

A new species of the millipede genus *Skleroprotopus* Attems, 1901 (Diplopoda: Julida: Mongoliulidae) from Korea

Новый вид двупарноногих многоножек рода *Skleroprotopus* Attems, 1901 (Diplopoda: Julida: Mongoliulidae) из Кореи

K.Y. Lim* & E.V. Mikhailjova**

К.Й. Лим* & Е.В. Михалёва**

* Department of Agrobiolgy, College of Agriculture, Chonbuk National University, Jeonju 561-756, South Korea.

** Institute of Biology and Soil Science, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok 690022 Russia.

* Отделение агробиологии, Колледж земледелия, Университет Чонбук, Чонджу 561-756, Южная Корея.

** Биолого-почвенный институт ДВО РАН, Владивосток 690022 Россия

KEY WORDS: Diplopoda, *Skleroprotopus*, new species, South Korea.

КЛЮЧЕВЫЕ СЛОВА: Diplopoda, *Skleroprotopus*, новый вид, Южная Корея.

ABSTRACT: A new millipede species, *Skleroprotopus ramuliferus* sp.n., is described from South Korea. It differs from congeners mainly by shape of the anterior branch of the posterior gonopod which is supplied with a pair of apical outgrowths, of which the external one looks like a slender serrate twig and the inner one oval, as well as by the rounded, semi-ellipsoid terminal segment of the male leg-pair 1.

РЕЗЮМЕ: Из Южной Кореи описан новый вид диплопод: *Skleroprotopus ramuliferus* sp.n. Этот вид отличается от других членов рода, главным образом, формой передней ветви задних гоноподий, которая заканчивается парой выростов, наружный из которых похож на зазубренную веточку, а внутренний округлён. Кроме того, вид отличается формой последнего членика первой пары ног самца в виде полуэллипса.

Like the entire family Mongoliulidae it belongs in, the prolific diplopod genus *Skleroprotopus* Attems, 1901 is typically Manchurian in terms of its distribution pattern, with its about 15 valid species restricted to Japan, Korea, northeastern China, and the Russian Far East [Attems, 1901; Verhoeff, 1939, 1941; Takakuwa, 1940a, 1940b, 1942; Takakuwa & Takashima, 1949; Miyosi, 1957a, 1957b; Shinohara, 1960; Murakami & Paik, 1968; Golovatch, 1979; Mikhailjova, 1982; Zhang, 1985]. Although the bulk of *Skleroprotopus* species diversity is confined to Japan, we would not claim this as the ultimate truth, since the diplopod fauna of China is too poorly known. Basically, the same concerns Korea whence only three species of *Skleroprotopus* have hitherto been recorded. The present paper puts on record a fourth Korean member of this genus described from the southern part of the peninsula. Yet even this discovery hardly changes the general picture that the distribution of *Skleroprotopus*, and of the Mongoliulidae as a whole,

displays a gradual but obvious decline toward the Sikhote-Alin Mountains in the north. Indeed, two species each of *Kopidoiulus* Attems, 1909 and *Skleroprotopus*, as well as a single species of *Ussuriulus* Golovatch, 1980, are the only representatives of Mongoliulidae occurring in the Russian Far East, all restricted to its southern part only [Mikhailjova, 1998].

Most of the type material is kept at the Chonbuk National University, Jeonju, Republic of Korea (ChNU), while a few duplicates have been shared with the collections of the Zoological Museum of the State University of Moscow, Russia (ZMUM) and of the Institute of Biology and Soil Science, Far Eastern Branch of the Russian Academy of Sciences, Vladivostok, Russia (IBSV), as indicated hereafter.

Skleroprotopus ramuliferus sp.n.

Figs 1–12.

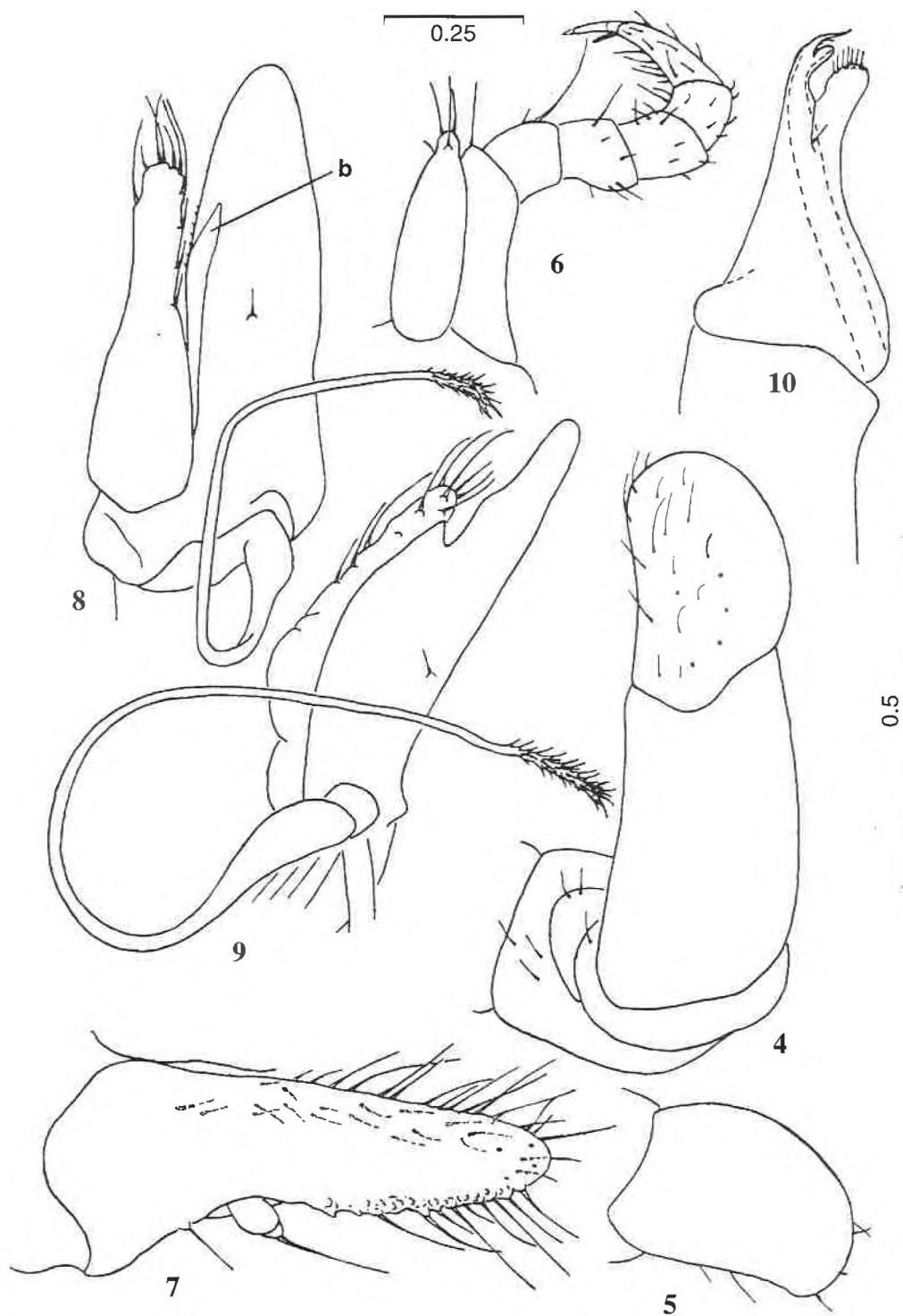
Holotype: ♂ (ChNU), Gyeonggi-do, Yangpyeong, 18.V.1991; leg. K.Y. Lim. — Paratypes: 1 ♂, 1 ♀ (IBPV), 1 ♂, 1 ♀ (ZMUM), 5 ♂♂, 2 ♀♀, 1 juv. (ChNU), same locality, together with holotype, 18.V.1991; leg. K.Y. Lim.

NAME: The species epithet refers to the serrate twig of the posterior gonopod anterior branch.

DIAGNOSIS: The shape of the posterior gonopod anterior branch with a pair of apical outgrowths, of which the external one like a slender serrate twig and the inner one oval, as well as the rounded semi-ellipsoid terminal segment of the male leg-pair 1 separate the new species from others.

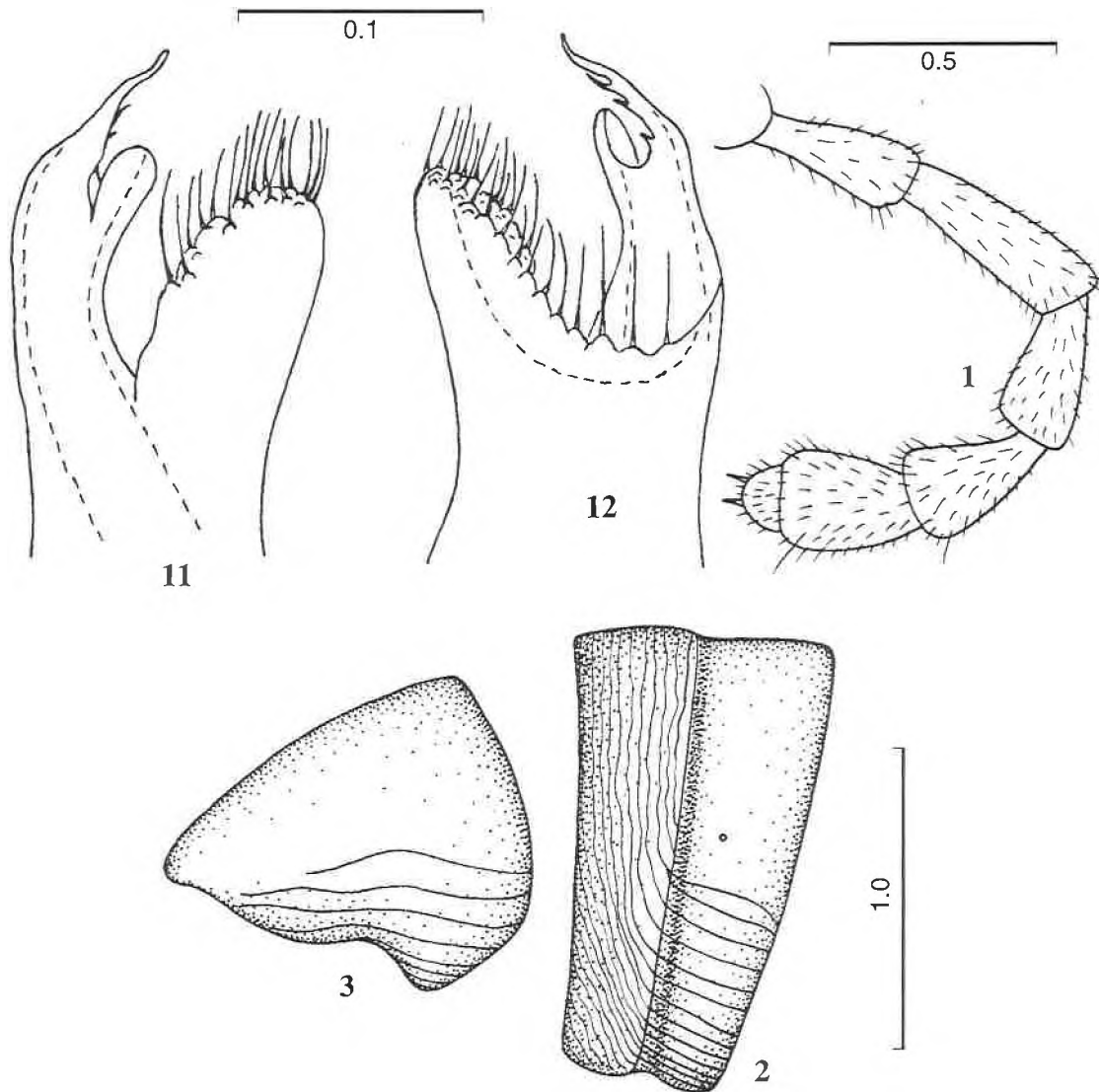
DESCRIPTION: Male. Body 28–38 mm long, 1.5–1.9 mm in diameter. Body segments without telson up to 58(-1), mostly between 47(-2) and 53(-2); in subadult male 47(-4). Prozona dark brown with a light fore portion. Metazona light brown with yellowish or brownish marble spots dorsally and laterally, as well as below and above ozopore. Latter placed in the middle of a small, brownish, vague spot. Legs and antennae brown, eyes black.

Body subcylindrical, smooth. About 40 (in medium-sized examples) to 50 (in larger specimens) ocelli in an oval-triangular eye-patch on each side of head. Vertigial setae absent, epicranial suture poorly developed. Supralabral se-



Figs 1–12. *Skleroprotopus ramuliferus* sp.n., ♂ paratype: 1 — antenna; 2 — somite 8; 3 — collum; 4 — leg-pair 1 (caudoventral view); 5 — terminal segment of leg-pair 1 (frontoventral view); 6 — leg-pair 2 (caudal view, apex of claw broken off); 7 — leg-pair 7 (caudal view); 8 — anterior gonopod (caudal view); 9 — same (mesal view); 10 — posterior gonopod (mesal view); 11 — distal part of posterior gonopod (mesal view); 12 — same (lateral view); b — lobe of anterior gonopod coxal process. — Scale bars in mm.

Рис. 1–12. *Skleroprotopus ramuliferus* sp.n., самец-паратип: 1 — усик; 2 — 8-й сегмент тела; 3 — коллум; 4 — 1-я пара ног (задне-вентральный вид); 5 — последний членик 1-й пары ног (передне-вентральный вид); 6 — 2-я пара ног (вид сзади, вершина коготка обломлена); 7 — 7-я пара ног (вид сзади); 8 — передний гоноподий (вид сзади); 9 — то же (вид изнутри); 10 — задний гоноподий (вид изнутри); 11 — дистальная часть заднего гоноподия (вид изнутри); 12 — то же (вид сбоку); b — лопасть коксального отростка передних гоноподий. — Масштаб в мм.



tae 2+2, labral setae 9+9, 10+10 or 11+11. Genae with two short ventral outgrowths. Gnathochilarium with three setae on stipes, a stretched and prominent promentum, and 6–7 setae on each lamella lingualis. Antennae (Fig. 1) relatively short, clavate, without sensory bacilli. Prozona (Fig. 2) with uneven striations directed obliquely laterally and increasingly transversely dorsad. Metazona (Fig. 2) with distinct striae below ozopores. Collum (Fig. 3) with 8–9 striae of varying length laterally. Ozopores small, beginning from segment 6, lying behind and set off from suture dividing pro- and metazona. Telson setose along hind margin, without epiroct. Each anal valve and an oval subanal scale with two setae.

Legs moderately long, slender, claws long with an additional claw at base. Leg-pair 1 (Figs 4 & 5) very strongly enlarged dorsoventrally, flattened, curved forward. Its terminal segment rounded, half-ellipsoid with thin setae both caudally and mesally, 3th segment longest, covered with tiny setae on front surface and laterally. Penes subconical, with three long setae apically (Fig. 6). Leg-pair 7 (Fig. 7) with a 2-segmented telopodite and a tongue-shaped coxal process

bearing long setae both frontally, mesally and laterally. Anterior gonopods (Figs 8 & 9) with 1-segmented, slightly flattened telopodites bearing long setae both apically and mesally. Coxal process flat, lateral edge curved caudally, lobuliform (b), pointed apically. Lateral surface of coxal process beset with tiny setae. Parabasal long flagella with thin spines apically. Posterior gonopods (Figs 10–12) bifid, anterior branch with a pair of apical outgrowths, of which external one like a slender serrate twig and inner one rounded, posterior branch mesally with a spoon-shaped excavation, latter's both inner surface and external edge covered with long setae.

Female. Body 36–39 mm long, 2.1–2.25 mm in diameter. About 50 ocelli. Body segments without telson up to 63(-1), largely between 52(-2) and 56(-1). Coloration as in male except for lateral and dorsal spots which can be smaller in size. Other nonsexual characters as in ♂.

Acknowledgments: We are most grateful to Dr. S.I. Golovatch for his editing the English and his help with publication of the paper. Mrs. G.A. Sinelnikova kindly inked Figs 1–3.

References

- Attems C. 1901. Myriopoden // Dritte asiatische Forschungsreise des Grafen E. Zichy Budapest. Bd.2. S.271–310.
- Golovatch S.I. 1979. [A genus of the superfamily Parajuloidea (Diplopoda) new to the USSR fauna] // Entom. Obozr. Vol.58. No.4. P.904–908 [in Russian, with English summary].
- Mikhailjova E.V. 1982. [On the synonymy of two forms of Diplopoda from the USSR Far East] // Zool. Zhurn. Vol.61. No.8. P.1265–1268 [in Russian, with English summary].
- Mikhailjova E.V. 1998. The millipedes of the Far East of Russia (Diplopoda) // Arthropoda Selecta. Vol.7. No.1. P.1–77.
- Miyosi Y. 1957a. Beiträge zur Kenntnis japanischer Myriopoden 19. Über eine neue Gattung und zwei neue Arten von Diplopoden // Zool. Mag., Tokyo. Vol.66. P.29–33 [in Japanese, with German summary].
- Miyosi Y. 1957b. Beiträge zur Kenntnis japanischer Myriopoden 22. Über zwei neue Arten von Diplopoda // Ibid. Vol.66. P.403–406 [in Japanese, with German summary].
- Murakami Y. & Paik K. Y. 1968. Results of a speleological survey in South Korea 1966. XI. Cave-dwelling myriapods from the southern part of Korea // Bull. Natn. Sci. Mus., Tokyo. Vol.11. No.4. P.363–384.
- Shinohara K. 1960. Three new species of Juloidea (Diplopoda) from Chichibu // Bull. Chichibu Mus. Nat. Hist. Vol.10. P.23–30.
- Takakuwa Y. 1940a. Über *Skleroprotopus*-Arten // Annot. Zool. Japon. Vol.19. No.1. P.19–22.
- Takakuwa Y. 1940b. Weitere *Skleroprotopus*-Arten (Diplopoda) // Ibid. Vol.19. No.4. P.289–293.
- Takakuwa Y. 1942. Zur Kenntnis japanischen Diplopoden // Ibid. Vol.21. No.1. P.39–47.
- Takakuwa Y. & Takashima H. 1949. Myriapods collected in Shansi, North China // Acta Arachnol. Vol.11. Nos 3–4. P. 51–69.
- Verhoeff K.W. 1939. *Skleroprotopus* in japanischer Höhle // Mitt. Höhlen- u. Karstforschung, Berlin. Jg.1939. S.8–16.
- Verhoeff K.W. 1941. Ostasiatische Diplopoden aus Höhlen // Ibid. Jg.1941. H.1–2. S.34–45.
- Zang Ch.Z. 1985. A new millipede of the genus *Skleroprotopus* in Stone Buddha Cave, Fangsheng County, Beijing // Karst Geomorph. and Speleol. Sci. Press, Beijing P.154–156.