

Scientific Note

Tetranychus marianae McGregor, 1950 (Acari: Tetranychidae) in *Piper* (Piperaceae) species in the state of Pará, Brazil

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Abstract. This study reports the occurrence of the phytophagous mite *Tetranychus marianae* McGregor, 1950 (Tetranychidae), in species of the genus *Piper* (*P. hispidum* Sw., *P. marginatum* Jacq., *P. montealegreanum* Yunk., *P. peltatum* L., *P. reticulatum* L., and *P. tuberculatum* Jacq.) (Piperaceae) and the predator mite *Amblyseius tamatavensis* Blommers, 1974 (Phytoseiidae), in species and cultivars of *Piper nigrum* L., from the Piperaceae collection of Embrapa Amazônia Oriental in Belém, Pará.

Keywords: phytophagous mite, *Amblyseius tamatavensis*, Phytoseiidae.

Species of the genus *Piper* (Piperaceae) are of great importance for the cosmetics, pharmaceutical, insecticide and food industries because they accumulate compounds and metabolites (Fazolín et al. 2005; Silva et al. 2007; Ribeiro et al. 2015), stimulating scientific interest in several areas, such as genetic improvements, molecular biology, phytotechnics, and animal and plant health (Rodrigues et al. 2019).

Some species of mites belonging to the family Tetranychidae have been reported to be associated with plants of the genus *Piper* in Brazil, such as *Tetranychus ludeni* Zacher, 1913 on *Piper* spp. in São Paulo (Feres et al. 2005), *Eotetranychus tremae* De Leon, 1957 on *Piper* spp. in São Paulo (Flechtmann 1981; Feres et al. 2005) and *Tetranychus marianae* McGregor, 1950 on *Piper* spp. in Pernambuco (Moraes & Flechtmann 1981).

In October 2020, a mite infestation was observed in *Piper* spp. kept in pots in a greenhouse that are part of the collection of Piperaceae belonging to Embrapa Amazônia Oriental (01°27'S; 48°30'W), in the municipality of Belém, state of Pará.

Samples of leaves from 13 species (*Piper alatipetiolatum* Yunck., *Piper arboreum* Aubl., *Piper carniconnectivum* C. DC., *Piper colubrinum* Link, *Piper cernuum* Vell., *Piper divaricatum* G. Mey., *Piper hispidum* Sw., *Piper marginatum* Jacq., *Piper montealegreanum* Yunck., *Piper peltatum* L., *Piper reticulatum* L., *Piper tuberculatum* Jacq., *Piper nigrum* L. cultivars Apra, Bragantina, Cingapura, Cleo, Equador, Guajarina, laçará, Kottanadan, Panakotta and Uthirankotta) were collected and placed in plastic bags for laboratory screening. The samples consisted of leaves from the middle third of the plant, the site of greater colony formation and symptoms of infestation in the plants. The number of leaves varied according to the availability of plant material.

The abaxial and adaxial surfaces of the leaves and the collection of phytophagous and other mite specimens were observed with a stereomicroscope. The mites were preserved in 70% alcohol for subsequent assembly in Hoyer's medium. Identification was performed under a phase contrast optical microscope (Zeiss Imager Z2) and with the aid of a dichotomous key (Baker & Tuttle 1994).

The phytophagous mites were identified as *Tetranychus marianae* (female, male and immature mites), with tarsal I and duplex setae of tarsus I and males and tarsal I and II duplex setae of females, the main diagnostic characteristics of the species (Fig. 1). The specimens were deposited in the reference collection of the Museu de Ciências Naturais

(ZAUMCN) da Universidade do Vale do Taquari (UNIVATES) Lajeado, Rio Grande do Sul.

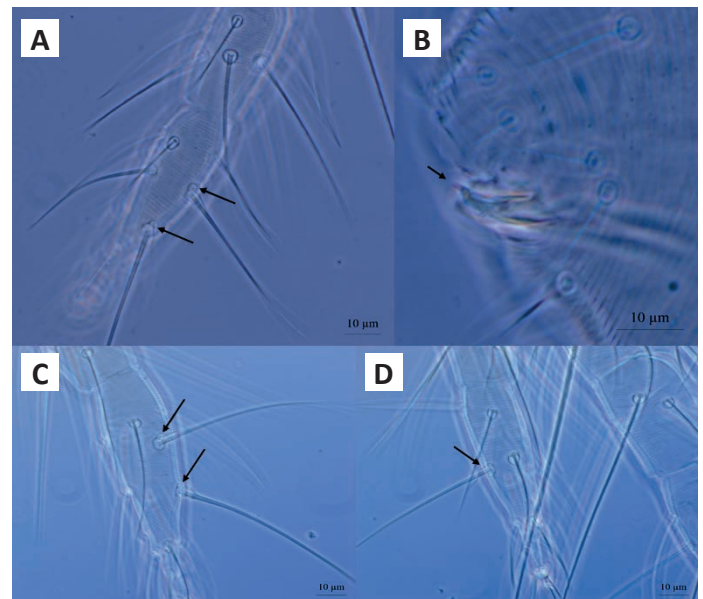


Figure 1. *Tetranychus marianae* McGregor, 1950 – Male: duplex setae of tarsus I (A) and aedeagus (B); Female: duplex setae of tarsus I (C) and tarsus II (D). (Photos: Júlia J. Ferla).

The colonies of *T. marianae* were located preferentially on the abaxial surface of the leaves and, to a lesser extent, on the adaxial surface. The eggs were located preferentially close to the veins. Six species of *Piper* (*P. hispidum*, *P. marginatum*, *P. montealegreanum*, *P. peltatum*, *P. reticulatum* and *P. tuberculatum*) had colonies of *T. marianae*; however, only *P. marginatum*, *P. peltatum* and *P. reticulatum* had colonies on leaves that caused chlorosis and tanning to occur (Fig. 2).

In addition to this Tetranychidae, 78 specimens of mites belonging to the families Cheyletidae (one specimen), Phytoseiidae (39 females, 12 males and 17 nymphs), Tydeidae (one specimen) and the suborder Oribatida (8 specimens) were also collected. The predator Phytoseiidae

was identified as *Amblyseius tamatavensis* Blommers, 1974 and was collected from *P. marginatum*, *P. reticulatum* and *Piper* species without the presence of *T. marianae* (*P. alatipetiolatum*, *P. arboreum*, *P. colubrinum*, *P. cernuum*, *P. divaricatum* and *P. nigrum*).

Tetranychus marianae was reported in approximately 105 host plants (Migeon & Dorkeld 2021). In Brazil, the only report of this species in a *Piper* sp. was the result of a collection obtained in September 1977 in the municipality of Recife, state of Pernambuco, without citing damage (Moraes & Flechtmann 1981; Flechtmann & Moraes 2017). In addition to this *Piper* sp., *T. marianae* was reported to be associated with *Abelmoschus esculentus* L. Moench (Malvaceae), *Capsicum annuum* L. (Solanaceae), *Chenopodium ambrosioides* L. (Amaranthaceae), *Glycine max* (L.) Merr. (Fabaceae), *Ipomoea* sp. (Convolvulaceae), *Ipomoea potatoes* (L.) Lam. (Convolvulaceae), *Lycopersicon esculentum* Mill. (Solanaceae), *Morus* sp. (Moraceae), *Nicotiana tabacum* L. (Solanaceae), *Passiflora* sp. (Passifloraceae), *Passiflora edulis* f. *flavicarpa* Deg. (Passifloraceae), *Physalis* sp. (Solanaceae), *Ricinus communis* L. (Euphorbiaceae), *Sechium edule* (Jacq.) Sw. (Cucurbitaceae), *Solanum gilo* Raddi, *Solanum melongena* L., *Solanum paniculatum* L., *Solanum tuberosum* L. (Solanaceae), *Thunbergia* sp. (Acanthaceae) and *Vigna* sp. (Fabaceae) (Pascoal & Reis 1968; Flechtmann & Abreu 1973; Flechtmann 1987; Moraes et al. 1987; Noronha 2006; Moraes & Flechtmann 2008; Flechtmann & Moraes 2017; Flechtmann 2020).

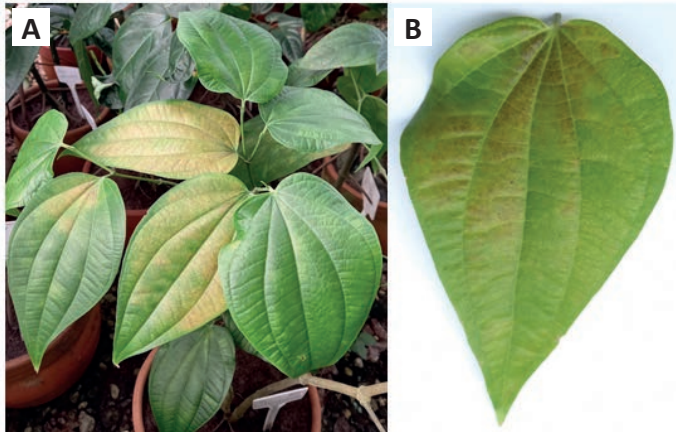


Figure 2. Chlorosis (A) and tanning (B) caused by *Tetranychus marianae* McGregor, 1950 (Tetranychidae) on *Piper reticulatum* L. (Piperaceae) leaves in a greenhouse. (Photos: Aloysia C.S. Noronha).

Regarding the predatorial Phytoseiidae, *A. tamatavensis* is widely distributed and has been reported as occurring in Africa, South and Central America, Asia and Oceania (Demite et al. 2021). In Brazil, it is widespread in all regions (Demite et al. 2021). In the Amazon biome, *A. tamatavensis* has been reported in the states of Amazonas (without indication of hosts; Vasconcelos & Silva 2015), Roraima (*Citrus* sp. (Rutaceae) and *Cocos nucifera* L. (Arecaceae); Gondim Jr. et al. 2012; Figueirêdo et al. 2019) and Pará (fruits and leaves of *C. nucifera*; Lawson-Balagbo et al. 2008). This species of Phytoseiidae seems to fit the Type III b group (generalist predators that live on glabrous leaves) defined by McMurtry et al. (2013). It was first reported in association with the red palm mite *Raoiella indica* Hirst, 1924 (Tenuipalpidae) in the state of Roraima (Gondim Jr. et al. 2012), and it has also been cited as a promising natural enemy of *Bemisia tabaci* (Gennadius, 1889) (Hemiptera: Aleyrodidae) (Cavalcante et al. 2017; Barbosa et al. 2019).

Despite the wide scientific importance of species of the genus *Piper* in Brazil and their use in breeding programs of species with significant economic importance (Rodrigues et al. 2019), the diversity of mites in these plants is practically unknown. In this study, phytophagous *T. marianae* was reported for the first time in the state of Pará in six species of *Piper*, while the predator *A. tamatavensis* is a new record in *Piper* spp. in Brazil.

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Authors' Contributions

ACSN, RCV, LSD and ICM conducted the activities in the laboratory and greenhouse. ACSN prepared the manuscript. JJF and JLCM identified the mite species. All authors discussed and reviewed the manuscript.

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