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Orb-weaving Spider, *Argiope savignyi* (Araneidae), Predation on the Proboscis Bat *Rhynchonycteris naso* (Emballonuridae)

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ABSTRACT.—We report an observation of an orb-weaving spider (*Argiope savignyi*; Araneidae) capturing and feeding on a proboscis bat (*Rhynchonycteris naso*; Emballonuridae) at the La Selva Biological Station in the Caribbean lowlands of Costa Rica. This observation and others suggest that spiders prey upon small bats more frequently than has been noted previously, and that invertebrates should now be considered as regular predators on small bats.

KEYWORDS.—*Argiope*, Chiroptera, Costa Rica, predation, *Rhynchonycteris*, sac-winged bat

Bats are preyed upon by a wide range of vertebrate predators but there are few records of invertebrate predators. Gillette and Kimbrough (1970) listed five invertebrate groups as potential predators—American cockroaches (*Pariplaneta americana*), Australian cockroaches (*Pariplaneta australis*), driver ants, scorpions, and large spiders. Molinari et al. (2005) documented predation on three species of bats by giant centipedes (*Scolopendra gigantea*) in a Ven-

ezuelan cave; the centipedes killed and consumed adult bats that were captured while they roosted on the ceiling of the cave. However, there are few definite records of spider predation on bats.

Cantor (1842) wrote that a small pipistrelle (genus *Pipistrellus*; Vespertilionidae) in eastern China was "arrested in the strong web of two large spiders, *Epeira bilineata* and *heraldica* . . . has given rise to the common erroneous belief that those and similar spiders feed upon bats." In India, the synanthropic, large sparassid spider *Heteropoda venatoria* was seen to catch and kill a *Pipistrellus*; however, it was not fed upon (Bhattacharya 1941). Laduc (1993) found the desiccated carcass of a western pipistrelle, *Pipistrellus hesperus*, entangled in the web of an unknown species of spider in the Sonoran Desert of Arizona. He was unable to determine if the bat was fed upon. In the Neotropics, Wilson (1971) documented the black myotis (*Myotis nigricans*; Vespertilionidae) being captured and fed upon by orb-weaving spiders (reported as *Areophora*, but probably *Eriophora*) on Barro Colorado Island, Panama. Additional observations of spiders preying upon vertebrates are summarized in Kaston (1965). There are about 4,000 different species of orb-weaving spiders, all of which make suspended, sticky, wheel-shaped webs; the largest of these species are potential predators of smaller vertebrates.

On 25 July 2005, at the La Selva Biological Station (10°26'N, 83°59'W), Heredia Province, in the Caribbean lowlands of northeastern Costa Rica (elev. 80 m), we observed an adult proboscis bat (*Rhynchonycteris naso*; Emballonuridae) caught in the web of an orb-weaving spider (*Argiope savignyi* Levi; Araneidae), a common species at La Selva. The bat was dead when first observed at 0930 hr and was hanging near the center of the spider's web (Fig. 1). We assume that the bat was caught within only a couple of hours before our first observation because it showed little sign of dehydration or emaciation and was only partially covered by spider silk. We observed the web throughout the day—the spider fully applied additional webbing until the bat was totally encased in web. We ob-



FIG. 1. An adult orb-weaving spider (*Argiope savignyi*) with an adult proboscis bat (*Rhynchonycteris naso*) caught in its web at the La Selva Biological Station, Heredia Province, Costa Rica. Photograph by M. Losilla.

served the spider on or near the bat throughout the day and the manipulation of its mouthparts on the bat, which we interpret as the spider actively feeding upon the bat. Our final observation was at 1830 h, at which point the bat was completely encased in silk and was shrunken.

The bat apparently became entangled in the web while attempting to return to its roost from a foraging bout because its body was oriented toward the roost when first observed. The web was constructed between two rafters supporting an overhanging roof of the River Station building and would have been difficult to see because it was in the shadow of the overhanging roof. A colony of proboscis bats was roosting on the exterior wall of the building ca. 1½ m from the web. *Rhynchonycteris naso* regularly roosts under the eaves of the River Station building at La Selva. Webs of *Argiope* generally are found in the openings between trees and shrubs but we have observed them on several occasions attached to the rafters of this building.

This is the first recorded instance of an emballonurid bat being preyed upon by an invertebrate, and the first documentation that *Argiope* is able to capture and consume a mammal. Colleagues have informed us that they too have observed bats caught in the webs of *Argiope* elsewhere in Costa Rica. Bats are commonly believed to suffer lower predation rates than other mammals, but we believe that spider predation upon

small bats will be found to be more common than previously realized.

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LITERATURE CITED

- Bhattacharya, G. C. 1941. *Heteropoda venatoria* preying on a pipistrelle bat. *Curr. Biol.* 10:183.
- Cantor, T. 1842. General features of Chusan, with remarks on the flora and fauna of that island (conclusion). *Ann. Mag. Nat. Hist.* 1(9):481-493.
- Gillette, D. D., and J. D. Kimbrough. 1970. Chiropteran mortality. In *About bats: A chiropteran biology symposium*, eds. B. H. Slaughter and D. W. Walton, pp. 262-283. Dallas: Southern Methodist University Press.
- Kaston, B. J. 1965. Some little known aspects of spider behavior. *Amer. Midl. Nat.* 73:336-356.
- Laduc, T. J. 1993. Accidental death by web entanglement in the western pipistrelle, *Pipistrellus hesperus*. *Bat Res. News* 34(2&3):58-59.
- Molinari, J. et al. 2005. Predation by giant centipeds, *Scolopendra gigantea*, on three species of bats in a Venezuelan cave. *Caribb. J. Sci.* 41(2):340-346.
- Wilson, D. E. 1971. Ecology of *Myotis nigricans* (Mammalia: Chiroptera) on Barro Colorado Island, Panama Canal Zone. *J. Zool.* 163(1):1-13.