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Parasitology

PARASITOFAUNA OF CAPE HORSE MACKEREL,  
*TRACHURUS TRACHURUS CAPENSIS* CASTELNAU, 1861

PARAZYTOFAUNA OSTROBOKA KAPSKIEGO  
*TRACHURUS TRACHURUS CAPENSIS* CASTELNAU, 1861

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87 individuals of Cape horse mackerel *Trachurus trachurus capensis*, caught on the Namibian fishing grounds off the Cunene mouth were examined. Representatives of 7 species of parasites (3 monogeneans, 2 nematodes, 1 hirudinean, and 1 copepod species) were found. A relationship between the infestation and fish age was given a particular attention.

#### INTRODUCTION

Cape horse mackerel (*Trachurus trachurus capensis*), a subspecies of horse mackerel, *T. trachurus* L., was the object of the present study. The subspecies, owing to its geographic isolation and some differences in its biology, may exhibit certain variation in

its infestation with parasites, compared to other horse mackerel subspecies. *T. trachurus capensis*, in spite of its substantial contribution to the world's and Polish fisheries (522 thou. t and 123 thou. t, respectively; FAO, 1979), was studied by a few authors only.

## MATERIALS AND METHODS

The specimens to be examined were collected by the author during a cruise of MT "Bogar" in 1980. The materials for detailed parasitologic studies consist of three samples taken within April – May 1980 off the Cunene mouth (the Namibian fishing grounds). A total of 87 specimens measuring 109–470 mm, weighing 8–640 g, and aged 1+ to 8 yr were examined. The largest sample of 67 individuals was taken on 17 May 1980 at lat. 19° 04' S long 12° 01' E within the depth range of 135–150 m. Those fishes were divided into 2 age groups: 39 individuals measuring 109–123 mm and weighing 8–12 g were allotted to the 1+ group, while the remaining 30 ones measuring 215–300 mm and weighing 69–222 g were classified as the 2–4+ group. Fish age was determined from otoliths mounted in Canada balsam (Kompowski and Wysokiński, 1976). The following organs were checked for parasites: skin, eyes, mouth and body cavities, heart, liver, stomach, pyloric processes, intestine, gonads, and muscles. The *Monogenea* found were fixed in 75% ethyl alcohol and mounted in glycerin. Nematodes and copepods were fixed in 4% formalin-physiologic fluid solution. The poor condition of the fish specimens made it impossible to study protozoan infestation.

The study materials comprised additionally all the Cape horse mackerel individuals examined personally by the author on board the "Bogar" in the Namibian fishing grounds in 1980. Attention was paid to the presence of muscle and skin parasites. A large number of fishes examined in this way allowed to draw justified conclusions.

## RESULTS

### Monogenea

*Cemocotyle trachuri* Kovaleva, 1970

Family: *Heteraxinae* Price, 1961

A gill parasite. Opisthaptor on the wedge-like body end. Terminal lapet with anchors (a single pair measuring 0.045 mm found), two rows of clamps on both sides (a total of up to 30, measuring 0.032 × 0.033 mm to 0.077 × 0.078 mm). Elongated egg (0.26 mm long) with filaments on both ends and an operculum on one end. Genital corona (0.033 mm diameter) consists of spines (Fig. 1.).

17 specimens were found in 12 fish individuals. The invasion incidence was 13.8%, the intensity amounting to 1–4 parasites in a fish. The mean invasion intensity of the population was 0.20, the mean invasion intensity being 1.42. *C. trachuri* was encountered in both age groups.

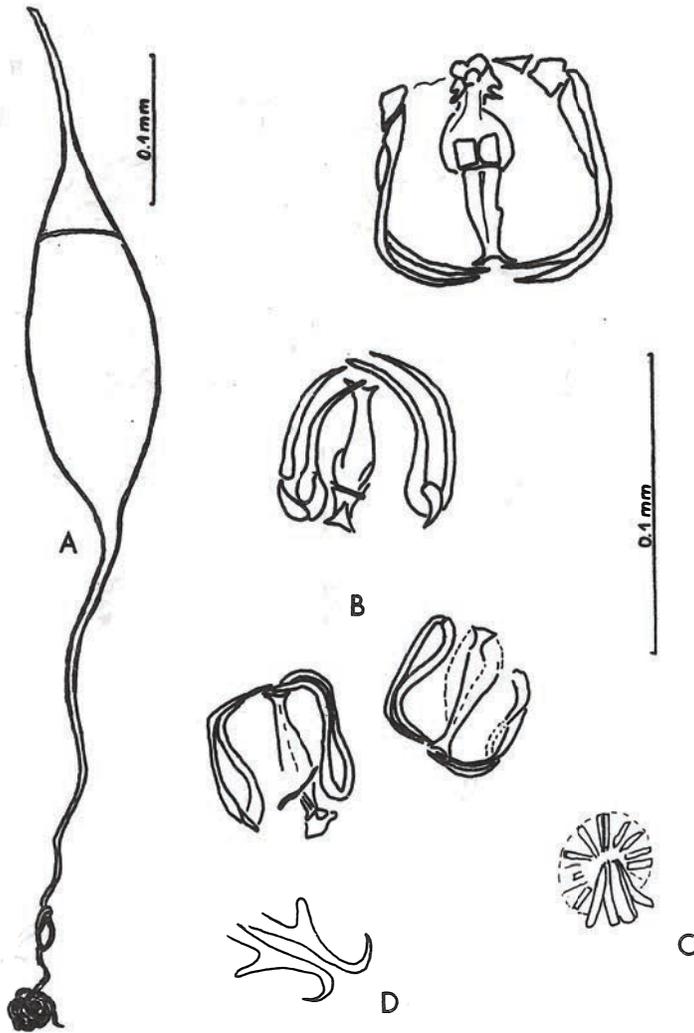


Fig. 1. *Cemocotyle trachuri*, A – egg, B – clamps, C – genital corona, D – anchors

*Gastrocytyle trachuri* Beneden et Hesse, 1863

Family: *Gastrocotylidae* Price, 1943

A gill parasite. Opisthohaptor placed on a side; it consists of up to 33 clamps arranged in a single row and of a terminal lapet with three pairs of anchors of different size (Fig. 2). Genital corona (0.016 mm diameter) consists of 12 spines. Elongated and operculated egg (0.25 mm long) with filaments on both sides. Clamps are of the following dimensions:  $0.070 \times 0.055$  mm to  $0.100 \times 0.077$  mm. Large anchors measure 0.058 mm, small ones 0.026 mm (Fig. 2). Medium sized anchors were impossible to measure.

11 specimens of *G. trachuri* were found in 8 fish individuals. The invasion incidence

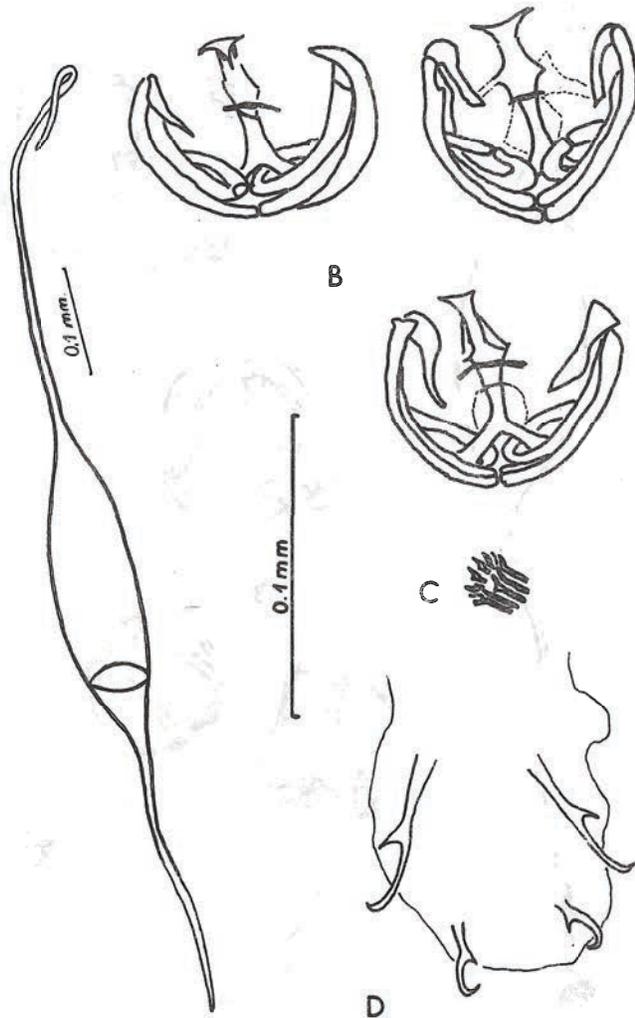


Fig. 2. *Gastrocotyle trachuri*, A – egg, B – clamps, C – genital corona, D – terminal lapet

was 9.2%. The invasion intensity amounted to 1–4 parasites in a fish, the mean intensity of the population invasion being 0.13 and the mean invasion intensity 1.38. The parasites occurred in older fishes (2–4+ age group) only (Table 1).

*Pseudaxine* sp.

Family: *Gastrocotylidae* Price, 1943

A gill parasite. Body shape, colour, and location in gills similar to the two other monogenean species described (Fig. 3). The only individual found measured 2.7 mm. Opisthohaptor on the posterior body end, armed with clamps and anchors.

The clamps are similar to those in *G. trachuri*, but almost half their size

Table 1

Comparison between infestation of age groups of Cape horse mackerel

	Invasion incidence		Invasion intensity (ind.)	No. of parasites found	Mean invasion intensity in population	Mean invasion intensity
	No. of fish individ.	%				
1+ AGE GROUP						
TOTAL	25	64.1	1-3	42	0.48	1.68
MONOGENEA:	5	12.8	1-2	6*	0.15	1.2
<i>Cemocotyle trachuri</i>	4	10.3	1	4	0.10	1.0
COPEPODA:						
<i>Lernanthropus trachuri</i>	22	56.4	1-3	36	0.92	1.64
♂	11	28.2	1-2	13	0.33	1.18
♀	17	43.6	1-2	23	0.59	1.35
2 to 4+ AGE GROUP						
TOTAL	20	66.6	1-6	56	1.86	2.8
MONOGENEA	8	26.6	1-5	19*	0.63	2.38
<i>Cemocotyle trachuri</i>	4	13.3	1-4	9	0.3	2.25
<i>Gastrocotyle trachuri</i>	4	13.3	1-4	7	0.23	1.75
<i>Pseudaxine sp.</i>	1	3.3	1	1	0.03	1.0
NEMATODA	5	16.6	1-3	8	0.27	1.6
<i>Anisakis simplex</i>	4	13.3	1-3	6	0.2	1.5
<i>Nematoda gen. sp.</i>	1	3.3	2	2	0.07	2.0
COPEPODA						
<i>Lernanthropus trachuri</i>	18	60.0	1-4	29	0.97	1.61
♂	16	53.3	1-2	18	0.6	1.12
♀	4	13.3	1-3	11	0.27	1.6

\* including 2 unidentified monogenean individuals

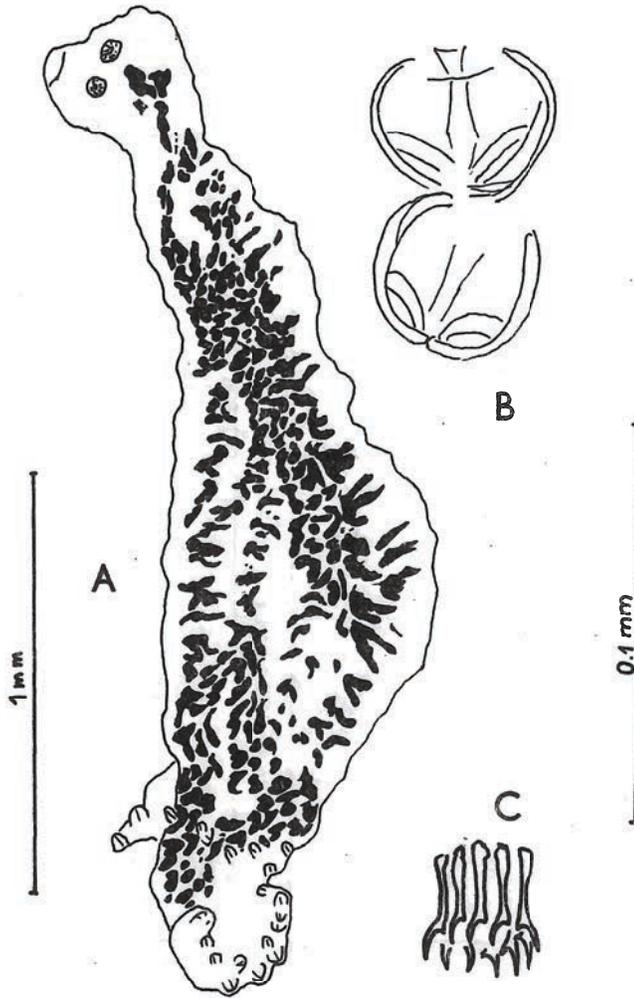


Fig. 3. *Pseudaxine* sp. A – entire parasite, B – clamps, C – genital corona

( $0.04 \times 0.04$  mm). Vitellaries nearly entirely fill the body. The anterior body end shows a characteristic swelling with two suckers (0.036 mm diameter) below it. Still below there is the genital corona (0.03 mm diameter), its framing of a characteristic shape and consisting of spines. No eggs were observed in the individual found. The fish infested was aged 3+.

No monogenean-caused damages in the host tissues were observed.

### Nematoda

*Anisakis simplex* Rudolphi, 1809

Family: *Anisakidae* Skrjabin et Karokhin, 1945

All the parasites found were the 3rd stage larvae (Grabda, 1976) measuring from 12 to 24 mm. A total of 31 larvae were found in 8 fish specimens, 9.2% being the invasion

incidence. The invasion intensity, mean invasion intensity in the population, and mean invasion intensity were 1–22, 0.36, and 3.87 parasites in a fish, respectively. The 1+ age group fishes were parasite-free, the older ones (2–4+) being infested in 13.3% with the maximum intensity of 3 nematodes in a fish (Table 1). The most heavy infested was a horse mackerel individual, 8-yr-old, containing 22 larvae. No nematodes, either in dissected fishes or the horse mackerel examined in the ship's processing plant, were found in muscles.

#### Nematoda gen. sp.

One of the 3+ horse mackerels yielded 2 very small nematodes, coiled and surrounded by a black covering. They were 1.4 mm long and 0.05 mm wide. The poor condition of the nematodes rendered their more accurate identification impossible.

### Hirudinea

#### *Pontobdella muricata*

Family: *Piscicolidae* Johnston, 1865

The only hirudinean specimen observed by the author when on board MT "Bogar". The parasite was 76 mm long and 9.6 mm thick (Photo 1). Body of dark green colour. Both ends of the body armed with suckers of the following dimensions: 4 × 2.6 mm and 6.3 × 6.3 mm. Body segments with node-like processes. A fairly large damage of the fish body was found where the parasite had been attached. A horse mackerel individual attacked measured about 24 cm.

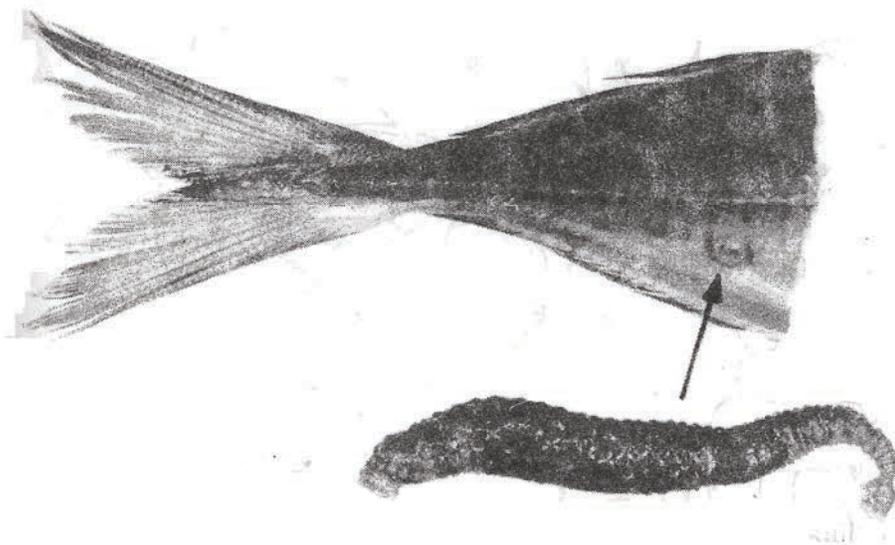


Photo 1. *Pontobdella muricata* L.

Copepoda

*Lernanthropus trachuri* Brian, 1903  
 Family: *Lernanthropidae* Kabata, 1979

The most common parasite of the Cape horse mackerel, occurring on gill lobes. The copepods show a very clear sexual dimorphism (Delamare-Deboutteville and Nunez-Ruivo, 1954).

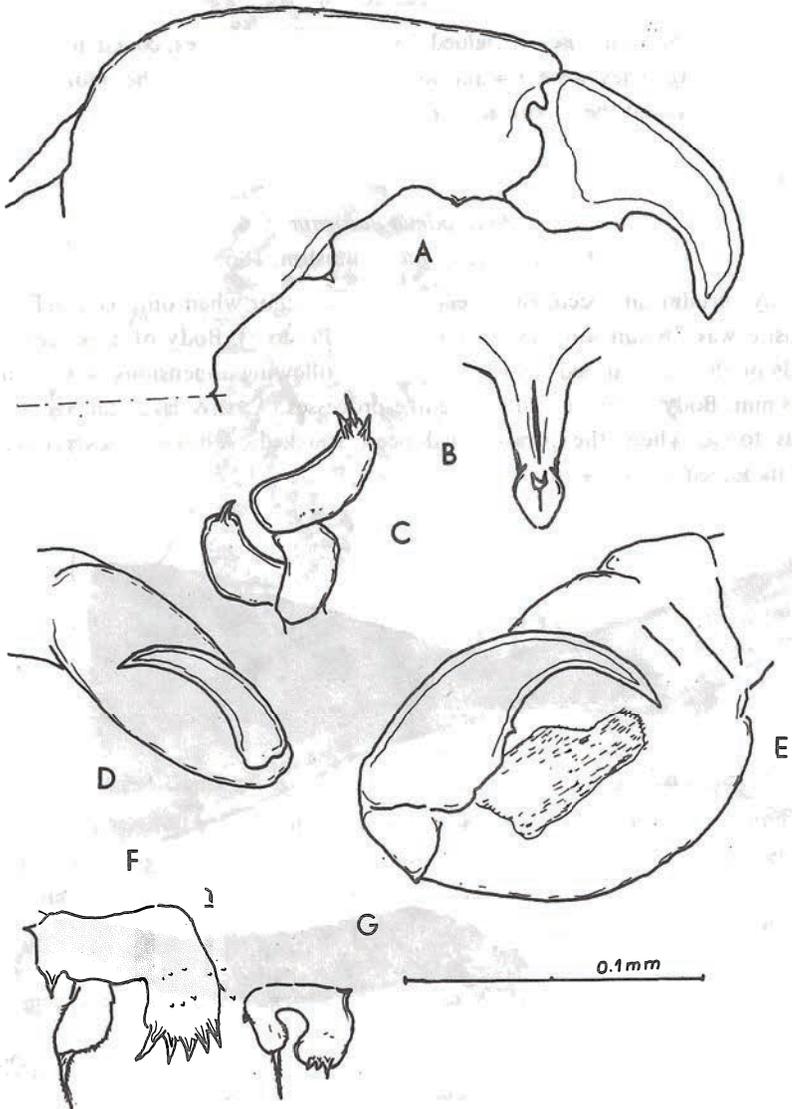


Fig. 4. *Lernanthropus trachuri* ♀ – appendages: A – second antennae, B – mouth, C – first maxilla, D – second maxilla, E – maxilliped, F – first leg, G – second leg

Female: total length (including the 4th pair of appendages) 2.6–7.5 mm. Cephalothorax slightly elongated, with 2 processes at the anterior end. The 2nd antennae transformed into two grasping hooks. Mouth appendages and the 1st and 2nd pairs of legs only slightly modified (Fig. 4). The 4th pair of legs very long, nonsegmented and split at their base. Genital segment with attached egg sacs longer than the 4th pair of legs. Uropods with 1 bristle each at their base and 2 spines each on their ends.

Male: total length (including the 4th pair of appendages) 1.8–4 mm. Cephalothorax less elongated and more rounded than in females (Fig. 5). Mouth appendages and the 1st and 2nd pairs of legs as in females (Fig. 6). The 3rd and 4th pairs of legs non-segmented and uniramous.

In 57 fish specimens 87 individuals of *L. trachurus* (40 males and 47 females) were found, which amounts to 58.6% invasion incidence. The invasion intensity, mean invasion intensity in the population, and mean invasion intensity were 1–5, 1.0, and 1.71, respectively. Males occurred in 31 fishes, females in 33; 12 fish individuals were found to contain both males and females. No significant age-related quantitative differences were observed (Table 1). Younger fishes (1+) yielded 11 males and 17 females, the older ones (2–4+) containing 16 males and 4 females. The highest amount of copepods occurred on

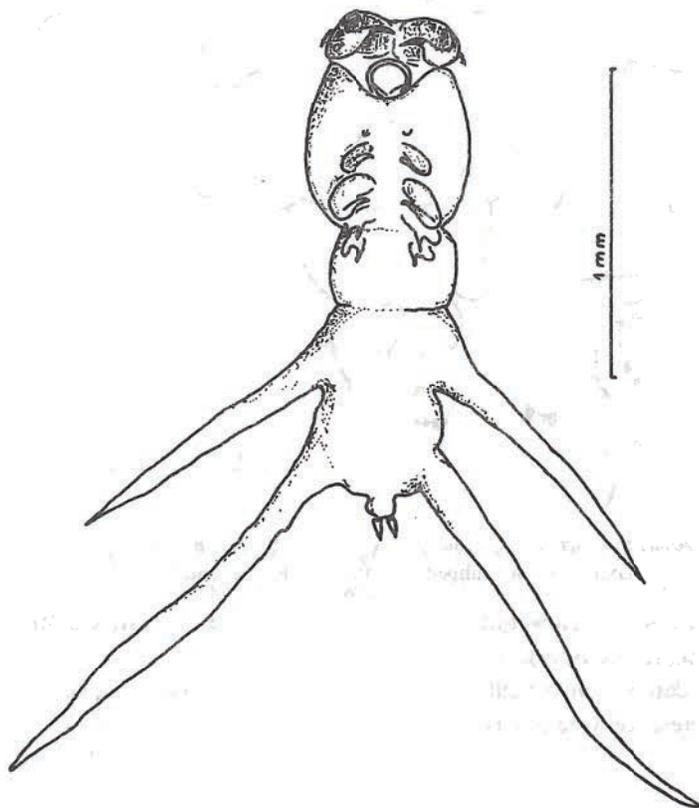


Fig. 5. *Lernanthropus trachuri* ♂, ventral view

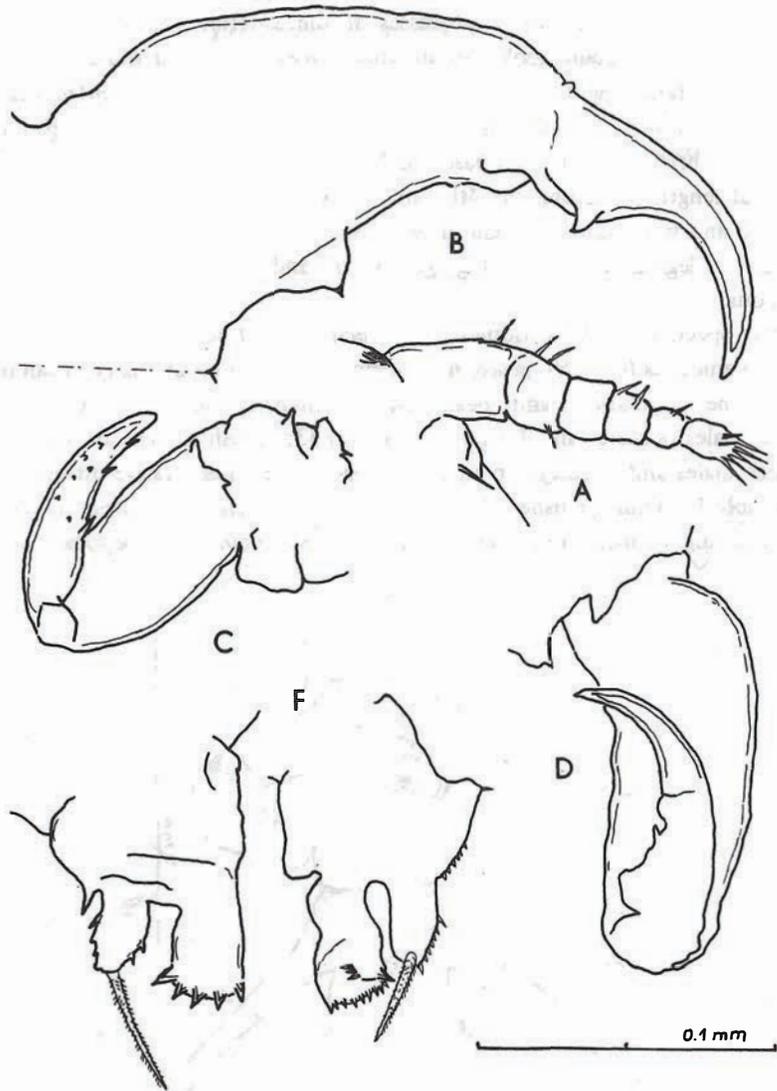


Fig. 6. *Lernanthropus trachuri* ♂ – appendages: A – first antennae, B – second antennae, C – second maxilla, D – maxilliped, E – first leg, F – second leg

the 2nd gill arch (42.1%); lower numbers were found on the 3rd, 1st, and 4th archs (23.9, 22.6, and 11.4%, respectively).

No marked damages in the gill tissue or necrotic changes that could be associated with the parasites' presence were observed.

## DISCUSSION

A detailed check-up of 87 specimens of Cape horse mackerel and a cursory examination of fishes processed on board yielded 7 species of parasites belonging to 4 higher taxa. Only 59 (67.8%) fish individuals were affected. Some of the parasites, namely: *Lernanthropus trachuri*, *Pontobdella muricata*, and *Pseudaxine sp.*, were recorded in *T. trachurus capensis* for the first time. The two latter species are without doubt rare ones, as only single specimens were found. On the other hand, *L. trachuri* is the most common parasite, since 51 (58.6%) fish specimens were infested. The copopod invasion incidence and intensity are similar in the two age groups considered. No significant differences between the two age groups in terms of their infestation were revealed also by Paruchin (1973) who studied *T. indicus* Necrasov from the Indian Ocean.

The next most frequent parasite was a monogenean *Cemocotyle trachuri*. The number and shape of its clamps found in the materials examined were similar to those described in the literature. The egg was observed to have an operculum, a feature absent in the description given by Kovaleva (1970).

Another monogenean, *Gastrocotyle trachuri*, occurred with a similar incidence. The dimension of its various body parts were similar to those reported in the literature. The younger fishes (1+) were parasite-free, while the older ones (2 to 4+) were affected with the incidence of 13.3% and a mean invasion intensity in the population of 0.23. Jessen (1975) recorded a much heavier infestation of *T. trachurus* (40%) and a mean invasion intensity in the population of 0.4. On the other hand, he quotes Kovaleva (1968) as recording the higher infestation of *T. trachurus capensis* (66%) in the 2-yr-old fishes, the 4–5-yr-old ones being infested in 15.1, while the 6-yr-old specimens were parasite-free. The present author's studies reveal a reverse trend in the monogenean invasion, which is in agreement with the data reported by Paruchin (1973). In *T. indicus* he found younger individuals to be monogenean-invaded in 21.8%, 88.3% being the incidence in older ones; off Oman, the respective incidences were 4 and 61.5%.

The third monogenean found was identified as *Pseudaxine sp.* It is probably the same species that Lebedev et al. (1979)\* had found in fishes from the North Vietnamese waters and Jessen (1975) in African fishes. The former authors had found one parasite, while Jessen two. The key character is the genital corona, definitely different from that in *P. trachuri* Parona et Perugia, 1890.

The *Anisakis simplex* nematodes were being found exclusively in the fishes older than 2 years, the 1+ group being parasite-free, which could be accounted for by the absence of *Euphausiacea*, the nematode's intermediate hosts, in food of the youngest horse mackerel (Lipskaja, 1972; Kompowski, 1976). The Cape horse mackerel infestation observed is slightly lower (incidence of 9.2) than that reported by Todorov, (1973); 20% incidence, intensity of 1–26 individuals in a fish).

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\* after Jessen (1975)

A hirudinean, *Pontobdella muricata*, is an accidental parasite; it has not been recorded for the horse mackerel in the literature available.

Of the parasites found, it is only *Anisakis simplex* that can be dangerous to man (Grabda, 1973; Grabda and Felińska, 1975). In the materials examined, no larvae were found in fish muscles; it is nevertheless recommended that a particular care be exercised with respect to these parasites.

Compared to other species fished by the Polish fleet with an equal intensity (blue whiting, saury, hake), the Cape horse mackerel belongs to those less infested.

## CONCLUSIONS

1. The parasitic fauna of the Cape horse mackerel examined consists of the following species: *Cemocotyle trachuri*, *Gastrocotyle trachuri*, *Pseudaxine sp.*, *Anisakis simplex*, *Nematoda* gen. sp., *Pontobdella muricata*, *Lernanthropus trachuri*, each affecting the fishes to a different extent.
2. *Trachurus trachurus capensis* is relatively weakly infested, as parasites were found in only 67.8% of the specimens examined.
3. *Lernanthropus trachuri* is the most common parasite.
4. The infestation with monogeneans and nematodes increases with fish age.
5. The *Anisakis simplex* larvae are absent in younger fishes (1+). In spite of the parasites' absence in muscles of older fishes, the nematodes occurring in the body cavity only, a particular care should be exercised when handling the fishes.
6. *L. trachuri*, *Pontobdella muricata*, and *Pseudaxine sp.* are recorded for the first time in *Trachurus trachurus capensis*.

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PARAZYTOFAUNA OSTROBOKA KAPSKIEGO  
*TRACHURUS TRACHURUS CAPENSIS*,  
CASTELNAU 1861 (*PERCIFORMS, CARANGIDAE*)

Streszczenie

Przebadano 87 ostroboków kapskich *T. trachurus capensis* złowionych od kwietnia do maja 1980 roku, na łowiskach Namibii w okolicach rzeki Cunene. Materiał do sekcji zamrożono na statku, a pełne badania parazytologiczne przeprowadzono w pracowni Zakładu Chorób Ryb Instytutu Ichtiologii. Z uwagi na zły stan ryb nie badano zarażenia pierwotniakami. Brano pod uwagę również makroskopowe obserwacje ryb, poczynione przez autora w czasie pracy na statku M/T „Bogar”. Zarażonych było 67,8% sekcjonowanych ryb. Znalaziono 7 gatunków pasożytów w tym 3 *Monogenea*, 2 *Nematoda*, 1 *Hirudinea*, 1 *Copepoda*. Przywry monogenetyczne *Cemocotyle trachuri*, *Gastrocotyle trachuri*, nicienie *Anisakis simplex* oraz widłonóg *Lernanthropus trachuri* są typowymi pasożytami ostroboka kapskiego. Widłonóg *Lernanthropus trachuri*, pijawka *Pontobdella* sp., oraz przywra monogenetyczna *Pseudaxine* sp. są notowane po raz pierwszy u tej ryby. Pasożytem najczęściej występującym okazał się *Lernanthropus trachuri*. Zauważono, że zarażenie przez *Monogenea* i *Nematoda* wzrasta wraz z wiekiem ryb, zarażenie widłonogami nie zmienia się. *Anisakis simplex*, nicienie patogenne dla człowieka, występuje z bardzo małą ekstensywnością i intensywnością zarażenia, przy tym nie są nim zarażone najmłodsze ryby (1+). Nie stwierdzono występowania larw nicieni w mięśniach. Mimo to należy jednak zwrócić na tego pasożyta uwagę w przypadku ostroboków przeznaczonych do spożycia.

В. Пясецки

ПАРАЗИТОФАУНА КАПСКОЙ СТАВРИДЫ *TRACHURUS TRACHURUS CAPENSIS*  
CASTELNAU, 1861 (PERCIFORMES, CARANGIDAE)

Р е з ю м е

Исследовали 87 экз. капской ставриды *T. trachurus capensis* отловленных в период апрель- май 1980 г. у берегов Намибии в районе реки Кунэнэ. Материал для исследований замораживали на судне, а полные паразитологические исследования провели в лаборатории Болезней рыб Института Ихтиологии. Из-за плохого состояния рыб не изучали заражения их простейшими. Принимали во внимание макроскопические наблюдения за рыбами, которые провел автор во время рейса на рыболовном траулере "Богар". 67,8% вскрываемых рыб оказалось зараженными. Нашли 7 видов паразитов: 3 Monogenea, 2 Nematoda, 1 Hirudinea, 1 Copepoda. Моногенетические трематоды *Cemocotyle trachuri*, *Gastrocotyle trachuri*, нематоды *Anisakis simplex* а также *Lernanthropus trachuri* являются типичными паразитами капской ставриды. *Lernanthropus trachuri*, пиявка *Pontobdella* sp. и моногенетическая трематода *Pseudaxine* sp. впервые были найдены у капской ставриды. Наиболее часто встречаемым паразитом оказался *Lernanthropus trachuri*. Заметили тоже, что заражение Monogenea и Nematoda растет с возрастом рыб, заражение *Lernanthropus trachuri* не изменяется. *Anisakis simplex* нематода патогенная для человека встречается с очень малой экстенсивностью и интенсивностью заражения. Причем не заражены ним самые младшие особи (1+). Не обнаружили личинок нематода в мышцах рыб. Тем не менее при исследовании ставриды предназначенной для пищевого употребления необходимо обратить особенное внимание на этого паразита.

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