

## Article

### **Oribatid mites (Acari: Oribatida) from the biosphere reserve Dasht-e Arjan and Parishan, and Chehel Cheshmeh region (Fars Province), Iran**

Ali Iranpoor and Mohammad Ali Akrami\*

*Department of Plant Protection, College of Agriculture, Shiraz University, Shiraz, Iran;  
E-mails: aliiranpoor21@gmail.com, akrami@shirazu.ac.ir*

\* Corresponding author

#### **Abstract**

In the course of a faunistic survey of oribatid mites (Acari: Oribatida) from the biosphere reserve Dasht-e Arjan and Parishan, and Chehel Cheshmeh region (Fars Province) during 2014–2015, a total of 91 species belonging to 68 genera and 43 families were collected and identified. Among them, one genus and seven species were recorded for the first time for the mite fauna of Iran.

**Key words:** Fauna; new record; Sarcoptiformes; southern Iran; taxonomy.

#### **Introduction**

A biosphere reserve is an ecosystem with plants and animals of unusual scientific and natural interest. It is a title given by UNESCO to help protect the sites. The plan is to promote management, research and education in ecosystem conservation. This includes the “sustainable use of natural resources”. Biosphere reserves exchange knowledge and experiences on new ideas for sustainable development. Biosphere reserves are areas that are used to develop new ways of doing things, test these ways and share the results. The aim is to get a balanced relationship between mankind and nature (Wikipedia site). Arjan-Parishan is a biosphere reserve located in southern Iran (Fars Province). This area is well known for Persian lion at both national and international level. Parishan lake and Arjan wetland with exclusive biodiversity level increase the importance of the situation. This region has a warm, dry climate in Parishan zone and a cold semi-humid climate in Arjan zone. Annual temperature varies from 12°C in the northwest part (Arjan zone) and is usually limited to 24.4°C in southern part of Parishan zone. There is a freezing period from October to April and an annual precipitation level between 328 to 1263 mm. Dominant land cover types are forest (the most part of area), rangeland and agriculture lands (Monavari and Momen Bellah Fard 2010).

Oribatid mites are one of the numerically dominant arthropod groups in the organic horizons of most soils. The role of oribatid mites in decomposition, nutrient cycling and soil formation is important (Behan-Pelletier 1997). Oribatid mites are mostly known as particle feeding saprophages and mycophages, but opportunistic predation on nematodes and other microfauna and scavengers on small dead arthropoda (necrophagy) are probably underestimated (Norton and Behan-Pelletier 2009). These mites hold a

great potential for using in ecotoxicology due to the structural and functional complexity of their communities, and several peculiarities not found in other arthropods (Lebrun and van Straalen, 1995). Faunal lists of oribatid mites from Iran containing descriptions of several new species and introductions of some new records have been published by Bayartogtokh and Akrami 2000a, b; Mahunka and Akrami 2001; Haddad Irani-Nejad *et al.* 2003; Akrami 2007; Akrami and Subías 2007, 2008, 2009; Akrami *et al.* 2009, 2011; Akrami and Ebrahimi 2013a, b; Akrami and Behmanesh 2013a, b; Bayartogtokh and Akrami 2014; Akrami and Behmanesh 2015 and Akrami 2015, 2016.

### Materials and methods

In the course of a faunistic survey of oribatid mites in biosphere reserve of Dasht-e Arjan and Parishan, and Chehel Cheshmeh region (Fars Province, Iran), soil samples were taken from different locations in 2014–2015 and were transferred into the Acarological laboratory of the Shiraz University. The mites were extracted by Berlese funnel. Oribatid mites were removed, cleared in lactophenol and mounted in Hoyer's medium on glass microscope slides for identification. The slides were placed in an oven at 45°C for 10 days and then the specimens were examined using a light microscope (Zeiss Standard 20). All specimens were deposited in the Acarological Collection of the Department of Plant Protection, College of Agriculture, Shiraz University, Iran. The codes in front of species names are used to show the sampling data which presented in Table 1.

### Results

During this study, 91 species belonging to 68 genera and 43 families of oribatid mites from various habitats of the biosphere reserve of Dasht-e Arjan and Parishan, and Chehel Cheshmeh region (Fars Province, Iran) were identified, of which one genus and seven species are reported for the first time from Iran (marked by one asterisk), 5 families, 10 genera and 16 species are reported for the first time from Fars Province (marked by two asterisks) and 7 families, 16 genera and 23 species are reported for the first time from Biosphere reserve of Dasht-e Arjan and Parishan (marked by three asterisks). The systematics and nomenclature and general distribution of species used here predominantly follows Subías (2004, updated 2016).

#### Ctenacaridae Grandjean, 1954

*Ctenacarus\*\*\* araneola\*\*\** (Grandjean, 1932): F

Distribution: Pantropical and Subtropical regions; Iran (Bayartogtokh and Akrami 2000 a).

*Gilarovella demetrii\*\** Lange, 1974:

A2-1, B1-4, C6-5

Distribution: Southern Holarctic (Mediterranean, Western Asia and the U.S.A.: New Mexico); Iran (Akrami and Saboori 2004).

#### Aphelacaridae\*\*\* Grandjean, 1954

*Aphelacarus\*\*\* acarinus acarinus\*\*\** (Berlese, 1910):

A, B, F, B6-1, C1-2, C2-5

Distribution: Semicosmopolitan (Holarctic: Ethiopic and Neotropical); Iran (Akrami and Saboori 2012).

### **Brachychthoniidae Thor, 1934**

*Brachychthonius hauserorum*\*\* (Mahunka, 1979): D

Distribution: Southern Palaearctic: Mediterranean (Greece and Tunisia); Iran (Akrami 2015).

*Sellnickochthonius*\*\* *gracilis*\*\* (Chinone, 1974):

A, B, D, C3-2, C4-2

Distribution: Palaearctic (Japan) East and southeast China; Iran (Akrami 2015).

### **Cosmochthoniidae Grandjean, 1947**

*Cosmochthonius (Cosmochthonius) asiaticus*\*\* Gordeeva, 1980:

F, A6-2, B1-1

Distribution: Southern Palaearctic (west-central Asia and Spain); Iran (Akrami 2015).

*Cosmochthonius (C.) ponticus*\*\*\* Gordeeva, 1980:

A6-2, B3-1, B5-4, C1-5

Distribution: Eastern Mediterranean; Iran (Akrami 2015).

*Cosmochthonius (C.) reticulatus* Grandjean, 1947:

A, B, C, F, A6-1, A6-2, B6-4, C4-1, C6-5

Distribution: Southern Palaearctic (Mediterranean and Brazil); Iran (Ebrahimi and Akrami 2015).

*Cosmochthonius (C.) zanini*\* Penttinen and Gordeeva, 2003:

A3-1, A4-2, A6-1, B6-4, B2-3, B5-3, B6-4

Distribution: Eastern Mediterranean.

**Note.** This is the first record of this species for Iran.

*Cosmochthonius (C.)* sp.: F, C3-3

*Phyllozetes*\*\*\* *emmae*\*\*\* (Berlese, 1910):

F, A3-2, A5-4, A6-1, B2-1, B2-2, B5-2, C2-1, C3-5

Distribution: Pantropical (except Ethiopian) and Subtropical; Iran (Bayartogtokh and Akrami 2000a).

*Phyllozetes*\*\*\* *latifolius*\* Gordeeva, 1980: C1-3, C3-5

Distribution: Mediterranean and tropical (Mexico and Indonesia).

**Note.** This is the first record of this species for Iran.

*Phyllozetes*\*\*\* *tauricus*\*\*\* Gordeeva, 1978: B1-4

Distribution: Southern Palaearctic (Mediterranean and west-central Asia); Iran (Akrami 2015).

*Phyllozetes*\*\*\* sp.: A3-1, B5-1

### **Haplochthoniidae Hammen, 1959**

*Haplochthonius (Haplochthonius) sanctaeluciae*\*\*\* Bernini, 1973:

F, A3-1, B1-2, C1-3

Distribution: Southern Palaearctic region (Mediterranean and west central Asia) and tropical: Senegal, Neotropical region; Iran (Akrami and Saboori 2012).

*Haplochthonius (H.) simplex*\*\*\* (Willmann, 1930): F, B2-3

Distribution: Semicosmopolitan: Holarctic, Ethiopian and Oriental; Iran (Akrami and Saboori 2012).

### **Sphaerochthoniidae Grandjean, 1947**

*Sphaerochthonius splendidus* (Berlese, 1904):

B, A1-2, A6-1, B1-3, B3- 2, B6-4, C1-3, C2-4, C4-5, C5-5

Distribution: Pantropical: Oriental (Southeast China and Vietnam), Australian (Australia and Polynesia), Neotropical, Ethiopian, and subtropical; Iran (Bayartogtokh and Akrami 2000a).

### **Protoplophoridae Ewing, 1917**

*Protoplophora iranica* Akrami and Behmanesh 2012:

A2-1, B2-3, C1-1

Distribution: Iran (Akrami and Behmanesh 2012a).

### **Hypochthoniidae Berlese, 1910**

*Hypochthonius rufulus*\*\* Koch, 1835: A

Distribution: Semicosmopolitan: Holarctic, Oriental (Southeast China and India: West Bengal), I. Seychelles and Mexico); Iran (Akrami and Saboori 2004).

### **Lohmanniidae Berlese, 1916**

*Papillacarus aciculatus* (Berlese, 1905): B2-1, C1-4

Distribution Southern Palaearctic: Western Palaearctic (except in the north) and Vietnam. Iran (Akrami and Saboori 2004).

### **Epilohmanniidae Oudemans, 1923**

*Epilohmannia cylindrica cylindrica* (Berlese, 1904):

B, D, E, F, C3-4, C3-5, C4-4

Distribution: Cosmopolitan (Palearctic: Nearctic, Ethiopian, Oriental, Australian: Hawaii, and Neotropical); Iran (Akrami and Saboori 2004).

*Epilohmannia styriaca*\*\*\* Schuster, 1960: B1-3

Distribution: Southern Palearctic (southern Europe); Iran (Akrami and Saboori 2004).

### **Euphthiracaridae Jacot, 1930**

*Acrotrititia pirovaci*\*\* Niedbała, 2006:

A, C, F, A6-2, B5-4, B5-5, B6-1, B6-3

Distribution: Southern Palearctic (Croatia); Iran (Mortazavi *et al.* 2015).

### **Phthiracaridae Perty, 1841**

*Atropacarus*\*\*\* *echinodiscus*\*\*\* (Mahunka, 1982):

A5-2, A6-4, A6-5

Distribution: Southern Palearctic (Greece); Iran (Akrami *et al.* 2006).

*Atropacarus*\*\*\* *striculus*\*\*\* (Koch, 1835):

A6-2, B3-1, C3-4

Distribution: Semicosmopolitan (Holarctic, Oriental, Central America and Australia); Iran (Akrami and Saboori 2012).

*Austrophthiracarus*\*\* *pavidus*\*\* (Berlese, 1913):

A, B, C, A5-4, A6-1, B5-2

Distribution: Southern Palearctic; Iran (Akrami *et al.* 2006).

*Phthiracarus (Archiphthiracarus) furvus*\*\*\* Niedbała, 1983:

A, B, C, D, E, F, C3-2, C3-4, C4-3, C4-5

Distribution: Eastern Mediterranean; Iran (Akrami and Saboori 2004).

### **Malaconothridae Berlese, 1916**

*Malaconothrus (Malaconothrus) processus* Hammen, 1952:

B1-3, B1-4

Distribution: Southern Palearctic (South central Europe); Iran (Behmanesh and Akrami 2012).

### **Nothridae Berlese, 1896**

*Nothrus anauniensis*\*\*\* Canestrini and Fanzago, 1876:

A, B, C, D, F, A1-1, C3-4, C3-5

Distribution: Cosmopolitan (except Antarctic): common in Palearctic; Iran (Akrami

2015).

**Crotoniidae Thorell, 1876**

*Camisia (Camisia) borealis* (Thorell, 1871): B, A2-1

Distribution: Boreoalpine (Euro-Siberian, Caucasus, East Asian Russia and Greenland); Iran (Behmanesh and Akrami 2012).

*Camisia (C.) horrida* (Hermann, 1804):

B, F, A3-1, B6-1

Distribution: Holarctic (common), North East, Ethiopic and North Neotropical; Iran (Akrami and Saboori 2004).

**Hermanniellidae Grandjean, 1934**

*Hermanniella grandis*\*\* Sitnikova, 1973: A1-1, B1-3

Distribution: Southern Palaearctic (Spain, East of Eastern Palaearctic); Iran (Akrami and Doryanizadeh 2013).

**Licnodamaeidae Grandjean, 1954**

*Licnodamaeus inaequalis*\*\* (Balogh and Mahunka, 1965):

A2-1, B2-3

Distribution: Southeastern Europe (Crimea) and South Eastern Palaearctic; Iran (Frazaneh and Akrami 2016).

*Licnodamaeus* sp.:

A1-2, A2-1, A3-2, A5-2, B1-4, B3-1, C6-5

**Licnobelbidae Grandjean, 1965**

*Licnobelba latiflabellata* (Paoli, 1908): A, B, A5-2, B3-1

Distribution: Western Palaearctic (except North) and West of the Eastern Palaearctic; Iran (Akrami 2007).

**Gymnodamaeidae Grandjean, 1954**

*Jacotella frondeus* (Kulijev, 1979):

A, B, C, E, F, A3-1, B2-3, C3-4, C3-5

Distribution: Eastern Mediterranean; Iran (Akrami 2015).

**Aleurodamaeidae Paschoal and Johnston, 1985**

*Aleurodamaeus* sp.:

B3-1, B3-2, B4-1, B5-4, C5-3, C5-5

**Damaeidae\*\*\* Berlese, 1896**

*Belba (B.)\*\*\* dubinini*\* Bulanova-Zachvatkina, 1962:

A, B, F, A1-2, A2-1, A3-1, B1-3, B2-3

Distribution: Palaearctic (Europe Central Eastern and Eastern Palaearctic).

**Note.** This is the first record of this species for Iran.

**Xenillidae\*\* Woolley and Higgins, 1966**

*Xenillus\*\* setosus\*\** Grobler, Ozman and Cobanoğlu, 2003:

A1-1, C4-3

Distribution: Turkey; Iran (Akrami 2015).

**Zetorchestidae Michael, 1898**

*Zetorchestes* sp.: A6-2, B6-4

**Damaeolidae\*\*\* Grandjean, 1965**

*Fosseremus\*\*\* sculpturatus\** Mahunka, 1982: D, F, C4-5

Distribution: Ethiopian and northeastern China.

**Note.** This is the first record of this species for Iran.

**Oppiidae Sellnick, 1937**

*Neoppia\*\** sp.: C1-1

*Graptoppia (Graptoppia)\*\* sundensis acuta\*\** Ayyildiz, 1989: A, B2-3, C1-3

Distribution: Eastern Mediterranean; Iran (Akrami 2015).

*Lasiobelba (L.)* sp.: B, A1-1, B2-1

*Multioppia (Hammeroppia)\*\*\* wilsoni laniseta\*\*\** Moritz, 1966:

A1-1, B1-4, C1-5

Distribution: Western Palaearctic, Eastern Palaearctic (except East), U.S.A. and Venezuela; Iran (Akrami 2015).

*Ramusella (Rectoppia)* sp.: C1-4

*Ramusella (Rectoppia) damavandica* Akrami and Subías 2008:

A, B, E, F, A1-2, B1-4, C1-1, C2-3

Distribution: Iran (Akrami and Subías 2008).

*Ramusella (Rectoppia) mihelcici\*\** (Perez-Inigo, 1965): C, A1-1

Distribution: Palaearctic and Venezuela; Iran (Akrami 2015).

*Ramusella (Ramusella)\*\*\* persica\*\*\** Akrami, Behmanesh and Subías, 2015:

E, B6-4, C4-1

Distribution: Iran (Akrami *et al.* 2015).

*Ramusella (Ramusella)\*\*\* puertomonttensis\*\*\** Hammer, 1962: A, B2-3

Distribution: Tropical (India: West Bengal, Melanesia: I. Fiji, and Neotropical: Chile and Brazil) and subtropical: Southern Palaearctic (Mediterranean, eastern Asian Russia); Iran (Akrami and Subías 2007).

*Ramusella (Insculptoppia) iranica\*\*\** Akrami and Subías, 2008: B

Distribution: Iran (Akrami and Subías 2008).

*Rhinoppia (Rhinoppia) obsoleta* (Paoli, 1908):

E, A1-1, B1-4

Distribution: Palaearctic (except those of Eastern Palaearctic): common, Greenland and Australia (New Zealand and Hawaii); Iran (Akrami and Subías 2007).

*Oppiella (Perspicuoppia)\*\* sp.:* A1-2

*Microppia minus minus* (Paoli, 1908): A1-2

Distribution: Cosmopolitan; Iran (Akrami 2015).

*Microppia minus longisetosa\*\** Subías and Rodríguez, 1988: A1-2

Distribution: Southern Palaearctic (Mediterranean) and Argentina; Iran (Mirzaie and Akrami 2012).

### **Suctobelbidae\*\*\* Jacot, 1938**

*Suctobelba\*\*\* sp.:* E, A1-1.

*Suctobelbella (Flagrosuctobelba) subtrigona\*\*\** (Oudemans, 1900):

B, A1-1, B4-1

Distribution: Holarctic (Palaearctic: common in Western Palaearctic and northern Nearctic), Mexico and Vietnam; Iran (Akrami 2015).

*Suctobelbella (Suctobelbella) naranensis\** Hammer, 1967:

A1-1, B3-2

Distribution: Pakistan.

**Note.** This is the first record of this species for Iran.

### **Carabodidae\*\* Koch, 1837**

*Austrocarabodes (Austrocarabodes)\*\* foliaceisetus georgiensis\*\** Murvanidze and Weigmann, 2007: B, C, B4-1, C4-4

Distribution: Caucasus; Iran (Akrami 2015).

### **Tectocephidae Grandjean, 1954**

*Tectocephus velatus* (Michael, 1880):



A, B, C, D, E, A3-2, A5-2, B3-2, B3-3, C3-4

Distribution: Cosmopolitan; Iran (Akrami 2015).

**Passalozetidae\*\* Grandjean, 1954**

*Bipassalozetes (Bipassalozetes)\*\* intermedius\** (Mihelčič, 1954): A1-2

Distribution: Palaearctic.

**Note.** This is the first record of this species for Iran.

**Phenopelopidae\*\*\* Petrunkevitch, 1955**

*Eupelops\*\*\* cf. eximius\*\*\** Sitnikova, 1967: A1-2, B5-1

**Microzetidae Grandjean, 1936**

*Berlesezetes brazilozetoides\*\** Balogh and Mahunka, 1981:

A1-1, B2-3, C2-4

Distribution: Neotropical; Iran (Akrami 2015).

*Christovizetes\*\*\* iranensis\*\*\** Akrami and Behmanesh, 2011:

A1-2, B1-4, C2-4, C2-5

Distribution: Iran (Akrami and Behmanesh 2011).

**Achipteriidae\*\*\* Thor, 1929**

*Achipteria (A.)\*\*\* coleoprata\** (Linnaeus, 1758): A

Distribution: Holarctic (Northern Nearctic and Palaearctic), India (Sikkim) and St. Helena Island.

**Note.** This is the first record of this species for Iran.

**Ceratozetidae Jacot, 1925**

*Ceratozetes (C.)* sp.: C

**Punctoribatidae Thor, 1937**

*Punctoribates (Punctoribates) liber* Pavlitshenko, 1991: A, B

Distribution: Southern Palaearctic (Mediterranean); Iran (Akrami 2008).

**Zetomotrichidae Grandjean, 1934**

*Ghilarovus\*\*\* hispanicus\*\*\** Subías and Pérez-Íñigo, 1977:

A, B, C, A6-1, B2-3, C5-4, C5-5

Distribution: Southern Palaearctic; Iran (Ebrahimi and Akrami 2015).

*Zetomotrichus lacrimans* Grandjean, 1934: B, C, F, A1-1, B4-4, C6-1

Distribution: Paleotropical and subtropical (Southern Palaearctic); Iran (Akrami and Bastan 2012).

*Zetomotrichus persicus* Akrami and Behmanesh, 2013: B, F, C1-3

Distribution: Iran (Akrami and Behmanesh 2013a).

### **Oribatulidae Thor, 1929**

*Oribatula (Oribatula) tibialis tibialis* (Nicolet, 1855): A

Distribution: Holarctic (Common) and India (Sikkim); Iran (Akrami 2015).

*Oribatula (O.) pallida* Banks, 1906: B, C, F, A6-2, B4-1, C1-4

Distribution: Holarctic (Northern Nearctic and Palaeartic); Iran (Akrami 2015).

*Oribatula (O.)* sp.: C4-2

*Oribatula (Zygoribatula) frisiae*\*\* (Oudemans, 1900):

A, B, C, D, E, F, B1-2, C3-1

Distribution: Holarctic (common in southern Palaeartic); Iran (Akrami 2015).

*Oribatula (Z.) connexa connexa* Berlese, 1904:

A, B, D, E, C6-2

Distribution: Subtropical (Southern Palaeartic, Neotropical: South America and Brazil, and Australian: Australia and New Zealand); Iran (Akrami 2008).

*Oribatula (Z.) skrjabini*\*\*\* (Bulanova-Zachvatkina, 1967):

A, B, C, D, F, C3-5

Distribution: Southern Palaeartic (East Mediterranean and Western Asia); Iran (Akrami 2015).

*Oribatula (Z.) undulata* Berlese, 1916: A, B, C, E

Distribution: Pantropical (except for Neotropical) and subtropical; Iran (Akrami 2015).

### **Pseudoppiidae\*\* Mahunka, 1975**

*Pseudoppia*\*\* sp. : E

### **Hemileiidae\*\* J. and P. Balogh, 1984**

*Hemileius (Simkinia)*\*\* sp. : B1-4, C6-5

### **Scheloribatidae\*\*\* Grandjean, 1933**

*Scheloribates*\*\*\* sp.: A, B, C, D, F, C1-3

### **Protoribatidae J. and P. Balogh, 1984**

*Protoribates (Protoribates) capucinus*\*\* Berlese, 1908: F

Distribution: Cosmopolitan (except Antarctic); Iran (Akrami 2015).

*Protoribates (Protoribates) paracapucinus* (Mahunka, 1988):

A, B, C, D, F

Distribution: Oriental, Eastern Palaearctic, Ethiopian and Neotropical; Iran (Bayartogtokh and Akrami 2000b).

*Protoribates (Triaunguis) obtusus* (Mihelčič, 1956): B1-1

Distribution: Southern Palaearctic (Mediterranean); Iran (Bayartogtokh and Akrami 2000b).

### Haplozetidae Grandjean, 1936

*Baloghiella*\*\*\* *foveolata*\*\*\* Akrami and Ebrahimi 2013b: C1-2

Distribution: Iran (Akrami and Ebrahimi 2013b).

*Indoribates (Haplozetes) fusifer* (Berlese, 1908):

A3-1, B4-3, B5-3

Distribution: Southern Palaearctic (Mediterranean) and India; Iran (Akrami 2015).

*Peloribates* sp.: F, A2-1, B1-4, C1-4, C6-4

*Pilobatella*\* sp.: B1-3

**Note.** This is the first record of this genus for Iran.

### Parakalummidae Grandjean, 1936

*Neoribates granulatus* Akrami and Behmanesh 2012:

A4-1, B3-2

Distribution: Iran (Akrami and Behmanesh 2012b).

### Galumnidae Jacot, 1925

*Acrogalumna*\*\*\* *lanceolata*\*\*\* Bayartogtokh and Akrami 2014: B

Distribution: Iran (Bayartogtokh and Akrami 2014).

*Galumna iranensis* Mahunka and Akrami, 2001:

A, B, D, F, A1-1, B1-2, C1-4

Distribution: Iran (Mahunka and Akrami 2001).

*Galumna karajica* Mahunka and Akrami, 2001:

A, B, D, E, A4-1, B6-3, C4-4

Distribution: Caucasus; Iran (Mahunka and Akrami 2001).

*Allogalumna* sp.: B1-1, C1-2

*Pilogalumna tenuiclava* (Berlese, 1908):

A, B, C, D, E, A6-2, B6-4, C6-2

Distribution: Holarctic; Iran (Akrami 2007).

### Acknowledgement

This study was partly supported by the project “Fauna of oribatid mites of Shiraz, Fars Province” funded by Shiraz University.

### References

- Akrami, M.A. (2007) Introduction of twelve species of brachypylina oribatid mites (Acari: Oribatida: Brachypylina), new records for the fauna of Iran. *Journal of Agricultural Science and Technology*, 9: 77–86.
- Akrami, M.A. (2008) Introduction of poronotic oribatid mites of Mazandaran province, Northern Iran. In: Bertrand, M., Kreiter, S., McCoy, K.D., Migeon, A., Navajas, M., Tixier, M.S. & Vial, L. (Eds.), *Integrative Acarology*. Proceeding of the 6th European Congress, Montpellier, France, p. 15.
- Akrami, M.A. (2015) An annotated checklist of oribatid mites (Acari: Oribatida) of Iran. *Zootaxa*, 3963 (4): 451–501.
- Akrami, M.A. (2016) The oribatid mite family Brachychthoniidae of Iran (Acari: Oribatida), with description of a new species. *Systematic and Applied Acarology*, 21(4): 398–404.
- Akrami, M.A. & Bastan, S.R. (2012) Report of the second genus and species of oribatid mites of the family Zetomotrichidae (Acari, Oribatida) from Iran. *Journal of Entomological Society of Iran*, 32 (2): 131–132 (In Persian with English abstract).
- Akrami, M.A. & Behmanesh, M. (2011) A new species of *Christovizetes* Krivolutsky (Acari: Oribatida: Microzetidae) from Iran. *Systematic and Applied Acarology*, 16(3): 247–251.
- Akrami, M.A. & Behmanesh, M. (2012a) A new oribatid mite of the genus *Protoplophora* Berlese, 1910 (Acari: Oribatida: Protoplophoridae) from Iran. *International Journal of Acarology*, 38(2): 168–176.
- Akrami, M.A. & Behmanesh, M. (2012b) The first record of the family Parakalummidae Grandjean, 1936 (Acari: Oribatida) from Iran, with description of a new species. *Systematic and Applied Acarology*, 17(4): 428–434.
- Akrami, M.A. & Behmanesh, M. (2013a) A new species of the family Zetomotrichidae (Acari: Oribatida) from Iran. *Persian Journal of Acarology*, 2(1): 1–7.
- Akrami, M.A. & Behmanesh, M. (2013b) Complementary data on *Haplozetesfusifer* (Berlese, 1908) (Acari, Oribatida, Haplozetidae) collected from Iran. *Graellsia*, 69 (2): 147–152.
- Akrami, M.A. & Behmanesh, M. (2015) Oribatid mites (Acari: Oribatida) of Shiraz township, Fars province, Iran. *Entomofauna*, 36: 377–396.
- Akrami, M.A. & Ebrahimi, F. (2013a) A new species of the genus *Pergalumna* from Iran (Acari: Oribatida). *Zoology in the Middle East*, 59 (2): 168–172.
- Akrami, M.A. & Ebrahimi, F. (2013b) A new species of the genus *Baloghiella* Bulanova-Zachvatkina, 1966 (Oribatida: Haplozetidae) from Iran. *Systematic and Applied Acarology*, 18 (4): 396–400.
- Akrami, M.A. & Doryanizadeh, N. (2013) A new report of four species of *Hermanniella* (Acari: Oribatida: Hermanniellidae) from Iran. *Journal of Entomological Society of Iran*, 33 (1): 95–97 (In Persian, with English abstract).
- Akrami, M.A. & Mortazavi, S.H. (2016) Suctobelbid mites of Iran, with new records and key for Iranian species (Acari: Oribatida: Suctobelbidae). *Entomofauna*, 37: 445–452.

- Akrami, M.A. & Saboori, A. (2004) Report of thirteen species of macropyline oribatid mites (Acari: Oribatida), new to the fauna of Iran. *Iran Agricultural Research*, 23 (1): 111–117.
- Akrami, M.A. & Saboori, A. (2012) Acari of Iran (Vol. 2): Oribatid mites. University of Tehran Press, 281 pp. (In Persian).
- Akrami, M.A. & Subías, L.S. (2007) Oppiid mites (Acari: Oribatida: Oppiidae) from Mazandaran province, with a description of *Medioppia bipectinata* sp. n. *Systematic and Applied Acarology*, 12: 237–243.
- Akrami, M.A. & Subías, L.S. (2008) Two new species of the subfamily Multioppiinae Balogh, 1983 (Acari: Oribatida: Oppiidae) from Iran. *Journal of the Acarological Society of Japan*, 17 (2): 93–99.
- Akrami, M.A. & Subías, L.S. (2009) A new species of the family Quadroppiidae and a new subspecies of the family Oppiidae (Acari, Oribatida) from Iran. *Journal of the Acarological Society of Japan*, 18 (2): 65–71.
- Akrami, M.A., Behmanesh, M. & Subías, L.S. (2015) *Ramusella* (*Ramusella*) *persica* (Acari: Oribatida: Oppiidae), a new replacement name for *Ramusella* (*R.*) *iranica*. *Persian Journal of Acarology*, 4(1): 137–138.
- Akrami, M.A., Subías, L.S. & Behmanesh, M. (2011) A new species of *Ramusella* Hammer, 1962 (Acari, Oppiidae), from Fars province, Iran. *Graellsia*, 67 (2): 199–203.
- Akrami, M.A., Subías, L.S. & Saboori, A. (2009) *Serratoppia iranica* (Acari: Oppiidae), a new species of oribatid mite from Iran. *Systematic and Applied Acarology*, 14: 171–176.
- Akrami, M.A., Saboori, A., Kamali K. & Kharrazi-Pakdel, A. (2006) Introduction of some ptyctimous oribatid mites (Acari: Oribatida: Ptyctima) of Mazandaran province. *Journal of the Entomological Society of Iran*, 26 (2): 65–89 (In Persian, with English abstract).
- Bayartogtokh, B. & Akrami, M.A. (2000a) Oribatid mites (Acari: Oribatida) from Iran, with descriptions of two new species. *Journal of the Acarological Society of Japan*, 9 (2): 129–145.
- Bayartogtokh, B. & Akrami, M.A. (2000b) Poronotic oribatid mites (Acari: Oribatida: Poronota) from Iran. *Journal of the Acarological Society of Japan*, 9 (2): 159–172.
- Bayartogtokh, B. & Akrami, M.A. (2014) The soil mite family Galumnidae of Iran (Acari: Oribatida). *Journal of Natural History*, 48 (15–16): 881–917.
- Behan-Pelletier, V.M. (1997) Oribatid Mites (Acari: Oribatida) of the Yukon. In: Danks, H.V. & Downes, J.A. (Eds.), *Insects of the Yukon. Biological Survey of Canada (Terrestrial Arthropods)*, Ottawa, pp. 115–149.
- Behmanesh, M. & Akrami, M.A. (2012) Introduction of macropyline oribatid mites (Acari: Oribatida) from Shiraz township, Fars province, southern Iran. In: Sarafrazi, A., Abdollahi, T. & Solhjoui Fard, S. (Eds.), *Proceeding of the 20th Iranian Plant Protection Congress*, Shiraz, Iran, p. 496.
- Ebrahimi, F. & Akrami, M.A. (2015) Oribatid mites (Acari: Oribatida) associated with pastures of Shiraz township, Fars province, Iran. *Linzer biologische Beitrage*, 47 (1): 491–503.
- Frazaneh, T. & Akrami, M.A. (2016) Oribatid mites (Acari: Oribatida) of Mashhad township, Razavi Khorasan province, Iran. *Linzer biologische Beitrage* (in press).
- Haddad Irani-Nejad, K., Kamali K. & Maleki Milani, H. (2003) Poronotic brachypylinae oribatid mite species of cotton fields in Moghan plain. *Applied Entomology and Phytopathology*, 69: 17–47 (In Persian, with English abstract).


- Lebrun, P. & Van Straalen, N.M. (1995) Oribatid Mites: Prospects for their Use in Ecotoxicology. *Experimental and Applied Acarology*, 19: 361–379.
- Mahunka, S. & Akrami, M.A. (2001) Galumnatid mites from Iran (Acari: Oribatida). *Annales historico-naturales Musei nationalis hungarici*, 93: 231–237.
- Mirzaie, M. & Akrami, M.A. (2012) New records of the family Oppiidae (Acari: Sarcoptiformes: Oribatida) for the fauna of Iran. *Persian Journal of Acarology*, 1 (2): 101–108.
- Monavari, S.M. & Momen Bellah Fard, S. (2010) A GIS based assessment tool for biodiversity conservation. *International Journal of Environmental Research*, 4(4): 701–712.
- Mortazavi, SH., Hajizadeh, J. & Akrami, M.A. (2015) Ptyctimous mites (Acari: Oribatida) from Guilan Province, Iran, with a checklist and a key to the ptyctimous mites of Iran and additional description of *Euphthiracarus monodactylus* (Willmann, 1919). *International Journal of Acarology*, 41(5): 371–381.
- Norton, R.A. & Behan-Pelletier, V.M. (2009) Oribatida. In: Krantz, G.W. & Walter D.E. (Eds.), *A Manual of Acarology*, third edition. Lubbock: Texas Tech University Press, pp. 421–564.
- Subías, L.S. (2016) Listado sistemático, sinonímico y biogeográfico de los ácaros oribátidos (Acariformes: Oribatida) del mundo (excepto fósiles). Originally published in *Graellsia*, 60 (número extraordinario), 3–305. Available from: <http://www.ucm.es/info/zoo/Artropodos/Catalogo.pdf>
- Wikipedia (2016) Biosphere reserve. Available from: [https://simple.wikipedia.org/wiki/Biosphere\\_Reserve](https://simple.wikipedia.org/wiki/Biosphere_Reserve).

Received: 8 May 2016

Accepted: 29 May 2016

Published: 15 July 2016

## COPYRIGHT

 Iranpoor and Akrami. Persian Journal of Acarology is under free license. This open-access article is distributed under the terms of the Creative Commons-BY-NC-ND which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are credited.

**Table 1. Collection data.**

Code	Latitude and Longitude	Altitude (m a.s.l.)	Sampling date	Habitat (soil of) and locality
A	29° 42' N, 52° 01' E	2050	29.IV.2014	Apple tree, <i>Malus domestica</i> Borkh. (Rosaceae), Garden
B	29° 42' N, 52° 07' E	1900	8.V.2014	Alfalfa, <i>Medicago sativa</i> L. (Papilionaceae), Farm
C	29° 43' N, 51° 59' E	1950	21.VII.2014	Weeds, Hillside
D	29° 42' N, 52° 02' E	2100	2. VIII.2014	Walnut tree, <i>Juglans regia</i> L. (Juglandaceae), Garden
E	29° 42' N, 52° 01' E	1900	6.IX.2014	Weeds, Around the river
F	29° 42' N, 52° 00' E	2015	9. X.2014	Weeds, Pastures

Table 1. Continued.

Code	Latitude and Longitude	Altitude (m a.s.l.)	Sampling date	Habitat (soil of) and locality
A1-1	29° 38' N, 51° 55' E	2403	27. IV.2015	Oak tree, <i>Quercus</i> sp. (Fagaceae), Oak forest
A1-2	29° 34' N, 51° 55' E	2400	27. IV.2015	Mastic tree, <i>Pistacia atlantica</i> Desf. (Anacardiaceae), Hillside
A2-1	29° 34' N, 51° 55' E	2400	30.V.2015	Oak tree, Oak forest
A3-1	29° 34' N, 51° 55' E	2471	9. VII.2015	Oak tree, Oak forest
A3-2	29° 34' N, 51° 55' E	2480	9. VII.2015	Common reed, <i>Phragmites australis</i> Cav. (Gramineae), Hillside
A4-1	29° 34' N, 51° 55' E	2460	8. VIII.2015	Oak tree, Oak forest
A5-1	29° 33' N, 51° 56' E	2472	3. IX.2015	Oak tree, Oak forest
A5-2	29° 33' N, 51° 56' E	2480	3. IX.2015	Mastic tree, Hillside
A6-1	29°33'N, 51° 56'E	2490	8. X.2015	Oak tree, Oak forest
A6-2	29°33'N, 51° 56'E	2489	8. X.2015	Common reed, Hillside
B1-1	29° 33' N, 51° 56' E	2269	27. IV.2015	Mountain almond tree, <i>Amygdalus</i> <i>scoparia</i> L. (Rosaceae), Hillside
B1-2	29° 33' N, 51° 56' E	2269	27. IV.2015	Mountain almond tree, Hillside
B1-3	29° 33' N, 51° 56' E	2269	27. IV.2015	Berberry, <i>Berberis</i> sp. (Berberidaceae), Hillside
B1-4	29° 33' N, 51° 56' E	2268	27. IV.2015	Wild cherry, <i>Cerasus</i> sp. (Rosaceae), Hillside
B2-1	29° 33' N, 51° 56' E	2245	30.V.2015	Mountain almond tree, Hillside
B2-2	29° 33' N, 51° 56' E	2244	30.V.2015	Mountain almond tree, Hillside
B2-3	29° 33' N, 51° 56' E	2245	30.V.2015	Berberry, Hillside
B3-1	29° 33' N, 51° 56' E	2241	30.V.2015	Mountain almond tree, Hillside
B3-2	29° 33' N, 51° 56' E	2241	9. VII.2015	Mountain almond tree, Hillside
B4-1	29° 33' N, 51° 56' E	2120	8. VIII.2015	Berberry, Hillside
B5-1	29° 33' N, 51° 56' E	2289	3. IX.2015	Hawthorn tree, <i>Crataegus azarolus</i> L.(Rosaceae), Hillside
B5-2	29° 33' N, 51° 56' E	2280	3. IX.2015	Hawthorn Tree, Hillside
B5-3	29° 33' N, 51° 56' E	2285	3. IX.2015	Berberry, Hillside
B5-4	29° 33' N, 51° 56' E	2290	3. IX.2015	Wild cherry, Hillside
B6-1	29° 33' N, 51° 56' E	2187	8. X.2015	Fig tree, <i>Ficusjohannis</i> Boiss. (Moraceae), Hillside
B6-2	29° 33' N, 51° 56' E	2189	8. X.2015	Oak tree, Hillside
B6-3	29° 33' N, 51° 56' E	2190	8. X.2015	Berberry, Hillside
B6-4	29° 33' N, 51° 56' E	2189	8. X.2015	Hawthorn Tree, Hillside
C1-1	29° 38' N, 51° 59' E	1950	27. IV.2015	Alhaji grass, <i>Alhagi</i> <i>persarum</i> Gagnebin. (Fabaceae), Plain
C1-2	29° 38' N, 51° 59' E	1971	27. IV.2015	Willow Tree, <i>Salix</i> sp. (Salicaceae), Around the road
C1-3	29° 38' N, 51° 59' E	1966	27. IV.2015	Wild Rue, <i>Peganum harmala</i> L. (Nitrariaceae), Plain
C1-4	29° 38' N, 51° 59' E	1950	27. IV.2015	Bermuda grass, <i>Cynodon dactylon</i> L. (Poaceae), Plain

Table 1. Continued.

Code	Latitude and Longitude	Altitude (m a.s.l.)	Sampling date	Habitat (soil of) and locality
C1-5	29° 38' N, 51° 59' E	1962	27. IV.2015	Clover, <i>Trifolium</i> sp. (Papilionaceae), Plain
C2-1	29° 38' N, 51° 59' E	1950	30.V.2015	Sun spurge, <i>Euphorbia helioscopia</i> L. (Euphorbiaceae), Plain
C2-2	29° 38' N, 51° 59' E	1902	30.V.2015	Willow Tree, Around the road
C2-3	29° 38' N, 51° 59' E	1900	30.V.2015	Echinops, <i>Echinops adenocaulos</i> Boiss., (Asteraceae), Plain
C2-4	29° 38' N, 51° 59' E	1900	30.V.2015	Penny royal, <i>Mentha pulegium</i> L. (Lamiaceae), Plain
C2-5	29° 38' N, 51° 59' E	1912	30.V.2015	Oriental plane tree, <i>Platanus</i> <i>orientalis</i> L. (Platanaceae), Plain
C3-1	29° 38' N, 51° 57' E	2029	30.V.2015	Ash, <i>Fraxinus</i> sp. (Oleaceae), Around the road
C3-2	29° 38' N, 51° 57' E	2029	30.V.2015	Willow Tree, Around the road
C3-3	29° 38' N, 51° 57' E	2022	30.V.2015	Sun spurge, Plain
C3-4	29° 38' N, 51° 57' E	2029	30.V.2015	Bermuda grass, Plain
C3-5	29° 38' N, 51° 57' E	2029	30.V.2015	Clover, Plain
C4-1	29° 38' N, 51° 57' E	2021	8. VIII.2015	Penny royal, Plain
C4-2	29° 38' N, 52° 58' E	2029	8. VIII.2015	Ash, Around the road
C4-3	29° 38' N, 52° 58' E	2029	8. VIII.2015	Oriental plane tree, Plain
C4-4	29° 38' N, 52° 58' E	2020	8. VIII.2015	Bermuda grass, Plain
C4-5	29° 38' N, 52° 58' E	2029	8. VIII.2015	Clover, Plain
C5-1	29° 38' N, 52° 00' E	2005	3. IX.2015	Sun spurge, Plain
C5-2	29° 38' N, 52° 00' E	2004	3. IX.2015	Willow Tree, Around the road
C5-3	29° 38' N, 52° 00' E	2005	3. IX.2015	Ash, Around the road
C5-4	29° 38' N, 52° 00' E	2005	3. IX.2015	Bermuda grass, Plain
C5-5	29° 38' N, 52° 00' E	2007	3. IX.2015	Clover, Plain
C6-1	29° 38' N, 52° 00' E	1951	8. X.2015	Echinops, Plain
C6-2	29° 38' N, 52° 00' E	1950	8. X.2015	Willow Tree, Around the road
C6-3	29° 38' N, 52° 00' E	1950	8. X.2015	Wild Rue, Plain
C6-4	29° 38' N, 52° 00' E	1960	8. X.2015	Alhaji grass, Plain
C6-5	29° 38' N, 52° 00' E	1950	8. X.2015	Clover, Plain

Numbers A-F sampled at Chehel Cheshmeh, the rest sampled at Dasht-e Arjan and Parishan



کنه‌های اریباتید (**Acari: Oribatida**) ذخیره‌گاه زیست‌کره دشت ارژن و پریشان، و  
منطقه چهل چشمه (استان فارس)، ایران

علی ایرانپور و محمدعلی اکرمی\*

بخش گیاهپزشکی، دانشکده کشاورزی، دانشگاه شیراز، شیراز، ایران؛ رایانامه‌ها:  
*akrami@shirazu.ac.ir* \**aliiranpoor21@gmail.com*

\* نویسنده مسئول

### چکیده

در بررسی فون کنه‌های اریباتید ذخیره‌گاه زیست‌کره دشت ارژن و پریشان، و منطقه چهل چشمه (استان فارس)، که طی سال‌های ۱۳۹۳ و ۱۳۹۴ انجام شد، در مجموع ۹۱ گونه از ۶۸ جنس و ۴۳ خانواده جمع‌آوری و شناسایی شد. در میان آن‌ها، یک جنس و هفت گونه برای فون کنه‌های ایران جدیدند.

واژگان کلیدی: فون؛ گزارش جدید؛ Sarcoptiformes؛ جنوب ایران؛ آرایه‌شناسی.

تاریخ دریافت: ۱۳۹۵/۲/۱۹

تاریخ پذیرش: ۱۳۹۵/۳/۹

تاریخ چاپ: ۱۳۹۵/۴/۲۵