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Catches of fishes of the genus *Notothenia* and *Trematomus* at Admiralty Bay (King George Island, South Shetland Islands) in the winter-spring season, 1977 *)

ABSTRACT: From July to October 1977, during the polar winter and at the beginning of spring, line-fishing was carried out at Admiralty Bay, near the Arctowski Station on King George Island, (South Shetland Islands). At that time only three species of fish were caught: *Notothenia rossi marmorata*, *Notothenia coriiceps neglecta* and *Trematomus newnesi*. Fish was caught in the irshore zone at depths ranging from 2 to 40—60 m.

Key words: Antarctic, fish, catches

1. Introduction

There are many studies which characterize the composition of fish catches in the Antarctic waters. Most of the fishing was carried out using large trawlers with pelagic and bottom trawls. Expeditions of the Polish research vessels r/v "Profesor Siedlecki" and r/v "Profesor Bogucki", exploring fishing grounds around Antarctica and in particular northern regions of that continent in 1976—1979, are well known. More recent publications characterizing the composition of trawl catches include papers by Linkowski and Rembiszewski (1978) and by Rembiszewski, Krzeptowski and Linkowski (1978). Earlier, this matter was described by Everson (1969) and Soljanik (1966). The results of the exploratory expedition of the West-German vessel r/v "Walther Herwig" to Antarctic waters have been described in detail. Fishing lines with spoon hooks have been known and used for a long time. They were used by Rakusa-Suszczewski (1972) and Rakusa-Suszczewski and Piasek (1973)

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off the coast of Antarctica with considerable effect. The aims and sites of their catches were different from ours, therefore the obtained results cannot be compared.

The selective effect of the fishing gear is a well-known phenomenon. The results of the catches merely supply information with the use of a certain fishing gear (in this case spoon hooks), as to the share of various species in the composition of the haul.

The aim of this study was to acquire as detailed information as possible of the species composition and the possibility of catching antarctic fishes in the polar winter season using fishing lines with various types of spoon hooks. These studies were carried out of Admiralty Bay near The Arctowski Station on King George Island, South Shetland Islands.

2. Material and methods

The material was caught using fishing lines with spoon hooks. The trolling spoons used for catching large fishes were of brass, lead or plated nickel. To catch small fishes, e.g. *Trematomus newnesi* (average body length 8.5 cm), brass "mormouse" was used. The fishing was usually carried out before noon, occasionally in the afternoon. The fishes were segregated according to species, then measurements of the total body length and weight were made.

Altogether 1461 fish specimens were caught. They belonged to two species of the genus *Notothenia: Notothenia rossi marmorata* Fischer and *Notothenia coriiceps neglecta* Nybelin, and one species of the genus *Trematomus: Trematomus newnesi* Boulenger.

3. Results and discussion

As results from the observation, several factors had substantial effect upon the results of the fisheries. The most significant was the direction of the water currents causing displacement of fish schools. In the inshore zone of Admiralty Bay, water currents from southwest due northwest and east caused dispersion of fish schools and their dislocation from the open oceanic waters. Water currents from north and east caused an inflow of oceanic waters into the Bay, carrying along numerous schools of fish and krill. The latter currents prevailed, with few deviations, during almost the whole winter season. Owing to this, there were always abundant and invariable aggregations of the same species of fish. They were feeding with fair intensity despite low temperatures falling below freezing point (−2°C).

In the collected material the specimens of *Notothenia rossi marmorata* prevailed decidedly quantitatively (Table I). As results from the quantity of caught fishes individuals of this species showed higher activity and consequently, maybe, greater intensity of food intake, though the relation of body weight to body volume is in this species very similar to that in *Notothenia coriiceps neglecta.*

Table I.

Number of fish specimens measured in the 1977 winter-spring season

Species	Month				Total
	July	August	September	October	
*Notothenia rossi marmorata**)	15	315	451	48	829
*Notothenia coriiceps neglecta***)	10	118	136	27	291
Trematomus newnesi	69	272	—	—	341
Total	94	705	587	75	1,461

*) Body length from 14 to 36 cm
**) Body length from 16.5 to 45 cm

A fairly high percentage of fish, not determined exactly broke loose from the spoon hooks. Obviously, it was not possible to determine to which species this applied. It was assumed, therefore, that the number of fishes which broke loose was in the same correlation as in the case of all the fishes caught. During the winter season seals were twice caught on the spoon hook, but they broke loose leaving off both hooks and line.

In the places where there were dense concentrations of algae, i.e. in the depth zone ranging from 10—12 m to 50—60 m, the following fish species were caught in winter: *Notothenia rossi marmorata* (body length from 14 to 36 cm), *Notothenia coriiceps neglecta* (16.5—45 cm long) and large specimens of *Trematomus newnesi* (mean body length 18.5 cm). This last species was found mainly in the deep sea at various depths. *Notothenia* stayed mostly at the bottom amongst the algae. Inshore, in the shallow water zone, at a depth of 2—3 m, the presence of large aggregates of small *Trematomus newnesi* (mean body length 8.5 cm) was observed. This zone had a rocky bottom completely devoid of any kind of plants. Large specimens of *Notothenia coriiceps neglecta* (over 30 cm long) and small specimens of *Notothenia rossi marmorata* (up to 15 cm long) were observed in this zone sporadically.

The reflex action of biting an artificial bait — metal spoon hooks — was most intense before noon. At dawn, fishes remained in the deep sea, often biting at a distance of a few metres off the bottom. Later in the morning, in daylight, biting occurred only when the bait was lowered to the bottom. At noon in sunny frosty weather, at a temperature of −25°C, biting often ceased completely. There were some rare cases of resolute and intense biting close beneatch the ice cover at a depth of 2—3 m. This happened on cloudy days with abundant snowfall. *Trematomus newnesi* schools occurring in the shallow waters were highly stable and remained there during July and August. In September these schools scatterred and disappeared.

In July the occurrence of *Notothenia rossi marmorata* was lowest, amounting to 39.4% (Table II). In the following two months a marked increase reaching over 70% was observed.

Table II.

Percentage distribution of the number of specimens (A) and the biomass (B) of various fish species caught with spoon hooks

Month	*Notothenia rossi marmorata*		*Notothenia coriiceps neglecta*		*Trematomus newnesi**)	
	A	B	A	B	A	B
July	39.4	42.2	26.3	48.8	34.3	9.0
August	72.8	61.2	27.2	38.8	—	—
September	76.8	64.1	23.2	35.9	—	—
October	64.0	45.4	36.0	54.6	—	—

*) At the depth of 40—60 m

The occurrence of *Notothenia coriiceps neglecta* was comparatively low, ranging from 23.2 to 36.0%, during the winter and spring. Large specimens of *Trematomus newnesi* were caught only in July and their frequency distribution was 34.3% (Table II). Small individuals (mean body length 9.1 cm) were caught in the shallows in July and August and their occurrence amounted to 100%. Large specimens of *Notothenia coriiceps neglecta* appeared among them sporadically.

Due to considerable differences in the body weight of the fishes of various species, significant changes in the value of the biomass were noted. Fishes belonging to *Notothenia coriiceps neglecta* species were of particular importance owing to the increase of their biomass from 35.9% up to 54.6%, which implies an increase in the number of large individuals.

4. Summary

In the australian winter season of 1977, fishing with the used trolling spoons was carried out near the Arctowski Station at Admiralty Bay, King George Island. Due to the decidedly selective effect of this type of fishing gear the catches were not greatly diversified as regards species composition. The catches consisted mostly of two species of the genus *Notothenia: N. coriiceps neglecta* and *N. rossi marmorata* and *Trematomus newnesi* (Table II).

The fishes were caught in winter at depths ranging from 2—12 to 60 m. Small specimens of *Trematomus* occurred only in the shallows (at a depth of 2—3 m) during July and August. It was found that better results were attained on cloudy days.

5. Резюме

В сезоне антарктической зимы 1977 г вблизи Станции Арцтовского в Адмиральты Бей у острова Кинг Джорж проведено ловлю блёснами. При сильно селективном характере действия этого типа приборов итоги были мало разнообразные по видовому составу рыб. Основную массу составляли два вида из рода *Notothenia*: *N. coriiceps neglecta* и *N. rossi marmorata*. Выступал также *Trematomus newnesi* (таьлица II).

Ловленные рыбы проживали в начальном и среднем периоде зимы на глубине с 2—12 до 60 м. Невеликий *Trematomus* выступал исключительно на мелководье

(2—3 м) в июле и августе. Констатировано, что лучшие результаты уловов выступали в дни пасмурные, в предобеденное время.

6. Streszczenie

W sezonie antarktycznej zimy 1977 roku w pobliżu Stacji Arctowskiego na Zatoce Admiralicji przy Wyspie Króla Jerzego prowadzono połowy na błyszcze. Wobec zdecydowanie selektywnego działania tego typu narzędzi połowu, wyniki były mało urozmaicone pod względem składu ryb. Podstawową masę stanowiły dwa gatunki z rodzaju *Notothenia: N. coriiceps neglecta* i *N. rossi marmorata*. Występował także *Trematomus newnesi* (tabela II).

Łowione ryby przebywały w początkowym i środkowym okresie zimy na głębokościach od 2—12 do 60 m. Małych rozmiarów *Trematomus* występował wyłącznie na płyciznach (2—3 m) w lipcu i sierpniu. Stwierdzono, że lepsze wyniki połowu przypadały na dni pochmurne w porze przedpołudniowej.

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