

## A New Record of *Simognathus* Halacarid Mite (Acari, Halacaridae) from Korea

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### ABSTRACT

A marine halacarid mite, *Simognathus fuscus* Viets, 1936, was discovered in the intertidal and subtidal sandy sediments of the southern coast of Jeju Island, Korea. *Simognathus fuscus*, which is distributed in the Caribbean, southwestern Atlantic, and southwestern Pacific, is characterized by a round ocular plate, secondary dorsal setae located on the membranous cuticle anterior to the ocular plate, an anterior epimeral plate almost entirely covered with foveae, the anterior area of the genitoanal plate without foveae, a pair of adanal setae on the sides of the anal cone, positioned ventrodistally, and one ventral and one parambulacral seta on tarsi III and IV, respectively. The Korean specimens corresponded well with the original description of *S. fuscus* from Bonaire in the Caribbean, as well as records from other regions, although they showed one minor morphological difference in that the Korean specimens have slightly larger body sizes. This is the first report of *S. fuscus* from Korea.

**Keywords:** Halacaroidea, marine, meiofauna, *Simognathus fuscus*, taxonomy

### INTRODUCTION

The genus *Simognathus* Trouessart, 1889, belonging to the subfamily Simognathinae Viets, 1927, was established by Trouessart (1889b) to accommodate *Simognathus minutus* (Hodge, 1863) (= *Pachygnathus minutus* Hodge, 1863), based on a short and wide rostrum, a pair of palps positioned close to each other, and the distal tip of the palp extending beyond the rostrum (Trouessart, 1889a, 1889b). To date, 44 species of this genus have been recorded in habitats such as invertebrate communities, algae, and debris in the intertidal and subtidal zones (Bartsch, 2005, 2006; WoRMS, 2024). Among them, only two species have been recorded in the Northwest Pacific: *S. foveolatus* Bartsch, 1991 from Hong Kong (Bartsch, 1991) and *S. corensis* Chatterjee and Chang, 2004 from Korea (Chatterjee and Chang, 2004).

This study deals with *S. fuscus* Viets, 1936, recently found on the southern coast of Jeju Island, making its first record to date in Korea.

Materials were collected from the intertidal and subtidal sandy sediments of the southern coast of Jeju Island, Korea.

Samples were obtained by diving or using a suction device, anesthetized with 7% magnesium chloride or tap water for about 30 min, filtered through a 64- $\mu$ m mesh, and immediately fixed in 80% ethanol or 5% formalin. The detailed methods of slide preparation, figure drawing, and measurements are followed by Lee et al. (2023). Scale bars in the figures are in micrometers ( $\mu$ m).

Voucher specimens are deposited at the National Marine Biodiversity Institute of Korea (MABIK), Seocheon and a specimen is kept at the Marine Interstitial fauna Resources Bank (MInRB), Institute of Ocean Science and Technology (KIOST), Busan, Korea.

Terminology and abbreviations in the text and figure captions follow Bartsch (2006): AD, anterior dorsal plate; AE, anterior epimeral plate; ds, dorsal setae on idiosoma (ds-1 to ds-5, first to fifth dorsal setae on idiosoma); GA, genitoanal plate; GO, genital opening; OC, ocular plate(s); P, palp (P-1 to P-3, first to third palpal segments); pas, parambulacral setae; PD, posterior dorsal plate; PE, posterior epimeral plate; pgs, perigenital setae; sgs, subgenital setae.

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## SYSTEMATIC ACCOUNTS

Subclass Acari Leach, 1817  
Order Trombidiformes Reuter, 1909  
Suborder Prostigmata Kramer, 1877  
Superfamily Halacaroidae Cunliffe, 1954  
Family Halacaridae Murray, 1877  
Subfamily Simognathinae Viets, 1927  
<sup>1</sup>\*Genus *Simognathus* Trouessart, 1889

### <sup>2</sup>\**Simognathus fuscus* Viets, 1936 (Figs. 1, 2)

*Simognathus fuscus* Viets, 1936: 421, figs. 50–54; Pepato and Tiago, 2004: 11, fig. 6A–J; Bartsch, 2009: 194, figs. 91–97. *Simognathus platyaspis* Otto, 2000: 519, figs. 14A–D, 15A–D; Bartsch, 2003: 36, fig. 9A–F; 2005: 305.

**Material examined.** Korea, Jeju Island: 1♀ (MABIK CR002 57875), Seogwipo-si, Saeseom Is. (33°14'16"N, 126°33'37"E), 6 m depth, 24 Apr 2006, Chang CY and Lee J leg.; 2♀♀ (MABIK CR00257876, MInRB-HI22-S003), Seogwipo-si, Saekdal-dong, Jungmun-Saekdal Beach (33°14'42"N, 126°24'39"E), 13 Jun 2022, Chang CY and Lee J leg. All specimens were mounted on H-S slides.

**Description of female (MABIK CR00257875).** Idiosoma (Fig. 1A) 448 µm long (379–448 µm long, mean = 414 µm, n = 3), 256 µm wide (211–256 µm wide, mean = 233 µm, n = 3), length-to-width ratio 1.75–1.80 (mean = 1.78, n = 3). All dorsal plates (AD, OC, and PD) well-developed, divided by membranous cuticle, covered with foveae except for anterior edge of AD; each fovea surrounded by numerous punctate pores (= canaliculi).

AD (Fig. 1A) 202 µm long, 161 µm wide, length-to-width ratio 1.25, about 0.45 times as long as idiosoma; brown-color in posterior 60%; anterior margin weakly convex, posterior margin slightly truncated, and widest at about half level of AD; with a transverse hyaline lens in anterior edge where lacking foveae.

OC (Fig. 1A) small and slightly round-shaped, 29 µm long, 21 µm wide, length-to-width ratio 1.38; located at posterior quarter of AD; with 1 large cornea and 8–11 foveae sparsely distributed.

PD (Fig. 1A) 210 µm long, 172 µm wide, length-to-width ratio 1.22, about 0.47 times as long as idiosoma; equal to or slightly larger than AD; anterior margin slightly truncated, posterior margin weakly convex, and widest at posterior one-third of PD; evenly covered with foveae.

Five pairs of dorsal setae (Fig. 1A): 2 pairs of ds (ds-1 and ds-3) on AD, of which anterior setae (ds-1) at 28% of AD, medially and posterior ones (ds-3) near corner of posterior

margin, at 89% of AD; ds-2 situated on membranous cuticle anterior to OC; 2 pairs of ds (ds-4 and ds-5) located on PD, each situated at anterior 6% and 57% of PD, respectively. A pair of adanal setae (Fig. 1B) positioned ventrodistally near anal cone.

All ventral plates (Fig. 1B) separated from each other by membranous cuticle, as in dorsal plates. AE (Fig. 1B) 172 µm long, 233 µm wide, length-to-width ratio about 0.74, about 0.38 times as long as idiosoma, widest at level of leg II; epimeron I well-developed, medial process of epimeron I pointed distally and lateral process slightly blunt; posterior margin slightly concave or truncate; with a pair of epimeral vesicles between epimera I and II, and 3 pairs of ventral setae; covered with foveae, except for medial epimeral processes, a part of anterior 19% of AE, and around epimeral vesicles.

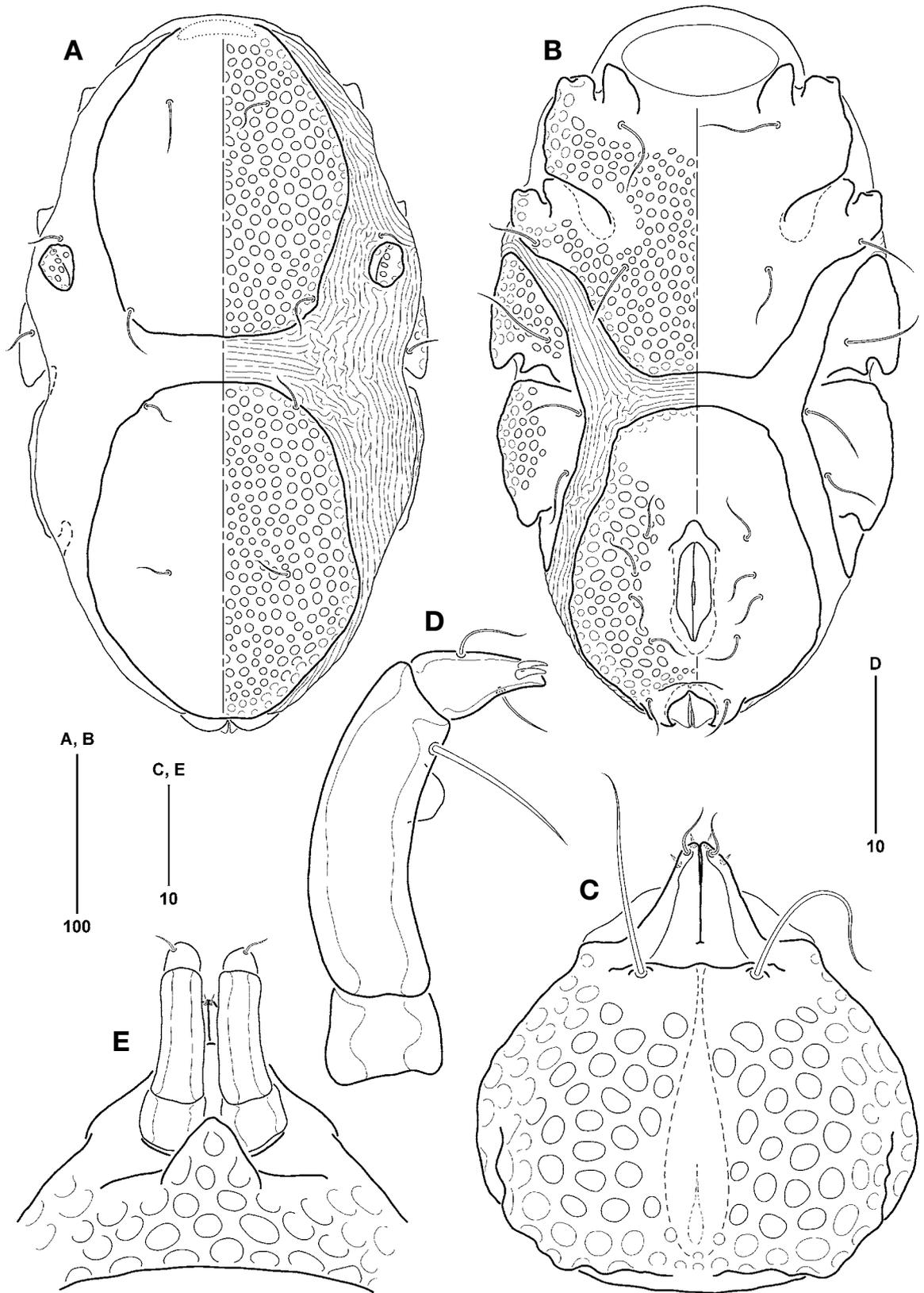
GA (Fig. 1B) 202 µm long, 158 µm wide, length-to-width ratio of about 1.28, about 0.45 times as long as idiosoma, 1.17 times longer than AE; anterior margin slightly convex or truncate, gradually widen to posterior end, widest at level of posterior end of GO; covered by foveae, except anterior part of GA, and 1–2 transversal rows of foveae arranged at anterior margin; with 4 pairs of pgs evenly spaced between anterior and posterior tips of GO. GO (Fig. 1B) 60 µm long, 24 µm wide, about 0.30 times as long as GA, sgs absent.

PE (Fig. 1A, B) with 1 dorsal and 3 ventral setae, dorsal one shorter than ventral ones; covered with foveae, except for proximal ventral part of epimeron IV.

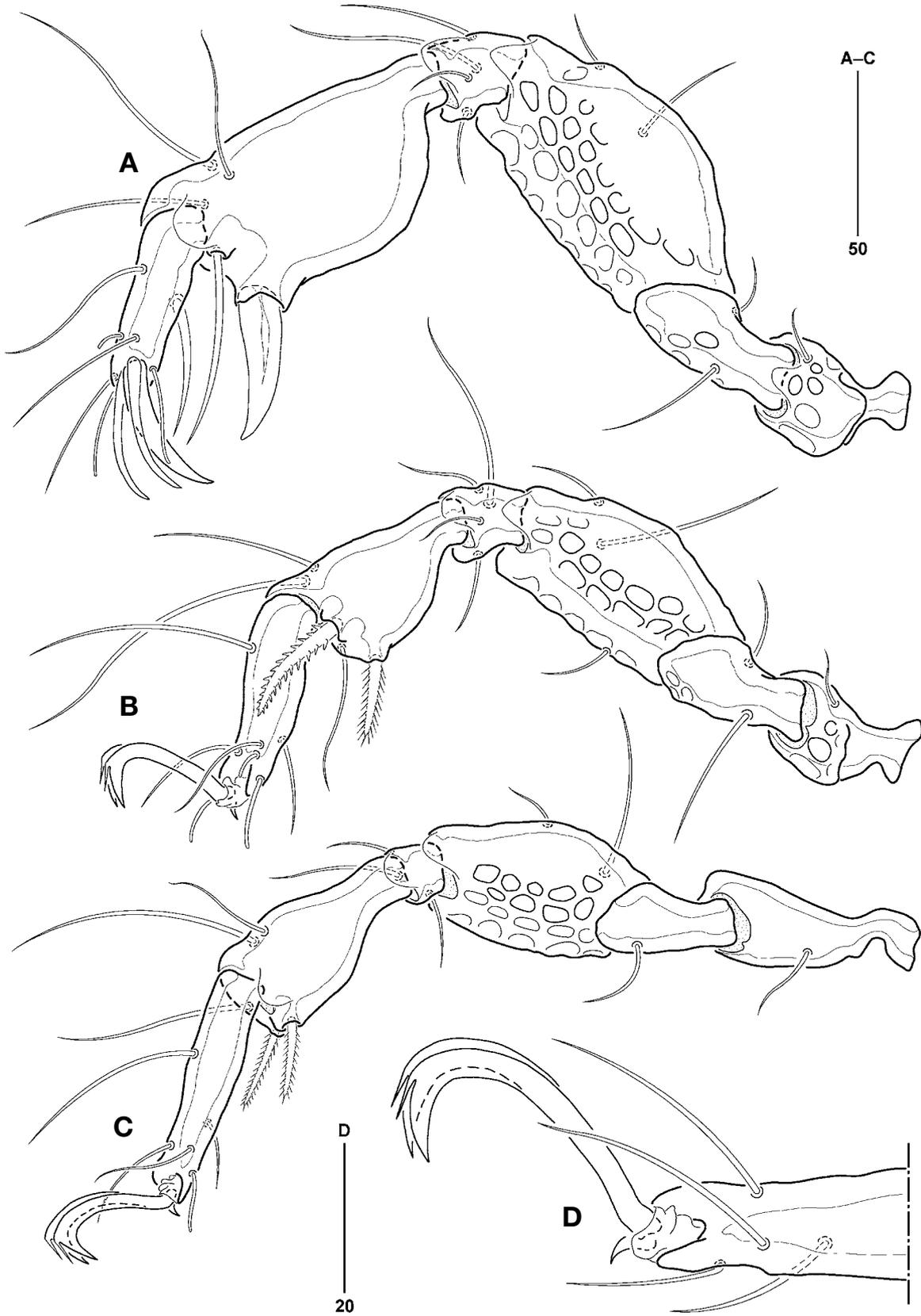
Gnathosoma (Fig. 1C, E) 111 µm long, 98 µm wide, length-to-width ratio of about 1.13, about 0.25 times as long as idiosoma, widest at anterior 65% of gnathosomal base; covered with foveae, except for rostrum and medial area of gnathosomal base. Rostrum (Fig. 1C) short, 26 µm long, about 0.39 times as long as gnathosomal base; anterior end not extending to distal end of P-2; with 4 pairs of rostral setae, consisting of a pair of tiny protorostral and deutorostral setae on anterior tip of rostrum, a pair of tritorostral setae at anterior 11% of rostrum ventrally, and a pair of basirostral setae at anterior margin of gnathosomal base. Palp (Fig. 1D, E) with 3 segments, 5, 18, and 7 µm long, respectively; P-1 lacking setae; P-2 with 1 ventral apophysis and 1 ventral seta, subdistally, 3.55 times as long as P-1; P-3 conical, with 1 dorsal and 1 ventral seta and 2 tiny subdistal spurs. Tectum (Fig. 1E) large, triangular.

All legs (Fig. 2A–C) strong, legs I–IV 355, 316, 324, and 326 µm long, respectively; leg IV (Fig. 2D) similar to leg III, except pas on tarsus. Chaetotaxy of legs as follows: trochanters 1-1-1-1; basifemora 2-2-1-1; telofemora 2-3-2-2; genua 4-4-3-3; tibiae 5-5-5-5; tarsi (excluding pas and solenidion) 4-4-4-4; number of bipectinate setae on tibiae I–IV 0-2-2-2 (none in other segments). All basifemora and telofemora with

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**Fig. 1.** *Simognathus fuscus* Viets, female. A, Idiosoma, dorsal; B, Idiosoma, ventral; C, Gnathosoma, ventral; D, Palp, lateral; E, Gnathosoma, dorsal.



**Fig. 2.** *Simognathus fuscus* Viets, female. A, Leg I, medial; B, Leg II, medial; C, Leg III, medial; D, Tip of tarsus IV, medial.

foveae at ventromedial surfaces. All genua shortest. All tibiae slender at the basal part than at distal part; tibia I (Fig. 2A) with 1 stout and strong ventral spine, 1 smooth ventromedial and 3 dorsal setae; tibia II (Fig. 2B) with 1 dentate ventromedial seta and 1 bipectinate ventral seta; tibiae III and IV (Fig. 2C) with 2 bipectinate ventral setae. Tarsus I (Fig. 2A) shorter than preceding segment (tibia I) with 1 solenidion, 1 ventral and 3 dorsal setae, and a pair of long singlet eupathid pas; length of tarsus II (Fig. 2B) similar to preceding segment (tibia II); tarsus II with 1 solenidion, 1 ventral and 3 dorsal setae, and a pair of singlet eupathid pas; tarsus III (Fig. 2C) slightly longer than preceding segment (tibia III), with 1 ventral and 3 dorsal setae, and 1 ventromedial eupathid pas; tarsus IV (Fig. 2D) with 1 ventral and 3 dorsal setae, and 1 ventromedial filiform pas. All legs with a pair of lateral claws bearing accessory processes dorsodistally and 1 small median claw, except for tarsus I with 1 stout sickle-shaped median claw and a pair of slender lateral claws without accessory processes.

**Male.** Unknown.

**Distribution.** Caribbean (Viets, 1936), Brazil (Pepato and Tiago, 2004), Australia (Otto, 2000; Bartsch, 2003), Singapore (Bartsch, 2009), Philippines (Bartsch, 2005), Korea (this study).

**Remarks.** The genus *Simognathus* is currently composed of 44 valid species (WoRMS, 2024) and is characterized by a spindle-shaped body, dorsal plates covered with foveae, three-segmented palp, a large apical ventral spine on tibia I, and a large sickle-shaped median claw and a pair of slender lateral claws on tarsus I (Otto, 2000; Pepato and Tiago, 2004; Rivas, 2006; Bartsch, 2009). Bartsch (1994) noted that the genus could be divided into two groups, the *S. minutus* group and the *S. leiomerus* group, based on the shape of the ocular plate and the presence or absence of corneae (Bartsch, 2005, 2006; WoRMS, 2024). The former group, to which *S. fuscus* belongs, comprises 27 species and is distinguished by large, triangular or round ocular plates and a single cornea, whereas the latter group consists of the remaining 17 species, which have reduced ocular plates, either entirely or as elongated sclerites, and lack corneae (Bartsch, 1994).

*Simognathus fuscus* was first described as a new species based on its brown-colored AD, which is reflected in its epithet, from Bonaire in the Caribbean by Viets (1936). It has subsequently been recorded in Brazil (Pepato and Tiago, 2004). Bartsch (2009) provided a comprehensive review of *S. fuscus* and offered supplementary observations, recognizing *S. platyaspis* Otto, 2000, recorded from Australia (Otto, 2000), as a synonym of *S. fuscus*. She noted that the coloration of *S. fuscus* should no longer be considered a distinguishing characteristic, as it varies depending on environmental conditions, age, and the method used for specimen fixation (Bartsch, 2009). Therefore, the representative characteristics of *S. fuscus*

are as follows: dorsal seta-2 located on the membranous cuticle anterior to the ocular plate, anterior epimeral plates almost adorned with foveae, absence of foveae on the anterior portion of the genitoanal plate, a pair of adanal setae positioned ventrodistally on the sides of the anal cone, and tarsi III and IV with one ventral and one parambulacral seta, respectively.

The Korean specimens corresponded well to the characteristics of *S. fuscus*, with the only minor difference being a slightly longer idiosoma, measuring 379–448  $\mu\text{m}$  in length, compared to the original type specimen (370  $\mu\text{m}$  long) and those recorded from other regions (306–364  $\mu\text{m}$  long).

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## CONFLICTS OF INTEREST

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

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