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THE SINGLE LINE WEB OF *PHORONCIDIA STUDO* LEVI (ARANEAE: THERIDIIDAE): A PREY ATTRACTANT?

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ABSTRACT

Phoroncidia studo constructs snares consisting of single, more or less horizontal sticky lines. Fragmentary evidence suggests that the sciarid fly *Bradysia* sp. nr. *coprophila* may be attracted to these snares.

INTRODUCTION

Evolution toward reduced webs has occurred in several families of web building spiders. Among orb weavers, it appears to have been associated with the evolution of substances attractive to prey in *Mastophora* spp. (Eberhard 1977) (Araneidae), and probably its near relatives, but not in *Miagrammopes* spp. (Lubin et al. 1978) (Uloboridae). In both of these groups as well as in *Eucta* sp. (Crome 1954) and *Wixia* sp. (Stowe 1978) (Araneidae), reduced webs are associated with particularly active attack behavior in which the spider either manipulates the web or snares the prey itself.

Very simple webs which are presumably secondarily reduced have also been found in the theridiids *Episinus* spp. (Holm 1939, pers. obs.) and *Phoroncidia* spp. (= *Ulesanis*) (Marples 1955). *Episinus* webs seem to be designed for pedestrian prey; they are often built at forks in branches and are somewhat similar to the "asterisk" webs of the araneid *Wixia* (Stowe 1978) except that they have adhesive at the ends of the lines. *Phoroncidia* webs differ in that they are strung between distant supports, with sticky portions away from the substrate rather than close to it (Marples 1955). Marples saw *P. rotunda* and *P. quadratum* webs consisting of only single threads partially covered with sticky material, and *P. pukeiwa* webs with from one to three lines with sticky segments. Sometimes *P. pukeiwa* manipulated its web by letting the line go slack when a prey was caught, but other times it did not. Marples did not give prey identities for any of these species.

This note concerns the web of still another species in this genus, *P. studo* Levi. Fragmentary evidence is presented which suggests that this species, which manipulates its web only minimally during prey capture, attracts prey to its web.

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STUDY SITE

Observations were made of one adult female and probably four different immatures on 10-11 December 1976 in secondary forest at the edge of older forest near Yotoco, Valle, Colombia (el. about 1300 m, "very wet subtropical forest" Holdridgian life zone–Espinal and Montenegro 1963). The spiders were found in an area of relatively thick vegetation; the species was not common, and I could not find others on subsequent visits to the site. A voucher specimen is deposited in the Museum of Comparative Zoology, Cambridge, Mass. 02138.

RESULTS

The Web.–The three webs I saw were in place during the day and consisted of a single, more or less horizontal sticky line. One line (of an immature) was about 30 cm long, but only the 10 cm segment closest to the spider was sticky, while another (of a mature female) was sticky along almost its complete length of about 50 cm. Each spider rested near one end of its line, facing the sticky portion. I saw five spiders at night, but none had webs. It thus appears that the webs are normally up only during the day.

Prey Capture.–I observed the behavior of two flies as they flew up to the web of a mature female and became trapped there. In both cases the fly hovered close to the web and made several darting flights toward it before finally touching it with its legs. In both cases I had a strong impression that the fly was not simply snared by the line as it flew by, but that it actively searched for it. Another indication of this was that all eight prey found in webs were held by the ends of their legs rather than by their wings or bodies. Once a prey hit the line, it struggled very little; it appeared that the glue held the flies so tightly that they could not move their legs.

An adult female spider gave variable reactions to the arrival of prey. On three occasions she made no observable response and continued to wait until more prey arrived; once she immediately slackened the line and moved out toward the prey; and once she moved toward the prey without first slackening the line, and only gradually let it go slack as she approached the prey. After four flies had become trapped, this female left her resting site and attacked them. The spider evidently formed a bridge between the line in front and the line behind as described by Marples (1955), and as she moved she rolled up the sticky line and let out dry line behind. As she approached the first prey, she appeared to touch it several times with her front legs then turned 180° and wrapped it with alternating strokes of her hind legs. The prey was wrapped as it hung in the web, and was not spun or manipulated by the spider. After administering a brief wrapping (less than one minute), the spider appeared to give the prey a brief bite, and then moved on to the next, leaving the first suspended on the dry line she laid as she went. After subduing three of the four prey in the web in this manner, the spider moved back to the end under the leaf where she rested, letting out sticky silk behind as she went and thus replacing the segment of sticky line she had removed while attacking. As she moved she gathered up the immobilized prey and tightened the line. When she reached the end she attached the prey bundle to the line (?), turned 180° and apparently began to feed. She further tightened the web, just after turning, by slowly reeling in the line behind her with alternate pulls of her hind legs.

The Prey.–At first I thought that the web probably functioned as a trap for the numerous small insects that were seen hanging on single silk lines in the vicinity (see

Lahmann and Zúñiga in press , Eberhard 1980, Eberhard in press). A comparison between the spiders' prey and the insects collected on such lines did not support this idea, however. Of a total of 70 insects collected in the immediate area during the day, nearly all were Diptera (with two Hymenoptera and one Lepidoptera), and the large majority belonged to the gall gnat family Cecidomyidae. There was a relatively high diversity within this family, with males and females of many species present. On the other hand, all four prey specimens I collected were males of the sciarid fly *Bradysia* sp. nr. *coprophila* (Lintner) a species not present in the other collection (the other four prey I observed were also nematocerous flies, but were not collected; unfortunately I did not observe them with enough care to see if they were different.). Although the numbers are small, it appears that the prey did not represent a random sample of the insects resting on spider threads in that area.

DISCUSSION

Phoroncidia studo represents an extreme in web spiders with regard to its reduced attack behavior and reliance on its web for retention of prey that have been intercepted. It contrasts sharply in this respect with other theridiids and araneids with reduced webs. It is also apparently unique in replacing its sticky line immediately after attacking prey. It seems to be similar to the *Phoroncidia* species studied by Marples (1955) with respect to web form, attack behavior, and web tightening behavior.

The behavior of prey arriving at webs, the fact that all prey were caught by the ends of their long legs, and the fact that only males of a single species were captured all suggest that *P. studo* uses some sort of attractant to lure flies to its web. M. Robinson has also pointed out to me that the fact that the spiders allow several prey to accumulate before attacking is logical in terms of the attractant hypothesis: if the web is particularly costly (contains attractant) and the likelihood of prey arriving is good (they are attracted), then infrequent web destruction and replacement would be advantageous. *Dinopus longipes* which hunts by ant trails (prey arrive often) seems to behave just as *P. studo*, allowing more than one small ant to accumulate in its web before collapsing the web and wrapping the prey (Robinson and Robinson 1971).

It is not known whether male *Bradysia* sp. nr. *coprophila* respond to chemical stimuli. Obviously more work on this or another, commoner species would be of interest.

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