

Nesting Behavior of Sphecidae on Dominica

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Abstract

This project was an observational study of a nest building, interaction, and general behavior of a species of Sphecidae on the island of Dominica. Over a period of two days, one nest was carefully observed as two females worked together to build, protect, provision, and oviposit within their nest. Each sphecid contributed to the building of the nest differently. The larger sphecid was more occupied with building of the nest, while the smaller sphecid visited the nest less often, displayed more grooming and guarding behavior. The larger sphecid also demonstrated a preference of which cells on the nest she worked on, and was observed “pushing” the other sphecid out of the way on several occasions. When the nest was dissected, *Tetragnatha* were found as the primary prey animal provisioned within the nest; a maximum of 1% of the prey items within the nest observed were not *Tetragnatha*.

Introduction

Sphecidae are a very important group of small parasitic wasps found in the order Hymenoptera. The species discussed in this observational study are approximately one centimeter in length. Characteristics typical for Sphecidae include the construction of mud nests, sometimes in close proximity to humans on the sides of buildings. Sphecids will often provision their nests with spiders, caterpillars, and other small prey items. The purpose of this observation was to document and increase current understanding of Sphecidae on Dominica.

Materials and Methods

A single nest of Sphecidae, possibly the genus *Trypoxylon*, was observed over the course of two days. Photographs were taken of the nest to show progression of the nest-building process

and its general size and shape. Video recordings of the wasps entering and leaving the nest were used to determine the average time a wasp spent on the nest, general nest-building behavior, and interaction amongst nest builders.

After the nest was observed, the two wasps contributing to the nest were collected, point mounted, and identified using Borror & DeLong's to Hymenoptera (2005). Every cell in the nest was observed under a dissecting microscope and prey items were counted and recorded per cell. Information about the location and surroundings of this and nearby nests was also noted. Photographs were taken of the pointed adult sphecid wasps, which will be deposited in the insect collection within the Entomology Department at Texas A&M University.

Results and Discussion

The nest observed (Fig. 1) was composed of mud and consisted of eleven cells; each approximately 0.5 cm wide and 1.5 cm long. Individual cells were large enough for all prey items stuffed within and an adult sphecid wasp, approximately 1.0 cm long. The construction of cells was staggered so that only one or two cells were assembled at any time.

The nest was located in a full-shade spot approximately five feet above the ground in an area where the elevation is approximately 1132 feet above sea level. Four other nests were found in close proximity to the nest observed, also in full-shade.



Figure 1: Sphecidae Trypoxylon nest on the side of building.

The wasps responsible for building the nest included two females; one larger wasp, hereafter referred to as “sphecid 1”, and one smaller wasp, hereafter referred to as “sphecid 2” (Fig. 2). Both females brought either a small clump of dirt or mud of approximately equivalent size and shape to contribute to the nest with each return.



Figure 2: Female Sphecidae, point mounted by S. Henderson. Photo by Dr. J. B. Woolley and X. Shirley.

When observing the nest mate interaction, it appeared as though the wasp that held claim to the more completed cell would oviposit her egg within that cell and not the competing wasp. Sphecid 2 was observed repeatedly returning to the only open cell, hereafter referred to as “cell 1”, which was almost completed, but sphecid 1 would “push” sphecid 2 out of the way when she returned to the nest each time.

The behavior meant by “push” can be seen in the video “Sarah.Henderson_Sphecidae.mp4” and described as the following: Sphecid 2 arrived at the nest with a ball of dirt, moistened it into an acceptable texture, and continued working on the one active cell. Before sphecid 2 finished using the mud she had brought, sphecid 1 arrived at the nest and alerted the other sphecid to move by flying in and touching the back of sphecid 2, flying out, and landing on the nest where sphecid 2 had been working. At the same time that sphecid 1 landed, sphecid 2 took off and then landed on a lower section of the nest. While sphecid 1 continued her work on cell 1, sphecid 2 walked from the bottom of the nest to the top and then scouted out an area to place another cell. The rough measurements taken by sphecid 2 can also be seen in the attached video when sphecid 2 walks back and forth at the top of the nest where a new cell will be built and starts working. In later observations sphecid 2 no longer works on cell 1, but on the new cell she created at the top of the nest.

Sphecid 2 demonstrated much more grooming behavior than sphecid 1, and was more wary of novel objects within the “comfort zone” of the nest demonstrating guarding behavior. Sphecid 1 was never observed guarding the nest and was much less wary of novel or moving objects within the “comfort zone” of the nest as established by sphecid 2. Sphecid 1 made many more trips to the nest than sphecid 2, but both wasps spent an average of 30 seconds at the nest each trip when there was only one wasp present on the nest at a time. When both wasps were on the nest the

average time spent at the nest was extended to an average of 50 seconds spent at the nest. When both wasps were present, the times each wasp spent was not separated into two times, but timed as one event. Part of the increase in time spent at the nest may be because of grooming behavior, nest guarding, or coordination of cell construction.

Each completed cell contained between nine and seventeen *Tetragnatha* spiders with an average of 14 prey items per cell, and possible 1% maximum of the spiders observed were not *Tetragnatha*. Most of the cells observed contained a single cell, but 3 cells out of 11 contained sphecid larvae –one of which was already preparing a silk puparium.

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Sources

Dr. J. B. Woolley. Interview, June 2012.

Borror, DeLong, C. A. Triplehorn, and N. F. Johnson. *Borror and DeLong's Introduction to the Study of Insects*. 7th edition, 2005.