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Parasitology

OCCURRENCE OF LARVAL NEMATODE *ANISAKIS SIMPLEX*,
LARVAL CESTODE *HEPATOXYLON TRICHIURI*,
AND PARASITIC COPEPOD *PARABRACHIELLA AUSTRALIS*
IN JUVENILE *MERLUCCIOUS CAPENSIS* OFF NAMIBIA

WYSTĘPOWANIE LARW NICIENI *ANISAKIS SIMPLEX*, LARW TASIEMCÓW
HEPATOXYLON TRICHIURI I PASOŻYTNICZYCH WIDŁONOGÓW
PARABRACHIELLA AUSTRALIS U MŁODYCH OSOBNIKÓW
MERLUCCIOUS CAPENSIS Z REJONU NAMIBII

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The author examined 2145 juvenile individuals of cape hake, *Merluccius capensis* Castelnau, 1861 caught off Namibia. The presence of larval *Anisakis simplex* (Rud., 1809), larval *Hepatoxylon trichiuri* Holten, 1802 as well as *Parabrachiella australis* Wilson, 1923 was revealed. The degree of infestation was related to sex and age of the fish.

INTRODUCTION

The Namibian shelf, its southern part in particular, has been an area of intensive hake (*Merluccius capensis* and *M. paradoxus*) fishery for a number of years, which has created ample opportunities for studies on the species. It should be stated that both the gear selectivity and depth levels operated most frequently at (below 300 m) allow no extensive and complete materials to be collected for studies on biology of the juvenile hake which basically inhabit shallow waters. The results obtained from the area in question (Chłapowski and Krzeptowski, 1979) indicate the area between 20°S and 24°S to be the major centre of the juvenile *M. capensis* distribution.

Indices of natural mortality known to be caused largely by parasites play an important part in planning the commercial fishing operations. In view a limited amount of data on

the occurrence of parasites in the juvenile fish, the observations made during the RV „Wieczno” cruise are considered interesting in this context.

Based on the materials collected, the present paper is an attempt to describe the degree of invasion of certain ecto- and endoparasites in juvenile *M. capensis*.

MATERIAL AND METHODS

Within the period of 31 March – 28 April 1979, studies on the hake recruitment in the Namibian shelf were carried out on board RV „Wieczno”, the research vessel owned by

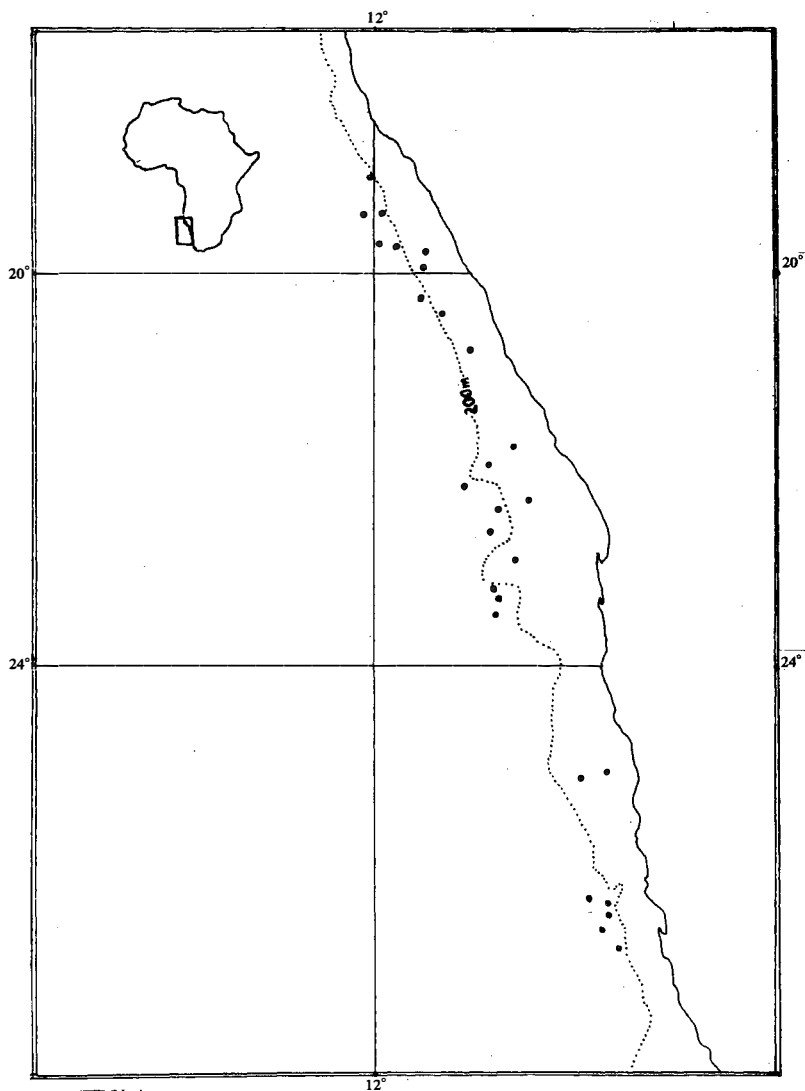


Fig. 1. Location of hauls made from RV „Wieczno” off Namibia

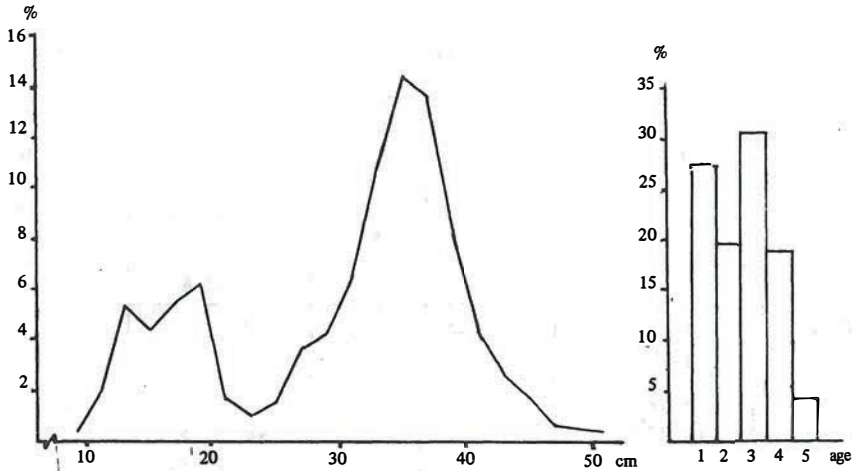


Fig. 2. Length and age of hake examined

the Sea Fisheries Institute, Gdynia (Krzeptowski, 1979). The area investigated and location of sampling sites are presented in Fig. 1.

During the routine ichthyological analyses of the hake, observations on the presence of parasites on gills and in the abdominal cavity were made. It should be noted that the analyses were aimed mainly at finding the physiological conditions of the fishes collected and at obtaining their otoliths, whereas the parasitologic survey which – in order to be sufficiently exact – is usually very time-consuming, was under the circumstances limited to an external examination of gills and viscera.

A total number of 2145 *M. capensis* individuals (1029 males and 1116 females) from 27 samples was examined.

The age of the fishes caught did not generally exceed 5 yr, their length range being 7–50 cm (Fig. 2).

The presence of the following parasites was revealed:

- 1) *Anisakis simplex* larvae,
- 2) *Hepatoxylon trichiuri* larvae,
- 3) *Parabrachiella australis*.

The tows made and the samples obtained are described in Table 1. Fishing operations made by means of demersal trawls (WD 28/32) with fine-mesh lining (2a = 10 mm) were performed at 100–300 m depth.

RESULTS AND DISCUSSION

The *Anisakis simplex* larvae were observed in the body cavity of the fish individuals examined, where singletons or several larvae were located usually on the liver. Their presence was revealed in the hake belonging to all age groups (Fig. 3), certain differences

Table 1

Description of samples collected by RV „Wieczno” off Namibia

Date, sample no.	Position	Mean depth (m)	No. of fish indiv. examined	Fish length (cm)	Percentage of fish infested with		
					<i>A. sim- plex</i>	<i>P. aus- trialis</i>	<i>H. tri- chiuri</i>
1	2	3	4	5	6	7	8
20.04 50	19°03' N 11°57' E	225	100	30–50	—	3	—
20.04 48	19°24' N 12°07' E	240	100	29–46	5	6	—
20.04 47	19°25' N 11°54' E	291	19	35–48	20	10	—
19.04 46	19°43' N 12°03' E	276	19	32–45	15	40	—
19.04 44	19°44' N 12°35' E	118	31	13–20	3	—	—
19.04 45	19°48' N 12°15' E	223	100	25–42	4	5	—
19.04 43	19°58' N 12°32' E	133	50	13–21	—	—	—
18.04 41	20°18' N 12°30' E	243	100	14–39	2	3	—
18.04 40	20°24' N 12°42' E	132	100	10–32	1	—	1
21.04 51	20°47' N 13°05' E	180	100	13–33	2	2	4
24.04 56	21°48' N 13°33' E	116	76	9–31	—	—	—
24.04 55	21°57' N 13°16' E	164	100	11–36	6	—	—
24.04 54	22°12' N 13°00' E	288	100	28–50	4	6	1
22.04 52	22°22' N 13°42' E	122	50	11–20	2	—	—
17.04 38	22°26' N 13°21' E	236	100	7–50	5	9	1

cd. tab. 1

1	2	3	4	5	6	7	8
17.04 37	22°38' N 13°16' E	264	100	7-50	19	15	—
17.04 35	22°55' N 13°34' E	148	100	8-37	13	10	—
16.04 34	23°08' N 13°22' E	250	100	7-50	5	18	—
16.04 33	23°21' N 13°22' E	298	100	25-50	35	12	—
16.04 32	23°30' N 13°29' E	242	100	12-50	4	13	1
14.04 29	25°05' N 14°34' E	100	50	9-17	—	—	—
14.04 30	25°09' N 14°17' E	160	100	19-23	1	—	—
12.04 25	26°21' N 14°18' E	298	100	29-50	19	8	3
12.04 24	26°23' N 14°34' E	250	100	27-47	13	6	2
12.04 23	26°29' N 14°35' E	258	50	29-49	—	—	—
11.04 22	26°39' N 14°30' E	250	50	26-49	—	—	—
11.04 21	26°48' N 14°39' E	236	50	27-46	—	—	—

being found between the lengths of the smallest females and smallest males infested (Fig. 4): the *Anisakis simplex* larvae were found in females as small as 15 cm, while the smallest males affected were 25 cm long.

Comparing the fishes of various age a clear increase in the infestation degree with fish age is observed. The percentages of infested females and males at the age of five are 22.9 and 16.2%, respectively.

The observations presented and also the findings of Chłapowski (1977) and Preński (1979) concerning the age-dependent changes in hake food composition allow the major pathways of the larval nematode invasion to be traced. The main source of invasion for the small and medium-size individuals (up to 40 cm) are the euphausiid crustaceans making up 20–40% of their food. The amount of crustaceans in food decreases with the

increase in fish size and they give way to an increasing cannibalism in the fish over 40 cm in length. With time, cannibalism presumably becomes the major pathway of endoparasitic invasion for older hake, which results in a constant increase in the number of parasitised fishes, a phenomenon observed in the material under study.

A. simplex is a parasite of whales and seals (J. Grabda, 1977). In view of a negligible amount of whales off Namibia, it is concluded that the fur seal, *Arctocephalus australis*

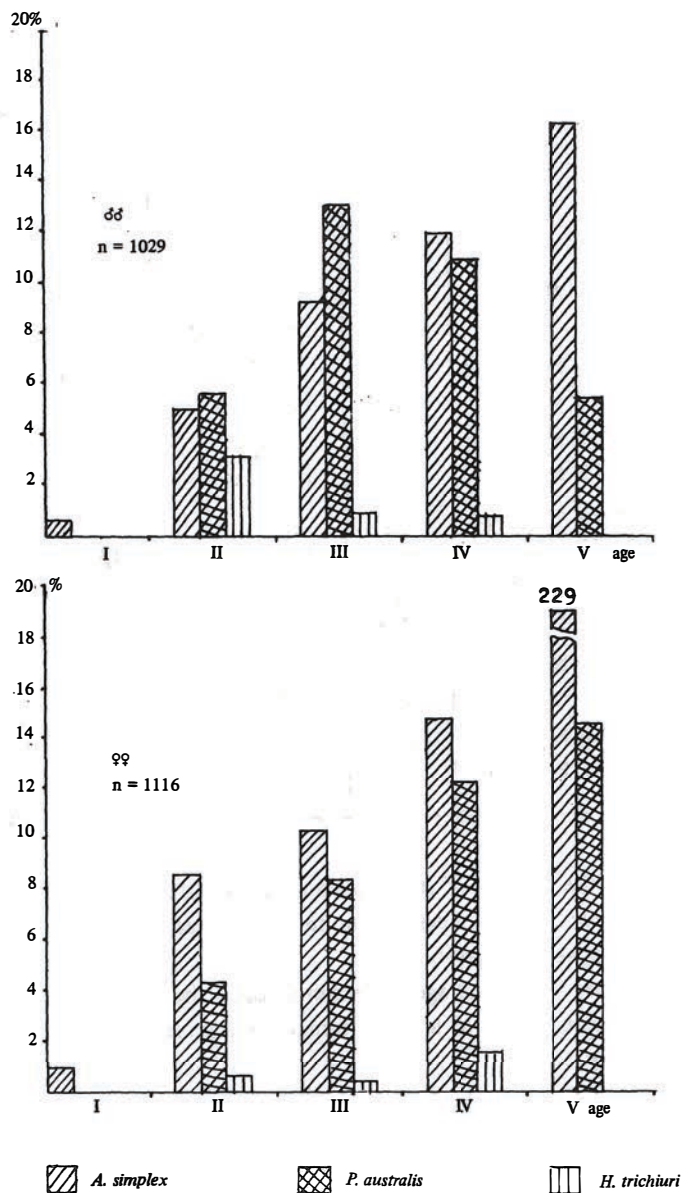


Fig. 3. Infestation degree – fish age relationship

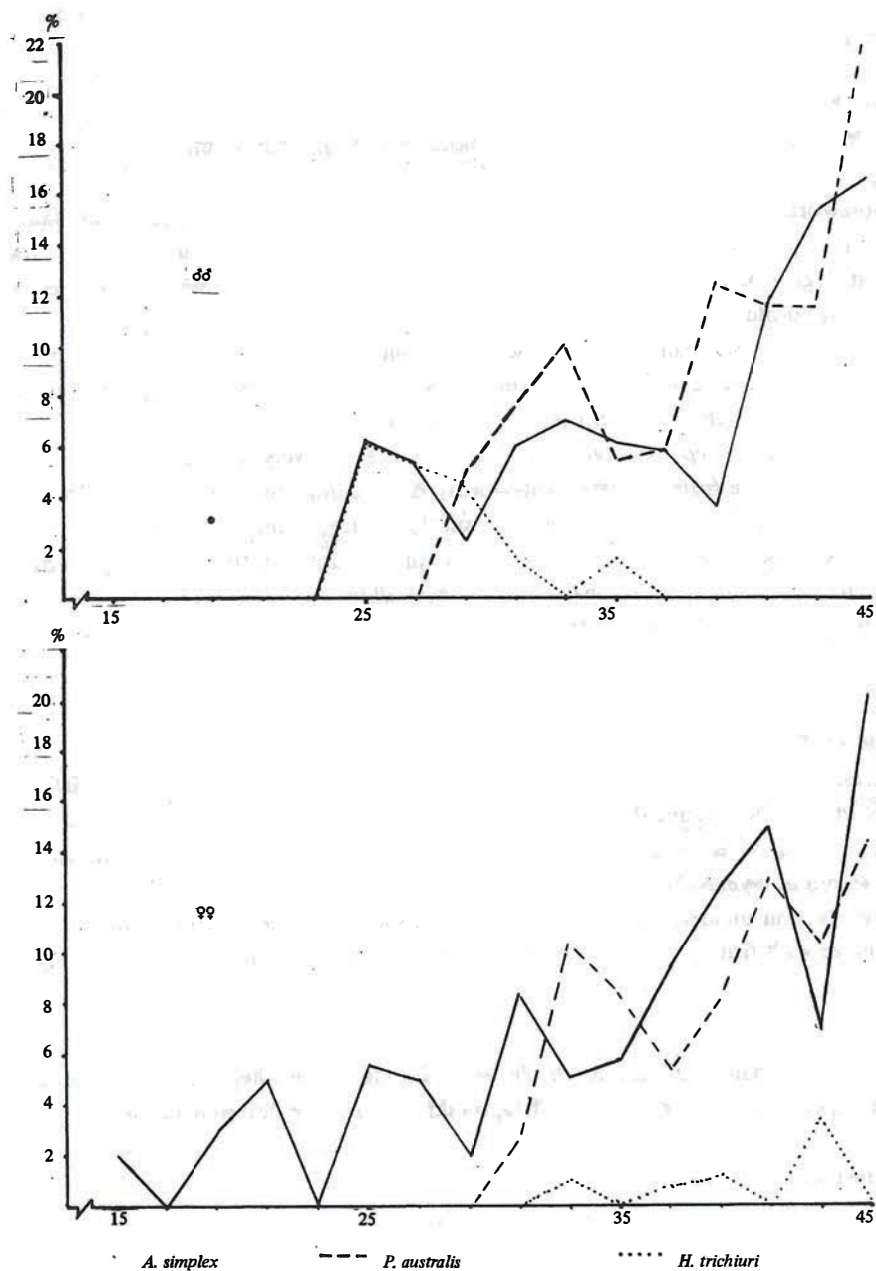


Fig. 4. Infestation degree-fish length relationship

very abundant in the area studied, are the definite hosts for the nematodes discussed.

Parasitic copepods *Parabrachiella australis* were found, numbering from one to several individuals, per fish on gill lamellae of the fishes examined. The species was the second (after *A. simplex*) most frequently occurring parasite in *M. capensis*, being observed both in males and females aged two and more (Fig. 3) and measuring from 29 and 31 cm, respectively, on.

Noteworthy are the age-related differences in the invasion incidence in both sexes. The number of parasitised females tends to increase with age, while 3-year-old males show the highest degree of infestation and a clear drop in the extent of invasion is observed in the 4- and 5-year-old ones.

Grabda and Soliman (1975) present data on the frequency of *P. australis* in the Angolan hake. The lack of information on the fish length in their paper, however, makes any comparison with the present results impossible.

Larval cestode *Hepatoxylon trichiuri* occurred exclusively as single individuals in the body cavity of the fishes studied. Noteworthy is the complete absence of the larvae in the 1- and 5-year-old individuals. The invasion incidence, compared to that of the other species described above, was very low (3% at the maximum), the invasion pattern being irregular both in females and males. These facts allow a conclusion to be drawn that the species is much more typical of the older fish.

CONCLUSIONS

1. The studies described revealed the presence of larvae of nematodes *Anisakis simplex*, parasitic copepods *Parabrachiella australis*, and larvae of cestodes *Hepatoxylon trichiuri* in the juvenile *Merluccius capensis*. The *A. simplex* larvae were recorded in the hake as early as in their first year of life, while *P. australis* and *H. trichiuri* were observed in 2-year-old and older fish individuals.
2. The invasion incidences of the *A. simplex* larvae and *P. australis* increase, in a regular manner with fish age, no such regularity being observed in the *H. trichiuri* invasion.

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HEPATOXYLON TRICHIURI I PASOŻYTNICZYCH WIDŁONOGÓW
PRABRACHIELLA AUSTRALIS
U MŁODYCH OSOBNIKÓW *MERLUCCIIUS CAPENSIS* Z REJONU NAMIBII

Streszczenie

W kwietniu 1979 roku R/V „Wieczno” prowadził badania pionowego i poziomego rozmieszczenia młodzieży morskczuków na szelfie Namibii. Pod względem parazytologicznym przebadano 2145 morskczuków pochodzących z 27 prób. W badanym materiale stwierdzono obecność larw *Anisakis simplex*, larw tasiemców *Hepatoxylon trichiuri* widłonogów pasożytniczych *Parabracchiella australis*. Larwy *A. simplex* Obserwowano już w pierwszym roku życia ryb, natomiast *P. australis* i larwy *H. trichiuri* pojawiły się po raz pierwszy u osobników dwuletnich. Odsetek ryb zarażonych larwami *A. simplex* oraz *P. australis* zwiększa się wraz z wiekiem. W przypadku zarażenia *H. trichiuri* zależności takiej nie obserwowano.

М. Кржептовски

ЛИЧИНКИ НЕМАТОД *ANISAKIS SIMPLEX*, ЦЕТОД *HEPATOXYLON TRICHIURI*
И ПАРАЗИТИЧЕСКИХ КОПЕПОД *PARABRACHIELLA AUSTRALIS*
У МОЛОДИ *MERLUCCIIUS CAPENSIS* ИЗ РАЙОНА НАМИБИИ

Резюме

В апреле 1979 года на научно-исследовательском судне „Вечно” проводили исследования вертикального и горизонтального размещения молодежи капской

мерлузы на шельфе Намибии. Исследовани паразитологически 2145 мерлуз из 27 проб. В исследованном материале обнаружили личинки нематод *Anisakis simplex*, личинки цестод *Hepatoxylon trichiuri* и паразитических копепод *Parabrachiella australis*. Личинки *A. simplex* наблюдали уже в первом году жизни рыб. *P. australis* и личинки *H. trichiuri* появляются впервые у особей в возрасте 2 лет. Процент рыб зараженных личинками *A. simplex* а также *P. australis* увеличивается вместе с возрастом. При заражении *H. trichiuri* такой зависимости не наблюдали.

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