

Naidid oligochaetes (Annelida: Clitellata) from the Seokhyeoncheon and Changreungcheon Streams with New Record of *Nais variabilis*

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Aquatic Oligochaeta is a notable animal group in freshwater environment such as streams, rivers and lakes in view of its biomass and species richness. Taxonomic studies of this group, however, have hardly been performed in Korea. Here five naidid oligochaete species are reported - *Slavina appendiculata*, *Pristina longiseta*, *Pristina biserrata*, *Chaetogaster diaphanus* and *Nais variabilis* - from the Seokhyeoncheon Stream in Yangju and from the Changreungcheon Stream in Goyang, Gyeonggi-do. Aquatic oligochaetes attaching on aquatic vegetations were collected with a plankton hand net. An image and description on *Nais variabilis* new to Korea are provided.

Key words : Naididae, *Nais variabilis*, Seokhyeoncheon Stream, Changreungcheon Stream, Korea

Aquatic Oligochaeta belonging to Annelida is a notable animal group in freshwater environment such as streams, rivers and lakes in view of its biomass and species richness. It also plays a preponderant role in recycling substances in benthic environments (Martin *et al.*, 2008). In Korea, however, taxonomic and ecological studies on aquatic oligochaetes have hardly been performed to date and they have not been considered important in limnological surveys. Yoon *et al.* (2000) who reported seven species provides the only faunistic report on aquatic oligochaetes in this country. All the species in their report are naidid oligochaetes. Naidid oligochaete species are usually small and live on the sediment surface or swim among aquatic vegetation in which they feed on algae (Martin *et al.*, 2008). The family Naididae is one of the most speciose groups in microdrile oligochaetes. While 59 species of naidid oligochaetes have been reported in China (Wang and Cui, 2007), many species still need to be discovered in Korea. In this study five naidid species were reported which were collected from the Seokhyeoncheon Stream

in Jangheung, Yangju, Gyeonggi-do and from the Changreungcheon Stream in Goyang, Gyeonggi-do. Of these, an image and description on *Nais variabilis* which is new to Korea are provided.

Naidid oligochaetes were collected from the Seokhyeoncheon and Changreungcheon Streams in Gyeonggi-do. Length and basin area of the Seokhyeoncheon Stream are about 9.5 km and 19.43 km², respectively. This stream runs through Jangheung and Ilyoung pleasure grounds, and has therefore been disturbed by vacationers. Another site, the Changreungcheon Stream, located in Goyang, Gyeonggi-do represents 22 km in length and 79.75 km² in basin area. This stream is also frequently disturbed with vacationers visiting Bukhansan (Mt.) and polluted by waste from new town recently built nearby.

Survey was performed on July 17 and July 19, 2010 at three locations (Table 1): near the Samsanggyo Bridge (SS1) and near the Cheoldari Bridge (SS2) in the Seokhyeoncheon Stream, and under the Jichukgyo Bridge (CS) in the Changreungcheon Stream. Naidid oligochaetes living on aquatic

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Table 1. Collecting locations.

Location	Date	Latitude/Longitude	Site description	Substrate type
Changreungcheon Stream (CS)	15 Jul 2010	N37° 38'34.8" E126° 55'25.5"	Jichukgyo Br.	Sand, silt, vegetation
Seokhyeoncheon Stream Site 1 (SS1)	17 Jul 2010	N37° 41'44.75" E126° 55'49.96"	Samsanggyo Br.	Sand, vegetation
Seokhyeoncheon Stream Site 2 (SS2)	17 Jul 2010	N37° 43'11.12" E126° 26'41.01"	Cheoldari Br.	Sand, silt

ic vegetation at the edge of the streams were collected with a plankton hand net (mesh size, 100 μm). Immediately after being caught, the behaviors of the oligochaetes were observed with a portable microscope. Then the specimens were fixed with 5% formalin solution. At the laboratory, the samples were sorted under a stereomicroscope and were moved into a 70% ethanol solution. Specimens were mounted on slide glasses in lactic acid, and were observed in detail with a light microscope (Nikon, Optiphot-2). The specimens are deposited at the laboratory of Ecological Genetics of the Department of Science Education at Ewha Womans University. Taxonomy of families and subfamilies follows the classification system of Erséus and Gustavsson (2002) and Erséus *et al.* (2008).

Phylum Annelida 환형동물문
Class Clitellata 환대강
Order Tubificida 실지렁이목
Family Naididae Ehrenberg, 1828 물지렁이과
Subfamily Naidinae Ehrenberg, 1828
물지렁이아목 (신칭)
Genus *Chaetogaster* von Baer, 1827
털배물지렁이속

1. *Chaetogaster diaphanus* (Gruithuisen, 1828)

수정털배물지렁이
Nais diaphana Gruithuisen, 1828: p. 409.

Material examined. 1 individual from SS1.

Remarks. This species is distributed over Europe, North America, African, and Asia. Yoon *et al.* (2000) firstly reported this species in Korea. It lives on solid substrates such as stones and vegetations, and feeds on small zooplankton and algae.

Genus *Nais* Müller, 1773 물지렁이속 (신칭)
2. *Nais variabilis* Piguet, 1906 물지렁이 (신칭)
(Fig. 1A-D)
Nais variabilis Piguet, 1906: p. 253.

Material examined. 4 individuals from SS1 and 1 from SS2.

Description. Length=4.05 mm, height=0.2 mm, segments=33. Dorsal chaetae, hairs and needles 1~2 per bundle, needles with conspicuous nodulus, at 1/4 from the distal end, teeth short but obvious. Dorsal hair chaetae 3~5 times longer than dorsal needle chaetae. Ventral chaetae 2~5 per bundle. Ventral chaetae of II and III with upper tooth slightly longer than ventral tooth (Fig. 1C, D). Stomachal widening abrupt. Swims with spiral movements.

Remarks. It is not easy to separate *Nais variabilis* from *N. communis* because both species overlap in distribution range, and represent similar morphological features. The former has ventral chaetae II with slight distal nodulus, but the latter has ones with median nodulus (Yamaguchi, 1953; Brinkhurst, 1964). Also *N. variabilis* shows swimming behavior with spiral movements, and abrupt widening of the stomach (Brinkhurst and Jameison, 1971). Features of specimens in this study conform to those of *N. variabilis* reported from previous studies.

Distribution. Cosmopolitan.

Genus *Slavina* Vejdovsky, 1883 꺾질물지렁이속
3. *Slavina appendiculata* (d'Udeken, 1855)
긴털꺾질물지렁이
Nais appendiculata d'Udeken, 1859: p. 21.

Material examined. 2 individuals from SS1.

Remarks. This species shows cosmopolitan distribution. Yoon *et al.* (2000) firstly reported this species in Korea.

Subfamily Pristinae Lastočkin, 1921
주둥이물지렁이아과 (신칭)
Genus *Pristina* Ehrenberg, 1828
주둥이물지렁이속

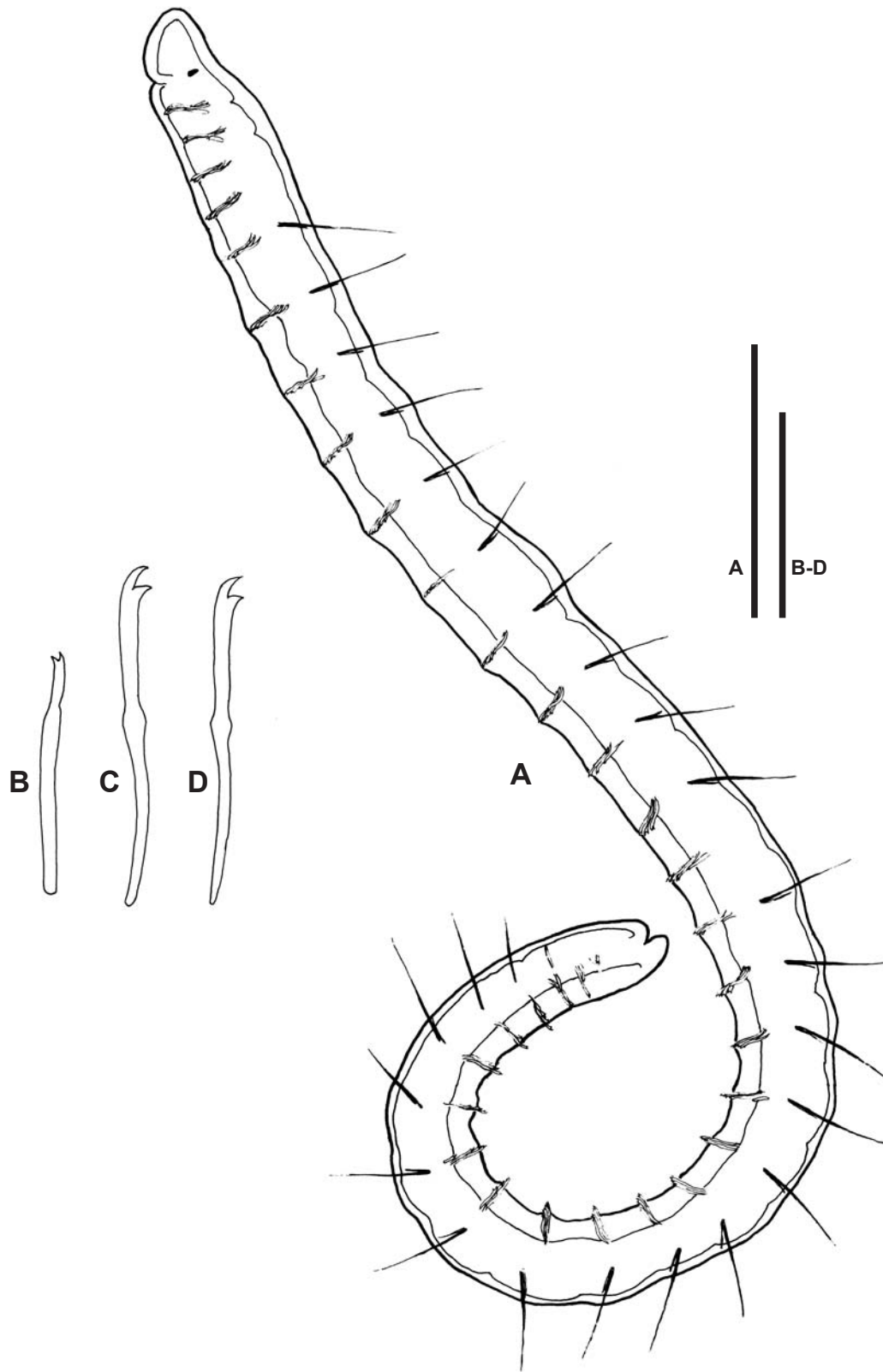


Fig. 1. *Nais variabilis* Piguet, 1909. A, lateral habitus; B, dorsal need chaeta; C, ventral chaeta in II; D, ventral chaeta in III. Scale bars=800 μ m (A); 50 μ m (B-D).

4. *Pristina longiseta* Ehrenberg, 1828

긴털주둥이물지렁이

Pristina longiseta Ehrenberg, 1828: p. 112.

Material examined. 1 individual from SS1.

Remarks. This species is distributed over Europe, Africa, and Asia. Yoon *et al.* (2000) firstly reported this species in Korea. It lives in mud and on water plants.

5. *Pristina biserrata* Chen, 1940

툽니털주둥이물지렁이

Pristina biserrata Chen, 1940: p. 49.

Material examined. 1 individual from CS.

Remarks. This species is distributed over South America, China and Korea. Yoon *et al.* (2000) firstly reported this species in Korea. It lives in mud, organic material, and leaf litter.

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