

LETTERS TO THE EDITOR

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Social phenomena in spiders

Sir: I read Mr. Shear's paper ("The evolution of social phenomena in spiders", Bull. Brit. Arach. Soc., vol.1:5) with great interest and would like to comment upon some inaccuracies regarding spiders of the genus *Cyrtophora*. Mr. Shear states, after Wheeler (1926), that prey capture in *Cyrtophora citricola* is "usually carried out by individuals, and communal feeding has been observed." Later he classifies *C. citricola* as semi-social, a situation "in which individuals of the same age aggregate and show a weak division of labor or cooperation."

I have studied the behaviour of *C. citricola* in Ghana and Ivory Coast (West Africa) and in Madagascar, and am currently studying the behaviour and ecology of *C. moluccensis* in New Guinea. Both species occur in colonies which give the appearance of social formations. In both cases, however, the colony is composed of individual webs of spiders of various ages, built in close proximity.

The individual web of *Cyrtophora*, as described by Kullman (1958) for *C. citricola* consists of several elements: (1) a horizontal, fine-meshed orb-web, (2) a dense, irregular snare immediately above the orb-web, the vertical threads of which are attached to the upper surface of the orb-web, (3) a less dense, irregular snare from which the dense snare and orb-web are suspended, and (4) an irregular snare below the orb-web. The horizontal orb-web of *Cyrtophora* is non-adhesive, and therefore, differs radically in function from the typical, adhesive argioid web. While an adhesive orb-web acts as a sticky trap for flying insects, the *Cyrtophora* web acts as a knock-down device. Flying insects are trapped in the upper snare (for the most part also non-adhesive) and fall onto the horizontal net, where they are attacked by the spider.

C. citricola and *C. moluccensis* are found in solitary and gregarious states. In a colony, the upper snare (element 3, above) of one web is continuous with the lower snare (element 4) of another web. Thus, the impression is one of many horizontal orbs suspended in a massive, irregular structure. Each web,

however, is a complete, self-sufficient structure containing all the elements found in a solitary web.

The female sits at the center (hub) of the horizontal net. Flying insects, trapped in the snare or on the net, are captured by the spider and brought to the hub where feeding occurs. The prey capture behaviour of *Cyrtophora* is similar to that of other "advanced" orb-weaving spiders, e.g. *Argiope* (Robinson, 1969). Occasionally, a female may respond to prey vibrations in an adjacent web and attempt to capture the insect. If the intruding female is the larger, she may succeed in capturing the prey and return with it to her own web. Only aggressive interactions of this sort were observed during prey capture. No communal feeding has been observed in either species; each female feeds at the hub of her own web. Nor have I observed feeding of young by the mother.

Aggressive interactions are also common during web building and web repair. During these activities, which occur at night, one spider will often invade the snare of another, only to be chased off by the owner. Cannibalism has been observed on at least five occasions.

It is clear from these observations that *Cyrtophora* is not a social spider. Cooperation between individuals has not been observed at any stage of prey capture, web building or reproduction. There is no division of labour and no parental care for the young. Nor can *Cyrtophora* be considered semi- or sub-social, according to Michener's (1958) definitions. However, there must be advantages to the type of colony formation found in both *C. citricola* and *C. moluccensis*. Current studies suggest that the colony may (1) increase the efficiency of prey capture of the individual spider in certain types of habitat, and (2) serve as an anti predator device.

References

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