

**Survey of Ants (Hymenoptera: Formicidae), grasshoppers, and related families {the suborder Caelifera (Orthoptera: Acrididae, Romaleidae, Tetrigidae, Tridactylidae)} in Big Thicket National Preserve.**

**Introduction**

Insects are often the most numerous organisms in terrestrial ecosystems both in terms of abundance of individuals and species richness, and they have a great impact on the environment. At present, few insect species have been documented in Big Thicket National Park as part of the ATBI with 40 species of aquatic true bugs, 48 species of butterflies, and only 1 species of terrestrial insect having been documented thus far (Big Thicket Association 2010). The research proposed here will focus on documenting the presence of species belonging to several important insects groups in the Big Thicket National Preserve. The focus groups of this study include ants (Hymenoptera: Formicidae), and grasshoppers and their relatives (suborder Caelifera), grasshoppers, grouse locusts, and pygmy mole crickets (Orthoptera: Acrididae, Romaleidae, Tetrigidae, Tridactylidae).

Among insects, ants are typically the most dominant and influential force in terrestrial ecosystems and often comprise a large amount of the animal biomass. They directly and indirectly affect flora and fauna by predation, scavenging, tending homopterans, protecting certain plants, dispersing seeds, aiding in nutrient and soil turnover. Numerous species of ants have habitat preferences and respond quickly to disturbances to their environment, which make them an important taxon for comparing habitat diversity and monitoring environmental changes. Ants also are of interest because of the many deleterious effects caused by pest species, such as carpenter ants and especially non-native species such as Argentine ants, imported fire ants, the dark rover ant, and the Raspberry crazy ant. Currently 291 species of ants are known from the

state of Texas, and approximately 60 of these have been recorded from the counties in and adjacent to the Big Thicket area. Based on work in similar habitats, it is expected that the actual number of ant species that occur in this region is significantly higher.

The Order Orthoptera is broken up into two suborders, the Caelifera (grasshoppers, grouse locusts, and pygmy mole crickets) and the Ensifera (crickets, katydids, and related families). This proposal only focuses on the suborder Caelifera. Grasshoppers (Acrididae and Romaleidae) are often dominant herbivores in temperate grasslands and savannahs and are in direct competition with other grazing animals, and can often be agricultural pests. Many species, particularly those in the genus *Melanoplus* are brachypterous (short-winged) and cannot fly. Often these species have very limited distributions and warrant conservation consideration. One hundred ninety-seven species of grasshopper are currently known from Texas, although the specific distributional information on many species is limited.

Grouse locusts (Tetrigidae) are small grasshopper-like organisms that are often found in moist habitats, but can occasionally be found in xeric situations. Grouse locusts are known to eat algae, and plant materials found on the ground. Fourteen species of grouse locust are currently known from Texas, although the specific distributional information on many species is limited.

Pygmy mole crickets (Tridactylidae) are small burrowing insects that resemble the larger mole crickets of the suborder Ensifera. Pygmy mole crickets are commonly found along the margins of ponds and streams. Two species are currently known from Texas, and both should occur in the Big Thicket area.

## **Methods**

Samples of focus taxa will be taken throughout Big Thicket Heritage Preserve and in all major habitat types to thoroughly document the faunas. Additional sampling may also be conducted on the Roy E. Larsen Sandyland Sanctuary. Ants will be collected by J. G. Hill and J. A. MacGown using various methods including visual searching for ants on the ground, in leaf litter, and plant parts. Leaf litter and other decaying organic matter will be collected and placed in a Berlese funnel in the laboratory for extraction of ants. Foraging ants will be collected by hand and with the use of baits, namely peanut butter and cookies, at each locality. Hand collected specimens will be preserved in 90% ethanol in separate vials for each ant colony or bait station. Representatives of each species will be pinned and labeled with collection data including state, county, natural area, latitude and longitude, date, collector, and any pertinent biological information. Specimens will then be identified by JoVonn Hill and Joe MacGown and deposited in the Mississippi Entomological Museum (MEM).

Grasshopper, grouse locust, and pygmy mole cricket specimens will be acquired by capturing individuals with a net once a collector on foot flushes them, or in the case of pygmy mole crickets searching for tunnels on creek banks. These specimens will be placed into a killing jar containing potassium cyanide and then pinned and labeled in a similar manner as the ants. Specimens will be identified by JoVonn Hill and then deposited in the Mississippi Entomological Museum, with duplicates deposited in the Texas A&M insect collection and the United States National Museum.

**Time - Line**

Sampling will take place from September 2011 – September 2013. At least seven 3-5 day long trips will be made to the Big Thicket NP during the sampling period by J. G. Hill. Hill will accompanied by J. A. MacGown on at least four of these trips. Annual reports will be provided

by September 30<sup>th</sup> of 2012 and 2013 and the final report will be submitted to the Big Thicket Association no later than September 2014.

**Anticipated Schedule of Field Work**

Late September/Early October/ 2011

Late May/Early June 2012

August 2012

Late September/Early October 2012

Late May/Early June 2013

August 2013

September 2013

Depending on scheduling at least on more

**Budget**

**2011-2012**

Mileage

Estimated 1200 miles traveled per trip x 4 trips = 4,800 miles traveled

.51 cents per mile x 4,800 miles = .....2,448

Meals

\$40 per diem x 4 days x 2 workers = \$320 x 4 trips = .....1,280

Supplies (Insect pins, specimen drawers, alcohol, ant bait, Ziploc bags forceps, nets ect.).....1,650

Student Wages.....1,475

Fringe for student worker.....9

**2011-2012 total.....\$6,670**

**2013**

Mileage.....2,448

Meals

\$40 per diem x 4 days x 1 worker =\$160 x 4 trips ..... 640

Supplies.....50

**2013 totals.....\$3,330**

**Total funding requested.....\$10,000**

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**Education**

B.S. Interdisciplinary Studies (Biology, Forestry, and Wildlife Science) - Mississippi State University- Summer 2002  
 M.S. Agriculture and Life Sciences - Entomology- Mississippi State University- Spring 2006.  
 Masters Thesis: Environmental Variables Affecting Ant (Hymenoptera: Formicidae) Community Composition in the Black Belt Prairie and Flatwoods regions of Mississippi  
 Ph.D Candidate - Entomology-Mississippi State University.

**Employment**

2006 – present Research Associate, Mississippi Entomological Museum

**Peer Reviewed Publications**

Hill J.G. 2010. A new species of *Melanoplus* (Orthoptera: Acrididae: Melanoplinae) from the cedar glades of Tennessee, USA. *Journal of Orthoptera Research* 19: 341-345.  
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- Hill, J. G. and B. V. Brown. 2006. New records of the rarely collected ant-decapitating fly *Apocephalus tenuipes* Borgmeier (Diptera: Phoridae). *Southeastern Naturalist* 5: 367-368.
- Hill, J. G. 2005. Disjunct distributions of *Pseudopomala brachyptera* and *Campylacantha olivacea* (Orthoptera: Acrididae) in blackland prairies of Mississippi. *Entomological News* 116: 127-130

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