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RESEARCH NOTE

HARVESTMAN (OPILIONES, GONYLEPTIDAE) TAKES PREY FROM A SPIDER (ARANEAE, CTENIDAE)

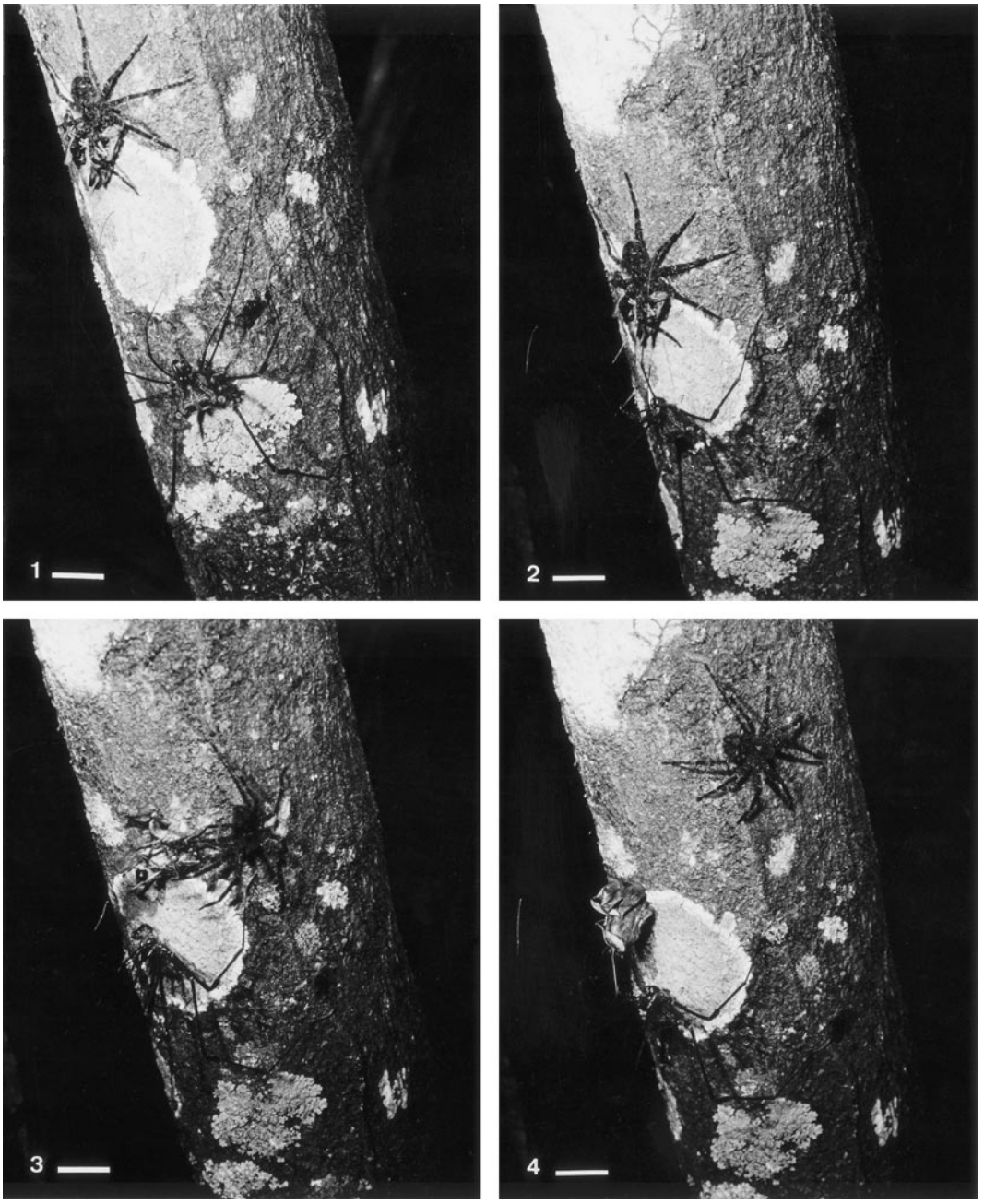
The diet of harvestmen has been addressed in several papers which showed that there is large variation in feeding habits (see Gnaspini 1996 for discussion). Several authors considered opilionids in general as predators or possibly as scavengers under natural conditions (Verhoeff 1900; Berland 1949; Bishop 1950; Todd 1950; Whiteley 1961; Juberthie 1964; Cannata 1988; Hillyard & Sankey 1989), as well as in the laboratory (Phillipson 1960; Briggs & Ubick 1981; Adams 1984; Acosta et al. 1995). Some studies done in both laboratory (Bishop 1950; Capocasale & Bruno-Trezza 1964; Edgar 1971; Anuradha & Parthasarathy 1976; Holmberg et al. 1984; Gnaspini 1996) and in nature (Bristowe 1949; Cloudsley-Thomson 1958; Savory 1962) have reported that they accept both animal and plant matter. Therefore, harvestmen seem to be omnivorous, with a preference for animal matter (Gnaspini 1996). Herein we report for the first time a case of a harvestman taking prey from another animal.

The harvestman and spider were observed in nature without touching or altering subjects, and were photographed by the senior author. The observations were made at Reserva Municipal da Mata de Santa Genebra, Campinas, state of São Paulo, Brazil (22°44′S, 47°06′W) on 26 September 1992 at about 2000 h. The temperature was about 25 °C, relative humidity was 60%, and the day was cloudy. Observations were made using a diffuse red light, and pictures were taken using flash. Because of our previous personal observations, we do not believe that the flash photography influenced the behavior of both animals.

The arachnids and prey were not collected. From the photographs, the harvestman was identified as a female *Goniosoma* cf. *longipes* (Roewer 1913) (Gonyleptidae, Goniosomatinae) and the spider as *Enoploctenus cyclothorax* (Bertkau 1880) (Ctenidae). After the proper nomenclatural changes are made, this is probably the only species of *Enoploctenus* found in Brazil south of Rio de Janeiro (A.D. Brescovit pers. comm.). The moth could not be identified.

The harvestman was first detected on a tree trunk about 20 cm from the spider. The spider was holding the prey (a moth partially wrapped in silk) with its chelicerae (Fig. 1). The harvestman slowly approached the spider, until it touched the spider with its first and second pairs of legs (Fig. 2). The harvestman touched the spider again three or four times. Meanwhile, the spider stood motionless. After 1–2 minutes, the harvestman suddenly moved over the spider, which dropped the prey and backed up about 3–4 cm. Because the harvestman also moved back slightly (ca. 1–2 cm), the prey was now located between the two arachnids (Fig. 3). Just a few seconds later, the harvestman started moving towards the prey, while the spider turned around and moved away (Fig. 4). The harvestman eventually picked the prey up with its pedipalps, and remained at the spot handling the prey (maybe already eating it) for several minutes afterwards.

No cases of prey theft or kleptoparasitism (regularly stealing food from other species) are known for harvestmen in nature. In captivity, several species of North American harvestmen have been observed to tug at and take ''prey'' (chopped pieces of mealworms) from conspecifics (J.C. Cokendolpher pers. comm.). In the wild, some Brazilian harvestmen have been observed eating prey taken from other animals: members of the genera *Cosmetus* and *Metavononoides* (Cosmetidae) have been observed taking prey from webs of *Blechroscelis* sp. spiders (Pholcidae) (A.B. Kury pers. comm.); a female *Goniosoma inscriptum* (Mello-Leitão 1922) (Gonyleptidae) was observed eating a homopteran prey wrapped in silk near a *Thwaitesia* sp. spider (Theridiidae) web, in Guapimirim, Rio de Janeiro (R. Pinto-



Figures 1–4.—Sequence of the harvestman *Goniosoma* cf. *longipes* taking a moth from the spider *Enoploctenus cyclothorax*. 1. The spider was holding the prey with its chelicerae when the harvestman was first detected about 20 cm away; 2. Slowly approaching and then touching the spider with its legs; 3. After 1–2 minutes, the harvestman suddenly moved over the spider, and both backed up; 4. Just a few seconds later, the harvestman started moving towards the prey, while the spider turned around and moved away. Scale = *ca.* 10 mm.

da-Rocha pers. comm.); and a female *Goniosoma longipes* was observed carrying arthropod pieces (dipteran wings and orthopteran legs) wrapped in silk (G. Machado, pers. comm.). These facts may be interpreted either as evidence of prey theft or as the harvestmen having collected abandoned spider prey, perhaps even partially consumed prey. Because kleptoparasitism is defined as a regular procedure of collecting prey from a given species, we do not consider any of these cases to be kleptoparasitism but rather consider them to be opportunistic theft. Kleptoparasitism is a relatively common practice for some species of at least five families of spiders (Coyle et al. 1991). In each of these cases, the kleptoparasitic spiders steal from other species of spiders. In addition, kleptoparasites also are generally much smaller than the host and do not confront the host when stealing the prey.

In order to understand how/why this harvestman succeeded in taking prey from so large a spider, it is important to look at their possible relationships. One of the main predators of goniosomatine harvestmen is the ctenid spider *Ctenus fasciatus* Mello-Leitão 1943, which preys mainly on adult and subadult harvestmen (Pinto-da-Rocha 1993; Gnaspini 1996; G. Machado pers. comm.). *Enoploctenus cyclothorax* is common at the entrances of caves where Goniosomatinae harvestmen occur (e.g., *G. spelaeum* (Mello-Leitão 1932) from the Ribeira Valley, São Paulo state -Trajano & Gnaspini-Netto 1991; Gnaspini & Trajano 1994), but this spider has never been observed preying on the harvestmen (P.G. pers. obs.). Moreover, during a nocturnal observation (G. Machado, pers. comm.), an adult female *E. cyclothorax* quickly moved over an adult male *G. longipes* which was wandering about near the spider. Immediately after touching the harvestman with its first legs and palps, the spider backed up and stopped, while the harvestman kept on walking in its path, showing no reaction to the spider. The same occurred between *E. cyclothorax* and *G. spelaeum* (F.H. Santos pers. comm.). Possibly, the timidity of the species determined their relationships with harvestmen and the possibility of the spider having its prey stolen by a harvestman. *Ctenus* spp. are much more aggressive than *Enoploctenus* spp. (A.D. Brescovit pers. comm.). Other factors involved could be the time since when the spider last fed as well as the age of the spider (which seemed to be a juvenile, based on size); i.e., juveniles may be less aggressive than adults, although no study on aggressiveness of these spiders has been conducted (A.D. Brescovit pers. comm.). The size of the ''thief'' may also be important in this kind of behavior—Goniosomatinae are large heavy-bodied harvestman. Moreover, in the above cited cases observed by Kury and Pinto-da-Rocha, the harvestmen were always bigger (in body dimensions) than the spider, which could have prevented the spiders from protecting themselves from the theft.

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