



New records of water mite (Acari, Hydrachnidia, Torrenticolidae) species for the Turkish fauna

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ABSTRACT: In this study, torrenticolid water mite specimens collected from Kulp district (Diyarbakır, Türkiye) between 2020-2021 years were evaluated. Totaly, 15 species are determined belonging to the family Torrenticolidae. *Torrenticola* (s.str.) *laskai* Di Sabatino, 2009, *Torrenticola* (*Megalpalpis*) *persica* Pesic, 2004 and *Monatractides* (s.str.) *persicus* Pesic, 2004 are new records for the fauna of Türkiye. The male of *Torrenticola* (*Megalpalpis*) *persica* has been described for the first time.

Keywords: *Monatractides*, *Torrenticola*, new record, Kulp district, Diyarbakır, Türkiye.

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INTRODUCTION

The family Torrenticolidae Piersig, 1892 contains nearly 485 described species worldwide (Zhang et al., 2011; Fisher, 2017). Torrenticolidae is one of the common and distinctive groups of water mites, and found worldwide except Antarctica. They are heavily sclerotized, dorsoventrally flattened, and crawling rather than swimming. Most of them live in fast-flowing streams, but several species occupy lentic habitats (Fisher, 2015). Their larvae are ectoparasites of chironomids (Diptera), the adults are predators of micro-crustaceans.

Torrenticolidae comprises six genera, two of which are speciose (*Torrenticola* Piersig, 1896 and *Monatractides* Viets, 1926) and four others are less than thirty species combined (*Testudacarus* Walter, 1928; *Pseudotorrenticola* Walter, 1906; *Neoatractides* Lundblad, 1941; and *Stygotorrenticola* Pešić and Gerecke, 2014). In Türkiye, Torrenticolidae comprises 22 species in three genera (*Torrenticola* Piersig, 1896, *Monatractides* Viets, 1926 and *Pseudotorrenticola* Walter, 1906) (Erman et al., 2010, 2019).

The present study is based on the materials collected from Kulp district, Diyarbakır, Türkiye between 2020-2021 years. The water mite fauna of this region has never been studied so far. In this paper, new records of three species of Torrenticolidae are given. Moreover, the male of *Torrenticola* (*Megalpalpis*) *persica* is described for the first time.

MATERIALS AND METHODS

Mite specimens were collected by hand netting, sorted on the spot from the living material, fixed in Koenike's fluid and dissected as described elsewhere (e.g. Gerecke et al., 2007). The specimens are deposited in the research collection of the Biology Department, Bingöl University, Bingöl, Türkiye.

All measurements and the scale bars in the figures are given in micrometers (μm). The following abbreviations are used: IV-L-6 = Fourth leg, sixth segment, dL = dorsal length, H = height, L = length, P-1 = palp, first segment, vL = ventral length, W = width.

RESULTS

During a survey of the freshwater fauna of Kulp district, 15 water mite species have been identified (Table 1), including three newly recorded species for the Turkish fauna. In this section, the locality information and specimens of the recorded species from Kulp district are given, and only the descriptions of the newly recorded species from Türkiye are given here.

Family: Torrenticolidae Piersig, 1902

Genus: *Torrenticola* Piersig, 1902

Torrenticola (s.str.) *laskai* Di Sabatino, 2009

Description

Male. Idiosoma slightly ovaly, L/W 605/540 (Fig. 1B); frontal and shoulder plate long, frontal plates L/W 128/60, shoulder plate L/W 199/70, dorsal shield L/W 577/473 (Fig. 1A); subcapitulum vL 308, rostrum L 121, chelicera L 354, claw L 50, P-2 as long as P-4, ventral dactyle of P-4 located in distal part (Fig. 1C), dL P-1 41, P-2 91, P-3 56, P-4 90, P-5 20; palp total L 298; genital field L/W 168/132, Cx-I mL 130, Cx-II+III mL 108 (ratio length Cx-I/Cx-II+III 1.2), gnathosomal bay L 140, distance between genital field and excretory pore 107 (Fig. 1B); dL of leg segments I-L-1-6: 40-80-83-90-93-95 = 481, II-L-1-6: 48-82-75-94-103-105 = 507, III-L-1-6: 60-95-82-100-110-122 = 569, IV-L-1-6: 110-100-122-140-156-148 = 786.

Female. Idiosoma L/W 735/662 (Fig. 2A); frontal and shoulder plate long, frontal plates L/W 146/70, shoulder

plate L/W 211/90, dorsal shield L/W 700/557; subcapitulum vL 345, rostrum L 133 (Fig. 2C), chelicera L 415, claw L 60 (Fig. 2D), dL P-1 37, P-2 110, P-3 59, P-4 99, P-5 17; genital field L/W 185/184, Cx-I mL 132, Cx-II+III mL 40, gnathosomal bay L 190, distance between genital field

and excretory pore 190 (Fig. 2B); dL of leg segments I-L-1-6: 61-80-87-98-103-100 = 529, II-L-1-6: 70-80-83-105-113-110 = 560, III-L-1-6: 71-83-81-121-149-136 = 641, IV-L-1-6: 120-110-129-160-184-178 = 881.

Table 1. Mite species recorded from Kulp district (Diyarbakır province).

Species	Materials examined
1 <i>Monatractides</i> (s.str.) <i>aberratus</i> (Lundblad, 1941)	Karpuzlu - Mezra Stream, 27.09.2020, 2♂♂, 1♀; 04.09.2021, 1♀.
2 <i>Monatractides</i> (s.str.) <i>algeriensis</i> (Lundblad, 1941)	Balurka Stream, 19.05.2021, 2♀♀.
3 <i>Monatractides</i> (s.str.) <i>lusitanicus</i> (Lundblad, 1941)	Karpuzlu - Mezra Stream, 27.09.2020, 1♀; Ağıllı - Gomak Stream, 27.09.2020, 1♀; 04.09.2021, 5♂♂, 9♀♀; Hanzık Stream, 23.10.2021, 1♀.
4 <i>Monatractides</i> (s.str.) <i>madritensis</i> (Viets, 1930)	Şenyaylası Stream, 05.09.2021, 2♂♂; Ağıllı - Gomak Stream, 27.09.2020, 1♂.
5 <i>Monatractides</i> (s.str.) <i>persicus</i> Pesic, 2004	Kulp Stream, 10.07.2020, 1♀.
6 <i>Monatractides</i> (s.str.) <i>stadleri</i> (Walter, 1921)	Karabulak Stream, 10.07.2020, 1♂; Değirmen Stream 14.07.2020, 3♂♂, 1♀; Çağlayan Stream, 05.09.2020, 1♀; Ağıllı - Gomak Stream, 27.09.2020, 11♂♂, 6♀♀; Balurka Stream, 09.05.2021, 2♀♀; Kulp Stream, 19.06.2021, 2♀♀; Ağıllı- Gomak Deresi, 04.09.2021, 20♂♂, 29♀♀; Hanzık Stream, 23.10.2021, 3♀♀.
7 <i>Monatractides</i> (s.str.) <i>vafaei</i> Pesic, 2004	Sarum Stream, 05.09.2020, 1♂, 1♀; 24.06.2021, 1♂, 9♀♀; Soravan Stream, 05.09.2021, 1♂.
8 <i>Torrenticola</i> (s.str.) <i>barsica</i> (Szalay, 1933)	Hanzık Village, Spring, 29.08.2020, 2♀♀; Şakirhan Stream, 05.06.2021, 1♀, 3♂♂.
9 <i>Torrenticola</i> (s.str.) <i>brevirostris</i> (Halbert, 1911)	Karpuzlu - Mezra Stream, 27.09.2020, 1♀, 2♂♂; Koçkar Stream, 19.05.2021, 1♀; Kulp Stream, 19.06.2021, 1♀.
10 <i>Torrenticola</i> (s.str.) <i>dudichi</i> (Szalay, 1933)	Şenyayla, Stream, 14.07.2020, 5♀♀.
11 <i>Torrenticola</i> (s.str.) <i>laskai</i> Di Sabatino, 2009	Hanzık Stream, 29.08.2020, 1♀; Gomak Stream, 04.09.2021, 1♂.
12 <i>Torrenticola</i> (s.str.) <i>oraviensis</i> Láska, 1953	Şenyayla, Streram, 05.09.2021, 2♂♂.
13 <i>Torrenticola</i> (s.str.) <i>ungeri</i> (Szalay, 1927)	Şakirhan Stream, 18.11.2020, 1♂; Kulp Stream, 19.06.2021, 1♂; Ağıllı - Gomak Stream, 04.09.2021, 6♂♂, 1♀; Şenyaylası Stream, 05.09.2021, 4♂♂, 12♀♀.
14 <i>Torrenticola</i> (<i>Megalpalpis</i>) <i>jasminae</i> Bader, 1988	Şenyayla Stream, 05.09.2021, 2♂♂.
15 <i>Torrenticola</i> (<i>Megalpalpis</i>) <i>persica</i> Pesic, 2004	Şenyaylası Village, stream, 5.09.2021, 2♂♂.

Distribution

Bosnia and Herzegovina, Bulgaria, Czechia, France (Cor-sice), Greece, Italy and Montenegro (Di Sabatino et al., 2009, 2010). It is new record for the Turkish fauna.

Remarks

Torrenticola laskai is very similar to *T. barsica* (Szalay, 1933). Males of *T. barsica* differ from *T. laskai* in shorter

medial suture of Cx-II+III (L ratio Cx-I / Cx-II+III 1.3-1.8), shape of genital field (anteriorly slightly enlarged, forming an obtuse triangle, anterolaterally obtuse angled), in both sexes, palp segment P-2 longer than P-4. So, distinction of females of the two species may be impossible (Di Sabatino et al., 2009, 2010). The Turkish male specimen is agree with *T. laskai* by the ratio length of Cx-I / Cx-II+III, genital field paralel sides, anterior margin smoothly convex, anterolateral angles rounded, P-2 and P-4 nearly equal in length. In female P-2 slightly longer than P-4, and

the other characteristic features is agree with previously description of the species.

Torrenticola (Megapalpis) persica Pesic, 2004

Description

Male Idiosoma elongated, L/W 650 / 421 (Fig. 2A), dorsal shield L/W 615 / 370 (length/width shield 1.7), frontal plate L/W 107/49, shoulder plate L/W 178/63; Cx-I mL 119, Cx-II+III mL 90, gnathosomal bay L 113 (Fig. 2B); rostrum long, subcapitulum vL 302, chelicera basal segment L 269, claw L 41 (Figs. 2C, D); ratio basal segment/claw 6.6, P-2 longest segment (Fig. 2C); dL of palp segments P-1 48, P-2 104, P-3 40, P-4 64, P-5 20, total L 276, P-2/P-4 ratio 1.6; genital field L/W 149/110, distance between genital field and excretory pore 200, excretory pore on primary sclerotization area, ejaculatory complex L 180, proximal chamber not enlarged (Fig. 2E); I-L-6 bearing 2-3 fine setae distoventrally (Fig. 2F); dL of leg segments I-L-1-6: 35-86-81-96-98-97 = 493, II-L-1-6: 44-77-72-96-102-121 = 512, III-L-1-6: 50-90-73-108-127-143 = 591, IV-L-1-6: 116-110-120-162-174-161 = 843.

Distribution

Iran (Pesic et al., 2004). It is newly recorded species for the Turkish fauna.

Remarks

The male of *T. persica* is described for the first time in this study. Pesic et al. (2004) described *T. (Megapalpis) persica* Pesic, 2004 based on a female from Fars province (Iran). This species can be distinguished from all other Palaearctic species by the excretory pore fused with the area of primary sclerotization. It differs from *T. thori* from the short cheliceral claw. The male *T. persica* differs from *T. fagei* in the dorsal shield length/width ratio (1.3-1.5) and P-2/P-4 ratio (1.3-1.4). *T. persica* differs from *T. tenuirostris* by the relatively short cheliceral claw (ratio basal segment/claw < 4). *T. persica* differs from *T. remyi* in the combination of an elongated idiosoma (1.35-1.4), and short cheliceral claw (ratio basal segment/claw 4.8-4.9).

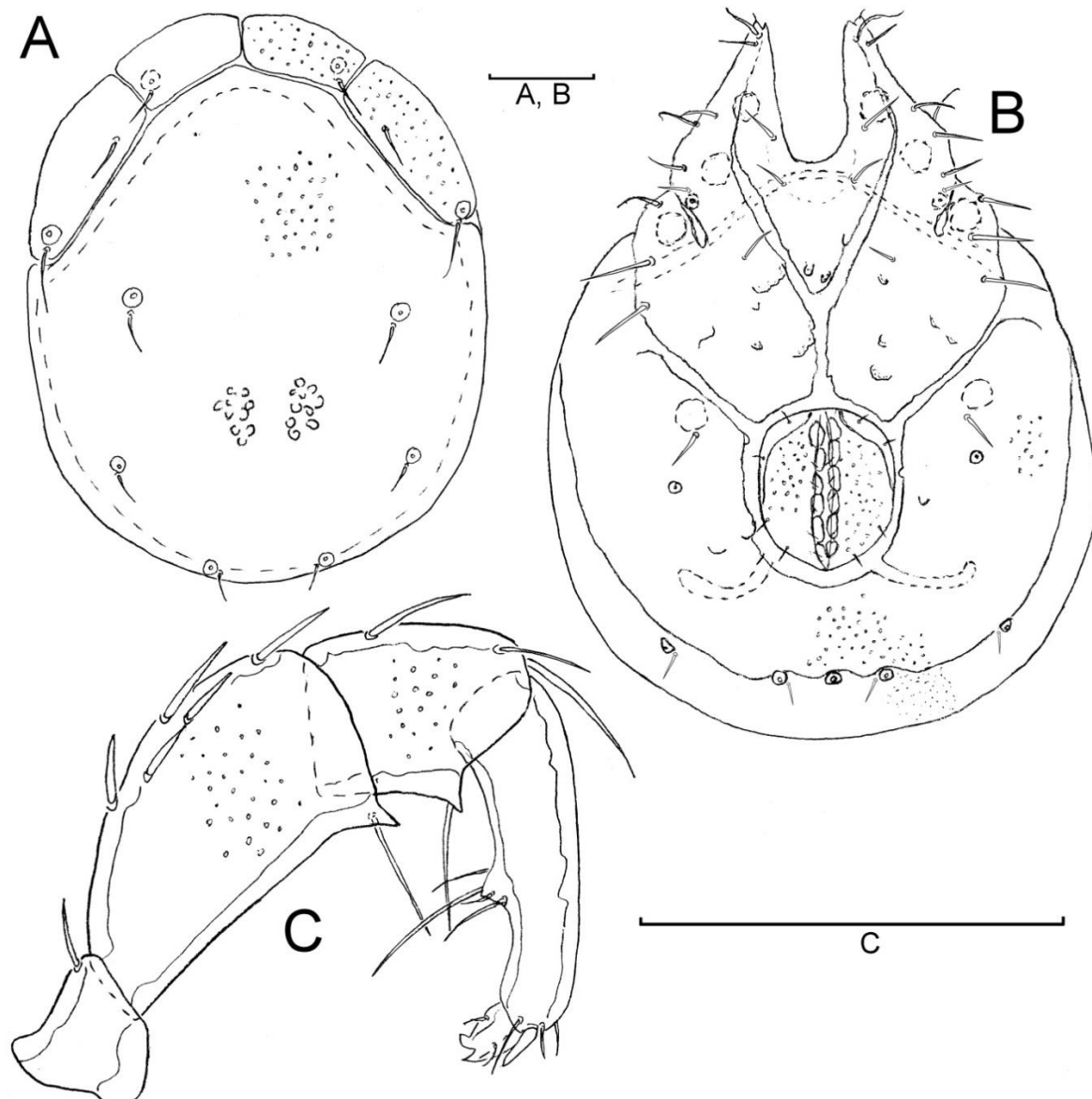


Figure 1. *Torrenticola* (s.str.) *laskai* (male). **A.** Dorsal shield, **B.** Idiosoma, ventral view, **C.** Palp, medial view (scale bars = 100).

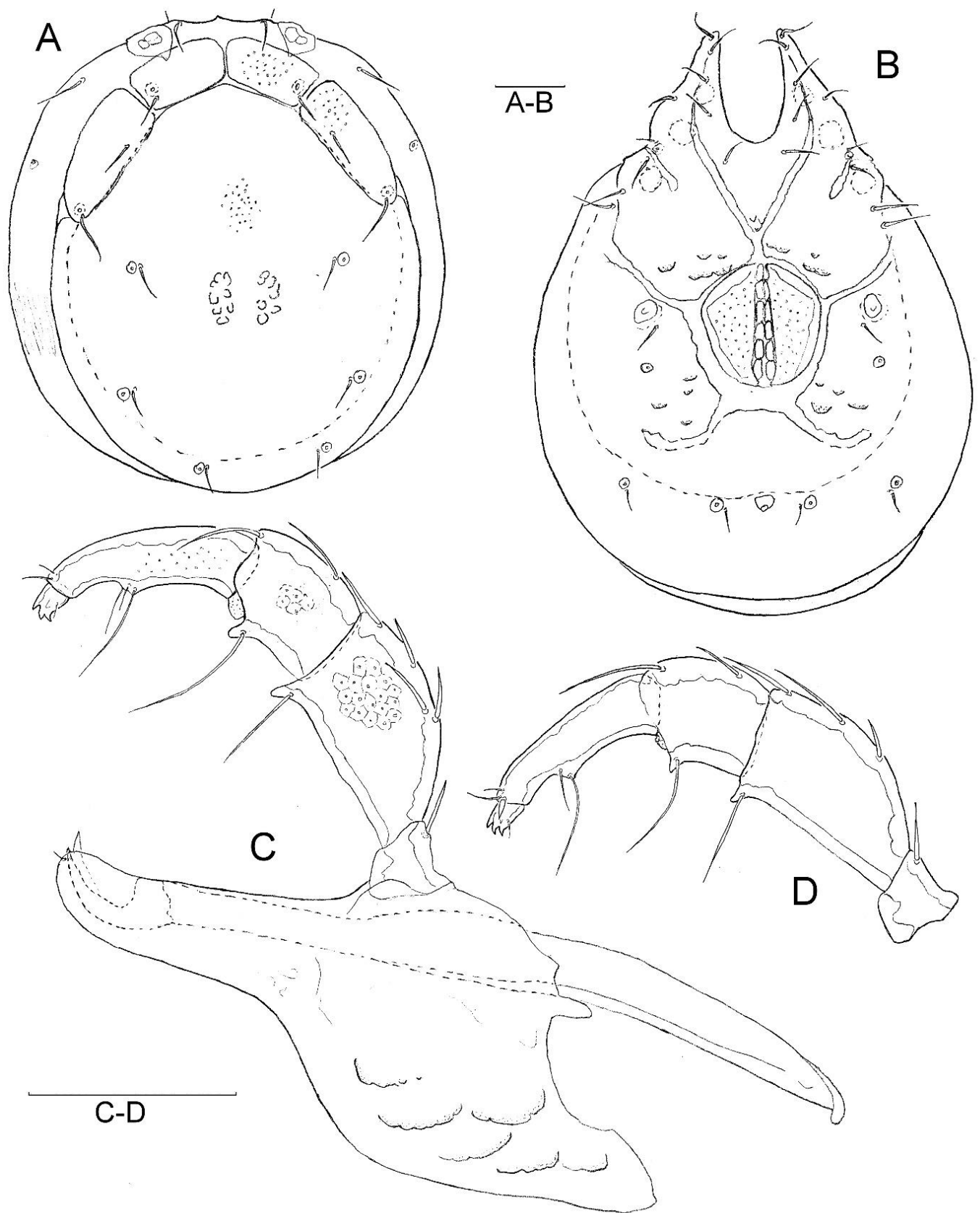


Figure 2. *Torrenticola* (s.str.) *laskai* (female). **A.** Idiosoma, dorsal view, **B.** Idiosoma, ventral view, **C.** Gnatosoma, **D.** Palp, medial view (scale bars = 100).

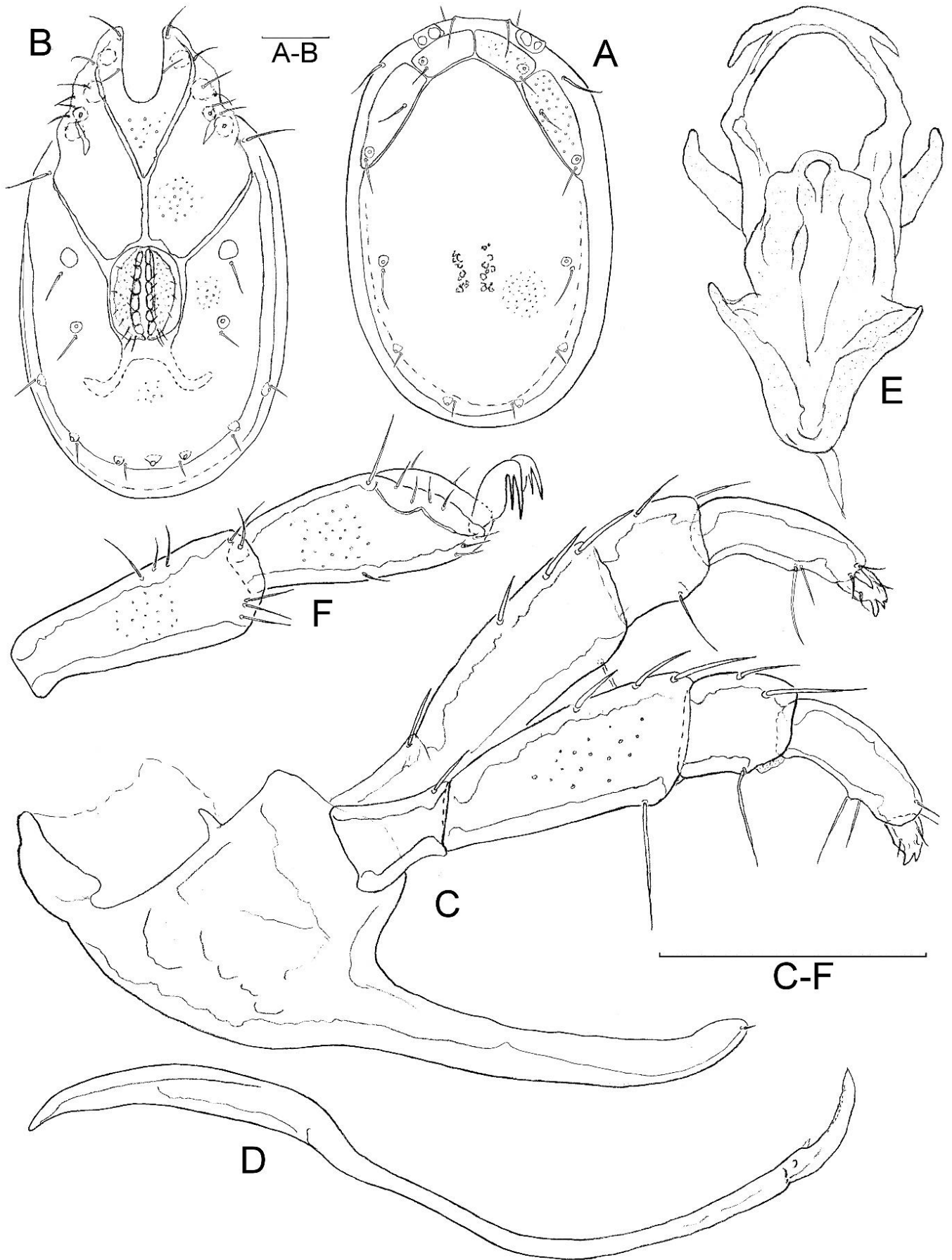


Figure 3. *Torrenticola (Megapalpis) persica* (male). **A.** Idiosoma, dorsal view, **B.** Idiosoma, ventral view, **C.** Gnatosoma, **D.** I-L-5-6 (scale bars = 100).

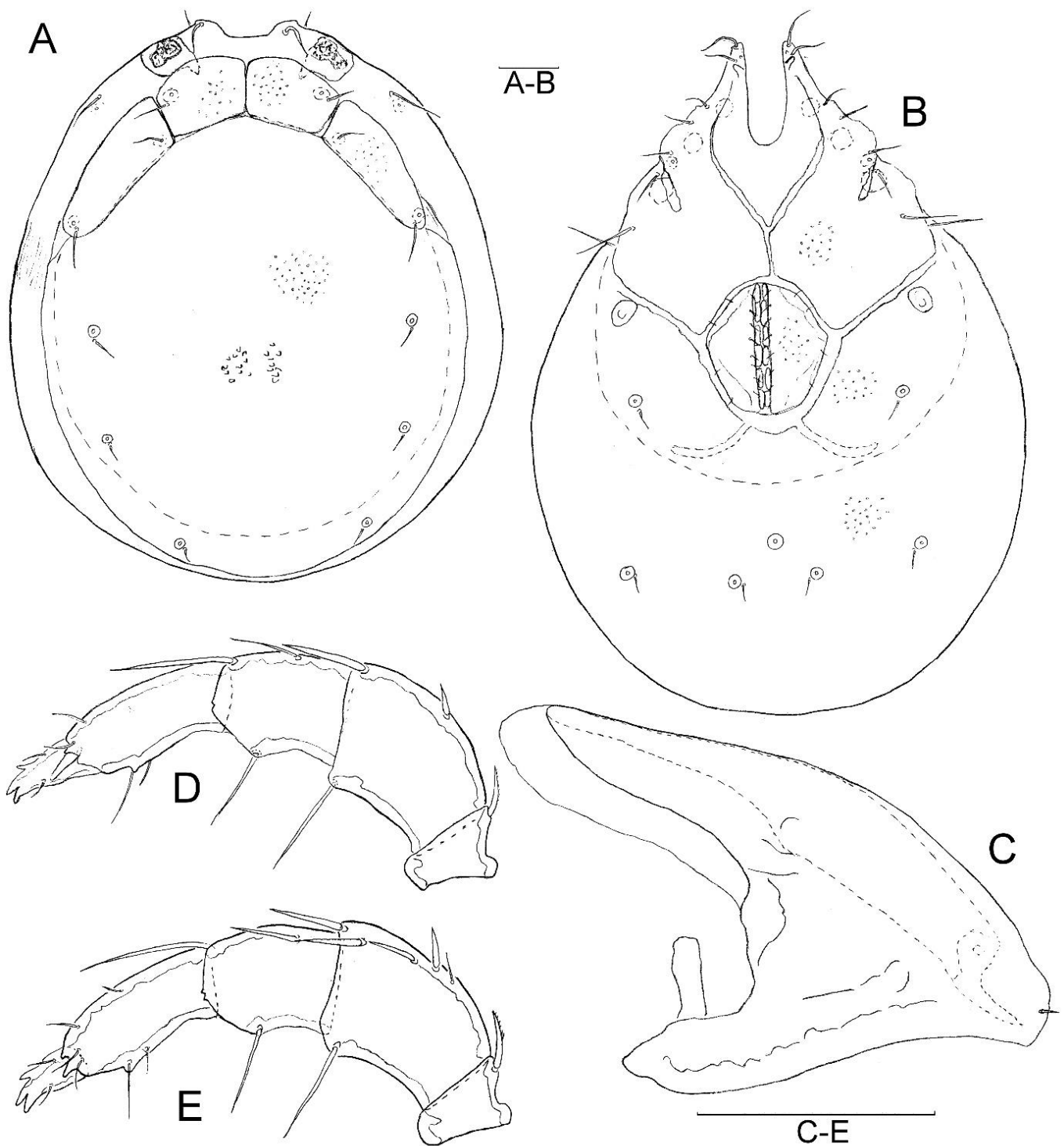


Figure 4. *Monatractides* (s.str.) *persicus* (female). **A.** Idiosoma, dorsal view, **B.** Idiosoma, ventral view, **C.** Subcapitulum, **D.** Palp, medial view, **E.** Palp, lateral view (scale bars = 100).

Genus: *Monatractides* K.Viets, 1926

***Monatractides* (s. str.) *persicus* Pesic, 2004**

Description

Female Idiosoma ovally, L/W 950/878, dorsal shield L/W 805/756, frontal plate L/W 172/115, shoulder plate L/W 268/100 (Fig. 3A), gnathosomal bay L 190, bearing a knob-shaped protrusion (Fig. 3B); subcapitulum vL 190, rostrum short (Fig. 3C), chelicera total L 252, H 43 (L/H

ratio 5.8), claw L 55; palp segments robust, distal margin of P-2 without denticles, P-3 with two denticles medi-distal margin, P-4 with a well visible denticle near the insertion of the ventral hairs (Figs 3D, E), dL of palp segments P-1 30, P-2 90, P-3 57, P-4 73, P-5 32, total L 282; genital field slightly enlarged anteriorly, L/W 240/200, Cx-I mL 135, Cx-II-III mL 80, distance between genital field to excretory pore L 232; dL of leg segments I-L-1-6: 60-94-120-147-140-120 = 681, II-L-1-6: 92-123-111-158-191-197 = 872, III-L-1-6: 83-140-144-186-216-238 = 1007, IV-L-1-6: 100-160-191-242-268-273 = 1234.

Distribution

Iran (Pestic and Saboori, 2004), new record for the Turkish fauna.

Remarks

The Turkish specimen agrees with relatively thicker chelicera and a knob-shaped protrusion at the margin of the gnathosomal bay. Differently, distal margin of P-2 not bearing a denticle. P-3 bearing two denticles distally.

DISCUSSION

So far, 22 species belonging to three genera are known in the family Torrenticolidae (*Monatractides* 8, *Pseudotorrenticola* 1 and *Torrenticola* 13) (Erman et al., 2010, 2019). This work shows that the studies should be continued to determine the water mite fauna of Türkiye. However, the Turkish record of *T. dudichi* (Szalay, 1933), which was given from the provinces of Burdur, Isparta and Antalya (Gülle et al., 2017; Durucan and Boyacı, 2020; Boyacı et al., 2012) is questionable because the description of males and females are not given. Genital field of this species is very large (length/width 180-190/140-150) (Di Sabatino et al., 2010). Boyacı (1995) recorded this species from Konya province and gave the genital field of males as 141/112. Similarly, Gülle (2010) recorded males of this species from Antalya province but measurements of the genital field do not agree with key characteristic of the species (genital field length/width 121/101). Therefore males of this species should be collected and re-evaluated according to the original description.

Authors' contributions

Murat Özdilek: Fieldwork, collection of samples, microscopic examinations (measurements, drawing), methodology, investigation. **Yunus Esen:** Identification of mites, writing-editing, methodology, investigation.

Statement of ethics approval

Not applicable.

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Conflict of interest

No potential conflict of interest was reported by the authors.

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