

The Determination of Leaf Processing Rates and  
Fungal Biomass via a Chemical Index

Anthony Sowers

Dr. Mel Zimmerman, project supervisor

Presented to the faculty of Lycoming College  
in partial fulfillment of the requirements  
for Departmental Honors in Biology

February 2003

Abstract

The goal of this study was to determine leaf processing rates and to determine fungal biomass accumulations on different leaf species in different seasonal environments. Sugar maple (*Acer saccharum*) and river birch (*Betula nigra*) leaves were incubated in two Northcentral Pennsylvania streams; Mill Creek, which is a second order stream, and Big Bear Creek, which is a third order stream. Leaves were incubated for 7 to 35 days during the summer and for 14 days during both the early and late fall. Weekly water chemistry and aquatic hyphomycetes spore counts were done during the incubation periods. Incubated samples were analyzed in the lab using HPLC to determine the presence of ergosterol, which is a membrane lipid of aquatic fungi. The surface areas of the incubated leaves were measured pre- and post- incubation to determine processing rates. Additionally, incubated samples were heated in a muffle oven to determine percent organic content. Sugar maple leaves had higher fungal biomass accumulations during the summer and early fall, but decline slightly during the late fall. River birch had smaller fungal biomass accumulations during the summer, but peaked during the late fall. Leaf processing rates for both leaf species were significantly lower during the fall studies. Invertebrate colonization on incubated leaf samples as also significantly lower during the fall studies. Spore counts were significantly higher during the late fall than both the summer and early fall.