Slime Mold Fruiting Bodies and Scanning Electron Microscopy

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Abstract

The purpose of this study was to determine whether the Hitachi TM-1000 and the Hitachi S-3400N Scanning Electron Microscopes could effectively resolve slime mold fruiting bodies of five species. The specimens were collected at the Big Thicket National Preserve. During SEM examination, viewing Sporagium fruiting types was more effective than the Aethalium fruiting types. Slime mold spores dehydrated at a fast rate under vacuum in the SEMs, and require a fixing technique prior to SEM examination to observe hydrated spores.

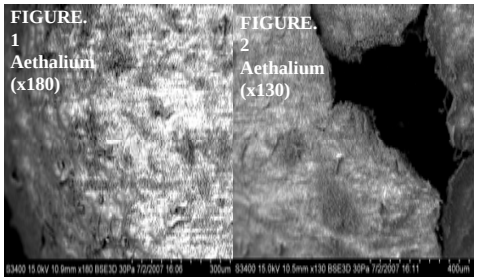
Introduction

Slime molds are protista, unicellular multinucleated organisms. Five phyla are categorized under protista. In this study the focus was on the phylum myxomycetes, plasmodial or true slime molds. Myxomycota is one of the most diverse groups, containing approximately 875 species, which can be found on decaying wood and leaves.

The plasmodium of slime mold produce fruiting bodies containing spores. Consisting of a combination of animal and fungus-like qualities, they can move similar to an amoeba and form and colonize like a fungus.

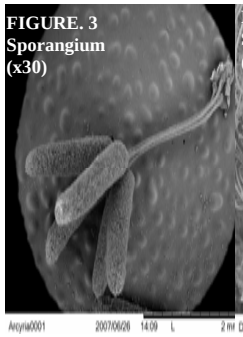
Four fruiting types are used to classify slime molds based on structure: Sporangium, Aethalium, Pseudoaethalium, and Pseudocarp. Only Sporangium and Aethalium were used in this study.

The primary goal of this study was to evaluate micrographs of slime molds to determine if the TM-1000 and the S-3400N SEMs were effective instruments for observing fruiting bodies of slime molds.

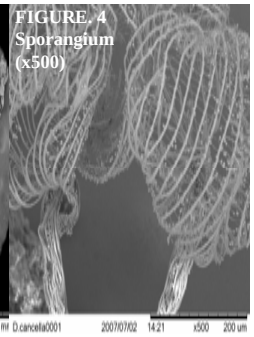


S-3400N | Charge-up
Fuligo septica

S-3400N | Spore damage
Lycogala epidendron



TM-1000 Micrograph
Arcyria cinerea



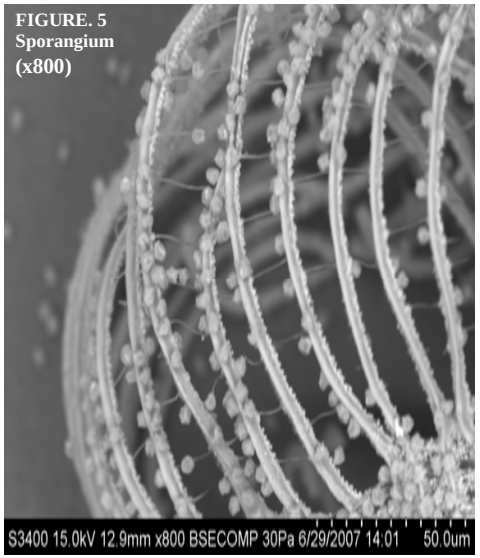
TM-1000 Micrograph
Dictydium cancellata

Methods

Collection of specimens:
Fruiting bodies on decaying wood and leaves were collected by cutting the substrate without disturbing the fruiting bodies. For protection and transportation purposes the specimens were placed in a tackle box.

Cultivation of moist chamber cultures:
A piece of filter paper and a single layer of substrate material were placed in Petri dishes. To initiate spore growth, water was added to the chambers.

The fruiting bodies of *Arcyria cinerea*, *Criberia cancellata*, *Dictydium cancellata*, *Lycogala epidendron*, and *Fuligo septica* were observed using Hitachi TM-1000 and S-3400N SEMs.



S-3400N Micrograph
Criberia cancellata

Results

The SEMs parched the spores held within their structures before the image was viewable on digital display.

Under vacuum, Aethalium fruiting types dehydrated more rapidly than sporangium fruiting types. For instance, charging (Fig.1) and deep crevices in the center of the fruiting body surface (Fig.2) are examples of the complications arising during SEM examination.

Sporangial fruiting types were more readily observed under the SEM at higher magnification. They maintained structure, but the spores were dehydrated (Fig.3, 4 & 5).

Discussion

Sporagium fruiting bodies maintained their structure under vacuum, but the spores were not visible in a hydrated state. Aethalium fruiting type structures were more difficult to observe due to excessive charging and quick damage from the vacuum in both the TM-1000 and S-3400N.

In past studies with slime molds and scanning electron microscopy researchers used sputter-coating and special preparation with OsO_4 (Osmium teteroxide), different percentages of glutaraldehyde vapors, ethanol, amyl acetate, Liquid Co_2, or Liquid N to prevent dehydration.

In conclusion, the fruiting bodies of slime molds could be observed, however spores dehydrated to rapidly using partial vacuum for SEM examination.

Acknowledgments

Special thanks to project mentors Katie Winsett, University of Arkansas, Dr. Jane Packard, Texas A&M University, Dr. Carl Knight, and Dr. Jill DeVito. Eastfield College Project Pathways Summer Institute is supported by the National Science Foundation Science Talent Expansion Program Grant # DUE-0525536, the Dallas County Community College District, the National Park Service, and the Big Thicket Association.