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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

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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.

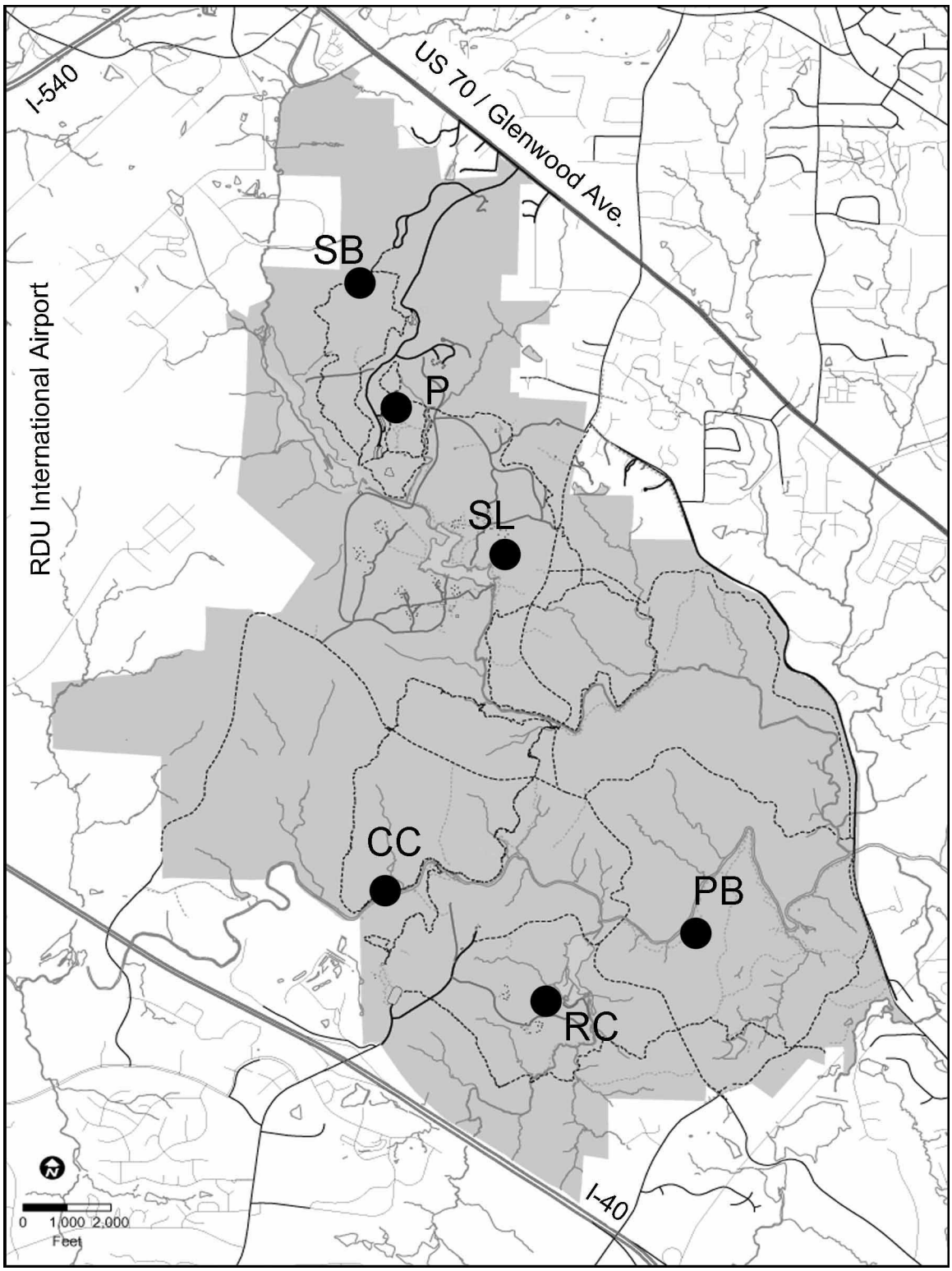

Figure 1. Map of William B. Umstead State Park (shaded). Collecting localities are mapped as large dots and the abbreviations used throughout the list are placed next to the dots.

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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