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## **Oribatid mites (Acari: Oribatida) from Alborz Province: new records for the fauna of the province and Iran**

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### **Abstract**

In the course of a faunistic survey on oribatid mites in Alborz Province, northern Iran, 18 species belonging to 14 genera and 12 families identified from soil and litter samples. Of which, one genus and four species are new records for mite fauna of Iran. All species are new for the mite fauna of the province. For new species records, a brief diagnostic characterization is provided (marked by \*).

Key words: Sarcotiformes, new records, Alborz Province, Iran.

### **Zusammenfassung**

Im Rahmen einer faunistischen Erhebung über Oribatidenmilben in der Provinz Alborz, Nordiran, wurden 18 Arten von 14 Gattungen und 12 Familien aus Boden- und Streuproben identifiziert. Davon sind eine Gattung und vier Arten Neubefunde für die Milbenfauna Irans; alle Arten sind Neubefunde für die Milbenfauna der Provinz. Neue Arten werden kurz diagnostisch charakterisiert (gekennzeichnet durch \*).

### **Introduction**

Alborz Province is the smallest province of Iran, located in the north of Iran, covers an area of 5,833 sq. km., bounded on the north by Mazandaran, on the east by Tehran, on the south by Markazi and Tehran and on the west by Qazvin Provinces. The province was formed by division of Tehran Province into two provinces in 2010, and situated 35 km northwest of Tehran at the foothill of the Alborz Mountains. This province has six counties including Karaj (capital of the province, with latitude and longitude of 35° 49' N and 50° 59' E respectively; elevation: 1,312 meter above sea level), Savojbolagh, Taleqan, Eshtehard, Fardis and Nazarabad (Figure 1).

Among the arthropods (Phylum Arthropoda), oribatid mites (Acari: Oribatida) are the most numerous and probably the most species-rich mite group (GULVIK 2007) that have had remarkable evolutionary success, with regard to species richness, variety of habitats colonized (mostly soil and litter, moss, barks of the trees, water, etc.), life-cycle variation and reproductive pattern (LEBRUN & VAN STRAALLEN 1995; NORTON & BEHAN-PELLETIER 2009). Almost 11,000 oribatid species and subspecies, representing 163 families, have been described (SUBIAS 2004, updated 2018).

There is little information on the oribatid mites of this province. Some new records were published by AKRAMI (2015) and KESHAVARZ JAMSHIDIAN et al. (2015). Here, we present the first records of some oribatid mites from Alborz Province and Iran.

### Materials and methods

During 2012 and 2013, the terrestrial oribatid mite fauna of Alborz Province, northern Iran, was investigated. Soil and litter samples were taken under different plants in different regions of the province and transferred into the Acarology laboratory of Plant Protection



Figure 1. Map of Iran (background), specifying Alborz Province and map of Alborz Province (foreground), showing the counties.

Department, Faculty of Agriculture, University of Tehran, Karaj. Mites were extracted from samples by using the Berlese–Tullgren funnel set over jars of 75% ethanol and separated under a stereomicroscope. After clearing in lactophenol were mounted in Hoyer's medium on glass microscope slides. Afterward the slides were placed in an oven at 45° C for two weeks and then the specimens were examined using a light microscope. The reference of distribution for all species refers to SUBÍAS (2004, updated 2018) and AKRAMI (2015). The specimens are deposited in the Acarology collection, Jalal Afshar Zoological Museum, Faculty of Agriculture, University of Tehran, Karaj, Iran. For shortening the references part, in section "previous record from Iran", we use the oribatid's checklist by AKRAMI (2015) with adding ones for more recent records after that. All materials were collected by M. Keshavarz Jamshidian.

## Results

In this study, a part of the fauna of oribatid mites (Acari: Oribatida) from Alborz Province, northern Iran is presented. Eighteen species, belonging to 14 genera and 12 families were identified, of which one genus and four species are introduced as new records for the mite fauna of Iran. For new species records a short diagnostic characterization is provided, with notes on their geographical distribution.

### **Nothridae BERLESE 1896**

#### ***Nothrus macedi*\* BECK 1962**

**Material examined and measurements:** One specimen (female) from soil under cherry trees (*Cerasus avium* (L.), Rosaceace) in Fouyeh Village, Savojbolagh, 35° 50' N, 50° 48'E, 1275 m a.s.l., 19-05-2013. Body length 824 µm, width of notogaster 475 µm.

**Diagnostic characters:** The median incision on the rostrum extended posteriad of the insertions of the rostral setae; rostral and lamellar setae are rough; lamellar setae almost as long as, but thicker than rostral setae; rostral and lamellar setae are almost as long as their mutual distances; interlamellar seta spatulate; sensillus medium in length, thin and bears fine barbs in distal half, and shorter than the mutual distance between the bothridial openings. The notogaster is elongate with convex lateral sides; notogastral setae spatulate; setae *kl*, the longest notogastral setae, is 1.5 to 2 times as long as the *pn* setae; setae *pn1* and *pn2* are nearly equal in length, longer and bigger than other notogastral setae except *kl*; setae  $f_i$  as long as or slightly longer as their mutual distance, epimeral chaetotaxy 7-4-5-5; aggenital setae absent; all tarsi tridactylous.

**Distribution:** Neotropical (Peru and Argentina) and Western Palaearctic (Caucasus).

**Comment:** The body size in our specimen is smaller in comparison with the average body size (960×520 µm) in original description of BECK (1962). This is the first record for Iran.

### **Lohmanniidae BERLESE 1916**

#### ***Papillacarus (Vepracarus) punctatus* (HU & WANG 1990)**

**Material examined and measurements:** Two specimens (females) from soil and litter under apple trees (*Malus domestica* Borkh, Rosaceae) in Jaarou Village, Eshtehard, 35° 70' N, 50° 71' E, 1420 m a.s.l., 28-5-2012. Body length 470–481 µm, width of notogaster 275–284 µm.

**Distribution:** Southeast China and Iran.

**Previous records from Iran:** Abarkouh; Behshahr road to Zaghmarz.

### **Ceratoppiidae KUNST 1971**

#### ***Ceratoppia quadridentata* (HALLER 1882)**

**Material examined and measurements:** Two specimens (females) from soil and litter under corn fields (*Zea mays* L., Graminae) in Chalus road, 36° 05' N, 51° 10' E, 1862 m a.s.l., 16-07-2012. Body length 510 µm, width of notogaster 412 µm.

**Distribution:** Holarctic (Palaeartic and Northern Nearctic) and Southeast China.

**Previous records from Iran:** Noor, Shabestar: Shendabad.

### **Amerobelbidae GRANDJEAN 1961**

#### ***Mongaillardia* sp.**

**Material examined and measurements:** Some specimens (females and males) from soil and litter of woods in Kalank, Taleqan, 36° 09' N, 50° 44' E, 2350 m a.s.l., 26-05-2013.

**Distribution:** Up to now, five species of the genus *Mongaillardia* GRANDJEAN 1961 have been reported from Palaeartic and Ethiopian regions.

**Previous records from Iran:** An unknown species of this genus reported from Zanjan County (Zanjan Province) by KESHAVARZ JAMSHIDIAN et al. (2015).

### **Phenopelopidae PETRUNKEVITCH 1955**

#### ***Peloptulus\* (P.) phaenotus\** (C. L. KOCH 1844)**

**Material examined and measurements:** One specimen (female) from soil under apple trees in Kouhsar, Savojbolagh, 35° 57' N, 50° 47' E, 1489 m a.s.l., 23-04-2013. Body length 426 µm, width of notogaster 340 µm.

**Diagnostic characters:** Rostrum truncate in the middle; rostral seate arcuate; lamellae with very broad cuspides, translamella very clear; interlamellar stae small and bristle shape; sensillus clavate; notogaster without central projection (tectum); notogasteral setae well- developed; setae *hl* strong.

**Distribution:** Palaeartic.

**Comment:** This is the first record both the genus and species from Iran.

### **Protoribatidae J. & P. BALOGH 1984**

#### ***Protoribates (P.) paracapucinus* (MAHUNKA 1988)**

**Material examined and measurements:** Some specimens (females) from soil and litter under cherry trees, Barikan Village, Taleqan, 36° 09' N, 50° 44' E, 2350 m a.s.l., 26-05-2013. Body length 330–360 µm, width of notogaster 179–201 µm.

**Distribution:** Oriental, Eastern Palaearctic (Iran), Ethiopian (Congo and Cameroon), Neotropical and Australian.

**Previous records from Iran:** Abarkouh, Tehran, Firoozabad, Arak, many places in Mazandaran Province, Shabestar: Shendabad, Rasht, Shiraz, Estahban, Larestan, Soofian, Jolfa, Marvdasht, Heyran and Arasbaran, Zanjan, Tabriz and Sistan and Balouchestan Province cited by AKRAMI (2015). KERMAN (KUN & LATIFI 2016).

### **Oribatulidae THOR 1929**

#### ***Oribatula (Oribatula) tibialis caliptera* BERLESE 1902**

#### **(=*Oribatula tibialis allifera* SUBÍAS 2000)**

**Material examined and measurements:** four specimens (females) from soil and litter under apple trees in Kouhsar, Savojbolagh, 35° 57' N, 50° 47' E, 1489 m a.s.l., 23.04.2013; six specimens (females) from soil and litter under cherry trees in Fouyeh Village, Savojbolagh, 35° 50' N, 50° 48'E, 1275 m a.s.l., 19-05-2013. Body length 518–529 µm, width of notogaster 322–340 µm.

**Distribution:** Holarctic (Mediterranean, Iran and Northern Nearctic).

**Previous records from Iran:** Nashtarood, Noor, Nowshahr, Shabestar: Shendabad, Rasht, Heyran and Arasbaran, cited by AKRAMI (2015). Zanjan (KESHAVARZ JAMSHIDIAN et al. 2015).

#### ***Oribatula (Zygoribatula) connexa connexa* BERLESE 1904**

**Material examined and measurements:** Five specimens (females) from soil and litter under cherry trees in Jey, Chalus road, 35° 55' N, 51° 05' E, 2005 m a.s.l., 16-07-2012; three specimens (females) from soil and litter under pine trees (*Pinus* sp., Pinaceae) in Faculty of Agriculture, University of Tehran, Karaj (Botanical garden), 14-06-2013. Body length 475–502 µm, width of notogaster 291–312 µm.

**Distribution:** Subtropical (Southern Palaearctic, Neotropical: South America and Brazil, Australian: Australia and New Zealand).

**Previous records from Iran:** Tabriz, many places in Hamadan Province, Abarkouh, Ardabil: Moghan Plain, Tabriz, Miandoab, Darab, Firoozabad, Tehran, Juybar, Soofian, Marand, Zenooz, Jolfa, Shabestar: Shendabad, Shiraz, Mashhad, Heyran and Arasbaran, Zanjan.

***Oribatula (Zygoribatula) skrjabini* (BULANOVA-ZACHVATKINA 1967)**

**Material examined and measurements:** Four specimens (females) from soil and litter under locoweed (*Astragalus* sp., Papilionaceae) in Khour, Savojbolagh, 36° 01' N, 50° 46'E, 2000 m a.s.l., 14-05-2012. Body length 478–490 µm, width of notogaster 265–290 µm.

**Distribution:** Southern Palaearctic (East Mediterranean and Central-Western Asia).

**Previous records from Iran:** Tabriz, Darab, Firoozabad, Behshahr, Arak, Shabestar, Shiraz, Zanjan cited by AKRAMI (2015). Zanjan (KESHAVARZ JAMSHIDIAN et al. 2015). Chitgar Park: Peykan-Shahr (AHADIYAT & AKRAMI 2015).

**Passalozetidae GRANDJEAN, 1954**

***Passalozetes hispanicus*\* MIHELČIĆ, 1955**

**Material examined and measurements:** Three specimens (females) from Kalank, Taleqan, soil and litter of weeds, 36° 09' N, 50° 44' E, 2350 m a.s.l., 26-05-2013. Body length 248–270 µm, width of notogaster 149–158 µm.

**Diagnostic characters:** Both dorsal and ventral sides of the body ornamented by longitudinal stripes which consist of broken branches or edges along and make reticular pattern; prodorsal setae are short and setiform; rostral setae are closer together than the lamellar setae; sensillus long, thin, bears fine barbs in distal half; The field in front of the boundary line between bothridia is broad and smooth; lenticulus present anteriorly with indistinct borders; three pairs of small porose areas are visible in dorsal view; all legs tridactylous.

**Distribution:** Mediterranean.

**Comment:** The body size in our specimens are smaller in comparison with the average size (320 × 190 µm) of original description of MIHELČIĆ (1955). This is the first record for Iran.

**Chamobatidae THOR 1937**

***Chamobates (Xiphobates) sergienkoeae* SHALDYBINA 1980**

**Material examined and measurements:** One specimen (female) from soil and litter of weeds in Kalank, Taleqan, 36° 09' N, 50° 44' E, 2350 m a.s.l., 26-05-2013. Body length 375 µm, width of notogaster 297 µm.

**Distribution:** Southern Palaearctic (Mediterranean and Iran).

**Previous records from Iran:** Neka, Rasht.

**Comment:** The rostrum in our specimen bears a median spine in comparison with the original description.

**Punctoribatidae THOR 1937**

***Punctoribates (P.) liber* PAULITCHENKO 1991**

Material examined and measurements: Two specimens (females) from soil and litter under Persian walnut trees (*Juglans regia* L., Juglandaceae) in Nesa, Chalus road, 36° 05' N, 51° 10' E, 1862 m a.s.l., 16-07-2012. Body length 312–320 µm, width of notogaster 217–250 µm.

Distribution: Southern Palaearctic (Mediterranean and Iran).

Previous records from Iran: Noor, Amol, Shabestar: Shenabad, Rasht, Shiraz, Heyran and Arasbaran.

**Liebstadiidae J. & P. BALOGH 1984**

***Liebstadia (L.) similis* (MICHAEL 1888)**

Material examined and measurements: Two specimens (female) from soil and litter under oriental plane trees (*Platanus orientalis* L., Platanaceae) in Asara, Chalus road, , 36° 01' N, 51° 10' E, 1852 m a.s.l., 16-07-2012. Body length 511–517 µm, width of notogaster 335–339.

Distribution: Holarctic (Palaearctic and Northern Nearctic), India (Sikkim) and New Zealand.

Previous records from Iran: Western regions of Mazandaran Province, Zenooz, Jolfa, Shabestar: Shendabad, Zanjan, Arasbaran.

**Galumnidae JACOT 1925**

***Allogalumna dentirostrata* BAYARTOGTOKH & AKRAMI 2014**

Material examined and measurements: One specimen (female). Body length 605 µm, width of notogaster 509 µm.

Distribution: Iran.

Previous records from Iran: Neka, Shiraz, Arjan Plain.

***Galumna (G.) iranensis* MAHUNKA & AKRAMI 2001**

Material examined and measurements: Two specimens (females) from soil and litter of cotton field (*Gossypium herbaceum* L., Malvaceae) in Morad Tappe Village, Eshtehard, 35° 44' N, 50° 18' E, 1438 m a.s.l., 28-5-2012. Body length 447–507 µm, width of notogaster 320–337 µm.

Distribution: Iran.

Previous records from Iran: Abarkouh, Behshahr, Shiraz, Marvdasht, Amol, Soofian, Marand, Jolfa, Zanjan, Ahvaz, Tabriz.

***Galumna (G.) karajica* MAHUNKA & AKRAMI 2001**

**Material examined and measurements:** Nine specimens (females) from soil and litter of weeds in Kalank, Taleqan, 36° 09' N, 50° 44' E, 2350 m a.s.l., 26-05-2013. Body length 434–560 µm, width of notogaster 357–427 µm.

**Distribution:** Iran and Caucasus.

**Previous records from Iran:** Abarkouh, Firoozabad, Behshahr, Miankaleh, Arak, Shiraz, Larestan, Estahban, Marvdasht, Soofian; Marand, Mashhad, Zanjan, Arasbaran.

**Note:** Unlike the species name, this species has not been reported from Alborz province until now. In 2001, this species named after Karaj, where the College of Agriculture of Tehran University (the education place of the senior author) is located (MAHUNKA & AKRAMI 2001).

***Galumna (G.) flabellifera*\* HAMMER 1958**

**Material examined and measurements:** One specimen (female) from soil under apple trees in Jaarou Village, Eshtehard, 35°70'N, 50°71'E, 1420 m a.s.l., 28-5-2012. Body length 312 µm, width of notogaster 290 µm.

**Diagnostic characters:** rostral setae thin and short; lamellar setae shorter than the rostral setae, situated on the tip of the well-developed lamellar lines; interlamellar setae minute; sensillus medium long, with narrow stalk and long broad head which bears fine barbs unilaterally; anterior margin of notogaster (dorsosejugal furrow) is slightly curved at the middle, has a double line; *Aa* oblong and twice larger than the other porose areas; median pore absent.

**Distribution:** Pantropical and subtropical.

**Comment:** This is the first record for Iran.

***Pergalumna iunctiporosa* BAYARTOGTOKH & AKRAMI 2014**

**Material examined and measurements:** Four specimens (females) from soil and litter under cherry trees in Fouyeh Village, Savojbolagh, 35°50' N, 50°48' E, 1275 m a.s.l., 19-05-2013. Body length 549–560 µm, width of notogaster 485–502 µm.

**Distribution:** Iran.

**Previous record from Iran:** Noof (BAYARTOGTOKH & AKRAMI 2014).



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