ACTA ICHTHYOLOGICA ET PISCATORIA
Vol. IX Fasc. 1 Szczecin 1979

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Parasitology

PARASITES OF NORTH SEA SPINY DOGFISH, *SQUALUS ACANTHIAS* L. *(SELACHIIFORMES, SQUALIDAE)*

PASOŻYTY KOLENIA *SQUALUS ACANTHIAS L. (SELACHIIFORMES, SQUALIDAE)* Z MORZA PÓŁNOCNEGO

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Forty five individuals of spiny dogfish *Squalus acanthias* L. from the North Sea were examined and found to contain 13 species of parasites out of which 1 cestode, 3 trematode, and 2 nematode species were revealed for the first time in dogfish. Five species proved typical of the *Chondrichthyes*, the remaining ones being typical teleost parasites.

INTRODUCTION

The studies reported herein were carried out on 45 juvenile spiny dogfish, *Squalus acanthias* L., caught from the North Sea (coordinates of catching site: 58°44 N latitute, 3°33 longitude; Fig.1) by Mt "Morąg" on 17 May, 1977. The fishes examined measured 52 -85 cm (l.t.) and weighed 380–2030 g. One individual only showed fully developed gonads. The sex ratio (males: females) of the material studied was 3.5:1. The fishes caught were frozen on board ship and examined after thawing, in a few weeks' time.

Skin, mouth and gill cavity, body cavity, intestine and remaining viscera were thoroughly examined. Basically, protozoans were not considered, gall bladder content smears being taken form 10 randomly chosen individuals.

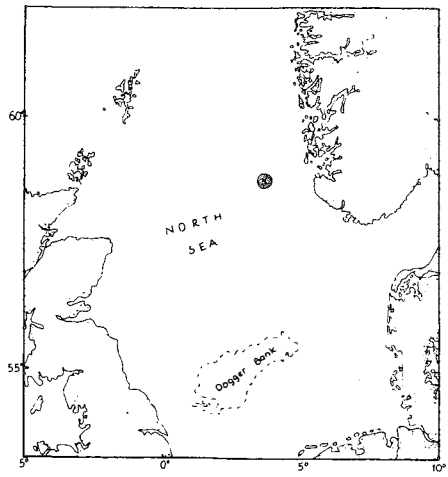


Fig. 1. Catching site

RESULTS

Protozoa:Myxobolidae

Chloromyxus leydigi (Mingazzini, 1890)

The species was found to occur in gall bladder of 7 out of 10 individuals examined. The invasion intensity was very low, single spores occurring in the fishes affected.

Monogenoidea

Erpocotyle squali (MacCallum, 1931)

A gill parasite. Opisthohaptor provided with 6 suckers and 6 hooks. Length range of 6–12 mm, width ranging within 0.1–1 mm; opisthohaptor diameter range 1.5–3 mm.

The parasites were found in 10 individuals.

Invasion incidence: 22.2%,

Mean invasion intensity: 2.4,

Mean intensity of population infestation: 0.53 (Fig. 2).

Cestoda

Trilocularia acanthiaevulgaris (Olsson, 1867) *(scolex)*

The cestodes were found exlusively as scolexes in stomachs and – more frequently – in intestine, 1–2 per fish. Dimensions: 4–5 mm long, 0.5 mm wide (Fig. 3).

Invasion incidence: 22.2%,

Mean invasiom intensity: 1.8,

Mean intensity of population infestation: 0.4.

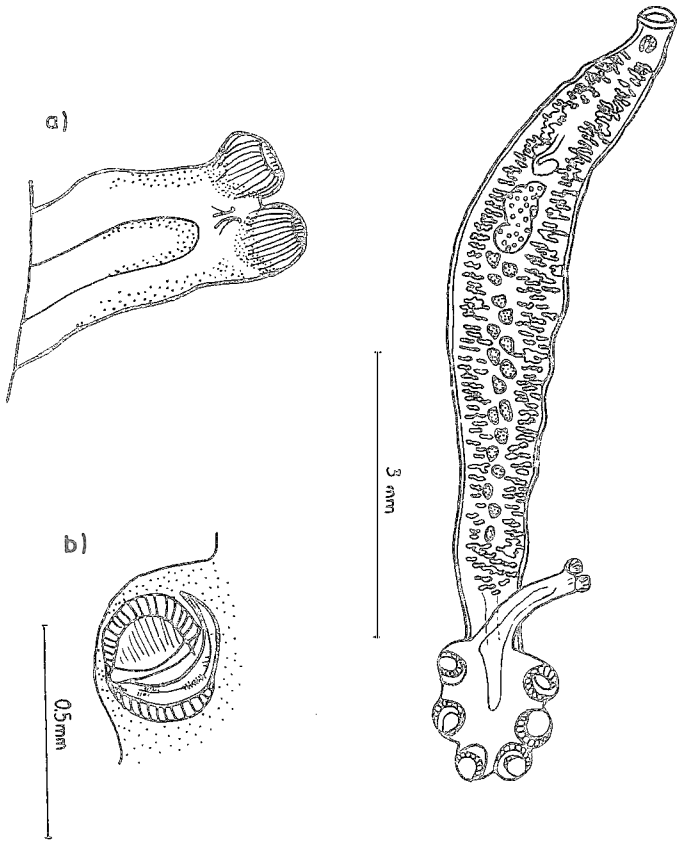


Fig. 2. *Erpocotyle squali,* o–a – optisthohaptor process, b – attachment organ

Gilquinia squali (Fabricius, 1794)

Found in densities up to 3 cestodes per fish. Since only deepfrozen material was studied, intact individuals were difficult to obtain, the strobiles being torn apart and only sigle proglotides visible.

Invasion incidence: 26.2%,

Mean invasion intensity: 1.41,

Mean intensity of population infestation: 0.37.

Scolex pleuronectis (Müller, 1788)

Found almost exclusively in stomachs and only once in intestine. The parasites' length and width ranged within 1.5–5 mm and 0.2–1 mm, respectively. Eight fishes infested were found to contain 1–2 parasites each (Fig. 4)

Invasion incidence: 17.7%

Mean invasion intensity: 1.25

Mean intensity of population infestation: 0.22

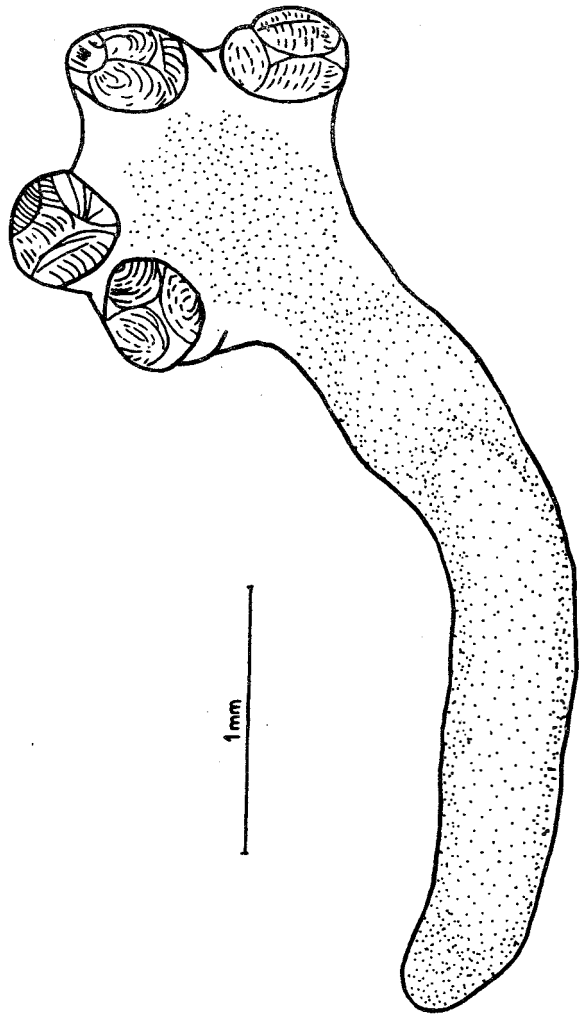


Fig. 3. *Trilocularia acanthiaevulgaris*

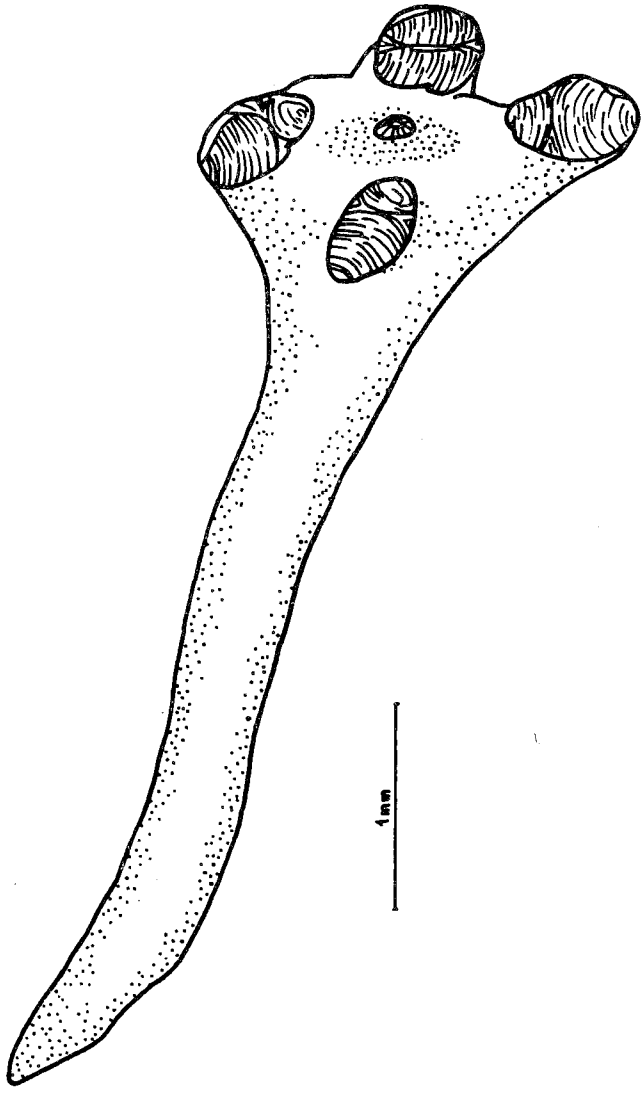
Trematoda

Bucephalopsis gracilescens (Rudolphi, 1819)

Two fishes were found to contain one parasite each. The parasites were juveniles 1.2 mm long and 0.5 mm wide.

Hemiurus levinseni (Odhner, 1905)

Found in stomachs of 2 fishes (1 and four trematodes); length and width ranges of the parasites were 0.7–1.6 mm and 0.3–0.4 mm, respectively.



Derogenes varicus (Müller, 1784)

7 dogfish stomachs were infested with the intensity reaching 10 parasite individuals per fish. Length and width of the parasites were 3.8 and 1.1 mm, respectively.

Invasion incidence: 15.5%

Mean invasion intensity: 2.42

Mean intensity of population infestation: 0.37

Nematoda

Anisakis simplex (Rudolphi, 1809)

Most common and most frequently occurring parasite. The total number of 295 3rd stage larvae were found, the invasion intensity ranging from 1 to 48 individuals; they were most frequently encysted on the peritoneum surrounding stomach and intestine. Body

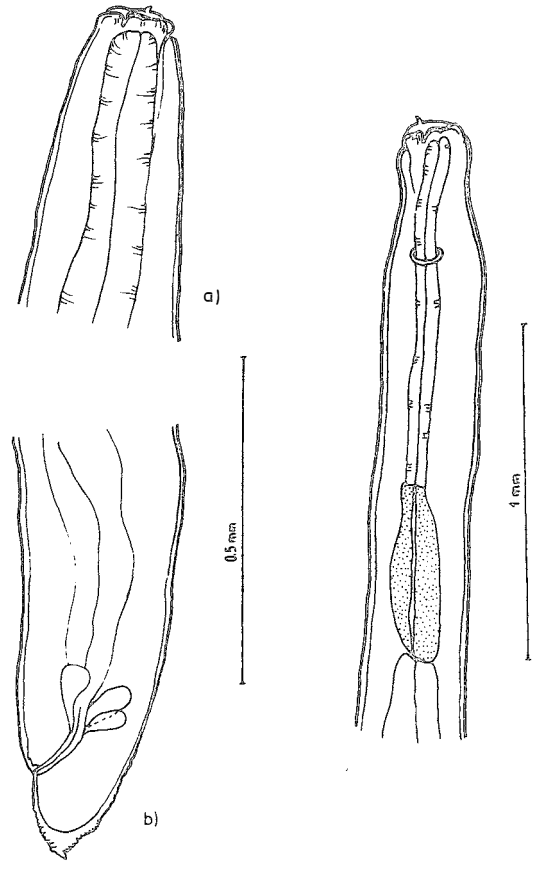


Fig. 5. *Anisakis simplex*, a – anterio part, b – posterior part

cavity (mesentery), liver, and gonads were found to contain 28, 9, and 2 individuals, respectively, none being found in muscles. Length of parasites ranged within 19–30 mm (Fig. 5).

Invasion incidence: 80%

Mean invasion intensity: 8.19

Mean intensity of population infestation: 6.55

Thynnascaris adunca (Rudolphi, 1802)

The nematodes most frequently recorded from dogfish. The 3rd and 4th stage larvae occurred in fish stomachs, the first being twice as abundant as the other. Most larvae were 9–18 mm long and 0.2–0.5 mm wide, some individuals reaching 30 mm in size. The invasion intensity reached 46 individuals per fish. The total number of 62 parasites were removed for studies (Fig. 6).

Invasion incidence: 20%

Mean invasion intensity: 6.88

Mean intensity of population infestation: 1.37.

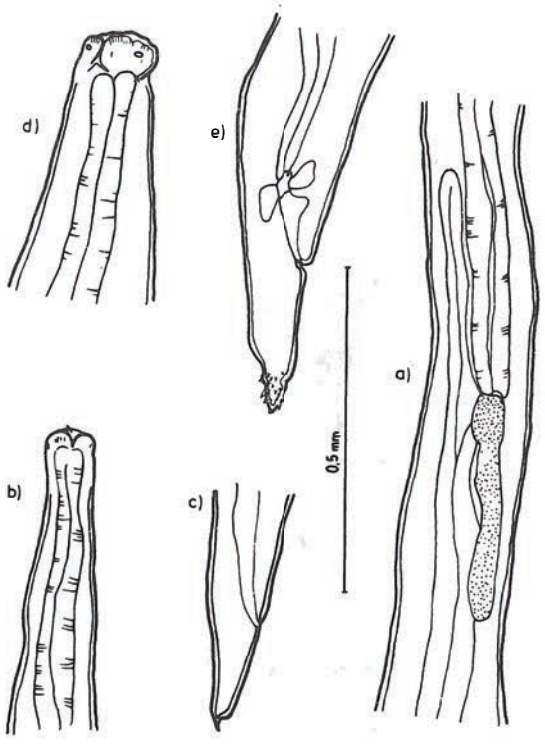


Fig. 6. *Thynnascaris adunca* – larva, a – alimentary tract, 3-rd stage – b – anterior part, c – posterior part, 4-th stage – d – anterior part, d – posterior part

Copepoda parasitica

Echthrogaleus coleopteratus (Guerin, 1837)

A single individual 13 mm long and 6 mm wide was found in 1 fish only, near anal fin.

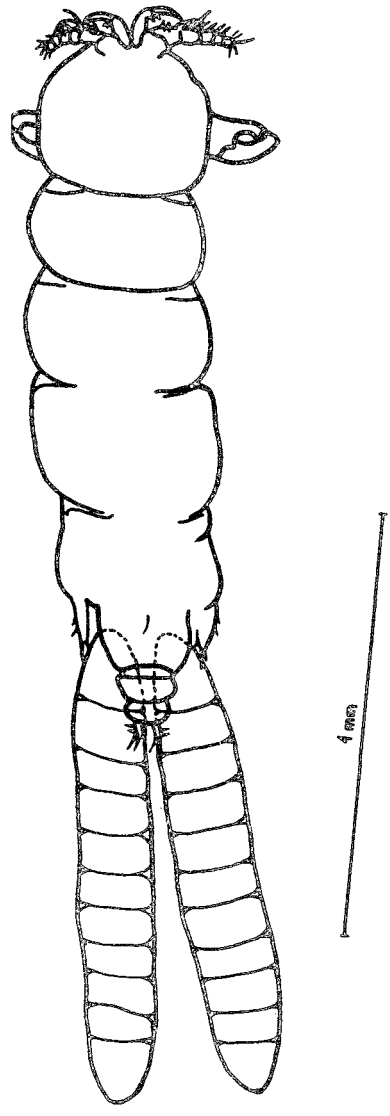


Fig. 7. *Eudactylina acanthi*

Eudactylina acanthii (Scott, 1901)

Found on gills of 25 fishes, the invasion intensity reaching 24 parasites per fish. Dimensions of the parasite: body length 1.5–2.2 mm; body length with egg sac 3.0–3.8 mm; body width 0.2 mm (Fig. 7).

Invasion incidence: 55.5%

Mean invasion intensity: 6.24

Mean invasion intensity of population infestation: 3.46

Pseudocharopinus bicaudatus (Krφyer, 1837)

Four fish individuals contained in their spiraculi from 1 to 2 parasites; the parasites' dimensions: cephalothorax length 3–4 mm, width 2.5–2.9 mm, thorax length 3–4 mm, egg sac length 5–6 mm.

Invasion incidence: 8.8%

Mean invasion intensity: 1.25

Mean intensity of population infestation: 0.11.

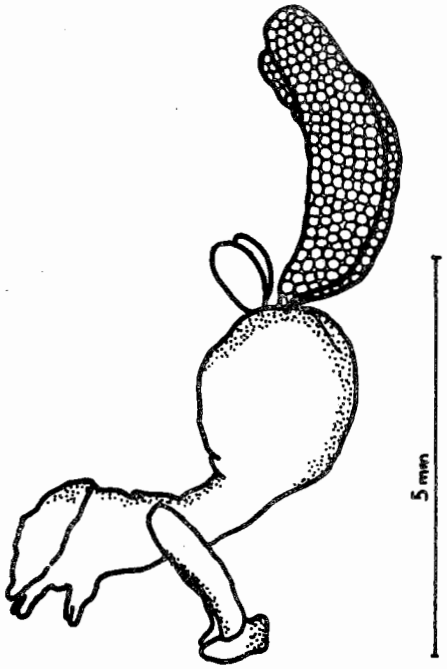


Fig. 8. *Pseudocharopinus bicaudatus*

DISCUSSION OF RESULTS

Out of 45 fish individuals examined, only one was found free of parasites, the remaining ones being hosts for 13 parasitic species occurring usually – apart from nematodes – in low numbers.

The relatively rare parasites were: *Bucephalopsis gracilescens* and *Hemiurus levinsoni* of the trematodes and *Pseudocharopius bicaudatus* and *Echtrogaleus coleopteratus* of the copepods.

There were a number of parasites recorded for the first time in dogfish. These included trematodes *Bucephalopsis gracilense, Hemiurus levinseni* and *Derogenes varicus.* The first species had been previously recorded mainly in gadoids (Dollfus, 1953; Skrjabin and Gušanskaya, 1962) and in the Barents Sea *Lophius piscatorius* (Poljanskij, 1955). Also *H. levinseni* appear to be common in gadoids (Dollfus, 1953; Skrjabin and Gušanskaya, 1954; Poljanskij, 1955). The two species were also observed in the Sea of Japan and in the Okhotsk Sea (Żukov, 1960). *Derogenes varicus* is a common parasite of many teleost fishes (Dollfus, 1953; Poljanskij, 1955; Żukov, 1960).

Scolex pleuronectis had not been recorded in dogfish before; this parasite is, however, common in other North Sea fishes such as *Cyclopterus lumpus* (Dollfus, 1955; Baer, 1962). In view of its occurrence mainly in stomachs, a possibility of the parasite's temporary survival there as a result of its being taken up with food cannot be excluded.

The two nematode species, *Anisakis* simplex and *Thynnascaris adunca* are also for the first time recorded in dogfish. Due to its pathogenic nature, the first parasite species deserves a particular attention in view of increasing commercial catches of dogfish.

CONCLUSIONS

1. The parasitic fauna of the North Sea dogfish is very diversified. Representatives of all the basic taxa were found, with 3 species each of the Trematoda, Cestoda, and Crustacea parasitica, 2 nematode species, and 1 species each of the Monogenoidea and Protozoa.
2. Some of the parasites *(Erpocotyle squali, Gilquinia squali, Trilocularia acanthiaevulgaris, Echtrogaleus coleopteratus*, and *Eudactylina acanthi (*are common in the *Chondrichthyes,* the others are frequent in teleosts.
3. The cestode *Scolex pleuronectis* trematodes *Bucephalopsis gracilescens, Hemiurus levinseni* and *Derogenes varicus* as well as the nematodes *Anisakis simplex* and *Thynnascaris adunca* are for the first time recorded in dogfish.
4. The particular attention should be pair to the nematode *Anisakis simplex* due to its pathogenic effects on humans; every possible measure of prevention, thermal processing in particular, should be applied before the fishes caught are delivered to consumers (Ruitenberg, 1970; J. Grabda, 1973).

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Translated: mgr Teresa Radziejewska

PASOŻYTY KOLENIA *SQUALUS ACANTHIAS (L.) (SELACHIIFORMES, SQUALIDAE)* Z MORZA PÓŁNOCNEGO

STRESZCZENIE

Przebadano 45 sztuk kolenia *Squalus acanthias* (L.) z Morza Północnego, złowionych w dniu 17 V 1977 r. na pozycji 58°44′N i 3°33′E. Materiał z połowu przemysłowego był zamrożony a dopiero po rozmrożeniu badany. Przeprowadzono pełne badanie parazytologiczne. Nie badano tylko na pierwotniaki. Niemniej pobrano losowo od 10 sztuk rozmazy z pęcherza żółciowego. U 7 stwierdzono niewielkie ilości spor *Chloromyxum leydigi*. Spośród 45 sztuk koleni tylko w jednym nie stwierdzono pasożytów w ogóle. W pozostałych mierne ilości pasożytów z 13 gatunków: po 3 gatunki przywr, tasiemców i widłonogów pasożytniczych, po 2 gatunki nicieni i po jednym z *Monogenea* i *Protozoa*.

Z tego nowymi dla koleni okazały się: z przywr – *Bucephalopsis oracilescens, Hemiurus levinseni Derogenes varicus*, z tasiemców – *Scolex pleuronectis*, z nicieni – *Anisakis simplex* i *Thynnascaris adunca*.

Gatunki: *Erpocotyle squali, Gilquinia squali, Trilocularia acanthiaevulgaris, Echtrogaleus coleopteratus* i *Eudactylina acanthii* są typowymi pasożytami ryb chrzęstnoszkieletowych (*Chondrichthyes*), pozostałe pospolite u ryb kostnoszkieletowych (*Teleostei*), a zwłaszcza dorszowatych (*Gadidae*).

Zdecydowanie licznie występowały nicienie a zwłaszcza *Anisakis simplex* jedynie w jamie ciała. Nie stwierdzono ich w mięśniach. Z uwagi na patogeniczność dla ludzi, należy zastosować wszystkie środki profilaktyczne w przypadku przeznaczenia koleni do konsumpcji.

К. Орловска

ПАРАЗИТЫ КАТРАНА SQUALUS ACANTHIAS L. (SELACHIFORMES, SQUALIDAE) СЕВЕРНОГО МОРЯ

Резюме

Исследовано 45 экземпляров катрана Squalus acanthias (L.) из Северного моря, выловленных 17 мая 1977 года в точке с координатами 58°44'N и 3°33'E. Материал из промыслового лова был заморожен и только после размораживания был исследован. Провели полное паразитологическое исследование. Не исследовали только на простейшие. Тем не менее взяли выборочно мазки из желчного пузыря от 10 экземпляров. У 7 экземпляров обнаружено небольшое количество спор Chloromyxum leydigi. Среди 45 экземпляров катрана только у одного не найдено паразитов вообще. У остальных нашли умеренное количество паразитов из 13 видов: по 3 вида трематод, ленточных червей, паразитических копепод; по 2 вида нематод и по 1 из Monogenea и Protozoa.

Среди них новыми для катрана оказались: трематоды - Bucephalopsis gracilescens, Hemiurus levinseni и Derogenes varicus; ленточные черви - Scolex pleuronectis, нематоды - Anisakis simplex и Thynnascaris adunca.

Виды: Erpocotyle squali, Gilquinia squali, Trilocularia acanthiaevulgaris, Echtrogaleus coleopteratus, Eudactylina acanthii являются типичными паразитами хрящевых рыб (Chondrichthies), остальные являются общими для костистых (Teleostei), особенно, тресковых (Gadidae).

Наиболее часто находились нематоды, особенно, Anisakis simple в полости тела. Не обнаружено их в мышцах. Имея в виду их патогенность для людей, в случае предназначения катрана для употребления надо применить все профилактические средства.

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Received: 8 XI 1978 r.