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## Observations on the Nesting Behavior of *Tachysphex antillarum* (Hymenoptera: Sphecidae)

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*Tachysphex antillarum* is one of five species of this genus known from Cuba (Pulawski, 1974, 1989); it also occurs in Puerto Rico (Bohart and Menke, 1976; Pulawski, 1989). The species belongs to the Nearctic "terminatus" group. These wasps principally use immature Orthoptera (Acrididae) as provisions for their developing larvae (Pulawski, 1974, 1989).

Nothing has been published on the biology of *T. antillarum*. This work describes some characteristics of its nesting behavior, including prey types for provisioning, nest structure, and the type of substrate at the nest site.

Observations were made at the mining center La Fosforita, near Güines, La Habana, Cuba. Materials extracted from this quarry are used in construction and for agricultural fertilizers. Areas at the site are mined on rotation, so that some regions are undisturbed for long periods of time. At this site there was a 106.5 × 33 m area of bare sandy soil, surrounded by earthen banks up to 5 m tall, where other Hymenoptera nested (Fig. 1). The quarry is situated between secondary forest and open hills with grasses and mixed vegetation or agriculture.

Wasps were first observed in October, 1986. During this month we visited the site four times, and thereafter we visited the site two or three times per month (except December, 1987) until August, 1988. Observations began between 800-900, and continued to 1700-1800 h.

Additional observations were made at the following sites: Pepito Tey, Cienfuegos (November, 1987); Los Indios, Isla de La Juventud (June, 1988); and Santa María del Mar beach, Ciudad de La Habana (August, 1988).

Cocoons, wasps and their prey were measured with an ocular micrometer immediately after their capture. Nests were excavated and the length of the nest main burrow was measured, as well as the depths of cells.

### Seasonal Activity, Nesting Sites, and Heterospecific Relationships

*Tachysphex antillarum* was multivoltine at the main site (Güines), reproducing during the entire year. Aggregations of this wasp occurred simultaneously in different types of substrate, such as sandy friable soil with a rocky surface; sandy, friable soil; and red clay, friable soil.

At Santa María del Mar beach, wasps nested in pure, fine sand, while at Los Indios a small group made their nests in black, scarcely friable soil. In Pepito

Tey, wasps nested in a quarry similar to the one previously mentioned. The nest entrances were always located in substrate free of vegetation.

In Güines, throughout the year *T. antillarum* nested with the following species: *Astata unicolor* Say, *Sphex jamaicensis* (Drury), *Hoplisoides ater* (Gmelin), *Bicyrtes spinosa* (Fabr.), *Bembix americana antilleana* Evans and Matthews, *Stictia signata* (Linn.), *Oxybelus analis* Cresson, *Philanthus banabacoa* Alayo, *Cerceris cubensis* Cress. and *C. cerverae* Ginér-Marí. The only species that nested during the whole year with *T. antillarum* was *O. analis*, which also appeared with it at all localities studied.

Males of *T. antillarum* make frequent, rapid flights back and forth above the soil at the nesting aggregation to attempt copulation. Both sexes have been taken feeding at flowers of *Chamaesyce berteriana* (Balbis) (Euphorbiaceae).

### Characteristics of the Nest

The entrance to many nests was situated next to little rocks and always in bare ground. The wasp prepared a temporary nest closure while it was away hunting, or when feeding and resting. The tumulus formed at the entrance was always leveled by the wasps. Nests were shallow and contained up to 5 cells. Eleven excavated nests averaged 5.90 cm (SD = 1.04) in main burrow length (range = 4.5-8.5 cm). The cells were found at depths ranging from 1.0 to 5.2 cm ( $\bar{x}$  = 2.3 cm, SD = 1.14,  $n$  = 28).

### Provisioning Behavior and Prey Types

Females hunted, captured, and paralyzed prey (Orthoptera) by stinging. Wasps carried the prey to their nests in flight, holding onto them with the mouthparts and legs [this type of transportation is the mandibular mechanism type 3 (M3) of Evans (1962)]. The weight of the prey forced the wasps to make frequent stops on rocks or plants, until reaching the nest entrance. Here, prey were placed ~1 cm from the entrance, with their heads facing the opening and their venters on the surface. Then the wasp removed the temporary closure and entered the nest, re-appearing a few seconds later to pull the prey into the nest; by grasping the base of the antenna, the antennal flagellomeres or, in some cases, a leg.

*Tachysphex antillarum* is a mass provisioner which deposits from 6 to 11 prey items in each cell ( $\bar{x}$  = 8.20, SD = 1.86,  $n$  = 20). The egg was fixed to the last prey (usually the largest) placed into a cell. Eggs were placed in a position typical for the genus—on the base of a forecoxa, extending transversely between the bases of the first and second pairs of legs (Fig. 2).

This species only preyed on the acridids *Parachloebata scudderii* Bolv. ( $n$  = 148), *Chorthophaga cubensis* Sauss. ( $n$  = 35) and an unidentified species ( $n$  = 22). All prey were immature, but various developmental stages were represented. Prey size ranged from 3.0 to 9.0 mm ( $\bar{x}$  = 4.88 mm, SD = 1.15,  $n$  = 208). The acridids were generally placed in the cell venter-up and with their heads toward the inner part of the cell. Cocoon length ranged from 6.0 to 8.1 mm ( $\bar{x}$  = 7.20 mm, SD = 0.70,  $n$  = 21).

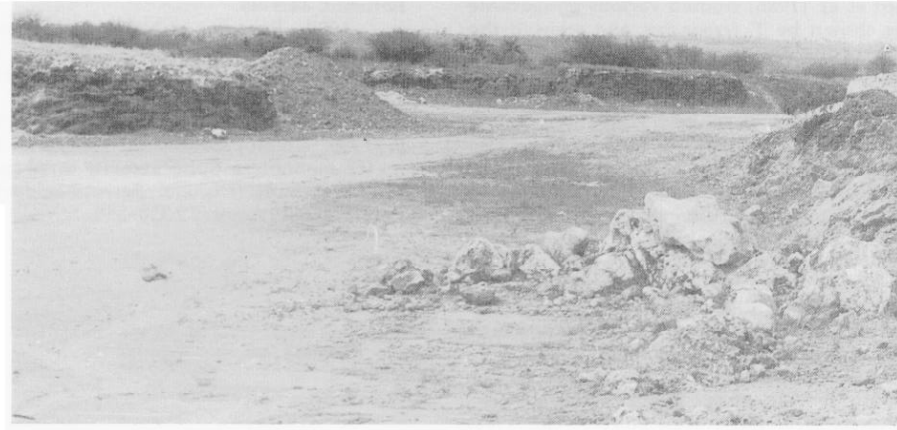


FIG. 1. Nesting habitat of *Tachysphex antillarum* in Güines, La Habana.

#### *Antiparasitic Behavior*

At the quarry, two species of cleptoparasitic flies (*Senotainia rubriventris* Maq. and *S. trilineata* (Wulp) (Miltogramminae)) were abundant. Many cells (53.6%

of 28 excavated) were parasitized by these flies. Female *T. antillarum* modified their provisioning flights in the presence of these flies, and sometimes did not enter the nests with prey, remaining up to 4 m away from the nest.

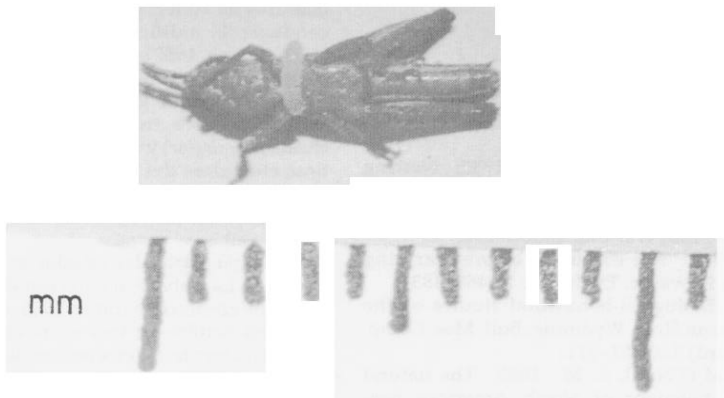


FIG. 2. Paralyzed prey bearing the egg of *Tachysphex antillarum*.

This behavior presumably forced the wasps to spend more energy, especially when the prey were of a large size, as they altered their flight patterns and also delayed the frequency of provisioning. In two cases we observed wasps attack, at the nest entrance, the flies that attempted to larviposit on their prey. Also, when the activity of the dipterans was particularly intense, wasps inspected the prey minutely, walking over it and feeling it with their antennae and mouthparts just before introducing it into the nest.

Spofford et al. (1986) studied various antiparasite behaviors shown by *T. terminatus*, and showed the importance of the nest closure, diversionary flights, as well as prey cleaning to eliminate the maggots. McCorquodale (1986) examined the provisioning flights in six species of sphecids wasps that nested sympatrically with the cleptoparasitic fly, *Senotainia trilineata*. He showed that wasps modified their flight patterns during nest provisioning, and this reduced the frequency of contact between parasite and host (see also Evans and O'Neill, 1988).

Due to the absence of well-defined seasons in Cuba, sphecids produce offspring many times during the year. Individuals of various populations of *T. antillarum* nested in a wide variety of soil types, which indicates a certain lack of specialization.

The nesting behavior of *T. antillarum* corresponds with that of other known species of the "*terminatus*" group (Evans, 1970; Elliott and Kurczewski, 1985; Kurczewski and Evans, 1986). Shared behaviors include method of prey carriage, presence of temporary nest closures, use of acridid nymphs as prey, and multicellular nests.

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#### LITERATURE CITED

- Bohart, R. M., and Menke, A. S. 1976. Sphecids wasps of the world. University of California Press, Berkeley. 695 pp.
- Elliott, N. B., and Kurczewski, F. E. 1985. Nesting and predatory behavior of some *Tachysphex* from the western United States (Hymenoptera: Sphecidae). *Great Basin Natural.* 45:293-298.
- Evans, H. E. 1962. The evolution of prey-carrying mechanisms in wasps. *Evolution* 16:468-483.
- . 1970. Ecological-behavioral studies of the wasps of Jackson Hole, Wyoming. *Bull. Mus. Comp. Zool. (Harvard)* 140:451-511.
- Evans, H. E., and O'Neill, K. M. 1988. The natural history and behavior of North American bees-wolves. Cornell University Press (Comstock Publ. Assoc.), Ithaca. 278 pp.
- , and Evans, H. E. 1986. Correct names for species of *Tachysphex* observed by Evans (1970) at Jackson Hole, Wyoming, with new information on *T. alpestris* and *T. semirufus* (Hymenoptera: Sphecidae). *Proc. Entomol. Soc. Wash.* 88:720-721.
- McCorquodale, D. B. 1986. Digger wasp (Hymenoptera: Sphecidae) provisioning flights as a defense against a nest parasite, *Senotainia trilineata* (Diptera: Sarcophagidae). *Can. J. Zool.* 64:1620-1627.
- Pulawski, W. 1974. A revision of the Neotropical *Tachysphex* Kohl (Hym., Sphecidae). *Polskie Pismo Entomol.* 44:3-80.
- . 1989. Revision of North American *Tachysphex* wasps including Central American and Caribbean species (Hymenoptera: Sphecidae). *Mem. Calif. Acad. Sci.* 10:1-211.
- Spofford, M. G., Kurczewski, F. E., and Peckham, D. F. 1986. Cleptoparasitism of *Tachysphex terminatus* (Hymenoptera: Sphecidae) by three species of Miltogrammini (Diptera: Sarcophagidae). *Ann. Entomol. Soc. Amer.* 79:350-358.

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### Conducta de Nidificación de *Astata unicolor* en Cuba (Hymenoptera: Sphecidae)

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*Astata* es un género de distribución mundial, que contiene unas 100 especies (Evans, 1957). En Cuba, está representado por *A. unicolor*, que se encuentra además en Norteamérica (Bohart y Menke, 1976). Las hembras aprovisionan sus nidos con adultos e inmaduros de Heteroptera y presentan elementos de la conducta de nidificación únicos en la familia Sphecidae (Evans, 1957).

Desafortunadamente, la etología de estos esfécidos es poco conocida. Evans (1957) aportó nuevos conocimientos sobre tres especies norteamericanas (incluida *A. unicolor*) y resumió las principales características etológicas del género. En este trabajo, damos a conocer por primera vez algunos datos sobre la conducta de nidificación y presas utilizadas por *A. unicolor* Say en Cuba.

La mayor parte del estudio se realizó en Güines, provincia La Habana, en una cantera con grandes áreas de suelo arenoso. Durante 1986 se realizaron cuatro viajes en octubre, y tres en noviembre y diciembre respectivamente. Se efectuaron dos o tres visitas mensuales en 1987, excepto en diciembre. En 1988 se muestreó con la misma frecuencia que en años anteriores, finalizando en el mes de diciembre. Se efectuaron además observaciones en La Gran Piedra, Santiago de Cuba, el 15 de septiembre de 1987 y en el