

Water Mites of the Subgenus *Micruracarus* Viets, 1911 (Acari: Arrenuridae) from Turkey

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Abstract: The list of the species of the subgenus *Micruracarus* Viets, 1911, in Turkey is reviewed. *Arrenurus (Micruracarus) cyprioticus* is a new record for Turkey and the second record after its original description. A short description, habitat features, including some water quality parameters are given for the species. In addition, new locality records (11 new localities from 5 provinces) for four previously recorded species are also given. In total, 9 *Micruracarus* species are known for Turkey.

Key words: Acari, water mite, new species, *Micruracarus*, Turkey

Introduction

Although some species of *Arrenurus* Dugès, 1834 are distributed in ground waters, springs, streams, rivers, temporary ponds and swamps, most species of this genus prefer stagnant waters and lakes in all continents except Antarctica. In general, they swim freely and can be found among algae, detritus and sediment. Larvae are parasitic on adults of aquatic insects and the extended distribution of many *Arrenurus* species can be explained with their parasitism on odonates. Adults are free-living and feed on small crustaceans. They are considered important for biological control (COOK 1974).

The genus *Arrenurus* is the most species-rich genus of all water mites and, to date, approximately 950 species in the world are known (SMIT 2012).

Until now, 8 species belonging to the subgenus *Micruracarus* Viets, 1911, have been recorded from Turkey (ERMAN *et al.* 2010). The aim of the present study is to review their distribution in this country.

Material and Methods

Water mites were collected by hand netting and sorted from the living material on the site, then pre-

served in Koenike's fluid (50% glycerin, 20% acetic acid, 30% water) and dissected for slide mounting in Hoyer's fluid. The specimens collected and studied are presented as "number of males / number of females". All measurements are given in µm. The following abbreviations are used: Cx- I= first coxae, H= height, L= length, W = width, P-1= palp, first segment, IV-L-5 = fourth leg, fifth segment.

Results

Family Arrenuridae Thor, 1900

Genus *Arrenurus* Dugès, 1834

Subgenus *Micruracarus* Viets, 1911

***Arrenurus (Micruracarus) bipapillosus* Halbert, 1911**

Former records from Turkey: Elazığ Province (ERMAN, ÖZKAN 2000, ÖZKAN, ERMAN 2000).

Distribution: Ireland, France, Germany, Spain, Italy.

***Arrenurus (Micruracarus) bisulcicodulus* Piersig, 1892**

Former records from Turkey: Erzurum Province (ERMAN *et al.* 2003).

Distribution: Europe.

Arrenurus (Micruracarus) forpicatus Neuman, 1880

Former records from Turkey: Erzincan Province (ERMAN *et al.* 2002).

Distribution: Europe.

Arrenurus (Micruracarus) novus (George, 1884)

New record: Afyonkarahisar Province:

23.05.2008, 26.06.2008, 22.07.2008, 23.08.2008, 30.09.2008, 28.10.2009, 38°04.51 N, 30°16.50E, 8/14, 10/8, 10/3, 2/0, 0/3, 0/2, 1007 m a.s.l., swamp area entirely covered by reeds, Çapalı Lake, collected by Y. Ö. Boyacı. **Denizli Province:** 20.07.2008, 16.08.2009, 38°12.30 N, 30°02.85 E, 11/10, 12/10, 825 m a.s.l., shallow lake with emergent plants and reeds on banks, Işıklı Lake, collected by Y.Ö. Boyacı.

Former records from Turkey: Kayseri Province (ÖZKAN *et al.* 1993, 1996); Afyon Province (ÖZKAN *et al.* 2003, BOYACI, ÖZKAN 2003); Elazığ Province (ERMAN *et al.* 2006).

Distribution: Britain, Spain, Germany, Netherlands, Morocco, Cameroon, Gambia.

Arrenurus (Micruracarus) cyprioticus Smit & Pesic, 2006

Studied material: Burdur, Alkaline (pH: 8.9 and total alkalinity 394 mg CaCO₃ l⁻¹) and salty (2.1 ppt), source feeding Lake Burdur having very high sulphure content (as 971 mg SO₄²⁻ l⁻¹) and electrical conductivity (3980 µScm⁻¹), 845 m a.s.l., 37°43.973' N, 36°06.75' E, 13.11.2012, (2/0/0), leg. İ. Gülle; 14.12.2012, (0/2/0). The material was dissected and slide mounted in Hoyer's fluid, deposited at the Science and Arts Faculty, Mehmet Akif Ersoy University, Burdur, Turkey.

Description

Male (measurements in parentheses represent the second specimen): Idiosoma greenish and its anterior edge slightly straight (Fig. 1a), L/W 837/686 (700/570). Dorsal shield roundish, except its posterior edge being straightened, L/W 423/430 (370/373). Capitular bay 198 (165). L/H P-1, 38/26 (32/22); P-2, 64/55 (55/43); P-3, 44/55 (34/43); P-4, 88/35 (77/26); P-5, 41/14 (38/12); total L 275. P-2 with 4 medial setae (Fig. 2c). Caudal area basally broad and distally narrower, posterior cauda margin in the ventral view with a closed cleft widening anteriorly to form an oval interspace, which is obscured largely by petiole in the dorsal view; caudal length 216 (Fig. 2a). Petiole placed within a caudal depression, tube-like, widened posteriorly, internally and basally sclerotized, upper margin with a hyaline collar shaped structure. Cx-I not extending beyond anterior idiosoma margin (Fig. 1b). Genital plates long and

narrow, extending onto dorsum; gonopore L 78 (65). The distance between genital field and posterior tip of the body 253 (218) (Fig. 1b). Lengths of I-leg-4-6: 151, 131, 128. Lengths of IV-leg-4-6: 191, 155, 152 (Fig. 2b). Third and fourth legs with numerous swimming setae.

Female (measurements in parentheses represent the second specimen): Idiosoma green, L/W 951/807 (852/701); anterior idiosoma margin slightly concave, rounded posterior margin slightly straightened (Fig. 3a). Dorsal shield complete and elongated, reaching the posterior margin, L/W 795/566 (690/500). Cx-I not extending to anterior idiosoma margin (Fig. 3b). Palp structure identical to that of the male. L/H P-1, 21/29 (24/31); P-2, 55/50 (51/40); P-3, 32/41 (30/40); P-4, 76/67 (74/67); P-5, 35/11 (33/8); total L 249. Genital field L/W 560/126 (545/118). Genital plates, L/W 241/102 (230/97), not reaching lateral

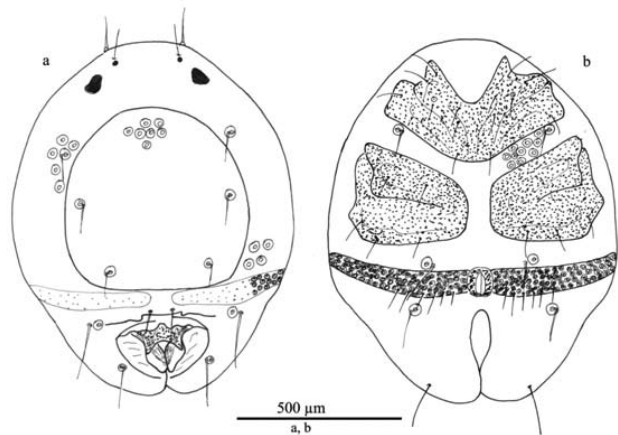


Fig. 1. *Arrenurus (Micruracarus) cyprioticus* Male: **a.** idiosoma, dorsal view; **b.** idiosoma, ventral view

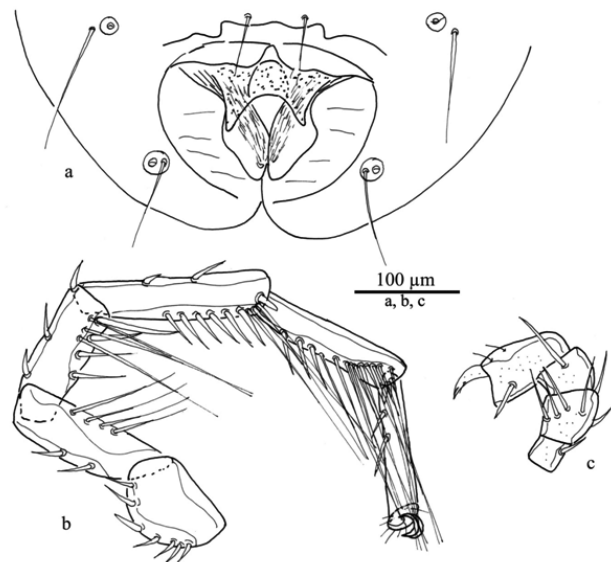


Fig. 2. *Arrenurus (Micruracarus) cyprioticus* Male: **a.** cauda; **b.** IV – Leg c palp

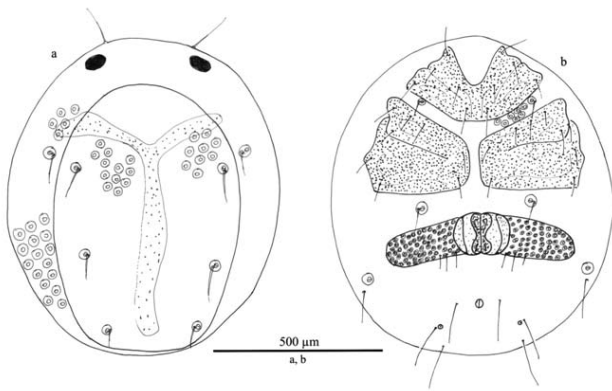


Fig. 3. *Arrenurus (Micruracarus) cyprionicus* Female: **a.** idiosoma, dorsal view; **b.** idiosoma, ventral view

idiosoma margin, connected with the gonopore. Gonopore 126 (118) long and 162 (151) wide, with two pairs of rounded sclerotizations connected by a median strip of sclerotization (Fig. 3b). Third and fourth legs with numerous swimming setae.

Remarks

It is the second record of *Arrenurus (Micruracarus) cyprionicus* after its original description (SMIT, PESIC 2006). The petiole of *A. cyprionicus* resembles that of several Afrotropical representatives of the subgenus *Micruracarus*, especially that of *A. baleensis* Smit, 2012 from Ethiopia, from which it differs by the presence of a hyaline collar-shaped structure in the upper margin and sclerotization in some parts which are absent in *A. baleensis*. Furthermore, males of *A. baleensis* have six medial setae on P-2. By presence of the collar-shaped structure and presence of sclerotized medial margins, the petiole of the new species also resembles that of *A. botswanicus* Smit, 2012 from Botswana, differing in the shape of the collar-shaped hyaline structure and the broader extend of the sclerotization. The genital area of the new species in females resembles that of *A. bechuanicus* Smit, 2012, also from Botswana, in which the genital plates encircle the gonopore (SMIT 2012).

Although all other *Micruracarus* species known from Turkey have been collected from ponds and lowland streams (ERMAN *et al.* 2010), *A. cyprionicus* was collected only from a single leakage spring with some specific features, for example, the presence of high sulphure and salt levels. The new species was found in the same spring together with *Nilotonia longipora* (Walter, 1925) and *N. turcica* Özkan & Soysal, 1989. ***Arrenurus (Micruracarus) octagonus* Halbert, 1906**

New records: Denizli Province: 05.07.2008, 37°49.06' N, 29°55.91' E, 4/10, 840 m a.s.l., numerous natural spring sources feeding Lake Acigöl, collected by Y.Ö. Boyacı.

Former records from Turkey: Elazığ Province (ERMAN, ÖZKAN 1990, 2000, ERMAN *et al.* 2006); Kayseri Province (ÖZKAN *et al.* 1996).

Distribution: Western Palaearctic.

***Arrenurus (Micruracarus) salmani* Erman & Özkan, 1990**

Records from Turkey: Elazığ Province (ERMAN, ÖZKAN 1990, 2000).

Distribution: Turkey.

***Arrenurus (Micruracarus) sinuator* (Müller, 1776)**

New record: Antalya Province: 26.07.2008, 37°04.79' N, 30°10.15' E, (9/0), 1030 m a.s.l., irrigation channel near dam outlet, Korkuteli, collected by P. Güllü. **Burdur Province:** 12.06.2008, 37°04.34' N, 29°30.84' E, 5/5, 990 m a.s.l., Evciler pond, Gölhisar; collected by Y.Ö. Boyacı. **Denizli Province:** 20.07.2008, 16.08.2009, 38°12.30' N, 30°02.85' E, 24/10, 9/3, 825 m a.s.l., shallow lake with emergent plants and reeds on banks, Işıklı lake, collected by Y.Ö. Boyacı. **Konya Province:** 14.06.2008, 38°20.83' N, 31°51.21' E, 3/6, 1030 m a.s.l., lake covered by algal mat, Ilgın lake, Ilgın, collected by Y.Ö. Boyacı.

Former records from Turkey: Elazığ Province (ERMAN, ÖZKAN 1990, 2000, ERMAN *et al.* 2006); Kayseri Province (ÖZKAN *et al.* 1996).

Distribution: Palaearctic

***Arrenurus (Micruracarus) walkanoffi* Viets, 1926**

New record: Afyonkarahisar Province: 21.04.2008, 23.05.2008, 26.06.2008, 22.07.2008, 23.08.2008, 30.09.2008, 28.10.2009, 38°04.51' N, 30°16.50' E, 10/3, 8/14, 15/8, 18/3, 2/0 0/3, 2/0, 1007m a.s.l., 1-2 m deep lake with rich aquatic vegetation, Çapalı Lake, collected by Y.Ö. Boyacı. **Burdur Province:** 12.07.2008, 37°00.87' N, 29°23.51' E, 2/4, 1090 m a.s.l., stream feeding dam lake, collected by Y.Ö. Boyacı. **Denizli Province:** 18.6.2008, 20.07.2008, 16.08.2009, 38°12.30' N, 30°02.85' E, 8/9, 24/10, 15/20, 825 m a.s.l., shallow lake with emergent plants and reeds on banks, Işıklı Lake, collected by Y.Ö. Boyacı. **Konya Province:** 07.07.2008, 37°45.60' N, 31°25.40' E, 4/8, 1125 m a.s.l., springs on the western bank of Lake Beyşehir, Beyşehir, collected by Y.Ö. Boyacı.

Former records from Turkey: Kayseri Province (ÖZKAN *et al.* 1993, 1996); Isparta (BOYACI, ÖZKAN 2004).

Distribution: Western Palaearctic.

Conclusions

Examination of *Micruracarus* material collected mainly from southwestern Turkey revealed the

presence of *A. (M.) cyprioticus* as a new record for Turkey, as well as 11 new locality records for the four previously recorded species from 5 provinces: *Arrenurus novus* (George, 1884) from the provinces of Afyonkarahisar and Denizli; *Arrenurus octagonus*

Halbert, 1906, from Denizli province; *Arrenurus sinuator* (Müller, 1776) from the provinces of Antalya, Burdur, Denizli and Konya; and *Arrenurus walkanoffi* Viets, 1926, from the provinces of Afyonkarahisar, Burdur, Denizli and Konya.

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