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

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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 arboresum Aubl., Piper connectivum 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, laçara, 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.

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. latifoliatum*, *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 2018; 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).

![Image 1](Image 26x789 to 61x821)

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

Regarding the predatory 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., *Solanum paniculatum* (Convolvulaceae), *Ipomoea* potatoes (L.) Lam. (Convolvulaceae), *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 3.** *A. tamatavensis* on *Piper reticulatum* L. *Piperaceae* leaves. (Photo: Aloyséia C.S. Noronha).
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