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Spider feeding on a Vespertilionid bat from Kerala, South India

Insectivorous bats occupy a relatively safe position in the food web, usually being predated upon only by owls, hawks and snakes[1–3]. Bats predated upon by spiders is a rare phenomenon and reports on the same in the Oriental region are rare[4,5]. Only a few chiropterologists and arachnologists have ever seen a bat being predated upon by a spider in the field[6–9]. Many field biologists and ecologists with special interest in such an ecological relationship between the two taxa have spent decades in the field with little success. There have been only 52 reports on bats being predated by spiders from across the globe over the past hundred years[10]. The infrequency of such reports implies that mortality of bats due to spiders is an extremely rare event, or it may be rarely observed and/or reported.

Of the 52 published reports mentioned earlier, only 2 are from India[4,5], including one from Chinnar Wildlife Sanctuary in Kerala. Here we report an additional record of bat predation by a spider from the Kerala Agricultural University main campus, Thrissur district, Kerala, South India.

The first report of bat being caught in a spider web was in 1842 by Cantor[11]. The earliest report from India was by Bhattacharya[4] in which a pipistrelle, *Pipistrellus* sp., was caught in the web of a Sparassid spider, *Heteropoda venatoria*, but the spider failed to feed on the bat. The second report from India was from Chinnar Wildlife Sanctuary; a Theraphosid spider, *Poecilotheria rufilata* fed on *Pipistrellus ceylonicus*[5].

Giant golden silk orb weavers of genus *Nephila* feed primarily on small insects like jewel beetles. However, they have been observed to go for large catches like cicadas, moths, grasshoppers, dragonflies, damselflies, large beetles, bats, fish, frog, lizards, snakes and rats as well[10]. There was an unsuccessful attempt of a *Nephila* spider trying to feed on a Grey-breasted Prinia, *Prinia hodgsonii*[12] (size 110 mm), at the Kerala Agricultural University main campus, Thrissur district (S. Sarath, 2011, pers. commun.).

On 25 November 2013, during the course of a regular bird-watching trail at the Botanical Garden of Kerala Agricultural University, Thrissur district, Kerala, India (Figure 1) (10°32′52.4″N, 76°17′12.4″E, altitude ~50 m), we made an interesting observation. At around 12:30 h, we saw a Giant Wood Spider (*Nephila pilipes*, family Nephilidae) feeding on a prey, which initially looked like a dry leaf to us. The spider web was on a *Lagerstroemia*

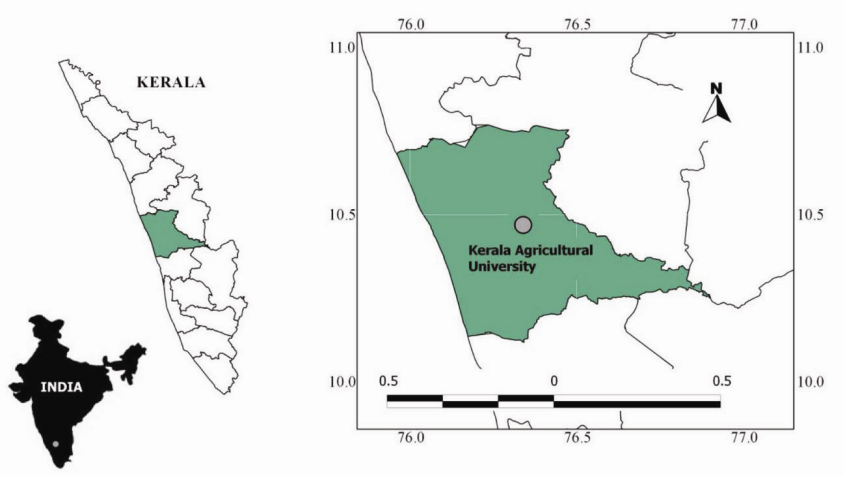

Figure 1. Location map of the Kerala Agricultural University main campus at Thrissur.

Figure 2. *Nephila pilipes* with the Vespertilionid bat caught in a spider web.

speciosa tree, and at height of about 2 m from the ground. We took a photograph of the spider and its feed. On closer examination initially of the photograph on a digital camera (Nikon Cool Pix P510) and subsequently of the prey, we realized that the spider was feeding on a bat. Our presence near the web might have disturbed the spider, which moved away from its feed (Figure 2). We then moved away from the web and waited for the spider to resume feeding. However, it did not come back to the prey. We then removed the bat from the web for detailed examination.

On closer examination, the bat was identified as a *Pipistrellus* sp. of Vespertilionidae family. The forearm length of the bat was 27.3 mm. There are two *Pipistrellus* sp. with a forearm length of this dimension – *P. tenuis* and *P. coromandra*[13]. The head of the bat could not be recovered for making further examination on the cranial and dental characters, as the spider had already eaten the bat's head. Hence, the species-level identification of the bat could not be confirmed.

Though there are known vertebrate predators for bats[1–3], bat predation by invertebrates is not uncommon. At least 52 incidences of bats being captured by spiders have been reported[10]. Bat predation by spiders has been reported from the Neotropics (42%), Asia (28.8%) and Australia–Papua New Guinea (13.5%). The spiders that dominate bat-predation belong to the Mygalomorph family, Theraphosidae, and the aranaeomorph families Nephilidae, Araneidae and Sparassidae. The main genera include *Nephila* and *Eriophora*. Most of the bats captured by spiders belong to the families Vespertilionidae (64%) and Emballonuridae (22%). Hipposideridae and Rhinolophidae account for only 8% and 3% of the total bat catches. Among the members of Vespertilionidae, *Pipistrellus* sp. is the most predated upon by spiders[10].

Thus, the present observation is the third instance of a spider feeding on a bat from India. It is interesting to note that in all the three cases the prey was the *Pipistrellus* sp. This may indicate that large spiders are probably a potential predator of the small-sized bats of the family Vespertilionidae.

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