

RESEARCH ARTICLE

Parasitic cestodes of fish in the waters off Gökçeada, North Aegean Sea

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Abstract

This study, performed in April, July, September, October 2011 and January, April 2012 near Gökçeada in the northeastern Aegean Sea in Turkey, seven species of cestoda (*Bothriocephalus scorpii*, *Tetrarhynchobothrium tenuicolle*, *Acanthobothrium coronatum*, *Phyllobothrium gracilis*, *Echeneibothrium variabile*, *Echinobothrium typus*, *Scolex pleuronectis*) were identified in a total of 57 fish samples of 13 fish species (*Trachurus mediterraneus*, *Boops boops*, *Trachinus araneus*, *Scomber japonicus*, *Torpedo marmorata*, *Dasyatis* sp., *Phycis phycis*, *Conger conger*, *Squalus acanthias*, *Raja clavata*, *Raja miraletus*, *Scyliorhinus canicula*, *Monochirus hispidus*) among a total of 887 fish samples of 50 fish species. *T. tenuicolle*, *E. variabile* are new records for the study area and Turkey.

Key words: Cestoda, fish parasite, Gökçeada.

Introduction

Cestoda (tapeworms) are obligate internal parasites of fish that display a wide range of body shape, life histories and host associations. They are parasites characterized by complex life cycles involving two or three hosts and several development stages. Cestoda have morphological differentiation in their body shape and these differentiations play an important role in their taxonomic identification. Some species are etiological agents of major disease in human. Host fish of cestoda and their infection values show some geographical variation.

The sea surrounding Gökçeada, North Aegean Sea is characterized by high fish diversity. While Ulutürk (1987) reported 144 fish species of 60 families, Keskin

and Ünsal (1998) detected 76 fish species near Gökçeada. Most of these fish species have commercial value and play an important role in Turkish fisheries.

The aim of this review is to provide a checklist of hosts and parasites, short descriptions of cestoda found in the fish near Gökçeada.

Materials and Methods

Fish samples were caught using various fishing methods such as trawl, gill-net, long-line, vertical long-line near, Turkey, in the northeastern Aegean Sea in April, July, September, October 2011 and January, April 2012. Fish samples were transported to the laboratory in aerated tanks and were kept alive until the dissection and parasitological investigation. The fish samples were identified according to Ekingen (2004) and Golani *et al.* (2006). Fish were carefully dissected for observation of the internal organs and placed in separate petri dishes containing physiological water and examined for cestod parasites under a stereomicroscope. Live parasites were slightly compressed between a slide and a coverslip prior to the examination under a light microscope. Some cestod parasites were fixed in 70% alcohol and then these parasites cleared in lactophenol were studied and taken measurements using an ocular micrometer or BEL view camera programs. Identification of the parasites was made according to Yamaguti (1959) and Khalil *et al.* (1994).

Results and Discussion

This study was carried out to determine the parasitic cestodes in fish in the water off Gökçeada. A total of 887 individual fish of 50 different fish species were investigated. As a result, seven species of cestoda were identified in 13 fish species among 50 different fish species.

Family: Bothriocephalidae Blanchard, 1849

Bothriocephalus scorpii Müller, 1776 (Figure1)

Host: *Trachinus araneus*

Number of investigated fish and prevalence: 9 and 22.22%.

Scolex elongate, with two bothria longitudinally elongated; apical disc present. Neck lacking. External segmentation present. Proglottids wider than long. Genital pores dorsomedian. Testes in two lateral fields.

Bothriocephalus scorpii is a cosmopolitan species showing a wide distribution from the Atlantic, Mediterranean to Pacific waters and can be found in many species of different families such as *Anguilla*, *Labrus*, *Scorpaena*, *Trigla*, *Raja*, and *Mullus*.

B. scorpii found in *T. araneus* in this study has been reported in *Scorpaena scrofa*, *Scorpaena porcus* and *Solea nasuta* in the same region (Akmirza 2002).

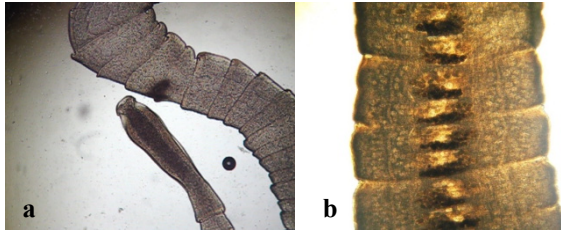


Figure 1. *Bothriocephalus scorpii*
a: Scolex; b: Proglottids

Family: Tetrarhynchobothriidae Dollfus, 1969

Tetrarhynchobothrium tenuicolle Diesing, 1854 (Figure 2)

Host: *Squalus acanthias*

Number of investigated fish and prevalence: 2 and 50%

Scolex with two bothridia and four retractile tentacles armed with spiral rows of hooks.

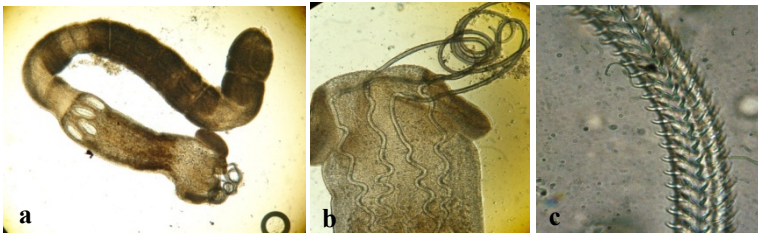


Figure 2. *Tetrarhynchobothrium tenuicolle*
a: Total view; b: Scolex; c: Tentacle

Family: Onchobothriidae Braun, 1900

Acanthobothrium coronatum Rudolphi, 1819 (Figure3)

Host: *Torpedo marmorata*, *Dasyatis* sp.

Number of investigated fish and prevalence: 8 and 37.7% for *Torpedo marmorata*, 2 and 50% for *Dasyatis* sp.

Scolex with four bothridia, each divided into three loculi by two transverse septa. In front of each bothridia one pair of symmetrically forked hooks.

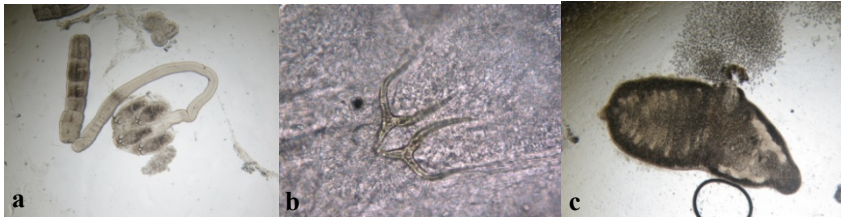


Figure 3. *Acanthobothrium coronatum*
 a: Total view; b: Hooks; c: Mature proglottid and discharge of eggs

Family: Phyllobothriidae Braun, 1900

Phyllobothrium gracilis Wedl, 1855 (Figure 4)

Host: *Torpedo marmorata*

Number of investigated fish and prevalence: 8 and 12.5 %

Scolex with four bothridia. Accessory sucker present. Immature segments longer than wide, mature segments wider than long. Testes numerous, ovary posterior, genital pore lateral.



Figure 4. Scolex of *Phyllobothrium gracilis*

Echeneibothrium variabile van Beneden 1850 (Figure 5)

Host: *Scyliorhis canicula*, *Raja miraletus*

Number of investigated fish and prevalence: 2 and 100% for *Scyliorhis canicula*, 4 and 25% for *Raja miraletus*.

Scolex with four bothridia divided by transverse and longitudinal septa. Myzorhynchus present. No accessory sucker. Neck present. Testes expanding longitudinally in intervascular field. Ovary at posterior end of proglottis.

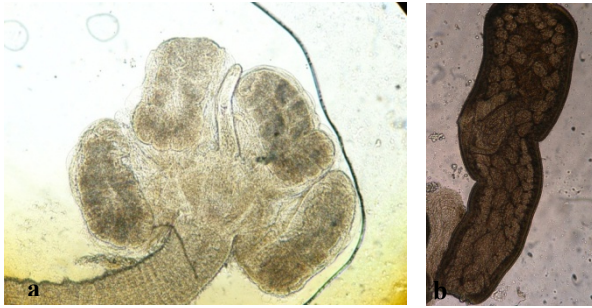


Figure 5. *Echinebothrium variabile*
a: Scolex; b: Proglottid

Family: Echinobothridae Perrier, 1897

Echinobothrium typus van Beneden 1849 (Figure 6)

Host: *Squalus acanthias*

Number of investigated fish and prevalence: 2 and 50%

Scolex with well-developed rostellum armed on dorsal and ventral surfaces with hooks. Two oval bothridia present. Neck covered with very small hair-like spines. Posterior proglottis longer than wide. Testes numerous, preovarian. Eggs rounded, provided with a short filament.

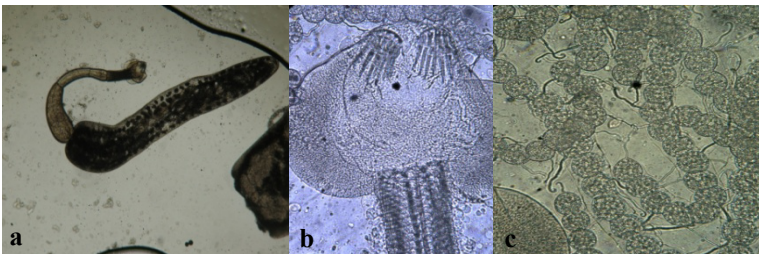


Figure 6. *Echinobothrium typus*
a: Total view; b: Scolex; c: Eggs

Scolex pleuronectis Muller, 1788. (Figure 7)

Host: *Phycis phycis*, *Trachurus mediterraneus*, *Boops boops*, *Trachinus araneus*, *Scomber japonicus*, *Conger conger*, *Monorchis hispidus*.

Scolex pleuronectis comprised of a scolex bearing four bothridia, an apical sucker and a long, slender body.

Tetraphyllidean metacestodes is difficult to identify due to their relatively featureless scolex morphology, which lacks the diagnostic feature of the adult

cestodes. All the metacestodes of this order of cestodes were proposed to accommodate with *Scolex pleuronectis* (synonymised them as *Scolex polymorphus*).



Figure 7. *Scolex pleuronectis*

Cestoda species (*Bothriocephalus scorpii*, *Acanthobothrium coronatum*, *Phyllobothrium gracilis*, *Echinobothrium typus*, *Scolex pleuronectis*) that found previously in this region (Akmirza 2002), were also found in the same or different fish hosts in this study. While *Phyllobothrium lactuca* found in the previous study was not encountered in this study, *Tetrarhynchobothrium tenuicolle* and *Echeneibothrium variabile* were detected for the first time in Turkey.

Gökçeada (Kuzey Ege Denizi) sularındaki balıkların parazitik sestodları

Özet

Gökçeada civarında Nisan, Temmuz, Eylül, Ekim 2011 ile Ocak, Nisan 2012 tarihlerinde gerçekleştirilen bu çalışmada, incelenen 50 balık türüne ait 887 balık örneğinden 13 balık türüne ait (*Trachurus mediterraneus*, *Boops boops*, *Trachinus araneus*, *Scomber japonicus*, *Torpedo marmorata*, *Dasyatis* sp., *Phycis phycis*, *Conger conger*, *Squalus acanthias*, *Raja clavata*, *Raja miraletus*, *Scyliorhinus canicula*, *Monochirus hispidus*) 57 balık örneğinde 7 sestod türü (*Bothriocephalus scorpii*, *Tetrarhynchobothrium tenuicolle*, *Acanthobothrium coronatum*, *Phyllobothrium gracilis*, *Echeneibothrium variabile*, *Echinobothrium typus*, *Scolex pleuronectis*) bulunmuştur. *Tetrarhynchobothrium tenuicolle*, *Echeneibothrium variabile* türleri Türkiye için yeni kayıtlardır.

Acknowledgements

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