# Lichen Survey of Johnson's Shut-Ins State Park

Reynolds County, Missouri

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## Summary

A comprehensive survey of lichens and lichen-associated fungi was conducted at Johnson's Shut-Ins State Park during 15 field days from November 2018 through June 2019. Additional lichens collected in the park from 1975 to 2017 by the author and colleagues were also evaluated, and a database search of North American lichen herbaria was conducted to develop a comprehensive list of all lichens collected at the park.

Despite several severe impacts to park ecosystems in the past two decades, the site contains an exceptionally high lichen biodiversity, including the highest lichen diversity recorded for a single site in the Interior Highlands and Lower Midwest. A total of 346 taxa were documented: 308 lichens, 9 lichenicolous fungi, and 29 nonlichenized, nonlichenicolous fungi often associated with lichens. Several of these taxa are new records for Missouri, the Ozark Ecroregion (encompassing portions of 5 states), or both. Some of these new records represent significant extensions of their known ranges. At least one species new to science was discovered during this survey.

Johnson's Shut-Ins State Park and the surrounding St. Francois Mountains landscape represents an irreplaceable and globally significant center of lichen diversity. The high concentration of geological, landform, and habitat diversity in the park, along with a long history of land protection and ecologically-focused management have all contributed to the exceptional biotic richness of the area. Future planning and management efforts should ensure maintenance and restoration of ecosystem and habitat integrity, protect existing habitats from future development, and abate ongoing and potential impacts from invasive species which are critically threatening key park resources.


## Introduction

A quintessential Ozark landscape, Johnson's Shut-Ins State Park encompasses 8,781 acres in the St. Francois Mountains of southeastern Missouri. The St. Francois Mountains comprise the structural core of the Ozarks, and are characterized by ancient, eroded, Precambrian and Cambrian igneous rocks and subsequent sedimentary depositions of dolomite, chert, and sandstone, followed by hundreds of millions of years of erosion, resulting in a rugged and complex topography and geology characterized by abundant bedrock exposures, steep slopes, and narrow valleys.

Most of the igneous substrates at the park are rhyolitic, in some areas with felsites, and a small region of granite porphyry. These igneous rocks shape the character of much of the park's landscape and natural communities, with frequent glades and gladey openings on upper slopes, and steeply sloping valleys with abundant igneous outcrops, boulders, and talus fields. Cambrian dolomite forms glades in two areas of the park, as well as outcrops and ledges in ravines and along the East Fork Black River above the shut-ins. Areas in the park developed from dolomite are characterized by less steeply angled slopes, and soils with abundant chert residuum. Small zones of scattered sandstone boulders occur on sideslopes. Nelson (1977) provides an excellent overview of the physical and ecological features of the park.

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Cover image: *Cladonia ravenelii*, a lichen associated with shortleaf pine and eastern red cedar trees and logs in the Ozarks; many local populations are sterile, but several abundantly fertile populations occur in the park, as demonstrated by the numerous red apothecia on a charred cedar log in this image from the park.

Microhabitat diversity in the park is exceptionally high, resulting from the wide range of geologic substrates, elevation, topography, landforms, exposure, aspect, hydrology, and natural communities. The presence of both calcareous rocks and siliceous rocks ranging in structure from coarsely grained to microcrystalline, occurring in all exposures, size classes, and moisture conditions, has created a plethora of cryptogam microhabitats. Additionally, a multiplicity of natural communities and associated richness of woody substrates, provides habitat for a diverse suite of corticolous cryptogams.

## Materials and Methods

Detailed field surveys were conducted to document as fully as possible the lichens and lichenicolous fungi occurring within Johnson's Shut-Ins State Park. Additionally a few non-lichenicolous, non-lichenized fungi normally treated by lichenologists are also included; most of these are included in Esslinger (2018) or referable to Hysteriaceae *sensu lato*.

A total of 15 field days[2] were spent surveying lichens throughout the park. Attempts were made to systematically survey all representative natural communities, microhabitats, and lichen substrates within the park. Additionally, I had previously spent seven field days surveying lichens or leading lichen workshops at the park from 1982 to 2017[3], and had made a few desultory collections of park lichens with Paul Nelson in the mid-1970's.

Representative permanent voucher specimens were made of each lichen taxon recorded; a number of duplicate collections were made, especially for taxa where field determinations were not possible because microscopic or chemical characters were necessary for identification, although not all of these were retained as permanent specimens. All areas of the park were surveyed except for the area west of the north part of Goggins Mountain in the northwest corner of the park; this portion of the park is a more recent acquisition and exhibits more disturbance from previous land use history; it is similar to the adjacent Goggins Mountain landscape.

Collections were stored and processed using standard protocols for cryptogam and fungal collections. Microscopic analyses for ascomal, spore, and other taxonomic characters were conducted using hand-sliced thin sections mounted in water and examined under a compound light microscope with oil immersion capability. Standard spot tests for chemical constituents were completed using the reagents and techniques of Brodo et al. (2001). When necessary, more detailed chemical data were obtained through thin-layer chromatography, using glass silica gel plates and a standardized three solvent system (Culberson 1972, 1974; Culberson & Johnson 1982 — see also Orange et al. 2001), with the substitution of methyl-tert-butyl ether for diethyl ether in solvent system A.

Approximately 780 collections were made during this study; I had also made ca. 75 lichen collections at the park between 1975 and 2017. Approximately 400 additional lichen collections made by other workers are deposited in various public herbaria in the United States and are listed in the Consortium of North American Lichen Herbaria database (CNALH) — many of these were collected by participating researchers during the 1997 Tuckerman Lichen Workshop held in the Ozarks. These reports are included

[2] 2018: 30 November, 17-19 December; 2019: 5-6 January, 10-12 March, 15-16 March, 5-6 May, 30 May, 13 June.
[3] 9 April 1982; 13 October 1993; 19 April 1997; 9 October 1997; 11 May 2017; 4 November 2017.

here if verified by the author, or if they were collected by the author's colleagues and collaborators on the Ozark lichen project. A few additional specimen reports are mentioned with qualifying information if they were not personally verified. Reports and collections of species provisionally excluded from the park's lichen list are included in Appendix 2, with explanatory notes.

## Results

A total of 346 taxa (308 lichens, 9 lichenicolous fungi, and 29 nonlichenized, nonlichenicolous fungi) were documented from Johnson's Shut-Ins State Park, demonstrating both the exceptionally high lichen diversity of the site, and its significance as a concentration of cryptogam biodiversity from a state and regional perspective.

Corticolous substrates (trees and shrubs) hosted the most taxa, with 161 species. Siliceous rocks (rhyolite, granite, sandstone, chert) hosted 108 taxa, while 39 taxa occurred on dolomite. Terricolous substrates hosted 23 taxa, lignicolous substrates had 31 taxa, and 7 taxa grew on bryophytes. Another 22 taxa occurred on other substrates, including anthropogenic substrates such as concrete and old iron; this category also includes the 9 lichenicolous species that occur on lichens. Note that the taxa from these substrate categories sum to more than the number of taxa in the park because several species occur on multiple substrate types.

Appendix 1 provides an annotated list of all taxa documented during this project, with information about habitats, substrates, abundance, and other information for each taxon. Appendix 2 provides a list of unverified and excluded taxa that have been attributed to the park. Note that Nelson (1977) included a list of 41 lichens from the park, based on his collections. Some of these collections are deposited at the herbarium of The Morton Arboretum (MOR) and were examined by me and included in Appendix 1. Some specimens were not located and of these, those not represented by other verified specimens are discussed in Appendix 2.

Assessing conservation significance or rarity of lichens and fungi is difficult because of major data gaps regarding distribution and abundance for most taxa. However, the Ozark ecoregion (particularly Missouri portions) has been the focus of intensive lichen research since the early 1980's (e.g. Harris & Ladd 2005, Ladd 1996a, Peck et al. 2004), resulting in extensive data about lichen composition, diversity, abundance, and distributions in the region. Several species documented during this study represent new records for Missouri and/or the Ozark Ecoregion, or are otherwise noteworthy from a regional, national, or global perspective, as shown in Table 1.

An interesting and unexpected aspect of this study is the relatively large diversity of calicioid taxa. These morphologically similar but taxonomically diverse lichens and nonlichenized fungi are often referred to as "stubble lichens" because of the minute stipitate ascoma that are often their only visible manifestations. Many of these species are associated with habitat integrity and continuity, and they have been used to assess old growth forests in northeastern North America (Sevla 2003). A total of 13 calicioid species occur in the park, which indicated a high level of habitat integrity and continuity, even in areas with far more calicioid taxa in the local flora.

| **Table 1.** New and noteworthy records of lichens and associated fungi at Johnson's Shut-Ins State Park | | | |
|---|---|---|---|
| **Taxon** | **New to Missouri** | **New to Ozark Ecoregion*** | **Comments** |
| *Chaenothecopsis perforata* | X | X | obligate on resin of *Rhus*; this is the world's first report from *Rhus copallinum* |
| *Dactylospora inquilina* | X | | |
| *Dictyocatenulata alba* | X | | |
| *Gloniopsis praelonga* | X | X | |
| *Hypocenomyce scalaris* | X | X | range extension from southern Appalachians and Great Lakes regions |
| *Multiclavula mucida* | X | X | first lichenized basidiomycete from lower Midwest; significant disjunction from nearest populations in southern Wisconsin and central Alabama |
| *Phaeocalicium* sp. #1 | | | undescribed species |
| *Phaeocalicium* sp. #2 | X | X | undescribed species currently known only from the park |
| *Plectocarpon diedertzianum* | X | X | North American distribution unknown, but currently documented from only a few records in eastern Great Plains |
| *Pyrenographa irregularis* | X | X | few North American records, but probably overlooked |
| *Sarea resinae* | X | X | second North American occurrence on juniper resin |
| *Scytinium tenuissimum* | | | second Ozark record; third record from Midwest since 1879 |
| *Synnemasporella aculeans* | X | X | |
| *Ozark Ecoregion sensu Harris & Ladd (2005), including parts of Arkansas, Illinois, Kansas, Missouri, and Oklahoma | | | |

The 346 taxa documented from the park in this study demonstrate the high level of diversity at the site. Table 2 provides some comparative data regarding lichen diversity at other sites within and beyond the region, highlighting the park's high level of diversity for a unit of this size. These numbers are approximations for general comparative purposes only; note also that the survey methods used in the Wetmore studies tend to underrepresent actual site lichen richness. For instance, the number cited below for Hercules Glade Wilderness includes ca. 40 additional taxa added by the author and colleagues since Wetmore's 1992 survey, representing an increase of 22%.

| **Table 2**. Lichen diversity at selected U.S. sites | | |
|---|---|---|
| **Site (source)** | **Size (acres)** | **Species*** |
| Johnson's Shut-Ins State Park, MO (this study) | 8,781 | 341 |
| Cuivre River State Park, MO (Ladd 2003, plus additions) | 6,400 | 190 |
| Mark Twain National Forest Flatwoods, MO [2 proximal tracts] (Ladd 1996b) | 1,231 | 201 |
| Hercules Glade Wilderness (MO) (Wetmore 1992, plus additions) | 12,315 | 219 |
| Upper Buffalo River Wilderness (AR) (Wetmore 2001) | 10,590 | 132 |
| Hot springs National Park (AR) (Wetmore & Bennett 2002) | 5,840 | 161 |
| Pine Bluff Arsenal (AR) (Ladd 2009) | 14,944 | 161 |
| Apostle Islands National Lakeshore (WI) (Wetmore 1988) | 42,000 | 306 |
| Okefenokee National Wildlife Refuge (GA) (Wetmore 1991) | 119,680 | 187 |
| Boundary Waters Canoe Area (MN) (Wetmore 1987) | 1,090,000 | 370 |
| Great Smoky Mountains National Park (NC/TN) (Lendemer et al. 2013) | 520,976 | 770 |
| *including only taxa listed in Esslinger (2018) | | |

## Impacts to Lichens at the Park

Since 2005, the ecological integrity of lands within the park has been severely impacted by three major stresses – two from recent one-time events and one an ongoing and increasingly severe issue.

The 2005 failure of the Taum Sauk Reservoir dam released a catastrophically destructive flood that instantly created a new scour channel to bedrock across woodlands downslope from the dam. The boulder-filled torrent surging across the park into the East Fork Black River obliterated or severely altered most of the floodplain and low mesic woodlands and riparian habitats along the river, as well as the irreplaceable Johnson's Shut-Ins Fen Natural Area, and impacted most of the lower elevation landscapes in the park. This disaster, and the subsequent decision to develop the impacted flats in the central valley as an expanded roadway and recreational access with broad mowed margins, medians, pull-offs, pavilions and expanded mowed picnic areas, has fragmented the woodland context of the park, undoubtedly with ongoing consequences to lichens associated with stable extensive woodlands. The scour and flooding also created opportunities for new introduced vascular species to become established in the park, some of which continue to expand.

Subsequently, in May 2009, an unusually severe derecho, sometimes termed a super-derecho, produced sustained high-speed winds across a wide swath of southern Missouri including the park, resulting in

major losses of canopy trees. In some areas of the park, more than 80% of standing trees were snapped off or uprooted during this event, again impacting canopy integrity on a large scale. The subsequent regrowth of dense young brush has altered ecological conditions in a continuing dynamic as successional processes continue. These impacts have undoubtedly influenced the lichen biota, although it is impossible to determine precise changes.

It is likely that these two events have had their greatest impact on lichens associated with stable, old-growth intact woodlands. This may account for why some lichens previously known from the park, such as *Anzia colpodes*, were not observed during the current study, despite extensive searching. Other lichens, such as some species of *Usnea* associated with these same habitat conditions, are also uncommon or absent from the park, possibly as a result of these events. A delayed effect of the derecho was a proliferation of downed decorticate logs of all types, creating a pulse of abundant habitat for *Cladonia* and other lignicolous lichens; these substrates will significantly diminish in the coming years, although all of their lichen inhabitants should persist at the site.

In recent years, there has been an increasingly damaging impact to park resources from feral hogs and armadillos. Feral hog impacts in particular have become pervasive throughout the park. Without intensive, dedicated, and sustained eradication efforts, this will result in permanent damages to park resources, including loss of biodiversity and increasing opportunities for establishment of problem invasive plant species. The remaining high-quality fens and seepages, containing many of the park's most conservative and biologically significant plants, are particular targets for hog wallowing and rooting, creating major damage. A suite of terricolous lichens associated with thin soils on exposed dolomite has been impacted by the severe animal disruptions that are pervasive across the Dolomite Glade Natural Area. Lichens indicative of stable, high quality terricolous habitats, such as *Heppia conchiloba*, *Psora decipiens*, and *Psora russellii* have been reduced to small scattered populations in the glade and may not persist under the current disturbance regime. Anecdotal observation indicates that impacts to vascular vegetation, particularly vernal flora in mesic areas, have also been severe.

## Management Recommendations

Despite these impacts, the lichen biota of the park is one of the most diverse constellations of lichen diversity that has been documented from a single site in midcontinental North America. This is likely due to a combination of high geological, topographic, porophyte, hydrological, and microclimate diversity, as well as a landscape context of minimally fragmented intact native habitat and a long history of land protection and ecologically-focused stewardship.

Many lichens, especially rare and conservative species, are associated with high-quality natural vegetation and a long history of stable habitat conditions. These lichens often have extremely specific microhabitat conditions, in terms of substrate, humidity levels, exposure, and light, and even subtle changes can result in their decline or loss in an area.

Management and restoration activities should attempt to maintain microhabitat conditions. Fire management that is so essential to the long-term synecological integrity of St. Francois Mountains ecosystems, including the park, should be insightfully implemented to minimize adverse effects to cryptogam populations. These considerations are even more critical in that current fuel loads and

configurations in the area are unlike their pre-Eurosettlement conditions, with potentially severe adverse consequences if these differences are not taken into account. For instance, the loss of contiguous fine fuels in most of the woodlands, accompanied by an increase in heavy fuels, can result in hotter fires with longer residence times and more smoke production. Many lichens are extremely sensitive to atmospheric contaminants and could be negatively impacted in these situations.

For these reasons, fire management at the site, particularly in areas with high cryptogam diversity, should aim to minimize both long residence time fire events and intense infernos with extreme flame lengths. As much as possible in keeping with ecological management goals, fires should be conducted in drier fine fuels, but with higher fuel moistures in heavier (100+ hour) fuels. Extensive upslope headfires should be avoided as much as possible in mesic ravines and on lower and mid slopes along the river. Fires should be restricted to dormant season events, especially given increasing anecdotal evidence of the damages of even early spring fires in local systems.

While most areas of the park have a presence and diversity of lichens that is unusual in much of the contemporary North American landscape, some areas warrant special recognition. The greatest concentration of lichen diversity and rare lichen taxa occurs in association with the main shut-ins and adjacent landscape, mostly within Johnson's Shut-Ins Natural Area and the slopes along the river northwest of the Natural Area. The small mesic runoff ravines on the slopes above the river in this region, particularly on the west side of the river, contain unique microhabitats and high levels of cryptogam abundance and diversity, including the only stations in the park for several species, such as *Dermatocarpon luridum* and *Pannaria lurida*. Management efforts should focus on maintaining habitat integrity in this area, using relatively low intensity fires to restore a more open woodland character, particularly on the upper slopes and ridges. The intermittently seepy bluff outcrops and mesic runoff ravines should not be used as ignition points and may well not burn in most fire events.

Several other areas within the park harbor unique or unusually diverse lichen biota, consideration of which should be an explicit part of any management actions or development activities impacting these areas:

1. The small spring-fed stream paralleling highway N west and north of Dolomite Glade Natural Area, which contains a delightful series of small seepages and dolomite bedrock.
2. With the obliteration of the main fen at Johnson's Shut-Ins Fen Natural Area because of the dam failure, the area of the park east of the East Fork Black River and north and west of highway N contains some of the last semi-intact fen and mucky seep habitats, with a corresponding diversity of both lichens and vascular flora. Unfortunately, this area is also being severely impacted by feral hogs.
3. The rhyolite glade complex at Horseshoe Glade, along with the surrounding glade-woodland complex and the extensive ravine system immediately to the south, comprise a glade habitat complex that supports many igneous glade lichens that are not found on the smaller, less diverse igneous glades elsewhere within the park.
4. As mentioned previously, Dolomite Glade Natural Area is a unique feature in the park and unusual for the St. Francois Mountain landscape. The site, particularly the thin soils over dolomite bedrock, is being severely impacts by feral hogs, and possibly by armadillos, and terricolous lichens restricted to these habitats are becoming extremely rare at the site.

It is unclear what the long-term results will be for the open landscape along the new entrance road, with scattered large boulders and a high proportion of mowed landscapes and medians. From an ecological perspective, consideration should be given to restoring much of the area to woodland with a diverse herbaceous understory. This would provide several benefits, in terms of reduced fragmentation, lower long-term maintenance costs, a landscape context that more appropriately honors both the natural heritage of the St. Francois Mountains and the original historical character of the park, and ultimately, increased area of diverse mesic and floodplain habitats and better riparian and hydrological outcomes.

Aggressive control of feral hogs and armadillos, and vigilant monitoring for and control of problem invasive plant species, particularly woodland-adapted taxa such as *Alliaria petiolata*, *Lonicera maackii*, and wetland adapted species such as *Microstegium vimineum*, are essential to ensure the long term integrity of the park's resources.

This inventory documents an extremely high diversity of lichens and associated fungi at Johnson's Shut-Ins State Park, further highlighting the regional and national significance of the unique landscape, and reaffirming its ecological potential despite recent catastrophic impacts. It remains a unique and irreplaceable natural and cultural asset to be carefully stewarded for present and future generations.

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# Appendix 1: Annotated List of Lichens, Lichenicolous Fungi, and Associated Fungi of Johnson's Shut-Ins State Park

In the following list, taxa are arranged alphabetically by genus, largely following the nomenclature and authorities of Esslinger (2018); provisional names for some undescribed taxa follow Harris & Ladd (2005). Although portions the large genus *Caloplaca* have recently been split into multiple segregate genera, they are all included here under *Caloplaca*, with segregate names following in parentheses. General habitat affinities and substrates are given for each taxon, along with a qualitative assessment of current abundance in the park along a relative conceptual spectrum of **rare, uncommon, occasional, common, abundant**. Taxonomic or other issues are also discussed for certain taxa where relevant. Information for some genera, notably *Acarospora* and *Verrucaria*, is tentative as there is considerable uncertainty about taxonomy and application of names to local concepts in these groups. Abundance and substrate information refers only to patterns within Johnson's Shut-Ins State Park and may not be reflective of patterns for the taxon elsewhere in the Ozarks. Voucher specimens on which this project is based are listed in brackets at the end of the entry for each taxon; some as yet undetermined specimens are not included. Collection numbers are those of Doug Ladd unless otherwise indicated. Standard herbarium acronyms as rendered by Index Herbariorum (http://sweetgum.nybg.org/science/ih/) are provided for specimens deposited in public institutions; all other collections will be held at the herbarium of the Missouri Botanical Garden (MO) pending final disposition. The number of collections for a given taxon depends on multiple factors and is not related to local abundance.

**Acarospora americana** H. Magn. --- occasional on exposed to lightly shaded igneous substrates; mostly on large rocks, but occasionally on cobbles [34852]

**Acarospora atromarginata** sensu Harris & Ladd (2005) --- uncommon on rhyolite boulders and cobbles in exposed sites. [32510; *Buck* 32747 (NY)]

**Acarospora cf. canadensis** H. Magn. --- known only from shaded old concrete. This species is rare on weathered concrete in the Ozarks. Irwin Brodo (pers. communication) has examined an image of the specimen cited here, and finds it resembles *A. canadensis* except for the lighter color. [35225B]

**Acarospora chrysops** (Tuck.) H. Magn. --- uncommon, but locally frequent and characteristic, on exposed rhyolite in glades and on bluffs. [34703]

**Acarospora fuscata** (Schrader) Arnold --- common on lightly shaded rhyolite and granite outcrops and boulders in wooded uplands. [34594, 34854, 35107; *Harris* 31253 (NY)]

**Acarospora tuckerae** K. Knudsen --- occasional, but never abundant at a given site, on exposed rhyolite in glades. [35063; *Harris* 31231 (NY)]

**Acrocordia megalospora** (Fink) R.C. Harris --- apparently rare; known only from the shaded bole of *Ulmus americana* on a dry-mesic lower slope woodland. [33812]

**Agonimia opuntiella** (Buschardt & Poelt) Vězda --- common on lightly shaded bryophytes over dolomite in woodlands and along glade edges; less commonly on mossy bases of hardwoods and bryophytes over siliceous substrates. [34775]

**Agonomia sp. #1** sensu Harris & Ladd (2005) --- uncommon on bryophytes and stable humus in wooded uplands, typically associated with tree bases and large rocks. [34692, 35067, 35098, 35115]

**Alyxoria varia** (Pers.) Ertz & Taylor --- common, usually in lightly shaded, somewhat mesic conditions on lower boles and bases of both hardwoods and *Juniperus virginiana*. [34568A, 34758, 34837, 35236]

**Amandinea polyspora** (Willey) E. Lay & P. May --- common on exposed twigs and branches of a variety of hardwoods in exposed conditions, in both natural habitats and disturbed woodlands and edges; in many

cases a pioneer lichen on newer corticolous substrates. At the park, this species is common on exposed small twigs along the East Fork Black River, occurring on diverse porophytes such as *Acer saccharum*, *Cornus*, *Physocarpus opulifolius*, *Platanus occidentalis*, *Quercus*, and *Salix caroliniana*. [34017, 34498, 34981, 35234]

**Amandinea punctata** (Hoffm.) Coppins & Scheid. --- common on softwood lignum, typically in seral or disturbed sites, but also in intact woodlands, where it has a predilection for *Pinus echinata* and occurs on decorticate logs, pine bark, and regularly on scales of old pine cones, where it invariably associates with *Lecanora strobilina*. This is also a common species on weathered softwood lumber and old fence posts and rails, and occasionally occurs on exposed to lightly shaded siliceous rocks, often in old ruderal areas. [34539, 34994]

**Amphisphaeria bufonia** (Berk. & Broome) Ces. & De Not. --- although seldom collected, this non-lichenized pyrenomycete is common and characteristic on lower boles of *Quercus alba* in wooded uplands throughout the park and region. [35193]

**Anaptychia palmulata** (Michaux) Vainio --- rare and restricted to intact high-quality woodlands, typically on lower slopes and in ravines, where it occurs on mossy dolomite exposures and more rarely mossy bases of hardwoods; this species appears to be highly conservative in the Ozarks and is generally indicative of high-quality sites. [35169]

**Anisomeridium polypori** (Ellis & Everh.) M.E. Barr --- locally uncommon in mesic woodlands, occurring on boles of trees, including *Fraxinus*, *Carpinus*, and *Acer saccharum*. [35083, 35248, 35251]

**Anzia colpodes** (Ach.) Stizenb. --- this conservative lichen is rare and sporadic throughout the Ozarks, occurring on lightly shaded boles of older hardwoods, usually in the red oak group, in intact woodlands. It typically occurs as solitary thalli and rarely are multiple thalli found in the same location. In 1989, it was collected on Acer saccharum along a glade margin, but has not been seen since then. Both the impacts of the 2005 dam break and the 2009 derecho may have adversely impacted this and several other taxa obligately associated with intact older woodlands. [13638]

**Arthonia anglica** Coppins --- occasional on hardwood boles in mesic woodlands and along streams, occurring on *Carpinus*, *Carya*, and *Ostrya*. This is one of the most common species of *Arthonia* at the park. Interestingly, despite the importance of the Ozark ecoregion as a center of diversity for the genus *Arthonia*, with nearly 40 species documented (Harris & Ladd 2005), the park is relatively depauperate in members of this genus. [34626, 34992, 35085, 35165]

**Arthonia quintaria** Nyl. --- probably common, although most individuals in the park are sterile and only tentatively assigned to this species; presumably this is the species forming the characteristic silvery-white zones on smooth, exposed twigs of a variety of hardwoods, in habitats ranging from canopy twigs of trees in mature woodlands to twigs and branches of shrubs on riverside gravel bars. [35237 (fertile)]. Two other undescribed taxa discussed by Harris & Ladd (2005) appear identical in the field and also occur in the park: 1) *Arthonia* sp. 17036 has smaller, fewer-celled ascospores that are not notably macrocephalic and was collected once on exposed branches of *Nyssa sylvatica* (34988A); 2) *Arthonia* sp. 50883 is a larger-spored variant of *A. quintaria* that was collected once on exposed young branches of *Gleditsia triacanthos* at the edge of a disturbed woodland (35273A). Although both of these elements appear to be uncommon at the park, little is known regarding what proportion of local sterile material is comprised by each taxon.

**Arthonia susa** R.C. Harris & Lendemer --- common in intact woodlands; on smooth bark of upper branches of hardwoods, especially *Quercus* and *Acer*, often in ravines or along streams. [34673, 34799, 34918]

**Arthothelium spectabile** (Flotow) A. Massal. --- occasional on lower boles of hardwoods, often various oaks, in mesic woodlands and along wooded streams. [34567, 34632]

**Aspicilia cinerea** (L.) Körber --- Common on lightly shaded siliceous boulders and outcrops in wooded uplands, as well as on massive rhyolite bedrock exposures in glades and smooth-weathered, occasionally inundated rhyolite bedrock exposures along the river. [34554, 34588, 34710, 34747]

**Aspicilia laevata** (Ach.) Arnold --- Common on boulders and outcrops of lightly shaded siliceous rocks in woodlands, occurring on chert, rhyolite, and sandstone. [34540, 34763, 35070, 35124, 35277]

**Bacidia circumspecta** (Nyl. *ex* Vainio) Malme --- uncommon on lightly shaded branches and upper boles of hardwoods, particularly *Acer saccharum*, in woodlands. [34623]

**Bacidia diffracta** Ekman --- common, usually on shaded boles of *Juniperus virginiana* in a variety of habitats, but occasionally on hardwoods such as *Quercus alba* and *Ulmus americana*. [34839, 34889, 34987; *Buck* 24202 & 32741 (both NY)]

**Bacidia granosa** (Tuck.) Zahlbr. --- common on exposed to more commonly shaded calcareous substrates, typically occurring on shaded dolomite boulders and outcrops, but also on old, shaded concrete. [34887, 34968]

**Bacidia helicospora** Ekman --- uncommon on hardwoods in woodlands, often in somewhat mesic but lightly shaded conditions; known in the park from *Acer saccharum* and *Carya*, and often associated with other species of *Bacidia*. [34975A, 34904]

**Bacidia purpurans** R.C. Harris, Lendemer & Ladd --- uncommon on shaded hardwood boles in mesic woodlands, often in similar habitats to those of *Bacidia schweinitzii*, with which it is sometimes associated. [34512B]

**Bacidia schweinitzii** (Fr. ex Tuck.) A. Schneider --- common on shaded boles and bases of a variety of hardwoods in mesic woodlands and wooded ravines. [34512A, 34650, 34922]

**Bacidia suffusa** (Fr.) A. Schneider --- through much of the Ozarks, this is a fairly common species of shaded hardwood boles in mesic habitats. Within the park it is known only from two saxicolous sites, on shaded, sheltered lips of dolomite outcrops. [34791, 34970]

**Bacidina delicata** (Leighton) V. Wirth & Vězda --- occasional, but cryptic and easily overlooked, occurring on shaded tree bases and exposed roots in mesic microhabitats, in both upland and mesic woodlands, as well as on protected sides and undersides of siliceous cobbles and small boulders of both rhyolite and chert. [34600, 34850, 35008, 35040]

**Bacidina egenula** (Nyl.) Vězda --- known only from a shaded dolomite outcrop in a disturbed woodland below a glade, although elsewhere in the region this species also occurs regularly on old concrete. [34946A]
An anomalous specimen collected from concrete [34528] has an unusually dark hypothecium reacting KOH+ deeper brown and requires further study.

**Bagliettoa calciseda** (DC.) Gueidan & Cl. Roux --- locally common and characteristic on shaded, massive dolomite bluffs, outcrops, and large boulders in woodlands. [34877, 34897, 34967]

**Bilimbia sabulaetorum** (Schreber) Arnold --- occasional on shaded bryophytes and stable bryophyte-derived humus in rocky woodlands. [20231, 34965]

**Botryolepraria lesdainii** (Hue) Hernández-M. et al. --- restricted to sheltered, shaded, mesic sites on dolomite that are protected from direct wetting. It is common in these microhabitats, such as mossy crevices under overhangs of dolomite outcrops in ravines and on thin soil pockets on shelves under dolomite ledges. [34793, 34971]

**Buellia badia** (Fr.) A. Massal .--- known only from rhyolite bedrock in an extensive rhyolite glade, where it was closely associated with (and likely a juvenile parasite on) *Buellia spuria*. [34723]

**Buellia maculata** Bungartz --- abundant on lightly shaded siliceous boulders and outcrops in wooded uplands, typically associated with *Flavoparmelia baltimorensis*. [34542, 34702, 34958]

**Buellia spuria** (Schaerer) Anzi --- common on exposed rhyolite in glades and large outcrops in open wooded uplands, usually in sites exposed to full sunlight. [34602; *Cole* 7459 (NY, WVA); *Cole* 7507, 7557 (both NY)]

**Buellia stillingiana** J. Steiner [=*Buellia erubescens* Arnold] --- abundant on a wide variety of exposed to lightly shaded corticolous substrates, typically occurring on smooth-barked upper boles and branches of hardwoods, but also in more shaded sites on lower boles. [34537, 34548, 34555, 34804, 34901, 35192; *Apfelbaum* 274A (MOR); *Harris* 31223 (NY)]

**Calicium abietinum** Pers. --- uncommon on boles of *Pinus echinata* in wooded uplands, usually in sites with high floristic diversity and natural quality. [20232, 34664B; *Buck* 32089 (NY)]

**Calacium salicinum** Pers. --- known only from a sheltered nook at the base of a large *Quercus alba* on a dry-mesic woodland slope. [35280]

**Caloplaca camptidia** (Tuck.) Zahlbr. --- common, but seldom abundant in a site and easily overlooked; occurring on lightly shaded branches and boles of a variety of hardwoods, especially *Carya* and *Quercus*. [34659]

**Caloplaca cerina** (Ehrh. ex Hedw.) Th. Fr. --- common on smaller branches and twigs of a wide variety of hardwood trees and shrubs, and occasionally on *Juniperus virginiana*; often along habitat edges or in seral areas. [34504]

**Caloplaca chrysophthalma** Degel. [=*Solitaria chrysophthalma* (Degel.) Arup et al.] --- uncommon on lightly shaded hardwoods, typically on boles of *Quercus muhlenbergii*, *Q. stellata*, and *Fraxinus* in open woodlands or along bluff summits and glade margins. [35019; *Harris* 31237 (FH, NY)]

**Caloplaca feracissima** H. Magn. [=*Xanthocapsa feracissima* Frödén et al.] --- occasional on calcareous substrates, especially on exposed to very lightly shaded, old, weathered concrete, but also found less commonly on exposed dolomite in glades, occurring on pebbles, boulders, and massive outcrops. [34884, 35262]

**Caloplaca ferruginea** (Hudson) Th. Fr. [=*Blastenia ferruginea* (Hudson) Th. Fr.] --- locally common on exposed to slightly shaded *Juniperus virginiana*, and less commonly, on hardwoods such as *Diospyros* and *Sideroxylon*; typically occurring on twigs and small branches; solitary trees and shrubs in glades and along glade margins are a frequent substrate. [34688, 34933]

**Caloplaca flavocitrina** (Nyl.) H. Olivier [=*Flavoplaca) flavocitrina* Arup et al.] --- although relatively common in the region, at the park this species is rare on sheltered dolomite in habitats with high light intensities that are protected from direct wetting, such as on sheltered lower faces of dolomite outcrops. [34790]

**Caloplaca flavorubescens** (Hudson) J.R. Laundon [=*Gyalolechia) flavorubescens* (Hudson) Søchting et al.] – native to the region, but likely a new addition to the park's lichen biota, occurring only at the base of a solitary large *Populus deltoides* in the median along the entrance road through the flood-damaged valley bottom impacted by the 2005 dam failure. [35227]

**Caloplaca flavovirescens** (Wulfen) Dalla Torre & Sarnth. [=*Gyalolechia flavovirescens* (Wulfen) Søchting et al.] --- abundant on lightly shaded rocks in mesic habitats, such as outcrops along streams and in open wooded ravines, occurring on both calcareous (dolomite, old concrete) and siliceous (rhyolite, granite, chert) substrates. [34227, 34774]

**Caloplaca holocarpa** (Hoffm. ex Ach.) M. Wade [=*Athallia holocarpa* (Hoffm.) Arup et al. --- uncommon on lignicolous substrates, particularly old weathered softwood lumber, but also rarely on hardwood lignin. [35223]

**Caloplaca microphyllina** (Tuck.) Hasse --- rare, usually occurring as single or a few small thalli on lightly shaded old decorticate branches of standing *Juniperus* and *Pinus*, and twice on lightly shaded, old, weathered softwood lumber. [35035]

**Caloplaca subsoluta** (Nyl.) Zahlbr. [=*Squamulea subsoluta* (Nyl.) Arup. et al.] --- abundant on exposed to slightly shaded calcareous substrates, including both dolomite and old concrete, and much less commonly, on sandstone and igneous substrates. This species occurs on all sizes of rocks from tiny pebbles to massive bedrock outcrops. [34813]

An element that may be a variant of this species is also characteristic on smooth, eroded rhyolite bedrock below flood line along the East Fork Black River near and below the main shut-ins; this taxon has thinner but larger and more prominent areoles that sometimes coalesce. [34743]

**Caloplaca sp. #1** sensu Harris & Ladd (2005) --- known only from a shaded, sheltered lip on the lower face of a dolomite ledge in a mesic ravine. [sub 34970 *Bacidia suffusa*]

**Candelaria concolor** (Dickson) Stein --- abundant and nearly ubiquitous on all manner of corticolous substrates ranging from exposed canopy branches to shaded mossy tree bases; occurring on both hardwoods and softwoods, as well as on lignum, calcareous and siliceous rocks, old shaded concrete and even old rusty ironwork. [34810; *Apfelbaum* 263 (MOR); *Harris* 31242 (NY); *Nelson* B94 (MOR)]

**Candelaria fibrosa** (Fr.) Müll. Arg. --- common on lightly shaded hardwood branches in woodland canopies, and less commonly, on lower branches of hardwood trees and shrubs along woodland edges. [34749]

**Candelariella vitellina** (Hoffm.) Müll. Arg. --- rare and known only from tiny patches on lightly shaded massive rhyolite on bluff summits near the main shut-ins. The rarity of this lichen at the park despite the abundance of siliceous substrates was surprising. Although this species is usually common on exposed siliceous rocks such as granite and sandstone, it may be the smoother rhyolites produce harsher conditions, such as retaining less moisture, and are not favorable for this species. [35218]

**Candelariella xanthostigma** (Ach.) Lettau --- common on exposed to more commonly lightly shaded larger branches and boles of hardwoods, especially *Carya ovata*. [34957B, 35005, 35130, 35206]

**Candelariella xanthostigmoides** (Müll. Arg.) R.W. Rogers --- occasional on branches and boles of hardwoods in relatively high light exposures, such as in woodland clearings and along glade margins. [34670, 34986A, 35016A]

**Canoparmelia caroliniana** (Nyl.) Elix & Hale --- occasional in natural areas, occurring on both softwoods (*Juniperus virginiana*, *Pinus echinata*) and shaded faces of massive rhyolite bluffs. [34685, 34699A, 34733]

**Canoparmelia texana** (Tuck.) Elix & Hale --- abundant in lightly shaded habitats, on all types of trees, especially softwoods, as well as on massive rhyolite faces. This species also occurs on fallen decorticate logs, old weathered lumber, old ironwork, and was even observed on a shaded old propane tank and an old fiberglass camper top in a dump area. [34517, 35013; *Lay* 97-0282 (NY); *Wilhelm* 10560 (MOR)]

**Carbonicola anthracophila** (Nyl.) Bendiksby & Timdal --- uncommon and restricted to old, decorticate, often charred, stumps of *Pinus echinata* on wooded upland slopes. [35084, 35279]

**Catillaria nigroclavata** (Nyl.) Schuler --- common, but inconspicuous and overlooked, on (often dead) shaded lower branches of *Juniperus virginiana*, as well as less commonly on *Juniperus* boles and hardwood branches and boles. [34909, 34935, 35207B]

**Chaenothecopsis debilis** (Sm.) Tibell --- apparently uncommon, growing on both bark and decayed lignum in sheltered, shaded crevices and niches on bases and lower boles of hardwoods in woodlands,often in somewhat mesic sites. Known in the park from *Fraxinus, Nyssa,* and *Quercus*. [34559, 35089, 35252]

**Chaenothecopsis nana** Tibell --- occasional in intact wooded uplands with stands of *Pinus echinata*, occurring on lightly shaded lower and mid boles of larger pines, causing distinctive small, smooth white patches on the bark. [34663]

**Chaenothecopsis perforata** Rikkinen & Tuovila --- this resinicolous fungus was recently reported new to North America (Gockman et al. 2019), occurring on several species of sumac (*Rhus glabra*, *R*. *lanceolata*, *R*. *typhina*, and *R*. *virens*), including records from states adjacent to Missouri (Iowa, Nebraska). The authors mention unsuccessful attempts to locate the species on *Rhus copallinum*, but a small population of the *Chaenothecopsis* was found on *R*. *copallinum* in a disturbed woodland near the south end of the park. This is the first record from both Missouri and the Ozark ecoregion, and represents a previously unreported substrate for the species. [35282]

**Chaenothecopsis savonica** (Räsänen) Tibell --- rare; known from the sheltered bases of large *Quercus* in mesic to dry-mesic sites, and once from the sheltered side of a decorticate snag of *Juniperus virginina* bordering a glade. [34568B, 35285]

**Chrysothrix caesia** (Flotow) Ertz & Tehler --- abundant on a variety of corticolous substrates in high light exposures, including hardwoods and softwoods, becoming most prominent in disturbed or successional habitats, such as exposed branches of trees and shrubs along streams. This species also occurs regularly, although as small individual thalli, on shaded boles of larger trees in more mature woodlands. Another substrate is scales of old cones of *Pinus echinata*. [34508; *Buck* 24201 (NY)]

**Chrysothrix insulizans** R.C. Harris & Ladd --- uncommon and restricted to sheltered faces and underhanging ledges of massive rhyolite outcrops and boulders, in relatively high light conditions that are protected from direct wetting. [34726, 35066; *Harris* 31226 (NY)]

**Chrysothrix xanthina** (Vainio) Kalb --- occasional in woodlands, on usually larger, lightly shaded boles of *Pinus*, *Juniperus*, and hardwoods such as *Platanus* and *Quercus*, typically occurring in sheltered bark crevices or on undersides of leaning boles. [35090, 35204]

**Circinaria caesiocinerea** (Nyl. ex Malbr.) Arnold --- apparently occasional; on exposed to lightly shaded rhyolite outcrops and boulders in glades and wooded uplands. [34593]

**Cladonia apodocarpa** Robbins --- common in lightly shaded wooded uplands, in well-drained acidic soils with sparse vascular vegetation, such as on ridges on steep gravelly soil banks; typically associated with bryophytes and other *Cladonia* species. This species also occurs on well-drained, mossy rhyolite outcrops and faces. The large, elongate, chalky blue-gray squamules with prominent white undersides are distinctive. [34581, 34709, 35051]

**Cladonia beaumontii** (Tuck.) Vainio --- occasional in wooded uplands, occurring on both well-drained mossy acidic soil and on decorticate softwood logs (both *Juniperus* and *Pinus*). Local populations all appear to contain barbatic acid. [34580, 34668B, 35134]

**Cladonia caespiticia** (Pers.) Flörke --- locally common in woodlands, on well-drained, acidic soils with minimal vascular vegetation, sometimes associated with bryophytes and forming extensive mats. [34576, 34583]

**Cladonia cristatella** Tuck. --- common on decorticate logs and stumps in lightly shaded uplands, as well as on acidic, gravelly soils in similar sites, often in microhabitats with decomposing lignin or leaf or needle humus. [34577, 34841; *Nelson* B20 (MOR); *Wilhelm* 10534 (MOR)]

**Cladonia cryptochlorophaea** Asahina --- occasional in wooded uplands, igneous glades, and along open wooded streams, growing on acidic soils with copious chert or igneous gravel. Two chemotypes are known from the park. [cryptochlorophaeic acid only: 34579; cryptochlorophaeic acid + atranorin: 35270; chemotype unknown: *Nelson* B63, *Wilhelm* 10535A (both MOR)]

**Cladonia dimorphoclada** Robbins --- abundant, but restricted to exposed siliceous bedrock and associated thin soils over bedrock, on igneous glades on bluff summits, where it is a characteristic lichen. *Cladonia uncialis* is a frequent associate. [35021, 35274; *Harris* 31208 (NY)]

**Cladonia furcata** (Hudson) Schrader --- common on well-drained, lightly shaded, acidic soils and humus with sparse vascular vegetation, such as on ridges and steep rocky slopes in wooded uplands; various bryophytes and *Cladonia subtenuis* are consistent associates in these habitats. [34526; *Apfelbaum* 270 (MOR); *Nelson* B22 (MOR)]

**Cladonia grayi** G. Merr. ex Sandst. --- common on mossy siliceous rocks and well-drained acidic soils and stable litter in wooded uplands and glades, on shaded mossy boles and bases of hardwood and softwood trees, and on shaded decorticate logs. This is the most common cup-forming lichen at the park, and displays a bewildering variety of cup sizes and proliferations. Three chemotypes are known from the park, with no clear habitat or morphological relationships. [grayanic acid only: 34819, 34928; grayanic + fumarprotocetraric acids: 34545, 35027; grayanic + fumarprotocetraric acids + atranorin: 34834; chemotype unknown: *Apfelbaum* 280, *Nelson* B2, B21, B82, B106, *Wilhelm* 10532 (all MOR)]

**Cladonia macilenta** Hoffm. var. **bacillaris** (Ach.) Schaerer --- abundant and characteristic on shaded, decorticate logs of both hardwoods and softwoods in woodlands and along glade margins; also on old mossy softwood lumber and cedar fence posts and rails in lightly shaded sites. This species also occurs on old weathered decorticate stumps and logs in exposed sites such as glades. Two chemotypes occur in the park. [barbatic acid only: 34572, 34996, 34183; barbatic + usnic acids: 34616, 34669, 34752, 34753; chemotype unknown: 34668A, *Nelson* B9 (MOR)]

**Cladonia mateocyatha** Robbins --- occasional on exposed rhyolite or thin soils over rhyolite in glades. [34711; *Harris* 31210 (NY)]

**Cladonia ochrochlora** Flörke --- common in woodlands, on decorticate logs and stumps of both softwoods and hardwoods in woodlands, and sometimes on tree bases, especially in mesic sites with sufficient ambient light at ground level. [34516, 34557, 34800; *Harris* 41365 (NY)]

**Cladonia parasitica** (Hoffm.) Hoffm. --- occasional on decorticate hardwood logs in mesic woodlands; at least some populations in the park have barbatic acid in addition to thamnolic acid. [34556, 34558]

**Cladonia peziziformis** (With.) J.R. Laundon --- abundant on soil, humus, stable leaf litter, decorticate logs, and stumps in woodlands, old fields, roadside embankments, and similar habitats, generally in relatively high light intensities. This is by far the most common and disturbance-adapted species of *Cladonia* at the park and in the region, and also seems to require the least acidic microhabitats, occurring even on litter in dolomite glades. [34584; *Harris* 31229 (NY)]

**Cladonia piedmontensis** G. Merr. --- rare; known from a few scattered occurrences in the park, on exposed to lightly shaded, acidic gravelly soils with minimal vascular vegetation, usually in open wooded uplands. [34998]

**Cladonia pleurota** (Flörke) Schaerer --- occasional on acidic soils in wooded uplands on cherty or rhyolitic soils, often in mossy areas along trails or openings. [34578, 35118]

**Cladonia pyxidata** (L.) Hoffm. --- uncommon in wooded uplands, on well-drained soil and rhyolite outcrops. [34690, 35175; *Wilhelm* 10535B (MOR)]

**Cladonia ramulosa** (With.) J.R. Laundon --- occasional on rotting decorticate hardwood logs in woodlands, and collected once in a soil crevice on a lightly shaded rhyolite outcrop. 35026, 35255]

**Cladonia rangiferina** (L.) F.H. Wigg. --- occasional in exposed to slightly shaded, well drained, acidic sites, including rhyolite glades and bluff summits and open rocky woodlands, almost always associated with

the more common *Cladonia subtenuis*. *Cladonia dimorphoclada* is a consistent associate in glades. [*s.n.* 14 February 1976 (MOR); 6195 (MOR), 34717; *Nelson* B15 (MOR)]

**Cladonia ravenelii** Tuck. --- occasional on rotting decorticate *Pinus* and *Juniperus* logs in exposed sites on glades and bluffs; these populations are typically abundantly fertile. This species is also common and characteristic on the lightly shaded bases and lower boles of *Pinus echinata* in wooded uplands, where it is usually sterile and consists only of sorediate primary squamules. The 2009 derecho that impacted the park created an abundance of downed softwood logs that provide abundant habitat for this species and other lichens associated with decorticate logs. [34665, 34667, 34926, 35284]

**Cladonia robbinsii** A. Evans --- common on rhyolite glades, growing both directly on bedrock as well as in gravel flats and thin soil patches over rhyolite bedrock. This species also occurs on well drained acidic soil in woodlands and openings, typically associated with other species of *Cladonia*. [34691; *Harris* 31235 (NY); *Nelson* B11 (MOR)]

**Cladonia squamosa** Hoffm. --- known only from a single 1997 collection from woodlands on the lower slope along the west side of the main shut-ins. [*Harris* 41360 (NY)]

**Cladonia strepsilis** (Ach.) Grognot --- common and characteristic in igneous glades, on exposed rhyolite or thin soil flats over rhyolite. [34693]

**Cladonia subtenuis** (Abbayes) Mattick --- abundant on well-drained acidic soils and litter, decorticate logs, stumps, and siliceous bedrock in exposed to lightly shaded conditions. In wooded uplands with sparse vascular vegetation, it commonly occurs with *Cladonia furcata*, *Dicranum*, and *Leucobryum*. It occurs with a variety of other *Cladonia* taxa in igneous glades, notably *C. dimorphoclada* and *C. robbinsii*. This species is also an early colonizer of roadbanks and disturbed areas in acidic, well-drained gravelly soils. [34527, 34695, 35057; *Nelson* B1, B8 (both MOR)]

**Cladonia subcariosa** Nyl., fumarprotocetraric acid strain (=*Cladonia sobolescens* Nyl. ex. Vainio) --- apparently rare or uncommon; known only from a lightly shaded rhyolite outcrop in a wooded upland. [35024]

**Cladonia subcariosa** Nyl., norstictic acid strain (=*Cladonia polycarpoides* Nyl.) --- occasional in open gravelly acidic soils, such as banks along the scour from the dam break, roadbanks, soil pockets in rhyolite glades, and sparsely vegetated old fields and power line cuts. [34821; *Harris* 41364 (NY)]

**Cladonia uncialis** (L.) F.H. Wigg. --- locally common in rhyolite glades, growing on exposed bedrock, gravel flats, and thin soil over bedrock; *Cladonia dimorphoclada* is a consistent associate. [34707, 34722, 35055, 35111; *Harris* 31230 (NY); *Nelson* B5 (MOR)]

**Coccocarpia palmicola** (Sprengel) Arv. & D.J. Galloway --- occasional in lightly shaded mesic sites in intact woodlands, growing on mossy outcrops, lower bluff faces, and boulders of rhyolite, granite, and sandstone, as well as on mossy bases and lower boles of hardwoods. [34736; *Lay* 97-0290 (NY); *Harris* 41362 (NY)]

**Coenogonium luteum** (Dicks.) Kalb & Lücking --- known only from the lightly shaded bole of *Juglans nigra* along a woodland edge bordering a picnic area. [34761]

**Coenogonium pineti** (Ach.) Lücking & Lumbsch --- occasional in woodlands but overlooked; on rotting decorticate logs rotting stumps, and stable humus and litter on mounds and banks. [34514]

**Collema conglomeratum** Hoffm. --- occasional on slightly shaded hardwood boles on open woodland ridges and along glade margins; *Fraxinus* and *Quercus stellata* are typical substrates, and *Caloplaca chrysophthalma* is a consistent associate. Local material has 1-septate ascospores and is referable to variety *conglomeratum*. [35286]

**Collema flaccidum** (Ach.) Ach. --- uncommon in woodlands, occurring on massive granite outcrops as well as rarely on boles of hardwoods in mesic sites. [34830, 35100]

**Collema furfuraceum** (Arnold) Du Rietz --- known only from a 1993 collection from *Juniperus virginiana* near the main shut-ins. [*Harris* 31219 (NY)]

**Collema subflaccidum** Degel. --- common on shaded, often mossy, boles of *Juniperus* and hardwoods in mesic and upland sites. [34570, 35032]

**Crespoa crozalsiana** (B. de Lesd. ex Harm.) Lendemer & Hodkinson --- uncommon and sporadic; on lightly shaded boles of hardwoods in intact woodlands, trees in picnic areas, and occasionally in more disturbed sites, usually occurring as one or a few thalli and never abundant at one place. [34653; *Wilhelm* 10561 (MOR)]

**Dactylospora inquilina** (Tuck.) Haffelner --- this lichenicolous fungus is known only from thalli of *Pertusaria paratuberculifera* growing on the bole of *Carya* in a wooded upland. This is the first report from Missouri. [34651]

**Dermatocarpon arenosaxi** Amtoft --- common and characteristic on exposed rhyolite bedrock flats, where it is often locally abundant, especially in intermittent runoff zones. This species also occurs on both granite and rhyolite outcrops and large boulders in woodland openings, and on eroded rhyolite bedrock exposures below flood level along the East Fork Black River. [17692, 34712, 34744, 35103; *Harris* 31225, 31246, 31255 (all NY)]

**Dermatocarpon dolomiticum** Amtoft --- locally common on exposed dolomite in Dolomite Glade Natural Area, usually growing on flat low ledges or flat surfaces of large slabs. [34952]

**Dermatocarpon luridum** (With.) J.R. Laundon var. **luridum** --- known only from a mesic, mossy, seasonally seepy rhyolite face near a small waterfall in a mesic ravine. This is the second record of this taxon from Missouri. [35050]

**Dermatocarpon muhlenbergii** (Ach.) Müll. Arg. --- common on dolomite outcrops and ledges, typically in mesic ravines. [34786, 34871]

**Dictyocatenulata alba** Finley & E.F. Morris --- rare or more likely overlooked; on flaring bases and exposed roots of large hardwood trees (*Quercus alba*) in mesic woodlands, especially along streams. This is the first report for Missouri, although it has been documented in nearby portions of the Ozark regions of Arkansas and Illinois. [35246]

**Didymosphaeria oblitescens** (Berk. & Broome) Fuckel --- this nonlichenized pyrenomycete is common on bark plates of *Carya ovata*. [35130C]

**Dimelaena oreina** (Ach.) Norman --- common and characteristic of exposed to lightly shaded, massive siliceous substrates, occurring on both granite and rhyolite in the park, and often associating with various species of *Xanthoparmelia*. [34714]

**Diploschistes actinostomus** (Ach.) Zahlbr. --- occasional on massive, exposed to lightly shaded outcrops and large boulders of rhyolite and granite, typically in glades and on open wooded ridges and steep slopes. [34721; *Harris* 31244 (NY)]

**Diploschistes muscorum** (Scop.) R. Sant. --- occasional in and around rhyolite glades, growing on mosses and *Cladonia* squamules, particularly *C. strepsilis*, as well as on decorticate, lichenose logs of *Juniperus* and *Pinus* these habitats. [34666]

**Diploschistes scruposus** (Schreber) Norman --- although fairly frequent on massive siliceous substrates in the region, at the park this species is known only from old, eroded rhyolite bedrock exposures below flood line along the East Fork Black River below the main shut-ins. [35222]

**Dirinaria frostii** (Tuck.) Hale & W.L. Culb. --- locally common and characteristic on shaded, sheltered, massive siliceous rock exposures in sites with high light intensities but protected from direct wetting, such as under overhanging ledges and on massive bluffs. [34734]

**Endocarpon pallidulum** (Nyl.) Nyl. --- abundant on both exposed to shaded carbonate substrates of all sizes, including dolomite pebbles, boulders, and outcrops, old concrete, as well as less commonly on siliceous substrates and mossy tree bases in wooded uplands. [34888]

**Endococcus perpusillus** Nyl. --- this lichenicolous fungus parasitizes *Porpidia albocaerulescens* and was collected once in the park in 1997. The host lichen is common in shaded mesic habitats in the park, but the parasite was not relocated during this survey, suggesting it is rare locally. Although I have not examined the specimen, it was determined and cited by a globally recognized expert on lichenicolous fungi (Cole and Hawksworth 2001). [*Cole* 7506 (MIN)]

**Epigloea pleiospora** Döbbeler --- seemingly rare, but apparently vernal, and almost invisible under dry conditions, so actual abundance unknown; on algal films growing over bryophytes in open sites such as seepy glade margins and seasonally wet areas on extensive rhyolite talus slopes. [35133]

**Fellhanera silicis** R.C.Harris & Ladd --- occasional on siliceous cobbles and boulders in wooded uplands, occurring on both chert and rhyolite. [34768, 35120, 35133]

**Flavoparmelia baltimorensis** (Gyelnik & Fóriss.) Hale --- abundant in lightly shaded woodlands throughout the park, occurring on siliceous boulders, outcrops, and ledges of rhyolite, granite, sandstone, and chert, as well as occasionally on bases and lower boles of hardwoods in these habitats, and rarely on stable needle humus and decorticate hardwood logs. [34589]

**Flavoparmelia caperata** (L.) Hale --- abundant on boles and larger branches of most types of trees and decorticate logs in the park; this is one of the most common macrolichens in the park and region. [34518, 34529]

**Fuscidea recensa** (Stirton) Hertel et al. --- occasional and local on massive siliceous rocks in exposed sites, especially associated with rhyolite glades and upper portions of massive rhyolite bluffs. [17695, 34701, 34724; *Harris* 31222 (NY)]

**Gloniopsis praelonga** (Schw.) Zogg --- this nonlichenized lirellate fungus was found once on a decorticate hardwood log in a mesic wooded ravine. [34924]

**Gomphillus americanus** Essl. --- occasional on wooded slopes along the river, usually in rocky woodlands, growing over *Leucodon julaceus* on shaded boles and larger branches of *Juniperus virginiana*; also found once on a shaded, mossy fallen log. [17711; *Buck* 24198 (NY)]

**Graphis scripta** (L.) Ach --- an abundant and characteristic lichen of boles, branches, and twigs of trees and shrubs in woodlands ranging from mesic to dry, with a predeliction for smooth, hard bark. This species is among the more shade-tolerant lichens in the local biota, and often occurs on trees and shrubs in deeply shaded ravines with few other lichens. Typical substrates include *Acer saccharum*, *Amelanchier arborea*, *Carpinus caroliniana*, *Carya* spp., *Hamamelis* spp. *Quercus coccinea*, *Q. rubra*, and *Q. velutina*, but it grows on a large variety of trees and shrubs. [33818]

**Gyalecta farlowii** Nyl. --- uncommon on moist outcrops and large boulders of dolomite in mesic wooded ravines. [34969]

**Gyalecta sp. #1** sensu Harris & Ladd (2005) --- known only from a dripping low dolomite ledge in a shaded ravine bottom. [34604]

**Gyalideopsis moodyae** Lendemer & Lücking --- rare, but probably overlooked and more common than assumed; on humus and leaf litter in open dry-mesic woodlands with minimal vascular vegetation. [21017; Buck 24208, 32087, 32740 (all NY)]

**Halecania rheophila** sensu Harris & Ladd (2005) --- uncommon on exposed or shaded, hard siliceous rocks, mostly rhyolite, in flood zones along the shut-ins and associated exposed rhyolite outcrops, and on

rhyolite outcrops and boulders along streams in lower ravines, typically growing close to water level. [35174]

**Heppia conchiloba** Zahlbr. --- rare on exposed thin soil over dolomite bedrock in Dolomite Glade Natural Area, consistently associated with *Placidium squamulosum*. Recent pervasive soil disturbance in the glade by feral hogs and/or armadillos threatens the long-term survival of this species at the park. [35287]

**Hertelidea pseudobotryosa** R.C. Haris, Ladd & Printzen --- uncommon on weathered decorticate logs and exposed decorticate roots of *Juniperus virginiana* associated with glades and bluffs. [35209]

**Heterodermia granulifera** (Ach.) W.L. Culb. --- occasional in wooded uplands, on lightly shaded bases, boles and larger branches of *Quercus*, *Carya*, and, less commonly, *Juniperus*. [34648]

**Heterodermia hypoleuca** (Muhl.) Trevisan --- uncommon on lightly shaded mid and upper boles and larger branches of a variety of hardwoods, usually in upland sites and most commonly on *Quercus*. [34762]

**Heterodermia obscurata** (Nyl.) Trevisan --- common but scattered and nowhere abundant, on bases and lower boles of both hardwoods and softwoods in mesic to dry woodlands. [34615; *Parker* 2372 (MOR)]

**Heterodermia speciosa** (Wulfwn) Trevisan --- common in woodlands; on shaded bases and boles of hardwoods and conifers and on mossy siliceous and carbonate rocks. [33828, 34566, 34643; *Nelson* B43 (MOR); *Wilhelm* 10531, 10546 (both MOR)]

**Hyperphyscia adglutinata** (Flörke) H. Mayrhofer & Poelt --- rare in the park, on boles of scattered hardwoods in mowed park and picnic areas. [35240]

**Hyperphyscia syncolla** (Tuck. ex Nyl.) Kalb --- abundant on all sizes of branches and boles of hardwoods, especially on floodplains and along rivers and streams; *Celtis*, *Cercis*, and *Ulmus* are frequent substrates. This lichen also occurs on small twigs and branches of shrubs and hardwoods in seral sites and along woodland edges, but is uncommon to absent in dry mesic and dry wooded uplands. [34503]

**Hypocenomyce scalaris** (Ach. ex Lilj.) M. Choisy --- known only from an old, charred, decorticate snag of *Juniperus virginiana* in the main dolomite glade at the south end of the park. This is the first record for both Missouri and the Ozark ecoregion, and represents a significant range extension of several hundred miles from the nearest verified localities in the southern Appalachians and southern Great Lakes. Note that CNALH maps a specimen deposited at LSU from Iron County, Missouri, but this almost certainly a misidentification of *Carbonicola anthracophila*, which is known to occur at the Iron County location. [34938]

**Hypotrachyna livida** (Taylor) Hale --- Common on upper boles and branches of canopy hardwoods and conifers in intact woodlands, occurring less commonly on lower boles of these trees and rarely on lightly shaded decorticate logs and siliceous rocks. [34550; *Nelson* B16 (MOR)]

**Hypotrachyna minarum** (Vainio) Krog & Swinscow --- occasional in wooded uplands; on lightly shaded rhyolite, granite, and sandstone boulders and outcrops. This species also occurs occasionally on boles and larger branches of both hardwoods and conifers in wooded uplands. [34586, 34927]

**Hypotrachyna pustulifera** (Hale) Skorepa --- uncommon and restricted to exposed bark and lignum of trees in intact habitats, such as bluff summits and glade margins. *Juniperus virginiana* is the most common substrate, but also found on *Pinus* and rarely on hardwoods and massive rhyolite faces. [34699B, 34679]

**Hysterium angustatum** Pers. --- this lirellate nonlichenized fungus is common on two substrates in two divergent habitats: small branches of *Vaccinium arboreum* in wooded uplands, and almost always on boles of mature *Betula nigra* in forested floodplains and along waterways. It also occurs infrequently on other hardwoods. [34612B, 35020]

**Hysterobrevium mori** (Schwein.) Boehm & Schoch --- another lirellate nonlichenized fungus, this species is occasional on exposed to lightly shaded boles of *Acer saccharum* and A*. saccharinum*, and occasionally on other hardwoods, in both natural areas and managed recreational areas. [35233]

**Imshaugia aleurites** (Ach.) S.F. Meyer --- uncommon in natural areas such as around glades and on bluffs, growing on both corticate and decorticate wood of *Juniperus virginiana* and *Pinus echinata*, typically in exposed sites. [17709, 34683; *Harris* 41361 (NY)]

**Ionaspis alba** Liutzoni --- uncommon or overlooked; on siliceous boulders, especially smaller chert boulders, in lightly shaded woodlands. [35181; *Harris* 41358]

**Julella fallaciosa** (A. Massal.) Coppins --- common on boles of smooth-barked hardwoods in intact woodlands, forming distinctive white patches on trees such as *Acer saccharum* and *Carya ovata*. [34905, 35003C, 35086.

**Lecania croatica** (Zahlbr.) Kotlov --- common on shaded boles of hardwoods in mesic, and sometimes dry-mesic, woodlands, including on deeply shaded boles of small saplings in mesic woodlands. [33819]

**Lecanora appalachensis** Lendemer & R.C. Harris --- occasional on shaded boles of *Juniperus virginiana*, and more rarely on hardwoods. [35009; *Darigo* 3656]

**Lecanora hybocarpa** (Tuck.) Brodo --- abundant on hardwoods in woodlands, growing on boles, branches, and even exposed twigs of a variety of hardwoods. [*Harris* 31227 (NY)]

**Lecanora layana** Lendemer --- known only from *Carpinus caroliniana* in a mesic stream ravine; this species is morphologically identical to *L*. *nothocaesiella*, differing only in the presence of stictic acid, and so may be confused with that species and overlooked, although the sole collection from the park is in a significantly more shaded and mesic habitat than is typical for the more common *L*. *nothocaesiella*. [35247]

**Lecanora minutella** Nyl. --- rare and restricted to scales of old cones of Pinus *echinata*, where it is consistently associated with *Amandinea punctata*, *Lecanora strobilina*, and often, *Propolis rhodoleuca*. [35042]

**Lecanora nothocaesiella** R.C. Harris & Lendemer --- common on lightly shaded boles and bases of hardwoods, in both intact and disturbed (such as grazed) woodlands, and less commonly on boles of *Juniperus virginiana*. [34562, 35034A; *Harris* 31258 (NY)]

**Lecanora oreinoides** (Körber) Hertel & Rambold --- abundant on exposed to slightly shaded rhyolite and granite ledges, bluffs, outcrops, and boulders. [17702, 34705; *Harris* 31227 (NY)]

**Lecanora saligna** (Schrader) Zahlbr. --- occasional on weathered lignum of old logs of both hardwoods and softwoods in lightly shaded uplands and on old weathered softwood lumber. [34846, 35036, 35266]

**Lecanora saxigena** Lendemer & R.C. Harris --- uncommon on shaded siliceous boulders and small outcrops in woodlands; known from granite and chert. [34893, 35097]

**Lecanora strobilina** (Sprengel) Keiffer --- abundant on bark and wood of hardwoods and conifers in a variety of high light habitats, including boles, branches, decorticate logs, rotting stumps, pine cone scales, and rarely on lightly shaded siliceous rocks. [34642, 34844]

**Lecanora subimmergens** Vainio --- occasional on lightly shaded siliceous rocks in woodlands, occurring on boulders of rhyolite, chert, and sandstone. [34591, 34770, 34772]

**Lecanora subpallens** Zahlbr. --- common on branches and boles of smooth-barked hardwood in mesic woodlands, and also in drier sites, where it regularly occurs on *Amelanchier arborea*. [17703 (NY), 17706; Harris 31224, 31234 (both NY)]

**Lecanora thysanophora** R.C. Harris --- common on shaded hardwood boles, especially *Acer and Fraxinus*, in mesic woodlands and along wooded streams; rarely on mossy boulders in these habitats. [34620, 34982A]

**Lecidea cyrtidea** Tuck. --- occasional on small rhyolite and chert boulders and cobbles in wooded uplands and along woodland margins, often growing very close to soil level. [34597, 34276]

**Lecidea varians** Ach. --- common pioneer species on small branches and twigs of hardwood trees and shrubs, as well as on exposed small upper branches of canopy trees in woodlands, especially on floodplains. [34501A]

**Lecidella asema** (Nyl.) Knoph & Hertel --- known only from shaded rhyolite talus at the base of a large bluff. [35179]

**Lecidella enterolucella** (Nyl.) Hertel --- occasional in shaded rhyolite boulders in woodlands and along streams. [34595, 35072; *Cole* 7457 (NY); *Buck* 32742 (NY); *Harris* 41359 (NY)]

**Lecidella euphorea** (Flörke) Hertel --- known only from a rotting, decorticate fallen branch in the scour channel. [34831]

**Lecidella stigmatea** (Ach.) Hertel & Leuckert --- known only from the sheltered face of a massive rhyolite bluff. [35172]

**Leimonis erratica** (Körber) R.C. Harris & Lendemer --- uncommon on lightly shaded small chert boulders and cobbles in woodlands. [34954]

**Lepra amara** (Ach.) Hafellner --- uncommon in mesic and dry-mesic woodlands and on floodplains; on boles of hardwoods, especially *Carya* sp. [34742, 35191, 35198]

**Lepra hypothamnolica** (Dibben) Lendemer & R.C. Harris --- although common through the region, within the park this is an uncommon species mostly found on exposed to lightly shaded branches of *Juniperus virginiana* associated with glades and bluffs. It also rarely occurs on hardwoods. [35017, 35044]

**Lepra multipunctoides** (Dibben) Lendemer & R.C. Harris --- known only from the bole of *Acer rubrum* at the base of a dry-mesic wooded slope. [35190]

**Lepra pustulata** (Brodo & W. Culb.) Lendemer & R.C. Harris --- abundant on lightly shaded boles and larger branches of a wide variety of trees including both hardwoods and conifers, as well as on lightly shaded rhyolite, sandstone, chert, granite, and dolomite, and occasionally on rotting decorticate logs and stumps in woodlands. [34647, 34622, 34931, 34934; *Apfebaum* 266A (MOR); *Harris* 31228, 31248 (both NY)]

**Lepra trachythallina** (Erichsen) Lendemer & R.C. Harris --- occasional on hardwood branches in high light intensities, especially on canopy branches of oaks in intact wooded uplands. This species is also relatively frequent on shaded boles of *Amelanchier arborea* on wooded upper slopes. [34628, 34802]

**Lepraria caesiella** R.C. Harris --- uncommon on lightly shaded sandstone outcrops and boulders in wooded uplands. [34764]

**Lepraria disjuncta** Lendemer --- known only from the sheltered face of a dolomite outcrop in a mesic woodland. [34792]

**Lepraria finkii** (B. de Lesd.) R.C. Harris --- one of the most abundant and shade tolerant lichens in the park, occurring on all types of corticolous and saxicolous substrates, as well as on mossy rotting logs and sheltered vertical soil banks along streams and in ravines; typically in shaded humid microhabitats even when growing in dry sites. [34787, 34984, 35106, 35250, 35257]

**Lepraria harrisiana** Lendemer --- uncommon on shaded boles and lower branches (including dead decorticate branches) of *Juniperus virginiana*. [34502]

**Lepraria neglecta** (Nyl.) Erichsen --- known only from a lightly shaded rhyolite face along a small intermittent stream, but possibly overlooked, as are many members of this group. Material from the park contains alectorialic acid and is referable to chemotype 1 of Lendemer (2013). [34730]

**Lepraria normandinoides** Lendemer & R.C. Harris --- locally common on massive exposures of rhyolite and granite in glades and on bluff faces, in sites with full light exposure to slight shading, but generally somewhat protected from direct wetting. [34738, 35101; *Harris* 31254 (NY)]

**Lepraria sp. sensu lato** --- this is an uncommon species in the park, characterized by a bright, pale yellowish green leprose thallus that forms large patches on sheltered faces of massive rhyolite exposures in woodlands. It contains usnic acid and an unknown compound with Rf values close to those of barbatic acid. [35073]

**Leprocaulon adhaerens** (K. Knudsen et al.) Lendemer & Hodkinson --- rare on mossy shaded rhyolite faces in humid microhabitats, such as near small waterfalls and along intermittent streams; also found on a shaded chert boulder in a mesic woodland. [34771, 35060]

**Leptogium austroamericanum** (Malme) C.W. Dodge --- uncommon on shaded lower boles and bases of hardwoods and *Juniperus virginiana* in mesic and dry-mesic woodlands. [17707, 34644; *Apfelbaum* 254A (MOR)]

**Leptogium cyanescens** (Rabenh.) Körber --- common on lightly shaded tree boles and bases, and both calcareous and siliceous rocks, in woodlands ranging from forested floodplains to mesic ravines and dry-mesic upland slopes. [34511, 34564, 35048, 35068, 35104, 35291; *Lay* 97-0324 (NY); *Harris* 31211, 31232 (both NY); *Wilhelm* 10536, 10541 (both MOR)]

**Leptogium hirsutum** Sierk --- occasional on mesic, mossy dolomite outcrops and boulders in humid sites along streams and in ravines, and rarely on siliceous mossy outcrops in these habitats. [33825]

**Leptogium milligranum** Sierk --- occasional in wooded uplands, on exposed to lightly shaded boles of both hardwoods and *Juniperus virginiana*. [34675, 35195; *Wilhelm* 10550 (MOR)]

**Lichenopeltella heterodermiicola** M.S. Cole & D. Hawksw. --- this lichenicolous fungus is rare within the park, infesting thalli of *Heterodermia speciosa* growing on mossy dolomite outcrops in woodlands. [35077]

cf. **Lichenothelia** D. Hawksw. --- shaded siliceous boulders in woodlands throughout the park and the Ozarks frequently have a thin, lustrous black film appearing almost like paint. This is presumably the fungal genus *Lichenothelia*, which is invariably sterile and thus not identifiable to genus, but is included here because it is such a ubiquitous feature of these habitats. [35096]

**Lithothelium hyalosporum** (Nyl.) Aptroot --- Rare; occurring on shaded bases of *Acer saccharum* and *Fraxinus* along small streams in shaded mesic ravines. [35166]

**Marchandiomyces corallinus** (Roberge) Diederich & D. Hawksw. --- an occasional parasite of *Physcia stellaris* on exposed hardwood branches. There is also a record of this species from the park reportedly growing on *Flavoparmelia baltimorensis* (*Cole* 7500, MIN), but I have not seen the specimen. [34815; *Harris* 31241 (NY)]

**Maronea polyphaea** H. Magn. --- common on boles and branches of a variety of hardwoods. [34534]

**Micarea peliocarpa** (Anzi) Coppins & R. Sant. --- known only from two collections growing on bryophytes in woodlands. [*Buck* 24209, 32088 (both NY)]

**Micarea prasina** Fr. --- common in woodlands, on rotting decorticate logs of both hardwoods and conifers. [34845, 34976; *Buck* 32745 (NY)]

**Minutoexcipula tuckerae** V. Atienza & D. Hawksw. --- an uncommon lichenicolous parasite on thalli of *Pertusaria texana* in wooded uplands. [34797B]

**Multiclavula mucida** (Fr.) R. Petersen --- Rare; known from punky, saturated, decorticate logs of *Juniperus virginiana* in or along small wooded streams at both the north and south parts of the park. This species is new to both Missouri and the Ozark ecoregion, and is several hundred miles from the closest known occurrences in southern Wisconsin and central Alabama. The basidiocarps are ephemeral, appearing in

early mid-winter at the park, and the species would be indistinguishable from an algal film on a log for the rest of the year. [34894, 34977]

**Mycocalicium albonigrum** (Nyl.) Fink --- occasional on exposed to lightly shaded hardwood snags and intact lignin of decorticate logs, growing in sheltered areas protected from direct wetting. *Quercus* is a preferred substrate. [34617, 35082, 35230]

**Mycocalicium ozarkanum** sensu Harris & Ladd (2005) --- rare on sheltered, decorticate portions of bole and stumps of old *Juniperus virginiana*. [21025, 34681]

**Mycocalicium subtile** (Pers.) Szatala --- common on decorticate snags of *Juniperus*, *Pinus*, and *Quercus* in open woodlands, ranging from upper slopes and ridges to mesic stream ravines. [34574, 34575, 34680, 34806A, 35180, 35249]

**Mycoglaena meridionalis** (Zahlbr.) Szatala --- uncommon on exposed small twigs of hardwood trees and shrubs along streams and woodland edges, usually associated with *Arthonia* cf. *quintaria*. [34988B]

**Mycoglaena quercicola** R.C. Harris --- known only from the exposed twigs of a small shrubby *Quercus* in a disturbed gravelly area [34827]

**Mycoporum eschweileri** (Müll. Arg.) R.C. Harris --- apparently uncommon; known from on young wood at the tips of branches of *Quercus* subgenus *Erythrobalanus* along woodland edges. [34826]

**Mycoporum pycnocarpoides** Müll. Arg. --- known only from the bole of a small *Carpinus caroliniana* on a dry-mesic wooded slope. [34795B]

**Myelochroa aurulenta** (Tuck.) Elix & Hale --- abundant in woodlands, growing on bases and lower boles of hardwoods and conifers, as well as on both carbonate and siliceous rocks and becoming especially common in lightly shaded mesic habitats. [34633; *Wilhelm* 10549 (MOR)]

**Myelochroa galbina** (Ach.) Elix & Hale --- common on exposed to lightly shaded upper branches of hardwoods, particularly *Quercus* subgenus *Erythrobalanus*, in intact woodland; also less frequently on boles hardwoods in these habitats. [34551; *Apfelbaum* 256 (MOR; *Nelson* B16 (MOR)]

**Myelochroa obsessa** (Ach.) Elix & Hale --- occasional on lightly shaded siliceous rocks, usually in dry to dry-mesic habitats and occurring on boulders and outcrops of rhyolite, granite, chert, and sandstone. [34585; Harris 31249]

**Myriolecis dispersa** (Pers.) Śliwa et al. --- occasional on carbonate substrates, usually in disturbed habitats, including old concrete culverts and pavements and excavated dolomite outcrops along road cuts. [35261, 35272]

**Nadvornikia sorediata** R.C. Harris --- apparently uncommon; on boles of hardwoods in mesic and wet woodlands, including on *Betula nigra* on a wooded floodplain. [35029]

**Nephroma helveticum** Ach. --- uncommon and confined to high quality habitats in mesic ravines and lower portions of massive bluffs, growing on moist mossy rhyolite faces and outcrops. [35047; *Harris* 41366 (NY); *Lay* 97-036 (NY); *Wilhelm* 10540 (MOR)]

**Normandina pulchella** (Borrer) Nyl. --- rare and confined to high quality woodlands and bluff systems proximal to the main shut-ins area along the East Fork Black River, growing on mossy boles of large *Juniperus virginiana* on rocky slopes. [17710; *Buck* 24211 (NY)]

**Ochrolechia africana** Vainio --- common on exposed to slightly shaded twigs and branches of hardwoods in and around both dolomite and rhyolite glades and in open woodlands, occurring on substrates as varied as *Juniperus virginiana* and *Sideroxylon lanuginosum*. Populations with and without lichexanthone occur in the park. [34686, 34914]

**Ochrolechia arborea** (Kreyer) Almb. --- uncommon on exposed, often dead, branches of *Juniperus virginiana* in glades and on bluffs. [35010]

**Opegrapha diffracticola** R.C. Harris & Ladd --- this lichenicolous fungus is occasional on thalli of *Bacidia diffracta*, typically occurring as small tight clusters of short lirellae on the host thallus. It has only been seen in the park on host thalli that are growing on *Juniperus virginiana*, although the *Bacidia* also occurs on hardwoods. [34840, 34890, 34978A]

**Opegrapha rupestris** Pers. --- this lichenicolous fungus was observed twice at the park, parasitizing thalli of *Willeya diffractella* on shaded dolomite outcrops in dry-mesic and mesic woodlands. [34777]

**Opegrapha vulgata** Ach. --- common in mesic woodlands, on lightly shaded hardwood boles, particularly *Acer*, *Carya*, and *Quercus*. [33824, 34638, 34646, 34654, 34671, 34983, 35228]

**Oviculispora parmeliae** (Berk. & M.A. Curtis) Etayo --- an uncommon lichenicolous fungus on foliose macrolichens such as *Myelochroa aurulenta*, *Physcia americana*, *Punctelia missouriensis*, and *Punctelia rudecta*, typically in mesic or dry-mesic woodlands. [34991]

**Pannaria lurida** (Mont.) Nyl. subsp. **quercicola** P.M. Jørg. --- known only from a mesic seeping rhyolite face near a small waterfall in a mesic ravine, associated with *Leptogium cyanescens* and *Nephroma helveticum*. This is the first saxicolous occurrence in the Ozarks for this rare, typically corticolous, species. [35046]

**Pannaria subrubiginosa** *sensu* Brodo (2016) --- rare on lightly shaded boles of mature hardwoods in wooded uplands, occurring on *Quercus stellata* and *Carya texana*. [35018]

**Parmotrema austrosinense** (Zahlbr.) Hale --- occasional on exposed to lightly shaded boles and branches of hardwoods and conifers in woodlands and disturbed areas. This species appears to be increasing in the region in recent years, as suggested by the lack of older collections despite significant pre-2010 macrolichen collections from the park by multiple investigators (e.g. see cited specimens for *Parmotrema hypotropum*). [34536, 34613, 34818]

**Parmotrema cetratum** (Ach.) Hale --- uncommon, occurring on shaded boles of hardwoods and *Juniperus virginiana* in both wooded uplands and managed park landscapes. [34760, 34921]

**Parmotrema hypotropum** (Nyl.) Hale --- abundant on slightly shaded upper branches of trees in all woodland types, occurring on a variety of hardwoods and both *Juniperus* and *Pinus*. This species also occurs less frequently on lightly shaded tree boles, particularly of *Pinus*, and even more rarely on lightly shaded siliceous rocks in wooded uplands. [34500, 34798; *Apfelbaum* 264-1 (MOR); *Harris* 31217 (NY); *Wilhelm* 10559 (MOR)]

**Parmotrema perforatum** (Jacq.) A. Massal. --- rare in the park despite its frequency elsewhere in the region; occurring on boles and branches of trees (*Cercis*, *Gleditsia*) in managed areas such as picnic grounds and along park roads. [35238, *Nelson* B80 (MOR)]

**Parmotrema reticulatum** (Taylor) M. Choisy --- abundant in wooded uplands, occurring on shaded bases, boles, and larger branches of most types of hardwoods and both taxa native conifers as well as planted *Pinus strobus* occurring in the park, consistently associated with *Flavoparmelia caperata*. *Parmotrema reticulatum* also occurs regularly on trees in managed landscapes within the park, and on decorticate logs and lightly shaded siliceous boulders. [34530; *Apfelbaum* 258-1, 264-2 (both MOR); *Harris* 31209, 31216 (both NY); *Wilhelm* 10543, 10544, 10556 (all MOR)]

**Parmotrema submarginale** (Michx.) DePriest & B. Hale --- occasional on shaded branches and, less commonly, boles of hardwood trees in intact woodlands, occurring on *Acer*, *Carya*, and *Quercus*. [34907, 35007, 35189; *Nelson* B4 (MOR)]

**Parmotrema subtinctorium** (Zahlbr.) Hale --- occasional on shaded boles and larger branches of hardwoods and *Juniperus virginiana* in woodlands and along woodland edges. [34521, 34761, 34161]

**Parmotrema tinctorum** (Delise ex Nyl.) Hale --- uncommon on lightly shaded vertical faces of massive rhyolite ledges and outcrops in woodlands. [17698; *Harris* 31260 (NY)]

**Peltigera elisabethae** Gyelnik --- known only from a shaded, mesic, seasonally seepy rhyolite face bordering a small waterfall in a mesic ravine. [35049]

**Peltigera phyllidiosa** Goffinet & Miądl --- uncommon on mossy shaded faces of dolomite outcrops in mesic ravines. [34785, 35099]

**Peltigera praetextata** (Flörke ex Sommerf.) Zopf. --- occasional in woodlands, on well-drained mossy soil slopes and on mossy rhyolite. [34735; *Harris* 31238, 41354 (both NY)]

**Pertusaria globularis** (Ach.) Tuck. --- rare on granite boulders on a wooded upper slope. [35113]

**Pertusaria ostiolata** Dibben – although common elsewhere in the Ozarks, at the park this is an occasional species of lightly shaded hardwood boles, particularly *Carya*, in wooded uplands. [34652, 34920, 35043]

**Pertusaria paratuberculifera** Dibben --- abundant in woodlands, on lightly shaded boles and larger branches of hardwoods and *Juniperus virginiana*; the most common species of *Pertusaria* in the park. [34507, 34522, 34636, 34754, 35003A; *Cole* 7374 (NY)]

**Pertusaria plittiana** Erichsen --- common in wooded uplands, on lightly shaded siliceous boulders and outcrops; growing on rhyolite, granite, and sandstone. [34587; *Buck* 24210 (NY)]

**Pertusaria propinqua** Müll. Arg. --- occasional on lightly shaded boles and branches of trees in wooded uplands and along glade margins; *Carya ovata* and *Juniperus virginiana* are frequent substrates. [35003B, 35012, 35119]

**Pertusaria pustulata** (Ach.) Duby --- uncommon on lightly shaded boles of *Carya ovata* in wooded uplands, as well as rarely on exposed canopy branches of other hardwoods in woodlands. [35004]

**Pertusaria subpertusa** Brodo --- rare on *Amelanchier arborea* in woodlands; populations at the park occur in drier habitats than are modal for this species. [34627]

**Pertusaria tetrathalamia** (Fée) Nyl. --- occasional on shaded, often mossy, boles and branches of *Juniperus virginiana*, particularly along glades and bluffs. This species also occurs rarely on hardwoods in woodlands. [34687, 34932, 35045, 35207A; *Harris* 31236 (NY)]

**Pertusaria texana** Müll. Arg. --- common on twigs, branches, and sometimes on lightly shaded boles, of a variety of hardwoods in open woodlands and along woodland margins. [34660, 34797A]

**Pertusaria valliculata** Dibben --- despite intensive searching, known only from the bole of *Quercus rubra* in a dry -mesic woodland; collected as an admixture with *P. tetrathalamia*. [ 34649]

**Phaeocalicium polyporaeum** (Nyl.) Tibell --- occasional on upper surface of thalli of the corticolous polyporus bracket fungus *Trichaptum biforme*, which occurs on a variety of dead hardwood snags and logs in mesic and dry-mesic woodlands. [34513]

**Phaeocalicium sp. 1** --- rare; on young tips of branches of *Juglans nigra* along woodland edges. This undescribed species occurs at a few sites across the Ozarks. It is similar to *Phaeocalicium boreale* (Nyl.) Tibell, a boreal taxon known in North America only from *Salix* bark in Montana, this is likely an undescribed species. [35242]

**Phaeocalicium sp. 2** --- this apparently undescribed species was found on the tips of lower branches of a solitary *Populus deltoides* in the scour caused by the 2005 Taum Sauk Reservoir dam collapse. Ascomata are black, ca. 0.2 mm tall, with small apothecia; in section the excipulum is brown, with a gray to brownish, KOH- stalk, a brown excipulum and hypothecium; ascospores are 1-septate, pale gray, ca. 10-11 x 4.5 µm. [34883]

**Phaeophyscia adiastola** (Essl.) Essl. --- common on lightly shaded, often mossy, substrates in woodlands, including siliceous rocks, dolomite, and bases of hardwoods. [34773, 34778, 35071; *Harris* 31243 (NY)]

**Phaeophyscia ciliata** (Hoffm.) Moberg --- uncommon on twigs and branches of less acid-barked hardwoods in woodlands and managed landscape areas. [34624]

**Phaeophyscia hirsuta** (Mereschk.) Essl. --- occasional, often on trees in disturbed sites, and occasionally on hardwoods and *Juniperus* in intact woodlands; rarely on mossy shaded rocks. [35235; *Wilhelm* 10563 (MOR)]

**Phaeophyscia hirtella** Essl. --- apparently rare; known from bark of *Populus deltoides* and *Quercus*, typically in managed landscapes. [sub 35227 (*Gyalolechia flavorubescens*); *Apfelbaum* 262 (MOR)]

**Phaeophyscia pusilloides** (Zahlbr.) Essl. --- occasional on shaded boles of hardwoods and *Juniperus virginiana* in woodlands and managed park landscapes. [34816, 35011]

**Phaeophyscia rubropulchra** (Degel.) Essl. --- common on bases and lower boles of shaded hardwoods, as well as on shaded, often mossy, siliceous and dolomite boulders and outcrops in woodlands ranging from wet mesic floodplains to dry ridges. [34533, 34917; *Wilhelm* 10551 (MOR)]

**Phaeophyscia squarrosa** Kashiw. --- common on shaded, typically mossy, substrates in intact woodlands, including bases of hardwoods (especially *Quercus*) and both siliceous and dolomite boulders and outcrops. [34563, 34569, 34911; *Wilhelm* 10553 (MOR)]

**Phlyctis petraea** R.C. Harris, Muscavitch, Ladd & Lendemer --- occasional in intact habitats, on exposed to lightly shaded, massive rhyolite boulders, outcrops, and bluff faces, and less commonly on granite; this species tends to grow on rapidly-drained vertical faces or in sites protected from direct wetting. [17699; *Harris* 41363 (NY)]

**Phyllopsora corallina** (Eschw.) Müll. Arg. --- uncommon and local; mostly restricted to lower portions of mesic wooded ravines, where it occurs on mossy dolomite outcrops. Also collected once on the shaded bole of *Juniperus virginiana* in a mesic woodland. [34607, 34609, 35079, 35081]

**Physcia americana** G. Merr. --- common on lightly shaded boles and branches of both hardwoods and softwoods in woodlands, and sometimes on trees in more disturbed habitats and uncommon on shaded mossy dolomite boulders and outcrops. [34794; *Parker* 2371 (MOR)]

**Physcia halei** J.W. Thomson --- occasional on exposed to slightly shaded rhyolite and granite boulders and outcrops on glades and open wooded upper slopes. [34715]

**Physcia millegrana** Degel. --- common on branches and boles of trees and shrubs in disturbed sites, including within mowed areas of the park and along the river. This species is also common on upper branches of trees in wooded floodplains, and occasionally occurs in intact wooded uplands. [34505; *Apfelbaum* 257 (MOR); *Nelson* B97 (MOR); *Wilhelm* 10562 (MOR)]

**Physcia pumilior** R.C. Harris --- rare or uncommon, but in the field resembling the abundant *P*. *stellaris* and so possibly more common than initial impressions indicate. On branches of canopy hardwoods, especially Q*uercus*, in intact woodlands. [34630]

**Physcia stellaris** (L.) Nyl. --- abundant on upper branches and exposed boles of a wide variety of hardwoods, particularly on young branches of canopy trees in woodlands and on boles of trees in open sites, such as in mowed areas in the park with scattered trees and shrubs, and along streamside thickets above flood line. [34497, 34656, 34750; *Nelson* B18 (MOR)]

**Physcia subtilis** Degel. --- common on lightly shaded siliceous outcrops and boulders rhyolite, granite, chert, sandstone) in woodlands, especially in dry mesic and dry sites. This species tends to occur on larger rocks, and is seldom found on boulders less than 50 cm in diameter. [34766, 35123, 35215; *Harris* 31240 (NY)]

**Physcia thomsoniana** Esslinger --- common on exposed rhyolite and granite, especially on massive bedrock exposures in glades, where in frequently forms extensive patches. [34720, 35022]

**Physciella chloantha** (Ach.) Essl. --- occasional on shaded boles of hardwoods and especially *Juniperus virginiana*; in both intact and disturbed sites. This species also occurs uncommonly on shaded mossy dolomite boulders and outcrops. [34910]

**Physconia leucoleiptes** (Tuck.) Essl. --- common but sporadic, on lightly shaded lower boles and bases of hardwoods and *Juniperus virginiana* and shaded, often mossy, siliceous and dolomite outcrops. This species is also frequent on the bases of old marble tombstones in the Johnston Cemetery in the park. [34756, 34955; Wilhelm 10554 (MOR)

**Piccolia nannaria** (Tuck.) Lendemer & Beeching --- known only from the shaded bole of *Acer rubrum* in an overgrown mesic ravine. This is the third Missouri record for the species, and the fifth record west of the Mississippi river. [35037]

**Placidiopsis minor** R.C. Harris --- uncommon and restricted to small rhyolite pebbles over extensive rhyolite bedrock in glades. [34697]

**Placidium arboreum** (Schwein. ex E. Michener) Lendemer --- occasional on lightly shaded boles and bases of trees in wooded uplands, occurring on *Fraxinus*, *Juniperus virginiana*, *Quercus alba*, and *Q. stellata*, as well as regularly occurring on shaded mossy dolomite outcrops in mesic habitats. [34565, 34608; *Harris* 31247 (NY); *Parker* 2370, 2374A (both MOR)]

**Placidium squamulosum** (Ach.) Breuß --- locally common on fully exposed thin soils over dolomite bedrock in glades, and uncommonly occurring in exposed gravelly soil with minimal vascular vegetation below dolomite outcrops along roads and lower slopes. [34942A, 35288]

**Placynthiella icmalea** (Ach.) Coppins & P. James --- occasional on rotting decorticate hardwood logs, in both exposed and, more commonly, lightly shaded sites, as well as rarely on mossy soil and humus in uplands. [33832, 34822]

**Placynthium nigrum** (Hudson) Gray --- uncommon, although sometimes locally abundant at a site, on exposed and shaded dolomite outcrops. [34784]

**Plechtocarpon diedertzianum** Y. Joshi et al. --- this lichenicolous fungus is rare on shaded thalli of *Myelochroa aurulenta* in mesic woodlands and on wooded floodplains. These represent the first report for Missouri and the Ozark ecoregion; the only other North American records of this species are from the eastern Great Plains (C. Morse, personal communication). [34903, 35167]

**Polysporina simplex** (Taylor) Vězda --- occasional on exposed rhyolite cobbles and pebbles, and rarely on larger substrates, occurring in both natural areas such as glades and in disturbed open sites. [35132]

**Porpidia albocaerulescens** (Wulfen) Hertel & Knoph --- common, and locally abundant at some areas, on shaded siliceous rocks, especially rhyolite, in wet to mesic sites, including along wooded streams, lower slopes and bottoms of ravines, and on shaded bluff faces in woodlands. [34541; *Cole* 7505 (NY)]

**Porpidia subsimplex** (H. Magn.) Fryday --- uncommon on exposed to lightly shaded granite and rhyolite boulders and talus in wooded uplands. [17700, 35176; *Harris* 31213 (NY)]

**Propolis rhodoleuca** (Sommerf.) Fr. --- this nonlichenized ascomycete is occasional on lightly shaded scales of old cones of *Pinus echinata* in wooded uplands, almost always associated with *Amandinea punctata* and *Lecanora strobilina*. [35041]

**Protoblastenia rupestris** (Scop.) J. Steiner --- occasional on exposed to lightly shaded dolomite boulders and outcrops, especially in and around Dolomite Glade Natural Area and on dolomite bedrock along small streams. [34947, 34961]

**Pseudosagedia cestrensis** (Tuck.) R.C. Harris --- abundant on boles and sometimes shaded branches of trees and shrubs in wet to mesic shaded areas, especially on wooded floodplains and along waterways; *Carpinus caroliniana* is a frequent substrate. [34549, 34612A]

**Pseudosagedia guentheri** --- occasional on shaded siliceous boulders and outcrops, usually in mesic sites, but sometimes in dry mesic woodlands. Most populations in the park occur on rhyolite, but it also grows on chert boulders. [34596, 34737, 34767, 35059]

**Psora decipiens** (Hedwid) Hoffm. --- known only from exposed thin soil over dolomite bedrock at Dolomite Glade Natural Area, where it is rare and consistently associated with *Placidium squamulosum*. [34904]

**Psora pseudorussellii** Timdal --- common in sites with exposed to lightly shaded dolomite bedrock and boulders, including Dolomite Glade Natural Area and outcropping dolomite ledge in mid-slope woodlands with high light intensities. [34868; *Nelson* B41 (MOR)]

**Psora russellii** (Tuck.) A. Schneider --- occasional and local in thin soil over dolomite bedrock in the glade at Dolomite Glade Natural Area, always associated with *Placidium squamulosum*. [34942B]

**Psorotichia schaereri** (A. Massal.) Arnold --- uncommon on exposed to slightly shaded dolomite, both on newly exposed bedrock ledges in the scour, and in dolomite glades. [34866, 34948]

**Psorula rufonigra** (Tuck.) Gotth. Schneid. --- through most of the park, this is an uncommon species of exposed to slightly shaded rhyolite and granite along glade margins and in boulders and outcrops in wooded uplands, typically growing on flat surfaces or depressions where a thin layer of fine soil has accumulated. This species is also locally common on exposed, smooth-eroded rhyolite bedrock along the East Fork Black river in the vicinity of the Shut-Ins, growing in low zones that just above normal water level and subject to regular flooding. Consistently associated with *Spilonema revertens*, upon which it is reported to be an obligate parasite, although the *Psorula* is itself lichenized. [34746]

**Punctelia caseana** Lendemer & Hodkinson --- uncommon and scattered; mostly on lightly shaded boles and bases of *Pinus echinata* in wooded uplands, but occasionally on lightly shaded hardwood boles and once on twigs of *Vaccinium arboreum*. [34519, 34573; *Apfelbaum* 272B (MOR)]

**Punctelia graminicola** (B. de Lesd.) Egan --- occasional; on lightly shaded faces of massive rhyolite bluffs, and sometimes on exposed rhyolite bedrock in glades. Less commonly, this species grows on lightly shaded rhyolite and granite boulders and outcrops in wooded uplands. [34732, 35023; *Apfelbaum* 255 (MOR); *Harris* 31250 (NY); *Lay* 97-0365 (NY); *Wilhelm* 10538 (MOR)]

**Punctelia missouriensis** G. Wilh. & Ladd --- abundant on boles of all types of trees, usually in dry-mesic and drier woodland habitats but occasionally in more densely shaded mesic sites. this species is also characteristic on lightly shaded, often mossy, siliceous rocks, including boulders, outcrops and bluff faces. It also occurs on tree bases and boles in mowed park landscapes [34520; *Harris* 31245 (NY); *Wilhelm* 10533 (MOR)]

**Punctelia perreticulata** (Räsänen) G. Wilh. & Ladd --- uncommon and usually on exposed branches of *Juniperus virginiana* associated with both dolomite and igneous glades and exposed bluff summits; rarely on boles of *Pinus echinata*. [34684; *Nelson* B61 (MOR)]

**Punctelia rudecta** (Ach.) Krog --- abundant throughout the park in both natural habitats and disturbed sites; undoubtedly the most common large foliose lichen in the park. It occurs on bases, boles and larger branches of all manner of trees, as well as on decorticate logs, old rusty ironwork, weathered lumber and fence rails, and rarely on organic humus and leaf and needle litter among mosses and *Cladonia* squamules. It is common on shaded boulders and outcrops of rhyolite, granite, chert, sandstone, and dolomite, and even rarely grows on shaded old concrete. [34618; *Apfelbaum* 258-3, 272B (both MOR); *Nelson* B58 (MOR); *Wilhelm* 10548 (MOR)]

**Pyrenographa irregularis** (Wehm.) R.C. Harris --- the distribution of this nonlichenized pyrenomycete is uncertain, as it has only recently been reported from North America (James Lendemer, personal communication). In the park, it is known only from exposed, weathered, decorticate, dead lower

branches of a gnarled old *Juniperus virginiana* on a low dolomite bluff along the East Fork black River. [34979]

**Pyrenula carya** R.C. Harris --- uncommon; on lightly shaded branches and, less commonly, boles of *Carya* in wooded uplands on ridges and upper slopes. [34662]

**Pyrenula pseudobufonia** (Rehm) R.C. Harris --- common on shaded hardwood boles in woodlands. [34621, 34625, 34674; *Apfelbaum* 259 (MOR); *Harris* 31259, 41357 (both NY)]

**Pyrenula subelliptica** (Tuck.) R.C. Harris --- known only from the shaded base of *Fraxinus americana* in a mesic wooded ravine. [35039]

**Pyxine sorediata** (Ach.) Mont. --- Common on shaded bases, boles and branches of trees in intact woodlands, along woodland edges, and in managed recreational areas. This species also occurs rarely on shaded siliceous rocks in wooded uplands. [24523; *Apfelbaum* 268 (MOR); *Harris* 31212 (NY); *Wilhelm* 10557 (MOR)]

**Pyxine subcinerea** Stirton --- common on lightly shaded boles and branches of trees in both intact and disturbed habitats, occurring on both hardwoods and conifers. [34824, 35088; Nelson B103 (MOR); Wilhelm 10552 (MOR)]

**Ramalina cf. sinensis** Jatta --- known from boles of *Cercis canadensis* originally planted in picnic areas along the East Fork Black River after the 2005 Taum Sauk Upper Reservoir dam collapse; it is not known where the nursery stock originated, or whether the lichens were introduced with the trees or colonized the trees after they were installed, but several trees in the area have abundant populations of *Ramalina*. This taxon, which occurs elsewhere in the region, particularly in the western Ozarks, is problematical: it has multi-lobed, broadly expanded (to 2 cm) thalli with ± elongate pseudocyphellae and a reticulate pattern of strongly raised cortical ridges in older thalli, and contains usnic acid only. These are all characteristic of *R*. *sinensis*, which has larger, curved ascospores and rarely has laminal apothecia. Local populations have small, uniformly straight ascospores and abundant laminal apothecia. A related species with even larger thalli and abundant laminal apothecia, *R*. *unifolia* Thomson, described (Thomson 1990) as a "prairie forest border species", has single monophyllous thalli, otherwise resembling *R*. *sinensis*; neither taxon as described is an exact match for Ozark material. [34016]

Another, smaller element in this genus, likely *R*. *culbersoniorum* LaGreca, is uncommon on exposed branches of hardwoods in the park, but was not documented because of an oversight.

**Rhizocarpon grande** (Flörke ex Flotow) Arnold --- common on exposed to lightly shaded rhyolite bedrock, outcrops, and large boulders in glades and open wooded uplands. [17701, 34601, 34725, 35126]

**Rhizocarpon reductum** Th. Fr. --- occasional on exposed to lightly shaded cobbles, boulders and outcrops on rhyolite and chert in uplands. [17696, 34719, 35259]

**Rhizoplaca subdiscrepans** (Nyl.) R. Sant. --- common in its restricted habitat of massive exposures of siliceous rocks, such as rhyolite glades, and exposed, large granite and rhyolite outcrops in open woodlands. [34716]

**Rinodina maculans** Müll. Arg. --- common on exposed to lightly shaded small branches, and more rarely, boles, of hardwoods in woodlands, and occasionally on small branches and twigs of shrubs (e.g. *Physocarpus opulifolius, Rhamnus carolinianus*) along waterways and woodland edges. [34449, 34506, 34631, 34655]

**Rinodina oxydata** (A. Massal.) A. Massal. --- occasional on exposed siliceous substrates, including massive rhyolite bedrock exposures in glades and chert cobbles on soil embankments. [34973]

**Rinodina pachysperma** H. Magn. --- known only from a single occurrence on branches of *Cephalanthus occidentalis* in a degraded fen. [34814]

**Rinodina papillata** H. Magn. --- common, but easily overlooked; on lightly shaded boles of hardwoods and *Juniperus virginiana*; also occurring on bases of these trees in more exposed conditions. [34957A, 35016B, 34212]

**Rinodina siouxiana** Sheard --- uncommon on lightly shaded, large rhyolite boulders and slabs in wooded uplands. [35058A]

**Rinodina subminuta** H. Magn. --- known only from a single scrappy thallus at the base of a large *Quercus rubra* in a floodplain woodland. [35034B]

**Rinodina tephraspis** (Tuck.) Herre --- occasional on lightly shaded granite and rhyolite in wooded uplands. [35095; *Harris* 31252, 31256 (both NY)]

**Sarcogyne regularis** Körber --- common on exposed to slightly shaded calcareous substrates, often in disturbed sites, including dolomite glades, dolomite fragments and pebbles on embankments and disturbed graded areas, and old weathered concrete. This species is an abundant pioneer species on the newly exposed, massive dolomite outcrops lining the scour channel from the 2005 Taum Sauk reservoir dam failure. [34870, 34878, 34881, 34962B]

**Sarcogyne similis** H. Magn. --- although common in the region and known from a variety of siliceous substrates, including igneous rocks, at Johnson's Shut-Ins this is an extremely rare lichen confined to lightly shaded sandstone outcrops and boulders at a few scattered locations in the park. Interestingly, all of these occurrences have pycnidia only and lack apothecia, although the presence of psoromic acid is diagnostic. [34765]

**Sarea resinae** (Fr.) Kuntze --- known only from solidified resin on the shaded bole of *Juniperus virginiana* on a steep talus slope above the main shut-ins. The was an unexpected find, and represents a new record for both Missouri and the Ozark ecoregion. The nearest known populations are in the Ouachita Mountains of central Arkansas. The substrate is also unusual, as this is normally a species of *Pinus*, *Abies*, *Picea*, and occasionally *Larix*, *Chamaecyparis*, and *Thuja*. In searching nearly 300 records for this species from the Consortium of North American Lichen Herbaria, I can find only one other record on juniper resin, from New Jersey. [35162]

**Schismatomma glaucescens** (Nyl. ex Willey) R.C. Harris --- uncommon in intact dry and dry-mesic woodlands, on lightly shaded boles of mature *Quercus coccinea*, *Q. rubra*, and *Q. velutina*, where it is restricted to crevices between the bark plates. [34634]

**Scoliciosporum umbrinum** (Ach.) Arnold --- occasional on shaded rhyolite, often on small fragments and cobbles, but also occurring on lower parts of lager rhyolite faces. [35069, 35117, 35173]

**Scytinium dactylinum** (Tuck.) Otálora et al. --- common in lightly shaded mesic to dry-mesic woodlands, often in ravines and along intermittent runoff streams, usually growing among bryophytes; on tree bases, rocks – especially dolomite, and sometimes on mossy soil exposures with minimal vascular vegetation. [35108, 35116; *Harris* 41355 (MOR)]

**Scytinium juniperinum** (Tuck.) Otálora et al. --- known only from a shaded hardwood root along a small intermittent stream in a mesic ravine. [35054]

**Scytinium lichenoides** (L.) Otálora et al. --- common on shaded, typically mossy, dolomite outcrops and boulders in mesic and dry-mesic sites. [34781]

**Scytinium tenuissimum** (Dickson) Otálora et al. --- known from exposed cherty soil on a roadbank below a dolomite outcrop, associated with *Placidium squamulosum*. In the Ozarks, this species is known only from one other site in central Missouri. The closest other records are an 1878 collection from southern Illinois and a recent collection from southwestern Minnesota. [35260]

**Speerschneidera euploca** (Tuck.) Trevisan --- occasional on lightly shaded, typically vertical, portions of dolomite outcrops and ledges on wooded slopes. [34872; *Nelson* B71 (MOR)]

**Spilonema revertens** Nyl. --- substrates and habitats identical to these of *Psorula rufonigra*, which is an obligate lichenized parasite of this species; all local populations observed are sterile. [sub 34746]

**Stenocybe pullatula** (Ach.) Stein --- rare and restricted to stems and branches of *Alnus serrulata* in areas not subjected to frequent or violent flooding, such as small fen seepage areas in protected valleys. Nelson's (1977) evocative description and striking image of the well-developed *Alnus* stands and fen in what was subsequently designated Johnson's Shut-Ins Fen Natural Area would have provided ideal habitat for this species. Sadly, the catastrophic destruction caused by the 2005 Taum Sauk Reservoir dam failure, and subsequent restoration design and actions, have reduced this site to a depauperate shadow of its former resplendence. Diligent searching of the few remaining *Alnus* (among proliferating thickets of *Salix* and *Cephalanthus*) failed to find any *Stenocybe*, or much lichen diversity of any kind. [35256]

**Stigmidium fuscatae** (Arnold) R. Sant. --- this lichenicolous fungus is uncommon on thalli of *Acarospora fuscata* at the park. [35122A]

**Stigmidium lendemeri** Kocourk. & K. Knudsen --- this inconspicuous lichenicolous fungus parasitizes thalli of *Aspicilia* sp. and is known in the park from two 1997 collections. Given the abundance of *Aspicilia* in the park, it is likely more common than indicated by these data. [*Cole* 7458, 7556 (both NY)]

**Strigula submuriformis** (R.C. Harris) R.C. Harris --- known only from the shaded bole of *Quercus muhlenbergii* in a mesic woodland. Given the frequency of *Carya ovata*, which is a favored substrate for this lichen, it is puzzling why it is not more common in the park .[34796]

**Synnemasporella aculeans** (Schwein.) X.L. Fan & J.D. P. Bezerra --- this diaporthalean fungus occurs on dead stems of *Rhus glabra*, producing abundant capitate synnemata that at first glance are evocative of calicialian taxa. It is occasional in well-developed older stands of the host that have developed on scoured areas along the East Fork Black River after the Taum Sauk Reservoir dam collapse. This appears to be the first record from both Missouri and the Ozark ecoregion. [35268]

**Teloschistes chrysophthalmus** (L.) Th. Fr. --- known only from exposed twigs of a small shrub colonizing open gravelly areas of the extensive scour created by the Taum Sauk Reservoir dam collapse. This species is common in the western Ozarks, but uncommon in the more heavily timbered eastern Ozarks. [34825]

**Thelenella muscorum** (Fr.) Vainio --- uncommon in wet and mesic shaded sites, such as on lower slopes of wooded ravines, growing on bryophytes over tree bases and both dolomite and rhyolite. [34603, 34611]

**Thelidium decipiens** (Nyl.) Kremp. --- known only from the face of a moist, mossy dolomite ledge in a mesic wooded ravine. [34605]

**Thelocarpon laureri** (Flotow) Nyl. --- known only from a partially buried, charred, decorticate fragment of *Juniperus virginiana* in a mowed area. [34817B]

**Thyrea confusa** Henssen --- known only from intermittent runoff zones of extensive dolomite bedrock flats in the lower portions of the dolomite glade in Dolomite Glade Natural Area, where it is locally common. [34950]

**Trapelia glebulosa** (Sm.) J.R. Laundon --- common on pebbles and cobbles of chert, rhyolite, and granite in exposed to lightly shaded sites, including rubble flats of rhyolite in glades, road banks, and rocky tip-up mounds; often a pioneer species on newly exposed substrate, such as in igneous rubble flats in the sour from the Taum Sauk Reservoir dam collapse. [17694, 34599; *Harris* 31233 (NY)]

**Trapelia placodioides** Coppins & P. James --- uncommon on lightly shaded rhyolite and granite boulders in woodlands. [34860, 35094]

**Trapeliopsis flexuosa** (Fr.) Coppins & P. James --- abundant on decorticate logs and standing snags of both hardwoods (especially *Quercus*) and conifers, as well as occasionally on weathered fence rails and old weathered softwood lumber. [34615]

**Trimmatothelopsis dispersa** (H. Magn.) K. Knudsen & Lendemer --- apparently uncommon but possibly overlooked; on lightly shaded to exposed siliceous boulders and outcrops, including both sandstone and rhyolite. [35121]

**Usnea amblyoclada** (Müll. Arg.) Zahlbr. --- occasional in open intact woodlands and glades; on vertical faces of large igneous outcrops and bluffs, growing on both rhyolite and granite. [34718, 34727]

**Usnea mutalilis** Stirton --- although relatively frequent in the region, at the park this appears to be an uncommon species, typically occurring on lightly shaded boles of hardwoods in wooded uplands. [35185; *Wilhelm* 10555 (MOR)]

**Usnea strigosa** (Ach.) Eaton **subsp. rubiginea** (Michaux) I. Tav. --- occasional on canopy branches of hardwoods in intact woodlands, as well as sometimes on boles and branches of hardwoods in more exposed sites. All material from the park that was analyzed contained psoromic and usnic acids, which is the most common chemotype in the Ozarks. Sterile small thalli of *Usnea* are fairly common on fallen canopy branches in woodlands in the park and are presumably this taxon. [35006]
A sterile specimen in this complex containing usnic acid only may be referable to subspecies *strigosa*. [34748]

**Usnea trichodea** Ach. --- not seen in the park in recent years, this species was collected in 1993 from the steep wooded talus slopes on the east side of the main shut-ins, presumably growing on *Juniperus virginiana*. [*Harris* 31221 (NY)]

**Varicellaria velata** (Turner) Schmitt & Lumbsch --- common in intact woodlands; on lightly shaded hardwood boles, especially *Carya* and *Quercus*, as well as on shaded boles of *Juniperus virginiana*. This species also occurs rarely on mossy chert boulders and decorticate hardwood logs. Populations in the park do not contain lichexanthone. [34553, 34891; *Apfelbaum* 266B (MOR)]

**Verrucaria calkinsiana** Servít --- locally common on exposed to lightly shaded dolomite of all sizes from pebbles to bedrock outcrops, occurring in a variety of habitats including glades, ledges along waterways, and gravel flats in the scour from the Taum Sauk Reservoir dam collapse. [34809, 34879, 34943. 34962A]

**Verrucaria fayettensis** Servít --- occasional on exposed to lightly shaded dolomite ledges and outcrops. [34869]

**Verrucaria cf. glaucovirens** Grummann --- known from exposed dolomite bedrock in the glade at Dolomite Glade Natural Area. [35289]

**Verrucaria sp. #1** sensu Harris & Ladd (2005) --- common on small (pebbles, cobbles, rubble) siliceous substrates (chert, granite, rhyolite) in light shaded or sometimes in more exposed sites, sometimes in disturbed areas such as stable gravel bars; uncommonly on larger outcrops and boulders. [34509, 34862, 35258]

**Vulpicida viridis** (Schwein.) J.-E. Mattsson & M.J. Lai --- occasional on branches of canopy hardwoods in intact woodlands; typically on trees in the red oak group (*Quercus* subgenus *Erythrobalanus*). [34571; *Lay* 97-0395 (NY)]

**Willeya diffractella** (Nyl.) Müll. Arg. --- occasional on lightly shaded rocks, including cobbles, boulders, and outcrops of chert, rhyolite, and dolomite. [33827, 34974; *Buck* 24204 (NY)]

**Xanthomendoza weberi** (S.Y. Kondr. & Kärnefelt) L. Lindblom --- common on exposed to slightly shaded hardwoods and *Juniperus virginiana*, including in disturbed sites; growing on branches and more exposed boles and bases of trees in areas such as mowed landscapes. This species also occurs on exposed rock outcrops in disturbed areas, as well as on old concrete and tombstones. [34811, 35229; *Darigo* 3657]

**Xanthoparmelia angustiphylla** (Gyelnik) Hale --- apparently common on exposed to lightly shaded rhyolite and granite. [34704, 35712, 35221]

**Xanthoparmelia cumberlandia** (Gyelnik) Hale --- Known only from a 1982 collection from exposed rhyolite in a glade, but given the similarity of this species in the field to other members of the genus, this may not be indicative of local rarity. [6193 (MOR)]

**Xanthoparmelia hypofusca** (Gyelnik) Hodkinson & Lendemer --- common on exposed to lightly shaded rhyolite, granite, and thin soil over these substrates in open woodlands and glades, as well as on exposed siliceous boulders and bedrock along the East Fork Black river. [35001, 35125, 35127; *Harris* 41456 (NY)]; *Nelson* s.n. 14 January 1976, B12, B60 (all MOR)]

**Xanthoparmelia hypomelaena** (Hale) Hale --- locally frequent on exposed rhyolite bedrock in glades. [34706, 35062]

**Xanthoparmelia subramigera** (Gyelnik) Hale --- common on massive siliceous substrates, typically in slightly shaded sites, but also occurring on exposed rhyolite in glades. [34590, 34592, 35110]

**Xanthoparmelia viriduloumbrina** (Gyelnik) Lendemer --- likely common; on exposed rhyolite boulders and bedrock in glades. [34700; *Wilhelm* 10542 (MOR)]

**Xyleborus sporodochifer** R.C. Harris & Ladd --- occasional on lightly shaded, weathered, hard lignum of decorticate log of *Quercus* in woodlands. [34560]

# Appendix 2: Excluded taxa and questionable reports

This is an account of taxa attributed to the park from literature reports or through a June 2019 search of the Consortium of North American Lichen Herbaria (CNALH) database, but which are not currently accepted as part of the lichen biota of the park. The list is arranged alphabetically by genus, largely following the species concepts and nomenclature of Esslinger (2018). For each taxon, the rationale for excluding it from the park flora is provided. Specimens cited in CNALH, but not seen by the author, are not included here if there are confirmed vouchers of the same taxon from the park included in Appendix 1. Similarly, older synonyms used for valid taxa cited in Appendix 1 are generally not included here.

**Candelariella efflorescens** --- this species does not occur in the Ozarks, and all local reports, including *Apfelbaum* 274D (MOR) from the park, are referable to *C*. *xanthostigmoides*.

**Chrysothrix candelaris** --- (*Crane* 97-213, ILLS); this species does not occur in most of North America (Harris & Ladd 2008) and this report is referable to *C*. *insulizans* or *C*. *xanthina*.

**Cladina arbuscula** [=*Cladonia arbuscula*] --- two specimens are cited by Nelson (1997); B1 is *C*. *subtenuis* and B2 is *C*. *furcata*.

**Cladonia caroliniana** --- local reports for this eastern species are referable to *C*. *dimorphoclada*.

**Cladonia verticillata** --- cited by Nelson (1977), but this specimen has not been located. *Cladonia verticillata* is extremely rare in the Ozarks, and most reports are based on specimens in the *C. chlorophaea* group with marginally proliferating podetia.

**Dermatocarpon miniatum** (L.) Mann. --- cited by Nelson (1977), and there are several other specimens from the park; these specimens were not examined but *D*. *miniatum* is not known from the Ozark region and these reports are likely *D*. *arenosaxi*, *D*. *dolomiticum*, and/or *D*. *muhlenbergii*.

**Dermatocarpon multifolium** --- there is a 1997 collection labelled as this species from igneous rocks at the park (*Lutzoni* 97.10.09-13, DUKE), but *D*. *multifolium* occurs on calcareous rocks, and this specimen, despite the collector's co-authorship of the publication, was not cited in the paper describing *D*. *multifolium* (Amtoft et al. 2008).

**Heterodermia domingensis** --- cited by Nelson (1977); the specimen was not located, but this report is referable to another sorediate species of *Heterodermia*, likely *H*. *speciosa*.

**Parmelia bolliana** [=*Punctelia bolliana*] -cited by Nelson (1977); the specimen was not located, but this is almost certainly referable to *Punctelia graminicola*.

**Parmotrema margaritatum** --- based on *Apfelbaum* 258-2 (MOR), on *Quercus*; the author examined this specimen in 2006, and while it displayed some features of *P*. *margaritatum*, the cortex was locally more reticulate and evocative of the more common *P*. *reticulatum*. Further study is needed, although intensive searching during this study did not reveal any *P*. *margaritatum*.

**Peltigera canina** --- three specimens cited from the park by Nelson (1977), also another collection listed in CNALH (*Sharnoff & Sharnoff* 1993-03-27, CANL); none of these were examined, but *P*. *canina* is not known from the region, and these reports are referable to other species of *Peltigera*; elsewhere in the Ozarks most specimens originally determined as this species are actually *P*. *praetextata*.

**Peltigera rufescens** --- (*Crane* 97-214, ILLS); this specimen was not examined, but *P*. *rufescens* does not occur in the region and the specimen is likely *P*. *praetextata*.

**Physcia caesia** --- (*Sharnoff & Sharnoff* 1060.18, CANL); *P*. *caesia* does not occur in the Ozark region or lower Midwest, and this report, as are many others so-named from the Ozarks, is likely referable to saxicolous populations of *P*. *americana*.

**Physcia orbicularis** [=*Phaeophyscia orbicularis*] --- cited by Nelson (1977); the specimen was not located, but *P. orbicularis* is not known from the Ozark region, and this report is probably referable to *Phaeophyscia adiastola*.

**Placidium lacinulatum** --- (*Crane* 97-205, ILLS); the specimen was not examined for this study; both this species and the similar *P. squamulosum* occur in the Ozarks, but all material examined to date from the park has been *P. squamulosum*. While this record may be correct, it is excluded from the flora pending confirmation.

**Platismatia glauca** --- a collection from the park labelled as the striking boreal and montane species (Crane 97-219, ILLS) is certainly a misidentification, perhaps based on the vaguely similar *Parmotrema hypotropum*.

**Punctelia semansiana** --- local reports for this southwestern taxon, which does not occur anywhere near the region, are referable to *P. graminicola*; early authors combined the two concepts under the *semansiana* epithet.