

ARTÍCULO:

Harvestmen (Opiliones: Gonyleptidae)  
Predating On Treefrogs (Anura: Hylidae)

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**Revista Ibérica de Aracnología**

ISSN: 1576 - 9518.  
Dep. Legal: Z-2656-2000.  
Vol. 11, 31-VII-2005  
Sección: Artículos y Notas.  
Pp: 43-45

Edita:

**Grupo Ibérico de Aracnología (GIA)**

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Índice, resúmenes, abstracts vols. publicados:  
<http://entomologia.rediris.es/sea/publicaciones/ria/index.htm>

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ARTÍCULO:

## Harvestmen (Opiliones: Gonyleptidae) predating on treefrogs (Anura: Hylidae)

Luciano Mendes Castanho & Ricardo Pinto da Rocha

**Abstract:**

A male and female of the gonyleptidean *Neosadocus maximus* (Giltay 1928) were observed eating frogs in the Atlantic Rain Forest of southeastern Brazil. This is the first report of a harvestman species eating amphibians.

**Key words:** Opiliones, Brazil, Atlantic Rain Forest, predation, frogs.

### Harvestmen (Opiliones: Gonyleptidae) Predating On Treefrogs (Anura: Hylidae)

**Resumen:**

Un macho y una hembra del gonyleptido *Neosadocus maximus* (Giltay, 1928) fueron observados comiendo ranas en el Bosque Lluvioso Atlántico del sudeste de Brasil. Este es el primer informe de un opilión que come anfibios.

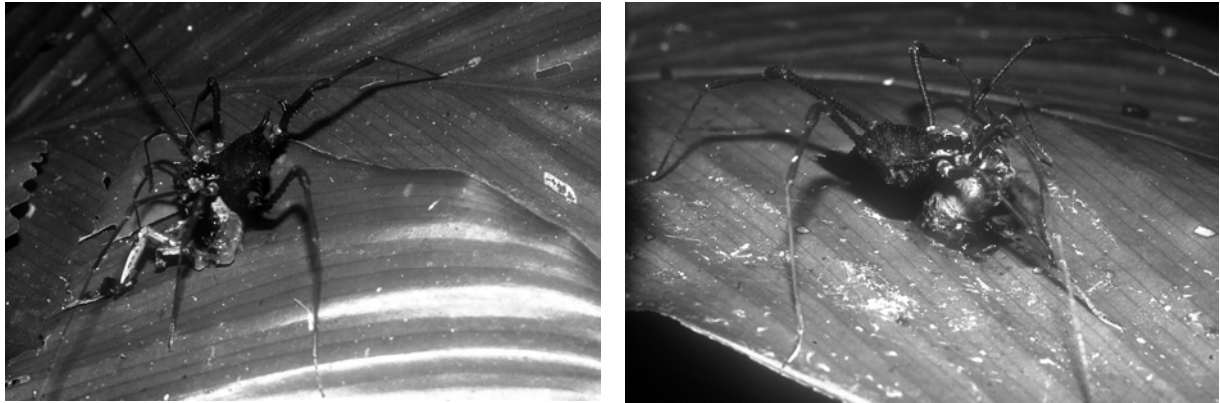
**Palabras clave:** Opiliones, Brasil, bosque lluvioso atlántico, predación, ranas.

Most arachnids are exclusively predators, excluding opilionids and some groups of mites that feed on dead matter or are phytophagous. It is remarkable that harvestmen are omnivorous, feeding on live and dead animals, plants and fungi. However, the trend is toward carnivory with an opportunistic diet (Gnaspini 1996, Acosta & Machado in press). Nevertheless, this generalization is not applicable to all groups, because a few harvestmen are specialized feeders, such as *Ischyropsalis hellwigi* (Panzer, 1794) and some Trogludidae, the famous gastropod predators (Acosta & Machado in press). Harvestmen are generally predators of small, soft-skinned arthropods and other invertebrates such as various insects (both adults and immatures of orthopterans, dipterans, lepidopterans, neuropterans, hymenopterans and homopterans), arachnids (including other harvestmen, even conspecifics), myriapods, isopods (woodlice), earthworms, leeches, and gastropods (Hillyard & Sankey 1989, Kury & Pinto-da-Rocha 2002, Acosta & Machado in press). However, opportunistically they may take dead prey, including recently died vertebrates (see an excellent review in Acosta & Machado in press).

Arachnids as predators of vertebrates were reported in a few cases. Spiders of the family Theraphosidae have been reported as predators of birds by the early naturalist Bates in the Amazon region. Araneomorphae families, such as Pisauridae can eat tadpoles and small fishes (McCornick & Polis 1982). However, small Passeriformes and even bats can be victims of web spiders (Shear 1986, Teixeira et al. 1991). Scorpions, whipscorpions, whipspiders and solifuges have also been scarcely reported predating upon vertebrates, such as small mammals, snakes, frogs, lizards and even birds (McCornick 1982, 1990, Weygoldt 2000, J.Cokendolpher pers. com.). Acari are parasites of vertebrates. Other arachnid orders have not been reported as vertebrate predators.

The predominate items in the diet of reported arachnid predators (excluding mites) are beetles, butterflies, moths, grasshoppers among others (Foelix 1996, McCornick & Polis 1990).

The predatory events of the *Neosadocus maximus* (Giltay 1928), a gonyleptidean with a male dorsal scute length about 10.5 mm and leg IV about 43 mm, were observed during the night at the Parque Estadual Carlos Botelho, Municipality of São Miguel Arcanjo, State of São Paulo, Southeastern Brazil. The observations were made in the marginal vegetation of a non-seasonal pond of about 20 m diameter in the Atlantic Rain Forest (24°15'S, 47°45'W, c.a. 800 m elev.). The study area receives 2000-3000 mm rainfall each year, mean annual temperatures range from 17 to 19°C,



**Figs. 1-2.** *Neosadocus maximus* (Giltay, 1928) eating frogs. 1, male eating a metamorph of *Hyla Laurenti*, 1768. 2, female eating an unrecognizable frog

seasonality is not well marked but, there are colder and dryer periods lasting from April to September.

On 30 November 2001 the first author observed a male *N. maximus* eating a treefrog on a leaf of “caeté” (Marantaceae), about 50 cm above the ground. In spite of the frog being half consumed, its color and size (about 20 mm SVL) allowed us to recognize it as a metamorph of Hylidae Rafinesque, 1815 (Fig. 1), probably *Hypsiboas bischoffi* (Boulenger, 1887). The pond is also used for reproduction of the following other species of Hylidae: *Hypsiboas faber* (Wied-Neuwied, 1821), *Dendropsophus minutus* (Peters, 1872), *Dendropsophus* aff. *microps* (Peters, 1872), *Aplastodiscus leucopygius* (Cruz & Peixoto, “1984” [1985]), *Scinax hayii* (Barbour, 1909), *Scinax perereca* Pombal, Haddad & Kasahara, 1995

One year later (26 October 2002) the first author observed a female *N. maximus* eating a frog in the marginal vegetation. The prey had been consumed beyond species recognition (Fig. 2).

Unfortunately, the predatory behavior was not observed in either case reported, and we are not absolutely sure the opilionids caught the frogs alive. There are the possibilities of theft (see Sabino & Gnaspini 1999) or they could have been eatings frogs that had very recently died from other causes.

Most observations recorded in the literature suggested that harvestmen are relatively stationary and opportunistic while seeking live prey (Acosta & Machado in press). Hunting harvestmen adopt a motionless posture, sometimes for several hours, with extended appendages, legs II straight upwards or sideways; this posture is widespread among Gonyleptidae, including *Neosadocus*, spp. (Acosta & Machado in press, R. Pinto-da-Rocha pers. obs.). After contact, the prey, they are immobilized and held secure by the spiny pedipalps that can act as a subchelate tool and the twizzer-like chelicera, or even with the anterior legs. Feeding begins only after immobilization has occurred

(Acosta & Machado in press). Size of the potential prey and hardness of the body may determine whether the harvestman will take or refuse prey (Phillipson 1960, Acosta & Machado in press), as well as palatability. This is the first report of harvestmen eating frogs, as well as any vertebrate. Young frogs are especially vulnerable in the phase of life when they possess legs and a tail. Most metamorphs, which will absorb their tails in about 48 h, leave the water from October to January and can represent a good and predictable source of food for predators.

The species of *Neosadocus*, a genus found in southern and southeastern Brazil (Kury 2003), are commonly found on the low strata of the forest, living over litter, on low leaves of the understory or trunks. During the day they are hidden under fallen or standing logs or trunk crevices. Machado et al. (2004) reported males of *Neosadocus* sp. guarding egg batches in cavities in ravines (see their Figs. 2b, 2c), some probably having been constructed by digger wasps or spiders, others being natural cavities. *Neosadocus* spp. presents a large spectrum of food items. *N. maximus* was reported by Machado & Pizo (2000) foraging on fruits in the lowland forest in southeastern Brazil and they consumed the pulp or aril fruits during the night period belonging to *Cabalea*, *Alchornea*, *Eugenia* and *Virola*. At Jureia Itatins (State of São Paulo), *N. maximus* was reported eating earthworms (see Fig. 66 in Brescovit et al. 2004). *Neosadocus* sp. was observed in Guaricana eating live basidiomycetes (R. Pinto-da-Rocha pers. obs.). In captivity, *Neosadocus* sp. accepts *Tenebrio* Linneus, 1758, larvae in pieces, smashed cockroaches [*Periplaneta americana* Linneus, 1758 and *Nauphoeta cinerea* (Olivier, 1789)], smashed Psychodidae (Diptera), bread, cooked rice or beans, banana, cat food, apple, cooked meat, cream cheese, and ham (Chelini & Willemart pers. comm.). The diet of *Neosadocus* spp., in the field, was not studied in detail but, it seems to be one of the most diversified among harvestmen species.

### Acknowledgements

We are grateful to Instituto Florestal de São Paulo for providing facilities at Parque Estadual Carlos Botelho. The study was partially supported by the Fundação de Amparo à Pesquisa do Estado de São Paulo, Programa

Biota Fapesp (grant No. 01/1334-3) and FAP/CEPE PUC-SP. We thank Carolina Câmara Pianca, Jean Saliba Neto and Renato Augusto de Moraes for field assistance.

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