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DESCRIPTION OF A NEW WATER MITE SPECIES OF THE GENUS *SOLDANELLONYX* WALTER, 1917 (ACARI: HALACARIDAE) FROM JAPAN

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[Тузовский П.В. Описание нового вида водяного клеща рода *Soldanellonyx* Walter, 1917 (Acari: Halacaridae) из Японии]
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Key words: *Halacaridae, Soldanellonyx biwaensis, water mites, new species, female, Biwa lake, Japan, description*

Ключевые слова: *Halacaridae, Soldanellonyx biwaensis, новый вид, водяные клещи, самка, озеро Бива, Япония, описание*

Summary. A new water mite species, *Soldanellonyx biwaensis* (Acari: Halacaridae), collected in Biwa Lake, Japan is described. This species is characterized by the following features: genital flaps with five setae each, genital acetabula located on genital plate and soft integument behind genital field, telofemur of leg I with two long sword-like setae and one short ventroproximal spine, claws of leg I with 12–14 teeth, dorsal margins of P-3 and its ventral peg-like seta subequal in length.

Резюме. Описание нового вида водяных клещей *Soldanellonyx biwaensis* (Acari: Halacaridae), найденного в японском озере Бива. Вид характеризуется следующими признаками: генитальные створки с 5 щетинками, генитальные присоски располагаются на генитальной пластинке и на мягком покрове сзади генитального поля, телофемур ноги I с 2 длинными мечевидными щетинками и 1 коротким вентро-проксимальным шипом, коготки ног I с 12–14 зубцами, дорсальный край P-3 и его вентральная колышковидная щетинка одинаковые в длину.

INTRODUCTION

The genus *Soldanellonyx* Walter, 1917 includes dozen species and subspecies [Viets, 1987]. The following species and subspecies of the genus *Soldanellonyx* have been recorded from Japan: *S. chappuisi* Walter, 1917; *S. papillosus* Imamura, 1957; *S. miyakoensis* Imamura, 1957; *S. akiyoshiensis* Imamura, 1959; *S. morimotoi* Imamura, 1970; *S. monardi japonicus* Imamura, 1971, and *S. monardi monardi* Walter, 1919 = *S. monardi hyogoensis* Imamura, 1981 [Imamura, 1957, 1959, 1970, 1971, 1981].

Lake Biwa is the largest (674 km^2) and oldest (around 0.4 Mya) lake in Japan [Nakajima, Nakai, 1994]. Seven species of fresh-water mites (Hydrachnidia) have been recorded from lake Biwa [Imamura, 1970a; Mori and Miura, 1990]. Our examination of samples from the Lake Biwa revealed further 14 species of hydrachnids [Tuzovskij, 2001, 2003a, 2003b, 2003c, 2003d, 2003e, 2004], hitherto unknown from this lake. In addition, in Biwa lake an undescribed mite belonging to the genus *Soldanellonyx* has been found.

The present paper describes the female of the water mite, *Soldanellonyx biwaensis*, sp. n. (Halacaridae).

MATERIALS AND METHODS

The material (I female) was collected by O.A. Timoshkin (1996) in the Biwa Lake (Japan). The material was sampled with common hand net with 200 μm mesh size. Specimen was fixed in 3% formaldehyde solution and mounted on slide using Hoyer's medium. The external morphology of the mite was investigated with the help of an optical microscope "Leica Galen III". External morphology terminology mainly follows to Bartsch [2007].

The following abbreviations are used: P-1–4, first to fourth palp segments; I-Leg.1–6 , first leg, segments 1–6 (trochanter, basifemur, telofemur, genu, tibia, and tarsus) i.e. III-Leg.4 = genu of third leg; Gl.1-Gl.5, gland pores; so, slit organ; sc.1-sc.4, sclerites 1-4; s, solenidion; n, the number of specimens measured. All measurements are given in μm.

Soldanellonyx biwaensis, sp. n. (Figs 1–11)

Type material – Holotype: female, Japan, Honshu, northern part of Biwa Lake, Kita-Komatsu, interstitial waters, 2 September 1996, coll. O. Timoshkin. Holotype will be deposited in the collection of the Lake Biwa Research Institute (Japan).

Female, description. Body almost colorless in preservative. Anterior dorsal plate transverse, L/W ratio 0.9, with nearly straight anterior margin, convex lateral margins and slightly concave posterior margin, bearing one pair of setae near anterolateral corners (Fig. 1). Ocular plates relatively small, more or less oval in shape, L/W ratio 1.07–1.1, with narrow oblique strip each, bearing one seta each in the posterolateral areas. Ocular plates having no eye lens. Posterodorsal plate large elongate, L/W ratio 1.5, with straight anterior margin, convex lateral margins, and rounded posterior end, bearing two pairs of setae on anterior half (on the slide only their alveoli are visible). Integument between dorsal plates soft and finely striated. First pair of gland pores located on small sclerites, which fuse to anterolateral corners of anterior plate, but suture line present; second to fifth pairs in striated integument.

Epimeral plates (coxae of legs I–IV) in three groups (Fig. 2). Anterior epimeral group (coxae I+II) wide, L/W ratio 0.6, capitular bay wide with straight posterior margin. Coxae I with one seta near anterior margin, coxae II with median and lateral setae on each side. Posterior epimeral groups (coxae III + IV) elongated. Coxae III with two setae (dorsal and ventrolateral), coxae IV with one medial seta on each side. Genital field large and trapezoidal. Genital flaps elongated with convex lateral margins, L/W ratio 3.4, with five setae each. Genital plate wide horseshoe-shaped,

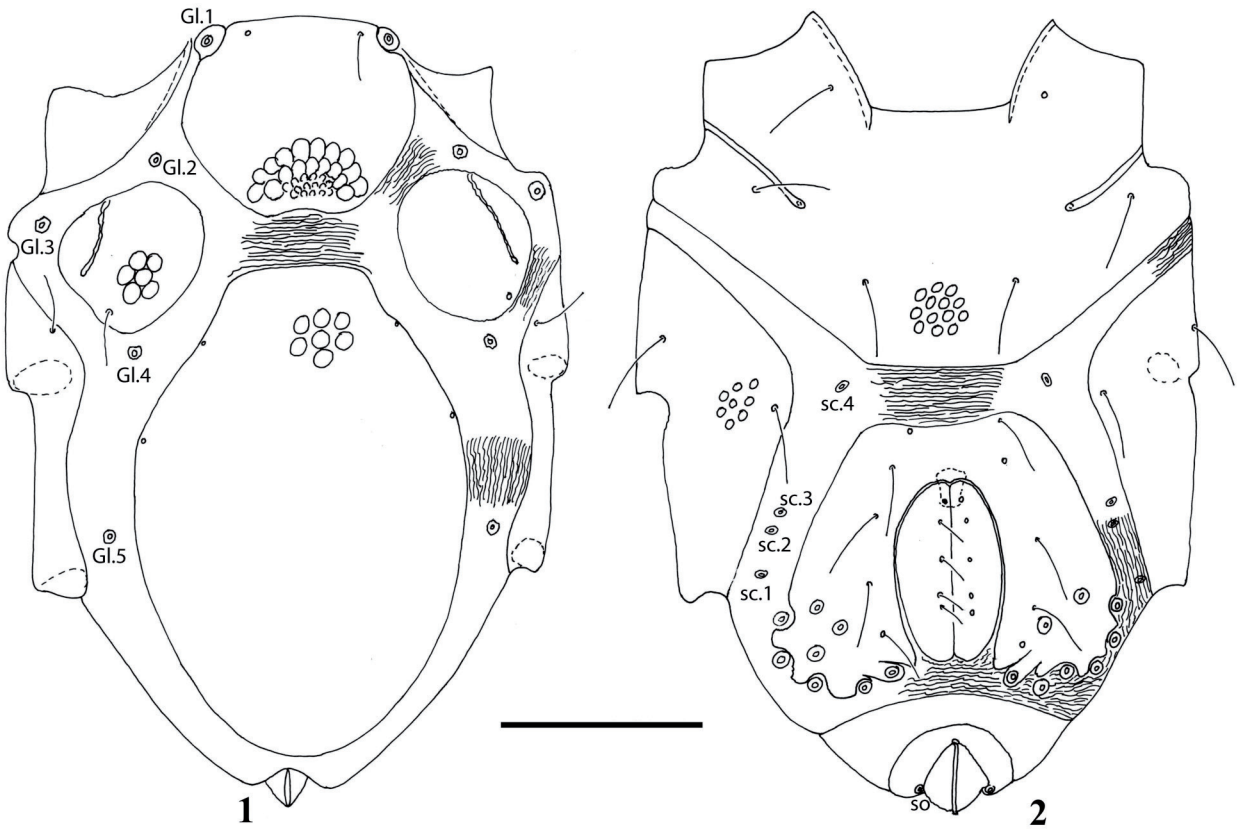

Fig. 1– 2. *Soldanellonyx biwaensis*, **sp. n.**, female: 1 – dorsal view, 2 – ventral view. Scale bar: 100 μm.
Рис. 1–2. *Soldanellonyx biwaensis*, **sp. n.**, самка: 1 – дорсальная сторона, 2 – вентральная сторона. Шкала: 100 μm.

bearing three or four acetabula and five perigenital setae on each side. In addition, four or five acetabula located on soft integument behind each posterolateral margin of genital plate. Perigenital setae longer than genital ones.

Anal plate with wide slightly convex anterior margin. Excretory pore terminal and posterior. Anal plate and genital field separate. Slit organs located on anal plate laterocaudally. Three pairs of minute sclerites situated on soft integument between genital plate and coxae IV, and one pair in space between coxae I + II, coxae III + IV, and anterolateral corners of genital plate each side.

Capitulum (Fig. 3) with wide base and narrow conical rostrum. Both pairs of capitular setae subequal in length. Cheliceral stylet (Fig. 4) pointed. First palp segment (Fig. 5) short, without setae. Second palp segment large, expanded in distal half with two subequal dorsodistal spines. Third palp segment short with large peg-like ventral seta. Fourth palp segment with large peg-like seta, three short thin setae (two ventral and one dorsal) and two rather long dorsodistal setae. Peg-like seta on P-4 longer and thinner than on P-3. Legs I (Fig. 6) considerably longer and stronger than the following legs: trochanter with single thin seta; basifemur with short dorsal spine and two long, thin ventral setae; telofemur with four dorsal and one distolateral approximately subequal spines, one long thin distolateral seta, one short spine and two long ventroproximal sword-like setae; genu relatively short with straight ventral margin and convex dorsal margin, bearing three long thin setae, long sword-like seta, one short dorsal spine, and one ventral unequal spine; tibia with blunt dorsal hump, with four long thin setae, two long sword-like setae, and two relatively short unequal spines; tarsus with one solenidion, three long and four short thin distal setae. Claws of leg I spoon-shaped with 12–14 rather large teeth (Fig. 7). Leg II (Fig. 8): trochanter with single thin seta; basifemur with long thin setae and unequal short spines; telofemur with three dorsal, one lateral, and one ventroproximal spine, and one thin and long distal seta; genu with three subequal spines, two long, thin setae, and one slightly thickened relatively short ventrodistal seta; tibia bearing two long, thin setae, two short proximal spines, and three unequal sword-like setae, tarsus with one solenidion, three rather long dorsal setae, and three short distal setae. Number and arrangement of setae on first four segments of leg III (Fig. 9) and leg IV (Fig. 10) similar to each other. Tarsi of these legs without solenidion, but having small leaf-like distolateral seta each. Tarsus of leg III with four thin long dorsal setae, and tarsus of leg IV with three long dorsodistal setae. Tibia of left leg IV with five sword-like setae, but tibia of right leg IV with four sword-like setae (absent sword-like seta shown by a dotted line on Fig. 10). Claws of legs II–IV hooked with very thin ventral teeth (Fig. 11).

Measurements, n = 1. Body 450 long, 320 wide; anterodorsal plate 120 long, 135 wide; ocular plates 90–93 long, 80–85 wide; posterodorsal plate 238 long, 190 wide; coxae I + II 190 long, 305 wide; coxae III + IV 190 long; genital plate 138 long, 190 wide; genital flap 105 long, 30 wide; anal plate 65 long, 155 wide; capitulum 150 long, 138

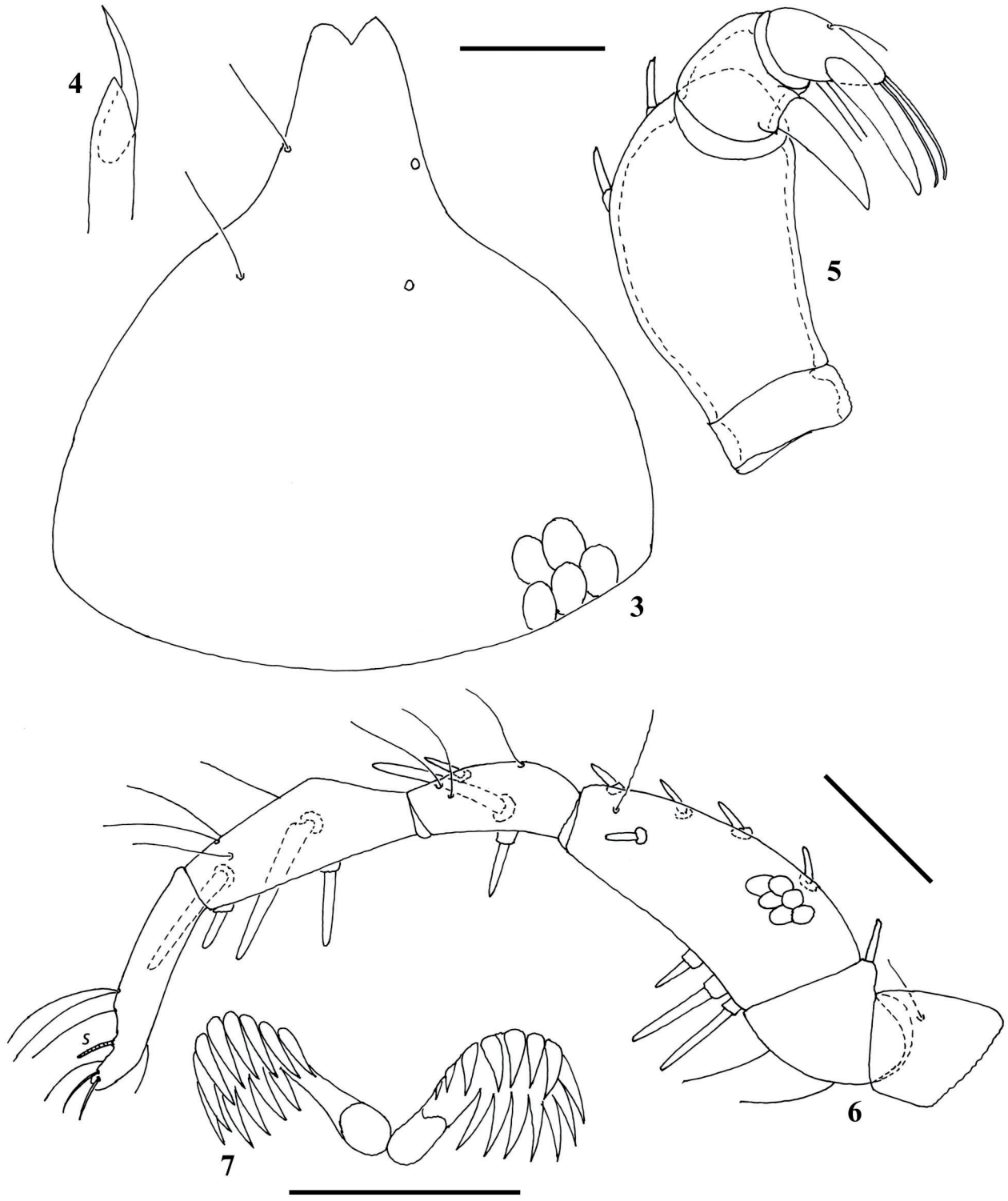

Fig. 3–7. *Soldanellonyx biwaensis*, **sp. n.**, female: 3 – capitulum, ventral view, 4 – cheliceral stylet, 5 – pedipalp, 6 – leg I, 7 – claws of leg I. Scale bars: 3–5 = 50 μm; 6 = 100 μm; 7 = 25 μm.
Рис. 3–7. *Soldanellonyx biwaensis*, **sp. n.**, самка: 3 – капитулум, вентральная сторона, 4 – стилет хелицеры, 5 – педипальпа, 6 – нога I, 7 – коготки ноги I. Шкалы: 3–5 = 50 μm; 6 = 100 μm; 7 = 25 μm.

wide; basal segment of chelicera 110 long, cheliceral stylet 36 long; length of pedipalpal segments (P1–4): 24, 75, 33, 20; peg-like seta on P3 30 long, 9 wide; peg-like seta on P4 42 long, 7 wide; lengths of leg segments: I-Leg.1–6: 70, 75, 165, 85, 120, 115; II-Leg.1–6: 55, 60, 85, 55, 80, 93; III-Leg.1–6: 67, 45, 65, 52, 100, 98; IV-Leg.1–6: 75, 48, 65, 55, 95, 100.

Male. Unknown.

Etymology. The species name is derived from its type locality, Biwa Lake.

Habitat. Interstitial waters.

Distribution. Asia: Japan, Biwa Lake.

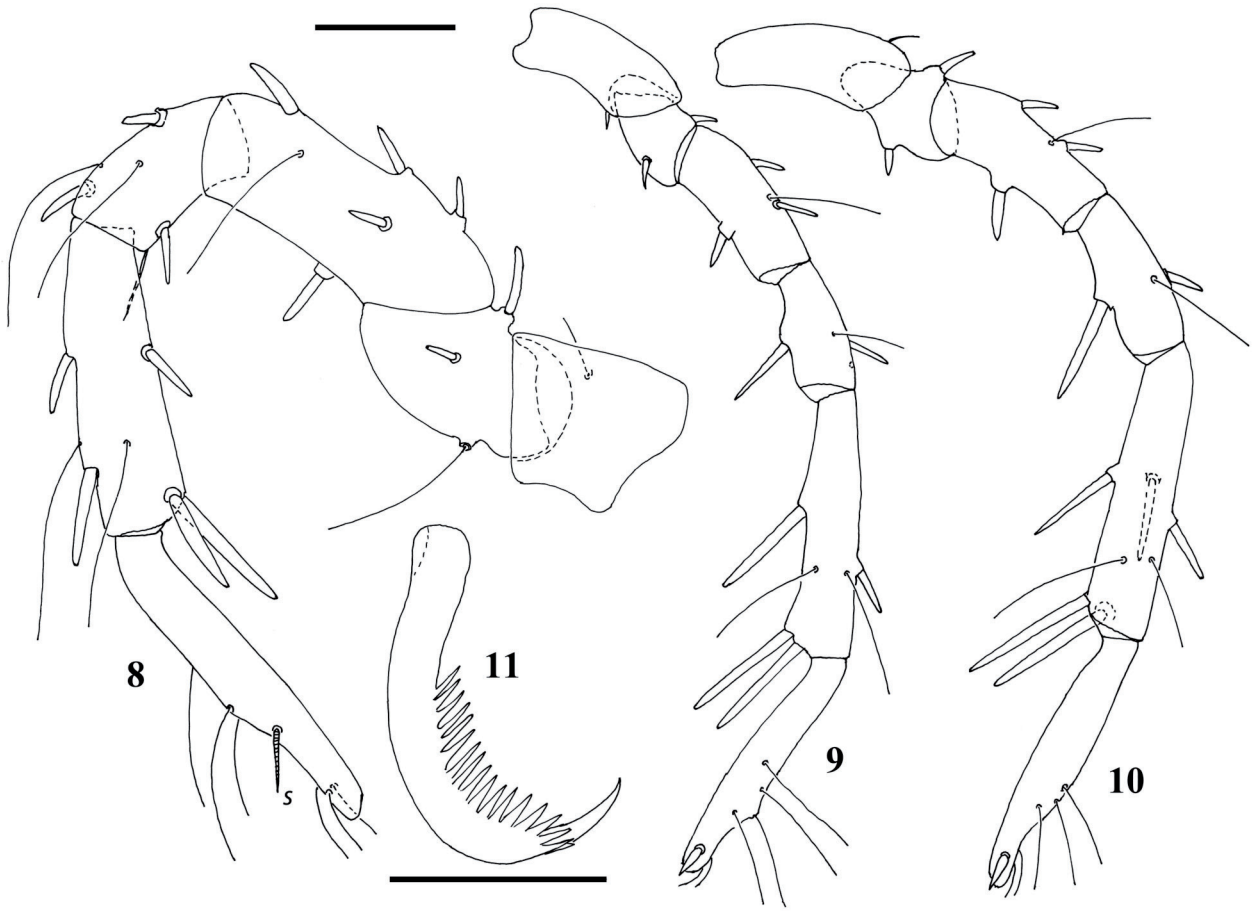

Fig. 8–11. *Soldanellonyx biwaensis*, **sp. n.**, female: 8 – leg II, 9 – leg III, 10 - leg IV, 11 - claw. Scale bars: 8–10 = 50 μm; 11 = 25 μm.
Рис. 8–11. *Soldanellonyx biwaensis*, **sp. n.**, самка: 8 – нога II, 9 – нога III, 10 – нога IV, 11 – коготок. Шкалы: 8–10 = 50 μm; 11 = 25 μm.

DISCUSSION

This new species is similar to *S. morimotoi*, *S. papillosus*, *S. visurgis* Viets, 1959, *S. chappuisi* Walter, 1917 and *S. chappuisi tracicus* Petrova, 1975. The genital plate of the female *S. papillosus* has five pairs of acetabula, P-2 with single dorsodistal spine, telofemur of leg I with three short ventral spines, integument with conical papillae [Imamura, 1957]; in contrast, the genital plate of the female *S. biwaensis* sp.n. has 8-9 pairs of acetabula, P-2 with two dorsodistal spines, telofemur of leg I with two long and one short ventral spines, integument without papillae. The palps in the female *S. morimotoi* and the female *S. visurgis* with long P-3 (dorsal margin considerably longer than height P-3) and short peg-like seta (its length is shorter than ventral margin P-3), the genital plate at first species has four pairs acetabula [Imamura, 1970] and has five pairs of acetabula at second species [Bartsch, 2007]; in contrast, P-3 in *S. biwaensis* sp.n. relatively short (length of dorsal margin and height P-3 approximately subequal), with long peg-like seta (dorsal margin of P-3 and this seta subequal in length).

The new species is very similar to *S. chappuisi* Walter, 1917, but differs by the following characters [character states of *S. chappuisi* are in parenthesis from Walter [1917], Viets [1936], Sokolow [1952], Bartsch [2007]: telofemur of leg I with two long sword-like setae and one short ventroproximal spine (with two relatively short ventroproximal spines); claws of leg I with 12–14 teeth (with 6–10 teeth), dorsal margins of P-3 and of peg-like seta subequal in length (dorsal margin of P-3 longer than peg-like seta). The subspecies *S. chappuisi tracicus* is very similar to the species *S. chappuisi* and does not require a taxonomic separation [Bartsch, 2007]. The genital acetabula at all species of the genus *Soldanellonyx* located in the distolateral area of the genital plate [Bartsch, 2007], whereas in *S. biwaensis* genital acetabula located on the genital plate and on soft integument behind each posterolateral margin of genital plate.

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