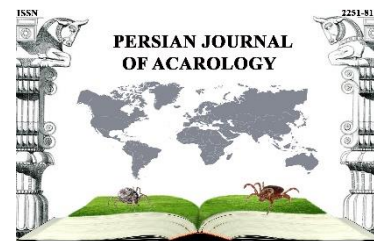




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Article

Eriophyoid (Acari: Eriophyoidea) mite fauna of Hesar village in Meshginshahr region with description of a new species

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ABSTRACT

To identify eriophyoid mites, sampling was done on dominant plants of Hesar village in Meshginshahr region of the Ardabil province during summer 2020. Two families, five subfamilies, five tribes, 12 genera and 27 species were identified among which *Cecidophyopsis hesariensis* Lotfollahi & Hemmatzadeh **sp. nov.** collected on the host plant *Lonicera iberica* M. Bieb. (Caprifoliaceae) was new to science and the second *Cecidophyopsis* species found on plants of the family Caprifoliaceae. Three species including *Aculus saliciscanae* (Nalepa, 1925), *Aceria peucedani* (Canestrini, 1892) and *Aculus eurynotus* (Nalepa, 1894) were new reports for Iran. A list of identified taxa is provided with comments and 22 species were reported for the first time in Ardabil province.

KEYWORDS: *Aceria*, *Aculus*, Ardabil, Caprifoliaceae, *Cecidophyopsis*.

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INTRODUCTION

The province of Ardabil is in the north-west of Iran, bordering the Republic of Azerbaijan and the provinces of East Azarbaijan and Zanjan, and includes the natural area of the Sabalan mountains. This province is considered the coldest in Iran and the average annual rainfall is about 400 mm, offering green and forested spaces. Meshginshahr rangelands are connected to the Sabalan mountains and have great economic and ecological importance for Nomads of the Shahsavan tribe and their livestock. Despite the very high economic importance of eriophyoid mites, so far, no comprehensive study has been done on the mites of this superfamily on the flora in the Ardabil province and no eriophyoid mites have been recorded from this province up to now, whereas many investigations have focused on other areas of Iran (Alavi *et al.* 2016).

During a survey of eriophyoid mites in these rangelands, a new species was found and described

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from the genus *Cecidophyopsis* Keifer, 1959 (Eriophyidae: Cecidophyinae). Mites of the genus *Cecidophyopsis* are characterized by vermiform body, gnathosoma rather small, projecting obliquely downwards, frontal lobe absent or very indistinct, scapular setae and related tubercles absent, all usual coxal setae present, legs with all usual segments and setae, empodium simple, opisthosomal setae *c2*, *d*, *e* and *f* present, female genital apodeme bent up and shortened, usually appearing as a heavy transverse line in ventral view and appressed to coxae, female genital coverflap provided with two uneven ranks of striae, coxae I usually narrowly connate at center line, sternal line shortened, coxae often with curved lines outlining tubercles of setae, specially setae *1a* (Amrine *et al.* 2003). Until now only *Cecidophyopsis hendersoni* (Keifer, 1954) has been collected in Iran from *Yucca glauca* Nutt., and *Y. gloriosa* (Asparagaceae) (Ramazani *et al.* 2006; Gharezare *et al.* 2013). The newly described species here was found on *Lonicera iberica* M.Bieb. (Caprifoliaceae). The species *C. cephalarius* Chetverikov, Letukhova, Marinković & Petanović, 2018 is the only *Cecidophyopsis* species known on Caprifoliaceae plant species.

This paper is aimed to provide a preliminary survey of the eriophyoid fauna of the province of Ardabil, included the description of the new *Cecidophyopsis* species.

MATERIAL AND METHODS

During the survey on eriophyoid mite fauna of Hesar village rangelands in Meshginshahr region of East Azerbaijan province, Iran, during summer 2020, samplings were done in four localities listed in Table 1.

Table 1. List of sampling localities, their geographic coordinates and altitude.

Sampling Locality	Longitude (E)	Latitude (N)	Altitude (m)
Hesar 1	47° 34' 22.27"	38° 21' 06.94"	1286
Hesar 2	47° 34' 27.54"	38° 20' 56.88"	1308
Hesar 3	47° 34' 48.22"	38° 20' 03.06"	1405
Hesar 4	47° 34' 34.73"	38° 20' 39.61"	1349

Eriophyoid mites were recovered from the plant material by means of a modified washing method developed by Monfreda *et al.* (2007). Methodology described in Mehri-Heyran *et al.* (2020) was applied for slide mounting. The terminology and the setal notation in the morphological description of the mites follow mainly Lindquist (1996) and terminology of the internal female genital apparatus follows Chetverikov (2014) and Chetverikov *et al.* (2014).

All morphological measurements were taken by means of a phase contrast microscope Olympus BX53, 1,000× magnification (oil immersion) according to Amrine and Manson (1996) as modified by de Lillo *et al.* (2010). Counting of dorsal, ventral and coxigenital semiannuli follows Lotfollahi *et al.* (2020). Measurements and means are rounded off to the nearest integer when required except of the characters with very short length. Measurements refer to the length of the morphological traits unless otherwise specified and are given in micrometers. In the female description, the holotype measurements are followed by range values, in parentheses, of the studied population (*i.e.* holotype and paratypes); for males and immature stages, only the range values are given. The mean values of the paratypes are reported when the measurements of the holotype could not be taken, due to the slide mounting position of the specimens, and are marked by an asterisk (*) in the narrative description.

Line drawings were hand-made through a *camera lucida* according to de Lillo *et al.* (2010) and the plates were edited with Adobe Photoshop CC 2017. The abbreviations labelling schematic drawings in figures follow mainly Amrine *et al.* (2003).

The eriophyoid genera classification follows Amrine *et al.* (2003) and comparisons are also made

with new genera described since that publication.

Host plant names and their synonymies are in accordance with "The World Flora Online" (2023). Type materials are deposited at the Acarology Laboratory, Department of Plant Protection, Faculty of Agriculture, Azarbaijan Shahid Madani University, Tabriz (Iran) except two paratypes which are deposited in the Acarological Collection, Jalal Afshar Zoological Museum (JAZM), Faculty of Agriculture, University of Tehran, Karaj, Iran.

RESULTS

In this study, a total of two families, five subfamilies, five tribes, 12 genera and 27 species were identified, among which three species are new records for Iran and the family Diptilomiopidae, three subfamilies, Rhyncaphytoptinae, Cecidophyinae and Phyllocoptinae, four tribes, Anthocoptini, Tegonotini, Phyllocoptini and Cecidophyini, 11 genera and 22 species were new records for Ardabil province. The highest number of mites belonged to the species *Aculops seguieranae* Lotfollahi, Haddad, Khanjani, Moghadam & de Lillo, 2012 (Table 3). Information on identified species is provided below:

Family Eriophyidae Nalepa, 1898
Subfamily Cecidophyinae Keifer, 1966
Tribe Cecidophyini Keifer, 1966

***Cecidophyopsis hesariensis* Lotfollahi & Hemmatzadeh sp. nov.**

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Description

Female (Fig. 1; measured specimens = 12) – Body vermiform, 200 (187–206, excluding gnathosoma), 42* (no range available) thick, 54 (47–62) wide. **Gnathosoma** projecting obliquely downwards, cheliceral stylets 21 (19–25), palp 24 (20–25), palp coxal setae *ep* 2 (2–3), dorsal palp genual setae *d* 6 (6–7), unbranched, palp tarsal setae *v* not observed. Suboral plate a little concave on the front anteriorly, smooth. **Prodorsal shield** 31 (31–35) including frontal lobe, 48 (40–57) wide, sub-circular; with a broad distally rounded flexible frontal lobe, 4 (4–5), over gnathosomal base. Shield pattern distinct, consisting of complete median line and admedian lines, two pairs of submedian lines and two pairs of lateral lines, made by lined dashes and in some specimens broken. Several distinct granules between lateral sides of prodorsal shield and coxal region in lateral view. Scapular setae *sc* and related tubercles absent. **Legs** with all usual segments and setae. Leg I 25 (24–27), trochanter 6 (5–7), femur 9 (8–10), genu 5 (4–5), tibia 6 (5–6), tarsus 7 (6–8), tarsal solenidion ω 7 (7–8), curved down, distally tapered, empodium simple, 6 (5–7), 5-rayed; femoral setae *bv* 10 (9–11), genual setae *l''* 24 (23–28), paraxial tibial setae *l'* 10 (8–13), located in middle of tibia, paraxial fastigial tarsal setae *ft'* 12 (11–16), antaxial fastigial tarsal setae *ft''* 20 (16–23), paraxial unguinal tarsal setae *u'* 3.5 (3.5–4). Leg II 23 (22–24), trochanter 5 (5–6), femur 9 (8–9), genu 4 (4–4.5), tibia 5 (4–5), tarsus 6 (6–8), tarsal solenidion ω 9 (7–10), curved down, distally tapered, empodium simple, 6 (6–7), 5-rayed; femoral setae *bv* 12 (9–13), genual setae *l''* 9 (7–10), paraxial fastigial tarsal setae *ft'* 6 (6–8), antaxial fastigial tarsal setae *ft''* 22 (21–26), paraxial unguinal tarsal setae *u'* 3.5 (3–4). **Coxisternal region:** prosternal apodeme indistinct, anterior setae on coxisternum I *Ib* 6 (5–7), 9 (8–10) apart; proximal setae on coxisternum I *Ia* 18 (17–22), 9 (8–11) apart; proximal setae on coxisternum II *2a* 34 (31–39), 19 (19–23) apart; 5 (no variation) microtuberculate semiannuli between coxae and genital coverflap plus 0–1 transversal rows of lined fine granules at the coverflap base. Coxae with some distinct short lines. **External genitalia** 10 (10–14), 18 (18–21) wide, coverflap with two rows (basal and distal) of longitudinal striae including 9 (8–12) on basal part and 10 (10–13) on

distal part; setae *3a* 12 (10–14), 14 (14–17) apart. **Internal genitalia:** spermathecae globose, spermathecal tubes short, slightly swollen, directed obliquely posteriad; spermathecal process distinct, longitudinal bridge shorten, anterior (transverse) genital apodeme is a transverse plate, oblique apodeme indistinct. **Opisthosoma** dorsally evenly rounded, with 61 (57–65) dorsal semiannuli, 55 (53–59) ventral semiannuli. **Microtubercles** circular, on posterior part of dorsal and ventral semiannuli; spiny on the rear margin of last 4 (4–5) dorsal semiannuli and elongated and linear on last 3 (3–4) ventral semiannuli. Setae *c2* 21 (20–25) on ventral semiannulus 6 (5–8), setae *d* 50 (50–66) on ventral semiannulus 17 (17–19); setae *e* 7 (7–11) on ventral semiannulus 30 (29–33); setae *f* 20 (18–24) on ventral semiannulus 55 (53–59); 5 annuli posterior to setae *f*. Setae *h2* 60 (55–66) apically very fine, *h1* absent.

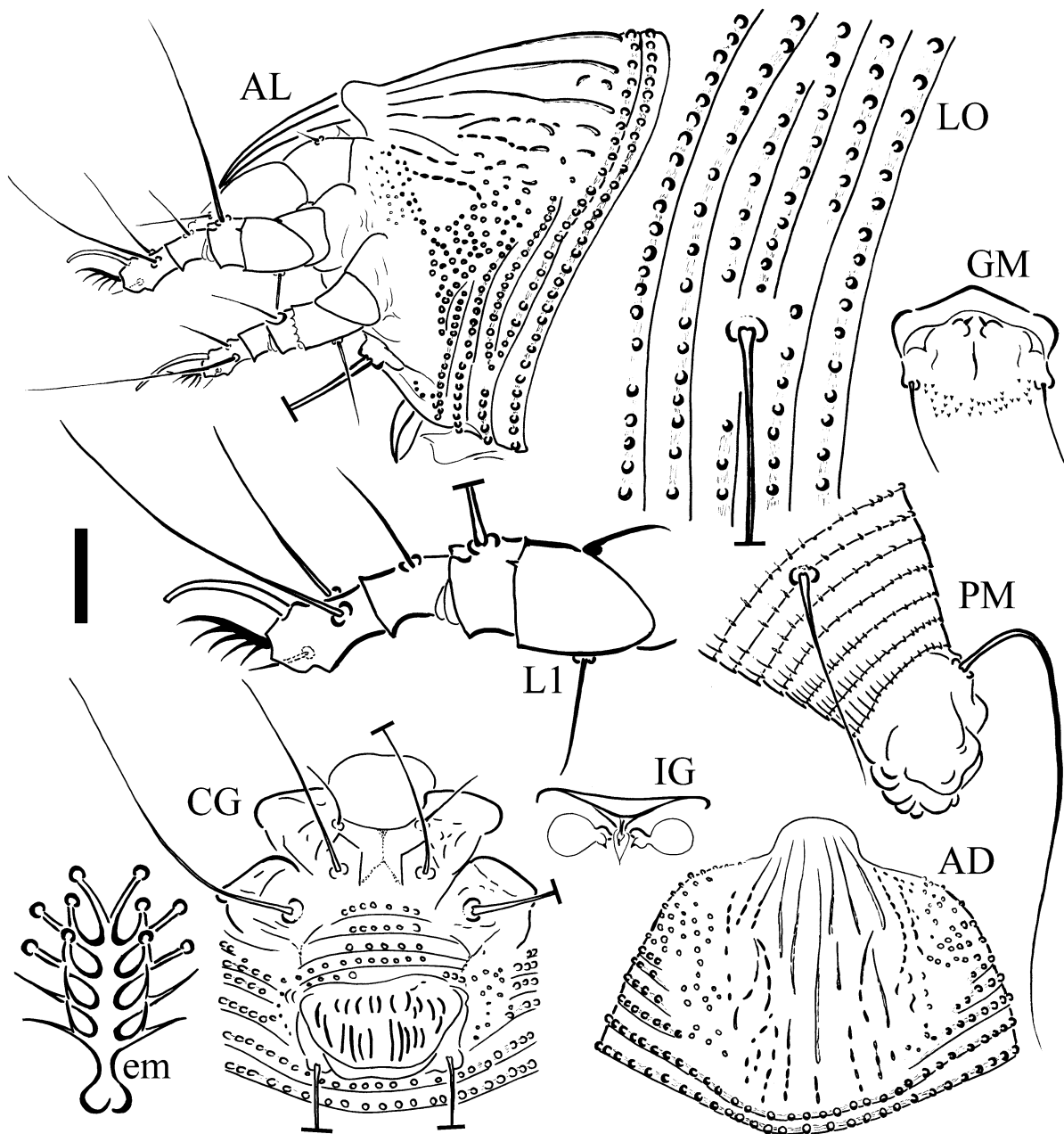


Figure 1. Schematic drawings of *Cecidophyopsis hesariensis* Lotfollahi & Hemmatzadeh sp. nov. – AD. Prodorsal shield; AL. Lateral view of anterior body region; CG. Female coxigenital region; em. Empodium; GM. Male genital region; IG. Internal female genitalia; LO. Lateral view of annuli; L1. Leg I; PM. Lateral view of posterior opisthosoma. Scale bar: 10 μ m for AD, AL, CG, GM, IG, PM; 7 μ m for LO, L1; 2.5 μ m for em.

Male (Fig. 1-GM; measured specimens = 2) – Similar in shape and prodorsal shield arrangement to female. Body smaller than female, 146–152 (excluding gnathosoma), 43–44 wide; palp genual setae *d* 5–6; prodorsal shield 31–33, 32–42 wide; scapular setae *sc* and related tubercles absent. Opisthosoma with 54–55 dorsal semiannuli and 50–52 ventral semiannuli; 5 semiannuli between coxae and genitalia, with microtubercles similar to that of female. Setae: *Ib* 5, *Ia* 17–19, *2a* 27–29, *c2* 18–20, *d* 28–31, *e* 8, *f* 14–17, *h1* absent, *h2* 31–40. Male genitalia 16–17 wide, setae *3a* 10, 14–16 apart.

Nymph (Fig. 2; measured specimen = 1) – Body vermiform, 142 (excluding gnathosoma), 42 wide; palp genual setae *d* 5. Prodorsal shield 25 including frontal lobe, 37 wide, sub-circular. Shield pattern similar to female but not completely formed. Scapular setae *sc* and related tubercles absent. Opisthosoma with 50 dorsal semiannuli with circular microtubercles set on rear part of semiannuli, 41 ventral semiannuli with circular microtubercles, elongated on the posterior semiannuli. Setae: *Ib* 2, *Ia* 10, *2a* 20, *c2* 15, *d* 30, *e* 5, *f* 13, *h2* 34, *h1* absent. Setae *3a* 7, 8 apart on semiannulus 9 after coxae.

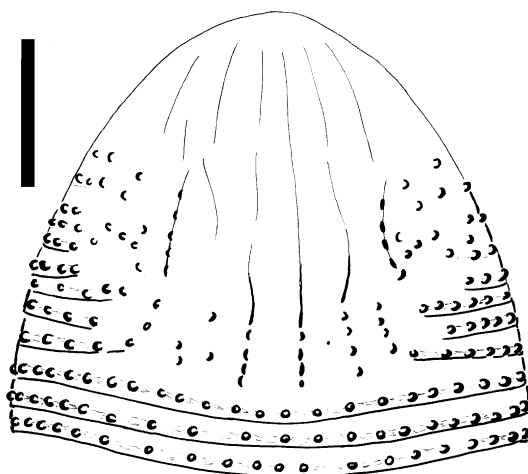


Figure 2. Schematic drawings of *Cecidophyopsis hesariensis* Lotfollahi & Hemmatzadeh **sp. nov.** – Nymph prodorsal shield. Scale bar: 10 μ m.

Type host plant

Lonicera iberica M.Bieb. (Caprifoliaceae).

Type locality

Hesar village, Meshginshahr region, Ardabil province, Iran (38° 20' 09.60" N, 47° 34' 43.86" E), 1405 m above sea level (Table 2), coll. H. Hemmatzadeh, 7 August 2020.

Type material

Holotype: single female on a microscope slide (Lsp-IA-MR-HR-2020-H-1). Paratypes: 11 females, 2 males and 1 nymph mounted singly on separate microscope slides (Lsp-IA-MR-HR-2020-H-2–15).

Other materials

Mites preserved in a vial (Lsp-IA-MR-HR-2020-H) of Oudemans' fluid (Walter and Krantz 2009) as extracted from the same sample as the type specimens; 2 females from *Scabiosa ochroleuca* L. (Caprifoliaceae) in the same locality of type specimens (Table 2).

Table 2. Differences between *Cecidophyopsis cephalarius* Chetverikov *et al.*, 2018 and *Cecidophyopsis hesariensis* Lotfollahi & Hemmatzadeh **sp. nov.**

Character	<i>C. hesariensis</i> sp. nov.	<i>C. cephalarius</i>
Body length	187–206	205–228
Body width	52–62	60–67
Dorsal semiannuli number	57–65	53–59
Ventral semiannuli number	53–59	56–61
Semiannuli between coxae and genitalia coverflap	5	2–3 (5 in the drawing)
Last dorsal semiannuli without microtubercles	0	12–15
Last dorsal semiannuli with spiny microtubercles	4–5	-
Last ventral semiannuli with elongated microtubercles	3–4	5–6
Setae <i>1b</i> length	5–7	7–9
Tubercles of setae <i>1b</i> distance	8–10	10–13
Setae <i>1a</i> length	17–20	13–18
Tubercles of setae <i>2a</i> distance	19–23	22–26
Setae <i>d</i> length	50–66	32–40
Setae <i>h2</i> length	55–66	38–47
Setae <i>3a</i> length	10–14	6–9

Relation to the host plant

Vagrant; no symptoms were observed.

Distribution

Cecidophyopsis hesariensis Lotfollahi & Hemmatzadeh **sp. nov.** has been found only in Meshginshahr. However, *Lonicera* species are widely distributed in Ardabil province so future surveys could reveal a wider distribution for this new mite species.

Etymology

This species is named after the village where it was collected.

Differential diagnosis

Cecidophyopsis cephalarius Chetverikov *et al.*, 2018 was the only *Cecidophyopsis* species found on plants of family Caprifoliaceae. This species was found and described on *Cephalaria demetrii* Bobr. in Crimea, Karadag Nature Reserve. The new species differs from this species in ornamentations and morphometry. Prodorsal shield pattern of the new species is distinct, consisting of complete median and admedian lines, two pairs of submedian lines and two pairs of lateral lines, made by dashed lines and in some specimens broken. In addition, there are also several distinct granules between lateral sides of prodorsal shield and coxal region in lateral view. The prodorsal shield pattern of *C. cephalarius* consists of large round microtubercles forming median, two admedian and two submedian lines, whereas the lateral fields of the prodorsal shield and the epicoxal areas are provided with tiny microtubercles. The coxae of the new species are ornamented with some distinct short lines, while in *C. cephalarius* there are a few indistinct microgranulations and curved ridges on coxae. Female genital coverflap of the new species is ornamented with two rows of longitudinal striae including 8–12 on basal part and 10–13 on distal part, while the genital coverflap of *C. cephalarius* is rounded, with tiny round microtubercles on basal part and 11–13 longitudinal ridges on distal part. The new species is smaller than *C. cephalarius* and there are differences in some morphometric characters between the two species that are listed in Table 2. Also, the host plants of two species are different.

Remarks

This is the second *Cecidophyopsis* species found on plants of family Caprifoliaceae and the second *Cecidophyopsis* species found in Iran.

Subfamily Eriophyinae Nalepa, 1898
Tribe Acerini Amrine & Stasny, 1994

Aceria chondrillae (Canestrini, 1890) – collected from *Chondrilla juncea* L. (Asteraceae) and occasionally collected from *Xeranthemum squarrosum* Boiss. (Asteraceae) in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Aceria tosichella species complex – occasionally collected from *Euphorbia seguieriana* Neck. (Euphorbiaceae), *Astragalus gummifer* Labill. (Fabaceae), *Chenopodium album* L. (Amaranthaceae), *Urtica dioica* L. (Urticaceae), *Arctium lappa* Willd. (Asteraceae), *Scabiosa ochroleuca* L. (Caprifoliaceae), *Mentha asiatica* Boriss. (Lamiaceae), *Echium italicum* L. (Boraginaceae), *Echinops iranshahrii* Rech.f. (Asteraceae) and two unknown species from the families Ranunculaceae and Apiaceae in four localities (Table 3). This is a new record to the fauna of Ardabil province.

Aceria xeranthemis Lotfollahi *et al.* 2013 – collected from *X. squarrosum* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Aceria squalida (Nalepa, 1892) – collected from *S. ochroleuca* and occasionally collected from *E. seguieriana* in two localities (Table 3). This is a new record to the fauna of Ardabil province.

Aceria kiefferi (Nalepa, 1891a) – collected from *Achillea micrantha* Willd. (Asteraceae) and occasionally collected from *M. asiatica* in two localities (Table 3). This is a new record to the fauna of Ardabil province.

Aceria anthocoptes (Nalepa, 1892) – occasionally collected from *A. gummifer* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Aceria peucedani (Canestrini, 1892) – collected from *Eryngium campestre* L. (Apiaceae) in two localities (Table 3). This is a new record to the fauna of Iran.

Aceria longisolenidia Lotfollahi, Haddad & de Lillo, 2015 – occasionally collected from *A. gummifer* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Aceria begdiliorum Lotfollahi & Hemmatzadeh, 2022 – (in Hemmatzadeh-khorshidabadi *et al.* 2022): collected from *A. gummifer* in two localities (Table 3).

Aceria inturbida Boczek, 1961 – collected from *A. lappa* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Aceria loborectiangulae Lotfollahi & Tajaddod, 2018 – (in Tajaddod *et al.* 2018): collected from *Atraphaxis spinosa* L. (Polygonaceae) in one locality (Table 3). This is a new record to the fauna of Ardabil province and also the first record of this mite from the host plant *A. spinosa*.

Subfamily Phyllocoptinae Nalepa, 1892
Tribe Anthocoptini Amrine & Stasny, 1994

Aculops maroccensis Keifer, 1972 – collected from *M. asiatica* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Aculops seguieranae Lotfollahi, Irani-Nejad, Khanjani, Moghadam & de Lillo, 2012 – collected from *E. seguieriana*, and occasionally collected from *A. gummifer*, *C. album*, *S. ochroleuca* and *Echinops iranshahrii* Rech.f. (Asteraceae) in four localities (Table 3). This is a new record to the fauna of Ardabil province.

Aculodes capillaris Skoracka, 2003 – occasionally collected from *A. gummifer*, *C. album* and *M. asiatica* in three localities (Table 3). This is a new record to the fauna of Ardabil province.

Aculodes altamurgiensis de Lillo & Vidović, 2018 – (in de Lillo *et al.* 2018): occasionally collected from *A. gummifer* and *Lonicera iberica* M. Bieb (Caprifoliaceae) in two localities (Table 3). This is a new record to the fauna of Ardabil province.

Aculus salicisincanae (Nalepa, 1925) – occasionally collected from *C. album* in one locality (Table 3). This is a new record to the fauna of Iran.

Aculus mogeri (Farkas, 1960) – collected from *Populus nigra* L. (Salicaceae) and occasionally collected from *A. spinosa*, *A. gummifer* and *C. album* in two localities (Table 3). This is a new record to the fauna of Ardabil province.

Table 3. List of surveyed species, their distribution and number of collected specimens distinct for localities during the current survey; two dominant species marked by one asterisk (*). H1–4 = Hesar 1–4.

Species	N				
	H1	H2	H3	H4	Total
<i>Cecidophyopsis hesariensis</i> Lotfollahi & Hemmatzadeh sp. nov.	-	-	17	-	17
<i>Aceria chondrillae</i> (Canestrini, 1890)	-	-	10	-	10
<i>Aceria tosichella</i> species complex	69	5	85	6	165
<i>Aceria xeranthemis</i> Lotfollahi <i>et al.</i> , 2013	-	-	20	-	20
<i>Aceria squalida</i> (Nalepa, 1892)	-	2	23	-	25
<i>Aceria kiefferi</i> (Nalepa, 1891)	8	-	-	1	9
<i>Aceria anthocoptes</i> (Nalepa, 1892)	1	-	-	-	1
<i>Aceria peucedani</i> (Canestrini, 1892)	-	-	1	8	9
<i>Aceria longisolenidia</i> Lotfollahi <i>et al.</i> , 2015	-	-	6	-	6
* <i>Aceria begdiliorum</i> Lotfollahi & Hemmatzadeh, 2022	-	-	1488	188	1676
<i>Aceria inturbida</i> Boczek, 1961	-	-	1	-	1
<i>Aceria loborectiangulae</i> Lotfollahi & Tajaddod, 2018	-	-	-	18	18
<i>Aculops maroccensis</i> Keifer, 1972	-	-	-	5	5
* <i>Aculops seguieranae</i> Lotfollahi <i>et al.</i> , 2012	51	1	5090	1949	7091
<i>Aculodes capillaris</i> Skoracka, 2003	21	-	6	21	48
<i>Aculodes altamurgiensis</i> de Lillo & Vidović, 2018	11	-	1	-	12
<i>Aculus salicisincanae</i> (Nalepa, 1925)	-	-	8	-	8
<i>Aculus mogeri</i> (Farkas, 1960)	-	-	28	1	29
<i>Aculus fockeui</i> (Nalepa & Trouessart, 1890)	94	13	8	6	121
<i>Aculus eurynotus</i> (Nalepa, 1894)	11	1	13	-	25
<i>Abacarus hystrix</i> species complex	11	4	12	2	29
<i>Tegoprionus dentatus</i> (Nalepa, 1891)	5	-	-	-	5
<i>Shevtchenkella denticulata</i> Lotfollahi <i>et al.</i> , 2014	-	-	11	-	11
<i>Phyllocoptes abaenus</i> Keifer, 1940	5	-	-	6	11
<i>Calepitrimerus baileyi</i> Keifer, 1938	37	3	32	6	78
<i>Leipothrix mazandaranicus</i> Ranjbar-Varandi <i>et al.</i> , 2020	-	-	12	1	13
<i>Quadracus urticae</i> Keifer, 1944	-	-	1	-	1

Aculus fockeui (Nalepa & Trouessart, 1890) – (in Nalepa, 1890): occasionally collected from *E. seguieriana*, *A. gummifer*, *C. album*, *U. dioica*, *A. lappa*, *S. ochroleuca*, *Eryngium campestre* L. (Apiaceae), unknown species from the family Ranunculaceae and unknown species from the family Apiaceae in four localities (Table 3). This is a new record to the fauna of Ardabil province.

Aculus eurynotus (Nalepa, 1894) – collected from unknown species from the family Apiaceae and occasionally collected from *A. gummifer* in three localities (Table 3). This is a new record to the fauna of Iran.

Abacarus hystrix species complex – occasionally collected from *A. gummifer*, *C. album*, *U. dioica*, *A. lappa*, *S. ochroleuca*, *Echium italicum* L. (Boraginaceae) and unknown species from the

family Ranunculaceae in four localities (Table 3). This is a new record to the fauna of Ardabil province.

***Tegoprionus dentatus* (Nalepa, 1891b)** – occasionally collected from *A. gummifer* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Tribe Tegenotini Bagdasarian, 1978

***Shevtchenkella denticulata* Lotfollahi, de Lillo & Haddad, 2014** – collected from *E. campestre* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

Tribe Phyllocoptini Nalepa, 1892

***Phyllocoptes abaenus* Keifer, 1940** – occasionally collected from *E. seguieriana* and *A. gummifer* in two localities (Table 3). This is a new record to the fauna of Ardabil province.

***Calepitrimerus baileyi* Keifer, 1938** – occasionally collected from *E. seguieriana*, *A. gummifer*, *U. dioica*, *C. album*, *A. lappa*, *S. ochroleuca*, *E. italicum*, *E. campestre*, *P. nigra* and unknown plant species of the family Apiaceae in four localities (Table 3). This is a new record to the fauna of Ardabil province.

***Leipothrix mazandaranicus* Ranjbar-Varandi, Haddad Irani-Nejad & Lotfollahi, 2020** – collected from *U. dioica*, and occasionally collected from *M. asiatica* in two localities (Table 3). This is a new record to the fauna of Ardabil province.

Family Diptilomiopidae Keifer, 1944

Subfamily Rhyncaphyoptinae Roivainen, 1953

***Quadracus urticae* Keifer, 1944** – occasionally collected from *S. ochroleuca* in one locality (Table 3). This is a new record to the fauna of Ardabil province.

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REFERENCES

- Alavi, A., Zolali, F. & Zendeh-del, N. (2016) *A handbook for investment in Ardabil Provinces (projects, benefits, rules and regulations)*. Economic and financial affairs administration of Ardabil Province, 152 pp.
- Amrine, J.W. Jr. & Manson, D.C.M. (1996) Preparation, mounting and descriptive study of Eriophyoid mites. In: Lindquist, E.E., Sabelis, M.W. & Bruin, J. (Eds.), *Eriophyoid mites. Their biology, natural enemies and control*. World Crop Pests, Vol. 6, Elsevier Science Publishers, Amsterdam, The Netherlands: pp. 383–396. DOI: [10.1016/S1572-4379\(96\)80023-6](https://doi.org/10.1016/S1572-4379(96)80023-6)
- Amrine, J.W. Jr., Stasny, T.A.H. & Flechtmann, C.H.W. (2003) *Revised keys to world genera of Eriophyoidea (Acari: Prostigmata)*. Indira Publishing House, West Bloomfield, Michigan, USA, 244 pp.

- Boczek, J. (1961) Badania nad roztoczymi z rodziny Eriophyidae (Szpecielowate) w Polsce. I. [Studies on eriophyid mites of Poland. I]. *Prace Naukowe Instytutu Ochrony Roslin, Poznan*, 3(2): 5–85.
- Canestrini, G. (1891) Ricerche intorno ai fitoptidi. *Atti Società Veneta di Scienze Naturali, Padova*, 12(1): 40–63
- Canestrini, G. (1892) Sopra due nuove specie di *Phytoptus*. (Quinta serie). *Atti Società Veneta di Scienze Naturali, Padova*, (1891) 12(2): 377–378.
- Chetverikov, P.E. (2014) Comparative confocal microscopy of internal genitalia of phytoptine mites (Eriophyoidea, Phytoptidae): new generic diagnoses reflecting host-plant associations. *Experimental Applied Acarology*, 62: 129–160. DOI: [10.1007/s10493-013-9734-2](https://doi.org/10.1007/s10493-013-9734-2)
- Chetverikov, P.E., Craemer, C., Vishnyakov, A.E. & Sukhareva, S.I. (2014) CLSM anatomy of internal genitalia of *Mackiella reclinata* n. sp. and systematic remarks on eriophyid mites from the tribe Mackiellini Keifer, 1946 (Eriophyoidea, Phytoptidae). *Zootaxa*, 3860(3): 261–279. DOI: [10.11646/zootaxa.3860.3.5](https://doi.org/10.11646/zootaxa.3860.3.5)
- Chetverikov, P.E., Letukhova, V.YU., Marinković, S.M. & Petanović, R.U. (2018) Three new species and new records of eriophyid mites (Acari, Eriophyoidea) from Karadag Nature Reserve, Crimea. *Systematic and Applied Acarology*, 23(4): 628–642. DOI: [10.11158/saa.23.4.5](https://doi.org/10.11158/saa.23.4.5)
- de Lillo, E., Craemer, C., Amrine, J.W. Jr. & Nuzzaci, G. (2010) Recommended procedures and techniques for morphological studies of Eriophyoidea (Acari: Prostigmata). *Experimental and Applied Acarology*, 51(1–3): 283–307. DOI: [10.1007/S10493-009-9311-x](https://doi.org/10.1007/S10493-009-9311-x)
- de Lillo, E., Vidović, B., Petanović, R., Cristofaro, M., Marini, F., Augé, M., Cvrković, T., Babić, E., Mattia, C., Lotfollahi, P. & Rector, B.G. (2018) A new *Aculodes* species (Prostigmata: Eriophyoidea: Eriophyidae) associated with medusahead, *Taeniatherum caput-medusae* (L.) Nevski (Poaceae). *Systematic and Applied Acarology*, 23(7): 1217–1226. DOI: [10.11158/saa.23.7.1](https://doi.org/10.11158/saa.23.7.1)
- Farkas, H.K. (1960) Über die Eriophyiden (Acarina) Ungarns. I. Beschreibung neuer und wenig bekannter Arten. *Acta Zoologica Academiae Scientiarum Hungaricae*, 6: 315–339.
- Gharezare, M., Kamali, H. & Shirdel, D. (2013) Mite fauna of the superfamily Eriophyoidea (Acari: Prostigmata) associated with landscape plants and trees in Mashhad city, Iran. *Proceedings of the 2nd International Persian Congress of Acarology, 29–31 August, University of Tehran, Iran*, p. 11.
- Hemmatzadeh-khorshidabadi, H., Lotfollahi, P., Mehrvar, A., Shiri, J. & de Lillo, E. (2022) Two new *Aceria* species (Acari: Eriophyidae) from Meshginshahr rangelands, Iran. *Systematic and Applied Acarology*, 27(9): 1687–1701. DOI: [10.11158/saa.27.9.1](https://doi.org/10.11158/saa.27.9.1)
- Keifer, H.H. (1938) Eriophyid studies II. *Bulletin of the Department of Agriculture, State of California*, 27: 301–323.
- Keifer, H.H. (1940) Eriophyid studies VIII. *Bulletin of the Department of Agriculture, State of California*, 29: 21–46.
- Keifer, H.H. (1944) Eriophyid studies XIV. *Bulletin of the Department of Agriculture, State of California*, 33: 18–38.
- Keifer, H.H. (1954) Eriophyid studies XXII. *Bulletin of the Department of Agriculture, State of California*, 43: 121–131.
- Keifer, H.H. (1959) Eriophyid studies XXVI. *Bulletin of the Department of Agriculture, State of California*, 47: 271–281.
- Keifer, H.H. (1972) Eriophyid studies C-7. *Agricultural Research Service- U.S. Department of Agriculture*, pp. 1–24.

- Lindquist, E.E. (1996) External anatomy and notation of structures. *In*: Lindquist, E.E., Sabelis, M.W. & Bruin, J. (Eds.), *Eriophyoid mites. Their biology, natural enemies and control*. World Crop Pests, Vol. 6, Elsevier Science Publishers, Amsterdam, The Netherlands, pp. 3–31. DOI: [10.1016/S1572-4379\(96\)80003-0](https://doi.org/10.1016/S1572-4379(96)80003-0)
- Lotfollahi, P., de Lillo, E. & Haddad Irani-Nejad, K. (2014) Three new species from the subfamily Phyllocoptinae (Acari, Trombidiformes, Eriophyidae) in Iran. *ZooKeys*, 426: 17–27.
- Lotfollahi, P., Haddad Irani-Nejad, K. & de Lillo, E. (2015) Two new *Aceria* species (Acari: Trombidiformes: Eriophyidae) from Hilevar village, East Azerbaijan, Iran. *International Journal of Acarology*, 41(4): 283–289. DOI: [10.1080/01647954.2015.1028439](https://doi.org/10.1080/01647954.2015.1028439)
- Lotfollahi, P., Haddad Irani-Nejad, K., Khanjani, M., Moghadam, M. & de Lillo, E. (2012) Two new eriophyoid mite species (Acari: Prostigmata: Eriophyidae) on *Euphorbia* spp. (Euphorbiaceae) from Iran. *Zootaxa*, 3556: 55–60.
- Lotfollahi, P., Haddad Irani-Nejad, K., Khanjani, M., Maghadam, M. & de Lillo, E. (2013) Eriophyoid mites (Acari: Prostigmata: Eriophyidae) associated with Compositae in Iran. *Zootaxa*, 3664(3): 349–360. DOI: [10.11646/zootaxa.3664.3.5](https://doi.org/10.11646/zootaxa.3664.3.5)
- Lotfollahi, P., Ranjbar-Varandi, F., Bahirai, F., Jafari, S. & Shakarami, J. (2020) Two new *Aceria* species (Acari: Eriophyidae) from Lorestan Province of Iran. *Systematic and Applied Acarology*, 25: 1169–1177. DOI: [10.11158/saa.25.7.1](https://doi.org/10.11158/saa.25.7.1)
- Mehri-Heyran, H., Lotfollahi, P., de Lillo, E. & Azimi, S. (2020) Eriophyoid (Trombidiformes: Eriophyoidea) mite fauna of Miandoab region in Iran with redescription of *Aceria kiefferi* (Nalepa). *Persian Journal of Acarology*, 9(2): 161–171. DOI: [10.22073/pja.v9i2.59382](https://doi.org/10.22073/pja.v9i2.59382)
- Monfreda, R., Nuzzaci, G. & de Lillo, E. (2007) Detection, extraction, and collection of eriophyoid mites. *Zootaxa*, 1662: 35–43.
- Nalepa, A. (1890) Neue Phytoptiden. *Akademie Wissenschaften. Mathematische-naturwissenschaftliche Klasse, Wien*, 27(20): 212–213.
- Nalepa, A. (1891a) Genera und Species der Familie Phytoptida. *Denkschriften der Kaiserlichen Akademie der Wissenschaften. Mathematische-naturwissenschaftliche, Wien*, 58: 867–884.
- Nalepa, A. (1891b) Neue Gallmilben. 1. Fort. *Anzeiger der kaiserlichen Akademie Wissenschaften. Mathematische-naturwissenschaftliche Klasse, Wien*, 28(19): 198–199.
- Nalepa, A. (1892) Neue Arten der Gattung *Phytoptus* Duj. und *Cecidophyes* Nal. kaiserlichen Akademie Wissenschaften. *Mathematische-naturwissenschaftliche, Wien*, 59: 525–540 + 4 pls.
- Nalepa, A. (1894) Neue Gallmilben. 9. Fort. *Anzeiger der kaiserlichen Akademie Wissenschaften. Mathematische-naturwissenschaftliche Klasse, Wien*, 31(4): 1–38.
- Nalepa, A. (1925) Beiträge zur Kenntnis der Weiden-Gallmilben. *Marcellia*, 21(1–6): 31–58.
- Ramazani, L., Mosaddegh, M.S., Shishehbor, P. & Kamali, K. (2006) Seven new records of eriophyoid mites on weeds from Iran. *The Proceedings 17th Plant Protection Congress Iran, Faculty of Agriculture, University of Tehran, Karaj, Iran*, p. 18.
- Ranjbar-Varandi, F., Haddad Irani-Nejad, K. & Lotfollahi, P. (2020) Two new eriophyid species (Acariformes: Eriophyidae) from North of Iran. *Systematic and Applied Acarology*, 25(7): 1178–1187. DOI: [10.11158/saa.25.7.2](https://doi.org/10.11158/saa.25.7.2)
- Skoracka, A. (2003) New species of *Aculodes* (Acari: Eriophyoidea) from grasses in Poland. *Acta Zoologica Academiae Scientiarum Hungaricae*, 49(1): 43–60.
- Tajaddod, S., Lotfollahi, P. & de Lillo, E. (2018) Two new *Aceria* species (Acari: Trombidiformes: Eriophyoidea) from Ajabshir, Iran. *Systematic and Applied Acarology*, 23(2): 305–313. DOI: [10.11158/saa.23.2.7](https://doi.org/10.11158/saa.23.2.7)

The World Flora Online (2023) World Flora Online. Available from <http://www.worldfloraonline.org/taxon/wfo-0000125895> (Accessed on 28 February 2023).

Walter, D.E. & Krantz, G.W. (2009) Collecting, rearing, and preparing specimens. *In*: Krantz, G.W. & Walter, D.E. (Eds.), *A Manual of Acarology*. Third Edition. Texas Tech University Press, Lubbock, Texas, USA, pp. 83–96.

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فون کنه‌های اریوفیوئید (Acari: Eriophyoidea) روستای حصار منطقه مشکین‌شهر همراه با توصیف گونه‌ای جدید

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چکیده

برای شناسایی کنه‌های اریوفیوئید، نمونه‌برداری از گیاهان غالب روستای حصار منطقه مشکین‌شهر استان اردبیل طی تابستان ۱۳۹۹ انجام شد که در نتیجه دو خانواده، پنج زیرخانواده، پنج قبیله، ۱۲ جنس و ۲۷ گونه شناسایی شدند که از بین آن‌ها *Cecidophyopsis hesariensis* Lotfollahi & Hemmatzadeh **sp. nov.** جمع‌آوری شده از روی گیاه میزبان *Lonicera iberica* M. Bieb (Caprifoliaceae) برای جهان جدید بود و دومین گونه *Cecidophyopsis* بود که از روی گیاهان خانواده Caprifoliaceae یافت شده است. سه گونه شامل *Aculus* (*Aculus eurynotus* (Nalepa, 1894) و *Aceria peucedani* (Canestrini, 1892) *salicisincanae* (Nalepa, 1925) جدیدی برای فون ایران هستند. فهرست آرایه‌های شناسایی شده همراه با توضیحاتی ارائه شده است و ۲۲ گونه برای نخستین بار از استان اردبیل گزارش می‌شود.

واژگان کلیدی: *Aculus* *Aceria*، اردبیل، Caprifoliaceae، *Cecidophyopsis*.

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