

NOTES ON THE NESTING BEHAVIOR OF THE
BETHYLID WASP, *EPYRIS ERIOGONI* KIEFFER,
IN SOUTHERN TEXAS

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In spite of its cosmopolitan distribution and large size, the family Bethylidae remains relatively poorly known, especially from a behavioral viewpoint. This is particularly unfortunate because of the presumed phylogenetic importance of this group (e.g., Malyshev, 1968) and a growing appreciation of the possible value of these wasps in biological control (e.g., Yamada, 1955; Schaefer, 1962; Gordh, 1976; Gordh and Evans, 1976). Evidently there is a great diversity in the behavior of members of this family. (For reviews see Richards, 1939; Yamada, 1955; Evans, 1964; Gordh, 1976). The present paper concerns a species exhibiting behavior remarkably similar to that of some of the more generalized fossorial wasps of the families Sphecidae and Pompilidae.

The genus *Epyris*, one of the largest in the family, is found in all zoogeographic regions. They are small wasps (2–10 mm in length) and have been little studied aside from a brief report by Bridwell (1917), and a somewhat more detailed account by Williams (1919). Bridwell observed a female of a South African species carrying a tenebrionid larva. Williams studied the Hawaiian species *E. extraneus* Bridwell, also a predator on tenebrionid larvae, and described stinging behavior, prey carriage, larval development, and certain aspects of its nesting behavior. He found that prey were hunted and stung before a nest site was selected, and were dragged to the nest site using what Williams described as a unique form of carriage, "the prey being borne rapidly along on the wasp's back".

Our studies are the first conducted on a North American species of *Epyris* and confirm Williams' observations while adding some details. They were conducted on the shores of the Rio Grande, approximately one mile west of the Bentsen-Rio Grande State Park,

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Hidalgo County, Texas, on May 19, 27, and 28, 1979. *E. eriogoni* Kieffer males and females were common in sandy, bare areas among the vegetation within 10–20 meters of the shoreline (Fig. 1). Males, in loose aggregations, were observed to be active from mid-morning to early afternoon. They were observed to fly just above the soil surface, landing and digging occasionally, and seemed to stray little from an area of a few square meters. Females were most abundant in areas where males were observed; however, no copulations were seen. Other females were observed primarily on low-lying vegetation. In most cases the females flew little. Most of their activity was devoted to scurrying along the soil surface, entering cracks and crevices, or exploring under clods of earth and other debris scattered on the soil surface. Female activity was restricted to early to mid morning hours; few were observed in the afternoon.

Two field observations were made of *E. eriogoni* nesting behavior. At 1030 hours, May 19, we observed a female carrying its tenebrionid prey up a slight incline in a bare expanse of beach sand. Prey transport consisted of pulling the prey backwards over the sand (Fig. 2a), or carrying it alongside, and sometimes slightly above (Fig. 2b).



Fig. 1. Typical nesting habitat of *Epyris eriogoni* in southern Texas.

In both cases the wasp grasped the larva in the head region, apparently by the palps. A similar mode of transport was described by Williams (1919) for *E. extraneus* in Hawaii.

After experiencing much difficulty in carrying the relatively larger prey the wasp carried it under a clod of sand. She emerged after approximately one minute and was captured and preserved. Subsequent excavation recovered the prey at about 1 cm depth. Since no egg was found on the prey, we hypothesize that this site probably represented a temporary location to be utilized until a suitable nest site could be found.

At 0930 hrs on May 28 a second female, *E. eriogoni*, was observed dragging its larval tenebrionid prey up a gradual sandy incline. Again the same two forms of prey carriage were noted (Fig. 2). The wasp abandoned the prey several times and, in a 50 to 100 cm radius, investigated numerous cracks and depressions in the soil surface. She appeared to experience some difficulty in relocating the prey after each of these forays. On the third foray the bethylid entered a tiny hole in the sand (which later proved to be the temporarily closed burrow of a sand wasp), remained several seconds, and then returned directly to the prey and began transporting it towards the hole. Upon reaching the burrow, she deposited the prey outside, a few millimeters distant, and entered the burrow. Within a few seconds she reemerged, grasped the head (palps?) of the prey, and backed into the burrow with it. Shortly after the prey and bethylid had disappeared into the burrow, a *Bembix troglodytes* entered the same burrow with its dipterous prey; this caused the bethylid to leave the burrow momentarily. After re-entering the burrow the bethylid remained for at least two hours (until 1200 hours), when observations were discontinued.

Excavation of the sand wasp nest revealed a small horizontal tunnel (approx. 1–2 mm diam.) leading off at a right angle from the sand wasp burrow. It extended about two centimeters where it enlarged to a "C" shaped cell only slightly larger than the partially curled tenebrionid prey it contained. The *Epyris* "nest" was located at approximately 25 cm depth and immediately before the internal closure of the sand wasp nest (leading to the cell of the latter nest). The female bethylid was not found in the nest. The prey contained a single egg (Fig. 3) in a position nearly identical to that pictured for *E. extraneus* in Hawaii (Williams, 1919). The egg died before hatching.

The two preserved tenebrionid larvae were identified as *Blastinus* sp., which are apparently very close taxonomically to the prey

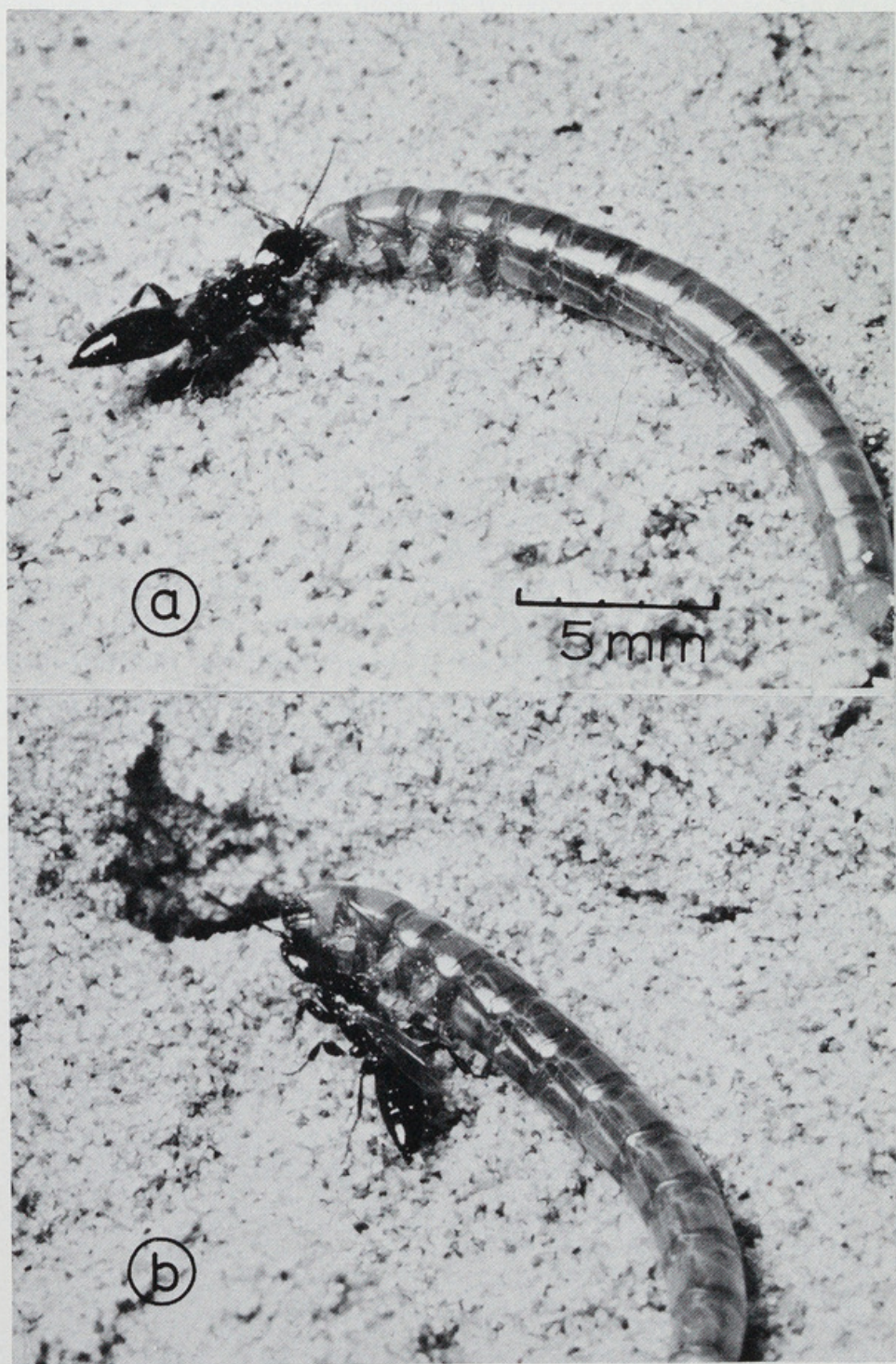


Fig. 2. *Epyrus eriogoni* dragging its *Blastinus* sp. prey: a) backwards along the soil surface, and b) forward along the soil surface and toward the nest opening.

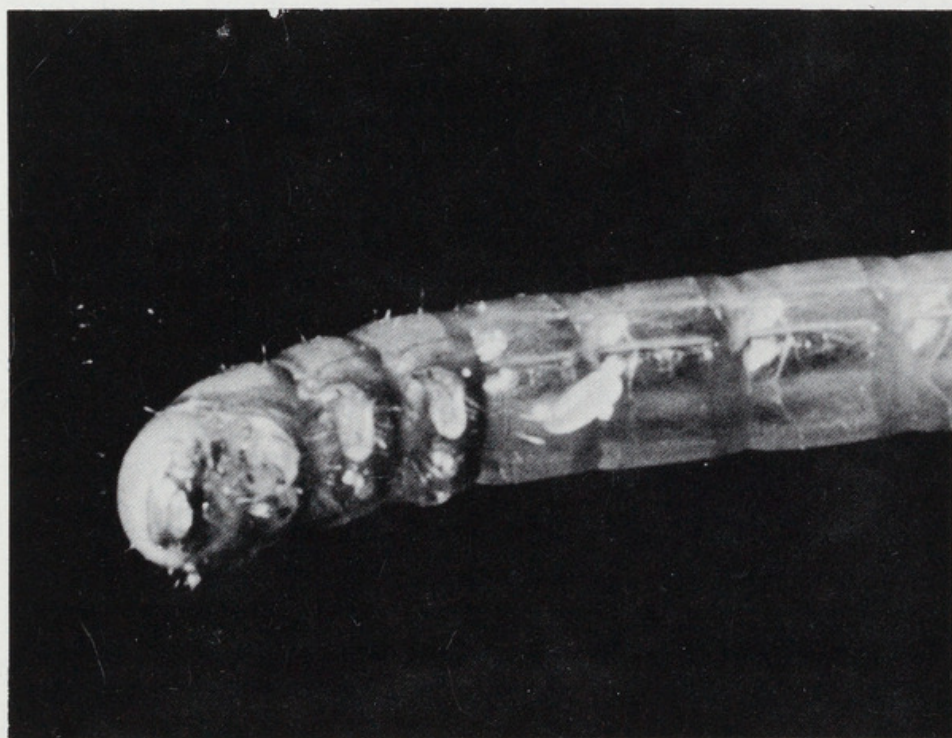


Fig. 3. *Blastinus* sp. larval prey of *Epyris eriogoni* showing egg on the first abdominal segment.

(*Gonocephalum seriatum* (Boisduval)) Williams (1919) found to be used by *E. extraneus* (T. J. Spilman, pers. comm.).

Four female and five male wasps were returned to the laboratory in an attempt to further study their biology. The males survived for several days and the females for a period of two months on a 5% honey-water diet. Captive females would not accept *Tenebrio molitor* L. larvae of the appropriate size class as prey. Although they did appear to be searching for prey in the available cracks and crevices in the rearing chamber, no interest in mealworms was apparent.

DISCUSSION

Based on this report and that of Williams (1919), the habits of *Epyris* are seen to parallel remarkably those of some of the primitive fossorial wasps. Certain Pompilidae, for example, commonly build cells from the sides of digger wasp burrows (e.g., Evans, 1974) and some Sphecidae of genera such as *Chlorion* regularly nest from pre-existing burrows (e.g., Peckham and Kurczewski, 1978). Man-

dibular prey carriage over the ground also occurs in both of these families, and the manner of dragging the prey backward (Fig. 2a) is remarkably like that of many Pompilidae. Williams was, however, correct in characterizing carriage such as that shown in Figure 2b as unique.

Members of other genera of Bethylidae are known to carry their prey to a second site for oviposition after being stung; this includes *Bethylus*, *Holepyris*, *Parascleroderma*, and to a certain extent *Allepyris* (Yamada, 1955). However, only *Epyris* actually constructs a nest. Further work regarding the comparative ethology of *Epyris*, as well as other members of this family should prove very rewarding.

ACKNOWLEDGMENTS

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