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Two Bucephalid Parasites, *Dolichoenterum longissimum* and *Prosorhynchus aculeatus* (Trematoda: Digenea), of Conger Eel, *Conger myriaster*, from Coastal Areas in Korea

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During the course of studying the helminth fauna from the fishes of the Korean coastal waters, two bucephalid species, *Dolichoenterum longissimum* Ozaki, 1924 and *Prosorhynchus aculeatus* Odhner, 1905, were collected from the alimentary canal of the conger eel, *Conger myriaster*. *D. longissimum* was characterized by having the ovary between the testes, and 7~8 horn-like projections on the ventral side of rhynchus. *P. aculeatus* was distinguished from the other species by the location of the mouth or the opening position of the excretory vesicle. These two bucephalid digeneans are new to the Korean fauna.

Key words: *Dolichoeneterum longissimum*, *Prosorhynchus aculeatus*, Digenea, Bucephalidae, *Conger myriaster*

Introduction

The adult and metacercarial stages of bucephalids are parasites of freshwater and marine fishes. Since Park (1939) had recorded *Bucephalopsis cybii* as a new species from *Cybium coreanum* and *Acanthogobius hasta*, no bucephalids have been recorded in Korea.

In the present study, two bucephalid species, *Dolichoenterum longissimum* Ozaki, 1924 and *Prosorhynchus aculeatus* Odhner, 1905, were collected from the alimentary canal of the conger eel, *Conger myriaster*, living in the Korean costal areas. They were redescribed with taxonomical comments.

Materials and Methods

Conger eels were collected using a small trawl from the Kwangyang Bay, the Chinhae Bay, and the coast of Kori during the period from 1996 through 1998. The fish were transported to the laboratory in live state and all organs were examined for parasites. Living worms were fixed in hot AFA (ethanol-formalin-acetic acid), stored in 70% ethanol, and stained with acetocarmine in the routine preparation of whole mounts. Specimens were measured with an ocular micrometer, and were drawn with the aid of a camera lucida. Measurements are in millimeters.

Results and Discussion

Descriptions were based on 5 mature, unflattened specimens. Each value is the mean with the range in parentheses.

Dolichoenterum longissimum Ozaki, 1924 (Fig. 1)

Body consisting of a filiformed anterior portion and a elongated cylindrical posterior portion, 9.39 (7.50~10.63) long by 0.65 (0.54~0.78) in maximum width. Tegument beset with fine spines which is sparse posteriorly. Rhynchus funnel-shaped, with 7~8 horn-like ventrally located projections, 0.28 (0.24~0.33) long by 0.31 (0.25~0.36) wide. Mouth ventral, about one fourth length of body from

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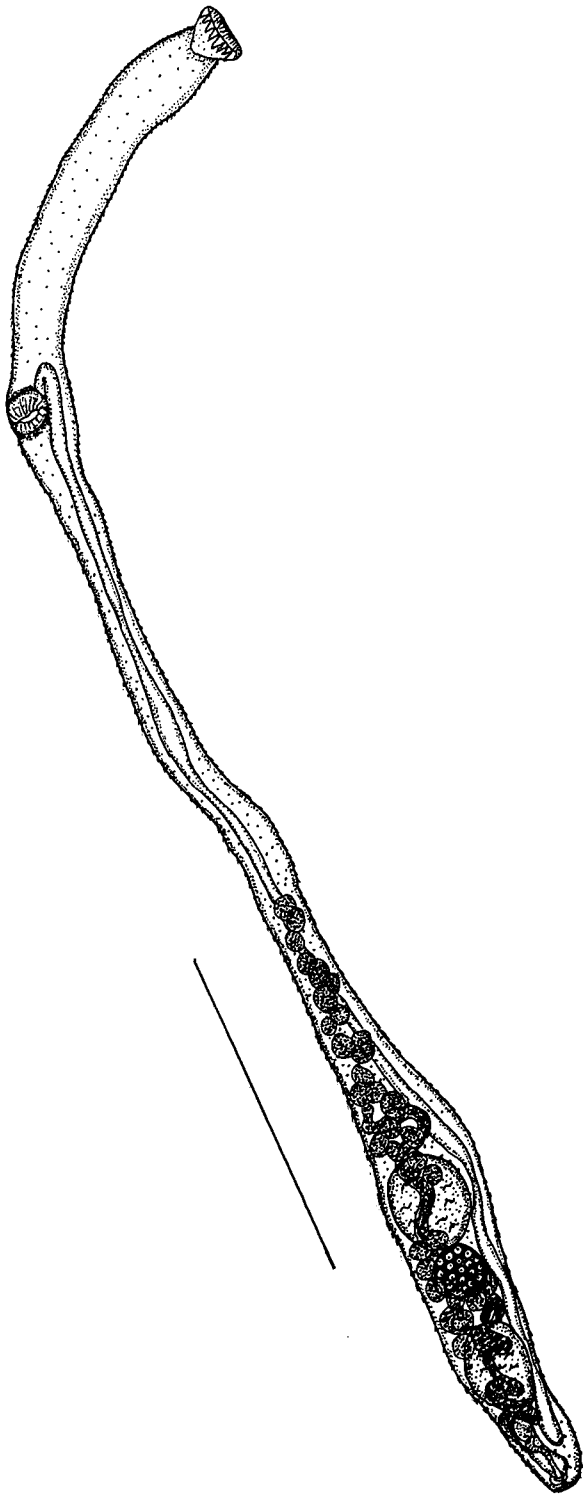

Fig. 1. *Dolichoenterum longissimum* Ozaki, 1924 from the intestine of *Conger myriaster*. Whole mount, ventral view. Bar scale: 2 mm.

anterior end. Pharynx well developed, 0.15 (0.13~0.17) in both length and width. Esophagus short, expanding to form an elongated digestive sac which turns and extends posteriorly to mid-level of cirrus pouch.

Testes tandem, in posterior part of body, separated by intercalated ovary, oval and entire; anterior testis slightly smaller than posterior, 0.42 (0.36~0.50) long by 0.41 (0.33~0.48) wide; posterior testis 0.44 (0.38-0.51) long by 0.40 (0.32~0.45) wide. Cirrus pouch cylindrical, thick walled, located at posterior end, 0.52 (0.50~0.54) long by 0.15 (0.15~0.16) wide. Seminal vesicle spherical, entire, internal of cirrus pouch. Pars prostatica tubular, sinuous at basal portion, dilated slightly before joining ejaculatory duct. Penis conical, lying in genital atrium. Genital atrium ventral.

Ovary oval, entire, intertesticular, submedian, smaller than testes, 0.31 (0.30~0.32) long by 0.32 (0.28~0.36) wide. Seminal receptacle absent. Ootype posterior to ovary. Vitellaria large follicular, extending to posterior testis. Uterus occupying all available space of poterior body. Eggs oval, 29.3 μm (28~30 μm) long by 19 μm (18~20 μm) wide. Excretory vesicle tubular, terminating in terminal excretory pore, which situated just posterior to genital atrium.

Host: *Conger myriaster*

Locality: The Chinhae Bay (March 14, 1998; May 15, 1998; July 20, 1998)

Location in host: Intestine

Specimens deposition: PKNU (Pukyong National University) Helminth Collection

Remarks: The genus *Dolichoenterum* was erected by Ozaki (1924) to hold *D. longissimum* from *Leptocephalus myriaster* in Japan. This genus differs from all other genera of Bucephalidae in having the ovary between the testes. *D. longissimum* is the only member of the genus found as adult in fish. According to Ozaki (1924), the excretory vesicle opened into the genital sinus forming urogenital pore, but in our specimes the excretory pore opened just behind the genital pore. This was also indicated by Yamaguti (1934). Therefore, it should be corrected as the excretory vesicle of *D. longissimum* opens not in genital pore but in separated excretory pore. The dimensions of each character in Ozaki's (1924) original description and present specimens are given in Table 1.

Table 1. Dimensions[a] of *Dolichoenterum longissimum* from the intestine of *Conger myriaster* in Korea and comparison with Ozaki's (1924) original description

Characters	Ozaki (1924)	Present study
Body	9.64 (5.33~13.30)× 0.73 (0.60~1.28)	9.39 (7.50~10.63)× 0.65 (0.54~0.78)
Rhynchus	with 6~8 projections	with 7~8 projections
Pharynx	0.25 (0.19~0.30) in diameter	0.15 (0.13~0.17) in diameter
Anterior testis	0.35~0.72 in diameter	0.42 (0.36~0.50)× 0.41 (0.33~0.48)
Posterior testis		0.44 (0.38~0.51)× 0.40 (0.32~0.45)
Cirrus pouch	1.05 (0.76~1.35)× 0.36 (0.22~0.40)	0.52 (0.50~0.54)× 0.15 (0.15~0.16)
Ovary	0.42 (0.27~0.51) in diameter	0.31 (0.30~0.32)× 0.32 (0.28~0.36)
Eggs	0.023~0.027× 0.016~0.019	0.029 (0.028~0.030)× 0.019 (0.018~0.020)
Host	*Conger myriaster*	*Conger myriaster*
Locality	Japan	Korea

[a] Length× width; Unit is mm

Prosorhynchus aculeatus Odhner, 1905
(Fig. 2)

Body spindle-shaped, 1.24 (1.07~1.42) long by 0.65 (0.48~0.78) in maximum width. Tegument spinous throughout. Rhynchus plug-shaped with a saucer-like depression centrally, 0.12 (0.09~0.15) long by 0.15 (0.12~0.17) wide. Mouth mid-ventral, about two third length of body from anterior end. Pharynx muscular, 0.10 (0.09~0.11) long by 0.11 wide. Esophagus short, expanding to form an sac-like intestine.

Testes oblique or symmetrical, spherical and entire; left testis 0.17 (0.13~0.18) long by 0.19 (0.17~0.21) wide; right testis larger than left, 0.26 (0.23~0.30) long by 0.19 (0.14~0.24) wide. Cirrus pouch cylindrical, thick walled, located at posterior end, reaches to left testis anteriorly, 0.37 (0.33~0.41) long by 0.14 (0.11~0.16) wide. Seminal vesicle relatively large, spherical, internal of cirrus pouch. Pars prostatica tubular, forming a loop, dilated slightly before joining ejaculatory duct. Penis lying in genital atrium.

Ovary oval, entire, anterodorsal to right testis, smaller than testes, 0.16 (0.14~0.20) long by 0.15 (0.13~0.18) wide. Vitellaria follicular, forming an arc of about twelve to fourteen follicles on each side in anterior region, extending to level of anterior margin of ovary. Uterus with ascending and descending limbs, occupying all available space of body except anterior region of vitelline arc. Eggs oval, 26 μm (25~28 μm) long by 18 μm wide. Excretory vesicle opened just posterior to genital atrium.

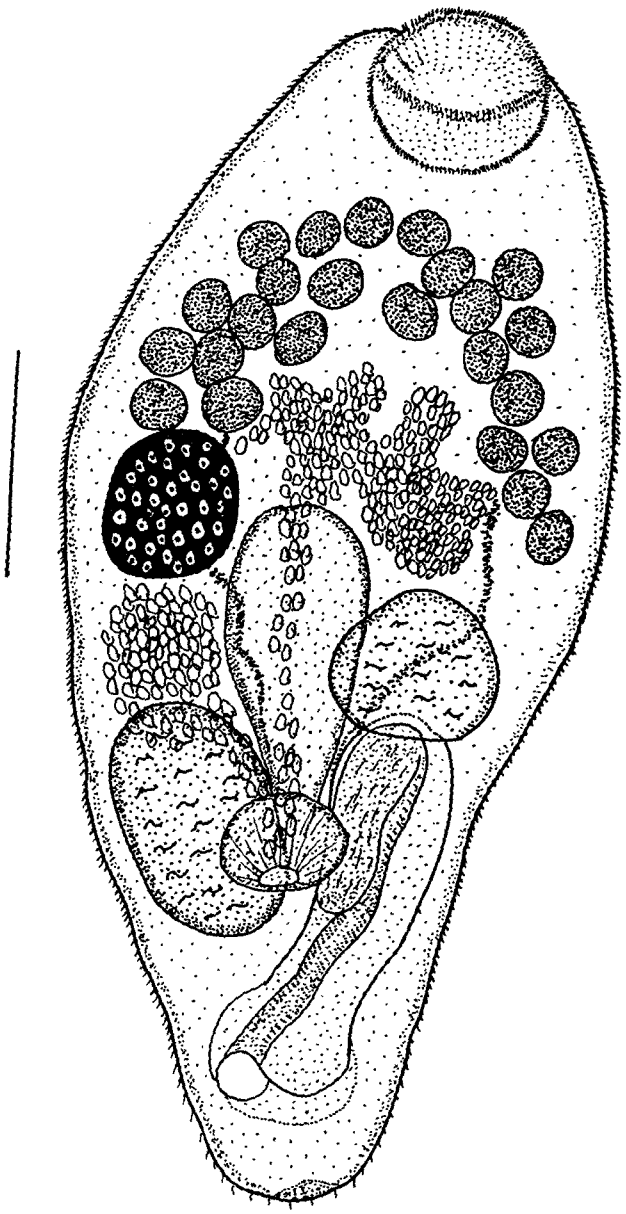

Fig. 2. *Prosorhynchus aculeatus* Odhner, 1905 from the intestine of *Conger myriaster*. Whole mount, ventral view. Bar scale: 0.2 mm.

Host: *Conger myriaster*

Locality: the Kwangyang Bay (May 15, 1997; July 24, 1997) Kori, Kyongsangnam-do (Nov. 20, 1996)

Location in host: Intestine

Specimens deposition: PKNU (Pukyong National University) Helminth Collection

Table 2. Dimensions[a] of *Prosorhynchus aculeatus* from the intestine of *Conger myriaster* in Korea and comparison with those of previous reports

Characters	Odhner (1905)	Yamaguti (1938)	Present study
Body	1.0~2.5 in length	1.40~1.60× 0.55~0.75	1.24 (1.07~1.42)× 0.65 (0.48~0.78)
Rhynchus	0.27× 0.15	0.05~0.08× 0.13~0.17	0.12 (0.09~0.15)× 0.15 (0.12~0.17)
Pharynx	–	0.11~0.13 in diameter	0.10 (0.09~0.11)× 0.11
Left testis	–		0.17 (0.13~0.18)× 0.19 (0.17~0.21)
Right testis		0.14~0.22× 0.10~0.20	
			0.26 (0.23~0.30)× 0.19 (0.14~0.24)
Cirrus pouch	–	0.27~0.40× 0.08~0.15	0.37 (0.33~0.41)× 0.14 (0.11~0.16)
Ovary	–	0.14~0.19× 0.10~0.16	0.16 (0.14~0.20)× 0.15 (0.13~0.18)
Eggs	0.026~0.031× 0.016~0.020	0.026~0.027× 0.017~0.018	0.025~0.028× 0.018
Host	*Conger* sp.	*Conger myriaster*	*Conger myriaster*
Locality	Far East and Arctic region	Japan	Korea

[a] Length× width; Unit is mm

Remarks: Odhner (1905) erected a new genus *Prosorhynchus* to accomodate *P. crucibulum* and described two new species, *P. squamatus* and *P. aculeatus*. In *Conger myriaster*, *P. aculeatus*, *P. crucibulum*, *P. magniovatum*, *P. squamatus*, and *P. uniporus* have been recorded from Japan. The present specimens were well coincide with the morphological characteristics of *P. aculeatus*. *P. aculeatus* is easily distinguished from *P. crucibulum* and *P. squamatus* in the location of mouth. Mouth of *P. aculeatus* is located in one third length of the body from the posterior end, but that of both *P. crucibulum* and *P. squamatus* is located in middle of body length. Moreover, the rhynchus of *P. crucibulum* is much longer than that of *P. aculeatus*. *P. magniovatum* reported by Yamaguti (1938) is very similar with *P. aculeatus* in morphology. However, the mouth of *P. magniovatum* is located in one fifth length of the body from the posterior end, and the eggs are much larger than those of *P. aculeatus*. *P. uniporus* is distinguished from *P. aculeatus* by having the genital atrium and the excretory vesicle open through a common pore. The dimensions of each character in Odhner's (1905) original description, Yamaguti's (1938) redescription and present specimens are given in Table 2.

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