

## New Report of *Scoelepis geniculata* (Annelida: Spionidae) in Korean Fauna

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### ABSTRACT

The spionid polychaete *Scoelepis geniculata*, originally described in Japan, is newly recorded in the Korean fauna. Specimens collected from the eastern and southern coasts of Korea between May 1999 and October 2002, stored in the invertebrate collection of the National Institute of Biological Resources, were examined based on their morphology. *Scoelepis geniculata* is morphologically most similar to *S. yamaguchii* from Japan and Korea but is distinguished by having branchiae separated from the notopodial lamellae in posterior chaetigers and notopodial prechaetal lamellae digitiform in anterior chaetigers instead of subtriangular. A detailed morphological description of *S. geniculata*, and an amended identification key to all Korean *Scoelepis* species is provided.

**Keywords:** Korean waters, morphology, new record, *Parascoelepis*, taxonomy

### INTRODUCTION

The genus *Scoelepis* Blainville, 1828, belonging to the family Spionidae Grube, 1850, is one of the most common and abundant groups in intertidal and shallow subtidal zones (Blake et al., 2020). Generally, this genus is characterized by an anteriorly pointed prostomium, branchiae appearing from chaetiger 2, an absence of ciliated grooves on the palps, and the presence of a cushion-like pygidium without cirri (Maciolek, 1987; Delgado-Blas, 2006; Lee and Min, 2022). Up to date, a total of eight species [*S. papillosa* (Okuda, 1937); *S. yamaguchii* (Imajima, 1959); *S. lingulata* Imajima, 1992; *S. sagittaria* Imajima, 1992; *S. daphninos* Zhou, Ji and Li, 2009; *S. antero-branchiata* Lee and Min, 2022; *S. brunnea* Lee and Min, 2022; *S. rubra* Lee and Min, 2022] have been recorded in Korea (Paik, 1982, 1989; Lee and Min, 2022; Lee et al., 2022). In this study, we report the discovery of a previously unrecorded species in Korea, *Scoelepis geniculata* Imajima, 1992, which was previously known only in Japan.

Examined specimens were discovered among the invertebrate collections labeled 'Polychaeta' in the storage room of the National Institute of Biological Resources (NIBR) in Korea. All specimens were collected from the eastern and

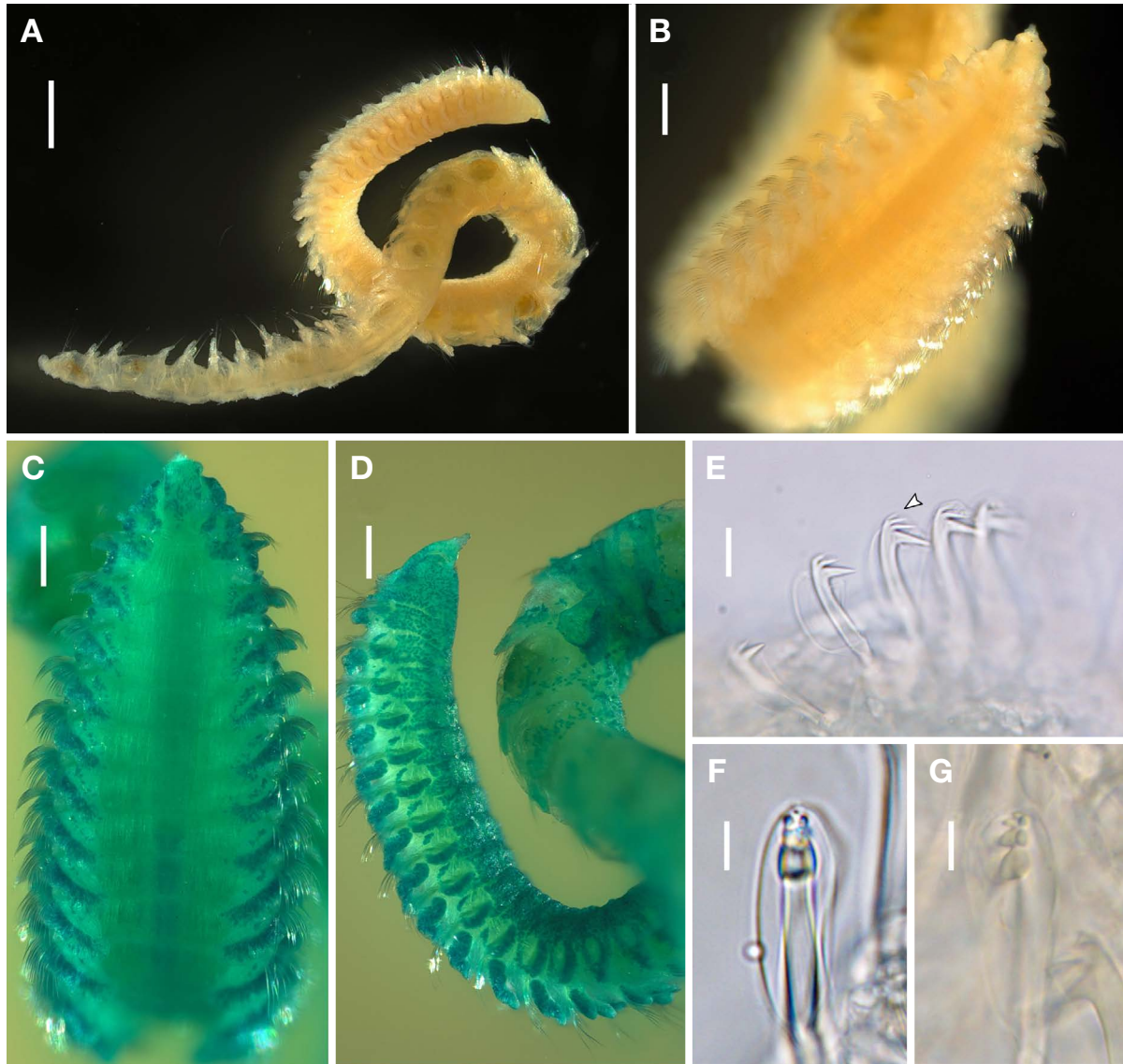
southern coasts of South Korea. Morphological characteristics were observed under a stereomicroscope (MZ125; Leica, Wetzlar, Germany) and photographed using a digital camera (Dhyana 400DC; Tucsen, Fuzhou, China) with the capture program (Mosaic version 15; Tucsen). The dissected appendages were observed under a light microscope (BX53; Olympus, Tokyo, Japan) and photographed using a CCD camera (eXcope K5; DIXI Science, Daejeon, Korea). The specimens were stained with an alcohol solution of methylene green to observe the staining pattern. The specimens used for the scanning electron microscope (JSM-6390; Jeol, Tokyo, Japan) were dried using an automated critical point dryer (EM CPD300; Leica) and coated using a gold sputter coater (Cressington Sputter Coater 108 Auto; Cressington Scientific Instruments, Watford, UK).

### SYSTEMATIC ACCOUNTS

Phylum Annelida Lamarck, 1809  
Family Spionidae Grube, 1850  
Genus *Scoelepis* Blainville, 1828

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**Fig. 1.** *Scolelepis geniculata* Imajima, 1992 (A–D, NIBRIV0000810307; E–G, NIBRIV0000810308). A, Entire body, lateral view; B, Anterior end without palps, dorsal view; C, Anterior end stained in methylene green (MG), dorsal view; D, Anterior end stained in MG, lateral view; E, Hooded hooks from chaetiger 22, lateral view, arrowhead indicating uppermost tooth; F, Hooded hook from chaetiger 22, frontal view; G, Hooded hook from chaetiger 24, frontolateral view. Scale bars: A=0.5 mm, B–D=0.2 mm, E=10  $\mu$ m, F, G=5  $\mu$ m.

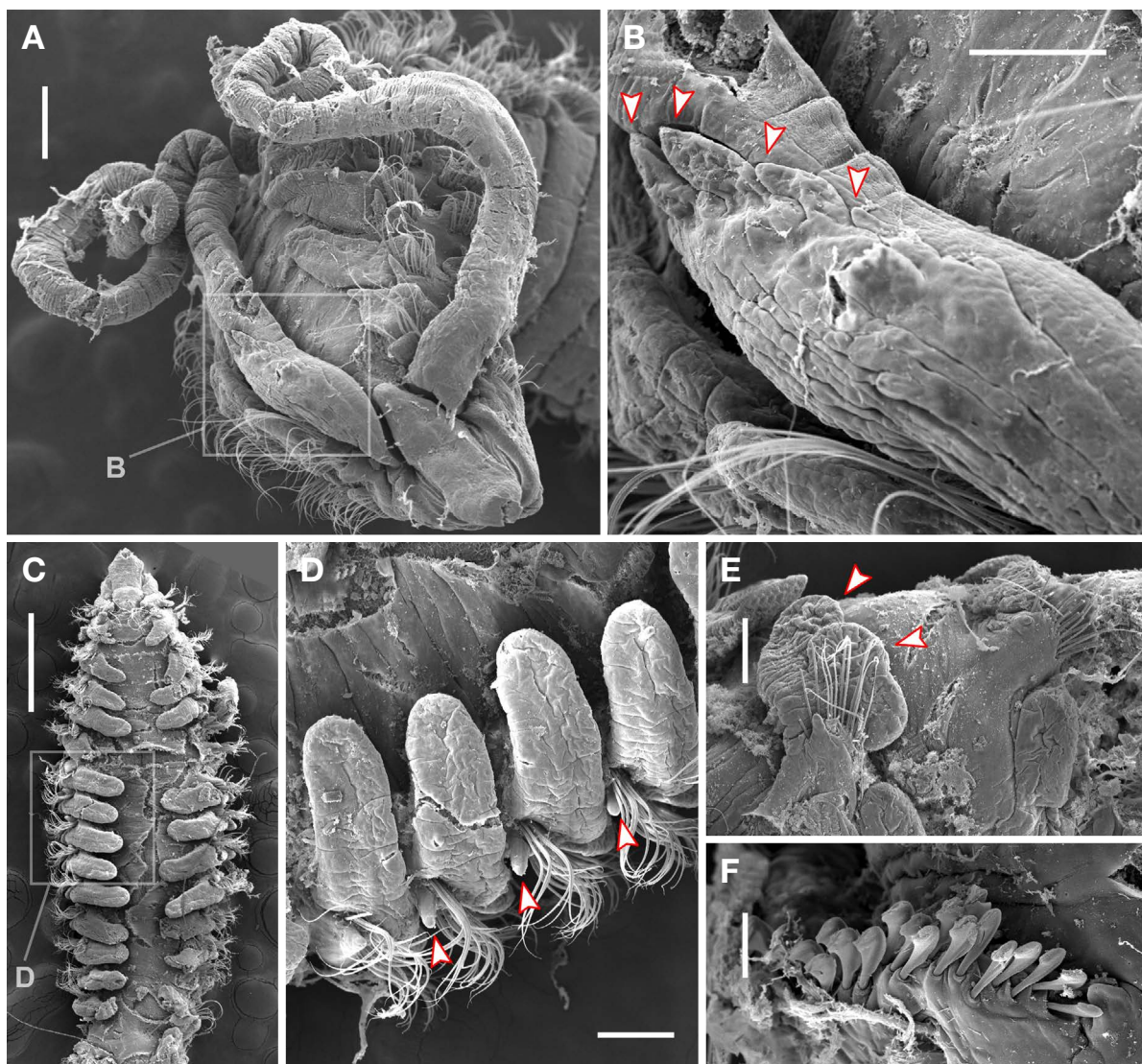
<sup>1</sup>\**Scolelepis geniculata* Imajima, 1992 (Figs. 1, 2)

*Scolelepis* (*Parascolelepis*) *geniculata* Imajima, 1992: 26, figs. 18, 19; 1996: 243, fig. 194.

**Material examined.** Korea: 1 ind. (anterior fragment, NIBR IV0000810280), Gyeongsangnam-do: Hadong-gun, no further information, 28 May 1999; 5 inds. (3 complete, 2 anterior fragments, NIBRIV0000810281, NIBRIV0000810282), 25 Apr

1998; 2 inds. (2 anterior fragments, NIBRIV0000810298), 16 Oct 1998; 3 inds. (1 complete, 2 anterior fragments, NIBR IV0000810303), Feb 2001; 3 inds. (2 complete, 1 anterior fragment, NIBRIV0000810304), Gyeongsangbuk-do: Uljin-gun, Hupo-myeon, no further information, Oct 2002; 1 ind. (anterior fragment, NIBRIV0000810305), Aug 2001; 1 ind. (complete, NIBRIV0000810306), Oct 2001; 1 ind. (complete, NIBRIV0000810307), Feb 2002; 1 ind. (complete,

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**Fig. 2.** Scanning electron microscope images of *Scolelepis geniculata* Imajima, 1992 (A, B, NIBRIV0000810305; C-F, NIBRIV0000810281). A, Anterior end with palps, frontal view; B, Basal sheath of right palp, arrowheads indicating papillae; C, Anterior end without palp, dorsal view; D, Chaetigers 7–10, arrows indicating digitiform notopodial prechaetal lamellae; E, Notopodial lamellae of middle chaetigers, arrowheads indicating lamellae separated into lobes; F, Hooded hooks in posterior chaetigers. Scale bars: A=0.2 mm, B, D, E=0.1 mm, C=0.5 mm, F=20  $\mu$ m.

NIBRIV0000810308), Gyeongsangbuk-do: Pohang-si, Guryongpo-eup, no further information, Oct 2002. All specimens were probably fixed in formalin and collected by Jae-Sang Hong.

**Description.** Body complete with 47–50 chaetigers, 0.9–1.2 mm wide (measured at about chaetiger 10) and 1.2–1.7 mm long (measured in fixed specimen). Color of fixed specimen whitish-yellow with or without brownish-yellow pigmentation on prostomium (Fig. 1A, B). Prostomium elongated, anteriorly trifold, extending as caruncle to posterior end of chaetiger 1; two pairs of reddish eyes arranged in trapezoid (eyes indis-

cernible in some specimens), anterolateral pair larger, crescent-shaped, wider apart, and posterior pair smaller, rounded; short occipital antenna present (Figs. 1B, C, 2A, C). Peristomium partially fused to chaetiger 1, not forming lateral wings (Figs. 1B–D, 2A, C). Palp with papillae on the upper side of the basal sheath; ciliation patterns indiscernible due to poor specimen conditions (Fig. 2A, B). Low but distinct transverse ciliated bands present almost throughout body. Lateral ciliated organs present between notopodial and neuropodial parapodia from chaetiger 1 to posteriormost chaetigers. Chaetiger 1 reduced, with small conical with rounded tip postchaetal rami



(Fig. 2A). Branchiae appearing from chaetiger 2 throughout body (Fig. 1A). Notopodial postchaetal lamellae elongated and rounded, largest on chaetigers 2–14, gradually decreasing in size posteriorly; postchaetal lamella entirely fused to branchiae in anterior chaetigers (Fig. 2C); from about chaetiger 14, lamellae divided into subrounded process on distal part and broadly rounded to foliaceous lobes on basal part (Fig. 2E); prechaetal lamellae digitiform in anterior chaetigers, conical with rounded tips in posterior chaetigers (Fig. 2D). Neuropodial postchaetal lamellae broadly rounded in anterior chaetigers, becoming ear-like in posterior chaetigers; prechaetal lamellae small and rounded. Anterior chaetae all granulated capillaries with narrow sheaths, arranged in two rows until hook-bearing chaetigers; neuropodial hooded hooks from chaetigers 15 invariably, numbering 7–8 at first, then increasing up to 20 per fascicle posteriorly; hooded hooks with two pairs of teeth and uppermost tooth surmounting main fang (Figs. 1E–G, 2F). Pygidium bilobed.

**Variation.** The neuropodial hooded hooks of the Japanese specimens have six teeth above the main fang whereas the Korean specimens have five teeth above the main fang (Fig. 1E–G).

**Methyl green staining pattern.** Posterior part of prostomium, peristomium, basal part of palps, lateral ciliated organs, postchaetal lamellae of both rami, and pygidium most stained; branchiae slightly stained. On ventral side, transverse bands of scattered dots per segment of about first 23 chaetigers intensely stained. On dorsal side, transverse ciliated bands across dorsum were not stained (Fig. 1C, D).

**Remarks.** A recent phylogenetic analysis based on mitochondrial and nuclear genes (Lee and Min, 2022) in the genus *Scolelepis* did not support the “traditional” subgeneral classification (Surugiu, 2023). This result indicated that the subgeneral classification proposed by Maciolek (1987) seems to be not supported by the molecular data (Surugiu, 2023). Therefore, only the genus level was used in the present study.

The Korean specimens collected from the eastern and southern coasts of Korea agree well with the original description of *Scolelepis geniculata* by the following characteristics: (1) neuropodial hooded hooks appearing from chaetiger 15 (Figs. 1E–G, 2F), (2) branchiae completely fused with notopodial postchaetal lamellae in anterior chaetigers (Fig. 2C, D), (3) notopodial prechaetal lamellae digitiform in anteriormost chaetigers (Fig. 2A, D), (4) notochaetae present in chaetiger 1 (Fig. 2A, C), and (5) palps with papillae on the upper side of the basal sheath (Fig. 2B) (Imajima, 1992). *Scolelepis geniculata* is most similar to *S. yamaguchii* (Imajima, 1959) in having papillae on the palps, the presence of notochaetae in chaetiger 1, and branchiae completely fused with notopodial postchaetal lamellae in anterior chaetigers. However, *S. geniculata* differs from *S. yamaguchii* in having notopodial post-

chaetal lamellae separated from the branchiae in posterior chaetigers (Fig. 2E) (vs. not separated in posterior chaetigers in *S. yamaguchii*) and digitiform notopodial prechaetal lamellae in anterior chaetigers (Fig. 2A, D) (vs. subtriangular).

**Distribution.** Japan, Korea (present study).

#### Identification key to *Scolelepis* species from Korean waters

1. Caruncle detached from dorsum ..... 2
  - Caruncle attached to dorsum ..... 3
2. Hooks bi- or tridentate, appearing from chaetigers 26–30; hooks in notopodia present ..... *S. sagittaria*
  - Hooks uni- or bidentate, appearing from chaetiger 22; hooks in notopodia absent ..... *S. lingulata*
3. Palps with papillae on the upper side of the basal sheath ..... 4
  - Palps without papillae ..... 6
4. Chaetiger 1 without notochaetae ..... *S. papillosa*
  - Chaetiger 1 with notochaetae ..... 5
5. Notopodial postchaetal lamellae separated from branchiae in posterior chaetigers; notopodial prechaetal lamellae digitiform in anterior chaetigers ..... *S. geniculata*
  - Notopodial postchaetal lamellae not separated from branchiae in posterior chaetigers; notopodial prechaetal lamellae subtriangular in anterior chaetigers ..... *S. yamaguchii*
6. Chaetiger 1 without notochaetae ..... 7
  - Chaetiger 1 with notochaetae ..... 8
7. Anterior body with orangish yellow pigmentation; hooks quinquedentate, appearing from chaetigers 17–18 .....
  - ..... *S. anterobranchiata*
  - Anterior body with reddish-brown pigmentation; hooks quadridentate, appearing from chaetigers 21–22 .....
    - ..... *S. brunnea*
8. Body whitish-yellow, with conspicuous reddish-brown pigmentation along transverse ciliated bands; prostomium always conical with point tip ..... *S. daphnois*
  - Body reddish pink, without pigmentation along transverse ciliated bands; prostomium conical with point tip or occasionally with lateral angles ..... *S. rubra*

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#### CONFLICTS OF INTEREST

Taeseo Park contributing editor of the Animal Systematics, Evolution and Diversity, was not involved in the editorial

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