Undergraduate Research Symposium May 17, 2013 Mary Gates Hall

Online Proceedings

SESSION 1N

MCNAIR SESSION - EXPLORING THE NATURAL WORLD: FROM NUMBERS TO NANOPARTICLES AND BATS TO BACTERIA

Session Moderator: Todd Sperry, Office of Minority Affairs & Diversity
287 MGH
1:15 PM to 2:45 PM

* Note: Titles in order of presentation.

Degradation of Bat Wings by *Geomyces destructans*
Cheyenne Gerdes, Senior, Wildlife Ecology and Management, Arkansas State University
McNair Scholar
Mentor: Thomas Risch, Biological Sciences, Arkansas State University

White-nose Syndrome (WNS) is a wildlife disease caused by the pathogenic fungus *Geomyces destructans* that has resulted in the mass mortalities of North American cave bats. One clinical sign of WNS is wing necrosis. *Geomyces destructans* may secrete proteases that degrade tissue, thus reducing wing strength and elasticity. We isolated *Geomyces destructans* extracellular enzymes from an in vitro system and applied enzyme solution to bat wing tissue. The toughness, strength, and elasticity of tissues was assessed with tensile testing. Protease activity was assessed with SDS-PAGE and peptide mass fingerprinting by MALDI-TOF MS. Protein profiles generated by SDS-PAGE indicate higher solubilized protein in treated samples. Major bands were identified as integumentary proteins by MS. Tensile testing did not detect damage, but *Geomyces destructans* proteases may cleave host integument.

POSTER SESSION 3

MGH 241, Easel 143
2:30 PM to 4:00 PM

Perch-Type Characteristics in Overwintering Red-Tailed Hawks (*Buteojamaicensis*) and American Kestrels (*Falcosparverius*)
Alexander Worm, Senior, Wildlife Ecology and Management, Arkansas State University
McNair Scholar
Mentor: Thomas Risch, Biological Sciences, Arkansas State University
Mentor: Melissa Bobowski

Red-tailed Hawks (*Buteojamaicensis*) and American Kestrels (*Falcosparverius*) are sit-and-wait predators that rely on perch-sites to forage efficiently. Overwintering Red-tailed Hawks and American Kestrels use available perches (i.e., utility poles and wires, trees, fences, gates, etc.) to hunt for prey items in the agricultural fields in Northeast Arkansas. Observations were made from December 2011 to the present on three representative cover types: short rice stubble, soybean stubble, and fallow areas including roadsides in order to determine which perch-sites were used by Red-tailed Hawks and American Kestrels the most. Prey density and vegetation cover were also estimated in each cover type. Utility pole crossbeams at a height of 6.3 meters are the main perch-site used by Red-tailed Hawks, demonstrating the use of man-made structures as perch-sites. These perches were generally in or near short rice stubble fields, which were found to have the lowest amount of vegetation cover, and low prey density. Conversely, American Kestrels most used utility wires at a height of 4.9 meters from the ground, over fallow roadsides as perch-sites, representing an area with high prey density and vegetation cover. Although there have been documented cases of inter-specific competition between these two species, Red-tailed Hawks and American Kestrels may limit direct interaction via differential uses of perch-sites. The study gained insight into the behavioral ecology of two competing raptors in northeast Arkansas.