



## A new species of the genus *Ledermuelleriopsis* Willmann (Acari: Stigmaeidae) from Turkey

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**ABSTRACT:** A new species viz. *Ledermuelleriopsis aydinensis* sp. nov., collected from soil and litter under *Pistacia lentiscus* (Anacardiaceae), *Pinus brutia* (Pinaceae), *Oenanthe pimpinelloides* (Apiaceae), *Salsola soda* (Chenopodiaceae), *Ptilostemon chamaepeuce* (Asteraceae), is described and illustrated based on adult females.

**Keywords:** Soil mite, Trombidiformes, Raphignathoidea, *Ledermuelleriopsis*.

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### INTRODUCTION

Members of the family Stigmaeidae are predators and discovered from all biogeographical regions though most of them were discovered from the Palaearctic, Oriental, Nearctic, Afrotropical and Australian regions (Fan and Zhang, 2005). Stigmaeidae is the largest in the superfamily Raphignathoidea and includes about 598 species of 34 valid genera (Fan et al., 2016; Khaustov and Tsurikov, 2018).

Among them, the genus *Ledermuelleriopsis* with 33 species is known in the world (Fan et al., 2003; Dönel and Doğan, 2011; Khanjani et al., 2012a, 2012b; Maleki et al., 2013; Fan et al., 2016). *Ledermuelleriopsis* species live in soil, litter, grass, lichen, moss, old sand dune, bark trees and decayed stump. Up till now, 11 species of *Ledermuelleriopsis* have been reported from Turkey: *Ledermuelleriopsis ayyildizi* Doğan, *L. bisetalis* Doğan, *L. giresuniensis* Doğan and Ayyıldız, *L. indiscretus* Dönel and Doğan, *L. plumosa* Willmann, *L. punctata* Soliman, *L. rizeiensis* Doğan, *L. sezeki* Doğan, *L. tamariski* Maleki and Bagheri, *L. toleratus* Kuznetsov, *L. triscutata* Willmann (Koç and Ayyıldız, 1997; Doğan and Ayyıldız, 2003; Doğan, 2004a, 2004b, 2007; Erman et al., 2007; Dönel and Doğan, 2011; Özçelik and Doğan, 2011; Somoncu and Koç, 2012; Bingül and Doğan, 2016). In this paper, one more new species, *Ledermuelleriopsis aydinensis* sp. nov., is described and illustrated from Aydın, Turkey.

### MATERIAL AND METHODS

The soil and litter samples taken from Dilek Peninsula-Büyük Menderes Delta National Park (located in the Aegean Region and within the boundaries of Aydın province) in 2015 and 2016 were brought to the laboratory in plastic bags and extracted Berlese-Tullgren funnels for 7 days. Mites were collected in 70% ethanol and mounted on slides in modified Hoyer's medium (pure water 50 ml, gum arabic 50g, chloral hydrate 125 g, glycerin 30 ml).

The mite figures were drawn and measured by means of a research microscope (Nikon Eclipse E 400). The setal nomenclature follows those of Kethley (1990) and Grandjean (1944). All measurements are given in micrometers ( $\mu\text{m}$ ). The holotype measurements were given first and followed by range measurements of paratypes in parentheses. Measurements of legs were taken from base of femur to tips of tarsal claws. The specimens mounted on slide are deposited in the Zoological Research Laboratory of Manisa Celal Bayar University, Manisa, Turkey.

### RESULTS

Family: Stigmaeidae Oudemans

Genus: *Ledermuelleriopsis* Willmann

Type species: *Ledermuelleriopsis triscutata* Willmann

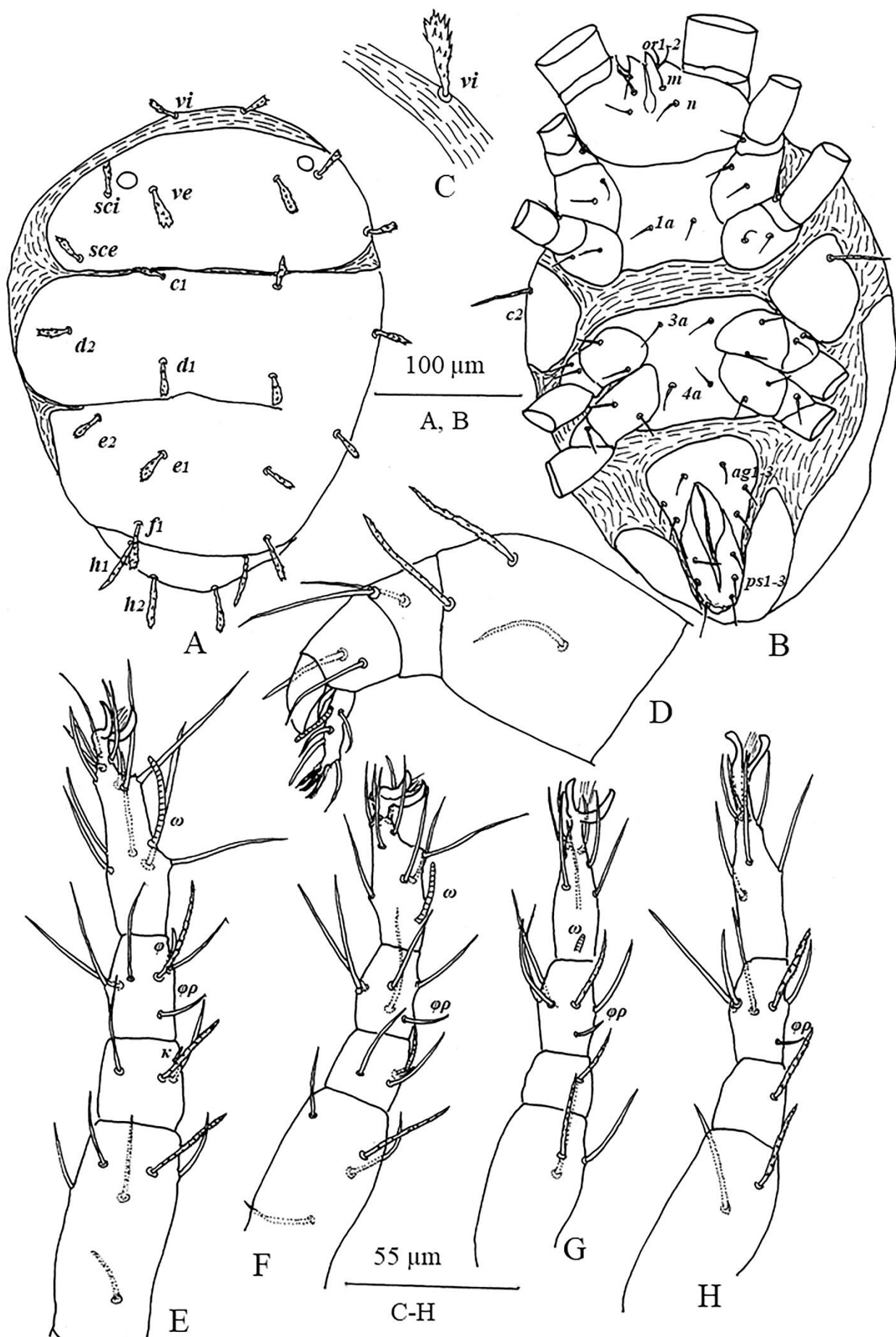
Diagnosis: Prodorsal shield bears 4 pairs of setae (*vi*, *ve*, *sci*, *sce*) and a pair of eyes. Dorsal hysterosomal area covered with either completely or incompletely divided two shields, each bear 3 pairs of setae, metapodosomal shield with setae (*c*<sub>1</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>), opisthosomal shield with setae (*e*<sub>1</sub>, *e*<sub>2</sub>, *f*<sub>1</sub>). Suranal shield entire with 2 pairs of setae (*h*<sub>1</sub>, *h*<sub>2</sub>). Humeral shields ventro-lateral position, with setae *c*<sub>2</sub>. Coxisternal shields divided or fused. Ventral opisthosoma with 1-3 pairs of aggenital setae (*ag*<sub>1-3</sub>). Genital setae absent. Anogenital shields with 3 pairs of pseudanal setae (*ps*<sub>1-2</sub>) Palp with a tridentate terminal eupathidium. Chelicerae separated. (Fan and Zhang, 2005; Dönel and Doğan, 2011; Bingül and Doğan, 2016).

*Ledermuelleriopsis aydinensis* sp. nov.

(Fig. 1)

Female (n=6)

Body ovoid, length (excluding gnathosoma) 338 (312 – 314), width 260 (247–250).



**Figure 1.** *Ledermuelleriopsis aydinensis* sp. nov. (Female) – A) Dorsal view of idiosoma, B) Ventral view of idiosoma, C) Dorsal seta *vi*, D) Palp, E) Leg I, F) Leg II, G) Leg III, H) Leg IV.

*Gnathosoma*. 70 (68) long. Chelicerae separate, 65 (65) long. Palp 117 (114) long. Counts of setae and solenidia from palptrochanter to palptarsus: 0, 3, 2, 2 + 1 claw + 1 seta like accessory claw, 4 + 1 solenidion + 1 subterminal seta-like eupathidion + 1 tridentate eupathidion (Fig. 1 D). Subcapitulum with two pairs of adoral setae ( $or_{1-2}$ ) and 2 pairs of subcapitular setae ( $m, n$ ). Dimensions and distance between subcapitular setae,  $m$  16 (13–16),  $n$  16 (13),  $m-n$  21 (16–18),  $n-n$  29 (26–29),  $m-n$  13 (13) (Fig. 1 B).

*Dorsum of idiosoma*. Dorsal shields smooth, without small pits and vacuoles (Fig. 1 A). Propodosomal shield with three pairs of setae ( $ve, sci, sce$ ) and one pair of eyes located between setae  $ve$  and  $sci$ . Seta  $vi$  on the striated integument (Fig. 1 C). Metapodosomal shield with three pairs of setae ( $c_1, d_1, d_2$ ). Opisthosomal shield with three pairs of setae ( $e_1, e_2, f_1$ ). Suranal shield with two pairs of setae ( $h_1, h_2$ ). Humeral shields ventro-lateral, similar that of other dorsal shields, with setae  $c_2$  (Fig. 1 B). All dorsal setae clavate except for setae  $c_2$ . Lengths and distances of dorsal idiosomal setae as follows:  $vi$  23 (23),  $ve$  26 (26),  $sci$  21 (21),  $sce$  23 (23),  $c_1$  26 (23),  $c_2$  36 (34–36),  $d_1$  21 (21),  $d_2$  23 (23),  $e_1$  23 (23),  $e_2$  23 (23),  $f_1$  31 (26),  $h_1$  34 (26–29),  $h_2$  31 (26),  $vi-vi$  34 (35),  $vi-ve$  52 (42–47),  $ve-ve$  86 (78–81),  $ve-sci$  29 (26),  $sci-sci$  146 (135),  $sci-sce$  49 (47),  $sce-sce$  200 (187),  $sce-c_1$  62 (62),  $c_1-c_1$  78 (70),  $c_2-c_2$  208 (198–203),  $d_2-d_2$  216 (198–200),  $c_1-d_1$  62 (57),  $d_1-d_1$  78 (73–75),  $d_1-e_1$  65 (60–62),  $e_1-e_1$  75 (62–65),  $e_1-e_2$  52 (49–57),  $e_2-e_2$  166 (156),  $e_1-f_1$  47 (47),  $f_1-f_1$  88 (78–83),  $h_1-h_1$  42 (39),  $h_1-h_2$  26 (26),  $h_2-h_2$  81 (78).

*Venter of idiosoma*. Ventral cuticle transversely striated between coxae II and III. Coxisternal shields between coxae I–II, III–IV fused at midline, smooth and bearing three pairs of setae ( $1a, 3a, 4a$ ) (Fig. 1 B). Length of setae  $1a$  13 (10),  $3a$  13 (10),  $4a$  13 (10). Aggenital shield with three pairs of setae ( $ag_{1-3}$ ) and three pairs of pseudanal setae ( $ps_{1-3}$ ). Lengths of ventral setae as follows:  $ag_1 = ag_2 = ag_3$  10 (10),  $ps_1$  18 (18),  $ps_2 = ps_3$  16 (16).

*Legs*. Leg I 182 (169–177), leg II 156 (143–148), leg III 143 (130–138), leg IV 166 (161–164). Chaetotaxy of leg segments as follows: coxae 2–2–2–2, trochanters 1–1–2–1, femora 6–4–3–2, genua 3(+1 $\kappa$ )-3(+1 $\kappa$ )-1–1, tibiae 5(+1 $\phi$ +1 $\phi\phi$ )-5(+1 $\phi\phi$ )-5(+1 $\phi\phi$ )-5(+1 $\phi\phi$ ), tarsi 13(+1 $\omega$ )-9(+1 $\omega$ )-7(+1 $\omega$ )-7 (Fig. 1 E–H).

*Male and immature stages*. Unknown.

*Etymology*. The name of the new species is refers to distribution in Aydın (Turkey).

*Material examined*. Holotype female from litter and soil under *Pistacia lentiscus*, 600 m a.s.l., 14 March 2016; one paratype female from litter and soil under *Pinus brutia*, 450 m a.s.l., 15 November 2015; one paratype female from litter and soil under *Oenanthe pimpinelloides*, 600 m a.s.l. and two paratype females from litter and soil under *Salsola soda*, 300 m a.s.l., 12 December 2015; one paratype female from litter and soil under *Ptilostemon chamaepeuce*, 600 m a.s.l., 16 May 2016; Dilek Peninsula -

Büyük Menderes Delta National Park, Kuşadası district, Aydın province, Turkey, coll. M. P. Gül.

Remarks. *Ledermuelleriopsis aydinensis* sp. nov. resembles *L. plumosa* Willmann in general appearance and all dorsal setae clavate and setae  $c_2$  longer than other dorsal setae. However, it can easily be differentiated by following characters: (1) setae  $vi$  on the striated integument whereas setae  $vi$  on the propodosomal shield in *L. plumosa* (2) dorsal and ventral shields smooth, without small pits and vacuoles in the former oppose to reticulation, with small pits and vacuoles (3) tarsus II with nine setae in the former oppose to eight in the latter. Actually, this new species can be readily distinguished from the known species of the genus in that setae  $vi$  on the striated integument.

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