

SHORT COMMUNICATION

Predation on the treefrog *Scinax similis* (Anura: Hylidae) by the orb-weaver spider *Eriophora fuliginea* (Araneae: Araneidae) in southeastern Brazil

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Post-metamorphic anurans commonly are preyed upon by invertebrates (Toledo 2005). Many of these predators are arthropods, mainly arachnids and hexapods, such as spiders and aquatic insects (McCormick and Polis 1982, Menin *et al.* 2005, Toledo 2005). Although it is difficult to evaluate the impact of predatory arthropods on their prey, we know that some (e.g., spiders) are responsible for considerable mortality among some anuran populations (McCormick and Polis 1982). Many vertebrates preyed upon by arachnids are smaller than their predators; Menin *et al.* (2005) provided a correlation between frog and the spider sizes. Spiders are of a similar or slightly smaller size

than their anuran prey. However, poison glands, and structures specialized for feeding and the construction of silk webs are advantageous in consuming prey of similar or larger sizes than the predatory spider (McCormick and Polis 1982, Menin *et al.* 2005). In Toledo's (2005) account of predation on post-metamorphic anurans by invertebrates, there are many records of predation upon anurans by many species of webless, wandering spiders. In particular, wolf-spiders, Lycosidae (e.g., Almeida *et al.* 2010, Abegg *et al.* 2014), Ctenidae (e.g., Folly *et al.* 2014, Maffei *et al.* 2014, Amaral *et al.* 2015), and fishing-spiders, Pisauridae and Trechaleidae (e.g., Costa-Pereira *et al.* 2010, Gaiarsa *et al.* 2012) are common wandering predators of anurans in Brazil. In contrast, Toledo (2005) cited only four species of web-building spiders preying on anurans, all events reported in hylid frogs. The wolf-spider *Diapontia cf. uruguayensis*

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Keyserling, 1877, from southern Brazil, builds small, funnel webs near water where *Dendropsophus sanborni* (Schmidt, 1944) adults are trapped (Del-Grande and Moura 1997). The other three species are orb-weavers: *Acanthepeira stellata* (Walckenaer, 1805), *Argiope aurantia* Lucas, 1833 (both Araneidae from North America), and *Nephila plumipes* (Latreille, 1804) (Nephilidae from Australia); these prey on treefrogs *Dryophytes cinereus* (Schneider, 1799), *Dryophytes versicolor* (LeConte, 1825), and an unidentified treefrog, respectively (McCormick and Polis 1982, Toledo 2005). Recently, Muscat *et al.* (2014) reported another araneid species, *Eriophora fuliginea* (C. L. Koch, 1838) that preys on *Ololygon littoralis* (Pombal and Gordo, 1991), and suggested that webs may be effective for capturing hyliid frogs.

The treefrog *Scinax similis* (Cochran, 1952) occurs in the Atlantic Forest of the coastal region of Rio de Janeiro and Espírito Santo states, in southeastern Brazil (Frost 2016). It inhabits open areas, marshes, and “restingas” (sand coastal vegetation) (Alves and Carvalho-e-Silva 1999) where they breed and their tadpoles develop (Izecksohn and Carvalho-e-Silva 2001). The frogs can be identified by its gray ground color, along with the presence of irregular blotches and a pair of stripes in the shape of inverted parenthesis on the dorsum (Izecksohn and Carvalho-e-Silva 2001; figure 34).

Eriophora fuliginea is a large orb-weaving spider [female body (cephalothorax + abdomen length) varying from 14–30 mm], with records from Honduras to Brazil (Levi 1971, World Spider Catalog 2016). The body is dark to light brown, with the abdomen bearing a median, white longitudinal stripe over the darker dorsum; the venter has a large, black triangular mark with its posterior apex oriented posteriorly between the epigynum and spinnerets, and a white pigment spot on each side anterior to the spinnerets (Levi 1971; figures 25–34). The orange to yellow setae covering the venter of abdomen, sternum, and basal articles of legs of mature and large immature individuals strongly

contrast with the brown background (Muscat *et al.* 2014; figures 1, 2). Its large orb web commonly is encountered at night, among bushes or near tree trunks, at the borders of forests or forest trails. The webs usually are anchored at or near the ground, covering an area above the herbaceous layer. Both the form and position of the web suggest that it is a trap for the larger insects flying above this understory (Robinson *et al.* 1971).

Here, we report an observation made in the Reserva Biológica de Poço das Antas (RBPA), Rio de Janeiro state in southeastern Brazil (22°32' S, 42°18' W) on 07 March 2015 at approximately 19:00 h, when it was raining and the temperature was 23°C. The RBPA retains part of the original cover of Lowland Atlantic Forest, including areas in all stages of recovery; however, some areas are grassy fields owing to former use as cattle pasture. In a trail inside the forest, Rodolfo Sul, we observed a female *Eriophora fuliginea* (Figure 1B) preying on a *Scinax similis* (Figure 1C). The treefrog was wrapped in silk in the center of the web, which was anchored in branches of a shrub aboutn 70 cm above the ground (Figure 1A). The spider was resting on its prey, but moved to the margin of the web when disturbed after being illuminated with a flashlight. We remained at the site for almost 30 min, during which time, the spider did not return to the center of the web. We collected both prey and predator, and as vouchers. The treefrog was still alive when we captured it. The spider [body: 25 mm long (cephalothorax + abdomen length); cephalothorax: 16 mm wide] was deposited in the Laboratório de Diversidade de Aracnídeos, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro (UFRJ 1130), and the frog (snout-vent length 40.7 mm) is housed in the amphibian collection of Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro (ZUF RJ 15175).

As mentioned above, most records of spiders preying upon anurans refer to involve either terrestrial or fishing spiders, with a handful of

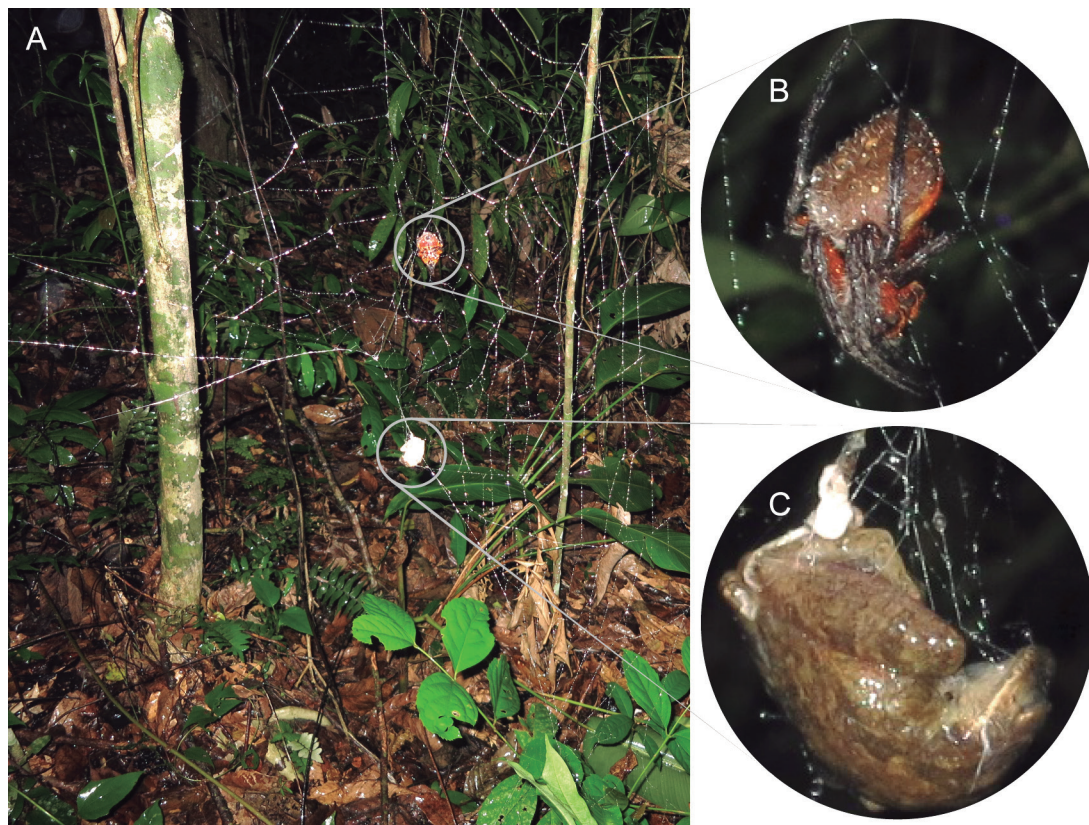



Figure 1. (A) Web of *Eriophora fuliginea* at the Reserva Biológica de Poço das Antas in southeastern Brazil; (B) *Eriophora fuliginea*; (C) *Scinax similis*.

records referring to web spiders (e.g., Muscat *et al.* 2014). The two cases of *Eriophora fuliginea* preying upon *Oloolygon littoralis* by Muscat *et al.* (2014) are the only records of predation by this large orb-weaving spider upon anurans up to now. Robinson *et al.* (1971) described the predatory behavior of *E. fuliginea* when presented with different insects, noting that the strategies for capture varied in relation to size and type of prey. They also recorded natural and experimental attacks on bats captured on the strong webs of this spider. Our record corroborates the suggestion of Muscat *et al.* (2014) that webs of *E. fuliginea* may be effective for capturing hylid frogs, especially as they leap

through the vegetation. The large orb web of this spider is an effective trap for small anurans as well as large flying or hopping insects that *E. fuliginea* usually feeds on. Both records indicate that species of *Scinax*, as well as other small anurans might represent a sizable part of the diet of *E. fuliginea*. Although opportunistic, these cases might be more common than expected. Possibly, *E. fuliginea* and other related species would be good model organisms for testing feeding behavior of orb-spiders upon vertebrate prey. The sparsity of information about predation on treefrogs by orb-weaving spiders may be because the phenomenon is rare given the sit-and-wait nature of the spider and the restricted

activity of the tree frogs. Alternately, such events may be overlooked by researchers in the field given the nocturnal habits of these spiders. In either case, further investigation is needed on the impact of predation of *E. fuliginea* and similar orb-weaving species upon anurans.

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