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unsampled populations of pocket gopher burrows in Louisiana

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Beetles (Coleoptera: Histeridae and Scarabaeidae) from previously unsampled populations of pocket gopher burrows in Louisiana

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**Abstract.** Pocket gopher burrows (Rodentia: Geomyidae) were sampled from five previously unsampled localities in northern Louisiana to determine the associated faunal composition of Histeridae and Scarabaeidae (Coleoptera). Sampling produced four species of Histeridae and seven species of Scarabaeidae, all of which had been previously reported from Louisiana. The most commonly collected scarab beetle was *Cryptoscatomaseter haldemani* (Horn) followed by *Geomyphilus insolitus* (Brown). *Onthophilus kirni* Ross was the most commonly collected hister beetle.

### Introduction

Renewed interest in the insect fauna associated with pocket gopher burrows has yielded several published studies including a number of undescribed species of insects, mainly beetles in the families Histeridae and Scarabaeidae (Skelley and Woodruff 1991; Skelley and Gordon 2001, Skelley and Kovarik 2001, Kriska and Katovich 2005, Paulsen 2006; Kovarik et al. 2008; Tishechkin and Cline 2008). Some of these studies have focused on specific species/subspecies of pocket gophers (e.g. Skelley and Kovarik 2001; Kovarik et al. 2008), while others have focused on geopolitical boundaries (e.g. Kriska and Katovich 2005; Tishechkin and Cline 2008). From these studies, regional distributions of insect inquilines are starting to emerge, however there is still a paucity of collections in selected areas.

Louisiana has only one native species of pocket gopher (Rodentia: Geomyidae), *Geomys breviceps* Baird (Baird's pocket gopher), with the nominate subspecies, *G. b. breviceps* Baird, occurring in Morehouse Parish (northeastern corner of the state) and *G. b. sagittalis* Merriam occupying the rest of the distribution (Lowery 1974). Tishechkin and Cline (2008) published the distributions of the beetle fauna associated with Baird's pocket gopher (*Geomys breviceps*) in Louisiana and found seven species of scarab and four species of histerid from *G. b. sagittalis* and only one scarab and histerid, respectively, from the burrows of *G. b. breviceps*. Although there was a large difference in total beetle diversity between the burrows of these two gopher subspecies, only two disjunct areas had been sampled. This study fills the gap between the two previously sampled regions of western and eastern Louisiana.

### Materials and Methods

Nest/chamber excavations were conducted from October 2009 through April 2010 at the following five localities in northern Louisiana (Fig. 1):

- 1) Junction City, LA Hwy 9, Claiborne Parish (33.009481°; -92.732411°)
- 2) Ruston, Hwy 167, Lincoln Parish (32.475723°; -92.645634°)
- 3) Calhoun, 1 km W. Junction LA Hwy 151/837, Ouachita Parish (32.540046°; -92.366883°)
- 4) Mount Union, Junction LA 15/ Union Parish Co. Rd. 3671 (32.914638°; -92.527451°)
- 5) Shongaloo, Hwy 2, 4 km E Shongaloo, Webster Parish (32.952893°; -93.255480°)

Pocket gopher burrows were excavated at the site of large nest mounds containing the nest and associated latrine chambers and the insect inquilines (Fig 2). The insects were collected via subsequent removal and sifting of the nesting and latrine material. All specimens were preserved in 70% EtOH for latter identification and subsequently deposited in the following institutions: Louisiana State Arthropod Museum, Baton Rouge, LA, and Florida State Collection of Arthropods, Gainesville, FL. The taxonomy of the Scarabaeidae follows Gordon and Skelley (2007), which synonymized some species as well as providing

new generic names for the scarab species formerly included in the genus *Aphodius* Illiger. Specimen identifications were furnished by the following specialists for each group as listed: A. K. Tishechkin (Histeridae), Santa Barbara Museum of Natural History; and P. E. Skelley, Florida State Collection of Arthropods (Scarabaeidae).

## Results

Sampling nest mounds constructed by Baird's pocket gopher produced four species of Histeridae and seven species of Scarabaeidae. The list of identified species is listed in the following format: scientific name, abbreviated locality, date, and number collected. When more than ten individuals of a species were collected, I report the number as >10.

### Histeridae

#### *Atholus minutus* Ross

Shongaloo, 14.XI.2009, (2);

#### *Geomysaprinus goffi* Ross

Junction City, 30.X.2009, (1);

#### *Onthophilus kirni* Ross

Junction City, 30.X.2009, (>10);  
Calhoun, 28.XII.2009, (>10);  
Mount Union, 12-18.XII.2009, (>10);  
Mount Union, 11-18.I.2010, (>10);  
Shongaloo, 2.III.2010, (8);

#### *Spilodiscus gloveri* (Horn)

Mount Union, 12-18.XII.2009, (5);  
Shongaloo, 2.III.2010, (4);

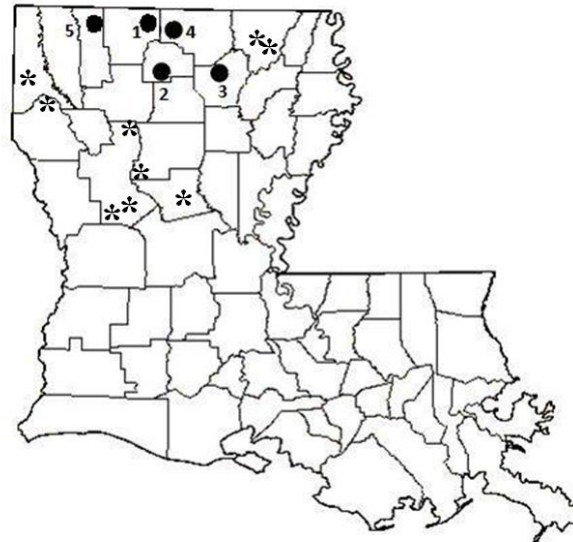
### Scarabaeidae

#### *Cryptoscatomaseter acuminatus* (Cartwright) [= *Aphodius acuminatus*]

Calhoun, 28.XII.2009, (6);  
Mount Union, 20-21.II.2010 (1);  
Shongaloo, 14.XI.2009, (1);  
Shongaloo, 6.III.2010, (>10);

#### *Cryptoscatomaseter haldemani* (Horn) [= *Aphodius haldemani*]

Junction City, 30.X.2009, (1);  
Ruston, 4.XII.2009, (8);  
Calhoun, 28.XII.2009, (>10);  
Mount Union, 6.XII.2009, (1);  
Mount Union, 12-18.XII.2009, (>10);  
Mount Union, 11.I.2010, (>10);  
Mount Union, 18.I.2010, (>10);  
Mount Union, 20-21.II.2010, (>10);



**Figure 1.** A map of Louisiana detailing the five Parishes in which pocket gopher (*Geomys breviceps*) mounds were sampled for beetle inquilines. Black circles represent localities sampled in this study and asterisks represent localities reported in Tishechkin and Cline (2008). Numbers correspond to numbered localities listed in Methods.

Shongaloo, 14.XI.2009, (>10);

Shongaloo, 6.III.2010, (>10);

*Cryptoscatomaseter oklahomensis* (Brown)  
[=*Aphodius atwateri* Cartwright, *Aphodius oklahomensis*]

Mount Union, 12-18.XII.2009, (>10);

Mount Union, 11-18.I.2010, (>10);

Mount Union, 20-21.II.2010, (>10);

Mount Union, 11.IV.2010, (1);

*Dellacasiellus kirni* (Cartwright) [= *Aphodius kirni*]

Mount Union, 18.XII.2009, (1);

Mount Union, 11.IV.2010 (>10);

Shongaloo, 14.XI.2009, (1);

*Euphoria discicollis* Thomson

Shongaloo, 14.XI.2009, (1);

*Geomyphilus insolitus* (Brown) [= *Aphodius insolitus*]

Ruston, 4.XII.2009, (1);

Calhoun, 28.XII.2009, (>10);

Mount Union, 6.XII.2009, (1);

Mount Union, 18.XII.2009, (10);

Mount Union, 11.I.2010, (>10);

Shongaloo, 14.XI.2009, (3);

Shongaloo, 6.III.2010, (>10);

*Scabrostomus sepultus* (Cartwright) [= *Aphodius sepultus*]

Shongaloo, 6.III.2010, (2);

## Discussion

All of these species were previously reported from Louisiana by Tishechkin and Cline (2008) so there was no net increase in the number of pocket gopher burrow insect inquilines within Louisiana. As compared to the previous survey in Louisiana by Tishechkin and Cline (2008), excavation of nest and latrine chambers produces a greater species diversity of insect inquilines than pitfall trapping. Tishechkin and Cline (2008) only collected *Spilodiscus gloveri* from nest or latrine chambers, however only collected *Cryptoscatomaseter oklahomensis* from pitfall trapping and none from chambers. Nest and latrine chamber excavation produced four species of Histeridae and seven species of Scarabaeidae. Although it is possible that some rare species were not collected, the species of insect inquilines that are reported herein probably represent the majority of the faunal composition of pocket gopher burrows in northern Louisiana.

*Geomysaprinus goffi* represents only the second record for Louisiana with a distance of approximately 100 km from its initial collection in Natchitoches Parish (Tishechkin and Cline 2008). *Onthophilus kirni* was the most frequently collected hister beetle, being collected from every location except Lincoln Parish. *Cryptoscatomaseter haldemani* was the most commonly collected Scarab beetle, being collected from every parish. *Geomyphilus insolitus* was the second most commonly collected scarab beetle, being collected from every location except Claiborne Parish. All the species of Histeridae except *Geomysaprinus goffi* have been reported from neighboring Arkansas (Kovarik et al. 2008). Due to the proximity of the collection location for *G. goffi* to the Arkansas state line, it probably occurs within Arkansas. All of the Histeridae have been collected from Texas (Ross 1944a, b; Blume and Summerlin 1988; Caterino 1998; Godwin 2000). All of the scarabs have been collected in Arkansas (Kovarik et al. 2008; Kovarik et al. in



**Figure 2.** *Geomys breviceps* nest mound in northern Louisiana. **A)** Before excavation. **B)** The same nest mound excavated revealing the nest chamber (shown in the center of the mound).

*litt.*; Fiene et al. 2011) and Texas (Blume and Aga 1979; Godwin 2000; Godwin 2002; Gordon and Skelley 2007).

The patchy distribution of insect inquiline communities, evidenced by these collections, suggests that insect inquilines are affected not only by pocket gopher distribution, but other factors. For instance, the *G. b. breviceps* populations occur in highly disturbed habitats (*i.e.*, urban/suburban development; agricultural row crops) that are not conducive to beetle inquilines, which possibly explains the low species richness reported by Tishechkin and Cline (2008). Many of these insect inquilines possibly require other habitat components, such as specific soil types or habitat cover, for dispersal and reproduction rather than simply a pocket gopher burrow system, which would explain some of the insect species (e.g. *Geomysaprinus goffi* typically being found in sandy soil [P. W. Kovarik, pers. comm.]) being associated with several different pocket gopher species. All of these components should be taken into consideration for research and conservation purposes when investigating the inquiline insect fauna associated with pocket gopher burrows.

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