Opuscula Philolichenum, **2**: 21-26. 2005.

Contributions to the Lichen Flora of Pennsylvania: The Lichen Flora of the Diabase Region of Northern Bucks and Montgomery Counties

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ABSTRACT. – This preliminary checklist of lichens and lichenicolous fungi occurring in the diabase region of northern Bucks and Montgomery Counties, Pennsylvania, USA, includes a total of 72 taxa, of which ten have not previously been reported from the state. The range of *Lecanora oreinoides* (Körber) Hertel & Rambold, is extended to include Connecticut, Massachusetts, and Pennsylvania.

INTRODUCTION

The lichen flora of Pennsylvania, though under study for more than two centuries, remains poorly documented and understood. I recently began large-scale inventories in eastern Pennsylvania in an effort to increase knowledge of its lichen flora (Lendemer, 2004). Now, in conjunction with floristic inventories of A. Rhoads and T. Block, I conducted an inventory of the lichens growing in the diabase region of northern Bucks and Montgomery Counties, in southeastern Pennsylvania.

This diabase region is confined to portions of upper Bucks and Montgomery Counties, Pennsylvania, where extensive diabase (igneous rock) outcrops (or remnants) occur (Inners, undated). The natural properties of diabase, such as strong resistance to natural weathering and human alteration, coupled with the abundance of rock, have resulted in little human impact on these forests in comparison to the surrounding areas, which are primarily underlain by Triassic shales of the Newark Supergroup[1].

MATERIALS AND METHODS

The checklist presented here is the result of several trips by A. Rhoads and me the study area in 2004. An additional trip to Nockamixon State Park by R. Lendemer and me are also included. Several collections made outside the diabase region in Nockamixon State Park are also included as an appendix for completeness.

Data for each locality visited are given below, followed by the abbreviation used in the checklist and a short discussion of the habitat:

Fulshaw Craeg Preserve, Montgomery Co. (FCP) – The Fulshaw Craeg Preserve includes a large portion of the Ridge Creek Valley in northern Montgomery County, and was visited on two separate occasions by J. Lendemer and A. Rhoads. Because each collecting trip focused on a different part of the preserve each portion is treated separately:

FCPI - Open diabase boulder-field with sparse birch (*Betula*) and ash (*Fraxinus*) and surrounded by a forest of birch, ash, red maple (*Acer rubrum*), and basswood (*Tilia*); just east of King Road, ca. ½ mile north of intersection of King Road & Camp Road, Fulshaw Craeg Preserve (Natural Lands Trust), north of Sumneytown, Salford Township.

FCPII - Rocky diabase forest (*Acer, Fraxinus, Liriodendron*) on the north slope of the Ridge

[1] The term "Newark Supergroup" is used here in the sense of Bock (1969) as a collective term for the Triassic age strata that occur throughout eastern North America.

Creek Valley along the north shore of Ridge Creek, west side of King Road, ca. ½ mile north of intersection of King Road & Camp Road, Fulshaw Craeg Preserve (Natural Lands Trust), north of Sumneytown, Salford Township.

The forested slopes of the valley, which are primarily composed of deciduous forests, were sparsely settled historically and at present remain relatively undisturbed. The boulder field on a north-facing slope in a sugar maple (*Acer saccharum*) – basswood (*Tilia americana*) forest (cf. Fike, 1999) is particularly noteworthy for its lichen diversity, which is likely due to the fact that the forest has apparently not been extensively disturbed and the boulder field itself is not heavily visited. Thus there is relatively little human impact on the saxicolous lichens growing there. Interesting discoveries from the preserve including populations of *Arthonia helvola* (Nylander) Nylander, and *Parmelia neodiscordans* Hale.

Nockamixon State Park, Bucks Co. (NSP) – Nockamixon State Park encompasses two distinct geological regions. The lower (southeastern) portions of the park are underlain by Triassic shales of the Newark Supergroup, but the upper (northwestern) portions of the park lie within the diabase region, and include large expanses of northern hardwood forest with abundant diabase outcroppings. The parts of the park within the diabase region were visited on three separate occasions by J. Lendemer and A. Rhoads and were the focus of an additional trip by R. Lendemer and me. Interestingly, though most of the field work for this survey was carried out within the park, the overall diversity of lichen species was considerably less than that of Fulshaw Craeg Preserve. The specific collecting sites are as follows:

NSPI – A mixed hardwood forest of *Acer, Quercus, Nyssa,* and *Fraxinus* with abundant diabase boulders, along a small tributary to Tohickon Creek, east of Tohickon Creek, north of a parking area at the terminus of Camp Trail Road, north of PA Route #563, ca. 4 miles southeast of Quakertown, Nockamixon State Park.

NSPII – A mixed hardwood forest of *Acer, Quercus, Nyssa,* and *Fraxinus* with abundant diabase boulders and a small stream, west of Sawmill Road, north of PA Route #563, ca. 4 miles southeast of Quakertown, Nockamixon State Park

NSPIII – A moist rocky stream valley with abundant mossy diabase boulders and a forest of *Acer, Fraxinus, Liriodendron,* etc., along a small tributary to the Tohickon Creek, south of PA Route #563, east of Kellers Church.

NSPIV – A small diabase boulder field in a rocky forest with *Acer, Fraxinus, Liriodendron,* etc., with abundant diabase boulders, along a small tributary to the Tohickon Creek with abundant mosses and hepatics, as well as *Dermatocarpon luridum,* south of PA Route #563, north of Kellers Church.

NSPV – A forest with *Acer, Fraxinus, Liriodendron,* etc., with abundant diabase boulders, along a small tributary to the Tohickon Creek with abundant mosses and hepatics as well as *Dermatocarpon,* north of PA Route #563, north of Kellers Church.

ANNOTATED CHECKLIST

This checklist is arranged alphabetically by genus and species and includes material that could only be identified to genus. Unnamed sterile sorediate crusts, grouped by chemistry, are also included at the end; while sterile sorediate crusts for which names could be found are integrated into the list. Though lichenicolous fungi were not actively sought, several that were found are included in the checklist (indicated by an asterisk).

The collection numbers (*italicized*) given are those of the author (J.C. Lendemer) and follow the locality abbreviations defined above. All taxa reported here are based on voucher specimens deposited in the herbarium of the author (hb. Lendemer), with a nearly complete set of duplicates in the herbarium of the New York Botanical Garden (NY). Since all reports are based on vouchers, taxa that were not vouchered are not included. Sterile or moribund specimens of common taxa (*Acarospora fuscata, Porpidia albocaerulescens*, etc.) were discarded. The nomenclature presented here generally follows Esslinger

(1997), with a few exceptions. For example, the use of *Pseudosagedia* Hafellner & Kalb for the species previously referred to *Trichothelium sensu* R.C. Harris, follows Harris (2005).

Acarospora fuscata (Acharius) Arnold – FCPII, *2169;* NSPI, *1987.*
Agonimia sp.– FCPI, *1888*; NSPI, *1976.*
Agonimia sp. (?) – NSPI, *1975.*
This saxicolous collection is problematic in several respects and further study is needed to determine if it is best placed elsewhere.
Amandinea polyspora (Willey) Lay & P. May – NSPIII, *2142.*
Arthonia helvola (Nylander) Nylander – FCPI, *1896.*
Anaptychia palmulata (Michaux) Vainio – FCPI, *1848*; FCPII, *2152;* NSPI, *1955, 1958.*
Bacidia schweinitzii (Fries *ex* Michener) Schneider – FCPI, *1895.*
Bacidina sp. – NSPI, *1988* (pycnidia only).
Bacidina sp. – NSPIII, *2336.*
Biatora longispora (Degelius) Lendemer & Printzen – FCPI, *1890*; NSPII, *1971*; NSPIII, *2332.*
Biatora printzenii Tønsberg – FCPI, *1874, 1875;* FCPII, *2155, 2184;* NSPI, *2122*; NSPIII, *2127.*
All collections of *B. printzenii* reported here are sterile.
Caloplaca sideritis (Tuckerman) Zahlbruckner –NSPI, *1991.*
Candelariella efflorescens R.C. Harris & Buck – FCPI, *1891.*
Cladonia apodocarpa Robbins – FCPI, *2179.*
Cladonia petrophila R.C. Harris – FCPII, *2143, 2144, 2145.*
Coenogonium pineti (Acharius) *ined.* – NSPIII, *2338.*
Collema subflaccidum Degelius – FCPI, *1887, 1889*; NSPI, *1963;* NSPIII, *2104;* NSPIV, *2118;* NSPV, *2117.*
Dactylospora pertusariicola (Willey *ex* Tuckerman) Hafellner* – NSPIII, *2137* (on *Pertusaria plittiana*).
Dermatocarpon luridum (Withering) J.R. Laundon – NSPI, *1982*; NSPIII, *2107.*
Endocarpon sp. – FCPII, *2173.*
This collection is similar to *E. pallidulum* (Nylander) Nylander in having overlapping squamules with a black underside, but differs in having larger ascospores (36-39 x 16-20µm) and apparently larger hymenial algae.
Fellhanera sp. 2 – NSPIII, *2139, 2140.*
This taxon is apparently undescribed. It will be described in another publication.
Flavoparmelia baltimorensis (Gyelnik & Fóriss) Hale – FCPI, *1849*; FCPII, *2157;* NSPI, *1956*; NSPV, *2116.*
Heterodermia speciosa (Wulfen) Trevisan – FCPI, *1860;* NSPV, *2120.*
Lecanora oreinoides (Körber) Hertel & Rambold – FCPI, *1883.*
This record extends the range mapped by Brodo et al. (2001) northward. Several additional collections are also reported here[2].
Lecanora strobilina (Sprengel) Kieffer – FCPI, *1892.*
Lecanora thysanophora R.C. Harris – FCPI, *1844;* FCPII, *2154.*
Lecidea berengeriana (A. Massalongo) Nylander – FCPI, *1879.*
Lepraria sp. (?) (TLC: unknown [bright UV+ yellow], usnic acid) - FCPI, *1873.*
Lepraria sp. (TLC: pannarin?, zeorin) – FCPII, *2183.*
Lepraria sp. (TLC: xanthone?, usnic acid) – FCPII, *2181.*
Lepraria caesiella R.C. Harris *in* Lendemer – NSPIII, *2128.*
Lepraria lobificans Nylander – FCPI, *1867, 1870, 1876*; NSPI, *1967, 1968*; NSPIII, *2129;* NSPV, *2398.*
Lepraria normandinoides ined. – FCPI, *1868;* FCPII, *2182;* NSPI, *1964, 1965, 1966.*
The above unpublished name should be applied to *Lepraria* sp. (protocetraric/fumarprotocetraric acid) of Harris (2004). The taxonomic status with respect to other taxa with similar chemistries is currently under study.
Lepraria vouauxii (Hue) R.C. Harris – NSPV, *2131.*
Leptogium cyanescens (Körber) Rabenhorst – FCPI, *1847, 1863.*
Leptogium dactylinum Tuckerman – FCPII, *2160, 2166;* NSPI, *1992*; NSPIII, *2110.*

[2] USA. CONNECTICUT. Ellsworth, *H.A. Green s.n.* (NY), 21.August.1889. MASSACHUSETTS. Wellesley, *Cummings s.n.* (NY), April.1884. Nantasket, *sine coll.* (NY).

Loxospora pustulata (Brodo & Culberson) R.C. Harris – FCPI, *1852, 1866.*
Melaspilea sp. *s. lat.* – FCPII, *2174.*
Micarea peliocarpa (Anzi) Coppins & R. Santesson – FCPI, *1878*; FCPII, *2171.*
Mycobilimbia ahlesii (Körber) *ined.* - FCPII, *2167.*
Myelochroa aurulenta (Tuckerman) Elix & Hale – FCPI, *1846, 1853*; FCPII, *2156, 2159*; NSPI, *1953, 1959;* NSPIII, *2105, 2113;* NSPIV, *2119.*
Myelochroa obsessa (Acharius) Elix & Hale – FCPI, *1877.*
Nadvornikia sorediata R.C. Harris – NSPI, *1969, 1976.*
Parmelia neodiscordans Hale – FCPI, *1869.*
Peltigera praetextata (Flörke *ex* Sommerfelt) Zopf – NSPI, *1983*.
Pertusaria globularis (Acharius) Tuckerman – FCPI, *1865*; FCPII, *2150;* NSPI, *1960.*
Pertusaria plittiana Erichsen – FCPI, *1893*; NSPIII, *2138.*
Pertusaria velata (Turner) Nylander – FCPI, *1857.*
Phaeophyscia adiastola (Esslinger) Esslinger – FCPI, *1851, 1854, 1855, 1861, 1862, 1884, 1885*; FCPII, *2147, 2148, 2149;* NSPI*, 1980, 1957, 1985, 1989*; NSPII, *1981*; NSPIII, *2114.*
Phaeophyscia rubropulchra (Degelius) Esslinger – FCPI, *1850*; FCPII, *2162;* NCPI, *1978*; NSPIII, *2103, 2106;* NSPV, *2134.*
Phlyctis sp.– FCPI, *1858, 1859*; FCPII, *2111, 2146;* NSPI, *1962;* NSPIV, *2115.*
This taxon is common in the region and was reported from New York by Harris (2004).
Physcia millegrana Degelius – NSPIII, *2112;* NSPIV, *2121*.
Physcia phaea (Tuckerman) J.W. Thomson – FCPII, *2158, 2164;* NSPIII, *2109.*
Physcia pseudospeciosa J.W. Thomson – FCPII, *2151.*
Physcia subtilis Degelius – FCPII, *2163.*
Porpidia albocaerulescens (Wulfen) Hertel & Knoph – FCPI, *1880, 1881, 1882*; NSPI, *1986.*
Lendemer (2004b) placed *Lecidea hebescens* Nylander in synonymy with *P. albocaerulescens,* noting the only difference to be the brown coloration of the thallus in *L. hebescens*. During the course of this study many thalli of *P. albocaerulescens* were encountered with brown coloration like the type material of *L. hebescens*. These thalli differ from those of typical *P. albocaerulescens* (i.e. with blue-gray coloration) only in color and, semi-diligent searching revealed thalli with both types of coloration present.
Pseudosagedia cestrense (Tuckerman *ex* Michener) R.C. Harris – FCPII, *2175;* NSPI, *1972, 1974.*
This species was previously reported from Pennsylvania by McGrath (1991) as *Porina pulla* (Acharius) Müll. Arg.
Pseudosagedia guentheri (Flörke) Hafellner & Kalb – FCPII, *2172*.
The collection cited above is a good example of the problems involving the taxonomy of the *P. cestrense* group as little more then the substrate seems to separate it from corticolous *P. cestrense*.
Punctelia rudecta (Acharius) Krog – FCPI, *1845;* NSPIII, *2108.*
Punctelia subrudecta auct. Amer. – NSPI, *1954.*
Pyrenidium cf. *actinellum* Nylander* (on *Acarospora fuscata*) – FCPII, *2168.*
Pyxine sorediata (Acharius) Montagne – FCPI, *1898.*
Ramalina petrina Bowler & Rundel – FCPI, *1886.*
Rinodina oxydata (A. Massalongo) A. Massalongo *s. lat.* – NSPI, *1990.*
I recently reported *R. vezdae* from Pennsylvania and Maryland. Comparing the specimens to the protologue of *R. vezdae* (Mayrhofer, 1984) the spores ((15)-18-22 x (8)-10-12µm) do not fit the range reported for *R. vezdae* (22-29 x 9-15µm). Since little more than spore size seems to separate *R. oxydata* and *R. vezdae* the material is referred to *R. oxydata* pending further study.
Scoliciosporum umbrinum (Acharius) Arnold – FCPI, *1897.*
Staurothele diffractella (Nylander) Tuckerman – NSPIII, *2141.*
Stereocaulon saxatile H. Magnusson – FCPI, *1871, 1872.*
Trapelia placodioides Coppins & P. James – NSPI, *1961* (shade form?).
Trapeliopsis flexuosa (Fries) Coppins & P. James – FCPII, *2177.*
Verrucaria sp. – NSPI, *1973*.
Xanthoparmelia conspersa (Ehrhart *ex* Acharius) Hale – NSPV, *2135.*
Xanthoparmelia somloënsis (Gyelnik) Hale – FCPI, *1856, 1864.*
sterile sorediate crustose sp. (TLC: no substances) – NSPIII, *2133*.
sterile sorediate crustose sp. (TLC: no substances) – FCPII: *2178.*

sterile sorediate crustose sp. (TLC: atranorin, zeorin, stictic acid agg.) – NSPIII, *2132.*
sterile sorediate crustose sp. (TLC: unknowns (trace)) – FCPII, *2161.*

DISCUSSION

This checklist of lichens and lichenicolous fungi occurring in the diabase region of southeastern Pennsylvania presently includes 72 taxa, few of which had previously been reported from the region (McGrath, 1991). Though further work will undoubtedly result in additions to the checklist, these will likely be in often overlooked groups, since the taxa present in each locality do not differ significantly.

Perhaps the most interesting conclusion that can be drawn from this study is that the affinities of the lichen flora of the diabase region do not strongly correspond to those of the vascular plant flora (A. Rhoads unpublished), in that they do not include elements that are generally restricted to several other specific habitat types (i.e, serpentine barrens). Thus, the majority of lichen species occurring in the diabase region are typical of northern Appalachian forests. Taxa more common in the southern Appalachians are also present, however.

Several records presented here are of particular interest because they represent rarely collected taxa (*Arthonia helvola, Lepraria vouauxii, Physcia pseudospeciosa,* and *Parmelia neodiscordans*). Others apparently represent the first collection of a species in the state since that of the type by G.H.E Muhlenberg in the early 19th century (i.e. *Pertusaria globularis*). The report of *Lecanora oreinoides* extends its range northward from that mapped by Brodo et al. (2001). The reports of *Nadvornikia sorediata* serve to fill in the gaps in the northern distribution of that species, which was first described from Florida (including a paratype from Delaware) by Harris (1990) and subsequently reported from New Jersey by Lendemer (2004a) and New York by Harris (2004).

Of the taxa reported here, the following apparently represent the first report for Bucks (B) or Montgomery (M) Counties: *Acarospora fuscata* (B, M), *Amandinea polyspora* (B), *Arthonia helvola* (M), *Anaptychia palmulata* (B, M), *Biatora longispora* (B, M), *B. printzenii* (B, M), *Caloplaca sideritis* (B), *Candelariella efflorescens* (M), *Cladonia petrophila* (M), *Collema subflaccidum* (B, M), *Dactylospora pertusariicola* (B), *Flavoparmelia baltimorensis* (B, M), *Heterodermia speciosa* (M), *Lecanora oreinoides* (M), *Lecanora strobilina* (M), *Lecanora thysanophora* (M), *Lecidea berengeriana* (M), *Lepraria lobificans* (B, M), *Lepraria vouauxii* (B), *Leptogium dactylinum* (B, M), *Loxospora pustulata* (M), *Micarea peliocarpa* (M), *Myelochroa aurulenta* (B, M), *M. obsessa* (M), *Nadvornikia sorediata* (B), *Parmelia neodiscordans* (M), *Pertusaria globularis* (B, M), *P. plittiana* (B, M), *Phaeophyscia adiastola* (B, M), *P. rubropulchra* (B), *Physcia phaea* (B, M), *P. pseudospeciosa* (M), *P. subtilis* (M), *Pseudosagedia cestrense* (B, M), *Punctelia rudecta* (B, M), *P. subrudecta* auct. Amer. (B), *Ramalina petrina* (M), *Rinodina oxydata* s. lat. (B), *Scoliciosporum umbrinum* (M), *Staurothele diffractella* (B), *Trapelia placodioides* (B), *Trapeliopsis flexuosa* (M), *Xanthoparmelia conspersa* (B), and *X. somloënsis* (M).

Of the above taxa, the following are reported for the first time from Pennsylvania: *Arthonia helvola, Biatora printzenii, Caloplaca sideritis, Collema subflaccidum, Dactylospora pertusariicola, Lecanora oreinoides, Lepraria vouauxii, Nadvornikia sorediata, Pertusaria plittiana, Physcia pseudospeciosa, Ramalina petrina,* and *Staurothele diffractella.*

ACKNOWLEDGEMENTS

I wish to thank A. Rhoads for facilitating much of the field work for this study,as well as R.C. Harris for his constant help in determining/confirming problem specimens and performing TLC on the sterile sorediate crusts. P. Diederich determined the lichenicolous fungi. And, R Dirig and R.C. Harris for reviewing the manuscript.

LITERATURE CITED

Brodo, I.M., Sharnoff, S.D. & Sharnoff, S. 2001. Lichens of North America. Yale University Press, New Haven, London, 794pp.

Esslinger, T. L. 1997. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. North Dakota State University: http://www.ndsu.nodak.edu/instruct/esslinge/chcklst/chcklst7.htm (First Posted 1 December 1997, Most Recent Update 27 August 2001), Fargo, North Dakota.

Fike, J. 1999. Terrestrial & Palustrine Plant Communities of Pennsylvania. Harrisburg, PA. 86pp.

Harris, R.C. 1990. Some Florida Lichens. Bronx, N.Y., 109 pp.

Harris, R.C. 2004. A preliminary list of the lichens of New York. Opuscula Philolichenum, 1: 55-74.

Harris, R.C. 2005. Some Name Changes in *Porina s. lat.* Opuscula Philolichenum, 2. 15-16.
Inners, J.D. undated. Pennsylvania Trail of Geology. Nockamixon State Park, Bucks County. Park Guide 14, 5pp. Pennsylvania Harrisburg, Pennsylvania.
Lendemer, J.C. 2004. A preliminary checklist of the lichen flora of Lehigh Gorge State Park, Pennsylvania, USA. Opuscula Philolichenum, 1: 1-8.
Lendemer, J.C. 2004a. Recent records of lichens in the local area (MD, NJ, PA). I. Opuscula Philolichenum, 1: 9-20.
Lendemer, J.C. 2004b. Changes and additions to the checklist of North American Lichens. – I. Mycotaxon, 89(2): 255-258.
McGrath, J.K. 1991. A Checklist of the Lichens of Pennsylvania. Lansdowne, Pennsylvania. 55pp. 352 numbered figs.
Mayrhofer, H. 1984. Die saxicolen Arten der Flechtengattungen *Rinodina* und *Rinodinella* in der alten SSWelt. Journal of the Hattori Botanical Laboratory, 55: 327-493.

APPENDIX

Lichens were also collected by the author and A. Rhoads at two additional localities in Nockamixon State Park, which were outside the diabase region. The records are included below for completeness.

Vicinity of Sentinel Rock, Nockamixon State Park, Bucks Co. (NSPVI) – Erosional remnants including Sentinel Rock in a conifer-dominated forest on a south-facing slope, on the north/east shore of the Tohickon Creek, northeast of Kellers Church.

Unnamed red shale cliffs, Nockamixon State Park, Bucks Co. (NSPVII) – Red shale, west-facing cliffs with a forest, on the north/east shore of the Tohickon Creek, northeast of Kellers Church.

Dermatocarpon americanum Vainio – NSPVII, *2124*.
Leptogium dactylinum Tuckerman – NSPVII, *2123.*
Leptogium lichenoides (L.) Zahlbruckner – NSPVII, *2136.*
Lepraria lobificans Nylander – NSPVII, *2130.*
Phaeophyscia adiastola (Esslinger) Esslinger – NSPVII, *2126.*
Rinodina oxydata (A. Massalongo) A. Massalongo *s. lat.* – NSPVII, *2170.*
Xanthoparmelia subramigera (Gyelnik) Hale – NSPVI, *2125.*