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Macrofungal Diversity at the Gordon Natural Area

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Abstract

The Gordon Natural Area (GNA), a suburban preserve in Chester County, has been protected since 1973. In Fall 2007, riparian and wooded habitats at the GNA were surveyed for macrofungi (MF) presence and abundance. Specifically, Ascomycete and Basidiomycete sporocarps were identified, counted, and classed into functional groups as: decomposers, mycorrhizal, or other. Several species of gilled mushrooms, jelly fungi, morels, puffballs, and shelf fungi were found. Of these, shelf fungi were the most abundant, while morels were the rarest. Most species were classed functionally as decomposers of fallen logs and snags, while several presumed mycorrhizal species were also found, primarily associating with oak (*Quercus*) hosts. Further, most species were found in forest compared to floodplain habitats. This is the first comprehensive MF survey at the GNA, and results suggest that MF species richness can be relatively high in natural areas located in fragmented, urban landscapes in southeastern PA.

Introduction

In the fall of 2007 a survey was conducted documenting MF diversity in the GNA in West Chester, PA. Biodiversity studies generally focus on vertebrate animal and plant species, while MF are often ignored among important biodiversity taxa. This is unfortunate given the key role MF play in forest ecosystem dynamics. Dead plant and animal biomass is decomposed by fungi, which then cycle the nutrients from the detritus into the soil. Without fungi, leaf litter and animal detritus would build up and soils would become devoid of essential nutrients such as carbon, nitrogen and phosphorous. Further, many MF benefit forest ecosystems by forming mycorrhizal associations with host plants that benefit plant growth and survival. Finally, many MF provide food for many species of animals and other fungi.

Previous studies at the GNA have catalogued the diversity of trees, mosses, shrubs, other plants, and vertebrate animals, but none have surveyed MF diversity there. In an effort to continue conservation at the GNA and assess its overall taxonomic diversity, our study was a comprehensive effort to catalogue as many different types of MF as possible. This effort was made in order to benefit overall conservation efforts at the preserve. Knowing, for example, which MF occur, and the abundances of each MF species, important taxonomic and ecological information is found. Also, our survey differentiates MF into functional groups and in different habitats, providing important ecosystem and spatial information. We plan to continue cataloguing MF at the GNA, which is important since this preserve is facing further forest fragmentation, exotic plant and animal invasions, and stressors from recreational use, which may impact MF and other forms of biodiversity into the future.
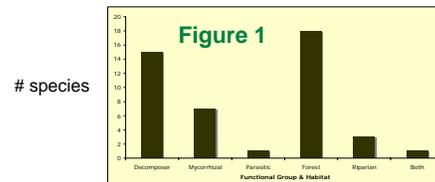
Methods

Field Sampling
A walking survey was performed in three major *habitats* of the GNA: (1) the "Big Woods", (2) a remnant forest, and (3) a floodplain. When MF sporocarps were found, efforts to *identify* them was made using field guides. Pictures were also taken to document them with a digital camera for later lab ID. The number of individual sporocarps per sample was also recorded to assess MF abundance. Also determined, using field location, was the *functional status* of each MF sporocarp sample. Specifically, a determination as to whether a given sample was a *decomposer* or "potentially" *mycorrhizal* was determined using the following criteria: (1) MF likely a decomposer if found colonizing coarse woody debris (i.e. logs, snags or stumps) or (2) MF presumed mycorrhizal if found on bare soil or open grass near trees, or clearly attached to roots of a host tree. Last, MF were assigned to the specific habitat in which they were sampled.
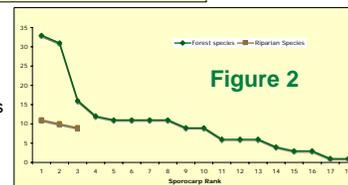
Lab Identification
After field sampling was complete, MF sporocarp photos were compared to MF field guides and identified based on their morphological and phenotypic characteristics. Because identification based solely on morphology can be limiting, however, dried sporocarps and photos were reviewed by a field mycologist for further verification.

Data Analysis
Identified samples and frequency data were used to construct a simple ecological profile of the MF at the GNA. Overall MF species richness, and within functional groups, was calculated as was species abundance (as total sporocarp numbers) overall and in specific habitats.

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Findings & Conclusions

❖ Twenty two MF species were found, suggesting fair species richness given the study's short duration. Sporocarp abundance shown in (); Brown = decomposer, blue = presumed mycorrhizal species, *also parasitic; f = forest, r = riparian habitats.

Coriolus versicolor (33)f
Stereum ostrea (31)f
Coprinus comatus (16)f
Mycena leaiana (15)fr
Pleurotus ostreatus (12)f
Ciboria species (11)f
Fomes species (11)f
Lactarius species (11)f
Oudemansiella radicata (11)r
Red unknown species (11)f
Coprinus atramentarius (10)r

Trametes hirsuta (9)r
Unknown shelf fungus (9)f
Volvariella speciosa (9)f
Agaricus species (6)f
Bolete species (6)f
Dacryomycetaceae species (6)f
*Polyporous squamosus (4)*f*
Strobilomyces floccopus (3)f
Amanita vaginita (3)f
Physarum species (1)f
Morchella esculenta (1)f

❖ 15 species were decomposers, seven were presumed mycorrhizal, one is a known parasite. 18 species found in forest habitats, three in the floodplain, and one in both (Figure 1). Most species were found in shaded, moist, micro-habitats in the forests.

❖ The most abundant species were *Coriolus vesicular* and *Stereum ostrea*, decomposers of woody debris in forest habitats. Other decomposers were also abundant, while two species of moderate abundance were mycorrhizal. Among the least encountered species were a *Physarum* species and the common morel (*M. esculenta*). Species abundance curves suggest > species evenness in the riparian habitat compared to forest habitats (Figure 2).

Figure 1

species
Functional Group & Habitat

Figure 2

species
Sporocarp Rank

Macrofungi Mosaic

Turkeytail

Common Morel

False Turkeytail

Shaggy Mane

Golden Fairy Helmet

Dryad's Saddle

Inky Cap

Acknowledgement