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**MALE BEHAVIOR IN *EVAGETES SUBANGULATUS*
(HYMENOPTERA: POMPILIDAE)**

Edward M. Barrows

ABSTRACT¹

Males of *Evagetes subangulatus* patrolled primarily among shrubs in an area where females dug in soil. Twenty-nine individually-marked males were seen from 0 to 16 days after marking. They shared a home range space of about 400 m³. Although they did not exhibit territoriality, they chased and pounced upon one another and upon unmarked, conspecific males and females.

Evagetes subangulatus (Banks) is a medium-sized, totally black spider wasp that occurs across North America in the Hudsonian and Transition Zones (Muesebeck et al., 1951). Behavior of this wasp has not been reported. Moreover, knowledge of male hymenopteran mate-location behavior is meager, especially with regard to Pompilidae (Alcock et al., in press); therefore, I attempted to investigate mate-location behavior and, in particular, space partitioning in male *E. subangulatus*.

Male pompilids were observed from 12 to 29 July at the University of Michigan Biological Station, Cheboygan County, Michigan. By 29 July, males were scarce at the study site. Searches for males were made from 0630 to 2030 from one to five times on each day during the observation period. Males were captured and marked for individual recognition on their scuta with fast-drying enamel paints.

Twenty-nine marked males of *E. subangulatus* were seen in the study site for from 0 to 16 days ($\bar{x} = 4.6$, $M = 3$) after the days on which they were first marked (Figure 1). All males were captured and marked in region 1. Thirty-one percent of the males subsequently appeared in region 2; 35% in region 4; and 17% in region 3 during the entire observation period of 18 days. Region 1 included bushes of *Diervilla lonicera* Mill., *Vaccinium* spp., and a 40-cm high sapling of *Quercus rubra* L. Region 2 was a 1-m *Q. rubra* sapling on which pompilids and other hymenopterans obtained honeydew or other substances from kermesid scale insects. *Polistes fuscatus* (Fabricius) (Vespidae) workers established individual feeding territories and chased *E. subangulatus* and other insects from these kermesids (Barrows, in prep.). Region 3 has only bushes of *Gaylussacia baccata* (Wang.) K. Koch; and region 4 has the same species of plants as region 1 plus *G. baccata*. Males of *E. subangulatus* were primarily in shrubby areas in a larger area of about 400 m². They appeared most frequently from about 0800 to 1000 and from 1600 to 1900 on warm, clear days.

Male *E. subangulatus* flew from a few cm to 1 m above the ground, and crawled over soil, dead leaves, *Pinus strobus* L. cones, and bushes. Males did not appear to move among landmarks in particular sequences, perch in constant places, or establish territories; however, they were constant to an about 400 m³ space which they shared. Crawling males frequently flicked their wings and groomed. They were less common at their partolling sites during mid-day and early afternoon, perhaps because sand temperatures became too high. Males of *Episyron quinquenotatus* (Say) were occasionally seen patrolling in the same space as males of *E. subangulatus*.

Marked males often chased and pounced upon one another and upon unmarked conspecifics which were males and females, but no copulations were seen. *E. subangulatus* possibly mates early in its flight season (when I was unable to observe it); females mate once or only a few times, or both. One male pounced upon a piece of charcoal that was

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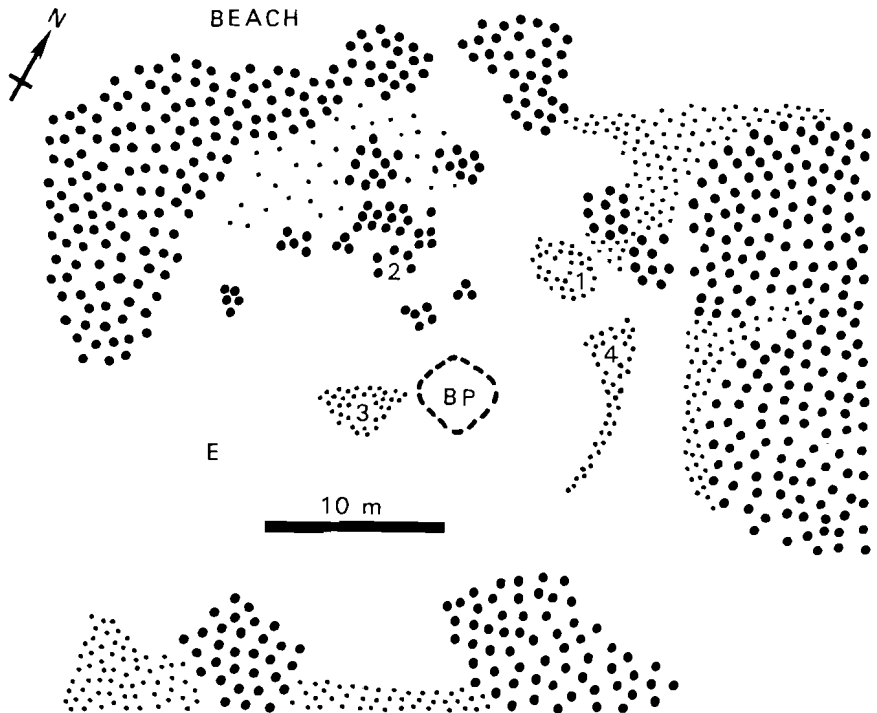


Fig. 1. Distribution of male *Evagetes subangulatus* from 12 to 29 July, 1977, in a female digging area. Large dots indicate areas of trees and saplings, small dots indicate areas harboring low shrubs, and absence of dots indicates open sand or sandy areas with sparse forbs. BP is a brush pile and E is wasp E. "1" is the area where wasps A to Z and AA to CC were captured, marked, released and many of which were seen on days subsequent to marking. "2" is an oak sapling (5 dots) that harbored kermesid scale insects from which wasps E, H, I, M, O, Q, Y, V, and CC were seen obtaining honeydew. "3" is a shrubby area where wasps A, F, H, K, N, O, Q, T, U, and V were seen. "4" is another shrubby area where wasps B, C, R, Q, and Z were seen.

about the size and shape of a conspecific female. Other male hymenopterans, for example, bees, also evidently waste time and energy orienting toward and pouncing upon other conspecific males, unreceptive females, or dark, female-sized objects (Barrows, 1975; 1976a; 1976b).

Male V, for example, was noted as he patrolled for 3 minutes; his path is diagrammed in Figure 2. He spent most of the 3 minutes crawling over soil, leaves, and pine cones on the soil; however, he occasionally crawled over bushes of *Diervilla lonicera*. He moved a total of about 21 m during this observational period.

Some aspects of pompilid reproductive biology have been reported by Richards and Hamm (1939), Evans (1948), Evans et al. (1953), and Wasbauer (1955, 1957). *E. subangulatus* is similar to other pompilids in that males search for females at nesting sites, and they may mate or attempt to mate with females on the ground.

ACKNOWLEDGMENTS

Howard E. Evans, Colorado State University, made helpful comments on a preliminary draft of this note. Henry R. Hermann, University of Georgia, identified *Polistes fuscatus*;



Fig. 2. Top view of a patrolling route generated by male V in 3 minutes in region 1 (see Figure 1). He spent most of his time crawling over dead leaves, pine cones on the soil and over bare soil. Occasionally he crawled over shrubs. D, *Diervilla lonicera*; F, end of the male's path; P, cones of *Pinus strobus*; Q, sapling of *Quercus rubra*; S, beginning of male's path; V, *Vaccinium* spp. Dead leaves beneath shrubs are not diagrammed.

Arnold S. Menke, USDA, Washington, D.C., identified the pompilids; Alison Reissman, University of Michigan, helped me map the pompilid patrolling site; and Mark McMahon, Georgetown University, helped prepare the manuscript.

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