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Article

Description of *Ameroseius lidiae* male (Mesostigmata: Ameroseiidae) from Iran with a key to males of European species within the genus

Ewa Teodorowicz¹ and Alireza Nemati^{2*} 

1. Poznan University of Life Sciences, Faculty of Forestry and Wood Technology, Wojska Polskiego 71c, 60-625 Poznan, Poland; E-mail: ewateo@hotmail.com

2. Plant Protection Department, Agricultural College, Shahrekord University, Iran; E-mail: alireza.mesoacari@gmail.com, alireza.nemati@ymail.com

* Corresponding author

ABSTRACT

Specimens of *Ameroseius lidiae* Bregetova were found in soil from Ahwaz city, Khuzestan Province, Iran. The previously unknown male of this species is described here. Before the present study, only male of *A. corbiculus* (Sowerby) had been reported from Iran. A key to males of the genus *Ameroseius* occurring in Europe is provided.

KEYWORDS: Khuzestan Province, male, mites, morphology, taxonomy.

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INTRODUCTION

Family Ameroseiidae covers 12 genera, amongst which *Ameroseius* Berlese is the largest, with about 50 species described worldwide, 13 species in Europe (Mašán 2017). Comprehensive studies on the family Ameroseiidae (Westerboer and Bernhard 1963; Bregetova 1977; Evans and Till 1979; Karg 1993; Halliday 1997; Mašán 2017) indicate that the majority of ameroseiid representatives are fungivores, pollen feeders, organic material decomposers and rarely predators. They have been recorded in various habitats like soil, humus, decomposing organic matter, litter, moss, coarse woody debris, excrements, fungi sporocarps, bark beetle galleries, birds' nests and stored products. Moreover, they display a phoretic relationships with animals they co-habit, especially insects or birds. Compared to the other mesostigmatid mite families of Iran, the fauna of the Ameroseiidae is well-known (Hajizadeh *et al.* 2013), though the knowledge is restricted mostly to the list of species. Species of five genera namely, *Ameroseius* Berlese, *Asperolaelaps* Womersley, *Epicriopsis* Berlese, *Kleemannia* Oudemans and *Sertitympanum* Elsen & Whitaker have been reported from different parts of Iran (Ghasemi and Hajizadeh 2021; Hajizadeh and Hosseini 2022; Nemati *et al.* 2013, 2018; Khalili-Moghadam and Saboori 2014, 2016).

The genus *Ameroseius* is amongst the numerous representants of the family. *Ameroseius lidiae* was formerly described by Bregetova in 1977, with a holotype deposited in Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia; however, very briefly and not meeting the

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nowadays taxonomical standards. This matter has been undertaken by Khalili-Moghadam and Saboori (2014) who made a detailed redescription of *A. lidiae* female. The species seems to be quite common as mentioned by many authors from different countries (Masan 2017; Khalili-Moghadam and Saboori 2021). In Iran, it was recorded in various microhabitats as given by Nemati *et al.* (2013, 2018) and Khalili-Moghadam and Saboori (2021). Also, it was found in a very specific microhabitat, bird's nests of a specific bird species e.g. in Slovakia: European serin *Serinus serinus* (L.), mute swan *Cygnus olor* (Gmelin); western marsh harrier *Circus aeruginosus* (L.); eurasian coot *Fulica atra* L.; common pochard *Aythya ferina* (L.) (Mašán 2017); and in Poland: white-tailed sea eagle *Haliaeetus albicilla* (L.) (Gwiazdowicz *et al.* 2006).

In general, based on the literature review concerning ameroseiid mites, only the male of *A. corbiculus* (Sowerby) has been officially reported from Iran (Khalili-Moghadam and Saboori 2014). Up to now, only seven European ameroseiid males were described in detail (Westerboer and Bernhard 1963; Kaczmarek and Michalski 1988; Mašán 1998; Teodorowicz and Gwiazdowicz 2020; Teodorowicz 2021). This paper adds a description of an *A. lidiae* male from Iran, which is yet described nowhere and thus of the unknown status. A key to males of the genus *Ameroseius* occurring in Europe is also provided.

MATERIALS AND METHODS

The materials were found by A. Nemati, 1998 from soil and litter samples in Ahwaz, Khuzestan Province (Iran) and deposited in Acarological Laboratory, Plant Protection Department, Agricultural College, Shahrekord University (APAS), Iran. Mites were extracted from samples using Berlese-Tullgren funnels, cleared in lactic acid at 55 °C, mounted in Hoyer's medium on permanent microslides and examined under a Zeiss Axioskop 2 light microscope. Initial pencil drawings were made using a drawing tube and digital drawings were made with the use of Wacom Cintiq 21UX graphic tablet and Photoshop software. All measurements were taken in micrometers (µm). Chaetotaxy for the dorsal idiosoma is based on that of Lindquist and Evans (1965) and for leg that of Evans (1963). Totally two males were studied.

TAXONOMY

Genus *Ameroseius* Berlese, 1904

The genus concept has been accepted here as refined and clarified by Mašán (2017).

Ameroseius lidiae Bregetova, 1977 (Figs. 1–10)

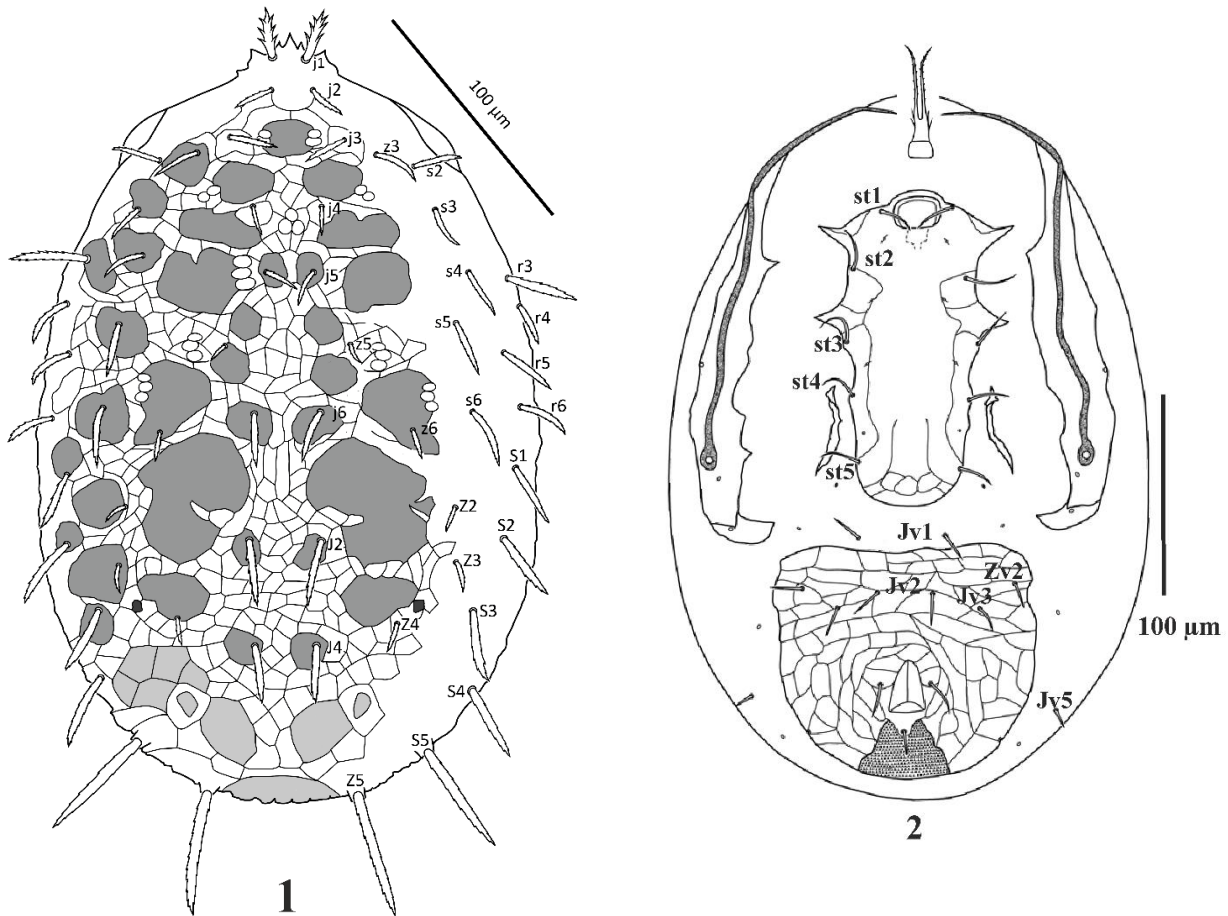
Description of male (n = 2)

Idiosoma – 325–390 long and 210–250 wide.

Dorsum (Fig. 1) – Dorsal aspect oval shaped covered with deep fossae and reticulate pattern out and between; totally 29 pairs of setae, 19 pairs on the podonotal and 10 on the opisthonotal part respectively; all setae delicately barbed and moderately robust; vertical setae *j1* (22–23) with less dense but more distinct barbs; humeral setae *r3* (33–40) slightly thicker and longer than the surrounding setae; the shortest setae are *z5*, *z6*, *Z2*, *Z3*, *Z4* measuring 9–14; the longest *S5* (50–60) and *Z5* (55–65); the latter setae are as given: *j2* (18–22), *j3* (23–27), *j4* (15–19), *j5* (17–19), *j6* (24–29), *z3* (25–29), *s2* (21–25), *s3* (25–30), *s4* (27–33), *s5* (27–31), *s6* (28–33), *r4* (27–31), *r5* (27–32), *r6* (28–32); *J2* (30–36), *J4* (25–30), *S1* (30–35), *S2* (30–35), *S3* (32–37), *S4* (36–42). A fine pair of pores between setae *Z3* and *Z4*.

Venter (Fig. 2) – Tritosternum base 10 with a bifurcate laciniae fused up to 23–25 and free up to 35–37. Sternogenital shield reticulated in lateral and posterior parts, 150–175 long at midline and

90–100 wide at *st1/st2* level. Genital orifice located presternally. Five pairs of Sternogenital setae located on the shield *st1-st3* reaching 18–20 and shorter *st4-st5* (13–15). Anal shield to a small degree wider than long 110–135 width at level *Zv2* setae and 100–120 length at midline. Shield with M-shaped cribrum at the bottom, slightly developed upwards on both sides of post anal seta. Opisthogastric setae *Jv1*, *Jv2*, *Jv3*, *Zv2* short about 11–14, *Jv5* even shorter only 9–10; para anal setae 16–19, post anal seta 12–15. All setae simple but post anal delicately barbed. Setae *Jv1* and *Jv5* inserted on a soft cuticle. Endopodal plates either fused to sternal shield or free form surrounding the 4th coxa. Stigma at the level of 4th coxa. Peritremes running forth to the very anterior part of idiosoma and partially visible on the dorsal side.

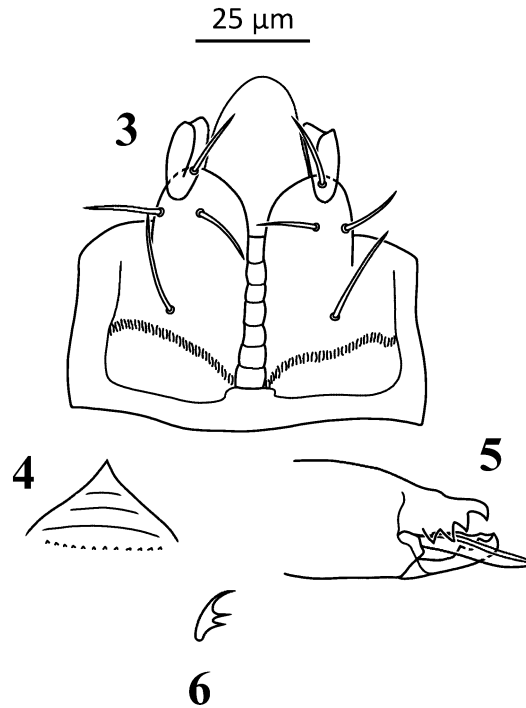


Figures 1–2. *Ameroseius lidiae* Bregetova, 1977 (male) – 1. Dorsal idiosoma; 2. Ventral idiosoma.

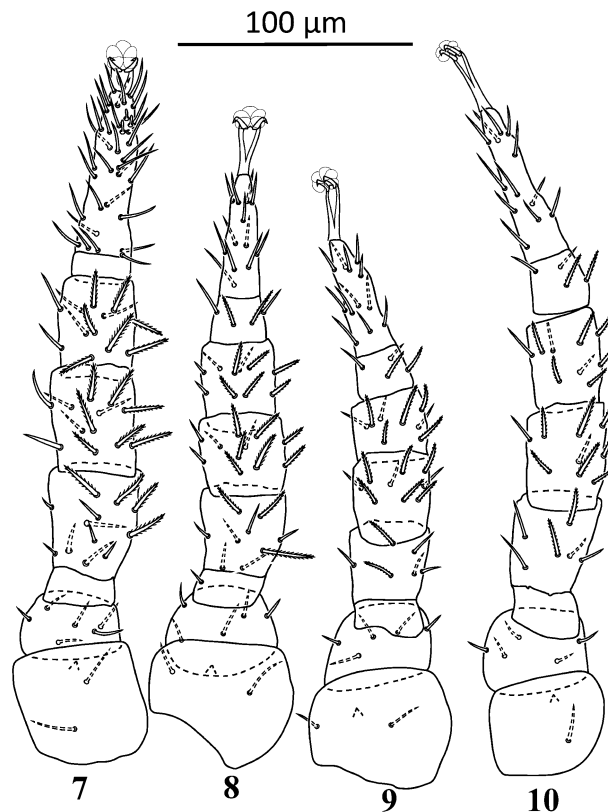
Gnathosoma (Figs. 3–6) – Hypostome with four pairs of simple setae as given *h1-2* (14–15), *h3* (12–13), *pcx* (14–16). Seven rows of denticles in the deutosternal groove but the denticles discernible. Internal malae not divided. Corniculi bifurcate 16–18 long (Fig. 3). Epistome arc-shaped though pointed centrally, with a smooth edge and barely visible denticles at the bottom part (Fig. 4); fixed digit with three teeth, moveable digit 18–19 with less protruded two teeth and spermatodactyl measuring 15 outside digit (Fig. 5). Palps around 65, palp setation standard: setation as given: palptrochanter – 2, palpfemur – 5, palpgenu – 6, palptibia – 14, palptarsus – 15. Palptarsal apotele (11–13) three-tined (Fig. 6).

Legs (Figs. 7–10) – Pretarsi comprised of claws, ambulacrum and hyaline sheath varied in length: I = 15, II = 25, III = 25, IV = 30; leg I = 280–310, leg II = 230–260, leg III = 220–250, leg IV = 290–320. Overall leg setation comprising of coxa-trochanter-femur-genu-tibia-tarsus as given: I – 2-6-12-12-12-32; II – 2-5-10-11-10-16; III – 2-5-6-9-8-16; IV – 1-5-6-9-9-16. More specific leg

setation for femur-genu-tibia as given (anterolateral anterodorsal/posterodorsal anteroventral/posteroventral posterolateral): **I** – 2 3/2 1/2 2 - 2 3/2 2/1 2 - 2 3/2 2/1 2; **II** – 2 2/2 1/2 1 - 2 3/2 1/1 2 - 2 2/2 1/1 2; **III** – 1 2/1 1/0 1 - 2 2/2 1/1 1 - 2 1/2 1/1 1; **IV** – 1 2/1 1/0 1 - 2 2/3 1/0 1 - 2 2/2 1/1 1. Note that in the drawing 3rd and 4th leg are rotated leading to a possible misinterpretation of some setae especially situated anterolaterally, posteroventrally or posterolaterally.



Figures 3–6. *Ameroseius lidiae* Bregetova, 1977 (male) – 3. Hypostome, 4. Epistome, 5. Chelicera, 6. Apotele.



Figures 7–10. *Ameroseius lidiae* Bregetova, 1977 (male) – 7. Leg I, 8. Leg II, 9. Leg III, 10. Leg IV.

Differential diagnosis

Ameroseius lidiae males resemble most *A. sculptilis* Berlese males. However, the unmistakable difference between the two is the presence of a characteristic subtriangular sculpture between setae *j6* and *J2* in *A. sculptilis* which is not present in *A. lidiae*. Generally, all dorsal setae of *A. sculptilis* are medium length, with no extraordinary length difference between the longest versus shortest seta, except *Z5* which is visibly longer especially when compared to the closest *S5*. In *A. lidiae* dorsal setae show greater variability, as there are very short setae, medium-length setae, and the longest setae *Z5* and *S5* of the same lengths, contrary to those of *A. sculptilis*. Ventral side of *A. sculptilis* reveals the heart-shaped ventrianal shield, noticeably wider than long, while in *A. lidiae* a ventrianal shield is as wide as long and suboval in shape. Moreover, there is a different dentation of digitus mobilis within these two species. *Ameroseius sculptilis* has a digitus mobilis with one tooth, while *A. lidiae* has a digitus mobilis with two teeth.

Key to European species of the genus *Ameroseius* (male)

Males presented in the key herein were described in detail by Westerboer and Bernhard (1963), which are *A. corbiculus* and *A. sculptilis* (syn.: *A. pulcher*). Later another two were described by Mařán (1998) – *A. callosus* and *A. fungicola*. Male of *A. longitrichus* was described by Kaczmarek and Michalski (1988), *A. ulmi* by Teodorowicz and Gwiazdowicz (2020) and *A. georgei* by Teodorowicz (2021).

1. Anal shield with circum-anal setae only 2
 - Ventrianal shield with both circum-anal and opisthogastric setae 3
2. Setae *j3*, *J2*, *J4* as long as *j1* ***Ameroseius fungicola* Mařán, 1998**
 - Setae *j3*, *J2*, *J4* of one-third of *j1* length ***Ameroseius callosus* Mařán, 1998**
3. Dorsal setae relatively long, especially those in *J* row reaching bases of the consequent seta 4
 - Dorsal setae relatively short, especially those in *J* row never reaching bases of the consequent setae 6
4. Vertical setae *j1* quite large and pubescent distinct from the remaining setae; *Jv5* short and simple; anal shield wider than long; palp tarsus three-tined ***Ameroseius corbiculus* (Sowerby, 1806)**
 - Vertical setae *j1* quite short and barbed likewise the remaining setae; *Jv5* long and barbed; anal shield round as long as wide; palp tarsus two-tined 5
5. Seta *j5* very long; *j6* long but reaching only bases of one consequent seta (*J2*); none of the short setae situated on tubercles ***Ameroseius longitrichus* Hirschmann, 1963**
 - Setae *j5* is very short; *j6* is extremely long reaching bases of two consequent setae (*J2*, *J4*); multiple pairs of short setae situated on more or less distinct tubercles .. ***Ameroseius georgei* (Turk, 1943)**
6. Setae *r3* long and robust; setae *j1*, *r3*, *J2*, *J4*, *Z4*, *Z5* and *S5* broad at their tips; anterior margin of epistome denticulate ***Ameroseius ulmi* Hirschmann, 1963**
 - Setae *r3* not as above; setae *j1*, *r3*, *J2*, *J4*, *Z4*, *Z5* and *S5* narrow at their tips; anterior margin of epistome smooth 7
7. Characteristic subtriangular sculpture between setae *j6* and *J2*; ventrianal shield wide and heart-shaped; digitus mobilis with one tooth ***Ameroseius sculptilis* Berlese, 1916**
 - No subtriangular sculpture between setae *j6* and *J2*; ventrianal shield as wide as long and suboval; digitus mobilis with two teeth ***Ameroseius lidiae* Bregetova, 1977**

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توصیف کنه نر *Ameroseius lidiae* (Mesostigmata: Ameroseiidae) از ایران همراه با کلید شناسایی کنه‌های نر این جنس در اروپا

اوا تئودروویچ^۱ و علیرضا نعمتی^{۲*}

۱. دانشگاه علوم زیستی پوزنان، گروه جنگلداری و فناوری چوب، ویسکا پولسکیگو ۷۱ سی، ۶۲۵-۶۰ پوزنان، لهستان؛
رایانامه: ewateo@hotmail.com

۲. گروه گیاهپزشکی، دانشکده کشاورزی، دانشگاه شهرکرد، ایران؛ رایانامه‌ها: alireza.nemat@ymail.com nemati.alireza@sku.ac.ir

* نویسنده مسئول

چکیده

نمونه‌های گونه *Ameroseius lidiae* Bregetova از خاک در شهر اهواز، استان خوزستان، ایران یافت شدند. کنه نر این گونه که پیش از این ناشناخته بود توصیف می‌شود. تا پیش از این بررسی، فقط کنه نر *A. corbiculus* (Sowerby) از ایران گزارش شده بود. کلید شناسایی کنه‌های نر جنس *Ameroseius* در اروپا ارائه می‌شود.

واژگان کلیدی: استان خوزستان، نر، کنه، ریخت‌شناسی، آرایه‌شناسی.

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