

## ***Scaptognathus magnus* (Acari: Halacaridae), a New Record from Korea**

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### **ABSTRACT**

An arenicolous halacarid, *Scaptognathus magnus* Abé is first recorded from Korea, which was collected from littoral coarse sandy bottom around Simnibawi Rock off Gangreung in the east coast of South Korea. The remarkable characteristics of this species are large body with idiosoma more than 470 µm long, nearly trapezoidal anterior dorsal plate, and a unique chaetotaxy of bipectinate setae 5-3-3-3 on tibiae I–IV. The characteristics of Korean specimens coincide well with the original description from Hokkaido, Japan, except for the number of parambulacral setae on tarsus III and the weak median claws. Detailed illustrations and scanning electron microscope photographs based on Korean specimens are provided.

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

### **INTRODUCTION**

*Scaptognathus* halacarids are known to inhabit sandy and muddy littoral sediment mostly in warm and temperate regions, though also found in subpolar waters (Bartsch, 2006, 2009). In the genus *Scaptognathus* Trouessart, 1889, 31 species are currently recognized as yet (WoRMS, 2020). In Korea, only one species, *S. teuriensis* Abé, 1990 was recorded from Dokdo Island by Lee and Chang (2017).

Samplings were taken the upper surface (less than 5 deep) of the sediments with a Smith-McIntyre grab (0.1 m<sup>2</sup>) at the littoral bottom (10 m in depth) around the Simnibawi Rock (37°48'43"N, 128°54'38"E) which consists of two large rocks situated about 0.6 km off Gyeongpo Beach at Gangreung in the east coast of South Korea. The procedures of extraction and preparation are as written in our previous paper as well as the methods for scanning electron microscopy (Lee and Chang, 2017).

All voucher specimens are kept in the Marine Interstitial fauna Resources Bank (MInRB) of the Korea Institute of Ocean Science & Technology (KIOST), Busan, Korea.

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

anterior epimeral plate; ds, dorsal setae on idiosoma (ds-2, second dorsal setae on idiosoma); GA, genitoanal plate; GO, genital opening; mc, membranous cuticle; OC, ocular plate; P, palp (P-2, second palpal segment); pas, parambulacral setae; 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 Halacaroidae Murray, 1877  
Family Halacaridae Murray, 1877  
Genus *Scaptognathus* Trouessart, 1889

***Scaptognathus magnus* Abé, 1990 (Figs. 1–3)**  
*Scaptognathus magnus* Abé, 1990: 349, figs. 1, 2.

**Material examined.** 4 females (MInRB-HI04-S001–004, mounted on H-S slide) and 2 females (mounted on an aluminum stub for scanning electron microscopy), subtidal bottom

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(10 m deep), near Simnibawi (37°48'43"N, 128°54'38"E), Gangneung, South Korea, 25 Jul 2017, *leg.* J. Lee.

**Description (Females).** Idiosoma (Figs. 1A, 3A, C) 467 µm long, 321 µm wide, length to width ratio about 1.45. All dorsal plates separate; length of AD, PD, and interval between AD and PD similar, each one about 1/3 idiosoma. AD 136 µm long, 170 µm wide, trapezoidal with well convex posterior margin; with a pair of gland pores near anterolateral 1/3. OC small, less than 19 µm in diameter, with a gland pore (Fig. 1A). Cornea absent. PD 140 µm long, 131 µm wide, slightly longer than wide. Dorsum furnished with 7 pairs of dorsal setae; ds-1 stout and long, located near 1/3 of AD, and close to a gland pore; ds-2 to ds-5 short and slender, about 1/4 of ds-1 length, situated on membranous cuticle; ds-2 on mc of between posterior AD and OC; ds-3 positioned posterior AD, mid-dorsally; ds-4 located at posterior OC; ds-5 on mc 0.54 level of idiosoma; ds-6 and ds-7 on PD.

All ventral plates large and separate (Figs. 1B, 3B). AE furnished with 3 pairs of setae: first one located near medial bases of leg I, second pair near lateral bases of leg II and last one near posterior margin of AE. PE triangle, with 1 dorsal and 3 ventral setae. A pair of subsurface pores mid-ventrally between AE and GA. GA (Figs. 1C, 3D) bipartite, consisting of pars membranousum with many short slits and pars sclerosum; oval, anterior part protruding anteriorly, its anterior extending beyond level of insertion of leg III; length to width ratio about 1.8 (200 µm long, 111 µm wide). GO oval, surrounded with 3 pairs of pgs, first pair near posterior membranousum part, second one near anterolateral margin GO and last pair near posterolateral margin of GO; with a pair of short sgs, locating at anterior 2/3 of GO. Adanal setae lacking.

Gnathosoma (Figs. 1D–G, 3E–H) large, about 368 µm long, length gnathosoma/idiosoma 0.79. Rostrum (Figs. 1E, F, 3F, H) 178 µm long, nearly half of gnathosoma; spatula-shaped with truncate apex, slightly not extending to anterior end of palp; with 3 pairs of rostral setae: a pair of small protorostral setae issued at dorsolateral corner near anterior margin of rostrum, small deutorostrals placed ventrolateral, behind protorostral seta, and long tritorostrals located near anterior 1/3 level of dorsal surface; without basirostrals. Chelicera styliform, extending far beyond tip of rostrum. Palp issued dorsally, with 3 segments; P-1 short, 40 µm long, cylindrical, without setae; P-2 long, 118 µm long, about 3 times as long as P-1, with a short proximal seta innerdorsally and a long distal one 1/8 dorsally; P-3 imperfectly fused with P-4 (Fig. 1G), furnished with 2 wide, bladeshaped projection distally, ventral one (on P-4) of them smaller, 1 incisor-like projection distally, and 2 long, naked setae.

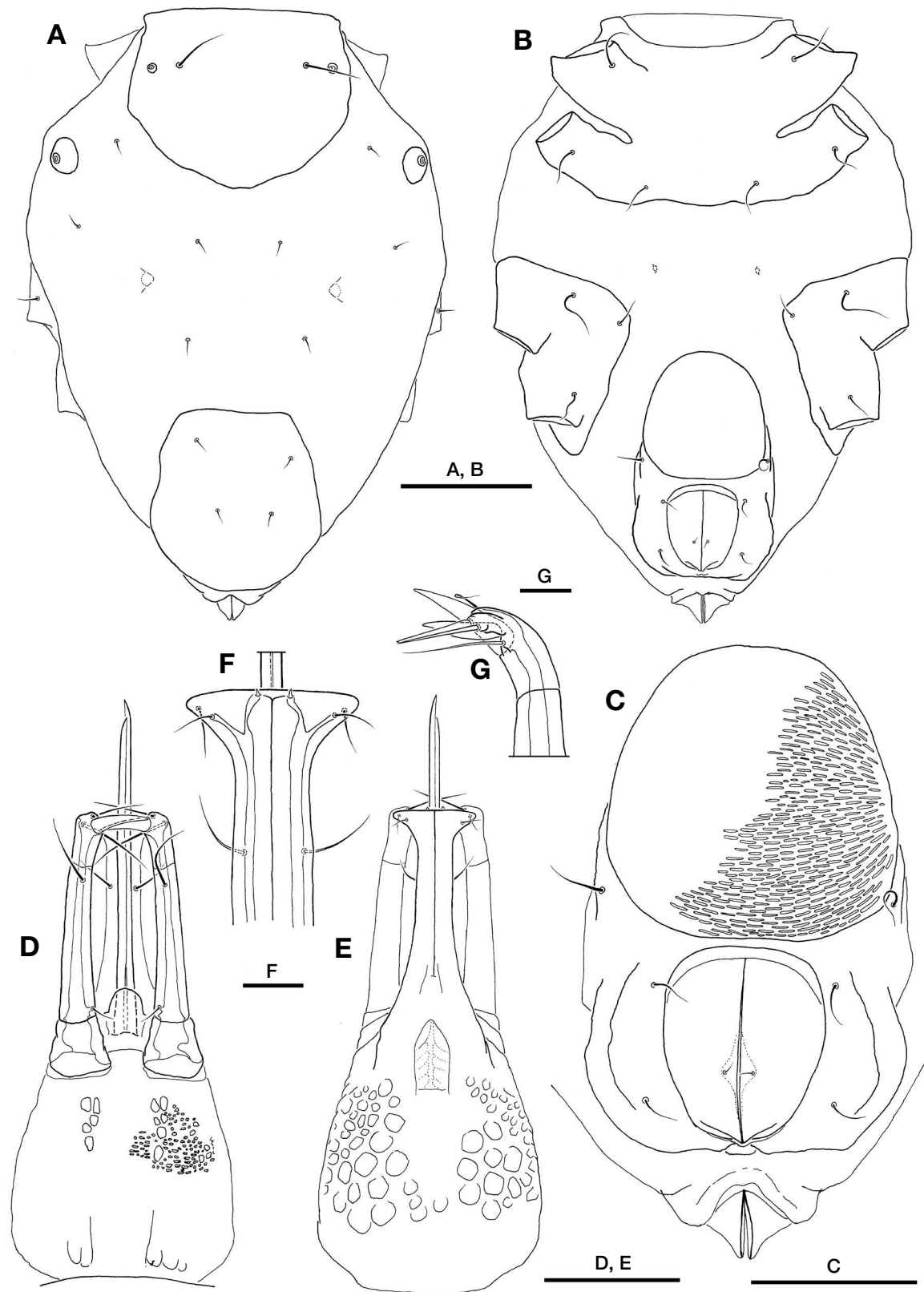
Leg chaetotaxy (trochanter to tibia, Figs. 2A–D, 4A–D): trochanters 1-1-1-1, basifemora 2-2-2-2, telofemora 4-3-2-2, genua 4-5-3-3, tibiae 8-6-6-6. Number of bipectinate se-

tae on each segment of legs I–IV: telofemora 2-1-0-0, genua 2-1-0-0, tibiae 5-3-3-3, tarsi 1-1-0-0. Tarsi I–IV (Fig. 2E–H) with paired lateral claws, each with accessory process with 4 combs dorsally (Fig. 4F, arrowhead); ventral margin of lateral claw smooth, without pecten; median claw present, but minute and feeble (Fig. 4E, arrowhead). Tarsus I (Figs. 2E, 4E) with 3 dorsal setae, 1 ventral seta, 1 ventromedial bipectinate seta, 1 dorsolateral solenidion and 1 minute famulus, and 2 pairs of doublet pas (eupathidia). Tarsus II (Fig. 2F) with 3 filiform dorsal setae, 1 short ventral bipectinate seta, 1 solenidion, 2 eupathid pas. Tarsus III (Fig. 2G) with 3 filiform dorsal setae and 3 pas (doublet on medial, single on lateral surface). Tarsus IV (Fig. 2H) with 3 filiform dorsal setae and 2 pas (filiform).

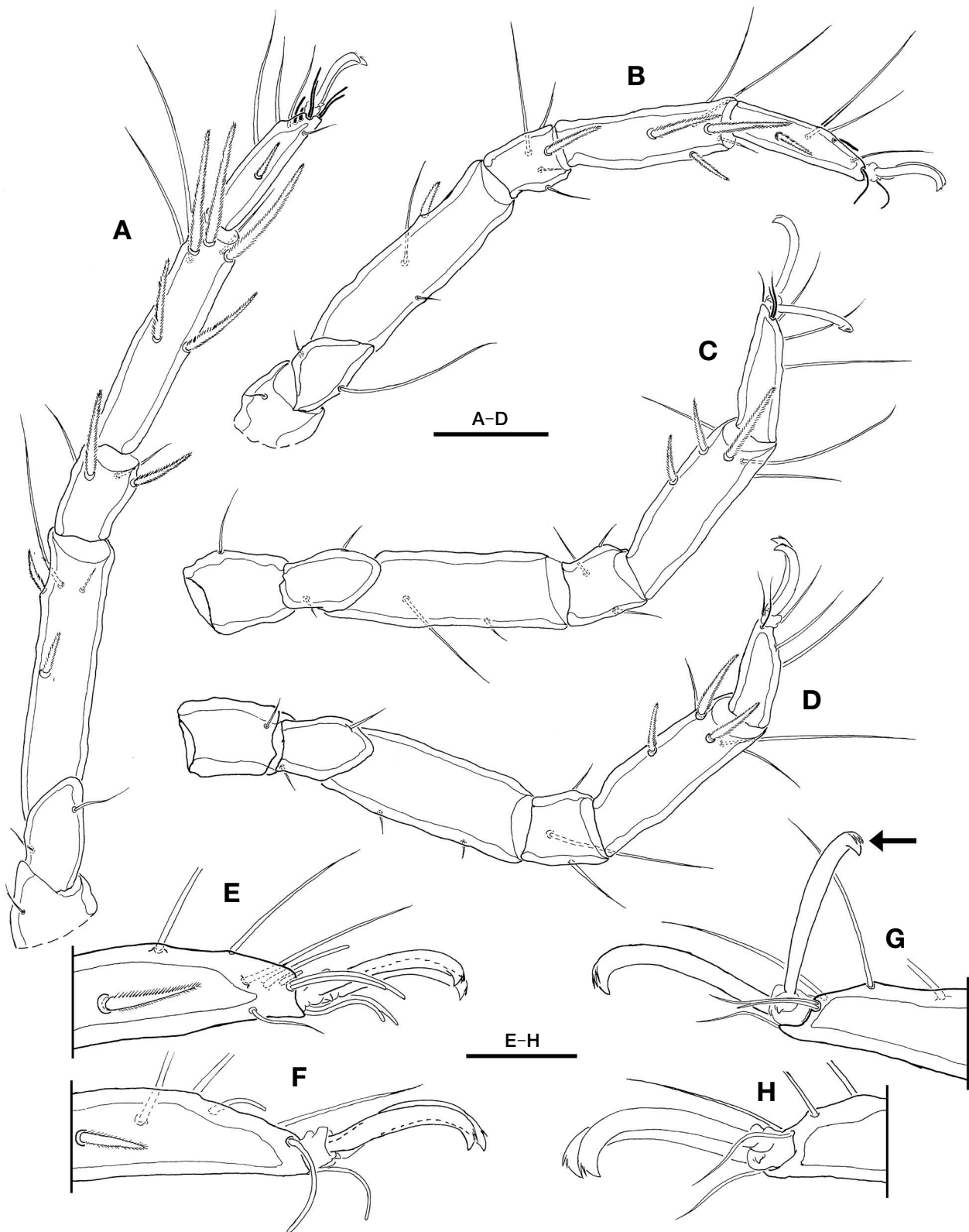
**Remarks.** The genus *Scaptognathus* belonging to the subfamily Lohmannellinae Viets, 1927 which consists of four genera (Bartsch, 2003), is most characterized by the spatula-shaped rostrum, two large spines at the end of the palps, weakly developed ocular plate, bi- or tripartite genitoanal plate of female (except for *S. monstrosus* Otto, 2000), and paired smooth claws or sometimes with a tiny simple process (not modified as umbrella-like or strongly pectinated) (Otto, 2000; Bartsch, 2006). Moreover, the members of *Scaptognathus* are known to be exclusively arenicolous (Abé and Green, 1994).

As mentioned in our previous paper (Lee and Chang, 2017), five of 31 *Scaptognathus* species recognized to date are known distributed in the northwest Pacific. Among them, *S. teuriensis* Abé, 1990 was first reported outside the type locality, Teuri Island of Hokkaido, Japan, from Dokdo Islet, South Korea by Lee and Chang (2017). They provided brief comments on its similarities and dissimilarities with other east Asian congeners (Lee and Chang, 2017). Recently, another *Scaptognathus* species was collected from littoral coarse sandy bottom in the east coast of South Korea, and evidently identified as *S. magnus* Abé, 1990 by the remarkably large body exceeding 800 µm in total length as suggested in the specific name, and the leg chaetotaxy of bipectinate setae on the tibiae I–IV as 5-3-3-3 (see Abé, 1990).

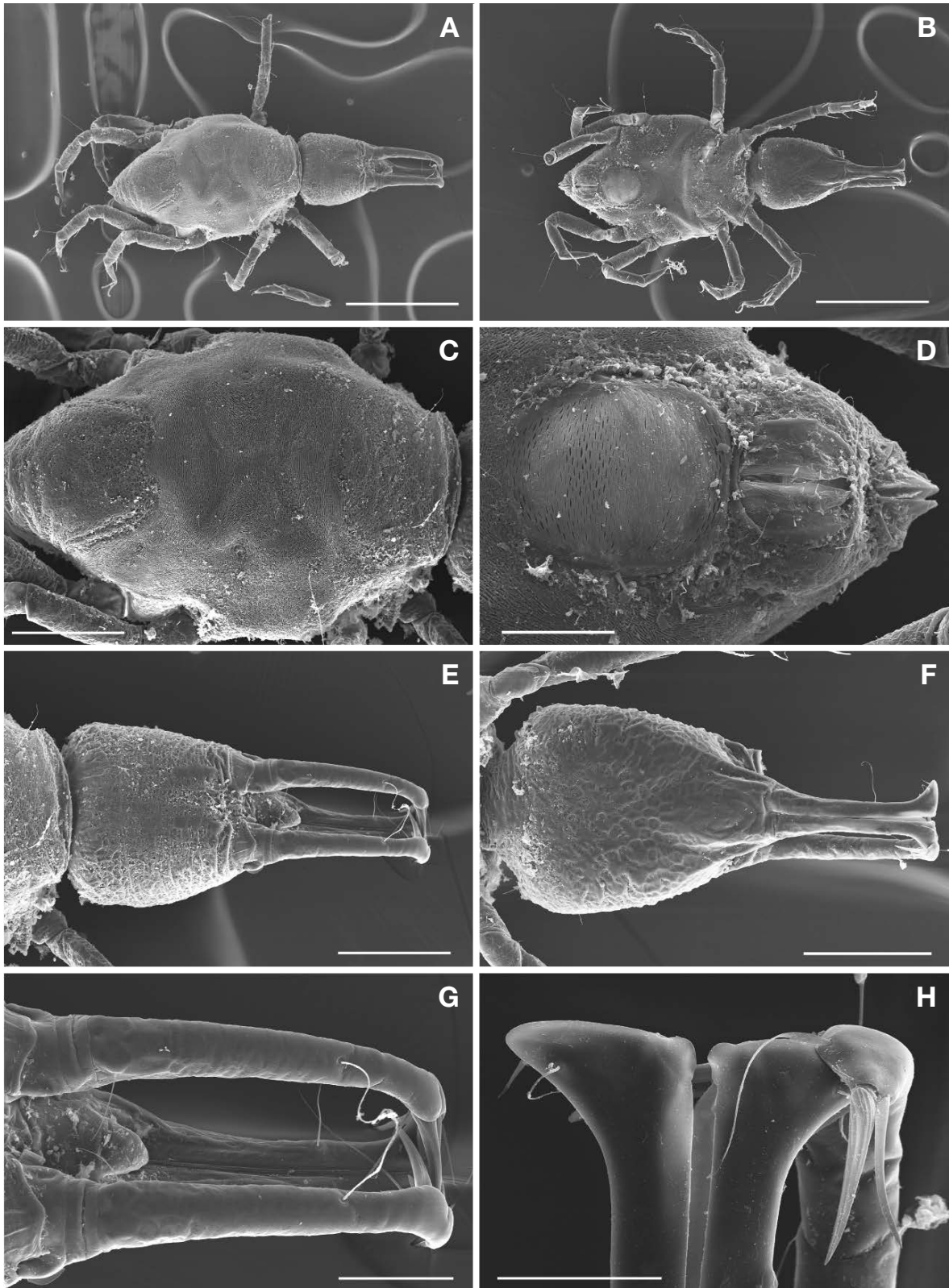
Korean specimens coincide well with the original description from Hokkaido, Japan, but different from it by having three parambulacral setae consisting of single on the anterior and doublet on the posterior in tarsus III (vs. one parambulacral seta on the anterior and the other on the posterior in the Japanese specimens), presence of accessory process on the lateral claws, represented by a comb-like ornamentation with more than four spinules (see Figs. 2G, 4F, arrows) (vs. lacking the comb in the Japanese), and much smaller slits on pars membranousum in female genitoanal plate than those in the Japanese. Moreover, the median claws of legs I–IV, despite minute and feeble, were not shown and mentioned in the



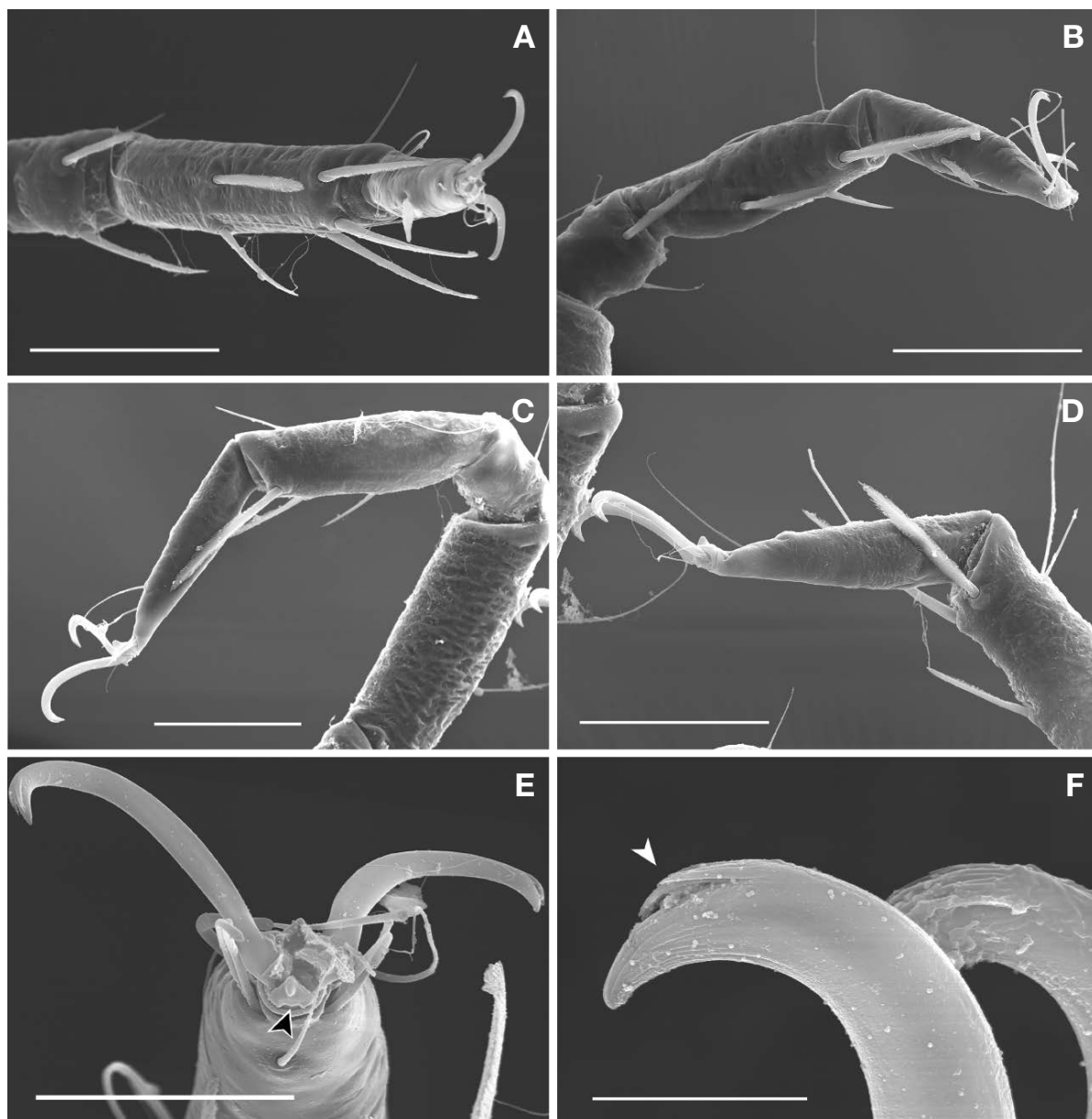
**Fig. 1.** *Scaptognathus magnus*, female. A, Idiosoma, dorsal; B, Idiosoma, ventral; C, Genitoanal region; D, Gnathosoma, dorsal; E, Gnathosoma, ventral; F, Tip of rostrum, anterior; G, Tip of palp, lateral. Scale bars: A, B, D, E = 100 µm, C = 50 µm, F, G = 20 µm.



**Fig. 2.** *Scaptognathus magnus*, female. A-D, Legs I-IV; E-H, Distal part of tarsus of legs I-IV (G, arrow indicating accessory process). Scale bars: A-D=50  $\mu$ m, E-H=20  $\mu$ m.



**Fig. 3.** *Scaptognathus magnus*, female, scanning electron microscope photographs. A, Habitus, dorsal; B, Habitus, ventral; C, Idiosoma, dorsal; D, Genitoanal region, ventral; E, Gnathosoma, dorsal; F, Gnathosoma, ventral; G, Palps, dorsal; H, Distal part of gnathosoma, ventral. Scale bars: A, B=250  $\mu$ m, C, E, F=100  $\mu$ m, D, G=50  $\mu$ m, H=25  $\mu$ m.



**Fig. 4.** *Scaptognathus magnus*, female, scanning electron microscope photographs. A, Tarsus and tibia of leg I; B, Tarsus and tibia of leg II; C, Leg III; D, Tarsus and tibia of leg IV; E, Distal part of tarsus I (arrowhead indicating median claw); F, Lateral claws of leg II (arrowhead indicating accessory process). Scale bars: A–D = 50  $\mu$ m, E = 20  $\mu$ m, F = 5  $\mu$ m.

original description (Abé, 1990), are confirmed in this study under a scanning electron microscope and a DIC microscope with high magnification (1,000 $\times$ ) (see Figs. 2E–H, 4E).

**Measurements.** The size range of idiosoma, anterior dorsal plate, posterior dorsal plate, gnathosoma, and genitoanal plate in four adult specimens were as follows: idiosoma 384–467  $\mu$ m long (mean 421  $\mu$ m), 247–321  $\mu$ m wide (mean 285  $\mu$ m); anterior dorsal plate 121–136  $\mu$ m long (mean 128  $\mu$ m), 158–170  $\mu$ m wide (mean 164  $\mu$ m); posterior dorsal

plate 105–141  $\mu$ m long (mean 126  $\mu$ m), 119–152  $\mu$ m wide (mean 132  $\mu$ m); gnathosoma 328–368  $\mu$ m long (mean 339  $\mu$ m), 154–169  $\mu$ m wide (mean 162  $\mu$ m); and genitoanal plate 166–200  $\mu$ m long (mean 180  $\mu$ m), 84–111  $\mu$ m wide (mean 95  $\mu$ m), respectively. The average ratio of length-to-width in idiosoma, anterior dorsal plate, posterior dorsal plate, gnathosoma and genitoanal plate in Korean specimens ( $n=4$ ) were 1.48, 0.78, 0.95, 2.09, and 1.89, respectively.

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

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## CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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