

## ***Scaptognathus teuriensis*, a New Record of Halacarid Mite (Acari, Halacaridae) from Dokdo Island of Korea**

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### **ABSTRACT**

A halacarid species of *Scaptognathus teuriensis* Abé is recorded from Korea on the basis of the specimens collected from littoral sandy sediments at Dokdo Island, the easternmost island off Uleung Island of South Korea. Korean specimens coincide well with the key characters in the original description for types from Hokkaido, Japan, such as male genitoanal plate comprising only pars sclerosum, bipartite female genitoanal plate with six perigenital setae, rounded posterior margin of anterior dorsal plate, second and fifth dorsal setae both positioned at membranous cuticle, leg chaetotaxy of bipectinate setae on tibiae I–IV of 4-2-2-2, and tarsi of all legs armed with paired large lateral claws with accessory teeth and small median claw. Redescription based on Korean specimens and scanning electron microscope photomicrographs are provided herein. This is the first record of the genus from Korea.

**Keywords:** marine, meiofauna, mite, SEM, taxonomy

### **INTRODUCTION**

Halacarid fauna of Korea is very poor. Only thirteen species have been recorded from Korean coasts since 2003: nine *Copidognathus* species of *C. koreanus* Chatterjee and Chang, 2003 (Chatterjee and Chang, 2003), *C. laevisetosus* Chatterjee, Lee and Chang, 2004, *C. cerberoides* Bartsch, 1991 (Chatterjee et al., 2004), *C. jejuensis* Chatterjee and Chang, 2004 (Chatterjee and Chang, 2004a, 2006), *C. polyporus* Bartsch, 1991 (Chatterjee and Chang, 2004a), *C. fistulosus* Chatterjee and Chang, 2005, *C. quadriporosus* Chatterjee and Chang, 2006, *C. tetrahachis* Chatterjee and Chang, 2006 (Chatterjee and Chang, 2006), and *C. curtus* Hall, 1912 (Chatterjee et al., 2012); *Simognathus coreensis* Chatterjee and Chang, 2004 (Chatterjee and Chang, 2004b); *Agauae laevunguis* Chang and Chatterjee, 2006 (Chang and Chatterjee, 2006); and two *Agauopsis* species of *A. ivanomorsellii* Chatterjee and Chang, 2007 and *A. youngilensis* Chatterjee and Chang, 2007 (Chatterjee and Chang, 2007). The taxonomic study on the genus *Scaptognathus* is entirely lacking in Korea as yet. In the present report, a new record from Korea of *S. teuriensis* Abé, 1990 is redescribed with scan-

ning electron microscope (SEM) photomicrographs.

Samplings were conducted by scooping top centimeters of bottom sediments into 500 mL plastic bottles at the sublittoral bottom (about 5 m in depth) near the wharf at Seodo islet of Dokdo Island, easternmost island of South Korea. After freshwater rinsing for osmotic shock, sand samples were filtered through nylon net with a mesh size of 64 µm in the field. Filtered samples were fixed immediately by adding about 10% solution of formalin. Mites were mounted in lactic acid or glycerine on H-S slide.

Scanning electron microscopy was conducted as follows: prefixation in 2.5% glutaraldehyde in 0.1 M phosphate buffer (pH 7.4) for 17 h; postfixation in 2% OsO<sub>4</sub> in 0.1 M phosphate buffer for 2 h; dehydration through an ethanol series of 50%–100% at 10% intervals; freeze-dried with ES-2030 (Hitachi, Japan); coated with platinum in ion sputter (E-1045; Hitachi); examined on a Hitachi S-4300 SEM at 10 kV.

Voucher specimens are kept in the collection of the junior author (CYC) at the Department of Biological Science, Daegu University (DB), Korea.

Terminology and abbreviations used in the text and figures follow Bartsch (2006): AD, anterior dorsal plate; ds,

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dorsal setae on idiosoma (ds-2, second dorsal setae on idiosoma); GA, genitoanal plate; GN, gnathosoma; OC, ocular plate; P, palp (P-2, second palpal segment); PD, posterior dorsal plate; PE, posterior epimeral plate; pgs, perigenital setae; sgs, subgenital setae.

## SYSTEMATIC ACCOUNTS

Subclass Acari Leach, 1817  
Order Trombidiformes Reuter, 1909  
Suborder Prostigmata Kramer, 1877  
Superfamily Halacaroidea Murray, 1877  
Family Halacaridae Murray, 1877  
Genus *Scaptognathus* Trouessart, 1889

*Scaptognathus teuriensis* Abé, 1990 (Figs. 1–3)  
*Scaptognathus teuriensis* Abé, 1990b: 352, figs. 3–5.

**Material examined.** 5 females, 1 male, 1 juvenile (DB50020-50026, mounted on H-S slide), 11 individuals (mounted on an aluminum stub for SEM study), subtidal sandy bottom (5 m deep), near wharf of Seodo islet (37°14'26.24"N, 131°51'57.35"E), Dokdo Island, Uleung County, Gyeongbuk Province, South Korea, 30 Apr 2005, leg. J. Lee.

**Description. Males:** Idiosoma (Fig. 1A–C) flattened; 321–353 µm long, 187–224 µm wide, length to width ratio about 1.6; pale ivory white in formalin preservation. All dorsal plates separate. AD and PD large; OC small, less than 20 µm in diameter (Fig. 1C). AD and OC, each with gland pore. AD (Fig. 1A), ornamented with small areolations; posterior margin slightly convex or nearly truncate. Dorsum furnished with 7 pairs of dorsal setae; ds-2 to ds-5 short and slender, situated on membranous cuticle; ds-1 relatively long, located near anterior margin of AD; ds-2 close to outer posterior corner of AD (Fig. 1A); ds-3 mid-dorsal, situated at anterior quarter between AD and PD; ds-4 positioned lateral, slightly ahead of insertion of leg III; ds-5 on membranous cuticle at posterior quarter between AD and PD; ds-6 and ds-7 on PD.

All ventral plates large and separate (Fig. 1B). AE with 3 pairs of setae (first pair near bases of leg I, second pair near bases of leg II and last pair near posterior margin of AE). PE with 1 dorsal and 3 ventral setae. GA oval, anterior part protruding anteriorly, reaching slightly beyond level of insertions of leg III, length/width ratio about 1.6; unipartite. Genital opening (Fig. 1D) oval; surrounded with 18–22 perigenital setae along posterolateral and posterior part of genital opening; with 3 pairs of subgenital setae on genital sclerites, showing 1–2 arrangement. Anal opening terminally placed; adanal setae lacking. Spermatophorotype polygonal, located near middle of GA, its anterior end reaching to

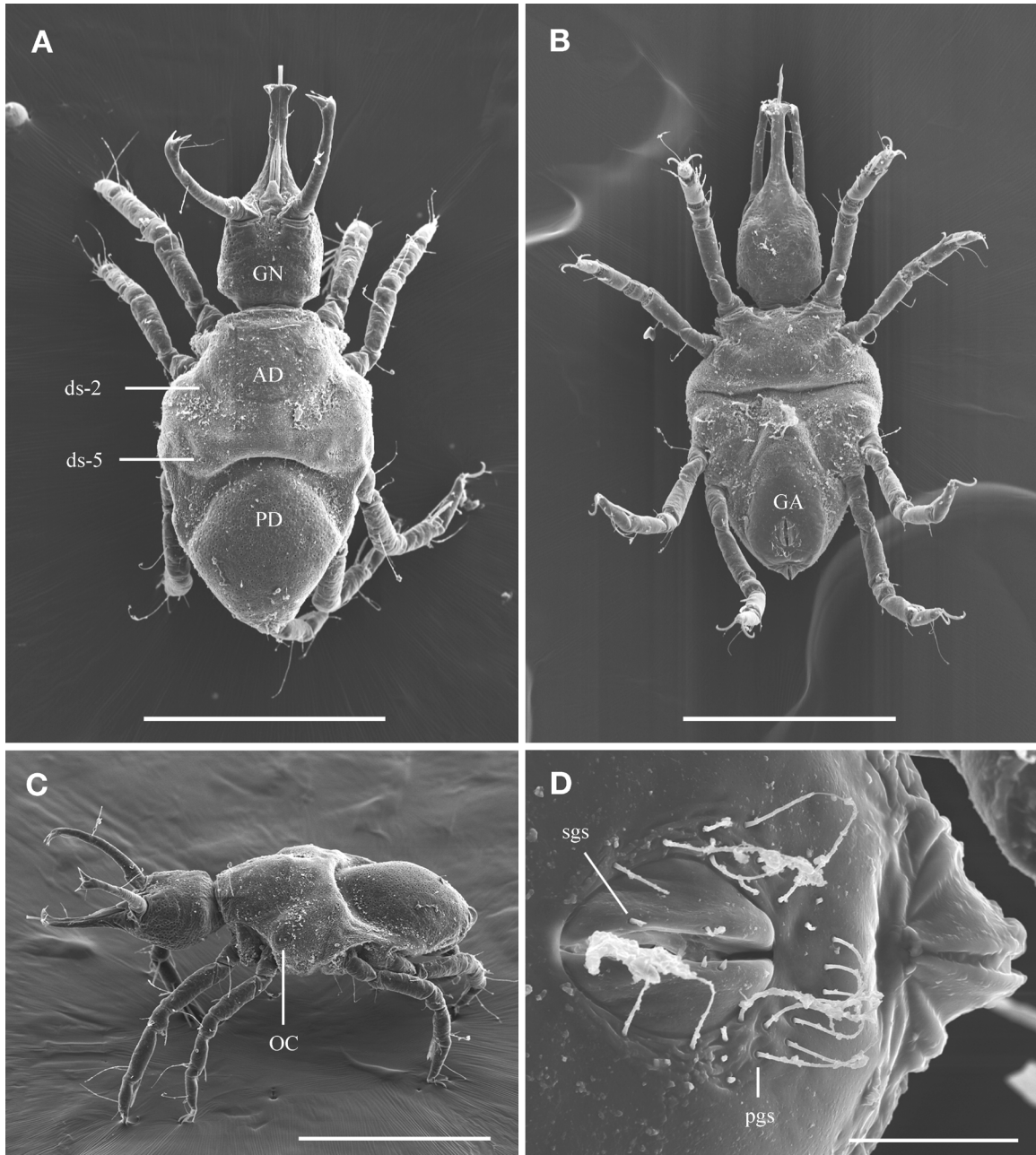
level of insertions of leg IV, approximately half the length of GA.

Gnathosoma (Figs. 1A–C, 2A) large, about 240 µm long, nearly 2/3 times as long as idiosoma. Rostrum spatula-shaped with truncate apex, slightly not reaching to anterior end of palp; with 3 rostral setae: protorostrals at dorsolateral corner near anterior margin of rostrum, deutorostrals situated ventrolateral, behind protorostral seta, and long tritrostrals placed near anterior quarter of dorsal surface; basirostrals lacking. Chelicera styliiform, extending far beyond apex of rostrum, slightly shorter than gnathosoma. Palp inserted dorsally; P-1 short, cylindrical, lacking seta; P-2 (= palpal shaft) elongate, 5–6 times as long as wide, with 1 short proximal and 1 long distal setae dorsally; P-3 incompletely fused with P-4 (cf. Fig. 2B), each armed with 1 wide, blade-shaped projection distally, ventral one (on P-4) of them bidentate, and 1 shorter, incisor-like projection between them, furnished with 2 long, naked setae, each at ventrolateral corner of P-3 and on dorsolateral margin of P-4, respectively.

Leg chaetotaxy (trochanter to tibia): leg I 1-1-4-4-7, leg II 1-1-3-4-5, leg III 1-1-2-3-5, leg IV 1-1-1-3-5. Number of bipectinate setae on each segment of legs I–II–III–IV: 2-1-0-0 on telofemora, 2-1-0-0 on genua, 4-2-2-2 on tibiae, 1-1-0-0 on tarsi (Figs. 2C, E, F, 3D). Tarsi I–IV with 2 lateral claws, each with accessory teeth dorsally; ventral margin of lateral claw smooth, lacking pecten; median claw minute, rather vestigial, unidentate (Fig. 2D, arrowhead). Tarsus I (Fig. 2D) with 3 long dorsal setae, 2 ventral setae proximally, 1 dorso-lateral solenidion and 1 minute famulus on claw fossa, and 2 pairs of parambulacral setae (eupathidia). Tarsus II (Fig. 2E) with 3 filiform setae dorsally, 1 short bipectinate seta ventrally, 1 solenidion dorsolaterally and 2 parambulacral setae (eupathidia). Tarsus III (Fig. 2F) with 3 filiform setae dorsally and 3 parambulacral setae (doublet on posterior, single on anterior surface). Tarsus IV with 3 filiform setae dorsally and 2 parambulacral setae.

**Female:** Idiosoma (Fig. 3A, B) 314–326 µm long. AD and PD separated from each other by interval of approximate length of PD. GA (Fig. 3C) slightly less than 1/3 times as long as idiosoma; oval-shaped, its anterior end reaching to level of insertion of leg III; bipartite, consisting of anterior pars membranosum (perforated and reticulated structure) and posterior pars sclerosum with 3 pairs of perigenital setae. Genital opening round, about 1/3 the length of GA, situated between about middle and posterior 3/4 of GA, with 1 pair of subgenital setae, arranged 0-1. Other characteristics nearly same as in male.

**Remarks.** In the genus *Scaptognathus*, 31 species are currently recognized (Bartsch, 2005). Among them, Korean specimens are evidently assigned to *S. teuriensis* Abé, 1990



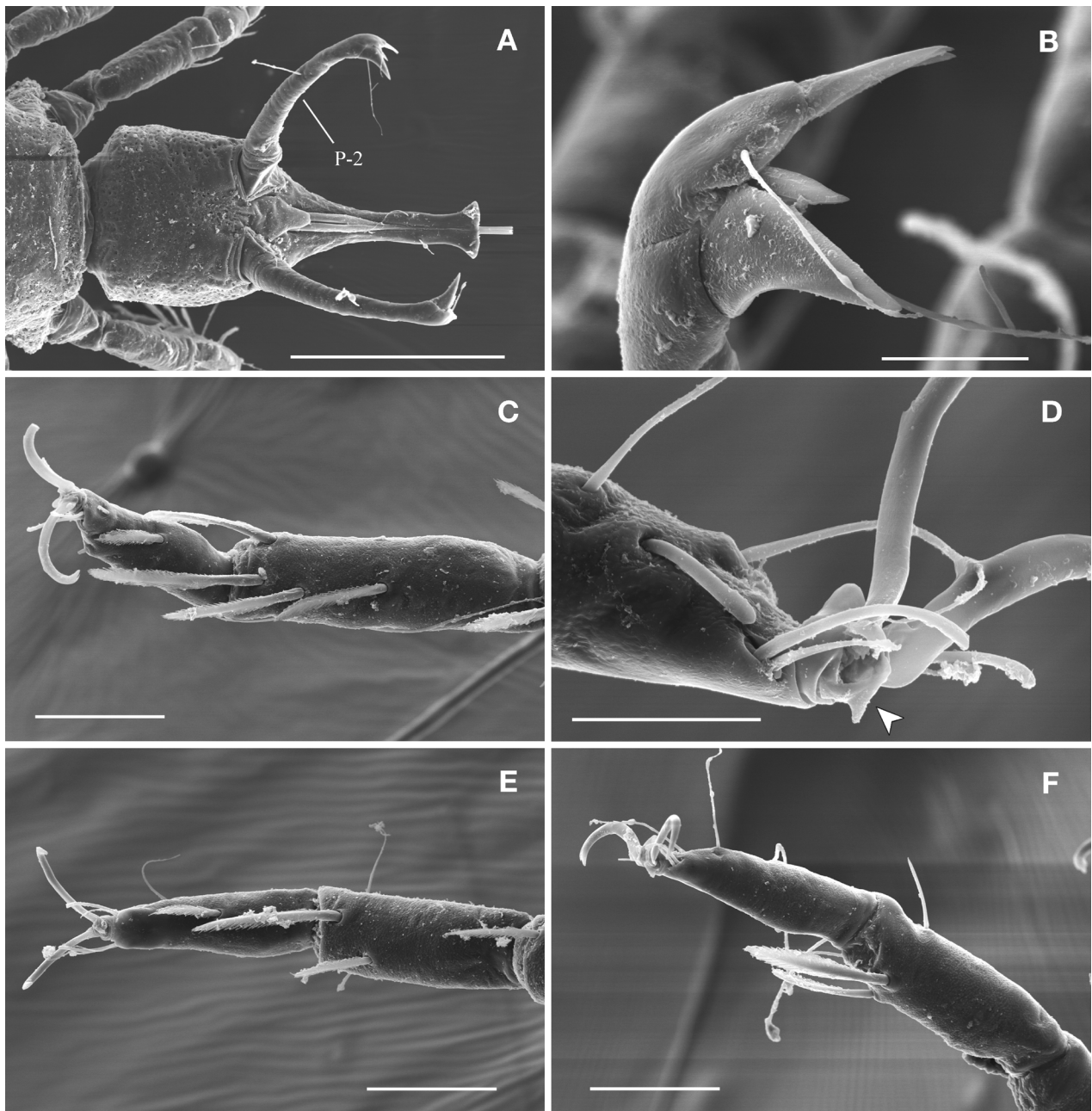
**Fig. 1.** *Scaptognathus teuriensis*, male, scanning electron microscope photographs. A, Habitus, dorsal; B, Habitus, ventral; C, Habitus, lateral; D, Genitoanal region, ventral. Scale bars: A–C=200  $\mu$ m, D=20  $\mu$ m.

recorded previously from Hokkaido, Japan in coinciding exactly with its key characters: male GA comprising only pars sclerosum, bipartite female GA with six perigenital setae, leg chaetotaxy of bipectinate setae on tibiae I–IV of 4-2-2-2, presence of median claws on tarsi of legs I–IV, rounded posterior margin of AD, and both ds-2 and ds-5 positioned at membranous cuticle.

This species is most characterized among the congeners

by leg chaetotaxy, especially setal arrangement of bipectinate setae on tibiae I–II–III–IV, 4-2-2-2. According to all the relevant references, *S. teuriensis* is the only one that possesses four bipectinate setae on tibia I among the congeners known so far.

In the original description, Abé (1990b) described median claws as “well developed,” however, they turned out to be very minute after SEM study for Korean specimens.



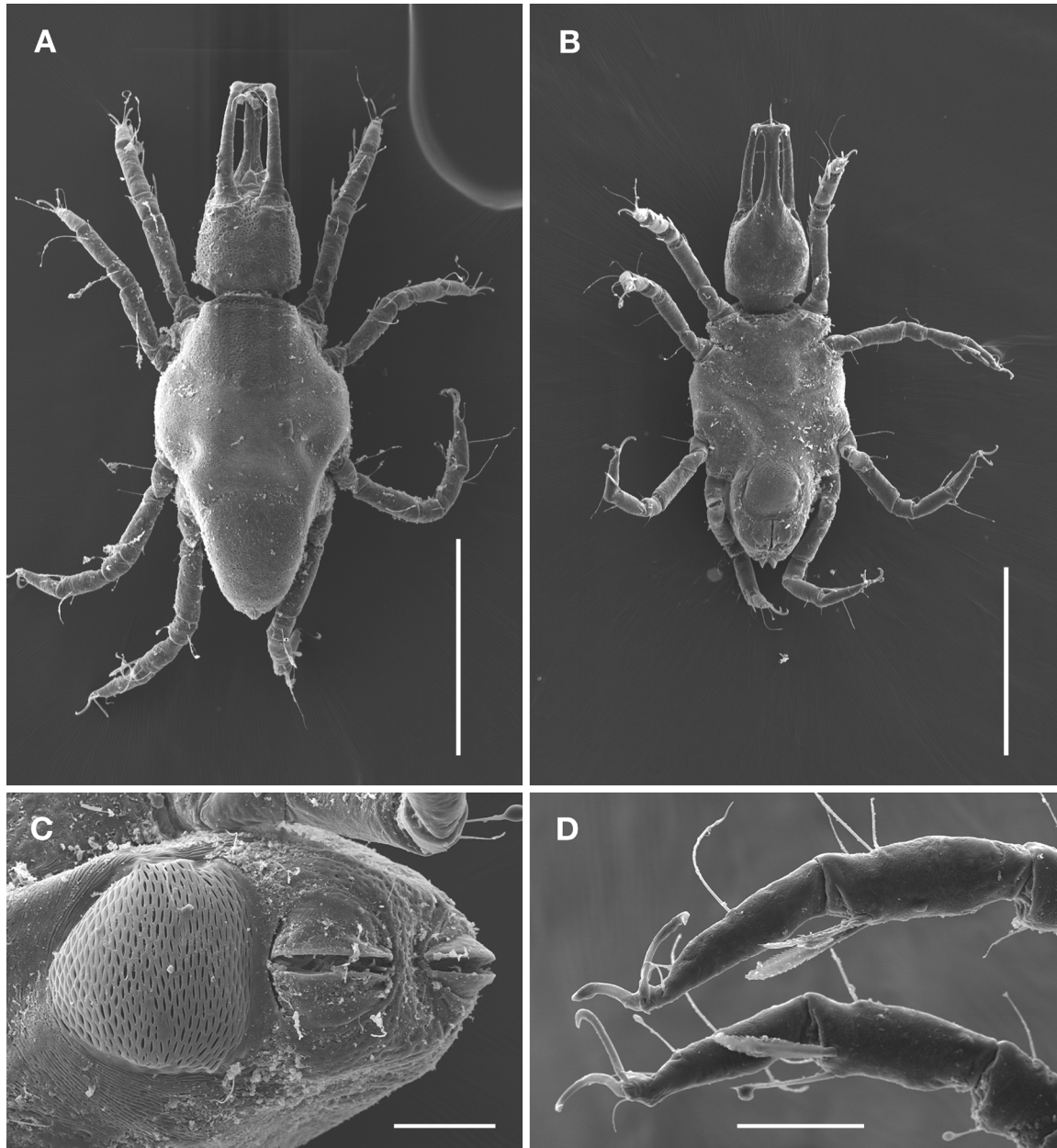
**Fig. 2.** *Scaptognathus teuriensis*, male, scanning electron microscope photographs. A, Gnathosoma, dorsal; B, Distal part of palp, anterior dorsal; C, Tarsus and tibia of leg I, ventral; D, Distal part of tarsus I, lateral (arrowhead indicating median claw); E, Tarsus and tibia of leg II, ventral; F, Tarsus and tibia of leg III, ventrolateral. Scale bars: A=100  $\mu$ m, B, D=10  $\mu$ m, C, E, F=25  $\mu$ m.

Among 31 congeners, only four species have median claws, comprising *S. triunguis* Bartsch, 1991 with really developed median claws as the specific name indicates (see Bartsch, 1991), and three species with minute median claws: *S. pacificus* Newell, 1971, *S. gibbosus* Bartsch, 1977, and the present *S. teuriensis* (see Newell, 1971; Bartsch, 1977).

Abé (1990b) demonstrated that “*S. teuriensis* has closest

affinity to *S. sabularius* André, 1961” in having a genitoanal plate which consists of only pars sclerosum in the male. Among the 31 congeneric species currently recognized, the male is known in 16 species, of which only the above two share the genitoanal plate of only pars sclerosum (see André, 1961).

In the Northwest Pacific, five species have been reported



**Fig. 3.** *Scaptognathus teuriensis*, female, scanning electron microscope photographs. A, Habitus, dorsal; B, Habitus, ventral; C, Genitoanal region, ventral; D, Tarsus, tibia and genu of leg III (upper) and leg IV (below), lateral. Scale bars: A, B=200  $\mu$ m, C, D=30  $\mu$ m.

so far: *S. ventridiscus* Abé, 1990 from Hokkaido, Japan (Abé, 1990a); *S. magnus* Abé, 1990 and *S. teuriensis* Abé, 1990 (Abé, 1990b) from Hokkaido, Japan; *S. triunguis* Bartsch, 1991 from Hong Kong (Bartsch, 1991); *S. okinawensis* Abé, 2012 from Okinawa Islands, Japan (Abé, 2012).

*Scaptognathus magnus* has a very large body, and idiosoma is about 480  $\mu$ m long, while much less than 300  $\mu$ m long in *S. okinawensis*, and around 360–380  $\mu$ m long in larger

adult specimens of the other species including *S. teuriensis*. Among the five East Asian species, males are known in two species only, *S. teuriensis* and *S. ventridiscus*. The male genitoanal plate of *S. teuriensis* is easily distinguished from that of *S. ventridiscus* in lacking pars membranosum (while pars membranosum is situated anteriorly apart from pars sclerosum in *S. ventridiscus*) (cf. Abé, 1990a, figs. 1C, 2A). Meanwhile, the female GA of *S. okinawensis* is tripartite,

and definitely differs from the bipartite ones of the other four species including *S. teuriensis*. As already mentioned above, the leg chaetotaxy of bipectinate setae on tibiae I-IV is unique as 4-2-2-2 in *S. teuriensis* (against 6-4-4-4 in *S. ventridiscus*, 5-3-3-3 in *S. magnus*, 3-2-2-2 in *S. triunguis*, and 6-3-4-4 in *S. okinawensis*). Median claws are shown in two species, *S. teuriensis* and *S. triunguis*; the latter has prominently large median claws (around half of the neighboring lateral claws) (cf. Bartsch, 1991, fig. 2E-I) while those of the former are minute and even vestigial.

**Distribution.** Japan (Hokkaido), Korea (East Sea).

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