

MOUSTAFA EL-MEHLAWY  
JERZY ROKICKI  
MAGDALENA PODOLSKA  
Department of Invertebrate Zoology,  
University of Gdańsk,  
Gdynia, Poland

Parasitic copepods  
*Eubrachiella antarctica*

Occurrence dynamics of *Eubrachiella antarctica* (Quidor, 1906) on *Dissostichus eleginoides* from South Georgia

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Abstract

Infestation of antarctic fish *Dissostichus eleginoides* by the parasitic copepod *Eubrachiella antarctica* was studied. An attempt was made in this paper to relate the degree of infestation of *D. eleginoides* to body length and season of capture of the fish.

1. Introduction

*Dissostichus eleginoides* inhabits Argentinian shelf (above 38° S), Patagonian and Falkland shelves, Magellan Strait, South Georgia region, Crozet's Islands, Prince Edward's Islands and Kergulena's Islands. It occupies bottom as well as pelagical waters, sometimes far from land, at the depth of 72 to 830 meters. *D. eleginoides* does not occur in shoals but it lives individually or in small flocks. Probably its spawning proceeds in shallow waters. *D. eleginoides* is predacious and feeds mainly on other species of fishes. The longest individual of this species noted to date was 206 cm long and weighed 76 kg.

*E. antarctica* acts as ectoparasite of fishes belonging to families Chaenichthyidae and Notothenidae. There is little data about occurrence dynamics of ectoparasites of antarctic fishes, also little is known about the biology and development of *E. antarctica*. Only Kock and Möller (1977), Siegel (1980), Sosiński and Janusz (1986), Rokicki and Skóra (1986) and

Rokicki and Zdzitowiecki (1991) provided some information concerning prevalence and intensity of infestation of some Chaenichthyidae and Nototheniidae.

Occurrence of *E. antarctica* on *D. eleginoides* was confirmed by Kock and Möller (1977), Siegel (1980), and Stadler (1986), on *Notothenia rossi marmorata* by Rokicki and Zdzitowiecki (1991).

## 2. Material and method

Parasites were collected from fish caught in years 1978 and 1986/87. 51 individuals caught on 01.02.1978 in South Georgia (53°47'S, 37°38 'W) and 56 fishes caught in the period from 11.11.1986 to 28.01.1987 in the same area (53°39'S, 37°W) were investigated.

Table 1. Theoretical length of *Dissostichus eleginoides* calculated for each year of life using the Von Bertalanffy equation

Age [years]	Theoretical length [cm]
1	17.03
2	28.29
3	36.98
4	46.15
5	54.81
6	63.00
7	70.74
8	78.06
9	84.97
10	91.51
11	97.69
12	103.53
13	109.05
14	114.27
15	119.20

Fishes caught in 1978 were ichthyologically analysed. They were measured with 1 cm accuracy and weighed with 5 g accuracy. The stage of gonads was determined. The age of the fishes was calculated theoretically on the basis of the Von Bertalanffy equation (Tab. 1). This method

consists in determination of body length of fish in the consecutive years of life according to the formula:

$$L_t = L_\infty \{1 - e^{-K(t-t_0)}\}, \quad (1)$$

where

- $L_t$  - length of fish at age  $t$ ,
- $t$  - age for which length  $L_t$  is calculated,
- $e$  - base of natural logarithm,
- $L_\infty$  - maximal length = 204.3 cm,
- $K = 0.0563$ ,
- $t_0 = -0.543$ .

### 3. Results

From among 51 investigated fishes caught in 1978, only 44 were infested by *E. antarctica*. The lengths of these fishes, ranging from 48 cm to above 87 cm, are presented in Tab. 2 where they are divided into 3 cm-classes. Among the eleven classes of lengths the mean intensity of infestation by *E. antarctica* oscillates from 1.3 (in the length classes 60-63 cm) to 4.0 (length 72-79 and 84-87 cm). Because of the small number of the available individuals in the classes above 64 cm in length, it is impossible to prove dependence of degree of infestation on the body length of fish. Mean intensity of infestation for all investigated fishes was 3.5, prevalence of infestation was 86.3%.

Among the fishes investigated prevailed individuals with length 52-59 cm and body weight of 801-2200 g. These fishes were young and sexually immature. The weights of the fishes studied are presented in Tab. 3, divided into 700 g-classes. In the classes where infestation occurred, mean intensity of infestation fluctuated from 1.3 (in the class 2201-2900 g) to 7.0 (in the class 4301-5000 g). Among the investigated fishes there were 25 males and 26 females (Tab. 4). There were 78 specimens of *E. antarctica* noticed in males and 74 in females. All parasites were found in the buccal cavity. From 56 fishes caught in 1985/1987, only 37 were infested by *E. antarctica* (located upon the skin of head and thorax). Mean intensity of infestation was 3.1 and the prevalence was 66.1%.

Table 2. *Dissostichus eleginoides* infested by *Eubrachiella antarctica*, dependence on fish length (1978)

Length classes [cm]	Number of fishes		Intensity of infestation		Prevalence
	examined	infested	Number of parasites	Mean intensity	
48-51	3	3	9	3.0	-
52-55	18	15	52	2.9	-
56-59	8	7	30	3.8	-
60-63	6	5	8	1.3	-
64-67	3	2	7	2.3	-
68-71	2	2	7	3.5	-
72-75	3	2	12	4.0	-
76-79	2	2	8	4.0	-
80-83	2	2	5	2.5	-
84-87	2	2	8	4.0	-
above 87	2	2	6	3.0	-
Total	51	44	152	3.5	86.3%

Table 3. *Dissostichus eleginoides* infested by *Eubrachiella antarctica*, dependence on body weight (1978)

Body weight classes [g]	Number of fishes		Intensity of infestation		Prevalence
	examined	infested	Number of parasites	Mean intensity	
801 - 1500	17	15	53	3.1	-
1501- 2200	14	12	42	3.0	-
2201- 2900	6	4	8	1.3	-
2901- 3600	4	4	16	4.0	-
3601- 4300	3	2	7	2.3	-
4301- 5000	1	1	7	7.0	-
5001- 5700	2	2	5	2.5	-
5701- 6400	2	2	8	4.0	-
above 6400	2	2	6	3.0	-
Total	51	44	152	3.5	86.3%

Table 4. *Dissostichus eleginoides* infested by *Eubrachiella antarctica*, dependence on sex (1978)

Sex	Number of fishes examined	Number of infested	Number of parasites
males	25	23	78
females	26	21	74
Total	51	44	152

#### 4. Discussion

Data concerning biology and dynamics of *D. eleginoides* population are scarce. This species, according to Kock (1976), attains sexual maturity with the body length of 55 cm (Kock and Möller, 1977). According to Siegel (1980), who refers to personal information from Skóra, the length at which *D. eleginoides* attains sexual maturity corresponds to fish age of about 10.5 years. This age corresponds to 90 cm of body length calculated theoretically basing on the Von Bertalanffy equation.

During the research carried out on fishes caught in 1978, *E. antarctica* were picked from the buccal cavity, while among the fishes investigated in the years 1986/1987, parasites were found upon the skin of head and thorax. The location of infestation by *E. antarctica* in Kock and Möller's (1977) and Stadler's (1986) studies, was limited to the buccal cavity. Siegel (1980) described *E. antarctica* from the buccal cavity and from skin of the head and fins.

Comparing the mean intensity of infestation in 1978, which amounts to 3.5 with the mean intensity in years 1986/1987, which amounts to 3.1, its decrease can be noticed. In years 1986/1987 results revealed a lower prevalence of infestation (66.1%) compared to studies done in 1978, when the prevalence amounted to 86.3%. The recent results provided the evidence for the increased prevalence compared to that observed by Kock and Möller (1977) during the antarctic expedition in 1975/1976. These authors reported that the mean intensity of infestation of *D. eleginoides* by *E. antarctica* in South Georgia region was 1.9–2.0 and the prevalence was 55.6–66.7%. In Burdwood bank, the mean intensity of infestation in *D. elenginoides* amounted to 2.4–2.7 and the prevalence to 81.8–96.4%. The prevalence in *D. elginoides* from South Georgia amounted to 81.9% (Siegel, 1980).

The above results demonstrate that the highest mean intensity of infestation in *D. eleginoides* from South Georgia was recorded in 1978 and the lowest in the years 1975/1976. The highest prevalence of infestation was noticed in years 1975/1976 in Burdwood bank and the lowest in South Georgia region. The differences in the degree of infestation between the latter two areas can be explained by the different regional population of this species or periodical overcatching of antarctic fish, as suggested by Sosiński and Janusz (1986).

For *Champocephalus gunnari* (family Chaenichthyidae) caught in years 1975/1976 in South Georgia region the low mean intensity of infestation (1.0–2.9) and the prevalence 1.9–2.7% (Kock and Möller, 1977) were determined. Rokicki and Skóra (1986) reported the prevalence of infestation by copepoda in *Notothenia gibberifrons* from South Georgia as 12.4%. Prevalence of infestation of *Notothenia rossi marmorata* by *E. antarctica* amounted to 20.14% (Rokicki and Zdzitowiecki, 1991). Taking these data together, it can be concluded that, from the families Chaenichthyidae and Notothenidae, *D. eleginoides* is infested by *E. antarctica* to the highest degree.

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