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SCIENTIFIC NOTE

Observations on Possible Myrmecophily in *Stephanucha pilipennis* Kraatz (Coleoptera: Scarabaeidae: Cetoniinae) in Western Nebraska

Little has been published on the life history of the five currently recognized species of *Stephanucha* Burmeister. Skelley (1991) published the most thorough treatment to date for *S. thoracica* Casey (recently synonymized with *S. areata* (F.) by Harpootlian 2001). Skelley located larvae in the mounds of the pocket gopher, *Geomys pinetus* Rafinesque, in Florida and was the first to describe an immature stage for the genus. Published accounts of *Stephanucha* species biology are consistent with respect to spring emergence, presence in sandy habitats, and a potential lack of adult feeding or liquid feeding (Lago *et al.* 1979; Skelley 1991). Skelley (1991) suggested that the main habitat of *Stephanucha* spp. might be pocket gopher mounds. He noted sympatric distributions of *Stephanucha* spp. with pocket gophers, including *S. pilipennis* Kraatz found in the range of *G. bursarius* (Shaw). However, he noted that the larvae he observed were nonspecific in habitat requirements, also utilizing mounds in sandy soil created by other organisms or processes.

My observations on *S. pilipennis* in western Nebraska differ somewhat from previously published accounts for the genus. I have collected adult beetles from May until September in western Nebraska (data on their frequency earlier in the year is not available due to a lack of collecting in the area). By far the most individuals are encountered in September, at which time specimens are densely setose. As setae are subject to wear with age, the possibility of a fall emergence in the area exists. As with previous reports, adult *S. pilipennis* are found on sandy substrate or flying low to the ground. The beetles are occasionally seen hovering near wild sunflower (*Helianthus annuus* L.) and Platte thistle (*Cirsium canescens* Nutt.); ants of the genus *Formica* commonly tend aphids on these plants in the area (pers. obs.; T. A. Rand pers. comm.).

On two occasions during field work at Cedar Point Biological Station (Ogallala, Keith Co., NE) in September 2000, setose individuals of *S. pilipennis* were observed circling and landing upon a wild sunflower plant teeming with the ant, *Formica obscuripes* Forel. The beetles moved about the upper surface of the topmost leaf until contacted by an ant. At that time, each beetle became inactive and apparently feigned death. Thanatosis continued while the beetles were collected by the ants and transported down the entire height of the stem, approximately 1 m. From one to several ants carried the beetles down the stem (Figs. 1a,b). In one case, I collected the beetle after the ants brought it to the ground. In the second, I observed as the ants continued to carry the beetle for more than 1 m along the ground until the beetle abruptly became active and disengaged the ants. The beetle flew to another nearby plant where it was subsequently collected. The *F. obscuripes* mound could not be located within the vicinity of the sunflower plant.

The thanatosis exhibited by these beetles suggests that *S. pilipennis* may be myrmecophilous, perhaps developing in ant mounds in western Nebraska. Other species of Cetoniinae are associated with the nests of *F. obscuripes* (Ratcliffe 1976, 1991; Mico *et al.* 2000). In 2001, I monitored scarabs transported to a large (~1 m height) thatch mound by *F. obscuripes* and also dissected 3 smaller mounds.

At the large mound, no specimens of *S. pilipennis* were found being transported by ants in 2001, even though hundreds of wild sunflower plants grew near the colony. In May, I collected 46 *Cremastocheilus wheeleri* LeConte, 2 *C. retractus* LeConte, 19 *Euphoria hirtipes* Horn, and 5 *E. inda* (L.) being transported alive by the ants. Most living *E. hirtipes* were missing antennae or tarsi, and 10 dead specimens were also collected that were dismembered to varying degrees. Ant activity decreased greatly in the summer, but in late August and September I again encountered a few specimens of *C. wheeleri* being transported by the ants. I did not find *E. inda* being transported by ants in the fall, although at the time this species was abundant and readily found nearby feeding on exudate from wild sunflower stems. Dissection of the three ant mounds revealed no specimens of *S. pilipennis*. A small (25 cm in height) mound dissected in early May contained only 21 dead adult *E. hirtipes* still within their pupal chambers. The other two mounds (~30 cm high) dissected in mid August contained living *C. wheeleri* (3 total).

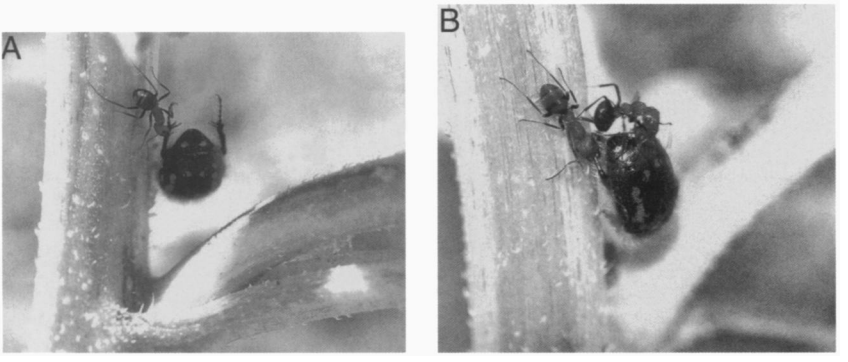

Fig. 1. A motionless *Stephanucha pilipennis* transported down a wild sunflower stem by the ant *Formica obscuripes*, either **A)** singly or **B)** as a group.

Absence of *S. pilipennis* in these mounds does not rule out the potential use of ant mounds by this species, as this is a rarely encountered species and few ant mounds were sampled. The dissection of more and larger *F. obscuripes* mounds (especially with more systematic sampling of mounds when ants and beetles become active again in the fall in western Nebraska) may lead to the recovery of adults and larvae of *S. pilipennis*. Thanatosis observed in these beetles might prove to be an adaptation for gaining access to the thatch mounds of ants, likely a suitable larval environment for generalists in mound-type habitats.

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