Persian J. Acarol., 2025, Vol. 14, No.3, pp. 383–397.
https://doi.org/10.22073/pja.v14i3.86877
Journal homepage: http://www.biotaxa.org/pja

Article

Redescription of *Eutrombidium tehranicum* (Acari: Trombidiformes: Microtrombidiidae), with two new synonyms and remarks on related taxa

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ABSTRACT
We redescribed and illustrated *Eutrombidium tehranicum* Karimi Iravanlou, Kamali & Talebi, 2002 based on the examination of type material, and new materials collected from three provinces (Kurdestan, Kermanshah and West Azarbaijan) on new hosts of grasshoppers (Tettigoniidae and Acrididae). *Eutrombidium elborzensis* Karimi Iravanlou, Kamali & Talebi, 2002 and *E. fathipouri* Karimi Iravanlou, Kamali & Talebi, 2002 are considered junior synonyms of *E. tehranicum*. This study provides an updated and corrected description, illustrations, and host records for *E. tehranicum*, along with a discussion of its taxonomic status and distribution.

KEYWORDS: Eutrombidiinae, Karaj, Orthoptera, Parasitengona, Prostigmata, Varamin.

PAPER INFO.: Received: 01.01.2025, Accepted by: *P. Lotfollahi*, 02.02.2025, Published: 15.07.2025

INTRODUCTION

Eutrombidiinae Thor, 1935 is a subfamily within Microtrombidiidae Thor, 1935 and currently includes 13 genera (Wohltmann *et al*. 2006; Mąkol and Wohltmann 2012; Mąkol *et al*. 2017; Sevsay and Elverici 2023). *Eutrombidium* Verdun, 1909 is a genus within this subfamily which are commonly found in terrestrial habitats (Wohltmann *et al*. 2006). Larval stage parasitizes Orthoptera (Southcott 1993; Felska *et al*. 2018), whereas their postlarval stages act as predators of various invertebrates, including nematodes, other mites, and insect eggs. This predatory activity might contribute to pest populations regulation in agricultural soils (Wohltmann *et al*. 1996; Branson 2003), offering potential benefits for pest management.

Within the genus *Eutrombidium*, 18 species are known from active post-larval stages, three species both on larval and post-larval stages (*E. debilipes* (Leonardi), *E. odorheiense* Feider, these

How to cite: Faizi, F., Hajiqanbar, H., Talebi, A.A., Mehrabadi, M., Saboori, A. & Hakimitabar, M. (2025) Redescription of *Eutrombidium tehranicum* (Acari: Trombidiformes: Microtrombidiidae), with two new synonyms and remarks on related taxa. *Persian Journal of Acarology*, 14(3): 383–397.

species are considered as nomina dubia (Mąkol and Wohltmann 2012) and *E. trigonum* (Hermann)) and 24 species have been described based on larval stages only (Mąkol and Wohltmann 2012, 2013; Haitlinger 2015; Noei and Šundić 2020; Mirzaee *et al*. 2021; Kiany *et al*. 2023; Neeloor *et al*. 2024).

According to the identification key to larval *Eutrombidium* species (e.g., Noei and Šundić 2020) this genus is divided into two groups based on the morphology of the distal bilobed setae on coxae I-III: **Group A:** This group includes 18 species with lateral coxalae I and coxalae II and III being small bilobed setae with an incision in their distal half. **Group B:** This group comprises seven species with lateral coxalae I, coxalae II and III exibiting fully separated lobes and the incision extending approximatly 3/4 of the length of the scobillum from the apex. Additionally, the coxalae length in this group is larger than in the previous one (> 14 µm) (Saboori *et al*. 2000; Saboori and Nemati 2001; Saboori and Pešić 2006; Noei and Šundić 2020; Kiany *et al*. 2023; Neeloor *et al*. 2024; Hakimitabar and Saboori 2025).

Eutrombidium tehranicum was originaly described by Karimi Iravanlou *et al*. (2000) and the holotype was collected ectoparasitically on *Aiolopus thalassinus* (Fabricius) (Orthoptera: Acrididae) in Varamin, Tehran province, Iran, and three paratypes were collected from *Truxalis robusta* (Uvarov) (Orthoptera: Acrididae) in Varamin and from *Sphingonotus nebulosus persa* Saussure and *Thisoicetrinus pterostichus* (Fischer von Waldheim) (Orthoptera: Acrididae) in Karaj, Alborz province, Iran. There were some mistakes in the description and accompanying illustrations of this species were inaccurate and unclear. Also, in the same paper, *E. elburzensis* (based on four specimens) was described from *Locusta migratoria* L., *Sphingonotus rubescens* (Walker) and *Calliptamus barbarus* (Costa) (Orthoptera: Acrididae), collected from Varamin, as well as from *Oedaleus decorus* (Germar) in Karaj. Additionally, *E. fathipouri* (based on one specimen) was described from *Pyrgodera armata* (Fischer von Waldheim) (Orthoptera: Acrididae) in Karaj. In this paper, we redescribe *E. tehranicum*, providing corrected metric and meristic data based on the type specimens and new materials. We also report new host records and present new data for this species.

MATERIALS AND METHODS

The holotypes of *E. tehranicum*, *E. elburzensis* and *E. fathipouri*, deposited in the Acarological Collection, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran (ACTMU), were examined. Specimens from the new materials were detached by insect pin, preserved in 96% ethanol, cleared in a mixture of lactophenol and Nesbitt's solution (80:20, v/v), and mounted in Hoyer's medium on microscope slides (Walter and Krantz 2009). These prepared specimens were deposited in ACTMU collection.

Figures were drawn and measurements (given in micrometres) were taken using an Olympus BX51 phase-contrast microscope equipped with a Camera Lucida. Images were captured, and digital drawings were prepared using CorelDRAW version 22.0.0.412 based on the original pencil line drawings. Photographs were taken using a digital camera attached to the BX51 microscope. Terminology and abbreviations used follow Southcott (1993) and Wohltmann *et al*. (2006).

RESULTS

Family Microtrombidiidae Thor, 1935
Subfamily Eutrombidiinae Thor, 1935
Genus *Eutrombidium* Verdun, 1909

Eutrombidium tehranicum Karimi Iravanlou, Kamali & Talebi, 2002 (Figs. 1–7)

Eutrombidium elburzensis Karimi Iravanlou, Kamali & Talebi, 2002, **syn. nov.**
Eutrombidium fathipouri Karimi Iravanlou, Kamali & Talebi, 2002, **syn. nov.**

Diagnosis (based on type specimens and new materials)

Distal bilobed setae on coxae I–III, small and with incisions on their distal half; coxalae *1b*, *2b*, and *3b* bifid with two approximately equal lobes; h_2/h_1 1.25–1.45; Ti III 27–43.

Redescription

Dorsum (Fig. 1A) – Dorsal surface of idiosoma with 24 barbed setae. Dorsal setae arranged in 5 rows, c_{1-3} (c_1 on scutellum), d_{1-3}, e_{1-3}, f_{1-2} and h_{1-2}; setae c_2, d_1 and h_{1-2} arise from larger punctate circle plates, fD = 4(+2)-6-6-4-4= 24(+2) (Fig. 1A). Scutum pentagonal and punctate (in holotype the position of scutum is not good) (Figs. 1A, 4) with two chitinous bars near AM bases, bearing three pairs of non-sensillary setae (AM, AL and PL) and one pair of sensilla (S). The anterior part of the scutum convex, the posterior border concave; anterolateral borders slightly convex or straight, posterolateral borders slightly concave or stright. Sensillary setae (S) thin and nude, inserted between PL and AL. AM setiform, nude and thinner than AL and PL; AL and PL pointed and barbed, AM > AL > PL.

Two pairs of eye lenses situated laterally to posterior region of scutum, each pair located on a punctate ocular plate (35–40 long, 17–20 wide), anterior lens (diameter 10–12) larger than the posterior one (diameter 7–10). Scutellum (Figs. 1A, 4) trapezoidal in shape, punctate, anterior border of scutellum convex, lateral borders slightly concave, posterior border straight, with one pair of barbed and pointed setae (c_1) arising from anterior half.

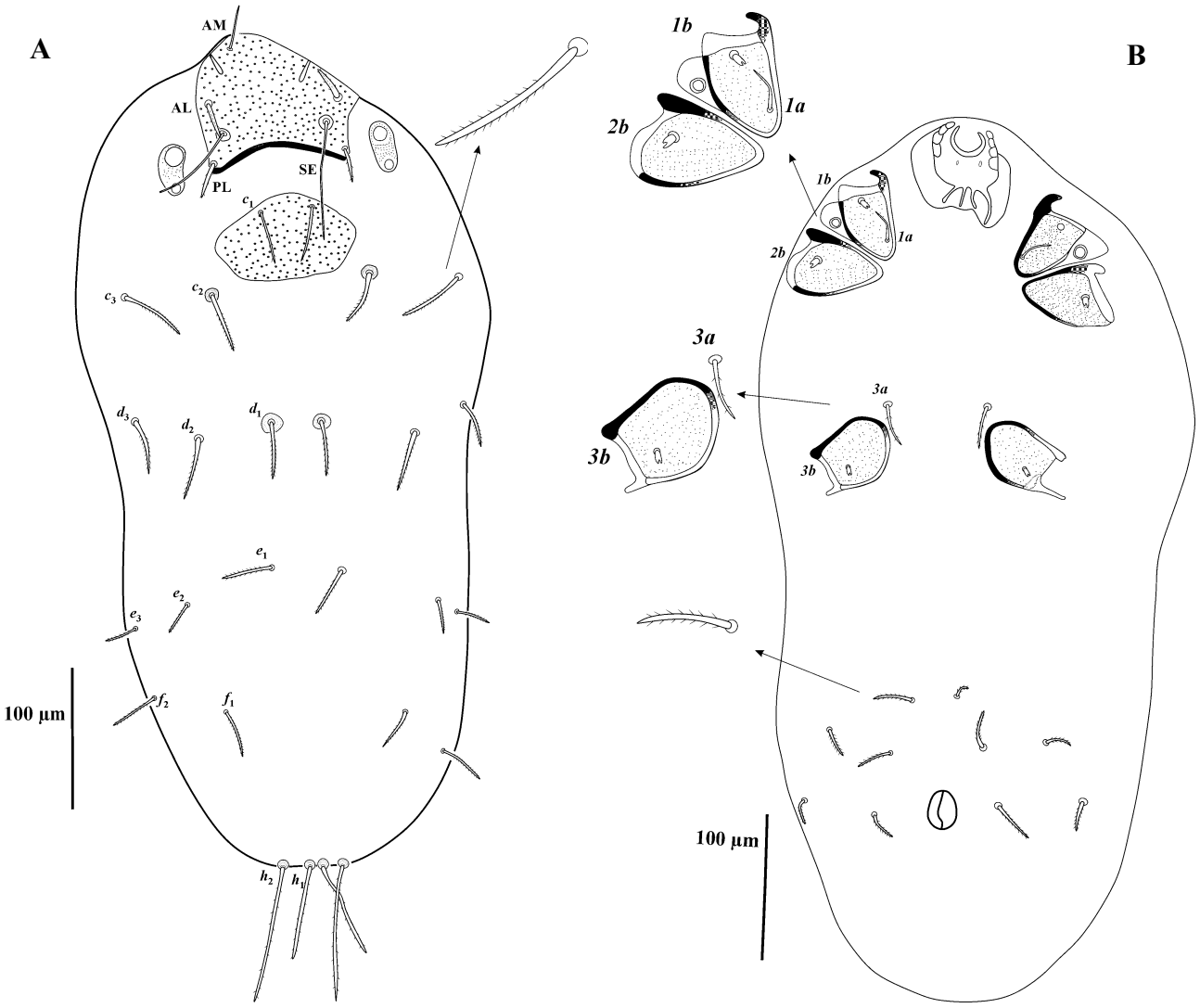

Figure 1. *Eutrombidium tehranicum* Karimi Iravanlou *et al.*, 2000 (holotype) – **A.** Dorsal view; **B.** Ventral view.

Venter (Fig. 1B) – Ventral side of idiosoma with one pair of barbed and pointed sternal setae (*3a*), five pairs of barbed and pointed setae behind coxa III (fV = 10) and an anus. Coxa I with setae *1a*, slender and nude; coxalae *1b*, *2b* and *3b* (Figs. 1B, 5) bifid with two approximately equal lobes, Claparede's organ circular (10–12) diameter. Coxal plates punctate. NDV = 24(+2) + 10 = 34 (+2).

Gnathosoma (Fig. 2) – Gnathosoma hidden beneath anterior end of idiosoma; with a horse-shoe like, dentate oral ring, hypostomal setae (*bs*) conical in shape, adoral setae (*cs*) short and pointed; chelicerae robust; cheliceral blade sickled-shaped with one tooth subterminally, 21–24 long. Palp femur and genu, each with one nude spine-like seta. Palp tibia with three nude setae; one long, the others short, and one is close to the tibial claw (paradont). Palp tibial claw bifurcate. Palptarsus with six nude setae (four are long, the others are spine-like), a solenidion and an eupathidium. fPp =0-N-N-NNN$_2$-6Nωζ.

Legs (Figs. 3A–C) – Leg segmentation formula 6–6–6. Leg setal formula: Leg I: Ta - 1ω, 1ε, 2ζ, 18n; Ti - 2φ, 1κ, 6n; Ge - 2σ, 1κ, 4n; Fe - 6n; Tr - 1n; Cx - 2n (Figs. 2, 3A); Leg II: Ta - 1ω, 1ε, 1ζ, 14n; Ti - 2φ, 5n; Ge - lσ, 1κ, 2n; Fe - 5n; Tr - 1n; Cx - 1n (Figs. 2, 3B); Leg III: Ta - 13n; Ti - 5n; Ge - l σ, 2n; Fe - 4n; Tr - 1n; Cx - 1n (Figs. 2, 3C).

Tarsi I & II with two normal claws and a claw-like empodium. Tarsal empodium elongate, longer than claws. Ta III outer claw normal, but its inner claw has been modified into smilum. Tarsus III with one scopa (with eight setules in the holotype and two of the paratypes and seven setules in the other new material) and a 10-branched lophotrix. Metric data is given in Table 1.

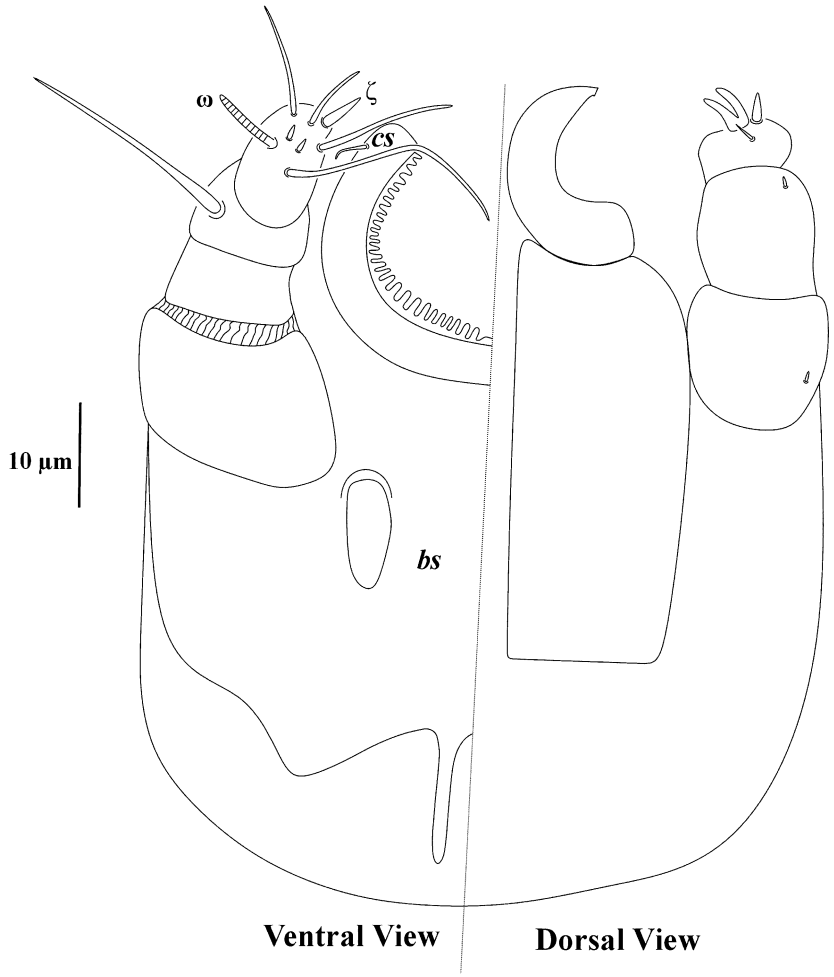

Figure 2. *Eutrombidium tehranicum* Karimi Iravanlou *et al.*, 2000 (holotype) – Dorsal (right) and ventral view (left) of gnathosoma.

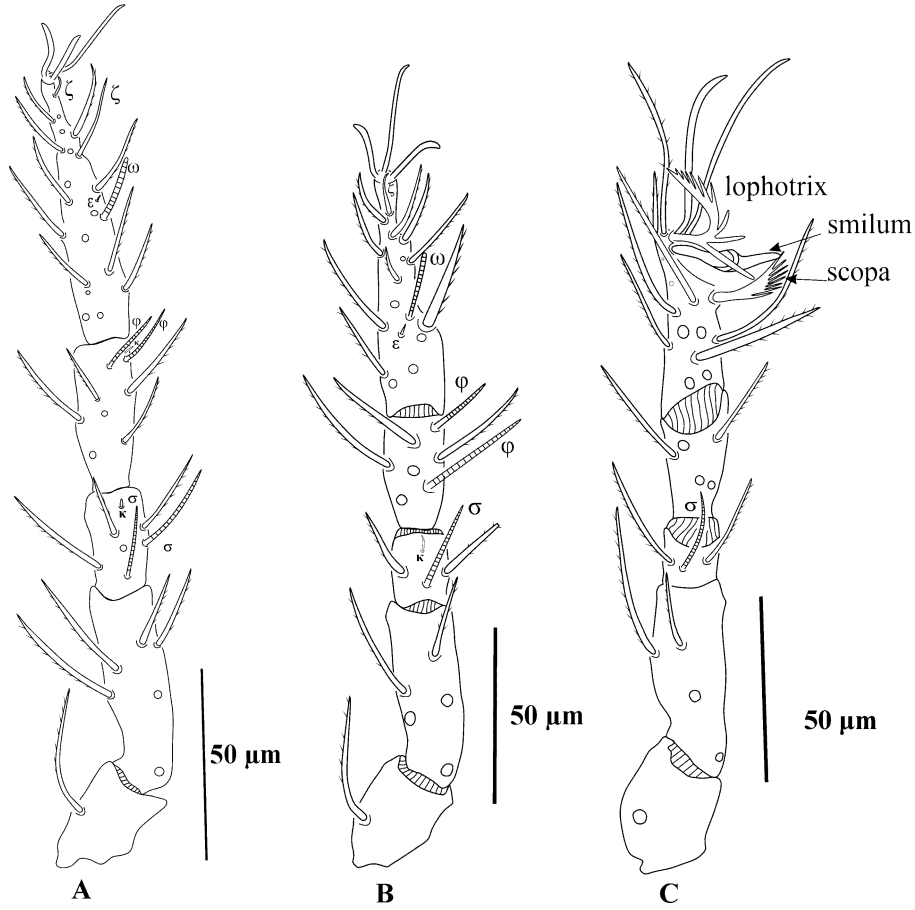

Figure 3. *Eutrombidium tehranicum* Karimi Iravanlou *et al.*, 2000 (holotype) – **A.** trochanter-tarsus I; **B.** trochanter-tarsus II; **C**. trochanter-tarsus III (hollow circles represent ventral setae).

Type material and deposition

Holotype of *E. tehranicum* (K4) (ACTMU, without accession number), on *Aiolopus thalassinus* (Fabricius,), Iran, Tehran province, Varamin city (51° 39' N, 35° 19' E, 900 m a.s.l.), 16 July 1998; holotype of *E. fathipouri* (N3H) (ACTMU, without accession number), on *Pergodera armata*, Iran, Alborz province, Karaj city (35° 53' N, 50° 58' E, 1312 m a.s.l.), 21 August 1998; holotype of *E. elburzensis* (K8) (ACTMU, without accession number), on *Locusta migratoria* (L.), Iran, Tehran province, Varamin city (51° 39' N, 35° 19' E, 900 m a.s.l.), 31 July 1998 (Fig. 6), collector J.S. Karimi Iravanlou.

Additional material examined

One larva of *E. tehranicum* (ACTMU23012025-1a) ectoparasitic on one female *Notostaurus* sp. (Orthoptera: Acrididae: Gomphocerinae) vicinity of Dezaj county, Kurdistan province, Iran, (35° 05' N, 47° 58' E, 1818 m a.s.l.), 16 September 2022; one larva (ACTMU23012025-1b) ectoparasitic on one Tettigoniidae, Darshademan village, Kermashah county, Kermashah province, Iran, (34° 41' N, 46° 53' E, 1339 m a.s.l.), 1 September 2021; one larva (ACTMU23012025-1c) ectoparasitic on one female *Oedipoda* sp. (Orthoptera: Acrdidae: Oedipodinae) Guzal Bolagh village, Shahin Dezh county, West Azerbaijan province, Iran, (36° 26' N, 46° 39' E, 1700 m a.s.l.), 23 September 2022; five larvae (ACTMU23012025-1d -1h) ectoparasitic on one female *Notostaurus* sp. and one larva (ACTMU23012025-1i) ectoparasitic on female *Oedipoda* sp., Chuin village, Marivan county, Kurdistan province, Iran, (35° 25' N, 46° 32' E, 1635 m a.s.l.) (Fig. 6), 23 and 6 August 2021, respectively, col. Fardin Faizi.

All specimens and the grasshopper hosts deposited in the Acarological Collection of the Department of Entomology, Faculty of Agriculture, Tarbiat Modares University (ACTMU), Tehran, Iran.

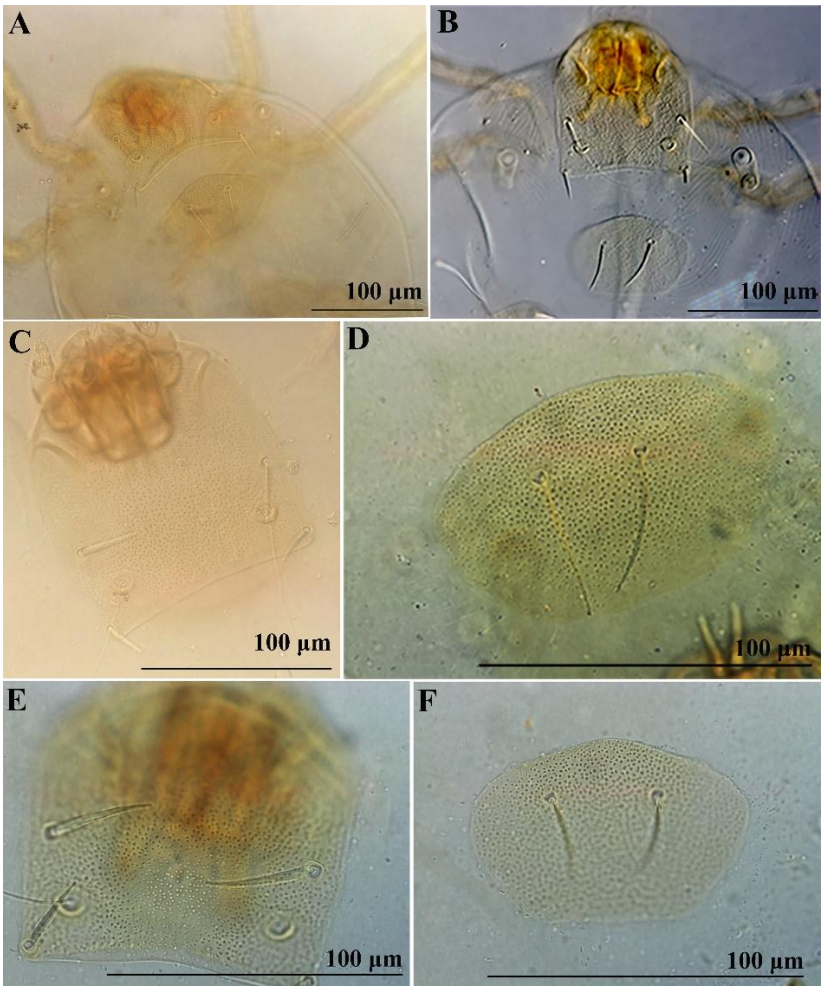

Figure 4. *Eutrombidium tehranicum* Karimi Iravanlou *et al.*, 2000 – **A.** Scutum and scutellum of *E. tehranicum* (holotype); **B.** Scutum and scutellum of *E. tehranicum* (ACTMU23012025-1d); **C** and **D.** Scutum and scutellum of *E. tehranicum* (K8), respectively; **E** and **F.** Scutum and scutellum of *E. tehranicum* (N3H), respectively.

Figure 5. Coxalae *1b*, *2b* and *3b* in *E. tehranicum* Karimi Iravanlou *et al.*, 2000 (K8).

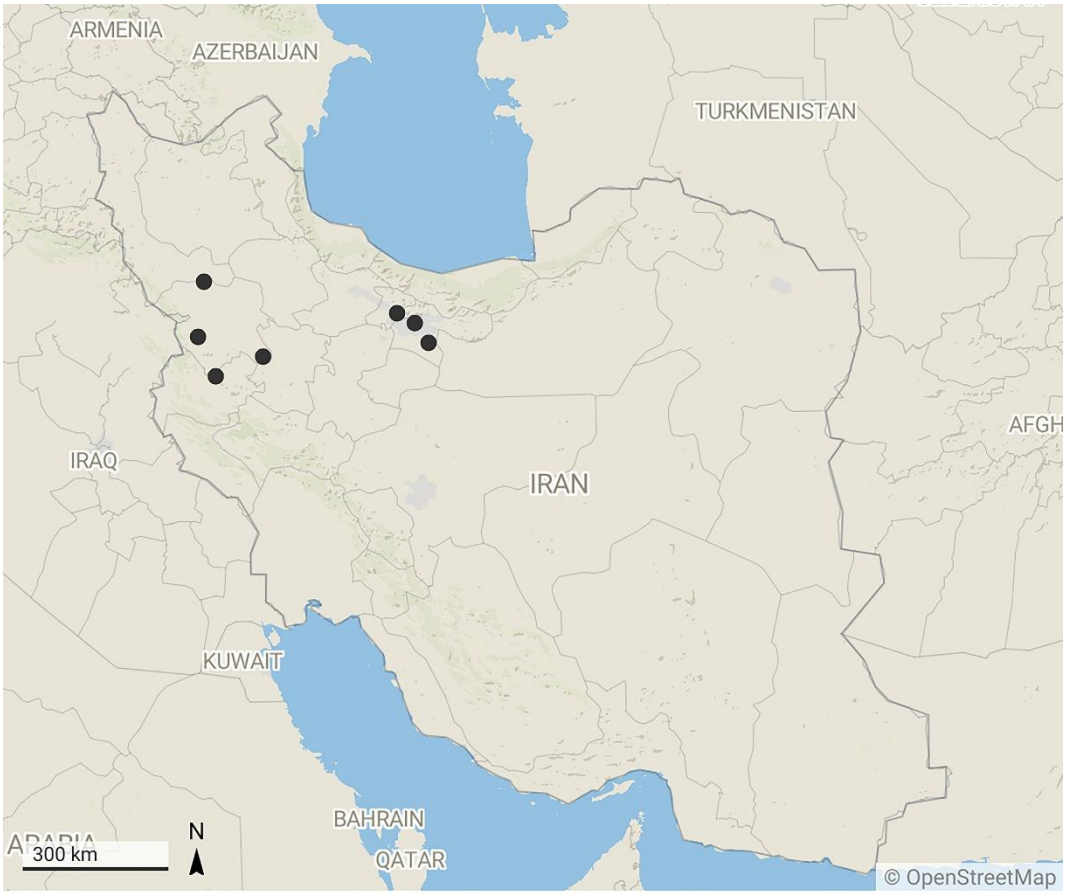

Figure 6. Distribution map of *Eutrombidium tehranicum* Karimi Iravanlou *et al*., 2000 in Iran.

Table 1. Metric data for *Eutrombidium tehranicum*: holotype of *E. tehranicum* (K4); species identified as *E. elburzensis* (K8); species identified as *E. fathipouri* (N3H) and new materials (1a–1i)

Character	K4	K8	N3H	1a	1b	1c	1d	1e	1f	1g	1h	1i	Range
IL	585	1440	1287	1750	1608	965	1435	-	1846	742	1831	866	585–1846
IW	277	950	618	940	643	569	-	470	955	346	970	386	277–970
LN	-	17	12	12	20	15	23	20	19	12	17	18	12–23
MA	41	61	55	49	59	64	57	60	62	37	60	62	37–64
AW	90	96	90	89	96	97	87	94	94	79	79	91	79–97
PW	94	103	95	96	99	96	94	99	99	94	94	96	94–103
SB	72	74	71	74	74	74	70	74	74	72	72	71	71–74
MSA	38*	59	49*	54	56	61	55	60	57	34	54	56	34–61
ASB	70	99	90	71	100	87	96	87	104	67	99	99	67–104
PSB	24	24	24	24	24	24	24	24	24	24	24	24	24
L	92	124*	114	96	124	128	120	111	128	91	123	123	91–128
W	99	111*	101*	103	106	101	100	103	104	99	99	103	99–111
AP	41	37	35*	40	40	40	38	42	39	35	42	37	35–42
SA	22	24	24	27	27	24	23	27	22	20	24	22	20–27
SP	23	24	21	24	24	22	22	22	24	20	24	24	20–24
GL	68	81	86	74	86	89	85	86	84	72	82	86	68–89
AM	31	34*	40*	32	37	42	39	40	39	-	35	35	31–42

Table 2. Continued.

Character	K4	K8	N3H	1a	1b	1c	1d	1e	1f	1g	1h	1i	Range
AL	25	27	35	30	34	34	36	32	34	25	32	30	25–36
PL	22	-	27	20	20	22	24	27	22	22	20	22	20–27
AMB	50	52	56*	55	59	59	54	55	59	56	54	59	50–59
S	82	86	-	86	85	82	83	80	79	77	82	81	77–86
PLN	32*	35*	30*	30	30	29	29	30	29	25	27	27	25–35
PSL	59*	64	63	62	62	62	62	64	62	59	62	64	59–64
PSW	99	101	89	91	94	96	97	96	92	91	91	91	89–101
QW	36	30	38	37	38	37	35	37	37	35	35	37	30–38
QL	38	42	32	49	34	38	40	42	37	22	30	37	22–49
DS min.	24	24	27	28	28	22	28	25	35	17	35	29	17–35
DS max.	47	54	54	56	53	50	52	54	54	42	54	52	42–56
***h*$_1$**	68	80	82	81	77	84	84	79	74	60	81	74	60–84
***h*$_2$**	99	112	103	103	103	106	106	-	99	82	103	106	82–112
lb	6	7	7	7	7	7	7	7	7	8	8	9	6–9
2b	7	7	6	6	6	6	7	6	6	7	7	7	6–7
3b	7	7	5	6	6	6	6	7	6	7	7	7	5–7
3a	29	32	35	32	32	34	30	32	30	24	32	29	24–35
Ta I (L)	73	86	88	89	77	86	89	74	89	72	89	84	72–89
Ti I	40	44	40	42	44	42	40	44	40	35	40	42	35–44
Ge I	26	29	28	27	30	30	30	24	30	24	27	27	24–30
Fe I	51	59	54	59	57	57	54	57	62	45	56	59	45–62
Tr I	25	29	25	30	32	30	29	30	30	27	30	32	25–32
Cx I	56	56	58	57	58	54	56	57	54	52	57	57	52–58
Leg I	271	303	293	304	298	299	298	286	305	255	299	301	255–305
Ta II (L)	69	74	67*	76	76	72	74	74	76	67	76	72	67–76
Ti II	33	37	32	35	35	37	33	35	35	30	32	35	30–37
Ge II	23	22	21	22	22	21	22	22	24	22	22	22	21–24
Fe II	50	54	46*	52	56	52	50	54	52	45	57	59	45–59
Tr II	28	30	30	32	30	30	29	30	30	27	32	32	27–32
Cx II	54	61	53	54	54	54	55	54	54	52	54	57	52–61
Leg II	257	278	249	271	273	266	263	269	271	243	273	277	243–278
Ta III (L)	43*	56	50	56	59	59	54	52	57	45	60	60	43–60
Ti III	36	39	43	37	37	37	36	37	36	27	37	37	27–43
Ge III	17	22	23	22	22	20	22	22	24	19	22	24	17–24
Fe III	53	62	58	56	62	59	59	62	62	50	62	62	50–62
Tr III	30	37	38	32	34	37	35	37	37	30	34	37	30–38
Cx III	55	56	54	54	54	54	54	54	54	52	54	57	52–57
Leg III	234	272	266	257	268	266	260	264	270	223	269	277	223–277
IP	762	853	808	832	839	831	821	819	846	721	841	855	721–855

Taxonomic notes

We examined the type specimens of *E. tehranicum*, *E. fathipouri* and *E. elburzensis*, which were collected from Tehran and Alborz proviences of Iran, two geographically close regions. Karimi Iravanlou *et al*. (2000) reported the following diagnostic characteristics for these species:

Eutrombidium fathipouri: Five normal setae on Fe I, one solenidion on each Ti I and Ge I, four normal setae on Ti II, three normal setae on Ge II, three normal setae on Ge III.

Eutrombidium elburzensis: Five normal setae on Fe I, one solenidion on each Ti I and Ge I, two solenidia on Ti II, one normal seta on Ge II and the absence of setae c_2 on dorsal idiosoma.

However, after examining the type specimens, we found that both species share the following characteristics: Six normal setae on Fe I, two solenidia on each Ti I and Ge I, five normal setae on Ti II, two normal setae on each Ge II and III, and the presence of setae c_2. Additionally, several metric data in the original descriptions were found to be incorrect; corrected values are marked with an asterisk in Table 1.

Based on these findings, and ICZN Article 24.2 (ICZN, 1999), we propose the following synonymy:

Eutrombidium fathipouri **syn. nov.** of *E. tehranicum*.

Eutrombidium elburzensis **syn. nov.** of *E. tehranicum*.

Remarks

Eutrombidium tehranicum belongs to Group A (see Introduction), characterized by the presence of small distal bilobed setae on coxae I–III, with an incision in the distal half. This group includes 15 species: *E. sigirijanum* Haitlinger, 2006 from Sri Lanka; *E. trigonum* (Hermann, 1804) from 17 European countries and Northern America; *E. feldmanmuhsame* Feider, 1977 from Israel; *E. africanum* Southcott, 1993 from Niger; *E. australiense* Southcott, 1993 from Australia; *E. indicum* Southcott, 1993 from India; *E. macfarlanei* Southcott, 1993 from Niger; *E. orientale* Southcott, 1993 from Canada and USA; *E. robauxi* Southcott, 1993 from Turkey; *E. verdense* Southcott, 1993 from Bermuda; *E. aegyptium* Karimi Iravanlou, Kamali & Talebi, 2000 from Iran; *E. sorbasiensis* Mayoral & Barranco, 2004 from Spain and Iran; *E. fortunatae* Haitlinger, 2005 from Argentina; *E. pelebinum* Haitlinger, 2007 from Benin, and *E. parishanensis* Kiany, Seiedy & Hakimitabar, 2023 from Iran (Southcott 1993; Karimi Iravanlou *et al*. 2000; Mayoral and Barranco 2004; Haitlinger 2005, 2006, 2007, 2015; Azimi *et al*. 2011; Mirzaee *et al*. 2021; Kiany *et al*. 2023).

Eutrombidium tehranicum differs from *E. sigirijanum* in the number of solenidia on Ge II (1 vs. 2 in *E. sigirijanum*), longer W (99–111 vs. 94), AM (31–42 vs. 26), SA (20–27 vs. 18), S (77–86 vs. 68), SB (71–74 vs. 64), PLN (25–35 vs. 14); from *E. feldmanmuhsame* by AL scutalae tapering (vs. lanceolate), number of solenidia on Ti I (1 vs. 3), number of normal setae on Fe I (6 vs. 5), number of normal setae on Fe II (5 vs. 6), longer SA (20–27 vs. 19), AM (31–42 vs. 21–26), LN (12–23 vs. 21), PLN (25–35 vs. 23), shorter PSL (59–64 vs. 74), PSW (89–101 vs.110–131); from *E. pelebinum* in the number of solenidia on Ge I (2 vs. 1), number of solenidia on Ti II (2 vs. 1), number of normal setae on Fe I (6 vs. 5), number of normal setae on Ge I (4 vs. 5), number of normal setae on Fe III (4 vs. 5), longer S (77–86 vs. 70–76), shorter PL (20–27 vs. 34); from *E. africanum* in the number of normal setae on Ge I (4 vs. 5), shorter PW (94–103 vs. 115–124), SB (71–74 vs. 88–91), ASB (67–104 vs. 108), W (99–111 vs. 131–140), AM (31–42 vs. 50–58), AL (25–36 vs. 47–61), PL (20–27 vs. 34–36), PSL (59–64 vs. 70–75), PSW (89–101 vs. 122–143), QW (30–38 vs. 43–61), longer PLN (25–35 vs. 10–13); from *E. fortunatae* in the number of normal setae on Ti III (5 vs. 4), Ti I and Ge I with microseta (vs. without), longer PLN (25–35 vs. 16), shorter PW (94–103 vs. 130), SB (71–74 vs. 94), W (99–111 vs. 140), AL (25–36 vs. 48), SA (20–27 vs. 32), GL (68–89 vs. 92); from *E. trigonum* in the shorter LN (12–23 vs. 29–40), AW (79–97 vs. 103–122), PW (94–103 vs. 116–130), SB (71–74 vs. 87–101), ASB (67–104 vs. 108–119), L (91–128 vs. 130–145), W (99–111 vs. 127–142), AL (25–36 vs. 40–52), AMB (50–59 vs 68–88), PSW (89–101 vs. 112–145), longer PLN (25–35 vs. 13–18); from *E. verdense* in the number of normal setae on Ge I (4 vs. 2), shorter AW (79–97 vs. 104–113), PW (94–103 vs. 119–124), SB (71–74 vs. 83–91), ASB (67–104 vs. 106–111), L (91–128 vs. 129–135), W (99–111 vs. 131–140), SA (20–27 vs. 29–30), AM (31–42 vs. 47), AL (25–36 vs. 41–48), AMB (50–59 vs. 69–77), PSL (59–64 vs. 67–81), PSW (89–101 vs. 123–143), QW (30–38 vs. 41–54), QL (22–49 vs. 55–57), longer PLN (25–35 vs. 17–20); from *E. sorbasiensis* by scutum without network ornamentation (vs. with), number of setae on dorsal idiosoma (24 vs. 22), longer PLN (25–35 vs. 13–20), shorter PSW (89–101 vs. 105–115), Cx III (52–57 vs. 60–70), PSL/PLN

(1.82–2.97 vs. 3.38–4); from *E. orientale* by the number of solenidialae on Ti I (2 vs. 1), Ti II (2 vs. 0), number of normal setae on Ti I (6 vs. 7), Ti II (5 vs. 7), Ti III (5 vs. 4), Ge I and II with microseta (vs. without), scuta without reticular patterns (vs. with), shorter AW (79–97 vs. 99–115), PW (94–103 vs. 108–127), W (99–111 vs. 125–147), SA (20–27 vs. 29–33), AL (25–36 vs. 43–48), AMB (50–59 vs. 77–93), PSW (89–101 vs. 122–145), QW (30–38 vs. 39–57), longer PLN (25–35 vs. 14–18); from *E. australiense* in the number of normal setae on Fe III (4 vs. 5), scuta without reticular patterns (vs. with), longer PSB (24 vs. 15–23), h_2 (82–112 vs. 52–79); from *E. indicum* by the number of solenidialae on Ti I (2 vs. 1), Ti II (2 vs.1), number of normal setae on Ti I (6 vs. 7), scuta without reticular patterns (vs. with), shorter LN (12–23 vs. 33), AW (79–97 vs. 100–102), SB (71–74 vs. 77–79), ASB (67–104 vs. 107), L (91–128 vs. 134), W (99–111 vs. 122–125), AM (31–42 vs. 45–48), AL (25–36 vs. 36–38), PSL (59–64 vs. 72), PSW (89–101 vs. 113–115), QW (30–38 vs. 42–45), QL (22–49 vs. 67–70), longer SP (20–24 vs. 18), PLN (25–35 vs. 19–20); from *E. robauxi* by the number of solenidialae on Ti II (2 vs.1), Ti I (6 vs. 5), number of setae on dorsal idiosoma (24 vs. 28), scuta without reticular patterns (vs. with), longer PLN (25–35 vs. 16–23); from *E. macfarlanei* by the number of solenidialae on Ti I (2 vs. 1), Ti II (2 vs. 0), Ti I (6 vs. 7), scuta without faint reticular patterns (vs. with), longer MSA (34–61 vs. 25), ASB (67–104 vs. 59), L (91–128 vs. 82), PLN (25–35 vs. 23), shorter PSL (59–64 vs. 70), QL (22–49 vs. 55); from *E. parishanensis* by scuta without reticular patterns (vs. with), shorter LN (12–23 vs. 29), MA (37–64 vs. 74–82), AW (79–97 vs. 120–122), PW (94–103 vs. 125), SB (71–74 vs. 98–103), MSA (34–61 vs. 72–77), ASB (67–104 vs. 113–134), PSB (24 vs. 26–31), L (91–128 vs. 158–161), W (99–111 vs. 144–149), AP (35–42 vs. 53), SA (20–27 vs. 36), AL (25–36 vs. 46–48), AMB (50–59 vs. 74–77), S (77–86 vs. 101–108), PSL (59–64 vs. 77), PSW (89–101 vs. 130–134), QW (30–38 vs. 50–53), Ge I (24–30 vs. 34–36), Fe I (45–62 vs. 74–77); from *E. aegyptium* by scuta without network marking patterns (vs. with), number of setae on dorsal idiosoma (24 vs. 22), longer PW (94–103 vs. 91), AL (25–36 vs. 24), S (77–86 vs. 74), PLN (25–35 vs. 17), Ta II (67–76 vs. 64), Tr II (27–32 vs. 24), shorter PSB (24 vs. 30), PSL (59–64 vs. 67), PSL/PLN (1.82–2.97 vs. 3.94), Cx III (52–57 vs. 59).

Eutrombidium sorbasiensis Mayoral & Barranco, 2004 (Fig. 7)

Noei and Šundić (2020) in the key to world species of *Eutormbidium* considered lanceolate AL setae for *E. sorbasiensis*. However, our findings (Fig. 7) show that AL setae are tapering, which is consistent with the illustration provided by Azimi *et al.* (2011) in their Figure 1. Additionally, in their work, Figures 1 and 7 in this paper clearly show the presence of a network-like ornamentation on the posteromedian part of the scutum. This species was reported from different European countries, with a wide range of metric data (Mayoral and Barranco 2004; Haitlinger 2006, 2015; Azimi *et al*. 2011), particularly in the lengths of h_1 and h_2, which is not common in microtrombidiids and it seems they belong to different species. Molecular studies can solve this taxonomic issue. For this reason, we compared our species exclusively with the type material of *E. sorbasiensis*.

DISCUSSION

The genus *Eutrombidium* currently includes 22 species described based on larval stage, six of which have been recorded from Iran. Host-parasite interactions in *Eutrombidium* mites are well-documented, particularly in relation to Orthoptera hosts. The genus *Eutrombidium* includes several species that parasitize grasshoppers and other insects during their larval stage (Southcott 1993; Mąkol and Wohltmann 2012; Felska *et al*. 2018; Mirzaee *et al*. 2021; Neeloor *et al*. 2024). In Iran, these mites have been recorded from various host species, including *Calliptamus italicus* (L.), *Anacridium aegyptium* (L.), *Ochrilidia gracilis* (Krauss), *Oedipoda caerulescens* (L.), *Aiolopus thalassinus* (F.), *Locusta migratoria* (L.) (Orthoptera: Acrididae), and *Acheta domesticus* (L.) (Orthoptera: Gryllidae) (Karimi Iravanlou *et al*. 2000; Saboori *et al*. 2000; Saboori and Nemati 2001; Azimi *et al*. 2011; Noei

and Šundić 2020; Kiany *et al*. 2023). Studies have shown that these mites can affect the survival, development, and reproductive life history of their hosts, often influencing population dynamics in natural ecosystems (Branson 2003).

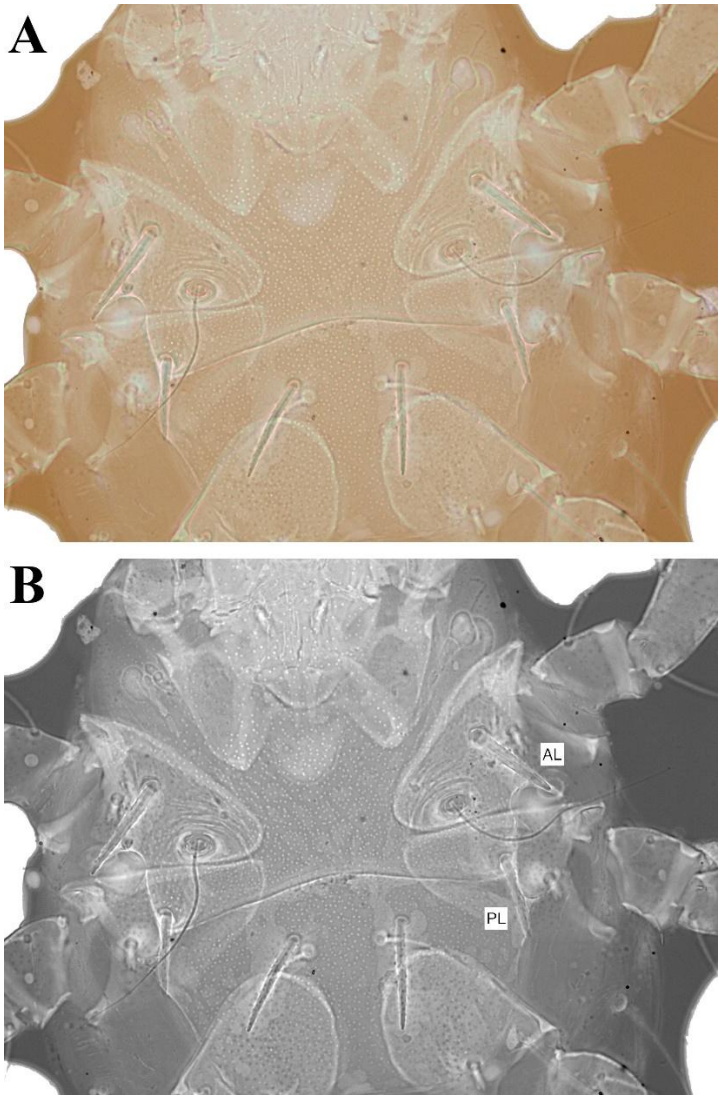

Figure 7. Scutum in *Eutrombidium sorbasiensis* Mayoral & Barranco, 2004 (paratype) – **A.** Colour picture; **B.** Black and white picture. Both pictures are out of scale.

Considering the little morphological variation, the high host diversity of *E. tehranicum* in both the original description and the present study further supports the proposed synonymy. Moreover, molecular studies are increasingly recognized as essential in resolving discontinuities in taxonomic research (Nevajas and Fenton 2000; Saboori 2016).

In this study, we report *Notostaurus* sp. and Tettigoniidae as new hosts for *E. tehranicum*. Previous research has highlighted the importance of such new host records in understanding mite-host relationships (Zhang 1998; Felska *et al*. 2018). During sampling, the largest population of *E. tehranicum* was observed from early August to late September, though individuals were recorded from early June to late October. These findings suggest a broad temporal activity period, which may be influenced by environmental conditions and host availability. Further studies across different

regions are recommended to gain a more comprehensive understanding of the host spectrum and geographic distribution of this species, as it is likely to be found in other provinces.

ACKNOWLEDGEMENTS

We are sincerely grateful to Dr. Jaime Mayoral (Department of Biological Sciences, Florida International University, USA) for sending pictures of *Eutrombidium sorbasiensis*, Dr. Majid Pedram (Department of Plant Pathology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran); Farhad Eshraghi-Mofrad (Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran) and Mahdi Tork (Jalal Afshar Zoological Museum, Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran), for their generous assistance in providing lab equipment, preparing images and identifying host grasshoppers, respectively. Also, we would like to acknowledge the financial and equipment facilities support provided by the Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, Iran.

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بازتوصیف *Eutrombidium tehranicum* (Acari: Trombidiformes: Microtrombidiidae) همراه با دو مترادف جدید و توضیحاتی در مورد گونه‌های مرتبط

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چکیده

در این پژوهش بر اساس بررسی نمونه‌های تایپ و نمونه‌های جدید جمع‌آوری‌شده از سه استان (کردستان، کرمانشاه و آذربایجان غربی) روی میزبان جدید ملخ‌ها (Tettigoniidae و Acrididae)، گونه *Eutrombidium tehranicum* Karimi Iravanlou, Kamali & Talebi, 2002 بازتوصیف و ترسیم شد. گونه‌های *Eutrombidium elborzensis* Karimi Iravanlou, Kamali & Talebi, 2002 و *E. fathipouri* Karimi Iravanlou, Kamali & Talebi, 2002 مترادف‌های جدید *E. tehranicum* در نظر گرفته شدند. این بررسی، توصیف، تصاویر و گزارش‌های به‌روز و اصلاح‌شدهٔ میزبان را برای *E. tehranicum* به همراه بحث در مورد وضعیت آرایه‌شناسی و پراکندگی آن ارایه می‌دهد.

واژگان کلیدی: زیرخانوادهٔ Eutrombidiinae، کرج، راست‌بالان، پارازیتنگونا، پیش‌سُفتیان، ورامین.

اطلاعات مقاله: تاریخ دریافت: ۱٤۰۳/۱۰/۱۲، پذیرش توسط پ. *لطف‌الهی*: ۱٤۰۳/۱۱/۱٤، تاریخ چاپ: ۱٤۰٤/٤/۲٤