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Article

Three new records of the superfamily Uropodoidea (Acari: Mesostigmata: Uropodina) from Iran, and a key to the known Iranian species of Uropodoidea

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Abstract

Based on studies on edaphic mites of the superfamily Uropodoidea in Mazandaran Province, northern Iran, three new records of the families Uropodidae and Trematuridae were collected and identified as follows: *Neodiscopoma splendida* (Kramer), *Uropoda* (*Uropoda*) *fumicola* (Schweizer) and *Trichouropoda spatulifera* (Moniez). Also, a key to the known Iranian species of Uropodoidea is presented.

Key words: Soil mites, Uropodidae, Trematuridae, Mazandaran, Iran.

Introduction

The Uropodoidea, or "higher uropodines" (Evans 1972), is the largest superfamily of Uropodina, comprising over 80 currently recognized genera (Wiśniewski & Hirschmann 1993). The family Uropodidae is a large group of monogynaspid Mesostigmata which has not a worldwide accepted taxonomy. The cosmopolitan genus *Uropoda* Latreille, 1806 with more than 240 species has a same situation of taxonomy (Wiśniewski 1998). The genus was divided into three subgenera: *Uropoda*, *Cilliba* von Heyden, 1826 and *Phaulodinychus* Berlese, 1903 by some authors (e.g. Karg 1989; Mašán 2001), or to four subgenera, besides of *Metadinychus* Berlese, 1916, by Wiśniewski & Hirschmann (1993) of which about 10 species of the genus *Cilliba* have been transferred to the family Cillibidae (Błoszyk *et al*. 2006; Stachowiak *et al.* 2008). Lindquist *et al.* (2009) referred to the family Uropodidae with about 40 defined genera and did not mention Cillibidae as a separate family. Also, the family Trematuridae includes the genera *Trichouropoda* Berlese, 1916 and *Nenteria* Oudemans, 1915 in some references or species of these genera are grouped into two distinct families as Trematuridae and Nenteriidae in Beaulieu *et al*. (2011).

The uropodid mites usually inhabit in soil and forest litter, decaying organic materials, manure, nests of mammals, birds, insects and moles, beach wrack, and plant debris (Karg 1989; Wiśniewski & Hirschmann 1993; Mašán & Krištofík 1995; Mašán 2001; Błoszyk 1999). Total life duration of these mites are approximately one year and

deutonymphs play an important role in the persistence of the species because of their ability to pass unsuitable environmental condition, long life and their potential for phoresy (Athias-Binche 1984).

The Iranian Uropodoidea mites are poorly known. Kamali *et al.* (2001) listed 11 species under the family Uropodidae including two species belong to the family Blattisociidae [*Blattisocius mali* (Oudemans, 1929) and *B. dentriticus* (Berlese, 1918)], and four synonymous species [*Trematura jacksonia* Hughes, 1948 as junior synonym of *Trichouropoda patavina* (Canestrini, 1885), and *Leiodinycus krameri* Berlese, 1884 as junior synonym of *T. orbicularis* (O.F. Müller, 1776)], and also an unidentified species of the genus *Oplitis* Berlese, 1884, but during the last decade, about three times more species have been reported from Iran (Jalaeian & Breitegger 2002; Jalaeian 2003; Kazemi 2012; Kazemi *et al*. 2003, 2008a, b; Kazemi & Kontschán 2007; Bahrami *et al*. 2011; Beyzavi & Ostovan 2012; Kazemi & Rajaei 2013; Kontschán & Hajizadeh 2013). So far, only two new species of the Uropodina have been recorded from Iran by Kazemi & Kontschan (2007), namely: *Oplitis iranicus* and *Neodicopoma persica*. During a wide investigation on Iranian mesostigmatic mites in Mazandaran Province, northern Iran, several mite species of the cohort Uropodina were collected of which three identified species belong to the genera *Uropoda*, *Neodiscopoma* Vitzthum, 1943 and *Trichouropoda* are new for Iran mite fauna that will be reported and diagnosed here, and a key to the known Iranian mite species of Uropodoidea is presented.

Materials and methods

Mite specimens were extracted from soil, litter and manure by means of a modified Berlese-Tullgren funnel, cleared in Nesbitt's fluid and then mounted in Hoyer's medium. Morphological observations, measurements and illustrations were made using a compound microscope equipped with differential interference contrast and phase contrast optical systems and a drawing tube (Olympus BX51). Measurements are given in micrometers (μm). Dorsal and genital shields lengths and widths, respectively, were taken from the anterior to posterior margins at the mid-level and from the lateral margins at the broadest point.

Family Uropodidae Kramer, 1881

Uropoda fumicola (Schweizer, 1961) (Fig. 1)
Uropoda (*Uropoda*) *fumicola.*— Karg (1989): 171; Mašán (2001): 275; Kontschán (2008): 12.

Diagnosis. Body rounded, dorsal shield without separate caudal and marginal platelets, with a network reticulation over entire surface, including a pair of median dorsal shield setae apically plumose, two posterior larger and apically densely plumose setae, other dorsal shield setae short and acicular. Female genital shield oviform, smooth, with a sharp and relatively long anterior prong (Fig. 1). Pair of ventral setae and posterior adanal setae longer and plumose. Peritremes L-shape.

Measurements of Iranian specimens: Length and width of female idiosoma, respectively 988–996, 878–883, length of genital shield including anterior prong 241–244 and width of shield 123–126, length of anterior prong of genital shield 61–64.

Studied materials. Two female specimens from forest soil and litter in Tonekabon, Dimron (40° 62' N; 47° 05' E), altitude 1704 m a.s.l., 1 June 2010, deposited in the Acarological Collection, Institute of Science and High Technology and Environmental Sciences, Graduate University of Advanced Technology, Kerman, Iran (ACISTE); one female from forest soil and litter in Tonekabon, Jasid, 22 May 2010, deposited in the Acarological Collection, Acarological Society of Iran, Faculty of Agriculture, University of Tehran, Karaj, Iran (ACASI).

Distribution. Switzerland, Germany, Hungary, Spain, Poland, Romania (Karg 1989; Mašán 2001; Kontschán 2008), and Iran (this paper).

Neodiscopoma splendida (Kramer, 1882)
Uropoda (*Uropoda*) *splendida.*— Kadite & Petrova (1977): 648–649; Karg (1989): 170; Mašán (2001): 278–280.
Neodiscopoma splendida.— Vitzthum (1943): 785; Błoszyk (1999): 168–169; Kontschán (2008): 13; Kontschán (2009): 112; Kontschán (2013): 116–118.

Diagnosis. Body oval shape. Dorsal shield strongly sclerotized, bearing longitudinal lines with four sclerotized lateral projections. Dorsal setae smooth and relatively long. Marginal shield wide and caudally narrowed, with smooth setae. Four pairs of small oval plates bearing one seta situated on caudal area of dorsal side of body. Genital shield oval-shape, with a rounded anterior margin, without any conspicuous surface structures.

Measurements of Iranian specimens: Length and width of idiosoma, respectively, in female specimens: 767–784, 586–600, in male specimens: 711–780, 582–625; length and width of genital shield of female, respectively: 174–183, 112–122.

Studied materials. Five females from forest soil and litter in Chalous, Roshandarreh (40° 62' N; 47° 05' E), altitude 1704 m a.s.l., 29 May 2010, deposited in ACISTE; one female and one male from soil and litter in Tonekabon, Jasid, 4 May 2010, deposited in ACISTE; two females and one male from forest soil and litter in Nowshahr, Sisangan Forest Park, 9 May 2011, deposited in ACASI; one female and two males from soil and litter in Tonekabon, Dimron, 1 May 1010, deposited in ACISTE.

Distribution. Europe, former USSR (Kadite & Petrova 1977; Karg 1989; Błoszyk 1999; Mašán 2001; Kontschán 2008, 2009, 2013), Iran (this paper).

Family Trematuridae Berlese, 1917

Trichouropoda spatulifera (Moniez, 1892)
Trichouropoda spatulifera.— Kadite & Petrova (1977): 674–675; Hirschmann & Wisniewski (1986): 3, 48–51; Karg (1989): 90; Mašán (2001): 148–149; Kontschán (2008): 7.

Diagnosis. Dorsal and ventral shields surface with large pit-like structures. Setae on dorsal shield mostly spatulate and denticulate, setae x1 and x2 needle-like. Genital

shield with plenty pores and sharply pointed at the front. Metapodal areas with few pores. Anterior endopodal line reaches sternal bristles v2.

Measurements of Iranian specimens: Length and width of female idiosoma 845 and 707, respectively; length and width of genital shield 274 and 151, respectively.

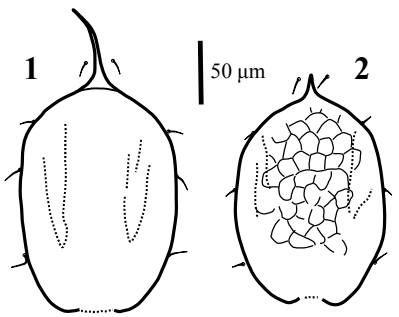
Studied material: One female from forest soil and litter in Tonekabon, Jasid, 29 April 2010, deposited in ACASI.

Distribution. Europe, former USSR (Kadite & Petrova 1977; Karg 1989; Mašán 2001) and Iran (this paper).

Key to the known Iranian species of the superfamily Uropodoidea

1. Female genital shield located behind coxae IV....*Metagynella paradoxa* Berlese, 1919
– Female genital shield located between coxae II-IV.....2
2. Internal malae divided into several pilose branches (moustache-like).....3
– Internal malae not divided into several pilose branches.....4
3. Dorsal setae ensiform.....*Oplitis paradoxa* (Canestrini & Berlese, 1884)
– Dorsal setae setiform..... *Oplitis iranicus* Kazemi & Kontschán, 2007
4. Paralaciniae present.....5
– Paralaciniae absent.....7
5. Peritremes anteriorly turned to the front in a 90° angle; genital shield with a relatively long and narrow anterior process.....*Nenteria stylifera* (Berlese, 1904)
– Peritremes without anterior projection to forward; genital shield without anterior long and narrow anterior process.....6
6. Surface between pedofossae with oval pits.....
…….....*Nenteria stammeri* Hirschmann & Z.-Nicol, 1962
– Surface between pedofossae with reticulate pattern.....
.....*Nenteria breviunguiculata* (Willmann, 1949)
7. Corniculi with lateral teeth 8
– Corniculi without lateral teeth.....13
8. Genital shield with a long narrow anterior process.....9
– Genital shield without a long narrow anterior process.....10
9. With one pair long setae on caudal area of body.....
…….....*Trichouropoda bipilis* (Vitzthum, 1923)
– Without one pair long setae on caudal area of body.....
…….....*Trichouropoda elegans* (Kramer, 1882)
10. Ventral aspect of body with reticulate sculptural pattern.....
.....*Trichouropoda orbicularis* (C.L. Koch, 1839)
– Ventral aspect of body with oval or irregular pits.....11
11. Genital shield rounded anteriorly, ratio of length/width of shield less than 1.5.....*Trichouropoda patavina* (Canestrini, 1885)
– Genital shield anteiorly pointed, ratio of length/width of shield almost 2.....12
12. Dorsal setae expanded, spatuliform.....*Trichouropoda spatulifera* (Moniez, 1892)
– Dorsal setae mostly acicular.....*Trichouropoda ovalis* (C.L. Koch, 1839)
13. Internal sclerotized node associated with levantor tendon present.....14
– Internal sclerotized node associated with levantor tendon absent.....19

14. Corniculi finger-like; fixed digit as long as movable digit of chelicerae; genital shield of female very small.....*Macrodinychus bregetovaae* Hirschmann, 1975
– Corniculi horn-like; fixed digit usually longer than movable digit of chelicerae; genital shield of female large….....15
15. Posterior part of marginal shield reduced or divided.....16
– Posterior part of marginal shield complete, not reduced or divided.....17
16. Genital shield rounded anteriorly; pedofossae absent.....
…….....*Uroobovella fimicola* (Berlese, 1903)
– Genital shield with a bifid anterior spike; pedofossae present.....
.....*Uroobovella marginata* (C.L. Koch, 1839)
17. Idiosoma strongly sclerotized and ornamented; dorsal setae pilose……
…….....*Uroobovella pulchella* (Berlese, 1904)
– Idiosoma not strongly sclerotized and ornamented; dorsal setae mostly acicular.....18
18. Marginal setae longer than those setae on podonotal area of dorsal shield; genital shield sub-triangular, anterior area of shield blunt; all dorsal setae acicular……
…….....*Uroobovella obovata* (Canestrini & Berlese, 1884)
– Marginal setae as long as those setae on podonotal area of dorsal shield; genital shield sub-oval, anterior area of shield with a minute spike; two pairs of caudal area of dorsal setae pilose.....*Uroobovella difoveolata* Hirschmann & Z-Nicol, 1969
19. Hypostomal setae h1 serrate or pilose; internal malae marginally strongly pilose…...
.....*Discorella modesta* (Leonardi, 1899)
– Hypostomal setae h1 smooth; internal malae smooth or slightly pilose.....20
20. Idiosoma strongly sclerotized, central area elevated from other part of dorsal shield; dorsal shield ornamented with ridges.....21
– Idiosoma not strongly sclerotized; dorsal shield without ridges.....22
21. Surface of female genital shield smooth; caudal platelets on dorsal side of body small.....*Neodiscopoma splendida* (Kramer, 1882)
– Surface of female genital shield ornamented; caudal platelets on dorsal side of body large.....*Neodiscopoma persica* Kazemi & Kontschán, 2007
22. With a distinct deutosternal groove between hypostomal setae h1-h3, without transverse rows.....*Uropoda* (*Phaulodinychus*) *copridis* (Oudemans, 1916)
– Distinct deutosternal groove absent, area between hypoastomal setae h1-sc covered with dense small denticles.....23
23. Surface of genital shield in female smooth (Fig. 1).....
…….....*Uropoda* (*Uropoda*) *fumicola* (Schweizer, 1961)
– Surface of genital shield in female ornamented by reticulate pattern (Fig. 2).....*Uropoda* (*Uropoda*) *orbicularis* (Müller, 1776)



Figures 1–2. Female genital shields of *Uropoda* spp. 1. *U. fumicola*; 2. *U. orbicularis.*

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سه گزارش جدید از کنه‌های بالاخانوادهٔ Uropodoidea (Acari: Mesostigmata: Uropodina) برای ایران و کلید شناسایی گونه‌های شناخته شدهٔ این بالاخانواده در ایران

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چکیده

در بررسی کنه‌های خاک‌زی بالاخانواده‌ی Uropodoidea در استان مازندران، شمال ایران، سه گونه متعلق به خانواده‌های Uropodidae و Trematuridae شامل *Neodiscopoma splendida* (Kramer)، *Uropoda* (*Uropoda*) *fumicola* (Schweizer) و *Trichouropoda spatulifera* (Moniez) جمع‌آوری و شناسایی شدند که گزارش آنها برای فون ایران جدید است. هم‌چنین کلید شناسایی گونه‌های شناخته شده از بالاخانوادهٔ Uropodoidea در ایران نیز ارایه می‌شود.

واژگان کلیدی: کنه‌های خاک، Uropodidae، Trematuridae، مازندران، ایران.

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