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Corticolous Lichens of Meeman Biological Station, Shelby County, Tennessee

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***Abstract*. An inventory of the corticolous lichen flora of the Edward J. Meeman Biological Station of the University of Memphis was conducted to determine the biodiversity of this protected site. In total, 43 species representing 28 genera and 15 families were identified. This preliminary list provides baseline data for future studies of the lichen flora of the area.**

***Keywords*. Biodiversity, corticolous lichens, Meeman Biological Station, Tennessee.**

INTRODUCTION

Few lichen floristic studies have been conducted in the state of Tennessee and most of those have been restricted to the eastern most part of the state, particularly to the Smoky Mountains (Calkins 1890, Skorepa 1972, Lendemer et al. 2013). Lichens are more abundant in the mountains and there is greater species diversity there. A lower lichen diversity and abundance may be one reason that few studies have extended into Western Tennessee, with the exception of Phillips (1963) who collected lichens in Fayette County, in the southwestern portion of the state.

This study examined lichens collected from Shelby County, which is in the southwestern-most corner of Tennessee, bounded by the Mississippi River to the west and the state of Mississippi to the south. Specifically, they were collected from the Edward J. Meeman Biological Station, operated by the University of Memphis. It began as a family estate that was willed to the University to be used in the study of ecology, conservation, and natural history. It comprises approximately 252 ha (620 acres) and is located approximately 40 km north of Memphis, Tennessee. The University took over the property in 1967 and established a biological field station that has been used by many local and visiting scientists. The land has remained virtually untouched for more than 50 years, is densely wooded, and is in the final stages of succession dominated by oaks (*Quercus* spp.). This upland hardwood site is located on the Chickasaw Bluffs, about four km east of the Mississippi River (elevation 120 m). It is adjacent to, and contiguous with, Shelby Forest State Park, which consists of approximately 7,000 ha (13,500 acres) of bottomland hardwood forest. The average yearly rainfall is 132 cm.

This compilation is a continuation of our work to document the lichen diversity of western-most Tennessee. Little work has been done in this part of the Mississippi River Valley to identify the lichens found here. This checklist fills a gap in knowledge regarding the lichen distribution in this part of the state.

METHODS

Specimens were collected during four collecting trips from July 2013 to March 2015. Collections were taken from tree trunks at approximately 1-1.5 meters in height. Lichens were also collected from limbs that had fallen from the canopy. Specimens were identified to species when possible using Brodo et al. (2001) and Brodo (2016). Nomenclature follows Esslinger (2015).

Chemical spot tests were used in identification of the lichens collected. These included a 10% potassium hydroxide solution (KOH), sodium hypochlorite solution (household bleach 8.2%), and a stable aqueous solution of *para*-phenylenediamine, prepared according to McCune and Geiser (2009). A hand-held, long- and shortwave UV light (Versalume by Raytech, Model PP-FLS) was used to detect xanthones.

A digital image was made of the voucher specimens and the list was entered on the Consortium of North American Lichen Herbaria website (CNALH 2016). Voucher specimens are stored in the Christian Brothers University herbarium.

RESULTS

A total of 43 species were identified from 28 genera and 15 families. Identified species, and the substrate on which they were found, are listed below.

Amandinea milliaria (Tuck.) P.May & Sheard – *S5986* on the trunk of *Castanea* sp.
Baculifera curtisii (Tuck.) Marbach – *S6006* on unidentified fallen limbs
Candelaria concolor (Dickson) Stein – *M308* on unidentified fallen limbs
Candelaria fibrosa (Fr.) Müll. Arg. – *M220* on the trunk of *Juglans nigra,* fallen branches of *Quercus* sp., *Liriodendron tulipifera,* and on other unidentified fallen limbs
Canoparmelia texana (Tuck.) Elix & Hale – *S6079* on fallen branches of *Liriodendron tulipifera*
Catillaria nigroclavata (Nyl.) Schuler – *M-317* on unidentified fallen limbs
Chrysothrix xanthina (Vainio) Kalb – *S5908* on the trunk of *Castanea* sp. Verified by I. Brodo
Cladonia sp. – *S5900* squamules on the trunk of *Pinus taeda*
Crespoa crozalsiana (B. de Lesd. ex Harm.) Lendemer & Hodkinson – *S5913b* on the trunk of *Castanea* sp.
Dirinaria aegialita (Afz.) B.J. Moore – *M230* on unidentified fallen limbs
Graphis scripta (L.) Ach. – *S5914* on the trunk of *Castanea* sp., and on unidentified fallen limbs
Flavoparmelia caperata (L.) Hale – *S6021* on fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs
Heterodermia albicans (Pers.) Swinscow & Krog – *S6098* on the trunks of *Liquidambar styraciflua, Castanea* sp., *Magnolia grandiflora, Acer rubrum, Juglans nigra,* on fallen branches of *Liriodendron tulipifera, and Quercus* spp.
Hyperphyscia adglutinata (Flörke) H. Mayrhofer & Poelt – *M337* on unidentified fallen limbs
Hyperphyscia syncolla (Tuck. ex Nyl.) Kalb – *S5893* on the trunk of *Juglans nigra,* and on unidentified fallen limbs
Lecanora hybocarpa (Tuck.) Brodo – *M338* on fallen branches of *Liriodendron tulipifera*
Lecanora strobilina (Sprengel) Kieffer – *S5902* on the trunk of *Pinus taeda*
Lepraria hodkinsoniana Lendemer – *M244* found on trunk of unknown tree Species determined by J. Lendemer.
Micarea melaena (Nyl.) Hedl. – *M342* on unidentified fallen limbs
Myelochroa aurulenta (Tuck.) Elix & Hale – *S6033* on the trunk of *Liquidambar styraciflua*
Myelochroa galbina (Ach.) Elix & Hale – *S6098* on fallen branches of *Liriodendron tulipifera*
Ochrolechia africana Vaino – *S5876* on unidentified fallen limbs
Ochrolechia pseudopallescens Brodo – *M340* on unidentified fallen limbs
Ochrolechia trochophora (Vaino) Oshio – *S6081* on fallen branches of *Liriodendron tulipifera*
Parmotrema austrosinense (Zahlbr.) Hale – *M287* on the trunks of *Pinus taeda, Castanea* sp., *Acer rubrum,* and fallen branches of *Quercus* spp. and *Liriodendron tulipifera*

Parmotrema eurysacum (Hue) Hale – *S6083* on fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs. Verified by I. Brodo

Parmotrema hypotropum (Nyl.) Hale – *S6071* on the trunks of *Pinus taeda, Castanea* sp., fallen branches of *Quercus* spp., and on unidentified fallen limbs

Parmotrema perforatum (Jacq.) A. Massal. – *S6055* on the trunk of *Castanea* sp., fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs

Parmotrema reticulatum (Taylor) M. Choisy – *S6085* on the trunks of *Castanea* sp., *Juglans nigra, Magnolia grandiflora*, fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs

Parmotrema stuppeum (Taylor) Hale – *M339* on unidentified fallen branches. Determined by I. Brodo

Pertusaria sp. *S6035* – on the trunk of *Fagus grandiflora*, and on fallen branches of *Liriodendron tulipifera*

Pertusaria pustulata (Ach.) Duby – *S6096a* on fallen branches of *Liriodendron tulipifera.* Determined by I. Brodo.

Pertusaria xanthodes Müll. Arg. – *S6096b* on fallen branches of *Liriodendron tulipifera.* Dettermined by I. Brodo.

Phaeophyscia pusilloides (Zahlbr.) Essl. – *S5886c* on fallen branches of *Quercus* spp., *Liriodendron tulipifera* and unidentified fallen limbs

Phaeophyscia rubropulchra (Degel.) Essl. – *S5983* on the trunk of *Castanea* sp., on fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs

Physcia millegrana Degel. – *M336* on the trunks of *Castanea* sp., *Cercis canadensis, Acer rubrum,* fallen branches of *Quercus* spp., *Liriodendron tulipifera,* and on unidentified fallen limbs

Physcia pumilior R.C. Harris – *M261* on unidentified fallen limbs

Physcia stellaris (L.) Nyl. – *S5886d* on unidentified fallen limbs

Punctelia missouriensis G. Wilh. & Ladd – *S5830* on unidentified fallen limbs

Punctelia rudecta (Ach.) Krog – *S5915* on the trunks of *Liquidambar styraciflua, Pinus taeda, Juglans nigra, Cercis canadensis, Acer rubrum, Castanea* sp., on fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs

Pyxine subcinerea Stirton – *M328* on the trunks of *Magnolia grandiflora, Cercis canadensis, Castanea* sp., fallen branches of *Quercus* spp., *Liriodendron tulipifera,* and on unidentified fallen limbs

Ramalina americana Hale – M279 on unidentified fallen limbs. Verified by I. Brodo

Rinodina maculans Müll. Arg. – *M341* on unidentified fallen limbs

Usnea strigosa (Ach.) Eaton – *S6062* on fallen branches of *Fagus grandiflora*

Xanthomendoza weberi (S. Y. Kondr. & Kärnefelt) L. Lindblom – *M280* on the trunks of *Juglans nigra, Castanea* sp., on fallen branches of *Liriodendron tulipifera,* and on unidentified fallen limbs.

DISCUSSION

The lichen flora in and around Memphis is depauperate compared to mountainous sites in the easternmost part of the state (Miller and Sullivan 2015). Growth forms, for the most part, are small, with only 41 species being previously reported from the western-most counties of Tennessee (Miller and Sullivan 2015). No soil lichens were found in this area, and there is very little exposed rock, so no saxicolous lichens were collected. All lichens were corticolous with 87 of the 313 specimens collected from the trunks of trees and the remainder from the canopy/fallen branches. Many lichens in this list represent the first reported findings from Shelby County.

Most of the lichen records in the closest proximity are from the Ozark region of Arkansas and the Smoky Mountains of Eastern Tennessee, whereas Western Tennessee is in the Gulf Coastal Plains physiographic region of the lower Mississippi Valley (Nelson and Zillgitt 1969). It

is not unusual to find species of plants in Western Tennessee that are considered coastal whose range extends up the Mississippi River valley, such as water tupelo (*Nyssa aquatica*), bald cypress (*Taxodium distichum*), and water hickory (*Carya aquatica*) just to name a few (Kirkman, et al. 2007). Western Tennessee is marked by low elevation and a relatively flat terrain. The climate, elevation and microhabitat associated with the elevation are probably the factors that most affect the species differences found between the Mississippi River Valley and those to the east and west.

Lichen species diversity is generally greater in northern latitudes (Spribille et al. 2010) and higher elevations. We have certainly found this with the lichen populations at Meeman. Forest density also affects lichen species diversity. Gaps in the forest offer a greater opportunity for recruitment of additional lichen species (Neitlich and McCune 1997). This could contribute to the lower number of lichen species found in our study area, as there are few gaps in the canopy at this site.

Lichens are important as indicators of climate change (Root et al. 2014), and it is therefore important to obtain baseline data on the species that are present. This paper serves to document the species currently found in the extreme southwestern corner of Tennessee. Knowing the species that are found here will be important to future studies examining the results of climate change in the lower Mississippi River Valley.

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