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E-ISSN: 2458-7893, <http://www.actabiologicturcica.com>*Original research***First description of the deutonymph of *Eustigmaeus turcicus* Doğan and Ayyıldız (Acari: Stigmaeidae)**Sibel DOĞAN^{1,*}, Salih DOĞAN², Orhan ERMAN³¹Erzincan Binali Yıldırım University, Vocational School of Health Services, Medical Services and Techniques, Erzincan, Turkey²Erzincan Binali Yıldırım University, Arts & Sciences Faculty, Biology Department, Erzincan, Turkey³Firat University, Sciences Faculty, Biology Department, Elazığ, Turkey

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Abstract: In this study, deutonymph stage of *Eustigmaeus turcicus* Doğan and Ayyıldız was herein described and figured based on the specimens collected from Vauk Gate (Turkey). This is the first record of the deutonymph of *E. turcicus* in the world.

Keywords: Description, Deutonymph, *Eustigmaeus*, First Record, Turkey

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Introduction

The family Stigmaeidae (Acari: Raphignathoidea) includes 33 valid genera (Khaustov, 2019). The genus *Eustigmaeus* is one of the oldest mite genera in the Stigmaeidae with 130 described species. (Fan et al., 2016; Stathakis et al., 2016; Karasu et al., 2018; Khaustov and Tsurikov, 2018; Khaustov, 2019). One of these species, *E. turcicus* was only known Turkey and given before from type locality, Erzurum, and later reported from Afyonkarahisar, Yozgat, Kütahya, Bingöl, Kelkit Valley, Erzincan, Aydın and Harşit Valley (Doğan and Ayyıldız, 2003; Doğan, 2005, 2007; Erman et al., 2007; Akyol, 2007, 2017; Özçelik et al., 2010; Dönel and Doğan, 2011; Özçelik and Doğan, 2011; Dilkaraoğlu et al., 2016; Uluçay, 2013). By now, female and male of this species were described, but its immature stages were unknown. In this study, 6 deutonymph specimens of *E. turcicus* were found from Vauk Gate (Turkey). The description and illustrations of the deutonymph specimens were given, and also its measurements for some body parts were made.

Materials and Methods

The mite specimens were extracted in litter under *Cornus* sp. and *Crataegus* sp. collected from Vauk Gate

(Gümüşhane-Bayburt Province border, Turkey) using Berlese funnels, cleared in 60% lactic acid and mounted on microscopic slides in Hoyer's medium under stereo microscope. Drawings were made with the aid of a Leica DM 4000 B phase-contrast light microscope. Body size and measurements of various structures of the body were taken in micrometers (µm) with the aid of The Leica Application Suite (LAS) Software Version 3.8. The terminology used is based on Grandjean (1944) and Kethley (1990). Specimens examined were deposited in Acarology Laboratory of Erzincan Binali Yıldırım University, Erzincan, Turkey.

Results

Family: Stigmaeidae Oudemans, 1931

Genus: *Eustigmaeus* Berlese, 1910

Eustigmaeus turcicus Doğan and Ayyıldız, 2003

Up to now, totally 155 specimens of *E. turcicus* were found from the Vauk Gate: 146 females and 3 males found by Dilkaraoğlu et al. (2016) and 6 deutonymphs by this work.

Description of the Deutonymph (n=3) (Figs 1-3)

Idiosoma ovate. Length of body 272 (250-297), 227 (206-238) wide.

Gnathosoma. 53 (51-56), chelicerae 74 (70-77) long. Subcapitulum with two pairs of adoral setae ($or_{1,2}$) and two pairs of subcapitular setae (m, n). Lengths and distance between subcapitular setae, m 7 (7-8), n 7 (7-8), $m-m$ 14 (13-15), $n-n$ 15 (14-16), $m-n$ 11 (10-11).

Dorsum (Fig. 1). Dorsal shields covered with reticulate patterns formed by the dimples. Prodorsal shield with four pairs, ophisthosomal shield with six pairs of setae; suranal shield with two pairs of setae. Eyes 10 (10-11) in diameter *Pob* absent. all dorsal body setae spinulate. Lengths and distances of dorsal idiosomal setae as follows: vi 57 (55-59), ve 59 (57-60), sci 54 (53-54), sce 49 (48-50), c_1 48 (47-49), d_1 62 (60-64), e_1 67 (62-71), f_1 52 (49-55), h_1 35 (33-36), h_2 27 (25-28), $vi-vi$ 26 (23-28), $ve-ve$ 78 (72-82), $vi-ve$ 25 (23-27), $sci-sci$ 127 (120-133), $ve-sci$ 23 (20-25), $sce-sce$ 165 (157-171), $sci-sce$ 31 (30-33), c_1-c_1 43 (42-44), c_1-d_1 35 (33-37), d_1-d_1 60 (57-63), d_1-e_1 46 (43-48), e_1-e_1 64 (60-67), f_1-f_1 26 (22-29), e_1-f_1 19 (16-21), f_1-h_1 36 (33-38), f_1-h_2 33 (31-35), h_1-h_1 22 (21-23), h_2-h_2 43 (39-45), h_1-h_2 17 (16-17).

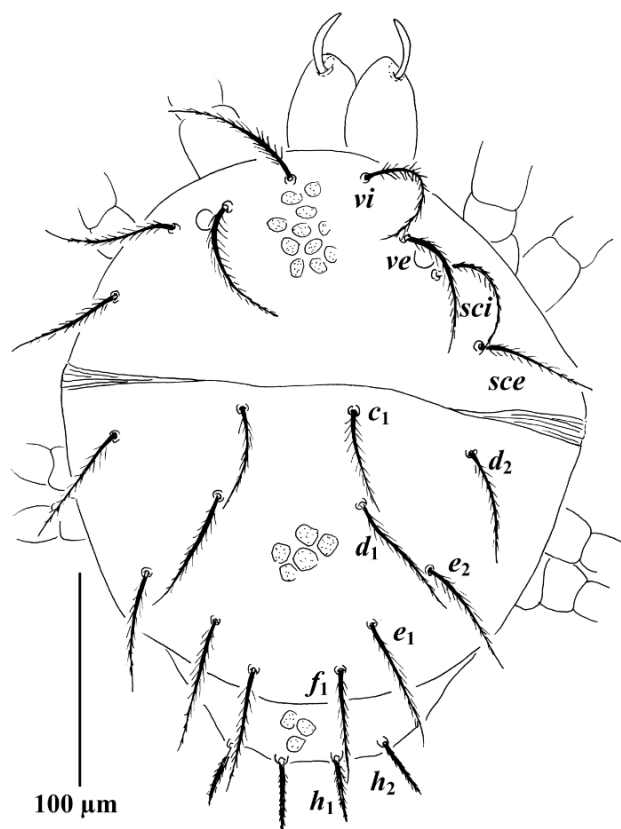


Figure 1. *Eustigmaeus turcicus* Doğan and Ayyıldız (Deutonymph). Body, dorsal.

Venter (Fig. 2). Coxisternal shields without patterns and bearing $1a, 3a$ and $4a$ setae. Humeral shields triangular and bearing setae c_2 . Aggenital shield with two pairs of setae (ag_{1-2}) and pseudanal shield with three pairs of setae. ag_1 8 (7-8), ag_2 6 (6-7), ps_1 8 (8-8), ps_2 8 (7-8), ps_3 8 (7-8).

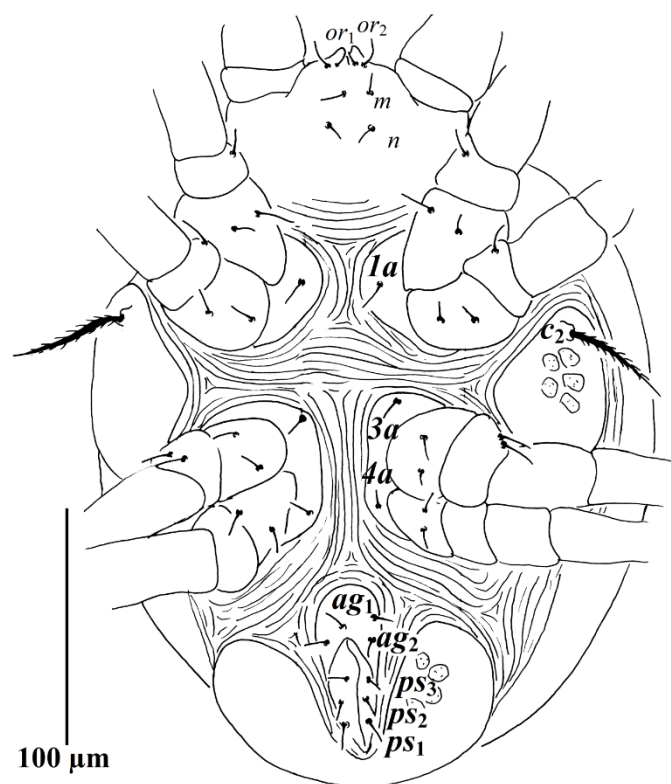


Figure 2. *Eustigmaeus turcicus* Doğan and Ayyıldız (Deutonymph). Body, venter.

Legs (Fig. 3). leg I 160 (151-167), leg II 127 (123-133), leg III 121 (119-125), leg IV 122 (115-128) long. Setal formulae of legs I-IV; coxae 2-2-2-2, trochanters 1-1-2-0, femora 6-4-3-2, genua 3(+1 κ)-2(+1 κ)-0-0, tibiae 5(+1 $\varphi\varphi$ +1 φ)-5(+1 $\varphi\varphi$)-5(+1 $\varphi\varphi$)-5(+1 $\varphi\varphi$), tarsi 13(+1 ω)-9(+1 ω)-7(+1 ω)-7.

Material examined

Six deutonymphs from litter under *Cornus* sp. and *Crataegus* sp., Vauk Gate (Turkey), 40°22'17"N, 39°49'00"E, 1605 m a.s.l., 11 April 2014.

Distribution

This species was known only from Turkey: Afyonkarahisar, Bingöl, Erzincan, Erzurum, Harşit Valley, Kelkit Valley, Kütahya and Yozgat (Doğan and Ayyıldız, 2003; Doğan, 2005, 2007; Erman et al., 2007;

Akyol, 2007, 2017; Özçelik et al., 2010; Dönel and Doğan, 2011; Özçelik and Doğan, 2011; Dilkaraoğlu et al., 2016; Uluçay, 2013).

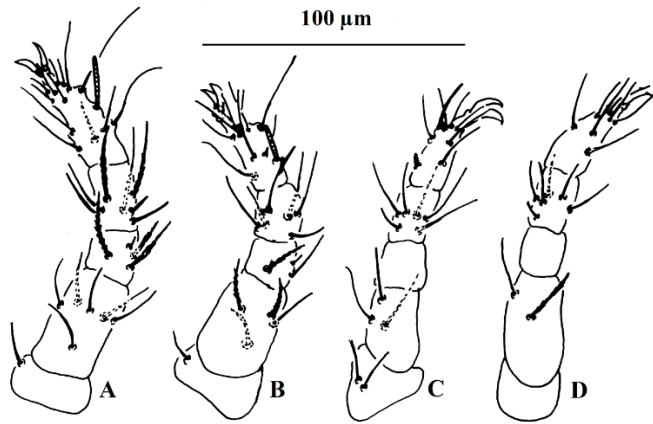


Figure 3. *Eustigmaeus turcicus* Doğan and Ayyıldız (Deutonymph). A. Leg I, B. Leg II, C. Leg III, D. Leg IV.

Discussion

This species, resembling to *Eustigmaeus pinnatus* (Kuznetsov), can be distinguished from others in the genus by the shape of the dorsal dimples and dorsal setae, and the numbers of femoral and aggenital setae. By now, female and male of this species were known (Dilkaraoğlu et al., 2016), but its immature stages were not. In this study, deutonymph of *E. turcicus* was described for the first time. The deutonymph resembles the adult female, but fewer setae on segments of the legs than those of the female (trochanter IV without setae, genu II bearing three setae (including solenidion κ), genua III and IV without setae).

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