

## SHORT COMMUNICATION

### Report of the arboreal tarantula *Iridopelma vanini* (Araneae: Theraphosidae) feeding on the Southern house wren *Troglodytes musculus* (Aves: Troglodytidae) in Brazil

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**Abstract.** Reports of tarantulas feeding on birds are rare and were a matter of intense debate among naturalists for centuries. The first account dates from the early eighteenth century by the German naturalist Marie Sibylla Merian, and since then only a few reliable predation events have been published. We herein report on a predation event by the arboreal tarantula *Iridopelma vanini* Bertani, 2012 on two Southern house wrens *Troglodytes musculus* Naumann, 1823 in Brazil. The spider, a male, was found feeding on a young bird on a signpost made of two wooden posts, at dusk. The following day, one of the posts was removed and the spider was found feeding on a second young bird on its nest. We also update and discuss the identification of the theraphosids involved in predation events reported in previous works.

**Keywords:** Aviculariinae, Cerrado, predator-prey, spider predation, trophic interaction

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While documenting aspects of the natural history of invertebrates in Surinam at the turn of the eighteenth century, the German naturalist Marie Sibylla Merian illustrated a large spider feeding on a hummingbird (Merian 1705). This was unknown to naturalists and unexpected at that time. Linnaeus (1758), probably based on the drawings of Merian (1705), gave the name *Aranea avicularia* Linnaeus, 1758 for the large spider depicted in the illustration, due to its feeding behavior (Berland 1932; Smith 2000a; Fukushima & Bertani 2017). A century later, the naturalist Palisot de Beauvois (1805–1821), who lived some years in the Dominican Republic, reported that a large theraphosid he identified as *Mygale blondi* Latreille, 1804 lives inside burrows but leaves them when there is not enough food. On these occasions, it was reported that the spiders climb trees, in a similar way as the '*Aranea avicularia*' illustrated by Merian (1705), and feed on young birds in their nests.

A heated debate on the idea of large spiders feeding on birds took place in the nineteenth century. Some naturalists accepted the idea (Latreille 1804, 1818; Palisot de Beauvois 1805–1821; Perty 1833; Walckenaer 1837; Shuckard 1842), whereas others, mainly influenced by the naturalist and explorer Baron von Langsdorff (Shuckard 1842; Bates 1863; Smith 2000a, b) refused to accept the observations (Guilding 1834; MacLeay 1842; Wood 1883). Only after an additional reliable record confirming the observation of Merian (1705) was her account accepted. During travels through the Brazilian Amazon, in the locality of Cameté, in the state of Pará, the naturalist Bates (1863) found on a tree a '*Mygale avicularia*' feeding on a still live finch. Another finch was reported as dead, close to the spider. Later, Pocock (1899) commented on the illustration of Merian (1705) and, although rare, considered the predation of large arboreal tarantulas on birds to be probable. To confirm this, he reported that the *Phormingochilus tigrinus* Pocock, 1895 specimen he used to describe the species was found feeding on a young bird in a nest in Borneo (Pocock 1895, 1899). Two decades later, a large Australian theraphosid *Selenotypus plumipes* Pocock, 1895 was considered responsible for killing and dragging a young chicken 50 feet away to its hole in North Queensland (Chisholm 1919).

Almost a century later, some new records on theraphosids feeding on birds were published. Silva & Meirelles (2016) found an *Avicularia variegata* F.O. Pickard-Cambridge, 1896 feeding on *Troglodytes musculus* in Manaus, Brazil, and a *Theraphosa blondi* (Latreille, 1804)

feeding on a Rufous-throated antbird *Gymnopithys rufigula* (Boddaert, 1783) entangled in a bird net. In the same year, Carvalho et al. (2016) also published a similar opportunistic predation by *T. blondi* on a Common scale-backed antbird *Willisornis poecilinotus* (Cabanis, 1847) in the state of Amapá, Brazil.

Herein, we report on the predation of two young *Troglodytes musculus* birds by *Iridopelma vanini* Bertani, 2012, an arboreal Brazilian tarantula. We also update and discuss the identification of the theraphosids reported in previous works. The study area was Fazenda Santo Amaro in Urbano Santos municipality, state of Maranhão, Brazil (3°14'35"S, 43°25'27"W). This area is dominated by vegetation typical of Cerrado, consisting of a mosaic of riparian forest, mesophytic forest, *Eucalyptus* culture, and open areas covered by small bushes and grasses (Maciel et al. 2012).

On the afternoon of 29 August 2004 at 18:00, while working on a herpetological survey, the second author found a large spider on a farm signpost made with two timber trunks in an area covered by dense grasses, approximately 8 meters from the closest forest border. Upon closer examination, it was possible to see the spider feeding on a dead young bird of *Troglodytes musculus* (Figs. 1, 2), at approximately 1 meter from the ground. Part of the bird nest was visible, and another young bird was vocalizing inside the nest. Adult birds were not observed. No interference was made, and only photos were taken. The following day, at 17:00, there was no sign of the spider out of the retreat, nor of bird remains. One of the signpost timber trunks was then removed and the spider was found in the nest feeding on a second young bird. Photos were taken again (Figs. 3, 4).

The spider was identified as an adult male *Iridopelma vanini* Bertani, 2012. The genus *Iridopelma* Pocock, 1901, with six described species, occurs in north-eastern and parts of central-western Brazil (Bertani 2012). Two species [*I. hirsutum* Pocock, 1901 and *I. zorodes* (Mello-Leitão, 1926)] live in trees in the Brazilian Atlantic Rainforest, making retreats of tree leaves joined with silk threads. Other arboreal species are found in savannah-like environments in Brazilian Caatinga (*I. oliveirai* Bertani, 2012), Cerrado (*I. marcoi* Bertani, 2012), or Campos de Altitude (*I. katieae* Bertani, 2012) (Bertani 2012), the latter living in self-made silk retreats between bromeliad leaves. *Iridopelma vanini* is known to occur in the coastal regions of the states of Piauí and Maranhão, including areas of Restinga (tropical coastal vegetation) with sand dunes in Barreirinhas (Lençóis Maranhenses



Figures 1–4.—*Iridopelma vanini*, male, feeding on *Troglodytes musculus* chicks. 1–2 First bird, out of the nest, 29 August 2004. 3–4 Second bird, inside the nest, 30 August 2004.

National Park) (Bertani 2012), ca. 80 km from Urbano Santos municipality, where the predation event was observed. Almost nothing is known of the ecology and biology of this species.

The bird, *Troglodytes musculus*, is a small passerine widely distributed from México through Central America to Argentina in South America (Johnson 2020). In Brazil, the species is found in all biomes and is quite common in urban areas, commonly building its nests in cavities around human habitations (Sick 2001; Johnson 2020).

A series of records have shown that large theraphosids, and even smaller spiders such as ctenids, lycosids and araneids, can overpower and feed upon small vertebrates such as lizards, snakes, anurans, birds, bats and rodents (McCormick & Polis 1982; Peloso & Sousa 2007; Nordberg et al. 2018; Nyffeler & Altig 2020; Valdez 2020). Records of predation of birds by theraphosids are rare (Merian 1705; Palisot de Beauvois 1805–1821; Bates 1863; Pocock 1895; Chisholm 1919; Carvalho et al. 2016; Silva & Meirelles 2016; Valdez 2020). The main obstacle in recording this behavior may be explained by the difficulty in observing arboreal spiders which typically live high in trees, out of sight. Furthermore, theraphosids have nocturnal foraging habits, making it more difficult to witness a predation event. It is therefore probable that encounters between arboreal therapho-

sids and birds may be more frequent than records suggest. Nonetheless, the predation event reported here shows that theraphosids may occasionally be active during the daytime and forage in open areas close to the forest.

The New World is home to a diverse arboreal theraphosid fauna with ca. 10 genera and 57 species known to occur from the Tropic of Capricorn to Mexico and parts of the Caribbean (Fukushima & Bertani 2017; World Spider Catalog 2020). In the Old World, the genera *Stromatopelma* Karsch, 1881, *Heteroscodra* Pocock, 1900 and *Encyocratella* Strand, 1907, with 8 species, are found in limited regions of Africa; and in Asia, the genera *Phormingochilus* Pocock, 1895 and *Poecilotheria* Simon, 1885, with 19 species, are arboreal. All are large spiders, especially *Poecilotheria*, which have similar habits to *Avicularia avicularia*, in using trees cavities as retreats (Pocock 1899).

The record of *I. vanini* feeding on two young birds extends the predation of those vertebrates to this spider genus in Aviculariinae. *Iridopelma vanini* is the largest species of the genus, and the largest aviculariine species in north-eastern Brazilian, resembling some Amazon species such as *A. avicularia* in size (Bertani 2012). Other aviculariine species in the region are smaller and it is improbable that they could subdue a bird, not necessarily because of their size (since

Table 1.—Records of birds preyed upon by theraphosids

Reference	Locality	Bird species	Theraphosid species, original report	Theraphosid species, updated
Merian (1705)	Surinam	Hummingbird in the nest	Spider	<i>Avicularia avicularia</i> <sup>1</sup>
Palisot de Beauvois (1805)	Dominican Republic, Santo Domingo	Hummingbird in the nest	<i>Mygale blondii</i>	<i>Phormictopus cancerides</i> <sup>2</sup>
Bates (1863)	Brazil, state of Pará, Cametá	Two finches	<i>Mygale avicularia</i>	<i>Avicularia avicularia</i> <sup>3</sup>
Pocock (1895, 1899)	Borneo	Young bird in the nest	<i>Phormingochilus tigrinus</i>	<i>Phormingochilus tigrinus</i> <sup>4</sup>
Chisholm (1919)	Australia, North Queensland	Chicken	<i>Selenotypus plumipes</i>	<i>Selenotypus</i> sp. <sup>5</sup>
Silva & Meirelles (2016)	Brazil, state of Amazonas, Manaus	<i>Troglodytes musculus</i> , adult	<i>Avicularia avicularia variegata</i>	<i>Avicularia variegata</i> <sup>6</sup>
Silva & Meirelles (2016)	Brazil, state of Amazonas, Manaus	<i>Gymnophthys rufigula</i> , adult	<i>Theraphosa blondii</i>	<i>Theraphosa</i> sp. <sup>7</sup>
Carvalho et al. (2016)	Brazil, Amapá	<i>Willisornis poecilonotus</i> , adult	<i>Theraphosa blondi</i>	<i>Theraphosa blondi</i>
This work	Brazil, Maranhão	<i>Troglodytes musculus</i> , two young in the nest		<i>Iridopelma vanini</i>

1, Merian (1705) illustrated a large dark arboreal spider with orange leg tips. One of the spiders was leaving a retreat. Spiders of the genus *Avicularia* have colored leg tips, which is why they are called “pink toes”. The retreat is similar to the ones made by *Avicularia* species. The specific name *avicularia* has been used by most authors since Linnaeus (1758) for the species illustrated by Merian (1705). The *Avicularia* genus was recently revised (Fukushima & Bertani 2017) and the only *Avicularia* species recorded for Surinam is *Avicularia avicularia*, thus corroborating previous identifications.

2, The naturalist Palisot de Beauvois (1805–1821) lived some years in the Dominican Republic and reported on the habits of two theraphosids. One of these species he called *Mygale crabe*, which is the same species Latreille (1806) described as *Mygale cancerides* Latreille, 1806 [now *Phormictopus cancerides* (Latreille, 1806)]. He found this species only once, in an old kitchen, and observed that Latreille did not note a peculiar character, a double tubercle on the third segment of the first leg. This corresponds to the tibial apophysis, a secondary sexual organ that many theraphosid males have. The second species he identified as *Mygale de Le Blond* (now *Theraphosa blondi*), which was described one year before by Latreille (1804) for specimens collected in Cayenne, French Guyana, and known only from northern South America (World Spider Catalog 2020). Palisot de Beauvois (1805–1821) distinguished the two species by the second lacking the apophysis on the legs and differences in color. The figures in his book show clearly that the first specimen, corresponding to *Mygale crabe*, is a male, having the double tibial apophysis on leg I and a copulatory organ on the palps, whereas fig. 2 corresponds to a female or an immature, that lacks the tibial apophysis and the copulatory organ. Thus, he was distinguishing the two supposed species with characters related to sexual dimorphism. It is very probable that they are male and female of the same species, and the species he referred to as feeding on hummingbirds is *Phormictopus cancerides*.

3, The Bates (1863) identification seems correct, the most common *Avicularia* species in the State of Pará, Brazil is *Avicularia avicularia* (Fukushima & Bertani 2017).

4, Pocock (1899) stated the specimen used in the description of the species was found feeding on a bird, thus, it is the holotype of the species.

5, Chisholm (1919) reported on a domestic chicken chick from a brood being found dead 50 feet away, with one leg inside the hole of a five-inch large *Selenotypus plumipes*. A photo showing the spider at the side of the chick was provided. However, *Selenotypus plumipes* has the fourth leg thicker and bushier than the first and the specimen in the photo lacks these features being as yet an undescribed species (R. Raven, pers. comm.). Therefore, we update the species identification to *Selenotypus* sp.

6, After the revision by Fukushima & Bertani (2017), the subspecies *A. a. variegata* was elevated to full species. That is the common *Avicularia* species occurring in Manaus, Brazil.

7, *Theraphosa blondi* is not recorded from Manaus, Brazil. The species could be *Theraphosa stirmi* Rudloff & Weinmann, 2010, or another species, therefore we left it as *Theraphosa* sp.

small araneids can prey on birds; Peloso & Sousa 2007), but because theraphosids do not have auxiliary methods for capturing prey, such as a web. Other large opportunistic or arboreal theraphosids in the Amazon, Central America and the Caribbean, such as species of *Psalmopoeus* Pocock, 1895, *Tapinauchenius* Ausserer, 1871 and *Caribena* Fukushima & Bertani, 2017, can be considered potential bird predators.

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