

RESEARCH NOTES

PREDATORS OF TWO ORB-WEB SPIDERS (ARANEAE, ARANEIDAE)

I present direct and indirect evidence of five spider predators on the orb-web spiders, *Argiope aurantia*, Lucas and *A. trifasciata* (Forsk.) I also discuss indirect evidence of avian predation on these spiders. Michael J. Apicella and John Chambarlis made some of the observations on invertebrate predators. David Wise offered helpful criticisms during the preparation of this manuscript, and George Uetz identified the *Schizocosa* for me. Part of this study was supported by a grant (DEB-790491) from the National Science Foundation.

Argiope aurantia and *A. trifasciata* are large spiders (adult females ca 25 and 20 mm respectively) which build nearly vertical orbs in old field and edge habitats throughout North America. Both species overwinter in the egg case and emerge in the late spring. During the summer they increase in size from 1-2 mm up to adult size. Both species usually rebuild their orbs every day, with the exceptions of the periods around molting and egg laying.

Previously recorded invertebrate predators of *A. aurantia* and *A. trifasciata* include Hymenoptera (e.g., Muma and Jeffers 1945, Krombein 1953, Kurczewski and Kurczewski 1968, Marples 1969, Enders 1974), *Phidippus audax* (Hentz) and *P. rimator* (Walckenaer) (Salticidae) (Tolbert 1975), and unidentified lycosid (Enders 1975), an unidentified mimetid (Enders 1974) and congeneric spiders (Enders 1974, Tolbert 1975, Taub 1977).

Birds were suggested as a major group of predators on orb-web spiders (Hingston 1927, Bristowe 1941, Marples 1969), and avian predation on several araneids was observed (Marples 1969, Robinson and Robinson 1970, Royama 1970, Blanke 1972). However, no accounts exist of avian predation on *A. aurantia* or *A. trifasciata*.

The observations presented here were made while studying these spiders at the Smithsonian's Chesapeake Bay Center for Environmental Studies in Edgewater, Maryland, during June through August of 1979 and 1980. The invertebrate predators were encountered while recording data on 8580 unmarked spiders and their webs. The evidence of avian predation resulted from a part of the study which involved marking the spiders and webs and following spider movement on a daily basis. During this portion webs were marked and individuals followed for an average of 5 days each, for a total of 2674 web-days.

Spider predation.—Observations of spider predators are summarized in Table 1. *Phidippus* and *Schizocosa* were observed feeding on *Argiope*. The actual attacks by *Lycosa*, *Oxyopes*, and *Rhomphaea* were not observed, but these species were found sitting head down in hubs of *Argiope* webs (the normal location of *Argiope*). I assume that a wandering spider such as *Lycosa* or *Oxyopes* which is in the hub of an *Argiope* web had attacked and perhaps ingested the original resident. *Rhomphaea lacerta* was previously observed entering the webs of other species and killing the occupant (Archer 1940).

Table 1.—Summary of the observed instances of spider predation on *A. aurantia* and *A. trifasciata*. (* = approximate size, based on web dimensions)

Predator	n	body size in mm.		Prey ID
		predator	prey	
Lycosidae				
<i>Lycosa rabida</i> (Walck.)	8	5-12	3-10*	A.a.
<i>Schizocosa retorsa</i> (Banks)	1	8	2	A.t.
Theridiidae				
<i>Rhomphaea lacerta</i> (Walck.)	2	6,5-7	5-7*	A.t.
Oxyopidae				
<i>Rhomphaea salticus</i> (Hentz)	3	4-6	3-5	A.t.
Salticidae				
<i>Phidippus rimator</i> (Walck.)	2	7,8	6,11	A.a., A.t.

Avian predation.—I did not observe avian predation on these spiders, presumably due to the rarity of the event and the fact that birds are scared away by human observers. However, I encountered a characteristic type of web destruction, consisting of a missing triangular sector beginning in the hub and extending out to the periphery of the orb. I found this type of damage in 15 out of a total of 2674 webs during 1979 and 1980. I believe such damage is due to avian predation. The missing sector usually consists of 1/6 to 1/3 of the web. Occasionally as much as 1/2 of the web is missing. The size of the missing portion varies, but it always begins within the hub, where the spider normally rests. These spiders make new webs essentially every day, and these missing sectors were found in new webs which were otherwise in good condition.

During a laboratory study of avian predators on *A. aurantia* and *A. trifasciata* (Horton 1980), I observed blue jays attacking spiders in their webs. Typically the bird perched adjacent to the web and grasped the spider with a pecking movement. Frequently the bird moved its head laterally after the attack, resulting in the removal of a triangular sector of the web which began at the hub. While in the field during the same study I observed this pattern of web destruction in 9 of 276 webs.

Holes in the center of the web were also found (5 of 2674). This type of damage could have been caused by Hymenoptera or birds. David Wise (pers. comm.) observed that web damage can result from predatory attacks by Hymenoptera on orb-web spiders. A small predator such as a Hymenoptera would probably not cause extensive web damage. The holes could also be caused by a bird pecking at the spider.

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