PREY CAPTURE BY *DRYMUSA DINORA* (ARANEAE, SCYTODIDAE)

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Introduction

The family Scytodidae includes at present three genera, of which *Scytodes* and *Loxosceles* are well known because of their specialized prey-capturing strategies. *Scytodes* species eject a sticky substance (perhaps similar to the silk from the spinnerets) from the chelicerae at a considerable distance to trap the prey (Bristowe, 1931; McAlister, 1960). The species of *Loxosceles* have developed a very effective venom capable of subduing strong prey almost instantly (Hite *et al.*, 1966). This venom affects even vertebrate tissues, including those of man (Bücherl, 1961).

The genus *Drymusa,* a small and poorly studied group, is morphologically more closely related to *Loxosceles* than to *Scytodes.* It lacks the high carapace, and possesses a colulus; also the male bulbus is located at the tip of the tarsus (Valerio, 1971). The forest-dwelling species of *D. dinora* Valerio, which lives exclusively under logs utilizing crevices and horizontal tunnels in the decomposed wood (Valerio, 1971), exhibits highly specialized behavioral patterns never observed in other spiders. The permanent web, composed of a few tangled threads, seems to alert the spider to the presence of prey and to restrict the movement of prey. Clearly, this type of construction represents a very primitive conditon in the phylogeny of the web (Kaston, 1966).

Materials

Several mature and immature specimens of *D. dinora,* of both sexes, were collected in a wet lowland forest in southwestern Costa Rica and kept individually isolated in 12-dram vials (100 × 22 mm), at 100 percent humidity and 24.5 ± 0.2°C.

Observations

This species is remarkable in two aspects of its attack behavior, departing from all known patterns: for large prey the spider spins

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a trap *after* the prey's arrival in the web, and prey-wrapping is carried out exclusively by movements of the abdomen and without using the appendages. Prey is treated in a different manner according to size and perhaps other qualities, as also occurs in other groups of web-building spiders (Eberhard, 1967; Robinson, 1969; Shear, 1969).

Attack on small prey: The spider rests in the center of the web (B in figure 1) near the superior edge of the crevice or tunnel. When small prey (less than ¼ the size of the spider) enters the tangled threads, the spider moves and attacks directly with the chelicerae and holds on firmly until the prey stops moving. Usually the prey is then carried to the resting site and feeding starts immediately without previous wrapping in silk. The arrival of a second item of prey does not elicit a response from the spider.

Attack on large prey: When large prey penetrates at one side (C in Figure 1), the spider runs to A and starts immediately spinning a horizontal partition. The prey then moves through the tangles of the center towards the trap web. If the prey cannot cross this barrier of dry silk and starts heading back, the spider moves ahead of it to C where it builds another vertical web, thus enclosing the prey in a silken trap. Then, the direct attack begins. The spider approaches its victim with certain caution and suddenly strikes five or six times with the chelicerae at intervals of one second. Sometimes, some chasing is involved. After the envenomation the prey may move around the web but the spider usually ignores it. Once the prey slows down (apparently due to the effect of the venom), it is wrapped in silk.

The silk is distributed by oscillatory movements of the whole body, reinforced by more pronounced side movements of the abdomen (with conspicuous flexions of the pedicel), changing position at intervals to deliver silk to different parts around the prey. No appendages (other than the spinnerets) are involved in the process. The prey is carried in the chelicerae to the upper portion of the web where wrapping continues for a few seconds. This post-immobilization wrapping seems to facilitate transportation of the prey to the resting site and attachment to the web for later feeding (Robinson *et al.*, 1969). Once the prey is wrapped, the spinnerets are carefully cleaned by back and forth movements of the distal third of the fourth metatarsus. Later, the fourth metatarsi, are, in turn, cleaned by the chelicerae.

Very large or very strong prey items entering the web do not produce an aggressive response from the spider. It simply lies flat

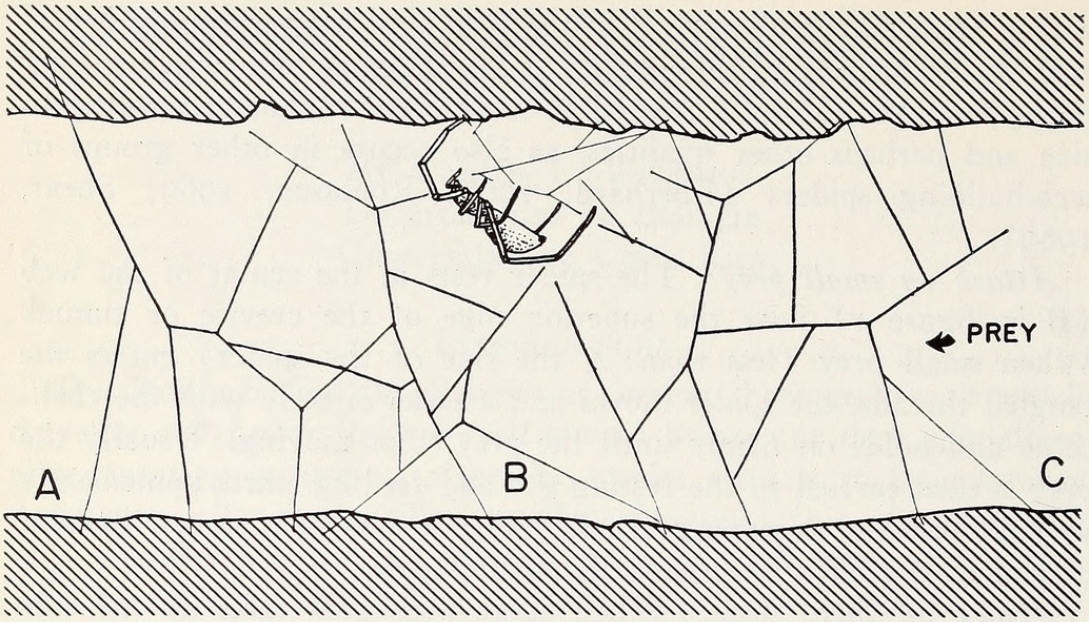

Figure 1. Spider *Drymusa dinora* in the resting area (B) in the center of the web. A trap is built at site A after prey enters through site C; later a second trap web is built at C to corral prey.

against the substrate while the prey passes through the area and moves on.

Females carry the egg-sac in their chelicerae much like the species of the genus *Scytodes* (and the structure of the sac itself resembles that of *Scytodes* also). The sac is temporarily abandoned when a suitable prey enters the web.

Discussion

In the attack on small prey the species behaves like the very primitive spiders, including their relatives of the genus *Sicarius* (Sicariidae) (Levi, 1967), attacking and subduing the prey solely by the use of the chelicerae (Eberhard, 1967).

Large prey is caught by trapping webs and is subdued by biting, but neither holding nor wrapping is involved in the immobilization process. The trapping is a remarkable adaptation to the species' habits, since the web is frequently exposed to prey too large to be captured (e.g., passalid beetles). An extensive capturing web, often destroyed without reward for the spider, would represent a significant loss of energy (through the production of silk).

During the post-immobilization wrapping the spinnerets are applied directly to the prey in a fashion similar to that observed in the diguetids (Eberhard, 1967).

The capturing behavior of *Drymusa dinora* suggests the presence of an effective venom indicating a closer relationship with *Loxosceles*.

The three genera in the family *Scytodidae* share in common the small size of the permanent web and the specialized technique for subduing of prey.

Conclusions

The species should be considered very primitive since no wrapping is involved in the immobilization of prey. There seems to be a tendency for the economy of silk through the reduction of the permanent web and the overcoming of small prey without the use of trap webs.

These behavioral observations, along with the morphological evidence, indicate that it might be best to keep the three genera (*Drymusa, Loxosceles* and *Scytodes*) within one family, the Scytodidae.

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