

## *Contracaecum osculatum* (Nematoda, Anisakidae) in cod, *Gadus morhua* L. from the Polish coast of the Baltic

Jerzy Rokicki<sup>1</sup>, Elena D. Valter<sup>2</sup> and Przemysław Myjak<sup>3</sup>

<sup>1</sup>Department of Invertebrate Zoology, University of Gdańsk, J. Piłsudskiego 46, 81-378 Gdynia, Poland; <sup>2</sup>Department of Invertebrate Zoology, Moscow University, Lenin Hills, 117234 Moscow, Russia; <sup>3</sup>Institute of Marine and Tropical Medicine, Powstania Styczniowego 9b, 81-519 Gdynia, Poland

**Abstract.** The nematodes were collected from livers of Baltic cod caught off the Gulf of Gdańsk. This paper consists of a description of the third stage larvae of

*Contracaecum osculatum* (Rud.). This nematode is also pathogenic for man and its occurrence on the Polish coast has epidemiological significance.

### Introduction

*Contracaecum osculatum* is geographically widely dispersed. It has been found in the North Atlantic, especially at the eastern coast of Greenland, and around the British Isles. The third stage larvae also have been found in: the Northern Sea (Wootten 1978), the Norwegian Sea (Berland 1961), the White Sea (Valter 1979), and in Japanese waters (Moravec et al. 1985), also in the Baltic, mainly its northern and central part (Sjöblom and Kuittinen 1976; Fagerholm 1982b; Valtonen et al. 1988). *C. osculatum*, until now has not been noted in Polish Baltic waters.

### Material and methods

The nematodes under study come from cod caught on 28th June 1989 in the southern Baltic off the Gulf of Gdańsk. They were found in an envelope under the serous membrane of the liver. Twenty larvae from 8 cod were collected. The nematodes were killed in hot water and were put into 70% alcohol with glycerin.

### Results

*Contracaecum osculatum* (Rudolphi, 1802) larva, (Fig. 1)  
Description (third stage larva): body whitish, head end rounded, posterior end gradually narrowing. Cuticle with distinct stripes 1.4–20.0–2.7–5.9  $\mu\text{m}$  distance in various regions of the body. Between them sometimes up to 10 unclear and thin stripes 0.7  $\mu\text{m}$  long. The head end has

three lips only slightly separated from one another. There is a larval tooth between the ventro-lateral lips. The excretory pore opens at the head end slightly below the larval tooth and leads to the excretory canal. The alimentary canal has the same width almost the whole of the body length. A whitish ventriculus appendix extends from the ventriculus. The intestinal appendix is better developed in bigger nematodes and is close in size to the ventriculus appendix. Near the tail the mid-intestine turns into a straight rectum which ends in the anus. Between the mid-intestine and the rectum there are 3 rectal glands.

Location: under the serous membrane of the liver, covered by a tight capsule.

Remarks: sexual system development has not been seen as it is not developed in the L3. Sex of the larvae was estimated based on the tail length. Seven larvae out of 20 examined appear to be females; their tails were a little shorter than in the other specimens. The collected individuals do not differ from L3 *C. osculatum* coming from White Sea fish. They do not differ from descriptions of L3 *C. osculatum* delivered by Sudarikov and Ryzhikov 1953, Valter 1979, Moravec et al. 1985.

### Discussion

Until now *Contracaecum osculatum* has not been noted in the Polish Baltic. The life cycle of the nematode is not fully known. It includes planktonic and benthic crustaceans (Copepoda, Amphipoda) and marine fishes in which develop the parasite's third stage. Seals are the final host in whose stomach and intestine the nematode

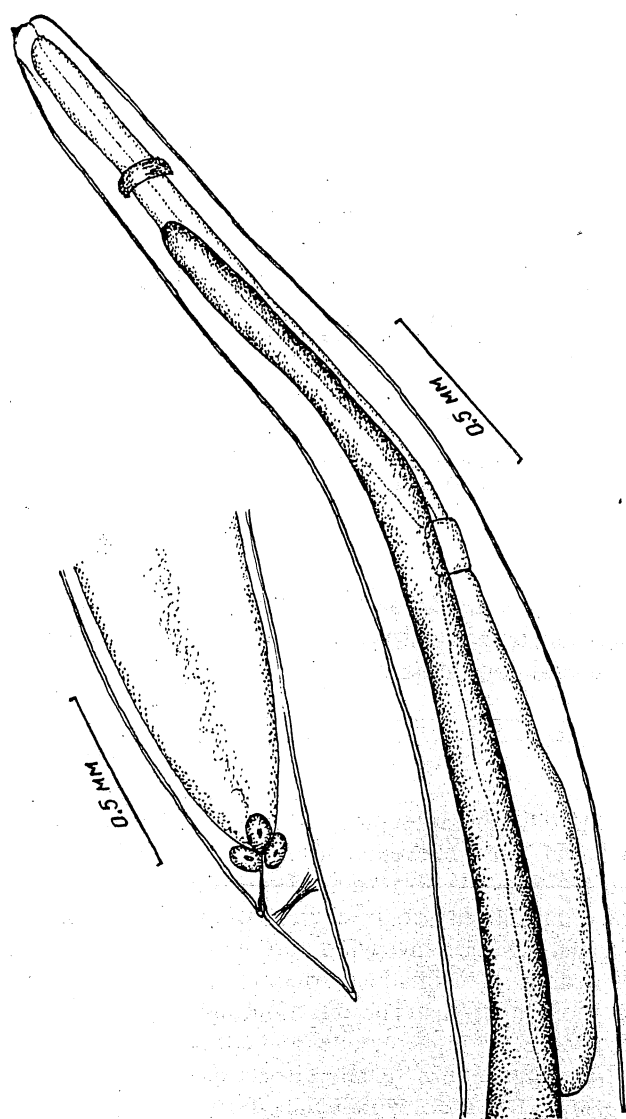


Fig. 1. *Contracaecum osculatum* (Rudolphi, 1802), third stage larva reaches sexual maturity. Man can become infected by third stage larva of *C. osculatum* by eating raw fish. Then nematode is responsible for the illnesses in human intestines. After having hatched from the egg, *C. osculatum* L2 has a tiny ventriculus appendix but no intestinal one. It appears later when the larva starts a more active feeding in second intermediate host, a fish. In the examined L3 the intestinal appendix is more-or-less developed (Tab. II). One may thus draw a conclusion that during that stage, the intestinal appendix develops. In the L3 stage the intestinal appendix is shorter than the stomach one or is close to its size. In adult nematodes the intestinal appendix is longer than the ventricular one. The sizes of the collected L3 are not equal. Differences in length may be double (Tab. I). One may presume that they grow in the cod's body and develop there intensively. Third stage larvae of *C. osculatum* and *Hysterothylacium aduncum* (Rudolphi, 1802) are similar morphologically and anatomically, and possibly, that before now, L3 *C. os-*

*culatum* may have occurred in the Polish Baltic at random along with *H. aduncum* and had been considered as *H. aduncum*. The third stage larvae of *C. osculatum* are whitish while those of *H. aduncum* are of an ivory colour. The excretory pore can hardly be seen and in *C. osculatum* ends a little below the larval tooth whereas in *H. aduncum* it opens at the level of the nerve ring. The intestinal appendix reaches almost the nerve ring in *C. osculatum* and is definitely much lower in *H. aduncum*. The tail end is gradually narrowed in *C. osculatum*.

Table I. Measurements of third stage larvae of *Contracaecum osculatum* (n = 20) from *Gadus morhua* from Gdańsk Bay of the Baltic Sea

Measurements (in $\mu\text{m}$ )	Range	Mean
Total L	11.319–22.534 mm	18.378 mm
W at head region	77–132	95
W at ventriculus level	264–374	297
Maximum W	385–693	500
W at anus level	65–143	117
Nerve ring to anterior end	264–361	361
Tail L	95–275	190
Oesophagus L	847–1430	1173
Oesophagus W	55–88	70
Ventriculus L	50–100	81
Ventriculus W	44–111	80
Ventricular appendage L	891–1540	1163
Ventricular appendage W	88–154	128
Intestinal caecum L	561–935	751
Intestinal caecum W	66–121	89
Intestinal caecum/ventricular appendage L	510–880	650

L – length, W – width.

Table II. *Contracaecum osculatum* L3 from Baltic cod, *Gadus morhua* (in mm)

The body	Length of	
	intestinal appendix	ventriculus appendix
11.319	0.594	1.166
13.856	0.704	1.088
19.024	0.836	0.946
20.009	0.704	0.935

Fagerholm 1982a identified L3 *C. osculatum* having followed their development in experimental animals to L4 which is a stage of larvae found on seals. This author is of the opinion that L3 identification is impossible when based on only morphological criteria.

*C. osculatum* is widely dispersed across seas and oceans, the Baltic included. The third stage larvae of *C. osculatum* were found in herring and cod near the Finnish coast; mass occurrence of these larvae occurred in 7 fish species, cod included, in the Bothnian Bay

(Sjöblom and Kuittinen 1976; Fagerholm 1982b; Valtonen et al. 1988). The same authors found this parasite occasionally in *Phoca hispida botnica* and a frequent occurrence in *Halichoerus grypus*. This raises a question that if the infected cod have come to our coast from the northern Baltic, then *C. osculatum*'s life cycle is completed in Polish waters. There dwell three seal species in the Baltic: ringed seal, *Phoca hispida* (Schreiber, 1755); ordinary seal *Phoca vitulina* L.; and grey seal *Halichoerus grypus* (Fabricius, 1791), the latter occurring most often near the Polish coast. According to Valtonen et al. 1988 the grey seal is the host most heavily infected by *C. osculatum*.

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