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# Redescription of *Ameroseius eumorphus* Bregetova (Acari: Mesostigmata: Ameroseiidae), a new record of *Epicriopsis* Berlese from Iran and a new homonym in Ameroseiidae

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**ABSTRACT** — In this paper we redescribe *Ameroseius eumorphus* Bregetova, 1977 based on morphological characters of female specimens collected from soil and litter from Chaharmahal va Bakhtiari and Khuzestan Provinces, Iran, using comparison with photographs of its holotype. The world distribution, hosts and habitats of this species are reviewed. *Epicriopsis baloghi* Kandil, 1978 is recorded for the first time from Iran. *Ameroseius qinghaiensis* Ma, 2008 is a junior primary homonym of *Ameroseius qinghaiensis* Li and Yang, 2000 and a new replacement name is proposed for this species. We also present corrected data for leg segment sizes of *Ameroseius lidiae* in Khalili-Moghadam and Saboori (2014).

**KEYWORDS** — Ameroseiidae; female; Mesostigmata; mite; taxonomy

## INTRODUCTION

Ameroseiid mites with wide ranges of habitats including moss, manure, dead wood, fungi cap, stored products and so on feed on different materials and act as predatory, fungivorous and substrate decomposers agents. Some species have been reported in associated with mammals, birds, rodents and social insects and their nest (Westerboer and Bernhard 1963, Allred 1970, Bregetova 1977, Domrow 1979, Evans and Till 1979, Karg 1993, Halliday 1997, Mašán 1998, Vargas and Polaco 2001, Villegas-Guzmán *et al.* 2004, Lindquist *et al.* 2009).

Different taxonomical studies have been done on ameroseid mites around the world (Westerboer and Bernhard 1963, Bregetova 1977, Karg 1993, Halliday

1997, Moraza 2006, Lindquist *et al.* 2009, Moraes and Narita 2010, Narita *et al.* 2013, 2015). *Ameroseius* Berlese, 1904 is the largest genus in this family comprising about 100 species reported from different habitats in various geographical areas (Narita *et al.* 2015).

The present information on mites of this family in Iran is poor. Twenty three species have been previously reported (Hajizadeh *et al.* 2013a,b, Kazemi and Rajaei 2013, Nemati *et al.* 2013, Khalili-Moghadam and Saboori 2014, Khaleghabadian *et al.* 2015).

The present knowledge on *Ameroseius eumorphus* is based on Bregetova (1977), who provided a brief description of the species. Barilo (1986) presented

some morphological information about *A. eumorphus*, such as dorsal shield with 28 pairs of lanceolate or very slightly serrate setae, epistome arc-shaped with an elongate, acute and smooth central projection, and ventri-anal shield wider than long. In this paper, redescription of *A. eumorphus* is presented based on morphological characters of female specimens, using comparison with photographs of the holotype in Academy of Sciences, Museum of Anthropology and Ethnography, St. Petersburg, Russia. A new record of *Epicriopsis* for Iranian mite fauna is presented. *Ameroseius qinghaiensis* Ma, 2008 is a junior primary homonym of *Ameroseius qinghaiensis* Li and Yang, 2000 and a new replacement name proposed for this species. Corrected data of leg segment sizes of *Ameroseius lidiae* in Khalili-Moghadam and Saboori (2014) is presented.

## MATERIALS AND METHODS

Soil and litter samples were collected from different parts of Chaharmahal va Bakhtiari and Khuzestan Provinces. Mites were extracted from samples using Berlese funnels, cleared in lactic acid at 55 °C and then mounted in Hoyer's medium on permanent microscope slides. Line drawings were made using a phase-contrast Olympus BX52 microscope equipped with a drawing tube. Figures were performed with Corel X-draw software, based on the scanned line drawings. Measurements are expressed as mean (minimum-maximum) ranges in micrometers (µm). The dorsal setae notation and leg chaetotaxy followed that of Lindquist & Evans (1965) and Evans (1963b), respectively. Lengths of leg segments were measured dorsomedially, and tarsi were measured with the stalk and pretarsus. Specimens on which this paper is based on are deposited in the Acarological Laboratory, Department of Plant Protection, Agricultural College, Shahrekord University, Shahrekord (APAS) and some of them are deposited in the Acarological collection of Jalal Afshar Zoological Museum (JAZM), Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran.

## RESULTS AND DISCUSSION

### REDESCRIPTION

#### *Ameroseius Berlese, 1904*

*Ameroseius* Berlese, 1904: 258. Type species: *Seius echinatus* C.L. Koch, 1839: 13.

*Kleemannia* Oudemans, 1930: 135. Synonymy by Westerboer and Bernhard, 1963: 479. Type species: *Zercon pavidus* C.L. Koch, 1839: 10.

*Primoseius* Womersley, 1956: 116. Synonymy by Hughes, 1961: 246. Type species: *Zercoseius macauleyi* Hughes, 1948: 146.

For diagnosis of the genus see Halliday (1997) and Narita *et al.* (2013).

#### *Ameroseius eumorphus* Bregetova, 1977 (Figures 1-3)

*A. eumorphus* Bregetova, 1977: 153.

*A. eumorphus* - Narita *et al.* 2013: 7.

Diagnosis — Palp tarsal claws and corniculi two and three tined respectively; setae h1 about twice thicker than h2 and h3; fixed cheliceral digit with four large teeth near the base of digit and subapical offset gabelzahn. Dorsal shield with 28 pairs of lanceolate setae and very slightly serrate (j1 leaf-shaped), tips of J2 and J4 do not reach the base of J4 and Z5, respectively. Opisthogasteric region with 6 pairs of setae, 2 of which on the ventri-anal shield (in addition to circumanal setae). Ventri-anal shield wider than long, anterior margin with clearly depression, pre-anal setae (Jv2) set closed together.

Adult female (Figures 1-3) (5 specimens measured)

Gnathosoma (Figure 1A) — Hypostomal and palpcoxal setae smooth; h1 26 (26-27), h2 21 (20-22), h3 18 (16-19) and pc 24 (22-26). Deutosternal groove narrow; transverse rows of denticles not discernable on any of the specimens examined. Corniculi trifid. Epistome arc-shaped with an elongate, acute and smooth central projection (Figure 1B). Chelicera with dorsal seta and dorsal lyrifissure, fixed cheliceral digit 24 (22-26) long, with four large teeth near the base of digit and subapical offset gabelzahn, setaceous pilus dentilis not observed,

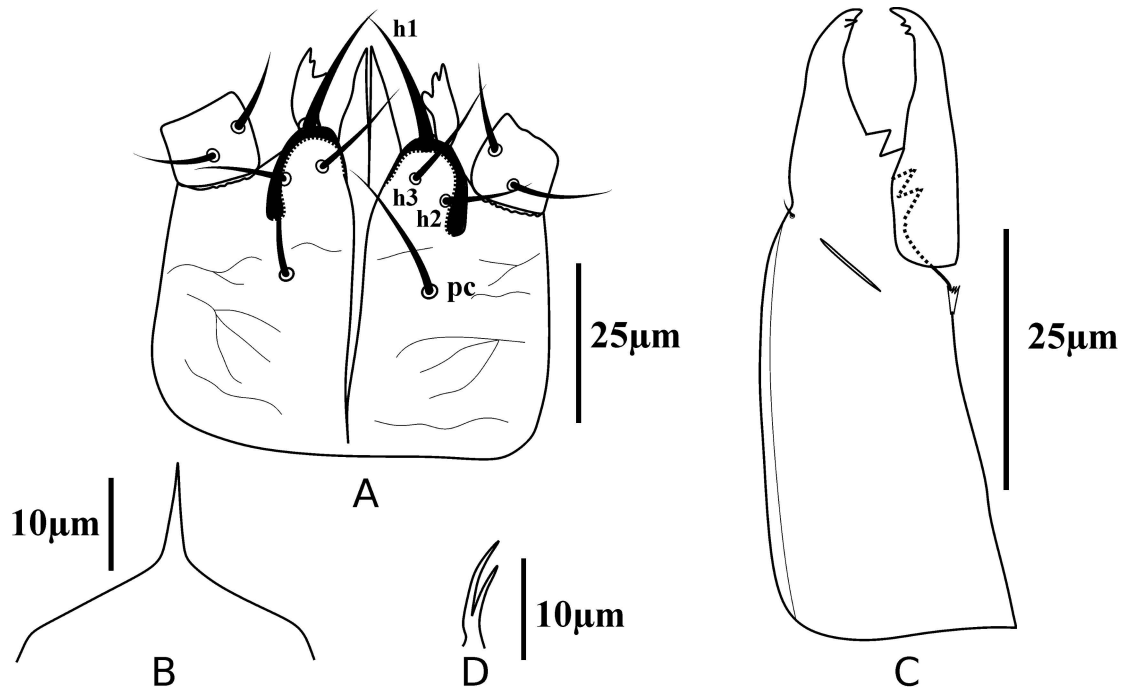


FIGURE 1: *Ameroseius eumorphus* Bregetova, 1997 (female): A – Hypostome, B – epistome, C – Chelicera, D – apotele.

movable digit 22 (22-24) long and with 2 small sub-apical teeth, middle cheliceral segment 53 (50-56) long (Figure 1C). Palpus 72 (66-79) long; number of setae from trochanter to tibia: 2, 5, 6, and 14. Palp apotele bifid (Figure 1D).

Dorsal idiosoma (Figure 2) — Dorsal shield entire, totally reticulate; reticula formed by simple lines; 360 (338 – 400) long (from its anteromedian edge anterior to bases of setae j1 to its posteromedian edge posterior to bases of setae Z5) and 235 (218 – 255) wide at level of s6; with 28 pairs of setae, 18 pairs on podonotal region (j1-6, z2, z4-5, s1-2, s4-6, r2-5) and 10 pairs on opisthonotal region (J2, J4, Z1-2, Z4-5, S2-5); dorsal setae lanceolate and very slightly serrate, j1 leaf-shaped, serrate on both sides and slightly thicker than the other dorsal setae (Figure 2). Lengths of dorsal setae: j1 24 (23-25); j2 30 (29-31); j3 32 (31-34); j4 37 (36-38); j5 45 (43-46); j6 59 (52-64); J2 68 (67-71); J4 72 (69-76); z2 36 (35-37); z4 36 (34-37); z5 47 (44-50); Z1 43 (41-46); Z2 43 (45-53); Z4 59 (54-64); Z5 51 (52-53); s1 23 (22-24); s2 33 (31-36); s4 39 (34-42); s5 43 (42-44); s6 42 (42-43); S2 41 (40-42); S3 38 (37-40); S4 42 (38-45); S5 43 (42-43); r2 32 (32-34); r3 28 (27-30); r4 34 (33-35); r5 33 (31-

34). A few setae reach the bases of the subsequent setae of each series but tips of J2 and J4 do not reach the base of J4 and Z5, respectively. Pore-like structures on podonotal and opisthonotal regions were not clear and not observed.

Ventral idiosoma (Figure 3) — Tritosternum 73 (67-75) with columnar base 25 (24-26) and pilose laciniae 43 (40-44) which are fused along basal part for 18 (17-19). Sternal shield reticulate; 74 (71-79) long along midline from anterior edge to its posterior margin and 68 (66-73) wide at widest level, bearing two pairs of setae: st1 23 (22-24) and st2 22 (20-23) and two pairs of lyrifissures (iv1, iv2). Setae st3 21 (19-23) located on two small plates adjacent to posterior margin of sternal shield and st4 19 (15-21) on unsclerotized cuticle. Third pair of lyrifissures (iv3) located on posterior edge of metasternal plates. Genital shield reticulate, 78 (77-84) long at midline and 89 (86-91) wide at widest area, truncate posteriorly, bearing genital setae st5 20 (17-22); a pair of pores on soft cuticle postero-laterad of st5. Ventri-anal shield reticulate, wider than long, anterior margin with clearly depression, and a pair of pre-anal setae (Jv2) set closed together, 113 (107-

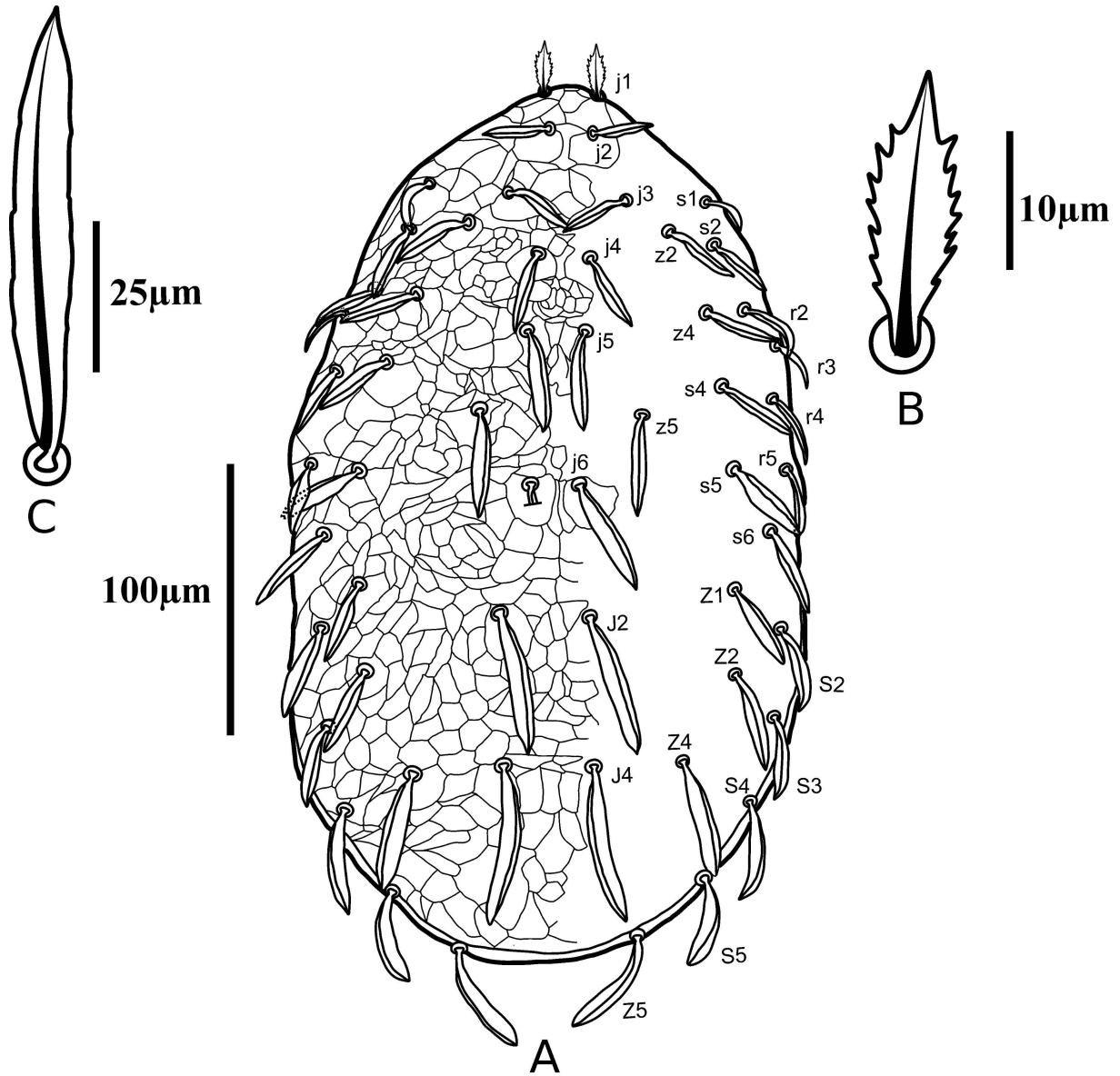


FIGURE 2: *Ameroseius eumorphus* Bregetova, 1997 (female): A – dorsal shield, B – j1, C – dorsal setae.

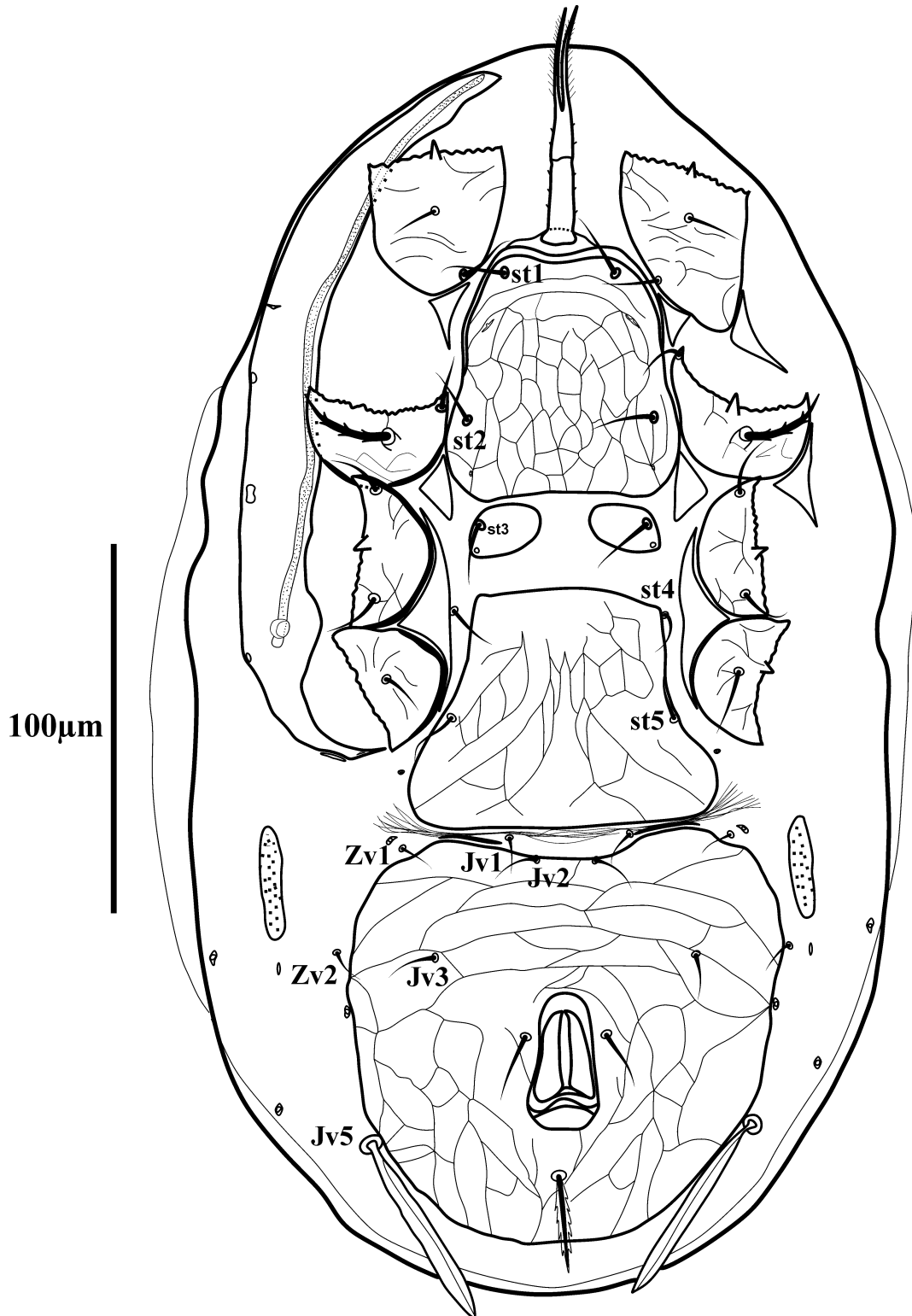


FIGURE 3: Ventral idiosoma of *Ameroseius eumorphus* Bregetova, 1997 (female).

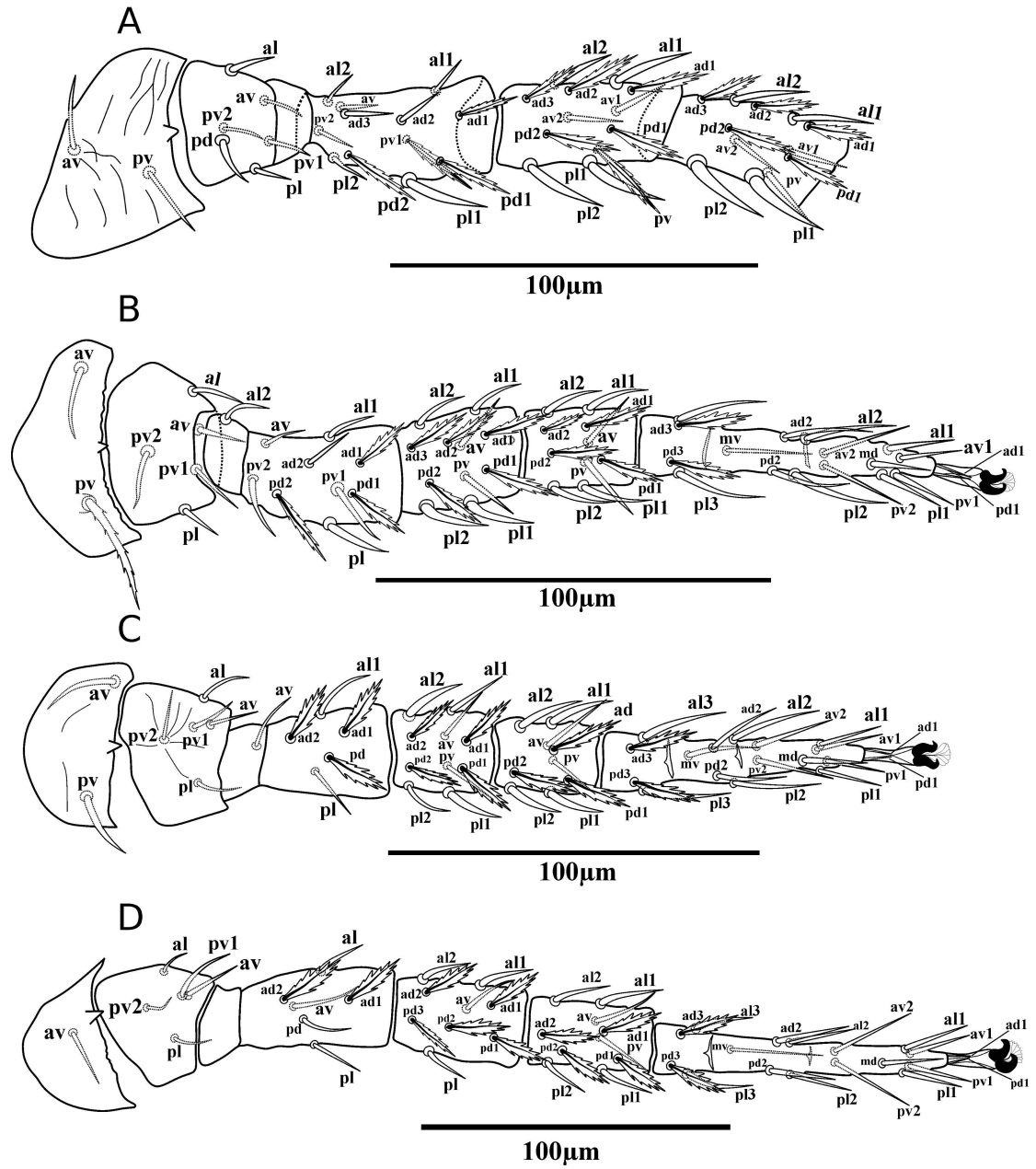


FIGURE 4: *Ameroseius eumorphus* Bregetova, 1997 (female): A - Leg I, B - Leg II, C - Leg III, D - Leg IV.



111) long at midline from the anterior margin to the posterior edge of the cribrum and 131 (127–144) wide at the widest part, bearing 2 pair of setae, Jv2 21 (18–22) and Jv3 21 (18–23) in addition to para-anal setae 19 (18–21) and post-anal seta 27 (26–28); unsclerotized cuticle of opisthogasteric region with setae Jv1 19 (15–22), Jv5 63 (58–66), Zv1 18 (16–19) and Zv2 15 (14–16), 4 pairs of lyrifissures, a pair of elongate metapodal platelets with minute platelets located at posterior margin, membranous layer and remnants platelets are between genital and ventrianal shield. All ventral setae setiform and smooth, Jv5 leaf-shaped similar to dorsal setae and post-anal seta serrate. Remnants of endopodal shield represented by a triangular platelets between coxae I and II, II and III, and stretched, curved triangular platelet between coxae III and IV. Remnants of exodopodal shield represented by a triangular platelets between coxae I-II and coxae II-III. Peritreme almost reaching level of setae j2. Peritrematal shield wide, with 5 pore-like structures and lyrifissures on exterior lateral margin: 1 lyrifissure between coxae I-II, 1 pore-like structure at level of anterior margin of coxa II, 1 large pore at level of anterior margin of coxa III, 1 pore-like structure located at posterior side of stigmatal opening and 1 lyrifissure near the tip of the shield posterior to coxa IV. A minute platelet present beneath of arched post-stigmatal plate.

Legs (Figure 4) — Tarsi of all legs with pulvilli and claws. The chaetotaxy and measurements of all leg segments are as follows:

**leg I** (Figure 4A), 347 (348–352), coxa 50 (52–55) 0 0/1 0/1 0, trochanter 27 (25–29) 1 0/1 1/2 1, basifemur 15 (14–16), telofemur 40 (36–44) 2 3/1 2/2 2, genu 45 (43–47) 2 3/2 2/1 2, tibia 44 (43–45) 2 3/2 2/1 2, tarsus (with stalk and pretarsus) 115 (113–120);

**leg II** (Figure 4B), 269 (248–290), coxa 24 (23–26) 0 0/1 0/1 0 (pv seta tick and barbed) trochanter 26 (25–27): 1 0/1 0/2 1, basifemur 14 (13–15), telofemur 41 (32–47) 2 2/1 2/2 1, genu 34 (32–36) 2 3/1 2/1 2, tibia 30 (29–31) 2 2/1 2/1 2, tarsus (with stalk and pretarsus) 93 (83–103);

**leg III** (Figure 4C), 267 (255–275), coxa 26 (24–27) 0 0/1 0/1 0, trochanter 29 (28–31) 1 0/1 0/2 1, basifemur 13 (14–16), telofemur 32 (27–36) 1 2/1 1/0 1, genu 31 (29–32) 2 2/1 2/1 2, tibia 30 (28–32) 2 1/1 2/1 2, tarsus (with stalk and pretarsus) 91 (84–97);

**leg IV** (Figure 4D), 341 (328–354), coxa 27 (21–29) 0 0/1 0/0 0, trochanter 33 (28–38) 1 0/1 0/2 1, basifemur 17 (16–18), telofemur 47 (45–51) 1 2/1 1/0 1, genu 45 (43–47) 2 2/1 2/1 2, tibia 44 (41–46) 2 2/1 2/1 2, tarsus (with stalk and pretarsus) 121 (113–127). Tarsi I-IV with 18 setae 3 3/2 3/2 3 + mv, md. Legs I and IV longer than legs II and III.

Material examined — Specimens were collected at the following places, habitats, numbers and dates: Chaharmahal Va Bakhtiari Province, Shahrekrod city (32°14'32" N, 50°50'26" E, 2039 m a.s.l.), soil, 4 females, coll. A. Khalili-Moghadam, 20 July 2013; Lordegan city (31°31'11" N, 50°37'51" E, 1482 m a.s.l.), litter, 6 females, coll. A. Khalili-Moghadam, 28 March 2014; Khuzestan Province, Ahvaz city (indeterminate), soil, 1 female, coll. A. Nemati, 5 July 1998; Ahvaz city (31°18'84" N, 48°39'89" E, 17 m a.s.l.), soil of ant nest, 4 females, coll. F. Vatankhah, 6 March 2014.

Remarks — According to Evans 1963 (p. 300) adult female of Ameroseiidae have 9 setae on tibia IV: 2-2/1-2/1-1. This is different from what was observed for *Ameroseius potchefstroomensis* (Kruger and Loots, 1980) and *A. mineiro* Narita *et al.*, 2013 (presence of pl2). According to our observations on 30 specimens of *A. eumorphus*, it revealed that this situation (the presence of pl2) also is correct for this species.

Narita *et al.* (2013) considered *plumosus* species-group includes 8 species. This species group has the following features: dorsal shield reticulate and without pit-like depressions; with 28 pairs of setae, exceptionally 26 pairs (for *Ameroseius dipankari* Bhattacharyya, 2004); dorsal setae are lanceolate to leaf-shaped, also opisthogastric region with 5–6 pairs of setae, which 2 pairs are located on ventrianal shield.

TABLE 1: Comparison of *A. eumorphus* with closely related species.

Characters	<i>Ameroseius eumorphus</i>	<i>Ameroseius potchefstroomensis</i>	<i>Ameroseius pseudoplumosus</i>	<i>Ameroseius walahbi</i>	<i>Ameroseius parplumosus</i>	<i>Ameroseius plumosus</i>	<i>Ameroseius miniro</i>
<b>No. pairs of dorsal setae</b>	28	28	28	28	28	28	28
<b>dorsal setae shape</b>	lanceolate and very slightly serrate	lanceolate and very slightly serrate	lanceolate and slightly serrate	leaf-shaped	leaf-shaped	leaf-shaped; and very slightly serrate	leaf-shaped and serrate
<b>j1 shape</b>	leaf-shaped and serrate	leaf-shaped and serrate	leaf-shaped and serrate	feather-shaped	feather-shaped	leaf-shaped; and distinctly serrate	leaf-shaped and serrate
<b>length of J2 and J4</b>	elongate, although tip not reaching base on J4, Z5, respectively	elongate, although tip not reaching base on J4, Z5, respectively	elongate, tip reaching base on J4, Z5, respectively	short, wide, tip reaching ca. 0.5x distance of J2 - J4 and J4 - Z5, respectively	short, wide, tip reaching ca. 0.5x distance of J2 - J4 and J4 - Z5, respectively	short, wide, tip reaching ca. 0.5x distance of J2 - J4 and J4 - Z5, respectively	moderate, tip reaching ca. 0.7x distance of J2 - J4 and J4 - Z5, respectively
<b>No. teeth on fixed cheliceral digit</b>	4 large teeth near the base of digit, and a subapical offset gabelzahn	4 large teeth in mid-region of digit, and 1 minute subapical tooth	4 large teeth near the base of digit, and 1 subapical tooth	5 respectively	3	4 large teeth near the base of digit and 2 minute subapical teeth	4
<b>No. teeth on movable cheliceral digit</b>	2 minute subapical teeth	2 minute subapical teeth	2 minute subapical teeth	2 (not defined in the description)	edentate	-	2 minute subapical teeth
<b>No. corniculi teeth</b>	3	3	3	2	3	3	3
<b>h1 thickness</b>	about double of setae h2-3	similar to setae h2-3	about double of setae h2-3	similar to setae h2-3	similar to setae h2-3	-	similar to setae h2-3

TABLE 1: Continued.

Characters	<i>Ameroseius eumorphus</i>	<i>Ameroseius potchefstroomensis</i>	<i>Ameroseius pseudoplumosus</i>	<i>Ameroseius wahaibi</i>	<i>Ameroseius parplumosus</i>	<i>Ameroseius plumosus</i>	<i>Ameroseius mineiro</i>
No. pairs of setae in opisthogastric region	6	6	6	5	6	6	6
post anal setae	leaf-shaped and serrate	serrate	leaf-shaped and serrate	slightly flat	pilose	leaf-shaped and serrate	leaf-shaped and serrate
sternal shield ornamentation	reticulated	about with fully reticulated	fully reticulated	without reticulation	fully reticulated	Sternal shield reticulate over most of its extension, smooth centrally with an inverted "U"-shaped with scanty striae	Sternal shield scantily reticulate over most of its extension, smooth posterocentrally
genital shield ornamentation	reticulated	without reticulation	reticulate	without reticulation	with well sclerotized and inverted U-shaped structure anteromedially	reticulate	reticulate

TABLE 2: The distribution, habitat and host of *A. eumorphus*

Locality	Habitat/Host	Reference
Iran	soil and manure	Arjomandi <i>et al.</i> 2013, Hajizadeh <i>et al.</i> 2013b, Kazemi and Rajaei 2013, Nemati <i>et al.</i> 2013
Kyrgyzstan	<i>Meriones tamariscinus</i> (Rodentia: Muridae)	Fedorova and Kharadov 2013
Latvia	soil and forests	Salmane 2005 and 2011, Salmane and Brumelis 2010
Poland	<i>Mus musculus</i> (Rodentia: Muridae)	Haitlinger and Turek 2006
Russia	under plants on a peat slope on rocks, soil from a rabbit warren	Bregetova 1977
Spain	-	Oromí and García 2009
Uzbekistan	under plants on a peat slope on rocks, soil from a rabbit warren, on woodlice	Bregetova 1977, Khamraev 2003

One species of this group is *A. eumorphus* which is similar to *Ameroseius mineiro*, *A. wahabi* (Ibrahim and Abdel-Samed, 1999), *A. parplumosus* (Nasr and Abou-Awad, 1986), *A. potchefstroomensis*, *A. plumosus* (Oudemans, 1902) and *A. pseudoplumosus* Rack, 1972. To compare *A. eumorphus* with similar species, several important taxonomic characters were considered and comparison between them is shown in Table 1.

Distribution, habitat and host of *A. eumorphus* — The distribution, habitat and host of *A. eumorphus* are presented in Table 2.

Type deposition — Collection of the Zoological Institute of the Academy of Sciences of the USSR, Leningrad.

#### *Epicriopsis baloghi* Kandil, 1978

*E. baloghi* Kandil, 1978: 165.

Distribution and habitats — This species is recorded for the first time in Iran (Saman city, 32°38'02" N, 50°51'04" E, 2009 m a.s.l.), litter, 2 females, coll. A. Khalili-Moghadam, 17 April 2014.

It was previously recorded from Hungary (Kandil 1978) and mosses in a pine forest in Latvia

(Salmane 2006 and 2011, Salmane and Brumelis 2010).

Type deposition — holotype and 5 paratypes deposited in the Hungarian Natural History Museum, Hungary; 14 paratypes in the Faculty Agricultural Sciences at Moshtohor, Egypt.

#### *Ameroseius chinensis* nom. nov.

Syn.: *Ameroseius qinghaiensis* Ma, 2008 (not *Ameroseius qinghaiensis* Li and Yang, 2000).

Ye and Ma (1993) described *Ameroseius crassisetosus* from *Apodemus sylvaticus* (Rodentia) in Xinjiang Province, China. Later, Li and Yang (2000) described *Ameroseius qinghaiensis* from compost in Qinghai Province, China. Then, Ma (2006) synonymized the two mentioned species, but according to our observation and checking of descriptions and figures of these two species and also based on the following diagnostic characters, we believe that these species are not synonyms and each of those are considered as a valid and separate species. Differential characters are as follows: dorsal shield with 27 pairs of setae in *A. qinghaiensis* and 29 pairs in *A. crassisetosus*; the length of J4 setae in *A. crassisetosus* is enough long to pass the base of Z5, but these don't reach the base of Z5 in *A. qinghaiensis*; dorsal

TABLE 3: Comparison among *A. crassisetosus* Ye and Ma, 1993; *A. qinghaiensis* Ma, 2008 and *A. qinghaiensis* Li and Yang, 2000.

Characters	<i>A. crassisetosus</i> Ye and Ma, 1993	<i>A. qinghaiensis</i> Li and Yang, 2000	<i>A. qinghaiensis</i> Ma, 2008
No. pairs of dorsal setae	29	27	29
dorsal shield ornamentation	reticulated and with some deep depression	reticulated and with some deep depression	reticulated and with simple lines
j1 shape	leaf-shaped and serrate	leaf-shaped and pilose	pilose
length of dorsal setae specially j series	tip reaching the base on next seta	tip not reaching the base on next seta	tip reaching well beyond the base of next seta
length of J2 and J4	tip reaching the base on J4, Z5, respectively	tip not reaching the base on J4, Z5, respectively	tip reaching well beyond the base on J4, Z5, respectively
dorsal setae thickness	quite thick	moderately tick	moderately tick
anterior margin of dorsal shield	with 3-6 denticles	normal (without denticles)	normal (without denticles)
anterior margin of sternal shield	slightly concave	very slightly concave	deeply concave
posterior margin of genital shield	truncate	convex	truncate
No. pairs of setae in opisthogastric region	5	5	5
No. pairs of setae on ventrianal shield	0	0	2
length and shape of Jv5 setae	short; similar to ventral setae	short; similar to ventral setae	long; similar to dorsal setae
No. corniculi teeth	2	2	3

TABLE 4: Corrected measurements for the lengths of leg segments of *Ameroseius lidiae* Bregetova, 1977.

	<b>Khalili-Moghadam and Saboori (2014)</b>	<b>Corrected lengths</b>
<b>Leg I</b>	<b>140 (136–147)</b>	<b>341 (332–359)</b>
Coxa I	21 (20–25)	51 (49–61)
Trochanter I	11 (9–15)	27 (22–37)
basi-femur I	7 (6–7)	(15–17)
Telo-femur I	20 (18–22)	49 (44–54)
Genu I	20 (18–21)	49 (44–51)
Tibia I	19 (17–21)	46 (41–51)
Tarsus I	42 (41–44)	102 (100–107)
<b>Leg II</b>	<b>120 (113–138)</b>	<b>293 (275–336)</b>
Coxa II	14 (12–15)	34 (29–36)
Trochanter II	17 (15–19)	41 (36–46)
Basi-femur II	8 (7–9)	(17–22)
Telo-femur II	17 (15–19)	41 (36–46)
Genu II	15 (13–20)	36 (31–48)
Tibia II	14 (11–20)	34 (27–49)
Tarsus II	37 (31–44)	90 (76–107)
<b>Leg III</b>	<b>112 (106–118)</b>	<b>273 (258–288)</b>
Coxa III	13 (12–14)	32 (29–34)
Trochanter III	15 (12–16)	36 (30–39)
basi-femur III	8 (6–9)	(15–22)
Telo-femur III	(14–15)	(34–36)
Genu III	13 (12–14)	32 (29–34)
Tibia III	12 (10–14)	29 (24–34)
Tarsus III	36 (35–38)	88 (85–93)
<b>Leg IV</b>	<b>137 (115–154)</b>	<b>334 (281–376)</b>
Coxa IV	14 (12–18)	34 (29–44)
Trochanter IV	19 (15–21)	46 (36–51)
basi-femur IV	(9–11)	(22–27)
Telo-femur IV	19 (15–21)	46 (37–51)
Genu IV	16 (14–19)	39 (34–46)
Tibia IV	16 (13–19)	39 (32–46)
Tarsus IV	43(37–47)	104 (90–115)

setae in *A. crassisetosus* are much thicker than those in *A. qinghaiensis*. Also, in addition to the diagnostic characters mentioned above, there are other small diagnostic characters which are shown in Table 3.

Ma (2008) collected another *Ameroseius* species from *Rattus norvegicus* (Rodentia) in Qinghai Province, China, described it as a new species and considered the same name (*Ameroseius qinghaiensis*) for it. According to original description and figures of *Ameroseius qinghaiensis* in these two papers (Li and Yang 2000 and Ma 2008), they refer to two different species. Characters distinguishing the two species are shown in Table 3. *Ameroseius qinghaiensis* Ma, 2008 is a junior primary homonym of *A. qinghaiensis* Li and Yang, 2000 now. For this reason, we propose *Ameroseius chinensis* **nom. nov.** as a replacement name for *Ameroseius qinghaiensis* Ma, 2008.

Etymology — The specific epithet is derived from the country of origin, China.

Note on *Ameroseius lidiae* Bregetova, 1977 — *Ameroseius lidiae* Bregetova, 1977 was redescribed by Khalili-Moghadam and Saboori (2014). The lengths presented for the leg segments were incorrect and the amendment data of leg segment sizes is presented as in Table 4.

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#### REFERENCES

- Allred D. 1970 — New ameroseiid mites from birds of New Guinea — *J. Med. Entomol.*, 7: 99-102. doi:10.1093/jmedent/7.1.99
- Arjomandi E., Kazemi Sh., Afshari A. 2013 — Fauna and diversity of the manure-inhabiting Mesostigmata (Acari) in Kerman County, South Eastern Iran — *Persian J. Acarol.*, 2(2): 253-263.
- Barilo A.B. 1986 — New species of gamasid mites of Veigaiidae, Antennoseiidae and Ameroseiidae families in the fauna of Middle Asia — *Zool. Zh.*, 66(8): 1264-1269.
- Berlese A. 1904 — Acari nuovi. Manipulus Ilus — *Redia* 1, 258-280.
- Bhattacharyya A.K. 2004 — A new species of *Ameroseius* (Mesostigmata, Ameroseiidae) from the Indian Thar desert — *Zootaxa*, 620: 1-7.
- Bregetova N.G. 1977 — Family Ameroseiidae (Berlese, 1919) Evans, 1961. In: Ghilyarov MS, Bregetova NG (Eds.), A key to the soil inhabiting mites. Mesostigmata — p. 148-169. (Akademia Nauka: Leningrad).
- Domrow R. 1979 — Ascid and ameroseiid mites phoretic on Australian mammals and birds — *Rec. West. Aust. Mus.*, 8: 97-116.
- Evans G.O. 1963 — Observations on the chaetotaxy of the legs in the free-living Gamasina (Acari: Mesostigmata) — *Bull. Br. Mus. (Nat. Hist.) Zool.*, 10: 275-303.
- Evans G.O., Till W.M. 1979 — Mesostigmatic mites of Britain and Ireland (Chelicerata: Acari-Parasitiformes) — An introduction to their external morphology and classification — *Trans. Zool. Soc. Lond.*, 35: 145-270. doi:10.1111/j.1096-3642.1979.tb00059.x
- Fedorova S.Zh., Kharadov A.V. 2013 — Ectoparasites of *Meriones* Ill. gerbil in Northern Kyrgyzstan — *Euroasia Entomol. J.*, 12(3): 227-232.
- Haitlinger P., Turek M. 2006 — Arthropods occurring on *Mus musculus* Linnaeus, 1758 (Mammalia: Rodentia: Muridae) in Poland — *Zesz. Nauk. UP Wroc. Biol. i Hod. Zwierz.*, LIV, 548: 43-57.
- Hajizadeh J., Ramroby S., Mašán P. 2013a — First report of two ameroseiid (Mesostigmata: Ameroseiidae) mite species from Iran and Guilan Province — *Plant Pest Res.*, 3(2): 67-71. [in Farsi].
- Hajizadeh J., Tajmiri P., Mašán P. 2013b — Redescription of *Ameroseius lanceosetis* Livshitz and Mitrofanov (Acari: Mesostigmata), with a checklist and a key to the ameroseiid mites of Iran — *Internat. J. Acarol.*, 39 (2): 146-152.
- Halliday R.B. 1997 — Revision of the Australian Ameroseiidae — *Invertebr. Taxon.*, 10: 179-201. doi:10.1071/IT96010
- Hughes A.M. 1948 — The mites associated with stored food products — London: Ministry of Agriculture, Fisheries and Food. His majesty's Stationery Office, pp. 168.
- Hughes A.M. 1961 — The mites of stored food — 1st ed. London: Technical Bulletin 9, Ministry of Agriculture,

- Fisheries and Food. Her Majesty's Stationery Office; pp. 287.
- Ibrahim G.A., Abdel-Samed M.A. 1999 — *Kleemania wahabi* n. sp., a new ameroseiid mite from Egypt (Acari: Mesostigmata) — Bull. Ent. Soc. Egypt, 70: 137-140.
- Kandil M.M. 1978 — The genus *Epicriopsis* Berlese, 1916 in Hungary (Acarina: Ameroseiidae) — Folia Entomol. Hung., 31: 165-172.
- Karg W. 1993 — Acari (Acarina), Milben Parasitiformes (Anactinochaeta) Cohors Gamasina Leach. Raubmilben — Jena, Stuttgart, New York Gustav Fischer Verlag, pp. 523.
- Kazemi Sh., Rajaei A. 2013 — An annotated checklist of Iranian Mesostigmata (Acari), excluding the family Phytoseiidae — Persian J. Acarol., 2 (1): 63-158.
- Khaleghabadian Z., Sadeghi N.H., Ardeshir F., Nemati A., Hatefi S. 2014 — Fauna of predatory mites associated with stored food mites in the North East of Iran — J. Plant Prot. 28 (4): 555-564. [In Farsi].
- Khalili-Moghadam A., Saboori A. 2014 — Ameroseiid mites (Acari: Ameroseiidae) in some parts of Iran with redescription of *Ameroseius lidiae* Bregetova — J. Crop. Prot. 3: 673-682.
- Khamraev A.Sh. 2003 — Soil organism and entocomplexes in Khorezm and Karakalpakstan (Uzbekistan) — ZEF Work Papers for Sustainable Development in Central Asia, 6: 1-67.
- Kruger A.J., Loots G.C. 1980 — Two new species of *Kleemannia* (Ameroseiidae: Mesostigmata) from Southern Africa — Wetenskaplike Bydraes van die pu vir cho. Reeks, B: Natuurwetenskappe, 103: 1-6.
- Koch C.L. 1839 — Deutschlands Crustaceen, Myriapoden und Arachniden. Ein Beitrag zur deutschen Fauna - Regensburg 24: 11.
- Li C., Yang X.Z. 2000 — *Ameroseius qinghaiensis* sp. nov. a new species from compost in Qinghai Province, Northwest China (Acari: Ameroseiidae) — Syst. Appl. Acarol., 5: 65-67. doi:10.11158/saa.5.1.8
- Lindquist E.E., Evans G.O. 1965 — Taxonomic concepts in the Ascidae, with a modified setal nomenclature for the idiosoma of the Gamasina (Acarina: Mesostigmata) — Mem. Entomol. Soc. Can., 47: 1-64. doi:10.4039/entm9747fv
- Lindquist E.E., Krantz G.W., Walter D.E. 2009 — Order Mesostigmata — In: Krantz, GW, Walter DE, editors. A Manual of Acarology. 3rd ed. Lubbock, TX, USA: Texas Tech University Press, pp. 124-232.
- Ma L.M. 2006 — New synonyms of gamasid mites (Acari: Mesostigmata) — Acta. Arachnol. Sin., 15(1): 23-26.
- Ma Y. 2008 — A new species of the genus *Ameroseius* from Qinghai, China (Acari, Ameroseiidae) — Acta. Zootaxon. Sin., 33 (4) 748-750.
- Mašán P. 1998 — *Ameroseius fungicolis* sp. n. and *A. callosus* sp. n., two new ameroseiid species (Acarina, Mesostigmata) associated with wood-destroying fungi — Biologia, 53: 645-649.
- Moraes G.J., Narita J.P.Z. 2010 — Description of a new species of *Neocypholaelaps* (Acari: Ameroseiidae) from Brazil, with a key to the world species — Zootaxa, 2554: 37-44.
- Moraza M.L. 2006 — A new species of Ameroseiidae from the Canary Islands, Spain (Acari: Mesostigmata). Internat. J. Acarol., 32(2): 163-167. doi:10.1080/01647950608684455
- Narita J.P.Z., Bernardi L.F.O., Ferreira R.L., Moraes G.J. 2013 — A new species of *Ameroseius* Berlese from Brazil, redescription of *Ameroseius plumosus* (Oudemans) and *Ameroseius plumigera* (Oudemans) (Acari: Mesostigmata: Ameroseiidae) based on the examination of type material — J. Nat. Hist., 47 (35-36): 2311-2326. doi:10.1080/00222933.2013.791888
- Narita J.P.Z., Abduch W.Y., Moraes G.J., Klingen I. 2015 — Description of a new species of *Ameroseius* Berlese (Acari: Ameroseiidae) from Norway, with a key to related species — Zootaxa, 4034 (2): 390-398.
- Nasr A.K., Abou-Awad B.A. 1986 — Four new species of family Ameroseiidae from Egypt (Acari: Mesostigmata) — Bull. Ent. Soc. Egypt, 66: 75-83.
- Nemati A., Riahi E., Gwiazdowicz D.J., Kheradmand K. 2013 — A catalogue of mesostigmatid mites of Iran-Part 3: Family Ameroseiidae — Iranian J. Entomol. 3: 18-23.
- Oromí P., García A. 2009 — List of species of Wild Canary Islands fungi, plants and terrestrial animals — Edición y financiación Gobierno de Canarias, pp. 577.
- Oudemans A.C. 1902 — New list of Dutch Acari. Second Part. — Tijdschr. Entomol., 45: 1-52.
- Oudemans A.C. 1930 — Acarologische Aanteekeningen CIV — Entomol. Ber., (Amst.) 8: 135-140.
- Rack G. 1972 — Weitere beobachtungen uber milben in neubauten mite beschreibung einer neuen Art, *Ameroseius pseudoplumosus* sp. n. (Acarina, Mesostigmata) — Ent. Mitt. Zool. Mus. Hamburg. Bd., 4 (77): 249-257.
- Salmane I. 2005 — Addition to the Latvian Mesostigmata (Acari, Parasitiformes) check-list — Latv. Entom., 42: 72-76.
- Salmane I. 2006 — New Mesostigmata (Acari, Parasitiformes) species in the fauna of Latvia — Latv. Entom., 43: 52-56.
- Salmane I. 2011 — Mesostigmata mite (Acari, Parasitiformes) fauna and habitats Division Latvia [PhD Theses] — Latvijas Universitāte Bioloģijas kolēģes (Biological degree of Doctor of Subsector: Zoology) pp. 42.




- Salmane I., Brumelis G. 2010 — Species list and habitat preference of Mesostigmata mites (Acari, Parasitiformes) in Latvia — *Acarologia*, 50(3): 373-394.
- Vargas M., Polaco O.J. 2001 — Una nueva especie del género *Kleemannia* (Gamasida: Ameroseiidae) asociada a *Dipodomys nelsoni* (Rodentia: Heteromyidae) — In: Vargas M, Polaco OJ, Zu-iga G (coords.). *Contribuciones entomológicas: Homenaje a la Dra. Isabel Basols*. Instituto Politécnico Nacional, Escuela Nacional de Ciencias Biológicas. México. p. 171-175.
- Villegas-Guzmán G.A., Parra M.G., Vargas M., Polaco O.J. 2004 — Ameroséidos asociados a nidos de *Neotoma Mexicana* Baird, 1855 (Rodentia: Muridae) y descripción de una nueva especie del género *Sertitympanum* Elsen and Whithaker, 1985 — *Acta. Zool. Mex.*, 20(1): 27-36.
- Westerboer I., Bernhard F. 1963 — Die familie Phytosei-

idae Berlese 1916 — In: Stammer H editor. *Beitrage zur Systematik und Onkologie mitteleuropaischer Acarina*. Band II, Mesostigmata I. Leipzig: Akademische Verlagsgesellschaft; pp. 451-791.

Womersley H. 1956 — Some additions to the Acarina-Mesostigmata of Australia — *Trans. R. Soc. S. Aust.*, 79: 104-120.

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