

## A NEW SPECIES OF *EUSTIGMAEUS* BERLESE (ACARI: PROSTIGMATA: STIGMAEIDAE) FROM NORTHWESTERN IRAN

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**ABSTRACT:** A new species of *Eustigmaeus* Berlese (Acari: Prostigmata: Stigmaeidae), *Eustigmaeus azerbaijanensis* sp. n. is described and illustrated; The new species differs from the closely related species, *Eustigmaeus coronaria* Kuznetzov, 1977, in the shape of dorsal, ventral and coxal setae and number of paragenital setae. A key to the Iranian species of *Eustigmaeus* is provided.

**KEY WORDS:** Acari, Stigmaeidae, *Eustigmaeus*, new species, Iran

### INTRODUCTION

*Eustigmaeus* Berlese is one of the main genera of the Stigmaeidae and contains about 100 species (Dogan et al. 2003, Faraji et al. 2007). Members of the genus *Eustigmaeus* live on mosses, lichens, grass, litter and ant nests or they are bryophagous (Summers and Price 1961; Chaudhri 1965; Wood 1971, 1972, 1973; Gerson 1972a, b; Tseng 1982; Dogan et al. 2003). To date six species of the genus *Eustigmaeus* have been reported from Iran, namely: *Eustigmaeus nasrinae* Khanjani et Ueckermann, 2002, *E. segnis* (Koch, 1836), *E. jiangxiensis* Hu, Chen et Huang, 1996, *E. ornatus* Ueckermann et Meyer, 1987, *E. spathatus* Ueckermann et Meyer, 1987, and *Eustigmaeus sculptus* Doğan, Ayyildiz et Fan, 2003. In this paper, a new species, *Eustigmaeus azerbaijanensis* sp. n. from Iran is described and illustrated. A key to the females of all known species of *Eustigmaeus* from Iran is given.

### MATERIAL AND METHODS

Stigmaeid mite fauna of East Azerbaijan Province, Iran was sampled in 2009. The new species, *Eustigmaeus azerbaijanensis* sp. n. was collected from an apple orchard at Shendabad (Shabestar) on 15 August 2009 by A. Akbari. Specimens were transferred to the acarology laboratory of the Plant Protection Department, Faculty of Agriculture, University of Tabriz and the mites extracted using a Berlese funnel or direct observation under a stereo microscope. Mites were cleared with Nesbitt's and mounted in Hoyer's medium. Identifications were done with a phase contrast microscope (Olympus, BX41). Illustrations were made using a drawing tube. The leg and idiosomal chaetotaxy

of the species description follows Grandjean (1939, 1944) as adapted by Kethley (1990). All measurements are given in micrometers (µm).

#### Key to the Iranian species of *Eustigmaeus* Berlese

1. Eyes absent ..... *E. azerbaijanensis* sp. n.
- Eyes present ..... 2
2. Setae  $c_1$  and  $d_1$  longer than 50 µm ..... 3
- Setae  $c_1$  and  $d_1$  shorter than 50 µm ..... 4
3. Coxisternal shields smooth and divided. ....
- ..... *E. ornatus* Ueckermann et Meyer, 1987
- Coxisternal shields reticulated and fused .....
- ..... *E. segnis* (Koch, 1836)
4. Femur II with five setae ..... 5
- Femur II with 4 setae ..... 6
5. Three pairs of *ag* setae .....
- ..... *E. sculptus* Dogan, Ayyildiz et Fan, 2003
- Two pairs of *ag* setae .....
- ..... *E. jiangxiensis* Hu, Chen et Huang, 1996
6. Dorsal body setae short and spatulate .....
- ..... *E. spathatus* Ueckermann et Meyer, 1987
- Dorsal body setae densely setose, most terminating as blunt tip .....
- ..... *E. nasrinae* Khanjani et Ueckermann, 2002

#### Stigmaeidae Oudemans, 1931

Type genus: *Stigmaeus* Koch, 1836

#### *Eustigmaeus* Berlese, 1910

*Eustigmaeus* Berlese, 1910: 206 (= *Ledermuelleria* Oudemans, 1923)

Type species: *Stigmaeus kermesinus* Koch, 1841

**Diagnosis.** Idiosoma globular and red to straw colored. Gnathosoma partly covered by overhang-

ing prodorsum; Chelicerae separate; palp 5-segmented; palptibial claw well developed, with small accessory claw at its base; terminal eupathidia on palptarsus basally fused and split into 3 long prongs; subcapitulum with 2 pairs of subcapitular setae, *m* and *n*. Dorsum covered with 3 unpaired shields mostly ornamented. Prodorsal shield typically bearing 4 pairs of setae (*vi*, *ve*, *sci* and *sce*) and with or without 1 pair of eyes; opisthosomal shield bearing 6 pairs of setae and suranal shield (usually situated ventrally) bearing 2 pairs of setae. Humeral shields triangular, displaced to a ventral or ventrolateral position bearing *c*<sub>2</sub>. Coxisternal shields I–II and III–IV present fused or divided; Aggenital shield with 1 to 3 pairs of setae. Pseudanal shield bearing 3 pairs of setae. Legs stout, shorter than idiosoma; tarsal claws robust; empodia with 3 pairs of tenent hairs before extending beyond tips of claws. The genus *Eustigmaeues* includes about 100 species distributed worldwide (Faraji et al. 2007).

*Eustigmaeues azerbaijanensis*  
Haddad, Lotfollahi et Akbari sp. n.

Figs. 1–8

**Female** (n=13). Relatively large species, robust and sclerotized; idiosoma globular. Measurements of holotype (variations in measurements of paratypes in parentheses): Length of idiosoma 379 (348–420), width 308 (291–376) (Fig. 1).

**Gnathosoma.** Palpal setation: tarsus with 1 terminal tridentate eupathidium + 1 solenidion + 5 tactile setae; tibia with 1 well-developed claw + 1 accessory claw + 2 tactile setae; genua with 2 tactile setae; femur with 3 serrate setae (Fig. 3). Accessory claw spine-like. Subcapitular setae *m* longer than *n*, *m* = 35 (32–35), *n* = 28 (22–28); *m*–*m* = 35 (32–35), *n*–*n* = 35 (30–35), *m*–*n* = 16 (13–16) (Fig. 2).

**Dorsum** (Fig. 1). Covered with 3 unpaired shields ornamented with distinct polygonal cells, not vacuolated. Prodorsal shield bearing 4 pairs of setae (*vi*, *ve*, *sci* and *sce*), without eyes and *pobs*; ratios: *vi*: *vi*–*vi* = 3.6 (3.6–4.1), *ve*: *sci* = 1.2, *sce*: *sci* = 1.1; setae *vi* 127 (125–142), *ve* 166 (166–174), *sci* 142 (142–150), *sce* 155 (150–155); distances: *vi*–*vi* 35, *vi*–*ve* 43 (41–47), *ve*–*ve* 85 (79–87), *ve*–*sci* 43 (43–60), *sci*–*sci* 163 (163–183), *sci*–*sce* 51 (44–51). Opisthosomal shield with 6 pairs of setae. Humeral shields triangular, displaced to a ventrolateral position and bears *c*<sub>2</sub>; setal lengths: *c*<sub>1</sub> 169 (158–169), *c*<sub>2</sub> 126 (120–130), *d*<sub>1</sub> 177 (166–177), *d*<sub>2</sub> 166 (158–166), *e*<sub>1</sub> 174 (158–178), *e*<sub>2</sub> 182 (178–185), *f*<sub>1</sub> 148 (148–150); ratios

*c*<sub>1</sub>: *c*<sub>1</sub>–*c*<sub>1</sub> = 1.6, *e*<sub>1</sub>: *e*<sub>1</sub>–*e*<sub>1</sub> = 1.7 (1.4–1.7), *c*<sub>1</sub>–*c*<sub>1</sub>: *d*<sub>1</sub>–*d*<sub>1</sub>: *e*<sub>1</sub>–*e*<sub>1</sub>: *f*<sub>1</sub>–*f*<sub>1</sub> = 1.4–1.5: 1.3–1.4: 1.5–1.6: 1.1–1.2; distances: *c*<sub>1</sub>–*c*<sub>1</sub> 103 (99–103), *c*<sub>1</sub>–*d*<sub>1</sub> 87 (85–87), *d*<sub>1</sub>–*d*<sub>1</sub> 99 (92–99), *d*<sub>1</sub>–*d*<sub>2</sub> 74 (74–87), *d*<sub>2</sub>–*d*<sub>2</sub> 237 (237–253), *d*<sub>1</sub>–*e*<sub>1</sub> 92 (92–101), *e*<sub>1</sub>–*e*<sub>1</sub> 103 (103–111), *e*<sub>1</sub>–*e*<sub>2</sub> 63 (63–68), *e*<sub>2</sub>–*e*<sub>2</sub> 221 (213–223), *e*<sub>1</sub>–*f*<sub>1</sub> 55 (44–57), *f*<sub>1</sub>–*f*<sub>1</sub> 84 (79–84). Suranal shield (situated ventrally) reticulated and bearing 2 pairs of setae, *h*<sub>1</sub> 95 (95–103), *h*<sub>2</sub> 54 (54–62). Dorsal setae as figured (Fig. 8).

**Venter** (Fig. 2). Covered with striae except for coxal and anogenital areas. Ventral setae *1a*, *3a* and *4a* equal in length, ratio *1a*: *3a*: *4a* = 1.3–1.6: 1.3–1.6: 1.2–1.6; lengths: *1a* 32 (27–32), *3a* 32 (26–32) and *4a* 32 (24–32). Aggenital area with 2 pairs of setae, *ag*<sub>1</sub> 20 (14–20), *ag*<sub>2</sub> 24 (22–24); 3 pairs of pseudoanal setae, lengths: *ps*<sub>1</sub> 27 (18–28), *ps*<sub>2</sub> 32 (17–32), *ps*<sub>3</sub> 38 (35–38).

**Legs** (Figs. 4–7). Length: leg I 240 (240–257), leg II 225 (221–225), leg III 234 (161–234), leg IV 266 (245–266). Counts of setae (solenidia and setae  $\kappa$  not included) on legs I–IV: coxae 2, 2, 2, 2; trochanters 1, 1, 2, 1; femora 6, 5, 3, 2; genua 4, 3+1 $\kappa$ , 1, 1; tibiae 5 + 1 $\phi$ +1 $\phi p$ , 5 + 1 $\phi p$ , 5 + 1 $\phi p$ , 5 + 1 $\phi p$ ; tarsi 13 + 1 $\omega$ , 9 + 1 $\omega$ , 7 + 1 $\omega$ , 7 + 1 $\omega$ . Lengths of solenidia: *I* $\omega$  17, *II* $\omega$  17, *III* $\omega$  15, *IV* $\omega$  6.

**Male.** Unknown.

**Type materials.** Holotype female and 13 female paratypes: Shendabad, East Azerbaijan, Iran, from soil in an apple orchard, 15 August 2009, coll. A. Akbari.

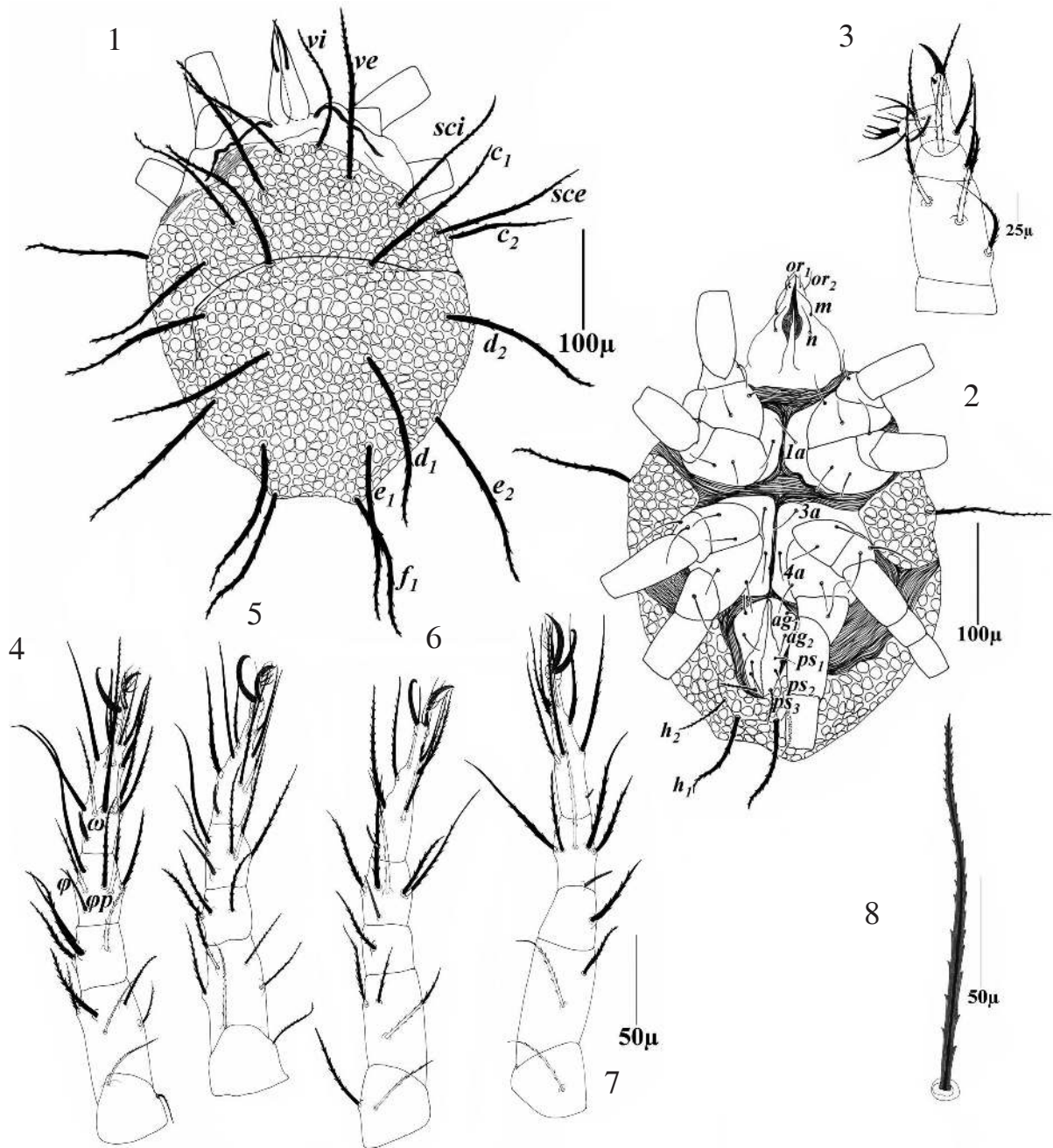
**Type material deposition.** Holotype and 10 paratypes are deposited in the Acarological Collection, Department of Plant Protection, Faculty of Agriculture, University of Tabriz, Tabriz, Iran. Three paratypes will be deposited in the Arachnida Collection of Plant Protection Research Institute, Pretoria, South Africa.

**Remarks.** The new species resembles *Eustigmaeues coronaria* Kuznetsov, 1977 in the body shape, arrangement and ornamentation of shields and number of setae on all segments of legs, however, it differs from this species in that dorsal setae are not inflated basally or sheathed, ventral and coxal setae are not serrated and by the presence of only two pairs of paragenital setae (vs. 3 pairs in *E. coronaria*).

**Etymology.** This species is named after the Province where it was collected.

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Figs 1–8. *Eustigmaeus azerbaijanensis* sp. n., female: 1—dorsal view; 2—ventral view; 3—palp; 4—leg I ( $\omega$ : solenidion on the tarsus;  $\phi$ : solenidion on anterior of tibia;  $\phi p$ : solenidion on posterior of tibia); 5—leg II; 6—leg III; 7—leg IV; 8—dorsal seta.

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