

ARTÍCULO:

**A new species and two new records of Phytoseiidae (Acari: Mesostigmata) from Spain.**

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ARTÍCULO:

## A new species and two new records of Phytoseiidae (Acari: Mesostigmata) from Spain

Farid Faraji, Frank Bakker & Josep Roig

### Abstract:

*Typhlodromus (Anthoseius) yasminae* sp. nov. collected from grapevine in Cataluña, Spain is described, illustrated and pictured. *Typhlodromus (Anthoseius) foenilis* Oudemans, 1930 and *Proprioseiopsis ovatus* (Garman, 1958) were collected for the first time in Spain from grapevine and citrus trees, respectively. These two species are also redescribed in this paper.

**Key Words:** Spain, new species, new records, Phytoseiidae

**Taxonomy:** *Typhlodromus (Anthoseius) yasminae* sp. nov.

### Una nueva especie y dos nuevas citas de Phytoseiidae (Acari: Mesostigmata) para España.

### Resumen:

*Typhlodromus (Anthoseius) yasminae* sp. nov. recolectada en cultivos de viña en Cataluña, España, es descrita e ilustrada. *Typhlodromus (Anthoseius) foenilis* Oudemans, 1930 y *Proprioseiopsis ovatus* (Garman, 1958) fueron recolectadas por primera vez en España en viña y cítricos, respectivamente. Estas dos especies son, también, redescritas en este trabajo.

**Palabras clave:** España, nueva especie, nuevas citas, Phytoseiidae.

**Taxonomía:** *Typhlodromus (Anthoseius) yasminae* sp. nov.

### Introduction

According to the Phytoseiidae catalog of Moraes *et al.* (2004) and recent papers by Moraza *et al.* (2005) and Moraza & Peña-Estevez (2006), 49 species of Phytoseiidae have been recorded for Spain only one of which belong to the subgenus *Anthoseius* De Leon of the genus *Typhlodromus* Scheuten and five to the genus *Proprioseiopsis* Muma. The genus *Typhlodromus* is diagnosed by having setae  $z_3$ ,  $s_6$ ,  $J_2$ ,  $S_2$ ,  $R_1$ ,  $JV_2$  and  $ZV_3$ ; setae  $z_6$ ,  $J_1$ ,  $Z_1$  and  $Z_3$  absent (Chant & McMurtry, 1994). Chant & McMurtry (1994) recognized two subgenera in *Typhlodromus*: *Typhlodromus (Typhlodromus)* and *Typhlodromus (Anthoseius)* based on the presence or absence of seta  $S_5$ . The genus *Proprioseiopsis* is well diagnosed by Chant & McMurtry (2005) and characterized as: seta  $J_2$  absent;  $j_5$  present; dorsocentral setae,  $S_2$ ,  $S_4$  and  $S_5$  short to medium length; genital and ventrianal shields usually somewhat broader; leg I usually without macrosetae; legs II and III usually with macrosetae; leg IV with 3 strong macrosetae.

During two surveys on Acari biodiversity in a vineyard and a citrus orchard in Spain, a new species and two new records have been found. In this paper, the new species belonging to the genus *Typhlodromus* (subgenus *Anthoseius*) is described, illustrated and pictured. Redescriptions also given for the species new to the Spanish mite fauna.

## Material and Methods

The studies were conducted in Cataluña, Spain; one in a vineyard in Baldomar near Artesa del Segre (Lérida province), the other in a citrus grove located near Alcanar (Tarragona province). Mites were collected by chemical inventory sampling as well as washing of leaf samples. Mites in leaf washed samples were extracted using the method described by Faraji *et al.* (2004). For chemical inventory sampling, two Mylar collecting sheets (approximately 2.80 x 1.40 m each) were placed beneath the selected trees. After application of the pesticide, the material on the sheet was collected by washing it into a centrifuge tube through a sieve (63 µm) with 70% Ethanol. The collected mites were cleared in a mixture of lactophenol and Nesbitt's solution (1:1), and mounted in Hoyer's medium on a microscope slide. The mites then were examined under a phase contrast microscope. Measurements are in micrometers (µm) and the first measurement is the mean followed by the range in parentheses. The notations used for dorsal and ventral setae follow Rowell *et al.* (1978) and Chant & Yoshida-Shaul (1991) respectively. The type and voucher material of slide-mounted specimens are deposited in National Museum of Natural Sciences, Madrid, Spain (NMNS); Muséum National d'Histoire Naturelle de Paris, France (MNHN) and National Museum of Natural History, Leiden, The Netherlands (RMNH).

## Taxonomy

### *Typhlodromus* Scheuten, 1857: 111

#### Subgenus *Anthoseius* De Leon, 1959: 258

#### *Typhlodromus* (*Anthoseius*) *yasminae* Faraji sp. nov.

Figs. 1–6

**LOCALITY AND TYPE MATERIAL.** Holotype female, *Vitis vinifera*, Baldomar (Lérida, Cataluña, Spain), 8.viii.2002, collected by Mitox (F. Bakker) and 4 paratype females with the same data as holotype deposited in NMNS; three paratype females deposited in MNHN and two paratype females in RMNH with the same data as holotype.

**ETYMOLOGY.** This species is named after the daughter of the senior author Yasmin who helped her father with the drawings.

**DESCRIPTION.** FEMALE. Five specimens measured (including holotype).

**Dorsal idiosoma.** (Fig. 1) – Dorsal shield 368 (350–375) long and 194 (193–195) wide at  $z_5$  level, entirely reticulated; 18 pairs of dorsal setae, 5 pairs of large solenostomes and 13 pairs of poroides on dorsal shield; all dorsal setae smooth except for pectinated  $Z_5$ ; lengths  $j_1$  27 (26–28),  $j_3$  33 (32–33),  $j_4$  18 (18–19),  $j_5$  18 (17–19),  $j_6$  19 (18–20),  $J_2$  22 (20–23),  $J_5$  8,  $z_2$  18 (18–19),  $z_3$  25 (24–25),  $z_4$  23,  $z_5$  17 (16–18),  $Z_4$  33 (33–34),  $Z_5$  50 (48–53),  $s_4$  25 (25–26),  $s_6$  30 (29–30),  $S_2$  31 (30–31),  $S_4$  29 (28–30),  $S_5$  16; setae  $r_3$  27 (26–28) and  $R_1$  26 (26–27) on lateral integument.

**Peritreme** Extending to level between setae  $j_1$  and  $j_3$  (Fig. 1); peritremal shield as shown in Fig. 4.

**Ventral idiosoma** (Fig. 2) – Sternal shield smooth 70 long and 73 (72–73) wide at level setae  $ST_2$ , posterior margin slightly wavy, with 2 pairs of setae and 2 pairs of lyrifissures, setae  $ST_3$  located off shield on small platelets, setae  $ST_4$  and a pair of poroides on metasternal shields,  $ST_1$  29 (29–30),  $ST_2$  29,  $ST_3$  29,  $ST_4$  26 (25–26); genital shield smooth, width 79 (78–80) at widest level; setae  $ST_5$  27 (26–28); paragenital poroides located on integument between setae  $ST_5$  and  $ZV_1$ ; a narrow integumental platelet located between genital and ventrianal shield; 2 pairs of metapodal shields, primary platelet 28 (25–30) long and accessory platelet 12 (11–14) long; ventrianal shield pentagonal, with some reticulations, length 122 (120–123), width at level of setae  $JV_2$  92 (87–95) and width at level of paranal setae 82 (78–85); with 4 pairs of preanal setae  $JV_1$  23 (22–23),  $JV_2$  21 (21–22),  $JV_3$  20 (20–21),  $ZV_2$  20 (20–21); 5 pairs of poroides and 4 pairs of setae surrounding ventrianal shield on integument,  $JV_4$  20 (19–20),  $JV_5$  54 (50–58),  $ZV_1$  25 (24–25),  $ZV_3$  13 (13–14); ventrianal shield with a pair of solenostomes ( $gv_3$ ), distance between these glandular pores slightly shorter than the distance between bases of  $JV_2$  setae (Plate E).

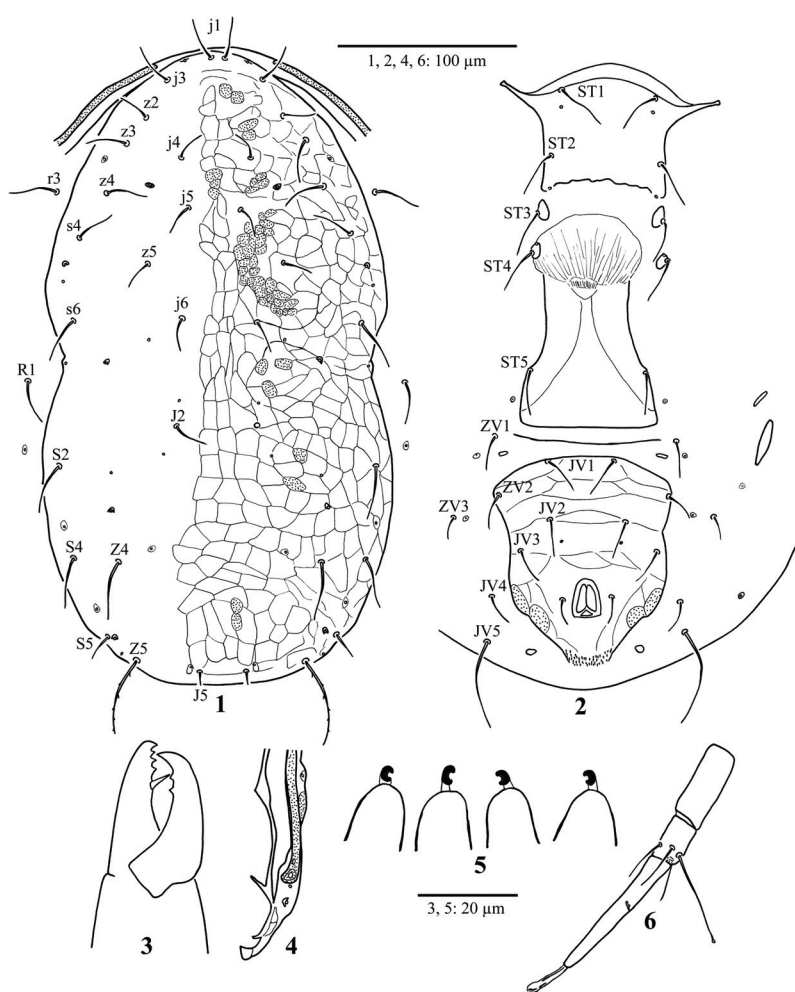
**Spermatheca** Calyx cup-shaped 13 (12–14) long and 9 (9–10) wide with a c-shaped atrium on a short stalk (Fig. 3 and Plates A, B, C & D).

**Chelicera** Fixed digit 29 (28–30) long with 3 teeth; movable digit 30 long with 2 teeth (Fig. 3)

**Legs** Macroseta on basitarsus IV 59 (58–60) relatively long and knobbed apically (Fig. 6 & Plate F), longer than the distance between its base and the dorsal tarsal slit organ 45; genua and tibiae I–II–III–IV with 10–7–7–7 and 10–7–7–6 setae, respectively.

MALE. Unknown.

**REMARKS.** *Typhlodromus yasminae* resembles *T. (A.) commenticius* Livshitz & Kuznetsov (1972) closely. However, the latter species has one tooth on the movable cheliceral digit, peritreme extends to level of setae  $z_2$  and spermatheca without stalk between calyx and atrium while in *T. yasminae* movable cheliceral digit has 2 teeth, peritreme extends to level of between setae  $j_1$  and  $j_3$  and spermatheca with a short stalk between calyx and atrium.



**Figs 1–6.** *Typhlodromus (Anthoseius) yasminae* Faraji sp. nov., female holotype, **1.** Dorsal view of idiosoma, **2.** Ventral view of idiosoma, **3.** Chelicera, **4.** Peritremal shield, **5.** Spermathecae (paratypes), **6.** Tarsus leg IV.

***Typhlodromus (Anthoseius) foenilis* Oudemans**

*Typhlodromus foenilis* Oudemans, 1930: 70

Figs. 7–11

**MATERIAL EXAMINED.** Three females, *Vitis vinifera*, Baldomar (Lérida, Cataluña, Spain), 8.viii.2002, collected by Mitox (F. Bakker), deposited in NMNS.

**DESCRIPTION.** FEMALE Three specimens measured. **Dorsal idiosoma** (Fig. 7) – Dorsal shield 363 (360–368) long and 204 (203–205) wide at  $z_5$  level, entirely reticulated; 18 pairs of dorsal setae, 5 pairs of large solenostomes and 13 pairs of poroides on dorsal shield; all dorsal setae smooth except pectinate  $Z_5$ ; lengths  $j_1$  27 (26–27),  $j_3$  30 (29–30),  $j_4$  17 (16–17),  $j_5$  15 (15–16),  $j_6$  19 (18–19),  $J_2$  20 (20–21),  $J_5$  8,  $z_2$  15 (14–15),  $z_3$  21 (21–22),  $z_4$  20 (20–21),  $z_5$  15,  $Z_4$  38 (38–39),  $Z_5$  48 (48–49),  $s_4$  23 (22–23),  $s_6$  27 (27–28),  $S_2$  31 (30–31),  $S_4$  29 (27–30),  $S_5$  19 (18–20); setae  $r_3$  25 (25–26) and  $R_1$  24 (24–25) on lateral integument.

**Peritreme** Extending to level of, or just pass bases of, setae  $j_1$ .

**Ventral idiosoma** Sternal shield smooth, 57 (56–58) long and 71 (70–72) wide at level setae  $ST_2$ , posterior margin slightly wavy, with 2 pairs of setae and 2 pairs of lyri-fissures, setae  $ST_3$  located off shield on small platelets,

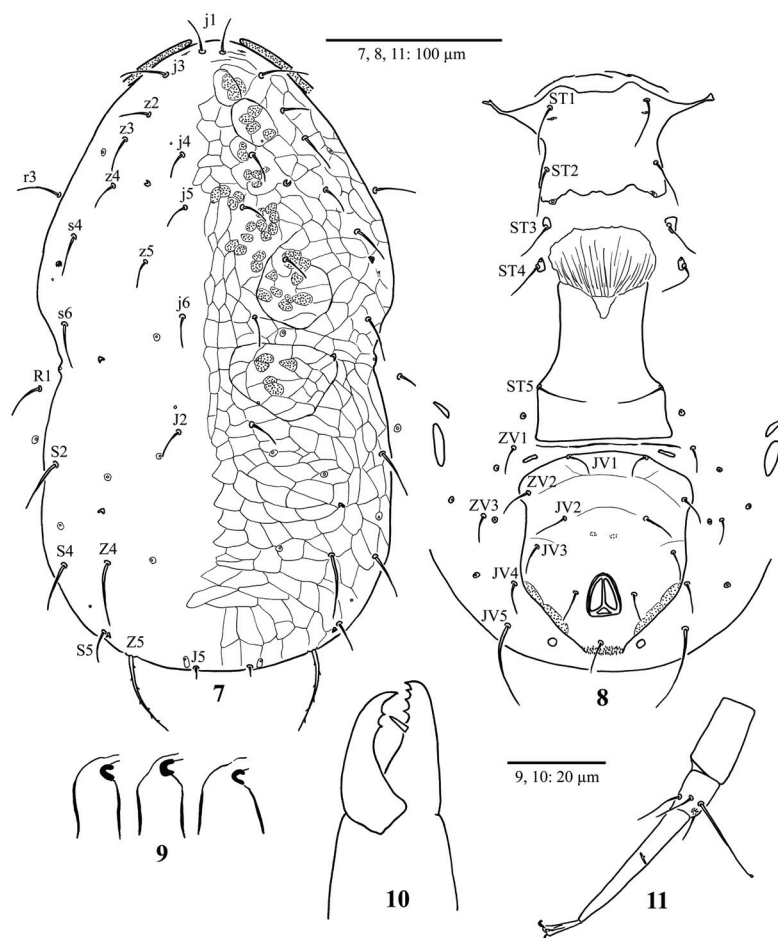
setae  $ST_4$  and a pair of poroides on metasternal shields,  $ST_1$  32 (31–32),  $ST_2$  30 (30–31),  $ST_3$  30,  $ST_4$  26 (26–27); genital shield smooth, width 81 (80–82) at widest level; setae  $ST_5$  26; paragenital poroides located on integument between setae  $ST_5$  and  $ZV_1$ ; a narrow integumental platelet located between genital and ventrianal shield; 2 pairs of metapodal shields, primary platelet 25 (25–26) and accessory platelet 12 (12–13) long; ventrianal shield pentagonal, with a few striae, anterior margin convex, length 117 (115–118), width at level of setae  $ZV_2$  93 (93–95) and width at level of paranal setae 86 (85–87); with 4 pairs of preanal setae:  $JV_1$  20 (20–21),  $JV_2$  21,  $JV_3$  19, and  $ZV_2$  20 (20–21); 4 pairs of setae surrounding ventrianal shield on integument,  $JV_4$  20 (20–21),  $JV_5$  51 (50–52),  $ZV_1$  21 (21–22),  $ZV_3$  14 (14–15) (Fig. 8).

**Spermatheca** Calyx cup-shaped 15 (15–16) long with a c-shaped atrium incorporated in the calyx (Fig. 9).

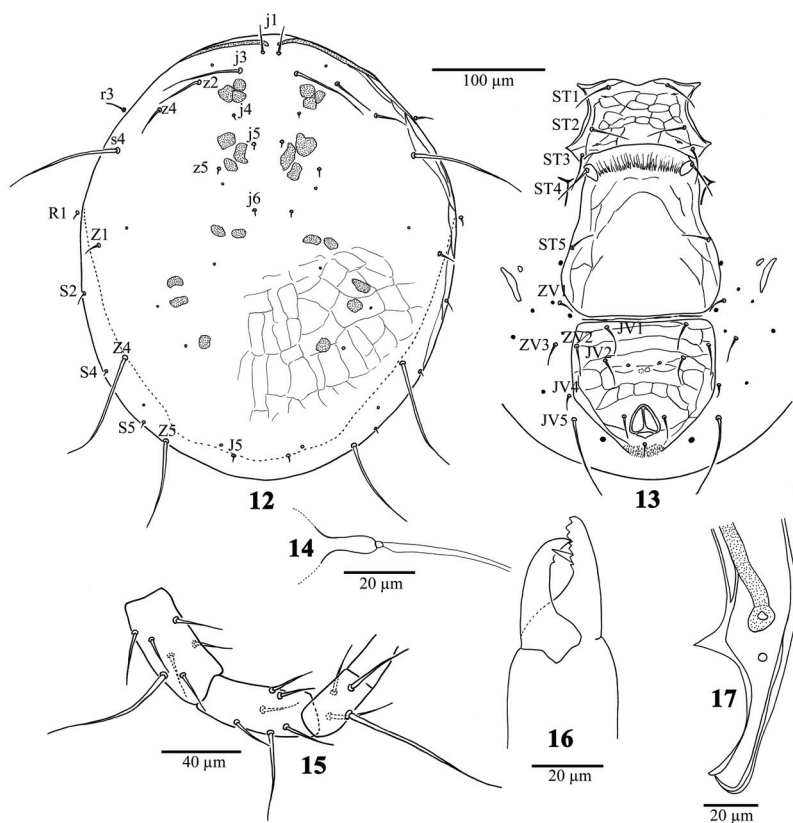
**Chelicera** Fixed digit with 3 teeth; movable digit with 2 teeth (Fig. 10)

**Legs** Macrosetae on basitarsus IV with a small apical knob, 53 (52–53) long, longer than the distance between its base and the dorsal tarsal slit organ 43 (42–43); genua and tibiae I–II–III–IV with 10–7–7–7 and 10–7–7–6 setae, respectively.

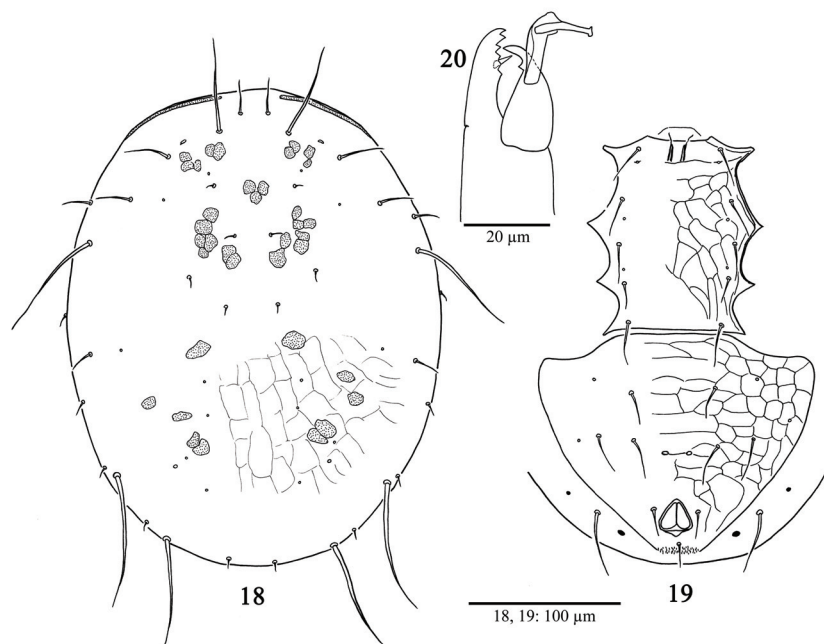
**MALE.** Not found in our sampling.



**Figs 7–11.** *Typhlodromus (Anthoseius) foenilis*, female, 7. Dorsal view of idiosoma, 8. Ventral view of idiosoma, 9. Spermathecae, 10. Chelicera, 11. Tarsus leg IV.



**Figs 12–17.** *Proprioseiopsis ova-tus*, female, 12. Dorsal view of idiosoma, 13. Ventral view of idiosoma, 14. Spermatheca, 15. Genua, tibia and basitarsus IV, 16. Chelicera, 17. Peritremal shield.



**Figs 18–20.** *Proprioiseiopsis ovatus*, male, 18. Dorsal view of idiosoma, 19. Ventral view of idiosoma, 20. Chelicera.

**REMARKS.** *Typhlodromus foenilis*, which is a new record for the Spanish mite fauna was found in the neighboring country France by Kreiter *et al.* (2000) and Tixier *et al.* (2000) under the name of *Typhlodromus (Anthoseius) cryptus* Athias-Henriot. Evans & Momen (1988) made *T. cryptus* a junior synonym of *T. foenilis*. The Spanish specimens completely fit the re-description of *T. foenilis* given by Evans & Momen (1988). The only noticeable difference is that the dorsal shield is wider in the Spanish specimens: 203–205 vs 165–180.

***Proprioiseiopsis ovatus* (Garman, 1958)**

*Amblyseiopsis ovatus* Garman, 1958: 78.

Figs. 12–20

**MATERIAL EXAMINED.** Five females and 3 males, Alcanar (Tarragona, Cataluña, Spain), citrus trees, chemical inventory sampling, 23.x.2001 (one female, 7.viii.2001), collected by Mitox (F. Bakker), all deposited in NMNS.

**DESCRIPTION.** FEMALE. Five specimens measured. (Figs 12–17)

**Dorsal idiosoma** (Fig. 12) – Dorsal shield brownish, round and smooth (only a faint network of reticulation is visible at posterior half of dorsal shield) with some scattered muscle scars, 396 (386–406) long and 331 (317–337) wide at  $j_6$  level; 17 pairs of smooth setae and 8 pairs of poroides on dorsal shield;  $j_1$  29 (26–30),  $j_3$  84 (80–89),  $j_4, j_5$  8 (7–8),  $j_6$  13 (12–14),  $J_5$  9,  $z_2$  40 (38–42),  $z_4$  30 (27–35),  $z_5$  9 (8–9),  $Z_1$  18 (17–20),  $Z_4$  104 (100–107),  $Z_5$  80 (73–88),  $s_4$  105 (103–108),  $S_2$  11 (10–12),  $S_4, S_5$  9 (8–9),  $r_3$  21 (19–22),  $R_1$  12 (11–12); setae  $r_3$  and  $R_1$  on lateral integument.

**Peritreme** Extending anterior to setae  $j_1$  (Fig. 12); peritremal shield as shown in Fig. 17.

**Ventral idiosoma** (Fig. 13) – Ventral shields well sclerotized and reticulated; all ventral setae simple; sternal

shield 51 (48–53) long along midline and 98 (95–100) wide at  $ST_2$  level with 3 pairs of setae  $ST_1$  40 (37–41),  $ST_2$  42 (39–44),  $ST_3$  37 (36–37) and two pairs of lyrifissures; metasternal plate with seta  $ST_4$  43 (41–47) and a poroid; genital shield 142 (133–150) wide (at widest point) and posteriorly truncate with setae  $ST_5$  43 (41–44); paragenital poroides on soft cuticle posterior to  $ST_5$ ; a membranous strip located between genital and ventrianal shield; ventrianal shield roughly pentagonal 124 (118–130) long and 128 (120–133) wide at  $JV_2$  level, with a pair of solenostomes ( $gv_3$ ) between  $JV_2$ , four pairs of setae:  $JV_1$  36 (34–37),  $JV_2$  37 (37–38),  $ZV_2$  39 (37–41), para-anal setae 18 (17–19) and post-anal seta 15 (15–16);  $JV_4$  19 (17–21),  $JV_5$  73 (65–75),  $ZV_1$  36 (32–38) and  $ZV_3$  22 (21–23) on soft cuticle surrounding ventrianal shield; two pairs of metapodal plates located posterior to coxae IV, primary plate 36 (30–40) and accessory plate 9 (6–10) long.

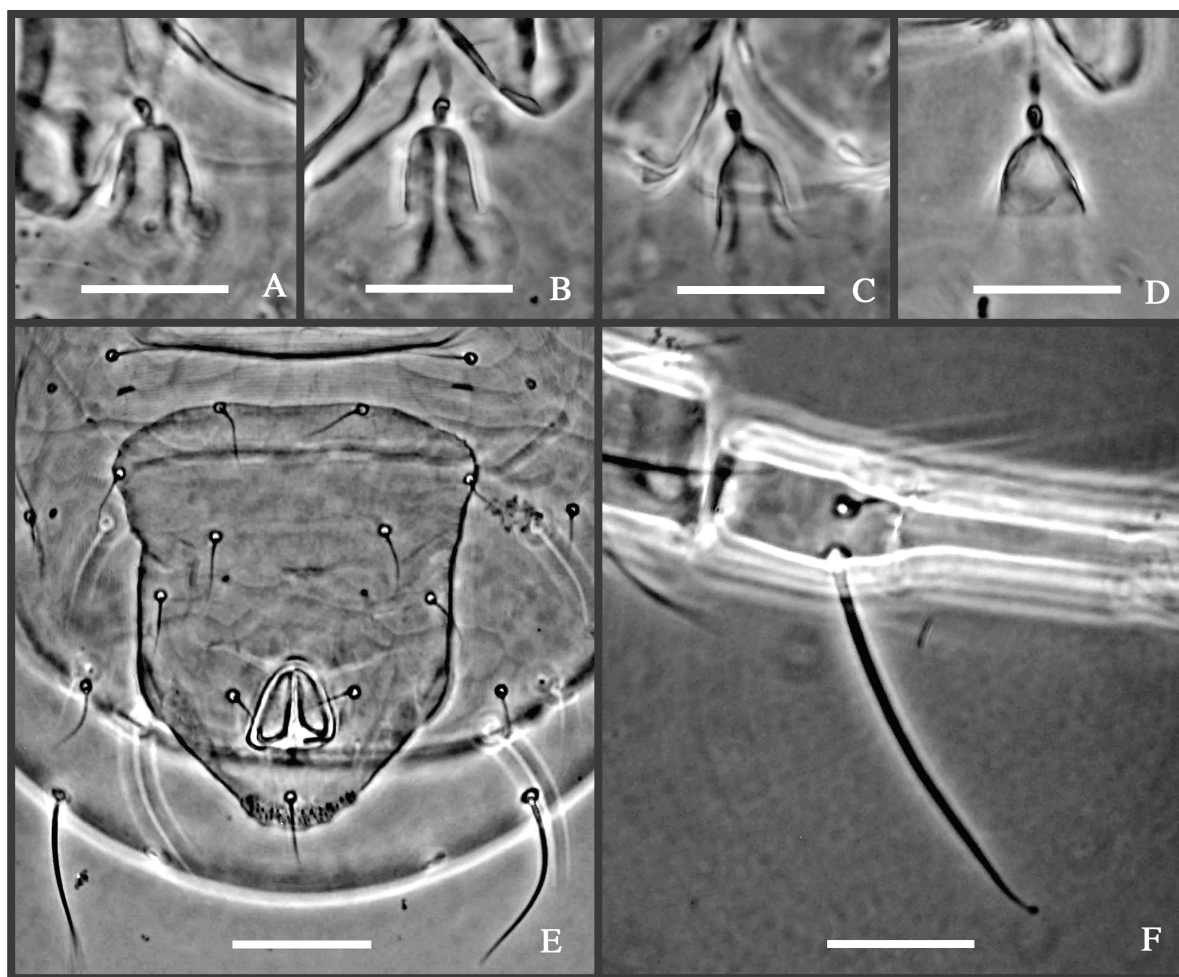
**Chelicera** Fixed digit of chelicera with 5–6 teeth; movable digit 37 (35–38) with a tooth (Fig. 16).

**Legs** Genua and tibiae I–II–III–IV with 10–7–7–7 and 10–7–7–6 setae, respectively; tarsi I without an erected seta; leg IV (Fig. 15) with three macrosetae  $StIV$  77 (76–78),  $StiIV$  36 (31–40),  $SgeIV$  61 (57–64); leg III with three shorter macrosetae  $StIII$  35,  $StiIII$  28 (27–28),  $SgeIII$  30 (28–33); macrosetae on leg II are not recognizable.

**Spermatheca** (Fig. 14) – Spermatheca with saccular calyx, calyx 21 (20–22) long.

**MALE.** Three specimens measured. (Figs 18–20)

Color, reticulation and sclerotization of body similar to that of female, dorsal shield 307 (300–310) long and 234 (225–238) wide at  $j_6$  level (Fig. 18); all dorsal setae simple and smooth, setae  $r_3$  and  $R_1$  on the shield,  $j_1$  23 (22–24),  $j_3$  59 (58–61),  $j_4, j_5, z_5$  7 (6–8),  $j_6$  12 (11–13),  $J_5$  8 (7–8),  $z_2$  28 (27–30),  $z_4$  24 (22–27),  $Z_1$  16 (16–17),  $Z_4$  84 (83–85),  $Z_5$  68 (67–70),  $s_4$  77 (71–80),  $S_2$  11 (10–11),



**Plates A–F.** *Typhlodromus (Anthoseius) yasminae* Faraji sp. nov., female, **A–D**, Spermathecae, **E**, Ventrianal shield, **F**, Tarsus leg IV with knobbed macroseta, Scale bars: A, B, C, D & F 20  $\mu$ m; E 40  $\mu$ m.

$S_4$ ,  $S_5$  8 (7–8),  $r_3$  18 (17–18),  $R_1$  11 (11–12); peritreme extending beyond  $j_3$ ; sternogenital shield 121 (120–123) long and 84 (80–87) wide at  $ST_2$  level (Fig. 19), with 3 pairs of poroides and 5 pairs of sternogenital setae  $ST_1$ ,  $ST_2$  29 (29–30),  $ST_3$  27 (26–27),  $ST_4$  28,  $ST_5$  30; ventrianal shield 137 (135–138) long and 174 (168–178) wide, with four pairs of setae,  $JV_5$  41 (40–43) long; movable digit of chelicera with one tooth and fixed digit with 5 teeth, spermatodactyl as shown in Figure 20; leg IV with three macrosetae  $StIV$  66 (64–67),  $StiIV$  27 (27–28),  $SgeIV$  37 (36–38).

**REMARKS.** *Proprioseiopsis ovatus* was not found in our citrus leaf samples. This might indicate the presence of this species on the trunks of citrus trees close to the soil, humus, litter and grasses where the other species of *Proprioseiopsis* are usually found.

The original description of *Proprioseiopsis ovatus* (Garman, 1958) is based on material from Ecuador, intercepted at Brownsville, USA. This species was re-described by Chant & Baker (1965) on material collected in Costa Rica and Honduras, and Schuster & Pritchard (1963) on specimens collected in California,

Arizona and New Mexico, USA. Our re-description of *P. ovatus* conforms to the data provided by Moraes *et al.* (2007) on the specimens collected in sub-Saharan Africa. This species is a new record for the Spanish mite fauna.

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