

Preliminary Survey of Ants (Hymenoptera: Formicidae) and Grasshoppers (Orthoptera: Acrididae) of the Big Thicket Region of Texas.  
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The Big Thicket region of Texas is a southerly tilted topographical basin bounded between the Trinity and Sabine rivers in southeast Texas (Watson 2006). (Figure 1). Big Thicket has been called " the biological crossroads of North America" as species from the east and west occur relatively near each other within a mosaic of habitats such as arid sandylands, bottomland hardwood forests and cypress sloughs, palmetto hardwood flats, wetland pine savannah, upland pine forests, and mixed grass prairies (NPS 2010). Over 1,189 species of plants, 185 species of birds, and 50 reptile species have been documented within the Big Thicket.

Since the 1930's the Thicket has had a very active army of citizen scientists who have fought for the conservation of the regions biota. In 1974, all their efforts paid off when the Big Thicket National Preserve was established (It was also the first national preserve in U. S. history). The preserve consists of over 100,000 acres in 15 units spread out across seven counties. Additionally, the Nature Conservancy, the state of Texas, and several other entities have preserves established throughout the region.

In 2006, an All Taxa Biodiversity Inventory (ATBI) began in the Thicket to document every living species within the region. As part of the ATBI, surveys of ants (Hymenoptera: Formicidae) and grasshoppers began in 2011, and should continue for at least another year. Among insects, ants are typically the most dominant and influential force in terrestrial ecosystems, often comprise a large amount of the animal biomass, are very sensitive to habitat changes making them ideal choices for such baseline inventories such as the ATBI. Grasshoppers are often influential herbivores in temperate grasslands, as well as major food sources for vertebrates as well as vectors of several bird parasites, making them ideal focus taxa for inventory based studies as well.

## Methods

Sampling of the ant and grasshopper fauna of the Big Thicket region has take place during 14-18 September 2011, 19-22 June 2012, and 23-26 September 2012 across fifteen sites (Table 1). Ants were sampled using various methods including visual searching for ants on the ground, in leaf litter, and plant parts. Leaf litter and other decaying organic matter was collected and placed in a Berlese funnel in the laboratory for extraction of ants. Foraging ants were collected by hand and with the use of baits, namely peanut butter and cookies, at each locality. Grasshopper specimens were acquired by capturing individuals with a standard insect net once a collector on foot flushed them from the vegetation or ground. Ant specimens are deposited in the Mississippi Entomological Museum and Grasshopper specimens are deposited in the Mississippi Entomological Museum and the United States National Museum.

Table 1. Collection locality and habitat data for survey sites in the Big Thicket region of Texas

| <b>Unit</b>                    | <b>Lat/Long</b>       | <b>Habitat Type</b>        |
|--------------------------------|-----------------------|----------------------------|
| Larson Sandyland Preserve      | 30°20'54"N 94°14'13"W | Arid sandyland             |
| Turkey Creek                   | 30°28'02"N 94°20'45"W | Bottomland hardwood forest |
| Turkey Creek                   | 30°36'48"N 94°20'39"W | Upland Pine Savannah       |
| Turkey Creek                   | 30°34'56"N 94°20'10"W | Mesic longleaf savannah    |
| Hickory Creek                  | 30°32'53"N 94°23'34"W | Mesic Longleaf Savannah    |
| Rossier                        | 30°15'03"N 94°29'12"W | Bottomland hardwood forest |
| Rossier                        | 30°15'30"N 94°30'44"W | Bottomland hardwood forest |
| Rossier                        | 30°18'21"N 94°26'54"W | Palmetto hardwood flat     |
| Marysee Prairie                | 30°15'16"N 94°40'43"W | Coastal Prairie            |
| Big Thicket N.P. Visitors Cntr | 30°27'30"N 94°40'13"W | Upland Pine Savannah       |
| Watson Preserve                | 30°34'45"N 94°22'40"W | Mesic Pine Savannah        |
| Big Sandy                      | 30°40'46"N 94°41'58"W | Upland Pine Savannah       |
| Big Sandy                      | 30°36'52"N 94°40'14"W | Upland Pine Savannah       |
| Big Sandy                      | 30°38'34"N 94°39'41"W | Upland Pine savannah       |
| Beech Creek                    | 30°43'10"N 94°13'37"W | Beech hardwood forest      |

## Results

During this first year of sampling, 38 ant species and 23 grasshopper species were documented across various habitats within the Big Thicket (Tables 2 and 3). The documentation of two ants, *Dolichoderus pustulatus* and *Strumigenys angulata* represent new state records for Texas. Additionally, six exotic ant species were documented in the region with three species (*Brachymyrmex patagonicus*, *S. invicta*, and *Pheidole morens*) being extremely abundant, even in apparently undisturbed habitats. Both the monogyne and polygyne social forms of *S. invicta* have been found in the region. An undescribed species of grasshopper belonging to the *Melanoplus scudderi* species group was documented in several habitats in the region, and a revision of the group is being undertaken by the author.

## Discussion

Based on the maps produced by O'keefe et al. 2000, 60 species of ants have previously been documented from the counties within the Big Thicket region. The first year of ant sampling for the ATBI found over half that number despite the region being in extreme drought conditions during a portion of the year. It is likely that many more ant species will be documented during the second year of sampling as many species that are common in the southeastern United States have yet to be found and several more habitat types have yet to be sampled..

Grasshopper diversity in the Big Thicket has proven to comparable to studies of other mosaic habitats in the southeastern United States (Hill 2012). However, there are more grasshopper species that should occur within the Big Thicket which have yet to be documented. It is interesting to note that the grasshopper fauna of Big Thicket, with the exception on the one undescribed species, is made up of widespread species. Even the undescribed species has relatively large range for a brachypterous species, which extends out of the region.

Table 2. Ants collected in the various habitats of the Big Thicket region of Texas. Coastal Prairie (CP), Arid Sandyland (AS), Upland Pine Savannah (UPS), Palmetto Hardwood Flats (PHF), Bottomland Hardwood/Cypress Slough (BHCS), Mesic Pine Savannah, and Beech/Hardwood (BH). \* denotes a new state record for Texas and \*\* denotes an exotic species.

| Ant Species                                    | CP | AS | UP | PHF | BHCS | MPS | BH |
|--|----|----|----|-----|------|-----|----|
| <i>Aphaenogaster carolinensis</i> Wheeler      | 0  | 0  | 0  | 1   | 1    | 0   | 0  |
| <i>Aphaenogaster treatae</i> Forel             | 0  | 1  | 0  | 0   | 0    | 0   | 0  |
| <i>Atta texana</i> (Buckley)                   | 0  | 1  | 1  | 0   | 0    | 0   | 0  |
| <i>Brachymyrmex depilis</i> Emery              | 0  | 0  | 0  | 1   | 0    | 0   | 1  |
| <i>Brachymyrmex patagonicus</i> Mayr**         | 1  | 0  | 1  | 1   | 0    | 1   | 0  |
| <i>Camponotus castaneus</i> (Latreille)        | 0  | 1  | 0  | 1   | 0    | 0   | 0  |
| <i>Camponotus pennsylvanicus</i> (DeGeer)      | 0  | 0  | 1  | 1   | 1    | 0   | 0  |
| <i>Crematogaster ashmeadi</i> Mayr             | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Crematogaster pilosa</i> Emery              | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Crematogaster pinicola</i> Deyrup and Cover | 0  | 1  | 0  | 0   | 0    | 0   | 0  |
| <i>Cyphomyrmex rimosus</i> (Spinola)**         | 1  | 1  | 0  | 1   | 0    | 0   | 0  |
| <i>Discothyrea testacea</i> Roger              | 0  | 0  | 1  | 0   | 0    | 0   | 0  |
| <i>Dolichoderus pustulatus</i> Mayr*           | 0  | 0  | 0  | 0   | 0    | 1   | 0  |
| <i>Dorymyrmex bureni</i> (Trager)              | 1  | 1  | 0  | 0   | 0    | 0   | 0  |
| <i>Formica dolosa</i> Buren                    | 1  | 0  | 0  | 0   | 0    | 0   | 0  |
| <i>Hypoponera inexorata</i> (Wheeler)          | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Hypoponera opacior</i> (Forel)              | 1  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Labidus coecus</i> (Latreille)              | 0  | 1  | 0  | 1   | 0    | 0   | 0  |
| <i>Monomorium minimum</i> (Buckley)            | 0  | 0  | 1  | 1   | 0    | 0   | 0  |
| <i>Myrmecina americana</i> Emery               | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Nylanderia arenivaga</i> (Wheeler)          | 0  | 1  | 0  | 0   | 0    | 0   | 0  |
| <i>Nylanderia faisonensis</i> (Forel)          | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Nylanderia terricola</i> (Buckley)          | 1  | 0  | 0  | 0   | 0    | 0   | 0  |
| <i>Pachycondyla harpax</i> (Fabricius)**       | 0  | 1  | 1  | 1   | 0    | 0   | 1  |
| <i>Pheidole dentata</i> M.R.Smith              | 0  | 1  | 1  | 1   | 0    | 0   | 1  |
| <i>Pheidole metallescens</i> Emery             | 0  | 1  | 1  | 1   | 0    | 0   | 0  |
| <i>Pheidole moerens</i> Wheeler**              | 0  | 0  | 1  | 1   | 0    | 0   | 1  |
| <i>Ponera pennsylvanica</i> Buckley            | 0  | 0  | 0  | 1   | 0    | 0   | 1  |
| <i>Solenopsis carolinensis</i> Forel           | 0  | 0  | 0  | 1   | 1    | 0   | 1  |
| <i>Solenopsis invicta</i> Buren**              | 1  | 1  | 1  | 1   | 1    | 1   | 1  |
| <i>Solenopsis subterranea</i> MacKay & Vinson  | 1  | 0  | 0  | 0   | 0    | 0   | 0  |
| <i>Solenopsis tonsa</i> Thompson               | 0  | 1  | 0  | 0   | 0    | 0   | 0  |
| <i>Strumigenys louisianae</i> Roger            | 0  | 1  | 0  | 1   | 0    | 0   | 1  |
| <i>Strumigenys angulata</i> Smith*             | 0  | 1  | 0  | 0   | 0    | 0   | 0  |
| <i>Strumigenys dietrichi</i> M. R. Smith       | 0  | 0  | 0  | 0   | 0    | 0   | 1  |
| <i>Strumigenys membranifera</i> Emery**        | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Strumigenys ornata</i> Mayr                 | 0  | 0  | 0  | 1   | 0    | 0   | 0  |
| <i>Trachymyrmex septentrionalis</i> (McCook)   | 0  | 0  | 1  | 0   | 0    | 0   | 0  |
| Totals   | 8  | 15 | 11 | 24  | 4    | 3   | 9  |

Table 3. Grasshoppers collected in the Big Thicket of Texas. Coastal Prairie (CP), Arid Sandyland (AS), Upland Pine Savannah (UPS), Palmetto Hardwood Flats (PHF), Bottomland Hardwood/Cypress Slough (BHCS), Mesic Pine Savannah, and Beech/Hardwood (BH).

| Grasshopper Species  | CP | AS | UPS | PHF | BHCS | MPS | BH |
|--|----|----|-----|-----|------|-----|----|
| <i>Achurum carinatum</i> (Walker)                          | 0  | 0  | 1   | 0   | 0    | 0   | 0  |
| <i>Amblytropidia mysteca</i> (Saussure)                    | 1  | 0  | 1   | 1   | 0    | 0   | 0  |
| <i>Arphia sulphurea</i> (Fabricius)                        | 0  | 0  | 1   | 0   | 0    | 1   | 0  |
| <i>Arphia xanthoptera</i> (Burmeister)                     | 0  | 0  | 1   | 0   | 0    | 0   | 0  |
| <i>Campylacantha olivacea</i> (Scudder)                    | 0  | 0  | 1   | 0   | 0    | 0   | 0  |
| <i>Chortophaga viridifasciata</i> (DeGeer)                 | 1  | 1  | 1   | 0   | 0    | 0   | 0  |
| <i>Dichromorpha viridis</i> (Scudder)                      | 1  | 0  | 1   | 0   | 1    | 0   | 0  |
| <i>Melanoplus angustipennis</i> (Dodge)                    | 0  | 1  | 1   | 0   | 0    | 0   | 0  |
| <i>Melanoplus differentialis nigricans</i> Cockerell       | 1  | 0  | 0   | 0   | 0    | 0   | 0  |
| <i>Melanoplus keeleri</i> (Thomas)                         | 0  | 0  | 1   | 0   | 0    | 0   | 0  |
| <i>Melanoplus ponderosus ponderosus</i> (Scudder)          | 1  | 0  | 1   | 1   | 1    | 0   | 0  |
| <i>Melanoplus sanguinipes vulturinus</i> Gurney and Brooks | 1  | 1  | 0   | 0   | 0    | 0   | 0  |
| <i>Melanoplus sp. nov.</i>                                 | 0  | 1  | 1   | 0   | 0    | 0   | 0  |
| <i>Orphulella pelidna</i> (Burmeister)                     | 1  | 1  | 1   | 1   | 0    | 1   | 0  |
| <i>Orphulella speciosa</i> (Scudder)                       | 1  | 0  | 0   | 0   | 0    | 0   | 0  |
| <i>Paroxya atlantica</i> Scudder                           | 1  | 0  | 0   | 0   | 0    | 1   | 0  |
| <i>Psinidia fenestralis</i> (Serville)                     | 0  | 1  | 0   | 0   | 0    | 0   | 0  |
| <i>Schistocerca alutacea</i> (Harris)                      | 0  | 0  | 0   | 0   | 0    | 1   | 0  |
| <i>Schistocerca americana</i> (Drury)                      | 1  | 1  | 0   | 0   | 0    | 0   | 0  |
| <i>Schistocerca damnifica</i> (Saussure)                   | 1  | 1  | 1   | 0   | 0    | 0   | 0  |
| <i>Spharagemon bolli</i> Scudder                           | 0  | 1  | 0   | 0   | 0    | 0   | 0  |
| <i>Spharagemon cristatum</i> (Scudder)                     | 1  | 1  | 1   | 0   | 0    | 0   | 0  |
| <i>Syrbula admirabilis</i> (Uhler)                         | 0  | 0  | 1   | 0   | 0    | 1   | 0  |
| Totals   | 12 | 10 | 15  | 3   | 2    | 5   | 0  |

## References

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