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A new species of silverfish of the genus *Sceletolepisma* Wygodz., 1955 (Zygentoma, Lepismatidae) from the Southeastern coast of the Arabian Peninsula

Новый вид щетинохвосток рода *Sceletolepisma* Wygodz., 1955 (Zygentoma, Lepismatidae) с юго-восточного побережья Аравийского полуострова

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Key words: Africa, Western Asia, Oman, new taxon, distribution, desert landscapes.
Ключевые слова: Африка, Западная Азия, новый таксон, распространение, пустынные ландшафты.

Abstract. A new species of *Sceletolepisma nazwanum* Kaplin, **sp.n.** from the Sultanate of Oman on the southeastern coast of the Arabian Peninsula is described and illustrated. The species is related to similar species, namely *S. omanicum* Kaplin, 2024, *S. sagartianum* Molero et al., 2015, *S. maroccanum* Mendes, 1980, *S. africanellum* Wygodz., 1955; *S. weberi* Esch., 1905 and *S. kervillei* Silv., 1911 from the Republic of South Africa, Morocco, Syria, Iran and Oman, differing in body length, chaetotaxy of thoracic and abdominal sternites, the shape of urotergite X. The main distinctive features of the new species include the shape and chaetotaxy of the prosternum, the shape of urotergite X and the apical palpomere of the labial palps.

Резюме. Новый вид *Sceletolepisma nazwanum* Kaplin, **sp.n.** из Султаната Оман на юго-восточном побережье Аравийского полуострова описан и проиллюстрирован. Родственен близким видам: *S. omanicum* Kaplin, 2024, *S. sagartianum* Molero et al., 2015, *S. maroccanum* Mendes, 1980, *S. africanellum* Wygodz., 1955; *S. weberi* Esch., 1905 и *S. kervillei* Silv., 1911 из Южной Африки, Марокко, Сирии, Ирана и Омана, различающихся длиной тела, хетотаксией грудных и брюшных стернитов, формой X тергита брюшка. К отличительным признакам нового вида относятся форма и хетотаксия простернума, форма X тергита брюшка и апикального членика губных щупиков.

Introduction

The silverfish family Lepismatidae includes six subfamilies, about 40 genera and more than 300 described species [Mendes, 1991; Smith, 2017], with the subfamily Ctenolepismatinae comprising 21 genera and about 195 species [Molero-Baltanás et al., 2024]. The species of the subfamily Ctenolepismatinae are characterised by the pectinate macrochaetae and the thoracic sterna as large plates attached only at their anterior margins. These plates largely cover the inner anterior margins of coxae of all legs [Smith, 2017].

About 123 (68 %) species in Ctenolepismatinae belong to two close genera *Ctenolepisma* Escherich, 1905 and *Sceletolepisma* Wygodzinsky, 1955 [Wygodzinsky, 1955; Irish, 1987; Smith, 2018; Molero-Baltanás et al., 2024]. In Oman, the fauna of *Ctenolepisma* and *Sceletolepisma* is poorly studied, with four widespread species recorded: *C. ciliatum* (Dufour, 1831), *C. mauritanicum* (Lucas, 1846), *S. wahrmani* Wygodzinsky, 1952, *S. michaelseni* Escherich, 1905 and one species known from the Middle East (Syria, Iran, Oman), *S. kervillei* Silvestri, 1911 [Irish, 1991].

Materials and methods

The silverfish were stored in 70 % ethanol. The holotype (female) and one paratype (female) were dissected and mounted in Berlese fluid on glass microscope slides. The drawings were made using a microscope and a drawing tool. The type specimens of the new species are deposited in the collection of the All-Russian Institution of Plant Protection, Pushkin, St Petersburg, Russia.

Nomenclatural acts introduced in the present work are registered in ZooBank (www.zoobank.org) under urn:lsid:zoobank.org:pub:5A0A5971-F8E4-4A67-ACF6-C5899A9943FC

Taxonomy

Zygentoma Börner, 1904
Lepismatidae Latreille, 1802
Ctenolepismatinae Mendes, 1991
Sceletolepisma Wygodzinsky, 1955

Sceletolepisma Wygodzinsky, 1955: Irish, 1987. Type species: *Lepisma lineatum* Fabricius, 1775.

Sceletolepisma nazwanum Kaplin, **sp.n.**
Figs 1–11.

urn:lsid:zoobank.org:act:5D6CFD61-FEA6-4CD8-BC36-A0DF4EED37E1

Material. **Oman:** Holotype, ♀, near Nazwa, 22°56′ N, 57°32′ E, 500 m a.s.l., under stones, 5.III.2024, V. Kaplin leg., paratype, 1♀, ibidem.

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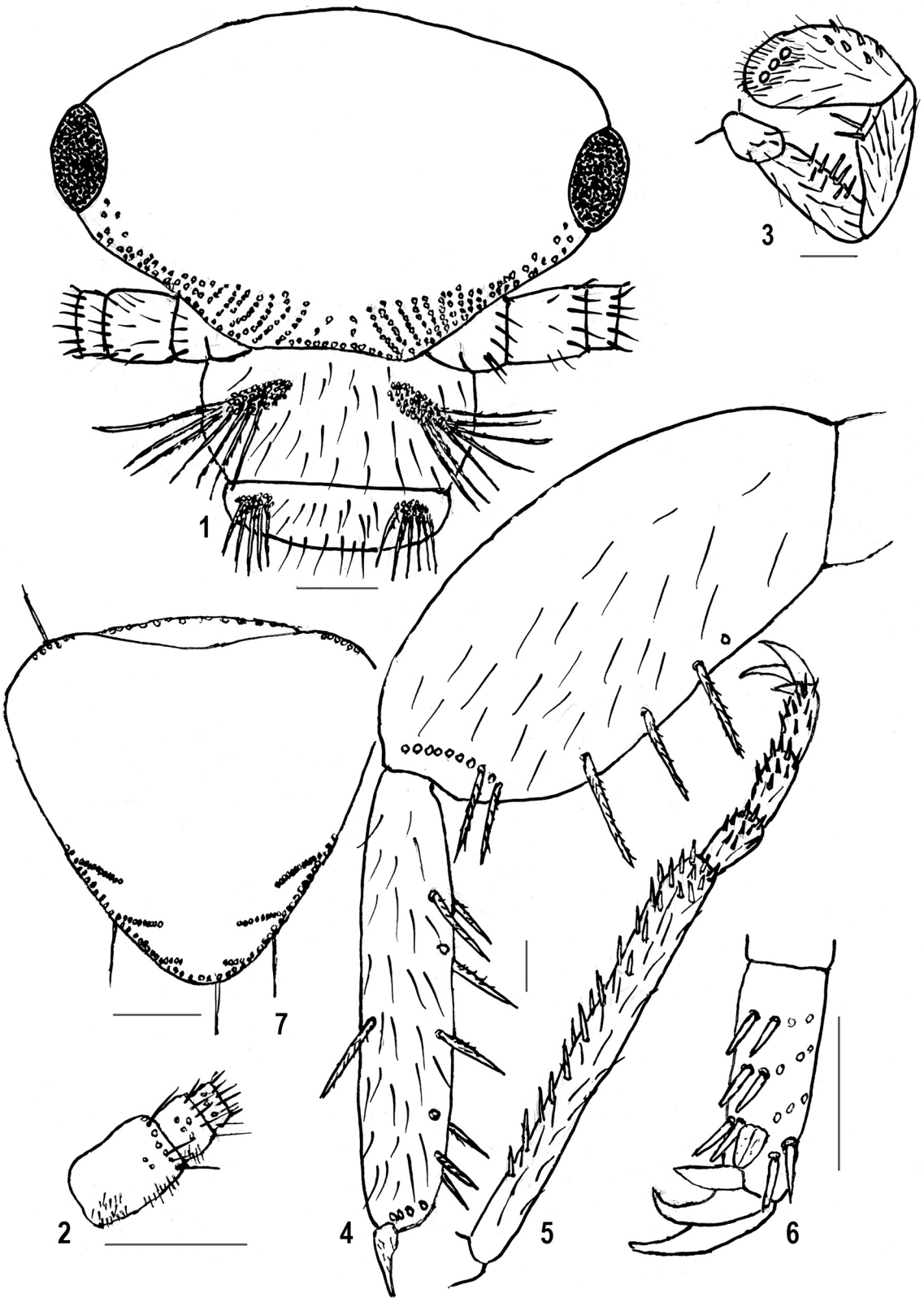


Figs 1–7. *Sceletolepisma nazwanum* sp.n. (female, holotype), general view and details of structure. 1 — head capsule (compound eyes, frons, vertex, clypeus, upper lip); 2 — scapus, pedicellus and first flagellomere of antenna; 3 — labial palp; 4 — femur and tibia of hind leg; 5 — tarsus of hind leg; 6 — apical tarsomere of hind legs; 7 — prosternum. Scale bars: 0.1 mm.

Рис. 1–7. Sceletolepisma nazwanum sp.n. (самка, голотип), общий вид и детали строения. 1 — головная капсула (сложные глаза, лоб, вершина головы, наличник, верхняя губа); 2 — основной членик, ножка и первый членик жгутика усика; 3 — губной щупик; 4 — бедро и голень задней ноги; 5 — лапка задней ноги; 6 — четвёртый членик лапки задней ноги; 7 — стернит переднегруди. Масштаб: 0,1 мм.

Description. Medium-sized silverfish. Body noticeably elongate, with thorax slightly wider than abdominal segment I. Body length (including head): 12.1 mm, body width 2.7 mm. Ratio of head length to whole body length about 0.07, that of thorax to whole body about 0.31, abdomen to whole body about 0.62. Width of head 1.8 mm, width of thorax 2.7, width of abdomen 2.3 and width of urotergite X 1.6 mm. Head 2.1 times as wide as long. Eyes black, well-developed (Fig. 1). Antennae, cerci and median dorsal appendage damaged. Maximum length of preserved part of antenna 10.0 mm. Scapus and pedicellus with scales, but antennal flagellum without scales. Ratio of scapus length to width about 1.9, all flagellomeres of antennae with one transverse row of simple bristles (Fig. 2). Tarsae and tibiae of legs, terminal filaments also without scales. Body length of paratype 8.0 mm.

General color of body (in ethanol) whitish; frons, scapus and pedicellus of antennae, mandibles, labial and maxillary palps and especially posterior part of abdomen with brownish-violet pigment. Scales on upper side of body brownish-dark gray, on lower side light brown.

Macrochaetae pectinate, are not bifurcated apically, with their large number on the forehead opposite the bases of the antennae, also there are two tufts of macrochaetae on the sides of the clypeus, as well as on the labrum (Fig. 1).

Mandible with well-developed molar and incisor areas, with five strong chitinized teeth: two smaller and three larger ones, of which two sharp and one wide. Main part of mandible with numerous relatively long, strongly pectinate and bifid apically, colorless macrochaetae. Near incisor area of mandible there are about 18–20 smooth, short and relatively long, light brown and bifid apically chaetae. Maxilla without peculiar characters; lacinia with three strong teeth (two large and one smaller), seven lamellate processes and a row of six light brown simple chaetae; galea laterally with about 9–10 small and 5–7 longer chaetae. Apical palpomere of maxillary palp about 1.2–1.3 as long as its penultimate palpomere. Labium broad; postmentum with a row of relatively large, smooth chaetae. Labial palps well-developed; apical palpomere oval, with three papillae in one row, ratio of its length to width approximately 2.0 (Fig. 3, Table 1).

Legs fairly long, running (Figs 4, 5). Hind legs about 1.25 times as long as fore and 1.20 times as middle legs. Ratios of length to width in leg segments as in Table 1. Coxae and femora covered with scales. Middle and hind femora and coxae most widened. Ratio of length of first tarsomere of hind tarsus to total its length about 0.69 (Fig. 5). The tarsi of all legs are 4-segmented. Their third and fourth segments are fused and of equal length. Pretarsus with lateral claws relatively long and curved, between the paired lateral claws there are one sharp-angled shorter protrusion, as well as a bolobed supporting platform (Fig. 6). Fore, middle and hind tarsus about 1.3–1.4 times as long as respective tibia. First tarsomere of all legs with 25–29, second, third and fourth tarsomeres with 8–10 relatively short, tibia and femur with 12–15, coxa with 60–90 longer pectinate macrochaetae.

Table 1. Ratios of length to width of female main leg segments in *Sceletolepisma nazwanum* sp.n.

Таблица 1. Отношения длины к ширине основных сегментов ног самки *Sceletolepisma nazwanum* sp.n.

Segments	Legs		
	Fore	Middle	Hind
Tarsus	8.7	13.2	15.0
Tibia	2.9	3.7	5.5
Femur	2.7	2.5	2.3
Coxa	2.6	1.8	2.0

Prosternum (Fig. 7) subtriangular. Mesosternum and metasternum semioval, rounded apically. Pro-, meso- and metasternum almost reaching apex of coxae of fore, middle and hind legs, respectively. Ratio of length to width of thoracic sterna about 0.91, 0.92–1.0 and 0.87–0.88, respectively. Distal parts of all thoracic sterna with bristle combs: they located in about 0.36 of prosternum, 0.19 of mesosternum and 0.11 of metasternum length. Distal part of prosternum with 3–4 + 3–4 bristle combs, that of mesosternum with 2–3 + 2–3 combs, preapical part of metasternum with 2 + 2 combs, including 3–12, 3–10 and 10–11 large pectinate macrochaetae, respectively. All thoracic sterna with hyaline scales.

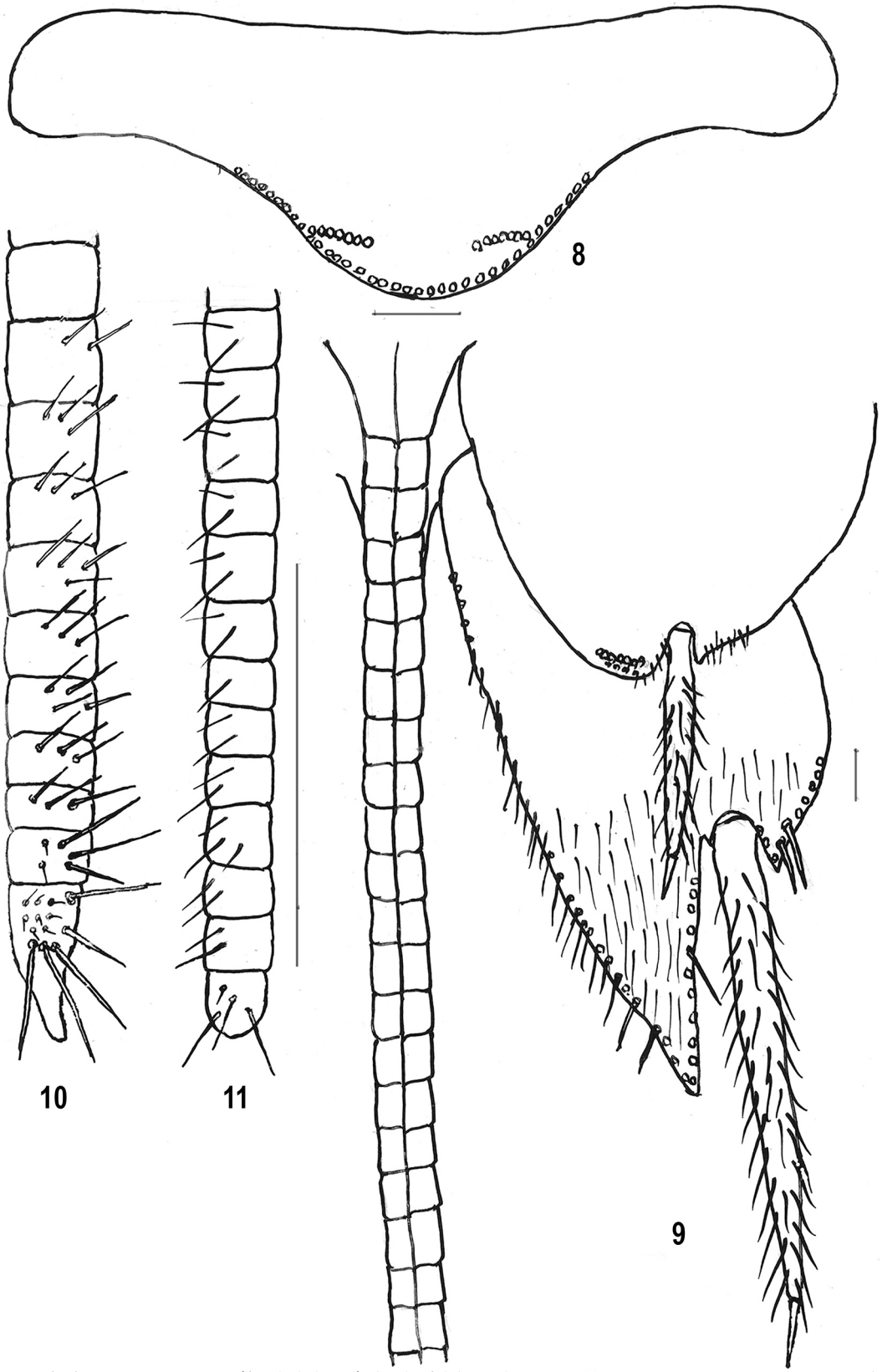
Anterior margin of pronotum with interrupted chaetal collar. Lateral margins of pronotum with 7–8 + 7–8, mesonotum with 9–10 + 9–10 and metanotum with 8–9 + 9–9 bristle combs in male and female, including 4–7, less often 2–3, long, pectinate, apically bifurcate macrochaetae and with open trichobothrial areas with one or two thin, very long trichobothria on both sides of all lateral combs. Posterior margins of pro-, meso- and metanotum with 1 + 1 sublateral bristle combs including 8–9 pectinate macrochaetae.

Urotergite I with 1 + 1 lateral, II–VII with 3 + 3 lateral, sublateral and submedial, urotergite VIII with 2 + 2 lateral and sublateral, X with 1 + 1 apical bristle combs, including 6–12 pectinate macrochaetae. Urotergite IX without bristle combs. Numbers of macrochaetae in abdominal bristle combs as in Table 2. Urotergite X subtriangular with rounded apex, wider than long (Fig. 8). Abdominal segments with two pair of urostyli on urocoxites VIII and IX (Fig. 9). Length of urostyli VIII about 0.6 mm, IX 1.1 mm. Urosternite I without bristle combs. Urosternites III–VII and urocoxites VIII with 1 + 1 sublateral and urosternites II–VI with one medial bristle combs, including 8–21 and 11–24 pectinate macrochaetae, respectively.

Table 2. Number of macrochaetae per bristle comb females of *Sceletolepisma nazwanum* sp.n.

Таблица 2. Количество макрохет в щетинковых гребнях самок *Sceletolepisma nazwanum* sp.n.

Segment	Urotergite			Urosternite	
	lateral	sublateral	submedial	sublateral	medial
I	6–8	–	–	–	–
II	10–11	9	9	–	19–24
III	11	8	9	13–21	14–19
IV	7–8	7–9	6–9	12–21	11–19
V	6–9	6–8	7–8	13–19	11–24
VI	8–11	7–9	7–9	13–19	11–19
VII	8–12	7–9	7–9	12–18	–
VIII	8 –10	6–10	–	8–9	–
IX	0			–	–
X	7–8 (apical)	–	–	–	–



Figs 8–11. *Sceletolepisma nazwanum* sp.n. (female, holotype), details of abdominal structure. 8 — urotergite X; 9 — urocoxites VIII and IX with urostyle and ovipositor; 10 — distal part of posterior gonapophysis; 11 — distal part of anterior gonapophysis. Scale bars: 0.1 mm.

Рис. 8–11. *Sceletolepisma nazwanum* sp.n. (самка, голотип), детали строения брюшка. 8 — тергит X сегмента брюшка; 9 — кокситы VIII и IX сегментов брюшка с грифельками и яйцекладом; 10 — дистальная часть заднего гонапофиза яйцеклада; 11 — дистальная часть переднего гонапофиза яйцеклада. Масштабная линейка: 0,1 мм.

Table 3. Main morphological differences between *Sceletolepisma nazwanum* sp.n., *S. sagartianum, S. omanicum, S. kervillei, S. maroccanum, S. africanellum* and *S. weberi* [Silvestri, 1911; Wygodzinsky, 1955; Mendes, 1980; Irish, 1991; Kahrarian et al., 2015]

Таблица 3. Основные морфологические отличия у видов *Sceletolepisma nazwanum* sp.n., *S. sagartianum, S. omanicum, S. kervillei, S. maroccanum, S. africanellum* and *S. weberi* [Silvestri, 1911; Wygodzinsky, 1955; Mendes, 1980; Irish, 1991; Kahrarian et al., 2015]

Morphological features	Species						
	S. nazwanum sp.n.	*S. sagartianum* Molero, Kahrarian & Gaju, 2015	*S. omanicum* Kaplin, 2024.	*S. kervillei* Silv., 1911	*S. maroccanum* Mendes, 1980	*S. africanella* Wygodz., 1955	*S. weberi* Esch., 1905
Bode length, mm	8–11	6.7	9–10	8	6.2	9.5	11
Number of sensory papillae on apical palpomere of labial palps	3	3	5	5	5	3	5
Ratio lengths of apical to penultimate palpomeres of maxillary palps	1.2–1.3 ♀	0.95	1.02♂, 1.12♀	0.8	1.0♀	1.27♀	0.9♂
Number of bristle combs on thoracic prosternum	3–4 + 3–4	2–3 + 2–3	4 + 4	4 + 4	2 + 2	5 + 5	1 + 1
Ratio of length to width of prosternum	0.91	1.15	1.01	?	0.85	1.0	1.05
Ratio of length of distal part with bristle combs to length of prosternum	0.36	0.28	0.27	?	0.17	0.61	0.15
Pairs of urostyli	2	2	1	1–2	1	2	1
Urotergite X	Subtriangular with rounded apex, wider than long	Trapezoidal, with a straight or slightly emarginated hind margin, wider than long					
Ratio length/width at the base of urotergite X about	0.33	0.37	0.54	?	0.34	0.29	0.31
Ratio of length to width of labial palps apical palpomere	2.0 ♀	1.0	0.8–0.9♂, 1.3–1.4♀	1.5	1.06♀	1.0♀	0.77♂
Distribution	Oman, near Nazwa	Western Iran	Oman, near Mascat	Syria, Iran, Oman	Marocco	South Africa, Cape Province	South Africa

Ovipositor long, about 4.7 mm (holotype) and 2.4 mm (paratype) with 42–44 divisions, its apex surpassing the tip of the inner process of coxite IX by about 1.3 times its length (holotype). Ratio lengths of ovipositor to body about 0.39 (holotype), 0.30 (paratype). Apical divisions of posterior gonapophyses with relatively long supporting projections, also with five long thin setae and eight small sensory setae (Fig. 10). Two small sensory setae there are on the preapical divisions. From second to ninth divisions of posterior gonapophyses with 3–4, tenth division with two simple thin setae, remaining divisions of posterior gonapophyses glabrous. From first to thirteenth divisions of anterior gonapophyses with 2–3 simple thin setae, but remaining divisions of these gonapophyses also glabrous too (Fig. 11).

Comparison. *Sceletolepisma nazwanum* sp.n. is the species of the genus *Sceletolepisma* with 1 + 1 bristle combs on urotergite I, 3 + 3 bristle combs on urotergites II–VII, 2 + 2 on urotergite VIII; urosternite I without bristle combs, urosternites III–VIII with 1 + 1 sublateral and II–VI with one medial bristle combs; apical palpomere of labial palps with three sensory papillae in one row; in female of new species there are two pairs of styli on urocoxites VIII and IX. The indicated morphological features are characteristic of a few related species of this genus from North Africa, *S. maroccanum* Mendes, 1980, South Africa, *S. africanella* Wygodz., 1955 and *S. weberi* Esch., 1905, Western Iran, *S. sagartianum* Molero et al., 2015, from Syria, Iran and Oman, *S. kervillei* Silv., 1911, from Oman, *S. omanicum* Kaplin, 2024 [Silvestri, 1911; Wygodzinsky, 1955; Mendes, 1980; Irish, 1987, 1991; Kahrarian et al., 2015]. The differences between these species (body length, number of bristle combs on thoracic sterna, chaetotaxy of urosternites, the shape of tergite X) are given in Table 3. The main distinctive features of the new species include the shape and chaetotaxy of the prosternum, the shape of urotergite X and the apical palpomere of the labial palps.

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