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Liverworts (Marchantiophyta) of Miami, Florida, USA

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Abstract: This study, the first survey of species composition and abundance in the built environment of Miami, Florida, USA, found 18 taxa, six of them new records for Miami-Dade County. The newly reported taxa are: *Acrolejeunea heterophylla*, *Frullania brittoniae*, *F. eboracensis* ssp. *virginica*, *F. inflata* var. *communis*, *Lejeunea trinitensis*, and *Marchantia inflexa*. In addition, *Frullanoides bahamensis*, last seen in the county in 1916, was recollected. A comparison of the findings of this study with previous works shows that the liverwort flora of the built environment is more similar in species composition to the flora of coastal woodlands of the Tampa Bay area than it is to the flora of tropical hammocks of Miami-Dade County.

Keywords: flora, Florida, Hepaticae, liverwort, Miami, urban.

Introduction

The diversity of liverworts (Hepaticae or Marchantiophyta) in Florida has been documented through herbarium collections since the late 19th Century, and continued interest in the state's liverworts have resulted in a well-documented flora (McFarlin 1940, Redfearn 1952, Breil 1970, Dauphin et al. 2011). Even certain special habitats, such as mangroves and coastal woodlands (TeStrake et al. 1986), temperate hammocks (Davis Fleming 1997), and tropical hardwood hammocks (Schuster 1971), have been surveyed for their liverworts, revealing compositional differences and similarities, as well as showing that about half of Florida's liverworts have tropical affinities (Dauphin et al. 2011).

Surprisingly, the built environment (also called the "cultural environment") of urban and suburban Miami, Miami-Dade County, Florida, has been eschewed by hepaticologists, perhaps in the mistaken belief that liverworts cannot thrive in the built environment. However, as many surveys have shown (e.g., Fudali 2006), liverworts can and do colonize urban environments. The built environment may have been neglected in the belief that its artificiality is irrelevant to "natural" floras, but in an era when virtually all habitats are influenced directly or indirectly by human activities, I argue that the built environment is but one habitat of many available for colonization and that all habitats must be taken into account in surveys of species' ranges and abundance (Stevenson & Hill 2008). The built environment may take on greater conservation importance as "natural" habitat is lost or despoiled (Kirmaci & Ağcagil 2009; Oishi 2012).

Based on herbarium collections held by the New York Botanical Garden (NY), the University of Florida (FLAS), and the University of South Florida (USF), Dauphin et al. (2011) tallied 167 species of liverworts from the state of Florida. Miami-Dade County (formerly known as Dade County) is home to 61 species. The county comprises less than 3% of the state's area (4915 km^2 out of 170,304 km^2 – data from US Census Bureau) but is home to 36% of its liverwort taxa.

The classical collecting sites in South Florida were the tropical hardwood hammocks, such as Castellow Hammock, Hattie Bauer Hammock, and Brickell Hammock, many of which are still preserved, although no longer pristine. Schuster (1971) wrote, "Total environmental destruction in south Florida has proceeded to such a degree that collecting there is now nearly profitless; a similar situation exists in the Florida Keys." In the four decades since Schuster's pronouncement, urbanization and agriculture have continued to affect much of Miami-Dade County's natural areas, but is the liverwort flora in as dire straits as Schuster proclaimed? Do liverworts have a foothold in the built environment? What is the urban/suburban liverwort flora and how does it differ from that of the nearby natural areas?

Materials and Methods

Collections-based surveys were completed in four built environments across Miami, Miami-Dade Co., Florida, USA (Fig. 1), from December 2011 to December 2012. These collecting sites are: Florida