

Scientific Note

Aponychus schultzi (Blanchard, 1940) (Prostigmata: Tetranychidae) on chayote plants in Rio Grande do Sul state, Brazil

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Abstract. The chayote, *Sechium edule* (Jacq.) Swartz (Cucurbitaceae), is a perennial herbaceous plant cultivated across Brazil. Although the spider mite *Aponychus schultzi* (Blanchard, 1940) (Tetranychidae) has been previously recorded infesting this crop only in the Brazilian states of Minas Gerais, São Paulo, and Paraná, we here report its first occurrence infesting chayote plants in Rio Grande do Sul state, southern Brazil. Leaf injuries on the adaxial surface and diagnostic morphological traits of the species are presented. These findings extend the known association between *A. schultzi* and chayote to Rio Grande do Sul, broadening the geographic distribution of this host-mite association in southern Brazil.

Keywords: *Sechium edule*, Spider mite, Phytophagous mites, Leaf injuries.

Sechium edule (Jacq.) Swartz (Cucurbitaceae) is a perennial herbaceous plant with long stems, native to Mesoamerica (Saade 1996). Its fruits, commonly known as chayote, have high nutritional value due to the presence of antioxidants and are widely consumed by humans (Vieira et al. 2019; Chang et al. 2021). Chayote is commercially cultivated and marketed in Brazil, and pests reported for this crop include insects such as the chayote borer, *Phymatophorus squamosus* Faust, 1896 (Coleoptera: Curculionidae), and nematodes, including *Meloidogyne incognita* (Kofoid & White, 1919) and *Meloidogyne javanica* (Treub, 1885) (Rhabditida: Meloidogynidae) (Lopes et al. 1994; Reis et al. 2008). Although less frequently reported, mite species have also been associated with damage to chayote plants, such as *Polyphagotarsonemus latus* (Banks, 1904) (Prostigmata: Tarsonemidae) (Lopes et al. 1994). While the presence of mites such as *P. latus* has been documented, other groups of phytophagous mites, particularly tetranychid mites remain poorly studied in association with chayote (Flechtmann & Moraes 2017).

Within Tetranychidae, the genus *Aponychus* has been reported on a wide range of host plants, but its association with chayote has been poorly documented. Currently, the genus comprises 20 species, five of which have been recorded in Brazil (Migeon et al. 2011; Flechtmann & Moraes 2017). Most Brazilian records of the genus are concentrated in the states of Minas Gerais (MG), São Paulo (SP), and Paraná (PR) (Flechtmann & Moraes 2017). To date, only two species have been recorded from Rio Grande do Sul (RS): *Aponychus mauritanum* Ferla & Ferla, 2020 (Prostigmata: Tetranychidae) infesting *Solanum mauritanum* Scopoli (Solanaceae) and *Plantago australis* Lam. (Plantaginaceae) (Ferla et al. 2020; Rode et al. 2024) and *Aponychus schultzi* (Blanchard, 1940) (Prostigmata: Tetranychidae), infesting *Carica papaya* L. (Caricaceae) (Flechtmann 2020). Among species of this genus, *A. schultzi* has already been reported in Brazil on several host plants, including cultivated plants such as beans, hibiscus, papaya, cassava, and chayote (Flechtmann & Baker 1970; Paschoal 1970; Flechtmann 1968; Migeon et al. 2011). Within this context, records of *A. schultzi* on *S. edule* are restricted to MG, SP, and PR states (Fig. 1A) (Flechtmann 1968; Flechtmann & Baker 1970; 1975). Besides, this mite species has already been recorded in RS, infesting papaya (Flechtmann 2020). Thus, this study reports spider mite *A. schultzi* infesting chayote

plants in Rio Grande do Sul state, Brazil, and characterizes the injuries associated with its infestation.

Chayote plants with mite injuries were sampled in a domestic garden (urban agriculture), managed without pesticides and fertilizers, in Lajeado, Rio Grande do Sul, Brazil (29°26'13.8"S 51°57'46.9"W). The symptoms consisted of irregularly shaped whitish and yellowish spots on the upper leaf surface, possibly characterized by air-filled intercellular spaces (Fig. 1B). Yellowish spots indicate oxidation of tissues and membranes, as observed in soybean plants attacked by *Tetranychus ludeni* Zacher, 1913 (Prostigmata: Tetranychidae) (Wurlitzer et al. 2024). In the abaxial region, although several specimens were observed, no visible injuries were detected.

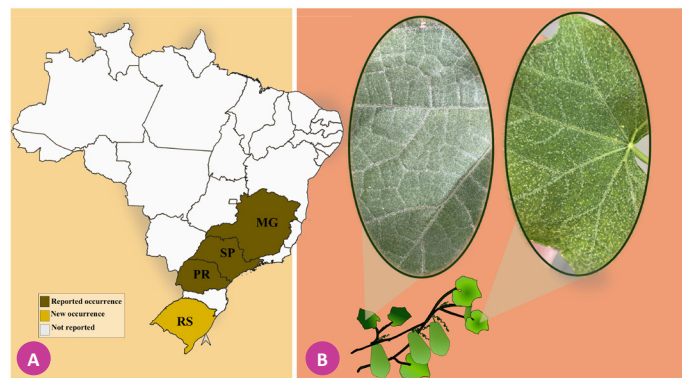


Figure 1. (A) Geographic distribution of *Aponychus schultzi* (Blanchard, 1940) (Prostigmata: Tetranychidae) records in chayote in Brazil, showing states with previous records (in brown) and new state records (in yellow). States: MG-Minas Gerais; SP-São Paulo; PR-Paraná; RS-Rio Grande do Sul. (B) Injuries caused on the adaxial surface of chayote leaves.

For identifying the mites, leaves with injuries were sampled and placed in a plastic bag and taken to the Laboratory of Acarology at Universidade do Vale do Taquari - Univates. There was a high infestation of this mite in the plants, with the mites found on various leaves. The mites were collected under a stereomicroscope and mounted on glass slides in Hoyer's medium (Krantz & Walter 2009) and kept in an oven for 5 to 6 days for mites fixation and clarification. The mites (Fig. 2A-B)

were collected especially from the adaxial region of the leaves, where injuries were present. The identification was performed with a phase contrast microscope, using dichotomous keys (Baker & Tuttle 1994; Chant & McMurtry 1994; 2007).



Figure 2A-B. *Aponychus schultzi* (Blanchard, 1940) (Prostigmata: Tetranychidae) observed under a stereomicroscope: (A) Adult female. (B) Adult male.

Specimens were examined under phase-contrast microscopy, based on morphological characters. Species identification was performed based on females. The main morphological characteristics consist of the shape and size of some dorsal setae, dorsal striations, and the number of legs tactile and sensory setae (Pritchard & Baker 1955; Ehara 1966). The observed specimens were consistent with the diagnostic features described for *A. schultzi*, supporting the identification of the species associated with the observed leaf injuries.

Aponychus schultzi was identified with female characteristics as follows: faintly striated idiosoma (Fig. 3A). Dorsal setae inserted on strong tubercles (Fig. 3A, B, C). Setae *sc1*, *c3* and *h1* blunt, dilated near the tip, broadly spatulate (Fig. 3B, C). Leg chaetotaxy (Fig. 3D) and anogenital region (Fig. 3E) with 1 pair of pseudo-anal setae were analyzed for mite identification.

Leg chaetotaxy presented from coxae to tibia (I-IV) with sensory setae indicated in parentheses: coxa 2-2-1-1, femur 7-4-3-2, genu 3-3-1-1 and tibia 6(1)-5-4-4.

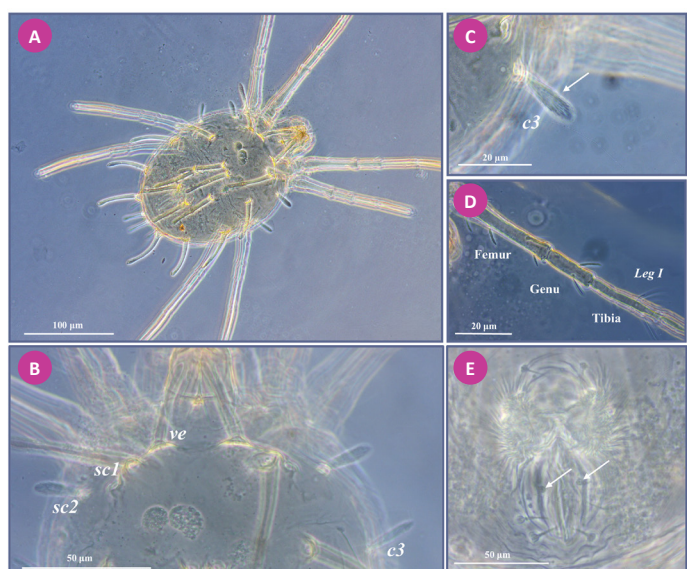


Figure 3A-E. Phase contrast microscope. *Aponychus schultzi* (Blanchard, 1940) (Prostigmata: Tetranychidae). (A) Dorsal view. (B) Setae *ve*, *sc1*, *sc2* and *c3*. (C) Seta *c3*. (D) Dorsal setae of Leg I, from femur to tibia. (E) Anogenital region (arrows indicating the pseudo-anal setae).

The geographic distribution of *A. schultzi* records on chayote in Brazil indicates that previous occurrences were restricted to the states of MG, PR and SP, whereas the present study represents the record of this species in chayote plants also in RS (Fig. 1A).

In addition to the phytophagous mites, a predatory mite species *Iphiseiodes saopaulus* (Denmark & Muma, 1973) (Mesostigmata:

Phytoseiidae) was also reported on the plants. Phytoseiid mites are widely used for controlling mites and small insects (McMurtry & Croft 1997; Gerson et al. 2003). *Iphiseiodes* De Leon, 1966 species are known as pollen feeding and generalist predators, being able to develop and reproduce on some phytophagous mites, including Tetranychidae species (Villanueva & Childers 2006; Sarmiento et al. 2011; McMurtry et al. 2013; Villanueva & Childers 2014). Further studies under laboratory and field conditions are needed to evaluate the ecological interactions between *I. saopaulus* and *A. schultzi*.

Thus, this study reports the occurrence of *A. schultzi* in chayote plants in Rio Grande do Sul state, southern Brazil. This finding updates the geographical range of this spider mite in the country. The characterization of leaf injuries and the confirmation of species identity based on morphological traits contribute to improving the knowledge of mite fauna associated with chayote crops.

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Authors' Contributions

JJF: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing. WBW: Conceptualization, Methodology, Investigation, Writing - review & editing. JRS: Conceptualization, Methodology, Investigation, Writing - review & editing. GMP: Conceptualization, Methodology. NJF: Conceptualization, Investigation, Writing - review & editing, Validation, Resources.

Conflict of Interest Statement

The authors declare no competing interests.

Ethical Approval

Not applicable.

Data Availability

All data analyzed during this study are included in this paper.

Generative AI Statement

The AI tools ChatGPT (OpenAI) and DeepL were used exclusively to provide linguistic support during the preparation of the manuscript, including reviewing grammar and improving text fluency.

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