Description of Two New Surface Behaviors in the Antlion Vella americana Drury (Neuroptera: Myrmeleontidae)

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Description of two new surface behaviors in the antlion *Vella americana* Drury (Neuroptera: Myrmeleontidae)

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Sand-dwelling antlions in central Florida are non-invasive, non-endemic organisms that nevertheless thrive in the Florida scrub, a rare xeric ecosystem with a remarkably high rate of endemism (Deyrup 1990). About 85% of pre-Columbian Florida scrub has been lost to development or conversion (Craddock 2008). The sand roads at Archbold Biological Station provide habitats for plant and animal species that ordinarily colonize gaps produced by fire or the allelopathic litter of *Ceratiola ericoides* Michx. (Ericaceae) (Menges et al. 2008). This human-facilitated environment supports a dense community of sand-dwelling antlions, including several species of pit-building *Myrmeleon* and surface-walking *Brachynemurus* (Stange 1980). While the charismatic pit-building species are frequent subjects of behavioral observation, the actively hunting genera are not well known. Sand roads at Archbold Biological Station therefore provide an opportunity to observe and collect larger numbers of antlion larvae than may be found in natural foliage gaps.

Vella americana (Drury) is an acanthaclisine antlion found in the southeastern United States and Mexico, and possibly the largest antlion in the Western Hemisphere (Miller & Stange 1985). Larval *V. americana* require deep, loose sand in order to conceal their defenseless bodies and enable them to burrow. This author has observed only backwards-wriggling movement in this species, with the muscular abdomen producing most of the force, and so it appears that *V. americana* cannot walk forward like the *Brachynemurus* that share its habitat. The habits and behaviors of *V. americana* have received little attention or study.

Live collection and in situ observation were conducted at Archbold Biological Station between Mar and Jul 2016. Thirteen *V. americana* were raised in captivity for 3 mo and at least 20 others were held captive for a few days at a time. As this species does not construct pit traps, individuals were located by following their burrow trails. In captivity, hunting *V. americana* lie in wait for prey to walk over their jaws, and often burrow towards and around mobile prey to better facilitate striking. After seizing prey, larvae quickly disappear beneath the surface. Larvae readily accepted any prey they could catch and submerge, including beetles, ants (*Pogonomyrmex badius* Latreille [Hymenoptera: Formicidae], Florida harvester ant), moths, myriapods, isopods, and arachnids.

Although larval *V. americana* display the flicking motion that is characteristic of pit-building *Myrmeleon*, they do not use this tactic to excavate pits (Fig. 1). Flicking serves several purposes for pit-building antlions, including excavating and maintaining traps, discarding debris, and directly striking prey to encourage pit wall collapse (Heinrich & Heinrich 1984). The occasional flicking and associated substrate tossing of *V. americana* does not serve to produce the excavation depth seen in

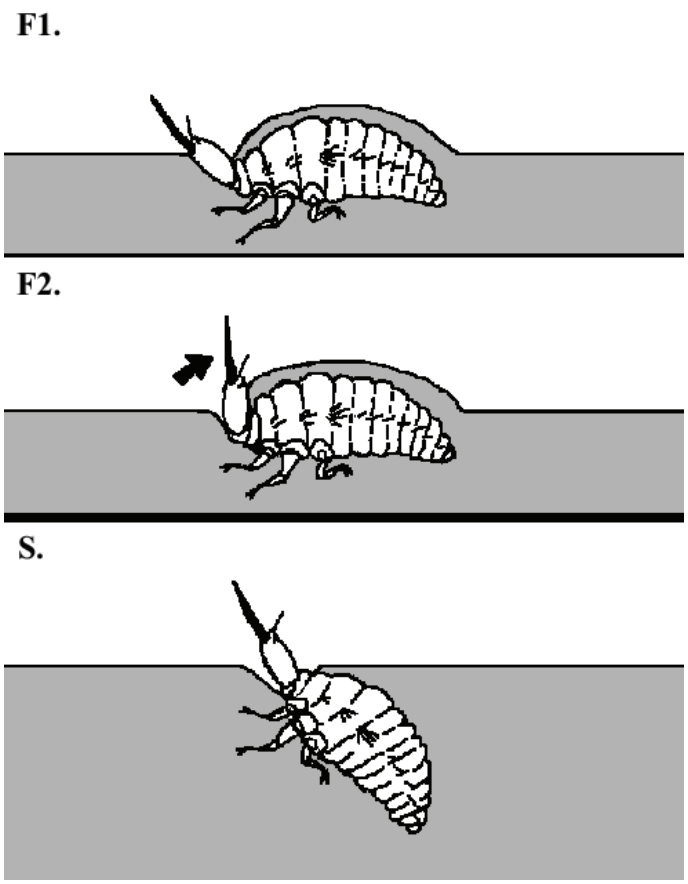

Fig. 1. New surface behaviors of *Vella americana*. **F1:** First step of flick: *V. americana* exposes head at the surface. **F2:** Second step of flick: *V. americana* snaps its head upward, then quickly returns to position A. Flicking is often performed several times in succession before submerging. Substrate may be tossed but this is not always the case. **S:** A spyhop, in which *V. americana* orients vertically and remains very still with head and cervical area exposed. Body position is inferred based on flexibility of head and burrowing direction.

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Myrmeleon, as the latter burrows in a tight spiral and repeatedly tosses substrate from the same area. This author has observed only flicking in *V. americana* when prey insects are active on the sand surface posterior to the larvae. Because there are no loose pit walls, striking prey with sand cannot have the dislodging effect that *Myrmeleon* rely upon to bring prey within striking distance. It is hypothesized that flicking by *V. americana* serves to attract the attention of prey on the surface. In particular, Florida harvester ants struck with sand were observed to move towards the submerged larvae. Harvester ants are frequent cohabitants of the areas where *V. americana* hunt, and likely serve as occasional prey items.

This author observed a new surface behavior in larval *V. americana* that does not have an analog in pit builders. In the presence of prey, a larva will expose its entire head from the sand and hold it still with jaws closed and antennae upright (Fig. 1). This pose is reminiscent of the behavior called "spyhopping," in which an aquatic animal orients its entire body vertically to poke its head out of the water. Cetaceans use this behavior to observe prey or objects above the surface, and it is likened to a human being treading water (Mohamed 2014). It is hypothesized that spyhopping in *V. americana* allows the animal to access information above the surface of sand without exposing the entire body. Partially exiting the substrate may expand the sensitive region of the stalked stemmata and antennae. The acuity of larval *V. americana* vision is not known, but on multiple occasions resting individuals (jaws open and buried) have been seen vibrating the body in such a way as to expose the stemmata and antennae, so evidently they are of some use. This action produces a distinctive image: a horizontal groove is formed by sand resting on the jaws, and the stemmata can be seen as black pinpricks within this groove.

Further investigation into the sensory capabilities of *V. americana* out of sand could support this hypothesis or suggest alternative functions for the behaviors. Investigating the sensory capabilities of a partially submerged *V. americana* would make for an interesting research subject in the future, as larvae unbury themselves completely in order to escape a shallow collection of sand. In conclusion, more study is necessary to determine the sensory capabilities of *V. americana*.

I am grateful to Dr. Mark Deyrup and Dr. John Oswald for assistance in locating wild *V. americana* and suggesting methods of study, and to the staff at Archbold Biological Station for making my stay so easy and wonderful. I thank my peers and my future peers at Cornell and Archbold, who shared and furthered my enthusiasm for these interesting creatures.

Summary

Two surface behaviors were described in the larva of the antlion *V. americana*. *Vella americana* were observed flicking in a similar manner to pit builders, but in a way that does not lead to pit construction. A new spyhop behavior also was observed in which a larva exposes its head and thorax above the sand and remains very still for some time. It is hypothesized that these behaviors assist larval *V. americana* in hunting and orientation. The flicking motion may attract the attention of certain prey species, and the spyhop exposes the larva's stalked stemmata and multi-segmented antennae to increase sensitivity to prey or disturbance.

Key Words: flicking, Acanthaclisini, stemmata

Sumario

Se describieron dos comportamientos sobre la superficia del suelo por parte de las larvas de león de hormigas, *V. americana*. Se observó *Vella americana* tirando de una manera similar a los constructores de hoyos, pero de una manera que no llega a la construcción total de hoyos. También se observó una nueva conducta como el salto de espía en la que una larva expone su cabeza y tórax por encima de la arena y permanece muy quieta durante algún tiempo. Se plantea la hipótesis de que estos comportamientos ayudan a la larva *V. americana* en la caza y la orientación. El movimiento de tirar puede atraer la atención de ciertas especies de presas, y el salto de espia expone la stemmata de la larva y las antenas multi-segmentadas para aumentar la sensibilidad a las presas o disturbios.

Palabras clave: tirar, Acanthaclisini, stemmata

References Cited

Craddock AL, Menges ES, Salo JA, Weekley CW, Zinthefer R. 2008. Gap ecology in Florida scrub: Species occurrence, diversity, and gap properties. Journal of Vegetation Science 19: 503–514.

Deyrup MA. 1990. Arthropod footprints in the sands of time. Florida Entomologist 73: 529–538.

Heinrich B, Heinrich MJE. 1984. The pit-trapping foraging strategy of the ant lion, *Myrmeleon immaculatus* DeGeer (Neuroptera: Myrmeleontidae). Behavioral Ecology and Sociobiology 14: 151–160.

Menges ES, Pickert RL, Weekley CW. 2008. An ecological map of Florida's Lake Wales Ridge: A new boundary delineation and an assessment of post-Columbian habitat loss. Florida Scientist 71: 45–64.

Miller RB, Stange LA. 1985. A generic review of the Acanthaclisine antlions based on larvae (Neuroptera: Myrmeleontidae). Insecta Mundi 1: 29–45.

Mohamed KS, Ragesh N, Sajikumar KK. 2014. Behavior of short-finned pilot whales *Globicephala macrorhynchus* (Gray, 1846) (Mammalia: Cetartiodactyla: Delphinidae) in the southeastern Arabian Sea. Journal of Threatened Taxa 6: 6488–6492.

Stange LA. 1980. The ant-lions of Florida II: Genera based on larvae. Entomology Circular 221.