

Preliminary Investigations into the Ant (Hymenoptera: Formicidae) and Grasshopper (Orthoptera: Acrididae) Fauna of the Big Thicket Region of Texas.

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Introduction

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 coastal prairies (National Park Service 2010) (Figure 2). 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 this 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, and include several notorious exotic species such as the red imported fire ant (*Solenopsis invicta* Buren) making them ideal choices for 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 also.

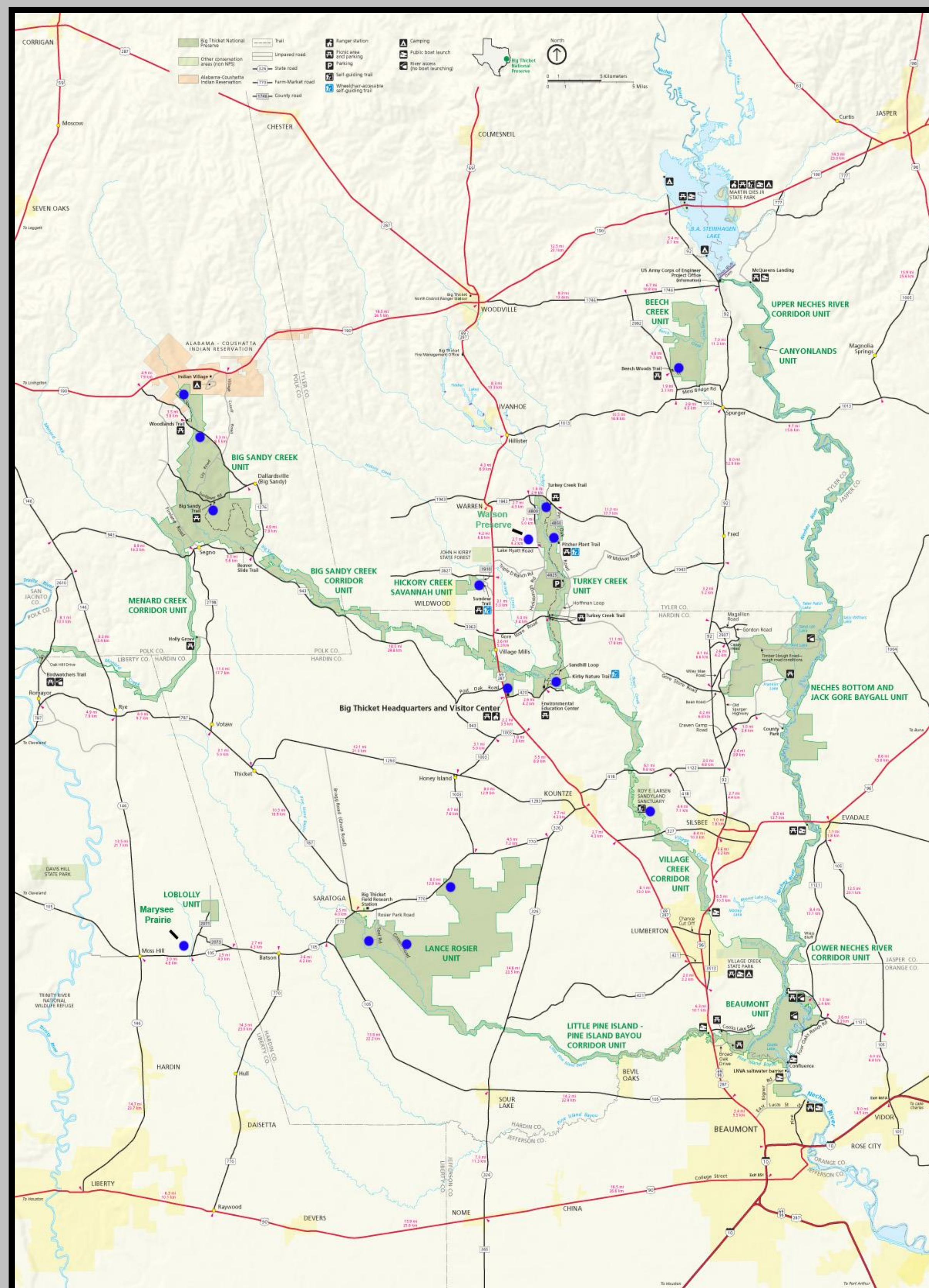


Figure 1. Big Thicket Region of Texas showing the units of the Big Thicket National Preserve and other preserves in the area where sampling occurred. ● indicates sampling locales.

Methods

Sampling of the ant and grasshopper fauna of the Big Thicket region took place during 14-18 September 2011, 19-22 June 2012, and 23-26 September 2012 at 15 different localities. (Figure 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 (MEM) and grasshopper specimens are deposited in the MEM and the United States National Museum.

Results

During this first year of sampling, 38 ant species (Table 1.) and 23 grasshopper species (Table 2.) were documented across various habitats within the Big Thicket. The documentation of two ants, *Dolichoderus pustulatus* and *Strumigenys angulata* (Fig. 3) 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 moerens*) being extremely abundant, even in apparently undisturbed habitats. An undescribed species of grasshopper (Fig. 4) 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.

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 inexacta</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 membrifer</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 1. 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.

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>Psindia 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

Table 2. Grasshoppers collected in various habitats of 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).



Figure 2. Some Thicket Habitats. A. Coastal Prairie, B. Bottomland Hardwood Forest/Cypress Slough, C. Arid Sandyland, D. Upland Pine.

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 for most of the year. More ant species will be likely 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 habitat types have yet to be sampled.

Grasshopper diversity in the Big Thicket has proven to be comparable to studies of another mosaic habitat in the southeastern United States (Hill 2010). However, there are more grasshopper species that should occur within the Big Thicket that have yet to be documented. It is interesting to note that the grasshopper fauna of Big Thicket, with the exception of the one undescribed species, is made up of widespread, relatively common species. Even the undescribed species has relatively large range, which extends well out of the region.

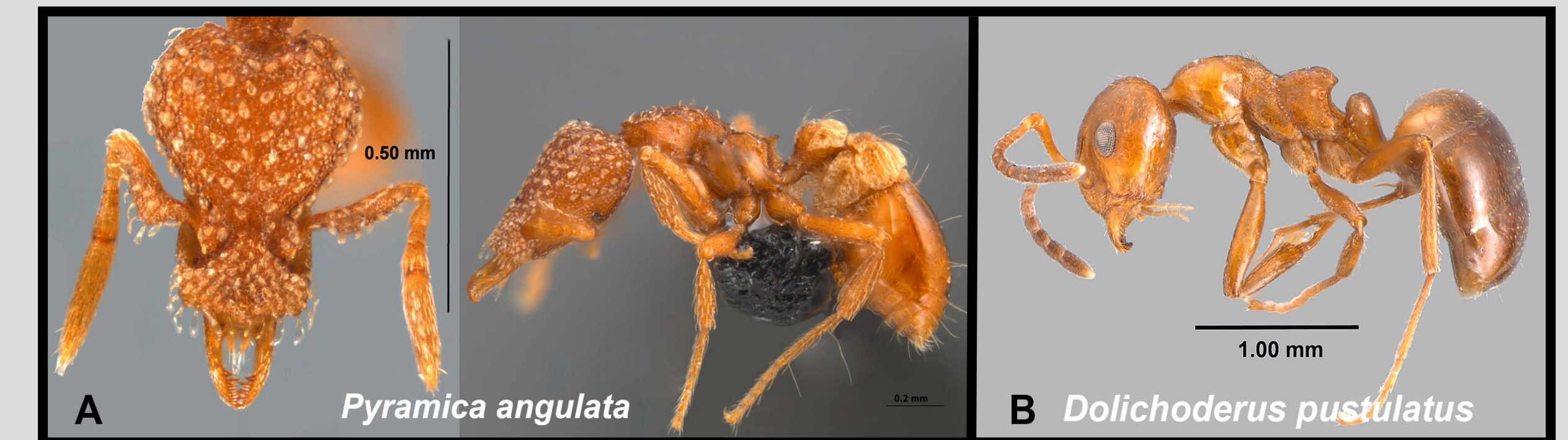


Figure 3. New state records for Texas discovered during the first year of sampling in the Big Thicket.

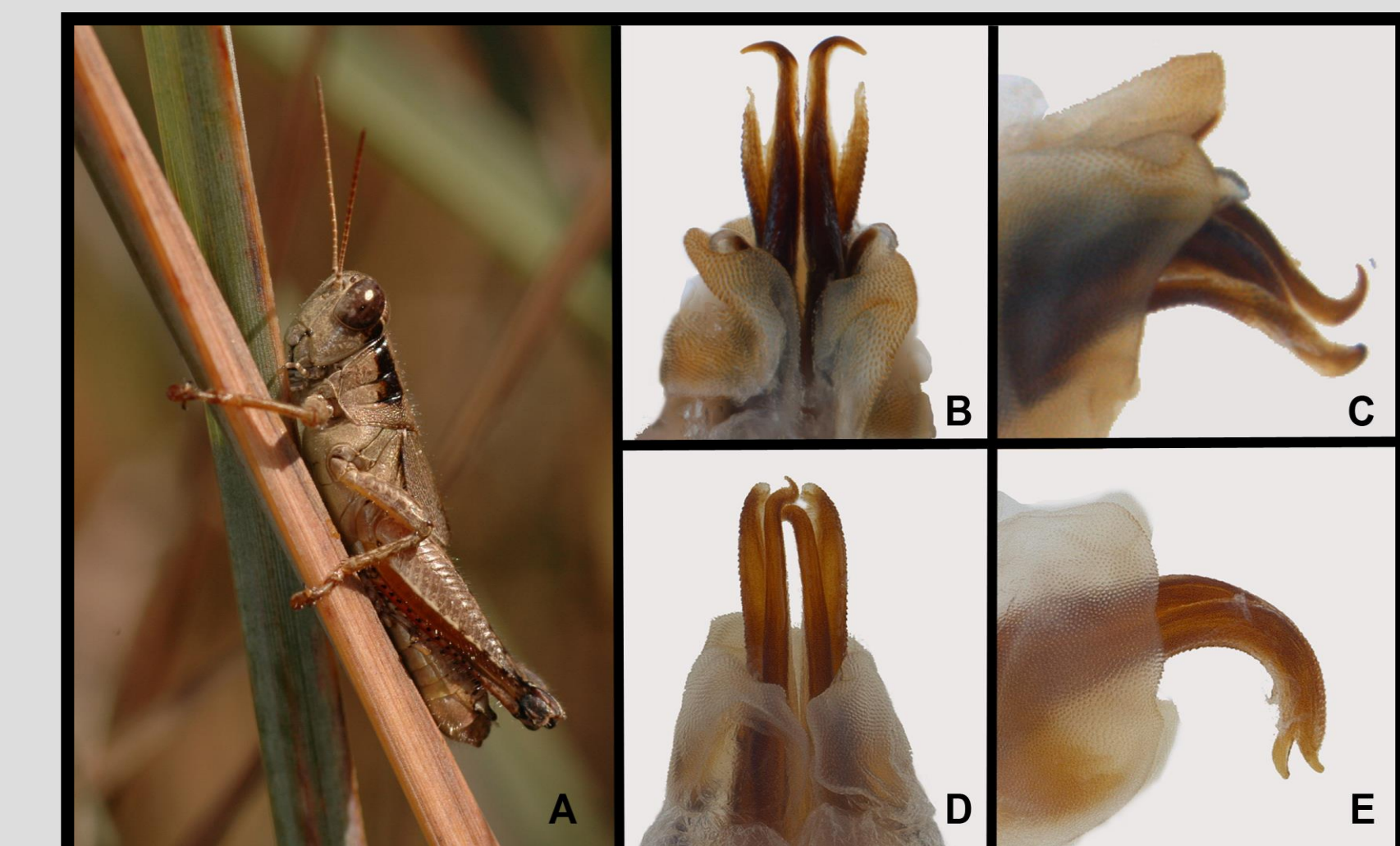


Figure 4. A. Undescribed species of the *Melanoplus scudderi* group, B. Dorsal view of the aedeagus of *M. scudderi*, C. Lateral view of the aedeagus of *M. scudderi*, D. Dorsal view of the aedeagus of the undescribed species, E. Lateral view of the aedeagus of the undescribed species.

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