PIEDMONT LICHEN INVENTORY:

BUILDING A LICHEN BIODIVERSITY BASELINE FOR THE PIEDMONT ECOREGION OF NORTH CAROLINA, USA

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This Final Project, whose results are reported herein with sections also published in the scientific literature, is dedicated to Daniel G. Perlmutter, who urged that I return to academia. And to Theresa, Nichole and Dakota, for putting up with my passion in lichenology, which brought them from southern California to the Traingle of North Carolina.

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INTRODUCTION

Lichens are composite organisms, consisting of a fungus (the mycobiont) and a photosynthesising alga and/or cyanobacterium (the photobiont), which together make a life form that is distinct from either partner in isolation (Brodo *et al.* 2001). The relationship is a symbiosis, with the mycobiont providing a habitat for the photobiont, which in turn provides the fungus with carbohydrates for nourishment and in the case of cyanobionts with fixed nitrogen. While often considered a part of the vegetation (*e.g.* Godfrey 1997), lichens are classified as lichenized fungi with most mycobionts being sac fungi (Phylum Ascomycota) while a few are mushroom fungi (Phylum Basidiomycota).

Lichens grow on most surfaces, including rocks, bark, wood and soil. They come in a wide array of colors from white to black, and include reds, oranges, yellows, greens, blues and browns. Morphologically they are also varied, with three major growth forms or habits: crustose (crust-like), foliose (leaf-like) and fruticose (shrub-like or otherwise three-dimensional).

Found in nearly all terrestrial habitats and a few aquatic ones, lichens are able to withstand extreme conditions from the Antarctic to the hottest deserts (Nash 1996), even experimental exposures to outer space (Schulte *et al.* 2006). Yet despite this hardiness, lichens are susceptible to air pollution, since they receive all their nutrients from the atmosphere without the protection of a cuticle as found in plants. Lichen diversity has been used as an indicator of air quality (Gries 1996) and forest health (Selva 1994), with richer floras being found consistently in cleaner, less disturbed and older environments.

Prior to this study, very little was known of the lichen diversity of the North Carolina Piedmont habitats, as most of the research was reported from the mountains in the western part

of the state (*e.g.* Dey 1978, Heiman 1996, DePriest 2001) with only a few scattered reports from the Piedmont (Robinson 1959, Becker *et al.* 1978). The objective of this Final Project was to build a baseline of lichen biodiversity in the North Carolina Piedmont for future studies including those involving impacts of land use changes (*i.e.*, real estate development and resulting habitat loss), air pollution and climate change. This Project consists of four stages: 1) a working checklist for the state of North Carolina compiled from the literature, 2) an annotated checklist of lichen taxa of the state's Piedmont region built largely from an extensive herbarium survey, 3) field surveys, and 4) a revised checklist of the Piedmont lichens incorporating specimens collected from earlier stages. The first two stages contributed to the background research to assess the knowledge of lichen diversity in the North Carolina Piedmont prior to field research. The third stage (*i.e.*, fieldwork) included both collecting forays to state parks and a more structured plot-based survey of the North Carolina Botanical Garden's Mason Farm Biological Reserve. The fourth stage is a culmination of prior stage activities, and serves to provide a more comprehensive baseline of the lichen biodiversity for the North Carolina Piedmont, rendering stage two's report largely obsolete.

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CHAPTER I

THE NORTH CAROLINA LICHEN CHECKLIST

The first step toward building a baseline lichen diversity assessment anywhere is to determine what has already been reported in the literature. Therefore, prior to conducting any fieldwork, an extensive literature search was made for lichen taxa reported from North Carolina. The result of this literature review was a statewide checklist (Perlmutter 2005; Appendix I-A), listing 605 taxa of lichens and lichenicolous fungi for the state.

The article, the first listing of lichens for North Carolina, was widely received by the lichenological community. Responses were from lichenologists from the USA and abroad, offering encouragement while pointing out mistakes and additional literature sources that were overlooked. With the help of one colleague an addendum to the checklist was made, listing an additional 128 taxa (Perlmutter and Greene 2005; Appendix I-B).

The state checklist had since become a web-based document through the invitation to supervise an internet version on a global lichen checklist portal run by Dr. Tassilo Feuerer of the University of Hamburg, Germany. The advantage of an online checklist is that it can be updated with periodic review of additional literature sources, especially newer reports as the field of lichenology continues to produce many new discoveries. In essence, it is a living, growing document. Prior to Perlmutter (2005), the portal's list for North Carolina stood at 136 taxa in 2004. Currently this list has grown to 850 with an anticipated lichen flora of over 1000 species for the state (Perlmutter 2008; Appendix I-C), effectively rendering the earlier checklists obsolete. With further surveys and exploration the state lichen biota is expected to reach a richness of 1000 taxa within five years.

LITERATURE CITED

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CHAPTER II

HERBARIA SURVEYS AND INITIATION OF A NEW LICHEN COLLECTION AT THE UNIVERISTY OF NORTH CAROLINA HERBARIUM (NCU)

After producing the North Carolina lichen checklist the next step in the background research phase of this Project was to survey the herbaria holdings for specimens collected in the North Carolina Piedmont. I first met with University of North Carolina Herbarium (NCU) curatorial staff Alan Weakley and Carol Ann McCormick, to whom I proposed to review their collection and deposit specimens that I would collect during the field phase of the Project. As a measure of good faith, I deposited my initial reference collection of about 25 specimens from southern California in NCU.

Review of the NCU collection and later that of Duke University cryptogamic herbarium (DUKE) co-incided with my initial collecting of local specimens to become familiar with the local lichen flora. An initial report, listing specimens from these herbaria, was produced for each Herbarium and a draft was prepared and submitted for publication in *Castanea*. Initial peer review by regional lichenologists prompted a re-examination of each of the above herbaria collections to verify specimen identities. With the permission from the journal's assigned Managing Editor, Dr. Paul Davison of the University of Alabama, a survey of internet-accessible specimen records of herbaria around the world was conducted, listing specimens of taxa collected in the Piedmont of North Carolina by reputable lichenologists. To further boost this Piedmont lichen inventory, I incorporated my own collections, some of which representing species not yet reported for the state. The revised report (Perlmutter 2006; Appendix II-A) documented 338 taxa, including 22 additions to the state checklist.

One of these newly reported taxa is *Flakea papillata*, an unusual microfoliose lichen which had "slipped through the cracks" and was not reported for North America until the 21st century despite collections in American herbaria for over fifty years. This curious cryptogam was called "The Thing" as collectors were unsure how to classify it. In 1992 Swedish lichenologist Ove Eriksson published a description of *F. papillata* and determined it to be a lichen based on tropical specimens he collected and examined (Eriksson 1992). With the encouragement of New York Botanical Garden's lichenologist Richard C. Harris I undertook a side study of this species, examining specimens from DUKE and NY herbaria and published its occurrence and distribution in North America (Perlmutter 2006a; Appendix II-B). Subsequent molecular analysis of North Carolina specimens at the University of Graz, Austria (GZU) had placed *F. papillata* formally into the lichen family Verrucariaceae (Muggia *et al*., in press).

As indicated above, I assumed responsibility of building the lichen collection at NCU as part of this project. Upon reviewing its existing collection in 2005 I found that most specimens were collected in the early half of the twentieth century with virtually no specimens dating later than 1965. The condition of this collection, which is estimated at about 1,000 specimens, was observed in need of an overhaul with many poorly housed in either letter envelopes or drugstore medicine ones and organized somewhat alphabetically.

Beginning with my initial reference collection from California I started a new collection, housed in packets of Herbarium grade paper and stored in acid-free boxes per guidance of curatorial staff at NCU, DUKE and the Santa Barbara Botanic Garden (SBBG). The collection is organized in a phylogenetic arrangement following the accepted classification of Myconet's Outline of Ascomycota (Lumbsch and Huhndorf 2007), and is periodically reorganized per published updates of the outline.

Further, each specimen's collection information is entered into a Microsoft Access database uploaded into NCU's intranet. The database was downloaded and modified from a blank template that was found available online on the Arizona State University Herbarium (ASU) website with permission from the collections manager Robin Schroeder. A feature of this database is a label function, where specimen labels in a standard format can be printed for specimen packets. Currently, over 1900 specimens are databased and filed in the new collection, including all those surveyed in the NC Piedmont from the older collection. This collection is currently split between a cabinet in the hallway of Coker Hall and those inside the Herbarium near the older collection. To eventually incorporate this collection into the Herbarium's web-accessible vascular plant database, all specimens are accessioned as part of routine processing and filing. An updated outline to the newer collection is posted in the cabinet with the specimens, and a copy of it is attached as Appendix II-C.

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Perlmutter, G.B. 2006. Lichen inventory of the North Carolina Piedmont. *Castanea* 71(4): 282-294.

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CHAPTER III

PREPARATORY FIELD SURVEYS I: BATTLE PARK AND ROCK CLIFF FARM

As my lichen knowledge began to grow, I was invited by then NCBG Education Specialist Lynn Cole to participate as a team leader in two successive yet separate biodiversity inventory events in the Triangle area. These were excellent opportunities to further explore the region's lichen biota and further prepare myself in identification skills for the plot surveys at Mason Farm. The first was at Battle Park in Chapel Hill, Orange County, in April 2005 followed two months later at Rock Cliff Farm in Falls Lake State Recreational Area, Wake County. Collection checklists from both events are presented here; selected specimens are also cited in Perlmutter (2006).

LICHENS COLLECTED DURING THE BATTLE PARK BIOBLITZ

The North Carolina Botanical Garden (NCBG) assumed responsibility for Battle Park in Chapel Hill on 1 July 2004. A continuing forest with a mix of native and exotic vegetation, this park was first explored for its biodiversity via a one-day survey or bioblitz on 23 April 2005. This event was organized by the Garden and UNC's Morehead Planetarium and involved teams of experts and the public which focused on various groups, including: vascular plants, bryophytes, birds, wood-decay fungi and lichens. I led the lichen team, which collected in the vicinity of Forest Theater. Lichen collection was continued on a follow-up visit on 30 April 2005 to more completely inventory this part of the park's biota. All specimens were deposited in NCU. The resulting collection list was submitted to NCBG for inclusion in the Battle Park

vegetation survey report as an appendix (Geinke and White in prep). Nomenclature follows Esslinger (2008). Author's collection numbers of vouchers follow taxa.

Collection List

Arthonia quintaria Nyl. – *86, 111, 111a*

Bacidia schweinitzii (Fr. *ex* E. Michener) A. Schneider – *79*

Candellariella reflexa (Nyl.) Lettau – *107, 100*

Cladonia petrophila R.C. Harris – *108*

Flavoparmelia caperata (L.) Hale - *92*

Graphis scripta (L.) Ach. – *109*

Hypotrachyna livida (Taylor) Hale – *91*

Lecanora hybocarpa (Tuck.) Brodo - *81*

Lecidella enteroleucella (Nyl.) Hertel – *87, 94a*

Lepraria lobificans Nyl. – *103, 113*

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – *130a*

Ochrolechia africana Vain. – *106*

Parmotrema hypotropum (Nyl.) Hale – *104*

Parmotrema submarginale (Michx.) DePriest & B. Hale - *88*

Physcia atrostriata Moberg *et al.* – *105*

Physcia pumilior R.C. Harris – *90*

Punctelia rudecta (Ach.) Krog – *89, 98*

LICHENS COLLECTED DURING THE ROCK CLIFF FARM NATURAL HISTORY INVENTORY

The B.W. Wells Association, of which NCBG is a partner, hosted a natural history inventory at Rock Cliff Farm on 4 June 2005, to compliment an earlier event that occurred in February of that year. Rock Cliff Farm lies in the B.W. Wells Recreation Area within the Falls Lake State Recreation Area in northern Wake County (35°59'59"N, 78°38'51"W). It is the site where pioneer ecologist Dr. B.W. Wells had lived after retiring from North Carolina State College (now North Carolina State Univeristy). While the lichen biota was explored in the Zeagle's Rock Trail area by a Duke University lichenologist during the earlier inventory event, I led a team that explored the Terrace Trail and Wildflower Trail areas to better complete the inventory for Rock Cliff Farm. An amended checklist will appear in a publication about Rock Cliff Farm by the B.W. Wells Association at a later date, and the portion from the June 2005 event specifically is presented here. Author's collection numbers of vouchers follow taxa.

Collection List

Arthonia quintaria Nyl. – *118, 118a*

Arthonia rubella (Fée) Nyl. - *140*

Buellia maculata Bungartz - *134*

Cladonia peziziformis (With.) J. R. Laundon - *141*

Cladonia ochrochlora Flörke - *124*

Cladonia subtenuis (Abbayes) Mattick – *135*

Hypotrachyna livida (Vain.) Hale – *128*

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – *130a, 150*

Ochrolechia africana Vain. – *132*

Parmotrema hypoleucinum (Steiner) Hale - *119*

Parmotrema hypotropum (Nyl.) Hale – *120*

Parmotrema perforatum (Jacq.) A. Massal. - *127*

Parmotrema submarginale (Michx.) DePriest & B. Hale – *138*

Pertusaria epixantha R.C. Harris – *117*

Pertusaria trachythallina Erichsen – *130*

Physcia americana G. Merr. – *133*

Polymeridium proponens (Nyl.) R.C. Harris – *145*

Punctelia rudecta (Ach.) Krog – *137*

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CHAPTER IV

PREPARATORY FIELD SURVEYS II: STATE PARK FORAYS

Beginning February 2006 I explored the North Carolina State Park System of its lichen diversity. The first park visited was William B. Umstead State Park (WIUM) in western Wake County between the cities of Raleigh and Durham. A representative of protected Piedmont mixed forest, WIUM presented itself an excellent area to practice my skills at field collecting and to further learn the local lichen biodiversity in preparation for the Mason Farm plot study. Multiple sites within the park were surveyed throughout the year as public educational walks, followed by a two-day intensive collecting foray in January 2007 with lichenologist James C. Lendemer of the Academy of Natural Sciences of Philadelphia (PH), later of the New York Botanical Garden (NY). The resulting checklist report for the park (Perlmutter and Lendemer 2008; Appendix IV) lists 140 taxa from over 300 collections deposited in NCU and PH. Species observations were entered into the NC Department of Parks and Recreation's Natural Resource Inventory Database (NRID): http://149.168.1.196/nrid/.

Other elements of the state park system were visited by invitation by park staff to explore and catalogue their lichen diversities. Parks inventoried include: Fort Macon State Park and Theodore Roosevelt State Natural Area in maritime forest of the Outer Banks of Carteret County; Raven Rock State Park along the fall line in Harnett County; Lower Haw River State Natural Area in riparian / alluvial forests in Chatham County; and Piedmont monadnock habitats of Morrow Mountain, Occoneechee Mountain and Pilot Mountian state parks and natural areas. Pilot Mountain State Park, it should be noted, has two elements, each of which were visited: the Yadkin River Section and Pilot Mouuntain Section. Pilot Mountain itself, while a monadnock, is

part of the Saurotown Mountains and a disjunct portion of the Blue Ridge Level III Ecoregion while the lower elevation Yadkin River Section is within the Piedmont Level III Ecoregion (Griffith *et al.* 2002). As with WIUM, species observations were entered in the NRID and year-end reports were prepared for the parks system. Checklists from the two coastal forays were published in the literature (Perlmutter 2007 and 2007a). The experience gained from these forays further strengthened my identification skills and further prepared me for the plot surveys at Mason Farm.

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CHAPTER V

LICHEN BIOTA OF MASON FARM BIOLOGICAL RESERVE

In 2007 the plot survey in Mason Farm was conducted, yielding a checklist of 100 taxa of lichens and allied fungi in six disctinct communities as delineated by forest type and layer in the two forests in the Southern Shagbark Hickory Slope and Big Oak Woods Natural Areas. Results of this study were presented at the Association of Southeastern Biologists 69th annual meeting (Perlmutter 2008), with the report published in *The Journal of the North Carolina Academy of Sciences* (Perlmutter 2008a; Appendix V). Additional information is provided below.

During collecting, select duplicates of shield lichens (Family Parmeliaceae) were sent to the Biocenter Klein Flottbek's Herbarium Hamburgense (HBG) in the University of Hamburg, Germany, for a molecular study of the family's diversity in North Carolina. Further, two specimens of *Canoparmelia* were submitted Dr. Ana Crespo in Madrid, Spain for molecular analysis as part of a global study of the Parmeliaceae (Divakar *et al.* 2008).

Plot locations, elevations and canopy covers, which were not published in Perlmutter (2008a) are in Table 1.

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Perlmutter, G.B. 2008a. The lichen biota of Mason Farm Biological Reserve, North Carolina. *Journal of the North Carolina Academy of Sciences* 124(3) 82-90.

Table 1. Plot locations and canopy measurements taken in 2007. SSH = Southern Shagbark Hickory Natural Area, BOW = Big Oak Woods Natural Area. See Perlmutter (2008a) for descriptions.

Natural Area	Plot No.	Latitude	Longitude	Elevation (m)	% Canopy Cover Summer	% Canopy Cover Winter
SSH	5	35°53’23"	79°01’07"	80.7	61.81	35.26
	6	35°53’20”	79°01’14”	88.8	65.68	36.04
	8	35°53’08”	79°01’10”	80.0	68.80	25.38
	9	35°53’02”	79°01’13”	80.8	73.22	32.14
BOW	13	35°53’01”	79°00’49”	74.4	71.92	37.29
	14	35°53’03”	79°00’50”	74.0	70.62	36.56
	19	35°53’09”	79°00’49”	74.8	69.58	37.34
	20	35°53’14”	79°00’55”	75.2	72.70	34.74
				Mean	69.29	34.34
				SD	3.87	3.99

CHAPTER VI

ADDITIONAL PIEDMONT LICHEN SURVEYS: UWHARRIE MOUNTAINS

Many of the state parks surveyed in 2006 included monadnocks or isolated peaks locally known as mountains, which rise conspicuously above the Piedmont hills. One of these parks is Morrow Mountain State Park, which lies in the Uwharrie Mountains: a chain of monadnocks stretching northeast in three counties. In 2008 two more sites in the Uwharries were visited, in habitats considered rare or unique. A checklist from these two trips was compiled to represent the Uwharries and to encourage further survey work in this region as well as other monadnocks (Perlmutter 2009; Appendix VI).

LITERATURE CITED

Perlmutter, G.B. 2009. Contributions to the lichen biota of North Carolina: a preliminary checklist of the lichens of the Uwharrie Mountains. *Opuscula Philolichenum* 6: 65-72.

CHAPTER VII

A REVISED LICHEN INVENTORY OF THE NORTH CAROLINA PIEDMONT

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Abstract. Based on a reinterpretation of regional boundaries and a resurvey of the UNC Herbarium's lichen collection and other sources after four years of survey work, an updated yet still preliminary lichen flora of the North Carolina Piedmont is here presented. Three hundred forty-three detrmined taxa representing 129 genera in 55 families, including two species of lichenized Basidiomycota are lsited. Broken down by habit, the current Piedmont lichen biota comprises 45% crustose, 33% foliose and 22% fruticose taxa. Thirteen new taxa have been described since the publication of the region's first lichen inventory in 2006. Specimens cited from Hanging Rock State Park and Stone Mountain State Park were removed as these areas are considered portions of the Southern Appalachains.

Keywords: biodiversity, checklist, lichen, North Carolina, Piedmont.

INTRODUCTION

Since the first attempt to document the lichen biodiversity of the North Carolina Piedmont, largely based on herbaria records (Perlmutter 2006), a concerted effort was made to field inventory portions of representative communities of this region. Most of these surveys focused on forested habitats, including Mesic Mixed Hardwood Forest, Piedmont Swamp Forest, Piedmont Monadnock Forest, and Basic Oak-Hickory Forest (Shafale and Weakley 1990). Rock outcrops and loose rocky areas were also sampled as well as urban habitats, the latter in the state capital city of Raleigh. These collections were compiled and incorporated with a resurvey of the UNC Herbarium into a revised lichen flora for the North Carolina Piedmont, an effort which will be periodically updated with continued survey work.

STUDY REGION REDEFINED

A description of the North Carolina Piedmont is provided in Perlmutter (2006). While that report described the region as a physiographic province, in this revision I used the more recent description as an EPA Level III Ecoregion (Griffith *et al.* 2003), which incorporates both biotic and abiotic factors, to determine species occurrences within the Piedmont. In terms of topography, geology, climate and vegetation, the two region descriptions are essentially the same. It should be noted that the Piedmont is bordered from the Southern Appalachians by the Blue Ridge escarpment to the west, and from the flatter coastal plain by the Fall Line to the east. The map delineating the Piedmont Ecoregion (Griffith *et al.* 2002, reproduced as Appendix VII) is considerably more precise than that I had used previously. As a result, some changes were made to the checklist.

Based on this updated mapping of regions, the monadnocks of Pilot Mountian (Surry County) and Hanging Rock (Stokes County) state parks are now considered the Saurotown Mountains as disjunct parts of the Blue Ridge Level III Ecoregion of the Southern Appalachians (≈ Mountain Physiographic Province). Stone Mountian, lying on the Blue Ridge escarpment itself, is also part of the Blue Ridge Ecoregion. Specimens from Hanging Rock State Park and Stone Mountian State Park (Wilkes County) cited in Perlmutter (2006) were erroneously listed as Piedmont taxa. Based on Griffith *et al.*'s ecoregion delineation they are acknowledged as mountain lichens and removed in this revision. However, no major changes resulted from the revision in the Piedmont's eastern border with the Southeastern Plains Ecoregion of the coastal plain.

METHODS

The NCU lichen collection, which had grown considerably from several collecting trips since its initial survey in 2005, was resurveyed of its North Carolina Piedmont specimens in 2008-2009 following methods in that initial effort (Perlmutter 2006). In addition to citing Piedmont specimens, those found in the mountains to the west and in the coastal plain the east were noted to give a fuller range account for each Piedmont taxon. The Virtual Herbarium of the New York Botanical Garden (http://sciweb.nybg.org/science2/VirtualHerbarium.asp, accessed April 2009) was also surveyed of its North Carolina Piedmont lichens and allied fungi online, and are included in this report. The literature was similarly mined for Piedmont records, notably recent reports describing new taxa. When multiple sources are available, listing of a taxon was cited according to the following order of priority: observed specimens from the NCU collection > cited specimens from the NY Virtual Herbarium, determined or verified by the cryptogamic

herbarium staff of Buck, Harris and Lendemer > recent survey publications post Perlmutter (2006) > Perlmutter (2006) > older published sources. Substrates and habitats where available were noted for each taxon. Finally, if a species was found in the mountains and the coastal plain of the state, but not in the Piedmont, it was listed separately as anticipated.

RESULTS AND DISCUSSION

A total of 343 taxa representing 129 genera in 55 families were tallied from the NCU collection, the NY virtual herbarium listings, and literature sources. This revised Piedmont lichen diversity represents 40% of the reported North Carolina lichen biota as a whole (Perlmutter 2008). The largest families included: Parmeliaceae with 63 species in 18 genera, Cladoniaceae with 47 taxa in two genera, and Physciaceae with 36 taxa in 12 genera. Species richness is lower in these families than than previously reported (Perlmutter 2006) due to the removal of species citations from Hanging Rock State Park and Stone Mountain State Park. Broken down by habit, the current Piedmont lichen biota comprises 45% crustose, 33% foliose and 22% fruticose taxa, with a greater proportion of crusts and lesser one of foliose lichens than reported previously.

Most noteworthy is the addition of two *Multiclavula* species (*M. corynoides* and *M. mucida*), mushroom lichens that represent the Phylum Basidiomycota. Since the first Piedmont lichen inventory for the state, 13 taxa have been described as new to science, including *Fellhanera hybrida,* which was discovered in William B. Umstead State Park, Wake County, in 2007 (Harris and Lendemer 2009). Several specimens have here been determined only to genus and may represent undescribed taxa. Further study is needed, some of which is already underway.

While the current checklist better represents the North Carolina Piedmont than its previous version, it is still far from complete as only a handful of counties were sampled. Further survey work is needed to better understand the region's lichen biodiversity, which will likely add more taxa not only to this area, but also the larger regions in which the Piedmont reside, plus new species to science. Continued survey work is underway, yielding potential additions to the lichen biota of this rich and fascinating region, once thought "boring" by botanists.

REVISED ANNOTATED CHECKLIST OF LICHENS AND ALLIED FUNGI OF THE NORTH CAROLINA PIEDMONT

A revised annotated checklist of lichens and allied fungi is presented for the Piedmont ecoregion of North Carolina, USA. Nomenclature follows Esslinger (2008) except where as noted, with author abbreviations following Hafellner (2002); classification follows Lumbsch and Huhndorf (2007). Following each family name is the number of genera and species so far found in the region. Species names are followed by county reported (and specimen citations if unpublished); and neighboring regions (CP = Coastal Plain, Mt = Blue Ridge) reported within the state (as reviewed in Perlmutter 2008 and references therein). Specimen citations include the collector's name and number followed by institution where depostied. * = taxon newly described since the first lichen inventory of the region (Perlmutter 2006).

Phylum Ascomycota

Class Arthoniomycetes

Order Arthoniales

Family Arthoniaceae (2 genera, 7 determined species, several incompletely determined)

Arthonia caesia (Flot.) Körb. – **Chatham County:** *G.B. Perlmutter 742* (NCU!); **Orange County:** *G.B. Perlmutter 870a* (NCU!); **Wake County:** *G.B. Perlmutter 1616* (NCU!); CP (*F. Williams s.n.* [NCU!]). On exposed trunks and branches.

Arthonia difrusella? – **Wake County:** *G.B. Perlmutter 237* (NCU!). Thallus whitish; ascomata irregular, black, I+ orange; hypothecium brown; photobiont chlorococcoid; asci arthonioid-elongate; spores 3-4-celled, one end larger, hyaline. On *Betula nigra* trunk.

Arthonia dryadum* R.C. Harris & Ladd *ined.* (Harris & Ladd 2005) – **Orange County: *G.B. Perlmutter 917, 1135* (NCU!); **Wake County:** *G.B. Perlmutter 801, 1253, 1608, 1610* (NCU!); CP (*R.C. Harris 47084* [NY]), Mt (*J.C. Lendemer 8159* [NY]). On shaded trunks and branches.

Arthonia quintaria Nyl. – **Harnett County:** *G.B. Perlmutter 505* (NCU!), **Montgomery County:** *G.B. Perlmutter 1438* (NCU!), **Orange County:** *G.B. Perlmutter 86, 111, 111a, 163, 847, 861, 948, 1104, 1150, 1445* (NCU!), Stanly (*G.B. Perlmutter 405, 426* (NCU!), **Wake County:** *G.B. Perlmutter 73, 118, 118a, 234, 285, 394, 1621* (NCU!); CP (*G.B. Perlmutter 993* [NCU!]). On shaded and exposed branches and trunks.

Arthonia rubella (Fée) Nyl. – **Orange County:** *G.B. Perlmutter 982, 1097, 1178* (NCU!); **Wake County:** *G.B. Perlmutter 140, 353, 575, 1609* (NCU!); CP (*W.R. Buck 51133* [NY]). On shaded trunks.

Arthonia sp. – **Orange County:** *G.B. Perlmutter 1106* (NY!). Thallus purple; ascomata blackish, stellate lirelline; spores 4-celled. On shaded branch.

Arthonia sp. – **Stanly County:** *G.B. Perlmutter 436I* (NCU!). Superficially resembles *A. dryadum* including photobiont and spore characters, but differs in chemistry (epihymenium K+ red-violet, dissolving pigments; C-, KC-). On shaded branch.

Arthothelium spectabile A. Massal. – **Durham County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 852, 926, 1132* (NCU!); **Wake County:** Perlmutter & Lendemer (2008). On shaded trunks.

Arthothelium taediosum auct. Amer. – **Chatham County:** *G.B. Perlmutter 977* (NCU!); **Harnett County:** *G.B. Perlmutter 471, 496, 497* (NCU!); **Johnston County:** *G.B. Perlmutter 75*

(NCU!); **Montgomery County:** *G.B. Perlmutter 1395, 1434, 1444* (NCU!); **Nash County:** *G.B. Perlmutter 210* (NCU!); **Orange County:** *G.B. Perlmutter 362, 378, 1008* (NCU!); **Polk County:** *W.R. Buck 50092* (NY); **Wake County:** *G.B. Perlmutter 56* (NCU!); CP (*G.B. Perlmutter 75, 995* [NCU!]), Mt (Lendemer & Tripp 2008). On exposed and shaded trunks and branches.

Family Chrysotricaceae (1 genus, 4 species)

Chrysothrix flavovirens Tønsberg – **Harnett County:** *G.B. Perlmutter 474* (NCU!); **Wake County:** *G.B. Perlmutter 352, 786* (NCU!); CP (*G.B. Perlmutter 700* [NCU!]). On shaded pine trunks.

Chrysothrix insulizans* R.C. Harris & Ladd (Harris and Ladd 2008) – **Chatham County: Perlmutter (2009); **Montgomery County:** *G.B. Perlmutter 1400, 1416* (NCU!); **Orange County:** Perlmutter (2009), **Stanly County:** *G.B. Perlmutter 369* (NCU!); CP (*R.C. Harris 47176* [NY]), Mt (*P.O. Schallert s.n.* [NCU!]). On partly shaded rock.

Chrysothrix xanthina (Vain.) Kalb – **Montgomery County:** *G.B. Perlmutter 1398* (NCU!); **Orange County:** *G.B. Perlmutter 357, 866, 981, 1030, 1183* (NCU!); **Person County:** (Perlmutter 2009); **Stanly County:** *G.B. Perlmutter 425* (NCU!); **Wake County:** Perlmutter & Lendemer (2008); CP (*G.B. Perlmutter 325* [NCU!]), Mt (*J.C. Lendemer 11906* [NY]). On bark.

Family Melaspileaceae (1 genus, 2 indetermined species)

Melaspilea sp. 1 – **Orange County:** *G.B. Perlmutter 827, 929, 1456, 1470* (NCU!). Thallus shiny tan, endocortic; ascomata short lirelline, black; spores 8 / ascus, brownish hyaline, 2-celled, constricted at septum, 8-16 × 20-26 µm. Also collected from South Carolina CP (*G.B. Perlmutter 1495* [NCU!]) and Virgnina Mt (*G.B. Perlmutter 1284* [NCU!]). On shaded branches and trunks.

Melaspilea sp.2 – **Orange County:** *G.B. Perlmutter 912* (NCU!). Thallus green, brown in herbarium specimens, endocortic w/ dark contact lines; ascomata short lirelline, black; spores 8 / ascus, brownish hyaline, 2-celled, constricted at septum, 10-14 × 26-30 µm. On a shaded branch.

Family Rocellaceae (1 genus, 4 species)

Opegrapha corticola Coppins & P. James – **Orange County:** *G.B. Perlmutter 985* (NCU!); **Wake County:** *J.C. Lendemer 8381* (NY); Mt (*J.C. Lendemer 10415* [NY]). On shaded bark.

Opagrapha varia Pers. – **Orange County:** *G.B. Perlmutter 1457* (NCU!); **Wake County:** *G.B. Perlmutter 761* (NCU!); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10444* [NY]). On shaded bark.

Opegrapha viridis (Ach.) Behlen & Desberger – **Orange County:** *G.B. Perlmutter 1139, 1227* (NCU!); **Wake County:** *G.B. Perlmutter 1241, 1248* (NCU!); CP (*R.C. Harris 47226* [NY]). On shaded bark.

Opegrapha vulgata Ach. – **Orange County:** *G.B. Perlmutter 853, 1031, 1131* (NCU!); **Wake County:** *G.B. Perlmutter 1254, 1271* (NCU!); CP (*W.R. Buck 43737* [NY]), Mt (Lendemer & Tripp 2008). On bark.

Schismatomma glaucescens (Nyl. *ex* Willey) R.C. Harris – **Polk County:** *W.R. Buck 50091* (NY).

Class Dothideomycetes

Order Capnodiales

Family *incertae sedis*

Racodium rupestre Pers. (Muggia *et al.* 2008) – **Forsyth County:** Perlmutter (2006). Substrate not recorded.

Orders Indetermined

Family Arthopyreniaceae (2 genus, 2 species)

Arthopyrenia cinchonae (Ach.) Müll. Arg. – **Wake County:** *G.B. Perlmutter 790* (NCU!); CP (*W.R. Buck 43826* [NY]), Mt (Lendemer & Tripp [2008] as *Anisomeridium cinchonae*). Corticolous.

Julella fallaciosa (Arnold) R.C. Harris – **Orange County:** *G.B. Perrlmutter 1450* (NCU!); **Wake County:** *G.B. Perlmutter 152* (NCU!); CP (*W.R. Buck 51130* [NY]). Family placement follows Harris (1995). Corticolous.

Family Mycoporaceae (1 genus, 2 species)

Mycoporum acervatum R.C. Harris – **Montgomery County:** *G.B. Perlmutter 1442* (NCU!); **Wake County:** *G.B. Perlmutter 1161, 1604* (NCU!). On exposed bark in urban and natural areas.

Mycoporum compositum (A. Massal.) R.C. Harris – **Montgomery County:** *G.B. Perlmutter 1443* (NCU!). On exposed bark.

Family Trypetheliaceae (3 genera, 4 species)

Bathelium carolinianum (Tuck.) R.C. Harris – **Montgomery County:** *G.B. Perlmutter 1385* (NCU!); **Orange County:** *G.B. Perlmutter 855, 983, 1021* (NCU!); CP (Lendemer & Yahr 2004). On shaded, smooth bark.

Polymeridium proponens (Nyl.) R.C. Harris – **Montgomery County:** *G.B. Perlmutter 1372* (NCU!); **Wake County:** *G.B. Perlmutter 145* (NY). Corticolous.

Trypethelium elutariae Spreng. – **Orange County:** *J.N. Couch 14840* (NCU!). Corticolous.

Trypethelium virens Tuck. *ex* E. Michener – **Franklin County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1383* (NCU!); **Orange County:** *G.B. Perlmutter 829, 1032, 1204* (NCU!); **Stanly County:** *G.B. Perlmutter 435* (NCU!); **Wake County:** *G.B. Perlmutter 223, 570, 1244* [blue thallus on beech] (NCU!); CP (*R.C. Harris 47168* [NY]), Mt (J.C. *Lendemer 10499* [NY]). On shaded, smooth bark (mostly on hollies).

Class Eurotiomycetes

Order Pyrenulales

Family Monoblastiaceae (2 genera, 4 species)

Anisomeridium leucochlorum (Müll. Arg.) R.C. Harris – **Orange County:** *G.B. Perlmutter 1180b*. On bark.

Anisomeridium polypori (Ellis & Everh.) M.E. Barr – **Orange County:** *G.B. Perlmutter 905* (NCU!); Mt (Schmitt & Slack [1990] as *A. nyssaegenum*). Corticolous.

Anisomeridium subprostans (Nyl.) R.C. Harris – **Surry County:** *G.B. Perlmutter 616* (NCU!); **Wake County:** *G.B. Perlmutter 753* (NCU!). On bark.

Monoblastia rappii Zahlbr. – **Orange County:** *G.B. Perlmutter 1192* (NCU!). On shaded bark.

Family Pyrenulaceae (3 genera, 9 species)

Anthracothecium nanum (Zahlbr.) R.C. Harris – **Orange County:** *G.B. Perlmutter 889, 895* (NCU!); CP (*R.C. Harris 47225* [NY]), Mt (Lendemer & Tripp 2008). On shaded bark.

Lithothelium phaeosporum (R.C. Harris) Aptroot – **Wake County:** Perlmutter & Lendemer (2008). Corticolous.

Pyrenula caryae R.C. Harris – **Orange County:** *G.B. Perlmutter 1141, 1207* (NCU!); **Surry County:** *G.B. Perlmutter 615* (NCU!). On shaded bark.

Pyrenula citriformis R.C. Harris – **Wake County:** *G.B. Perlmutter 762, 795, 1466* (NCU!); CP (Lendemer & Yahr 2004). On beech.

Pyrenula leucostoma Ach. – **Wake County:** *G.B. Perlmutter 807* (NCU!); CP (*R.C. Harris 47186* [NY]), Mt (Lendemer & Tripp 2008). On shaded, smooth bark.

Pyrenula nitidula (Bresadola) R.C. Harris – **Gaston County:** Perlmutter (2006). Substrate not reported.

Pyrenula pseudobufonia (Rehm) R.C. Harris – **Forsyth County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 924, 1151, 1162* (NCU!); **Wake County:** *G.B. Perlmutter 1242, 1255, 1256, 1260, 1463, 1614* (NCU!); CP (*R.C. Harris 47086* [NY]), Mt (*J.C. Lendemer 10474* [NY]). On shaded trunks.

Pyrenula pyrenuloides (Mont.) R.C. Harris – **Orange County:** *G.B. Perlmutter 1189a, 1206* (NCU!); Polk: Perlmutter (2006). On shaded bark.

Pyrenula subelliptica (Tuck.) R.C. Harris – **Orange County:** *G.B. Perlmutter 1189* (NCU!); **Wake County:** *G.B. Perlmutter 354, 751, 1252, 1259, 1273, 1462, 1464, 1465, 1615* (NCU!); Mt (*J.C. Lendemer 10492* [NY]). On smooth, shaded bark of beech and young hickories.

Order Verrucariales

Family Verrucariaceae (6 genera, 8 determined species)

Agonimia sp. – **Wake County:** Perlmutter & Lendemer (2008): "Thallus terricolous / lignicolous, minutely areolate; ascospores 8/ascus, hyaline, muriform, (30-)33(-37) × (8-)12(-17)µm." specimens in PH.

Dermatocarpon arenosaxi Amtoft – **Orange County:** *J. Metzgar s.n.* (NY); Mt (*W.R. Buck 25245* [NY]). Saxicolous near creek.

Dermatocarpon intestiniforme (Körb.) Hasse – **Forsyth County:** *P.O. Schallert s.n.* (NY); **Stokes County:** *P.O. Schallert s.n.* (NCU!). On soil.

Dermatocarpon luridum (With.) J.R. Laundon – **Forsyth County:** Perlmutter (2006); **Wake County:** *W.C. Coker s.n.* (NCU!); Mt (*J.C. Lendemer 10494* [NY]). On rocks near creeks.

Dermatocarpon miniatum (L.) W. Mann – **Polk County:** Perlmutter (2006); Mt (*P.O. Schallert s.n.* [NCU!]). On soil.

Flakea papillata O.E. Erikss. – **Alamance County:** *G.B. Perlmutter 1267* (NCU!); **Orange County:** *G.B. Perlmutter 1263, 1264* (NCU!); CP (*Perlmutter 470* [NCU!]), Mt (*W.R. Buck 50132* [NY]). Family placement follows Muggia *et al.* (in press). Saxicolous / muscicolous in deep shade of rock crevices and underhangs near creeks.

Normandina pulchella (Borrer) Nyl. – **Chatham County:** Perlmutter (2006); Mt (*J.C. Lendemer 10811* [NY]). Family placement follows Index Fungorum: www.indexfungorum.org (Accessed 24 April 2009). Corticolous.

Placidium arboreum (Schwein. *ex* Michener) Lendemer – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); Mt (*J.C. Lendemer 10414* [NY]). Corticolous.

Staurothele diffractella (Nyl.) Tuck. – **Alexander County:** Perlmutter (2006). Saxicolous.

Verrucaria sp. – **Montgomery County:** *G.B. Perlmutter 1408* (NCU!). Thallus dark, endolithic; perithecia minute; spores simple, hyaline, 8 per ascus, 28-34 × 8-10 µm. On metamorphic rock.

Verrucaria sp. – **Wake County:** Perlmutter & Lendemer (2008). Endolithic on siliceous rock; perithecia <1/3 immersed in substrate, exiple lacking below; ascospores 8/ascus, 22-25.5 × 8-10 µm.

Order Mycocaliciales

Family Mycocaliciaceae (1 genus, species indetermined)

Chaenothecopsis sp. – **Wake County:** Perlmutter & Lendemer (2008). Non-lichenized fungus; substrate not reported.

Order Indetermined

Family Strigulaceae (1 genus, 1 species)

Strigula americana R.C. Harris – **Orange County:** *G.B. Perlmutter 1184* (NCU!); **Wake County:** Perlmutter & Lendemer (2008); CP (*R.C. Harris 47112* [NY]). Saxicolous.

Class Lecanoromycetes

Order Acarosporales

Family Acarosporaceae (3 genera, 3 species)

Acarospora dispersa H. Magn. – **Anson County:** *A.W. Herre 208* (NCU!); **Orange County:** *G.B. Perlmutter 878a, 1224* (NCU!); **Wake County:** *G.B. Perlmutter 815, 821* (NCU!); Mt (*J.C. Lendemer 10835* [NY]. Saxicolous.

Polysporina simplex (Davies) Vězda – **Montgomery County:** *G.B. Perlmutter 1431* (NCU!); **Wake County:** *G.B. Perlmutter 814, 820* (NCU!); Mt (Lendemer & Tripp 2008). Saxicolous.

Order Agyriales

Family Agyriaceae (3 genera, 7 species)

Placynthiella dasea (Stirt.) Tønsberg – **Wake County:** *G.B. Perlmutter 793* (NCU!).

Placynthiella icmalea (Ach.) Coppins & P. James – **Orange County:** Perlmutter (2006); **Wake County:** Perlmutter & Lendemer (2008); CP (*W.R. Buck 43722* [NY]), Mt (*J.C. Lendemer 10849* [NY]. On soil / wood.

Trapelia coarctata (Sm.) M. Choisy – **Orange County:** *G.B. Perlmutter 914* (NCU!); Mt (*Lendemer 10496* [NY]). Saxicolous.

Trapelia glebulosa (Sm.) J.R. Laundon – **Montgomery County:** *G.B. Perlmutter 1402* (NCU!); **Wake County:** *G.B. Perlmutter 760* (NCU!); Mt (Lendemer & Tripp 2008). On pebbles.

Trapelia placodioides Coppins & P. James – **Orange County:** *G.B. Perlmutter 878, 885, 1217* (NCU!); **Wake County:** *G.B. Perlmutter 805* (NCU!); Mt (Lendemer & Tripp 2008). On shaded rock.

Trapeliopsis flexuosa (Fr.) Coppins & P. James – **Wake County:** *G.B. Perlmutter 784a* (NCU!); CP (*R.C. Harris 47131* [NY]). On wood and bark.

Trapeliopsis gelatinosa (Flörke) Coppins & P. James – **Wake County:** Perlmutter & Lendemer (2008); Mt (*J.C. Lendemer 11968* [NY]. On soil and humus.

Order Ostropales

Family Coenogoniaceae (1 genus, 2 species)

Coenogonium luteum (Dicks.) Kalb & Lücking *s. lat.* – **Wake County:** Perlmutter & Lendemer (2008); CP (*R.C. Harris 47082* [NY]), Mt (Lendemer 2007). Substrate not reported.

Coenogonium pineti (Ach.) Lücking & Lumbsch – **Durham County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 780* (NCU!); Mt (Lendemer & Tripp 2008). On pine bark.

Family Gomphillaceae (2 genera, 3 species)

Gomphillus americanus Essl. – **Orange County:** *W.R. Buck 34450* (NY); **Wake County:** *Buck 48965* (NY) (TYPE locality); CP (*W.R. Buck 43747* [NY]), Mt (*J.C. Lendemer 10817* [NY]). On moss over large lateral branches of Eastern Red Cedar, *Juniperus virginiana*.

Gyalideopsis buckii* Lücking, Serus. & Vězda (Lücking *et al*. 2007) – **Orange County: *W.R. Buck 33444* (NY); **Wake County:** Perlmutter & Lendemer (2008); CP (*J.C. Lendemer 3715* [NY]), Mt (*R.C. Harris 24849* [NY]). On shaded branches.

Gyalideopsis ozarkensis* Lücking & W.R. Buck (Lücking *et al.* 2007) – **Wake County: *W.R. Buck 48964* (NY); CP (*J.C. Lendemer 4459* [NY]), Mt (Lücking *et al.* 2007). On branches.

Family Graphidaceae (3 genera, 7 determined species)

Graphis furcata Fée – **Orange County:** *G.B. Perlmutter 952* (NCU!); Mt (*J.C. Lendemer 10818* [NY]. Corticolous.

Graphis inversa R.C. Harris – **Wake County:** Perlmutter & Lendemer (2008). On bark.

Graphis lineola Ach. – **Iridell County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 859, 886* (NCU!); **Wake County:** *G.B. Perlmutter 788* (NCU!); CP (*W.R. Buck 43687* [NY]), Mt (Lendemer & Tripp 2008). On shaded bark.

Graphis scripta (L.) Ach. – **Chatham County:** *G.B. Perlmutter 975* (NCU!); **Montgomery County:** *G.B. Perlmutter 1382* (NCU!); **Orange County:** *G.B. Perlmutter 109, 832, 834, 907, 945, 1015, 1020, 1154, 1170, 1225, 1459a, 1459b* (NCU!); **Stanly County:** *G.B. Perlmutter 434* (NCU!); **Surry County:** *G.B. Perlmutter 611* (NCU!); **Wake County:** *G.B.*

Perlmutter 207, 351, 798, 1245, 1246, 1249, 1250, 1257, 1461 (NCU!); CP (*G.P. Anderson s.n.* [NY]), Mt (*J.C. Lendemer 10884* [NY]). Likely the most common crust on shaded bark.

Leiorreuma explicans* (Fink) Lendemer (Lendemer and Knudson 2008) – **Orange County: *G.B. Perlmutter 856* (NCU!); **Wake County:** *Perlmutter 574* (NY); CP (*R.C. Harris 31082* [NY]).

Phaeographis erumpens (Nyl.) Müll. Arg. – **Orange County:** *G.B. Perlmutter 1027, 1108* (NCU!). On shaded bark.

Phaeographis inusta (Ach.) Müll. Arg. – **Chatham County:** *G.B. Perlmutter 965* (NCU!); **Durham County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 367, 1109* (NCU!); **Stanly County:** *G.B. Perlmutter 428* (NCU!); **Union County:** *F.W. Gray L411* (NY); **Wake County:** *G.B. Perlmutter 787* (NCU!); CP (*G.B. Perlmutter 330* [NCU!]), Mt (*W.R. Buck 25279* [NY]). Corticolous.

Phaeographis sp. – **Orange County:** *G.B. Perlmutter 860* (NCU!); **Wake County:** *G.B. Perlmutter 464* (NCU!). Common script on bark, with an olive thallus bordered by a white prothallus. Lirellae purplish pruinose, branched star-like, coalescing into tight folds in older specimens (not unlike *Sarcographa*), with white border; spores 4-celled, brown, 13-21 × 5-10 µm.

Family Phlyctidaceae (1 genus, 2 species)

Phlyctis ludoviciensis (Müll. Arg.) Lendemer – **Chatham County:** *G.B. Perlmutter 963* (NCU!); **Montgomery County:** *G.B. Perlmutter 1377* (NCU!); **Orange County:** *G.B. Perlmutter 837, 979* (NCU!); **Wake County:** *G.B. Perlmutter 744, 746, 797* (NCU!); CP (*R.C. Harris 47244* [NY]), Mt (*J.C. Lendemer 10881* [NY]). On shaded bark.

Phlyctis petraea* R.C. Harris *ined.* (Harris and Ladd 2005) – **Wake County: *G.B. Perlmutter 70, 341* (NCU!). Saxicolous on shaded rocks.

Family Porinaceae (2 genera, 3 species)

Porina heterospora (Fink) R.C. Harris – **Orange County:** *G.B. Perlmutter 1190* (NCU!); **Wake County:** Perlmutter & Lendemer (2008); CP (*R.C. Harris 47113* [NY]). On shaded bark.

Pseudosagedia cestrensis (Michener) R.C. Harris – **Orange County:** *G.B. Perlmutter 858, 1148, 1018* (NCU!); **Wake County:** *G.B. Perlmutter 244, 772, 759, 1238, 1247, 1607, 1612*

(NCU!); CP (*W.R. Buck 4381* as *Trichothelium cestrense*), Mt (Lendemer & Tripp 2008). On shaded bark.

Pseudosagedia guentheri (Flot.) Hafellner & Kalb – **Montgomery County:** *G.B. Perlmutter 1401* (NCU!); **Wake County:** *G.B. Perlmutter 804* (NCU!); Mt (*J.C. Lendemer 10481* [NY]. On shaded rock.

Family Stictidaceae (1 genus, 1 species)

Thelopsis inordinata Nyl. – **Orange County:** *G.B. Perlmutter 925* (NCU!). On bark.

Family Thelotremataceae (4 genera, 5 species)

Diploschistes actinostomus (Ach.) Zahlbr. – **Anson County:** *P.O. Schallert 139* (NCU!); **Orange County:** *G.B. Perlmutter 374* (NCU!); CP (Perlmutter 2007), Mt (Lendemer & Tripp 2008). Saxicolous.

Dioploschistes muscorum (Scop.) R. Sant. – **Polk County:** Perlmutter (2006). Saxicolous.

Leucodecton subcompunctum* (Nyl.) A. Frisch (Frisch 2006) – **Polk County: Perlmutter (2006) as *Myriotrema subcompunctum*); Mt (Lendemer & Tripp 2008 as *M. subcompunctum*). Corticolous.

Nadvornikia sorediata R.C. Harris – **Orange County:** *G.B. Perlmutter 897, 1137* (NCU!); **Stanly County:** *G.B. Perlmutter 460* (NCU!); **Wake County:** *G.B. Perlmutter 221, 342, 768, 1243* (NCU!); CP (*G.B. Perlmutter 706* [NCU!]), Mt (*J.C. Lendemer 10448* [NY]). Corticolous on shaded bark.

Thelotrema subtile Tuck. – **Orange County:** *G.B. Perlmutter 826, 1017* (NCU!); **Wake County:** *G.B. Perlmutter 349, 775* (NCU!); CP (*G.B. Perlmutter 703* [NCU!]), Mt (*J.C. Lendemer 10470* [NY]). On shaded bark.

Order Pertusariales

Family Icmadophilaceae (1 genus, 1 species)

Dibaeis baeomyces (L.) Rambold & Hertel – **Durham County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1428* (NCU!); **Wake County:** *G.B. Perlmutter 651* (NCU!); Mt (*W.R. Buck 51875* [NY]). Terricolous.

Family Megasporaceae (1 genus, 1 indetermined species)

Aspicilia laevata (Ach.) Arnold – **Orange County:** *G.B. Perlmutter 1452* (NY). Saxicolous on shaded rock.

Aspicilia sp. – **Montgomery County:** *G.B. Perlmutter 1407* (NCU!); **Orange County:** *G.B. Perlmutter 922, 931, 1407* (NCU!). Thallus areolate, gray, K+ yellow; ascomata cryptolecanorine apothecia with greenish epihymenium, hymenium K+ brown, paraphyses moniliform; spores simple, hyaline. On rock.

Family Ochrolechiaceae (1 genus, 4 species)

Ochrolechia africana Vain. – **Chatham County:** *G.B. Perlmutter 958* (NCU!); **Harnett County:** *Perlmutter 485* (NCU!); **Montgomery County:** *G.B. Perlmutter 1393, 1435* (NCU!); **Orange County:** *G.B. Perlmutter 85, 106, 918, 1025, 1448* (NCU!); **Wake County:** *G.B. Perlmutter 60, 132, 388* (NCU!); CP (*G.B. Perlmutter 331* [NCU!]). On bark.

Ochrolechia trochophora (Vain.) Oshio – **Orange County:** Perlmutter (2006); Mt (Lendemer & Tripp 2008). Corticolous.

Ochrolechia yasudae Vain. – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); Mt (Brodo [1991]). On rock.

Family Pertusariaceae (1 genus, 17 species)

Pertusaria epixantha R.C. Harris – **Harnett County:** *G.B. Perlmutter 489, 506* (NCU!); **Montgomery County:** *G.B. Perlmutter 1376, 1397, 1426* (NCU!); **Orange County:** *G.B. Perlmutter 356a, 377, 888, 1013* (NCU!); **Stanly County:** *G.B. Perlmutter 408* (NCU!); **Wake County:** *G.B. Perlmutter 117, 229, 257, 796* (NCU!); CP (*G.B. Perlmutter 708* [NCU!]), Mt (Lendemer & Tripp 2008). Common on bark.

Pertusaria macounii (Lamb) Dibben – **Harnett County:** *G.B. Perlmutter 491* (NCU!); **Randolph County:** Perlmutter (2006); Mt (Schmitt & Slack 1990). Corticolous.

Pertusaria multipunctoides Dibben – **Orange County:** *G.B. Perlmutter 830, 840, 980, 1094* (NCU!); **Wake County:** *G.B. Perlmutter 232, 648, 750* (NCU!); CP (*C.F. Reed 78106* [NY], Mtn (*G.B. Perlmutter 607* [NCU!]). Corticolous.

Pertusaria neoscotica Lamb – **Davidson County:** Perlmutter (2006); CP (*W.R. Buck 43749* [NY]), Mt (Lendemer & Tripp 2008). Substrate not reported.

Pertusaria ostiolata Dibben – **Guilford County:** Perlmutter (2006); **Stanly County:** *G.B. Perlmutter 449* (NCU!); **Wake County:** *G.B. Perlmutter 220* (NCU!); Mt (Schmitt & Slack 1990). On bark.

Pertusaria paratuberculifera Dibben – **Orange County:** *G.B. Perlmutter 356, 359, 371, 825, 877, 935* (NCU!); **Stanly County:** *G.B. Perlmutter 407, 457* (NCU!); **Wake County:** *G.B. Perlmutter 63, 343* (NCU!); **Wilkes County:** Perlmutter (2006); CP (*R.C. Harris 47178* [NY]), Mt (*G.B. Perlmutter 604* [NCU!]). Corticolous on hardwoods.

Pertusaria plittiana Erichsen – **Davidson County:** Perlmutter (2006); **Gaston County:** *H.A. Green s.n.* (NY); **Wake County:** *G.B. Perlmutter 340, 806* (NCU!). Saxicolous.

Pertusaria pustulata (Ach.) Duby – **Wake County:** *G.B. Perlmutter 398* (NCU!); CP (*R.C. Harris 47207* [NY]), Mt (Lendemer & Tripp (2008). Corticolous.

Pertusaria rubefacta Erichsen – **Mecklenberg County:** Perlmutter (2006); Mt (Lendemer & Tripp 2008). Corticolous.

Pertusaria sinusmexicani Dibben – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Orange County:** Perlmutter (2006); **Polk County:** *W.R. Buck 50093* (NY); CP (*G.B. Perlmutter 681* [NCU!]), Mt (Lendemer & Tripp 2008). On bark.

Pertusaria subpertusa Brodo – **Chatham County:** *G.B. Perlmutter 966* (NCU!); **Montgomery County:** *G.B. Perlmutter 1378* (NCU!); **Orange County:** *G.B. Perlmutter 857, 1026, 1123, 1460* (NCU!); **Randolph County:** Perlmutter (2006); **Surry County:** *G.B. Perlmutter 618* (NCU!); **Wake County:** *G.B. Perlmutter 756* (NCU!); CP (Lendemer & Yahr 2004), Mt (*Lendemer 10418* [NY]). Corticolous on branches.

Pertusaria tetrathalamia (Fée) Nyl. – **Gaston County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 233* (NCU!); CP (*R.C. Harris 47096* [NY]). Corticolous.

Pertusaria texana Müll. Arg. – **Orange County:** *G.B. Perlmutter 1026* (NCU!); **Stanly County:** *G.B. Perlmutter 448* (NCU!); CP (Lendemer & Yahr 2004), Mt (Lendemer & Tripp 2008). Corticolous.

Pertusaria trachythallina Erichsen – **Wake County:** *G.B. Perlmutter 130* (NCU!); Mt (*J.C. Lendemer 11930* [NY]). On bark, and rock.

Pertusaria velata (Turner) Nyl. – **Orange County:** *W.C. Coker s.n.* (NCU!); **Stanly County:** *G.B. Perlmutter 441* (NCU!); Mt (Lendemer & Tripp 2008). Corticolous.

Pertusaria xanthodes Müll. Arg. – **Granville County:** *G.B. Perlmutter 638* (NCU!); **Stanly County:** *G.B. Perlmutter 446* (NCU!); **Wake County:** *G.B. Perlmutter 142, 1620* (NCU!); CP (*G.B. Perlmutter 304* [NCU!]), Mt (*J.C. Lendemer 10427* [NY]). On bark.

Orders Indetermined

Family Hymeneliaceae (1 genus, 2 species)

Ionaspis alba Lutzoni – **Montgomery County:** *G.B. Perlmutter 1410* (NCU!); Mt (Lendemer & Tripp 2008). Saxicolous.

Ionaspis lacustris (With.) Lutzoni – **Wake County:** *G.B. Perlmutter 811* (NCU!); Mt (*J.C. Lendemer 10477* [NY]). Saxicolous.

Family Sarrameanaceae (1 genus, 1 species)

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – **Montgomery County:** *G.B. Perlmutter 1396* (NCU!); **Orange County:** *G.B. Perlmutter 355, 1115* (NCU!); **Stanly County:** *G.B. Perlmutter 459* (NCU!); **Wake County:** *G.B. Perlmutter 130a, 150, 162, 253, 291, 345* (NCU!); **Wilkes County:** Perlmutter (NCU!); CP (*R.C. Harris 47083* [NY]), Mt (*J.C. Lendemer 10421* [NY]). This species may be revised to genus *Pertusaria* (J.C. Lendemer, pers. comm.). Common on bark.

Order Lecanorales

Family Cattilariaceae (1 genus, 1 species)

Halecania rheophila* R.C. Harris & Ladd *ined.* (Harris and Ladd 2005) – **Orange County: *G.B. Perlmutter 1223* (NCU!). On diabase rock.

Family Cladoniaceae (2 genera, 45 species, 3 varieties)

Cladonia apodocarpa Robbins – **Chatham County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1388, 1391* (NCU!); **Orange County:** Perlmutter (2006); **Wake:** *G.B. Perlmutter 272* (NCU!); **Yadkin County:** *F.W. Gray s.n.* (NCU!); CP (Lendemer & Yahr 2008), Mt (*J.C. Lendemer 11906* [NY]). On shaded soil.

Cladonia arbuscula (Wallr.) Flot. – **Union County:** *F.W. Gray s.n.* (NCU!); **Wake County:** *H.R. Totten & B.W. Wells s.n.* (NCU!); CP (Perlmutter 2007), Mt (Heiman 1996). On soil / humus.

Cladonia atlantica A. Evans – **Harnett County:** Perlmutter (2006); CP (*R.H. Torrey s.n.* [NY]), Mt (*G.P. Anderson s.n.* [NY]). On tree bases.

Cladonia beaumontii (Tuck.) Vain. – **Union County:** *F.W. Gray s.n.* (NCU!); **Wake County:** Perlmutter (2006). On soil / rock / bark of roots.

Cladonia botrytes (K. Hagen) Wild. – **Durham County:** Perlmutter (2006). Substrate not reported.

Cladonia caespiticia (Pers.) Flörke – **Forsyth County:** Perlmutter & Lendemer (2008); **Rockingham County:** *A.W. Evans 646* (NCU!); **Wake County:** *G.B. Perlmutter 468* (NCU!); Mt (*J.C. Lendemer 10439* [NY]). On bark in shaded forests.

Cladonia caroliniana Tuck. – **Forsyth County:** *P.O. Schallert s.n.* (TOPOTYPE, NCU!); CP (Lendemer & Yahr 2004), Mt (Heiman 1996). On rock / duff over rock in exposed areas such as flatrock.

Cladonia chlorophaea (Flörke *ex* Sommerf.) Spreng. – **Durham County:** *A.W. Evans 441* (NCU!); **Orange County:** *G.B. Perlmutter 375* (NCU!); **Wake County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (*J. Lam s.n.* [NY]). On various substrates on the forest floor.

Cladonia ciliata var. *tenuis* (Flörke) Ahti – **Forsyth County:** *A.W. Evans 614* (NCU!); CP (Oosting & Anderson [1939] as *C. tenuis*).

Cladonia coniocrea (Flörke) Spreng. – **Orange County:** *A.W. Evans 404* (NCU!); CP (Lendemer & Yahr 20040, Mt (McCune *et al*. 1997). On soil / wood.

Cladonia cristatella Tuck. – **Orange County:** *A.W. Evans 410* (NCU!); **Wake County:** Perlmutter & Lendemer (2008); CP (*W.R. Buck 51127* [NY]), Mt (McCune *et al*. 1997). Terricolous.

Cladonia cryptochlorophaea Asah. – **Orange County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (Dey 1978). On soil and tree bases.

Cladonia cylindrica (A. Evans) A. Evans – **Orange County:** Perlmutter (2006); Mt (McCune *et al*. 1997). Lignicolous.

Cladonia didyma (Fée) Vain. var. *dydima* – **Forsyth County:** Perlmutter (2006); **Orange County:** *A.W. Evans 407* (NCU!); Mt (*W.R. Buck 1535A* [NY]). Lignicolous.

Cladonia didyma (Fée) Vain. var. *vulcanica* (Zoll. & Moritz.) Vain. – **Wake County:** *G.B. Perlmutter 647* (NCU!); Mt (*Lendemer 10482* [NY]). On wood.

Cladonia digitata (L.) Hoffm. – **Wake County:** Perlmutter (2006); Mt (*J.C. Lendemer 11937* [NY]). On wood and bark.

Cladonia fimbriata (L.) Fr. – **Randolph County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (Heiman 1996). On soil / humus.

Cladonia floridana Vain. – **Durham County:** *A.W. Evans 679* (NCU!); **Gaston County:** *H.A. Green s.n.* (NY); CP (Lendemer & Yahr 2004). On soil / humus.

Cladonia furcata (Huds.) Schrad. – **Union County:** *F.W. Gray s.n.* (NCU!); **Wilkes County:** Perlmutter (2006); Mt (*J.C. Lendemer 10857* [NY]). On rock / soil.

Cladonia grayi G. Merr. *ex* Sandst. – **Alamance County:** *G.P. Anderson s.n.* (NY); **Mecklenberg County:** *F.W. Gray s.n.* (ISOTYPE, NCU!), **Stokes County:** Perlmutter (2006), **Wake County:** *G.B. Perlmutter 273* (NCU!); Mt (*J.C. Lendemer 11945* [NY]). Terricolous.

Cladonia incrassata Flörke – **Moore County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10837* [NY]). On wood, humus.

Cladonia leporina Fr. – **Forsyth County:** *A.W. Evans 616* (NCU!); CP (*R.C. Harris 47125* [NY]), Mt (Oosting & Anderson 1939). On exposed rock.

Cladonia macilenta Hoffm. – **Wake County:** *G.B. Perlmutter 255, R. Tebeau s.n* (NCU!); CP (Lendemer & Yahr 2004), Mt (McCune *et al*. 1997). On wood.

Cladonia macilenta var. *bacillaris* (Genth) Schaer. – **Harnett County:** *G.B. Perlmutter 487* (NCU!); **Orange County:** *A.W. Evans 514* (NCU!); Mt (Perlmutter [2006] as from Wilkes County). On wood.

Cladonia mateocyatha Robbins – **Alexander County:** Perlmutter (2006); **Durham County:** Perlmutter (2006); **Union County:** *F.W. Gray 5103* (NCU!); Mt (Lendemer & Tripp 2008). On soil / rock in exposed areas.

Cladonia mitis Sandst. – **Wake County:** *G.B. Perlmutter 645* (NCU!); Mt (Oosting & Anderson 1937). On wood.

Cladonia ochrochlora Flörke – **Orange County:** *G.B. Perlmutter 839, 369, 96, 1126* (NCU!); **Stanly County:** *G.B. Perlmutter 437* (NCU!); **Wake County:** *G.B. Perlmutter 124, 789* (NCU!); CP (Lendemer & Yahr 2004), Mt (*Lendemer 10851* [NY]). Lignicolous.

Cladonia parasitica (Hoffm.) Hoffm. –**Wake County:** *G.B. Perlmutter 766* (NCU!); CP (*R.C. Harris 47065* [NY]), Mt (Lendemer & Tripp 2008). Lignicolous.

Cladonia petrophila R.C. Harris – **Orange County:** *G.B. Perlmutter 108* (NCU!); **Wake County:** *G.B. Perlmutter 467* (NCU!); CP (*Lendemer 10867* [NY]). On shaded rock.

Cladonia peziziformis (With.) J. R. Laundon – **Forsyth County:** *A.W. Evans 611* (NCU!); **Halifax County:** *C.F. Reed 48223* (NY); **Orange County:** *G.B. Perlmutter 849* (NCU!); **Wake County:** *G.B. Perlmutter 141, 646, 779* (NCU!); CP (*R.H. Torrey s.n.* [NY]), Mt (*W.C. Grow 20* [NCU!]). On soil.

Cladonia piedmontensis G. Merr. – **Chatham County:** Perlmutter (2006); **Rockingham County:** *F.W. Gray 5108* (NCU!); **Wake County:** Perlmutter (2006); Mt (*J.C. Lendemer 11556* [NY]). On soil / humus, rock.

Cladonia pleurota (Flörke) Schaer. – **Montgomery County:** *G.B. Perlmutter 1421BA* (NCU!); **Orange County:** *A.W. Evans 537* (NCU!). On soil.

Cladonia polycarpoides Nyl. – **Durham County:** Perlmutter (2006); **Johnston County:** Perlmutter (2006); Mt (*W.C. Grow 23* [NCU!]). On wood.

Cladonia pyxidata (L.) Hoffm. – **Forsyth County:** *P.O. Schallert 2028* (NCU!); Mt (Heiman 1996). Saxicolous.

Cladonia ramulosa (With.) J. R. Laundon – **Durham County:** Perlmutter (2006); **Orange County:** *Perlmutter 1196, 1200* (NCU!); **Wake County:** *G.B. Perlmutter 274, 758, 767* (NCU!); Mt (McCune *et al.* 1997). On soil and wood.

Cladonia rangiferina (L.) F.H. Wigg. – **Burke County:** Perlmutter (2006); **Randolph County:** *F.W. Gray s.n.* (NCU!); Mt (*Lendemer 11907* [NY]). On humus over rock in exposed mats.

Cladonia ravenelii Tuck. – **Durham County:** Perlmutter (2006); CP (*R.C. Harris 47135* [NY]). On wood / bark.

Cladonia robbinsii A. Evans – **Alamance County:** Perlmutter (2006); **Wake County:** *W.C. Coker & H.R. Totten s.n.* (NCU!). On rock / soil.

Cladonia squamosa Hoffm. – **Polk County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 129* (NCU!); Mt (*J.C. Lendemer 10456* [NY]). On various substrates on the forest floor.

Cladonia strepsilis (Ach.) Grognot – **Durham County:** *A.W. Evans 438* (NCU!); **Mecklenberg County:** Perlmutter (2006); Mt (Perlmutter [2006] as from Wilkes County). Over rock in exposed areas.

Cladonia subcariosa Nyl. – **Wake County:** Perlmutter (2006).

Cladonia submitis A. Evans – **Wake County:** Perlmutter (2006). On soil.

Cladonia subradiata (Vain.) Sandst. – **Orange County:** *A.W. Evans 402* (NCU!); CP (*R. Newman s.n.* [NCU!]). Lignicolous.

Cladonia subtenuis (Abbayes) Mattick – **Durham County:** Perlmutter (2006); **Forsyth County:** Perlmutter (2006); **Harnett County:** *G.B. Perlmutter 475* (NCU!); **Montgomery County:** Perlmutter (2009); **Orange County:** *G.B. Perlmutter 340, 360, 932* (NCU!); **Polk County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 135, 185, 254* (NCU!); CP (*G.B. Perlmutter 303* [NCU!]), Mt (*W.C. Grow 12* [NCU!]). On humus in partly shaded areas.

Cladonia uncialis (L.) F.H. Wigg. – **Rowan County:** *P.O. Schallert s.n.* (NCU!); CP (*R.C. Harris 47144* [NY]), Mt (Lendemer & Tripp 2008). On soil / humus.

Cladonia verticillata (Hoffm.) Schaer. – **Durham County:** *C.F. Reed 73847* (NY); **Orange County:** *A.W. Evans 518* (NCU!); **Wake County:** *C.F. Reed 73972* (NY); Mt (*E. Schwartzman s.n.* [NCU!]). On soil / humus.

Pycnothelia papillaria Dufour – **Orange County:** *A.W. Evans 415, G.B. Perlmutter 363* (NCU!), **Wake County:** Perlmutter (2006); CP (*W.R. Buck 43768* [NY]), Mt (Lendemer & Tripp 2008). On soil.

Family Dactylosporaceae (1 genus, 2 species)

Dactylospora lurida Hafellner – **Orange County:** *G.B. Perlmutter 1175* (NCU!). On wood.

Dactylospora pertusariicola* (Tuck. *ex* Willey) Hafellner – **Wake County: Perlmutter (2006). Lichenicolous fungus on *Pertusaria*.

Family Lecanoraceae (4 genera, 17 species, 1 incompletely determined)

Lecanora chlarotera Nyl. – **Durham County:** Perlmutter (2006). Corticolous.

Lecanora hybocarpa (Tuck.) Brodo – **Chatham County:** *G.B. Perlmutter 967* (NCU!); **Davidson County:** Perlmutter (2006); **Harnett County:** *G.B. Perlmutter 500* (NCU!); **Montgomery County:** *G.B. Perlmutter 1373* (NCU!); **Orange County:** *G.B. Perlmutter 81, 380, 1215, 1144, 1172* (NCU!); **Stanly County:** *G.B. Perlmutter 430* (NCU!); **Wake County:** *G.B. Perlmutter 53, 154, 215, 393* (NCU!); CP (*G.B. Perlmutter 212, 322, F. Williams s.n.* [NCU!]), Mt (*W.C. Grow 2* [NCU!]). On bark.

Lecanora imshaugii Brodo – **Iridell County:** Perlmutter (2006); Mt (*J.C. Lendemer 10468* [NY]). Corticolous.

Lecanora miculata Ach. – **Mecklenberg County:** Perlmutter (2006). Corticolous.

Lecanora minutella Nyl. – **Davie County:** Perlmutter (2006); Mt (Lendemer & Tripp 2008). On cones, bark and wood of conifers.

Lecanora oreinoides (Körb.) Hertel & Rambold – **Chatham County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1389* (NCU!); **Orange County:** *G.B. Perlmutter 903, 904* (NCU!); **Stanly County:** *G.B. Perlmutter 461* (NCU!); Mt (Lendemer & Tripp 2008). On rock.

Lecanora strobilina (Spreng.) Kieff. – **Harnett County:** *G.B. Perlmutter 483, 503* (NCU!); **Montgomery County:** *G.B. Perlmutter 1392, 1440* (NCU!); **Orange County:** *G.B. Perlmutter 862, 1111, 1214a* (NCU!); **Stanly County:** *G.B. Perlmutter 402, 445* (NCU!); **Surry County:** *Perlmutter 628* (NCU!); **Wake County:** *G.B. Perlmutter 59, 208, 395* (NCU!); CP (*R.C. Harris 47143* [NY]), Mt (*J.C. Lendemer 10845* [NY]). On twigs, pine cones.

Lecanora cf. *strobilina* (Spreng.) Kieff. (saxicolous, lacking decarboxysquamatic acid) – **Orange County:** *G.B. Perlmutter 373* (NCU!); **Wake County:** Perlmutter & Lendemer (2008).

Lecanora subimmergens Vain. – **Montgomery County:** *G.B. Perlmutter 1405, 1418* (NCU!); **Wake County:** *G.B. Perlmutter 344, 809* (NCU!); Mt (*J.C. Lendemer 10762* [NY]). Saxicolous.

Lecanora subpallens Zahlbr. – **Harnett County:** *G.B. Perlmutter 492, 493, 502* (NCU!); **Montgomery County:** *G.B. Perlmutter 1394* (NCU!); **Orange County:** *G.B. Perlmutter 384, 953, 1116* (NCU!); **Stanly County:** *G.B. Perlmutter 414* (NCU!); **Wake County:** *G.B. Perlmutter 157, 387, 653* (NCU!); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10417* [NY]). Corticolous.

Lecanora thysanophora R.C. Harris. – **Wake County:** *G.B. Perlmutter 777* (NCU!); Mt (*J.C. Lendemer 10775* [NY]). On bark.

Lecanora varia (Hoffm.) Ach. – **Chatham County:** Perlmutter (2006). Substrate not reported.

Lecanora sp. – **Wake County:** *G.B. Perlmutter 792* (NCU!). Thallus whitish, leprose, lacking apothecia; C-, K+ yellow, PD+ yellow. On bark.

Lecidella enteroleucella (Nyl.) Hertel – **Montogery County:** *G.B. Perlmutter 1399* (NCU!); **Orange County:** *G.B. Perlmutter 87, 94a* (NCU!); Mt (*J.C. Lendemer 10458* [NY]). On shaded rock.

Lecidella stigmatea (Ach.) Hertel & Luckert – **Orange County:** *G.B. Perlmutter 900* (NCU!). On shaded rock.

Pyrrhospora varians (Ach.) R.C. Harris – **Chatham County:** *G.B. Perlmutter 976* (NCU!); **Harnett County:** *G.B. Perlmutter 504* (NCU!); **Montgomery County:** *G.B. Perlmutter 1374* (NCU!); **Orange County:** *G.B. Perlmutter 386, 881, 928, 941, 1110* (NCU!); **Stanly County:** *G.B. Perlmutter 429, 433* (NCU!); **Wake County:** *G.B. Perlmutter 164, 979* (NCU!); CP (*F. Williams s.n.* [NCU!]), Mt (Lendemer & Tripp 2008). Corticolous.

Family Parmeliaceae (24 genera, 79 taxa)

Bulbothirx goeblii (Zenker) Hale – **Lee County:** Perlmutter (2006); CP (*R.C. Harris 47228* [NY]). Corticolous.

Bulbothrix isidiza (Nyl.) Hale – **Wake County:** *G.B. Perlmutter 774* (NCU!); CP (*R.C. Harris 47161* [NY]). On bark.

Canoparmelia caroliniana (Nyl.) Elix & Hale – **Harnett County:** *G.B. Perlmutter 486* (NCU!); **Montgomery County:** *G.B. Perlmutter 1432, 1437* (NCU!); **Orange County:** *G.B. Perlmutter 824, 1103* (NCU!); **Polk County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 34, 252, 256* (NCU!); CP (*G.B. Perlmutter 999* [NCU!]), Mt (Lendemer & Tripp 2008). On bark and wood.

Canoparmelia crozalsiana (B. De Lesd. *ex* Harm.) Elix & Hale – **Wake County:** Perlmutter (2006); Mt (McCune *et al.* 1997). On bark.

Canoparmelia texana (Tuck.) Elix & Hale – **Chatham County:** *G.B. Perlmutter 959* (NCU!); **Wake County:** *G.B. Perlmutter 1237* (NCU!); CP (*G.B. Perlmutter 213* [NCU!]). Corticolous.

Flavoparmelia baltimorensis (Gyeln. & Fóriss) Hale – **Davidson County:** Perlmutter (2006); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Montgomery County:** *G.B. Perlmutter 1403* (NCU!); **Orange County:** *G.B. Perlmutter 364* (NCU!); **Polk County:** Perlmutter (2006); **Stanly County:** Perlmutter (2009); **Wake County:** *G.B. Perlmutter 339* (NCU!); Mt (Lendemer & Tripp 2008). On rock.

Flavoparmelia caperata (L.) Hale – **Caswell County:** *G.B. Perlmutter 629* (NCU!); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Granville County:** *G.B. Perlmutter 633* (NCU!); **Montgomery County:** *G.B. Perlmutter 1422BA* (NCU!); **Orange County:** *G.B. Perlmutter 92, 841, 1023* (NCU!); **Stanly County:** *G.B. Perlmutter 422* (NCU!); **Surry County:** *Perlmutter 623* (NCU!); **Wake County:** *G.B. Perlmutter 32, 255, 350* (NCU!); Mt (*W.C. Grow 4* [NCU!]). On bark.

Hypogymnia krogiae Ohlsson – **Davidson County:** Perlmutter (2006); Mt (*J.C. Lendemer 11960* [NY]). Corticolous.

Hypotrachyna livida (Taylor) Hale – **Chatham County:** *G.B. Perlmutter 962* (NCU!); **Harnett County:** *G.B. Perlmutter 478* (NCU!); **Orange County:** *G.B. Perlmutter 91, 166, 893, 1028, 1112, 1124, 1152, 1181* (NCU!); **Surry County:** *G.B. Perlmutter 625* (NCU!); **Wake**

County: *G.B. Perlmutter 33, 116, 128, 260* (NCU!); CP (*F. Williams s.n.* [NCU!]), Mt (*G.B. Perlmutter 992* [NCU!]). On branches.

Hypotrachyna osseoalba (Vain.) Park & Hale – **Surry County:** (Perlmutter 2006); **Wake County:** *G.B. Perlmutter 784* (NCU!); CP (Lendemer & Yahr 2004), Mt (Lendemer & Tripp 2008). Corticolous.

Hypotrachyna pustulifera (Hale) Skorepa – **Wake County:** *Perlmutter 1134* (NCU!); Mt (Perlmutter [2006] as from Stokes County). Corticolous.

Imshaugia aleurites (Ach.) S.F. Meyer – **Granville County:** Perlmutter (2006); Mt (*J.C. Lendemer 10774* [NY]). On pine.

Imshaugia placorodia (Ach.) S.F. Meyer – **Durham County:** Perlmutter (2006); Mt (McCune *et al.* 1997). On pine.

Melanelixia subargentifera (Nyl.) O. Blanco *et al.* – **Stanly County:** Perlmutter (2009). On rock.

Myelochroa aurulenta (Tuck.) Elix & Hale – **Chatham County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1417* (NCU!); **Orange County:** *G.B. Perlmutter 850, 894, 901, 988, 1012, 1022, 1157, 1163, 1193, 1202, 1229* (NCU!); **Randolph County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 747* (NCU!); Mt (*J.C. Lendemer 10814* [NY]). On rock and bark.

Myelochroa galbina (Ach.) Elix & Hale – **Polk County:** Perlmutter (2006); Mt (DePriest 2001). Corticolous.

Myelochroa obsessa (Ach.) Elix & Hale – **Anson County:** *P.O. Schallert s.n.* (NCU!); **Davidson County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1414a* (NCU!); **Orange County:** *G.B. Perlmutter 939* (NCU!); **Wake County:** *G.B. Perlmutter 812* (NCU!); Mt (DePriest 2001). Saxicolous.

Parmelia saxatilis (L.) Ach. – **Mecklenberg County:** Perlmutter (2006); Mt (Heiman 1996). On rock / soil.

Parmelinopsis horrescens (Taylor) Elix & Hale – **Wake County:** Perlmutter & Lendemer (2006); CP (*R.C. Harris 47165* [NY]); Mt (*J.C. Lendemer 11976* [NY]). Corticolous.

Parmelinopsis minarum (Vain.) Elix & Hale – **Orange County:** *G.B. Perlmutter 933, 1230* (NCU!); **Wake County:** Perlmutter & Lendemer (2008); CP (*G.B. Perlmutter 733* [NCU!]), Mt (*W.C. Grow 14* [NCU!]). On bark.

Parmeliopsis subambigua Gyeln. – **Granville County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 783* (NCU!); CP (Lendemer & Yahr 2004). On pine bark.

Parmotrema chinense (Osbeck) Hale & Ahti – **Surry County:** Perlmutter (2006); Mt (DePriest 2001). Corticolous.

Parmotrema crinitum (Ach.) M. Choisy – **Durham County:** Perlmutter (2006); CP (*R.C. Harris 47251* [NY]), Mt (*J.C. Lendemer 10866* [NY]). On bark and rock.

Parmotrema dilatatum – (Vain.) Hale – **Chatham County:** Perlmutter (2006); Mt (McCune *et al.* 1996). On bark.

Parmotrema gardneri (C.W. Dodge) Hale – **Surry County:** *G.B. Perlmutter 626* (NCU!); **Wake County:** Perlmutter & Lendemer (2008); Mt (*J.C. Lendemer 11981* [NY]). Corticolous.

Parmotrema haitiense (Hale) Hale – **Orange County:** Perlmutter (2006); CP (Lendemer & Yahr [2004] as *Canomaculina haitiensis*). Corticolous.

Parmotrema hypoleucinum (Steiner) Hale – **Stanly County:** *G.B. Perlmutter 455* (NCU!); **Warren County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 119* (NCU!); CP (*G.B. Perlmutter 695* [NCU!]). On branches.

Parmotrema hypotropum (Nyl.) Hale – **Chatham County:** *G.B. Perlmutter 960* (NCU!); **Montgomery County:** *G.B. Perlmutter 1371, 1425* (NCU!); **Orange County:** *G.B. Perlmutter 104, 381, 870, 870c, 949, 1096a, 1114, 1155, 1191, 1209, 1467* (NCU!); **Polk County:** Perlmutter (2006); **Stanly County:** *G.B. Perlmutter 396, 431* (NCU!); **Surry County:** *G.B. Perlmutter 614* (NCU!); **Wake County:** *G.B. Perlmutter 120, 262, 270, 296, 745, 752, R. Tebeau s.n.* (NCU!); CP (*F. Williams s.n.* [NCU!]), Mt (*W.C. Grow 19* [NCU!]). On branches.

Parmotrema madagascariaceum (Hue) Hale – **Wake County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (Perlmutter [2006] as from Stokes County). Saxicolous.

Parmotrema margaritatum (Hue) Hale – **Alexander County:** Perlmutter (2006); Mt (McCune *et al.* 1997). Corticolous.

Parmotrema mellissii (C.W. Dodge) Hale – **Durham County:** Perlmutter (2006); **Wake County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10821* [NY]). On rock and bark.

Parmotrema perforatum (Jacq.) A. Massal. – **Chatham County:** *G.B. Perlmutter 956* (NCU!); **Granville County:** *G.B. Perlmutter 637* (NCU!); **Orange County:** *G.B. Perlmutter 1143* (NCU!); **Stanly County:** *G.B. Perlmutter* 413, 442, 452 (NCU!); **Wake County:** *G.B. Perlmutter 127, 268, 1195* (NCU!); CP (*G.B. Perlmutter 997* [NCU!]), Mt (*W.C. Grow 22* [NCU!]). On branches.

Parmotrema reticulatum (Taylor) Hale – **Chatham County:** *G.B. Perlmutter 972* (NCU!); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Harnett County:** *G.B. Perlmutter 480* (NCU!); **Montgomery County:** *G.B. Perlmutter 1424, 1427, 1433* (NCU!); **Orange County:** *G.B. Perlmutter 365, 892, 911, 1198* (NCU!); **Polk County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 143, 258, 264, 288* (NCU!); CP (*G.B. Perlmutter 998* [NCU!]), Mt (*W.C. Grow 5* [NCU!]). On bark.

Parmotrema subisidiosum (Müll. Arg.) Hale & Fletcher – **Montgomery County:** *G.B. Perlmutter 1387, 1390, 1436* (NCU!); **Orange County:** *G.B. Perlmutter 902* (NCU!); **Stanly County:** *G.B. Perlmutter 440* (NCU!); **Wake County:** *G.B. Perlmutter 466, 822* (NCU!); CP (*G.B. Perlmutter 677* [NCU!]), Mt (*J.C. Lendemer 11908* [NY]). Corticolous.

Parmotrema submarginale (Michx.) DePriest & B. Hale – **Chatham County:** *G.B. Perlmutter 955* (NCU!); **Durham County:** Perlmutter (2006); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Granville County:** *G.B. Perlmutter 635* (NCU!); **Harnett County:** *G.B. Perlmutter 488, 495* (NCU!); **Montgomery County:** *G.B. Perlmutter 1379, 1441* (NCU!); **Orange County:** *W.C. Coker s.n., G.B. Perlmutter 88, 919, 946, 1096b, 1105, 1145* (NCU!); **Stanly County:** *G.B. Perlmutter 400, 427, 451* (NCU!); **Surry County:** *G.B. Perlmutter 627* (NCU!); **Wake County:** *G.B. Perlmutter 115, 138, 161, 269, 1235* (NCU!); CP (*F. Williams s.n.* [NCU!]), Mt (*W.C. Grow 13* [NCU!]). Corticolous.

Parmotrema subtinctorium (Zahlbr.) Hale – **Wake County:** *G.B. Perlmutter 799* (NCU!); CP (Lendemer & Yahr [2004] as *Canomaculina subtinctoria*), Mt (Lendemer & Tripp 2008). On bark.

Parmotrema tinctorum (Delise *ex* Nyl.) Hale – **Orange County:** Perlmutter (2006); CP (*Perlmutter 664* [NCU!]), Mt (DePriest 2001). On bark.

Parmotrema ultralucens (Krog) Hale – **Chatham County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 896, 899, 910* (NCU!); CP (*R.C. Harris 47146* [NY]), Mt (DePriest 2001). On shaded rock.

Punctelia borreri (Sm.) Krog – **Durham County:** Perlmutter (2006); Mt (Schmitt & Slack 1990).

Punctelia rudecta (Ach.) Krog – **Chatham County:** *G.B. Perlmutter 968* (NCU!); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Harnett County:** *G.B. Perlmutter 473, 494* (NCU!); **Montgomery County:** *G.B. Perlmutter 1384, 1423BA* (NCU!); **Orange County:** *G.B. Perlmutter 98, 879, 942, 1029* (NCU!); **Stanly County:** *G.B. Perlmutter 423, 450* (NCU!); **Surry County:** *G.B. Perlmutter 624* (NCU!); **Wake County:** *G.B. Perlmutter 29, 137, 230, 287* (NCU!); CP (*G.B. Perlmutter 198* [NCU!]), Mt (*W.C. Grow s.n.* [NCU!]). On bark and wood.

Punctelia subrudecta auct. Amer. – **Wake County:** Perlmutter & Lendemer (2008); Mt (*W.C.Grow 16* [NCU!]). Corticolous.

Tuckermanella fendleri (Nyl.) Essl. – **Durham County:** Perlmutter (2006); **Wake County:** Perlmutter & Lendemer (2008); Mt (McCune *et al.* [1997] as *Cetraria fendleri*). On pine twigs.

Tuckermannopsis americana (Spreng.) Hale – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); Mt (McCune *et al.* [1997] as *Cetraria americana*). On pine bark.

Tuckermannopsis ciliaris (Ach.) Gyeln. – **Polk County:** Perlmutter (2006); Mt (*W.C. Grow 9* [NCU!]). On bark.

Tuckermannopsis orbata (Nyl.) M.J. Lai – **Catawba County:** Perlmutter (2006); Mt (*J.C. Lendemer 11974* [NY]). On conifers.

Usnea ambyloclada (Müll. Arg.) Zahlbr. – **Orange County:** Clerc & Herrera-Campos (1997). Saxicolous.

Usnea endochrysea Stirt. – **Wake County:** Perlmutter & Lendemer (2006); CP (*G.B. Perlmutter 721* [NCU!]). Corticolous.

Usnea mutabilis Stirt. – **Wake County:** *G.B. Perlmutter 282* (NCU!); CP (*R.C. Harris 47142* [NY]), Mt (McCune *et al.* 1997). Corticolous.

Usnea pensylvanica Mot. – **Chatham County:** Perlmutter (2006); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Orange County:** *G.B. Perlmutter 867* (NCU!); **Stanly County:** Perlmutter (NCU!); **Wake County:** Perlmutter (2006); CP (*R.C. Harris 47128* [NY]), Mt (*J.C. Lendemer 10828* [NY]). Corticolous.

Usnea strigosa (Ach.) Eaton – **Chatham County:** *G.B. Perlmutter 957, 969, 971* (NCU!); **Orange County:** *G.B. Perlmutter 1024a* (NCU!); **Stanly County:** Perlmutter (2009); **Wake County:** *G.B. Perlmutter 661* (NCU!); CP (Perlmutter 2007a), Mt (Lendemer & Tripp 2008). Common in canopy branches.

Usnea strigosa (Ach.) Eaton NORSTICTIC ACID CHEMOTYPE – **Orange County:** *G.B. Perlmutter 864* (NCU!). On canopy branches.

Usnea subfloridana Stirt. – **Durham County:** Perlmutter (2006); Mt (*J.C. Lendemer 11934* [NY]). On conifers.

Usnea subgracilis Vain. – **Forsyth County:** Perlmutter (2006); Mt (*J.C. Lendemer 10431* [NY]). Corticolous.

Usnea subscabrosa Nyl. *ex* Mot. – **Forsyth County:** Perlmutter (2006); CP (*G.B. Perlmutter 727* [NCU!]), Mt (*J.C. Lendemer 10812* [NY]). On bark and rock.

Usnea trichodea Ach. – **Wake County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (Dey 1978). Corticolous.

Vulpicida canadensis (Räsänan) J.-E. Mattson & M.J. Lai – **Burke County:** Perlmutter (2006). Substratre not reported.

Vulpicida pinastri (Scop.) J.-E. Mattson & M.J. Lai – **Wake County:** *W.C. Coker & H.R. Totten s.n.* (NCU!); Mt (Heiman [1996] as *Tuckermannopsis pinastri*). Corticolous.

Vulpidica viridis (Schwein.) J.-E. Mattson & M.J. Lai – **Burke County:** Perlmutter (2006); **Polk County:** Perlmutter (2006); Mt (McCune *et al.* [1997] as *Cetraria viridis*). On branches.

Xanthoparmelia conspersa (Ehrh. *ex* Ach.) Hale – **Wake County:** *G.B. Perlmutter 71* (NCU!); Mt (*G.P. Anderson s.n.* [NY]). Saxicolous in exposed areas.

Xanthoparmelia hypomeleana (Hale) Hale – **Durham County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1414* (NCU!); **Orange County:** Hale (1967) as *Parmelia hypomeleana*. Saxicolous in exposed areas.

Xanthoparmelia monticola (J.P. Dey) Hale – **Montgomery County:** Perlmutter (2009); Mt (Heiman 1996). Saxicolous in exposed areas of monadnocks.

Xanthoparmelia piedmontensis (Hale) Hale – **Orange County:** Perlmutter (2006); Mt (Heiman 1996). Saxicolous.

Xanthoparmelia plittii (Gyeln.) Hale – **Wake County:** *G.B. Perlmutter 813, 816* (NCU!); Mt (*J.C. Lendemer 10771* [NY]). Saxicolous in exposed areas.

Xanthparmelia subramigera (Gyeln.) Hale – **Chatham County:** Perlmutter (2006); Mt (Heiman 1996). Saxicolous.

Xanthoparmelia tasmanica (Hook. f. & Taylor) Hale – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); Mt (*R.C. Harris 33211* [NY]). Saxicolous.

Family Pilocarpaceae (3 genera, 5 species)

Byssoloma subdiscordans (Nyl.) P. James – **Wake County:** *G.B. Perlmutter 810* (NCU!); CP (Lendemer & Yahr 2004). On shaded rocks.

Fellhanera granulosa* R.C. Harris & Lendemer (Lendemer and Harris 2009) – **Wake County: *G.B. Perlmutter 810* (NCU!); Mt (*J.C. Lendemer 8211* HOLOTYPE [NY]). On shaded rocks.

Fellhanera hybrida* R.C Harris & Lendemer (Lendemer and Harris 2009) – **Wake County: *J.C. Lendemer 8390* HOLOTYPE (NY). On shaded rocks.

Micarea neostipitata Coppins & P. James – **Wake County:** Perlmutter & Lendemer (2008); Mt (Lendemer & Tripp 2008). On conifers.

Micarea prasina Fr. – **Wake County:** *J.C. Lendemer 8073* (NY); CP (*W.R. Buck 43688* [NY]). Lignicolous.

Family Ramalinaceae (4 genera, 10 species)

Bacidia circumspecta (Nyl. *ex* Vain.) Malme – **Stanly County:** *G.B. Perlmutter 419* (NCU!); CP (*Perlmutter 319* [NCU!]). Corticolous.

Bacidia polychroa (Th. Fr.) Körb. – **Stanly County:** *G.B. Perlmutter 418* (NCU!). On bark.

Bacidia schweinitzii (Fr. *ex* E. Michener) A. Schneid. – **Gaston County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 79, 370, 836, 871, 934, 1033, 1156, 1182, 1205, 1455, 1472* (NCU!); **Polk County:** *W.R. Buck 50101* (NY); **Stanly County:** *G.B. Perlmutter 409, 420* (NCU!); **Wake County:** *G.B. Perlmutter 579, 773, 776* (NCU!); CP (*R.C. Harris 47092* [NY]), Mt (*G.B. Perlmutter 610* [NCU!]). On shaded bark of hardwood trunks.

Bacidia suffusa (Fr.) A. Schneid. – **Orange County:** *G.B. Perlmutter 880* (NCU!); **Wake County:** *G.B. Perlmutter 581* (NCU!); CP (*R.C. Harris 47118* [NY]). Corticolous.

Biatora printzenii Tønsberg – **Orange County:** *G.B. Perlmutter 835, 1140, 1210, 1451* (NCU!); **Surry County:** *G.B. Perlmutter 613* (NCU!); Mt (Lendemer & Tripp 2008). On shaded bark of hardwood trunks.

Phyllopsora confusa Swinsc. & Krog – **Orange County:** *G.B. Perlmutter 851, 1098, 1211* (NCU!); **Polk County:** *W.R. Buck 50095* (NY); **Wake County:** *G.B. Perlmutter 1266* (NCU!); CP (*G.B. Perlmutter 715* [NCU!]), Mt (Lendemer & Tripp 2008). On shaded bark and rock.

Phyllopsora corallina (Eschw.) Müll. Arg. – **Wake County:** *G.B. Perlmutter 754* (NCU!); Mt (Lendemer & Tripp 2008). Corticolous.

Phyllopsora parvifolia (Pers.) Müll. Arg. var. *parvifolia* – **Durham County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 1265* (NCU!); CP (*Perlmutter 666* [NCU!]). Corticolous.

Ramalina culbersoriorum La Grecia – **Orange County:** *G.B. Perlmutter 1171* (NY); Mt (*J.C. Lendemer 10457* [NY]). Corticolous.

Family Stereocaulaceae (1 genus, 4 determined species)

Lepraria caesiella R.C. Harris – **Surry County:** *G.B. Perlmutter 622* (NCU!); Mt (*J.C. Lendemer 4617* [NY]). Corticolous on trunks and trunk bases.

Lepraria friabilis* Lendemer, K. Knudson & Elix (Lendemer *et al.* 2008) – **Orange County: *G.B. Perlmutter 1100* (NCU!); **Wake County:** *G.B. Perlmutter 794* (NCU!); CP (*R.C. Harris 46078* [NY]). On bark of pines in bottomlands.

Lepraria lobificans Nyl. – **Alamance County:** *G.B. Perlmutter 1269* (NCU!); **Forsyth County;** *P.O. Schallert s.n.* (NCU!); **Montgomery County:** *G.B. Perlmutter 1415* (NCU!); **Orange County:** *G.B. Perlmutter 103, 113, 833, 1169, 1179* (NCU!); **Wake County:** *G.B. Perlmutter 72, 277* (NCU!); CP (*R.C. Harris 47254* [NY]); Mt (*J.C. Lendemer 11939* [NY]). On bark and rock.

Lepraria normandinoides* Lendemer & R.C. Harris (Lendemer and Harris 2007) – **Anson County: *P.O. Schallert s.n.* (NCU!); Mt (*J.C. Lendemer 7001* HOLOTYPE [NY]). On bark and rock.

Lepraria sp. – **Wake County:** Perlmutter & Lendemer (2008). Usnic acid, zeroin; to be described in an upcoming publication by J.C. Lendemer. Corticolous.

Order Peltigerales

Family Coccocarpiaceae (1 genus, 2 species)

Coccocarpia erythroxyli (Spreng.) Swinsc. & Krog – **Burke County:** Perlmutter (2006); CP (Lendemer & Yahr 2004). Substrate not reported.

Coccocarpia palmicola (Spreng.) Arv. & D.J. Galloway – **Polk County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10859* [NY]). On shaded rock and bark.

Family Collemataceae (2 genera, 12 taxa)

Collema conglomeratum Hoffm. – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Orange County:** Perlmutter (2006); Mt (*J.C. Lendemer 10436* [NY]). Corticolous.

Collema pulcellum var. *leucopeplum* (Tuck.) Degel. – **Mecklenberg County:** Perlmutter (2006). Substrate not reported.

Collema pulcellum var. *subnigrescens* (Müll. Arg.) Degel. – **Mecklenberg County:** Perlmutter (2006); CP (Lendemer & Yahr 2004). Substrate not reported.

Collema subflaccidum Degel. – **Anson County:** *F.S. Chapman s.n.* (NCU!); **Forsyth County:** Becker *et al.* (1977) as *C. subfurvum*; **Wake County:** *W.C. Coker* (NCU!); Mt (*J.C. Lendemer 10484* [NY]). On bark and rock.

Leptogium austoramericanum (Malme) C.W. Dodge – **Orange County:** *Perlmutter 854* (NCU!); **Polk County:** Perlmutter (2006); CP (*C.F. Reed 78113* [NY]), Mt (DePriest 2001). On shaded bark.

Leptogium corticola Taylor – **Forsyth County:** Becker *et al.* (1977); **Wake County:** Perlmutter & Lendemer (2008); Mt (*G.B. Perlmutter 609a* [NCU!]). On shaded bark.

Leptogium chloromelum (Ach.) Nyl. – **Forsyth County:** Becker *et al.* (1977); CP (Lendemer & Yahr 2004), Mt (Dey 1978). Corticolous.

Leptogium cyanescens (Rabenh.) Körb. – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Montgomery County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 984, 1128, 1147, 2101* (NCU!); **Polk County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 572, 771* (NCU!); CP (*G.B. Perlmutter 687* [NCU!]), Mt (*G.B. Perlmutter 609* [NCU!]). On shaded bark.

Leptogium dactylinum Tuck. – **Forsyth County:** Perlmutter (2006); **Wake County:** Perlmutter & Lendemer (2008); CP (Lendemer & Yahr 2004), Mt (Lendemer & Tripp 2008). Corticolous.

Leptogium hirsutum Sierk – **Cleveland County:** Perlmutter (2006); Mt (Perry & Moore 1952). On shaded rock and bark.

Leptogium millegranum Sierk – **Chatham County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (DePriest 2001). Corticolous.

Leptogium palmatum (Huds.) Mont. – **Forsyth County:** Perlmutter (2006). Substrate not reported.

Family Pannariaceae (3 genera, 5 species)

Fuscopannaria leucosticta (Tuck.) P.M. Jørg. – **Alamance County:** *G.B. Perlmutter 1270* (NCU!); **Forsyth County:** Perlmutter (2006); **Polk County:** Perlmutter (2006); Mt (*J.C. Lendemer 10502* [NY]). On shaded rock.

Pannaria rubiginosa (Ach.) Bory – **Mecklenberg County:** Perlmutter (2006); Mt Jørgensen (2000b). Substrate nor reported.

Pannaria subfusca P.M. Jørg. – **Durham County:** Perlmutter (2006); Mt (*J.C. Lendemer 10759* [NY]). Corticolous.

Pannaria tavaresii P.M. Jørg. – **Durham County:** Perlmutter (2006); Mt (Lendemer & Tripp 2008). Corticolous.

Parmeliella appalachensis P.M. Jørg. – **Polk County:** Perlmutter (2006)**,** Mt (*J.C. Lendemer 10870* [NY]). Saxicolous and corticolous.

Family Lobariaceae (3 genera, 6 species)

Lobaria pulmonaria (L.) Hoffm. – **Polk County:** *D.C. Peattie* (NCU!); Mt (*E. Schwartzman s.n.* [NCU!]). On bark and moss.

Lobaria quercizans Michx. – **Forsyth County:** Becker *et al.* (1977); **Orange County:** Perlmutter (2006); Mt (*J.C. Lendemer 10808* [NY]). On bark.

Lobaria ravenelii (Tuck.) Yoshim. – **Durham County:** Perlmutter (2006); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Wake County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (Perlmutter [2006] as from Stokes County). On bark.

Pseudocyphellaria aurata (Ach.) Vain. – **Wake County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10846* [NY]). On bark.

Sticta beauvoisii Delise – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); Mt (*W.C. Grow 17* [NCU!]). On moss.

Sticta carolinensis McDonald – **Alamance County:** *G.B. Perlmutter 1268* (NCU!); **Polk County:** *buck 50094* NY); CP (Lendemer & Yahr 2004), Mt (Lendemer & Tripp 2008). On shaded rock.

Family Nephromataceae (1 genus, 1 species)

Nephroma helveticum Ach. subsp. *helveticum* – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); Mt (*J.C. Lendemer 10504* [NY]). On moss.

Family Peltigeraceae (1 genus, 7 determined species)

Peltigera canina (L.) Wild. – **Forsyth County:** Becker *et al.* (1977); **Orange County:** Perlmutter (2006); Mt (Heiman 1996). On soil.

Peltigera didactyla (With.) J.R. Laundon – **Wake County:** *G.B. Perlmutter 818* (NCU!). On soil.

Peltigera elizabethae Gyeln. – **Caswell County:** Perlmutter (2006); Mt (Heiman [1996] as *P. horizontalis*). Substrate not reported.

Peltigera phyllidiosa Goffinet & Miadl. – **Orange County:** *G.B. Perlmutter 1203* (NCU!); Mt (*J.C. Lendemer 11926* [NY]). On trunk base.

Peltigera praetextata (Flörke *ex* Sommerf.) Zopf – **Caswell County:** Perlmutter (2006); Mt (*J.C. Lendemer 10806* [NY]). On shaded soil.

Peltigera rufescens (Weiss) Humb. – **Anson County:** *F.S. Chapman s.n.* (NCU!); Mt (Oosting & Anderson 1937). On soil.

Peltigera sp. – **Wake County:** *G.B. Perlmutter 765* (NCU!). On soil. Similar to *P. praetextata*, but requires further study for species delimitation.

Order Teloschistiales

Family Megalosporaceae (1 genus, 1 species)

Megalospora porphyritis (Tuck.) R.C. Harris – **Wake County:** *G.B. Perlmutter 757* (NCU!); CP (Perlmutter 2007a), Mt (*J.C. Lendemer 10476* [NY]). On bark.

Family Physciaceae (13 genera, 43 species)

Amandinea polyspora (Willey) E. Lay & P. May – **Orange County:** *G.B. Perlmutter 1106a*; CP (*R.C. Harris 47069* [NY]). On twigs.

Anaptychia palmulata (Michx.) Vain. – **Orange County:** *G.B. Perlmutter 908, 927* (NCU!); **Rowan County:** Perlmutter (2006); Mt (*G.B. Perlmutter 608* [NCU!]). On rock and bark.

Buellia curtisii (Tuck.) Imshaug (Syn. *Baculifera curtisii* [Tuck.] Marbach) – **Chatham County:** *G.B. Perlmutter 964* (NCU!); **Harnett County:** *G.B. Perlmutter 501* (NCU!); **Orange County:** *G.B. Perlmutter 369, 891b, 1118a, 1142, 1197, 1213* (NCU!); **Stanly County:** *G.B. Perlmutter 416, 444* (NCU!); **Surry County:** *G.B. Perlmutter 621* (NCU!); **Wake County:** *G.B. Perlmutter 743, 1605* (NCU!); CP (*G.B. Perlmutter 214* [NCU!]), Mt (*J.C. Lendemer 10441* [NY]). On exposed bark.

Buellia maculata Bungartz – **Montgomery County:** *G.B. Perlmutter 1404, 1419* (NCU!); **Stanly County:** *G.B. Perlmutter 458* (NCU!); **Wake County:** *G.B. Perlmutter 134, 290* (NCU!). On sileceous rock.

Buellia mamillana (Tuck.) W.A. Weber – **Orange County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 819* (NCU!). On bark.

Buellia spuria (Schaer.) Anzi – **Anson County:** *P.O. Schallert s.n.* (NCU!); Mt (Lendemer & Tripp 2008). On rock.

Buellia stillingiana J. Steiner – **Durham County:** Perlmutter (2006); **Harnett County:** *G.B. Perlmutter 482* (NCU!); **Orange County:** *G.B. Perlmutter 385, 891, 1118, 1173, 1446* (NCU!); **Stanly County:** *G.B. Perlmutter 424, 432* (NCU!); **Wake County:** *G.B. Perlmutter 26, 389* (NCU!); CP (*G.B. Perlmutter 697* [NCU!]), Mt (*W.C. Grow 10* [NCU!]). On bark.

Dimelaena oreina (Ach.) Norman – **Montgomery County:** *P.O. Schallert 11359* (NY); Mt (*G.B. Perlmutter 596* [NCU!]). On exposed rock.

Dirinaria frostii (Tuck.) Hale & W.L. Culb. – **Montgomery County:** *G.B. Perlmutter 1409* (NCU!); Mt (*J.C. Lendemer 11924* [NY]). On rock.

Heterodermia albicans (Pers.) Swinsc. & Krog – **Durham County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 227, 1001* (NCU!); CP (*Perlmutter 718* [NCU!]), Mt (Lendemer & Tripp 2008). On bark and rock.

Heterodermia echiniata (Taylor) W.L. Culb. – **Wake County:** *W.C. Coker & H.R. Totten s.n.* (NCU!); Mt (DePriest 2001). On branches.

Heterodermia obscurata (Nyl.) Trevisan – **Alamance County:** *G.P. Anderson s.n.* (NY); **Chatham County:** Perlmutter (2006); **Granville County:** *C.F. Reed 116993* (NY); **Wake County:** *W.C. Coker s.n., G.B. Perlmutter 294, 785, 1003* (NCU!); CP (*C.F. Reed 66165* [NY]), Mt (*R.C. Harris 13682* [NY]). Corticolous.

Heterodermia pseudospeciosa (Kurok.) W.L. Culb. – **Orange County:** Perlmutter (2006); Mt (*R.C. Harris 38612* [NY]). Saxicolous.

Heterodermia speciosa (Wulfen) Trevisan – **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Orange County:** *G.B. Perlmutter 372, 909* (NCU!); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10768* [NY]). On hardwood trunks.

Hyperphyscia syncolla (Tuck. *ex* Nyl.) Kalb – **Forsyth County:** Perlmutter (2006); Mt (DePriest 2001). Corticolous.

Phaeophyscia adiastola (Essl.) Essl. – **Montgomery County:** *G.B. Perlmutter 1413* (NCU!); **Orange County:** *G.B. Perlmutter 990, 1474* (NCU!); **Randolph County:** Perlmutter (2006); Mt (DePriest 2001). Corticolous.

Phaeophyscia ciliata (Hoffm.) Moberg – **Durham County:** Perlmutter (2006); **Mecklenberg County:** Perlmutter (2006); **Wake County:** Perlmutter & Lendemer (2008); Mt (DePriest 2001). Corticolous.

Phaeophyscia hirsuta (Mereschk.) Essl. – **Davie County:** Perlmutter (2006). Saxicolous and corticolous.

Phaeophyscia pusilloides (Zahlbr.) Essl. – **Orange County:** *G.B. Perlmutter 1138, 1168, 1447* (NCU!); **Wake County:** *G.B. Pelrmutter 1188* (NCU!); **Warren County:** Perlmutter (2006); Mt (Lendemer & Tripp 2008). On shaded hardwood trunks.

Phaeophyscia rubropulchra (Degel.) Essl. – **Orange County:** *G.B. Perlmutter 376, 883, 1153, 1158, 1220* (NCU!); **Wake County:** *G.B. Perlmutter 280, 764, 803* (NCU!); CP (Lendemer & Yahr 2004), Mt (*J.C. Lendemer 10824* [NY]). On shaded bark and rock.

Phaeophyscia squarrosa Kashiwadani – **Stanly County:** Perlmutter (2006); CP (Lendemer & Yahr 2004), Mt (Lendemer & Tripp 2008). Saxicolous.

Physcia aipolia (Ehrh. *ex* Humb.) Fürnr. – **Durham County:** Perlmutter (2006); Mt (DePriest 2001). Corticolous.

Physcia americana G. Merr. – **Forsyth County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 930, 989, 1164, 1208, 1226* (NCU!); **Wake County:** *G.B. Perlmutter 133, 578, 770* (NCU!); CP (*G.B. Perlmutter 722* [NCU!]), Mt (*J.C. Lendemer 10409* [NY]). Corticolous.

Physcia atrostiata Moberg *et al*. – **Cabarras County:** Perlmutter (2006); **Montgomery County:** *G.B. Perlmutter 1386* (NCU!); **Orange County:** *G.B. Perlmutter 105* (NCU!); CP (*C.F. Reed 138749* [NY]), Mt (Dey [1978] as *P. ciliata*). Corticolous.

Physcia millegrana Degel. – **Granville County:** *G.B. Perlmutter 636* (NCU!); **Nash County:** *G.B. Perlmutter 209* (NCU!); **Orange County:** *G.B. Perlmutter 950, 951* (NCU!); **Wake County:** *G.B. Perlmutter 159, 196, 1194* (NCU!); CP (*G.B. Perlmutter197* [NCU!]), Mt (DePriest 2001). On exposed branches and trunks in forests and cities. Pollution tolerant.

Physcia pumilior R.C. Harris – **Granville County:** *G.B. Perlmutter 634* (NCU!); **Harnett County:** *G.B. Perlmutter 479, 481* (NCU!); **Montgomery County:** *G.B. Perlmutter 1380, 1439* (NCU!); **Orange County:** *G.B. Perlmutter 90, 1095, 1212, 1218, 1468* (NCU!); **Stanly County:** *G.B. Perlmutter 404* (NCU!); **Wake County:** *G.B. Perlmutter 195, 286, 397, 1234* (NCU!); CP (*G.B. Perlmutter 200* [NCU!], Mt (*W.C. Grow 11* [NCU!]). On branches.

Physcia stellaris (L.) Nyl. – **Chatham County:** *G.B. Perlmutter 954* (NCU!); **Montgomery County:** *G.B. Perlmutter 1375* (NCU!); **Orange County:** *G.B. Perlmutter 1167, 1458* (NCU!); **Wake County:** *G.B. Perlmutter 27* (NCU!); Mt (Lendemer & Tripp 2008). On branches.

Physcia subtilis Degel. – **Montgomery County:** *G.B. Perlmutter 1420* (NCU!); **Wake County:** *G.B. Perlmutter 278* (NCU!); Mt (Perlmutter [2006] as from Stokes and Wilkes counties). Saxicolous.

Physciella chloantha (Ach.) Essl. – **Durham County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 791* (NCU!). Corticolous and saxicolous.

Pyxine sorediata (Ach.) Mont. – **Chatham County:** Perlmutter (2006); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Orange County:** *G.B. Perlmutter 987* (NCU!); **Surry County:** *G.B. Perlmutter 612* (NCU!); **Wake County:** Perlmutter (2006); Mt (*J.C. Lendemer 10877* [NY]). Corticolous.

Pyxine subcinerea Stirt. – **Chatham County:** Perlmutter (2006); **Orange County:** *G.B. Perlmutter 884, 944, 1129* (NCU!); **Stanly County:** *G.B. Perlmutter 456* (NCU!); **Wake**

County: *G.B. Perlmutter 1160, 1186, 1233, 1236, 1617* (NCU!); CP (*G.B. Perlmutter 202* [NCU!]), Mt (Amtoft 2002). Corticolous.

Rinodina destituta (Nyl.) Zahlbr. – **Montgomery County:** *G.B. Perlmutter 1412, 1422* (NCU!); Mt (*W.R. Buck 32657* [NY]). Saxicolous.

Rinodina granuligera H. Magn. – **Wake County:** *J.C. Lendemer 8319* (NY). Corticolous.

Rinodina maculans Müll. Arg. – **Orange County:** *G.B. Perlmutter 1180a* (NCU!); **Wake County:** *G.B. Perlmutter 165, 251, 1618*; CP (*W.R. Buck 43870* [NY]). Corticolous.

Rinodina oxydata (A. Massal.) A. Massal. *s. lat.* – **Wake County:** *G.B. Perlmutter 289* (NCU!). Thallus tan, continuous crustose; apothecia lecanorine, disk blackish; spores brown, 2-celled, 24 × 12 μm; cortex C-, medulla I-, ascus tips I+ blue. Saxicolous.

Rinodina tephraspis (Tuck.) Herre – **Wake County:** *G.B. Perlmutter 69* (NCU!); Mt (*W.R. Buck 25209* [NY]). Saxicolous near streams.

Family Teloschistiaceae (3 genera, 9 species)

Caloplaca camptida (Tuck.) Zahlbr. – **Iridell County:** Perlmutter (2006). Corticolous.

Caloplaca cerina (Ehrh. ex Hedwig) Th. Fr. – **Chatham County:** Perlmutter (2006). Corticolous.

Caloplaca cinnabarina (Ach.) Zahlbr. – **Gaston County:** Perlmutter (2006). Saxicolous.

Caloplaca ferracissima H. Magn. – **Wake County:** *G.B. Perlmutter 316* (NCU!). On urban sidewalks.

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – **Chatham County:** *G.B. Perlmutter 974* (NCU!); **Mecklenberg County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 266* (NCU!); Mt (DePriest 2001). On silecious rocks near streams.

Caloplaca holocarpa (Hoffm. *ex* Ach.) M. Wade – **Orange County:** Perlmutter (2006). On bark of riparian hardwoods.

Caloplaca querzicola H. Magn. – **Polk County:** Perlmutter (2006). Substrate not reported.

Caloplaca sideritis (Tuck.) Zahlbr. – **Montgomery County:** *G.B. Perlmutter 1411* (NCU!); Mt (Wetmore [1996]). Saxicolous.

Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr.) – **Granville County:** *G.B. Perlmutter 639* (NCU!); **Orange County:** Perlmutter (2006). On trees and rocks.

Xanthomendoza weberi* (S. Kondr. & Kärnefelt) L. Lindblom (Lindblom 2006) – **Granville County: *G.B. Perlmutter 640* (NCU!); **Orange County:** Lindblom (2006); CP (*R. Newman s.n.* [NCU!]). Corticolous.

Xanthoria candelaria (L.) Th. Fr. – **Person County:** Perlmutter (2006). Substrate not reported.

Orders Indetermined

Family Brigantiaeaceae (1 genus, 1 species)

Brigantiaea leucoxantha (Spreng.) R. Sant. & Hafellner – **Montgomery County:** Perlmutter (2006); CP (*G.B. Perlmutter 662* [NCU!]), Mt (*J.C. Lendemer 10773* [NY]). On bark.

Family Fuscideaceae (2 genera, 2 species)

Fuscidea appalachensis Fryday – **Burke County:** *P.A. Smith 3114* (NY). Saxicolous.

Maronea polyphaea H. Magn. – **Durham County:** Perlmutter (2006); **Orange County:** *Perlmutter 882, 1199* (NCU!); **Wake County:** *G.B. Perlmutter 206* (NCU!); CP (Lendemer & Yahr 2004), Mt (*W.C. Grow 26* [NCU!]). On branches.

Family Lecideaceae (2 genera, 2 taxa)

Hypocoenomyce sp. – **Wake County:** Perlmutter & Lendemer (2008). Details not reported.

Porpidia albocaerulescens (Wulfen) Hertel & Knoph – **Chatham County:** *G.B. Perlmutter 973* (NCU!); **Forsyth County:** *P.O. Schallert s.n.* (NCU!); **Montgomery County:** *G.B. Perlmutter 1406* (NCU!); **Orange County:** *G.B. Perlmutter 848* (NCU!); **Wake County:** *G.B. Perlmutter 58, 800* (NCU!); Mt (*J.C. Lendemer 10829* [NY]). Common on shaded rocks.

Family Rhizocarpaceae (1 genus, 1 species)

Rhizocarpon reductum Th. Fr. – **Wake County:** *G.B. Perlmutter 820a* (NCU!); Mt (*W.R. Buck 50120* [NY]). Saxicolous on shaded rocks.

Family Vezdaeaceae (1 genus, 1 species)

Vezdaea leprosa (P. James) Vězda – **Durham County:** Perlmutter (2006). Muscicolous / terricolous.

Order Candelariales

Family Candelariaceae (2 genera, 4 species)

Candelaria concolor (Dicks.) Stein – **Orange County:** *G.B. Perlmutter 1185, 1219, 1449* (NCU!); **Person County:** Perlmutter (2006); **Wake County:** *G.B. Perlmutter 1187, 1240* (NCU!); Mt (DePriest 2001). On exposed bark of branches and trunks, especially in urban areas.

Candelaria fibrosa (Fr.) Müll. Arg. – **Granville County:** Perlmutter (2006); Mt (McCune *et al.* 1997). Corticolous.

Candelariella reflexa (Nyl.) Lettau – **Harnett County:** *G.B. Perlmutter 484*; **Orange County:** *G.B. Perlmutter 100, 107, 937, 947, 1180* (NCU!); **Stanly County;** *G.B. Perlmutter 447* (NCU!); **Wake County:** *G.B. Perlmutter 391, 1239* (NCU!); CP (*G.B. Perlmutter 201* [NCU!]), Mt (DePriest 2001). On exposed branches and trunks, especially in urban areas.

Order Umbilicariales

Family Umbilicariaceae (2 genera, 4 species)

Lasallia papulosa (Ach.) Llano – **Cleveland County:** *W.C. Coker s.n.* (NCU!); **Polk County:** Perlmutter (2006); Mt (*E. Schwartzman s.n.* [NCU!]). Saxicolous.

Lasallia pensylvanica (Hoffm.) Llano – **Gaston County:** Perlmutter (2006); Mt (Perlmutter [2006] as from Stokes County). Saxicolous.

Umbilicaria mammulata (Ach.) Tuck. – **Forsyth County:** Perlmutter (2006); Mt (*G.B. Perlmutter 589* [NCU!]). Saxicolous.

Class Lichininomycetes

Order Lichinales

Family Lichinaceae (2 genera, 2 species)

Lichina willeyi (Tuck.) Henssen – **Wake County:** Perlmutter (2006). Saxicolous?

Family Peltulaceae (1 genus, 2 species)

Peltula cylindrica Wetmore – **Alexander County:** Perlmutter (2006). Saxicolous on granitic flatrocks.

Peltula zahlbruckneri (Hasse) Wetmore – **Wake County:** Wetmore (1970). Saxicolous on granitic flatrocks.

Class Sordariomycetes

Family Amphisphaeriaceae (1 genus, 1 species)

Amphisphaeria bufonia (Berk. & Broome) Ces. & De Not. – **Orange County:** *G.B. Perlmutter 923* (NCU!). On oak trunks.

Position Indetermined

Dictyocatenulata alba Finley & E.F. Morris – **Wake County:** *G.B. Perlmutter 769* (NCU!). Anamorphic lichen. On tree bases.

Marchandiomyces corallinus (Roberge) Diederich & Hawksw. – **Wake County:** Perlmutter & Lendemer (2008). Anamorphic, lichenicolous fungus.

Phylum Basidiomycota (http://www.indexfungorum.org/Names/fundic.asp)

Class Agaricomycetes

Order Cantharellales

Family Clavulinaceae (1 genus, 2 species)

Multiclavula corynoides (Peck) R.H. Peterson – **Montgomery County:** *G.B. Perlmutter 1429* (NY). On soil.

Multiclavula mucida (Peck) R.H. Petersen – **Chatham County:** *D. Harnden s.n.* (NCU!). On wood.

Anticipated taxa (represented by specimens collected in surrounding ecoregions)

Calicium abietinum Pers. (Physciaceae) – CP (*W.R. Buck 43769* [NY]), Mt **(**Perlmutter (2006] as from Wilkes County). Corticolous.

Cladonia dimorphoclada Robbins (Cladoniaceae) – CP (Lendemer & Yahr 2004), Mt (*G.P. Anderson s.n.* [NY]). On soil.

Hypocenomyce anthracophila (Nyl.) P James & Gotth. Schneid. (Lecideaceae) – CP (*W.R. Buck 41891* [NY]), Mt (*R.C. Harris 33141* [NY]). On conifers.

Parmotrema cetratum (Ach.) Hale (Parmeliaceae) – CP (Lendemer & Yahr 2004), Mt (Lendemer & Tripp 2008). Corticolous.

**Ramboldia russula* (Ach.) Kalb, Lumbsch & Elix (Lecanoraceae) (Kalb *et al.* 2008) – CP (*R.C. Harris 47518* [NY]), Mt (*G.B. Perlmutter 585* (NCU!). Corticolous and saxicolous.

Trapeliopsis granulosa (Hoffm.) Lumbsch (Agyriaceae) – CP (Lendemer & Yahr 2004), Mt (Perlmutter [2006] as in Stokes County). Substrate not reported.

Usnea halei P. Clerc (Parmeliaceae) – CP (*R.C. Harris 47162* [NY]), Mt (*G.B. Perlmutter 600* [NCU!]). Saxicolous.

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APPENDICES

Appendix I-A: Lichen Checklist for North Carolina, USA (reprint of *Evansia* 22(2): 51-77)

Appendix I-B: Corrections and Additions to the North Carolina, USA Lichens Checklist (reprint of *Evansia* 22(4): 126-137)

Appendix I-C: Checklist of Lichens and Lichenicolous Fungi of North Carolina, USA, Version 1 May 2009 (unpublished revision)

Appendix II-A: Lichen Inventory of the North Carolina Piedmont (reprint of *Castanea* 71(4): 282-294)

Appendix II-B: *Flakea papillata* in North America (reprint of *The Bryologist* 109(4): 566-569)

Appendix II-C: Outline to NCU Lichen Collection (revised 13 May 2009)

Appendix IV: Contributions to the Lichen Flora of North Carolina: a Preliminary Checklist of the Lichens and Allied Fungi at William B. Umstead State Park (reprint of *Opuscula Philolichenum* 5: 67-76)

Appendix V: The Lichen Biota of Mason Farm Biological Reserve, North Carolina (reprint of *Journal of the North Carolina Academy of Sciences* 124(3): 82-90)

Appendix VI: Contributions to the Lichen Flora of North Carolina: a Preliminary Checklist of Lichens of the Uwharrie Mountains (reprint of *Opuscula Philolichenum* 6: 65-72)

Appendix VII: Map of Level III and IV Ecoregions of North Carolina (ftp://ftp.epa.gov/wed/ecoregions/nc_sc/nc_eco.pdf, accessed 14 May 2009)

Lichen Checklist for North Carolina, USA

Gary B. Perlmutter[1]

Abstract -- A checklist of lichens from a thorough literature review of both printed and online resources covering North Carolina, USA is presented. This list contains over 600 taxa from the state.

While preparing a report for an herbaria review I had conducted for lichens of the Piedmont of North Carolina, I found it necessary to compile a checklist for the state to verify reviewed taxa as already reported or as new. The only existing checklist for North Carolina is from a website from the University of Hamburg, Germany (www.biologie.uni-hamburg.de/checklists/), which I found to be inadequate for my review. Therefore, I conducted a more thorough review of the literature, including both printed and online sources, from early papers (e.g. Oosting and Anderson 1937) to the most recent online publications (e.g. USGS 2005). The resulting checklist includes 605 lichen taxa and is the most complete listing of lichens of North Carolina to date.

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Lichen checklist for North Carolina from literature review. Nomenclature follows Esslinger (1997) with synonyms as found in the literature. References are as first appeared in the literature.

Taxon	Reference
Acarospora fuscata (Schrader) Arnold	Brodo et al. 2001
Acarospora glaucocarpa (Ach.) Körber	Brodo et al. 2001
Ahtiana aurescens (Tuck. ex Riddle) Goward & Thell (Syn.: Cetraria aurescens, Tuckermannopsis aurescens)	Dey 1978
Alectoria fallacina Mot.	Dey 1978
Allocetraria oakesiana (Tuck.) Randlane & Thell (Syn.: Cetraria oaksiana, Tuckermannopsis oaksaina)	Perry & Moore 1969
Amandinea langloisii Imshaug ex Marbach	Lendemer & Yahr 2004
Amandinea milliaria (Tuck.) P. May & Sheard	Lendemer & Yahr 2004
Amandinea polyspora (Willey) E. Lay & P. May	Lendemer & Yahr 2004
Amandinea punctata (Hoffm.) Coppins & Scheid. (Syn.: Buellia punctata)	Brodo et al. 2001
Anaptychia palmulata (Michaux) Vainio	Perry & Moore 1969
Anaptychia setifera Räsänen	NatureServe 2005
Anisomeridium biforme (Borrer) R. C. Harris	Lendemer & Yahr 2004
Anthracothecium nanum (Zahlbr.) R. C. Harris	Lendemer & Yahr 2004
Anzia americana Yoshim. & Sharp	NatureServe 2005
Anzia colpodes (Ach.) Stizenb.	Perry & Moore 1969
Anzia ornata (Zahlbr.) Asah.	NatureServe 2005
Arctoparmelia incurva (Pers.) Hale (Syn.: Parmelia incurva)	Dey 1978
Arthonia albovirescens Nyl.	Lendemer & Yahr 2004
Arthonia caesia (Flotow) Körber	Brodo et al. 2001
Arthonia cinnabarina (DC.) Wallr.	Brodo et al. 2001
Arthonia rubella (Fée) Nyl.	Lendemer & Yahr 2004
Arthopyrenia cinchonae (Ach.) Müll. Arg.	Lendemer & Yahr 2004
Arthopyrenia degelii R. C. Harris	Harris 1995
Arthothelium interveniens (Nyl.) Zahlbr.	Lendemer & Yahr 2004
Arthothelium taediosum (Nyl.) Müll. Arg.	Lendemer & Yahr 2004
Aspicilia cinerea (L.) Körber (Syn.: Lecanora cinerea)	Brodo et al. 2001

Taxon	Reference
Bacidia heterochroa (Müll. Arg.) Zahlbr.	Lendemer & Yahr 2004
Bacidia polychroa (Th. Fr.) Körber	Lendemer & Yahr 2004
Bacidia rubella (Hoffm.) A. Massal.	Brodo et al. 2001
Bacidia schweinitzii (Fr. ex E. Michener) A. Schneider	Brodo et al. 2001
Bacidina egenula (Nyl.) Vezda	Lendemer & Yahr 2004
Bactrospora mesospora R.C. Harris	Lendemer & Yahr 2004
Baculifera curtisii (Tuck.) Marbach (Syn.: Buellia curtisii)	Lendemer & Yahr 2004
Baculifera imshaugiana (R. C. Harris) Marbach (Syn.: Buellia imshaugiana)	Lendemer & Yahr 2004
Bathelium carolinianum (Tuck.) R. C. Harris	Lendemer & Yahr 2004
Baeomyces rufus (Hudson) Rebent.	Dey 1978
Biatora pontica Printzen & Tønsberg	Printzen & Tønsberg 2003
Biatora printzenii Tønsberg	Tønsberg 2002
Brigantiaea leucoxantha (Sprengel) R. Sant. & Hafellner	Brodo et al. 2001
Bryoria bicolor (Ehrh.) Brodo & D. Hawksw. (Syn.: Alectoria bicolor)	Perry & More 1969
Bryoria furcellata (Fr.) Brodo & D. Hawksw. (Syn.: Alectoria nidulifera)	Perry & More 1969
Bryoria nadvornikiana (Gyelnik) Brodo & D. Hawksw. (Syn.: Alectoria nadvornikiana)	Perry & More 1969
Bryoria tenuis (E. Dahl) Brodo & D. Hawksw. Syn (Syn.: Alectoria tenuis)	Dey 1978
Bryoria trichodes subsp. americana (Mot.) Brodo & D. Hawksw. (Syn.: Alectoria americana)	Perry & More 1969
Buellia curatellae Malme	USGS 2005
Buellia spuria (Schaerer) Anzi	Brodo et al. 2001
Buellia stillingiana J. Steiner	Brodo et al. 2001
Bulbothrix confoederata (Culb.) Hale	Brodo et al. 2001
Bulbothrix goebelii (Zenker) Hale	McCune et al. 1997
Bulbothrix isidiza (Nyl.) Hale	Dey 1987
Byssoloma leucoblepharum (Nyl.) Vainio	Lendemer & Yahr 2004
Byssoloma meadii (Tuck.) S. S. Ekman	Brodo et al. 2001
Byssoloma subdiscordans (Nyl.) P. James	Lendemer & Yahr 2004
Calicium abietinum Pers.	Lendemer & Yahr 2004

Taxon	Reference
Calicium hyperelloides Nyl.	Lendemer & Yahr 2004
Calicium trabinellum (Ach.) Ach	Lendemer & Yahr 2004
Caloplaca cerina (Ehrh. ex Hedwig) Th. Fr.	Brodo et al. 2001
Caloplaca chrysophthalma Degel.	Lendemer & Yahr 2004
Caloplaca cinnabarina (Ach.) Zahlbr.	Wetmore & Kärnefelt 1999
Caloplaca citrina (Hoffm.) Th. Fr.	Brodo et al. 2001
Caloplaca ferruginea (Hudson) Th. Fr.	USGS 2005
Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth.	Brodo et al. 2001
Candelaria concolor (Dickson) Stein	Perry & Moore 1969
Candelaria fibrosa (Fr.) Müll. Arg.	Perry & Moore 1969
Candelariella efflorescens R. C. Harris & W. R. Buck	Brodo et al. 2001
Candelariella vitellina (Hoffm.) Müll. Arg.	USGS 2005
Canomaculina haitiensis (Hale) Elix (Syn.: Parmotrema haitiense)	Lendemer & Yahr 2004
Canomaculina neotropica (Kurok.) Elix (Syn.: Parmotrema neotropicum)	Heiman 1996
Canomaculina subsumpta (Nyl.) Elix (Syn.: Parmotrema subsumptum)	McCune et al. 1997
Canomaculina subtinctoria (Zahlbr.) Elix (Syn.: Parmotrema subtinctorium, Parmelia subcrinita)	Perry & Moore 1969
Canoparmelia amabilis Heiman & Elix	Heiman & Elix 1999
Canoparmelia amazonica (Nyl.) Elix & Hale	Lendemer & Yahr 2004
Canoparmelia caroliniana (Nyl.) Elix & Hale (Syn.: Parmelia caroliniana)	Perry & Moore 1969
Canoparmelia crozalsiana (B. de Lesd. ex Harm.) Elix & Hale	Heiman 1996
Canoparmelia texana (Tuck.) Elix & Hale	Brodo et al. 2001
Cetradonia linearis (Evans) J.-C. Wei & Ahti (Syn.: Cladonia linearis, Gymnoderma lineare)	Perry & More 1969
Cetraria aculeata (Schreber) Fr.	Mozingo 1954
Cetraria arenaria Kärnefelt	Heiman 1996
Cetraria islandica (L.) Ach. subsp. islandica	Perry & Moore 1969
Cetrelia cetrarioides (Duby) Culb. & C. Culb.	Dey 1978
Cetrelia chicitae (Culb.) Culb. & C. Culb.	Perry & Moore 1969
Cetrelia olivetorum (Nyl.) Culb. & C. Culb.	Perry & Moore 1969

Taxon	Reference
Chaenotheca brunneola (Ach.) Müll. Arg.	Brodo et al. 2001
Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell (Saprophytic fungus related to lichens or lichenicolous fungi)	Lendemer & Yahr 2004
Chrysothrix candelaris (L.) J. R. Laundon (Syn.: Lepraria flava)	Brodo et al. 2001
Chrysothrix flavovirens Tønsberg s. lat.	Lendemer 2005
Ciposia wheeleri (R. C. Harris) Marbach (Syn.: Buellia wheeleri)	Lendemer & Yahr 2004
Cladonia anitae Culb. & C. Culb.	Culberson et al. 1982
Cladonia apodocarpa Robbins	Keever et al. 1951
Cladonia arbuscula (Wallr.) Flotow (Syn.: Cladina arbuscula, Cladonia sylvatica)	Oosting & Anderson 1937
Cladonia beaumontii (Tuck.) Vainio	Brodo et al. 2001
Cladonia caespiticia (Pers.) Flörke	Oosting & Anderson 1937
Cladonia caroliniana Tuck.	Oosting & Anderson 1939
Cladonia cenotea (Ach.) Schaerer	Perry & Moore 1969
Cladonia cervicornis (Ach.) Flotow subsp. cervicornis	Heiman 1996
Cladonia cervicornis subsp. verticillata (Hoffm.) Ahti (Syn.: Cladonia verticillata)	Perry & Moore 1969
Cladonia chlorophaea (Flörke ex Sommerf.) Sprengel	Perry & Moore 1969
Cladonia ciliata var. tenuis (Flörke) Ahti (Syn.: Cladonia tenuis)	Oosting & Anderson 1937
Cladonia coccifera (L.) Willd.	Oosting & Anderson 1937
Cladonia coniocraea (Flörke) Sprengel	Oosting & Anderson 1937
Cladonia crispata (Ach.) Flotow var. crispata	Brodo et al. 2001
Cladonia cristatella Tuck.	Keever et al. 1951
Cladonia cryptochlrophaea Asah.	Perry & Moore 1969
Cladonia cylindrica (A. Evans) A. Evans	Heiman 1996
Cladonia didyma (Fée) Vainio	Perry & Moore 1969
Cladonia didyma var. vulcanica (Zoll. & Moritzi) Vainio (Syn.: Cladonia vulcanica)	McCune et al. 1997
Cladonia digitata (L.) Hoffm.	Dey 1978

Taxon	Reference
Cladonia dimorphoclada Robbins	Brodo et al. 2001
Cladonia evansii Abbayes (Syn.: Cladina evansii)	Brodo et al. 2001
Cladonia fimbriata (L.) Fr.	Oosting & Anderson 1937
Cladonia floerkeana (Fr.) Flörke	Oosting & Anderson 1937
Cladonia floridana Vainio	Brodo et al. 2001
Cladonia furcata (Hudson) Schrader	Oosting & Anderson 1937
Cladonia gracilis (L.) Willd. subsp. gracilis (Syn.: Cladonia gracilis)	Perry & Moore 1969
Cladonia grayi G. Merr. ex Sandst.	Keever et al. 1951
Cladonia humilis (With.) J. R. Laundon	Heiman 1996
Cladonia incrassata Flörke	Oosting & Anderson 1937
Cladonia leporina Fr.	Oosting & Anderson 1939
Cladonia macilenta Hoffm.	Heiman 1996
Cladonia macilenta var. bacillaris (Genth) Schaerer (Syn.: Cladonia bacillaris)	Keever et al. 1951
Cladonia mateocyatha Robbins	Robinson 1959
Cladonia merochlorophaea Asah.	Dey 1978
Cladonia mitis Sandst. (Syn.: Cladina mitis)	Oosting & Anderson 1937
Cladonia ochrochlora Flörke	McCune et al. 1997
Cladonia pachycladodes Vainio	Brodo et al. 2001
Cladonia parasitica (Hoffm.) Hoffm. (Syn.: Cladonia delicata)	Robinson 1959
Cladonia peziziformis (With.) J. R. Laundon (Syn.: Cladonia capitata)	Robinson 1959
Cladonia piedmontensis G. Merr.	Keever et al. 1951
Cladonia pleurota (Flörke) Schaerer	Perry & Moore 1969
Cladonia polycarpoides Nyl.	Heiman 1996
Cladonia psoromica J. P. Dey	Dey 1973
Cladonia pyxidata (L.) Hoffm.	Oosting & Anderson 1937
Cladonia ramulosa (With.) J. R. Laundon (Syn.: Cladonia pityrea)	McCune et al. 1997
Cladonia rangiferina (L.) F. H. Wigg. (Syn.:	Oosting & Anderson

Taxon	Reference
Cladina rangiferina)	1937
Cladonia rappii A. Evans (Syn.: Cladonia calycantha)	Brodo et al. 2001
Cladonia rei Schaerer (Syn.: Cladonia nemoxyna)	Perry & More 1969
Cladonia robbinsii A. Evans	Brodo et al. 2001
Cladonia santensis Tuck.	Lendemer & Yahr 2004
Cladonia sobolescens Nyl. ex Vainio	SCAN 1997
Cladonia squamosa Hoffm.	Oosting & Anderson 1937
Cladonia stellaris (Opiz) Pouzar & Vzda (Syn.: Cladonia alpestris)	Oosting & Anderson 1937
Cladonia strepsilis (Ach.) Grognot	Oosting & Anderson 1937
Cladonia stygia (Fr.) Ruoss (Syn.: Cladina stygia)	Ahti & Hyvonen 1985
Cladonia subcariosa Nyl. (Syn.: Cladonia clavulifera, C. polycarpia)	Oosting & Anderson 1937
Cladonia submitis A. Evans (Syn.: Cladina submitis)	Dey 1978
Cladonia subradiata (Vainio) Sandst.	Brodo et al. 2001
Cladonia subsetacea Robbins ex A. Evans	Lendemer & Yahr 2004
Cladonia subtenuis (Abbayes) Mattick (Syn.: Cladina subtenuis)	Robinson 1959
Cladonia turgida Hoffm.	Heiman 1996
Cladonia uncialis (L.) F. H. Wigg.	Keever et al. 1951
Coccocarpia erythroxyli (Sprengel) Swinscow & Krog	Brodo et al. 2001
Coccocarpia palmicola (Sprengel) Arv. & D. J. Galloway (Syn.: Coccocarpia cronia)	Perry & Moore 1969
Coenogonium luteum (Dicks.) Kalb & Lücking (Syn.: Dimerella lutea)	Brodo et al. 2001
Collema callibotrys Tuck.	GBIF 2005
Collema conglomeratum Hoffm.	Perry & Moore 1969
Collema flaccidum (Ach.) Ach.	Dey 1978
Collema furfuraceum (Arnold) Du Rietz	Dey 1978
Collema nigrescens (Hudson) DC.	Dey 1978
Collema pulcellum Ach.	Brodo et al. 2001
Collema subflaccidum Degel. (Syn.: Collema subfervum)	Perry & Moore 1969

Taxon	Reference
Conotrema urceolatum (Ach.) Tuck.	Brodo et al. 2001
Cryptothecia rubrocincta (Ehrenb. : Fr.) Thor (Syn.: Herpothallon sanguineum)	Brodo 1994
Dendriscocaulon intricatulum (Nyl.) Henssen	Brodo et al. 2001
Dermatocarpon luridum (With.) J. R. Laundon (Syn.: Dermatocarpon fluviatile)	Heiman 1996
Dermatocarpon miniatum (L.) W. Mann	Perry & Moore 1969
Dibaeis absoluta (Tuck.) Kalb & Gierl (Syn.: Baeomyces absolutus)	Perry & Moore 1969
Dibaeis baeomyces (L. F.) Rambold & Hertel (Syn.: Baeomyces fungoides, B. roseus)	Perry & Moore 1969
Dimelaena oreina (Ach.) Norman	Brodo et al. 2001
Diploschistes muscorum (Scop.) R. Sant. subsp. muscorum	Brodo et al. 2001
Diploschistes scruposus (Schreber) Norman	Brodo et al. 2001
Dirinaria aegialita (Afz.) B. Moore (Syn.: Dirinaria aspera)	Brodo et al. 2001
Dirinaria confusa D. D. Awasthi	Brodo et al. 2001
Dirinaria frostii (Tuck.) Hale & Culb. (Syn: Physcia frostii)	Perry & Moore 1969
Dirinaria picta (Sw.) Clem. & Shear	Lendemer & Yahr 2004
Dyplolabia afzelii (Ach.) A. Massal. (Syn.: Graphis afzelii)	Brodo et al. 2001
Endocarpon pusillum Hedwig	Brodo et al. 2001
Enterographa lecanoroides R. C. Harris (Syn.: Enterographa anguinella)	Lendemer & Yahr 2004
Ephebe americana Henssen	Dey 1978
Ephebe lanata (L.) Vainio	Brodo et al. 2001
Ephebe solida Bornet	NatureServe 2005
Epigloea pleiospora Döbbeler	Buck & Harris 2002
Everniastrum catawbiense (Degel.) Hale ex Sipman (Syn.: Parmelia catawbiensis)	Dey 1978
Fissurina columbina (Tuck.) Staiger	Lendemer & Yahr 2004
Fissurina subnitidula (Nyl.) Staiger	Lendemer & Yahr 2004
Flavoparmelia baltimorensis (Gyelnik & Fóriss) Hale	Dey 1978
Flavoparmelia caperata (L.) Hale (Syn.: Parmelia caperata)	Perry & Moore 1969
Flavopunctelia flaventior (Stirton) Hale (Syn.:	Dey 1978

Taxon	Reference
Parmelia flaventior)	
Fuscidea recensa (Stirton) Hertel, V. Wirth & Vezda	Brodo et al. 2001
Fuscopannaria leucophaea (Vahl) P. M. Jørg. (Syn.: Pannaria leucophaea)	McCune et al. 1997
Fuscopannaria leucosticta (Tuck.) P. M. Jørg. (Syn.: Pannaria leucosticta)	Perry & Moore 1969
Gassicurtia elizae (Tuck.) Marbach (Syn.: Buellia elizae)	Lendemer & Yahr 2004
Glyphis cicatricosa Ach.	Brodo et al. 2001
Gomphillus americanus Essl.	Buck 1998
Graphina cypressi Müll. Arg.	Lendemer & Yahr 2004
Graphina peplophora M. Wirth & Hale	Lendemer & Yahr 2004
Graphis desquamescens (Fée) Zahlbr.	Lendemer & Yahr 2004
Graphis illiterata R. C. Harris	Lendemer & Yahr 2004
Graphis librata C. Knight	Lendemer & Yahr 2004
Graphis lineola Ach.	Lendemer & Yahr 2004
Graphis lucifica R. C. Harris	Lendemer & Yahr 2004
Graphis scripta (L.) Ach.	SCAN 1996
Graphis striatula (Ach.) Sprengel	Lendemer & Yahr 2004
Gyrostomum scyphuliferum (Ach.) Nyl.	Lendemer & Yahr 2004
Haematomma accolens (Stirton) Hillm.	Brodo et al. 2001
Haematomma flexuosum Hillm.	Lendemer & Yahr 2004
Haematomma persoonii (Fée) A. Massal.	Brodo et al. 2001
Hafellia disciformis (Fr.) Marbach & H. Mayrhofer	USGS 2005
Heppia adglutinata (Kremp.) A. Massal.	Lendemer & Yahr 2004
Hertelidea pseudobotryosa R.C. Harris, Ladd & Printzen	Printzen & Kantvilas 2004
Heterodermia albicans (Pers.) Swinscow & Krog	SCAN 1996
Heterodermia appalachensis (Kurok.) Culb.	Culberson 1966
Heterodermia caserettiana (A. Massal.) Trevisan	Perry & Moore 1969
Heterodermia crocea R. C. Harris	Brodo et al. 2001
Heterodermia echinata (Taylor) Culb.	Culberson 1966
Heterodermia galactophylla (Tuck.) Culb.	Culberson 1966
Heterodermia granulifera (Ach.) Culb.	Culberson 1966
Heterodermia hypoleuca (Ach.) Trevisan	Perry & Moore 1969

Taxon	Reference
Heterodermia leucomela (L.) Poelt	Perry & Moore 1969
Heterodermia microphylla (Kurok.) Skorepa	McCune et al. 1997
Heterodermia obscurata (Nyl.) Trevisan	Perry & Moore 1969
Heterodermia propagulifera (Vainio) J. P. Dey	Dey 1978
Heterodermia pseudospeciosa (Kurok.) Culb.	Culberson 1966
Heterodermia speciosa (Wulfen) Trevisan (Syn.: Anaptychia speciosa, Heterodermia tremulans)	Culberson 1966
Heterodermia squamulosa (Degel.) Culb.	Perry & Moore 1969
Hydrothyria venosa J. L. Russell	Heiman 1996
Hyperphyscia adglutinata (Flörke) H. Mayrh. & Poelt	Brodo et al. 2001
Hyperphyscia syncolla (Tuck. ex Nyl.) Kalb	DePriest 2001
Hypocenomyce anthracophila (Nyl.) P. James & Gotth. Schneider	Brodo et al. 2001
Hypocenomyce scalaris (Ach.) M. Choisy	Brodo et al. 2001
Hypogymnia enteromorpha (Ach.) Nyl.	Perry & Moore 1969
Hypogymnia krogiae Ohlsson	Dey 1978
Hypogymnia physodes (L.) Nyl.	Perry & Moore 1969
Hypogymnia tubulosa (Schaerer) Hav.	Dey 1978
Hypogymnia vittata (Ach.) Parrique	Dey 1978
Hypotrachyna croceopustulata (Kurok.) Hale (Syn.: Parmelia croceopustulata)	Perry & Moore 1969
Hypotrachyna densirhizinata (Kurok.) Hale (Syn.: Parmelia densirhizinata)	Dey 1978
Hypotrachyna dentella (Hale & Kurok.) Hale (Syn.: Parmelia dentella)	Perry & Moore 1969
Hypotrachyna gondylophora (Hale) Hale (Syn.: Parmelia gondylophora)	Dey 1978
Hypotrachyna imbricatula (Zahlbr.) Hale (Syn.: Parmelia imbricatula)	Perry & Moore 1969
Hypotrachyna laevigata (Sm.) Hale (Syn.: Parmelia laevigata)	Dey 1978
Hypotrachyna livida (Taylor) Hale (Syn.: Parmelia livida)	Perry & Moore 1969
Hypotrachyna oostingii (J. P. Dey) Hale (Syn.: Parmelia oostingii)	Dey 1978
Hypotrachyna osseoalba (Vainio) Park & Hale (Syn.: Hypotrachyna formosana)	Heiman 1996
Hypotrachyna producta Hale (Syn.: Parmelia	Dey 1978

Taxon	Reference
producta)	
Hypotrachyna prolongata (Kurok.) Hale (Syn.: Parmelia rachista)	Dey 1978
Hypotrachyna pseudosinuosa (Asah.) Hale	McCune et al. 1997
Hypotrachyna pustulifera (Hale) Skorepa	McCune et al. 1997
Hypotrachyna revoluta (Flörke) Hale (Syn.: Parmelia revoluta)	Perry & Moore 1969
Hypotrachyna rockii (Zahlbr.) Hale (Syn.: Parmelia rockii)	Perry & Moore 1969
Hypotrachyna showmanii Hale	McCune et al. 1997
Hypotrachyna sinuosa (Sm.) Hale (Syn.: Parmelia sinuosa)	Dey 1978
Hypotrachyna thysanota (Kurok.) Hale (Syn.: Parmelia thysanota)	Dey 1978
Hypotrachyna virginica (Hale) Hale (Syn.: Parmelia virginica)	Perry & Moore 1969
Imschaugia aleurites (Ach.) S. F. Meyer (Syn.: Parmeliopsis aleurites)	Perry & Moore 1969
Imschaugia placorodia (Ach.) S. F. Meyer (Syn.: Parmeliopsis placorida)	Perry & Moore 1969
Ionapsis lacustris (With.) Lutzoni (Syn.: Lecanora lacustris)	Brodo et al. 2001
Lasallia papulosa (Ach.) Llano (Syn.: Umbilicaria pusulata var. papulosa)	Oosting & Anderson 1937
Lasallia pensylvanica (Hoffm.) Llano (Syn.: Umbilicaria pustulata)	Dey 1978
Lasallia pustulata (L.) Mérat	Keever et al. 1951
Lecanora allophana Nyl.	Brodo et al. 2001
Lecanora caesiorubella Ach. subsp. caesiorubella	Brodo et al. 2001
Lecanora caesiorubella subsp. glaucomodes (Nyl.) Imshaug & Brodo	Lendemer & Yahr 2004
Lecanora caesiorubella subsp. prolifera (Fink) R. C. Harris	DePriest 2001
Lecanora cenisia Ach.	Brodo et al. 2001
Lecanora cinereofusca H. Magn. var. cinereofusca	Brodo et al. 2001
Lecanora cinereofusca var. appalachensis Brodo	Brodo et al. 2001
Lecanora cupressi Tuck.	Brodo et al. 2001
Lecanora hybocarpa (Tuck.) Brodo	Brodo et al. 2001
Lecnora louisianae B. de Lesd.	Lendemer & Yahr 2004

Taxon	Reference
Lecanora minutella Nyl.	LaGreca & Lumbsch 2001
Lecanora oreinoides (Körber) Hertel & Rambold	SCAN 1997
Lecanora polytropa (Hoffm.) Rabenh.	Brodo et al. 2001
Lecanora strobilina (Sprengel) Kieffer	Brodo et al. 2001
Lecanora symmicta (Ach.) Ach.	Brodo et al. 2001
Lecanora thysanophora Harris	Brodo et al. 2001
Lecanora varia (Hoffm.) Ach.	SCAN 1997
Lecidea tessellata Flörke	Brodo et al. 2001
Leiorreuma sericeum (Eschw.) Staiger (Syn.: Pheographis sericea)	Lendemer & Yahr 2004
Lepraria lobificans Nyl. (Syn.: Lepraria finkii)	Brodo et al. 2001
Lepraria neglecta (Nyl.) Erichsen	Brodo et al. 2001
Lepraria membranacea (Dickson) Vainio (Syn.: Amphiloma lanuginosa, Leproloma membranaceum)	SCAN 1997
Leptogium austroamericanum (Malme) C. W. Dodge	Heiman 1996
Leptogium azureum (Sw.) Mont.	Perry & Moore 1969
Leptogium burnetiae C. W. Dodge	Dey 1978
Leptogium chloromelum (Sw. ex Ach.) Nyl.	Perry & Moore 1969
Leptogium corticola (Taylor) Tuck.	Perry & Moore 1969
Leptogium cyanescens (Rabenh.) Körber	Perry & Moore 1969
Leptogium dactylinum Tuck.	Lendemer & Yahr 2004
Leptogium hirsutum Sierk	Perry & Moore 1969
Leptogium laceroides (B. de Lesd.) P. M. Jørg.	Dey 1978
Leptogium lichinoides (L.) Zahlbr.	Heiman 1996
Leptogium milligranum Sierk	Perry & Moore 1969
Leptogium phyllocarpum (Pers.) Mont.	Brodo et al. 2001
Leptogium tenuissimum (Dickson) Körber	USGS 2005
Leptogium teretiusculum (Wallr.) Arnold	McCune et al. 1997
Lichenodiplis lecanorae (Vouaux) Dyko & D. Hawksw. (Lichenocolous fungus, on Pertusaria)	Lendemer & Yahr 2004
Lobaria pulmonaria (L.) Hoffm.	Perry & Moore 1969
Lobaria quercizans Michaux	Perry & Moore 1969
Lobaria ravenelii (Tuck.) Yoshim.	McCune et al. 1997

Taxon	Reference
Lobaria scrobiculata (Scop.) DC.	Perry & Moore 1969
Loxospora pustulata (Brodo & Culb.) R. C. Harris (Syn.: Haematomma pustulatum)	Brodo & Culberson 1986
Loxospora ochrophaea (Tuck.) R. C. Harris	Brodo et al. 2001
Maronea constans (Nyl.) Hepp	SCAN 1998
Maronea polyphaea H. Magn.	Lendemer & Yahr 2004
Megalaria laureri (Th. Fr.) Hafellner	Brodo et al. 2001
Megalospora tuberculosa (Fée) Sipman	USGS 2005
Melanelia culbersonii (Hale) Thell (Syn.: Cetraria culbersonii)	Heiman 1996
Melanelia hepatizon (Ach.) Thell (Syn.: Cetraria hepatizon)	Dey 1978
Melanelia exasperata (De Not.) Essl.	Heiman 1996
Melanelia fuliginosa (Fr. ex Duby) Essl.	Brodo et al. 2001
Melanelia halei (Ahti) Essl. (Syn.: Parmelia halei)	Perry & Moore 1969
Melanelia stygia (L.) Essl. (Syn.: Parmelia stygia)	Perry & Moore 1969
Melanelia subaurifera (Nyl.) Essl. (Syn.: Parmelia subaurifera)	Dey 1978
Menegazzia terebrata (Hoffm.) A. Massal.	Perry & Moore 1969
Micarea neostipitata Coppins & P. May	Coppins & May 2001
Micarea peliocarpa (Anzi) Coppins & R. Sant.	Brodo et al. 2001
Micarea prasina Fr.	Lendemer & Yahr 2004
Mycocalicium subtile (Pers.) Szatala (Saprophytic fungus related to lichens or lichenicolous fungi)	Lendemer & Yahr 2004
Myelochroa aurulenta (Tuck.) Elix & Hale (Syn.: Parmelia aurulenta, Parmelina aurulenta)	Perry & Moore 1969
Myelochroa galbina (Ach.) Elix & Hale (Syn.: Parmelia galbina, Parmelina galbina)	Perry & Moore 1969
Myelochroa obsessa (Ach.) Elix & Hale (Syn.: Parmelina obsessa)	Heiman 1996
Myxobilimbia sabuletorum (Schreber) Hafellner (Syn.: Bacidia sabuletorum, Mycobilimbia sabuletorum)	Brodo et al. 2001
Myriotrema glaucescens (Nyl.) Hale	Lendemer & Yahr 2004
Myriotrema wightii (Taylor) Hale (Syn.: Thelotrema ravenelii)	Lendemer & Yahr 2004
Nadvornikia sorediata R. C. Harris	Lendemer & Yahr 2004
Nephroma helveticum Ach. subsp. helveticum	Perry & Moore 1969

Taxon	Reference
Nephroma parile (Ach.) Ach.	Dey 1978
Nephroma resupinatum (L.) Ach.	Dey 1978
Normadina pulchella (Borrer) Nyl.	Dey 1978
Ocellularia praestans (Müll. Arg.) Hale	Lendemer & Yahr 2004
Ochrolechia africana Vainio	Brodo et al. 2001
Ochrolechia pseudopallescens Brodo	Brodo 1991
Ochrolechia trochophora (Vainio) Oshio var. trochophora	Brodo et al. 2001
Ochrolechia yasudae Vainio	Brodo et al. 2001
Opegrapha varia Pers.	Brodo et al. 2001
Opegrapha viridis (Pers. ex Ach.) Behlen & Desberger	Lendemer & Yahr 2004
Pannaria conoplea (Ach.) Bory (Syn.: Pannaria pityrea)	Dey 1978
Pannaria lurida (Mont.) Nyl. ssp. lurida	Brodo et al. 2001
Pannaria rubiginosa (Ach.) Bory	Perry & Moore 1969
Pannaria tavarisii P. M. Jørg.	Heiman 1996
Parmelia omphalodes (L.) Ach. subsp. omphalodes	Perry & Moore 1969
Parmelia saxatilis (L.) Ach.	Perry & Moore 1969
Parmelia squarrosa Hale	Dey 1978
Parmelia sulcata Taylor	Perry & Moore 1969
Parmeliella appalachensis P. M. Jørg.	Jørgensen 2000
Parmeliella corallinoides (Hoffm.) Zahlbr.	Perry & Moore 1969
Parmeliella pannosa (Sw.) Nyl.	Heiman 1996
Parmeliella triptophylla (Ach.) Müll. Arg.	McCune et al. 1997
Parmelinopsis horrescens (Taylor) Elix & Hale (Syn.: Parmelia horrescens, Parmelina horrescens)	Perry & Moore 1969
Parmelinopsis minarum (Vainio) Elix & Hale (Syn.: Parmelia dissecta, Parmelina minarum)	Perry & Moore 1969
Parmelinopsis spumosa (Asah.) Elix & Hale	McCune et al. 1997
Parmeliopsis subambigua Gyelnik	Brodo et al. 2001
Parmotrema arnoldii (Du Rietz) Hale	Dey 1978
Parmotrema austrosinense (Zahlbr.) Hale	Heiman 1996
Parmotrema chinense (Osbeck) Hale & Ahti (Syn.: Parmelia perlata)	Perry & Moore 1969
Parmotrema crinitum (Ach.) M. Choisy (Syn.: Parmelia crinita)	Perry & Moore 1969

Taxon	Reference
Parmotrema dilatatum (Vainio) Hale	McCune et al. 1997
Parmotrema dominicanum (Vainio) Hale	USGS 2005
Parmotrema eurysacum (Hue) Hale	McCune et al. 1997
Parmotrema hypoleucinum (Steiner) Hale	Lendemer & Yahr 2004
Parmotrema hypotropum (Nyl.) Hale (Syn.: Parmelia hypotropa)	Perry & Moore 1969
Parmotrema madagascariaceum (Hue) Hale	Lendemer & Yahr 2004
Parmotrema margaritatum (Hue) Hale (Syn.: Parmelia margaritata)	Perry & Moore 1969
Parmotrema mellissii (C. W. Dodge) Hale (Syn.: Parmelia mellissii)	Dey 1978
Parmotrema perforatum (Jacq.) A. Massal. (Syn.: Parmelia perforata)	Perry & Moore 1969
Parmotrema praesorediosum (Nyl.) Hale	McCune et al. 1997
Parmotrema rampoddense (Nyl.) Hale	Brodo et al. 2001
Parmotrema rigidum (Lynge) Hale	McCune et al. 1997
Parmotrema stuppeum (Taylor) Hale (Syn.: Parmelia stuppea)	Perry & Moore 1969
Parmotrema submarginale (Michx.) DePriest & B. Hale (Syn.: Parmotrema michauxiana)	Perry & Moore 1969
Parmotrema tinctorum (Delise ex Nyl.) Hale	DePriest 2001
Parmotrema ultralucens (Krog) Hale	Heiman 1996
Parmotrema xanthinum (Müll. Arg.) Hale (Syn.: Parmelia xanthina)	Perry & Moore 1969
Peccania kansana (Tuck.) Forss.	Keever et al. 1951
Peltigera canina (L.) Willd.	Perry & Moore 1969
Peltigera didactyla (With.) J. R. Laundon	Brodo et al. 2001
Peltigera elisabethae Gyelnik (Syn.: Peltigera horizontalis)	Dey 1978
Peltigera lepidophora (Vainio) Bitter	Brodo et al. 2001
Peltigera leucophlebia (Nyl.) Gyelnik	Heiman 1996
Peltigera malacea (Ach.) Funck	Heiman 1996
Peltigera neckeri Hepp ex Müll. Arg.	Brodo et al. 2001
Peltigera phyllidiosa Goffinet & Miadlikowska	Goffinet & Miadlikowska 1999
Peltigera polydactylon (Necker) Hoffm.	Perry & Moore 1969
Peltigera praetextata (Flörke ex Sommerf.) Zopf	Brodo et al. 2001

Taxon	Reference
Peltigera rufescens (Weiss) Humb.	Oosting & Anderson 1937
Peltula cylindrica Wetmore	Brodo et al. 2001
Peltula zahlbruckneri (Hasse) Wetmore	Wetmore 1970
Pertusaria amara (Ach.) Nyl.	Brodo et al. 2001
Pertusaria copiosa Erichsen	Lendemer & Yahr 2004
Pertusaria epixantha R. C. Harris	Lendemer & Yahr 2004
Pertusaria globularis (Ach.) Tuck.	Perlmutter (in review)
Pertusaria hypothamnolica Dibben	Lendemer & Yahr 2004
Pertusaria iners R. C. Harris	Lendemer & Yahr 2004
Pertusaria leioplaca DC. (Syn.: Pertusaria leucostoma)	DePriest 2001
Pertusaria macounii (Lamb) Dibben	Brodo et al. 2001
Pertusaria neoscotica Lamb	Lendemer & Yahr 2004
Pertusaria obruta R. C. Harris	Lendemer & Yahr 2004
Pertusaria ostiolata Dibben	SCAN 1996
Pertusaria paratuberculifera Dibben	Brodo et al. 2001
Pertusaria plittiana Erichsen	Brodo et al. 2001
Pertusaria propinqua Müll. Arg.	GBIF 2005
Pertusaria pustulata (Ach.) Duby	DePriest 2001
Pertusaria rubefacta Erichsen	GBIF 2005
Pertusaria subpertusa Brodo	Brodo et al. 2001
Pertusaria texana Müll. Arg.	SCAN 1998
Pertusaria trachythallina Erichsen	Brodo et al. 2001
Pertusaria velata (Turner) Nyl.	Brodo et al. 2001
Pertusaria xanthodes Müll. Arg.	SCAN 1997
Phaeographis dendritica (Ach.) Müll. Arg.	Lendemer & Yahr 2004
Phaeographis inusta (Ach.) Müll. Arg.	Brodo et al. 2001
Phaeographis lobata (Eschw.) Müll. Arg.	Lendemer & Yahr 2004
Phaeographis subtigrina (Vainio) Zahlbr.	Lendemer & Yahr 2004
Phaeophyscia adiastola (Essl.) Essl.	Hieman 1996
Phaeophyscia cernohorskyi (Nádv.) Essl.	Brodo et al. 2001
Phaeophyscia ciliata (Hoffm.) Moberg (Syn.: Physcia ciliata)	Dey 1978
Phaeophyscia erythrocardia (Tuck.) Essl.	Heiman 1996

Taxon	Reference
Phaeophyscia hispidula (Ach.) Essl. (Syn.: Phaeophyscia imbricata, Physcia setosa)	Perry & Moore 1969
Phaeophyscia orbicularis (Necker) Moberg (Syn.: Physcia orbicularis)	Perry & Moore 1969
Phaeophyscia pusilloides (Zahlbr.) Essl. (Syn.: Physcia pusilloides)	Heiman 1996
Phaeophyscia rubropulchra (Degel.) Essl.	Heiman 1996
Phaeophyscia squarrosa Kashiwadani (Moberg 1995) (Syn.: Physcia lacinulata)	Perry & Moore 1969
Phlyctis argena (Sprengel) Flotow	Brodo et al. 2001
Phlyctis ludoviciensis (Müll. Arg.) Lendemer	Lendemer 2005
Phyllospora confusa Swinscow & Krog	Lendemer & Yahr 2004
Phyllospora parvifolia (Pers.) Müll Arg. var. parvifolia	Lendemer & Yahr 2004
Physcia adscendens (Fr.) H. Olivier	Hieman 1996
Physcia aipolia (Ehrh. ex Humb.) Fürnr. var. aipolia	Perry & Moore 1969
Physcia americana G. Merr. (Syn.: Physcia tribacoides)	Perry & Moore 1969
Physcia atrostriata Moberg (Syn.: Physcia albicans)	Brodo et al. 2001
Physcia halei J. W. Thomson	Brodo et al. 2001
Physcia millegrana Degel.	Heiman 1996
Physcia neogaea R. C. Harris	McCune et al. 1997
Physcia phaea (Tuck.) J. W. Thomson	Dey 1978
Physcia pseudospeciosa J. W. Thomson	Heiman 1996
Physcia pumilior R. C. Harris	Brodo et al. 2001
Physcia sorediosa (Vainio) Lynge	Brodo et al. 2001
Physcia stellaris (L.) Nyl.	Perry & Moore 1969
Physcia subtilis Degel.	Perry & Moore 1969
Physcia tribacia (Ach.) Nyl.	Oosting & Anderson 1937
Physcia wainioi Räsänen	Perry & Moore 1969
Physciella chloantha (Ach.) Essl.	Brodo et al. 2001
Physconia detersa (Nyl.) Poelt	Heiman 1996
Piccolia conspersa (Fée) Vainio	Lendemer & Yahr 2004
Placidium lachneum (Ach.) Breuss	USGS 2005
Placidium lacinulatum (Ach.) Breuss	Brodo et al. 2001

Taxon	Reference
Placidium tuckermanii (Ravenel ex Mont.) Breuss (Syn.: Dermatocarpon arboreum, D. tuckermanii)	Perry & Moore 1969
Placynthiella icmalea (Ach.) Coppins & P. James	Lendemer & Yahr 2004
Placynthiella uliginosa (Schrader) Coppins & P. James	Lendemer & Yahr 2004
Placynthium nigrum (Hudson) Gray	Brodo et al. 2001
Platismatia glauca (L.) Culb. & C. Culb.	Perry & Moore 1969
Platismatia tuckermanii (Oakes) Culb. & C. Culb.	Perry & Moore 1969
Porina heterospora (Fink) R. C. Harris	Brodo et al. 2001
Porina scabrida R. C. Harris	Lendemer & Yahr 2004
Porpidia albocaerulescens (Wulfen) Hertel & Knoph (Syn.: Lecidea albocaerulescens)	Brodo et al. 2001
Porpidia cinereoatra (Ach.) Hertel & Knoph	NatureServe 2005
Porpidia crustulata (Ach.) Hertel & Knoph	Brodo et al. 2001
Porpidia diversa (Lowe) Gowan	NatureServe 2005
Porpidia herteliana Gowan	NatureServe 2005
Porpidia macrocarpa (DC.) Hertel & A. J. Schwab	NatureServe 2005
Porpidia tahawasiana Gowan	NatureServe 2005
Porpidia tuberculosa (Sm.) Hertel & Knoph	NatureServe 2005
Pseudevernia cladonia (Tuck.) Hale & Culb.	Perry & Moore 1969
Pseudevernia consocians (Vainio) Hale & Culb.	Perry & Moore 1969
Pseudocyphellaria aurata (Ach.) Vainio	Perry & Moore 1969
Pseudocyphellaria crocata (L.) Vainio	Perry & Moore 1969
Pseudoparmelia uleana (Müll. Arg.) Elix & Nash	Lendemer & Yahr 2004
Psorula rufonigra (Tuck.) Gotth. Schneider	Brodo et al. 2001
Punctelia appalachensis (Culb.) Krog (Syn.: Parmelia appalachensis)	Perry & Moore 1969
Punctelia bolliana (Müll. Arg.) Krog	Hieman 1996
Punctelia graminicola (B. de Lesd.) Egan (Syn.: Punctelia semansiana)	McCune et al. 1997
Punctelia missouriensis G. Wilh. & Ladd	McCune et al. 1997
Punctelia reddenda (Stirton) Krog (Syn.: Parmelia reddenda)	Dey 1978
Punctelia rudecta (Ach.) Krog (Syn.: Parmelia rudecta)	Perry & Moore 1969
Punctelia subrudecta (Nyl.) Krog (Syn.: Parmelia subrudecta)	Perry & Moore 1969

Taxon	Reference
Pycnothelia papillaria Dufour (Syn.: Cladonia papillaria)	Robinson 1959
Pyrenula anomala (Ach.) Vainio	Lendemer & Yahr 2004
Pyrenula aspistea (Ach.) Ach.	Lendemer & Yahr 2004
Pyrenula caryae R. C. Harris	Harris 1995
Pyrenula citriformis R. C. Harris	Lendemer & Yahr 2004
Pyrenula concatervans (Nyl.) R. C. Harris	Lendemer & Yahr 2004
Pyrenula cruenta (Mont.) Vainio	Brodo et al. 2001
Pyrenula leucostoma Ach.	Lendemer & Yahr 2004
Pyrenula micheneri R. C. Harris	NatureServe 2005
Pyrenula microcarpa Müll. Arg.	Lendemer & Yahr 2004
Pyrenula psuedobufonia (Rehm) R. C. Harris	Brodo et al. 2001
Pyrenula ravenelii (Tuck.) R. C. Harris	Lendemer & Yahr 2004
Pyrenula santensis (Nyl.) Müll. Arg.	Lendemer & Yahr 2004
Pyrrhospora russula (Ach.) Hafellner	Brodo et al. 2001
Pyrrhospora varians (Ach.) R. C. Harris	DePriest 2001
Pyxine caesiopruinosa (Nyl.) Imshaug	Heiman 1996
Pyxine sorediata (Ach.) Mont.	Perry & Moore 1969
Pyxine subcinerea Stirton	Lendemer & Yahr 2004
Ramalina americana Hale (Syn.: Ramalina fastigiata)	Perry & Moore 1969
Ramalina complanata (Sw.) Ach.	Lendemer & Yahr 2004
Ramalina culbersoniorum La Greca	DePriest 2001
Ramalina intermedia (Delise ex Nyl.) Nyl.	Perry & Moore 1969
Ramalina montagnei De Not.	USGS 2005
Ramalina paludosa B. Moore	Brodo et al. 2001
Ramalina pollinaria (Westr.) Ach.	Perry & Moore 1969
Ramalina stenospora Müll. Arg.	Lendemer & Yahr 2004
Ramalina willeyi R. Howe	Brodo et al. 2001
Ramonia microspora Vezda	Lendemer & Yahr 2004
Rhizocarpon geographicum (L.) DC.	Brodo et al. 2001
Rhizocarpon hochstetteri (Körber) Vainio	Brodo et al. 2001
Rhizocarpon obscuratum (Ach.) A. Massal.	Brodo et al. 2001
Rimelia cetrata (Ach.) Hale & Fletcher (Syn.: Parmelia cetrata, Parmotrema cetratum)	Perry & Moore 1969

Taxon	Reference
Rimelia diffractaica (Essl.) Hale & Fletcher	McCune et al. 1997
Rimelia reticulata (Taylor) Hale & Fletcher (Syn.: Parmelia reticulata, Parmotrema reticulatum)	Perry & Moore 1969
Rimelia simulans (Hale) Hale & Fletcher	McCune et al. 1997
Rimelia subisidiosa (Müll. Arg.) Hale & Fletcher (Syn.: Parmelia subisidiosa, Parmotrema subisidiosum)	Perry & Moore 1969
Rinodina applanata H. Magn. (Syn.: Rinodina maculans)	Lendemer & Yahr 2004
Rinodina ascociscana Tuck.	Brodo et al. 2001
Sarcographa tricosa (Ach.) Müll. Arg.	Lendemer & Yahr 2004
Schismatomma glaucescens (Nyl. ex Willey) R. C. Harris	Lendemer & Yahr 2004
Scoliosporum chlorococcum (Stenh.) Vezda	Brodo et al. 2001
Scoliosporum umbrinum (Ach.) Arnold	USGS 2005
Sphinctrina anglica Nyl.	USGS 2005
Sphinctrina tubiformis A. Massal.	Lendemer & Yahr 2004
Staurolemma carolinianum Jørg.	Jørgensen 2004
Staurothele diffractella (Nyl.) Tuck.	Keever et al. 1951
Steinia geophana (Nyl.) Stein	Buck et al. 1999
Stereocaulon dactylophyllum Flörke	Perry & Moore 1969
Stereocaulon dactylophyllum var. occidentale (H. Magn.) Lamb	NatureServe 2005
Stereocaulon paschale (L.) Hoffm.	Heiman 1996
Stereocaulon pileatum Ach.	Perry & Moore 1969
Stereocaulon saxatile H. Magn.	Heiman 1996
Stereocaulon tennesseense H. Magn. ex Degel.	Dey 1978
Sticta beauvoisii Delise	Brodo et al. 2001
Sticta carolinensis McDonald	McDonald et al. 2003
Sticta fragilanata McDonald	McDonald et al. 2003
Sticta fuliginosa (Hoffm.) Ach.	Perry & Moore 1969
Sticta limbata (Sm.) Ach.	Dey 1978
Teloschistes chrysophthalmus (L.) Th. Fr.	Brodo et al. 2001
Teloschistes flavicans (Sw.) Norman	NatureServe 2005
Tephromela atra (Hudson) Hafellner	Brodo et al. 2001
Thelotrema adjectum Nyl.	Lendemer & Yahr 2004

Taxon	Reference
Thelotrema defectum Hale	Lendemer & Yahr 2004
Thelotrema lathraeum Tuck.	Lendemer & Yahr 2004
Thelotrema monospermum R. C. Harris	USGS 2005
Thelotrema subtile Tuck.	Lendemer & Yahr 2004
Topelia aperiens P. M. Jørg. & Vezda	Lendemer & Yahr 2004
Trapelia involuta (Taylor) Hertel	Brodo et al. 2001
Trapeliopsis flexuosa (Fr.) Coppins & P. James	Brodo et al. 2001
Trapeliopsis granulosa (Hoffm.) Lumbsch	Brodo et al. 2001
Tremolecia atrata (Ach.) Hertel	Brodo et al. 2001
Trichothelium cestrense (Michener) R. C. Harris	Lendemer & Yahr 2004
Trichothelium rhaphidospermum (Müll. Arg.) R. C. Harris	Lendemer & Yahr 2004
Trypethelium tropicum (Ach.) Müll. Arg.	Lendemer & Yahr 2004
Trypethelium virens Tuck. ex Michener	Brodo et al. 2001
Tuckermanella fendleri (Nyl.) Essl. (Syn.: Cetraria fendleri, Tuckermannopsis fendleri)	Perry & Moore 1969
Tuckermannopsis americana (Sprengel) Hale (Syn.: Cetraria halei)	Perry & Moore 1969
Tuckermannopsis ciliaris (Ach.) Gyelnik (Syn.: Cetraria ciliaris)	Perry & Moore 1969
Tuckermannopsis orbata (Nyl.) M. J. Lai (Syn.: Cetraria orbata)	Perry & Moore 1969
Umbilicaria caroliniana Tuck.	Perry & Moore 1969
Umbilicaria mammulata (Ach.) Tuck.	Perry & Moore 1969
Umbilicaria muhlenbergii (Ach.) Tuck. (Syn.: Actinogyra muhlenbergii)	Perry & Moore 1969
Umbilicaria polyphylla (L.) Baumg.	Heiman 1996
Umbilicaria vellea (L.) Hoffm.	Heiman 1996
Usnea amblyoclada (Müll. Arg.) Zahlbr.	Brodo et al. 2001
Usnea angulata Ach.	Perry & Moore 1969
Usnea baileyi (Stirton) Zahlbr.	Lendemer & Yahr 2004
Usnea ceratina Ach.	Dey 1978
Usnea confusa Asah.	Dey 1978
Usnea cornuta Körber	McCune et al. 1997
Usnea dasaea Stirton	McCune et al. 1997
Usnea diplotypus Vainio	Dey 1978

Taxon	Reference
Usnea evansii Mot.	Lendemer & Yahr 2004
Usnea filipendula Stirton	Brodo et al. 2001
Usnea fragilescens var. mollis (Vainio) Clerc (Syn.: Usnea mollis)	Dey 1978
Usnea fulvoreagens (Räsänen) Räsänen	Dey 1978
Usnea hesperina Mot.	Dey 1978
Usnea merrillii Mot.	Perry & Moore 1969
Usnea mutabilis Stirton	Hieman 1996
Usnea occidentalis Mot.	Perry & Moore 1969
Usnea pachyclada Mot.	Perry & Moore 1969
Usnea pensylvanica Mot.	Lendemer & Yahr 2004
Usnea rubicunda Stirton	Perry & Moore 1969
Usnea strigosa (Ach.) Eaton subsp. strigosa	Perry & Moore 1969
Usnea strigosa subsp. rubiginea (Michaux) I. Tav.	USGS 2005
Usnea subfloridana Stirton	Dey 1978
Usnea subfusca Stirton	Dey 1978
Usnea subscabrosa Nyl. ex Mot.	Perry & Moore 1969
Usnea trichodea Ach.	Perry & Moore 1969
Vainionora americana Kalb, Tonsberg & Elix	Kalb 2004
Verrucaria calciseda DC.	Lendemer & Yahr 2004
Verrucaria nigrescens Pers.	Oosting & Anderson 1939
Vezdaea leprosa (P. James) Vezda	Buck et al. 1999
Vulpicida pinastri (Scop.) J.-E. Mattsson & M. J. Lai (Syn.: Tuckermannopsis pinastri)	Hieman 1996
Vulpicida viridis (Schwein.) J.-E. Mattsson & M. J. Lai (Syn.: Cetraria viridis, Tuckermannopsis viridis)	Perry & Moore 1969
Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr. (Syn.: Xanthoria fulva)	Brodo et al. 2001
Xanthoparmelia conspersa (Ehrh. ex Ach.) Hale (Syn.: Parmelia conspersa)	Oosting & Anderson 1937
Xanthoparmelia cumberlandia (Gyelnik) Hale	Dey 1978
Xanthoparmelia monticola (J. P. Dey) Hale (Syn.: Parmelia monticola)	Dey 1978
Xanthoparmelia piedmontensis (Hale) Hale	Heiman 1996
Xanthoparmelia plittii (Gyelnk) Hale (Syn.:	Perry & Moore 1969

Taxon	Reference
Parmelia plittii)	
Xanthoparmelia somloënsis (Gyelnik) Hale	Brodo et al. 2001
Xanthoparmelia subramegira (Gyelnik) Hale	Heiman 1996
Xanthoparmelia tasmanica (Hook. f. & Taylor) Hale (Syn.: Parmelia tasmanica)	Perry & Moore 1969
Xanthoria candelaria (L.) Th. Fr.	USGS 2005
Xanthoria elegans (Link) Th. Fr.	Brodo et al. 2001
Xanthoria polycarpa (Hoffm.) Rieber	Dey 1978
Xanthoria sorediata (Vainio) Poelt	Heiman 1996
Xylographa parallela (Ach. : Fr.) Behlen & Desberger	Brodo et al. 2001
Total	**605**

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Corrections and Additions to the North Carolina, USA Lichen Checklist

Gary B. Perlmutter[1] and Douglas N. Greene[2]

In response to the recently published North Carolina lichen checklist (Perlmutter 2005), a few errors were noticed and many citings of literature reports documenting additional taxa have been brought to our attention. Therefore, corrections to these errors and a supplemental checklist are here presented to clarify the checklist and make it more complete. An additional 128 lichen taxa are here reported for the state (Table 1) with two removed as not occurring in North America, bringing the total to 731.

Corrections -- Corrections to the checklist are listed below:

1. The Global Biodiversity Information Facility (GBIF) references were not fully cited. These are for three taxa: *Collema callibotrys*, *Pertusaria propinqua* and *P. rubefacta*. Their full citations are:

   Collema callibotrys: GBIF Data Portal, www.gbif.net. 2005-08-03. Collema callibotrys Tuck.; United States. GBIF-Sweden Provider, Lichens (S), 1 record from North Carolina.

   Pertusaria propinqua: GBIF Data Portal, www.gbif.net. 2005-08-03. Pertusaria propinqua Müll. Arg.; United States. International Institute for Sustainability (ASU) DiGIR Provider, Arizona State University Lichen Herbarium, 2 records from North Carolina.

   Pertusaria rubefacta: GBIF Data Portal, www.gbif.net. 2005-08-03. Pertusaria rubefacta Erichsen; United States. International Institute for Sustainability (ASU) DiGIR Provider, Arizona State University Lichen Herbarium, 1 record from North Carolina.

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2. *Lasallia pustulata*: "A very common lichen in Europe is most likely not found in North America." Brodo et al. (2001). This taxon should be excluded from the checklist.

3. *Lecanora varia*: Only *L. densa* and *L. laxa* occur in North America. *Lecanora varia* occurs in Europe, and therefore should be excluded from the checklist. See: Śliwa and Wetmore (2000) for descriptions and the keys to North American species.

4. *Parmotrema rigidum* (Lynge) Hale is now *P. subrigidum* Egan, a new species distinct from *P. rigidum* from South America (Egan et al. 2005).

5. *Pertusaria globularis* is cited from unpublished material; the citation should be Dibben (1980).

6. *Umbilicaria phaea* Tuck. has not been reported east of Nebraska (Llano 1950, Brodo et al. 2001). Therefore, this taxon should be excluded from the list as it is likely a misidentification.

7. Lendemer and Yahr (2004) is partially cited. The full citation is:

   Lendemer, J.C. and R. Yahr. 2004. A Checklist of the lichens collected during the Tuckerman Workshop #12, Outer Banks, North Carolina, USA. Evansia 21(3): 247-256.

8. *Usnea ambyloclada* (Müll. Arg.) Zahlbr. is *U. ambyloclada* Clerc & Herrera-Campos (Clerc & Herrera-Campos 1997)

9. *Usnea hesperina* Motyka is a synonym for *U. schadenbergiana* Göpp & Stein (Clerc 2004).

Acknowledgements -- We would like to thank the following for bringing these corrections and additional references to our attention: Philippe Clerc, Jonathan P. Dey, James C. Lendemer, and Tor Tønsberg. Carol Ann McCormick of the University of North Carolina Herbarium (NCU) provided some of these materials. This report in part meets the Final Project requirement of the North Carolina Botanical Garden Native Plant Studies certificate program for G.B. Perlmutter.

Table 1. Supplemental lichen taxa reported in the literature not listed in Perlmutter (2005). All taxa follow accepted nomenclature of Esslinger [1997 (updated 14 June 2005)] with synonyms as found in the literature. References are as first reported in the literature.

Taxon	**Reference**
Alectoria sarmentosa (Ach.) Ach. subsp. *sarmentosa*	Degelius 1941
Anisomeridium polypori (Ellis & Everh.) M.E. Barr (Syn.: *Arthopyrenia willeyana*)	Harris 1973
Anisomeridium subprostans (Nyl.) R.C. Harris (Syn.: *Arthopyrenia* cf. *subprostans*)	Degelius 1941
Arthonia biseptata Degel.	Degelius 1941
Arthonia spadicea Leighton	Schmitt and Slack 1990
Arthopyrenia degelii R.C. Harris	Harris 1995
Bacidia diffracta S. Eckman	Ekman 1996
Bacidia sufffusa (Fr.) A. Schnieder	Ekman 1996
Bacidina arnoldiana (Körber) S. Ekman	Ekman 1996
Biatora appalachensis Printzen & Tønsberg	Printzen & Tønsberg 2004
Biatora helvola Körber ex Hellborn (Syn.: *Lecidea helvola*)	Degelius 1941
Biatora longispora (Degel.) Lendemer & Printzen	Printzen & Tønsberg 2004
Biatora pycnidiata Printzen & Tønsberg	Printzen & Tønsberg 2004
Bryoria furcellata (Fr.) Brodo & D. Hawksw. (Syn.: *Alectoria nidulifera*)	Culberson 1958
Buellia mamillana (Tuck.) W. A. Weber (Syn.: *Rinodina thomae*)	Fink 1935
Caloplaca camptida (Tuck.) Zalbr.	Rudolph 1955
Caloplaca conversa (Kremp.) Jatta	Wetmore 1994
Caloplaca pollinii (A. Massal.) Jatta	Wetmore 1994
Caloplaca quercicola H. Magn.	Rudolph 1955
Caloplaca sideritis (Tuck.) Zahlbr.	Wetmore 1996
Caloplaca subsoluta (Nyl.) Zahlbr.	Wetmore 2003
Caloplaca xanthostigmoidea (Räsänen) Zahlbr.	Wetmore 2001
Cetrariella dilesei (Bory ex Schaerer) Kärnefelt & Thell (Syn.: *Cetraria hiascens*)	Fink 1935
Chaenothecopsis pusilla (Ach.) A.F.W. Schmidt	Sullivan 1996
Chrismofulvea dialyta (Nyl.) Marbach (Syn.: *Buellia dialyta*)	Fink 1935
Cladonia perlomera Kristinsson	Culberson and Kristinsson 1969
Cladonia petrophila R.C. Harris	Harris 1992

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Taxon	**Reference**
Cladonia polycladodes Nyl.	Evans 1947
Coenogonium pineti (Ach.) ined. (Syn.: *Dimerella diluta, D. pineti, Microphiale diluta*)	Degelius 1941
Cresponea premnea (Ach.) Egea & Torrente (Syn.: *Lecanactis premnea*)	Culberson 1972
Dendriscocaulon umhausense (Auersw.) Degel.	Degelius 1941
Dermiscellum oulocheila (Tuck.) Lendemer	Lendemer 2003
Diploschistes actinostomus (Ach.) Zahlbr.	Fink 1935
Erioderma mollissimum (Samp.) Du Reitz	Degelius 1941
Fuscidea arboricola Coppins & Tønsberg	Tønsberg 1993
Fuscidea cyathoides (Ach.) V. Wirth & Vezda (Syn.: *Lecidea rivulosa*)	Fink 1935
Fuscopannaria ahlneri (P.M. Jørg) P.M. Jørg	Jørgensen 2000
Gassicurtia vernicoma (Tuck.) Marbach (Syn.: *Buellia vernicoma*)	Imshaug 1951
Gomphillus calycioides (Duby) Nyl.	Buck 1998
Graphis rigidula Müll. Arg.	Lendemer and Yahr 2004
Hafellia parastata (Nyl.) Kalb. (Syn.: *Buellia rinodinospora*)	Imshaug 1951
Heterodermia dendritica (Pers.) Poelt	Culberson 1966
Hypotrachyna taylorensis (M.E. Mitch.) Hale	Groner and Dietrich 1996
Lecanora albella (Pers.) Ach. var. *albella* (Syn.: *L. pallida*)	Culberson 1958
Lecanora albellula Nyl. (Syn.: *L. piniperda*)	Degelius 1941
Lecanora argentata (Ach.) Malme	Brodo 1984
Lecanora chlarotera Nyl.	Brodo 1984
Lecanora expallens Ach. (Syn.: *L. conizaea*)	Degelius 1941
Lecanora hypoptoides (Nyl.) Nyl.	Degelius 1941
Lecanora impudens Degelius	Schmitt and Slack 1990
Lecanora imshaugii Brodo	Brodo 1984
Lecanora insignis Degel.	Degelius 1941
Lecanora miculata Ach.	Brodo 1984
Lecanora pulicaris (Pers.) Ach. (Syn.: *L. pinastri*)	Degelius 1941
Lecanora rugosella Zahlbr.	Brodo 1984
Lecanora subimmergens Vainio	Brodo 1984
Lecanora wisconsinensis H. Magn.	Brodo 1984

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Taxon	**Reference**
**Lecidea microps* Tuck.	Fink 1935
Lecidea micytho Tuck.	Fink 1935
Lecidea nylanderi (Anzi) Th. Fr.	Culberson 1958
Lecidea subtilis Degel.	Degelius 1941
Lecidella elaeochroma (Ach.) Haszl. (Syn.: *Lecidea olivacea*)	Degelius 1941
Leioderma cherokeense P.M. Jørg. & Tønsberg	Jørgensen & Tønsberg 2005
Leptogium juniperinum Tuck.	Sierk 1964
Leptorhaphis contorta Degel.	Degelius 1941
Lithothelium hyalosporum (Nyl.) Aptroot (Syn.: *Plagiocarpia hyalospora*)	Harris 1973
Lithothelium illotum (Nyl.) Aptroot	Harris 1995
Lithothelium macrosporum (R. C. Harris) Aptroot (Syn.: *Plagiocarpa macrocarpa*)	Harris 1989
Lithothelium phaeosporum (R.C. Harris) Aproot	Harris 1989
Lithothelium septemseptatum (R.C. Harris) Aproot)	Harris 1989
Loxospora cismonica (Beltr.) Haffelner (Syn.: *Haematomma cismonicum*)	Fink 1935
Loxospora elatina (Ach.) A. Massal. (Syn.: *Haematomma elatinum*)	Fink 1935
Megalaria albocincta (Degel.) Tønsberg (Syn.: *Catinaria albocincta*)	Degelius 1941
Megalospora porphyritis (Tuck.) R.C. Harris	Harris 1984
Megaspora verrucosa (Tuck.) Sipman (Syn.: *Lecanora verrucosa*)	Fink 1935
Melanohalea olivacea (L.) O. Blanco et al. (Syn.: *Parmelia olivacea*)	Degelius 1941
**Melaspilea gemella* (Eshw.) Nyl. (Syn.: *Opegrapha scaphella* var. *gemella*)	Fink 1935
Micarea endocyanea (Tuck. Ex Willey) R. C. Harris	Schmitt and Slack 1990
Melaspilea tribuloides (Tuck.) Müll. Arg.	Fink 1935
Mycoporum compositum (A. Massal.) R.C. Harris (Syn.: *M. ohiense*)	Fink 1935
Mycoporum pycnocarpoides Müll. Arg.	Harris 1973

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Taxon	**Reference**
Ochrolechia arborea (Kreyer) Almb.	Brodo 1991
Ochrolechia mexicana Vainio	Brodo 1991
Ochrolechia trochophora var. *pruinirosella* Brodo	Brodo 1991
Ochrolechia tartarea (L.) A. Massal.	Howard 1970
Pannaria lurida subsp. *russellii* (Tuck.) P.M. Jørg	Jørgensen 2000
Pannaria subfusca P.M. Jørg	Jørgensen 2000
**Parmelia submarginalis* (Wulfen) Ach.	Fink 1935
Parmeliopsis ambigua (Wulfen) Nyl.	Culberson 1958
Parmeliopsis hyperopta (Ach.) Arnold	Culberson 1958
Parmotrema gardneri (C. W. Dodge) Sérus. (Syn.: *Parmotrema robustum*)	Schmitt and Slack 1990
Pertusaria geminipara (Th. Fr.) C. Knight ex Brodo (Syn.: *Ochrolechia geminipara*)	Howard 1970
Pertusaria multipunctoides Dibben	Dibben 1980
Pertusaria sinusmexicani Dibben	Dibben 1980
Pertusaria tetrathalamia (Fée) Nyl.	Dibben 1980
Pertusaria waghornei Hulting	Dibben 1980
Phaeographis erumpens (Nyl.) Müll. Arg.	Fink 1935
Phylliscum demangeonii (Moug. & Mont.) Nyl.	Yoshimura and Sharp 1968
Punctelia borreri (Sm.) Krog	Schmitt and Slack 1990
Punctelia perreticulata (Räsänen) G. Wilh. & Ladd	Aptroot 2003
Pyrenopsis subfuliginea Nyl.	Degelius 1941
Pyrenula cuyabensis (Malme) R.C. Harris	Harris 1989
Pyrenula laevigata (Pers.) Arnold	Schmitt and Slack 1990
Pyrenula lucifera R.C. Harris	Harris 1989
Pyrenula plittii R. C. Harris	Schmitt and Slack 1990
Pyrenula punctella (Nyl.) Trevisan	Harris 1989
Pyrenula subelliptica (Tuck.) R.C. Harris (Syn.: *P. imperfecta*)	Harris 1973
Pyxine albovirens (G. Meyer) Aproot	Amtoft 2002
Racodium rupestre Pers.	Fink 1935
Rhizocarpon infernulum (Nyl.) Lynge	Fryday 2002
Rhizocarpon rubescens Th. Fr. (Syn.: *R.*	Degelius 1941

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Taxon	**Reference**
plicatile)	
Rinodina chrysomelaena Tuck.	Fink 1935
**Rinodina dolichospora* Malme	Sheard and Mayehofer 2002
Rinodina subminuta H. Magn.	Schmitt and Slack 1990
Rinodina willeyii Sheard & Giralt	Sheard 1995
Ropalospora chlorantha (Tuck.) S. Ekman (Syn.: *Bacidia chlorantha*)	Degelius 1941
Santessoniella crossophylla (Nyl.) P.M. Jørg	Jørgensen 2000
Sticta sylvatica (Hudson) Ach.	Fink 1935
Thelenella muscorum (Fries) Vainio var. *muscorum*	Harris 1995
Thelomma carolinianum (Tuck.) Tibell (Syn.: *Cyphelium carolinianum*)	Fink 1935
Trapeliopsis viridescens (Schraader) Coppins & P. James	Sullivan 1996
Trichothelium chloroticum (Ach.) R.C. Harris (Syn.: *Porina chlorotica*)	Fink 1935
Trichothelium guentheri (Flotow) R.C. Harris	Harris 1995
Usnea cavarnosa Tuck.	Degelius 1941
Usnea entoviolata Motyka	Clerc 2004
Usnea halei Clerc	Clerc & Herrera-Campos 1997
Usnea praetervisa (Asahina) P.Clerc	Clerc 2004
Usnea silesiaca Motyka (Syn.: *U. madiernensis*)	Clerc 1991
Xanthoparmelia hypomeleana (Hale) Hale	Hale 1967
Total	**129**

*New to North America; not listed in Esslinger's checklist. Names were confirmed via Index Fungorum (CABI Bioscience et al. 2005).

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Checklist of lichens and lichenicolous fungi of North Carolina (USA)
Supervised by Gary B. Perlmutter, Raleigh, North Carolina
Version 1 May 2009

Acarospora dispersa H. Magn. – Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 86)
Acarospora obpallens (Nyl. *ex* Hasse) Zahlbr. – Lendemer & Tripp (2008: 59)

Acrocordia megalospora (Fink) R.C. Harris – Harris & Ladd (2005: 45)

Ahtiana aurescens (Tuck. *ex* Riddle) Goward & A. Thell – Culberson (1958: 26 as *Cetraria aurescens*), Perry & Moore (1969: 149 as *Cetraria aurescens*), Dey (1978: 45 as *Cetraria aurescens*), Heiman (1996: 57 as *Tuckermannopsis aurescens*), Perlmutter (2006: 288)

Alectoria fallacina Mot. – Dey (1978: 73)
Alectoria sarmentosa (Ach.) Ach. – Degelius (1941:)

Allocetraria oakesiana (Tuck.) Randlane & A. Thell – Culberson (1958: 26 as *Cetraria oakesiana*), Perry & Moore (1969: 149 as *Cetraria oakesiana*), Dey (1978: 46 as *Cetraria oakesiana*), Schmitt & Slack (1990: 266 as *Tuckermannpsis oakesiana*), Heiman (1996: 57 as *Tuckermannopsis oakesiana*), McCune *et al.* (1997: 150 as *Cetraria oakesiana*), DePriest (2001: 8), Lendemer & Tripp (2008: 59)

Amandinea insperata (Nyl.) H. Mayrhofer & Ropin – Lendemer *et al.* (2008: 380)
Amandinea langloisii Imshaug ex Marbach – Lendemer & Yahr (2004: 128)
Amandinea milliaria (Tuck.) P. May & Sheard – Lendemer & Yahr (2004: 127)
Amandinea polyspora (Willey) E. Lay & P. May – Lendemer & Yahr (2004: 128), Perlmutter (2008: 88)
Amandinea punctata (Hoffm.) Coppins & Schneider – Culberson (1958: 26 as *Buellia punctata*), Lendemer & Yahr (2004: 120), Perlmutter (2006: 290)

Amphisphaeria bufonia (Berk. & Broome) Ces. & De Not. – Perlmutter (2008: 88)

Anaptychia palmulata (Michx.) Vain. – Culberson (1966: 477), Perry & Moore (1969: 148), Dey (1978: 83), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 290), Esslinger (2007: 794), Lendemer & Tripp (2008: 59), Perlmutter (2008: 88)
Anaptychia crinalis (Schaerer) Vězda – NatureServe (2005: as *A. setifera*)

Anisomeridium biforme (Borrer) R.C. Harris – Lendemer & Yahr (2004: 122)
Anisomeridium polypori (Ellis & Everh.) M.E. Barr – Harris (1973: as *Arthopyrenia willeyana*), Schmitt & Slack 1990: 264 as *Anisomeridium nyssaegenum*), Perlmutter (2008: 86)
Anisomeridium subprostans (Nyl.) R.C. Harris – Degelius (1941: as *Arthopyrenia* cf. *subprostans*), Perlmutter & Lendemer (2008: 71)

Anthracothecium nanum (Zahlbr.) R.C. Harris – Lendemer & Yahr (2004: 131), Lendemer & Tripp (2008: 59), Perlmutter (2008: 86)

Anzia americana Yoshim. & Sharp – NatureServe (2005:)

Anzia colpodes (Ach.) Stizenb. – Perry & Moore (1969: 148), Dey (1978: 72), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 287), Lendemer & Tripp (2008: 59)
Anzia ornata (Zahlbr.) Asah. – Yoshimura & Sharp (1969: 110), NatureServe (2005:)

Arctoparmelia incurva (Pers.) Hale – Dey (1978: 58 as *Parmelia incurva*)

Arthonia albovirescens Nyl. – Lendemer & Yahr (2004: 120)
Arthonia biseptata Degel. – Degelius (1941:)
Arthonia caesia (Flot.) Körb. – Perlmutter (2008: 86)
Arthonia cinnabarina (DC.) Wallr. – Perlmutter & Lendemer (2008: 71)
Arthonia diffusa Nyl. – Harris & Ladd (2005: 56)
Arthonia dryadum R.C. Harris & Ladd ined. – Perlmutter & Lendemer (2008: 71)
Arthonia quintaria Nyl. – Perlmutter (2006: 285), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 86), Perlmutter (2009: 68)
Arthonia rubella (Fée) Nyl. – Schmitt & Slack (1990: 264), Lendemer & Yahr (2004: 122), Perlmutter (2006: 285), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 86)
Arthonia spadicea Leighton – Schmitt & Slack (1990: 264)

Arthopyrenia cinchonae (Ach.) Müll. Arg. – Lendemer & Yahr (2004: 58 as 128), Lendemer & Tripp (2008: 59 as *Anisomeridium cinchonae*), Perlmutter & Lendemer (2008: 71)
Arthopyrenia degelii R.C. Harris – Harris (1995: 76)
Arthopyrenia lyrata R.C. Harris – Tucker & Harris (1980: 6)
Arthopyrenia plumbaria (Stizenb.) R.C. Harris – Fink (1935: 58 as *Pyrenula herreri*)

Arthotheliopsis floridensis Lücking & W.R. Buck – Luckig *et al.* (2007: 631)

Arthothelium interveniens (Nyl.) Zahlbr. – Lendemer & Yahr (2004: 120)
Arthothelium runanum (A. Massal.) Körb. – Schmitt & Slack (1990: 264)
Arthothelium spectabile A. Massal. – Schmitt & Slack (1990: 264), Perlmutter (2006: 285), Lendemer (2007b: 98), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 86)
Arthothelium taediosum auct. Amer. – Lendemer & Yahr (2004: 123), Perlmutter (2006: 285), Lendemer & Tripp (2008: 59), Perlmutter & Lendemer (2008: 71), Perlmutter (2009: 68)

Aspilidea myrinii (Fr.) Hafellner – Culberson (1961: 266 as *Lecanora myrini*)

Aulaxina quadrangula (Stirt.) R. Sant. – Lendemer & Tripp (2008: 60)

Bacidia circumspecta (Nyl. *ex* Vain.) Malme – Perlmutter (2009: 68)
Bacidia diffracta S. Ekman – Ekman (1996:)
Bacidia heliospora S. Ekman – Lendemer & Tripp (2008: 60)
Bacidia heterochroa (Müll. Arg.) Zahlbr. – Lendemer & Yahr (2004: 118), Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 71)
Bacidia lobarica Printzen & Tønsberg – Printzen & Tønsberg (2007: 487)
Bacidia polychroa (Th. Fr.) Körb. – Lendemer & Yahr (2004: 131), Perlmutter (2009: 68)
Bacidia rubella (Hoffm.) A. Massal. – DePriest (2001: 8)

Bacidia schweinitzii (Fr. *ex* Michener) Schneider – Culberson (1961: 266), Schmitt & Slack (1990: 264), DePriest (2001: 8), Lendemer & Yahr (2004: 120), Perlmutter (2006: 291), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 87), Perlmutter (2009: 68)
Bacidia suffusa (Fr.) A. Schneider – Ekman (1996:), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 87)

Bacidina arnoldiana (Körb.) Wirth & Vězda – Ekman (1996:)
Bacidina egenula (Nyl.) Vězda – Lendemer & Yahr (2004: 122), Perlmutter (2007: 27)

Bactrospora lamprospora (Nyl.) Lendemer – Lendemer & Yahr (2004: 131), Perlmutter (2007a: 117)
Bactrospora mesospora R.C. Harris – Lendemer & Yahr (2004: 123)

Baeomyces rufus (Huds.) Rebent. – Dey (1978: 27)

Bagliettoa baldensis (A. Massal.) Vězda – Lendemer & Yahr (2004: 123 as *Verrucaria baldensis*)

Bathelium carolinianum (Tuck.) R.C. Harris – Lendemer & Yahr (2004: 122), Perlmutter (2008: 86), Perlmutter (2009: 68)

Biatora appalachensis Printzen & Tønsberg – Printzen & Tønsberg (2004:)
Biatora helvola Körb. *ex* Hellborn – Degelius (1941:)
Biatora longispora (Degel.) Lendemer & Printzen – Printzen & Tønsberg (2004:), Lendemer & Tripp (2008: 60)
Biatora pontica Printzen & Tønsberg – Printzen & Tønsberg (2003:)
Biatora printzenii Tønsberg – Tønsberg (2002: 122), Lendemer & Tripp (2008: 60), Perlmutter (2008: 87)
Biatora pycnidiata Printzen & Tønsberg – Printzen & Tønsberg (2004:)
Biatora vernalis (L.) Fr. – Lendemer (2007b: 98)

Botryleprarria lesdanii (Hue) Canals *et al.* – Lendemer (2008b: 103)

Brigantiaea leucoxantha (Spreng.) R. Sant. & Hafellner – Fink (1935: 235 as *Lopadium leucoxanthum*), Lendemer & Yahr (2004: 131), Perlmutter (2006: 292), Lendemer (2007a: 72), Perlmutter (2007a: 117), Lendemer & Tripp (2008: 60)

Bryoria bicolor (Ehrh.) Brodo & D. Hawksw. – Perry & More (1969: 148 as *Alectoria bicolor*), Dey (1978: 73 as *Alectoria bicolor*), McCune *et al.* (1997: 150)
Bryoria furcellata (Fr.) Brodo & D. Hawksw. – Perry & More (1969: 148 as *Alectoria nidulifera*), Dey (1978: 74 as *Alectoria nidulifera*), Heiman (1996: 53), McCune *et al.* (1997: 150), Lendemer & Tripp (2008: 60)
Bryoria nadvornikiana (Gyelnik) Brodo & D. Hawksw. – Perry & More (1969: 148 as *Alectoria nadvornikiana*), Dey (1978: 74 as *Alectoria nadvornikiana*)
Bryoria tenuis (E. Dahl) Brodo & D. Hawksw. – Dey (1978: 75 as *Alectoria tenuis*)
Bryoria trichodes **subsp.** ***americana*** (Mot.) Brodo & D. Hawksw. – Perry & More (1969: 148 as *Alectoria americana*), Dey (1978: 73 as *Alectoria americana*)

Buellia curtisii (Tuck.) Imshaug – Schmitt & Slack (1990: 264), Lendemer & Yahr (2004: 120, 122), Perlmutter (2006: 290 as *Baculifera curtisii*), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 88), Perlmutter (2009: 68)
Buellia dialyta (Nyl.) Tuck. – Fink (1935: 369), Schmitt & Slack (1990: 264)
Buellia elizae (Tuck.) Tuck. – Schmitt & Slack (1990: 264), Lendemer & Yahr (2004: 118), Lendemer & Tripp (2008: 60)
Buellia imshaugiana R.C. Harris – Lendemer & Yahr (2004: 123)
Buellia lepidastra (Tuck.) Tuck – Bungartz & Nash (2004:)
Buellia japonica (Tuck.) Tuck. – Lendemer & Tripp (2008: 60)
Buellia maculata Bungartz – Bungartz & Nash (2004: 454), Perlmutter (2006: 290), Lendemer (2007b: 98), Perlmutter & Lendemer (2008: 71), Perlmutter (2009: 68)
Buellia mamillana (Tuck.) W.A. Weber – Fink (1935: 377 as *Rinodina thomae*), Perlmutter (2006: 290)
Buellia spuria (Schaer.) Anzi – Perlmutter (2006: 290), Lendemer & Tripp (2008: 60)
Buellia stillingiana Steiner – Culberson (1958: 26), Schmitt & Slack (1990: 264), Lendemer & Yahr (2004: 118), Perlmutter (2006: 290), Perlmutter (2007a: 117), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 88), Perlmutter (2009: 69)
Buellia vernicoma (Tuck.) Tuck. – Imshaug (1951:), Perlmutter (2006: 290 as *Gassicurtia vermicoma*), Lendemer & Tripp (2008: 60)
Buellia wheeleri R.C. Harris – Lendemer & Yahr (2004: 131)

Bulbothrix confoederata (W.L. Culb.) Hale – Lendemer & Yahr (2004: 119). **ISOTYPE** in Wahsington DC, USA (US) as *Parmelia confoederata*.
Bulbothrix goebelii (Zenker) Hale – McCune *et al.* (1997: 150), Lendemer & Yahr (2004: 119), Perlmutter (2006: 288)
Bulbothrix isidiza (Nyl.) Hale – Dey (1987:), Lendemer & Yahr (2004: 122)

Byssoloma leucoblepharum (Nyl.) Vain. – Lendemer & Yahr (2004: 119), Perlmutter (2006: 288), Lendemer & Tripp (2008: 60)
Byssoloma meadii (Tuck. *ex* Willey) Ekman – Harris (1995: 30 as *B. pubescens*), Lendemer & Yahr (2004: 119), Lendemer & Tripp (2008: 60)
Byssoloma subdiscordans (Nyl.) P. James – Lendemer & Yahr (2004: 119), Perlmutter & Lendemer (2008: 71)

Calicium abietinum Pers. – Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Calicium hyperelloides Nyl. – Lendemer & Yahr (2004: 128)
Calicium trabinellum (Ach.) Ach. – Lendemer & Yahr (2004: 128)

Caloplaca camptidia (Tuck.) Zahlbr. – Rudolf (1955:), Perlmutter (2006: 292)
Caloplaca cerina (Ehrh. *ex* Hedwig) Th. Fr. – Perlmutter (2006: 292)
Caloplaca chryophthalma Degel. – Lendemer & Yahr (2004: 124)
Caloplaca cinnabarina (Ach.) Zahlbr. – Wetmore & Kärnefelt (1999:), Perlmutter (2006: 292)
Caloplaca citrina (Hoffm.) Th. Fr. – Wetmore (2001: 7), Perlmutter (2006: 292), Perlmutter (2007: 27)
Caloplaca conversa (Kremp.) Jatta – Wetmore (1994:)
Caloplaca feracissima H. Magn. – Perlmutter (2006: 292), Perlmutter (2007: 27)
Caloplaca ferruginea (Hudson) Th. Fr. – USGS (2005:)
Caloplaca flavorubescens (Huds.) J.R. Laundon – Lendemer (2007: 99)

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – DePriest (2001: 8), Perlmutter (2006: 292), Perlmutter & Lendemer (2008: 71)
Caloplaca holocarpa (Hoffm. *ex* Ach.) A.E. Wade – Perlmutter (2006: 292)
Caloplaca pollinii (A. Massal.) Jatta – Wetmore (1994:), Perlmutter (2006: 292)
Caloplaca quercicola H. Magn. – Rudolf (1955:), Perlmutter (2006: 292)
Caloplaca sideritis (Tuck.) Zahlbr. – Wetmore (1996: 308), Perlmutter (2009: 69)
Caloplaca subsoluta (Nyl.) Zahlbr. – Wetmore (2003: 106), Perlmutter (2007: 27)
Caloplaca xanthostigmoidea (Räsänen) Zahlbr. – Wetmore (2001: 9)

Candelaria concolor (Dicks.) Stein – Perry & Moore (1969: 148), Dey (1978: 82), Heiman (1996: 53), McCune et al. (1997: 150), DePriest (2001: 8), Perlmutter (2006: 288), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 88)
Candelaria fibrosa (Fr.) Müll. Arg. – Perry & Moore (1969: 148), Heiman (1996: 53), McCune *et al.* (1997: 150), Perlmutter (2006: 288)

Candelariella reflexa (Nyl.) Lettau – DePriest (2001: 8), Perlmutter (2006: 288 as *C. efflorescens*), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 88), Perlmutter (2009: 69)
Candelariella vitellina (Hoffm.) Müll. Arg. – USGS (2005:)

Canoparmelia amabilis Heiman & Elix – Heiman & Elix (1999: 163), Lendemer & Yahr (2004: 119)
Canoparmelia amazonica (Nyl.) Elix & Hale – Lendemer & Yahr (2004: 127)
Canoparmelia caroliniana (Nyl.) Elix & Hale – Culberson (1957: 445 as *Parmelia caroliniana*), Culberson (1958: 26 as *Parmelia caroliniana*), Perry & Moore (1969: 152 as *Parmelia caroliniana*), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune *et al.* (1997: 150), DePriest (2001: 8), Lendemer & Yahr (2004: 119), Perlmutter (2006: 288), Perlmutter (2007: 26), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 87), Perlmutter (2009: 69)
Canoparmelia crozalsiana (B. de Lesd. *ex* Harm.) Elix & Hale – Heiman (1996: 53), McCune *et al.* (1997: 150), Perlmutter (2006: 289)
Canoparmelia texana (Tuck.) Elix & Hale – Perlmutter (2006: 289), Perlmutter (2009: 69)

Catillochroma albocincta (Degel.) Kalb – Degelius (1941: as *Catinaria albocincta*)

Cetradonia linearis (Evans) J.-C. Wei & Ahti – Evans (1947: 49 as *Cladonia linearis*), Perry & More (1969: 150 as *Cladonia linearis*), Dey (1978: 39 as *Gymnoderma lineare*), Heiman (1996: 54 as *Gymnoderma lineare*)

Cetraria aculeata (Schreber) Fr. – Mozingo (1954: 31)
Cetraria arenaria Kärnefelt – Heiman (1996: 53)
Cetraria islandica (L.) Ach. – Mozingo (1954: 31), Perry & Moore (1969: 149), Dey (1978: 45)

Cetrariella delisei (Bory *ex* Schaerer) Kärnefelt & Thell – Fink (1935:)

Cetrelia cetrarioides (Del. *ex* Duby) W.L. Culb. & C.F. Culb. – Dey (1978: 47), Schmitt & Slack (1990: 264), McCune *et al.* (1997: 150)

Cetrelia chicitae (W.L. Culb.) W.L. Culb. & C.F. Culb. – Perry & Moore (1969: 149), Dey (1978: 48), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 289)
Cetrelia olivetorum (Nyl.) W.L. Culb. & C.F. Culb. – Perry & Moore (1969: 149), Dey (1978: 48), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune *et al.* (1997: 150), DePriest (2001: 8)

Chaenotheca brunneola (Ach.) Müll. Arg. – Harris (1995: 23), Lendemer & Yahr (2004: 131)

Chaenothecopsis debilis (Turner & Borrer *ex* Sm.) Tibell – Lendemer & Yahr (2004: 124)
Chaenothecopsis kalbii Tibell & Ryman – Lendemer *et al.* (2008: 381)
Chaenothecopsis pusilla (Ach.) A.F.W. Schmidt – Sullivan (1996:)

Chrysothrix flavovirens Tønsberg – Lendemer (2005: 49), Perlmutter (2007a: 117), Harris & Ladd (2008: 34), Perlmutter & Lendemer (2008: 71)
Chrysothrix insulizans R.C. Harris & Ladd – Harris & Ladd (2008: 36), Perlmutter (2009: 69)
Chrysothrix onokoensis (Wolle) R.C. Harris & Ladd – Lendemer (2008a: 97)
Chrysothrix xanthina (Vain.) Kalb – Harris & Ladd (2008: 40), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 86), Perlmutter (2009: 69)

Cladonia anitae W.L. Culb. & C.F. Culb. – Culberson *et al.* (1982:). **ISOTYPE** in Wahsington DC, USA (US).
Cladonia apodocarpa Robbins – Keever *et al.* (1951:), Heiman (1996: 53), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287), Perlmutter & Lendemer (2008: 71), Perlmutter (2009: 69)
Cladonia arbuscula (Wallr.) Flot. – Oosting & Anderson (1937: 284 as *Cladonia sylvatica*), Perry & Moore (1969: 149), Dey (1978: 30), Heiman (1996: 53 as *Cladina arbuscula*), Perlmutter (2006: 287), Perlmutter (2007: 26)
Cladonia atlantica A. Evans – Perlmutter (2006: 287)
Cladonia bacillaris (Ach.) Nyl. – Keever *et al.* (1951:), Johnsen (1959: 39), Perry & Moore (1969: 149), Dey (1978: 31), Heiman (1996: 53), McCune *et al.* (1997: 150), Perlmutter (2005: 56 as *Cladonia macilenta* var. *bacillaris*), Perlmutter (2006: 287 as *Cladonia macilenta* var. *bacillaris*), Perlmutter (2008: 87 as *Cladonia macilenta* var. *bacillaris*)
Cladonia beaumontii (Tuck.) Vain. – Fink (1935: 261), Perlmutter (2006: 287)
Cladonia botrytes (K.G. Hagen) Wild. – Perlmutter (2006: 287)
Cladonia caespiticia (Pers.) Flörke – Oosting & Anderson (1937: 284), Perry & Moore (1969: 149), Dey (1978: 31), Heiman (1996: 53), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 287), Perlmutter (2007: 27), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71)
Cladonia caroliniana Tuck. – Fink (1935: 254), Oosting & Anderson (1939: 754), Evans (1947: 35), Heiman (1996: 53), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia cenotea (Ach.) Schaerer – Perry & Moore (1969: 149)
Cladonia cervicornis (Ach.) Flot. – Heiman (1996: 53)
Cladonia chlorophaea (Flörke *ex* Sommerf.) Spreng. – Perry & Moore (1969: 149), Culberson *et al.* (1977: 72), Dey (1978: 31, 32 as *Cladonia clavulivera*), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune *et al.* (1997: 150), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia coccifera (L.) Willd. – Oosting & Anderson (1937: 283), Lendemer & Tripp (2008: 60)

Cladonia coniocraea (Flörke) Spreng. – Oosting & Anderson (1937: 284), Culberson (1958: 26), Johnsen (1959: 39), Perry & Moore (1969: 149), Dey (1978: 32), Schmitt & Slack (1990: 264), McCune *et al.* (1997: 150), McAlister (1997: 118), Lendemer & Yahr (2004: 120), Perlmutter (2006: 287)
Cladonia cristatella Tuck. – Keever *et al.* (1951:), Robinsion (1959: 256), Perry & Moore (1969: 149), Dey (1978: 32), McCune *et al.* (1997: 150), DePriest (2001: 8), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287), Perlmutter & Lendemer (2008: 71)
Cladonia cryptochlorophaea Asah. – Perry & Moore (1969: 149), Culberson *et al.* (1977: 72), Dey (1978: 32), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia cylindrica (A. Evans) A. Evans – Heiman (1996: 53), McCune *et al.* (1997: 150), Perlmutter (2006: 287)
Cladonia didyma (Fée) Vain. – Perry & Moore (1969: 149), Dey (1978: 33), Heiman (1996: 53), McCune *et al.* (1997: 150), Perlmutter (2006: 287)
Cladonia digitata (L.) Hoffm. – Dey (1978: 33), Perlmutter (2006: 287)
Cladonia dimorphoclada Robbins – Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia evansii Abbayes – Evans (1947: 17), Lendemer & Yahr (2004: 124 as *Cladina evansii*), Perlmutter (2006: 287)
Cladonia fimbriata (L.) Fr. – Oosting & Anderson (1937: 284), Perry & Moore (1969: 150), Dey (1978: 33), Heiman (1996: 53), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia floerkeana (Fr.) Flörke – Oosting & Anderson (1937: 284), Perry & Moore (1969: 150), Dey (1978: 33), Perlmutter (2007: 26)
Cladonia floridana Vain. – Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia furcata (Huds.) Schrad. – Oosting & Anderson (1937: 284), Perry & Moore (1969: 150), Dey (1978: 34), Schmitt & Slack (1990: 264), Heiman (1996: 53), Perlmutter (2006: 287)
Cladonia gracilis (L.) Willd. – Perry & Moore (1969: 150), Dey (1978: 34), Heiman (1996: 53), Perlmutter (2006: 287)
Cladonia grayi G. Merr. – Keever *et al.* (1951:), Johnsen (1959: 39), Robinson (1959: 255), Perry & Moore (1969: 150), Culberson *et al.* (1977: 72), Dey (1978: 34), Heiman (1996: 53), Perlmutter (2006: 287), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71). **ISOLECTOTYPE** in Wahsington DC, USA (US).
Cladonia humilis (With.) J.R. Laundon – Culberson *et al.* (1977: 72 as *Cladonia conista*), Heiman (1996: 53)
Cladonia incrassata Flörke – Oosting & Anderson (1937: 290), Perry & Moore (1969: 150), Dey (1978: 34), Lendemer & Yahr (2004: 120), Perlmutter (2006: 287)
Cladonia leporina Fr. – Oosting & Anderson (1939: 754), Evans (1947: 23), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287)
Cladonia macilenta Hoffm. – Perry & Moore (1969: 150), Dey (1978: 35), Heiman (1996: 53), McCune et al. (1997: 150), DePriest (2001: 8), Lendemer & Yahr (2004: 124), Perlmutter (2006: 287), Perlmutter & Lendemer (2008: 71)
Cladonia mateocyatha Robbins – Robinson (1959: 255), Perry & Moore (1969: 150), Dey (1978: 35), Heiman (1996: 53), Perlmutter (2006: 287), Lendemer & Tripp (2008: 60)
Cladonia merochlorophaea Asah. – Culberson *et al.* (1977: 72), Dey (1978: 35)
Cladonia mitis Sandst. – Oosting & Anderson (1937: 284)
Cladonia ochrochlora Flörke – McCune *et al.* (1997: 150), DePriest (2001: 8), Lendemer & Yahr (2004: 120), Perlmutter (2006: 287), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 87), Perlmutter (2009: 69)
Cladonia pachycladodes Vain. – Evans (1947: 29), Lendemer & Yahr (2004: 124)

Cladonia parasitica (Hoffm.) Hoffm. – Culberson (1958: 26 as *Cladonia delicata*), Robinson (1959: 255 as *Cladonia delicata*), Dey (1978: 35), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 287), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71)
Cladonia perlomera Kristinsson – Culberson & Kristinsson (1969: 433), Culberson *et al.* (1977: 72). **ISOTYPE** in Wahsington DC, USA (US).
Cladonia petrophila R.C. Harris – Harris (1992:), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71)
Cladonia peziziformis (With.) J.R. Laundon – Robinson (1959: 255 as *Cladonia capitata*), Perry & Moore (1969: 149 as *Cladonia capitata*), Dey (1978: 31 as *Cladonia capitata*), Heiman (1996: 53), Lendemer & Yahr (2004: 128), Perlmutter (2006: 287), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 87)
Cladonia piedmontensis G. Merr. – Keever *et al.* (1951:), Johnsen (1959: 39), Robinson (1959: 256), Perlmutter (2006: 287)
Cladonia pleurota (Flörke) Schaer. – Perry & Moore (1969: 150), Dey (1978: 36), Heiman (1996: 53), Perlmutter (2006: 287), Perlmutter (2009: 69)
Cladonia psoromica J.P. Dey – Dey (1973: 420), Perlmutter (2006: 288)
Cladonia pyxidata (L.) Hoffm. – Oosting & Anderson (1937: 285), Perry & Moore (1969: 150), Dey (1978: 36), Heiman (1996: 53), Perlmutter (2006: 288)
Cladonia ramulosa (With.) J.R. Laundon - Perry & Moore (1969: 150 as *Cladonia pityrea*), Dey (1978: 36 as *Cladonia pityrea*), McCune *et al.* (1997: 150), Perlmutter (2006: 288), Perlmutter & Lendemer (2008: 71), Perlmutter (2008: 87)
Cladonia rangiferina (L.) F.H. Wigg. – Oosting & Anderson (1937: 284), Perry & Moore (1969: 150), Dey (1978: 37), Heiman (1996: 53 as *Cladina rangiferina*), Perlmutter (2006: 288), Lendemer & Tripp (2008: 60)
Cladonia rappii A. Evans –Lendemer & Yahr (2004: 124)
Cladonia ravenelii Tuck. – Perlmutter (2006: 288)
Cladonia robbinsii A. Evans – Perlmutter (2006: 288), Perlmutter & Lendemer (2008: 71)
Cladonia santensis Tuck. – Fink (1935: 156), Lendemer & Yahr (2004: 120)
Cladonia sobolescens Vain. *ex* Vain. – Lendemer & Yahr (2004: 124), Perlmutter (2006: 288), Perlmutter & Lendemer (2008: 72)
Cladonia squamosa Hoffm. – Oosting & Anderson (1937: 289), Perry & Moore (1969: 150), Dey (1978: 37), Schmitt & Slack (1990: 264), Heiman (1996: 53), McCune et al. (1997: 150), DePriest (2001: 8), Perlmutter (2006: 288), Lendemer & Tripp (2008: 60)
Cladonia stellaris (Opiz) Pouzar & Vezda – Oosting & Anderson (1937: as *Cladonia alpestris*)
Cladonia strepsilis (Ach.) Grognot – Oosting & Anderson (1937: 284), Oosting & Anderson (1939: 764), Johnsen (1959: 39), Robinson (1959: 255), Perry & Moore (1969: 150), Dey (1978: 37), Perlmutter (2006: 288)
Cladonia stygia (Fr.) Ruoss – Ahti & Hyvonen (1985: as *Cladina stygia*)
Cladonia subcariosa Nyl. – Oosting & Anderson (1937: 283), Evans (1947: as *Cladonia polycarpoides*), Johnsen (1959: 39), Robinson (1959: 256), Perry & Moore (1969: 149 and 150 as *Cladonia clavulifera*), Heiman (1996: 53 as *Cladonia polycarpia*), Perlmutter (2006: 287 as *Cladonia polycarpoides*, 288)
Cladonia submitis A. Evans – Dey (1978: 38), Perlmutter (2006: 288)
Cladonia subradiata (Vain.) Sandst. – Lendemer & Yahr (2004: 119), Perlmutter (2006: 288), Perlmutter (2007a: 117)
Cladonia subsetacea Robbins *ex* A. Evans – Evans (1947: 33), Lendemer & Yahr (2004: 124). **HOLOTYPE** in Wahsington DC, USA (US).

Cladonia subtenuis (Abb.) Mattick – Robinson (1959: 255), Perry & Moore (1969: 150), Dey (1978: 38), Heiman (1996: 53 as *Cladina subtenuis*), DePriest (2001: 8 as *Cladina subtenuis*), Lendemer & Yahr (2004: 124 as *Cladina subtenuis*), Perlmutter (2006: 288), Perlmutter (2007: 26), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 69)
Cladonia subulata (L.) F.H. Wigg. – Perry & More (1969: 150 as *Cladonia nemoxyna*), Heiman (1996: 53)
Cladonia symphycarpia (Flörke) Fr. – Lendemer & Yahr (2004: 124)
Cladonia tenuis (Flörke) Harm. – Oosting & Anderson (1937: 284), Oosting & Anderson (1939: 760), Perlmutter (2005: 55 as *Cladonia ciliata* var. *tenuis*), Perlmutter (2006: 287 as *Cladonia ciliata* var. *tenuis*)
Cladonia turgida Hoffm. - Heiman (1996: 53)
Cladonia uncialis (L.) F.H. Wigg. – Keever *et al.* (1951:), Perry & Moore (1969: 150), Dey (1978: 38), Lendemer & Yahr (2004: 125), Perlmutter (2006: 288), Lendemer & Tripp (2008: 60)
Cladonia verticillata (Hoffm.) Schaer. – Perry & Moore (1969: 150), Dey (1978: 38), Perlmutter (2005: 55 as *Cladonia cervicornis* subsp. *verticillata*), Perlmutter (2006: 287), Lendemer (2007a: 73), Lendemer & Tripp (2008: 60)
Cladonia vulcanica Zoll. – Dey (1978: 38), McCune *et al.* (1997: 150), Perlmutter (2005: 55 as *Cladonia didyma* var. *vulcanica*), Perlmutter (2006: 287 as *Cladonia didyma* var. *vulcanica*), Lendemer & Tripp (2008: 60 as *Cladonia didyma* var. *vulcanica*), Perlmutter & Lendemer (2008: 71 as *Cladonia didyma* var. *vulcanica*)

Coccocarpia erythroxyli (Spreng.) Swinscow & Krog – Culberson (1961: 266 as *C. parmelioides*), Lendemer & Yahr (2004: 125), Perlmutter (2006: 291)
Coccocarpia palmicola (Spreng.) Arv. & D.J. Galloway – Perry & Moore (1969: 150 as *Coccocarpia cronia*), Dey (1978: 18 as *Coccocarpia cronia*), Becker (1980: 30 as *Coccocarpia cronia*), Schmitt & Slack (1990: 264), McCune *et al.* (1997: 150), DePriest (2001: 8), Lendemer & Yahr (2004: 125), Perlmutter (2006: 291), Lendemer & Tripp (2008: 60)

Coenogonium luteum (Dicks.) Kalb & Lücking – Lendemer & Yahr (2004: 122 as *Dimerella lutea*), Lendemer & Yahr (2004: 119), Lendemer (2007a: 78), Perlmutter & Lendemer (2008: 72)
Coenogonium pineti (Ach.) ined. - Degel. (1941:), Perlmutter (2006: 286), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72)

Collema callibotrys Tuck. – GBIF (2005:)
Collema conglomeratum Hoffm. – Perry & Moore (1969:), Becker *et al.* (1977: 96), McCune *et al.* (1997: 150), Perlmutter (2006: 291)
Collema flaccidum (Ach.) Ach. – Dey (1978: 16), Heiman (1996: 54)
Collema furfuraceum (Arnold) Du Rietz – Dey (1978: 16), DePriest (2001: 8)
Collema nigrescens (Huds.) DC. – Dey (1978: 16), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 150), Perlmutter (2006: 291)
Collema pulcellum Ach. – Lendemer & Yahr (2004: 120), Perlmutter (2006: 291-292, includes var. *leucopeplum* and var. *subnigrescens*)
Collema subflaccidum Degel. – Perry & Moore (1969:), Becker *et al.* (1977: 96 as *Collema subfurvum*), Dey (1978: 16), Becker (1980: 30), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 292), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72)

Cresponea premnea (Ach.) Egea & Torrente – Culberson (1972: as *Lecanactis premnea*), Culberson (1975: 46 as *Lecanactis premnea*)

Cryptothecia rubrocincta (Ehrenb.:Fr.) Thor – Brodo (1994:), Lendemer & Yahr (2004: 131), Perlmutter (2007a: 117)

Cystocoleus ebeneus (Dillwyn) Thwaites – Lendemer (2007b: 99)

Dactylospora inquilina (Tuck.) Hafellner – Lendemer & Tripp (2008: 60)
Dactylospora lurida Hafellner – Perlmutter (2008: 87)
Dactylospora pertusariicola (Willey *ex.* Tuck) Hafellner – Perlmutter & Lendemer (2008: 72)

Dendriscocaulon intricatulum (Nyl.) Henssen – Lendemer & Tripp (2008: 60)
Dendriscocaulon umhausense (Auersw.) Degel. – Degelius (1941:), Schmitt & Slack (1990: 264)

Dermatocarpon intestiniforme (Körb.) Hasse – Perlmutter (2006: 286)
Dermatocarpon luridum (With.) J.R. Laundon – Heiman (1996: 54), DePriest (2001: 8), Perlmutter (2006: 286)
Dermatocarpon miniatum (L.) W. Mann – Perry & Moore (1969: 151), Perlmutter (2006: 286)

Dermiscellum oulochelia (Tuck.) Lendemer – Fink (1935: 102 as *Opegrapha oulocheila*), Lendemer (2003: 106)

Dibaeis absoluta (Tuck.) Kalb & Gierl – Fink (1935: 242 as *Baeomyces absolutus*), Perry & Moore (1969: 148 as *Baeomyces absolutus*)
Dibaeis baeomyces (L. f.) Rambold & Hertel – Perry & Moore (1969: 148 as *Baeomyces roseus*), Dey (1978: 26 as *Baeomyces fungoides*), Heiman (1996: 53 as *Baeomyces roseus*), Perlmutter (2006: 286), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72), Perlmutter (2009: 69)

Dictyocatenulata alba Finley & E.F. Morris – Lendemer (2007b: 99), Perlmutter & Lendemer (2008: 72)

Dimelaena oreina (Ach.) Norman – Perlmutter (2006: 290)

Diploschistes actinostomus (Ach.) Zahlbr. – Fink (1935: 137), Perlmutter (2006: 286), Perlmutter (2007: 27), Lendemer & Tripp (2008: 60)
Diploschistes muscorum (Scop.) R. Sant. – Perlmutter (2006: 286)
Diploschistes scruposus (Schreber) Norman – Perlmutter (2006: 286), Lendemer & Tripp (2008: 60)

Dirina massiliensis* f. *sorediata (Müll. Arg.) Tehler – Lendemer (2008a: 97)

Dirinaria aegialita (Afz.) B. Moore – Lendemer & Yahr (2004: 128), Perlmutter (2006: 290)
Dirinaria confusa D.D. Awasthi – Lendemer & Yahr (2004: 125), Perlmutter (2006: 290), Perlmutter (2007: 26), Perlmutter (2007a: 117)
Dirinaria frostii (Tuck.) Hale & W.L. Culb. – Perry & Moore (1969: 154 as *Physcia frostii*), Perlmutter (2009: 69), Lendemer (2009a: 176)

Dirinaria picta (Sw.) Clem. & Shear. – Lendemer & Yahr (2004: 128), Perlmutter (2007: 26), Perlmutter & Lendemer (2008: 72)

Dyplolabia afzelii (Ach.) A. Massal. – Fink (1935: 107 as *Graphis afzelii*), Lendemer & Yahr (2004: 131), Perlmutter (2006: 286), Perlmutter (2007a: 117)

Endocarpon pallidulum (Nyl.) Nyl. – Lendemer & Yahr (2004: 122 as *E. pusillum*), Lendemer (2007c: 105)
Endocarpon petrolepideum (Nyl.) Hasse – Lendemer (2007c: 105)

Enterographa anguinella (Nyl.) Redinger – Lendemer & Yahr (2004: 128), Perlmutter (2007: 26)
Enterographa hutchinsiniae (Leight.) A. Massal. – Andreas *et al.* (2007: 57), Lendemer (2007b: 100)

Eopyrenula intermedia Coppins – DePriest (2001: 8)

Ephebe americana Henssen – Dey (1978: 15), Lendemer & Tripp (2008: 60)
Ephebe lanata (L.) Vain. – Perlmutter (2006: 293)
Ephebe solida Bornet – NatureServe (2005:)

Epigloea pleiospora Döbbeler – Buck & Harris (2002:)

Erioderma mollissimum (Samp.) Du Reitz. – Degelius (1941:), Jørgensen (2000b: 673)

Everniastrum catawbiense (Degel.) Hale *ex* Sipman – Dey (1978: 59 as *Parmelia catawbiensis*), Heiman (1996: 54), McCune *et al.* (1997: 150)

Fellhanera eriniae R.C. Harris & Lendemer – Harris & Lendemer (2009: 165). **HOLOTYPE in NY.**
Fellhanera granulosa R.C. Harris & Lendemer – Harris & Lendemer (2009: 167). **HOLOTYPE in NY.**
Fellhanera hybrida R.C. Harris & Lendemer – Perlmutter & Lendemer (2008: 72), Harris & Lendemer (2009: 168). **HOLOTYPE in NY.**
Fellhanera montesfunosi R.C. Harris & Lendemer – Harris & Lendemer (2009: 170). **HOLOTYPE in NY.**
Fellhanera minisinkorum R.C. Harris & Lendemer ined. – Perlmutter & Lendemer (2008: 72)

Fissurina columbina (Tuck.) Staiger – Lendemer & Yahr (2004: 131)
Fissurina cypressi (Müll. Arg.) Lendemer – Lendemer & Yahr (2004: 134 as *Graphina cypressi*), Lendemer (2007a: 70)
Fissurina dumastii Fée – Lendemer & Yahr (2004: 135 as *Graphis dumastii*)
Fissurina illiterata (R.C. Harris) Lendemer – Lendemer & Yahr (2004: 128 as *Graphis illiterata*)
Fissurina incrustans Fée – Lendemer & Yahr (2004: 133)
Fissurina insidiosa C. Knight & Mitten – Lendemer & Yahr (2004: 122), Perlmutter (2007a: 117), Lendemer & Tripp (2008: 60), Perlmutter (2009: 69)
Fissurina scolecitis (Tuck.) Lendemer – Lendemer (2007a: 70)
Fissurina subnitidula (Nyl.) Staiger – Lendemer & Yahr (2004: 131)

Flakea papillata O.E. Erikss. – Perlmutter (2006: 293), Perlmutter (2006a: 567)

Flavoparmelia baltimorensis (Gyelnik & Fóriss) Hale **–** Dey (1978: 64 as *Parmelia baltimorensis),* Heiman (1996: 54), Perlmutter (2006: 289), Perlmutter & Lendemer (2008: 72), Perlmutter (2009: 69)
Flavoparmelia caperata (L.) Hale **–** Culberson (1958: 26 as *Parmelia caperata*), Perry & Moore (1969: as *Parmelia caperata*), Dey (1978: 64 as *Parmelia caperata*), Schmitt & Slack (1990: 264), Heiman (1996: 54), McAlister (1997: 118), McCune *et al.* (1997: 150), DePriest (2001: 8), Perlmutter (2006: 289), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 69)

Flavopunctelia flaventior (Stirt.) Hale **–** Dey (1978: 60 as *Parmelia flaventior*), Heiman (1996: 54), McCune *et al.* (1997: 150)

Fuscidea appalachensis Fryday – Fryday (2008: 303)
Fuscidea arboricola Coppins & Tønsberg **–** Tønsberg (1993:), Fryday (2008: 304)
Fuscidea recensa (Stirt.) Hertel, V. Wirth & Vezda – Fryday (2008: 313)
Fuscidea recensa* var. *arcuatula (Arnold) Fryday – Fryday (2008: 315)

Fuscopannaria ahlneri (P.M. Jørg.) P.M. Jørg. – Jørgensen (2000b: 677), Perlmutter (2006: 292)
Fuscopannaria leucosticta (Tuck.) P.M. Jørg. – Perry & Moore (1969: 152 as *Pannaria leucosticta*), Becker *et al.* (1997: 96 as *Pannaria leucosticta*), Dey (1978: 19 as *Pannaria leucosticta*), McCune *et al.* (1997: 151 as *Pannaria leucosticta*), Perlmutter (2006: 292), Lendemer & Tripp (2008: 60)
Fuscopannaria sorediata P.M. Jørg. – Jørgensen (2000a: 106)

Glyphis cicatricosa Ach. – Fink (1935: 120), Perlmutter (2006: 286), Lendemer & Tripp (2008: 60)

Gomphillus americanus Essl. – Lendemer & Yahr (2004: 122), Perlmutter (2006: 286), Lücking *et al.* (2007: 639), Lendemer & Tripp (2008: 60). **HOLOTYPE** in Wahsington DC, USA (US).
Gomphillus calycioides (Duby) Nyl. – Buck (1998:), Lücking *et al.* (2007: 639)

Graphina peplophora Wirth & Hale – Lendemer & Yahr (2004: 128)

Graphis desquamescens *s. lat.* – Perlmutter (2007a: 117)
Graphis desquamescens (Fée) Zahlbr. – Lendemer & Yahr (2004: 133)
Graphis furcata Fée – Perlmutter (2008: 86)
Graphis inversa R.C. Harris – Lendemer (2007b: 100), Perlmutter & Lendemer (2008: 72)
Graphis librata C. Knight – Lendemer & Yahr (2004: 131)
Graphis lineola auct. – Lendemer & Yahr (2004: 119), Perlmutter (2006: 286), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 86)
Graphis lucifica R.C. Harris – Lendemer & Yahr (2004: 125)
Graphis rigidula Müll. Arg. – Lendemer & Yahr (2004: 135)
Graphis scripta (L.) Ach. – Culberson (1958: 26), Schmitt & Slack (1990: 264), DePriest (2001: 8), Lendemer & Yahr (2004: 119), Perlmutter (2006: 286), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 86), Perlmutter (2009: 69)
Graphis striatula (Ach.) Spreng. – Lendemer & Yahr (2004: 128), Lendemer & Tripp (2008: 60)

Gyalecta geoica (Wahlenb. *ex* Ach.) Ach. – Perlmutter (2006: 286)

Gyalectidium appendiculatum Lücking, Lendemer & E. Tripp – Lücking *et al.* (2007: 639), Lendemer & Tripp (2008: 60)

Gyalideopsis anastomosans P. James & Vezda - Tønsberg (2006: 61)
Gyalideopsis buckii Lücking, Sérus & Vězda – Lücking *et al.* (2007: 650), Perlmutter & Lendemer (2008: 72)
Gyalideopsis moodyae Lendemer & Lücking – Lücking et al. (2007: 655)
Gyalideopsis ozarkensis Lücking, W.R. Buck & R.C. Harris – Lücking *et al.* (2007: 655), Perlmutter & Lendemer (2008: 72)

Gyrostomum scyphuliferum (Ach.) Nyl. – Lendemer & Yahr (2004: 128)

Haematomma accolens (Stirt.) Hillm. – Lendemer & Yahr (2004: 119, 131 as *H. flexuosum*), Perlmutter (2007: 26), Perlmutter (2007a: 117), Brodo *et al.* (2008: 382)
Haematomma flexuosum group – Lendemer & Tripp (2008: 60)
Haematomma persoonii (Fée) A. Massal. – Brodo *et al.* (2008: 411)

Hafellia curatellae (Malme) Marbach – USGS (2005: as *Buellia curatellae*)
Hafellia disciformis (Fr.) Marbach & H. Mayrhofer – USGS (2005), Perlmutter (2006: 290)
Hafellia parastata (Nyl.) Kalb. – Imshaug (1951:)

Halecania rheophila R.C. Harris – Perlmutter (2008: 87)

Heppia adglutinata (Kremp.) A. Massal. – Lendemer & Yahr (2004: 125)
Heppia lutosa (Ach.) Nyl. – Culberson (1961: 266)

Hertelidea pseudobotryosa R.C. Harris, Ladd & Printzen – Printzen & Kantvilas (2004:)

Heterodermia albicans (Pers.) Swinscow & Krog – Culberson (1966: 477 as *Heterodermia domingensis*), Lendemer & Yahr (2004: 120), Perlmutter (2006: 290), Perlmutter (2007a: 117), Lendemer & Tripp (2008: 60), Lendemer (2009: 5)
Heterodermia appalachensis (Kurok.) W.L. Culb. – Culberson (1966: 479), Perry & Moore (1969: 151), Heiman (1996: 54), McCune *et al.* (1997: 150), Perlmutter (2006: 290), Lendemer (2009: 6)
Heterodermia casarettiana (A. Massal.) Trev. – Culberson (1966: 477), Perry & Moore (1969: 151), Dey (1978: 84), Heiman (1996: 54), Perlmutter (2006: 290), Lendemer & Tripp (2008: 60), Lendemer (2008a: 98), Lendemer (2009: 11)
Heterodermia comosa (Eschw.) Follm. & Redón – Lendemer (2009: 12)
Heterodermia crocea R.C. Harris – Perlmutter (2007a: 117), Lendemer & Tripp (2008: 60), Lendemer (2009: 12)
Heterodermia dendritica (Pers.) Poelt – Culberson (1966: 481)
Heterodermia echinata (Taylor) W.L. Culb. – Culberson (1966: 481), Heiman (1996: 54), DePriest (2001: 8), Perlmutter (2006: 290), Lendemer (2009: 13)
Heterodermia erecta Lendemer – Lendemer (2009: 13). **HOLOTYPE IN NY.**
Heterodermia galactophylla (Tuck.) W.L. Culb. – Culberson (1966: 482), Perlmutter (2006: 290)

Heterodermia granulifera (Ach.) W.L. Culb. – Culberson (1966: 482), Perry & Moore (1969: 151), Perlmutter (2006: 290), Lendemer & Tripp (2008: 60), Lendemer (2009: 18)
Heterodermia hypoleuca (Ach.) Trevisan - Culberson (1966: 477), Perry & Moore (1969: 151), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 8), Perlmutter (2006: 290), Lendemer & Tripp (2008: 60), Lendemer (2009: 19)
Heterodermia leucomela (L.) Poelt - Fink (1935: 391 as *Anaptychia leucomela*), Culberson (1966: 483), Perry & Moore (1969: 151), Dey (1978: 85 as *Heterodermia leucomelaena*), Schmitt & Slack (1990: 264 as *Heterodermia leucomelos*), Heiman (1996: 54 as *Heterodermia leucomelos*), McCune *et al.* (1997: 151 as *Heterodermia leucomelos*), DePriest (2001: 8), Søchting & Lutzoni (2003: 1268), Lendemer (2009: 23)
Heterodermia microphylla (Kurok.) Skorepa - McCune *et al.* (1997: 151)
Heterodermia neglecta Lendemer, R.C. Harris & E. Tripp – Lendemer *et al.* (2007: 490), Lendemer & Tripp (2008: 61), Lendemer (2009: 25)
Heterodermia obscurata (Nyl.) Trevis. – Culberson (1966: 477), Perry & Moore (1969: 151), Dey (1978: 82), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 8), Lendemer & Yahr (2004: 119), Perlmutter (2006: 290), Lendemer & Tripp (2008: 60), Perlmutter & Lendemer (2008: 72), Lendemer (2009: 26)
Heterodermia propagulifera (Vain.) J.P. Dey – Dey (1978: 86), Perlmutter (2006: 290)
Heterodermia pseudospeciosa (Kurok.) W.L. Culb. – Culberson (1966: 477), Perry & Moore (1969: 151), Dey (1978: 86), Heiman (1996: 54), Perlmutter (2006: 291), Lendemer (2009: 29)
Heterodermia speciosa (Wulfen) Trevis. – Culberson (1966: 477 as *Heterodermia tremulans*), Perry & Moore (1969: 151 as *Heterodermia tremulans*), Dey (1978: 86 as *Heterodermia tremulans*), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 8), Lendemer & Yahr (2004: 119), Perlmutter (2006: 291), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 88), Lendemer (2009: 30)
Heterodermia squamulosa (Degel.) W.L. Culb. – Culberson (1966: 485), Perry & Moore (1969: 151), Dey (1978: 86), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 8), Lendemer & Tripp (2008: 61), Lendemer (2009: 31). **ISOTYPE** in Washington DC, USA (US) as *Anaptychia squamulosa*.

****Homostegia hertelii*** D. Hawksw., V. Atienza & M.S. Cole – Lendemer (2008a: 98)

Hyperphyscia adglutinata (Flörke) H. Mayrh. & Poelt – Perlmutter (2006: 291)
Hyperphyscia syncolla (Tuck. *ex* Nyl.) Kalb – DePriest (2001: 9), Perlmutter (2006: 291)

Hypocenomyce anthracophila (Nyl.) P. James & Gotth. Schneider – Fink (1935: 214 as *Psora anthracophila*), Perlmutter (2006: 288)

Hypogymnia enteromorpha (Ach.) Nyl. – Perry & Moore (1969: 151)
Hypogymnia krogiae Ohlsson – Dey (1978: 42), Heiman (1996: 54), Perlmutter (2006: 289)
Hypogymnia physodes (L.) Nyl. – Perry & Moore (1969: 151), Dey (1978: 42), Schmitt & Slack 282. (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9)
Hypogymnia tubulosa (Schaer.) Hav. – Dey (1978: 43)
Hypogymnia vittata (Ach.) Parrique – Dey (1978: 43)

Hypotrachyna afrorevoluta (Krog & Swinsc.) Krog & Swinsc. – Knudsen & Lendemer (2005: 292), Lendemer & Tripp (2008: 61)

Hypotrachyna croceopustulata (Kurok.) Hale – Perry & Moore (1969: 153 as *Parmelia croceopustulata*), Dey (1978: 65 as *Parmelia croceopustulata*), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61). **ISOTYPE** in Washington DC, USA (US) as *Parmelia croceopustulata*.
Hypotrachyna densirhizinata (Kurok.) Hale – Dey (1978: 65 as *Parmelia densirhizinata*)
Hypotrachyna dentella (Hale & Kurok.) Hale – Perry & Moore (1969: 153 as *Parmelia dentella*), Dey (1978: 67 as *Parmelia dentella*)
Hypotrachyna gondylophora (Hale) Hale – Hale (1967: 420 as *Parmelia gondylophora*), Dey (1978: 66 as *Parmelia gondylophora*), Heiman (1996: 54), McCune *et al.* (1997: 151)
Hypotrachyna imbricatula (Zahlbr.) Hale – Perry & Moore (1969: 153 as *Parmelia imbricatula*), Dey (1978: 66 as *Parmelia imbricatula*), Schmitt & Slack (1990: 264), Heiman (1996: 54), DePriest (2001: 9)
Hypotrachyna laevigata (Sm.) Hale – Dey (1978: 67 as *Parmelia laevigata*), Heiman (1996: 54)
Hypotrachyna livida (Taylor) Hale – Perry & Moore (1969: 153 as *Parmelia livida*), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 119), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87)
Hypotrachyna oostingii (J.P. Dey) Hale – Dey (1978: 67 as *Parmelia oostingii*), Heiman (1996: 54). **ISOTYPE** in Washington DC, USA (US) as *Parmelia oostingii*.
Hypotrachyna osseoalba (Vain.) Park & Hale – Heiman (1996: 54 as *Hypotrachyna formosana*), Lendemer & Yahr (2004: 119), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72).
Hypotrachyna producta Hale – Dey (1978: as *Parmelia producta*)
Hypotrachyna prolongata (Kurok.) Hale – Dey (1978: 68 as *Parmelia rachista*), Heiman (1996: 54)
Hypotrachyna pseudosinuosa (Asah.) Hale – McCune *et al.* (1997: 151), Lendemer & Tripp (2008: 61)
Hypotrachyna pustulifera (Hale) Skorepa – McCune *et al.* (1997: 151), Perlmutter (2006: 289)
Hypotrachyna revoluta (Flörke) Hale – Perry & Moore (1969: 153 as *Parmelia revoluta*), Dey (1978: 68 as *Parmelia revoluta*), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Tripp (2008: 61)
Hypotrachyna rockii (Zahlbr.) Hale – Perry & Moore (1969: 153 as *Parmelia rockii*), Dey (1978: 70 as *Parmelia rockii*), Schmitt & Slack (1990: 264), Heiman (1996: 54), McCune *et al.* (1997: 151)
Hypotrachyna showmanii Hale – McCune *et al.* (1997: 151), Perlmutter (2006: 289)
Hypotrachyna sinuosa (Sm.) Hale – Dey (1978: 70 as *Parmelia sinuosa*)
Hypotrachyna taylorensis (M.E. Mitch.) Hale – Groner & Dietrich (1996: 459)
Hypotrachyna thysanota (Kurok.) Hale – Dey (1978: 70 as *Parmelia thysanota*)
Hypotrachyna virginica (Hale) Hale – Perry & Moore (1969: 154 as *Parmelia virginica*), Dey (1978: 70 as *Parmelia virginica*), Heiman (1996: 54)

Imshaugia aleurites (Ach.) S.F. Meyer – Perry & Moore (1969: 154 as *Parmeliopsis aleurites*), Dey (1978: 71 as *Parmeliopsis aleurites*), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61)
Imshaugia placorodia (Ach.) S.F. Meyer – Fink (1935: 319 as *Parmeliopsis placorodia*), Perry & Moore (1969: 154 as *Parmeliopsis placorida*), McCune *et al.* (1997: 151), Perlmutter (2006: 289)

Ionaspis alba Lutzoni – Lendemer & Tripp (2008: 61), Perlmutter (2009: 69)
Ionaspis lacustris (With.) Lutzoni – Fink (1935: 299 as *Lecanora lacustris*), Perlmutter & Lendemer (2008: 72)

Jamesiella anastomosans (P. James & Vězda) Lücking, Sérus. & Vězda – Lücking *et al.* (2007: 663)

Lasallia papulosa (Ach.) Llano – Oosting & Anderson (1937: 286 as *Umbilicaria pustulata* var. *papulosa*), Perry & Moore (1969: 151), Dey (1978: 40), Heiman (1996: 54), Perlmutter (2006: 293), Lendemer & Tripp (2008: 61)
Lasallia pensylvanica (Hoffm.) Llano – Dey (1978: 40), Perlmutter (2006: 293)

Lecanora albella (Pers.) Ach. – Culberson (1958: as *Lecanora pallida*)
Lecanora albellula Nyl. – Degelius (1951: as *Lecanora piniperda*)
Lecanora allophana Nyl. – Schmitt & Slack (1990: 264), Perlmutter (2006: 288)
Lecanora argentata (Ach.) Malme – Schmitt & Slack (1990: 264), Brodo (1984:)
Lecanora caesiorubella Ach. – Schmitt & Slack (1990: 264), Lendemer & Yahr (2004: 119), Perlmutter (2006: 288), Perlmutter (2007: 26), Lendemer & Tripp (2008: 61)
Lecanora caesiorubella **subsp. *glaucomodes*** (Nyl.) Imshaug & Brodo - Lendemer & Yahr (2004: 129)
Lecanora cenisia Ach. – Perlmutter (2006: 288)
Lecanora chlarotera Nyl. – Brodo (1984:), Perlmutter (2006: 288)
Lecanora cinereofusca H. Magn. – Schmitt & Slack (1990: 264), Perlmutter (2006: 288)
Lecanora cupressi Tuck. – Lendemer & Yahr (2004: 125)
Lecanora expallens Ach. – Degelius (1941: as *Lecanora conizaea*)
Lecanora hybocarpa (Tuck.) Brodo – Schmitt & Slack (1990: 264), Lendemer & Yahr (2004: 119), Perlmutter (2006: 288), Perlmutter (2007: 26), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 69)
Lecanora hypoptoides (Nyl.) Nyl. – Degelius (1941:)
Lecanora impudens Degel. – Schmitt & Slack (1990: 264)
Lecanora imshaugii Brodo – Brodo (1984:), Schmitt & Slack (1990: 264), Perlmutter (2006: 288), Lendemer & Tripp (2008: 61)
Lecanora insignis Degel. – Degelius (1941:)
Lecanora louisianae B. de Lesd. – DePriest (2001: 9), Lendemer & Yahr (2004: 125), Perlmutter (2007: 26), Perlmutter (2007a: 117)
Lecanora miculata Ach. – Brodo (1984:), Perlmutter (2006: 288)
Lecanora minutella Nyl. – Culberson (1958: 26), LaGreca & Lumbsch (2001:), Perlmutter (2006: 288), Lendemer & Tripp (2008: 61)
Lecanora oreinoides (Körb.) Hertel & Rambold – Perlmutter (2006: 288), Lendemer & Tripp (2008: 61), Perlmutter (2008: 87), Perlmutter (2009: 69)
Lecanora pulicaris (Pers.) Ach. – Degelius (1941: as *Lecanora pinastri*), Perlmutter (2006: 288)
Lecanora rugosella Zahlbr. – Brodo (1984:), Schmitt & Slack (1990: 265), Perlmutter (2007: 26)
Lecanora strobilina (Spreng.) Kieffer – Schmitt & Slack (1990: 265), Lendemer & Yahr (2004: 128), Perlmutter (2006: 288), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 70)
Lecanora subimmergens Vain. – Brodo (1984:), Perlmutter & Lendemer (2008: 72), Perlmutter (2009: 69)
Lecanora subpallens Zahlbr. – DePriest (2001: 9 as *Lecanora caesiorubella* subsp. *prolifera*), Lendemer & Yahr (2004: 125), Perlmutter (2006: 288), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 70)
Lecanora thysanophora R.C. Harris – Schmitt & Slack (1990: 265), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72)
Lecanora varia (Hoffm.) Ach. – Perlmutter (2006: 288)

Lecanora wisconsinensis H. Magn. – Brodo (1984:)

Lecidea cyrtidia Tuck. – Lendemer & Tripp (2008: 61)
Lecidea microps Tuck. – Fink (1935: 212)
Lecidea micytho Tuck. *ex* Willey – Fink 1935: 206)
Lecidea nylanderi (Anzi) Th. Fr. – Culberson (1958: 26), Perlmutter (2006: 288)
Lecidea roseotincta Coppins & Tønsberg – Tønsberg (2006: 62)
Lecidea subtilis Degel. – Degelius (1941:)

Lecidella elaeochroma (Ach.) M. Choisy – Degelius (1941: as *Lecidea olivacea*), Lendemer & Tripp (2008: 61)
Lecidella enteroleucella (Nyl.) Hertel – Perlmutter (2006: 288), Perlmutter (2009: 70)
Lecidella stigmatea (Ach.) Hertel & Luckert – Perlmutter (2008: 87)

Leioderma cherokeense P.M. Jørg. – Jørgensen & Tønsberg (2005: 412 Protolog) 351. Type in BG

Leiorreuma explicans (Fink) Lendemer – Perlmutter & Lendemer (2008: 72)
Leiorreuma sericeum (Eschw.) Staiger – Lendemer & Yahr (2004: 134 as *Pheographis sericea*)

Lepraria caesiella R.C. Harris – Perlmutter (2006: 291), Lendemer & Tripp (2008: 61)
Lepraria friabilis Lendemer, K. Knudson & Elix – Lendemer, Knudson & Elix (2008: 66), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87)
Lepraria lanata Tønsberg – Tønsberg (2007: 52)
Lepraria lobificans Nyl. – Perlmutter (2006: 291), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 70)
Lepraria normandinoides Lendemer & R.C. Harris – Perlmutter (2006: 291 as *L. membranacea*), Lendemer & Harris (2007: 45), Lendemer (2007a: 73), Lendemer & Tripp (2008: 61). **HOLOTYPE** in New York NY, USA (NY).
Lepraria salazinica Tønsberg – Tønsberg (2007: 52)
Lepraria vouauxii (Hue) R.C. Harris – Lendemer & Tripp (2008: 61)

Leptogium austroamericanum (Malme) C.W. Dodge – Heiman (1996: 54), DePriest (2001: 9), Lendemer & Yahr (2004: 122), Perlmutter (2006: 292), Perlmutter (2008: 88)
Leptogium azureum (Sw. *ex* Ach.) Mont. – Sierk (1964: 305), Perry & Moore (1969: 151), Lendemer & Yahr (2004: 132), Perlmutter (2006: 292), Perlmutter (2007a: 117)
Leptogium burnetiae C.W. Dodge – Dey (1978: 17), Heiman (1996: 54), DePriest (2001: 9)
Leptogium byssinum (Hoffm.) Zwackh *ex* Nyl. – Fink (1935: 162)
Leptogium chloromelum (Sw.) Nyl. – Sierk (1964: 293), Perry & Moore (1969: 151), Becker *et al.* (1977: 96), Dey (1978: 17), Lendemer & Yahr (2004: 128)
Leptogium corticola (Taylor) Tuck. – Perry & Moore (1969: 151), Becker *et al.* (1977: 96), Dey (1978: 17), Becker (1980: 30), Schmitt & Slack (1990: 265), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 292), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72)
Leptogium cyanescens (Rabenh.) Körb. – Perry & Moore (1969: 152), Becker *et al.* (1977: 96), Dey (1978: 17), Becker (1980: 30), Schmitt & Slack (1990: 265), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 119), Perlmutter (2006: 292), Perlmutter (2007a: 117), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 88)

Leptogium dactylinum Tuck. – Sierk (1964: 300), Lendemer & Yahr (2004: 122), Perlmutter (2006: 292), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72)
Leptogium hirsutum Sierk – Perry & Moore (1969: 152), Perlmutter (2006: 292)
Leptogium isidiosellum (Riddle) Sierk – Lendemer (2008: 103)
Leptogium juniperinum Tuck. – Sierk (1964: 316), Perlmutter (2006: 292)
Leptogium juressianum Tav. – Lendemer *et al.* (2008: 383)
Leptogium laceroides (B. de Lesd.) P.M. Jørg. – Sierk (1964: 264 as *Leptogium americanum*), Dey (1978: 17), Heiman (1996: 54), McCune *et al.* (1997: 151), Lendemer & Tripp (2008: 61)
Leptogium lichinoides (L.) Zahlbr. – Heiman (1996: 54)
Leptogium milligranum Sierk – Perry & Moore (1969: 152), DePriest (2001: 9), Lendemer & Yahr (2004: 128), Perlmutter (2006: 292)
Leptogium palmatum (Huds.) Mont. – Perlmutter (2006: 292)
Leptogium phyllocarpum (Pers.) Mont. – Sierk (1964: 296)
Leptogium tenuissimum (Dicks.) Körb. – USGS (2005:)
Leptogium teretiusculum (Wallr.) Arnold – McCune *et al.* (1997: 151)

Leptorhaphis contorta Degel. – Degelius (1941:)

Leptotrema wightii (Taylor) Müll. Arg. – Lendemer & Yahr (2004: 122 as *Myriotrema wightii*)

Leucodecton glaucescens (Nyl.) A. Frisch – Lendemer & Yahr (2004: 122 as Myriotrema glaucescens)
Leucodecton subcompunctum (Nyl.) A. Frisch – Perlmutter (2006: 286 as *Myriotrema subcompunctum*), Lendemer & Tripp (2008: 61 as *Myriotrema subcompunctum*)

Lichenodiplis lecanorae (Vouaux) Dyko & Hawksw. – Lendemer & Yahr (2004: 128) Parasite on *Pertusaria*.

Lichenopeltella heterodermiicola M.S. Cole & D. Hawksw. – Lendemer & Tripp (2008: 61). Parasite on *Heterodermia*.

Lichina willeyi (Tuck.) Henssen – Perlmutter (2006: 293 as *Lichinia willeyi*)

****Lichenoconium lecanorae*** (Jaap) D. Hawksw. – Lendemer (2008a: 98)

Lithothelium hyalosporum (Nyl.) Aptroot – Harris (1973:)
Lithothelium illotum (Nyl.) Aptroot – Harris (1995:)
Lithothelium macrosporum (R.C. Harris) Aptroot – Harris (1989:)
Lithothelium phaeosporum (R.C. Harris) Aptroot – Harris (1989:), Perlmutter & Lendemer (2008: 72)
Lithothelium septemseptatum (R.C. Harris) Aptroot – Harris (1989:). **ISOTYPE** in Washington DC, USA (US) as *Plagiocarpa septemseptata*.

Lobaria pulmonaria (L.) Hoffm. – Perry & Moore (1969: 152), Dey (1978: 22), Becker (1980: 30), Schmitt & Slack (1990: 265), Heiman (1996: 54), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 292), Lendemer (2007a: 74), Lendemer & Tripp (2008: 61)

Lobaria quercizans Michx. – Perry & Moore (1969: 152), Becker *et al.* (1977: 96), Dey (1978: 22), Becker (1980: 30), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 292)
Lobaria ravenelii (Tuck.) Yoshim. – McCune *et al.* (1997:), Lendemer & Yahr (2004: 122), Perlmutter (2006: 292)
Lobaria scrobiculata (Scop.) DC. – Perry & Moore (1969: 152), Dey (1978: 23), Heiman (1996: 55)

Loxospora cismonica (Beltr.) Hafellner – Fink (1935: 315 as *Haematomma cismonicum*), Culberson (1958: 26 as *Haematomma cismonicum*)
Loxospora elatina (Ach.) A. Massal. – Fink (1935: 314 as *Haematomma elatinum*), Perlmutter (2006: 288)
Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – Brodo & Culberson (1986: 204 as *Haematomma pustulatum*), Schmitt & Slack (1990: 265 as *Heamatomma pustulatum*), Lendemer & Yahr (2004: 125), Perlmutter (2006: 288), Perlmutter (2007a: 117), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 87), Perlmutter (2009: 70). **ISOTYPE** in Wahsington DC, USA (US) as *Heamatomma pustulatum*.

Marchandiomyces corallinus (Roberge) Diederich & Hawksw. – Perlmutter & Lendemer (2008: 72)

Maronea polyphaea H. Magn. – Lendemer & Yahr (2004: 119), Perlmutter (2006: 292), Perlmutter & Lendemer (2008: 72), Perlmutter (2008: 88)

Megalaria beechingii Lendemer – Lendemer (2007: 42), Lendemer (2007b: 100)
Megalaria laureri (Hepp *ex* Th. Fr.) Hafellner – Schmitt & Slack (1990: 265 as *Catinaria laureri*)

Megalospora porphyritis (Tuck.) R.C. Harris – Harris (1984:), Lendemer (2007a: 78 as *Megaspora porphyritis*), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 72)
Megalospora tuberculosa (Fée) Sipman – USGS (2005:)

Megaspora verrucosa (Ach.) Hafellner & V. Wirth – Fink (1935: 297 as *Lecanora verrucosa*)

Melanelia culbersonii (Hale) Thell – Hale (1967: 416 as *Cetraria culbersonii*), Heiman (1996: 53 as *Cetraria culbersonii*), Perlmutter (2006: 289)
Melanelia hepatizon (Ach.) Thell – Dey (1978: 46 as *Cetraria hepatizon*)
Melanelia stygia (L.) Essl. – Perry & Moore (1969: 154 as *Parmelia stygia*), Dey (1978: 55 as *Parmelia stygia*), Heiman (1996: 55)

Melanelixia subaurifera (Nyl.) O. Blanco *et al.* – Dey (1978: 55 as *Parmelia subaurifera*), McCune *et al.* (1997: 151 as *Melanelia subaurifera*), DePriest (2001: 9 as *Melanelia subaurifera*)
Melanelixia subargentifera (Nyl.) O. Blanco *et al.* – Perlmutter (2009: 70)

Melanohalea exasperata (De Not.) O. Blanco *et al.* – Heiman (1996: 55 as *Melanelia exasperata*)
Melanohalea halei (Ahti) O. Blanco *et al.* – Perry & Moore (1969: 153 as *Parmelia halei*), Dey (1978: 54 as *Parmelia halei*), Schmitt & Slack (1990: 265 as *Melanelia halei*), Heiman (1996: 55 as *Melanelia halei*), McCune *et al.* (1997: 151 as *Melanelia halei*)
Melanohalea olivacea (L.) O. Blanco *et al.* – Degelius (1941: as *Parmelia olivacea*)

Melaspilea gemella (Eshw.) Nyl. – Fink (1935: 102 as *Opegrapha scaphella* var. *gemella*)
Melaspilea tribuloides (Tuck.) Müll. Arg. – Fink (1935: 105)

Menegazzia subsimilis (H. Magn.) R. Sant. – Lendemer & Tripp (2008: 61)
Menegazzia terebrata (Hoffm.) A. Massal. – Culberson (1958: 26 as *Parmelia pertusa*), Perry & Moore (1969: 152), Dey (1978: 43), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9)

Micarea endocyanea (Tuck. *ex* Willey) R.C. Harris – Schmitt & Slack (1990: 265)
Micarea melaena (Nyl.) Hedl. – Lendemer & Tripp (2008: 61)
Micarea misella (Nyl.) Hedl. – Lendemer & Yahr (2004: 125)
Micarea neostipitata Coppins & P. May – Coppins & May (2001: 490), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73)
Micarea peliocarpa (Anzi) Coppins & R. Sant. – Lendemer & Tripp (2008: 61)
Micarea prasina Fr. – Lendemer & Yahr (2004: 119), Perlmutter & Lendemer (2008: 73)

Monoblastia rappii Zahlbr. – Perlmutter (2008: 86)

Multiclavula corynoides (Peck) R.H. Peterson – Perlmutter (2009: 70)

Mycoblastus caesius (Coppins & P. James) Tønsberg – Tønsberg (2006: 62)

Mycocalicium subtile (Pers.) Szatala – Lendemer & Yahr (2004: 120) Fungus

Mycoporum acervatum R.C. Harris – Perlmutter (2009: 70)
Mycoporum antecellens (Nyl.) R.C. Harris – Lendemer (2008a: 99)
Mycoporum compositum (A. Massal.) R.C. Harris – Fink (1935: 67 as *Mycoporum ohiense*), Perlmutter (2009: 70)
Mycoporum pycnocarpoides Müll. Arg. – Harris (1973:)

Myelochroa aurulenta (Tuck.) Elix & Hale – Perry & Moore (1969: 152 as *Parmelia aurulenta*), Dey (1978: 62 as *Parmelia aurulenta*), Schmitt & Slack (1990: 265 as *Parmelina aurulenta*), Heiman (1996: 55 as *Parmelina aurulenta*), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Myelochroa galbina (Ach.) Elix & Hale – Perry & Moore (1969: 153 as *Parmelia glabina*), Dey (1978: 63 as *Parmelia galbina*), Heiman (1996: 55 as *Parmelina galbina*), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 289), Perlmutter & Lendemer (2008: 73)
Myelochroa metarevoluta (Asah.) Elix & Hale – Lendemer (2007b: 100)
Myelochroa obsessa (Ach.) Elix & Hale – Heiman (1996: 55 as *Parmelina obsessa*), DePriest (2001: 9), Perlmutter (2006: 289), Perlmutter & Lendemer (2008: 73), Perlmutter (2009: 70)

Nadvornikia sorediata R.C. Harris – Lendemer & Yahr (2004: 133), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)

Nectriopsis rubefaciens (Ellis & Everh.) M.S. Cole & Hawksw. – Lendemer (2007b: 100). Parasite on *Aspicilia*.

Nephroma helveticum Ach. – Perry & Moore (1969: 152), Dey (1978: 21), Becker (1980: 30), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 292), Lendemer & Tripp (2008: 61)
Nephroma parile (Ach.) Ach. – Dey (1978: 21)
Nephroma resupinatum (L.) Ach. – Dey (1978: 21)

Normandina pulchella (Borr.) Nyl. – Dey (1978: 14), Schmitt & Slack (1990: 265), DePriest (2001: 9), Perlmutter (2006: 293), Lendemer & Tripp (2008: 61)

Ocellularia praestans (Müll. Arg.) Hale – Lendemer & Yahr (2004: 135)

Ochrolechia africana Vain. – Brodo (1991: 740), Lendemer & Yahr (2004: 119), Perlmutter (2006: 286), Perlmutter (2007: 26), Perlmutter (2007a: 118), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Ochrolechia arborea (Kreyer) Almb. – Brodo (1991: 745)
Ochrolechia mexicana Vain. – Brodo (1991: 752)
Ochrolechia pseudopallescens Brodo – Brodo (1991: 757), Perlmutter (2006: 286)
Ochrolechia tartarea (L.) A. Massal. – Howard (1970: 125), Perlmutter (2006: 286)
Ochrolechia trochophora (Vain.) Oshio – Brodo (1991: 763), Perlmutter (2006: 286), Lendemer & Tripp (2008: 61)
Ochrolechia trochophora* var. *pruinirosella Brodo – Brodo (1991: 764)
Ochrolechia yasudae Vain. – Howard (1970: 129), Brodo (1991: 765), Perlmutter (2006: 286)

Opegrapha corticola Coppins & P. James – Tønsberg (2006: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 86)
Opegrapha moroziana Lendemer – Lendemer (2009c: 52). **HOLOTYPE in NY.**
Opegrapha varia Pers. – Lendemer & Yahr (2004: 119), Perlmutter (2006: 285), Perlmutter & Lendemer (2008: 73)
Opegrapha viridis (Pers. *ex* Ach.) Behlen & Desberger – Lendemer & Yahr (2004: 135), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 86)
Opegrapha vulgata Ach. – Lendemer & Yahr (2004: 122), Lendemer & Tripp (2008: 61), Perlmutter (2008: 86)

Pannaria conoplea (Ach.) Bory – Dey (1978: 19 as *Pannaria pityrea*), Schmitt & Slack (1990: 265), Heiman (1996: 55), Lendemer & Tripp (2008: 61)
Pannaria lurida (Mont.) Nyl. – Perlmutter (2006: 292), Lendemer & Tripp (2008: 61)
Pannaria lurida* ssp. *russellii (Tuck.) P.M. Jørg. – Jørgensen (2000b: 694)
Pannaria rubiginosa (Ach.) Bory – Fink (1935: 177), Perry & Moore (1969: 152), Dey (1978: 19), Becker (1980: 30), Heiman (1996: 55), McCune *et al.* (1997: 151), Jørgensen (2000b: 695), Perlmutter (2006: 292)
Pannaria subfusca P.M. Jørg. – Jørgensen (2000b: 695), Perlmutter (2006: 292), Lendemer & Tripp (2008: 61)
Pannaria tavarisii P.M. Jørg. – Heiman (1996: 55), McCune *et al.* (1997: 151), Jørgensen (2000b: 695), Perlmutter (2006: 292), Lendemer & Tripp (2008: 61)

Parmelia omphalodes (L.) Ach. – Perry & Moore (1969: 153), Dey (1978: 60), Heiman (1996: 55)

Parmelia saxatilis (L.) Ach. – Perry & Moore (1969: 154), Dey (1978: 61), Heiman (1996: 55), Perlmutter (2006: 289)
Parmelia squarrosa Hale – Dey (1978: 61), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61)
Parmelia sulcata Taylor – Perry & Moore (1969: 154), Dey (1978: 62), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151)

Parmeliella appalachensis P.M. Jørg. – Jørgensen (2000b: 696), Perlmutter (2006: 292), Lendemer (2007a: 74), Lendemer & Tripp (2008: 61)
Parmeliella corallinoides (Hoffm.) Zahlbr. – Perry & Moore (1969: 154), Dey (1978: 19), Becker (1980: 30)
Parmeliella pannosa (Sw.) Nyl. – Heiman (1996: 55), Jørgensen (2000b: 698)
Parmeliella triptophylla (Ach.) Müll. Arg. – McCune *et al.* (1997: 151), Heiman (1996: 55)

Parmelinopsis horrescens (Taylor) Elix & Hale – Perry & Moore (1969: 153 as *Parmelia horrescens*), Dey (1978: 64 as *Parmelia horrescens*), Schmitt & Slack (1990: 265 as *Parmelina horrescens*), Heiman (1996: 55 as *Parmelina horrescens*), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 119), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73)
Parmelinopsis minarum (Vain.) Elix & Hale – Culberson (1958: 26 as *Parmelia dissecta*), Perry & Moore (1969: 153 as *Parmelia dissecta*), Dey (1978: 63 as *Parmelia dissecta*), Schmitt & Slack (1990: 265 as *Parmelina minarum*), Heiman (1996: 55 as *Parmelina minarum*), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 128), Perlmutter (2006: 289), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87)
Parmelinopsis spumosa (Asah.) Elix & Hale – McCune *et al.* (1997: 151), Lendemer & Yahr (2004: 119)

Parmeliopsis ambigua (Wulfen) Nyl. – Culberson (1958:)
Parmeliopsis hyperopta (Ach.) Arnold – Culberson (1958:)
Parmeliopsis subambigua Gyeln. – Hale (1967: 422 as *Parmeliopsis halei*), Lendemer & Yahr (2004: 125), Perlmutter (2006: 289), Perlmutter & Lendemer (2008: 73)

Parmotrema arnoldii (Du Rietz) Hale – Dey (1978: 55 as *Parmelia arnoldii*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9)
Parmotrema austrosinense (Zahlbr.) Hale – Heiman (1996: 55)
Parmotrema cetratum (Ach.) Hale – Perry & Moore (1969: 152 as *Parmelia cetrata*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 152 as *Rimelia cetrata*), DePriest (2001: 10 as *Rimelia cetrata*), Lendemer & Yahr (2004: 120 as *Rimelia cetrata*), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61)
Parmotrema chinense (Osbeck) Hale & Ahti – Perry & Moore (1969: 153 as *Parmelia perlata*), Dey (1978: 57 as *Parmelia perlata*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Perlmutter (2006: 289)
Parmotrema crinitum (Ach.) M. Choisy – Perry & Moore (1969: 152 as *Parmelia crinita*), Dey (1978: 56 as *Parmelia crinita*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 119), Perlmutter (2006: 289)
Parmotrema diffractaicum (Essl.) Hale – McCune *et al.* (1997: 152 as *Rimelia diffractaica*), Perlmutter (2006: 289)
Parmotrema dilatatum (Vain.) Hale – McCune *et al.* (1997: 151), Perlmutter (2006: 289)

Parmotrema dominicanum (Vain.) Hale – USGS (2005:)
Parmotrema eurysacum (Hue) Hale – McCune *et al.* (1997: 151)
Parmotrema gardneri (C.W. Dodge) Sérus. – Schmitt & Slack (1990: 265 as *Parmotrema robustrum*), DePriest (2001: 9), Perlmutter & Lendemer (2008: 73)
Parmotrema haitiense (Hale) Hale – Lendemer & Yahr (2004: 122 as *Canomaculina haitiensis*), Perlmutter (2006: 289)
Parmotrema hypoleucinum (Steiner) Hale – Lendemer & Yahr (2004: 125), Perlmutter (2006: 289), Perlmutter (2007a: 118), Perlmutter & Lendemer (2008: 73), Perlmutter (2009: 70)
Parmotrema hypotropum (Nyl.) Hale – Perry & Moore (1969: 153 as *Parmelia hypotropa*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 125), Perlmutter (2006: 289), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Parmotrema madagascariaceum (Hue) Hale – Lendemer & Yahr (2004: 125), Perlmutter (2006: 289)
Parmotrema margaritatum (Hue) Hale - Perry & Moore (1969: 153 as *Parmelia margaritata*), Dey (1978: 56 as *Parmelia margaritata*), Heiman (1996: 55), McCune *et al.* (1997: 151), Perlmutter (2006: 289)
Parmotrema mellissii (C.W. Dodge) Hale – Dey (1978: 56 as *Parmelia mellissii*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 120), Perlmutter (2006: 289), Lendemer (2007a: 70), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73)
Parmotrema neotropicum Kurok. *ex* Hale – Heiman (1996: 55)
Parmotrema perforatum (Jacq.) A. Massal. – Culberson (1958: 26 as *Parmelia erecta*), Perry & Moore (1969: 153 as *Parmelia perforata*), Heiman (1996: 55), McCune *et al.* (1997: 151), DePriest (2001: 9), Lendemer & Yahr (2004: 119), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Parmotrema praesorediosum (Nyl.) Hale – McCune *et al.* (1997:), Lendemer & Yahr (2004: 128), Perlmutter (2007a: 118)
Parmotrema rampoddense (Nyl.) Hale – Lendemer & Yahr (2004: 119), Perlmutter (2006: 289)
Parmotrema reticulatum (Taylor) M. Choisy – Culberson (1958: 26 as *Parmelia reticulata*), Perry & Moore (1969: 153 as *Parmelia reticulata*), Dey (1978: 62 as *Parmelia reticulata*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 152 as *Rimelia reticulata*), DePriest (2001: 10 as *Rimelia reticulata*), Lendemer & Yahr (2004: 120 as *Rimelia reticulata*), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Parmotrema simulans (Hale) Hale – McCune *et al.* (1997: as *Rimelia simulans*), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61)
Parmotrema stuppeum (Taylor) Hale – Perry & Moore (1969: 154 as *Parmelia stuppea*), Dey (1978: 57 as *Parmelia stuppea*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 152)
Parmotrema subisidiosum (Müll. Arg.) Hale – Perry & Moore (1969: 154 as *Parmelia subisidiosa*), Dey (1978: 62 as *Parmelia subisidiosa*), Schmitt & Slack (1990: 265), Heiman (1996: 55), McCune *et al.* (1997: 152 as *Rimelia subisidiosa*), DePriest (2001: 10 as *Rimelia subisidiosa*), Lendemer & Yahr (2004: 123 as *Rimelia subisidiosa*), Perlmutter (2006: 289), Perlmutter (2007a: 118), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Parmotrema submarginale (Michx.) De Priest & B. Hale – Fink (1935: as *Parmelia submarginalis*), Perry & Moore (1969: 153 as *Parmelia michauxiana*), Heiman (1996: 55 as *Parmotrema michauxianum*), McCune *et al.* (1997: 151 as *Parmotrema michauxianum*), DePriest (2001:9), Lendemer & Yahr (2004: 119), Perlmutter (2006: 289), Perlmutter (2007: 27), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)

Parmotrema subrigidum Egan – McCune *et al.* (1997: 152 as *Parmotrema rigidum*), Lendemer & Yahr (2004: 122 as *Parmotrema rigidum*), Egan *et al*. (2005: 405), Perlmutter (2007: 27), Perlmutter (2007a: 118)
Parmotrema subsumptum (Nyl.) Hale – McCune *et al.* (1997: 152 as *Canomaculina subsumpta*), Perlmutter (2006: 289)
Parmotrema subtinctorium (Zahlbr.) Hale – Perry & Moore (1969: 154 as *Parmelia subcrinita*), Heiman (1996: 55), McCune *et al*. (1997: 152), DePriest (2001: 8 as *Canomaculina subtinctoria*), Lendemer & Yahr (2004: 124 as *Canomaculina subtinctoria*), Perlmutter (2006: 289), Lendemer & Tripp (2008: 61)
Parmotrema tinctorum (Delise *ex* Nyl.) Hale – Heiman (1996: 55), DePriest (2001: 9), Lendemer & Yahr (2004: 126), Perlmutter (2006: 289), Perlmutter (2007: 27), Perlmutter (2007a: 118)
Parmotrema ultralucens (Krog) Hale – Heiman (1996: 55), DePriest (2001: 9), Lendemer & Yahr (2004: 126), Perlmutter (2006: 289), Perlmutter (2008: 87)
Parmotrema xanthinum (Müll. Arg.) Hale – Perry & Moore (1969: 154 as *Parmelia xanthina*), McCune *et al.* (1997: 152), Lendemer & Yahr (2004: 126), Lendemer (2005: 49), Perlmutter (2006: 289)

****Patriciomyces valentinianus*** D.Hawksw. – Diederich (2003: 69)

Peccania kansana (Tuck.) Forss. – Keever *et al.* (1951:), Perlmutter (2006: 293)

Peltigera canina (L.) Willd. – Perry & Moore (1969: 154), Becker *et al.* (1977: 96), Dey (1978: 20), Becker (1980: 30), Heiman (1996: 55), Perlmutter (2006: 292)
Peltigera didactyla (With.) J.R. Laundon – Perlmutter & Lendemer (2008: 73)
Peltigera elisabethae Gyeln. - Dey (1978: as *Peltigera horizontalis*), Heiman (1996: 55 as *Peltigera horizontalis*), Perlmutter (2006: 292)
Peltigera hydrothyria Miadl. & Lutzoni – Fink (1935: 171 as *Hydrothyria venosa*), Perry & Moore (1959: 156 as *Hydrothyria venosa*), Heiman (1996: as *Hydrothyria venosa*), Perlmutter (2006: 292)
Peltigera leucophlebia (Nyl.) Gyelnik – Heiman (1996: 56)
Peltigera malacea (Ach.) Funck – Heiman (1996: 56)
Peltigera phyllidiosa Goffinet & Miadl. – Goffinet & Miadlikowska (1999: 255), Perlmutter (2006: 292), Perlmutter (2008: 88)
Peltigera polydactylon (Neck.) Hoffm. – Perry & Moore (1969: 154 as *Peltigera polydactyla*), Dey (1978: 20 as *Peltigera polydactyla*), Becker (1980: 30 as *Peltigera polydactyla*), Schmitt & Slack (1990: 265 as *Peltigera polydactyla*), Heiman (1996: 56 as *Peltigera polydactyla*), Perlmutter (2006: 292)
Peltigera praetextata (Flörke *ex* Sommerf.) Zopf – Perlmutter (2006: 292)
Peltigera rufescens (Weiss) Humb. – Oosting & Anderson (1937: 290), Perlmutter (2006: 292)

Peltula cylindrica Wetmore – Perlmutter (2006: 293)
Peltula zahlbruckneri (Hasse) Wetmore – Wetmore (1970:), Perlmutter (2006: 293)

Pertusaria amara (Ach.) Nyl. – Schmitt & Slack (1990: 265), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62)
Pertusaria andersonii Lendemer – Lendemer (2009b: 55). **HOLOTYPE in NY.**
Pertusaria appalachensis Lendemer, R.C. Harris & Elix – Lendemer, Harris & Elix (2008: 80)
Pertusaria commutata Müll. Arg. – Lendemer & Yahr (2004: 133 as *P. copiosa*), Perlmutter (2007a: 118)
Pertusaria epixantha R.C. Harris – Lendemer & Yahr (2004: 126), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 61), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)

Pertusaria geminipara (Th. Fr.) C. Knight *ex* Brodo – Howard (1970: 107 as *Ochrolechia geminipara*), Perlmutter (2006: 286)
Pertusaria globularis (Ach.) Tuck. – Dibben (1980:), Schmitt & Slack (1990: 265), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62)
Pertusaria hypothamnolica Dibben – Lendemer & Yahr (2004: 127), Perlmutter (2006: 286)
Pertusaria iners R.C. Harris – Lendemer & Yahr (2004: 135)
Pertusaria leioplaca DC. – DePriest (2001: 9 as *Pertusaria leucostoma*), Lendemer & Yahr (2004: 129 as *Pertusaria leucostoma*)
Pertusaria macounii (I.M. Lamb) Dibben – Schmitt & Slack (1990: 265), Perlmutter (2006: 286)
Pertusaria multipunctoides Dibben – Dibben (1980: 59), Schmitt & Slack (1990: 265), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87). **ISOTYPE** in Washington DC, USA (US).
Pertusaria neoscotica I.M. Lamb – Lendemer & Yahr (2004: 126), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62)
Pertusaria obruta R.C. Harris – Lendemer & Yahr (2004: 133)
Pertusaria opthalmiza (Nyl.) Nyl. – Lendemer & Tripp (2008: 62)
Pertusaria ostiolata Dibben – Dibben (1980: 99), Schmitt & Slack (1990: 265), Perlmutter (2009: 70). **ISOTYPE** in Washington DC, USA (US).
Pertusaria paratuberculifera Dibben – Schmitt & Slack (1990: 265), Lendemer & Yahr (2004: 122), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Pertusaria plittiana Erichsen – Perlmutter (2006: 286), Perlmutter & Lendemer (2008: 73)
Pertusaria propinqua Müll. Arg. – GBIF (2005:), Perlmutter (2006: 286)
Pertusaria pustulata (Ach.) Duby – DePriest (2001: 9), Perlmutter (2006: 286), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73)
Pertusaria rubefacta Erichsen – Schmitt & Slack (1990: 265), GBIF (2005:), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62)
Pertusaria sinusmexicani Dibben – Dibben (1980:), Perlmutter (2006: 286), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 62)
Pertusaria subpertusa Brodo – Schmitt & Slack (1990: 265), Lendemer & Yahr (2004: 122), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87), Perlmutter (2009: 70)
Pertusaria tetrathalamia (Fée) Nyl. – Dibben (1980:), Perlmutter (2006: 287)
Pertusaria texana Müll. Arg. – Lendemer & Yahr (2004: 129), Lendemer (2005: 48), Perlmutter (2006: 287), Lendemer & Tripp (2008: 62), Perlmutter (2008: 87), Perlmutter (2009: 71)
Pertusaria trachythallina Erichsen – Schmitt & Slack (1990: 265), Lendemer & Tripp (2008: 62)
Pertusaria velata (Turner) Nyl. – Schmitt & Slack (1990: 265), Perlmutter (2006: 28), Lendemer & Tripp (2008: 62), Perlmutter (2009: 71)
Pertusaria waghornei Hulting – Dibben (1980:), Schmitt & Slack (1990: 265)
Pertusaria xanthodes Müll. Arg. – Lendemer & Yahr (2004: 120), Perlmutter (2006: 287), Perlmutter (2007: 27), Perlmutter (2009: 71)

Phaeographis brasiliensis (A. Massal.) Kalb & Mattes-Leicht – Lendemer & Yahr (2004: 134 as *P. subtigrina*), Lendemer & Tripp (2008: 62 as *P. subtigrina*)
Phaeographis dendritica (Ach.) Müll. Arg. – DePriest (2001: 9), Lendemer & Yahr (2004: 119)

Phaeographis erumpens (Nyl.) Müll. Arg. – Fink (1935: 113), Culberson (1961: 266), Perlmutter (2008: 86)
Phaeographis illitoraticola ined. – Lendemer & Yahr (2004: 129), Perlmutter (2007a: 118)
Phaeographis inusta (Ach.) Müll. Arg. – Lendemer & Yahr (2004: 120), Perlmutter (2006: 286), Perlmutter (2007: 27), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 86), Perlmutter (2009: 71)
Phaeographis lobata (Eschw.) Müll. Arg. – Lendemer & Yahr (2004: 129), Perlmutter (2007a: 118)

Phaeophyscia adiastola (Essl.) Essl. – Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 291), Perlmutter (2008: 88), Perlmutter (2009: 71)
Phaeophyscia ciliata (Hoffm.) Moberg – Dey (1978: as *Physcia ciliata*), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 73)
Phaeophyscia erythrocardia (Tuck.) Essl. – Heiman (1996: 56), McCune *et al.* (1997: 152)
Phaeophyscia hirsuta (Mereschk.) Essl. – Perlmutter (2006: 291)
Phaeophyscia hispidula (Ach.) Essl. – Perry & Moore (1969: 155 as *Physcia setosa*), Heiman (1996: 56 as *Phaeophyscia imbricata*), Perlmutter (2006: 291)
Phaeophyscia insignis (Mereschk.) Moberg – Perlmutter (2006: 291)
Phaeophyscia orbicularis (Neck.) Moberg – Perry & Moore (1969: 155 as *Physcia orbicularis*), Dey (1978: 88), Heiman (1996: 56), DePriest (2001: 10), Perlmutter (2006: 291)
Phaeophyscia pusilloides (Zahlbr.) Essl. – Dey (1978: 89 as *Physcia pusilloides*), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62), Perlmutter (2008: 88)
Phaeophyscia rubropulchra (Degel.) Essl. – Schmitt & Slack (1990: 265), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Yahr (2004: 122), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 88)
Phaeophyscia squarrosa Kashiwadani – Perry & Moore (1969: 154 as *Physcia lacinulata*), (Moberg 1995:), Lendemer & Yahr (2004: 122), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62). **ISOTYPE** in Washington DC, USA (US) as *Physcia culbersonii*.

****Phaeopyxis punctum*** (A.Massal.) Rambold, Triebel & Coppins – Diederich (2003: 72)

Phaeosporobolus fellhanerae R.C. Harris & Lendemer – Harris & Lendemer (2009: 173). **HOLOTYPE in NY.**
Phaeosporobolus usneae D.Hawksw. & Hafellner – Diederich (2003: 73)

Phlyctis argena (Spreng.) Flot. – Schmitt & Slack (1990: 265)
Phlyctis ludoviciensis (Müll. Arg.) Lendemer – Schmitt & Slack (1990: 265 as *Phlyctidia ludoviciensis*), Lendemer & Yahr (2004: 133), Lendemer (2005: 49), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 86), Perlmutter (2009: 71)
Phlyctis petrea R.C. Harris – Perlmutter & Lendemer (2008: 73)

Phylliscum demangeonii (Moug. & Mont.) Nyl. – Yoshimura & Sharp (1968: 109)

Phyllopsora confusa Swinsc. & Krog – Lendemer & Yahr (2004: 130), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 87)

Phyllopsora corralina (Eschw.) Müll. Arg. – Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73)
Phyllopsora parvifolia (Pers.) Müll. Arg. – Lendemer & Yahr (2004: 122), Perlmutter (2006: 291), Perlmutter (2007a: 118)

Physcia adscendens (Fr.) H. Olivier – Heiman (1996: 56)
Physcia aipolia (Ehrh. *ex* Humb.) Fürnr. – Perry & Moore (1969: 154), Dey (1978: 88), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 291)
Physcia americana G. Merr. – Perry & Moore (1969: 155 as *Physcia tribacoides*), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Yahr (2004: 119), Perlmutter (2006: 291), Perlmutter (2007a: 118), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 88)
Physcia atrostriata Moberg – Dey (1978: 88 as *Physcia ciliata*), Perlmutter (2006: 291), Perlmutter (2009: 71)
Physcia halei J.W. Thomson – Lendemer & Tripp (2008: 62)
Physcia millegrana Degel. – Schmitt & Slack (1990: 265), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Yahr (2004: 130), Perlmutter (2006: 291), Perlmutter (2008: 88)
Physcia neogaea R.C. Harris – McCune *et al.* (1997: 152), DePriest (2001: 10)
Physcia phaea (Tuck.) J.W. Thomson – Dey (1978:), Heiman (1996: 56)
Physcia pseudospeciosa J.W. Thomson – Heiman (1996: 56)
Physcia pumilior R.C. Harris –Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 73), Perlmutter (2008: 88), Perlmutter (2009: 71)
Physcia sorediosa (Vain.) Lynge – Lendemer & Yahr (2004: 132), Perlmutter (2006: 291)
Physcia stellaris (L.) Nyl. – Perry & Moore (1969: 155), Dey (1978: 89), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Tripp (2008: 62), Perlmutter (2008: 88), Perlmutter (2009: 71)
Physcia subtilis Degel. – Perry & Moore (1969: 155), Dey (1978: 89), Heiman (1996: 56), DePriest (2001: 10), Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 73), Perlmutter (2009: 71)
Physcia tribacia (Ach.) Nyl. – Oosting & Anderson (1937: 286)
Physcia wainioi Räsänen – Perry & Moore (1969: 155)

Physciella chloantha (Ach.) Essl. – Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 73)

Physconia detersa (Nyl.) Poelt – Heiman (1996: 56)
Physconia leucoleiptes (Tuck.) Essl. – DePriest (2001: 10)

Piccolia conspersa (Fée) Hafellner – Lendemer & Yahr (2004: 120)

Placidium arboreum (Schwein. *ex* Michener) Lendemer – Perry & Moore (1969: 151 as *Dermatocarpon tuckermannii*), Perlmutter (2006: 286), Lendemer & Tripp (2008: 62)
Placidium lachneum (Ach.) Breuss – USGS (2005)
Placidium lacinulatum (Ach.) Breuss – Perlmutter (2006: 286)

Placynthiella dasea (Stirt.) Tønsberg – Perlmutter & Lendemer (2008: 73)
Placynthiella icmalea (Ach.) Coppins & P. James – Lendemer & Yahr (2004: 120), Perlmutter (2006: 286), Perlmutter & Lendemer (2008: 73)
Placynthiella uliginosa (Schrad.) Coppins & P. James – Lendemer & Yahr (2004: 126)

Platismatia glauca (L.) W.L. Culb. & C.F. Culb. – Perry & Moore (1969: 155), Dey (1978: 71)
Platismatia tuckermanii (Oakes) W.L. Culb. & C.F. Culb. – Culberson (1958: 26 as *Cetraria tuckermannii*), Perry & Moore (1969: 155), Dey (1978: 71), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 289), Lendemer & Tripp (2008: 62)

Polymeridium proponens (Nyl.) R.C. Harris – Tucker and Harris (1980: 9 as *Campylothelium ampylosporum*), Harris (1991:), Perlmutter (2006: 285), Perlmutter (2009: 71)

Polysporina simplex (Davies) Vězda – Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 73), Perlmutter (2009: 71)

Porina heterospora (Fink) R.C. Harris – Lendemer & Yahr (2004: 122), Perlmutter (2006: 287), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 86)
Porina scabrida R.C. Harris – Lendemer & Yahr (2004:), Lendemer & Yahr (2004: 134)

Porpidia albocaerulescens (Wulfen) Hertel & Knoph – DePriest (2001: 10), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 88), Perlmutter (2009: 71)
Porpidia cinereoatra (Ach.) Hertel & Knoph – NatureServe (2005)
Porpidia diversa (Lowe) Gowan – NatureServe (2005)
Porpidia herteliana Gowan – NatureServe (2005)
Porpidia macrocarpa (DC.) Hertel & A.J. Schwab – Fink (1935: 206 as *Lecidea platycarpa*), NatureServe (2005), Perlmutter (2006: 291)
Porpidia subsimplex (H. Magn.) Fryday – NatureServe (2005: as *Porpidia tahawasiana*), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62)
Porpidia tuberculosa (Sm.) Hertel & Knoph – NatureServe (2005:)

Pseudevernia cladonia (Tuck.) Hale & W.L. Culb. – Perry & Moore (1969: 155), Yoshimura & Sharp (1969: 113), Dey (1978: 44), Heiman (1996: 56), McCune *et al.* (1997: 152)
Pseudevernia consocians (Vain.) Hale & W.L. Culb. – Fink (1935: 340 as *Evernia ceratea*), Perry & Moore (1969: 155), Dey (1978: 44), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Tripp (2008: 62)

Pseudocyphellaria aurata (Ach.) Vain. – Perry & Moore (1969: 155), Schmitt & Slack (1990: 265), Heiman (1996: 56), DePriest (2001: 10), Lendemer & Yahr (2004: 132), Perlmutter (2006: 292), Lendemer & Tripp (2008: 62)
Pseudocyphellaria crocata (L.) Vain. – Perry & Moore (1969: 155), Dey (1978: 23), Becker (1980: 30), McCune *et al.* (1997: 152), Lendemer & Tripp (2008: 62)
Pseudocyphellaria perpetua McCune & Miadl. – Lendemer & Tripp (2008: 62)

Pseudoparmelia uleana (Müll. Arg.) Elix & T.H. Nash – Lendemer & Yahr (2004: 135)

Pseudosagedia cestrensis (E. Michener) R.C. Harris – Lendemer & Yahr (2004: 130 as *Trichothelium cestrense*), Perlmutter (2006: 287), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 86)
Pseudosagedia chlorotica (Ach.) Hafellner & Kalb – Fink (1935: 54 as *Porina chlorotica*), Lendemer & Tripp (2008: 62)
Pseudosagedia guentheri (Flot.) Hafellner & Kalb – Harris (1995: 170 as *Trichothelium guentheri*), Perlmutter & Lendemer (2008: 74), Perlmutter (2009: 71)
Pseudosagedia raphidosperma (Müll. Arg.) R.C. Harris – Lendemer & Yahr (2004: 130 as *Trichothelium raphidospermum*), Lendemer & Tripp (2008: 62)

Punctelia appalachensis (W.L. Culb.) Krog – Perry & Moore (1969: 152 as *Parmelia appalachensis*), Dey (1978: 59 as *Parmelia appalachensis*), Schmitt & Slack (1990: 266), Heiman (1996: 56), McCune *et al.* (1997: 152), Perlmutter (2006: 289), Lendemer & Tripp (2008: 62)
Punctelia bolliana (Müll. Arg.) Krog – Fink (1935: 326 as *Parmelia frondifera*), Hieman (1996: 56)
Punctelia borreri (Turner) Krog – Schmitt & Slack (1990: 266), Perlmutter (2006: 289)
Punctelia graminicola (B. de Lesd.) Egan – McCune *et al.* (1997: 152 as *Punctelia semansiana*)
Punctelia missouriensis G. Wilh. & Ladd – McCune *et al.* (1997: 152), Perlmutter (2006: 290)
Punctelia perreticulata (Räsänen) G. Wilh. & Ladd – Aptroot (2003: 318)
Punctelia reddenda (Stirt.) Krog – Dey (1978: 60 as *Parmelia reddenda*), Schmitt & Slack (1990: 266)
Punctelia rudecta (Ach.) Krog – Perry & Moore (1969: 153 as *Parmelia rudecta*), Dey (1978: 60 as *Parmelia rudecta*), Schmitt & Slack (1990: 266), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Yahr (2004: 120), Perlmutter (2006: 290), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 87), Perlmutter (2009: 71)
Punctelia subrudecta auct. Amer. – Perry & Moore (1969: 154 as *Parmelia subrudecta*), Dey (1978: 62 as *Parmelia subrudecta*), Schmitt & Slack (1990: 266), Heiman (1996: 56), McAlister (1997: 118), McCune *et al.* (1997: 152), Perlmutter (2006: 290), Perlmutter & Lendemer (2008: 74)

Pycnothelia papillaria Dufour – Robinson (1959: 255 as *Cladonia papillaria*), Perry & Moore (1969: 155), Dey (1978: 39), Heiman (1996: 56), Lendemer & Yahr (2004: 126), Perlmutter (2006: 288), Lendemer & Tripp (2008: 62)

Pyrenopsis polycocca (Nyl.) Tuck. – Culberson (1961: 266)
Pyrenopsis subfuliginea Nyl. – Degelius (1935:)

Pyrenula anomala (Ach.) Vain. – Lendemer & Yahr (2004: 132), Perlmutter (2007a: 118)
Pyrenula aspistea (Ach.) Ach. – Lendemer & Yahr (2004: 134)
Pyrenula caryae R.C. Harris – Harris (1995: 102), Harris & Ladd (2005: 41), Perlmutter (2008: 86)
Pyrenula citriformis R.C. Harris – Lendemer & Yahr (2004: 134), Perlmutter & Lendemer (2008: 74)
Pyrenula concatervans (Nyl.) R.C. Harris – Lendemer & Yahr (2004: 130)
Pyrenula cruenta (Mont.) Vain. – Lendemer & Yahr (2004: 123), Perlmutter (2007a: 118)
Pyrenula cuyabensis (Malme) R.C. Harris – Harris (1989:), Lendemer (2008a: 99)
Pyrenula laevigata (Pers.) Arnold – Schmitt & Slack (1990: 266)
Pyrenula leucostoma Ach. – Lendemer & Yahr (2004: 123), Perlmutter (2006: 285), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74)
Pyrenula lucifera R.C. Harris – Harris (1989:)
Pyrenula micheneri R.C. Harris – Harris & Ladd (2005: 208)

Pyrenula microcarpa Müll. Arg. – Lendemer & Yahr (2004: 133), Perlmutter (2007a: 118)
Pyrenula nitidula (Bresadola) R.C. Harris ined. – Perlmutter (2006: 285)
Pyrenula plittii R.C. Harris – Schmitt & Slack (1990: 266)
Pyrenula pseudobufonia (Rehm) R.C. Harris – Schmitt & Slack (1990: 266), DePriest (2001: 10), Lendemer & Yahr (2004: 120), Perlmutter (2006: 285), Lendemer & Tripp (2008: 62), Perlmutter (2008: 86)
Pyrenula punctella (Nyl.) Trevis. – Harris (1989:), Schmitt & Slack (1990: 266), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74)
Pyrenula pyrenuloides (Mont.) R.C. Harris – Perlmutter (2006: 285), Perlmutter (2008: 86)
Pyrenula ravenellii (Tuck.) R.C. Harris – Lendemer & Yahr (2004: 123)
Pyrenula santensis (Nyl.) Müll. Arg. – Lendemer & Yahr (2004: 123)
Pyrenula subelliptica (Tuck.) R.C. Harris – Harris (1973:), Schmitt & Slack (1990: 266), Perlmutter (2008: 86)

Pyrrhospora varians (Ach.) R.C. Harris – DePriest (2001: 10), Lendemer & Yahr (2004: 120), Perlmutter (2006: 288), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 87), Perlmutter (2009: 71). Note: Treated as *Lecidea* by Hertel

Pyxine albovirens (G. Meyer) Aptroot – Amtoft (2002:)
Pyxine caesiopruinosa (Nyl.) Imshaug – Heiman (1996: 56), McCune *et al.* (1997: 152)
Pyxine eschweileri (Tuck.) Vain. – DePriest (2001: 10)
Pyxine sorediata (Ach.) Mont. – Perry & Moore (1969: 155), Dey (1978: 89), Schmitt & Slack (1990: 266), Heiman (1996: 566), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 88)
Pyxine subcinerea Stirt. – DePriest (2001: 10), Amtoft (2002: 271), Lendemer & Yahr (2004: 130), Perlmutter (2006: 291), Perlmutter (2008: 88), Perlmutter (2009: 71)

Racodium rupestre Pers. – Fink (1935: 141), Perlmutter (2006: 293)

Ramalina americana Hale – Perry & Moore (1969: 155 as *Ramalina fastigiata*), Dey (1978: 81 as *Ramalina fastigiata*), Schmitt & Slack (1990: 266), Heiman (1996: 56), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter & Lendemer (2008: 74)
Ramalina complanata (Sw.) Ach. – Lendemer & Yahr (2004: 130)
Ramalina culbersoniorum La Greca – DePriest (2001: 10), Perlmutter (2006: 291), Lendemer & Tripp (2008: 62)
Ramalina intermedia (Del. *ex* Nyl.) Nyl. – Perry & Moore (1969: 155), Dey (1978: 81), Heiman (1996: 56), Perlmutter (2006: 291)
Ramalina montagnei De Not. – USGS (2005)
Ramalina paludosa B. Moore – Lendemer & Yahr (2004: 120)
Ramalina pollinaria (Westr.) Ach. – Perry & Moore (1969: 155)
Ramalina stenospora Müll. Arg. – Lendemer & Yahr (2004: 132), Perlmutter (2007: 27), Perlmutter (2007a: 118)
Ramalina willeyi R. Howe – Lendemer & Yahr (2004: 120), Perlmutter (2007: 27), Perlmutter (2007a: 118)

Ramboldia russula (Ach.) Kalb, Lumbsch & Elix –Lendemer & Yahr (2004: 120 as *Pyrrhospora russula*), Lendemer & Tripp (2008: 62 as *Pyrrhospora russula*)

Ramonia microspora Vězda – Lendemer & Yahr (2004: 120)

Rhizocarpon infernulum (Nyl.) Lynge – Fryday (2002:), Lendemer & Tripp (2008: 62)
Rhizocarpon reductum Th. Fr. – Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 74)
Rhizocarpon rubescens Th. Fr. – Degelius (1941:)
Rhizocarpon subgeminatum Eitner – Lendemer & Tripp (2008: 62)

Rinodina adirondackii H. Magn. – Lendemer & Tripp (2008: 62)
Rinodina chrysomelaena (Ach.) Tuck. – Fink (1935: 381), Lendemer & Sheard (2006: 564)
Rinodina destituta (Nyl.) Zalhbr. – Perlmutter (2009: 71)
Rinodina dolichospora Malme – Sheard & Mayehofer (2002: 105)
Rinodina efflorescens Malme – Lendemer & Tripp (2008: 62)
Rinodina granuligera H. Magn. – Perlmutter & Lendemer (2008: 74)
Rinodina maculans Müll. Arg. - Lendemer & Yahr (2004: 130), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 88)
Rinodina oxydata (A. Massal.) A. Massal. *s. lat.* – Perlmutter & Lendemer (2008: 74)
Rinodina subminuta H. Magn. – Schmitt & Slack (1990: 266)
Rinodina tephraspis (Tuck.) Herre – Mayrhofer et al. (1992: 455), Perlmutter (2006: 291), Perlmutter & Lendemer (2008: 74)
Rinodina willeyii Sheard & Giralt – Sheard (1995:), Lendemer & Tripp (2008: 62)

Ropalospora chlorantha (Tuck.) S. Ekman – Degelius (1941: as *Bacidia chlorantha*), Schmitt & Slack (1990: 266 as *Bacidia chlorantha*)

Santessoniella crossophylla (Nyl.) P.M. Jørg. – Jørgensen (2000b: 702), Lendemer & Anderson (2008: 75), Lendemer (2008a: 99)

Sarcographa tricosa (Ach.) Müll. Arg. – Lendemer & Yahr (2004: 120)

Sarcogyne similis H. Magn. – Perlmutter (2006: 286)

Schismatomma glaucescens (Nyl. *ex* Willey) R.C. Harris – Fink (1935: 86 as *Arthonia glaucescens*), Culberson (1961: 266 as *Arthonia glaucescens*) Lendemer & Yahr (2004: 130)

Scoliciosporum umbrinum (Ach.) Arnold – Fink (1935: 231 as *Bacidia umbrina*), USGS (2005)

Sphinctrina anglica Nyl. – USGS (2005)
Sphinctrina tubaeformis A. Massal. – Lendemer & Yahr (2004: 130)

Staurolemma carolinianum P.M. Jørg. – Jørgensen (2004:)

Staurothele diffractella (Nyl.) Tuck. – Keever *et al.* (1951:), Perlmutter (2006: 286)

Steinia geophana (Nyl.) Stein – Buck *et al.* (1999: 132), Perlmutter (2006: 288)

Stereocaulon dactylophyllum Flörke – Fink (1935: 270 as *S. coralloides*), Perry & Moore (1969: 155), Dey (1978: 25), Heiman (1996: 56)
Stereocaulon dactylophyllum* var. *occidentale (H. Magn.) I.M. Lamb – NatureServe (2005)
Stereocaulon paschale (L.) Hoffm. – Heiman (1996: 56)
Stereocaulon pileatum Ach. – Perry & Moore (1969: 155), Dey (1978: 25), Heiman (1996: 56)
Stereocaulon saxatile H. Magn. – Heiman (1996: 56)
Stereocaulon tennesseense H. Magn. *ex* Degel. – Dey (1978: 26)

Sticta beauvoisii Delise – DePriest (2001: 10), McDonald *et al.* (2003: 72), Perlmutter (2006: 292), Lendemer & Tripp (2008: 62)
Sticta carolinensis T. McDonald – McDonald *et al.* (2003: 74), Lendemer & Yahr (2004: 123), Lendemer & Tripp (2008: 62)
Sticta fragilanata T. McDonald – McDonald *et al.* (2003: 75)
Sticta fuliginosa (Hoffm.) Ach. – Fink (1935: 182), Perry & Moore (1969: 156), Dey (1978: 23), Becker (1980: 30 as *Sticta weigelii*), Schmitt & Slack (1990: 266), Heiman (1996: 56), DePriest (2001: 10), McDonald et al. (2003: 77), Perlmutter (2006: 292)
Sticta limbata (Sm.) Ach. – Dey (1978: 24)
Sticta sylvatica (Huds.) Ach. – Fink (1935: 182)

Strangospora pinicola (A. Massal.) Körb. – Lendemer & Tripp (2008: 62)

Strigula americana R.C. Harris – Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 86)

Teloschistes flavicans (Sw.) Norman – NatureServe (2005:), Perlmutter (2007a: 119)

Tephromela atra (Huds.) Hafellner – Perlmutter (2006: 291)

Thelenella muscorum (Fries) Vain. – Harris (1995: 153 as *Chromatochlamys muscorum*)
Thelenella rappii R.C. Harris – Lendemer & Yahr (2004: 136)

Thelidium zwackhii (Hepp) A. Massal. – Lendemer & Yahr (2004: 123)

Thelomma carolinianum (Tuck.) Tibell – Fink (1935: as *Cyphelium carolinianum*)

Thelopsis inordinata Nyl. – Perlmutter (2008: 86)

Thelotrema adjectum Nyl. – Lendemer & Yahr (2004: 134)
Thelotrema defectum Hale – Lendemer & Yahr (2004: 130)
Thelotrema lathraeum Tuck. – Lendemer & Yahr (2004: 132)
Thelotrema lepadinum (Ach.) Ach. – Culberson (1961: 266)
Thelotrema monospermum R.C. Harris – USGS (2005:), Lendemer (2007b: 100)
Thelotrema subtile Tuck. – Lendemer & Yahr (2004: 123), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 87)

Topelia aperiens P.M. Jørg. & Vězda – Lendemer & Yahr (2004: 130)

Trapelia coarctica (Turner *ex* Sm.) M. Choisy – Lendemer (2008a: 99)
Trapelia glebulosa (Sm.) J.R. Laundon – Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2009: 71)
Trapelia placodioides Coppins & P. James – Lendemer & Tripp (2008: 62), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 86)

Trapeliopsis flexuosa (Fr.) Coppins & P. James – Lendemer & Yahr (2004: 126)
Trapeliopsis gelatinosa (Flörke) Coppins & P. James – Perlmutter & Lendemer (2008: 74), Lendemer (2008a: 99)
Trapeliopsis granulosa (Hoffm.) Lumbsch – Lendemer & Yahr (2004: 126), Perlmutter (2006: 286)
Trapeliopsis viridescens (Schrad.) Coppins & P. James – Sullivan (1996:), Lendemer & Tripp (2008: 62)

****Tremella cladoniae*** Diederich & M.S.Christ. – Diederich (2003:82)
****Tremella parmeliarum*** Diederich – Diederich (2003: 85)

Trypethelium elutariae Spreng. – Perlmutter (2006: 286)
Trypethelium tropicum (Ach.) Müll. Arg. – Lendemer & Yahr (2004: 123)
Trypethelium virens Tuck. *ex* Michener – Fink (1935: 62 as *T. exocanthum* and *T. scorites*), Lendemer & Yahr (2004: 121), Perlmutter (2006: 286), Perlmutter (2007: 27), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 63), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 86), Perlmutter (2009: 71)

Tuckermanella fendleri (Nyl.) Essl. – Culberson (1958: 26 as *Cetraria fendleri*), Perry & Moore (1969: 149 as *Cetraria fendleri*), McCune *et al.* (1997: 150 as *Cetraria fendleri*), Perlmutter (2006: 290), Perlmutter & Lendemer (2008: 74)

Tuckermanopsis americana (Spreng.) Hale – Perry & Moore (1969: 149 as *Cetraria halei*), Dey (1978: 45 as *Cetraria halei*), Heiman (1996: 56), McCune *et al.* (1997: 150 as *Cetraria americana*), Perlmutter (2006: 290)
Tuckermanopsis ciliaris (Ach.) Gyeln. – Culberson (1958: 26 as *Cetraria ciliaris*), Perry & Moore (1969: 149 as *Cetraria ciliaris*), Dey (1978: 45 as *Cetraria ciliaris*), Heiman (1996: 57), McCune *et al.* (1997: 150 as *Cetraria ciliaris*), DePriest (2001: 10), Perlmutter (2006: 290), Lendemer & Tripp (2008: 63)
Tuckermanopsis orbata (Nyl.) M.J. Lai – Perry & Moore (1969: 149 as *Cetraria orbata*), Dey (1978: 47 as *Cetraria orbata*), Heiman (1996: 57), McCune *et al.* (1997: 150 as *Cetraria orbata*), Perlmutter (2006: 290)

Umbilicaria caroliniana Tuck. – Fink (1935: 276), Perry & Moore (1969: 156), Dey (1978: 41), Heiman (1996: 57)
Umbilicaria mammulata (Ach.) Tuck. – Oosting & Anderson (1937: 286 as *Umbilicaria dillenii*), Perry & Moore (1969: 156), Dey (1978: 41), Heiman (1996: 56). Perlmutter (2006: 293), Lendemer & Tripp (2008: 63)
Umbilicaria muhlenbergii (Ach.) Tuck. – Perry & Moore (1969: 148 as *Actinogyra muhlenbergii*), Dey (1978: 41), Heiman (1996: 56), Perlmutter (2006: 293)
Umbilicaria phaea Tuck. – Fink (1935: 273 as *Gyrophora phaea*)
Umbilicaria polyphylla (L.) Baumg. – Fink (1935: 274 as *Gyrophora polyphylla*), Heiman (1996: 57)
Umbilicaria vellea (L.) Hoffm. – Heiman (1996: 57)
Umbilicaria virginis Schaer. – Feige & Lumbsch (2003: 13)

Usnea amblyoclada (Müll. Arg.) Zahlbr. – Clerc & Herrera-Campos (1997: 287), Perlmutter (2006: 290)
Usnea angulata Ach. – Perry & Moore (1969: 156), Harris & Ladd (2005: 236)
Usnea baileyi (Stirt.) Zahlbr. – Lendemer & Yahr (2004: 126)
Usnea cavernosa Tuck. – Degelius (1941:)
Usnea ceratina Ach. – Dey (1978: 76), Schmitt & Slack (1990: 266), McCune *et al.* (1997: 152), Lendemer & Yahr (2004: 123)
Usnea cornuta Körb. – Dey (1978: 76 as *Usnea confusa*), Clerc & Herrera-Campos (1997: 295), McCune *et al.* (1997: 152)
Usnea dasaea Stirt. – Clerc & Herrera-Campos (1997: 298), McCune *et al.* (1997: 152)
Usnea diplotypus Vain. – Dey (1978: 77)
Usnea endochrysea Stirt. – Perlmutter & Lendemer (2008: 74)
Usnea entoviolata Motyka – Clerc (2004:), Lendemer & Tripp (2008: 63)
Usnea evansii Motyka – Lendemer & Yahr (2004: 120)
Usnea fragilescens Hav. *ex* Lynge **var. *mollis*** (Vain.) Clerc – Dey (1978: 78 as Usnea mollis)
Usnea fulvoreagens (Räsänen) Räsänen – Dey (1978: 78)
Usnea halei P. Clerc – Clerc & Herrera-Campos (1997: 292)
Usnea merrillii Motyka – Perry & Moore (1969: 156)
Usnea mutabilis Stirt. – Hieman (1996: 57), McCune *et al.* (1997: 152), Lendemer & Yahr (2004: 120), Perlmutter (2006: 290), Perlmutter (2007a: 118), Perlmutter & Lendemer (2008: 74)
Usnea occidentalis Motyka – Perry & Moore (1969: 156), McCune *et al.* (1997: 152)
Usnea pachyclada Motyka – Perry & Moore (1969: 156)
Usnea pensylvanica Motyka – Lendemer & Yahr (2004: 123), Perlmutter (2006: 290), Lendemer & Tripp (2008: 63), Perlmutter (2008: 87)
Usnea praetervisa (Asah.) P. Clerc – Clerc (2004:)
Usnea rubicunda Stirt. – Perry & Moore (1969: 156), Schmitt & Slack (1990: 266), Heiman (1996: 57), Clerc & Herrera-Campos (1997: 300), McCune *et al.* (1997: 152), DePriest (2001: 10)
Usnea silesiaca Motyka – Clerc (1991:)
Usnea strigosa (Ach.) A. Eaton – Perry & Moore (1969: 156), Dey (1978: 79), Heiman (1996: 57), McCune *et al.* (1997: 152), DePriest (2001: 10), Lendemer & Yahr (2004: 120), Lendemer (2005: 50), Perlmutter (2006: 290), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 63), Perlmutter & Lendemer (2008: 74), Perlmutter (2008: 87), Perlmutter (2009: 71). **NORSTICTIC ACID CHEMOTYPE** in New York, NY, USA (NY).
Usnea strigosa **subsp. *rubiginea*** (Michx.) I. Tav. – USGS (2005: 9)
Usnea subfloridana Stirt. – Dey (1978: 79), Schmitt & Slack (1990: 266), McCune *et al.* (1997: 152), DePriest (2001: 10), Perlmutter (2006: 290)
Usnea subfusca Sirt. – Dey (1978: 80)
Usnea subgracilis Vain. – Dey (1978: 78 as *Usnea hesperina*), Schmitt & Slack (1990: 266 as *Usnea hesperina*), Clerc & Herrera-Campos (1997: 299 as *Usnea hesperina*), McCune *et al.* (1997: 152 as *Usnea hesperina*), Perlmutter (2006: 290), Lendemer & Tripp (2008: 63)
Usnea subscabrosa Motyka – Perry & Moore (1969: 156), Clerc & Herrera-Campos (1997: 300), McCune et al. (1997: 152), Lendemer & Yahr (2004: 127), Perlmutter (2006: 290), Perlmutter (2007a: 118), Lendemer & Tripp (2008: 63)
Usnea trichodea Ach. – Perry & Moore (1969: 156), Dey (1978: 80), Lendemer & Yahr (2004: 127), Perlmutter (2006: 290)

Vahliella leucophaea (Vahl) P.M. Jørg. – McCune *et al.* (1997: 151 as *Pannaria leucophaea*)

Vainionora americana Kalb, Tønsberg & Elix – Kalb (2004: 326), Lendemer & Tripp (2008: 63)

Verrucaria calciseda DC. – Lendemer & Yahr (2004: 127)
Verrucaria nigrescens Pers. – Oosting & Anderson (1939: 753)

Vezdaea leprosa (P. James) Vězda – Buck *et al.* (1999: 132), Perlmutter (2006: 293)

****Vouauxiomyces truncatus*** (de Lesd.) Dyko & D. Hawksw. – Lendemer (2008a: 100)

Vulpicida canadensis (Räsänen) J.-E. Mattsson & M. J. Lai – Perlmutter (2006: 290)
Vulpicida pinastri (Scop.) J.-E. Mattsson & M.J. Lai – Hieman (1996: 57 as *Tuckermanopsis pinastri*), Perlmutter (2006: 290)
Vulpicida viridis (Schwein.) J.-E. Mattsson & M.J. Lai – Perry & Moore (1969: 149 as *Cetraria viridis*), Heiman (1996: 57 as *Tuckermannopsis viridis*), McCune *et al.* (1997: 150 as *Cetraria viridis*), Perlmutter (2006: 290)

Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr. – Perlmutter (2006: 292)
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Lichen Inventory of the North Carolina Piedmont

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ABSTRACT

Based on surveys of the literature and herbaria, including internet-available herbarium databases ("virtual herbaria"), plus recent collections, the lichen flora of the Piedmont of North Carolina, USA, consists of 338 taxa representing 110 genera in 41 families including three taxa of uncertain position. Broken down by habit, the flora is 32% crustose, 47% foliose, and 21% fruticose. This report presents the first lichen checklist for the North Carolina Piedmont. Twenty-two taxa are reported as new for the state, including the genera *Gyalecta, Lichinia* and *Sarcogyne*.

INTRODUCTION

Lichens are symbiotic organisms comprised of a fungus (the mycobiont) and an alga and/or cyanobacterium (the photobiont). These composite organisms are abundant in the environment, growing on trees, rocks and soil, yet they are relatively little studied as compared to plants. In fact, many lichen taxa have incomplete distributions in North America, if not globally, due to insufficient collecting (NatureServe 2005). However, some endemic taxa do have sufficient distribution data to be considered endangered, such as the Rock Gnome Lichen (*Cetradonia linearis*) of the high elevation mountains of the southern Appalachians.

Lacking a protective cuticle as found in plants, lichens can be sensitive to air pollution. This sensitivity lends their diversities useful in assessing air quality and environmental health with richer floras being consistently found in cleaner, less disturbed, older environments (Selva 1994, Gries 1996). This trend has even been demonstrated in the southeastern United States fairly recently (McCune et al. 1997). The depauperate lichen flora in some parts of southern California and the drastic reduction in the ranges of many lichens have been linked to poor air quality and habitat loss (Herre 1936, Hale and Cole 1988). Little is known about the status of lichens in North Carolina as bioindicators. Lichen data from North Carolina were not included in the United States Forest Service's Forest Health Monitoring Program (Conkling et al. 2005)—presumably due to the lack of available survey data.

While lichen biotas have been inventoried in North Carolina, (e.g. Culberson 1958, Perry and Moore 1969, Dey 1978, DePriest 2001, Lendemer and Yahr 2004, Perlmutter 2005), no studies have focused solely on the Piedmont, which is currently undergoing rapid growth and development. The objective of this report is to establish a much needed baseline checklist of the lichens of the North Carolina Piedmont.

Study Region

The Piedmont physiographic province occupies more than a third of North Carolina, as a broad belt running northeast to southwest between the Atlantic Coastal Plain and the

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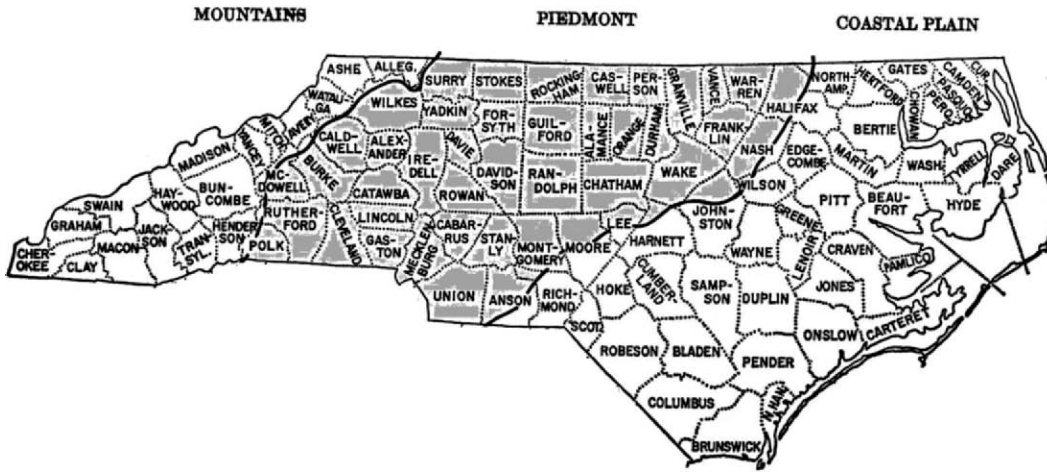

Figure 1. County map of North Carolina showing the Piedmont physiographic province (shaded area). Map reproduced and modified from Radford et al. (1968) with permission from the University of North Carolina Press.

Appalachian Mountains (Figure 1). The topography is characterized by rolling hills, which reflect an ancient mountainous geology of Precambrian and Paleozoic (400–600 million years before present) crystalline bedrock, much of it granite (Godfrey 1997). The region has a four-season climate with hot, humid summers and mildly cold winters. Rainfall is even throughout the year without a pronounced wet or dry season, supporting a rich plant flora. The vegetation is in the Eastern Deciduous Forest biome, with nearly all of it in some stage of seral succession, and varying along topographic and moisture gradients (i.e. from hydric bottomlands to xeric uplands). Mature forests are usually characterized by a canopy of oak (*Quercus* spp.) and hickory (*Carya* spp.) trees, with younger stands exhibiting a mix of hardwoods and successional pines (*Pinus* spp.).

METHODS

The herbaria of the University of North Carolina – Chapel Hill (NCU) and Duke University (DUKE) were visited to examine lichen collections for specimens collected in the study region [North Carolina State University Herbarium (NCSC) lacks lichens in its collection]. Taxa in each collection were tallied and specimen label information (collector's name and number, date, and county) was recorded for at least one representative specimen. At least one representative specimen of each taxon was examined to confirm its identity; annotations were made as appropriate.

Online herbarium databases were checked for North Carolina Piedmont specimen records. These "virtual herbaria" include: ASU (http://nhc.asu.edu/lichens/), F (Field Museum 2005), HAL (http://www.uni-essen.de/botanik/herbbot.htm), LD (http://www.biomus.lu.se/indexBdate.html), MICH (http://herbarium.lsa.umich.edu/), MSC (Johnson et al. 2005), NBM (http://142.166.43.115/Botany2.htm), NY (http://sciweb.nybg.org/science2/hcol/lena/lenafamilychecklist.asp), OSC (http://oregonstate.edu/dept/botany/herbarium/), S (http://www2.nrm.se/S/welcome.html.en), SBBG (http://seinet.asu.edu/collections/selection.jsp) TSB (http://www.univ.ts.it/~biologia/leggi.html), UBC (http://herbarium.botany.ubc.ca/index.html), UPS (http://www-hotel.uu.se/evolmuseum/fytotek/Fytoeng/index.htm) and US (http://ravenel.si.edu/botany/types/). Both MICH and US had only type specimens databased and web-accessible. Additional specimen records were provided by Richard C. Harris of NY.

Table 1. North Carolina Piedmont lichen (lichenized Ascomycota) systematic summary, following Eriksson (2006). *Includes squamulose and dimorphic habits

Family	Number of genera	Number of species		
		Crustose	Foliose	Fruticose*
Class ARTHONIOMYCETES				
ARTHONIACEAE	2	4		
CHRYSOTRICHACEAE	1	1		
ROCCELLACEAE	1	1		
Class EUROTIOMYCETES				
PYRENULACEAE	1	4		
TRYPETHELIACEAE	2	3		
VERRUCARIACEAE	3	1	5	
Class LECANOROMYCETES				
ACAROSPORACEAE	1	1		
AGYRIACEAE	2	2		
COENOGONIACEAE	1			1
GYALECTACEAE	1	1		
GOMPHILLACEAE	1			1
GRAPHIDACEAE	4	5		
THELOTREMATACEAE	2	4		
ICMADOPHILACEAE	1			1
PERTUSARIACEAE	2	24		
PORINACEAE	2	2		
ANZIACEAE	1		1	
CALICIACEAE	1			1
CLADONIACEAE	2			50
LECANORACEAE	5	17	2	
LECIDEACEAE	3	2	1	
LOXOSPORACEAE	1	2		
PARMELIACEAE	23		68	9
PHYSCIACEAE	14	11	35	
PORPIDIACEAE	1	3		
RAMALINACEAE	4	3		3
RHIZOCARPACEAE	1	1		
STEREOCAULACEAE	1	3		
COCCOCARPACEAE	1		2	
COLLEMATACEAE	2		15	
PANNARIACEAE	3		7	
LOBARIACEAE	3		6	
NEPHROMATACEAE	1		1	
PELTIGERACEAE	1		7	
TELOSCHISTIACEAE	3	9	3	
BRIGANTIAEACEAE	1	1		
FUSCIDEACEAE	1	1		
UMBILICARIACEAE	2		4	
VEZDEACEAE	1	1		
Class LICHINOMYCETES				
LICHINACEAE	3			3
PELTULACEAE	1			2
Taxa of uncertain position	3		1	2
Total	**110**	**107**	**158**	**73**

Numerous journal articles and books were reviewed for reports of North Carolina Piedmont lichens to cross reference taxa encountered in the above herbarium surveys. A partial listing of the literature reviewed is given in Perlmutter (2005), Perlmutter and Greene (2005).

Sporadic collections were made in the Piedmont of Orange and Wake counties, North Carolina, from 2004 to 2006. These included two local bioblitzes, team-collected events to determine the biodiversities of Battle Park in Chapel Hill (Orange County) and Rock Cliff Farm of Falls Lake State Recreational Area (Wake County), as well as opportunistic collecting in North Raleigh and Cedar Fork of the Little River (both in Wake County). All vouchers were deposited at NCU with selected duplicates at DUKE, FH, NY, PH and the private herbarium of B. de Vries (hb-dV) in Saskatchewan, Canada.

RESULTS AND DISCUSSION

A total of 338 lichen taxa representing 110 genera and 41 families were tallied among available herbaria collections and the literature including three taxa of uncertain taxonomic placement (Appendix 1). Families with the most taxa included Parmeliaceae (78), Cladoniaceae (51) and Physciaceae (46). By far *Cladonia* was the largest genus with 49 taxa, followed by *Parmotrema* with 22 taxa and *Pertusaria* with 19. Broken down by habit, these comprise 32% crustose, 47% foliose, 21% fruticose species (Table 1).

Twenty-two lichen taxa were previously unreported for North Carolina and 117 taxa were previously unreported for the North Carolina Piedmont (Appendix 1). These include three genera new for the state: *Gyalecta, Lichinia*, and *Sarcogyne*. *Gyalecta* represents the Gyalectaceae, a family previously unreported for North Carolina. All taxa presented in this report are known from North America (Esslinger 1997 [updated 10 April 2006]). Perlmutter (2005), Perlmutter and Greene (2005) presented an amended checklist of over 700 taxa of North Carolina lichens. During the course of this study, it was discovered that one taxon, *Polymeridium proponens* (Nyl.) R.C. Harris, was overlooked in the previous North Carolina checklists. *Polymeridium proponens* was reported for Wake County, North Carolina by Harris (1991).

APPENDIX 1

Lichen checklist for the North Carolina Piedmont. Nomenclature follows Esslinger (1997 [updated 10 April 2006]) unless otherwise indicated; organization follows classification of Eriksson (2006). *New record for North Carolina, **new record for the North Carolina Piedmont, †Listed in Esslinger (1997 [updated 10 April 2006]), but not in Eriksson (2006).

CLASS ARTHONIOMYCETES
ARTHONIACEAE

Arthonia quintaria* Nyl. – **Wake County: *G.B. Perlmutter 73*, 19 February 2005 (DUKE!, NCU!, hb-dv!)

***Arthonia rubella* (Fée) Nyl. – **Wake County:** *G.B. Perlmutter 140*, 4 June 2005 (NCU!)

***Arthothelium spectabile* A. Massal. – **Durham County:** *E.S. Luttrell 1081*, 7 October 1938 (DUKE!)

***Arthothelium taediosum* auct. Amer. – **Johnston County:** *G.B. Perlmutter 75*, 25 March 2005 (DUKE!, NCU!, NY!)

CHRYSOTRICHACEAE

***Chrysothrix candelaris* (L.) J. R. Laundon – **Orange County:** *W.L. Culberson 10842*, 1962 (DUKE!) **Stokes County:** *P.O. Schallert s.n.*, 1 August 1934 (NCU!)

ROCCELLACEAE

Opegrapha varia Pers. – Brodo et al. (2001)

CLASS EUROTIOMYCETES
PYRENULACEAE

Pyrenula leucostoma Ach. – **Nash County:** *G.T. Johnson s.n.*, 21 October 1966 (ASU)

Pyrenula nitidula* (Bresadola) R.C. Harris ined. – **Gaston County: *H.A. Greene s.n.*, 2 August 1886 (F)

Pyrenula psuedobufonia (Rehm) R.C. Harris – **Forsyth County:** *W.L. Culberson 6321*, 31 July 1957 (DUKE!)

***Pyrenula pyrenuloides* (Mont.) R.C. Harris – **Polk County:** *H.A. Green s.n.*, 25 February 1899 (DUKE!)

TRYPETHELIACEAE

Polymeridium proponens (Nyl.) R.C. Harris – **Wake County:** *G.B. Perlmutter 145*, 4 June 2005 (NY!)

Trypethelium elutariae* Sprengel – **Orange County: *J.N. Couch 14840*, 20 April 1955 (NCU!)

Trypethelium virens Tuck. ex Michener – **Franklin County:** *G.T. Johnson 5389*, 21 August 1966 (ASU); **Wake County:** *G.B. Perlmutter 223*, 25 December 2005 (NCU!)

VERRUCARIACEAE

Dermatocarpon intestiniforme* (Körb.) Hasse – **Forsyth County: *P.O. Schallert s.n.*, 17 March 1940 (NY); **Stokes County:** *P.O. Schallert s.n.*, no date avail. (NCU!)

Dermatocarpon luridum (With.) J. R. Laundon – **Forsyth County:** *P.O. Schallert s.n.*, 23 October 1932 (NY); **Wake County:** *W.C. Coker s.n.*, 9 April 1932 (NCU!); *W.L. Culberson 6778*, October 1955 (UPS); *T.H. Nash III 1687*, 1967 (ASU)

***Dermatocarpon miniatum* (L.) W. Mann – **Polk County:** *T.H. Nash III 3008*, no date (ASU); **Stokes County:** *P.O. Schallert s.n.*, 23 October 1933 (NCU!)

Placidium arboreum (Schwein. ex Michener) Lendemer – **Forsyth County:** *P.O. Schallert s.n.*, 27 April 1936 (NCU!)

Placidium lacinulatum (Ach.) Breuss – Brodo et al. (2001)

Staurothele diffractella (Nyl.) Tuck. – **Alexander County:** *C. Keever 421*, 21 June 1941 (DUKE!)

CLASS LECANOROMYCETES
ACAROSPORACEAE

Sarcogyne similis* H. Magn. – **Wilkes County: *W.R. Buck 24037*, 23 September 1993 (NY)

AGYRIACEAE

***Placynthiella icmalea* (Ach.) Coppins & P. James – **Orange County:** *B. Goffinet 5164*, 12 July 1998 (DUKE!)

***Trapeliopsis granulosa* (Hoffm.) Lumbsch – **Stokes County:** *T.L. Esslinger 3642*, 18 September 1971 (DUKE!)

COENOGONIACEAE

***Coenogonium pineti* (Ach.) Lücking & Lumbsch (=*Dimerella pineti*) – **Durham County:** *I.M. Brodo 31393*, 25 October 2003 (DUKE!)

GYALECTACEAE

Gyalecta geoica* (Wahlenb. ex Ach.) Ach. – **Durham County: *W.B. Schofield & H. Robinson 11279a*, 5 May 1960 (DUKE!)

GOMPHILLACEAE

Gomphillus americanus Essl. – **Wake County:** *T.L. Esslinger 3184a*, 28 March 1974 (Holotype, US); **Wilkes County:** *W.R. Buck 24017*, 23 September 1993 (NY)

GRAPHIDACEAE

Dyplolabia afzelii (Ach.) A. Massal. – Brodo et al. (2001)

Graphis scripta (L.) Ach. – **Orange County:** *G.B. Perlmutter 109*, 4 June 2005 (NCU!)

Graphis lineola Ach. – **Iridell County:** *W.L. Culberson 7204*, August 1958 (DUKE!)

Glyphis cicatricosa Ach. – Brodo et al. (2001)

Phaeographis inusta (Ach.) Müll. Arg. – **Durham County:** *W.L. & C.F. Culberson 21106*, 20 October 1990 (DUKE!)

THELOTREMATACEAE

***Diploschistes actinostomus* (Ach.) Zahlbr. – **Anson County:** *P.O. Schallert & A.W. Herre 139*, 2 August 1936 (NCU!)

Diploschistes muscorum (Scop.) R. Sant. subsp. *muscorum* – **Polk County:** *W.L. Culberson 5823*, August 1958 (DUKE!)

Diploschistes scruposus (Schreb.) Norman – Brodo et al. (2001)

Myriotrema subcompunctum* (Nyl.) Hale – **Polk County: *H.A. Green s.n.*, December 1895 (DUKE!)

ICMADOPHILACEAE

Dibaeis baeomyces (L. f.) Rambold & Hertel – **Durham County:** *A. Henssen 17161-b*, 4 April 1964 (ASU); **Stokes County:** *R.C. Harris 30688*, 22 September 1993 (NY)

PERTUSARIACEAE

Ochrolechia africana Vainio – **Orange County:** *G.B. Perlmutter 106*, 30 April 2005 (NCU!)

Ochrolechia pseudopallescens Brodo – **Stokes County:** *R.C. Harris 30730*, 22 September 1993 (NY)

***Ochrolechia tartarea* (L.) A. Massal. – **McDowell County:** *W.L. Culberson 4861*, June 1956 (DUKE!)

***Ochrolechia trochophora* (Vainio) Oshio var. *trochophora* – **Orange County:** *E.A. Tripp & S. Joneson 49*, 23 September 2003 (DUKE!)

Ochrolechia yasudae Vainio – **Forsyth County:** *P.O. Schallert s.n.*, 4 July 1936 (NCU!); **Stokes County:** *R.C. Harris 30702*, 22 September 1993 (NY)

Pertusaria amara (Ach.) Nyl. – **Wake County:** *G.B. Perlmutter 130*, 4 June 2005 (NCU!)

Pertusaria geminipara (Th. Fr.) C. Knight ex Brodo – Howard (1970)

Pertusaria globularis (Ach.) Tuck. – Dibben (1980)

Pertusaria hypothamnolica Dibben – Dibben (1980)

Pertusaria macounii (Lamb) Dibben – **Randolph County:** *M.J. Dibben 20675*, 10 June 1969 (DUKE!)

***Pertusaria multipunctoides* Dibben – **Stokes County:** *R.C. Harris 30723*, 22 September 1993 (NY)

***Pertusaria neoscotica* Lamb – **Davidson County:** *M.J. Dibben 20674*, 10 June 1969 (DUKE!)

***Pertusaria ostiolata* Dibben - **Guilford County:** *M.J. Dibben 20653*, 10 June 1969 (Isotype, US)

Pertusaria paratuberculifera Dibben – **Wake County:** *G.B. Perlmutter 117*, 4 June 2005 (NCU!); **Wilkes County:** *R.C. Harris 30800*, 23 September 1993 (NY)

***Pertusaria plittiana* Erichsen – **Davidson County:** *W.L. Culberson 6404*, 2 August 1957 (DUKE!)

***Pertusaria propinqua* Müll. Arg. – **Wilkes County:** *R.C. Harris 30804*, 23 September 1993 (NY)

***Pertusaria pustulata* (Ach.) Duby – **Forsyth County:** *P.O. Schallert s.n.*, 10 October 1936 (NCU!)

***Pertusaria rubefacta* Erichsen – **Mecklenburg County:** *W.L. Culberson 5247*, July 1956 (DUKE!)

***Pertusaria sinusmexicani* Dibben – **Orange County:** *G.B. Perlmutter 114*, 30 April 2005 (NCU!)

Pertusaria subpertusa Brodo – **Randolph County:** *M.J. Dibben 20665*, 10 June 1969 (DUKE!)

****Pertusaria tetrathalamia** (Fée) Nyl. – **Gaston County:** *W.L. Culberson 5270*, August 1956 (DUKE!)

Pertusaria texana Müll. Arg. – **Chatham County:** *M.J. Dibben 20668*, 10 June 1969 (DUKE!)

Pertusaria velata (Turner) Nyl. – **Orange County:** *W.C. Coker s.n.*, no date available (UV-, NCU!); **Stokes County:** *R.C. Harris 30690*, 22 September 1993 (NY)

Pertusaria xanthodes Müll. Arg. – **Wake County:** *G.B. Perlmutter 142*, 4 June 2005 (NCU!)

PORINACEAE

Porina heterospora (Fink) R. C. Harris – Brodo et al. (2001)

****Pseudosagedia cestrensis** (Michener) R. C. Harris – **Wake County:** *G.B. Perlmutter 244*, 16 October 2005 (NCU!, PH!)

ANZIACEAE

Anzia colpodes (Ach.) Stizenb. – **Stokes County:** *W.L. Culberson 6472*, 28 January 1958 (DUKE!)

CALICIACEAE

****Calicium abietinum** Pers. – **Wilkes County:** *R.C. Harris 30766*, 23 September 1993 (NY)

CLADONIACEAE

Cladonia apodocarpa Robbins – **Chatham County:** *W.L. Culberson 7938*, May 1959 (MSC); **Orange County:** *W.L. Culberson 17402*, 10 September 1978 (ASU); *W.L. Culberson & C.F. Culberson s.n.*, 10 September 1978 (TSB, UPS); *F.W. Gray s.n.*, 25 June 1935 (NCU!); **Wilkes County:** *R.C. Harris 30802*, 23 September 1993 (NY)

Cladonia arbuscula (Wallr.) Flotow – **Union County:** *F.W. Gray 5109*, 9 September 1936 (NCU!)

***Cladonia atlantica** A. Evans – **Harnett County:** *S. LaGreca et al. 353*, 12 September 1992 (DUKE!)

Cladonia beaumontii (Tuck.) Vainio - **Union County:** *F.W. Gray s.n.*, 9 September 1936 (NCU!), **Wake County:** *A. Johnson 20708*, 1 July 1988 (SBBG); *Culbersons s.n.*, 1 July 1988 (TSB)

***Cladonia botrytes** (K. Hagen) Willd. – **Durham County:** *R. Yahr 1202*, 29 August 1998 (DUKE!)

Cladonia caespiticia (Pers.) Flörke – **Forsyth County:** *L.v.Schweinitz s.n.*, no date available (UPS); **Rockingham County:** *A.W. Evans 646*, 12 March 1938 (NCU!)

Cladonia caroliniana Tuck. – **Forsyth County:** *P.O. Schallert s.n.*, 1 January 1923 (ASU); *P.O. Schallert s.n.*, 1 October 1932 (Topotype NCU!); *P.O. Schallert s.n.*, no date available (OSC); *P.O. Schallert 25*, 1923 (UBC); *L.v.Schweinitz s.n.*, no date available (Isolectotype UPS)

****Cladonia verticillata** (Hoffm.) Schaer. – **Orange County:** *A.W. Evans 518*, 30 November 1937 (NCU!)

Cladonia chlorophaea (Flörke ex Sommerf.) Sprengel – **Orange County:** *A.W. Evans 441*, 25 September 1937 (NCU!), **Wake County:** *T.H. Nash III 1661*, 10 April 1967 (ASU)

Cladonia ciliata var. *tenuis* (Flörke) Ahti – **Forsyth County:** *A.W. Evans 614*, 10 March 1938 (NCU!)

Cladonia coniocraea (Flörke) Sprengel – **Orange County:** *A.W. Evans 404*, 30 September 1937 (NCU!)

Cladonia cristatella Tuck. – **Orange County:** *W.L. Culberson 17401*, 10 September 1978 (ASU); *W.L. Culberson & C.F. Culberson s.n.*, 10 September 1978 (UPS); *A.W. Evans 410*, 27 September 1937 (NCU!)

****Cladonia cryptochlrophaea** Asah. – **Orange County:** *S.A. LaGreca & W.L. Culberson 188*, 13 August 1992 (DUKE!)

****Cladonia cylindrica** (A. Evans) A. Evans – **Orange County:** *A.W. Evans 402*, 30 September 1937 (DUKE!)

Cladonia didyma (Fée) Vainio – **Forsyth County:** *L. v. Schweinitz s.n.*, date unavailable (lectotype, UPS); **Orange County:** *A.W. Evans 407*, 30 June 1937 (NCU!)

****Cladonia didyma** var. *vulcanica* (Zoll. & Moritzi) Vainio – **Orange County:** *G.B. Perlmutter 110*, 30 April 2005 (NCU!)

****Cladonia digitata** (L.) Hoffm. – **Wake County:** *R. Yahr 1630*, 12 December 1998 (DUKE!)

Cladonia dimorphoclada Robbins – **Stokes County:** *R.C. Harris 30697*, 22 September 1993 (NY)

Cladonia evansii Abbayes – **Wake County:** *G.B. Perlmutter 135*, 4 June 2005 (NCU!)

Cladonia fimbriata (L.) Fr. – **Randolph County:** *A.W. Evans & L.E. Anderson 1321*, 24 August 1939 (DUKE!)

Cladonia floridana Vainio – **Durham County:** *A.W. Evans 679*, 12 March 1938 (NCU!)

Cladonia furcata (Hudson) Schrader – **Union County:** *F.W. Gray s.n.*, 9 September 1936 (NCU!); **Wilkes County:** *R.C. Harris 30787*, 23 September 1993 (NY)

****Cladonia gracilis** (L.) Willd. subsp. *gracilis* – **Wake County:** *R. Yahr 1623*, 12 December 1998 (DUKE!)

Cladonia grayi G. Merr. ex Sandst. – **Mecklenberg County:** *F.W. Gray s.n.*, June 1928 (Isolectotype, US; Isotype, MICH, NCU!); **Stokes County:** *R.C. Harris 30687*, 22 September 1993 (NY)

Cladonia incrassata Flörke – **Moore County:** *B. Lazar s.n.*, July 1979 (DUKE!)

Cladonia leporina Fr. – **Forsyth County:** *L.v.Schweinitz s.n.*, date unavailable (lectotype, UPS); *A.W. Evans 616*, 10 March 1938 (NCU!)

Cladonia macilenta Hoffm. – Brodo et al. (2001)

Cladonia macilenta var. *bacillaris* (Genth) Schaerer – **Orange County:** *A.W. Evans 514*, 30 November 1937 (NCU!); **Wilkes County:** *R.C. Harris 30776*, 23 September 1993 (NY)

Cladonia mateocyatha Robbins – **Alexander County:** *W.L. Culberson 14343*, 1 November 1969 (ASU); **Durham County:** *W.L. Culberson & C.F. Culbserson s.n.*, 24 February 1980 (TSB, UPS); **Union County:** *F.W. Gray 5103*, 9 September 1936 (NCU!)

****Cladonia ochrochlora** Flörke – **Stokes County:** *R.C. Harris 30712*, 22 September 1993 (NY)

Cladonia parasitica (Hoffm.) Hoffm. – **Stokes County:** *R.C. Harris 30731*, 22 September 1993 (NY); **Wake County:** *G.B. Perlmutter 124*, 4 June 2005 (NCU!)

Cladonia peziziformis (With.) J. R. Laundon – **Forsyth County:** *A.W. Evans 611*, 10 March 1938 (NCU!)

Cladonia piedmontensis G. Merr. – **Chatham County:** *W.L. Culberson 12684*, 24 March 1968 (MSC); **Rockingham County:** *F.W. Gray 5108*, 8 September 1936 (NCU!), **Wake County:** *T.H. Nash III 1660*, 10 April 1967 (ASU)

Cladonia pleurota (Flörke) Schaerer – **Orange County:** *A.W. Evans 537*, 4 December 1937 (NCU!)

****Cladonia polycarpoides** Nyl. – **Durham County:** *W.L. Culberson s.n.*, 8 May 1969 (UPS); **Johnston**

County: *Culbersons s.n.*, 9 March 1983 (TSB); **Wake County:** *G.B. Perlmutter 129*, 4 June 2005 (NCU!)

Cladonia psoromica J. P. Dey – Dey (1973)

Cladonia pyxidata (L.) Hoffm. – **Forsyth County:** *P.O. Schallert s.n.*, 20 March 1924 (NCU!)

***Cladonia ramulosa* (With.) J. R. Laundon – **Durham County:** *C.W. Schnieder 273*, 15 September 1971 (DUKE!)

Cladonia rangiferina (L.) F. H. Wigg. – **Burke County:** *W.L. Culberson 13129*, 25 August 2968 (MSC); **Randolph County:** *F.W. Gray s.n.*, 6 September 1936 (NCU!); **Stokes County:** *R.C. Harris 30686*, 22 September 1993 (NY)

Cladonia ravenelii Tuck. – **Durham County:** *Culbersons s.n.*, 26 December 1994 (TSB)

Cladonia robbinsii A. Evans – **Alamance County:** *W.L. Culberson 19157*, 30 December 1982 (ASU); *Culbersons s.n.*, 30 December 1982 (TSB); **Wake County:** *W.C. Coker & H.R. Totten s.n.*, 19 April 1932 (NCU!)

***Cladonia sobolescens* Nyl. ex Vainio – **Wake County:** *G.B. Perlmutter 165*, 6 September 2005 (NCU!)

Cladonia squamosa Hoffm. – **Polk County:** *T.H. Nash III 40244*, 1 January 1997 (ASU); **Stokes County:** *R.C. Harris 30715*, 22 September 1993 (NY)

Cladonia strepsilis (Ach.) Grognot – **Durham County:** *A.W. Evans 438*, 25 September 1937 (NCU!); *W.L. Culberson 12275*, 1 July 1966 (UPS); *V. Peters 72*, 1 July 1966 (MSC); **Mecklenberg County:** *F.W. Gray s.n.*, 1 January 1925 (ASU); *G.K. Merrill s.n.*, 1925 (UBC); **Wilkes County:** *R.C. Harris 30786*, 23 September 1993 (NY)

Cladonia subcariosa Nyl. – **Orange County:** *A.W. Evans 588*, 1 March 1938 (NCU!), **Wake County:** *T.H. Nash III 1663*, 10 April 1967 (ASU)

Cladonia submitis A. Evans – **Wake County:** *W.L. & C.F. Culberson 20705*, 1 July 1988 (DUKE!)

***Cladonia subradiata* (Vainio) Sandst. – **Orange County:** *A.W. Evans 402*, 30 September 1937 (NCU!)

Cladonia subtenuis (Abbayes) Mattick – **Durham County:** *W.L. Culberson s.n.*, 25 September 1960 (UPS); **Forsyth County:** *P.O. Schallert s.n.*, no date available (OSC); **Polk County:** *T.H. Nash III 40242*, 1 January 1997 (ASU); **Stokes County:** *R.C. Harris 30685*, 22 September 1993 (NY)

Cladonia uncialis (L.) F. H. Wigg. – **Rowan County:** *P.O. Schallert s.n.*, 2 August 1936 (NCU!)

Pycnothelia papillaria Dufour – **Orange County:** *A.W. Evans 415*, 27 September 1937 (NCU!); **Stokes County:** *R.C. Harris 30713*, 22 September 1993 (NY); **Wake County:** *T.H. Nash III 1666*, 10 April 1967 (ASU)

LECANORACEAE

Candelaria concolor (Dicks.) Stein – **Person County:** *W.L. Culberson 6387*, 30 July 1957 (DUKE!); **Wake County:** *G.B. Perlmutter 228*, 29 December 2005 (NCU!)

Candelaria fibrosa (Fr.) Müll. Arg. – **Granville County:** *W.L. Culberson 6516*, 21 July 1958 (DUKE!)

Candelariella efflorescens R.C. Harris & Buck – **Orange County:** *G.B. Perlmutter 100*, 30 April 2005 (NCU!); **Wilkes County:** *R.C. Harris 30790*, 23 September 1993 (NY)

Lecanora allophana Nyl. – Brodo et al. (2001)

Lecanora caesiorubella Ach. – **Durham County:** *T.H. Nash III 1755*, 10 April 1967 (ASU)

Lecanora cenisia Ach. – Brodo et al. (2001)

***Lecanora chlarotera* Nyl. – **Durham County:** *W.L. Culberson 11677*, February 1965 (DUKE!)

***Lecanora cinereofusca* H. Magn – **Wake County:** *G.B. Perlmutter 53*, 5 December 2005 (NCU!)

Lecanora hybocarpa (Tuck.) Brodo – **Davidson County:** *W.L. Culberson 7044*, August 1958 (DUKE!)

***Lecanora imshaugii* Brodo – **Iredell County:** *W.L. Culberson 7200*, August 1958 (DUKE!)

***Lecanora miculata* Ach. – **Mecklenburg County:** *W.L. Culberson 5224*, July 1956 (DUKE!)

Lecanora minutella Nyl. – **Davie County:** *W.L. Culberson 6046*, 2 August 1957 (DUKE!)

Lecanora oreinoides (Körber) Hertel & Rambold – **Chatham County:** *W.L. Culberson 10417*, 5 March 1961 (DUKE!)

***Lecanora pulicaris* (Pers.) Ach. – **Stokes County:** *R.C. Harris 30732*, 22 September 1993 (NY)

Lecanora strobilina (Sprengel) Kieffer – **Stokes County:** *R.C. Harris 30728*, 22 September 1993 (NY); **Wake County:** *G.B. Perlmutter 59*, 3 January 2005 (NCU!)

***Lecanora subpallens* Zahlbr. – **Wake County:** *J. Bauer s.n.*, 1852 (UPS)

Lecanora varia (Hoffm.) Ach. – **Chatham County:** *W.L. Culberson 10411*, 1 January 1961 (DUKE!)

Lecidella enteroleucella* (Nyl.) Hertel – **Orange County: *G.B. Perlmutter 87*, 23 April 2005 (NCU!, PH!)

***Pyrrhospora varians* (Ach.) R. C. Harris – **Stokes County:** *R.C. Harris 30700*, 22 September 1993 (NY)

LECIDEACEAE

***Hypocenomyce anthracophila* (Nyl.) P. James & Gotth. Schneider – **Stokes County:** *W.L. Culberson 14337*, March 1970 (DUKE!)

Lecidea nylanderi (Anzi) Th. Fr. – Culberson (1958)

Steinia geophana (Nyl.) Stein – Buck et al. (1999)

LOXOSPORACEAE

Loxospora elatina (Ach.) A. Massal. – Culberson (1963) as *Haematomma elatinum*

Loxospora pustulata (Brodo & Culb.) R.C. Harris – **Orange County:** *P. Clerc s.n.*, 2 May 1989 (ASU); *Culbersons s.n.*, 22 November 1984 (TSB); **Stokes County:** *R.C. Harris 30682*, 22 September 1993 (NY); **Wake County:** *G.B. Perlmutter 162*, 6 September 2005 (NCU!); **Wilkes County:** *R.C. Harris 30761*, 23 September 1993 (LD)

PARMELIACEAE

Ahtiana aurescens (Tuck.) Thell & Randlane – **Stokes County:** *W.L. Culberson 11543*, 10 October 1964 (DUKE!)

Allocetraria oakesiana (Tuck.) Randlane & Thell – **Stokes County:** *R.C. Harris 30720*, 22 September 1993 (NY)

***Bulbothrix goebelii* (Zenker) Hale – **Lee County:** *W.L. Culberson 7701*, September 1958 (DUKE!)

Bulbothrix isidiza (Nyl.) Hale – **Wake County:** *T.L. Esslinger 3126*, 20 March 1970 (DUKE!)

Canoparmelia caroliniana (Nyl.) Elix & Hale – **Polk County:** *T.H. Nash III 40247*, 1 January 1997 (SBBG); *T.H. Nash III s.n.*, 1 January 1997 (UPS); **Stokes County:** *R.C. Harris 30710*, 22 September 1993 (NY); **Wake County:** *G.B. Perlmutter 34*, 21 November 2004 (NCU!)

****Canoparmelia crozalsiana** (B. de Lesd. ex Harm.) Elix & Hale – **Wake County:** *G.B. Perlmutter 175*, 3 October 2005 (NCU!)

Canoparmelia texana (Tuck.) Elix & Hale – **Wake County:** *G.B. Perlmutter 143*, 4 June 2005 (NCU)

****Cetrelia chicitae** (Culb.) Culb. & C. Culb. – **Stokes County:** *S. Kupferberg s.n.*, 3 October 1982 (DUKE!)

Flavoparmelia baltimorensis (Gyelnik & Fóriss) Hale – **Davidson County:** *P.O. Schallert s.n.*, 10 January 1935 (NCU!); **Polk County:** *T.H. Nash III 1773*, 22 April 1967 (ASU); **Stokes County:** *W.L. Culberson & J. Poelt s.n.*, March 1970 (UPS); *R.C. Harris 30693*, 22 September 1993 (NY)

Flavoparmelia caperata (L.) Hale – **Wake County:** *T.H. Nash III 1623*, 10 April 1967 (ASU); *G.B. Perlmutter 32*, 21 November 2004 (NCU!)

****Hypogymnia krogiae** Ohlsson – **Davidson County:** *W.L. Culberson 7080*, August 1958 (DUKE!)

****Hypotrachyna croceopustulata** (Kurok.) Hale – **Wake County:** *G.B. Perlmutter 122*, 4 June 2005 (NCU!)

Hypotrachyna livida (Taylor) Hale – **Wake County:** *T.H. Nash III 1760*, 13 May 1967 (ASU); *G.B. Perlmutter 116*, 4 June 2005 (NCU!)

Hypotrachyna osseoalba (Vainio) Park & Hale – **Surrey County:** *W.L. Culberson 6169*, 31 July 1957 (DUKE!); **Wake County:** *T.H. Nash III 1761*, 13 May 1967 (ASU)

****Hypotrachyna pustulifera** (Hale) Skorepa – **Stokes County:** *E. van Volkenburgh 63*, 18 Sep 1972 (DUKE!)

****Hypotrachyna showmanii** Hale – **Stokes County:** *W.L. Culberson 12348*, 11 Mar 1967 (DUKE!)

Imshaugia aleurites (Ach.) S. F. Meyer – **Granville County:** *W.L. Culberson s.n.*, 1 March 1955 (ASU); *W.L. Culberson L 1369*, 1 March 1955 (SBBG); *Culberson s.n.*, March 1955 (TSB); **Stokes County:** *R.C. Harris 30684*, 22 September 1993 (NY)

Imshaugia placorodia (Ach.) S. F. Meyer – **Durham County:** *W.L. Culberson 12273*, 1 July 1966 (DUKE!)

Melanelia culbersonii (Hale) Thell – **Stokes County:** *W.L. Culberson 14319*, March 1970 (DUKE!)

Menegazzia terebrata s. lat. – Culberson (1958)

Myelochroa aurulenta (Tuck.) Elix & Hale – **Chatham County:** *W.L. Culberson s.n.*, 1962 (TSB); **Randolph County:** *W.L. Culberson s.n.*, August 1959 (UPS); **Wake County:** *T.H. Nash 1748*, 13 May 1967 (ASU); **Wilkes County:** *R.C. Harris 30758*, 23 September 1993 (NY)

Myelochroa galbina (Ach.) Elix & Hale – **Polk County:** *T.H. Nash III 19816*, 27 December 1982 (ASU)

****Myelochroa obsessa** (Ach.) Elix & Hale – **Davidson County:** *W.L. Culberson 6491*, 2 August 1957 (DUKE!)

****Parmelia saxatilis** (L.) Ach. – **Mecklenberg County:** *W.L. Culberson 5242*, July 1956 (DUKE!)

****Parmelia squarrosa** Hale – **Wilkes County:** *R.C. Harris 30757*, 23 September 1993 (NY)

Parmelinopsis horrescens (Taylor) Elix & Hale – **Wilkes County:** *R.C. Harris 30768*, 23 September 1993 (NY)

Parmelinopsis minarum (Vainio) Elix & Hale – **Stokes County:** *J.A. Snider 1267*, 7 Mar 1970 (DUKE!)

****Parmeliopsis subambigua** Gyelnik – **Granville County:** *W.L. Culberson s.n.*, 1 March 1955 (ASU); *W.L. Culberson s.n.*, March 1954 (UPS)

Parmotrema cetratum (Ach.) Hale – **Wilkes County:** *R.C. Harris 30771*, 23 September 1993 (NY)

Parmotrema chinense (Osbeck) Hale & Ahti – **Surrey County:** *W.L. Culberson 7143*, 28 January 1958 (DUKE!)

Parmotrema crinitum (Ach.) M. Choisy – **Durham County:** *W.L. Culberson 12326*, 25 September 1966 (DUKE!)

****Parmotrema diffractaicum** (Essl.) Hale – **Stokes County:** *T.L. Esslinger 2645*, 3 October 1970 (DUKE!)

****Parmotrema dilatatum** (Vainio) Hale – **Chatham County:** *T.H. Nash III 1652*, 10 April 1967 (ASU); **Orange County:** *G.B. Perlmutter et al. 91*, 23 April 2005 (NCU!)

****Parmotrema haitiense** (Hale) Hale – **Orange County:** *W.L. Culberson 6496*, 2 June 1958 (DUKE!)

****Parmotrema hypoleucinum** (Steiner) Hale – **Warren County:** *W.L. Culberson 6857*, July 1958 (DUKE!)

Parmotrema hypotropum (Nyl.) Hale – **Orange County:** *G.B. Perlmutter 104*, 30 April 2005 (NCU!); **Polk County:** *T.H. Nash III 19815*, 27 December 1982 (ASU); **Stokes County:** *R.C. Harris 30721*, 22 September 1993 (NY)

****Parmotrema madagascariaceum** (Hue) Hale – **Stokes County:** *R.C. Harris 30716*, 22 September 1993 (NY); **Wake County:** *T.H. Nash III 1759*, 13 May 1967 (ASU)

****Parmotrema margaritatum** (Hue) Hale – **Alexander County:** *W.L. Culberson 13315*, 27 March 1969 (DUKE!)

****Parmotrema mellissii** (C.W. Dodge) Hale – **Durham County:** *T.H. Nash III 1674*, 10 April 1967 (ASU)

Parmotrema perforatum (Jacq.) A. Massal. – **Chatham County:** *T.H. Nash* 1654, 10 April 1967 (ASU)

Parmotrema rampoddense (Nyl.) Hale – **Wake County:** *G.B. Perlmutter 28*, 20 November 2005 (NCU!)

Parmotrema reticulatum (Taylor) M. Choisy – **Forsyth County:** *P.O. Schallert s.n.*, 10 October 1937 (NCU!); **Polk County:** *T.H. Nash III 7260*, 27 June 1973 (ASU); **Stokes County:** *R.C. Harris 30701*, 22 September 1993 (NY)

****Parmotrema simulans** (Hale) Hale – **Stokes County:** *K. Gabard 90*, 25 September 1966 (DUKE!)

Parmotrema subisidiosum (Müll. Arg.) Hale – **Chatham County:** *W.L. Culberson 10433*, 5 March 1961 (MSC); **Wilkes County:** *R.C. Harris 30760*, 23 September 1993 (NY)

Parmotrema submarginale (Michx.) DePriest & B. Hale – **Durham County:** *T.H. Nash III 1653*, 10 April 1967 (ASU); **Wake County:** *G.B. Perlmutter 115*, 12 May 2005 (NCU!)

****Parmotrema subsumptum** (Nyl.) Elix – **Stokes County:** *R.C. Harris 30706*, 22 September 1993 (NY)

Parmotrema subtinctorium (Zahlbr.) Hale – **Wake County:** *W.L. Culberson 11686*, February 1965 (DUKE!)

Parmotrema tinctorum (Delise ex Nyl.) Hale – **Orange County:** *P.W. Rundel 2225*, 11 February 1967 (DUKE!)

Parmotrema ultralucens (Krog) Hale – **Chatham County:** *W.L. Culberson s.n.*, January 1965 (TSB, UPS)

Parmotrema xanthinum (Müll. Arg.) Hale – Brodo et al. (2001)

Platismatia tuckermanii (Oakes) Culb. & C. Culb. – **Wilkes County:** *R.C. Harris 30770*, 23 September 1993 (NY)

Punctelia appalachensis (Culb.) Krog – **Stokes County:** *W.L. Culberson 14318*, March 1970 (DUKE!)

***Punctelia borreri** (Sm.) Krog – **Durham County:** *W.L. Culberson 12325*, 25 September 1966 (DUKE!)

****Punctelia missouriensis** G. Wilh. & Ladd – **Wilkes County:** *R.C. Harris 30777*, 23 September 1993 (NY)

Punctelia rudecta (Ach.) Krog – **Chatham County:** *W.L. Culberson & C.F. Culberson 12167*, 9 January 1966 (UPS); *T.H. Nash* 1669, 10 April 1967 (ASU); **Forsyth County:** *P.O. Schallert s.n.*, 10 April 1936 (NCU!)

Punctelia subrudecta (Nyl.) Krog – **Stokes County:** *W.L. Culberson 11520*, 10 October 1964 (DUKE!); *R.C. Harris 30699*, 22 September 1993 (NY)

Tuckermanella fendleri (Nyl.) Essl. – **Durham County:** *A. Henssen 17150a*, 4 April 1964 (LD); *T.H. Nash III 1596*, 6 March 1967 (ASU); *W.L. Culberson 7898*, May 1959 (MSC)

****Tuckermannopsis americana** (Sprengel) Hale – **Forsyth County:** *P.O. Schallert s.n.*, 9 March 1938 (NCU!)

Tuckermannopsis ciliaris (Ach.) Gyelnik – **Polk County:** *T.H. Nash III 19810*, 27 December 1982 (ASU); **Wilkes County:** *R.C. Harris 30767*, 23 September 1993 (NY)

Tuckermannopsis orbata (Nyl.) M. J. Lai – **Catawba County:** *FHM crew s.n.*, 1993 (DUKE!)

Usnea amblyoclada Clerc & Herrera-Campos – Clerc & Herrera-Campos (1997)

Usnea mutabilis Stirton – **Wake County:** *G.B. Perlmutter 160*, 5 September 2005 (NCU!)

****Usnea pensylvanica** Mot. (Syn.: *U. rubicunda*) – **Chatham County:** *W.L. Culberson 10397*, 1 January 1961 (UPS); **Forsyth County:** *P.O. Schallert s.n.*, 5 December 1937 (NCU!); **Stanly County:** *W.L. Culberson 5063*, July 1956 (MSC); **Stokes County:** *R.C. Harris 30724*, 22 September 1993 (NY); **Wake County:** *T.H. Nash III 1746*, 13 May 1967 (ASU)

Usnea strigosa (Ach.) Eaton subsp. *strigosa* **– Chatham County:** *T.H. Nash III 1668*, 10 April 1967 (ASU); **Wake County:** *G.B. Perlmutter 126*, 4 June 2005 (NCU!)

****Usnea subfloridana** Stirton – **Durham County:** *T.H. Nash III 1651*, 10 April 1967 (ASU)

Usnea subgracilis Vainio – **Forsyth County:** *W.L. Culberson 6320*, 31 July 1957 (DUKE!)

Usnea subscabrosa Nyl. ex Mot. – **Forsyth County:** *P.O. Schallert s.n.*, 1 November 1941 (F)

Usnea trichodea Ach. – **Wake County:** *P. Clerc s.n.*, 14 October 1988 (ASU)

***Vulpicida canadensis** (Räsänen) J.-E. Mattsson & M. J. Lai – **Burke County:** *W.L. Culberson 7016*, August 1958 (MSC)

***Vulpicida pinastri** (Scop.) J.-E. Mattsson & M. J. Lai – **Wake County:** *W.C. Coker & H.R. Totten s.n.*, 9 April 1932 (NCU!)

Vulpicida viridis (Schwein.) J.-E. Mattsson & M. J. Lai – **Burke County:** *W.L. Culberson 7016*, August 1958 (LD, UPS); **Polk County:** *T.H. Nash III 19811*, 27 December 1982 (ASU)

Xanthoparmelia conspersa (Ehrh. ex Ach.) Hale – **Stokes County:** *R.C. Harris 30704*, 22 September 1993 (NY); **Wake County:** *W.L. Culberson s.n.*, 20 July 1968 (UPS); *T.H. Nash III 1751*, 13 May 1967 (ASU)

***Xanthoparmelia hypomelaena** (Hale) Hale – **Durham County:** *H.L. Blomquist s.n.*, 3 March 1933 (DUKE!)

Xanthoparmelia piedmontensis (Hale) Hale – **Orange County:** *G.B. Perlmutter et al. 94*, 23 April 2005 (NCU!)

Xanthoparmelia plittii (Gyelnik) Hale – Brodo et al. (2001)

****Xanthoparmelia subramigera** (Gyelnik) Hale – **Chatham County:** *W.L. Culberson 10425*, 5 March 1961 (DUKE!)

Xanthoparmelia tasmanica (Hook. f. & Taylor) Hale – **Forsyth County:** *P.O. Schallert s.n.*, 13 May 1934 (NCU!)

PHYSCIACEAE

Amandinea punctata (Hoffm.) Coppins & Scheid. – **Wake County:** *G.B. Perlmutter 55*, 5 December 2004 (NCU!)

Anaptychia palmulata (Michx.) Vainio – **Rowan County:** *W.L. Culberson 6370*, 2 August 1957 (DUKE!)

Baculifera curtisii (Tuck.) Marbach (Syn.: *Buellia curtisii*) **– Wake County:** *G.B. Perlmutter 250*, 4 June 2005 (NCU!)

***Buellia maculata** Bungartz – **Wake County:** *G.B. Perlmutter 134*, 4 June 2005 (NCU!)

****Buellia mamillana** (Tuck.) W. A. Weber – **Orange County:** *T.L. Esslinger 2688b*, 11 October 1970 (DUKE!)

Buellia spuria (Schaerer) Anzi – **Anson County:** *P.O. Schallert & A.W. Herre 209*, 2 Aug 1936 (NCU!); **Stokes County:** *R.C. Harris 30718*, 22 September 1993 (NY)

Buellia stillingiana J. Steiner – **Durham County:** *W.L. Culberson & C.F. Culberson s.n.*, 19 September 1993 (UPS); **Wilkes County:** *R.C. Harris 30767*, 23 September 1993 (NY)

Dimelaena oreina (Ach.) Norman – **Stokes County:** *T.H. Nash III 1775*, 11 March 1967 (ASU); *R.C. Harris 30714*, 22 September 1993 (NY)

Dirinaria aegialita (Afz.) B. Moore – Brodo et al. (2001)

Dirinaria confusa D. D. Awasthi – **Orange County:** *G.B. Perlmutter et al. 90*, 23 April 2005 (NCU!)

Gassicurtia vermicoma (Tuck.) Marbach (Syn.: *Buellia vermicorma*) – Imshaug (1951)

Hafellia disciformis (Fr.) Marbach & H. Mayrhofer – **Wake County:** *G.B. Perlmutter 65*, 3 January 2005 (NCU!)

Heterodermia albicans (Pers.) Swinscow & Krog – **Durham County:** *W.L. Culberson 12314*, 18 September 1966 (DUKE!)

Heterodermia appalachensis (Kurok.) Culb. – **Stokes County:** *W.L. Culberson 12336*, 11 March 1967 (DUKE!)

Heterodermia caserettiana (A. Massal.) Trevisan – **Stokes County:** *R.C. Harris 30691*, 22 September 1993 (NY, HAL)

Heterodermia echinata (Taylor) Culb. – **Wake County:** *W.C. Coker & H.R. Totten s.n.*, 9 April 1932 (NCU!); *T.H. Nash III 1688*, 10 April 1967 (ASU)

****Heterodermia galactophylla** (Tuck.) Culb. **– Wilkes County:** *R.C. Harris 30807*, 23 September 1993 (NY)

Heterodermia granulifera (Ach.) Culb. – **Anson County:** *P.O. Schallert s.n.*, 2 August 1936 (NCU!)

****Heterodermia hypoleuca** (Ach.) Trevisan – **Wilkes County:** *R.C. Harris 30774*, 23 September 1993 (NY)

Heterodermia obscurata (Nyl.) Trevisan – **Chatham County:** *W.L. Culberson 13579*, 10 June 1969 (MSC); **Wake County:** *W.C. Coker & H.R. Totten s.n.*, 9 April 1932 (NCU!); *T.H. Nash III 1767*, 13 May 1967 (ASU); **Wilkes County:** *R.C. Harris 30759*, 23 September 1993 (NY)

****Heterodermia propagulifera** (Vainio) J. P. Dey – **Stokes County:** *W.L. Culberson 12338*, 11 March 1967 (DUKE!)

Heterodermia pseudospeciosa (Kurok.) Culb. – **Orange County:** *T.L. Esslinger 2743d*, 28 November 1970 (DUKE!)

Heterodermia speciosa (Wulfen) Trevisan – **Forsyth County:** *P.O. Schallert s.n.*, 1 October 1937 (NCU!); **Stokes County:** *R.C. Harris 30698*, 22 September 1993 (NY)

Hyperphyscia adglutinata (Flörke) H. Mayrh. & Poelt – Brodo et al. (2001)

Hyperphyscia syncolla (Tuck. ex Nyl.) Kalb – **Forsyth County:** *L.v.Schweinitz s.n.*, date unavailable (UPS)

Phaeophyscia adiastola (Essl.) Essl. – **Randolph County:** *W.L. Culberson 6745*, March 1958 (DUKE!)

Phaeophyscia ciliata (Hoffm.) Moberg – **Durham County:** *T.H. Nash III 1770*, 10 April 1967 (ASU); **Mecklenberg County:** *F.W. Gray 259*, November 1923 (UPS)

Phaeophyscia hirsuta (Mereschk.) Essl. – **Davie County:** *W.L. Culberson 6157*, 2 August 1957 (DUKE!)

****Phaeophyscia hispidula* (Ach.) Essl. – **Wake County:** *G.B. Perlmutter 33*, 21 November 2004 (NCU!)

***Phaeophyscia insignis* (Mereschenk.) Moberg – **Wilkes County:** *R.C. Harris 30773*, 23 September 1993 (NY)

****Phaeophyscia orbicularis* (Necker) Moberg – **Wake County:** *G.B. Perlmutter 71*, 12 February 2005 (NCU!)

Phaeophyscia pusilloides (Zahlbr.) Essl. – **Warren County:** *W.L. Culberson 6898*, July 1958 (DUKE!)

Phaeophyscia rubropulchra (Degel.) Essl. – **Wake County:** *T.H. Nash III 1768*, 13 May 1967 (ASU)

****Phaeophyscia squarrosa* Kashiwadani – **Stanly County:** *W.L. Culberson 7112*, August 1958 (Isotypes UPS, US)

Physcia aipolia (Ehrh. ex Humb.) Fürnr. var. *aipolia* – **Durham County:** *T.H. Nash III 1624*, 10 April 1967 (ASU!)

Physcia americana G. Merr. – **Forsyth County:** *L.v. Schweinitz s.n.*, no date available (UPS); **Orange County:** *G.B. Perlmutter 105*, 30 April 2005 (NCU!)

Physcia atrostriata Moberg – **Cabarras County:** *W.L. Culberson 4993*, July 1956 (DUKE!)

Physcia millegrana Degel. – **Granville County:** *W.L. Culberson 6549*, August 1958 (UPS)

Physcia pumilior R. C. Harris – **Stokes County:** *R.C. Harris 30722*, 22 September 1993 (NY); **Wake County:** *G.B. Perlmutter195*, 20 November 2005 (NCU!)

Physcia sorediosa (Vainio) Lynge – Brodo et al. (2001)

Physcia subtilis Degel. – **Stokes County:** *T.H. Nash III 1773*, 11 March 1967 (ASU); **Wilkes County:** *R.C. Harris 30781*, 23 September 1993 (NY)

Physciella chloantha (Ach.) Essl. – **Durham County:** *E.S. Luttrell s.n.*, 20 January 1938 (DUKE!)

Pyxine sorediata (Ach.) Mont. – **Chatham County:** *W.L. Culberson 7932*, May 1959 (MSC); **Forsyth County:** *P.O. Schallert s.n.*, 1 October 1937 (NCU!); *L.v.Schweinitz s.n.*, no date available (UPS); **Wake Conty:** *T.H. Nash III 1749*, 13 May 1967 (ASU)

****Pyxine subcinerea* Stirton – **Chatham County:** *W.L. Culberson 12166*, 9 January 1966 (DUKE!)

****Rinodina subminuta* H. Magn. – **Wake County:** *G.B. Perlmutter 251*, 17 January 2006 (NCU)

Rinodina tephraspis (Tuck.) Herre – **Anson County:** *P.O. Schallert s.n.*, 2 August 1936 (NCU!); **Wake County:** *T.L. Esslinger 3105*, 20 March 1971 (DUKE!)

PORPIDIACEAE

Porpidia albocaerulescens (Wulfen) Hertel & Knoph – **Forsyth County:** *P.O. Schallert s.n.*, 15 March 1936 (NCU!); **Orange County:** *W.L. Culberson 7857*, 1959 (MSC); **Stokes County:** *R.C. Harris 30696*, 22 September 1993 (NY)

****Porpidia macrocarpa* (DC.) Hertel & A. J. Schwab – **Wilkes County:** *R.C. Harris 30806*, 23 September 1993 (NY)

****Porpidia subsimplex* (H. Magn.) Fryday – **Stokes County:** *R.C. Harris 30694*, 22 September 1993 (NY)

RAMALINACEAE

Bacidia heterochroa (Müll. Arg.) Zahlbr. – **Wake County:** *G.B. Perlmutter 183*, 16 October 2005 (NCU!)

Bacidia schweinitzii (Fr. ex E. Michener) A. Schneider – **Gaston (=Tryon) County:** *A.W. Evans 406*, 20 January 1928 (UPS); **Orange County:** *G.B. Perlmutter et al. 79*, 23 April 2005 (NCU!); **Polk County:** *T.H. Nash III 7256*, 26 June 1973 (ASU); **Stokes County:** *W.R. Buck 24014*, 22 September 1993 (NY)

Phyllospora parvifolia (Pers.) Müll Arg. var. *parvifolia* – **Durham County:** *R. Yahr 1520*, 20 October 1998 (DUKE!)

Ramalina culbersoniorum La Greca – **Forsyth County:** *P.O. Schallert 11547*, 5 December 1937 (NCU!)

****Ramalina intermedia* (Delise ex Nyl.) Nyl. – **Stokes County:** *S. LaGreca & D. Goldman 564*, 15 April 1997 (DUKE!)

Tephromela atra (Hudson) Hafellner – Brodo et al. (2001)

RHIZOCARPACEAE

****Rhizocarpon reductum* Th. Fr. [Syn.: *R. obscuratum* (Fryday 2000)] – **Wilkes County:** *R.C. Harris 30783*, 23 September 1993 (NY)

STEREOCAULACEAE

***Lepraria caesiella* R.C. Harris – **Wilkes County:** *R.C. Harris 30793*, 23 September 1993 (NY)

Lepraria lobificans Nyl. – **Stokes County:** *R.C. Harris 30711*, 22 September 1993 (NY); **Wake County:** *G.B. Perlmutter 72*, 12 February 2005 (NCU!)

Lepraria membranacea (Dicks.) Vainio – **Anson County:** *P.O. Schallert s.n.*, 2 August 1936 (NCU!)

COCCOCARPIACEAE

Coccocarpia erythroxyli (Sprengel) Swinscow & Krog – **Burke County:** *W.L. Culberson 7064*, August 1958 (DUKE!)

Coccocarpia palmicola (Sprengel) Arv. & D. J. Galloway – **Polk County:** *T.H. Nash III 19812*, 27 December 1982 (ASU); **Stokes County:** *R.C. Harris 30725-A*, 22 September 1993 (NY)

COLLEMATACEAE

****Collema conglomeratum* Hoffm. – **Forsyth County:** *P.O. Schallert s.n.*, 10 March 1932 (NCU!); **Orange County:** *W.L. Culberson 10893*, 11 March 1963 (DUKE!)

Collema nigrescens (Hudson) DC. – Brodo et al. (2001)

Collema pulcellum Ach. – **Forsyth County:** *L.v. Schweinitz s.n.*, no date available (UPS)

Collema pulcellum var. *leucopeplum* (Tuck.) Degel. – **Mecklenberg County:** *F.W. Gray L-871*, 11 June 1926 (UPS)

Collema pulcellum var. *subnigrescens* (Müll. Arg.) Degel. – **Mecklenberg County:** *F.W. Gray 2871*, 11 June 1928 (UPS)

Collema subflaccidum Degel. – **Wake County:** *W.C. Coker and H.R. Totten s.n.*, 9 April 1932 (NCU!)

Leptogium austroamericanum (Malme) C. W. Dodge - **Polk County:** *A.W. Evans 18*, 20 January 1928 (S)

Leptogium azureum (Sw.) Mont. – Brodo et al. (2001)

Leptogium corticola (Taylor) Tuck. – **Montgomery County:** *W.L. Culberson 5121*, July 1956 (DUKE!)

Leptogium cyanescens (Rabenh.) Körber – **Forsyth County:** *P.O. Schallert s.n.*, 27 March 1938 (NCU!); **Montgomery County:** *W.L. Culberson 5121*, July 1956 (UPS); **Polk County:** *A.W. Evans* 19, 16 January 1928 (S); **Wake County:** *T.H. Nash III 1655*, 10 April 1967 (ASU); **Wilkes County:** *R.C. Harris 30803*, 23 September 1993 (NY)

***Leptogium dactylinum* Tuck. – **Forsyth County:** *L.v.Schweinitz s.n.*, no date available (UPS)

***Leptogium hirsutum* Sierk – **Cleveland County:** *W.L. Culberson 5506*, August 1956 (DUKE!)

Leptogium juniperinum Tuck. – Sierk (1964)

Leptogium milligranum Sierk – **Chatham County:** *W.L. Culberson 12177*, 9 January 1966 (UPS)

Leptogium palmatum* (Huds.) Mont. – **Forsyth County: *L.v.Schweinitz s.n.*, (UPS)

PANNARIACEAE

Fuscopannaria ahlneri (P.M. Jørg.) P.M. Jørg. – Jørgensen (2000)

Fuscopannaria leucosticta (Tuck.) P.M. Jørg. – **Forsyth County:** *Tuckerman s.n.*, no date available (UPS); **Polk County:** *T.H. Nash III 19819*, 27 December 1982 (ASU); **Stokes County:** *R.C. Harris 30725*, 22 September 1993 (NY)

Pannaria lurida (Mont.) Nyl. subsp. *lurida* – Brodo et al. (2001)

Pannaria rubiginosa (Ach.) Bory – **Mecklenberg County:** *F.W. Gray L873*, June 1928 (UPS)

Pannaria subfusca P.M. Jørg. – **Durham County:** *W.L. Culberson 4806*, October 1955 (UPS)

Pannaria tavaresii P.M. Jørg. – **Durham County:** *E.S. Luttrell s.n.*, 6 March 1938 (DUKE!)

***Parmeliella appalachensis* P.M. Jørg. – **Polk County:** *T.H. Nash III 19820*, 27 December 1982 (ASU!); **Stokes County:** *C.W. Schneider 311*, 18 September 1971 (DUKE!)

LOBARIACEAE

***Lobaria pulmonaria* (L.) Hoffm. – **Polk County:** *D.C. Peattie s.n.*, 30 April 1937 (NCU!)

***Lobaria quercizans* Michx. – **Orange County:** *T.L. Esslinger 3137*, 25 March 1971 (DUKE!)

***Lobaria ravenellii* (Tuck.) Yoshim. – **Durham County:** *W.L. Culberson & C.F. Culberson s.n.*, 26 December 1994 (UPS); **Forsyth County:** *P.O. Schallert s.n.*, 13 May 1934 (NCU!); **Wake County:** *A. Henssen 17118a*, 1 April 1964 (ASU); **Stokes County:** *R.C. Harris 30683*, 22 September 1993 (NY)

Pseudocyphellaria aurata (Ach.) Vainio – **Wake County:** *S. Tucker 16950*, 16 April 1977 (SBBG)

Sticta beauvoisii Delise – **Forsyth County:** *P.O. Schallert 3079*, 1 July 1922 (F); *PO Schallert s.n.*, 6 April 1936 (NCU!); **Stokes County:** *W.L. Culberson 14311*, March 1970 (DUKE!); **Wilkes County:** *R.C. Harris 30764*, 23 September 1993 (NY)

Sticta fuliginosa (Hoffm.) Ach. – **Orange County:** *T.L. Esslinger 3137*, 25 March 1971 (DUKE!)

NEPHROMATACEAE

Nephroma helveticum Ach. subsp. *helveticum* – **Forsyth County:** *P.O. Schallert s.n.*, 13 March 1938 (NCU!)

PELTIGERACEAE

***Peltigera canina* (L.) Willd. – **Orange County:** *W.L. Culberson 6498*, 2 June 1958 (DUKE!)

***Peltigera elisabethae* Gyelnik – **Caswell County:** *W.L. Culberson 6217*, 30 July 1957 (DUKE!)

***Peltigera hydrothyria* Miadlikowska & Lutzoni – **Stokes County:** *H.E. Ahles 62661*, 9 October 1965 (NCU!)

***Peltigera phyllidiosa* Goffinet & Miadlikowska – **Orange County:** *H. O'Brien 01102002*, 2001 (DUKE!)

***Peltigera polydactylon* (Necker) Hoffm. – **Warren County:** *W.L. Culberson 6625*, July 1958 (DUKE!)

***Peltigera praetextata* (Flörke ex Sommerf.) Zopf – **Caswell County:** *W.L. Culberson 6218*, 30 July 1957 (DUKE!)

Peltigera rufescens (Weiss) Humb. – **Anson County:** *F.S. Chapman 1279*, 1 March 1921 (NCU!)

TELOSCHISTIACEAE

Caloplaca camptidia (Tuck.) Zahlbr. – **Iredell County:** *W.L. Culberson 6432*, 2 August 1957 (DUKE!)

Caloplaca cerina (Ehrh. ex Hedwig) Th. Fr. – **Chatham County:** *W.L. Culberson 10405*, 1 January 1961 (DUKE!)

Caloplaca cinnabarina (Ach.) Zahlbr. – **Gaston County:** *H.A. Green 128*, 25 May 1893 (F); *H.A. Green s.n.*, 25 May 1893 (NBM)

Caloplaca citrina (Hoffm.) Th. Fr. – Brodo et al. (2001)

Caloplaca feracissima* H. Magn. – **Wake County: *G.B. Perlmutter 266*, 10 February 2006 (NCU!)

Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – **Mecklenberg County:** *W.L. Culberson 5848*, August 1956 (LD, MSC)

Caloplaca holocarpa* (Hoffm. ex Ach.) M. Wade – **Orange County: *W.L. Culberson 10888*, 3 March 1963 (DUKE!)

Caloplaca pollinnii (A. Massal.) Jatta – Wetmore (1994)

Caloplaca quercicola H. Magn. – **Polk County:** *A.W. Evans 411*, 27 December 1927 (holotype, UPS)

Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr. – **Orange County:** *W.L. Culberson & C.F. Culberson s.n.*, 3 March 1963 (LD)

Xanthomendoza weberi (S. Kondr. & Kärnefelt) L. Lindblom – Lindblom (2006)

***Xanthoria candelaria* (L.) Th. Fr. – **Person County:** *W.L. Culberson 6385*, 30 July 1957 (DUKE!)

BRIGANTIAEACEAE

Brigantiaea leucoxantha (Sprengel) R. Sant. & Hafellner – **Montgomery County:** *W.L. Culberson 5131*, July 1956 (DUKE!)

FUSCIDEACEAE

***Maronea polyphaea* H. Magn. (Harris 2006) – **Durham County:** *W.L. Culberson 12317*, 25 September 1966 (DUKE!)

UMBILICARIACEAE

Lasallia papulosa (Ach.) Llano – **Cleveland County:** *W.C. Coker s.n.*, no date (NCU!); **Polk County:** *T.H. Nash III 1712*, 22 April 1967 (ASU); **Stokes County:** *W.L. Culberson & J. Poelt 5631*, March 1970 (HAL); *R.C. Harris 30727*, 22 September 1993 (NY)

Lasallia pensylvanica (Hoffm.) Llano – **Gaston County:** *H.A. Green s.n.*, 25 May 1893 (NBM); **Stokes County:** *W.L. Culberson & J. Poelt 5633*, March 1970 (HAL); *T.H. Nash III 1713*, 11 March 1967 (ASU)

Umbilicaria mammulata (Ach.) Tuck. – **Forsyth County:** *Anonymous (P.O. Schallert?)*, 6 December 1937 (OSC)

Umbilicaria muhlenbergii (Ach.) Tuck. – **Stokes County:** *T.H. Nash III 1710*, 11 March 1967 (ASU)

VEZDAEACEAE

Vezdaea leprosa (P. James) Vezda – **Durham County:** *J. Shaw 9340*, 14 February 1998 (DUKE!)

CLASS LICHINOMYCETES
LICHINACEAE

***Ephebe lanata* (L.) Vainio – **Stokes County:** *P.O. Schallert s.n.*, 30 May 1932 (NCU!)

Lichinia willeyi* (Tuck.) Henssen – **Wake County: *A. Henssen 17111a*, 1 May 1964 (ASU); *A. Henssen & L. A. Whitford s.n.*, 1 April 1964 (UPS); *L.A. Whitford s.n.*, 25 November 1958 (DUKE!)

Peccania kansana (Tuck.) Forss. – Keever et al. (1951)

PELTULACEAE

Peltula cylindrica Wetmore – **Alexander County:** *W.L. Culberson 13329*, 27 March 1969 (DUKE!); **Wilkes County:** *W.R. Buck 24039*, 23 September 1993 (NY)

Peltula zahlbruckneri (Hasse) Wetmore – **Wilkes County:** *J.B. Taggert 11*, 11 September 1972 (DUKE!)

POSITION UNCERTAIN

Flakea papillata* O.E. Erikss. (Hansen 2003) – **Orange County: *L.E. Anderson 27037*, 24 March 1994 (DUKE!).

Normandina pulchella (Borrer) Nyl. – **Chatham County:** *W.L. Culberson 12228*, 23 January 1966 (DUKE!)

†*Racodium rupestre* Pers. – **Forsyth County:** *P.O. Schallert s.n.*, 1 January 1925 (ASU)

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Flakea papillata in North America

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Abstract. The distribution of *Flakea papillata* in North America is here reported from a survey of herbarium specimens. Unlike reported specimens from the tropics, North American *F. papillata* is primarily saxicolous with the first report on soil. Examined specimens were found in humid habitats near water.

Keywords. Biogeography, distribution, *Flakea papillata*, lichen, North America, U.S.A.

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Flakea papillata O. E. Erikss. is a sterile, minute, membranous foliose lichen with tufts of melanized rhizoids extending from the thallus and a microscopically papillate surface. It has been collected in the eastern United States for many years, but has not been reported for North America until the early twenty-first century (Hansen 2003; this paper).

Dubbed "The Thing" by American collectors due to its unusual morphology, this organism's identity as a lichen was originally held in question, with some researchers suggesting it to be a fern prothallium, a bryophyte, a hepatic or even a terrestrial alga (W. R. Buck, C. F. Culberson, pers. comm.). Apparently unaware of the North American collections, Ove E. Eriksson published the first treatment of the species in 1992 (Eriksson 1992) based on his examinations of tropical specimens, causing him to comment: "It is so different from other lichens that others may have not described it to avoid a flaw." Eriksson considered the placement of this curious cryptogam and concluded *F. papillata* to be a lichen through the process of elimination. He described the mycobiont and photobiont, thus confirming his determination that the organism is a lichen, and suggested that it might be an ascomycete. The detection of zeorin and other triterpenoids in *F. papillata* by independent studies in Japan and U.S.A. supports the placement within the Ascomycota, but not definitively so, as zeorin is most commonly but not exclusively reported from ascomycetes (Thor & Kashiwadani 1996; C. F. Culberson, unpublished data). Some reseachers have since considered it to lie within the lichenized ascomycete genus *Agonimia* (Verrucariacae) as *A. papillata* (O. Eriksson) Diederich & Aptroot (Aptroot et al. 1997; Seward & Aptroot 2002) based on the papillate thallus character. But gross thallus morphology in *Flakea* is distinct from other species of *Agonimia*, the latter of which are usually squamulose-leprose. Recent epifluorescence examination (O. E. Eriksson, pers. comm.) and preliminary molecular analysis (C. Gueidan, pers. comm.) further confirms *Flakea* to be a lichen, with the latter results suggesting it to lie in the Verrucariaceae. This familial placement, however, needs confirmation with further analysis and/or finding of fertile specimens. In light of the unresolved taxonomic placement of this species, I will use the original genus, *Flakea*, in this report to emphasize the uniqueness of this lichen.

The current known distribution of *F. papillata* is pantropical, being found in the Caribbean, South America, Africa and Australia/Oceania (Eriksson 1992). More recently it has been found in the Galapagos Islands (Weber 1993), the more isolated Chagos Archipelago in the Indian Ocean (Seward & Aptroot 2002), and northward into the Japanese

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archipelago (Thor & Kashiwadani 1996). It was only recently that *F. papillata* was first reported in North America in a lichen checklist for Alabama, U.S.A. (Hansen 2003).

While preparing a lichen checklist for the Piedmont of North Carolina, U.S.A., I came across a specimen of *Flakea papillata* in the Duke University cryptogamic herbarium (DUKE) collected in my region of study. Surprisingly, I learned that this species was not listed for temperate North America (Esslinger 1997) and was encouraged to map and document its distribution on this continent by Richard C. Harris of The New York Botanical Garden Herbarium (NY). This paper therefore documents the distribution of *F. papillata*, "The Thing," in North America.

Methods

Specimens of *Flakea papillata* from herbarium collections in the U.S.A. (ASU, DUKE, FH, NY) were examined and mapped to determine this taxon's distribution in North America. I examined these specimens, already determined by the collectors or at the loaning institutions, under 50× to confirm their determinations using the description provided in Eriksson (1992) as type material was not available. Once the identity was confirmed, I noted the substrate of each specimen and recorded all available information from its packet label, including the habitat, location, collector and date. For those specimens lacking location coordinates (i.e., latitude and longitude), these were determined from the location information via the topographic map website www.topozone.com. Specimen locations were then plotted onto an outline map of the U.S.A. to show the known distribution of *F. papillata* in North America.

Results

Flakea papillata O. E. Erikss., Systema Ascomycetum 11: 14. 1992. [Syn.: *Agonimia papillata* (O. Eriksson) Diederich & Aptroot]

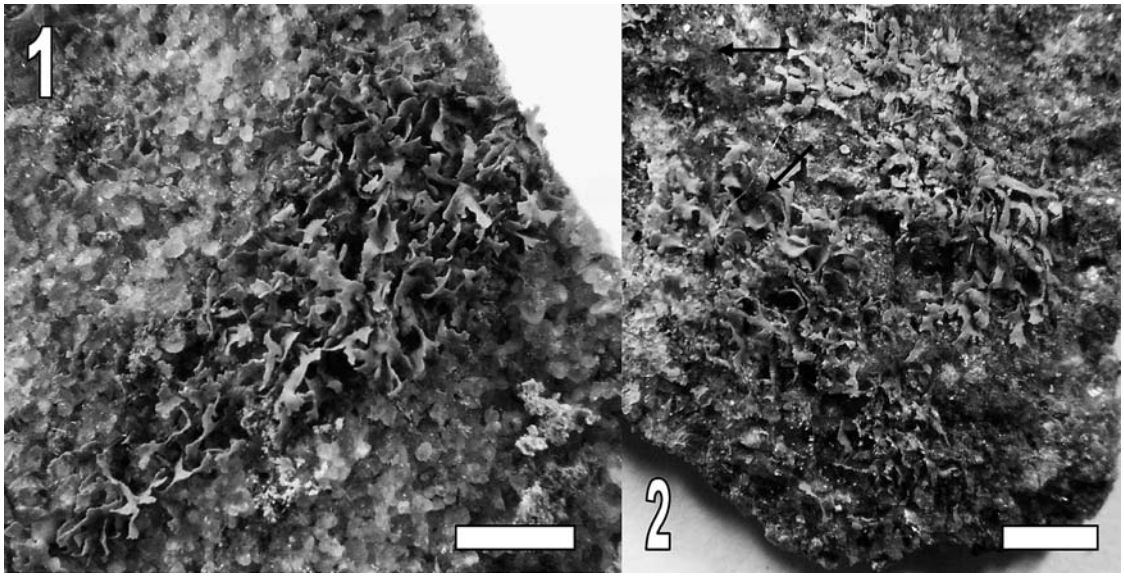
Figs. 1, 2

Type: CUBA. PINAR DEL RÍO PROV.: Viñales, S. part of Valle de San Vicente (W of ridge with Cueva de San Miguel), on the stem of a tree, 10 Jan 1989, *O. E. Eriksson & M. Eriksson 890110–3a* (UPS, holotype; HAJB, IMI, UME, isotypes).

Description. Thallus squamulose, small, loosely adnate. Lobes thin, grayish blue-green, becoming brown when old, flattened, 0.2–0.5(−0.9) mm wide, incised, narrower toward the base and often lobulate, often imbricate; surface papillate, with occasional shiny, dark green bundles of rhizoids extending from the thallus margin, sometimes coalescing into thick tufts. Ascomata and pycnidia not known. See Eriksson (1992) for microscopic anatomy. All chemical spot tests negative (Thor & Kashiwadani 1996).

Distribution and ecology. Specimens are here reported from eastern temperate North America in the following states of the U.S.A.: Alabama, Arkansas, Florida, Georgia, Illinois, Kentucky, North Carolina, Ohio, South Carolina, Tennessee and West Virginia (**Fig. 3**). Most specimens were collected in humid microhabitats near water such as creek banks or along waterfalls with many on sandstone underhangs and outcrops. Out of a total of 64 specimens examined from North America, 54 were on rock, five on bark, four on moss and one on soil. All bark specimens and that on soil were collected in Florida.

Selected specimens examined. U.S.A. ALABAMA: Cherokee Co., 3 Oct 1999, *Yahr 1929* (DUKE); Clay Co., 24 Sep 1992, *Buck 21802* (NY); Dekalb & Marshall Cos., 3 Oct 1998, *Buck 34705* (NY); Franklin Co., 26 Sep 1992, *Anderson 26549* (DUKE); Jackson Co., 2 Oct 1999, *Buck 36332* (NY); Winston Co., 25 Sep 1992, *Buck 21858* (FH). ARKANSAS: Franklin Co., 16 Apr 2004, *Buck 46675* (NY). FLORIDA: Clay Co., 29 Nov 1992, *Buck 22337* (NY); Collier Co., 7 Dec 1992, *Buck 22887* (NY); Dade Co., 25 Jan 1987, *Buckley 595* (NY); Polk Co., 24 Mar 1998, *Buck 33549* (NY); Sarasota Co., 16 Feb 1937, *Romer s.n.* (NY); Taylor Co., 12 Dec 1993, *Buck 24816* (NY). GEORGIA: Coffee Co., 7 Oct 1999, *Buck 36613* (NY); Jeff Davis Co., 18 Sep 1996, *Buck 30537* (NY); Rabun Co., 16 Aug 1995, *Zartman & Pittillo 531b* (DUKE). ILLINOIS: Jackson Co., 15 Oct 1993, *Buck 24225* (NY); Pope Co., 16 Oct 1993, *Buck 24272* (NY); Randolph Co., 7 Nov 2004, *Buck 47685* (NY); Union Co., 17 Oct 1993, *Buck 24282* (NY). KENTUCKY: Letcher Co., 7 Sep 1991, *Anderson 26223* (DUKE); Perry Co., 6 Oct 2001, *Buck 39914* (NY). MISSISSIPPI: Tishomingo Co., 27 Sep 1992, *Anderson 26583* (DUKE), *Buck 21955* (NY). NORTH CAROLINA: Buncombe Co., 16 Jul 1998, *Pittillo 9875* (DUKE); Harnett Co., 4 Feb 1992, *Anderson 26259* (DUKE); Jackson Co., 9 Jul 1992, *Anderson 26326* (DUKE); Macon Co., 2 Jun 1977, *Hicks*



Figures 1, 2. Saxicolous *Flakea papillata* from North America (bar = 2 mm). **1.** Thallus on sandstone, collected in Letcher County, Kentucky (*Anderson 26223*, DUKE). **2.** Thallus with rhizoid tufts (arrows), Macon County, North Carolina (*Buck 30229*, ASU).

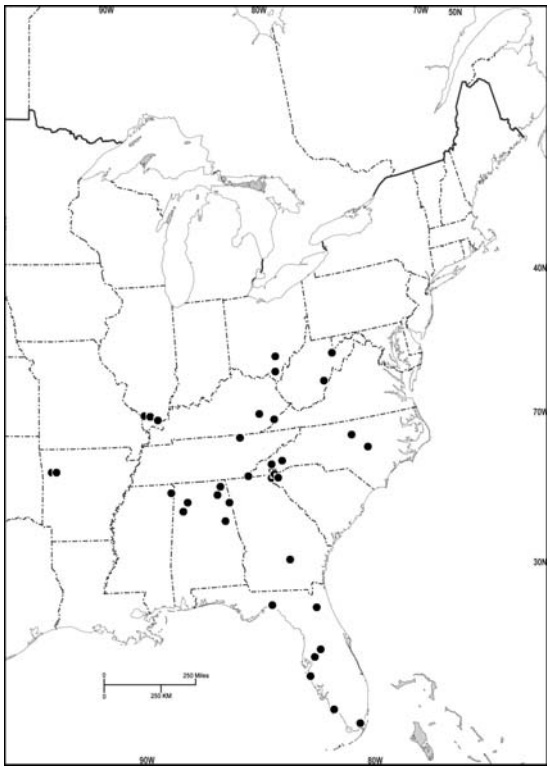


Figure 3. Distribution map of *Flakea papillata* in North America from herbarium specimens.

6388 (DUKE), 16 Jul 1996, *Buck 30229* (ASU, NY); Orange Co., 24 Mar 1994, *Anderson 27037* (DUKE); Transylvania Co., 22 Jun 1994, *Anderson 27144* (DUKE). OHIO: Gallia Co., 21 May 2006, *Buck 50333* (NY); Hocking Co., 22 May 1990, *Anderson 25846* (DUKE). SOUTH CAROLINA: Oconee Co., 19 Aug 1994, *Anderson 27232* (DUKE). TENNESSEE: Polk Co., 5 Oct 1998, *Buck 34801* (NY); Scott Co., 7 Aug 1994, *Buck 25197* (NY). WEST VIRGINIA: Pocahontas Co., 15 May 2000, *Buck 37088* (NY), *Shaw 10414* (DUKE); Tucker Co., 22 Apr 2001, *Buck 39068* (NY).

DISCUSSION

Previously reported only twice before from North America, in a recent checklist of Alabama lichens (Hansen 2003) and a preliminary publication on Ozark lichens (Harris & Ladd 2005), *Flakea papillata* is here found to be widespread in the eastern part of the continent. Examined specimens date back to 1937, more than 50 years prior to Eriksson's treatment. Similarly, Eriksson (1992) documented specimens collected in South America that also date to the early half of the twentieth century. Possibly due to its historical taxonomic ambiguity, which to this day is not completely resolved, *F. papillata* has received little biogeographic attention until the 1990′s.

The widespread nature of *Flakea* in eastern North

America is not unexpected, considering its previously reported distribution and the lichen's affinity for humid habitats. What is interesting is its rocky substrate affinity north of Florida, which is distinct from the predominantly corticolous nature of tropical specimens. While specimens reported from Japan are also saxicolous in humid forests (Thor & Kashiwadani 1996), those found in the U.S. are often in deep, cave-like sandstone underhangs near water. This habitat specificity appears to break down in Florida, where thalli are also found on bark and soil. The specimen on soil is here first reported for *Flakea* on this substrate, and demonstrates a more plastic substrate affinity in this species than previously thought.

It is the author's hope that this paper illuminates this unique lichen to collectors and the scientific community so that its distribution and ecology, as well as its taxonomic placement, become better understood.

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I am most grateful to Richard C. Harris of NY for suggesting that I report the distribution of *Flakea papillata* in North America, and I appreciate Paul Davison for alerting me of an Alabama checklist which reported this species for the first time on the continent. I also thank Molly McMullen of DUKE for allowing me to examine specimens as well as the curators of ASU, FH and NY for loaning their material to the University of North Carolina Herbarium (NCU) for examination. Chicita Culberson (DUKE), Ove Eriksson (UME) and Cécile Gueidan (DUKE) provided insightful comments into *Flakea*'s taxonomic history and current status. Carol Ann McCormick of NCU provided the original paper by Eriksson plus other related literature, and coordinated specimen loan requests. Bill Buck, Ted Esslinger, Johnny Randall and one anonymous reviewer offered helpful comments on the manuscript. This report in part meets the Final Project requirement of the NCBG Native Plant Studies certificate program.

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Outline to NCU Lichen Collection

Classification per Lumbsch & Huhndorf (2007)

Genera underlined include specimens from North Carolina

Phylum **ASCOMYCOTA**

Subphylum **Pezizomycotina**

(dups of North Carolina specimens at NY)

Class **Arthoniomycetes**

Order Arthoniales (dups of representatives sent to GZU for molecular study)

- Arthoniaceae
  - *Arthonia* (dups at DUKE and Hb- deVries)
  - *Arthothelium* (dups at DUKE and NY)
  - *Coniarthonia*
  - *Cryptothecia* (dups at PH)
- Chrysotrichaceae
  - *Chrysothrix* (dups at BG, PH)
- ?Melaspileaceae
  - *Melaspilea*
- Rocellaceae
  - *Bactrospora* (dups at PH)
  - *Enterographa*
  - *Opegrapha* (dup at PH)
  - *Sigridea*

Class **Dothideomycetes**

Dothideomycetes, families *incertae sedis*

- Arthopyreniaceae
  - *Arthopyrenia*
  - *Julella*
- Mycoporaceae
  - *Mycoporum*
- Trypetheliaceae
  - *Bathelium*
  - *Polymeridium*
  - *Trypethelium*

Class **Eurotiomycetes**

Subclass **Chaetothyriomycetidae**

Order Pyrenulales

- ?Monoblastiaceae
  - *Acrocordia*
  - *Anisomeridium* (at PH)
  - *Monoblastia*
- Pyrenulaceae
  - *Anthracothecium*
  - *Lithothelium*
  - *Pyrenula* (dups at PH)

Order Verrucariales

- Verrucariaceae
  - *Bagliettoa*
  - *Dermatocarpon*
  - *Endocarpon*
  - *Flakea* (dup at GZU determined familial placement via molecular analysis)
  - *Placidium*
  - *Thelidium*
  - *Verrucaria* (at PH, Hb-Eagle Hill)

Chaetothyriomycetidae, families *incertae sedis*

- Strigulaceae
  - *Strigula*

Class **Lecanoromycetes**

Subclass **Acarosporomycetidae**

Order Acarosporales

- Acarosporaceae
  - *Acarospora* (dup at PH)
  - *Glypholecia*
  - *Pleopsidium*
  - *Polysporina*
  - *Sarcogyne*

Subclass **Ostropomycetidae**

Order Agyriales

- Agyriaceae
  - *Placynthiella*
  - *Trapelia*
  - *Trapeliopsis*
  - *Xylographa*

Order Baeomycetales

- Baeomycetaceae
  - *Baeomyces*

Order Ostropales

- Coenogoniaceae
  - *Coenogonium*
- Gomphillaceae
  - *Gyalediopsis*
- Graphidaceae
  - *Fissurina* (dup at PH)
  - *Glyphis*
  - *Graphis* (dups at PH)
  - *Leiorreuma*
  - *Phaeographina*
  - *Phaeographis* (dups at PH)
  - *Platygramme* (sterile, at PH)
- Phlyctidaceae
  - *Phlyctis* (dup at DUKE)
- Porinaceae
  - *Porina*
  - *Pseudosagedia* (dup at PH)
- Stictidaceae
  - ?*Thelopsis*
- Thelotremataceae
  - *Diploschistes*
  - *Luecodecton*
  - *Nadvornikia* (dup at PH)
  - *Thelotrema* (dups at PH)

Order Pertusariales

- Icmadophilaceae
  - *Dibaeis*
  - *Icmadophila*
- Megasporaceae
  - *Aspicilia*

- Ochrolechiaceae
  - *Ochrolechia* (dup at PH)
- Pertusariaceae
  - *Pertusaria* (dups at PH)

Ostropomycetidae, families incertae sedis

- Hymeneliaceae
  - *Ionaspis*
- Sarrameanaceae
  - *Loxospora*

Subclass **Lecanoromycetidae**

Order Lecanorales

- Catillariaceae
  - *Halecania*
- Cladoniaceae
  - *Cladonia* (dups at PH)
  - *Pycnothelia*
- Dactylosporaceae
  - *Dactylospora*
- Haematommataceae
  - *Haematomma*
- Lecanoraceae
  - *Lecanora* (dups at FH, PH and Hb-deVries)
  - *Lecidella* (dup at PH)
  - *Pyrrhospora*
  - *Ramboldia*
  - *Rhizoplaca*
- Mycoblastaceae
  - *Mycoblastus*
- Parmeliaceae (representatives of each species on loan to HBG for molecular study)
  - *Allocetraria*
  - *Bryoria*
  - *Bulbothrix*
  - *Canoparmelia*
  - *Cetrelia*
  - *Evernia*
  - *Flavocetraria*
  - *Flavoparmelia* (dup at PH)
  - *Flavopunctelia*
  - *Hypogymnia*
  - *Hypotrachyna*
  - *Letharia*
  - *Melanelia*
  - *Melanohalea*
  - *Menegazzia*
  - *Myelochroa*
  - *Nodobryoria*
  - *Parmelia*
  - *Parmelina*
  - *Parmelinopsis* (dups at PH)
  - *Parmeliopsis*
  - *Parmotrema* (dups at PH)
  - *Platismatia*
  - *Pseudevernia*
  - *Punctelia*
  - *Tuckermanella*
  - *Tuckermannopsis*
  - *Usnea* (dups at PH)
  - *Vulpicida*
  - *Xanthoparmelia*
- Pilocarpaceae
  - *Byssoloma*
  - *Fellhanera* (at PH)
  - *?Lopadium*
  - *Micarea*
- Psoraceae
  - *Psora*
- Ramalinaceae
  - *Bacidia* (dup at PH)
  - *Bacidina* (dup at PH)
  - *Biatora*
  - *Niebla*
  - *Phyllopsora* (dups at PH)
  - *Ramalina* (dups at PH)
  - *Toninia*
- Stereocaulaceae
  - *Lepraria* (dups at DUKE, BG)
  - *Stereocaulon*

Order Peltigerales

Suborder Collematineae

- Coccocarpaceae
  - *Coccocarpia*
- Collemataceae
  - *Collema*
  - *Leptogium* (dups at PH)
- Pannariaceae
  - *Fuscopannaria*

Suborder Peltigerineae

- Lobariaceae
  - *Lobaria* (dup at PH)
  - *Pseudocyphellaria* (dup at PH)
  - *Sticta*
- Nephromataceae
  - *Nephroma*
- Peltigeraceae
  - *Peltigera* (dup at PH)

Order Teloschistiales

- Megalosporaceae
  - *Meglaospora*
- Physciaceae
  - *Amandinea*
  - *Anaptychia*
  - *Buellia*
  - *Dimeleana*
  - *Dirinaria*
  - *Hafellia*
  - *Heterodermia* (dups at PH)
  - *Phaeophyscia*
  - *Physcia* (dups at PH)
  - *Pyxine*
  - *Rinodina* (dups at PH)
- Teloschistaceae
  - *Caloplaca*
  - *Teloschistes*
  - *Xanthomendoza*
  - *Xanthoria*

Lecanoromycetidae, families *incertae sedis*

- Brigantiaeaceae
  - *Brigantiaea* (dup at PH)

Fuscideaceae
Fuscidea
Maronea (dup at NY)
Lecideaceae
Lecidea (dup at PH)
Porpidia (dup at DUKE)
Rhizocarpaceae
Rhizocarpon (dup Hb-Eagle Hill)

Lecanoromycetes, orders *incertae sedis*
Order Candelariales
Candelariaceae
Candelaria
Candelariella
Order Umbilicariales
Umbilicariaceae
Lasallia (dup at PH)
Umbilicaria

Lecanoromycetes *incertae sedis*
Botryolepraria

Class **Lichinomycetes**
Order Lichinales
Lichinaceae
Ephebe (dup at PH)
Euopsis
Pyrenopsis

Peltulaceae
Peltula

ASCOMYTOTA, families *insertae sedis*
Microcaliciaceae
Microcalicium

Phylum BASIDIOMYCOTA
Class **Agaricomycetes**
Order Canthrellales
Clavulinaceae
Multiclavula

Indetermined Specimens

Nonlichenized Fungi
Amphisphaeria
Biscogniauxia
Disctyocatenulata
Gloniopsis (dups at PH, NCSC, NY)
Pulcherricium (dup at NCSC)
Stilbella (dup at UMFK)

CITATION

Lumbsch, H.T. & S.M. Huhndorf (eds.). 2007. Outline of Ascomycota - 2007. *Myconet* 13: 1 - 58.

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Contributions to the Lichen Flora of North Carolina: A Preliminary Checklist of the Lichens and Allied Fungi at William B. Umstead State Park

GARY B. PERLMUTTER[1] & JAMES C. LENDEMER[2]

ABSTRACT. – A preliminary checklist of lichens and allied fungi collected in William B. Umstead State Park in central North Carolina is here presented, documenting 153 taxa in 76 genera from repeated forays in 2006-2007. Forty-six taxa are newly reported for the North Carolina Piedmont, of which 20 are newly reported for the state, including: *Acarospora dispersa*, *Arthonia dryadum*, *Byssoloma subdiscordans*, *Candelariella reflexa*, *Chrysothrix xanthina*, *Fellhanera hybrida, F. minisinkorum*, *Leiorreuma explicans*, *Lepraria friabilis*, *Peltigera didactyla*, *Phlyctis petraea*, *Placynthiella dasea*, *Polysporina simplex*, *Rinodina oxydata*, *Strigula americana*, *Trapelia placodioides*, *Trapeliopsis gelatinosa* and *Usnea endochrysea*. The lichenicolous fungi *Dactylospora pertusariicola* and *Marchandiomyces corallinus* were found on *Pertusaria plittiana* and *Physcia americana*, respectively. The significance of this baseline checklist for assessing environmental health within a fast growing metropolitan area is discussed.

KEYWORDS. – lichens, North Carolina, Piedmont forest, William B. Umstead State Park.

INTRODUCTION

William B. Umstead State Park lies between the cities of Raleigh and Durham in western Wake County, North Carolina, USA. The park is over 5500 acres (2225 ha) of recovering oak-hickory deciduous forest. Cleared for farming since the 1770's, the soil was exhausted by over a century of poor agricultural practices, and the area was purchased by federal and state agencies to be established as parkland in the 1930's. Currently the park is registered as a Significant Natural Heritage Area in North Carolina (Anonymous 2005). While the plant communities of the park have been classified (Schafale & Weakley 1990), the lichen communities and the biological diversity therein have remained largely unstudied.

The lichen flora of Umstead State Park is of particular interest because this large park contains a largely intact Piedmont forest in the Raleigh-Durham-Chapel Hill area (i.e. Triangle) of North Carolina, a region that is currently undergoing rapid metropolitan growth. Since richer lichen floras have been correlated with higher air quality in the southeastern USA (McCune et al. 1997), an understanding of the lichen flora at this park could serve as a baseline to assess the Triangle's environmental health by comparing it to lichen communities and floras in more heavily impacted areas. In addition, such a baseline checklist could serve in future environmental health assessments in the Triangle to track changes wrought by further land use, changes in air quality, and climatic changes from global warming, as well as changes within the park itself as its forests continue to mature since their protection seventy years ago.

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This report presents a preliminary checklist of lichens and allied fungi for Umstead State Park. The objectives of this report are: 1) to contribute to the growing knowledge of the lichen flora of North Carolina and the Piedmont physiographic province within the state, 2) to provide a lichen checklist of a representative Piedmont forest, and 3) to provide a baseline lichen checklist for use in lichen-based environmental health assessments in the Triangle area.

Methods

William B. Umstead State Park lies between the cities of Raleigh and Durham and adjacent to the RDU International airport in western Wake County, North Carolina, USA. The park lies in the Piedmont physiographic province, characterized by rolling hills that reflect an ancient mountainous geology of Proterozoic and Paleozoic (400-600 million yrs bp) crystalline bedrock, much of it granite. The area has a four-season climate with hot, humid summers and mildly cold winters. Thirty-year (1971-2000) mean climatic data from the RDU weather station include summer maximum and winter minimum temperatures 31.7°C for July and –1.3°C for January, respectively. Yearly mean precipitation is 1093 mm, falling 71-109 mm per month; annual snowfall average is 183 mm (NOAA 2004).

Multiple visits were made to the park to inventory its lichen biota in 2006-2007. These visits included educational group forays led by the first author with follow-up collecting visits in 2006. A two-day intensive foray was conducted by both of us in January 2007 to more thoroughly document the lichen biota of the park. Site locations are depicted in Fig. 1; descriptions are as follows:

SB - The forest immediately behind and NNW of the Visitor Center in the vicinity of Sal's Branch Trail (35°53'03"N, 78°45'41"W), elevation 360-460 ft (110-140 m). Habitat is Mesic Mixed Hardwood Forest (Schafale & Weakley 1990), characterized by a canopy of *Acer rubrum*, *Fagus grandifolia*, *Liriodendron tulipifera*, *Pinus taeda*, and *Quercus rubra*. Area visited repeatedly by GBP beginning February 2006 with the park's first instructional walk and followed by collecting visits.

P - Riparian forest at the junction of Potts Branch Trail and Sycamore Trail (35°52'18"N, 78°45'27"W), elevation 330 ft (101 m). Habitat is Mesic Mixed Hardwood Forest. Area visited by GBP as a field trip while leading a one-day lichen workshop for park staff and the public on 11 November 2006.

SL - Rocky ravines near Sycamore Lake, a converted rock quarry (35°51'46"N, 78°44'59"W), elevation 325-450 ft (99-137 m). Habitats include Mesic Mixed Hardwood Forest variants dominated by *Pinus taeda* near the parking lot in the vicinity of an abandoned group camp, mature beech forest near the lakeshore, and a more open forest with exposed rock faces at and below the dam spillway. First surveyed by GBP on 18 February 2006 with follow-up visits in August 2006, and 14 January 2007, the latter with JCL.

CC - Crabtree Creek Natural Area and Inspiration Trail loop (35°50'34"N, 78°45'35"W), elevation 250-400 ft (76-122 m). Habitat includes Mesic Hardwood Forest with Piedmont/Coastal Plain Heath Bluff (Schafale & Weakley 1990) along the creek itself, the latter of which is characterized by a more open canopy and a shrub layer with *Kalmia latifolia* and *Rhododendron* spp. Visited by GBP on 15 April 2006 with follow-up collecting on 9 May 2006.

PB - Piedmont Beech Natural Area (35°50'18"N, 78°44'24"W), elevation 300-350 ft (91-107 m). Habitat includes Mesic Mixed Hardwood Forest with mature *Fagus grandifolia*, as well as trees in the genera *Acer*, *Carya*, *Pinus*, and *Quercus*. Surveyed by both of us on 13 January 2007.

RC - Reedy Creek area (35°49'54"N, 78°44'49"W). Habitat is Mesic Mixed Hardwood Forest, swampy and wet in places with many small dry streams and occasional rock outcrops. Visited on 1 November 2006 by JCL.

Many taxa encountered were digitally imaged, and specimens of all taxa here reported were deposited as vouchers in the University of North Carolina Herbarium (NCU), Academy of Natural Sciences of Philadelphia (PH), and the New York Botanical Garden (NY). Specimens were identified using standard laboratory techniques including microscopic examination of reproductive structures, chemical spot tests and TLC. Keys consulted included Brodo et al. (2001), Harris (1995) and miscellaneous treatments both in the published and "gray" literature.

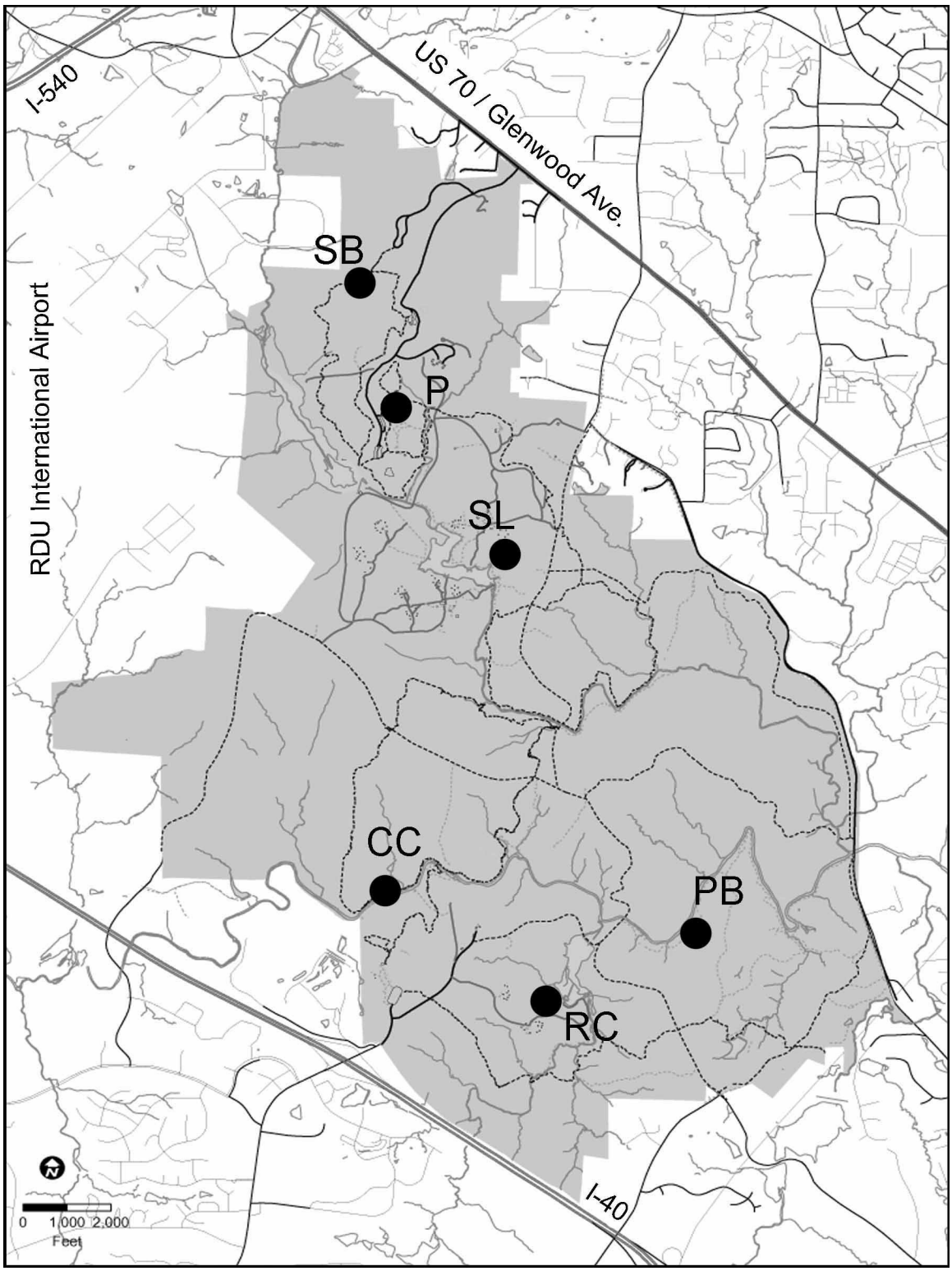

Figure 1. Map of William B. Umstead State Park (shaded). Collecting localities are mapped as large dots and the abbreviations used throughout the list are placed next to the dots.

Lichen observation records and images were entered into North Carolina Division of Park and Recreation's Natural Resource Inventory Database (NRID). The NRID is a web-accessible database (http://207.4.179.38/Checklist/find.php) designed to bring public awareness to the park system's biodiversity. Species checklists of a given organism grouping (e.g. "LICHEN") or that of a community (e.g. "TERRESTRIAL COMMUNITY") can be generated for a particular park or natural area (e.g. "William B. Umstead State Park") from the pull-down menus, and printed for field use. The site also has an image gallery for further reference or "armchair exploration" of a park's natural resources.

Taxa were analyzed by habit, forest layer (i.e. floor, midbole, canopy), and substrate to further describe the lichen biotic composition of the park.

Results And Discussion

A total of 320 collections were made in Umstead State Park, representing 153 species in 76 genera. The flora comprises 59% crustose, 27% foliose and 14% fruticose taxa, the latter including squamulose and dimorphic growth forms. Although this lichen flora is richer in crusts than previously reported from the North Carolina Piedmont as a whole (Perlmutter 2006), the crustose component of the Umstead Park flora is representative of a typical lichen flora (I.M. Brodo, pers. comm.). The report by Perlmutter (2006), which was largely from a survey of herbarium records, appears to reveal a bias toward macrolichens by earlier collectors.

Lichens were found across all forest layers, with 37% taxa found on the floor, 39% on trunk midboles, and 24% in the canopy. On the floor most were found on rock (20% of the taxa) with few species (<5%) each on soil and wood of downed, rotting logs. The canopy is represented by corticolous lichens, found as fallen material (branches, twigs, bark fragments) on the forest floor. Corticolous species, representing both the canopy and midbole levels, make up 76% of specimens collected.

From the US Forest Service's Forest Health Monitoring program an epiphytic macrolichen survey using circular plots produced an Air Quality Gradient for the southeastern USA, with greater species richness in cleaner areas (McCune et al. 1997). As the lichen diversity from plots in central North Carolina (Fig. 6 of that report) appeared to lie in a moderate region of this gradient, similar findings might be expected for plots in Umstead State Park.

While differences in sampling methodology make it impossible to evaluate Umstead State Park on the Air Quality Gradient of McCune et al., the presence of cyanolichens (in the genera *Collema, Leptogium* and *Peltigera*) indicate a relatively healthy forest environment in the park as these taxa are particularly sensitive to air pollution (Richardson and Cameron 2004). Both *Peltigera didactyla* and *P. praetextata* are known to be sensitive to ozone (Peterson et al. 1992, Flenniken 2003). However, the rarity of *Peltigera* (only two specimens were encountered) may indicate a forest environment compromised by the air quality of the surrounding metropolitan area (L. Geiser, pers. comm.).

The purpose of this report is to provide a baseline lichen checklist from a representative Piedmont forest in North Carolina. Although several sites were visited, this inventory should be considered preliminary due to: 1) the limited area of the park explored, 2) the difficulty in collecting saxicolous specimens from smooth rock surfaces, 3) a limited canopy flora available as litterfall, and 4) the often cryptic nature of lichens which makes them easy to be overlooked. Nevertheless this checklist enhances our understanding of the lichen flora at Umstead State Park, and can be used in comparison to other local floras, in particular those that are impacted by human activities such as industrial, urban or agricultural areas. However, further exploration of William B. Umstead State Park and other natural areas of the North Carolina Piedmont is needed to better understand the Piedmont lichen flora of this state.

Annotated Checklist

Checklist of lichens (lichenized Ascomycota), lichenicolous fungi (*), and non-lichenized fungi often treated with lichens (+) collected in William B. Umstead State Park in 2006-2007. Nomenclature follows Esslinger (2008) except where as noted. Locations follow each taxon and are abbreviated as: Sal's Branch Trail (SB), Potts Branch Trail (P), Sycamore Lake (SL), Crabtree Creek Natural Area (CC), and Piedmont Beech Natural Area (PB). Collection number(s) of voucher(s) follow the location symbol. Those with "P" were collected by GBP and deposited in NCU; preceded with "L" collected by JCL and deposited in PH or NY. [1]New to North Carolina; [2]new to the North Carolina Piedmont. New records were determined from comparison with baseline checklists of Perlmutter (2007) and Perlmutter (2006), respectively.

[1]*Acarospora dispersa* H. Magn. – SL: *L-8369*, *P-815*, *P-821*.
[1]*Agonimia* sp. – PS: *L-8320*; SL: *L-8405*.
Thallus terricolous/lignicolous, minutely areolate; ascospores 8/ascus, hyaline, muriform, (30-)33(-37) x (8-)12(-17)µm.
Anisomeridium subprostans (Nyl.) R.C. Harris – PB: *P-753*.
Arthonia cinnabarina (DC.) Wallr. – SL: *P-801*.
[1]*Arthonia dryadum* R.C. Harris & Ladd ined. – PB: *L-8314*.
This comma lichen was first reported from the Ozark highlands of central North America (Harris and Ladd 2005). It is widespread in the southeastern United States and contains gyrophoric acid.
Arthonia quintaria Nyl. – SL: *P-285*; CC: *P-394*; PB: *L-8345*.
Arthonia rubella (Fée) Nyl. – SB: *P-353*; SL: *P-575*.
[2]*Arthopyrenia cinchonae* (Ach.) Müll. Arg. – SL: *L-8403, P-790*.
Arthothelium spectabile (Flot.) A. Massal. – PB: *L-8344*.
Arthothelium taediosum auct. Amer.– SB: *P-263* (PH).
Bacidia heterochroa (Müll. Arg.) Zahlbr. – PB: *L-8316*.
Bacidia schweinitzii (Fr. ex E. Michener) A. Schneid. – SL: *P-579*; PB: *P-773, P-776*, *L-8333*.
[2]*Bacidia suffusa* (Fr.) A. Schneid. – SL: *P-581*.
This corticolous crust has been reported only from the mountainous part of the state (Ekman 1996).
Buellia curtisii (Tuck.) Imshaug – PB: *P-743*.
Buellia cf. mamillana (Tuck.) W.A. Weber – SL: P-817, P-819.
Buellia maculata Bungartz – RC: *L-8061*; SL: *P-290*, *L-8364*.
Buellia stillingiana J. Steiner – CC: *P-389*.
[1]*Byssoloma subdiscordans* (Nyl.) P. James – SL: *P-810*, *L-8411*.
Caloplaca flavovirescens (Wulfen) Dalla Torre & Sarnth. – CC: *316*.
Candelaria concolor (Dicks.) Stein – PB: *L-8310*.
[1]*Candelariella reflexa* (Nyl.) Lettau – CC: *P-391* (sterile).
Canoparmelia caroliniana (Nyl.) Elix & Hale – SB: *P-256*; RC: *L-8069*.
[2]+*Chaenothecopsis* sp. – PB: *L-8349-A*.
[2]*Chrysothrix flavovirens* Tønsberg – SB: *P-352*; SL: *P-786*; RC: *L-8048*; SL: *L-8393*.
[1]*Chrysothrix xanthina* (Vain.) Kalb – PB: *L-8300*, *L-8334*; SL: *L-8360*.
These two yellow leprose crusts differ in soredia morphology, color and substrate (Harris and Ladd 2008).
Cladonia apodocarpa Robbins – SL: *P-272*, *L-8362*.
Cladonia caespiticia (Pers.) Flörke – SL: *P-275*; CC: *P-468*; PB: *P-778*; RC: *L-8074*.
Cladonia cristatella Tuck. – RC: *L-8071*; SB: *L-8415*.
Cladonia didyma (Fée) Vain. var. *vulcanica* (Zoll. & Moritz.) Vainio – SB: *P-647*; RC: *L-8063*.
Cladonia grayi G. Merr *ex* Sandst. – SL: *P-273*, *L-8372*, *L-8410-A*.
Cladonia macilenta Hoffm. – SB: *P-255*.
Cladonia ochrochlora Flörke – SL: *P-789*, *L-8358*.
Cladonia parasitica (Hoffm.) Hoffm. – PB: *P-766*; SB: *P-346*; RC: *L-8067*.
[2]*Cladonia petrophila* R.C. Harris – CC: *P-467*.
Cladonia peziziformis (With.) J.R. Laundon – SB: *P-646*; PB: *P-779*; SL: *L-8370*.
Cladonia ramulosa (With.) J.R. Laundon – SL: *P-274*; PB: *L-8330*, *P-758, P-767*; SB: *L-8416*.
Cladonia robbinsii A. Evans – P: *P-650*.

Cladonia sobolescens Nyl. *ex* Vain. – CC: *P-338.*
Cladonia subtenuis (Abbayes) Mattick – SB: *P-254, P-645*; SL: *L-8410-B.*
[2]*Coenogonium luteum* (Dicks.) Kalb & Lücking *s. lat.* – SL: *P-780*; *L-8414.*
Coenogonium pineti (Ach.) Lücking & Lumbsch – RC: *L-8076*; PB: *L-8298.*
Collema subflaccidum Degel. – RC: *L-8070.*
[1]**Dactylospora pertusariicola* (Tuck. *ex* Willey) Hafellner – SL: *L-8361-A* (on thallus of *Pertusaria plittiana*).
Dibaeis baeomyces (L.) Rambold & Hertel – P: *P-651.*
Dictyocatenulata alba Finley & E. F. Morris – *PB: P-769*, *L-8303*, *L-8315.*

This crust was recently reported for North Carolina in the mountains and Piedmont by Lendemer (2007).

[2]*Dirinaria picta* (Sw.) Clem. & Shear – SL: *P-578.*
Fellhanera hybrida R.C. Harris & Lendemer ined. – CC: *P-465*; SL: *P-808*, *L-8371*, *L-8390*, *L-8410.*
[1]*Fellhanera minisinkorum R.C. Harris & Lendemer ined. – RC: L-8077.*
Flavoparmelia baltimorensis (Gyeln. & Fóriss) Hale – CC: *P-339*; SL: *L-8932*.
Flavoparmelia caperata (L.) Hale – SB: *P-350*; RC: *L-8066*.
Graphis inversa R.C. Harris – SL: *L-8401*.

This specimen has been recently reported as a new state record (Lendemer 2007) for North Carolina.

Graphis lineola Ach. – SL: *P-788*, *L-8350.*
Graphis scripta (L.) Ach. – SB: *P-351*; SL: *P-798.*
Gyalideopsis buckii Lücking, Serus. & Vězda – PB: *L-8335.*
Gyalideopsis ozarkensis Lücking & W.R. Buck– PB: *L-8299.*

Both this and the preceding species were recently described from North America (Lücking et al. 2007).

Heterodermia obscurata (Nyl.) Trevisan – SL: *P-294*, *L-8396*; RC: *L-8065.*
Heterodermia speciosa (Wulfen) Trevisan – SL: *P-785.*
Hypocenomyce sp. – RC: *L-8062.*
Hypotrachyna livida (Taylor) Hale – SB: *P-260*; RC: *L-8055*; SL: *L-8376.*
Hypotrachyna osseoalba (Vain.) Park & Hale – SB: *P-261*; SL: *P-784*, *L-8352.*
[2]*Ionaspis lacustris* (With.) Lutzoni – SL: *P-811*, *L-8391.*
Lecanora hybocarpa (Tuck.) Brodo – CC: *P-393.*
Lecanora strobilina (Sprengel) Kieffer – SB: *P-347*; CC: *P-395.*
[2]*Lecanora subimmergens* Vain. – CC: *P-344*; SL: *P-809*, *L-8400.*
Lecanora subpallens Zahlbr. – CC: *P-387*; P: *P-653.*
[2]*Lecanora thysanophora* R.C. Harris – PB: *P-777*, *L-8332.*
Lecanora sp. – SL: *P-792*, *L-8354.*

The above collections may represent *Lecanora strobilina*, however they are saxicolous and lack decarboxysquamatic acid.

[1]*Leiorreuma explicans* (Fink) Lendemer – SL: *P-574* (NY).

This name is a new combination for *Phaeographina explicans* Fink (Lendemer and Knudson 2008).

[1]*Lepraria friabilis* Lendemer & K. Knudsen – SL: *P-794*, *L-8398.*

This dust lichen is newly described by Lendemer et al. (2008), in eastern North America is known from only the Coastal Plain and Piedmont.

Lepraria lobificans Nyl. – SL: *P-277*; RC: *L-8064*; PB: *L-8295.*
Lepraria sp. (usnic acid, zeroin) – RC: *L-8039, L-8042*; PB: *L-8296.*

This corticolous species is widespread in eastern North America and the Ozarks, and is apparently undescribed. It will be delt with in an upcoming publication on usnic acid containing *Lepraria* species by the second author.

Leptogium corticola Taylor – PB: *L-8341.*
Leptogium cyanescens (Rabenh.) Körber – SL: *P-572*; PB: *P-771*; RC: *L-8057.*
Leptogium dactylinum Tuck. – PB: *L-8321.*
[2]*Lithothelium phaeosporum* (R.C. Harris) Aptroot – PB: *L-8339.*
Loxospora pustulata (Brodo & Culb.) R.C. Harris – SB: *P-345*; PB: *L-8347*; SL: *P-291*, *L-8368.*

This common crust is found both on rock and bark.

[1]**Marchandiomyces corallinus* (Roberge) Diederich & Hawksw. – PB: *L-8311* (on thallus of *Physcia americana*).
Maronea polyphaea H. Magn. – RC: *L-8049.*
[2]*Megalospora porphyritis* (Tuck.) R.C. Harris – PB: *L-8326*, *L-8349*, *P-757.*

[2]*Micarea neostipitata* Coppins & P. May – SL: *L-8402.*
Micarea prasina Fr. s. lat. – PB: *L-8312*, *L-8343*; RC: *L-8073.*
Myelochroa aurulenta (Tuck.) Elix & Hale – PB: *P-747.*
Myelochroa galbina (Ach.) Elix & Hale - PB: *P-774.*
Myelochroa obsessa (Ach.) Elix & Hale – SL: *P-812*, *L-8412.*
[2] *Nadvornikia sorediata* R.C. Harris – CC: *P-342*; PB: *P-768*; RC: *L-8040*, *L-8060.*

This common, yet easily overlooked, corticolous crust is a new report for the North Carolina Piedmont. It has previously been reported from the Coastal Plain (Lendemer & Yahr 2004, Perlmutter 2007).

Ochrolechia africana Vain. – CC: *P-388*; RC: *L-8052.*
[2]*Opegrapha corticola* Coppins & P. James – PB: *L-8329*; SL: *L-8381.*
Opegrapha varia Pers. – PB: *P-761, L. 8304.*
[2]*Opegrapha viridis* Pers. – PB: *L-8309*, *L-8313.*
Parmelinopsis horrescens (Taylor) Elix & Hale – SB: *P-265.*
Parmelinopsis minarum (Vain.) Elix & Hale – SL: *P-295*; PB: *L-8327.*
Parmeliopsis subambigua Gyeln. – SL: *P-783*, *L-8373.*
[2]*Parmotrema gardneri* (C.W. Dodge) Hale – SL: *L-8351.*
Parmotrema hypoleucinum (Steiner) Hale – RC: *L-8058.*
Parmotrema hypotropum (Nyl.) Hale – SB: *P-262*, *P-270*; PB: *P-745*, *P-752*; SL: *P-296*; RC: *L-8044.*
Parmotrema mellissii (C.W. Dodge) Hale – SL: *P-799.*
Parmotrema perforatum (Jacq.) A. Massal. – SB: *P-268.*
Parmotrema reticulatum (Taylor) Hale – SB: *P-258*, *P-264*; SL: *P-288*, *L-8363.*
Parmotrema subisidiosum (Müll. Arg.) Hale & Fletcher – SB: *P-267*; CC: *P-466*; SL: *P-822*, *L-8382.*
Parmotrema submarginale (Michx.) DePriest & B. Hale – SB: *269*; RC: *L 8045.*
[1]*Peltigera didactyla* (With.) J.R. Laundon – SL: *P-818*, *L-8387.*
Peltigera sp. – PB: *P-765*, *L-8302.*

The above material seems similar to *Pelitgera praetextata* (Sommerf.) Zopf, but not conspecific with it. Further study is needed, preferably with molecular methods.

[2] *Pertusaria epixantha* R.C. Harris – SB: *P-257*; SL: *P-796*; RC: *L-8050.*
Pertusaria multipunctoides Dibben – SB: *P-648*; PB: *P-750*, *L-8324*; RC: *L-8041.*
Pertusaria paratuberculifera Dibben – CC: *P-343*; RC: *L-8051.*
Pertusaria plittiana Erichsen – SL: *P-806*, *L-8361*; CC: *P-340.*
Pertusaria pustulata (Ach.) Duby – CC: *P-398.*
Pertusaria subpertusa Brodo – PB: *L-8331*, *P-756.*
Phaeographis inusta (Ach.) Müll. Arg. – SL: *P-577* (PH), *P-787*, *L-8379.*
Phaeographis sp. - SL: *P-576* (NY).

This taxon is widely distributed on hardwoods in the southeastern United States and has been widely confused with *Sarcographa labyrinthica* (Ach.) Müll. Arg. because of the white mealy margins of the lirellae. Using the key in *More Florida Lichens* (Harris 1995) this taxon would indeed key to *S. labyrinthica* if one were unfamiliar with the heavily carbonized compound stroma in that species.

Phaeophyscia ciliata (Hoffm.) Moberg – PB: *L-8346.*
Phaeophyscia rubropulchra (Degel.) Essl. – SL: *P-280*, *P-803*, *L-8388*; PB: *P-764*; RC: *L-8054.*
[2]*Phlyctis ludoviciensis* (Müll. Arg.) Lendemer – SL: *P-797*, *L-8383*; PB: *L-8325, P-744, P-746.*

This common crust has only been reported from the Coastal Plain (Lendemer & Yahr 2004) and is here newly reported for the Piedmont.

[1]*Phlyctis petraea* R.C. Harris ined. – CC: *P-341.*
[2]*Phyllopsora confusa* Swinscow & Krog – RC: *L-8072.*
Phyllopsora corallina (Eschw.) Müll. Arg. – PB: *P-754, L-8307.*
Physcia americana G. Merr. – PB: *P-770*; RC: *L-8056.*
Physcia pumilior R.C. Harris – SB: *P-271*; SL: *P-286*; CC: *P-397*; RC: *L-8043.*
Physcia subtilis Degel. – SL: *P-278*, *L-8377.*
Physciella chloantha (Ach.) Essl. – SL: *P-791*, *L-8409.*
[1]*Placynthiella dasea* (Stirton) Tønsberg – SL: *P-793*, *L-8378*, *L-8404*; RC: *L-8075.*
Placynthiella icmalea (Ach.) Coppins & P. James – RC: *L-8046.*
[1]*Polysporina simplex* (Davies) Vězda – SL: *P-814*, *P-820*, *L-8395.*

Porina heterospora (Fink *ex* J. Hedrick) R.C. Harris – PB: *L-8337*.
Porpidia albocaerulescens (Wulfen) Hertel & Knoph – SL: *P-281*, *P-800*, *L-8386*.
This saxicolous crust is dominant on granite boulders in rocky ravines near Sycamore Lake and along Crabtree Creek and Sycamore Creek near Potts Branch trail; it is likely widespread in the park in similar shady rocky habitats.
Pseudosagedia cestrensis (Tuck. ex E. Michener) R.C. Harris – RC: *L-8047-A*; PB: *L-8322, P-772, P-759*.
[2]*Pseudosagedia guentheri* (Flot.) Hafellner & Kalb – SL: *P-804*, *L-8356*.
Punctelia rudecta (Ach.) Krog – SL: *P-287*.
Punctelia subrudecta auct. Amer. – PB: *L-8308*.
[2]*Pyrenula citriformis* R.C. Harris – PB: *L-8340, P-762*; SL: *L-8359*, *P-795*.
Pyrenula leucostoma Ach. – SL: *P-807*, *L-8406*.
[2]*Pyrenula punctella* (Nyl.) Trevisan – SB: *P-354*; PB: *P-751*; SL: *L-8355*.
This pox lichen is common on large beech trunks.
Pyrrhospora varians (Ach.) R.C. Harris – SB: *P-978*.
Pyxine sorediata (Ach.) Mont. – RC: *L-8053*.
[2]*Ramalina americana* Hale – PB: *P-763*.
Rhizocarpon reductum Th. Fr. (Syn. *R. obscuratum*) – SL: *L-8394*, *P-820a*.
Rinodina granuligera H. Magn. – PB: *L-8319*.
[2]*Rinodina maculans* Müll. Arg. – CC: *P-390*; PB: *L-8336*.
[1]*Rinodina oxydata* (A. Massal.) A. Massal. *s. lat.* – SL: *P-289*.
The specimen was collected on a vertical rock wall below the Lake Sycamore Dam.
Rinodina tephraspis (Tuck.) Herre – SL: *P-817*, *L-8380*, *L-8400*.
[1]*Strigula americana* R.C. Harris – PB: *L-3883*, *L-8342*.
[2]*Thelotrema subtile* Tuck. – SB: *P-349*; SL: *P-573* (PH); PB: *P-775*; RC: *L-8047*; PB: *L-8297*.
Like *Nadvornikia sorediata* above, this too is a new report for the North Carolina Piedmont, only reported previously from the Coastal Plain (Lendemer & Yahr 2004, Perlmutter 2007).
Trapelia glebulosa (Sm.) J.R. Laundon – PB: *P-760*.
[1]*Trapelia placodioides* Coppins & P. James – SL: *P-805*, *L-8389*.
[1]*Trapeliopsis gelatinosa* (Flörke) Coppins & P. James – SL: *L-8385*.
Trypethelium virens Tuck. *ex* Michener – SL: *P-570*.
Observed on trunks of holly (*Ilex* spp.) almost exclusively in each site; it is likely common throughout the park on this substrate.
Tuckermannella fendleri (Nyl.) Essl. – SB: *P-259*; SL: *L-8375*.
[1] *Usnea endochrysea* Stirton – PB: *L-8318*; SL: *L-8365*, *L-8367*.
Usnea mutabilis Sirton – SL: P-282.U
Usnea strigosa group (sterile) – SB: *P-644*; CC: *P-392*; RC: *L-8059* (norstictic acid); SL: *L-8366* (psoromic acid).
Verrucaria sp. – SL: *P-293*; *L-8407*.
Thallus saxicolous on siliceous rock, endolithic; perithecia 0.3-0.4mm diameter, <1/3 immersed in substrate, exciple lacking below; ascospores 8/ascus, 22-25.5 x 8-10µm.
Xanthoparmelia conspersa (Ehrh. *ex* Ach.) Hale – SL: *P-279*, *L-8328*.
This saxicolous foliose lichen is found abundantly on exposed rock surfaces in the Lake Sycamore Dam spillway.
Xanthoparmelia plittii (Gyeln.) Hale – SL: *P-813*, *P-816*, *L-8384*, *L-8397*.

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THE LICHEN BIOTA OF MASON FARM BIOLOGICAL RESERVE, NORTH CAROLINA

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Abstract: As part of a baseline project to document the lichen biodiversity of the North Carolina Piedmont, the lichen biota of Mason Farm Biological Reserve (MFBR) at the North Carolina Botanical Garden, the University of North Carolina at Chapel Hill, was inventoried in 2007 via a survey of permanent 0.1 ha vegetation plots in two distinct Piedmont forest communities: Basic Oak-Hickory Forest with diabase outcrops, and Piedmont/Mountain Swamp Forest lacking outcrops. Plots yielded 34–56 species each, with a total of 104 taxa. Twenty-six species are considered common to MFBR, and 14 taxa are newly reported for the North Carolina Piedmont. Beta diversities were calculated using Jaccard indices (J) to assess similarities in species composition of lichen communities within and between the two forest types as well as a larger scale comparison between the MBFR lichen biota *in toto* and that of William B. Umstead State Park (WIUM), a recently surveyed Piedmont forested area in Mixed Mesic Hardwood Forest with granitic outcrops. Within MFBR results included low to moderate similarity indices (J = 0.00–0.51) with the highest found between each forest's canopy; a moderate similarity was also detected between the MFBR *in toto* and WIUM. Differences in lichen communities and larger biotas are likely explained by substrate and environmental variability. Plot canopy cover was measured and correlated against lichen data, resulting in a negative correlation with summer shade and midbole lichen spp. Descriptions of the lichen communities within MFBR's two forests are presented.

Key Words: diversity; lichen community; Mason Farm Biological Reserve; Piedmont; Oak-Hickory Forest; Swamp Forest.

INTRODUCTION

Lichens are symbiotic organisms consisting of a fungal partner (mycobiont) and a photosynthesising algal and/or cyanobacterial partner (photobiont). These organisms are found throughout our environment, growing on vegetation, rocks, and soil, functioning as part of the vegetation and contributing to nutrient cycling through their decomposition after death. Yet because of their small size and often-cryptic nature, lichens are a relatively neglected part of the local forest community as compared to the larger vascular plants and vertebrate animals.

Mason Farm Biological Reserve (MFBR) is a 148.5 ha (367 acres) protected area in southeastern Orange County, North Carolina, USA. Located in the Triassic Basins Ecoregion of the Piedmont physiographic province (Griffith et al. 2002), MFBR contains old fields and continuing forests that are managed by the North Carolina Botanical Garden, University of North Carolina at Chapel Hill, (NCBG) since 1984. The area is used for academic research and public education as well as low impact recreation. While the vegetation of MFBR has been described (White et al. 1992, 2000), its lichen biota remained unexplored. This report documents the lichen diversity of MFBR from a plot survey conducted in 2007, part of an on-going effort to describe the lichen biota of the North Carolina Piedmont (Perlmutter 2006; Perlmutter and Lendemer 2008). Its objectives are to describe the lichen component of the two forest communities in Mason Farm and determine whether these two forests harbour different lichen floras.

MATERIALS AND METHODS

Study Area.—Mason Farm Biological Reserve lies within the city limits of Chapel Hill in southeastern Orange County, North Carolina, in the central Piedmont of the state (35°53′N, 79°01′W). The Piedmont physiographic province is characterized by rolling hills, which reflect an ancient mountainous geology of Proterozoic and Paleozoic (400–600 million yrs bp) crystalline bedrock, much of it granite. However, the geology of MFBR is instead in the younger Deep River Triassic Basin, a rift basin formed during the breakup of Pangea (Clark et al. 2001), and is strewn with older, more resistant diabase dikes that form the uplands (White et al. 1992). The area has a four–season climate with hot, humid summers and mildly cold winters interspersed with mild spring and fall seasons. Thirty-year (1971–2000) mean climatic data from the Chapel Hill weather station included summer maximum and

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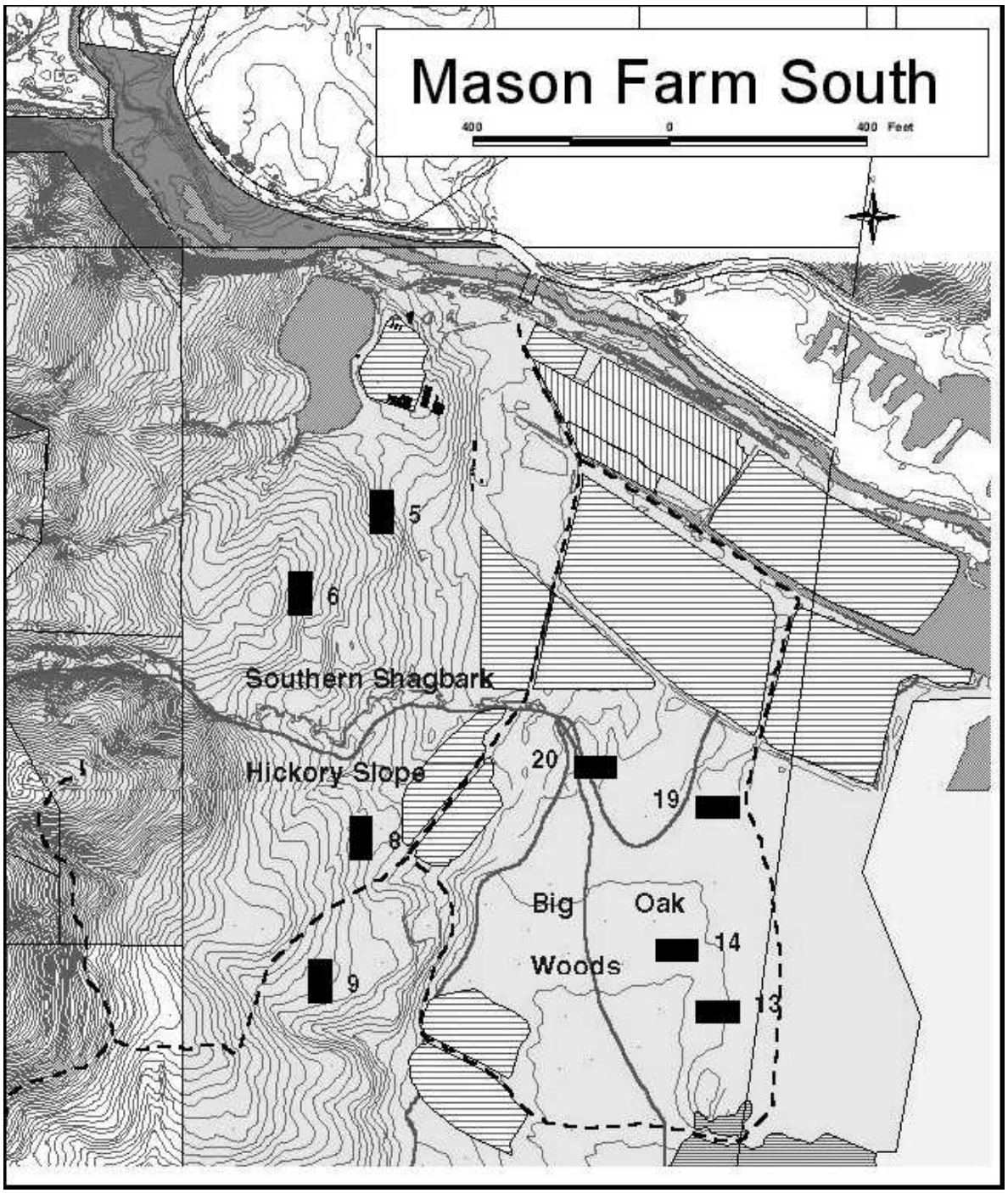

FIG. 1. Map of Mason Farm Biological Reserve showing locations of lichen surveyed plots in the forested Southern Shagbark Hickory Slope Natural Area and Big Oak Woods Natural Area.

winter minimum temperatures 31.7°C for July and −2.6°C for January, respectively (NOAA 2004). Yearly mean precipitation was 1,209 mm, falling 82–114 mm per month; mean annual snowfall was 165 mm.

Forest habitats within MFBR lay in two Natural Areas: 1) the Southern Shagbark Hickory Slope Natural Area (SSH) to the east, and 2) the Big Oak Woods Natural Area (BOW) occupying the southern third of the Reserve (Fig. 1). The lichen diversity at MFBR was inventoried via a survey on established 0.1 ha (20 × 50 m) permanent plots in these natural areas to provide an additional layer of data to those collected previously for the vascular flora (White et al. 1992). More specifically, four plots were sampled in each Natural Area with the objective to describe the lichen biotas in the two distinct forest types they represent (Fig. 1).

Southern Shagbark Hickory Slope Natural Area.—This area lay on a gradual east-facing slope over a north–south running geological dike of diabase with exposed rocks on the ground. The natural community is Basic Oak–Hickory Forest (Shafale and Weakley 1990), characterized by a canopy of oaks (*Quercus* spp.) and hickories (*Carya* spp.) with other hardwoods and conifers, including *Acer*, *Juniperus* and *Pinus*. Plots sampled include Nos. 5, 6, 8 and 9 from White et al. (1992) (Fig. 1), ranging 80.0–88.8 m in elevation. The original vegetation surveyed by White et al. (1992) in SSH exhibited a canopy dominated by *Quercus alba*. In Plots 5 & 6 *Quercus stallata*, a species characteristic of upland habitats was a co-dominant. Other characteristic co-dominant and subdominant tree species included *Acer rubrum* (Plots 5 & 9), *Carya carolinae-septentrionalis* (Plots 8 & 9), *C. glabra* (Plots 5 & 8), *Juniperus virginianus* (Plot 6), *Nyssa sylvatica* (Plot 8), *Pinus echinata* (Plot 5), *Q. falcata* (Plot 5), and *Q. shumardii* (Plot 9). The dominant shrub was *Viburnum rafinesquianum* throughout.

Big Oak Woods Natural Area.—Lying in the south-central portion of MFBR, Big Oak Woods is a seasonally flooded bottomland at the northern tip of the Lake Jordan watershed, lain over Triassic sediments. The natural community is Piedmont/Mountain Swamp Forest (Shafale and Weakley 1990), a hardwood bottomland forest that has been intact since before European settlement of the area. Like in SSH, the BOW canopy is characterized by oaks and hickories but some of different taxa, as well as other hardwoods and pines. Plots sampled include Nos. 13, 14, 19 and 20 (Fig. 1), ranging 74.0–75.2 m in elevation. White et al. (1992) described this forest as dominated by *Quercus pagoda*, *Q. phellos*, *Carya ovata* and *Liquidambar styraciflua*. More specifically, Plot 13 was dominated by *Q. pagoda* and *L. styraciflua*, Plot 14 by *C. ovata* and *Ulmus alata*, Plot 19 by *Q. phellos*, and Plot 20 by *Q. alba*. The shrub layer was again dominated by *V. rafinesquianum* in all but Plot 14, which was dominated by *Ilex decidua*.

The current vegetation of both Natural Areas appeared to match those originally described. However, it should be noted that in the lower BOW plots (Plots 13 and 14) were found many small trees and saplings, in particular *C. ovata* saplings.

Field collection.—All lichen taxa encountered were recorded in each surveyed plot. This sampling deviated from the nested plot method that the original vegetation survey employed (White et al. 1992) because of the three-dimensional nature of the lichens' forest habitat. Instead, the forest layer (i.e., floor, midbole and canopy) each lichen was observed in was recorded as well as its substrate (including species of phorophyte if identified). The floor layer included soil, rocks, decaying logs and stumps, and tree bases up to 0.5 m height. The midbole layer included vegetation (both trunks and branches) from 0.5–2.0 m, as far as can be reached by hand. The canopy was represented by litterfall (fallen branches, tree limbs and bark fragments). This latter category also included downed trees from recent storms. Vouchers of each species encountered were collected and deposited in the UNC Herbarium (NCU) with duplicates sent to cryptogamic herbaria of the New York Botanical Garden (NY) and Duke University (DUKE).

Specimens were determined using standard laboratory techniques, including microscopic examination of reproductive structures, chemical spot testing, and TLC (the latter at NY, using Solvents C and G following methods as applied by Lendemer et al. 2008). Keys used include those in Brodo et al. (2001), Harris (1995) and Harris and Ladd (2005). Taxa were cross-referenced against checklists of Perlmutter (2007) to determine new state records, and those of Perlmutter (2006) and Perlmutter and Lendemer (2008) to determine new NC Piedmont records.

Environmental data were measured in each plot in addition to the lichen data collected. These included latitude and longitude co-ordinates, elevation and percent canopy cover. Co-ordinates were taken with a GPS unit, with the elevation recorded using www.topozone.com as a cross-reference. Canopy cover was measured in September 2007 and February 2008 to reflect summer maximum and winter minimum, respectively. The canopy coverage data were tested for correlation with plot species numbers.

Diversity measures.—Lichen biodiversity was measured at a variety of scales, from the community level, here defined as forest layer (floor, midbole and canopy) within a Natural Area, to the forest type in each Natural Area (layers combined), to MFBR as a whole, to the forests of the central Piedmont here represented by MFBR and the mixed Mesic Hardwood Forests recently inventoried at William B. Umstead State Park (WIUM) in Wake County (Perlmutter and Lendemer 2008), 23 km east of MFBR. Beta diversities were measured with the Jaccard index (J) as practiced by Lendemer and Tripp (2008) for comparing lichen biotas in North Carolina:

$$J = j/(a + b - j),$$

where j = number taxa common to both areas, a = number taxa in site A, and b = number taxa in site B. A Jaccard index of 1 indicated complete species overlap between both sites; conversely, J = 0 indicated communities with no taxa in common. Here J values were calculated to compare lichen assemblage similarities at each but the largest scale. Finally, gamma diversity was determined at the largest scale here examined by combining the checklists of MFBR and WIUM.

Table 1. Lichen diversity and habit compositions of surveyed plots in MFBR, 2007.

Natural Area	Plot No.	Identified Lichen Taxa			
		Crustose	Foliose	Fruticose	Total
SSH	5	32	9	5	46
	6	35	17	4	56
	8	25	13	2	40
	9	28	13	3	44
BOW	13	24	9	1	34
	14	32	11	1	44
	19	25	11	1	37
	20	28	11	2	40
Total		68	27	10	104

RESULTS

A total of 104 taxa of lichens and allied fungi are reported from 254 collections in the MFBR survey with individual plot totals ranging 34–56 taxa, including those determined to genus only (Table 1). These taxa represent 59 genera in 33 families. Families contributing significantly to the MFBR lichen flora included: Parmeliaceae (14.4%), Physciaceae (14.4%), Arthoniaceae (6.7%), and Lecanoraceae (5.8%); the remaining families each contributed less than 5% (5 or fewer species). Broken down by habit, the flora was 65% crustose, 26% foliose and 9% fruticose (the latter including squamulose and dimorphic habits). The only significant correlation found from the canopy coverage measurement analysis was that between plot summer canopy cover and midbole lichen diversity ($r = -0.73$, $p < 0.05$).

Species most commonly encountered (in six or more plots) include: *Arthonia quintaria*, *Bacidia schweinitzii*, *Buellia curtisii*, *Candelariella reflexa*, *Flavoparmelia caperata*, *Graphis scripta*, *Lecanora strobilina*, *L. subpallens*, *Loxospora pustulata*, *Myelochroa aurulenta*, *Nadvornikia sorediata*, *Ochrolechia africana*, *Parmotrema hypotropum*, *P. submarginale*, *Pertusaria epixantha*, *P. multipunctoides*, *Phaeophyscia rubropulchra*, *Phyllopsora confusa*, *Physcia americana*, *P. pumilior*, *Pseudosagedia cestrensis*, *Punctelia rudecta*, *Pyrrhospora varians*, *Thelotrema subtile*, *Trypethelium virens*, and *Usnea strigosa*. All are corticolous species representing the midbole and canopy forest layers.

Calculated Jaccard indices (Table 2) revealed low to moderate similarities among lichen communities of the two forests. The highest J values were from comparisons of the two forests' midbole communities and canopy communities. The largest differences were between the floor and the canopy layers, regardless whether in the same forest or not, with virtually no species in common.

The lichen biota in SSH totalled 87 taxa, 27.9% more than that of BOW (68 taxa found). Fifty-two taxa were found in common between the two areas with a Jaccard index of 0.50 (Table 3).

Table 2. Beta diversities from Jaccard pairwise comparisons of species richness between forest layers within the forested Natural Areas of Mason Farm Biological Reserve. J = 1.00 is complete species overlap.

Natural Area	Forest Layer	SSH		BOW		
		Midbole	Canopy	Floor	Midbole	Canopy
SSH	Floor	0.04	0.02	0.07	0.06	0.03
	Midbole	—	0.20	0.04	0.42	0.18
	Canopy	—	—	0.00	0.12	0.51
BOW	Floor	—	—	—	0.09	0.00
	Midbole	—	—	—	—	0.06

Combining the MFBR checklist with that of WIUM produced a gamma diversity of 192 taxa. Beta diversity between these two areas resulted in a Jaccard index of 0.50, greater than that between the two MFBR Natural Areas (J = 0.44). Sixty-nine taxa were found in both areas, in the following 47 genera: *Acarospora*, *Arthonia*, *Arthothelium*, *Bacidia*, *Buellia*, *Candelaria*, *Candelariella*, *Canoparmelia*, *Chrysothrix*, *Cladonia*, *Flavoparmelia*, *Graphis*, *Heterodermia*, *Hypotrachyna*, *Lecanora*, *Lepraria*, *Leptogium*, *Loxospora*, *Maronea*, *Myelochroa*, *Nadvornikia*, *Ochrolechia*, *Opegrapha*, *Parmelinopsis*, *Parmotrema*, *Pertusaria*, *Phaeographis*, *Phaeophyscia*, *Phlyctis*, *Plyllopsora*, *Physcia*, *Porina*, *Porpidia*, *Pseudosagedia*, *Punctelia*, *Pyrenula*, *Pyrrhospora*, *Pyxine*, *Ramalina*, *Rinodina*, *Strigula*, *Thelotrema*, *Trapelia*, *Trypethelium*, and *Usnea*. All of the above common species in MFBR are also reported from WIUM.

ANNOTATED CHECKLIST

An annotated checklist of lichens and allied fungi is presented for the North Carolina Botanical Garden's Mason Farm Biological Reserve, Orange County, North Carolina, USA, surveyed in 2007. Nomenclature follows Esslinger (2008) except where as noted, with author abbreviations following Hafellner (2002); classification follows Lumbsch and Huhndorf (2007). Names are followed by Natural Area (BOW = Big Oak Woods; SSH = Southern Shaghbark Hickory Slope) to designate forest type, and plot number where encountered.

Table 3. Lichen flora of MFBR plots, categorized by forest layer.

Natural Area	Plot No.	Forest Layer		
		Floor	Midbole	Canopy
SSH	5	10	27	12
	6	15	26	17
	8	1	13	25
	9	11	18	16
BOW	13	0	16	18
	14	2	22	21
	19	0	18	20
	20	1	17	25

Author's collection numbers of vouchers (in italics) follow plot numbers. However, this checklist should be considered preliminary because of: 1) difficulty in collecting some saxicolous taxa on smooth rock surfaces; 2) a restricted canopy biota available for recording as litterfall, and 3) the cryptic nature of many taxa that lend themselves to be overlooked. Taxa reported as new to North Carolina and new to the North Carolina Piedmont are preceded with ([1]) and ([2]), respectively.

CLASS ARTHONIOMYCETES

ARTHONIACEAE

Arthonia caesia (Flot.) Körb. – SSH 5: *870a*.

Arthonia quintaria Nyl. – SSH 5, 8: *847*, *861*, *948*; BOW 20, 19: *1104*, *1150* (purple thallus).

Arthonia rubella (Fée) Nyl. – SSH 8: *982*; BOW 20, 14: *1097*, *1178*.

Arthonia sp. – SSH 6: *917*; BOW 19: *1135*.

Arthonia sp. 2 – BOW 20: *1106* (thallus purple, spores 4-celled).

Arthothelium spectabile A. Massal. – SSH 5, 6, 8: *852*; BOW 20, 14: *1132*.

Arthothelium taediosum auct. Amer. – SSH 5, 6, 8: *926*; BOW 14, 13: *1008*.

CHRYSOTRICHACEAE

Chrysothrix xanthina (Vain.) Kalb – SSH 5, 8: *866**, *981*; BOW 20, 14: *1030*, *1183*. This taxon now replaces *C. candelaris* for most corticolous specimens on hardwoods in eastern North America (Harris & Ladd, 2008). *Specimen cited in Harris & Ladd (2008).

MELASPILEACEAE

[1]*Melaspilea* sp. – SSH 5, 6: *827*, *912*, *929*.

ROCELLACEAE

Opegrapha corticola Coppins & P. James – SSH 8: *985*.

Opegrapha viridis (Ach.) Behlen & Desberger – SSH 9: *1227*; BOW 19: *1139*.

Opegrapha vulgata Ach. – SSH 5: *853*; BOW 20: *1031*, *1131*.

CLASS DOTHIDEOMYCETES

TRYPETHELIACEAE

[2]*Bathelium carolinianum* (Tuck.) R.C. Harris – SSH 5, 6, 8: *855*, *983*; BOW 20, 13: *1021*.

Trypethelium virens Tuck. ex E. Michener – SSH 5, 6, 9: *829*, *1204*; BOW 20, 19, 14: *1032*.

CLASS EUROTIOMYCETES

MONOBLASTIACEAE

[2]*Anisomeridium polypori* (Ellis & Everh.) M.E. Barr – SSH 6: *905*.

[1]*Monoblastia rappii* Zahlbr. – BOW 14: *1192*.

PYRENULACEAE

[2]*Anthracothecium nanum* (Zahlbr.) R.C. Harris – SSH 5, 6: *889*, *895*.

Pyrenula caryae R.C. Harris – BOW 19, 13: *1141*, *1207*.

Pyrenula pseudobufonia (Rehm) R.C. Harris – SSH 6: *897a*, *924*; BOW 19: *1151*, *1162*.

[1]*Pyrenula pyrenuloides* (Mont.) R.C. Harris – BOW 14, 13: *1206*, *1189a*.

[2]*Pyrenula subelliptica* (Tuck.) R.C. Harris – BOW 14: *1189*.

STRIGULACEAE

Strigula americana R.C. Harris – BOW 14: *1184*.

CLASS LECANOROMYCETES

ACAROSPORACEAE

Acarospora dispersa H. Magn. – SSH 5, 9: *878a*, *1224*.

AGYRIACEAE

Trapelia placodioides Coppins & P. James – SSH 5, 6: *878*, *885*.

Trapelia sp – SSH 6: *914*.

GRAPHIDACEAE

Graphis furcata Fée – SSH 8: *952*.

Graphis lineola Ach. – SSH 5, 6: *859*, *886*; BOW 19, 14, 13.

Graphis scripta (L.) Ach. – SSH 5, 6, 8, 9: *832*, *834*, *907*, *945*, *1015*, *1225*; BOW 20, 19, 14, 13: *1020*, *1154*, *1170*.

[2]*Phaeographis erumpens* (Nyl.) Müll. Arg. – BOW 20, 14: *1027*, *1108*.

Phaeographis inusta (Ach.) Müll. Arg. – BOW 20: *1109*.

Phaeographis sp. – SSH 5, 8: *856*, *860*. Common script, with an olive thallus bordered by a white prothallus. Lirellae purplish pruinose, branched star-like, coalescing into tight folds in older specimens (not unlike *Sarcographa*), with white border. May represent undescribed species (also found in Wake County, North Carolina [Perlmutter & Lendemer, 2008] and Jasper County, Georgia Beeching et al. (2008)).

PHLYCTIDACEAE

Phlyctis ludoviciensis (Müll. Arg.) Lendemer – SSH 5, 8, 9: *837*, *979*.

PORINACEAE

Porina heterospora (Fink) R.C. Harris – BOW 14: *1190*.

Pseudosagedia cestrensis (Michener) R.C. Harris – SSH 5, 6, 8, 9: *858*; BOW 20, 19, 14: *1018*, *1148*.

STICTIDACEAE

[1]*Thelopsis inordinata* Nyl. – SSH 6: *925*.

THELOTREMATACEAE

Nadvornikia sorediata R.C. Harris – SSH 5, 8: *887*; BOW 19, 14, 13: *1137*.

Thelotrema subtile Tuck. – SSH 5, 6, 8: *826*; BOW 20, 19, 14, 13: *1017*.

MEGASPORACEAE

Aspicilia sp. – SSH 6, 9: *922*, *931*, *1221*.

OCHROLECHIACEAE

Ochrolechia africana Vain. – SSH 5, 6, 8: *918*; BOW 20, 19, 14: *1025*.

PERTUSARIACEAE

Pertusaria epixantha R.C. Harris – SSH 5, 6, 8: *888*, *1013*; BOW 20, 19, 14.

Pertusaria multipunctoides Dibben – SSH 5, 6, 8: *830*, *980*; Plot 20, 19, 13: *1094*.

Pertusaria paratuberculifera Dibben – SSH 5, 9: *825*, *877*.

Pertusaria subpertusa Brodo – SSH 5, 6: *840*, *857*; BOW 20, 14: *1123*.

Pertusaria texana Müll. Arg – BOW 20: *1026*.

SARRAMEANACEAE

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris – SSH 6, 8, 9; BOW 20, 19, 14: *1115*.

CATILLARIACEAE

[1]*Halecania rheophila* R.C. Harris & Ladd ined. – SSH 9: *1223*.

CLADONIACEAE

Cladonia macilenta var. *bacillaris* (Genth) Schaer. – Plot 5: *843*.

Cladonia ochrochlora Flörke – SSH 5, 6: *839*, *869*, *906*; BOW 20: *1126*.

Cladonia peziziformis (With.) J.R. Laundon – SSH 5, 6: *849*.

Cladonia ramulosa (With.) J.R. Laundon – SSH 9: *1196*, *1200*.

Cladonia subtenuis (Abbayes) Mattick – SSH 6: *932*, *940*.

DACTYLOSPORACEAE

[1]*Dactylospora lurida* Hafellner – BOW 14: *1175*.

LECANORACEAE

Lecanora hybocarpa (Tuck.) Brodo – BOW 19, 14, 13: *1144*, *1172*, *1215*.

Lecanora oreinoides (Körb.) Hertel & Rambold – SSH 6: *903*, *904*.

Lecanora strobilina (Spreng.) Kieff. – SSH 5, 6, 8: *862*; BOW 20, 19, 14, 13: *1111*, *1214a*.

Lecanora subpallens Zahlbr. – SSH 8: *953*; BOW 20, 19, 14: *1116*.

[1]*Lecidella stigmatea* (Ach.) Hertel & Luckert – SSH 6: *900*.

Pyrrhospora varians (Ach.) R.C. Harris – SSH 5, 6, 9: *881*, *928*, *941*; Plot 20, 19, 14, 13: *1110*.

PARMELIACEAE

Canoparmelia caroliniana (Nyl.) Elix & Hale – SSH 5, 6: *824*; BOW 20: *1103*.

Flavoparmelia caperata (L.) Hale – SSH 5, 6, 8, 9: *841*; BOW 20, 19, 14: *1023*, *1120*.

Hypotrachyna livida (Taylor) Hale – SSH 6: *893*; BOW 20, 19, 14: *1028*, *1112*, *1124*, *1146*, *1152*, *1181*.

Myelochroa aurulenta (Tuck.) Elix & Hale – SSH 5, 6, 8, 9: *850*, *894*, *901*, *988*, *1012*, *1016*, *1202*; BOW 20, 19: *1022*, *1157*, *1163*.

Myelochroa obsessa (Ach.) Elix & Hale – SSH 6: *939*.

Parmelinopsis minarum (Vain.) Elix & Hale – SSH 6: *933*.

Parmotrema hypotropum (Nyl.) Hale – SSH 5, 8: *870*, *870c*, *949*; BOW 20, 19, 14, 13: *1096a*, *1114*, *1119*, *1155*, *1191*, *1209*.

Parmotrema perforatum (Jacq.) A. Massal. – BOW 19: *1143*.

Parmotrema reticulatum (Taylor) Hale – SSH 5, 6, 8, 9: *870b*, *911*, *986*, *1198*.

Parmotrema subisidiosum (Müll. Arg.) Hale & Fletcher – SSH 6: *902*.

Parmotrema submarginale (Michx.) DePriest & B. Hale – SSH 6, 8, 9: *919*, *946*, *1007*; BOW 20, 19, 14: *1096b*, *1105*, *1145*.

Parmotrema ultralucens (Krog) Hale – SSH 6: *896*, *899*, *910*.

Punctelia rudecta (Ach.) Krog – SSH 5, 6, 8, 9: *879*, *942*; BOW 20, 19, 14: *1029*, *1121*.

Usnea strigosa (Ach.) Eaton – SSH 5, 6, 8, 9: *864*; BOW 19, 14, 13.

Usnea strigosa (Ach.) Eaton – BOW 20: *1024*, *1024a* NORSTICTIC ACID CHEMOTYPE.

Usnea pensylvanica Mot. – SSH 5: *867*.

RAMALINACEAE

Bacidia schweinitzii (Fr. ex E. Michener) A. Schneid. – SSH 5, 6: *836*, *871*, *934*; BOW 20, 19, 14, 13: *1033*, *1156*, *1182*, *1205*. This is a variable crust, with apothecia ranging from tan to black.

Bacidia suffusa (Fr.) A. Schneid. – SSH 5: *880*.

Biatora printzenii Tønsberg – SSH 5: *835*; BOW 19: *1140*.

Phyllopsora confusa Swins. & Krog – SSH 5, 6, 8: *851*; BOW 20, 14, 13: *1098*, *1211*.

STEREOCAULACEAE

Lepraria friabilis Lendemer, K. Knudson & Elix – BOW 20: *1100*. This is a newly described species (Lendemer et al. 2008), first reported from the North Carolina Piedmont in Umstead State Park (Perlmutter & Lendemer, 2008).

Lepraria lobificans Nyl. – SSH 5, 6, 9: *833*; BOW 19, 14: *1169*, *1179*.

COLLEMATACEAE

Leptogium austoramericanum (Malme) Dodge – SSH 5: *854*.

Leptogium cyanescens (Rabenh.) Körb. – SSH 8, 9: *984*, *1201*; BOW 20, 19, 14: *1128*, *1147*.

PELTIGERACEAE

Peltigera phyllidiosa Goffinet & Miadl. – SSH 9: *1203*. The presence of this speices signifies a relatively healthy environment as *Peltigera* spp. are known to be sensitive to air pollution, in particular ozone concentrations from smog. However, the rarity of this same taxon could also indicate a compromised environment by the air quality of the surrounding Raleigh-Durham-Chapel Hill metropolitan area. Similar occurrences of *Peltigera* spp. were reported from WIUM (Perlmutter & Lendemer, 2008).

PHYSCIACEAE

Anaptychia palmulata (Michx.) Vain. – SSH 6: *908*, *927* (fertile).

[2]*Amandinea polyspora* (Willey) E. Lay & P. May – BOW 20: *1106a*.

Buellia curtisii (Tuck.) Imshaug (cited as *Baculifera curtisii* [Tuck.] Marbach in Esslinger [2008]) – SSH 6, 8, 9: *891b*, *1197*; BOW 20, 19, 14, 13: *1118a*, *1142*, *1174*, *1213*.

Buellia stillingiana J. Steiner – SSH 6, 8: *891*, *891c*; BOW 14, 20: *1118*, *1173*.

Heterodermia speciosa (Wulfen) Trevisan – SSH 6: *909*.

Phaeophyscia adiastola (Essl.) Essl. – SSH 8: *990*.

Phaeophyscia pusilloides (Zahlbr.) Essl. – BOW 19, 14: *1138*, *1168*.

Phaeophyscia rubropulchra (Degel.) Essl. – SSH 5, 6, 8, 9: *883*, *1220*; BOW 19, 14, 13: *1153*, *1158*.

Physcia americana G. Merr. – SSH 6, 8, 9: *930*, *989*, *1226*; BOW 20, 19, 13: *1019*, *1164*, *1208*.

Physcia millegrana Degel. – SSH 8: *950*, *951*, *1005*; BOW 14.

Physcia pumilior R.C. Harris – SSH 6, 8, 9: *1218*; BOW 20, 19, 13: *1095*, *1212*.

Physcia stellaris (L.) Nyl. – BOW 14: *1167*.

Pyxine sorediata (Ach.) Mont. – SSH 6, 8: *987*.

Pyxine subcinerea Stirt. – SSH 5, 6: *884*, *944*; BOW 20: *1129*.

Rinodina maculans Müll. Arg. – SSH 5, 6, 8: *882*, *1014*; BOW 14: *1180a*. Not listed in Esslinger (2008), but reported from WIUM (Perlmutter & Lendemer, 2008).

FUSCIDEACEAE

Maronea polyphaea H. Magn. – SSH 9: *1199*.

LECIDEACEAE

Porpidia albocaerulescens (Wulfen) Hertel & Knoph – SSH 5, 6, 9: *848*.

CANDELARIACEAE

Candelaria concolor (Dicks.) Stein – SSH 9: *1219*; BOW 14: *1185*.

Candelariella reflexa (Nyl.) Lettau - SSH 6, 8: *937*, *947*; BOW 20, 19, 14: *1180*.

CLASS SORDARIOMYCETES

AMPHISPHAERIACEAE

[1]*Amphisphaeria bufonia* (Berk. & Broome) Ces. & De Not. – SSH 6: *923*. A new state record for species and family. Nonlichen.

DISCUSSION

The forests of Mason Farm Biological Reserve contain a rich lichen biota, further describing that of the North Carolina Piedmont. A picture of the two forests' lichen diversities is emerging from this survey, adding to the complexity of the structure of these three-dimensional habitats. The two forest communities in MFBR were found to bear differences in their lichen biotas, both in terms of species richness and composition, and these were found to be different from the Mesic Mixed Hardwood Forests of WIUM. In fact, the Jaccard analysis of all six lichen communities (three forest layers in two forest communities) within MFBR showed each to be distinct.

Differences here found were likely attributed to variation in available substrates and environmental conditions of a given site or forest layer. For example, the forest floor is a shaded habitat containing soil, rocks, dead and decaying logs, moss and the bark of tree bases as potential lichen substrates, which is distinct from the canopy. The canopy by contrast is an exposed environment of twigs and branches. The lichens of a floor community are adapted to the sheltered conditions and are likely shade tolerant, whereas those in the canopy are adapted to the more exposed conditions and limited substrate areas that branches and twigs offer. Lichen communities in the midbole and canopy layers were found to be less distinct than between the latter and the floor. While substrata (tree bark) were more uniform above the floor, the environment at the midbole was like the floor more sheltered than that in the exposed canopy.

Within a level, lichen community differences were also found between the two forests. This is most pronounced at the floor level as suitable substrata in the BOW plots were largely lacking both by an absence of exposed rock and the presence of a seasonal flood regime, the latter which may have precluded the establishment of lichen thalli on tree bases and exposed wood of downed trees and stumps. This was in stark contrast with the SSH

floor, which lay in an upland / slope habitat that is well drained, and often studded with rocks. Midboles of the two Natural Areas largely comprised of different species of phorophytes, whose bark characteristics differed in texture, water retaining capacity and possibly pH (not measured here). Most lichens in the SSH plots were recorded from *Acer rubrum*, *Fraxinus americana* and *Quercus rubra*, whereas *Carya ovata* and *Ilex decidua* bore the most lichen records in the BOW plots. Further, the amount of summer sunlight penetrating onto midboles also appeared to affect species richness in this layer with more species found in plots with lower summer canopy coverage. Canopies of the two Natural Areas exhibited the greatest species overlap in their lichen communities of the three forest layers; however, differences were still considerable. Although the fallen branches and bark fragments were often not identified to their parent tree species, it is plausible that again they comprised of taxa representative of each forest type, and the lichens were differentially selecting phorophytes according to their substrate preferences. Furthermore, when tree data from White et al. (1992) were compared between the two forests, the resulting beta diversity (J = 0.51) was identical to that of the lichens in the midbole layer and similar to that in the canopy layer.

A moderate Jaccard index was calculated at a larger scale between MFBR *in toto* and WIUM, which was lower than that between the two Natural Areas within MFBR. The difference can be explained by habitat heterogeneity, where the habitats of MFBR were fairly uniform between the two forest types, and those of WIUM were more varied, including riparian, mesic slopes, and bottomland forests, the latter characterized by the presence of *Fagus grandifolia*, which was not found in the MFBR plots. Collecting sites within WIUM in addition included open riparian rocky habitats where numerous lichens were found on sunny rocks and exposed soil banks. About 50 more species were found in WIUM than in MFBR as a result of this greater habitat variability.

The two forest's lichen communities in Mason Farm can be described from this study's results; species richness and habit composition of each forest's lichen biota are broken down by forest layer (Table 4).

Basic Oak-Hickory Forest.—In the SSH the floor community is relatively rich and morphologically diverse, with species of all three habits in even proportions found on tree bases, exposed rocks of the dike, and down, decaying logs. The most common floor species, found in three out of the four plots surveyed, included the rock crust *Porpidia albocaerulescens* and the foliose lichen *Canoparmelia caroliniana* (the latter found primarily on wood of downed red cedars); most other taxa were found in only 1–2 plots each. The trunks at the midbole level harboured mostly a crustose flora.

Table 4. Lichen species richness and habit composition of the two forested Natural Areas in MFBR, broken down by forest layer.

Natural Area	Forest Layer	Total Species	Habit Composition		
			Crustose	Foliose	Fruticose
SSH	Floor	26	9	10	8
	Midbole	48	38	10	0
	Canopy	35	22	12	2
BOW	Floor	5	3	1	2
	Midbole	30	28	5	0
	Canopy	36	23	11	1

Most common species (in three or more plots each) at this level included: *Arthothelium spectabile*, *Bathelium carolinianum*, *Graphis scripta*, *Pertusaria multipunctoides*, *P. paratuberculifera* and *Pseudosagedia cestrensis* on large tree trunks, and *Thelotrema subtile* and *Trypethelium virens* on smaller trunks and lower branches. All are crustose species. And the canopy has a mixed community. In this layer the most common foliose lichens include: *Flavoparmelia caperata*, *Parmotrema reticulatum*, *P. submarginale* and *Punctelia rudecta*; crusts include: *Buellia curtisii*, *Loxospora pustulata*, *Ochrolechia africana*, *Pyrrhospora varians* and *Rinodina maculans*; and *Usnea strigosa* was the only common fruticose lichen.

Piedmont/Mountain Swamp Forest.—The lichen biota of the BOW plots is distinct from that in the SSH plots, but with many species in common. The floor is sparsely inhabited by comparison, with only a few species on tree bases and downed, decaying logs and stumps. These include *Cladonia* spp., *Lepraria lobificans*, *Leptogium cyanescens* and the allied fungus *Dactylospora lurida*, all but the lattermost also found in the SSH plots (however, this may be due to *D. lurida* being rare and easily overlooked). The midbole layer has a larger crustose component than in the SSH plots, with *Bacidia schweinitzii*, *Graphis lineola*, *Nadvornikia sorediata*, *Pseudosagedia cestrensis* and *Trypethelium virens* the most common crusts; and *Leptogium cyanescens* and *Phaeophyscia rubropulchra* the most common foliose lichens. The lichens of the canopy are also mixed in habit, and include: *Arthothelium taediosum*, *Buellia curtisii*, *Candelariella reflexa*, three species of *Lecanora* (*L. hybocarpa*, *L. strobilina* and *L. subpallens*), and *Ochrolechia africana*, as the most frequently collected crusts. Common macrolichens include: *Flavopamelia caperata*, *Hypotrachyna livida*, *Parmotrema hypotropum*, *P. submarginale*, *Physcia pumilior*, *Punctelia rudecta* and *Usnea strigosa*.

While this study gives an insight into the lichen diversity of Mason Farm Biological Reserve, it is by no means complete. Further exploration of the forests in MFBR will likely yield additional taxa, including potential new species records like the newly described *Lepraria friabilis* discovered here.

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Contributions to the Lichen Flora of North Carolina: A Preliminary Checklist of Lichens of the Uwharrie Mountains

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ABSTRACT. – A preliminary checklist of 78 species in 47 genera of lichens from 137 collections made in the Uwharrie Mountains of the North Carolina Piedmont is presented. Notewothy finds include *Mycoporum acervatum* and *Rinodina destituta* as new for North Carolina, and six new records for the North Carolina Piedmont. Among the latter is the rare *Xanthoparmelia monticola*, here first reported from outside its known range in the high elevation rock outcrops of the southern Appalachians.

INTRODUCTION

Approximately one third of North Carolina lies in the Piedmont physiographic province, an area characterized by rolling hills derived from ancient bedrock that is largely over 400 million years in age. The Piedmont is the most heavily populated region in the state, with three metropolitan areas involving the cities of Charlotte, Greensboro and Raleigh. Yet it still harbors many natural areas abounding with scenic rivers and lush deciduous forests.

One particularly noteworthy area within the North Carolina Piedmont is the Uwharrie Mountains, a narrow chain of peaks (150–300 m elevation) stretching southwest to northeast approximately 46 km in Stanly, Montgomery and Randolph counties. As summarized by Daniel and Butler (1996), the geology of this range was formed approximately 500 million years ago from eruptions by a chain of volcanic islands in shallow seas. Those volcanic rocks were later metamorphosed, folded and faulted, and finally exposed via erosion to form the chain of isolated peaks, known as monadnocks. The geology is largely metamorphic, complicated with a mixture of metavolcanic and mafic rocks in the northern half, and metasedimentary rocks with abundant metavolcanic rocks in the southern half of the chain.

As part of an ongoing effort to inventory the lichens of the North Carolina Piedmont (Perlmutter 2006, 2008, Perlmutter & Lendemer 2008), this report documents lichens found during two forays into the Uwharrie Mountains, a region that previously has received little if any attention lichenologically.

STUDY AREA

On separate collecting forays three areas in the Uwharries were explored: Morrow Mountain State Park, Barnes Creek Bluffs in Uwharrie National Forest and The Nature Conservancy's Black Ankle Bog Preserve. Morrow Mountain State Park is in Stanly County, while the latter two areas are in Montgomery County (Fig.1). Descriptions of these areas are as follows.

Morrow Mountain State Park

Morrow Mountain State Park lies adjacent to the Pee Dee River in eastern Stanly County. The park covers 1920 ha of oak–hickory deciduous forest and its natural areas are listed as nationally significant (NC Natural Heritage Program 2008). Distinctive features include four monadnocks, the highest being Morrow Mountain at nearly 305 m elevation, rising approximately 185 meters above the Piedmont hills. This park is known for its rhyolite quarries that were mined by Native Americans for centuries. Morrow Mountain Rhyolite (technically a metarhyodacite) is a hard, uniform and fine–grained rock that was favored for making stone tools such as arrowheads and spear points (Stewart and Roberson 2007).

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On 13 May 2006 I surveyed the lichens of Morrow Mountain State Park with park staff at their invitation. Specimens were collected from the following four sites:

(I) The forest immediately outside the park office (35°22'28"N, 80°04'26"W), elevation 130 m. Trees sampled included *Acer rubrum, Carya ovata, Quercus* sp. and *Ilex decidua.*

(II) Quarry Trail area and adjacent picnic area (35°22'43"N, 80°04'17"W), elevation 105 m. Habitat includes Mesic Mixed Hardwood Forest (Shafale and Weakley 1990) and argillite rock surfaces of an abandoned quarry and rock outcrops. The quarry was abandoned in the 1930's, with stone surfaces having a maximum age of lichen colonization of ~70 years. Phorophytes sampled include: *Fagus grandifolia, Ilex opaca* and fallen material of various species.

(III) Morrow Mountain Summit (35°21'11"N, 80°05'35"W), elevation 270 m. Habitat is Piedmont Monadnock Forest with a canopy dominated by chestnut oak (*Quercus prinus*) with other oaks (*Quercus* spp.) and hickories (*Carya* spp.) (Schafale and Weakley 1990).

(IV) Needle Eye – a basalt boulder field west of the road to the summit of Morrow Mountain, north of the bridle trail crossing (35°21'30"N, 80°05'28"W), elevation 165 m. Habitat is Piedmont Monadnock Forest with *Carya ovata* being the most sampled phorophyte.

Barnes Creek Bluffs

Barnes Creek Bluffs are in the Uwharrie National Forest, about 13 km NW of Troy in northern Montgomery County (35°28'48"N, 79°57'05"W). This 40.5 ha site is listed as a state–significant natural area (NC Natural Heritage Program 2008). According to a site profile prepared by the North Carolina Natural Heritage Program (NCNHP) (Schafale 1995), "The site is a complex of steep slopes and floodplains where Barnes Creek cuts through Dark Mountain. It supports several distinctive natural communities. The floodplain communities have a mixture of mountain and Coastal Plain species, with both mountain laurel [*Kalmia latifolia*] and titi [*Cyrilla racemiflora*]. A fairly extensive sloping rock outcrop is present…and supports a glade–like community with some species characteristic of high pH rocks…The site also contains a small boulderfield–like mesic forest with an extensive woody vine layer. The first of these communities is unlike anything known elsewhere in the state. The other two are very rare, undescribed natural community variants or new types."

This site's northernmost bluff was visited during an informal botanical field trip led by staff of the North Carolina Botanical Garden (NCBG) and NCNHP on 19 April 2008. We explored the floodplain north of Barnes Creek, and up the steep S–facing slope to near the summit, spanning an elevation range of 142–180 m. The slope was studded with boulders below outcrops of metamorphic and intermediate volcanic rocks. This bluff consisted of the three unique natural communities described above, here termed "Piedmont Alluvial Forest" along a floodplain adjacent to Barnes Creek, "Piedmont Mafic Glade" up the slope and "Dry Oak–Hickory Forest" near the summit.

Black Ankle Bog

The Nature Conservancy's Black Ankle Bog Preserve is located in the northeastern corner of Montgomery County, about 6 km SW from the town of Seagrove in neighboring Randolph County (35°29'58"N, 79°49'09"W). At 219 m elevation this preserve is 115 hectares and is listed as a nationally significant area (NC Natural Heritage Program 2008). The natural community is Hillside Seepage Bog (Schafale and Weakley 1990), a globally rare habitat that is ranked G1 (*i.e.*, known from five or fewer occurrences worldwide) with only two other occurrences in North Carolina. Also in the preserve is the equally rare Piedmont Longleaf Pine Forest, which is found only in Montgomery County. Although not a monadnock, this site has a geology that is of the same type (metamudstone and meta–argillite) as in the other sites yet distinct from that of the surrounding Piedmont (felsic metavolcanic) (Brown *et al.* 1985). Therefore, Black Ankle Bog has been determined to be a part of the Uwharrie Mountains region (M. Schafale, pers. comm.) and its lichens are reported here.

Black Ankle Bog was surveyed on 19 April 2008, following our visit to Barnes Creek Bluffs. We explored the bog and surrounding habitats, noting evidence of a prescribed burn that occurred about two years earlier.

METHODS

In each area all lichen taxa encountered were collected. With each collection the forest layer (*i.e.*, floor, understory and canopy) and the substrate were recorded. The floor layer included soil, rocks, decaying logs and stumps, and tree bases up to 0.5 m height. The understory layer included vegetation (both trunks

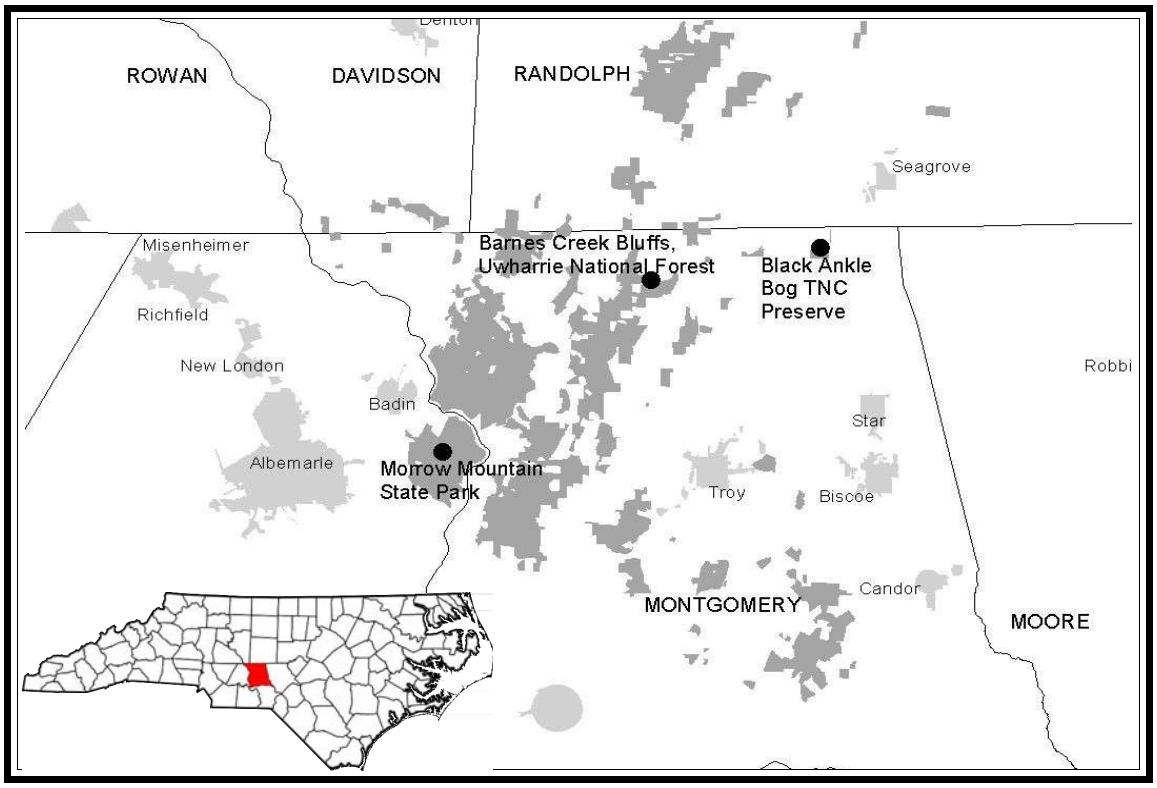

Figure 1. Map showing survey sites within the Uwharrie Mountains, North Carolina. Darker shaded areas are protected lands; lighter shaded areas depict towns.

and branches) from 0.5–2.0 m, as far as can be reached by hand. The canopy was represented by litterfall (fallen branches, tree limbs and bark fragments). This latter category also included downed trees from recent storms. Vouchers of each species encountered were collected and deposited in the UNC Herbarium (NCU) with select duplicates sent to the cryptogamic herbarium of the New York Botanical Garden (NY) for verification.

Specimens were determined using standard laboratory techniques, including microscopic examination of reproductive structures, chemical spot testing, and TLC (the latter at NY, using Solvents C and G following methods as applied by Lendemer and Tripp (2008)). Keys used include those in Brodo *et al.* (2001), Harris (1995) and Harris and Ladd (2005). Taxa were cross–referenced against checklists of Perlmutter (2008a) to determine new state records, and those of Perlmutter (2006, 2008) and Perlmutter & Lendemer (2008) to determine new North Carolina Piedmont records. Lichens encountered in the state park were also digitally imaged, some in the field and others later in the herbarium.

Lichen observation records and images from the Morrow Mountain visit were entered into North Carolina Division of Park and Recreation's Natural Resource Inventory Database (NRID). The NRID is a web–accessible database (http://207.4.179.38/Checklist/find.php) designed to bring public awareness to the park system's biodiversity. Species checklists of a given organismal grouping (e.g. "LICHEN") or that of a community (e.g. "TERRESTRIAL COMMUNITY") can be generated for a particular park or natural area (e.g. "Morrow Mountain State Park") from the pull–down menus, and printed for field use. The site also has an image gallery for further reference of a park's natural resources. Similarly, checklists were submitted to NCNHP as a condition of permission to collect at Barnes Creek Bluffs and Black Ankle Bog.

Taxa were analyzed by habit, forest layer (*i.e.*, floor, understory, canopy) and substrate to further characterize the lichen flora of this area.

Results And Discussion

The two forays yielded 137 collections representing 78 species in 47 genera. Of the 28 families represented by this flora, the largest are Parmeliaceae (15 spp.), Physciaceae (11 spp.), Lecanoraceae (8

spp.) and Pertusariaceae (6 spp.). Broken down by habit, the flora comprised 64% crustose, 27% foliose and 9% fruticose lichens, the latter including squamulose and dimorphic growth forms. Forty–four species were found in Morrow Mountain State Park, 53 in Barnes Creek Bluffs and 19 in Black Ankle Bog.

Lichens were found across all forest layers, with 41% of taxa found on the floor, 22% in the understory, and 37% in the canopy. On the floor most were found on rock (32% total flora taxa) with five species on soil and two on wood of downed, decaying logs. Corticolous species (representing both understory and canopy forest layers) make up 59% of taxa collected.

Compared to two other Piedmont lichen floras surveyed in North Carolina –Mason Farm Biological Reserve in Orange County and William B. Umstead State Park in Wake County, which yielded checklists of 100 and 150 taxa, respectively (Perlmutter 2008, Perlmutter and Lendemer 2008)–, the lichen flora of the Uwharrie Mountains appears to be somewhat less species rich at 78 taxa despite the high diversity of habitats sampled. This can be best explained by the limited time spent exploring in the Uwharries as compared to that given in the more intensive surveys conducted in the forests of Orange and Wake counties, despite the wide variation in sampling area (Mason Farm has 150 ha, Umstead State Park has 5500 ha, and combined area of this survey is approximately 2075 ha).

Nevertheless, the checklist in this report does give an indication of the lichen biodiversity of these monadnocks. For instance, many common taxa from the previous two surveys were found here, and are likely common throughout the Piedmont: *Arthonia quintaria, Bacidia schweinitzii, Buellia curtisii, Candelaria reflexa, Flavoparmelia caperata, Graphis scripta, Lecanora strobilina, L. subpallens, Loxospora pustulata, Myelochroa aurulenta, Nadvornikia sorediata, Ochrolechia africana, Parmotrema hypotropum, P. submarginale, Pertusaria epixantha, Physcia pumilior, Punctelia rudecta, Pyrrhospora varians, Trypethelium virens* and *Usnea strigosa*. Of the new Piedmont records, these were either overlooked/misidentified taxa (*Chrysothrix insulizans* and *Ionaspis alba*) or predominantly mountainous taxa (*e.g. Xanthoparmelia monticola*). The observation of *Fissurina insidiosa* in the Alluvial Forest at Barnes Creek Bluffs indicates that the lichen component of the vegetation is also Coastal Plain–affiliated. Further survey work is needed to better describe the lichen diversity of this fascinating region.

Annotated Checklist

Preliminary lichen checklist from forays to the Uwharrie Mountains, North Carolina, in 2006 and 2008. Nomenclature follows Esslinger (2008) unless otherwise indicated; family placement follows Lumbsch and Huhndorf (2007). Collection number(s) of voucher(s) follows each taxon, followed by site code in brackets (BA = Black Ankle Bog, BC = Barnes Creek Bluffs, MM = Morrow Mountain State Park). A notation on substrate and habitat (*i.e.*, natural community) is provided for each taxon, as well as a brief description if seemingly undescribed. [1]New record for North Carolina; [2]new record for the North Carolina Piedmont.

Arthonia quintaria Nyl. (Arthoniaceae) – *405*, *426, 1438* [BA, MM]. On twigs and branches, including *Acer rubrum* and *Liquidambar styraciflua* in Mesic Mixed Hardwood Forest and Hillside Seepage Bog.

Arthonia sp. (Arthoniaceae) – *436* [MM]. Resembles *A. dryadum* R.C. Harris & Ladd ined. in photobiont and spore characteristics, but differs in chemistry (epihymenium K+ red–violet, pigments dissolving; C–, KC–). On *Ilex opaca* sapling in Mesic Mixed Hardwood Forest.

Arthothelium taediosum auct. Amer. (Arthoniaceae) – *1395, 1434, 1444* [BA, BC]. On branches, including *Liquidambar styraciflua*, and on *Acer rubrum* snag in Dry Oak–Hickory Forest and Hillside Seepage Bog.

Aspicilia sp. (Megasporaceae) – *1407a* [BC]. Thallus dark gray, rimose; spores simple, hyaline, 18–20 × 12–14 µm; stictic acid. On circumneutral metamorphic rock in Piedmont Mafic Glade.

Bacidia circumspecta (Nyl. ex Vain.) Malme (Ramalinaceae) – *419* [MM]. On *Carya ovata* trunk in Mesic Mixed Hardwood Forest.

Bacidia polychroa (Th. Fr.) Körb. (Ramalinaceae) – *418* [MM]. On *Carya ovata* trunk in Mesic Mixed Hardwood Forest.

Bacidia schweinitzii (Fr. ex E. Michener) A. Schneid. (Ramalinaceae) – *409, 420* [MM]. On maple trunks in Mesic Mixed Hardwood Forest.

Bathelium carolinianum (Tuck.) R.C. Harris (Trypetheliaceae) – *1385* [BC]. On *Acer rubrum* trunk in Piedmont Mafic Glade.

Buellia curtisii (Tuck.) Imshaug (Syn. *Baculifera curtisii* in Esslinger 2008) (Physciaceae) – *416*, *444* [MM]. On hardwood branches in Mesic Mixed Hardwood Forest and Piedmont Monadnock Forest.

Buellia maculata Bungartz (Physciaceae) – *458, 1404, 1419* [BC, MM]. On basaltic and circumneutral metamorphic rock in Piedmont Moanadnock Forest and Piedmont Mafic Glade, respectively.

Buellia stillingiana J. Steiner (Physciaceae) – *424, 432* [MM]. On fallen bark fragments in Mesic Mixed Hardwood Forest and Piedmont Monadnock Forest.

[2]*Caloplaca sideritis* (Tuck.) Zahlbr. (Teloschistaceae) – *1411* [BC]. On circumneutral metamorphic rock in Piedmont Mafic Glade. Previously reported from Graham County in the mountain physiographic province of western North Carolina (Wetmore 1996).

Candelariella reflexa (Nyl.) Lettau (Candelariaceae) – *447* [MM]. On a hardwood branch in Piedmont Monadnock Forest.

Canoparmelia caroliniana (Nyl.) Elix & Hale (Parmeliaceae) – *1432, 1437* [BA]. On hardwood trees including *Liquidambar styracilua* in Hillside Seepage Bog.

Canoparmelia texana (Tuck.) Elix & Hale (Parmeliaceae) – *453* [MM]. On *Quercus rubra* in Piedmont Modnadnock Forest.

[2]*Chrysothrix insulizans* R.C. Harris & Ladd (Chrysotrichaceae) – *369, 1400, 1416* [BC, MM]. On argillite quarry wall in Mesic Mixed Hardwood Forest, and circumneutral metamorphic outcrops in Dry Oak–Hickory Forest and Piedmont Mafic Glade. Two specimens from the North Carolina Piedmont (*W.L. Culberson 10842*, Orange County [DUKE] and *P.O. Schallert s.n.*, Stokes County [NCU]) were reported as *C. candelaris* in Perlmutter (2006). These plus *W.L. Culberson 10422* (Chatham Co. [DUKE]) had since been redetermined as *C. insulizans*; the DUKE material by B.P. Hodkinson.

Chrysothrix xanthina (Vain.) Kalb (Chrysotrichaceae) – *425, 1398* [BC, MM]. On pine and oak trunks in Mesic Mixed Hardwood Forest and Dry Oak–Hickory Forest, repsectively. Additional specimens from the North Carolina Piedmont include *W.L. Culberson 6391* (Person County) and *W.L. Culberson 12123* (Orange County), both determined by B.P. Hodkinson (DUKE).

Cladonia apodocarpa Robbins (Cladoniaceae) – *1388, 1391* [BC]. On soil in Dry Oak–Hickory Forest and Piedmont Mafic Glade.

Cladonia ochrochlora Flörke (Cladoniaceae) – *437* [MM]. On wood of decaying log in Mesic Mixed Hardwood Forest.

Cladonia pleurota (Flörke) Schaerer (Cladoniaceae) – *1421BA* [BA]. On soil in Hillside Seepage Bog.

Cladonia subtenuis (Abbayes) Mattick (Cladoniaceae) – observed [BC]. On soil / duff in Piedmont Mafic Glade. Specimens collected were subsequently lost; they were determined in the field based on author's experience with this common Piedmont cladonia (Perlmutter 2006, 2008, Perlmutter & Lendemer 2008).

Dibaeis baeomyces (L. f.) Rambold & Hertel (Icmadophilaceae) – *1428* [BA]. On soil of tip–up mound in Hillside Seepage Bog.

[2]*Dirinaria frostii* (Tuck.) Hale & W.L. Culb. (Physciaceae) – *1409* [BC]. On metamorphic rock in Piedmont Mafic Glade. Previously reported from the mountains of Buncombe County (Perry & Moore 1969).

[2]*Fissurina insidiosa* C. Knight & Mitten (Graphidaceae) – observed [BC]. On *Cyrilla racemiflora* trunk in Piedmont Alluvial Forest. Specimens collected were subsequently lost; they were determined in the field based on author's experience with this distinctive graphid (Perlmutter 2007). *Fissurina. insidiosa* is noteworthy as it is a Coastal Plain species not yet reported from the Piedmont. Similarly, it was found further inland in Gorges State Park of North Carolinas mountain province, which surprisingly also has Coastal Plain affinities in its lichen biota (Lendemer and Tripp 2008).

Flavoparmelia baltimorensis (Gyeln. & Fóriss) Hale (Parmeliaceae) – *439, 1403* [BC, MM]. On argillite quarry wall in Mesic Mixed Hardwood Forest and on metamorphic rock in Piedmont Mafic Glade.

Flavoparmelia caperata (L.) Hale (Parmeliaceae) – *422, 1422BA* [BA, MM]. On hardwoods in Mesic Mixed Hardwood Forest and Hillside Seepage Bog.

Graphis scripta (L.) Ach. (Graphidaceae) – *434, 1382* [BC, MM]. On *Ilex opaca* trunks in Mesic Mixed Hardwood Forest and Piedmont Mafic Glade.

[2]*Ionaspis alba* Lutzoni (Hymeneliaceae) – *1410* [BC]. On metamorphic rock in Piedmont Mafic Glade. This saxicolous crust has been reported from the Piedmont of Georgia (Beeching *et al.* 2008).

Lecanora hybocarpa (Tuck.) Brodo (Lecanoraceae) – *430, 1373* [BC, MM]. On hardwood branches in Piedmont Alluvial Forest and Mesic Mixed Hardwood Forest.

Lecanora oreinoides (Körb.) Hertel & Rambold (Lecanoraceae) – *461, 1389* [BC, MM]. On basalt and metamorphic rock in Piedmont Monadnock Forest and Piedmont Mafic Glade, respectively.

Lecanora strobilina (Spreng.) Kieff. (Lecanoraceae) – *402*, *445, 1392, 1440* [BA, BC, MM]. On hardwood branches and twigs in Mesic Mixed Hardwood Forest, Piedmont Monadnock Forest and Dry Oak–Hickory Forest.

Lecanora subimmergens Vain. (Lecanoraceae) – *1405, 1418* [BC]. On circumneutral metamorphic rock in Piedmont Mafic Glade.

Lecanora subpallens Zahlbr. (Lecanoraceae) – *414, 1394* [BC, MM]. On hardwood branches in Mesic Mixed Hardwood Forest and Dry Oak–Hickory Forest.

Lecidella enteroleucella (Nyl.) Hertel (Lecanoraceae) – *454, 1399* [BC, MM]. On basalt and metamorphic rock in Piedmont Monadnock Forest and Piedmont Mafic Glade, respectively.

Lepraria lobificans Nyl. (Stereocaulaceae) – *1415* [BC]. On circumneutral metamorphic cobble in Piedmont Mafic Glade.

Loxospora pustulata (Brodo & W.L. Culb.) R.C. Harris (Sarrameanaceae) – *459, 1396* [BC, MM]. On *Carya ovata* and *Quercus rubra* trunks in Piedmont Monadnock Forest and Dry Oak–Hickory Forest, respectively.

Melanelixia subargentifera (Nyl.) O. Blanco *et al.* (Parmeliaceae) – *438* [MM]. On shaded, vertical argillite rock face of abandoned quarry in Mesic Mixed Hardwood Forest. Specimen was sent to HBG for molecular analysis.

Multiclavula cf. *corynoides* (Peck) R.H. Petersen (lichenized Basidiomycota) – *1429* [BA]. On soil of tip–up mound in Hillside Seepage Bog.

[1]*Mycoporum acervatum* R.C. Harris (Mycoporaceae) – *1442* [BA]. On exposed oak sapling stem in Hillside Seepage Bog. This crust has also been collected from planted *Quercus phellos* trees in Raleigh, NC (*G.B. Perlmutter 1164, 1604* [NCU]).

Mycoporum compositum (A. Massal.) R.C. Harris (Mycoporaceae) – *1443* [BA]. On exposed oak sapling stem in Hillside Seepage Bog.

Myelochroa aurulenta (Tuck.) Elix & Hale (Parmeliaceae) – *1417* [BC]. On metamorphic rock in Piedmont Mafic Glade.

Myelochroa obsessa (Ach.) Elix & Hale (Parmeliaceae) – *1414a* [BC]. On metamorphic rock in Dry Oak–Hickory Forest.

Nadvornikia sorediata R.C. Harris (Thelotremataceae) – *421*, *460* [MM]. On hardwood trunks in Mesic Mixed Forest and Piedmont Monadnock Forest.

Ochrolechia africana Vain. (Ochrolechiaceae) – *1393, 1435* [BA, BC]. On hardwood branches in Dry Oak–Hickory Forest and Hillside Seepage Bog.

Parmotrema hypoleucinum (Steiner) Hale (Parmeliaceae) – *455* [MM]. On wood of a hickory log in Piedmont Monadnock Forest.

Parmotrema hypotropum (Nyl.) Hale (Parmeliaceae) – *396, 431*, *1371, 1425* [BA, BC, MM]. On branches and twigs in Piedmont Alluvial Forest, Mesic Mixed Hardwood Forest, Piedmont Monadnock Forest and Hillside Seepage Bog.

Parmotrema perforatum (Jacq.) A. Massal. (Parmeliaceae) – *406, 413*, *442*, *452* [MM]. On hardwood branches in Mesic Mixed Hardwood Forest and Piedmont Monadnock Forest.

Parmotrema reticulatum (Taylor) Hale (Parmeliaceae) – *1424, 1427, 1433* [BA]. On bark in Hillside Seepage Bog.

Parmotrema subisidiosum (Müll. Arg.) Hale & A. Fletcher (Parmeliaceae) – *440, 1387, 1390, 1436, 1443a* [BA, MM]. On bark of hardwoods and conifers as well as rock in Mesic Mixed Hardwood Forest, Mafic Glade, Dry Oak–Hickory Forest and Hillside Seepage Bog.

Parmotrema submarginale (Michx.) DePriest & B.W. Hale (Parmeliaceae) – *400*, *427*, *451, 1379, 1441* [BA, BC, MM]. On bark of hardwoods and conifers in Piedmont Alluvial Forest, Mesic Mixed Hardwood Forest, Piedmont Monadnock Forest and Hillside Seepage Bog.

Pertusaria epixantha R.C. Harris (Pertusariaceae) – *408, 1376, 1397, 1426* [BA, BC, MM]. On hardwood trunks and branches in Piedmont Alluvial Forest, Mesic Mixed Hardwood Forest, Dry Oak–Hickory Forest and Hillside Seepage Bog.

Pertusaria ostiolata Dibben (Pertusariaceae) – *449* [MM]. On *Cornus florida* trunk in Piedmont Monadnock Forest.

Pertusaria paratuberculifera Dibben (Pertusariaceae) – *407*, *457* [MM]. On *Acer rubrum* and *Carya ovata* trunks in Mesic Mixed Hardwood Forest and Piedmont Monadnock Forest.

Pertusaria subpertusa Brodo (Pertusariaceae) – *1378* [BC]. On hardwood branch in Piedmont Alluvial Forest.

Pertusaria texana Müll. Arg. (Pertusariaceae) – *448* [MM]. Corticolous in Piedmont Monadnock Forest.

Pertusaria velata (Turner) Nyl. (Pertusariaceae) – *441* [MM]. On hardwood branch in Mesic Mixed Hardwood Forest.

Pertusaria xanthodes Müll. Arg. (Pertusariaceae) – *401*, *446* [MM]. On hardwood branches in Mesic Mixed Hardwood Forest and Piedmont Monadnock Forest.

Phaeographis inusta (Ach.) Müll. Arg. (Graphidaceae) – *428* [MM]. On hardwood branch in Piedmont Monadnock Forest.

Phaeophyscia adiastola (Essl.) Essl. (Physciaceae) – *1413* [BC]. On metamorphic rock in Piedmont Mafic Glade.

Phlyctis ludoviciensis (Müll. Arg.) Lendemer (Phlyctidaceae) – *1377* [BC]. On fallen hardwood branch in Piedmont Alluvial Forest.

Physcia atrostriata Moberg *et al.* (Physciaceae) – *1386* [BC]. On *Juniperus virginiana* trunk in Piedmont Mafic Glade.

Physcia pumilior R.C. Harris (Physciaceae) – *404, 1380, 1439* [BA, BC, MM]. On fallen branches and twigs in Piedmont Alluvial Forest, Mesic Mixed Hardwood Forest and Hillside Seepage Bog.

Physcia stellaris (L.) Nyl. (Physciaceae) – *1375* [BC]. On fallen branch in Piedmont Alluvial Forest.

Physcia subtilis Degel. (Physciaceae) – *1407b*, *1420* [BC]. On metamorphic outcrop in Piedmont Mafic Glade and Dry Oak–Hickory Forest.

Polymeridium proponens (Nyl.) R.C. Harris (Trypetheliaceae) – *1372* [BC]. On *Liquidambar styraciflua* sapling in Piedmont Mafic Glade.

Polysporina simplex Davies Vězda (Acarosporaceae) – *1431* [BA]. On metasandstone outcrop in Hillside Seepage Bog.

Porpidia albocaerulescens (Wulfen) Hertel & Knoph (Lecideaceae) – *1406* [BC]. On circumneutral metamorphic cobble in Piedmont Mafic Glade.

Pseudosagedia guentheri (Flot.) Hafellner & Kalb (Porinaceae) – *1401* [BC]. On metaconglomerate rock in Piedmont Mafic Glade.

Punctelia rudecta (Ach.) Krog (Parmeliaceae) – *415*, *423*, *450, 1384, 1423BA* [BA, BC, MM]. On hardwood and conifer bark in Mesic Mixed Hardwood Forest, Piedmont Monadnock Forest, Piedmont Mafic Glade and Hillside Seepage Bog.

Pyrrhospora varians (Ach.) R.C. Harris (Lecanoraceae) – *429, 433, 1374* [BC, MM]. On fallen bark in Piedmont Alluvial Forest and Mesic Mixed Hardwood Forest.

Pyxine subcinerea Stirt. (Physciaceae) – *456* [MM]. On *Carya ovata* trunk in Piedmont Monadnock Forest.

[1]*Rinodina destituta* (Nyl.) Zahlbr. (Physciaceae) – *1412, 1422* [BC]. On metamorphic rock in Piedmont Mafic Glade. A search of the literature failed to reveal any reports of this taxon in North Carolina; however, web–accessible herbarium records from NY (http://sciweb.nybg.org/science2/hcol/lena/index.asp, accessed 22 December 2008) indicate that it is widespread in eastern North America.

Trapelia glebulosa (Sm.) J. R. Laundon (Agyriaceae) – *1402* [BC]. On a pebble in an upturned root bole in Piedmont Mafic Glade.

Trypethelium virens Tuck. *ex* Michener (Trypetheliaceae) – *435, 1383* [BC, MM]. On *Ilex opaca* trunks in Mesic Mixed Hardwood Forest, Piedmont Monadnock Forest and Piedmont Mafic Glade. Common on smooth bark of hollies (*Ilex* spp.) almost exclusively in shaded forests.

Usnea strigosa (Ach.) Eaton (Parmeliaceae) – *399* [MM]. On fallen *Quercus rubra* bark fragment in Piedmont Monadnock Forest.

Verrucaria sp. (Verrucariaceae) – *1408* [BC]. Thallus dark, endolithic; perithecia minute; spores simple, hyaline, 8 per ascus, 28–34 × 8–10 µm. On metamorphic (metavolcanic?) rock in Piedmont Mafic Glade.

[2]*Xanthoparmelia monticola* (J.P. Dey) Hale (Parmeliaceae) – *1414*, *1423* [BC]. On metamorphic rock in Piedmont Mafic Glade and Dry Oak–Hickory Forest. This rock shield lichen is tracked by NCNHP as SR–L, meaning it is rare with a species range limited to North Carolina and adjacent states, and a global ranking of G2, meaning it is imperiled with 6–20 populations (Franklin and Finnegan 2006). Five records of this species are currently known in the state, all from high elevation rock outcrops in the southern Appalachians. This represents the first record outside its known range in the southern Appalachians. Other monadnock outcrops should be surveyed for this lichen.

Indetermined – *443* [MM]. Resembles *Phyllopsora*: thallus microsquamulose, gray–green; apothecia biatorine, black. Specimen under further study by J.C. Lendemer (NY). On wood of decaying log in Mixed Mesic Hardwood Forest.

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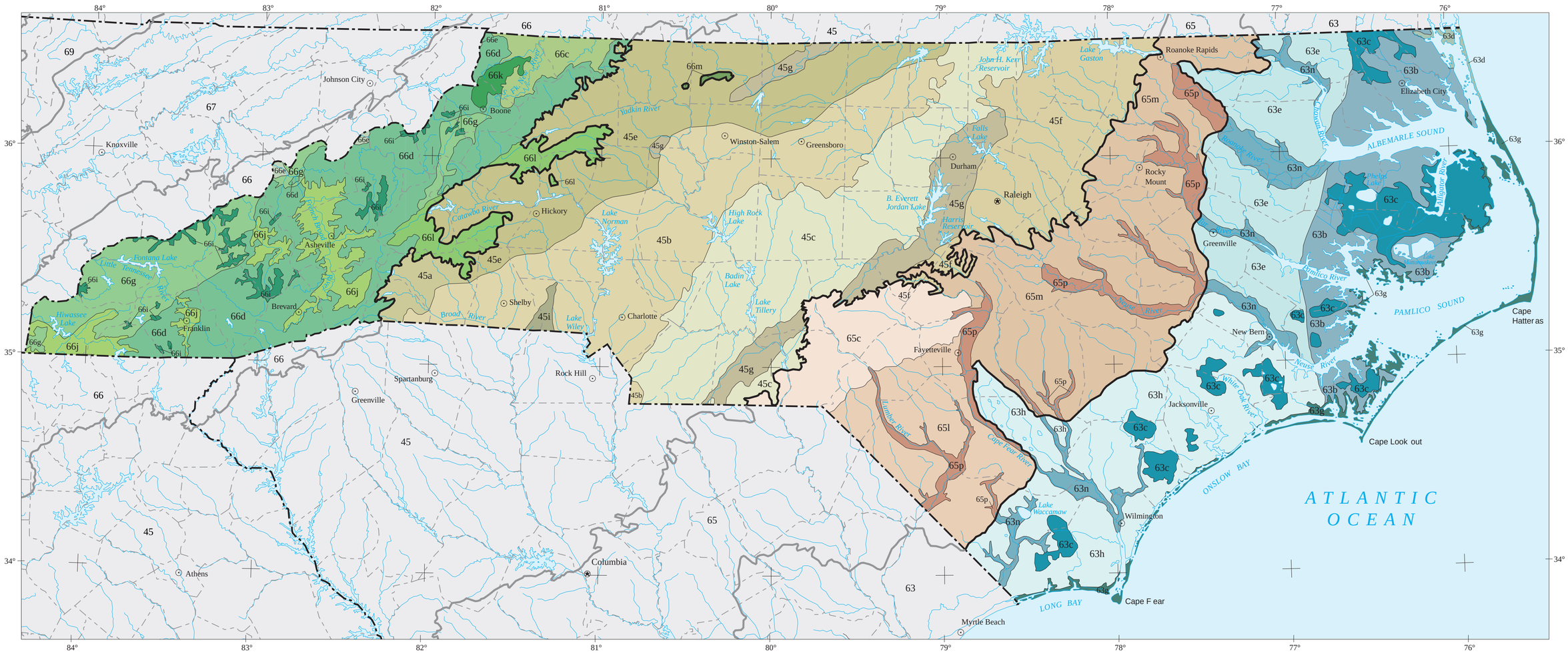
Ecoregions of North Carolina



45 Piedmont
- 45a Southern Inner Piedmont
- 45b Southern Outer Piedmont
- 45c Carolina Slate Belt
- 45e Northern Inner Piedmont
- 45f Northern Outer Piedmont
- 45g Triassic Basins
- 45i Kings Mountain

63 Middle Atlantic Coastal Plain
- 63b Chesapeake-Pamlico Lowlands and Tidal Marshes
- 63c Nonriverine Swamps and Peatlands
- 63d Virginian Barrier Islands and Coastal Marshes
- 63e Mid-Atlantic Flatwoods
- 63g Carolinian Barrier Islands and Coastal Marshes
- 63h Carolina Flatwoods
- 63n Mid-Atlantic Floodplains and Low Terraces

65 Southeastern Plains
- 65c Sand Hills
- 65l Atlantic Southern Loam Plains
- 65m Rolling Coastal Plain
- 65p Southeastern Floodplains and Low Terraces

66 Blue Ridge
- 66c New River Plateau
- 66d Southern Crystalline Ridges and Mountains
- 66e Southern Sedimentary Ridges
- 66g Southern Metasedimentary Mountains
- 66i High Mountains
- 66j Broad Basins
- 66k Amphibolite Mountains
- 66l Eastern Blue Ridge Foothills
- 66m Sauratown Mountains

Level III ecoregion
Level IV ecoregion
County boundary
State boundary

SCALE 1:1 500 000

15 10 5 0 30 60 mi

30 20 10 0 60 120 km

Albers Equal Area Projection

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Ecoregions denote areas of general similarity in ecosystems and in the type, quality, and quantity of environmental resources. They are designed to serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and ecosystem components. Ecoregions are directly applicable to many state agency activities, including the selection of regional stream reference sites, the development of biological criteria and water quality standards, and the establishment of management goals for nonpoint-source pollution. They are also relevant to integrated ecosystem management, an ultimate goal of many federal and state resource management agencies.

The approach used to compile this map of North Carolina is based on the premise that ecological regions are hierarchical and can be identified through the analysis of the spatial patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity (Wiken 1986; Omernik 1987, 1995). These phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. The relative importance of each characteristic varies from one ecological region to another regardless of the hierarchical level. A Roman numeral hierarchical scheme has been adopted for different levels of ecological regions. Level I and Level II divide the North American continent into 15 and 52 regions, respectively (Commission for Environmental Cooperation Working Group 1997). At Level III, the continental United States contains 104 regions (United States Environmental Protection Agency [U.S. EPA] 2000). Level IV is a further subdivision of the Level III ecoregions. Explanations of the methods used to define the U.S. EPA's ecoregions are given in Omernik (1995), Omernik and others (2000), Griffith and others (1994, 1997), and Gallant and others (1989).

The Level III and IV ecoregions were compiled at a scale of 1:250,000 and depict revisions and subdivisions of earlier level III ecoregions that were originally compiled at a smaller scale (U.S. EPA 2000; Omernik 1987). Compilation of this map is part of a collaborative project primarily between the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS), the U.S. EPA National Health and Environmental Effects Research Laboratory (NHEERL), U.S. EPA Region IV, and the North Carolina Department of Environment and Natural Resources. This project is also associated with an interagency effort to develop a common framework of ecological regions (McMahon and others 2001). Regional collaborative projects, such as this one in North Carolina where some agreement can be reached among multiple resource management agencies, are a step in the direction of attaining commonality and consistency in ecoregion frameworks for the entire nation.

Comments regarding the Level III and IV Ecoregions of North Carolina map should be addressed to Glenn Griffith, USDA-NRCS, 200 SW 35th Street, Corvallis, OR 97333, (541) 754-4465, FAX: (541) 754-4716, email: griffith.glenn@epa.gov, or to James Omernik, USGS, 200 SW 35th Street, Corvallis, OR 97333, (541) 754-4458, email: omernik.james@epa.gov.

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