Laboratory tests on feeding interactions and food preferences of some Antarctic fish from Admiralty Bay, King George Island, South Shetland Islands

Edith FANTA

Departamento de Biologia Celular
Universidade Federal do Paraná,
81531-970 Curitiba, PR, BRAZIL
e-mail: fantaf@uol.com.br

ABSTRACT: The Antarctic nototheniid fish *Notothenia neglecta*, *N. coriiceps*, *Trematomus newnesi*, *T. bernacchii*, *Lepidonotothen nudifrons*, *Pagothenia borchgrevinki*, *Gobionotothen giberifrons* and *Pleuragramma antarcticum* were caught in the Admiralty Bay during the Antarctic summer. Their food acceptance was tested in the laboratory under controlled environmental conditions. In 1000 litre tanks fish, krill, and amphipods were offered as food. Some of the offered items were detected, recognized, or accepted as food and ingested; some items were rejected, showing the capacity of fish to make choices. All fish fed on krill; seven fish ingested the amphipod *Gondogeneia antarctica* but *Waldeckia obesa* was rejected by all species; *N. neglecta*, *N. coriiceps*, *P. borchgrevinki* and *T. bernacchii* preyed on the fish *P. antarcticum*. *N. neglecta* is at the top of this food chain, preying on seven of the species that were offered as food and also performing necrophagy and cannibalism, followed by *T. bernacchii* and *P. borchgrevinki*, which accepted five species as food. The more specialized feeders were *T. newnesi*, which accepted only two of the offered food items. The trophic interactions for all organisms herein studied were established, indicating a difference between the preferential food of some fish when the offer is unlimited, in artificial conditions, and their reported diet when in the natural environment.

Key words: Antarctica, King George Island, fish, feeding, interactions.

Introduction

Antarctic marine environments and especially some coastal regions with depths between 50 and 100 meters, are characterized by relatively constant low temperature, sometimes variable salinity, and ice cover (Fanta et al. 1995, Hubold 1991, Rakusa-Suszczewski 1993) and seasonal changes in the light levels and
photoperiod (Clarke and North 1991; Eastman 1993; Everson 1984; Fanta et al. 1994; Grötzner and Fanta 1998) that may cause seasonal variability in the available food (Clarke 1985).

As such environmental conditions may have prevailed over the past 20 million years, this lead to effects on the composition of the fish fauna (DeWitt 1970). The Nototheniidae have adapted, being able to occupy a large number of very different ecological niches (Hureau 1994), mainly on the continental shelf or the shelf area surrounding the island groups. They also occur in the Admiralty Bay, a fjord and drainage basin in King George Island (Rakusa-Suszczewski 1993).

Most of the fishes are sedentary (Everson 1984), well adjusted to the local environmental conditions, as in Admiralty Bay (Fanta et al. 1989 a, b; 1995). There the food offer varies along the year. Habitat, food and life style often correlates with special morphological or behavioural adaptation (Ekau 1991, Fanta 1994, Fanta et al. 1994, Fanta and Meyer 1998, Grötzner and Fanta 1998, Meyer and Fanta 1998, Rios and Fanta 1998).

When fish share the same environment, competition for food must be minimized for successful survival and expansion of the species. This is often provided by diversification of feeding strategies, as well as the flexibility to change from preferable to available food (Fanta et al. 1994, Fanta and Meyer 1998, Meyer and Fanta 1998, Rios and Fanta 1998). The relation between predators and preys is not only size-dependent (Rios and Fanta 1998) but also circumstantial, and often changes in the presence of different species or according to the availability of shelters (Fanta et al. 1994, Fanta and Meyer 1998).

In Admiralty Bay some species share specific areas and consequently resting and feeding grounds (Fanta and Meyer 1998, Skóra 1993). The aim of this study was the experimental evaluation of food acceptance and food preferences. The approach was an analysis of the ability of the fish *Notothenia neglecta*, *N. coriiceps*, *Trematomus newnesii*, *T. bernacchii*, *Pagothenia borchgrevinki*, *Gobionotothen gibberifrons*, *Lepidonotothen nudifrons* and *Pleuragramma antarcticum* to detect, apprehend, and ingest fish, krill, and amphipods. The results provide an indication of feeding interactions and feeding preferences of species obtained from the same geographical region when the available food is abundant and search for food is not necessary because the experiments are conducted under controlled conditions in tanks.

### Material and methods

The following fish were caught in Admiralty Bay, King George Island, South Shetland Islands, during the summer: *Notothenia neglecta* Nybelin, 1951 (TL 17.5–30.0 cm); *N. coriiceps* Richardson, 1844 (TL 16.5–19.5 cm); *Lepidonotothen (Lindbergichthys) nudifrons* (Lönnberg, 1905) (TL 11.3–15.5 cm); *Trematomus*
Laboratory tests on feeding and food preferences of some Antarctic fish

newnesi Boulenger, 1902 (TL 12.7–15.5 cm); T. bernacchii Boulenger, 1902 (TL 25.0–25.5 cm); Pagophthoedia borchgrevinki (Boulenger, 1902) (TL 10.0–15.0 cm); Gobionotothen (Notothenia) gibberifrons (Lönberg, 1905) (TL 13.7–20.0 cm) and Pleuragramma antarcticum Boulenger, 1902 (TL 6.5–7.5 cm). All fish were identified according to Fischer and Hureau (1985) and the names adjusted according to Kock (1992), except for Notothenia neglecta and N. coriiceps which were maintained as two distinct species.

The following species were offered as food: the fish N. neglecta (TL 8.0–15.0 cm), L. nudifrons (TL 8.5–11.7 cm), T. newnesi and T. bernacchii (TL 10.0–15.0 cm), P. borchgrevinki (TL 10.0–15.0 cm), G. gibberifrons (TL 9.0–17.0 cm) and P. antarcticum (TL 6.5–8.0 cm); the krill Euphausia superba Dana, 1852 (TL 3.5–5.5 cm); the amphipods Bovallia gigantea Pfeffer, 1888 (TL 0.4–0.8 cm), Gondogeneia antarctica (Chevreux, 1906) (TL 0.5–1.3 cm) and Waldeckia obesa (Chevreux, 1905) (TL 0.2–0.3 cm). Krill and amphipods were identified respectively by V. Gomes (Instituto Oceanográfico, Sao Paulo, Brazil) and by C. De Broyer (Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium).

Fish were caught with gillnets from 40 to 80 m depth, by midwater and bottom trawl and traps. Krill was obtained through midwater trawl and the amphipods with traps, trawl, and hand nets.

All species were maintained in separate tanks or aquaria under controlled environmental conditions (photoperiod of 20 hours light and 4 hours darkness, light intensity between 9 and 15 lux, temperature of 0°C, pH 7.2, and salinity 35 ppt).

In 1000 litre tanks the reaction of each species of fish: (i) to each one of the food items separately; and (ii) to all food items together, was observed from the moment in which the food was made available till the end of feeding activity caused by depletion. At least 10 observations were made for each predator in the presence of each one of the food items of situation (i) and of all food items in situation (ii).

Results

The choice of food was specific. When different potential food items were available, each species reacted in a certain way. The offered item could stimulate the fish to identify it as food or not (Table 1). Through typical feeding movements (Fanta et al. 1994; Fanta and Meyer 1998), this food was eventually captured.

Selection occurred at different moments: when the offered food was seen, mechanically perceived, or chemically evaluated at distance; or chemically when it touched the lips; and also after capture, when it came in contact with the inner part of the mouth. At each one of these moments, the selection could result in acceptance or rejection of food.
Table 1

Food acceptance by: *Notothenia neglecta, N. coriiceps, Trematomus bernacchii, T. newnesi, Pagotheria borchgrevinki, Lepidonotothen nudifrons, Gobionotothen gibberifrons and Pleuragramma antarcticum.* Offered food: (K) krill *Euphausia superba*; (A) amphipods, (G) *Gondogeneia antarctica*, (W) *Waldeckia obesa*, (B) *Bovallia gigantea*; (F) fish, (Pa) *Pleuragramma antarcticum*, (Tn) *Trematomus newnesi*, (Tb) *T. bernacchii*, (Gg) *Gobionotothen gibberifrons*, (Ln) *Lepidonotothen nudifrons*, (Nc) *Notothenia coriiceps*, (Nn) *N. neglecta*, (Pb) *Pagothenia borchgrevinki*; (ne) necrophagy; (+) fish performed the action in more than 75% of the experimental situations; (-) fish never performed the action; (grey field) situation is not presented. For each predator, 10 repetitions of each situation were analysed.

| Offered food | K | A | G | W | A | B | F | Pa | F | Tn | F | Gg | F | Ln | F | Nc | F | Tb | F | Pb | F | Nn | ne |
|--------------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| *N. neglecta* |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| detection    | + | + | + | + | + | + | + | +  | -  | + |    |    |    |    |    |    |    |    |    |    |    |    |    |
| capture      | + | + | + | + | + | + | + | +  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ingestion    | + | + | - | + | + | + | + | +  |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| rejection    | - | - | - | - | - | - | - |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| *P. borchgrevinki* |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| detection    | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| capture      | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ingestion    | + | + | - | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| rejection    | - | - | - | - | - | - | - |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| *L. nudifrons* |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| detection    | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| capture      | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ingestion    | + | + | - | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| rejection    | - | - | - | - | - | - | - |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| *G. gibberifrons* |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| detection    | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| capture      | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ingestion    | + | + | - | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| rejection    | - | - | - | - | - | - | - |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| *T. newnesi* |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| detection    | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| capture      | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ingestion    | + | + | - | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| rejection    | - | - | - | - | - | - | - |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| *P. antarcticum* |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| detection    | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| capture      | + | + | + | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| ingestion    | + | + | - | + | + | + | + |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| rejection    | - | - | - | - | - | - | - |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
Some fish like *P. antarcticum*, *T. newnesi*, *G. gibberifrons* and *L. nudifrons* were preyed by other fish species, mainly *N. neglecta* and *P. borchgrevinki*. However, krill and amphipods, once introduced in the containers with fish, were always recognized as potential food by all species.

All fish fed on krill and the presence of *E. superba* was highly stimulating to them. Whereas all species fed on amphipods, the detection and acceptance of food was species’ dependent: *G. antarctica* was ingested by all fish except *L. nudifrons*, and *B. gigantea* by *N. neglecta*, *T. bernacchii* and *L. nudifrons*. On the other hand, *W. obesa* was not detected as food by *T. bernacchii*, *P. borchgrevinki* and *G. gibberifrons*. All other species were stimulated by its presence, capturing *W. obesa* but throwing it out immediately.

Among the fish, *P. antarcticum* was preyed by *N. neglecta*, *N. coriiceps* and *P. borchgrevinki*. If they were swimming very actively they inhibited the feeding of *N. coriiceps*. Other small specimens like *T. newnesi* were preyed by *N. neglecta* and *P. borchgrevinki*, *G. gibberifrons* being ingested by both and also by *N. coriiceps*.

*N. neglecta* is at the top of this food chain, preying on seven species but also exceptionally ingesting small individuals of their own species. The next more intense feeders were *T. bernacchii* and *P. borchgrevinki*, followed by *N. coriiceps*. The most specialised feeder was *T. newnesi*, which accepted only 2 of the offered food items.

The results of the relations between fishes and the food, concerning its detection, apprehension, and ingestion or rejection are summarised in Table 1 and the intensity of predation is summarised in Table 2.

**Table 2**

<table>
<thead>
<tr>
<th>Decreasing levels of predation</th>
<th>Food item</th>
<th>Number of fish species that ingested the food item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><em>Euphausia superba</em></td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td><em>Gondogeneia antarctica</em></td>
<td>7</td>
</tr>
<tr>
<td>3.</td>
<td><em>Pleuragramma antarcticum</em></td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td><em>Bovallia gigantea</em></td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td><em>Gobionotothen gibberifrons</em></td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td><em>Notothenia neglecta</em></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><em>Notothenia coriiceps</em></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><em>Pagothenia borchgrevinki</em></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><em>Trematomus bernacchii</em></td>
<td>0</td>
</tr>
<tr>
<td></td>
<td><em>Waldeckia obesa</em></td>
<td>0</td>
</tr>
</tbody>
</table>

Considering only the accepted food items, one may observe what seems to be a sequence in the preference of certain items upon others. This seems to be based on
the facility of capture, intensity of visual or chemical stimulation, type of prey
movements, shape or colour, or some other criteria, which are undetectable to us. 
*N. neglecta* is equally stimulated by krill and by small swimming fish, eating am-
hipods as a second choice and small species of fish at the bottom as third choice. 
Necrophagy occurs when there is no living food available. *N. coriiceps* is more ac-
tive in the presence of krill, being sometimes inhibited by a higher density of swim-
mimg fish. Their second choice seems to be amphipods. *T. newnesi* eats mostly am-
hipods but is highly stimulated by krill. *G. gibberifrons* usually eats amphipods,
mainly when they are close to the bottom, but is highly stimulated by krill. *P.
borchgrevinki* prefers fish, then krill, and its last choice is amphipods. *T. bernacchii*
prefers krill, then amphipods and will eventually take some fish. *L.
nudifrons* prefers krill to amphipods.

Discussion

Feeding behaviour of fish can be related to multiple factors such as food offer,
food preferences when the offer varies, morpho-functional capacity of food detec-
tion and selection, stomach capacity, inter and intraspecific competition for food,
among others (Eastman and DeVries 1985, Fanta et al 1994, Fanta and Meyer

Studies on the stomach contents of Antarctic fish from different regions have
shown a strong relation between the available food and the ingested food (Moreno

On the other hand, it was perceived that fish make some choices when feeding,
even rejecting some food items (Fanta et al 1994, Iken et al. 1997, Fanta and Meyer
1998, Meyer and Fanta 1998). Therefore, the food that is found in the stomach of
fish captured from the natural environment often reflects the available but not the
preferred organisms. Even food which is considered as usual for fish like *N. negl-
ecta* and *G. gibberifrons*, such as ophiuroids, polychaetes, isopods, molluscs
or algae (Everson 1984, Fischer and Hureau 1985, Kock 1992, Hureau 1994, Iken
et al. 1997) were never ingested when food items like amphipods, krill, or fish
were available in quantity (personal observ.).

At least during the summer, around 23 fish species live in the Admiralty Bay
(Skóra 1993). In the Martel Inlet around 10 Nototheniidae are usually found during
the summer (Fanta and Meyer 1998), as well as Channichthyidae, Harpagiferidae,
and Bathydraconidae (personal observ.).

In some cases, Antarctic fish taxonomy only adheres to the morphological and
meristic characters, often based on small samples. A typical case is that of *Noto-
thenia coriiceps* and *N. neglecta*. Presently it is considered to be one widespread
species with different populations which occur around all islands of the Southern Ocean and around the Antarctic Continent (Kock 1992). It is believed that the geographical distance or barriers between populations may have caused some genetic and morphological differences and so, for a while, two species, *N. neglecta* and *N. coriiceps* were considered as valid (Fischer and Hureau 1985). On the other hand, we have captured both “species” in the Admiralty Bay. They showed some slight morphological differences, which allowed for their classification according to Fischer and Hureau (1985). Some behavioural differences were also detected by Fanta and Meyer (1998), as well as their food choices in the present tests. Therefore, it is not clear if the individuals herein studied belong to one single species with a high variability in all ethological and morphological characters or if they are really two species, or subspecies. The answer might be possible in the future, if such individuals are analysed from the genetic and molecular biological perspective.

Even considering that the physico-chemical conditions in a container are not identical to those in the natural environment, Antarctic fish have been tested in aquaria for the evaluation of the effects of certain environmental conditions on their organisms (Fanta *et al.* 1989a, b, 1995; Fanta 1994), and also to evaluate their feeding behaviour (Fanta *et al.* 1994, Fanta and Meyer 1998, Meyer and Fanta 1998, Freiberger and Fanta, *unpubl.*). Aquarium observations have also greatly contributed to the understanding of trophic interactions on benthos (Arntz and Gallardo 1994). A limited area and the availability of sufficient food in tanks, under constant environmental conditions, made it possible to test not only the capacity of food detection, but also the morpho-physiological possibility and the willingness to catch the detected food item, selecting it according to taste, size, consistency, or some other unknown or undetectable criteria.

For that reason, a case study with some of the most common species that share an area in the shallow coastal nearshore region of Martel Inlet in the Admiralty Bay can help in understanding of some of the local feeding interactions. Evaluations of the stomach content and feeding habits of some fish have been made in the bay (Linkowski *et al.* 1983, Rios and Fanta 1998), and in the South Shetlands region (Iken *et al.* 1997, Takahashi and Iwami 1997), but through the tests in tanks herein conducted it is possible to detect if some of the food items are preferred or rejected when enough food is available and therefore the fish are allowed to make choices.

Size selective predation is important (Ellis and Gibson 1995, Rios and Fanta 1998) and consequently there are limitations in feeding possibilities. Thus, even if attracted to species like *G. gibberifrons* or *L. nudifrons*, only large specimens of *N. neglecta* are able to ingest them. The same was observed for *P. antarcticum*, which can ingest only small krill (Fanta and Meyer 1998). On the other hand, it was noticed that movement, shape, colour and taste were meaningful in active preying, or selection of food.
It was observed that some predators were more selective than others. Thus, *L. nudifrons*, *G. gibberifrons*, *T. newnesi* and *P. antarcticum* fed only on krill, and one species of amphipod, while *N. neglecta* fed on 7 different preys, including 4 fish species, krill, and two types of amphipods. *N. neglecta* is known as being versatile in its feeding (Kock 1992, Fanta and Meyer 1998, Rios and Fanta 1998), ingesting whatever is available, and so apparently very well adapted to all possible changes in food availability. It was observed, however, that once preferred food is available, even this species rejects isopods, polychaetes, ophiuroids, and algae (personal observ.).

Fish mostly prefer epibenthos, especially the more motile crustacean groups, to the generally sparse infauna (Daniels, 1982). But it was observed that fish like *T. bernacchii*, *N. neglecta*, *N. coriiceps* and *P. borchgrevinki* also fed...
Laboratory tests on feeding and food preferences of some Antarctic fish

343

on smaller motile fish specimens (Fanta and Meyer 1998). *T. bernacchii* is an active swimmer that preys on benthic animals (Hureau 1994), but Moreno (1980) also found pelagic euphausiids in their stomachs. In tanks it was seen that they were attracted by krill and amphipods but fed mostly on fish like *P. antarcticum*, if available. This agrees with Hureau (1970), who states that feeding seems to be directed upwards.

Necrophagy seems to be quite common among Antarctic fish (Arnaud 1970). Nevertheless we observed that it occurred only when no motile or live food was available, and only by some of the species, mainly *N. neglecta* and *G. gibberifrons*.

It was also observed that fish may be attracted or stimulated either by inadequate food, rejecting too large individuals or individuals with bad taste or consistency or by adequate food items that are well appreciated. Thus, it was noted that some amphipods like *G. antarcticum* were accepted by all fish except *L. nudifrons*, being the second most preyed upon of the organisms that were offered, while *W. obesa* was not identified as food or, when apprehended, was immediately rejected by all species. Krill, on the other hand, was the most preyed upon item and the preferential food for most of the fish, stimulating all of them to a high level of activity and feeding behaviour.

Based on all results herein obtained, one can suggest that there are some universal preys like *E. superba* and *G. antarctica*, while others are mostly not preyed, like *N. neglecta*, *N. coriiceps*, *P. borchgrevinki*, *T. bernacchii* and *W. obesa*. Among the fish, one can conclude that *N. neglecta* is the strongest predator of this community when in a restricted area while *T. newnesi*, *L. nudifrons*, *P. antarcticum* and *G. gibberifrons* are intensively preyed upon by at least two different predators (Fig. 1).

It may be suggested that stomach content is a useful indicator to determine the presence of certain food items in the natural environment, but not necessarily to determine the most appreciated or preferential food. Fish are able to make choices and to reject food that they don’t like, even if previously attracted visually or chemically towards it. Thus, if there is a great diversity of food available, fish will choose their preferential item. The studies that will follow will test the food preferences from the perspective of the energy costs for feeding and gains from the ingested nutrients.

Acknowledgements. — The author wishes to thank Dr. Claude De Broyer for giving and identifying the amphipods used as food items; Dr. Vicente Gomes and Dr. Maria José Campos Rocha for the krill and small fish used as food items and for the identification of the krill; to MSc Ana Aparecida Meyer for temporary help in the field work; to the staff of the Brazilian Antarctic Station *Comandante Ferraz* for valuable help; to the Secretaria da Comissao Interministerial para os Recursos do Mar (SECIRM) and the Brazilian Antarctic Programme for all logistical support. The financial support for the Project was provided by the CNPq grant N° 48131.3/95-8, 480708.96-7 and 480844/97-6; stipends were given to the author by CNPq (N° 521752/95-7 and 300831/93-5). The author is also grateful to Dr. Claude De Broyer and Prof. Dr. Andrzej Kompowski for their valuable suggestions to this paper.
References


Laboratory tests on feeding and food preferences of some Antarctic fish

Gobionotothen gibberifrons (Lönnberg, 1905) (Pisces, Nototheniidae) under different light conditions. — Nankyoku Shiryô (Antarctic Record), Tokyo; 38: 13–29.


Received July 2, 1998
Accepted April 15, 1999

Streszczenie

Praca przedstawia wyniki eksperymentów dotyczących wybiórczości pokarmowej kilku gatunków antarktycznych ryb z rodziny Nototheniidae: Notothenia neglecta, N. coriiceps, Trematomus newnesi, T. bernacchii, Lepidonotothen nudifrons, Pagothenia borchgrevinki, Gobionotothen gibberifrons i Pleuragramma antarcticum. W 1000-litrowych zbiornikach w laboratorium umieszczono...

W wyniku tych badań ustalono pewne interakcje troficzne; stwierdzono różnice międzygatunkowe w preferencjach pokarmowych ryb w warunkach laboratoryjnych przy nielimitowaniu podanego pokarmu różnego rodzaju, a także różnice w stosunku do diety obserwowanej w warunkach naturalnych.