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Parasitology

PARASITIC FAUNA OF GREENLAND HALIBUT, *REINHARDTIUS HIPPOGLOSSOIDES*
(WALBAUM, 1792) FROM THE BARENTS SEA

FAUNA PASOŻYTNICZAHALIBUTA NIEBIESKIEGO, *REINHARDTIUS*
HIPPOGLOSSOIDES (WALBAUM, 1792) Z MORZA BARENTSA

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Surveys on Greenland halibut from the Barents Sea show presence of 18 parasitic species belonging to: Protozoa (4 species), *Cestoda* (2), *Trematoda* (5), *Nematoda* (3), *Acanthocephala* (3), and *Crustacea* (1 species). Infestation extensivity and intensity of the tested fish population was given as well as location of parasite within the host. Two species pathogenic for man were found.

INTRODUCTION

A detailed study of parasitic fauna of Greenland halibut, *Reinhardtius hippoglossoides* (Walbaum, 1792) from the Barents Sea was purpose of the conducted surveys. Those surveys, based on, relatively, large material and including all systematic groups of parasites, let to complete data from that area, a fragmentary one, so far (Poljanskij 1955). Materials of Reimer (1981) come, also, from the North-Eastern Atlantic. However fish tested by the author were caught near the Bear Island. Besides, in this work Reimer omitted the Protozoa group. The cognition of Greenland halibut's parasitic fauna is the continuation of surveys conducted earlier by the author in the North-Eastern Atlantic (Wierzbicka 1990b).

MATERIAL AND METHODS

Material for surveys originated from catches done at fishing ground of the Barents Sea on 6 th May, 1977. The exact fishing position was 72°34' N and 15°00' E. When caught, fish was frozen below -20°C at the fishing vessel. Altogether 106 Greenland

Table 1

Occurrence of *Nematoda* and *Acanthocephala* larvae in the Greenland halibut

Parasite species	Total number of parasites	Percent of incidence within particular organs*					
		stomach **	intestine and pyloric caeca**	liver	gonads	other organs***	muscles
<i>Anisakis simplex</i> (III st.)	28 876	75.9	6.0	8.8	1.3	1.1	6.9
<i>Phocanema decipiens</i> (III st.)	248	11.3	12.1	68.1	0	8.1	0.4
<i>Thynnascaris adunca</i> (III st.)	2 250	21.3	49.8	24.6	0.3	3.7	0.3
<i>Corynosoma strumosum</i>	482	18.7	57.9	17.6	1.5	3.9	0.4
<i>Corynosoma semerme</i>	22	22.7	45.5	27.3	0	4.5	0

* - a total number of parasites of each taxon taken for 100%

** - within walls and outside these organs

*** - heart, kidney, peritoneum by the kidney, bile sack, bladder, spleen or freely distributed within the abdominal cavity

halibut individuals, *Reinhardtius hippoglossoides* (Walbaum, 1792) was subjected to detailed parasitological testing. Total length (longitudototalis) of the fish tested ranged from 36.5 to 77.5 cm and their weight from 350 to 5140 g.

Data on methods of analysis were given by Wierzbicka (1990b) with detailed information on Protozoa identification presented by the same author (1990a). The trematode nomenclature according to Yamaguti (1971).

RESULTS

Surveys on Greenland halibut from the Barents Sea indicated presence of 18 parasitic species belonging to *Protozoa* (4 species), *Cestoda* (2), *Trematoda* (5), *Nematoda* (3), *Acanthocephala* (3) and *Crustacea* (1). Infestation with these parasites was strongly differentiated. Some of them were isolated very often and with high infestation intensity.

The most often isolated parasites were *Ceratomyxa drepanopsettae* present in the gall bladder of all the tested fish and *Paramyxoproteus reinhardti* isolated from urine bladder (Tab. 1). Percent of fish highly infested with spores of *C. drepanopsettae* and *P. reinhardti* was 6.6% and 21.4%, respectively. Less numerous infestation of the Greenland halibut individuals with the spores of *C. drepanopsettae* and *P. reinhardti* was noted, respectively, for 16 and 14.5 percent of fish tested.

Among the common parasites of the tested host in that area were *Anisakis simplex* and *Thynnascaris adunca* (Tab. 1). Characteristic for those species were high extensivity and intensity of infestation. The maximum number of *A. simplex* larvae reached over 4 thousand per 1 fish and in case of *Th. adunca* was up to 392 larvae. All were encysted nematodes at the third stage of growth. The *A. simplex* larvae were present, mostly, within different organs of abdominal cavity; being most numerous within a stomach wall (Tab. 2). Besides they were present quite often within muscles. That was where 1996 larvae were isolated from, which was 6.9% of the total number of isolated individuals. Nematodes were located mostly within the laminae of ventral integuments on fish body side facing the ground (blind one), being less numerous on the opposite part of body (optic one) and even less numerous within muscles of dorsal part of body. The *Th. adunca* larvae were distributed almost entirely within the cavity, and were gathered mainly at intestine and pyloric caeca within liver and at the stomach (Tab. 2). Single larvae of that species were, also, found within muscles of an abdominal part of 8 fish. Except for larval forms at stage III, one at stage IV was found in the Greenland halibut's stomach. Two fishes harboured single individuals of the grown up *Th. adunca* (Tab. 1).

The common parasites of the tested fish population were, also, acanthocephalons *Corynosoma strumosum* and trematodes *Derogenes varicus* (Tab. 1). Encysted juvenile forms of *C. strumosum* were present on various organs within the cavity; the most numerous being on intestine and pyloric caeca (Tab. 2). In one case two larvae

Table 2

Infestation of the Greenland halibut with parasites

Parasite species	ekst.	int.	middle
<i>Protozoa - Myxosporidia</i>			
<i>Ceratomyxa drepanopsettae</i> Awerinzew, 1908	100.0	single - mass*	
<i>Myxidium incurvatum</i> Thélohan, 1892	25.5	single - numerous	
<i>Ortholinea divergens</i> (Thélohan, 1895)	1.9	single - numerous	
<i>Paramyxoproteus reinhardti</i> Wierzbicka 1986	92.45	single - mass	
<i>Cestoda</i>			
<i>Nybelinia surmenicola</i> Okada in Dollfus, 1929, pl.	1.9	1	1
<i>Scolex pleuronectis</i> Müller, 1788, pl.	31.1	1-520	66.18
<i>Trematoda</i>			
<i>Felodistomum furcigerum</i> (Olsson, 1867) Yamaguti, 1954	20.75	1-73	14.14
<i>Stenacron vetustum</i> Stafford, 1904	5.7	1-7	2.83
<i>Hemiurus levinseni</i> Odhner, 1905	7.55	1-16	4.62
<i>Derogenes varicus</i> (Müller, 1784) Looss, 1901	74.5	1-195	19.87
<i>Lecithaster gibbosus</i> (Rudolphi, 1802) Lühe, 1901	3.8	1	1
<i>Nematoda</i>			
<i>Anisakis simplex</i> (Rudolphi, 1809) Dujardin, 1845, larva	95.3	1-4168	285.90
<i>Phocanema decipiens</i> (Krabbe, 1878) Myers, 1959, larva	50.9	1-18	4.59
<i>Thynnascaris adunca</i> (Rudolphi, 1802), larva III st.	98.1	1-392	21.63
<i>Thynnascaris adunca</i> (Rudolphi, 1802), larva IV st. et ad.	1.9	2-3	2.50
<i>Acanthocephala</i>			
<i>Echinorhynchus gadi</i> Zoega in Müller, 1776	1.9	1-3	2.00
<i>Corynosoma strumosum</i> (Rudolphi, 1802), larva	81.1	1-62	5.60
<i>Corynosoma semerme</i> (Forssell, 1904), larva	15.1	1-2	1.37
<i>Crustacea</i>			
<i>Neobrachiella rostrata</i> (Krøyer, 1837)	34.9	1-15	2.32

ekst. - extensivity (percent of fish infested)

int. - infestation intensity (number of parasites within one host)

šred. - average infestation intensity (number of parasites per one infested individual within population)

* - in case of Protozoans: single - single spores (in suspension, in scraping), numerous - about 50 spores in 30 vision fields under enlargement 400x, mass - above 10 spores in one vision field

were found within the muscles of ventral integuments. The grown up forms of *D. varicus* were noted mostly within the stomach being only occasionally observed within intestine and gills cavity, where they probably got after the fish death.

The parasites frequently present on the Greenland halibut from the Barents Sea happened to be nematodes *Phocanema decipiens*; infestation extensivity being 50.9% (Tab. 1). That were encysted larvae at the 3rd stage of growth, inhabiting, mostly, liver, and less often attached to walls of intestinal track or other organs within the cavity (Tab. 2). In the tested sample only one larva was found in the muscles, near abdominal fins.

Another four species – *Myxidium incurvatum*, *Scolex pleuronectis*, *Fellodistomum furcigerum* and *Neobrachiella rostrata* were noted in tested material not so often. Infestation extensivity with those parasites reached 20.75 up to 34.9% (Tab. 1). Protozoans *Myxidium incurvatum* were distributed within a gall bladder, while *S. pleuronectis* larvae were found within intestine. That species of cestoid had high infestation intensity; a maximum number of cestodes reached up to 520 individuals per fish. An intestine parasite was also trematode *Fellodistomum furcigerum*. However infestation intensity with that species was lower (Tab. 1). The crustacean *Neobrachiella rostrata* was isolated most often from gill arches and gill-rakers (62.8% of collected females). Besides they were attached to pseudobranchia (18.6%) and interbranchial septum.

A relatively rare parasite of the tested host was acanthocephalon *Corynosoma sermerme* (Tab. 1), present in larval form within the cavity on various organs (Tab. 2). Even more rare the trematodes were; *Stenacron vetustum*, inhabiting usually intestine and *Hemiurus levinsenii* within the stomach (respectively, 5.7 and 7.55% of infested fish (Tab. 1)).

Remaining species: *Ortholinea divergens*, *Hybelinia surmenicola*, *Lecithastern gibbosus* and *Echinorhynchus gadi* were parasites very rarely present in the tested fish population. The intestine trematode – *L. gibbosus* – was isolated from 4 fishes while other species inhabited 2 fishes, only (Tab. 1). *Ortholinea divergens* were found within the bladder, encysted plerococoids of *Nybelinia surmenicola* were found in the stomach walls, while the grown up individuals of *E. gadi* were present within intestine.

DISCUSSION

When comparing own data from the Barents Sea with results of Poljanski (1955), who tested only two Greenland halibuts from that area, it is to say him to find the most common parasites of the host in that very area. Those were *Ceratomyxa drepanopsettae*, *Scolex pleuronectis*, *Derogenes varicus*, *Thynnascaris adunca* (larvas and grown up forms) and larvae of *Anisakis* sp., Besides he mentioned trematode *Genarchopsis mülleri*, which, in my material, occurred sporadically and within the Labrador region, only (Wierzbicka, 1990b).

Number of parasites, on Greenland halibut from the Barents Sea, found by me (18 species) exceeded also Reimer's data (1981), who had found only 9 species on fish caught around the Bear Island.

Analysing results, both mine and Reimer's, one can notice some concurrence. Infestation of Greenland halibut from the Bear Island area is, to some extent, nearing data for the Barents Sea. One can see also similarities in infestation of Greenland halibut from the Strait of Davis (Reimer 1981) and the Labrador fishing ground (Wierzbicka 1990b). It concerns, above all, *Anisakis simplex* and *Corynosoma strumosum* larvae (the parasites whose final hosts are sea mammals) as well as crustacean *Neobrachchiella rostrata*. Those species, alike in the Barents Sea, were more numerous on fish caught near the Bear Islands. Besides trematode *Stenacron vetustum* was a common parasite at the Labrador fishing ground, only rarely isolated from the Barents Sea fish. Those trematodes (though not numerous) were also found by Reimer in the Strait of Davis, only. Worth to be mentioned were plerocercoids of *Grillotia* genus, observed by that author rarely and only within the Strait of Davis. They were also sporadically present in my own material and only for samples from the Labrador area (Wierzbicka 1990b). Some doubts may arise from comparing both data, because Reimer has not given age and length of the fish tested. Nevertheless, examples of some similarities between Greenland halibut parasitofauna from the Barents Sea up to the Bear Island and from the Labrador fishing ground up to the Strait of Davis, mentioned above, seem to be ecologically justified, for the regions being very close to each other. It can be presumed the Greenland halibut individuals tested by Reimer had been caught by fishermen, and were, to some extent, close, by size, to my own ones.

The Greenland halibut from the Barents Sea harboured two species parasitic for man. These are larvae of *Anisakis simplex* and *Phocanema decipiens*. Infestation of Greenland halibut with *A. simplex* was particularly high (Tab. 1). Average infestation intensity with that parasite reached up to 272.42 larvae per one fish tested. Most of the parasites located within the cavity (Tab. 2), with some larvae present in muscles (6.9% of larvae found). Infestation of Greenland halibut with larvae of *Ph. decipiens* was much smaller. However larvae were isolated from 50.9% of the tested fish individuals, with average infestation intensity being 2.34 larvae per fish. Nematodes of that species were found mainly within liver, and were noted relatively rare in muscles (Tab. 2). The Greenland halibut from fishing grounds of the Barents Sea may be a serious source of infestation with those parasites for man. It seems useful, though, for Greenland halibut to be gutted on deck immediately after catching and then deeply frozen.

REFERENCES

- Poljanskij Ju.I., 1955: Materialy po parazitologii ryb severnyh morej SSSR. Parazity ryb Barentsova morja. — Trudy Zool. Inst. AN SSSR, 19: 5–170. (in Russian)

- Reimer L.W., 1981: Parasiten von Reinhardtius hippoglossoides (Walbaum), dem Schwarzen Heilbutt aus dem Nordatlantik. IV. Wissenschaftliche Konferenz zu Fragen der Physiologie, Biologie und Parasitologie von Nutzfischen vom 3. bis 6. September 1980 in Rostock. Wilhelm – Pieck – Univ. Rostock: 121–123.
- Wierzbicka J., 1990a: Parasitic protozoans of the Greenland halibut, Reinhardtius hippoglossoides (Walbaum, 1792). – Acta Ichthyol. Piscat. **20**, 1: 91–98.
- Wierzbicka J., 1990b: Parasitic fauna of the Greenland halibut, Reinhardtius hippoglossoides (Walbaum, 1792) from off Labrador. – Acta Ichthyol. Piscat., **21**, 1: 21–29.
- Yamaguti S., 1971: Synopsis of digenetic trematodes of vertebrates. 1, 2. – Keigaku Publ. Co., Tokyo.

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FAUNA PASOŻYTNICZA HALIBUTA NIEBIESKIEGO, *REINHARDTIUS HIPPOGLOSSOIDES*
(WALBAUM, 1792) Z MORZA BARENTSA

STRESZCZENIE

Materiał do badań pochodził z połowów rybackich dokonanych 6 maja 1977 r. na łowisku Morza Barentsa. Łącznie zbadano 106 osobników halibuta niebieskiego o wymiarach 36,5–77,5 (longitudo totalis) i masie 350–5140 g.

W badanej populacji halibuta niebieskiego stwierdzono występowanie 18 gatunków pasożytów, które należały do: *Protozoa* (4 gatunki), *Cestoda* (2), *Trematoda* (5), *Nematoda* (3), *Acanthocephala* (3) i *Crustacea* (1 gatunek). Ekstensywność i intensywność zarażenia poszczególnymi pasożytami były bardzo różne (tab. 1). Niektóre z nich notowano bardzo często i osiągały one wysoki stopień zarażenia. Pasożyty zasiedlały różne narządy. Nieliczne gatunki umiejscawiały się także w mięśniach (tab. 2). Dwa z nich – *Anisakis simplex* i *Phocanema decipiens* są chorobotwórcze dla człowieka. Szczególnie silne zarażenie obserwowano larwami *A. simplex* (tab. 1). Halibut niebieski może więc stanowić na łowiskach Morza Barentsa poważne źródło zarażenia człowieka. W związku z tym autorka proponuje usunięcie wnętrzności z jamy ciała halibuta niebieskiego bezpośrednio po złowieniu oraz stosowanie głębokiego mrożenia.

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