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The first study of isotomidae fauna (collembola: apterygota) in Lorestan Province, Western Iran, with new records for Iranian fauna

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Abstract

Preliminary fauna of the Isotomidae were investigated in 10 different regions of the Kohdasht County (Lorestan province, Western Iran) during 2013-2014. The specimens were collected from the surface layer of soil and leaf litter. Totally 8 species belonging to 5 genera were found. All species reported for the first time in this province of Iran. It is also the first time that the species *Folsomia* cf. *asiatica* (Martynova, 1971) is reported for the fauna of Iran.

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Introduction

Isotomidae is one of the most common families of Collembola and easily recognized by lacking setae on the dorsal side of prothorax, weak differentiation of chaeta-like components and uniformity of chaetotaxy of body segments (Potapov, 2002).

Koohdasht is a large and culturally rich city located in the central Zagros Mountain region. Its geographical location in southwestern Iran and with altitude of 1195 m above sea level. Situated between the North West province Kermanshah and the northwestern city of Shirvan and Chrdavl, Puldokhtar city to the south, southwest of the city Dareh shahr and the East valley city limit is Khorramabad. (Bakhtiari, 2004).

The first studies of the Isotomidae fauna in the west part of Iran were carried out by Kahrarian *et al.,* 2012. They reported 6 families, 15 genera and 9 species of Collembola which 8 genera were belonging to Isotomidae (Kahrarian *et al*., 2012). After that some other paper on Isotomidae fauna from Western Iran (especially Kermanshah province) were published (Kahrarian and Arbea, 2013; Ghahramani Nezhad *et al*., 2013) but there are no data about Collembola species in Lorestan Province. In this study, we have investigated Isotomidae fauna in different regions of Koohdasht County during 2013-2014.

Material and methods

Site description

This study was carried out during 2013-2014 in Koohdasht County. All specimens recorded in this study were collected from a total of 10 sites ranging in elevation 1110 m a.s.l. to 1632 m a.s.l. from the surface layer of soil and leaf litter (Table. 1).

Table 1. Information on the identified species from Lorestan provinces (Iran)

Species	County/area/village	N	E	Elevation	Habitat
Folsomia cf. *asiatica*	Dalab village	033°34`	047°31`	1632	Oak
Folsomia near *similis*	Dalab village	033°34`	047°31`	1632	Oak
Folsomia quadrioculata	Davood Rashid	033°35`	047°38`	1322	Oak
	Tazehabad county	033°31`	047°33`	1212	pine
Folsomides marchicus	Roomeshgan county	033°16`	047°34`	1110	pine
	Davood Rashid	033°35`	047°38`	1322	Oak
	Dalab village	033°34`	047°31`	1632	Oak
Folsomides parvulus	Roomeshgan county	033°16`	047°34`	1110	pine
	Davood Rashid	033°35`	047°38`	1322	Oak
	Dalab village	033°34`	047°31`	1632	Oak
Desoria tigrina	Beloran village	033°33`	047°18`	1510	Oak
	Kohenany village	033°24`	047°21`	1088	pine
	Dalab village	033°34`	047°32`	1398	Oak
Isotomiella minor	Dalab village	033°33`	047°31`	1632	Oak
	Soorkhdom village	033°34`	047°31`	1632	Oak
Parisotoma notabilis	Roomeshgan county	033°16`	047°34`	1110	pine
	Beloran village	033°33`	047°18`	1510	Oak
	Kohenany village	033°24`	047°21`	1088	pine
	Dalab village	033°34`	047°31`	1632	Oak

Methods

The samples were retained in white plastic boxes and then were transferred to the Entomology Laboratory of Azad University of Kermanshah Branch. The species were extracted by Berlese Funnel and fixed in 75% ethanol. Specimens were cleared in a Nesbitt solution and mounted under slides in Hoyer's solution. Terminology for the primarily description given in Potapove (2002) and then the specimens were sent to Dr. Javier Arbea and Dr Mikhail Poapove for identification to species level.

Abbreviations: Ant. - antennal segment; Abd. - abdominal segment; Cl.–Claw; Emp. - Empodium; ex. – example; Oma. – Ommatidium/ Ommatidia; PAO – post antennal organ.

Results and discussion

A total of 8 species of Isotomidae belonging to 5 genera was collected and identified from Lorestan Province (Kohdash County) which all species reported for the first time in this province of Iran. Collecting information on the species is presented in Table 1. The species *Folsomia* cf. *asiatica* (Martynova, 1971) is new for the fauna of Iran.

Remarks on collected species:

A

B

C

D

E

F

Fig. 1. A) *Desoria tigrina*, B) *Folsomia quadrioculata*, C) *Parisotoma notabilis*, D) *Folsomides marchicus,* E) *Isotomiella minor*, F) *Folsomia* cf. *asiatica.*

Folsomia cf. *asiatica* (Martynova, 1971)

Material examined: 2 ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht County, Lorestan, Iran.

Distribution: This species was reported in Middle Asia, such as Tadzhikistan and Azerbaijan (Rasulova, 1984). It is the first record of this species in Iran.

Description: Total body length 1.3 - 1.7 mm (up to 1.8 mm). White, without pigmentation and Omma. PAO narrowly elliptical, slightly constricted, a little shorter than width of Ant I. Cl without teeth. Mucro with two teeth (Potapov, 2002).

***Folsomia* cf. *similis* (Bagnall, 1939)**

Material examined: 5 ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht County, Lorestan, Iran.

Description: Probably widely distributed in Holarctic with scattered records: Gr. Britain, Germany, Poland, Slovakia, Switzerland, France, Russia (Moscow), Abkhasia, Jugoslavia (Serbia). A few records from Japan and S Far East of Russia (Potapov, 2002). Already recorded from Iran (Moravvej *et al.,* 2007; Daghighi, 2012; Kahrarian, 2015).

Description: Total body length up to 1.2 mm. White, with black pigment grains scattered on body. 1+1 pigmented Omma. PAO rather narrow, constricted, longer than width of Ant I. Cl without teeth. Mucro with two teeth (Potapov, 2002).

Folsomia quadrioculata (Tullberg, 1871)

Material examined: 5 ex, soil and leaf litter under oak trees (*Q. infectoria*), DavoodRashid village, Kuhdasht County, Lorestan, Iran; 4 ex, soil and leaf litter under oak trees (*Q. infectoria*), TazehAbad area, Kuhdasht county, Lorestan, Iran.

Distribution: Widely distributed Holarctic species. In the Palaearctic, it has been recorded from all European and Northern Asiatic countries (Potapov, 2002). In Iran this species is reported by Cox, 1982.

Description*:* Total body length sometimes up to 2.5 mm (0.95 to 1.30 mm). Color pale grey to almost black, spotted. Granules of pigment irregulary scattered on body, sometimes forming a striped and spotted colour pattern. 2+2 Omma, arranged far from each other. PAO narrow, constricted, longer than width of Ant I. Cl without teeth. Mucro with two teeth (Potapov, 2002).

Folsomides marchicus (Frenzel, 1941)

Material examined: 20 ex, soil and leaf litter under oak trees (*Q. infectoria*), DavoodRashid village, Kuhdasht County, Lorestan, Iran; 15 ex, soil and leaf litter under oak trees (*Q. infectoria*), Romeshgan village, Kuhdasht county, Lorestan, Iran; 20 ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht county, Lorestan, Iran.

Distribution: Cosmopolitan, already recorded from Iran by Kahrarian *et al.,* 2012; Kahrarian and Arbea, 2013.

Description*:* Total body length 0.8-1 mm; colour dark grey; 5+5 omma; PAO about 2.5–3.0 times the length of omma; bifurcate maxillary palp; macrochaetotaxy 1,1/1,1,1,3,3 (type 3 after Fjellberg 1993); sensilla on body short (half as long as the surrounding chaetae); microsensilla 10/001; lower pair of sensilla on Abd V slightly thicker and longer than the upper one, placed in p-row; dens with 3 posterior and no anterior chaetae; tibiotarsi I–III with 20,20,22 chaetae.

Folsomides parvulus (Stach, 1922)

Material examined: 8 ex, soil and leaf litter under oak trees (*Q. infectoria*), DavoodRashid village, Kuhdasht County, Lorestan, Iran; 5 ex, soil and leaf litter under oak trees (*Q. infectoria*), Romeshgan village, Kuhdasht county, Lorestan, Iran; 9 ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht county, Lorestan, Iran.

Distribution: Cosmopolitan, already recorded from Iran by Cox (1982); Kahrarian and Arbea, 2013; Yoosefi Lafoorakiand and Shayanmehr, 2013; Gazi and Shayanmeh, 2014.

Description*:* Total length up to 0.9 mm. Body shape tube-like. No pigment on body, excluding dark spots under Omma. 2+2, 1+1, 2+1 Omma, posterior one, if present, far apart from or more rarely, close to anterior. Iranian populations normally with 2+2 equal Omma, the posterior far apart. PAO narrow, long, with 3 posterior setae. Mucro bidentate, fused to dens (Potapov, 2002)

Desoria tigrina (Nicolet, 1842)

Material examined: 3 ex, soil and leaf litter under oak trees (*Q. infectoria*), Beloran village, Kuhdasht county, Lorestan, Iran; 5 ex, soil and leaf litter under oak trees (*Q. infectoria*), Konany village, Kuhdasht county, Lorestan, Iran; 6 ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht county, Lorestan, Iran.

Distribution: Probably cosmopolitan species. In the Palearctic, all over Europe, with scattered records from the Asiatic part such as Siberia and China (Potapov, 2002). Already recorded from Iran by Kahrarian *et al*., 2012; Kahrarian and Arbea, 2013.

Description*:* Total length up to 2.1 mm. Colour rather variable, usually light to dark grey or brown, diffuse, never white or dark blue or violet. 8+8 nearly equal Omma. PAO narrow, 2-3 times as long as an Omma. Cl and Emp with teeth. Dens with many crenulations. Anterior side of Man and dens strongly chitinised. Mucro quadridentate, apical tooth larger than subapical one, without seta. Abd V and VI separate (Potapov, 2002).

Isotomiella minor (Schaeffer, 1896)

Material examined: 10ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht County, Lorestan, Iran; 8 ex, soil and leaf litter under oak trees (*Q. infectoria*), Soorkhdom village, Kuhdasht county, Lorestan, Iran.

Distribution: Cosmopolitan, already recorded from Iran by Cox, 1982; Daghighi, 2012; Yahyapour, 2012; Ghahramaninezhad *et al*., 2012.

Description: Total length 0.7 - 1.1 mm. White, without pigmentation and Omma. canals present from head to Abd II. Emp rather broad. Ret with 4+4 teeth and one setae. Dens long, 2.5 - 3.0 times longer than Man, Mucro tridentate, not slender (Potapov, 2002).

Parisotoma notabilis (Schaeffer, 1896)

Material examined: 3 ex, soil and leaf litter under oak trees (*Q. infectoria*), Beloran village, Kuhdasht county, Lorestan, Iran; 2 ex, soil and leaf litter under oak trees (*Q. infectoria*), Konany village, Kuhdasht county, Lorestan, Iran; 5 ex, soil and leaf litter under oak trees (*Q. infectoria*), Dalab village, Kuhdasht county, Lorestan, Iran; 2 ex, soil and leaf litter under oak trees (*Q. infectoria*), Romeshgan village, Kuhdasht county, Lorestan, Iran.

Distribution: Cosmopolitan, already recorded from Iran by Cox, 1982; Moravvej, 2007; Kahrarian *et al*., 2012; Kahrarian and Arbea, 2013.

Description*:* Total length up to 1 mm. color from pale to diffusely grey or blackish. 2+2 to 5+5 Omma. PAO broad, 3-4 times longer than cornea of Omma. Cl without teeth. Ret with 4+4 teeth and 2 setae. Dens as normal for genus. Mucro tridentate (Potapov, 2002).

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