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Redescription of *Scleropilio insolens* from Southern Siberia with Comments on the Genus *Scleropilio* (Arachnida: Opiliones: Phalangiidae)

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Abstract — *Scleropilio insolens* (Simon 1895) is redescribed based on the materials collected from southern Siberia, Russia. A total of six species are synonymized with *Scleropilio insolens*: four species of *Scleropilio*, *S. coriaceus* Roewer 1911, *S. tibialis* (Roewer 1956), *S. diadema* (Gricenko 1975), *S. elenae* (Gricenko 1975), *Opilio armatus* Roewer 1911, and *Udezatus spinous* Nakatsudi 1943. Ovipositor and seminal receptacle of the species are illustrated and described for the first time.

Key words — Opiliones, redescription, Russia, *Scleropilio*, Siberia, synonymy

Introduction

During a series of extensive surveys on spider and opilionid faunas of southern Siberia, one of us (D.L.) has collected many specimens of the genus *Scleropilio* (Phalangiidae, Phalangiinae). Through a detailed examination of the material and a literature survey, we identified the species as *Scleropilio insolens* (Simon), which was originally described from Xinjiang (=Sinkiang) province of China, and concluded that several other species so far described in *Scleropilio* or other related genera also should be considered junior synonyms of *Scleropilio insolens*. In this paper, we present redescription of the latter species based on the material from southern Siberia together with general comments on the genus.

Abbreviations used: ISE - Zoological Museum, Institute for Systematics and Ecology of Animals, Novosibirsk, Russia, D. V. Logunov; TUJ - Department of Biology, Faculty of Education and Regional Sciences, Tottori Univ., Tottori, Japan, N. Tsurusaki; Fe - femur, Pa - patella, Ti - tibia, Ta - tarsus.

Family Phalangiidae
Subfamily Phanangiinae
Genus *Scleropilio* Roewer 1911

Scleropilio Roewer 1911, p. 31 (Type-species: *Scleropilio coriaceus* Roewer 1911); Roewer 1912, p. 118; Roewer 1923, p. 766; Roewer 1956, p. 312; Starega 1978, p. 228; Gricenko 1979, p. 37; Gricenko

1980, p. 554.

Scutopilio Roewer 1956, p. 312. Type species: *Scutopilio tibialis* Roewer 1956; Gricenko 1975, p. 132. Synonymized with *Scleropilio* by Starega (1978).

Udezatus Nakatsudi 1943, p. 110. Type species: *Udezatus spinosus* Nakatsudi 1943. **NEW SYNONYMY**

This genus was established by Roewer (1911) for *Scleropilio coriaceus* Roewer from Tekes (Almaty Area, Kazakhstan), Central Asia. Later, Roewer (1956) created another genus *Scutopilio* for *Scutopilio tibialis* Roewer 1956 from Ferghana Valley (Central Asia). The latter was synonymized with the former independently by Starega (1978) and Gricenko (1980) on the basis of resemblance of general morphology and male genitalia. On the other hand, the genus *Udezatus* was created for a Chinese species, *Udezatus spinosus* Nakatsudi by Nakatsudi (1943). Description of the species by Nakatsudi (1943) fully corresponds to diagnosis of *Scleropilio*; hence we treat also *Udezatus* as a junior synonym of *Scleropilio*.

Diagnosis. *Scleropilio* is easily distinguishable from other genera of Phalangiinae by having: 1) an elongated and heavily sclerotized body with several spines pointing anteriorly on the anterior margin of the carapace; 2) an abdominal shield produced by fusions of 1st to 7th abdonimal tergites; 3) an ocular tubercle is spaced from the anterior margin of the carapace at least by twice length of its diameter; 4) rather short legs (length of femur of the first leg not exceeding a half of the body length); 5) first pair of legs with much thickened and spiny femora, patellae, and tibiae; 6) a slender rod-like penis with a darkly colored shaft in male.

Distribution. Central Asia (From Kazakhstan, Xinjiang (=Sinkiang) Province of China, Mongolia), southern Siberia, to the northeastern part of China (Manchuria).

Included species. *Scleropilio insolens* (Simon 1895) alone.

Scleropilio insolens (Simon 1895)

(Figs. 1-4)

Egaenus insolens Simon 1895, p. 345 (Type: male, River Chatu, Sailügem [Mt. Range], Mongolia [on the frontier with the SE Altai, Russia]; Roewer 1911, p. 18; Roewer 1923, p. 816.

Scleropilio coriaceus Roewer 1911, p. 32 (Type: male, Tekkes, Turkestan, RI/9/603 SMF [now Kazakhstan, Almaty Area, Raiymbek Distr., Tekes, ca. 42°50′N, 80°03′E]); Roewer 1912, p. 118; Roewer 1923, p. 766, fig. 940; Gricenko 1979, p. 37; Gricenko 1980, p. 554; Starega 1978, p. 228. NEW SYNONYMY

Opilio armatus Roewer 1911, p. 46, fig. 7 in plate 7 and figs. 1-3 in plate 3 (Type: male, Turkestan, RI/8/587 [uncertain locality]); Roewer 1912, p. 133, fig. 8 in plate I and Figs. 4 and 7 in plate 2); Roewer 1923, p. 774; Roewer 1956, p. 281. **NEW SYNONYMY**

Udezatus spinosus Nakatsudi 1943, p. 110, fig. 4 (Type: male, Dalian (=Dairen), China, Tokyo University of Agriculture, lost). **NEW SYNONYMY**

Scutopilio tibialis Roewer 1956, p. 312 (Type: male, Ferghana, Turkestan, RII/2825/112 [now Ferghana Valley in Uzbekistan, Tadjikistan or Kyrghyzstan]), Gricenko 1975, p. 132, figs. 1-4. **NEW SYNONYMY**

Scutopilio diadema Gricenko 1975, p. 133, figs. 5-10 (holotype: male, Andarak, Khodzhent, Tadjikistan, Zoological Institute, Russian Academy of Sciences [now Kyrghyzstan, Osh Area, Lyailyaksky Distr., Andarak, ca. 39°46′N, 69°28′E]). **NEW SYNONYMY**

Scutopilio elenae Gricenko 1975, p. 134, figs. 11-16. (holotype: male, Taldyk Pass, Alai range, Zoological Institute, Russian Academy of Sciences [Kyrghyzstan, Osh Area, Alai Distr., Alai Mt. Range, Taldyk Pass, 39°46′N, 73°10′E]) **NEW SYNONYMY**

Scleropilio insolens: Starega 1978, p. 228.

Scleropilio tibialis: Starega 1978, p. 228; Gricenko 1979, p. 37; Gricenko 1980, p. 556.

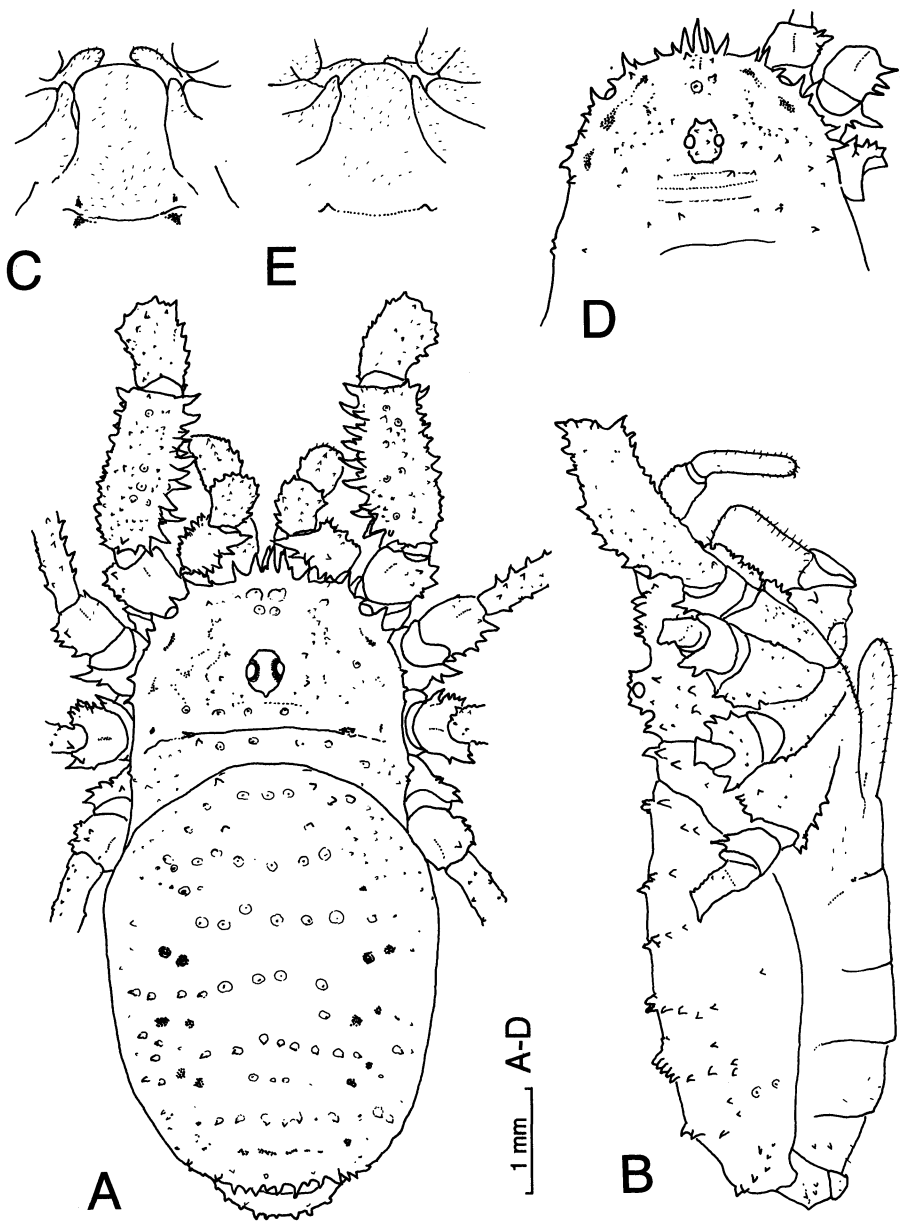

Fig. 1. *Scleropilio insolens* (A–C, male; D–E, female; both from 5 km E of Khol-Oozhu, Tes-Khemskiy District, Tuva) —— A–B, dorsal (A) and lateral (B) views of body; D, dorsal view of cephalothorax; C–E, ventral view of genital operculum.

Scleropilio diadema: Starega 1978, p. 228; Gricenko 1979, p. 37; Gricenko 1980, p. 556.
Scleropilio elenae: Starega 1978, p. 228; Gricenko 1979, p. 37.

Material examined. TUVA. Tes-Khemskiy Distr: 59 ♂ 15 ♀ (ISE), 12 ♂ 5 ♀ (TUJ), 5 km E of

Khol-Oozhu [50°45′N, 94°29′E], 1300–1400 m alt., 15–16–VII–1993 (D. V. Logunov); 5 ♂, 14 ♀ (ISE), 8–10 km NE of Khol-Oozhu, Belengish natural limits [50°47′N, 94°19′E], 1300–1400 m alt., 9–12–VII–1989 (D. V. Logunov); 3 ♂, 4 ♀ (ISE), 8–10 km E of Khol-Oozhu, Shivilig-Khem River [50°47′N, 94° 38′E], 30–IV– 1990 (O. V. Lyakhov); 1 ♂ (ISE), 8 km N of Samagaltai [50°44′N, 95°19′E], 10–VII–1993

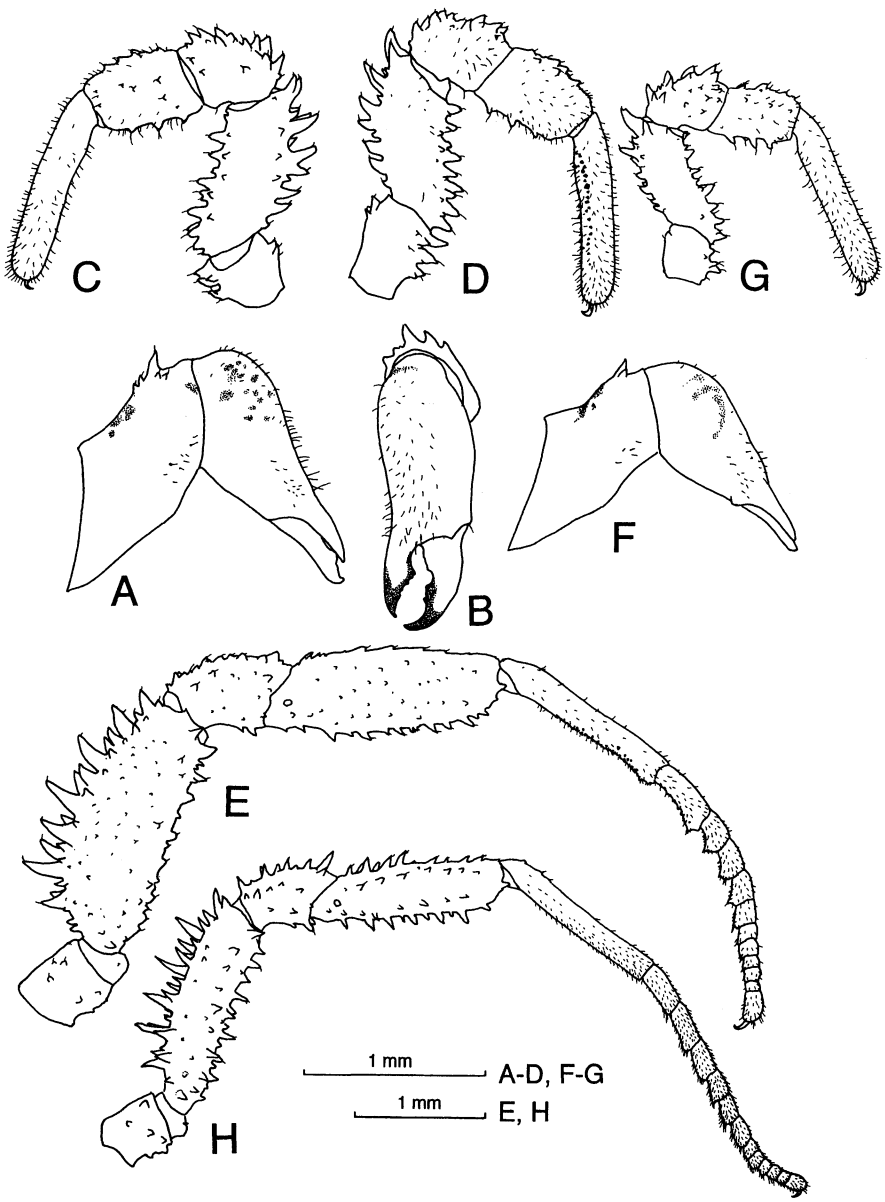

Fig. 2. *Scleropilio insolens* (A–E, male; F–H, female; both from 5 km E of Khol-Oozhu, Tes-Khemskiy District, Tuva) —— A, F, mesal view of left chelicera; B, frontal view of left chelicera; C, ectal view of left palp; D, G, mesal view of left palp; E, H, ectal view of right first leg.

(D. V. Logunov); 1 ♂ (ISE), 20 km N of Oo-Shynaa, 3-4 km E of Despen [50°48′N, 93°50′E], 1600 m alt., 17-VII-1989 (D. V. Logunov). Mongun-Taiga Distr.: 1 ♀, 3 juv. (ISE), confluence of Barlyk and Onachy Rivers [50°25′N, 90°55′E], 2000-2100 m alt., 13-VI-1989 (D. V. Logunov); 1 ♂, 4 ♀ (ISE), same locality, 6-VI-1990 (O. V. Lyakhov); 1 ♀ (ISE), 30-35 km W of Mugur-Aksy, the upper reaches of Mugur River [50°22′N, 90°05′E], 3100-3200 m alt., 23-VII-1993 (D. V. Logunov); 1 juv. (ISE), the upper reaches of Kargy River, Kuge-Davaa natural limits [50°24′N, 90°30′E], 2500-2700 m alt., 19-V-1990 (D. V. Logunov); 1 ♀ (ISE), 5-6 km SE of Mugur-Aksy, Kargy River Valley [50°20′N, 90°30′E], 18-V-1990 (O. V. Lyakhov). Tandinskiv Distr.: 3 juv (ISE), 1-5 km SW of Khovu-Aksy [51°07′N, 93° 36′E], 4-6-V-1990 (D. V. Logunov). - CHITA AREA. Kyra Distr.: 16 ♂, 21 ♀ (ISE), 60-65 km SW of Kyra, Sokhondo State Reserve [ca. 49°30′N, 111°64′E], 1600-1800 m alt., 28-V to 5-VII-1991 (S. E. Tchernyshev & B. P. Zakharov); 2 ♂, 10 ♀ (TUJ), same reserve, confluence of Agutsa River and Larionov (Talgikta) Spring [ca. 49°37′N, 111°15′E], 1300 m alt., 13-VI-I991 (D. V. Logunov).

Description. Male (specimens from Khol-Oozhu, Tes-Khemskiy Distr. Tuva): Body from above and lateral as in Fig. 1A-B; robust and rather elongated. Anterior margin of carapace swollen and armed with a group of 8-10 long tubercles, of which five to six directed forward. Scent gland pores, visible from above, bordered by two large tubercles. Ocular tubercle dorsally armed with a few small tubercles, located from the anterior rim of the carapace by twice length of its diameter. Coxae I-IV ventrally with

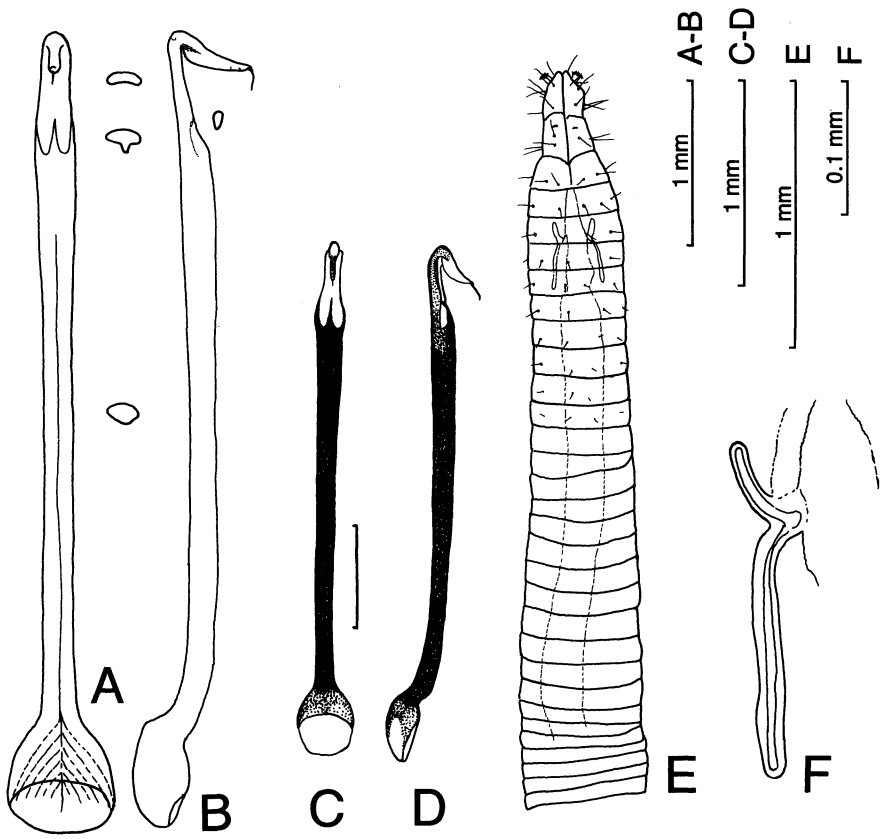

Fig. 3. *Scleropilio insolens* (A-D, male; E-F, female; all from 5 km E of Khol-Oozhu, Tes-Khemskiy District, Tuva) —— A-D, dorsal (A, C) and lateral (B, D) view of penis; E, ventral views of ovipositor; F, left seminal receptacle.

sparse denticles. Genital operculum as in Fig. 1C, smooth, with only scattered hairs. Supracheliceral lamellae invisible from above.

Chelicera (Fig. 2A–B) swollen and stout, without a ventral spine on basal joint. Basal segment dorsally with 4–5 apical tubercles.

Palp (Fig. 1C–D) short and robust; trochanter and femur dorsally and ventrally with many prominent tubercles; patella dorsally and tibia dorsally and ventrally with similar tubercles; tarsus ventrally with two rows of small but distinct denticles; claw smooth

Legs: Legs I, as in Fig. 2E, femora strongly swollen dorsally, with two groups of robust tubercles situated closer to the medial side; patellae swollen, covered with smaller denticles; tibiae strongly swollen, with strong ventral tubercles and a spiracle on the ectal surface near basal joint; metatarsus ventrally covered with numerous blackish-brown denticles; remaining segments of normal structure. Legs II–IV appear normal, covered with numerous denticles. Metatarsi and tarsal segments of all legs ventrally covered with numerous small dark hairs and a pair of apical spines on each segment.

Penis as in Fig. 3A–D, slender and rod-shaped with widened base; ca. 5 mm long, ca. 0.13 mm in diameter, 0.63 mm wide at base; Shaft, black and ventrally carinated towards apical part. Glans distally with two lateral pairs of small spines. Muscles confined to the widened base of the shaft. (Fig. 3A).

Coloration: Dorsum and legs sandy-colored to yellowish-brown, but tarsi usually lighter. Venter yellow.

Female (Fig. 1D–E, 2F–H, 3E–F): Coloration and form as in males except for

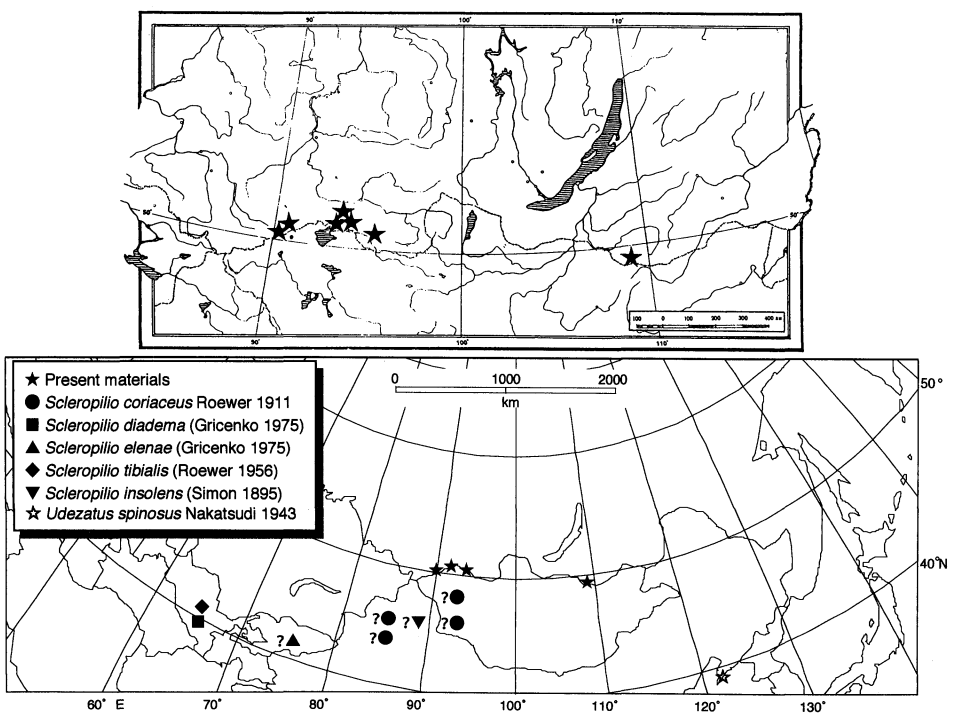

Fig. 4. Distribution of *Scleropilio insolens*.

following respects: first legs stouter than other legs but less-developed compared with that in males. Metatarsi I lack ventral denticles. Base of the genital operculum flares posteriorly (Figs. 1E).

Ovipositor (Fig. 3E) normal in structure, not darkened. With a single slit sensillum per side on second segment. Seminal receptacles, found between 5th to 7th ovipositor segments, as in Fig. 3F, with two atria.

Measurements (in mm, males, females in parentheses). Cephalothorax length 1.75-2.35 (1.45-1.90); total body length 5.75-7.25 (5.25-7.25); body width 3.25-3.90 (3.10-4.25); body height 2.25-2.80 (2.35-3.40). Distance between ocular tubercle and anterior margin of carapace 0.80-1.20 (0.58-0.85). Ocular tubercle, 0.35-0.43 wide, 0.18-0.25 high. Length of palpal segments (Fe/Pa/Ti/Ta/Total):0.95-1.15(0.68-0.70)/0.43-0.58 (0.28-0.38)/0.55-0.60(0.30-0.43)/1.08-1.30(0.85-1.10)/4.16-4.58(2.11-2.61). Length of leg segments (Fe/Pa/Ti/Mt/Ta//Total): leg I, 1.80-2.80(1.25-1.55)/0.90-1.20(0.53-0.85)/0.90-1.20(0.53-0.85)/1.40-2.15(0.93-1.25)/1.40-1.80(1.08-1.50)/2.05-2.60(1.68-2.15)// 7.55-10.55(5.47-7.30); leg II, 2.85-3.65(2.20-2.80)/1.13-1.40(0.78-1.15)/2.20-2.85(1.65-2.10)/2.10-2.75(1.68-2.25)/4.00-5.25(2.50-4.15)// 12.28-15.90(8.81-12.45); leg III, 1.35-2.00(1.15-1.50)/0.75-1.00(0.65-0.80)/1.35-1.65(0.93-1.20)/1.60-2.15(1.25-1.65)/2.25-3.35(2.00-2.70)// 7.30-10.15(5.98-7.85); leg IV, 2.60-3.35(2.33-2.90)/1.00-1.30(0.75-1.05)/1.80-2.30(1.50-1.85)/2.25-3.50(2.13-2.65)/3.45-4.50(2.95-3.50)// 11.1-14.95(9.66-11.95).

Distribution. Central Asia (From Kazakhstan, Sinkiang Province of China, Mongolia), southern Siberia, to the northeastern part of China.

Habitat. In southern Siberia, the species has been collected from mountain moss-stony tundra (goltsy), sloping shrub-stony steppes, subalpine meadows, and stony debris with moss covers.

Remarks. Five species (*insolens, coriaceus, diadema, elenae*, and *tibialis*) have so far been recorded under the genus *Scleropilio* (Starega 1978; Gricenko 1980). However, the distinction between them relies mainly on slight difference in armature of body and chelicerae, and body size; these are characters that are apt to vary both within and between populations in the species of the subfamily Phalangiinae to which the genus belongs. Furthermore, they are only allopatrically found with each other. Therefore, it is highly probable that they constitute a single polytypic species or a superspecies comprised by a series of vicarious species each with a restricted range. We prefer to the former as a provisional conclusion because their general structure of various parts of body including penis is invariable, and treat four species (*coriaceus, diadema, elenae*, and *tibialis*) as junior synonyms of *Scleropilio insolens* (Simon 1895). Present materials correspond well with the descriptions of the five species including *S. insolens*, so we identified them as *S. insolens*.

Opilo armatus first described by Roewer (1911) from an uncertain locality of Central Asia (Turkestan is a name of unexisting country, not confused with Turkestan Town in S-Kazakhstan) is also synonymized with *Scleropilio insolens*, since figures presented in his paper represent characteristic features of *Scleropilio insolens*.

Udezatus spinosus was described by Nakatsudi in 1943 for specimens collected from Dalian (=Dairen) in the northeastern part of China. However, the description of the species seems to be overlooked by European and Russian researchers, probably due to the fact that its description was published in a Japanese journal at the time near the end of World War II, when Japan lost diplomatic contact with most of the overseas countries. Except for a few points (e.g. smooth eye tubercle and less armed palpal patella and tibia in *Udezatus spinosus*), the description of the species well corresponds to that of the

present material. Hence, we treat also this species as a junior synonym of *Scleropilio insolens*.

Highly sclerotized body with remarkably short legs of the species may represent adaptation to their dry habitat.

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