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A new species of *Syrioiulus* Verhoeff, 1914 from Iran, with remarks on the taxonomy of the genus (Diplopoda: Julida: Julidae)

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Abstract: *Syrioiulus lohmanderi* sp. nov. is described from material collected in Gilan Province, northwestern Iran. The new species is morphologically most similar to *S. astrabadensis* (Lohmander, 1932a) and *S. persicus* (Golovatch, 1983), also known only from the northern parts of Iran. A key to the species of *Syrioiulus* Verhoeff, 1914 recorded from this country is compiled, and a checklist of all species presently assigned to the genus is given. *Syrioiulus adsharicus* (Lohmander, 1936) and *S. cappadocius* (Lohmander, 1939) are transferred from *Amblyiulus* Silvestri, 1896. The taxonomic problems within *Syrioiulus* and related genera are briefly discussed.

Keywords: Taxonomy - millipedes - Pachyiulini - identification key - distribution - Alborz Mts.

INTRODUCTION

Syrioiulus Verhoeff, 1914 is one of the 16-22 recognized genera and/or subgenera currently comprising the julid tribe Pachyiulini (Tabacaru, 1978; Golovatch, 1979; Mauriès, 1982; Enghoff, 1992; Mauriès *et al*., 1997). It belongs to a group of genera, along with *Afropachyiulus* Schubart, 1960, *Amblyiulus* Silvestri, 1896, *Dolichoiulus* Verhoeff, 1901, and *Japanoiulus* Verhoeff, 1937, characterized by a (mostly) spoon-shaped promere with one or two apical denticles/ridges, by the presence of a well differentiated mesomeral process, and by the solenomere being devoid of either fovea or pseudofovea, as well as of a pseudoflagellum (see also Enghoff, 1992). The delimitations of these five genera have been highly problematic, particularly because they [with the exception of *Dolichoiulus* which was thoroughly revised by Enghoff (1992)] have never been properly diagnosed, partly due to their rather simple and uniform gonopod morphology that is typical of Pachyiulini in general (see e.g. Enghoff, 1992; Frederiksen *et al.*, 2012; Vagalinski *et al.*, 2014).

Originally proposed as a subgenus of *Dolichoiulus*, *Syrioiulus* was mostly disregarded by subsequent authors dealing with Pachyiulini (Attems, 1926; Lohmander, 1932a, b, 1936; Tabacaru, 1978; see also Golovatch, 2018) until Mauriès (1982) synonymized the genera and subgenera *Caspiopachyiulus* Lohmander, 1932a, *Elbaiulus* Verhoeff, 1930, *Heteropachyiulus* Lohmander, 1936, *Iudaeoiulus* Verhoeff, 1930, and *Japanoiulus* Verhoeff, 1937 under *Syrioiulus*, recognizing a total of 15-16 species within the redefined genus. Two years later the same author added a new species from Greece to the list of congeners (Mauriès, 1984). In his checklist of the Diplopoda of Israel Tabacaru (1995), unlike Mauriès (1982), treated *Syrioiulus aharonii* under *Amblyiulus*, most likely remaining consistent with an earlier study by himself (Tabacaru, 1978) on Pachyiulini systematics in which he regarded *Syrioiulus* as a synonym of *Amblyiulus*. The latest treatment of *Syrioiulus* is that of Golovatch (2018) in the framework of a review of the Israeli Pachyiulini (referred to as subfamily Pachyiulinae). In that paper the author emphasized the importance of the solenomere structure for the differentiation between *Syrioiulus* and *Amblyiulus*, specifically of the presence in the latter genus of a slender, rod-like mesal process which is absent in *Syrioiulus*. Golovatch (2018) clearly illustrated the existence of such a process in *Syrioiulus cedrophilus* (Attems, 1911) [(as referred to by Mauriès (1982)], which was the reason why he transferred that species back to *Amblyiulus*.

Here I describe a new species of *Syrioiulus* from the Caspian region of Iran, using the occasion to sort out taxonomic problems concerning the genus, in an attempt to add some clarity to its systematic affinities and species composition.

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MATERIAL AND METHODS

A MBS-10 stereomicroscope was used for general examinations and measurements. Whole body pictures of type specimens were prepared from multilayer photographs made under a Carl Zeiss Discovery V8 stereo microscope with a Nikon Coolpix S3700 camera mounted on one of the eyepieces, followed by focal stacking in Photoshop CC 2019. Certain body parts (legs, antennae, penis, edge of male body ring 7, gonopods, and vulva) were dissected and mounted in glycerin on temporary slides. They were then examined and photographed with the aid of a ProgRes C7 camera connected to a Zeiss Axio Imager 2 compound microscope. Some of the pictures were used for making drawings on tracing paper from a laptop display. SEM micrographs of one posterior gonopod were taken with a JEOL JSM-5510 scanning electron microscope after mounting on a sticky aluminum tape and sputter-coating with gold.

The description of the new species mostly follows the pattern used in Vagalinski & Lazányi (2018) and Vagalinski & Golovatch (2019). Terminology of the gonopod structures is mostly after Enghoff (1992), with the following differences: "promere" is used instead of "promerite", "mesomeral process" instead of "mesomerite", "opisthomere" instead of "opisthomerite", "caudomesal lamella" instead of "membrane", and "mesal ridge" and "anterior process" are here interpreted as parts of the anterior lamella of the solenomere.

The examined samples are deposited in the Muséum d'histoire naturelle, Genève, Switzerland (MHNG) and in the Göteborg Naturhistoriska Museet, Göteborg, Sweden (GNM).

TAXONOMIC PART

Genus *Syrioiulus* Verhoeff, 1914

Syrioiulus Verhoeff, 1914: 65 (established as a subgenus of *Dolichoiulus*).

Type species: *Dolichoiulus polyzonus* Attems, 1911, by subsequent designation by Jeekel (1970).

Tentative diagnosis: A genus of the tribe Pachyiulini characterized by a (more or less distinctly) spoon-shaped promere with two apical denticles, and with an opisthomere deeply divided into a mesomeral and a solenomeral branch, the latter lacking fovea or pseudofovea and pseudoflagellum. Different from the similar genera *Afropachyiulus*, *Amblyiulus*, *Dolichoiulus*, and *Japanoiulus* mostly by a typically (but not always) weakly pronounced anterior lamella of the solenomere, apically never drawn into a distinct process, and by the solenomere apex being blunt or concave, sometimes bearing minute apical processes or/and ciliae, but not tapering into a single, pointed tip.

Syrioiulus lohmanderi sp. nov.

Figs 1-16

Material: MNHG; male holotype (fragmented into head, rings 1-6, left part of ring 7 and rest of body; gonopods, left antenna, leg-pair 1, leg-pair 2, penis, right leg 3, right edge of ring 7, and left mid-body leg dissected; left opisthomere prepared for SEM), sample field number 7314; label "Iran (Gilan), Siahkal, tamis., mousse, creux gros arbres" [Iran, Gilan Province, Siahkal, sifting, moss, old, hollow trees]; 06.JUL.1973; leg. A. Senglet. – MNHG; 1 adult female paratype (fragmented into head to ring 3 and rest of body; right vulva dissected); 1 juvenile female paratype (unbroken); same collecting data as holotype.

Type locality: Iran, Gilan Province, Siahkal.

Etymology: Named in memory of Hans Lohmander (1896-1961), a prominent millipede taxonomist who described six species currently assigned to *Syrioiulus*.

Diagnosis: A blind species of *Syrioiulus*, particularly similar to *S. astrabadensis* (Lohmander, 1932a) and *S. persicus* (Golovatch, 1983) in gonopod and vulva structure. Different from *S. astrabadensis* mostly by its larger size and darker colouration, and by mesomeral process being subequal to rather than significantly shorter than solenomere. Different from *S. persicus* by absence of metazonal setae, and by presence of typical, pointed mesal apical denticle of promere (the same being a rounded lobe in the latter species).

Description

Measurements: Holotype with 60+1+T body rings, length 29 mm, mid-body vertical diameter 1.65 mm. Adult female paratype with 59+1+T body rings, length 28 mm, mid-body vertical diameter 1.9 mm. Juvenile female paratype with 49+4+T body rings.

Colouration (after more than 40 years of ethanol preservation) (Figs 1-4): Mostly ochre brown, prozonae greyish with purple tinges; head with a dark, blurred, oval spot mesally to each antenna, and with a dark, narrow, axial line on vertex; body without axial line; legs and antennae light yellow to completely pallid; pre-anal ring and paraprocts darker ventrally.

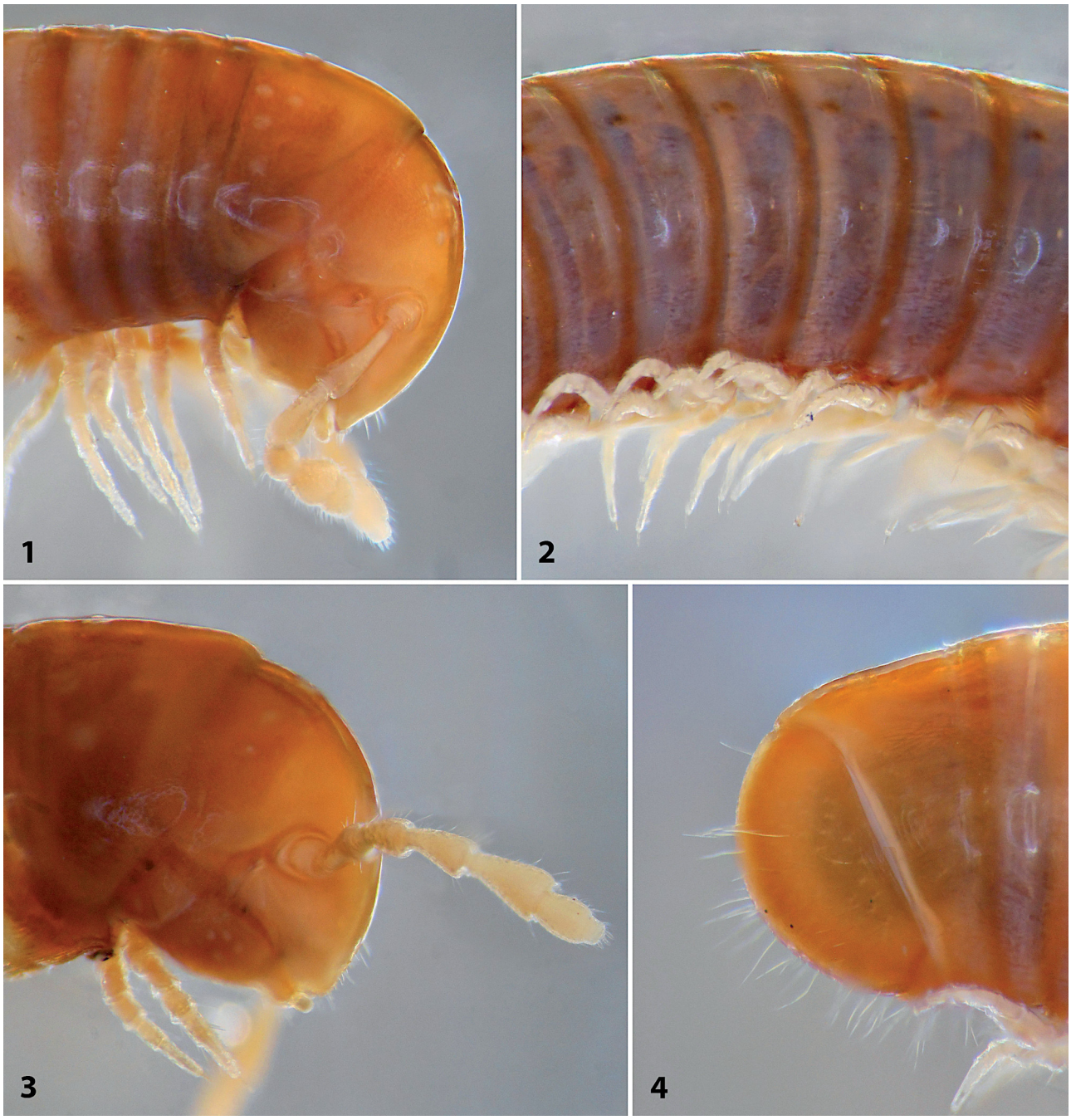
General morphology (Figs 1-4, 5): Ommatidia absent; vertigial setae absent; 5 supralabral setae in the adult specimens, and 4 in the juvenile; 20-26 labral setae. Antennae (Fig. 5) about 1.2 times as long as head in both sexes; antennomeres 3, 4, and 5 subequal in length, about 0.8 times as long as 2, and 1.5 times as long as 6, 5 considerably thicker than 6; a whorl of sensilla basiconica at distal margins of antennomeres 5 and 6, those on 5 nearly as long as the four apical cones, somewhat longer than those on 6. Gnathochilarium of normal julid appearance; prementum relatively short: considerably less than half the length of lingual lamellae; each lingual lamella bearing 4-5 setae. Collum smooth,

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some specimens with one to several very shallow grooves near posterolateral corners.

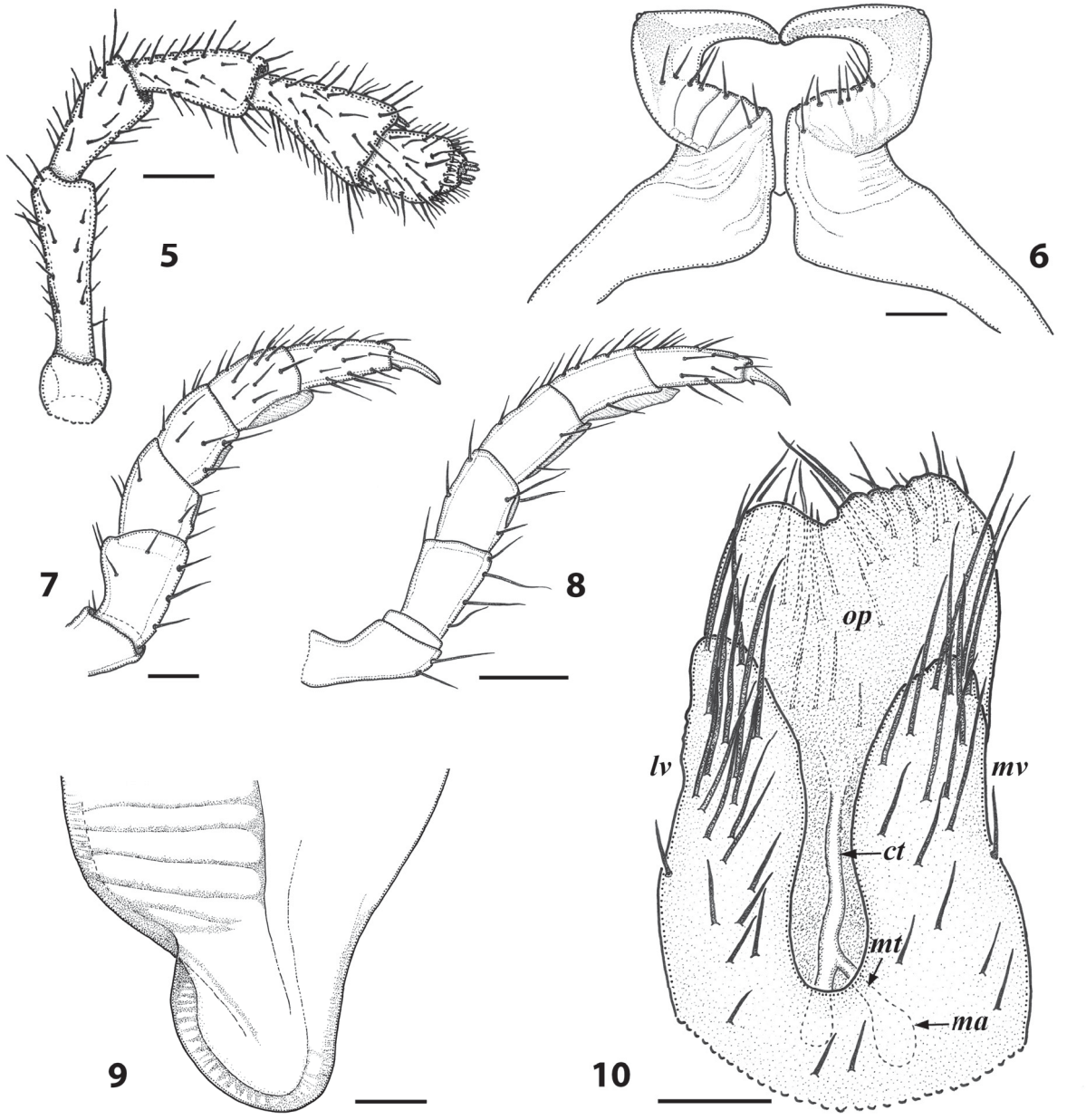
Prozonae with very short and shallow, scattered, longitudinal striae. Metazonae rather shallowly and somewhat irregularly striated, with 5-8 striae in a square with sides equal to metazonal length just below ozopore level; hind margins slightly turned outwards, bearing no setae. Ozopores set in metazonae, at 1/4-1/3 of metazonal length behind pro-metazonal suture; the latter indistinct, especially on dorsal side, recognizable only as a barely visible concentric groove running through middle of ring. Mid-body legs 1.55 and 0.95 times as long as mid-body diameter in the adult male and in the adult female, respectively. Tarsus of mid-body legs 1.2-1.3 times as long as tibia, and about 3 times as long as apical claw.

Telson (Fig. 4): Pre-anal ring dorsally with a few short setae; epiproct absent; hypoproct short and broadly rounded, tightly fitting under paraprocts in both sexes,



Figs 1-4. *Syrioiulus lohmanderi* sp. nov., overall appearance of male holotype (1, 2, 4) and female paratype (3), in MHNG. (1) Head and body rings 1-5. (2) Mid-body rings. (3) Head and collum. (4) Telson. Photos not to scale.

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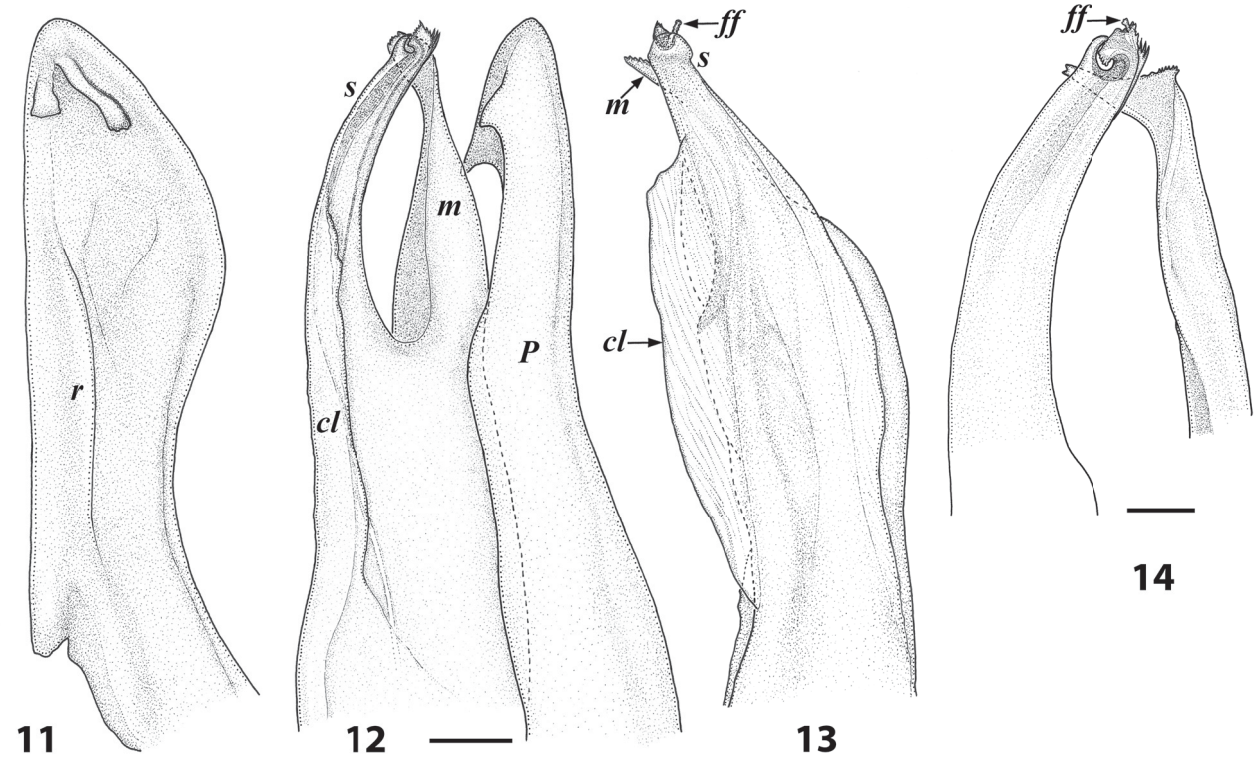
Figs 5-10. *Syrioiulus lohmanderi* sp. nov., structures of male holotype (5-9) and female paratype (10), in MHNG. (5) Antenna. (6) Leg-pair 1, frontal view. (7) Leg 2. (8) Leg 3. (9) Right ventral edge of pleurotergum 7, ventro-lateral view. (10) Right vulva, caudal, slightly mesal view. Abbreviations: *ct* = central tube; *lv* = lateral valve; *ma* = mesal ampulla; *mt* = mesal tube; *mv* = mesal valve; *op* = operculum. Scale bar of Fig. 8: 0.2 mm; the rest: 0.1 mm.

with a pair of disto-median setae and a transverse row of around 10 setae proximally to the former. Paraprocts densely covered with long setae, without rows of short and stiff setae along caudal margins.

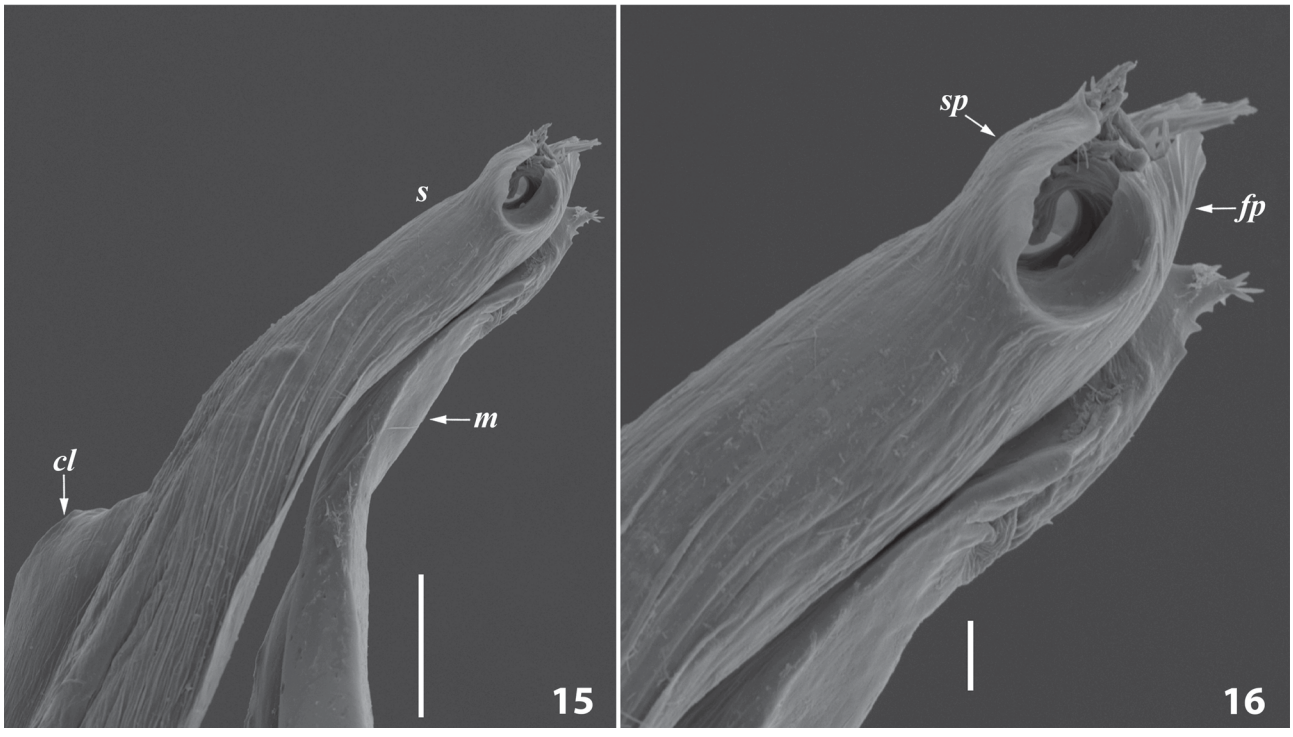
Male sexual characters: Mandibular stipites (see Fig. 1) forming rather small, rounded, frontoventral lobes. Leg-pair 1 (Fig. 6) developed as compact hooks pointing mostly mesad, with a tapering tibial outgrowth and a minute, knob-like, tarsal remnant. Leg-pair 2 (Fig. 7) with two crested adhesive pads, one each on postfemur and tibia. Leg-pair 3 (Fig. 8) and following pairs additionally with a vestigial pad on femur; all pads gradually diminishing in size towards telson, completely disappearing in posterior third of body. Pleurotergum 7 (Fig. 9) ventrally forming large, rounded lobes originating from the border between pro- and metazona, protruding mostly ventrad. Penis soft, hyaline, with deeply divided, conoidal lobes ending up in fingertip-like terminal lamellae turned slightly caudad.

Gonopods (Figs 11-16): Promere (Fig. 11, *P* in Fig. 12) relatively slender and spoon-like, tapering, as high as opisthomere; width of shaft about 0.7 times that of bowl; ridge (*r*) massive and rounded, without freely

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Figs 11-14. *Syrioiulus lohmanderi* sp. nov., gonopods of male holotype, in MHNG. (11) Left promere, caudal view. (12) Right pair of gonopods, mesal view. (13) Left opisthomere, caudal, slightly lateral view. (14) Distal parts of left opisthomere, lateral view. Abbreviations: *cl* = caudomesal lamella, *ff* = central filiform process, *fp* = fan-like process; *m* = mesomeral process; *P* = promere; *s* = solenomere; *sp* = shield-like process. Scale bar of Figs 11-13: 0.1 mm; Figs 14-15: 0.05 mm; Fig. 16: 0.01 mm.



Figs 15-16. *Syrioiulus lohmanderi* sp. nov., gonopods of male holotype, in MHNG. (15) Distal parts of left opisthomere, caudo-lateral view. (16) Solenomere, same aspect.

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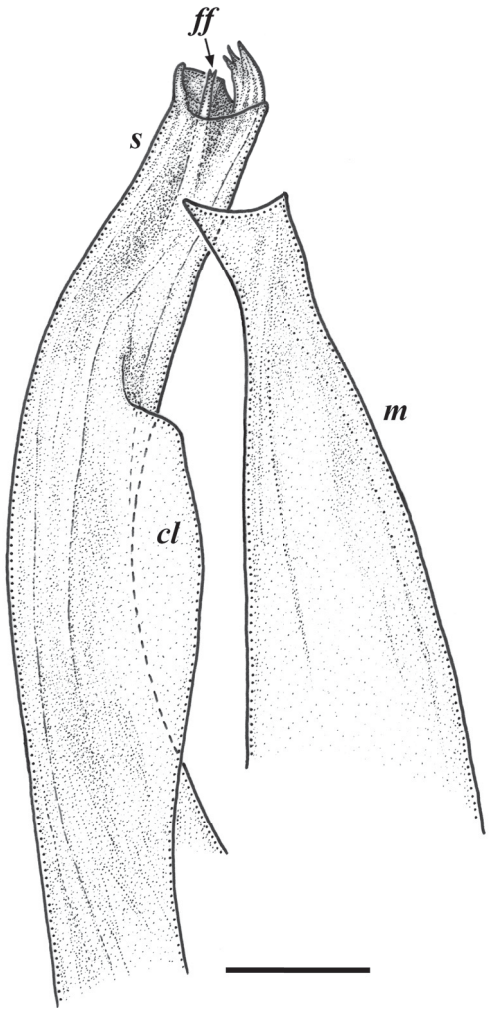


Fig. 17. *Syrioiulus astrabadensis* (Lohmander, 1932a), paratype male, in GNM, distal parts of right opisthomere in mesal view. Abbreviations: *cl* = caudomesal lamella; *ff* = *central filiform process;* *m* = mesomeral process; *s* = solenomere. Scale bar: 0.05 mm.

protruding apical part; apical denticles well developed, clearly separated, mesal one running vertical, lateral one somewhat oblique, both with blunt tips pointing caudo-basad. Opisthomere (Figs 12-16) approximately halfway divided into mesomeral process (*m*) and solenomere (*s*), these being subequal in height, forming a broad sinus between them; mesomeral process running mostly straight, at considerable distance from solenomere, apically broadened and spade-like, with a strongly elongated mesal corner turned caudad, partly concealing solenomere, and with a nearly right-angled lateral corner bearing several minute spines/denticles; caudomesal lamella (*cl*) well-developed, forming a narrow ridge protruding completely mesad, thus being clearly visible in frontal and caudal views; solenomere slender, gradually bent anteriad, ending in two small processes [an anterior, fan-like (*fp*) and a posterior, shield-like one (*sp*)] surrounding a deep central concavity; a minute central filiform process (*ff*) visible in certain aspects; anterior lamella vestigial, recognizable only by several apical fringes.

Female sexual characters: Leg-pair 1 considerably, leg-pair 2 slightly flattened antero-caudally. Vulva (Fig. 10) strongly compressed in the sagittal plane; bursa mostly symmetric: lateral valve (*lv*) slightly higher and more narrow than mesal one (*mv*); median cleft relatively broad; operculum (*op*) by far exceeding bursa, apical margin with a distinct mid-lateral incision and with several bumps along mesal section; setation moderately dense, randomly spread across whole surface of vulva. Receptaculum seminis consisting of a narrow, nearly straight central tube (*ct*) supporting a very short mesal tube (*mt*) ending in a small, ovoid, mesal ampulla (*ma*).

Remarks: The type locality of the new species lies in the foothills of the Alborz Mountains, the mountain range where most *Syrioiulus* species from Iran were exclusively recorded (Fig. 18). The only exception is *S. zarudnyi* (Lohmander, 1932a) which is known also from two localities in the central part of the country.

Considering the absence of ommatidia and the method (sifting dead organic matter) by which the studied specimens were collected, *S. lohmanderi* sp. nov. is likely an euedaphic species.

***Syrioiulus astrabadensis* (Lohmander, 1932)**

Fig. 17

Amblyiulus astrabadensis Lohmander, 1932a: 30-33, figs 30-32.

Material: GNM; 2 (supposed) female syntypes of "*Amblyiulus astrabadensis* n. sp."; Persien: Astrabad (nr. 28); 02.May.1905, E. Filippowitsch. – GNM; 2 slide preparations of (supposed) female syntypes: *Amblyiul*. nr. 28, I: vulvae, legs, and mouthparts, and *Amblyiul*. nr. 28, II: mouthparts and vulvae. – GNM; 2 slide preparations of (supposed) male syntypes: *Amblyiul*. nr. 28: gonopods, mouthparts, legs, antennae, edges of pleurotergum 7, and *Amblyiul*. nr. 28, II: labrum, mandible, legs.

Type locality: Iran, Golestan province, Gorgan (formerly Esterabad).

Taxonomic notes: Promere virtually indistinguishable from that of *S. lohmanderi* sp. nov. Caudomesal lamella (*cl*) directed meso-anteriad rather than completely mesad. Mesomeral process (*m*) considerably shorter than solenomere (*s*), without strongly protruding apical corners; solenomere apically forming more shallow concavity in comparison with *S. lohmanderi* sp. nov., and with an anterior process directed mostly distad rather than bent caudad. A very fine central filiform process (*ff*), similar to that of *S. lohmanderi* sp. nov., visible.

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Remarks: Despite the conspicuous similarities between the gonopods of *S. astrabadensis* and *S. lohmanderi* sp. nov., the two species can be rather easily distinguished by overall appearance: *S. astrabadensis* is less than 25 mm in length and entirely pallid, whereas *S. lohmanderi* sp. nov. is 28-29 mm long and has a brownish pigmentation. Likewise, the very similar gonopod conformation in *S. persicus* is in a way countervailed by the setose metazonal hind margins in this species; both *S. astrabadensis* and *S. lohmanderi* sp. nov. lack metazonal setae. Examples of species with (almost) completely identical gonopods but otherwise obvious differences in size and colouration are not uncommon in Pachyiulini (e.g. Frederiksen *et al*., 2012; Golovatch, 2018).

Provisional checklist of species of *Syrioiulus*

Syrioiulus adsharicus (Lohmander, 1936) comb. nov.

Amblyiulus (Heteropachyiulus) adsharicus Lohmander, 1936: 156-159, figs 131-132.
Amblyiulus adsharicus. – Kokhia & Golovatch, 2018: 40.

Known records: Ajara [geographic region], region of Batumi, "Bortschcha" [probably Borçka, Turkey, about 15 km south of the border with Georgia] (type locality).

Note: The original gonopod drawings clearly show an apically concave solenomere which lacks both a rod-like mesal process and an anterior lamella, or the latter is very weakly pronounced. Thus, the species is here transferred from *Amblyiulus* to *Syrioiulus*.

Syrioiulus aharonii (Verhoeff 1914)

Pachyiulus (Trichopachyiulus) aharonii Verhoeff, 1914: 64-65, no figures.
Micropachyiulus (Syrioiulus) aharonii. – Verhoeff, 1923: 120, 122-123, figs 1-2.
Amblyiulus Aharonii (sic!). – Attems, 1926: 258, 260.
Amblyiulus aharonii. – Bodenheimer, 1937: 233. – Tabacaru, 1995: 24.
Syrioiulus aharoni (sic!). – Mauriès, 1982: 441.
Syrioiulus aharonii. – Golovatch, 2018: 794, figs 3A-D, 4A-D.

Known records: All from Israel: Rehovot (type locality); by the Sea of Galilee (Verhoeff, 1923); Allone [Alonei] Abba, Beqaot S of Bet Shean [Beit She'an], Allonim, Nilit (Golovatch, 2018).

Syrioiulus andreevi Mauriès, 1984

Syrioiulus andreevi Mauriès, 1984: 44-48, figs 12-20. – Stoev & Beron, 2001: 100.

Known records: Greece, Paros Island, Marathi (type locality).

Syrioiulus astrabadensis (Lohmander, 1932)

Amblyiulus astrabadensis Lohmander, 1932a: 30-33, figs 30-32.
Syrioiulus astrabadensis. – Mauriès, 1984: 48. – Enghoff & Moravvej, 2005: 64.

Known records: Iran, Gorgan (type locality).

? *Syrioiulus cappadocius* (Lohmander, 1939) comb. nov.

Amblyiulus cappadocius Lohmander, 1939: 138-140, figs 19-22. – Mauriès, 1982: 441.
Amblyiulus cappdoicus (sic!). – Enghoff, 2006: 180.

Known records: Turkey, Keğubat near Kayseri (type locality).

Note: The solenomere in this species ends up with a broad and blunt tip, while it lacks a rod-like mesal process, and the anterior lamella does not form an apical protrusion. This combination of characters does not correspond to the latest concept of *Amblyiulus* (see Golovatch, 2018) but it fits the current diagnosis of *Syrioiulus*. Thus the species is here transferred to *Syrioiulus*. However, the pronouncedly spoon-shaped promere, with a lateral prominence and the mesomeral process tightly contiguous with the solenomere, partly concealing the latter in lateral view, are untypical of *Syrioiulus*, but are rather common within the genera *Amblyiulus* and *Dolichoiulus*. Hence the question mark applied.

Syrioiulus continentalis (Attems, 1903)

Pachyiulus (Dolichoiulus) continentalis Attems, 1903: 147-148, figs 82-84.
Amblyiulus continentalis. – Lohmander, 1932a: 40, 41, figs 33-35. – Bababekova, 1996: 90.
Syrioiulus continentalis. – Mauriès, 1982: 441. – Mauriès, 1984: 48.

Known records: Azerbaijan, Lenkoran [Lankaran] (type locality); Iran, the vicinity of Gorgan (Lohmander, 1932a).

Syrioiulus discolor (Lohmander, 1932)

Amblyiulus discolor Lohmander, 1932a: 28-30, figs 27-29.
Syrioiulus discolor. – Mauriès, 1982: 441. – Enghoff & Moravvej, 2005: 64.

Known records: Iran, Garmab Plain near Gorgan (type locality).

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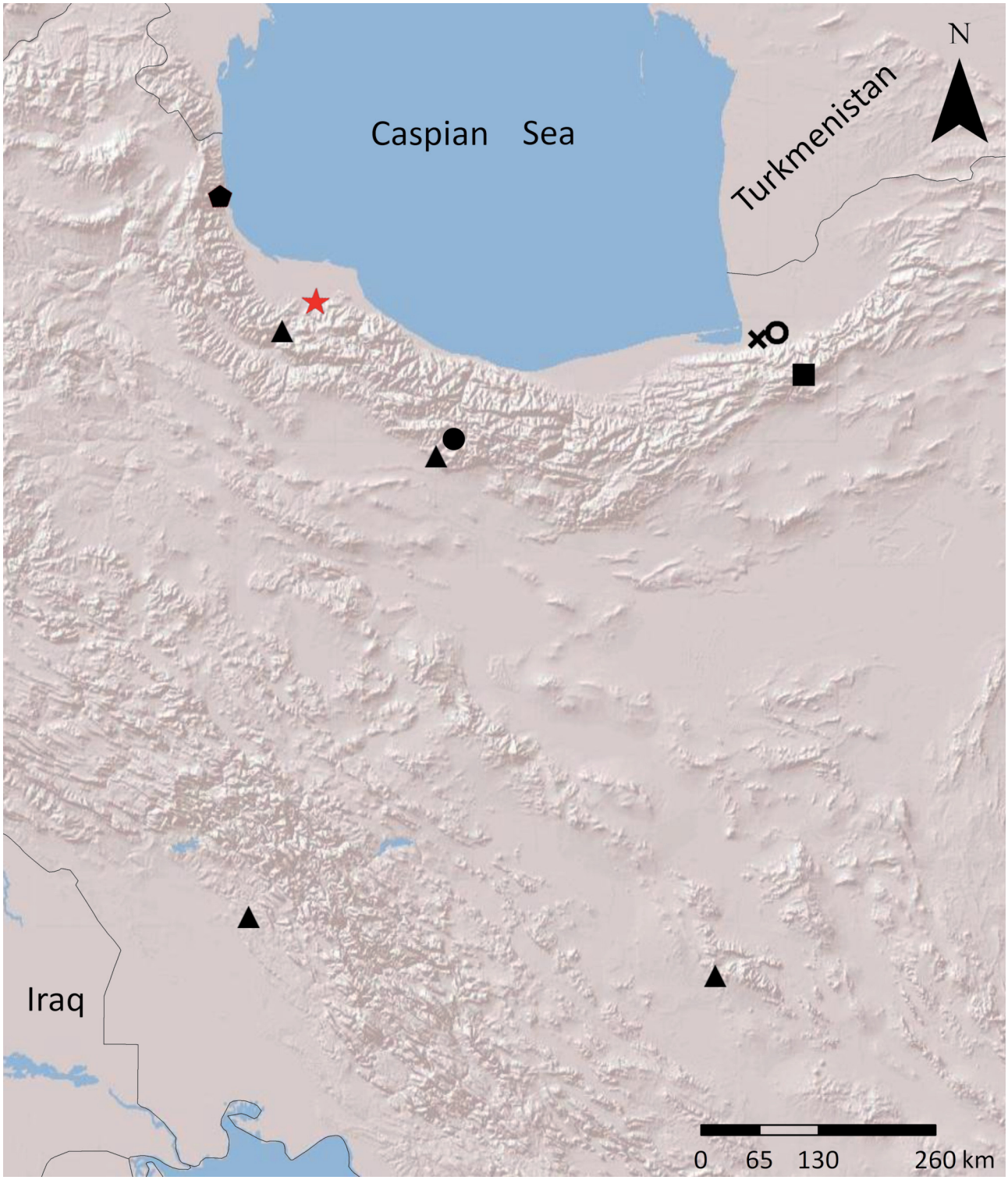
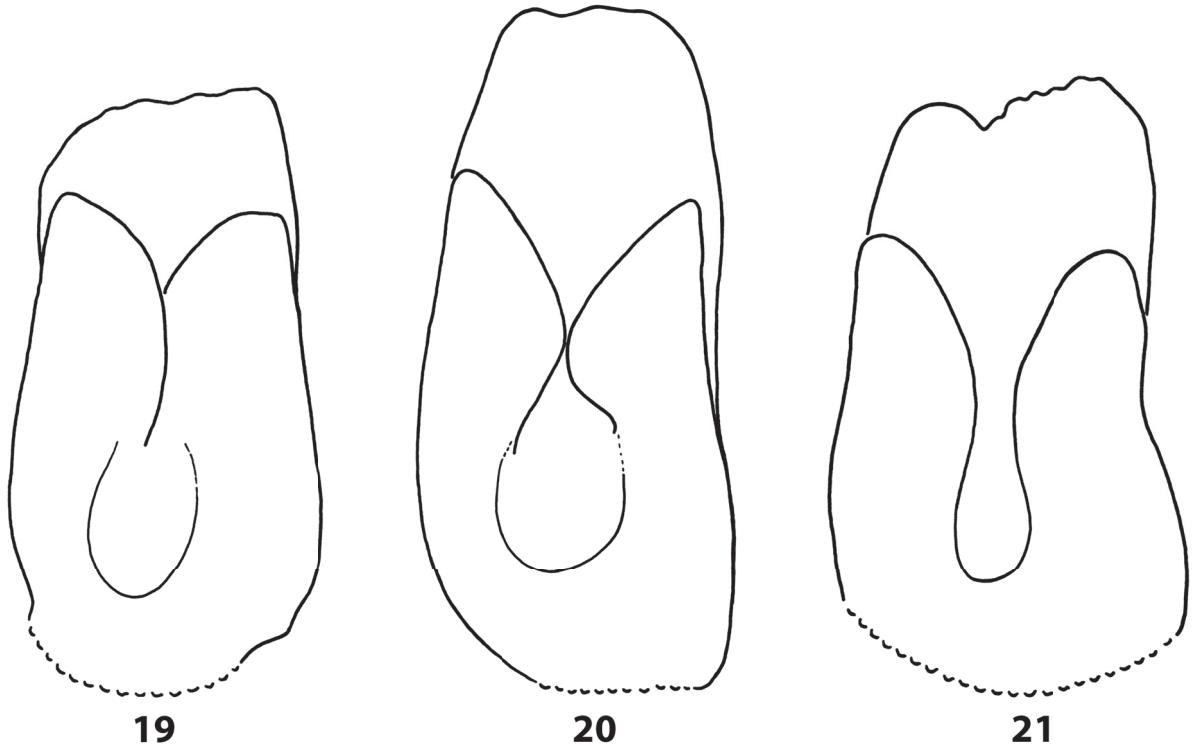


Fig. 18. Localities of *Syrioiulus* spp. in Iran. Ring: *S. astrabadensis*; cross: *S. continentalis*; square: *S. discolor*; pentagon: *S. incarnatus*; star: *S. lohmanderi* sp. nov.; filled circle: *S. persicus*; triangle: *S. zarudnyi*.

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Figs 19-21. Semidiagrammatic drawings of vulvae in caudal views of *Syrioiulus* spp. (19) *S. astrabadensis*. (20) *S. incarnatus*. (21) *S. lohmanderi* sp. nov. (Figs 19-20 redrawn from Lohmander, 1932a). Not to scale.

Syrioiulus incarnatus (Lohmander, 1932)

Amblyiulus incarnatus Lohmander, 1932a: 33-35, fig. 26.
? *Syrioiulus incarnatus*. – Mauriès, 1982: 441.
Syrioiulus incarnatus. – Mauriès, 1984: 48. – Enghoff & Moravvej, 2005: 64.

Known records: Iran, eastern slopes of Bogrov Dāgh [Talysh Mts], "Altschaly" (type locality).

Note: Despite the unknown male characters, the vulval structure in this species is so similar with that observed in the other three blind representatives of *Syrioiulus* known from Iran that there can be no doubt that *incarnatus* is their congener.

Syrioiulus lohmanderi sp. nov.

Known records: Iran, Gilan Province, Siahkal (type locality).

Syrioiulus persicus (Golovatch, 1983)

Amblyiulus persicus Golovatch, 1983: 161-162, figs 3-7.
Syrioiulus persicus. – Enghoff & Moravvej, 2005: 65.

Known records: Iran, 10 km N of Keredj [Karaj] (type locality).

Syrioiulus polyzonus (Attems, 1911)

Dolichoiulus polyzonus Attems, 1911: 66-67.
Dolichoiulus (Syrioiulus) polyzonus. – Verhoeff, 1914: 64.
Micropachyiulus (Syrioiulus) polyzonus. – Verhoeff, 1923: 122-123.
Amblyiulus polyzonus. – Attems, 1926: 263-264, figs 15-18.
Syrioiulus polyzonus. – Jeekel, 1970: 171.

Known records: Syria, Berzé [Barzeh, today part of Damascus] (type locality).

? *Syrioiulus posthirsutus* (Verhoeff, 1923)

Pachyiulus (Trichopachyiulus) posthirsutus Verhoeff, 1923: 120, 123-125, figs 4-6.
Amblyiulus posthirsutus. – Attems, 1926: 258-259. – Bodenheimer, 1937: 233. – Tabacaru, 1995: 24.
Trichopachyiulus (Iudaeoiulus) posthirsutus. – Verhoeff, 1930: 1670.
Syrioiulus sp. – Golovatch & Wytwer, 2009: 170.
Syrioiulus posthirsutus. – Golovatch, 2018: 792-794, figs 1A-C, 2A-E.

Known records: All from Israel: Rehovot, Hulda, Nahal Rubin National Park, by the Sea of Galilee (original localities); Judean Mts, Devir (Golovatch & Wytwer, 2009; Golovatch, 2018); Timrat, Allonim, Nahal Mearot Nature Preserve, Giveat Yeshaiahu, Regba (Golovatch, 2018).

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Note: Athough the solenomere in this species seems to correspond with the current diagnosis of *Syrioiulus*, the intermediate lobe connecting the proximal sections of mesomeral process and solenomere, and especially the complete absence of apical denticles on the promere are characters that set *S. posthirsutus* apart from all remaining congeners, hence the question mark.

Syrioiulus taliscius (Attems, 1927)

Amblyiulus taliscius Attems, 1927: 243-244, figs 336-338. – Bababekova, 1996: 90. – Lohmander, 1932b: 182.
Syrioiulus taliscius. – Mauriès, 1982: 441.

Known records: Azerbaijan, Lenkoran [Lankaran], area of Talysh Mts (type locality).

? *Syrioiulus zarudnyi* (Lohmander, 1932)

Amblyiulus zarudnyi Lohmander, 1932a: 23-27, figs 21-25. – Golovatch, 1983: 161.
Syrioiulus zarudni (sic!). – Mauriès, 1982: 441.
Syrioiulus zarydnyi. – Mauriès, 1984: 48. – Enghoff & Moravvej, 2005: 65.

Known records: All from Iran, Khuzestan Province (type locality) [exact locality unknown]; NW Iran, Canyon Sefidruda [on Sefid-rud River]; 68 km SW of Yezd; N end of Keredj [Karaj] (Golovatch, 1983).

Note: This is another species of *Syrioiulus* deviating from the majority of congeners by the conformations of promere and mesomeral processes which are alike those of *S. cappadocius*. Furthermore, *S. zarudnyi* has a prominent anterior lamella of the solenomere (albeit apically not drawn into a process) which is also untypical of the genus. However, before a comprehensive revision and phylogeny of *Syrioiulus* and related genera is made, it seems better that this and the other two aforementioned doubtful species are placed in *Syrioiulus*.
According to Lohmander (1932a) the type locality of *S. zarudnyi* is the "Tschemle-Rogan" Spring in Arabistan (today Khuzestan Province). The toponym obviously refers to "Tscheschme-Rogan" ["Cheshme" (English transliteration) meaning "spring" in Persian], "in the land of the Bakhtiary people". This is one of the sites visited by the original collector of this species, the Russian zoologist Nikolai Zarudny, during his forth expedition to Iran (Birula, 1905). The exact location of that spring remains

Key to the species of *Syrioiulus* known from Iran based on characters of gonopods, vulvae and external somatic morphology

1A With ommatidia 2
1B Without ommatidia 4

2A Opisthomere with a poorly developed mesocaudal lamella and a thick, apically finely dentate, anterior lamella ..... ***S. zarudnyi* (Lohmander, 1932)**
2B Opisthomere with a well-developed mesocaudal lamella and a rather indistinct anterior lamella 3

3A Mesocaudal lamella apically forming a freely protruding pointed outgrowth, this being subequal to or slightly exceeding solenomere; ozopores in anterior part of body set at some distance behind pro-metazonal suture; metazonal hind margins without setae; walking legs in males without adhesive pads ..... ***S. discolor* (Lohmander, 1932)**
3B Mesocaudal lamella without freely protruding apical part but ending bluntly much lower than tip of solenomere; ozopores in anterior part of body set right behind pro-metazonal suture; metazonal hind margins with a whorl of short setae; walking legs in males with adhesive pads on tibiae ..... ***S. continentalis* (Attems, 1903)**

4A Metazonal hind margins with a whorl of setae; vulval operculum only slightly exceeding bursa; promere with a rounded, lobe-like mesal denticle ..... ***S. persicus* (Golovatch, 1983)**
4B Metazonal hind margins without setae; vulval operculum considerably exceeding bursa 5

5A Ozopores in anterior part of body set at 1/4-1/3 of metazonal length behind pro-metazonal suture; apical margin of vulval operculum with a distinct incision mid-laterally (Figs 10, 21); mesomeral process subequal to solenomere (Figs 12, 14, 15, 16) ..... ***S. lohmanderi* sp. nov.**
5B Ozopores in anterior part of body set on or right behind pro-metazonal sutures; apical margin of vulval operculum more or less smooth 6

6A Vulva with its operculum exceeding bursa by 1/4-1/3 of total vulval height (Fig. 20); adult females 30-32 mm in length and 2.1-2.3 mm in diameter ..... ***S. incarnatus* (Lohmander, 1932)** (known only from females)
6B Vulva with its operculum exceeding bursa by 1/5-1/4 of total vulval height (Fig. 19); females 24-28 mm in length and 1.4-1.5 mm in diameter; males with expanded mandibular stipites; mesomeral process shorter than solenomere (Fig. 17) ..... ***S. astrabadensis* (Lohmander, 1932)**

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unknown, but it is most likely situated in the eastern parts of Khuzestan which is inhabited predominantly by the Bakhtiari ethnic group.

CONCLUDING REMARKS

Despite the present contribution, the scope of the name *Syrioiulus* remains rather vague. The diagnosis of the genus is unsatisfactory, as none of the two main characters that delimit it from the similar *Afropachyiulus*, *Amblyiulus, Dolichoiulus,* and *Japanoiulus* can be considered apomorphic. The absence of a distinct apical process formed by the anterior lamella of the solenomere is apparently the plesiomorphic state within Pachyiulini, as it is observed in the majority of representatives of the same tribe except for the four aforementioned genera. As regards the blunt or concave solenomeral apex, in the absence of any recognizable, specialized structure this character is too obscure to reliably indicate a monophyly of *Syrioiulus* in its presently accepted species composition.

Afropachyiulus is even more problematic in that respect, with two of its species, *A. comatus* (Attems, 1899) and *A. mauriesi* Akkari & Enghoff, 2008, having a gonopod conformation typical of *Dolichoiulus*, while the filiform process on the mesal side of the solenomere seen in *A. lepineyi* (Verhoeff, 1936) and *A. maritimus* Strasser, 1970 may be homologous with the rod-like process in the type species of *Amblyiulus*, viz. *A. barroisi* Porrat, 1893. *Amblyiulus* itself appears as a heterogenous assemblage: apart from *A. barroisi*, the diagnostic, rod-like process is known only in *A. cedrophilus*, while other congeners show more or less "*Dolichoiulus*-like" gonopods (Enghoff, 1992, personal observations). The last holds true also for *Japanoiulus lobatus* Verhoeff, 1937, the sole species of the monotypic genus *Japanoiulus*. The only difference between it and species of *Dolichoiulus* seems to be the presence of one instead of two apical denticles on the promere (Enghoff, 1992). However, one apical denticle is also characteristic of some species of *Afropachyiulus* (see Enghoff, 1992; Akkari & Enghoff, 2008).

Given the remarkable simplicity and monotony of the gonopods, and the mostly random distribution of most of the potentially diagnostic external somatic characters, e.g. setation (Golovatch, 2008), a solid revision and phylogeny of *Syrioiulus* and the above-discussed related genera will inevitably have to include molecular data.

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