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Further taxonomic notes on the genus *Scleropilio* Roewer, 1911 (Arachnida: Opiliones: Phalangiidae)

Дальнейшие таксономические заметки о роде *Scleropilio* Roewer, 1911 (Arachnida: Opiliones: Phalangiidae)

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КЛЮЧЕВЫЕ СЛОВА: Opiliones, *Scleropilio*, обзор, Центральная Азия, Юж. Сибирь, Монголия.

ABSTRACT: This paper presents a review of the harvestman genus *Scleropilio* Roewer, 1911, which contains at least four valid species: *S. insolens* (Simon, 1895), *S. coriaceus* Roewer, 1911, *S. armatus* (Roewer, 1911) comb.n. and *S. tibialis* (Roewer, 1956). The latter three species are removed from synonymy with *S. insolens*. *Scutopilio diadema* Gritsenko, 1975 is considered a junior synonym of *S. armatus* (Roewer, 1911); a new combination is proposed for the latter species (ex *Opilio*). The female of *S. tibialis* is described for the first time. All species are diagnosed, redescribed, figured, and their distributions are mapped.

РЕЗЮМЕ: Данная работа представляет собой обзор сенокосцев рода *Scleropilio* Roewer, 1911, который включает по меньшей мере четыре валидных вида: *S. insolens* (Simon, 1895), *S. coriaceus* Roewer, 1911, *S. armatus* (Roewer, 1911) comb.n. and *S. tibialis* (Roewer, 1956). Три последних вида выведены из синонимии с *S. insolens*. *Scutopilio diadema* Gritsenko, 1975 является младшим синонимом *S. armatus* (Roewer, 1911) comb.n.; для последнего вида дана новая комбинация (ex *Opilio*). Впервые описана самка *S. tibialis*. Для всех видов даны диагнозы, переописания и рисунки, а так же приводятся карты распространения.

Introduction

In a recently published work, Tsurusaki *et al*. [2000] synonymized the remaining five known species of *Scleropilio* with *S. insolens* (Simon, 1895), which was provisionally considered a quite variable, polytypic species. However, most of the synonymized species were known from single type specimens only, and this prevented us from a rigorous evaluation of both somatic and genital character variation. Newly collected specimens from Middle Asia, as well as re-examination of the holotypes of *S. insolens*, *S. tibialis* (Roewer 1956), *S. coriaceus* Roewer 1911 and *Opilio asiaticus* Roewer, 1911, allowed us to conclude that at least four closely related and clearly separate species are included in *Scleropilio*. The species are easily distinguished by the structure of various parts of the body and limbs, and also differ in penis structure.

It is necessary to stress that *S. insolens* is indeed a quite variable, polymorphic species; its populations from different regions of S. Siberia and Mongolia vary greatly in arms structure and body size, although the penis structure remains virtually constant.

Unfortunately, in the course of this study we have been unable to locate and re-examine the type specimens (♂♂) of *S. diadema* Gritsenko, 1975 and *S. elenae* Gritsenko, 1975. According to the original description [s. Gritsenko, 1975] they should have been located in the Zoological Institute in St.-Petersburg (Russia), but were not found in their collections (checked personally by DL). Repeated attempts by DL to correspond with Mr N.I. Gritsenko (Kazakhstan, Almaty), the author of the descriptions of the above two species, have received no replies. Thus, these types either do not exist, or their actual repository is unknown.

Examination of numerous *Scleropilio* specimens from Middle Asia available to us, and comparison of these with the descriptions and diagnoses published by Gritsenko [1975, 1979, 1980], left no doubts that they can be assigned to *S. diadema*. On the other hand, a re-study of the syntypes of *Opilo armatus* described by Roewer [1911] from Kazakhstan (Turkestan) and their comparison with the same Middle Asian specimens, has proven their identity. Thus, it is reasonable to conclude that *Scleropilio armatus* (Roewer, 1911) comb.n. is a valid name for the examined Middle Asian species and the latter name is to be considered a senior synonym of *S. diadema*.

The taxonomic status of *S. elenae* described from the Osh Area of Kyrghyzstan [Gritsenko, 1975; listed in Zonstein, 1996], must remain uncertain until the types have been found and re-examined or topotypes have been collected. As for *Udezatus spinosus* Nakatsudi, 1943, we follow Tsurusaki *et al*. [2000] and consider it a junior synonym of *S. insolens*. Both these species are omitted in the following survey.

The specimens used for this study were loaned from or are distributed among the following museums: ISEA — Institute for Systematics and Ecology of Animals, Novosibirsk, Russia (Miss G.N. Azarkina); MMUM — The Manchester Museum, The University of Manchester, Manchester, UK (Dr D. V. Logunov); MNHN — Muséum national d'Histoire naturelle, Paris, France (Dr. A. Munos-Cuevas); SMFM — Naturmuseum und Forschungsingsinstitut Senckenberg, Frankfurt a. Main, Germany (Dr. M. Grasshoff). Abbreviations used in the text and table: Fm — femur, Pt — patella, Tb — tibia, Mt — metatarsus, Tr — tarsus. "Clypeus" is the space between the ocularium and the front margin of the carapace. Names of some collectors are abbreviated as follows: D.L. — Dr. D.V. Logunov, Y.M. — Dr. Yu.M. Marusik. All measurements are in mm.

Survey of species

Genus *Scleropilio* Roewer 1911

The genus *Scleropilio* belongs to the family Phalangiidae (subfamily Phalangiinae) and can easily be separated from other genera of Phalangiinae by the following characters [modified from Tsurusaki *et al*., 2000]: (1) body elongated and heavily sclerotized, with papillose integument; (2) anterior margin of the carapace with several forward-protruding tubercles/spines; (3) abdominal shield is produced by fusion of the first seven abdominal tergites; (4) an ocular tubercle is situated at a distance from the anterior margin of the carapace, which is at least twice the length of its diameter; (5) relatively short and spiny legs (length of femur I is less than half the body length); (6) first pair of legs robust and thickened, their femora, patellae and tibiae swollen and armed with numerous tubercles and denticles; (7) the penis slender, with darkly-coloured and rod-shaped corpus, its base swollen, twice as wide as corpus (except for *S. coriaceus*).

DISTRIBUTION. From Central Asia (Turkmenistan and Uzbekistan) in the south-west throughout NW China (Xinjiang), Mongolia and the mountains of S. Siberia (Tuva, Transbaikalia) to NE China (Manchuria).

SPECIES INCLUDED. *Scleropilio armatus* (Roewer, 1911), *S. coriaceus* Roewer, 1911; *S. insolens* (Simon, 1895) and *S. tibialis* (Roewer, 1956).

Scleropilio insolens (Simon, 1895)
Figs 1–9, 36; Map 1.

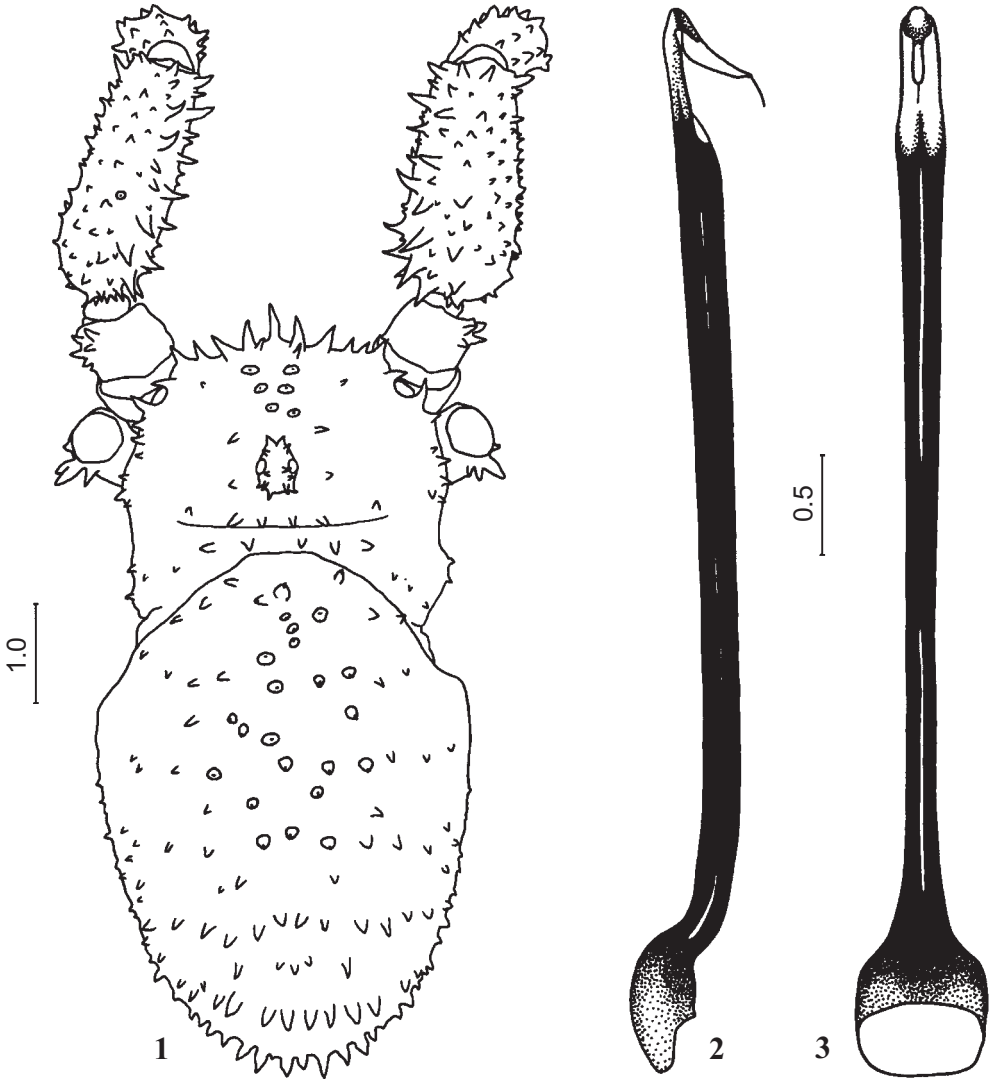
Egaenus insolens Simon, 1895: 345 (the ♂♀ syntypes in the MNHN; examined).

Egaenus insolens: Roewer, 1911: 18; Roewer, 1923: 816.

Scleropilio insolens: Staręga, 1978: 228, Tsurusaki *et al*., 2000: 87–94, figs 1–3.

Udezatus spinosus Nakatsudi, 1943: 110, fig. 4. Synonymized with *S. insolens* by Tsurusaki *et al*. [2000].

MATERIAL. RUSSIA: THE ALTAI: 1 ♂, 1 ♀ (MNHN; the syntypes of *Egaenus insolens*), "Vallée de la River Chatu, sur le vers. Oriental de la chaonte du Sailügem (10/VI 1879)" [SE Altai, Sailyugem Mt Range]; 1 ♀ (ISEA), Charysh Distr., Tigiretskii Mt. Range, Korolevskii Belok Mt., 1800–2300 m a.s.l, 20.07.1999, G.I. Azarkina; 9 ♀♀ (ISEA), Tor-Ai, 24–27.06.1970, coll.?; 12 ♂♂, 16 ♀♀ (ISEA), ca 50 km W of Kosh-Agatch, 20–25 km W of Bel'tir, Shaltra stand (plateau), 2700–2800 m a.s.l., 25–30.06.1999, D.L.; 1 ♂ (ISEA), Kholzun Mt. Range, the upper reaches of left tributary of Bannaya River, 2000–2250 m a.s.l., 13–14.06.1999, R.Yu. & A.Yu. Dudko; 2 ♂♂ (ISEA), E of Narymskii Mt. Range, upper reaches of Ozernaya River, 2300–2700 m a.s.l., 19.07.1997, R.Yu. Dudko & V.V. Zinchenko. TUVA: 1 ♂ (ISEA), Ovyurskiy Distr., ca 10 km W of Ak-Tsyraa Vil., Irbitei River Valley, [50°44'N, 93°08'E], 1000–1050 m a.s.l., 13–16.06.1995, D.L.; 1 ♂ (ISEA), near Kyzyl, 600–700 m a.s.l., 21.09.1989, D.L.; 2 ♂♂, 2 ♀♀ (ISEA), East Tannu-Ola Mt., Aryskannyg-Khem River Canyon, 1250–1350 m a.s.l., 16–18.06.1995, Yu.M.; 1 ♀ (ISEA), same locality, [50°45'N, 94°29'E], 16–18.06.1995, D.L.; 4 ♂♂, 1 ♀♀ (ISEA), same locality, [50°44N, 93°08'E], 13–16.06.1996, Yu.M. Marusik; 35 ♂♂, 32 ♀♀ (ISEA), 3 ♂♂, 3 ♀♀ (MMUM), Sangelen Mt. Range, the middle reaches of Dzhen-Aryk River [50°31'N, 95°28'E], 1450 m a.s.l., 14–18.07.1996, Yu.M. & D.V. Obydov; 1 ♂ (ISEA), same locality, Moren Vil., [50°23'N, 95°22'E], 1150 m a.s.l., 14–18.07.1996, D.V. Obydov; 7 ♂♂, 2 ♀♀ (ISEA), Khorumnug-Taiga Mt. Range, Chuurmak, [50°44'N, 95°19'E], 1100 m a.s.l., 20.06–18.07.1996, Yu.M.; 1 ♂ (ISEA), the middle reaches of Naryn River [50°12'N, 95°39'E], 1540 m a.s.l., 24.06.1996, Yu.M.; 2 ♂♂, 1 ♀ (ISEA), Naryn-Balyktyg-Khem Pass [50°15'N, 96°19'E], 2550 m a.s.l., 26.06.1996, Yu.M.; 2 ♂♂ (ISEA), the upper reaches of Balyktyg-Khem River [50°17'N 96°39'E], 2000 m, 26–28.06.1990, Yu.M.; Tes-Khemskiy Distr: 59 ♂♂, 15 ♀♀ (ISEA), ca 5 km E of Khol-Oozhu, 1300–1400 m a.s.l., 15–16.07.1993, D.L.; 1 ♂ (ISEA), ca 10 km NE of Khol-Oozhu, 1300–1400 m a.s.l., 12.07.1989, D.L.; 5 ♂♂, 9 ♀♀ (ISAE), 8-10 km NE of Khol-Oozhu, Belengish natural limits, 1300-1400 m a.s.l., 9-11.07.1989, D. V. Logunov; 2 ♂♂, 5 ♀♀ (ISEA), 8-10 km E of Khol-Oozhu, Shiviliig-Khem River, 30.04.1990, O.V. Lyakhov; 1 ♂ (ISEA), ca 8 km N of Samagaltai, 10.07.1993, D.L.; 1 ♂ (ISEA), ca 20 km N of Oo-Shinaa, 3–4 km E of Despen, 1600 m a.s.l., 17.07.1989, D.L.; 4 ♀♀ (ISAE), Mongun-Taiga Distr., Barlyk River Valley, Tsagan-Shibetu Mt. Range, 6.06.1990, O. V. Lyakhov; 1 ♂ (ISEA), a.s.l., 6.06.1990, D.L.; 1 ♀ (ISEA), confluence of Barlyk and Onachy Rivers, Tsagan-Shibetu Mt. Range, 2000–2100 m a.s.l., 13.06.1989, D.L.; 6 ♂♂ (ISEA), Kargy River, middle flow, [50°44'N, 93°08'E], 1300 m a.s.l., 13–16.06.1995, Yu.M.; 1 ♂ (ISEA), same locality [50°31'N, 97°03'E], 1400 m a.s.l, 28–30.06.1996, Yu.M.; 1 ♀ (ISEA), 30–35 km W of Mugur-Aksy, the upper reaches of Mugur River, 3100–3200 m a.s.l., 23.071993, D.L.; 1 ♂, 1 ♀ (ISEA), 5–6 km SE of Mugur-Aksy, Kargy River Valley, 18.05.1990, O.V. Lyakhov. CHITA AREA: 1 ♂ (ISE), Kyra Distr., 60–65 km SW of Kyra, Sokhondo State Reserve, 1600–1800 m a.s.l., 3–5.07.1991, S.E. Tchernyshev; 1 ♂, 2 ♀♀ (ISEA), same locality, 1–3.07.1991, S.E. Tchernyshev; 1 ♂, 2 ♀♀ (ISEA), same locality, 28–29.06.1991, S.E. Tchernyshev; 4 ♀♀ (ISEA), same locality, 26.06.1991, B.P. Zakharov & N.A. Gladkevich; 4 ♀♀ (ISEA), same locality, 24–25.06.1991, B.P. Zakharov; 3 ♂♂, 7 ♀♀ (ISEA), same locality, Sokhondo Mt., 1700–1800 m, S.E Tchernyshev; 2 ♂♂, 10 ♀♀ (TUJ), same locality, confluence of Agutsa River and Larionov (Talgikta) Spring, 1300 m a.s.l., 13.06.991, D.L. — KAZAKHSTAN: 2 ♀♀ (ISEA), Dzhungarskii Alatau Mt. Range, 7 km NE of Tekeli, [44°54'N, 78°52'E], 2400 m a.s.l., 13.06.1999, A.V. Gromov; 1 ♂ (ISEA), South Kazakhstan Area, NE of Shimkent, Baraldaitau Mt. Range, canyon of Baraldai River, 16.04.1988, Ch. Tarabaev; 2 ♂♂ (ISEA), Zhambyl [Dzhambul, Taraz] Area, Kurdai Distr., Chu-Ili [Shu-Ili] Mts., 15.7 km NW of Kenen (43°31'N, 74°55'E), 20.04.1997, A.V. Gromov. — KYRGHYZSTAN: 13 ♂♂, 4 ♀♀ (ISEA), Talasskii Alatay Mt. Range, NE slope of Suusamyr Mt. Range, Ala-Bel' Pass [45°15'N, 73°02'E], 3200 m a.s.l., 9.07.2000, A.V. Gromov. — MONGOLIA: 5 ♂♂, 2 ♀♀ (ISEA), Bayanhkongor Aimak, Gurvanbulag Somon, Khokh-Nuur Lake, [47°32'N, 98°32'E], 2600 m a.s.l., 7–10.06.1997, Yu.M.; 11 ♂♂, 4 ♀♀ (ISEA), same aimak, Bayanlig Somon, Ikh-Bogd Mt. Range, Khar-Obot Mt.,



Figs 1–3. *Scleropilio insolens* (Simon, 1895): 1 — male body, dorsal view; 2 — penis, lateral view; 3 — penis, dorsal view.
Рис. 1–3. *Scleropilio insolens* (Simon, 1895): 1 — тело самца, дорзально; 2 — пенис, латерально; 3 — пенис, дорзально.

[44°54'N, 100°34'E], 2500 m a.s.l., 4–6.06.1997, Yu.M.; 1 ♂, 1 ♀ (ISEA), Arkhangai Aimak, Ondrer-Ulaan, Tsakhir, Chulut gorge, [48°07'N, 100°22'E], 2100 m a.s.l., 10–13.06.1997, Yu.M.; 2 ♀♀ (ISEA), Arkhangai Aimak, Tariat Somon, Tsugu-Nuur Volcano [48°10'N, 99°40'E], 10.06.1997, Yu.M.

DIAGNOSIS. This species is closest to *S. armatus* (females of both species are especially close), but can be separated by the following characters: the first pair of legs less solid (cf Figs 4 and 13); body and limbs are much more heavily armed with prominent tubercles/denticles (body is almost entirely covered with tubercles) (cf Figs 1 and 10); the penis of average size, but with a shorter base (cf Figs 3 and 12). The females of *S. insolens* differ from those of *S. armatus* in having shorter seminal receptacles (cf Figs 36 and 37). See also table 1.

DISTRIBUTION. From Central Asia (Kyrghyzstan and SE Kazakhstan), throughout S. Siberia (the Altai, Tuva and Chita Area) and Mongolia to NE China (Liaoning: Dalian; not shown on the Map 1) (Map 1).

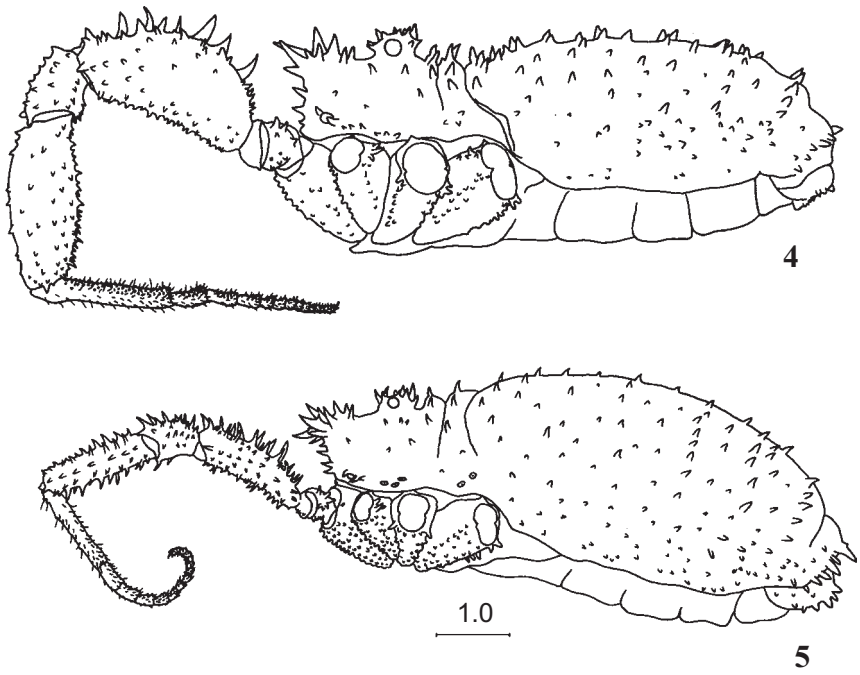
The records of *S. insolens* from NW China (Xinjiang) [s. Gritsenko, 1980; Tsurusaki *et al*., 2000: fig.4] are not taken into consideration here, as we have been unable to locate and re-examine Gritsenko's specimens.

HABITAT. Mountain moss-stony tundra (goltsy), sloping shrub-stony steppes, subalpine meadows, stony debris with moss cover, *Larix* forest.

DESCRIPTION. MALE. Measurements. Body: length 5.75–7.25; width 3.25–3.91. Cephalothorax length 1.75–2.35. Eye tubercle width 0.33–0.41. "Clypeal" length 0.78–1.21. Chelicera: basal segment length 1.63–1.71; distal segment length 1.22–1.32; length of forceps 0.85–0.87. Penis: length 4.11–5.17; width at base 0.58–0.61. Length of palp and legs:

		Fm	Pt	Tb	Mt	Tr	Total
Palp:		0.95–1.15	0.43–0.58	0.55–0.60	–	1.08–1.30	4.16–4.58
Legs:	I	1.80–2.80	0.90–1.20	2.05–2.16	1.62–1.93	2.05–2.60	8.42–10.69
	II	2.85–3.65	1.13–1.40	2.20–2.85	2.10–2.75	4.00–5.25	12.28–15.90
	III	1.35–2.00	0.75–1.00	1.35–1.65	1.60–2.15	2.25–3.35	7.30–10.15
	IV	2.60–3.35	1.00–1.30	1.80–2.30	2.25–3.50	3.45–4.50	11.1–14.95

Body large, elongated and robust (Figs 1, 4). Carapace prominent in the mid region, armed with scattered denticles. Anterior margin of carapace armed with 10–12 anteriorly-



Figs 4–5. *Scleropilio insolens* (Simon, 1895): 4 — male body, lateral view; 5 — female body, lateral view.
Рис. 4–5. *Scleropilio insolens* (Simon, 1895): 4 — тело самца, латерально; 5 — тело самки, латерально.

directed tubercles; the central one is very long and may exceed the length of ocularium. Meta- and mesopeltidium and all abdominal tergites with rows of anteriorly-directed tubercles. Scent gland pores visible in dorsal view and bordered by two large tubercles. Ocular tubercle higher than that of other species and armed dorsally with a few tall tubercles; it is positioned twice its diameter from the anterior edge of the carapace. Supracheliceral lamellae are invisible from dorsal view.

Chelicerae swollen and stout (Figs 8–9); basal segment without a ventral spine, but dorsally with 3 long, and 2–3 tiny apical tubercles; distal segment armed only with setae.

Palps short and robust (Figs 6–7). Trochanter less than half the length of the femur. Trochanter and femur armed dorsally and ventrally with numerous tubercles. Femur dorsally with a row of long, anteriorly-directed tubercles. Patella armed dorsally and tibia armed dorsally, ventrally and laterally, with numerous prominent tubercles. Tarsus ventrally with two rows of black microdenticles; claw smooth.

Legs. All coxae covered the small tubercles, but with larger tubercles apically. Legs I stout and robust (Figs 1, 4); trochanter, femora, patellae and tibiae heavily swollen. Trochanter armed ventrally and laterally with small tubercles and a few scattered denticles. Femora armed ventrally and prolaterally with long, strong prominent tubercles. Femora, patellae and tibiae almost entirely covered with numerous small tubercles and scattered denticles. Metatarsus and 1st to 5th segments of tarsus covered ventrally with numerous black microdenticles; remaining tarsal segments covered with setae. Legs II–IV of normal structure, cylindrical in cross-section, covered with longitudinal rows of prominent tubercles. Metatarsi and tarsal segments of all legs covered ventrally with short, dark hairs, and with a pair of apical spines.

Penis long and thin with broad base (Figs 2–3); its corpus slender, black and rod-shaped, gradually extending to its apical region, ventrally carinated; base small, spatulate from dorso-ventral aspect. Glans beak-shaped, with visible stylus.

FEMALE. Measurements. Body: length 4.93–7.64; width 3.07–4.33. Cephalothorax length 1.23–2.02. Eye tubercle width 0.30–0.38. "Clypeal" length 0.51–0.88. Chelicera: basal segment length 1.57–1.62; distal segment length 1.18–1.20; length of forceps 0.79–0.81. Length of palp and legs:

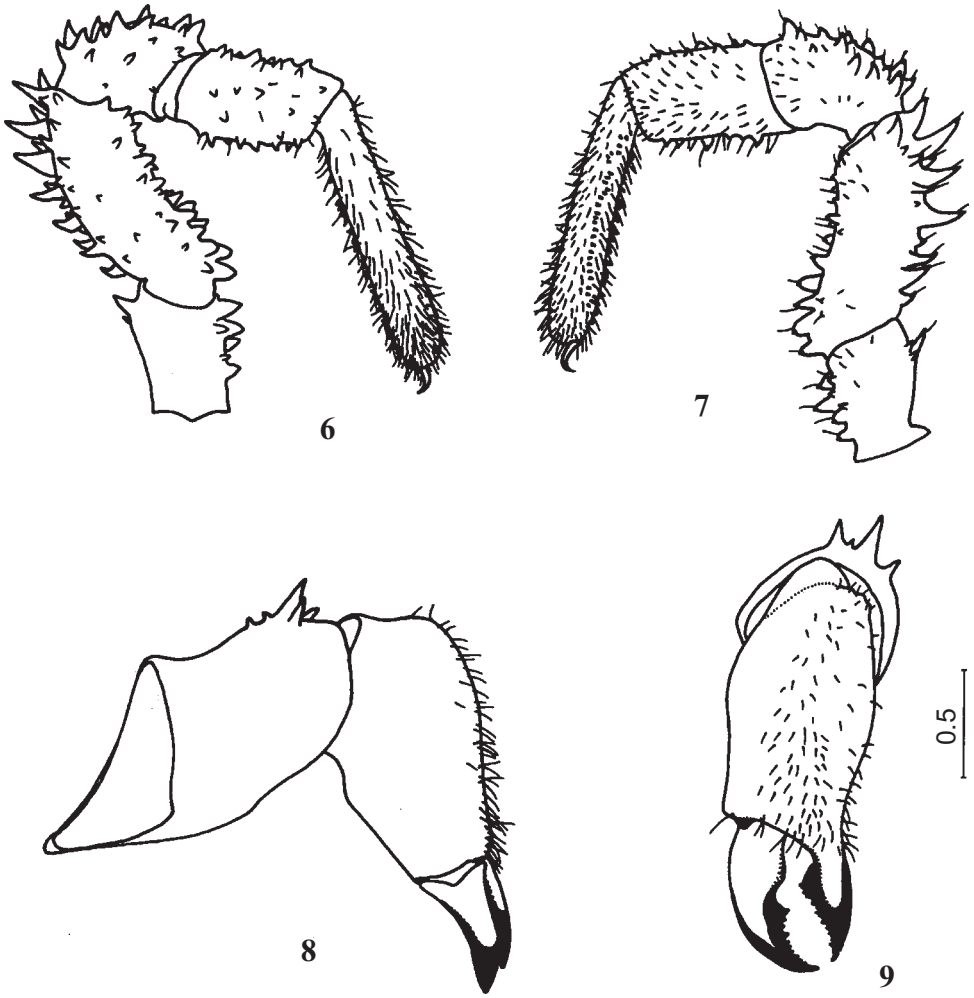
		Fm	Pt	Tb	Mt	Tr	Total
Palp:		0.68–0.70	0.28–0.38	0.30–0.43	–	0.85–1.10	2.11–2.61
Legs:	I	1.25–1.55	0.53–0.85	0.93–1.25	1.08–1.50	1.68–2.15	5.47–7.30
	II	2.20–2.80	0.78–1.15	1.65–2.10	1.68–2.25	2.50–4.15	8.81–12.45
	III	1.15–1.50	0.65–0.80	0.93–1.20	1.25–1.65	2.00–2.70	5.98–7.85
	IV	2.33–2.90	0.75–1.05	1.50–1.85	2.13–2.65	2.95–3.50	9.66–11.95

Female general appearance is similar to that of the male (Fig. 5). Body and limbs more strongly armed than in males, almost entirely covered with long, thin tubercles. Anterior margin of carapace with long anteriorly-directed tubercles (central tubercles sometimes bifurcated). Body the same size or bigger than in males, with a more swollen abdomen. I legs more stout than other legs, but less-developed in comparison to males. Tarsal palps and metatarsi I lacking ventral microdenticles. Chelicerae not strong, of normal structure.

Ovipositor normal in structure, seminal receptacles found between 5th to 7th segments (Fig. 36), with two atria.

COLORATION. Dorsum and venter with black to brown patches. Legs and palps usually lighter than body. Ocularium dorsally with light ochre band in the middle. Chelicerae with black and white, zebra-like banding pattern.

VARIATION. Samples of *S. insolens* from different geographical areas can vary greatly in size, pattern of tubercle/denticle armature, and body coloration; this could cause difficulties in identification. For instance, the specimens from the Altai and Chita Area are less heavily armed and smaller than those from Tuva and Mongolia. Body and limbs of Tuvan specimens are almost entirely covered with long tubercles and



Figs 6–9. *Scleropilio insolens* (Simon, 1895): 6 — male palp, ectal view; 7 — male palp, mesal view; 8 — male chelicerae, ectal view; 9 — male chelicerae, distal segment.

Рис. 6–9. *Scleropilio insolens* (Simon, 1895): 6 — пальпа самца, эктально; 7 — пальпа самца, мезально; 8 — хелицера самца, эктально; 9 — хелицера самца, дистальный членник.

denticles, and the tubercles are often bifurcated (see above description of the females from Tuva), while the specimens from the Altai generally lack body tubercles and denticles. The body coloration varies as well: usually light, sandy-ochre specimens are collected from Tuva, Mongolia and Kazakhstan, whereas dark brown specimens predominate in the Altai and Kyrghyzstan.

Scleropilio armatus (Roewer, 1911) **comb.n.**
Figs 10–18, 37; Map 2.

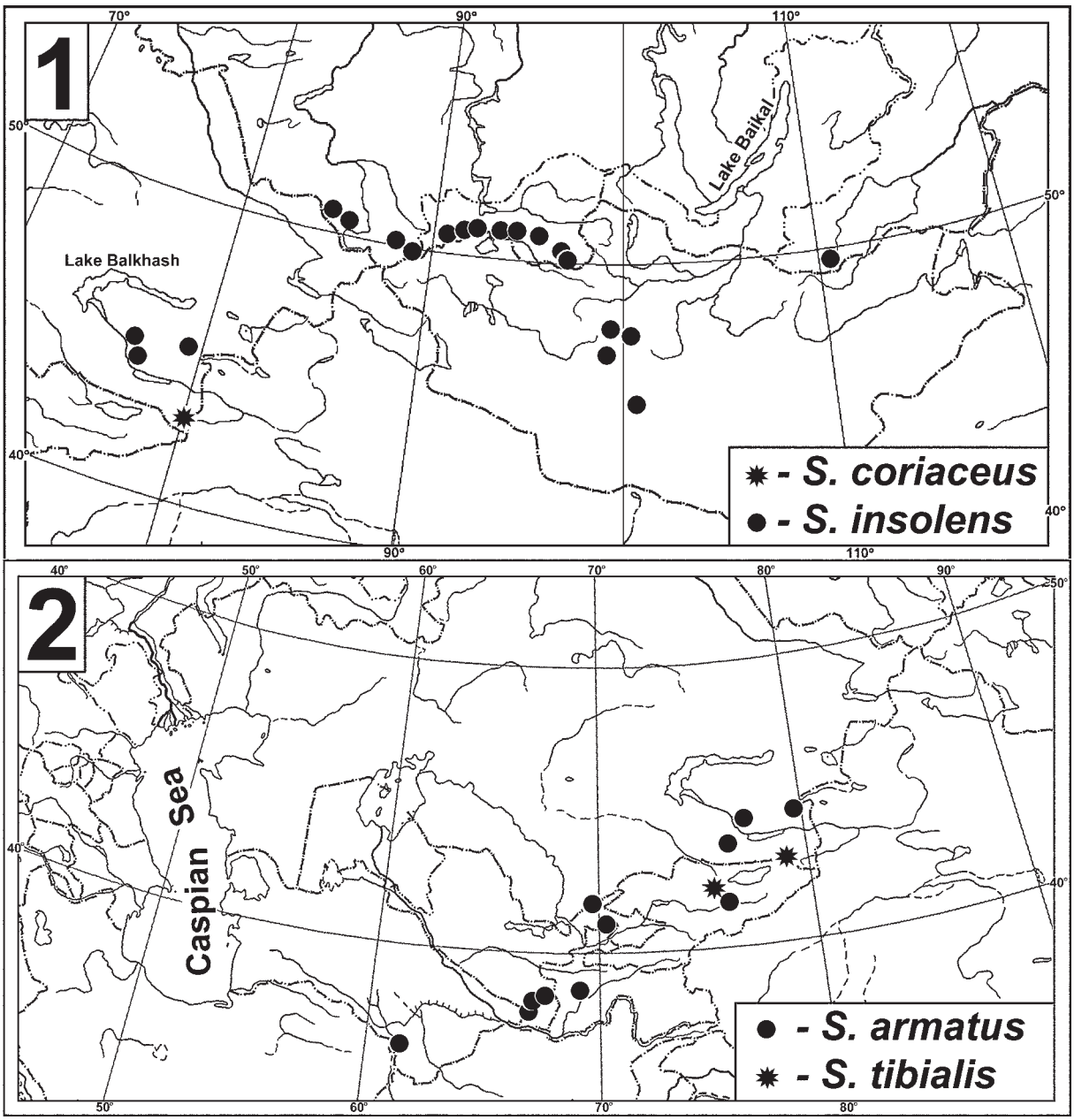
Opilio armatus Roewer, 1911: 46, fig. 7 in plate 7 and figs 1–3 in plates 1–3 (the ♀ syntypes in SMFM, not a ♂, as stated in Tsurusaki *et al*. [2000: 88]; examined). Synonymized with *S. insolens* by Tsurusaki *et al*. [2000], revalidated herein.

Opilio armatus: Roewer, 1912: 133, fig. 8 in plate 1 and figs 4 and 7 in plate 2, 1923: 774, 1956: 281.

Scutopilio diadema Gritsenko, 1975: 133, figs 11–16 (the ♂ holotype; not located and examined). **Syn.n**. Synonymized with *S. insolens* by Tsurusaki *et al*. [2000].

Scleropilio diadema: Redikorzev, 1936: 1; Staręga, 1978: 228; Gritsenko, 1979a: 37, 1980: 556; Zonstein, 1996: 132.

MATERIAL. KAZAKHSTAN: 2 ♀♀ (SMFM, RI/8/587; the syntypes of *Opilio armatus*), "Turkestan" [an unknown locality in Central Asia]; 1 ♂ (ISEA), Almaty [=Alma-Ata] Area, Panfilov [=Zharkent] Distr., near Aidarly, Kumkala Sands (ca 44°01'N, 79°35'E) 27.06.1989, V.G. Linskii; 3 ♀♀ (ISEA), Zhambyl Distr., ca 80 km NW of Uzunagach, 12.05.1992, A.A. Zyuzin; 1 ♂, 1 ♀ (ISEA), Zhambyl [Dzhambul, Taraz] Area, Kurdai Distr., Chu-Ili [Shu-Ili] Mts., 15.7 km NW of Kenen (43°31'N, 74°55'E), 9–10.04.1997, A.V. Gromov. — UZBEKISTAN: 1 ♂ (ISEA), Tashkent Area, Ugamskii Mt. Range, Khumsan [41°40'N, 69°57'E], S slope of Echemichid Mt., 2.05.1974, coll.?; 1♂ (ISEA), Surkhandarya Area, Baisun [=Boisun] Distr., near Derbent (38°13'N, 66°59'E), 10.05.1994, O.V. Lyakhov; 1 ♂ (ISEA), Surkhandarya Area, Uzun Distr., ca 30 km SE of Denau [=Denov], W slope of Babatagh Mt. Range, (ca 38°12'N, 67°58'E), 19.04.1994, A.V. Gromov; 1 ♂ (ISEA), same area and district, Babatagh Mt. Range, 1.05.1995, S.L. Zonstein; 1♂, 2♀♀ (ISEA), Kughitang Mt. Range, 4.05.1981, N.E. Ergashev; 4♂♂, 1♀ (ISEA), 2♂♂ (MMUM), Kashkadarya Area, 15–20 km NW of Kitab, Zeravrshanskii Mt. Range, 1500 m a.s.l., 27.04.1993, D.L. — KYRGHYZSTAN: 1 ♂, 1 ♀ (ISEA), Tashkent Area, S slope of western end of Ugamkii Mt. Range, Kainar-Sai (41°42'N, 70°02'E), 1100–1500 m a.s.l., 10–11.05.1981, S.L. Zonstein; 1 ♂♂, 1 ♀ (ISEA), 2 ♀♀ (MMUM), Issyk-Kul' [=Ysyk-Kol] Area, Issyk-Kul' [=Ysyk-Kol] Distr., Kungei-Alatoo Mt.



Maps 1–2. Distribution of the *Scleropilio* species: 1 — *S. coriaceus* Roewer, 1911 and *S. insolens* (Simon, 1895); for the latter species, its record from NE China (Liaoning: Dalian) by Nakatsudi [1943: sub *Udezatus spinosus*] is not shown; 2 — *S. armatus* (Roewer, 1911) and *S. tibialis* (Roewer, 1956).

Карты 1–2. Распространение видов рода *Scleropilio*: 1 — *S. coriaceus* Roewer, 1911 и *S. insolens* (Simon, 1895); для последнего вида локалитет из СВ Китая (Ляонин: Далиан) [Nakatsudi, 1943: sub *Udezatus spinosus*] не показан; 2 — *S. armatus* (Roewer, 1911) и *S. tibialis* (Roewer, 1956).

Range, ca 17 km ENE of Rybachie [=Balykchy], near Toru-Aigyr (ca 42°30'N, 76°25'E), 18.04–5.05.1970, A.P. Kononenko. — TURKMENISTAN: 1 ♂ (ISEA), Mary Area, Kushka Distr., Badkhyz Nature Reserve, 96 km NW of Kushka, Kepelya Cordon, (35°48'N, 61°33'E), 12.04.1993, A.A. Zyuzin.

DIAGNOSIS. In general appearance, this species is similar to *S. insolens*, but clearly differs in having the heavily swollen first pair of legs (especially in males) (cf Figs 13 and 4). In addition, males of *S. armatus* have large and robust chelicerae with a tubercle on the distal end of the fingers' forceps, and the armature of their bodies and limbs is less pronounced than in *S. insolens* (cf Figs 17 and 8). The penis of *S. armatus* is long and its base less distinct when compared to that of *S. insolens* (cf Figs 11–12 and 2–3). The main distinguishing characters for females of *S. armatus* are the swollen first pair of legs, a wide abdomen (cf Figs 14 and 5), and long seminal receptacles (cf Figs 37 and 36). See also table 1.

DISTRIBUTION. Central Asia (Kazakhstan, Turkmenistan, Kyrghyzstan and Uzbekistan) (Map 2).

DESCRIPTION. MALE. Measurements. Body: length 7.92; width 3.97. Cephalothorax length 1.76. Eye tubercle

Table 1. Main diagnostic characters for species of the genus *Scleropilio*.
Таблица 1. Основные диагностические признаки видов рода *Scleropilio*.

Structure	*Scleropilio coriaceus*	*Scleropilio armatus*	*Scleropilio insolens*	*Scleropilio tibialis*
Chelicerae	Small, not modified; forceps' fingers of normal structure (Figs 34–35)	Very strong, swollen and stout; forceps' fingers with a distal tubercle (Figs 17–18)	Swollen and stout; forceps' fingers of normal structure (Figs 8–9)	Not modified; forceps' fingers of normal structure (Figs 26–27)
Penis	Short; corpus narrowed in its middle part, gradually widening to proximal and distal ends; base is not swollen and separated from corpus (Figs 29–30)	Very long and thin; corpus slender and rod-shaped, its base spatulate in dorso-ventral aspect, twice as wide as corpus (Figs 11–12)	Long and thin, with broad base; corpus black, slender and rod-shaped; base small, spatulate in dorso-ventral aspect (Figs 2–3)	Average size, slender and rod-shaped with broad base; corpus with a median keel looking in the proximal part like a notch; base small, spatulate in dorso-ventral aspect (Figs 20–21)
Body (males)	Small; armed on the anterior carapace margin (Figs 28, 31)	Large; each tergite with a longitudinal row of tubercles and scattered denticles (Figs 10, 13)	Large; each tergite with a longitudinal row of tubercles and scattered denticles (Figs 1, 4)	Medium-sized; armed on the anterior carapace margin (Figs 19, 22)
Body (females)	–	With very wide abdomen (Fig. 14)	As in males, with wide abdomen (Fig. 5)	As in males, with wide abdomen (Fig. 23)
Legs (males)	Leg I slightly swollen, with small tubercles; coxa I with small tubercles (Figs 28, 31); coxae II–IV with elongated setae only	Leg I very heavily swollen and robust, with numerous variable tubercles (Figs 10, 13); all coxae almost entirely covered with small tubercles	Leg I swollen and robust, with numerous variable tubercles (Figs 1, 4); all coxae almost entirely covered with small tubercles	Leg I swollen and stout, covered with small tubercles (Figs 19, 22); all coxae with small tubercles on lateral surface only
Legs (females)	–	Leg I swollen and robust, almost completely covered with numerous long tubercles (Fig. 14)	Leg I thin, almost completely covered with numerous variable tubercles (Fig. 5)	Leg I thin with few small tubercles (Fig. 23)

width 0.49. "Clypeal" length 1.20. Chelicera: basal segment 1.87; distal segment length 1.72; length of forceps 0.85. Penis: length 4.87; width at base 0.62. Length of palp and legs:

		Fm	Pt	Tb	Mt	Tr	Total
Palp:		1.32	0.74	0.86	–	1.47	4.37
Legs:	I	3.82	1.63	2.61	2.51	2.48	13.05
	II	4.03	1.58	2.92	3.22	5.67	17.42
	III	3.23	1.48	2.21	2.31	3.34	12.57
	IV	3.61	1.46	2.54	3.24	4.33	15.18

Body large, elongated and robust (Figs 10, 13). Carapace prominent, armed with scattered denticles in its mid region. Carapace anterior margin armed with 25–30 short and robust tubercles, of which numbers 17–20 are directed anteriorly; posterior margin, behind an ocularium, armed with a few rows of small tubercles. Scent gland pores are visible in dorsal view and bordered by two large tubercles. Ocular tubercle armed dorsally with a few tiny tubercles; it is positioned twice its diameter from the anterior edge of the carapace. Suprachelicеral lamellae are invisible in dorsal view.

Abdomen oval, slightly swollen (seen in lateral view); each abdominal tergite with a row of small tubercles.

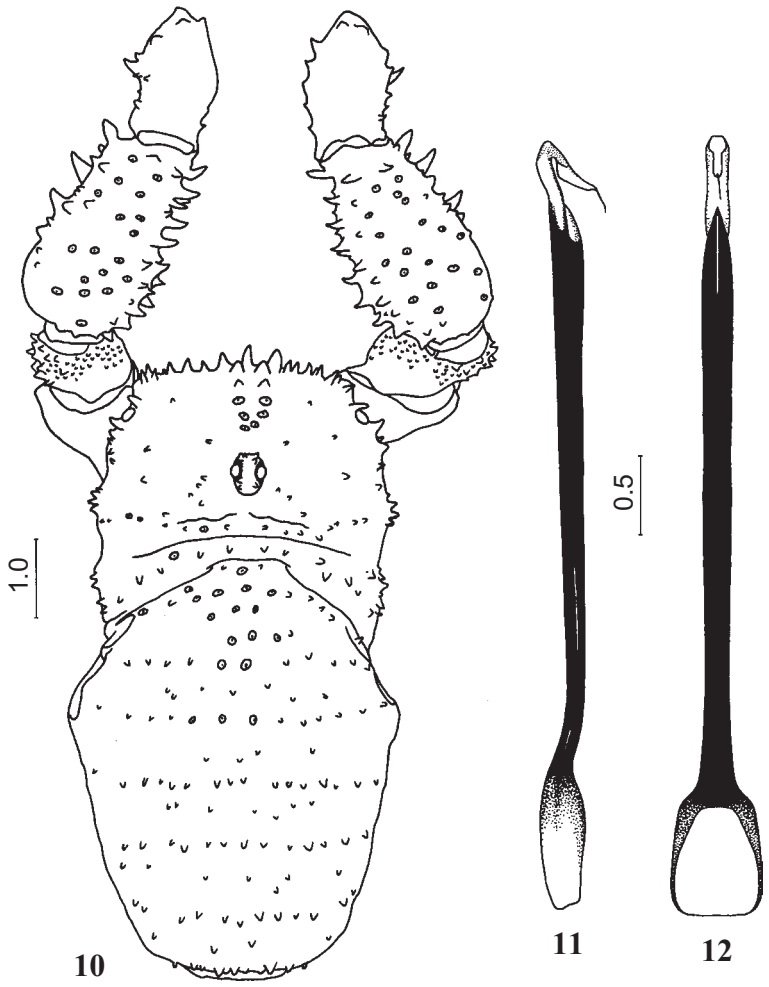
Chelicerae robust, swollen and stout (Figs 17–18); basal segment lacking a ventral spine, but dorsally with 7–9 apical tubercles; distal segment armed dorsally with 6–9 apical tubercles; forceps' fingers armed with a tubercle in the distal region.

Palps short and robust (Figs 15–16); trochanter long, in average up to 2/3 the lenth of the femurs; trochanter, femur and tibia armed dorsally and ventrally with numerous prominent tubercles; patella armed dorsally with numerous small tubercles; tarsus armed ventrally with two rows of black microdenticles; claw smooth.

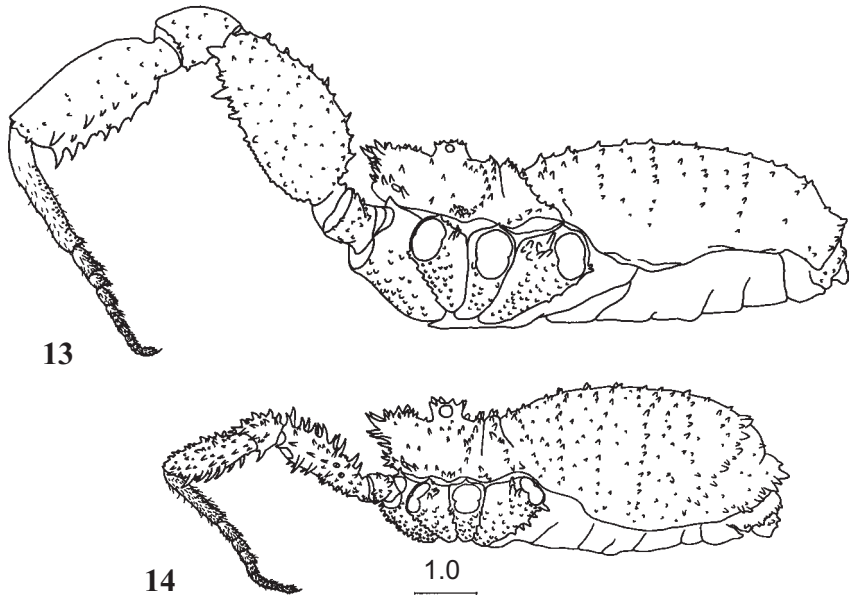
Legs. All coxae covered with small tubercles, but with larger tubercles in their apical regions. Legs I strong and robust (Figs 10, 13); trochanters, femora, patellae and tibiae heavily swollen. Each trochanter armed dorsally and laterally with small tubercles and numerous scattered denticles. Femora armed ventrally and dorsally with numerous anteriorly-directed tubercles; their lateral surfaces are covered with scattered denticles. Patellae and tibiae armed laterally and ventrally with tubercles; ventral tubercles of tibiae long and anteriorly-directed. Metatarsi and 1st to 5th tarsal segments covered ventrally with numerous black microdenticles; remaining tarsal segments covered with setae. Legs II–IV of normal structure, cylindrical in cross-section, bearing longitudinal rows of prominent tubercles. Metatarsi and tarsal segments of all legs covered ventrally with numerous short, dark hairs and with a pair of apical spines.

Penis long and thin, with broad, spatulate base (Figs 11–12). Corpus slender, rod-shaped and black, gradually extending to its apical region, ventrally carinated. Base elongated and dilated to its posterior part, spatulate from dorso-ventral aspect. Glans beak-shaped, with visible stylus.

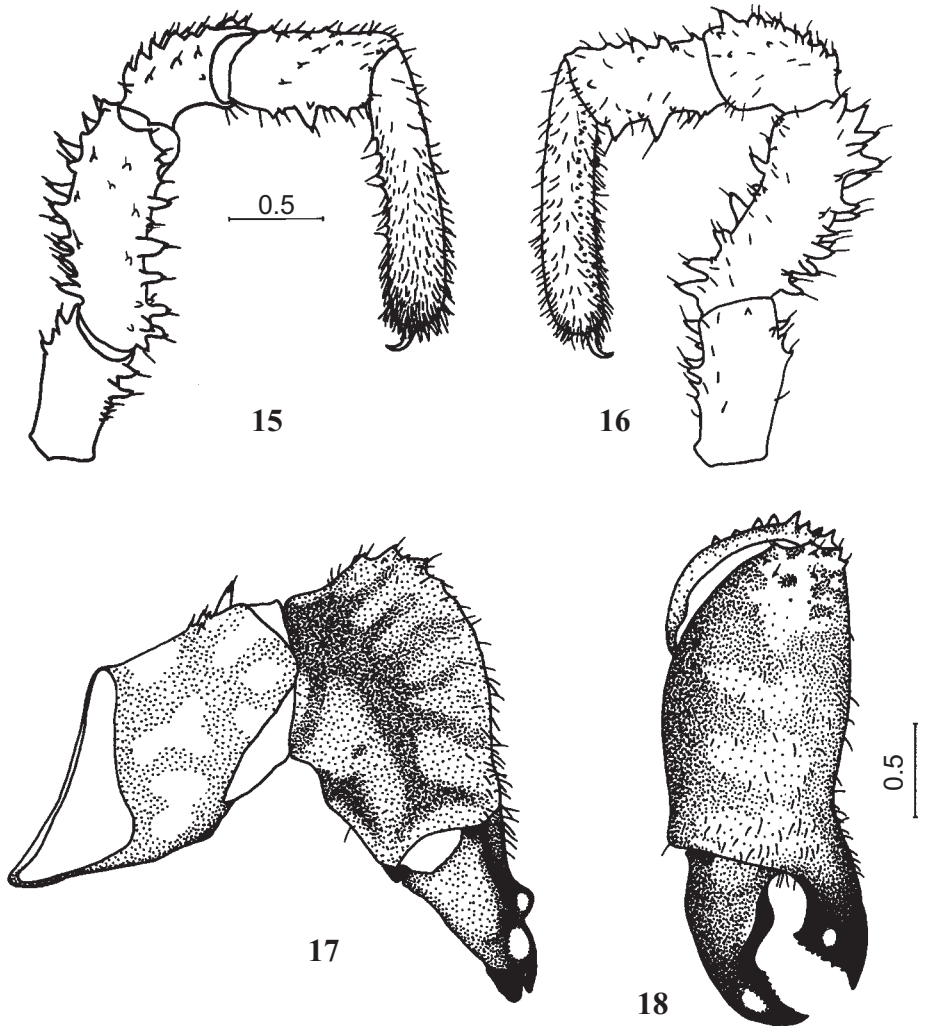
FEMALE. Measurements. Body: length 6.63; width 4.03. Cephalothorax length 1.97. Eye tubercle width 0.43. "Clypeal" length 0.83. Chelicera: basal segment 0.89; distal seg-



Figs 10–12. *Scleropilio armatus* (Roewer, 1911): 10 — male body, dorsal view; 11 — penis, lateral view; 12 — penis, dorsal view.
Рис. 10–12. *Scleropilio armatus* (Roewer, 1911): 10 — тело самца, дорзально; 11 — пенис, латерально; 12 — пенис, дорзально.



Figs 13–14. *Scleropilio armatus* (Roewer, 1911): 13 — male body, lateral view; 14 — female body, lateral view.
Рис. 13–14. *Scleropilio armatus* (Roewer, 1911): 13 — тело самца, латерально; 14 — тело самки, латерально.



Figs 15–18. *Scleropilio armatus* (Roewer, 1911): 15 — male palp, ectal view; 16 — male palp, mesal view; 17 — male chelicerae, ectal view; 18 — male chelicerae, distal segment.

Рис. 15–18. *Scleropilio armatus* (Roewer, 1911): 15 — пальпа самца, эктально; 16 — пальпа самца, мезально; 17 — хелицера самца, эктально; 18 — хелицера самца, дистальный членник.

ment length 0.92; length of forceps 0.58. Length of palp and legs:

		Fm	Pt	Tb	Mt	Tr	Total
Palp:		0.93	0.51	0.58	–	1.08	3.1
Legs:	I	1.78	0.84	1.42	1.22	1.88	7.14
	II	3.08	1.12	2.11	2.17	3.88	12.36
	III	1.62	0.78	1.13	1.52	2.24	7.29
	IV	2.82	1.18	1.96	2.78	3.22	11.96

Females are generally similar to males (Fig. 14). Body and limbs almost entirely covered with tubercles. Femur, patellae, tibiae and anterior margin of carapace armed with long, anteriorly-directed tubercles. Meta- and mesopeltidium and abdominal tergites armed with rows of small tubercles and scattered denticles. Body size equal to, or larger than in males, and with a more swollen abdomen. Legs I more stout than other legs, but less-developed when compared to males. Tarsal palps and metatarsi I lacking ventral microdenticles. Chelicerae of normal structure.

COLORATION. Dorsum and venter sandy-ochre to black-brown, body tubercles always lighter. Legs and palps usually lighter than body. Ocularium dorsally with light-ochre band in the middle. Chelicerae with zebra-like banding pattern.

Ovipositor normal in structure, seminal receptacles long — found between 4th to 7th segments (Fig. 37), with two atria.

Scleropilio tibialis (Roewer, 1956)
Figs 19–27, 38; Map 2.

Scutopilio tibialis Roewer, 1956: 312 (the ♂ holotype in SMFM; examined). Synonymized with *S. insolens* by Tsurusaki *et al*. [2000], revalidated herein.

Scutopilio tibialis: Gritsenko, 1975: 132, Figs 1–4.

Scleropilio tibialis: Staręga, 1978: 228; Gritsenko, 1979a: 37, 1980: 556.

MATERIAL. UNKNOWN LOCALITY: 1 ♂ (SMFM, RII/2825/112; the holotype of *Scutopilio tibialis*), "Ferghana, Turkestan" (now Ferghana Valley in Uzbekistan, Tadjikistan or Kyrghizstan). — KAZAKHSTAN: 7 ♂♂, 1 ♀ (ISEA), Almaty [Alma-Ata] Area, Kegen Distr, left tributary of Charyn River, right slope of Orta-Merke Mt. (ca 42°59'N, 78°48'E), 2700 m a.s.l., 25.02.1992, A.V. Gromov. — KYRGHYZSTAN: 2 ♂♂, 2 ♀♀ (ISEA), 1♂, 1♀ (MMUM), Baidulu Mt. Range, ca 35 km E of Lake Song-Kel', SW of Dolon Pass (ca 41°49'N, 75°43'E), short grass

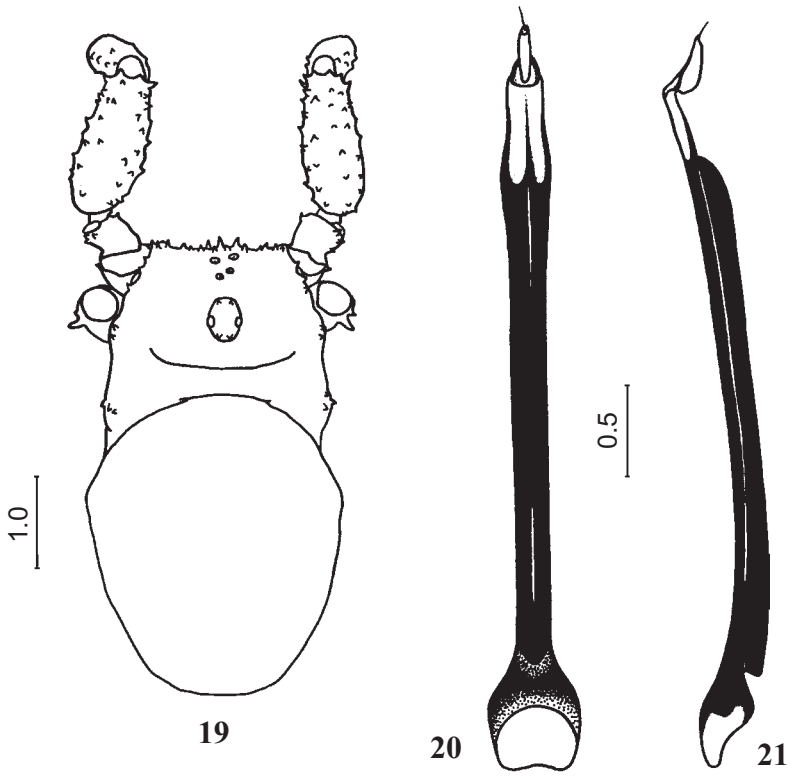


Рис. 19–21. *Scleropilio tibialis* (Roewer, 1956): 19 — male body, dorsal view; 20 — penis, lateral view; 21 — penis, dorsal view.
Рис. 19–21. *Scleropilio tibialis* (Roewer, 1956): 19 — тело самца, дорзально; 20 — пенис, латерально; 21 — пенис, дорзально.

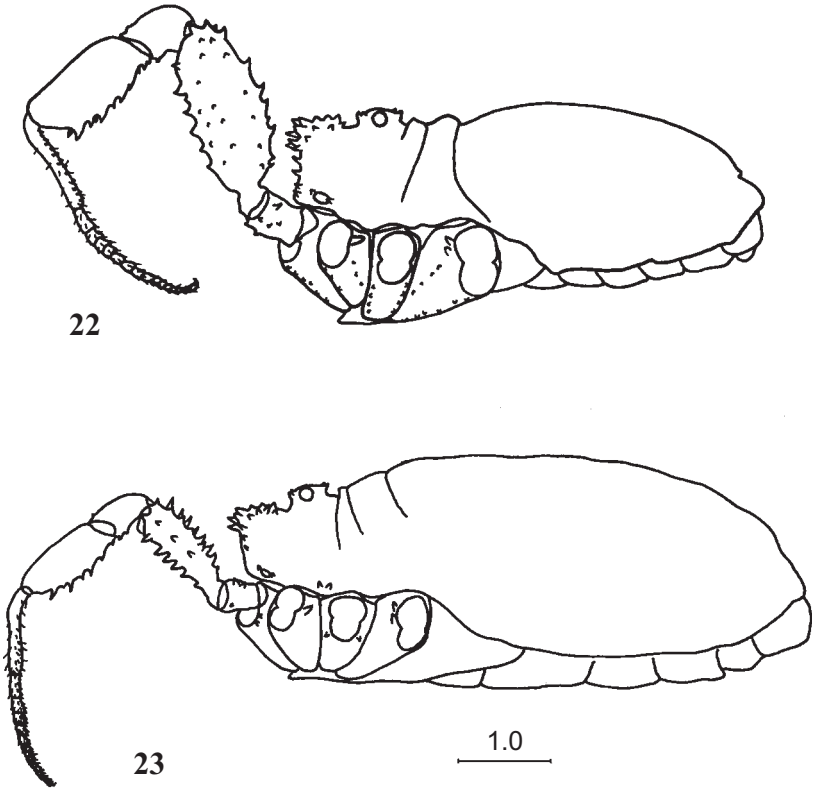


Рис. 22–23. *Scleropilio tibialis* (Roewer, 1956): 22 — male body, lateral view; 23 — female body, lateral view.
Рис. 22–23. *Scleropilio tibialis* (Roewer, 1956): 22 — тело самца, латерально; 23 — тело самки, латерально.

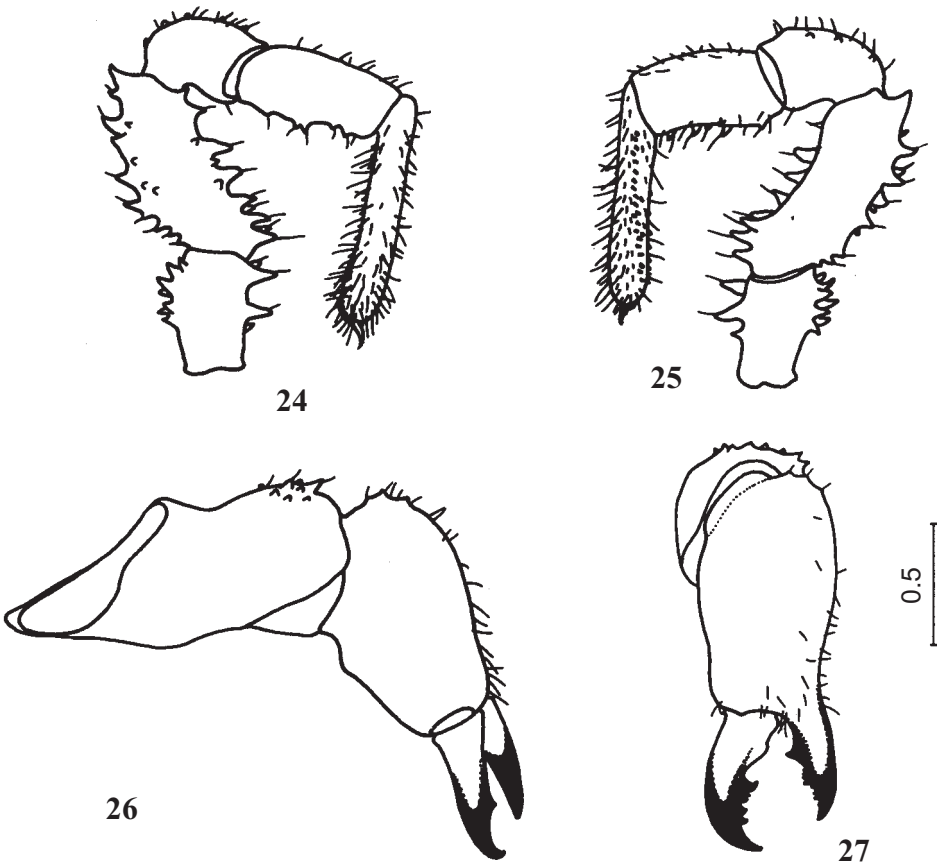


Рис. 24–27. *Scleropilio tibialis* (Roewer, 1956): 24 — male palp, ectal view; 25 — male palp, mesal view; 26 — male chelicerae, ectal view; 27 — male chelicerae, distal segment.

Рис. 24–27. *Scleropilio tibialis* (Roewer, 1956): 24 — пальпа самца, эктально; 25 — пальпа самца, мезально; 26 — хелицера самца, эктально; 27 — хелицера самца, дистальный членник.

alpine vegetation (under stones), 3500–3700 m a.s.l., 5.08.2000, V.V. Dubatolov.

DIAGNOSIS. In the structure and pattern of armature, this species is closest to *S. coriaceus*, but can easily be distinguished by the much smaller, poorly armed body (only the anterior margin of the carapace possesses denticles) (cf Figs 19 and 28). The first pair of legs are heavily swollen (cf Figs 22 and 31), the corpus of penis with a "notch" in its proximal region (cf Figs 21 and 30). The females of *S. tibialis* have shorter seminal receptacles than any other species (cf Figs 38 and 36–37). See also table 1.

DISTRIBUTION. SE Kazakhstan and Kyrghyzstan, at high elevations (Map 2).

HABITAT. Subalpine meadows [present data taken from collecting labels].

DESCRIPTION.MALE. Measurements. Body: length 4.98; width 2.83. Cephalothorax length 1.62. Eye tubercle width 0.38. "Clypeal" length 0.63. Chelicera: basal segment 1.43; distal segment length 0.92; length of forceps 0.52. Penis: length 3.55; width at base 0.47. Length of palp and legs:

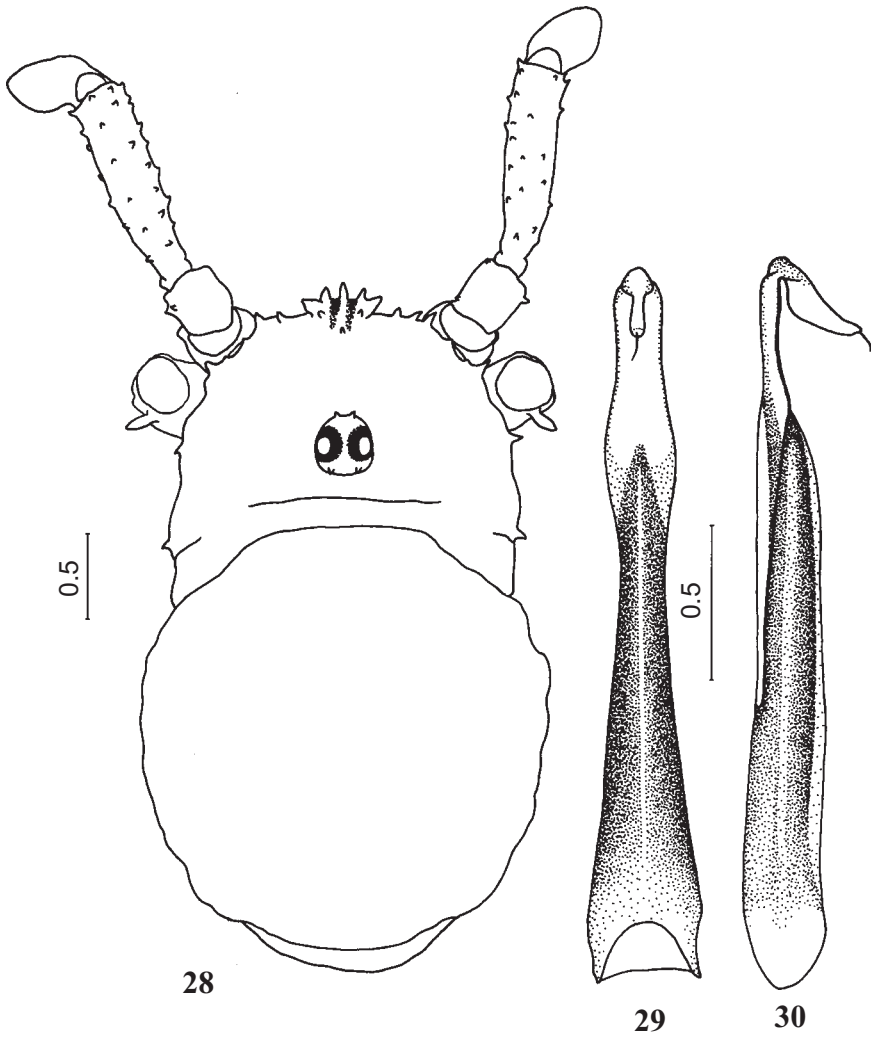
		Fm	Pt	Tb	Mt	Tr	Total
Palp:		0.87	0.51	0.55	–	0.91	2.84
Legs:	I	1.92	0.72	1.46	1.18	1.93	7.21
	II	2.16	0.82	1.78	1.49	3.04	9.29
	III	1.42	0.73	1.28	1.41	1.98	6.82
	IV	2.12	0.82	1.53	2.08	2.74	9.29

Body solid, of average size and rather elongated (Figs 19, 22). Carapace swollen anteriorly. Anterior margin of carapace armed with 20–22 small, robust tubercles, of which numbers 14–16 are directed anteriorly. The remainder of the carapace and the abdominal tergites are unarmed. Scent gland pores are visible in dorsal view and bordered by two tubercles. Ocular tubercle low, armed dorsally with a few tiny tubercles; it is positioned twice its diameter from the anterior edge of the carapace. Supracheliceral lamellae are not visible in dorsal view.

Chelicerae small (Figs 26–27); basal segment without a ventral spine; armed dorsally with 6–8 small, apical tubercles; distal segment armed dorsally with 2–3 small, apical tubercles.

Palps small and robust (Figs 24–25). Trochanter nearly half the length of the femur, armed dorsally with a group of small tubercles, and ventrally with 2–4 anteriorly-directed tubercles. Femur armed dorsally and ventrally with numerous prominent tubercles, and laterally armed sparsely with tiny tubercles. Patella armed dorsally with sparsely distributed, tiny tubercles. Tibia armed ventrally with small tubercles. Tarsus armed ventrally with two rows of black microdenticles; claw smooth.

Legs: Legs I strong and robust (Figs 19, 22); femora, patellae and tibiae swollen. Femora armed ventrally, dorsally and laterally with numerous small tubercles. Patellae sparsely armed with small tubercles. Tibiae armed ventrally with tubercles. Metatarsus and 1st to 3rd tarsal segments covered



Figs 28–30. *Scleropilio coriaceus* Roewer, 1911: 28 — male body, dorsal view; 29 — penis, lateral view; 30 — penis, dorsal view.
Рис. 28–30. *Scleropilio coriaceus* Roewer, 1911: 28 — тело самца, дорзально; 29 — пенис, латерально; 30 — пенис, дорзально.

ventrally with numerous black microdenticles; remaining segments of normal structure. Legs II–IV of normal structure, cylindrical in cross-section, armed with longitudinal rows of tubercles. Metatarsi and tarsal segments of all legs covered ventrally with numerous short, dark hairs and with a pair of apical spines.

Penis of average sizes, slender and rod-shaped, with broad, spatulate base (Figs 20–21). Corpus black, gradually extending to its apical region, proximally with an outgrowth, ventrally carinated. Base small, spatulate from dorso-ventral aspect. Glans beak-shaped, with visible stylus.

FEMALE. Measurements. Body: length 6.28; width 3.54. Cephalothorax length 1.63. Eye tubercle width 0.36. "Clypeal" length 0.54. Chelicera: basal segment 1.24; distal segment length 0.72; length of forceps 0.38. Length of palp and legs:

		Fm	Pt	Tb	Mt	Tr	Total
Palp:		0.69	0.32	0.48	–	0.74	2.23
Legs:	I	1.44	0.61	1.11	0.94	1.62	5.72
	II	1.88	0.66	1.48	1.24	2.77	8.03
	III	1.38	0.62	0.98	0.96	1.53	5.47
	IV	1.82	0.62	1.18	1.78	2.54	7.94

FEMALE. Females are similar in general appearance to males (Fig. 23), but differ as follows: body larger, with more swollen abdomen; legs I more stout than other legs, but less-developed in comparison to males; palpal tarsi and metatarsi I lack ventral microdenticles.

COLORATION: All individuals are completely black, except for the holotype, which seems faded and is light-ochre, with small brown spots on its sides.

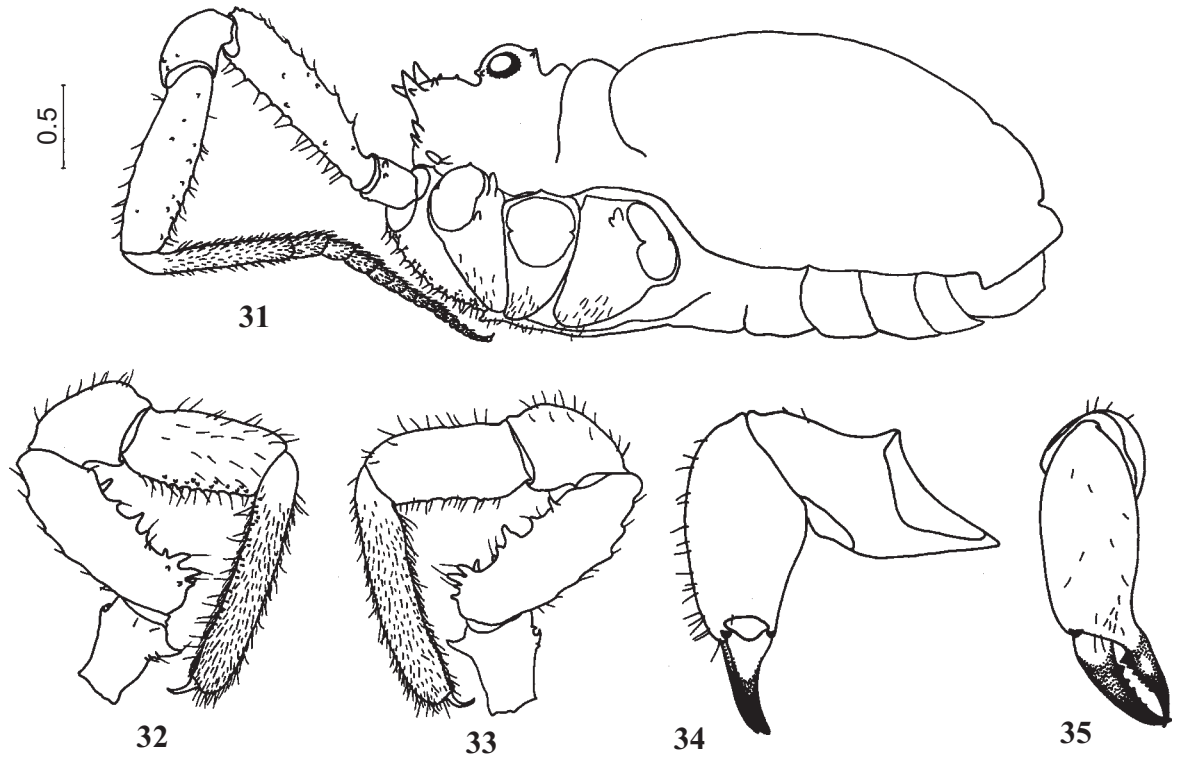
Ovipositor normal in structure, seminal receptacles located between 5th and 7th segments (Fig. 38), with two atria.

Scleropilio coriaceus Roewer, 1911
Figs 28–35; Map 1.

Scleropilio coriaceus Roewer, 1911: 32 (the ♂ holotype in SMFM; examined). Synonymized with *S. insolens* by Tsurusaki *et al*. [2000], revalidated herein.

Scleropilio coriaceus: Roewer, 1912: 118, 1923: 774, 1956: 281; Redikorzev, 1936: 1; Staręga, 1978: 228; Gritsenko, 1979: 37, 1980: 554.

MATERIAL. KAZAKHSTAN: 1 ♂ (SMFM, RI/9/603; the holotype of *Scleropilio coriaceus*), "Tekkes, Turkestan" (now Kazakhstan, Almaty Area Raiymbek Distr., Tekes, [ca. 42°50'N, 80°03'E]).



Figs 31–35. *Scleropilio coriaceus* Roewer, 1911: 31 — male body, lateral view; 32 — male palp, ectal view; 33 — male palp, mesal view; 34 — male chelicerae, ectal view; 35 — male chelicerae, distal segment.

Рис. 31–35. *Scleropilio coriaceus* Roewer, 1911: 31 — тело самца, латерально; 32 — пальпа самца, эктально; 33 — пальпа самца, мезально; 34 — хелицера самца, эктально; 35 — хелицера самца, дистальный членник.

DIAGNOSIS. This is the smallest of all the *Scleropilio* species known to date and is close to *S. tibialis*; it can be separated from that species by the following characters: the first pair of legs are less swollen (cf Figs 31 and 22) and the atypical structure of penis, which differs from all known *Scleropilio* species, *viz*. the corpus relatively flat and wide (cf Figs 29–30 and 2–3, 11–12, 20–21), with no spatulate base. See also table 1.

DISTRIBUTION. Kazakhstan (the type locality only) (Map 1).

The records of *S. coriaceus* from NW China (Xinjiang) and W. Mongolia [s. Gritsenko, 1980; Tsurusaki *et al*., 2000: fig.4] are not taken into consideration here, as we have been unable to locate and re-examine Gritsenko's specimens.

DESCRIPTION.MALE. Measurements. Body: length 3.93; width 2.32. Cephalothorax length 1.18. Eye tubercle width 0.29. "Clypeal" length 0.28. Chelicera: basal segment length 0.94; distal segment length 0.71; length of forceps 0.37. Penis: length 2.33; width at base 0.35 Length of palp and legs:

		Fm	Pt	Tb	Mt	Tr	Total
Palp:		0.74	0.37	0.51	–	0.83	2.45
Legs:	I	1.43	0.61	1.22	1.04	2.37	6.67
	II	2.18	0.79	1.82	1.73	2.92	9.44
	III	1.42	0.61	1.17	1.34	2.48	7.02
	IV	2.01	remaining segments absent in the holotype				

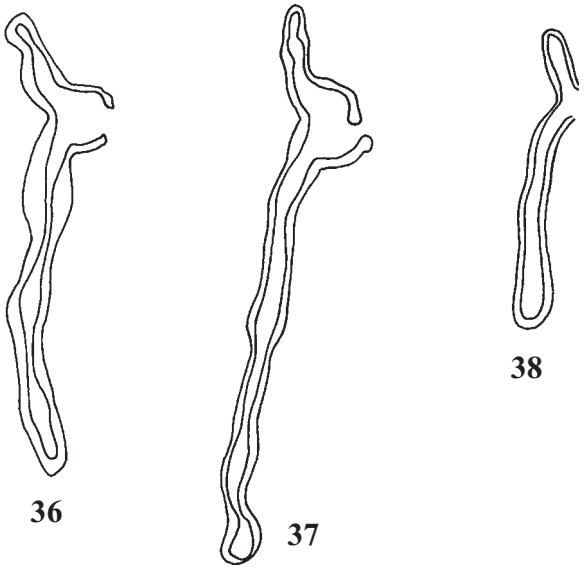
Body small, but robust (Figs 28, 31); only the carapace is armed; abdomen ovoid, slightly swollen (seen in lateral view), without longitudinal rows of tubercles. Anterior margin of carapace armed with 10–12 small, anteriorly-directed tubercles. Meta- and mesopeltidium unarmed. Scent gland pores are visible in dorsal view and bordered by two small tubercles. Ocular tubercle armed dorsally with 4 tiny tubercles; it is positioned twice its diameter from the anterior edge of the carapace. Supracheliceral lamellae are not visible in dorsal view.

Chelicerae small, of typical structure (Figs 34–35); basal and distal segments covered only with setae.

Palps small (Figs 32–33). Trochanter short, armed dorsally with 2–3 small denticles, and ventrally with 1 tubercle and 2–3 small denticles. Femur with a rough dorsal surface, and armed ventrally with 10–12 prominent tubercles. Patella unarmed. Tibia armed ventrally with small denticles. Tarsus armed ventrally with two rows of black microdenticles; claw smooth. All segments, except trochanters, covered with setae.

Legs. Legs I slightly swollen (Figs 28, 31); femora armed ventrally, dorsally and laterally with small tubercles; patellae armed only dorsally, with small tubercles; tibiae armed ventrally and laterally with similar tubercles; metatarsus without microdenticles. Legs II–IV of normal structure, thin, cylindrical in cross-section and covered with setae. Coxae I armed ventrally with numerous small tubercles. Other coxae covered only with elongate setae. Metatarsi and tarsal segments of all legs covered ventrally with numerous small, dark hairs and with a pair of apical spines.

Penis short (Figs 29–30); without a spatulate base; corpus is narrowed in its mid region, gradually widening to its proximal and distal ends, ventrally carinated. Glans beak-shaped, with visible stylus.



Figs 36–38. Seminal receptacles of females: 36 — *Scleropilio insolens* (Simon, 1895); 37 — *Scleropilio armatus* (Roewer, 1911); 38 — *Scleropilio tibialis* (Roewer, 1956).

Рис. 36–38. Семяприемник самки: 36 — *Scleropilio insolens* (Simon, 1895); 37 — *Scleropilio armatus* (Roewer, 1911); 38 — *Scleropilio tibialis* (Roewer, 1956).

COLORATION. Dorsum brown. Anterior part of carapace orange-ochre. Ventrum ochre. Palps and chelicerae lighter than body. Legs I orange-ochre, others legs brown.

FEMALE. Unknown.

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