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SCIENTIFIC NOTE:

First record of *Myrmecophilus nebrascensis* Lugger 1898 (Orthoptera: Myrmecophilidae) in Beaver County, Oklahoma

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Ant-loving crickets, Myrmecophilidae, are an uncommon family of Orthoptera. There is only one genus, *Myrmecophilus*, and four species known from the continental United States (MacGown & Hill 2006). These crickets live as inquilines within ant nests, feeding on the secretions of their hosts either from the walls of the nest or from the bodies of the ants themselves (Wheeler 1900; Capinera *et al.* 2004). They scrape the legs and abdomina of host ants with their mouths, collecting and eating the resulting oily discharge. The ants have been reported to show aggression toward the crickets when sufficient disturbance has been achieved by swinging their heads around and lunging at the pest. Perhaps to increase the likelihood of escape from this aggression, the crickets have been reported to feed primarily on secretions that result from strigilating the legs and abdomen, but not the thorax or head (Wheeler 1900). Other reports indicate that the crickets will mimic ant grooming behavior and attempt to partake in trophallaxis with the ants, doing so successfully in a laboratory setting (Henderson & Akre 1986; Wetterer & Hugel 2008).

Both feeding behaviors can be very risky for the cricket and it is unlikely that the only way they escape being eaten is through their dexterity. One study indicates that Myrmecophilidae can change their cuticular hydrocarbon profile so as to confuse their ant hosts chemically. It is reported that this chemical camouflage changes depending on the ant species with which the cricket is associating (Akino *et al.* 1996). This form of chemical mimicry suggests rigid host specificity by Myrmecophilidae. However, a single *Myrmecophilus* species can be associated with several host ant species. Hebard (1920) reports that *Myrmecophilus nebrascensis* have been found in the nests of nine different ant species spanning eight ant genera. Additionally, certain ant genera host multiple *Myrmecophilus* species. Four different ant-cricket species have been recovered from *Formica* ant colonies (Hebard 1920).

An array of pitfall traps was established to measure activity density of ground-dwelling arthropod families that are potential prey items for Northern Bobwhite quail (*Colinus viriginianus*) on the Beaver River Wildlife Management Area, Beaver County, Oklahoma. The pitfall traps were made of aluminum flashing approximately 1.22 m × 0.25 m with 0.1 m buried in the ground. At both ends of the flashing a 16 oz plastic cup was buried with the lip flush with the ground. The 16 oz cup housed a 9 oz plastic cup with 25 mL of 80% EtOH/10% glycerol killing-solution. A plastic funnel-shaped cup with the bottom removed was placed over the 16 oz cup to facilitate the capture of ground-dwelling arthropods. The pitfall traps were left open for seven days. The contents were collected every two days and then closed for two weeks. To close the pitfall traps, an identical funnel cup with the bottom intact was placed inside of the open funnel cup and filled with proximal substrate. This was done to prevent unnecessary trapping of arthropods. Trapping occurred from May 13 to August 15, 2012 to coincide with the reported arthropod feeding activity of Northern Bobwhite.

A single adult male *M. nebrascensis* was collected from these traps on August 9, 2012 from a pitfall trap located at 36.826281°N, 100.641786°W (Fig. 1). The habitat associated with this trap is a mixed grass lowland with encroaching salt cedar (Fig. 2A). Body length of the specimen measured 2.3 mm. A second *M. nebrascensis* adult male was collected on August 11, 2012 from a pitfall trap located at 36.829983°N, 100.640632°W. The habitat associated with this trap is a transitional zone between the mixed grass lowland and a sandy upland comprised of sand plum, sage brush, and buffalo grass (Fig. 2B). Body length of this specimen measured 2.2 mm. Both specimens are yellowish brown. They were identified to family using the dichotomous key in Borror and Delong's Introduction to the Study of Insects 7th ed. (Triplehorn & Johnson 2005). They were identified to species using Hebard's (1920) key for the North American species of *Myrmecophilus* by Oklahoma State University personnel and confirmed by personnel at Mississippi State University. The defining characteristics were the two caudal metatarsal spinulae (Fig. 3A, B) and the three spines along the dorso-internal margin of caudal tibia (Fig. 3C, D). These characteristics, the specimens' body lengths, and their coloration are consistent with Hebard's description of *M. nebrascensis* (1920). Six ant species were collected from the same pitfall traps with the *M. nebrascensis* specimens and all serve as potential hosts for these crickets (Table 1).

While the known distribution of *M. nebrascensis* is from Nebraska to Texas (Capinera *et al.* 2004; MacGown & Hill 2006), this report is the first time the species has been recorded in Beaver County, OK. A previous record (1967) from the K. C. Emerson Entomology Museum indicates that in Oklahoma *M. nebrascensis* has only been recorded in Ellis county. *Myrmecophilus pergandei* Bruner is the only other recorded species of Myrmecophilidae in Oklahoma, recorded in Payne and Adair counties (1960 and 1967 respectively). Both specimens described here are currently housed in the K.C. Emerson Entomology museum at Oklahoma State University, Stillwater, OK.

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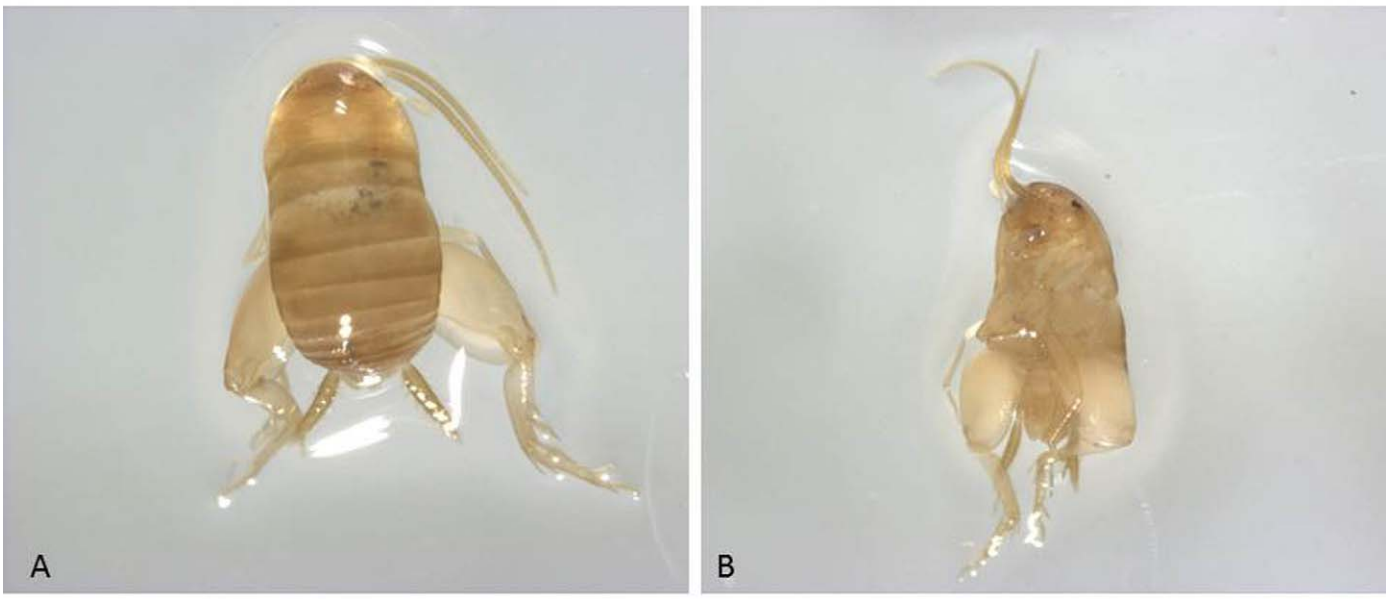


Fig. 1. The dorsal (A) and ventral (B) sides of a *Myrmecophilus nebrascensis* individual from Beaver County, Oklahoma.

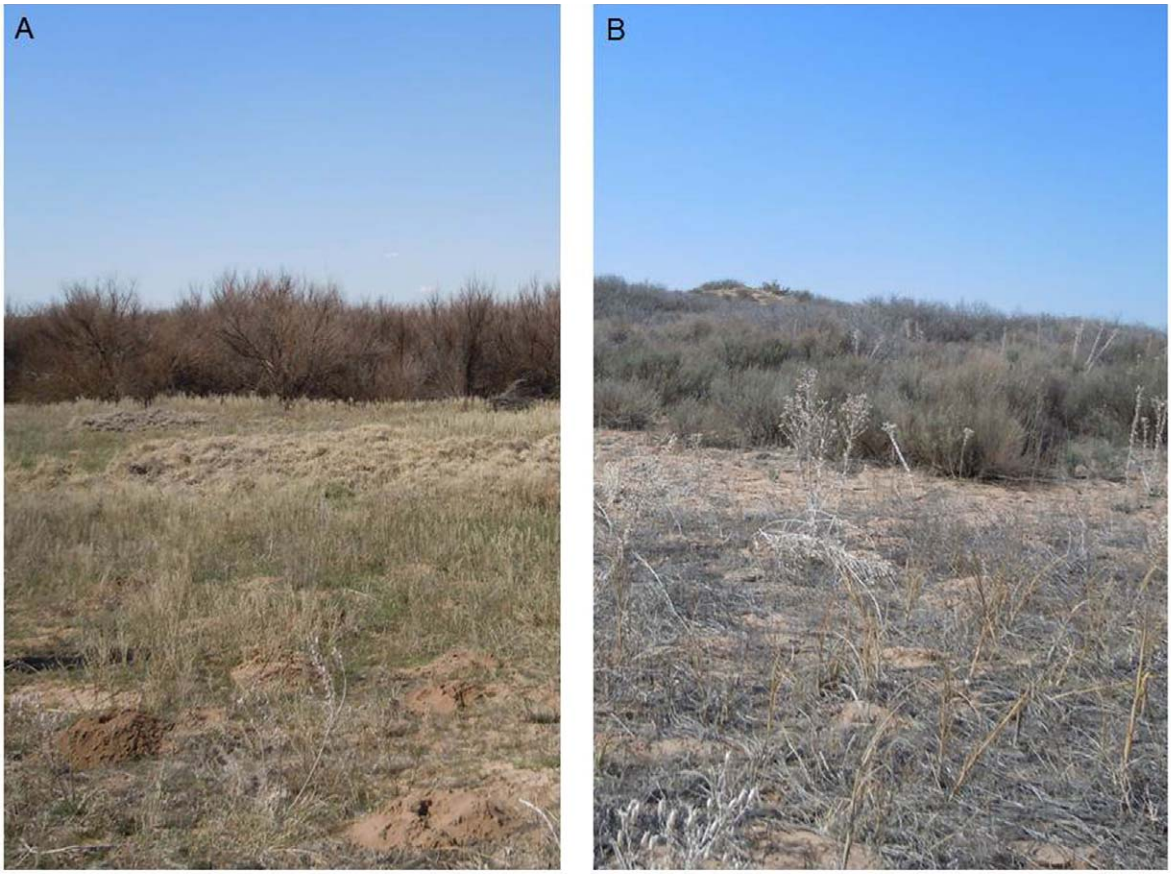


Fig. 2. The sites from which two *M. nebrascensis* specimens were trapped. A) A mixed grass lowland with encroaching salt cedar and B) a transitional zone between mixed grass lowland and sandy upland.

philidae specimens. The research being conducted that resulted in this county record is funded by the Oklahoma Department of Wildlife Conservation and the Oklahoma Agricultural Experiment Station (project number OKLO2624).

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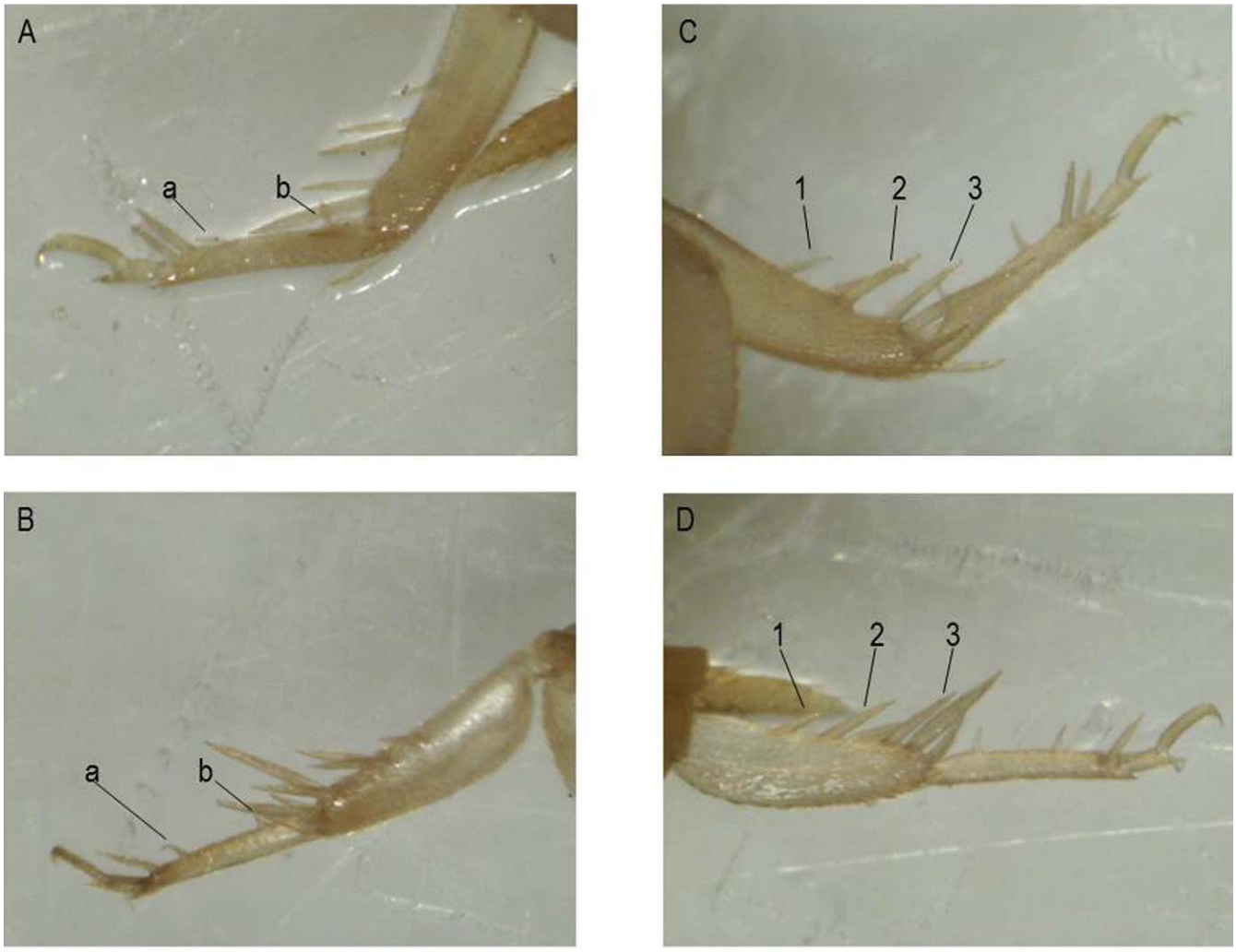


Fig. 3. A and B) The left hind legs of the two *M. nebrascensis* individuals from Beaver County, Oklahoma. Two spinulae on the dorsal surface of the caudal metatarsus are labeled "a" and "b". C and D) The right hind legs of the two *M. nebrascensis* individuals from Beaver County, Oklahoma. The three spines lining the dorso-internal margin of the caudal tibia are labeled "1", "2", and "3". Note how the spines increase in size distally (Hebard 1920).

Table 1. A list of the six ant species collected from the pitfall traps with *M. nebrascensis* individuals. These ant species all serve as potential hosts to these crickets. Ant species marked with asterisks were only collected from the pitfall trap associated with the transitional habitat type. All other species were collected from both traps. Major workers of the ant genus *Phiedole* are the only caste that can be used to identify individuals to species. No major workers were collected from the pitfall traps, so identification to genera is all that can be accomplished with confidence.

Ant species trapped with *M. nebrascensis* **Lugger**	
Dorymyrmex flavus	*Monomorium minimum**
*Formica pallidefulva pallidefulva**	*Pheidole* spp.*
Linepithema humile	*Pogonomyrmex barbatus*

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