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Oribatid mites (Acari: Oribatida) of Shiraz township, Fars province, Iran

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Abstract

Faunal study of oribatid mites (Acari: Oribatida) in Shiraz township (Fars province – southern Iran) was conducted during 2009-2010. Totally, 68 species belonging to 62 genera and 40 families were collected and identified. Of which one genus and 7 species are reported for the first time from Iran, and 9 families, 18 genera and 21 species are reported for the first time from Fars province.

Key words: Acari, Oribatida, Shiraz, Iran, fauna.

Zusammenfassung

Im Zeitraum von 2009-2010 wurden im Stadtgebiet von Shiraz (Provinz Fars - Süd-Iran) faunistischen Untersuchung der Hornmilben (Acari Oribatida) durchgeführt. Insgesamt wurden 68 Arten, die in 62 Gattungen und 40 Familien gehören, gesammelt und bestimmt. Von denen eine Gattung und 7 Arten zum ersten Mal aus dem Iran dokumentiert werden. Für der Provinz Fars werden 9 Familien, 18 Gattungen und 21 Arten erstmals festgestellt.

Introduction

Oribatid mites (formerly Cryptostigmata), also known as moss mites or beetle mites, are a suborder of mites (Suborder Oribatida), in the superorder Acariformes, order Sarcoptiformes. They range in size from 0.2 to 1.4 millimetres. Oribatid mites generally have low metabolic rates, slow development and low fecundity. Species are iteroparous with adults living a relatively long time; for example, estimates of development time from egg to adult vary from several months to two years in temperate forest soils. Oribatid mites have six active instars: prelarva, larva, three nymphal instars and the adult. All these stages after the prelarva feed on a wide variety of material including living and dead plant and fungal material, lichens and carrion; some are predatory, but none is parasitic and feeding habits may differ between immatures and adults of the same species (HOY 2008; NORTON & BEHAN-PELLETIER 2009).

The Oribatida are of economic importance as hosts of various tapeworm species, and by increasing the breakdown of organic material in the soil, in a similar manner to earthworms (BAKER & WHARTON 1952).

During 2009- 2010, oribatid mite fauna of Shiraz township, Fars province, Iran was studied. Shiraz is the fifth most populous city of Iran and the capital of Fars province. In 2009 the population of the city was 1,455,073, the majority of whom are Persian. Shiraz is located in the south of Iran and the northwest of Fars province, 919 kilometres (571 mi) south of Tehran. It is built in a green plain at the foot of the Zagros Mountains 1,500 metres (4,900 feet) above sea level. A seasonal river, Rudkhaneye Khoshk, flows through the northern part of the city and on into Maharloo Lake. As of 1920, the area had a large forest of oak trees. It has a moderate climate and has been a regional trade center for over a thousand years. It is regarded as one of the oldest cities of ancient Persia. Shiraz's climate has distinct seasons, and is overall classed as a hot semi-arid climate, though it is only a little short of a hot-summer Mediterranean climate. Summers are hot, with a July average high of 37.8 °C (100.0 °F). Winters are cool, with average low temperatures below freezing in December and January. Around 300 mm (12 in) of rain falls each year, almost entirely in the winter months (Wikipedia site).

Materials and methods

Soil and litter samples were taken from different locations of Shiraz, during 2009- 2010, and were transferred to the Acarological laboratory of Shiraz University. The mites were extracted by Berlese funnel. Oribatid mites were removed, cleared in lactophenol and mounted in Hoyer's medium on glass microscopic 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 deposited in the Acarological Collection of the Department of Plant Protection, College of Agriculture, Shiraz University, Iran. All specimens collected by junior author.

Results

During this study, 68 species belonging to 62 genera and 40 families of oribatid mites from various habitats of Shiraz township were collected and identified, of which one genus and 7 species are reported for the first time from Iran, and 9 families, 18 genera and 21 species are reported for the first time from Fars province. Also 2 families and 3 genera of this collection have previously reported and 6 species have described.

C t e n a c a r i d a e GRANDJEAN 1954

***Beklemishevia* sp.**

S a m p l e c o d e : D1, A13 (Refer to Table 1)

N o t e s : This is the first record of this genus for Fars province.

***Ctenacarus araneola* (GRANDJEAN 1932)**

S a m p l e c o d e : B7, B8

D i s t r i b u t i o n : Pantropical and Subtropical regions (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

***Gilarovella* sp.**

S a m p l e c o d e : A2, A19, A13, B7, D1, D2, D4, D8, D20

N o t e s : This is the first record of this genus for Fars province.

***Neoctenacarus hastilis* MORITZ 1974**

S a m p l e c o d e : D7

D i s t r i b u t i o n : South central Europe (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

N o t e s : This is the first record of this genus and species for Fars province.

A p h e l a c a r i d a e GRANDJEAN 1954

***Aphelacarus acarinus acarinus* (BERLESE 1910)**

S a m p l e c o d e : A1, A9, A19, A23, B1, B7, D4, D11, D15, D20

D i s t r i b u t i o n : Semicosmopolitan (Holarctic, Ethiopian, Neotropical); Iran (AKRAMI & SABOORI 2012).

H y p o c h t h o n i i d a e BERLESE 1910

***Hypochthonius luteus* OUDEMANS 1917**

S a m p l e c o d e : A13, A14, A17, A18, A20

D i s t r i b u t i o n : Holarctic region, northeast of Oriental region, New Zealand (SUBIAS 2014) and Iran (BAYARTOGTOKH & AKRAMI 2000a).

C o s m o c h t h o n i i d a e GRANDJEAN 1947

***Cosmochthonius* sp.**

S a m p l e c o d e : D6, D20, A19, D7, D11, D8, A18

***Phyllozetes emmae* (BERLESE 1910)**

S a m p l e c o d e : A23, D20, B7

D i s t r i b u t i o n : Pantropical (except Ethiopian) and Subtropical (SUBIAS 2014).

N o t e s : This is the first record of this genus and species for Fars province.

H a p l o c h t h o n i i d a e HAMMEN 1959

***Haplochthonius* (*H.*) *chamela* MAHUNKA & MEJIA-RECAMIER 1998**

S a m p l e c o d e : A13, A19, D11, D20

D i s t r i b u t i o n : Mexico (SUBIAS 2014).

N o t e s : This is the first record of this species for Iran.

***Haplochthonius* (*H.*) *sanctaeluciae* BERNINI 1973**

S a m p l e c o d e : D4, D7, D8, D11, A16, B1, B7

D i s t r i b u t i o n : Southern Palaearctic region (Mediterranean and west central Asia), Senegal, Neotropical region (Galapagos and Chile) (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

***Haplochthonius* (*H.*) *simplex* (WILLMANN 1930)**

S a m p l e c o d e : A20, D7

D i s t r i b u t i o n : Semicosmopolitan: Holarctic, Ethiopian (Senegal and Congo) and Oriental (SUBIAS 2014); Iran (AKRAMI & SABOORI 2012).

S p h a e r o c h t h o n i i d a e GRANDJEAN 1947

***Sphaerochthonius splendidus* (BERLESE 1904)**

S a m p l e c o d e : A18, D8, B3, D11, A2, A13, A20, D21, D20, B7, A9, A12, D2

D i s t r i b u t i o n : Pantropical, Neotropical and Subtropical regions and Iran (SUBIAS 2014; BAYARTOGTOKH & AKRAMI, 2000a).

B r a c h y c h t h o n i i d a e THOR 1934

***Brachychthonius* sp.**

S a m p l e c o d e : A18, D20, D21, D7, D8, A9, D21, B1, A12, A4, A14, D1, A17, A10, D5

N o t e s : This is the first record of this family for Fars province.

***Eobrachychthonius* sp.**

S a m p l e c o d e : D20

***Liochthonius* sp.**

S a m p l e c o d e : A18, D2, D20, A14, D4, D3

***Poecilochthonius italicus* (BERLESE 1910)**

S a m p l e c o d e : A14, A15

D i s t r i b u t i o n : Holarctic (SUBIAS 2014); Iran (AKRAMI & SABOORI 2004).

***Synchthonius crenulatus* (JACOT 1938)**

S a m p l e c o d e : A14

D i s t r i b u t i o n : Holarctic (SUBIAS 2014).

N o t e s : This is the first record of this genus and species for Iran.

***Synchthonius elegans* FORSSLUND 1957**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Holarctic (SUBIAS 2014).

N o t e s : This is the first record of this species for Iran.

E p i l o h m a n n i i d a e OUDEMANS 1923

***Epilohmannia cylindrica cylindrica* (BERLESE 1904)**

S a m p l e c o d e : A8, A17

D i s t r i b u t i o n : Cosmopolitan (SUBIAS 2014); Iran (AKRAMI & SABOORI 2004).

***Epilohmannia* sp.**

S a m p l e c o d e : A13

L o h m a n n i i d a e BERLESE 1916

***Cryptacarus promecus* GRANDJEAN 1950**

S a m p l e c o d e : B1

D i s t r i b u t i o n : Southern Palaearctic (Mediterranean and west central Asia) and Ethiopian (SUBIAS 2014); Iran (AKRAMI & SABOORI 2012).

N o t e s : This is the first record of this genus and species for Fars province.

***Papillacarus aciculatus* (BERLESE 1905)**

S a m p l e c o d e : A13

D i s t r i b u t i o n : West central Palaearctic region, Vietnam (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2004).

***Papillacarus chamartinensis* PEREZ-INIGO 1967**

S a m p l e c o d e : B3

D i s t r i b u t i o n : Spain and Iran (SUBIAS 2014).

N o t e s : This is the first record of this species for Fars province.

***Lohmannia turcmenica* BULANOVA-ZACHVATKINA 1960**

S a m p l e c o d e : A17

D i s t r i b u t i o n : Southern Palaearctic, Southeastern China and Argentina (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

P r o t o p l o p h o r i d a e EWING 1917

***Protoplophora iranica* AKRAMI & BEHMANESH 2012**

S a m p l e c o d e : A13, D20

D i s t r i b u t i o n : Iran (SUBIAS 2014).

N o t e s : This family reported for the first time from Iran and the species described (AKRAMI & BEHMANESH 2012).

E u p h t h i r a c a r i d a e JACOT 1930

***Acrotritia ardua* (KOCH 1841)**

S a m p l e c o d e : A12, A16, A15, A8, A7, A14

D i s t r i b u t i o n : Cosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

P h t h i r a c a r i d a e PERTY 1841

***Atropacarus echinodiscus* (MAHUNKA 1982)**

S a m p l e c o d e : A20, A21

D i s t r i b u t i o n : Southern Palaearctic (Greece and Iran) (SUBIAS 2014; AKRAMI et al. 2006)

N o t e s : This is the first record of this genus and species for Fars province.

***Atropacarus striculus* (KOCH 1835)**

S a m p l e c o d e : A20, A21

D i s t r i b u t i o n : Semicosmopolitan (Holarctic, Oriental, Central America and Australian) (SUBIAS 2014); Iran (AKRAMI & SABOORI 2012).

N o t e s : This is the first record of this species for Fars province.

***Phthiracarus* sp.**

S a m p l e c o d e : A14, A15, A21, D1

M a l a c o n o t h r i d a e BERLESE 1916

***Malaconothrus* (*M.*) *monodactylus* (MICHAEL 1888)**

= *Malaconothrus* (*M.*) *egregious* (BERLESE 1904)

S a m p l e c o d e : A14

D i s t r i b u t i o n : Holarctic and Neotropical (SUBIAS 2014); Iran (AKRAMI et al. 2008).

N o t e s : This is the first record of this species for Fars province.

***Malaconothrus* (*M.*) *processus* HAMMEN 1952**

S a m p l e c o d e : A18

D i s t r i b u t i o n : South central Europe (SUBIAS 2014).

N o t e s : This is the first record of this species for Iran.

N o t h r i d a e BERLESE 1896

***Nothrus biciliatus* KOCH 1841**

S a m p l e c o d e : A7, A12, A13, A21

D i s t r i b u t i o n : Germany, Netherlands, Sweden, Austria, Denmark, Hungary, Italy, Japan, Ireland (BALOGH & MAHUNKA 1983) and Iran (AKRAMI & SABOORI 2012).

C r o t o n i i d a e THORELL 1876

***Camisia* (*Camisia*) *borealis* (THORELL 1871)**

S a m p l e c o d e : A13, A21

D i s t r i b u t i o n : Boreoalpina (Eurosiberian, Caucasus and Greenland) (SUBIAS 2014).

N o t e s : This is the first record of this species for Iran and the family for Fars province.

***Camisia* (*C.*) *horrida* (HERMANN 1804)**

S a m p l e c o d e : A18

D i s t r i b u t i o n : Holarctic, North of Oriental, Ethiopian and North of Neotropical (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2004).

N o t e s : This is the first record of this species for Fars province.

H e r m a n n i e l l i d a e GRANDJEAN 1934

***Hermanniella dolosa* GRANDJEAN 1931**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Palaearctic region (SUBIAS 2014); Iran (AKRAMI et al. 2008).

N o t e s : This is the first record of this family for Fars province.

***Hermanniella picea* (KOCH 1839)**

= *H. punctulata* BERLESE 1908

S a m p l e c o d e : A18

D i s t r i b u t i o n : Holarctic (Palaearctic: less frequent in the North, and U.S.A.: Virginia), North-East of Oriental and the Philippines (SUBIAS 2014).

N o t e s : This is the first record of this species for Iran.

N e o l i o d i d a e SELLNICK 1928

***Neoliodes terrestris* (WALLWORK 1963)**

S a m p l e c o d e : A16

D i s t r i b u t i o n : Tropical: Ethiopian, Oriental (India) and Neotropical (Venezuela and Mexico), and southern Palaearctic (Caucasus and west-central Asia) (SUBIAS 2014).

N o t e s : This is the first record of this species for Iran and the family for Fars province.

L i c n o d a m a e i d a e GRANDJEAN 1954

***Licnodamaeus pulcherrimus* (PAOLI 1908)**

S a m p l e c o d e : A2, A13, D20

D i s t r i b u t i o n : Palaearctic region (SUBIAS 2014); Iran (AKRAMI 2007).

L i c n o b e l b i d a e GRANDJEAN 1965

***Licnobelba latiflabellata* (PAOLI 1908)**

= *L. alestensis* GRANDJEAN 1931

S a m p l e c o d e : A6, A13, A18

D i s t r i b u t i o n : Western Palaearctic (except North) and west of Siberia (SUBIAS 2014); Iran (AKRAMI 2007).

N o t e s : This is the first record of this family for Fars province.

G y m n o d a m a e i d a e GRANDJEAN 1954

***Jacotella frondeus* (KULIJEV 1979)**

= *Plesiodamaeus ornatus* MAHUNKA 1979

S a m p l e c o d e : A20, A21, A18, A16, D8, A13, A6, B1

D i s t r i b u t i o n **:** Eastern Mediterranean (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

***Joshuella* spp.**

S a m p l e c o d e : D2, D20, A2, B8, D8, A19, D6

A l e u r o d a m a e i d a e PASCHOAL & JOHNSTON 1985

***Aleurodamaeus* (*Aleurodamaeus*) *setosus* (BERLESE 1883)**

S a m p l e c o d e : A21, D11, D20, A2, A13, A16

D i s t r i b u t i o n : Southern Palaearctic (SUBIAS 2014) and Iran (AKRAMI 2007).

M i c r o z e t i d a e GRANDJEAN 1936

***Berlesezetes aegypticus* (BAYOUMI 1977)**

S a m p l e c o d e : A9, A13, D3

D i s t r i b u t i o n : Egypt (SUBIAS 2014) and Iran (AKRAMI 2007).

***Christovizetes iranensis* AKRAMI & BEHMANESH 2011**

S a m p l e c o d e : H3, H5

D i s t r i b u t i o n : Iran (SUBIAS 2014).

N o t e s : This species described for the first time (AKRAMI & BEHMANESH 2011).

Z e t o r c h e s t i d a e MICHAEL 1898

***Zetorchestes reticulatus* KARPPINEN & POLTAVSKAJA 1990**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Caucasus (SUBIAS 2014).

N o t e s : This is the first record of species for Iran and the family for Fars province.

E r e m a e i d a e OUDEMANS 1900

***Eueremaeus* sp.**

S a m p l e c o d e : A21

N o t e s : This is the first record of this family for Fars province.

E r e m u l i d a e GRANDJEAN 1965

***Eremulus avenifer* BERLESE 1913**

S a m p l e c o d e : A15

D i s t r i b u t i o n : Southern Palaearctic (Italy and South Eastern Palaearctic), Oriental and Polynesia (Tahiti) (SUBIAS 2014); Iran (AKRAMI & SABOORI 2001).

N o t e s : This is the first record of this family for Fars province.

D a m a e o l i d a e GRANDJEAN 1965

***Damaeolus asperatus* (BERLESE 1904)**

S a m p l e c o d e : A2, A18, A21, D6, D15, D20

D i s t r i b u t i o n : Holarctic (Palaearctic: except North, and U.S.A.: Columbia) (SUBIAS 2014); Iran (ALIKHANI et al. 2012).

N o t e s : This is the first record of this species for Fars province.

T h y r i s o m i d a e GRANDJEAN 1953

***Banksinoma exobothridialis* BAYARTOGTOKH 1997**

S a m p l e c o d e : B6

D i s t r i b u t i o n : Mongolia (SUBIAS 2014); Iran (AKRAMI & BEHMANESH unpublished data).

O p p i i d a e SELLNICK 1937

***Lasiobelba* (*Lasiobelba*) *neonominata* SUBIAS 2004**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Ethiopian (South Africa and Malagasy), Hawaii and southern Palaearctic (Western Mediterranean and Iran) (SUBIAS 2014; AKRAMI & SUBIAS 2007).

N o t e s : This is the first record of this species for Fars province.

***Ramusella* (*Ramusella*) *persica* BEHMANESH, AKRAMI & SUBIAS 2013**

= *Ramusella* (*R.*) *iranica* BEHMANESH, AKRAMI & SUBIAS 2012

S a m p l e c o d e : A9, A24

D i s t r i b u t i o n : Iran (SUBIAS 2014).

N o t e s : This species described for the first time (BEHMANESH et al. 2012).

***Ramusella* (*R.*) *puertomonttensis* HAMMER 1962**

S a m p l e c o d e : H2

D i s t r i b u t i o n : Tropical (India: west Bengal, Melanesia: I. Fiji and Neotropical: Chile and Brazil) and southern Palaearctic (Mediterranean and Eastern Asiatic Russia) (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

N o t e s : This is the first record of this species for Fars province.

***Ramusella* (*Insculptoppia*) *insculpta* (PAOLI 1908)**

S a m p l e c o d e : A3, A4, A14

D i s t r i b u t i o n : Palaearctic region, Vietnam (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

***Ramusella* (*I.*) *farsi* AKRAMI, SUBIAS & BEHMANESH 2011**

S a m p l e c o d e : A4, H5

D i s t r i b u t i o n : Iran (SUBIAS 2014).

N o t e s : This species described for the first time (AKRAMI et al. 2011).

***Ramusella* (*I.*) *iranica* AKRAMI & SUBIAS 2008**

S a m p l e c o d e : B1

D i s t r i b u t i o n : Iran (AKRAMI & SUBIAS 2008; SUBIAS 2014).

N o t e s : This is the first record of this species for Fars province.

***Ramusella* (*Insculptoppiella*) *varians* (WALLWORK 1961)**

S a m p l e c o d e : B1

D i s t r i b u t i o n : Ethiopian (Ghana and I. St. Helena) and center of southern Palaearctic (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

N o t e s : This is the first record of this species for Fars province.

***Ramusella* (*Rectoppia*) *damavandica* AKRAMI & SUBIAS 2008**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Iran (AKRAMI & SUBIAS 2008; SUBIAS 2014).

***Discoppia* (*Cylindroppia*) *cylindrica* (PEREZ-INIGO 1965)**

S a m p l e c o d e : A13, B1

D i s t r i b u t i o n : Southern Palaearctic, Oriental and Central America (SUBIAS 2014) and Iran (AKRAMI & SUBIAS 2007).

***Microppia minus* (PAOLI 1908)**

S a m p l e c o d e : A3, A4, A13, A14, A20, B1, B3

D i s t r i b u t i o n : Cosmopolitan (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

N o t e s : This is the first record of this species for Fars province.

***Rhinoppia obsoleta* (PAOLI 1908)**

S a m p l e c o d e : A2, A13

D i s t r i b u t i o n : Palaearctic region, Greenland, New Zealand, Hawaii (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

***Oppiella* (*Oppiella*) *nova* (OUDEMANS 1902)**

S a m p l e c o d e : A2, A3, A12, A14, A23, B2

D i s t r i b u t i o n : Cosmopolitan (SUBIAS 2014); Iran (AKRAMI & SUBIAS 2007).

N o t e s : This is the first record of this species for Fars province.

T e c t o c e p h e i d a e GRANDJEAN 1954

***Tectocepheus minor* BERLESE 1903**

S a m p l e c o d e : A18, A20

D i s t r i b u t i o n : Semicosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

***Tectocepheus velatus* (MICHAEL 1880)**

S a m p l e c o d e : A2, A7, A13, A18, A24, D5

D i s t r i b u t i o n : Cosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000a).

P a s s a l o z e t i d a e GRANDJEAN 1954

***Passalozetes* (*Passalozetes*) *africanus* GRANDJEAN 1932**

S a m p l e c o d e : A2, A22, A23, D7

D i s t r i b u t i o n : South central Palaearctic region, Guinea (SUBIAS 2014) and Iran (BAYARTOGTOKH & AKRAMI 2000a).

C e r a t o z e t i d a e JACOT 1925

***Ceratozetes* (*Ceratozetes*) cf. *macromediocris* SHALDYBINA 1970**

S a m p l e c o d e : A14, A16

D i s t r i b u t i o n : *Ceratozetes* (*C.*) *macromediocris* distributed in Eastern Europe (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

P u n c t o r i b a t i d a e THOR 1937

***Punctoribates* (*Punctoribates*) *liber* PAVLITCHENKO 1991**

S a m p l e c o d e : A18, A21

D i s t r i b u t i o n : Mediterranean region and Iran (SUBIAS 2014).

O r i b a t e l l i d a e JACOT 1925

***Oribatella* sp.**

S a m p l e c o d e : A4, A17, A18

N o t e s : This is the first record of this family for Fars province.

Z e t o m o t r i c h i d a e GRANDJEAN 1934

***Zetomotrichus persicus* AKRAMI & BEHMANESH 2013**

S a m p l e c o d e : A2, A13

D i s t r i b u t i o n : Iran (SUBIAS 2014).

N o t e s : This species described for the first time (AKRAMI & BEHMANESH 2013a).

***Ghilarovus* sp.**

S a m p l e c o d e : Unknown

O r i b a t u l i d a e THOR 1929

***Oribatula* (*O.*) *tibialis* (NICOLET 1855)**

S a m p l e c o d e : A1, A6, A13, A16, A21, D1, D2

D i s t r i b u t i o n : Holarctic region, India (SUBIAS 2014); Iran (AKRAMI et al. 2008).

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

S a m p l e c o d e : A4, A9, A17

D i s t r i b u t i o n : Subtropical region (SUBIAS 2014) and Iran (BAYARTOGTOKH & AKRAMI 2000b).

***Oribatula* (*Z.*) *undulata* BERLESE 1916**

S a m p l e c o d e : A4, A7, A9, A10, A17

D i s t r i b u t i o n : Pantropical and subtropical regions (SUBIAS 2014) and Iran (AKRAMI & SABOORI 2012).

***Oribatula* (*Z.*) cf. *skrjabini* (BULANOVA-ZACHVATKINA 1967)**

S a m p l e c o d e : A6, A24, B7, B8, D1

D i s t r i b u t i o n : *Oribatula* (*Z.*) *skrjabini* distributed in southern Palaearctic region (SUBIAS 2014).

S c h e l o r i b a t i d a e GRANDJEAN 1933

***Scheloribates fimbriatus* THOR 1930**

S a m p l e c o d e : D4, D5

D i s t r i b u t i o n : Cosmopolitan (SUBIAS 2014); Iran (BAYARTOGTOKH & AKRAMI 2000b).

P r o t o r i b a t i d a e J. & P. BALOGH 1984

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

S a m p l e c o d e : A3, A7, A13, A17, A18, A20

D i s t r i b u t i o n : Oriental region, Congo, Ecuador and Iran (SUBIAS 2014; BAYARTOGTOKH & AKRAMI 2000b).

***Protoribates* (*Triaunguis*) *obtusus* (MIHELCIC 1956)**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Southern Palaearctic (Mediterranean and Iran) (BAYARTOGTOKH & AKRAMI 2000b; SUBIAS 2014).

N o t e s : This is the first record of this species for Fars province.

H a p l o z e t i d a e GRANDJEAN 1936

***Baloghiella granulata* BAYARTOGTOKH & AKRAMI 2000**

S a m p l e c o d e : D4

D i s t r i b u t i o n : Iran (BAYARTOGTOKH & AKRAMI 2000b; SUBIAS 2014).

***Haplozetes fusifer* (BERLESE 1908)**

S a m p l e c o d e : A10, A13, A19, D20

D i s t r i b u t i o n : Mediterranean, India (SUBIAS 2014); Iran (AKRAMI & BEHMANESH 2013b).

G a l u m n i d a e JACOT 1925

***Galumna iranensis* MAHUNKA & AKRAMI 2001**

S a m p l e c o d e : A4, A9, A13, A19, A20, D20

D i s t r i b u t i o n : Iran (MAHUNKA & AKRAMI 2001; SUBIAS 2014).

***Galumna karajica* MAHUNKA & AKRAMI 2001**

S a m p l e c o d e : A18, D3, D15

D i s t r i b u t i o n : Iran (MAHUNKA & AKRAMI 2001; SUBIAS 2014).

***Pilogalumna tenuiclava* (BERLESE 1908)**

= *Allogalumna boevi* KRIVOLUTSKAJA 1952

S a m p l e c o d e : A7, A10, A13, A14, A16, A21

D i s t r i b u t i o n : Holarctic region (SUBIAS 2014); Iran (AKRAMI 2007).

***Pergalumna* sp.**

S a m p l e c o d e : Unknown

P a r a k a l u m m i d a e GRANDJEAN 1936

***Neoribates* (*Neoribates*) *granulatus* AKRAMI & BEHMANESH 2012**

S a m p l e c o d e : A13

D i s t r i b u t i o n : Iran (SUBIAS 2014).

N o t e s : This family reported for the first time from Iran and the species described (AKRAMI & BEHMANESH 2012)

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Table 1: Sampling information

Code	Latitude		Longitude		Altitude (m)	Habitat (soil of)	Sampling date	Sampling location	
	Degree	Minutes	Degree	Minutes					
A1	29	32	52	35	1810	Cotoneaster, *Cotoneaster* sp. (Rosacoae)	24.VII.2009	Hillside	Bajgah
A2	29	32	52	35	1810	Locoweed, *Astragalus* sp. (Papilionaceae)	24.VII.2009	Hillside	Bajgah
A2	29	32	52	35	1810	Prickly thrift, *Acantholimon* sp. (Plumbaginaceae)	24.VII.2009	Hillside	Bajgah
A6	29	32	52	35	1810	Wild fig, *Ficus johannis* Boiss. (Moraceae)	1.IIX.2009	Hillside	Bajgah
A7	29	32	52	35	1810	Clover, *Trifolium* sp. (Papilionaceae)	1.IIX.2009	Hillside	Bajgah
A8	29	32	52	35	1810	Tamarisk, *Tamarix* sp. (Tamaricaceae)	5.IIX.2009	College of Agriculture	Bajgah
A8	29	32	52	35	1810	Wild mint, *Mentha* sp. (Labiatae)	5.IIX.2009	College of Agriculture	Bajgah
A9	29	32	52	35	1810	Bermuda grass, *Cynodon dactylon* (L.) (Gramineae)	5.IIX.2009	College of Agriculture	Bajgah
A12	29	32	52	35	1810	Alfalfa, *Medicago sativa* L. (Papilionaceae)	13.X.2009	College of Agriculture	Bajgah
H4	29	32	52	35	1810	Common fig, *Ficus carica* L. (Moraceae)	5.VI.2010	Mount Bamoo	Bajgah
H1	29	32	52	35	1810	Elm tree, *Ulmus campestris* L. (Ulmaceae)	10.VI.2010	College of Agriculture	Bajgah
H2	29	32	52	35	1810	Rotten tree trunk of willow, *Salix* sp. (Salicaceae)	10.VI.2010	College of Agriculture	Bajgah
H3	29	32	52	35	1810	Rotten tree trunk of willow	10.VI.2010	College of Agriculture	Bajgah

Code	Latitude		Longitude		Altitude (m)	Habitat (soil of)	Sampling date	Sampling location	
	Degree	Minutes	Degree	Minutes					
H9	29	32	52	35	1810	Ash, *Fraxinus* sp. (Oleaceae)	10.VI.2010	College of Agriculture	Bajgah
H5	29	32	52	35	1810	Azarole hawthorn, *Crataegus azarolus* L. (Rosaceae)	11.VI.2010	Mount Bamoo	Bajgah
H6	29	32	52	35	1810	*Acantholimon* sp.	11.VI.2010	Mount Bamoo	Bajgah
H8	29	32	52	35	1810	*Cotoneaster* sp.	11.VI.2010	Mount Bamoo	Bajgah
A10	29	32	52	35	1810	Common reed, *Phragmites australis* (Cav.) (Gramineae)	6.IIX.2009	Dry river	Shiraz
A16	29	40	52	8	1953	*Acantholimon* sp.	2. XI.2009	Around the street	Khanezenyan
A21	29	40	52	8	1953	Berberry, *Berberis* sp. (Berberidaceae)	2. XI.2009	Around the street	Khanezenyan
A18	29	34	52	57	2042	*Crataegus azarolus*	2. XI.2009	Oak forest	Dasht Arjan
A13	29	34	52	57	2042	Oak tree, *Quercus* sp. (Fagaceae)	2. XI.2009	Oak forest	Dasht Arjan
A14	29	39	52	59	2013	*Salix* sp.	2. XI.2009	Around the river	Dasht Arjan
A17	29	39	52	59	2013	Weeds	2. XI.2009	Around the river	Dasht Arjan
A11	29	39	52	58	2022	*Phragmites australis*	2. XI.2009	Around the river	Dasht Arjan
A19	29	48	52	18	2431	Mountain almond, *Amygdalus scoparia* Spach (Rosaceae)	2. XI.2009	Top of the mountain	Ghalat
A19	29	48	52	18	2431	*Crataegus azarolus*	2. XI.2009	Top of the mountain	Ghalat
A20	29	48	52	19	2072	Oriental plane tree, *Platanus orientalis* L. (Platanaceae)	2. XI.2009	Around the river	Ghalat
A20	29	48	52	19	2072	Persian walnut, *Juglans regia* L. (Juglandaceae)	2. XI.2009	Around the river	Ghalat
A20	29	48	52	19	2072	Moss	2. XI.2009	Around the river	Ghalat
A15	29	48	52	19	2072	Rotten tree trunk of oriental plane tree,	2. XI.2009	Around the river	Ghalat

Code	Latitude		Longitude		Altitude (m)	Habitat (soil of)	Sampling date	Sampling location	
	Degree	Minutes	Degree	Minutes					
						Platanus orientalis L. (Platanaceae)			
A22	29	31	52	50	1437	Beneath the stone	18.XI.2009	Hillside	Kaftarak
A23	29	31	52	50	1437	*Acantholimon* sp.	18.XI.2009	Hillside	Kaftarak
B1	29	32	52	46	1471	*Ficus carica*	18.XI.2009	Hillside	Kaftarak
B5	29	32	52	46	1464	*Acantholimon* sp.	18.XI.2009	Hillside	Kaftarak
B8	29	33	52	42	1428	*Astragalus* sp.	18.XI.2009	Hillside	Kaftarak
A24	29	30	52	50	1409	*Medicago sativa*	18.XI.2009	Around the road	Kaftarak
B2	29	32	52	46	1456	*Phragmites australis*	18.XI.2009	Around the road	Kaftarak
B6	29	33	52	43	1426	*Phragmites australis*	18.XI.2009	Around the road	Kaftarak
B7	29	30	52	50	1411	*Tamarix* sp.	18.XI.2009	Around the road	Kaftarak
B3	29	31	52	47	1413	*Tamarix* sp.	18.XI.2009	Around the lake	Kaftarak
B4	29	31	52	47	1416	Weeds	18.XI.2009	Around the lake	Kaftarak
D6	29	24	52	47	1504	*Tamarix* sp.	17.XII.2009	Hillside	Sarvestan
D7	29	24	52	47	1546	*Amygdalus scoparia*	17.XII.2009	Hillside	Sarvestan
D8	29	24	52	47	1546	*Astragalus* sp.	17.XII.2009	Hillside	Sarvestan
D2	29	24	52	47	1540	*Astragalus* sp.	17.XII.2009	Hillside	Sarvestan
D10	29	24	52	47	1558	*Acantholimon* sp.	17.XII.2009	Hillside	Sarvestan
D11	29	24	52	47	1545	*Amygdalus scoparia*	17.XII.2009	Hillside	Sarvestan
D12	29	24	52	47	1624	*Ficus carica*	17.XII.2009	Hillside	Sarvestan
D20	29	24	52	47	1600	Wild cherry, *Cerasus* sp. (Rosaceae)	17.XII.2009	Hillside	Sarvestan
D21	29	24	52	47	1608	*Amygdalus scoparia*	17.XII.2009	Hillside	Sarvestan
D14	29	26	52	42	1460	*Tamarix* sp.	17.XII.2009	Hillside	Sarvestan
D9	29	20	52	48	1550	Moss	17.XII.2009	Hillside	Maharloo
D1	29	20	52	48	1550	*Cotoneaster* sp.	17.XII.2009	Hillside	Maharloo
D3	29	20	52	48	1550	*Ficus johannis*	17.XII.2009	Hillside	Maharloo
D4	29	20	52	48	1559	*Astragalus* sp.	17.XII.2009	Hillside	Maharloo
D5	29	24	52	47	1468	Weeds	17.XII.2009	Around the lake	Maharloo

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