Thomson (2003) suspects that this species is equivalent to *V. calkinsiana*, but we think that there is a rather sharp distinction between the two, given the spreading nature of the involucrellum and exciple. It is more likely to be confused with *V. muralis*, some specimens of which can have some of the perithecia no larger than 0.2 mm in diameter. ~ Thallus endolithic to very thin, white or whitish; perithecia to 0.2 mm across, often partly imbedded in the substrate; exciple pale except apically where it is scarcely adnate to the involucrellum; periphyses to 20 μm long and 2 μm wide; hymenium IKI+ roseate; spores $12\text{--}18 \times 6\text{--}8 \mu\text{m}$ [$15.1 \pm 1.7 \times 7.8 \pm 0.5$ L/W 2.1 ± 0.3 (n=3)].

Cook-CACS*, F, MOR, Kenosha-MOR, LaSalle-NY

Verrucaria macrostoma DC. (*Gr. makros*, long, large + *L. stoma*, mouth) ~ Our only alleged occurrence of this species locally is from flagstone near Knox, Indiana. ~ Thallus rimose-areolate, brown, the areole margins often rimmed with isidia-like blastidia, without an obvious

black basal area; perithecia 1-few per areole partially immersed in the thallus 0.3–0.4 mm in diameter; exciple hyaline to nigrescent, usually dark proximally; involucrellum appressed to the exciple, rarely reaching the middle of the perithecium; periphyses 35–45 × 3–4 μm; asci 85–105 × 25–30 μm; spores 20–28 × 10–13 μm [25.3 ± 1.6 × 11.5 ± 1.6 L/W 2.2 ± 0.3 (n=7)].

Starke-MOR

Verrucaria margacea (Wahlenb.) Wahlenb. (*L. marga*, marl; from its wet chalky substrate—although it is reputed to grow only on siliceous rock) Yet unknown locally, this species is known from nearby districts north, east, and west of our. ~ Thallus smooth, thin, more or less continuous, dark gray to brownish green, to mottled green; perithecia evident as verrucose swellings, occasionally with only the tip exposed, lenticular to hemispherical; exciple subglobose, 0.2–0.3 mm in diameter, pale or brownish below, but nigrescent distally; involucrellum extending nearly or quite the length of the perithecium; hymenium IKI+ violet; periphyses 25–35 × 2–3 μm; asci 80–100 × 20–130 μm; spores 22–35 × 10–14 μm.

Verrucaria “muraleoides” Evidently an undescribed species, our two records are from siliceous pebbles in remnant landscapes, in prairie or partial shade. If it is even one species, the spore size and shape is rather too variable. ~ Thallus endolithic to thinly epilithic and pale gray to brownish; perithecia sessile, to 0.3 mm across, low-convex; involucrellum adnate about half way, the spreading; exciple hyaline below or nearly so; hymenial gen IKI+ reddish [18.1 ± 1.3 × 8.7 ± 0.4; L/W 2.2 ± 0.1 (n=2)].

Cook-MOR, McHenry-MOR

Verrucaria muralis Ach. (*L. muralis*, growing on walls; from the habitat, often on rock walls) This species is occasional on a variety of carbonate-rich substrates, including weathered concrete, flagstone, and small pebbles. We have recorded the following species with thalli growing amongst the perithecia: *Bacidina egenula*, *Endocarpon petrolepideum*, *Myriolecis dispersa*, *Sarcogyne regularis* and *Xanthocarpia crenulatella*. This is a rather variable species within which careful work might reveal several entities. ~ Thallus endolithic to epilithic, thin to thick, white or whitish, rimose or areolate, sometimes the ambient substrate sprinkle with *schmutzige* granules to about 400 μm in diameter, which appear to be small aggregations of chlorococcoid gonidia without any associated hyphae; perithecia 0.25–0.5 mm across; exciple hyaline to very thin and sordid, the involucrellum spreading in those specimens with robust thalli, adnate to the exciple to about the middle in those with very thin thalli; hymenial gel IKI+ reddish, sometimes with blue-green sections in the proximal portions; periphyses 30–60 μm; asci clavate, 65–75 × 16–22 μm; spores 17–25 × 8–12 μm [19.8 ± 2.1 × 10.5 ± 1.3; L/W 1.9 ± 0.2 (n=28)].

Branch-MOR, Cook-MOR, DuPage-MOR, Jefferson-MOR, Kankakee-MOR, Kenosha-MOR, LakeIN-MOR, LaSalle-CACS*, MIN*, MOR, NY, Livingston-MOR, Porter-MIN, Will-MOR

Verrucaria nigrescens Pers. (*L. nigrescens*, blackening; from the color of the thallus) As we understand it, this species locally rare. Our only record is from a limestone boulder at Warrenville Grove Forest Preserve. Calkins reported this species from limestone along streams, but several older specimens under this name we have referred elsewhere. The names *Verrucaria nigrescens*, along with *Verrucaria muralis*, are among the more frequent epithets applied to early local specimens, which we have referred elsewhere. ~ Thallus smooth or nearly so, epruinose, dark brown to nigrescent, with a well developed black medulla; perithecia immersed but the

ostiole evident at the surface; exciple black, confluent with the exciple; periphyses 20–35 μm long; asci clavate, 70–90 $\mu\text{m} \times 20\text{--}30 \mu\text{m}$; spores 17–27 \times 8–13 μm [We have seen too few spores to have reliable local statistics on the shape and size].

DuPage-MOR

Verrucaria nigrescentoidea Fink (from *V. nigrescens*, + *-oideus*, form, type; resembling *Verrucaria nigrescens*) This species is occasional on siliceous rocks of various sorts. ~ Thallus thin, brownish to olivaceous, without a black medulla or basal layer; perithecia partly immersed; hymenial gel IKI+ reddish; spores 14–23 \times 4.5–9.0 μm [18.4 \pm 1.6 \times 7.8 \pm 1.0; L/W 2.4 \pm 0.2 (n=8)].

Kankakee-MOR, LakeIL-MOR, McHenry-MOR, Walworth-MOR

Verrucaria othmarii K. Knudsen & L. Arcadia (in honor of the contemporary Austrian lichenologist, Othmar Breuß, student of the Verrucariaceae) Our only record for this Great Plains species is from a limestone rock at the Chiwaukee Prairie; our spores lie at the upper end of the size range. ~ Thallus irregularly areolate to subsquamulose, brown, the individual units more or less convex; perithecia immersed, but the ostiole notably evident; involucrellum absent; exciple hyaline except for the negrescent apical area around the ostiole; hymenial gel IKI+ reddish; spores narrowly elliptic, 11–15 \times 5–7 μm [15.3 \pm 2.8 \times 5.5 \pm 0.6; L/W 2.8 \pm 0.4 (n=6)]

Kenosha-MOR

Verrucaria papillosa Ach. (*L. papillosus*, invested with nipple-like protuberances or blisters) Our only local specimens from base-rich rock outcrops and pebbles. We may not have the best name for these specimens but the larger spores exclude it from *V. calkinsiana*, at least the local populations. ~ Thallus endolithic, but a thin black prothallus usually evident; perithecia mostly emerged but shallowly convex, without a distal neck; involucrellum adnate to the exciple at least half way to the base; exciple black throughout; hymenium IKI+ reddish; spores 18–29 \times 10–13 μm ; L/W: 2.0–2.3 [24.7 \pm 1.4 \times 11.4 \pm 0.8; L/W 2.2 \pm 0.2 (n=6)].

Kane-MOR, Will-MOR

Verrucaria phloeophila Breuß (Gr. *phloos*, bark + *philos*, loving, having an affinity for; from its inhabitancy of bark substrates) This is a poorly known corticolous or lignicolous species, probably much overlooked in North America, but known from just south of our region. ~ Thallus on bark or lignum, thin, greenish-brown, areolate, the areoles flat or slightly convex; hypothallus absent; perithecia to 0.3 mm across, immersed in the substrate, only slightly emergent, the involucrellum completely investing the exciple; spores 25–30 \times 12–14 μm .

Verrucaria pinguicula A. Massal. (*L. pinguicula*, little greasy one; perhaps from the oil inspersions of the hymenium) Our only records are from a base-rich in both exposed and partly shaded areas. ~ Thallus thin, epilithic and greenish to dark, sometimes with evidence of a black prothallus; involucrellum adnate to the exciple nearly or quite to the base; exciple usually hyaline; perithecia 0.15–0.3 mm across, scattered or more or less gregarious; spores 14–25 \times 5–10 μm [20.2 \pm 0.7 \times 9.4 \pm 0.7; L/W: 2.4 \pm 0.1].

Cass-MOR, Rock-MOR, Will-MOR

Verrucaria praetermissa (Trev.) Anzi (L. *praetermitto*, to miss by overlooking—something easy to do in *Verrucaria*!) *V. aethiobola* of Calkins, in Part. A western and eastern species of wet, rock, our only record is from a base-rich pebble in a marl flat near Lake-in-the-Hills, Illinois. McCune (2017) notes that this species can grow on either calcareous or not calcareous rock. ~ Thallus areoles brown or grayish when dry, becoming green when wet, rimose-areolate with notable cracks; perithecia 0.1–0.2 mm across, partly immersed, fused with a fine black layer of medulla; spores 15–25 × 7–11 μm.

Lakell-MOR

Verrucaria “pseudorupestris” This is MOR herbarium name for a species that is evocative of *V. rupestris*, which see below. It differs however in its spore size and shape as well as its black exciple. It could fit within *V. calkinsiana*, but, in addition to the persistently IKI+ blue hymenial gel, the spore size is near the margin of 1 standard deviation for our specimens of *V. calkinsiana*. Our only specimen is from weathered brick. ~ Thallus endolithic to thinly white and partly epilithic; perithecia to 0.4 mm across; involucrellum adnate to at or below the middle; exciple black [in our specimen]; hymenium persistently IKI+ blue; spores [18.6 ± 0.8 × 10.6 ± 0.8 L/W 1.8 ± 0.1 (n=7)].

Cook-MOR

Verrucaria quercina Breuß (L. *quercus*, oak + *-inus*, of or pertaining to; from its habitant relationship to oaks.) Yet unknown locally, this species is reported from districts just east and west of the Southern Lake Michigan Region, where it grows on bark and corticolous bryophytes. ~ Thallus thinly corticate, grayish-green, discontinuously developed, nearly without any medullary tissue; perithecia immersed in the substrate, slightly emergent, to 0.4 mm across; involucrellum adnate to the exciple to beyond the middle; asci 90–110 × 25–30 μm; spores 24–28 × 11–13 μm.

Verrucaria rupestris auct. (L. *rupestris*, of rocky cliffs) This is a name that has been applied to all manner of specimens, including those we now call *V. amyloacea*, *V. calkinsiana*, *V. illinoisensis*, *V. muralis*, and others, so the likelihood that our use of the name is proper is remote. Here we are inspired from Ryan (1991), who separates it from *V. muralis* based upon the IKI+ blue reaction. Our specimen is from pebbles, one base-rich the other base-poor, in a cherty limestone glade south of Whitakerville, Missouri. The perithecia, thallus, and spores are essentially identical. ~ Thallus endolithic to thinly white and partly epilithic; perithecia to 0.4 mm across; involucrellum spreading from near the middle; exciple hyaline; hymenium persistently IKI+ blue; spores (Ryan 1991: 17–26 × 8–13 μm; L/W 2.0 ± 0.2) [26.3 ± 1.9 × 13.1 ± 1.2 L/W 2.0 ± 0.1 (n=15)].

Verrucaria schindleri Servit (in honor of H. Schindler, who curated the lichen specimens at the *Naturkundemuseum* in Karlsruhe for many years. Occasional, this is a species of base-rich pebbles, rocks, and weathered concrete. The more frequent associates include, *Myriolecis dispersa*, *Sarcogyne regularis*, and *Xanthocarpia ferracissima*. All of our local specimens heretofore have been included with *V. calkinsiana*, from which it differs in having a relatively sumptuous thallus and an involucrellum that spreads into the thallus and is adnate to the exciple only in the distal portions. ~ Thallus rather thick, white or nearly so, rimose to areolate, dull, often

minutely roughened to farinose, without a discernable margin, tending to form a circular crack around the at least half immersed perithecium; involucrellum spreading, adnate to the exciple only above the middle; exciple black throughout; spores $19\text{--}25 \times 9\text{--}11 \mu\text{m}$ [$21.2 \pm 1.3 \times 10.9 \pm 0.7$; L/W 2.0 ± 0.1 (n=24)].

Cass-MOR, DuPage-MOR, Grundy-MOR, Kalamazoo-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-CACS*,F*, Lee-MOR, Ogle-MOR, Walworth-MOR, Will-MOR, Winnebago-MOR

Verrucaria sordida Fink (L. *sordidus*, dirty, foul; from the dirty brown color of the thallus) Uncommon locally, this species occurs on carbonate-rich rock, This appears to be a little-known species, and we are calling it *V. sordida*, not particularly because it closely fits Fink's description, but because it looks like specimens we have seen that Fink himself called *V. sordida*. Some of the specimens Calkins called *V. aethiobola* are referable here. We are also referring here a specimen (NY) he called *V. nigrescens*. It somewhat resembles *V. nigrescentoidea*, has a thicker thallus, more narrowly elliptic spores, and occurs only on siliceous rocks. One of the names Calkins used for this species was "*V. umbrinula*;" another was "*V. nigricans*;" another yet was "*V. nigrescens*." Specimens of sordid phases of *V. muralis* might key here if the larger perithecia are overlooked. ~ Thallus thin and epilithic, the poorly defined areoles sordid; perithecia numerous, 0.15–0.20 mm across, partly emergent, the exerted portion conic; exciple hyaline throughout; involucrellum more or less spreading, adnate to about the middle; exciple hyaline or nearly so at the base; spores $16\text{--}22 \times 9\text{--}12 \mu\text{m}$ [$19.4 \pm 1.2 \times 10.0 \pm 1.4$; L/W 2.0 ± 0.2 (n=13)].

Cook-NY, DuPage-MOR, Kane-MOR, Kendall-MOR, Koskiusko-MOR, LakeIL-MOR, Will-MOR, Winnebago-MOR

Verrucaria tectorum (A.Massal.) Körb. (L. *tectorum*, of house roofs; the thallus, perhaps, evoking shingles) This is a poorly understood species, the type of which may not look at all like our specimens. Locally it is rather rare, known only from a limestone rock along Saw Mill Creek in DuPage County and from a base-rich pebble in the Beach Ridge Plain of Illinois Beach State Park. All or our other specimens are from farther south in Illinois and Indiana. Our specimens strongly resemble the photograph of an alleged *V. tectorum* in Dobson (1981). Purvis *et al.* (1992) lists it as a synonym of *V. macrostoma* as does McCune (2001). See also notes under *V. furfuracea*. ~ Thallus epilithic, rimose, tan and remaining so when wet; areole margins bedecked with soredia or isidioid granules concolorous with the thallus or even lighter; perithecia hemispherical, to 0.15 mm across; exciple pale, subglobose; involucrellum extending to near the base, scarcely adpressed to spreading; hymenium IKI+ reddish; asci $65\text{--}66 \times 14\text{--}20 \mu\text{m}$, the ascoplasm golden yellow. Spores not seen.

DuPage-MOR, LakeIL-MOR

Verrucaria umbrinula Nyl. (L. *umbrina*, full of shade + *-ula*, diminutive; little dark one or shaded one). ~ A poorly known species in North America; our only local record for specimens for which we are exploiting this name are from basalt, sandstone, slate, and quartzite rock. Our concept here is derived from Thomson (1997), who acknowledges its evident scarcity in North America. ~ Thallus rather well-developed, a little uneven, olive-brown to nigrescent, the type said to have a hypothallus of fimbriate hyphae; perithecia 0.15–0.20 mm broad, scarcely emergent or only the ostiole and distal portions of the perithecium evident in the areolae;

involucrellum not differentiated well from the exciple, adnate to the base; exciple black; hymenium IKI+ reddish; spores elongate or ellipsoid, $12\text{--}20 \times 5\text{--}11 \mu\text{m}$ [$17.9 \pm 1.5 \times 9.4 \pm 1.0$; L/W 1.9 ± 0.2 (n=7)].

Berrien-MOR, DuPage, LaSalle-CACS*

Verrucaria viridula (Schrader) Ach. (*L. viridis*, green + *-ula*, diminutive; little green one)
Our only records are from high quality remnants, on pebbles in the antedunal sand prairie near Lake Michigan and from dolomitic pavement near Joliet, Illinois There is a fair amount of variation with species circumscriptions in the literature. McCune (2017) enables me to jamb our specimens into his concepts, although he demures on claiming truly to know what it really is; Fink's concept does not exclude our material. Nash *et al.* (2007) and Ryan (1999) generally require larger spores than our specimens display. Thomson (2003) disturbingly indicates that the hymenial gel reacts IKI+ blue! One of our specimens reacts IKI+ blue in the proximal parts of the hymenium. ~ Epilithic, rimose to areolate, thin to rather thick, mostly dark brown to greenish, smooth to scaberulous; perithecia partially immersed in the thallus, to 0.5 mm in diameter; involucrellum fused with the exciple, often all the way around, the two then difficult to distinguish; hymenial gel IKI+ reddish or with proximal portions bluish; periphyses 40–60 μm long, mostly simple; asci 100–110 \times 33–42 μm ; spores 20–35 \times 10–18 μm [$22.8 \pm 1.0 \times 13.0 \pm 1.2$; L/W 1.8 ± 0.2 (n=4)].

Cook-MOR, LakeIL-MOR, Will-MOR

VERRUCARIACEAE

- A. Perithecia always absent.
 - B. Conidia parasitic in the apothecia of other lichens **Lichenodiplis**
 - B. Conidia absent; not parasitic.
 - Thallus leprose **Botryolepraria**
 - Thallus squamulose **Agonimia**
- A. Perithecia usually present.
 - C. Spores septate or muriform.
 - D. Spores abundantly muriform.
 - E. Spores 4-8 per ascus **Willeya**
 - E. Spores 2 per ascus.
 - Spores hyaline in the ascus **Endocarpon**
 - Spores brown in the ascus **Staurothele**
 - D. Spores prevailingly merely septate, or rarely with a few longitudinal septa.
 - F. Ascospore strictly 1-septate **Placidiosis**
 - F. Many of the ascospores more than 1-septate.
 - Thallus lignicolous **Psoroglaena**
 - Thallus saxicolous **Thelidium**
 - C. Spores simple.
 - G. Thallus umbilicate or squamulose.
 - H. Thallus umbilicate, saxicolous **Dermatocarpon**
 - H. Thallus squamulose, terricolous.
 - Thallus pale grayish-brown, pruinose initially **Catapyrenium**
 - Thallus brown, never pruinose **Placidium**
 - D. Thallus crustose or absent, the ascomata not.
 - I. Ascomata lichenicolous in the apothecia of Teloschistaceous lichens **Muellerella**

- I. Ascomata not lichenicolous.
 - J. Perithecia and thallus deeply imbedded in the substrate; saxicolous **Bagliettoa**
 - J. Perithecia and thallus epilithic or only partially immersed in the substrate, or thallus corticolous.
 - K. Lower cortex absent. **Verrucaria**
 - K. Lower cortex present, at least marginally, or if scant, then areoles thickly short-stipitate.
 - Rhizohyphae present; lower cortex paraplectenchymatous. . . . **Heteroplacidium**
 - Rhizohyphae absent; lower cortex prosoplectenchymatous **Placopyrenium**

VILLOPHORA Söchting, Arup, and Froëdèn [TELOSCHISTACEAE
Photobiont: mostly "*Pseudotreboxia*." An awkward blend of Latin and Greek: L. *villus*, a tuft of hair + *phoros*, a bearing; evidently and allusion to the slender isidia of some species. ~ Thallus crustose, lignicolous, isidiate, blastidiate, or soorediate; apothecia rare; anthraquinones, particularly parietin.]

Villoghora microphyllina (Tuck.) S.Y. Kondr. (Gr. *mikros*, small + *phyllon*, leaf + L. *-inus*, pertaining to; perhaps from the occasional, tiny, flattened, areoles) = *Caloplaca microphyllina* (Tuck.) Hasse, *Placodium microphyllum* of Calkins. Fink (1935) spells the epithet "*microphyllina*." Common on weathered wood, this is the orange swatch that appears on farm wood and fences in the agricultural districts, where it often grows with *Amandinea punctata*, *Athallia holocarpa*, and *Physcia millegrana*. Its aboriginal haunt is rare, but we have seen it growing in open woods on *Carya ovata* with *Graphis scripta* and *Ochrolechia arborea*. Rudolph (1955) placed this species in the genus *Gasparinia*. Söchting *et al.* (2013) extract this species from *Caloplaca*, Kondratyuk *et al.* (2015) discuss its phylogeny, and Söchting *et al.* (2021), based upon three-gene DNA analysis, place it into *Tayloriellina*, all other species being of the southern hemisphere. While I am happy to remove *V. microphyllina* from *Caloplaca*, I think we may wait for four-gene analysis before we move this species again to another genus! ~ Thallus granular-soorediate, K+ deep orange; apothecia rare; spores 10–14 × 5–7 μm, the septum 3–4 μm.

Cook-CACS*, F*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-NY, Kane-MOR, Kendall-MOR, Kenosha-MOR, Kosciusko-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-CUP, FH, WIS, Lee-MOR, WIS, Livingston-MOR, McHenry-MOR, Newton-MOR, Ogle-MOR, Racine-MOR, Rock-MOR, WIS*, St. Joseph MI-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, WIS, White-MOR, Will-MOR, Winnebago-MOR

WILLEYA Müll. Arg. VERRUCARIACEAE [Photobiont: *Stichococcus*, *Protococcus*, and *Myrmecia*. In honor of the New England newspaper editor and lichenologist, Henry Willey, 1824-1907, productive but rather eccentric student of Edward Tuckerman.] ~ Thallus crustose, well developed, grayish to brown; perithecia immersed or emergent; asci with algae in the hymenial gel; spores muriform, 4–8, hyaline. According to Morse & Ladd (2019) there are 8-spored species in *Staurothele*, so I am still unclear as to how one distinguishes fundamentally it from *Willeya*.

Willeya diffractella (Nyl.) Müll. Arg. (L. *dis-*, away from + *fractus*, broken + *-ella*, diminutive; probably from the tendency of the thallus to break up into small, sometimes remote areoles) = *Endocarpon diffractellum* (Nyl.) Gueidan & Cl. Roux; *Staurothele diffractella* (Nyl.) Tuck. Uncommon locally on shaded or sheltered dolomitic boulders or cliff faces as well as siliceous rock. ~ Thallus gray to grayish-brown; spores hyaline, 15–28 μm \times 9–12 μm .

Cook-F*,MOR, DuPage-MOR, Kankakee-MOR, Kendall-MOR, LaSalle-NY

XANTHOCARPIA A. Massal. & De Not. (TELOSCHISTACEAE Photobiont: mostly "*Pseudotreboxia*." Gr. *xanthos*, the various shades of yellow + *karpos*, fruit. ~ Thallus crustose, mostly endolithic; apothecia biatorine or zeorine, K+ magenta; spores 8, hyaline, polaribilocular, the isthmus less than 3 μm long; anthraquinones, particularly parietin.)

1. Apothecia evidently lecanorine, with a thalline rim even at maturity, the latter notably paler than the disk; proper exciple obscure or absent even in young apothecia X. FERACISSIMA
1. Apothecia zeorine, often appearing biatorine, the well developed proper exciple concolorous with or slightly paler than the disk X. CRENULATELLA

Xanthocarpia crenulatella (Nyl.) Frödén, Arup & Söchting (L. *crenulata*, having small rounded teeth + *-ellus*, diminutive.) = *Caloplaca crenulatella* (Nyl.) H. Oliver. Occasional on base-rich rock, including weathered concrete, dolomite, slag, and base-rich gravel. It can occur with *Xanthocarpia feracissima*, particularly on weathered concrete. For a key to the species in the *X. crenulatella* complex, the student may wish to consult Vondrák *et al.* (2011) or Navarro-Rosinés & Hladun (1996), who have studied the narrow-septate *Caloplacae* fairly well. Unfortunately, neither treatment comments on New World species. We have a specimen from McHenry County on gravel from a remnant oak woodland; it has biatorine apothecia less than 0.3 mm across and might tempt us to use the name *Xanthocarpia lactea* (A. Massal.) A. Massal. (L. *lacteus*, milky, the allusion here unclear), but that species, as understood in Europe as broadly elliptic spores—those of our specimen are not notably broader in relation to width than our *X. crenulatella* material. Another biatorine species with tiny red-brown apothecia and rather large spores, *Xanthocarpia marmorata* (Bagl.) Frödén, Arup & Söchting (L. *marmoratus*, marble; perhaps from its substrate), is known from just south of our region in Pike County, Illinois. Alas, we probably do not have this species right, but it is the best we can do given the state of North American literature. ~ Thallus absent or scant; apothecia biatorine or very weakly zeorine, the proper exciple well developed, narrow to robust; spores 12–20 μm long, 5–8 μm wide, the isthmus 1–2.5 μm across.

Berrien-MOR, Boone-MOR, Branch-MOR, Cook-F*,MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MO, Jasper-MOR, Kalamazoo-MOR, Kane-MOR, Kendall-MOR, Koskiusko-MOR, LakeIL-F*,MOR, LakeIN-MOR, LaSalle-F*(on specimen with *Sarcogyne regularis*) Lee-MOR, Livingston-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Ogle-MOR, Ottawa-MOR, Rock-MOR, St.JosephIN-MOR, VanBuren-MOR, White-MOR, Will-MOR

Xanthocarpia feracissima (H. Magn.) Frödén, Arup & Söchting (L. *ferax*, rich, fertile + *-issimus*, superlative suffix; from the masses of tiny yellow apothecia) = *Caloplaca feracissima* H.

Magn. If we are interpreting it correctly, this species is occasional on weathered concrete and other base-rich rock as well as rarely on wood. It grows routinely with *Endocarpon petrolepideum* and *Myriolecis dispersa*, and unfortunately, with *Xanthocarpia crenulatella*, a cousin or perhaps sister! between which too many kisses appear to have resulted in some phenotypic confusion. Calkins (1896) recognized no *Placodium* with narrowly septate spores, although a specimen (#289, CACS) from Cook County and one from LaSalle (#55, MICH), which called *Placodium cinnabarinum*, are referable here. Indeed, the only Teloschistaceous saxicolous species he lists for “Chicago and Vicinity” is *P. cinnabarinum* and he did not even include *Gyalolechia flavorubescens*. His description indicates that he was referring to *Squamulea subsoluta* as understood today. No species of *Xanthocarpia* is accommodated all that well in Fink (1935). First named in 1953, the type specimen of *X. feracissima* is from Rock County, Wisconsin (Arup *et al.* 2013). Rudolph (1955) is completely unhelpful. Otherwise, the first published record of a narrow-septate *Caloplaca* for the Midwest was by Harris (1978), which he called *C. feracissima*. Since then, as far as we can tell, *C. feracissima* has been the default name for many *Xanthocarpia* specimens. Brodo (2016) suggests that *X. feracissima* prevails east of the Mississippi River, *X. crenulatella* west of it. Our splitting out of the quite variable *X. crenulatella*, but we have nowhere else to go with specimens in which the thalline exciple is so clearly subordinated by the proper exciple. Given their ubiquity and obvious distinctness as a complex, one might theorize that the *Xanthocarpia* species, as rendered here, are adventive locally; certainly their substrates do not belie that. Nevertheless, *X. feracissima* is still believed to be a strictly North American species. Rarely, the apothecia are closely associated with the parasitic fungus, *Thelidiella blastenicola* Fink, which is characterized by black, globular or subconic, scarcely ostiolate, perithecia. Specimens with spores no more than 15 μm long and no more than twice their length and paraphyses with end cell expanded to more than 4.5 μm long, one might refer to *X. lactea* (A. Massl.) A. Massal (L. *lactus*, milky); we are unable to detect that such local specimens are specifically distinct. ~ Thallus largely endolithic or present as a granular black crust; thalline rim bright yellow, ecorticate, and soon largely concealing the proper exciple, which is more or less concolorous with the burnt-orange disk; spores 15–20 μm long, 6–8 μm wide, the isthmus 1–2.5 μm long.

Benton-MOR, Boone-MOR, Branch-MOR, Cook-CACS*, MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, MSC, Kane-MOR, Kenosha-MOR, Koskiusko-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, Marshall-WIS, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Ogle-MOR, Ottawa-MOR, Porter-MOR, Racine-MOR, Rock-MOR, WIS, Steuben-MOR, St.JosephIN-MOR, St.JosephMI-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, White-MOR, Will-MOR

XANTHOMENDOZA S. Y. Kondr. & Kärnefelt TELOSCHISTACEAE
 [Photobiont: *Trebouxia*. Gr. *xanthos*, the various shades of yellow + (evidently) Mendoza, a town in Argentina; seemingly an awkward constriction, since I do not think that there is a genus Mendoza, certain jumping spiders notwithstanding. ~ Thallus minutely foliose or suffruticose, orange, K+

magenta, much branched; lower cortex white, rhizines evident or lacking; spores 8, hyaline, polaribilocular; anthraquinones, particularly parietin.]

1. Thallus esorediate. X. HASSEANA
1. Thallus sorediate.
 2. Thallus lobes dichotomously branched, all long and narrow, the ultimate lobes notably longer than broad X. WEBERI
 2. Thallus lobes irregularly palmately to flabellate-lobed, the ultimate lobes about as long as broad.
 3. Soredia fine, often greenish-yellow, confined to soralia formed at openings or slits between the upper and lower cortices, often between major lobe segments; larger lobes commonly more than 0.7 mm broad. X. FALLAX
 3. Soredia fine to granular, always yellow-orange, in marginal soralia or on the distal portions of the lobes and lower cortex; thallus lobes more or less than 0.7 mm broad.
 4. Soredia in marginal or even discrete laminal soralia, not produced along the distal portions of the lower surface; lobes often more than 0.5 mm broad orange; pimple-like pycnidia rare; thallus with the distinct tincture of ochre X. ULOPHYLLODES
 4. Soredia mostly along the lobe margins and extending in decorticate arrays beneath the lobe tips; lobes less than 0.5 mm broad; pycnidia frequent, appearing pimple-like on the upper surface; thallus distinctly orange.
 - Soralia formed in the open cavity of hook-like or helmet-like lobe tips . . . X. GALERICULATA
 - Lobe tips flat or more or less crowned, but not helmet-like X. FULVA

Xanthomendoza fallax (Arnold) Søchting, Kärnefelt & S. Y. Kondr. (L. *fallax*, deceptive; probably from its superficial resemblance to other species) = *Xanthoria fallax* (Arnold) Arnold. = *Theloschistes lichneus* of Calkins, in part, but this genus has recently undergone significant revision (Lindblom 1997), so it is likely that any *Xanthomendoza* seen by Calkins would have fallen within his *X. lichneus*. Frequent, more than half of our specimens are from fast-growing roadside trees such as *Acer platanoides*, *Populus deltoides*, *Fraxinus* spp., and *Ulmus* spp. It also grows on open-grown oaks and walnuts, as well as on weathered fence rails. A frequent associate is *Candelaria concolor*. Other associates include *Hyperphyscia adglutinata*, *Phaeophyscia ciliata*, *Physcia millegrana*, *Xanthomendoza fulva*, and *Xanthomendoza ulophyllodes*. Several local reports of this species have been misidentifications of *Xanthomendoza ulophyllodes*.

Allegan-MOR, Barry-MICH,MOR, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cass-MOR, Cook-F*,MOR, DeKalb-MOR, DuPage-ILLS*,MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIL-ILLS*,MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Livingston-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, Porter-MIN*,MOR, Pulaski-MOR, Racine-MOR, Rock-MOR, Starke-MOR, St.JosephIN-MOR,St.JosephMI-MOR, Steuben-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-ILLS*,MOR, White-MOR, Will-MOR, Winnebago-MOR

Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Y. Kondr. (L. *fulvus*, reddish yellow, from the conspicuous pycnidia) = *Theloschistes lichneus* of Calkins, in part. Frequent on open-grown corticolous substrates as well as both siliceous and carbonate rock. A frequent associate is *Candelaria concolor*. ~ As we are interpreting it, this is perhaps the more variable of our species in the genus, as we are interpreting it. It is characterized as having very narrow

lobes that tend to dilate distally into a flabelliform array of lobules no more than twice as long as wide. See also the comments under *Xanthomendoza weberi*.

Allegan-MOR, Barry-MOR, Benton-MOR, Berrien-MOR, Boone-MOR, Branch-MICH*, MOR, Cass-MOR, Cook-F*, MOR, DeKalb-MOR, Elkhart-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-CACS*, MOR, Kosciusko-MOR, LakeIL-MOR, LakeIN-MOR, LaSalle-CACS*, MOR, Lee-MOR, LaPorte-MOR, LaSalle-MICH*, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Newton-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, Porter-MOR, Pulaski-MOR, Rock-MOR, St.JosephIN-MOR, St.JosephMI-MOR, Steuben-MOR, VanBuren-MOR, Waukesha-MOR, White-MOR, Winnebago-ILLS*, MOR

Xanthomendoza galericulata L. Lindblom (*L. galericulatus*, shaped like a hood) Rare, our only records are from corticolous substrates, commonly with other species of *Xanthomendoza*.

DeKalb-MOR, DuPage-MOR, Kenosha-MOR, LakeIN-MOR, Will-MOR

Xanthomendoza hasseana (Räsänen) Søchting, Kärnefelt & S. Y. Kondr. (in honor of the American lichenologist, Hermann Edward Hasse, 1836-1915, who produced the "Lichens of Southern California") Local reports of *Xanthoria polycarpa* and *Polycauliona polycarpa*, including the citations from Cook and LaSalle counties by Rudolph (1955). This species is rather infrequent on fallen branches and on trees in cultural landscape settings.

Allegan-MOR, MSC, Berrien-MOR, Cass-MOR, Cook-CACS*FH, ILL, MOR, NY, DeKalb-MOR, DuPage-MOR, Grundy-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, LakeIL-MOR, LaPorte-MOR, LaSalle-NY, Marshall-MOR, McHenry-ILL-MOR, Porter-MOR, Walworth-ILLS*, MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

Xanthomendoza ulophyllodes (Räsänen) Søchting, Kärnefelt & S. Y. Kondr. (*Gr. ulo*, a scar, curly + *phyll*, leaf + *ode*, like) = *Xanthoria ulophyllodes* Räsänen This species is occasional on a wide variety of corticolous substrates, mostly in disturbed areas. It also grows on exposed dolomitic boulders and concrete. Frequent associates include *Candelaria concolor*, *Physcia millegrana*, *Physcia stellaris*, and *Xanthomendoza fallax*. The St. Joseph County, Indiana, record is on the same card as *X. fallax*.

Barry-MOR, Berrien-MOR, Boone-MOR, Branch-MOR, Calhoun-MOR, Cook-MOR, DeKalb-MOR, DuPage-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jasper-MOR, Jefferson-MOR, Kalamazoo-MOR, Kane-MOR, Kenosha-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-CACS*, Lee-MOR, Livingston-MOR, McHenry-MOR, Milwaukee-MOR, Ogle-MOR, Porter-MIN*, MOR, Racine-MOR, Rock-MOR, St.JosephIN-MOR, St.JosephMI-MOR, Starke-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR

Xanthomendoza weberi (S. Y. Kondr. & Kärnefelt) L. Lindblom (in honor of the American lichenologist, William Alfred Weber, 1918–2020, prolific student of lichens and professor at the University of Colorado at Boulder) *Theloschistes lychnus* of Calkins, in part. This species is occasional on corticolous substrates, particularly oaks and on and carbonate rocks, but we also have specimens from weathered wood. ~ This species is perhaps no more than varietally distinct locally from *Xanthomendoza fulva*. As we are interpreting this species, it differs in having the ultimately lobes longer than wide and nearly without a tendency to dilate distally, none of the lobes more than 0.2 mm wide.

Allegan-MOR, Barry-MOR, Berrien-MOR, Branch-MOR, Cass-MOR, Cook-CACS*, DeKalb-MOR, DuPage-MOR, Ford-MOR, Fulton-MOR, Grundy-MOR, Iroquois-MOR, Jefferson-MOR, Kane-MOR, Kankakee-MOR, Kenosha-MOR, Kosciusko-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-CACS*, MICH*, Livingston-MOR, McHenry-MOR, Ogle-MOR, Porter-MOR, Pulaski-MOR, Rock-MOR, Starke-MOR, Steuben-MOR, VanBuren-MOR, Waukesha-MOR, White-MOR, Will-MOR, Winnebago-MOR

XANTHOPARMELIA (Vainio) Hale PARMELIACEAE [Photobiont: *Trebouxia*. Gr. *xanthos*, the various shades of yellow + *Parmelia*; a segregate genus of *Parmelia*, which see, with strong tints of yellow. ~ Thallus foliose, rather large but adnate, yellow-green; lower cortex white to tan to brown or black; apothecia, if present, sessile, lecanorine, the disks brown; spores 8, hyaline, simple, ellipsoid; conidia bacilliform to variously fusiform; usnic acid]

1. Thallus without isidia.
 2. Thallus jet black below except near the margins.

Medulla K-	X. HYPOMELAENA
Medulla K+ yellow to red	X. HYPOFUSCA
 2. Thallus tan to brown below.

Salazinic acid present; medulla K+ red	X. VIRIDULOUMBRINA
Salazinic acid absent; medulla K+ yellow or very slowly turning reddish yellow	X. CUMBERLANDIA
1. Thallus isidiate.
 3. Medulla K-
 3. Medulla K+ yellow or red.
 4. Lower cortex black except near the margins

Medulla K+ yellow turning red	X. AUSTRALASICA
Medulla K+ yellow, or yellow turning slowly to reddish	X. CONSPERSA
 4. Lower cortex tan or brown nearly throughout.

Salazinic acid present	X. MEXICANA
Salazinic acid absent	X. PLITTII

Xanthoparmelia australasica D. J. Galloway (of southern Asia) = *Parmelia conspersa* of Calkins (1896), who indicated that his specimens were often isidiate, "fuscous-black" beneath, and grew on stones in Lemont and Will County. We have taken the liberty of including these reports here inasmuch as all modern records of isidiate morphs with black lower surfaces in northern Illinois are referable to *X. australasica*. Recent specimens of this species have been collected in nearby Ogle County on sandstone outcrops in open pasture west of Pine Rock Nature Preserve. Calkins's assertion that it grew on old wood near Elgin would represent a rare observation today. This species was called *X. tinctina* (Maheu & A. Gillet) Hale in Hale (1979). [usnic acid, salazinic acid, norstictic acid]

Cook, Ogle-MOR, Will

Xanthoparmelia conspersa (Ach.) Hale (*L. conspersus*, thickly and regularly aggregated) Yet unknown from the Southern Lake Michigan region, it is rather frequent in districts south and north. There is a report of a specimen from the bark of *Quercus velutina* (Hale #1024 WIS) in Waukesha County, determined by J. W. Thomson. A little farther north there is a record from a quartzite boulder. [usnic acid, stictic acid, with traces of constictic, cryptostictic, norstictic, and connorstictic acids, ± traces of hyposalazinic acid.]

Xanthoparmelia cumberlandia Gyelnik) Hale (after Cumberland, Maine, in the United States) Perhaps Berry's (1941) report (Cheney #3485, WIS) of *Parmelia conspersa* should be

referred here. This is the more frequent *Xanthoparmelia* locally. It grows on siliceous rock, usually in the open [usnic acid, stictic acid, norstictic acid]

Berrien-MSC, Cook-MOR, Ford-MOR, Grundy-MOR, Kankakee-MOR, LaSalle-MOR, Lee-MOR, McHenry-MOR, Ogle-MOR, Will-MOR, Winnebago-MOR

Xanthoparmelia hypofusca (Gyelnik) Hodgkinson & Lendemer (Gr. *hypo-* under, beneath + L. *fusca*, dark-colored—an awkward mixture of Greek and Latin in allusion to the black lower cortex) = *X. tasmanica* of local authors. This species, common in southern Illinois and the Missouri Ozarks, is recorded from as nearby as Sauk County, Wisconsin. ~ With this species the thallus is loosely attached and easily removed from the rock; a similar species, also K+ (norstictic and stictic acids), *X. angustiphylla* (Gyeln.) Hale (L. *angustus*, narrow + Gr. *phylla*, leaf) is too tightly adherent to the rock to remove easily. [usnic, salazinic, norstictic acids]

Xanthoparmelia hypomelaena (Hale) Hale (Gr. *hypo*, under, beneath, less than usual + *melaina*, black; from the color of the lower cortex) Our only record of this species is from a west-facing basalt boulder nestled in the bank of a drainage way in a pastured valley on the Waish Kee Shaw Reservation. [usnic acid, fumarprotocetraric acid]

Kendall-MOR

Xanthoparmelia mexicana (Gyelnik) Hale (of Mexico) This species is rather frequent in our western sector, where it grows on sandstone and granite. [usnic acid, salazinic acid, norstictic acid]

Kane-MOR, LaSalle-MOR, Lee-MOR, McHenry-MOR, Ogle-MOR

Xanthoparmelia plittii (Gyelnik) Hale (In honor of the American botanist and lichenologist, Charles Christian Plitt, 1869–1933) This species is infrequent on sandstone and on granitic erratics and tombstones. [usnic acid, stictic acid, norstictic acid, ± constictic acid]

Barry-MICH, MSC, Berrien-MOR, Calhoun-MOR, Fulton-MOR, LaSalle-MOR, Ogle-MOR, Pulaski-MOR, Rock-MOR, Walworth-MOR, Waukesha-MOR

Xanthoparmelia subramigera (Gyelnik) Hale (L. *sub-* below, slightly, imperfectly, nearly + *ramus*, branch + *gero*, to carry, bear; from the branched thallus) This species, common in southern Illinois, but our only local collection is from a granite boulder south of Sheridan along the Fox River. [usnic acid, fumarprotocetraric acid]

Xanthoparmelia viriduloumbrina (Gyelnik) Lendemer (L. *viridis*, green + *ulus*, diminutive + *umbrina*, full of shade) = *X. somloënsis* (Gyeln.) Hale Uncommon, our specimens are from granitic boulders and massive sandstone exposures. [usnic acid, salazinic acid, norstictic acid] Previous reports of *X. stenophylla* (Ach.) Ahti & D. Hawksw. (Gr. *stenos*, short + *phyllon*, leaf) are referable here.

Barry-MOR, Ogle-MOR, Will-MOR

XANTHOPYRENACEAE

One local genus **Pyrenocollema**

XANTHORIA (Fr.) Th. Fr. TELOSCHISTACEAE [Photobiont: *Trebouxia*. Gr. *xanthos*, the various shades of yellow + L. *orius*, a place suitable for something; from yellow portion of the spectrum. ~ Thallus foliose, K+ magenta, adnate, the

lower cortex white, without rhizines; apothecia lecanorine, the disks usually a deeper orange than the thalline rims; spores 8, hyaline, polaribilocular; anthraquinones, particularly parietin.]

Xanthoria parietina (L.) Th. Fr. (*L. parietis*, of a wall + *inus*, pertaining to; from its tendency to grow on walls) = *Theloschistes parietinus* of Calkins. A maritime species, this lichen is generally rare in the Midwest. There is a specimen of Calkins's from Cook County at the Chicago Academy of Sciences, which is correctly identified, but other early Cook County specimens (Calkins #16 NY, #5685 CACS), originally called *X. parietina*, are referable to *Xanthomendoza hasseana*. He (1896) treated it casually, stating that it grew "along the lake shore, on oaks and poplars; also in Lemont and elsewhere." Rudolph (1955) also reports it from Cook County, although the plants evident absence in the late 1900's, compelled Wilhelm (1998) to exclude it from the flora on the assumption that this notably maritime species was probably misidentified locally. Interestingly, Tuckerman (1860) reported it from Kendall County, well removed from Lake Michigan, but this was probably based upon Wheatland's (#52 F) early attribution of this species to *Candelaria fibrosa*, which see. In recent years it has begun to appear on planted trees in corporate campus or landscape settings, inevitably on young landscape trees with smooth bark. By the time a tree once rich with it grows to 7 or 8 inches in diameter, the thalli have disappeared. Trees upon which we have collected it include *Acer platanoides*, *Acer rubrum*, *Acer saccharum*, *Carpinus*, *Celtis occidentalis*, *Cercis canadensis*, *Ginkgo biloba*, *Gleditsia triacanthos*, *Gymnocladus dioica*, *Tilia cordifolia*, and *Ulmus*. Hardly common, persistent hunting in corporate-scale landscapes with young trees will often prove satisfying. Although we have it rarely from *Gleditsia triacanthos*, it is rare on this ubiquitously planted tree. ~ With us this species varies from adnate-foliose to suffruticose, the older portions of the thallus often blanching to gray.

Allegan-MOR, Berrien-MOR, Boone-MOR, Calhoun-MOR, Cass-MOR, Cook-CASC-MOR, DeKalb-MOR, DuPage-MOR, Elkhart-MOR, Fulton-MOR, Grundy-MOR, Jasper-MOR, Kalamazoo-MOR, Kane-MOR, Kankakee-MOR, Kendall-MOR, Kenosha-MOR, Kent-MOR, Kosciusko-MOR, LaGrange-MOR, LakeIL-MOR, LakeIN-MOR, LaPorte-MOR, LaSalle-MOR, Lee-MOR, Marshall-MOR, McHenry-MOR, Milwaukee-MOR, Noble-MOR, Ogle-MOR, Ottawa-MOR, Porter-MOR, Racine-MOR, Rock-MOR, Steuben-MOR, St.JosephIN-MOR, VanBuren-MOR, Walworth-MOR, Waukesha-MOR, Will-MOR, Winnebago-MOR

XYLOSPORA Bendiksby & Timdal OPHIOPARMACEAE [Photobiont: *Trebouxia*. Gr. *xylon*, wood + *spora*, seed; perhaps evoking the image of the numerous seeds on wood. ~ Thallus squamulose, greenish-brown, the squamules convex; apothecia biatorine, black, the margin obscure in age; spores 8, hyaline, simple; conidia bacilliform to ellipsoid.]

Xylospora friesii (Ach.) Bendiksby & Timdal (In honor of the Swedish botanist and lichenologist, 1832– 1913, Theodor Magnus Fries) Yet unknown from our region this species is rather frequent in districts just to our north on both sides of Lake Michigan. ~ Squamules K–,

C-, KC-, convex, esorediate; apothecia black, usually abundant; spores ellipsoid, 4.5–7.5 μm \times 2.5–3.5 μm .

ZWACKHIA Körber LECANOGRAPHACEAE [Photobiont: *Trentepohlia*. In honor of the German lichenologist Philipp Franz Wilhelm von Zwack-Holzhausen (1826-1903). Thallus crustose; apothecia black, the hymenium I+ blue to orange, the epihymenium pale; small; spores mostly 8, hyaline, 11–15 septate, acicular.]

Zwackhia viridis (Ach.) Poetsch & Schied. (*L. viridis*, green; from the greenish thallus of some specimens) = *Opegrapha viridis* Ach. The only Southern Lake Michigan Region records for this species were collected on *Ulmus americana* and a stump of *Acer negundo*. ~ Apothecia prevailingly less than 1 mm across; spores 25 μm –60 μm \times 6 μm –9 μm .

DuPage-MOR, LaSalle-MOR

INDEX OF SYNONYMS AND MISAPPLIED NAMES

The following is a listing of names that have been used or applied locally for Southern Lake Michigan region lichens. These names are not necessarily taxonomic synonyms or even routinely misapplied names; they may represent misidentifications or legitimate older names that are known now to have narrower distributions. In some cases, they are related species that appear in text where taxonomic issues are discussed. All of these names are indexed to the species under which they are listed or discussed.

- Acrocordia gemmata* — *Acrocordia megalospora*
Acarospora canadensis — *Sarcogyne canadensis*
Acarospora cervina — *Acarospora strigata*
Acarospora cinereoalba — *Acarospora americana*
Acarospora dispersa — *Trimmatothelopsis dispersa*
Acarospora glaucocarpa — *Acarospora strigata*
Acarospora immersa — *Caeruleum immersum*
Acarospora oligospora — *Acarospora macrospora*
Acarospora privigna — *Polysporina simplex*
Acarospora schleicheri — *Acarospora tuckerae*
Acarospora smaragdula — *Myriospora smaragdula*
Acolium inquinans — *Cyphelium tigillare*
Acrocordia cavata — *Acrocordia megalospora*
Anaptychia palmatula — *Anaptychia palmulata*
Anisomeridium juistense — *Anisomeridium polypori*
Anisomeridium nyssaegenum — *Anisomeridium polypori*
Anisomeridium willeyanum — *Anisomeridium polypori*
Arthonia caesia — *Chrysothrix caesia*
Arthonia didyma — *Arthonia spadicea*
Arthonia diffusella — *Arthonia crestviewensis*
Arthonia gregaria — *Arthonia cinnabarina*
Arthonia lecideella — *Arthonia byssacea*, *Chrysothrix caesia*
Arthonia polymorpha — *Arthonia diffusa*
Arthonia spectabilis — *Arthothelium spectabile*
Arthonia taediosa — *Arthonia susa*, *Mycoporum eschweileri*
Arthonia tumidula — *Arthonia cinnabarina*
Arthonia willeyi — *Arthonia diffusa*
Arthopyrenia affinia — *Strigula jamesii*
Arthopyrenia biformis — *Anisomeridium biforme*
Arthopyrenia cinchonae — *Constrictolumina cinchonae*
Arthopyrenia finkii — *Acrocordia megalospora*
Arthopyrenia gemmata — *Acrocordia megalospora*, *Anisomeridium biforme*
Arthopyrenia padii — *Naetrocymbe punctiformis*
Arthopyrenia prospersella — *Pyrenocollema prospersellum*
Arthopyrenia submuriformis — *Strigula submuriformis*
Arthopyrenia tenuis — *Strigula americana*
Arthopyrenia willeyana — *Anisomeridium polypori*
Arthrosporum populorum — *Toninia populorum*
Aspicilia caesiocinerea — *Circinaria caesiocinerea*
Aspicilia calcarea — *Circinaria calcarea*
Aspicilia contorta — *Circinaria contorta*
Athallia holocarpa — *Athallia pyracea*, *A. vitellinula*
Bacidia chlorantha — *Scoliciosporum chlorococcum*
Bacidia chlorococca — *Scoliciosporum chlorococcum*
Bacidia coprodes — *Bacidia granosa*
Bacidia delicata — *Bacidina delicata*
Bacidia egenula — *Bacidina egenula*
Bacidia fuscorubella — *Bacieia polychroa*
Bacidia inundata — *Bacidina egenula*
Bacidia luteola — *Bacidia rubella*
Bacidia muscorum — *Bacidia bagliettoana*
Bacidia naegeli — *Lecania naegeli*
Bacidia sabuletorum — *Bilimbia sabuletoru*
Bacidia trachona — *Aquacidia trachona*
Bacidina egenula — *egenula*
Baculifera curtisii — *Buellia curtisii*
Biatora anthracophila — *Carbonicola anthracophila*
Biatora calcivora — *Protoblastenia rupestris*
Biatora coarctata — *Trapelia coarctata*
Biatora cyphalea — *Strangospora cyphalea*
Biatora decipiens — *Psora decipiens*
Biatora fusco-rubella — *Bacidia polychroa*
Biatora hypnophylla — *Bilimbia sabuletorum*
Biatora inundata — *Bacidia egenula*
Biatora myriocarpoides — *Amandinea punctata*
Biatora sanguineoatra — *Bacidia bagliettoana*, *Bilimbia sabuletorum*
Biatora suffusa — *Bacidia suffusa*
Biatora uliginosa — *Trapeliopsis viridescens*
Biatora trachona — *Aquacidia trachona*
Biatora varians — *Traponora varians*
Biatorella cyphalea — *Strangospora cyphalea*
Biatorella hemispherica — *Biatorella fossarum*
Biatorella pruinosa — *Sarcogyne regularis*
Brianaria sylvicola — *Leimonis erratica*
Buellia atroalba — *Amandinea dakotensis*, *Diplotomma alboatrum*
Buellia parasema — *Amandinea punctata*, *Buellia curtisii*, *Buellia erubescens*
Buellia punctata — *Amandinea punctata*
Buellia stigmatia — *Buellia maculata*
Buellia stillingiana — *Buellia erubescens*
Buellia turgescens — *Amandinea punctata*, *Buellia badia*
Calicium tigillare — *Cyphelium tigillare*
Calicium viride — *Cyphelium tigillare*
Calogaya decipiens — *Calogaya pusilla*
Caloplaca approximata — *Amundsenia approximata*
Caloplaca arenaria — *Xanthocarpia crenulatella*
Caloplaca camptidia — *Phaeoplaca camptidia*
Caloplaca chrysophthalma — *Solitaria chrysophthalma*
Caloplaca cinnabarina — *Squamulea subsoluta*
Caloplaca citrina — *Flavoplaca citrina*
Caloplaca concretica — *Caloplaca pratensis*
Caloplaca crenulatella — *Xanthocarpia crenulatella*
Caloplaca feracissima — *Xanthocarpia feracissima*
Caloplaca ferruginea — *Blastenia ferruginea*
Caloplaca flavocitrina — *Flavoplaca flavocitrina*
Caloplaca flavorubescens — *Gyalolechia flavorubescens*
Caloplaca flavovirescens — *Gyalolechia flavovirescens*
Caloplaca gilva — *Caloplaca cerina*
Caloplaca holocarpa — *Athallia holocarpa*
Caloplaca microphyllina — *Vilophora microphyllina*
Caloplaca oxfordensis — *Rufoplaca oxfordensis*
Caloplaca pollinii — *Huneckia pollinii*
Caloplaca pratensis — *Pyrenodesmia pratensis*

- Caloplaca pyracea — *Athallia pyracea*
 Caloplaca saxicola — *Calogaya saxicola*
 Caloplaca subsoluta — *Squamulea subsoluta*
 Caloplaca soralifera — *Kuettingeria soralifera*
 Caloplaca ulcerosa — *Coppinsiella ulcerosa*
 Caloplaca variabilis — *Pyrenodesmia variabilis*
 Caloplaca vitellinula — *Athallia vitellinula*
 Caloplaca velana — *Squamulea subsoluta*
 Candelaria concolor effusa — *Candelaria concolor*
 Candelariella dispersa — *Candelariella rosulans*
 Candelariella lutella — *Candelariella vitellina*
 Candelariella reflexa — *Candelariella efflorescens*
 Candelariella xanthostigmoides — *Candelariella efflorescens*
 Canoparmelia crozalsiana — *Crespoa crozalsiana*
 Carbonea latypizodes — *Porpidia crustulata*
 Catapyrenium lachneum — *Placidium lachneum*
 Cetraria aleurites — *Imshaugia aleurites*
 Cetraria ciliaris — *Tuckermannopsis americana*
 Cetraria halei — *Tuckermannopsis americana*
 Chrysothrix candelaris — *Chrysothrix xanthina*
 Cladonia anomaea — *Cladonia ramulosa*
 Cladonia arbuscula — *Cladina arbuscula*
 Cladonia arbuscula mitis — *Cladina mitis*
 Cladonia bacillaris clavata — *Cladonia macilenta bacillaris*
 Cladonia bacilliformis — *Cladonia macilenta bacillaris*
 Cladonia borbonica cylindrica — *Cladonia cylindrica*
 Cladonia b otrytes — *Cladonia peziziformis*
 Cladonia capitata — *Cladonia peziziformis*
 Cladonia carneola — *Cladonia conista*
 Cladonia caroliniana — *Cladonia dimorphoclada*
 Cladonia cariota — *Cladonia cariosa*
 Cladonia caroliniana — *Cladonia dimorphoclada*
 Cladonia cervicornis verticillata — *Cladonia verticillata*
 Cladonia chlorophaea carpophora — *Cladonia chlorophaea*
 Cladonia chlorophaea simplex — *Cladonia chlorophaea*
 Cladonia clavulifera — *Cladonia sobolescens*
 Cladonia coniocraea ceratodes — *Cladonia coniocraea*
 Cladonia conista simplex — *Cladonia conista*
 Cladonia decorticata — *Cladonia rei*
 Cladonia delicata — *Cladonia parasitica*
 Cladonia didyma subulata — *Cladonia didyma*
 Cladonia fimbriata coniocraea — *Cladonia ochrochlora*
 Cladonia fimbriata simplex — *Cladonia chlorophaea*, *C. conista*, *C. cylindrica*
 Cladonia gracilis — *Cladonia gracilis turbinata*
 Cladonia gracilis dilacerata — *Cladonia gracilis turbinata*
 Cladonia gracilis dilatata — *Cladonia gracilis turbinata*
 Cladonia gracilis verticillata — *Cladonia gracilis*, *C. verticillata*
 Cladonia grayi aberrans — *Cladonia grayi*
 Cladonia humilis — *Cladonia conista*
 Cladonia leptophylla — *Cladonia peziziformia*
 Cladonia macilenta — *Cladonia macilenta bacillaris*
 Cladonia mitrulla squamulosa — *Cladonia peziziformis*
 Cladonia nemoxyyna — *Cladonia rei*
 Cladonia pityrea — *Cladonia ramulosa*
 Cladonia pityrea zwackhii squamulifera — *Cladonia ramulosa*
 Cladonia pityrea zwackhii subacuta — *Cladonia ramulosa*
 Cladonia polycarpoides — *Cladonia subcariosa*
 Cladonia pulchella — *Cladonia didyma*
 Cladonia pyxidata neglecta — *Cladonia pyxidata*
 Cladonia pyxidata pocillum — *Cladonia chlorophaea*
 Cladonia rangiferina — *Cladina rangiferina*
 Cladonia rangiferina sylvatica — *Cladina subtenuis*
 Cladonia rappii — *Cladonia phyllophora*
 Cladonia subapodocarpa — *Cladonia petrophila*
 Cladonia subtenuis — *Cladina subtenuis*
 Cladonia subulata — *Cladonia coniocraea*
 Cladonia sylvatica — *Cladina mitis*
 Clauzadea immersa — *Protoblastenia rupestris*
 Claviscidium lacinulatum — *Placidium lacinulatum*
 Claviscidium umbrinum — *Placidium umbrinum*
 Collema bachmanianum — *Enchylium bachmanianum*
 Collema cyrtaspis — *Enchylium conglomeratum*
 Collema conglomeratum — *Enchylium conglomeratum*
 Collema conglomeratum crassiusculum — *Enchylium conglomeratum*
 Collema granosum — *Lathagrium auriforme*
 Collema limosum — *Enchylium limosum*
 Collema microphyllum — *Scytinium fragrans*
 Collema polycarpon — *Enchylium polycarpon*
 Coniocybe pallida — *Sclerophora nivea*
 Conotrema urceolatum — *Stictis urceolatum*
 Dendrisocaulon umhausense — *Dendrisocaulon intricatum*
 Dermatocarpon lachneum — *Placidium lachneum*
 Dermatocarpon miniatum — *Dermatocarpon muhlenbergii*
 Dermatocarpon pusillum — *Endocarpon petrolepideum*
 Dimerella pineti — *Coenogonium pineti*
 Ditrems biformis — *Anisomeridium biforme*
 Ditrems nyssagenum — *Anisomeridium polypori*
 Endocarpon arboreum — *Placidium arboreum*
 Endocarpon diffractellum — *Willeya diffractella*
 Endocarpon hepaticum — *Placidium lachneum*
 Endocarpon miniatum — *Dermatocarpon muhlenbergii*
 Endocarpon miniatum complicatum — *Dermatocarpon muhlenbergii*
 Endocarpon miniatum muhlenbergii — *Dermatocarpon muhlenbergii*
 Endocarpon pusillum — *Endocarpon petrolepideum*
 Endocarpon pusillum garovaglii — *Endocarpon petrolepideum*
 Endocarpon rufescens — *Placidium lachneum*
 Eopyrenula leucoplaca — *Eopyrenula intermedia*
 Flavoplaca oasis — *Athallia pyracea*
 Gasparinia microphyllina — *Villophora microphyllina*
 Gonohymenia cribellifera — *Lichenella cribellifera*
 Gonohymenia nigritella — *Lichenella nigritella*
 Graphina abaphoides — *Graphis scripta*
 Graphis comma — *Graphis lineola*
 Graphis dendritica — *Graphis scripta*
 Graphis elegans — *Graphis scripta*
 Heppia adglutinata — *Heppia conchiloba*
 Heppia despreauxii — *Heppia conchiloba*
 Heppia lutosa — *Heppia conchiloba*
 Heterodermia hypoleuca — *Polyblastidium hypoleucum*
 Julella sericea — *Julella fallaciosa*
 Lecania croatica — *Coppinsidea croatica*
 Lecania perproxima — *Caloplaca atroalba*
 Lecaniella erysibe — *Lecania erysibe*
 Lecaniella naegelii — *Lecania naegelii*
 Lecanora albella — *Lecanora albellula*
 Lecanora aipospila — *Caloplaca atroalba*
 Lecanora argentea — *Lecanora cenisia*
 Lecanora caesiorubella — *Lecanora carpinea*
 Lecanora calcarea — *Circinaria calcarea*
 Lecanora calcarea contorta — *Circinaria contorta*
 Lecanora cervina — *Sarcogyne hypophaea*, *Sarcogyne regularis*
 Lecanora cinereofusca appalachensis — *Lecanora saxigena*
 Lecanora confusa — *L. strobilina*
 Lecanora dispersa — *Myriolecis dispersa*
 Lecanora erysibe — *Caloplaca atroalba*, *Lecania erysibe*
 Lecanora expallens — *Lecanora thysanophora*
 Lecanora glabrata — *Lecanora hybocarpa*
 Lecanora hagenii — *Myriolecis hagenii*
 Lecanora hagenii sambuci — *Myriolecis sambuci*

- Lecanora layana* — *Lecanora nothocasiella*
Lecanora muralis — *Protoparmeliopsis muralis*
Lecanora pallida — *Lecanora caesiorubella*
Lecanora perproxima — *Caloplaca atroalba*
Lecanora piniperda — *Lecanora albella*
Lecanora privigna — *Porpidia crustulata*, *Porpidia macrocarpa*,
Sarcogyne hypophaea
Lecanora privigna pruinosa — *Sarcogyne regularis*
Lecanora pseudo-chlarotera — *Lecanora hybocarpa*
Lecanora rubina — *Rhizoplaca subdiscrepans*
Lecanora sambuci — *Myriolecis sambuci*
Lecanora subfusca — *Lecanora chlarotera*, *Lecanora cinereofusca*,
Lecanora hybocarpa, *Myriolecis dispersa*
Lecanora subfusca allophana — *Lecanora hybocarpa*
Lecanora subintricata — *Lecanora saligna*
Lecanora umbrina — *Myriolecis hageni*
Lecanora valesiaca — *Protoparmeliopsis muralis*
Lecanora varia — *Lecanora laxa*, *Lecanora strobilina*, *Lecanora*
symmicta
Lecanora varia saepinicola — *Lecanora symmicta*
Lecanora varia symmicta — *Lecanora symmicta*
Lecidea aeruginosa — *Trapeliopsis flexuosa*
Lecidea albocaerulescens immersa — *Bagliettoa calciseda*
Lecidea cyrtidia — *Leimonis erratica*
Lecidea enteroleuca — *Lecidella euphorea*, *Trapeliopsis granulosa*
Lecidea erratica — *Leimonis erratica*
Lecidea flavidolivens — *Fellhanera minnisinkorum*
Lecidea flexuosa — *Trapeliopsis flexuosa*
Lecidea granulosa — *Trapeliopsis granulosa*
Lecidea hypopta — *Traconora varians*
Lecidea macrocarpa — *Porpidia macrocarpa*
Lecidea sp. #4 — *Lecania croatica*
Lecidea uliginosa — *Placynthiella icmalea*
Lecidea varians — *Traconora varians*
Lecidea virginiana — *Bryobilimbia ahlesii*
Lecidella elaeochroma — *Lecidella euphorea*
Lepra pustulata — *Loxospora pustulata*
Lepraria cryophila — *Lepraria hodkinsoniana*
Lepraria incana — *Lepraria hodkinsoniana*
Lepraria lesdainii — *Botryolepraria lesdainii*
Lepraria lobificans — *Lepraria normandinoides*
Leptogium bolacinum — *Dendriscoaulon intricatum*
Leptogium chloromelum — *Leptogium milligranum*
Leptogium dactylinum — *Scytinium dactylinum*
Leptogium hirsutum — *Leptogium hirsutum*
Leptogium juniperinum — *Scytinium juniperinum*
Leptogium lacerum — *Scytinium lichenoides*
Leptogium lichenoides — *Scytinium lichenoides*
Leptogium myochroum — *Scytinium dactylinum*
Leptogium pulchellum — *Leptogium corticola*
Leptogium saturninum — *Leptogium hirsutum*
Lichenothelia metzleri — *Lichenothelia scopularia*
Lithothelium phaeospora — *Lithothelium septemseptatum*
Lobaria amplissima — *Ricasolia quercizans*
Lobaria quercizans — *Ricasolia quercizans*
Marchandio aurantiacus — *Phaeophyscia ciliata*
Marchandiomyces corallinus — *Phaeophyscia ciliata*
Melanelia septentrionalis — *Melanohalea septentrionalis*
Melanelia subaurifera — *Melanelixia subaurifera*
Micarea micrococca — *Micarea byssacea*
Micarea misella — *Micarea byssacea*
Micarea prasina — *Micarea byssacea*
Microthelia micula — *Kirschsteiniotelia aethiops*
Microthelia wallrothii — *Mycocomicrothelia wallrothii*
Monerolechia badia — *Buella badia*
Muellerella lichenicola — *Gyalolechia flavovirescens*
Mycobilimbia sabuletorum — *Bilimbia sabuletorum*
Mycocalicium albonigrum — *Mycocalicium subtile*
Mycocomicrothelia — *Kirschsteiniotelia aethiops*
Mycobilimbia berengeriana — *Mycobilimbia tetramera*
Mycobilimbia hypnorum — *Bryobilimbia hypnorum*
Mycoglaena quercicola — *Mycoglaena meridionalis*
Mycoporum pycnocarpum — *Mycoporum compositum*
Naevia dispersa — *Arthonia dispersa*
Naevia punctiformis — *Arthonia punctiformis*
Omphalaria pulvinata — *Lichinella cribellifera*, *Thyrea pulvinata*
Opegrapha atra — *Arthonia atra*
Opegrapha pulicaris — *Alyxoria varia*
Opegrapha varia — *Alyxoria varia*
Opegrapha viridis — *Zwackhia viridis*
Pannaria lanuginosa — *Lepraria finkii*
Pannaria nigra — *Cryptothele permiscens*, *Placynthium nigrum*,
Rhizocarpon reductum
Parmelia andreana — *Flavopunctelia flaventior*
Parmelia aurulenta — *Myelochroa aurulenta*
Parmelia bolliana — *Punctelia bolliana*
Parmelia borrieri — *Punctelia bolliana*, *P. caseana*
Parmelia borrieri rudecta — *Punctelia rudecta*, *Hypotrachyna livida*
Parmelia caperata — *Flavoparmelia caperata*
Parmelia cetrata — *Parmotrema cetratum*
Parmelia colpodes — *Anzia colpodes*
Parmelia crinita — *Parmotrema crinitum*
Parmelia flaventior — *Flavopunctelia flaventior*
Parmelia frondifera — *Punctelia bolliana*
Parmelia galbina — *Myelochroa galbina*
Parmelia olivacea — *Melanelixia subaurifera*
Parmelia olivacea soledata — *Melanelixia subaurifera*
Parmelia perforata — *Parmotrema perforatum*
Parmelia perlata — *Parmotrema reticulatum*
Parmelia physodes — *Hypogymnia physodes*
Parmelia rudecta — *Punctelia rudecta*
Parmelia saxatilis sulcata — *Parmelia sulcata*
Parmelia septentrionalis — *Melanohalea septentrionalis*
Parmelia — *Flavopunctelia*
Parmelia subaurifera — *Melanelixia subaurifera*
Parmelia subquercifolia — *Myelochroa galbana*
Parmelia subrudecta — *Punctelia caseana*
Parmelia tiliacea — *Hypotrachyna livida*, *Myelochroa galbina*
Parmelia tiliacea sulphurea — *Myelochroa galbina*
Parmelia ulophyllodes — *Flavopunctelia*
Parmelia obsessa — *Myelochroa obsessa*
Parmeliopsis aleurites — *Imshaugia aleurites*
Parmotrema chinense — *Parmotrema perlatum*
Parmotrema submarginale — *Parmotrema arnoldii*
Peltigera aphthosa — *Peltigera leucophlebia*
Peltigera canina — *Peltigera polydactylon*
Peltigera canina rufescens — *Peltigera rufescens*
Peltigera canina rufescens innovans — *Peltigera praetextata*
Peltigera spuria — *Peltigera didactyla*
Pertusaria amara — *Lepra amara*
Pertusaria communis — *Pertusaria macounii*, *Variocellaria veltata*
Pertusaria leucostoma — *Pertusaria leioplaca*
Pertusaria multipuncta — *Lepra multipuncta*
Pertusaria paratuberculifera — *Pertusaria macounii*
Pertusaria pertusa — *Pertusaria macounii*
Pertusaria trachythallina — *Lepra trachythallina*
Pertusaria velata — *Varicellaria velata*
Phaeographis dendritica — *Graphis scripta*
Phaeophyscia cernohorskyi — *Phaeophyscia hirsuta*
Phaeophyscia chloantha — *Physciella chloantha*

- Phaeophyscia imbricata — Phaeophyscia squarrosa, Physciella melanchra
 Physcia adglutinata — Hyperphyscia adglutinata, Rinodina ascosciana
 Physcia aquila detonsa — Anaptychia palmulata
 Physcia astroidea — Physcia millegrana
 Physcia chloantha — Physciella chloantha
 Physcia granulifera — Heterodermia granulifera, Physcia aipolia, Physcia stellaris
 Physcia obscura — Heterodermia obscurata, Phaeophyscia adiaetola, Phaeophyscia ciliata, Phaeophyscia hirtella
 Physcia granulifera — Heterodermia granulifera, Physcia stellaris
 Physcia pulverulenta — Anaptychia palmulata
 Physcia speciosa — Heterodermia hypoleuca; Heterodermia speciosa
 Physcia stellaris aipolia — Physcia aipolia
 Physcia stellaris tuberculata — Physcia stellaris
 Physcia subtilis — Physcia dakotensis
 Physcia tribacea — Phaeophyscia squarrosa
 Physcia tribacia — Physcia millegrana
 Physiopsis adglutinata — Hyperphyscia adglutinata, Rinodina ascosciana
 Physiopsis syncolla — Hyperphyscia syncolla
 Physconia detersa — Physconia leucoleiptes
 Physconia grisea — Physconia leucoleiptes
 Physconia distorta — Anaptychia palmulata
 Placodium aurantiacum — Caloplaca ulmorum, Gyalolechia flavorubescens
 Placodium cinnabarinum — Squamulea subsoluta
 Placodium ferrugineum — Blastenia ferruginea, Caloplaca cerina
 Placodium microphyllum — Villophora microphyllina
 Placodium vitellinum — Candelariella vitellina, Candelariella xanthostigma
 Placodium vitellinum aurellum — Candelariella aurella
 Placopyrenium canella — Placopyrenium fuscella
 Placynthiella dasaea — Placynthiella icmalea
 Plagiocarpa hyalosporra — Lithothelium hyalosporum
 Plagiocarpa septemseptata — Lithothelium septemseptatum
 Polyblastiopsis fallaciosa — Julella fallaciosa
 Porina chlorotica — Pseudosagedia chlorotica
 Porpidia tahawasiana — Porpidia subsimplex
 Protoparmeliopsis gyrophorica — Protoparmeliopsis muralis
 Pseudoparmelia baltimorensis — Flavoparmelia baltimorensis
 Pseudoparmelia caperata — Flavoparmelia caperata
 Pseudoparmelia crozalsiana — Crespoa crozalsiana
 Pseudoparmelia texana — Canoparmelia texana
 Psora scalaris — Hypocomyce scalaris
 Psorotichia frustulata — Pycnocarpon thelostomum
 Punctelia flaventior — Flavopunctelia flaventior
 Punctelia hypoleucites — Punctelia graminicola
 Punctelia semansiana — Punctelia graminicola
 Punctelia — Flavopunctelia
 Punctelia subrudecta — Punctelia caseana
 Pyrenocarpon flotowianum — Pyrenocarpon thelostomum
 Pyrenopsis schaeferi — Bacidina egenula
 Pyrenula analepta — Naetrocymbe punctiformis
 Pyrenula gemmata — Anisomeridium biforme, Constrictolumina cinchonae, Eophyrenula intermedia, Pyrenula pseudobufonia
 Pyrenula glabrata — Constrictolumina cinchonae, Pyrenula laevigata
 Pyrenula imperfecta — Pyrenula subelliptica
 Pyrenula neglecta — Pyrenula pseudobufonia
 Pyrenula nitida — Pyrenula pseudobufonia
 Pyrenula punctiformis — Kirschsteiniotelia aethiops, Naetrocymbe punctiformis
 Pyrenula thelaena — Lithothelium hyalosporum
 Pyrrhospora varians — Traponora varians
 Pyxine caesiopruinosa — Pyxine subcinerea
 Pyxine cocoes — Pyxine soreliata
 Ramalina calicaris fastigiata — Ramalina sinensis
 Ramalina calicaris fraxinea — Ramalina sinensis
 Ramalina culbersoniorum — Ramalina americana
 Ramalina fastigiata subampliata — Ramalina sinensis
 Ramalina subampliata — Ramalina sinensis
 Ramalina unifolia — Ramalina sinensis
 Rhizocarpon obscuratum — Rhizocarpon reductum
 Rhizoplaca chrysoleuca — Rhizoplaca subdiscrepan
 Rimelia cetrata — Parmotrema citratum
 Rimelia reticulata — Parmotrema reticulatum
 Rinodina destituta — Rinodina moziana
 Rinodina sophodes — Rinodina cana
 Rufoplaca subpallida — Rufoplaca oxfordensis
 Saccomorpha icmalea — Placynthiella icmalea
 Saccomorpha oligotropa — Placynthiella oligotropa
 Sagedia oxyspora — Leptorhaphis epidermidis
 Sagestria laureri — Thelocarpon laureri
 Santessoniolichen punctiforme — Naetrocymbe punctiformis
 Sarcinulella banksiae — Anisomeridium polypori
 Scutula circumspeta — circumspeta
 Staurothele diffractella — Willeya diffractella
 Sticta quercizans — Lobaria quercizans
 Strigula stigmatella — Strigula submuriformis
 Tayloriellina microphyllina — Villophora
 Thelidium microcarpon — Thelidium zwackhii
 Thelidium pyrenophorum — Verrucaria illinoisensis
 Thelidiella blastenicola — Xanthocarpia feracissima
 Theloschistes chrysophthalmus — Theloschistes chrysophthalmus
 Theloschistes concolor — Candelaria concolor
 Theloschistes lychneus — Xanthomendoza fallax, X. fulva, X. weberi
 Theloschistes parietinus — Xanthoria parietina
 Theloschistes polycarpus — Candelaria fibrosa
 Trapelia involuta — Trapelia glebulosa
 Trichothelium chloroticum — Pseudosagedia chlorotica
 Urceolaria scruposa — Diploschistes muscorum
 Usnea barbata — Usnea strigosa
 Usnea barbata florida — Usnea strigosa
 Usnea filipendula — Usnea dasypoga
 Usnea florida — Usnea subfusca
 Usnea lapponica — Usnea substerilis
 Usnea parafloridana — Usnea substerilis
 Usnea perplexans — Usnea substerilis
 Usnea strigosa rubiginea — Usnea rubiginea
 Variolaria amara — Leptra amara
 Variolaria pustulata — Loxospora pustulata
 Verrucaria aethiobola — egenula, Verrucaria elaeomelaena, Verrucaria praetermissa, Verrucaria sordida
 Verrucaria alutacea — Verrucaria fayettensis
 Verrucaria baldensis — Bagliettoa baldensis
 Verrucaria calciseda — Bagliettoa calciseda
 Verrucaria fuscella — Placopyrenium fuscillum
 Verrucaria iowensis — Verrucaria fayettensis
 Verrucaria lecideoides — Verrucaria fraudulosa
 Verrucaria marmorea — Bagliettoa marmorea
 Verrucaria prospersella — Pyrenocollema prospersellum
 Verrucaria pyrenophora — Thelidium zwackhii, Verrucaria calkinsiana
 Verrucaria ruderella — Pyrenocollema prospersellum
 Verrucaria sorbinea — Verrucaria breussii
 Viridothelium virens — Trypethelium virens
 Xanthocarpia lactea — Xanthocarpia feracissima
 Xanthocarpia marmorata — Rufoplaca arenaria
 Xanthomendoza trachyphylla — Calogaya pusilla

Xanthoparmelia angustiphylla — Xanthoparmelia hypofusca
 Xanthoparmelia somloënsis — Xanthoparmelia viriduloumbrina
 Xanthoparmelia stenophylla — Xanthoparmelia viriduloumbrina
 Xanthoparmelia tasmanica — Xanthoparmelia hypofusca
 Xanthoparmelia trinctina — Xanthoparmelia australasica
 Xanthoria elegans — Rusavskia elegans
 Xanthoria fallax — Xanthomendoza fallax
 Xanthoria polycarpa — Xanthomendoza hasseana
 Xanthoria soreidiata — Rusavskia soreidiata
 Xanthoria ulophyllodes — Xanthomendoza ulophyllodes

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