

First record of *Typhlodromus (Anthoseius) transvaalensis* (Acari: Phytoseiidae) from Argentina

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RESUMEN. Se cita por primera vez de la Argentina a *Typhlodromus (Anthoseius) transvaalensis* Nesbitt (Acari: Phytoseiidae) sobre *Capsicum annuum* L. y *Lycopersicon esculentum* L. (Solanaceae) en la localidad de Concordia, Entre Ríos. Se proporcionan datos morfológicos de los ejemplares argentinos.

PALABRAS CLAVE. Ácaros fitoseidos. *Typhlodromus*. Cultivos hortícolas. Solanaceae.

ABSTRACT. We report for the first time from Argentina *Typhlodromus (Anthoseius) transvaalensis* Nesbitt from *Capsicum annuum* L. and *Lycopersicon esculentum* L. (Solanaceae) in Concordia, Entre Ríos. Morphometric parameters of Argentine specimens are provided.

KEY WORDS. Phytoseiid mites. *Typhlodromus*. Horticultural crops. Solanaceae.

The family Phytoseiidae Berlese (Acari: Mesostigmata) includes the most frequent predatory mites found on plants. Most of them are predaceous; some species are effective bio-control agents in greenhouses or open field. They are used to control spider mites, thrips, whiteflies and other pests in several parts of the world (Helle & Sabelis, 1985; Zhang, 2003; Gerson & Weintraub, 2007).

The family Phytoseiidae has three sub-families: Amblyseiinae, Phytoseiinae and Typhlodromiinae. In the latter, the subgenus *Typhlodromus (Anthoseius)* De Leon, comprising 322 species, is one of the largest within the family (Moraes, *et al.*, 2004; Rahmani *et al.*, 2010; Jafari *et al.*, 2011). Guanilo *et al.* (2008) give important taxonomic information of phytoseiid mites in northern Argentina, providing a key for their identification and reporting the species that belong to Amblyseiinae and Phytoseiinae. In this work, *Typhlodromus (Anthoseius) transvaalensis* is cited for the first time from Ar-

gentina. We also present morphometric parameters in order to characterize Argentine specimens.

Mites were collected on *Capsicum annuum* L. and *Lycopersicon esculentum* Mill. (Solanaceae), preserved in alcohol 70% and then mounted in Hoyer's medium for identification. The classification system used in this paper is that of Chant & McMurtry (1994, 2007). The system of nomenclature follows Rowell *et al.* (1978) for dorsal idiosomal setae and Chant & Yoshida-Shaul (1991) for ventral idiosomal setae. All measurements are given in micrometres (µm). Setal form is designated *sensu* Muma & Denmark (1970). Each measurement corresponds to the average for the number of individuals, followed (in parentheses) by the respective ranges.

Typhlodromus (Anthoseius) transvaalensis (Nesbitt 1951)

Female. (3 specimens measured)

Dorsum (Fig. 1). Dorsal shield reticulate; 376

(360-392) long and 237 (240-235) wide at level of s4, j1 26 (24-29), j3 41 (40-43), j4 32, j5 33(31-35), j6 35 (32-38), J2 48, J5 8 (7-10), z2 23 (22-24), z3 42 (41-43), z4 45 (43-47), z5 28 (27-29), Z4 60 (58-62), Z5 64 (62-67), s4 48 (48-49), s6 52(51-53), S2 60 (60-61), S4 60 (58-62), S5 9 (9-10), r3 34 (33-35), R1 45 (44-46); j4, j5, j6, z2 and z5 plumose with blunt tip, J5-S5 smooth and the rest of setae plumose and knobbed (Fig. 5).

Peritreme. Extending near coxa I. (Fig. 2)

Venter (Fig. 2). Sternal shield smooth, with two pairs of setae and posterior margin V-shaped, the third pair of setae on interscutal membrane and the fourth pair of setae on oval metasternal shields. Distance between st1-st3 81 (80-85) and st2-st2 70 (63-82). Genital shield smooth, distance between st5-st5 81 (81-82). Ventri-anal shield pentagonal, with anterior margin slightly convex and lateral margins slightly concave between JV2-JV4, JV3 absent; 135 long (130-141) and 79 (77-81) wide at level of ZV2 with three pairs of preanal setae and gv2 pore. Three pairs of setae, and a plumose and knobbed JV5. Two pairs of metapodal shields.

Chelicera (Fig. 3): fixed digit 32 (32-33) long with two sub-apical teeth, mobile digit 30.

Spermatheca (Fig. 4) slightly sclerotized, calix horn like, atrium, duct minor and major difficult to see.

Legs: on leg IV three knobbed macrosetae on genu 26 (25-27), tibia 33 and tarsus 42 (41-42).

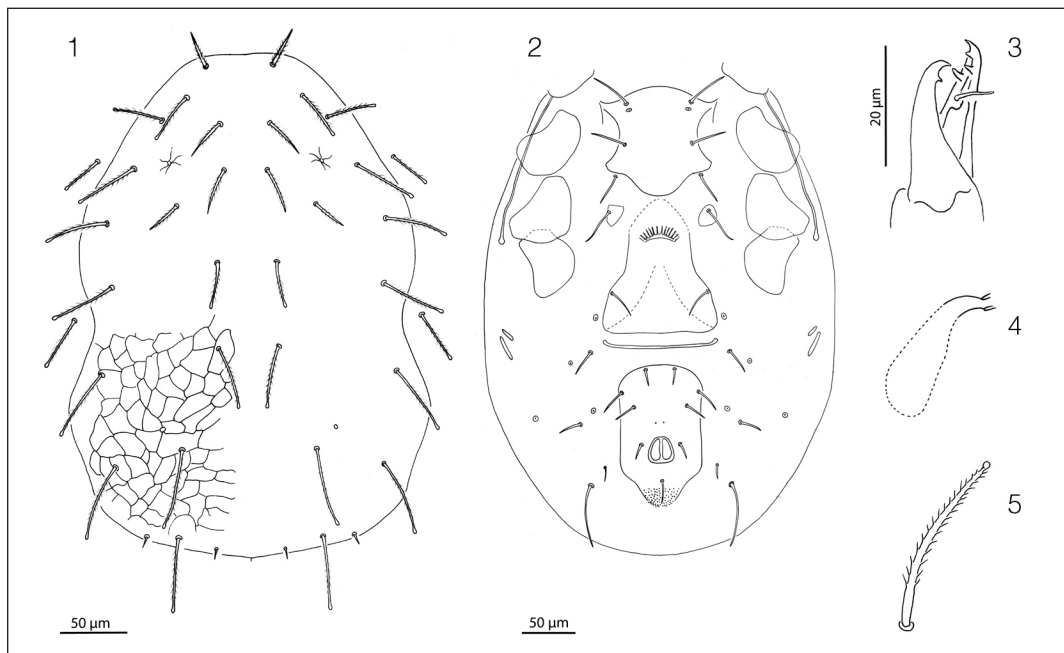
Male: not found.

Junior synonyms: *Typhlodromus (Anthoseius) jackmickleyi* De Leon, 1958: 75 and *Typhlodromus (Anthoseius) pectinatus* Athias-Henriot, 1960: 65; Chant *et al.*, 1974: 1265 Denmark & Muma, 1973: 269; Muma & Denmark, 1970: 141.

Other names: *Kampimodromus transvaalensis* Nesbitt, 1951: 55 —original designation, *Typhlodromus (Typhlodromus) transvaalensis*: Chant, 1957: 528; *Neoseiulus transvaalensis*: Muma, 1961: 295; *Typhlodromus (Neoseiulus) transvaalensis*: Pritchard & Baker, 1962: 218; *Mumaseius transvaalensis*: Abbasova, 1970: 1412; *Anthoseius (Anthoseius) transvaalensis*: Wainstein & Vartapetov, 1973: 103; *Clavidromus pectinatus*: Muma, 1961: 296.

Material Examined. ARGENTINA. Entre Ríos: Concordia, 26-10-2012, Castresana col., 2 females on *Capsicum annum* L. (Solanaceae); Chajarí, 22-02-2013, Castresana col., 1 female (MLP) on *Lycopersicum esculentum* (Solanaceae).

Hernandes *et al.* (2011) published a biogeographical analysis of the sub-genus *Typhlodromus (Anthoseius)* De Leon and found that *T. (A.) transvaalensis* has a worldwide distribution. Amitai & Swirski (1978) found this species



Figs. 1-5. 1, dorsal view with setal pattern; 2, ventral plates and peritreme; 3, chelicera; 4, spermatheca; 5, detail of plumose and knobbed setae.

in many habitats including stored products, this fact could explain its wide distribution. Measurements of dorsal shield of Argentine specimens are 5% longer and 30% wider than those provided by Schicha (1981), while ventri-anal shield is 6% narrower and 21% longer. With this record 48 species of phytoseiid mites are reported from Argentina.

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LITERATURE CITED

- ABBASOVA, E. 1970. Little known species and new subspecies of the genus *Mumaseius* De Leon (Acarina, Phytoseiidae). *Zoologicheskii Zhurnal* 49: 1410-1414.
- ATHIAS-HENRIOT, C. 1960. Phytoseiidae et Aceosejidae (Acarina, Gamasina) d' Algerie. IV. Genre *Typhlodromus* Scheuten, 1857. *Bulletin de la Societe d'Histoire Naturelle de l'Afrique du Nord Alger* 51: 62-107.
- AMITAL, S. & E. SWIRSKI. 1978. A new genus and new records of phytoseiid mites (Mesostigmata, Phytoseiidae) from Israel. *Israel Journal of Entomology* 12: 123-143.
- CHANT, D. 1957. Note on the status of some genera in the family Phytoseiidae (Acarina). *The Canadian Entomologist* 89(11): 528-532.
- CHANT, D., R. HANSELL & E. YOSHIDA-SHAUL. 1974. The genus *Typhlodromus* Scheuten (Acarina, Phytoseiidae) in Canada and Alaska. *Canadian Journal of Zoology* 52: 1265-1291.
- CHANT, D. & J. McMURTRY. 1994. A review of the subfamilies Phytoseiinae and Typhlodrominae (Acari, Phytoseiidae). *International Journal of Acarology* 20: 223-310.
- CHANT, D. & J. McMURTRY. 2007. *Illustrated key and diagnoses for the genera and subgenera of the Phytoseiidae of the world (Acari, Mesostigmata)*. Indira Publishing House, West Bloomfield, Michigan.
- CHANT, D. & E. YOSHIDA-SHAUL. 1991. Adult ventral patterns in the family Phytoseiidae (Acari, Gamasina). *International Journal of Acarology* 17: 187-199.
- DE LEON, D. 1958. Four new *Typhlodromus* from southern Florida (Acarina, Phytoseiidae). *The Florida Entomologist* 41: 73-76.
- DENMARK, H. & M. MUMA. 1973. Phytoseiid mites of Brazil (Acarina, Phytoseiidae). *Revista Brasileira de Biologia* 33: 235-276.
- GERSON, U. & P. WEINTRAUB. 2007. Mites for the control of pests in protected cultivation. *Review Pest Management Science* 63: 658-676.
- GUANILO, A., G. DE MORAES, S. TOLEDO & M. KNAPP. 2008. Phytoseiid mites (Acari, Phytoseiidae) from Argentina, with description of a new species. *Zootaxa* 1884: 1-35.
- HELLE, W. & M. W. SABELIS. 1985. *Spider mites. Their biology, natural enemies and control*. Vol. 1B. Elsevier, The Netherlands.
- HERNANDES, F., S. KREITER & M. S. TIXIER. 2011. Biogeographical analysis within the family Phytoseiidae Berlese (Acari, Mesostigmata): An example from the large subgenus *Typhlodromus (Anthoseius)* De Leon. *Acarologia* 51(4): 431-448.
- JAFARI, S., Y. FATHIPOUR & S. FARAJI. 2011. Redescriptions of *Amblyseius meghriensis* Arutunjan and *Typhlodromus haiastanius* (Arutunjan) with discussion on using preanal pores as a character in the subgenus *Anthoseius* (Mesostigmata, Phytoseiidae). *International Journal of Acarology* 37: 244-254.
- MORAES, G. de, J. McMURTRY, H. DENMARK & C. CAMPOS. 2004. A revised catalog of the mite family Phytoseiidae. *Zootaxa* 434: 1-494.
- MUMA, M. 1961. Subfamilies, genera, and species of Phytoseiidae (Acarina, Mesostigmata). *Florida State Museum Bulletin* 5(7): 267-302.
- MUMA, M. & H. DENMARK. 1970. *Phytoseiidae of Florida. Arthropods of Florida and neighboring land areas*, 6. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, USA.
- NESBITT, H. H. J. 1951. *A taxonomic study of the Phytoseiidae (Family Laelaptidae) predaceous upon Tetranychidae of economic importance*. Zoologische Verhandelingen, The Netherlands.
- PRITCHARD, A. & E. BAKER. 1962. Mites of the family Phytoseiidae from Central Africa, with remarks on genera of the world. *Hilgardia* 33: 205-309.
- RAHMANI, H., K. KAMALI & F. FARAJI. 2010. Predatory mite fauna of Phytoseiidae of northwest Iran (Acari, Mesostigmata). *Turkish Journal of Zoology* 34: 497-508.
- ROWELL, H., D. CHANT & R. HANSELL. 1978. The determination of setal homologies and setal patterns on the dorsal shield in the family Phytoseiidae (Acarina, Mesostigmata). *Canadian Entomologist* 110: 859-876.
- SCHICHA, E. 1981. Five known and five new species of phytoseiid mites from Australia and the South Pacific. *General and Applied Entomology* 13: 29-46.
- WAINSTEIN, B. & S. VARTAPETOV. 1973. Predatory mites of the family Phytoseiidae, Parasitiformes of Adzharskaya ASSR. *Akademiya Nauk Armyanskoy SSR, Biologicheskii Zhurnal Armenii* 26(2): 102-105.
- ZHANG, ZHI-QIANG. 2003. *Mites in greenhouses: identification, biology and control*. Cabi Publishing, Wallingford, UK.