



**TARA MCKINNON**

Faculty Research Mentor: Dr. Allen Hurlbert  
*Department of Biology*



Rosy Maple Moth caterpillars on a bird enclosure  
tree at Prairie Ridge Ecostation

### **Effect of Avian Predation on Arthropod Density Across Tree Species and Regions**

Many birds rely on arthropods, especially caterpillars, to feed their young during the breeding season. The availability of arthropods as a food resource is important for avian success. Although there are many studies on relationships between particular species of arthropods and their host plants, there are few characterizing the controls on arthropod density as a broad taxonomic group. We tested for bottom-up controls of tree species and top-down controls of bird predation on arthropod density at the NC Botanical Gardens and Prairie Ridge Ecostation in the NC Piedmont. To test the top-down effects of birds on the arthropod community and arthropod consumption of plant biomass (plant herbivory), birds were experimentally excluded from tree branches using mesh nets. Data on arthropod density, composition, and herbivory levels from the experimental enclosures were then compared to uncovered branches on nearby trees of the same species. We ran the same analyses on a similar dataset collected in the Southern Appalachians in previous years. There was a significant top-down effect on the subset of arthropods birds typically eat ("bird food" arthropods), but surprisingly not on caterpillars, and not on herbivory. We tested whether tree species has a bottom-up effect on arthropod density by measuring average arthropod density and comparing it to tree species in both locations. We found that there was a bottom-up effect of tree species on overall arthropod density, with certain regionally abundant tree species having significantly greater arthropod densities than others. These findings could help predict where "bird food" arthropods are abundant or scarce, and thereby predict the quality of a location as a site for insectivorous birds raising nestlings.