

First Record of the Monogenean Parasite of *Menziesia sebastodis* (Capsalidae) in Korea

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ABSTRACT

Menziesia sebastodis (Capsalidae: Monogenea) is found and described from the gill filaments and the gill rakers of the black rockfish, *Sebastes inermis*, caught at Dolsan Island, off the south coast of Yeosu, Jeollanam-do, Korea. The genus *Menziesia* is distinguished from other related genera *Benedenia*, *Megalobenedenia* and *Trochopus*, by septate haptors and the morphology of copulatory organs. *M. sebastodis* can be differentiated from other *Menziesia* species by the longer and slenderer posterior anchor, and the location of accessory gland reservoir. This is the first record of the genus *Menziesia* in Korea.

Key words: *Menziesia sebastodis*, Monogenea, Capsalidae, *Sebastes inermis*

INTRODUCTION

The class monogenea belongs to the phylum Platyhelminthes and mostly parasitize on skins and gills of freshwater and marine fishes (Ogawa, 2005). They are equipped with a large attachment organ called 'haptor' at the posterior end. These groups are hermaphrodites and have direct life cycles. Generally they are not considered to cause serious pathological effects in wild fishes. However, in captive conditions, monogeneans can increase exponentially by direct life cycles and cause fatal damages to fishes, consequently.

Several monogeneans, known to be pathogenic to aquaculture fish species, are already reported in Korea (Choi et al., 1997; Kim and Cho, 2000). However, these approaches have mainly been restricted to pathology and treatment, and identification and morphological description have not been sufficient. This paper deals with morphological description of *Menziesia sebastodis*, a capsalid monogenean found on the gills of black rockfish, *Sebastes inermis*, in Korea.

MATERIALS AND METHODS

Sampling was conducted in offshore of Dolsan Island, Yeosu, Korea in 2007 and 2008. Wild black rockfish, *Sebastes inermis* were caught by stationary net. Live fish were kept in a container with seawater and immediately transported to the laboratory. Excessive amount of 2-phenoxyethanol (Sigma, USA) were used for euthanasia. Each individual fish was measured, weighed and dissected for parasitological

examination. Gills were excised and examined in filtered seawater under a dissecting microscope. If monogeneans were found, they were individually picked and immediately fixed with AFA (mixture of 70% ethanol 20 parts, formaldehyde (40% w/v) 1 part and glacial acetic acid 1 part), after flattening with cover glass. Monogenean specimens were stained with Heidenhein's hematoxylin, dehydrated through an alcohol series, and mounted in Canada balsam prior to examination. Drawings were made with the aid of a camera lucida. Measurements are given in millimeters.

SYSTEMATIC ACCOUNTS

Phylum Platyhelminthes Gegenbaur, 1859
Class Monogenea Carus, 1863
Order Capsalidea Lebedev, 1988
Family Capsalidae Baird, 1853
Subfamily Benedeninae Johnston, 1931
Genus *Menziesia* Gibson, 1976

Menziesia sebastodis (Yamaguti, 1934) Whittington,
Deveney et Wyborn, 2001

Synonyms. *Epibdella sebastodis* Yamaguti, 1934; *Benedenia sebastodis* (Yamaguti, 1934) Meserve, 1938.

Type host. *Sebastes* (now *Sebastes*) *inermis* (Scorpaenidae).

Type Locality. Ise Bay, Japan.

Site. Gills (gill filaments and gill rakers).

Distribution. Ise Bay, Japan (Yamaguti, 1934); Coast of Fukuoka Prefecture, Japan (Iwata, 1990); Dolsan Island, Yeosu, Korea (This study).

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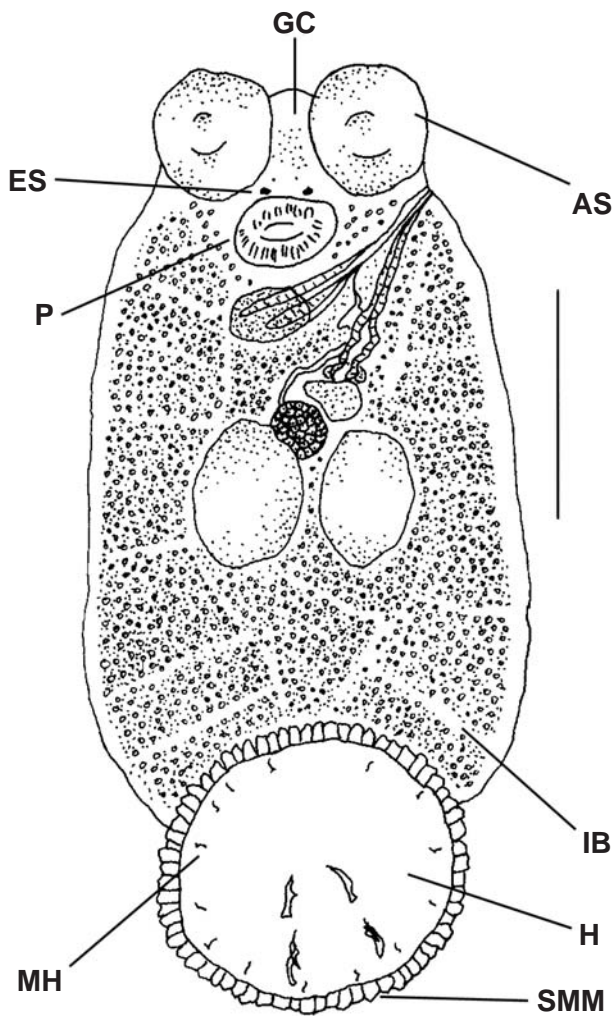


Fig. 1. *Menziesia sebastodis* (Yamaguti, 1934) Whittington, Deveney et Wyborn, 2001, Entire animal in ventral view. AS, anterior sucker; GC, gland cells; ES, eye spots; P, pharynx; IB, intestinal branches; H, haptor; MH, marginal hooklets; SMM, scalloped marginal membrane. Scale bar=0.5 mm.

Prevalence and intensity. At Dolsan Island, prevalence 75% (n=20 fish; total length 15.5-19.4 cm) in 2007, 100% (n=21 fish; total length 13.4-18.9 cm) in 2008; intensity 1-8 in 2007, 1-11 in 2008.

Materials examined. 4 individuals (from Dolsan Island, Yeosu, Korea).

Description (Figs. 1-3). Body flattened and oval, 1.42-2.09 long with maximum width of 1.03-1.30 at the middle of body proper. Haptor disc-shaped, aseptate, entirely surrounded by scalloped marginal membrane, 0.59-0.66 in diameter excluding the marginal membrane. 3 pairs of anchors and 7 pairs of marginal hooklets. Anterior anchor biramous root, flattened apex, 0.068-0.097 long, posterior anchor tined, 0.108-

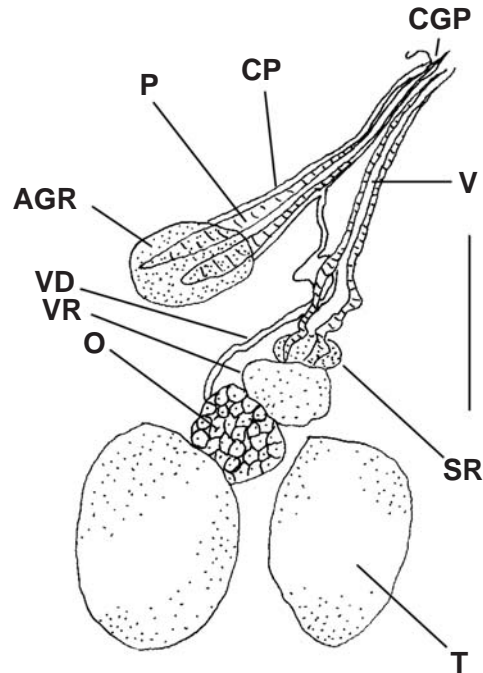


Fig. 2. Detailed reproductive system of *M. sebastodis* (Yamaguti, 1934) Whittington, Deveney et Wyborn, 2001. Ventral view. CGP, common genital pore; CP, cirrus pouch; P, penis; V, vagina; AGR, accessory gland reservoir; VD, vas deferens; VR, vitelline reservoir; O, ovary; SR, seminal receptacle; T, testis. Scale bar=0.25 mm.

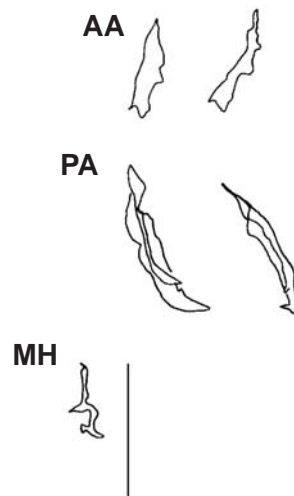


Fig. 3. Morphology of anterior and posterior anchors. AA, anterior anchors; PA, posterior anchors; MH, marginal hooklets. Scale bar=0.2 mm.

0.193 long. A pair of suckers at the anterior end of body, ovoid, 0.22-0.29 long by 0.27-0.29 wide. 2 pairs of eyespots behind anterior suckers. Pharynx circular, 0.158-0.238 long

by 0.215-0.293 wide. Gland cells between the pharynx and the anterior suckers. Intestine ramified, terminating blindly.

Two testes ovoid, in the middle of body proper, 0.194-0.287 long by 0.213-0.291 wide. Vas deferens running alongside of ovary, vitelline reservoir and entering cirrus pouch. Accessory gland reservoir sigmoid, dorsal to the proximal end of penis. Penis, elongated, tapering distally, in weakly muscular capsule. Common genital pore opening near left side of body approximately at the level of pharynx. Ovary elliptical, in front of testes, 0.129-0.186 long by 0.162-0.197 wide. Seminal receptacle ovoid, 0.048-0.076 long by 0.101-0.119 wide, anterior to vitelline reservoir. Vitelline reservoir irregular, 0.099-0.123 long by 0.131-0.145 wide, anterior to ovary. Vagina long, muscular, with wide lumen proximally, opening dorsal or posterior to common genital pore. No eggs observed.

DISCUSSION

This is the first report of *Menziesia sebastodis* which belong to family capsalidae in Korea. They were found from black rockfish (*Sebastes inermis*) caught Dolsan Island, off the south coast of Yeosu, Korea. Although a few reports were already recorded for capsalid monogeneans in Korea (Choi et al., 1997; Kim et al., 1998), they were misdiagnosed or not properly identified as species level.

Classification of family Capsalidae at the subfamily level has been conducted by haptor morphology, number and arrangement of testis. According to these, the capsalidae are divided into 9 subfamilies with approximately 44-46 genera including 200 species (Whittington, 2004). Generally, the capsalid monogeneans are known as 'skin parasites', however, they can attach to many different tissues such as fins and gills. Of 9 subfamilies, only 2 subfamilies (Benedeniinae, Trochopodinae) includes the genera using gills as their microhabitats; *Benedenia*, *Trochopus*, *Megalobenedenia*, *Menziesia* (Yamaguti, 1934, 1969; Arai and Koski, 1964; Egorova, 1994a, b, 2000; Whittington et al., 2001).

The capsalidae is an unusual monogenean family because species extend across major fish groups as their hosts. For example, 15 species in five genera are known to parasitize elasmobranchs, and six genera for lutjanid fishes as their hosts (Whittington, 2004). In the same manner, at least six genera (*Benedenia*, *Trochopus*, *Menziesia*, *Megalobenedenia*, *Megalocotyle*, *Megalocotyloides*) are found from scorpaenid fishes (Egorova, 1994b).

Based on these information collectively, three genera are found to be the possible capsalid monogeneans from *S. inermis* in this study; *Menziesia*, *Megalobenedenia*, *Trochopus*. However, both of genera *Megalobenedenia* and *Trochopus*

are distinguished from *Menziesia* by haptor morphology. They have a septate haptor, whereas *Menziesia* has an aseptate haptor. Capsalid monogeneans found in this study have an aseptate haptor. Hence, they were thought to belong to the genus *Menziesia*.

Genus *Menziesia* was erected by Gibson in 1976 with the characteristics of an elongate, tapering penis with a sigmoid accessory gland reservoir located alongside the proximal end of the penis. Another distinguishing character is a long muscular vagina with proximally wide rumen (Gibson, 1976). Genus *Menziesia* can be distinguished from the related genus *Benedenia* by penis morphology. *Menziesia sebastodis* was firstly described by Yamaguti (1934) as *Benedenia sebastodis* from *Sebastes inermis* and Iwata (1990) redescribed this monogenean parasite in detail. The measurements and the morphological characteristics of each anatomical parts of *Menziesia* species in this study closely resembles with those described by Iwata (1990). Recently Whittington et al. (2001) validated the genus *Menziesia*, after a rigorous taxonomic confusion, under the concept of morphological differences of copulatory organs. They transferred all the *Benedenia* species having an accessory gland reservoir located beside the proximal end of penis to the genus *Menziesia*. Therefore, *Benedenia sebastodis* was transferred to *Menziesia* Gibson, 1976 and the present specimens found in this study were identified as *M. sebastodis*.

There have been only two reports on capsalid monogeneans in Korea. Kim et al. (1998) described *Benedenia derzhavini* on the gills and gill operculum of *Sebastes schlegelii*. However, their description is questionable because *B. derzhavini* was transferred to a newly established genus *Megalobenedenia* in 1994, characterized by a septate haptor (Egorova, 1994a). Moreover, the monogeneans they described had an aseptate haptor, which is clearly different from that of *Megalobenedenia*. Choi et al. (1997) found *Benedenia* sp. on body surfaces of rock bream, *Oplegnathus fasciatus*, but they did not give any morphological description of the worms.

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