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Article

Redescription of *Odontoscirus iota* Atyeo (Acari: Trombidiformes: Bdellidae) from Iran, with a key to the Iranian species of *Odontoscirus*

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ABSTRACT
Odontoscirus iota Atyeo, 1960 is reported here for the first time from Iran. An additional description is provided for *O. iota* based on adult females collected from East Azerbaijan province, northwest of Iran. An updated key to the species of *Odontoscirus* from Iran is presented.

KEY WORDS: East Azerbaijan; female; Odontoscirinae; predatory mites; systematics.

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INTRODUCTION

The snout mites of the family Bdellidae Dugès (Acari: Bdelloidea) are often found in soil and litter in a variety of conditions, ranging from dry exposed desert to cool moist forest habitats (Walter *et al.* 2009). They are predators, and some of them play an important role in the biological control of plant pests. For instance, *Odontoscirus lapidaria* (Kramer) controls the lucerne flea, *Sminthurus viridis* (L.) (Collembola), in Australia and South Africa (Gerson *et al.* 2003).

Up to now, nine *Odontoscirus* species have been reported from Iran (Paktinat-Saeij *et al.* 2016; Eghbalian *et al.* 2017). The aim of this paper is to present the results of the latest efforts to collect bdellid mites from Iran. During this study, a new record of *Odontoscirus* was made and the number of species of Iranian *Odontoscirus* increased to 10. This new record, *Odontoscirus iota* Atyeo, 1960 is redescribed here and a key to the Iranian species of *Odontoscirus* is also provided.

MATERIALS AND METHODS

The samples were taken from soil and rotten leaves under apple trees from East Azerbaijan province. Mites were extracted using a Berlese-Tullgren funnel and put into AGA solution (Smiley 1992). Collected specimens were cleared in Nesbitt's fluid, mounted in Hoyer's medium (Walter and Krantz

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2009), and examined under a phase contrast microscope (Olympus BX41). Initial illustrations were made using a drawing tube attached to the phase contrast microscope, scanned, and edited using Adobe Illustrator CS6. Body length was measured from the apex of subcapitulum to posterior margin of idiosoma and body width at the level of setae c_2; setae were measured from their insertion point to their tips; and legs were measured from the ventral insertion of coxae to the base of pretarsi. The setal nomenclature of Kethley (1990) is followed for idiosoma except for the propodosomal setae, which follows the notation given by Fisher *et al.* (2011) and legs nomenclature follows that of Den Heyer (1981). All measurements are given in micrometers (μm). Variations of leg setae are indicated by slashes. The following abbreviations are used: Prodorsal setae: anterior trichobothria (*at*), posterior trichobothria (*pt*), lateral proterosomal setae (*lps*), median proterosomal setae (*mps*). Hysterosomal setae: internal humerals (c_1), external humerals (c_2), internal dorsals (d_1), internal lumbals (e_1), internal sacrals (f_1), external sacrals (f_2), internal clunals (h_1), external clunals (h_2). Anal region: postanals (*ps*); Genital region: aggenital setae (*ag*), genital setae (*g*). Ventral hypostomal setae ($vh_{1–6}$), dorsal hypostomal setae (*DHS*). Leg setae: attenuate (sharply) solenidion (*asl*), blunt-pointed rod-like solenidion (*bsl*), peg-like seta (*pe*), trichobothria (*T*), simple tactile seta (*sts*), macroseta (*ms*), duplex setae (*dxs*). Palp setae: solenidion (*s*), dorsal end seta (*DES*), and ventral end seta (*VES*). All specimens are deposited in the Acarological Collection, Department of Plant Protection, Faculty of Agriculture, University of Maragheh, Maragheh, Iran.

RESULTS

Family Bdellidae Dugès, 1834
Subfamily Odontoscirinae Grandjean, 1938
Genus *Odontoscirus* Thor, 1913

Type species: *Bdella vigulata* Canestrini and Fanzago, 1876

Odontoscirus iota Atyeo, 1960 (Figs. 1–9)

Diagnosis

Palp chaetotaxy: 0-5-1-4-7; chelicera striated; each chelicera with two setae; movable cheliceral digit with 4–5 teeth; genital valves each with seven setae; solenidotaxy of genua I–IV 5-2-1-1.

Redescription (female, n = 4)

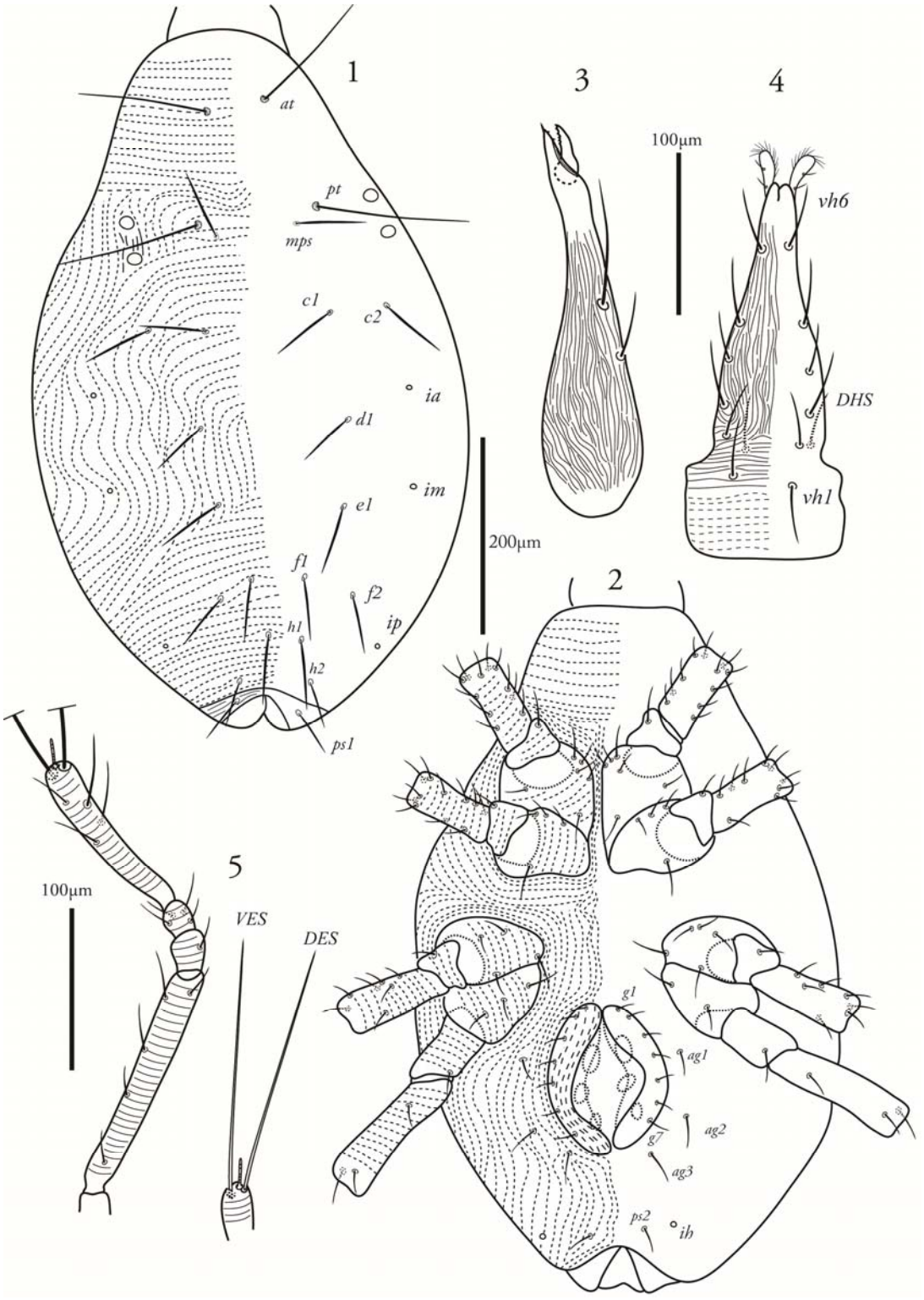
Measurements – Length of body (including gnathosoma) 891–951; width of body 364–418, length of gnathosoma 236–260; length of chelicera 224–243; leg lengths: I 468–515, II 457–475, III 506–530, IV 678–764; length of tarsi I–IV: 142–168; 132–143; 163–182; 194–225; *VES* 139–160, *DES* 142–155, *DHS* 39–53; palpomers I–V: 13–15, 130–153, 18–22, 20–22, 103–118; *at* 114–140, *pt* 121–149, *mps* 71–86, c_1 53–70, c_2 72–85, d_1 53–64, e_1 56–67, f_1 55–63, f_2 54–68, h_1 57–76, h_2 50–57; distance: *at–at* 53–65, *pt–pt* 116–132, *pt–mps* 22–25, *mps–mps* 84–100, c_1–c_1 103–127, c_1–c_2 56–60, c_1–d_1 94 –105, d_1– d_1 121–143.

Dorsum (Fig. 1) – Setae *lps* absent, *at* and *pt* thin and naked; prodorsum with fine broken striae; two pairs of eyes posterolateral to *pt* present, with transverse to oblique striations between them; hysterosoma with fine broken striae; dorsal setae smooth (Fig. 1).

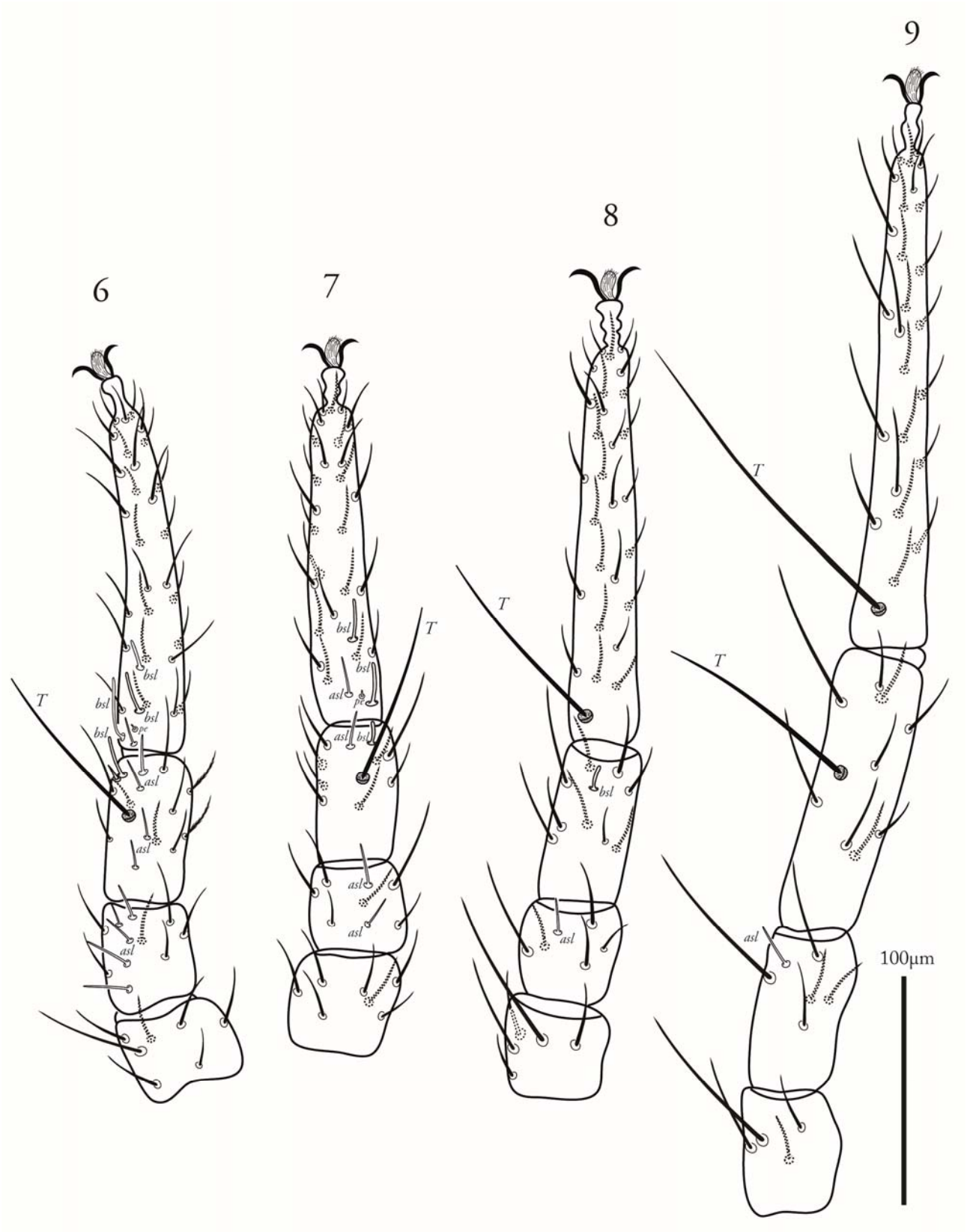
Venter (Fig. 2) – Genital valves each with seven setae (g_1–g_7); three pairs of agential setae (ag_1–ag_3) present; anal valves with two pairs of smooth anal setae (ps_1 and ps_2), ps_1 38–49, ps_2 27–34. Three pairs of genital papillae present.

Gnathosoma (Figs. 3–5) – Six pairs of ventral hypostomal setae (vh_1–vh_6) longitudinally aligned, distances vh_1 25–37, vh_2 31–35, vh_3 31–39, vh_4 35–41, vh_5 37–45, vh_6 at apex of hypostome, 31–36 (Fig. 4); hypostome ending in two lateral lips, bearing two adoral setae $or_{1–2}$ and with sparsely

longitudinal striations, which are transverse at base, dorsal hypostomal setae (*DHS*) present. Chelicera (Fig. 3) with longitudinal striae and with two setae, distal setae 55–67 longer than proximal setae 28–36; distance between setae 31–36. Movable digit with 4–5 teeth, fixed digit straight, with 1–2 teeth and one slender acute process. Palp (Fig. 5) chaetotaxy: trochanter 0, basifemur 5sts, telofemur 1sts, genu 4sts, tibiotarsus 4sts, 1s, 2 long terminal setae (*VES*, *DES*).



Figures 1–5. *Odontoscirus iota* Atyeo, 1960 (Female) – 1. Dorsal view of idiosoma; 2. Ventral view of idiosoma; 3. Chelicera; 4. Subcapitulum; 5. Palp.



Figures 6–9. *Odontoscirus iota* Atyeo, 1960 (Female) – 6. Leg I; 7. Leg II; 8. Leg III; 9. Leg IV.

Legs (Figs. 6–9) – Leg chaetotaxy: coxae I–IV 5/6-3/4-4/5-2/3 sts; trochanters I–IV 1-1-1-1 sts; basifemora I–IV 10/11-9/10/11-7/8-3 sts; telofemora I–IV 7 sts-7 sts-3/4/5 sts, 1 ms- 3 sts, 1 ms;

genua I–IV 5 asl, 6 sts- 2 asl, 6 sts- 1 asl, 5 sts- 1 asl, 5 sts; tibiae I–IV 4asl, 1bsl, 1pe, 1T, 8/9 sts- 1asl, 1bsl, 1T, 7/8 sts- 1bsl, 8/9 sts- 8/9 sts, 1T; tarsi I–IV 1asl, 3bsl, 1pe, 26/28 sts- 1asl, 2bsl, 1pe, 25/27 sts- 25/27 sts, 1T- 23/25 sts, 1T.

Remarks

Until now, *Odontoscirus iota* was reported from United States (Atyeo 1960), Georgia (Gomelauri 1963), Bulgaria (Sosnina *et al.* 1965), Ukraine (Kuznetsov and Livshits 1979), Poland (Michocka 1987) and China (Xin *et al.*1998). The characteristics of the specimens collected are similar to those of the original description of Atyeo (1960) except presence of *DHS* and an acute process on the fixed cheliceral digit *vs.* absence in original description; coxa II with 3/4 setae in the Iranian specimens *vs*. 2 setae in the American specimens and tibia III with 1bsl, 8/9 setae in the Iranian specimens *vs*. 1asl, 10 setae in the latter.

Furthermore, this redescription is also very similar to the redescriptions of Sosnina *et al.* (1965) and Michocka (1987) but it differs by: five setae on palp basifemur *vs*. six in latter. This is the first record of this species from Iran.

Material examined

One female from soil of an apple orchard, Torkamanchay, 11 December 2015; one female from bark of an apple tree, Balesin village, 18 December 2015, Miyaneh city, East Azerbaijan province were collected by Aylar Rostami and two females were collected from soil under a plum tree, Alavian village, 6 November 2016, Maragheh city, East Azerbaijan province, Iran, by Saeid Valizadeh.

Key to the Iranian species of *Odontoscirus* Thor (After Paktinat-Saeij *et al.* 2016)

1. Chelicera with one dorsal seta ……..……..…….…… 2
– Chelicera with two dorsal setae ……..……..…..…….…… 3
2. Palp basifemur with 14 setae ……..……..…..……. *O. longirostris* (Hermann)
– Palp basifemur with 16 setae ……..……. *O. iraniensis* (Ueckermann *et al.*)
3. Posterior trichobothria (*pt*) minute and closely associated with median proterosomal setae (*mps*) ...……..……..……...……..……. 4
– Posterior trichobothria (*pt*) normal and well separated from median proterosomal setae (*mps*) ... 7
4. Posterior trichobothria (*pt*) leaf-like……..……..…..……*O. lapidaria* (Kramer)
– Posterior trichobothria (*pt*) simple and not leaf-like ...……..…… 5
5. Palp basifemur with 3 setae; palp tibiotarsus with 7 setae (including solenidia, *VES* and *DES*) ……. ……..……..…..…. *O. meridionalis* (Thor)
– Palp basifemur with more than 3 setae; palp tibiotarsus with more than 7 setae (including solenidia, VES and DES) ……..……..…….……..……. 6
6. Palp basifemur with 4 setae; palp tibiotarsus with 11 setae (including solenidia, *VES* and *DES*) …...……..……...……. *O. kazeruni* (Ostovan & Kamali)
– Palp basifemur with 7 setae; palp tibiotarsus with 12 setae (including solenidia, *VES* and *DES*) …...……..…..……. *O. petila* (Atyeo)
7. Chelicera reticulated ……..… 8
– Chelicera not reticulated ……..……. 9
8. Movable digit of chelicera with 4–5 teeth; coxae I–II with 5 and 3 setae …...…... *O. alpinus* Atyeo
– Movable digit of chelicera with 6 teeth, coxae I–II with 3 and 4 setae ……..…..…..…… ……..…....… *O. denheyeri* Eghbalian *et al.*
9. Both cheliceral setae subequal in length …….....…. *O. virgulata* (Canestrini & Fanzago)
– Proximal cheliceral seta about 1/3 to 1/2 the length of the distal seta ……..……..… 10
10. Palp basifemur with 5 setae; movable digit of chelicerae with 4–5 teeth …….....… *O. iota* Atyeo

– Palp basifemur with 6 (7) setae; movable digit of chelicerae with 6–8 teeth …….. ……..…… *O. mazandaranensis* Paktinat-Saeij *et al.*

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بازتوصیف گونهٔ *Odontoscirus iota* Atyeo (Acari: Trombidiformes: Bdellidae) از ایران، به همراه کلید گونه‌های ایرانی جنس *Odontoscirus*

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چکیده

گونهٔ *Odontoscirus iota* Atyeo, 1960 برای نخستین بار از ایران گزارش می‌شود. همچنین بازتوصیف گونهٔ *O. iota* براساس نمونه‌های بالغ ماده جمع‌آوری شده از استان آذربایجان‌شرقی، شمال‌غرب ایران تهیه شده است. کلید به روزشده گونه‌های جنس *Odontoscirus* ایران ارایه شده است.

واژگان کلیدی: آذربایجان شرقی؛ ماده؛ زیرخانوادهٔ Odontoscirinae؛ کنه‌های شکارگر؛ سیستماتیک.

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