

The first report of the rare lichen species *Phaeophyscia leana* (Physciaceae) from Alabama

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Abstract. *Phaeophyscia leana*, largely considered to be endemic to the river systems of central eastern North America, is newly reported from Madison County, Alabama. This is the first report from Alabama and extends the distribution of the species nearly 195 kilometers south of its currently established southern range limit. The species occurs on trees in river floodplains, a habitat that has been widely altered through hydrological engineering throughout eastern North America.

Key words. Lichen diversity, southeastern United States, Tennessee River, conservation, Huntsville.

INTRODUCTION

Phaeophyscia leana (Tuck.) Essl., Lea's Bog Lichen, is a rare foliose lichen originally discovered near Cincinnati, Ohio in 1839 by Thomas Lea (1849). Thomson (1963) speculated that it had possibly gone extinct by the early 1960's. However, *P. leana* was rediscovered by Skorepa (1984) along the Ohio River in Hardin County, Illinois. Subsequent field and herbarium studies have documented extant populations in 12 counties and in five states, mainly along the Ohio and Wabash Rivers, the Green River in Kentucky and Cumberland River in Tennessee (Wilhelm and Master 1994, Wilhelm et al. 2000, Gillespie and Methven 2002, Andreas et al. 2007, Lendemer 2009; Fig. 1). Within that same range, at least five extirpated populations have also been reported (Taylor 1967, Gillespie and Methven 2002).

Phaeophyscia leana is found on the bark of trees in periodically inundated backwater sloughs, oxbows, lakes and bottomland forests along major rivers and tributaries in the Ohio River basin of eastern North America (Gillespie and Methven 2002, Lendemer 2009). Though restricted to this specific habitat, the species does not appear to be substrate-specific, occurring on *Acer*, *Carya*, *Celtis*, *Diospyros*, *Fraxinus*, *Gleditsia*, *Liquidambar*, *Maclura*, *Nyssa*, *Platanus*, *Populus*, *Quercus*, *Taxodium* and *Ulmus* (Skorepa 1984, Wilhelm et al. 2000, Gillespie and Methven 2002). Often found below the water mark on trees, *P. leana* is recognizable in the field by its pale lower surface and long, narrow (strap-like) lobes (Esslinger 1978, Lendemer 2009).

This rare lichen is of great conservation concern owing to habitat degradation and loss. Factors negatively influencing habitat quality of *P. leana* along the Ohio River and its major tributaries include altered hydrology regimes following construction of canals, dams, locks and levees (Wilhelm and Masters 1994, Wilhelm et al. 2000, Gillespie and Methven 2002). Land clearing, drainage projects and agricultural field runoff have led to eroded shorelines and heavy silt loads that have further altered water flow (Gillespie and Methven 2002). Increasingly irregular and high-volume floods have scoured shorelines and further eroded bottomland forests (Wilhelm et al. 2000, Gillespie and Methven 2002). New, targeted attempts to locate additional populations, as

well as other additional research such as population genetics and microhabitat ecological assessments, are needed to better understand the distribution of this species and factors affecting its rarity. *Phaeophyscia leana* has been listed as threatened in Illinois (Mankowski 2012), was proposed for federal listing as endangered or threatened (U.S. Fish and Wildlife Service 2011), and proposed for global protection on the Global Fungal Red List (IUCN 2018).

While performing a general lichen survey of Redstone Arsenal (hereafter RA) in Huntsville, Alabama, a population of *P. leana* was discovered in the Bradford Sinks area, a floodplain region near the Tennessee River. This is the first report of this rare lichen from Alabama and a substantial extension of its range southward from the previous southernmost known location in Tennessee.

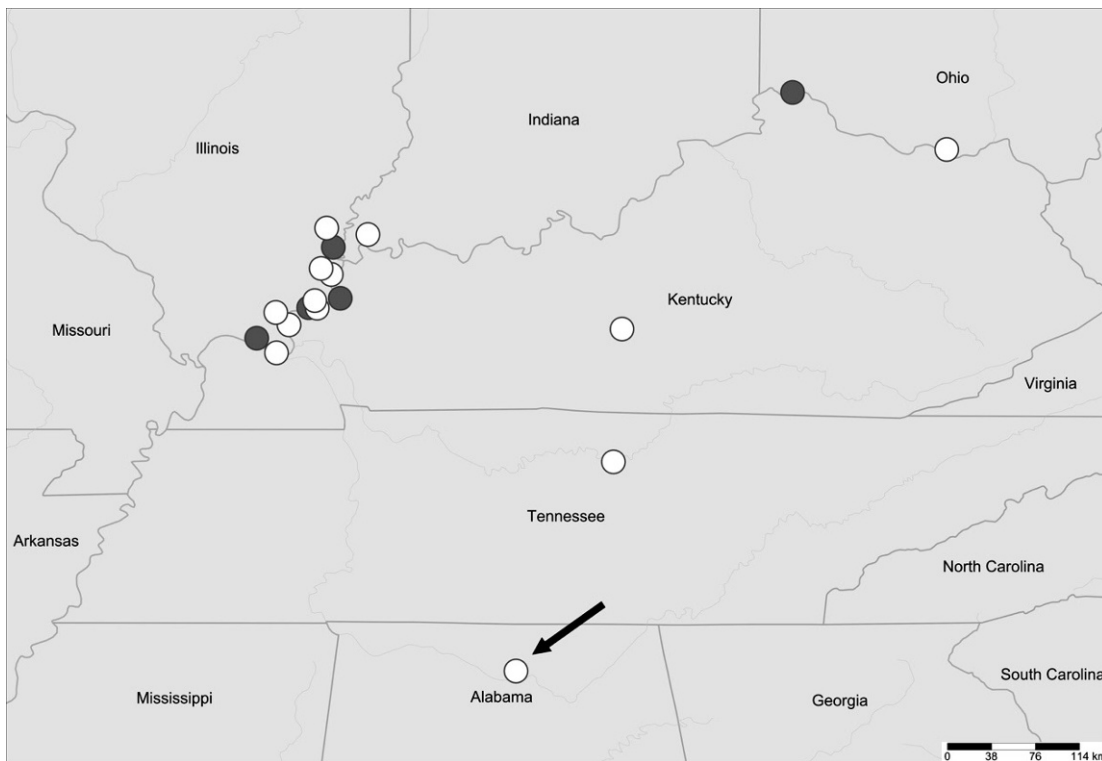


Figure 1. Known distribution of *Phaeophyscia leana* based on Wilhelm and Master (1994), Wilhelm et al. (2000), Gillespie and Methven (2002), Andreas et al. (2007), and Lendemer (2009). Shaded circles represent extirpated populations based on Taylor (1967) and Gillespie and Methven (2002). Open circles represent thirteen counties with extant populations, including the state record reported here (arrow).

MATERIALS AND METHODS

A general survey of lichens was carried out at RA, including the area known as Bradford Sinks. Specimens were collected using a hammer and chisel, placed into paper sacks and returned to the Freeman Herbarium (AUA) at the Auburn University Museum of Natural History for identification and processing prior to accessioning. Literature used for identification included, Brodo (2016), Brodo et al. (2001), Esslinger (1978) and Lendemer et al. (2013) and standard spot tests (K, C, P) followed Brodo et al. (2001). The *Phaeophyscia leana* sample was collected by CJH, identified by JCL and confirmed by T.L. Esslinger (*pers. comm.*).

RESULTS AND DISCUSSION

Only two individuals of *P. leana* were found growing on the base of an oak, in a wetland area called Bradford Sinks, located in the southwest corner of RA. Bradford Sinks is a system of several limestone sinkhole ponds periodically flooded by the Tennessee River and surrounded by a mixture of hardwoods and pines. The Tennessee River—the largest tributary to the Ohio River and the southernmost major river in the Ohio River basin (White et al. 2005)—defines the southern border of RA.

Previously unreported in Alabama (Hansen 2003, Hansen and Dute 2005, Hansen and Lendemer 2008, Hansen et al. 2008), except in the resulting checklist of survey work completed on RA (Hansen 2018), this new state record extends the known range of *P. leana* approximately 195 kilometers south-southwest of the next closest known population near Carthage, Tennessee and brings the number of counties with extant populations to 13, in six different states (Fig. 1). With a single known occurrence from Alabama, this unique and rare species—associated with a distinct habitat—warrants conservation monitoring, tracking and further search efforts in the Bradford Sinks area at RA and in similar habitats along the Tennessee River in northern Alabama. A subsequent trip to Bradford Sinks was successful in relocating the originally sampled tree but no other individuals of *P. leana* were located on other trees after several hours of searching. This strongly suggests that the species is rare at this location (Hansen *pers. comm.*).

Specimen Examined. – **U.S.A. ALABAMA. MADISON CO.:** Huntsville, Redstone Arsenal, Bradford Sinks area, 1.3 air mi NE of Triana. 15.xii.2016, on oak, *C.J. Hansen 6260* (AUA, NY).

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