Opuscula Philolichenum, **3**: 69-78. 2006.

Contributions to the Lichen Flora of Pennsylvania: Additions to the Checklist of Lichens of the Delaware Water Gap National Recreation Area

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ABSTRACT. – An account of the lichens collected by the participants of the 30th A. Leroy Andrews Foray to the Delaware Water Gap National Recreation Area is provided. This contribution supplements the report of Water Gap lichens previously compiled by the authors. *Bacidia phyllopsoropsis* is described as new to science.

The 30th A. Leroy Andrews Foray was held in the Delaware Water Gap National Recreation Area (abbreviated DWGNRA), Pennsylvania. The participants collected in the vicinity of Community Drive Wetlands and the Pocono Environmental Education Center (PEEC) on 16-18 September 2005. Both localities were visited previously by the authors as part of the 1st Howard Crum Bryological Workshop in 2004. Checklists were included in the report of the lichens collected during that workshop (Harris & Lendemer 2005). The temptation to test the completeness of the published list proved too great for the participants of the Andrews Foray, who made a number of additional finds which are reported here. Whereas previous foray reports have included complete checklists, we have chosen to include only new reports from the localities that were visited during the foray. In an effort to present this report in a more comprehensive and useful format we have chosen to divide it into the following sections: I) New reports for each locality (following the format of our previous report). II) New reports for the DWGNRA. III) Discussion of the implication of these reports on the flora of the DWGNRA as well as that of Pennsylvania as a whole.

I. ADDITIONS TO HARRIS & LENDEMER (2005)

The format of the checklist below follows that of our previous report (Harris & Lendemer 2005). The majority of collections cited below are those of W.R. Buck (NY), R.C. Harris (NY), and J.C. Lendemer (hb Lendemer, duplicates in NY). Duplicates of collections made by others that are also cited here have been deposited in NY. Lichenicolous fungi are indicated by an asterisk (*).

UNITED STATES OF AMERICA. PENNSYLVANIA. MONROE COUNTY.: Delaware Water Gap National Recreation Area, ca. 2 miles south of Bushkill, ca. 1 mile southeast of Shoemakers, Community Drive Wetlands. - elev. ca. 700-800 ft. – Lat. 41° 04' 43"N, Long. 75° 00' 24"W. - Drained portions bordered by *Alnus,* and swampy portions primarily with *Acer* and *Fraxinus*, bisected by Hogback Ridge forested with dense hemlocks (*Tsuga*) and large semi-calcareous rock exposures and boulders - 17September2005

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Arthonia helvola Nyl. – *Lendemer 5016.*

Arthonia s. lat. sp. – *Lendemer5036*.

The above collection occurred on the bark of a hemlock (*Tsuga canadensis*) associated with *Chrysothrix flavovirens,* on the margins of an open maple swamp. The taxon is characterized as follows: tiny, subglobose, whitish ascomata possibly associated with chlorococcoid algae. All tissues colorless. Interascal hyphae much branched and anastomosed. Hymenial gel K/I+ medium blue. Asci *Arthonia*-type, broadly clavate with tiny K/I+ apical ring with 8, irregularly arranged spores. Ascospores colorless, 3-septate, fusiform, 14-18 x 3-4 µm. The ascus type places this species in a broad concept of *Arthonia* but the pale ascomata, weak I-reaction and narrow, fusiform ascospores are anomalous for the majority of species of the genus.

Bacidia phyllopsoropsis R. C. Harris & Lendemer ***sp. nov.*** (see appendix, figs. 1-6) - *Buck 49265, Buck 49278, Buck 49311*.

Bacidia coprodes (Körb.) Lettau – *Buck 49308*.

Biatora printzenii Tønsberg – *Harris 5162.*

Bilimbia sabuletorum (Schreb.) Arnold – *Lendemer 5032.*

Candelaria concolor (Dicks.) Stein – *Guccion 566*.

Cladonia sobolescens Nyl. *ex* Vainio – *Lendemer 4966.*

Dictyocatenulata alba Finley & E.F. Morris – *Lendemer 5021.*

Graphis scripta (L.) Ach. – *Harris 51620*.

Julella fallaciosa (Stizenb. *ex* Arnold) R.C. Harris – *Lendemer 5019.*

Lecania subfuscula (Nyl.) S. Ekman ? – *Buck 49276.*

The above collection was named using Purvis et al. (1992), but unfortunately we lack comparative material.

Lecidea hypnorum Libert – *Harris 51626.*

Lepraria neglecta (Nyl.) Lettau – psoromic acid chemotype – *Harris* 51614 (on upper bole of fallen red oak), Harris *51623* (on rock).

Lithothelium hyalosporum (Nyl.) Aptroot – *Lendemer 5006.*

Marchandiomyces corallinus (Roberge) Diederich & D. Hawksw.* (thallus of *Flavoparmelia caperata*) – *Harris 51625.*

Melanelixia fuliginosa (Fr. *ex* Duby) O. Blanco et al. – *Lendemer 5023.*

Melaspilea sp. 1* (on depauperate *Bacidia schweinitzii*) – *Harris 51610*.

Micarea prasina Fr. – *Harris 51619, Lendemer 5069.*

Nectriopsis parmeliae (Berk. & Curtis) M. S. Cole & D. Hawksw.* (on *Punctelia rudecta) – Harris 51618*.

Nectriopsis rubefaciens (Ellis & Everh.) M. S. Cole & D. Hawksw.* ? – *Lendemer 5069-A* (on *Micarea prasina*).

The host is anomalous but the material seems otherwise indistinguishable from *N. rubefaciens*, which normally occurs on members of the Parmeliaceae.

Parmotrema hypotropum (Nyl.) Hale – *Guccion 569*.

Pertusaria globularis (Ach.) Tuck. – *Harris 51624.*

Physcia pumilior R.C. Harris – *Guccion 568*.

The report of this species was inadvertently omitted from Harris & Lendemer (2005). These collections represent the northernmost report for the species (see Lendemer 2006).

Physcia stellaris (L.) Nyl. – *Lendemer 5020.*

Physconia detersa (Nyl.) Poelt – *Guccion 567*, *Lendemer 5018.*

Placynthiella dasaea (Stirton) Tønsberg – *Buck 49271*.

Pyrrhospora varians (Ach.) R.C. Harris – *Buck 49303.*

Rinodina willeyi Sheard & Giralt – *Harris 51610-A*.

Staurothele diffractella (Nyl.) Tuck. – *Buck 49270*.

Thelocarpon sp. – *Buck 49274*

The above collection is rather poor and the taxon possibly undescribed: ascomata pallid with apical pruina; paraphyses absent; hymenial gel and ascus sheath I–; ascospores ca. 3 x 1.6-1.8 µm; on HCl– rock.

Usnea hirta (L.) F.H. Wigg. – *Lendemer 4963.*

Sterile sorediate crust sp. 11 (TLC: atranorin; saxicolous, thallus thick, blue-gray, verruculous, blastidiate/granulose). – *Lendemer 4961.*

Sterile sorediate crust sp. 12 (TLC: no lichen substances detected; saxicolous, thallus sub-squamulose, forming small rosettes, brown-gray, soralia laminal, with greenish-white soralia, pycnidia present, conidia hyaline, ellipsoid, simple). – *Lendemer 4977, Lendemer 5012.*

Sterile sorediate crust sp. 18 (TLC: no substances detected; corticolous, thallus green, continuous, soralia minute, somewhat diffuse with age) – *Lendemer 5664.*

UNITED STATES OF AMERICA. PENNSYLVANIA. PIKE COUNTY.: Delaware Water Gap National Recreation Area, Pocono Environmental Education Center. – elev. ca. 750 ft. – Lat. 41° 10' 05"N, Long. 74° 54' 34"W. - Upland pine (*Pinus*) - oak (*Quercus*) dominated forest with exposed east facing slopes, small maple (*Acer*) swamp with *Sphagnum* drainage, and shale barrens forested by *Juniperus* and *Pinus*. - 18September2005

Acarospora fuscata (Nyl.) Arn. – *Buck 49328, Harris 51794, Lendemer 5068.*
Allocetraria oakesiana (Tuck.) Randlane & A. Thell – *Lendemer 5017.*
Acrocordia megalospora (Fink) R.C. Harris – *Lendemer 5033*, *Olszewski 6247Bb.*
Anisomeridium polypori (Ellis & Everh.) R.C. Harris – *Lendemer 5060*.
Aspicilia cinerea (L.) Körb. *s. lat.* – *Buck 49349, Lendemer 5661.*
Aspcilia laevata (Ach.) Arnold – *Lendemer 5661-A.*
Bacidia schweinitzii (Fr. *ex* Michener) A. Schneid. – *Lendemer 5058*
Candelariella efflorescens R. C. Harris & Buck – *Buck 49342* (sterile).
Chrismofulvea dialyta (Nyl.) Marbach – *Buck 49315*, *Harris 51795*
Cladonia apodocarpa Robbins – *Lendemer 5051.*
Cladonia cristatella Tuck. – *Harris 51796, Lendemer 5054.*
Cladonia dimorphoclada Robbins – *Lendemer 4975.*
Cladonia grayi G. Merr. *ex* Sandst. – *Harris 51799, Lendemer 5053.*
Cladonia incrassata Flörke – *Lendemer 5044.*
Cladonia macilenta Hoffm. var. *bacillaris* – *Lendemer 4965.*
Cladonia macilenta Hoffm. var. *macilenta* – *Harris 51800*.
Two podetia only, growing mixed with *C. macilenta* var. *bacillaris*. Perhaps such proximity supports the view that these are only chemotypes unworthy of taxonomic recognition.
Cladonia ochrochlora Flörke – *Lendemer 5005.*
Cladonia parasitica (Hoffm.) Hoffm. – *Lendemer 5052.*
Cladonia robbinsii Evans – *Harris 51802, Lendemer 5055*.
Cladonia strepsilis (Ach.) Grognot – *Harris 51803*
Cladonia uncialis (L.) F.H. Wigg. (squamatic acid chemotype) – *Harris 51805, Lendemer 5050.*
Dactylospora pertusariicola (Willey *ex* Tuck.) Hafellner* (on *Pertusaria plittiana*) – *Lendemer 5066*
Dimelaena oreina (Ach.) Norman – *Lendemer 5076.*
Fuscidea arboricola Coppins & Tønsberg – *Harris 51812*.
Heterodermia speciosa (Nyl.) Trev. – *Lendemer 5039.*
Hypocenomyce scalaris (Ach.) M. Choisy – *Harris 51603*.
Hypogymnia physodes (L.) Nyl. – *Harris 51806, Lendemer 5031.*
Hypotrachyna livida (Taylor) Hale – *Harris 51807, Lendemer 5040.*
Hypotrachyna showmanii Hale – *Lendemer 5038.*
The reports of *Parmelinopsis spumosa* ?, by Harris & Lendemer (2005) belong here.
Imshaugia aleurites (Ach.) S. F. Meyer – *Guccion 570*.
Ionaspis lacustris (With.) Lutzoni – *Harris 51606*.
Lecanora hybocarpa (Tuck.) Brodo – *Lendemer 5065.*
Lecanora minutella Nyl. – *Buck 49344*.
Lecanora perplexa Brodo – *Lendemer 5044.*
Lecanora symmicta (Ach.) Ach. – *Harris 51808, Lendemer 5042, Lendemer 5067.*
Lecanora thysanophora R.C. Harris – *Lendemer 5087.*
Lecidea cyrtidia Tuck. – *Buck 49350, Harris 51608, Lendemer 5070.*
Lepraria caesiella R.C. Harris – *Lendemer 5089.*
Lepraria caesioalba (de Lesd.) J.R. Laundon – *Harris 51809, Harris 51810*.
Lepraria neglecta (Nyl.) Erichsen – *Lendemer 5007, Lendemer 5030.*

Leptogium cyanescens (Rabenh.) Körb. – *Lendemer 5026, Lendemer 5003.*
Melanelixia fuliginosa (Fr. *ex* Duby) O. Blanco et al. – *Harris 51811*
Melanelixia subaurifera (Nyl.) O. Blanco et al. – *Buck 49336*.
Melaspilea sp. ? 2* (on *Lecanora cf. perplexa*) – *Lendemer 5022.*
Micarea erratica (Körber) Hertel et al. – *Harris 51604.*
Micarea melaena (Nyl.) Hedl. – *Lendemer 5048.*
Muellerella pygmaea (Körber) D. Hawksw. var. *athallina* (Müll. Arg.) Triebel* – *Harris 51818* (on *Rhizocarpon rubescens*).
Mycocalicium subtile (Pers.) Szatala – *Buck 49325*.
Nectriopsis parmeliae (Berk. & M.A. Curtis) M.S. Cole & D. Hawksw.* – *Harris 51813, Lendemer 5046* (on *Parmelia sulcata*), *Lendemer 5049* (on *Ochrolechia arborea*), *Lendemer 5080* (on *Punctelia rudecta*), *Harris 51814* (on *Xanthoparmelia plittii*).
This species does not appear to have previously been reported from *Ochrolechia arborea*.
Nectriopsis rubefaciens (Ellis & Everh.) M. S. Cole & D. Hawksw.* – *Buck 49327* (on *Flavoparmelia caperata*, *Parmelia sulcata* and *Punctelia subrudecta*).
All three host species growing close together, apparently a rather promiscuous parasite.
Nephroma helveticum Ach. – *Lendemer 5025.*
Peltigera evansiana Gyelnik – *Lendemer 5004.*
Pertusaria plittiana Erichsen – *Lendemer 5077.*
Pertusaria pustulata (Ach.) Duby – *Lendemer 5075.*
Phaeocalicium polyporaeum (Nyl.) Tibell – *Lendemer 5072.*
Physcia millegrana Degel. – *Buck 49343*.
Physcia subtilis Degel. – *Guccion 571, Lendemer 5002.*
Placynthiella icmalea (Ach.) Coppins & P. James – *Buck 49337* (on soil).
Porpidia sp. – *Lendemer 4962.*
The above collection consists of a small sorediate thallus with several immature ascomata. The material contains the stictic acid complex (TLC, JCL) and has been sent to Alan Fryday for further study.
Porpidia albocaerulescens (Wulfen) Hertel & Knoph var. polycarpiza (Vain.) Rambold & Hertel – *Lendemer 4976.*
All our other collections of *P. albocaerulescens* from the Water Gap represent the stictic acid chemotype. The presence of norstictic acid in the above collection was confirmed with TLC (JCL). While filing specimens at NY an additional Water Gap collection of this taxon was found[3].
Porpidia crustulata (Ach.) Hertel & Knoph – *Buck 49337, Guccion 573, Harris 51605, Harris 51815*.
Pronectria sp.* – *Buck 49312* (on *Flavoparmelia caperata*).
The combination of ascospore size, ascospore arrangement and host do not seem to lead to a name. The ascospores are irregularly arranged in the ascus, fusiform, ca. 15 x 3.7 µm.
Punctelia subrudecta auct. Amer. – *Guccion 574, Lendemer 5035.*
Rhizocarpon infernulum f. *sylvaticum* Fryday – *Guccion 575, Lendemer 5011.*
Rhizocarpon reductum Th. Fr. – *Buck 49347.*
Rhizocarpon rubescens Th. Fr. – *Harris 51816, Lendemer 5064.*
Rhizoplaca subdiscrepans (Nyl.) R. Sant. – *Buck 49331, Lendemer 5078.*
Rimularia badioatra (Kremp.) Hertel & Rambold – *Buck 49331B* [with *Merismatium peregrinum* (Flotow) Triebel, as in previous report].
Rinodina sp. 2 – *Lendemer 5045, Lendemer 5074.*
The material has a minutely bullate thallus becoming continuous and thick, *Pachysporia*-type ascospores, and contains atranorin (TLC, JCL).
Rinodina oxydata (A. Massal.) A. Massal. – *Lendemer 5010.*
Roselliniella cladoniae (Anzi) Matzer & Hafellner* (on thallus of *Cladonia ochrochlora*) – *Lendemer 5009.*
Scoliciosporum chlorococcum (Stenh.) Vězda – *Buck 49335*.
Scoliciosporum umbrinum (Ach.) Arn. – *Lendemer 5071*[*?].

[3] *Porpidia albocaerulescens* (Wulfen) Hertel & Knoph *var. polycarpiza* (Vain.) Rambold & Hertel – USA. NEW JERSEY. WARREN CO.: Delaware Water Gap, near Dunfield Creek trail, on exposed limestone [sic] rock near trail, 26.iv.1975, *Prince 75-24* (NY!).

The above collection is apparently initially lichenicolous on *Porpidia albocaerulescens*. A number of thalli of *S. umbrinum* with similar ecology were observed at this locality.

Sphinctrina tubiformis A. Massal.* (on *Pertusaria plittiana*) - *Lendemer 5028.*

Trapelia glebulosa (Sw.) J.R. Laundon – *Buck 49348*.

Trapelia placodioides Coppins & P. James – *Lendemer 5029.*

Trapeliopsis sp. - *Lendemer 5662.*

The above collection could possibly be referred to *T. granulosa* however is saxicolous and dispersed areolate with the soralia erupting out of the areoles.

Trapeliopsis flexuosa (Fr.) Coppins & P. James – *Harris 51817*.

Trapeliopsis granulosa (Hoffm.) Lumbsch – *Lendemer 5059, Lendemer 5061.*

Tuckermanopsis americana (Sprengl.) Hale – *Olszewski 6283.*

Vouauxiella lichenicola (Linds.) Petrak & H. Sydow* (on thallus and apothecia of *Lecanora hybocarpa*) – *Lendemer 5065-A*.

Vouauxiomyces truncatus (de Lesd.) Dyko & D. Hawksw.* ? – *Buck 49331A* (on *Xanthoparmelia angustiphylla*).

Cole and Hawksworth (2001) described *Abrothallus tulasnei* from material on *Xanthoparmelia* but its conidia are described as (9.5)11-14.5(-19) x (3.5)4-5(-6.5) µm. Conidia in this specimen are 8-9.2 x 4.8-5.4 µm, a conidial size usually referred to *Vouauxiomyces truncatus,* the anamorph of *Abrothallus microspermus* Tul. *Abrothallus* is obviously a fertile field for study.

Xanthoparmelia angustiphylla (Gyelnik) Hale – *Lendemer 4973.*

Sterile sorediate crust sp. 5 – Lendemer 4974.

Sterile soredate crust sp. 13 (TLC: usnic acid, zeorin; corticolous, thallus continuous granulose-sorediate, blue-gray). – *Lendemer 4970.*

Sterile sorediate crust sp. 14 (TLC: atranorin, zeorin; corticolous, thallus thin, continuous, with well defined blue-gray soralia eventually becoming diffuse and continuous). – *Lendemer 4975.*

Sterile sorediate crust sp. 16 (TLC: fumarprotocetraric acid?; corticolous, thallus thin, greenish, shiny, with colorless prothallus, soralia distinct, bright green). – *Lendemer 5088.*

Sterile sorediate crust sp. 17 (TLC: atranorin; corticolous/muscicolous, thallus thin, soralia diffuse green) – *Lendemer 5081*.

Sterile sorediate sp. 17 is apparently not uncommon in the region, a number of additional collections[4], cited below, have been made in southern New Jersey and elsewhere in eastern Pennsylvania.

Sterile sorediate crust sp. 19 (TLC: no substances detected; lignicolous/muscicolous, thallus scant/poorly developed, soralia diffuse and becoming continuous, greenish) – *Lendemer 5663.*

II. NEW REPORTS FOR THE DWGNRA

The following taxa from the above section represent new reports for the DWGNRA.

Acrocordia megalospora (Fink) R.C. Harris

Arthonia helvola Nyl.

Arthonia sp. *s. lat.*

Bacidia coprodes (Körb.) Lettau

Bacidia phyllopsoropsis R.C. Harris & Lendemer *sp. nov.*

Biatora pycnidiata Printzen & Tønsberg[5]

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[4] *Sterile sorediate sp. 17* – USA. NEW JERSEY. BURLINGTON CO.: Wharton State Forest, west shore of the Skit Branch of the Batsto River, *J.C. Lendemer 3508 & R.F. Lendemer* (NY!, hbL!); Wharton State Forest, south of Batsto, *J.C. Lendemer 3283* (hbL!); Wharton State Forest, 0-1 mile north of Batsto, *J.C Lendemer 3177* (NY!, hbL!). CUMBERLAND CO.: Edward Bevin Wildlife Management Area, N of railroad tracks crossing NJ Route #555, *J.C. Lendemer 1933 & J.A. Macklin* (NY!, hbL!). PENNSYLVANIA. LANCASTER CO.: ca. 1 mile SW of Lees Bridge, *J.C. Lendemer 4492 & A.E. Schuyler* (hbL!).

[5] This recently described species was reported by Printzen and Tønsberg (2004) from the New Jersey side of the park: USA. NEW JERSEY. Sussex County: 3 mi S of Wallpack Center, on steep hill overlooking Delaware River, 1986, *Wetmore 56490* (M).

Candelariella efflorescens R.C. Harris & Buck
Cladonia apodocarpa Robbins
Cladonia dimorphoclada Robbins
Cladonia parasitica (Hoffm.) Hoffm.
Cladonia robbinsii Evans
Cladonia sobolescens Nyl. *ex* Vainio
Cladonia strepsilis (Ach.) Grognot
Dactylospora pertusariicola (Willey *ex* Tuck) Hafellner*
Dimelaena oreina (Ach.) Norman
Fuscidea arboricola Coppins & Tønsberg
Hypotrachyna livida (Taylor) Hale
Ionaspis lacustris (With.) Lutzoni
Julella fallaciosa (Stizenb. *ex* Arnold) R.C. Harris
Lecanora hybocarpa (Tuck.) Brodo
Lecanora minutella Nyl.
Lecania subfuscula (Nyl.) S. Ekman ?
Lecidea hypnorum Libert
Lepraria neglecta (Nyl.) Lettau [psoromic acid chemotype]
Lithothelium hyalosporum (Nyl.) Aptroot
Marchandiomyces corallinus (Roberge) Diederich & D. Hawksw.*
Melanelixia fuliginosa (Fr. *ex* Duby) O. Blanco et al.
Melaspilea sp. 1*
Melaspilea sp. ? 2*
Micarea melaena (Nyl.) Hedl.
Micarea prasina Fr.
Muellerella pygmaea (Körber) D. Hawksw. var. *athallina* (Müll. Arg.) Triebel*
Nectriopsis parmeliae (Berk. & Curtis) M. S. Cole & D. Hawksw.*
Nectriopsis rubefaciens (Ellis & Everh.) M. S. Cole & D. Hawksw.*
Nephroma helveticum Ach.
Parmotrema hypotropum (Nyl.) Hale
Pertusaria globularis (Ach.) Tuck.
Pertusaria plittiana Erichsen
[*Physcia pumilior* R.C. Harris]
Physcia stellaris (L.) Nyl.
Physcia subtilis Degel.
Physconia detersa (Nyl.) Poelt
Placynthiella dasaea (Stirton) Tønsberg
Placynthiella icmalea (Ach.) Coppins & P. James[6]
Porpidia sp.
Porpidia albocaerulescens (Wulfen) Hertel & Knoph var. polycarpiza (Vain.) Rambold & Hertel
Pronectria sp.*
Rhizocarpon rubescens Th. Fr.
Rhizoplaca subdiscrepans (Nyl.) R. Sant.
Rinodina sp. 2
Rinodina willeyi Sheard & Giralt
Roselliniella cladoniae (Anzi) Matzer & Hafellner*
Sphinctrina tubiformis A. Massal.*
Thelocarpon sp.
Trapeliopsis sp. - *Lendemer 5662.*
Trapeliopsis granulosa (Hoffm.) Lumbsch
Usnea hirta (L.) F.H. Wigg.
Vouauxiella lichenicola (Linds.) Petrak & H. Sydow*
Vouauxiomyces truncatus (de Lesd.) Dyko & D. Hawksw.*
Sterile sorediate crust 11

[6] Previous reported by Harris & Lendemer (2005) as a substrate for *Dactylospora lurida* Hafellner.

Sterile sorediate crust 12
Sterile sorediate crust 13
Sterile sorediate crust 14
Sterile sorediate crust 16
Sterile sorediate crust 17
Sterile sorediate crust 18
Sterile sorediate crust 19

Names Changes for Taxa Already Reported:

Caloplaca sp. = *Caloplaca oxfordensis* Fink *ex* J. Hedrick
Lecidea ahlesii (Körb.) Nyl. = *Lecidea ahlesii* (Körb.) Nyl. var. *nemoralis* (J. Lowe) *ined.*
Myxobilimbia sabuletorum (Schreb.) Hafellner = *Bilimbia sabuletorum* (Schreb.) Arnold
Parmelinopsis spumosa (Asah.) Elix & Hale ? = *Hypotrachyna showmanii* Hale
Trapelia involuta (Taylor) Hertel = *Trapelia glebulosa* (Sw.) J.R. Laundon
Xanthoparmelia somloensis (Gyelnik) Hale = *Xanthoparmelia viriduloumbrina* (Gyelnik) Lendemer

III. DISCUSSION

Prior to our contributions the lichen flora of the park was already among the most diverse in the United States (Bennett & Wetmore 2005). Even though Bennett & Wetmore's article had not been published when we began to compile our previous report of DWGNRA lichens (Harris & Lendemer 2005), we were astounded by the diversity of lichens in the park. The previous report included 209 species, of which many were newly reported for the state, two were newly reported for North America, and many apparently represented undescribed taxa of which two have subsequently been formally described (Harris & Lendemer 2005, Lendemer 2005). The opportunity to collect again in such a diverse area, especially with the many participants of the A. Leroy Andrews Foray, provided a rare chance to test the checklist we had compiled only a year ago. The fact that the foray would visit only localities *already* covered by the checklist piqued our interest even more. Though when we published the previous checklist, we expected "additional intensive collecting would likely significantly add" to the list, we did not expect the large number of additions reported here from localities we had already visited. This latest contribution should be considered a supplement to our previous checklist and reports an additional sixty four taxa [!] from the park. Though many of the newly reported taxa are inconspicuous crustose taxa, which are often ignored or overlooked in the field, a significant number of them are conspicuous macrolichens. It should be noted that a rather large number of the new reports also represent lichenicolous fungi, another group often overlooked in the field.

Since the seemingly remarkable diversity of lichens in the DWGNRA is based on truly minimal collection time, one immediate conclusion that can be drawn is that an intensive survey of DWGNRA lichens is desperately needed. Additionally, since the lichens listed in Bennett & Wetmore (2005) were collected in 1986, a resurvey would provide an important opportunity to evaluate the changes in lichen diversity after 20+ years. Moreover, in order to properly evaluate the uniqueness of DWGNRA, a similar intensity of collecting is needed from adjacent Pennsylvania. There are, however, virtually no comparable studies from Pennsylvania other than those currently being conducted in other portions of eastern Pennsylvania by the second author (JCL) which have shown a similar lack of adequate basic lichen diversity data. Thus the dire need for intensive floristic surveys is not limited to the political boundaries of the DWGNRA, but rather extends throughout the commonwealth as a whole.

Despite the existence of a wealth of baseline data for Pennsylvania from the late 1700's through the mid 1800's (Lendemer & Hewitt 2002), there has been virtually no progress towards a comprehensive understanding of the lichen flora of Pennsylvania until the work of the second author began several years ago. Such historical data are not available for many regions outside of Europe, and it is nothing short of astonishing that a region so close to the east coast megalopolis would have remained so poorly explored for such a long period of time. This contribution only supports the need to continue the series of reports by the second author and his collaborators; the diversity of lichens in Pennsylvania is far from being "well known" or adequately estimated and understood. The overall lack of such work throughout eastern North America should lead us to question the comparatively small value we heretofore have placed on basic

floristic and taxonomic studies of these diverse and dynamic organisms in our region. In conclusion, we quote from an essay we recommend be read by all funding agencies, written by Richard Korf, one of the elders of American mycology: "We *must* collect, collect, and collect."

ACKNOWLEDGEMENTS

We are indebted to Bill Olson for arranging the 30th A. Leroy Andrews for and the National Park Service for permission to collect in the Water Gap. We also thank the participants for their enthusiastic help testing (and adding) to our previous checklist. Also thanks to Bob Dirig and Stefan Ekman for reviewing the manuscript.

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APPENDIX

DESCRIPTION OF BACIDIA PHYLLOPSOROPSIS

Bacidia phyllopsoropsis R.C. Harris & Lendemer ***sp. nov.***

TYPE: Pennsylvania, Monroe County: Middle Smithfield Township, Delaware Water Gap National Recreation Area, Community Drive Wetlands, E of Community Drive, 0.6 mi NE of River Road, 41°04'43"N, 75°00'24"W, 215-145 m; extensive semi-calcareous rock outcrops in hemlock-dominated forest, 17 Sep 2005, *Buck 49265* (NY!, holotype; hb. Lendemer!, isotype).

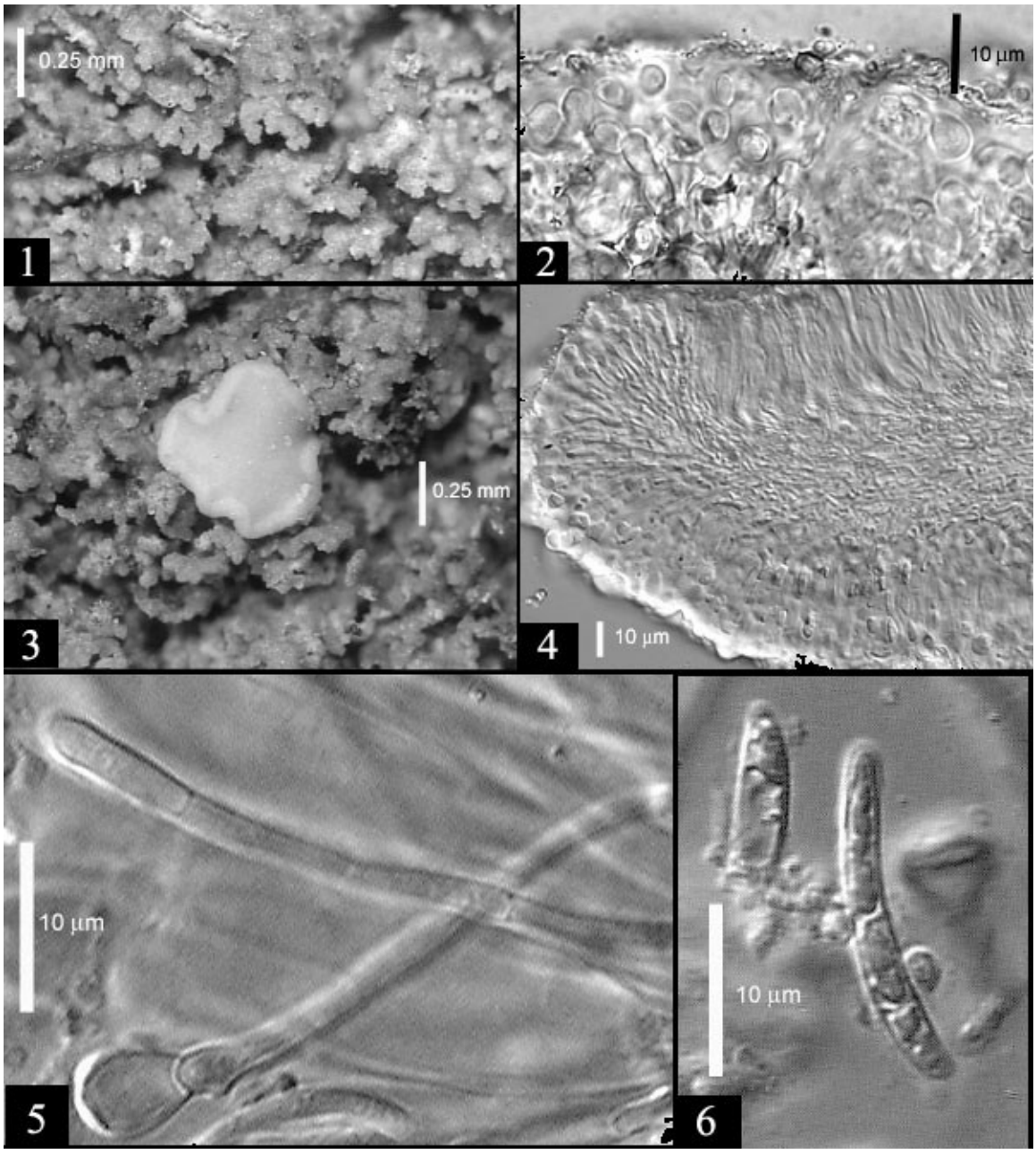
Thallus on moist, shaded, carbonate rock, squamulose, green to pale green, slightly shiny, tightly to loosely imbricate, ± flabellate, irregularly lobed, reaching 0.2-0.3 mm long, 0.3-0.4 mm wide, ca. 0.1 mm thick, corticate above, ecorticate below, with thin, whitish, weakly arachnoid prothallus; cortex paraplectenchymatous with thick cell walls, variable in thickness, 15-20 µm thick where well-developed, without crystals; KOH–, C–, PD–, no substances detected. Apothecia originating from hypothallus, initially sessile but soon surrounded and embedded by squamules, rounded when young with pale buff disk and whitish margin flush with disk, to 0.5 mm across, becoming irregular and convoluted with age, to 1.0 mm, disk darker in older apothecia of Pennsylvania collections (pale orangish to yellowish in New Jersey collection) apparently mainly due to presence in the hymenium of a brown hyphomycete, with the oldest apparently regenerating forming clusters of small apothecia, to 1.5 mm; no evident pigmentation in section (KOH–, N–); exciple of radiating hyphae ca. 45-60 µm thick, with cells enlarging outward, in center notably enlarged, and ± cylindrical; hypothecium prosoplectenchymatous, ca. 40-50 µm thick, with narrow

lumina and thick wall, K/I–; subhymenium ca. 40 µm thick, K/I+ blue; hymenium to 70 µm thick, K/I+ dark blue. Paraphyses little branched, some not expanded at tips, others with knob-like tip to 5µm in diameter. Asci subclavate, mostly with K/I– tholus but a few *Bacidia*-type seen, with eight spores. Spores acicular, 0-3-septate, 15-24 x 2.5-3 µm. Pycnidia not found.

We are not aware of any lichen in eastern North America similar to *B. phyllopsoropsis*. However, the generic position of this distinctive species is problematic. The squamulose thallus and whitish, arachnoid prothallus suggest *Phyllopsora* Müll. Arg. but apothecial anatomy and ascospores exclude it from that genus. It also seems excluded from the longer spored species segregated from *Phyllopsora* (*Bacidiopsora* Kalb, *Sporacestra* A. Massal., and *Squamacidia* Brako) by apothecial anatomy, prothallus color, lack of chemistry, etc. *Bacidina* Vězda is possible but the ascospores are rather broad for a *Bacidina*, the thallus does not produce goniocysts, and in the only squamulose species of *Bacidina* the squamules are ecorticate. The remaining choices seem to be *Bacidia* De Not. or a new genus. The path of least resistance has been taken. While the squamulose thallus is out of place in *Bacidia*, the apothecial anatomy of *B. phyllopsoropsis* seems close to that of *B. suffusa* (Fr.) A. Schneid. (Ekman, 1996, fig. 3C). Unfortunately pycnidia were not found since conidia are of considerable value in unraveling relationships in this group.

The new species was found growing on a vertical rock face in dense shade without associated lichens. The lack of associates seems to indicate that the species has developed a tolerance for shaded habitats where other lichens cannot grow. The shaded rock faces at the type locality are covered in many areas by species of *Lepraria* and *Phlyctis*. Similarly, the large shaded boulders at the type locality host abundant *Phaeophyscia adiastola* and *Trapelia placodioides* as well as *Verrucaria* and *Pseudosagedia* spp. It is interesting, considering the relative abundance of shade tolerant lichens, that *B. phyllopsoropsis* was found alone. It should also be recognized that the description of *B. phyllopsoropsis* brings the number of new species described from the Community Drive Wetlands to three, with a number of as yet unidentified collections possibly representing additional undescribed taxa.

Additional Specimens Examined. - U.S.A. NEW JERSEY. Warren Co., Frelinghuysen Township, Presbyterian Camp and Conference Center, ca. 1 mi SW of Johnsonburg on Co. Rd. 519, 40°58'N, 74°57'W, ca. 180 m, limestone outcropping in mixed hardwoods, 13 Sep 1992, *Buck 21604* (NY). PENNSYLVANIA. Monroe Co., [as for the type], *Buck 49278* (sterile), *Buck 49311* (NY).



Figs. 1-6 *Bacidia phyllopsoropsis* (holotype). Fig. 1: Squamulose thallus. Fig. 2: Cross-section of squamule. Fig. 3: Apothecium. Fig. 4: Cross-section of apothecium. Fig. 5: Paraphyses. Fig. 6: Ascospore. (figs. 4-6 differential interference contrast).