Revista Ibérica de Aracnología, nº **21** (31/12/2012): 15–19.
Grupo Ibérico de Aracnología (S.E.A.). ISSN: 1576 - 9518.

RE-DESCRIPTIONS OF TWO *TYPHLODROMUS* SCHEUTEN SPECIES (MESOSTIGMATA: PHYTOSEIIDAE) NEW TO IRAN

Farid Faraji[1], Hasan Rahmani[2] & Mohsen Zare[2]

[1] MITOX Consultants, P.O. Box 92260, 1090 AG Amsterdam, The Netherlands – farid.faraji@mitox.org
[2] Department of Plant protection, Faculty of Agriculture, University of Zanjan, P. O. Box: 313, Zanjan, Iran – rahmani@znu.ac.ir – zaremohsen90@yahoo.com

Abstract: Two species, new to Iran, of the subgenus *Typhlodromus* are re-described. *Typhlodromus klimenkoi* Kolodochka and *T. pritchardi* Arutunjan were collected from willow and alfalfa, respectively. Morphological comparisons have been made between the specimens found in Iran and the holotypes. A key to the Iranian species of the subgenus *Typhlodromus* is also provided.
Key words: Mesostigmata, Phytoseiidae, *Typhlodromus,* first records, predatory mite, taxonomy, Iran.

Redescripción de dos especies de *Typhlodromus* Scheuten (Mesostigmata: Phytoseiidae) nuevas para Irán
Resumen: Se redescriben dos especies del subgénero *Typhlodromus*, nuevas para Irán. *Typhlodromus klimenkoi* Kolodochka y *T. pritchardi* Arutunjan fueron colectadas sobre sauces y alfalfa, respectivamente. Se realizó la comparación morfológica con los holotipos correspondientes. Se presenta una clave de las especies iraníes del subgénero *Typhlodromus*.
Palabras clave: Mesostigmata, Phytoseiidae, *Typhlodromus,* primeros registros, ácaro depredador, taxonomía, Irán

Introduction

The main character to separate *Typhlodromus* from the other genera in the tribe Typhlodromini is the absence of setae Z_1. This genus has two subgenera (*Anthoseius* De Leon and *Typhlodromus* Scheuten) that can be separated by the presence or absence of setae S_5 (Chant & McMurtry, 2007). Unlike the subgenus *Anthoseius*, the concept of subgenus *Typhlodromus* is uncontroversial in two major recent revisions (Chant & McMurtry, 2007; Denmark & Evans, 2011). The present study deals with re-descriptions of two new records of subgenus *Typhlodromus* for the Iranian fauna, which increases the number of known species to seven (Faraji *et al*., 2007).

Material and methods

Mites were extracted from samples of plant foliage and leaves using a Berlese/Tullgren funnel or by direct examination under a stereomicroscope. Samples were taken weekly from various areas and habitats in Zanjan county in 2011. Specimens were cleared in lactophenol solution and mounted in Hoyer's medium on microscope slides. Drawings were made with the aid of a camera lucida attached to an Olympus phase contrast microscope. The setal notations used follow Lindquist and Evans (1965) as adapted by Rowell and Chant (1978) to phytoseiid mites. All measurements are given in micrometers (μm). The classification systems follow those of Chant and McMurtry (2007). The voucher specimens of the species re-described in this paper were deposited in the Acari collection of MITOX.

Taxonomy

***Typhlodromus* (*Typhlodromus*) *klimenkoi* Kolodochka**
Typhlodromus klimenkoi Kolodochka 1980.
Fig. 1-5, Plates A and C.

FEMALE: The first measurement is of the Iranian specimen followed by the measurement of the holotype as given by Chant & Yoshida-Shaul (1987).

Idiosomal setal pattern: 12A:7A/JV: ZV.
Dorsal idiosoma (Figure 1) – Dorsal shield 380 (401) long and 178 (180) wide at z_5 level, entirely reticulated; dorsal setae smooth; lengths j_1 25 (23), j_3 35 (31), j_4 20 (21), j_5 20 (22), j_6 28 (27), J_2 34 (31), J_5 8 (10), z_2 23 (21), z_3 33 (29), z_4 35 (32), z_5 24 (21), Z_4 39 (35), Z_5 50 (50), s_4 34 (33), s_6 35 (35), S_2 40 (38), S_4 45 (45); setae r_3 31 (30) and R_1 34 (37) on lateral integument; dorsal shield with four pairs of large solenostomes (gd_2, gd_6, gd_8 and gd_9).
Peritreme – Extending to level between setae z_4 and z_3; peritreme not stippled, with central core (Figures 1 and 3, Plate C).
Ventral idiosoma (Figure 2) – Sternal shield smooth 78 long and 73 wide at level of setae ST_2, with two pairs of pores and two pairs of setae, ST_1 30 and ST_2 29, both setae ST_3 28 and ST_4 26 on separate shields, ST_4 associated with a pore (one is off the plate), a piece of sclerotized v-shaped plate located between sternal and genital shields; genital shield smooth, width 73 at widest point, ST_5 28; two pairs of metapodal shields, primary 40 long and accessory 13 long; ventrianal shield subpentagonal, with striae between JV_1 and anus; length 128 (146), width at level of setae ZV_2 100 (104) and width at level of para-anal setae 84; with four pairs of preanal setae JV_1 20, JV_2 22, JV_3 20, ZV_2 20; four pairs of setae surrounding ventrianal shield on integument, JV_4 23, JV_5 58 (56), ZV_1 20, ZV_3 20; ventrianal shield with no preanal pores (Figure 2).
Spermatheca – Calyx saccular, 18 long and 10 wide, atrium c-shaped incorporated in calyx (Figure 4, Plate A).
Chelicera – The detail of cheliceral dentition is not discernible.
Legs – Leg IV (Figure 5) with one macroseta (pd3) slightly bulbous apically, StIV 47 (47) about the same distance between its base and the dorsal tarsal fissure 48; other legs with no macrosetae; genua and tibiae I–II–III–IV with 10–7–7–7 and 10–7–7–6 setae, respectively.

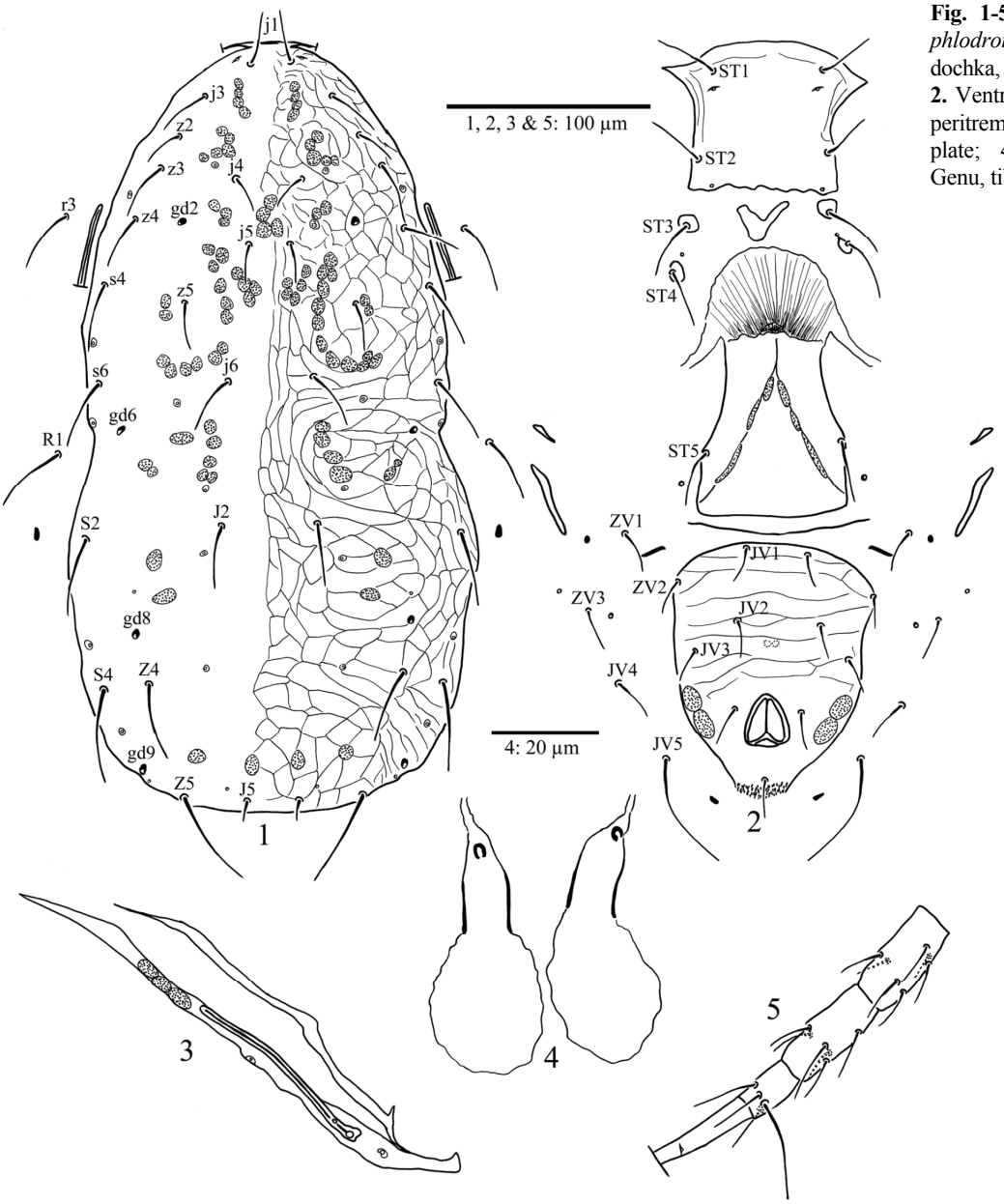


Fig. 1-5. *Typhlodromus* (*Typhlodromus*) *klimenkoi* Kolodochka, female; **1.** Dorsal view; **2.** Ventral view; **3.** Peritreme, peritremal plate and endopodal plate; **4.** Spermathecae; **5.** Genu, tibia and basitarsus IV.

SPECIMEN EXAMINED: One female, 05 August 2011; willow tree, Bayat-Jafar, Zanjan, Iran, collected by M. Zare.

DISTRIBUTION: Iran (this study), Israel (Swirski & Amitai, 1997), Kyrgyzstan (Kolodochka, 1980).

REMARKS: In the key to adult females of the *pyri* species group, Chant & Yoshida-Shaul (1987, page 1772) mentioned seta Z_4 equal in length to Z_5 for *T. klimenkoi* as opposed to shorter Z_4 in some other species. However, according to the measurements given in the re-description of *T. klimenkoi* Z_4 is much shorter than Z_5 (35 *vs* 50) (page, 1785). In the Iranian specimen seta Z_4 is slightly longer (39 *vs* 35) and ventrianal shield shorter (128 *vs* 146) than those of the holotype. Other morphological characters and measurements of the Iranian specimen closely resemble those of the original description and therefore the Iranian specimen is considered to be *T. klimenkoi*.

***Typhlodromus* (*Typhlodromus*) *pritchardi* Arutunjan**

Typhlodromus pritchardi Arutunjan 1971.

Fig. 6-10, Plates B and D.

FEMALE: The first measurement is of the Iranian specimen followed by that of the holotype in the parenthesis as given by Arutunjan (1971).

Idiosomal setal pattern: 12A:7A/JV:ZV.

Dorsal idiosoma (Figure 6) – Dorsal shield 360 (405) long and 178 (201) wide at z_5 level, entirely reticulated; dorsal setae smooth, except for Z_5, slightly serrate; lengths j_1 25 (27), j_3 30 (33), j_4 19 (15), j_5 18 (15), j_6 23 (18), J_2 28 (21), J_5 9 (8), z_2 21 (15), z_3 33 (30), z_4 28 (24), z_5 23 (18), Z_4 38 (33), Z_5 59 (60), s_4 38 (36), s_6 38 (36), S_2 35 (39), S_4 39 (39); setae r_3 30 and R_1 35 on lateral integument; dorsal shield with four pairs of large solenostomes (gd_2, gd_6, gd_8 and gd_9).

Peritreme – Extending to level of setae z_4 and stippled (Figure 6, Plate D).

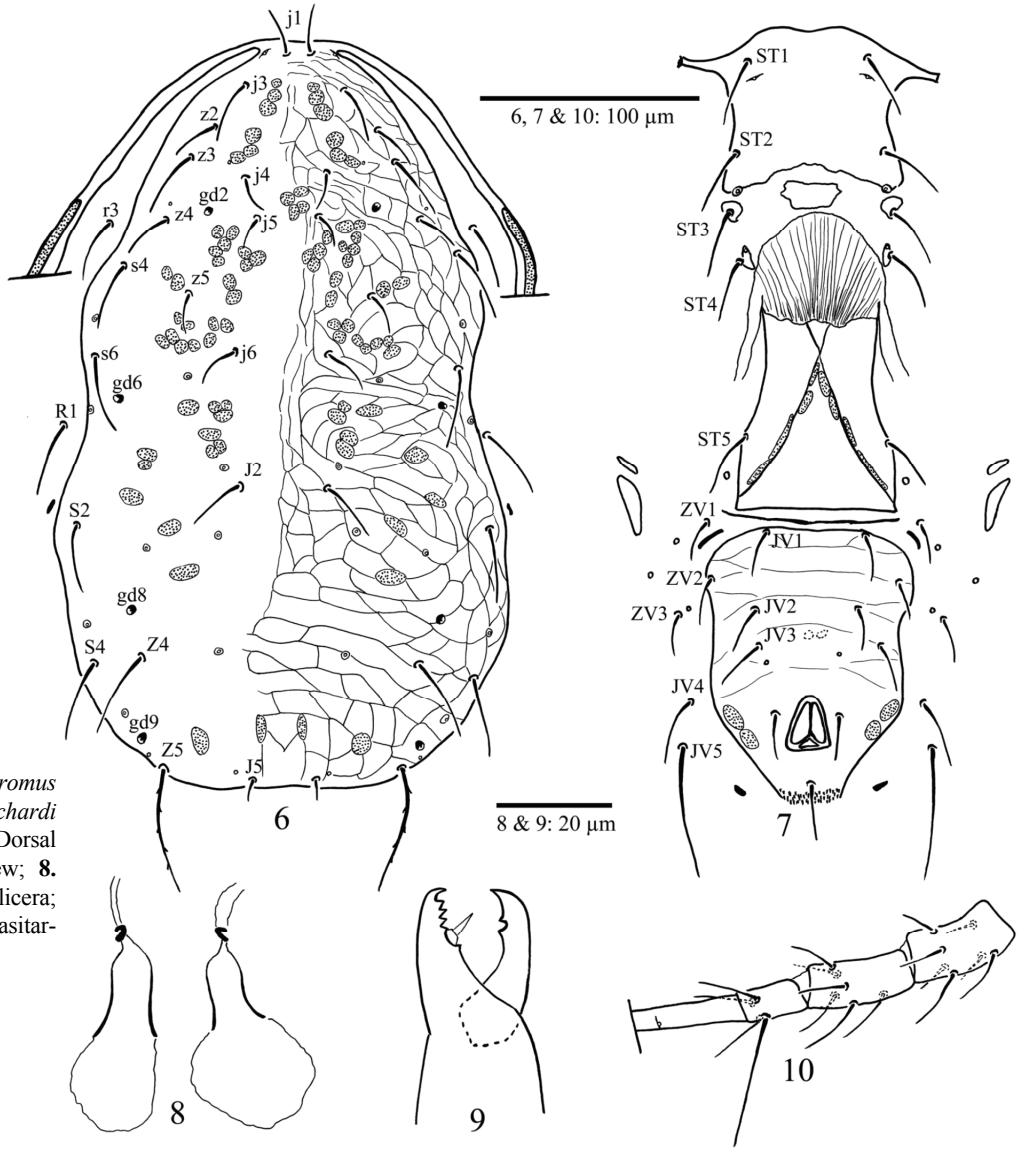


Fig. 6-10. *Typhlodromus* (*Typhlodromus*) *pritchardi* Arutunjan, female; **6.** Dorsal view; **7.** Ventral view; **8.** Spermathecae; **9.** Chelicera; **10.** Genu, tibia and basitarsus IV.

Ventral idiosoma (Figure 7) – Sternal shield smooth 55 long and 78 wide at level of setae ST_2, with two pairs of pores and two pairs of setae, ST_1 30 and ST_2 29; both setae ST_3 28 and ST_4 26 on separate shields, ST_4 associated with a pore, a piece of sclerotized trapezium-shaped plate located between sternal and genital shields; genital shield smooth, width 73 at widest point, ST_5 28; two pairs of metapodal shields, primary 30 long and accessory 13 long; ventrianal shield subpentagonal, length 128, width at level of setae ZV_2 96 and width at level of para-anal setae 83; with four pairs of preanal setae JV_1 19, JV_2 21, JV_3 23, ZV_2 20; four pairs of setae surrounding ventrianal shield on integument, JV_4 33, JV_5 63, ZV_1 21, ZV_3 20; ventrianal shield with a pair of small round preanal pores, distance between these pores 34 (Figure 7).

Spermatheca – Calyx saccular, 15 long and 8 wide, atrium c-shaped and not incorporated in calyx (Figure 8, Plate B).

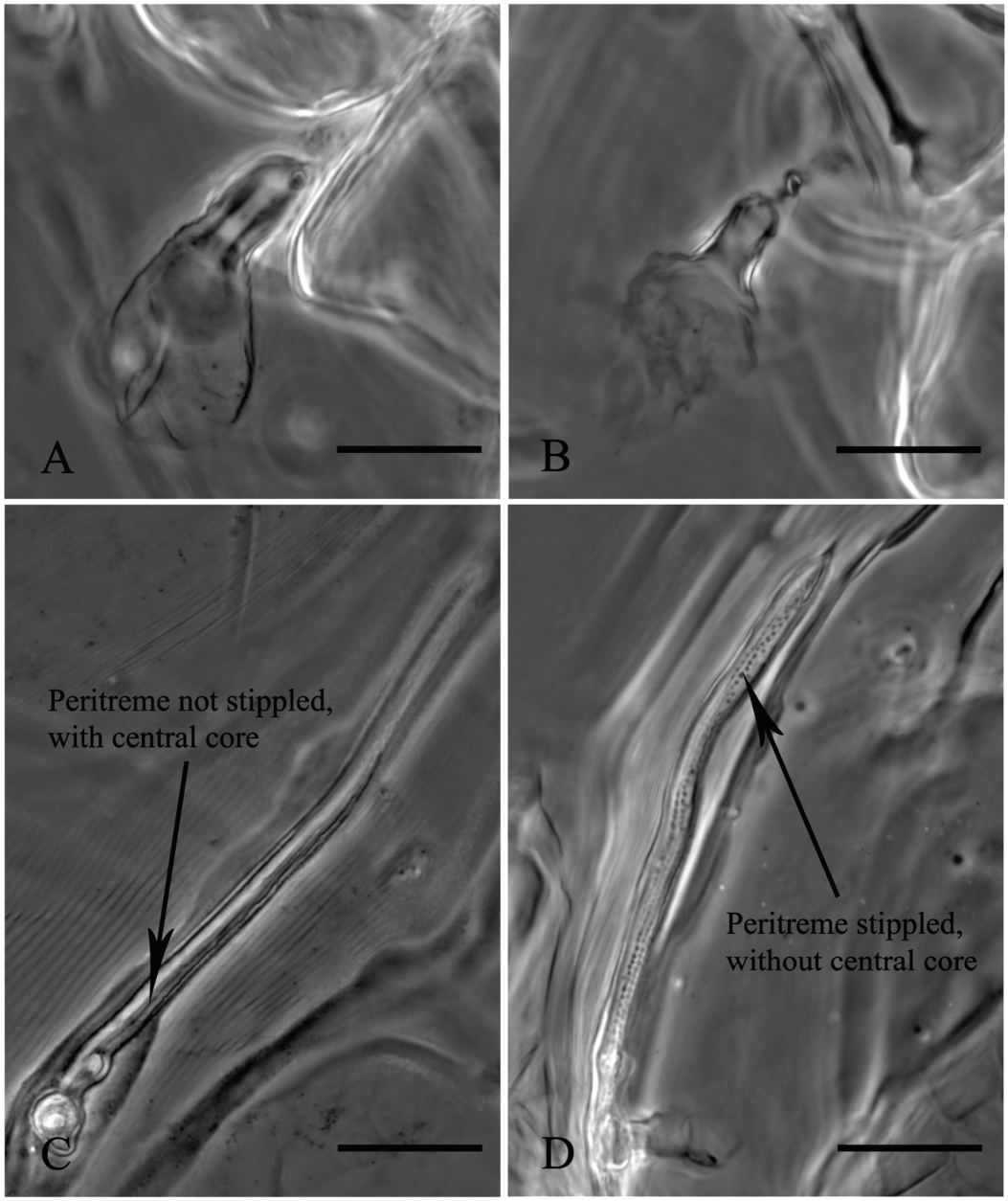
Chelicera – Fixed digit 28 long with four teeth; movable digit 29 long with two teeth (Figure 9).

Legs – Leg IV (Figure 10) with one macroseta (pd3) pointed apically (the segment of basitarsus slightly twisted), StIV 58 (57) longer than the distance between its base and the dorsal tarsal fissure 50; other legs with no macrosetae; genua and tibiae I–II–III–IV with 10–7–7–7 and 10–7–7–6 setae, respectively.

SPECIMEN EXAMINED: One female, 10 July 2011; alfalfa, Nikpay, Zanjan, Iran, collected by M. Zare.

DISTRIBUTION: Armenia (Arutunjan, 1971); Greece (Papadoulis & Emmanouel, 1997), Iran (this study); Russia (Meskov, 1999; Wainstein, 1975); Ukraine (Kolodochka, 1981).

REMARKS: In their review of the *pyri* species group, Chant and Yoshida-Shaul (1987) considered *T. pritchardi* a *species inquirendae,* because they were unable to examine the holotype, and *T. andrei* Karg (1982) as a possible synonym of the former. The only apparent difference they found was: setae Z_4 and Z_5 subequal in *T. andrei* (44 *vs* 39) while Z_5 is longer than Z_4 in *T. pritchardi* (60 *vs* 33). The length of seta Z_5 is 59 in the Iranian specimen similar to that of *T. pritchardi*. Unfortunately the length of JV_5 is not mentioned in the original description of *T. pritchardi* but in the Iranian specimen it is 63, much longer than that of *T. andrei* (46). Therefore we suggest the lengths of Z_5 and JV_5 to separate these two species. Since the Iranian specimen resembles *T. pritchardi* in all respects and the latter has priority over *T. andrei* (if conspecifics), we consider the Iranian specimen as *T. pritchardi*.



Plates A-D. *Typhlodromus* (*Typhlodromus*) *klimenkoi* Kolodochka, female: **A.** Spermatheca; **C.** Peritreme. *Typhlodromus* (*Typhlodromus*) *pritchardi* Arutunjan, female: **B.** Spermatheca; **D.** Peritreme; scale bars 20 µm.

Key to the species of the subgenus *Typhlodromus* of Iran

1. Ventrianal shield with three pairs of preanal setae; setae on dorsal shield short ..... *T.* (*T.*) *leptodactylus* Wainstein, 1961
– Ventrianal shield with four pairs of preanal setae; setae on dorsal shield longer 2
2. Dorsal shield with three pairs of prominent pores ..... *T.* (*T.*) *tubifer* Wainstein, 1961
– Dorsal shield with four pairs of prominent pores 3
3. Ventrianal shield with preanal pores ..... *T.* (*T.*) *pritchardi* Arutunjan, 1971
– Ventrianal shield without preanal pores 4
4. Peritreme short extending to level of z_4 and z_3; peritreme not stippled, with central core (Figure 3, plate C); Z_5 smooth ..... *T.* (*T.*) *klimenkoi* Kolodochka, 1980
– Peritreme longer extending anteriorly to level between z_2 and j_3; peritreme stippled (Plate D); Z_5 serrated 5
5. Calyx of spermatheca cup-shaped with neck long; seta JV_5 equal to Z_4 ..... *T.* (*T.*) *cotoneastri* Wainstein, 1961
– Calyx of spermatheca without neck; seta JV_5 longer than Z_4 6
6. Calyx of spermatheca longer than 20; Z_4 38 long ..... *T.* (*T.*) *athiasae* Porath and Swirski, 1965 [=*T.* (*T.*) *perbibus* Wainstein and Arutunjan, 1968]
– Calyx of spermatheca shorter than 20; Z_4 27 long ..... *T.* (*T.*) *laurae* Arutunjan, 1974

References

ARUTUNJAN, E.S. 1971. New species of the genus *Typhlodromus* Scheuten, 1857 (Parasitiformes, Phytoseiidae). *Doklady Akademii Nauk Armyanskoi SSR*, **52**: 305-308.

ARUTUNJAN, E.S. 1974. New genus and new species of the acarine family Phytoseiidae Berlese (Parasitiformes). *Doklady Akademii Nauk Armyanskoi SSR*, **58**: 56-59.

CHANT, D.A. & J.A. MCMURTRY 2007. *Illustrated keys and diagnoses for the genera and subgenera of the Phytoseiidae of the world (Acari: Mesostigmata)*. Indira Publishing House, USA, 220 pp.

CHANT, D.A. & E. YOSHIDA-SHAUL 1987. A world review of the *pyri* species group in the genus *Typhlodromus* Scheuten (Acari: Phytoseiidae). *Canadian Journal of Zoology*, **65**: 1770-1804.

DENMARK, H.A. & G.A. EVANS 2011. *Phytoseiidae of North America and Hawaii (Acari: Mesostigmata).* Indira Publishing House, USA, 451 pp.

FARAJI, F., J. HAJIZADEH, E.A. UECKERMANN, K. KAMALI & J.A. MCMURTRY 2007. Two new records for Iranian Phytoseiid mites with synonymy and keys to the species of *Typhloseiulus* Chant and McMurtry and Phytoseiidae in Iran (Acari: Mesostigmata). *International Journal of Acarology*, **33**: 1-9.

KARG, W. 1982. Diagnostic and systematics of predatory mites of the family Phytoseiidae Berlese in orchards. *Zoologische Jahrbucher Systematik*, **109**: 188-210.

KOLODOCHKA, L.A. 1980. New species of phytoseiid mites from the fauna of the USSR (Parasitiformes: Phytoseiidae). *Vestnik Zoologii*, **2**: 64-70.

KOLODOCHKA, L.A. 1981. New phytoseiid mites from Crimea (Parasitiformes: Phytoseiidae). II. *Vestnik Zoologii*, **5**: 16-20.

LINDQUIST, E.E. & G.O. EVANS 1965. Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina: Mesostigmata). *Memoirs of the Entomological Society of Canada*, **47**: 1-64.

MESHKOV, YU.I. 1999. Contribution to phytoseiid fauna (Parasitiformes, Phytoseiidae) of Moscow District. *Zoologicheskii Zhurnal*, **78**: 426-431.

PAPADOULIS, G.TH. & N.G. EMMANOUEL 1997. New records of phytoseiid mites from Greece, with a description of *Typhlodromus krimbasi* sp. nov. (Acarina: Phytoseiidae). *Acarologia*, **38**: 21-28.

PORATH, A. & E. SWIRSKI 1965. A survey of phytoseiid mites (Acarina: Phytoseiidae) on citrus, with a description of one new species. *Israel Journal of Agricultural Research*, **15**: 87-100.

ROWELL, H.J. & D.A. CHANT 1978. A quantitative comparison of morphological characters common to both sexes in the family Phytoseiidae (Acarina: Mesostigmata). *Canadian Journal of Zoology*, **56**: 2422-2429.

SWIRSKI, E. & S. AMITAI 1997. Notes on phytoseiid mites (Mesostigmata: Phytoseiidae) of Mt. Carmel (Israel), with descriptions of two new species. *Israel Journal of Entomology*, **31**: 1-20.

WAINSTEIN, B.A. 1961. New species of mites of the genus *Typhlodromus* (Parasitiformes: Phytoseiidae) in Georgia. *Trudy Instituta Zoologii Akademii Nauk Gruzinskoy SSR*, **18**: 153-162.

WAINSTEIN, B.A. 1975. Predatory mites of the family Phytoseiidae (Parasitiformes) of Yaroslavl Province. *Entomologicheskoe Obozrenie*, **54**: 914-922.

WAINSTEIN, B.A. & E.S. ARUTUNJAN 1968. New species of predaceous mites of the genus *Typhlodromus* (Parasitiformes: Phytoseiidae). *Zoologicheskii Zhurnal*, **47**: 1240-1244.