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FIND OF A TREMATODE *HELICOMETRA FASCIATA* (RUD., 1819) SENSU LATO FROM THE BLACK SEA COMMON STINGRAY *DASYATIS PASTINACA* (LINNAEUS, 1758)

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A trematode belonging to *Helicometra fasciata* sensu lato (family Opecoelidae) was found for the first time from the Black Sea common stingray, *Dasyatis pastinaca* (Linnaeus, 1758), caught in the Karkinitsky Bay (western coast of the Crimean Peninsula). A drawing and a morphological description of marita are provided. The find of this trematode from the common stingray is consistent with the data on *Helicometra* life cycle in the Black Sea. This is the first record of *Helicometra* spp. from cartilaginous fishes. The common stingray is classified as an accidental definitive host of these trematodes in the Black Sea. Dasyatidae is believed to be an undersampled host group for digenean infection in the Black Sea.

Keywords: Trematoda, Opecoelidae, Chondrichthyes, Batomorphi, Dasyatidae, new definitive host, Black Sea, food webs

Trematodes *Helicometra fasciata* (Rudolphi, 1819) Odhner, 1902 feature extremely broad specificity to final hosts – bony fishes from 51 families [Blend, Dronen, 2015]. For the first time, we have registered these trematodes from a cartilaginous fish – a stingray *Dasyatis pastinaca* (Linnaeus, 1758) caught in the Black Sea.

This article is focused on the morphological description of this extremely interesting find.

MATERIAL AND METHODS

The total balsam slide of a trematode No. 1439.Tr.39 is studied [label: the host, *D. pastinaca*, intestine, 16.05.2015; the Black Sea, the Karkinitsky Bay (Swan Islands); sampler, M. Maslennikova]. It is deposited in a subcollection of parasitic organisms of the IBSS Collection of Hydrobionts of the World Ocean (http://marineparasites.org/). For species identification of a trematode, we used an Olympus CX41 microscope with a CAM SC50 digital camera and CellSens Standard v. 1.18 software. In the text, all measurements are given in micrometers. Shape index is calculated as the ratio of the object length to its width. When describing eggs, their maximum sizes (min–max) and arithmetic means are provided.

RESULTS

On a slide, there is one mature marita of *Helicometra fasciata* (Rudolphi, 1819) sensu lato (Fig. 1).

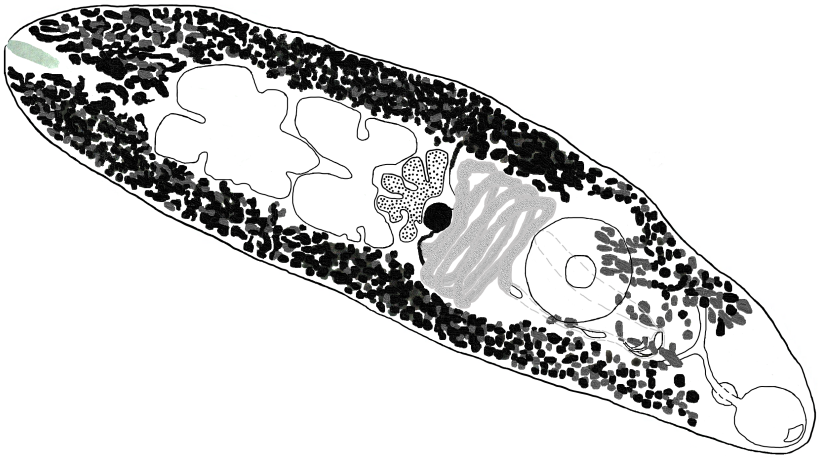

Fig. 1. *Helicometra fasciata* sensu lato marita from the Black Sea common stingray *Dasyatis pastinaca*, ventral view of general morphology

Sizes of the trematode body and organs are provided in Table 1.

Table 1. Measurements of *Helicometra fasciata* sensu lato marita from the Black Sea common stingray *Dasyatis pastinaca* compared to the ones from other Black Sea fish hosts

Parameter		*Helicometra fasciata* maritae from the Black Sea fishes	
		From *D. pastinaca*	From other fish hosts*
Body	length	1,489.81	0.414–3.795
	width	400.54	0.179–1.007
Oral sucker	length	143.80	0.041–0.193
	width	123.45	0.043–0.179
Ventral sucker	length	205.69	0.073–0.290
	width	207.37	0.073–0.331
Pharynx	length	41.64	0.030–0.110
	width	75.65	0.027–0.097
Anterior testis	length	218.58	0.024–0.552
	width	219.87	0.027–0.649
Posterior testis	length	213.92	0.024–0.731
	width	199.47	0.022–0.635
Ovary	length	114.88	0.016–0.276
	width	173.06	0.019–0.483
Bursa cirri	length	265.0	0.041–0.511
	width	71.63	0.011–0.110
Eggs (n = 14)	length	52.6–65.12 (58.19)	0.052–0.073
	width	23.7–25.6 (25.13)	0.023–0.041
Posttesticular space		296.71	–
Forebody		413.6	–

Note: *, according to [Korniychuk, 2009a; Kornyychuk, 2023].

Description of marita.

Body elongated-oval (shape index 3.71).

Tegument unarmed.

Oral sucker subterminal, slightly elongated along the longitudinal axis (shape index 1.16).

Ventral sucker (acetabulum) rounded (shape index 0.99). The length ratio of the oral and ventral suckers is 1 : 1.43; their width ratio is 1 : 1.68.

There are a short prepharynx, pharynx, and esophagus.

Forebody is 28% of the marita body length. Thus, the ventral sucker is located on the border of the first and second thirds of the worm body.

Gonads tandem.

Ovary five-lobed, submedian; its posterior edges at the level of the anterior edge of the anterior testis.

Testes contiguous, tandem, lobed.

Posttesticular space 19.9% of the body length.

Bursa cirri straight, elongated, club-shaped; its posterior end at the level of the posterior edge of the ventral sucker.

Metraterm extends along the left side of the bursa cirri.

Genital pore submedian, between bifurcation of intestine and anterior edge of the ventral sucker.

Vitelline glands follicular, in lateral fields, extend from the level of posterior border of pharynx to posterior end of the body; follicles are dorsally, laterally, and ventrally to intestinal branches. Vitelline follicles form “dorsolateral arch” [Korniychuk, 2009a] on the dorsal side of the worm body in the area from anterior border of ventral sucker to posterior border of pharynx. In the posttesticular space, the left and right vitelline fields are in contact with separate follicles, on the ventral side of the worm body only (Fig. 2).

Vitelline reservoir round, in front of the ovary, median.

Uterus between the ventral sucker and the ovary, helical. Uterus rings are parallel to the transverse axis of the body.

Eggs oval (shape index 2.31), with a long unipolar filament (Fig. 3).

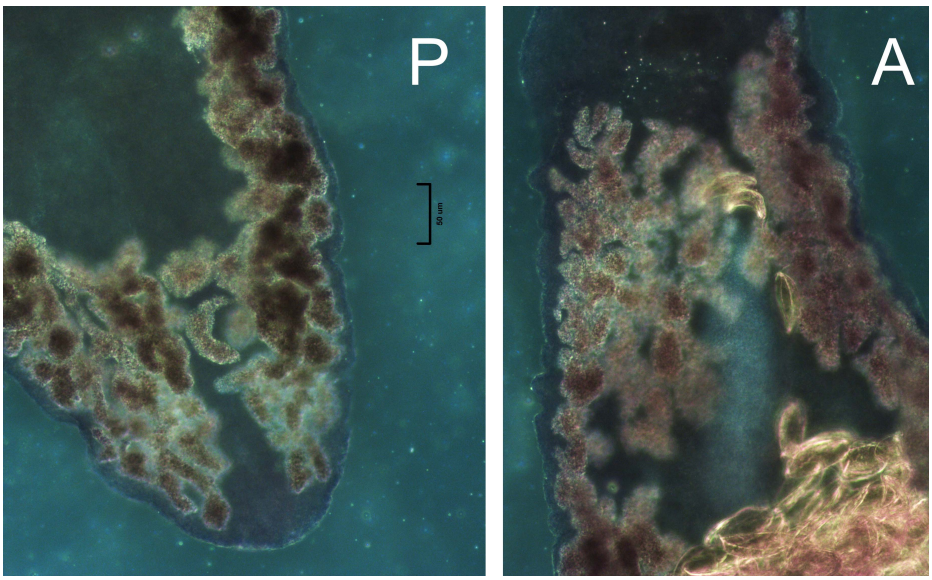

Fig. 2. The location of the vitellaria follicles at the posterior (P) and anterior (A) ends of the marita body of *Helicometra fasciata* sensu lato from the Black Sea common stingray *Dasyatis pastinaca*

Fig. 3. Filamented egg of *Helicometra fasciata* sensu lato from the Black Sea *Dasyatis pastinaca*

DISCUSSION

The studied specimen corresponds in morphology to the diagnosis of *H. fasciata* sensu lato [Blend, Dronen, 2015; Naidenova, Dolgikh, 1969]: oral sucker subterminal, almost rounded; ventral sucker in the anterior part of the marita body; uterus helical; eggs with a long unipolar filament; genital pore median, before the intestinal bifurcation; vitelline glands in lateral fields and enter the anterior part of the body; lobed gonads are tandem.

Sizes of the body and eggs of the marita analyzed, the shape of gonads, and the values of taxonomically significant morphological indices are within the limits previously established for sexually mature representatives of *H. fasciata* sensu lato from the Black Sea fish hosts (see Table 1).

As assumed, at least the Black Sea representatives of *H. fasciata* are a complex of cryptic species [Katokhin, Kornyychuk, 2020; Sokolov et al., 2022]. More precise taxonomic identification of these trematodes from the stingray implies molecular studies which could be carried out only after repeated finds.

D. pastinaca is the 34th known definitive fish host species of *H. fasciata* sensu lato complex in the Black Sea; out of them, 33 are bony fishes. This find is very interesting: trematodes identified as *H. fasciata* have not been known earlier from Dasyatidae family or from cartilaginous fishes in general anywhere in the World Ocean [Blend, Dronen, 2015].

Stingrays are common along all the Black Sea shores, where they inhabit shallows in the summer and move to deeper areas when it gets colder. Stingrays stay near the bottom and feed mainly on bottom and demersal crustaceans and fish [Svetovidov, 1964]. Various shrimps and crabs are common food for the Black Sea stingrays [Saglam et al., 2010; Smirnov, 1959].

Infection of the Black Sea stingrays with *H. fasciata* metacercariae is possible, for example, when feeding on a green crab *Carcinus aestuarii* Nardo, 1847, as well as rockpool and grass shrimps *Palaemon elegans* Rathke, 1836 and *Palaemon adspersus* Rathke, 1836; these species are involved in the life cycle of these trematodes in the Black Sea as the second intermediate hosts [Korniychuk, 2008, 2009b; Kornijchuk, Lozovsky, 2005; Mordvinova, 1980; Tkachuk, Mordvinova, 1999]. As the find of *H. fasciata* is a single one, despite the large number of the Black Sea stingrays studied by parasitologists, and as the trematode found is sexually mature, with a large number of eggs, we classify the stingray as an accidental definitive host of *H. fasciata* in the Black Sea.

Before this find, information on the trematode fauna of the Black Sea stingrays was limited to a single record of parasitism of a marita of *Nagmia yorkei* Nagaty, 1930 [syn. *Petalodistomum yorkei* (Nagaty, 1930)] from a stingray caught off the city of Yevpatoriya [Pogorel'tseva, 1964]. We conclude that Dasyatidae are evidently an undersampled host group for digenean infection in the Black Sea.

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О НАХОДКЕ ТРЕМАТОД *HELICOMETRA FASCIATA* (RUD., 1819) SENSU LATO У ЧЕРНОМОРСКОГО МОРСКОГО КОТА *DASYATIS PASTINACA* (LINNAEUS, 1758)

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У черноморского ската-хвостокола (морского кота) *Dasyatis pastinaca* (Linnaeus, 1758) из Каркинитского залива (западное побережье Крыма) впервые обнаружена трематода *Helicometra fasciata* sensu lato (семейство Opecoelidae). Приведены рисунок и морфологическое описание найденной единственной половозрелой мариты. Обнаружение этой трематоды у морского кота согласуется с данными об особенностях протекания жизненного цикла хеликометр в Чёрном море. Это первая находка представителей рода *Helicometra* у хрящевых рыб; черноморский морской кот отнесён к категории случайных дефинитивных хозяев *H. fasciata* sensu lato. Dasyatidae, в том числе черноморские, — семейство рыб, недостаточно исследованное в отношении их заражённости трематодами.

Ключевые слова: Trematoda, Opecoelidae, Chondrichthyes, Batomorphi, Dasyatidae, новый дефинитивный хозяин, Чёрное море, пищевые сети