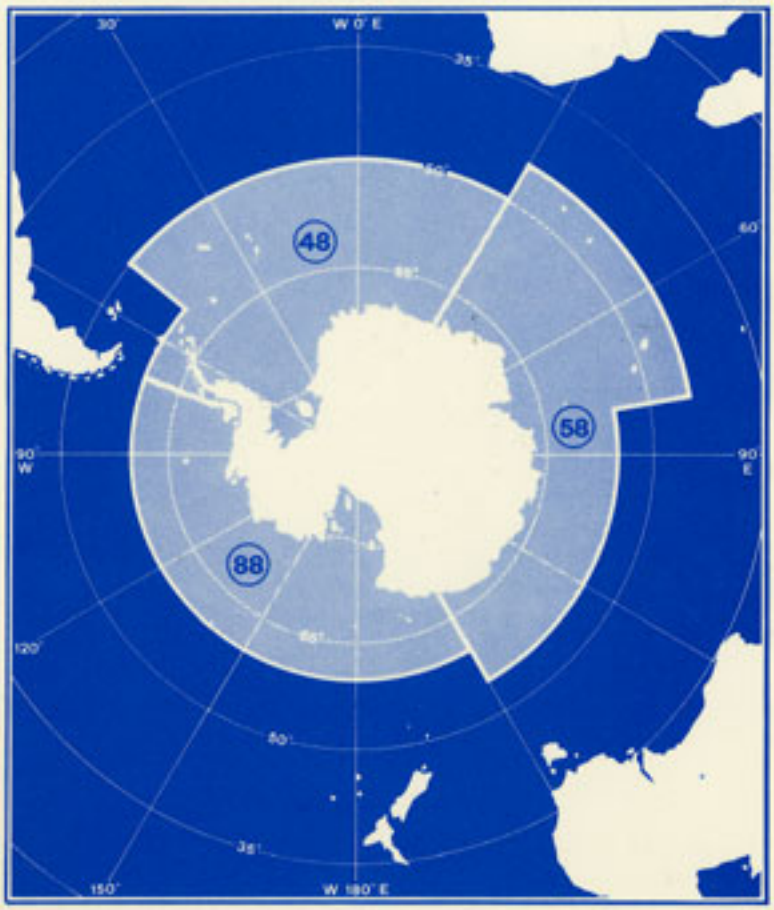
FAO SPECIES IDENTIFICATION SHEETS
FOR FISHERY PURPOSES

SOUTHERN OCEAN

CCAMLR CONVENTION AREA
FISHING AREAS 48, 58 and 88



VOLUME
I

COMMISSION FOR THE CONSERVATION OF ANTARCTIC
MARINE LIVING RESOURCES

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

FAO SPECIES IDENTIFICATION SHEETS

FOR FISHERY PURPOSES

SOUTHERN OCEAN

(Fishing Areas 48, 58 and 88)
(CCAMLR Convention Area)

Editor

W. Fischer
Marine Resources Service
Fishery Resources and Environment Division
FAO Fisheries Department
Rome, Italy

Co-editor

J.C. Hureau
Muséum national d'Histoire naturelle
Ichtyologie générale et appliquée
75231 Paris Cédex 05, France

Prepared and published with the support of the
Commission for the Conservation of Antarctic Marine Living Resources

VOLUME I

CONTENTS:

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome 1985

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

P-43
ISBN 92/5/102357/3

FOREWORD

This publication is the sixth in a series initiated by FAO which began with the Mediterranean/Black Sea (1973, two volumes) and continued with the Eastern Indian Ocean/Western Central Pacific (1974, four volumes), the Western Central Atlantic (1978, seven volumes), the Eastern Central Atlantic (1981, seven volumes) and the Western Indian Ocean (1984, six volumes). Its purpose is to provide those concerned with bio-ecological research and/or fisheries in the Southern Ocean with a practical tool for the correct identification of aquatic marine species believed to be of economic or fundamental ecological importance in that area.

The present set of Identification Sheets covers the area of concern to the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). It is the result of a joint effort by 18 experts with practical experience in the Antarctic region, which makes this publication a unique assemblage of first-hand information which could not have been achieved by any individual author. Furthermore, it is the first catalogue of species of interest to fisheries covering the Southern Ocean in its entirety. The fishery resources of this region are not well known and there are still considerable gaps in information on distribution, abundance and biology of many species, which are, to a large extent, the result of incorrect or insufficient species identifications. With the growing need for rational management of fish stocks in the Southern Ocean, more accurate and detailed basic data by individual species will be required in the near future.

The users of the Sheets can contribute significantly to the improvement of this reference work by communicating their practical experiences with the Sheets to FAO/HQ in Rome, and/or to the respective authors. In this way, the systematist and the fishery worker will benefit from each other's work, for it is only through a continuing cooperation of this kind that these Identification Sheets will remain up-to-date and useful.

The production of this set of Species Identification Sheets would not have been possible without the generous financial support of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR).

A. Lindquist
Director
Fishery Resources and Environment Division
Fisheries Department
FAO, Rome

ABSTRACT

This publication presents the marine living resources of the Southern Ocean considered to be of interest to fisheries or of major importance for the conservation of the Antarctic environment, in the form of a practical, illustrated field guide following the format of the by now well-established series of FAO Species Identification Sheets for Fishery Purposes. The major groups included are seaweeds, euphausiids, king crabs/stone crabs, bivalves, gastropods, cephalopods, hagfishes/lampreys, sharks, batoid fishes, bony fishes and marine mammals. Every group section includes an explanation of relevant technical terminology, general remarks, guides or keys to suborders, families or genera, and identification sheets for selected families and species. Identification sheets include an alpha-numerical family or species code, valid scientific names and synonyms still in use, proposed CCAMLR/FAO common names in English, French, Russian and Spanish, an illustration of the family or species in question, a diagnosis, illustrated differential diagnoses of similar families or species, and information on size, geographical distribution and behaviour (with a map), and fisheries. The publication ends with a comprehensive alphabetical index of scientific and common names.

For bibliographic purposes this document should be cited as follows:

Fischer, W. and J.C. Hureau (eds), FAO species identification sheets for fishery purposes. Southern Ocean (Fishing areas 48,58 and 88) (CCAMLR Convention Area). Prepared and published with the support of the Commission for the Conservation of Antarctic Marine Living Resources. Rome, FAO, Vol.1:232 p.
1985

Identification sheets. Taxonomy. Geographic distribution. Fisheries. Vernacular names. Marine mammals. Hagfishes and lampreys. Sharks. Batoid fishes. Bony fishes. Shrimps. Crabs. Euphausids. Bivalves. Gastropods. Cephalopods. Seaweeds. S.O.

FAO SPECIES IDENTIFICATION SHEETS

SOUTHERN OCEAN

Fishing Areas 48,58,88

LIST OF CONTRIBUTORS*

Authors:

Anderson, M. Eric, Research Biologist, Department of Ichthyology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA

Andriashev, A.N., Zoological Institute, Leningrad B 164, USSR

Antezana, T., Universidad de Concepcion, Casilla 2, Dichato, Chile

Arnaud, P.M., Station marine d'Endoume et Centre d'Océanographie, Rue de la Batterie des Lions, 13007 Marseille, France

Asensi, A., Université de Paris VI, Institut de Biologie Végétale Marine, 7, Quai Saint-Bernard, 75230 Paris Cedex 05, France

Bonner, W. Nigel, Life Sciences Division, British Antarctic Survey, High Cross Madingley Road, Cambridge CB3 OET, UK

Délépine, R., Université de Paris VI, Institut de Biologie Végétale Marine, 7, Quai Saint-Bernard, 75230 Paris Cedex 05, France

Duhamel, G., Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, 43, Rue Cuvier, 75231 Paris Cedex 05, France

Etchverry, Héctor D., Instituto de Oceanología, Universidad de Valparaíso, Casilla 13-D, Viña del Mar, Chile

Geistdoerfer, P., Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, 43, Rue Cuvier, 75231 Paris Cedex 05, France

Hulley, P.A., South African Museum, P.O. Box 61, Cape Town, South Africa

Hureau, J.C., Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, 43, Rue Cuvier, 75231 Paris Cedex 05, France

Iwamoto, T., Department of Ichthyology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA

Laws, R.M., British Antarctic Surveys, Natural Environment Research Council, High Cross Madingley Road, Cambridge CB3 OET, UK

Post, A., Ichthyologie Seefischerei, Zoologisches Institut und Zoologisches Museum der Universität Hamburg, Martin-Luther-King-Platz 3, D-2000 Hamburg 13, Federal Republic of Germany

Roper, Clyde F.E., Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, USA

Stehmann, M., Ichthyologie Seefischerei, Zoologisches Institut und Zoologisches Museum der Universität Hamburg, Martin-Luther-King Platz 3, D-2000 Hamburg 13, Federal Republic of Germany

Tomo, Aldo P., Instituto Antártico Argentina, Dirección Nacional del Antártico, Ministerio de Defensa, Buenos Aires, Argentina

Editors: W. Fischer and J.C. Hureau

Illustrators: Paolo Lastrico (principal illustrator) and Olivero Lidonnici

---

* Their respective contributions are indicated in the Table of Contents. Authors and Reviewers are also mentioned at the end of each section of Family Sheet

FAO Sheets | TABLE OF CONTENTS | Fishing Areas 48,58,88

EXPLANATORY NOTES TO THE FAO PROGRAMME ON SPECIES IDENTIFICATION SHEETS FOR FISHERY PURPOSES

Preamble

Under this programme, which is of worldwide scope, FAO is issuing a number of series of Identification Sheets arranged by regions (major fishing areas) and designed (a) to facilitate the identification of the world's principal commercial or ecologically important aquatic species, (b) to further the standardization of their names, and (c) to provide general information on their basic characteristics and exploitation.

Each regional series of sheets (in one or more volumes) will eventually lead toward a complete inventory of commercially important species found in a given fishing area (or areas). The inventory will serve as a permanent reference frame which will provide the basis for any classifications required for biological, statistical, or other purposes.

FAO is implementing this programme in close collaboration with the regional fishery bodies established in the various areas of the world and with the generous assistance of zoologists and fishery biologists actively engaged in research on the aquatic species occurring in these areas.

It is hoped that the use of this new work tool will contribute to the improvement of national and regional fishery statistics and will facilitate fishery resources survey work, sampling schemes and fishery activities in general.

Contents and Presentation

The Worldwide Identification Sheet programme covers the following major groups of aquatic organisms:

> seaweeds; echinoderms (sea urchins, sea cucumbers, etc.); crustaceans (shrimps, prawns, crabs, etc.); molluscs (snails, bivalves, squids, octopuses, etc.); sharks/ rays; bony fishes; aquatic reptiles (turtles, sea snakes); aquatic mammals (whales, dolphins, seals, etc.).

Other groups may be included in the future, e.g. sponges, tunicates, echinoderms, etc.

In areas containing very large numbers of commercially important species, special Family Sheets are prepared. Such sheets contain information on the principal family characters, the appearance of typical representatives (drawings), distinction from similar families, explanations of technical terms, a key to the genera, and a list of species found in the area.

The Species Identification Sheets each describe a single species and give information on its denominations (scientific FAO/CCAMLR (Commission for the Conservation of Antarctic Marine Living Resources) vernacular names in the four official CCAMLR languages; a blank space is foreseen for inclusion of National vernacular names by users of the publication), its appearance (drawing), its diagnostic field characters, its distinction from similar species in the area (including those for which no identification sheets have been prepared), its range and habits (where known) and data on its fishery and utilization.

The sheets of a regional series are included in one or more volumes and for ease of handling the major groups of organisms and the Index are separated by plastic sheets with tabs.

The paramount aim in the arrangement of the sheets has been to ensure that species in a regional series can be found easily without impairing the open-ended character of the system. Species are numbered within each genus (in chronological order of preparation of sheets on a world basis), the genera and species are arranged alphabetically within families and the families are also arranged alphabetically within their major group. Higher taxonomic categories (Suborders, Orders, Classes) are usually omitted on the Identification Sheets, but are included in the Family Picture Guide where practicable (for example, the higher classification of fishes still lacks general agreement).

FAO Species Identification Sheets are issued, depending on the areas, in one or more of the working languages of the Organization. Usually, the first version of sheets for any major fishing area will be a preliminary one, intended to be periodically updated and, if necessary, re-edited after the sheets have been thoroughly tested in the field.

Areas Covered

The intention is to produce one or more volumes of sheets covering a single major fishing area, but in several cases two or more areas might be grouped together. The area breakdown is that of the FAO Classification of Major Fishing Areas for Statistical Purposes (see FAO Fisheries Circular No. 420, Rome, December 1972). For the Southern Ocean, three Fishing Areas (48, 58 and 88) are grouped and correspond also to the area covered by CCAMLR.

It is obvious that the limits of the major fishing areas adopted for statistical purposes (in many cases they coincide with the areas of existing regional fishery bodies) do not normally follow the natural faunistic boundaries as they are based on a number of other criteria and practical requirements (collection of fishery statistics, geographical divisions of the oceans and seas, areas of application of regional conventions, etc.). In the case of the Southern Ocean, the area is roughly delimited to the north by the Antarctic Convergence.

Selection of Species

Each regional series of Identification Sheets is intended to include all species known to be of commercial importance occurring in the area(s). The selection is based on: **(a)** regional and national fishery statistics; **(b)** national lists of commercial species; **(c)** recommendations of fishery bodies and related working groups; and **(d)** experience of the authors of the sheets and other fishery biologists actively engaged in resources research within the area.

In some instances, particularly in areas which are little known or characterized by a large variety of edible aquatic organisms, the selection of species is difficult and may need to be updated as more information becomes available, or when certain species become more intensively exploited.

Pagination and Sheet Codes

The Species Identification Sheets are a flexible work tool, capable of updating through periodical revisions. Because of the alphabetical arrangement of families, genera and species in each major group the publication can be used in the manner of a dictionary. At the same time, however, it is desirable that at least similar fishes within a family are not widely separated.

Names

The correct scientific name for the species is given above the drawing. This is followed by other but invalid scientific names (synonyms) and the authors who have established them. Usually these refer to species once considered different but now known to be identical; a colon between the scientific name and the name of a zoologist shows that the latter was not the first to propose the species name (and may indeed have placed it in another genus). If the author's name is placed in brackets, this means that the author has originally described the species in another genus.

The widespread use of vernacular or common names for commercial aquatic species, particularly in the fields of fish processing and marketing, demands that special attention be given to them. In view of the confusion in the use of such names in many fishing areas, the need for standardization and consistency must be strongly emphasized. It is a rather complex task and for this reason the vernacular names of the species in the first edition of any regional set of Identification Sheets may be missing, or when listed, subject to revision by national authorities and regional fishery bodies. Where possible, two kinds of vernacular species names are used on FAO Species Identification Sheets:

1. FAO species names: those used in the FAO Yearbook of Fishery Statistics and in the FAO Thesaurus of Species and Stocks. They have been selected on the basis of the following criteria:

   (a) *each name must apply to one species only;*

   (b) names must conform to FAO rules of spelling nomenclature;

   (c) names commonly used within the area are preferred if they conform with **(a)** and **(b)**.

Many FAO species names are consistent with those used by regional fishery bodies, and it is hoped that they will ultimately become regional standard species names and will generally remain unchanged, although there may be instances where an alteration is unavoidable.

2. National species names: those vernacular species names officially adopted by a country. They always apply to individual species and should not be confused with common names assigned to statistical categories, or with trade names applying to groups of species. Like the regional standard species names, national species names should remain unchanged as far as possible. However, for reasons of space, national names cannot be included in the case of fishing areas comprising a large number of bordering countries, including many species for which national names are unavailable.

   The choice of national species names is the responsibility of national authorities. However, to ensure consistency, it is recommended that in selecting such names, the following criteria be observed:

   (a) each name should apply to one species only;

   (b) each species should have only one official national name;

   (c) the name should be selected, wherever possible, from among the "local names" most widely used within the country, and preference might be given to the FAO name where available;

   (d) if a local name applies to more than one species (often to a genus or a family), a second word, characterizing the species, might be added (e.g. "hunched" snapper, "olive-striped" snapper, etc.);

   (e) if a local name for a species is not availalbe, consideration should be given to the use of the FAO species name as the national one.

It is hoped that the progressive use of national species names in all official government documents will substantially contribute to the standardization of vernacular terminology within individual countries. It is recommended that national fishery authorities issue documents correlating scientific, national and local names for each of the species included in the regional set of Identification Sheets relevant to their area.

Illustrations and Maps

These include a main drawing of each species on the individual identification sheets and sketches showing characteristic features where pertinent, particularly in identification keys. Generally, the illustrations are based on figures already published in pertinent scientific literature.

The purpose of the maps is to give at a glance an idea of the range of the species within the fishing area. In cases where data are incomplete, a certain generalization in the range is unavoidable. Being necessarily on a small scale, the maps are of course limited in their use as a guide for detailed distribution patterns.

Fisheries Information

The catch data recorded in the area are largely based on fishery statistics supplied to FAO by Member Countries for inclusion in the FAO Yearbook of Fisheries Statistics. The information on fishing gear and forms of utilization of the species is provided by the authors of the sheets and completed by FAO taking into account the information made available to the Organization through national or regional institutions and field projects.

Indexing

An essential feature of the Species Identification Sheets is the comprehensive Index because the sheets will be used as a source of information (on correct nomenclature, vernacular names, succint biological information, etc.), as well as for identifying specimens. The Index has been keyed to families and genera, both of which are found alphabetically within each major group. Those who wish to use a taxonomic arrangement should consult the introductory pages (grey-edged) to each major group.

A system has been used in the Index by which it is possible to:

(i) determine from the code to which major group, family and genus a name applies;

(ii) locate the relevant sheet or sheets from a given scientific or vernacular name.

The system is described on the first page of the Index.

Revision of Sheets

From time to time, a set of revised sheets will be prepared. For this purpose, a species file by species for each of the regions concerned is being kept at FAO/HQ, in which new information can be included as it becomes available.

EDITORIAL NOTE

The first steps toward the preparation of this set of Species Identification Sheets were taken at two meetings of the SCAR/SCOR Working Party on Fish Ecolology ICIOMASS programme, (Danmarie Les Lys, 1981, and Hamburg, 1982), where preliminary discussions were held on area definition, scope, species coverage, and format. Subsequently, a draft project was elaborated by FAO and presented to the annual meeting of CCAMLR (Hobart, 1983) which approved some financial support for the preparation and printing of an English version to be followed by 3 other language editions (French, Russian and Spanish), to be carried out within the framework at FAO's species identification programme. The work was initiated toward the end of 1983 by the FAO Fishery Resources and Environment Division in cooperation with the various authors and with the assistance of Dr J.C. Hureau as co-editor.

This set of Identification Sheets includes most of the marine species of interest to fisheries occurring in the Southern Ocean, e.g., 30 seaweeds, 6 euphausiids, 2 crabs, 9 bivalves, 8 gastropods, 31 cephalopods, 2 hagfishes/lampreys, 2 sharks, 5 batoid fishes, 49 bony fishes and 21 mammals. While the format and presentation of the present set of tear- and water-proof sheets are basically the same as in previous issues, some changes have been introduced, especially the substitution of the traditional loose-leaf filing system. As a result of this, the open-ended character of the publication which did allow easy rearrangement, replacement or addition of sheets, had to be abandoned, but the new system has the advantages of lower cost, improved managability, better resistance to handling and mailing and reduced risk of loss of individual sheets. Furthermore, past experience has shown that the production of revised or additional sheets to be inserted in the existing volumes is less practical than the production of a new edition. This change of our system has allowed us to give sequential page numbering from beginning to end and to include the page numbers in the Table of Contents. Nevertheless, we have decided to keep the alphabetical, rather than systematic arrangements of families and genera, which helps find these taxa without consulting the index and we have also arranged the species within the genera in alphabetical order to facilitate their retrieval.

The main features and the scope of the programme of FAO Species Identification Sheets for Fishery Purposes are outlined in the Explanatory Notes preceding this Introduction, but attention should be drawn to the following points:

Geographical Area Covered

This publication covers the major statistical Fishing Areas 48, 58 and 88, which coincide with the limits defined by the Convention for the Conservation of Antarctic Marine Living Resources, covering most of the waters to the south of the Antarctic Convergence. Since the distribution maps on the Species Identification Sheets can only be small and rather general, it appreared necessary to indicate all geographical names referred to in this work on the detailed map under this section.

Selection of Major Groups, Families and Species

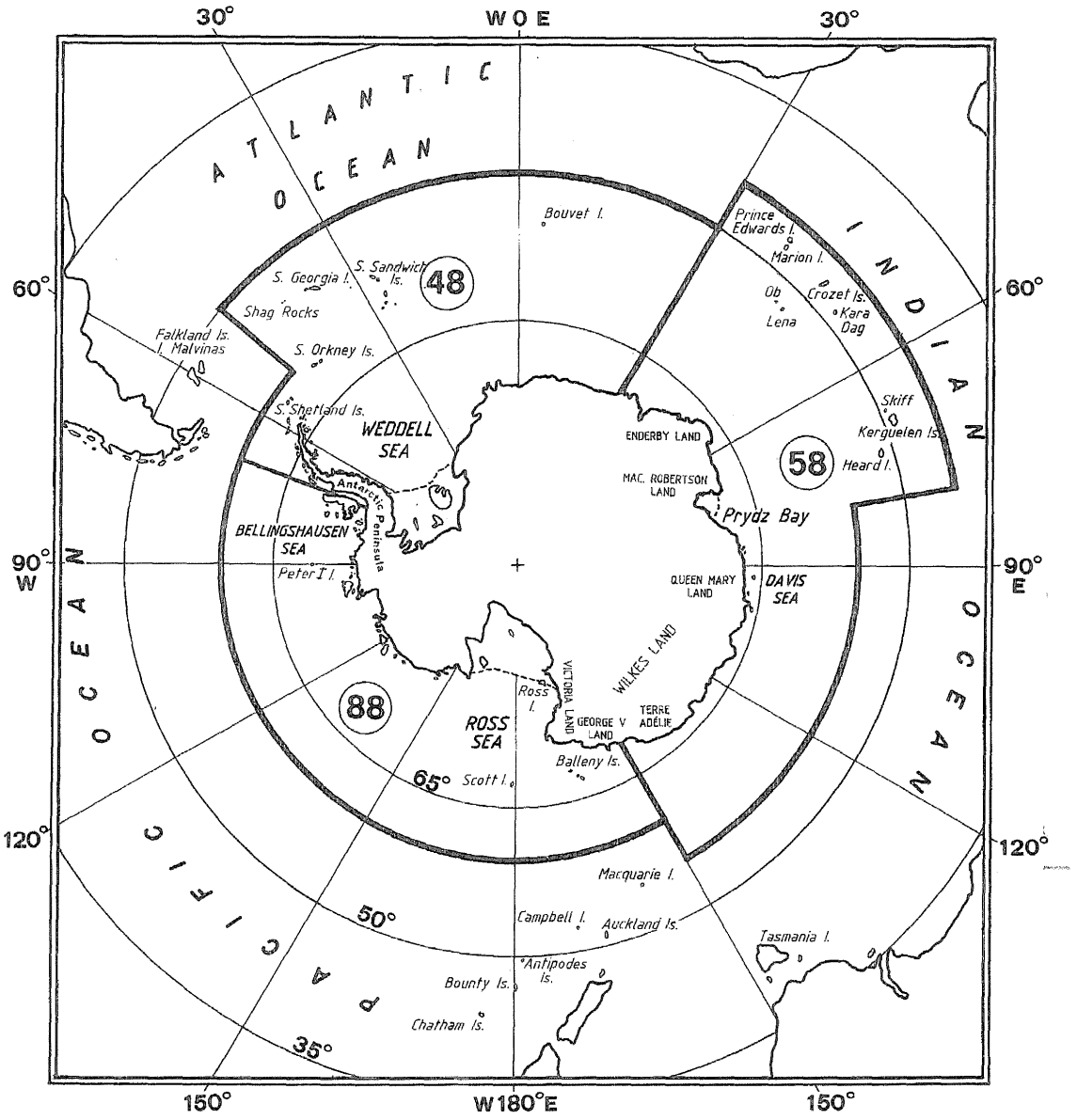
It is obviously impossible, in the context of the present work, to cover all major groups of plants and animals integrating the Antarctic ecosystem. The choice of the groups here included is based, on the one hand, on present and potential interest to fisheries, and on the other, on the aspects of conservation of the Antarctic marine ecosystem. Although we have tried to cover at least the most conspicuous of the Antarctic marine groups, we are aware of many shortcomings in this respect, particularly as concerns the birds and many groups of small invertebrates that are important food items for fishes. The birds were not included, despite their synecological importance, because they are not exploited by fisheries and have already been covered by other publications. The small invertebrates were excluded on the grounds that this publication is mainly intended as a field guide to the macrofauna of the Antarctic region (with the exception of the euphausiids which are of particular significance to fisheries and as forage organisms).

Each of the major groups is introduced by a general section (remarks, picture guides, or keys, etc.) in which an attempt is made to present the group in its entirety, even if the treatment of the various groups is necessarily somewhat unbalanced.

The selection of families and species to be described on identification sheets was based on the following criteria:

Family Sheets: **(a)** all families represented by Species Identification Sheets (except when a family has a single species in the area); **(b)** families having one or more representatives occasionally taken by fishing boats, but of minor importance; **(c)** for families not presently exploited but possibly of potential interest as food (including deep-water forms); **(d)** families of no interest to fisheries but of major significance in the Antarctic food-web.

Species Sheets: **(a)** all food species regularly fished for or taken as bycatch by fishing boats; **(b)** species requiring special protection measures.



Map of the Southern Ocean showing the principal localities mentioned in this publication

The present coverage must be considered as provisional in view of the paucity of precise data available to date for many of the Antarctic species. Furthermore, it is difficult to assess, at present, the future development of fishing and processing technologies for Antarctic resources and of their marketing possibilities.

Names and Codes

Scientific names: the scientific names used here have been based, as far as possible, on the most recent taxonomic revisional work.

Vernacular names: standard international names in English, French, Russian and Spanish, based on the criteria outlined in the Explanatory Notes (page xiii), are given for every family and species. These so-called "FAO/CCAMLR Names" have been selected by FAO and they hence do not fall under the authors' responsibilities. For species occurring also outside the Southern Ocean, the names used in previous sets of Identification Sheets are usually retained. However, in most cases, no vernacular species denominations could be found in the literature, and the few names so far used often appeared to be misleading due to likely confusion with families or species from other world areas. The proposed names have been discussed at the 4th CCAMLR meeting (Hobart, September 1985), and we hope that they may contribute toward the standardization of the vernacular nomenclature used in the Southern Ocean.

National species names (by countries) have been omitted on the Sheets; they would occupy too much space and there are only very few countries where official national names exist. Users are invited to add, where possible, such names in the blank space foreseen for this purpose, and to kindly communicate them to FAO for their inclusion in the Organization's worldwide species nomenclature system.

Figures and Sketches

As on previous occasions, the number of illustrations included here is unusually high, since they represent an essential complement to the text. Most figures and sketches have been redrawn or adapted from available literature, often following the recommendations of authors. Unfortunately, it is not possible here to quote the large number of sources used for this purpose.

Distribution Maps

The distribution maps are meant to give only a rough idea of the geographical range of the species within the region. In many cases, meaningful information on occurrence of species in certain parts of the area is very scanty, and gaps in information are often indicated by interrogation signs.

Information on Fisheries

Apart from a few species for which target fisheries are already in operation, the large majority of the edible species from the Southern Ocean are taken only as bycatch by fishing boats or in exploratory fishing research vessels. The potential interest to fisheries of most of these species is difficult to assess at the present time.

Index

A comprehensive Index of scientific and vernacular (FAO/CCAMLR) names is presented at the end of the volume.

Future Improvements

The Identification Sheets covering the Southern Ocean are issued as working documents which should be tested in the field before future revised versions are prepared. Draft sheets for this area have already been tested on several occasions by some scientists on research vessels. However, some of the families are still in need of revision, so that corrections or additions will doubtless become necessary as new information accumulates. Users are strongly urged to let FAO and the respective authors of this work benefit from their experience with the sheets by sending suggestions and comments to the editors.

Acknowledgements

The editors wish to express their deep gratitude to all those taxonomists and fishery workers who have contributed original draft accounts to the series and/or have collaborated in the revision and completion of this set of Identification Sheets. In many cases this has meant a personal sacrifice of time, more so because several other major faunistic compilations for other world areas have been running concurrently.

This work could not have been undertaken without the generous support of the Convention for the Conservation of Antarctic Marine Living Resources, which contributed financially to the preparation and printing of the Identification Sheets.

Finally, the Editors wish to express their personal thanks to all those in FAO who have assisted then in one way or another. Special recognition is due to Mrs M. Kautenberger-Longo and Mrs G. Sciarappa-Demuro for their invaluable assistance throughout the project, mainly in typing/composing on the word processor the highly technical texts, and to Mr P. Lastrico and Mr O. Lidonnici, who skillfully prepared most of the illustrations. Thanks are also due to Drs. A.N. Andriashev (Zool.Inst., Leningrad), R. Borodin (VNIRO, Moscow), I. Everson (B.A.S., Cambridge), K.H. Kock (Inst.f.Seefischerei, Hamburg), T.G. Lyubimova (VNIRO, Moscow), D. Miller (Sea Fisheries Institute, Capetown), Y. Shimadzu (Far Sea Fisheries Agency, Japan), M. White (B.A.S., Cambridge) and R. Williams (Antarctic Division, Hobart), for their comments and additions made during the fourth CCAMLR meeting (Hobart, 1985) or elsewhere.

USER'S GUIDE

While the sequence of families in the picture guide of any major group is governed primarily by similarity in appearance (to facilitate identification), the arrangement of Identification Sheets by families within major groups, by genera within families and by species within genera is alphabetic in order to facilitate their retrieval.

Information from the sheets can be retrieved in several ways, depending on the user's requirements. Essentially, two approaches can be followed:

1. **Field Identification**

   (a) Check your specimen against the Aid to Identification of Families (picture guides, illustrated keys, etc.). In the case of bony fishes, special attention should be paid to the shape and position of fins. Fins should be pulled forward to show their shape when erect. General appearance and arrows indicating conspicuous features will help you decide which family (or families) the specimen most resembles.

   (b) Find the Identification Sheets belonging to the family from its alphabetical sequence by using the capital letters of the Sheet Code (top right margin).

   (c) Determine the species by working through keys on the family sheet (when present) and by looking at all the Species Sheets belonging to the family. In some cases, the figure alone may be sufficient, but it is recommended that the sections "Distinctive Characters" and "Distinguishing Characters of Similar Species Occurring in the Area" be always read to ensure correct identification. This may also lead to identification of species for which a sheet is not included.

2. **Searching the Index**

   (a) Scientific (valid or invalid) or vernacular names are included in a single index and can be found alphabetically. In the case of scientific names, both the genus and the species names are cross-indexed, e.g. Euphausia superba and superba, Euphausia. This will help on occasions when a species name is coupled in the literature with an unusual generic name.

   (b) Remember that both the Index and the Identification Sheets indicate whether a scientific name is valid or obsolete, although it will always lead to the correct Identification Sheet.

3. **Family and Species Codes**

   All families and species described on Identification Sheets have an alpha-numerical code (see example below)

   Example:

	Euphausia superba	
EUPH	Euph	3
Family (EUPHAUSIDAE)	Genus (Euphausia)	Species (superba)

   The coding system is worldwide. Gaps in sequence of species code numbers indicate that the missing number has already been allocated to a species occurring in another fishing area.

MARINE ENVIRONMENT AND FISHERIES OF THE SOUTHERN OCEAN

In contrast to the almost barren, ice-clad continent, the Southern Ocean supports a very productive ecosystem, many components of which are of potentially high commercial value. There are well-developed, integrated, circumpolar atmospheric and oceanic circulations. The winds are predominantly from the east near the continent and drive the surface waters westward along the coast of Antarctica (Antarctic Coastal Current or East Wind Drift). North of about 60^{o}S the winds are westerly and the surface waters flow eastward in the Antarctic Circumpolar Current or West Wind Drift. Near the northern limit of the Antarctic Circumpolar Current the cold Antarctic surface waters meet and sink below warmer waters flowing south from out of the Atlantic, Indian and Pacific oceans. This complex, mobile area of eddies and meanders is called the Polar Front or Antarctic Convergence. The area south of the Antarctic Convergence covers 35 x 10^{6} km^{2}, which is about 10% of the World Ocean. The temperature of the Antarctic Surface Water increases from -1.0^{o}C near the continent to 3.5^{o}C at the Antarctic Convergence in summer, and from -1.8^{o} to 0.5^{o}C in winter. At the Antarctic Convergence the temperature rises quickly by 2 to 3 degrees. Very cold, highly saline water, the Antarctic Bottom Water, is produced by the formation of sea ice near the continent. This dense water sinks and flows northward along the sea floor of deep oceanic basins and reaches north of the Equator. A warmer, nutrient-rich body of water, the Circumpolar Deep Water, lies between the cold surface and bottom waters. This water has flowed southward out of the depths of the surrounding oceans. Near the Antarctic Continent it upwells to enrich the surface waters and contribute to the bountiful growth of marine life. This seemingly very hostile environment is thought to be one of the most productive marine areas of the World Ocean. Certainly the zooplankton biomass is significantly higher than that recorded for lower latitudes, averaging about 105 mg m^{-3}. Paradoxically, estimates of annual phytoplankton production ranging between 16 g C and 100 g C m^{-2}, suggesting that the area is no more productive per unit area than elsewhere, except the Arctic Ocean. However, very recent research suggests that the greater part of plant biomass is in the form of pico- and nannoplankton. The actual primary production could be as much as four times greater than the values quoted above. Krill is thought to form between 10 and 50% of the zooplankton biomass. Estimates range from 125 to 750 x 10^{6} t, making it the most abundant animal species on earth. Calculations of annual production are as high as 300 x 1 350 x 10^{6} t. Clearly krill occupies a key role in the Southern Ocean ecosystem, and indeed, many of the major carnivores - whales, seals, penguins, other sea birds, cephalopods and fish - as well as some of the zooplankton, are dependent on krill for food, either directly or indirectly.

Recent renewed interest in the living resources of the Southern Ocean, following the decline in the traditional Northern Hemisphere fisheries, has filled biologists with understandable and justifiable concern. It is particularly alarming that krill should be considered the most promising resource to harvest. It has been argued that the enormous reduction in baleen whale stocks has released some 100 to 150 x 10^{6} t of krill that could be harvested annually by man without depleting the krill stocks. The full attraction of this harvest may be realized if one considers that this amount is only slightly less than double the present total world fish catch! But 'surplus' food is a false premise! 'Extra' food resulting from the decline of a predator usually leads to faster growth rates in the remaining predatory. This in turn leads to earlier maturity, increased fertility, higher survival rates and larger populations. There is reliable evidence that such changes have taken place in many seal, bird and some whale species and they may also have occurred in squid and fish populations. Therefore it is essential that the rate of development of a krill fishing industry be slow enough to allow the ecosystem to come gradually to a new balance. It is a chilling thought that over-exploitation could mean not merely the loss of a species but also irreparable damage to the entire ecosystem, because krill is a major food species. Effective management must be soundly based on knowledge, and the concern of the Antarctic scientific community was heightened as it became aware of how little was known of the Southern Ocean ecosystem in general, and krill in particular. Fortunately this concern has been appreciated by the governments of the Antarctic Treaty nations; hence several national and international research programmes have been developed.

BIOMASS (Biological Investigations of Marine Antarctic Systems and Stocks) is a multinational research programme on the Antarctic marine ecosystem and its living resources, which pays particular attention to Antarctic krill, Euphausia superba. The First International BIOMASS Experiment (FIBEX) was a large-scale synoptic study of krill abundance and distribution. Twelve vessels from ten nations covered large areas of the Atlantic, Indian and Pacific sectors of the Southern Ocean during the austral summer 1980/81. In contrast, SIBEX was designed to investigate seasonal change in processes involved in the distribution, abundance and production of krill, related to the physical environment, food supply, competitors and predators. Seven nations (Argentina, Brazil, Chile, Japan, Poland, United Kingdom, West Germany) worked in the Bransfield Strait and southern Drake Passage. Each vessel worked a separate time slot allotted from a consecutive series extending from spring to autumn. Four other nations (Australia, France, Japan, South Africa) carried out a similar collaborative study in Prydz Bay at 70^{o}E in the Indian Ocean sector. All these nations, and the United States and the USSR, have independent national programmes of Southern Ocean biological research also. Why is there so much research interest, at both national and international level, in the World's windiest and roughest ocean, and why the particular interest in a small 5 to 7 cm shrimp-like crustacean?

This chapter is a compilation based on three recent publications:

- R.B. Heywood, Antarctica, offshore marine research, Biologist (1985). 32(3):139.
- S.Z. El-Sayed, Krill, the enigma of the deep south, Whalewatcher (1984). 18(3):13.
- D. Sahrhage, Present knowledge of living marine resources in the Antarctic. Possibilities for their exploitation and scientific perspectives, in Antarctic Challenge, pp. 67-88, Duncker and Humbolt, Berlin, 1984

We are indebted to the above authors for their kind permission to reproduce parts of their papers.

Krill, like most members of the zooplankton (and phytoplankton), is circumpolar in distribution, and is predominant in the East Wind Drift. The major concentrations appear to occur where there are permanent meanders or gyres in the water circulation, that is, the Weddell Sea, Bellingshausen Sea, northern Ross Sea, and the Kerguelen-Gaussberg Ridge area. Large concentrations also extend northward toward the Antarctic Convergence in the region of the Scotia Sea and South Georgia, presumably deflected northward in the current by the Scotia Ridge.

Krill aggregate to form dense patches that range from a few square metres to several hundred square kilometres. One patch has been recorded as covering an area of 450 km^2 and containing an estimated 2.1 x 10^6 t of krill. Within these aggregates the density of distribution is constantly changing as the krill undergo a diurnal pattern of movement. They rise and disperse near the surface at night, and sink and aggregate into very dense 'swarms' during the day. Recorded densities vary considerably but at night there may be 10 krill m^{-3}, and in daytime 145 krill m^{-3}. Feeding may be a major factor in this behaviour but there is evidence that moulting, spawning and other phenomena may be involved.

Values given for krill biomass are very dubious. Prior to FIBEX, attempts had been made to estimate biomass indirectly from primary production, predator consumption and as a percentage of total zooplankton. The values for all of these are themselves of questionable accuracy, even to an order of magnitude. For example there is an almost total lack of information on the consumption of krill by squid and fish. FIBEX attempts to measure the krill standing stock by echo-location techniques (echo-integration). The direct estimate for the area surveyed is $7.16 \pm 0.93 \times 10^6$ t. This cannot be extrapolated to the Southern Ocean as a whole because the work was carried out in areas thought to have high krill abundance. No measurements of annual production are available; the estimate of 300 to $1\,350 \times 10^6$ t is based on the generally accepted ratio of production being 1.8 to 2 times the biomass. In short, knowledge of this species is inadequate for resource management purposes, especially in details essential to the determination of production and turn-over rates.

Changes in the abundance of krill is another area in which full information is lacking. Though our present indirect methods have produced estimates of abundance or production which may be adequate for purposes of harvesting, the variance in these estimates (considered by some to be a factor of two or so) is so great that it is impossible to estimate the changes in the abundance of krill which have occurred or may occur.

While it is popularly believed that the krill stock increased after whale stocks decreased, and there is indirect evidence that this occurred (e.g., increase in the population of winged birds, penguins and seals that feed on krill), direct evidence is lacking. Present techniques of directly estimating krill biomass from net plankton hauls, or by acoustic methods, are subject to considerable variance because of the structure and highly irregular distribution of the swarms. Such estimates may also be biased because, for example, large krill escape from most nets, the proportion of krill living outside swarms is completely unknown, and scientists lack information on the acoustic properties of krill, either individually or in swarms, which limits the accuracy of estimates based on use of an echosounder.

Though these problems are of some significance, they do not invalidate present estimates of biomass and productivity which have been presented as broad ranges. They do make it difficult or impossible, however, to achieve the precision needed to monitor changes in the krill population which might occur.

Fish populations are a second important element within the Southern Ocean ecosystem. Fish resources are mainly concentrated in the shelf areas around Antarctic and sub-Antarctic islands and off the continent. Altogether there are about 270 species, belonging mostly to the families Nototheniidae, Channichthyidae and Myctophidae. However, only about 25 species are of commercial interest, but most of the other species have a significant importance in the Antarctic marine ecosystem.

It is interesting to note that, unlike conditions in northern waters, pelagic fish resources seem to be rather limited. Most species are living on or near the bottom, from where fish often undertake upward migrations for feeding on krill and other pelagic animals. In some areas substantial quantities of young fish have been found in upper water layers close to krill swarms so that it should be investigated whether or not capture of these fishes during krill fisheries could have an impact on the recruitment of fish stocks.

Commercial fish fisheries in the Antarctic started in the late sixties. They concentrate their efforts mainly on the waters around South Georgia, South Orkneys and South Shetlands in the Atlantic sector where landings were recently in the order of 100 000 t per year, and around the Kerguelen Islands in the southern Indian Ocean with landings in the order of 20 000 t annually during the last 5 years, and more in earlier years. These catches are almost exclusively made by fishing vessels from the Soviet Union (about 80%) but also Poland, the German Democratic Republic and Bulgaria. Recently also some French vessels have commenced fishing around the Kerguelen Islands.

Unfortunately there is still a serious lack of statistical and biological data from these fisheries (except for the Kerguelen area) which makes it difficult to assess the status of the Antarctic fish stocks. This holds true particularly for the Atlantic sector of the Antarctic. Some preliminary assessments have shown, however, that the resources seem to be limited and rather vulnerable to heavy exploitation. A recent review of biology and status of exploited Antarctic fish stocks has recently been published by SCAR (Scientific Committee on Antarctic Research) in BIOMASS Scientific Series No. 6 (1985). Fish of most species have low egg production

and show slow growth, at least when mature, so that they are already fished before reaching maturity. Furthermore, juvenile and adult fishes often inhabit the same areas, and with no mesh regulations in force, the young fish are caught together with the older fish. Nevertheless, ship and shore-based studies have produced a detailed account of the life history and biology of several species, e.g., the fish Notothenia rossii around Kerguelen or South Georgia; the larvae hatch in October or November and spend the first year offshore at depths of 5 to 50 m. In late January to mid-February the following spring, the fingerlings enter the fjords. Within a few weeks of their arrival they move near the bottom and become demersal, changing their diet and morphology. The juveniles stay within the fjords for 5 years but by the time they have attained a length of about 400 mm the majority have moved offshore to join the adult populations. Juvenile N. rossii are the dominant fish in coastal waters of less than 90 m depth. The juveniles eat mainly amphipods, isopods, other fish and algae, and euphausiid larvae in early summer. The adults feed mainly on krill, salps and young fish.

It takes also time until the losses of large fishes through fishing are replaced with the growing up of young fish. There are indications to show that fisheries exploitation have already serious effects on the fish stocks; steep decreases in catch rates, decreases in average body sizes of the fishes in the catches, changes from one major fishing ground to the next, and changing over from one major species (e.g., Notothenia rossii) to another (e.g., Champsocephalus gunnari).

Fairly reasonable statistics and other data have been submited so far only for the fisheries zone around the Kerguelen Islands. Preliminary assessments made by French scientists estimated the fish biomass around these islands for the depths between 50 and 500 m at about 130 000 t and the maximum sustainable yield at around 20 000 t. This is possibly an underestimation. However, it is much lower than the 100 000 t, or even up to 230 000 t, caught at the onset of the fishery.

For both the Atlantic and Indian Ocean sectors there is an urgent need for assessing the status of the commercially important fish stocks so as to improve the scientific basis for the consideration of adequate management measures. It appears that this important task must receive high priority now by CCAMLR.

Rather rough estimates led Soviet scientists to the assumption that the overall biomass of the fish resources in the Southern Ocean might be in the order fo 15×10^6 t. Many of these fishes are largely or almost entirely predating on krill, and the total amount of krill eaten by fish has been estimated at around 25×10^6 t annually. However, these figures should be treated with reservation since there is presently still a serious lack of knowledge. The amounts of squid and fish eaten by fish cannot yet be assessed.

Cephalopods form another important element within the ecosystem. However, much less is known about them than for fish and krill. Squid are very good swimmers, and it is rather difficult to catch them. Sampling techniques are still inadequate for the Southern Ocean and there is no commercial fishery for squid in the Antarctic.

Turning now to the **whales**, we are dealing with stocks which have been seriously reduced by man. Whaling in the Antarctic started in 1905 with a basis on South Georgia. It was however mainly after the introduction of the highly effective and mobile pelagic whaling with motherships and catching boats in 1924/25 that the large baleen whale resources were fished down one species after another.

An International Whaling Commission (IWC) was established in 1946 under the International Convention for the Regulation of Whaling in order to provide for the proper conservation of whale stocks and thus ensure the orderly development of the whaling industry. The establishment of a proper longterm management of the whale population turned out to be a very difficult task. A moratorium on whaling has been adopted recently by IWC to come into effect in 1985/86 and to be reviewed by 1990. Some countries have objected to this moratorium, and Japan and the USSR remain the only countries whaling in the Antarctic.

Seals are another component of the Antarctic ecosystem with six species. The most numerous is the crabeater seal with about 15×10^6 individuals. They are almost exclusively living on krill, and the annual consumption of krill by this species alone may be estimated at 63×10^6 t. The other five species are much less numerous and less dependent on krill.

Fur seals had been hunted since the early 19th century to near extinction but this hunting faded out until 1919, and later there was a steep increase in the populations.

Also the elephant seal, the largest seal in the Antarctic, was almost exterminated in the 19th century on South Georgia and Kerguelen Islands. Management measures restricted hunting between 1910 and 1964 to adult males only, and since then there was no harvesting. The population increased considerably over the last 50 years. Today any possible future hunting of seals can be regulated under the Convention for the Conservation of Antarctic Seals, signed in 1972.

Altogether it has been estimated that whales, seals, birds, fishes and squids consume annually at least 165×10^6 t of krill, 25×10^6 t of squid and 17×10^6 t of fish. This may still be an underestimation since the figures for the consumption by squid are not included due to the lack of knowledge. Again it is evident that the resources of krill are very large indeed.

Much remains to be done in increasing knowledge of the Antarctic marine ecosystem if rational management of a krill-fishing industry is to be achieved; programmes of research, both national and international will need to be long-term if problems are to be solved and possible trends detected. Krill fishing, with a current annual production of less than 500 000 t, is still comparatively small in scale. However, the full market for the product has yet to develop, though increasing fuel costs and other economic factors may prevent this industry suddenly booming. It is the duty of scientists (especially of the Scientific Committee on Antarctic Research, SCAR, through the BIOMASS Programme) and those funding research, through National Programmes and through the activities of the Scientific Committee of the CCAMLR, to ensure that adequate information is available both to satisfy the thirst for knowledge and to provide the basis for rational management of the Antarctic marine ecosystem (Fig.1).

GENERAL REMARKS

Algae are thallophytes, easily distinguished from higher plants by their relatively simple structure and the lack of a stem and true leaves. The term "seaweeds" does not correspond to a clearly defined taxonomic group of plants. It is applied to the larger species of marine algae, visible with the naked eye, which are attached to rocks and other substrates in littoral and infra-littoral areas, or are found floating on the sea surface.

The inclusion of the seaweeds in this publication is well-justified, despite the fact that none of the species are currently exploited within the boundaries of the fishing areas here included, in view of their considerable ecological importance and their potential for future exploitation.

Even if seaweeds do not have the enormous trophic significance of the phytoplankton in the general energy cycle of the oceans, they play a fundamental role in the coastal marine ecosystems as primary producers of organic matter, useful as food for the herbivores and, for the reintroduction of sulphur, nitrogen, phosphorus and other basic nutrients into the surrounding water as a result of bacterial action. Futhermore, they play a significant role in the purification and oxygenation of coastal waters and provide suitable habitats for a large variety of animals.

Unicellular algae may occur in all environments, even in snow and ice (i.e., species of Chlamydomonas, which are responsible for the so-called "coloured snows"), but seaweeds are only found in, or in the immediate vicinity of water. They are fixed to different kinds of inorganic substrates, especially rocks (epilithic species), but also to other plants (epiphyic species) or on animals (epizoic species). Because of their photosynthetic activity, they are obviously confined to the photic zones of the sea and hence occur only in the supra-littoral, littoral and infra-littoral zones, where they often form well-defined horizontal belts or strata, each with a typical species composition. The distribution and abundance of the various species is greatly influenced by environmental factors, particularly waves and tides, but also salinity, temperature, light conditions and substrate. Some species show a preference for dimly-lit environments, as for example Ballia callitricha which grows under the canopies of Macrocystis. The red alga Porphyra endiviifolium becomes so strongly discoloured by melting snow that it has been, until very recently, believed to belong to the genus Monostroma of the Division Chlorophyta (green algae). The development of the coastal marine vegetation is also highly variable with the seasons. In the Antarctic region, supra-littoral and littoral species may reach large sizes within a couple of months during the summer.

The biomass of seaweeds in the Antarctic and sub-Antarctic benthic communities is quite considerable, but only very few quantitative data like those for Macrocystis and Durvillea are available at present.

Studies on Macrocystis pyrifera, a commercial species regularly exploited in California, showed that there is a real potential for its exploitation in New Zealand, Tasmania, South America, and Kerguelen islands. The sea surface covered by the canopies of this species is huge, representing hundreds of km^2. Biomass data of 5.97 to 7.27 kg/m^2 and of 3.4 to 22.5 kg/m^2 (all fresh-weight) have been reported for Argentina and Kerguelen islands, respectively. At Kerguelen, a mean value of 4 kg/m^2 was obtained by collecting all individuals present in a transect of 600 m^2 (120 x 5 m). The biomass floating at the sea-surface (which represents the harvestable part) is about 30% of the total. The mean growth rate is around 2 cm/day in summer (values up to 20 cm/day are known in California).

Durvillea antarctica has been commercially exploited in New Zealand and is still being exploited in South America. In New Zealand and the Kerguelen islands, biomass values of 15 to 40 kg/m^2 (fresh-weight) are frequently obtained, with densities ranging from 20 to 100 individuals/m^2. However, as this species is restricted to a narrow belt in the intertidal zone, its total potential biomass is much less important and more difficult to harvest than that of Macrocystis.

The importance of seaweed exploitation throughout the world is rapidly increasing. A number of species are utilized as human food, especially in Japan, but also in some countries of continental Asia (i.e., Indonesia, China), in America (i.e., Mexico, Chile), and in Africa. Other traditional forms of utilization of seaweeds are fresh as cattle fodder, as meal in the preparation of animals feeds and as, agricultural fertilizers (highly effective due to their high content of trace elements). More recently, seaweeds are finding a wide range of industrial applications, among which the currently most important is the extraction of phycocolloids, in particular alginates from brown algae, and agar-agar, carrageenans, etc., from red algae. They are also increasingly used in the pharmaceutical industry, particularly for the numerous antibiotic or bacteriostatic substances they contain.

About 700 species of macroscopic benthic algae, corresponding to more or less to 300 genera, have been recorded from the Southern Ocean. Our present knowledge of Antarctic seaweeds does not allow us to set up an authoritative list of all the species that are, or may be, of interest for future exploitation. However, in the table that follows, an attempt is made to list about sixty genera liable to include species of commercial interest, on the basis of information from other parts of the world, with their distribution in different parts of the Southern Ocean and their possible utilization.

TYPES OF DISTRIBUTION AND UTILIZATION OF SEAWEEDS IN THE SOUTHERN OCEAN

ORDERS AND GENERA	BIOGEOGRAPHICAL AREAS*														TYPES OF UTILIZATION**					
	1		2					3		4			5							
	A/T/NZ	SPA	MAQ	KER	HEA	CRO	MAR	F/M	FUE	GEO	ORK	SHE	A.P.	E.A.	H	F	A	P	M	O
CYANOPHYTA NOSTOCALES																				
Spirulina and related genera	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
RHODOPHYTA BANGIALES																				
Porphyra	●	●	●	●				●	●	●	●		●		●				●	
GELIDIALES																				
Gelidium	●	●						●	●						●			●		
Pterocladia	●	●													●			●		
Suhria		●													●			●		
GIGARTINALES																				
Gracilaria	●			●				●	●	●					●		●	●		
Plocamium	●	●	●	●	●			●	●	●	●		●	●						●
Sarcodia				●						●					●					

***Biogeographical areas :** **(1)** countries north of the Polar Front: Australia including Tasmania (A/T); New Zealand including Auckland and Campbell Islands (NZ); Saint Paul and Amsterdam (SPA). **(2)** the girdle of sub-Antarctic islands: Macquarie (MAQ); Kerguelen (KER); Heard (HEA); Crozet (CRO); Marion or Prince Edward (MAR). Bouvet is omitted owing to the lack of published data. **(3)** Falkland/Malvinas Islands (F/M); Fuegia (FUE), corresponding to Chilean and Argentinian coasts south of latitude 50°. **(4)** the Scotia Arc: South Georgia (GEO); South Orkneys (ORK); South Shetlands (SHE). **(5)** the Antarctic Continent, *sensu stricto*: East Antarctica (E.A.) and the Antarctic Peninsula (A.P.)

****Types of utilization :** H = human food; F = fodder; A = agricultural fertilizers; **P** = phycocolloids; M = medical applications; O = other uses or potential still to explore.

ORDERS AND GENERA	BIOGEOGRAPHICAL AREAS														TYPES OF UTILIZATION					
	1		2					3		4			5							
	A/T/NZ	SPA	MAQ	KER	HEA	CRO	MAR	F/M	FUE	GEO	ORK	SHE	A.P.	E.A.	H	F	A	P	M	O
GIGARTINALES (cont'd)																				
Catenella								●	●						●					
Cystoclonium								●	●		●				●			●	●	
Hypnea	●	●							●						●			●	●	
Ahnfeltia			●	●		●		●	●	●					●			●		
Gymnogongrus	●							●	●				●	●	●			●		
Phyllophora			●	●														●	●	
Chondrus	●							●	●				●		●			●	●	
Gigartina	●	●	●	●				●	●				●	●				●		
Iridaea	●	●	●	●		●		●	●	●			●	●				●		
Rhodoglossum	●			●				●	●	●				●				●		
PALMARIALES																				
Palmaria	●	●		●		●	●	●	●	●				●	●	●				
Leptosomia			●	●							●		●		●					
CRYPTONEMIALES																				
Corallina (sensu lato)	●	●	●					●	●				●						●	
Lithothamnion (sensu lato)	●	●	●	●		●		●	●	●	●		●	●			●			●
Grateloupia	●	●		●		●			●						●			●		
Callophyllis	●	●	●	●	●	●	●	●	●	●	●	●	●						●	
Chaetangium	●		●	●		●		●	●	●										●

ORDERS AND GENERA	BIOGEOGRAPHICAL AREAS													TYPES OF UTILIZATION					
	1		2					3		4			5		H	F	A	P	M	O
	A/T/NZ	SPA	MAQ	KER	HEA	CRO	MAR	F/M	FUE	GEO	ORK	SHE	A.P.	E.A.						
BONNEMAISONIALES																				
Ptilonia	●		●	●		●		●	●				●						●	
CERAMIALES																				
Ballia	●	●	●	●		●	●	●	●	●			●	●						●
Callithamnion	●	●	●					●	●											●
Ceramium	●	●	●	●		●		●	●	●				●				●	●	●
Ptilota	●		●																	●
Griffithsia	●			●				●	●					●					●	
Delesseria	●	●	●	●		●		●	●	●	●								●	
Cladodonta			●	●				●	●										●	
Bostrychia	●	●	●	●				●	●	●					●					●
Chondria	●	●						●	●										●	●
Polysiphonia	●	●	●	●		●		●	●	●			●	●					●	●
PHAEOPHYTA																				
ECTOCARPALES																				
Ectocarpus (sensu lato)	●	●	●	●				●	●	●									●	●
SPHACELARIALES																				
Sphacelaria	●	●	●	●				●	●									●		
Cladostephus	●								●											●

ORDERS AND GENERA	BIOGEOGRAPHICAL AREAS															TYPES OF UTILIZATION					
	1		2					3		4			5								
	A/T/NZ	SPA	MAQ	KER	HEA	CRO	MAR	F/M	FUE	GEO	ORK	SHE	A.P.	E.A.		H	F	A	P	M	O
DICTYOTALES																					
Dictyota			●													●			●	●	
SCYTOSIPHONALES																					
Colpomenia				●															●		
Petalonia	●		●	●	●			●	●	●						●					
CHORDARIALES																					
Chordaria	●		●					●	●							●					
Splachnidium	●	●														●					
DESMARESTIALES																					
Desmarestia	●		●	●	●			●	●	●	●	●	●	●						●	
Himantothallus										●	●	●	●	●						●	
DICTYOSIPHONALES																					
Adenocystis			●	●		●		●	●	●	●	●	●						●	●	
Utriculidium				●		●		●	●	●		●									●
LAMINARIALES																					
Laminaria		●														●	●	●	●	●	
Lessonia	●		●	●	●			●	●										●		
Macrocystis	●	●	●	●		●	●	●	●	●						●	●	●	●		●

ORDER AND GENERA	BIOGEOGRAPHICAL AREAS														TYPES OF UTILIZATION					
	1		2					3		4			5							
	A/T/NZ	SPA	MAQ	KER	HEA	CRO	MAR	F/M	FUE	GEO	ORK	SHE	A.P.	E.A.	H	F	A	P	M	O
ASCOSEIRALES																				
Ascoseira										●	●	●	●					●		
DURVILLEALES																				
Durvillea	●		●	●	●	●	●	●	●	●					●		●	●	●	
FUCALES																				
Blossevillea	●																	●		
Cystosphaera												●	●					●		
CHLOROPHYTA																				
ULVALES																				
Monostroma (sensu lato)			●	●				●	●			●	●	●	●					
Enteromorpha	●	●	●	●		●		●	●	●			●	●	●	●	●		●	
Ulva	●	●	●	●		●		●	●	●					●	●	●		●	
PRASIOLALES																				
Prasiola			●	●				●	●	●			●	●	●					
ACROSIPHONIALES																				
Acrosiphonia	●	●	●	●	●	●		●	●	●		●							●	
SIPHONOCLADALES																				
Chaetomorpha	●	●	●	●					●						●					
Cladophora	●	●	●	●				●	●	●			●					●		
CODIALES																				
Codium	●		●	●				●	●						●					

THE MAIN DIVISIONS OF ALGAE

The algae were formally considered as a single natural plant group, but today their polyphyletic nature is fully recognized. They are grouped in 10 major well-differentiated Divisions of which 5 are excluded here (see footnotes). Their main diagnostic features are summarized in the following table.

Division	Pigments	Organization of plastids	Organization of nuclei	Reserve substances	Chemical composition of cell wall	Sexual reproductive cells
Cyanophyta (3 orders)	Chlorophyll **a** Plycocyanin Phycoerythrin	True plastids lacking	Procaryotic	Myxophycean starch	Lipopoly-saccharids	lacking
Rhodophyta (12 orders)	Chlorophyll **a** Phycoerythrin Phycocyanin	Archeo- or neo-plastidial structure; some genera with intraplastidial pyrenoids	Eucaryotic	Floridean starch in the cyto-plasm	Sulphated poly-saccharids, agar, carrageenans, etc.	Carpogonium with tricho-gyne Spermatium without flagella
Phaeophyta* (15 orders)	Chlorophyll **a** Chlorophyll **c** great quantity of different kinds of Xanthophyll	Generally neo-plastidial structure; pyrenoids, when present, located outside the stroma of the plastid	Eucaryotic	Laminaran dissolved in vacuoles	Alginic acid	Heterocont zoids
Euglenophyta (3 orders)	Chlorophyll **a** Chlorophyll **b**	Neoplastidial structure	Eucaryotic	Paramylon in the cytoplasm	Cell wall lacking	Heterocont cells
Chlorophyta** (15 orders)	Chlorophyll **a** Chlorophyll **b**	Archeo-, meso- or neoplastidial structure. Many genera with intraplastidial pyrenoids	Eucaryotic	Starch in side the plastids	Xylan, mannan	Isocont zoids

*There are other, closely related Divisions which are not included in this table: i.e., **Dinophyta** (6 orders), **Cryptophyta** (10 orders), **Xanthophyta** (4 orders) and **Bacillariophyta** (3 orders). They differ from the Phaeophyta by ultrastructural characteristics. They include mostly planktonic genera

A related phyllum is the Charophyta (1 order) which includes only fresh-water species. It has chlorophyll **a and **b**, plastids with grana (as in higher plants) and cell walls containing cellulose. It represents a transition towards the 3 Divisions of higher plants (**Bryophyta, Pteridophyta** and **Spermatophyta**)

Of the Divisions mentioned in the above table, only three are considered in the present work (Chlorophyta, Phaeophyta and Rhodophyta) as these are the only groups including seaweeds liable to be of potential interest to man.

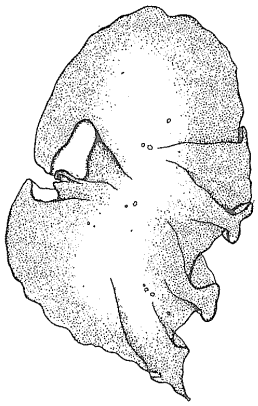
BASIC FEATURES OF SEAWEEDS, THEIR USEFULNESS FOR IDENTIFICATION PURPOSES

The correct identification of seaweeds usually requires more than the simple observation of the plant's habit. Most species, in fact, show a high degree of variation in their morphology and it is therefore necessary to complement the external observation with an examination of the structure and reproductive organs (under a magnifying glass) and in some cases even of the cytology (under a microscope). It is advisable, in cases of doubtful identification, to preserve the specimens, both in liquid fixatives and in herbaria for further, more detailed examination in the laboratory.

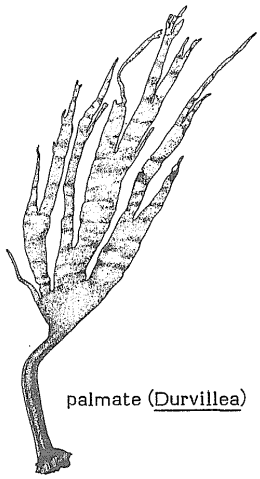
The most important general features to be considered when identifying a seaweed species are the following:

Morphology (usually verifiable without magnification).

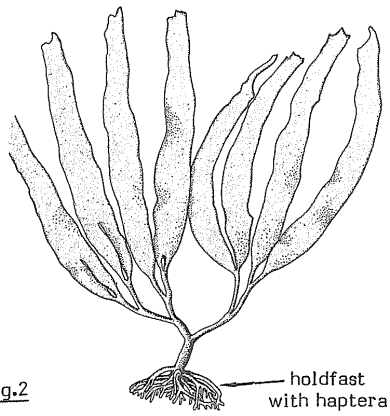
An individual seaweed or thallus is normally composed of a basal part which fixes the plant to the substrate and may have the shape of a small disc or of a more voluminous body ("holdfast" in the larger species), and of a frond which arises from this base in the form of a cylindrical or flattened "stipe" (either simple or dichotomously divided) and then expands to adopt the shape typical of the species. The shapes of the frond may be manifold, the most common ones being: foliaceous (Fig.1), palmate (Fig.2), ribbon- or blade-like (Fig.3), tubular (Fig.4), saccate (Fig.5), or filamentous (Fig.6). The frond may be entire, partially divided (for example into leafy segments) or more or less profusely branched; its margins may be smooth or toothed, and special structures (e.g., pneumatocysts) may be present in certain parts. In some species, the fixation disc is formed by corticating rhizoids, usually originating from the higher parts of the fronds.



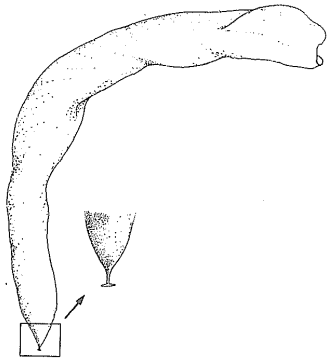
foliaceous (leaf-like) (Iridaea) Fig.1



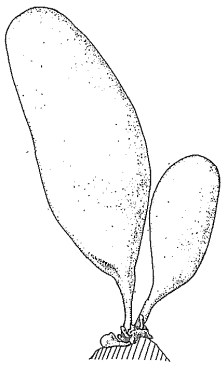
palmate (Durvillea) Fig.2



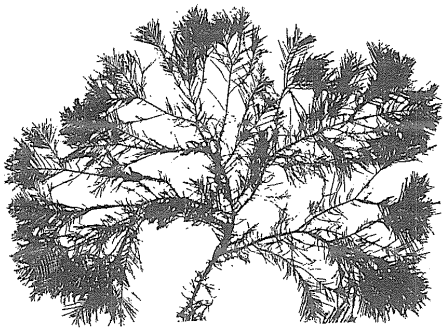
blade- or ribbon-like (Lessonia) Fig.3



tubular (Monostroma) Fig.4



saccate (Adenocystis) Fig.5



filamentous (Ballia) Fig.6

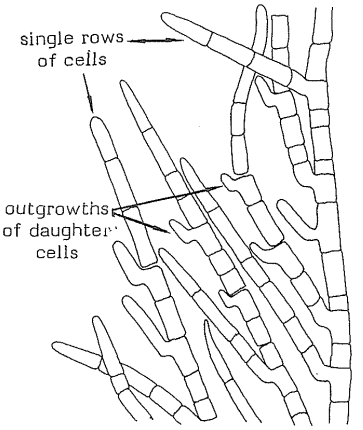
Structure and growth (usually verifiable with the help of a magnifying glass).

The structure of the thallus is closely linked to the type of growth. Basically it can be of two different types (uniaxial and multiaxial) in the evolved genera. However, the structure being often more complex and not easy to distinguish, we include here, for practical reasons, a third, "intermediate" type, characterized by a mixture of anatomical features of the other two types:

(a) uniaxial, characterized by the presence of a central axial filament formed by a single row of cells, either naked (uniseriate, e.g., Acrosiphonia, fig.7) or masked by surrounding cells (parenchymatous, e.g., Plocamium, Fig.8).

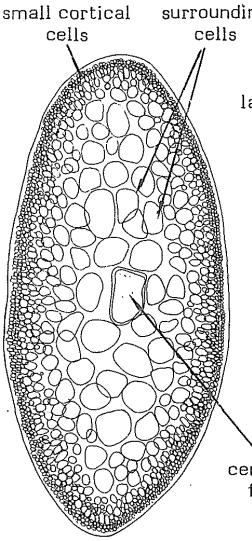
(b) intermediate, where the structure can be either relatively simple: a single layer of cells (monostromatic, e.g., Monostroma), two layers (distromatic, e.g., Ulva, Fig.10), or more complex, including a surface layer.

(c) multiaxial, where the thallus is built by numerous filaments which can also be naked or masked by other cells; in a cross section, it is possible to distinguish a surface layer, a cortex and a medulla, each with different characteristics. The medulla may be composed of large cells (e.g., Leptosomia, Fig.11) or of filamentous cells (Gigartina, Fig.12).



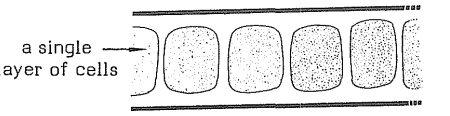
uniaxial, uniseriate structure

Acrosiphonia Fig.7



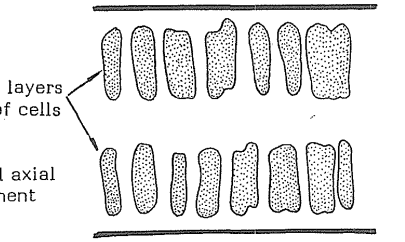
uniaxial, parenchymatous structure

Plocamium Fig.8



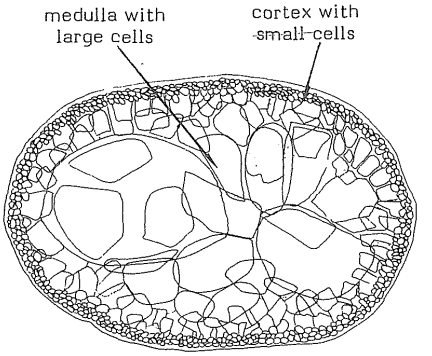
cross section of laminar part
(intermediate, monostromatic structure)

Monostroma Fig.9



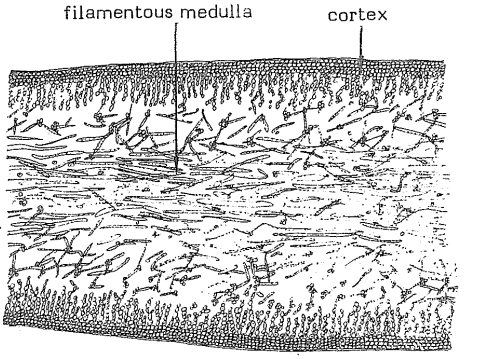
section through frond
(intermediate, distromatic structure)

Ulva Fig.10



cross section of basal part of thallus
(multiaxial structure)

Leptosomia Fig.11



longitudinal section of thallus
(multiaxial structure)

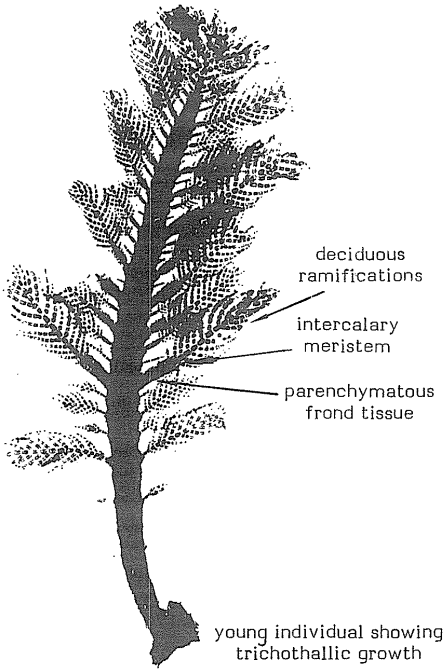
Gigartina Fig.12

The growth area is often localized in the apical region (e.g., Plocamium, Cystosphaera, Ptilonia, etc.), or it may be diffuse throughout the thallus, even if more important at the margins (e.g., Ulva).

Two special patterns must be noted in relation with the taxonomic position of the species involved:

(a) trichothallic, where intercalary meristems of young fronds give rise to small, coloured, deciduous ramifications apically and to parenchymatous frond tissue basally (e.g., Desmarestia, Himantothallus, Fig.13).

(b) sympodial, where daughter ramifications replace the mother branches which stop growing (e.g., Plocamium, Fig.14).



Desmarestia anceps Fig.13

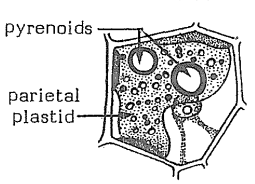
Plocamium Fig.14

Cytology (verifiable under a microscope).

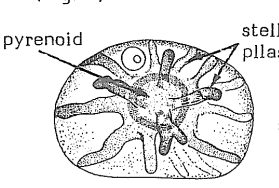
One of the most important cytological features for identification of genera and species is the type of plastidial organization of the cells, the plastids being intracellular organelles usually containing the photosynthetic apparatus. Inside the plastids sometimes there are one or more pyrenoids, specialized bodies distinct from the plastid's stroma. There are three types of plastidial organization:

(1) Archeoplastidial, where the cells contain a single plastid which may be parietal (applied against the cell wall, e.g., Ulva, fig.15) or stellate (e.g., Porphyra, Fig.16). In both cases, the plastid may or may not contain pyrenoids.

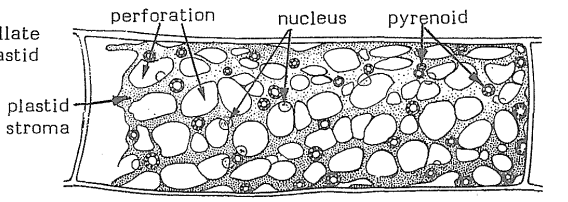
In the large cells of Acrosiphonia, the parietal plastid forms a tube which is profusely perforated and contains many pyrenoids (Fig.17).



cell of Ulva Fig.15



cell of Porphyra Fig.16

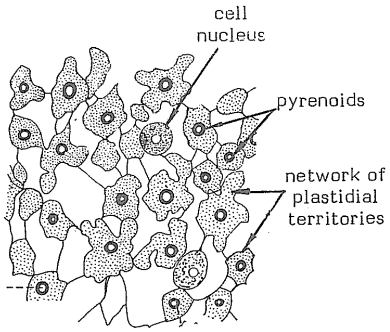


cell of Acrosiphonia Fig.17

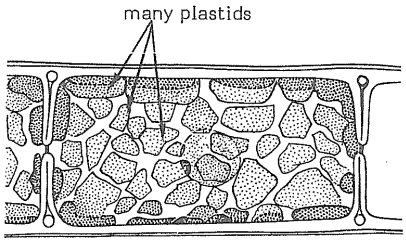
Archeoplastidial type of structure

(2) Mesoplastidial, where the cells contain a network of plastidial territories (rather than individual plastids), each of them with or without a pyrenoid (e.g., Cladophora, Fig.18).

(3) Neoplastidial, where each cell contains many separate plastids (e.g., many Rhodophyta, Fig.19).



Mesoplastidial type of structure as in Cladophora (Chlorophyta) Fig.18



Neoplastidial type of structure cell in Rhodophyta (schematic) Fig.19

Reproduction

The reproduction of seaweeds is usually sexual, but it can also be asexual (e.g., by budding). In the first case the plant undergoes a regular sexual cycle, often accompanied by an alternation of generations. As is typical of thallophytes, the fertile cells (spores and gametes) lack the usual multicellular wall that surrounds them in higher plants; also, one uses the terms gametocyst and sporocyst (rather than gametangia and sporangia) to denominate these fertile cells. The life cycle of seaweeds is unique among plants with alternate independent generations. It may include up to three such generations (trigenetic) as in many Rhodophytes, but it can also be mono- or digenetic.

The principal features of reproduction in the three major Divisions included here are the following:

(1) Chlorophyta:

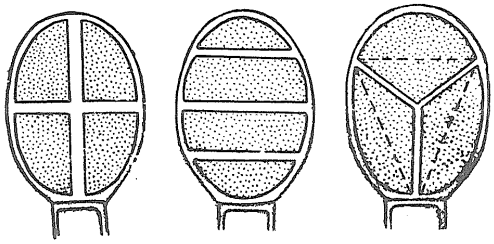
The reproductive elements are mainly biflagellate gametes and tetraflagellate spores and the life cycle is generally digenetic, the alternating generations being either isomorphic (morphologically similar, e.g., Ulva) or heteromorphic (e.g., Acrosiphonia). In the latter case the sporophyte is microscopic, unicellular, while the gametophyte is large, multicellular, filamentous and branched.

(2) Phaeophyta:

The reproductive organs of brown algae are unilocular or plurilocular cysts which liberate usually biflagellate, heterocont zoids (gametes and spores) but in some cases (Fucaceae) the female gametocyst liberates oospheres without flagella. The life cycle is usually digenetic and isomorphic, but the large kelps are digenetic and heteromorphic, and some families like the Fucaceae only have one generation (monogenetic).

(3) Rhodophyta:

The male reproduction organs or spermatocysts each liberate a single spermatia which fertilizes a female cyst or carpogonium through the trichogyne, a long, colourless hair surmounting it. The carpogonia remain on the female gametophyte. After fertilization, a carposporophyte, formed by gonimoblastic filaments (usually diploid cells) develops, either directly from the carpogonium or from an auxillary cell that receives the diploid nucleus from the carpogonium. The carposporophyte liberates carpospores which give rise to tetrasporophytes bearing the tetrasporocysts. The nucleus of the young tetrasporocysts undergoes meiosis and divides into two haploid tetraspores. According to the orientation of the meiotic axis, the type of division may be cruciate, zonate or tetrahedric (Fig. 20).



(a) cruciate (b) zonate (c) tetrahedric

principal modes of division of the tetrasporocysts Fig.20

The life cycle is trigenetic (gametophyte, carposporophyte, tetrasporophyte). The carposporophyte is always parasitic on a female gametophyte, the sterile gametophytes and tetrasporophytes are either morphologically similar (isomorphic trigenetic) or different (heteromorphic trigenetic).

GLOSSARY OF TECHNICAL TERMS

Agarophyte - Red alga used in the production of agar.

Alginic Acid - Polysaccharides from phaeoplyta. Organic acids formed from mannose and glucose rests.

Archeoplastidial structure - When there is only one plastid in each cell.

Carpogonium - Female gametocyst in the Rhodophyta. It is associated with a trichogyne and always stay on the female gametophyte.

Carpospore - Usually diploid spore produced by the carposporocyst in the Rhodophyta.

Carposporocyst - Carpospore-producing cyst derived directly or indirectly from the zygote in the Rhodophyta, through carposporophyte.

Carposporophyte - Usually diploid generation in the Rhodophyta derived from the zygote, and which forms the carpospores. It is always parasitic in female gametophyte tissue.

Carrageenan - Polysaccharide (phycocolloid) used in food industry and extracted from some red algae.

Cellulose - Polysaccharide composed of β-1,4 linked glucose molecules that forms the main skeletal framework of most algal cell walls.

Chlorophyll - Fat-soluble, green, porphyrin-type pigment.

Conceptacle - Cavity in a thallus where cysts are produced.

Cyst - (Sporocyst, gametocyst, zoidocyst) term used for all thallophytes for a cell becoming fertile.

Cystocarp - (In the Rhodophyta) the carposporophyte with the surrounding gametophytic tissue (pericarp).

Dichotomy - Division into two equal branches.

Diffuse growth - Type of growth where most of the cells in a thallus are capable of division.

Dioecious - An organism that has male and female gametes borne on separate plants.

Endolithic - Living inside rock.

Endophyte - Plant living inside another plant.

Endozoic - Living inside an animal.

Epilithic - Living on rocks.

Epiphyte - One plant living on another plant.

Epizoic - Living on an animal.

Eucaryotic - A cell having a membrane-enclosed nucleus (and a generally more evolved structure including, for example, mitochondria, discrete plastids, etc.).

Extraplastidial - Outside the stroma of the plastid but inside its envelope.

Filament - One or several rows of cells.

Floridean starch - Red algal storage product composed of α-1,4 and α-1,6 linked glucose residues.

Foliaceous (Foliose) - Leaf-like.

Gamete - Cell capable of fusion with another to form a zygote.

Gametocyst - Cell forming gametes in thallophytes.

Gametophyte - Plant generation that forms the gametes, usually haploid.

Gonimoblast - Usually diploid cells that form the carposporocysts in the Rhodophyta.

Heterokont - Having flagella of unequal length.

Heteromorphic alternation of generations - Having gametophytic and sporophytic generations of different morphology.

Holdfast - Part of an alga that attaches the plant to a substrate.

Hypha - Long, slender cell in the medulla of the Laminariales (Phaeophyta).

Intercalary - In between two cells or tissues.

Intertidal - Occurring between the low- and high-tide marks.

Intraplastidial - In the stroma of the plastid.

Laminaran - Food storage polysaccharide in the Phaeophytae composed principally of β-1,3 linked glucose residues.

Laminate - Flat.

Mannan - Polysaccharide composed of mannose residues.

Medulla - Inner part of algal thallus, usually composed of packed colourless filaments or cells.

Mesoplastidial structure - When numerous plastids are linked together to form a net in each cell (for example, in Cladophora - Chlorophyta).

Monoecious - Having male and female gametocysts borne on the same plant.

Multiaxial - Having an axis with a number of growing cells that give rise to a number of nearly parallel filaments.

Multiseriate - With more than one row of cells.

Myxophycean starch - Storage polysaccharide of the Cyanophyta, similar to glycogen.

Neoplastidial structure - Many plastids in each cell.

Oogonium - Single-celled female gametocyst containing one or more oospheres.

Paramylon - Storage polysaccharide composed of β-1,3 linked glucose molecules.

Paraphysis - Sterile structure found with cysts.

Parasite - Heterotrophic organism that derives nutrients from a living host.

Parietal - Peripheral, lying on the inner part of the cell wall.

Parthenogenetic - Germination of an egg without fertilization to form a new plant.

Phycobiliprotein or **phycobilin** - water-soluble blue-green or pink pigment in the Cyanophyta, Rhodophyta, and Cryptophyta.

Phycocolloid - Polysaccharide colloid formed by an alga.

Phycocyanin - Blue-green coloured phycobiliprotein.

Phycoerythrin - Pink-coloured phycobiliprotein.

Physode - (in the Phaeophyta, for example) inclusions associated with tannins; these phenolic compounds take a red colour with vanilin hydrochloride and blue colour with cresyl blue.

Plankton - Organisms that float aimlessly or swim too feebly to maintain a constant position against a water current.

Plastid - Double-membrane-bounded organelle usually containing the photosynthetic apparatus or some part of it.

Plurilocular - Many-chambered sporocyst in the Phaeophyta, each chamber forming one swarmer.

Pneumatocyst or **air bladder** - Expanded part of thallus containing gases.

Pore - A single hole.

Procaryotic cell - A type of cell lacking membrane-bounded organelles, especially nucleus.

Pyrenoid - Area of the plastid different from the stroma.

Receptacle - Swollen part of thallus containing conceptacles (Phaeophyta).

Rhizoid - Root-like filament without vascular tissue.

Sorus - Cluster of reproductive bodies.

Sperm or **spermotozoid** - Male gamete.

Spermatium - Male gamete in the rhodophyta (without flagellum).

Spermatocyst - Gametocyst forming male gametes.

Spore - Cell that germinates without fusing to form a new individual.

Sporocyst - Cyst forming spores.

Sporophyte - Plant that forms spores.

Starch - Storage polysaccharide composed of α-1,4 and α-1,6 linked glucose residues.

Stipe - Organ between a holdfast and a blade.

Supralittoral zone - Zone above the high-tide mark in the ocean, which receives splash during windy periods.

Swarmer - Motile cell, synonym of zoid.

Symbiosis or **reciprocal parasitism** - Two organisms living together to the mutual benefit of each.

Sympodial axis - Axis formed from successive branches in which a mother branch stops to grow while the growth of its daughter branch one continues to develop the thallus.

Taxon (plural **taxa**) - A taxonomic group.

Tetrasporocyst - A sporocyst producing four tetraspores, usually by meiosis.

Tetraspore - Spore formed in a tetrasporocyst, usually by meiosis.

Tetrasporophyte - Plant forming tetraspores in the Rhodophyta (usually diploid).

Thallophyte - Plant lacking roots, stem and leaves.

Trichogyne - Long colourless "hair" above the carpogonium that receives the spermatium in the Rhodophyta.

Trichothallic - Term describing intercalary meristem producing one or more rows of cells in one direction and the thallus in the other direction.

Uniaxial - Having a main axis consisting of a single row of usually large cells.

Unilocular sporocyst - Sporocyst composed of a single cell producing zoospores.

Uniseriate - Having a single row of cells.

Valve - Part of the cell wall in the Bacillariophyta.

Xanthophyll - A carotenoid composed of an oxygenated hydrocarbon.

Xylan - Polysaccharide composed of xylose sugar residues.

Zoid - Swarmer; it should be used in cases where the nature (gamete or spore) of the swarming cell is unknown.

Zoospore - Flagellated spore.

Zygote - Product of the fusion of two gametes.

AID TO IDENTIFICATION OF DIVISIONS AND GENERA INCLUDED HERE

Keys to the 300 or so genera occurring in the Southern Ocean would not have been practical at this time. Therefore, the keys which follow only relate to taxa described in the publication.

A. KEY TO DIVISIONS :

1. Green colour

   Starch as chief reserve substance, with intraplastidial localization (inside the plastids) (starch is stained blue-brown by iodine solution: 0.3 g I_2 added to 1.5 g KI dissolved in 100 ml water) ..... CHLOROPHYTA

2. Red colour

   Floridean starch as chief reserve substance, with cytoplasmic localization (floridean starch is stained yellow-brown-reddish by iodine solution) ..... RHODOPHYTA

3. Brown, yellow or dark colours

   No starch as reserve substance. Presence of physodes which are stained blue by cresyl blue ..... PHAEOPHYTA

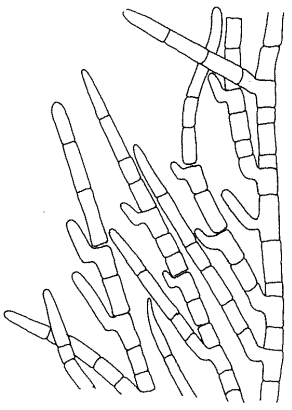
B. KEY TO GENERA IN THE DIVISION CHLOROPHYTA

1a. Frond filamentous with branched uniseriate filaments (Fig.1) ..... Acrosiphonia

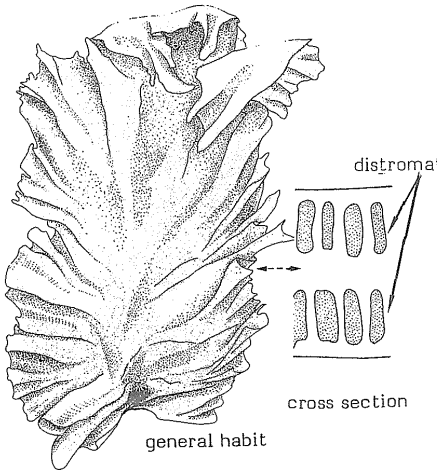
1b. Frond not filamentous

   2a. Frond foliaceous, its structure distromatic (Fig.2) ..... Ulva

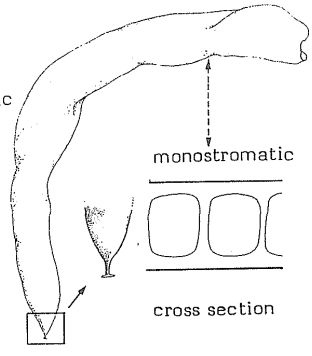
   2b. Frond foliaceous in adults, saccate in young, its structure monostromatic (Fig.3) ..... Monostroma



Acrosiphonia Fig.1



Ulva Fig.2



Monostroma Fig.3

C. KEY TO GENERA IN THE DIVISION PHAEOPHYTA:

1a. Thallus saccate, hollow (Fig.1)..... Adenocystis
Utriculidium

1b. Not as in 1a

2a. Thallus with a large, palmate lamina, frequently ending in ribbon-like segments; structure of adult parts of frond honeycombed. Stipe cylindrical; a massive globose holdfast without haptera (Fig.2) ..... Durvillea

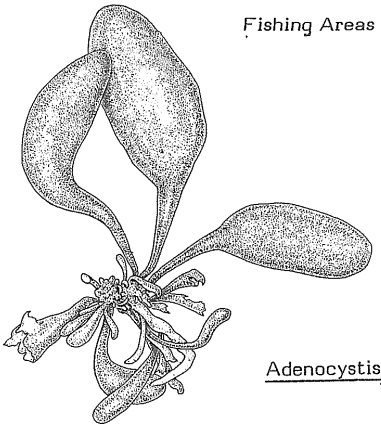
2b. Not as in 2a

3a. Thallus huge, consisting of several fronds (generally over 10 m long), formed by a long cylindrical stipe bearing lanceolate blades, each with a basal pneumatocyst. Thallus fixed on the bottom by a large holdfast with well developed, cylindrical haptera (Fig.3)..... Macrocystis

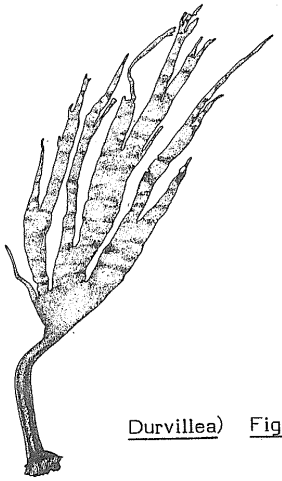
3b. Not as in 3a

4a. Thallus with leaf-like, falciform expansions disposed bilaterally in one plane. Pedicellate pneumatocysts present at axils of these expansions (Fig.4) ..... Cystosphaera

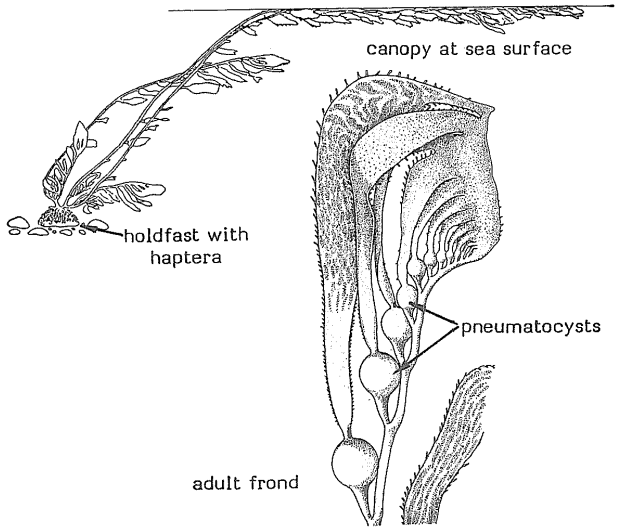
4b. Not as in 4a



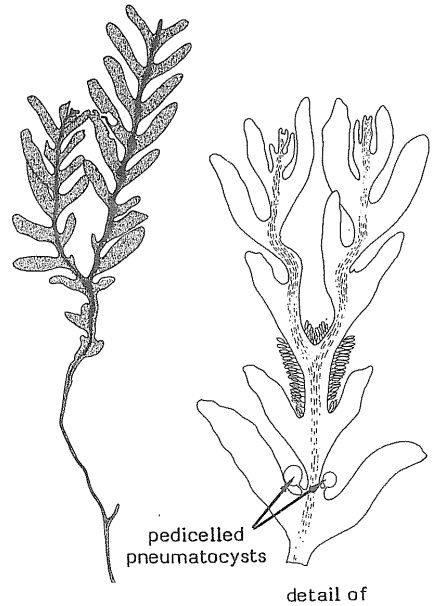
Adenocystis Fig.1



Durvillea) Fig.2



Macrocystis Fig.3



Cystosphaera Fig.4

5a. Thallus with lanceolate blades prolonging the dichotomously branched stipes; holdfast with haptera (Fig.5) ..... Lessonia

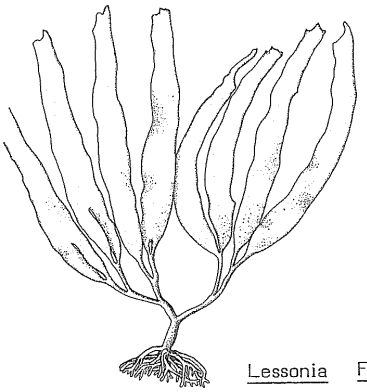
5b. Not as in 5a

6a. Thallus with elongated band-like laminae; stipe rather short, more or less dichotomously branched. Reproductive bodies in conceptacles scattered on the laminae (Fig.6) ..... Ascoseira

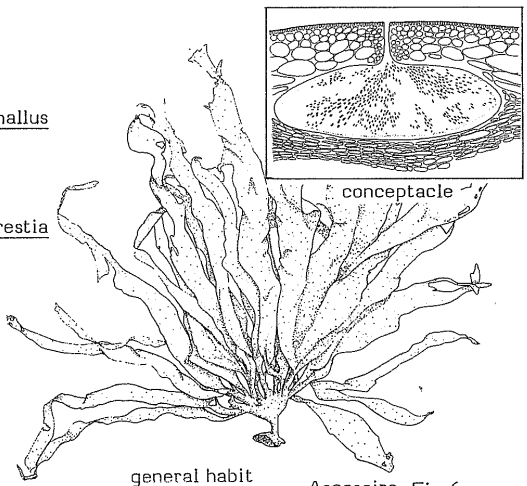
6b. No conceptacles on laminae; habit very different from 6a except for old individuals of Himantothallus. Morphology of thallus highly variable, but with the same basic uniaxial type of structure (sometimes only visible in the young apex undergoing trichotallic growth with an intercalary meristem; Fig.7). Holdfast with haptera more or less flattened and branched

7a. Thallus with blades (Fig.8) .....Himantothallus

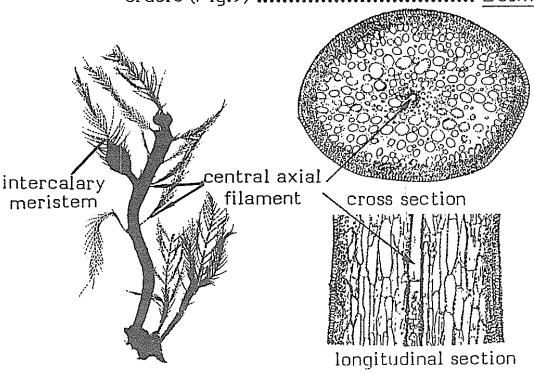
7b. Thallus filamentous, cylindrical or compressed, branched to up to 5 or 6 orders (Fig.9) ..... Desmarestia



Lessonia Fig.5

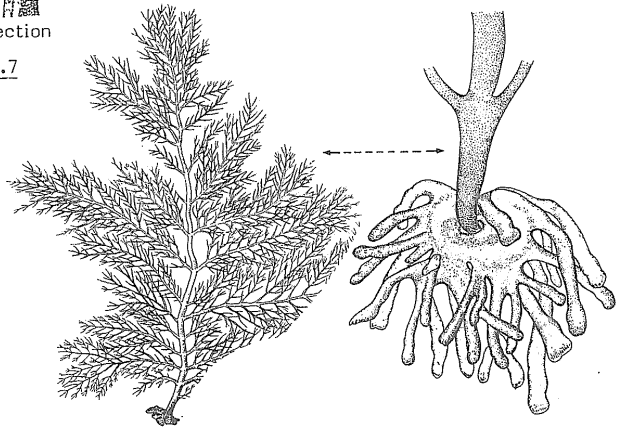


Ascoseira Fig.6



trichothallic growth Fig.7

Himantothallus Fig.8



Desmarestia Fig.9

D. KEY TO GENERA IN THE DIVISION RHODOPHYTA:

1a. Thallus cylindrical, saccate, branching dichotomously; internal cavity more or less filled with mucilage (Fig.1) ..... Chaetangium

1b. Not as in 1a

2a. Thallus foliaceus, formed of flaccid fronds without midribs, its structure monostromatic (Fig.2) ..... Porphyra

2b. Not as in 2a

3a. Thallus foliaceous, formed of leaf-like parts with midribs and paired lateral veins (Fig.3) ..... Cladodonta

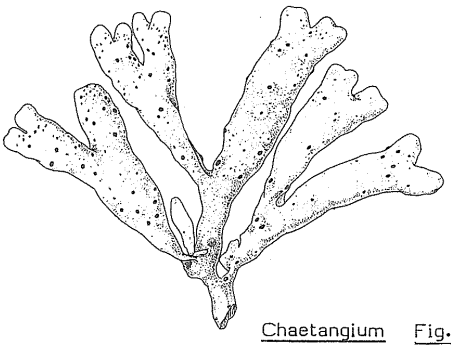
3b. Not as in 3a

4a. Thallus foliaceous, formed of membraneous, lanceolate fronds; medulla with large, unpigmented cells (Fig.4)..... Leptosomia

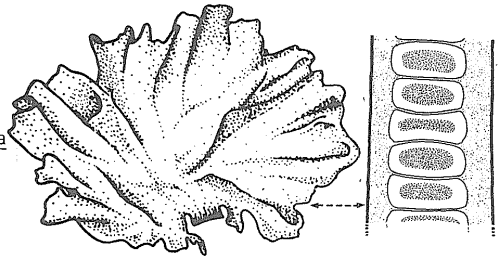
4b. Not as in 4a

5a. Thallus foliaceous, coriaceous; medulla with interwoven filaments (Fig.5) ..... Gigartina Iridaea

5b. Not as in 5a



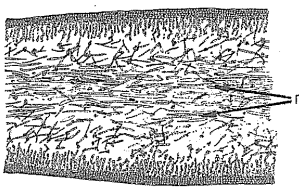
Chaetangium Fig.1



general habit cross section

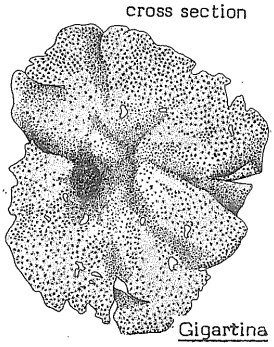
Porphyra Fig.2

Cladodonta Fig.3



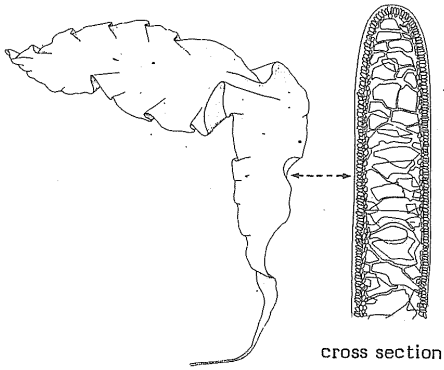
medullary filaments

cross section



Gigartina

Iridaea Fig.5



cross section

Leptosomia Fig.4

6a. Thallus not foliaceous, but flattened; type of branching more or less palmate or dichotomous; medulla with large cells interspearsed with small ones (Fig.6) ..... Callophyllis

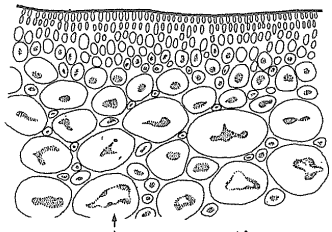
6b. Not as in 6a

7a. Thallus filamentous, formed by uniseriate rows of cells; type of branching distichous (Fig.7) ..... Ballia

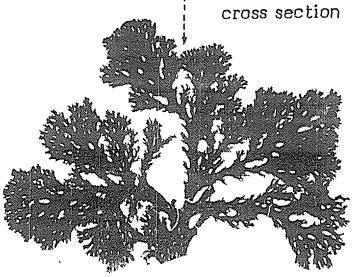
7b. Thallus compressed, formed of parenchymatous tissue

8a. Type of branching sympodial (Fig.8) .... Plocamium

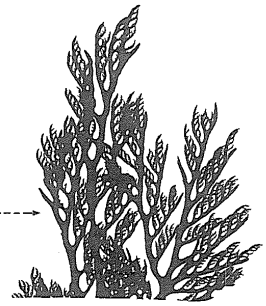
8b. Type of branching not sympodial (Fig. 9) ..... Ptilonia



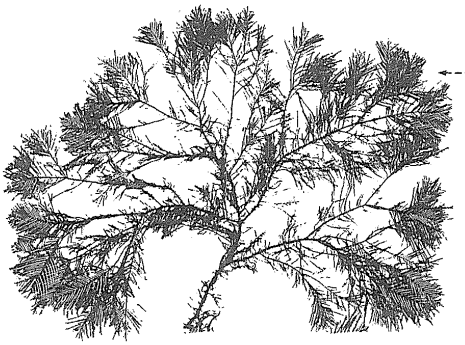
cross section



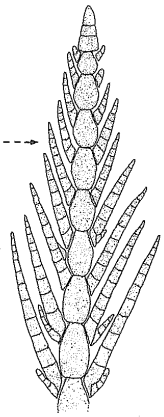
general habit Callophyllis Fig.6



detail showing sympodial type of branching

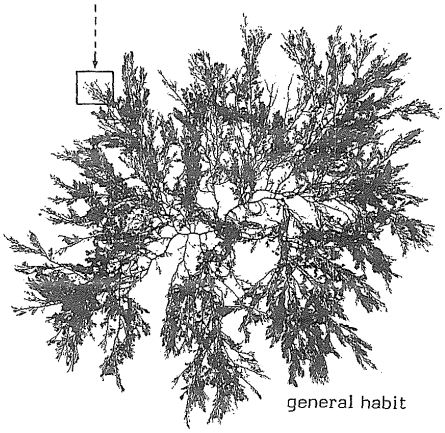


general habit



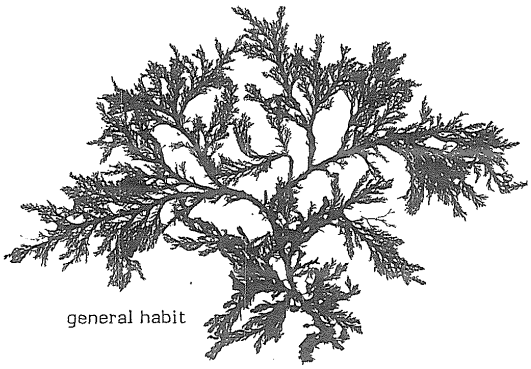
distichous branching

Ballia Fig.7



general habit

Plocamium Fig.8



general habit

Ptilonia Fig.9

FAO Sheets SEAWEEDS Fishing Areas 48,58,88

LIST OF SPECIES DESCRIBED ON IDENTIFICATION SHEETS

DIVISION CHLOROPHYTA	
ULVACEAE	CH ULV
Ulva lactuca Linnaeus	CH ULV Ulva 1
MONOSTROMATACEAE	CH MON
Monostroma hariotii Gain	CH MON Mono 1
ACROSIPHONIACEAE	CH ACR
Acrosiphonia pacifica (Montagne) J.Agardh	CH ACR Acro 1
DIVISION PHAEOPHYTA	
DESMARESTIACEAE	PH DES
Desmarestia anceps Montagne	PH DES Desm 1
Desmarestia chordalis Hooker & Harvey	PH DES Desm 2
Desmarestia willii Reinsch	PH DES Desm 3
Himantothallus grandifolius (A. & E.S. Gepp) Zinova	PH DES Hima 1
PUNCTARIACEAE	PH PUN
Adenocystis utricularis (Bory) Skottsberg	PH PUN Aden 1
Utriculidium durvillaei (Bory) Skottsberg	PH PUN Utri 1
LESSONIACEAE	PH LES
Lessonia flavicans Bory	PH LES Les 1
Macrocystis pyrifera (Linnaeus) C. Agardh	PH LES Mac 1
ASCOSEIRACEAE	PH ASC
Ascoseira mirabilis Skottsberg	PH ASC Ascos 1
DURVILLEACEAE	PH DUR
Durvillea antarctica (Chamisso) Hariot	PH DUR Durv 1
FUCACEAE	PH FUC
Cystosphaera jacquinotii (Montagne) Skottsberg	PH FUC Cyst 1
DIVISION RHODOPHYTA	
BANGIACEAE	RH BAN
Porphyra endiviifolium (A. & E.S. Gepp) Chamberlain	RH BAN Por 1
KALLYMENIACEAE	RH KAL
Callophyllis variegata (Bory) Kützing	RH KAL Callop 1
PLOCAMIACEAE	RH PLO
Plocamium cartilagineum (Linnaeus) Dixon	RH PLO Ploca 1
GIGARTINACEAE	RH GIG
Gigartina skottsbergii Setchell & Gardner	RH GIG Giga 1
Iridaea cordata (Turner) Bory	RH GIG Irid 1
PALMARIACEAE	RH PAL
Leptosomia simplex (A. & E.S. Gepp) Kylin	RH PAL Lepto 1
CHAETANGIACEAE	RH CHA
Chaetangium fastigiatum (Bory) J.Agardh	RH CHA Chae 1
BONNEMAISONIACEAE	RH BON
Ptilonia magellanica (Montagne) J.Agardh	RH BON Ptil 1
CERAMIACEAE	RH CER
Ballia callitricha (C.Agardh) Kützing	RH CER Bal 1
DELESSERIACEAE	RH DEL
Cladodonta lyallii (Hooker & Harvey) Skottsberg	RH DEL Cladod 1

Prepared by R. Délépine, A. Asensi (Biogéographie et Ecologie Benthiques, Université P. et M. Curie, Paris, France) and H. Etcheverry (Instituto de Oceanología, Universidad de Valparaíso, Viña del Mar, Chile)

CH ACR Acro 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ACROSIPHONIACEAE

FISHING AREAS 48,58,88 (Southern Ocean)

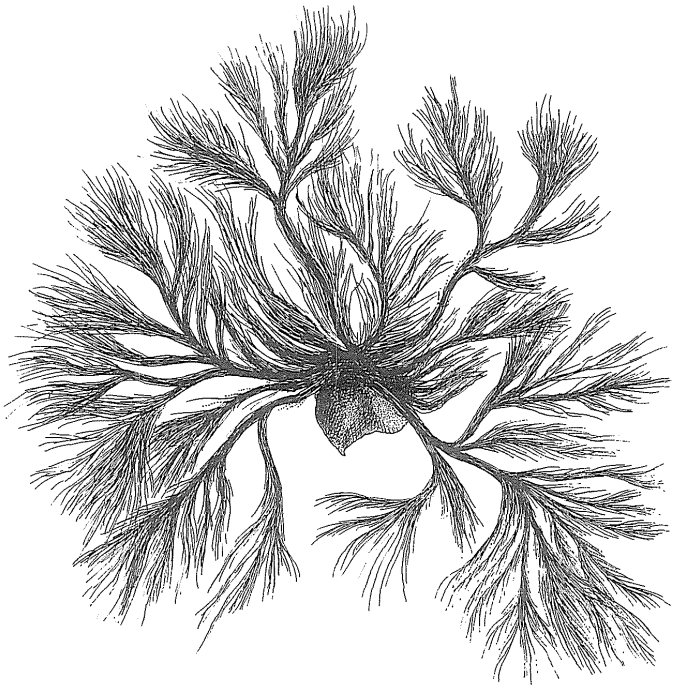
Acrosiphonia pacifica (Montagne) J. Agardh in Hohenacker, 1857

OTHER SCIENTIFIC NAMES STILL IN USE : Spongomorpha pacifica (Montagne) Kützing
Acrostiphonia arcta (Dillwyn) J. Agardh in Hohenacker, 1853

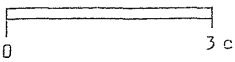
VERNACULAR NAMES :

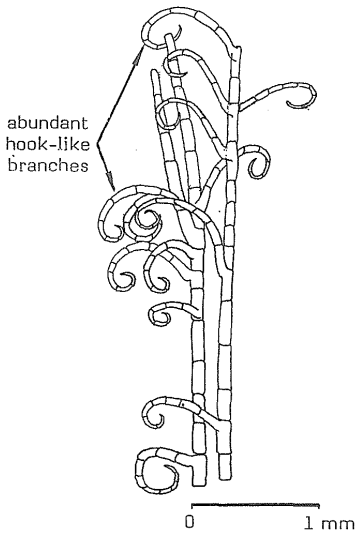
FAO/CCAMLR : En - Pacific Acrosiphonia
Fr - Acrosiphonie du Pacifique
Ru -
Sp - Acrosifonia del Pacífico

NATIONAL :



general habit of adult gametophyte





old part of thallus

MORPHOLOGY : Light green when young, but darker, with many epiphytes, when old. Frond of filamentous type, with many branches. Special spiny or hook-like branchlets more or less abundant, depending on age, ecological conditions, etc. Fixation by multicellular rhizoids developed from many cells above the base. Specimens described as A. arcta in this region are considered as developmental stages.

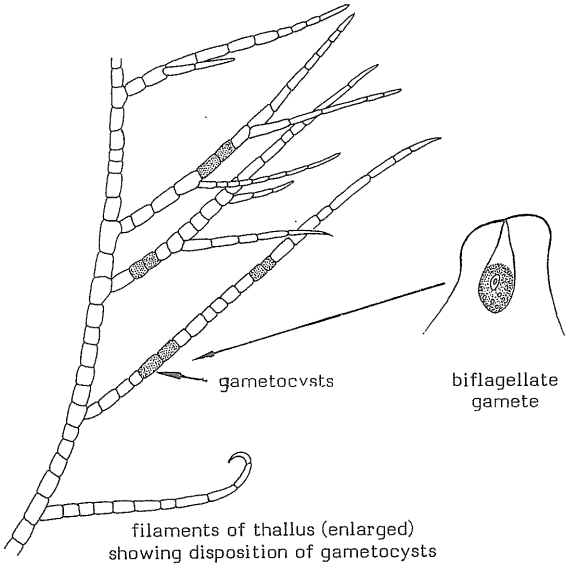
STRUCTURE AND GROWTH : Structure of uniaxial type, with apical, but also intercalary, growth. Bases of branches initiate and remain at right angles to the mother branch (i.e., no evection). The germling undergoes a creeping, ramified, filamentous stage before the main axis develops.

CYTOLOGY : Archaeoplastidial type; a single parietal, perforated plastid with many polypyramidal pyrenoids. The plastidial organization superficially resembles the Cladophorales type.

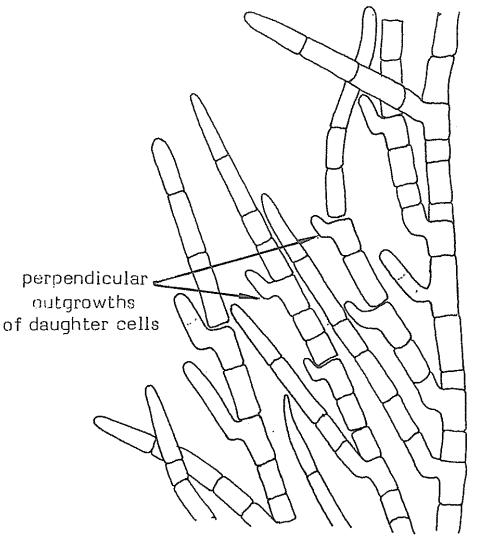
REPRODUCTION : The complete life cycle of this species is not yet known but, based on observations on European Acrosiphonia, it is probably digenetic heteromorphic, with alternance of a gametophyte as described above and a unicellular sporophyte which can be epilithic or parasitic (Codiolum or Chlorochytrium types). In the European species, gametes from Acrosiphonia are biflagellate and zoospores from Codiolum are quadriflagellate.

SIMILAR SPECIES OCCURRING IN THE AREA :

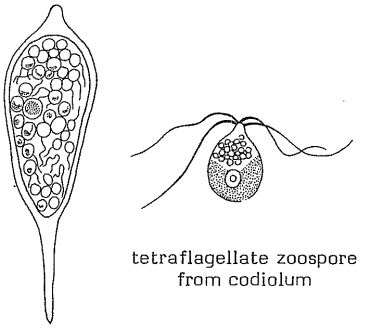
Some Cladophorales species: bases of branches also initiate at right angles to the mother branch, but rapidly become oblique (evection); the germling does not pass through a creeping stage before the main axis develops; mesoplastidial organization, with lenticular pyrenoids.



filaments of thallus (enlarged) showing disposition of gametocysts in European species of Acrosiphonia



characteristic type of branching



tetraflagellate zoospore from codiolum

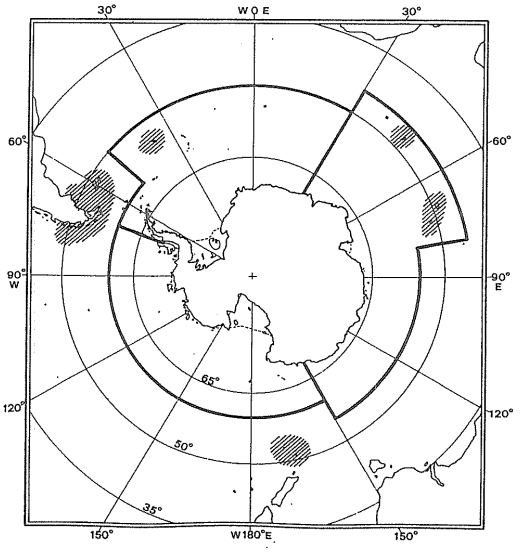
unicellular sporophyte (codiolum stage) from other species of Acrosiphonia

SIZE : The thallus reaches about 10 cm in length; the Codiolum to about 1 mm.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego and Falkland/Malvinas, South Shetland, South Georgia, Crozet, Kerguelen, Heard, Macquarie, Auckland and Campbell islands.

ECOLOGY : Found on rocks and in pools in the upper part of the intertidal zone.

UTILIZATION : Experimental tests suggest that this species might be of potential use in the pharmaceutical industry.



CH MON Mono 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MONOSTROMATACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

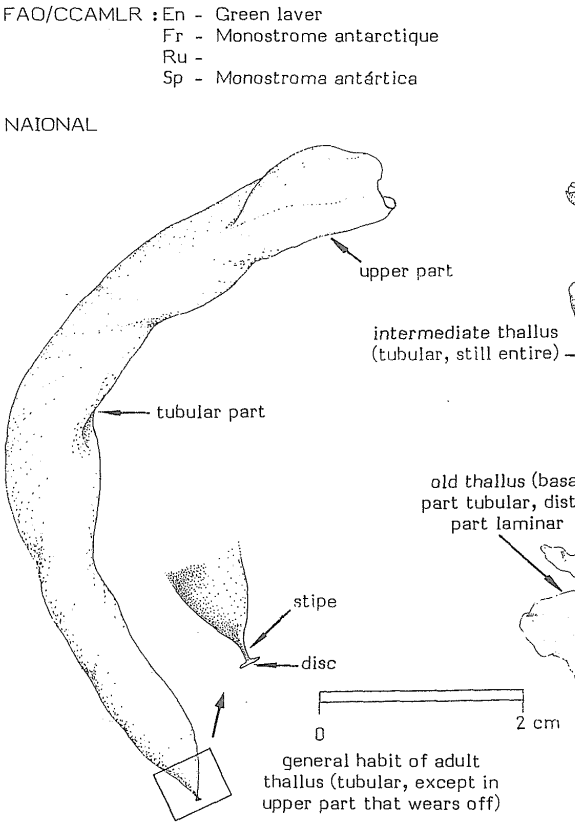
Monostroma hariotii Gain, 1911

OTHER SCIENTIFIC NAMES STILL IN USE : None

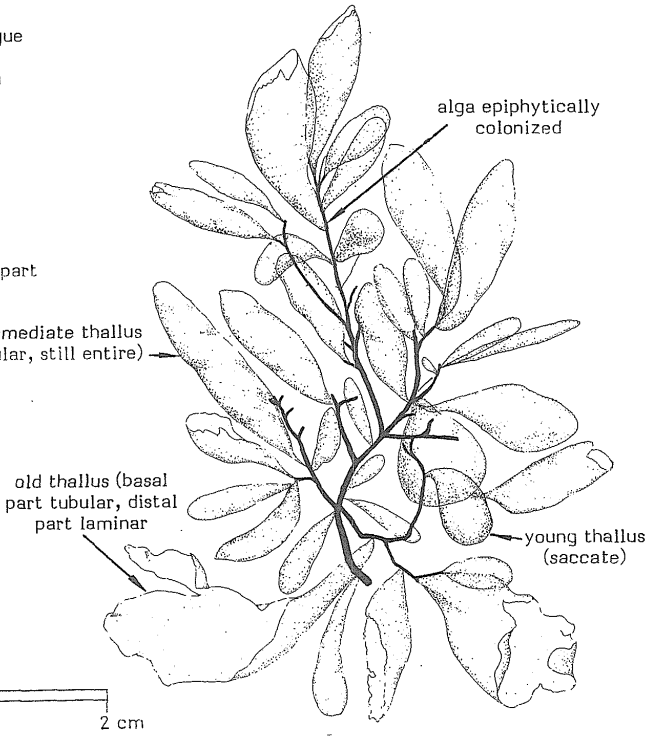
VERNACULAR NAMES :

FAO/CCAMLR : En - Green laver
Fr - Monostrome antarctique
Ru -
Sp - *Monostroma antártica*

NAIONAL

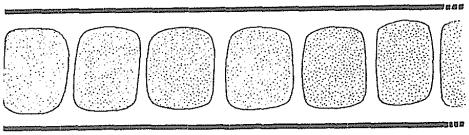


general habit of adult thallus (tubular, except in upper part that wears off)



individuals of different age growing epiphytically on another alga

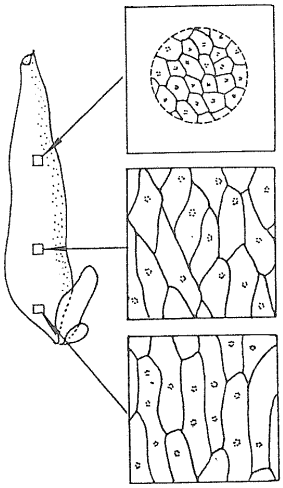
MORPHOLOGY : Frond bright green, first sack-like, then tubular; upper parts of mature thalli often wearing off progressively, but the basal part remaining tubular; base of frond attenuated as a stipe. Texture soft, cavity of thallus very large.



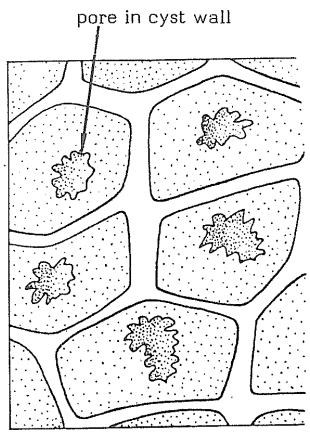
cross section of monostromatic laminar part of thallus

STRUCTURE AND GROWTH : Wall of tubular thallus monostromatic, about 30 µm thick. Basal cells with rhizoids forming the fixation disc.

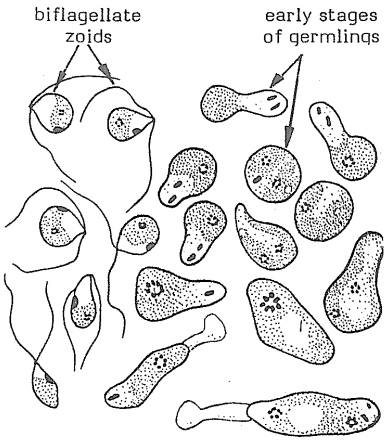
CYTOLOGY : Cells not in a particular pattern in the middle of the frond, but more or less arranged in rows in the upper parts. They measure about 10 x 5 µm in surface view, and 25 x 12 µm in cross section; cells with a parietal plast (archeoplastidial type), with a single pyrenoid.



enlarged surface view of cells from different parts of thallus



enlarged surface view of zoidocysts with pores



zoids and their germlings

REPRODUCTION : Biflagellate zoids (6 x 4 µm in diameter) are born in cysts localized in the fertile upper parts of the thallus. They are ejected through an irregular pore of the cyst. Only the earliest developmental stages of these zoids are known.

SIMILAR SPECIES OCCURRING IN THE AREA :

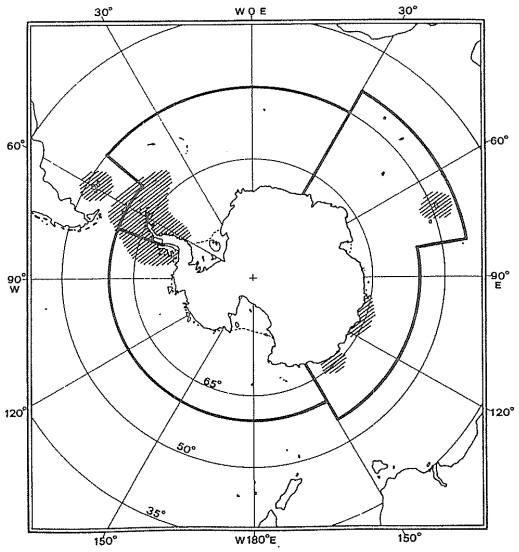
Enteromorpha species: also of tubular shape, but fronds never wearing off as laminae. Texture more rigid and cavity of thallus smaller.

SIZE : The thallus may reach 30 cm in length and 5 cm in width.

GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula, Adelie coast, Wilkes Land, and Falkland/ Malvinas, South Shetland and South Orkney islands.

ECOLOGY : Found on rocks and in pools in the intertidal zone.

UTILIZATION : Other species of this genus are used for human consumption in Japan, together with Porphyra.



CH ULV Ulva 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ULVACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

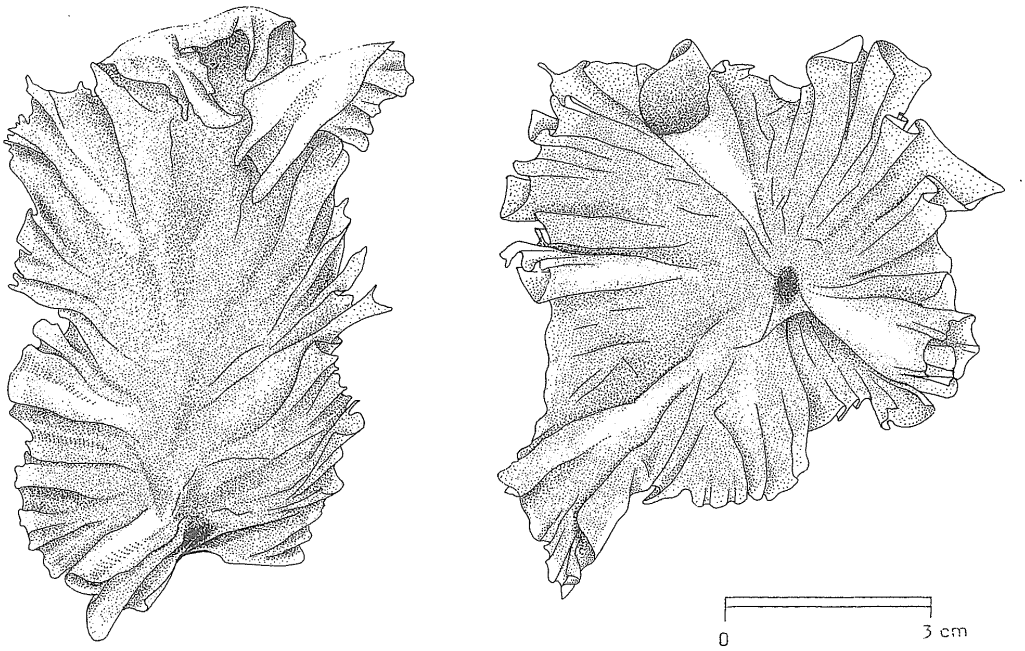
Ulva lactuca Linnaeus 1753

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

FAO/CCAMLR : En - Sea lettuce
Fr - Laitue de mer
Ru -
Sp - Lechuga de mar

NATIONAL :

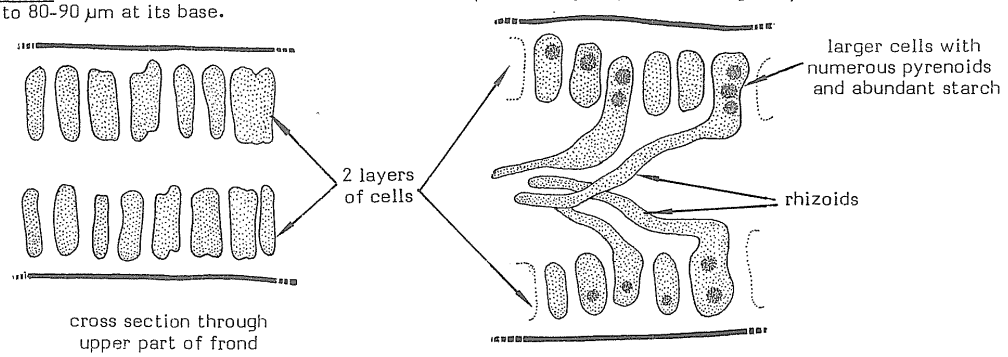


general habit

MORPHOLOGY : Ulva lactuca, like many other species of the genus, has a green foliaceous thallus in the form of large laminae. Its shape is highly variable, more or less laciniate or palmate, sometimes with big perforations.

Although the genus Ulva is very common in many of the world's oceans, the taxonomy of its species still presents considerable difficulties, and detailed studies of Antarctic material are urgently needed. According to Bliding, the most important diagnostic characters are **a)** the thickness of the thallus in different parts of the lamina (especially at the margin of the upper part, in the centre and at the base of the frond), **b)** the arrangement and size of the cells, **c)** the number of pyrenoids, and **d)** the mode of reproduction (ascertained by cross breeding and culture).

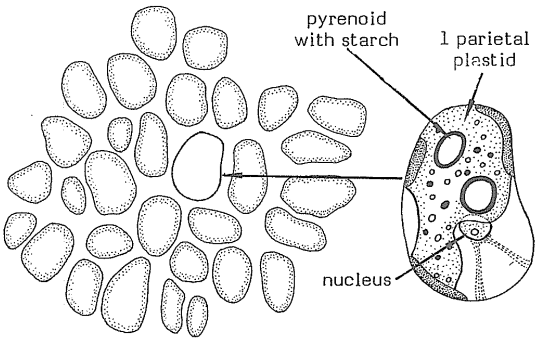
STRUCTURE AND GROWTH : The structure is distromatic (2 adjacent layers of cells) as is clearly shown in cross sections. However, germlings are distinctly uniseriate and become hollow before reaching their final distromatic stage. The fixation disc is formed by mulinucleate rhizoids coming from many cells of the basal part. These cells are rich in starch reserves. Growth is diffuse, but in young thalli it is greater at the margins. In Ulva lactuca, the thickness of the thallus varies from 50 µm in the young parts through 60 µm in the middle of the frond to 80-90 µm at its base.



cross section through
upper part of frond

cross section through
basal part of frond

CYTOLOGY : In Ulva lactuca, the mostly rectangular cells are relatively well arranged in slightly curved rows and measure 18 x 12 µm in surface view. Each cell has one large parietal plastid (archaeoplastidial type), generally bearing 1 pyrenoid. However, there may be a greater number of pyrenoids in the rhizoidal cells.



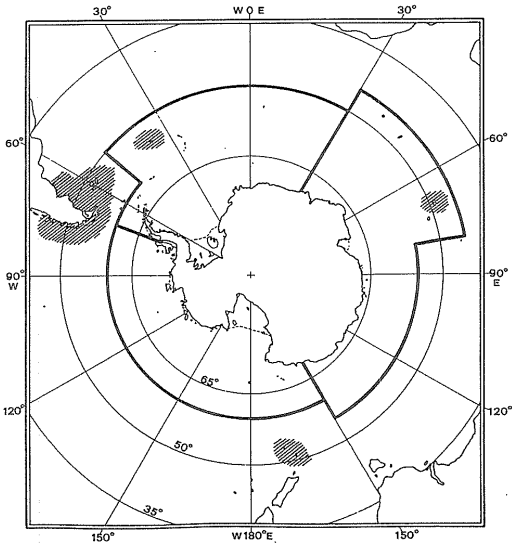
surface view showing
arrangement of cells

plastidial organization
of cell (surface view)

REPRODUCTION : The life-cycle is digenetic isomorphic, with alternation of sporophytes and dioecious gametophytes. Biflagellate gametes show a marked anisogamy (6.8 x 2.1 µm for the male, and 7.6 x 3.6 µm for the female). Quadriflagellate zoospores measure 10 x 6 µm. The tubular stage remains until the plant is about 3 to 4 mm high.

SIZE : The thallus may reach 1 m in length, particularly in specimens inhabiting waters of variable salinity.

GEOGRAPHICAL DISTRIBUTION : Specimens of the genus Ulva are recorded from Tierra del Fuego and Falkland/Malvinas, South Georgia, Macquarie, Kerguelen, Crozet, Auckland and Campbell islands.



ECOLOGY : This plant grows in environments of varying salinity. It can develop quite rapidly in nutrient-rich waters and is therefore particularly common in areas subjected to organic pollution.

UTILIZATION : Some species are used for human consumption, but they may have a much greater potential use as animal feeds, particularly in the form of ground meal.

PH ASC Ascos 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ASCOSEIRACEAE

FISHING AREAS 48,58,88 (Southern Ocean)

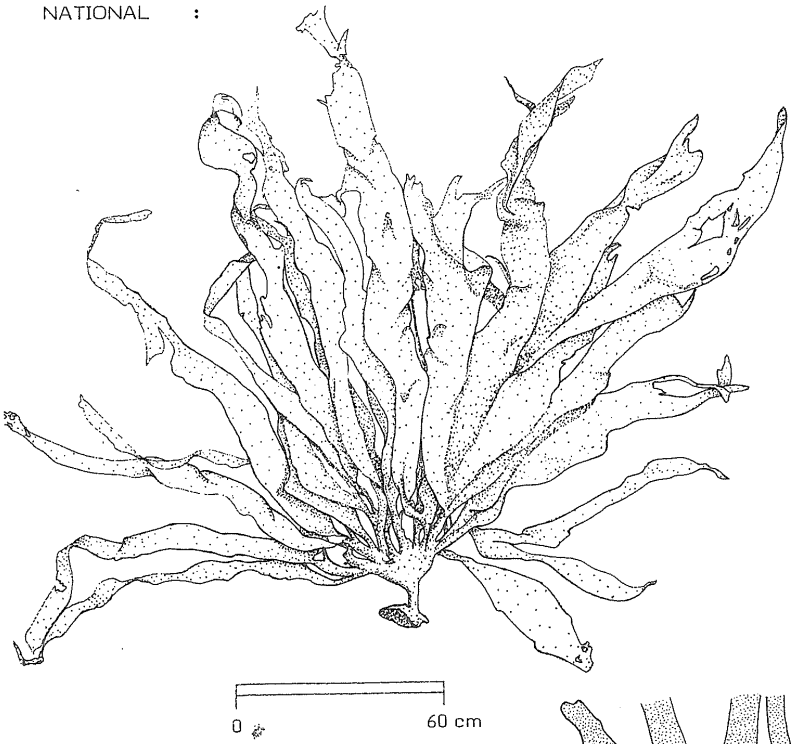
Ascoseira mirabilis Skottsberg, 1907

OTHER SCIENTIFIC NAMES STILL IN USE : None

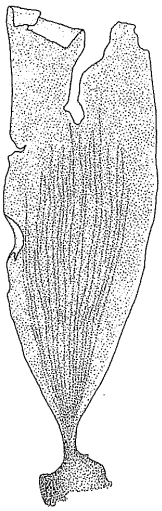
VERNACULAR NAMES :

FAO/CCAMLR : En - Ascoseira
Fr - Ascoseire
Ru -
Sp - Ascoseira

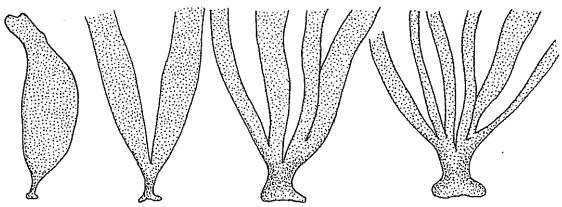
NATIONAL :



general habit



young plant
(2 cm long)



evolution of basal part of thallus with age

MORPHOLOGY : Thallus large, consisting of lanceolate, linear blades arising palmately from a short, flattened, dichotomously branched stipe; holdfast discoid. The colour is dark greenish brown in live specimens and reddish-brown in dried ones, with minute longitudinal striations.

STRUCTURE AND GROWTH : The structure is of multiaxial type. A cross section shows a medullary layer of interwoven filaments, a parenchymatous cortex composed of several cell layers, and 1 or 2 surface layers of small and pigmented cells.

Growth apparently of intercalary type (each blade with a basal meristem), but measurements of growth have not yet been made.

CYTOLOGY : Neoplastidial type; plastids are discoidal, parietal, without pyrenoids.

REPRODUCTION : The frond bears numerous dispersed conceptacles extending entirely over both surfaces, and opening through a canal ending in a pore or ostiole. In the conceptacles, growing chains of reproductive organs (zoidocysts), fragment into 8 ovoid or ellipsoid elements, each of which becomes a zoid. The zoids germinate without fusion, giving rise to young plants.

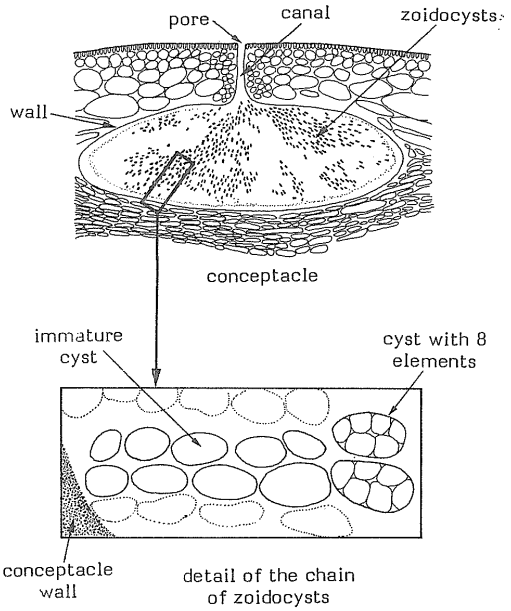
The interpretation of the life-cycle is still under discussion.

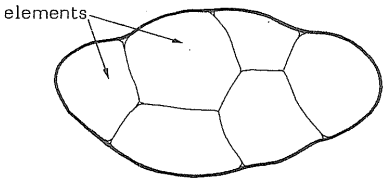
SIZE : Thallus reaching to 4 m in length; blades to 1 m long and 10 cm broad; holdfast attaining about 20 cm in diameter.

GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula and South Shetland, South Orkney, South Georgia and South Sandwich islands.

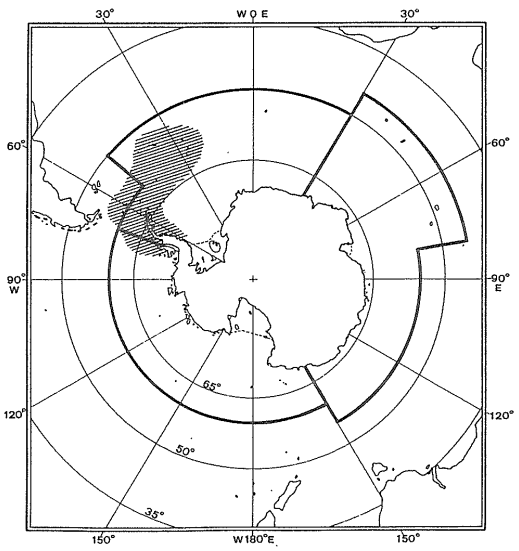
ECOLOGY : Occurs in the upper infra-littoral zone, to about 13 m depth.

UTILIZATION : In view of its intermediate systematic position between the Fucales and the Laminariales, this species might contain chemical compounds from both these orders, which could be of commercial interest.





detail of zoidocyst



PH DES Desm 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DESMARESTIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

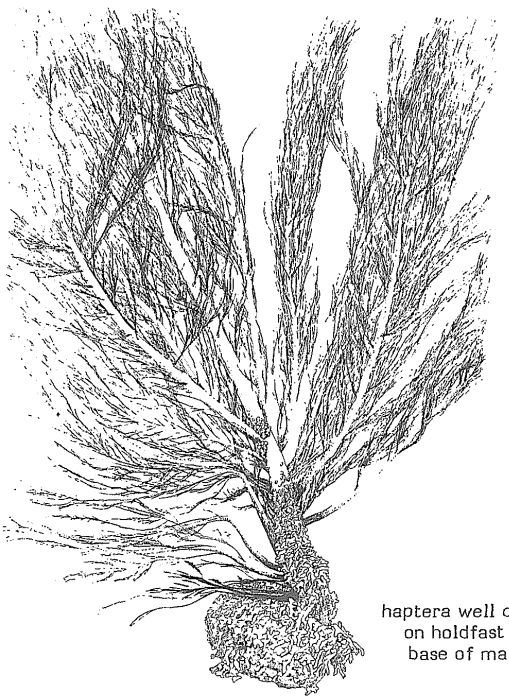
Desmarestia anceps Montagne, 1842

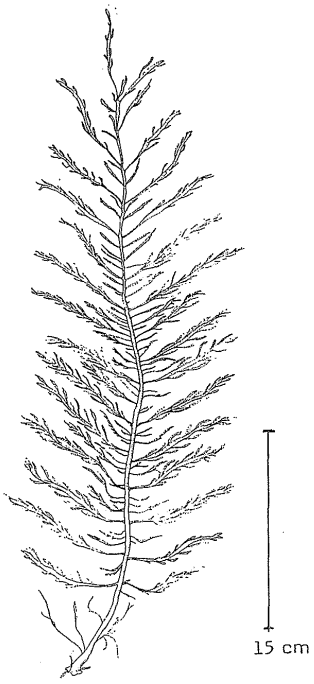
OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

FAO/CCAMLR : En - Largefoot desmarestia
Fr - Desmarestia à large crampon
Ru -
Sp - Desmarestia de grampón bulboso

NATIONAL :





MORPHOLOGY : Thallus large, emerging from a massive, subglobular holdfast as a flattened main axis giving off lateral narrow, flattened ramifications beset with primarily opposite smaller branches of second and third order. The smallest branchlets are distinctly flattened in the middle part and more or less cylindrical at their base and apex.

STRUCTURE AND GROWTH : Structure of uniaxial type. A cross section shows a large central axial filament surrounded by small and hypha-like cells, a cortex of parenchymatous cells, and a superficial layer of small pigment cells.

Growth of trichothallic type. The intercalary meristems of young fronds give rise to small, coloured, deciduous ramifications in one direction and to parenchymatous frond tissue in the opposite direction.

CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.

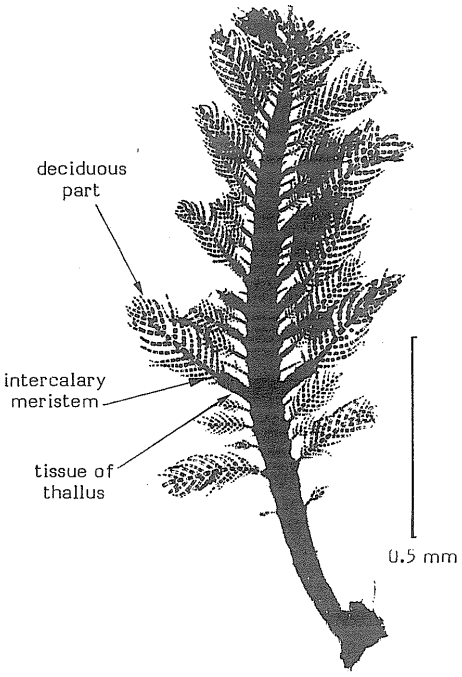
REPRODUCTION : Unilocular sporocysts are generated on the surface of the vegetative branches. The lifecycle is digenetic heteromorphic, with alternation of a large sporophyte and a microscopic gametophyte.

SIZE : Thallus reaching 3 to 4 m in length; main branches to about 3 cm in diameter; holdfast to 30 cm wide.

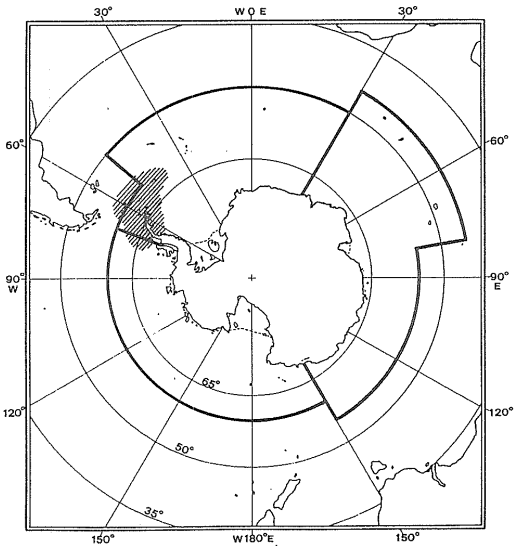
GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula and South Shetland and South Orkney islands.

ECOLOGY : Found in patches in the middle part of the infra-littoral zone, to about 30 m depth.

UTILIZATION : The tissue of this plant is conspicuously acid (pH=1). Its possible application in the pharmaceutical industry should be explored.



young individual clearly showing trichothallic growth



PH DES Desm 2
1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DESMARESTIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

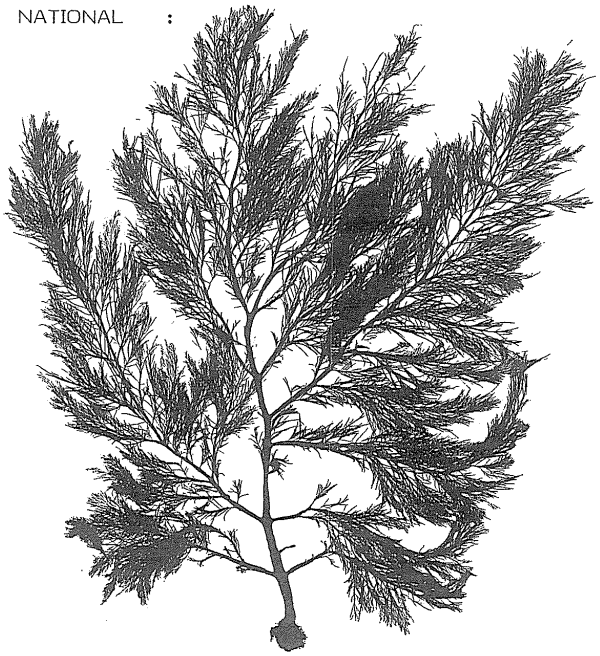
Desmarestia chordalis Hooker & Harvey, 1845

OTHER SCIENTIFIC NAMES STILL IN USE : Desmarestia rossii Hooker & Harvey, 1845 (young plant)

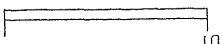
VERNACULAR NAMES :

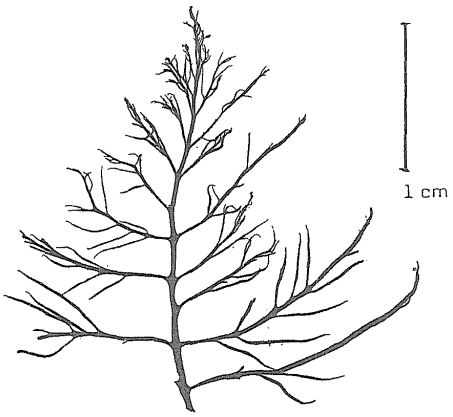
FAO/CCAMLR : En - Striped desmarestia
Fr - Desmarestia à rubans
Ru -
Sp - Desmarestia bandeada

NATIONAL :

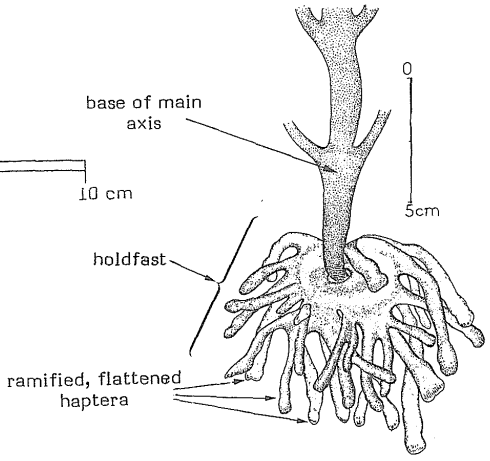


general habit of young individual
(Form D. rossii)





enlarged ultimate
ramifications

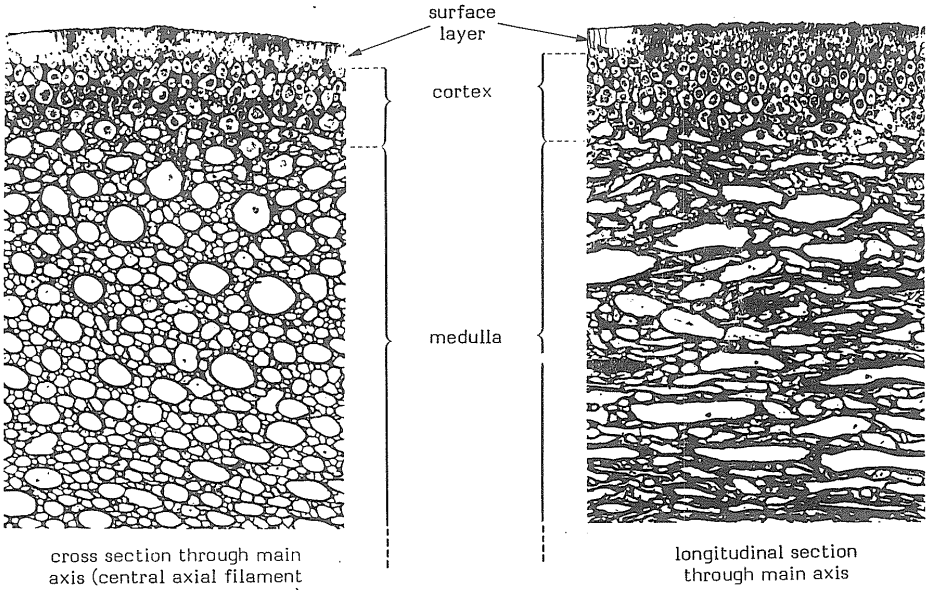


enlarged basal
part of thallus

MORPHOLOGY : Thallus large, its axis linear, compressed to flattened, arising from a solid, conical holdfast composed of fused haptera and branching to four orders, opposite to sub-opposite, pinnate; final branches short and cord-like in young fronds but characteristically long and ribbon-like in old ones.

STRUCTURE AND GROWTH : Structure of uniaxial type. A cross section shows a large, central axial filament surrounded by small and hypha-like cells, a cortex of parenchymatous cells, and a superficial layer of small pigment cells.

Growth of trichothallic type. The intercalary meristems of young fronds give rise to small, coloured, deciduous ramifications in one direction and to parenchymatous frond tissue in the opposite direction.



CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.

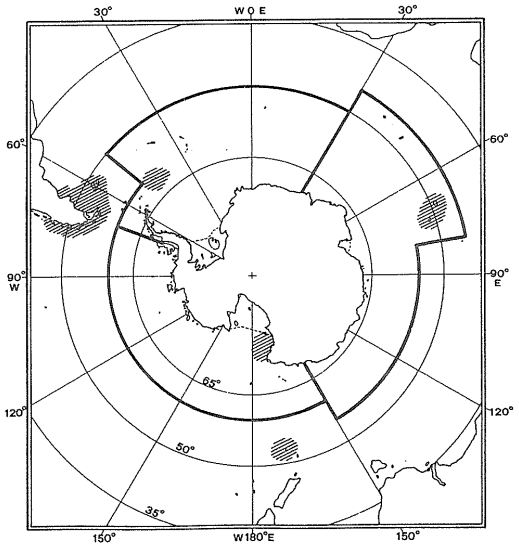
REPRODUCTION : Unilocular sporocysts are generated by transformation of superficial cells. Life cycle not yet studied, but persumably of digenetic, heteromorphic type.

SIZE : Thallus reaching up to 3 m in length; main branches to about 1.5 cm in diameter; holdfast to about 30 cm wide.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, Victoria Land, and Falkland/Malvinas, South Orkney, Kerguelen, Heard and Macquarie islands.

ECOLOGY : Found in patches in the infra-littoral zone, to about 30 m depth.

UTILIZATION : The tissue of this plant is conspicuously acid (pH=1). Its possible application in the pharmaceutical industry should be explored.



PH DES Desm 3

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DESMARESTIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

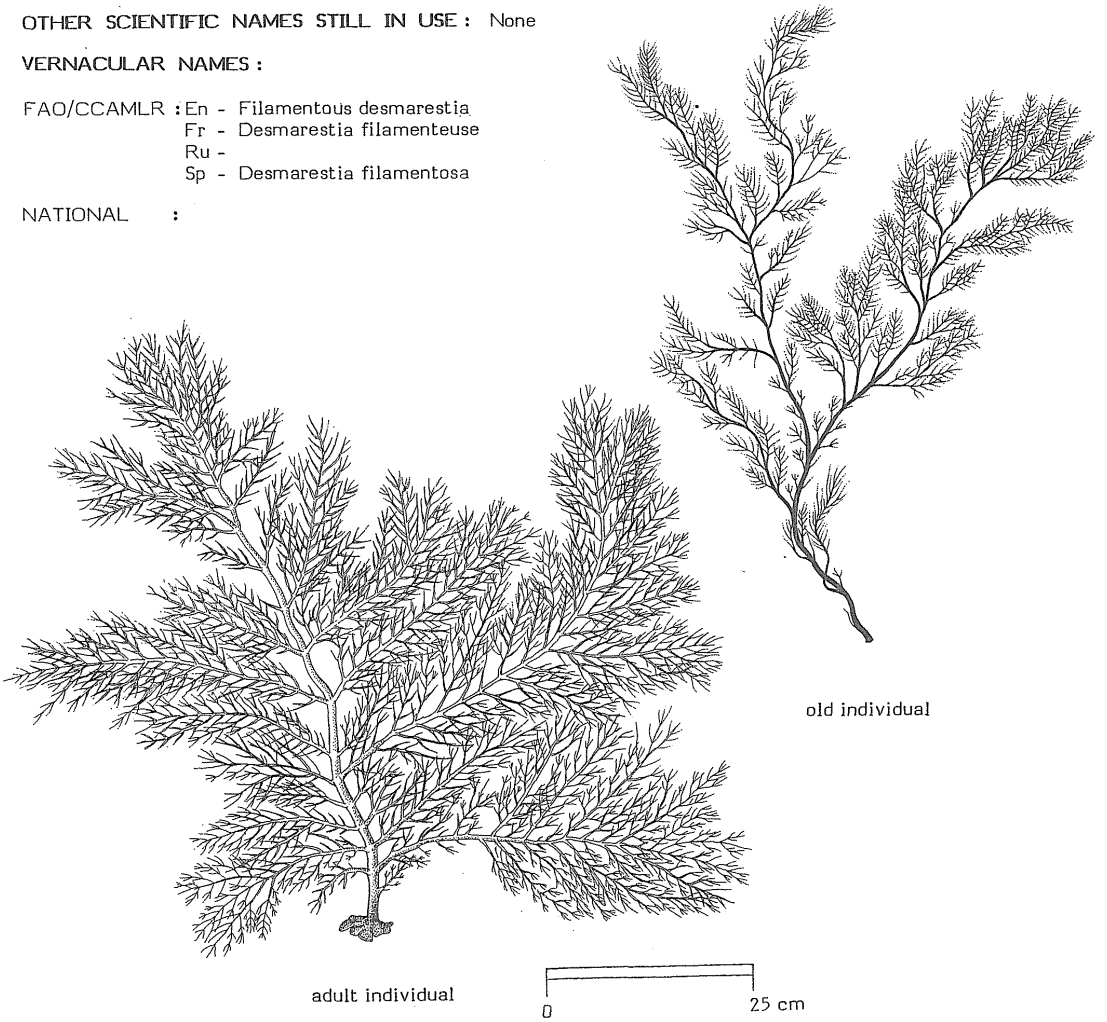
Desmarestia willii Reinsch, 1888

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

FAO/CCAMLR : En - Filamentous desmarestia
Fr - Desmarestia filamenteuse
Ru -
Sp - Desmarestia filamentosa

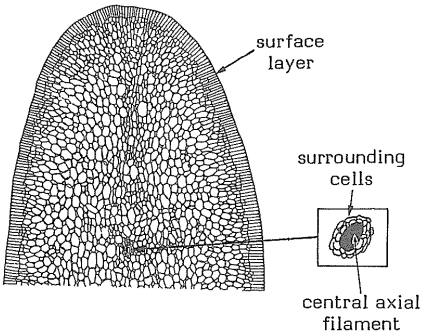
NATIONAL :



MORPHOLOGY : Thallus medium-sized, soft and flaccid, arising from a small, compact, conical holdfast. Main axis branching to 4 or 5 orders, type of branching opposite. All parts of the thallus are cylindrical or slightly compressed; ultimate branches (pinnules) thread-like.

STRUCTURE AND GROWTH : Structure of uniaxial type. A cross section shows a large central axial filament surrounded by small and hypha-like cells, a cortex of parenchymatous cells, and a superficial layer of small pigment cells.

Growth of trichothallic type. The intercalary meristems of young fronds give rise to small, coloured, deciduous ramifications in one direction and to parenchymatous frond tissue in the opposite direction.



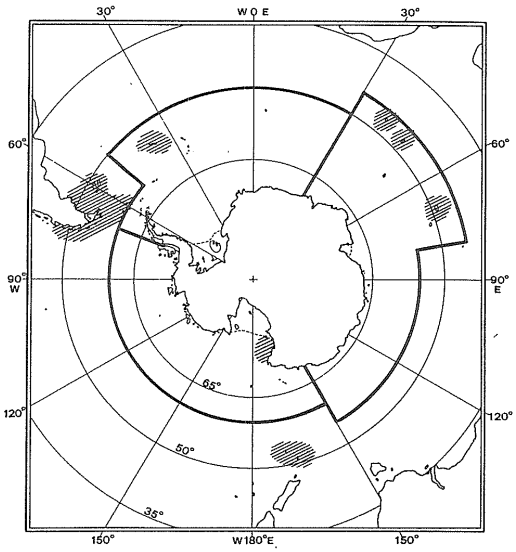
cross section of main axis

CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.

REPRODUCTION : Unilocular sporocysts are generated by transformation of superficial cells. The life cycle is digenetic heteromorphic, with alternation of a large sporophyte and a microscopic gametophyte.

SIZE : Thallus reaching up to 1 m in length; main axis 0.5 cm in diameter; holdfast to about 10 cm wide.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, South Georgia, Victoria Land and Falkland/Malvinas, South Shetland, Prince Edward, Crozet, Kerguelen, Macquarie and Auckland islands.



ECOLOGY : Found in dense patches in the upper part of the infra-littoral zone down to about 5 m depth.

UTILIZATION : The tissue of this plant is conspicuously acid (pH=1). Its possible application in the pharmaceutical industry should be explored.

PH DES Hima 1
1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DESMARESTIACEAE

FISHING AREAS 48,58,88 (Southern Ocean)

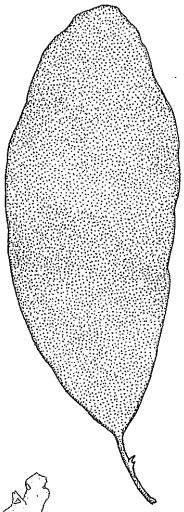
Himantothallus grandifolius (A. & E.S. Gepp) Zinova, 1959

OTHER SCIENTIFIC NAMES STILL IN USE : Phyllogigas grandifolius (A. & E.S. Gepp) Skottsberg, 1907 (intermediate individuals)
Phaeoglossum monacanthum Skottsberg, 1907 (young individuals)

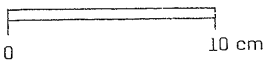
VERNACULAR NAMES :

FAO/CCAMLR : En - Large-frond tang
Fr - Grandes frondes brunes
Ru -
Sp - Grandes frondas pardas

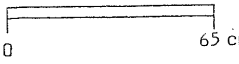
NATIONAL :

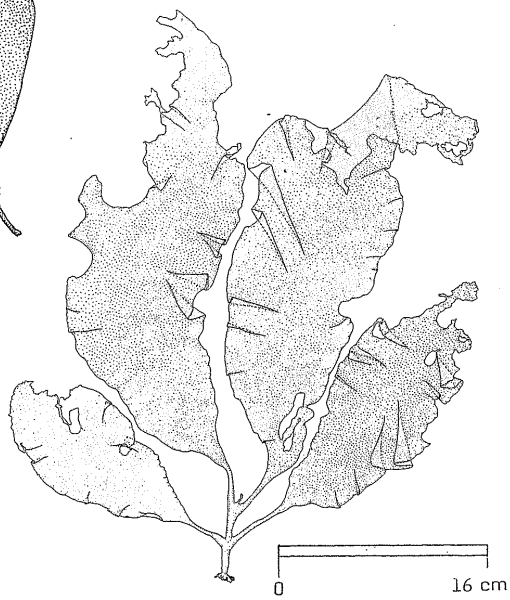


very young thallus
(Form Phaeoglossum)
(30 cm long)

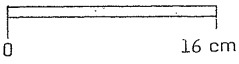


small adult thallus
(3 m long)





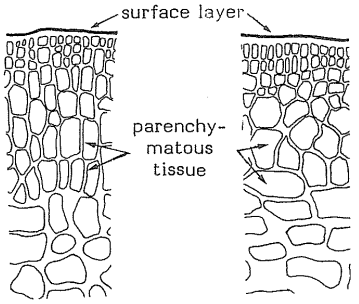
young thallus
(Form Phyllogigas)
(50 cm long)



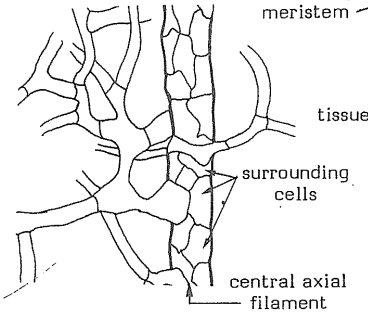
MORPHOLOGY : Thallus consisting of large, olive-green, lanceolate, undivided blades arising oppositely (young) or irregularly (old) from a short and strong, flattened stipe (often spirally twisted) fixed to the substratum by a holdfast composed of flattened haptera. The blades taper gradually to the stipe at their bases and die off at their distal ends.

STRUCTURE AND GROWTH : The structure is of uniaxial type. A cross section shows a distinct medulla with a central axis and longitudinal filaments, a cortex with several rows of parenchymatous cells, and a superficial meristoderm of small pigmented cells.

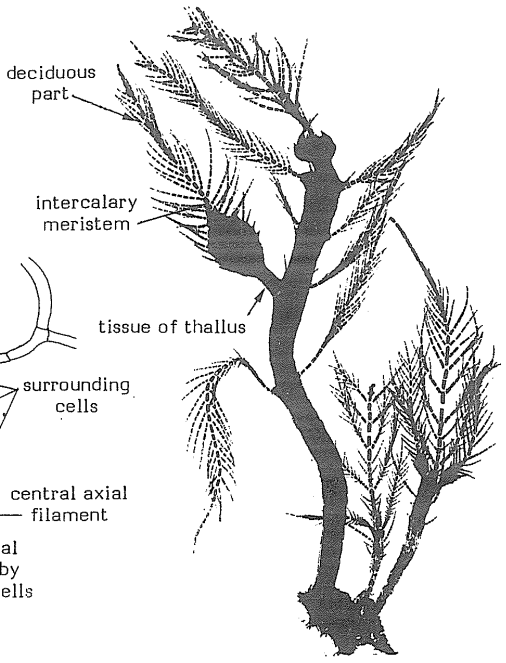
Growth of trichothallic-type, well visible in the young stages.



sections through cortex



longitudinal central filament covered by small surrounding cells



very young thallus, a few mm long, showing trichothallic growth

CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.

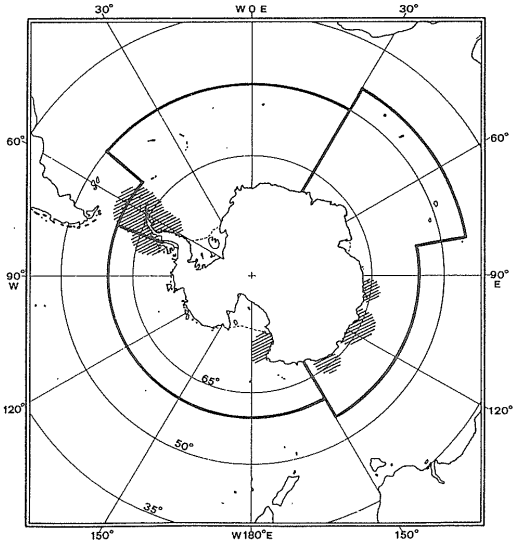
REPRODUCTION : The thallus bears sori of unilocular sporocysts interspersed with two-celled paraphyses. The life cycle is digenetic heteromorphic, with alternation of a large sporophyte and a microscopic gametophyte.

SIZE : The largest of the Antarctic kelps; thallus reaching to 10 m in length; largest known blades 8 m in length and 1 m in width; holdfast to about 50 cm wide.

GEOGRAPHICAL DISTRIBUTION : Endemic to the Antarctic region. Found on the Antarctic Peninsula, Queen Mary coast, Adelie coast, Wilkes Land, Victoria Land, and South Georgia, South Orkney and South Shetland islands.

ECOLOGY : Found as isolated patches in the infralittoral zone down to 30 m depth.

UTILIZATION : Chemical studies are needed to assess the possible potential of this large kelp.



PH DUR Durv 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DURVILLEACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

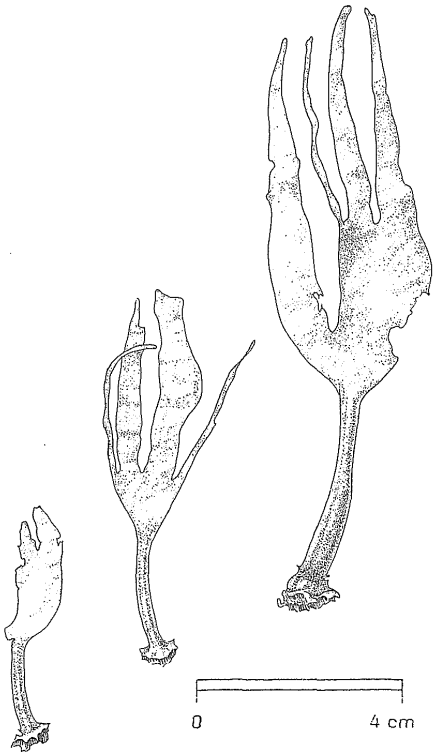
Durvillea antarctica (Chamisso in Choris) Hariot, 1892

OTHER SCIENTIFIC NAMES STILL IN USE : Durvillaea antarctica (Chamisso in Choris) Hariot, 1892 (another spelling)
Durvillea caepestipes (Montagne) Skottsberg, 1907

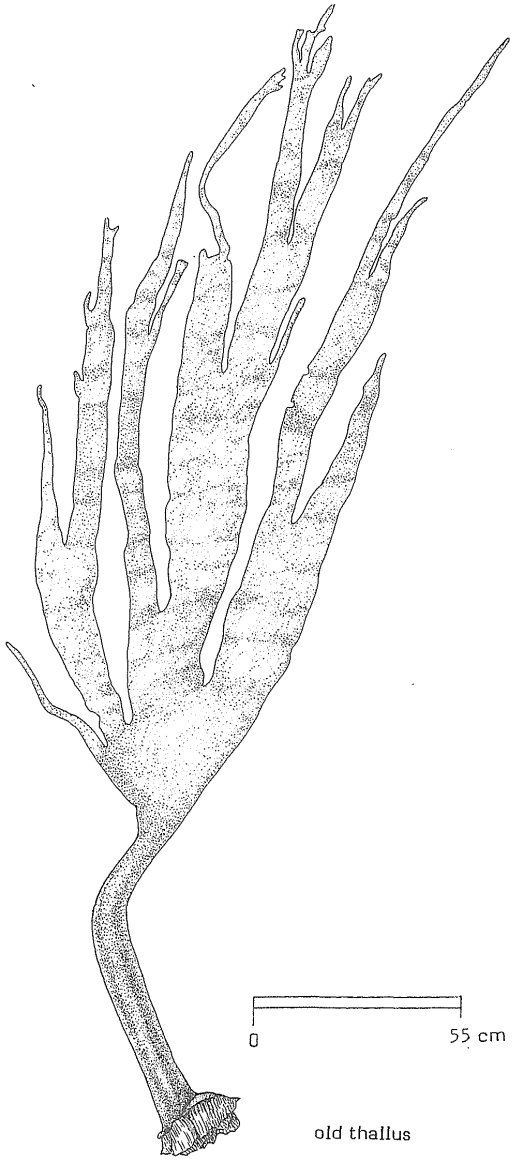
VERNACULAR NAMES :

FAO/CCAMLR : En - Bull kelp
Fr - Durvillée antarctique
Ru -
Sp - Cochayuyo

NATIONAL :



3 young thalli

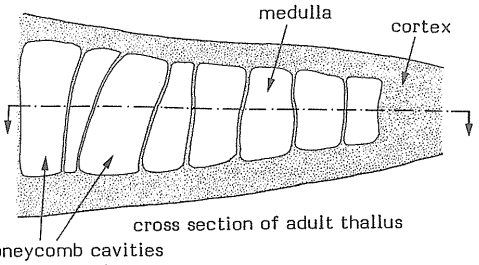


old thallus

MORPHOLOGY : Thallus large; frond long, thick and leathery, variably divided, usually into long, strap-like segments; stipe cylindrical; holdfast massive, bulbous, without haptera.

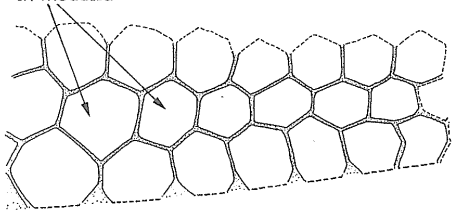
STRUCTURE AND GROWTH : Cortex with 5 or 6 outer layers of pigmented cells and several inner layers of irregular-shaped, paler cells; medulla filamentous in young fronds, but replaced by a honeycomb system of air chambers in adults.

Growth occurs at the terminal part of the segments, but no apical cells have been observed.

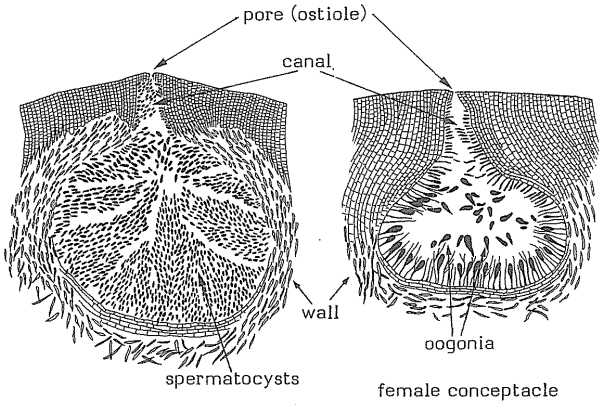


CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.

REPRODUCTION : Conceptacles dioecious, scattered over both sides of the frond. Spermatocysts and oogonia on branched filaments; each oogonium with 4 eggs (oospheres). The life-cycle is monogenetic, the thallus being the gametophyte.

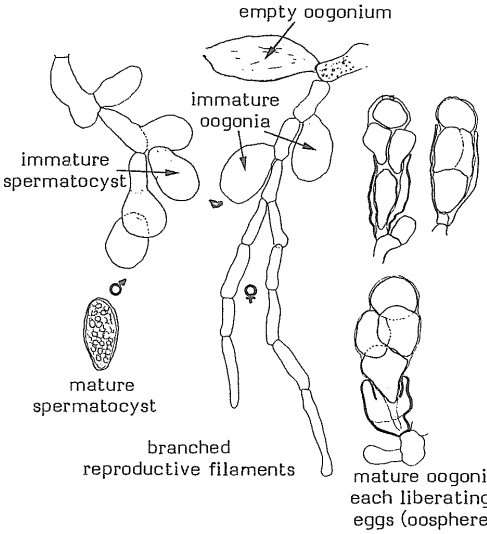

periclinal section through medulla

SIZE : Thallus reaching up to 10 m in length; holdfast to 30 cm wide.

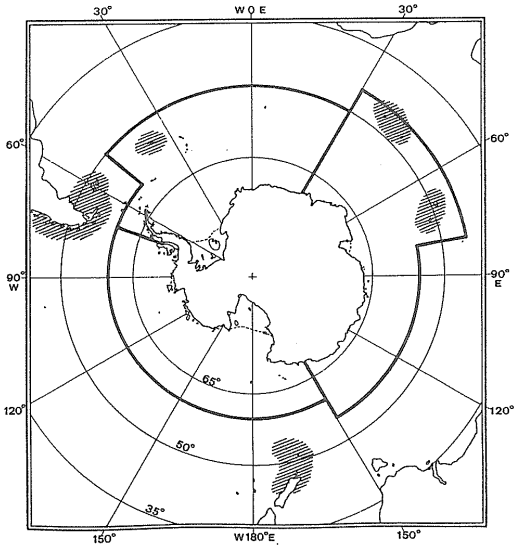


male conceptacle

female conceptacle



GEOGRAPHICAL DISTRIBUTION : Patagonian coasts of Chile and Argentina, Tierra del Fuego, Falkland/Malvinas Islands, South Georgia Islands, New Zealand, Prince Edward and Kerguelen, Crozet, Heard, Auckland, Campbell and Macquarie islands.



ECOLOGY : This species forms a kelp band in the lower third of the intertidal zone.

UTILIZATION : Used for the extraction of alginates and for human consumption (Chile).

PH FUC Cyst 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : FUCACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

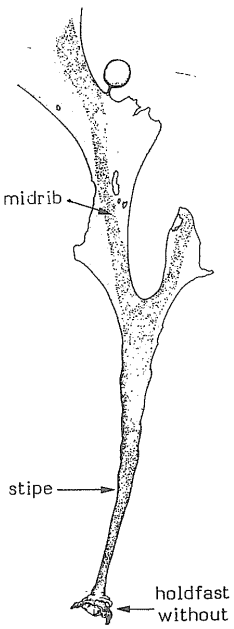
Cystosphaera jacquinotii (Montagne) Skottsberg, 1907

OTHER SCIENTIFIC NAMES STILL IN USE : None

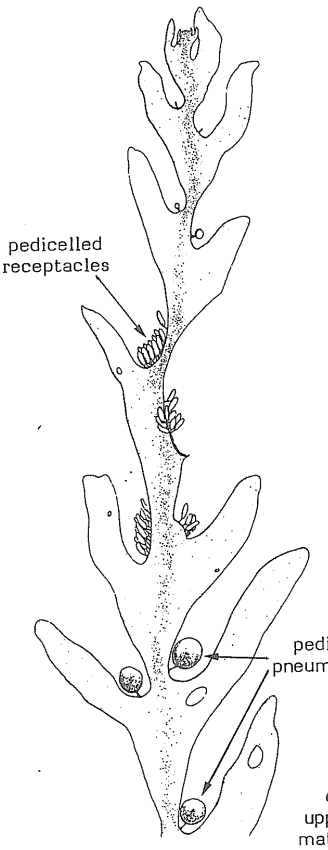
VERNACULAR NAMES :

FAO/CCAMLR : En - Cystosphaera
Fr - Cystosphère
Ru -
Sp - Cistosfera

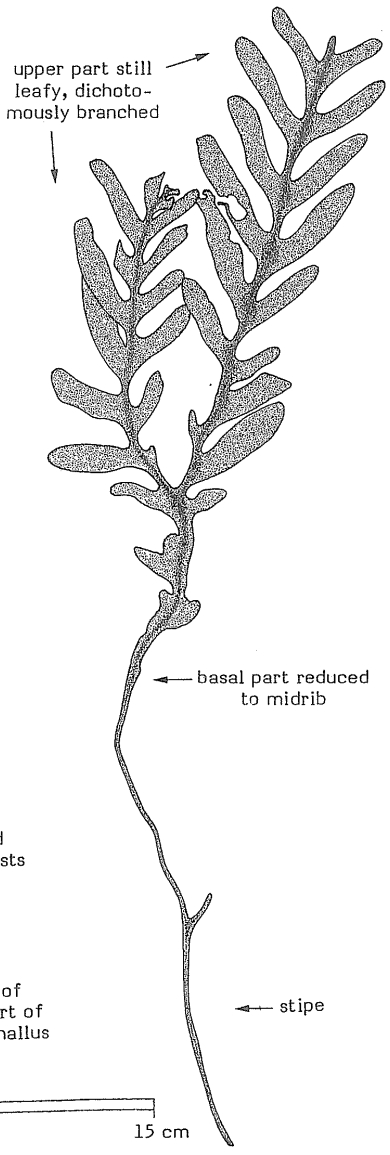
NATIONAL :



detail of
basal part



detail of
upper part of
mature thallus



general habit of a young, damaged thallus

MORPHOLOGY : Thallus medium-sized. Frond flattened, bilaterally winged and dichotomously branched, with a non-prominent midrib and pedicellate pneumatocysts located at the axils of the leaf-like expansions. Stipe short in young plant, becoming progressively longer and dichotomously branched in older individuals as a result of decay of the laminoid part of the frond. Holdfast globose, without haptera.

STRUCTURE AND GROWTH : A cross section shows a cortex of 2 or 3 external layers of small photosynthetic, coloured cells, several layers of paler, subcortical parenchymatous cells, and a central medulla of elongate hypha-like filaments.

Growth is initiated by a single apical cell, but very difficult to observe.

CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.

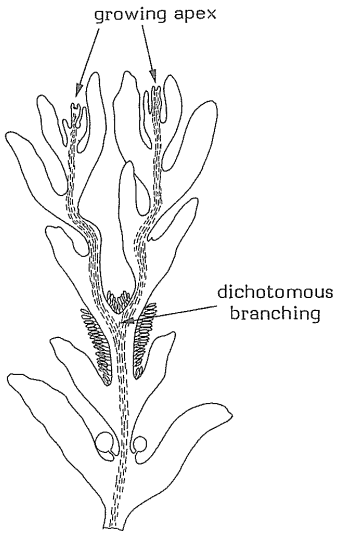
REPRODUCTION : The reproductive organs are shortly pedicellate, cylindrical receptacles located on the upper parts of the frond, in the axils of the leaf-like expansions. They bear conceptacles which contain either oogonia or spermatia and open by individual ostioles. The life-cycle is monogenetic, the thalli being gametophytes.

SIZE : The thallus may reach to 3 m in length; leafy expansions to a few cm in width and 30 cm in length.

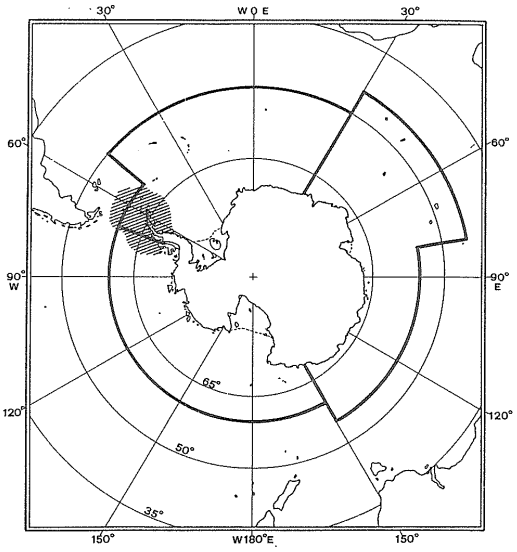
GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula and South Shetland islands.

ECOLOGY : Grows in the infra-littoral zone to about 20 m depth.

UTILIZATION : Like other Fucales, this species could be of potential interest for the extraction of alginates.



detail of growing apex



PH LES Les 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : LESSONIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

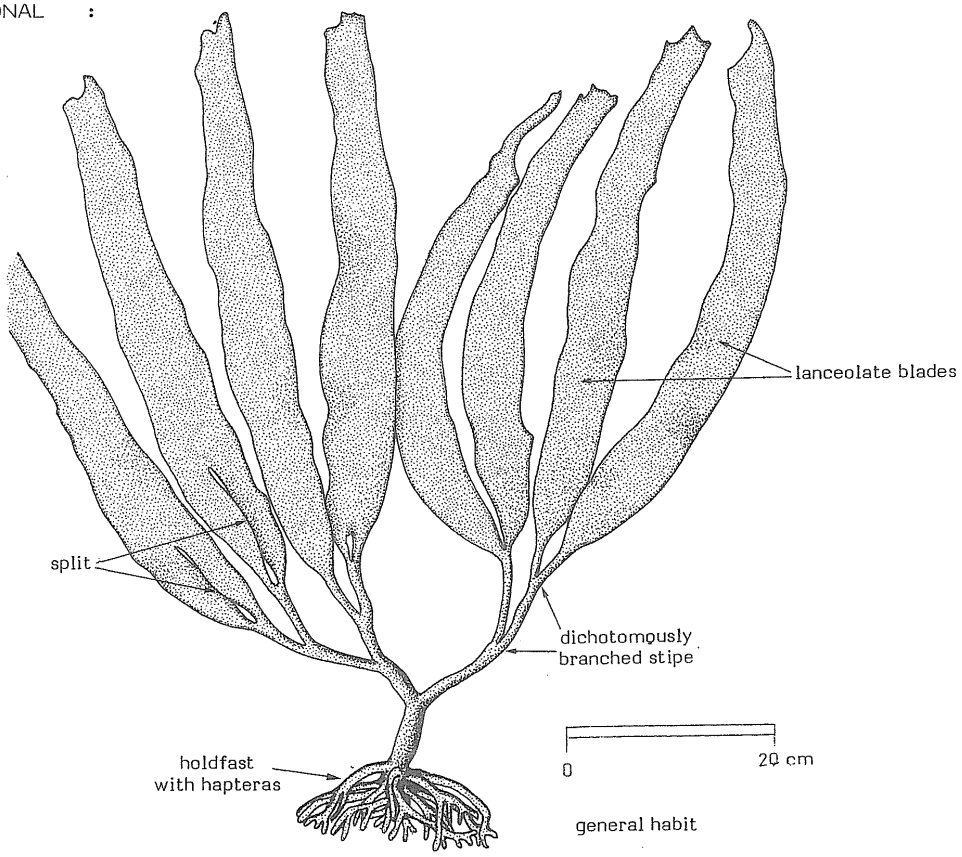
Lessonia flavicans Bory, 1826

OTHER SCIENTIFIC NAMES STILL IN USE : Lessonia fuscescens Bory, 1826
Lessonia frutescens Skottsberg, 1907

VERNACULAR NAMES :

FAO/CCAMLR : En - Southern brown kelp
Fr - Lessonie brunâtre
Ru -
Sp - Chascón

NATIONAL :



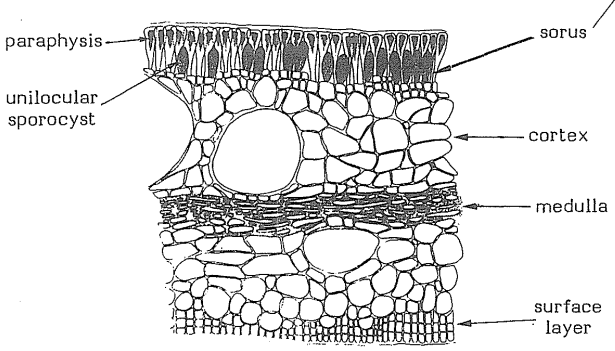
general habit

MORPHOLOGY : Thallus consisting of a solid, cylindrical, dichotomously branched stipe ending in large, elongate blades with entire to coarsely toothed margins; older blades have a longitudinal split at the middle of their base. Holdfast formed by richly branched haptera.

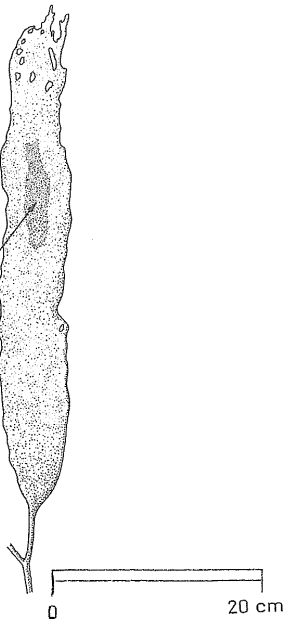
STRUCTURE AND GROWTH : The structure is of multiaxial type. There is a superficial meristoderm of small, pigmented and actively dividing cells. The cortex is formed of layers of parenchymatous cells. The medulla consists of filaments, some of which are trumpet-shaped hyphae.

Growth of intercalary type, localized at the bases of the blades, where the longitudinal split initiates. This split extends toward the end of the blade giving rise to two daughter blades.

CYTOLOGY : Neoplastidial type; plastids are parietal, discoid, without pyrenoids.



cross section through fertile part of a blade

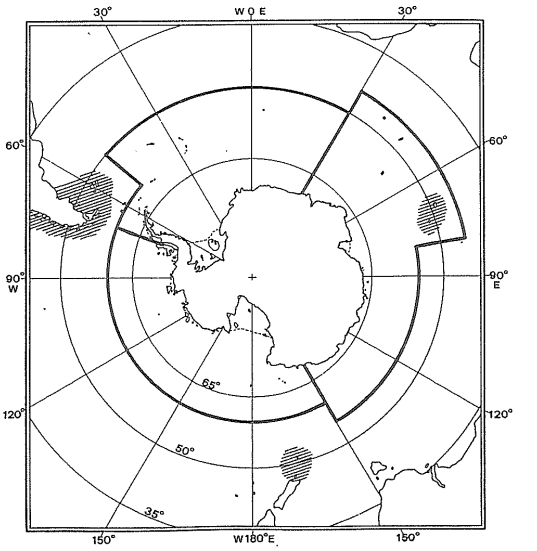


blade with sorus in its terminal part

REPRODUCTION : There are no special sporophylls. The sori develop on the terminal part of the blades, which are identical to the vegetative ones. Both blade faces bear unilocular sporocysts interspersed with unicellular paraphyses. The life-cycle is digenetic heteromorphic, with alternation of a large sporophyte and a microscopic gametophyte.

SIZE : Thallus reaching up to 4 m in length, the stipe up to 5 cm in diameter at its base. Holdfast about 30 cm wide. Blades grow to 150 cm long and 40 cm broad.

GEOGRAPHICAL DISTRIBUTION : Southern and central coast of Chile, Tierra del Fuego and Falkland/ Malvinas, Kerguelen, Heard and Auckland islands.



ECOLOGY : Grows in patches on rocks in the infra-littoral zone, down to about 40 m depth. Fronds may be exposed at low tide.

UTILIZATION : Exploited in Chile for extraction of alginates. The stipe is used as food.

PH LES Mac 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : LESSONIACEAE

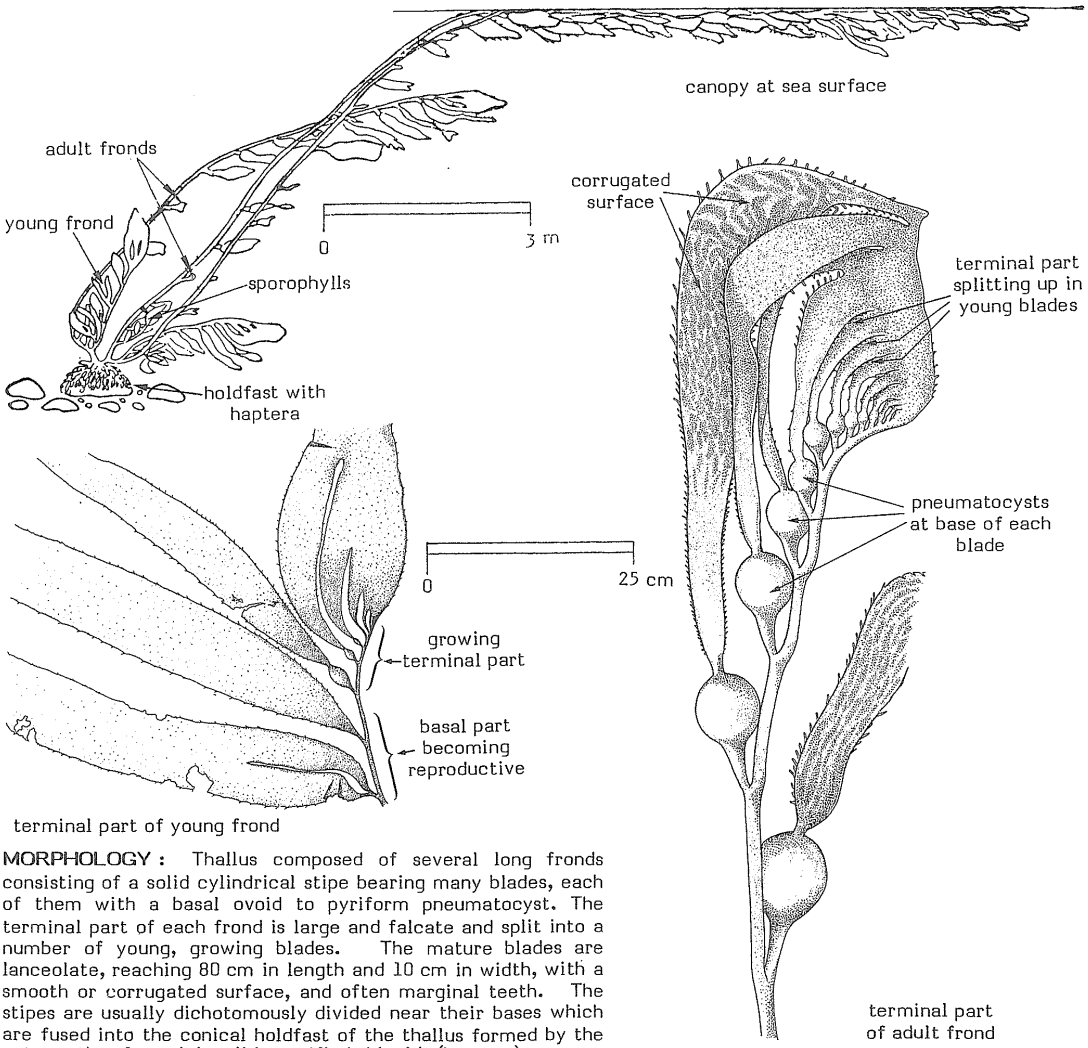
FISHING AREAS 48,58,88
(Southern Ocean)

Macrocystis pyrifera (Linnaeus) C.Agardh, 1820

VERNACULAR NAMES :

FAO/CCAMLR : En - Giant kelp
Fr - Macrocystis
Ru -
Sp - Cachiyuyo

NATIONAL :

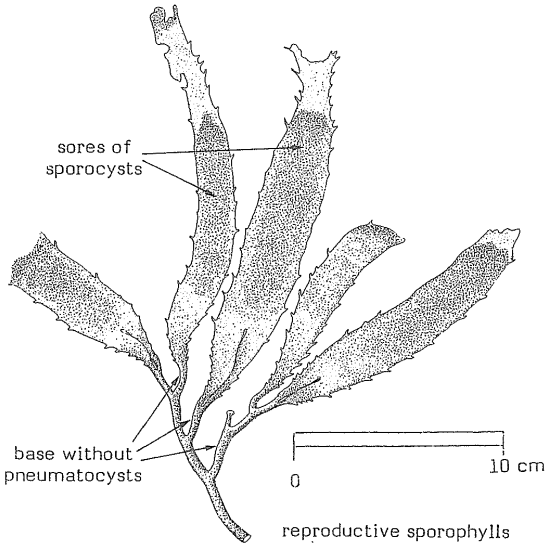


MORPHOLOGY : Thallus composed of several long fronds consisting of a solid cylindrical stipe bearing many blades, each of them with a basal ovoid to pyriform pneumatocyst. The terminal part of each frond is large and falcate and split into a number of young, growing blades. The mature blades are lanceolate, reaching 80 cm in length and 10 cm in width, with a smooth or corrugated surface, and often marginal teeth. The stipes are usually dichotomously divided near their bases which are fused into the conical holdfast of the thallus formed by the outgrowths of special, solid, ramified rhizoids (haptera).

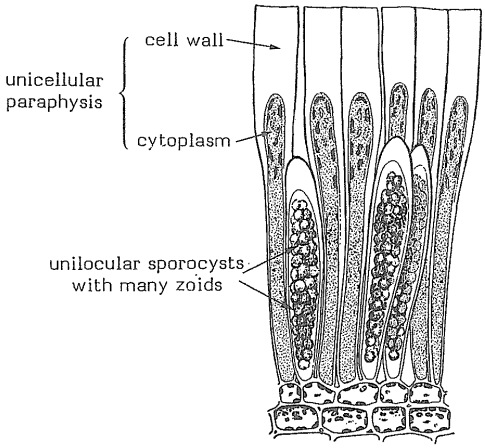
STRUCTURE AND GROWTH : The structure is of multiaxial type. There is a superficial meristoderm of small, pigmented and actively dividing cells. The cortex is formed of layers of parenchymatous cells. The medulla consists of filaments, some of which are trumpet-shaped hyphae.

Growth takes place in the meristematic region of the terminal blade.

CYTOLOGY : Neoplastidial type, plastids are parietal, discoid, without pyrenoids.



reproductive sporophylls

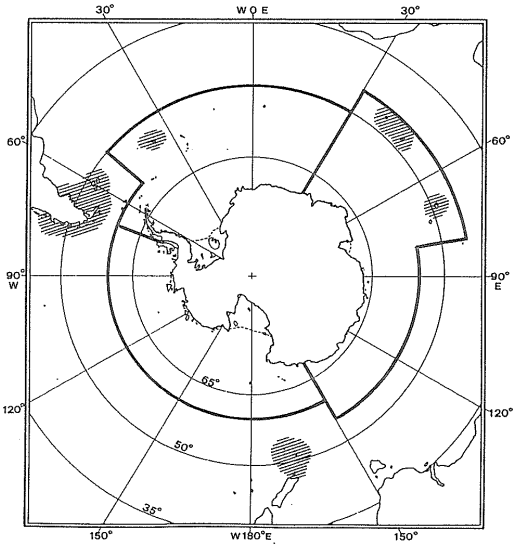


schematic section of laminarial sorus

REPRODUCTION : Special reproductive blades (sporophylls), characterized by the absence of pneumatocysts, occur on the basal parts of the stipes. Both blade faces bear sori or unilocular sporocysts, 40 to 50 µm long, interspersed with unicellular paraphyses.

SIZE : Thallus reaching up to 50 m long, holdfast to about 50 cm high and 50 cm wide.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego and Falkland/Malvinas, South Georgia, Prince Edward, Crozet, Kerguelen, Macquarie, Auckland and Campbell islands.



ECOLOGY : Although the thalli of this species are fixed at depths down to 20 m (Kerguelen), mainly on rocky substrates, the fronds grow up to the water surface, where they form extensive canopies ("kelp forests") sometimes over several square kilometres wide.

UTILIZATION : One of the world's most important commercial species of seaweed, especially in the sub-Antarctic region and in California. It is used for the extraction of phycocolloids (alginates), which find manifold applications in numerous industries, including the preparation of human food.

PH PUN Aden 1
1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PUNCTARIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

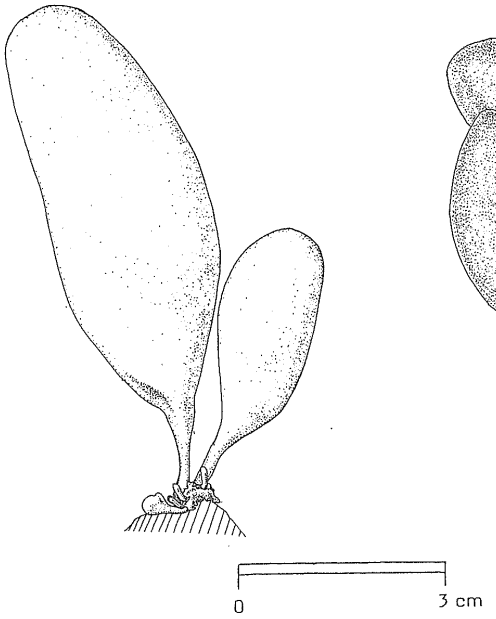
Adenocystis utricularis (Bory) Skottsberg

OTHER SCIENTIFIC NAMES STILL IN USE : None

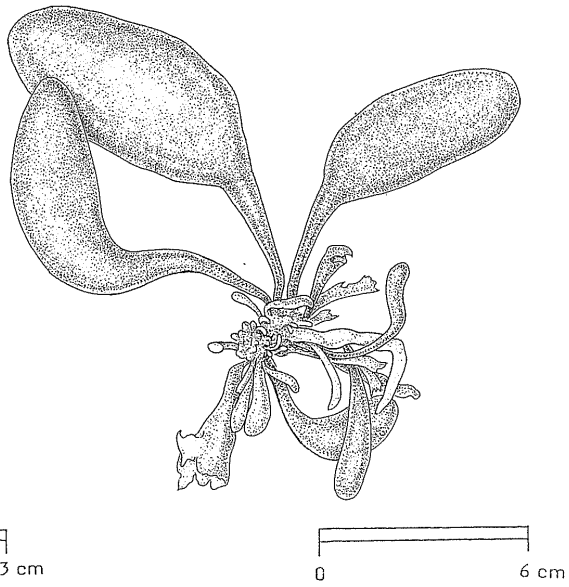
VERNACULAR NAMES :

FAO/CCAMLR : En - Adenocystis
Fr - Adenocystie
Ru -
Sp - Adenocisto

NATIONAL :



2 individuals attached
to a stone

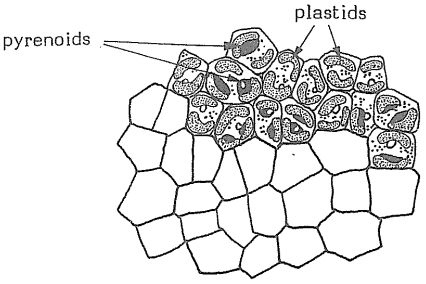


groups of individuals arising
from a common base

MORPHOLOGY : Thallus usually simple, pyriform-obovate, forming a long, hollow membraneous sac, tapering downward more or less gradually to a short, cylindrical stipe attached to the substratum by a minute basal disc. Usually several individuals form a colony arising from a common basal disc.

STRUCTURE AND GROWTH : Structure of multiaxial type. Cortex of thallus wall composed of several layers of cells; those in the outer layers are coloured, small, isodiametric and radially elongated; those of the inner layers become increasingly large and colourless, rounded or obtusely angulate. Medular lining of the cavity composed of a layer of branched and loosely reticulate, colourless filaments. Surface with numerous depressions (cryptostomata) each with a tuft of small, simple, colourless, deciduous, multicellular hairs.

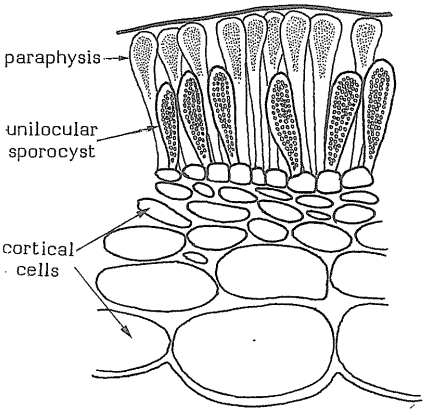
The growth is apical. In the apical region there is a tuft of hair with an underlying growth zone.



enlarged view of thallus surface

CYTOLOGY : Neoplastidial type; plastids are parietal with pyrenoids.

REPRODUCTION : The life cycle is digenetic and heteromorphic, with alternation of a sporophyte and a dioecious microscopic gametophyte. Only unilocular sporocysts are known; they are ovoid or pyriform, 30 to 50 µm long and 15 to 20 um in diameter, and arise between the unicellular paraphyses. The plurilocular sporocysts (gametocysts) are formed on the filamentous gametophyte.

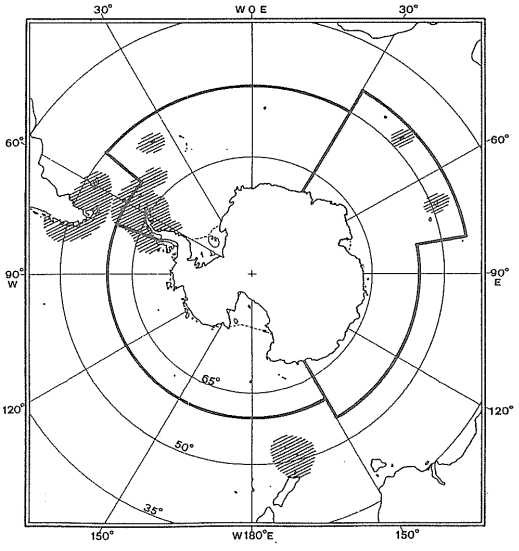


cross section of fertile part of thallus

SIMILAR SPECIES OCCURRING IN THE AREA :

Utriculidium durvillaei: only plurilocular sporocysts are found in wild plants.

SIZE : The thallus may reach 10 cm in length and 3 cm in diameter.



GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula, Tierra del Fuego and Falkland/Malvinas, South Georgia, South Orkney, South Shetland, Crozet, Kerguelen, Macquarie, Auckland and Campbell islands.

ECOLOGY : Found in the intertidal and the upper infra-littoral zones.

UTILIZATION : Although this species has been shown to contain alginates, its natural biomass is probably too low for commercial exploitation. Possibilities for its utilization in the pharmaceutical industry should be explored.

PH PUN Utri 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PUNCTARIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

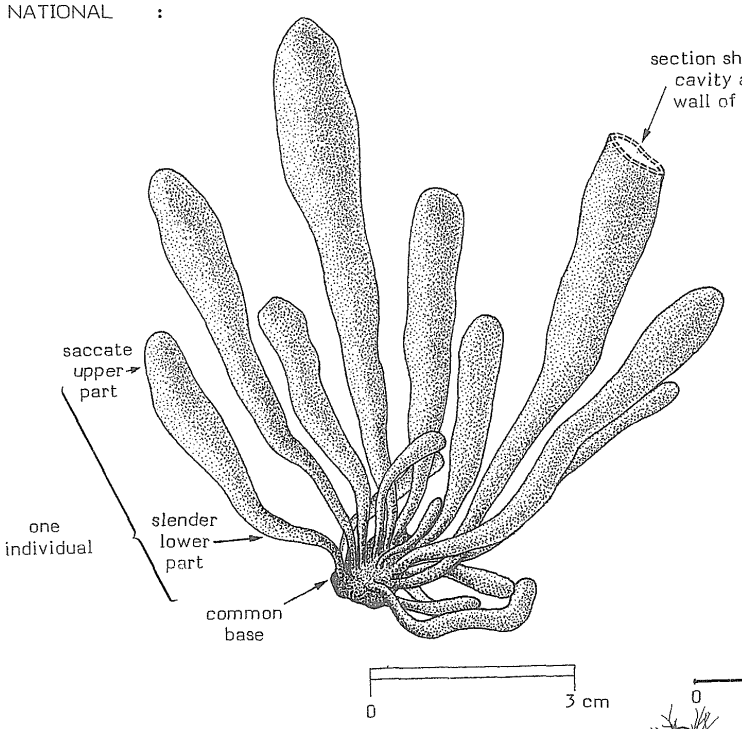
Utriculidium durvillaei (Bory) Skottsberg, 1907

OTHER SCIENTIFIC NAMES STILL IN USE : None

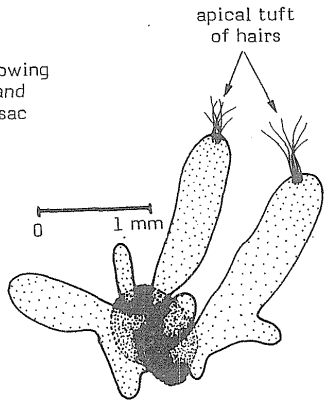
VERNACULAR NAMES :

FAO/CCAMLR : En - Finger weed
Fr - Utriculidium
Ru -
Sp - Dedo de guante

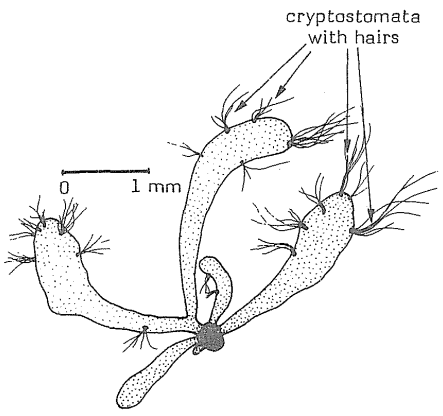
NATIONAL :



general habit of a group of individuals



young individuals arising from a common base

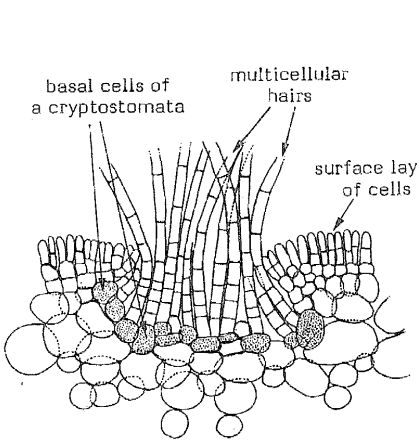


older individuals with many cyptostomata

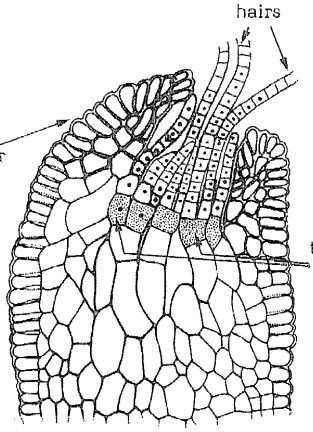
MORPHOLOGY : Thallus sac-like, clavate, often filled with water, much attenuated below as a slender, usually simple stipe of about 1 cm long. It tends to form colonies, the thalli arising from a common basal crust.

STRUCTURE AND GROWTH : Structure of multiaxial type. Cortex of thallus wall composed of several layers of cells; those in the outer layers are coloured, small, isodiametric and radially elongated; those of the inner layers become increasingly large and colourless, rounded or obtusely angulate. Medular lining of the cavity composed of a layer of branched and loosely reticulate, colourless filaments. Surface with numerous depressions (cryptostomata) each with a tuft of small, simple, colourless deciduous multicellular hairs.

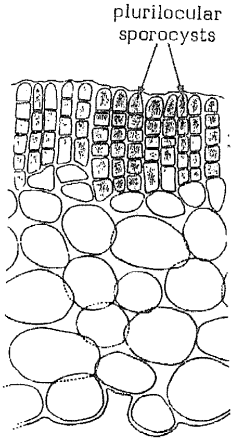
The growth is apical. In the apical region there is a tuft of hair with an underlying growth zone.



cross section of cortical layer of thallus



cross (sagital) section of apical part of a young individual showing multiaxial structure



cross section of a fertile thallus

CYTOLOGY : Neoplastidial type; plastids are parietal with pyrenoids.

REPRODUCTION : Only plurilocular sporocysts have been observed in the wild. They develop from surface cells which, after growing into cylindrical filaments, divide once or twice longitudinally and 5 to 7 times transversely. Paraphyses are wanting. Unilocular sporocysts have not been found, and hence, the complete life cycle is unknown.

SIMILAR SPECIES OCCURRING IN THE AREA :

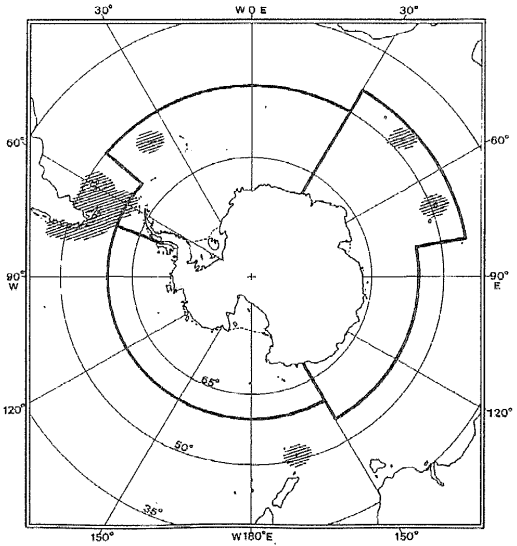
Adenocystis utricularis: only unilocular sporocysts are found in wild plants.

SIZE : The thallus may reach 5 cm in length and 1.5 cm in diameter.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego and Falkland/Malvinas, South Georgia, South Shetland, Crozet, Kerguelen and Campbell islands.

ECOLOGY : Found in the intertidal and the upper infra-littoral zones.

UTILIZATION : So far, no data are available on the potential use of this species. Its inclusion in this volume was decided because of its close resemblance to Adenocystis utricularis.



RH BAN Por 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BANGIACEAE

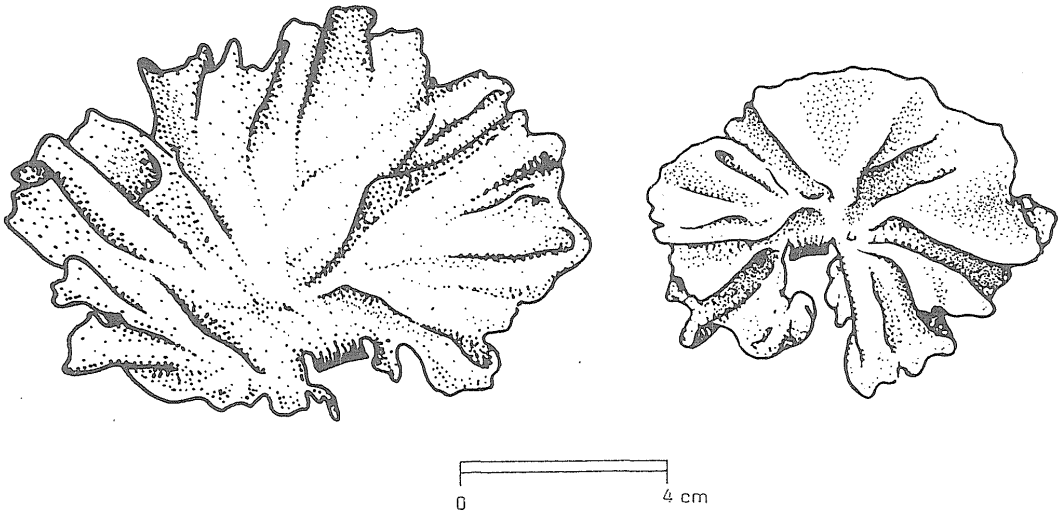
FISHING AREAS 48,58,88
(Southern Ocean)

Porphyra endiviifolium (A. & E.S. Gepp) Chamberlain, 1963

OTHER SCIENTIFIC NAMES STILL IN USE : Monostroma endiviaefolium A. & E.S. Gepp, 1905

VERNACULAR NAMES :

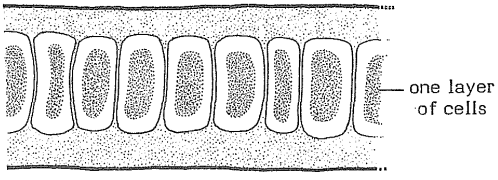
FAO/CCAMLR : En - Purple laver
Fr - Nori
Ru -
Sp - Luche



general habit of two young thalli

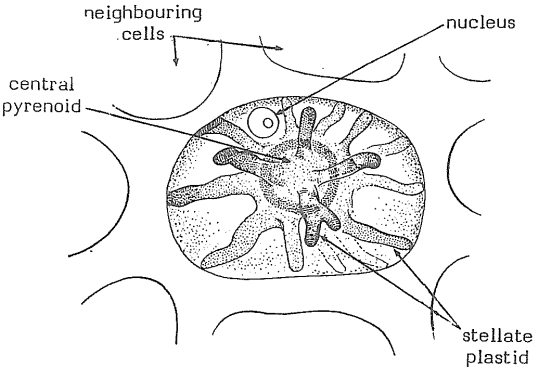
MORPHOLOGY : Thallus small, folliaceous, membranaceous, more or less divided, crinkled and undulate at edges, attached to the substrate by a small central disc. Colour in live specimens olive-green, with a few violaceous patches in young individuals, but turning to purple-brownish after drying. Due to its green colour, it has been considered for a long time as a Monostroma species, and only recently Chamberlain recognized its true identity.

STRUCTURE AND GROWTH : The thallus is monostromatic showing a layer of vertically elongated cells. Adult fronds have a diffuse growth (each cell dividing in 2 perpendicular directions) which results in a cell arrangement in pairs or tetrads. The larger cells near the basal disc produce unicellular and multinucleate rhizoids which adhere to the substrate by means of thick and gelatinous walls.



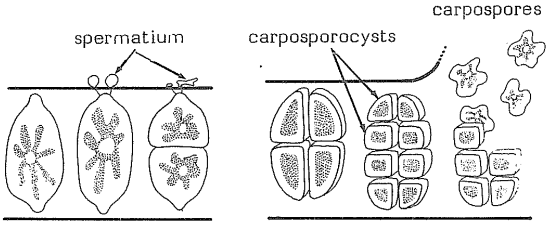
cross section of thallus

CYTOLOGY : Each cell contains an axial stellate plastid (archaeoplastidial type); there are no pit-connections between cells.

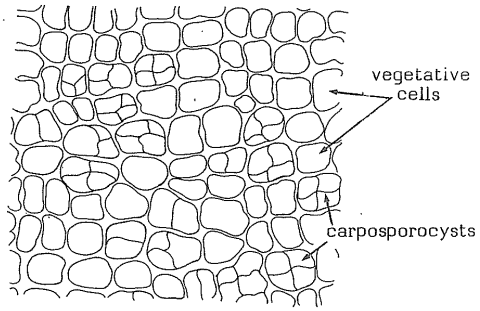


plastidial organization of cell (schematic)

REPRODUCTION : The life cycle of P. endiviifolium is unknown; only carpospores are described. Most species of Porphyra have a life cycle characterized by a succession of 3 morphologically different generations: (1) a gametophyte (the plant described above); (2) the equivalent of a carposporophyte (developing in female cells); and (3) a microscopic and endolithic tetrasporophyte, formerly named Conchocelis, quite different from the gametophyte.



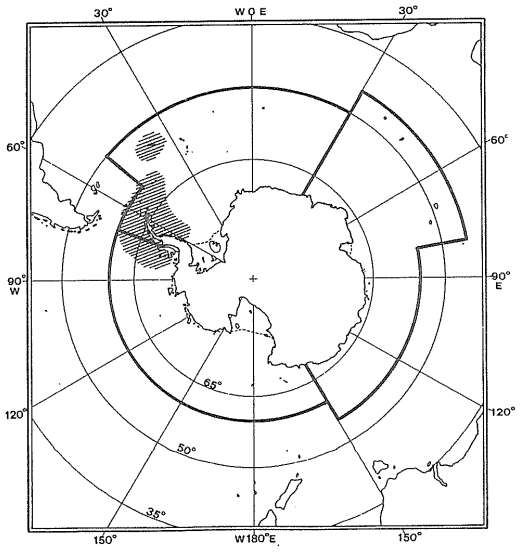
schematic section through female part of thallus



surface view of cells

SIZE : Thallus reaching to 15 cm in length.

GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula and South Orkney and South Georgia islands.



ECOLOGY : Particularly abundant in rock crevices of the supralittoral and the upper part of the intertidal zones, often just below the ice. The green colour results from the loss of the red pigment due to the action of fresh water from melting snow and ice.

UTILIZATION : Porphyra species are the most widely used seaweeds for human consumption (rich in proteins and oligoelements).

RH BON Ptil 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BONNEMAISONIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

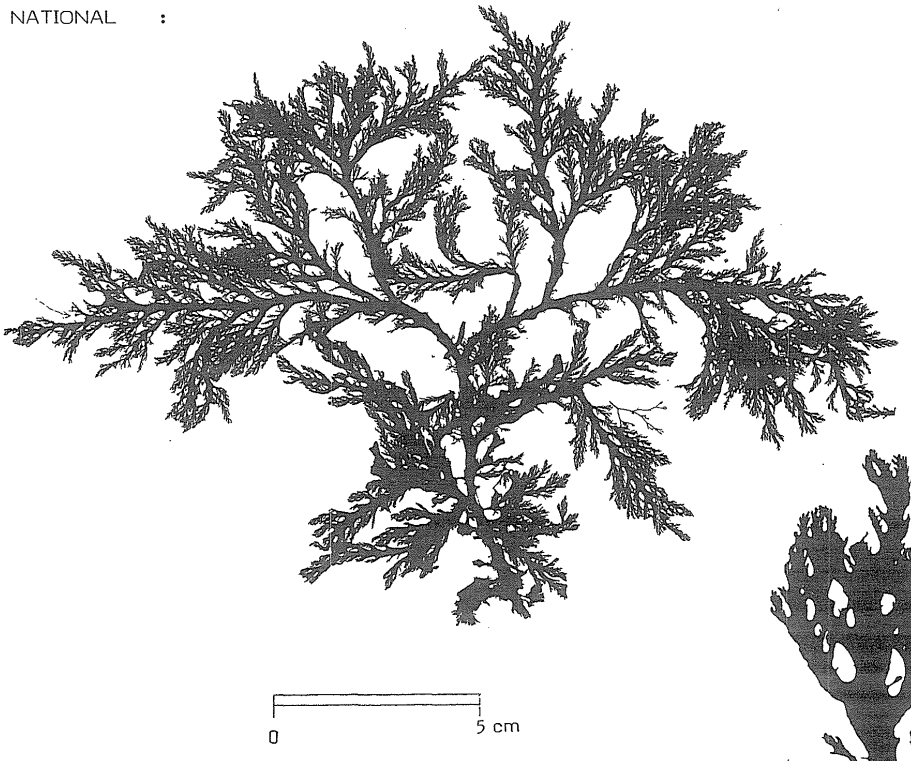
Ptilonia magellanica (Montagne) J. Agardh, 1852

OTHER SCIENTIFIC NAMES STILL IN USE : None

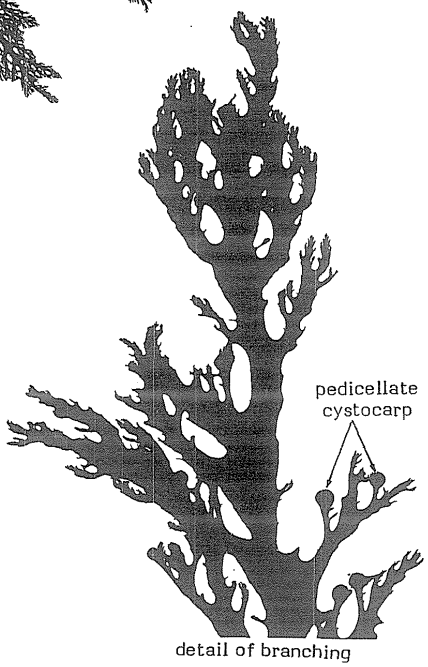
VERNACULAR NAMES :

FAO/CCAMLR : En - Magellanic ptilonia
Fr - Ptilonie de Magellan
Ru -
Sp - *Tilonia de Magallanes*

NATIONAL :



general habit of thallus

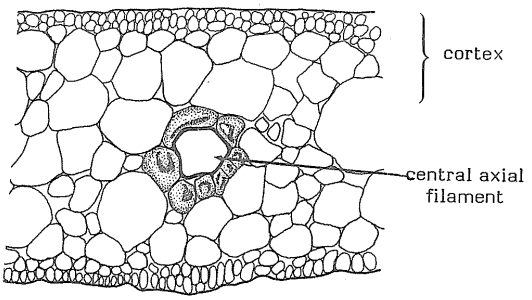


detail of branching

MORPHOLOGY : Thallus firm, flattened, membraneous, with an inconspicuous midrib in older parts, well ramified in one plane, with lateral branches arising alternately to irregularly. Margins finely serrate or with aciculate proliferations. Colour red-purple, but very easily altered, turning orange. Fresh material emits a characteristic odour.

STRUCTURE AND GROWTH : The structure is of uniaxial type. A cross section shows a central axis, quite noticeable, with corticating rhizoids, in older parts, a medulla with large, colourless cells, and a cortex with small cells.

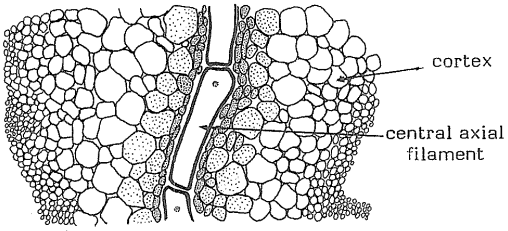
Growth of apical type, from a single cell.



schematic cross section

CYTOLOGY : Cortical cells of neoplastidial type (with many discoid rhodoplastids, each without pyrenoids). Some cortical cells are transformed into secretory cells (as in other members of Bonnemaisoniaceae); they might contribute to the characteristic odour of this species.

REPRODUCTION : Cystocarpic plants are frequent and easy to distinguish in the field by their pedicellate cystocarps provided with a single conspicuous pore. Carpospores clavate, very large; tetrasporophytes unknown.

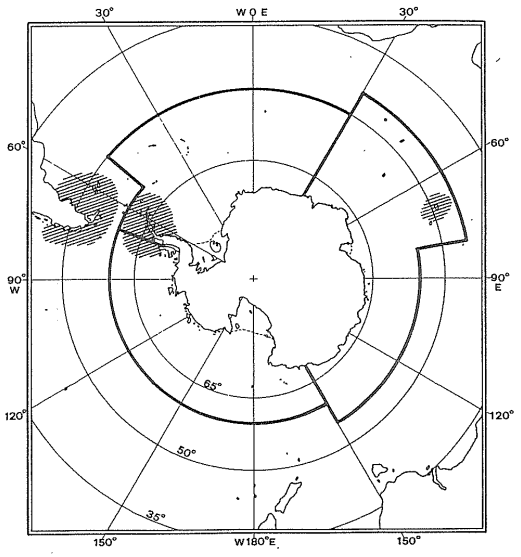


schematic longitudinal section

SIZE : Thallus reaching to about 30 cm in length.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, Antarctic Peninsula and Falkland/Malvinas and Kerguelen islands.

ECOLOGY : Very common in the sub-Antarctic region; forming large patches under Macrocystis canopies; in the infra-littoral zone it occurs down to 20 m depth.



UTILIZATION : The fact that antibiotic activities have been found in this species allows the assumption that it may be of potential interest in the pharmaceutical industry.

RH CER Bal 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CERAMIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

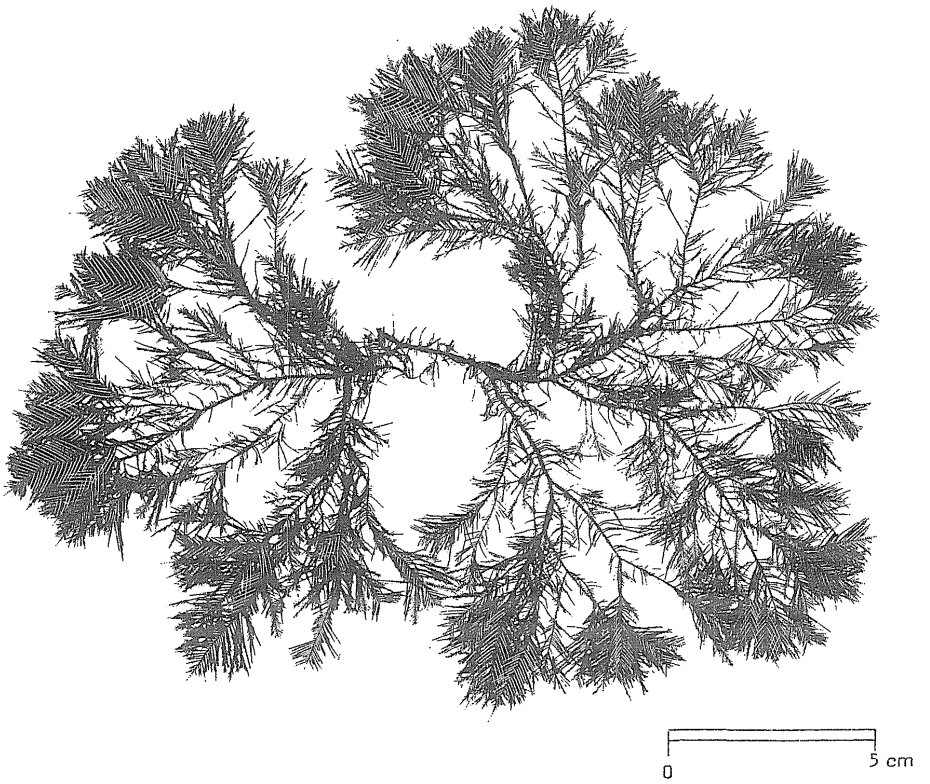
Ballia callitricha (C. Agardh) Kützing, 1843

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

FAO/CCAMLR : En - Ballia
Fr - Ballia
Ru -
Sp - Balia

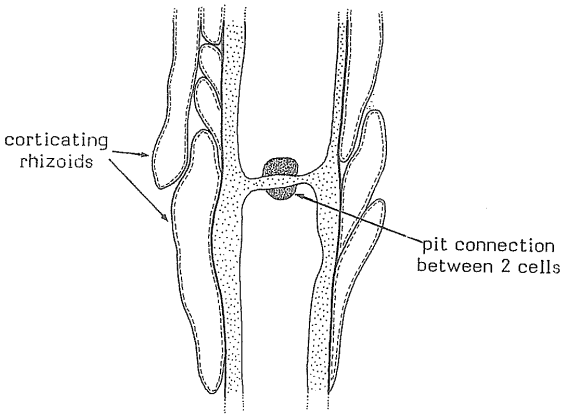
NATIONAL :



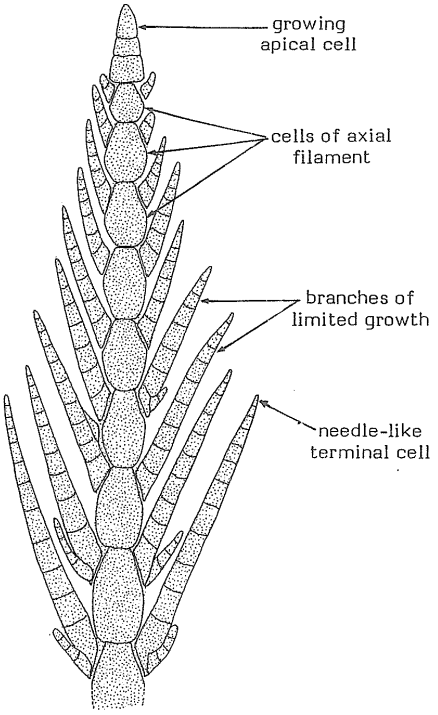
general habit

MORPHOLOGY : Thallus filamentous, with regularly pinnate ramifications giving a very fine feathery appearance. Several fronds may arise from the same base which is formed by corticating rhizoids originating from higher parts of the fronds.

STRUCTURE AND GROWTH : The structure is of uniaxial type. The apical cell is round in growing filaments, but becomes more aciculate when growth is reduced or stopped. Each cell generates two opposite ramifications and the branches have the same structure as the axis from which they arise. Corticating filaments arise from basal cells of the branches.



longitudinal section through basal part of main axis



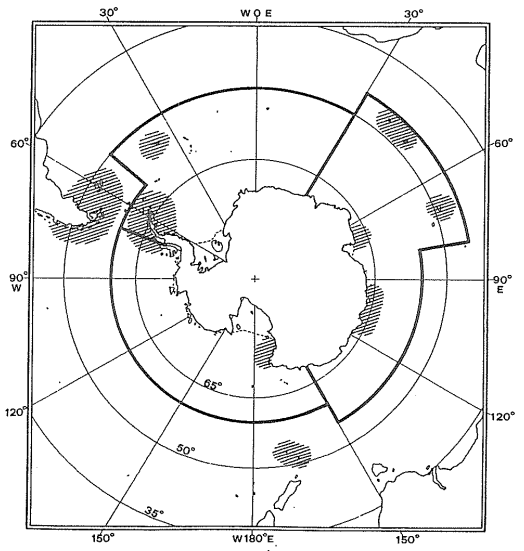
detail of distichal branching (apical part)

CYTOLOGY : Neoplastidial type; plastids are parietal, without pyrenoids. It should be noted that nuclei and pit-connections between cells are very large.

REPRODUCTION : Only tetrasporophytes are known in the wild, and the life cycle is unknown. At Kerguelen Islands, tetrasporocysts are ripe in winter. The germination of the tetraspores in experimental culture gives rise to microscopic thalli that can be interpreted as dioecious gametophytes.

SIZE : Thallus reaching 30 cm in length.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, Antarctic Peninsula, Falkland/Malvinas, MacRobertson coast, Wilkes Land, Victoria Land, and South Georgia, Prince Edward, Crozet, Kerguelen, Macquarie, Auckland and Campbell islands.



ECOLOGY : Found in scattered tufts in the infralittoral zone. At Kerguelen Island, it develops under attenuated light conditions, as for example in Macrocystis beds at about 10 m depth or under Durvillea fronds. Old individuals are almost always epiphyted by numerous diatoms and other algae and even animals, probably due to the feathery structure which represents a good trap for diaspores floating in the sea.

UTILIZATION : Not yet ascertained.

RH CHA Chae 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHAETANGIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

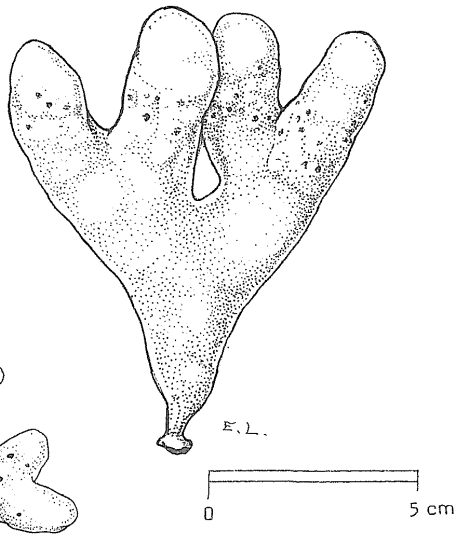
Chaetangium fastigiatum (Bory) J. Agardh, 1852

OTHER SCIENTIFIC NAMES STILL IN USE : None

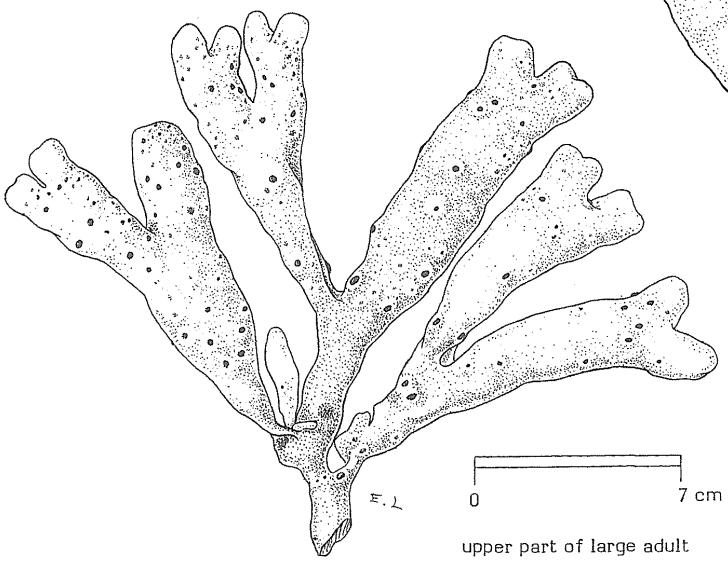
VERNACULAR NAMES :

FAO/CCAMLR : En - Branched chaetangium
Fr - Chaetanguim ramifié
Ru -
Sp - Quetangio ramificado

NATIONAL :



young thallus



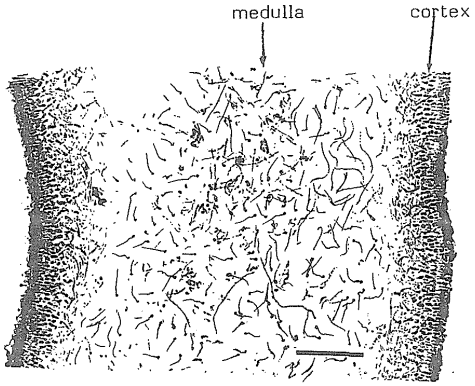
upper part of large adult

MORPHOLOGY : Thallus small, red, cartilaginous, dichotomously branched into saccate segments usually filled with mucilage. Toward the base, the plant narrows to a discoidal holdfast. The adult thallus is often infested by fungi, which appear as dark patches.

STRUCTURE AND GROWTH : The structure is multiaxial. The medulla consists of loose, longitudinal filaments organized in a gelatinous matrix; they give rise to the outer, anticlinal files of cells forming the cortex. The discoidal holdfast of the thallus is mainly formed by anticlinal rows of cells.

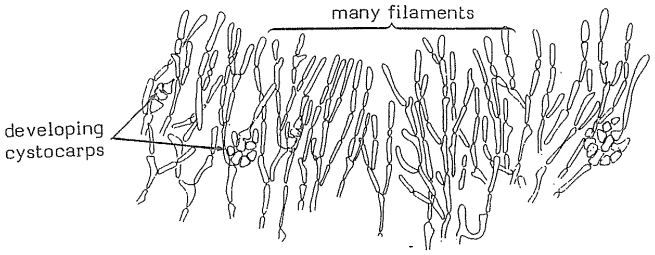
A growth zone is localized in a shallow apical invagination.

CYTOLOGY : Neoplastidial type. The cells of the medullary filaments are colourless, while those of cortex are red because of their numerous discoidal rhodoplasts, each without pyrenoids.

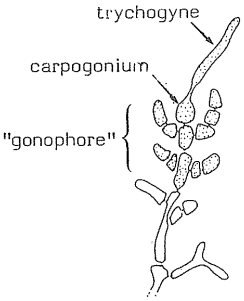


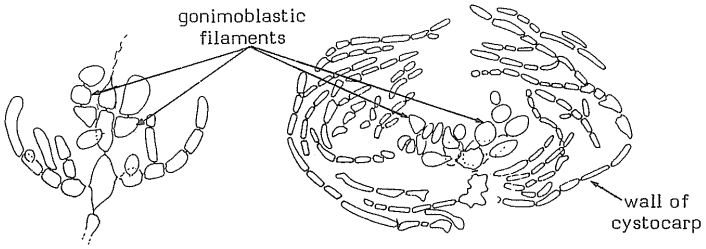
(schematic)
longitudinal section through
adult part of thallus

REPRODUCTION : In the wild, all fertile thalli are gametophytes, either male or female. Mature cystocarps are easily recognized as small, dark dots with a pericarp. They liberate carpospores which germinate and develop into discs representing the tetrasporophyte generation.

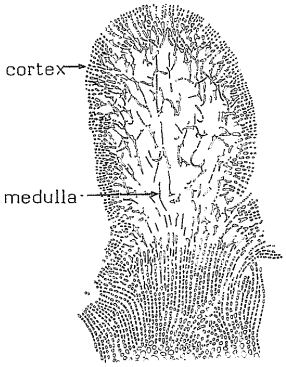


terminal part of a multiaxial growing apex



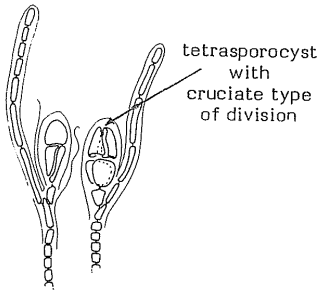


detail of 3 developing stages of cystocarps

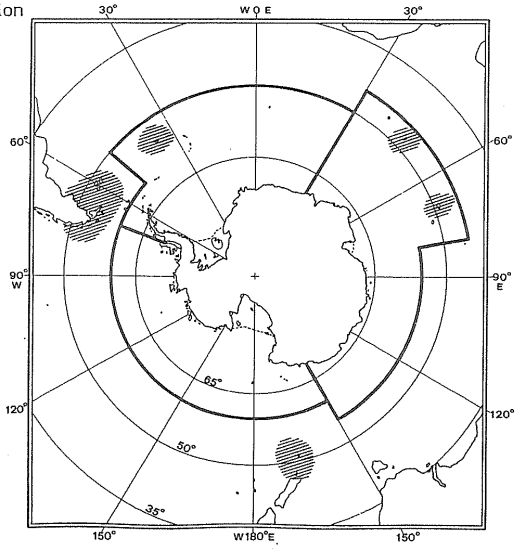


new gametophytic thallus arising from discoid base (from culture)

discoid tetrasporophytic generation



detail of tetrasporophytic filament



SIZE : Thallus reaching 10 cm in length; width of segments abour 1.5 cm.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, and Falkland/Malvinas, South Georgia, Crozet, Kerguelen, Macquarie, Auckland and Campbell islands.

ECOLOGY : An important component of the sub-Antarctic intertidal belt; found on rocky substrates.

UTILIZATION : Not yet ascertained.

RH DEL Cladod 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DELESSERIACEAE

FISHING AREAS 48,58,88 (Southern Ocean)

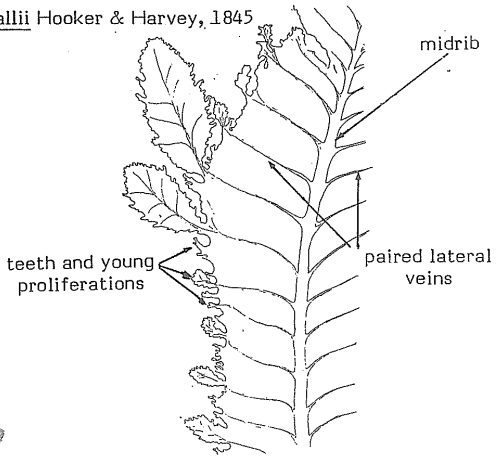
Cladodonta lyallii (Hooker & Harvey) Skottsberg, 1923

OTHER SCIENTIFIC NAMES STILL IN USE : Delesseria lyallii Hooker & Harvey, 1845

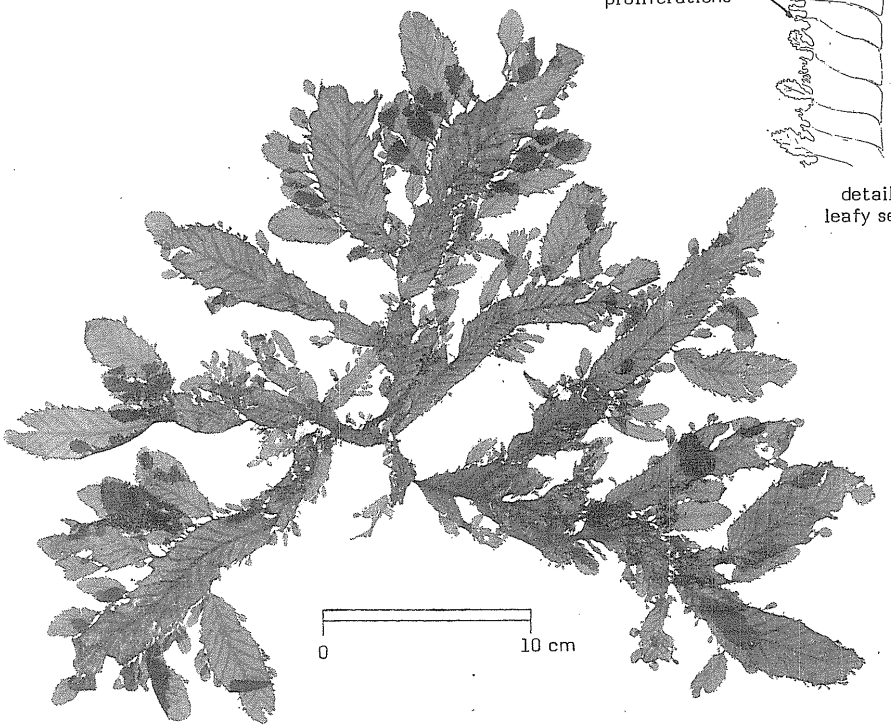
VERNACULAR NAMES :

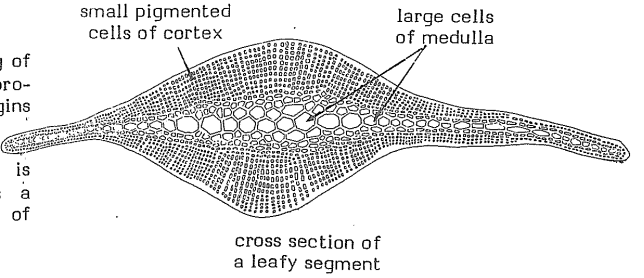
FAO/CCAMLR : En - Cladodonta
Fr - Cladodonta
Ru -
Sp - Cladodonta

NATIONAL :



detail of a leafy segment





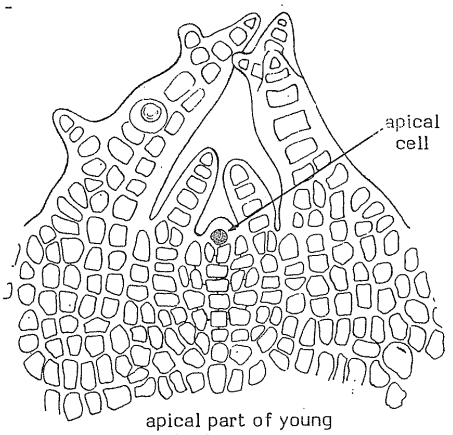
cross section of a leafy segment

MORPHOLOGY : Thallus foliaceous, consisting of characteristic leaf-like segments, each with a prominent midrib, paired lateral veins and margins producing numerous teeth or other young fronds.

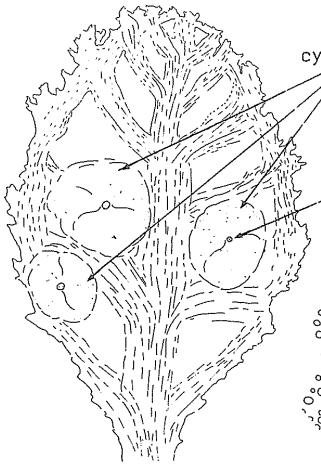
STRUCTURE AND GROWTH : The structure is of uniaxial type. A cross section shows a superficial layer of small cells and a medulla of larger cells.

CYTOLOGY : Neoplastidial type; plastids are parietal, without pyrenoids.

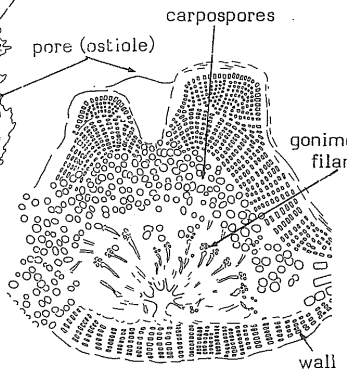
REPRODUCTION : Tetrasporocyst tetrahedrally divided, localized in sori between the veins. Cystocarp globose, very prominent, localized in the lower half of the leaf-like elements. The life cycle is trigenetic, with isomorphic gametophytic and tetrasporophytic generations.



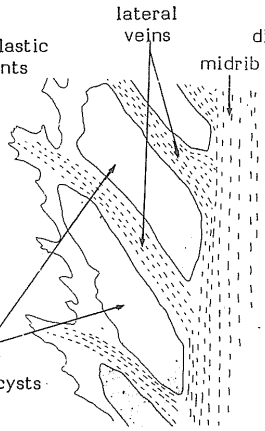
apical part of young leafy segment



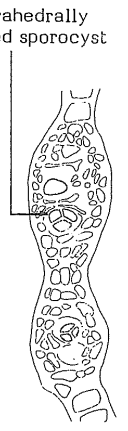
location of cystocarps on a leafy segment



cross section of a cystocarp



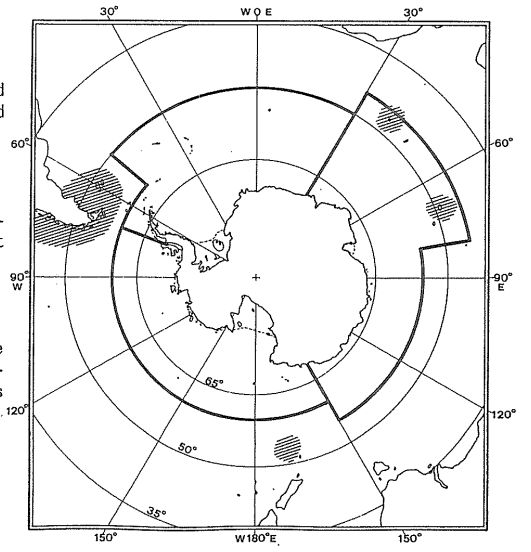
location of tetrasporocysts on a leafy segment



cross section of sori

SIZE : Thallus reaching to 50 cm in length.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego and Kerguelen, Falklands/Malvinas, Prince Edward and Macquarie islands.



ECOLOGY : Found in scattered tufts in the infra-littoral zone, preferring habitats with attenuated light conditions.

UTILIZATION : Possibly of some potential for the pharmaceutical industry, in view of its taxonomic similarity to Delesseria, which is already exploited for this purpose.

RH GIG Giga 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : GIGARTINACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

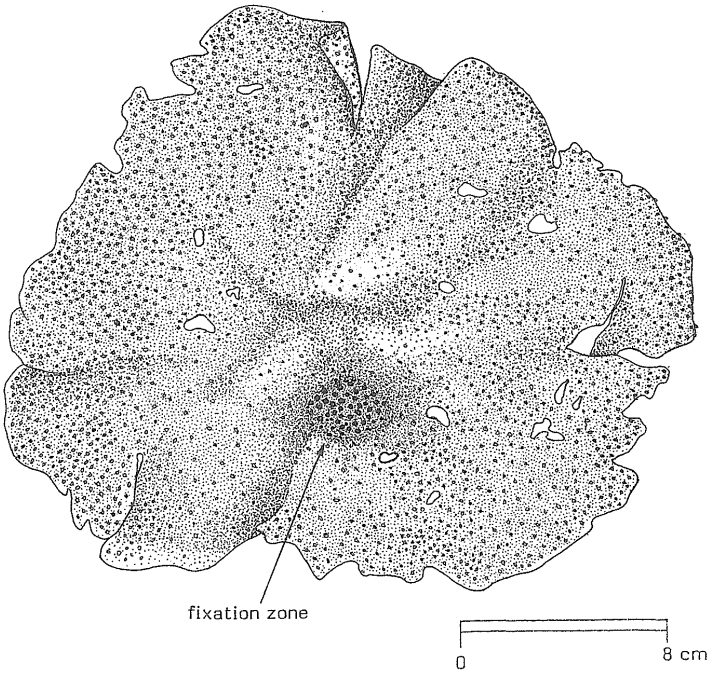
Gigartina skottsbergii Setchell & Gardner, 1936

OTHER SCIENTIFIC NAMES STILL IN USE : Gigartina radula Cotton, 1915

VERNACULAR NAMES :

FAO/CCAMLR : En - Skottsberg's gigartina
Fr - Gigartine de Skottsberg
Ru -
Sp - Gigartina de Skottsberg

NATIONAL :



MORPHOLOGY : Thallus medium-sized, foliaceous and cartilaginous, its shape highly variable, ranging from lobate through undulate to even cordate. Stipe short; holdfast often with many hapteroidal proliferations. Colour dark red. The status of the foliaceous species of Gigartina in the sub-Antarctic and Antarctic regions is not clear. The name used here is a synthetic one (including at least the morphological types described as G. radula and perhaps G. papillosa).

STRUCTURE AND GROWTH : The structure is of multiaxial type. Medulla distinct, with interwoven longitudinal filaments; cortex formed by anticlinal rows of cells which, in the inner region, are stellate due to the presence of secondary pit-connections.

Growth diffuse, but more important on the margins.

CYTOLOGY : Neoplastidial type; plastids parietal, without pyrenoids. Medullary filaments with none or only few ribbon-like plastids.

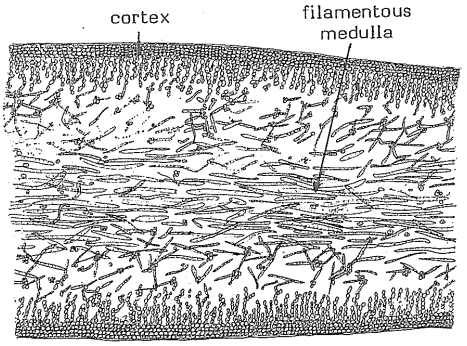
REPRODUCTION : Mature female gametophytes are quite distinct, bearing numerous fertile, stalked papillae containing cystocarps. The tetrasporocysts are crucially divided and grouped in sori embedded in the subcortical tissue. The life cycle is trigenetic, with a sterile gametophyte morphologically similar to the sterile tetrasporophytes.

SIZE : The thallus may reach exceptionally 1 m in length, but usually does not exceed 50 cm.

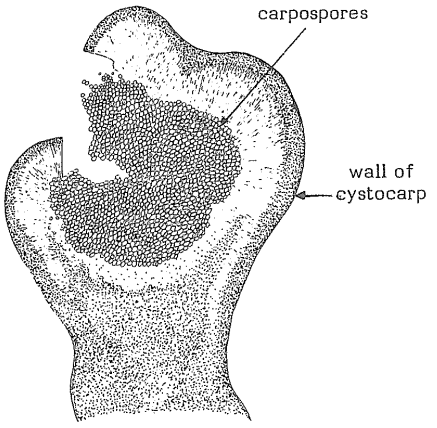
GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego and Falkland/Malvinas and Kerguelen islands.

ECOLOGY : Found in small patches in the infra-littoral zone. Very large and colourless (leatherlike) drifting thalli are sometimes observed on beaches.

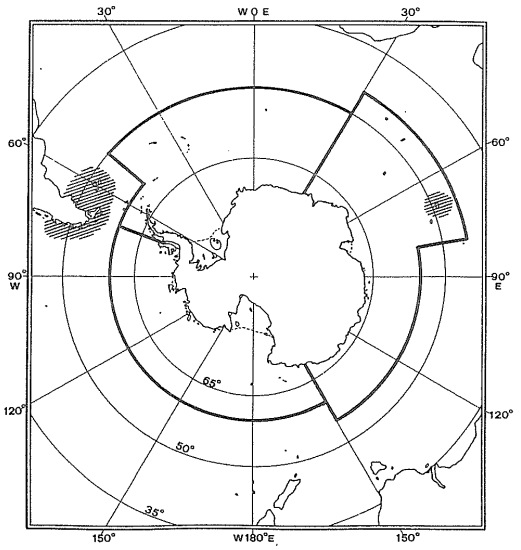
UTILIZATION : Exploited in South America for manifold industrial uses due to its contents of carrageenan.



longitudinal section of thallus



section through fertile female proliferation



RH GIG Irid 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : GIGARTINACEAE

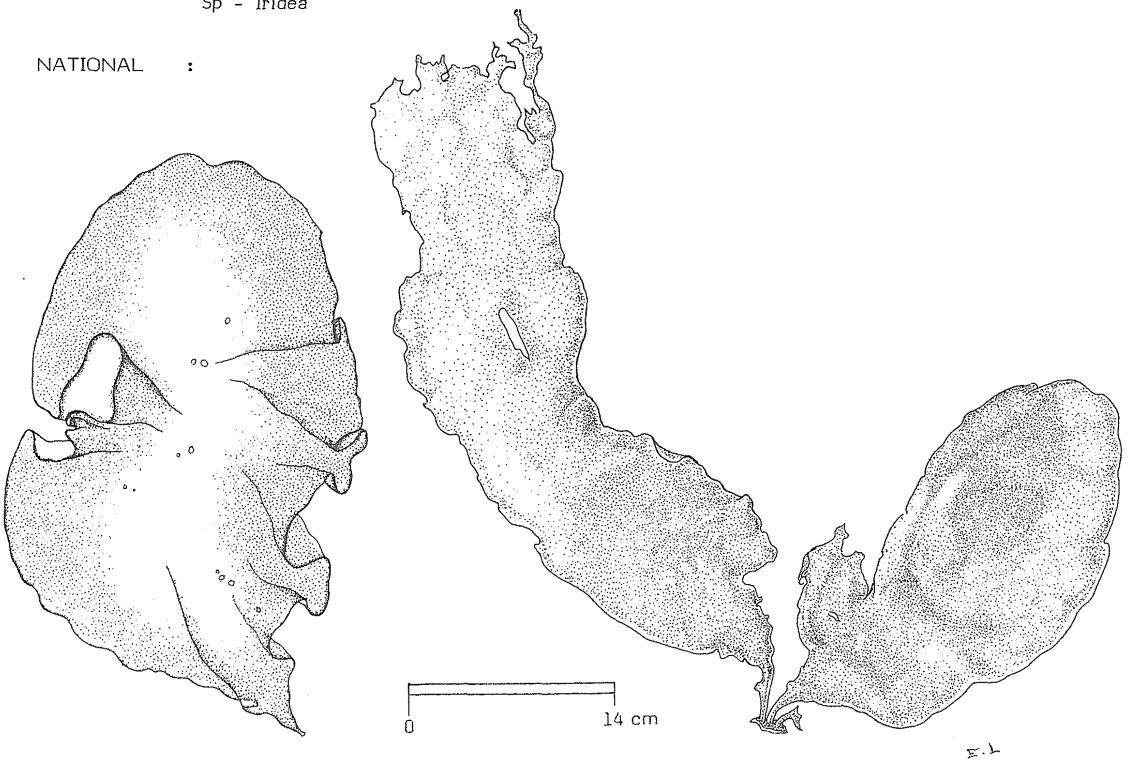
FISHING AREAS 48,58,88
(Southern Ocean)

Iridaea cordata (Turner) Bory, 1826

OTHER SCIENTIFIC NAMES STILL IN USE : Iridaea obovata Kützing, 1849
Iridaea mawsonii Lucus, 1919
Gigartina cordata (Turner) Kim, 1976
Iridaea micans Bory, 1826
Rhodoglossum schotteri Délépine in Arnaud & Délépine, 1964
Iridaea macrodonta Skottsberg, 1923

FAO/CCAMLR : En - Iridea
Fr - Iridée
Ru -
Sp - Iridea

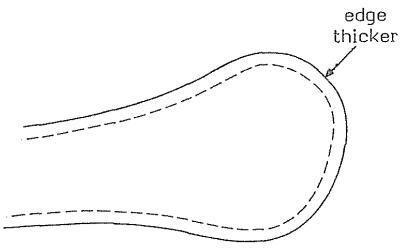
NATIONAL :



general habit

common discoid base with 3 individuals

MORPHOLOGY : Thallus medium-sized, foliaceous, relatively soft, with a perennial basal crust giving off several, usually entire, fronds. Margins without proliferations, but thicker than the other parts of the thallus. Colour brown or purple reddish, and sometimes iridiscent. According to recent unpublished studies by Leister, it seems that this species is very variable in shape and includes material described as I. obovata, I. micans, and even Rhodoglossum schotteri.



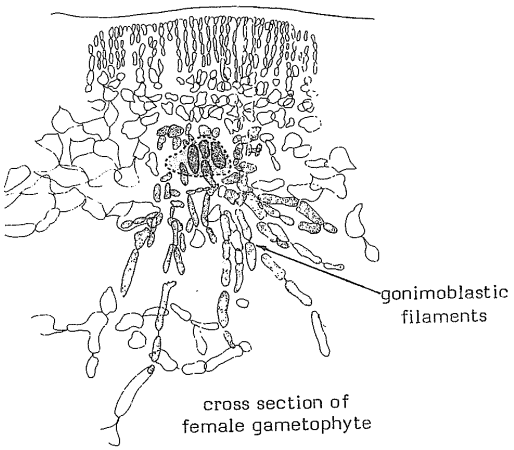
cross section of margin of thallus

STRUCTURE AND GROWTH: The structure is of multiaxial type. Medulla distinct with interwoven longitudinal filaments; cortex formed by anticlinal rows of cells, which in the inner region are stellate due to the presence of secundary pit-connections.

Growth diffuse, but more important on the margins.

CYTOLOGY: Neoplastidial type; plastids parietal, without pyrenoids. Medullary filaments with none or only few ribbon-like plastids.

REPRODUCTION: Mature female gametophytes without fruiting papillae, but with cystocarps embedded in the subcortical tissue. The tetrasporocysts are crucially divided and grouped in small sori resulting from the differenciation of several (4 or 5) inner cortical cells. The life cycle is trigenetic with a sterile gametophyte morphologically similar to the sterile tetrasporophyte.



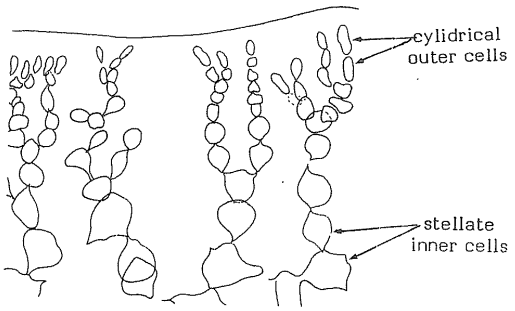
cross section of female gametophyte

SIZE: Thallus may reach 50 cm in length.

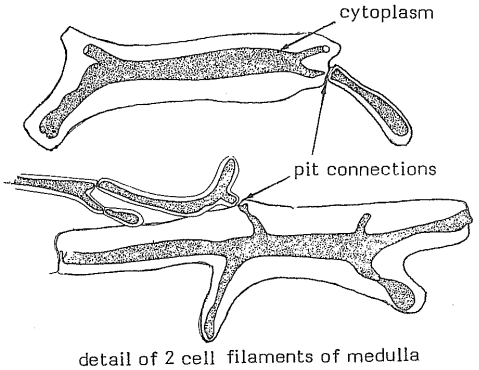
GEOGRAPHICAL DISTRIBUTION: George V and Victoria Land coasts, Southern Patagonia, Tierra del Fuego, Antarctic Peninsula and Falkland/Malvinas, South Georgia, Crozet, Kerguelen, South Shetland, Heard, Macquarie and Auckland islands.

ECOLOGY: A circumpolar species; Antarctic as well as sub-Antarctic. Found on rocky substrates, especially in the upper part of in the infra-littoral zone, but down to 20 m depth.

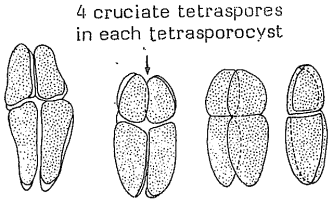
UTILIZATION: The species of this genus are used in South America as raw material for carrangeenans.



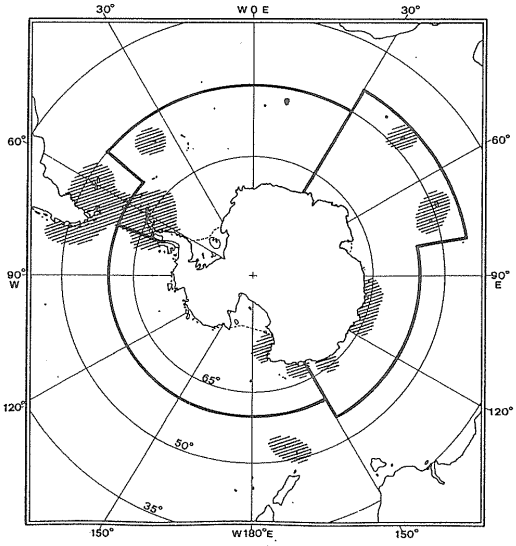
cross section of cortex



detail of 2 cell filaments of medulla



detail of tetrasporocysts



RH KAL Callop 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : KALLYMENIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

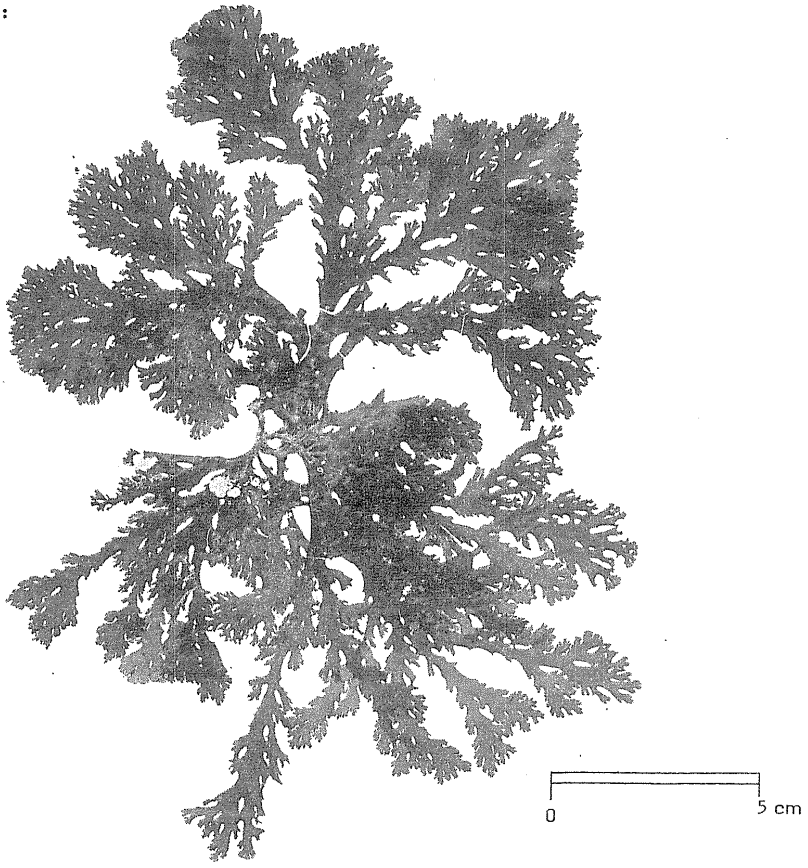
Callophyllis variegata (Bory) Kützing, 1843

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

FAO/CCAMLR : En - Manifold callophyllis
Fr - Callophyllis variable
Ru -
Sp - Calófila variable

NATIONAL :



MORPHOLOGY : Thallus membranous to cartilaginous, flabellately laciniate in one plane, highly variable in habit. Base with a small holdfast bearing hapteroid proliferations. Colour reddish with, very often, darker patches. More accurate studies on the morphological variations of this species are needed.

STRUCTURE AND GROWTH : The structure is of multiaxial type. A cross section shows a medullary zone with large, rounded cells, interspersed with small cells in filaments, and a cortical region formed of several rows of anticlinal cells.

Growth occurs predominantly in the terminal areas.

CYTOLOGY : Medullary cells rich in floridean starch. Cortical cells of neoplastidial type, with few rhodoplasts without pyrenoids.

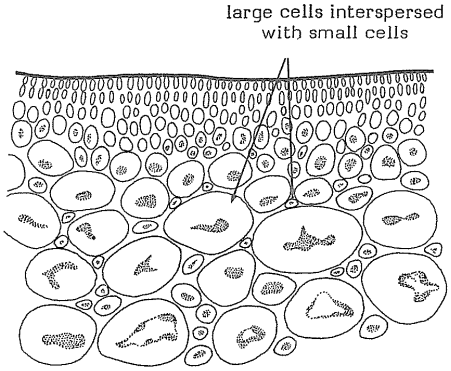
REPRODUCTION : Gametophytes with embedded cystocarps scattered over the upper parts of the thallus. Tetrasporophytes morphologically similar to gametophytes, bearing cruciate tetraspores in their cortical layers.

SIZE : Thallus reaching up to 40 cm in length.

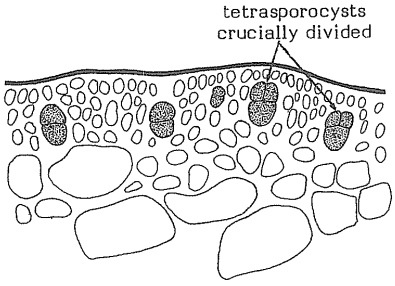
GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, Antarctic Peninsula and Falkland/Malvinas, South Orkney, Crozet, Kerguelen, Macquarie, Auckland and Campbell islands.

ECOLOGY : Found in small aggregations in the upper part of infra-littoral zone.

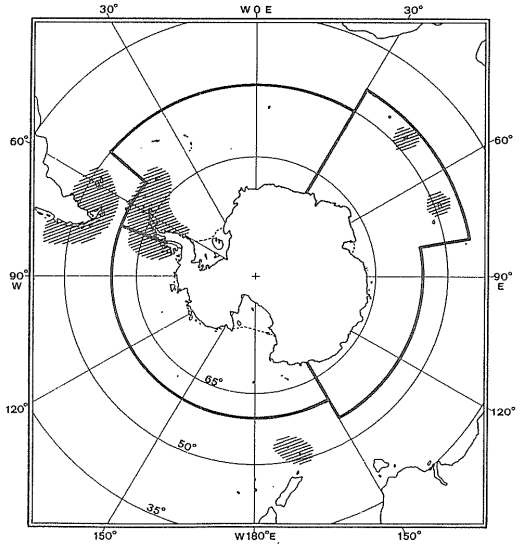
UTILIZATION : Some antimicrobial activity has been detected, hence this species may have potential interest in the pharmaceutical industry.



cross section of thallus



section through
a tetrasporophyte



RH PAL Lepto 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PALMARIACEAE

FISHING AREAS 48,58,88
(Southern Ocean)

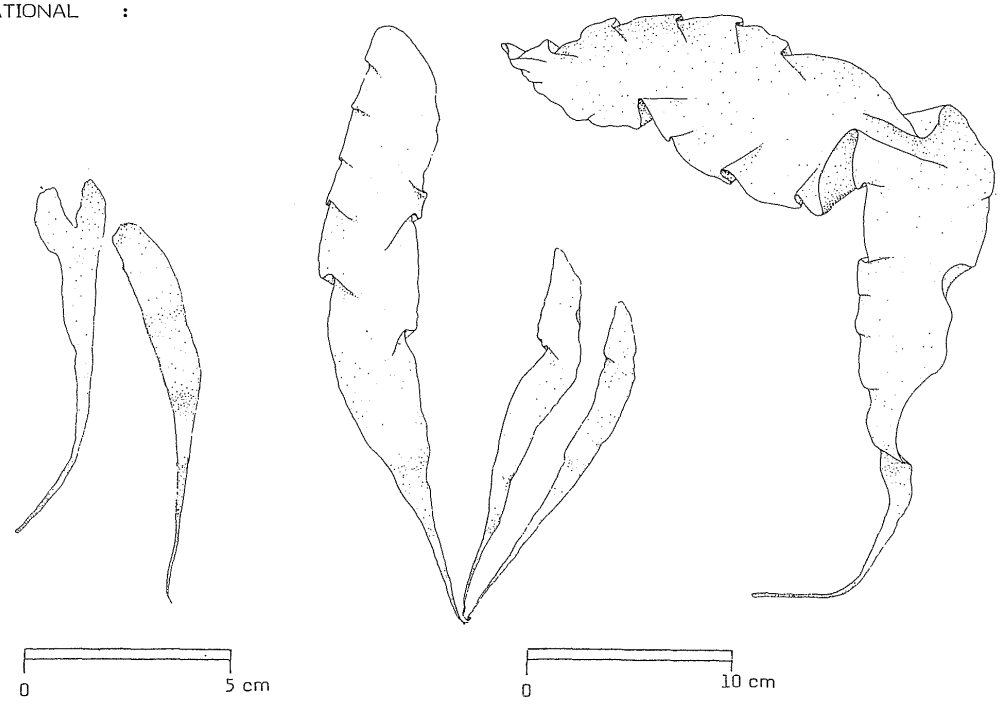
Leptosomia simplex (A. & E.S. Gepp) Kylin, 1956

OTHER SCIENTIFIC NAMES STILL IN USE : Leptosarca simplex A. & E.S. Gepp, 1905

VERNACULAR NAMES :

FAO/CCAMLR : En - Austral dulse
Fr - Dulce austral
Ru -
Sp - Dulce austral

NATIONAL :

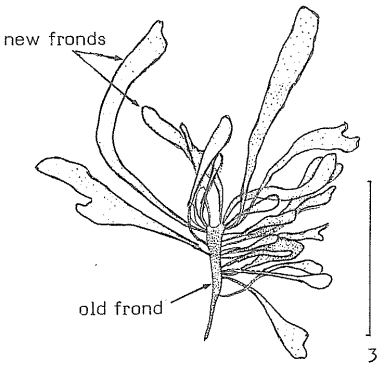


young thalli

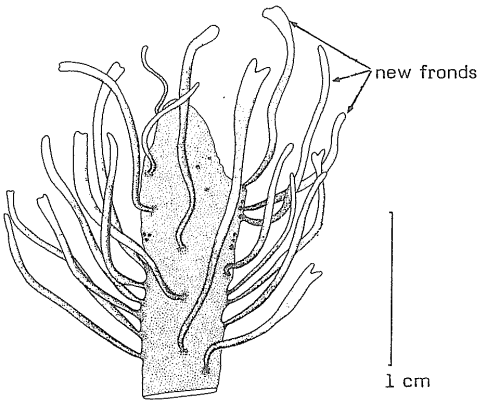
3 individuals arising from a common base

single adult individual

MORPHOLOGY : Thallus oblong, lanceolate, becoming gradually attenuate at its base, thinly membranous, of delicate flaccid texture when young, but becoming more coriaceous with age. The margins of old individuals generate new fronds which give the plant a general branched habit. Fronds often form groups, with individuals arising from a common basal disc.

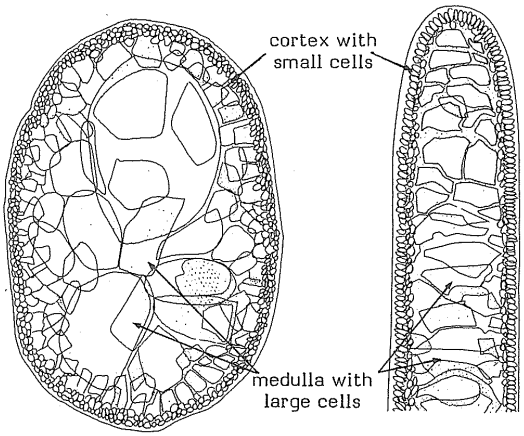


proliferation of new fronds



detail

STRUCTURE AND GROWTH : The structure is of multiaxial type. A cross section shows a medulla of large cells surrounded by a few layers of small, isodiametric cortical cells.

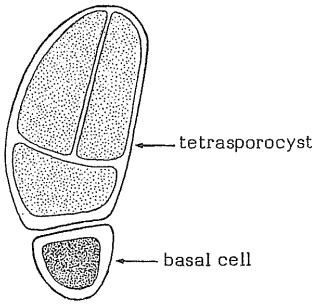


cross section through basal part

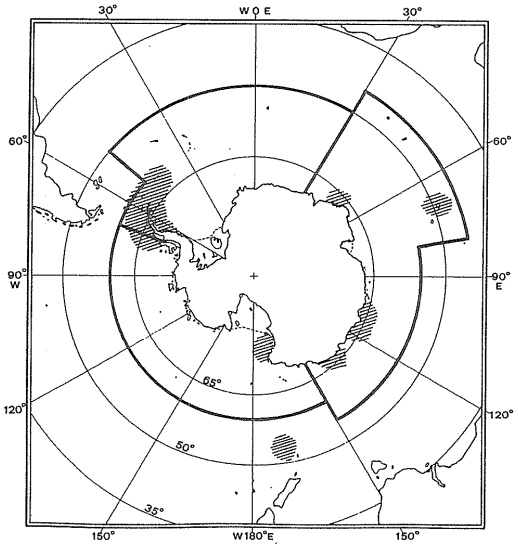
cross section through leafy terminal part

CYTOLOGY : Neoplastidial type. Plastids are parietal, without pynenoids.

REPRODUCTION : Only tetrasporophytes occur in the wild. They bear cruciately divided tetrasporocysts, each arising from a stalked cell. The life cycle is not known, but probably similar to Palmaria palmata, with a female microscopic thallus giving rise, after fertilization, to the tetrasporophyte.



SIZE : Thallus reaching to 40 cm in length and 15 cm in width.



GEOGRAPHICAL DISTRIBUTION : Antarctic Peninsula, Enderby Land, Adelie coast, Wilkes Land, Victoria Land, and South Orkney, Kerguelen and Macquarie islands.

ECOLOGY : Very abundant; forming a dense belt, especially in the lower part of intertidal zone.

UTILIZATION : Like Palmaria palmata, this species could have good potential as human food.

RH PLO Ploca 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PLOCAMIACEAE

FISHING AREAS 48,58,88 (Southern Ocean)

Plocamium cartilagineum (Linnaeus) Dixon, 1967

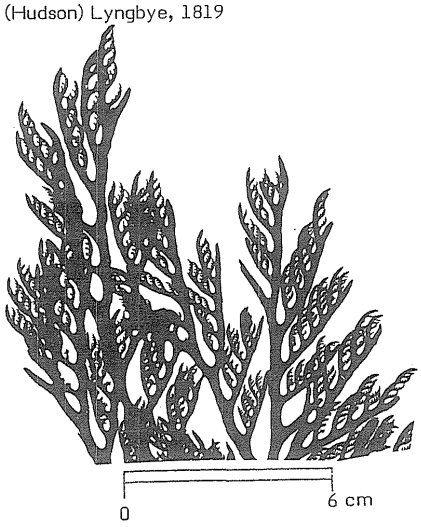
OTHER SCIENTIFIC NAMES STILL IN USE : Plocamium coccineum (Hudson) Lyngbye, 1819

OTHER SCIENTIFIC NAMES STILL IN USE : None

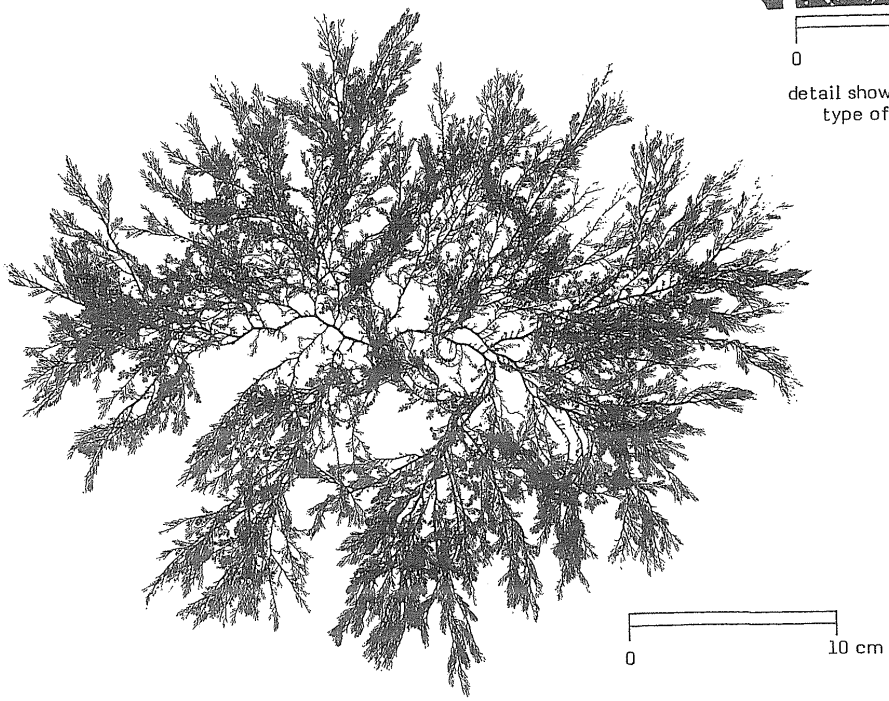
VERNACULAR NAMES :

FAO/CCAMLR : En - Plocamium
Fr - Plocamium
Ru -
Sp - Plocamio

NATIONAL :



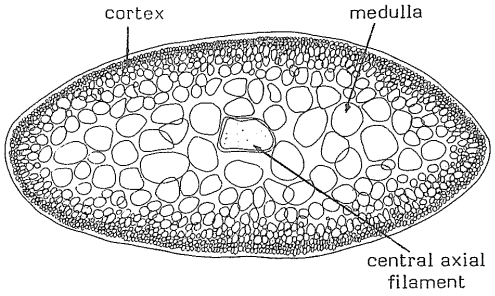
detail showing sympodial type of branching



MORPHOLOGY : Thallus compressed, well branched in a single plane, its main branches distinctly flattened, linear, without midribs. Type of branching distinctly of sympodial type, with up to 2 to 5 pectinate ramifications per segment. Colour bright red. Attached to the substrate by a holdfast of rhizoidal branches.

STRUCTURE AND GROWTH : The structure is of uniaxial type. Apical cell quite visible, but central filament often not evident in the lower parts of the thallus. Each cell of the central filament gives rise to large pericentral cells constituting a medullary region; cortex composed of few layers of small, pigmented cells.

Growth of apical type, constituting one of the best examples for sympodial growth in algae.

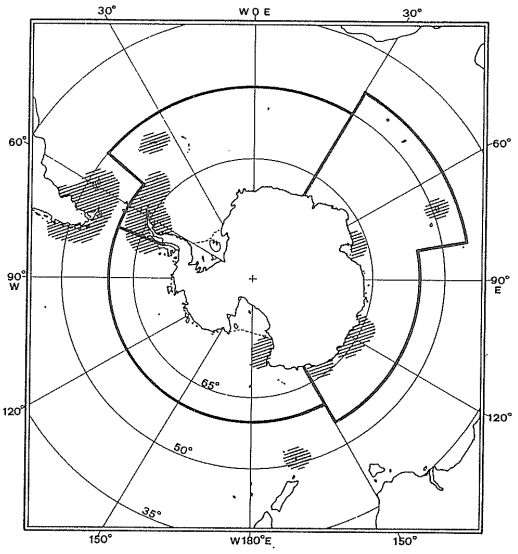


cross section of thallus

CYTOLOGY : Neoplastidial type; plastids without pyrenoids; cells with characteristic inclusions, quite visible in live material.

REPRODUCTION : Gametophytes dioecious: sori of spermatocysts located on young ramifications; cystocarps prominent.

Tetrasporophytes bearing special reproductive ramifications with zonate tetrasporocysts.



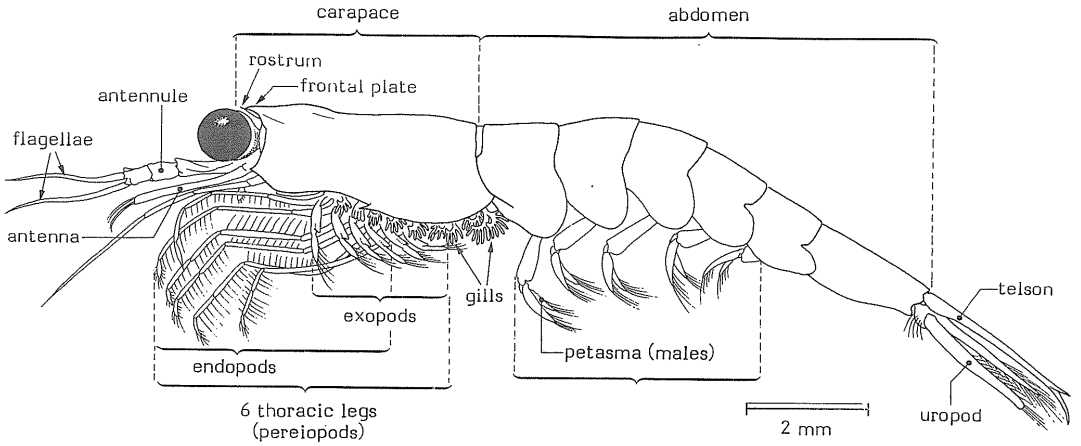
SIZE : Thallus reaching 30 cm in length; main branches a few mm in diameter.

GEOGRAPHICAL DISTRIBUTION : Tierra del Fuego, Antarctic Peninsula, MacRobertson coast, Adelie coast, Wilkes Land, Victoria Land and Falkland/Malvinas, South Georgia, South Orkney, Kerguelen, Auckland and Campbell islands.

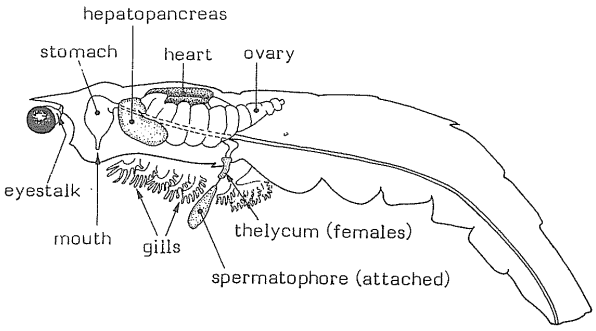
ECOLOGY : Small aggregations of this species are found on rocky substrates, or on larger algae in littoral pools and in the infra-littoral zone to 20 m depth.

UTILIZATION : The species might be of pharmaceutical interest.

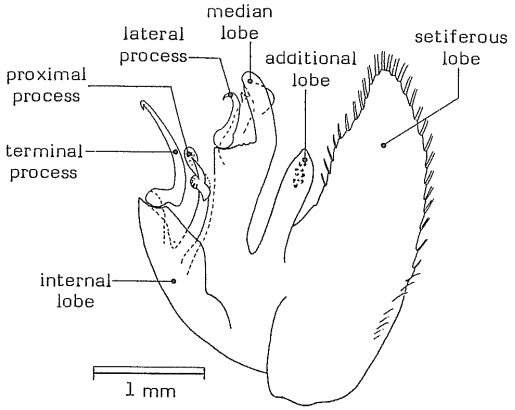
Glossary of Technical Terms



External morphology Fig.1



Internal morphology Fig.2



Petasma (males) Fig.3

Antenna	:	The second pair of anterior appendages of the head region placed behind the antennule, uniramous and provided with a leaf-like structure or antennal scale. Also referred to as second antenna (Fig.1).
Antennule	:	The pair of front-most appendages of the head region composed of a tri-articulate peduncle and a biramous multiarticulate flagellum; also referred to as first antenna (Fig.1).
Eyestalk	:	Peduncle movably articulated with the head, supporting the eye at its distal end (Fig.2).
Oostegites	:	Ventral lamella arising from the coxa of the pereiopods in females; participating in the formation of the midventral marsupium.
Pereiopods	:	Biramous locomotory thoracapod or thoracic legs, sometimes rudimentary (Fig.1).
Petasma	:	Pleopods modified as copulatory organs, typically composed of 4 lobes: setiferous, internal, median and additional, each one bearing spines, setae and/or elongated conspicuous processes (Fig.3).
Pleopods	:	Biramous limbs of any of the anterior five abdominal somites adapted for swimming. In adult males, the first two are adapted as copulatory organs (petasma) (Fig.1).
Podobranchial gills	:	A fan-like structure composed of thin-walled, finger-like protrusions attached to the coxopodites of the thoracic legs, functioning for respiration (Figs 1,2).
Telson	:	Last somite of the body bearing the anus and a set of spines. Combined laterally with the expanded uropods, it forms a powerful swimming structure or caudal fan (Fig.1).
Thelycum	:	External chamber on the surface of the thorax formed by outgrowths from the last thoracic somites which functions as a seminal receptacle (Fig.2).

GENERAL REMARKS

Euphausiids are small, shrimp-like crustacea which maintain most features of the caridoid facies. Commonly known as krill, a Norwegian word referring to dense concentration of crayfish-like food of whales, euphausiids have been previously classified among sergestid shrimps or among schizopods with mysiid shrimps. Translucent when fresh, euphausiids are spotted with red chromatophores over the dorsal surface, the mouth area and the sternal part of the cephalothorax.

The carapace of euphausiids is represented by a light chitinous shield fused with all thoracic somites, leaving the segmental podobranchial gills uncovered. The frontal plate of the carapace bears a keel and often extends into a distinct rostrum. The heart is small and restricted to the thorax; the hepatopancreas is large and ramified; and females lack oostegites. With one unique exception, euphausiids are bioluminescent. Light-producing organs (photophores), are located between the pleopods on the abdomen, on the thorax and on the eyestalks. The eyes are composite and two pairs of antennae precede the following mouth parts: labrum, mandibles, maxillules and maxillae. The biramous thoracic legs (pereiopods or thoracopods) are six to eight in number and of distinct generic development; their inner branches (endopodites) can be extremely elongated to form prehensile appendages; the pleopods or abdominal appendages are also biramous and are always present in the five adult abdominal segments; the telson and uropods form a caudal fin.

Euphausiids are dioecious (separate sexes) and some species exhibit external sexual dimorphism, either in antennal ornamentation or in difference in body size or proportion. Males possess two pairs of pleopods morpho-functionally adapted as copulatory organs (petasma) provided with lobes, processes, hooks and spines for mating. One to three spermatophores (stalked, chitinous ovoid sperm sacs) are implanted on the modified sternal plates (thelycum) of the female. Fertilization may occur internally as the eggs are laid. Females may maintain eggs in ovisacs, though eggs are free-living in several genera. Embryonic development may take hours to a few days. Larval development is distinctive and comprises several phases and the following stages: 2 nauplius, 1 metanauplius, 3 calyptopis, and a variable number of furcilia before the juvenile phase. Eggs hatch at the nauplius or metanauplius stage. Moulting of the exoskeleton is as frequent as 4 to 5 days in most species, but may extend to 14 to 16 days in others. The life expectancy is usually about 1 to 3 years, but large deep-living species may live several years. Recent work suggests Euphausia superba may also live 5 to 7 years.

The number of euphausiid species and their systematic status has changed little since early century expeditions and descriptions. The total number of living species is 85. All except one deep-living species (Bentheuphausia amblyops) compose the family Euphausiidae with 10 genera, and all are marine inhabitants of high seas and neritic waters extending from the poles to the tropics. Abundance and distributional habits vary widely. Most are epipelagic, although the depth ranges of some extend to over 3 000 m. Several species live in or form dense and distinct aggregations (swarms or schools). The size of most adults ranges between 1 and 2 cm; some reach 4 to 6 cm and rare species may measure up to 15 cm. Because of this and their swimming speed and behaviour, some species are not considered as planktonic but as nectonic organisms. Euphausiids are herbivorous, carnivorous, omnivorous or detrivorous; cannibalism is not discarded. They are major food items in the diets of baleen whales, seals, pelagic birds and both demersal and pelagic fishes.

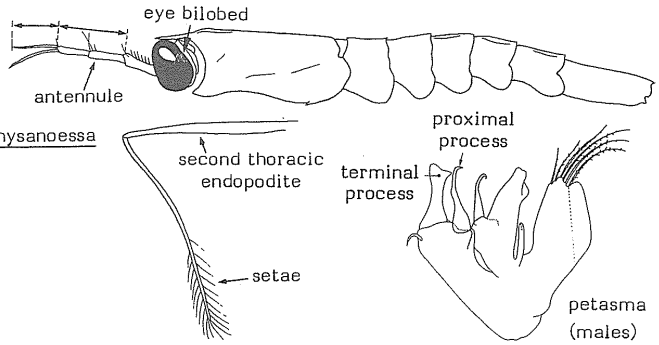
Although most species are unexploited by man, minor local fisheries may be based on coastal species, and a recent major fishery (1/2 million tons annually) is being established in the Antarctic, based almost exclusively on Euphausia superba. However, the actual catch (experimental and commercial) obtained in the course of the last few years by Federal Republic of Germany, Japan, Poland, USSR, etc. is probably higher. Midwater trawling is the most frequently used fishing technique in the Antarctic because krill concentrations are high and their acoustic targets are distinctive. An increase of fishing effort and of the catches in this area may be envisaged in the near future. Krill is primarily used for human and domestic animal consumption, among other uses.

Seven species belonging to two genera (Euphausia and Thysanoessa) occur in the Southern Ocean. Although only one of them, Euphausia superba, is currently of interest to fisheries, we are presenting sheets for the other species, in view of their important role in the Antarctic ecosystem, and also, to facilitate their differentiation from E. superba.

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA :

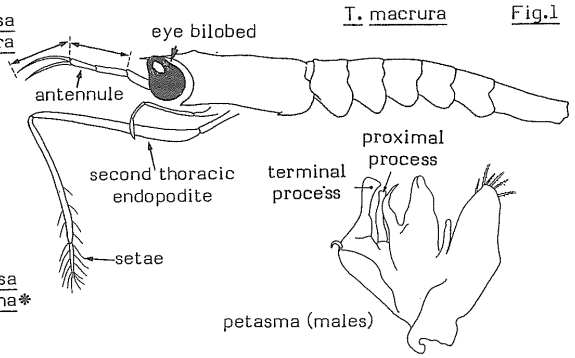
1a. Eyes divided into 2 lobes, the lower lobe larger than the upper; second thoracic endopodite elongate with setae fringing the margins of the last 2 segments (Figs 1 and 2) ..... Thysanoessa

2a. Antennule with the upper flagellum (often broken) somewhat shorter than the sum of the two distal peduncular segments. Terminal process of the petasma distally expanded at both sides, without serration; proximal process curved, pointed and longer than terminal process (Fig.1)..... Thysanoessa macrura



T. macrura Fig.1

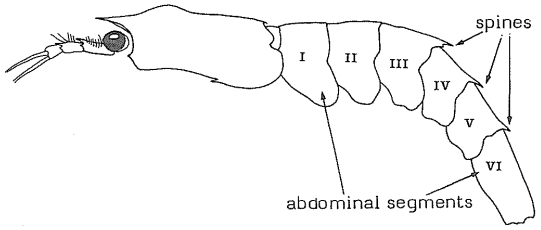
2b. Antennule with the upper flagellum somewhat or considerably longer than the two distal peduncular segments. Terminal process of the petasma somewhat expanded on the inner sides; distal margin finely serrated; proximal process laminar and shorter than terminal process (Fig.2) ..... Thysanoessa vicina*



T. vicina Fig.2

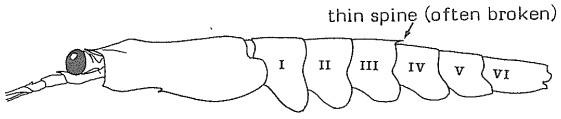
1b. Eyes spherical or slightly ovoid in shape; all thoracic endopodites nearly uniform in size and structure, the second not elongate (Figs 3 to 7) ..... Euphausia

3a. A mid-dorsal spine on third to fifth abdominal segments (Fig.3)..... Euphausia triacantha



E. triacantha Fig.3

3b. A mid-dorsal spine on third abdominal segment only (Fig.4)..... Euphausia vallentini



E. vallentini Fig.4

*These two species are very difficult to distinguish, particularly females and immature specimens

FAO Sheets

EUPHAUSIIDS

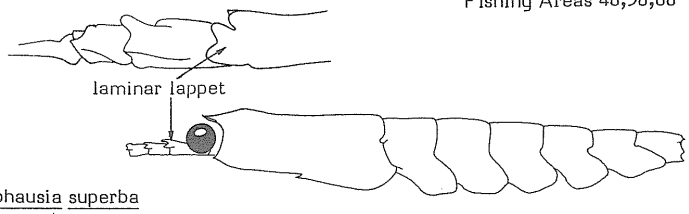
Fishing Areas 48,58,88

3c. No mid-dorsal spine on abdominal segments

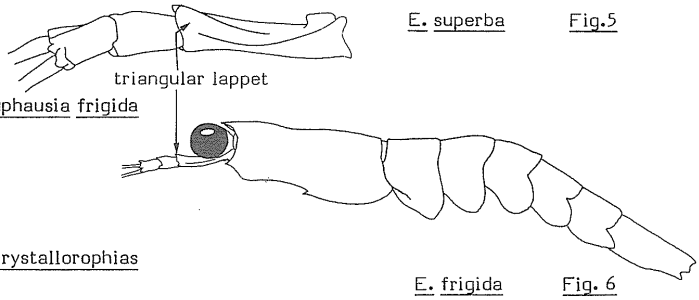
4a. First segment of antennule provided with a distal laminar lappet (Fig.5) .....Euphausia superba

4b. First segment of antennule provided with an obtuse triangular lappet (Fig.6) ..... Euphausia frigida

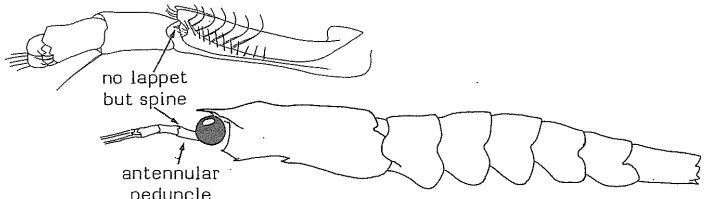
4c. First segment of antennule lacks lappet; only a stout, simple spine present on the outer distal corner (Fig.7) ..... Euphausia crystallorophias



E. superba Fig.5



E. frigida Fig. 6



E. crystallorophias Fig.7

LIST OF SPECIES OCCURRING IN THE AREA :

Code numbers are given for those species for which Identification Sheets are included

Euphausia crystallorophias Hold & Tattersall, 1906	EUPH Euph 1
Euphausia frigida Hansen, 1911	EUPH Euph 2
Euphausia superba Dana, 1852	EUPH Euph 3
Euphausia triacantha Holt & Tattersall, 1906	EUPH Euph 4
Euphausia vallentini Stebbing, 1900	EUPH Euph 5
Thysanoessa macrura G.O. Sars, 1983	EUPH Thy 1
Thysanoessa vicina Hansen, 1911	

Prepared by T. Antezana, Departamento de Oceanología, Facultad de Ciencias Biológicas y de Recursos Naturales, Universidad de Concepción, Concepción, Chile

EUPH Euph 1

1985

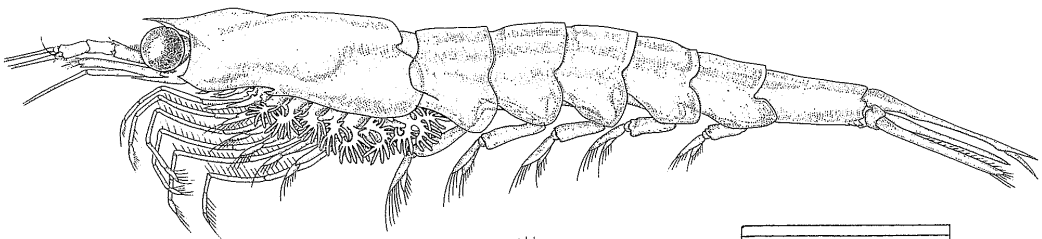
FAO SPECIES IDENTIFICATION SHEETS

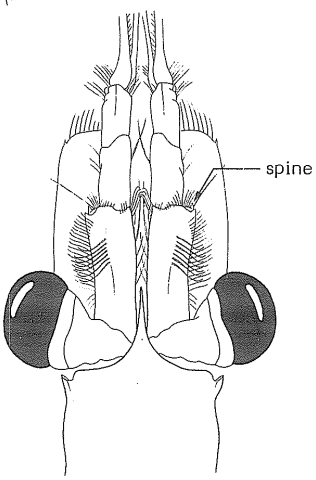
FAMILY : EUPHAUSIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Euphausia crystallorophias Hold & Tattersall, 1906

OTHER SCIENTIFIC NAMES STILL IN USE : None





dorsal view
of cephalothorax

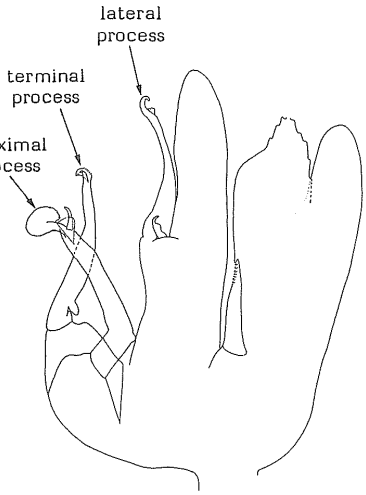
VERNACULAR NAMES :

FAO/CCAMLR : En - Ice krill
Fr - Krill des glaces
Ru - Podlednyi krill
Sp - Krill glacial

NATIONAL :

DISTINCTIVE CHARACTERS :

Eyes large, spherical. Frontal plate with a rectangular expansion over each eye. Rostrum long and acute, reaching beyond the eyes. Carapace keel long and low, extending to the rostrum. Mandibular palp short, with its distal segment 2 or 3 times as long as broad. First antennular segment with a short sharp spine or denticle on its outer distal corner; the third segment bears a thin, low keel with a straight distal edge. Abdominal segments without mid-dorsal spines. Proximal process of petasma slender, as long as the terminal, provided with a secondary process and ending in two expansions very different in size and shape; terminal process slender, with a very reduced heel as a blunt protuberance and terminating in two expansions: one small, curved, and finger-like, and the other large, laminar, curved and serrated on one edge; lateral process long, curved and acute at the end, with a rounded protuberance at its base. These form together a hook-like distal expansion.



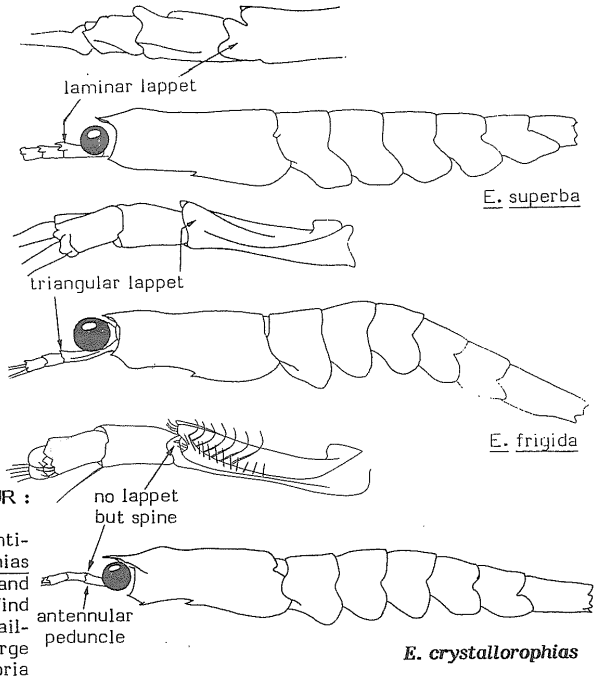
petasma (males)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Euphausia superba and E. frigida: first antennular segment with a wide laminar lappet or small triangular lobe distally. Rostrum short and somewhat truncate. Eye relatively smaller.

E. vallentini and E. triacantha: mid-dorsal processes on third (E. vallentini), or on third, fourth and fifth segments of abdomen (E. triacantha).

Thysanoessa vicina and T. macrura: eyes bilobed, second thoracic endopodite greatly elongated; antennular peduncle long and slender.



SIZE :

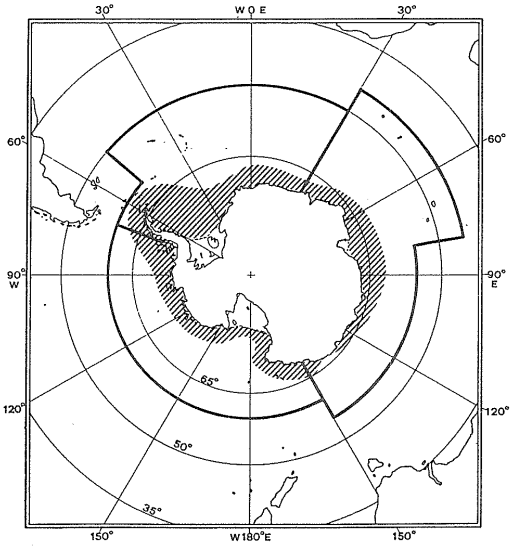
Maximum adult size: 34 mm (females); 32 mm (males).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Occurs between the coast of the Antarctic Continent and the Antarctic Covergence. E. crystallorophias replaces E. superba in dominance in regions of pack and floating ice in the coastal current of the East Wind Drift. It appears to be a swarming species and available as food for large consumers. Particularly large concentrations are found in the Ross Sea off Victoria Land and Whale Bay.

Found from the surface to usually 300 to 650 m, but recorded in the Bellinghausen Sea from depths near to 4 000 m. Apparently undertakes vertical diel migrations.

Breeds from the end of December to February under the ice.



INTEREST TO FISHERIES

Negligible as compared to E. superba.

EUPH Euph 2

1985

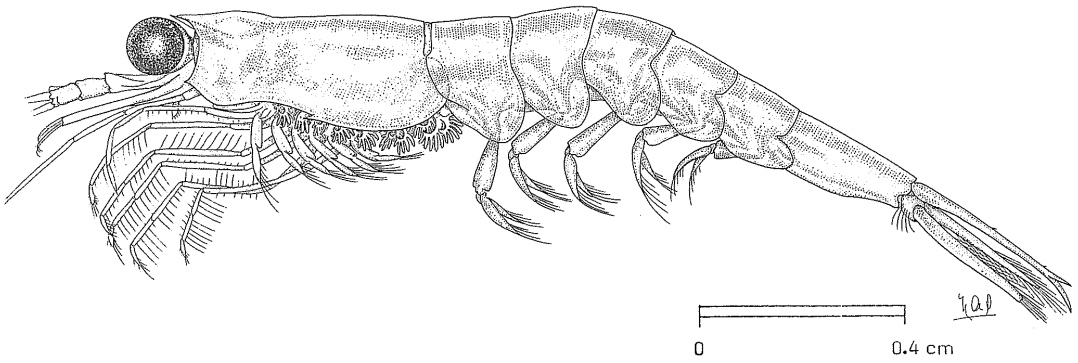
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : EUPHAUSIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Euphausia frigida Hansen, 1911

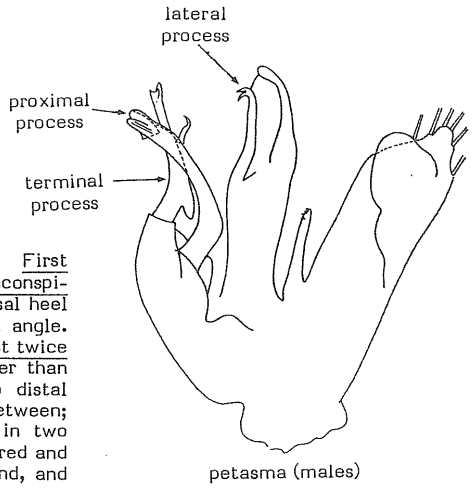
OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Pygmy krill
Fr - Krill pygmée
Ru - Krill-frigida
Sp - Krill pigmeo

NATIONAL :



petasma (males)

DISTINCTIVE CHARACTERS :

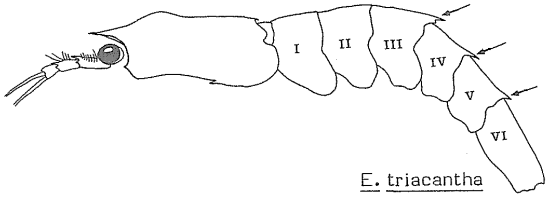
Eyes large, spherical. Rostrum very short and triangular. First segment of antennula with a very small, triangular lobe which is inconspicuous from lateral view; third segment bearing a strong, thin dorsal heel with straight upper and distal margins which meet nearly at right angle. Abdominal segments without mid-dorsal spines; sixth segment almost twice as long as high in lateral view. Proximal process of petasma longer than terminal process and provided with a secondary spine and two distal expansions of different size, with a robust, blade-like denticle in between; terminal process slender, with a rounded heel and terminating in two expansions: one lanceolate and serrated at one edge, the other squared and pointed distally; lateral process long and slender, curved at the end, and with a robust secondary tooth.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

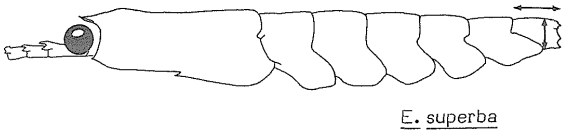
Euphausia vallentini and E. triacantha: mid-dorsal spine on third (E. vallentini) or on third, fourth and fifth abdominal segments (E. triacantha). Lappet of first antennular segment bifid or rounded and laminar.

E. crystallorophias and E. superba: first antennular segment with a stout simple spine (E. crystallorophias) or with a wide laminar lappet (E. superba). Also, sixth abdominal segment nearly as long as high from lateral view in E. superba.

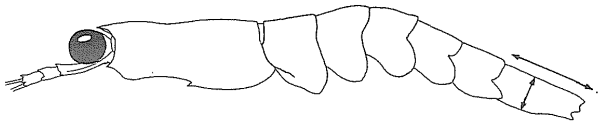
Thysanoessa vicina and T. macrura: eyes bi-lobed. Second thoracic endopodite greatly elongated; antennular peduncle long and slender.



E. triacantha



E. superba



E. frigida

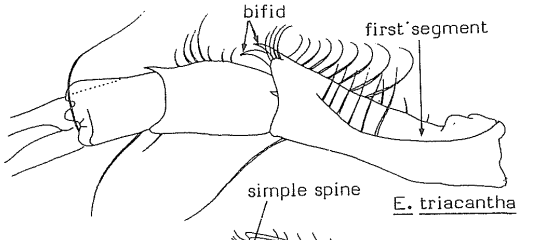
SIZE :

Maximum: 11 to 24 mm.

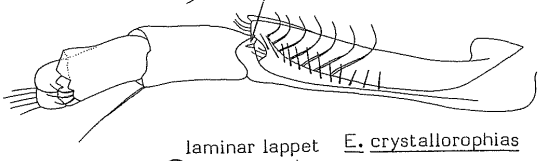
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Occurs from the Antarctic Convergence to the edge of the pack-ice and is not found in or under the ice; occasionally found just north of the Antarctic Convergence in the Drake Passage, south of the Falkland/Malvinas Islands, New Zealand and Kerguelen Islands. Although it is usually found in scarce numbers, a swarm was located in the Indian Ocean sector.

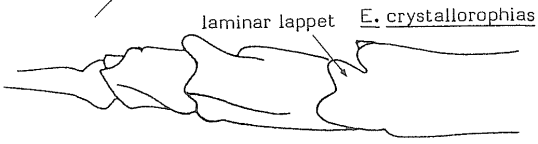
Undergoes vertical diel migrations from the surface to 200 m depth. Breeds between October and January north of the floating ice zone, but breeding may extend to March in the Scotia Sea.



E. triacantha



laminar lappet E. crystallorophias



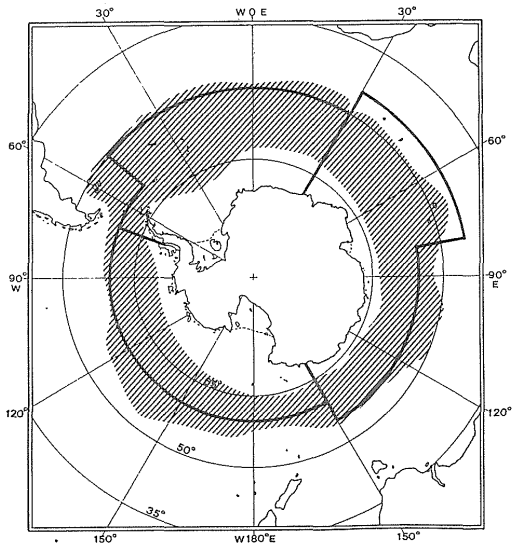
triangular lappet E. superba

antennular peduncle

E. frigida

INTEREST TO FISHERIES

None.



EUPH Euph 3

1985

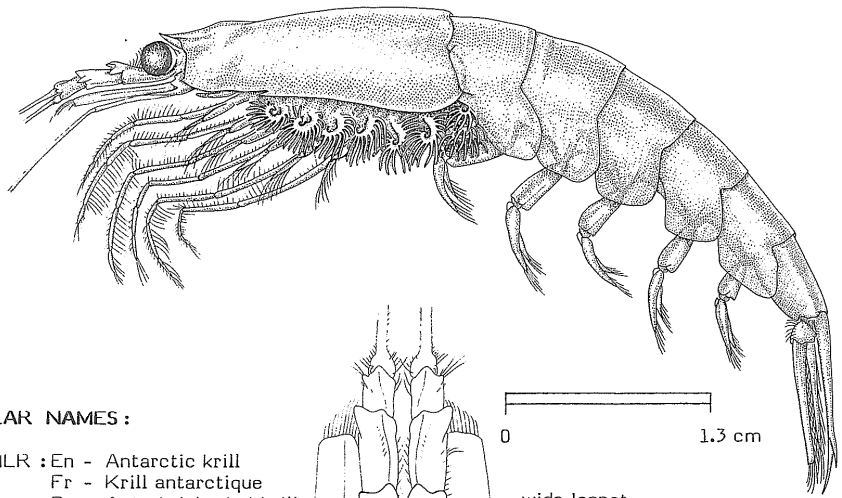
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : EUPHAUSIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Euphausia superba Dana, 1852

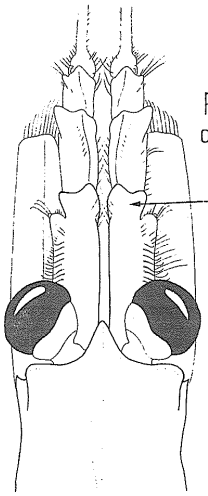
OTHER SCIENTIFIC NAMES STILL IN USE : None



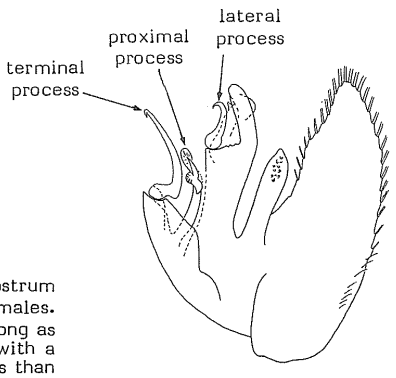
VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic krill
Fr - Krill antarctique
Ru - Antarkticheskyi krill
Sp - Krill antártico

NATIONAL :



dorsal view
of cephalothorax



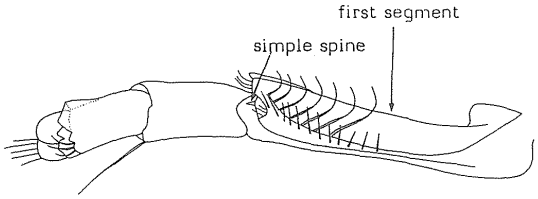
petasma (males)

DISTINCTIVE CHARACTERS :

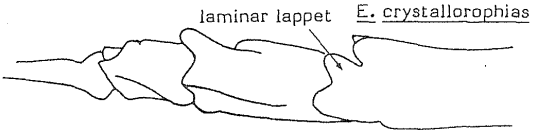
Eyes spherical, somewhat larger in males than in females. Rostrum short, triangular and truncated, a little shorter in males than in females. Distal segment of mandibular palp long and slender, seven times as long as broad. First segment of antennular peduncle bearing a wide lappet with a sinuous distal margin which is stouter, narrower and smaller in males than females; second segment bearing a dorsal lappet which is wider and larger in females. Abdominal segments without mid-dorsal spines; sixth segment nearly as long as high. Proximal process of petasma without keel, terminal process curved and pointed, not cleft in two; lateral process without secondary tooth.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

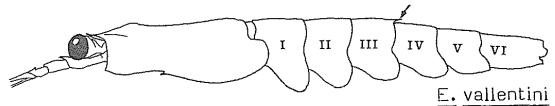
Euphausia crystallorophias and E. frigida: first antennular segment either without lappet but with a single stout, simple spine on outer distal corner (E. crystallorophias) or with a very short, triangular and obtuse lappet (E. frigida).



E. vallentini and E. triacantha: mid-dorsal spines present on third (E. vallentini), or on third, fourth and fifth segments of abdomen (E. triacantha).

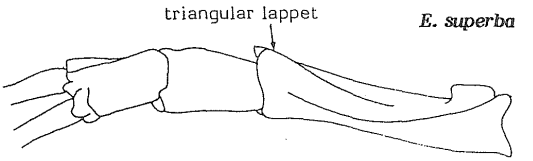


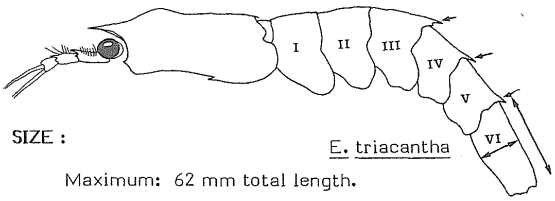
Thysanoessa vicina and T. macrura: eyes divided into 2 lobes, second thoracic endopodite greatly elongated; antennular peduncle long and slender.



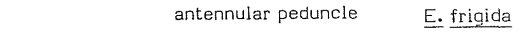
E. vallentini

E. superba





E. triacantha



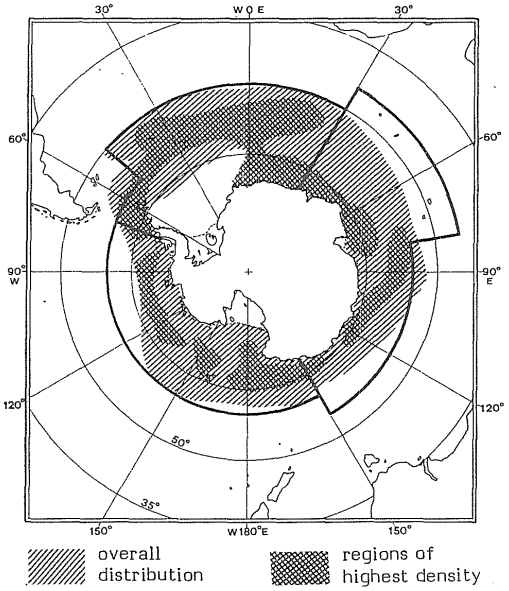
SIZE :

Maximum: 62 mm total length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

E. superba occurs in a wide circumpolar belt between the Antarctic Continent and the Polar Front. Areas of highest abundance as determined with plankton nets and trawls are found within or next to the East Wind Drift, and in other northern sectors such as the Scotia Sea, Weddell Drift and off the Antarctic Peninsula and the Kerguelen-Gaussberg Ridge.

The distribution pattern of populations may be a result of the effect of currents, eddies and other hydrographic processes, of the bottom topography, or of the food and predator distribution. The existence of more or less independent populations of this species around the Antarctic Continent has been proposed.



Overall densities of krill show considerable variability in space and time throughout the distributional range of the species, due to its gregarious behaviour. Recent observations showed krill swarms swimming at 90° to currents for about 180 miles, but as E. superba seems generally incapable of swimming against most Antarctic surface currents, it can form patches, shoals, schools, swarms or superswarms. These groups extend in space from a few square metres to more than 100 km^2, with densities ranging from 0.5 to several kg/m^3; they are located at the surface or at various depth ranges, either migrating vertically or remaining stationary within the upper 100 m water layer. These groups may be transient (hours-days) or persist for weeks to a life-time and their components vary considerably in shape, size and gonad development. Swarming and schooling behaviour of krill is explained as an adaptive strategy to avoid selective predators (fishes, birds, etc.), and to increase efficiency in food-searching and food-patch utilization. The groups are usually associated with islands, continental shelves and slopes, or zones of water mixing.

Although krill is commonly found in dense aggregations, a significant (perhaps a major) part of the population occurs in a solitary or dispersed stage.

Spawning probably occurs over most of the distributional range of the species, either near the continent or in the open ocean during late spring and summer, peaking from early January to mid-February. Several thousands of eggs per female are laid in the upper 100 m of water. The eggs sink for about 10 days and hatch as nauplii several hundreds to 2 000 m deep. The nauplii ascend and develop into metanauplii continuing to rise to shallower layers and developing into calyptopes. These surface dwellers pass through three stages to become furcilia (5 stages), the duration of every larval stage being between 8 and 15 days. Thereafter, the furcilia develop into juveniles which begin gonad development during the second spring-summer season of life. Individuals mature and begin mating at two years of age. Some individuals delay maturity and spawning until the third year, while others may spawn a second time in this third year. A major part of the population has a two-year life-span, but recent research suggests a 7-year lifespan. A typical summer size-class distribution of E. superba in the Scotia Sea shows 3 modes: calyptopes and furcilia peak at about 7 mm, juveniles at 34 mm and adults at 50 mm.

Calyptopes and early furcilia stages perform pronounced vertical diel migrations, while juveniles and adults are commonly found in the upper 30 m at night, and may migrate within the upper 100 m layer in daytime or remain stationary throughout day and night. No definite diel pattern of vertical distribution is established for juveniles or adults.

Krill feed preferentially on phytoplankton from large diatoms to nanno-plankton. They are also adapted to feed on a wide spectrum of items including their own eggs, larvae, molts and phaeces, live or dead krill specimens, other zooplankters, or ice-attached diatoms. Raptorial feeding rather than filter-feeding seems the main mode of food intake of E. superba. During the winter months, krill may depend upon alternative food sources rather than on phytoplankton, or may survive by consuming its body tissues which will be accompanied by body shrinkage and reversal of gonad development.

E. superba is considered a key species of the Antarctic ecosystem. As a dominant herbivore, it channels the organic matter produced by the phytoplankton to a greater variety of dominant components of the Antarctic biota. Baleen whales, seals, fishes, birds and cephalopods are among the largest krill predators.

INTEREST TO FISHERIES :

Recent estimates of total krill biomass range between 125 and 750 million metric tons. These estimates present great variation due to spatial and temporal variation in krill distribution and methods used. However, data analysis (in progress) of krill biomass using acoustics during a recent multiship survey in the Indian Ocean and Western Atlantic sectors of the Southern Ocean indicate a standing stock of only about 7 million t for the area surveyed, a figure much lower than expected. Estimates of annual krill production are also widely variable, ranging between 13 million to several billion tons.

Exploratory fishing began in 1961/62 with a catch of 4 t by the USSR. The total catch has risen to about 500 000 t annually since 1979/80. Most exploratory and commercial krill fishing is carried on by the USSR, Japan, Poland and Germany (F.R.). Other krill-fishing countries in the Antarctic are Korea, China (Taiwan Province), Chile and Bulgaria. The krill-fishing operations are carried out with large stern trawlers using successfuly midwater trawls, side trawls and conical nets. The maximum reported catch rate was 35 t in 8 minutes by a German trawler and daily catches of 200 to 300 t are reported practicable. One of the factors limiting the increase of catch rates is the rapid enzymatic breakdown and tainting of the meat by the gut and liver, which requires processing of the entire catch within 1 to 3 hours after capture.

Protein in krill meat amounts to 8 to 20% of wet weight (40 to 80% of dry weight). When fresh, krill has too strong a taste for direct consumption and when dehydrated it is bland with a characteristic after-taste and odour. Krill is mainly processed into a variety of products for direct human consumption (paste, frozen tails, sticks, etc.), and for animal feeds, or used as bait for sports fishermen (dehydrated or frozen). Many economic factors constraining this new fishery are expected to be solved, assuming a permissible catch of several million tons a year. It is nevertheless accepted that the scientific basis for management of this fishery is weak and further information on the behaviour of this species and fishing statistics are badly needed.

EUPH Euph 4

1985

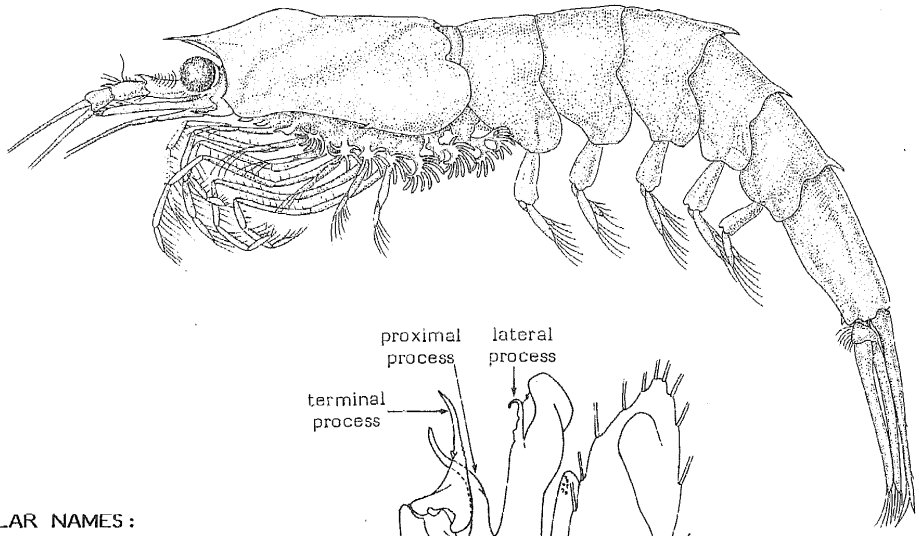
FAO SPECIES IDENTIFICATION SHEETS

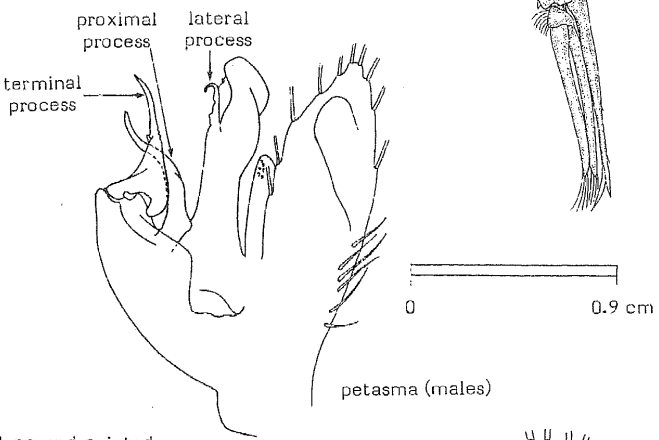
FAMILY : EUPHAUSIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Euphausia triacantha Holt & Tattersall, 1906

OTHER SCIENTIFIC NAMES STILL IN USE : None





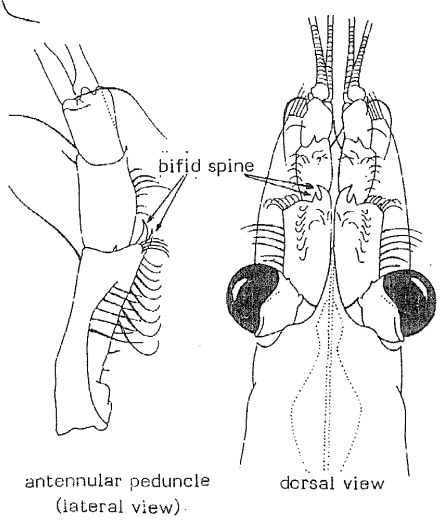
VERNACULAR NAMES :

FAO/CCAMLR : En - Spiny krill
Fr - Krill épineux
Ru - Trechzubyi krill
Sp - Krill espinudo

NATIONAL :

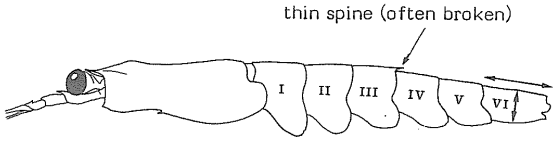
DISTINCTIVE CHARACTERS :

Eyes small and spherical. Rostrum long and pointed, extending well beyond the eyes, and provided with a small tooth-like process underneath and above the eyestalks. Carapace keel high and extending to the rostrum. First segment of antennular peduncle with a bifid lappet, the inner process stouter and more curved outward than the outer; second segment bearing a tooth-like process on the middle of its distal upper margin; third segment with a low rounded keel. Third, fourth and fifth abdominal segments holding mid-dorsal spines; third segment stoutest, longest and keeled; sixth segment almost twice as long as high in lateral view. Proximal process of petasma as long as terminal process, slightly curved and terminating in a small, serrated, leaf-like expansion; terminal process more robust on its proximal part where the heel is well developed; a small denticle or protuberance is located near the middle of this process; lateral process long and slender, with a sinuose margin; a small additional process is situated above in the median lobe. The animal is pale, but the anterior end of the cephalothorax is bright red in colour.

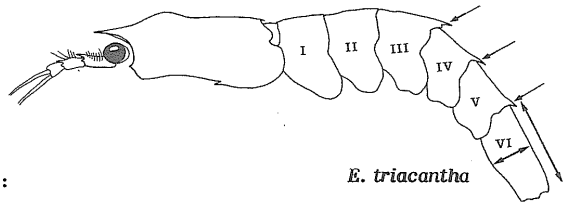


DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

None of the other Euphausia species in the area has the three characteristic mid-dorsal spines on the third, fourth and fifth abdominal segments, nor the typical bifid lappet on the first segment of the antennular peduncle. Euphausia vallentini: has a thin mid-dorsal spine only on the third abdominal segment and a much shorter sixth abdominal segment; the other Euphausia species lack mid-dorsal spines on all abdominal segments.



E. vallentini



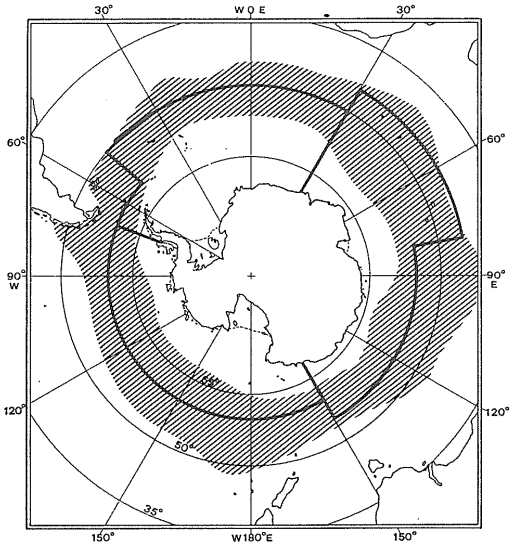
E. triacantha

SIZE :

Maximum: 41 mm total length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Highest densities are associated with the Polar Front, but the species occurs in a wide belt extending from sub-Antarctic waters to the ice-free zone of the Southern Ocean. Its distribution overlaps northward with that of E. vallentini and southward with that of E. frigida, E. superba and T. macrura. E. triacantha is rather sparsely but evenly distributed, and is the only Antarctic euphausiid which does not swarm in the adult stage.



E. triacantha undergoes pronounced vertical diel migrations between the surface at night to the 250 to 750 m layer in daytime.

Breeding takes place south of the Antarctic Convergence between October and November. The lifespan of E. triacantha is two years. During the first year, individuals pass through larval development to become juveniles; at the end of the second year of life, juveniles mature and spawn. A small part of the population does not spawn then but survives to spawn at the age of three years.

INTEREST TO FISHERIES :

Negligible as compared to E. superba.

EUPH Euph 5

1985

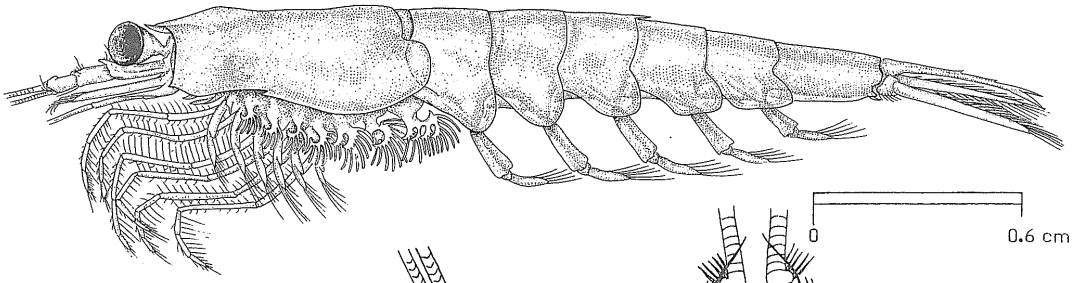
FAO SPECIES IDENTIFICATION SHEETS

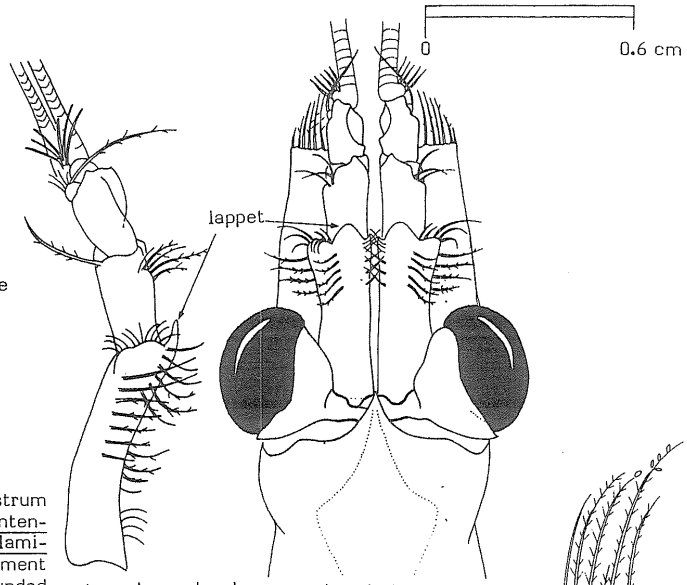
FAMILY : EUPHAUSIDAE

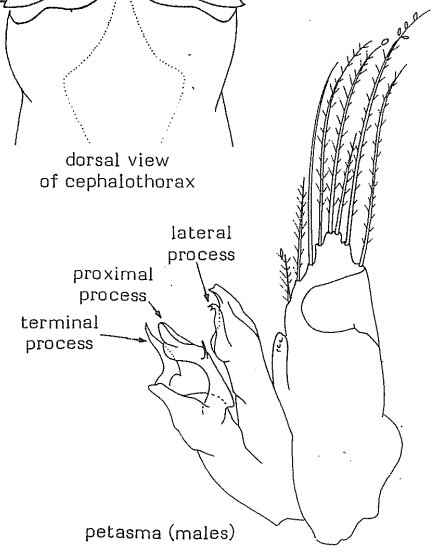
FISHING AREAS 48,58,88
(Southern Ocean)

Euphausia vallentini Stebbing, 1900

OTHER SCIENTIFIC NAMES STILL IN USE : None







VERNACULAR NAMES :

FAO/CCAMLR : En - Northern krill
Fr - Krill subantarctique
Ru - Krill Valentina
Sp - Krill subantártico

NATIONAL :

DISTINCTIVE CHARACTERS :

Eyes medium-sized, spherical. Rostrum short and triangular. First segment of antennular peduncle with a large round, broad, laminar lappet on its distal margin; third segment bearing a high dorsal keel with a rounded dorsal edge and an abrupt distal edge. Third abdominal segment with a short, thin, mid-dorsal spine which may be broken or absent occasionally; sixth abdominal segment not much longer than high. Proximal process of petasma stouter and longer than the terminal process and provided with a secondary spine and two distal expansions of similar size; terminal process small and thin, with a small and acute heel, and expanded distally in two curved processes and one small denticle; lateral process long and robust, curved at the end, and with a robust secondary tooth on whose axis is a tiny acute protuberance.

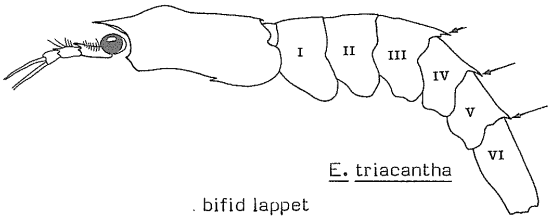
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Euphausia triacantha: a strong mid-dorsal spine on third, fourth and fifth abdominal segments. First segments of antennular peduncle with a bifid lappet.

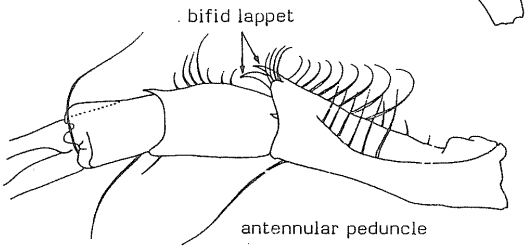
E. frigida: no mid-dorsal spine on the abdominal segments. Sixth abdominal segment almost twice as long as high in lateral view.

E. superba and E. crystallorophias: no mid-dorsal spines on the abdominal segments. First segment of antennular peduncle with a wide laminar lappet (E. superba) or a short sharp denticle (E. crystallorophias) distally.

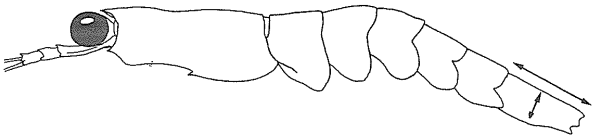
Thysanoessa macrura and T. vicina: eyes divided into two lobes. Second thoracic endopodite greatly elongated. Peduncle of antennule long and slender.



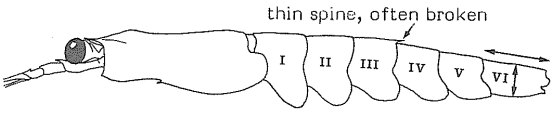
E. triacantha



E. triacantha



E. frigida



SIZE :

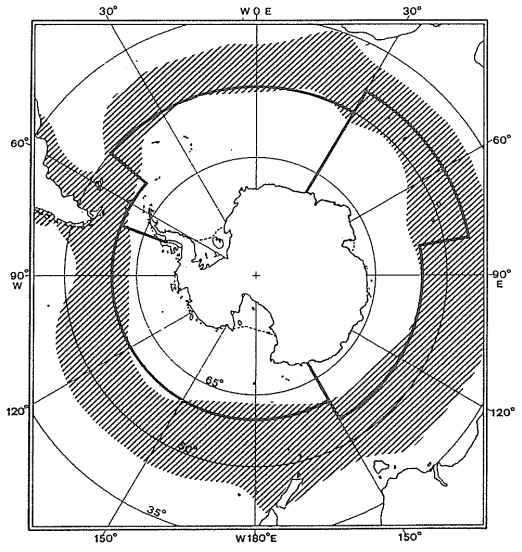
E. vallentini

Maximum: 28 mm total length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Occurs in the southern sector of the sub-Antarctic zone to beyond the Antarctic Convergence; its northern distribution extends to both the Pacific and Atlantic coasts of South America. This species is considered a staple food of the pigmy blue whale and is also found in stomachs of the swallowing-type of whales (fin and sei whales) near the Antarctic Convergence, which suggests a capacity to swarm.

Found between the surface and 750 m depth and seems to undergo vertical diel migrations.



INTEREST TO FISHERIES :

None.

EUPH Thy 1

1985

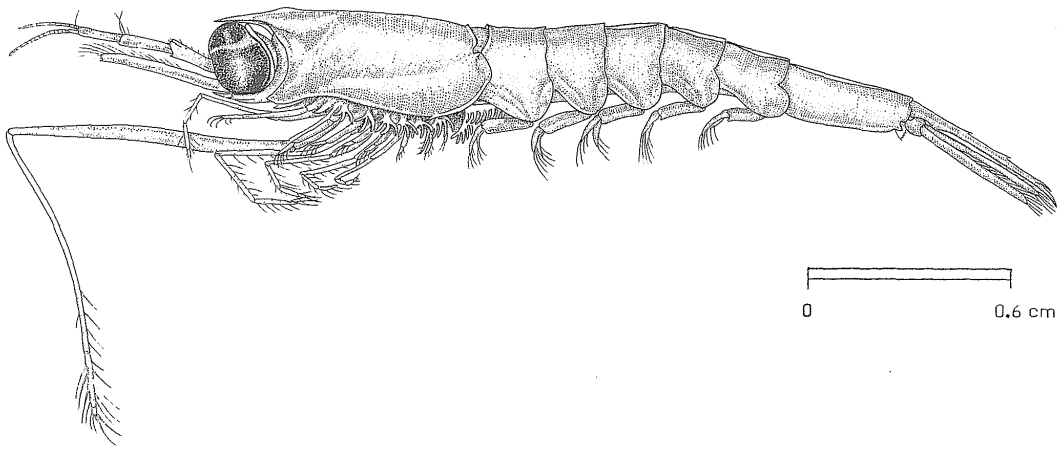
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : EUPHAUSIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Thysanoessa macrura G.O. Sars, 1883

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Bigeye krill
Fr - Krill à gros yeux
Ru - Chernoglazka antarkticheskaya
Sp - Krill ojigrande

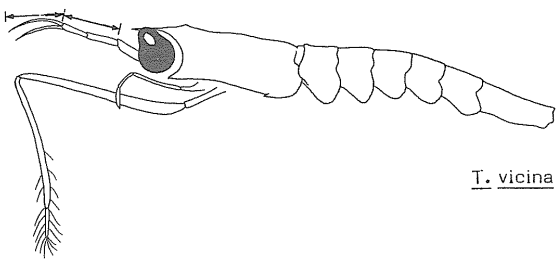
NATIONAL :

DISTINCTIVE CHARACTERS :

Eyes large, bilobed, lower lobe larger than upper, and larger in males than in females. Second thoracic endopodite elongated, with setae fringing both margins of the last two segments. Rostrum long and triangular and with sharp edges. Dorsal keel low and extending to the rostrum. First antennular segment without lappets or lobe-like projections; although its distal margin is sinuose, it is robust and shorter than the sum of the two distal antennular segments; upper flagellum somewhat shorter than lower flagellum and also shorter than the sum of the two distal peduncular segments. Third to sixth abdominal segments without mid-dorsal keels, although rudiments may be present in large specimens of T. macrura; sixth segment nearly cylindrical and as long as the sum of the fourth and fifth; preanal spines are denticulated; serrated in females and smooth in males. Proximal process of petasma barely longer than the terminal; it is large at the base and very slender, finger-like, sinuose and curved at the tip; terminal process with a slightly wider base than proximal process, slender in the middle and expanded distally without serrations on the rounded wide inner corner and the triangular outer corner; spiniform process strong and well curved; lateral process slightly shorter and considerably narrower than the terminal and proximal, it is also wider at the base, and well curved at the tip.

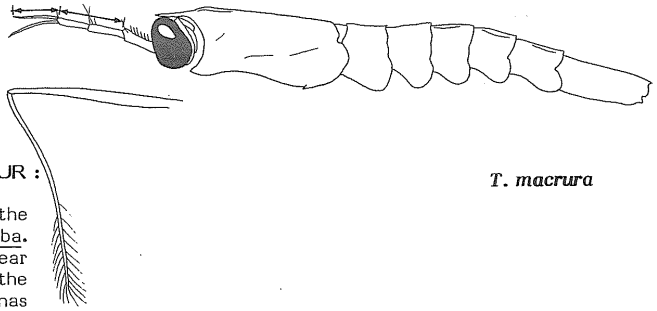
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Thysanoessa vicina: antennule with upper flagellum somewhat or considerably longer than the two distal peduncular segments. Terminal process of petasma somewhat expanded on inner side, distal margin finely serrated; proximal process laminar and shorter than terminal process. Maximum size smaller (only to 17 mm). This species is very difficult to distinguish from T. macrura, particularly the females and immatures.



T. vicina

Euphausia species: eyes spherical; first to sixth thoracic endopodites nearly uniform in size and structure, the second not elongated.



T. macrura

SIZE :

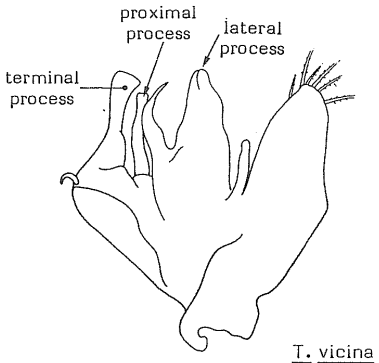
Maximum: 28 mm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Widely distributed from the continent to the pack-ice zone; apparently co-occurs with E. superba. It extends north of the Antarctic Convergence near the sub-Antarctic islands and particularly around the tip of South America and near the Falkland/Malvinas Islands.

Found solitary or in heavy swarms. It is an important alternative food source for E. superba consumers, whales, seals and birds among them.

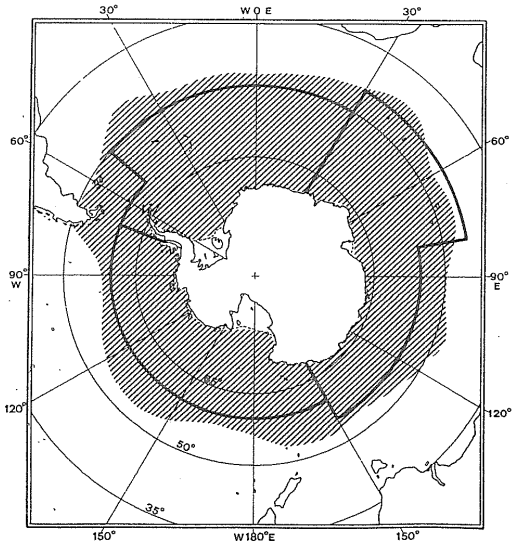
It reproduces near the pack-ice and floating ice zones around the continent and also in the open ocean during the spring and summer (October-February).

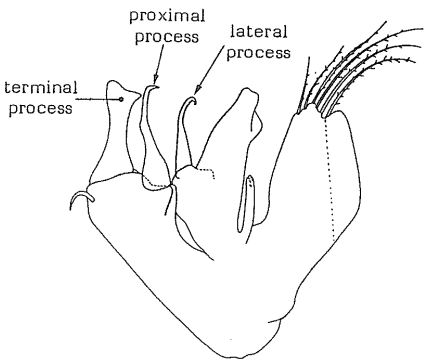


T. vicina

INTEREST TO FISHERIES

Negligible as compared to E. superba.





T. macrura

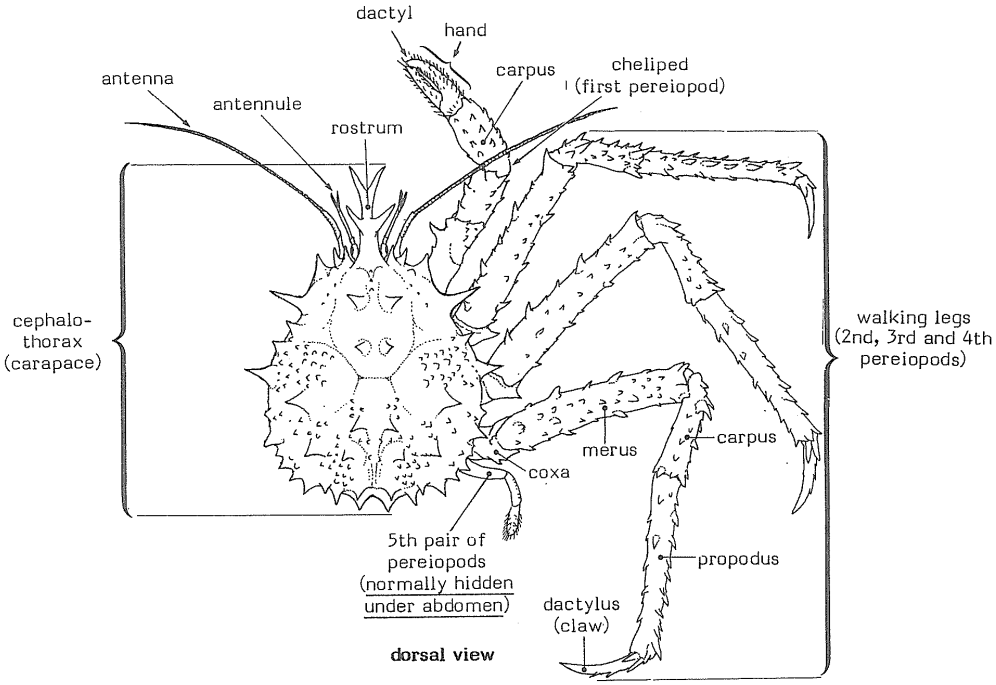
petasma (males)

FAO Sheets

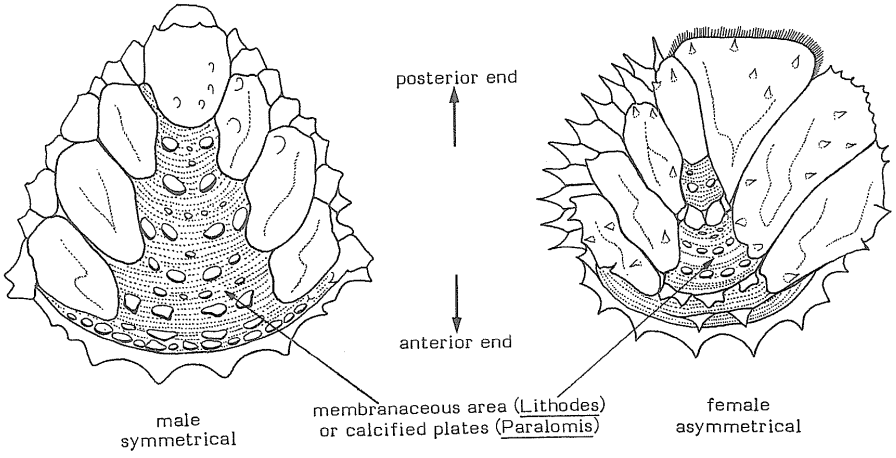
KING CRABS AND STONE CRABS

Fishing Areas 48,58,88

TECHNICAL TERMS



dorsal view



ventral view of abdomen

(folded under the carapace)

LITHO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

LITHODIDAE

King crabs and stone crabs

This family belongs to the Section Anomura (which also includes the hermit crabs). Although crablike in general appearance, its representatives differ considerably from the True Crabs (Section Brachyura). They are characterized by the following features:

Cephalothorax (carapace) large with a prominent median anterior rostrum, usually bearing lateral and/or ventral spines, the abdomen much reduced and bent under it; in the male, the abdomen is symmetrical and devoid of appendages (pleopods), while in the female it is strongly asymmetrical (with the plates on the right side much reduced) and bears a few pleopods on its inner surface. In both sexes, the third to fifth abdominal segments are either composed of well-calcified plates (genus Paralomis) or are less calcified, with calcareous nodules on a membranaceous median area (genus Lithodes). There are no uropods (caudal appendages) in both sexes. The first (anterior) pair of pereiopods (thoracic legs) are chelipeds (with a forceps-shaped hand) and used for predation, the right one usually larger than the left; the second to fourth pairs of pereiopods are walking legs ending in sharp claws; the last (fifth) pair is hidden under the abdomen where it is used as a cleaning device.

Two species are locally common in the Southern Ocean:

Lithodes murrayi Henderson, 1888 LITHO Lith 1

Paralomis aculeata Henderson, 1888 LITHO Par 1

The main commercial species of this family in other fishing areas are Paralithodes camtschatica (North Pacific and Barents Sea) and Lithodes antarctica or "Centolla" (Magellanic area).

LITHO Lith 1

1985

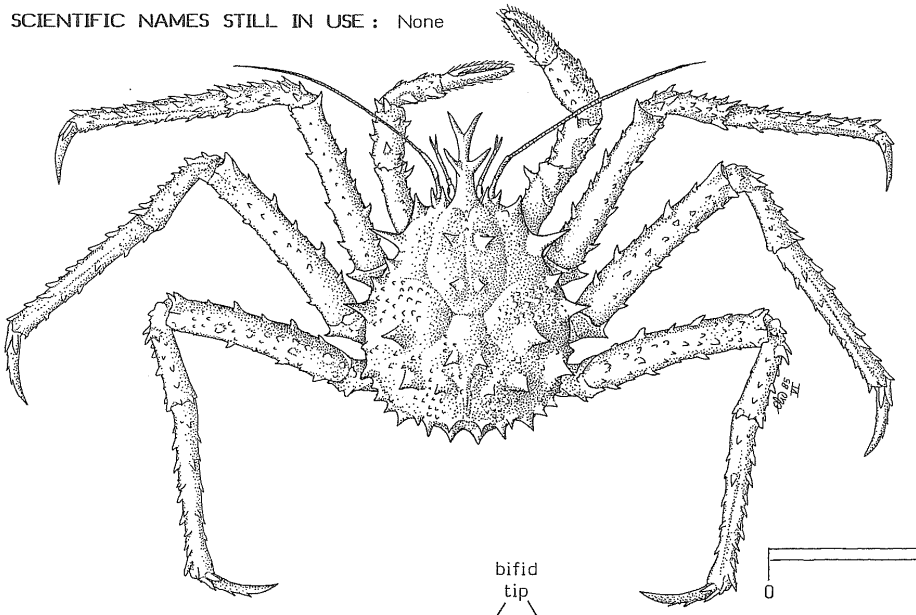
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : LITHODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Lithodes murrayi Henderson, 1888

OTHER SCIENTIFIC NAMES STILL IN USE : None



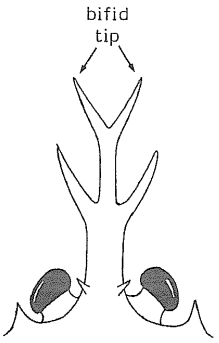
VERNACULAR NAMES :

FAO/CCAMLR : En - Subantarctic stone crab
Fr - Crabe royal subantarctique
Ru - Crab murrayi
Sp - Centolla subantártica

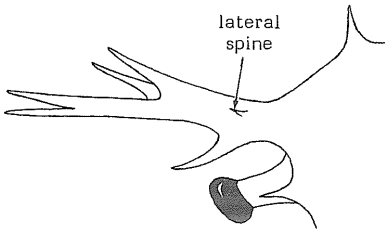
NATIONAL :

DISTINCTIVE CHARACTERS :

Carapace and legs with unequal spines (very sharp in juveniles) and tubercles; two characteristic sets of four conspicuous spines along median axis of carapace, separated by a transversal depression. Rostrum commonly long and sharp, with a pair of median spines, a bifid tip, a large curved ventral spine directed downward and forward, and a tiny spine on either side of its base; however, some specimens exhibit a "simplified" rostrum without lateral spines, or only a short conical rostrum without any spines. Hand of right cheliped larger than the left; walking legs very long (more than twice the width of carapace), with a sharp terminal claw. The abdomen includes a median membranaceous area (with calcareous nodules) from the third to the sixth segments. The sex is easily identified at first sight: in the male the abdomen is triangular and symmetrical, while in the female it is more rounded with asymmetrical plates, and twisted toward the right side of the animal. Colour reddish.

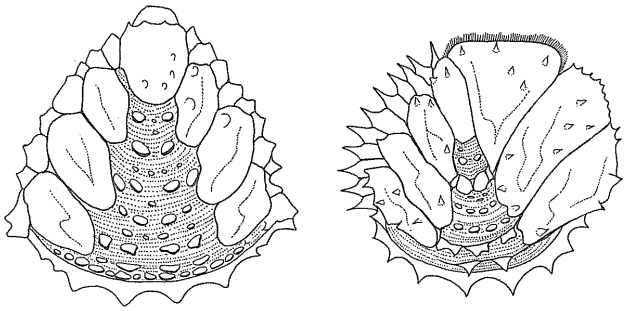


dorsal view



rostrum

lateral view



male

female

ventral view of abdomen

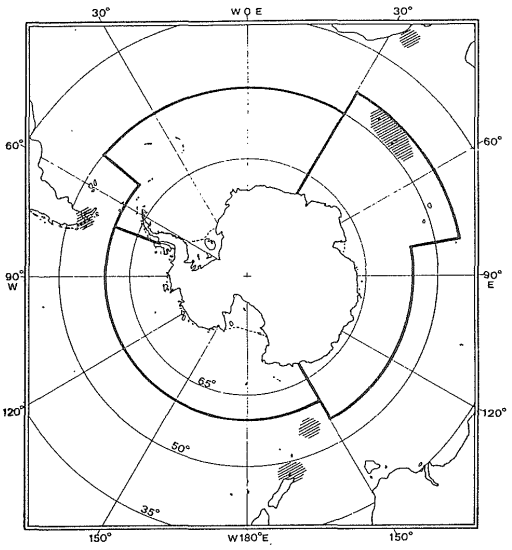
SIZE :

Maximum size (standard length excluding rostrum): males, 13.25 cm at Crozet Islands, 16 cm off Namibia, and 16.8 cm at Foveaux Strait, New Zealand; females, 9.35 cm at Crozet Islands.

Standard length of males commonly 8 to 10 cm at Crozet Islands and 8 to 12 cm off Namibia.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Known from Prince Edward Island, Crozet Islands (common), Kara Dag seamount (east of Crozet Islands), Macquarie Island, and also from southern Chile, Southwest Africa (as far north as 22°S lat.), Natal (off Durban), and Foveaux Strait (New Zealand; common).



The biology of this species has been studied around Crozet Islands, where, according to the season, L. murrayi was recorded from the shore to 1 015 m depth. As is also known for some other lithodid species, there is a seasonal migration to shallow waters for breeding, and then back to deeper waters.

The maturity of the female is reached at about 6.5 cm standard length. Berried females (females carrying eggs) have been found from 140 to 507 m depth, the egg numbers in each brood being relatively low, from 300 to 4 200. Some specimens are parasitized by the Rhizocephalan cirriped crustacean Briarosaccus callosus, which fixes under its abdomen and seems to inhibit the gonadal maturation (parasitic castration).

The diet is highly diversified, this species being an opportunistic feeder: it includes sessile as well as sedentary invertebrates, algae, a good quantity of stones and penguin feathers, but also any carrion on the bottom; cannibalism is more rare.

As a result of the larger size of males, there is a strong size hierarchy which results in feeding disadvantages for the females: they are commonly "dissuaded" by the males to enter the traps, and the same is probably true in regard to sex competition for natural prey.

PRESENT FISHING AREAS :

The species was fished experimentally around Crozet Islands during three oceanographic cruises of the M/S MARION-DUFRESNE. It was commercially exploited off Southwest Africa between 500 and 700 m, in 1970 and 1980. In New Zealand, it is taken by fishermen in increasing quantities.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

During the only commercial fishery initiated so far, 185 metric tons of fresh L. murrayi were trapped in 6 months off Southwest Africa, until the catch per unit effort fell to an uneconomic level. At Crozet Islands, up to 31 specimens per trap per night and up to 122 specimens per hour of beam trawling were obtained. L. murrayi may obviously also be caught with gillnets. The flesh is tasty but the legs and chelae are relatively slender, and hence, the commercial interest of this species is not very great.

LITHO Par 1

1985

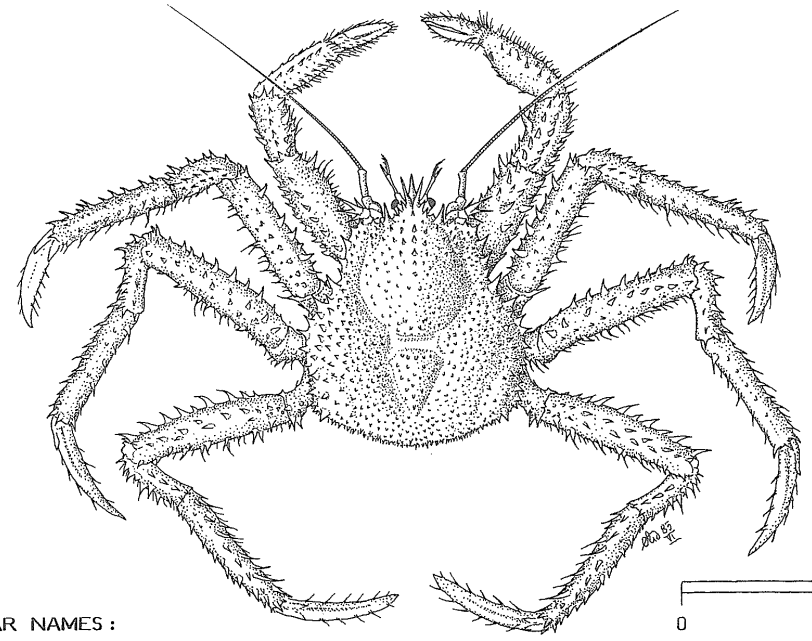
FAO SPECIES IDENTIFICATION SHEETS

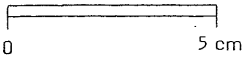
FAMILY : LITHODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Paralomis aculeata Henderson, 1888

OTHER SCIENTIFIC NAMES STILL IN USE : None





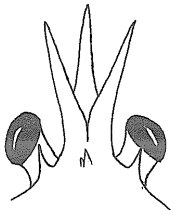
VERNACULAR NAMES :

FAO/CCAMLR : En - Red stone crab
Fr - Crabe royal rouge
Ru - Marionskyi paralomis
Sp - Centolla colorada

NATIONAL :

DISTINCTIVE CHARACTERS :

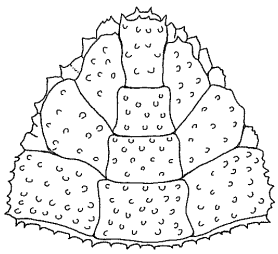
Carapace pear-shaped, covered by spiniform tubercles. Rostrum short, with two straight and divergent lateral spines and a forward-curved, larger median point; antennal acicle (or scaphocerite) moveable, relatively large, triangular and armed with three sharp spines on the external border and two smaller on the inner side. Right chela slightly stouter than the left; the six walking legs of moderate length, stout and with longitudinal rows of spines. Abdomen without membranaceous areas, the calcareous plates being contiguous and bearing faint blunt tubercles; the abdomen is symmetrical in the male and strongly twisted to the right in the female. Colour bright red.



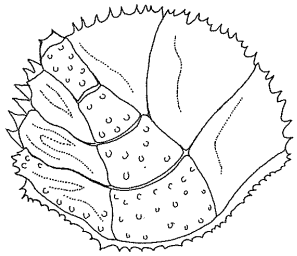
dorsal view

rostrum

lateral view



male



female

ventral view of abdomen

SIZE :

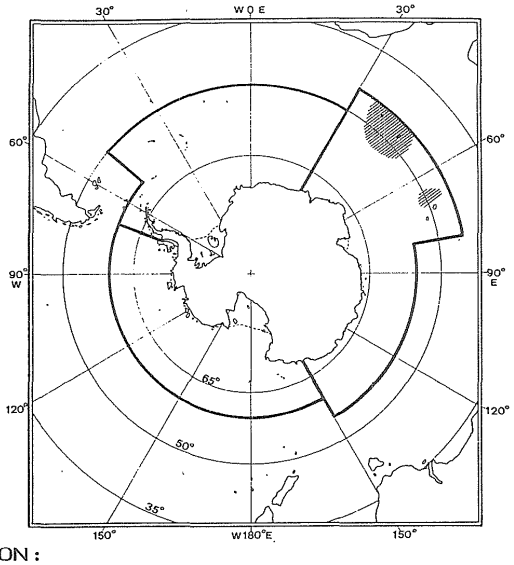
Maximum recorded standard length (excluding rostrum): males, 11.8 cm; females, 9.6 cm.

The standard length at Crozet Islands is commonly between 5 and 8 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

This species has only been recorded from off Prince Edward Island, around Crozet Islands (down to 1 500 m depth), at Ob and Lena seamounts (South and Crozet Islands) and at Skiff seamount (east of Kerguelen Island).

Its bathymetric range encompasses in part that of Lithodes murrayi (with which it is sometimes fished) but it is unknown at depths less than 180 m, and, conversely, is recorded far deeper than L. murrayi (which does not extend beyond 1 000 m).



PRESENT FISHING AREAS :

Never observed in large quantities, and hence not fished commercially.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Like Lithodes murrayi, it may be taken either by beam trawls or by baited traps, doubtless also by gillnets. The catch is always small (less than 10 specimens per haul).

FAO Sheets

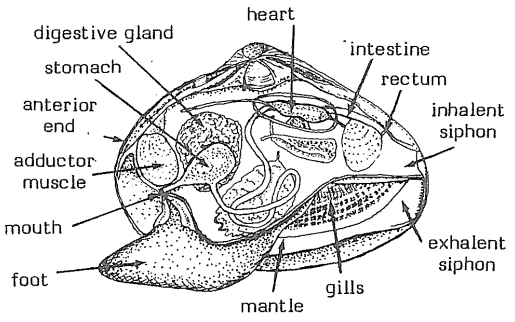
BIVALVES

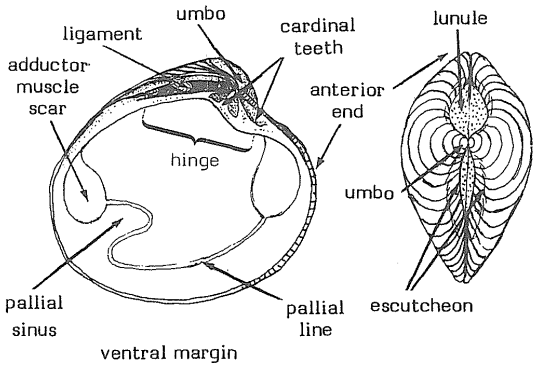
Fishing Areas 48,58,88

(Class Bivalvia - pelecypods, clams, oysters, etc.)

TECHNICAL TERMS AND GENERAL REMARKS

Bivalve Features





Glossary of Bivalve Terms

Beak (or umbo)	:	the first formed part of a valve, usually above the hinge
Byssus	:	clump of horny threads spun by the foot and attached to the hard bottom
Cardinal tooth	:	located under the beak
Chondrophore	:	spoon-shaped projection of the hinge bearing the ligament which controls valve opening
Concentric	:	running parallel to the growth margin of the valves
Equilateral	:	a valve having an axis of symmetry
Equivalve	:	species with two symmetrical valves
Escutcheon	:	a narrow, sunken region located behind the umbones and including the ligament
Gape	:	opening or gap at either end of the closed valves
Hinge	:	top interlocking margin of the valves, usually with teeth
Lateral tooth	:	located to the sides of the cardinal teeth
Ligament	:	an external or internal horny band, usually behind the beaks, holding the valves together
Lunule	:	a cordate or lanceolate area in front of the umbones
Pallial sinus	:	an embayment in the pallial line
Periostracum	:	horny covering protecting the outside of the shell from erosion
Radial	:	sculpture running from the beaks to the lower margins of the valves
Resilifer	:	ligament pit set into the hinge plate; may project to form a chondrophore
Rostrum	:	a beak-like process of the shell margin
Valve	:	one of the main shelly halves of a bivalve

Remarks

The class Bivalvia contains about 10 000 kinds of molluscs characterized by two shelly valves held together by a hinge usually bearing small interlocking teeth. Bivalves lack a ribbon of radula teeth and have no head. Feeding is done by filtering algae and diatoms over the gills and passing them by hair-like cilia to the mouth. Free bivalves, such as clams, use a large foot to move under the sand; scallops swim short distances by clapping the valves together; and other bivalves, like the oysters, are cemented to rocks or wood.

More than 100 species of bivalves are recorded from Antarctic waters: for example, 38 at the Kerguelen Islands, 30 around the South Shetland Islands, and 21 in Adelie Land (as compared to 51 species around the Falkland/Malvinas Islands). They are generally small (61 percent are less than 10 mm in maximum length), so they rarely grow to a size of commercial interest.

The shells of these Antarctic bivalves are commonly white or whitish with a yellow periostracum. There are no shells with coloured patterns (dots, blotches, lines, etc.) and only very few are uniformly coloured, either in red or its derivatives (Adamussium and Gaimardia, among the larger species; Kidderia and Lissarca among the smaller ones) or in blue (mussels).

As a result of low water temperatures, the calcification is poor and most valves are extremely brittle. For the same reason, there are no shell-attached forms (such as Ostreidae, Chamidae, etc.) and calcareous ornamentation (spines, tubercles, lamellae, etc.) is commonly missing.

The byssally-attached suspension-feeding forms are dominant over free-living ones, and some of the smallest bivalves are commensal with echinoids. There are no boring species, as a result of a lack of adequate substrates (sandstone, wood, etc.) and of well-calcified ornamented shells to bore.

Many families, including a fair number of those of commercial interest, have no representatives in Antarctic waters: for example, Ostreidae (oysters), Veneridae (Venus clams), Donacidae (wedge clams), Glycymeridae (bittersweet shells), Cardiidae (cockles), Lucinidae (lucines), Tellinidae (tellins), Mactridae (surf clams) and Solenidae (razor clams).

There is a high occurrence of direct development among Antarctic bivalves (protection of eggs and juveniles in the gills of the adults, or brood protection); hence there is generally no pelagic stage for dispersion. But the depth range and geographic distribution are nevertheless often very wide, due to the relative homogeneity of abiotic factors and to the eventual transportation of adults (with their brood) by ice or algae drifting in the circumpolar currents. Notable exceptions to such wide geographic distribution are representatives of Mytilus, Aulacomya and Gaimardia which are absent south of the Antarctic Convergence due to ice actions.

Generally speaking, it is clear that many of the above-mentioned characteristics have a negative bearing on the commercial potential of Antarctic bivalves. Other considerations (low commercial value, great distance from centres of marketing, technical problems of fishing in Antarctic waters, etc.) also point to a mere local interest of these bivalves (mussels of Kerguelen, for example).

LIST OF SPECIES INCLUDED :

The species included in this work were selected on the basis of a combination of conventional criteria, such as edibility, large size and high population densities.

CARDITIDAE - Cardita clams

Cyclocardia astartoides (Martens, 1878)	CARDIT Cycl 1

LATERNULIDAE - Soft-shell clams

Laternula elliptica King & Broderip, 1831	LATERN Lat 1

LIMOPSIDAE - Hairy clams

Limopsis marionensis Smith, 1885	LIMOP Lim 1

MALLETIIDAE - Malletia clams

Malletia gigantea (Smith, 1875)	MALLET Mal 1

MYTILIDAE - Sea mussels

Aulacomya ater (Molina, 1782)	MYTIL Aul 1
Mytilus edulis desolationis Lamy, 1936	MYTIL Mytil 2

NUCULANIDAE - Yoldia clams, nut shells

Portlandia isonota (Martens, 1881)	NUCUL Port 1
Yoldia eightsi (Couthouy in Jay, 1839)	NUCUL Yold 1

PECTINIDAE - Scallops

Adamussium colbecki (Smith, 1902)	PECT Adam 1

Prepared by Patrick M. Arnaud, Station Marine d'Endoume et Centre d'Océanographie, Marseille, France

CARDIT Cycl 1

1985

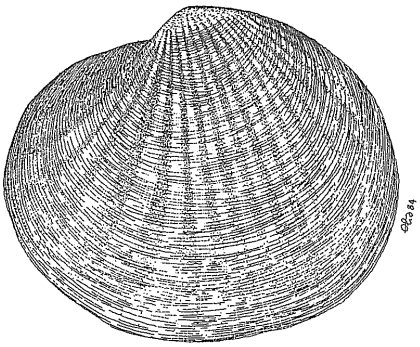
FAO SPECIES IDENTIFICATION SHEETS

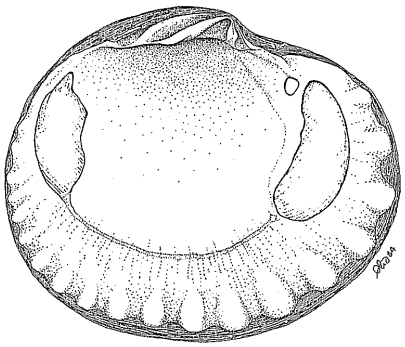
FAMILY : CARDITIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Cyclocardia astartoides (Martens, 1878)

OTHER SCIENTIFIC NAMES STILL IN USE : Cardita intermedia Thiele, 1912





VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic cardita
Fr - Cardite antarctique
Ru - Serdzevidka antarkticheskaya
Sp - Cardita antártica

NATIONAL :

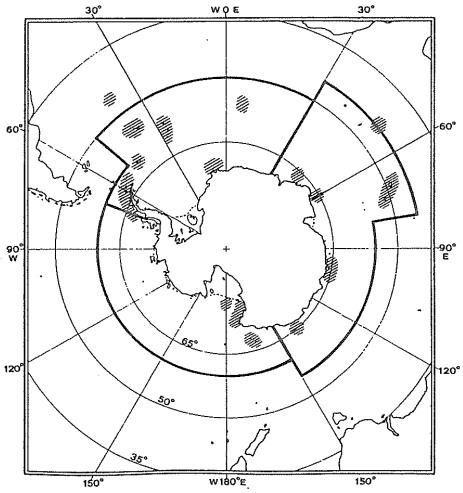
DISTINCTIVE CHARACTERS :

Shell ovate, equivalve, inequilateral and relatively thick, with about 20 regular radial ribs crossed by numerous concentric growth lines; inner edge of margin crenulated; ligament internal. Two strong cardinal teeth in each valve; lateral teeth more or less obsolete; pallial line without sinus, adductor muscle scars subequal.

Colour: white, with an olive-brown periostracum.

SIZE :

Max. : 3.5 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Very wide Antarctic and sub-Antarctic distribution. Lives in the open sea, on coarse sand mixed with gravel, shell and/or sponge spicules, from 2 to 800 m depth. Population density may reach 40 specimens per square metre.

LATERN Lat 1

1985

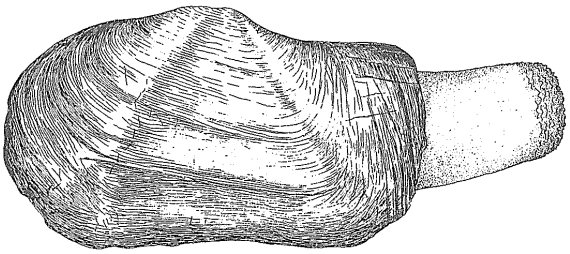
FAO SPECIES IDENTIFICATION SHEETS

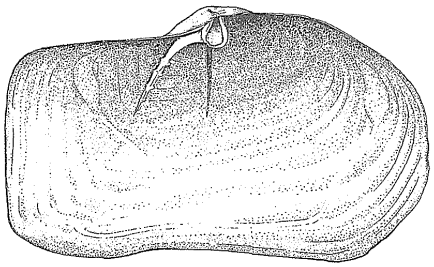
FAMILY : LATERNULIDAE

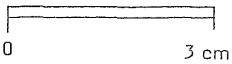
FISHING AREAS 48,58,88
(Southern Ocean)

Laternula elliptica King & Broderip, 1831

OTHER SCIENTIFIC NAMES STILL IN USE : Anatina prismatica Sowerby, 1831







VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic soft-shell clam
Fr - Laternule antarctique
Ru - Laternula antarkticheskaya
Sp - Latérnula antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell large, subequivalve, elongated, with a large posterior gape through which the huge siphon can protrude. Spoon-shaped chondrophore supported by a thin oblique buttress. Hinge without teeth. Pallial sinus broad.

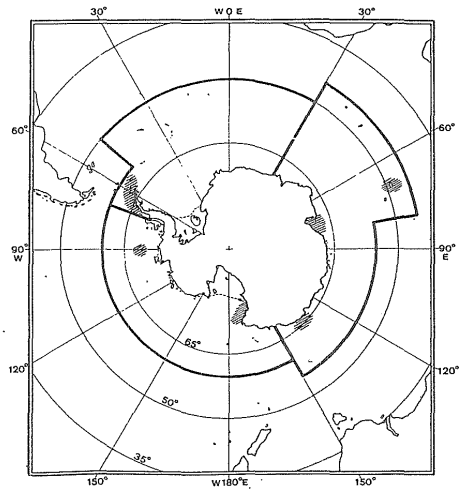
Colour: white, with a pinkish or greenish periostracum; a nacreous tinge in the interior.

SIZE :

Max. : 9.3 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

An Antarctic species with a wide distribution reaching as far north as the Kerguelen Islands and South Georgia. Occurs from 1 to 150 m depth in fine sand with a little silt, mostly in areas exposed to lowered salinities. Reaches densities of 5 kg/m^2 at Haswell Island (Queen Mary coast) or 140 specimens per m^2 at the Kerguelen Islands.



LIMOP Lim 1

1985

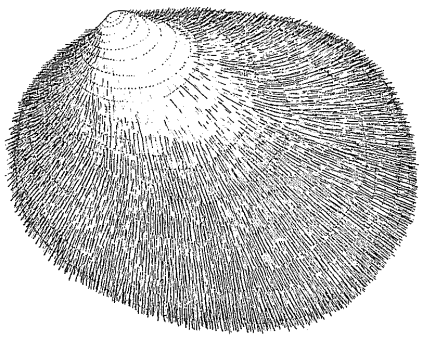
FAO SPECIES IDENTIFICATION SHEETS

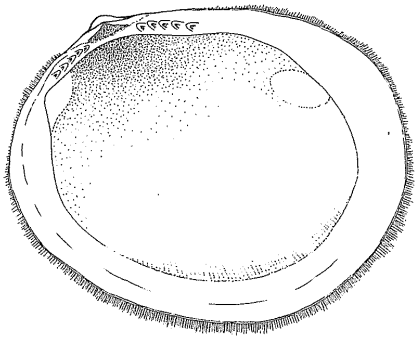
FAMILY : LIMOPSIDAE

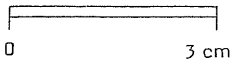
FISHING AREAS 48,58,88
(Southern Ocean)

Limopsis marionensis Smith, 1885

OTHER SCIENTIFIC NAMES STILL IN USE : Felicia jousseaumei Rochebrune & Mabille, 1889
Limopsis grandis Smith, 1907
Limopsis hardingii Melvill & Standen, 1914







VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic hairy limopsis
Fr - Limopsis antarctique
Ru - Limopsis antarkticheskyi
Sp - Limopsis antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell equivalve and inequilateral, obliquely ovate, compressed, covered by a dense thatched periostracum. Resilifer small, triangular; numerous small transverse teeth under the hinge. Inner margin smooth.

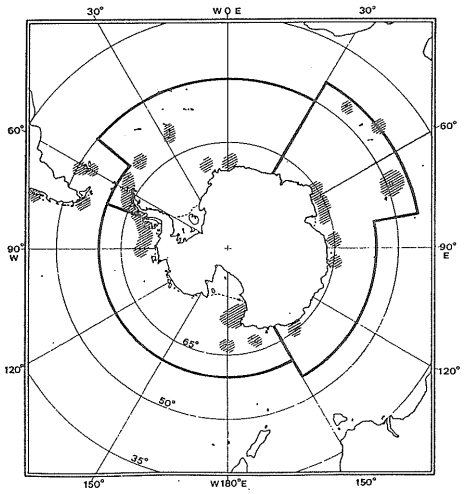
Colour: white, but generally hidden under the fulvous yellow periostracum

SIZE :

Max. : 8 cm (length) and 6.5 cm (height).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Very wide distribution including Antarctic and sub-Antarctic waters as far north as Seno de Reloncavi (Chile), at 42°S lat. Lives partly buried (mud bottoms) or on the substrate (coarser sediment), from 50 to about 1 200 m depth. The population density may attain 116 specimens per m^2.



MALLET Mal 1

1985

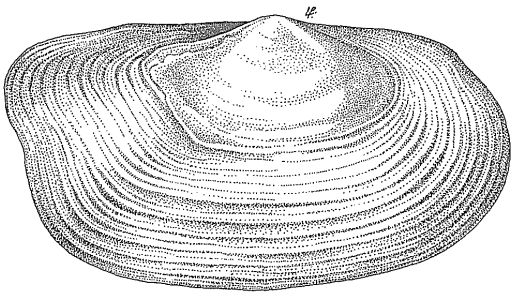
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MALLETIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

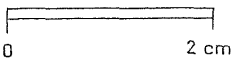
Malletia gigantea (Smith, 1875)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Kerguelen Malletia
Fr - Malletia de Kerguelen
Ru - Malletia kergelenskaya
Sp - Maletia de Kerguelen



NATIONAL :

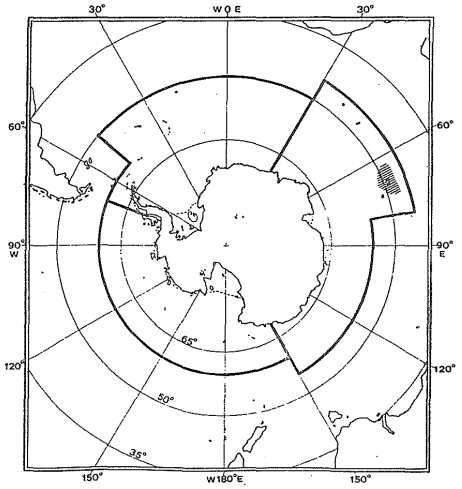
DISTINCTIVE CHARACTERS :

Shell thin, equivalve, elongate, umbones subcentral and commonly eroded; valves not gaping and without rostrum and furrow; ligament mostly external; pallial sinus deep; no resilifer; about 11 anterior and 32 posterior hinge teeth.

Colour: periostracum bright yellowish-olive, becoming dark olive-brown in old specimens, and slightly reflecting within the margin of the valves.

SIZE :

Max. : 6.2 cm; common to 5 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Restricted to the Kerguelen Islands. Lives in the black anoxic mud of fjords (densities up to 368 specimens per m^2) and more rarely in deep mud bottoms in the open sea. A deposit-feeder; depth range 11 to 925 m.

MYTIL Aul 1

1985

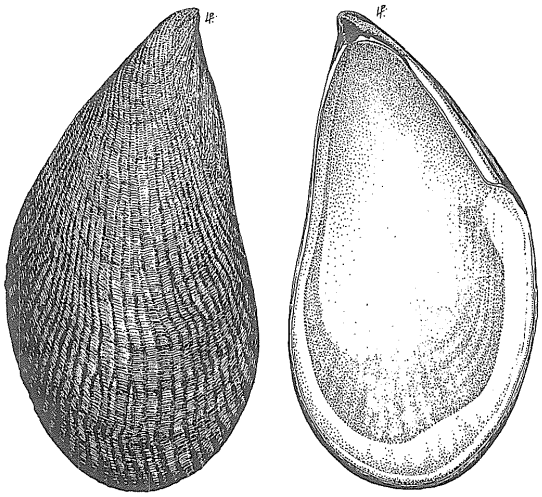
FAO SPECIES IDENTIFICATION SHEETS

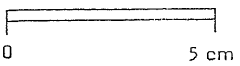
FAMILY : MYTILIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Aulacomya ater (Molina, 1782)

OTHER SCIENTIFIC NAMES STILL IN USE : Mytilus magellanicus Chemnitz, 1785
Mytilus orbignyanus Hupé, 1854





VERNACULAR NAMES :

FAO/CCAMLR : En - Magellan mussel, Ribbed mussel
Fr - Moule de Magellan
Ru - Midiya rebristaya
Sp - Cholga

NATIONAL :

DISTINCTIVE CHARACTERS :

Wedge-shaped with the ventral edge frequently concave near the beaks which are sharp. Conspicuous radial ribs and fine concentric striae. Calcareous nodules (pearls) are common in specimens from very shallow depths.

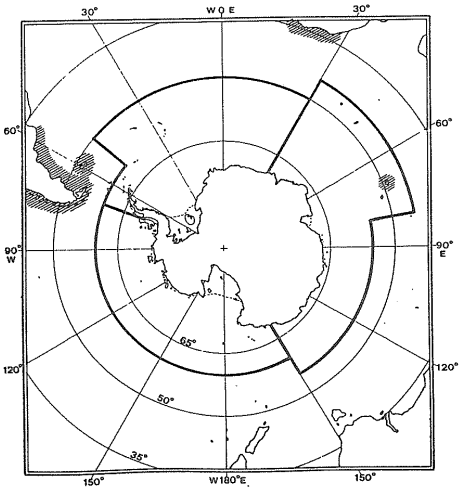
Colour: juveniles may be bright yellow, later becoming dark blue, purple or brownish, with the periostracum shining; interior nacreous and purplish.

SIZE :

Max. : 15 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Kerguelen Islands, Magellanic area (Falkland/ Malvinas Island and southern South America) and South Africa, from the intertidal zone to 70 m depth, on hard substrates (rocks, gravel, kelp roots, etc.).



MYTIL Mytil 2

1985

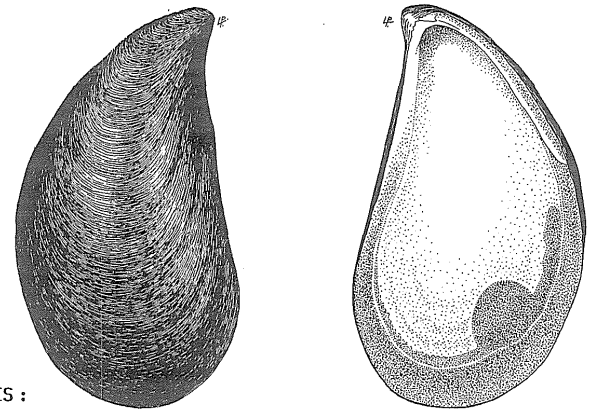
FAO SPECIES IDENTIFICATION SHEETS

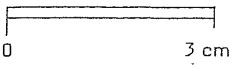
FAMILY : MYTILIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Mytilus edulis desolationis Lamy, 1936

OTHER SCIENTIFIC NAMES STILL IN USE : Mytilus kerguelenensis Fletcher, 1938





VERNACULAR NAMES :

FAO/CCAMLR : En - Kerguelen mussel
Fr - Moule de Kerguelen
Ru - Midiya kergelenskaya
Sp - Choro de Kerguelen

NATIONAL :

DISTINCTIVE CHARACTERS :

Wedge-shaped and elongate; beaks terminal; surface smooth, without radial ribs; margin not crenulate; very similar to the temperate edible mussel Mytilus edulis but much more inflated. No calcareous nodules (pearls).

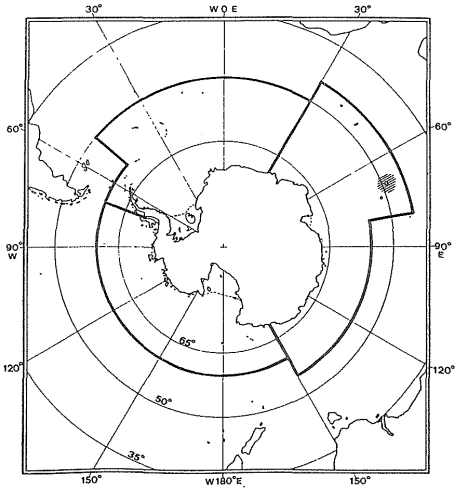
Colour: shell dark blue with periostracum brownish; interior blue-white.

SIZE :

Max. : 9.2 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Restricted to the Kerguelen Islands, from the intertidal zone to 15 m depth, byssally attached to rock, gravel or kelp roots (Macrocystis). The best beds are located on shallow banks exposed to strong tidal currents in fjords or in very sheltered bays. A typical suspension-feeder.



NUCUL Port 1

1985

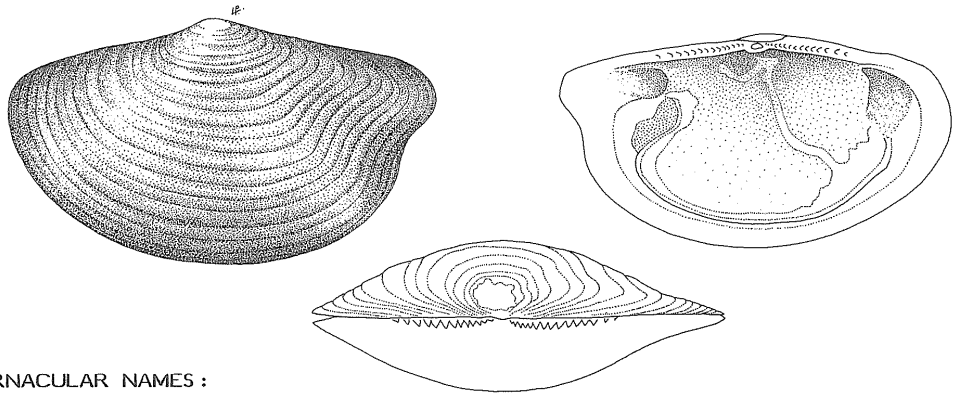
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NUCULANIDAE

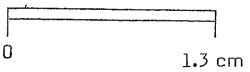
FISHING AREAS 48,58,88
(Southern Ocean)

Portlandia isonota (Martens, 1881)

OTHER SCIENTIFIC NAMES STILL IN USE : None



dorsal view



VERNACULAR NAMES :

FAO/CCAMLR : En - Kerguelen nut shell
Fr - Portlandia de Kerguelen
Ru - Portlandiya kergelenskaya
Sp - Portlandia de Kerguelen

NATIONAL :

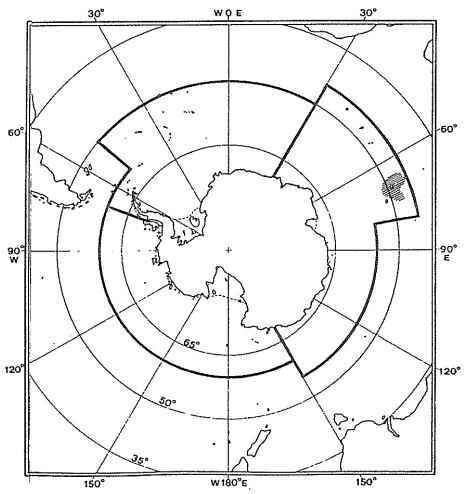
DISTINCTIVE CHARACTERS :

Shell very thin, equivalve, elongate and rostrate, with a posterior furrow and very small gapes; pallial sinus strong; resilifer triangular and hinge teeth small (14 to 17 anterior and 15 to 18 posterior).

Colour: bright olive-yellow or greenish-grey, becoming orange or brownish along the margins.

SIZE :

Max. : 4 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Restricted to the Kerguelen Islands. Lives in the black anoxic mud of fjords (densities up to 1 200 specimens per m^2) and more rarely in deep mud bottoms in the open sea. A deposit feeder; depth range 11 to 925 m.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Experimental fishing yielded 13 kg per 20 minutes of beam trawling.

NUCUL Yold 1

1985

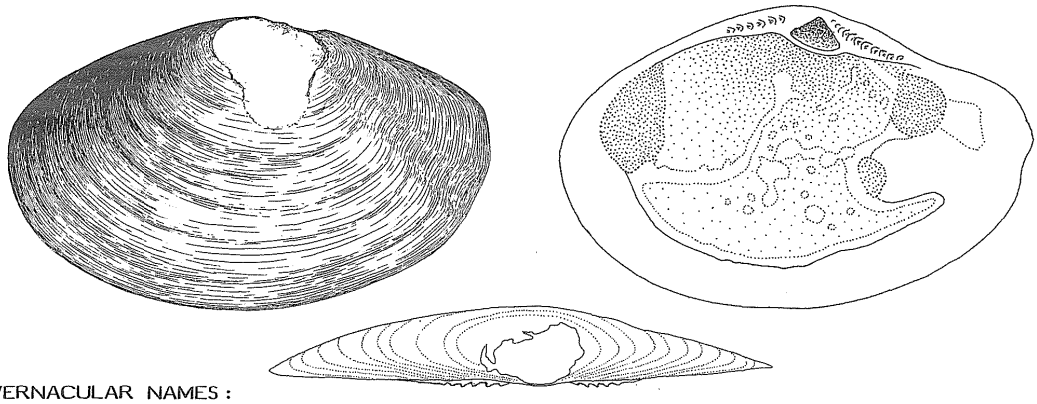
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NUCULANIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Yoldia eightsi (Couthouy in Jay, 1839)

OTHER SCIENTIFIC NAMES STILL IN USE : Yoldia subaequilateralis Smith, 1875
Yoldia kerguelensis Thiele & Jaeckel, 1931



dorsal view of one valve

0 1 cm

VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic Yoldia
Fr - Yoldia antarctique
Ru - Yoldia antarkticheskaya
Sp - Yoldia antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

Equivalve, subequilateral and widely gaping at both ends; ovate with rostrum more or less pronounced; umbones usually eroded; resilifer triangular; 7 to 18 anterior and 5 to 14 posterior hinge teeth; large U-shaped pallial sinus.

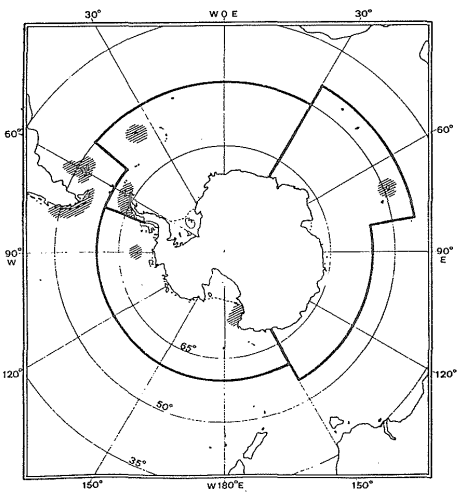
Colour: periostracum glossy and yellow-olivaceous with brown growth rings; large specimens very dark brown.

SIZE :

Max. : 3.7 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Ross area, Peter Øya, Antarctic Peninsula and Scotia Arc, Magellanic region, Kerguelen Islands. Lives in the open sea in coarse sand mixed with gravel, shells and/or sponge spicules, from 21 to 104 m depth. Population density reaches 70 specimens per m^2 at the Kerguelen Islands, and 150 specimens in Arthur Harbour (Anvers Island, Palmer Archipelago).



PECT Adam 1

1985

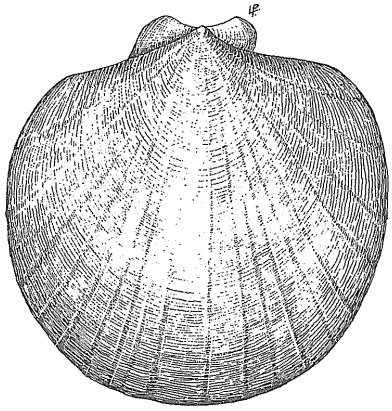
FAO SPECIES IDENTIFICATION SHEETS

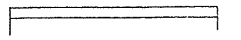
FAMILY : PECTINIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Adamussium colbecki (Smith, 1902)

OTHER SCIENTIFIC NAMES STILL IN USE : Pecten racovitzai Pelseneer, 1903





VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic scallop
Fr - Pecten antarctique
Ru - Grebeshok antarkticheskyi
Sp - Vieira antártica

NATIONAL :

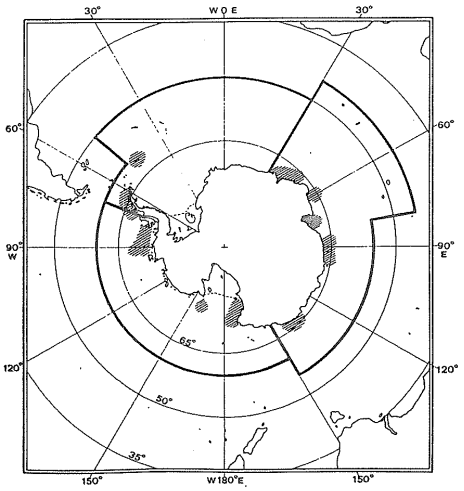
DISTINCTIVE CHARACTERS :

Shell thin and fragile, even if flexible; valves circular in outline, left valve a little more convex than the right; 15 to 22 radial ribs (wavy and vanishing near ventral margin) and regular tiny concentric striae on both valves. Ears small, with an anterior byssal notch.

Colour: reddish-purple to brown, but left valve frequently covered with a coat of diatoms and epibiotic invertebrates (hydroids, bryozoans, sponges, polychaetes, etc.).

SIZE :

Max. : 8.5 by 9 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circum-Antarctic, extending northward to the South Okney Islands only. Occurs in depths from 4 to 805 m, on soft or mixed substrates, sitting on its right valve but able to swim by clapping its valves. Common in shallow waters where its population density may reach 2 kg per m^2.

FAO Sheets

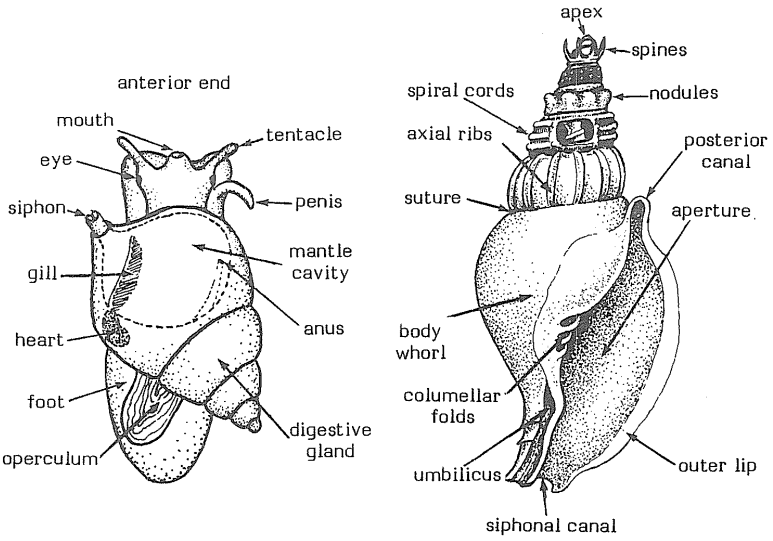
GASTROPODS

Fishing Areas 48,58,88

(Class Gastropoda - univalves, snails)

TECHNICAL TERMS AND GENERAL REMARKS

Gastropod Features



Glossary of Gastropod Terms

Aperture	:	the opening in the last whorl, providing an outlet for the head and foot
Axial sculpture	:	ribs or growth lines that run parallel to the outer lip
Callus	:	smooth shelly layer spreading from the interior side of the aperture over the columellar lip
Columella	:	central pillar of a gastropod shell around which the whorls are growing
Columellar fold (or plait)	:	spiral ridge projecting from the columella
Operculum	:	a chitinous or horny "trapdoor" grown on the posterior upper part of the foot of a snail
Periostracum	:	outer layer of chitinous material covering the outer shell
Protoconch	:	embryonic shell of a gastropod
Radula	:	microscopic hard teeth on a movable ribbon in the mouth of gastropods
Siphonal canal	:	a gutter or groove at the upper or at the lower end of the aperture
Spiral sculpture	:	cords or threads that encircle the whorls parallel to the sutures
Suture	:	continuous line on shell surface where the whorls join
Whorl	:	a turn or coil of a snail shell. The body whorl is the last and largest

Remarks

There are about 20 000 species of marine gastropods in the world ocean. Most of them produce a coiled shell, frequently with a shelly or horny operculum that seals the opening of the shell. Some, however, have a simple, cap-shaped shell and lack an operculum, as in the patellid limpets. Marine snails chew on food or bore holes in other shells; some species are carnivorous or even carrion-eaters; most aquatic snails breathe by means of feathery gills found within the mantle cavity.

About 350 species of prosobranch gastropods have been recorded from the Antarctic region (as compared to 126 species around Falkland/Malvinas Islands). Of the Antarctic species, 96 occur at South Georgia, 94 around the Kerguelen Islands, 66 at Crozet Islands, 61 in Adelie Land, and 32 around the South Shetland Islands.

Most of these species are small (74 percent never exceed 10 mm in size). Their shells are usually white or whitish, sometimes nacreous, but always devoid of colour pattern (dots, lines, etc.). The calcification is poor, due to the low water temperatures, even though some species of Muricidae (Murex shells) or Turridae (tower shells) develop discrete sculpturing, such as light calcareous lamellae.

Antarctic snails are herbivorous, carnivorous, detritophagous or opportunistic feeders (the food also including carrion). Their eggs are generally large, yolky and attached to hard substrates; some species protect their brood until the hatching of well-developed juveniles (direct development, without planktonic stage). However, as a result of circumpolar transportation by floating kelp or ice, and because of the relative homogeneity of the Antarctic environment, vertical and horizontal distribution of these snails are usually very extensive.

Families such as the Haliotidae (abalones) and Strombidae (stromb conchs), as well as the genus Concholepas (Chilean abalones) are lacking in Antarctic waters, and the Littorinidae (periwinkles) and Trochidae (pearly top shells) include only small representatives.

LIST OF SPECIES OCCURRING IN THE AREA :

There are no Antarctic gastropod species of present commercial interest. The criteria adopted for the selection of the species here included are edibility, large size and relatively high population densities.

BUCCINIDAE - Whelks	
Neobuccinum eatoni (Smith, 1875)	BUCCIN Neo 1
MURICIDAE - Trophons	
Trophon albolabratus Smith, 1875	MURIC Troph 1
PATELLIDAE - Limpets	
Nacella concinna Strebel, 1908	PATEL Nac 1
Nacella edgari Powell, 1957	PATEL Nac 2
Nacella kerguelenensis (Smith, 1877)	PATEL Nac 3
STRUTHIOLARIIDAE - Struthiolaria shells	
Perissodonta mirabilis (Smith, 1875)	STRUT Per 1
VOLUTIDAE - Volutes	
Harpovoluta charcoti (Lamy, 1910)	VOLUT Harp 1
Provocator pulcher Watson, 1882	VOLUT Prov 1

Prepared by Patrick M. Arnaud, Station Marine d'Endoume et Centre d'Océanographie, Marseille, France

BUCCIN Neo 1

1985

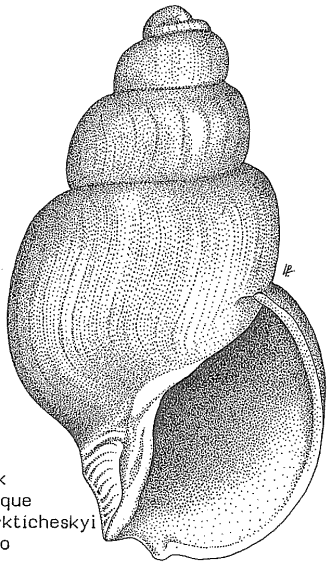
FAO SPECIES IDENTIFICATION SHEETS

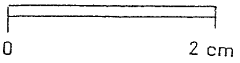
FAMILY : BUCCINIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Neobuccinum eatoni (Smith, 1875)

OTHER SCIENTIFIC NAMES STILL IN USE : Neobuccinum praeclarum Strebel, 1908





VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic whelk
Fr - Buccin antarctique
Ru - Buccinum antarkticheskyi
Sp - Bucino antártico

NATIONAL :

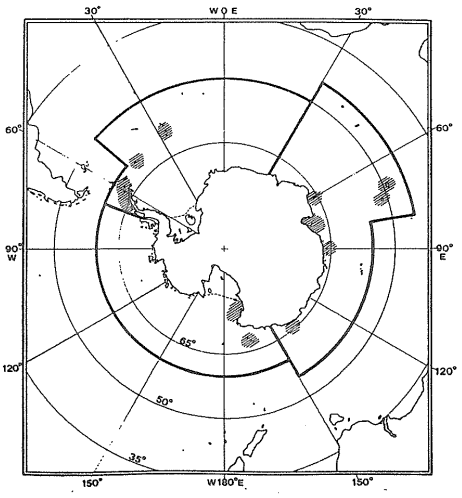
DISTINCTIVE CHARACTERS :

Shell elongate oval, with 6 smooth (growth lines only) and very convex whorls regularly growing; suture deep; aperture large and ovate, with the outer lip thin and simple; columella polished, slightly arcuate, with a longitudinal carina; siphonal canal very short and large; operculum ovate with nucleus almost terminal.

Colour: whitish or creamy, sometimes with a fulvous tinge.

SIZE :

Max.: height 7 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Wide Antarctic distribution, as far north as Kerguelen Islands, from 5 to 925 m depth. A very common scavenger in shallow waters.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

May be caught in large numbers with baited traps in Antarctic shallow waters, but should not be eaten with its digestive tract or before some time of starvation.

MURIC Troph 1

1985

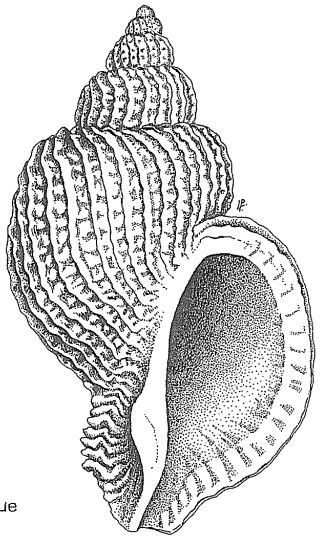
FAO SPECIES IDENTIFICATION SHEETS

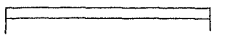
FAMILY : MURICIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Trophon albolabratus Smith, 1875

OTHER SCIENTIFIC NAMES STILL IN USE : Trophon cinguliferus Pfeffer in Martens & Pfeffer, 1886





VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic trophon
Fr - Trophon antarctique
Ru - Trophon belogubyi
Sp - Busano antártico

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell fusiform and turriculate, with 6 whorls bearing axial and spiral foliate lamellae. Aperture measuring 3/5 of the total height, ovate with a short and narrow anterior canal. Columella with a small callus.

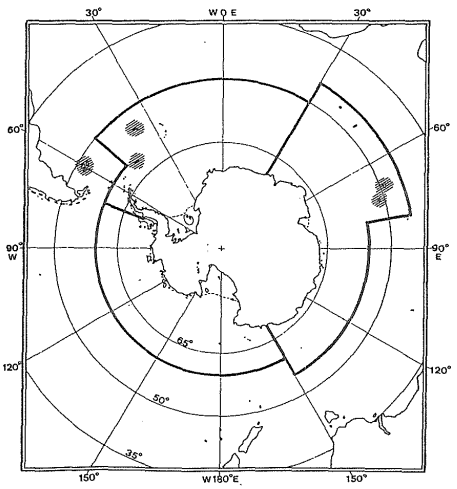
Colour: whitish with the interior of aperture brownish. Animal buff, with a yellowish brown operculum.

SIZE :

Max.: height, 4.4 cm; common to 3 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Islands off the Antarctic Continent: Falkland/ Malvinas, South Georgia, South Orkneys, Kerguelen and Heard, from the intertidal zone to 104 m depth, on sheltered mixed bottoms (mud or sand with gravel, stones and sponge spicules).



PATEL Nac 1

1985

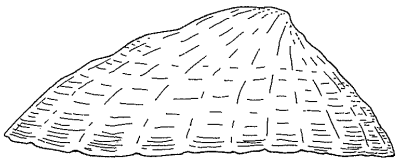
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PATELLIDAE

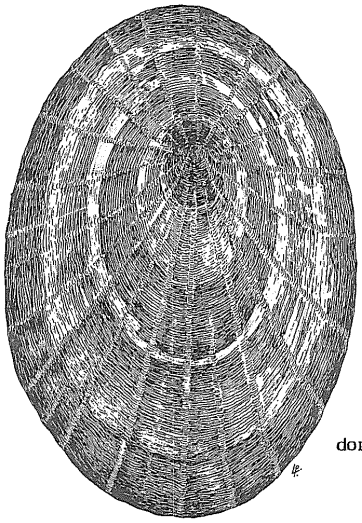
FISHING AREAS 48,58,88
(Southern Ocean)

Nacella concinna Strebel, 1908

OTHER SCIENTIFIC NAMES STILL IN USE : Patella polaris Hombron & Jacquinot, 1851



lateral view



dorsal view

VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic limpet
Fr - Patelle antarctique
Ru - Bludetchko yuzhnoantilskoe
Sp - Patela antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell patelliform, thin, elongate ovate and slightly narrowed anteriorly, with the apex between central and anterior third. Weak radial ribs becoming more or less obsolete with growth.

Colour: brownish clear; interior dark brownish-bronze.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

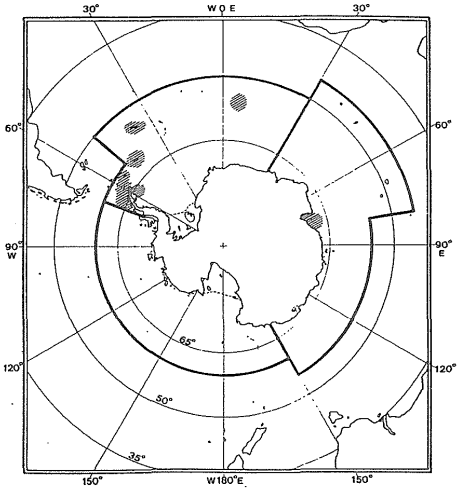
Resembling Nacella kerguelenensis but that species has a separate distribution and, in the adult shell the position of apex is very different.

SIZE :

Max.: length up to 6 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Scotia arc (Antarctic Peninsula to South Georgia Island) and Bouvet Island, from the intertidal zone to 110 m depth; population density reaching 372 specimens per m^2 in the South Orkneys, with a maximum between 3 and 5 m depth.



PATEL Nac 2

1985

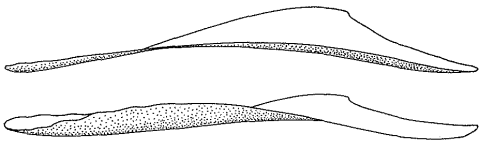
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PATELLIDAE

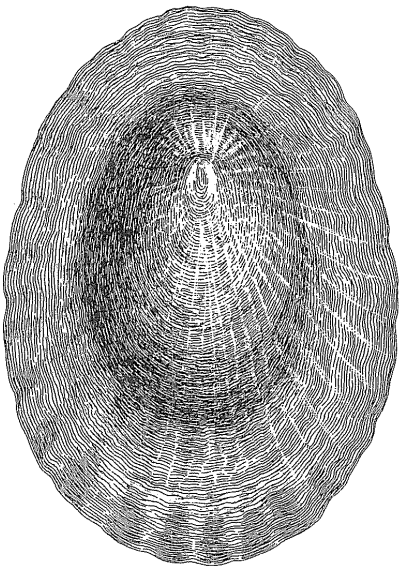
FISHING AREAS 48,58,88
(Southern Ocean)

Nacella edgari Powell, 1957

OTHER SCIENTIFIC NAMES STILL IN USE : Nacella fuegiensis edgari Powell, 1957



lateral views



dorsal view

VERNACULAR NAMES :

FAO/CCAMLR : En - Depressed limpet
Fr - Patelle plate
Ru - Bludetchko ploskoe
Sp - Patela chata

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell very thin and fragile, elongate ovate, patelliform in juveniles, becoming flat or even depressed in adults (except the apical area, slightly raised). Radial folds becoming broad and low and vanishing toward the margins. Sharp and undulating concentric growth lamellae.

Colour: brownish-grey; interior iridescent blue-grey with some reddish brown. Animal greenish-grey.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

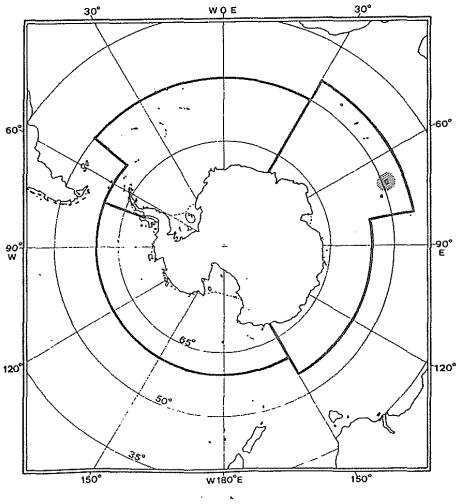
Easy to distinguish from Nacella concinna and N. kerguelenensis by its very light build, its shape (low depressed) and its sharp concentric lamellae.

SIZE :

Max.: 5.1 cm (length); 3.3 cm (width); 0.8 cm (height).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Only known from Kerguelen Islands, on gravel, mud, shells or algae (Macrocystis), from 8 to 67 m depth.



PATEL Nac 3

1985

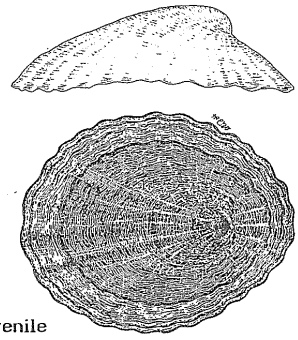
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PATELLIDAE

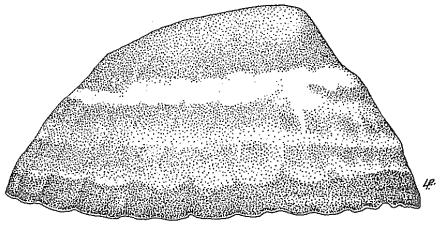
FISHING AREAS 48,58,88
(Southern Ocean)

Nacella kerguelenensis (Smith, 1877)

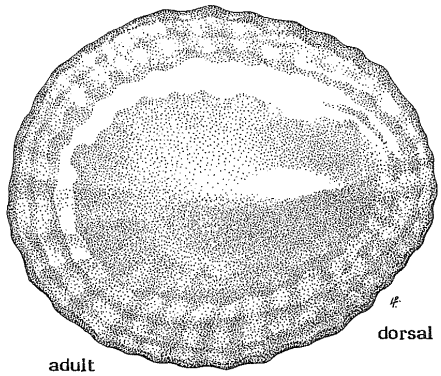
OTHER SCIENTIFIC NAMES STILL IN USE : None



juvenile



lateral view



adult

dorsal view

VERNACULAR NAMES :

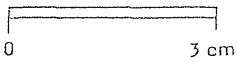
FAO/CCAMLR : En - Kerguelen limpet
Fr - Patelle de Kerguelen
Ru - Bludetchko kergelenskoe
Sp - Patela de Kerguelen

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell patelliform, thin, broadly ovate and narrowed anteriorly, with the apex near the front margin in juveniles but migrating backward to a subcentral position in adults. Weak radial folds.

Colour: purplish-brown; interior reddish-bronze. Animal ash-coloured.

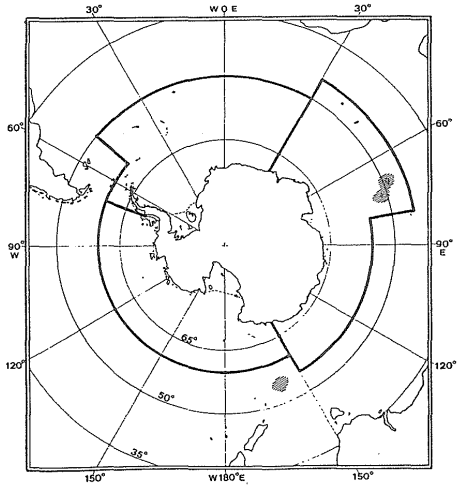


DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Resembling Nacella concinna but has a separate distribution and, in the adult shell the position of the apex is very different.

SIZE :

Max.: 8.2 cm (length); 7.0 cm (width); 4.5 cm (height).



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Restricted to the vicinity of the Antarctic Convergence: Kerguelen, Heard and Macquarie Islands, from the intertidal zone to 76 m depth, on hard bottoms and kelp beds.

STRUT Per 1

1985

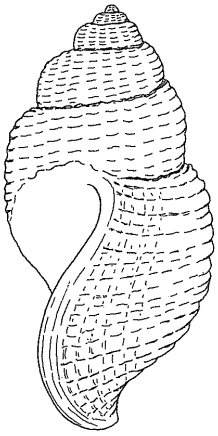
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : STRUTHIOLARIIDAE

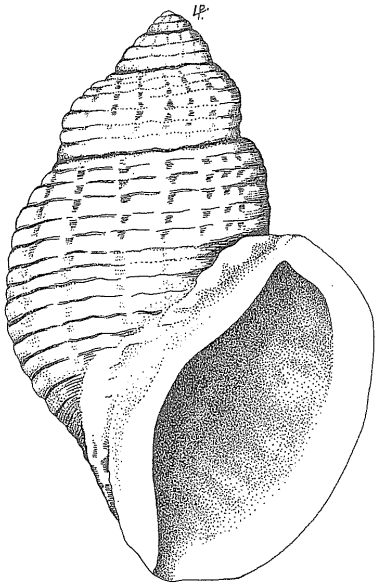
FISHING AREAS 48,58,88
(Southern Ocean)

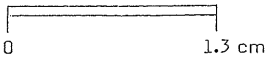
Perissodonta mirabilis (Smith, 1875)

OTHER SCIENTIFIC NAMES STILL IN USE : Struthiolaria costulata Martens, 1875
Perissodonta mirabilis var. georgiana Strebel, 1908



lateral view





VERNACULAR NAMES :

FAO/CCAMLR : En - Subantarctic struthiolaria
Fr - Struthiolaire subantarctique
Ru - Mnogozubka udivitelnaya
Sp - Strutiolaria subantártica

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell ovate and thin, turriculate, with 6 whorls very convex but flattened near the suture. Spiral folds which, in the upper half of the whorl only, are crossed by oblique wavy axial folds. Aperture measuring about half the height of the shell. Outer lip of characteristic shape in lateral view. Columella arcuate. Operculum ovate with a conspicuous projecting spine.

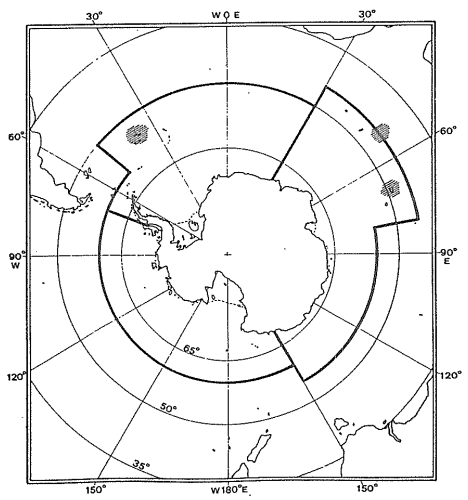
Colour: white, with an olivaceous light periostracum. Operculum horny.

SIZE :

Max.: height, 5.5 cm; common to 3.5 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Limited to islands near the Antarctic Convergence: South Georgia, Crozet and Kerguelen Islands, from 15 to 3 025 m depth; lives on mud (mixed with sand, shells or sponge spircules) or on algae.



VOLUT Harp 1

1985

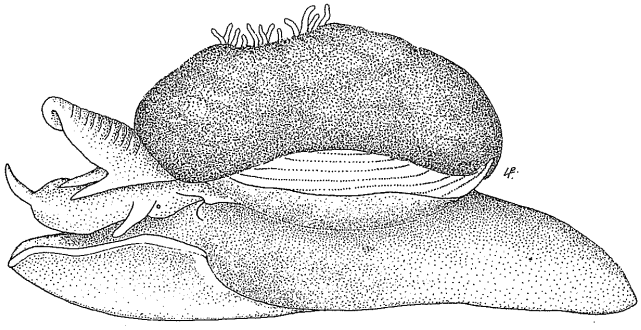
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : VOLUTIDAE

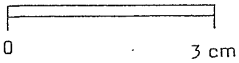
FISHING AREAS 48,58,88
(Southern Ocean)

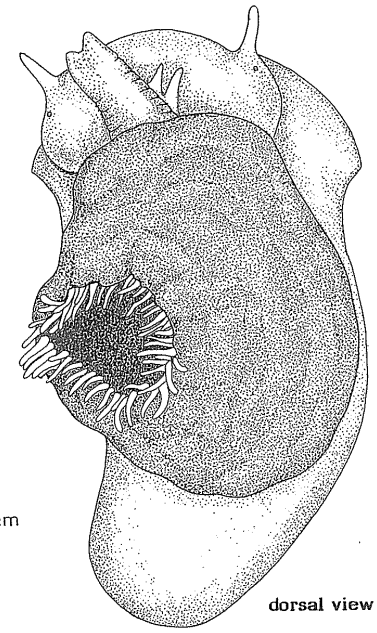
Harpovoluta charcoti (Lamy, 1910)

OTHER SCIENTIFIC NAMES STILL IN USE : Harpovoluta vanhoeffeni Thiele, 1912



lateral view





dorsal view

VERNACULAR NAMES :

FAO/CCAMLR : En - Charcot's volute
Fr - Volute de Charcot
Ru - Voluta Charcot
Sp - Voluta de Charcot

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell very fragile, globose with a sculpture of axial growth lines; aperture ovate with the outer lip thin and simple; columella concave without plaits; no operculum. The foot is too large to be retracted in the shell.

Colour: shell dull with a yellowish periostracum. Animal pale salmon.

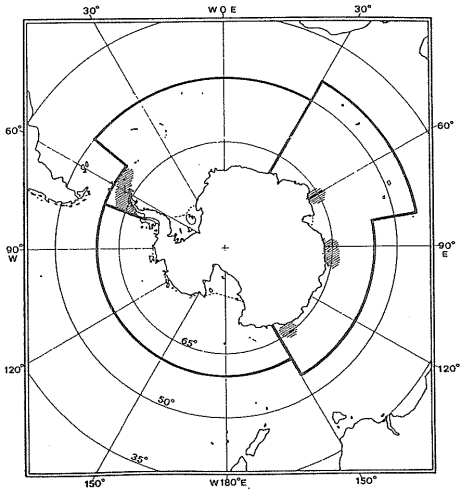
SIZE :

Max.: height, 7.5 cm; common to 5 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Indian sector of the Antarctic coasts, the Antarctic Peninsula and the South Shetland Islands, from 39 m to 630 m depth, on mixed bottoms.

A large commensalistic anemone, Isosicyonis alba, permanently covers the shell (see figures).



VOLUT Prov 1

1985

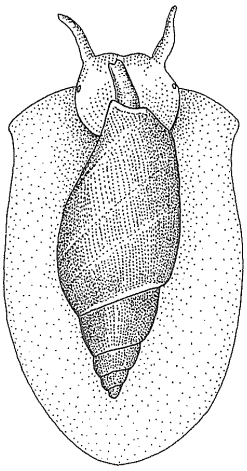
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : VOLUTIDAE

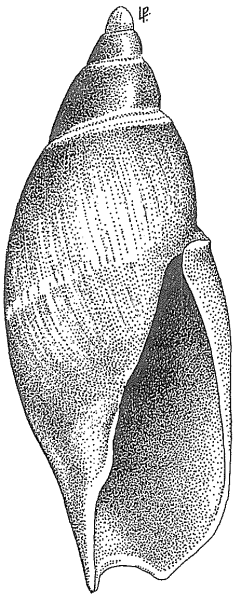
FISHING AREAS 48,58,88
(Southern Ocean)

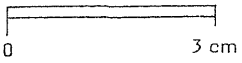
Provocator pulcher Watson, 1882

OTHER SCIENTIFIC NAMES STILL IN USE : Provocator provocator Sowerby, 1887



dorsal view





VERNACULAR NAMES :

FAO/CCAMLR : En - Challenger volute
Fr - *Volute du Challenger*
Ru - Voluta kergelenskaya
Sp - Voluta del Challenger

NATIONAL :

DISTINCTIVE CHARACTERS :

Shell large, fragile, fusiform, with the suture oblique buried in a thick glaze. Protoconch covered with enamel. Aperture pear-shaped, with the outer lip thin and simple. Columella with two very oblique blunt plaits. No operculum. The foot is too large to be retracted in the shell.

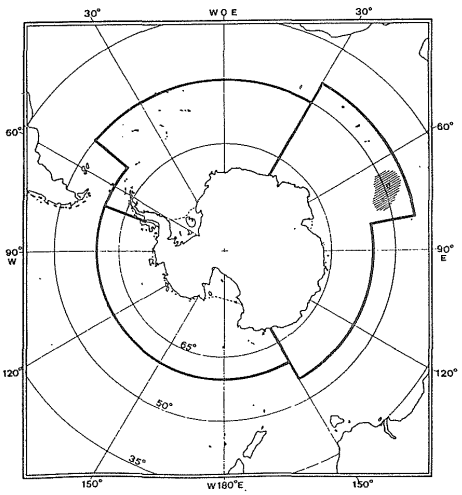
Colour: shell buff, with a light brown periostracum; animal salmon pink.

SIZE :

Max.: 7.5 cm height.

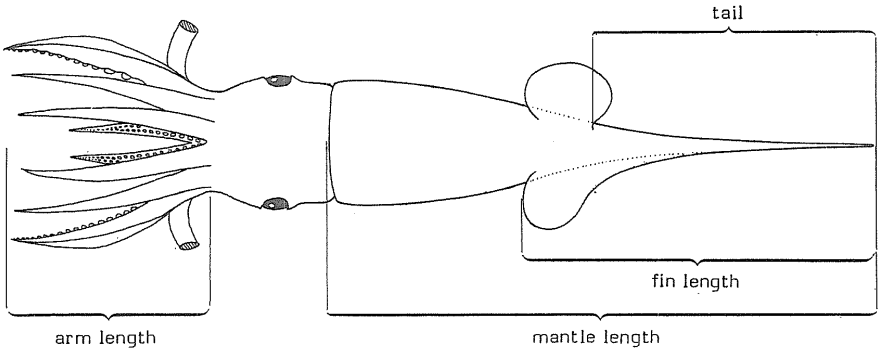
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Restricted to deep waters (155 to 3 240 m) in the Kerguelen-Heard area, on sandy to muddy substrates, heavily mixed with blocks or gravel of basalt or pumice.

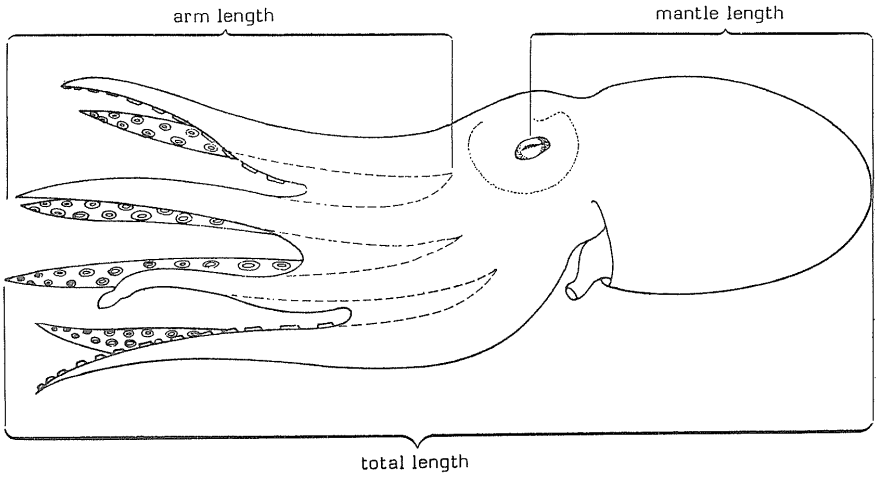


TECHNICAL TERMS AND MEASUREMENTS

General Morphology



Schematic illustration of a squid



Schematic illustration of an octopus

GENERAL REMARKS

The importance of cephalopods in the tropic structure of Antarctic ecosystems has been increasingly recognized in recent years. For example, Everson (1981) estimated that cephalopods annually consume about 100 million metric tons of the Antarctic krill, Euphausia superba. Cephalopods, in turn, are very significant prey organisms for sperm whales, seals, penguins, oceanic birds and fishes. Clarke calculated that the Antarctic population of about 500 000 sperm whales consumes around 50 million metric tons of cephalopods each year (Voss, 1973), an amount equivalent to about 75% of the annual world's catch of fisheries resources.

Attempts to more accurately assess the composition of the Antarctic cephalopod fauna and its resource potential are impeded by a general lack of knowledge about the systematics, distribution, and biology of these important animals. This lack of knowledge results primarily from inadequate sampling programmes that are directed specifically toward cephalopods. Recommendations for comprehensive sampling programmes have been put forth (Roper, 1981) but to date funding for such research has not become available.

While cephalopods in the Antarctic region occupy both benthic and pelagic habitats, the pelagic squids are believed to hold the greatest potential for fisheries development because of their presumed higher species diversity and higher biomass than those of benthic octopods and the few benthic squids known. Relatively restricted continental shelf areas and limited trawlable bottoms further constrain accessability to benthic forms. Jigging, midwater trawling and gillnetting seem to hold more potential as the most effective fishing gear.

Very little commercial exploitation of cephalopod resources is currently underway in the Antarctic zone per se, but several extensive fisheries are developed in sub-Antarctic waters. Several species of cephalopods are fished in the southern Argentina inshore waters, as well as on the Patagonian shelf, especially the squids Illex argentinus, Loligo sanpaulensis, Loligo gahi (patagonica = synonym), and the octopuses Octopus tehuelchus, Eledone massyae and Benthoctopus magellanicus. In 1979 about 92 000 t of I. argentinus were harvested in FAO Fishing Area 41, primarily by Japanese vessels under joint venture arrangements; these catches decreased to about 10 600 t by 1981 (Roper, Sweeney & Nauen, 1984). Nototodarus sloani in New Zealand waters has been fished at a rate averaging around 29 000 t a year, with the exception of the bumper year of 1980 when more than 63 000 t were reported (FAO, 1983). The circumpolar species Todarodes filippovae is an incidental bycatch in the New Zealand fishery, and has been taken in commercial quantities off Tasmania and the Falkland/Malvinas Islands (Roper, Sweeney & Nauen, 1984).

Although these Identification Sheets cover primarily the species found in the designated Antarctic Fishing Areas 48, 58 and 88, they also include several species from sub-Antarctic waters, some of which might penetrate the Southern Ocean area occasionally. Although most species included have potential for fisheries, a few have been included primarily because their biology is particularly well-known or because they are important prey in diets of noteworthy predators, e.g., sperm whales.

Acknowledgements

The authors are most grateful to several people who contributed measureably to this work. R. Toll is gratefully acknowledged for the use of his comprehensive illustrations of gladii. These illustrations appeared in a dissertation (Toll, 1982) and will be published in a monograph on the comparative morphology and phylogeny of the teuthoid gladius. We also gratefully acknowledge N.A. Voss for her very thorough contribution to the preparation of the sections on the Histioteuthidae and the Cranchiidae. Our sincere acknowledgement to G.L. Voss who provided a great deal of valuable information for the section on octopods. We made extensive use of a draft of the BIOMASS Handbook on Identification of Antarctic Cephalopods by Okutani and Clarke (1985), to whom we express thanks. Illustrations not specifically credited were taken from other FAO publications on cephalopods, notably Roper, Sweeney and Nauen (1984), or were provided by the authors.

GLOSSARY OF TECHNICAL TERMS

Anal flaps - A pair of fleshy papillae that arise at the sides of the anus (Fig.1).

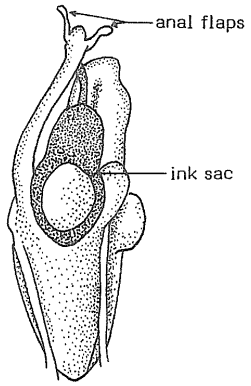


Fig.1

Anterior - Toward the head-end or toward the arm-tips of cephalopods.

Arm formula - Comparative length of the arms expressed numerically in decreasing order, e.g., 3.4.2.1 or 3.2.4.1.

Armature - Refers to the presence and arrangement of suckers and/or hooks on the arms and tentacular clubs of cephalopods.

Buccal lappet - Small, subtriangular flap at tip of muscular band that supports the buccal membrane; may bear suckers (Fig.2).

Buccal membrane - Thin web of tissue that encircles the mouth, reinforced by 6 to 8 buccal supports (Fig.2).

Buccal membrane connectives - Muscular bands that connect the supports of the buccal membrane to the bases of the arms (Fig.2)

Buccal suckers - Small suckers on the buccal lappets/membrane (Fig.2)

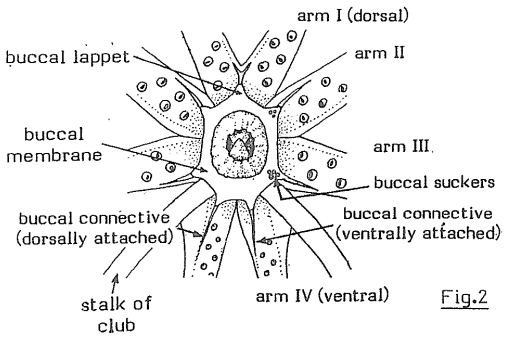


Fig.2

Calcified - Chalky, calcareous by deposition of calcium salts (calcium carbonate).

Calamus - The conical papilla or projection on the hectocotylus of octopods at the proximal terminus of the sperm groove, distal to the last sucker (Fig.3) (see Ligula).

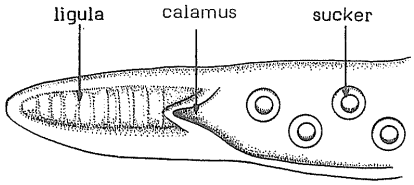


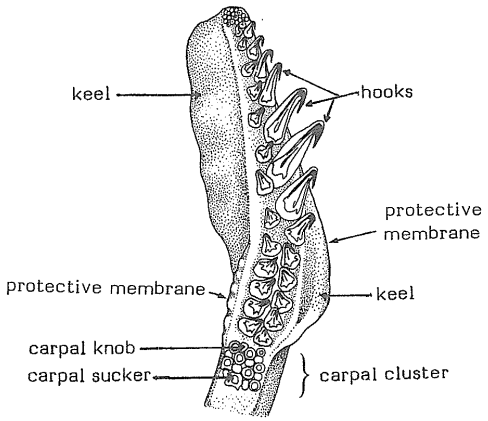
Fig.3

Carpal cluster (Carpal pad) - A usually distinct group of suckers and knobs on the carpus of the tentacular club (Fig.4).

Carpal knobs - Small, rounded, hemispherical protuberances on the carpus to which carpal suckers from the opposite club adhere during the locking of the clubs (Fig.4).

Carpal suckers - Small suckers on the carpus of the club that usually adhere to knobs on the opposite carpus during the locking of the clubs (Fig.4).

Carpus - The proximal zone of (small) suckers (and knobs) on the tentacular club (Fig.4).



tentacular club

Fig.4

"Cartilaginous" scales - Cartilage-like structures in the skin of certain squids; may be overlapping and scale-like, or multifaceted knobs or papillae (Fig.5). Recent evidence indicates these scales are not cartilage in all cases.

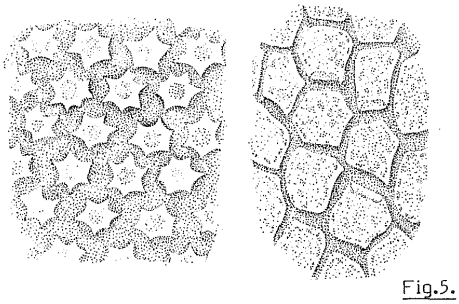


Fig.5.

Chitin(ous) - A horny polysaccharide substance (fingernail-like) that forms the sucker rings, hooks and beaks.

Chromatophores - Pigment-filled muscular sacs in the skin under individual nervous control that collectively provide the background colour, colour patterns, and colour play of cephalopods.

Circumoral appendages - The eight arms (squids, cuttlefishes and octopuses) and two tentacles (squids and cuttlefishes) or the very numerous arms (Nautilus) that arise from the head and encircle the mouth of cephalopods (Fig.2).

Cirri - Arm: elongate, fleshy, finger-like papillae along the lateral edges of the oral surface of the arms, especially in cirrate octopods (Fig.6).

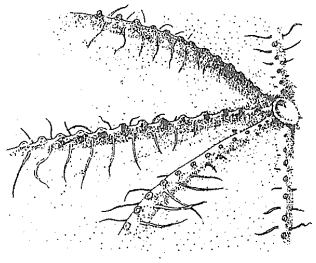


Fig.6

Body: fleshy protuberances of the skin that can be erected as papillae, usually over the eyes (Fig.7).

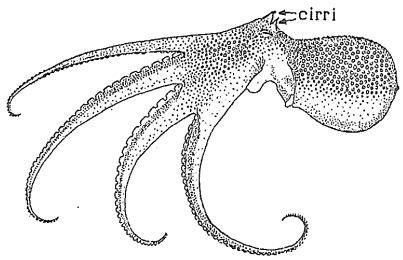
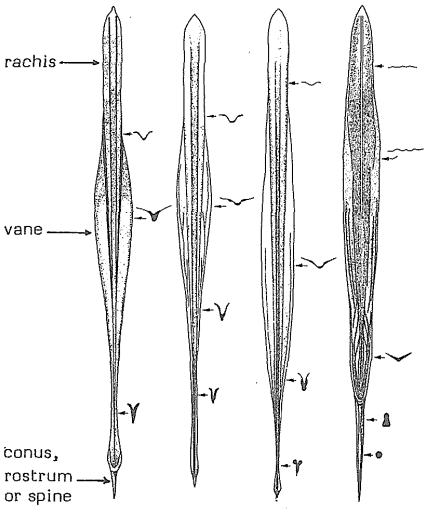


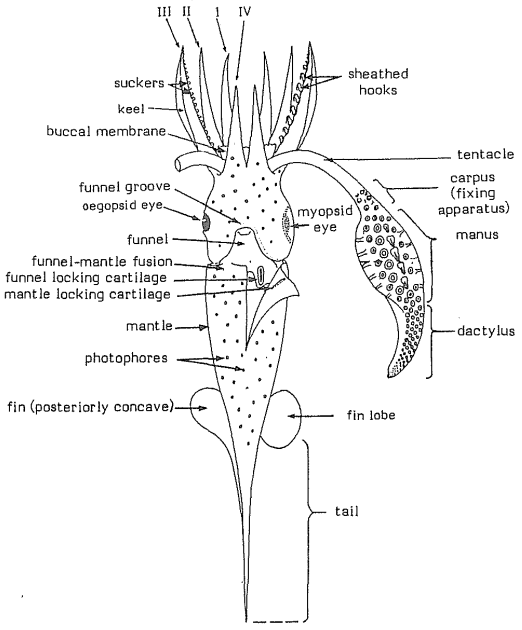
Fig.7

Cone, conus - The spoon-like or cup-like conical posterior terminus of the gladius or cuttlebone; homologous to the phragmacone of fossil teuthoids (Fig.8).



gladii Fig.8

Corneal membrane - The very thin, transparent skin that covers the eyes of myopsid and sepioid cephalopods (Fig.9).



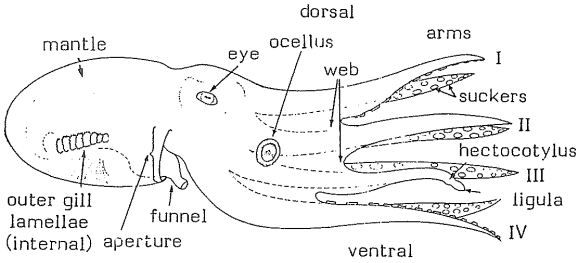
a composite diagram illustrating basic squid (teuthoid) features

ventral view Fig.9

Dactylus - The distal, terminal section of the tentacular club, often characterized by suckers of reduced size (Fig.9).

Distal - Away from the body or point of origin; toward the peripheral parts (opposite of proximal).

Dorsal - The uppermost or back surface of a cephalopod, opposite the ventral surface where the funnel is located (Fig.10).



schematic lateral view of octopus features Fig.10

Fin angle - The angle between the longitudinal axis of the mantle and the posterior border of one fin (Fig.11).

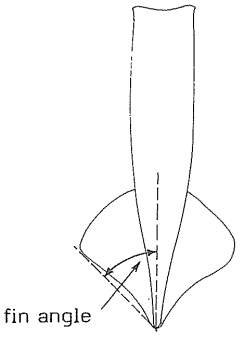


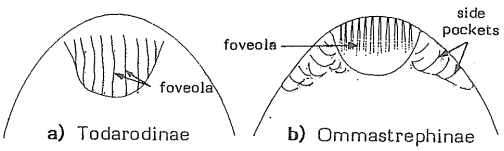
Fig.11

Fin lobe - The portion of each fin that protrudes anteriorly from the anterior point of attachment of the fin to the mantle (Fig.9).

Fins - The pair of muscular flaps that arise along the dorsolateral surface of the mantle of sepioids, teuthoids, and cirrate octopods; used for locomotion, steering and stabilization (Fig.9).

Fixing apparatus - The mechanism of suckers and knobs on the carpal region of the tentacular club that permits the two clubs to be locked together during capture of prey (Fig.4) (see Carpus).

Foveola - Transverse, membranous fold of skin that forms a pocket in the funnel groove of some oegopsids (Fig.12) (see Side pockets).

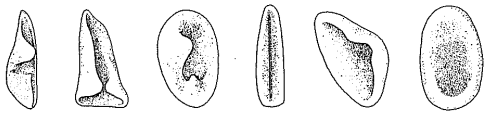


funnel groove Fig.12

Funnel - The ventral, subconical tube through which water is expelled from the mantle cavity during locomotion and respiration (reproductive and waste products and the ink also pass through the funnel) (Figs 9,10). Archaic term - siphon.

Funnel groove - The depression in the posteroventral surface of the head in which lies the anterior portion of the funnel (Fig.12).

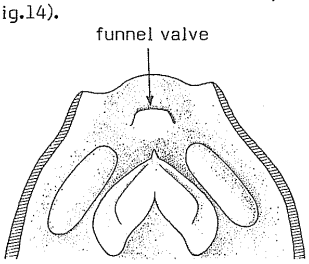
Funnel-locking cartilage - The cartilaginous groove, pit, pocket, or depression on each ventrolateral side of the posterior part of the funnel that joins with the mantle component to lock the funnel and mantle together during locomotion, so water is expelled only through the funnel and not around the mantle opening (Figs 9,13) (see also Mantle-locking cartilage).



funnel-locking cartilage Fig.13

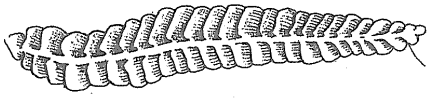
Funnel organ - The glandular structure fused to the internal surface of the funnel, generally a single W-shaped form in octopods and a dorsal inverted V-shaped component with opposed ventral oblong components in decapods (Fig.14).

Funnel valve - The semilunar muscular flap in the dorsal surface of the distal opening of the funnel (Fig.14).



funnel organ Fig.14

Gill lamellae - The leaf-like convoluted individual components of the gill through which gas exchange occurs (Figs 15,18).

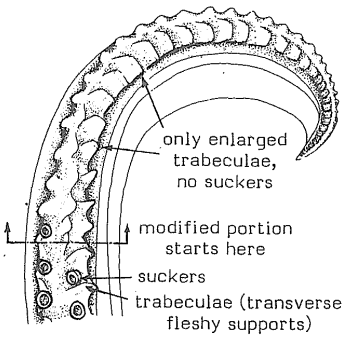


gill lamella

Fig.15

Gladius - The feather or rod-shaped chitinous supporting structure in the dorsal midline of teuthoids and non-sepiid sepioids; the homolog of the shell of ancestral forms (Fig.8) (= **Pen**).

Hectocotylus - One (or more) arm(s) of male cephalopods modified for transferring spermatophores to the female; modifications may involve suckers, sucker stalks, protective membranes, trabeculae (Figs 3,16) (see Calamus, Ligula).



hectocotylized arm
(Illex oxygonius)

Fig.16

Hooks - Chitinous, claw-like structures ontogenetically derived from the suckers on the arms and/or clubs of some oegopsids (Fig.4).

Ink sac - The structure that manufactures and stores the ink of cephalopods; it lies along the intestine and empties via a duct into the rectum (Fig.1).

Keel - **(1)** A flattened, muscular extension along the aboral surface of some arms to render them more hydrodynamic (Fig.9); **(2)** 1 or 2 expanded muscular membranes on the tentacular club of some groups (Fig.4).

Lateral - Pertaining to the side(s) of an organism or structure, away from the centre or midline.

Light organ - A simple or complex structure that produces bioluminescence by intrinsic (self-generated) or extrinsic (bacterial) means (also termed **photophore**) (Figs 9,17).

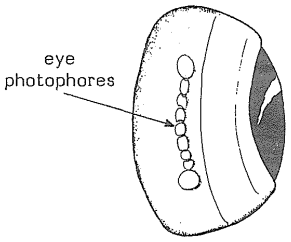


Fig.17

Ligula - The spatulate to spoon-shaped, terminal structure of the hectocotylus of octopods, that contains the calamus basally (proximally) and usually a series of transverse ridges and grooves on the oral surface (Fig.3) (see Calamus, Hectocotylus).

Mantle - The fleshy (muscular) tubular or sac-like body of cephalopods; provides propulsion through jet-like expulsion of water; contains the viscera (Figs 9,10).

Mantle-locking cartilage - The cartilaginous ridge, knob or swelling on each side of the ventrolateral, internal surface of mantle that locks into the funnel component of the apparatus during locomotion (Figs 9,14) (see Funnel-locking cartilage).

Manus - Central or "hand" portion of club between the dactylus distally and the carpus proximally (Fig.9).

Medial(n) - Pertaining to a structure located towards, on, or along the midline.

Needham's sac - The elongate, membraneous container at the terminus of the male reproductive tract that stores completed spermatophores (Fig. 18) (= **spermatophore sac**).

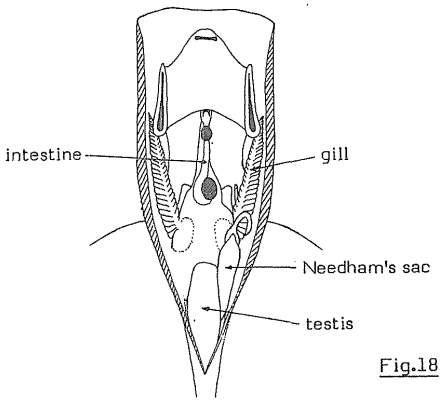


Fig.18

schematic internal view
of anterior ventral mantle

Ocellus - A pigmented spot or patch usually consisting of a central locus of concentrated chromatophores with one or more concentric rings of chromatophores. Ocelli occur on some octopuses, and their normally vivid pigmentation make them stand out against the background colouration (Fig. 10).

Olfactory papilla - A bump-like to finger-like protuberance on the posterolateral surface of each side of the head; of presumed olfactory function.

Orbital pore - Minute pore in the anterior part of the transparent tissue that covers the eyes of sepioids and myopsids (see Orbital sinus) (Fig.9).

Orbital sinus - An anteriorly directed indentation in the eyelid of oegopsids (Fig.19) (see Orbital pore).

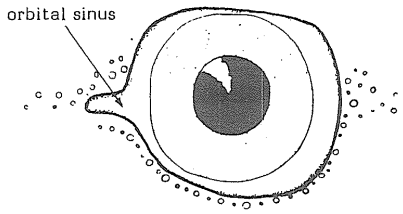
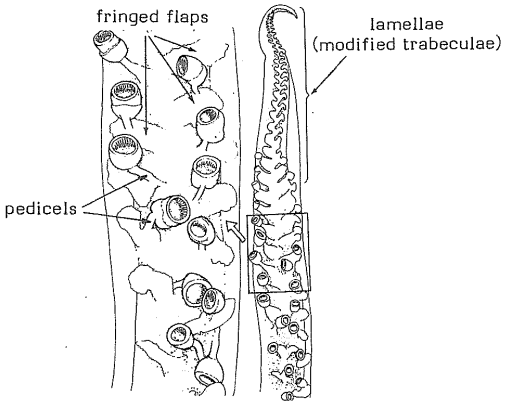


Fig.19

Pedicel - A short, tubular stalk that supports a sucker in sepioids and teuthoids (Fig.20).



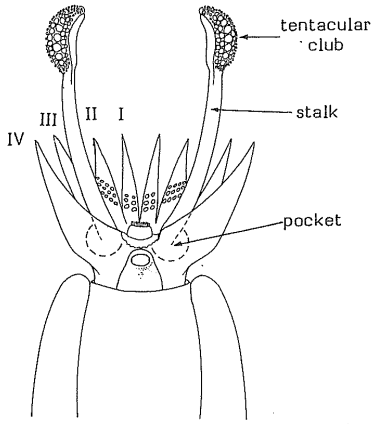
hectocotylized arm
in males

Fig.20

Pen - See gladius.

Photophore - An organ of greater or lesser complexity that produces and distributes bioluminescence, either intrinsically through biochemical reaction or extrinsically through luminescent bacteria (Figs 9,17) (see Light organ).

Pocket - An open depression in the anteroventral surface of the head of sepioids into which the feeding tentacles are retracted when not in use (Fig.21).



ventral view
partial diagrammatic
of cuttlefish features

Fig.21

Posterior - Toward the tail-end of cephalopods.

Protective membrane - Thin web-like integument along the lateral angles of the oral surface of the arms and clubs lateral to the suckers, supported by muscular rods called trabeculae (Fig.22) (see Trabeculae).

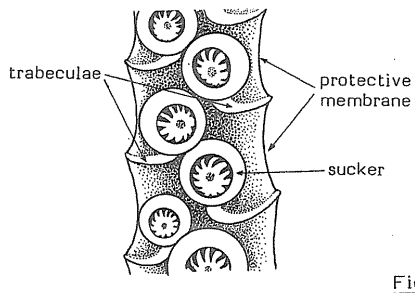
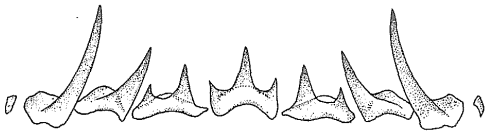


Fig.22

Proximal - Toward the body or nearest or next to the point of origin or attachment; (opposite of distal).

Rachis - The thickened central axis that usually extends the entire length of the gladius. Free rachis is the portion that does not support vanes (Fig.8) (see Gladius, Vane).

Radula - The chitinous, ribbon-like band in the mouth of cephalopods containing several transverse rows of teeth (Fig.23).



radula

Fig.23

Rostrum - A spike-like posterior extension of the gladius, exterior to the conus (Fig.8) (see Spine).

Secondary web - The narrow membrane that connects the primary web to the arms in some cirrate octopods; e.g., Cirroteuthidae.

Side pockets - Small membranous folds of the integument that form pockets lateral to the foveola (Fig.12) (see Foveola).

Sperm receptacle - A bulbous structure in the buccal region of some female cephalopods, e.g., loliginids, for the retention of viable sperm until they are required for fertilization.

Spermatophore - A tubular structure manufactured by male cephalopods for packaging sperm; capable of holding millions of sperm, being transferred intact, and attaching to the female until fertilization begins (Fig.24).

Fig.24

Spermatophore pad - A fleshy patch of tissue, usually in the mantle cavity of some female cephalopds (e.g. loliginids), to which spermatophores adhere after mating until fertilization occurs.

Spine - The sharp spike-like extension on the posterior tip of the gladius (Fig.8) (see Rostrum).

Suckers - Muscular, suction-cup structures on the arms and tentacles (rarely on the buccal membrane) of cephalopods; some are stalked, placed on muscular rods that contract (squids and cuttlefishes); some are sessile, embedded without stalks on the oral surface of the arms (octopuses) (Fig. 25a). They are usually counted either in longitudinal or in transverse (oblique) rows (Fig. 25b).

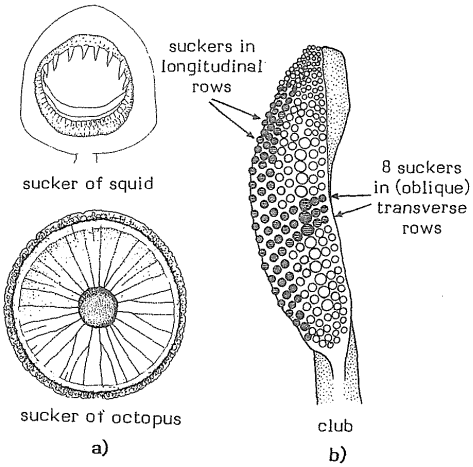


Fig.25

Sucker ring - Chitinous, often serrated or denticulate ring that encircles the opening of suckers of squids and cuttlefishes (Fig.26).

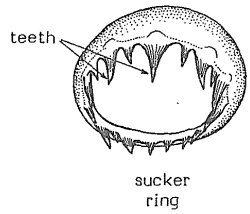


Fig.26

Swimming membrane (keel) - An elongate, muscular vane along the aboral surface of arms of cephalopods that functions to streamline and support the arms during swimming (Figs 4,9).

Tail - The posterior extension of the mantle, frequently elongate. Fins or tapered terminations of fins may extend posteriorly along the tail (Fig.9).

Tentacles - Elongate, stalked circumoral appendages of cuttlefishes and squids used for prey-capture; distal ends contain clubs with suckers (or hooks); stalks usually devoid of suckers. Tentacles can retract into pockets on the head of cuttlefishes, or merely contract, in squids (Figs 9,21).

Tentacular club - Terminal portion of a tentacle; armed with suckers (or suckers and/or hooks), used for capturing prey (Figs 4,9,21).

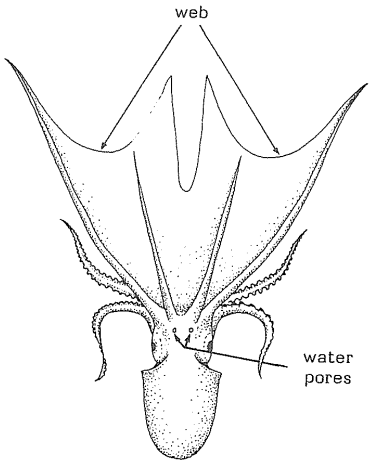
Trabeculae - Muscular rods that support the protective membranes on the arms and clubs of cephalopods; occasionally membranes are reduced and/or trabeculae are elongated, so they extend beyond the edge of the membrane, papilla-like (Fig. 22).

Vane - Thin lateral expansion of the gladius that arises from the rachis (Fig.8) (see Rachis).

Ventral - The lowermost or belly surface of a cephalopod; the surface on which the funnel is located; opposite the dorsal surface (Figs 9,10).

Water pores - Small orifices at base of the web of some pelagic octopuses, e.g., Tremoctopus (Fig.27).

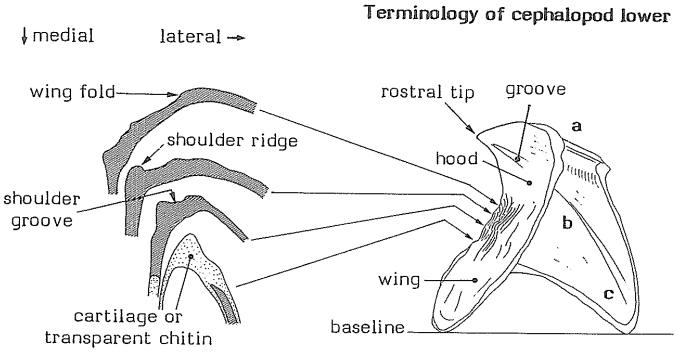
Web - A membranous sheet of greater or lesser extent that extends between the arms of many octopuses, giving an umbrella-like appearance when the arms are spread out, e.g., on cirroteuthids (Figs 10, or 27).



dorsal view

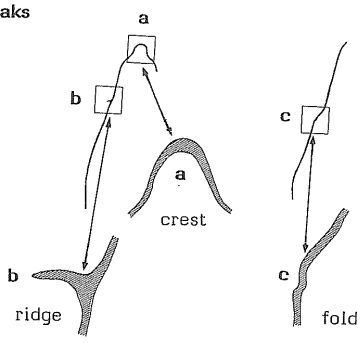
Fig.27

Terminology of cephalopod lower beaks

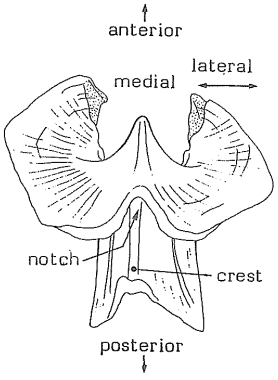


four sections across shoulder

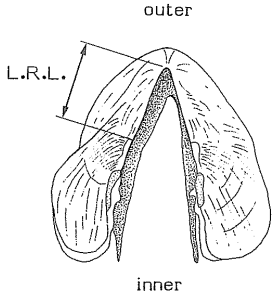
profile



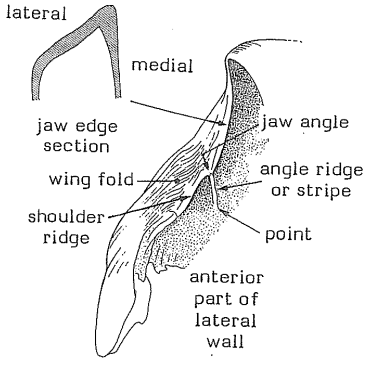
two sections across lateral wall



ventral view



anterior view and lower rostral length (L.R.L.)



anteromedial surface of shoulder

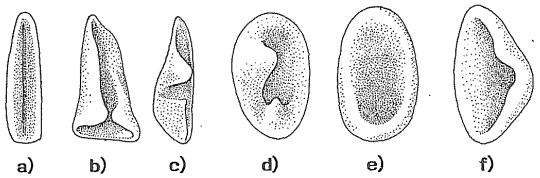
The lower beak is drawn with its inner (morphologically dorsal) end on a baseline. Descriptions on species identification sheets are based on similar sections and views of the lower beak to those shown above.

KEY TO ORDERS AND FAMILIES OCCURRING IN THE AREA :

1a. Ten circumoral appendages (8 arms, 2 contractile but not retractile, tentacles); internal shell straight, feather- or rod-shaped, no pockets .... Order Teuthoidea

2a. Funnel free from mantle; funnel-mantle locking apparatus present

3a. Funnel-locking apparatus a simple, straight groove and ridge (Fig.1a)

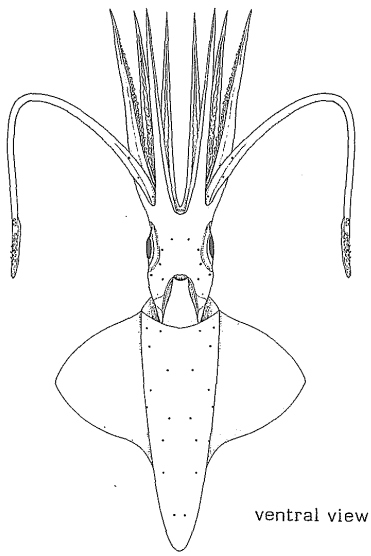


shapes of funnel-locking cartilage Fig.1

4a. Arms with hooks or with suckers in 4 rows on proximal half of ventral arms

5a. Armature (suckers, hooks) of arms in 2 rows

6a. Tentacles present; fully developed clubs present (Fig.2) ..... Family Enoploteuthidae



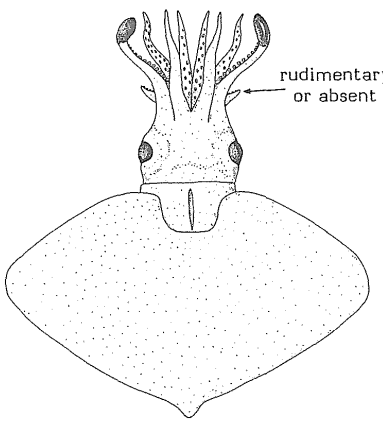
ventral view

Enoploteuthidae (Ancistrocheirus) Fig.2

6b. Tentacles and clubs absent in adults although present in larvae or occasionally in juveniles (Taningia) but always with rudimentary clubs (Fig.3) ..... Family Octopoteuthidae

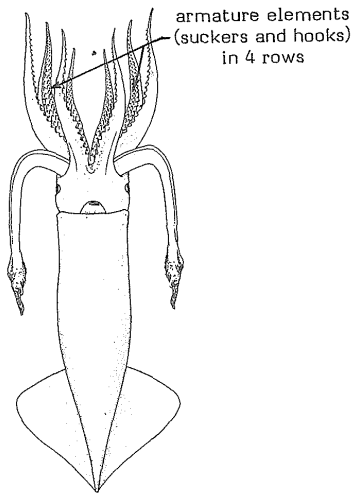
5b. Armature of arms in 4 rows (Fig.4) ..... Family Gonatidae

4b. Arms without hooks and with suckers in 2 rows on proximal half of ventral arms



dorsal view

Octopoteuthidae (Taningia) Fig.3



ventral view

Gonatidae (Gonatus) Fig.4

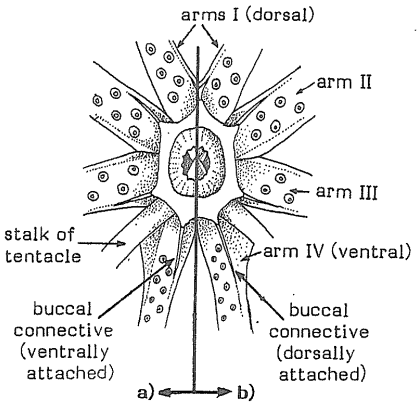
7a. Buccal membrane connectives attach to ventral sides of arms IV (Fig.5a)

8a. Hooks present on tentacular clubs (Fig.6) ..... Family Onychoteuthidae

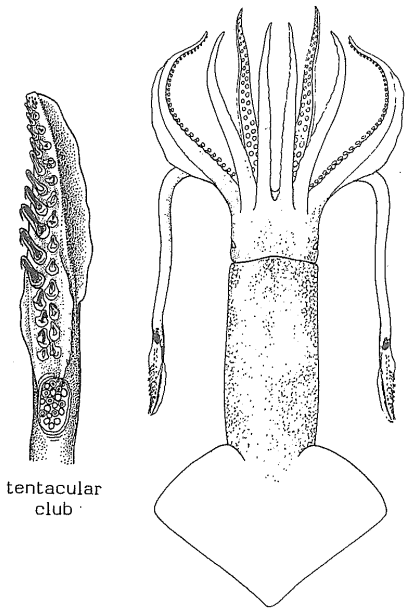
8b. Hooks lacking on tentacular clubs

9a. "Cartilaginous" scales present on mantle (may be minute); tentacular clubs with 4 longitudinal rows of suckers (Fig.7) .... Family Lepidoteuthidae*

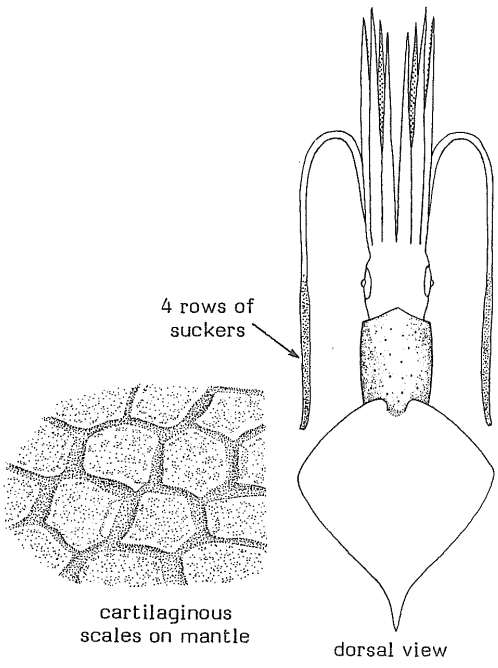
9b. "Cartilaginous" scales lacking; tentacular clubs with more than 4 longitudinal rows of suckers on some areas



oral view Fig.5



Onychoteuthidae (Moroteuthis) Fig.6



Lepidoteuthidae (Pholidoteuthis) Fig.7

* M.Clarke has stated (1980) that Lepidoteuthis and Pholidoteuthis should be placed in separate families

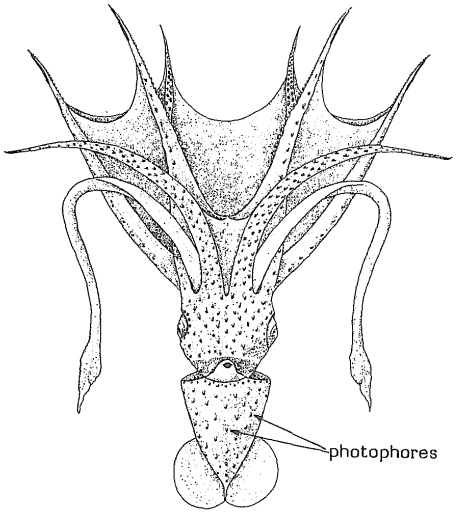
10a. Tentacular clubs with 6 uniform rows of suckers; a long, spike-like tail present (greater than fin length) (Fig.8) ..... Family Batoteuthidae

10b. Tentacular clubs with 4 rows of suckers on distal portion, numerous rows on proximal portion; no long, spike-like tail (Fig.9) ..... Family Brachioteuthidae

7b. Buccal membrane connectives attach to dorsal sides of arms IV (Fig.5b)

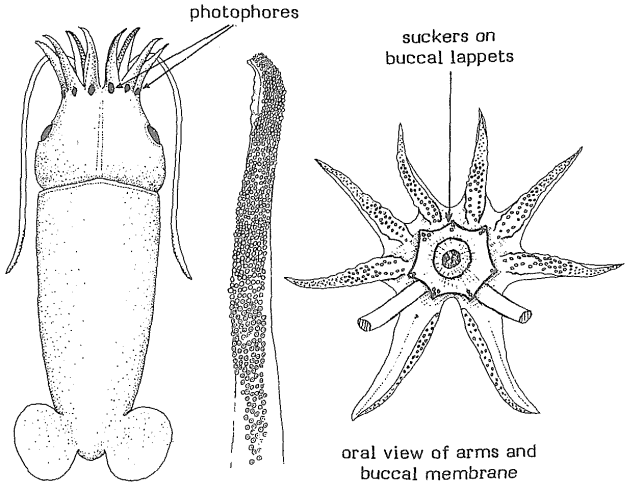
11a. Surface of mantle, head and arms covered with numerous photophores (usually large and distinct) (Fig.10) ..... Family Histioteuthidae

11b. Surface of mantle and head without photophores (arms may have a few photophores)

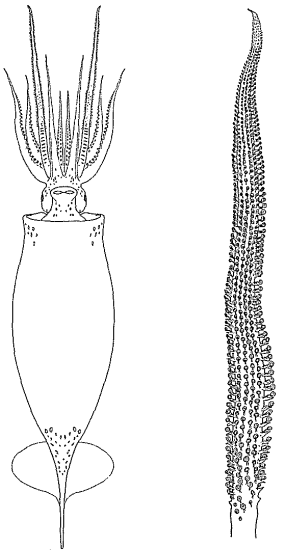


ventral view

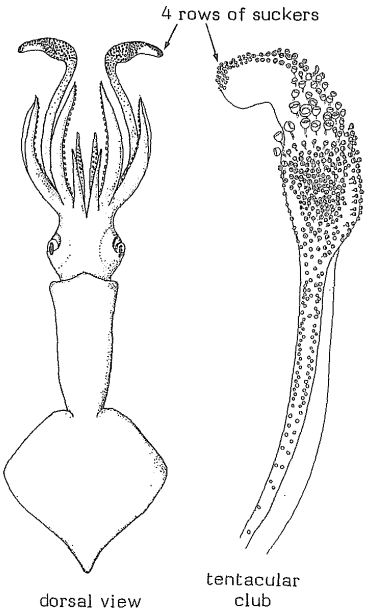
Histioteuthidae (Histioteuthis) Fig.10



Bathyteuthidae (Bathyteuthis) Fig.11



Batoteuthidae (Batoteuthis) Fig.8



Brachioteuthidae (Brachioteuthis) Fig.9

12a. Minute suckers present on oral surface of buccal lappets (Fig.11).. Family Bathyteuthidae

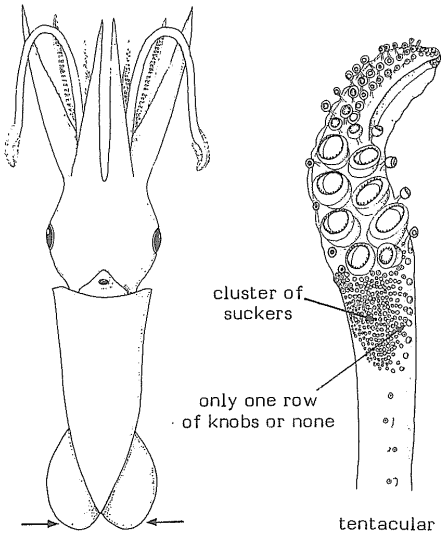
12b. No suckers on oral surface of buccal lappets

13a. Many small to minute suckers (or suckers and knobs) at proximal end of manus (Figs 12,13)

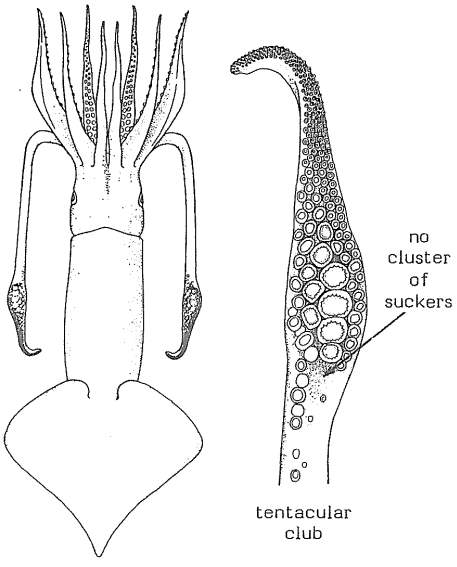
14a. Medial posterior borders of fins convex; carpal knobs in a single dorsal row or absent; small size (Fig.12) ..... Family Neoteuthidae

14b. Medial posterior borders of fins concave; carpal knobs in a cluster alternating with carpal suckers; attains very large size (Fig.13) ..... Family Architeuthidae

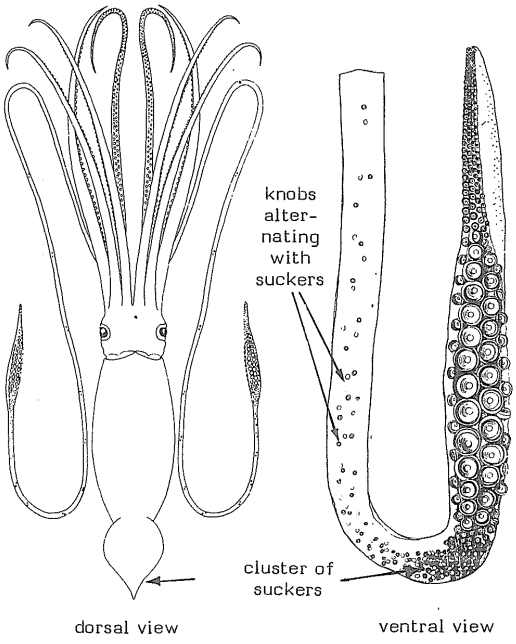
13b. No cluster of small suckers at proximal end of manus (Fig.14) ..... Family Psychroteuthidae



Neotheuthidae (Alluroteuthis) Fig.12



Psychroteuthidae (Psychroteuthis) Fig.14



Architeuthidae (Architeuthis) Fig.13

3b. Funnel-locking apparatus not a simple, straight groove and ridge

15a. Funnel-locking cartilage with a longitudinal and a transverse groove, ⊥ -shaped (Fig. 1b; 15) ..... Family Ommastrephidae

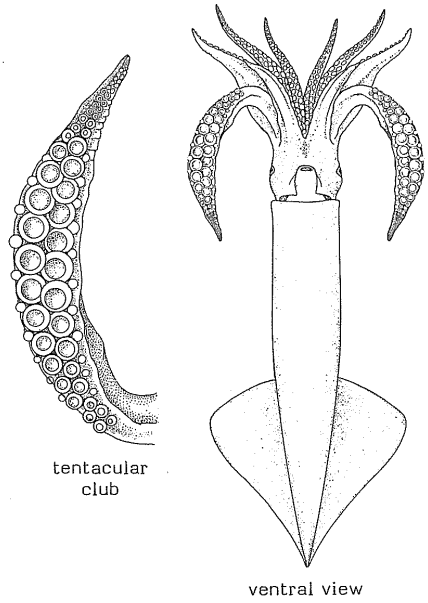
15b. Funnel-locking cartilage oval, triangular or oval with inward projecting knobs (Figs 1d,e,f)

16a. Funnel-locking cartilage oval with 1 or 2 knobs directed toward the centre of the concavity (Fig.1d)

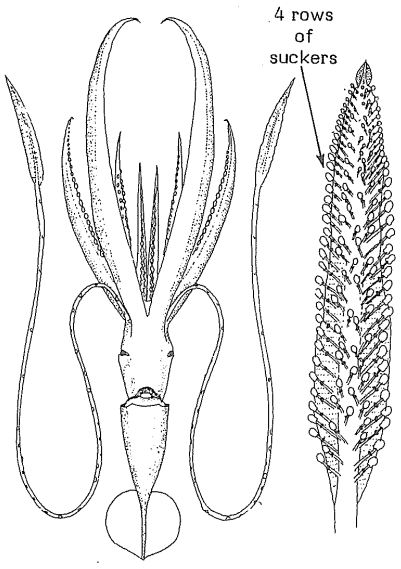
17a. Club with only 4 rows of suckers (Fig.16) ..... Family Chiroteuthidae

17b. Club with many (more than 15) rows of minute suckers (Fig.17) ..... Family Mastigoteuthidae

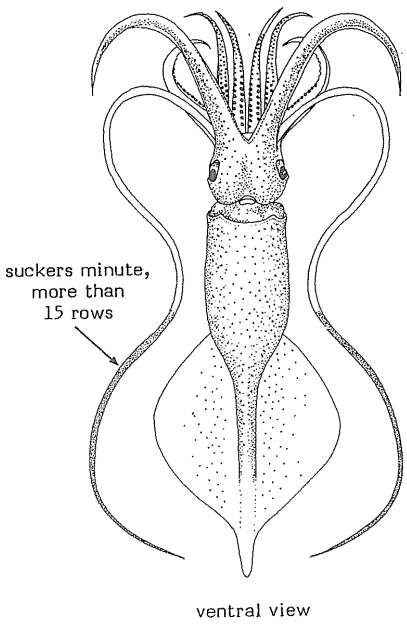
16b. Funnel-locking cartilage oval or sub-triangular, without knobs (Fig.1e,f)



Ommastrephidae (Todarodes) Fig.15



Chiroteuthidae (Chiroteuthis) Fig.16



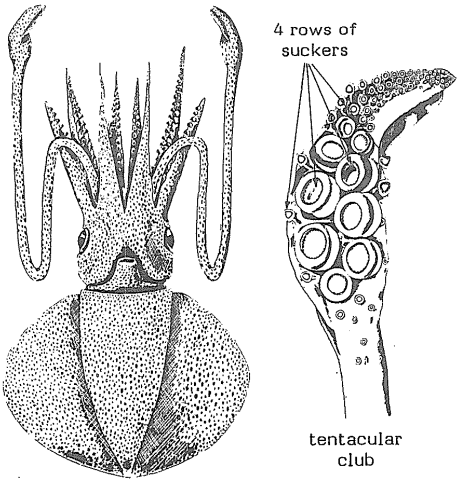
Mastigoteuthidae (Mastigoteuthis) Fig.17

18a. Suckers on tentacular club in 4 longitudinal rows; mantle free dorsally (Fig.18) ..... Family Cycloteuthidae

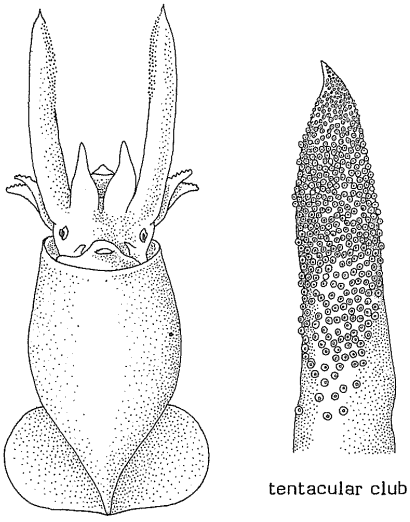
18b. Suckers on tentacular club in 8 or more longitudinal rows; mantle fused dorsally to head (Fig. 19) ..... Family Promachoteuthidae

2b. Funnel fused to mantle on each side; no funnel-mantle locking apparatus present (Fig.20) ..... Family Cranchiidae

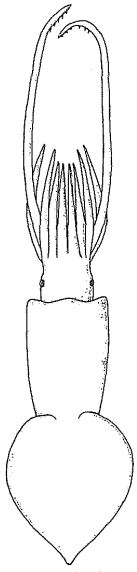
1b. Eight circumoral arms (no tentacles); internal shell vestage, either a small cartilaginous rods or a U-shaped support (Fig.21) ..... Order Octopoda
Family Octopodidae



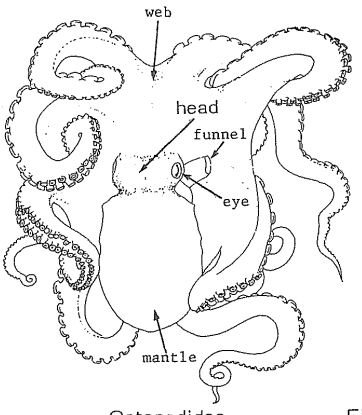
Cycloteuthidae (Discoteuthis) Fig.18



Promachoteuthidae (Promachoteuthis) Fig.19



Cranchiidae (Mesonychoteuthis) Fig.20

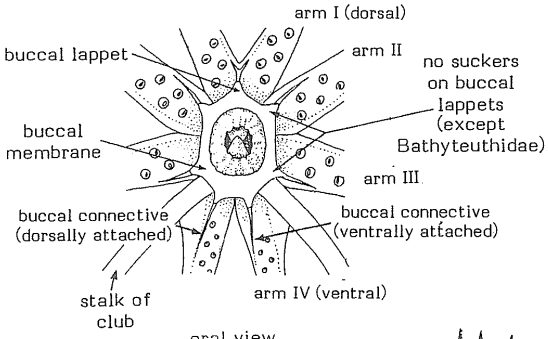


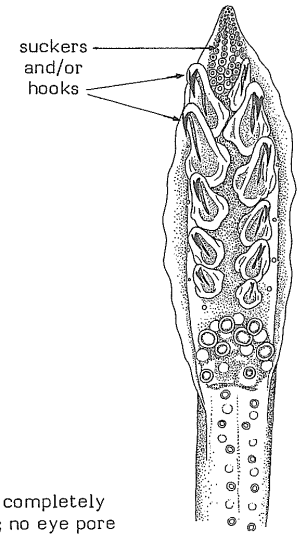
Octopodidae Fig.21

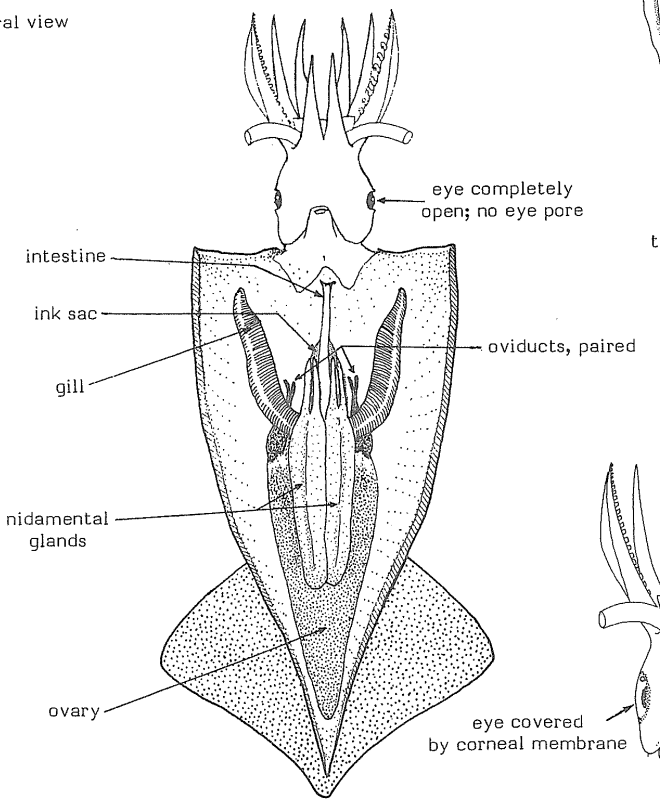
SQUIDS - Order Teuthoidea

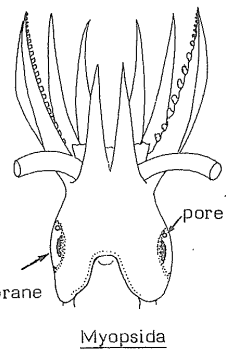
The Order Teuthoidea, or true squids, with two Suborders, Myopsida, "covered-eyed", nearshore (neritic) squids, and Oegopsida, "open-eyed", oceanic (pelagic) squids, occur in the oceans and seas of the world and form the basis of several major fisheries. Some species are demersal or epibenthic in certain periods of their life cycle, but most are pelagic. Only the Suborder Oegopsida occurs in the Southern Ocean.

The main features of oegopsid squids are the following: ten circumoral appendages, the fourth pair, or tentacles, contractile, but not retractile into pockets (occasionally tentacles secondarily lost); sucker ornamentation with chitinous rings and/or hooks. Radula teeth commonly with a primary projection and a secondary cusp(s), especially on the median (rachidian) and the first lateral teeth; buccal membrane present. The olfactory organ consists of two projecting papillae; eye completely open to the sea, without corneal membrane and pore. Gills with branchial canal between afferent and efferent branchial blood vessels. The liver consists of a single structure; female gonoducts are paired; accessory nidamental glands are absent. Shell (pen or gladius) internal, simple, rod- or feather-like, chitinous.









Myopsida

(absent from Antarctic waters)

LIST OF FAMILIES AND SPECIES OCCURRING IN THE SOUTHERN OCEAN AND ADJACENT WATERS*:

Code numbers are given for those species for which Identification Sheets are included

Family Enoploteuthidae Pfeffer, 1900	ENOP
Ancistrocheirus lesueuri (Orbigny, 1839)	ENOP Anci 1
Family Octopoteuthidae Berry, 1912	OCTO
Octopoteuthis rugosa Clarke, 1980	OCTO Octo 1
Taningia danae Joubin, 1931	OCTO Tanin 1
Family Onychoteuthidae Gray, 1849	ONYCHO
Kondakovia longimana Filippova, 1972	ONYCHO Kond 1
Moroteuthis ingens (Smith, 1881)	ONYCHO Moro 1
Moroteuthis knipovitchi Filippova, 1972	ONYCHO Moro 2
Moroteuthis robsoni Adam, 1962	ONYCHO Moro 4
Family Cycloteuthidae Naef, 1923	CYCL
Cycloteuthis akimushkini Filippova, 1968	CYCL Cycl 1
Family Gonatidae Hoyle, 1886	GONA
Gonatus antarcticus Lönnberg, 1898	GONA Gonat 5
** **Family Lepidoteuthidae** Pfeffer, 1912	LEPIDO
Lepidoteuthis grimaldii Joubin, 1895	LEPIDO Lepid 1
Pholidoteuthis boschmai Adam, 1950	LEPIDO Pholi 2
Family Architeuthidae Pfeffer, 1900	
Architeuthis spp.	
Family Histioteuthidae Verrill, 1881	HISTIO
Histioteuthis atlantica (Hoyle, 1885)	HISTIO Histio 4
Histioteuthis eltaninae Voss, 1969	HISTIO Histio 5
Histioteuthis macrohista Voss, 1969	HISTIO Histio 6
Histioteuthis miranda (Berry, 1918)	HISTIO Histio 7
Histioteuthis sp.	
Family Batoteuthidae Young & Roper, 1968	BATO
Batoteuthis skolops Young & Roper, 1968	BATO Bat 1
Family Psychroteuthidae Thiele, 1921	PSYCH
Psychroteuthis glacialis Thiele, 1921	PSYCH Psych 1
Family Neoteuthidae Naef, 1921	NEO
Alluroteuthis antarcticus Odhner, 1923	NEO Allur 1

* Arrangement of families in this list is phylogenetic, but order of sequence of identification sheets is alphabetical by families, genera and species

** M.R. Clarke has stated (1980) that Lepidoteuthis and Pholidoteuthis should be placed in separate families

Family Bathyteuthidae Pfeffer, 1900	BATHY
Bathyteuthis abyssicola Hoyle, 1885	BATHY Bathy 1
Family Brachioteuthidae Pfeffer, 1908	BRACHIO
Brachioteuthis picta Chun, 1910 Brachioteuthis sp.	BRACHIO Brachio 1
Family Ommastrephidae Steenstrup, 1857	OMMAS
Martialia hyadesi Rochebrune & Mabille, 1889	OMMAS Mart 1
Todarodes filippovae Adam, 1975	OMMAS Todarod 2
Family Chiroteuthidae Gray, 1849	
Chiroteuthis spp.	
Family Mastigoteuthidae Verrill, 1881	
Mastigoteuthis sp.	
Family Promachoteuthidae Naef, 1912	
Promachoteuthis sp.	
Family Cranchiidae Prosch, 1849	CRANCH
Galiteuthis glacialis (Chun, 1906) Galiteuthis spp.	CRANCH Gali 1
Megalocranchia sp.	
Mesonychoteuthis hamiltoni Robson, 1925	CRANCH Meso 1
Taonius sp.	
Teuthowenia pellucida (Chun, 1910)	CRANCH Teut 1

Prepared by Clyde F.E. Roper, Michael J. Sweeney, Department of Invertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, USA and Malcolm R. Clarke, Marine Biological Association, The Laboratory, Citadel Hill, Plymouth PL1 2PB, UK

BATHY

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

BATHYTEUTHIDAE

Deepsea squids

The family contains a single genus, Bathyteuthis with three species. Only the most common species, B. abyssicola (a deepsea form that has been recorded from all major oceans) is recorded from the Southern Ocean where it is one of the most abundant cephalopods.

Bathyteuthis abyssicola Hoyle, 1885

BATHY Bathy 1

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

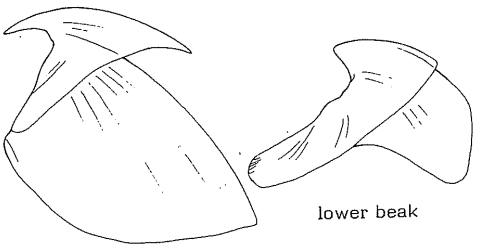
FAO/CCAMLR : En - Crown squid
Fr - Loutène couronnée
Ru - Abyssalnyi kalmar
Sp - Batiluria coronada

NATIONAL :

DISTINCTIVE CHARACTERS :

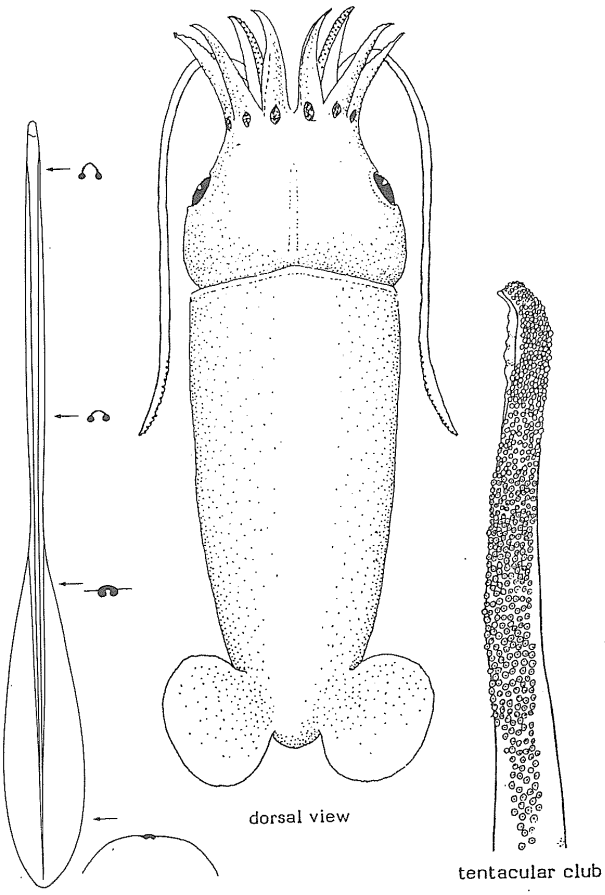
Mantle robust, bluntly rounded posteriorly. Fins subterminal, paddle-like, round, small, separate. Eyes oriented slightly anteriorly. Funnel-locking apparatus straight; buccal connectives attached to dorsal borders at arms IV, suckers present on the buccal lappets. Clubs small, unexpanded, short, with relatively few, small, coequal suckers in 8 to 10 rows. Arms short, with few small suckers arranged in irregular rows (2 rows proximally increasing to 4 rows distally); no enlarged trabeculae. A small, inconspicuous photophore at bases of arms I to III. Colour: deep maroon.

Lower beak: jaw edge slightly curved and exposed part only about one-third the length of wing; jaw angle obtuse; no angle point; wing fold low; jaw angle and lateral wall widely spaced; no notch in hood; crest unthickened and broad; no lateral wall ridge or fold.



upper beak

lower beak



gladius

dorsal view

tentacular club

(all after Roper, 1969)

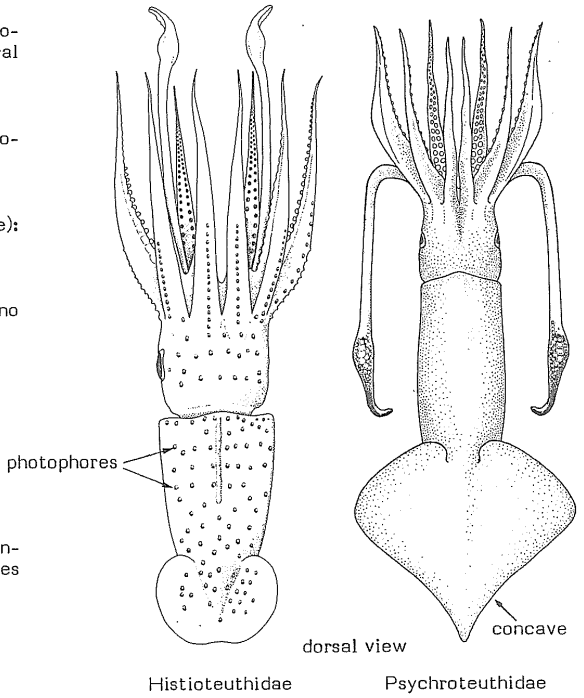
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Several families (Histioteuthidae, Psychroteuthidae and Neoteuthidae) have similar general characters, but can be differentiated as follows:

Histioteuthis species (Histioteuthidae): photophores present on mantle.

Psychroteuthis glacialis (Psychroteuthidae): posterior fin attachment concave.

Alluroteuthis antarctica (Neoteuthidae): no photophores at bases of arms.



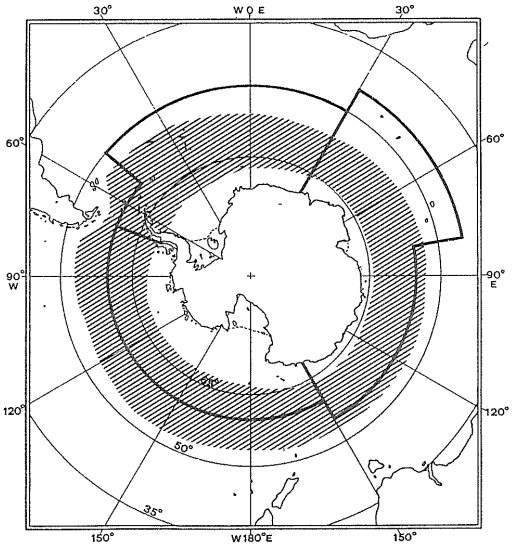
SIZE :

Maximum reported mantle length 7 cm; mantle length at maturity is about 4 to 5 cm in females and 3.5 cm in males.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar in the Southern Ocean and productive waters of the eastern Pacific, Atlantic and Indian Oceans.

An oceanic species occurring between about 100 m and 4 200 m depth, but normally encountered between 700 and 2 000 m. Believed to carry out diel vertical migrations between lesser depths (up to 100 m at night) and greater depths during the day.



INTEREST TO FISHERIES :

Although the species is abundant in the Southern Ocean, it has no commercial value at present.

BATO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

BATOTEUTHIDAE

Spiketail squids

This family was described from Antarctic waters, and the single species, Batoteuthis skolops, currently is known only from Antarctic waters.

Batoteuthis skolops Young & Roper, 1968

BATO Bat 1

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

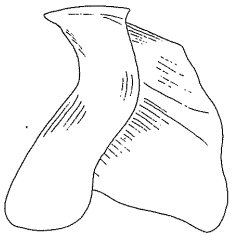
FAO/CCAMLR : En - Antarctic spiketail squid
Fr - Loutène épineuse antarctique
Ru - Antarkticheskyi shilokhvost
Sp - Espigoluria antártica

NATIONAL :

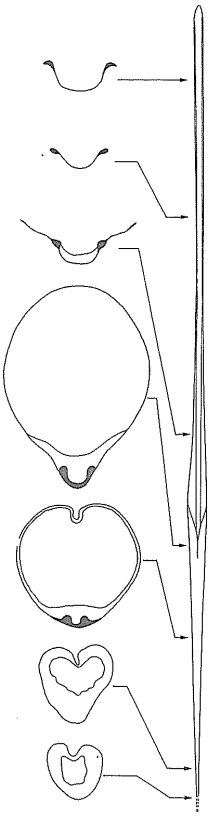
DISTINCTIVE CHARACTERS :

Mantle thin, muscular and fusiform, with a tapering posterior end forming a tail. Fins small, lacking the anterior lobe, together oval in outline. Head narrow with large eyes. Buccal connectives attached to ventral borders of arms IV. Funnel-locking apparatus with a straight, simple groove. Arms long, slender, with biserial suckers; sucker rings on arms II and III with 8 to 10 broadly spaced, large, sharp teeth; those on arms I to IV with 11 or 12 small, closely packed, sharp teeth. Tentacles relatively short, with a long, narrow club containing 6 rows of closely packed suckers; sucker rings on club have 6 small, conical, widely spaced teeth; no dactyl or carpal areas present on club.

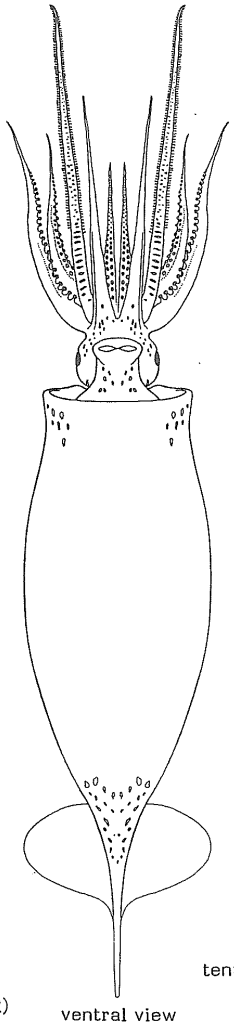
Lower beak: jaw angle nearly 90°; a sharp wing fold; a slightly thickened fold which runs to near the midpoint of the posterior edge of lateral wall.



lower beak
(profile)
(after Young & Roper, 1968)



gladius
(redrawn from Toll, 1982)



ventral view
(after Young & Roper, 1968)

tentacular club

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

No other known species in the area has a similarly long, narrow club with 6 longitudinal rows of suckers and lacks distinct dactyl or carpal areas.

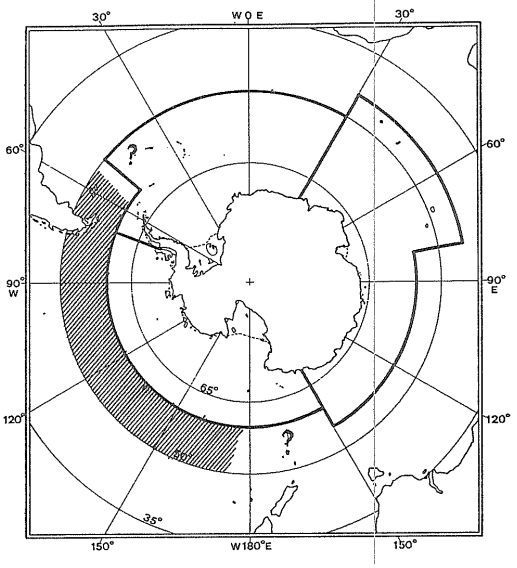
SIZE :

Maximum reported mantle length to 9.5 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Northern portion of Antarctic Ocean (50 to 60°S) in the Pacific sector and a portion of Atlantic sector (approximately 55 to 170°W); range limits undetermined.

An oceanic species, known only from original open-net captures between 366 and 2 525 m depth.



INTEREST TO FISHERIES :

Probably of limited fisheries potential.

BRACHIO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

BRACHIOTEUTHIDAE

Arm squids

This family is monotypic with only one representative recorded from Southern Ocean waters.

Brachioteuthis picta Chun, 1910

BRACHIO Brachio 1

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

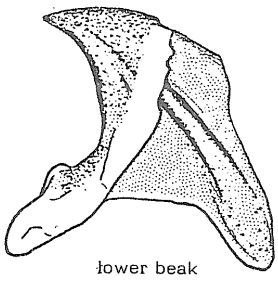
FAO/CCAMLR : En - Ornate arm squid
Fr - Encornet bras courts orné
Ru - Pyostryi kalmar
Sp - Braquiluria moteada

NATIONAL :

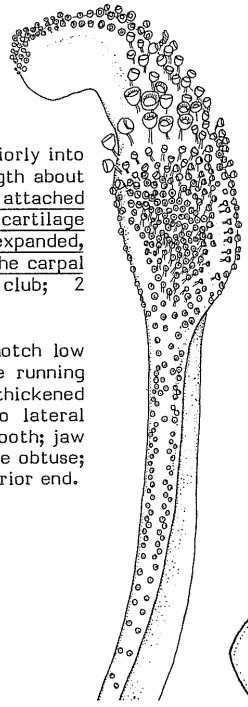
DISTINCTIVE CHARACTERS :

Mantle long, slender, produced posteriorly into a tail. Fins terminal, saggitate, their length about 50% of mantle length. Buccal connectives attached ventrally to arms IV. Funnel-locking cartilage straight, simple. Tentacular clubs expanded, covered with numerous minute suckers in the carpal region that extend proximally along the club; 2 rows of suckers on arms.

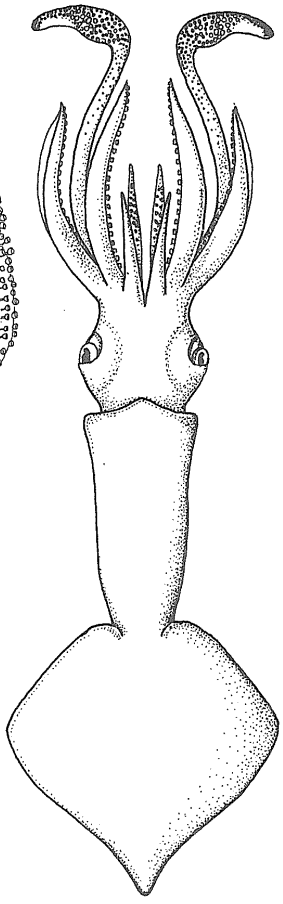
Lower beak: hood with a shallow notch low over the crest; a distinct, thickened ridge running toward the free corner of lateral wall; a thickened crest and distinctly curved lower edge to lateral wall; shoulder may form a short ridge or tooth; jaw edge about as long as hood length; jaw angle obtuse; wing fold very low, often prominent at anterior end.



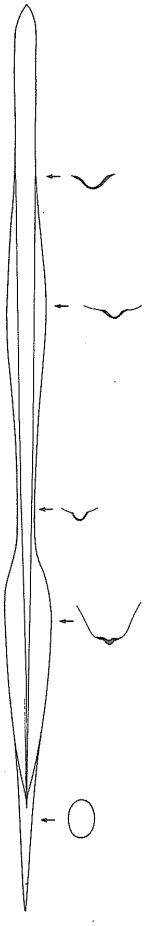
lower beak



tentacular club



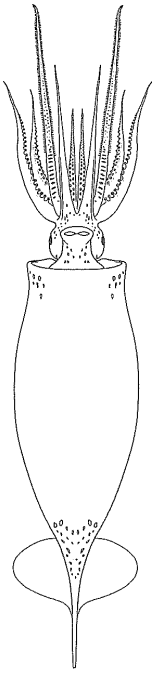
dorsal view



gladius
(redrawn from
Toll, 1982)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

The only other Antarctic family with similar characters for funnel-locking cartilage, buccal connectives, and armature on arms and clubs is the monotypic family Batoteuthidae. Batoteuthis skolops can easily be distinguished by its oval, non-terminal fins and by its very long tentacular club which has no differentiation for dactylus and carpus.



Batoteuthis skolops

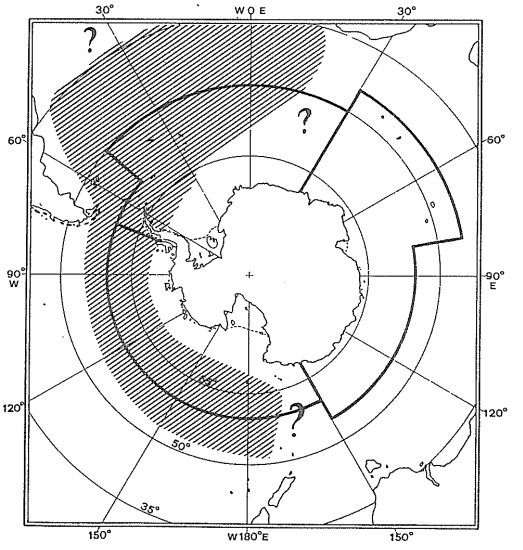
SIZE :

Maximum reported mantle length 9 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Southern Ocean, Atlantic and Pacific sectors; distribution limits undetermined due to uncertain identification in the literature.

An oceanic species occurring primarily in the upper 250 m of the water column, but its depth range may extend to 1 000 m.



INTEREST TO FISHERIES :

Undetermined.

CRANCH

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

CRANCHIIDAE

Cranch squids

One prominent character easily distinguishes all members of the family: the mantle is fused to the head in the nuchal region and to the funnel at its two posterolateral corners. Buccal connectives are attached to the ventral borders of arms IV; the armature of the clubs generally is in four longitudinal rows; the arms generally have biserial suckers; hooks occur on the arms (only 1 species) and on the clubs in several species; photophores are present on the eyes of all genera and on the digestive gland of 1 genus.

The cranchiids are among the most speciose and abundant squids in the world oceans and are of proven importance in the marine food chain. They exhibit a high degree of morphological diversity and undergo marked ontogenetic changes in morphology. All members exhibit ontogenetic descent, that is, preference of the young for shallower depths and of larger individuals for progressively deeper water. Cranch squids occupy the water column from the surface to about 2 500 m depth. Only the Southern Ocean species Mesonychoteuthis hamiltoni is considered to be of potential interest to fisheries at the present time.

The 13 cranchiid genera are grouped under two subfamilies, only one of which, the Taoniinae, occurs in the Southern Ocean and adjacent waters. This subfamily is characterized by the absence of cartilaginous strips that extend posteriorly from the funnel-mantle fusions, by the presence of a funnel that is free laterally, and of 1 to 3 generally crescent-shaped photophores on the eyes. It contains 10 genera: Sandalops, Liguriella, Bathothauma, Helicocranchia, Taonius, Galiteuthis, Mesonychoteuthis, Megalocranchia, Egea and Teuthowenia. A key to the genera of both subfamilies is given in the generic revision of the family by N. Voss (1980).

LIST OF SPECIES OCCURRING IN THE AREA :

Several species occur in large numbers in the waters of the southern sub-tropical Convergence to the Antarctic Continent. The 3 most abundant species from this area are treated here:

Galiteuthis glacialis Chun, 1906	CRANCH Gali 1
Mesonychoteuthis hamiltoni Robson, 1925	CRANCH Meso 1
Teuthowenia pellucida (Chun, 1910)	CRANCH Teut 1

The remaining species, representing various genera, will be included in the ongoing monographic study of the family by N. Voss. Several references in the recent literature have been made to certain of these undescribed species (? Galiteuthis suhmi, Nesis, 1974; Galiteuthis sp. D, and Taonius sp. B, Clarke, 1985).

Prepared by N.A. Voss, C.F.E. Roper, M. Sweeney and M.R. Clarke, based mainly on N.A. Voss's publications and unpublished information.

CRANCH Gali 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CRANCHIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Galiteuthis glacialis (Chun, 1906)

OTHER SCIENTIFIC NAMES STILL IN USE : Crystalloteuthis glacialis Chun, 1906; Filippova, 1972
Galiteuthis aspera Filippova, 1972
?Mesonychoteuthis sp. A. Clarke & Prince, 1981; Clarke, Croxall & Prince, 1981
?Galiteuthis armata, Clarke, 1980

VERNACULAR NAMES :

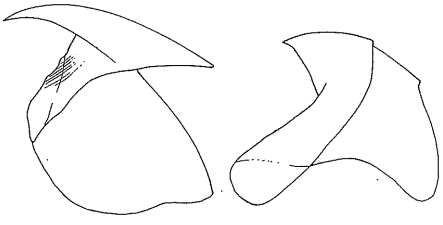
FAO/CCAMLR : En - Glacial cranch squid
Fr - Encornet outre glacial
Ru - Antarkticheskyi sherokhovatyi
Sp - Cranquiluria glacial

NATIONAL :

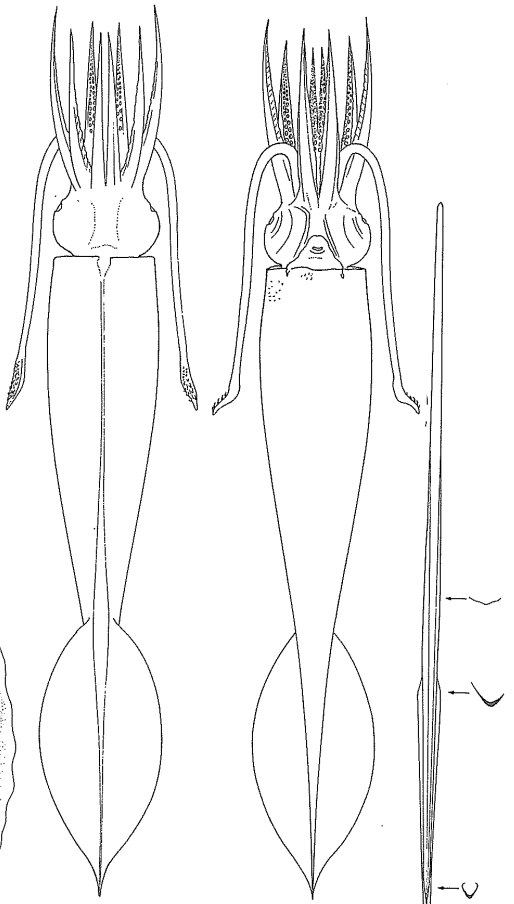
DISTINCTIVE CHARACTERS :

A moderately large species. Mantle long, slender, tapering to a slender posterior point, with cartilaginous tubercles on the surface of subadults and adults; funnel-mantle and nuchal-fusion cartilages with multiple tubercles. Fins long, lanceolate, terminal. Large, protruding, anterolaterally oriented eyes with 2 photophores. Tentacles short to medium in length, with 2 rows of carpal suckers; clubs slightly expanded, manus with 5 or 6 pairs of hooded hooks (first appear at about 6 cm mantle length), marginal rows of suckers reduced. Arms with well-developed trabeculate protective membranes; formula varies with sex and age.

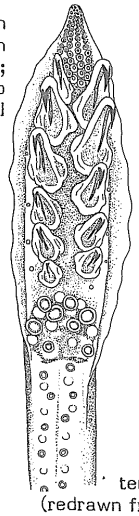
Lower beak has hood with only a shallow notch and lies close to rigid, thickened crest; rostrum broad, large, rostral edge over half of wing length; wing fold lower, wing narrow, a definite fold runs to above the midpoint of posterior edge of lateral wall which is short.



upper and lower beaks
(redrawn from McSweeny, 1978)



dorsal view ventral view
(redrawn from McSweeny, 1978)



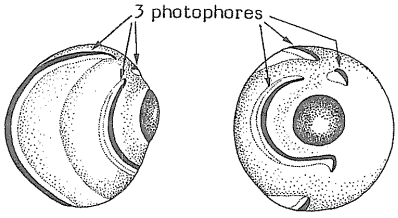
tentacular club
(redrawn from McSweeny, 1978)

gladius
(from Toll, 1982)

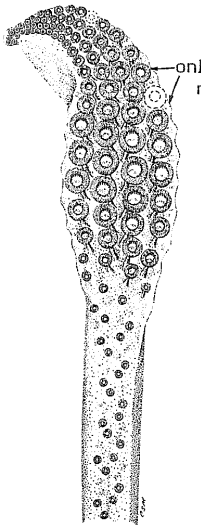
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Teuthowenia pellucida: no hooks on the tentacular clubs, no tubercles on the nuchal cartilage, 3 rather than 2 photophores on the eyes, and fins terminal-lateral rather than terminal.

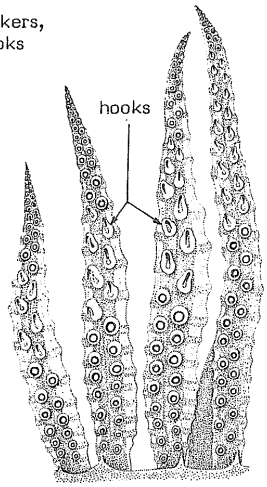
Mesonychoteuthis hamiltoni: more pairs of hooks on the clubs (10 to 13 rather than 5 or 6) and hooks present on the arms.



eye
T. pellucida



tentacular club
T. pellucida



left arms I to IV
M. hamiltoni

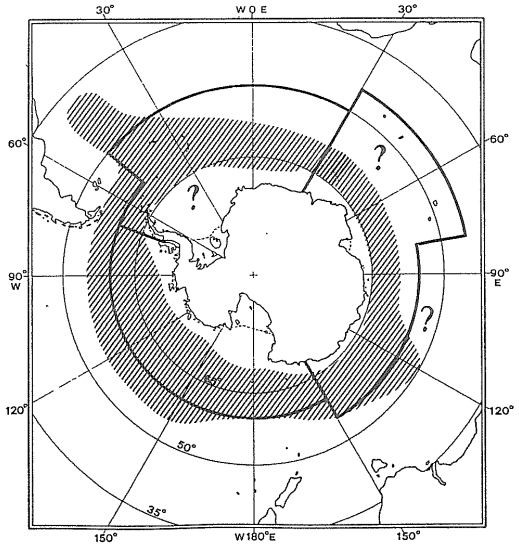
SIZE :

Maximum reported mantle length 49.6 cm (McSweeny, 1978).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Probably circumglobal in the vicinity of the Antarctic Convergence and in Antarctic waters; scattered in the western Atlantic to about 40°S (Nesis, 1974; McSweeny, 1978; N. Voss, unpublished data).

The most abundant cranchiid taken in midwater trawls in the Antarctic, distributed from the upper 100 m to 2 000 m depths; exhibits some diel vertical movement.



INTEREST TO FISHERIES :

Cannot be ascertained at the present time.

CRANCH Meso 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CRANCHIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Mesonychoteuthis hamiltoni Robson, 1925

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

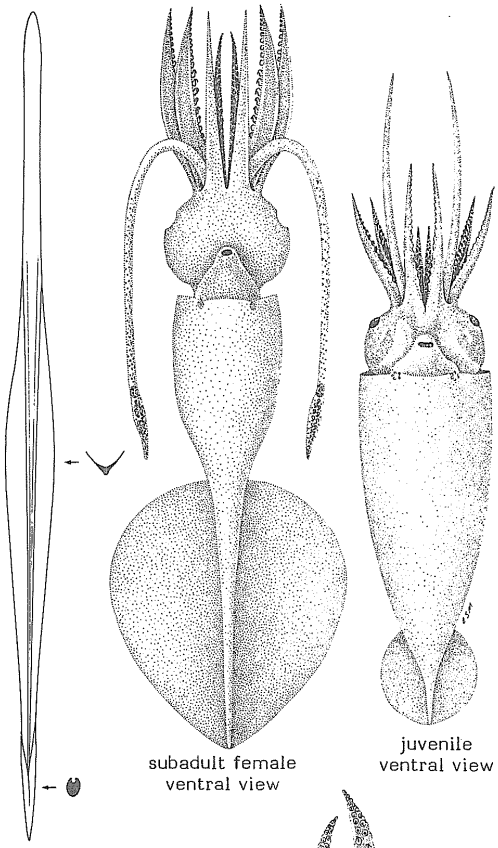
FAO/CCAMLR : En - Giant cranch squid
Fr - Encornet outre commun
Ru - Antarkticheskyi gigantskyi kalmar
Sp - Cranquiluria antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

A very large species. Mantle broad, tapering in its posterior third to a long, narrow, sharply pointed tail; mantle wall up to 5 to 6 cm thick, soft, slightly semigelatinous; funnel-mantle and nuchal cartilages short, stout, curved, without tubercles in subadults and adults. Fins over half the length of mantle, heart-shaped, broad, muscular, terminal. Large eyes with 2 photophores. Tentacles with 2 rows of carpal suckers; clubs relatively unexpanded, lacking swimming keel and protective membranes, with 2 rows of well-developed hooks medially on manus (up to 26) and minute lateral suckers; 4 rows of minute suckers on dactylus. Arms very thick, muscular; long, attenuate at tips, with broad protective membranes basally; mid-portion with 3 to 11 pairs of hooded hooks, distal third with suckers.

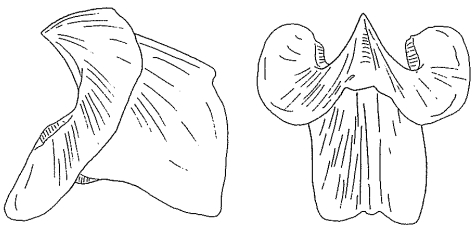
Lower beak stiff with thick chitin; cartilage forms the anterior half of the shoulder; low wing fold obscures obtuse jaw angle from side; a line, perpendicular from the rostrum tip, cuts the baseline near the wing tip; the hood has a distinct medial notch; hood length less than one-third of crest length; rostral edge slightly curved; hood broad and at steep angle to crest; crest thickened and tough; no ridge or fold present on lateral wall.



gladius
(redrawn from
Toll, 1982)

subadult female
ventral view

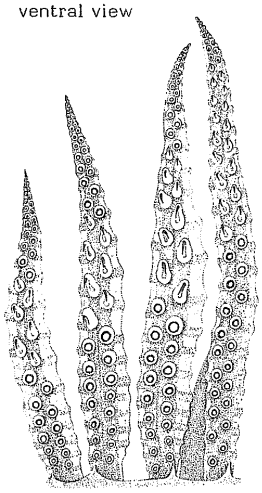
juvenile
ventral view



profile

ventral view

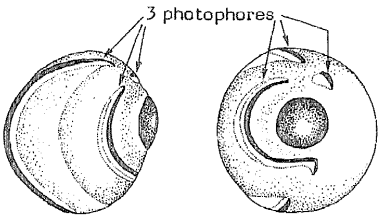
lower beak
(redrawn from Clarke, 1980)



left arms I to IV
(from Voss, 1980)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

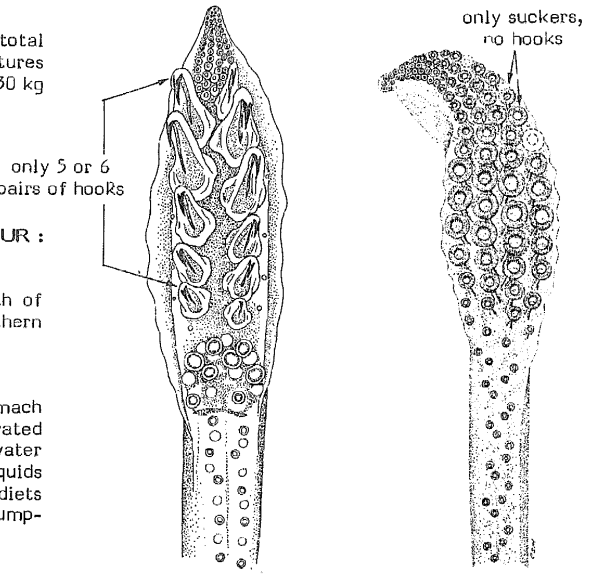
None of the other cranchiid species has hooded hooks on the arms. Furthermore, Galiteuthis glacialis has fewer pairs of hooks on the tentacular club (5 or 6 rather than 10 to 13); Teuthowenia pellucida lacks hooks on the club and has 3 instead of 2 photophores on the eyes.



eye
T. pellucida

SIZE :

Maximum reported mantle length 250 cm; total length exceeds 4 m; maximum weight 150 kg; matures at mantle lengths greater than 100 cm and 25 to 30 kg weight.



tentacular club
G. glacialis

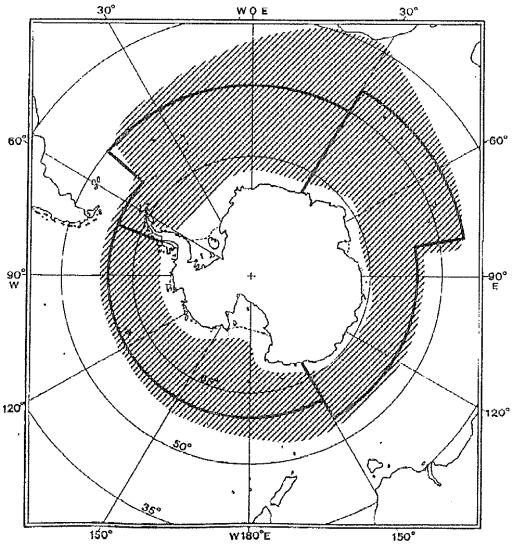
tentacular club
T. pellucida

(from Voss, 1985)

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Southern Ocean, circumpolar, primarily south of the Antarctic Convergence; at present, the northern limit is undetermined.

Known primarily from adults found in stomach contents of sperm whales. Appears to be concentrated in depths of about 2 000 to 4 000 m. Feeds on midwater fishes (Myctophidae and Paralepididae) and squids (Klumov and Yukhov, 1975). A major item in the diets of sperm whales in Antarctic waters (annual consumption estimated to be about 9.08×10^6 t).



INTEREST TO FISHERIES :

This species is believed to have some potential for a fishery. The flesh is said to be of excellent quality and very tasty. Klumov & Yukhov (1975) estimate that 1 or 2 million t can easily be taken in view of reduced sperm whale predation (whale population decline); total reserves estimated at 90 million t (biomass), but fishing methods have not yet been developed.

CRANCH Teut 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CRANCHIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Teuthowenia pellucida (Chun, 1910)

OTHER SCIENTIFIC NAMES STILL IN USE : Desmoteuthis pellucida Chun, 1910
Megalocranchia pardus Berry, 1916
Anomalocranchia impennis Robson, 1924
Megalocranchia richardsoni Dell, 1959
Taonius richardsoni Clarke, 1966
Megalocranchia megalops australis Voss, 1974
Verrilliteuthis richardsoni, Nesis, 1974
Vossoteuthis pardus, Nesis, 1974
Teuthowenia megalops impennis, Imber, 1978 (in part)
Fusocranchia pellucida Imber, 1978 (in part)
Teuthowenia sp. B. Clarke, 1985

VERNACULAR NAMES :

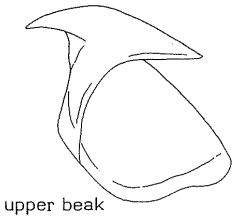
FAO/CCAMLR : En - Pellucid cranch squid
Fr - Encornet outre péllucide
Ru - Prozrachnyi kalmar
Sp - Cranquiluria lúcida

NATIONAL :

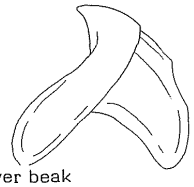
DISTINCTIVE CHARACTERS :

A medium-sized species. Mantle conical, elongate, tapering from widest point near anterior margin to a narrow posterior point; small, oval funnel-mantle fusion cartilages with a multipoint tubercle; nuchal cartilage without tubercles. Large, protruding, anteriorly-oriented eyes with 3 photophores. Fins long, narrow, terminal-lateral. Tentacles with 4 rows of carpal suckers arranged in zigzag fashion; clubs slightly expanded, with 4 rows of suckers on long pedestals but without hooks; protective membranes and swimming keel well developed. Arms muscular, short, with suckers on midportion of arms II and III markedly enlarged; no hooks.

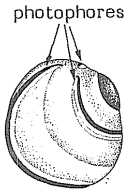
Lower beak with wing fold prominent; shoulder ridge low, sometimes developed into low, broad-based, triangular tooth; hood set low above straight or slightly curved crest; distal edge of hood with shallow median notch (Voss, 1985).



upper beak

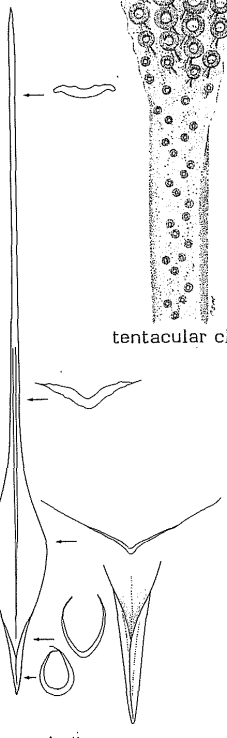


lower beak
(redrawn from Voss, 1985)

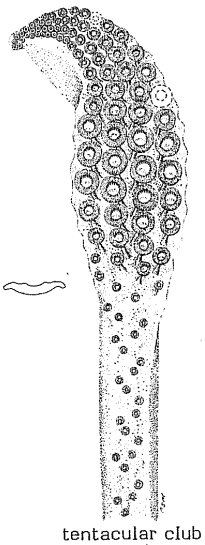


photophores

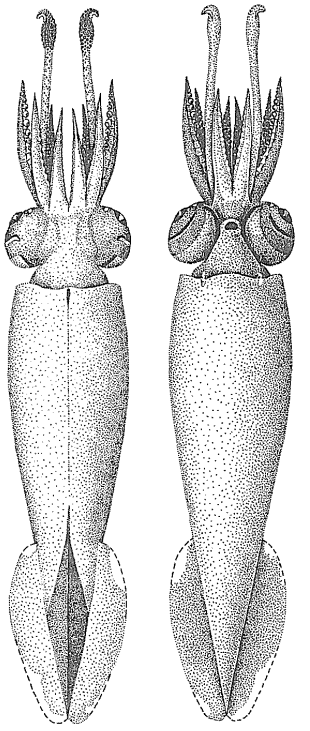
eye
(redrawn from Voss, 1985)



gladius
(redrawn from Voss, 1985)



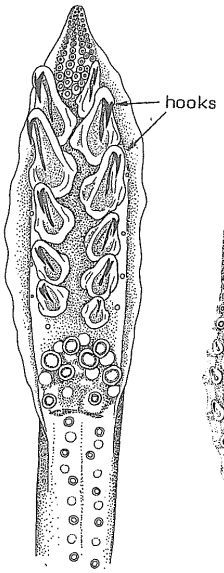
tentacular club



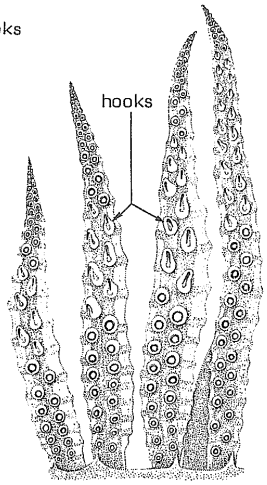
dorsal view ventral view
subadult
(from Voss, 1985)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

None of the other cranchiid species in the area has 4 rows of carpal suckers on the tentacles, 3 photophores on the eyes and terminal-lateral fins. Furthermore, Galiteuthis glacialis and Mesonychoteuthis hamiltoni have hooks on the tentacular clubs, and the latter species also has hooks on the arms.



tentacular club
G. glacialis



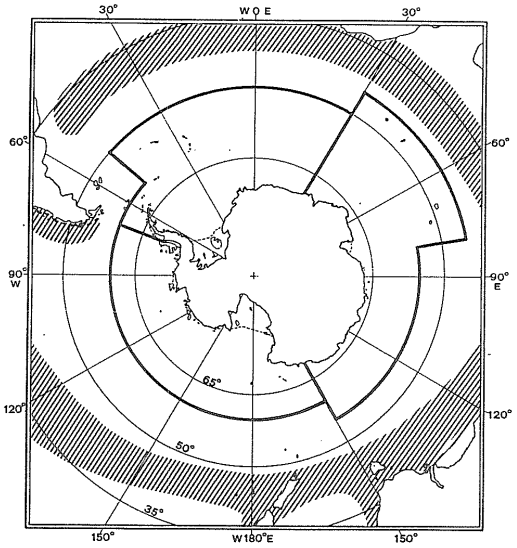
left arms I to IV
M. hamiltoni

SIZE :

Maximum reported mantle length 20.1 cm (N. Voss, 1985).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumglobal in the southern sub-tropical Convergence and fringing waters, extending into adjoining boundary currents (N. Voss, 1985), within the range affected by water productivity and sufficient bottom depths. Occurs from surface waters to depths beyond 2 500 m and exhibits some diel vertical movement. Mating and spawning appear to occur in deep midwaters. A substantial amount of morphological variation occurs in the young over the broad geographic range of this species.



INTEREST TO FISHERIES :

Cannot be ascertained at present.

CYCL

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

CYCLOTEUTHIDAE

Disc-fin squids

A single species is known from the area.

Cycloteuthis akimushkini Filippova, 1968

CYCL Cycl 1

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

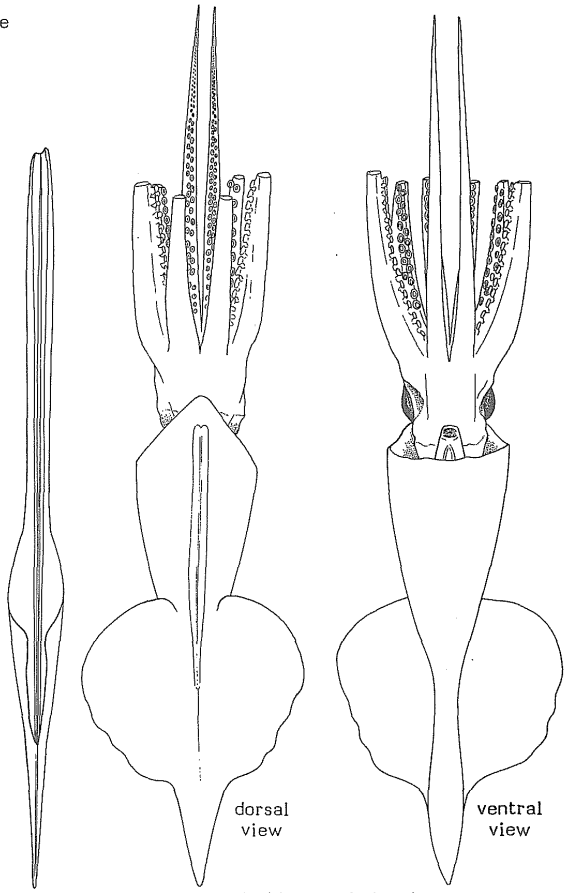
FAO/CCAMLR : En - Long-tail disc-fin squid
Fr - Encornet outre austral
Ru - Kruglopyoryi kalmar *Akimushkina*
Sp - Discoluria austral

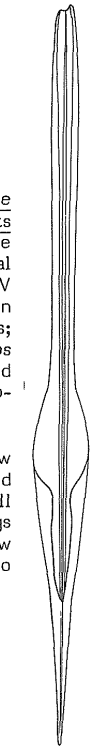
NATIONAL :

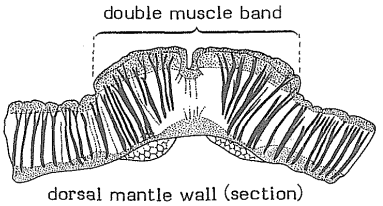
DISTINCTIVE CHARACTERS :

Mantle and head soft, fleshy; a strong double muscle band lies above the pen along most of its length; fin almost circular in outline; a photophore on ventral surface of ink sac and eye bulb. Buccal connectives attached to ventral borders of arms IV and consisting of a hollow on the anterior side of an obliquely running ridge. Arms with biserial suckers; tentacular clubs with tetraserial suckers; clubs believed to be compact, expanded, with well-defined manus and dactylus, but an ill-defined carpus; a sub-triangular funnel-locking cartilage.

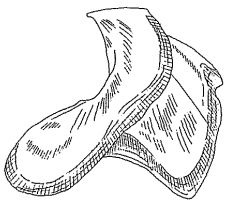
Lower beak: laterally compressed; narrow distinctive crest; rostral edge long relative to hood and wing; rostrum often asymmetrical with a small hook; jaw angle obtuse; low broad wing fold; wings broad; hood high above crest; a line or very narrow fold visible on surface of lateral wall which runs to the midpoint of the posterior edge.

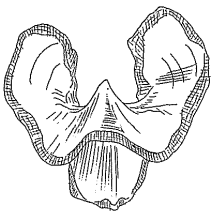



gladius
ventral view



dorsal mantle wall (section)


profile


ventral view

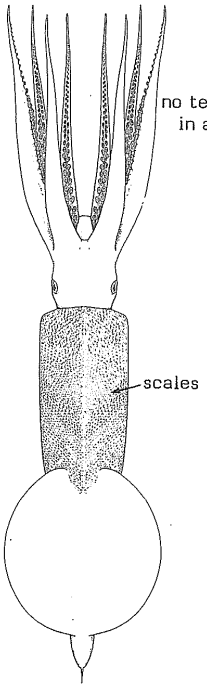
lower beak

(all after Clarke, 1980)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

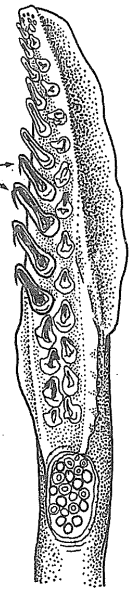
Lepidoteuthis species (Lepidoteuthidae): scales over body. No tentacles in large specimens.

Moroteuthis species (Onychoteuthidae): hooks present on tentacles.



dorsal view

Lepidoteuthis grimaldii
(Lepidoteuthidae)



tentacular club

Moroteuthis ingens
(Onychoteuthidae)

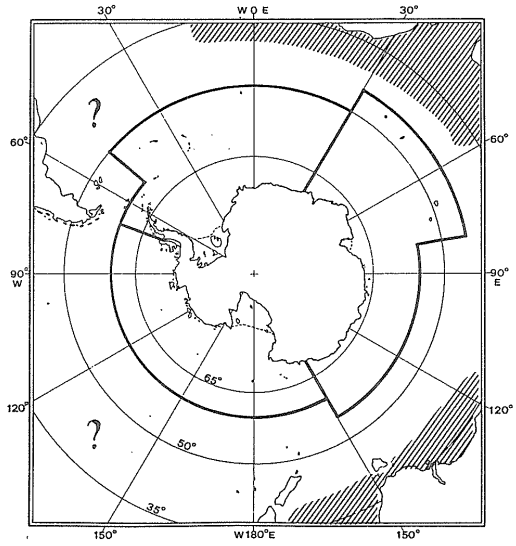
SIZE :

Maximum reported mantle length 47 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Widely spread from South Africa to the Tasman Sea, south to sub-Antarctic waters (to about $38^{o}S$, and possibly further south) and north to $30^{o}N$ in the Atlantic to at least $9^{o}S$ in the Indian Ocean and probably into the North Pacific.

Common in the diet of sperm whales but not usually abundant. Probably spawns deep on the continental slope.



INTEREST TO FISHERIES :

Its size and widespread distribution would make it valuable as a bycatch if fishing were carried out on the deeper part of the continental slope.

ENOP

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

ENOPLOTEUTHIDAE

Enope squids

A single species is positively known to occur in sub-Antarctic waters.

Ancistrocheirus lesueuri (Orbigny, 1839) — ENOP Anci 1

OTHER SCIENTIFIC NAMES STILL IN USE : Thelidioteuthis alessandrini (Verany, 1851)

VERNACULAR NAMES :

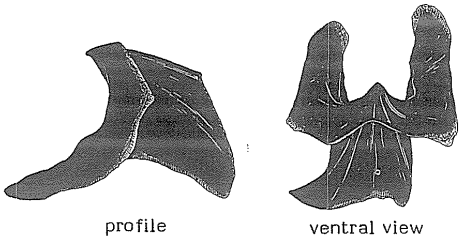
FAO/CCAMLR : En - Bigfin enope squid
Fr - Encornet cachalot
Ru - Bolshekrylyi svetlyachok
Sp - Enopluria rombica

NATIONAL :

DISTINCTIVE CHARACTERS :

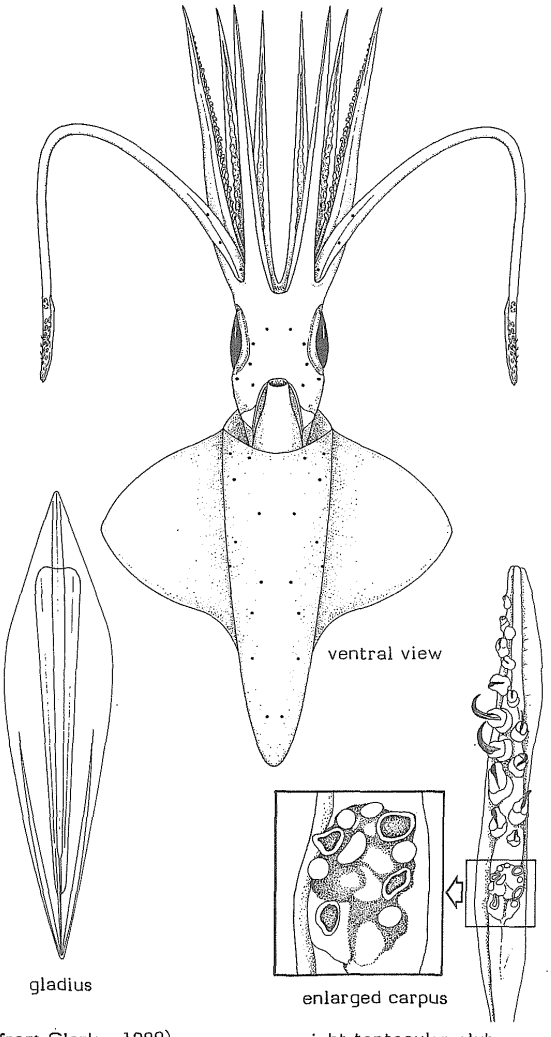
Fins very broad, almost the length of the mantle. Locking apparatus straight; 8 buccal lappets and buccal connectives that attach dorsally to the ventral arms. Armature (suckers) biserial on arms, tetraserial on tentacular clubs; hooks present on arms and tentacles; tentacular clubs with 2 rows of hooks. Distinct dark photophores in rows of 2 or 4 present on ventral surface of mantle. Gladius stiffened by a strong bar of cartilage along most of its length.

Lower beak: hood very short, with a deep, broad notch and its posterior edge raised high above crest; crest only slightly thickened, fairly straight and broad; lateral wall with no distinct notches in posterior edge near crest; a prominent fold runs to a position about halfway between crest and free corner; shoulder extends to form a small, rounded tooth or ridge; jaw angle obtuse.



profile — ventral view

lower beak

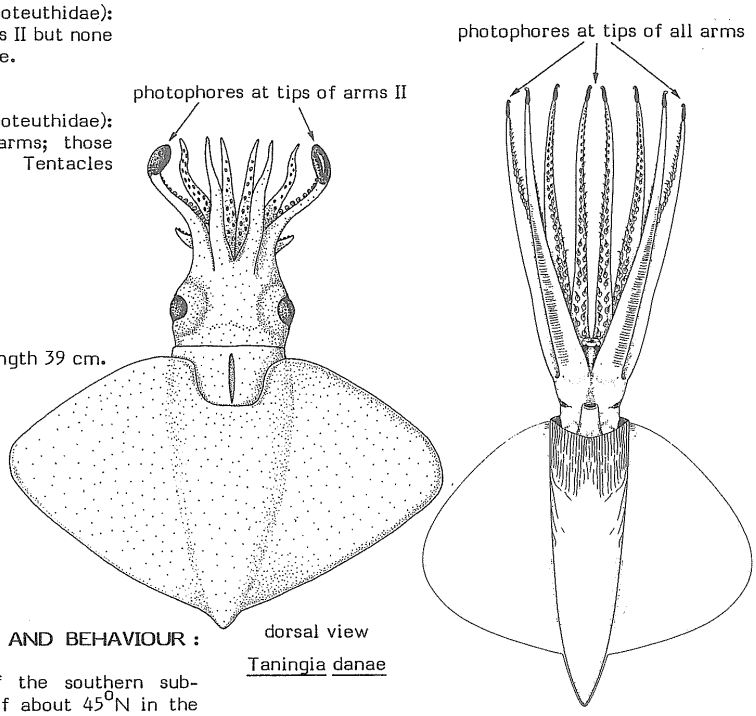


(all redrawn from Clarke, 1980)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Taningia species (Octopoteuthidae): photophores present on tips of arms II but none on body. Tentacles lost in early life.

Octopoteuthis rugosa (Octopoteuthidae): photophores present on tips of all arms; those on body not in transverse rows. Tentacles lost in early life.



dorsal view
Taningia danae

ventral view
Octopoteuthis rugosa

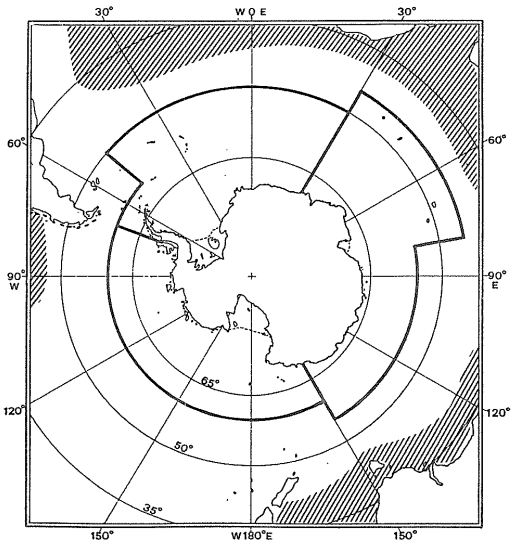
SIZE :

Maximum reported mantle length 39 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Widely distributed north of the southern sub-tropical Convergence and south of about 45°N in the Atlantic, Indian and Pacific oceans, but its presence in waters to the south of the Antarctic Convergence is still doubtful. Most specimens have been collected from sperm whale stomachs off South Georgia, South Africa, Western Australia, the Tasman Sea and Peru.

An oceanic species, important in the diet of sperm whales. Locally abundant. Probably spawns on the continental slope at depths of over 1 000 m.



INTEREST TO FISHERIES :

The size and abundance of this species make it a potential target for a fishery, although it probably has a calorific value about one-half that of muscular species.

GONA

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

GONATIDAE

Gonate squids

The species in this family belong to 3 genera, Berryteuthis, Gonatopsis and Gonatus. They are cold-water forms and are among the most abundant squids in higher latitudes. Only one described species, Gonatus antarcticus, is known to occur in the Southern Ocean.

Gonatus antarcticus Lönnberg, 1898

GONA Gonat 5

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

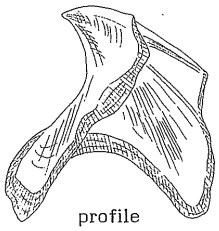
FAO/CCAMLR : En - Antarctic gonate squid
Fr - Encornet antarctique
Ru - Antarkticheskyi gonatus
Sp - Gonalura antártica

NATIONAL :

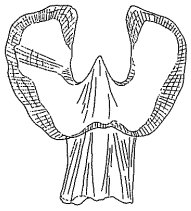
DISTINCTIVE CHARACTERS :

Mantle cylindrical but attenuated posteriorly, and rather muscular. Fins sagittate, their length nearly equals the width, both attain about 35 to 50% of mantle length. Buccal connectives attached to the ventral borders of arms IV. Funnel-locking cartilage straight. Arms have 4 series of armatures of which the medial two rows on arms I to III are hooks; otherwise suckers. Tentacles robust, with hooks in an uncrowded portion of manus. One of the hooks is very large. Juvenile stage shorter-bodied with oval fins.

Lower beak with small distance between obtuse jaw angles; lateral walls close together; hood lies very close to crest; one-third to half of crest length with a distinct medial notch; crest narrow, not thickened and often slightly curved in profile; wing fold thickened; shoulder ridge low and round; no angle point; an unthickened fold runs to a position outside the middle of the posterior edge of lateral wall.

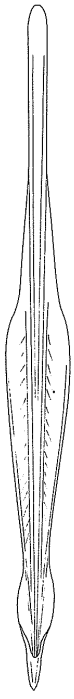


profile



ventral view
lower beak

(Clarke, 1980)



gladius

(Toll, 1982)

No illustration of the whole animal available

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

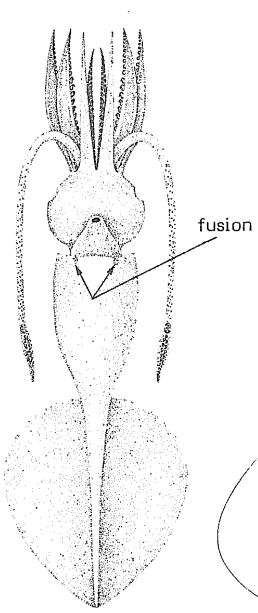
The other squids in the area with hooks on all appendages are:

Cranchiidae (Mesonychoteuthis): ventral lateral fusion of anterior mantle-margin (funnel-locking aparatus).

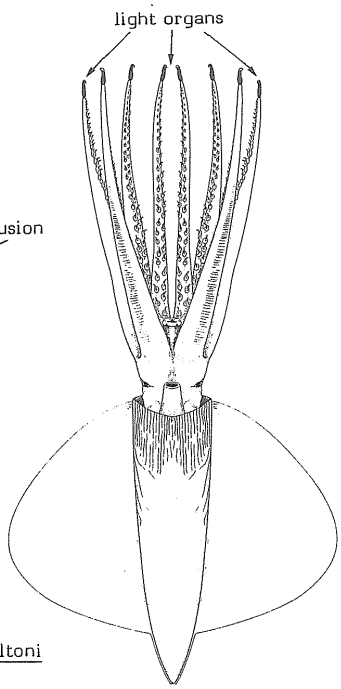
Octopoteuthidae: no tentacles in adults. Light organs at tips of arms II (Taningia) or on tips of all arms (Octopoteuthis).

Enoploteuthidae (Ancistrocheirus): photophores on ventral surface of mantle and head.

There is a second undescribed, small species of Gonatus (Gonatus sp. A) found in the stomachs of the wandering albatross and of the black-browed albatross.



ventral view
Mesonychoteuthis hamiltoni (Cranchiidae)



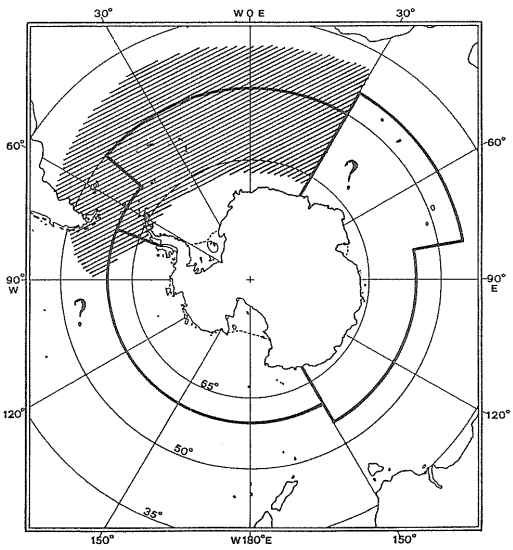
ventral view
Octopoteuthis
(Octopoteuthidae)

SIZE :

Maximum reported mantle length 35 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Range of distribution undetermined; most captures recorded to date are restricted to the Atlantic sector of the Southern Ocean with northern limits approximately to the sub-tropical Convergence; possibly circumpolar.



An oceanic species for which very little information is available. Its vertical distribution shows greater abundance in the upper 250 m in the Southern Ocean. A prey of sperm whales, seals and albatrosses. The annual consumption of this species by sperm whales in the Antarctic Ocean is estimated to be about 0.02×10^6 t.

INTEREST TO FISHERIES :

Cannot be ascertained at present.

HISTIO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

HISTIOTEUTHIDAE

Jewel squids, umbrella squids

This monotypic family is easily distinguished by the presence of large, anteriorly-directed photophores over the surface of the mantle, head and arms; a large head with the left eye considerably larger than the right; six or seven buccal lappets; buccal connectives that attach to the dorsal border of arms IV; a straight or slightly curved and slightly broad, simple, funnel-locking cartilage; suckers on the tentacular clubs arranged in four, or more commonly, more than four irregular rows; suckers on the arms biserial.

Of the 15 currently recognized species of the genus Histioteuthis, four occur in large numbers in the sub-Antarctic and southern sub-tropical Convergence zones. None appear to normally range into Antarctic waters. The distributions of two of the species treated here are related, in different degrees, to the sea floor off land masses and submarine mounts and ridges, while the other two are broadly distributed in the open ocean.

Some species are known to be extremely abundant; sizes at maturity in the family range from about 5 to 33 cm mantle length; many are major items in the diets of sperm whales and smaller toothed whales. The annual consumption of representatives of this family by sperm whales in the Antarctic is estimated to be about 0.1 x 10^6 t. Some potential for a specialized market might exist.

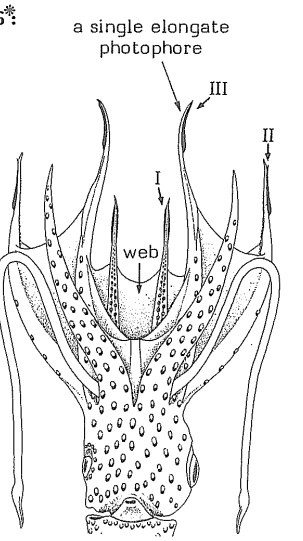
KEY TO SPECIES FROM THE SOUTHERN OCEAN AND ADJACENT WATERS*:

1a. A single, enlarged, elongate photophore on ends of arms I to III; a deep web (more than 50% of longest arm) between arms (Fig.1) ..... H. macrohista

1b. No single, enlarged photophores on ends of arms I to III; web, if present, much narrower

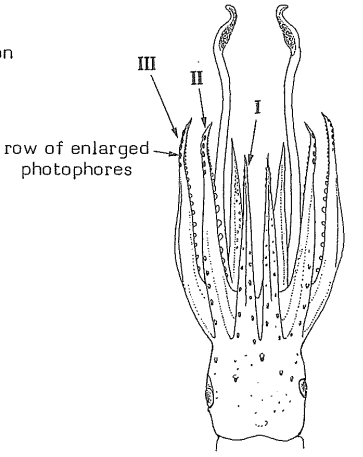
2a. Distal third of arms I to III with a ventral row of separate enlarged photophores (Fig.2) ..... H. atlantica

2b. No enlarged photophores on arms



ventral view

H. macrohista Fig.1



dorsal view

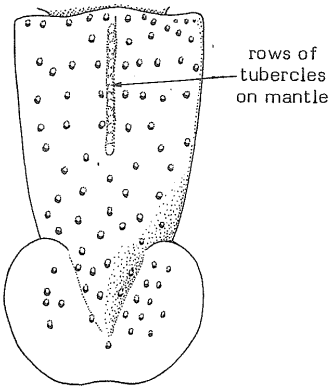
H. atlantica Fig.2

(redrawn from Voss, 1968)

* Excluding one undescribed species

3a. A row of low tubercles along mid-line of dorsal mantle surface and of arms I to III (Fig.3) ..... H. miranda

3b. No rows of tubercles on mantle or arms ..... H. eltaninae



dorsal view of mantle and fins

H. miranda

Fig.3

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Histioteuthis atlantica (Hoyle, 1885)	HISTIO Histio 4
Histioteuthis eltaninae Voss, 1969	HISTIO Histio 5
Histioteuthis macrohista Voss, 1969	HISTIO Histio 6
Histioteuthis miranda (Berry, 1918)	HISTIO Histio 7
Histioteuthis sp (undescribed)	

Prepared by N.A. Voss, C.F.E. Roper, M.J. Sweeney and M.R. Clarke, largely based on N. Voss's monograph (1969) and unpublished information provided by this author

HISTIO Histio 4

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : HISTIOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Histioteuthis atlantica (Hoyle, 1885)

OTHER SCIENTIFIC NAMES STILL IN USE : Histioteuthis cookiana Dell, 1951 (in part)
Calliteuthis miranda Berry, Dell, 1959 (in part)

VERNACULAR NAMES :

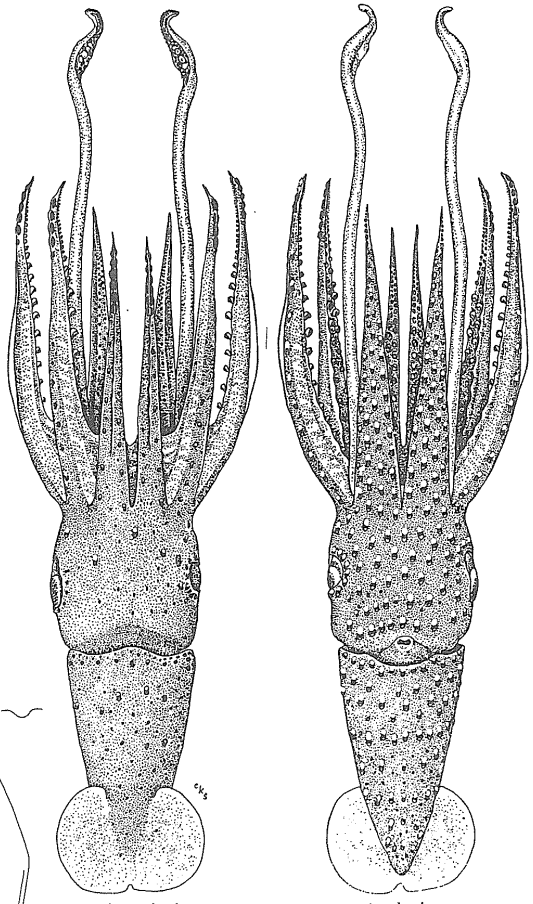
FAO/CCAMLR : En - Spotlight jewel squid
Fr - Loutène lumignon
Ru - Atlanticheskyi brillyantovyi kalmar
Sp - Joyeluria farolera

NATIONAL :

DISTINCTIVE CHARACTERS :

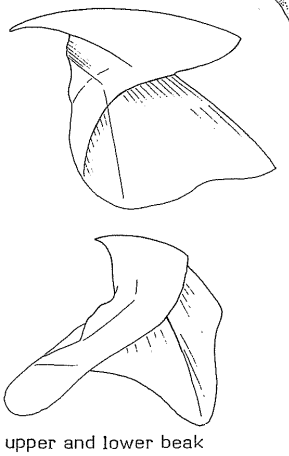
Mantle conical, relatively thick. Head typically large, exceeding width of mantle; left eye typically larger than right. Eighteen (17 large, 1 small) photophores around right eyelid; 12 to 16 photophores around left eyelid. Fins oval with a posterior notch and extending beyond posterior tip of mantle. Arms heavy basally, tapering to slender tips; length formula approximately 3.2.4.1; arms I to III connected basally by a moderately deep inner web, about 17 to 30% of longest arm. Photophores in ventral row on terminal third of arms I to III separate and enlarged.

Lower beak has hood with or without a shallow notch; wing fold high with a very steep medial side; lateral wall fold thickened to form a slight ridge; wing 3 to 4 times the length of rostral edge visible in profile.

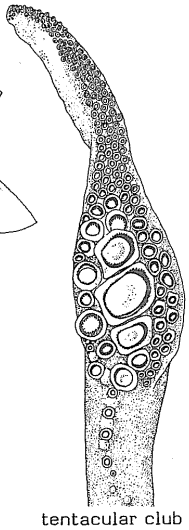


dorsal view ventral view

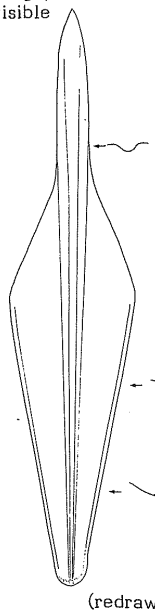
(from Voss, 1969)



upper and lower beak
(after Voss, 1969)



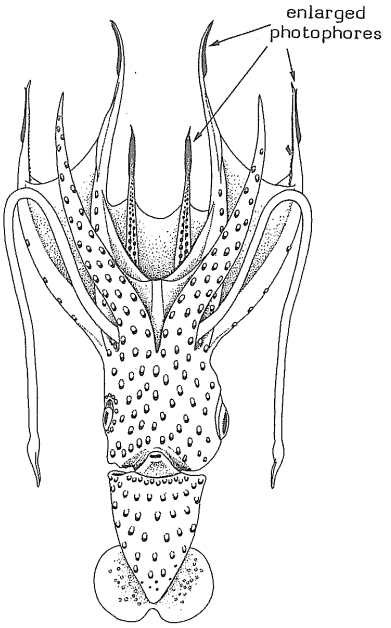
tentacular club
(from Voss, 1969)



gladius
(redrawn from Toll, 1982)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

None of the other four histioteuthids reported here has separate, enlarged photophores on the distal 1/3 of arms I to III. H. eltaninae and H. miranda have no enlarged photophores at all, and H. macrohista has a single, elongate photophore on the ends of arms I to III.



ventral view
H. macrohista

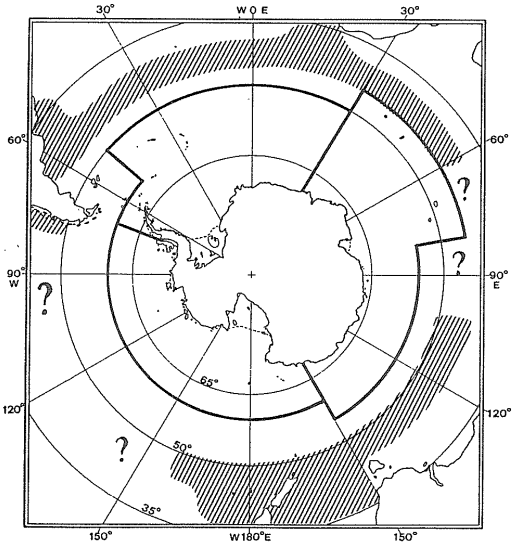
SIZE :

Maximum reported mantle length 9 cm. The FFS WALTHER HERWIG took near-mature and mature males and females of 14.2 to 14.9 cm mantle length (N. Voss, unpublished).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Probably circumglobal in sub-Antarctic and fringing waters; presently reported from 35° to 52°S at several longitudes.

Occurs in the open ocean as well as in waters related to land at depths from 52 to 3 700 m (greatest abundance at 300 to 3 000 m) (Voss, 1969). Actual greatest depth probably much shallower as available records are open-net captures. A prey of sperm whales in the Southern Ocean.



INTEREST TO FISHERIES :

Cannot be ascertained at present.

HISTIO Histio 5

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : HISTIOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Histioteuthis eltaninae Voss, 1969

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

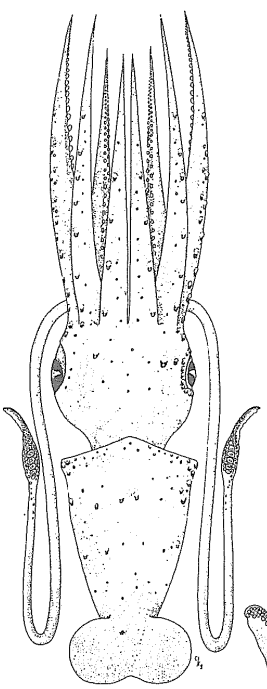
FAO/CCAMLR : En - Eltanin jewel squid
Fr - Loutène eltanine
Ru - Brilliantovyi kalmar Eltenina
Sp - Joyeluria eltanina

NATIONAL :

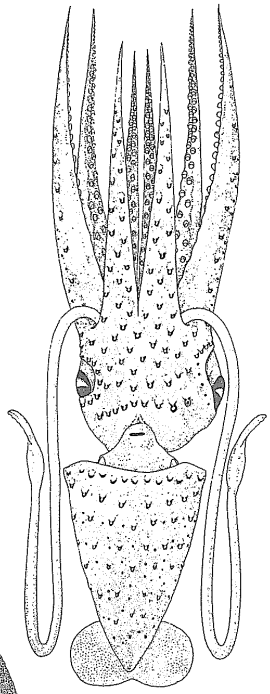
DISTINCTIVE CHARACTERS :

Mantle conical, moderately elongate. Head typically large, exceeding width of mantle; left eye typically larger than right. Eighteen (17 large, 1 small) photophores around right eyelid; 10 to 12 photophores around left eyelid. Fin width approximately 3/4 to 1/2 and length 1/3 to 1/2 that of mantle length. Arms stout basally, tapering to slender tips, their length 1 to 1 1/4 that of mantle; inner web between the arms low to vestigial. No enlarged photophores on terminal third of arms I to III.

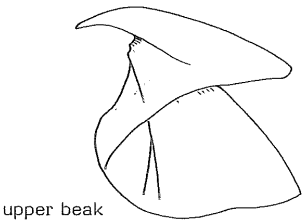
Lower beak has hood with no notch or with only a shallow notch; in profile, hood rounded anteriorly; wing fold low and also rounded; lateral wall fold not thickened or only slightly thickened to form a ridge under the hood; wing length 2.5 to 3.5 times longer than the rostral edge, visible in profile.



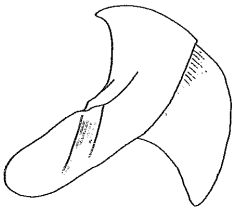
dorsal view
(from Voss, 1969)



ventral view

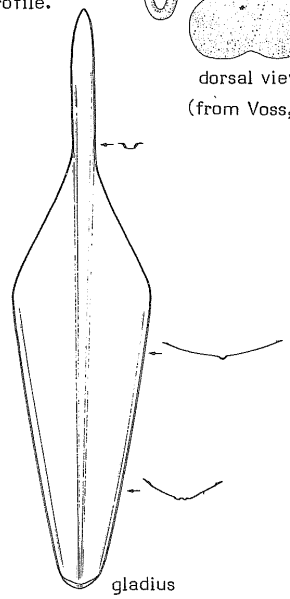


upper beak

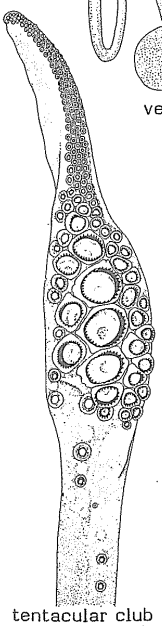


lower beak

beaks (profile)
(after Voss, 1969)



gladius
(redrawn from Toll, 1982)

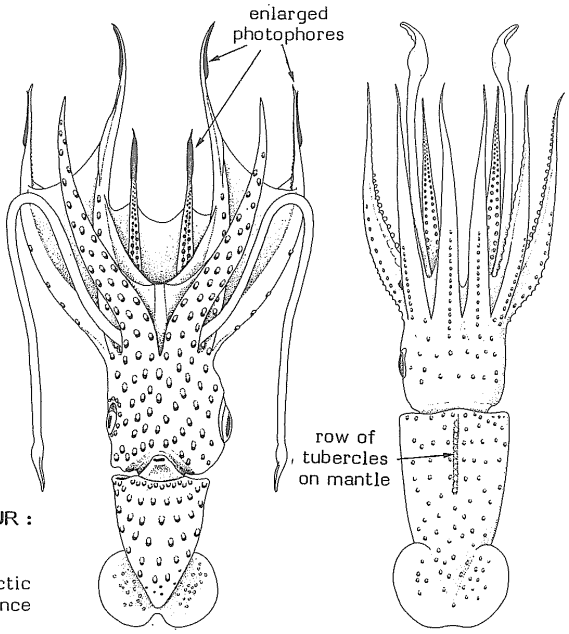


tentacular club
(from Voss, 1969)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Histioteuthis atlantica and H. macrohista: enlarged photophores on terminal 1/3 of arms I to III.

H. miranda: a row of low tubercles along midline of dorsal surface of mantle and on arms I to III.



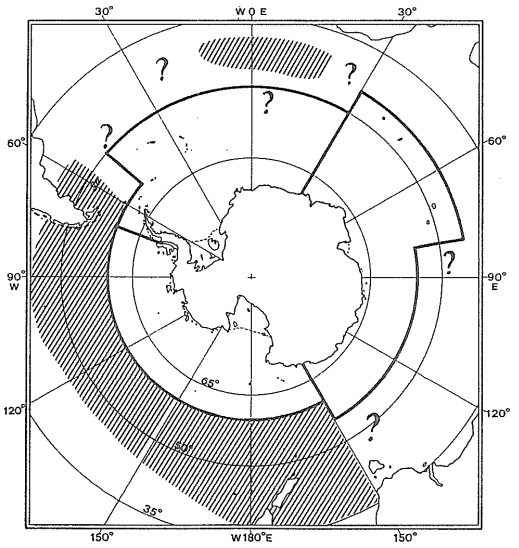
SIZE :

Maximum reported mantle length 6.6 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Appears to be circumglobal in sub-Antarctic waters (south of the southern sub-tropical Convergence and north of the Antarctic Convergence).

The most common histioteuthid in trawl samples within sub-Antarctic waters of the Pacific and western Atlantic; more abundant in proximity to land and oceanic ridges. Collected in greatest concentrations between 300 to 2 000 m depth (open-net captures).



INTEREST TO FISHERIES :

Cannot be ascertained at present.

HISTIO Histio 6

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : HISTIOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Histioteuthis macrohista Voss, 1969

OTHER SCIENTIFIC NAMES STILL IN USE : Histioteuthis cookiana (in part) Dell, 1951
Histioteuthis sp. G. Voss, 1967, 1975
?Al Histioteuthis meleagroteuthis, Clarke, 1980

VERNACULAR NAMES :

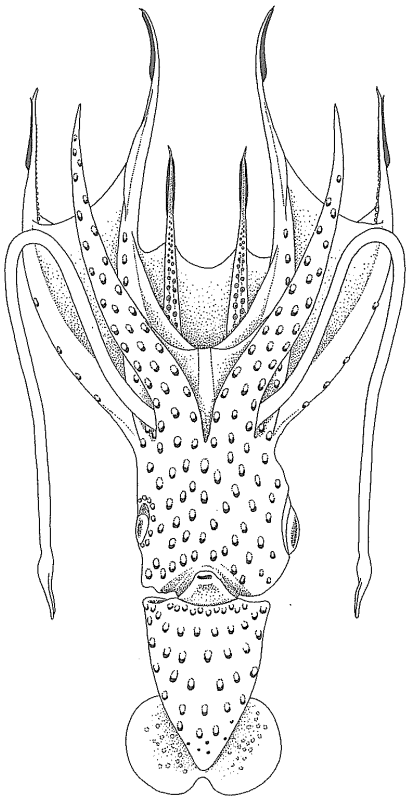
FAO/CCAMLR : En - Deep-webbed jewel squid
Fr - Loutène ombrelle
Ru - Zontichnyi brilliantovyi kalmar
Sp - Joyeluria membranosa

NATIONAL :

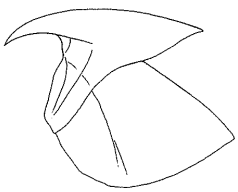
DISTINCTIVE CHARACTERS :

Mantle conical, short, its width less than 1/2 to more than 3/4 of mantle length. Head very large, exceeding width of mantle; left eye typically larger than right. Sixteen photophores around right eyelid; 8 to 11 photophores around left eyelid. Fins large, width more than 3/4 and length approximately 1/2 that of mantle length. Arms stout at base, tapering to slender tips, their length up to twice that of mantle; length formula approximately 3=2.4=1; inner web well developed between all arms, more than 50% of longest arm. Buccal membrane, 7-membered. A single enlarged, elongate photophore on ends of arms I to III.

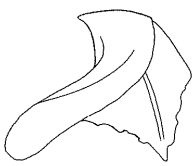
Lower beak has a broad hood with a narrow notch which covers more than half the crest; lateral wall ridge with steep side or groove on its upper side; a shallow shoulder groove; wing fold fairly low; rostral length 1 to 1.25 times the distance between the jaw angles.



ventral view
(redrawn from Voss, 1969)

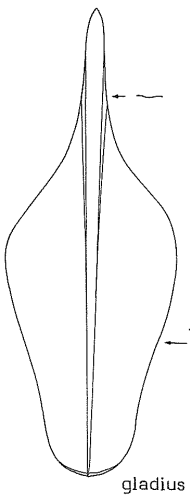


upper beak

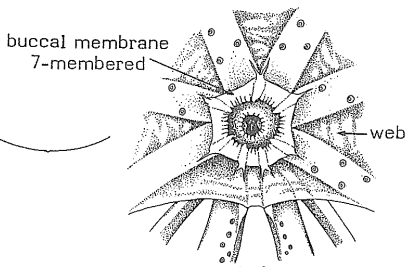


lower beak

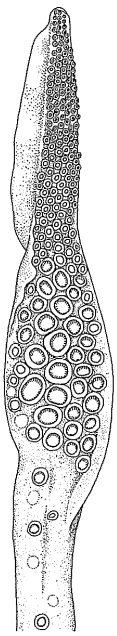
beaks (profile)
(after Voss, 1969)



gladius
(redrawn from Toll, 1982)



oral view
(redrawn from Voss, 1969)

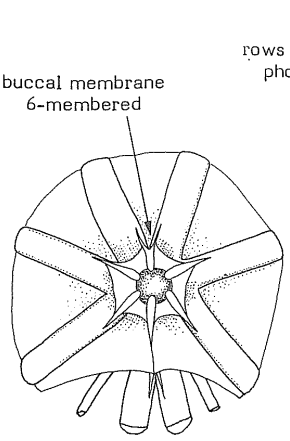


tentacular club
(redrawn from Voss, 1969)

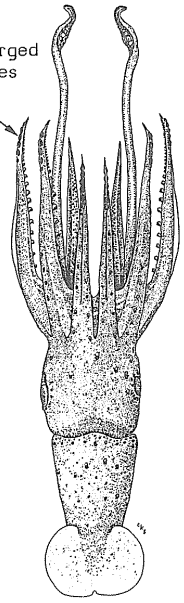
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

The three other histioteuthids reported here lack the single enlarged, elongate photophore on the ends of arms I to III and the deep (greater than 50% of longest arm) inner web between the arms. H. atlantica has a row of separate, enlarged photophores on terminal third of arms I to III; H. eltaninae and H. miranda have no enlarged photophores on ends of arms.

H. bonnellii corpuscula, which also has a single, enlarged, elongate photophore on the ends of arms I to III and a deep (greater than 50% of longest arm) inner web between the arms and may co-occur with H. macrohista in the northern part of its range, has a 6-membered buccal membrane.



(from Clarke, 1980)



dorsal view
H. atlantica

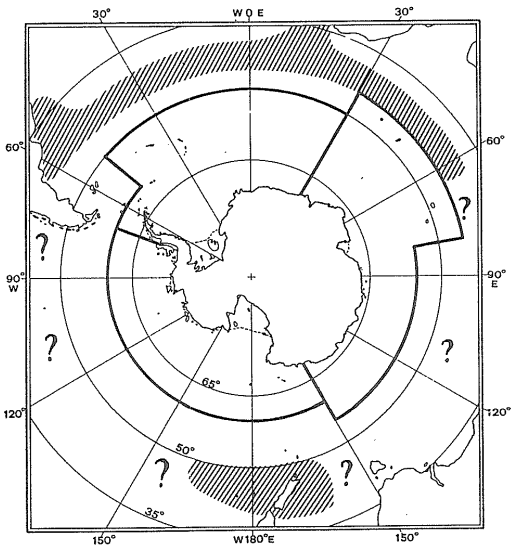
SIZE :

Maximum reported mantle length 6.7 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Appears to be circumglobal in sub-tropical Convergence and fringing waters (literature and unpublished data).

Commonly occurs in the open ocean as well as in waters related to land masses (unpublished data; Nesis, 1974). Open-net captures are concentrated between 200 and 2 000 m depths. A prey of sperm whales in the Southern Ocean.



INTEREST TO FISHERIES :

Cannot be ascertained at present.

HISTIO Histio 7

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : HISTIOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Histioteuthis miranda (Berry, 1918)

OTHER SCIENTIFIC NAMES STILL IN USE : ? Histioteuthis oceani Robson, 1948

VERNACULAR NAMES :

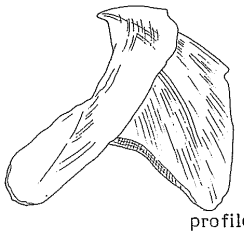
FAO/CCAMLR : En - Wonderful jewel squid
Fr - *Loutène miranda*
Ru - Udivitelnyi brilliantovyi kalmar
Sp - Joyeluria miranda

NATIONAL :

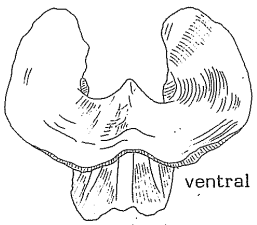
DISTINCTIVE CHARACTERS :

Mantle conical, robust, thick-walled, its width approximately 1/2 of mantle length. A ridge of low tubercles present beneath epithelium along median line of approximate anterior half of dorsum. Head large with typical asymmetrical eyes. Sixteen or 17 large photophores around right eye. Semicircular fins approximately 1/3 to 1/2 the length of mantle. Arms stout at base, tapering to slender ends, their length approximately 1 to 1 1/2 that of mantle; length formula approximately 3=2.1.4; a median row of low tubercles present beneath epithelium on approximate basal 1/3 of arms I to III; inner web developed between arms I to III approximately to 25% of arm length; bases of arms IV with 5 longitudinal rows of photophores. Large specimens are bluish-grey in colour.

Lower beak with hood distinctly notched in the midline and less than half of crest length; a well-developed ridge forms a distinct fin running to corner of lateral wall; a distinct broad shoulder groove with high borders; wing fold has a high, thick ridge on lateral border hiding jaw angle and almost half of rostral edge from side.

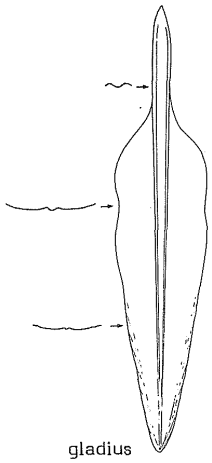


profile

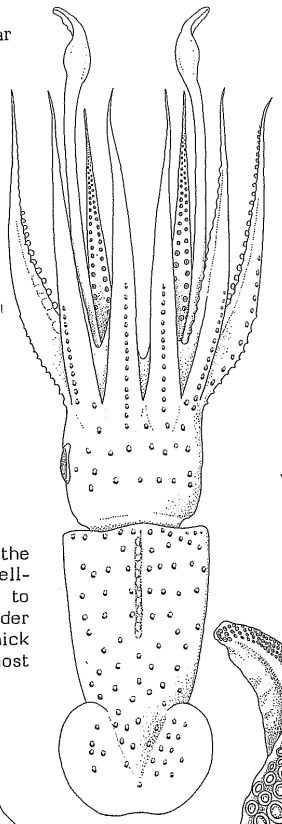


ventral view

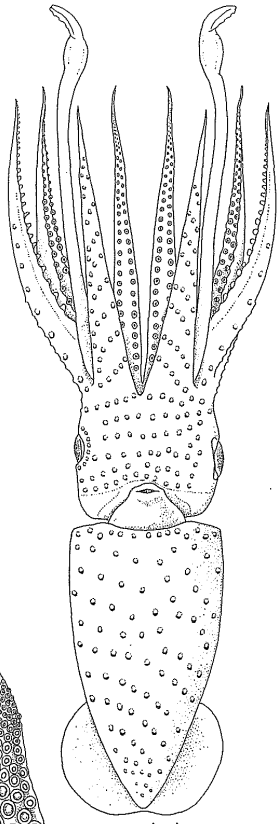
lower beak
(after M.R. Clarke, 1980)



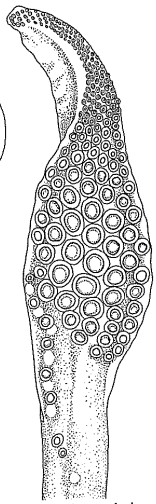
gladius
(redrawn from Toll, 1982)



dorsal view
(redrawn from Voss, 1969)



ventral view

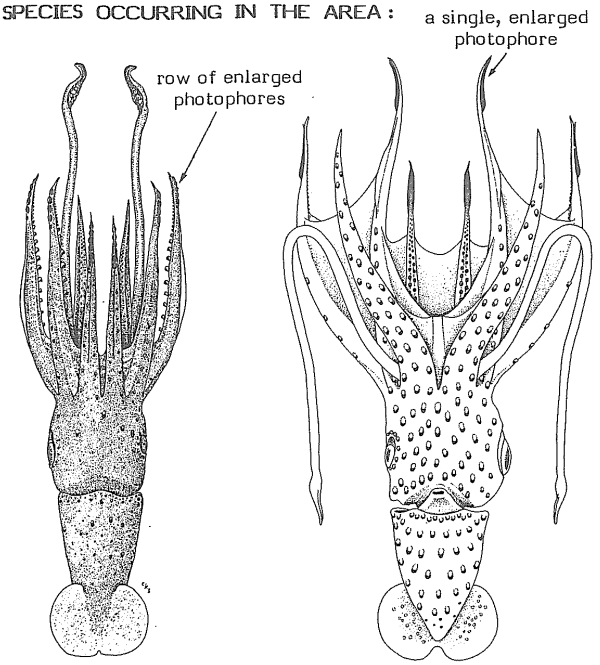


tentacular club
(redrawn from Voss, 1969)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

None of the other histioteuthid species treated here have a median ridge of tubercles on arms I to III and on the dorsum of the mantle. Furthermore, H. atlantica and H. macrohista have enlarged photophores on the ends of arms I to III.

A tropical/sub-tropical species, H. meleagroteuthis, which also has the tubercles on the arms and mantle and may co-occur with H. miranda in the northern part of its range, has densely-set, small photophores arranged in a circlet of 19 to 21 around the right eye and in 8 or 9 longitudinal rows on arms IV.



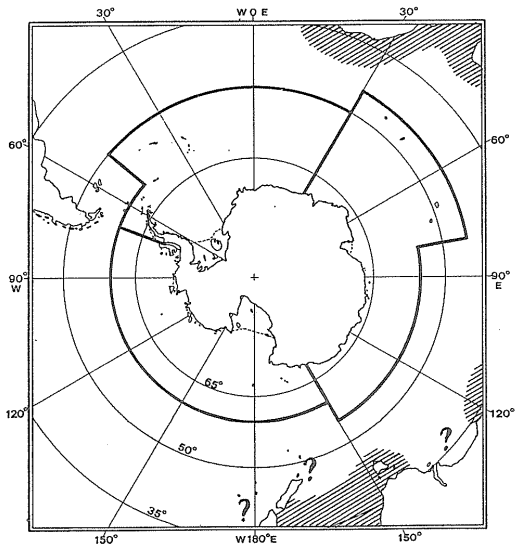
SIZE :

Maximum reported mantle length 18.2 cm; largest unpublished mantle length 28 cm (C.C. Lu, unpublished data).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Africa, Australia, Tasmania and New Zealand in the vicinity of the sub-tropical Convergence.

Closely related to continental slopes; common where found; adults are taken in demersal trawls at depths of about 600 to 1 000 m. Important in the diet of sperm whales.



INTEREST TO FISHERIES :

Cannot be ascertained at present.

LEPIDO

1985

FAO SPECIES IDENTIFICATION SHEETS

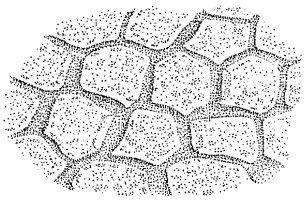
FISHING AREAS 48,58,88
(Southern Ocean)

LEPIDOTEUTHIDAE

Scaled squids

The family Lepidoteuthidae is characterized by the presence of distinct "cartilaginous" "scales" on the mantle; buccal connectives that attach to the ventral borders of arms IV; a straight, simple funnel-locking cartilage; biserial suckers on the arms, and tetraserial suckers on the tentacular clubs, except in Lepidoteuthis, which lacks tentacles in the adults. Photophores are absent.

The "scales" occur only on the surfaces of the mantle. The posterior end of the mantle, however, is devoid of "scales". The scaleless area on the dorsal side extends nearly to the anterior margin of the fins, but on the ventral side it occurs only on the posterior half or two-thirds of the area covered by the fins.

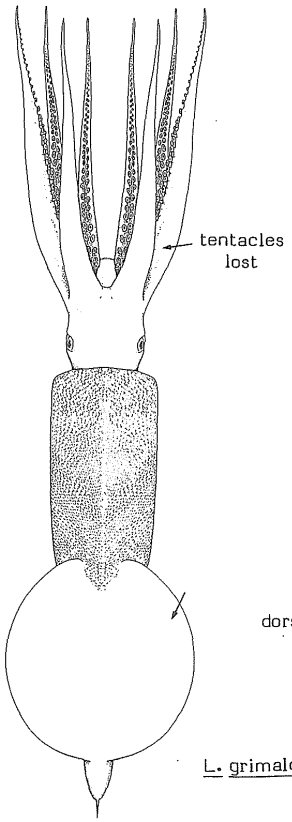


example of "scales"

KEY TO SPECIES OCCURRING IN THE SOUTHERN OCEAN AND ADJACENT WATERS:

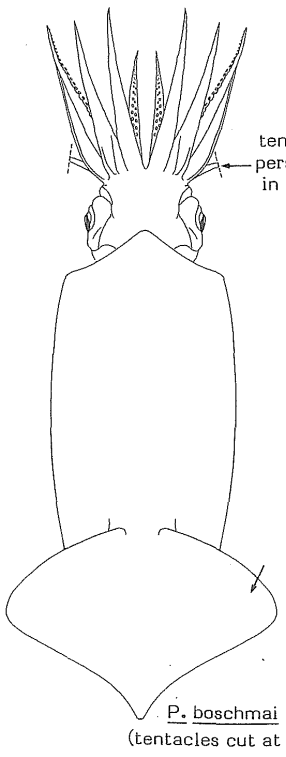
1a. Tentacles lost at about 8 cm mantle length; fins oval (Fig.1) ..... Lepidoteuthis grimaldii LEPIDO Lepid 1

1b. Tentacles persistent in adults; fins not oval (Fig.2) ..... Pholidoteuthis boschmai LEPIDO Pholi 2



L. grimaldii Fig.1

dorsal view



P. boschmai Fig.2
(tentacles cut at base)

LEPIDO Lepid 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : LEPIDOTEUTHIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Lepidoteuthis grimaldii Joubin, 1895

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

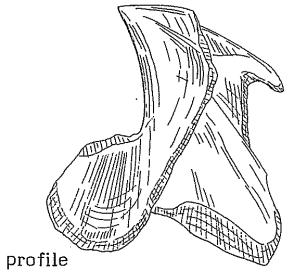
FAO/CCAMLR : En - Soft-bodied scaled squid
Fr - Loutène mollette
Ru - Cheshuityi kalmar
Sp - Luria escamuda blanda

NATIONAL :

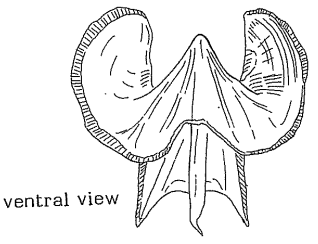
DISTINCTIVE CHARACTERS :

Mantle thick and leathery, with distinct scales covering its surface except for the ventral area between the fins. Fins oval and thick. Arms subequal bearing suckers in 2 rows, no hooks; tentacles lost at about 8.0 cm mantle length.

Lower beak: hood deeply notched, usually less than half the crest in length, with a shallow groove along sides of midline; a cartilaginous shoulder, even in large specimens; a very low wing fold that may (seldom) hide the 90^{0} or slightly obtuse jaw angle; jaw edge long, slightly curved, nearly vertical to baseline, rostrum narrow.

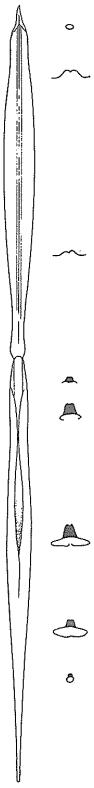


profile

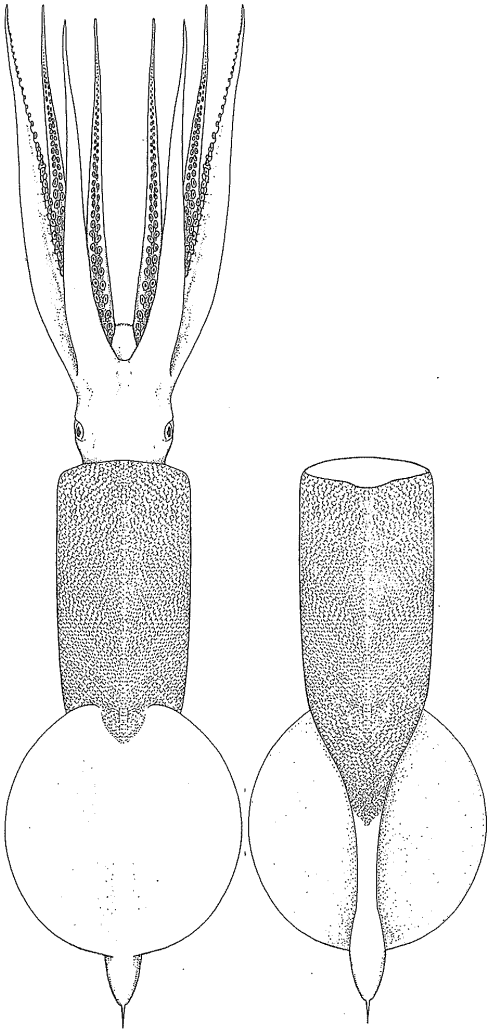


ventral view

lower beak



gladius

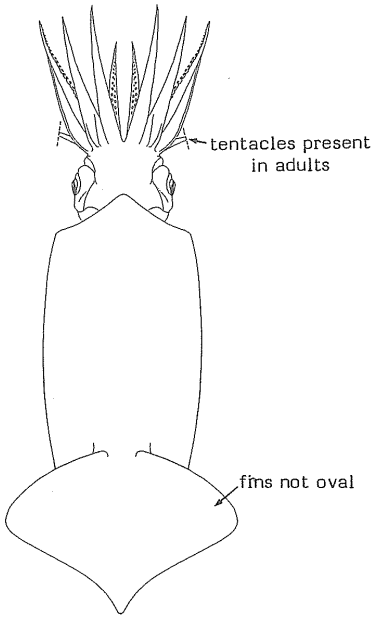


dorsal view ventral view

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Pholidoteuthis boschmai: tentacles present in adults; fins not oval.

Moroteuthis species and Kondakovia longimana (Onychoteuthidae): hooks present on tentacles; fins not oval.



dorsal view
Pholidoteuthis boschmai
(tentacles cut at base)

SIZE :

Maximum reported mantle length 100 cm (extrapolated from beak measurements).

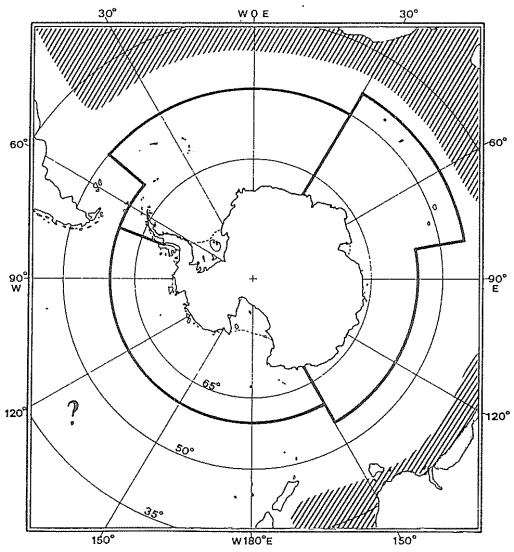
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Wide distribution north of the southern sub-tropical Convergence. Collected only from sperm whale and tuna stomachs and 3 juveniles caught by net in the North Atlantic.

An oceanic species. Never an important part of the diet of sperm whales, but present over a wide geographical area. Probably caught by whales over continental slopes at depths over about 1 000 m.

INTEREST TO FISHERIES :

Its large size and wide distribution would make this species valuable as a bycatch if other species were targeted on the deeper part of the continental slope.



LEPIDO Pholi 2

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : LEPIDOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pholidoteuthis boschmai Adam, 1950

OTHER SCIENTIFIC NAMES STILL IN USE : Tetronychoteuthis dussumieri (Orbigny, 1848)

VERNACULAR NAMES :

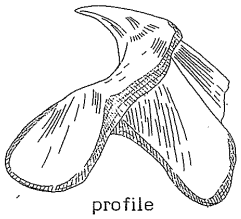
FAO/CCAMLR : En - Coffeebean scaled squid
Fr - Loutène battoir
Ru - Borodavchatyi kalmar
Sp - Luria escamuda cafetal

NATIONAL :

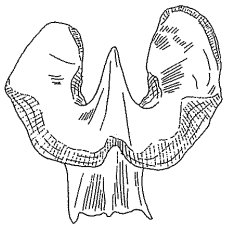
DISTINCTIVE CHARACTERS :

Mantle elongate, covered with small "scales". Fins 40 to 50% of mantle length, muscular. Tentacular clubs unexpanded, with laterally compressed suckers with bluntly toothed rings; arms stout, sucker rings with about 18 sharp teeth. (This is known to be a composite of several species.)

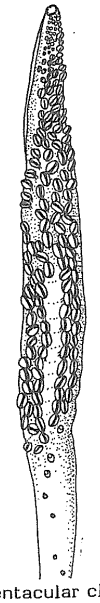
Lower beak: jaw edge curved in profile and exposed rostral edge only about half the wing length; jaw angle hidden from the side by a low thickened wing fold; hood with a deep medial notch; shoulder teeth short; jaw angle recessed; angle ridge short, with a very short angle point; a well defined fold runs to halfway between the thick, rigid crest and lateral wall corner.



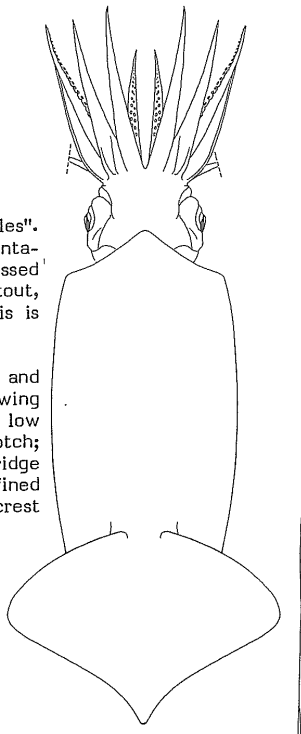
profile



ventral view
lower beak

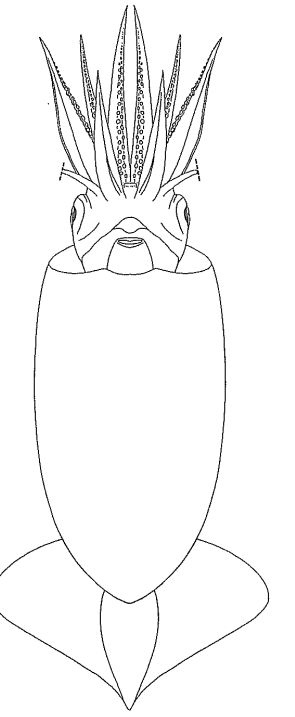


tentacular club



dorsal view
(25 cm mantle length,
adapted from M.R. Clarke, 1980)

gladius



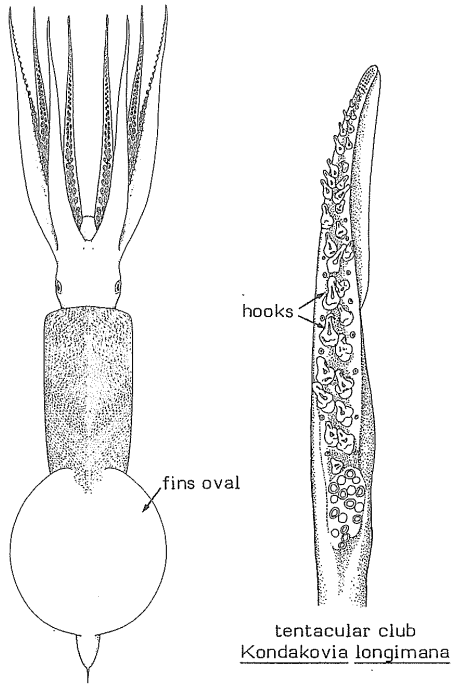
ventral view
(tentacles cut at base)

(after Toll, 1982)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Lepidoteuthis grimaldii: fins oval; tentacles lost at 8 cm mantle length.

Moroteuthis species and Kondakovia longimana (Onychoteuthidae): hooks present on tentacles.



SIZE :

Maximum reported mantle length 60 cm, 5.7 kg in weight.

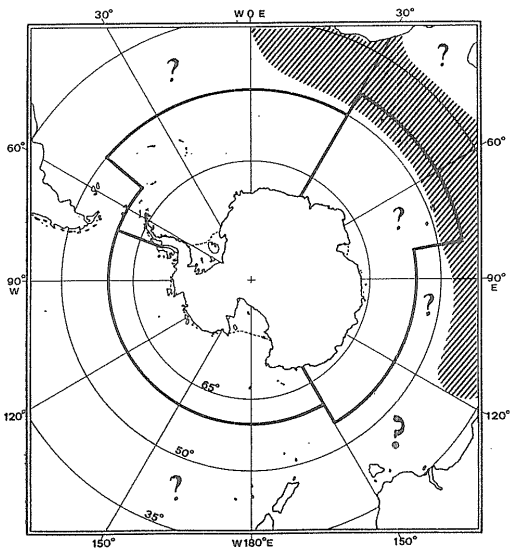
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Central and southeastern Atlantic; southern Indian Ocean; Banda and eastern Java seas. Southern limits undetermined.

An oceanic species; reported to occur between the surface and 2 000 m depth. Heavily preyed upon by sperm whales in the Southern Ocean.

INTEREST TO FISHERIES :

This species is believed to have some fishery potential because of its large size and muscular consistency.



NEO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

NEOTEUTHIDAE

Neosquids

A single species known to occur in the Southern Ocean.

Alluroteuthis antarcticus Odhner, 1923

NEO Allu 1

OTHER SCIENTIFIC NAMES STILL IN USE : Parateuthis tunicata Thiele, 1921
? Crystalloteuthis glacialis Clarke, 1980

VERNACULAR NAMES :

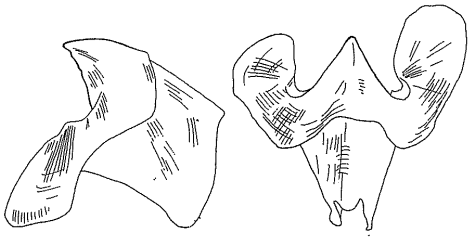
FAO/CCAMLR : En - Antarctic neosquid
Fr - Loutène australe
Ru - Antarkticheskyi myagkotelyi kalmar
Sp - Neoluria antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

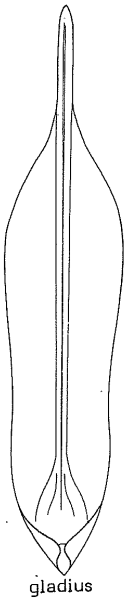
Mantle conical. Fins oval, anterior lobes absent, posterior lobes free. Head and eyes large; buccal connectives attach to dorsal borders of arms IV. Funnel-locking cartilage straight, simple. No photophores. Tentacles relatively thin; clubs with 6 to 8 enlarged suckers on median rows of manus, many rows of very small, extremely numerous suckers on carpus, with a few pairs of suckers/knobs extending proximally along the stalk; arms robust; suckers on arms biserial, those on arm IV reduced in size.

Lower beak: has hood with a broad notch and lies close to crest; thickened wing fold with ridge has characteristic shape in profile and obscures jaw angle from side; jaw angle acute or recessed; crest broad and thickened; no fold or ridge on lateral wall.

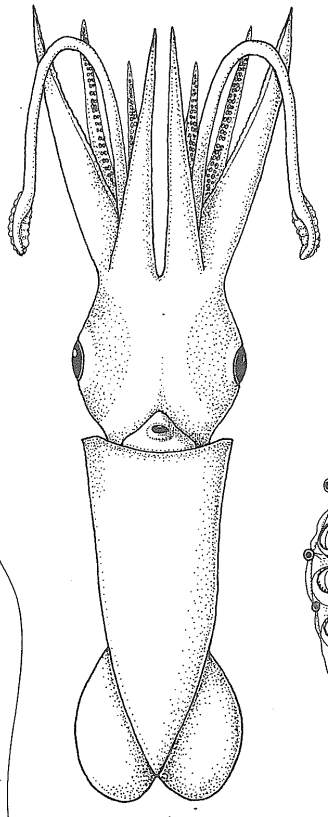


profile ventral view

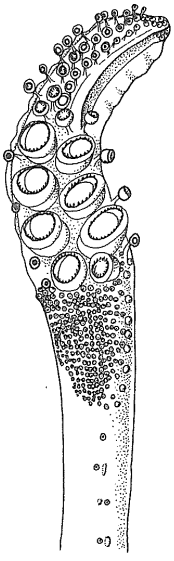
lower beak
(after M.R. Clarke, 1982)



gladius
(redrawn from Toll, 1982)



ventral view



tentacular club

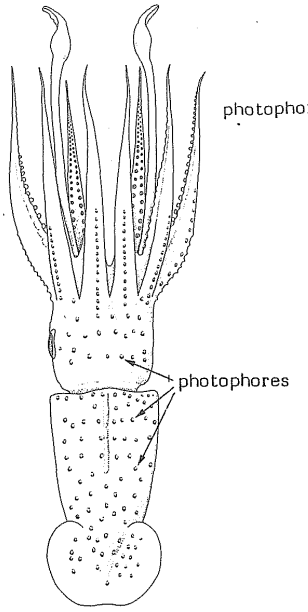
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Several families (Histioteuthidae, Bathyteuthidae and Psychroteuthidae) have similar general characters, but can be differentiated as follows:

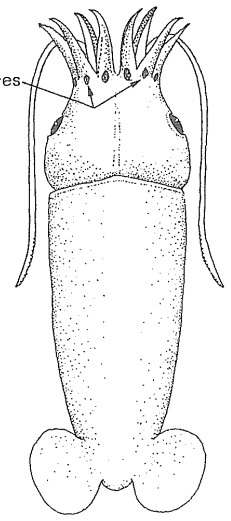
Histioteuthis species (Histioteuthidae): photophores present on mantle.

Bathyteuthis abyssicola (Bathyteuthidae): photophores present at bases of arms.

Psychroteuthis glacialis (Psychroteuthidae): posterior fin attachment concave.



dorsal view
Histioteuthis



dorsal view
Bathyteuthis abyssicola

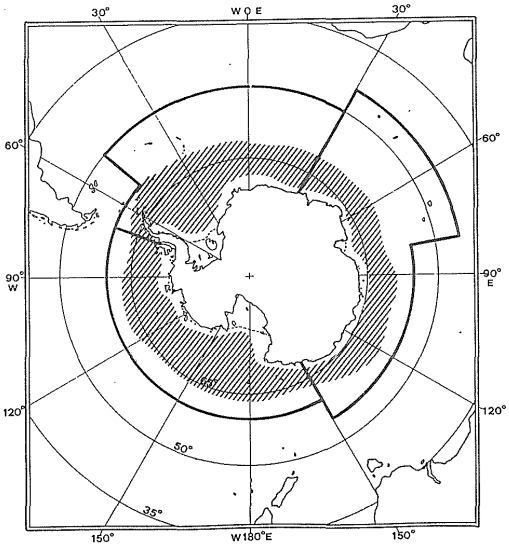
SIZE :

Maximum reported mantle length 11 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

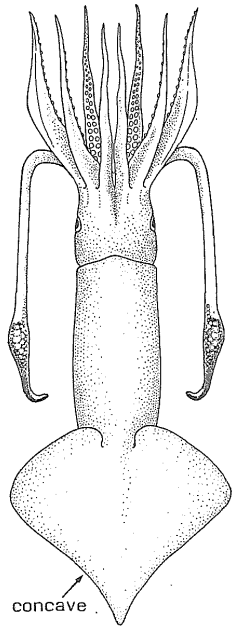
All sectors of the Antarctic Ocean; circumpolar.

An oceanic species, occurring in depths between 750 and 2 800 m. A prey of sperm whales, elephant and Weddell seals. The annual consumption of this species by sperm whales in the Antarctic is estimated to be about 0.01×10^6 t.



INTEREST TO FISHERIES :

Currently none.



dorsal view

Psychroteuthis glacialis

OCTO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

OCTOPOTEUTHIDAE

Octopus squids

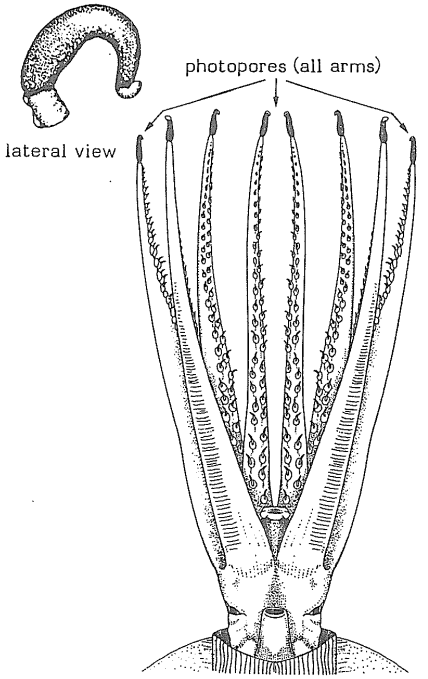
Characterized by biserial hooks on the arms (usually replaced by small biserial suckers near the arm tips); a lack of tentacles (in adults), buccal connectives that attach to the ventral borders of arms IV; a simple, straight, slightly broad funnel-locking cartilage; very large fins; light organs at the tips of at least some of the arms. Tentacles are present in larval forms of all species but are lost very early in development in Octopoteuthis, while they remain for some time in Taningia as small rudimentary filaments that bear a few distal club suckers; they eventually drop off in the juvenile stage.

The family comprises only two genera, both of which have one representative in this area.

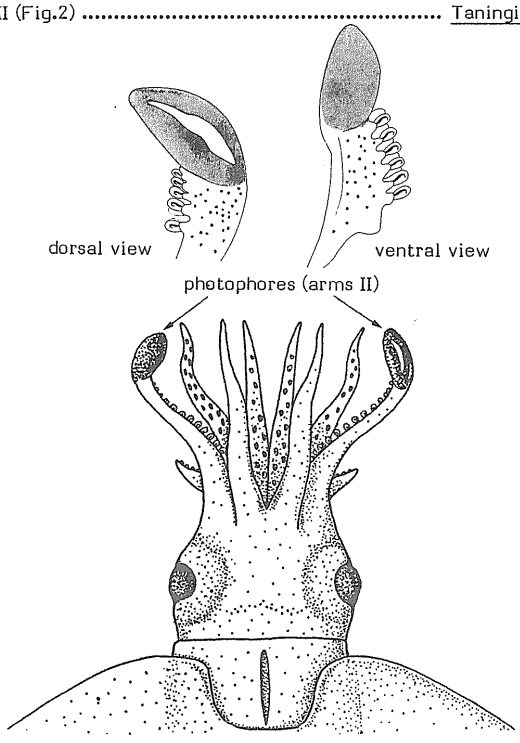
KEY TO GENERA OCCURRING IN THE AREA :

1a. A single, small, spindle-shaped photophore at tips of all eight arms (Fig.1) ..... Octopoteuthis

1b. A single, very large photophore at tip of each arm II (Fig.2) ..... Taningia



Octopoteuthis Fig.1



Taningia Fig.2

LIST OF SPECIES OCCURRING IN THE SOUTHERN OCEAN AND ADJACENT WATERS :

Octopoteuthis rugosa Clarke, 1980	OCTO Octo 1
Taningia danae Joubin, 1931	OCTO Tanin 1

OCTO Octo 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPOTEUTHIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Octopoteuthis rugosa Clarke, 1980

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

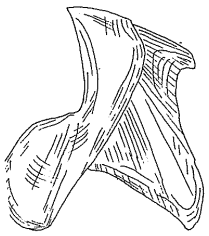
FAO/CCAMLR : En - Rough-skin octopus squid
Fr - Encornet poulpe râpe
Ru - Morshinistyi vosmirukyi kalmar
Sp - Pulpota lijera

NATIONAL :

DISTINCTIVE CHARACTERS :

Mantle conico-cylindrical with an external thick gelationous layer possessing longitudinal furrows anteriorly. Fins oval, large and thick, covering almost the entire dorsal surface of the mantle except for the blunt posterior end. Tentacles are lacking in adults; arms equal in length with biserial hooks; each hook with 2 minute hooklets near the base. Black photophores occur at the tips of all arms. Juvenile stages unknown.

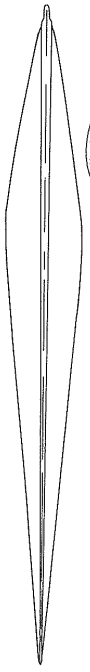
Lower beak rather narrow; jaw edge from the side is of about the same length or longer than the wing; baseline shorter than depth of beak; hood lies close to the crest which is narrow and thicker than the lateral wall immediately to the side of it; wing fold absent or barely prominent enough to hide the jaw angle from the side; jaw angle obtuse and close to a right angle; a very prominent fold runs to the posterior edge of the lateral wall.



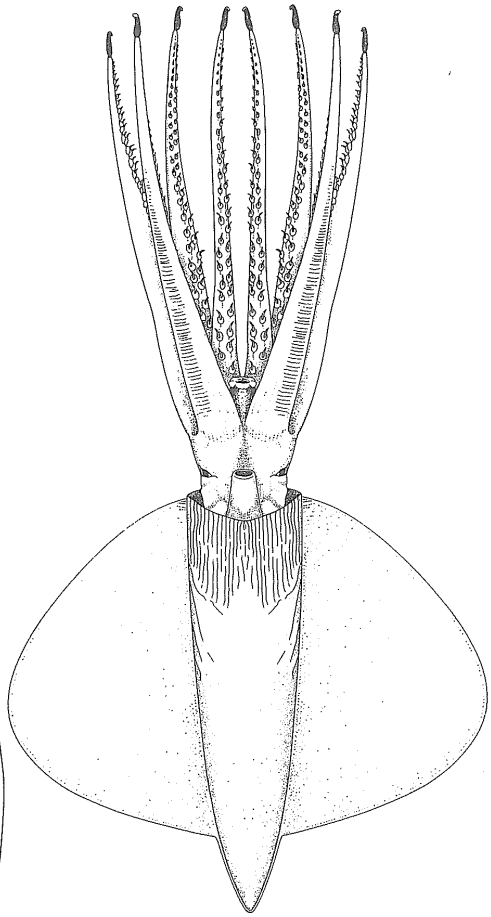
profile

ventral view

lower beak



gladius

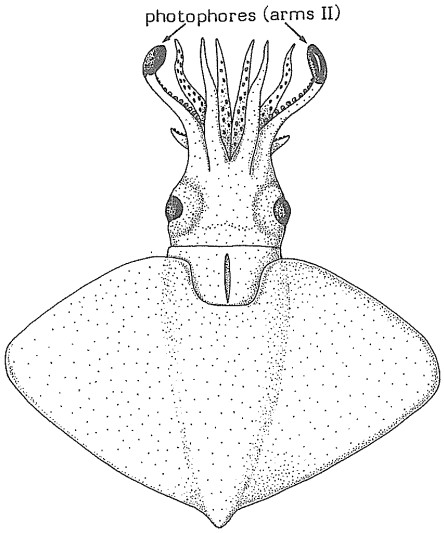


ventral view

(all after Clarke, 1980)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Taningia danae: fins also as long as mantle, but a large photophore present at the end of arms II only.



dorsal view
Taningia danae

SIZE :

Maximum reported mantle length 27 cm.

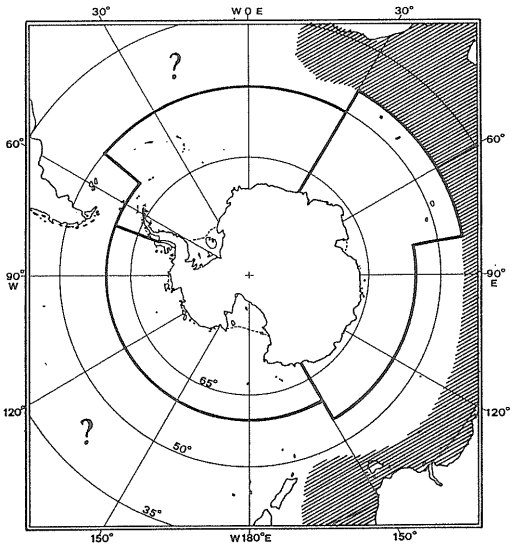
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Sub-Antarctic, from 47°S to the northwest Pacific and south Atlantic and possibly northward to the Azores.

Vertical distribution probably deeper than 500 m down to depths beyond 3 000 m.

INTEREST TO FISHERIES :

Cannot be ascertained at present.



OCTO Tanin 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Taningia danae Joubin, 1931

OTHER SCIENTIFIC NAMES STILL IN USE : Cucioteuthis unguiculatus Joubin, 1898, 1900
Cucioteuthis unguiculatus R. Clarke, 1956
Cucioteuthis unguiculata Rees & Maul, 1956
Cucioteuthis unguiculata M. Clarke, 1962

VERNACULAR NAMES :

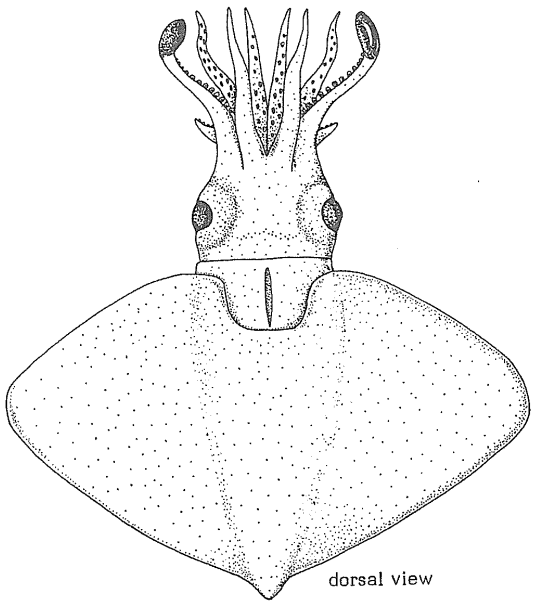
FAO/CCAMLR : En - Dana octopus squid
Fr - Encornet poulpe dana
Ru - Kalmar taningia
Sp - Pulpota

NATIONAL :

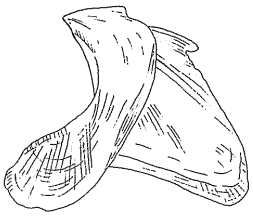
DISTINCTIVE CHARACTERS :

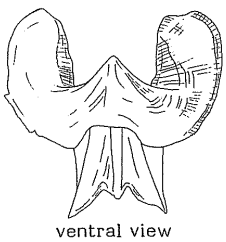
Mantle elongate-conical, broad, robust. Fins very large, rhombic, gelatinous and thick, their length about 85 to 95% of mantle length, their width 130% of mantle length. Tentacles lacking in adults; arms with 2 rows of strong hooks; arms II each with a large, distinct, black photophore at tip, its luminescent surface covered by an eyelid-type mechanism.

Lower beak broad; jaw edge visible from side is slightly longer than wing length in small specimens or slightly shorter in larger specimens; hood broad, with a distinct medial notch; wing fold poorly developed, covered with cartilage and hardly concealing jaw angle in profile; the shoulder is mainly cartilage but near jaw angle the chitin forms a shoulder ridge; crest slightly thickened; a distinct thickened fold runs to a position about halfway between the crest and the corner of the lateral wall.



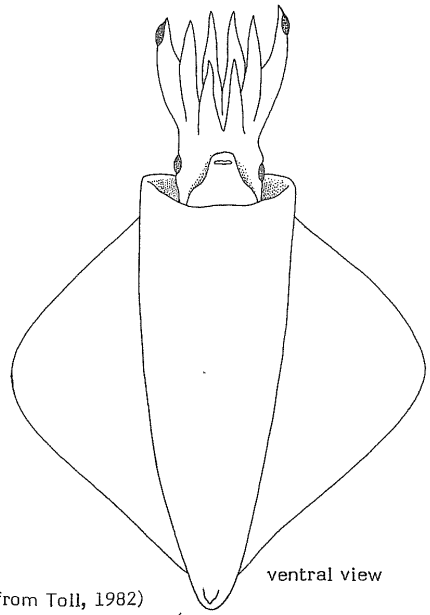
dorsal view





ventral view
lower beak
(after Clarke, 1980)

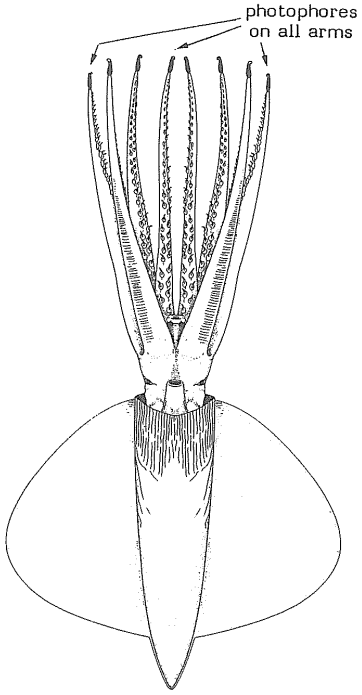
gladius
(redrawn from Toll, 1982)



ventral view
(redrawn from M.R. Clarke, 1967)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Octopoteuthis rugosa: photophore present at the tips of all eight arms.



ventral view
Octopoteuthis rugosa

SIZE :

Maximum reported mantle length 1.4 m, over 20 kg in weight.

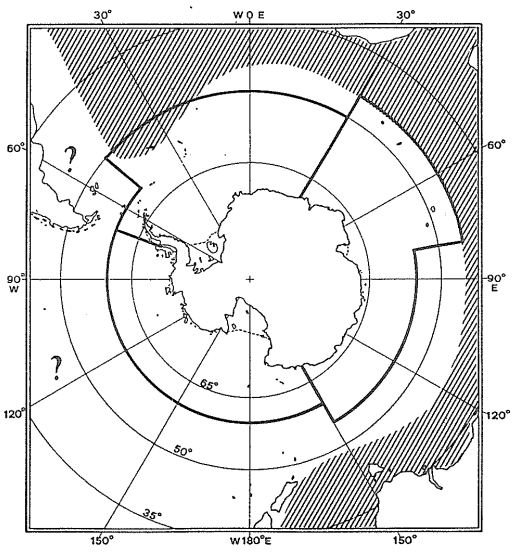
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Complete distributional range unknown; probably cosmopolitan in warmer water but extends south to at least 47°S (from South Georgia to the Tasman Sea); reported from western Japan, the northeastern Pacific; southern and central east Atlantic up to about 45°N; Hawaii; and western Indian Ocean.

A primarily oceanic midwater species, believed to spawn on the bottom, deep on the slope. It is heavily preyed upon by sperm whales throughout their range and to a lesser extent by wandering albatrosses.

INTEREST TO FISHERIES :

This species is believed to have some fishery potential.



OMMAS

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

OMMASTREPHIDAE

Flying squids

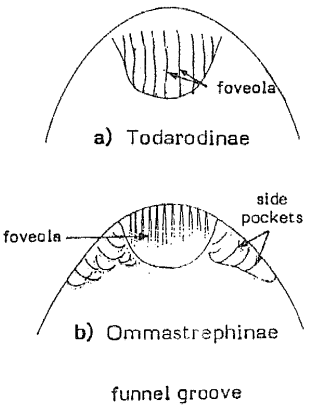
The family is characterized by an inverted T-shaped funnel-locking cartilage, which easily distinguishes it from all others, even in the youngest stages; biserial suckers on the arms; tetraserial suckers on the tentacular clubs (except for Illex which has 8 rows of suckers on the dactylus); buccal connectives that attach to the dorsal borders of arms IV, photophores in some genera, and a muscular bridge anterior to the funnel-locking cartilage which passes from the funnel to the ventral surface of the head.

All representatives of this oceanic and neritic family, but particularly the species in the subfamily Ommastrephinae, are very strong, powerful swimmers; most of them undertake diurnal vertical movements between the surface layer at night and deeper layers during the day. Several species school by size and migrate seasonally in response to changes of temperature conditions. Large numbers of small eggs are produced, encapsuled in gelatinous masses that either float on or near the surface or settle on the bottom. Hatching of the "rhynchoteuthis" larvae occurs after a few days to a few weeks. Post-spawning mortality is high. All species of the family in which the developmental stages are known, pass through the "rhynchoteuthis" larval stage recognized by the fusion of the tentacles to form a trunk-like proboscis. Growth is very rapid; in many species the lifespan does not exceed one year. Flying squids are active predators on fishes, pelagic crustaceans and other squids. Cannibalism is common. Ommastrephids in turn are preyed upon by sea birds, marine mammals and large predacious fishes such as tunas, billfishes, etc.

Most representatives of this family are of considerable interest to fisheries. Trawling and jigging are by far the most common fishing methods, results of the latter being greatly improved by light attraction, taking advantage of the positive phototaxis of most species. They are marketed fresh (i.e., sashimi), frozen or processed in various ways, such as, dried (surume), salted, salted-fermented. Jigged squids fetch the highest prices because the product is usually fresher and undamaged.

Of the three subfamilies currently recognized (Ommastrephinae, Todarodinae and Illicinae), only one, the Todarodinae, is represented with 2 species in the Southern Ocean and adjacent waters.

The Todarodinae has a foveola, but unlike the subfamily Ommastrephinae, lacks side pockets in the funnel groove, and lacks photophores.



LIST OF SPECIES OCCURRING IN THE AREA:

Martialia hyadesi Rochebrune & Mabille, 1889	OMMAS Mart 1
Todarodes filippovae Adam, 1975	OMMAS Todarod 2

OMMAS Mart 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OMMASTREPHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Martialia hyadesi Rochebrune & Mabille, 1889

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

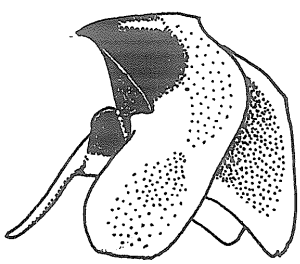
FAO/CCAMLR : En - Sevenstar flying squid
Fr - Encornet étoile
Ru - Kalmar martialia
Sp - Pota festoneada

NATIONAL :

DISTINCTIVE CHARACTERS :

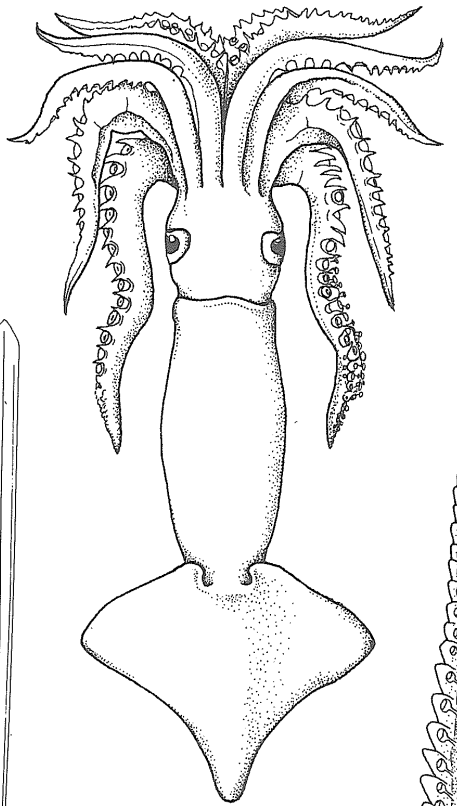
Mantle robust, tapering to a somewhat elongated tail. Fins rhomboidal, elongated posteriorly, single fin angle 35 to 45°. Funnel groove with foveola, no side pockets, 7 longitudinal folds. Tentacular clubs occupy almost the entire length of tentacles; 6 to 8 paired papillae at base of each tentacle. Protective membranes on arms very weak and low, but trabeculae very strongly developed into prominent, pointed cirri all along the arms; suckers proportionally small, rings with 5 teeth on distal half, the central one conical, the lateral ones becoming truncated; proximal half of ring smooth; right arm IV hectocotylized in males.

Lower beak characterized by a typically ommastrephid appearance and an unusually large hook to the rostrum, narrower than in other genera; a sharp cutting edge on rostrum; wing fold very low.

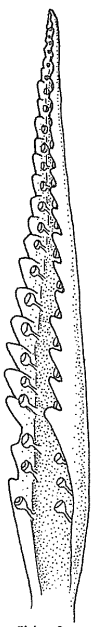


lower beak

gladius
(redrawn from
Toll, 1982)



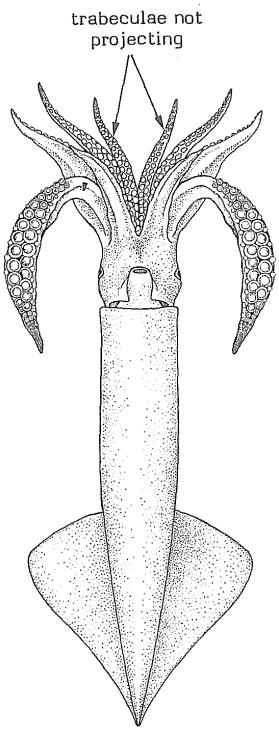
dorsal view



arms IV of male
hectocotylized

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Todarodes filippovae: normally developed protective membranes with normal, non-projecting trabeculae on the arms.



ventral view

Todarodes filippovae

SIZE :

Maximum reported mantle length approximately 40 cm.

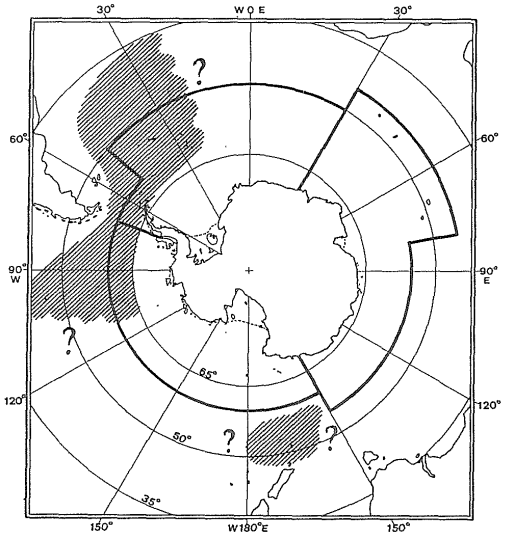
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Southwest Atlantic, Southern Pacific and the Antarctic Convergence; exact distribution undetermined. Washed ashore at Macquarie Island.

An oceanic species; exact depth distribution unknown; biology unknown.

INTEREST TO FISHERIES :

So far no direct fisheries have been developed for this species, but it is believed to represent an important component of the Japanese jig fishery off the Falkland/ Malvinas Islands.



OMMAS Todarod 2

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OMMASTREPHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Todarodes filippovae Adam, 1975

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

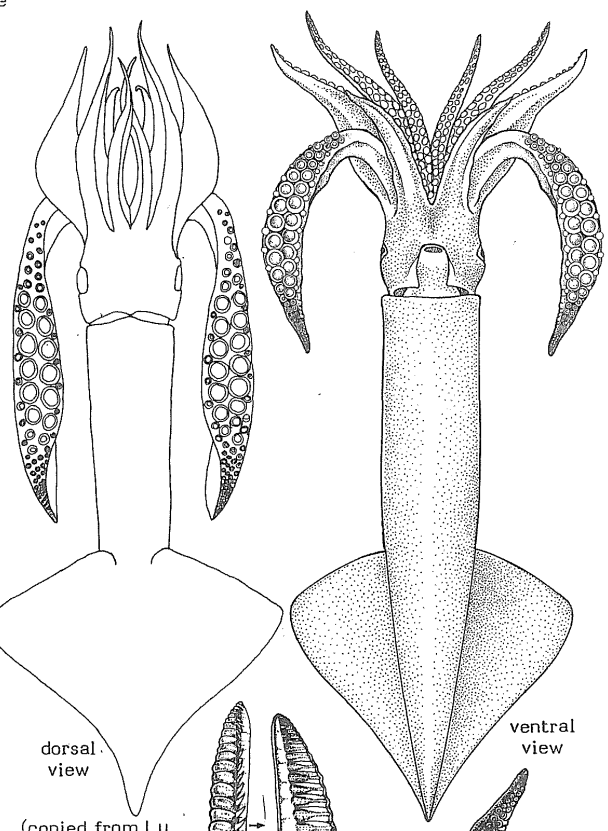
FAO/CCAMLR : En - Antarctic flying squid
Fr - Toutenon antarctique
Ru - Kalmar-strelka Filippovoy
Sp - Jibia antártica

NATIONAL :

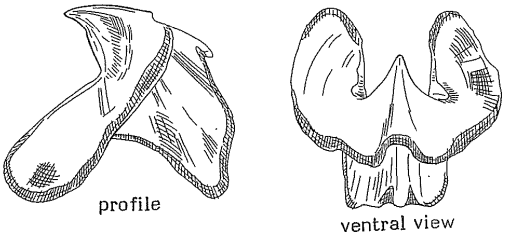
DISTINCTIVE CHARACTERS :

Mantle muscular, long, narrow (width 16 to 24% of mantle length) tapering to a pointed tail. Fins sagittate, their length and width about 50% of mantle length; single fin angle about 30^{o} to 35^{o} (60^{o} to 70^{o} both fins). Foveola without side pockets in the funnel groove. Tentacles very large and robust; clubs very expanded, occupying nearly the entire length of tentacles; only 2 pairs of carpal suckers at base of club; largest manus sucker rings with 8 to 11 sharp teeth alternating with low, flat platelets. Arms relatively short, protective membranes with normal, non-projecting trabeculae; sucker rings with 10 sharp teeth; right arm IV hectocotylized along distal 21 to 36% of the arm with suckers transformed into papillae and tubercles, with the ventral protective membrane and trabeculae very expansively developed.

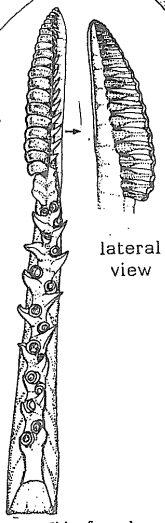
Lower beak: baseline length about equal to depth of beak; a low wing fold hides the jaw angle from side; hood covers about half the crest in the midline and is broad on either side of the deep medial notch; rostral edge usually sharply curved near tip; wing fold thickened; shoulder ridge well developed; jaw angle acute or recessed; crest broad and thickened; a broad fold runs across the upper half of the lateral wall.



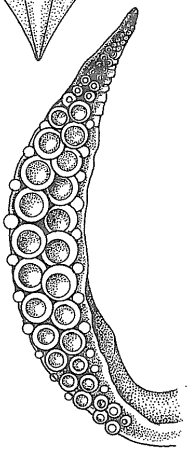
(copied from Lu and Dunning, 1982)



lower beak
(redrawn from Clarke, 1980)



right arm IV of male
hectoctylized

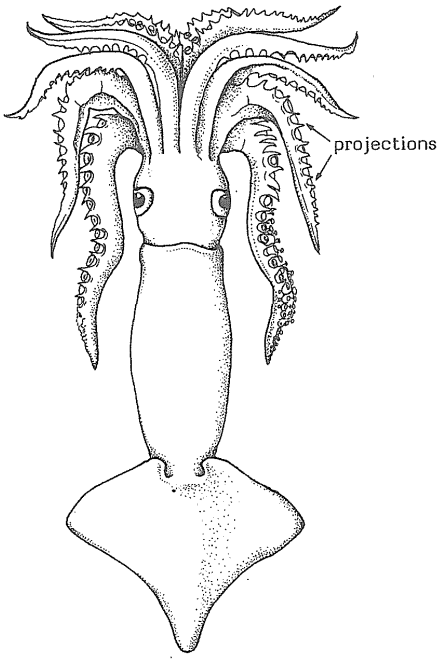


tentacular club

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

The other ommastrephid species in the area, Martialia hyadesi, has weakly developed, low protective membranes but strongly developed cirrus-like projections on the arms.

A second species of Todarodes occurs south of New Zealand and in the southern Tasman Sea, but to date its identity and distribution are unclear.



dorsal view
Martialia hyadesi

SIZE :

Maximum reported mantle length over 50 cm; common between 20 and 40 cm.

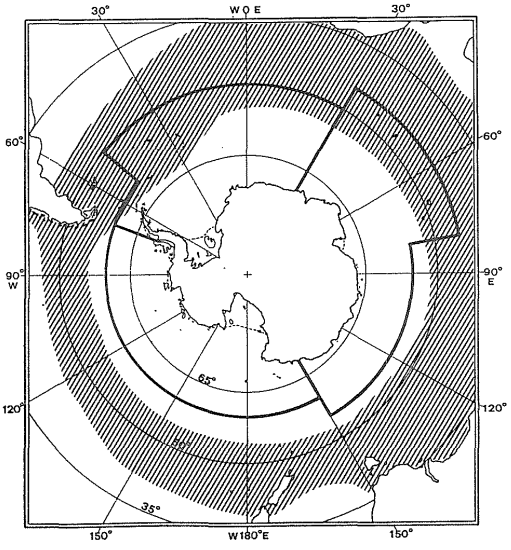
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar in the Southern Ocean, south of approximately 40°S; common in the Antarctic Convergence zone.

An oceanic species, occurring between the surface and about 1 000 m depth. Positive phototaxis is strongly developed.

INTEREST TO FISHERIES :

Taken as bycatch to the extensive Japanese jig fishery for Nototodarus sloani off New Zealand and southern Australia; in 1978 it was caught in commercial quantities off northeast Tasmania. Also taken with jigs off the Falkland/Malvinas Islands. The species is believed to have some fishery potential, but because specimens at least from the southern Tasman Sea are sometimes heavily parasitized, its market potential may be limited.



ONYCHO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

ONYCHOTEUTHIDAE

Hooked squids

Body muscular, tail pointed. Fins with sharp lateral angles; buccal connectives attached to ventral borders of ventral arms IV; funnel-locking appartus simple, straight; tentacular clubs with 2 rows of hooks and 2 marginal rows of suckers, or suckers absent; 8 arms and 2 contractile tentacles around mouth; 2 rows of suckers on arms. Colour: maroon to brick red, darker dorsally.

Six genera currently are recognized: Onychoteuthis, Onykia, Moroteuthis, Ancistroteuthis, Chaunoteuthis and Kondakovia. The generic boundaries, however, are not well defined and the family is in need of revision.

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA AND ADJACENT WATERS:

1a. Dermal ridges on mantle which develop longitudinal orientation in larger specimens (Fig.1a); marginal rows of suckers present on tentacular clubs (Fig.2) ..... Kondakovia longimana
ONYCHO Kond 1

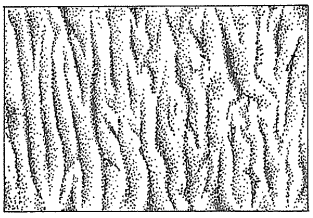
1b. Mantle either smooth or with round fleshy warts (Fig.1b), but not with longitudinal ridges; no marginal rows of suckers on tentacular clubs

2a. Mantle smooth; fin angle 45 to 50°, length of fins about 50% of mantle length (Fig.3a).... Moroteuthis knipovitchi
ONYCHO Moro 2

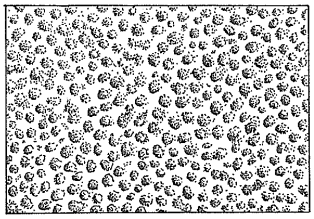
2b. Mantle with round, fleshy warts; fin angle and relative length of fins not as in 2a

3a. Fin angle 50 to 55°; length of fins about 45% of mantle length (Fig.3b) ..... Moroteuthis ingens
ONYCHO Moro 1

3b. Fin angle 30 to 40°, length of fins about 58 to 60% of mantle length (Fig.3c)... Moroteuthis robsoni
ONYCHO Moro 4

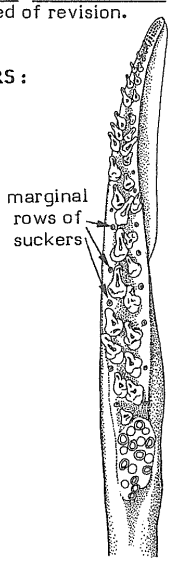


a) K. longimana

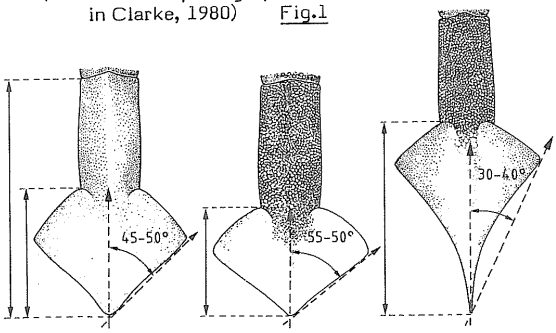


b) M. robsoni

skin showing ridges and warts (drawn after a photograph in Clarke, 1980) Fig.1



tentacular club
K. longimana Fig.2



a) M. knipovitchi b) M. ingens c) M. robsoni
dorsal view of mantle and fins Fig.3

ONYCHO Kond 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ONYCHOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Kondakovia longimana Filippova, 1971

OTHER SCIENTIFIC NAMES STILL IN USE : Moroteuthis ingens Clarke, 1962, 1965, 1966, 1972

VERNACULAR NAMES :

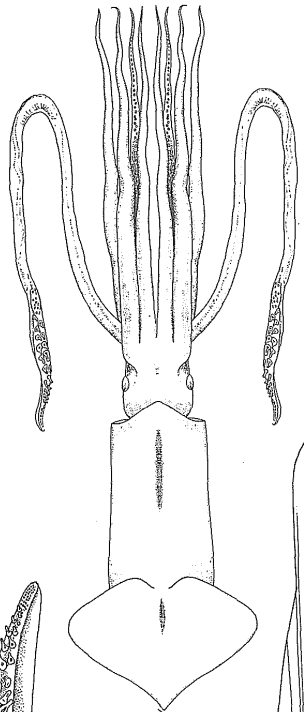
FAO/CCAMLR : En - Longarm octopus squid
Fr - Encornet-poulpe longbras
Ru - Kalmar kondakova
Sp - Pulpota brazolargo

NATIONAL :

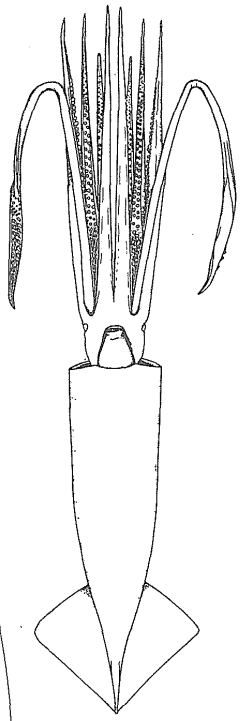
DISTINCTIVE CHARACTERS :

Mantle muscular, covered with dermal ridges which develop longitudinal orientation in larger specimens. Fins with straight-sided posterior margin, their width about 60% and their length about 40% of mantle length. Tentacular clubs with approximately 33 hooks and 33 marginal suckers on manus and with more than 20 suckers on dactylus.

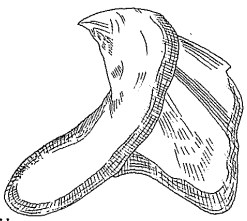
Lower beak with wing and hood very broad to the side of the rostral tip; wing length about 1.5 to 2 times the length of jaw edge exposed from the side; hood shorter than half the crest length; hood with a distinct medial notch; a broad wing fold obscures jaw angle from side; jaw angle obtuse; shoulder ridge distinct; cartilage on outer surface of wing fold (except in larger specimens); long angle ridge present; angle point usually extends to edge of pigmented part of the lateral wall; crests narrow, slightly thickened; lateral wall fold runs to midpoint between the crest and corner of the lateral wall.

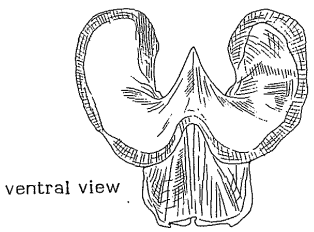


dorsal view
(redrawn from Filippova, 1972)

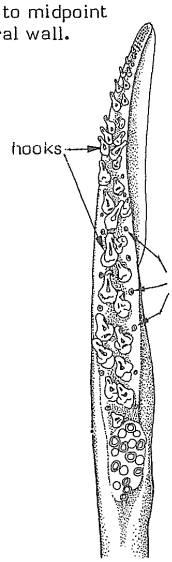


ventral view
(redrawn from Clarke, 1980)





lower beak
(redrawn from Clarke, 1980)

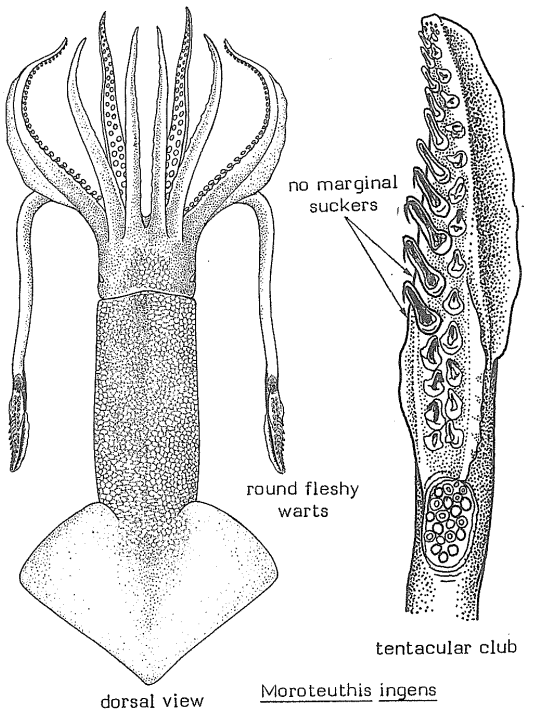


tentacular club
(redrawn from Filippova, 1972)

gladius
(redrawn from Toll, 1982)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Moroteuthis species: mantle either smooth or with round fleshy warts; no marginal suckers on tentacular clubs.



SIZE :

Maximum reported mantle length approximately 90 cm, corresponding to 33 kg in weight.

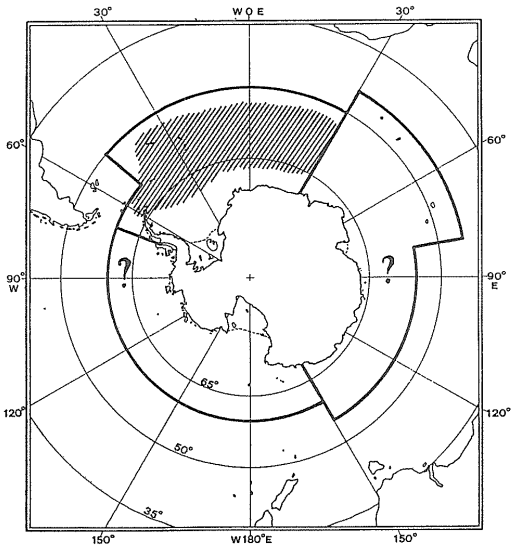
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

In Antarctic waters, the northernmost record is 49°S and the southernmost record, 65°S (derived from sperm whale stomachs).

This oceanic species is the secondmost important by weight in the diet of Antarctic sperm whales (annual consumption estimated to be 2.10×10^6 t) and has a high calorific value. The only known net captures are from 0 to 50 m depth and nearly all sperm whales from which stomach samples were taken, were caught in water depths exceeding 2 000 m. Nidamental glands examined by Clarke (1980) suggest spawning at approximately 50 cm mantle length. Stomach contents of K. longimana contained remains of fish, crustacea and squid.

INTEREST TO FISHERIES :

Undetermined, but considered of high potential.



ONYCHO Moro 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ONYCHOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Moroteuthis ingens (Smith, 1881)

OTHER SCIENTIFIC NAMES STILL IN USE : Onychoteuthis ingens Smith, 1881
? Moroteuthis "A" Clarke, 1980

VERNACULAR NAMES :

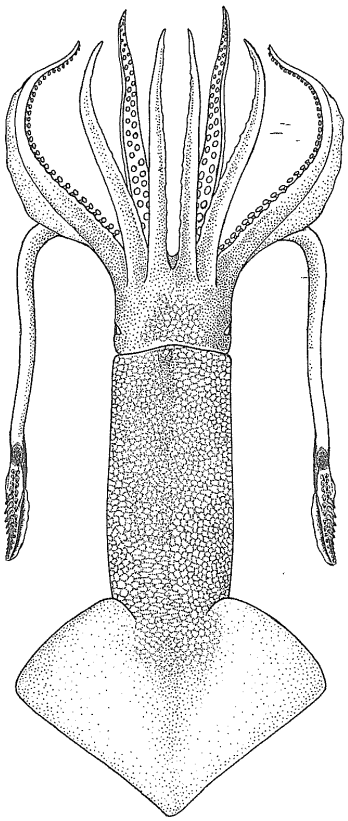
FAO/CCAMLR : En - Greater hooked squid
Fr - Cornet commun
Ru - Gigantskyi kryuchienosnyi kalmar
Sp - Lurión común

NATIONAL :

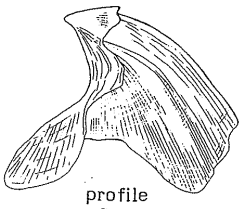
DISTINCTIVE CHARACTERS :

Mantle robust, broad, thick, heavily muscled, not drawn out into a sharp tail, covered with fleshy warts. Fins large, broad, their width 65 to 70% of mantle length (with broad angles of 50 to 55° each), length about 45% of mantle length. Tentacular clubs unexpanded, with 28 or 29 hooks in 2 rows, no marginal suckers. Longest arms (II and III) about 70% of mantle length.

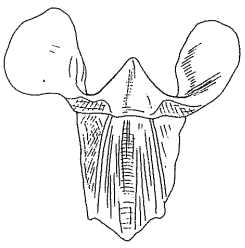
Lower beak with a distinct angle ridge; crest long and curved; hood extremely short; narrow, extremely thickened or cartilaginous region of the hood-wing structure to side of jaw angle; jaw angle obtuse; lateral wall fold very thick anteriorly.



dorsal view



profile



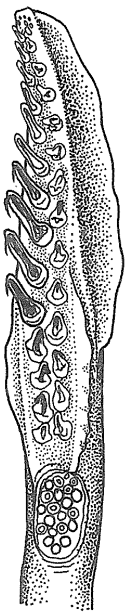
ventral view

lower beak

(after Clarke, 1982)

gladius

(after Toll, 1982)



tentacular club

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

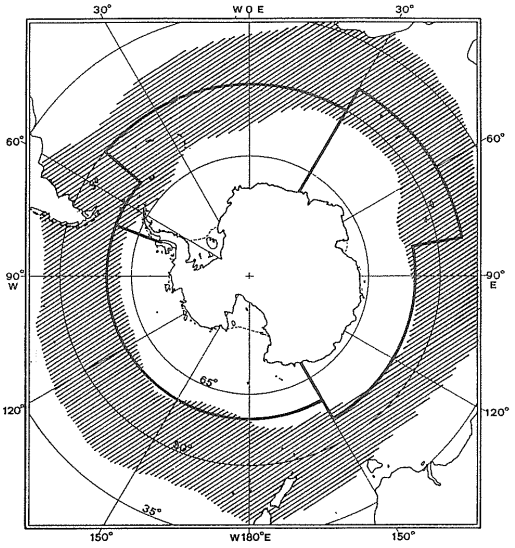
Moroteuthis knipovitchi: mantle smooth; fin angle 45 to 50°; length of fins about 50% of mantle length.

M. robsoni: round, fleshy warts on mantle; fin angle 30 to 40°; length of fins about 58 to 60% of mantle length.

Kondakovia longimana: mantle with dermal ridges; marginal rows of suckers present on tentacular clubs.

SIZE :

Maximum reported mantle length 40 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

In sub-Antarctic waters north of the Antarctic Convergence.

An oceanic-pelagic species; the exact depth range is unknown. Its biology is barely known. It is an item in the diet of sperm whales off New Zealand and probably near some oceanic islands; also preyed upon by seals.

INTEREST TO FISHERIES :

Abundant in sub-Antarctic waters and believed to have some fishery potential.

ONYCHO Moro 2

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ONYCHOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Moroteuthis knipovitchi Filippova, 1972

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

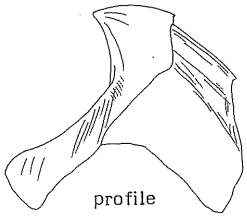
FAO/CCAMLR : En - Smooth-hooked squid
Fr - Cornet lisse
Ru - Gladkokozhyi kryuchienosnyi kalmar
Sp - Lurión liso

NATIONAL :

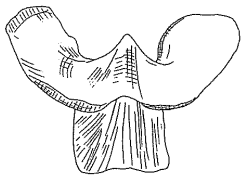
DISTINCTIVE CHARACTERS :

Mantle moderately broad, stout, smooth-textured surface, not drawn out into a prominent tail. Fins broad, fin angles 45 to 50° each, their length about 50% of mantle length. Tentacular clubs with 20 to 30 hooks in 2 rows, the 2nd to 4th on the dorsal row and the 6th to 8th on ventral row the largest; hooks have an indentation on one side of base; no marginal suckers. Arms subequal; longest arms (II) 90% of mantle length.

Lower beak with a distinct angle ridge; hood curved at a characteristic angle, around 0.3 to 0.5 the length of crest in midline and has a shallow, broad medial notch; wing fold thickened; angle point extends beyond pigmented region of lateral wall; crest distinctly thickened; a distinct fold runs to the middle of the posterior edge of lateral wall.



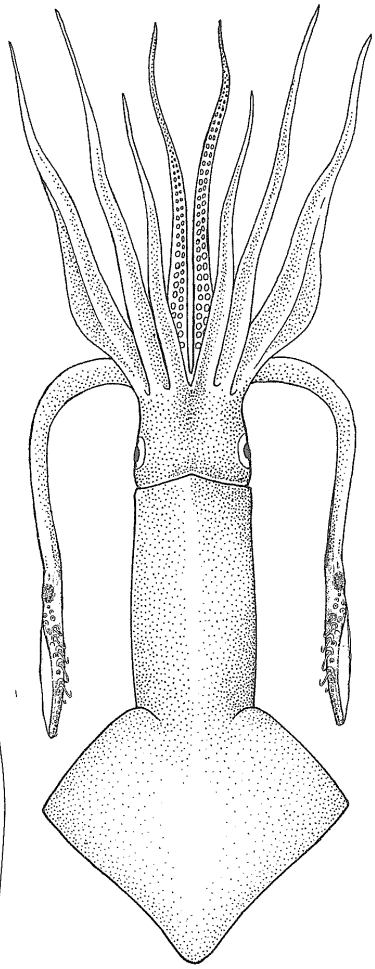
profile



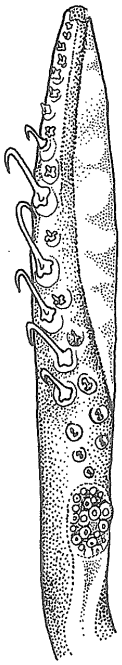
ventral view

lower beak
(after Clarke, 1980)

gladius
(after Toll, 1982)



dorsal view



tentacular club

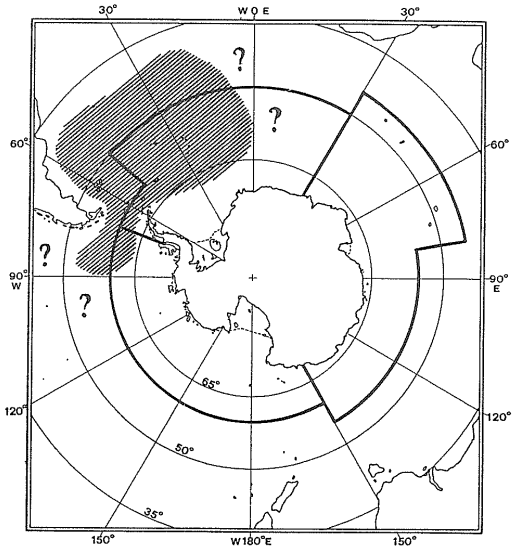
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Moroteuthis ingens and M. robsoni: mantle with round, fleshy warts. Furthermore, fin angle 50 to 55° and 30 to 40%, respectively, and length of fins in mantle length about 45% and 58 to 60%, respectively.

Kondakovia longimana: mantle with dermal ridges; marginal rows of suckers present on tentacular clubs.

SIZE :

Maximum reported mantle length 35 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Scotia Sea and Argentine Basin ranging into the Southern Ocean and through Drake Passage to the west; associated with island groups, possibly circumpolar.

An oceanic species; one of the most heavily preyed upon by sperm whales in the Southern Ocean. The annual consumption of this species by sperm whales in the Antarctic is estimated to be about 0.48 x 10^6 t. Additionally preyed upon by seals and albratrosses.

INTEREST TO FISHERIES :

Its size and consistency make it a potential target for a fishery.

ONYCHO Moro 4

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ONYCHOTEUTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Moroteuthis robsoni Adam, 1962

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

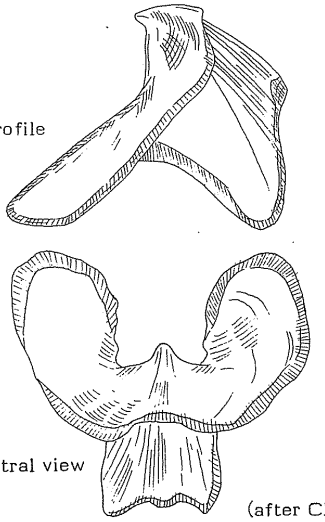
FAO/CCAMLR : En - Rugose hooked squid
Fr - Cornet rugueux
Ru - Sherokhovatyi kryuchienosnyi kalmar
Sp - Lurión rugoso

NATIONAL :

DISTINCTIVE CHARACTERS :

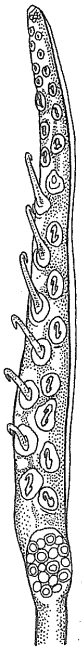
Mantle long, slender, covered with fleshy warts, its tip drawn out to a long, sharp tail. Fins relatively narrow, width 45% of mantle length, their length 58 to 60% of mantle length, forming a very sharply pointed lanceolate tail; fin angle 30^{0} to 40^{0} each. Tentacular clubs very narrow, unexpanded, with about 26 to 30 hooks in 2 rows; no marginal suckers. Arms attenuate, the longest (IV) about 57 to 68% of mantle length; arm sucker rings smooth. Colour reddish.

Lower beak with about twice the length of jaw edge visible from side; a perpendicular from rostral tip cuts baseline well behind the wing tip; hood slightly notched and is two-fifths to one-third of the crest length; rostral edge almost straight except for protruding tip in younger stages; ridge below jaw angle well developed; jaw edge and crest very thick; a broadly thickened fold runs to a position halfway between the crest and the corner of the lateral wall; the upper side of this fold is thinner than the lower side.

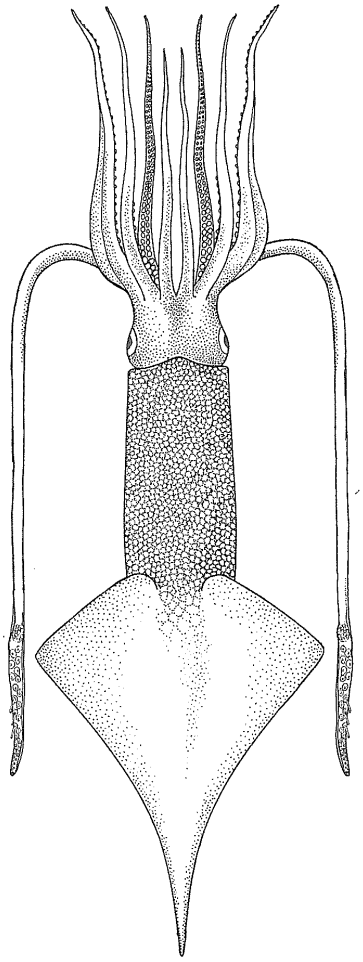


(after Clarke, 1980)

lower beak



tentacular club



dorsal view

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Moroteuthis ingens: fin angle 50 to 55°; fin length about 45% of mantle length.

M. knipovitchi: mantle smooth; fin angle 45 to 50°; fin length about 50% of mantle length.

Kondakovia longimana: dermal ridges on mantle; marginal rows of suckers present on tentacular clubs.

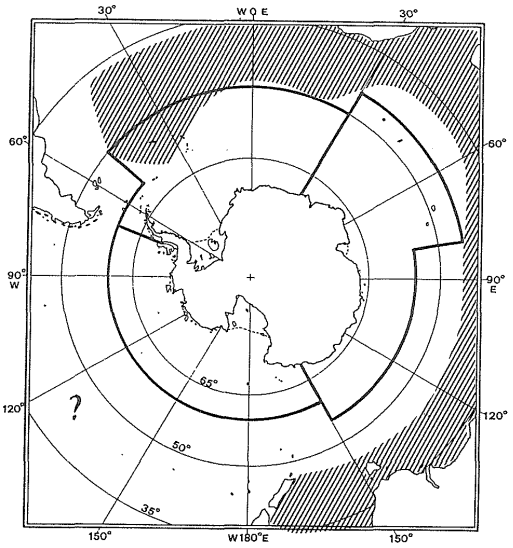
SIZE :

Maximum reported mantle length 75 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Scotia Sea; southern tip of Africa; off south-western Australia. Probably widespread from South America eastward to the Tasman Sea; distribution in the Pacific unknown.

An oceanic species, taken with open nets lowered to between 250 and 550 m depth; sperm whale diet data indicate its occurrence probably deeper than 1 000 m; its exact depth distribution is unknown. In the Southern Ocean, it is believed to spawn ;in autumn (May-June), hatch in June to August, live for almost two years before a single spawning and then, die. One of the squid species heavily preyed upon by sperm whales.



INTEREST TO FISHERIES :

Caught by bottom trawls; believed to have some fishery potential.

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

PSYCHROTEUTHIDAE

Glacial squids

This monotypic family is based on Psychroteuthis glacialis, described from incomplete specimens from the stomachs of penguins and seals. Because of the inadequate description, the status of the family has been considered doubtful. Recently, additional material has become available that confirms the validity of the Psychroteuthidae.

Psychroteuthis glacialis Thiele, 1921

PSYCHRO Psy 1

OTHER SCIENTIFIC NAMES STILL IN USE : None

VERNACULAR NAMES :

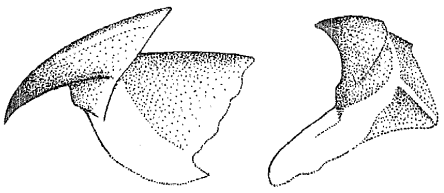
FAO/CCAMLR : En - Glacial squid
Fr - Encornet austral
Ru - Ledyanoy kalmar
Sp - Luria glacial

NATIONAL :

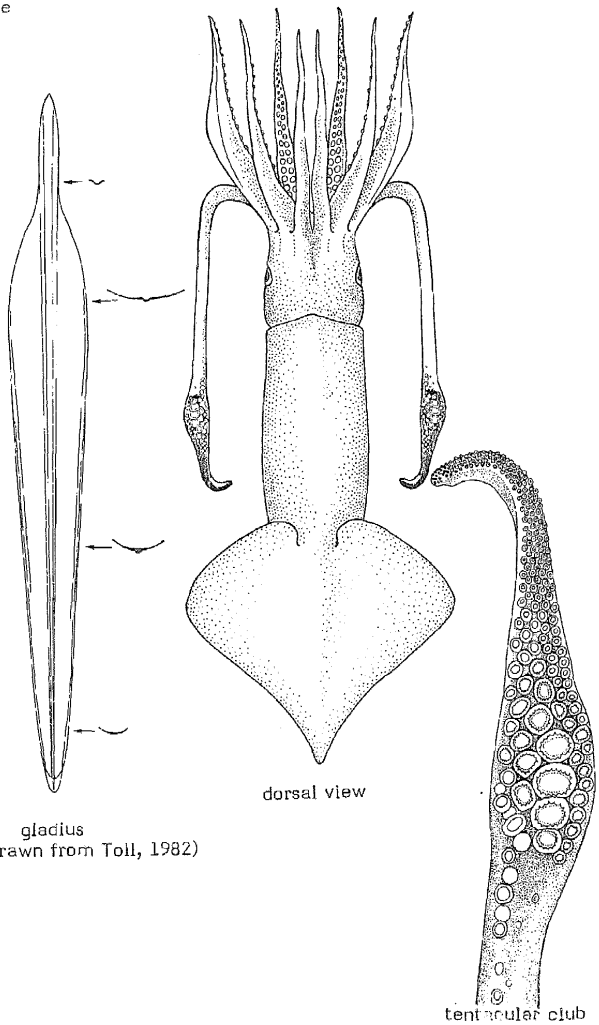
DISTINCTIVE CHARACTERS :

Mantle elongate, muscular, tapering to a pointed tail. Fins sagittate, muscular, their length 55% of mantle length. Buccal connectives attach to the dorsal borders of arms IV. A straight, simple funnel-locking cartilage. No photophores on mantle or head. Tentacular club with 4 to 7 suckers in transverse rows on the manus and dactylus, those of the ventromedian row of manus considerably enlarged; carpal suckers and knobs of tentacular clubs extending proximally along the tentacular stalk; arms with biserial suckers.

Lower beak with an obtuse jaw angle not obsured from the side by a low wing fold; a long, curved jaw edge almost as long as the wing; wings broad; rostrum fairly narrow; hood stands high above unthickened crest and has a shallow notch; a thick fin or ridge runs to the middle of the posterior edge of the lateral wall.



upper and lower beak
(profiles)
(redrawn from Filippova, 1972)



gladius
(redrawn from Toll, 1982)

dorsal view

tentacular club

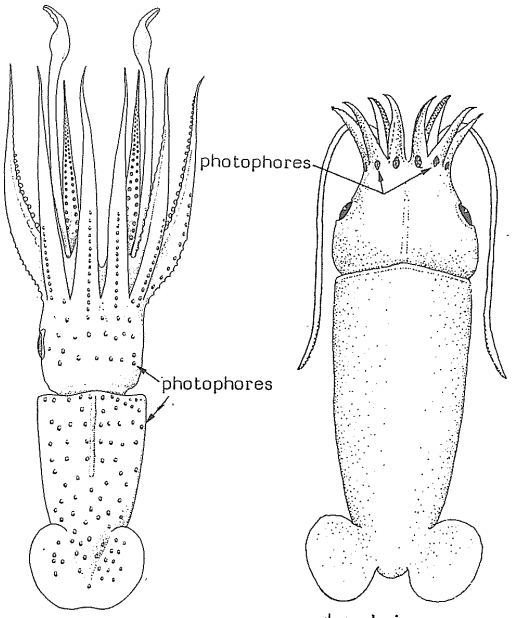
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Several families (Histioteuthidae, Bathyteuthidae and Neoteuthidae) have similar general characters, but can be differentiated as follows:

Histioteuthis species (Histioteuthidae): photophores present on mantle and head.

Bathyteuthis abyssicola (Bathyteuthidae): photophores present at bases of arms and fins subterminal.

Alluroteuthis antarcticus (Neoteuthidae): posterior fin attachment convex.



dorsal view
Histioteuthis

dorsal view
Bathyteuthis abyssicola

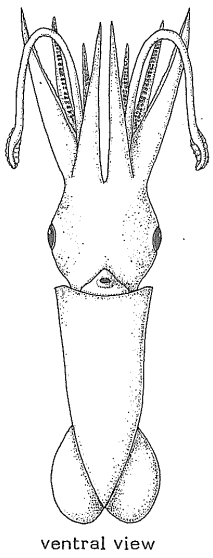
SIZE :

Maximum reported mantle length 44 cm (unpublished data).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Antarctic and sub-Antarctic sectors of the Atlantic; widespread in the Southern Ocean.

An oceanic (and neritic ?) species reported from less than 200 to about 700 m depths. It is preyed upon by sperm whales, penguins and Weddell and elephant seals.

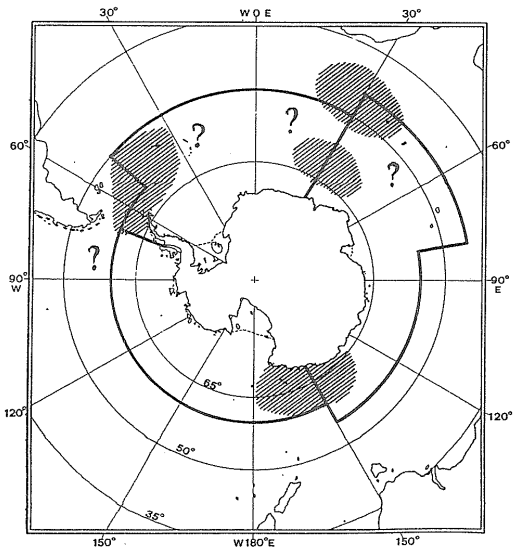


ventral view

Alluroteuthis antarcticus

INTEREST TO FISHERIES :

Currently no fishery exists, but the size and the consistency of the flesh of this species make it a potentially valuable resource.



OCTOPUSES - Order Octopoda

The Order Octopoda is divided into two suborders; Cirrata, mostly deep-sea pelagic and epibenthic forms which posses cirri along the arms and have paddle-shaped fins, and Incirrata, moderately deep to shallow-living benthic and epipelagic forms which possess neither cirri nor fins. Only the Incirrata are of commercial interest, with some species of Octopus supporting some of the major fisheries for cephalopods.

Only one family, the Octopodidae are known to occur in the Southern Ocean and adjacent waters.

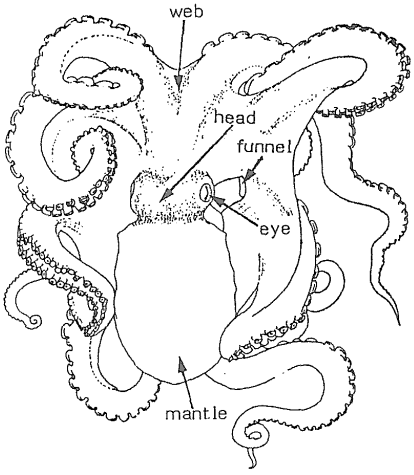
OCTOPODIDAE

OCT

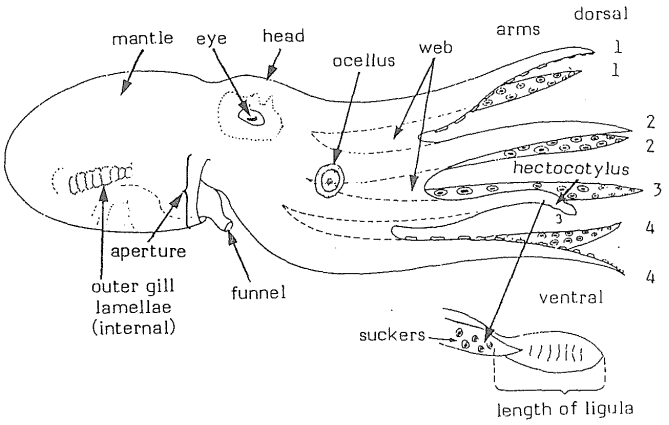
Octopuses

Body short, sack-like, with eight circumoral arms, but no tentacles; fins absent; shell reduced, vestigial, "cartilaginous", or absent; suckers without chitinous rings, set directly on arms without stalks; eye open to sea with primary and secondary (concentric) lids; branchial canal present on gills between down-folded filaments (some exceptions); liver a single structure with incorporated pancreas; central (rachidian) tooth of radula with one large projection and two or more small lateral cusps, first and second lateral teeth may have one or more cusps (but the rachidian teeth may lack lateral cusps, i.e., in Benthoctopus); buccal membrane absent; olfactory organ a ciliated pit. Third (ventrolateral) right arm in males hectocotylized (used to transfer sperm packets from the male to the female); the shape and structure of the modified distal portion (or ligula) of this arm is often useful as a diagnostic generic or specific character.

Most octopuses are benthic animals. Representatives of the family are usually encountered throughout the world from the coast down to at least 2 000 m depth. Many species have cryptic habits, hiding in crevices, empty mollusc shells and seagrass beds during the day and hunting at night; others occur over open trawlable bottoms. Some species lay relatively large eggs, others small eggs, but all are brooded by the female during a prolonged incubation period. During this time, females often almost cease feeding and hence, female mortality is high after the hatching of the eggs. Large-egg species have direct development and hatchlings almost immediately adopt the benthic life of the adults. In small-egg species, the larvae pass through a planktonic stage prior to changing to benthic life. Particularly cryptic species have a well developed territorial behaviour and therefore rarely form aggregations.



dorsal view



lateral view

FAO Sheets OCTOPODIDAE Fishing Areas 48,58,88

Octopuses are the most traditional of all cephalopod resources, and have been exploited for more than 2 000 years. The most important octopus fisheries and markets are located in Asia (particularly Japan) and in the Mediterranean countries. However, the few species occurring in Antarctic and sub-Antarctic waters are not fished at present and their potential as food resources remains as yet to be determined.

The systematics of the Octopodidae is in a thoroughly unsettled state and the group is very much in need of revision. Three subfamilies exist, Octopodinae, Eledoninae, and Bathypolypodinae, separated by relatively minor characters and all easily recognizable as octopuses. There are 21 currently accepted genera in this large family, but only 2 genera of Eledoninae and 2 genera of Bathypolypodinae, with at least 10 species positively known to occur in the Southern Ocean and adjacent waters:

LIST OF SPECIES OCCURRING IN THE AREA :

Genera are characterized according to Voss (1976) and Palacio (1978).

Code numbers are given for those species for which Identification Sheets are included

Subfamily Eledoninae

Eledone:

Arms heteromorphic, the tips of the non-hectocotylized male arms being modified into fleshy papillae or laminae; the hectocotylus is not differentiated into ligula and calamus.

Eledone massyae Voss, 1964	OCT Eled 3

Pareledone:

Suckers uniserial, ink sac well developed, deeply imbedded but externally visible; radula with unicuspid (tricuspid) or pentacuspid rachidian tooth; three well defined lateral teeth, marginal plates usually present. Third right arm hectocotylized with well defined ligula and deeply grooved calamus. Normal crop present. Funnel organ of the VV or W type. Large eggs. Restricted to the Southern Hemisphere. Eurybathic.

Pareledone charcoti (Joubin, 1905)	OCT Par 1
Pareledone polymorpha (Robson, 1930)	OCT Par 2
Pareledone turqueti (Joubin, 1905)	OCT Par 3

Subfamily Bathypolypodinae

Benthoctopus:

Suckers biserial; ink sac absent; gill filaments reduced in number; radula with multicusp rachis. This genus is in need of revision.

At least three nominal species as well as several undescribed species occur in this area.

Graneledone:

Suckers uniserial; ink sac absent; funnel organ VV-shaped; crop reduced or absent; gills small; hectocotylus small; mantle and arms covered with small to large cartilaginous spiny warts.

Graneledone antarctica Voss, 1976	OCT Gran 1
Graneledone challengeri (Berry, 1916)	
Graneledone macrotyla Voss, 1976	OCT Gran 2

Draft texts revised by G.L. Voss, School of Marine and Atmospheric Science, University of Miami, Miami, Florida, USA

OCT Eled 3

1985

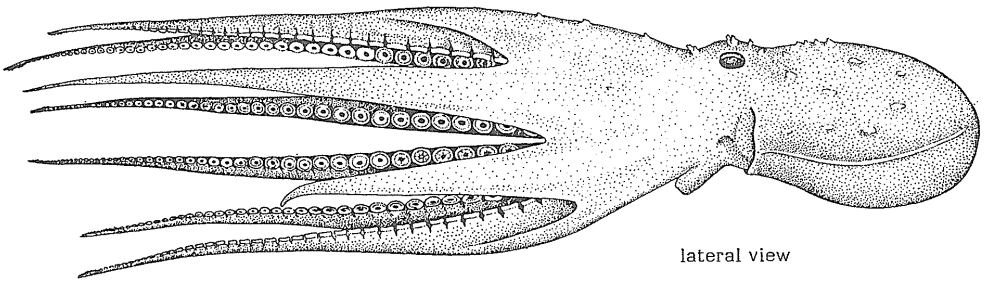
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

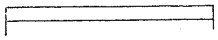
FISHING AREAS 48,58,88
(Southern Ocean)

Eledone massyae Voss, 1964

OTHER SCIENTIFIC NAMES STILL IN USE : Moschites brevis Massy, 1916



lateral view



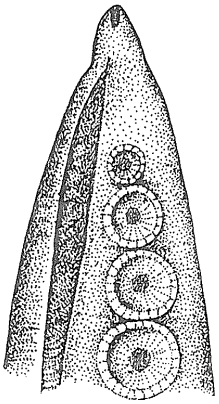
VERNACULAR NAMES :

FAO/CCAMLR : En - Combed octopus
Fr - Elédone peigne
Ru - Osminog Massy
Sp - Pulpo desflecado

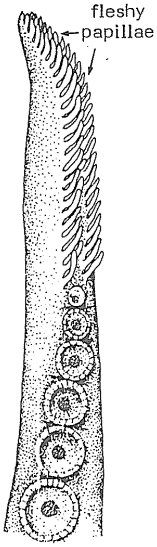
NATIONAL :

DISTINCTIVE CHARACTERS :

Animal covered with fine, round papillae interspersed with a few larger, simple papillae or warts. Mantle oval, broad (the width 60 to 100% of mantle length), somewhat dorsoventrally flattened; lateral periphery surrounded by a low cutaneous fold or ridge; mantle aperture wide. Head broad; no neck constriction; 2 or 4 bifid or multifid cirri occur over each eye. Arms moderately long, slender, tapering; suckers uniserial (in one row), small, well spaced proximally, crowded and minute distally. In males the 7 non-hectocotylized arms have suckers modified into a double row of minute, fleshy papillae; right arm III hectocotylized, only 65% as long as left arm III; ligula 4 to 15% of arm length, conical, undifferentiated; calamus absent; 8 to 10 filaments on outer demibranch of gill. Beaks undescribed.



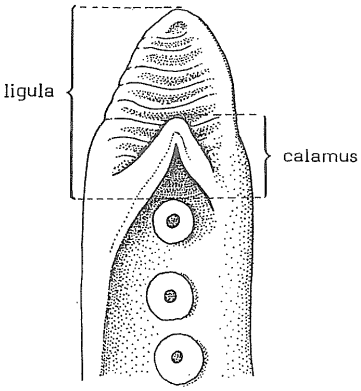
tip of hectocotylized right arm III of male



tip of normal arm of male

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Eledone massyae is the only currently recognized species of Eledone in the Antarctic. Species in the other genera of Octopodidae have no fleshy papillae on normal arms of males and their hectocotylus is differentiated into ligula and calamus.



example of hectocotylus with differentiated ligula and calamus (Graneledone antarctica)

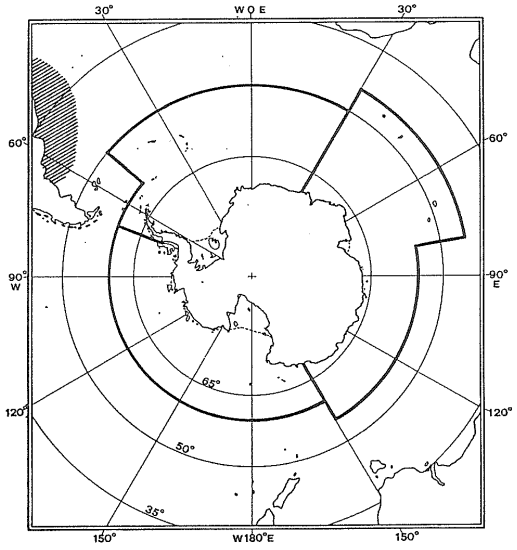
SIZE :

Maximum reported mantle length 7.5 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Southwestern Atlantic Ocean; Brazil; Trinidad Island (20°30'S, 29°20'W) and Argentina (20'S to 43'S). Southern limits of range undetermined.

A very little known, benthic species; caught on trawlable bottoms at 30 to 160 m depth.



INTEREST TO FISHERIES :

Possibly as bycatch to other demersal fisheries.

OCT Gran 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Graneledone antarctica Voss, 1976

OTHER SCIENTIFIC NAMES STILL IN USE : None

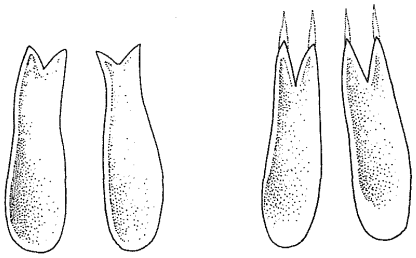
VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic papillose octopus
Fr - Elédone antarctique papilleuse
Ru - Antarkticheskyi borodavchatyi osminog
Sp - Pulpo antártico papiloso

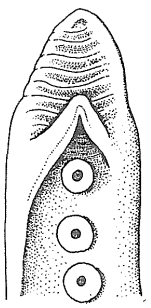
NATIONAL :

DISTINCTIVE CHARACTERS :

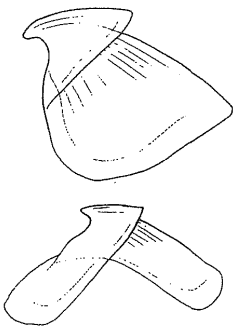
Mantle short and very wide with a slight head/mantle constriction. Surface of head, arms, and dorsum of mantle with numerous clusters of small papillae; ocular tubercles small. Funnel organ formed of double oval pads slightly to moderately split anteriorly. Arm formula 1.2.3.4. Web formula C=B.D.A=E; membrane on ventral side of arms wide. The hectocotylus (RIII) has a small, spoon-shaped ligula with thickened margins and a distal point. Calamus projecting, low and blunt. Beaks are illustrated but not described.



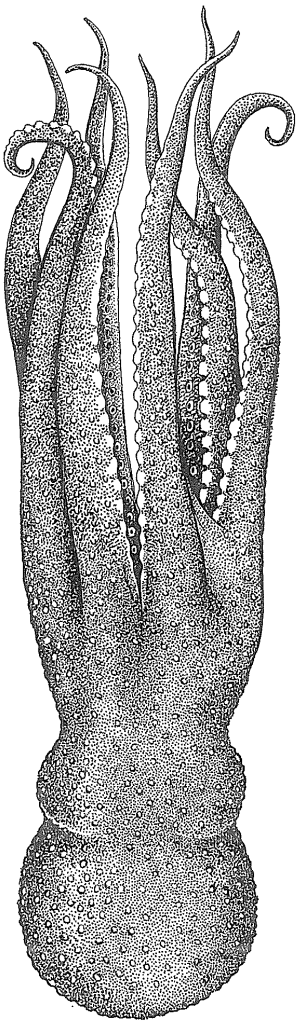
funnel organs



hectocotylus with ligula



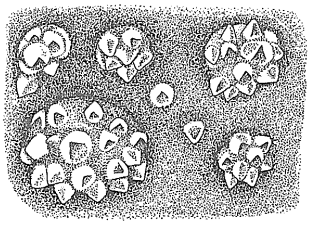
upper and lower beak



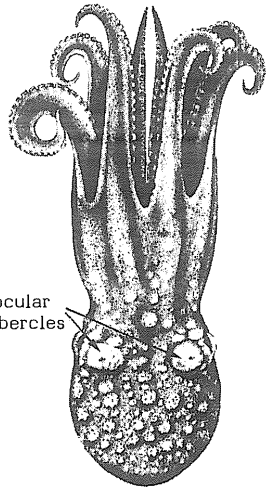
All illustrations redrawn from Voss, 1976

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Graneledone macrotyla: no head/mantle constriction; surface covered with large tubercles; ocular tubercles very large. Funnel organ VV-shaped, stout, with broad lateral limbs slightly stouter than median limbs. Arm formula 2.3.1.4.



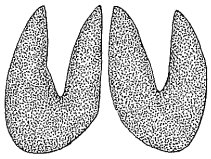
details of multipapillose tubercles



Graneledone macrotyla

SIZE :

Maximum reported mantle length 4.5 cm.



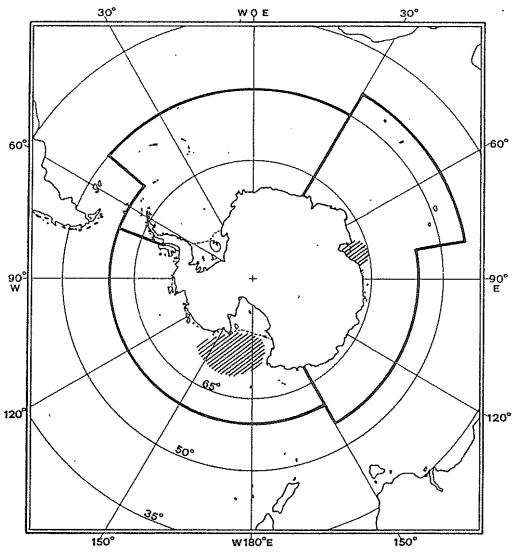
funnel organ

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Currently known from the Ross Sea, Antarctica and Prydz Bay.

INTEREST TO FISHERIES :

Undetermined at this time, but the consistency of its flesh would make it an acceptable food item.



OCT Gran 2

1985

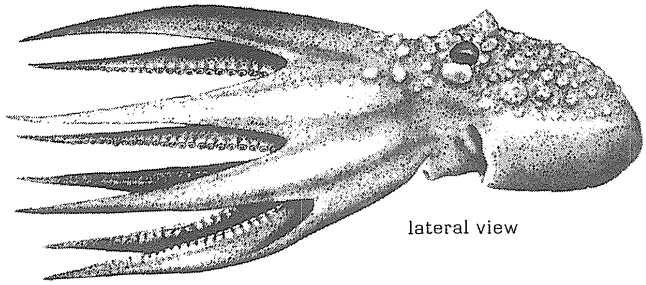
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

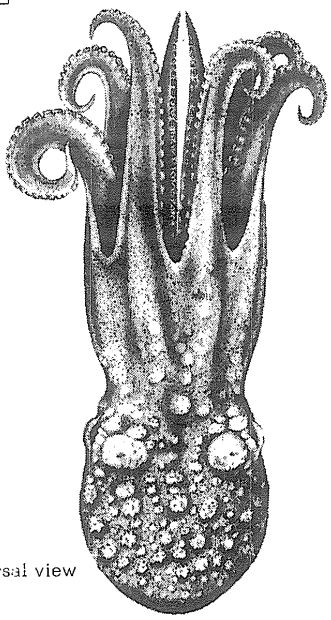
FISHING AREAS 48,58,88
(Southern Ocean)

Graneledone macrotyla Voss, 1976

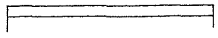
OTHER SCIENTIFIC NAMES STILL IN USE : None



lateral view



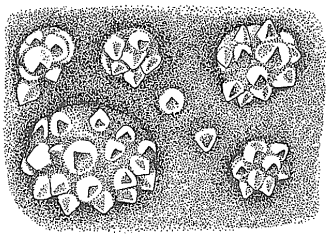
dorsal view



VERNACULAR NAMES :

FAO/CCAMLR : En - Cauliflower octopus
Fr - Elédone chou-fleur
Ru - Osminog-tsvetnaya kapusta
Sp - Pulpo coliflor

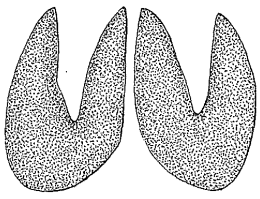
NATIONAL :



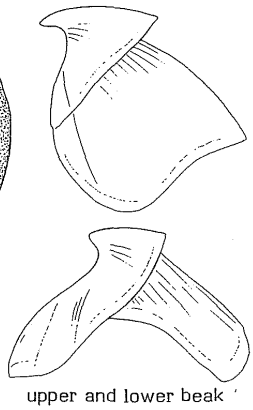
details of multipapillose tubercles

DISTINCTIVE CHARACTERS :

Mantle large, round, very wide with no head/mantle constriction. Dorsum of head and mantle covered with large multipapillose tubercles; one large multipapillose tubercle above each eye. Funnel organ VV-shaped, stout, with broad lateral limbs slightly stouter than median limbs. Arm formula 2.3.1.4. Web formula C.D.B=A.E; the web extends as a broad membrane along ventral side of each arm nearly to tip. Beaks are illustrated but not described.



funnel organ

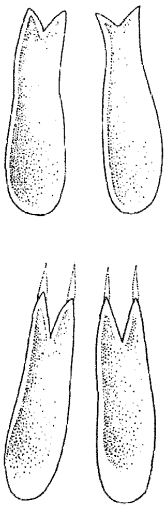


upper and lower beak

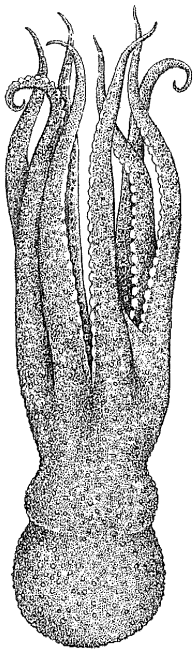
All illustrations redrawn from G.L. Voss, 1976

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Graneledone antarctica: a slight head/mantle constriction. Dorsum of head, arms, mantle covered with numerous clusters of small tubercles; ocular tubercles small. Funnel organ with double oval pads slightly split anteriorly. Arm formula 1.2.3.4.



funnel organ



dorsal view
Graneledone antarctica

SIZE :

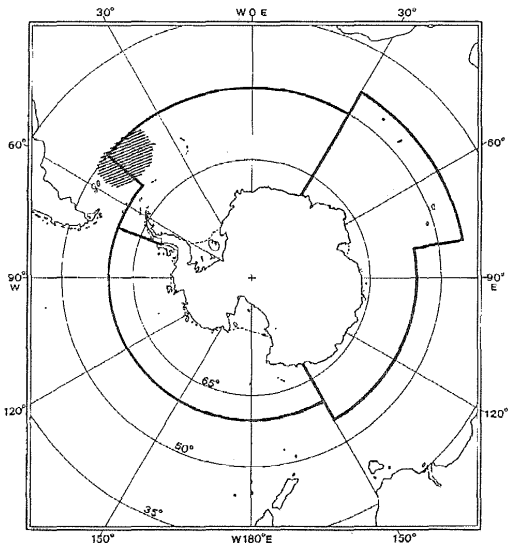
Maximum reported mantle length 3.4 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Currently known from the Falkland/Malvinas Islands. Limits of distributional range undetermined.

INTEREST TO FISHERIES :

Undetermined at this time, but may prove to be useful as food.



OCT Par 1

1985

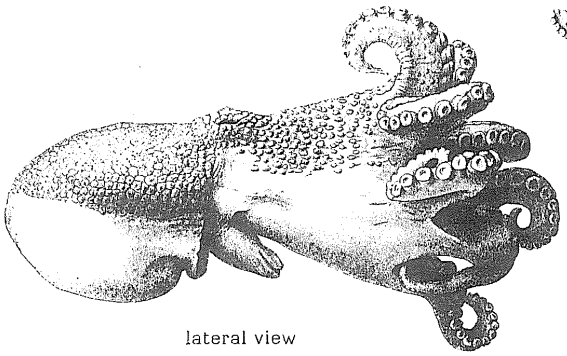
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

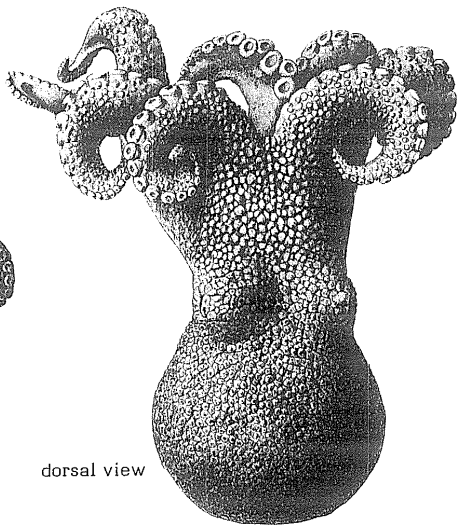
FISHING AREAS 48,58,88
(Southern Ocean)

Pareledone charcoti (Joubin, 1905)

OTHER SCIENTIFIC NAMES STILL IN USE : Cited by various authors as Eledone charcoti, Moschites charcoti and Graneledone charcoti



lateral view



dorsal view

0 6 cm

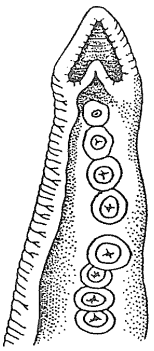
VERNACULAR NAMES :

FAO/CCAMLR : En - Charcot's octopus
Fr - Elédone de Charcot
Ru - Usminog Sharko
Sp - Pulpo de Charcot

NATIONAL :

DISTINCTIVE CHARACTERS :

Head narrower than body; mantle sculpture variable; eyes moderate-sized. Arms subequal, tuberculate; suckers uniserial, small, slightly larger in males. Funnel wide and prominent; funnel organ VV-shaped, thickened at base of V. Ink sac completely buried in liver. Gill demibranch with 8 to 11 filaments. Hectocotylus with a broad, pointed ligula and an acute, very short calamus. Beaks are undescribed.

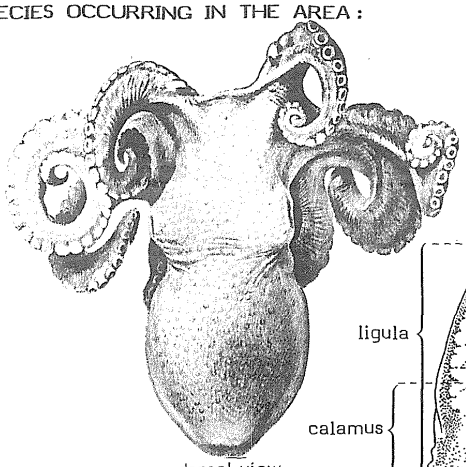


hectocotylus
(redrawn from Hoyle, 1912)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Pareledone polymorpha: funnel organ W-shaped; arms relatively robust. Hectocotylus large, well formed; ligula thicksided, with a deep narrow copulatory groove; calamus short and sub-basal.

P. turqueti: funnel organ thin, VV-shaped; arms smooth, sharply tapered. Hectocotylus small, with a short, broad ligula and a wide, slightly folded calamus.



dorsal view
P. polymorpha

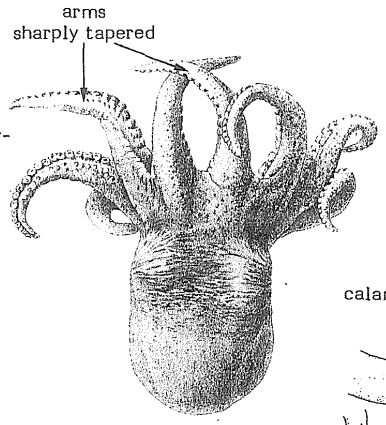
hectocotylus

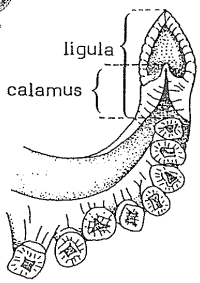
SIZE :

Maximum reported mantle length 7.4 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Most likely a circumpolar species. Maximum reported depth 420 m.



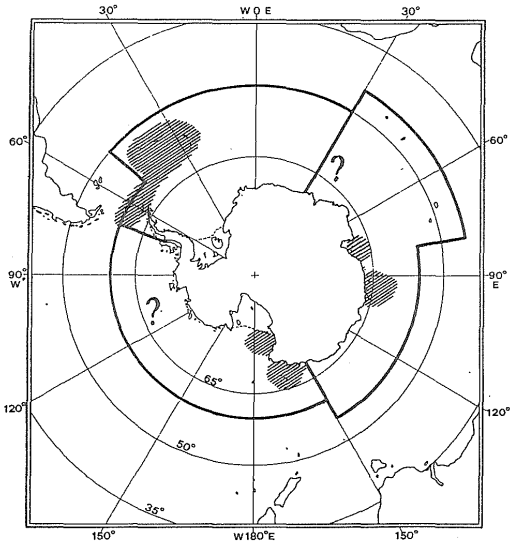


dorsal view
P. turqueti

hectocotylus

INTEREST TO FISHERIES :

Potential for commercial utilization undetermined at present.



OCT Par 2
1985

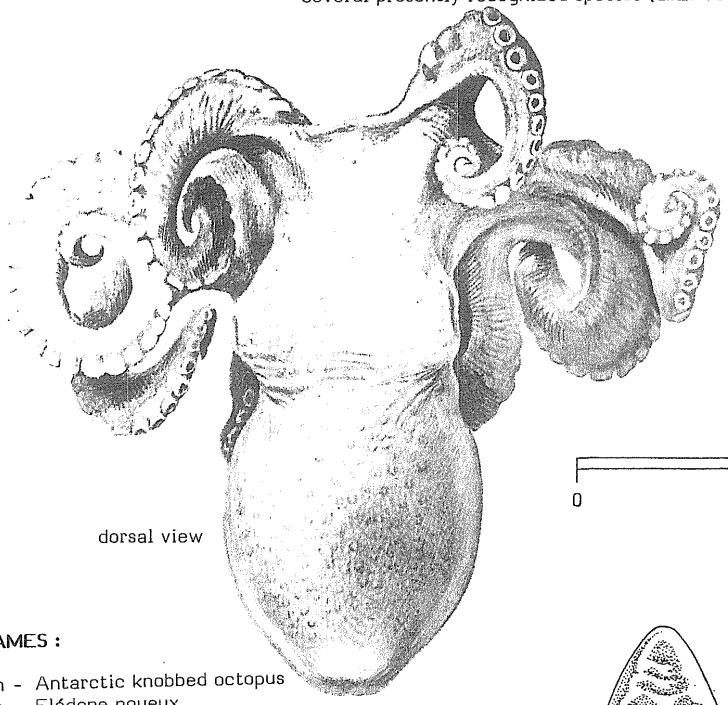
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pareledone polymorpha (Robson, 1930)

OTHER SCIENTIFIC NAMES STILL IN USE : Graneledone polymorpha Robson, 1930
Several presently recognized species (G.L. Voss, pers.com)



0 5 cm

dorsal view

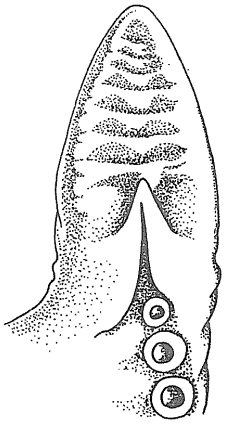
VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic knobbed octopus
Fr - Elédone noueux
Ru - Antarkticheskyi bugorchatyi osminog
Sp - Pulpo nodoso

NATIONAL :

DISTINCTIVE CHARACTERS :

Robson (1932) described 2 forms (P. oblonga and P. affinis) for this species. The mantle is either narrow and oblong, or ovoid and wide. Arms subequal, robust, suckers uniserial, small. Funnel short; funnel organ W-shaped. Ink sac completely imbedded in the liver. Gill demibranch with 6 to 10 filaments. Hectocotylus large, well formed; ligula thick-sided, with a deep, narrow copulatory groove; calamus short and sub-basal. Beaks are undescribed. Rostrum of lower beak straight or turned slightly outward (G.L. Voss, pers.com.).

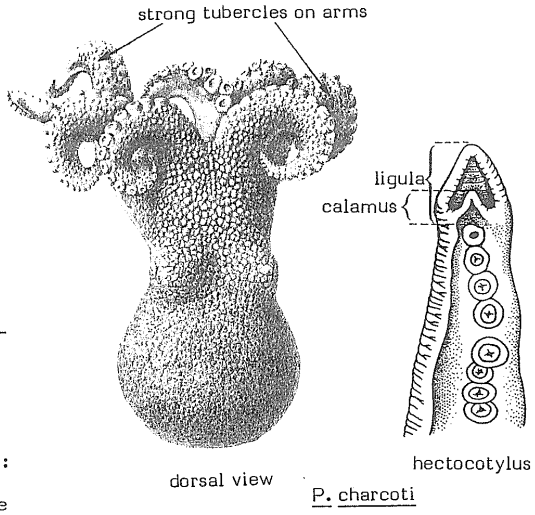


hectocotylus
(redrawn from
Robson, 1930)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Pareledone charcoti: funnel organ VV-shaped with thick bases; arms tuberculate. Hectocotylus with a broad, pointed ligula and an acute, very short calamus.

P. turqueti: funnel organ VV-shaped with thin limbs; arms smooth, sharply tapered. Hectocotylus small, with a short, broad ligula and a wide, slightly folded calamus.



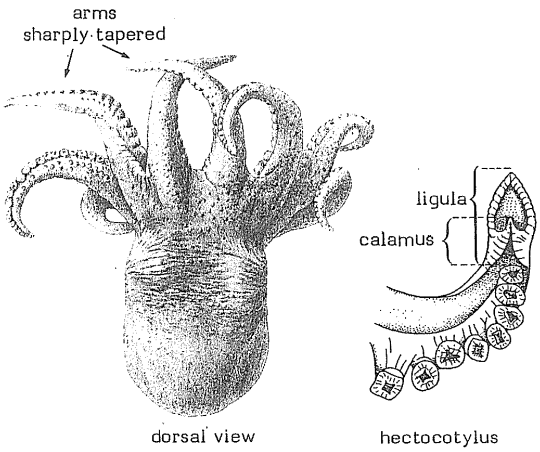
P. charcoti

SIZE :

Maximum reported mantle length 7.0 cm (unpublished data).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

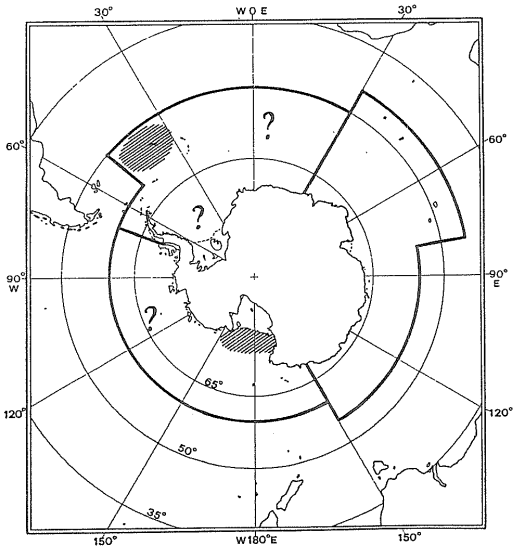
Currently found in the Atlantic sector of the Southern Ocean and in the Ross Sea. Maximum reported depth approximately 850 m (unpublished data).



P. turqueti

INTEREST TO FISHERIES :

Potential for commercial utilization undetermined at present.



OCT Par 3

1985

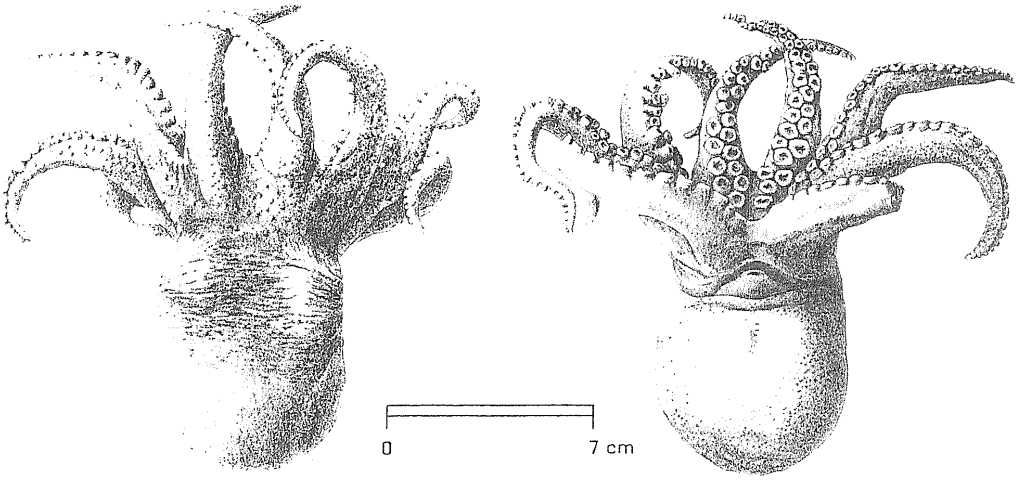
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pareledone turqueti (Joubin, 1905)

OTHER SCIENTIFIC NAMES STILL IN USE : Cited by various authors as Eledone turqueti, Moschites turqueti or Graneledone turqueti



dorsal view

ventral view

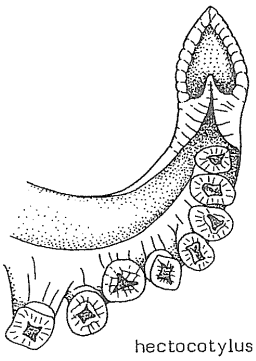
VERNACULAR NAMES :

FAO/CCAMLR : En - Turquet's octopus
Fr - Elédone de Turquet
Ru - Antarkticheskyi maloborodavchatyi osminog
Sp - Pulpo de Turquet

NATIONAL :

DISTINCTIVE CHARACTERS :

Body of uniform width; eyes not prominent, no constriction anterior or posterior to eyes. Arms subequal, smooth and rapidly tapering to sharp tips; suckers uniserial, small, slightly larger in males. Funnel small; funnel organ VV-shaped and thin-limbed. Ink sac imbedded in the liver with a small portion visible. Gill demibranch with 8 to 11 filaments. Hectocotylus small with a short, broad ligula and a wide, slightly folded calamus. Beaks are undescribed.

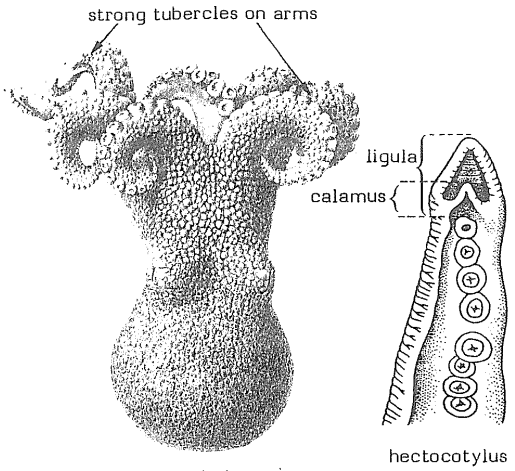


hectocotylus
(redrawn from Massy, 1916)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Pareledone charcoti: funnel organ VV-shaped with thick bases; arms tuberculate. Hectocotylus with a broad, pointed ligula and an acute, very short calamus.

P. polymorpha: funnel organ W-shaped; arms relatively robust. Hectocotylus large, well formed; ligula thick-sided with a deep, narrow copulatory groove; calamus short and sub-basal.



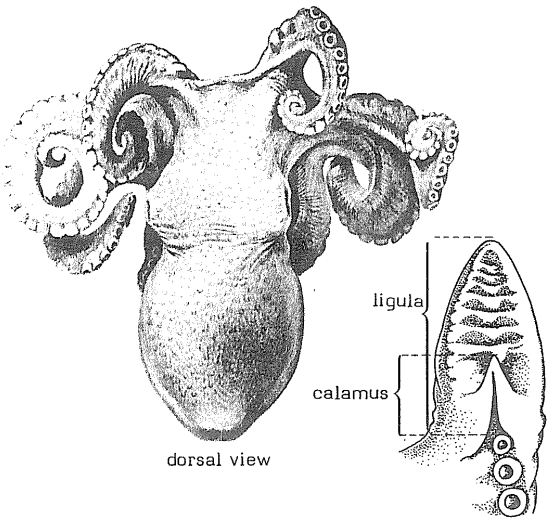
P. charcoti

SIZE :

Maximum reported mantle length 8.0 cm (unpublished data).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

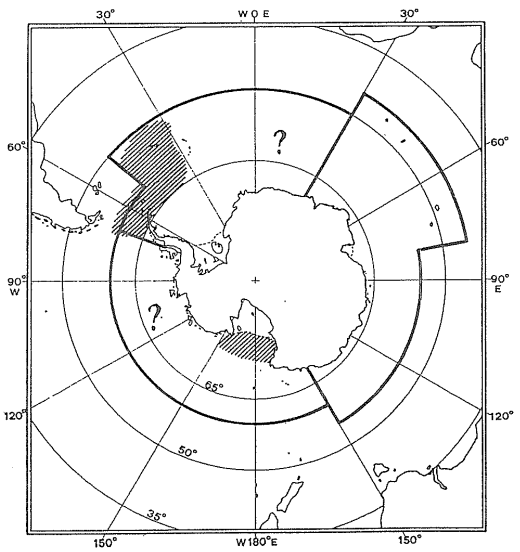
Currently found in the Atlantic sector of the Southern Ocean and in the Ross Sea. Depths range from 25 to 800 m (unpublished data).



P. polymorpha

INTEREST TO FISHERIES :

Potential for commercial utilization undetermined at present; because of its large size it may be exploitable.



GENERAL REMARKS

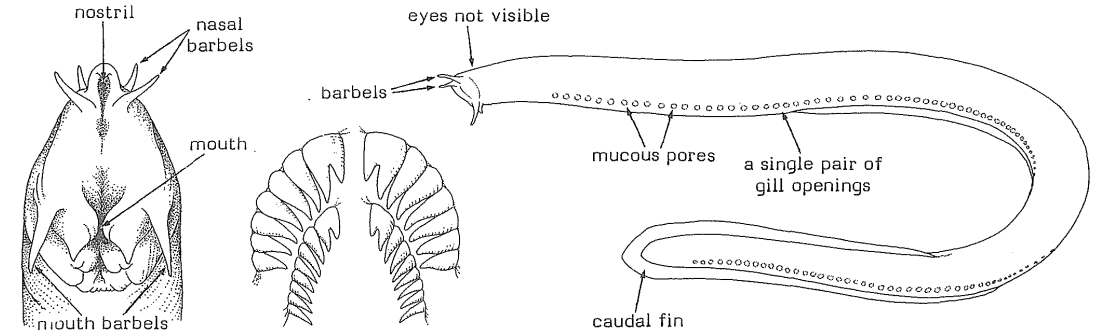
This group, also called "jawless fishes", is characterized by an eel-like body shape, a purely cartilaginous skeleton, small vestigial eyes, the absence of developed jaws, bony teeth, scales or paired fins and the presence of a single median nostril, and 6 or more pairs of gill pouches opening either directly into the pharynx or through a separate respiratory tube into the mouth.

The cyclostomes are considered as the most primitive vertebrates. Two of the three living families are represented in the Southern Ocean, each of them by a single species.

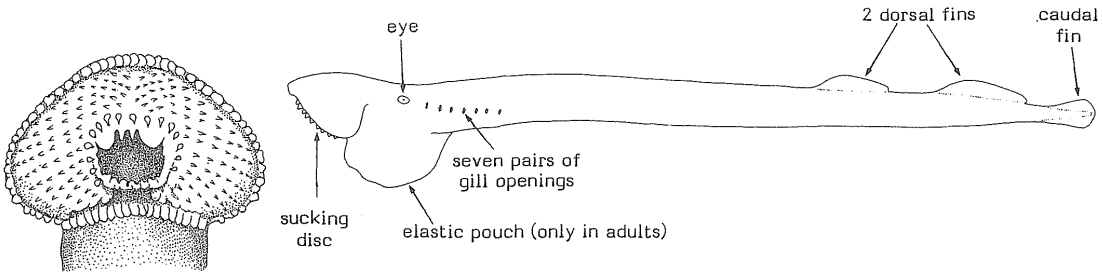
KEY TO FAMILIES OCCURRING IN THE AREA :

1a. Snout with prominent barbels; nasal opening at tip of snout; no separate dorsal fin, a continuous finfold originating ventrally about 1/3 of the distance from snout to caudal extremity and extending around the caudal tip to a short distance dorsally; caudal part of finfold supported by cartilaginous rods; eyes not visible externally; mouth opening narrow (Fig.1) ..... Myxinidae

1b. Snout without prominent barbel; nasal opening on upper side of head; 2 dorsal fins separated from caudal fin; eyes visible externally; mouth opening broad, operating as a sucking disc, funnel-shaped (Fig.2) ..... Petromyzontidae (Geotriinae)



Myxine glutinosa Fig.1



Geotria australis Fig.2

MYXINIDAE

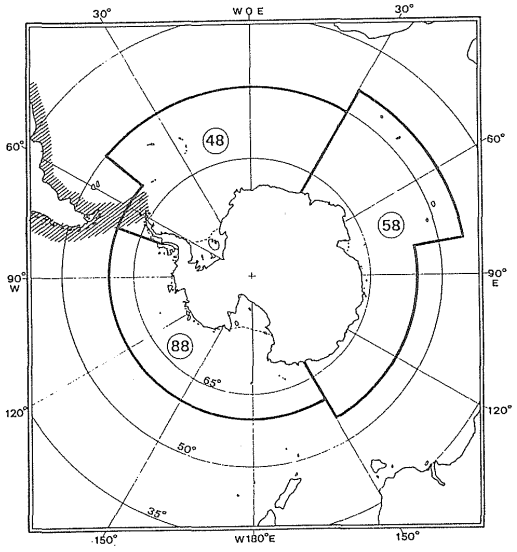
Hagfishes

MYXIN

A single species known from the area:

Myxine glutinosa, Linnaeus, 1758
(= Myxine australis Jenyns, 1842)

Within the Southern Ocean, this species has only once been recorded (South Shetland Islands). Outside this area it extends to the cooler waters of the Atlantic Ocean and along the coast of Chile. The hagfish attains sizes of up to 42 cm in the Southern Hemisphere. It is entirely marine and inhabits soft bottoms, ranging, at least off the Chilean coast, from shallow coastal waters to depths below 100 m. It is a scavenger, feeding largely on dead or disabled fish; it is well known for its habit of penetrating the body cavity of hooked or gilled fishes. However, the hagfish is not a parasite and is not known to attack living, uninjured fish.



PETROMYZONTIDAE (subfamily Geotriinae)

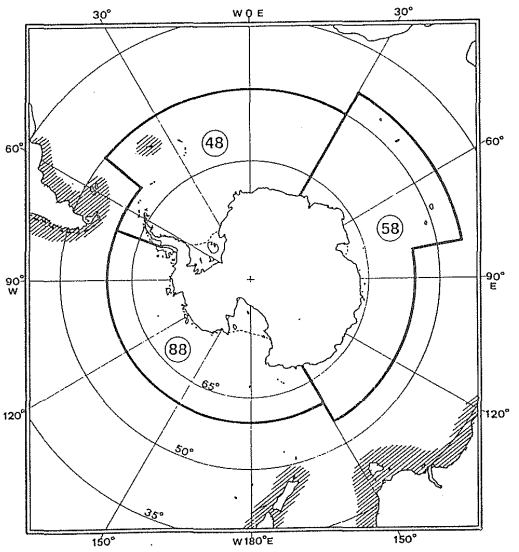
Lampreys

PETRO

A single species known from the area:

Geotria australis (Gray, 1851)

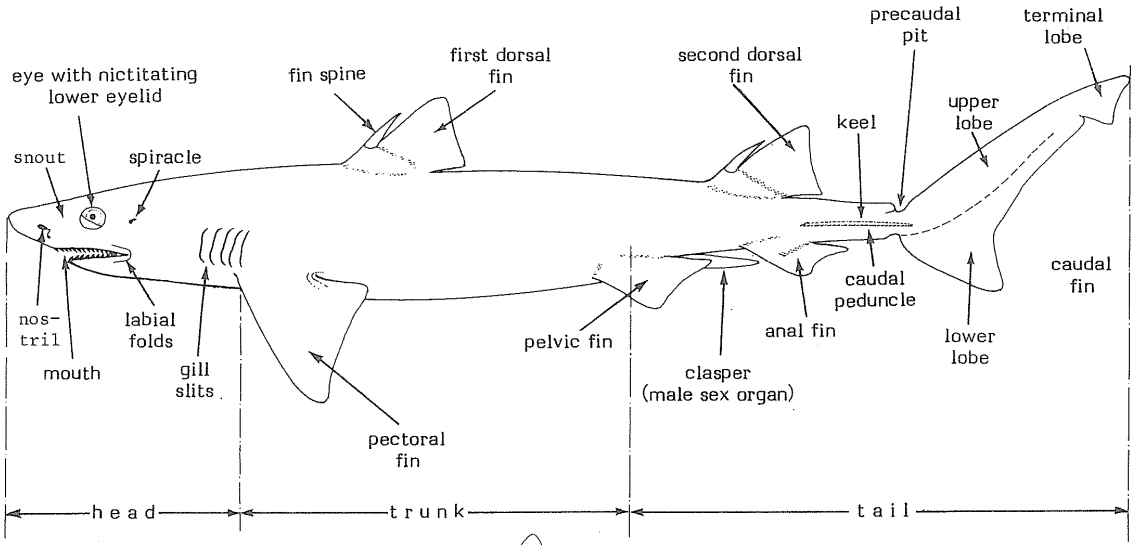
Within the Southern Ocean, this species has only been recorded from South Georgia. Northward it extends to the coasts of Australia, New Zealand, the Falkland/Malvinas Islands, Argentina and Chile. Although its presence in the Southern Ocean was discovered only recently (1964), this lamprey must be fairly common as it has been found in about 20% of stomachs of the Grey-headed albatross. It may reach up to 60 cm in length and the adults spawn in fresh water, the larvae (Ammocetes) undergoing a complex metamorphosis at sea. Its food habits are semi-parasitic; it rasps a hole in the skin of live fishes to which it attaches itself with the sucking disc.

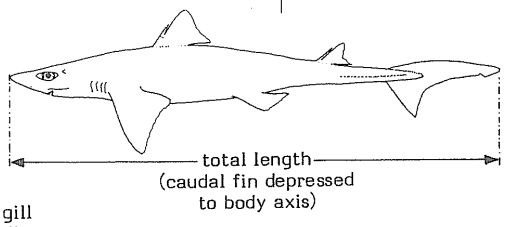


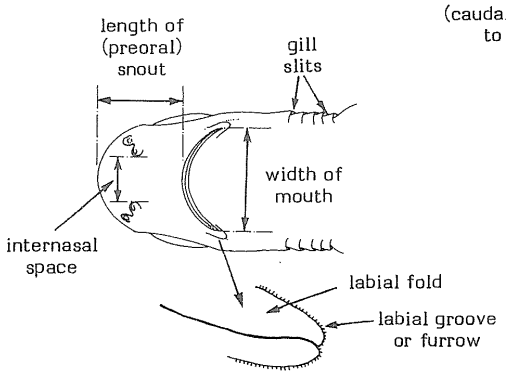
Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France and W. Fischer, FAO, Rome, Italy

TECHNICAL TERMS AND PRINCIPAL MEASUREMENT USED

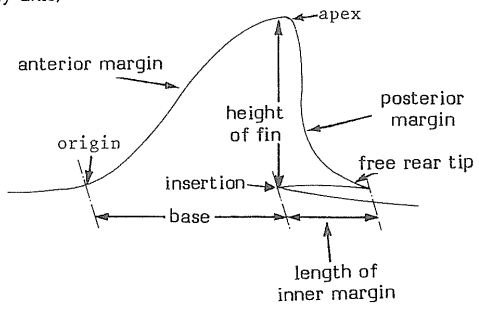
(Straight-line distances)







underside of head



dorsal fin

GENERAL REMARKS

Sharks include a variety of usually cylindrical, elongated, or moderately depressed fishes which differ from the rays in having lateral gill openings (or gill slits) and pectoral fins not fused to the sides of the head. The greatly depressed angel sharks (Family Squatinidae) might be mistaken for rays at first sight; they have large, broad, raylike pectoral fins that extend as triangular flaps alongside the gills, but are not connected to the head above them. Sharks have eyes on the dorsal surface or sides of the head and spiracles (when present) on its dorsal or dorsolateral surfaces. The tail and caudal fin are always well developed and serve to propel the animal by lateral undulations; gill openings are usually 5 on each side, more rarely 6 or 7; the mouth is most often ventral, occasionally terminal or nearly so. Most sharks have two (rarely one) dorsal fins, sometimes with spines on their front edges; an anal fin is usually present, but missing in several families. The teeth on the jaws are set in numerous transverse rows and are constantly replaced from inside the mouth. All shark species are more or less covered by small (occasionally enlarged) toothlike scales or dermal denticles. Male sharks have cylindrical copulatory organs or claspers on their pelvic fins, used for internal fertilization of eggs in females; many female sharks deposit eggs in rectangular or conical capsules, formed of a hornlike material (oviparity), but the majority are livebearers; some of the latter, including hammerheads (Sphyrnidae), most requiem sharks (Carcharhinidae), some houndsharks (Triakidae) and all members of the barbeled houndsharks (Leptochariidae), and the weaselsharks (Hemigaleidae), are viviparous, with yolk sacs of foetuses forming a placenta with the maternal uterus for nutrient transfer; other livebearing sharks are ovoviviparous, without a placenta.

Mature sharks vary in total length from about 15 cm (dwarf species of Squalidae) to at least 12.1 m (whale shark, Family Rhiniodontidae) and in weight from between 10 to 20 g to several metric tons. Most sharks are of small or moderate size; about 65 percent of known species are mature between lengths of 15 cm and 1.2 m, about 29 percent between 1.2 and 3.7 m and the remainder (6 percent) above 3.7 m.

All sharks are predators, their prey ranging widely, from planktonic crustaceans and benthic invertebrates to pelagic cephalopods and large marine fishes, mammals and other vertebrates. They are primarily marine, but a few requiem sharks (Carcharhinidae) have broad salinity tolerances, and one species (bull shark, Carcharhinus leucas) is wide-ranging in tropical lakes and rivers with sea access as well as shallow inshore waters. Sharks are widely distributed in all oceans, from the Arctic to sub-Antarctic islands, and from close inshore on reefs or off beaches to the lower continental slopes, possibly to abyssal plains, and the high seas. They are most diverse in tropical to warm-temperate seas, from inshore waters down to upper continental slopes, but are less so in colder waters, at greater depths, in the open ocean and off oceanic islands. The richest shark faunas occur in the Indo-West Pacific from South Africa and the Red Sea to Australia and Japan.

Sharks are uncommon in Antarctic waters in contrast with other areas of the world. Only two families are recorded from the Southern Ocean: the Squalidae and the Lamnidae. The first occurrence of a shark near the boundaries of the area is related from Macquarie Island (1912) where a specimen was found dead on a beach. The development of a bottom-trawl fishery around the islands and near the Antarctic coast since 1960/70 has provided news records of specimens and allowed to distinguish only two common species, Sommiosus macrocephalus and Lamna nasus. A third species, Etmopterus lucifer, is known from a single deep-sea specimen. All sharks in the Southern Ocean have been caught near the bottom around islands and no data exist about the presence of pelagic species or the extension of the distribution of sharks along the Antarctic coast.

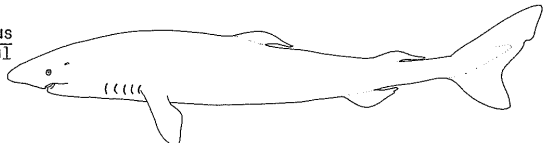
KEY TO SPECIES OCCURRING IN THE AREA

1a. Short-nosed, cylindrical sharks. No anal fin; 2 dorsal fins with or without spines; caudal fin not lunate ..... Family Squalidae

2a. Spines present on both dorsal fins (Fig.1) ..... Etmopterus lucifer Jordan and Snyder, 1902

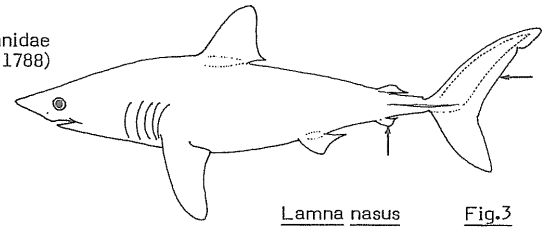
Etmopterus lucifer Fig.1

2b. No spines on dorsal fins (Fig.2) .... Somniosus microcephalus Bloch and Schneider, 1801



Somniosus microcephalus Fig.2

1b. Sharks with pointed snouts and spindle-shaped bodies; anal fin present; dorsal fins spineless; caudal fin lunate (Fig.3) ... Family Lamnidae
Lamna nasus (Bonnaterre, 1788)



Lamna nasus Fig.3

Prepared by G. Duhamel, Muséum national d'Histoire naturelle, Paris and L.J.V. Compagno, J.L.B. Smith Institute of Ichthyology, Grahamstown, South Africa

LAMN Lamn 1

1985

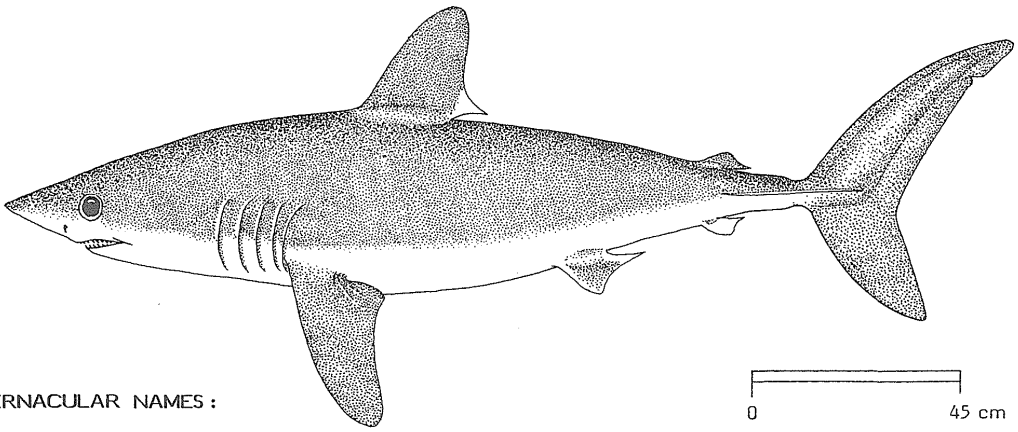
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : LAMNIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Lamna nasus (Bonnaterre, 1788)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

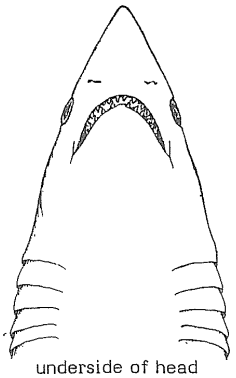
FAO/CCAMLR : En - Porbeagle
Fr - Taupe commun
Ru - Seldyanaya akula
Sp - Marrajo sardinero

NATIONAL :

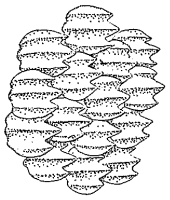
DISTINCTIVE CHARACTERS :

Body heavy, spindle-shaped. Snout moderately long and conical; mouth broadly parabolic, teeth narrow and thick, awl-shaped, with narrow, smooth-edged, nearly straight cusps and usually well developed lateral cusplets (except in young below 1 m long). Intermediate teeth in upper jaw small, less than half the height of upper anteriors; long gill slits. First dorsal origin over the pectoral insertions, large, with a free rear tip; minute pivoting second dorsal and anal fins, anal fin origin about under second dorsal origin; caudal fin lunate. Strong keels on caudal peduncle, short secondary keels on caudal base.

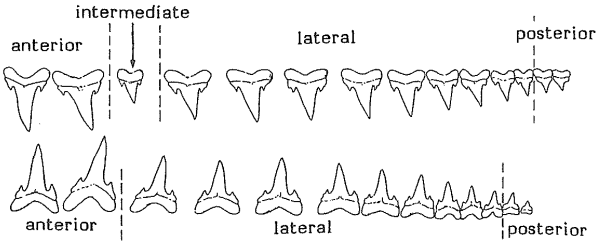
Colour: blue-grey above, ventral surface of body white. First dorsal fin with a conspicuous white rear tip, pectoral fins dusky.



underside of head



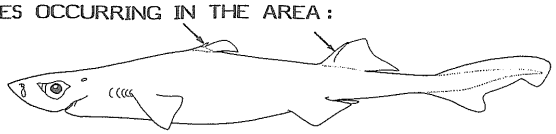
dermal denticles



upper and lower teeth from left side

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

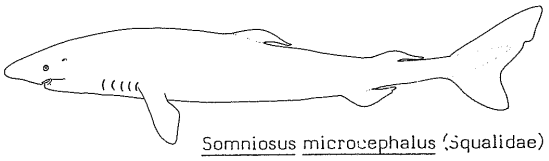
Species of Squalidae: body cylindrical, snout short; anal fin absent; caudal fin not lunate. Furthermore, dorsal fins with spines in Etmopterus lucifer.



Etmopterus lucifer (Squalidae)

SIZE :

Maximum: total length 300+ cm, common in the area between 160 and 220 cm.



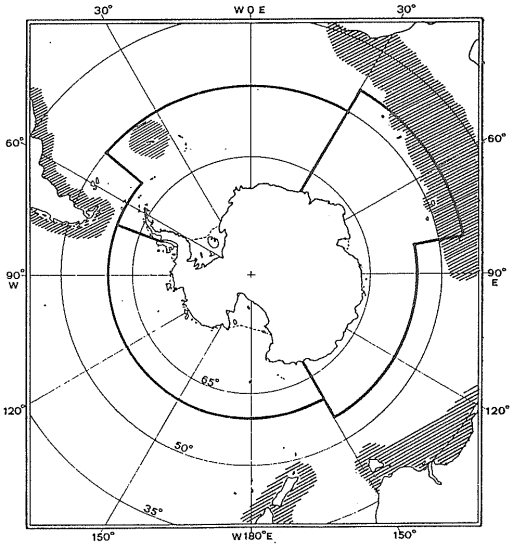
Somniosus microcephalus (Squalidae)

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

In the Southern Ocean, the Porbeagle is present in areas 48 and 58, respectively, around South Georgia and the Kerguelen Islands. The catches of this species are taken on the shelves at depths between 200 and 350 m where the temperature ranges fro 1°7 to 3°2C. It occurs also in the open sea north of the Kerguelen Islands and is a common species in other world areas (amphitemperate).

Few biological data from the Southern Ocean are available for this species. It is assumed that this ovoviviparous (and uterine cannibal) species must breed within the area.

Feeds mainly on the schooling fish Champsocephalus gunnari (Kerguelen Islands).



EXPLOITATION :

This shark is taken regularly each year with bottom trawls on the shelves of the South Georgia and Kerguelen Islands.

SQUAL Somn 1

1985

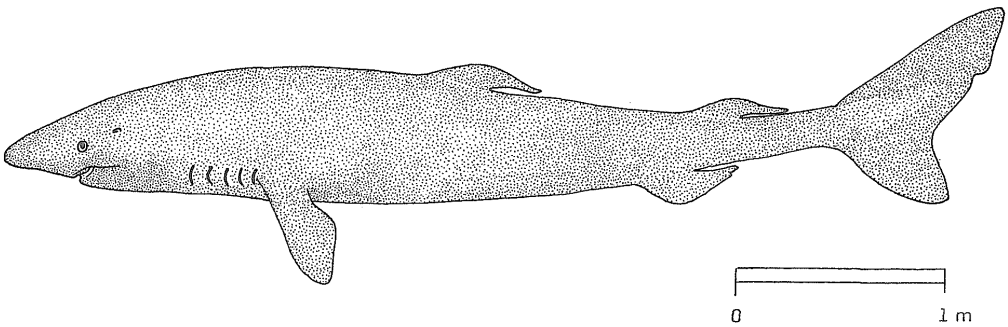
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : SQUALIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Somniosus microcephalus Bloch & Schneider, 1801*

OTHER SCIENTIFIC NAMES STILL IN USE : ? Somniosus antarcticus Whitley, 1939



VERNACULAR NAMES :

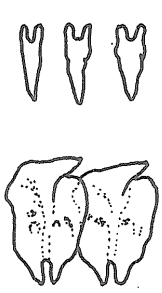
FAO/CCAMLR : En - Greenland shark
Fr - Laimargue du Groenland
Ru - Polyarnaya akula
Sp - Tollo de Groenlandia

NATIONAL :

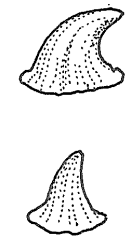
DISTINCTIVE CHARACTERS :

Body cylindrical; snout short and rounded; upper teeth lanceolate, lower teeth with short low, strongly oblique cusps and high, narrow roots. Two spineless, equal-sized dorsal fins, the first dorsal fin slightly closer to pelvics than to pectoral fins, interdorsal space greater than distance from snout to second gill slits; no anal fin, ventral caudal lobe long. No keels on base of caudal fin.

Colour: uniformly dusky.



upper and lower teeth



dermal denticles

* This shark has been identified from specimens examined on board trawlers, as well as from photographs. No specimens from the Southern Ocean are preserved, except one adult stuffed specimen preserved in the Zoological Institute in Leningrad, and a comparison with specimens from northern latitudes would be useful to confirm its identity. The name Somniosus antarcticus created by Whitley, 1939, to describe a specimen found dead on a beach at Macquarie Island is tentatively considered as a synonym here. The possible validity of that species requires examination of new material from the area.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Etmopterus lucifer: spines present on both dorsal fins. Probably rare in the Southern Ocean.

Lamna nasus (Family Lamnidae): body spindle-shaped; snout pointed; anal fin present; caudal fin lunate.

SIZE :

Maximum: over 6 m, common to 5 m.

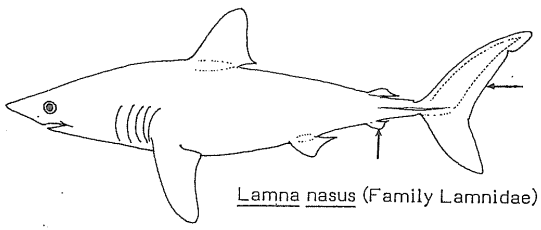
Etmopterus lucifer (Squalidae)

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

In the Southern Ocean, only recorded around the Kerguelen Islands. Even if not abundant, this species appears regularly each year in catches from depths between 200 to 360 m, where the temperature ranges from 1°8 to 3°C. Outside the area, this species occurs in the North Atlantic, the Arctic and off South Africa.

A sluggish and rather indolent species that offers almost no resistance to capture.

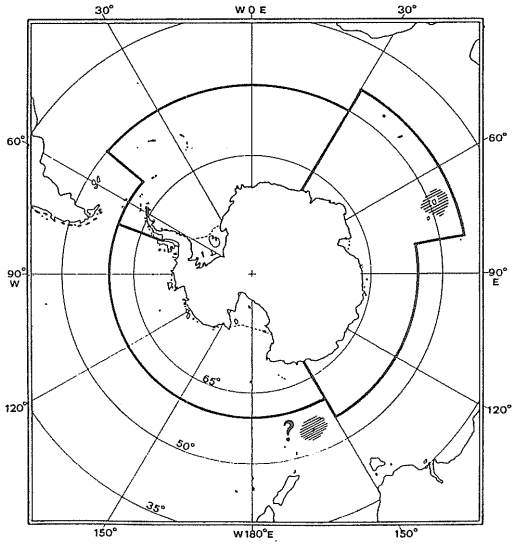
Feeds on icefish Champsocephalus gunnari and Notothenia squamifrons; rajiids have also been reported from stomach contents.



Lamna nasus (Family Lamnidae)

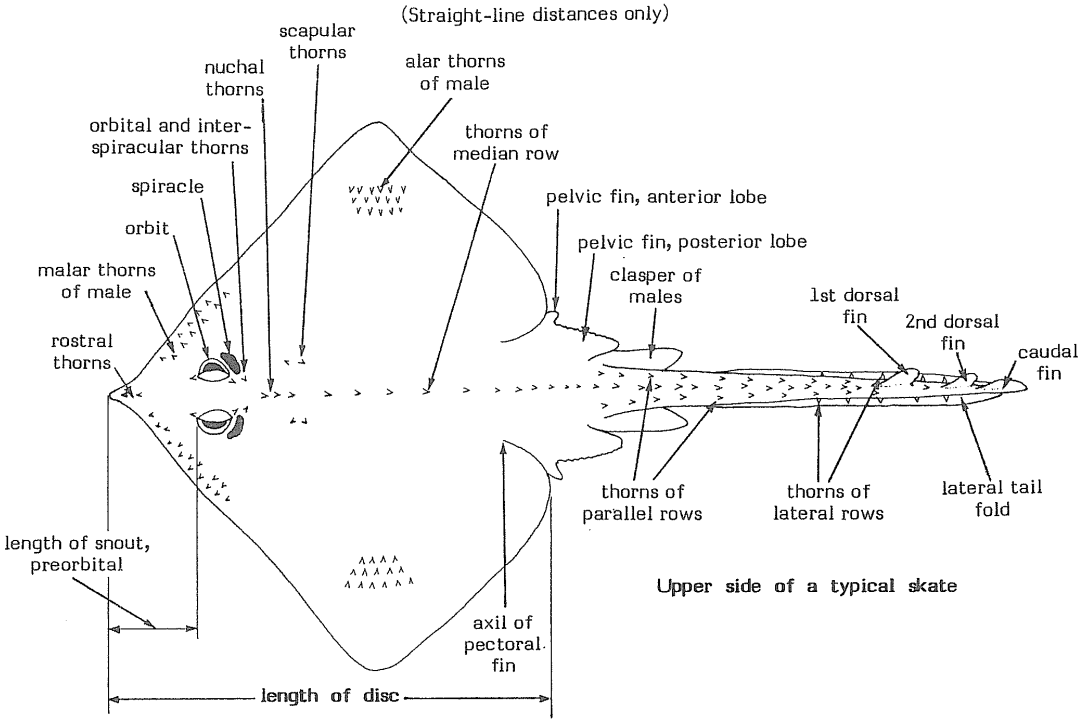
EXPLOITATION :

Taken incidentally in bottom trawls on the Kerguelen Island shelf.

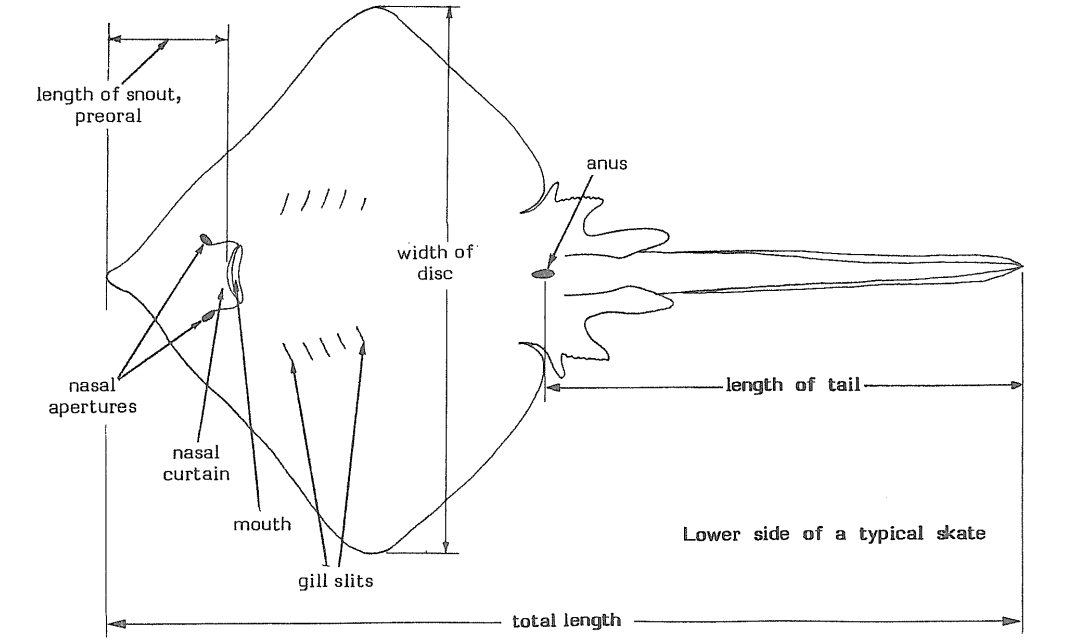


TECHNICAL TERMS AND PRINCIPAL MEASUREMENTS USED

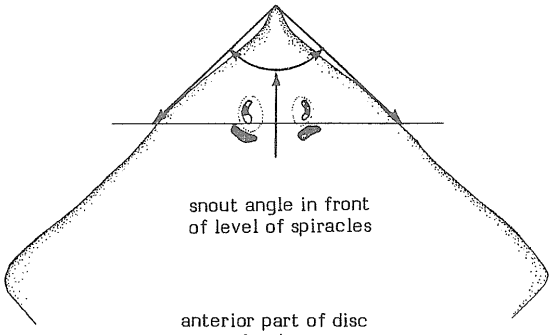
(Straight-line distances only)

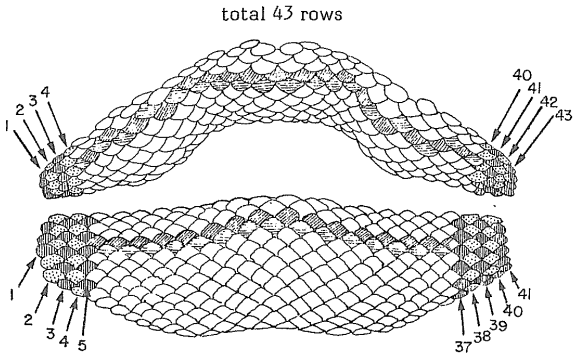


Upper side of a typical skate



Lower side of a typical skate





teeth of a stingray (arrows show method of counting pavement pattern in batoids)

GENERAL REMARKS

Surprisingly, and in contrast to the situation in polar waters of the Northern Hemisphere, chondrichthyan fishes are represented in Antarctic waters predominantly by batoids. Of this latter group only the family Rajidae, out of about 20 batoid families worldwide, has settled in southern polar waters, largely even in sub-Antarctic latitudes, where a few other chondrichthyan families have been reported with occasional records only.

RAJ

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

RAJIDAE

Skates

Rajid fishes range from very small (20 to 30 cm total length, e.g., in Breviraja, Neoraja) to rather large sizes (more than 2 m total length, e.g., in Bathyraja and subgenus Dipturus of Raja). They are characterized by the following diagnostic features:

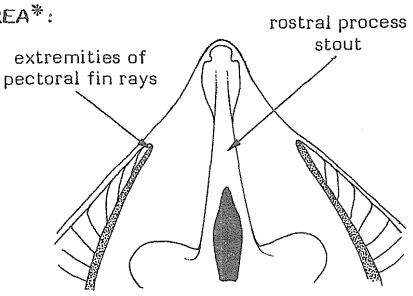
Body strongly flattened dorsoventrally; head, trunk and the greatly enlarged pectoral fins forming a rhombic to sometimes rather roundish disc. Pectoral fins completely fused to sides of head and trunk from tip or midlength of snout to insertion of pelvic fins. Tail moderately slender, distinctly marked off from disc, its length less than two times the disc width, with a narrow fold along each lower edge. Eyes and spiracles on top of head, spiracles immediately behind eyes and with pseudobranchial folds at anterior wall. Shape of snout ranging from acutely angled and usually long to obtusely rounded and usually very short. Front of cranium extended in most species as a rostral process, which is stout or delicate, in the latter case sometimes segmented distally, or basally. Anterior pectoral fin rays and their basal elements either extending almost to tip of snout (soft-snouted species, with a delicate, or even reduced rostral process), or to about midlength of snout only (hard-snouted species, with a stout rostral process). Transverse mouth gap on lower side straight to more or less arched. Numerous small teeth in bands along jaws, obtuse to pointed and showing sexual dimorphism in many species, placed either in pavement pattern (quincunx), or in parallel rows, or in a combination of both. Nasal apertures small and located shortly in front of mouth; their inner margins expanded rearward as a large bilobed nasal curtain with both lobes joined to a broad transverse isthmus, which is close in front of mouth and basally fused to median upper jaw. Pelvic fins bilobed, the two lobes separated externally by a more or less deep notch in their joint outer margins only. Two small dorsal fins far posterior on tail; caudal fin with a low fold on upper side of tail, a rudimentary ventral fold or keel sometimes also present. Upper surface more or less densely to sparsely set with spinules (prickles) and often also with thornlets as well as more or less distinct thorns; the latter almost regularly in pattern arrangement of patches, rows and single tubercles in distinct regions; at least a median row of thorns present along midline of tail (except in the subgenus Malacoraja of Raja, and malar and alar thorns on disc developed in sexually mature males only). Lower surface smooth to more or less prickly, rarely also with some irregularly distributed thorns. Squamation may vary with growth, age and sexual maturity.

Colour: the ground colour of the upper side of skates may comprise nearly all shades of grey to brown, few species are reddish-, or bluish-violet; also many kinds of patterns occur besides plain coloration. The lower surface may be uniformly dark or light, or mottled with both, or a light centre of the disc is edged with dark; some species have darkly pigmented pores. Deep-water skates can, as a rule, be characterized as plain dark on both surfaces, whereas shallow-water species are predominantly white ventrally and often extremely variegated on the dorsal surface, the colour and pattern of which may vary with the nature of the bottom substrate and also with growth and age.

Skates are widely distributed in all oceans from the Arctic to the Antarctic and from shallow coastal waters down to abyssal depths; they only become rare in tropical shallow waters, especially in the vicinity of coral reefs. They are predominantly marine fishes that occasionally invade brackish waters (e.g., western Baltic Sea), but never fresh waters. As typical bottom dwellers they are relatively stationary, feeding on all kinds of bottom-living animals mainly, but some species nevertheless show a wide geographical distribution, and a few deep-water species are reported to migrate over very long distances. All skates are oviparous, depositing on the sea bottom relatively large, horny egg-capsules of rectangular shape with a pair of long horns at each end. The Rajidae are the most diversified batoid family in terms of number of species, body shape, size, coloration, squamation, habitat and geographical distribution. There are commercial fisheries on skates in several parts of the world. In the Antarctic waters, where they form a major part of the fish biomass, some species are taken in more or less sizeable quantities as bycatch in commercial trawl fisheries, i.e., Bathyraja eatonii, B. irrasa and B. murrayi around the Kerguelen Islands; Raja georgiana around South Georgia; and Bathyraja maccaini and Bathyraja sp. 2 in the Atlantic sector, mainly around the South Orkney Islands. Only the wings are used for human consumption, fresh, salted or smoked.

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA*:

1a. Rostral process stout and firm, extending beyond extremities of pectoral fin rays, which distinctly fall short of snout tip (visible in translucent light, Fig.1, hard-snouted species) ..... Raja

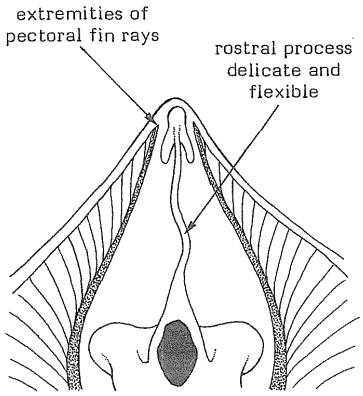


Raja Fig.1

2a. Usually 24 to 28 (rarely 20 at most) prominent thorns with a ribbed base in a median row from behind shoulder girdle to first dorsal fin. Most juveniles typically variegated dorsally on disc with light lines arranged in a net- or honeycomb-like pattern (see species sheet); this pattern becomes reduced with growth to numerous light spots, often mixed with more or less distinct dark blotches; larger specimens may also show ocellus-like pale blotches on the inner part of pectoral fins. Anterior pelvic lobe dorsally as dark as disc, at most pale-edged ..... Raja georgiana
(Atlantic sector, from around South Georgia southward)

2b. Usually 15 to 18 (rarely as many as 20) prominent thorns with a ribbed base in a median row from behind shoulder girdle to first dorsal fin. Dorsal colour pattern in all growth stages as more or less distinct dark blotches on greyish-brown ground colour, sometimes mixed with pale spots, but without pseudo-ocelli. Anterior pelvic lobe dorsally seldom dark with light edges, usually entirely white, sometimes with a few dark spots ..... Raja sp.
(Indian Ocean sector, Kerguelen/Crozet slopes)

1b. Rostral process delicate and flexible, extending to tip of snout, and extremities of pectoral fin rays extending very close to tip of rostral process (visible in translucent light), which is either long (large species), or of medium length (small or medium-sized species, Fig.2, soft-snouted species) ..... Bathyraja



Bathyraja Fig.2

3a. No thorns present dorsally on disc, a median row on tail only

4a. Uniformly dark to blackish-brown on both surfaces. Ventrally only the nostrils, jaws, gill slits, tips of anterior pelvic lobes and origin of tail may be marked white. Up to 40 thorns in a median row from above shoulder girdle to first dorsal fin, but 10 to 12 of these thorns on body are probably lost in adults ..... Bathyraja sp. 1
(Deep-water Atlantic sector, probably wider)
(in part, see also couplet 7a)

4b. Underside of disc predominantly white

---

* Excluding Raja sp. and Raja arctowskii in list of species

5a. Except for dorsally entirely prickly small juveniles, at least centres and posterior margins of pectorals smooth. Adults with a band of fine spinules around disc margins and along midbody. Eight to 16 widely spaced median tail thorns to first dorsal fin, all small and indistinct, the posterior ones often reduced. Snout relatively long and narrowly angled (pointed) from adolescent specimens on. Underside of tail entirely or partly brown, with a brown median strip, or at least with brown spots, or rarely white in Indian Ocean sector specimens, but usually plain white, or rarely with a few pale brown spots in Atlantic sector specimens ..... Bathyraja eatonii (in part)*
(Indian Ocean sector in Kerguelen/Crozet waters, and Atlantic sector south of 60-S; possibly circum-Antarctic)

5b. Upper side of disc always entirely and densely set with coarse spinules. Eighteen to 29 relatively indistinct median tail thorns to first dorsal fin. Underside of disc and tail whitish, pale dark spots may occur centrally on disc and on tail. Upper side of disc plain dark, except in small juveniles (up to 250 mm total length) which show a distinct pattern of light dots and strokes. Typically the mouth cavity and laterally the underside of nasal curtain are pigmented dark, at least in part ..... Bathyraja sp. 2

3b. Orbital and/or nape and shoulder thorns present on disc. A median row of thorns along tail, extending onto disc in juveniles of some species

6a. Underside of disc and tail predominantly, or entirely dark

7a. Ventrally plain blackish-brown, only nostrils, jaws, gill slits, tips of anterior pelvic lobes, and origin of tail may be white. No orbital or nape/shoulder thorns, but a median row of about 40 thorns from above shoulder girdle to first dorsal fin in juveniles and half-grown specimens, of which 10 to 12 thorns on disc are probably lost in adults ..... Bathyraja sp. 1
(in part, see also couplet 4a)

7b. Ventrally predominantly dark brown, but always an irregular-shaped broad white band on disc, from mouth along 2/3 of midbody. One preorbital thorn always present, up to two supraorbital and one postorbital may be present. Twelve to 23 relatively indistinct median thorns along tail. Upper side plain dark and entirely and densely set with coarse spinules ..... Bathyraja irrasa
(Indian Ocean Sector, Kerguelen/Crozet waters on deeper slope)

6b. Underside of disc and tail entirely, or predominantly white

8a. Upper side of disc largely rough, spinulose, pectoral centres more or less smooth only in adult males. Juveniles with a continuous median row of 21 to 26 distinct thorns from behind shoulder girdle to first dorsal fin, reduced to 12 to 19 on tail in larger specimens. A pre- and postorbital thorn, as well as 4 to 7 nape/shoulder thorns always present, the latter distributed as 2 or 3 on median line and 1 or 2 on each shoulder ..... Bathyraja murrayi
(Indian Ocean sector, Kerguelen/Crozet waters)

8b. Upper side of disc largely smooth in pectoral centres, except in very small juveniles. No median thorns on disc behind shoulder girdle, but orbital and/or nape and shoulder thorns either always or occasionally present

---

* See also couplet 9a

9a. If present at all, only 1 or 2 large thorns medially on nape/shoulder. Eight to 16 widely spaced, small and indistinct median tail thorns, of which the posterior ones are often reduced. Snout relatively long and narrowly angled, except in small juveniles ..... Bathyraja eatonii (in part, see also couplet 5a)

9b. A conspicuous thorn in front of and behind each eye and on each shoulder always present. Eight to 15 medium-sized distinct thorns along midline of tail. Snout moderately short and bluntly angled ..... Bathyraja maccaini (Atlantic sector, possibly circum-Antarctic)

LIST OF SPECIES OCCURRING IN THE AREAS:

Code numbers are given for those species for which Identification sheets are included

Bathyraja eatonii (Günther, 1876)	RAJ Bathy 1
Bathyraja irrasa Hureau & Ozouf-Costaz, 1980	RAJ Bathy 2
Bathyraja maccaini Springer, 1971	RAJ Bathy 3
Bathyraja murrayi (Günther, 1880)	RAJ Bathy 4
*Bathyraja sp. 1	
**Bathyraja sp. 2	
****Raja arctowskii Dollo, 1904	
Raja (Amblyraja) georgiana Norman, 1938	RAJ Raja 1
**Raja (Amblyraja) sp.	
***Raja sp.	

Prepared by M. Stehmann, Aussenstelle Ichthyologie, Institut für Seefischerei, Zool. Museum Universität Hamburg, Martin-Luther-King-Platz 3, D-2000 Hamburg 13, Federal Republic of Germany

---

* Specimens in Hamburg under investigation by Stehmann

** Specimens in Hamburg, Paris, Leningrad and Vladivostok under joint investigation by Stehmann, Neyelov and Dolganov. The Bathyraja sp. 2 corresponds to the Breviraja/Bathyraja griseocauda in Bigelow & Schroeder (1965) and Springer (1971)

*** Refers to a single small juvenile mentioned by McCleave, Dearborn & DeWitt (Antarctic J.U.S. 12(4):20, 1977), which was not made available for investigation to the present author and therefore could not be included in the key

**** Described nominally on three empty egg-capsules only, but it is unclear to which species these belong; validity uncertain, but possibly identical with Bathyraja sp. 2

RAJ Bathy 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : RAJIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

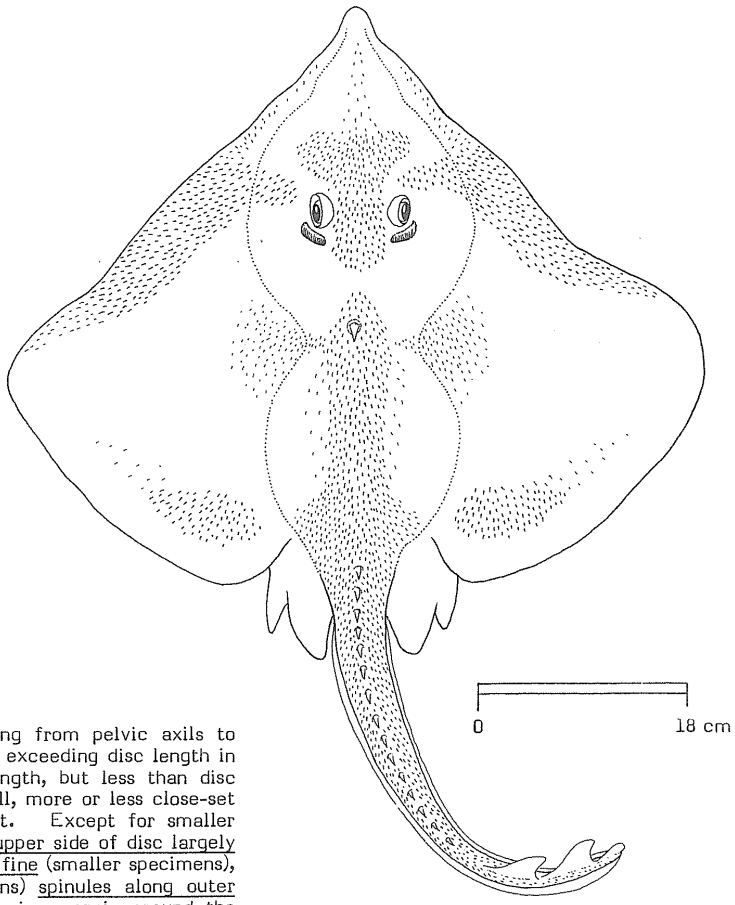
Bathyraja eatonii (Günther, 1876)

OTHER SCIENTIFIC NAMES STILL IN USE : Raja eatonii Günther, 1876; considered as synonym of the South African Bathyraja smithii (Müller & Henle, 1841) by Hulley (1970)

VERNACULAR NAMES :

FAO/CCAMLR : En - Eaton's skate
Fr - Raie d'Eaton
Ru - Skat Itona
Sp - Raya de Eaton

NATIONAL :



DISTINCTIVE CHARACTERS :

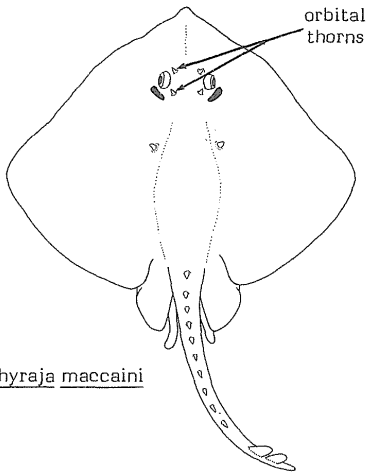
Disc rhombic, about 1.2 times as broad as long; its anterior margins weakly convex in young, more or less undulated in larger specimens, particularly in adult males; outer corners narrowly rounded at a nearly right angle. Snout moderately projecting and pointed at a relatively narrow angle, except in small juveniles; nostril flap and rear margins of nasal curtain fringed; mouth small, 22 to 30 tooth rows in upper jaw. Tail moderately slender, somewhat depressed, with lateral folds extending from pelvic axils to shortly in front of tail tip; tail length exceeding disc length in juveniles up to about 25 cm total length, but less than disc length in larger specimens. Two small, more or less close-set dorsal fins, their bases not confluent. Except for smaller juveniles, which are entirely prickly, upper side of disc largely smooth; usually a band of densely set fine (smaller specimens), or somewhat coarser (larger specimens) spinules along outer anterior margin and parallel to posterior margin around the loosely prickly or bare pectoral centres, and along midbody and tail. Underside completely smooth. One or 2 thorns medially in posterior nape/midshoulder position (may be lost but scars usually remain); no further thorns on disc. Eight to 16 medium-sized to small thorns widely spaced along midline of tail, of which the posterior ones tend to be reduced in large specimens; occasionally a small thorn between dorsal fins.

Colour: ground colour of upper side pale through dark ochre to greyish-brown, the semitransparent rostral 'triangle' usually lighter; often with patterning of dark and/or light spots, also as a marbled appearance; specimens with predominantly pale circular blotches occur as well as those with a pair of large, light pseudo-ocellar blotches on posterior pectorals; other individuals are plain-coloured. Underside of disc predominantly white, although greyish-brown speckling may appear mainly along the posterior pectoral margins and in the anus region; underside of tail entirely brown, with a brown median stripe only, or spotted brown at least partly (mainly Indian Ocean sector specimens), or plain white with at most a few pale brown spots (mainly Atlantic sector specimens).

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Bathyraja irrasa, B. maccaini, B. murrayi: at least orbital thorns present on disc.

Raja species: rostral process stout and firm, extending beyond extremities of pectoral finrays (hard-snouted species).



Bathyraja maccaini

SIZE:

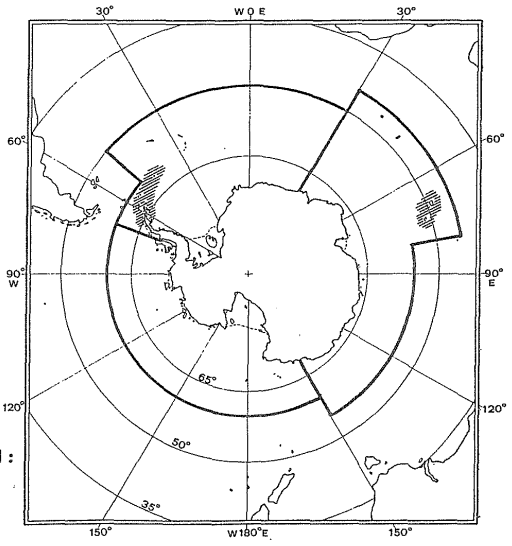
Maximum: total length over 1 m.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Around the Kerguelen and Heard Islands, where it had originally been thought to be endemic, but in recent years specimens have been obtained also around the South Orkney and South Shetland Islands and even farther south in the Atlantic sector. Possibly a circum-Antarctic species.

Benthic, in Kerguelen waters at about 15 to 800 m depth, in the Atlantic sector at about 200 to 300 m depth.

So far no specific data are available on nutrition, but it probably feeds on all kinds of bottom-living animals.



PRESENT FISHING GROUNDS:

Shelf waters around the Kerguelen Islands.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION:

Separate statistics are not reported for this species.

Taken with bottom trawls, mainly at depths between 200 and 400 m.

Marketed frozen (wings only).

RAJ Bathy 2

1985

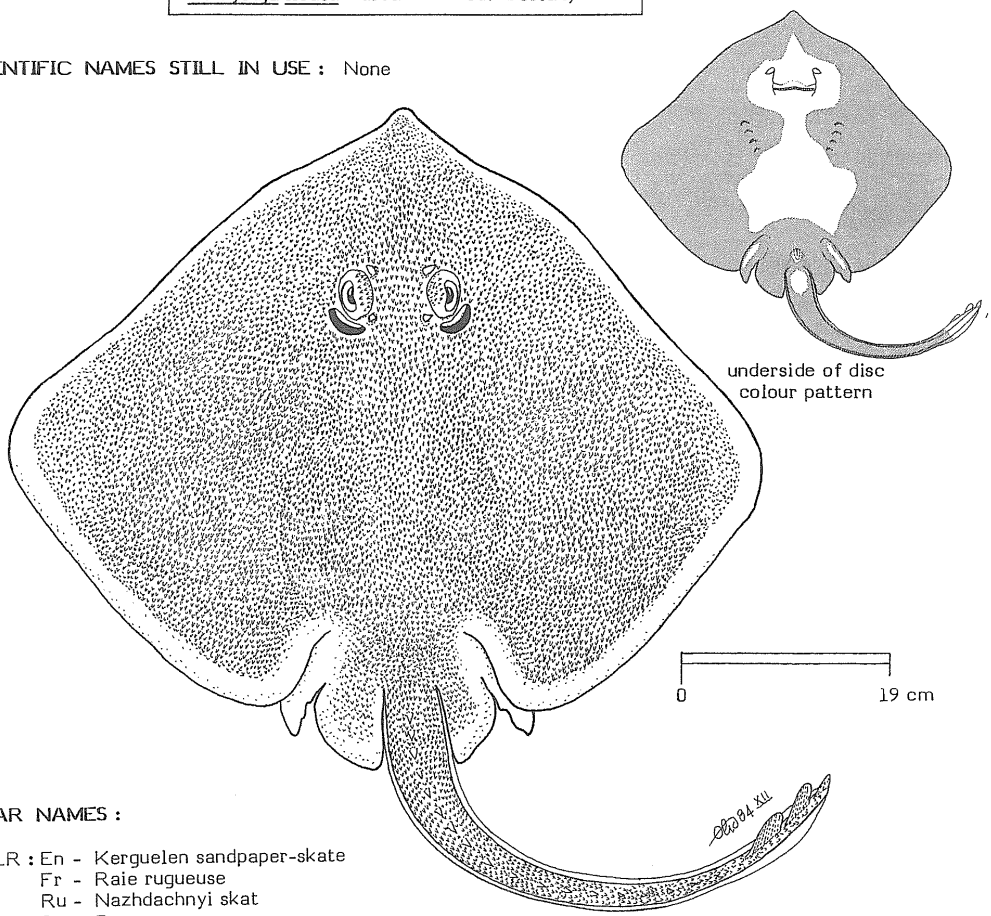
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : RAJIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Bathyraja irrasa Hureau & Ozouf-Costaz, 1980

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Kerguelen sandpaper-skate
Fr - Raie rugueuse
Ru - Nazhdachnyi skat
Sp - Raya rugosa

NATIONAL :

DISTINCTIVE CHARACTERS :

Disc rhombic, about 1.2 times as broad as long, its anterior margins weakly undulated, the outer corners moderately rounded at a nearly right angle; posterior disc margins straight to slightly convex. Snout moderately short and bluntly angled, its tip not pronounced; nasal flaps and rear margins of nasal curtain fringed; mouth small, with 25 to 30 tooth rows in upper jaw. Tail rather slender, moderately depressed, with narrow lateral folds extending from pelvic axils to shortly in front of tail tip; tail length slightly exceeding body length in specimens up to about 50 cm total length, but somewhat less than body length in larger specimens. A short interspace between bases of the small dorsal fins. Upper side of disc, including orbits and posterior pelvic lobes, and tail with dorsal fins entirely and densely set with coarse spinules (prickles); underside completely smooth. A distinct thorn in front of each eye always present, additional smaller supra- and/or postorbital thorns may occur; no further thorns on disc; a median row of 12 to 23 widely spaced, very small thorns along tail, becoming very indistinct to entirely reduced in posterior third of tail in front of the first dorsal fin; no thorns between dorsal fins.

Colour: upper side plain dark greyish-brown, midline of body and tail sometimes darker coffee-brown. Underside of disc predominantly dark brown, but always an irregular-shaped broad whitish band from about mouth rearward along two thirds of midbody; underside of tail whitish with brown spots, or plain brown, but origin of tail and its tip white.

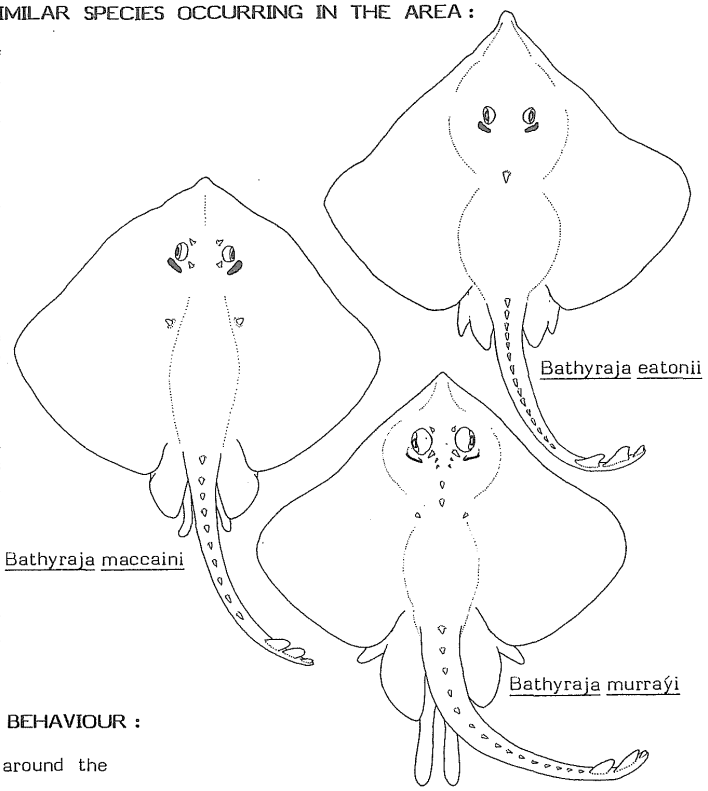
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Bathyraja eatonii: upper side of disc largely smooth, except in small juveniles, and at most with 1 or 2 median thorns on nape/shoulder region; underside of disc predominantly white.

B. maccaini: upper side of disc largely smooth, except in small juveniles, and always a distinct thorn in front of and behind each eye and on each shoulder; underside of disc predominantly white.

B. murrayi: always a distinct thorn in front of and behind each eye, 2 or 3 medially on nape, and 1 or 2 on each shoulder.

Raja species: rostral process stout and firm, extending beyond extremities of pectoral fin rays (hard-snouted species).



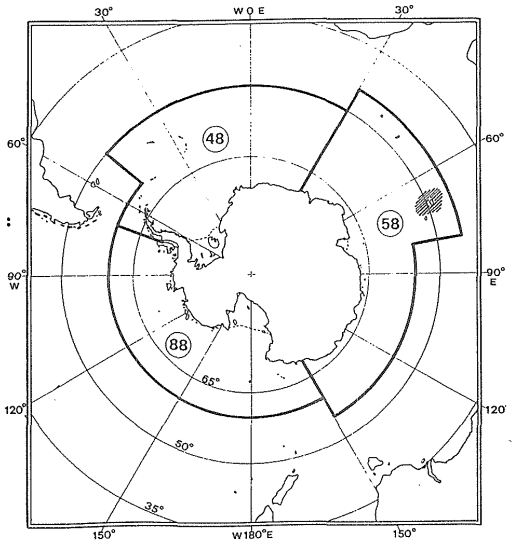
SIZE :

Adults so far unknown, but maximum total length supposedly up to about 100 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

So far only known from waters around the Kerguelen Islands.

Benthic on the slope at about 300 to 1 200 m depth. So far no specific data are available on nutrition, but it probably feeds on all kinds of bottom-living animals.



PRESENT FISHING GROUNDS :

Slope waters around the Kerguelen Islands.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species.

Taken with bottom trawls at depths mainly between 300 and 400 m.

Marketed frozen (wings only).

RAJ Bathy 3

1985

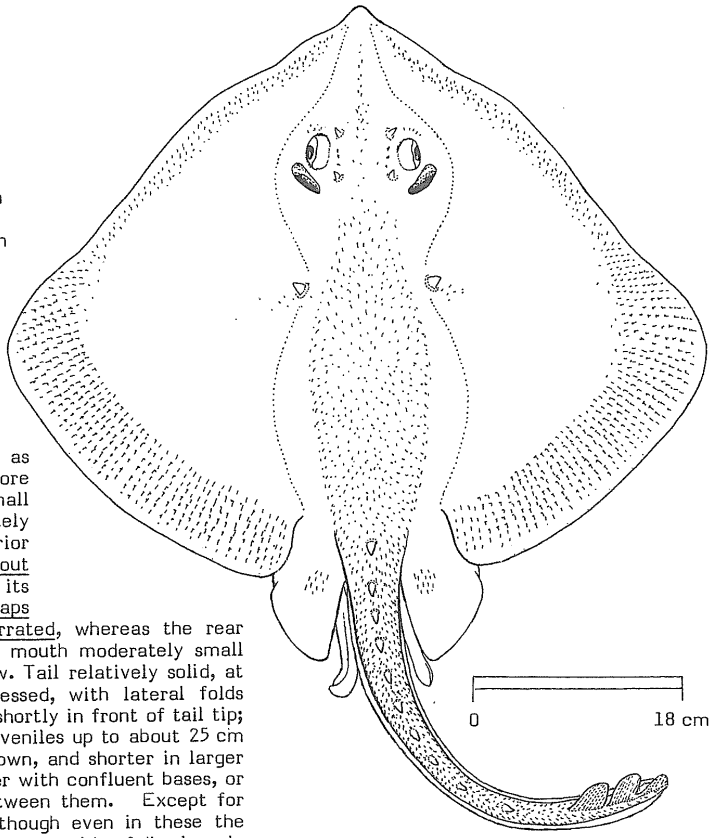
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : RAJIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Bathyraja maccaini Springer, 1971

OTHER SCIENTIFIC NAMES STILL IN USE : Raja rakusai Rembiszewski, 1981



VERNACULAR NAMES :

FAO/CCAMLR : En - McCain's skate
Fr - Raie de McCain
Ru - Skat Makkeina
Sp - Raya de McCain

NATIONAL :

DISTINCTIVE CHARACTERS :

Disc rhombic, about 1.2 times as broad as long; its anterior margins more or less weakly undulated, less so in small juveniles; outer corners moderately rounded at about a right angle; posterior disc margins evenly convex. Snout moderately short and bluntly angled, its tip somewhat marked off; nostril flaps smooth-edged, or at most edges serrated, whereas the rear margins of nasal curtain are fringed; mouth moderately small with 23 to 30 tooth rows in upper jaw. Tail relatively solid, at least in larger specimens, and depressed, with lateral folds extending from about pelvic axils to shortly in front of tail tip; tail length exceeding disc length in juveniles up to about 25 cm total length, equal in smaller half-grown, and shorter in larger specimens. Two small dorsal fins either with confluent bases, or close-set with a little interspace between them. Except for entirely prickly smaller juveniles (although even in these the pectoral centres are loosely spinulose), upper side of disc largely smooth; a band of relatively coarse and somewhat sparsely scattered spinules along margins around disc, along midbody and on tail. Underside entirely smooth. Always present is a distinct thorn in front of and behind each eye and on each shoulder; no further thorns on disc; 9 to 15 distinct to medium-sized thorns loosely spaced along midline of tail to first dorsal fin; occasionally a small thorn between dorsal fins, when these are close-set.

Colour: ground colour of upper side medium to dark greyish-brown, the semitransparent rostral 'triangle' may be marked off lighter; upper side regularly with a pattern of more or less pale light spots and circular blotches, the spots more frequent in smaller specimens; a pair (or more) of light pseudo-ocelli may appear on posterior pectorals. Underside of disc predominantly plain white, but larger specimens may show dark tips on anterior pelvic lobes and speckles or speckle-blotches of pale greyish-brown at and around anus, laterally along belly margins, in the shoulder region, and along posterior pectoral margins; underside of tail plain white.

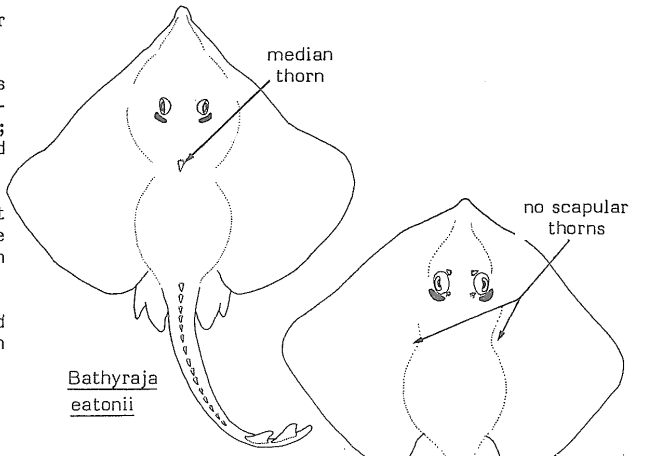
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Bathyraja eatonii: disc with at most 1 or 2 median nape/midshoulder thorns.

B. irrasa: upper side of disc always entirely prickly; underside of disc predominantly, that of tail completely dark-coloured; usually no thorns on nape/shoulder region, and median tail thorns indistinct posteriorly.

B. murrayi: 4 to 7 thorns always present on nape/shoulder region, of which 2 to 4 are placed in the median line and 1 or 2 on each shoulder.

Raja species: rostral process stout and firm, extending beyond tips of pectoral fin rays (hard-snouted species).



SIZE:

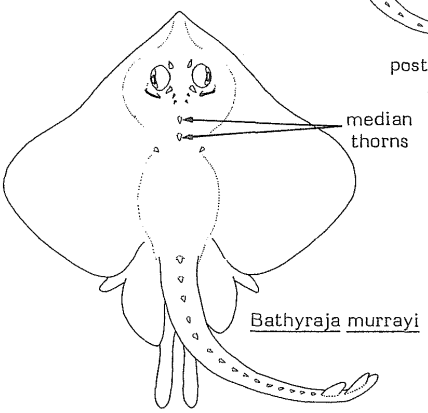
Maximum: total length over 1 m.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Atlantic sector around the South Orkney- and South Shetland Islands and the Antarctic Peninsula; possibly circum-Antarctic.

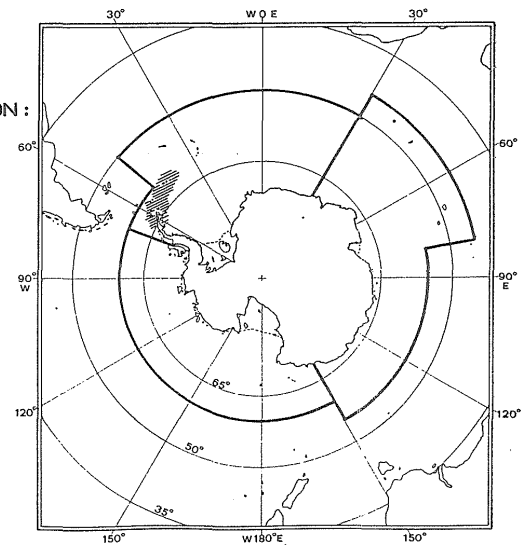
Benthic in shelf and upper slope waters to about 500 m depth.

So far no specific data are available on nutrition, but it probably feeds on all kinds of bottom-living animals.



POTENTIAL FISHING GROUNDS:

Shelf and slope areas around the islands of the Scotia Arc and off the Antarctic Peninsula.



CATCHES, FISHING GEAR AND FORMS OF UTILIZATION:

Taken with bottom trawls, but at present no information available on commercial utilization.

RAJ Bathy 4

1985

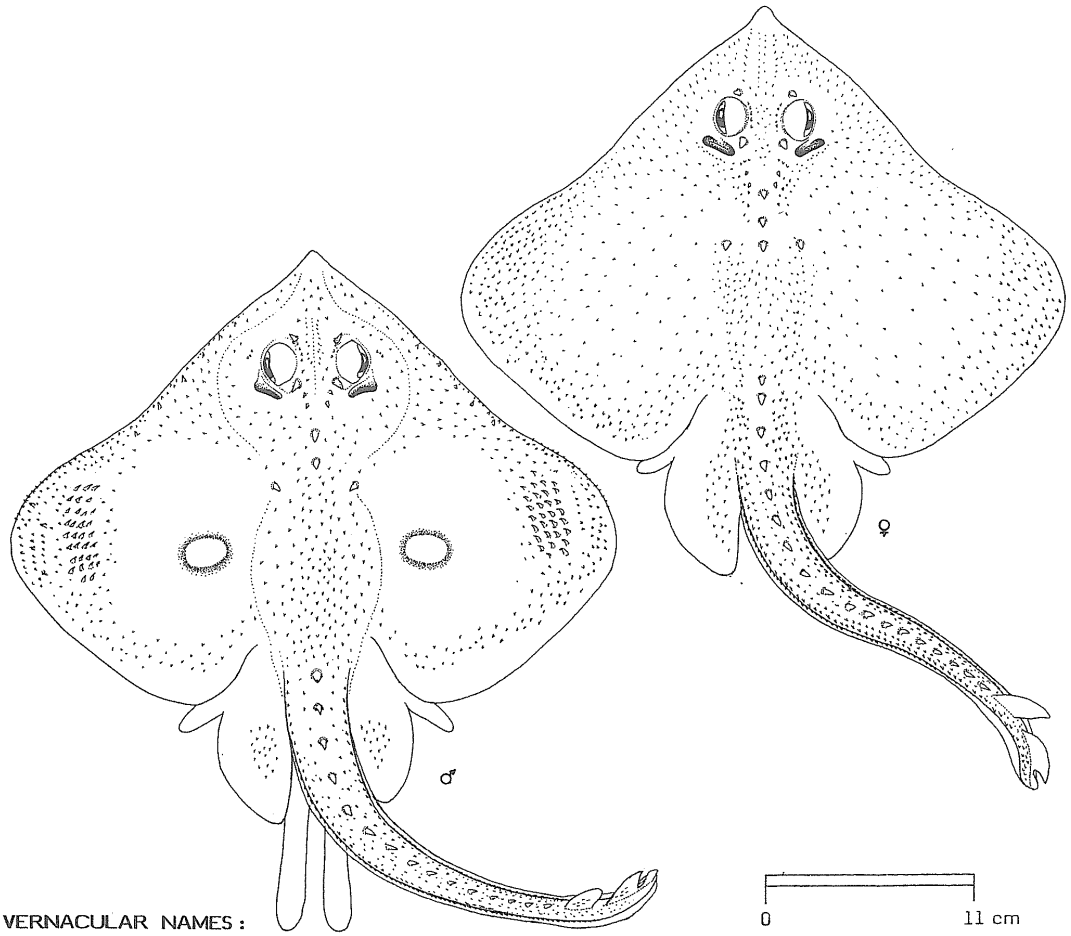
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : RAJIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Bathyraja murrayi (Günther, 1880)

OTHER SCIENTIFIC NAMES STILL IN USE : Raja murrayi Günther, 1880



VERNACULAR NAMES :

FAO/CCAMLR : En - Murray's skate
Fr - Raie de Murray
Ru - Skat Murreya
Sp - Raya de Murray

NATIONAL :

DISTINCTIVE CHARACTERS :

Disc rhombic, about 1.2 to 1.3 times as broad as long; its anterior margins more or less undulated, less so in smaller juveniles; outer corners broadly rounded in young, moderately to narrowly rounded in larger specimens, and forming a nearly right angle; posterior disc margins somewhat convex. Snout short and more or less bluntly angled, narrow-angled in adults; its tip not pronounced; nostril flap and rear margins of nasal curtain fringed; mouth small, with 20 to 26 tooth rows in upper jaw. Tail relatively solid and depressed, with lateral folds extending from about pelvic axils to shortly in front of tail tip; tail length distinctly exceeding disc length in

smaller specimens, about equal to or a little longer in adults. Two small, close-set dorsal fins, usually with a small interspace between them. Upper side typically very rough, with more or less loosely scattered coarse spinules and, in larger specimens, additional thornlets; only adult males may have bare pectoral centres, and large females may show a very loose spinulation there. Underside of disc and tail completely smooth. Always present on disc are a distinct thorn in front of and behind each eye, 2 or 3 thorns medially along nape, 1 on midshoulder (usually), and 1 or 2 on each shoulder; smaller additional thorns may occur in supraorbital, supra-and interspiracular position. Small juveniles with a continuous median row of up to 26 thorns from behind shoulder girdle to first dorsal fin; in larger specimens, 12 to 19 thorns are left on tail only.

Colour: ground colour of upper side medium to dark brown or greyish-brown. Often plain-coloured, but some specimens also show patterning of light and dark spots that may even result in a marbled appearance, and large specimens tend to have a pair (rarely 2 pairs) of light, dark-edged pseudo-ocelli on inner pectorals. Underside of disc predominantly white, but often with solid or blotched broad dark margins; additional dark spots may be scattered on disc; specimens with predominantly dark lower side of disc rarely occur, but these still have irregular white areas across the centre and around mouth; underside of tail may be plain white, but is usually speckled or spotted brown, or with brown median or lateral stripes, or almost plain dark.

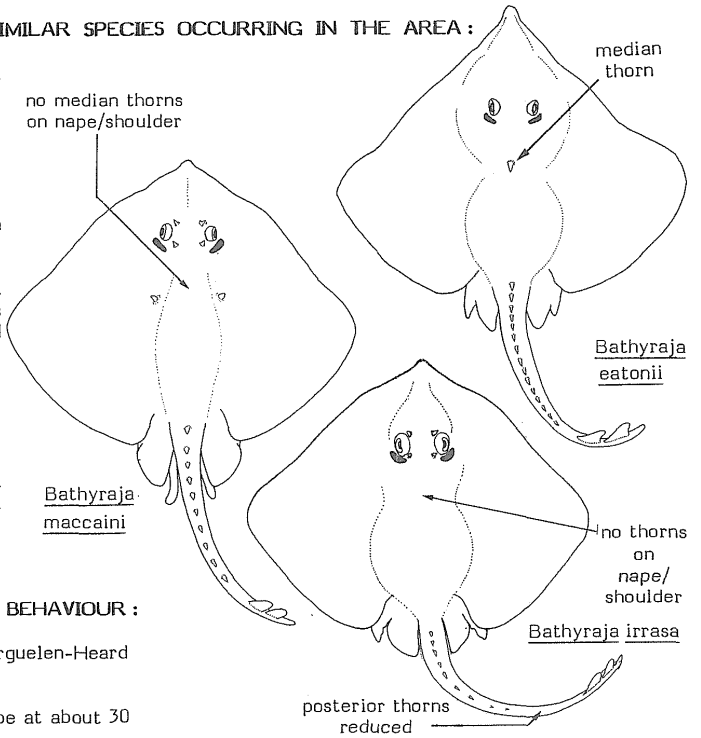
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Bathyraja eatonii: at most 1 or 2 median nape/midshoulder thorns on disc.

B. irrasa: usually no thorns on nape/shoulder region, median tail thorns indistinct posteriorly.

B. maccaini: no median thorns on nape/shoulder region.

Raja species: rostral process stout and firm, extending beyond extremities of pectoral fin rays (hard-snouted species).



SIZE:

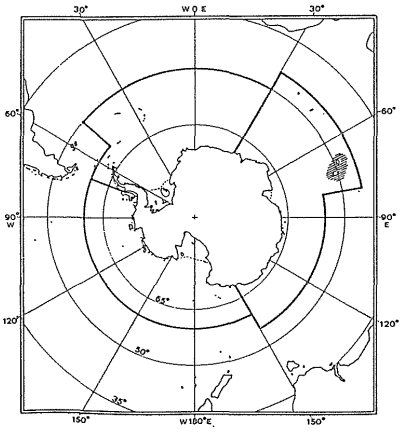
Maximum: total length to about 60 cm. Sexual maturity is attained at about 40 to 50 cm total length.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

So far only known from the Kerguelen-Heard waters, where it is possibly endemic.

Benthic on the shelf and upper slope at about 30 to 650 m depth.

So far no specific data are available on nutrition, but it probably feeds on all kinds of bottom-living animals.



CATCHES, FISHING GEAR AND FORMS OF UTILIZATION:

Taken with bottom trawls, but at present no information available on commercial utilization.

RAJ Raja 1

1985

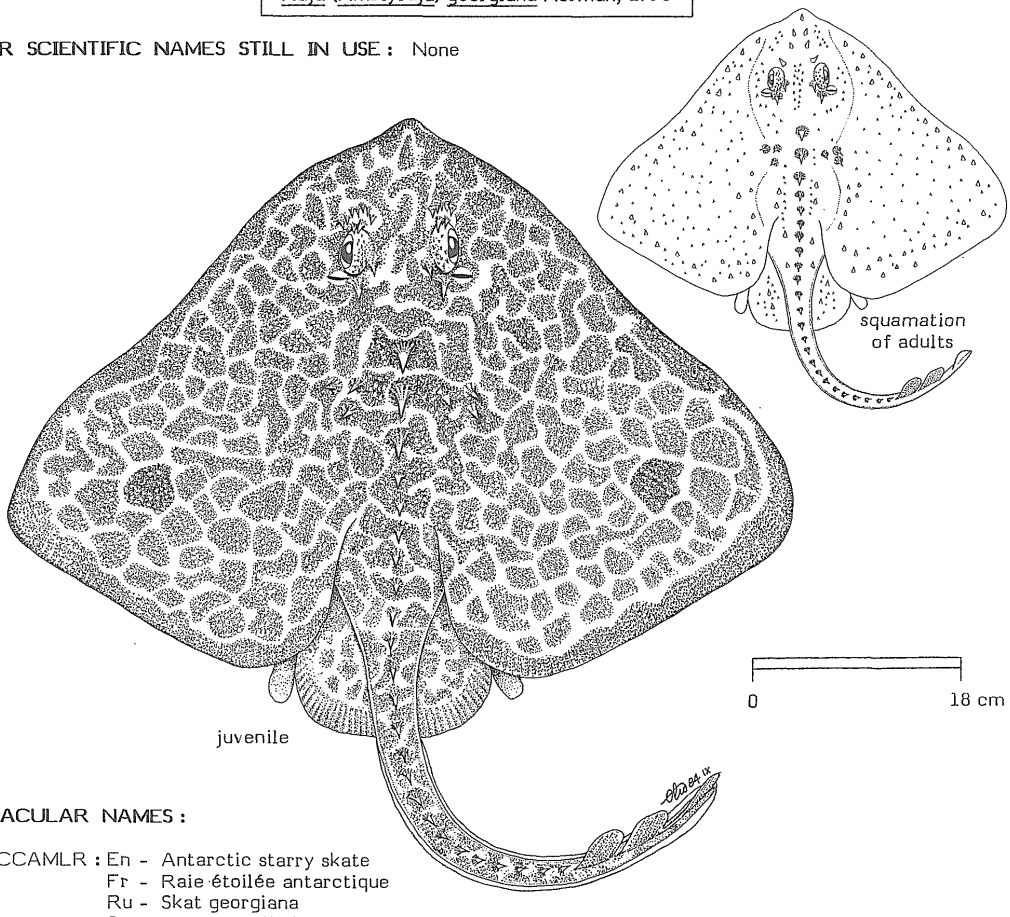
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : RAJIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Raja (Amblyraja) georgiana Norman, 1938

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic starry skate
Fr - Raie étoilée antarctique
Ru - Skat georgiana
Sp - Raya estrellada antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

Disc rhombic, distinctly broader (1.3 to 1.4 times) than long; its anterior margins undulated, less so in small juveniles, but strongly so in adult males; outer corners narrowly angled, posterior margins straight to weakly convex. Snout short and bluntly angled, its tip may be a little pronounced; nostril flap and rear margins of nasal curtain mostly strongly fringed; mouth wide with 33 to 42 tooth rows in upper jaw. Tail solid and depressed, with lateral folds extending from about pelvic axils to shortly in front of tail tip; tail length at most equal to disc length, distinctly shorter in larger specimens. Two small dorsal fins usually with confluent bases, less frequently with a little interspace between them. Typically the entire upper side of disc is very rough with more or less loosely scattered, coarse spinules; half-grown and larger specimens have additional strong thornlets, which are mostly concentrated on snout, along anterior disc margins, and from axils along insertion of pectoral fins; sides of tail and midline of body also with strong thornlets in larger specimens; pectoral centres may be loosely prickly to almost smooth at most in adult males. Underside of disc and tail completely smooth in many specimens, but others may have a narrow strip of few fine spinules medially on snout tip, and large adults (mostly females) may also have fine prickles at outer snout margins. There is a dorsal pattern of very prominent thorns, which typically have a distinctly ribbed base and a radiated basal plate (as the thornlets too), very

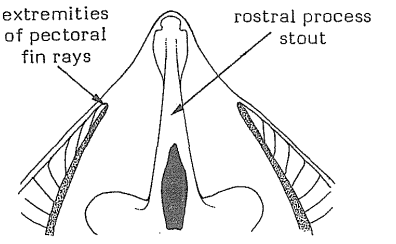
constant in arrangement: 1 in front of and behind each eye and above each spiracle, 1 or 2 medially on nape and 1 on midshoulder, 2 or 3 on each shoulder in oblique or triangular position, 20 to 28 along midline of body and tail to first dorsal fin (of which 4 to 6 are on the body); occassionally a small thorn between dorsal fins, if there is an interspace.

Colour: ground colour of upper side relatively dark brown to greyish-brown. Specimens may be plain-coloured, but more often show patterning of light spots scattered over the disc and partly arranged in oblique lines; almost all specimens with light crossbars and/or light lateral spots on tail. Small juveniles show a specific pattern of distinct light lines in net- or honeycomb-like arrangement which usually becomes reduced to numerous light spots with growth. Large specimens may also show pale, paired pseudo-ocellar blotches on pectorals. Underside of disc predominantly white, but regularly with greyish margins, or spotted or speckled brown; additional dark spots or blotches may occur irregularly at anus, on pelvic tips, and on centre of disc; underside of tail plain white, speckled or spotted pale brown, or with a brown median strip.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

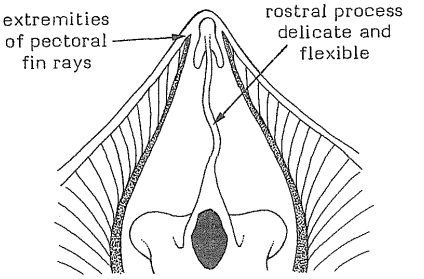
Raja (Amblyraja) sp. (Crozet/Kerguelen waters): 15 to 18, (exceptionally up to 20) thorns in a median row from behind shoulders to first dorsal fin (20 to 28 in R. georgiana). Dorsal colour pattern usually with dark blotches, rarely mixed with pale spots, and without pseudo-ocelli; anterior pelvic lobes regularly marked off white dorsally.

R. (A.) doellojuradoi (Patagonian waters): 14 to 18 median thorns from behind shoulder girdle to first dorsal fin. Lower side usually white, sometimes with traces of light grey.



Raja

Bathyraja species: rostral process delicate and flexible. Tips of pectoral fin rays extending almost to tip of snout (soft-snouted species).



Bathyraja

SIZE:

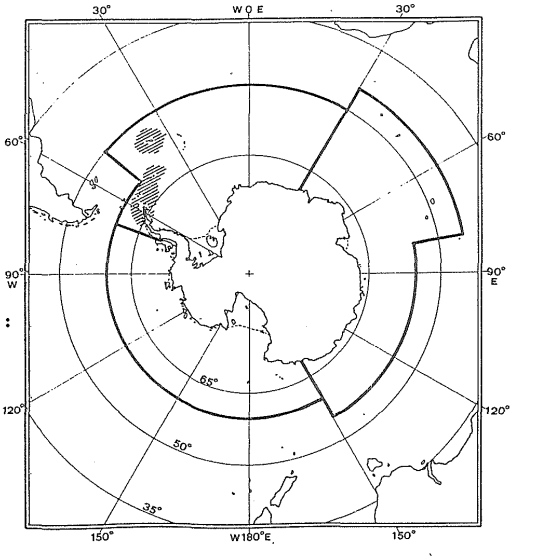
Maximum: total length to about 1 m.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Atlantic sector from around South Georgia southward to the Antarctic Continent. One specimen reported from the Ross Sea; possibly circum-Antarctic in distribution, but probably not identical with the above consubgener from off Kerguelen and Crozet.

Benthic on the shelf and upper slope at about 20 to 350 m depth.

So far, no specific data are available on nutrition, but it probably feeds on all kinds of bottom-living animals.



POTENTIAL FISHING GROUNDS:

Shelf waters around the islands of the Scotia Arc and off the Antarctic Peninsula.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION:

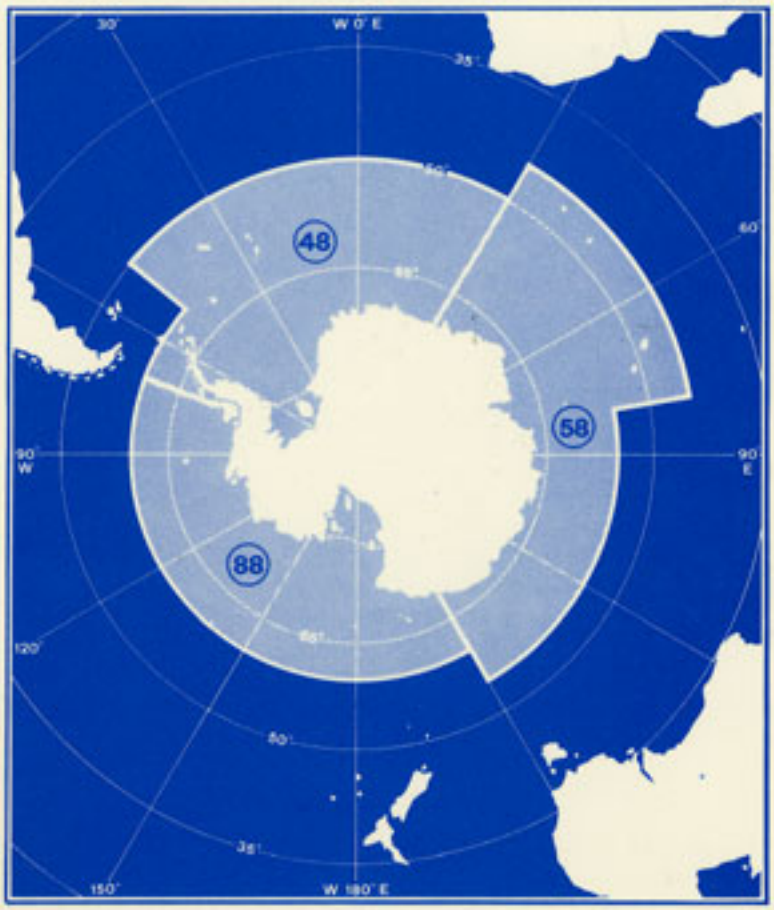
Taken with bottom trawls, but at present no information available on commercial utilization, although this species grows to large size and is rather abundant.

ISBN 92/5/102357/3

FAO SPECIES IDENTIFICATION SHEETS
FOR FISHERY PURPOSES

SOUTHERN OCEAN

CCAMLR CONVENTION AREA
FISHING AREAS 48, 58 and 88



VOLUME
II

COMMISSION FOR THE CONSERVATION OF ANTARCTIC
MARINE LIVING RESOURCES

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

FAO SPECIES IDENTIFICATION SHEETS

FOR FISHERY PURPOSES

SOUTHERN OCEAN

(Fishing Areas 48, 58 and 88)
(CCAMLR Convention Area)

Editor

W. Fischer
Marine Resources Service
Fishery Resources and Environment Division
FAO Fisheries Department
Rome, Italy

Co-editor

J.C. Hureau
Muséum national d'Histoire naturelle
Ichtyologie générale et appliquée
75231 Paris Cédex 05, France

Prepared and published with the support of the
Commission for the Conservation of Antarctic Marine Living Resources

VOLUME II

CONTENTS:

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome 1985

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

P-43
ISBN 92/5/102358/1

ABSTRACT

This publication presents the marine living resources of the Southern Ocean considered to be of interest to fisheries or of major importance for the conservation of the Antarctic environment, in the form of a practical, illustrated field guide following the format of the by now well-established series of FAO Species Identification Sheets for Fishery Purposes. The major groups included are seaweeds, euphausiids, king crabs/stone crabs, bivalves, gastropods, cephalopods, hagfishes/lampreys, sharks, batoid fishes, bony fishes and marine mammals. Every group section includes an explanation of relevant technical terminology, general remarks, guides or keys to suborders, families or genera, and identification sheets for selected families and species. Identification sheets include an alpha-numerical family or species code, valid scientific names and synonyms still in use, proposed CCAMLR/FAO common names in English, French, Russian and Spanish, an illustration of the family or species in question, a diagnosis, illustrated differential diagnoses of similar families or species, and information on size, geographical distribution and behaviour (with a map), and fisheries. The publication ends with a comprehensive alphabetical index of scientific and common names.

For bibliographic purposes this document should be cited as follows:

Fischer, W. and J.C. Hureau (eds), FAO species identification sheets for fishery purposes. Southern Ocean (Fishing areas 48,58 and 88) (CCAMLR Convention Area). Prepared and published with the support of the Commission for the Conservation of Antarctic Marine Living Resources. Rome, FAO, Vol.2:233-470.

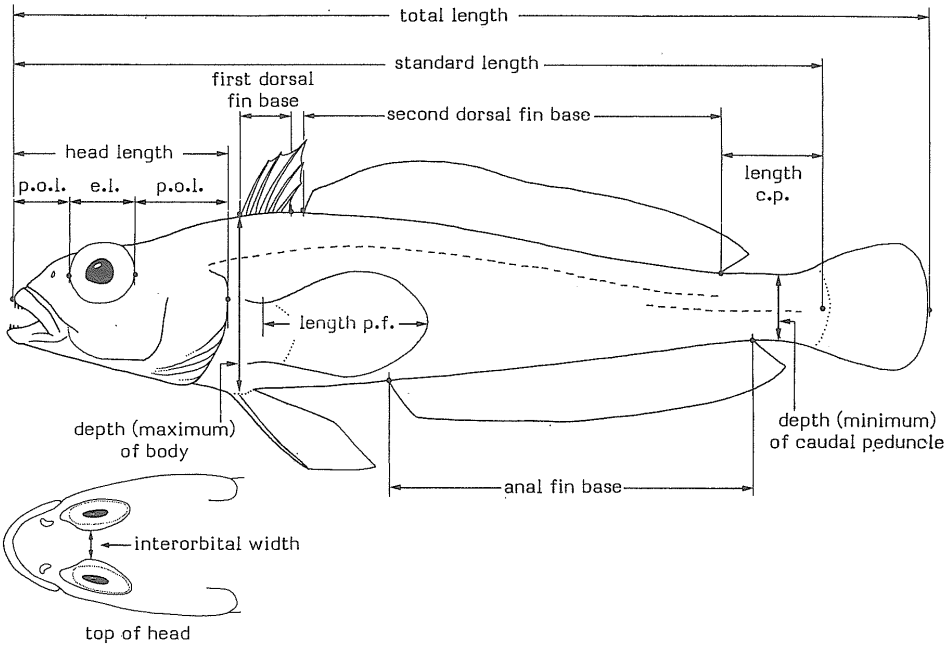
1985

Identification sheets. Taxonomy. Geographic distribution. Fisheries. Vernacular names. Marine mammals. Hagfishes and lampreys. Sharks. Batoid fishes. Bony fishes. Shrimps. Crabs. Euphausids. Bivalves. Gastropods. Cephalopods. Seaweeds. S.O.

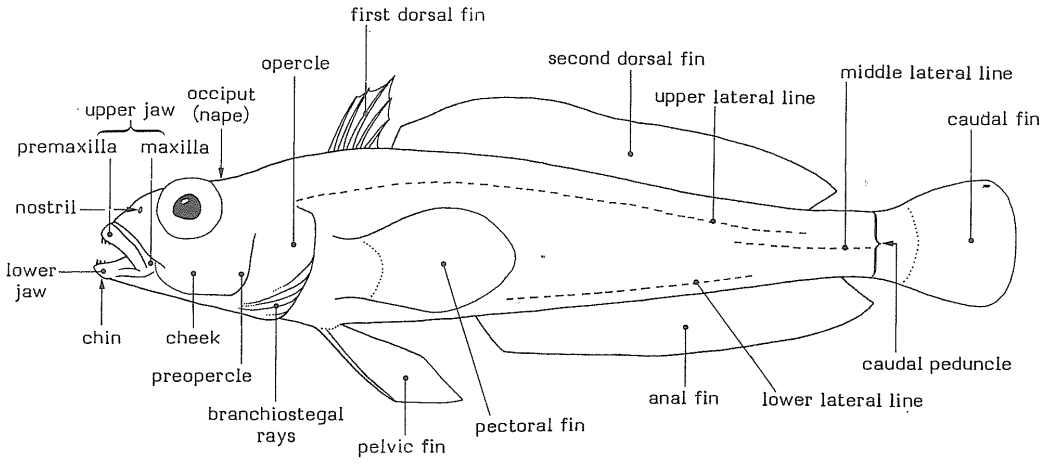
TECHNICAL TERMS

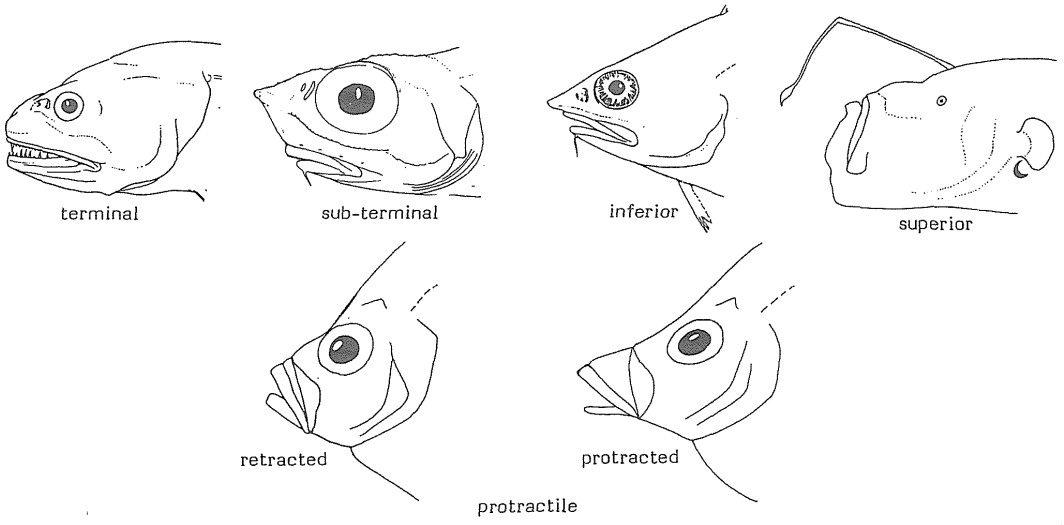
Principal Measurements Used

(shortest distance between the points marked)

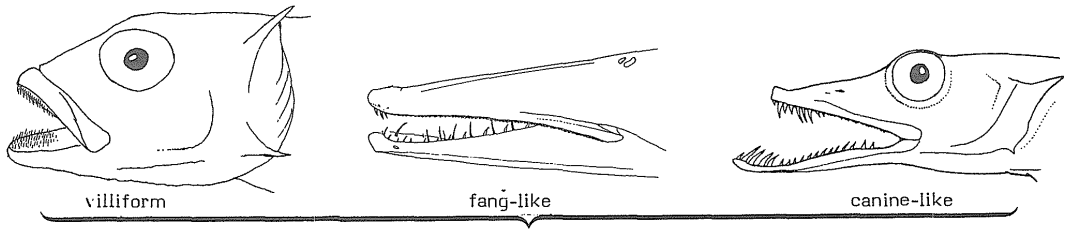


General Nomenclature of the External Morphology

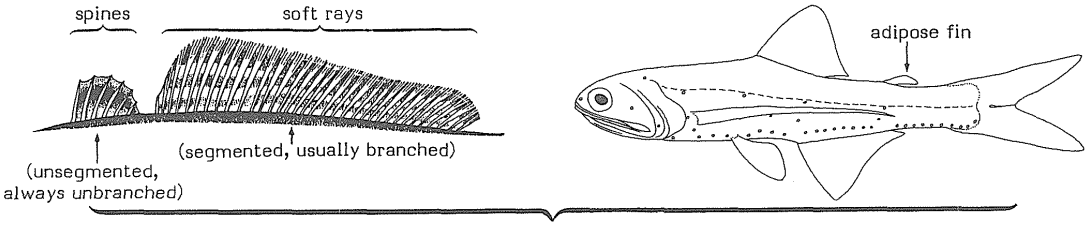




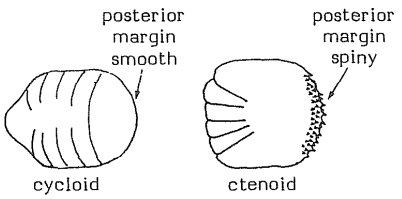
most common type of mouth



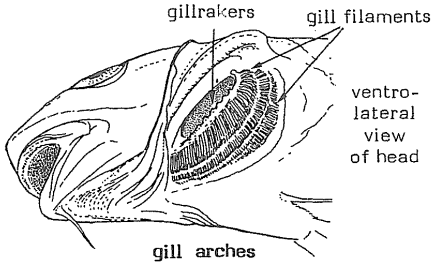
most common types of teeth



types of fins



schematic examples of "normal" scales



gill arches

most common types of caudal fin

General Remarks

This is the largest class of living fishes. Although it encompasses a very wide range of shapes and other morphological features, all of its representatives are easily distinguished from sharks and batoid fishes by the presence of a single gill opening on each side, often overlain by a complex of bones forming a gill cover. In addition, bony fishes usually have the skin covered by overlapping scales, but these may be reduced or even absent in some families, or modified by calcification into ossified plates in others. Unlike most sharks, the caudal fin of bony fishes is most often externally symmetrical (although strongly asymmetrical in its bony structure).

Our knowledge of the fish fauna from the Southern Ocean dates almost entirely from the present century and there are still considerable gaps in the information available, particularly on aspects such as species distribution, abundance and biology, which will hopefully be filled in the near future through scientific research correlated with the increasing fisheries and oceanographic activities in that area.

The fish fauna occurring to the south of the Antarctic Convergence is characterized by its rather limited diversification. In fact, of the world's ca. 20 000 living marine fish species, only about 200 occur in the waters south of the Antarctic Convergence. Another characteristic feature is the high degree of endemism of species inhabiting the shelf areas along the continent and around islands, which is doubtless a result of the geographical isolation of the Antarctic Continent. Endemism is much less widespread among species from deeper waters.

As regards their habitats, the Antarctic fishes can be generally grouped as follows:

1. **Benthic species inhabiting coastal and shelf areas** (to about 500 m depth). These include 90 species belonging to 11 families, of which 6 are notothenioids (Nototheniidae in part, Channichthyidae in part, Bathydraconidae in part, Artedidraconidae in part, Harpagiferidae and Bovichthyidae); 2 belong to other percomorph groups (Zoarcidae and Tripterygiidae), one is a gadiform (Muraenolepididae), one a scorpaeniform (Congiopodidae) and one a pleuronectiform (Bothidae). The large majority of the species (54) in this group belong to the suborder Notothenioidei and nearly half of them are members of the family Nototheniidae.

2. **Benthic species from deep waters.** This group comprises 43 species belonging to 6 families. Four of these families are notothenioid (Nototheniidae in part, Channichthyidae in part, Artedidraconidae in part and Bathydraconidae in part), one (Zoarcidae) belongs to another percomorph suborder, and the sixth (Halosauridae) is a notacanthiform represented by a single species. Within this group, the largest numbers of species are found in the families Zoarcidae (10), Artedidraconidae (12), and Bathydraconidae (8). Of the species included in this group, 20 are also represented in group 1.

3. **Benthopelagic species ranging from shelf areas to the continental slope, some of them to great depths.** This group includes about 25 species belonging to 6 families, i.e. 3 gadiforms (Moridae, Gadidae, Macrouridae), one ophidiiform (Ophidiidae in part), one scorpaeniform (Cyclopteridae or Liparididae, in part) and one notothenioid (Channichthyidae in part). The largest numbers of species are found in the families Macrouridae (8), Liparididae (7), and Channichthyidae (4).

4. **Epipelagic species (surface waters to about 200 m depth).** A small group of only 13 species belonging to 6 families, all of different orders or suborders: Myctophiformes: one family (Alepisauridae), with a single species also represented in group 5; Aulopiformes: one family (Paralepididae), with 4 species, also represented in group 5; Lampridiformes: one family (Lampididae), with a single species; Perciformes Scombroidei: one family (Trichiuridae), with a single species also represented in group 5; Perciformes Stromateoidei: one family (Stromateidae), with a single species also represented in group 5; and Perciformes Notothenioidei: one family (Nototheniidae) with 5 species, 2 of which are also represented in group 5.

5. **Mesopelagic and/or bathy-pelagic species, from about 300 m depth to often very deep waters.** This is a very large and diversified group which comprises about 70 species belonging to 20 families distributed in the following orders or suborders: Anguilliformes: one family (Synaphobranchidae); Salmoniformes: 6 families (Bathylagidae, Gonostomatidae, Sternoptychidae, Stomiidae, Astronesthidae and Idiacanthidae); Myctophiformes: 6 families (Myctophidae, Paralepididae, Scopelarchidae, Notosudidae, Alepisauridae (in part) and Anotopteridae); Aulopiformes: one family (Paralepididae); Lophiiformes: one family (Ceratiidae); Beryciformes: one family (Melamphaidae); Zeiformes: one family (Oreosomatidae); Perciformes Percoidei: Nototheniidae in part and Channichthyidae in part); Perciformes Scombroidei: one family (Trichiuridae in part) and Perciformes Stromateoidei: one family (Stromateidae). In this group, the family with the largest number of species is the Myctophidae. Five of the species in the meso-bathypelagic group are also represented in groups 1, 3 and 4.

Size and growth

The Antarctic ichthyofauna is dominated by small species. Fewer than half of the species grow to 25 cm in length and only about 30 attain sizes over 50 cm, but two of these may grow to beyond 200 cm in total length! Plotting the size ratio ($= \log_e \frac{\text{length at time } (t+1)}{\text{length at time } (t)}$) against the size at the start of the year, it was shown that Antarctic fish tend to have a slower growth rate than other cold-water species. The only species that grew as fast as the Arctic cod (Gadus morhua) were Notothenia rossii and Champsocephalus gunnari when feeding on krill. Thus, although the amount of data available is still limited, they lead to the conclusion that Antarctic fishes grow much more slowly than species from temperate waters and most of them grow also slower than fishes living in the Arctic region.

Reproduction

A direct consequence of the slow growth rate and long lifespan of most Antarctic fishes is the fact that many do not reach sexual maturity until they are over five years old. In the species studied so far, spawning typically takes place in the austral summer or early winter. The results tend to indicate that there is probably a relationship between the annual temperature regime or light intensity and the spawning season. Descriptions of the development and final maturation of the gonads have been given for several species, but the relative fecundity does vary greatly between species and within the same species from different localities. Spawning periods are fairly well known for quite a number of species, although development rates have only been studied in a few cases.

Food and annual cycles

Although most species are demersal in habit, they do feed rather often on pelagic prey, specially on krill, salps and pelagic amphipods. Three feeding groups are recognizable among Antarctic fishes: fish and krill feeders (e.g. Dissostichus species, channichthyids); mainly plankton feeders (e.g. Notothenia larseni, N. rossii, N. squamifrons, Pleuragramma antarcticum, Champsocephalus gunnari); and benthic crustacea feeders (e.g. rajids, Chaenocephalus aceratus, Notothenia gibberifrons, N. cyanobrancha, and juveniles of N. rossii). Annual cycles in gonad maturation, liver weight and growth are closely linked to the availability of food. For some species, the condition factor $\frac{(\text{weight} \times 100)}{(\text{length})^3}$ has been studied and a strong correlation was found between this factor and the various physiological cycles.

Adaptations

Two of the most important features of the Antarctic marine environment are: **(1)** the very low water temperature (-2 to +2°C near the Antarctic Continent; +3 to +6°C around the sub-Antarctic islands) and **(2)** the narrow range of seasonal temperature variation. This relative stability of the thermal environment has permitted the Antarctic fishes to evolve in such a way that their metabolism as a whole is most efficient at low temperature; on the other hand, they were bound to develop special systems to prevent freezing of their bodies. Sea water has a freezing point of about -1.8°C while the body fluids (blood) of fish have a salt concentration that can lower their freezing point only about -0.7°C. It has been shown by various workers that Antarctic fish can develop an "antifreeze" in their blood which is composed of a series of specific glycoproteins.

Antarctic fishes have developed other adaptations for reducing the effects of the slow rates of biochemical reactions in cold environments. As a result of this, Antarctic fishes are sufficiently active to live, grow, reproduce and prey entirely within the boundaries of the Southern Ocean.

There has also been a great deal of interest in the respiratory physiology of Antarctic fishes ever since it was discovered in 1954 that the icefishes (Channichthyidae) have no haemoglobin or any other respiratory pigments in their blood. Since icefishes and red-blooded fish have been shown to extract oxygen from the water at similar rates, the former require a faster blood circulation in order to maintain a normal metabolic level. This can be achieved by increasing either the heart beats per minute, the stroke volume or both together.

Production and Exploitation

At Signy Island, the biomass of Notothenia neglecta in shallow waters has been etimated at 194 kg/ha^{-1}. On the shelf area around the Kerguelen Islands, the standing stock of fish has been estimated at about 130 000 tons (24 kg/ha^{-1}). Estimates of fish production have also been based on total food consumption by major predators (whales, seals and birds). The greater part of the present fish catches in the Southern Ocean is taken from the South Georgia, South Orkneys and South Shetland islands (Fishing Area 48) and from the Kerguelen Islands (Fishing Area 58). Fishing effort is known only from the latter area.

Attention of commercial fisheries has focused on the Southern Ocean initially because of krill, which is potentially the largest resource of the area. However, as krill processing technology took a long time to develop, the major effort has so far been aimed at fish. Thus, although finfish were probably not the most important long-term target for most fishing boats or fleets, they have become very heavily exploited. Catches varied considerably from year to year, with a major peak during the 1970/71 season: two species dominated the catches, Notothenia rossii and Champsocephalus gunnari, with up to 400 000 and 125 000 tons, respectively. But during the last fishing seasons, catches have been regularly decreasing (only 195 000 tons of finfish were taken in both fishing areas during the 1982-83 season).

AID TO THE IDENTIFICATION OF FAMILIES OCCURRING IN THE SOUTHERN OCEAN

This guide includes all marine families present in the Southern Ocean waters, even those more frequently occurring at greater depths.

Code numbers are given for families described on Identification Sheets.

Note

(a) Outline drawings are intended to represent major morphological types in each family; therefore, not every genus is illustrated.

(b) Information applies to the Southern Ocean representatives only.

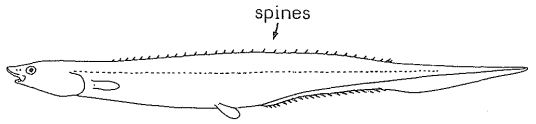
(c) Characterization of families and genera applies only to representatives from the Southern Ocean

SPINY EELS - Notacanthiformes

Body very elongate; snout projecting; a single short-based dorsal fin; anal fin long.

NOTACANTHIDAE Spiny eels

To 45 cm; marine, at depths around 2 600 m; benthic a single species known from the area: Polyacanthonotus challengeri.



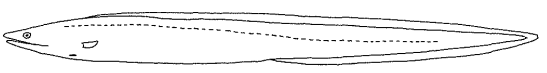
Polyacanthonotus

EELS - Anguilliformes

Body very elongate; fin-spines absent; pelvic fins absent; usually scaleless.

SYNAPHOBRANCHIDAE Cutthroat eels

To about 60 cm; marine, from about 1 500 to 4 000 m depth; benthic. A single species known from the area: Histiobranchus bathybius.



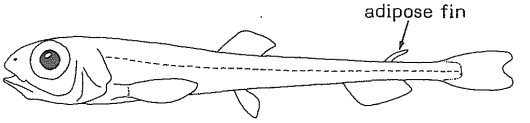
Histiobranchus

ARGENTINES AND ALLIES - Salmoniformes

A diverse assemblage of families characterized by the inclusion of the maxilla in the gape of mouth; fin-spines absent; adipose fin often present.

BATHYLAGIDAE Deep-sea smelts

To about 20 cm; marine, from the surface to below 2 000 m depth; epipelagic to mesopelagic and bathypelagic.



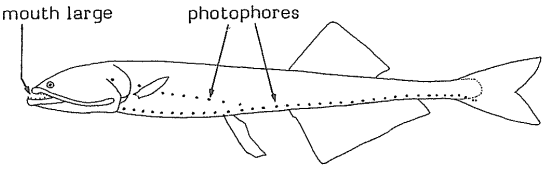
Bathylagus

BRISTLEMOUTHS AND ALLIES - Stomiiformes

Luminescent organs present; mouth large, extending past eye in most species; mental barbel present in some.

GONOSTOMATIDAE Bristlemouths

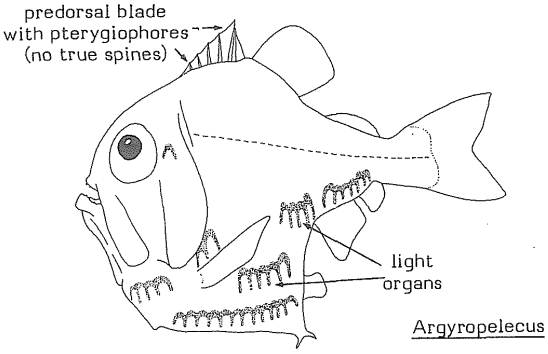
To about 25 cm; mostly in deep water (usually below 200 m), but some species coming up to about 50 m at night; mesopelagic to bathypelagic.



Cyclothone

STERNOPTYCHIDAE Marine hatchet fishes

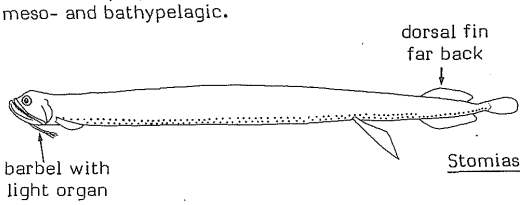
To 20 cm; marine, from the surface to below 3 500 m depth; meso- and bathypelagic.



Argyropelecus

STOMIIDAE Scaly dragonfishes

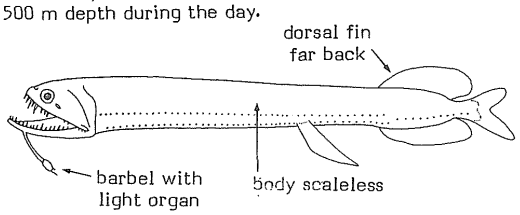
To 40 cm; marine, from the surface (rarely) to 2 000 m depth, but mainly between 300 and 500 m; meso- and bathypelagic.



Stomias

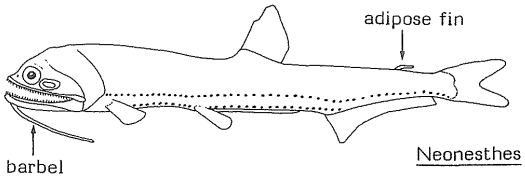
MELANOSTOMIIDAE Scaleless dragonfishes

To 35 cm; marine, meso- to bathypelagic deeper than 500 m depth during the day.



ASTRONESTHIDAE Snaggletooths

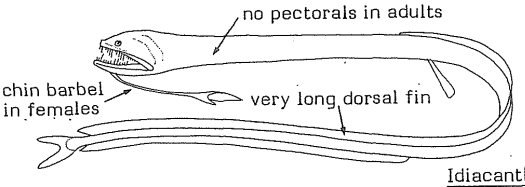
To about 20 cm; marine, from about 150 to below 2 000 m depth; mesopelagic.



Neonesthes

IDIACANTHIDAE Black dragonfishes

To about 45 cm; marine, from the surface (rarely) to over 2 000 m depth; meso- and bathypelagic.



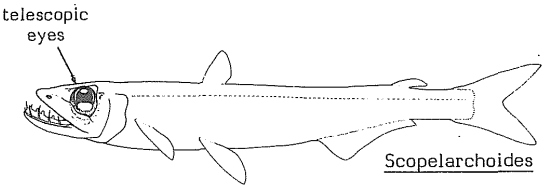
Idiacanthus

BARRACUDINAS AND ALLIES - Aulopiformes

Light organs absent. Characterized by specialization of gill arches.

SCOPELARCHIDAE Pearleyes

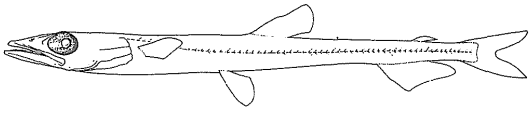
To 23 cm; marine, from the surface to below 3 000 m depth, mostly below 500 m; meso- and bathypelagic.



Scopelarchoides

NOTOSUDIDAE Waryfishes

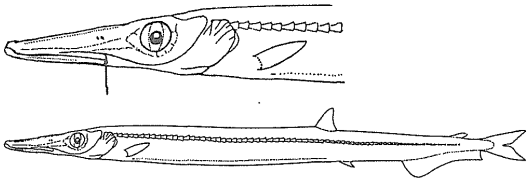
To 50 cm; marine, mostly above 1 000 m depth; mesopelagic.



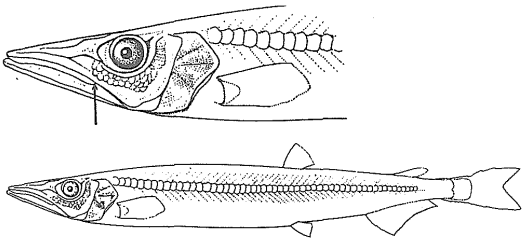
Scopelosaurus

PARALEPIDIDAE Barracudinas PARALEP

To 55 cm; marine, from the surface to below 2 000 m depth; meso- and bathypelagic.



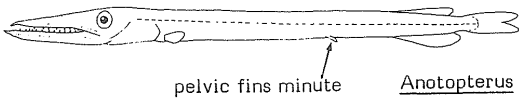
Notolepis



Magnisudis

ANOTOPTERIDAE Daggertooths

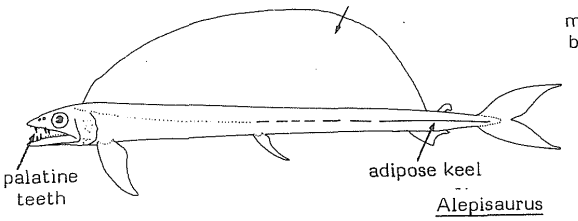
To at least 90 cm; marine, from about 500 to 2 000 m depth; meso- and bathypelagic. A single species known from the area: Anotopterus pharao.



Anotopterus

ALEPISAURIDAE Lancetfishes

To over 200 cm; marine, from the surface (mainly at night) to great depths; meso- and bathypelagic. A single species known from the area: Alepisaurus brevirostris.



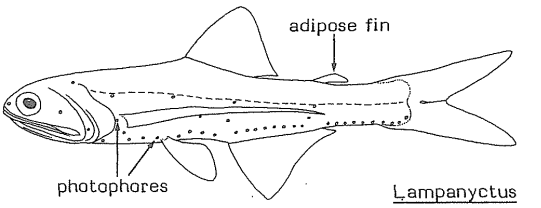
Alepisaurus

LANTERNFISHES AND ALLIES - Myctophiformes

Fin-spines absent; adipose fin present; light organs (photophores) sometimes present.

MYCTOPHIDAE Lanternfishes MYCT

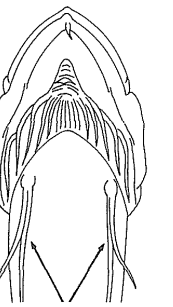
To 30 cm, but most species less than 10 cm; from the surface (at night) to below 2 000 m depth; meso- to bathypelagic.



Lampanyctus

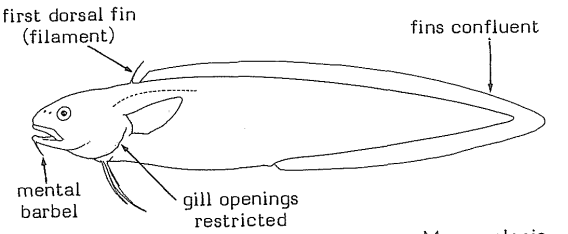
CODS, HAKES AND ALLIES - Gadiformes

No sharp spines in fins (except in dorsal fin of some macrourids); pelvic fins below or anterior to pectoral fins and widely separated from each other, usually entire, but reduced to filaments in some species; barbels often present on chin.



MURAENOLEPIDIDAE Moray cods MURAENOL

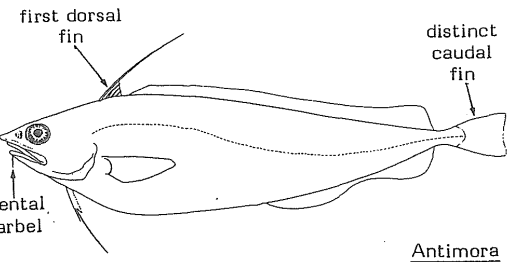
To 40 cm; marine, from shallow waters to about 600 m depth; benthic.



Muraenolepis

MORIDAE Moras MOR

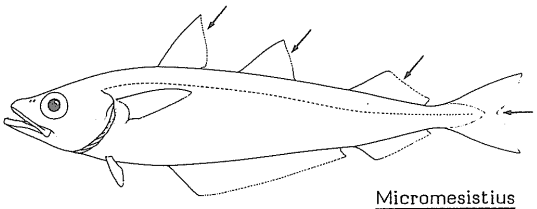
To 70 cm, but most species less than 50 cm; marine, from about 400 to below 3 000 m depth; benthopelagic.



Antimora

GADIDAE Cods GADI

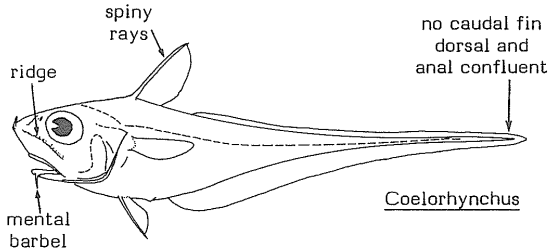
To about 90 cm; marine, from about 70 to 800 m depth; benthopelagic to pelagic. A single species known from the area: Micromesistius australis.



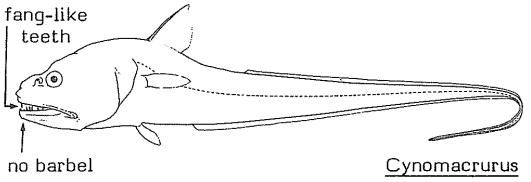
Micromesistius

MACROURIDAE Grenadiers MACROUR

To about 80 cm; marine, from about 150 to below 2 000 m depth; benthopelagic and bathypelagic.



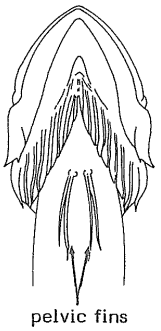
Coelorhynchus



Cynomacrurus

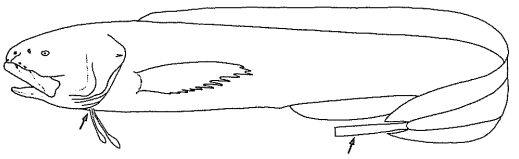
CUSKEELS, BROTULAS AND ALLIES - Ophidiiformes

No sharp spines in fins; pelvic fins absent in some species; when present, these fins are placed anterior to pectoral fins, sometimes far forward on under-surface of head; they are always close together and filamentous, each with no more than 2 rays; caudal fin separate or joined to dorsal and anal fins.



OPHIDIIDAE Cuskeels

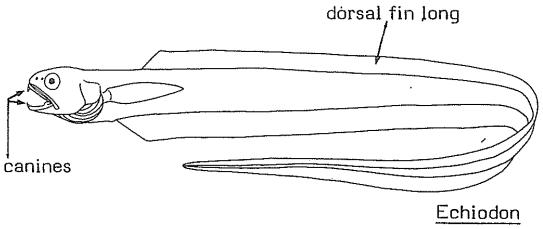
To at least 35 cm; marine, abyssal, benthopelagic. A single species from the area known from 1 specimen caught at 4 570 m depth: Holcomycteronus brucei.



Holcomycteronus

CARAPIDAE Pearlfishes

To about 20 cm; marine from coastal waters to the continental slope, mostly benthic, living in clams, tunicates and starfish. Rare in the Southern Ocean, recorded in South Georgia.



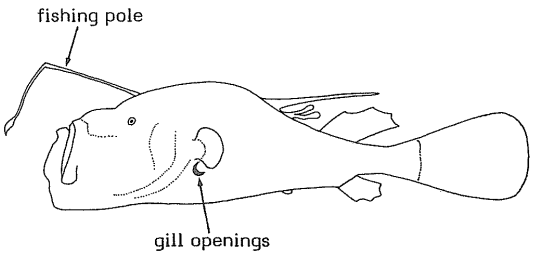
Echiodon

ANGLERFISHES AND ALLIES - Lophiiformes

Body globose or depressed; first spine of dorsal fin modified to form a "fishing pole", gill openings small and circular, usually located below or behind pectoral fins.

CERATIIDAE Seadevils

To at least 11 cm; marine, from around 700 m depth; meso- to bathypelagic. Males parasitic.



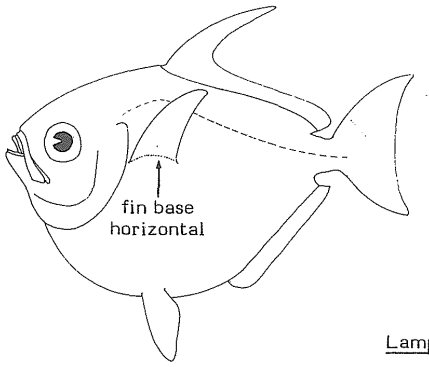
Cryptopsarus

OPAHS AND ALLIES - Lampridiformes

Body oval, fins spineless; bases of pectoral fins horizontal; jaws protrusible.

LAMPRIDIDAE Opahs

To 100 cm; marine, rare, from 300 (possibly from near the surface) to about 500 m depth; pelagic. A single species known from the area: Lampris immaculatus.



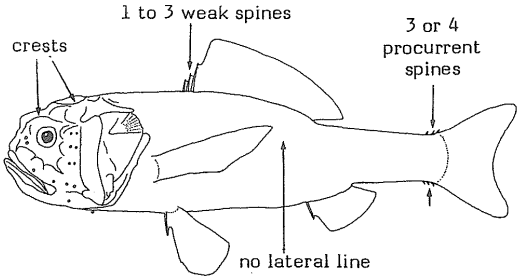
Lampris

SQUIRRELFISHES AND ALLIES - Beryciformes

Head spines and/or crests well developed; fin-spines well developed; scales heavy and large.

MELAMPHAIDAE Ridgeheads, Bigscale fishes

To about 20 cm; marine, from about 200 to below 2 000 m depth; meso- and bathypelagic.



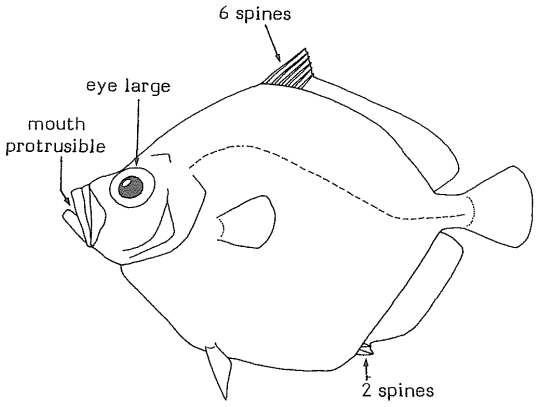
Melamphaes

DORIES AND ALLIES - Zeiformes

Body usually compressed and deep; jaws greatly extensible; prominent spines in anterior part of dorsal fin.

OREOSOMATIDAE Oreos

To 20 cm; marine, from 30 to about 700 m depth; mesopelagic; a single species known from the area: Xenocyttus nemotoi.



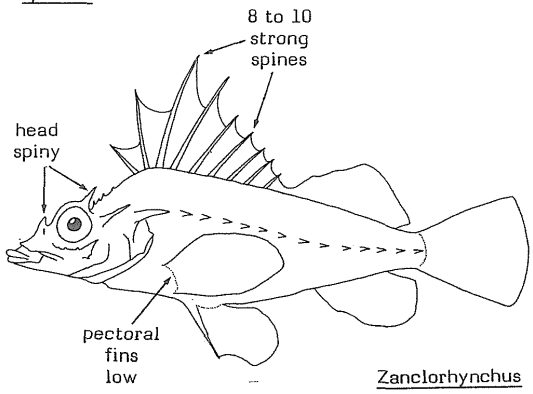
Xenocyttus

SCORPIONFISHES AND ALLIES - Scorpaeniformes

Cheeks with a bony strut (posterior extension of suborbital bone to preopercle); usually well developed spines on head and prominent spines in dorsal fin; pectoral fins usually rounded; membranes between lower rays often incised.

CONGIOPODIDAE Horsefishes CONGIO

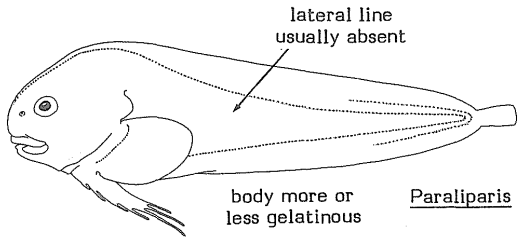
To 40 cm; marine, from shallow coastal waters (15 m) to about 150 m depth; benthic. A single species known from the area: Zanclorhynchus spinifer.



Zanclorhynchus

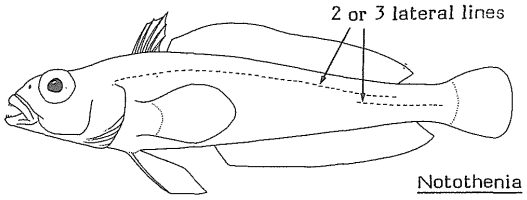
LIPARIDIDAE Lumpfishes and Snailfishes LIPA

To about 20 cm, but usually smaller; marine, from 400 to below 1 400 m depth; benthic to benthopelagic.



NOTOTHENIIDAE Rockcods, Noties, Ice devils NOT

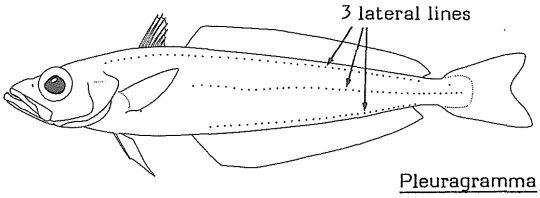
To 240 cm, but usually under 70 cm; marine, from the coastline to below 500 m depth; benthic or pelagic.

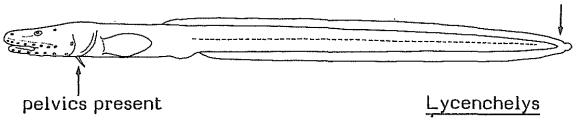


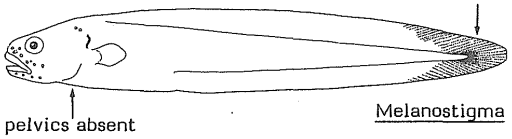
ROCKCODS AND ALLIES - Perciformes - Zoarcoidei

ZOARCIDAE Eelpouts ZOAR

To 30 cm; marine, from 500 to below 1 200 m; benthic.





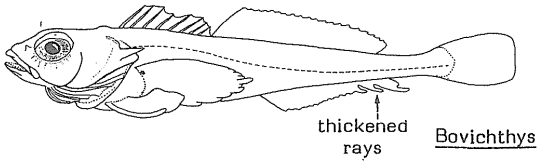


COD ICEFISHES AND ALLIES - Perciformes - Notothenioidei

A single nostril on each side; fins without pungent spines; first (spinous) dorsal, when developed, much shorter than the long second dorsal and anal fins; pectoral fins typically broad-based.

BOVICHTHYIDAE Bull blennies

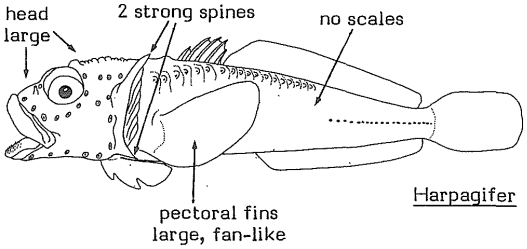
To 30 cm; marine, from shallow coastal waters (in summer) to about 100 m depth (in winter); benthic. A single species known from the area: Bovichthys elongatus.



HARPAGIFERIDAE HARPAG

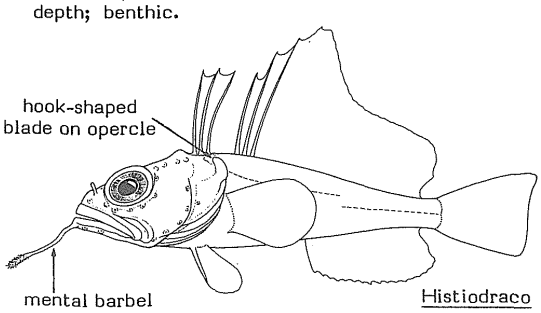
Spiny plunderfishes

To 11 cm; marine, from the coastline to about 180 m depth; benthic.



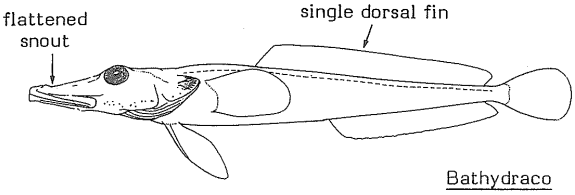
ARTEDIDRACONIDAE Plunderfishes ART

To 30 cm; marine, from about 100 to below 2 500 m depth; benthic.



BATHYDRACONIDAE Dragonfishes BATHY

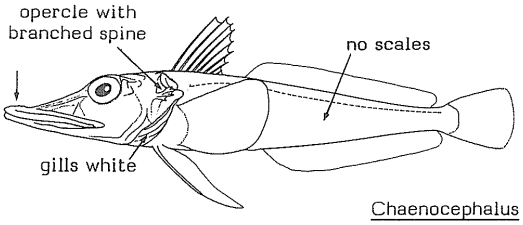
To 40 cm; marine, from the coastline to below 700 m depth; benthic.



Bathydraco

CHANNICHTHYIDAE Icefishes CHANN

To 75 cm; blood pigment absent; marine, from the coastline to below 700 m depth; benthic.



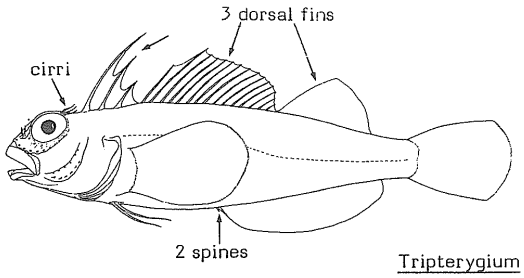
Chaenocephalus

BLENNIES AND ALLIES - Perciformes - Blennioidei

Dorsal fin long or multiple; pelvic fins reduced, with 1 hidden spine and 2 to 4 soft rays, located ahead of pectoral fins; tentacles often present on head; two anal-fin spines (one of them sometimes difficult to see).

TRIPTERYGIIDAE Threefin blennies

To 6 cm; marine in the intertidal zone; benthic. A single species known from the area: Tripterygium antarcticum.



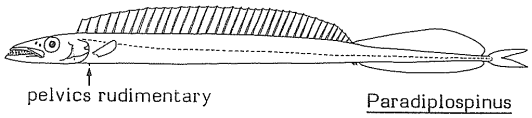
Tripterygium

SNAKE MACKERELS AND ALLIES - Perciformes - Scombroidei

Body extremely elongate; strong fang-like teeth; pelvic fins reduced to a minute spine in adults.

GEMPYLIDAE Snake mackerels, escolars and oilfishes

To about 50 cm; marine, from about 100 to below 2 800 m depth; mesopelagic and bathypelagic. A single species known from the area: Paradiplospinus antarcticus.



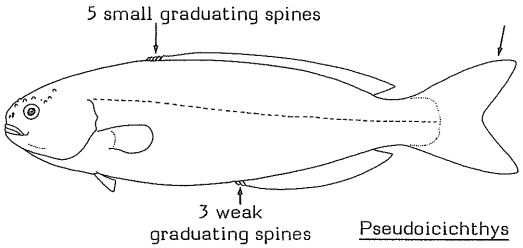
Paradiplospinus

HARVESTFISHES AND ALLIES - Perciformes - Stromateoidei

Shape variable; snout blunt and thick; toothed saccular outgrowths (pharyngeal sacs) present in the gullet immediately behind the last gill arch; teeth small, approximately uniserial.

CENTROLOPHIDAE Ruffs

To about 50 cm; marine, from near the surface to 1 200 m depth (possibly even deeper); epi- to bathypelagic. A single species known from the area: Pseudoicichthys australis.



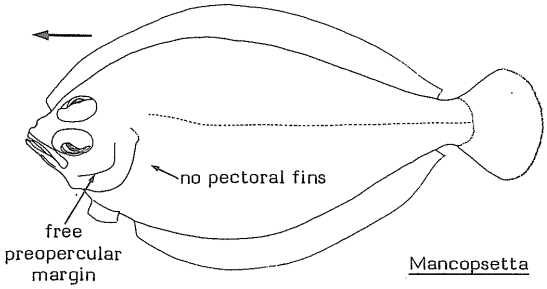
Pseudoicichthys

FLATFISHES - Pleuronectiformes

Flattened body shape; eyes present on one side of body only.

BOTHIDAE Lefteye flounders, armless flounders BOTH

To about 50 cm; marine, from 20 to below 600 m depth; benthic.



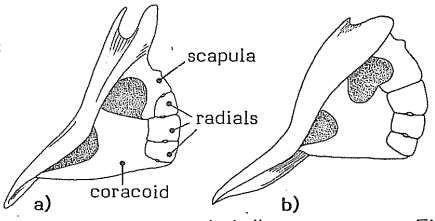
Mancopsetta

The suborder Notothenioidei of the order Perciformes, being the most important group, particularly in terms of number of species and value to fisheries, it appears necessary to include here a key to the families of that suborder.

KEY TO FAMILIES OF THE SUBORDER NOTOTHENIOIDEI:

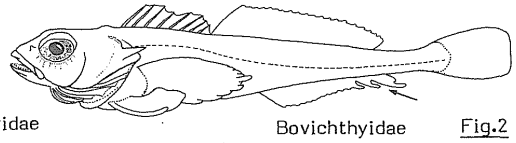
1a. Last rays of anal fin elongate and thickened; one radial on scapula bone, 2 on coracoid bone of the pectoral girdle (Figs 1a,2) ..... Bovichthyidae

1b. Last rays of anal fin shorter and thinner than the others; all 3 radials on the coracoid bone (Fig.1b)

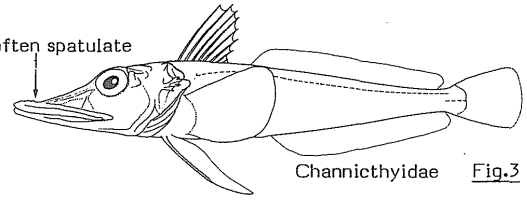


pectoral girdle Fig.1

2a. Palatine mostly ligamentous; mouth not protractile; snout produced, depressed and often spatulate; blood without red pigment (Fig.3) ..... Channichthyidae


Bovichthyidae Fig.2

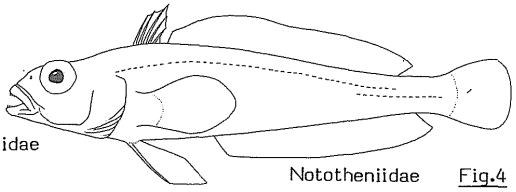
2b. Palatine normally developed; mouth protractile or not; snout never spatulate, often pointed or depressed; blood with normal red pigment



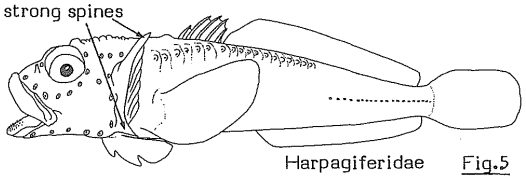
Channicthyidae Fig.3

3a. Two dorsal fins; mouth protractile

4a. Opercle normal, not hooked upward posteriorly; body scaled; gill membranes forming a fold across the isthmus (Fig.4) ..... Nototheniidae


Nototheniidae Fig.4

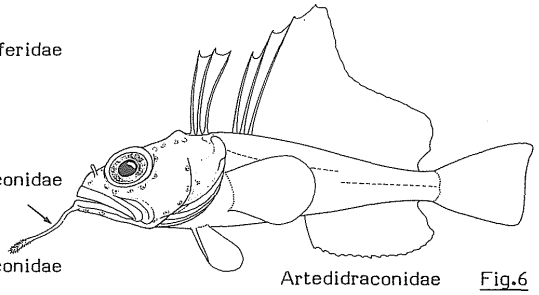
4b. Opercle hooked upward posteriorly, its upper edge deeply concave; body scaleless; gill membranes broadly united to isthmus



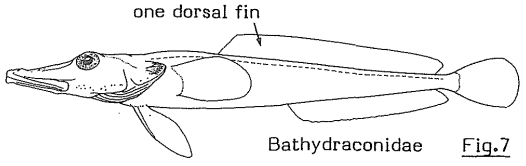
Harpagiferidae Fig.5

5a. Opercle and subopercle each bearing a strong spine; no barbel on chin (Fig.5)..... Harpagiferidae

5b. Opercle and subopercle without a strong spine; barbel always present on chin (Fig.6)..... Artedidraconidae


Artedidraconidae Fig.6

3b. Only one dorsal fin; mouth non-protractile (Fig.7) ..... Bathydraconidae



Bathydraconidae Fig.7

ART

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

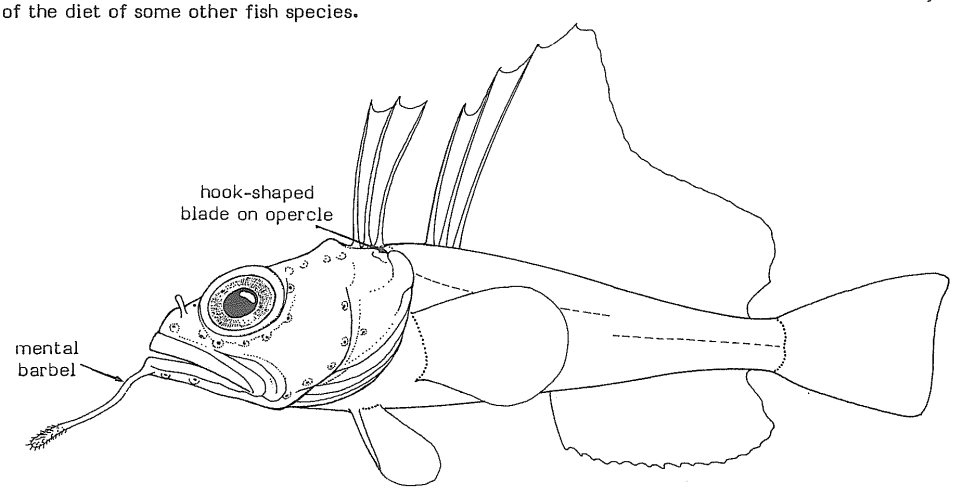
ARTEDIDRACONIDAE

Plunderfishes

Small to moderate-sized fishes (up to 30 cm). Body always elongate. Head large and high, sometimes depressed; snout short, rounded, shorter than eye diameter; lower jaw produced in most species, with the maxilla reaching posteriorly to below posterior part of eye in some species, but generally not extending beyond the anterior margin of pupil; mouth protractile; a mental barbel present, single and stalked, its tip variable in shape but specifically characteristic; teeth in villiform bands, without distinct canines; opercle without a strong spine, but with a characteristic hook-shaped blade; gill membranes broadly united to isthmus; gillrakers normally developed. Two dorsal fins, the first one with very few, flexible rays, short or very long, the second with a long base, rather elevated in some species; anal fin long and often elevated, without spines; pectoral fins broad and fan-like; pelvic fins jugular in position; caudal fin truncate, rounded or emarginate. Body completely scaleless, except the two lateral lines covered with tubular scales.

Colour: general pattern dark or clear with or without marbled bars or spots on body and head; fins often spotted with black dots.

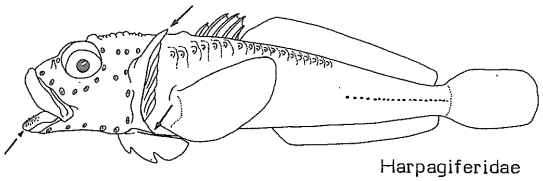
Plunderfishes are widely distributed on the shelves and slopes of the Antarctic Continent and sub-Antarctic islands. Some species have been found at considerable depths (more than 2 500 m). They mostly feed on benthic crustaceans and other small invertebrates. The Fishing Areas 48,58 and 88 comprise 4 genera and 19 species , none of which has any commercial value. They were included here because of their particular interest as members of the most common suborder (Notothenioidei) of Antarctic fishes and as major components of the diet of some other fish species.



SIMILAR FAMILIES OCCURRING IN THE AREA :

All other notothenioid fishes occurring in the Southern Ocean are easily distinguished from the Artedidraconidae, mainly by the following characters:

Harpagiferidae: no mental barbel; presence of strong and sharp spines on the opercle.



Harpagiferidae

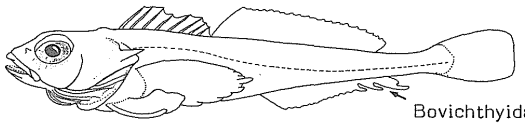
*Another species is being described by Miller & Rheuben and hence, cannot be included here

Nototheniidae: body scaled; opercle normal, not hooked upward posteriorly.

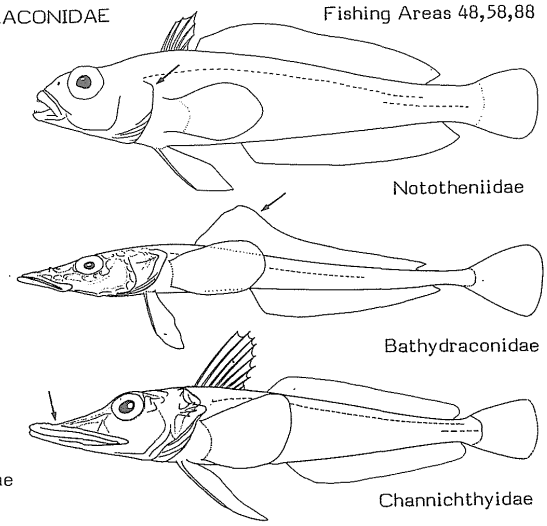
Bathydraconidae: only one dorsal fin; mouth non-protractile.

Channichthyidae: head spiny, with a produced and flattened snout. They also lack oxygen-carrying pigment in their blood which appears whitish or translucent, rather than red.

Bovichthyidae*: last rays of anal fin elongate and thickened distally.



Bovichthyidae



Nototheniidae

Bathydraconidae

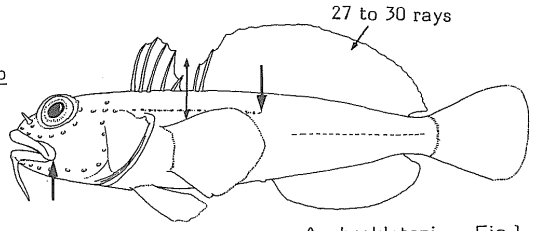
Channichthyidae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA**

1a. *Post-temporal bone not prominent; head* not or scarcely broader than deep; inter-orbital region narrow

2a. First dorsal fin at least partly above base of pectoral fin (Figs 1-5)..genus Artedidraco

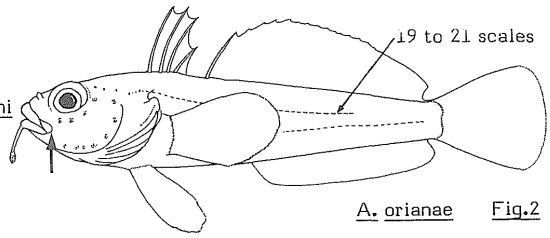
3a. Upper lateral line with 9 or more tubular scales, the row of tubular scales extending to below second dorsal fin, below the first 3 or more dorsal fin rays (Fig.1)



A. shackletoni Fig.1

4a. Second dorsal fin with 27 to 30 rays; length of upper jaw 12.6 to 14.5% of standard length (Fig.1) ... Artedidraco shackletoni

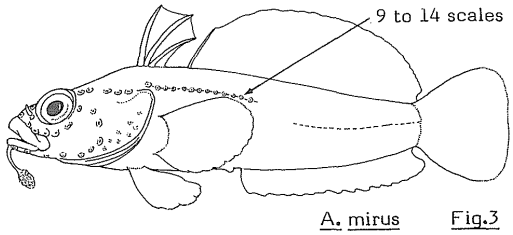
4b. Second dorsal fin with 23 to 25 rays; length of upper jaw 10.6 to 11.5% of standard length (Figs 2,3)



A. orianae Fig.2

5a. Upper lateral line with 19 to 21 tubular scales (Fig.2) ..... Artedidraco orianae

5b. Upper lateral line with 9 to 14 tubular scales (Fig.3) ..... Artedidraco mirus



A. mirus Fig.3

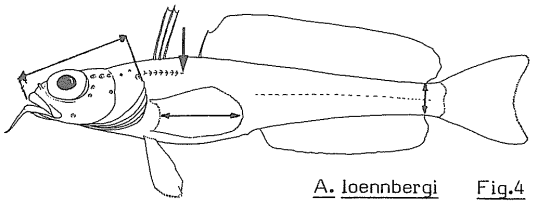
* Only one species has been described from area 48 (Antarctic Peninsula), Bovichthys elongatus Hureau & Tomo, 1977; the other species of the family are known from the southern coasts of South America, New Zealand and Australia

** The key to Pogonophryne species has been adapted from Eakin and Kock (1984)

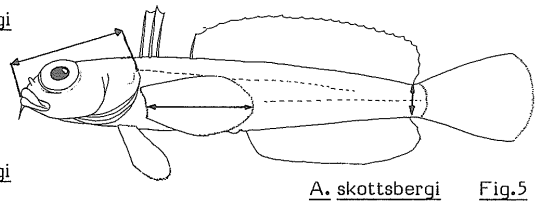
3b. Upper lateral line with 8 or fewer tubular scales, the row of tubular scales not extending to below dorsal fin, or at most, to below first dorsal ray (Fig.4)

6a. Depth of caudal peduncle 19.4 to 21.4% of head length; length of pectoral fins 60.7 to 71.8% of head length (Fig.4) .... Artedidraco loennbergi

6b. Depth of caudal peduncle 25.3 to 29.7% of head length; length of pectoral fin 77.4 to 85.2% of head length (Fig.5) ... Artedidraco skottsbergi

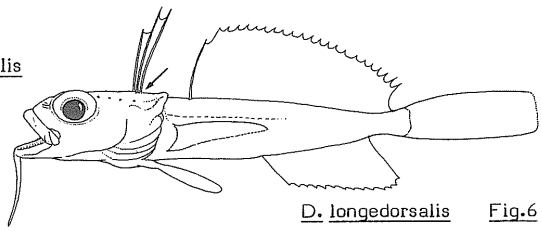


A. loennbergi Fig.4



A. skottsbergi Fig.5

2b. First dorsal fin entirely above or slightly behind opercle (Fig. 6) ..... Dolloidraco longedorsalis

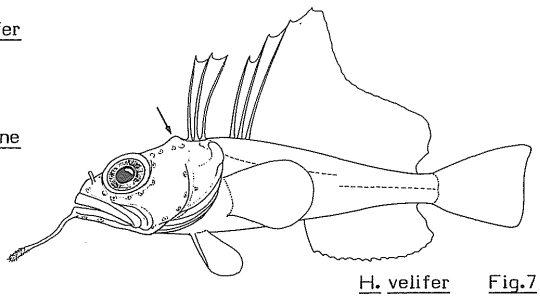


D. longedorsalis Fig.6

1b. Upper limb of post-temporal bone projecting as a prominent, curved ridge; first dorsal fin above opercle (Figs 7 to 19)

7a. Head longer than broad, scarcely broader than deep; interorbital region narrow (Fig.7) ..... Histiodraco velifer

7b. Head nearly as broad as long, much broader than deep; interorbital region wide or rather wide ..... genus Pogonophryne

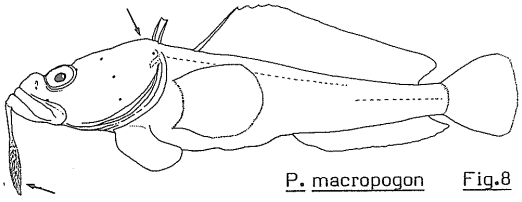


H. velifer Fig.7

8a. Body and at least part of head with dark spots

9a. Top of head with dark spots (Figs 11 to 15); second dorsal fin with 25 to 29 rays; vertebrae 36 to 39

10a. Mental barbel very long (about 23% of standard length), its expanded tip comprising over 63% of barbel length (Fig.9a); vertebrae 29 (Fig.8)... Pogonophryne macropogon



P. macropogon Fig.8

10b. Mental barbel of varying sizes and shapes, its tip, if expanded, comprising less than 63% of barbel length (Fig.9b to g); vertebrae 36 to 38

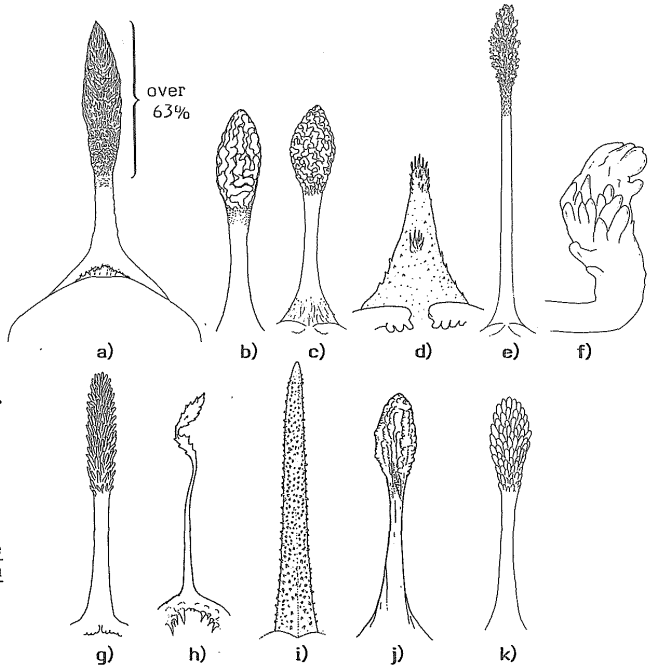
11a. Eye not filling entire orbit anteriorly; mental barbel with convoluted terminal expansion (Fig.9b,c)

12a. Caudal fin with vertical stripes; tip of tongue falling far short of oral valve ..... Pogonophryne sp.

12b. Caudal fin without vertical stripes, dark with light dorsal and ventral borders; tip of tongue reaching oral valve (Fig.10) ..... Pogonophryne marmorata

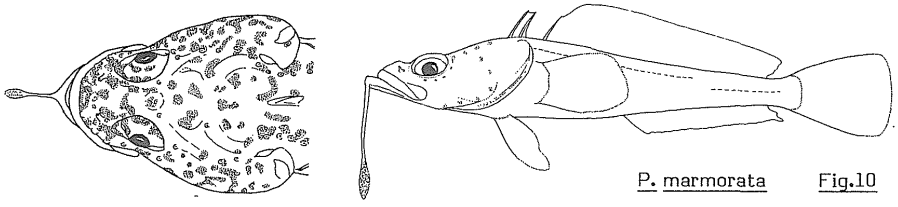
11b. Eye filling entire orbit; mental barbel without convoluted terminal expansion (Fig.9d to g)

13a. Colour, especially of fins, dark chocolate brown; mental barbel 8.2 to 14.3% of head length, without terminal expansion (Figs 9d,11).. Pogonophryne barsukovi*

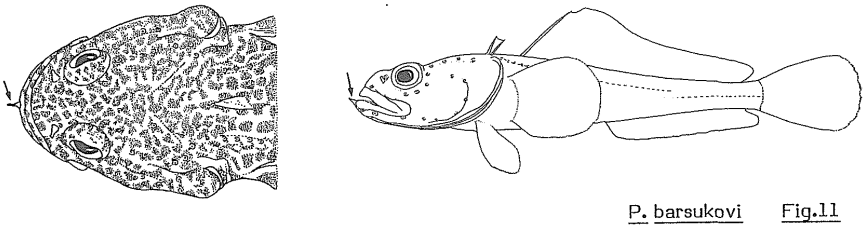


a) P. macropogon
b) Pogonophryne sp.
c) P. marmorata
d) P. barsukovi
e) P. mentella
f) P. velifera
g) P. permitini
h) P. phyllopogon
i) P. scotti
j) P. dolichobranchiata
k) P. albipinna

shapes of mental barbels (not in correct size relation) Fig.9



P. marmorata Fig.10

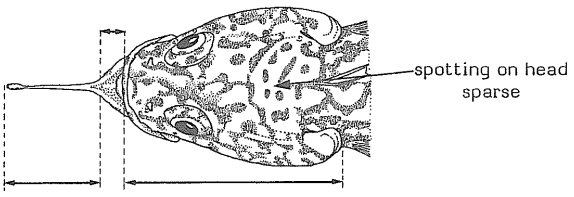


P. barsukovi Fig.11

* A closely related species, P. orcadensis, has been described by Tomo (1981) but, according to Eakin and Kock (1984), it must be considered as a junior synonym of P. barsukovi

13b. Colour of fins and body light brown; mental barbel 17.8 to 70.4% of head length, with a terminal expansion (Fig.9e to g)

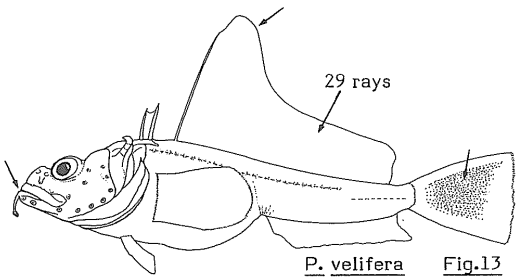
14a. Lower jaw projecting greatly beyond upper jaw (projection equals 6.8 to 10.5% of head length); spotting on head sparse, following cephalic pores; mental barbel 40.7 to 70.4% of head length; first gill arch with 17 to 19 gillrakers (Figs 9e,12) ..... Pogonophryne mentella *



P. mentella Fig.12

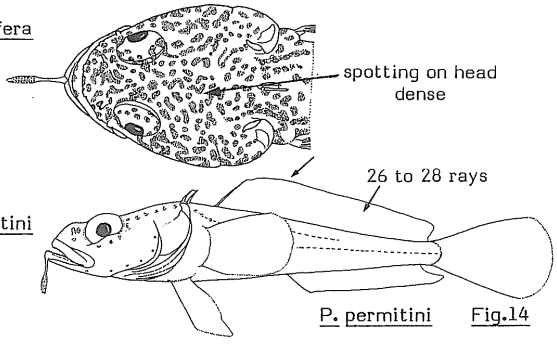
14b. Lower jaw not projecting greatly beyond upper jaw (projection equals 0 to 7.4% of head length); spotting on head dense, not following cephalic pores (Figs 13, 14); mental barbel 17.8 to 36.8% of head length; first gill arch with 13 to 17 gillrakers

15a. Second dorsal fin with 29 rays; anterior third of fin with a high lobe, length of longest ray 35.4% of standard length; mental barbel with short, thick, unbranched processes (Fig.9f); caudal fin with a dark median patch (Fig.13) ..... Pogonophryne velifera



P. velifera Fig.13

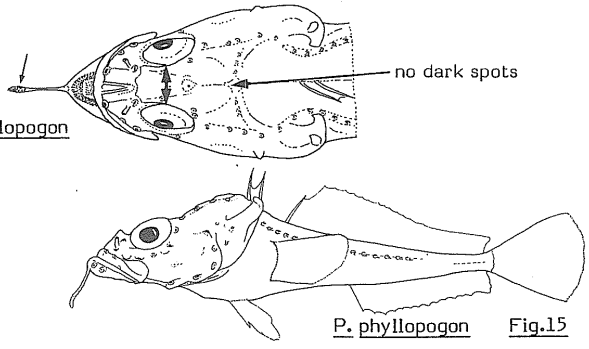
15b. Second dorsal fin with 26 to 28 rays and no anterior lobe; mental barbel with thin, finger-like processes, some branched (Fig.9g); caudal fin without a dark median patch (Fig.14) ..... Pogonophryne permitini



P. permitini Fig.14

9b. Top of head without dark spots (Fig.15 to 19); second dorsal fin with 24 to 26 rays; vertebrae 35 to 37

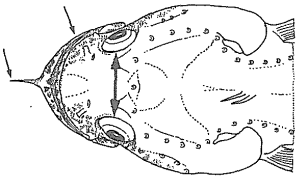
16a. Mental barbel with a flattened terminal expansion covered with tapering processes (Fig.9h); interorbital region narrow, 5.2 to 6.8% of standard length (Fig.15) ..... Pogonophryne phyllopogon



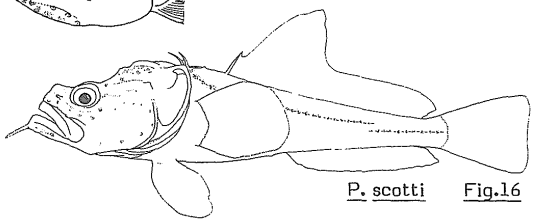
P. phyllopogon Fig.15

*A new species which is being described by Miller & Rheuben closely resembles P. mentella. It differs only by the colour of the pectoral fins and the shape of the cutaneous processes of the mental barbel

16b. Mental barbel either without flattened terminal expansion or terminal expansion not flattened and not covered with tapering processes (Fig.9i,j); interorbital region wide, 6.4 to 7.8% of standard length (Figs 16,17)

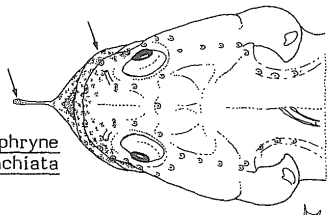


17a. Mental barbel without terminal expansion and entirely covered with papillae (Fig. 9i); upper jaw in dorsal view forming a smoothly rounded arc (Fig.16) ..... Pogonophryne scotti



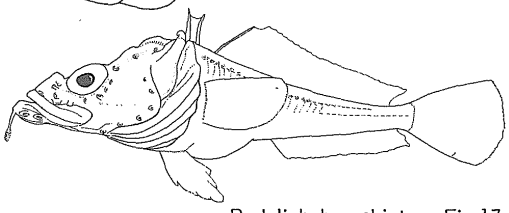
P. scotti Fig.16

17b. Mental barbel with a terminal expansion and not covered with papillae (Fig.9j); upper jaw in dorsal view somewhat angular, the maxillae directed posteriorly at an angle to the premaxillae (Fig.17) ..... Pogonophryne dolichobranchiata



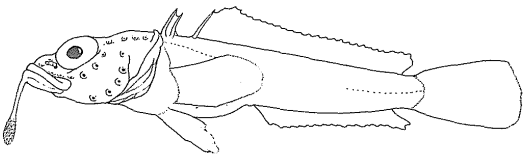
8b. Body and head entirely without dark spots

18a. Fins largely white; first gill arch with 21 gillrakers (Fig.18) .... Pogonophryne albipinna

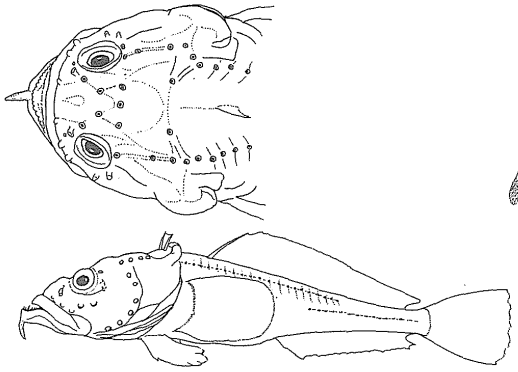


P. dolichobranchiata Fig.17

18b. Fins dark with light borders; first gill arch with 12 gillrakers (Fig.19) ..... Pogonophryne immaculata



P. albipinna Fig.18



P. immaculata Fig.19

LIST OF SPECIES OCCURRING IN THE AREA :

Artedidraco loennbergi (Roule, 1913)
Artedidraco mirus Lönnberg, 1905
Artedidraco orianae Regan, 1914
Artedidraco shackletoni Waite, 1911
Artedidraco skottsbergi Lönnberg, 1905

Dolloidraco longedorsalis Roule, 1913

Histiodraco velifer Regan, 1914

Pogonophryne albipinna Eakin, 1981
Pogonophryne barsukovi Andriashev, 1967 (= P. orcadensis Tomo, 1981)
Pogonophryne dolichobranchiata Andriashev, 1967
Pogonophryne immaculata Eakin, 1981
Pogonophryne macropogon Eakin, 1981
Pogonophryne marmorata Norman, 1938
Pogonophryne mentella Andriashev, 1967
Pogonophryne permitini Andriashev, 1967
Pogonophryne phyllopogon Andriashev, 1967
Pogonophryne scotti Regan, 1914
Pogonophryne velifera Eakin, 1981
Pogonophryne sp. Eakin & Kock, 1984

Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

BATHY

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

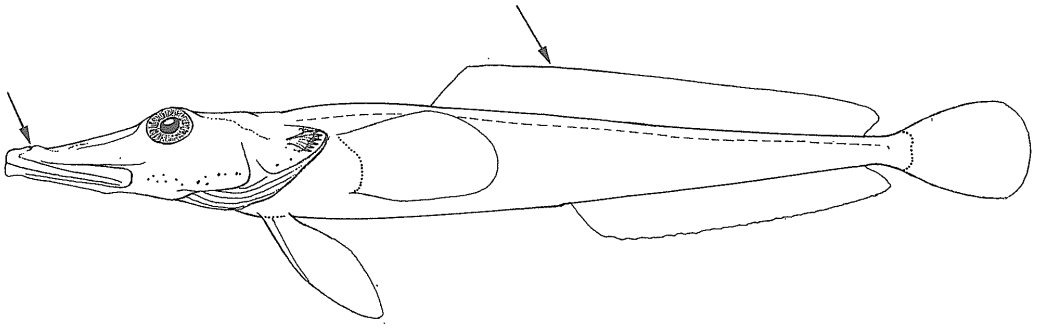
BATHYDRACONIDAE

Dragonfishes

Small to moderate-sized fishes. Body always elongate, fusiform. Head long, strongly depressed; snout spatulate or pointed; lower jaw produced in some species, the maxilla rarely reaching posteriorly to below anterior part of eye, more generally not reaching the anterior margin of eye; mouth non-protractile; teeth in villiform bands sometimes enlarged in canine-like teeth; palatine normally developed and elongate; opercle with or without spines; gill membranes attached to the isthmus or forming a fold across it; gillrakers normally developed. Only one, non-spinous, dorsal fin with a long base and often elevated; anal fin long and often elevated, without spines; pectoral fins broad and fan-like, pelvic fins jugular in position; caudal fin truncate, rounded or emarginate. Body scaled or scaleless. Lateral lines 1 to 3, covered with tubular scales, perforated scales or bony plates. No air bladder. Caudal skeleton with hypural bones 1 and 2, 3 and 4 always fused into 2 wide plates.

Colour: usually greyish or blackish with numerous black blotches and bands.

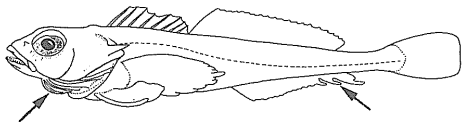
The dragonfishes are a small but diverse family of strictly Antarctic fishes, living at rather great depths close to the Antarctic Continent. Some species are coastal fishes adapted to life under the ice. The Fishing Areas 48, 58 and 88 comprise 16 species that are rather uncommon and seem to have no commercial value for fishing. They were included here because of their particular interest as members of the most common suborder (Notothenioidei) of Antarctic fishes.



SIMILAR FAMILIES OCCURRING IN THE AREA :

All other Notothenioid fishes occurring in the Southern Ocean are easily distinguished from the Bathydraconidae by having 2 dorsal fins. Other distinguishing characters are the following:

Bovichthyidae: gill membranes extending far forward, not attached to isthmus; body scaleless; posterior rays of anal fin elongate and thickened.



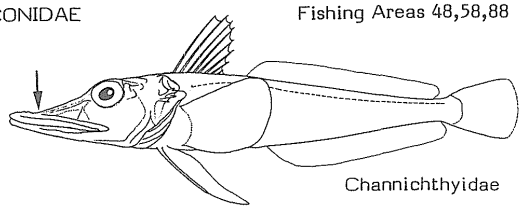
Bovichthyidae

FAO Species BATHYDRACONIDAE Fishing Areas 48,58,88

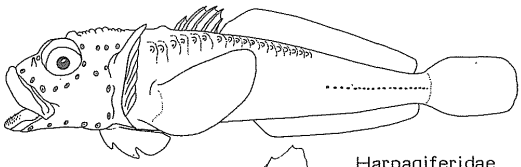
Channichthyidae: head very large, often spiny, with a produced and flattened snout. They also lack oxygen-carrying pigment in their blood which appears whitish or translucent, rather than red.

Harpagiferidae and Artedidraconidae: body scaleless and opercle hooked upward posteriorly, with a deeply concave upper edge; head large. Furthermore, the mental barbel present in Artedidraconidae.

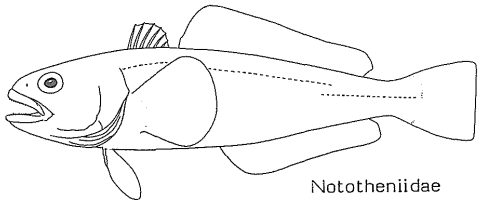
Nototheniidae: body always scaled; mouth protractile; opercle normal without spines.



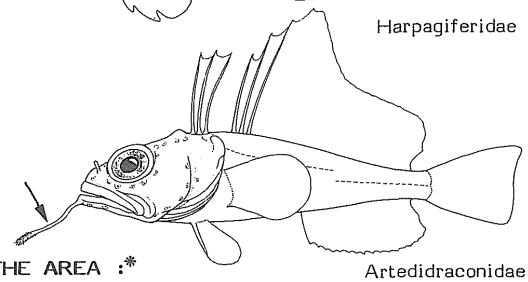
Channichthyidae



Harpagiferidae



Nototheniidae



Artedidraconidae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA :*

1a. Body scaled or with serrated bony plates

2a. Body scaled without serrated bony plates; upper lateral line, usually complete, rarely with row of tubular scales ending anterior to origin of dorsal fin

3a. A single lateral line present, usually running to middle of caudal fin base

4a. Twenty to 24 gillrakers on lower limb of first gill arch; lateral line with 37 to 45 tubular scales, ending below 5th to 12th posterior dorsal fin rays (Fig.1) ..... Bathydraco scotiae

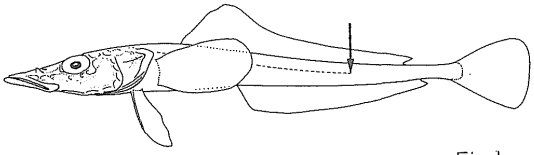


Fig.1

4b. Eleven to 19 gillrakers on lower limb of first gill arch; lateral line with 51 to 70 tubular scales ending posterior to dorsal base

5a. Head length 33% or more of standard length; distance between snout and anal fin origin more than half of standard length

6a. Dorsal fin with 36 to 38 rays; 10 or 11 rows of scales between origin of dorsal fin and lateral line; 103 to 116 scales in a longitudinal row (Fig.2).. Bathydraco antarcticus

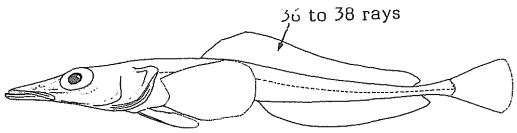
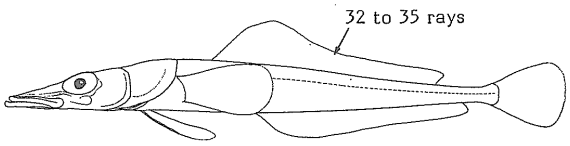


Fig.2

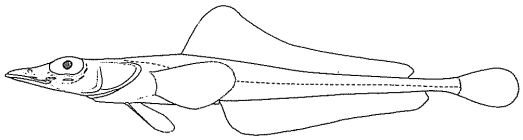
*Extended from the key to genera by DeWitt and Hureau (1979)

6b. Dorsal fin with 32 to 35 rays; 5 to 8 rows of scales between origin of dorsal fin and lateral line; 83 to 95 scales in a longitudinal row (Fig.3) .. Bathydraco macrolepis



Bathydraco macrolepis Fig.3

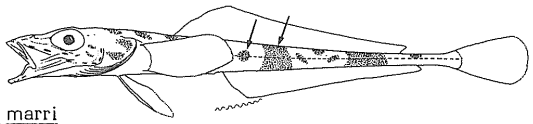
5b. Head length 32% or less of standard length; distance between snout and anal fin origin less than half of standard length



Bathydraco joannae Fig.4

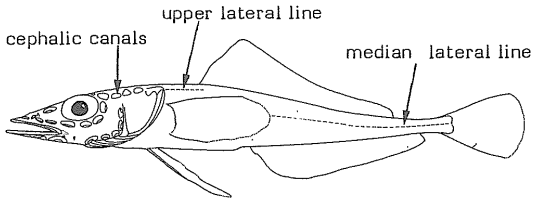
7a. Fouteeen to 17 gillrakers on lower limb of first gill arch; 55 to 67 tubular scales on lateral line; colour rather uniform brown (Fig.4) ..... Bathydraco joannae

7b. Eleven to 15 gillrakers on lower limb of first gill arch; 51 to 61 tubular scales on lateral line; ground colour pale, with a series of blotches and bars on sides and across back (Fig.5).. Bathydraco marri



Bathydraco marri Fig.5

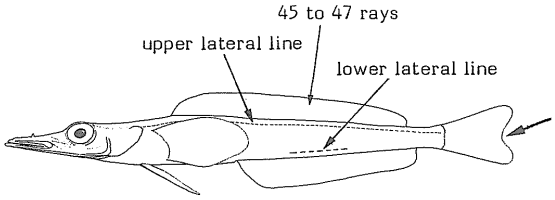
3b. Two or 3 lateral lines, the upper originating at upper angle of opercle and ending posteriorly in dorsal half of body; lateral lines covered with tubular or simple perforated scales



Akarotaxis nudiceps Fig.6

8a. Upper lateral line with less than 10 tubular scales; median lateral line with only perforated scales, extending from base of caudal fin to tip of pectoral fin; cephalic canals enlarged on top of head; no coronal pore (Fig.6) ..... Akarotaxis nudiceps

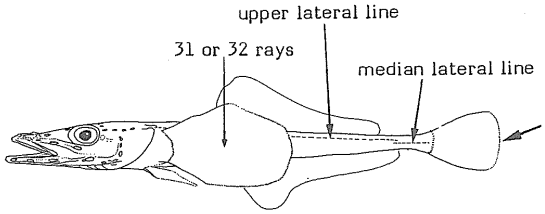
8b. Upper lateral line with more than 20 tubular scales; median lateral line present or absent; when present, with tubular scales; cephalic canals not greatly enlarged on top of head; coronal pore present



Gerlachea australis Fig.7

9a. Dorsal fin with 45 to 47 rays, the anterior part not elevated; caudal fin emarginate; upper and lower lateral lines present; median lateral line absent (Fig.7) ..... Gerlachea australis

9b. Dorsal fin with 30 to 37 rays, the anterior part forming a fairly distinct elevated lobe; caudal fin rounded or truncate; lower lateral line present or absent; median lateral line on caudal peduncle always present

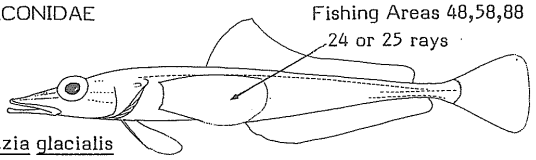


Vomeridens infuscipinnis Fig.8

10a. Pectoral fins with 31 or 32 rays; lower lateral line absent; teeth present on vomer bone (specimens longer than 100 mm standard length (Fig.8) ..... Vomeridens infuscipinnis

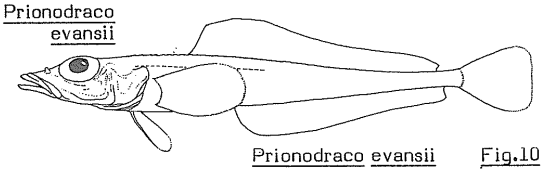
FAO Sheets BATHYDRACONIDAE Fishing Areas 48,58,88

10b. Pectoral fins with 24 or 25 rays; lower lateral line present on specimens longer than 130 mm standard length; no teeth on vomer bone (Fig.9) ..... Racovitzia glacialis



Racovitzia glacialis Fig.9

2b. Body quadrangular with a series of V-shaped serrated bony plates at each angle, each plate with a backwardly directed spine; a single short lateral line, ending below anterior part of dorsal fin (Fig.10) ..... Prionodraco evansii

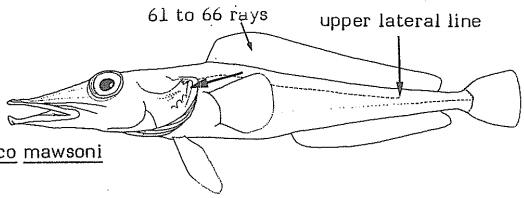


Prionodraco evansii Fig.10

1b. Body naked except for lateral line scales

11a. Teeth in jaws in villiform bands, without canine-like teeth; snout produced and spatulate; opercle with divergent ridges ending in spinous points

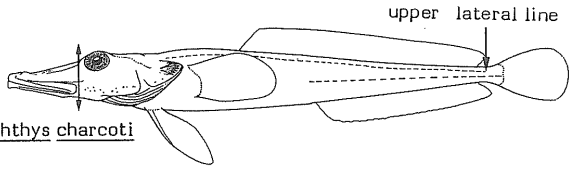
12a. Dorsal fin with 61 to 66 rays; upper lateral line ending below posterior part of dorsal fin (Fig.11) ..... Cygnodraco mawsoni



Cygnodraco mawsoni Fig.11

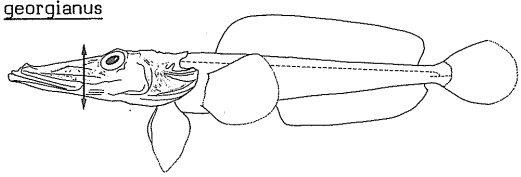
12b. Dorsal fin with 42 to 46 rays; upper lateral line extending beyond posterior end of dorsal fin

13a. Maxilla extending posteriorly to or nearly to below anterior margin of eye (Fig.12) ..... Parachaenichthys charcoti



Parachaenichthys charcoti Fig.12

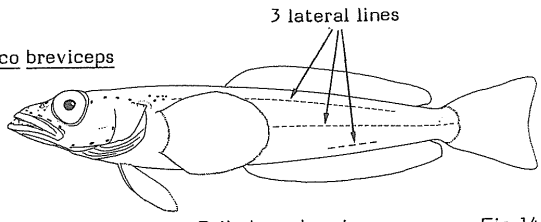
13b. Maxilla extending posteriorly to below a point at about one eye diameter in front of eye (Fig.13).. Parachaenichthys georgianus



Parachaenichthys georgianus Fig.13

11b. Canine-like teeth present in one or both jaws; snout pointed, not spatulate; opercle with a strong spine ending in a hooked process

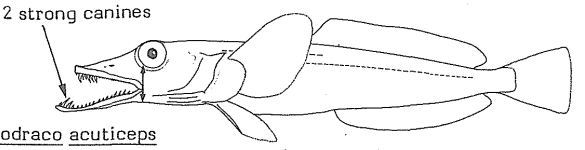
14a. Canine-like teeth present only on anterior parts of premaxilla; 3 lateral lines, none with a canal or tubular scales but with small pored scales; subopercular bone with 3 spines at anteroventral edge; preopercle with serrations near angle (Fig.14) ..... Psilodraco breviceps



Psilodraco breviceps Fig.14

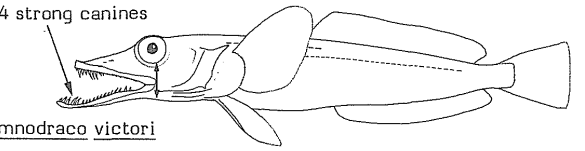
14b. Canine-like teeth present on anterior parts of both jaws; 2 lateral lines (upper and median), upper with a canal or tubular scales; subopercular bone with one spine at anteroventral corner; preopercle without spine or serrations

15a. Maxilla extending posteriorly to below anterior margin of eye; lower jaw strongly protruding bearing 2 strong curved canine teeth, the outer largest (Fig.15)..... Gymnodraco acuticeps



Gymnodraco acuticeps Fig.15

15b. Maxilla extending posteriorly beyond vertical of anterior margin of eye; lower jaw bearing 4 upward directed canine-like teeth, the inner largest (Fig.16) ..... Gymnodraco victori



Gymnodraco victori Fig.16

LIST OF SPECIES OCCURRING IN THE AREA :

Code numbers are given for those species for which Identification Sheets are included

Akarotaxis nudiceps (Waite, 1916) (= Bathydraco wohlschagi DeWitt & Tyler, 1960)

Bathydraco antarcticus Günther, 1887
Bathydraco joannae DeWitt, 1985
Bathydraco macrolepis Boulenger, 1907
Bathydraco marri Norman, 1938
Bathydraco scotiae Dollo, 1912

Cygnodraco mawsoni Waite, 1916

Gerlachea australis Dollo, 1900

Gymnodraco acuticeps Boulenger, 1902
Gymnodraco victori Hureau, 1963

Parachaenichthys charcoti (Vaillant, 1906)
Parachaenichthys georgianus (Fischer, 1885)

Prionodraco evansii Regan, 1914

Psilodraco breviceps Norman, 1938

Racovitzia glacialis Dollo, 1900 (= Aconichthys harrissoni Waite, 1916)

Vomeridens infuscipinnis (DeWitt, 1964)

Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

BOTH

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

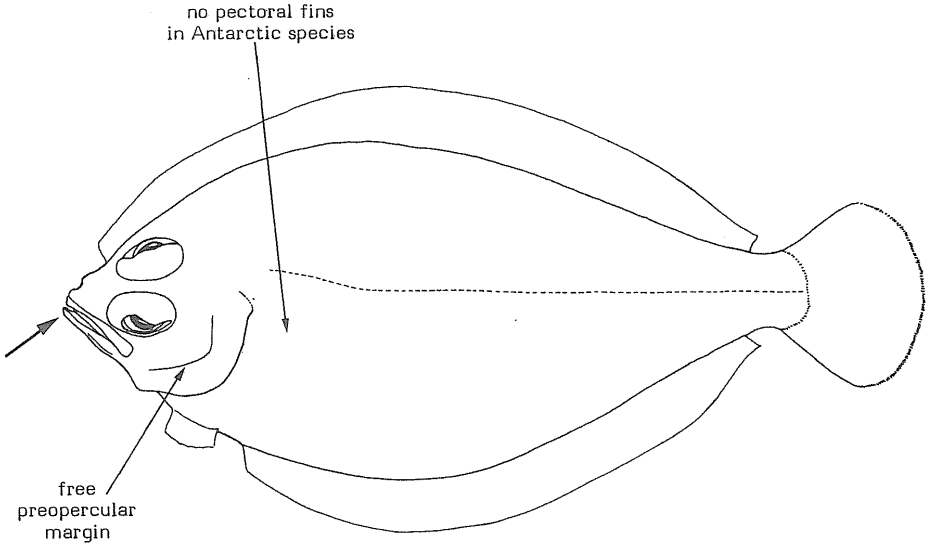
BOTHIDAE

Lefteye flounders, Armless flounders

Small to middle-sized flatfishes. Body asymmetrical, strongly flattened laterally. Both eyes on left side; preopercle with a free margin, clearly visible; lower jaw generally prominent; nasal organ of blind side generally near edge of head; mouth small or moderate-sized and a little protractile; dentition more or less developed on both sides of jaws; maxilla 30% or less of head length. Pelvic fins without spines, their bases unequal, the one on blind side much shorter; dorsal fin origin over the eyes or farther forward, without spinous rays; pectoral fins absent in the Antarctic genera.

Colour: highly variable, usually yellow-brown to dark brown, with or without black spots on the ocular side.

Armless flounders are rather rare in the Southern Ocean, where they are found on sandy or muddy bottoms at varying depths between 20 and 600 m. The Fishing Areas 48, 58 and 88 comprise only two genera, each with a single species; two other species and subspecies are found just outside the area around the Falkland/Malvinas Islands and are therefore included in this present account. The catches of these fishes are not yet reported, but one species is known to be taken as bycatch in the Kerguelen fisheries. The flesh is of excellent quality.



SIMILAR FAMILIES OCCURRING IN THE AREA:

No other flatfish family occurs in the Southern Ocean.

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA :

1a. Gillrakers along the full length of upper limb of first gill arch (Fig. 1a,b); scales small, ctenoid, the spinules directed horizontally; vertebrae 52 to 56 ..... Mancopsetta

2a. More than 128 scales in the lateral line; gillrakers thin, short, without expansion at the apical part; teeth biserial (Figs 1a,2) ..... Mancopsetta maculata antarctica

2b. Less than 126 scales in the lateral line; gillrakers thick, short, with an expansion at the apical part (Fig.1b); teeth uniserial ..... Mancopsetta maculata maculata*

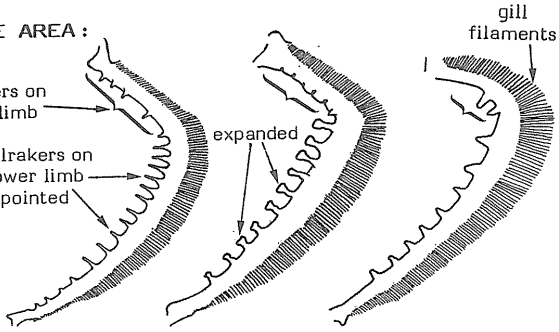
1b. Gillrakers on upper part of first gill arch located on the bend of arch (Fig.1c); vertebrae 63 to 66

3a. Scales ctenoid, with small spinules directed vertically, giving the skin a pilose appearance; snout rounded; no interorbital crest (Fig.3)

4a. Dorsal finrays 132; anal finrays 114 ..... Achiropsetta tricholepis

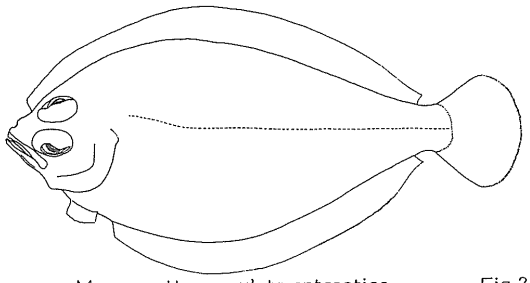
4b. Dorsal finrays 114 to 117; anal finrays 93 to 96 ..... Achiropsetta slavae

3b. Scales ctenoid, without small vertically directed spinules; snout with a pronounced hump; interorbital crest accentuated ... Neoachiropsetta milfordi*

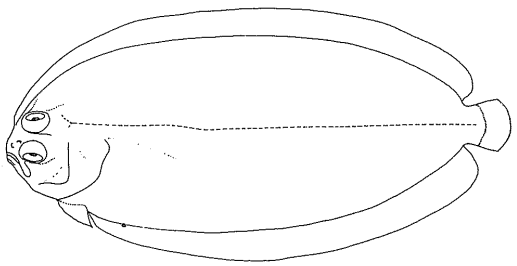


a) M. m. antarctica b) M. m. maculata c) A. tricholepis

first gill arch Fig.1



Mancopsetta maculata antarctica Fig.2



Achiropsetta tricholepis Fig.3

LIST OF SPECIES OCCURRING IN THE AREA :

Code numbers are given for those species for which Identification Sheets are included

Achiropsetta slavae Andriashev, 1960
Achiropsetta tricholepis Norman, 1930

Mancopsetta maculata antarctica Kotlyar, 1978 BOTH Manc 1
Mancopsetta maculata maculata (Günther, 1880)

Neoachiropsetta milfordi (Penrith, 1965)

** Pseudomancopsetta andriashevi Evseenko, 1984

Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

* Not yet recorded from the area but known to occur just outside (Falkland/Malvinas Islands)

** This recently described species, which occurs in the Indian Sector (northeast of Kerguelen Islands), could not be included in the key because the publication was not available to the author in good time

BOTH Manc 1

1985

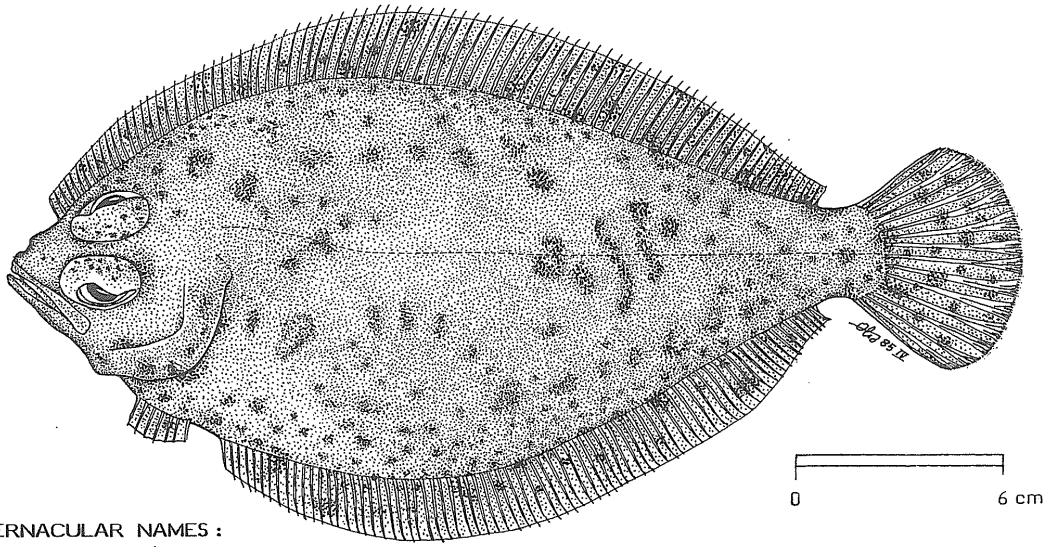
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BOTHIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Mancopsetta maculata antarctica Kotlyar, 1978

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic armless flounder
Fr - Mancoglosse antarctique
Ru - Antarkticheskaya mancopsetta
Sp - Mancolenguado antártico

NATIONAL :

DISTINCTIVE CHARACTERS :

Body rather elongate, compressed, its depth 29 to 38% of total length. Head rather small, 18 to 27% of total length; eyes large, placed both on the left side, separated by a bony ridge, the lower a little in advance of upper; horizontal eye diameter 29 to 37% of head length; interorbital width narrow, 3 to 7% of head length; eyeballs densely scaled; gillrakers rather thin and pointed, 5 to 7 on upper, and 10 to 16 on lower limb of first gill arch; mouth of moderate size, maxillary narrow, its length about 30% of head length; lower jaw slightly prominent; jaws equally developed on both sides, but dentition stronger on blind side; teeth biserial in both jaws. Dorsal fin origin on the vertical from anterior margin of lower eye; pectoral fins absent; pelvic fin of ocular side with 7 rays, elongate, located on median line of body; that of blind side with 5 rays, short-based, lateral in position, its first ray opposite to the fourth of left pelvic fin; both pelvic fins free from anal fin; caudal fin rounded. Lateral line nearly straight, equally developed on both sides of body. Scales small, ctenoid on both sides of body, the spinules directed horizontally.

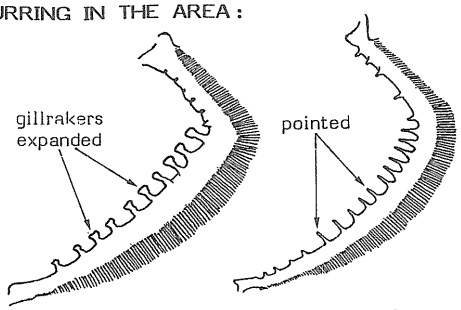
Colour: ocular side varying from brown, cinnamon brown, yellow-green to dark grey, sometimes almost black, with large and small brown spots of irregular shape over entire body; blind side white to light-grey.

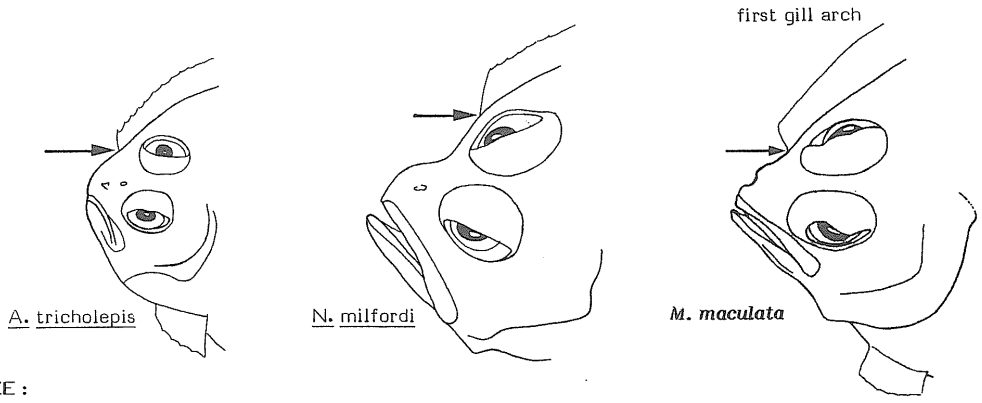
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Manocpsetta maculata maculata: gillrakers thick, short, expanded distally.

Achiropsetta tricholepis* : scales ctenoid with small spinules directed vertically, giving the skin a pilose appearance; snout rounded; dorsal fin origin well before vertical from anterior margin of eyes.

Neoachiropsetta milfordi: snout with a pronounced hump; dorsal fin origin behind vertical from anterior margin of upper eye.





SIZE :

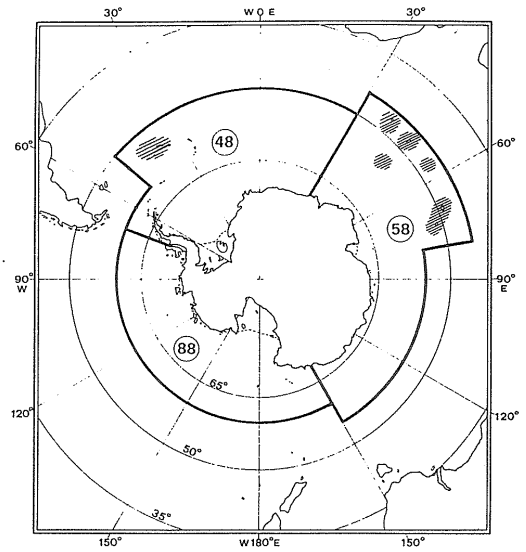
Maximum: over 50 cm; common to 30 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Known from Shag Rocks, South Georgia Island, Marion and Prince Edward Islands, Crozet Islands, Kara Dag Bank, Ob and Lena Seamounts, Kerguelen Islands, Heard and Mc Donald Islands.

Bottom-living on sand or mud from 20 to 600 m depth.

Feeds on benthic crustaceans and small molluscs.



POTENTIAL FISHING GROUNDS :

Shelf and slope areas throughout its range.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species, but taken as bycatch in the Kerguelen fisheries. Flesh of excellent quality.

---

*Achiropsetta tricholepis has been recorded from the Falkland/Malvinas Islands, the coasts of the Antarctic Continent (Wilkes Land) and from the Kerguelen Islands

CHANN

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

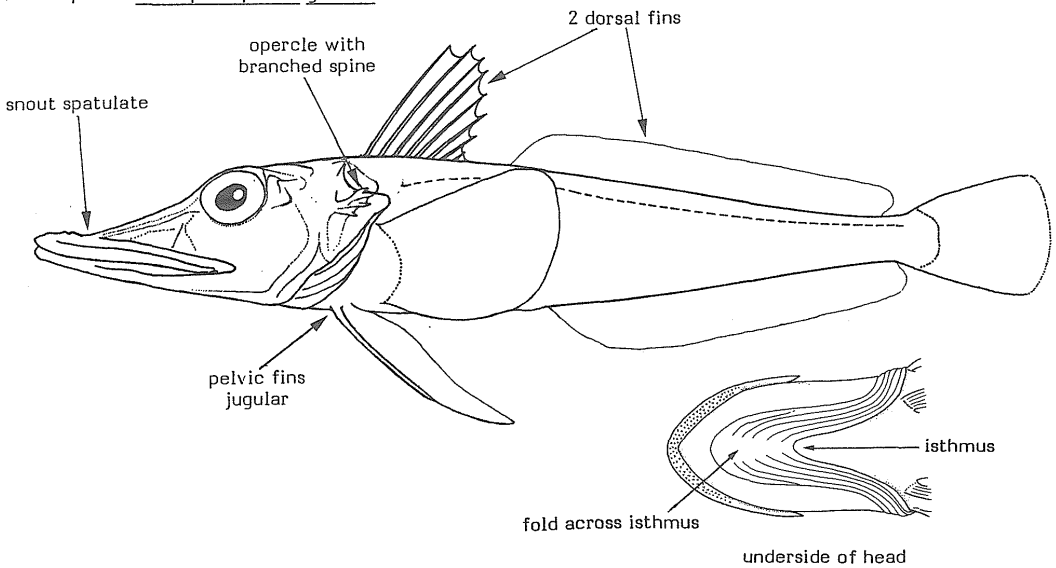
CHANNICHTHYIDAE

Icefishes

Small to moderately large fishes. Body always elongate, fusiform. Head very large and broad, strongly depressed; snout spatulate and produced; bony structures often easily visible through the head skin; eyes large; mouth large terminal, not protractile; lower jaw rarely protruding, with the maxilla reaching posteriorly to below anterior half of eye; teeth in both jaws cardiform, sometimes enlarged; palatine, to a large extent, ligamentous; opercle usually with radiating ridges ending in simple or branched spines; gill membranes very narrowly united to isthmus or forming a fold across it; branchiostegal rays 6, rarely 5 or 7; gillrakers vestigial, short or developed as dentigerous knobs or patches. Two dorsal fins, the first with a short or long base and with flexible and often long spines, well separated from the second dorsal fin which has a very long base and no spines; anal fin very long, without spines; pectoral fins broad and fan-like; pelvic fins strong, jugular in position, with some rays very long in some species, with or without spines; caudal fin rounded, truncate or emarginate. Body entirely scaleless. Lateral lines 2 or 3, sometimes covered with bony plates or tubular scales. No air bladder. Caudal skeleton always with the hypural bones 1 and 2 fused into a wide plate, hypural bones 3, 4 and 5 fused together and with the ural vertebral centrum; epural bones 2 and 3 always fused. The Channichthyidae are unique among fishes and, in fact, among all vertebrates because of the complete or nearly complete lack of hemoglobin in their blood cells; this resulting in a whitish or translucent rather than red blood.

Colour: usually whitish with numerous black blotches or bands; some species may have a brilliant red colour.

All icefishes are strictly marine and confined (except one sub-Antarctic species) to the cold waters of the Southern Ocean. This is the most interesting of all fish families from a physiological point of view. Hemoglobin is used by all vertebrate animals to carry oxygen from the respiratory organs (the gills of the fish) to the body cells. In the absence of this blood pigment, the Channichthyidae are bound to possess some alternative oxygen, carrying mechanism to meet the requirements of respiration, but no conclusive studies have been made so far to explain the ecological success of this family, which includes some pelagic species that are active enough to hunt for pelagic prey, such as other fish or krill. It has been suggested that this is rendered possible by the high oxygen saturation of Antarctic waters combined with the scaleless and highly vascularized skin, a larger gill surface, a more powerful heart muscle and a larger blood volume. Most of the species are alternately demersal by the day and pelagic at night. Some are adapted to live close to the ice or under the ice-cover, but most also show a rather wide vertical distribution. The Fishing Areas 48, 58 and 88 comprise 15 species (an additional species, Champsocephalus esox, occurs more northward in the Patagonian region and around the Falkland/Malvinas Islands). Up to now, six species are commercially caught and represent the most important quantity of fish reported from these fishing areas. Icefish catches totalled 162 673 t in 1982/83, but the maximum annual catch reported was that of the 1977/78 season, with a total of 213 000 t. The flesh of these fishes is excellent and the species Champsocephalus gunnari is the most attractive to fishermen.



SIMILAR FAMILIES OCCURRING IN THE AREA :

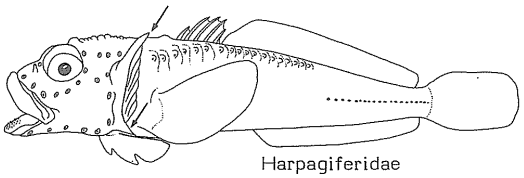
All other Notothenioid fishes occurring in the Southern Ocean are easily distinguished from the Channichthyidae by having normal red blood. Other distinguishing characters are the following:

Harpagiferidae and Artedidraconidae: body scaleless. Furthermore, 2 strong spines on opercle in Harpagiferidae; opercle hooked upward posteriorly, with a deeply concave upper edge, and a mental barbel present in Artedidraconidae.

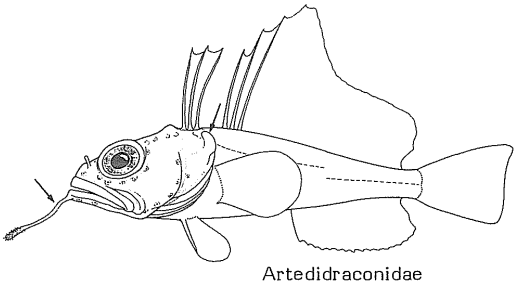
Bathydraconidae: body conspicuously elongate; spinous anterior dorsal fin absent. Some species with only a few scales, and others with pointed snouts and large canine teeth.

Bovichthyidae: gill membranes extending far forward, not attached to isthmus; body scaleless; posterior rays of anal fin elongate and thickened.

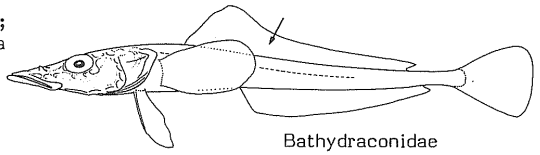
Nototheniidae: body scaled; mouth protractile; opercle normal without spine; gill membranes forming a fold across isthmus.



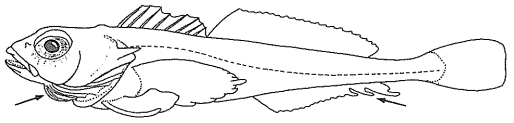
Harpagiferidae



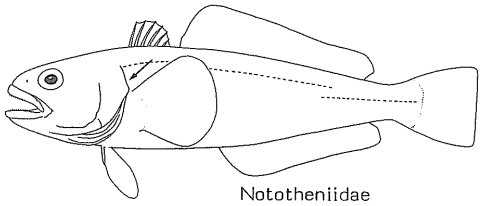
Artedidraconidae



Bathydraconidae



Bovichthyidae



Nototheniidae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA :*

1a. Middle rays of pelvic fins the longest

2a. Lateral lines without bony plates

3a. First dorsal fin with 8 to 15 spines; opercle with at least 3 spines

4a. Two lateral lines (upper and median); dorsal fins more or less contiguous

5a. First dorsal fin with 9 or 10 spines; second dorsal fin with 32 to 41 rays; anal fin with 31 to 39 rays; no rostral spine

6a. Second dorsal fin with 37 to 41 rays; anal fin with 35 to 39 rays; eye diameter 19 to 24% of head length (Figs 1,2a) ... Champsocephalus gunnari

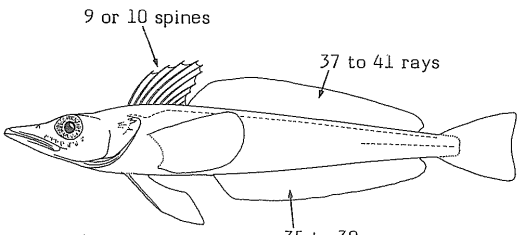
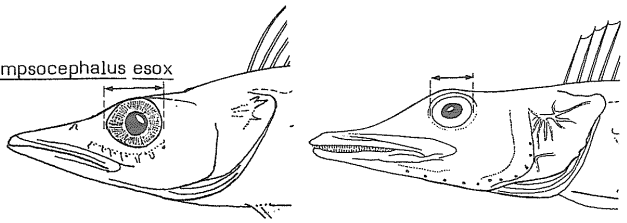


Fig. 1

* The classification here adopted follows recent revisions of some genera or species published by V.V. Barsukov & V.E. Permitin (1958), E.E. Meisner (1974), A.P. Andriashev & A.V. Neyelov (1978) and H.H. DeWitt & J.C. Hureau (1979). The key to genera and species has been adapted from Regan (1913) and from unpublished and incomplete keys prepared by H.H. DeWitt and by R. Miller

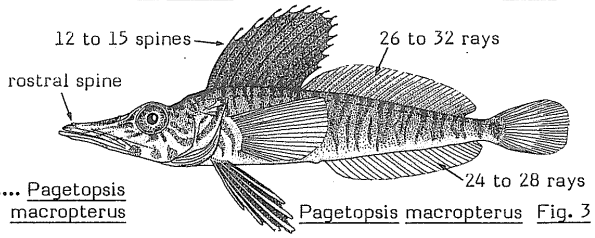
6b. Second dorsal fin with 32 to 37 rays; anal fin with 31 to 35 rays; eye diameter 13 to 19% of head length (Fig.2b) .. Champsocephalus esox

5b. First dorsal fin with 12 to 15 spines; second dorsal fin with 26 to 31 rays; anal fin with 24 to 27 rays; a rostral spine present



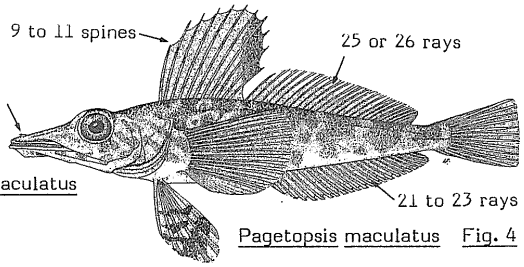
a) C. gunnari head **b)** C. esox Fig. 2

7a. First dorsal fin with 12 to 15 spines; second dorsal fin with 26 to 32 rays; anal fin with 24 to 28 rays; pelvic and first dorsal fin black; sides of the body with narrow dark bars (Fig.3) ..... Pagetopsis macropterus



Pagetopsis macropterus Fig. 3

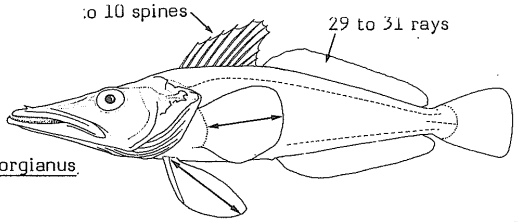
7b. First dorsal fin with 9 to 11 spines; second dorsal fin with 25 or 26 rays; anal fin with 21 to 23 rays; pelvic fin striped with dark bars; first dorsal fin light; body spotted (Fig.4).... Pagetopsis maculatus



Pagetopsis maculatus Fig. 4

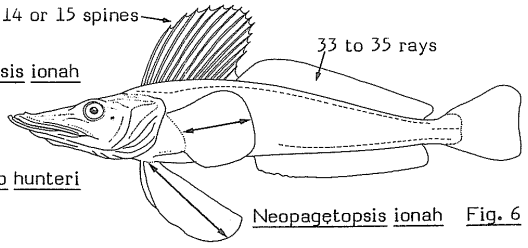
4b. Three lateral lines; dorsal fins contiguous

8a. First dorsal fin with 8 to 10 spines; second dorsal fin with 29 to 31 rays; pelvic fins moderate as long as or a little longer than pectorals (Fig.5) ..... Pseudochaenichthys georgianus



Pseudochaenichthys georgianus Fig. 5

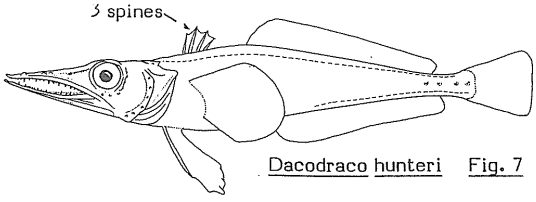
8b. First dorsal fin with 14 or 15 spines; second dorsal fin with 33 to 35 rays; pelvic fins very long, longer than pectoral fin (Fig.6) ..... Neopagetopsis ionah



Neopagetopsis ionah Fig. 6

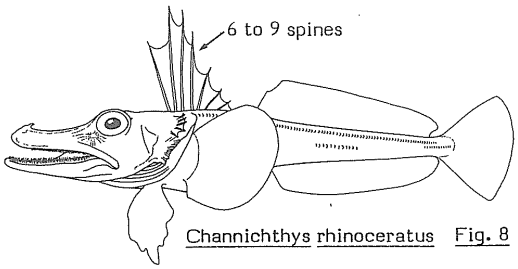
3b. First dorsal fin with 3 spines; opercle with a single broad, flat spine; two lateral lines (upper and lower) (Fig.7) ... Dacodraco hunteri

2b. Two lateral lines (upper and median) with bony plates; a rostral spine; dorsal fins usually well separated



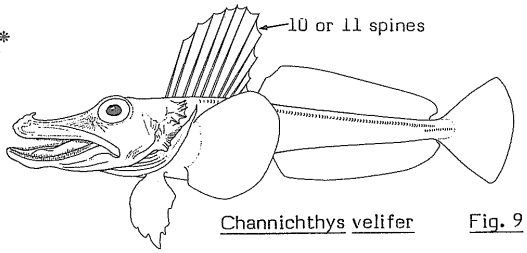
Dacodraco hunteri Fig. 7

9a. First dorsal fin with 6 to 9 spines, the second or third longest; median lateral line covered with 2 separate series of bony plates, one anterior one posterior (Fig.8)..... Channichthys rhinoceratus



Channichthys rhinoceratus Fig. 8

9b. First dorsal fin with 10 or 11 spines, the fourth or fifth longest; bony plates present only in posterior portion of median lateral line (Fig.9)..... Channichthys velifer*

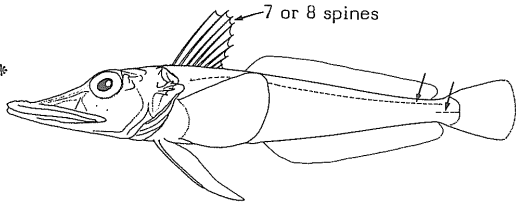


Channichthys velifer Fig. 9

1b. The 2 outer soft rays of pelvic fins the longest

10a. No spine on interopercular bone; rostral spine reduced or absent; 2 or 3 lateral lines

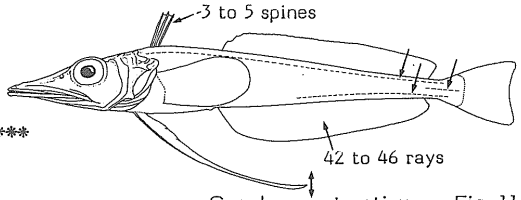
11a. Two lateral lines; first dorsal fin with 7 or 8 spines (Fig.10)..... Chaenocephalus aceratus**



Chaenocephalus aceratus Fig. 10

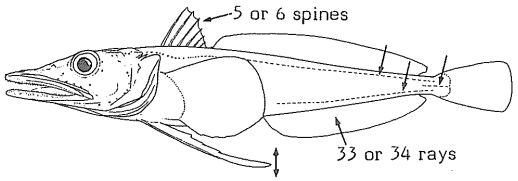
11b. Three lateral lines; first dorsal fin with 3 to 6 spines

12a. Pelvic fins long, extending in adults to below middle of dorsal fin; first dorsal fin with 3 to 5 spines; anal fin with 42 to 46 rays (Fig.11)..... Cryodraco antarcticus***



Cryodraco antarcticus Fig. 11

12b. Pelvic fins shorter, extending to base of 2nd or 7th anal fin ray; first dorsal fin with 5 or 6 spines; anal fin with 33 or 34 rays (Fig.12)... Chionobathyscus dewitti



Chionobathyscus dewitti Fig. 12

10b. A pair of spines on posteroventral angle of interopercular bone; rostral spine well developed or reduced; 3 lateral lines

---

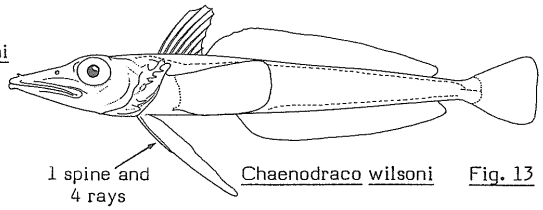
* That species described by Meisner in 1975 from 6 specimens from the continental slope of Kerguelen Islands is close to C. rhinoceratus and a complete revision of the genus Channichthys is needed. Ch. velifer is often considered as a junior synonym of Ch. rhinoceratus

** The closely related species Chaenocephalus bouvetensis Nybelin, 1947 is here considered as a junior synonym of C. aceratus

*** The closely related species, Cryodraco pappenheimi Regan, 1913 was described from 3 specimens; one of them has now moved to be another species, the second is lost, and the third mutilated; for this reason C. pappenheimi is here provisionally considered as a junior synonym of C. antarcticus

13a. Pelvic fins with 1 spine and 4 rays; gillrakers developed as blackish knobs, with tooth-like protuberances (Figs 13,14a)..... Chaenodraco wilsoni

13b. Pelvic fins with one spine and 5 rays; gillrakers reduced to low or small knobs, toothed or smooth (Fig.14b,c)

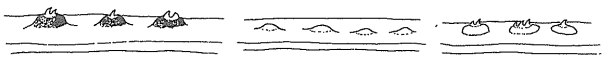


Chaenodraco wilsoni Fig. 13

14a. Rostral spine well developed; supraorbital region with radiating ridges and with crenulate margins; pectoral fins with 22 to 24 rays; preoperculo-mandibular lateral line canal not joined to temporal canal

15a. 2 to 7 gillrakers on lower limb of first arch reduced to tiny knobs, non-dentigerous (Figs 14b,15) .... Chionodraco hamatus

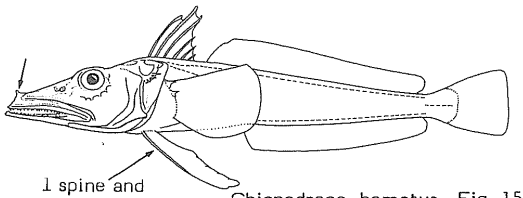
15b. 8 to 14 gillrakers reduced to low knobs, each bearing one to several teeth (Fig.14c) ... Chionodraco rastrospinosus



a) C. wilsoni b) C. hamatus c) C. rastrospinosus

gillrakers Fig. 14

14b. Rostral spine reduced to a small knob; supraorbital regions smooth and without crenulate margins; pectoral fins with 21 or 22 rays; preoperculomandibular canal joined to temporal canal ..... Chionodraco myersi



Chionodraco hamatus Fig. 15

LIST OF SPECIES OCCURRING IN MARINE WATERS OF THE AREAS:

Code numbers are given for those species for which Identification Sheets are included

Chaenocephalus aceratus Lönnberg, 1906	CHANN Chaenoc 1
Chaenodraco wilsoni Regan, 1914	CHANN Chaenod 1
*Champsocephalus esox (Günther, 1861) Champsocephalus gunnari Lönnberg, 1905	CHANN Cham 1
Channichthys rhinoceratus Richardson, 1844 Channichthys velifer Meisner, 1975	CHANN Chann 1
Chionobathyscus dewitti Andriashev & Neyelov, 1978	
**Chionodraco hamatus (Lönnberg, 1905) ***Chionodraco myersi DeWitt & Tyler, 1960 Chionodraco rastrospinosus DeWitt & Hureau, 1979	CHANN Chio 1
Cryodraco antarcticus Dollo, 1900 (= Cryodraco atkinsoni Regan, 1914)	
Dacodraco hunteri Waite, 1916	
Neopagetopsis ionah Nybelin, 1947	
Pagetopsis macropterus (Boulenger, 1907) Pagetopsis maculatus Barsukov & Permitin, 1958	
Pseudochaenichthys georgianus Norman, 1937	CHANN Pseudo 1

Prepared by J. C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

---

*The only species of Channichthyidae not occurring in the areas here covered but reported from the Patagonian region and the Falkland/Malvinas Islands

** = Chionodraco kathleenae Regan, 1914

*** = Chionodraco markhami Miller & Reseck, 1961

CHANN Chaenoc 1

1985

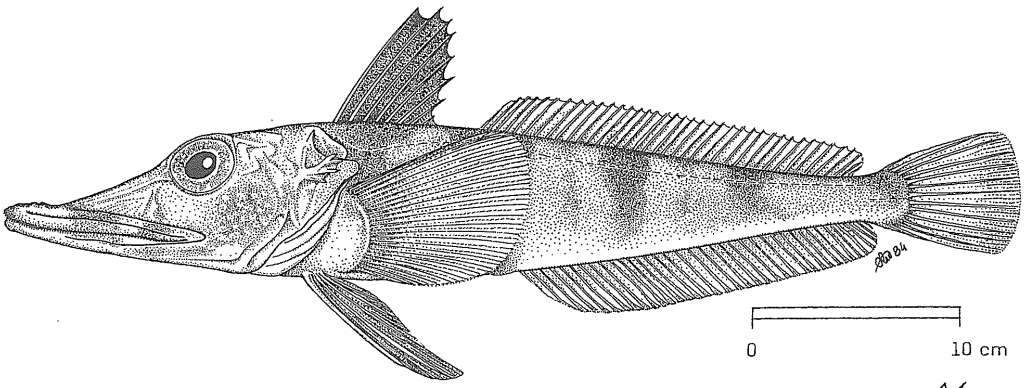
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHANNICHTHYIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Chaenocephalus aceratus Lönnberg, 1906

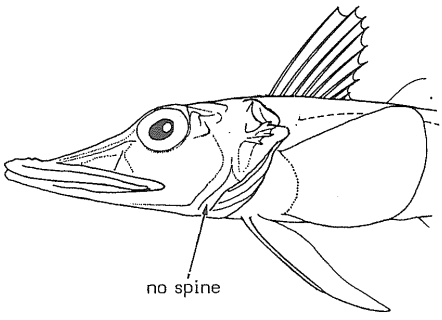
OTHER SCIENTIFIC NAMES STILL IN USE : Chaenocephalus bouvetensis Nybelin, 1947



VERNACULAR NAMES :

FAO/CCAMLR : En - Blackfin icefish, Scotia Sea icefish
Fr - Grande-gueule antarctique
Ru - Krokodilovaya belokrovka
Sp - Draco antártico

NATIONAL :



DISTINCTIVE CHARACTERS :

Body elongate, its depth 14.3 to 20% of standard length. Head depressed, its dorsal profile flat or slightly concave; length of head 35.7 to 40% of standard length; snout depressed, spatulate, a little longer than half of head; no rostral spine on tip of snout, but a small prominence at anterior end of ethmoid bone; opercle with 3 or 4 radiating ridges ending in spines; no spine on the interopercle; eye about equal to interorbital width, 16.6 to 20% of head length; gillrakers absent except 3 or 4 short ones at the angle of anterior arch; mouth almost horizontal, maxilla extending posteriorly to below middle of eye or beyond; jaws equal anteriorly; small and sharp teeth in both jaws in two broad bands. Two dorsal fins, their bases well separated, the first with 7 or 8 long and flexible spines, the second with 38 to 40 soft rays; 37 to 39 anal fin rays; pectoral fins long and fan-like, with 23 to 26 rays, extending to above anterior rays of anal fin; pelvic fins in young longer than head, reaching to middle of anal fin, much shorter in adults, not reaching vent; two outer soft rays of pelvic fins the longest; caudal fin slightly rounded. Two lateral lines without bony plates or scales; body entirely scaleless.

Colour: body greyish or pale brownish, whitish ventrally; a series of darker crossbars on sides; first dorsal fin usually blackish; other fins more or less pale; gills creamy-whitish due to absence of hemoglobin.

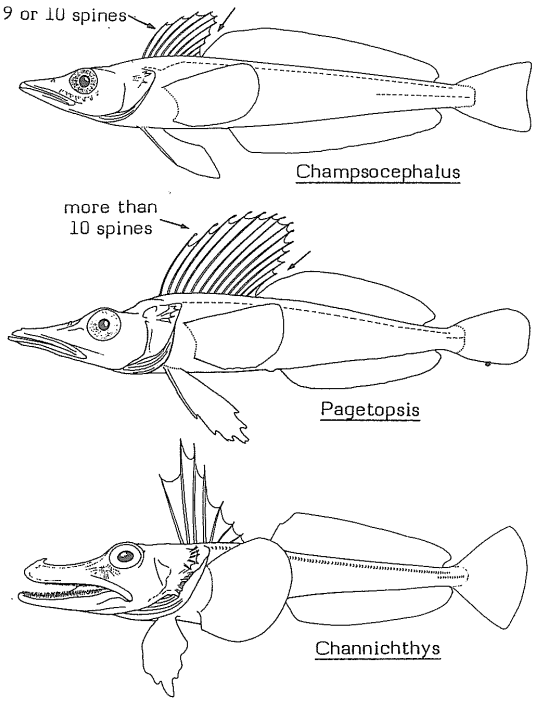
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Champsocephalus species: dorsal fins more or less contiguous; 9 or 10 spines in the first dorsal fin (7 or 8 in C. aceratus).

Pagetopsis species: dorsal fins more or less contiguous; first dorsal fin with more than 10 spines.

Channichthys species: lateral lines with bony plates.

Other species of Channichthyidae: either 3 lateral lines or less than 5 spines in first dorsal fin.



SIZE :

Maximum: 75 cm at South Georgia; common to 50 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

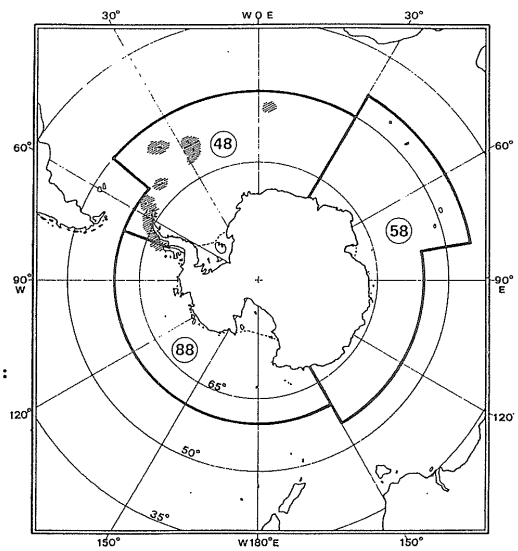
Reported from Bouvet Island and from the islands of the Scotia Arc (South Georgia, South Sandwich, South Orkney, South Shetland Islands), and the Antarctic Peninsula.

Found from about 5 to more than 770 m depth, Chaenocephalus aceratus spawns in the nearshore waters and fjords from February or March onward. Pelagic postlarvae and juveniles inhabit nearshore surface waters, while older juveniles and adults are bottom dwelling. This species has a relatively slow growth rate and matures at a length of about 50 cm (between 6 and 7 years).

Juveniles feed on krill, but specimens over 30 cm feed mostly on fishes.

PRESENT FISHING GROUNDS :

Mainly South Georgia and the South Shetland Islands.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

This species is commercially caught only since the 1976/77 season; few hundreds to 4 000 t have been reported annually from fishing area 48.

Caught only with bottom trawls.

Marketed as frozen fish (entire or fillets); the flesh is excellent.

CHANN Chaenod 1

1985

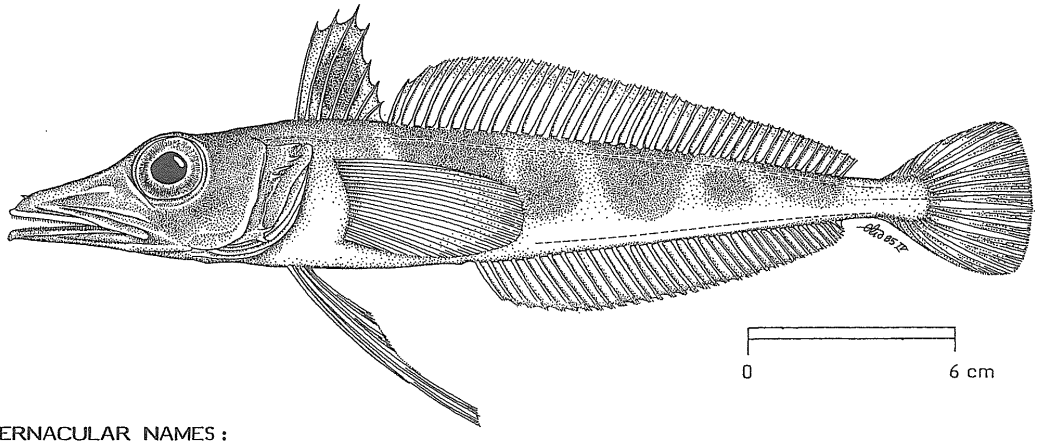
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHANNICHTHYIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Chaenodraco wilsoni Regan, 1914

OTHER SCIENTIFIC NAMES STILL IN USE : Chaenodraco fasciatus Regan, 1914



VERNACULAR NAMES :

FAO/CCAMLR : En - Spiny icefish
Fr - Grande-gueule épineuse
Ru - Chetyrekhpalaya belokrovka
Sp - Draco espinudo

NATIONAL :

DISTINCTIVE CHARACTERS :

Body elongate, its depth 14.3 to 16.6% of standard length. Head depressed, its dorsal profile flat or slightly concave; length of head 31.2 to 38.5% of standard length; snout depressed, slightly spatulate, less than half the length of head; an anterior pointing rostral spine well developed on tip of snout; opercle with 4 or 5 spines, a pair of spines on the posteroventral angle of the interopercular bone; eye 23.3 to 25% of head length; interorbital width 23.8 to 27% of head length; 12 to 14 gillrakers on lower part of anterior arch developed as blackish knobs with tooth-like protuberances; mouth almost horizontal, maxilla extending posteriorly to below anterior third of eye; jaws equal anteriorly; teeth in both jaws small and sharp. Two dorsal fins, their base more or less contiguous, the first with 6 to 8 long and flexible spines, the second with 38 to 42 soft rays; 32 to 35 anal fin rays; pectoral fins long and fan-like, with 22 to 24 rays, extending to above anterior rays of anal fin; pelvic fins with one spine and only 4 rays, as long as head length; 2 outer soft rays of pelvic fins the longest; caudal fin subtruncate or rounded. Three lateral lines without bony plates or scales; body entirely scaleless.

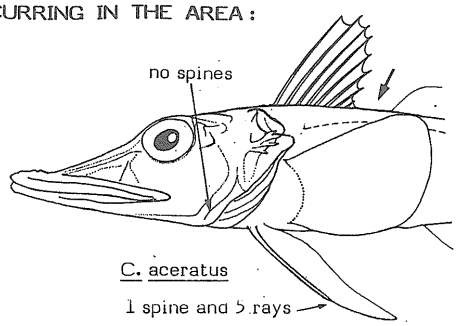
Colour: pale brownish, whitish ventrally; a series of 5 dark crossbars on sides; dark spots on head; a large black spot on the first dorsal fin; other fins more or less dusky; gills creamy-whitish due to absence of hemoglobin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Chionodraco species: pelvic fins with one spine and 5 rays (1 spine and 4 rays in C. wilsoni). Gill arches appear white. Gillrakers insignificant in Chionodraco hamatus.

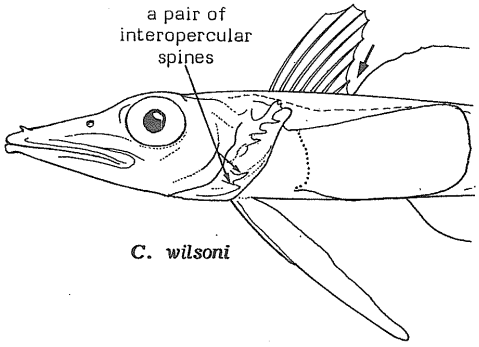
Chaenocephalus aceratus, Cryodraco antarcticus, Chionobathyscus dewitti: no spine on the posteroventral angle of the interopercular bone.

Other species of Channichthyidae: middle rays of pelvic fins the longest.



SIZE :

Maximum: 35 cm; common to 30 cm.

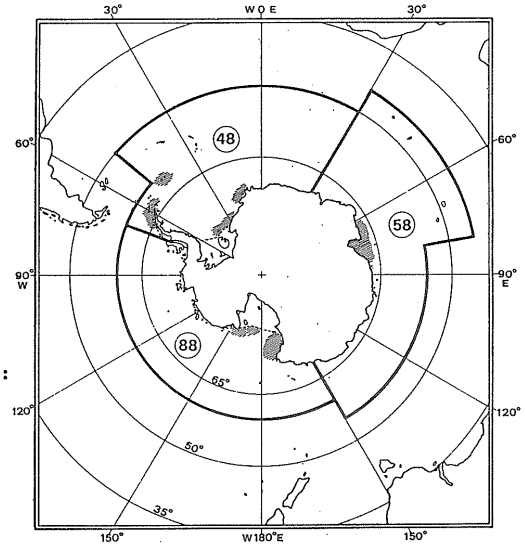


GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circum-Antarctic distribution south of 60°S; MacRobertson and Princess Martha coasts, Prydz Bay, Ross Sea, Weddell Sea, South Orkney and South Shetland Islands, northern part of Antarctic Peninsula.

Found from about 100 to about 650 m depth. Chaenodraco wilsoni spawns in winter; pelagic postlarvae and juveniles inhabit nearshore surface waters in December off South Orkney Islands; large numbers of juveniles have been encountered in or close to krill swarms in the South Shetland area; adult specimens seem to be pelagic.

Feeds exclusively on krill.



PRESENT FISHING GROUNDS :

Mainly around the South Shetland Islands and off Joinville Island (Antarctic Peninsula).

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Reported catches for the two fishing seasons 1978/79 and 1979/80 from fishing area 48 have been 10,130 and 956 t, respectively.

Caught only with bottom trawls.

Marketed as frozen fish.

CHANN Cham 1

1985

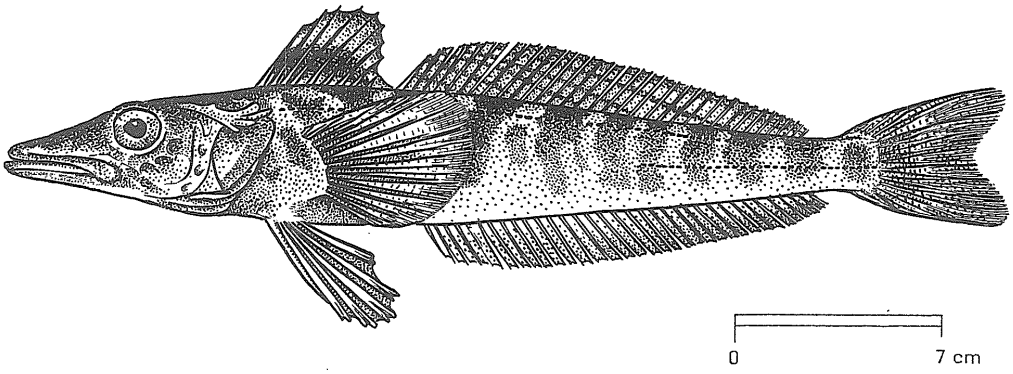
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHANNICHTHYIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Champsocephalus gunnari Lönnberg, 1905

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Mackerel icefish
Fr - Poisson des glaces
Ru - Ledyanaya ryba
Sp - Draco rayado

NATIONAL :

DISTINCTIVE CHARACTERS :

Body elongate, its depth 13.8 to 16.6% of standard length. Head depressed, its dorsal profile flat or slightly concave; length of head 28.5 to 31% of standard length; snout depressed slightly spatulate, about as long as postorbital part of head; no rostral spine on tip of snout; opercle with 2 spines, the upper bifid or trifid; eye 19 to 24% of head length; interorbital width 22.2 to 28.6% of head length; short dentigerous gillrakers on lower part of anterior arch; mouth slightly oblique, maxilla extending posteriorly to below posterior margin of eye; jaws almost equal anteriorly; teeth in both jaws in two narrow bands, small and sharp. Two dorsal fins, their base more or less contiguous, the first with 9 or 10 long and flexible spines, the second with 37 to 41 soft rays; 35 to 39 anal fin rays; pectoral fins long and fan-like, with 25 to 28 rays, extending to above anterior rays of anal fin; pelvic fins about 60% of head length; median rays of pelvic fins the longest; caudal fin emarginate. Two lateral lines without bony plates or scales; body entirely scaleless.

Colour: body light grey-silvery, whitish ventrally; a series of darker crossbars on sides; dorsal and anal fins usually more or less blackish; other fins pale or dusky; gills creamy-whitish due to absence of hemoglobin.

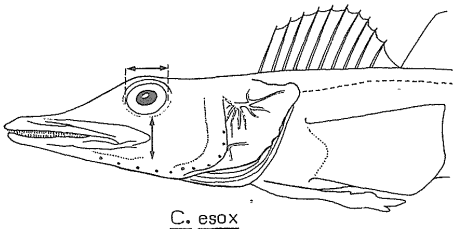
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Champsocephalus esox: second dorsal fin with 32 to 37 rays (37 to 41 in C. gunnari); anal fin with 31 to 35 rays (25 to 28 in C. gunnari); eye diameter 13 to 19% of head length; snout and upper jaw longer.

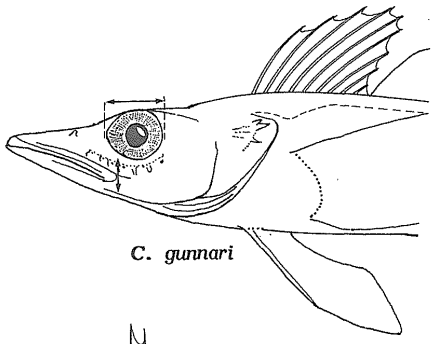
Pagetopsis species: first dorsal fin with more than 10 spines (9 or 10 in C. gunnari).

Channichthys species: lateral lines with bony plates.

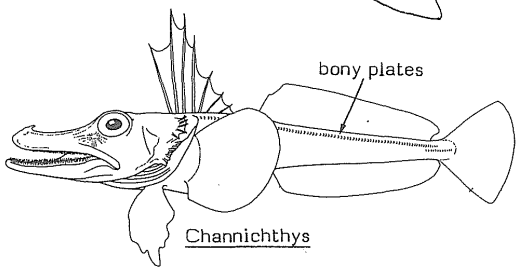
Other species of Channichthyidae: either 3 lateral lines or less than 9 spines in first dorsal fin.



C. esox



C. gunnari



Channichthys

SIZE :

Maximum: 64 cm at South Georgia, 45 cm at Kerguelen; common to 35 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

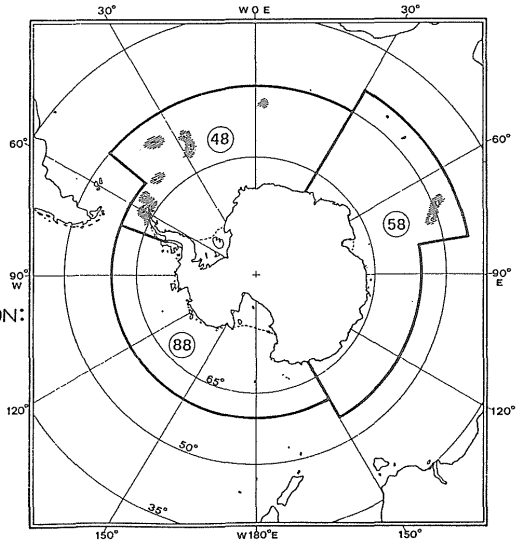
Reported from shelves of Kerguelen and Heard Islands, from Bouvet Island and from all the islands of the Scotia Arc (South Georgia, South Sandwich, South Orkney, South Shetland Islands), and the northern part of the Antarctic Peninsula.

Found from about 100 to more than 700 m depth, Champsocephalus gunnari spawns in the fjords from April to June, or later. Pelagic postlarvae and juveniles inhabit nearshore surface waters, while older juveniles and adults form large concentrations in the vicinity of krill or other forage concentrations. This species has a relatively fast growth rate and matures at a length of 22 to 26 cm (between 3 and 4 years).

Feeds on krill and other euphausiids, hyperiids and small myctophid fishes.

PRESENT FISHING GROUNDS :

Mainly around the Kerguelen Islands, South Georgia, South Orkneys and the South Shetland Islands.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

This is the most abundant species reported in the catches of the last 10 years from Fishing Areas 48,58 and 88; 162 673 t were reported from the 1982/83 season.

Caught with bottom trawls and recently with semipelagic trawls.

Marketed as frozen fish (entire or fillets); the flesh is excellent.

CHANN Chann 1

1985

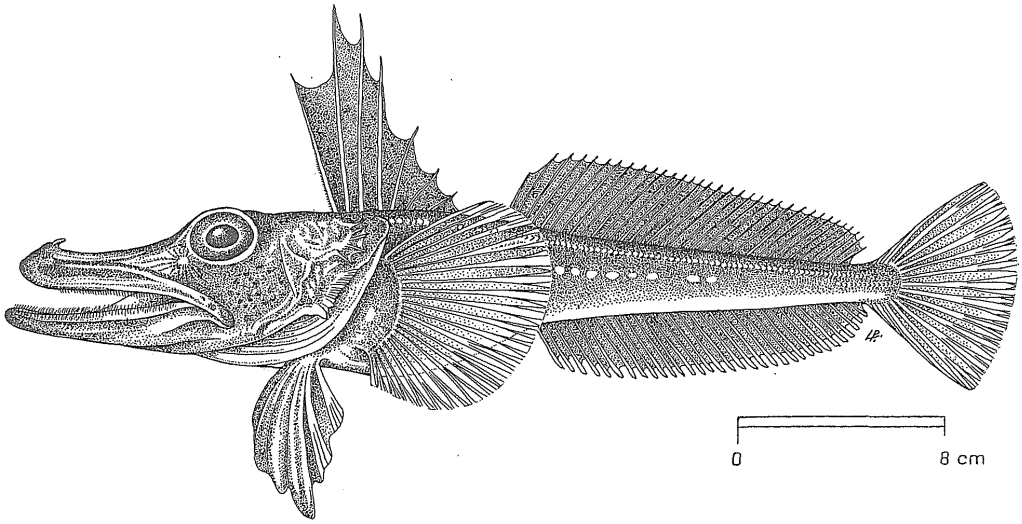
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHANNICHTHYIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Channichthys rhinoceratus Richardson, 1844

OTHER SCIENTIFIC NAMES STILL IN USE : Channichthys rugosus Regan, 1913
Chaenichthys rhinoceratus



VERNACULAR NAMES :

FAO/CCAMLR : En - Unicorn icefish
Fr - Grande-gueule
Ru - Nosorogaya Belokovka
Sp - Draco rinoceronte

NATIONAL :

DISTINCTIVE CHARACTERS :

Body elongate, its depth 14.3 to 18% of standard length. Head strongly rugose, depressed, its dorsal profile flat or concave; length of head 35.7 to 41.6% of standard length; snout depressed, strongly spatulate, a little shorter than half of head; a rostral spine present on tip of snout; opercle with 4 or 5 strong spines, the upper bifid or trifid; eye 13.8 to 20% of head length; interorbital width 15.4 to 20% of head length; short dentigerous gillrakers on lower part of anterior arch; mouth horizontal, maxilla extending posteriorly to below middle of eye or beyond; jaws almost equal anteriorly; teeth in both jaws in broad bands, small and sharp. Two dorsal fins, their base well separated, the first with 6 to 9 long and flexible spines, the second or third longest, the second dorsal fin with 30 to 34 soft rays; 27 to 33 anal fin rays; pectoral fins long and fan-like, with 18 to 22 rays, extending to above vent or origin of anal fin; pelvic fins a little longer than pectoral fins; median rays of pelvic fins the longest; caudal fin rounded. Two lateral lines with bony plates, 62 to 84 in upper line and 2 separate series of few plates on median line, one anterior and one posterior; body entirely scaleless.

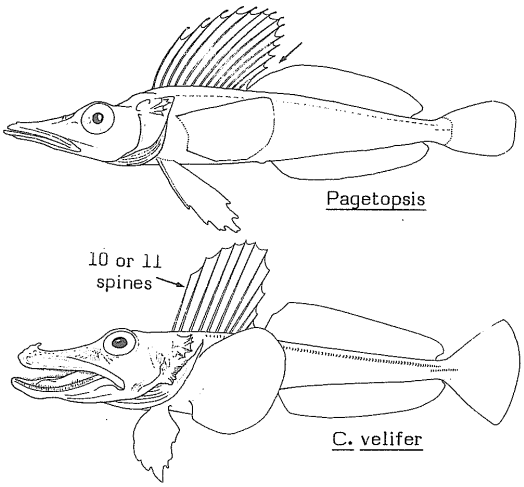
Colour: body colour pattern very variable, generally whitish with black markings or dots, often red or orange patches; ventral parts white or brightly red-coloured; anal fin orange-red or black and white; first dorsal fin blackish; other fins pale or dusky; gills creamy-whitish due to absence of hemoglobin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Pagetopsis and Champsocephalus species: dorsal fins more or less contiguous; lateral lines without bony plates.

Channichthys velifer : first dorsal fin with 10 or 11 spines (9 or 10 in C. rhinoceratus), the fourth and fifth longest; median lateral line with only one posterior series of bony plates.

Other species of Channichthyidae: no bony plates on lateral lines.



SIZE:

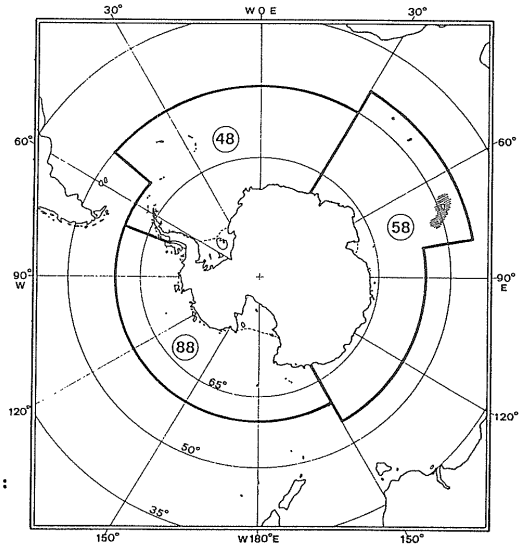
Maximum: 60 cm; common to 40 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Reported only from shelves of Kerguelen and Heard Islands, and from the connecting seamounts.

Found from nearshore waters to more than 750 m depth, Channichthys rhinoceratus spawns in the inshore waters in February. Pelagic postlarvae and juveniles inhabit nearshore surface waters, while older juveniles and adults are bottom living animals. This species matures at a length of 36 to 38 cm (5 years).

Feeds mainly on young fish (90% of the diet) and small euphausiids.



PRESENT FISHING GROUNDS:

Mainly around the Kerguelen Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Few tens (10 to 80) of tons are reported annually since the 1977/78 season from Fishing Area 58.

Caught only with bottom trawls as a bycatch in the Champsocephalus gunnari oriented fishery.

Marketed as frozen fish; the flesh is good.

---

*This species is often considered as a junior synonym of Channichthys rhinoceratus

CHANN Chio 1

1985

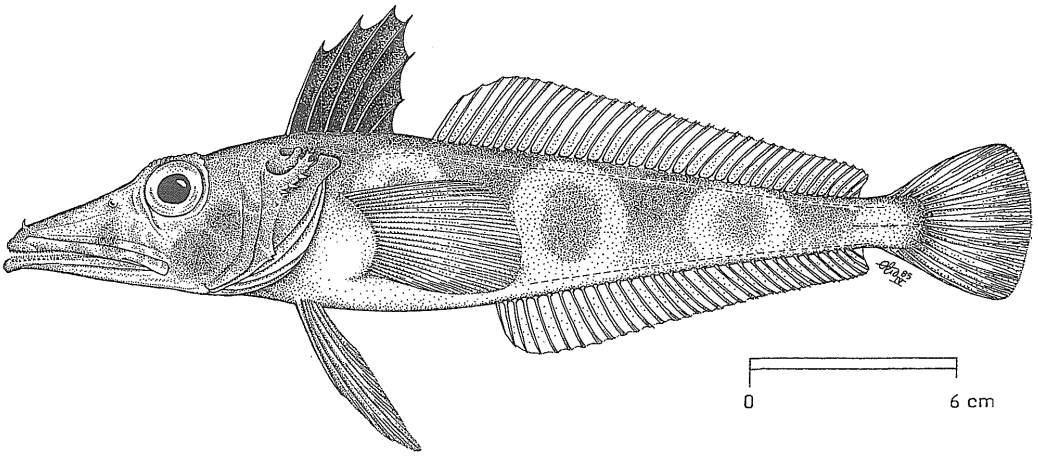
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHANNICHTHYIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Chionodraco rastrospinosus DeWitt & Hureau, 1979

OTHER SCIENTIFIC NAMES STILL IN USE : Often confused with Chionodraco hamatus non Lönnberg, 1905 (misidentification)



VERNACULAR NAMES :

FAO/CCAMLR : En - Ocellated icefish
Fr - Grande-gueule ocellée
Ru - Kolyuchaya belokrovka
Sp - Draco ocelado

NATIONAL :

DISTINCTIVE CHARACTERS :

Body elongate, its depth about 16% of standard length. Head depressed, its dorsal profile flat or slightly concave; length of head 37 to 38.5% of standard length; snout depressed, slightly spatulate, about half head length; a backward pointing rostral spine on tip of snout; opercle with 4 spines, the upper quadrifid; a pair of spines on the posteroventral angle of the interopercular bone; eye 20 to 21% of head length; interorbital width 23 to 32% of head length; supraorbital region with radiating ridges and with crenulate margins; preoperculo-mandibular lateral line canal not joined to temporal canal; 8 to 14 short dentigerous gillrakers on lower part of anterior arch, reduced to low knobs, each bearing one to several teeth; mouth slightly oblique, maxilla extending posteriorly to middle of eye; jaws almost equal anteriorly; teeth in both jaws in 2 or 3 rows, small, conical and curved. Two dorsal fins, their base well separated, the first with 4 to 6 long and flexible spines, the second usually longest, the second dorsal fin with 34 to 42 soft rays; 33 to 37 anal fin rays; pectoral fins long and fan-like, with 22 or 23 rays, extending to above anterior rays of anal fin; pelvic fins narrow and elongate; two outer soft rays of pelvic fins the longest; 1 spine and 5 rays in the pelvic fins; caudal fin rounded. Three lateral lines without bony plates, but covered with tubular scales, 94 to 118 in the upper, 9 to 17 in the median and 63 to 92 in the lower; body entirely scaleless, except for lateral lines.

Colour: normal colour pattern with four large pale circles on a dark background, each circle with a dark centre and displaced ventrally such that their lower part is incomplete; dark crossbars between the circles; a dorsomedial dark area anterior to first dorsal fin; top of head mottled and blotched; cheeks with two dark regions; first dorsal fin uniformly blackish; other fins pale.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Chionodraco hamatus: 2 to 7 gillrakers on lower limb of first arch (8 to 14 in C. rastrospinosus), reduced to small knobs, non-dentigerous.

C. myersi: rostral spine reduced to a small knob; supraorbital region smooth and without crenulate margins; preoperculomandibular canal joined to temporal canal.

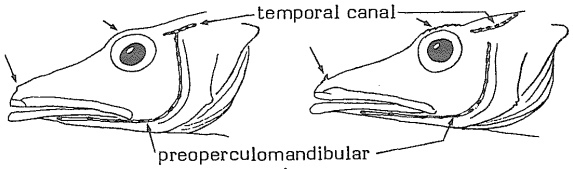
Chaenodraco wilsoni: pelvic fins with one spine and 4 rays (1 spine and 5 rays in C. rastrospinosus).

Chaenocephalus aceratus, Chionobathyscus dewitti and Cryodraco antarcticus: no spine on the posteroventral angle of the interopercular bone.

Other Channichthyidae: middle rays of pelvic fins the longest.

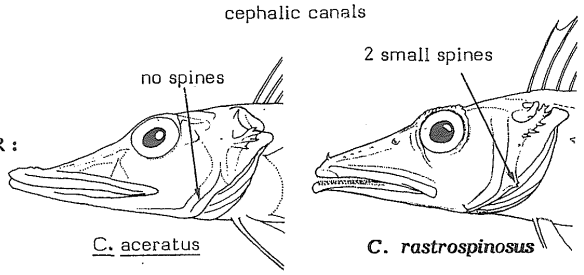
C. hamatus — *C. rastrospinosus*

gillrakers



C. myersi — *C. rastrospinosus*

cephalic canals



C. aceratus — *C. rastrospinosus*

spine on interopercle

SIZE:

Maximum: 52 cm; common to 30 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

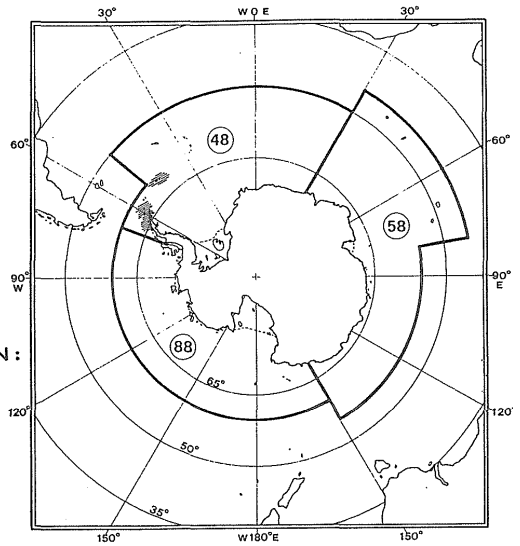
Reported only from the Antarctic Peninsula, the South Shetland and South Orkney Islands.

Found from about 200 to 1 000 m depth, Chionodraco rastrospinosus spawns from end of March onward. Postlarvae and juveniles inhabit pelagic waters in or close to krill swarms from December to February, while older juveniles and adults have demersopelagic habits. This species matures at a length of about 32 cm (between 4 and 5 years).

Feeds mostly on krill and other euphausiids and fishes.

PRESENT FISHING GROUNDS:

Mainly around the South Shetland Islands.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Reported catches for the two fishing seasons 1978/79 and 1979/80 from Fishing Area 48 have been 1 949 and 233 t, respectively.

Caught only with bottom trawls.

Marketed as frozen fish.

CHANN Pseudo 1

1985

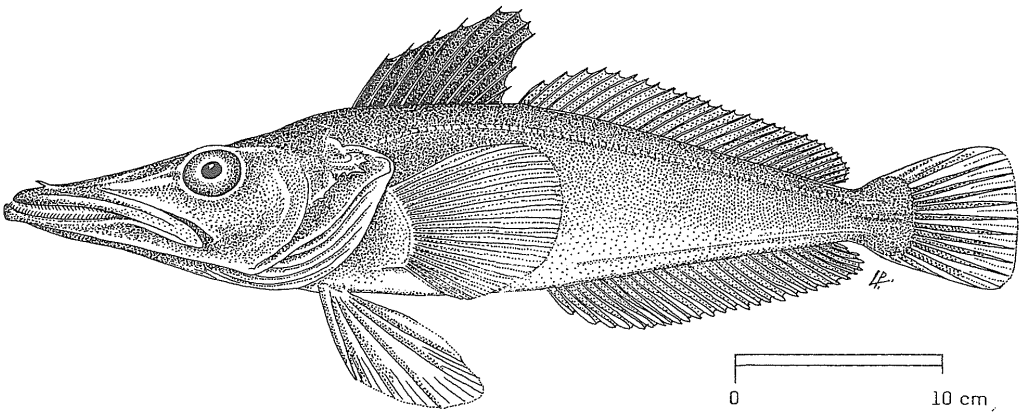
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : CHANNICHTHYIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pseudochaenichthys georgianus Norman, 1937

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - South Georgia icefish
Fr - Crocodile de Georgie
Ru - Femnaya belokrovka
Sp - Draco cocodrilo

NATIONAL :

DISTINCTIVE CHARACTERS :

Body relatively deep, its depth 16.6 to 22.5% of standard length. Head depressed, its dorsal profile flat or slightly concave; length of head 20 to 43.5% of standard length; snout depressed, spatulate, a little shorter than half of head; a forward pointing rostral spine on tip of snout; opercle with 4 or 5 spines, the upper with a forward pointing hook; diameter of eye variable with age, 14 to 20% of head length; interorbital width more than 25% of head length; very short, dentigerous and knob-like gillrakers on lower part of anterior arch; mouth horizontal, maxilla extending posteriorly to below middle of eye; lower jaw projecting; teeth in both jaws in broad bands, small, curved and sharp. Two dorsal fins, their base well separated, the first with 8 to 10 long and flexible spines, the second with 29 to 31 soft rays; 28 to 31 anal fin rays; pectoral fins long and fan-like, with 23 or 24 rays, extending to above anterior rays of anal fin; pelvic fins as long as or a little longer than pectoral fins; median rays of pelvic fins the longest; caudal fin subtruncate or a little rounded. Three lateral lines without bony plates; body entirely scaleless.

Colour: body greyish or greenish, whitish ventrally; a series of darker markings on the upper parts of the sides (young) which tend to become uniformly coloured in the adults; first dorsal and pelvic fins blackish; other fins pale or dusky; gills creamy-whitish due to absence of hemoglobin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

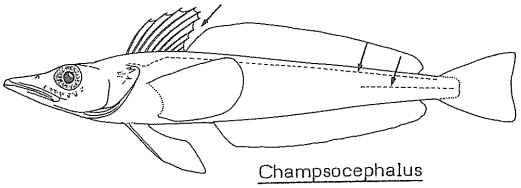
Champsocephalus species: dorsal fins more or less contiguous; two lateral lines (3 in P. georgianus).

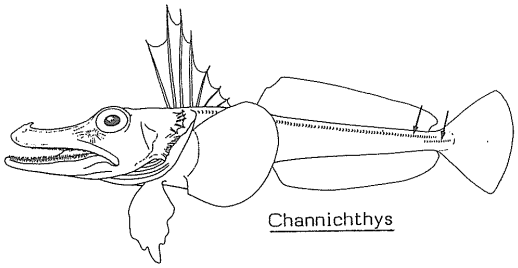
Channichthys species: two lateral lines with bony plates.

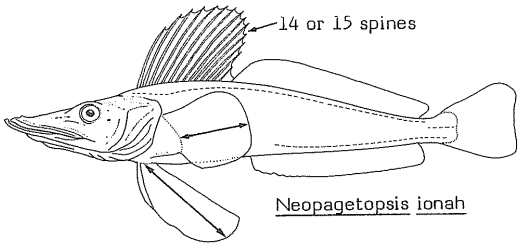
Neopagetopsis ionah: first dorsal fin with 14 to 15 spines (8 to 10 in P. georgianus); pelvic fins very long, longer than pectoral fins.

Pagetopsis species: first dorsal fin with more than 10 spines; two lateral lines.

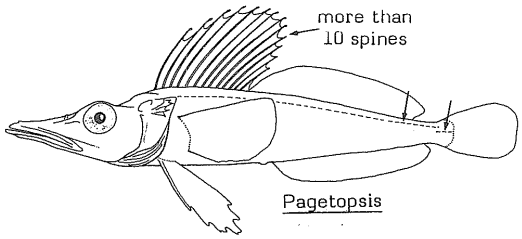
Other species of Channichthyidae: either 2 lateral lines or less than 8 spines in first dorsal fin.


Champsocephalus


Channichthys



Neopagetopsis ionah



Pagetopsis

SIZE :

Maximum: 60 cm; common to 50 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

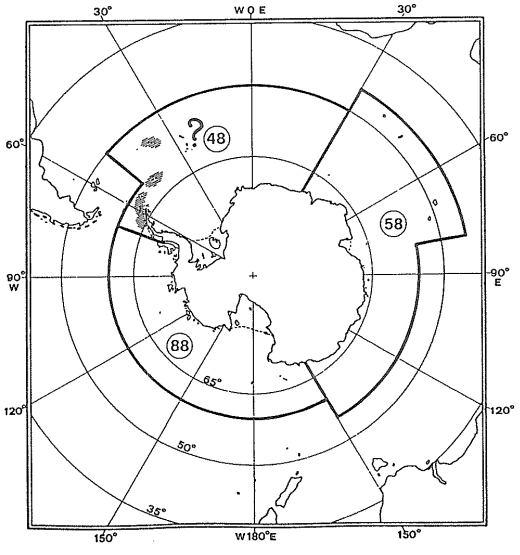
Reported from shelves of the Scotia Arc Islands (South Georgia, South Orkney, South Shetland Islands), and the northern part of the Antarctic Peninsula. Presence doubtful in South Sandwich Islands.

Found from shallow waters to about 500 m depth, Pseudochaenichthys georgianus spawns in the nearshore waters and fjords from April to May. Pelagic postlarvae and juveniles have been mostly encountered in pelagic waters often together with krill, while older juveniles and adults are demersal or semipelagic in habits, in the vicinity of krill swarms or other forage concentrations. This species matures at a length of about 42 cm (between 4 and 5 years).

Primarily feeds on krill and fish.

PRESENT FISHING GROUNDS :

Mainly around South Georgia and the South Orkney Islands.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

This species is commercially caught only since the 1976/77 season; 1 000 to 13 000 t have been reported annually from Fishing Area 48.

Caught only with bottom trawls.

Marketed as frozen fish (entire or fillets); the flesh is good.

CONGIO

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

CONGIOPODIDAE

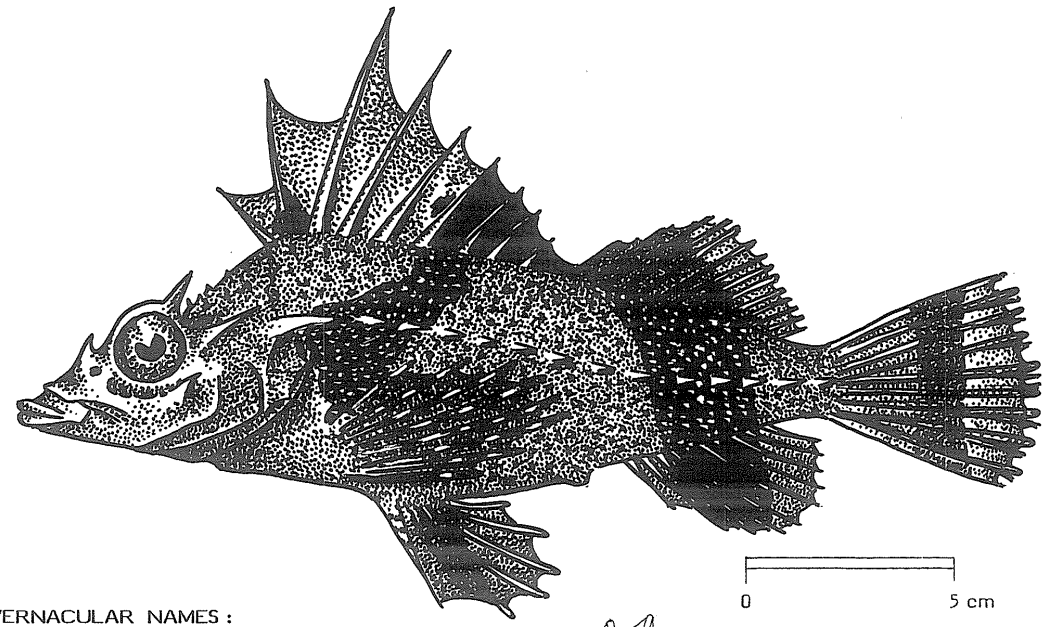
Horsefishes

Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Museum national d'Histoire naturelle, Paris, France

Zanclorhynchus spinifer (Günther, 1880)

CONGIO Zancl 1

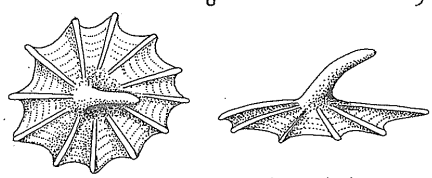
OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic horsefish
Fr - Cacique antarctique
Ru - Kolyuchka
Sp - Cacique antártico

NATIONAL :



scales

DISTINCTIVE CHARACTERS :

Body strongly compressed, its depth 30 to 33% of standard length. Head large and compressed, its length 33 to 35% of standard length; snout notably produced, longer than eye; eye diameter 22 to 33% of head length; mouth terminal, small, the maxilla in larger specimens not reaching level of nostrils; minute teeth in jaws and on vomer (roof of mouth); a spine present on each side of snout above nostrils; a strong supraorbital ridge ending backward in a strong spine; another strong spine just behind eye, above preopercle; a very large and long spine above opercle, nearly 25% of head length; head with a number of rugose areas on dorsal surface and

cheeks. Two contiguous dorsal fins, the first elevated anteriorly, with 8 to 10 strong spines, the third spine the longest, about as long as head; second dorsal fin with 12 to 15 unbranched soft rays, its base about 60% as long as that of spinous fin; dorsal fin membrane not connected to caudal peduncle posteriorly; 10 or 11 anal fin rays; pectoral fins low on body, with 9 unbranched rays, their bases relatively narrow; pelvic fin with 1 spine and 5 segmented rays; caudal fin truncate, with segmented rays branched. A single lateral line bearing 11 to 15 tubular and spiny scales, from opercular spine to middle of caudal peduncle. Body covered with small spiny scales embedded in the skin, giving the fish a rugose appearance, but some naked areas present around base of first dorsal fin and in the thoracic and abdominal regions.

Colour: variable from clear brown or purple to creamish ochre, with very dark markings; fins ochre, each with a broad dark bar; a black spot at base of second dorsal spine and a black blotch on posterior part of first dorsal fin; always a broad dark crossbar on caudal fin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

The characteristic body shape, scalation, spines and colour readily distinguish this species from any other fishes occurring in the area.

SIZE:

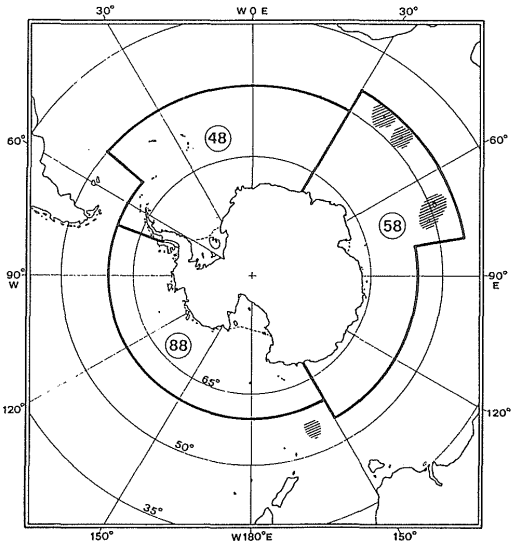
Maximum: 40 cm; common to 25 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Only known from Macquarie, Kerguelen, Heard(?) Crozet and Marion islands, but particularly abundant in the latter archipelago.

Bottom-living, at depths between 5 and 340 m, often found in kelp beds, or on sandy bottoms.

Feeds on small amphipods and other benthic invertebrates.



POTENTIAL FISHING GROUNDS:

Shelf areas thoughout its range.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION:

Separate statistics are not reported for this species.

Caught as bycatch in bottom trawls; not yet marketed for human comsumption, but sometimes used as fishmeal.

GADI

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

GADIDAE

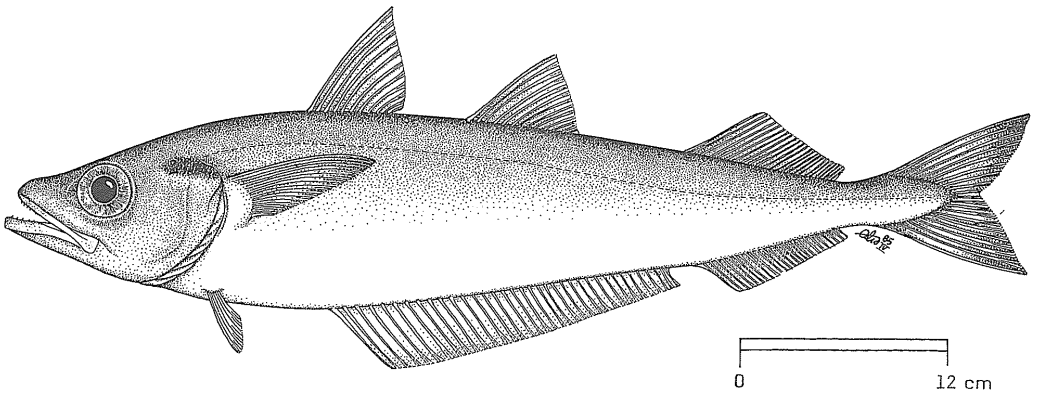
Cods

Prepared by A. Tomo, Instituto Antártico Argentino, Buenos Aires, Argentina

Micromesistius australis Norman, 1937

GADI Microm 2

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Southern blue whiting
Fr - Merlan bleu austral
Ru - Putassu yazknaya
Sp - Polaca argentina

NATIONAL :

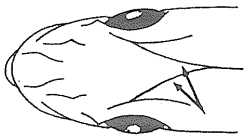
DISTINCTIVE CHARACTERS :

Body elongate, fusiform and compressed, its width about 1.7 times in greatest depth; caudal peduncle relatively deep. Head moderate, its length 4 to 4.5 times in standard length; mouth rather large and oblique; maxilla extending to below middle of eye, eye diameter 3.8 times in head length; 35 to 39 gillrakers on lower limb of first gill arch. No spines in fins; 3 dorsal fins, the space between the second and third much greater than that between first and second; 2 anal fins, the first very long-based and the second similar and slightly posterior to the third dorsal; pelvic fins small, thoracic in position; caudal fin spatulate, deeply emarginate; fin ray counts: first dorsal 11 or 12; second dorsal 12 to 15; third dorsal 20 to 25; first anal 34 to 37; second anal 24 to 26; pectorals 20 or 21; pelvics 6. Lateral line continuous from nape to base of caudal fin, with about 145 scales. Scales small, cycloid (smooth to touch), easily shed.

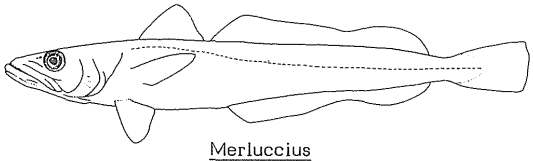
Colour: back bluish-silver, flanks and belly silvery-white; fins greyish; iris golden. A dark blotch on upper part of gill cover.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Merluccius species (Family *Merlucciidae*): a V-shaped ridge on top of head (characteristic of all Merlucciidae); only 2 dorsal fins and a single anal fin; caudal fin truncate.



top of head
Merluccidae



Merluccius

SIZE:

Maximum: to 90 cm; common to 60 cm. Average weight for medium-sized specimens 0.7 to 1 kg.

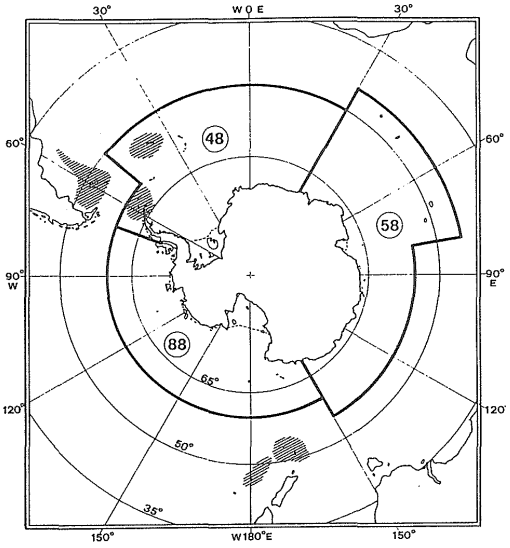
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Mainly found in waters of the Falkland/Malvinas current, on the Patagonian shelves off Argentina and the southernmost part of Chile between 55°S and 47°S, and on the Patagonian slope off Argentina northward to 38°S. In warm summers it migrates southward to South Georgia, the South Shetland Islands, Elephant Island and the northern part of the Antarctic Peninsula.

Another population (or subspecies) of *Micromesistius australis* (*M. australis pallidus* Inada and Nakamura, 1975) is fished on the southern shelf of New Zealand and around the Auckland and Campbell Islands.

It ranges in depth from 70 to 800 m, invading the shelf waters during summer and concentrating over the continental slope in winter south of 50°S, mostly restricted to slope areas north of this latitude.

Feeds on fishes, crustaceans and cuttlefishes.



PRESENT FISHING GROUNDS:

Throughout its range, with the largest catches (up to 1 to 5 t/h) outside the area, on the Patagonia/Fuegan shelf; often also very abundant around Elephant Island and South Orkeney Islands.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION:

Catches vary considerably from year to year. In 1982 they totalled (for the entire distribution area of the species) 158 546 t (mostly by Poland and the USSR, and to a lesser extent by Argentina and Japan). Within Area 48, even though mean catch rates of 1.8 t/h were recorded in exploratory midwater trawling off the South Orkney Islands, commercial catches have been reported only twice: in 1977/78 (3 t) and 1979/80 (27 t).

Caught with bottom trawls.

Utilized mainly frozen (in blocks) and as fishmeal. Due to the strong infestation with parasites (protozoans, trematodes, copepods) the flesh was not highly appreciated in the past. However, more recently parasitic infestation has diminished and the marketing of the frozen product has improved.

HARPAG

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

HARPAGIFERIDAE

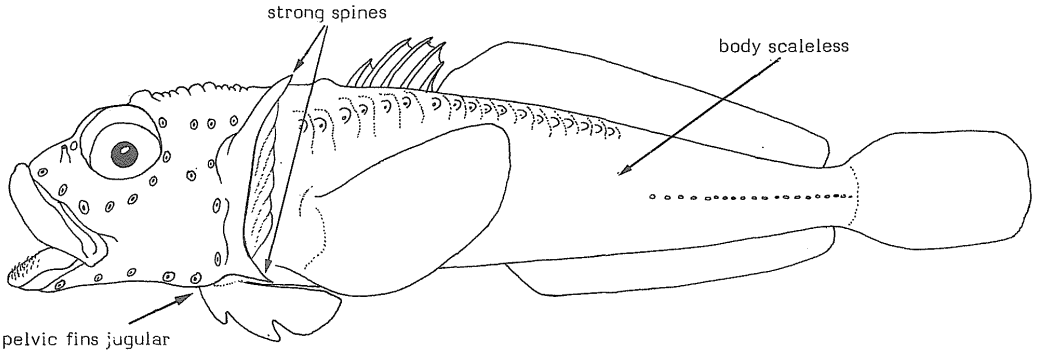
Spiny plunderfishes

Small bottom fishes, no more than 11 cm in length. Body shape somewhat elongate. Head large and wide; eyes large, sometimes upturned; snout short, about as long as eye; mouth protractile, terminal, rather large, set horizontally, the lower and upper jaws equal in length, with the maxilla reaching to below pupil; teeth in both jaws in villiform bands, without distinct canines; opercle and preopercle with strong spines; in some species, top of head with spines; branchiostegal rays 6; gillrakers reduced to a few rudimentary knobs near angle of arch. Two dorsal fins, the first with flexible spines, often placed over the base of the pectoral fins and close to the second dorsal fin which has a very long base and no spines; anal fin very long, without spines; pectoral fins large and fan-like; pelvic fins strong, jugular in position; caudal fin rounded. Body completely scaleless. Two lateral lines, a short upper one with tubules and a lower one reduced to a series of pores.

Colour: very variable, depending on the type of substrate on which the fish is living; body usually with dark blotches or irregular crossbars, sometimes pink-coloured; fins mostly with small dark spots or bars.

Harpagifers are marine fishes, widespread in the higher latitudes of the Southern Hemisphere. They are widely distributed in the sub-Antarctic area but also occur north of the Antarctic Convergence off southern South America and at several sub-Antarctic islands (Falkland/Malvinas, South Shetland, South Orkney, South Sandwich, South Georgia, Marion, Crozet, Kerguelen and Macquarie islands and north of Antarctic Peninsula). Most species are rather sedentary bottom forms which feed on a variety of invertebrates, mostly on benthic amphipods. They are found in shallow waters of the intertidal zone but some species can be found in waters as deep as 180 m.

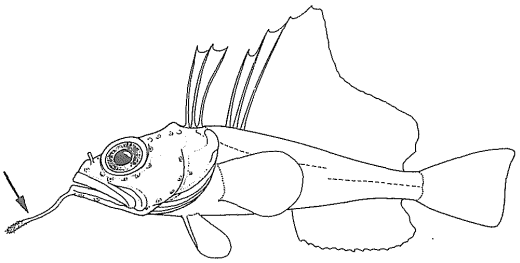
The Fishing Areas 48,58 and 88 comprise only one genus with 5 species, one of which is divided into two subspecies. None of them have any commercial value for fishing. They were included here because of their particular interest as members of the most common suborder (Notothenioidei) of Antarctic fishes and as major components of the diet of some other fish species (e.g., Channichthyidae).



SIMILAR FAMILIES OCCURRING IN THE AREA:

All other notothenioid fishes occurring in the Southern Ocean are easily distinguished from the Harpagiferidae, mainly by the following characters:

Artedidraconidae: a mental barbel present; no strong sharp spine on opercle.



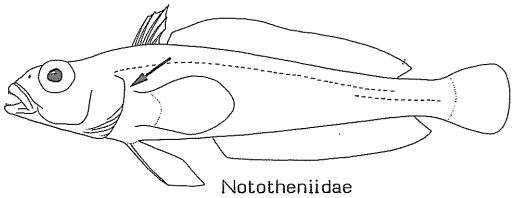
Artedidraconidae

Nototheniidae: opercle normal, not hooked upward posteriorly; body scaled.

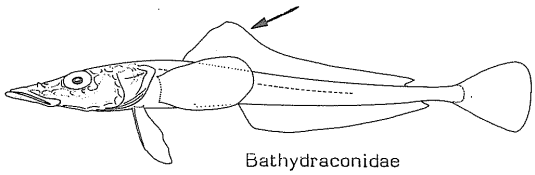
Bathydraconidae: only one dorsal fin; mouth non-protractile.

Channichthyidae: head very large, often spiny, with a produced and flattened snout. They also lack oxygen-carrying pigment in their blood which appears whitish or translucent, rather than red.

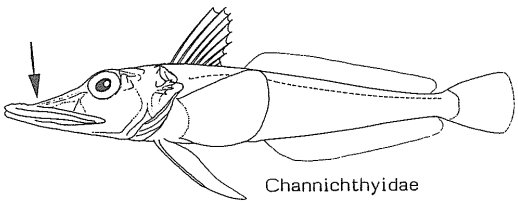
Bovichthyidae*: last rays of anal fin elongate and thickened distally.



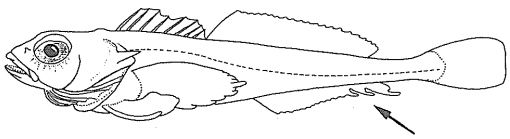
Nototheniidae



Bathydraconidae



Channichthyidae



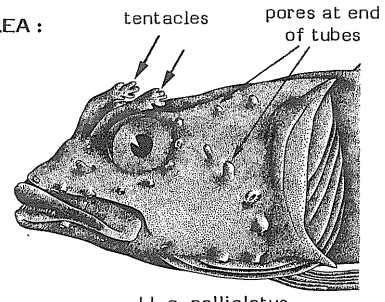
Bovichthyidae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA:

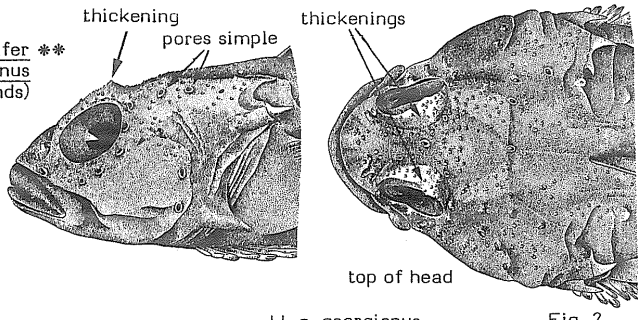
1a. Head length generally more than 35% (33 to 40%) of standard length

2a. Presence, above each eye, of one tentacle, simple in juveniles, multilobed in adults; cephalic pores opening at the extremity of long, projecting tubes (Fig. 1) .. Harpagifer georgianus palliolatus (Falkland/Malvinas Islands)

2b. No tentacle above eye but 2 thickenings at brow, more or less rounded; cephalic pores simple (Fig. 2) ..... Harpagifer ** georgianus georgianus (South Georgia, Marion Islands)



H. g. palliolatus Fig. 1



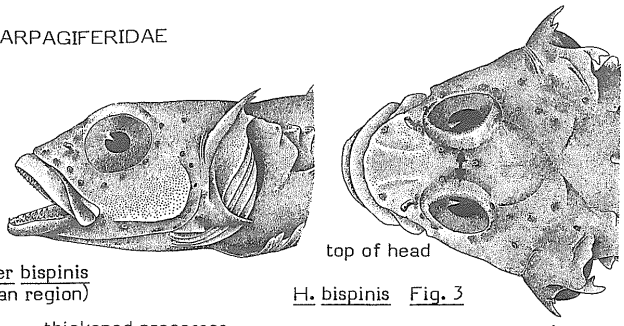
H. g. georgianus Fig. 2

* Only one species has been described from Area 48 (Antarctic Peninsula), Bovichthys elongatus Hureau & Tomo, 1977; the other species of the family are known from northern regions (southern coasts of South America, New Zealand and Australia)

** Some authors recognize another subspecies H. georgianus marionensis Nybelin, 1947, but it is here considered as a synonym of H. georgianus georgianus following Hureau et al., 1980

1b. Head length less than 35% of standard length

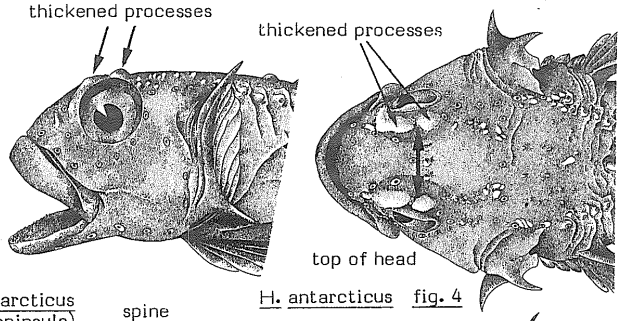
3a. Interorbital width less than 7% of standard length; pectoral fin with 11 to 16 rays (Fig. 3) ..... Harpagifer bispinis (Magellan region)



H. bispinis Fig. 3

3b. Interorbital width more than 7% of standard length; pectoral fin with 15 to 18 rays

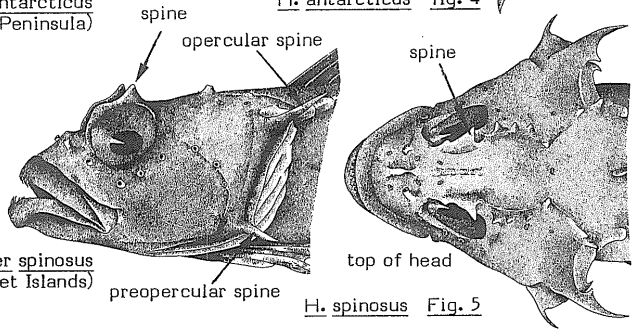
4a. Predorsal distance (tip of snout to base of first dorsal spine) 20 to 32% of standard length; preventral distance 16 to 26% of standard length; two separated, thickened processes above each orbit, the first low, the second higher and knob-like (Fig. 4) .... Harpagifer antarcticus (Antarctic Peninsula)



H. antarcticus fig. 4

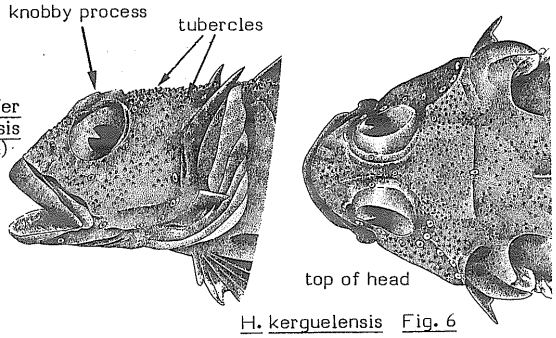
4b. Predorsal distance 29 to 37% of standard length; preventral distance 22 to 35% of standard length

5a. A spine present above each orbit; 2 very sharp spines on opercle and preopercle (Fig. 5) ..... Harpagifer spinosus (Crozet Islands)



H. spinosus Fig. 5

5b. No spine above the orbits, but sometimes, presence of a round knobby process above each eye; no tentacle but small tubercles scattered over the entire surface of head (Fig. 6) ..... Harpagifer kerguelensis (Kerguelen Islands)



H. kerguelensis Fig. 6

LIST OF SPECIES OCCURRING IN THE AREA :

Harpagifer antarcticus Nybelin, 1947
Harpagifer bispinis (Schneider, 1801)
Harpagifer georgianus georgianus Nybelin, 1947 (= H. georgianus marionensis Nybelin, 1947)
Harpagifer georgianus palliolatus Richardson, 1845
Harpagifer kerguelensis Nybelin, 1947
Harpagifer spinosus Hureau et al., 1980

Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

LIPA

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

LIPARIDIDAE

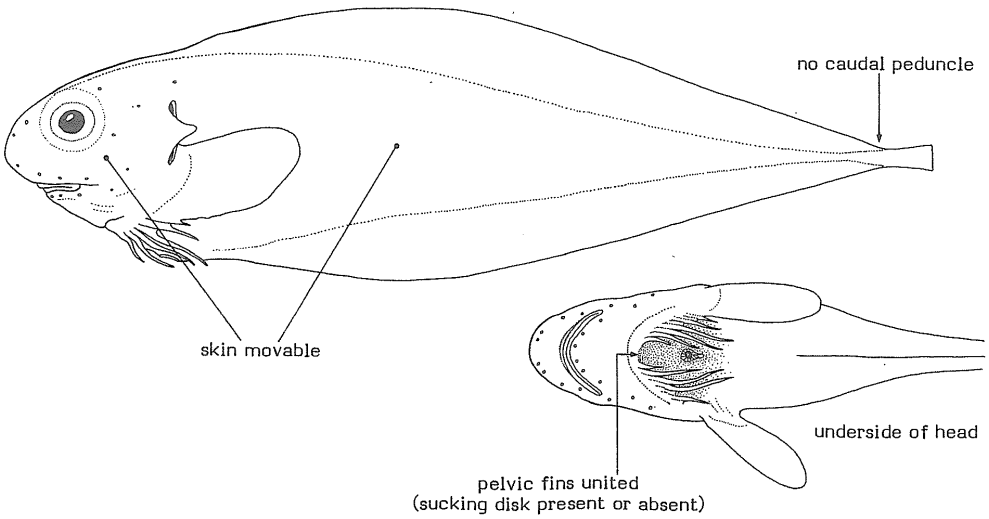
Snailfishes

Small to moderate-sized fishes (rarely up to 70 cm). Body cavity short, usually less than a half of standard length; tail part moderately or greatly elongated, compressed. Second suborbital bone styliform, not widened posteriorly, joined to the preopercle; teeth in jaws trilobed or simple, in bands, rarely uniserial or absent; teeth on vomer and palatines (roof of mouth) absent; pharyngeal teeth in one pair of patches; gill openings small, usually not extending lower than base of upper pectoral fin lobe, may be pore-like; gill 3 1/2, no slit behind the last; pseudobranchiae rudimentary or absent, branchiostegals 6, rarely 5. A single long dorsal fin, sometimes notched anteriorly, of 31 to 82 unbranched rays, the anterior ones not segmented; anal fin similar to the dorsal, with 25 to 76 rays; dorsal and anal fins usually overlapping caudal fin to some degree; no caudal peduncle; pectoral radials 4, 3 or 2, incised or rounded (in specialized forms); pectoral fins very broad-based, of 14 or 15 rays, forming a distinct lower lobe; pelvic fins, if present, with 1 spine and 5 soft rays, the fins united, forming a sucking disc, which is large in shallow-water species but usually reduced or absent in the midwater and deep-sea species; number of principal caudal fin rays 10-12 to 2; procurrent rays often reduced or absent. Skin movable with a more or less developed underlying gelatinous layer ("pseudotissue" Burke, 1930), naked or with prickles, but without bony tubercles. Lateral line on body never consists of canals with pores, but is represented by free neuromasts or indistinguishable. Pyloric caeca numerous (about 200 to 300) or in moderate number (3 to 70), rarely absent. No air bladder. Vertebrae 35 to 86. Two hypurals, separated or fused into one plate; epurals 2, often only one rudimentary or absent.

Colour highly variable in shallow-water species, mottled, spotted, with crossbars or longitudinal stripes. Deeper-living species are more uniformly coloured, pinkish, red or brown to black. Some abyssal and hadal species loose their pigmentation completely.

The Liparididae are marine fishes, widely distributed in cold and temperate waters of both hemispheres, occasionally occurring in the tropics. More than 210 species belonging to 20 genera are known to date (not including new genera and species discovered recently, but not yet published). The greatest species diversity occurs in the North Pacific and in the Antarctic and adjacent waters. The Fishing Areas 48, 58 and 88 comprise four genera with about 30 species.

Snailfishes are mainly bottom-dwellers, partly inhabiting also midwaters. Their bathymetric limits are very wide, from the tidal zone to more than 7 000 m depth, and in the Antarctic, from 100 to 5 500 m. The eggs are large and demersal (to 5 mm diameter); the fecundity is low. Many species are common in cold water below zero (to -1.9°C), but blood antifreezes are not found in the high Antarctic species Paraliparis devriesi Andriashev (DeVries, 1977). None of the species appear to be of commercial value.



SIMILAR FAMILIES OCCURRING IN THE AREA :

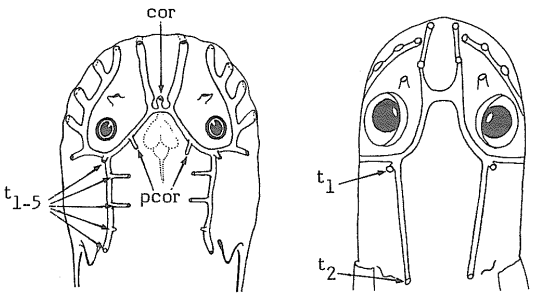
Zoarcidae (Melanostigma, Oidiphorus, etc.): no connection of second suborbital bone to preopercle; base of pectoral fin narrow, always less than length of jaw; dorsal and anal fins completely confluent with caudal fin.

Zoarcidae (Melanostigma)

KEY TO GENERA OCCURRING IN THE AREA :

1a. Ventral sucking disc present, not rudimentary

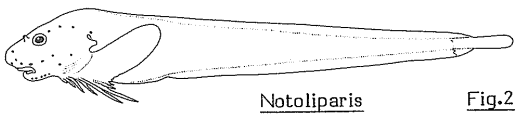
2a. One unpaired coronal pore (cor) and one pair of postcoronal pores (pcor) present in supraorbital canals (Fig.1a); 4 or 5 pores in temporal canal (t_{1-5}). Eye very small, 2.2 to 2.6% of standard length. Entire body without pigmentation (Fig.2). Inhabits hadal trenches, at about 5 000 to 8 000 m depth ..... Notoliparis



a) Notoliparis b) Careproctus

top of head showing pores and canals Fig.1

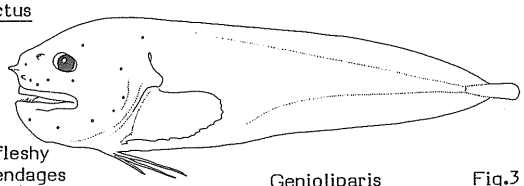
2b. Coronal and postcoronal pores absent; temporal pores reduced in number, usually to one postorbital and 1 or 2 terminal (suprabranchial) pores (Fig.1b). Eye not reduced, about 4 to 5% of standard length or more. Body pigmented, usually pinkish to red, brown or black. Inhabits mostly the shelf and slope (bathyal zone) and adjacent abyssal depths ..... Careproctus



Notoliparis Fig.2

1b. Ventral sucking disc absent

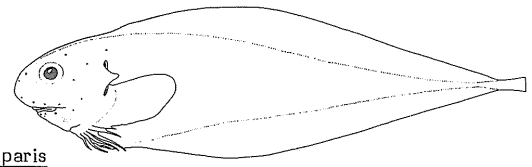
3a. Front part of snout with a transversal row of five fleshy barbel-like appendages. Skin of head, body and fins densely covered with small, sharp prickles. Teeth in posterior rows comparatively large, sharpened, canine-like, curved inward. Two separate hypurals present in urostyle vertebrae ... Genioliparis (Fig.3)



Genioliparis Fig.3

underside of head

3b. Snout without any barbel-like appendages. Skin smooth, without prickles. No canine-like, curved teeth. A single hypural plate present in urostyle vertebrae (remains of an interhypural slit may be discernible in few species) ..... Paraliparis (Fig.4)



Paraliparis Fig.4

LIST OF SPECIES OCCURRING IN THE AREA :

Careproctus georgianus Lönnberg, 1905
* Careproctus sp.n. 1 (South Shetland Islands, depth: 750 to 850 m)
* Careproctus sp.n. 2 (South Shetland Islands, depth: 570 to 583 m)
* Careproctus sp.n. 3 (South Georgia Island, depth: 500 to 600 m)

Genioliparis lindbergi Andriashev & Neelov, 1976

Notoliparis kurchatovi Andriashev, 1975
Notoliparis macquariensis Andriashev, 1978

Paraliparis antarcticus Regan, 1914
Paraliparis copei gibbericeps Andriashev, 1982
Paraliparis copei kerguelensis Andriashev, 1982
Paraliparis devriesi Andriashev, 1980
Paraliparis gracilis Norman, 1930
Paraliparis leobergi Andriashev, 1982
Paraliparis meganchus Andriashev, 1982
Paraliparis monoporus Andriashev & Neelov, 1979
Paraliparis neelovi Andriashev, 1982
Paraliparis operculosus Andriashev, 1982
Paraliparis somovi Andriashev & Neelov, 1979
Paraliparis terraenovae Regan, 1916
Paraliparis tetrapteryx Andriashev & Neelov, 1979
Paraliparis thalassobathyalis Andriashev, 1982
Paraliparis valentinae Andriashev & Neelov, 1985
Paraliparis spp.n. 1,2,3 (East Antarctica, depths: 950 to 1 100 m; 900 to 960 m; 980 to 1 080 m, respectively. In press)
Paraliparis spp.n. 4,5,6 (east of South Georgia Island, depth: 2 600 m. In press)
Paraliparis sp.n. 7 (southern part of Weddell Sea, depth: 550 m. In press)
Paraliparis sp.n. 8 (Antarctic Peninsula, depth: 210 to 260 m. In press)

Prepared by A.N. Andriashev, Zoological Institute, Academy of Sciences, Leningrad, USSR.

* Descriptions of Careproctus spp.n. 1 to 3 are in preparation

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

MACROURIDAE

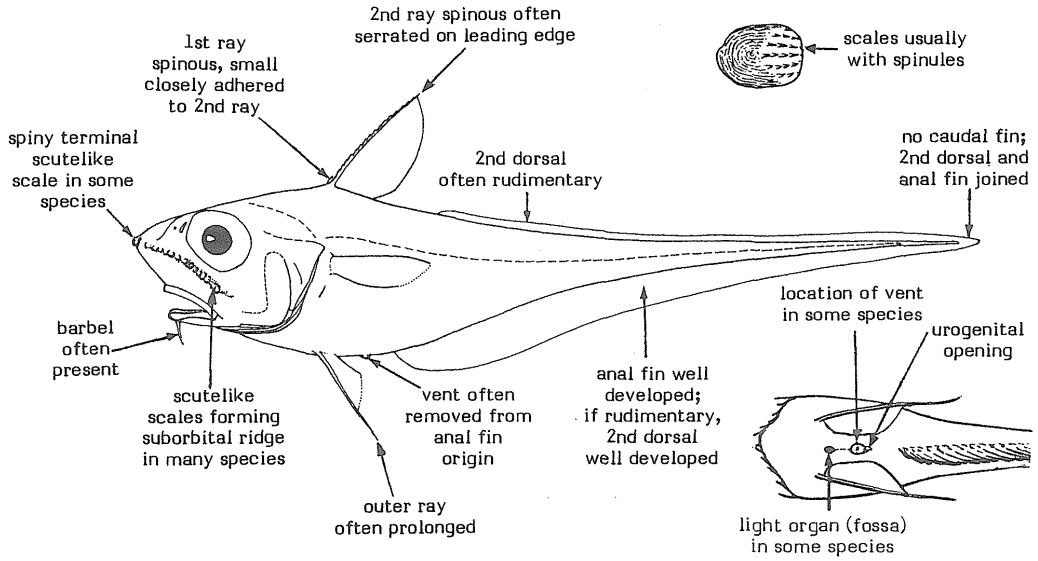
(sometimes Coryphaenoididae and Macrouroididae, in part, in literature)

Grenadiers

Trunk short, moderately compressed; tail greatly elongated, tapering to a point that usually lacks a caudal fin*. Head shape compressed, rounded or cylindrical, with a bluntly rounded to sharply pointed snout; mouth terminal to inferior, small to moderate in size; chin barbel usually present; eyes moderate to very large in most; teeth on premaxilla and mandible only, none on roof of mouth; arrangement variable, in single row to broad villiform band, sometimes with outer series enlarged; gillrakers tubercular in most, long and slender in some; branchiostegal rays 6 or 7. Dorsal fins two except in Macrouroidinae with one; first dorsal with the 2 anteriormost rays spinous except in Trachyrhyncus and Macrouroidinae; first ray often minute and closely appressed to base of long second ray; second dorsal and anal fins long, usually with more than 80 rays, both fins meet at tip of tail; pectoral fins narrow-based, positioned relatively high on trunk; pelvic fins narrow-based, thoracic to almost jugular in position, with 5 to 17 rays , outer ray often prolonged. Vent (or anus) closer to pelvic fins than to anal fin in some species; a light organ sometimes present on ventral midline of abdomen. Scales cycloid, but exposed field of each scale often covered with spinules, which are sometimes arranged in ridge-like rows; a stout, terminal, scute-like scale at tip of snout in some species; ridge-like rows of coarse, scute-like scales sometimes present on head.

Colour: usually grey, brown, or blackish, sometimes with a blue or violet tinge; some silvery along sides.

Deep-sea fishes, almost all benthopelagic in habit, found primarily at upper continental slope depths of 150 (rare) to 2 000 m, but a few species recorded from below 5 000 m. Distribution of family worldwide, except in high Arctic waters; species most numerous in tropics.



* Trachyrhyncus has a small caudal fin; other species may develop what appears to be a caudal fin when the tail tip is broken off and the dorsal and anal rays overgrow the broken end

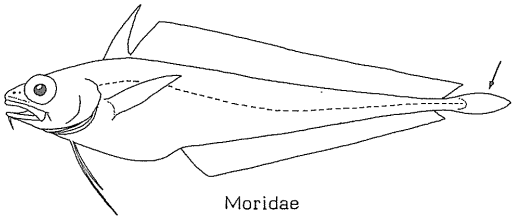
** Macrouroides, placed in Macrouroididae by some, lacks a pelvic fin

SIMILAR FAMILIES OCCURRING IN THE AREA :

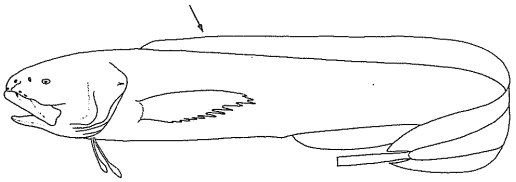
Moridae: a small but distinct caudal fin; both anal and second dorsal fins well developed, not confluent around tip of tail.

Ophidiidae, Zoarcidae and Carapidae : a single, spineless dorsal fin.

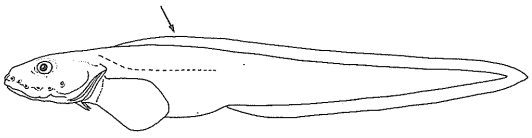
Muraenolepididae: first dorsal fin consisting of a single filamentous ray; gill openings restricted to area below pectoral fin.



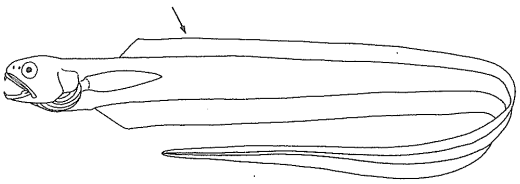
Moridae



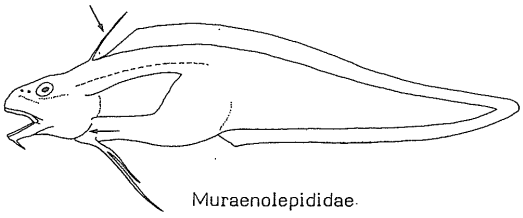
Ophidiidae



Zoarcidae



Carapidae



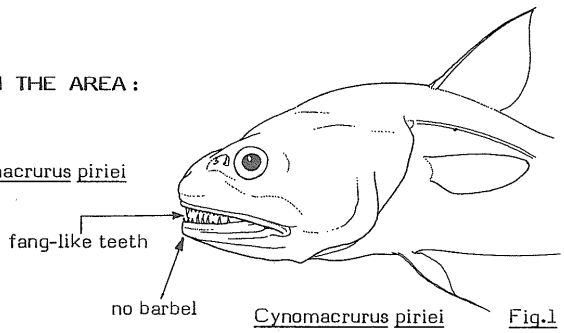
Muraenolepididae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA :

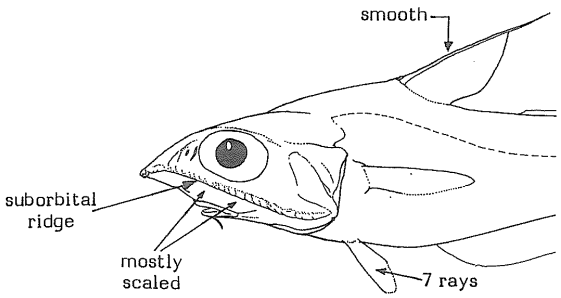
1a. Large fang-like teeth in both jaws (Fig.1); no chin barbel; colour black overall; bathypelagic ..... Cynomacrurus piriei

1b. Teeth small or slightly enlarged, not fang-like; chin barbel present; colour greyish-white to dark brown; benthopelagic

2a. Pelvic rays 7; a scaleless black fossa on belly or chest (Figs 3,5); second spinous ray of first dorsal fin smooth; a sharp spiny suborbital ridge extending from tip of snout to preopercular angle (Figs 2,4) (Coelorhynchus)



Cynomacrurus piriei Fig.1



Coelorhynchus marinii Fig.2

3a. Most ventral surfaces of head scaled (Fig.2); a large oval or lens-shaped black scaleless fossa on midline of chest, far removed from vent (Fig.3) ..... Coelorhynchus marinii

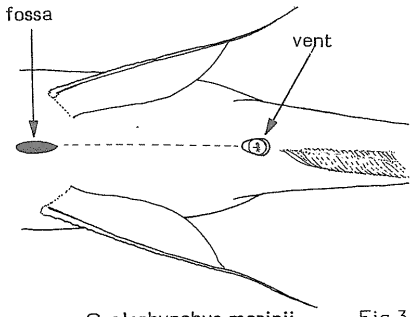
3b. Ventral surfaces of head scaleless (Fig.4); a large, lens-shaped, black, scaleless fossa on abdomen immediately before vent (Fig.5) ..... Coelorhynchus fasciatus

2b. Pelvic rays 8 to 12; no scaleless black fossa on belly or chest; second spinous ray of first dorsal fin denticulate (Fig.6) (denticulations weak or obsolete in larger specimens of some species); suborbital ridge rounded, not continuous to angle of preopercle

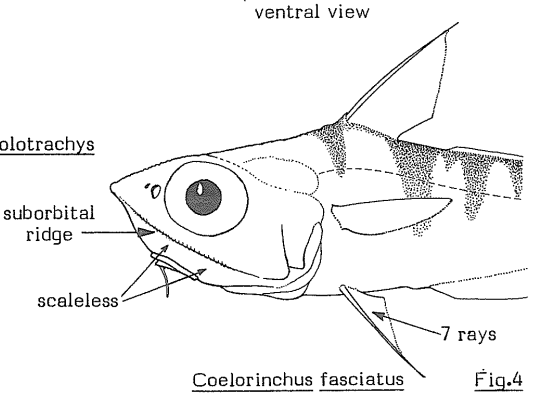
4a. Orbits large, about 3 times in head length (Fig.7) ..... Macrourus holotrachys

4b. Orbits moderate to small, more than 4 times in head length (Figs 8 to 11)

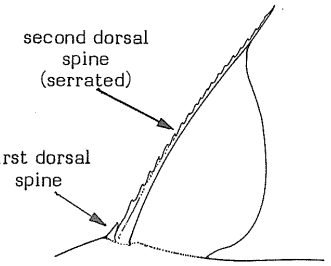
5a. Barbel thin and short, its length less than half of orbit diameter (Fig.8); scales either completely devoid of spinules, or spinules few, applied as small, greatly reclined points ..... Lionurus filicauda



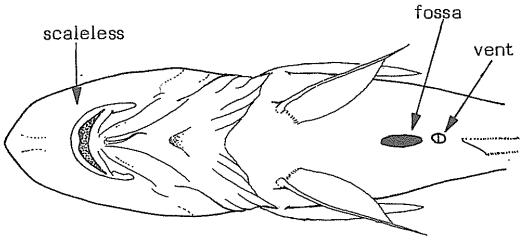
Coelorhynchus marinii Fig.3
ventral view



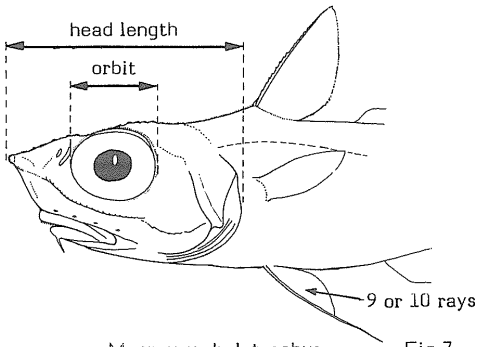
Coelorinchus fasciatus Fig.4



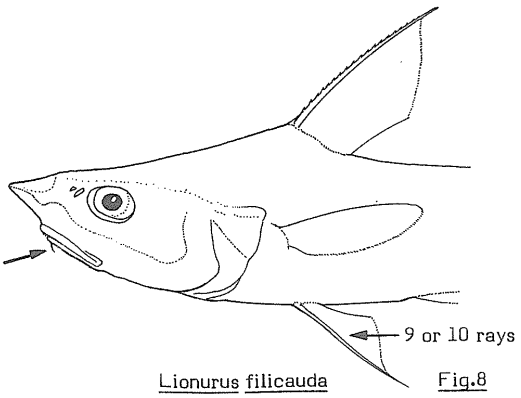
dorsal fin Fig.6



Coelorhynchus fasciatus Fig.5
ventral view



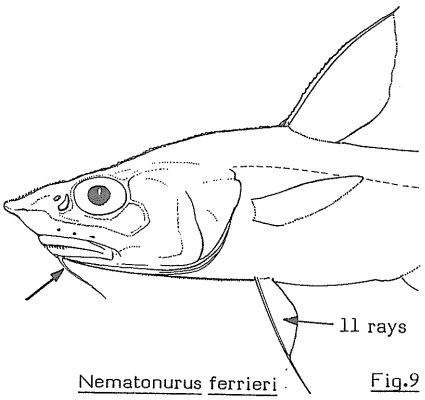
Macrourus holotrachys Fig.7



Lionurus filicauda Fig.8

5b. Barbel thick (at least at base), its length much more than half of orbit diameter (Figs 9 to 11)

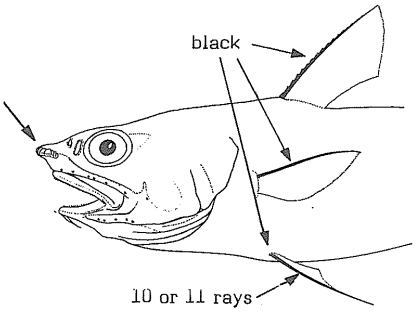
6a. Premaxillary dentition relatively slender, conical, without arrowhead-like tips, in irregular bands; scales relatively firm, strongly adherent (Fig.9) ..... Nematonurus ferrieri



Nematonurus ferrieri Fig.9

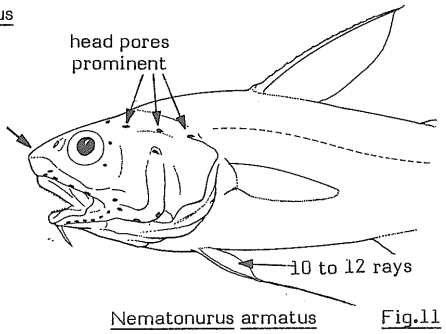
6b. Premaxillary dentition stoutly conical, with arrowhead-like tips, teeth in 1 or 2 distinct rows; scales thin, deciduous, with small low spinules

7a. General body colour whitish; serrated spinous ray in first dorsal, uppermost first pectoral ray and outermost first pelvic ray black, remainder of fin rays whitish or pale; sensory pores on head not well developed; snout narrow and rather sharply pointed; most ventral surfaces of head, including mandibular rami, scaled (Fig.10).. Nematonurus lecointei



Nematonurus lecointei Fig.10

7b. General body colour brown; all fin rays brownish to black; sensory pores on head large, prominent; snout broad, bluntly rounded; most ventral surfaces of head scaleless (Fig.11) ..... Nematonurus armatus



Nematonurus armatus Fig.11

LIST OF SPECIES OCCURRING IN THE AREA :

Code numbers are given for those species for which Identification Sheets are included

Coelorhynchus fasciatus (Günther, 1878)	MACROUR Coel 2
Coelorhynchus marinii Hubbs, 1934	MACROUR Coel 3
Cynomacrurus piriei Dollo, 1909	MACROUR Cyn 1
Lionurus filicauda (Günther, 1878)	
Macrourus holotrachys Günther, 1878	MACROUR Macr 1
Nematonurus armatus (Hector, 1875)	MACROUR Nem 1
Nematonurus ferrieri (Regan, 1913)	
Nematonurus lecointei (Dollo, 1900)	

Prepared by T. Iwamoto, Department of Ichthyology, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA and P. Geistdoerfer, Muséum national d'Histoire naturelle, Ichtyologie générale et appliquée, Paris, France

MACROUR Coel 2

1985

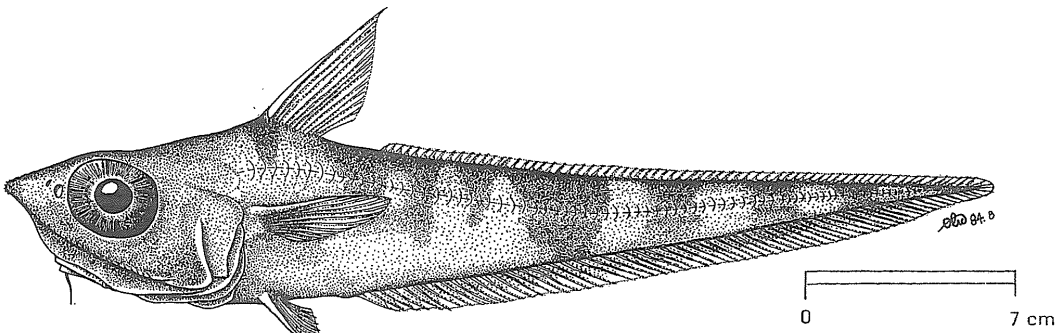
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MACROURIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Coelorhynchus fasciatus (Günther, 1878)

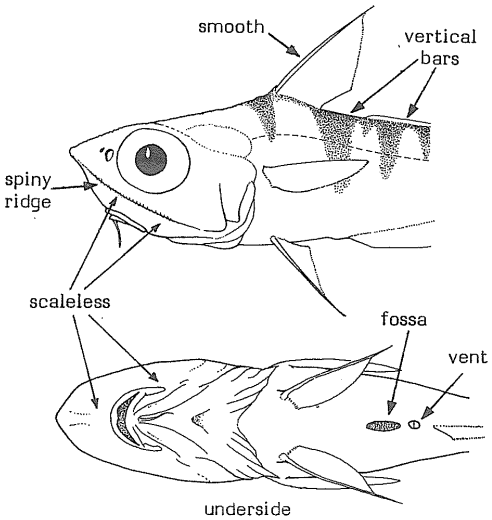
OTHER SCIENTIFIC NAMES STILL IN USE : Coelorinchus fasciatus (Günther, 1878)



VERNACULAR NAMES :

FAO/CCAMLR : En - Southern grenadier
Fr - Grenadier austral
Ru - Dolgokhvost polosatyi
Sp - Granadero austral

NATIONAL :



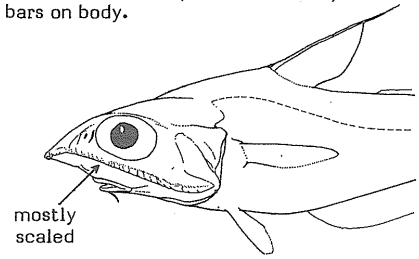
DISTINCTIVE CHARACTERS :

Mouth small, subterminal; snout bluntly pointed; a stout spiny ridge extends from snout tip to angle of preopercle; orbits large, equal to or larger than post-orbital length; ventral surfaces of head scaleless. Vent slightly removed from anal fin, preceded by a large, lens-shaped black scaleless fossa. Second spinous dorsal fin ray smooth; pelvic fins with 7 rays. No outer series of gillrakers on first (outer) gill arch.

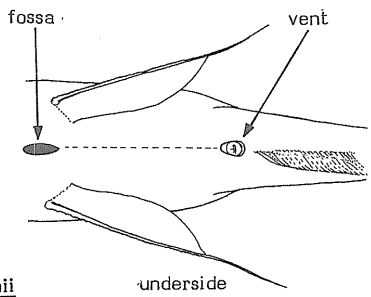
Colour: tawny to brownish, about 7 or 8 broad vertical bars across body.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Coelorhynchus marinii: ventral surfaces of head mostly scaled; scaleless fossa present on chest between pelvic fin bases; no vertical bars on body.

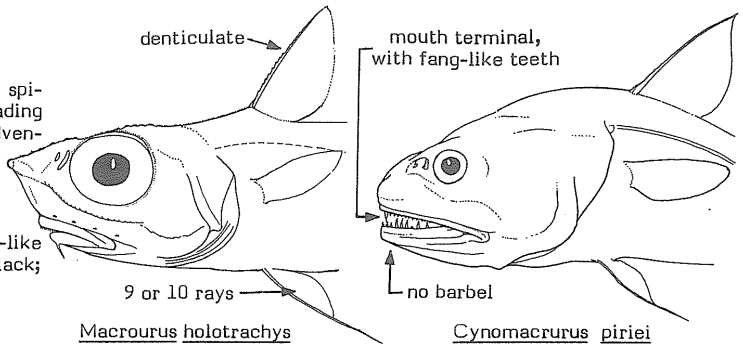


Coelorhynchus marinii

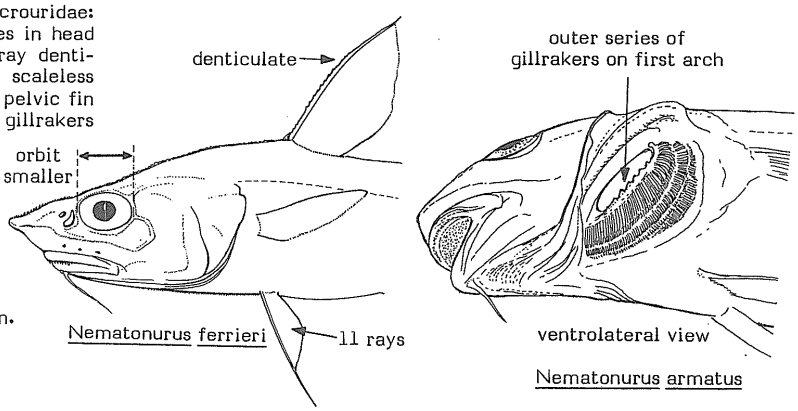


Macrourus holotrachys: second spinous dorsal ray denticulate on leading edge; no scaleless black fossa on midventral line; pelvic fin rays 9 or 10.

Cynomacrurus piriei: fang-like teeth on jaws; no barbel; colour black; mouth terminal; bathypelagic.



Other species of Macrouridae: orbits smaller, 4 or more times in head length; second spinous dorsal ray denticulate on leading edge; no scaleless black fossa on midventral line; pelvic fin rays 9 to 12; outer series of gillrakers present on first arch.



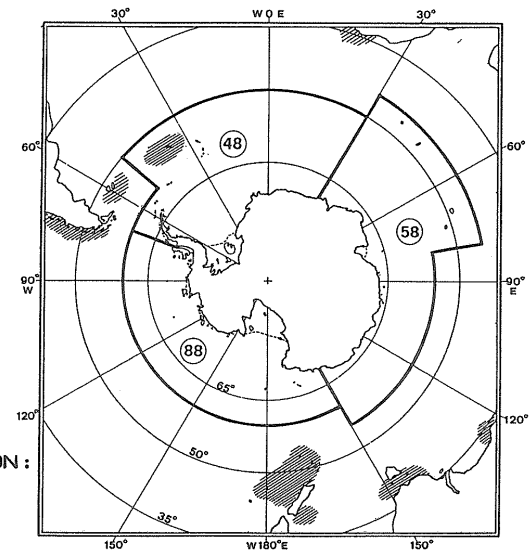
SIZE :

Maximum: to about 40 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Although so far only reported from the southernmost parts of South America, Africa, Australia and New Zealand, this species most probably occurs within the area.

Found at depths from about 150 m to more than 1 000 m.



POTENTIAL FISHING GROUNDS :

Continental slope.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species. It is taken (often in large quantities) as a bycatch of the commercially important hake (Merluccius) off Patagonia and southern Africa.

MACROUR Coel 3

1985

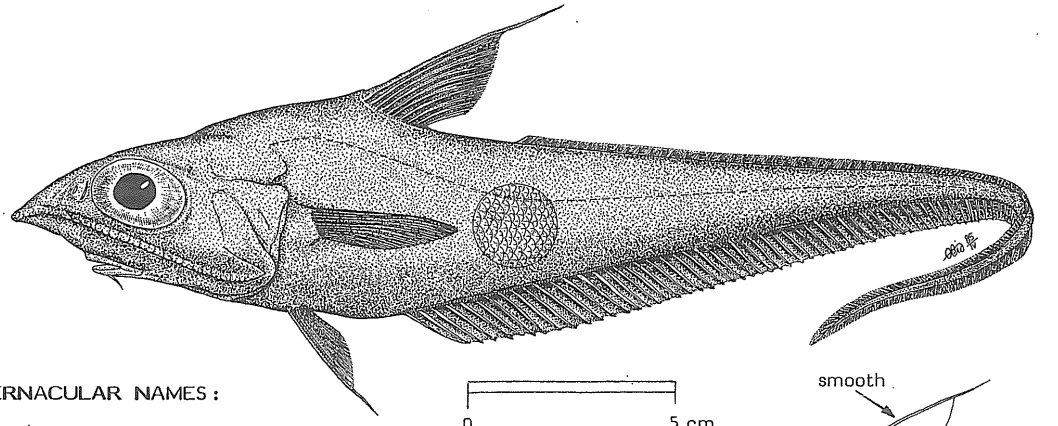
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MACROURIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Coelorhynchus marinii Hubbs, 1934

OTHER SCIENTIFIC NAMES STILL IN USE : Coelorinchus marinii Hubbs, 1934



0 5 cm

VERNACULAR NAMES :

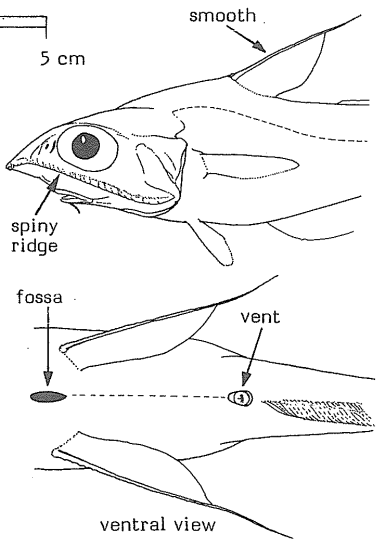
FAO/CCAMLR : En - Marini's grenadier
Fr - Grenadier de Marini
Ru - Dolgokhvost marini
Sp - Granadero de Marini

NATIONAL :

DISTINCTIVE CHARACTERS :

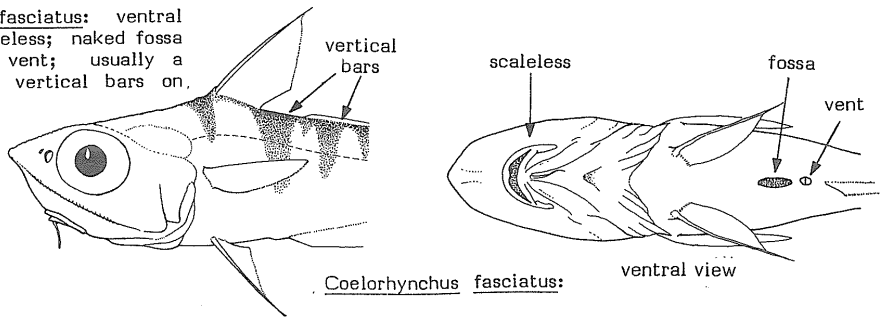
Mouth small, subterminal; snout pointed, divided into dorsal and ventral halves by a stout spiny ridge which extends from snout tip to angle of preopercle; orbits large, about equal to or larger than postorbital length; most ventral surfaces of snout scaled. Vent close before anal fin; a large oval or lens-shaped, black, scaleless fossa on midline of chest, far removed from vent. Second spinous dorsal fin ray smooth; pelvic fins with 7 rays. No outer series of gillrakers on first (outer) gill arch.

Colour: brownish, head and trunk ventrally blackish. Fins dusky to blackish.



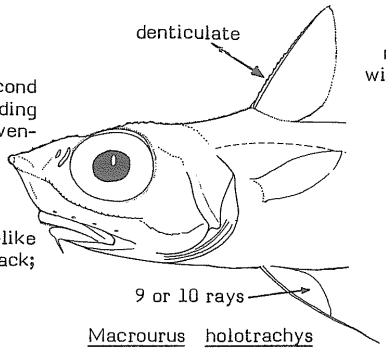
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Coelorhynchus fasciatus: ventral surfaces of head scaleless; naked fossa immediately before vent; usually a series of prominent vertical bars on body.

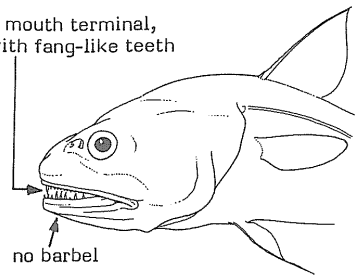


Macrourus holotrachys: second spinous dorsal ray denticulate on leading edge; no scaleless black fossa on midventral line; pelvic fin rays 9 or 10.

Cynomacrurus piriei: fang-like teeth in jaws; no barbel; colour black; mouth terminal; bathypelagic.

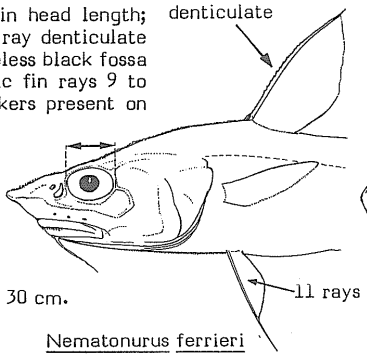


Macrourus holotrachys

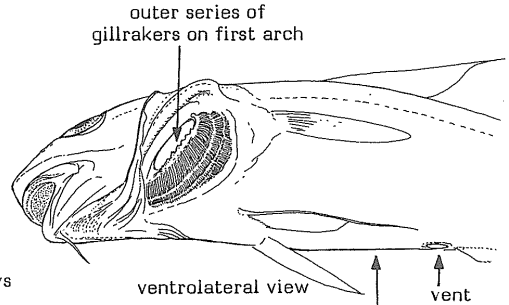


Cynomacrurus piriei

Other species of Macrouridae: orbits 4 or more times in head length; second spinous dorsal fin ray denticulate on leading edge; no scaleless black fossa on midventral line; pelvic fin rays 9 to 12; outer series of gillrakers present on first arch.



Nematonurus ferrieri



Nematonurus armatus

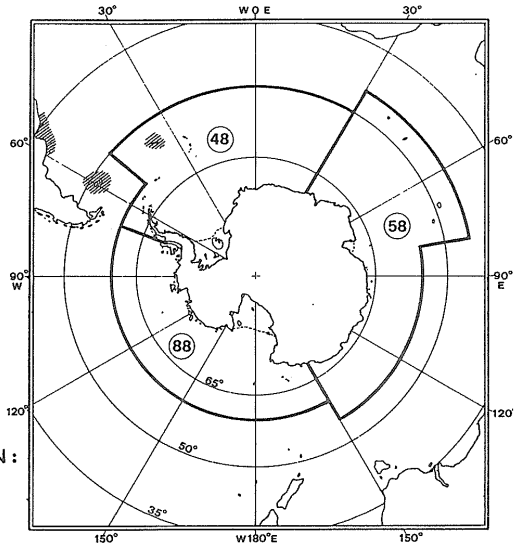
SIZE :

Maximum: to about 30 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Western Atlantic south of Uruguay to the Falkland/Malvinas and South Georgia.

Found at depths of about 300 m (probably 200 to 500 m).



POTENTIAL FISHING GROUNDS :

Continental slope.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species. At present it is taken almost exclusively by research vessels in bottom trawls from deep waters and incidentally in the bycatch of vessels fishing for the Patagonian hake (Merluccius hubbsi).

MACROUR Cyn 1

1985

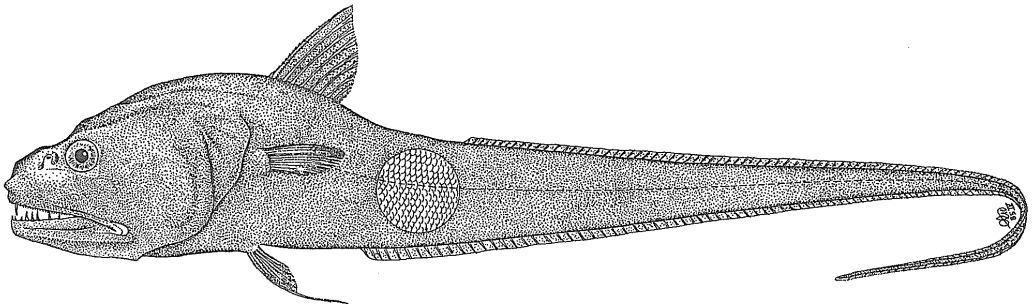
FAO SPECIES IDENTIFICATION SHEETS

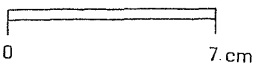
FAMILY : MACROURIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Cynomacrurus piriei Dollo, 1909

OTHER SCIENTIFIC NAMES STILL IN USE : None





VERNACULAR NAMES :

FAO/CCAMLR : En - Dogtooth grenadier
Fr - Grenadier denté
Ru - Dolgokhvost Pirri
Sp - Granadero dentón

NATIONAL :

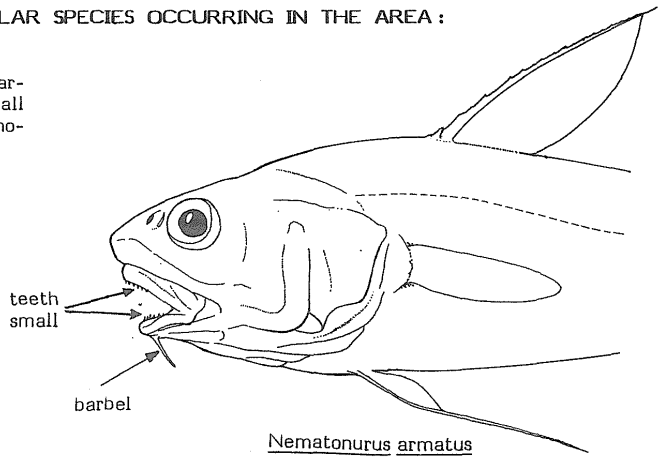
DISTINCTIVE CHARACTERS :

Mouth large and terminal; barbels absent; upper jaw with a narrow band of small pointed teeth, and a strong pair of anterolateral canines; lower jaw with 7 to 11 (in adults) strong, unequal, well-spaced and uniserial teeth; eye small (less than 15% of head length). Pelvic fins with 7 or 8 rays. Scales with diverging rows of spinules. Vent just before anal fin; no light organ.

Colour: brownish. Mouth and branchial cavities black.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

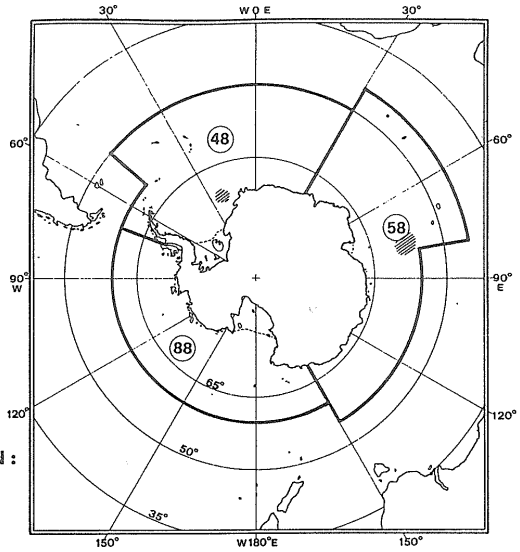
Other species of Macrouridae: chin barbel present; mouth subterminal; teeth small or slightly enlarged, not fang-like; benthopelagic.



Nematonurus armatus

SIZE :

Maximum: 31 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Weddell Sea and Banzare Bank, but probably circum-Antarctic. Bathypelagic, to depths of about 3 800 m.

POTENTIAL FISHING GROUNDS :

Continental slope.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species. At present it is taken almost exclusively by research vessels in bottom trawls from deep waters.

MACROUR Macr 1

1985

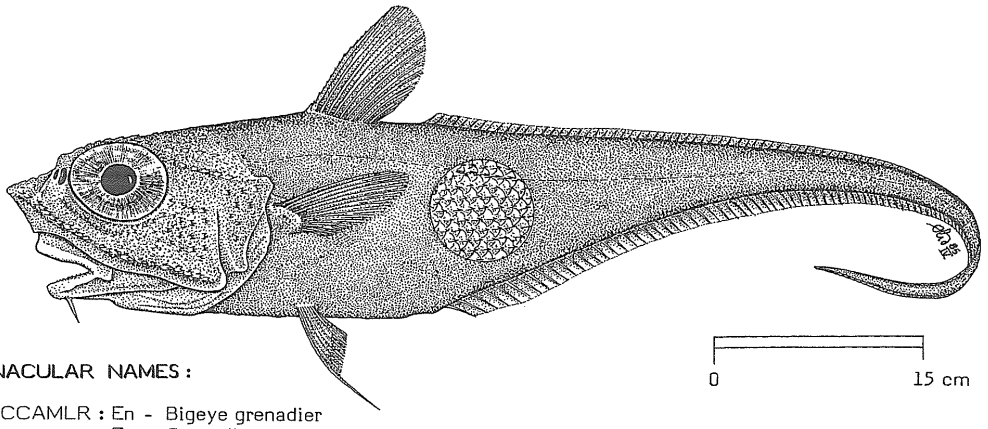
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MACROURIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Macrourus holotrachys Günther, 1878

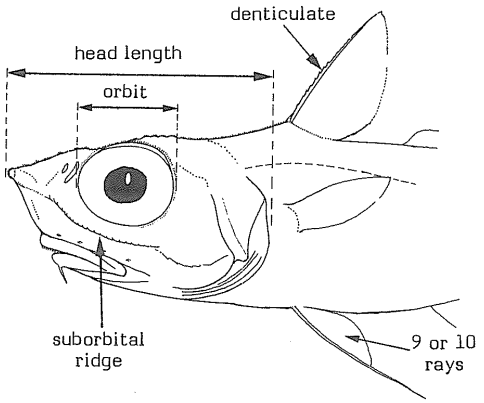
OTHER SCIENTIFIC NAMES STILL IN USE : Macrourus carinatus Günther, 1878
Macrourus whitsoni Regan, 1913



VERNACULAR NAMES :

FAO/CCAMLR : En - Bigeye grenadier
Fr - Grenadier grosyeux
Ru - Bolsheglazyi dolgokhvost
Sp - Granadero ojisapo

NATIONAL :



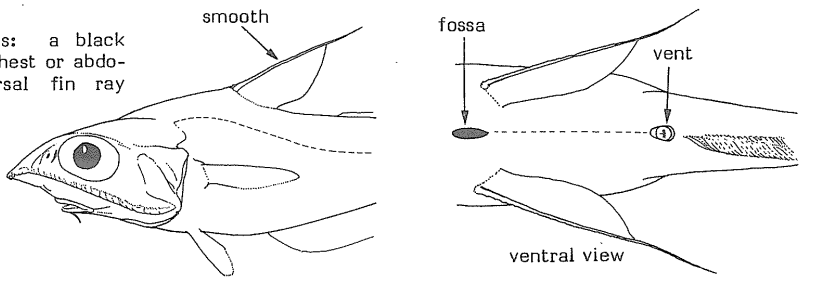
DISTINCTIVE CHARACTERS :

Mouth moderate in size, subterminal; snout bluntly pointed; a stout spiny ridge extends from snout tip to angle of preopercle; orbits large, about equal to or larger than postorbital length; ventral surfaces of snout mostly scaleless. Scales with prominent median row of spinules forming longitudinal striations on body surfaces. Vent close before anal fin; no ventral fossa. Second spinous dorsal fin ray denticulate; pelvic fins with 9 or 10 rays. No outer series of gillrakers on first (outer) gill arch.

Colour: light brown. Fins dusky to blackish.

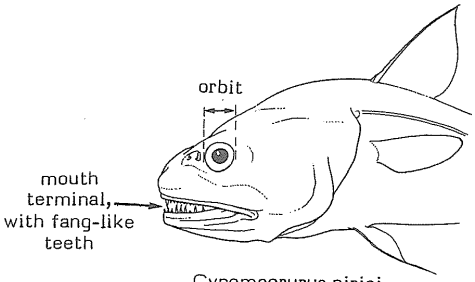
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Coelorhynchus species: a black scaleless fossa present on chest or abdomen; second spinous dorsal fin ray smooth.



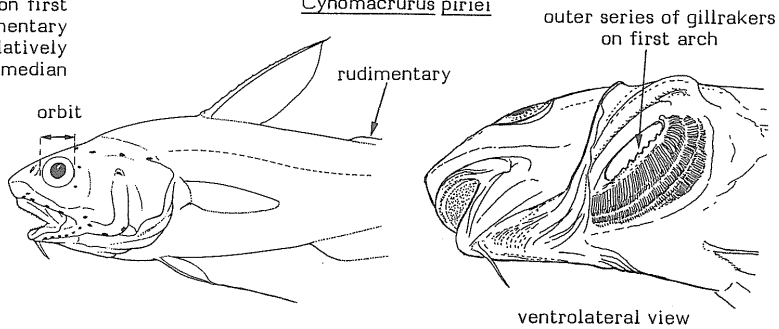
Coelorhynchus marini

Cynomacrurus piriei: fang-like teeth in jaws; colour black; mouth terminal; bathypelagic; orbits smaller.



Cynomacrurus piriei

Other species of Macrouridae: orbits 4 or more times in head length; outer series of gillrakers present on first gill arch; second dorsal fin rudimentary anteriorly; scale spinulation relatively fine, without an especially strong median ridge.



Nematonurus armatus

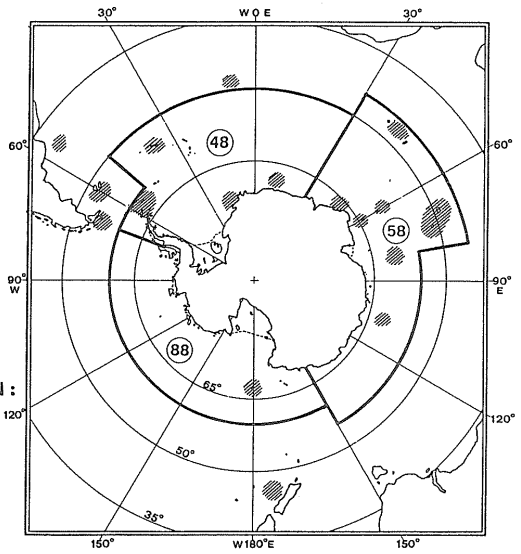
SIZE :

Maximum: to about 87 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circum-Antarctic and also from off Uruguay, southern tip of South America, Prince Edward Island and New Zealand.

Found at depths from 272 m to more than 1 200 m.



POTENTIAL FISHING GROUNDS :

Continental slope.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species. At present it is taken almost exclusively by research vessels in bottom trawls from deep waters and incidentally in the bycatch of vessels fishing for the Patagonian hake (Merluccius hubbsi).

MACROUR Nem 1

1985

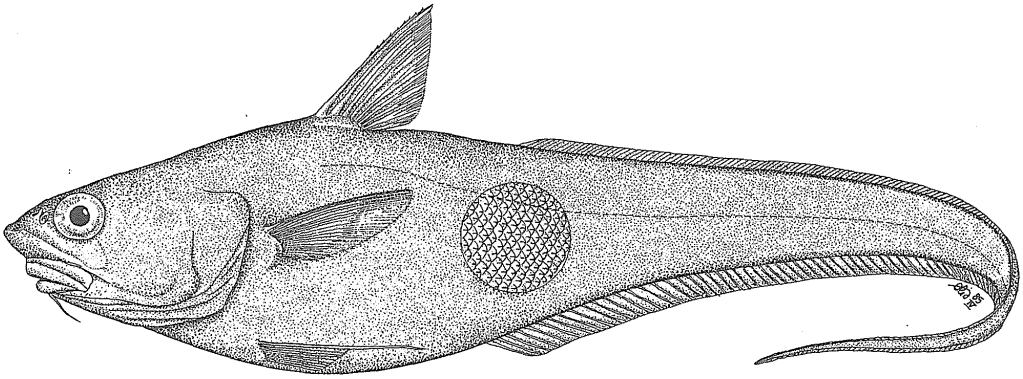
FAO SPECIES IDENTIFICATION SHEETS

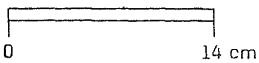
FAMILY : MACROURIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Nematonurus armatus (Hector, 1875)

OTHER SCIENTIFIC NAMES STILL IN USE : Coryphaenoides (Nematonurus) armatus (Hector, 1875)





VERNACULAR NAMES :

FAO/CCAMLR : En - Armed grenadier
Fr - Grenadier armé
Ru - Dolgokhvost vooruzhennyi
Sp - Granadero armado

NATIONAL :

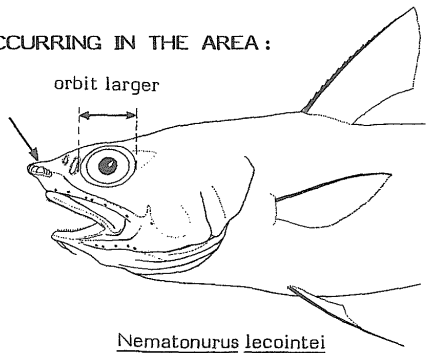
DISTINCTIVE CHARACTERS :

Mouth moderate, subterminal to inferior, upper jaw with teeth in two rows, the outer row enlarged; a single row of teeth in lower jaw; orbit relatively small, its diameter less than interorbital width and than length of snout (horizontal diameter of orbit ranges from 18.3 to 23% of head length); a pair of scaleless areas above snout, just behind the leading edge of snout; underside of snout scaleless. Origin of first dorsal fin well behind insertions of pectoral fins, with spinous ray of first dorsal fin serrated; pelvic fins with 10 or 11 rays. Scales with spines arranged in regular, parallel to divergent rows. Vent close before anal fin; no light organ.

Colour: brownish to reddish-brown. Fins brownish; mouth and branchial cavities blackish.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

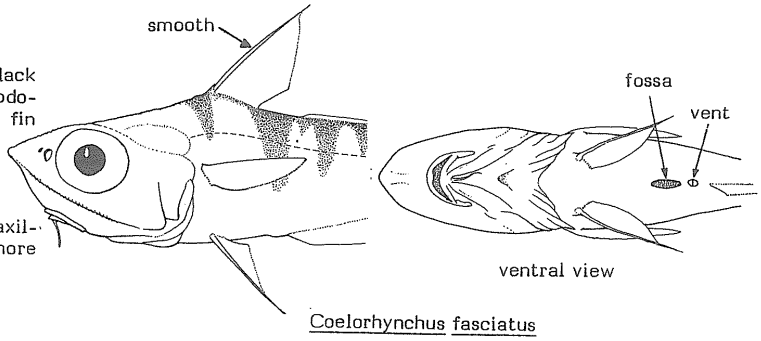
Nematonurus lecointei: snout narrow and rather sharp-pointed; diameter of orbit greater than interorbital width.



Nematonurus lecointei

Coelorhynchus species: a black scaleless fossa present on chest or abdomen; spinous ray of first dorsal fin smooth.

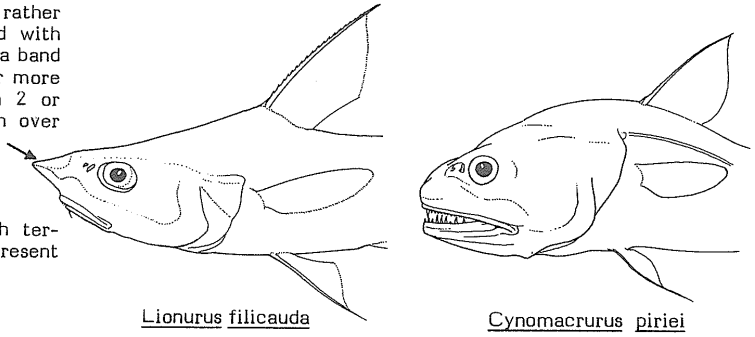
Nematonurus ferrieri: premaxillary teeth relatively slender and in more than 2 rows.



Coelorhynchus fasciatus

Lionurus filicauda: snout rather pointed, its tip and angles armed with tubercular scales; upper jaw with a band of pointed premaxillary teeth (3 or more near symphysis); lower jaw with 2 or more rows of small pointed teeth over anterior part of mandible.

Cynomacrurus piriei: mouth terminal; no barbel; fang-like teeth present in jaws; bathypelagic.

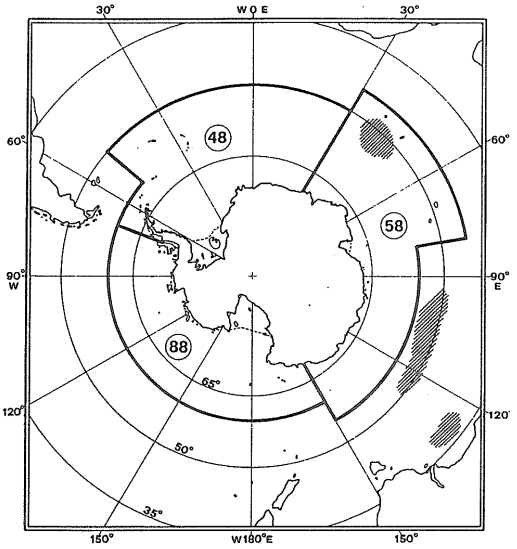


Lionurus filicauda

Cynomacrurus piriei

SIZE :

Maximum: to at least 80 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Antarctic Indian Ocean sector and off south Australia and New Zealand, probably circumantarctic; also in the Atlantic and Pacific oceans. Benthopelagic between 280 and 4 700 m.

Feeds on benthic crustaceans (amphipods, isopods, cumaceans), pelagic crustaceans (mysids, euphausiids); echinoderms, cephalopods and fishes.

POTENTIAL FISHING GROUNDS :

Continental slope.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Separate statistics are not reported for this species. At present it is taken almost exclusively by research vessels in bottom trawls from deep waters.

MOR

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

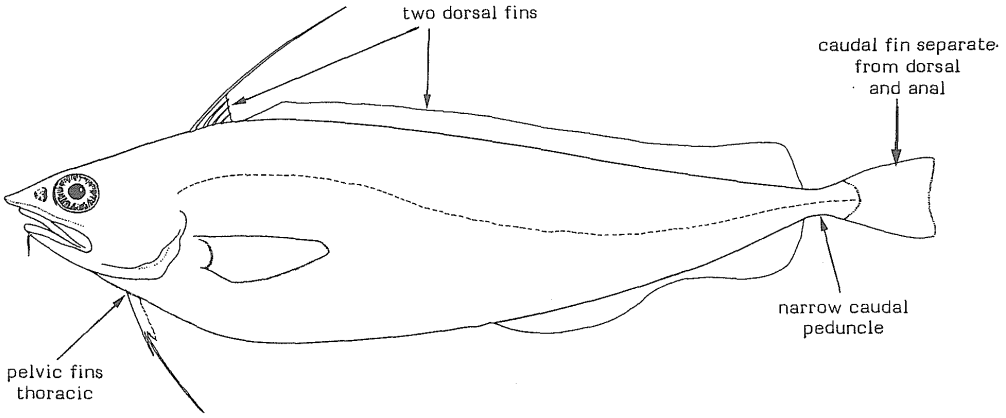
MORIDAE

Moras

Body elongate, tapering to a narrow caudal peduncle. Mouth terminal or inferior; a mental barbel present; teeth few or lacking on anterior part of vomer; gill openings wide. Sometimes ventral luminous organ present. No spines in fins; 2 or 3 dorsal fins, the first with a short base; 1 or 2 anal fins; pelvic fins thoracic, attached far in front of pectoral fins, never very close together; first dorsal fin and pelvic fins often with 1 or 2 elongate rays; caudal fin always separate from dorsal and anal fins. Small cycloid scales on body and head. Anterior paired projections of swimbladder attached to a membranous area at rear of cranium.

Colour: variable, black or grey to light-brown or pink; some species may have iridescent areas.

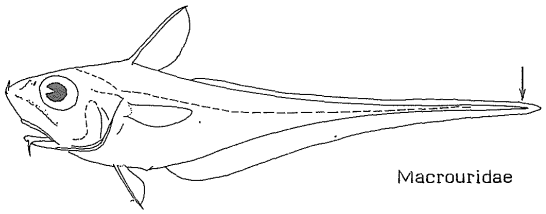
Small to large size fishes (up to 70 cm), found close to the bottom of the continental slope and in abyssal depths. Locally abundant in some habitats. About 20 genera, 3 in the area. Taken as bycatch in bottom trawls.

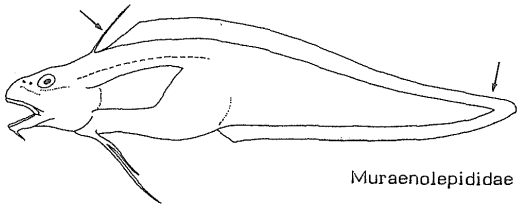


SIMILAR FAMILIES OCCURRING IN THE AREA :

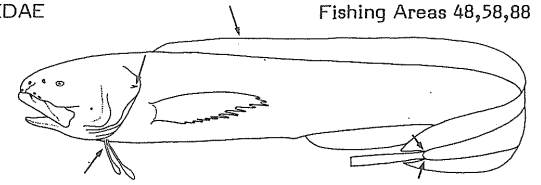
Macrouridae: body very elongate, tapering to a point; caudal fin generally lacking.

Muraenolepididae: body elongate, but dorsal, caudal and anal fins joined together, first dorsal fin with one elongate ray.



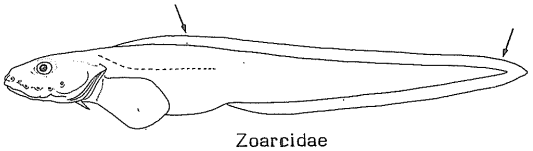


Ophidiidae: a single dorsal fin; pelvic fins close together; dorsal, caudal and anal fins joined together in most species; one opercular spine present.



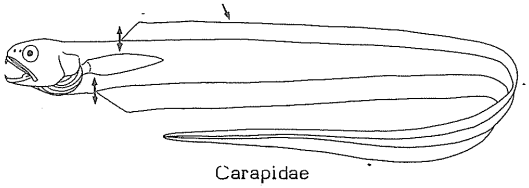
Ophidiidae

Zoarcidae: a single dorsal fin; dorsal and anal fins confluent with caudal fin.



Zoarcidae

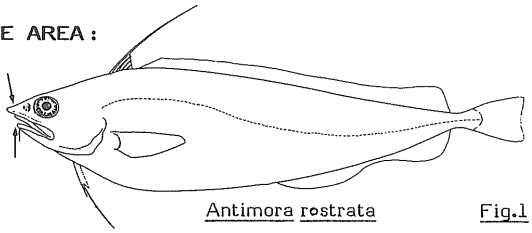
Carapidae: a single dorsal fin; anal fin origin in advance of dorsal origin and under pectoral fin.



Carapidae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA:

1a. Mouth inferior, snout prominent, flattened, pointed and bony (Fig.1) ..... Antimora rostrata



Antimora rostrata Fig.1

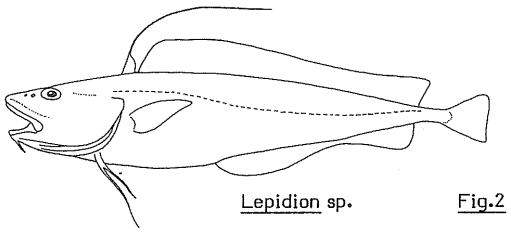
1b. Mouth terminal, snout normal

2a. First dorsal fin short, elevated and filamentous (Fig. 2) ..... Lepidion sp.

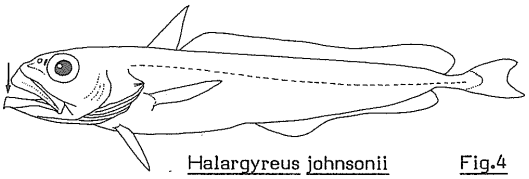
2b. First dorsal fin normal

3a. Only one anal fin (Fig.3) ..... Physiculus marginatus

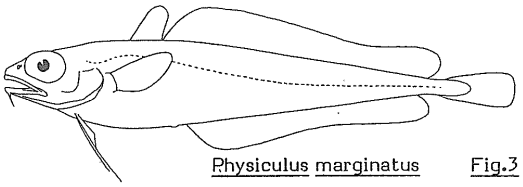
3b. Two joined anal fins (Fig.4) ..... Halargyreus johnsonii



Lepidion sp. Fig.2



Halargyreus johnsonii Fig.4



Physiculus marginatus Fig.3

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Antimora rostrata (Günther, 1878)	MOR Ant 1
Halargyreus johnsoni Günther, 1862	
Lepidion sp.	
Physiculus marginatus	

Prepared by G. Geistdoerfer and J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

* The Lepidion species occurring in the area need more accurate studies

MOR Ant 1

1985

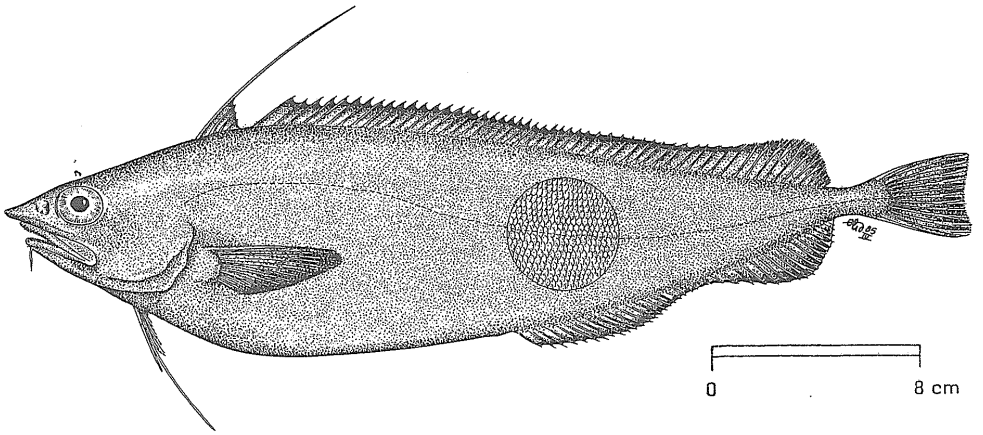
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MORIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Antimora rostrata (Günther, 1878)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Blue antimora
Fr - Antimore bleu
Ru - Antimora
Sp - Mollera azul

NATIONAL :

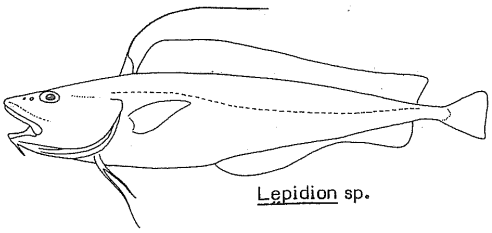
DISTINCTIVE CHARACTERS :

Snout pointed, rostrum flattened; mouth inferior; mental barbel well developed; teeth on both jaws villiform and pluriserial; teeth also present on anterior part of vomer (roof of mouth). Gillrakers relatively short, 76 to 90 on first arch. First dorsal fin short-based, its first ray elongate; second dorsal fin long, with more than 50 rays; anal fin deeply notched in its posterior part; pelvic fin rays 6, some elongate.

Colour: dark brown to black.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Lepidion species: mouth terminal; pelvic fins with 7 or 8 rays (6 in A. rostrata); snout not pointed; colour grey. This genus has been recorded from Kerguelen, Crozet, Marion and Prince Edward islands.



Lepidion sp.

SIZE :

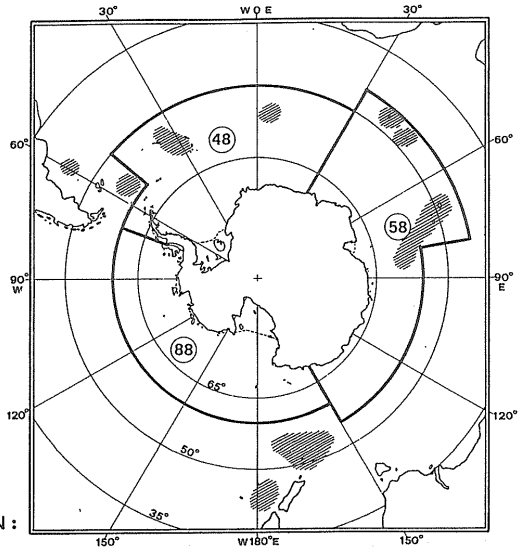
Maximum: over 60 cm; common to 40 cm; females attain greater sizes than males.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circum-Antarctic, found to the south of the Falkland/Malvinas Islands, off South Georgia and South Sandwich islands, around Bouvet, Marion, Prince Edward, Crozet, Kerguelen and Heard islands. This nearly cosmopolitan species (except north of 10^{0}N in the Pacific Ocean) can be locally very abundant.

A benthopelagic species on the continental slopes, from 400 m to over 3 000 m.

Feeds on pelagic crustaceans, cephalopods and other pelagic invertebrates.



POTENTIAL FISHING GROUNDS :

Not yet commercially exploited.

CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Caught only by research ships during deep trawling. General abundance apparently rather low.

MURAENOL

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

MURAENOLEPIDIDAE

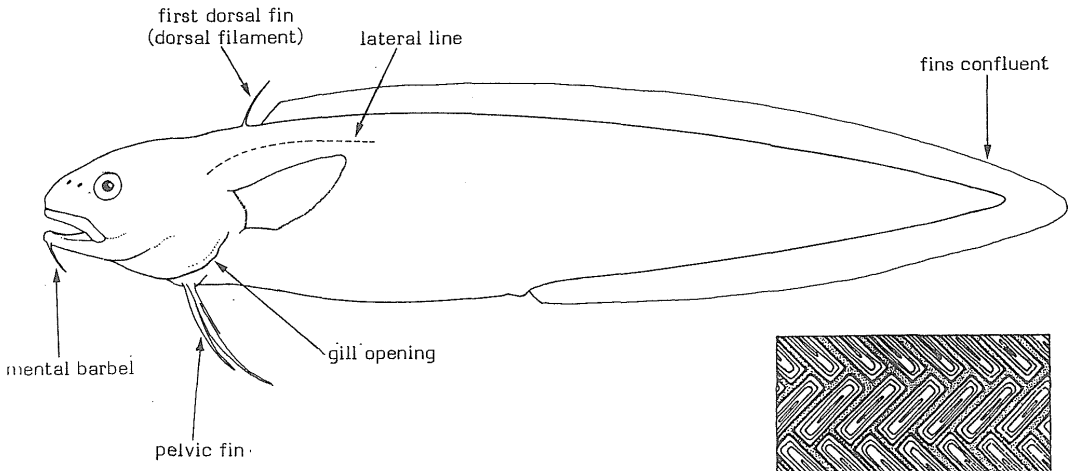
Moray cods

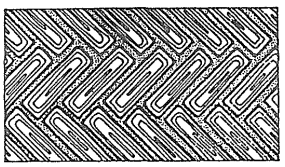
A somewhat anomalous group of fishes of the Order Gadiformes. Body long and compressed. Head small, with a mental barbel; gill openings restricted below the pectoral fins. No spines in fins; dorsal, caudal and anal fins joined together; 2 dorsal fins, the first with only 1 ray (dorsal filament); a single anal fin; pectoral fin rays 10 to 13; pelvic fins thoracic in position, with 5 rays, of which the 2 or 3 outer rays are prolonged and at least partially free. Lateral line not extending to hind part of body. Scales elongate, non-imbricate, set at right angles to each other, embedded in the skin which appears smooth.

Colour: greyish-brown to reddish, often with typical iridescent reflections.

The muraenolepids are restricted to the cold-temperate waters of the Southern Hemisphere. They were considered a typically Antarctic family by Andriashev (1965), but De Witt (1971) believes that they are more recent invaders of the Southern Ocean. The four species described in a single genus, Muraenolepis, are not well known and a revision of the family is needed.

Muraenolopids live near the sea bottom at moderate depths on the continental shelf and the upper part of the slope, but feed primarily on zooplankton. They are occasionally taken with bottom trawls, but none of the species present in the Southern Ocean appear to be of commercial importance at present.

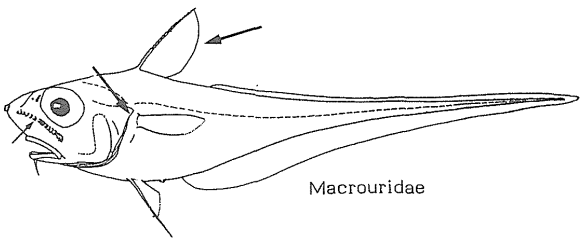




arrangement of scales
(schematic)

SIMILAR FAMILIES OCCURRING IN THE AREA:

Macrouridae: gill openings extending up to at least level of pectoral fins; first dorsal fin with more than one ray, the first two usually spinous; second dorsal fin often rudimentary; scales imbricate, cycloid or ctenoid, exposed field of each scale covered with spinules; ridge-like rows of course, scute-like scales often present on head.



Macrouridae

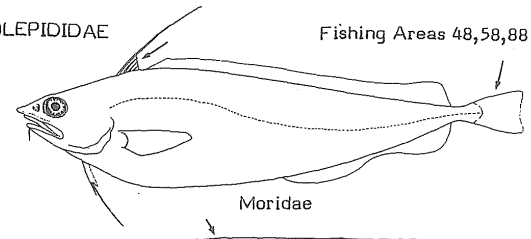
FAO Sheets

MURAENOLEPIDIDAE

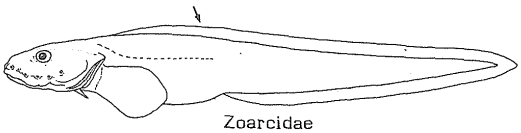
Fishing Areas 48,58,88

Moridae: some species superficially similar, but first dorsal fin with more than one ray, caudal fin not confluent with dorsal and anal fins, lateral line extending backward to base of caudal fin.

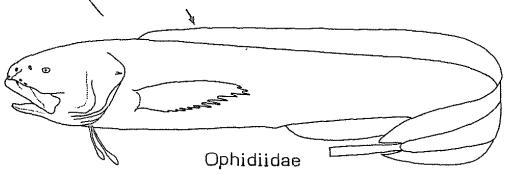
Ophidiidae and Zoarcidae: a single dorsal fin; no mental barbel; gill opening reduced to a pore or extending to upper edge of pectoral fin base.



Moridae



Zoarcidae



Ophidiidae

KEY TO SPECIES OCCURRING IN THE AREA:

1a. Lateral line reaching backward to below middle of second dorsal fin (Figs 1,2)

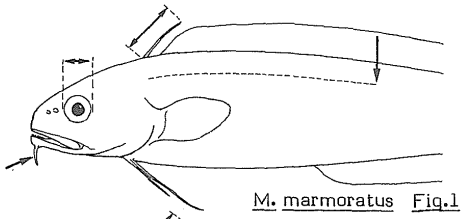
2a. Filament of first dorsal fin equal to, or a little longer than eye diameter; mental barbel shorter than eye diameter (Fig.1) ..... Muraenolepis marmoratus

2b. Dorsal filament 3 times longer than eye diameter; mental barbel equal to eye diameter (Fig.2) ..... Muraenolepis orangiensis

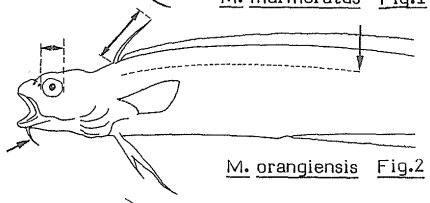
1b. Lateral line reaching backward slightly beyond tips of pectoral fins (Figs 3,4)

3a. Dorsal filament no longer than twice the eye diameter; mental barbel longer than eye diameter (Fig.3) .....Muraenolepis microps

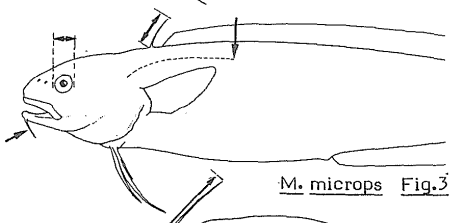
3b. Dorsal filament more than 4 times the eye diameter; mental barbel equal to eye diameter (Fig.4) .....Muraenolepis microcephalus



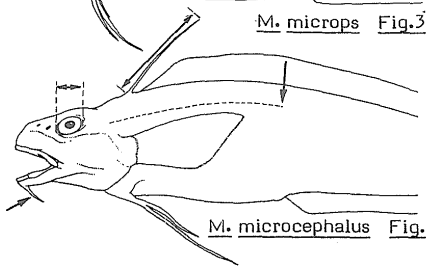
M. marmoratus Fig.1



M. orangiensis Fig.2



M. microps Fig.3



M. microcephalus Fig.4

LIST OF SPECIES OCCURRING IN THE AREA:

Code numbers are given for those species for which Identification Sheets are included

Muraenolepis marmoratus Günther, 1880	MURAENOL Mur 1
Muraenolepis microcephalus Norman,1932	MURAENOL Mur 2
Muraenolepis microps Lönnberg, 1905	MURAENOL Mur 3
Muraenolepis orangiensis Vaillant, 1907	MURAENOL Mur 4

Prepared by A. Tomo, Instituto Antártico Argentino, Buenos Aires, Argentina and J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

MURAENOL Mur 1

1985

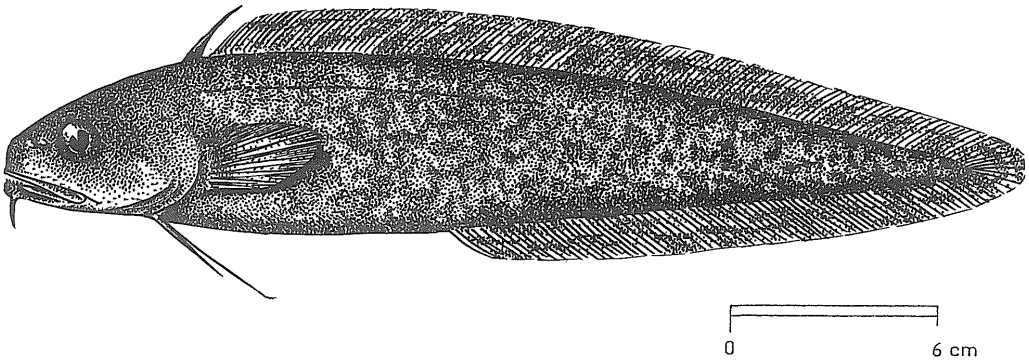
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MURAENOLEPIDIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Muraenolepis marmoratus Günther, 1880

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Marbled moray cod
Fr - Gadomurène marbrée
Ru - Mrumorny parketnik
Sp - Gadimorena jaspeada

NATIONAL :

DISTINCTIVE CHARACTERS :

Head and body compressed; body depth 5 to 6 times in standard length; head profile above eye nearly straight; head length about 5.2 times in standard length; eye diameter smaller than, or equal to interorbital width; snout blunt; mental barbel shorter than eye diameter. Dorsal filament (single ray in first dorsal fin) equal to, or larger than eye diameter; pectoral fins not extending to anus when appressed; pelvic fins narrow, with 5 rays, the 2 outer rays filamentous, of different length. Lateral line reaching backward to below middle of second dorsal fin. Scales elongate, non-imbricate, set at right angles to each other.

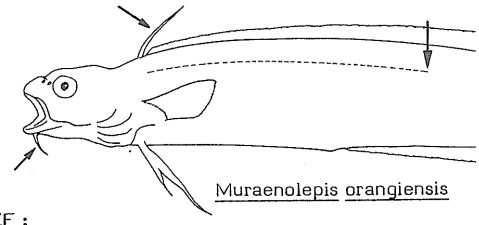
Colour: variable, usually reddish, marbled with brown, with iridescent hues.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

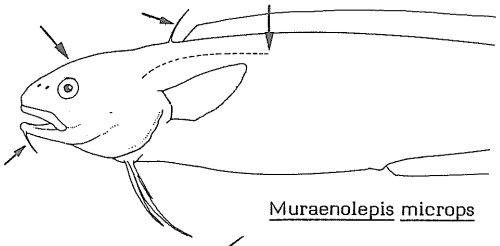
Muraenolepis microps: head smaller, its profile distinctly curved; eye smaller, dorsal filament usually longer; mental barbel always longer than eye diameter (shorter in M. marmoratus); lateral line shorter, extending to just behind pectoral fin tips.

M. microcephalus: head smaller, 5.7 to 6 times in standard length (5.2 times in M. marmoratus); dorsal fin filament more than 4 times longer than eye diameter; mental barbel equal to eye diameter (shorter in M. marmoratus); lateral line shorter, extending just to behind pectoral fin tips.

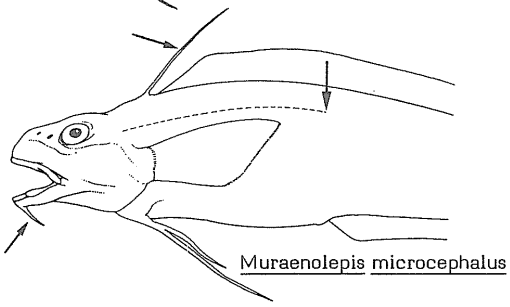
M. orangiensis: dorsal filament 3 times longer than eye diameter; mental barbel equal to eye diameter.



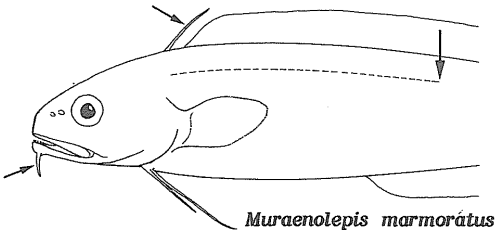
Muraenolepis orangiensis



Muraenolepis microps



Muraenolepis microcephalus



Muraenolepis marmoratus

SIZE:

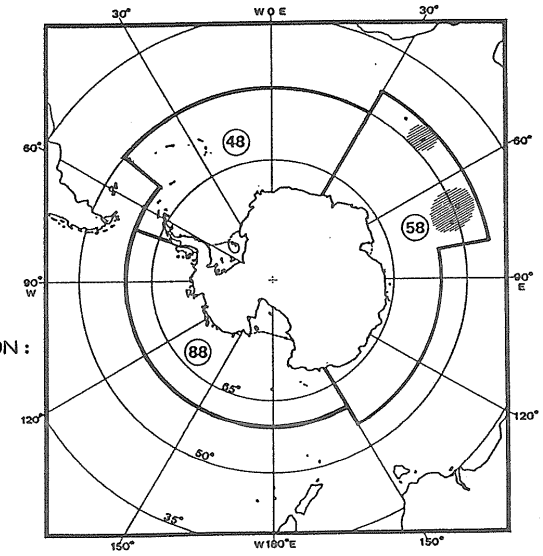
Maximum: 40 cm; common to 30 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Only known from the Crozet, Kerguelen and Heard islands.

Inhabits waters over the continental shelf and slope, from 30 to 1 600 m depth.

Feeds on zooplankton.



PRESENT FISHING GROUNDS:

Shelf and slope waters around the Kerguelen Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Separate statistics are not reported for this species.

Commonly taken as bycatch in bottom trawls (Kerguelen fisheries).

MURAENOL Mur 2

1985

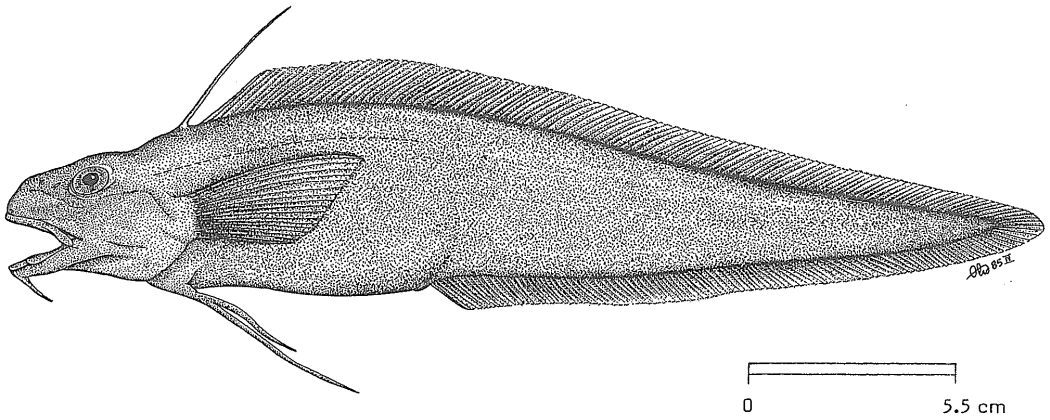
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MURAENOLEPIDIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Muraenolepis microcephalus Norman, 1937

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Smallhead moray cod
Fr - Gadomurène microcéphale
Ru - Malugolovy parketnik
Sp - Gadimorena microcéfala

NATIONAL :

DISTINCTIVE CHARACTERS :

Body and head compressed; body depth about 5.5 times in standard length. Head rather small, its length 5.7 to 6 times in standard length; eye diameter 5.3 to 5.8 times in head length; interorbital width 4 times in head length and larger than eye diameter; mental barbel equal to eye diameter. Dorsal filament (single ray in first dorsal fin) more than 4 times the eye diameter; pectoral fins not extending backward to anus when appressed; pelvic fins narrow, with 5 rays, the 2 outer rays filamentous, of different lengths. Lateral line reaching backward slightly beyond tips of pectoral fins. Scales elongate, non-imbricate, set at right angles to each other.

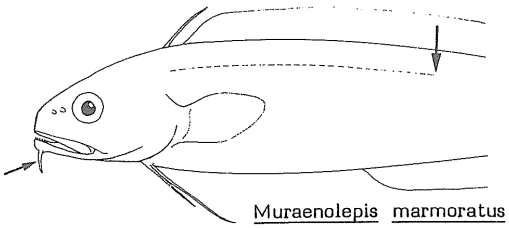
Colour: brownish-grey, with iridescent hues.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

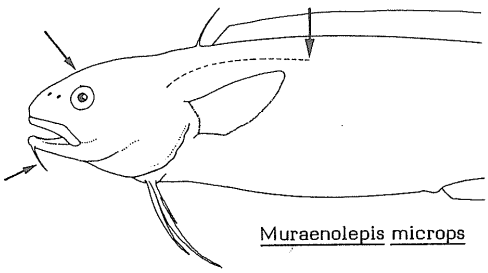
Muraenolepis marmoratus: head distinctly longer, 5.2 times in standard length (5.7 to 6 times in M. microcephalus); mental barbel shorter than eye diameter (equal in M. microcephalus); dorsal filament much shorter; lateral line longer, extending to below middle of second dorsal fin.

M. microps: head slightly larger, its dorsal profile distinctly curved; mental barbel longer than eye diameter (equal to eye diameter in M. microcephalus); dorsal filament much shorter.

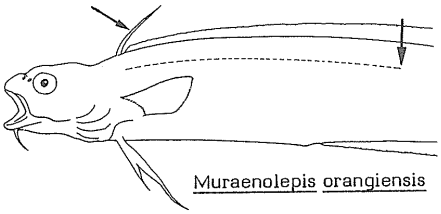
M. orangiensis: lateral line reaching backward to below middle of second dorsal fin; dorsal filament 3 times longer than eye diameter.



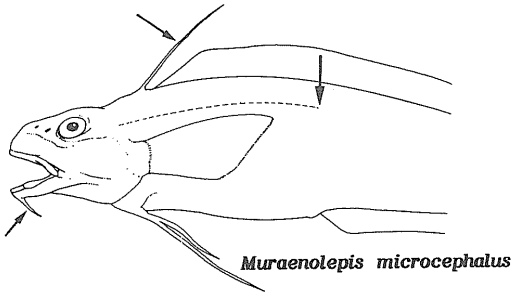
Muraenolepis marmoratus



Muraenolepis microps



Muraenolepis orangiensis



Muraenolepis microcephalus

SIZE:

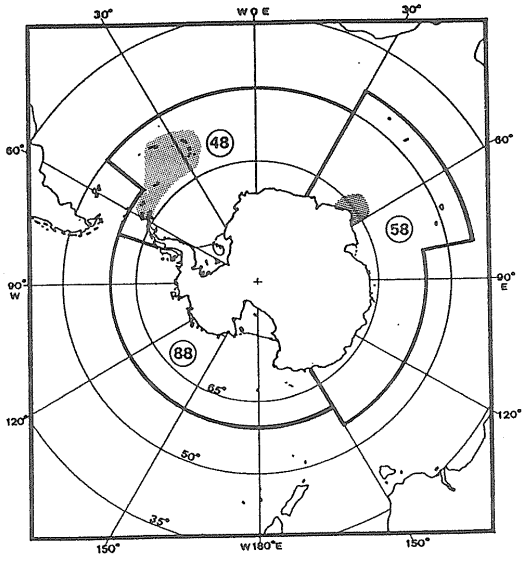
Maximum: 30 cm; common to 27 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Scotia Ridge (South Georgia, Sandwich Islands), South Orkney and South Shetland Islands, northern part of Antarctic Peninsula and Enderby coast.

Inhabits waters over the continental shelf and slope.

Feeds on zooplankton.



PRESENT FISHING GROUNDS:

Islands of the Scotia Arc.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Separate statistics are not reported for this species, but taken occasionally as bycatch in bottom trawls.

Probably used only for fishmeal.

MURAENOL Mur 3

1985

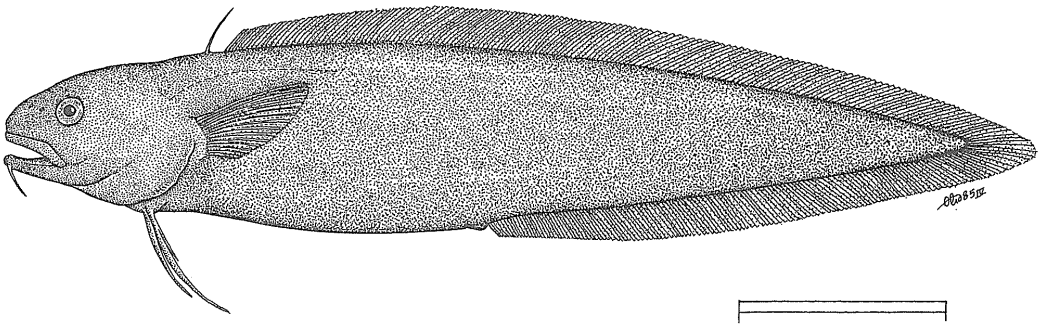
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MURAENOLEPIDIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Muraenolepis microps Lönnberg, 1905

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Smalleye moray cod
Fr - Gadomurène petit oeil
Ru - Maloylazy parketnik
Sp - Gadimorena ojichica

NATIONAL :

DISTINCTIVE CHARACTERS :

Body and head compressed; body depth 4.8 times in standard length. Head length about 5.6 times in standard length, head profile over eye distinctly curved; eye diameter 5.3 times in head length; interorbital width about 4.5 times in head length; mental barbel longer than eye diameter. Dorsal filament (single ray in front of dorsal fin) variable in length, but never longer than twice the eye diameter; pelvic fins narrow, with 5 rays, the outer rays filamentous, of different length. Lateral line arched above pectoral fin, reaching backward to slightly beyond pectoral tips. Scales elongate, non-imbricate, set at right angles to each other.

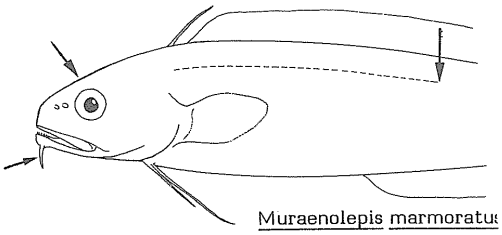
Colour: uniform grey-brown, with iridescent hues.

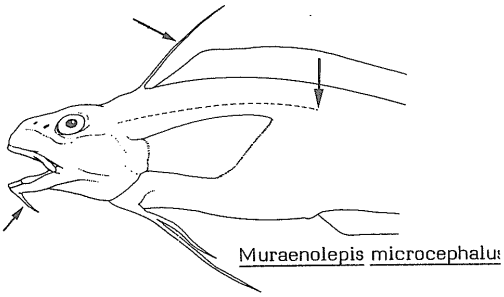
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

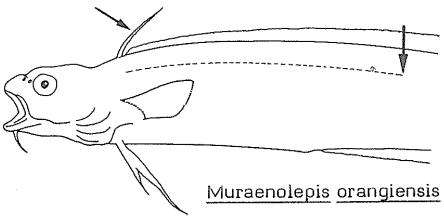
Muraenolepis marmoratus: head larger, 5.2 times in standard length (5.6 times in M. microps); head profile straight; mental barbel shorter than eye diameter (longer in M. microps); lateral line longer, extending to below middle of second dorsal fin. So far only known from the Kerguelen Islands.

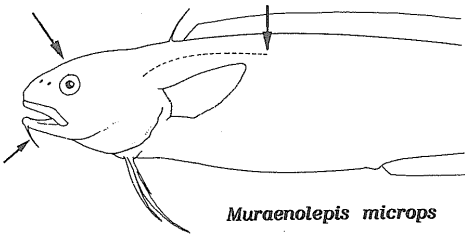
M. microcephalus: head smaller, 5.7 to 6 times in standard length; dorsal filament more than 4 times eye diameter; mental barbel equal to eye diameter.

M. orangiensis: lateral line reaching backward to below middle of second dorsal fin; dorsal filament 3 times longer than eye diameter.


Muraenolepis marmoratus


Muraenolepis microcephalus


Muraenolepis orangiensis


Muraenolepis microps

SIZE :

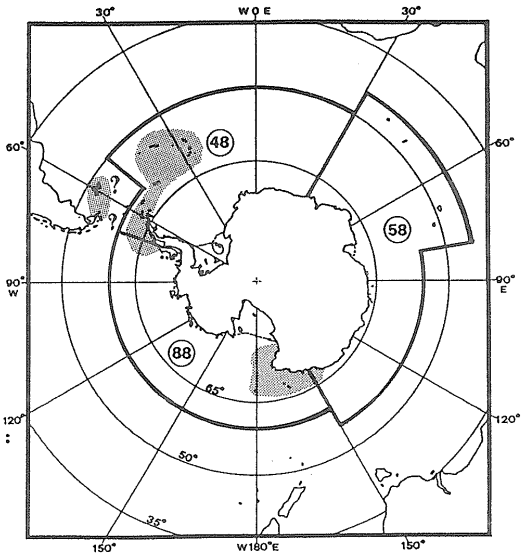
Maximum: 35 cm; common to 27 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Coasts of Antarctic Peninsula, South Georgia, Sandwich, Orkney and Shetland Islands and Victoria Land.

Inhabits waters between 10 and 1 600 m depth.

Feeds mainly on zooplankton.



PRESENT FISHING GROUNDS :

Islands of the Scotia Arc.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species, but taken occasionally as bycatch in bottom trawls.

Probably used only for fishmeal.

MURAENOL Mur 4

1985

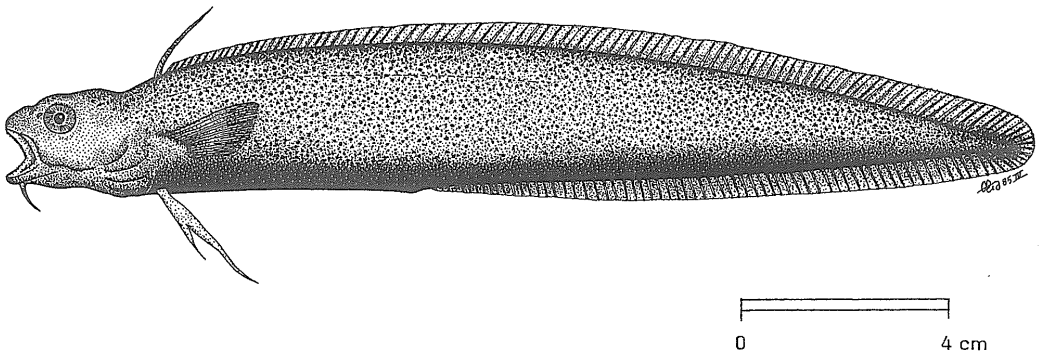
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : MURAENOLEPIDIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Muraenolepis orangiensis Vaillant, 1907

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Patagonian moray cod
Fr - Gadomurène de Patagonie
Ru - Patagonsky parketnik
Sp - Gadimorena patagonica

NATIONAL :

DISTINCTIVE CHARACTERS :

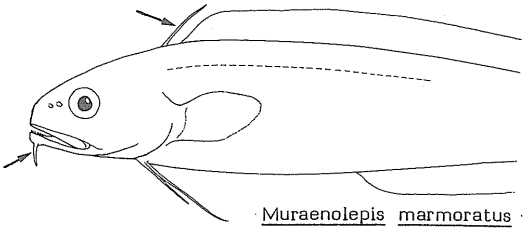
Body and head compressed; body depth 6.5 times in standard length. Head small, its length about 6.3 times in standard length; eye diameter more than 5 times in head length and greater than interorbital width; mental barbel equal to eye diameter. Dorsal filament (single ray in first dorsal fin) 3 times longer than eye diameter; pelvic fins rather short, not extending backward to anus when appressed; pelvic fins narrow, with 5 rays, the outer ray filamentous. Lateral line reaching backward to below middle of second dorsal fin. Scales elongate, non-imbricate, set at right angles to each other.

Colour: grey-reddish; body covered with numerous small black dots; abdomen black.

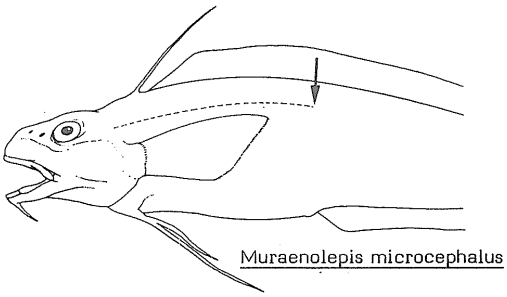
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Muraenolepis marmoratus: dorsal filament equal to or a little longer than eye diameter; mental barbel shorter than eye diameter.

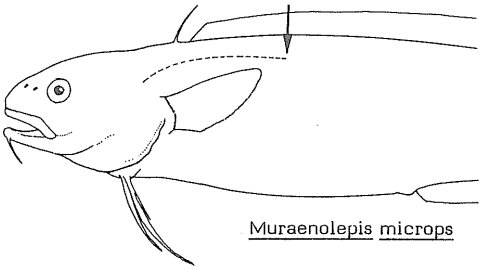
M. microcephalus and M. microps: lateral line reaching backward only slightly beyond tips of pectoral fins.



Muraenolepis marmoratus



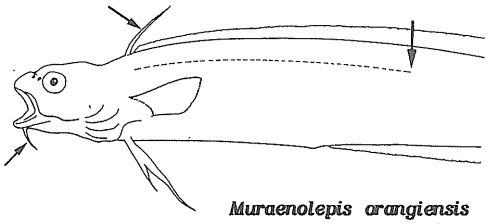
Muraenolepis microcephalus



Muraenolepis microps

SIZE :

Maximum: 30 cm; common to 20 cm.



Muraenolepis orangiensis

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

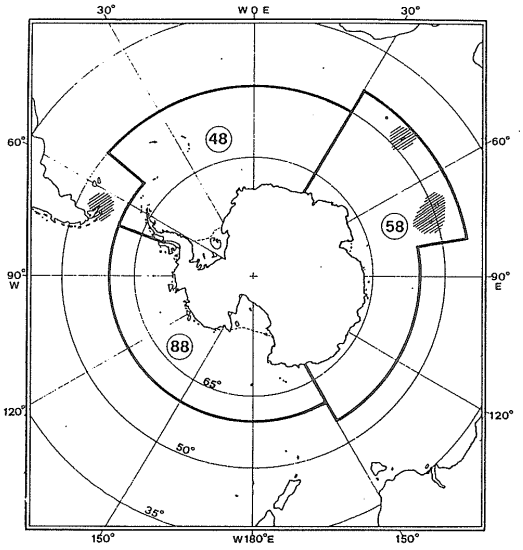
Muraenolepis orangiensis has been reported from Patagonian waters and from the Kerguelen, Heard and Crozet Islands.

Inhabits waters over the continental shelf and slope from 140 to 600 m depth.

Feeds on zooplankton.

PRESENT FISHING GROUNDS :

Shelf and slope waters around the Kerguelen Islands.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species, but taken as bycatch in bottom trawls.

MYCT

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

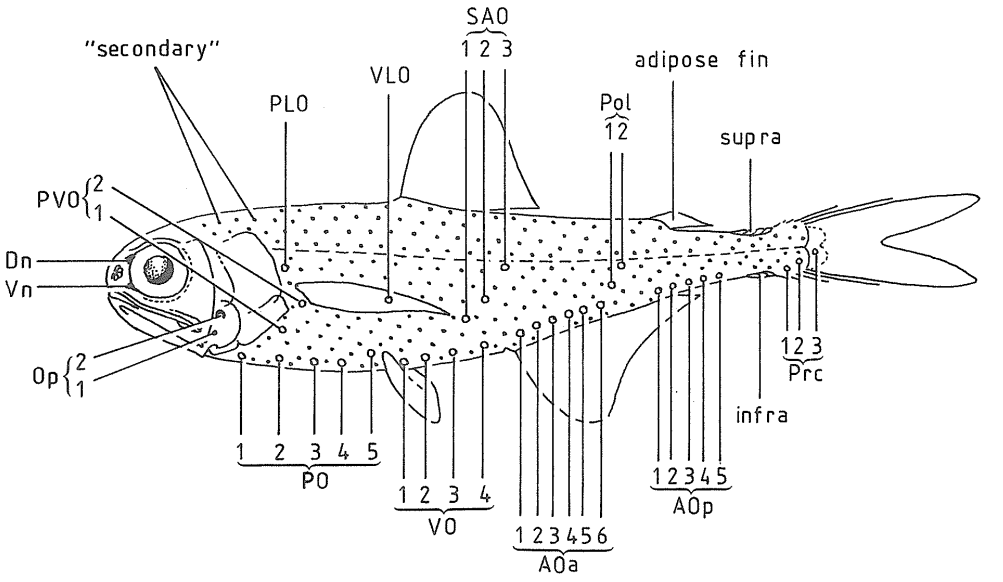
MYCTOPHIDAE

Lanternfishes

Head and body compressed. Eyes large and lateral (dorsolateral in Protomyctophum (Hierops)); mouth terminal (subterminal in Centrobranchus, Gonichthys, Loweina); jaws extending to or beyond vertical through posterior margin of eye; edge of upper jaw formed by premaxillae only; maxillae expanded posteriorly and truncate; premaxillary and dentary teeth numerous, small, and closely set in bands, those of inner rows sometimes slightly enlarged (some species with posterior teeth broad-based and hooked forward); teeth present on roof of mouth; palatines with a close-set band or with 1 or 2 rows of enlarged, widely-spaced teeth; mesopterygoids with a close-set patch of small teeth or a patch of widely-spaced, enlarged teeth; and vomer with a cluster of small teeth on each side; branchiostegal rays usually 7 to 11; gillrakers well-developed, except in Centrobranchus. All fins lacking spines (a rudimentary spine at origin of dorsal and anal, and at uppermost pectoral and outermost pelvic ray); dorsal adipose fin present; origin of anal fin under or close behind base of dorsal fin; pelvic fins with 8 principal rays, except in Notolychnus (6) and Gonichthys (7); caudal fin with 10 dorsal and 9 ventral principal rays. Scales cycloid or ctenoid, but easily lost except in some shallow-living species. Photophores present (absent in Taaningichthys paurolychnus), arranged in distinct groups on head and trunk; smaller "secondary" photophores on head, trunk and fins in some species. Luminous organs of various shapes and sizes on head or caudal peduncle, and at base of adipose fin in some species.

Colour: mainly brown to black in forms which lose their scales, but shallow-living species silvery; some genera with metallic green to metallic blue scales.

Myctophids range in size from 2 cm to 30 cm. They occur from Arctic to Antarctic waters in the open ocean mesopelagic and bathypelagic zones or in the pelagic and epibenthic faunas above continental shelf and slope regions. Mesopelagic and pseudoceanic pelagic species exhibit diurnal vertical migration to between the surface of the sea and 200 m depth at night, some showing size stratification with depth and some with adults and/or juveniles non-migratory. Bathypelagic species do not migrate vertically. Lanternfishes are mainly opportunistic feeders on copepods, amphipods, ostracods, euphausiids, chaetognaths, fish eggs and fish larvae.



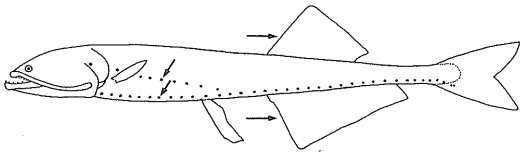
General distribution of luminous organs and their abbreviated terminology in the family Myctophidae

Myctophids are mostly abundant, although a few species are rare. They represent a potentially important, alternate fishery resource for the production of fishmeal and fish oil. In the eastern South Atlantic, the catches of one species (Lampanyctodes hectoris) have fluctuated annually since 1969, with a maximum of 42 560 t (10.45% of the total pelagic catch) having been taken in 1973. Catch rates of 30 t/h (Diaphus dumerilii) and 20 t/h (Benthosema pterotum) have been reported off the coast of Uruguay and in the Arabian Sea, respectively. Some epibenthic species of the Southern Ocean (Gymnoscopelus spp.) and Indian Ocean (Diaphus coeruleus) have been fished on a commercial basis for human consumption, when the fishes are smoked.

More than 340 species of myctophids have been described, but only about 250 species (in 30 genera) are currently recognized. While 21 species (9 genera) have actually been recorded in Fishing Areas 48, 58 and 88, stray specimens of additional sub-Antarctic and Convergence species could well be recorded in the future, depending upon variations in meridional current flow. Seven species (Electrona antarctica, Gymnoscopelus braueri, Gymnoscopelus nicholsi, Gymnoscopelus opisthopterus, Krefftichthys anderssoni, Protomyctophum bolini, Protomyctophum tenisoni) are considered to be truely representative of regions to the south of the Antarctic Polar Front.

SIMILAR FAMILIES OCCURRING IN THE AREA :

Gonostomatidae: posterior portion of upper jaw formed by toothed maxilla; dorsal and anal fins displaced posteriorly; one or more horizontal rows of photophores on ventral part of body and sides.



Gonostomatidae
(Cyclothone)

KEY TO GENERA RECORDED FROM OR POTENTIALLY OCCURRING IN THE AREA :

1a. Two Prc photophores (Fig.1a,b)

2a. PLO from less than its diameter above to well below level of upper end of pectoral fin base (Figs 2,3)

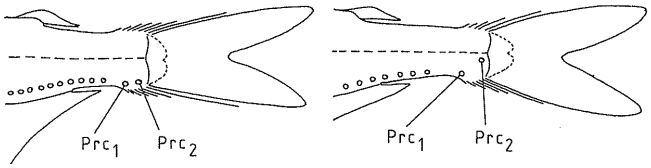


Fig.1

3a. Mouth subterminal; snout conical and more-or-less protruding; PLO at or slightly above level of upper end of pectoral fin base (Fig.3); AO series divided into AOa and AOp; caudal peduncle markedly slender, its least depth 2.5 times or more in its length (Figs 4,5)

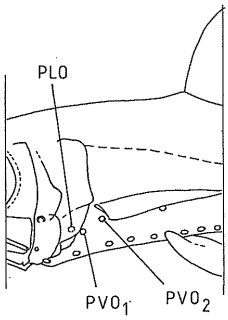


Fig.2

4a. Origin of anal fin under middle of base of dorsal fin; none or only one AOp photophore over base of anal fin; least depth of caudal peduncle about 2.5 times in peduncle length (Fig.4) ..... Loweina

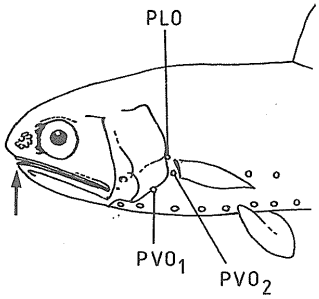
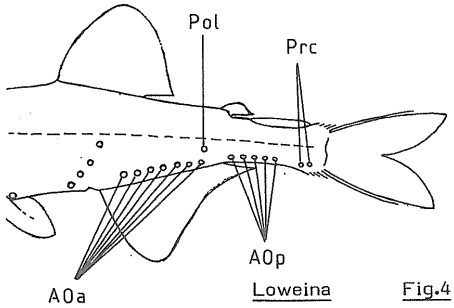
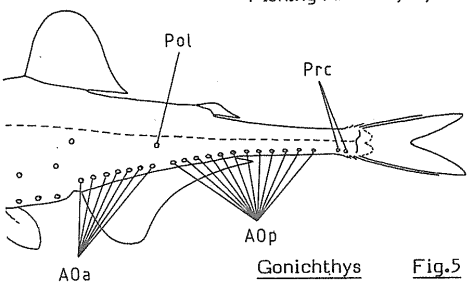


Fig.3



Loweina Fig.4

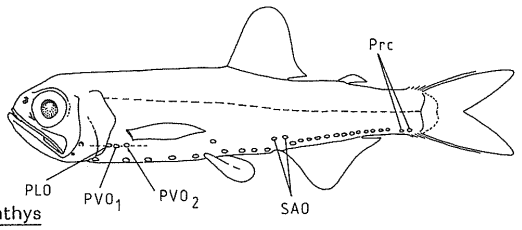
4b. Origin of anal fin on or slightly in advance of vertical through base of last dorsal ray; 5 to 7 AOp photophores over base of anal fin; least depth of caudal peduncle 3.5 times or more in peduncle length (Fig.5) ..... Gonichthys



Gonichthys Fig.5

3b. Mouth terminal; snout not protruding; PLO well below level on upper end of base of pectoral fin; AO series continuous; caudal peduncle not markedly slender, its least depth less than 2.5 times in its length (Figs 6,7)

5a. Body slender, with dorsal and ventral profiles parallel; PLO, PVO_1, PVO_2 on same straight horizontal line; 2 SAO; Prc_2 above anterior procurrent caudal ray, Prc_1 in front (Fig.6) ..... Krefftichthys



Krefftichthys Fig.6

5b. Dorsal and ventral profiles of body not parallel; PLO slightly above to well above PVO_1; 3 SAO; Prc_1 above anterior procurrent caudal ray, Prc_2 behind (Fig.7)

6a. PLO in front of and slightly higher than PVO_1; PLO, PVO_1, PVO_2 on somewhat angulate line

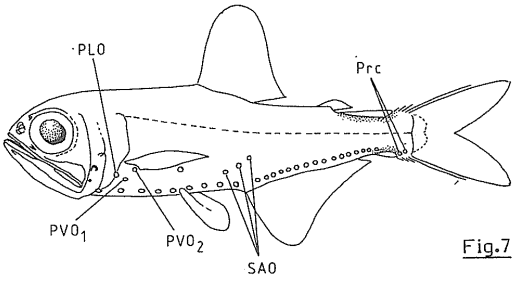
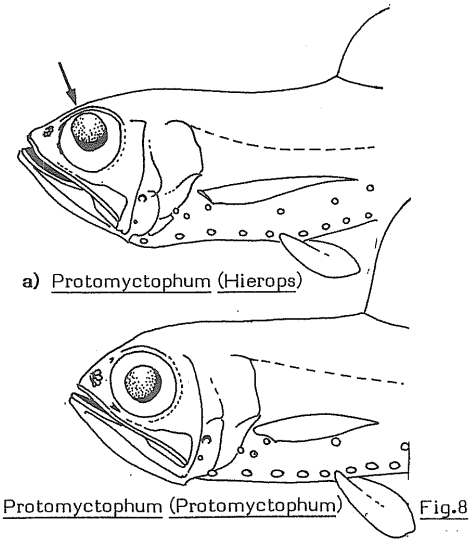


Fig.7

7a. Eyes semi-telescopic; interorbital width less than expanded posterior end of maxilla (Fig.8a)..... Protomyctophum (Hierops)

7b. Eyes normal; interorbital width greater than expanded posterior end of maxilla (Fig.8b) ..... Protomyctophum (Protomyctophum)



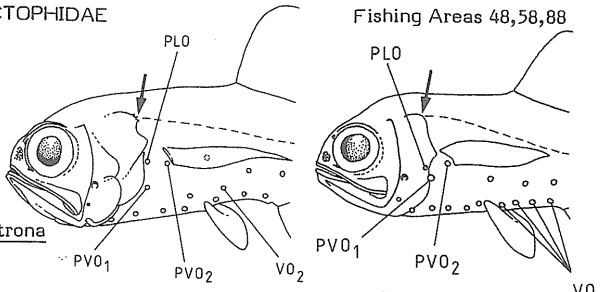
a) Protomyctophum (Hierops)

b) Protomyctophum (Protomyctophum) Fig.8

6b. PLO almost directly above PVO_1; PLO, PVO_1, PVO_2 forming a triangle (Fig.9)

8a. VO_2 elevated; posterodorsal margin of opercle sharply rounded and serrate (Fig.9a) ..... Metelectrona

8b. VO series level or VO_2 only slightly raised; posterodorsal margin of opercle broadly rounded, without serrations (Fig.9b) .... Electrona



a) Metelectrona b) Electrona Fig.9

2b. PLO more than its diameter above level of upper end of base of pectoral fin (Fig.10)

9a. 1 Pol (Fig.11a) ..... Symbolophorus

9b. 2 Pol (Fig.11b) ..... Hygophum

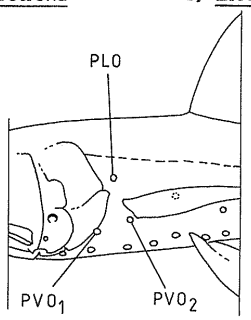
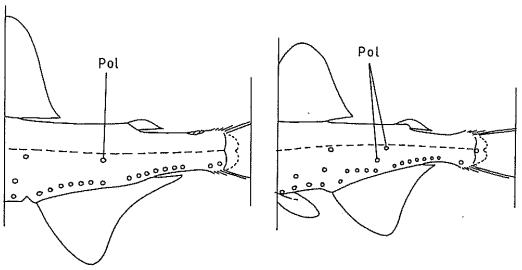


Fig.10

1a. More than 2 Prc photophores (Fig.12)

10a. PO_1, PVO_1, PVO_2 on a straight, ascending, oblique line; VO_1, VO_2, VO_3 on a straight, ascending, oblique line (Fig.13) ..... Diaphus

10b. PO_1, PVO_1, PVO_2 not on a straight, ascending, oblique line; VO_1, VO_2, VO_3 not on straight, ascending, oblique line.



a) Symbolophorus b) Hygophum Fig.11

11a. Supracaudal and infracaudal luminous glands large, singular, and bordered by heavy black pigment (Fig.14)

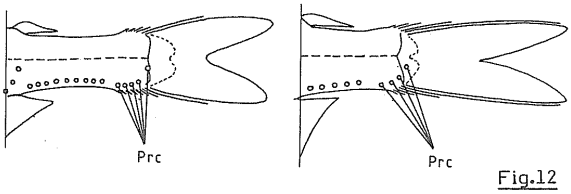
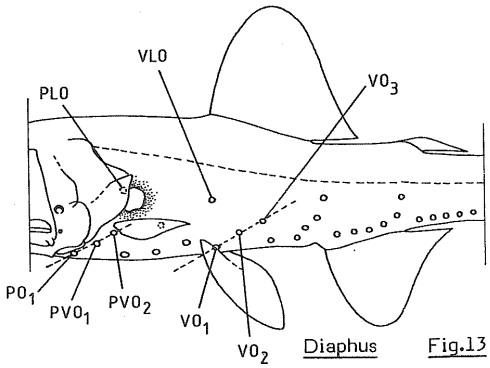


Fig.12



Diaphus Fig.13

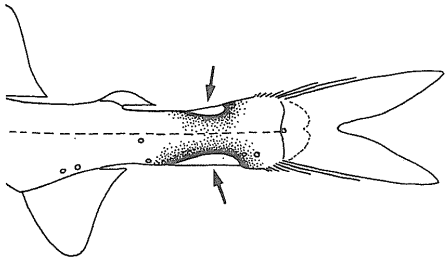
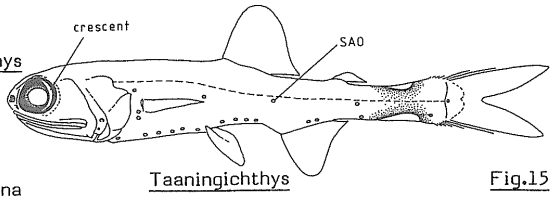


Fig.14

12a. Origin of dorsal fin behind vertical through outer base of pelvic fin; a large crescent of whitish tissue on posterior half of iris; 1 SAO (Fig.15) ..... Taaningichthys

12b. Origin of dorsal fin on or somewhat in advance of vertical through outer base of pelvic fin; no crescent of whitish tissue on posterior half of iris; 3 SAO (Fig.16).. Lampadena

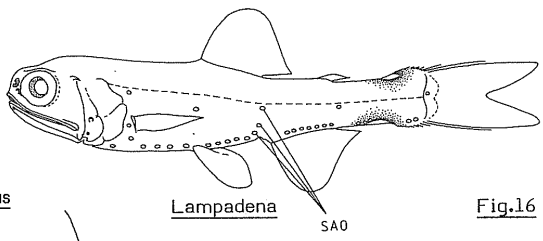


Taaningichthys Fig.15

11b. Supracaudal and infracaudal glands (when present) consisting of a series of overlapping, scale-like structures, not bordered by heavy black pigment (Fig.17)

13a. PO_4 highly elevated and anteriorly displaced to about above PO_3 (Fig.18). Lampanyctus

13b. PO_4 level with rest of series



Lampadena Fig.16

14a. Luminous scale-like structures mid-ventrally between bases of pelvic fins and anus present (Fig.19) ..... Ceratoscopelus

14b. Luminous scale-like structures mid-ventrally between bases of pelvic fins and anus absent

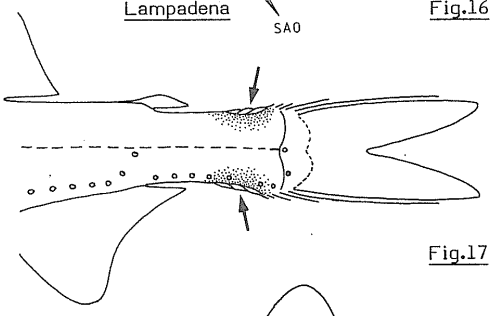
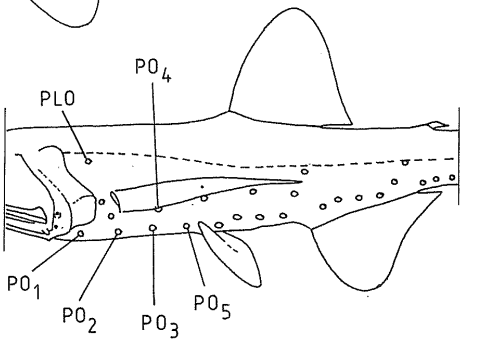


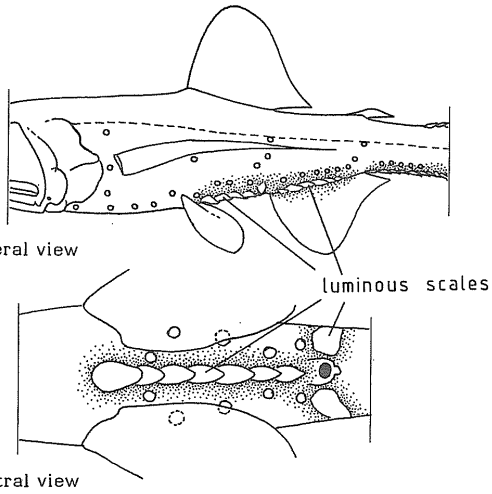
Fig.17

15a. VO_2 elevated; less than 14 anal rays ..... Hintonia

15b. VO series level or only slightly arched; more than 17 anal rays



Lampanyctus Fig.18



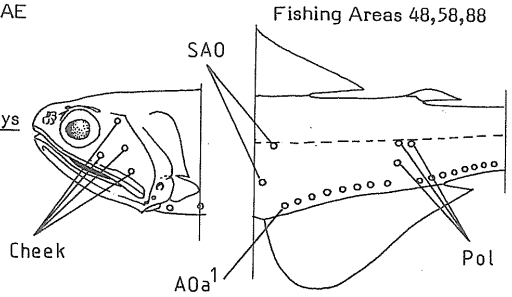
lateral view

ventral view

Ceratoscopelus Fig.19

16a. 3 to 7 cheek photophores; 3 Pol, forming a right angle; AOa^1 level; "secondary" photophores on head and body (Fig.20) ..... Lampichthys

16b. Cheek photophores absent; 2 Pol, forming a subvertical line with last AOa; AOa^1 elevated above rest of series; "secondary" photophores on head and body absent (Fig.21)



Lampichthys Fig.20

17a. PVO_1 and PVO_2 below level of upper end of base of pectoral fin (Fig.22a) ..... Gymnoscopelus (Gymnoscopelus)

17b. PVO_2 noticeably above level of upper end of base of pectoral fin (Fig.22b) ..... Gymnoscopelus (Nasolychnus)

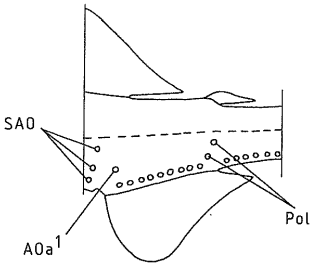
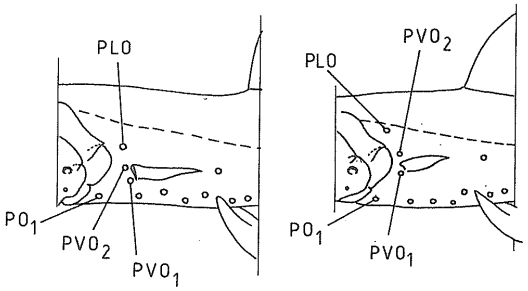


Fig.21



a) Gymnoscopelus (Gymnoscopelus) b) Gymnoscopelus (Nasolychnus) Fig.22

LIST OF SPECIES RECORDED FROM OR POTENTIALLY OCCURRING IN THE AREA:

*Ceratoscopelus warmingii (Lütken, 1892)

Diaphus hudsoni Zubrigg & Scott, 1976
Diaphus meadi Nafpaktitis, 1978
Diaphus ostenfeldi Taning, 1932

*Electrona antarctica (Günther, 1878)
*Electrona carlsbergi (Taning, 1932)
Electrona paucirastra Bolin in Andriashev, 1962
*Electrona subaspera (Günther, 1864)

Gonichthys barnesi Whitley, 1943

*Gymnoscopelus (Gymnoscopelus) bolini Andriashev, 1962
*Gymnoscopelus (Gymnoscopelus) braueri (Lönnberg, 1905)
*Gymnoscopelus (Gymnoscopelus) nicholsi (Gilbert, 1911)
*Gymnoscopelus (Gymnoscopelus) opisthopterus Fraser-Brunner, 1949
*Gymnoscopelus (Nasolychnus) fraseri (Fraser-Brunner, 1949)
Gymnoscopelus (Nasolychnus) hintonoides Hulley, 1981
*Gymnoscopelus (Nasolychnus) microlampas Hulley, 1981
Gymnoscopelus (Nasolychnus) piabilis (Whitley, 1931)

Hintonia candens Fraser-Brunner, 1949

Hygophum hanseni (Taning, 1932)

*Krefftichthys anderssoni (Lönnberg, 1905)

---

*Recorded from Areas 48,58 and 88

Lampadena dea Fraser-Brunner, 1949
Lampadena notialis Nafpaktitis & Paxton, 1968
Lampadena speculigera Goode & Bean, 1896

*Lampanyctus achirus Andriashev, 1962
Lampanyctus australis Tåning, 1932
Lampanyctus intricarius Tåning, 1928
Lampanyctus lepidolychnus Bekker, 1967
*Lampanyctus macdonaldi (Goode & Bean, 1896)

Lampichthys procerus Brauer, 1906

Loweina interrupta (Tåning, 1928)

Metelectrona herwigi Hulley, 1981
Metelectrona ventralis (Bekker, 1963)

*Protomyctophum (Hierops) parallelum (Lönnberg, 1905)
Protomyctophum (Hierops) subparallelum (Tåning, 1932)
*Protomyctophum (Protomyctophum) andriashevi Bekker, 1963
*Protomyctophum (Protomyctophum) bolini (Fraser-Brunner, 1949)
*Protomyctophum (Protomyctophum) choriodon Hulley, 1981
*Protomyctophum (Protomyctophum) gemmatum Hulley, 1981
*Protomyctophum (Protomyctophum) luciferum Hulley, 1981
Protomyctophum (Protomyctophum) normani (Tåning, 1932)
*Protomyctophum (Protomyctophum) tenisoni (Norman, 1930)

*Symbolophorus boops (Richardson, 1845)

*Taaningichthys bathyphilus (Tåning, 1928)

Prepared by P. Alexander Hulley, South African Museum, Cape Town, South Africa

*Recorded from Areas 48,58 and 88

NOT

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

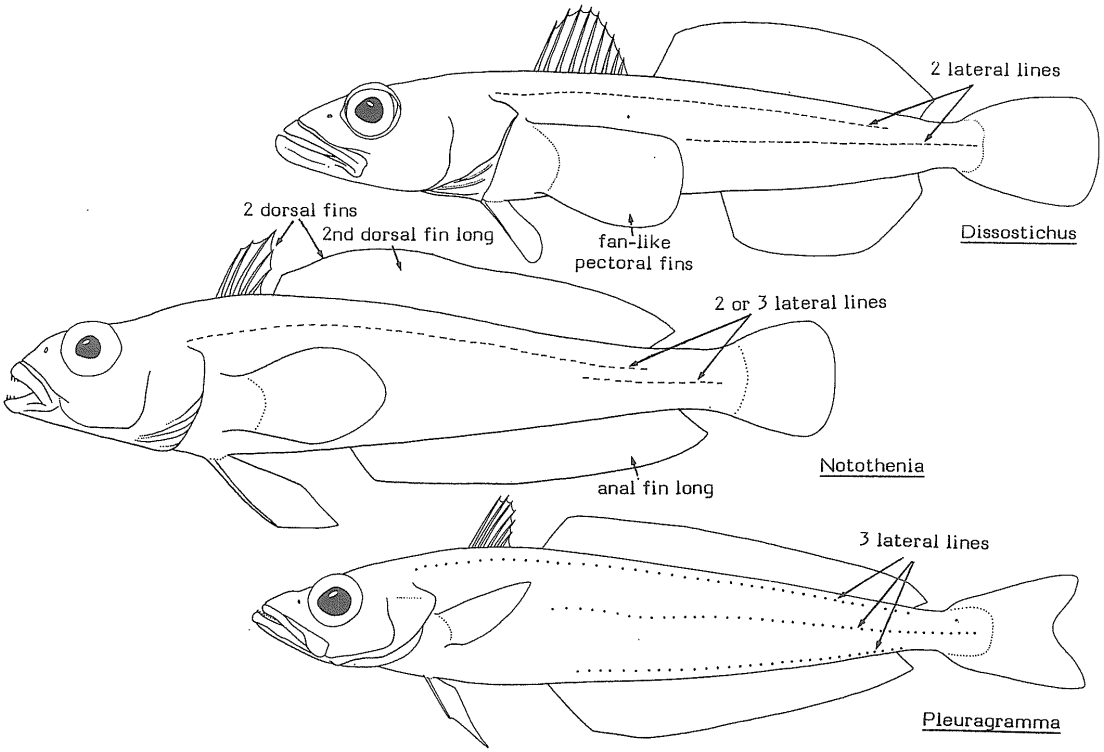
NOTOTHENIIDAE

Antarctic rock cods, Southern rock cods, Toothfishes, Nties

Small to very large fishes. Body shape somewhat elongate. Head large and more or less depressed; eyes large, sometimes upturned; snout moderately produced; mouth protractile, set obliquely, the lower jaw longer than the upper, with the maxilla reaching to below the eye; teeth in both jaws villiform or cardiform, sometimes with a few stronger canine-like teeth, arranged in one or two rows; palate toothless; opercle and preopercle without spines, opercle with a protruding margin at the upper edge of pectoral fin base; gill membranes forming a fold across the isthmus; branchiostegal rays 6 or 7; gillrakers generally short, not numerous. Two dorsal fins, the first with a short base and with flexible spines, well separated from the second dorsal which has a very long base and no spines; anal fin very long, without spines or occasionally with one spine; pectoral fins broad and fan-like; pelvic fins strong, jugular in position; caudal fin usually rounded, sometimes truncate or slightly forked. Body entirely scaly; parts of head sometimes scaleless; scales ctenoid (rough to touch) or cycloid (smooth), generally covered with thick mucus. One to 3 lateral lines, usually two, covered or not by tubular scales; distribution of cephalic pores is an important diagnostic character (see key). No air bladder; pectoral girdles with all radials on the coracoid; caudal skeleton with 5 hypurals and 3 epurals that may be fused together to different extents according to the genera.

Colour: usually greyish with dark or black patches, but some species have a typical pattern with various bright colours: yellow, red, blue or green.

Antarctic rock cods are widely distributed in the higher latitudes of the Southern Hemisphere, only in marine waters. This family forms the largest assemblage of Antarctic fishes and is the most diversified fish group in regard to structure, habits and distribution. Most species are rather sedentary bottom forms which feed on a variety of invertebrates and in some cases, on algae. Some have become specifically adapted to living in or under the surface of the sea ice. Only a few species are entirely pelagic in habit. The Fishing Areas 48, 58 and 88 comprise 49 species, some of which attain large sizes (over 200 cm for both Dissostichus species). Up to the present time only 6 or 7 species are commercially caught. The Antarctic rockcod catches reported in 1982/83 totalled 9 791 t which is much less than those reported in the early seventies (up to 600 000 t). Some species (especially Notothenia rossii marmorata, around South Georgia Island, and Notothenia rossii rossii, around Kerguelen Islands) are already overexploited and require conservation measures. The flesh of these fishes is usually of good quality, but some species have more fat than others.



SIMILAR FAMILIES OCCURRING IN THE AREA:

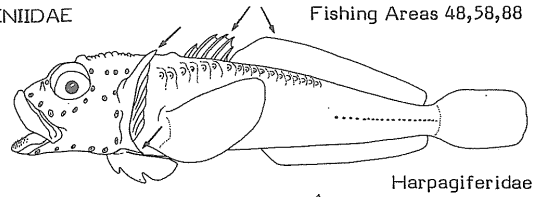
All other Notothenioid fishes occurring in the Southern Ocean are easily distinguished from the Notothenidae, mainly by the following characters:

Harpagiferidae and Artedidraconidae: body scaleless; head larger. Furthermore, 2 strong spines on opercle in Harpagiferidae; opercle hooked upward posteriorly, with a deeply concave upper edge, and a mental barbel present in Artedidraconidae.

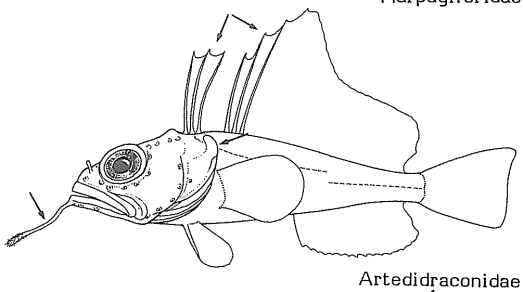
Bathydraconidae: body conspicuously elongate; spinous anterior dorsal fin absent; some species with only a few scales, and others with pointed snout and large canine teeth.

Channichthyidae: scales almost completely absent; head very large, often spiny, with a produced and flattened snout. They also lack oxygen-carrying pigment in their blood which appears whitish or translucent, rather than red.

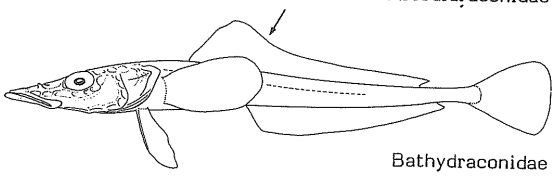
Bovichthyidae: gill membranes extending far forward, not attached to isthmus; body scaleless. Two dorsal fins; last rays of anal fin, elongate and distally thickened.



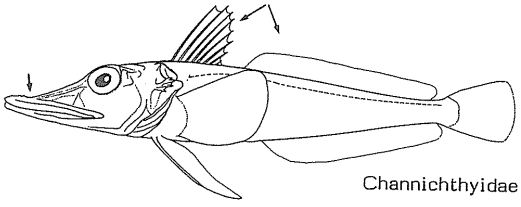
Harpagiferidae



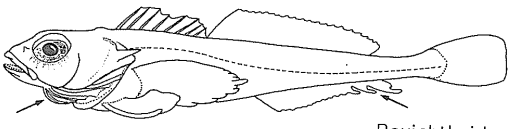
Artedidraconidae



Bathydraconidae

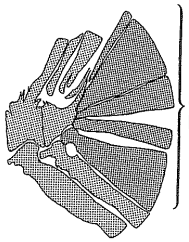


Channichthyidae



Bovichthyidae

KEY TO GENERA AND SPECIES OCCURRING IN THE AREA:*



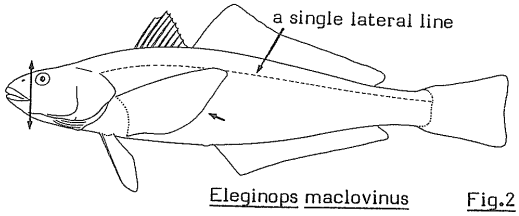
caudal skeleton

D. mawsoni Fig.1

1a. The five hypural bones separated (type 1+1+1+1+1, Fig.1); cephalic sensory canals with prolonged superficial canaliculi

2a. Lateral line single, uninterrupted; maxilla not extending to eye in adult; pectoral fin obliquely truncate, the upper rays longest (Fig.2) ...Eleginops maclovinus

2b. Two lateral lines; maxilla reaching to below middle of eye or beyond; pectoral fin rounded or vertically truncate (Figs 4,5) .....genus Dissostichus



Eleginops maclovinus Fig.2

* The classification here adopted follows the new system proposed by N.C. Andersen (1984) which has been approved by the BIOMASS Working Group on Fish Ecology of the SCAR GROUP OF Specialists on Antarctic marine ecosystems and their living resources. The author has also used part of the key prepared by H.H. DeWitt (1966) for the genus Notothenia (and related genera) and has adopted some of the new genera defined by A.V. Balushkin (1976) as revised by Andersen and J. C. Hureau (1979)

3a. Elongate scaleless areas present on upper surface of head (Fig.3a); lower lateral line begins below anterior half of soft dorsal fin (Fig.4) ..... Dissostichus eleginoides*

3b. No elongate scaleless areas on upper surface of head (Fig.3b); lower lateral line begins below posterior third of soft dorsal fin (Fig.5)..... Dissostichus mawsoni*

1b. Hypural bones 1 and 2 fused together (Fig. 6a); cephalic sensory canals without prolonged superficial canaliculi

4a. Supraorbital canal with 5 pores; first two hypural bones fused, the others separate (type 2+1+1+1, Fig.6a); pectoral foramen bordered by scapula and coracoid bones (Fig.6b) ..... genus Patagonotothen

5a. Occipital region of top of head scaly (except some individuals of P. sima)

6a. Upper lateral line with 57 to 65 tubular scales..... Patagonotothen canina

6b. Upper lateral line with 30 to 41 tubular scales

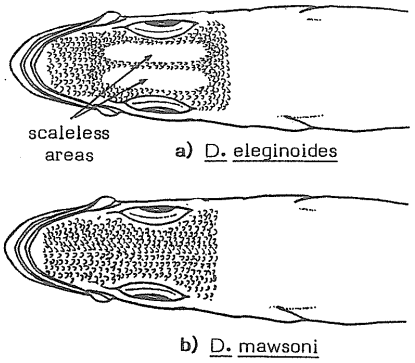
7a. 40 to 51 scales in lateral series; second dorsal fin with 26 to 32 rays

8a. 13 to 19 gillrakers on lower limb of first gill arch; interorbital width 21.6 to 27.5% of head length ..... Patagonotothen squamiceps

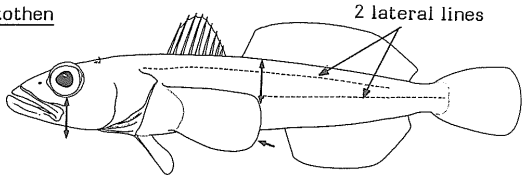
8b. 9 to 13 gillrakers; interorbital width 12 to 18% of head length ..... Patagonotothen sima

7b. 54 to 80 scales in lateral series; second dorsal fin with 31 to 37 rays

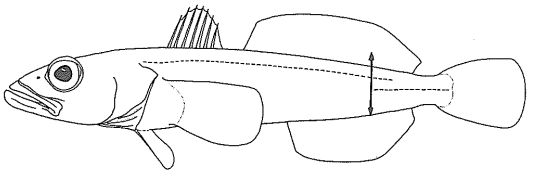
9a. Second dorsal fin with numerous distinct spots and lines; upper lateral line ending below, or a little behind, last ray of soft dorsal fin (Fig.7)



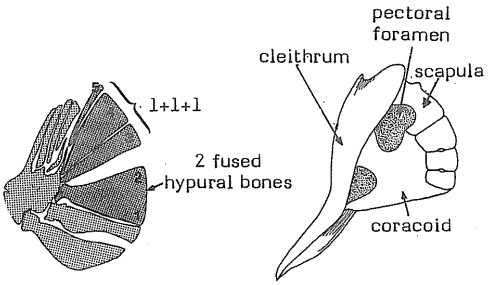
top of head Fig.3



Dissostichus eleginoides Fig.4



Dissostichus mawsoni Fig.5



caudal fin skeleton (schematic)
a) Patagonotothen (tessellata)

pectoral girdle
b) Patagonotothen

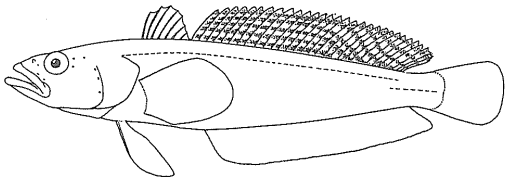
Fig.6

*A third species of Dissostichus (D. amissus) has been described from southern Chile but is known only from a photograph and cannot be retained here; it is considered as a synonym of D. eleginoides

10a. Lower limb of first gill arch with 20 to 25 gillrakers; interorbital width 19.6 to 21.5% of head length ..... Patagonotothen jordani

10b. Lower limb of first gill arch with 12 to 16 gillrakers; interorbital width 12.6 to 16.5% of head length. (Fig.7) .... Patagonotothen tessellata

9b. Second dorsal fin plain (dusky or light); upper lateral line ending well beyond last ray of soft dorsal fin (Fig.8)



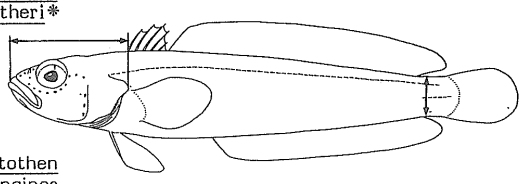
Patagonotothen tessellata Fig.7

11a. First dorsal fin with 4 to 7 spines; pectoral fin with 22 to 28 rays

12a. 14 to 20 gillrakers on lower limb of first gill arch; least depth of caudal peduncle 30.5 to 32.8% of head length ..... Patagonotothen brevicauda brevicauda

12b. 16 to 22 gillrakers; least depth of caudal peduncle 25.7 to 30.8% of head length. (Fig.8) ..... Patagonotothen brevicauda guntheri*

11b. First dorsal fin with 5 to 8 spines; pectoral fin with 24 to 29 rays



Patagonothothen brevicauda guntheri Fig.8

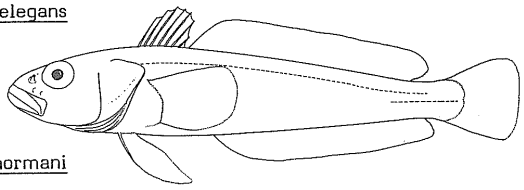
13a. 14 to 16 gillrakers on lower limb of first gill arch; total number of anterior gillrakers 23 to 30 ..... Patagonotothen longipes longipes

13b. 16 to 25 gillrakers on lower limb of first gill arch; total number of anterior gillrakers 30 to 43. (Fig.9) ..... Patagonotothen longipes ramsayi

5b. Occipital region of top of head scaleless (except some individuals of P. sima)

14a. Interorbital width less than 10% of head length ..... Patagonotothen elegans

14b. Interorbital width greater than 10% of head length



Patagonotothen longipes ramsayi Fig.9

15a. No tubular scales in middle lateral line; interorbital width 11.6 to 13.5% of head length ..... Patagonotothen normani

15b. Tubular scales present in middle lateral line; interorbital width 15.6 to 20.5% of head length

16a. Opercle completely or nearly completely scaled; 3 or 4 pores in supratemporal canal ..... Patagonotothen sima

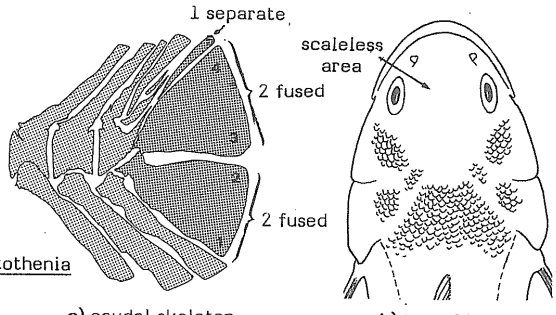
16b. Opercle scaled only on upper parts; 5 to 7 pores in supratemporal canal .....Patagonotothen cornucola

*Another subspecies P. brevicauda shagensis has been described by A.V. Balushkin and Y.Y. Permitin in 1982 from Shag Rocks near South Georgia; it closely resembles P. brevicauda guntheri

4b. Supraorbital canal with 4 pores (5 in Cryothenia); hypurals 3, 4 and 5 fused or partially fused

17a. Temporal canal with 4 pores

18a. Hypurals 3 and 4 entirely fused (type 2+2+1, Fig.10); pectoral foramen bordered by scapula and coracoid bones (Fig.6b)..... genus Notothenia



a) caudal skeleton b) top of head

Notothenia (N.) rossii Fig.10

19a. Upper surface of head scaleless (Fig.10b); 8 or 9 pores in the infraorbital canal .....subgenus Notothenia

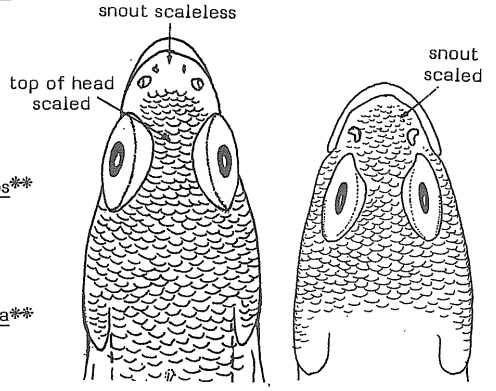
20a. 21 to 24 pectoral fin rays..... Notothenia (N.) rossii*

20b. 16 to 19 pectoral fin rays

21a. Interorbital width 22 to 25% of head length; second dorsal fin with 35 to 38 rays.. Notothenia (N.) coriiceps**

21b. Interorbital width 26 to 33% of head length; second dorsal fin with 37 to 41 rays ..Notothenia (N.) neglecta**

19b. Upper surface of head scaled, at least posteriorly (Fig.11a,b); 7 pores in the infraorbital canal



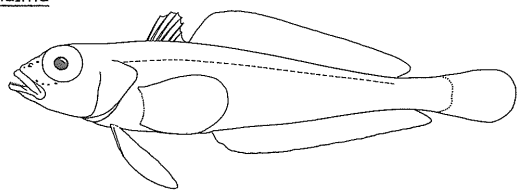
a)N.(L.)macrophthalma b)N.(L.) squamifrons

top of head Fig.11

22a. Preorbital area scaled..... subgenus Lepidonotothen

23a. 33 to 35 dorsal fin rays; 28 to 31 anal fin rays; snout scaleless (Figs 11a, 12)... Notothenia (L.) macrophthalma

23b. 35 to 38 dorsal fin rays; 31 to 35 anal fin rays; snout completely scaled (Fig.11b)



Notothenia (L.) macrophthalma Fig.12

*Notothenia (N.) rossii is often split into two subspecies, N. (N.) rossii rossii from the Indian sector of the Southern Ocean (e.g., Kerguelen Islands) and N. (N.) rossii marmorata from South Georgia. These subspecies are probably geographical populations; they differ only by their coloration and in some ecological aspects

**Notothenia (N.) coriiceps and N. (N.) neglecta are considered by some authors as subspecies of N. (N.) coriiceps

24a. Interorbital width 7.6 to 11.5% of head length (Fig.11b) ..... Notothenia (L.) squamifrons*

24b. Interorbital width 4.6 to 7.5% of head length ..... Notothenia (L.) kempi

22b. Preorbital area scaleless (Fig.13) ..... subgenus Gobionotothen

25a. Interorbital width less than 9% of head length

26a. Lower parts of opercle scaleless; upper lateral line with 26 to 34 tubular scales ..... Notothenia (G.) angustifrons

26b. Lower parts of opercle scaled; upper lateral line with 34 to 51 tubular scales

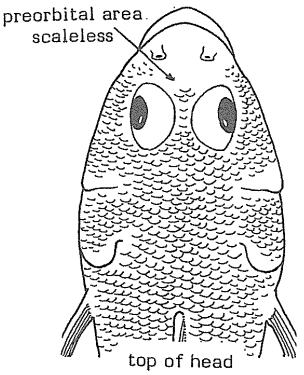
27a. Middle lateral line with 25 to 42 tubular scales; second dorsal fin with 31 to 34 rays ..... Notothenia (G.) gibberifrons

27b. Middle lateral line with 15 to 18 tubular scales; second dorsal fin with 28 to 30 rays ..... Notothenia (G.) acuta

25b. Interorbital width greater than 9% of head length

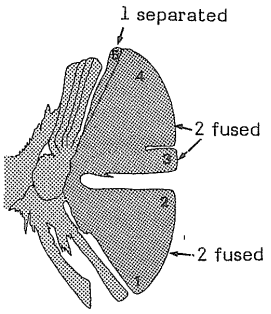
28a. Middle lateral line with 15 to 17 tubular scales; interorbital width about 10% of head length ..... Notothenia (G.) marionensis

28b. Middle lateral line with 4 to 15 tubular scales; interorbital width 11.6 to 20.5% of head length ..... Notothenia (G.) cyanobrancha



N. (G.) angustifrons Fig.13

18b. Hypurals 3 and 4 partially fused (type 2+(2)+1, Fig.14); pectoral foramen bordered by scapula and coracoid (Fig.6b)



caudal skeleton

Paranotothenia magellanica Fig.14

29a. Middle lateral line with tubular scales (Fig.15a); infraorbital canal with 8 to 11 pores; upper and lower hypural plates fused to the ural centrum (Fig.14) ..... genus Paranotothenia

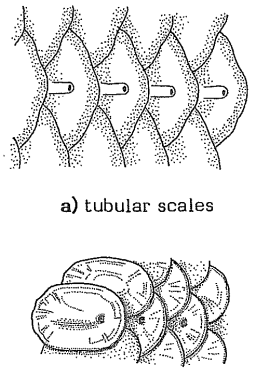
30a. Middle lateral line with 24 to 37 tubular scales; upper lateral line with 59 to 75 tubular scales ..... Paranotothenia microlepidota

30b. Middle lateral line with 23 or less tubular scales; upper lateral line with 30 to 61 tubular scales

31a. Length of caudal peduncle 37 to 45.5% of head length ..... Paranotothenia magellanica

31b. Length of caudal peduncle 25.5 to 34.5% of head length ..... Paranotothenia angustata

29b. Middle lateral line with perforated scales (Fig.15b); infraorbital canal with 9 pores ..... genus Nototheniops



a) tubular scales

b) perforated scales

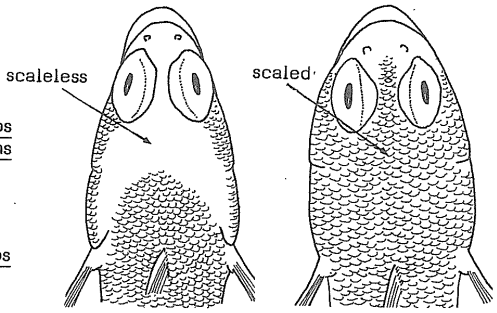
Fig.15

*Notothenia (L.) squamifrons is often split into two subspecies: N. (L.) squamifrons squamifrons from Kerguelen area and N. (L.) squamifrons atlantica from the south Atlantic sector of the Southern Ocean. The present author prefers to consider them as a single species until conclusive evidence on their conspecificity is given

32a. Preorbital region scaleless

33a. Upper surface of head scaleless (Fig. 16a); origin of anal fin under base of 7th to 10th ray of second dorsal fin.. Notothenioops nudifrons

33b. Scales present on top of head behind eyes (Fig.16b); origin of anal fin under base of 5th to 8th ray of second dorsal fin ..... Notothenioops mizops



a) N. nudifrons b) N. mizops

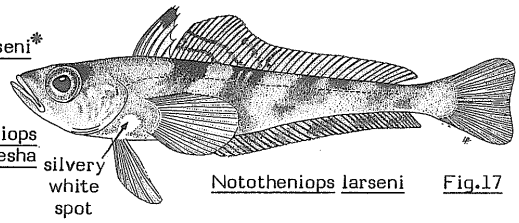
top of head Fig.16

32b. Preorbital region scaled

34a. Lower jaw covered with scales

35a. 37 or 38 anal fin rays; 16 to 18 gillrakers on lower part of the first arch; a silvery-white spot on breast and lower part of pectoral fin bases (Fig.17)..... Notothenioops larseni*

35b. 34 to 36 anal fin rays; 14 or 15 gillrakers on lower part of the first arch; no silvery-white spot..Notothenioops loesha



Notothenioops larseni Fig.17

34b. No scales on lower jaw

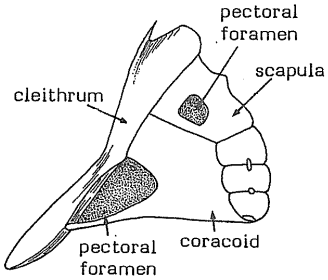
36a. Interorbital width 5 to 7% of head length; 22 to 25 pectoral fin rays; no silvery-white spot on breast or pectoral fin bases ..... Notothenioops nybelini

36b. Interorbital width 9 to 10% of head length; 25 to 27 pectoral fin rays; a silvery-white spot on breast and pectoral fin bases ... Notothenioops tchizh

17b. Temporal canal with 5 pores

37a. Hypurals 3 and 4 entirely fused (type 2+2+1, Fig.10a)

38a. 3 pores in supratemporal canal; pectoral foramen entirely in scapula (Fig.18) ..... genus Trematomus



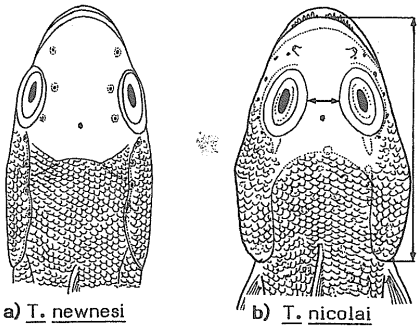
pectoral girdle

Trematomus newnesi Fig.18

39a. Upper surface of head scaleless

40a. Interorbital width 20 to 30% of head length; first dorsal fin with 5 to 8 spines (Fig.19a) ..... Trematomus newnesi

40b. Interorbital width 11.1 to 14.3% of head length; first dorsal fin with 4 spines (Fig.19b) ..... Trematomus nicolai



a) T. newnesi b) T. nicolai

top of head Fig.19

* The "larseni" species group is considered by some authors as a single species comprising of 4 subspecies or geographical populations: N. larseni larseni, N. larseni loesha, N. larseni nybelini and N. larseni tchizh

39b. Upper surface of head scaled, at least posteriorly

41a. Interorbital region with 2 or 3 longitudinal series of scales (Fig.20a) ..... Trematomus vicarius

41b. Interorbital region fully scaled (Fig.20b)

42a. Snout and lower jaw scaleless; preorbital area scaleless (except in T. scotti)

43a. Upper lateral line with 30 or more tubular scales

44a. 60 to 83 scales in a longitudinal series ..... Trematomus loennbergi

44b. 49 to 60 scales in a longitudinal series

45a. Dorsal spines flexible, as long as rays; eye diameter 28.6 to 31.2% of head length (Fig.21)..Trematomus pennelli

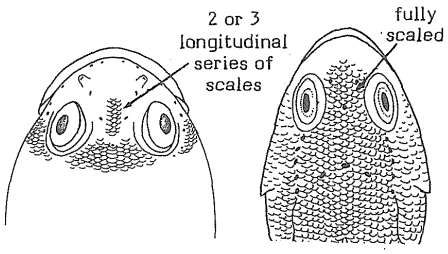
45b. Dorsal spines pungent, shorter than rays eye diameter 30.3 to 38.5% of head length (Fig.22)..... Trematomus centronotus

43b. Upper lateral line with 10 to 23 tubular scales ..... Trematomus scotti

42b. Snout, lower jaw and preorbital area scaled

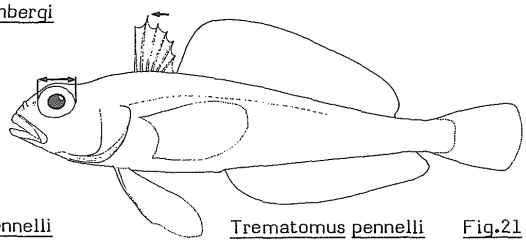
46a. Middle lateral line with 26 to 38 tubular scales; 2nd dorsal fin with 31 to 33 rays (Fig.23); preanal distance shorter than anal fin base ..Trematomus lepidorhinus

46b. Middle lateral line with 10 to 22 tubular scales; 2nd dorsal fin with 34 to 37 rays (Fig.24); preanal distance longer than or equal to anal fin base .....Trematomus eulepidotus

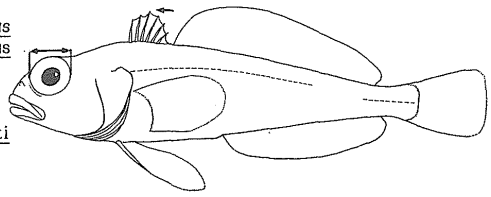


a) Trematomus vicarius b) Trematomus loennbergi

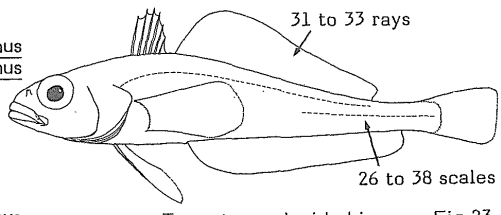
Fig.20



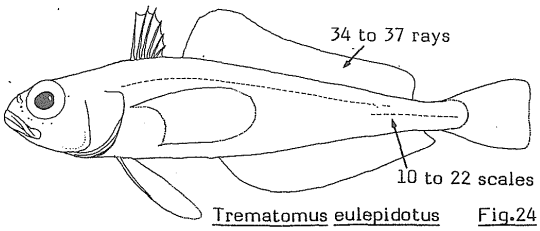
Trematomus pennelli Fig.21



Trematomus centronotus Fig.22



Trematomus lepidorhinus Fig.23



Trematomus eulepidotus Fig.24

38b. 5 or more pores in supratemporal canal which is divided into 3 or 4 sections; pectoral foramen entirely or not in scapula, separated or not from coracoid by a very narrow bridge of bone (Fig.25) ..... genus Pagothenia

47a. Supraorbital commissure with 2 pores; supratemporal canal divided into 4 sections; 30 to 34 caudal vertebrae

48a. Dark transversal bands on caudal fin (Fig.26); distal part of dorsal, anal, caudal and pelvic fins bordered with black colour; interorbital width 18 to 25% of head length; 23 or 24 pectoral fin rays ... Pagothenia brachysoma

48b. No dark transversal bands on caudal fin; interorbital width 25 to 33% of head length; about 23 pectoral fin rays ..... Pagothenia borchgrevinki

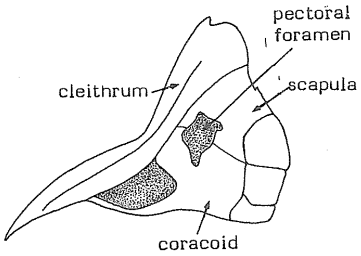
47b. Supraorbital commissure with only one pore; supratemporal canal divided into 3 sections; 35 to 37 caudal vertebrae

49a. Dark transversal bands on caudal fin (Fig.27); 27 to 33 pectoral fin rays ..... Pagothenia hansoni

49b. No dark transversal bands on caudal fin

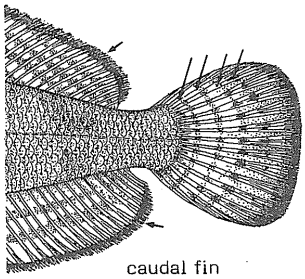
50a. Occiput scaled; interorbital region scaleless or with a median series of scales; 3 green spots on upper part of pectoral fin base; distal part of first dorsal fin dark; 22 to 26 pectoral fin rays (Fig.28) .. Pagothenia bernacchii

50b. Upper surface of head scaleless; no green spots on pectoral fin base; one black spot on middle of first dorsal fin; 29 or 30 pectoral fin rays (Fig.29)..... Pagothenia tokarevi



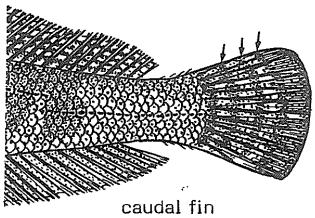
pectoral girdle

Pagothenia (hansoni) Fig.25



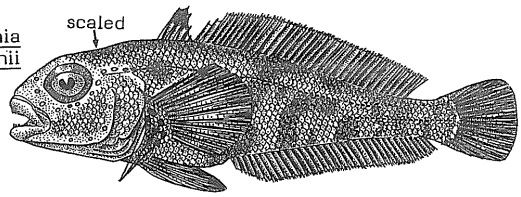
caudal fin

Pagothenia brachysoma Fig.26

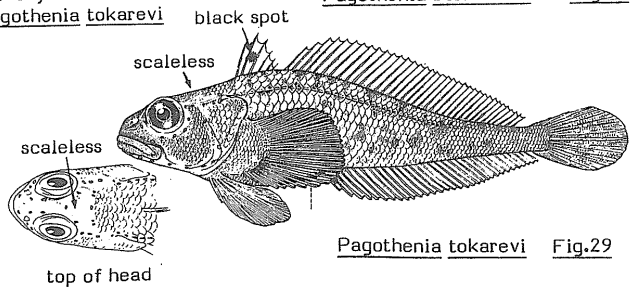


caudal fin

Pagothenia hansoni Fig.27



Pagothenia bernacchii Fig.28



Pagothenia tokarevi Fig.29

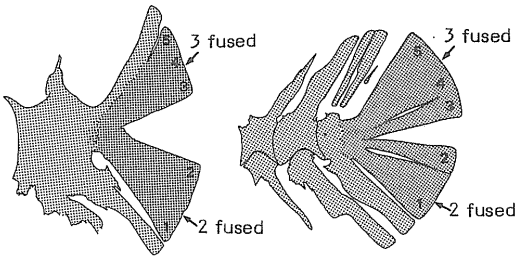
37b. Hypurals 3, 4 and 5 fused (type 2¡3, Fig.30a,b)

51a. Two lateral lines

52a. No tubular scales on lateral lines; 15 to 17 short gill-rakers on first arch ..... Cryothenia peninsulae

52b. Tubular scales present on lateral lines; numerous (about 50) elongate gillrakers on first arch ..... Aethotaxis mitopteryx

51b. Three lateral lines without tubular scales, but scales pored, 20 to 25 gillrakers on first arch ..... Pleuragramma antarcticum



a) Pleuragramma antarcticum b) Aethotaxis mitopteryx

caudal skeleton Fig.30

LIST OF SPECIES OCCURRING IN THE AREA :

Code numbers are given for those species for which Identification Sheets are included

Aethotaxis mitopteryx DeWitt, 1962	NOT Aet 1
Cryothenia peninsulae Daniels, 1981	NOT Cryo 1
Dissostichus eleginoides Smitt, 1898	NOT Dis 1
Dissostichus mawsoni Norman, 1937	NOT Dis 2
*Eleginops maclovinus (Cuvier & Valenciennes, 1830)	
Notothenia (Gobionotothen) acuta Günther, 1880	NOT Not 1
Notothenia (Gobionotothen) angustifrons Fischer, 1885	NOT Not 2
Notothenia (Notothenia) coriiceps Richardson, 1844	NOT Not 3
Notothenia (Gobionotothen) cyanobrancha Richardson, 1844	NOT Not 4
Notothenia (Gobionotothen) gibberifrons Lönnberg, 1905	NOT Not 5
Notothenia (Lepidonotothen) kempi Norman, 1937	NOT Not 6
Notothenia (Lepidonotothen) macrophthalma Norman, 1937	
Notothenia (Gobionotothen) marionensis Günther, 1880	
Notothenia (Notothenia) neglecta Nybelin, 1951	NOT Not 7
Notothenia (Notothenia) rossii Richardson, 1844	NOT Not 8
Notothenia (Lepidonotothen) squamifrons Günther, 1880	NOT Not 9
Nototheniops larseni (Lönnberg, 1905)	NOT Noto 1
Nototheniops loesha (Balushkin, 1976)	
Nototheniops mizops (Günther, 1880)	NOT Noto 2
Nototheniops nudifrons (Lönnberg, 1905)	NOT Noto 3
Nototheniops nybelini (Balushkin, 1976)	
Nototheniops tchizh (Balushkin, 1976)	
Pagothenia bernacchii (Boulenger, 1902)	NOT Pag 1
Pagothenia borchgrevinki (Boulenger, 1902)	NOT Pag 2
Pagothenia brachysoma (Pappenheim, 1912)	NOT Pag 3
Pagothenia hansoni (Boulenger, 1902)	NOT Pag 4
Pagothenia tokarevi (Andriashev, 1978)	
*Paranotothenia angustata (Hutton, 1875)	
Paranotothenia magellanica (Forster, 1801)	NOT Par 1
*Paranotothenia microlepidota (Hutton, 1875)	

* Species which do not occur in Fishing Areas 48, 58 and 88 but are included in the family key

*Patagonotothen brevicauda brevicauda (Lönnberg, 1905)	
Patagonotothen brevicauda guntheri (Norman, 1937)	NOT Pat 1
*Patagonotothen canina (Smitt, 1897)	
*Patagonotothen cornucola (Richardson, 1844)	
*Patagonotothen elegans (Günther, 1880)	
*Patagonotothen jordani (Thompson, 1916)	
*Patagonotothen longipes longipes (Steindachner, 1876)	
*Patagonotothen longipes ramsayi (Regan, 1913)	
Patagonotothen normani (Nybelin, 1947)	
*Patagonotothen sima (Richardson, 1845)	
*Patagonotothen squamiceps (Peters, 1876)	
*Patagonotothen tessellata (Richardson, 1845)	
Pleuragramma antarcticum Boulenger, 1902	NOT Pleu 1
Trematomus centronotus Regan, 1914	
Trematomus eulepidotus Regan, 1914	
Trematomus lepidorhinus Pappenheim, 1911	
Trematomus loennbergi Regan, 1913	NOT Trem 1
Trematomus newnesi Boulenger, 1902	NOT Trem 2
Trematomus nicolai Boulenger, 1902	
Trematomus pennelli Regan, 1914	
Trematomus scotti Boulenger, 1907	NOT Trem 3
Trematomus vicarius Lönnberg, 1905	

Prepared by J.C. Hureau, Ichtyologie générale et appliquée, Muséum national d'Histoire naturelle, Paris, France

* Species which do not occur in Fishing Areas 48, 58 and 88 but are included in the family key

NOT Aet 1

1985

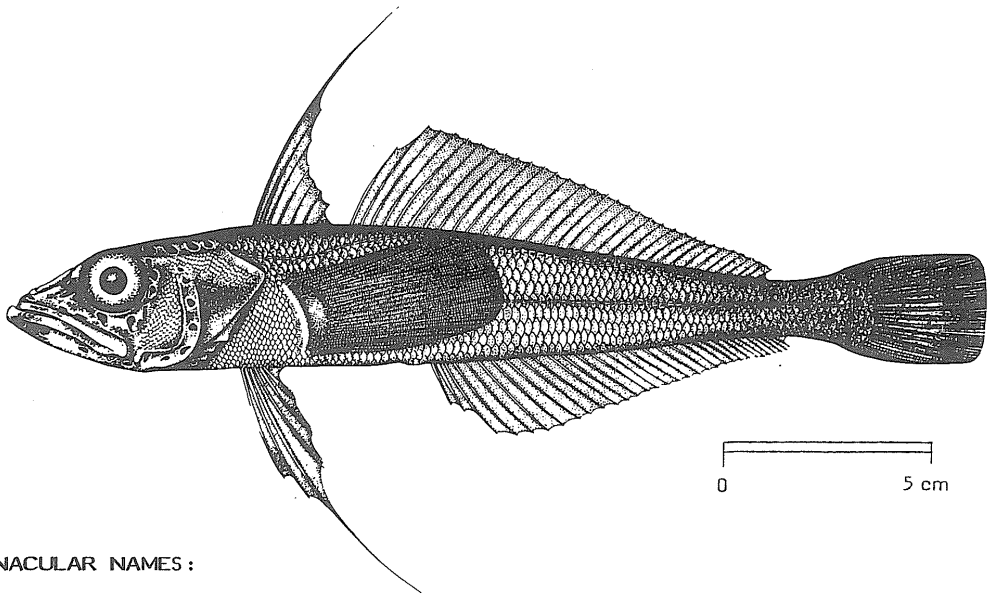
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Aethotaxis mitopteryx DeWitt, 1962

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Longfin icedevil
Fr - Calandre fil
Ru - Dolgoperka
Sp - Diablillo de hebra

NATIONAL :

DISTINCTIVE CHARACTERS :

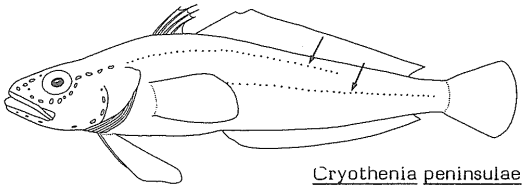
Body elongate, moderately compressed, its depth 20 to 21% of standard length. Head moderate in size, its length 3.3 to 3.5 times in standard length; cephalic sensory canals possess very large open pores; median part of supratemporal canal lost; infraorbital canal in 3 sections with 5+2+1 pores; temporal canal with 5 pores; supraorbital canal with 4 large pores, the canal of each side opening into a large coronal pit which has the shape of a pair of wings; preoperculomandibular canal in 2 sections with 4+7 pores; eye 3.8 to 4.4 times in head length; interorbital width 23 to 26% of head length; 47 to 51 elongate gillrakers on lower part of anterior arch; mouth large and oblique, maxilla extending posteriorly to below anterior part of pupil; lower jaw protruding; teeth in both jaws small, villiform. Two dorsal fins, the first with 7 or 8 flexible spines, the 2 first elongate, the second dorsal fin with 32 to 34 soft rays; 30 or 31 anal fin rays; pectoral fins large, fan-like, with 24 to 28 rays, shorter than the pelvics whose second ray is greatly elongated. Two lateral lines, the upper ending below the last rays of second dorsal fin; 49 to 54 tubular scales in upper lateral line and 30 in the middle line; the body entirely covered with large and deciduous scales; upper surface of head, snout and preorbital area scaleless; upper half of opercles and cheeks scaled. The hypural bones 1 and 2, 3, 4 and 5 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely located in scapula bone.

Colour: grey with violet hue; lighter below with metallic lustre; fins dark-grey; caudal fin apparently unpigmented but with whitish margin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Cryothenia peninsulae: only 2 lateral lines without tubular scales; 15 to 17 short gillrakers on first arch (47 to 51 in A. mitopteryx).

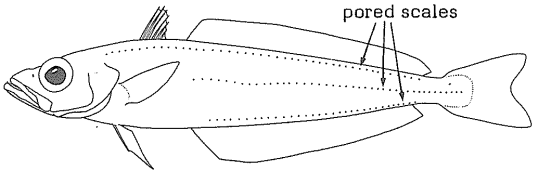
Pleuragramma antarcticum: 3 lateral lines covered with pored scales; 20 to 25 gillrakers on lower limb of first arch.



Cryothenia peninsulae

SIZE :

Maximum: 35 cm; common to 25 cm.



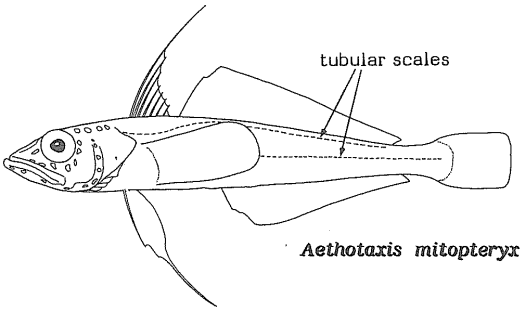
Pleuragramma antarcticum

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Apparently distribution is circumpolar with records in South Shetland, South Orkney and South Sandwich Islands, in Prydz Bay and in the Ross Sea. The Ross Sea specimens may represent a separate subspecies.

Pelagic species known from the surface (rarely) to 850 m depth.

Feeds on pelagic small organisms, probably krill, copepods and pelagic amphipods.



Aethotaxis mitopteryx

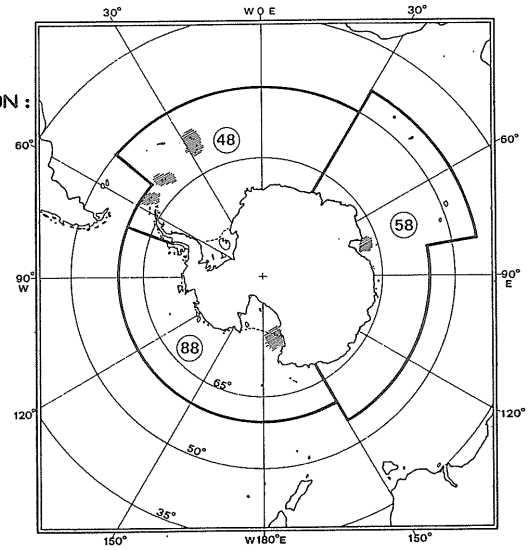
PRESENT FISHING GROUNDS :

Not yet commercially exploited.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Could be caught only with pelagic trawls.



NOT Cryo 1

1985

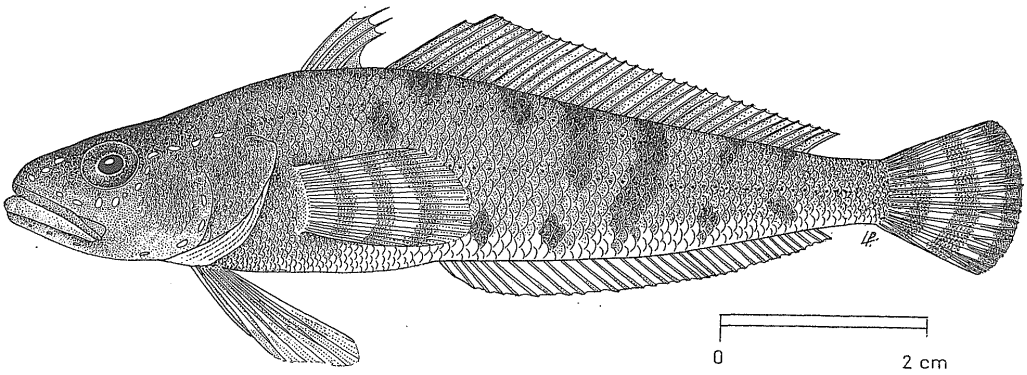
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Cryothenia peninsulae Daniels, 1981

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - True icedevil
Fr - Calandre des glaces
Ru - Kriotenia
Sp - Diablillo heladero

NATIONAL :

DISTINCTIVE CHARACTERS :

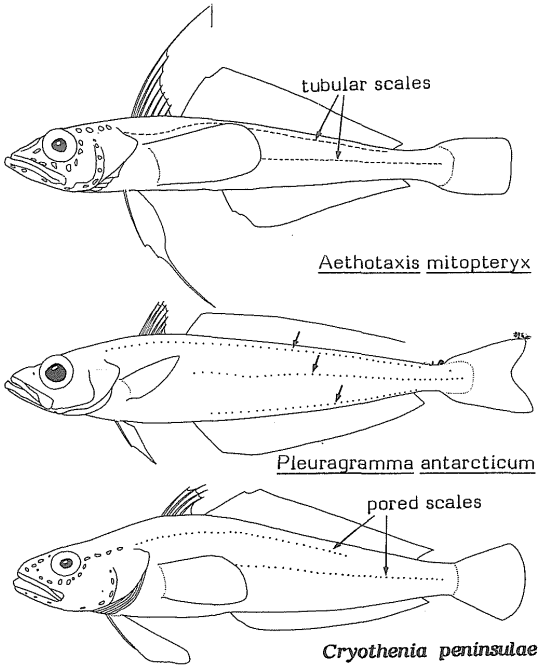
Body fusiform, slightly compressed, its depth 15.7 to 21% of standard length. Head relatively small, its length 3.2 to 3.5 times in standard length; cephalic sensory canals possess large open pores; median part of supratemporal canal and supraorbital commisure lost; 7 to 9 pores in the infraorbital canal; temporal canal with 5 pores; supraorbital canal with 5 pores; preoperculomandibular canal in 2 sections with 4 and 7 pores; eye 3.2 to 4.0 times in head length; interorbital width deeply depressed, 18 to 23% of head length; 15 to 17 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below middle of eye; lower jaw slightly protruding; teeth in both jaws villiform at symphyses, on a single row laterally. Two dorsal fins, the first with 4 to 6 flexible spines, the second with 34 to 36 soft rays; 33 to 35 anal fin rays; pectoral fins large, fan-like, with 24 to 26 rays, as long as the pelvics; caudal fin rounded. Two lateral lines without tubular scales but with pored scales; 32 to 37 pored scales in upper lateral line and 34 to 38 in the lower; the body entirely covered with large and cycloid (smooth) scales; occiput and opercle fully scaled; interorbital space, snout, preorbital area, lower jaw and lower part of cheeks scaleless. The hypural bones 1 and 2, 3, 4 and 5 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely located in scapula bone.

Colour: barred with light and dark areas of purple and silver; head purple; both dorsal fins and posterior rays of anal fin purple; pectoral and caudal fins barred.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Aethotaxis mitopteryx: 3 lateral lines with tubular scales; numerous elongate gillrakers on lower part of anterior arch (15 to 17 in C. peninsulae).

Pleuragramma antarcticum: 3 lateral lines with pored scales; 20 or more gillrakers on lower part of anterior arch.



SIZE:

Maximum: 15 cm; common to 10 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Only reported from the west coast of the Antarctic Peninsula.

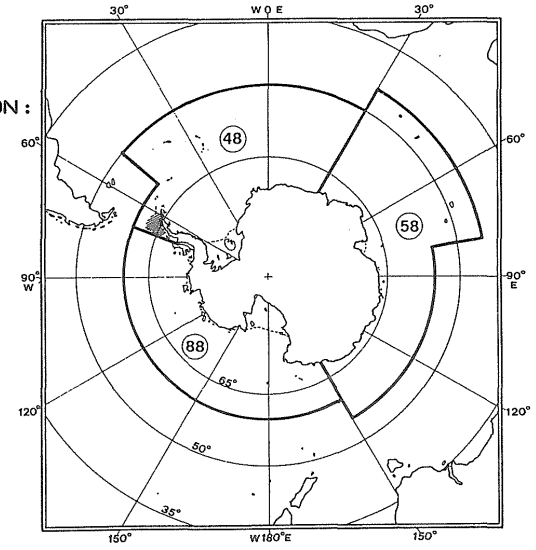
Pelagic species in midwaters between 50 and 100 m depth. Spawning in autumn and winter.

Feeds on small pelagic invertebrates: krill, copepods.

PRESENT FISHING GROUNDS:

Not yet commercially exploited.

Cryothenia peninsulae



CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Separate statistics are not reported for this species.

Could be caught with pelagic trawls.

NOT Dis 1

1985

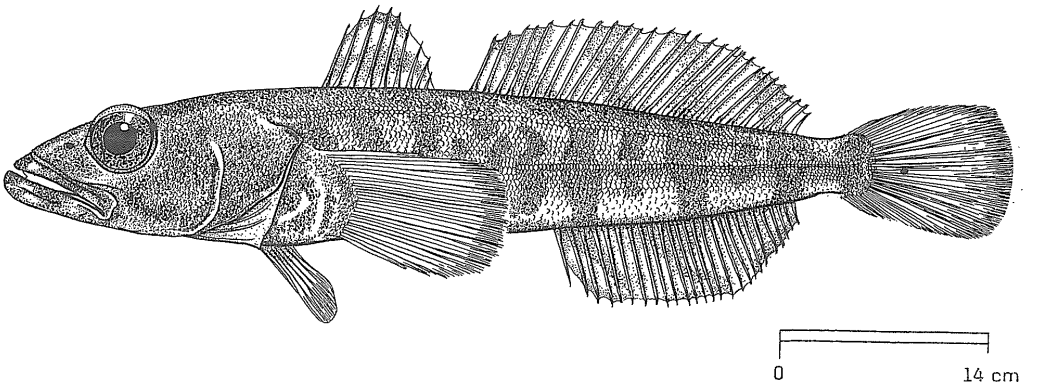
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Dissostichus eleginoides Smitt, 1898

OTHER SCIENTIFIC NAMES STILL IN USE : Dissostichus amissus (Gill & Townsend, 1901)



VERNACULAR NAMES :

FAO/CCAMLR : En - Patagonian toothfish
Fr - Légine australe
Ru - Patagonsky klykach
Sp - Austromerluza negra

NATIONAL :

DISTINCTIVE CHARACTERS :

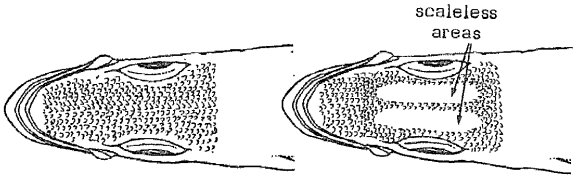
One of the two largest species occurring in the Antarctic. Body fusiform, rather elongate, its depth 16 to 20% of standard length. Head depressed, its dorsal profile flat; length of head about 3 times in standard length; cephalic sensory canals with prolonged superficial canaliculi; eye 5 or 6 times in head length; 11 or 12 small gillrakers on lower part of anterior arch; mouth large, maxilla extending posteriorly to below middle or posterior part of eye; lower jaw strongly projecting; teeth biserial in upper jaw, those of the outer row enlarged, canine-like; a group of stronger canine teeth on each premaxilla; teeth on lower jaw uniserial, canine-like. Two dorsal fins, the first with 8 to 11 flexible spines, the second with 26 to 30 soft rays; 26 to 30 anal fin rays; pectoral fins large, fan-like, with 24 rays, much longer than the pelvics; caudal fin truncate or a little emarginate. Two lateral lines, the lower beginning below or anterior to the middle of the second dorsal fin; about 95 tubular scales in upper lateral line and 64 in the lower; the body entirely covered with large and more or less smooth scales; upper surface of head (except snout and preorbital area), cheeks and opercles with small scales; 2 elongate scaleless areas symmetrically arranged on upper surface of head. The five hypural bones of the caudal skeleton are separated from each other. Pectoral foramen entirely located in the scapula bone.

Colour: brown-grey, with more or less indistinct darker markings; spinous dorsal fin with a distal dusky area. Juveniles without black crossbars.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Dissostichus mawsoni: no elongate scaleless areas on upper surface of head; lower lateral line begins below posterior third of soft dorsal fin.

Other species of Nototheniidae: no strong canine-like teeth on upper and lower jaws.



SIZE:

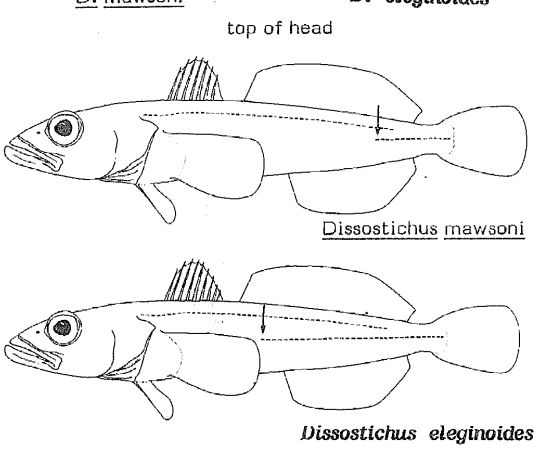
Maximum: 215 cm; common to 70 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Within the area, reported from all shelves of the sub-Antarctic islands, from the Kerguelen-Heard Ridge to Bouvet Island in the Indian and east Atlantic parts of the Southern Ocean, and also from all the islands of the Scotia Arc and the northern part of the Antarctic Peninsula.* Outside the area, it is known from the southern coast of Chile northward to 30°S and the coast of Argentina, especially in the Patagonian area.

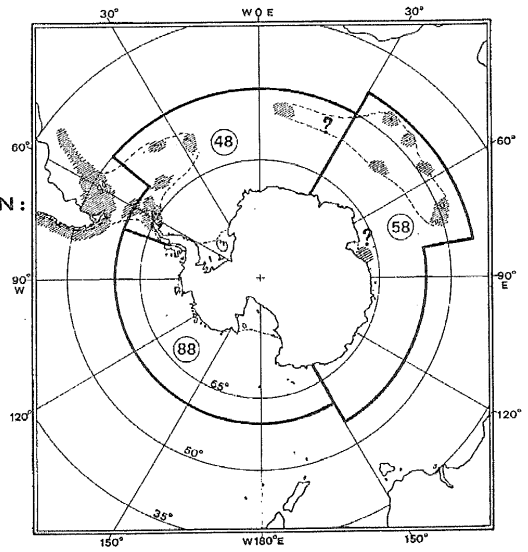
Found between 70 and 1 500 m depth, D. eleginoides is reported as having a pelagic behaviour during some periods of its life.

Feeds on other fishes and cephalopods.



PRESENT FISHING GROUNDS:

Mainly around the Kerguelen Islands, South Georgia, South Shetlands and outside the area, on the Patagonian shelf.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Less than 400 t are reported annually from the area, but 6 500 t were caught around the Kerguelen Islands during the 1984/85 season. The extraterritorial catches (Patagonian Shelf) are higher.

Caught only with bottom trawls.

Marketed as frozen fish and fishmeal, flesh of excellent quality.

---

* One young specimen has been recorded from Prydz Bay: it has very few scales on the upper surface of head and the lower lateral line is characteristic of D. eleginoides

NOT Dis 2

1985

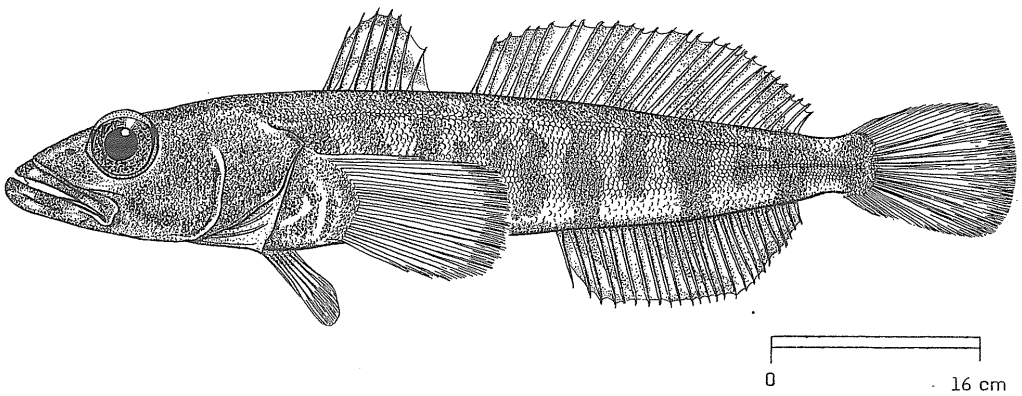
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Dissostichus mawsoni Norman, 1937

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic toothfish
Fr - Légine antarctique
Ru - Antarktichesky klykach
Sp - Austromerluza antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

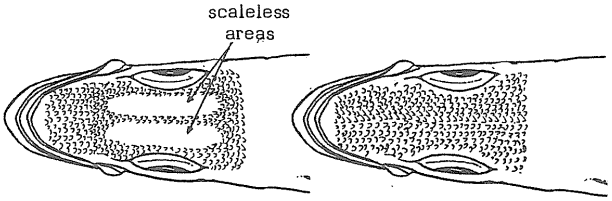
One of the two largest species occurring in the Antarctic. Body fusiform, rather elongate, its depth less than 16% of standard length. Head depressed, its dorsal profile flat; length of head about 3.3 times in standard length; cephalic sensory canals with prolonged superficial canaliculi; eye 4 or 5 times in head length; 12 or 13 small gillrakers on lower part of anterior arch; mouth large, maxilla extending posteriorly to below middle of eye or a little beyond; lower jaw strongly projecting; teeth biserial in upper jaw, those of the outer row enlarged, canine-like; a group of stronger canine teeth on each premaxilla; teeth on lower jaw uniserial, canine-like. Two dorsal fins, the first with 7 to 9 flexible spines, the second with 24 to 27 soft rays; 25 to 28 anal fin rays; pectoral fins large, fan-like, with 26 to 29 rays, much longer than the pelvics; caudal fin rounded or truncate. Two lateral lines, the lower beginnning below the posterior third of the second dorsal fin; about 95 tubular scales in upper lateral line and 43 to 48 in the lower; the body entirely covered with large and more or less smooth scales; upper surface of head (except snout and preorbital area), cheeks and opercles with small scales; no elongate scaleless areas on upper surface of head. The five hypural bones of the caudal skeleton are separated from each other. Pectoral foramen entirely located in the scapula bone.

Colour: uniformly brownish with 4 black crossbars in the juveniles which fade with age; spinous dorsal fin with a transversal medial dark stripe.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Dissostichus eleginoides: two elongate scaleless areas on upper surface of head; lower line begins below or anterior to the middle of the second dorsal fin.

Other species of Nototheniidae: no canine-like teeth on upper and lower jaws.



D. eleginoides *D. mawsoni*

top of head

SIZE :

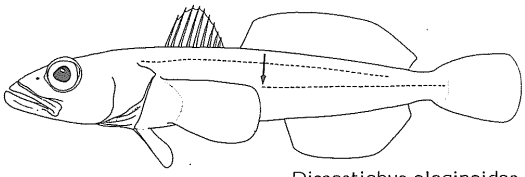
Maximum: 175 cm; common to 80 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

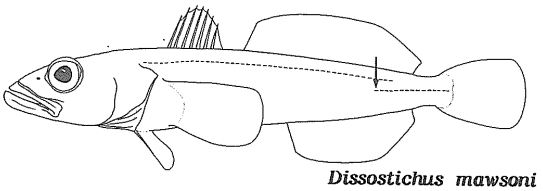
Circumpolar distribution; reported from all the coast of the Antarctic Continent, and also from the islands of the Scotia Arc (South Orkney and South Shetland) and the northern part of the Antarctic Peninsula. Presence questionable in South Georgia and South Sandwich Islands.

Found between 100 and 1 600 m depth, D. mawsoni is reported as having a demersal behaviour, but with pelagic juveniles. Adult specimens (120 cm and more) are known to undertake extensive oceanic migrations.

Feeds on other fishes and cephalopods.



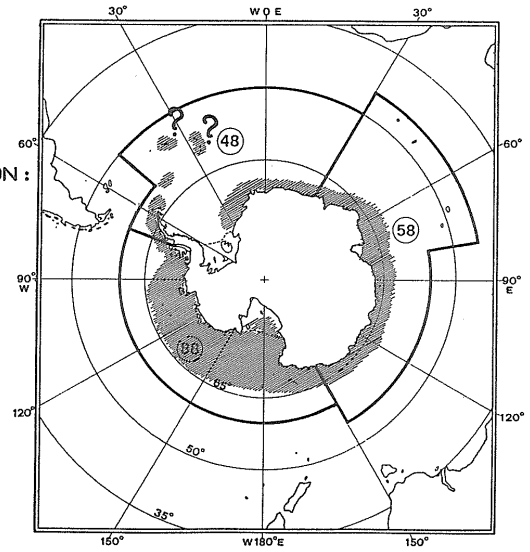
Dissostichus eleginoides



Dissostichus mawsoni

PRESENT FISHING GROUNDS :

This species is not fished, except locally (Ross Sea or Antarctic Peninsula) for the scientific stations.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught with bottom trawls, but also with hook-and-line.

Flesh of excellent quality.

NOT Not 1

1985

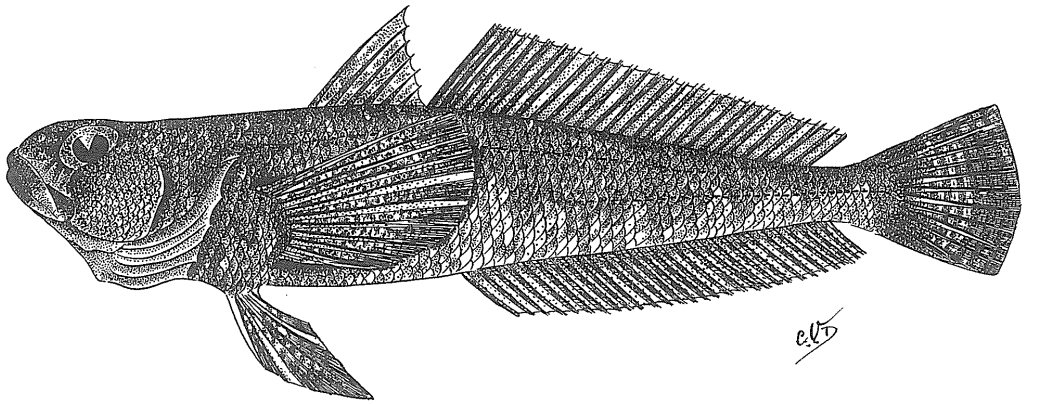
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Gobionotothen) acuta Günther, 1880

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Triangular rockcod
Fr - Bocasse triangulaire
Ru - Nototenia ostroluchka
Sp - Trama triangular

NATIONAL :

DISTINCTIVE CHARACTERS :

Body slender, compressed posteriorly, its depth about 15.5% of standard length. Head behind eyes broad and depressed, becoming narrow in area of eyes; snout rather narrow, rising nearly uniformly at a steep angle, its dorsal profile curving most strongly just anterior to eye; eyes placed just below dorsal profile of head, bulging slightly into it; length of head a little more than 3 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 7 pores in the infraorbital canal; temporal canal with 4 pores; preoperculo-mandibular canal with 10 pores; eye 3 to 3.7 times in head length; interorbital width very narrow, about 6% of head length; 12 to 14 gillrakers on lower part of anterior arch; mouth small and narrow, maxilla extending posteriorly to below anterior part of eye; jaws equal anteriorly; teeth in upper jaws in two narrow bands, those of the outer band composed of larger teeth; teeth in lower jaws in a single narrow band. Two dorsal fins, the first with 5 to 7 flexible spines, the second with 28 to 30 soft rays; 28 to 31 anal fin rays; pectoral fins large, fan-like, with 19 or 20 rays, much longer than the pelvics; caudal fin slightly rounded. Two lateral lines, the upper ending under base of about 5th last ray of second dorsal fin; 34 to 39 tubular scales in upper lateral line and 15 to 18 in the lower; a few pored scales present anteriorly, the body entirely covered with large and ctenoid scales; upper surface of head scaled; lower parts of opercle and cheeks scaled; preorbital region scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates, themselves fused to the ural vertebral centrum. Pectoral foramen bordered by scapula and coracoid.

Colour: brown, darker dorsally, with 4 or less distinct dark bars; dorsal rays with a series of small spots; caudal fin faintly barred; rays of pectoral fins with spots forming irregular bars, the membrane clear.

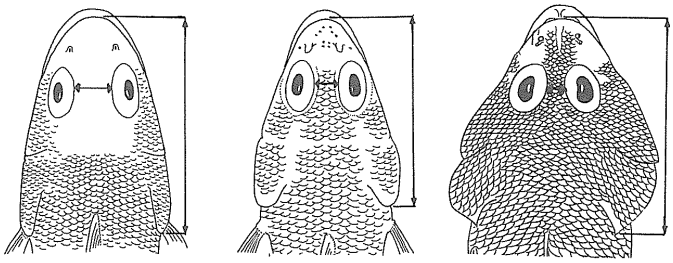
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia (G.) angustifrons: lower part of opercle scaleless; upper lateral line with 26 to 34 tubular scales (34 to 39 in N. (G.) acuta).

N. (G.) cyanobrancha: posterior membrane of the opercle dark-blue; interorbital width 11.6 to 20.5% of head length (about 6% in N. (G.) acuta); lower lateral line with 4 to 15 tubular scales (15 to 18 in N. (G.) acuta).

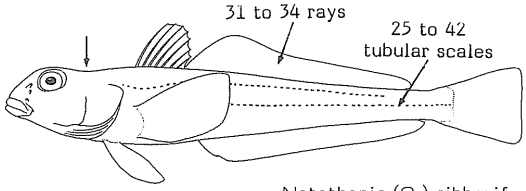
N. (G.) gibberifrons: head strongly depressed behind eyes; lower lateral line with 25 to 42 tubular scales; second dorsal fin with 31 to 34 rays (28 to 30 in N. (G.) acuta).

N. (G.) marionensis: interorbital width about 10% of head length.



N. (G.) cyanobrancha — N. (G.) marionensis — *N. (G.) acuta*

top of head



Notothenia (G.) gibberifrons

SIZE :

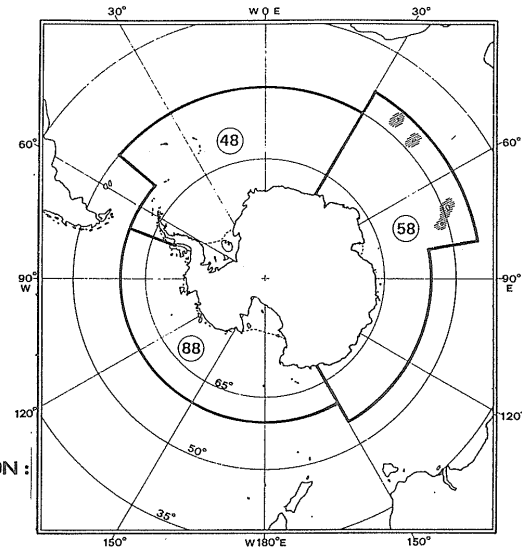
Maximum: 35 cm; common to 20 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported from shelves of the sub-Antarctic islands: Kerguelen, Heard, Crozet and Marion-Prince Edward.

Found from the shore to 300 m depth.

Feeds on benthic invertebrates (mostly amphipods and isopods).



PRESENT FISHING GROUNDS :

Not commercially exploited, but taken as by-catch around the Kerguelen Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught as bycatch in bottom trawls.

Not yet marketed.

NOT Not 2

1985

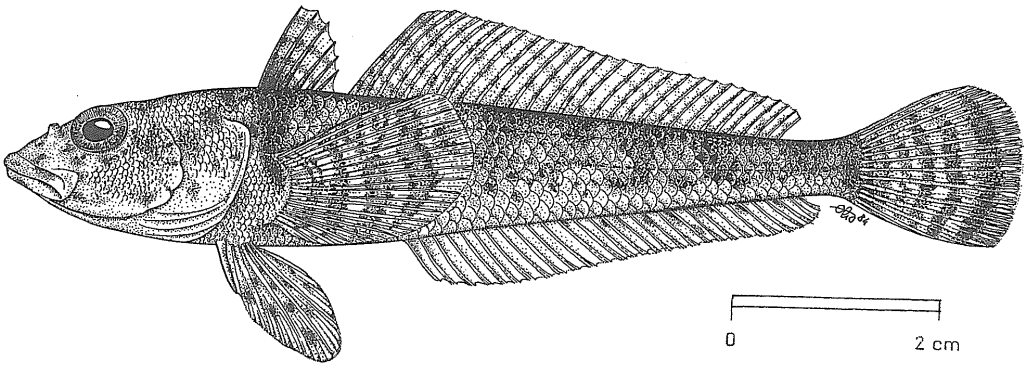
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Gobionotothen) angustifrons Fischer, 1885

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia sandwichensis Nybelin, 1947



VERNACULAR NAMES :

FAO/CCAMLR : En - Narrowhead rockcod
Fr - Bocasse obtuse
Ru - Uzkolobaya nototenia
Sp - Trama

NATIONAL :

DISTINCTIVE CHARACTERS :

Body rather elongate and slender, its depth about 16 to 19% of standard length. Head moderate in length, a little more than 3 times in standard length, its width about 5 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 7 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 10 pores; eye 3.7 to 5 times in head length; interorbital width narrow, about 5.3% of head length; 12 or 13 gillrakers on lower part of anterior arch; mouth relatively small, maxilla extending posteriorly to below anterior margin or anterior quarter of eye; jaws equal anteriorly; teeth in both jaws in two narrow bands, those of the outer band slightly larger. Two dorsal fins, the first with 5 to 8 flexible spines, the second with 28 to 32 soft rays; 29 to 32 anal fin rays; pectoral fins large, fan-like, with 18 to 21 rays, much longer than the pelvics; caudal fin rounded. Two lateral lines, the upper ending below middle or posterior part of second dorsal fin; 26 to 34 tubular scales in upper lateral line and 15 to 26 in the lower; the body entirely covered with large and ctenoid scales; upper surface of head scaled; lower part of opercle scaleless; cheeks scaled, preorbital region scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates, themselves fused to the ural vertebral centrum. Pectoral foramen bordered by scapula and coracoid.

Colour: grey-brown, darker dorsally, with black transverse bars; spots on the sides of the body; dorsal, caudal and pectoral fins with series of small dark spots on the rays. Often a dark bar through the spinous dorsal fin, connecting the bases of the pectoral fins.

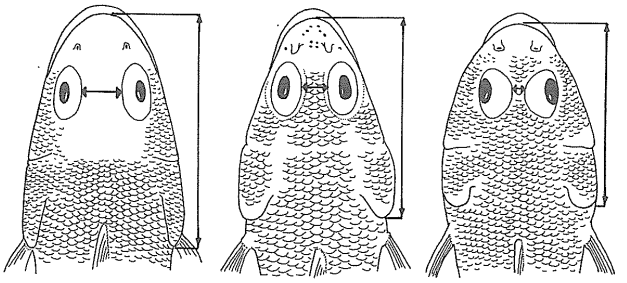
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia (G.) acuta: snout narrow, head triangular; lower parts of opercle scaled; lower lateral line with 15 to 18 tubular scales (15 to 26 in N. (G.) angustifrons).

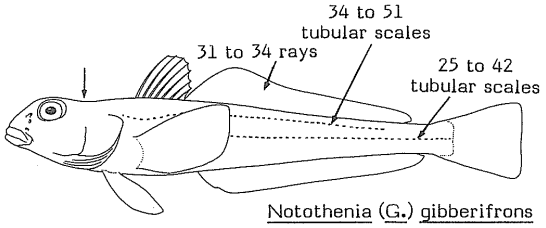
N. (G.) cyanobrancha: posterior membrane of the opercle dark-blue; interorbital width 11.6 to 20.5% of head length (about 5.3% in N. (G.) angustifrons); lower lateral line with 4 to 15 tubular scales.

N. (G.) gibberifrons: head strongly depressed behind eyes; lower parts of opercle scaled; upper lateral line with 34 to 51 tubular scales (26 to 34 in N. (G.) angustifrons); lower lateral line with 25 to 42 tubular scales; second dorsal fin with 31 to 34 rays (28 to 32 in N. (G.) angustifrons).

N. (G.) marionensis: interorbital width about 10% of head length; lower lateral line with 15 to 17 tubular scales.



N. (G.) cyanobrancha N. (G.) marionensis top of head *N. (G.) angustifrons*



Notothenia (G.) gibberifrons

SIZE :

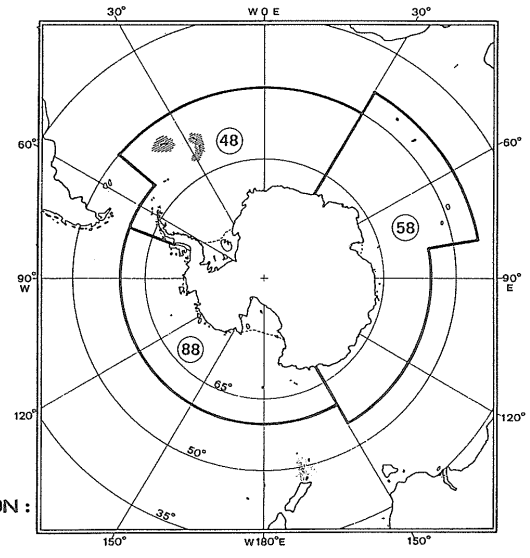
Maximum: 20 cm; common to 10 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Notothenia (Gobionotothen) angustifrons is confined to South Georgia and the South Sandwich Islands.

Found from the shore to 100 m depth, this species is commonly caught between 15 and 40 m. Nothing is known about its behaviour.

Feeds probably on benthic invertebrates and is often found in the stomachs of Notothenia (N.) rossii.



PRESENT FISHING GROUNDS :

No specific fishery.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught as bycatch in bottom trawls.

Not yet marketed.

NOT Not 3

1985

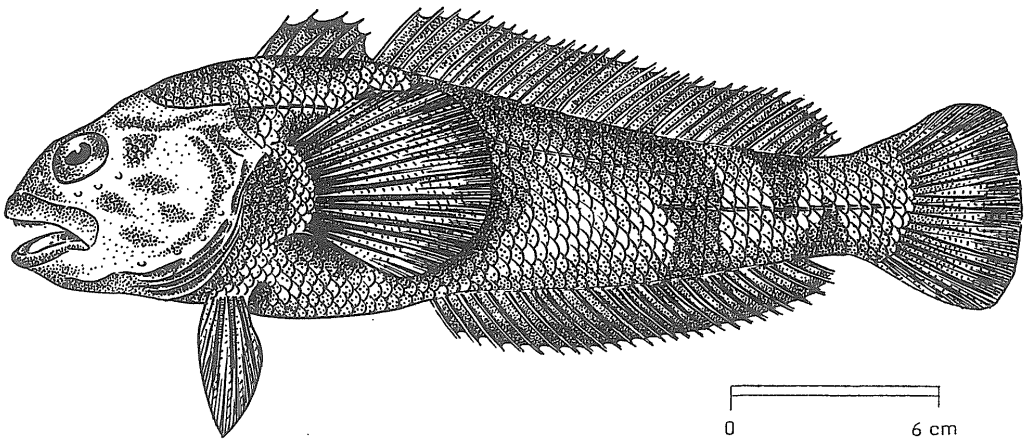
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Notothenia) coriiceps Richardson, 1844

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia coriiceps coriiceps Richardson, 1844



VERNACULAR NAMES :

FAO/CCAMLR : En - Black rockcod
Fr - Notothenia noir, Bocasse noire
Ru - Subantarkticheskaya golobaya nototenia
Sp - Trama negra

NATIONAL :

DISTINCTIVE CHARACTERS :

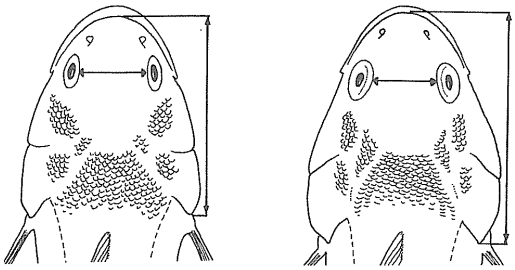
Body robust and rather broad in larger specimens, its depth 20 to 25% of standard length. Head large and broad, slightly depressed; length of head a little less than 3 times in standard length; cephalic sensory canals normal in pattern; 9 pores in the infraorbital canal; temporal canal with 4 pores, but preoperculomandibular canal with only 8 or 9 pores; eye 5 or 6 times in head length much larger in small specimens; interorbital width 22 to 25% of head length; 11 to 13 small spiny gillrakers on lower part of anterior arch; mouth rather large; gape of mouth nearly horizontal; maxilla extending posteriorly to below middle or posterior half of eye; jaws about equal anteriorly; teeth in both jaws in two bands, those of the outer band uniserial and enlarged. Two dorsal fins, the first with 4 or 5 flexible spines, the second with 35 to 38 soft rays; 27 to 29 anal fin rays; pectoral fins large, fan-like, with 16 or 17 rays, much longer than the pelvics; caudal fin slightly rounded in large specimens, lobed in juveniles. Two lateral lines, the upper ending a little anterior to posterior end of base of second dorsal fin; about 34 to 49 tubular scales in upper lateral line and 6 to 17 in the lower; the body nearly fully covered with large and mostly cycloid (smooth) scales; upper surface of head scaleless; very upper part of opercles and area behind eyes with small scales. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen bordered by scapula and coracoid.

Colour: coloration pattern very variable; uniformly blackish-brown above; ventral parts lighter; belly and branchiostegal region usually mustard-yellow in colour; irregular blackish markings present across back and on sides of body; juveniles silvery or light brown.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia (N.) neglecta: 17 to 19 pectoral fin rays (16 or 17 in N. (N.) coriiceps); interorbital width 26 to 33% of head length (22 to 25% in N. (N.) coriiceps); 37 to 41 rays in the second dorsal fin (35 to 38 in N. (N.) coriiceps).

N. (N.) rossii: 21 to 24 pectoral fin rays; interorbital width 29 to 31.5% of head length; 10 preoperculomandibular pores (8 or 9 in N. (N.) coriiceps).



N. (N.) rossii — *N. (N.) coriiceps*

top of head

SIZE :

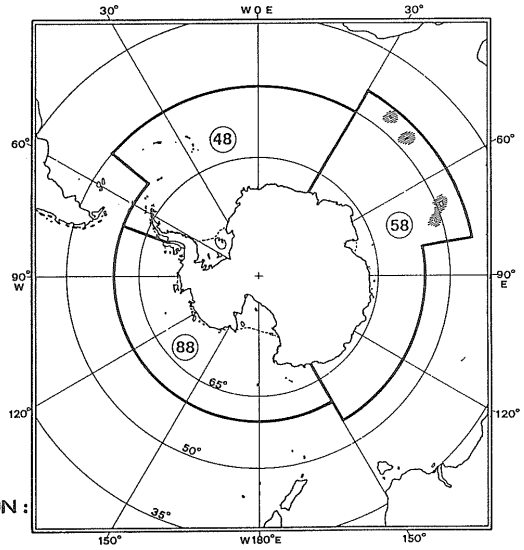
Maximum: 50 cm; common to 30 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported from all shelves of the sub-Antarctic islands of the Indian sector of the Southern Ocean (Kerguelen, Heard, Crozet, Marion-Prince Edward Islands).

Generally found in shallow waters near shore.

Feeds on bottom invertebrates.



PRESENT FISHING GROUNDS :

Not commercially exploited at present but of potential importance.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species, but isolated specimens may be included in the Notothenia rossii catches.

Caught only with bottom trawls, or by hook-and-line close to the scientific stations.

NOT Not 4

1985

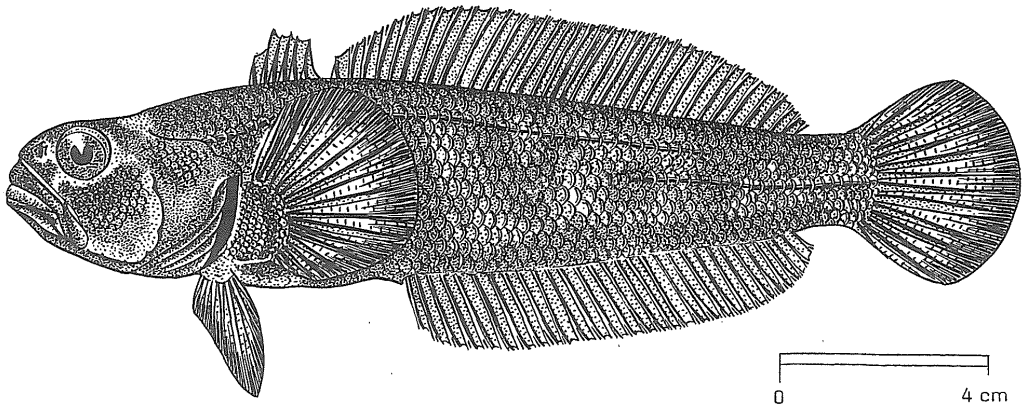
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Gobionotothen) cyanobrancha Richardson, 1844

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia purpuriceps Richardson, 1844



VERNACULAR NAMES :

FAO/CCAMLR : En - Blue rockcod
Fr - Bocasse bleue
Ru - Sunegorlaya nototenia
Sp - Trama azul

NATIONAL :

DISTINCTIVE CHARACTERS :

Body elongate, compressed, its depth 18 to 19.5% of standard length. Head a little compressed; interorbital space, smooth and thrown into irregularly arranged folds; length of head 3 or a little more than 3 times in standard length; cephalic sensory canals normal, the rim of each pore being raised slightly; 7 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 10 pores; eye 4.6 to 4.8 times in head length; moderate-sized interorbital width, 17 to 18% of head length; 10 to 13 pointed and elongate gillrakers on lower part of anterior arch; mouth large, maxilla extending posteriorly to below posterior 1/4 of eye; jaws equal anteriorly; teeth in upper jaw in two uniserial rows; teeth in lower jaw rather large, spaced and canine-like, arranged in a single uniserial row. Two dorsal fins, the first with 4 to 6 flexible spines, the second with 33 to 36 soft rays; 30 to 34 anal fin rays; pectoral fins large, fan-like, with 20 or 21 rays, much longer than the pelvics; caudal fin well rounded. Two lateral lines, the upper ending posteriorly below beginning of last third of second dorsal fin; 31 to 39 tubular scales in upper lateral line and 4 to 15 in the lower; the body entirely covered with large and cycloid (smooth) scales; ctenoid scales only in area covered by pectoral fins; upper surface of head and preorbital area scaleless; upper quarter of opercles and cheeks with small cycloid scales. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates, themselves fused to the ural vertebral centrum. Pectoral foramen bordered by scapula and coracoid.

Colour: body uniformly dark brown, a little lighter ventrally; margin of opercular membrane dark-blue; all fins are dark, the lightest being the pelvics.

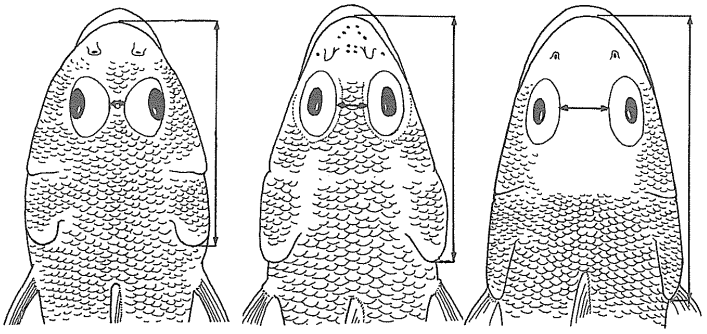
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia (G.) acuta: snout narrow, head triangular; lower lateral line with 15 to 18 tubular scales (4 to 15 in N. (G.) cyanobrancha); second dorsal fin with 28 to 30 rays (33 to 36 in N. (G.) cyanobrancha).

N. (G.) angustifrons: interorbital width narrow, about 5.3% of head length (17 to 18% in N. (G.) cyanobrancha); 15 to 26 tubular scales in lower lateral line.

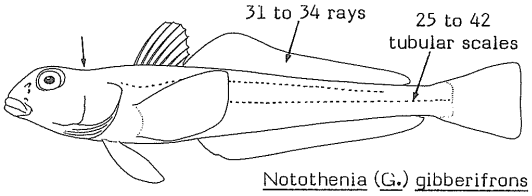
N. (G.) gibberifrons: head strongly depressed behind eyes; general coloration bright, yellow to green; lower lateral line with 25 to 42 tubular scales; second dorsal fin with 31 to 34 rays.

N. (G.) marionensis: interorbital width about 10% of head length; lower lateral line with 15 to 17 tubular scales.



N. (G.) angustifrons — N. (G.) marionensis — *N. (G.) cyanobrancha*

top of head



Notothenia (G.) gibberifrons

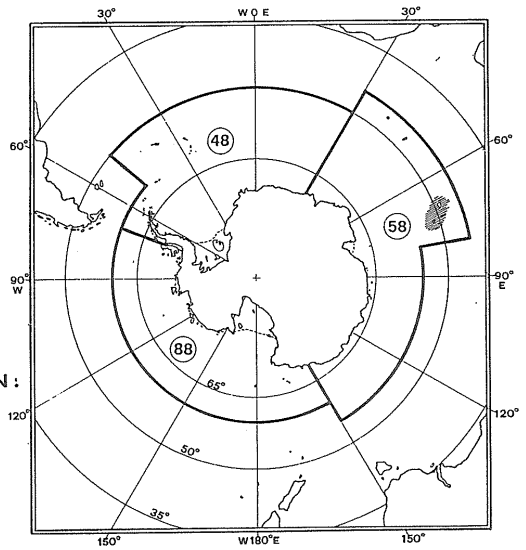
SIZE :

Maximum: 30 cm; common to 20 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Species known only from the Kerguelen and Heard Islands in very shallow waters from the shore and intertidal pools, under small rocks, down to about 20 m depth.

Feeds on benthic invertebrates (amphipods, molluscs of the Patinigera group).



PRESENT FISHING GROUNDS :

Only in the bays of Kerguelen and Heard Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Not yet commercially exploited.

Caught only with gillnets and hook-and-line.

Not yet marketed.

NOT Not 5

1985

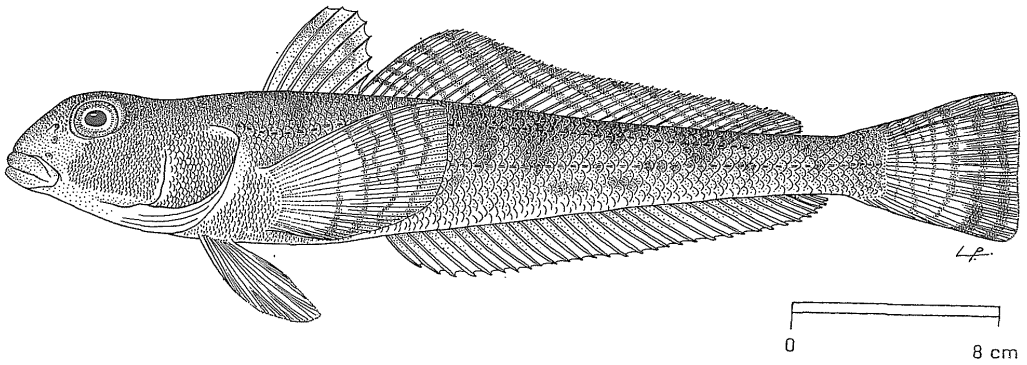
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Notothenia (Gobionotothen) gibberifrons Lönnberg, 1905

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Humped rockcod
Fr - Bocasse bossue
Ru - Zilenaya nototenia; Antarktichesky bychok
Sp - Trama jorobada

NATIONAL :

DISTINCTIVE CHARACTERS :

Body relatively elongate and slender, its depth about 15% of standard length; dorsal profile much more convex than ventral which is nearly horizontal; compressed posteriorly, becoming depressed in region of bases of pectoral fins; the body behind the head rises abruptly toward the origin of the first dorsal fin; profile of snout very steep; length of head 3.2 to 3.8 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 7 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 9 or 10 pores; eye 3 (young) to 4.6 times in head length; interorbital width narrow, 6 to 7% of head length; 8 to 11 gillrakers on lower part of anterior arch; mouth small and narrow nearly horizontal, maxilla extending posteriorly to below anterior margin of eye; teeth in both jaws conical in a single band. Two dorsal fins, the first with 6 to 8 flexible spines, the second with 31 to 34 soft rays; 31 to 34 anal fin rays; pectoral fins large, fan-like, with 20 to 22 rays, much longer than the pelvics; caudal fin truncate. Two lateral lines, the upper ending posteriorly below bases of second or third last rays of second dorsal fin; 34 to 51 tubular scales in upper lateral line and 30 to 42 in the lower, which is much longer than in most nototheniids; the body entirely covered with large and ctenoid scales; upper surface of head and greater part of snout scaled, but preorbital area scaleless; lower parts of opercle scaled. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates, which are themselves fused to the ural vertebral centrum. Pectoral foramen bordered by scapula and coracoid.

Colour: ground colour yellow, fins greenish with brown spots; upper part of head and body irregularly spotted and blotched; dorsal, caudal and pectoral fins with series of dark spots forming bars; anal fin pale.

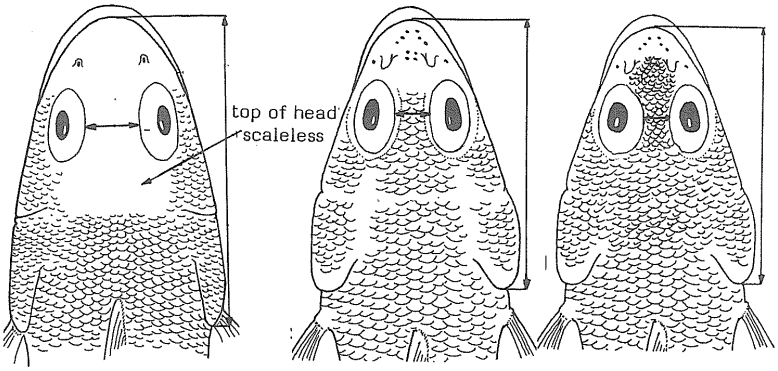
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

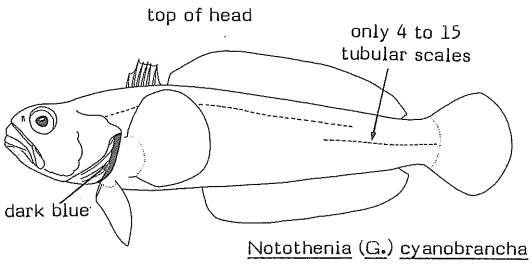
Notothenia (G.) angustifrons: lower part of opercle scaleless; upper lateral line with 26 to 34 tubular scales (34 to 51 in N. (G.) gibberifrons).

N. (G.) acuta: snout narrow, head triangular; lower lateral line with 15 to 18 tubular scales (30 to 42 in N. (G.) gibberifrons); second dorsal fin with 28 to 30 rays (31 to 34 in N. (G.) gibberifrons).

N. (G.) cyanobrancha: posterior membrane of the opercle dark-blue; interorbital width 11.6 to 20.5% of head length (6 to 7% in N. (G.) gibberifrons); lower lateral line with 4 to 15 tubular scales. Top of head scaleless.

N. (G.) marionensis: interorbital width about 10% of head length; lower lateral line with 15 to 17 tubular scales.





SIZE :

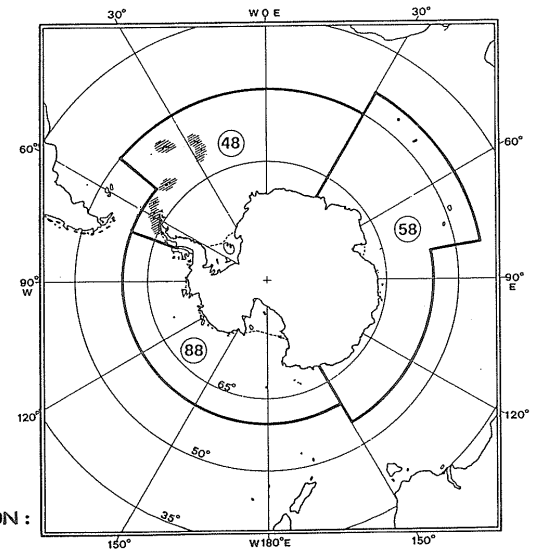
Maximum: 55 cm; common to 40 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported from shelves of all islands of the Scotia Arc: South Georgia, South Sandwich, South Orkney, South Shetland Islands, and the northern part of the Antarctic Peninsula.

Found from 5 to 750 m depth, N. (G.) gibberifrons spawns in August/September. Pelagic fingerlings inhabit the 100 m waters over the bottom. After settling on the bottom, both juveniles and adults are observed on the same grounds.

Feeds mostly on benthic organisms (polychaetes, amphipods and isopods) and to a less extent on krill and other euphausiids or on algae.



PRESENT FISHING GROUNDS :

Mainly around South Georgia, South Orkneys and the South Shetland Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Reported catches are variable from one year to another and range between about 3,000 and 15,000 t annually.

Caught only in bottom trawls.

Marketed as frozen fish; flesh is good. The low reported catch during the season 1982/83 means that this species needs particular conservation measures.

NOT Not 6

1985

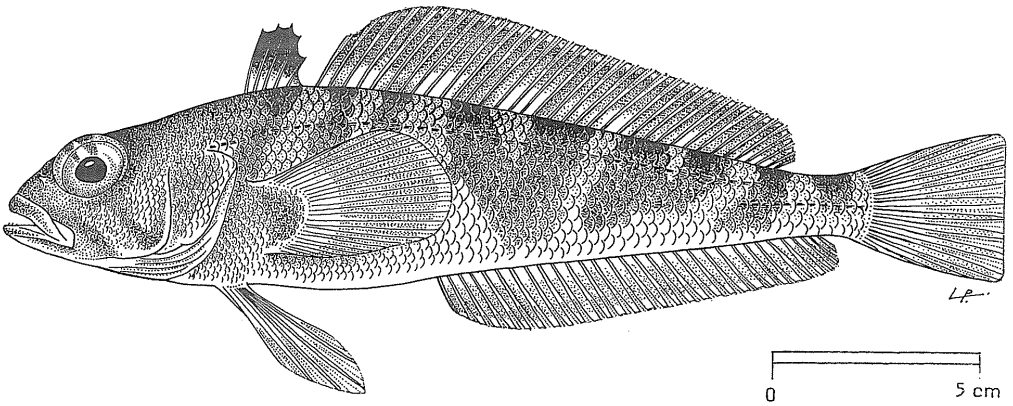
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Lepidonotothen) kempi Norman, 1937

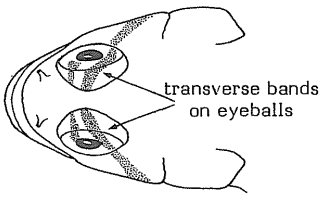
OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Striped-eyed rockcod
Fr - Bocasse aux yeux rayés
Ru - Cheshueglazku kempa
Sp - Trama ojirayada

NATIONAL :



top of head

DISTINCTIVE CHARACTERS :

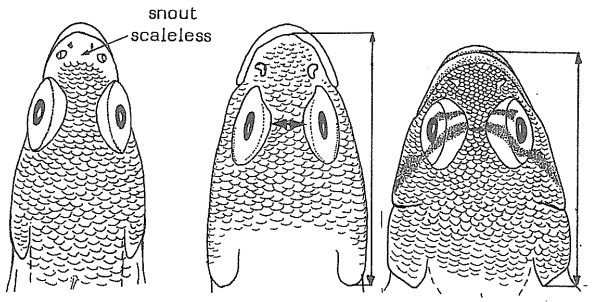
Body compressed, its depth about 16 to 20% of standard length. Head a little depressed, its dorsal profile more convex than ventral; length of head 3 or 4 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 7 pores in the infraorbital canal; temporal canal with 4 pores; preoperculo-mandibular canal with 10 pores; eye large and bulbous 2.7 to 3 times in head length; interorbital width very narrow, 4.6 to 7.5% of head length; 12 to 17 gillrakers on lower part of anterior arch; mouth slightly oblique, maxilla extending posteriorly to below anterior 1/4 to 1/3 of eye; lower jaw slightly protruding; teeth all conical in both jaws in 2 bands, those of the outer band uniserial, slightly enlarged; inner band composed of smaller, variably-sized teeth. Two dorsal fins, the first with 5 or 6 flexible spines, the second with 34 to 38 soft rays; 30 to 35 anal fin rays; pectoral fins large, fan-like, with 23 to 26 rays, about the same length as the pelvics; caudal fin truncate or slightly emarginate. Two lateral lines, the upper extending posteriorly almost to end of the second dorsal fin; 38 to 48 tubular scales in upper lateral line and 7 to 19 in the lower; the body entirely covered with large and ctenoid scales; head entirely scaled; scales present on upper parts of eyes, on proximal part of lower jaw and over the interopercular area. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen bordered by scapula and coracoid.

Colour: light grey; broad dark transverse bands on back and sides of body; head and snout dark grey; two dark oblique stripes on cheeks; dark grey transverse band on upper part of eyeball; proximal 2/3 of first dorsal fin very dark.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia (Lepidonotothen) macrophthalma: 33 to 35 dorsal fin rays, 28 to 31 anal fin rays (34 to 38 and 30 to 35, respectively, in N. (L.) kempi); snout scaleless.

N. (L.) squamifrons: interorbital width 7.6 to 11.5% of head length (4.6 to 7.5% in N. (L.) kempi).



N. (L.) macrophthalma N. (L.) squamifrons *N. (L.) kempi*

top of head

SIZE :

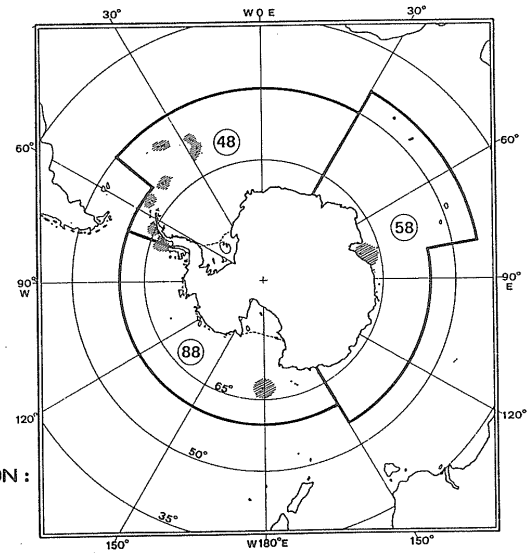
Maximum: 40 cm; common to 25 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported from shelves of the Scotia Arc. South Georgia, South Sandwich, South Orkney, South Shetland Islands, and the northern part of the Antarctic Peninsula. Also known from the east Antarctica shelf (Prydz Bay) and Scott Island.

Found from 160 to 900 m depth.

Feeds on krill, other euphausiids, bottom invertebrates (cephalopods, amphipods) and algae.



PRESENT FISHING GROUNDS :

Caught throughout its range, but no specific fishery.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught as bycatch in bottom trawls.

Not yet marketed.

NOT Not 7

1985

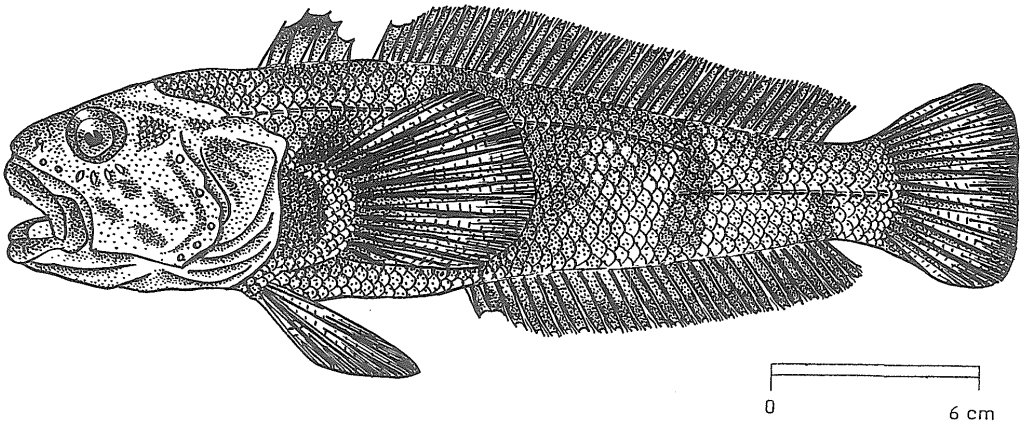
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Notothenia (Notothenia) neglecta Nybelin, 1951

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia coriiceps neglecta Nybelin, 1951



VERNACULAR NAMES :

FAO/CCAMLR : En - Yellowbelly rockcod
Fr - Bocasse jaune
Ru - Antarkticheskaya golobaya nototenia
Sp - Trama amarilla

NATIONAL :

DISTINCTIVE CHARACTERS :

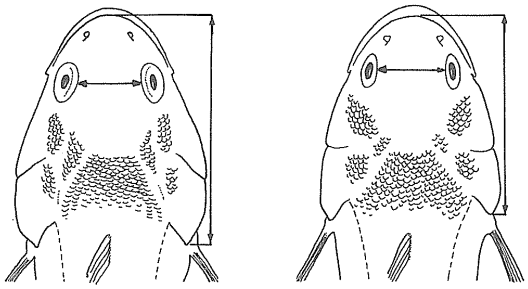
Body rather broad in large specimens, compressed in juveniles, its depth 20 to 25% of standard length. Head large and slightly depressed, length of head about 4 times in standard length; cephalic sensory canals normal in pattern; 9 pores in the infraorbital canal; temporal canal with 4 pores but preoperculomandibular canal with 8 or 9 pores; eye 5 or 6 times in head length; interorbital width 26 to 33% of head length; 11 to 13 small spiny gillrakers on lower part of anterior arch; mouth large, maxilla extending posteriorly to below middle or posterior half of eye; jaws about equal anteriorly; teeth in both jaws in two bands, those of the outer band uniserial and enlarged. Two dorsal fins, the first with 3 to 7 flexible spines, the second with 37 to 41 soft rays; 28 to 32 anal fin rays; pectoral fins large, fan-like, with 17 to 19 rays, much longer than the pelvics; caudal fin slightly rounded or subtruncate. Two lateral lines, the upper ending a little anterior to posterior end of second dorsal fin; about 34 to 49 tubular scales in upper lateral line and 6 to 77 in the lower; the body entirely covered with large and mostly cycloid (smooth) scales; upper surface of head scaleless; very upper part of opercles and area behind eyes, with small scales. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen bordered by scapula and coracoid.

Colour: adult specimens with a more or less deep brown colour, with numerous spots, light brown, black or greenish; abdomen light yellow, becoming greenish-yellow or green with age; dorsal and anal fins with some dark stripes; young fish are bright red with the abdomen golden-yellow; top of the head adorned with a big black spot; one black spot situated in front of the first dorsal; opercle with four elongated black spots.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Notothenia (N.) coriiceps: 16 or 17 pectoral fin rays (17 to 19 in N. (N.) neglecta); interorbital width 22 to 25% of head length (26 to 33% in N. (N.) neglecta); 35 to 38 rays in the second dorsal fin (37 to 41 in N. (N.) neglecta).

N. (N.) rossii: 21 to 24 pectoral fin rays; interorbital width 29 to 31.5% of head length.



N. (N.) coriiceps — *N. (N.) neglecta*

top of head

SIZE:

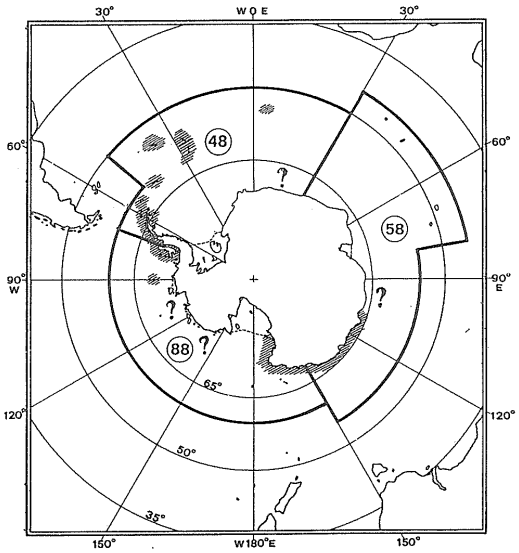
Maximum: 58 cm; common to 50 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Circum-Antarctic distribution, coasts of the Antarctic Continent, Antarctic Peninsula, South Georgia, South Sandwich, South Shetland, South Orkney, Bouvet and Peter I Islands. Presence questionable on the Pacific coast and on the Indian coasts of Antarctica.

A shallow water species to 35 m depth, exceptionally to 100 m; juveniles are known to be pelagic during a few months, down to 250 m depth.

Feeds on benthic invertebrates (amphipods, isopods, molluscs, polychaetes) and partly on euphausiids and cephalopods.



PRESENT FISHING GROUNDS:

Not commercially exploited at present but of potential importance for coastal fishing.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Separate statistics are not reported for this species.

Caught only with traps, gillnets and hook-and line.

NOT Not 8

1985

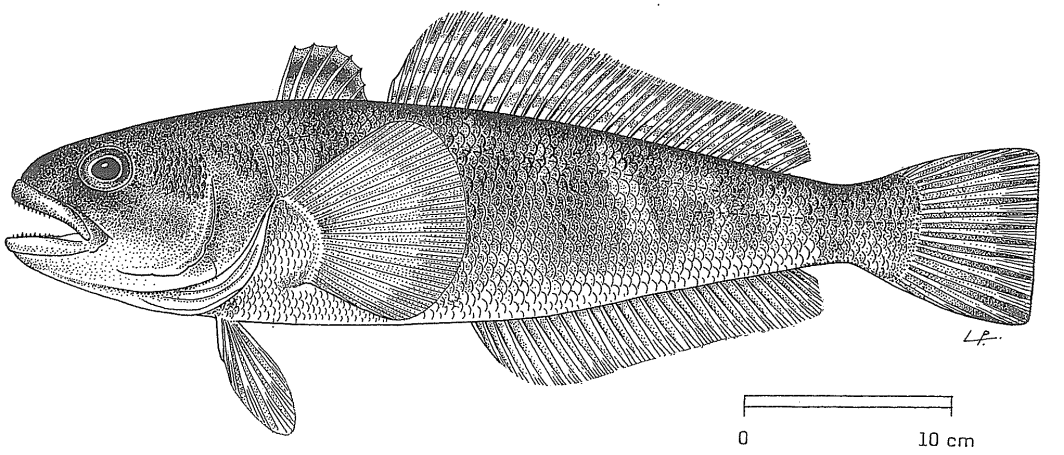
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Notothenia) rossii Richardson, 1844

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia rossii rossii Richardson, 1844
Notothenia rossii marmorata (Fischer, 1885)



VERNACULAR NAMES :

FAO/CCAMLR : En - Marbled rockcod
Fr - Bocasse marbrée, Colin de Kerguelen
Ru - Mramornaya nototenia
Sp - Trama jaspeada

NATIONAL :

DISTINCTIVE CHARACTERS :

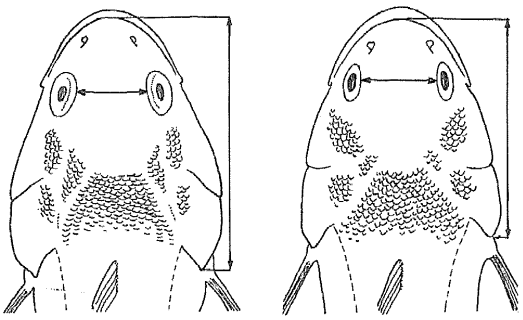
Body moderately compressed, its depth 21 to 26% of standard length. Head a little depressed, its dorsal profile flat or lightly curved; length of head a little more than 3 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 9 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 10 pores; eye 3.6 (young) to 6.5 times in head length; interorbital width 29 to 31.5% of head length; 13 or 14 small gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below middle or posterior part of eye; lower jaw slightly protruding; teeth in both jaws in two bands, those of the outer band uniserial, canine-like; inner bands composed of smaller, variably-sized teeth. Two dorsal fins, the first with 4 to 7 flexible spines, the second with 32 to 36 soft rays; 26 to 30 anal fin rays; pectoral fins large, fan-like, with 21 to 24 rays, much longer than the pelvics; caudal fin truncate in large specimens or lobed in young. Two lateral lines, the upper ending anterior to posterior end of second dorsal fin; 40 to 46 tubular scales in upper lateral line and 10 to 23 in the lower; body entirely covered with large and cycloid (smooth) scales; upper surface of head scaleless; upper half of opercles and cheeks behind eyes, with small scales. The hypurals bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen bordered by scapula and coracoid.

Colour: light brown, darker dorsally, with more or less distinct marbling black spots; the coloration pattern is very variable, the juveniles being yellow-brown or yellow-orange; the adults are darker but the dominant yellow colour remains; spinous dorsal fin with medial dusky marks at posterior edges of each membrane section.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Notothenia (N.) coriiceps: 16 or 17 pectoral fin rays (21 to 24 in N. (N.) rossii); interorbital width 22 to 25% of head length (29 to 31.5% in N. (N.) rossii); 8 or 9 preoperculomandibular pores (10 in N. (N.) rossii).

Notothenia (N.) neglecta: 17 to 19 pectoral fin rays; interorbital width 26 to 33% of head length.



N. (N.) coriiceps — *N. (N.) rossii*

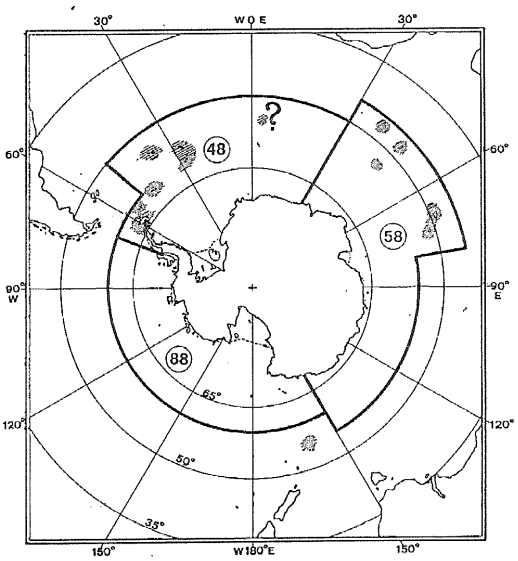
top of head

SIZE:

Maximum: 90 cm; common to 50 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Reported from shelves of the sub-Antarctic islands: Kerguelen, Heard, Crozet, Marion-Prince Edward, Macquarie (N. rossii rossii), South Georgia, South Sandwich, South Orkney, South Shetland Islands, and the northern part of the Antarctic Peninsula (N. rossii marmorata). Presence questionable at Bouvet Island. Also reported from some seamounts (Ob and Lena seamounts, Skiff bank).



Found from the shore to 500 m depth, N. rossii spawns on the continental shelf from April to June. Pelagic fingerlings inhabit the surface waters and after six months migrate inshore and become demersal. Offshore migration starts from age 5 when the fish reach sexual maturity.

Feeds on fishes (mainly Champsocephalus gunnari), krill and other euphausiids, hyperiids and ctenophores.

PRESENT FISHING GROUNDS:

Mainly around the Kerguelen Islands, South Georgia and the South Shetland Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

After extensive catches (up to 400 000 t in the early seventies) less than 3 000 t are now reported annually from the area.

Caught only with bottom trawls.

Marketed as frozen fish; flesh is good but a thick layer of fat occurs between the skin and the flesh. Often caught for its eggs, this species needs particular conservation measures.

NOT Not 9

1985

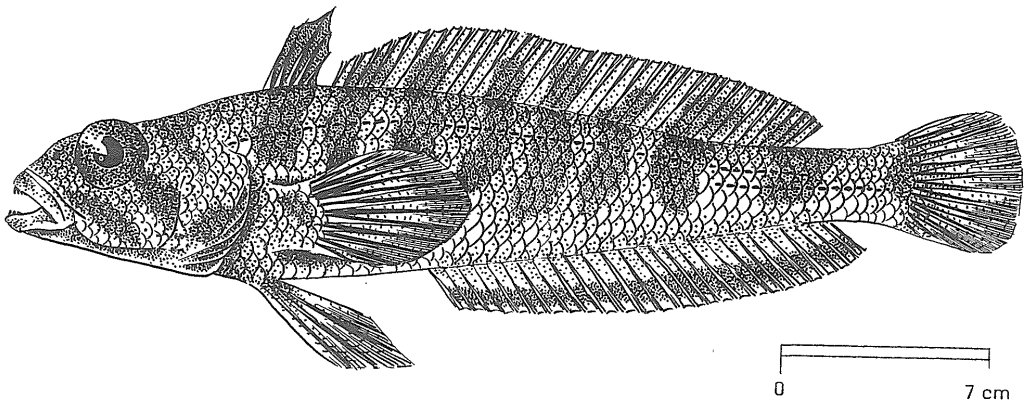
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia (Lepidonotothen) squamifrons Günther, 1880

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia squamifrons squamifrons
Notothenia squamifrons atlantica Permitin & Sàzonov, 1974
Notothenia brevipectoralis Hureau, 1966



VERNACULAR NAMES :

FAO/CCAMLR : En - Grey rockcod
Fr - Bocasse grise, Colin austral
Ru - Squama, Seraya nototenia
Sp - Trama gris

NATIONAL :

DISTINCTIVE CHARACTERS :

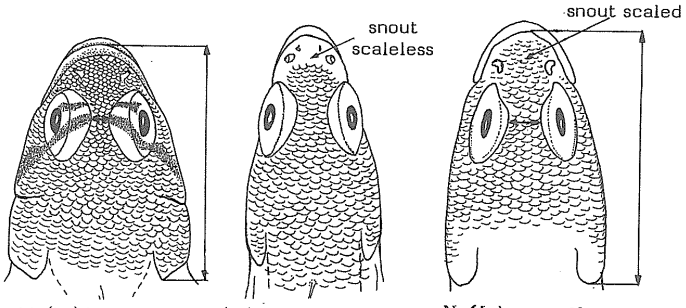
Body rather compressed, its depth about 22% of standard length. Head depressed, its length about 3.6 times in standard length; cephalic sensory canals normal in pattern; 7 pores in the infraorbital canal; temporal canal with 4 pores; eye 3 to 3.5 times in head length; interorbital width 7.6 to 11.5% of head length; 12 to 16 gillrakers on lower part of anterior arch; mouth large, maxilla extending posteriorly to below anterior 1/4 of eye; jaws equal anteriorly; teeth in both jaws in 2 or 3 rows. Two dorsal fins, the first with 4 to 6 flexible spines, the second with 36 or 37 soft rays; 31 to 33 anal fin rays; pectoral fins large, fan-like, with 23 to 26 rays, much longer than the pelvics; caudal fin slightly rounded. Two lateral lines, the upper ending below the end of the second dorsal fin; 37 to 46 tubular scales in upper lateral line and 9 to 29 in the lower; the body entirely covered with feebly ctenoid or cycloid scales; top of head, interorbital space, snout, cheeks and opercles covered with ctenoid scales. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen bordered by scapula and coracoid.

Colour: greyish to greyish-green; dark grey transverse bands on body; two oblique dark bands on cheeks; dorsal and anal fins dark, distal end of rays white.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia (Lepidonotothen) kempi: interorbital width narrow, 4.6 to 7.5% of head length (7.6 to 11.5% in N. (L.) squamifrons).

N. (L.) macrophthalma: 33 to 35 dorsal fin rays, 28 to 31 anal fin rays (36 or 37 and 31 to 33, respectively, in N. (L.) squamifrons); snout scaleless.



N. (L.) kempi — N. (L.) macrophthalma — *N. (L.) squamifrons*

top of head

SIZE :

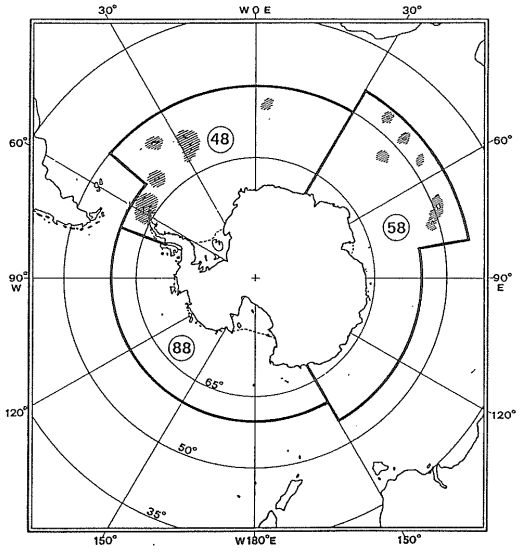
Maximum: 55 cm; common to 35 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Common and abundant species over the shelves of the sub-Antarctic islands of the Indian sector of the Southern Ocean (Kerguelen, Heard, Crozet, Marion-Prince Edward Islands) and over the seamounts Skiff, Kara-Dag, Ob and Lena (Notothenia squamifrons squamifrons). Known around South Georgia and the islands of the Scotia Arc under the name Notothenia squamifrons atlantica.

Found between 10 and 570 m depth, Notothenia (L.) squamifrons spawns between 270 and 380 m depth.

Feeds at night on pelagic organisms (pelagic amphipods, salps, euphausiids) and also partly on benthic invertebrates and young fish.



PRESENT FISHING GROUNDS :

Mainly around the Kerguelen Islands, South Georgia and the Ob and Lena seamounts.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

During the seventies, 20 000 to 30 000 t were reported annually from the Fishing Area 58. Since 1980, less than 2,000 t are reported annually.

Caught only with bottom trawls.

Marketed as frozen fish and fishmeal, flesh of good quality.

NOT Noto 1

1985

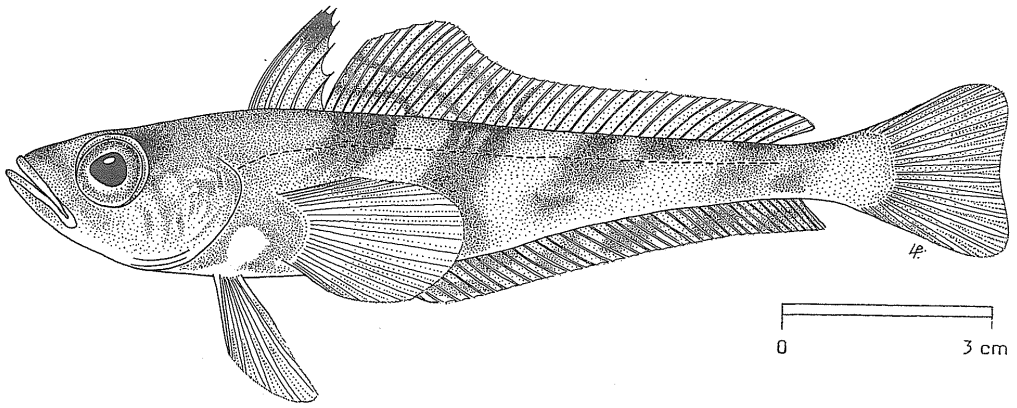
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notothenia larseni (Lönnberg, 1905)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Painted notie
Fr - Bocassette écrivain
Ru - Nototeniops larsena
Sp - Doradillo escribano

NATIONAL :

DISTINCTIVE CHARACTERS :

Body compressed, relatively slender, its depth 13 to 19% of standard length. Head rather small, its length 3.3 to 4 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 9 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 9 pores; eye 2.8 to 3.2 times in head length; interorbital width narrow 5.4 to 9% of head length; 16 to 18 slender and elongate gillrakers on lower part of anterior arch; mouth oblique, lips narrow, maxilla extending posteriorly to below anterior margin of eye; jaws equal anteriorly; teeth in both jaws, conical and small, in two bands, snout not steep, distinctly shorter than eye. Two dorsal fins, the first with 5 or 6 flexible spines, the second with 37 to 39 soft rays; 37 or 38 anal fin rays; pectoral fins large, fan-like, with 25 or 26 rays, as long as the pelvics; caudal fin emarginate. Two lateral lines, the upper ending below the end of second dorsal fin; 46 to 58 tubular scales in upper lateral line; lower lateral line with pored scales only; the body entirely covered with large and ctenoid (rough) scales; upper and lateral parts of head, including preorbital region scaled; lower jaw covered with scales. The hypural bones 1 and 2 of the caudal skeleton are fused; the hypural bones 3 and 4 are partially fused. Pectoral foramen bordered by scapula and coracoid.

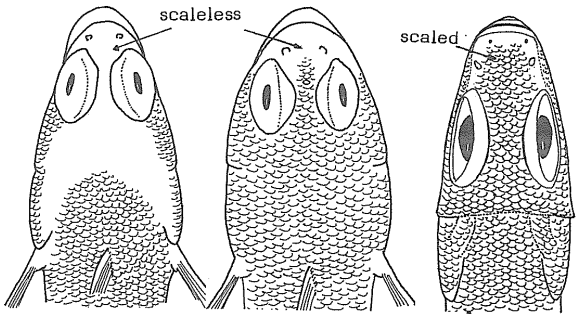
Colour: 4 dark transverse stripes on the sides of the body; a black occipital spot on the head; a silvery white coloration of the breast, extending upward to the middle of the depth of the bases of the pectoral fins is extremely typical of this species; second dorsal fin with a series of transverse dark stripes; first dorsal fin with a black spot on top; remaining fins light.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia nudifrons and N. mizops: preorbital region scaleless.

N. loesha: 34 to 36 anal fin rays (37 or 38 in N. larseni); 14 or 15 gillrakers on lower limb of first arch (16 to 18 in N. larseni); no silvery-white coloration of the breast and bases of pectoral fins.

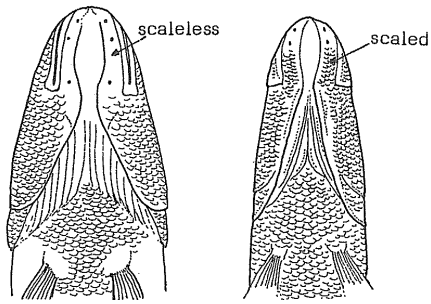
N. nybelini and N. tchizh: no scales on the lower jaw.



top of head

SIZE :

Maximum: 23 cm; common to 15 cm.



underside of head

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported only from the shelves of South Georgia and South Sandwich Islands and Bouvet Island. The other species of the "larseni" group of species have the following distribution:

Nototheniops nybelini: South Orkney, South Shetland Islands, north of Antarctic Peninsula and Peter I Island.

N. loesha: Balleny Islands.

N. tchizh: Crozet, Marion-Prince Edward Islands and Ob and Lena seamounts.

Found from 30 to 300 m depth, the fish spawn in winter.

Feeds on polychaetes worms, amphipods and krill.

PRESENT FISHING GROUNDS :

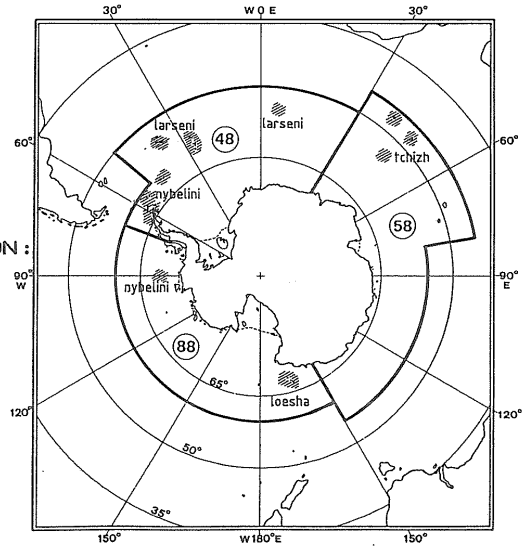
Not yet commercially fished.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught as bycatch with bottom trawls.

Not marketed, except perhaps as fishmeal.



Distribution of the "larseni" species group

NOT Noto 2

1985

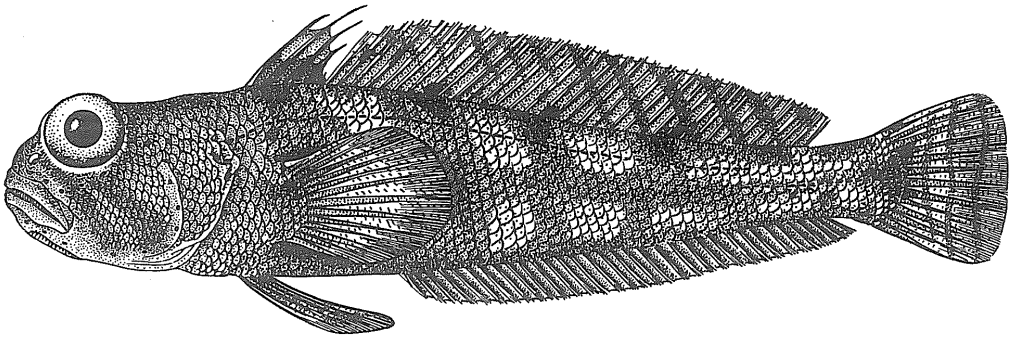
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Nototheniops mizops (Günther, 1880)

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia mizops Günther, 1880
Lindbergichthys mizops (Günther, 1880)



VERNACULAR NAMES :

FAO/CCAMLR : En - Toad notie
Fr - Bocassette crapaud
Ru - Kergelenskaya nototenia-zvezdochet
Sp - Ojo de sapo

NATIONAL :

DISTINCTIVE CHARACTERS :

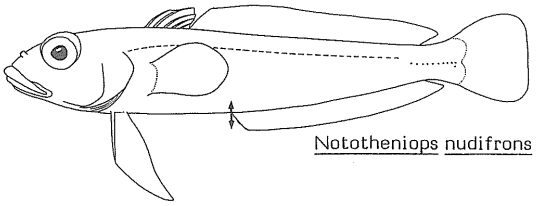
Body moderately deep, relatively compressed, its depth 19.7 to 21.4% of standard length. Head rather small, its length 3.4 to 3.6 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 9 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 9 pores; eye 3 to 3.5 times in head length; interorbital width narrow, 6 to 7.5% of head length; 9 to 13 slender and elongate gillrakers on lower part of anterior arch; mouth oblique, small, lips narrow, maxilla extending posteriorly to below anterior one-third of eye; jaws equal anteriorly; teeth in both jaws conical, outermost enlarged; snout short and steep. Two dorsal fins, the first with 4 or 5 flexible spines, the second with 34 to 37 soft rays; 33 to 35 anal fin rays; origin of anal fin under base of 5th to 8th ray of second dorsal fin; pectoral fins large, fan-like, with 21 or 22 rays, much shorter than the pelvics; caudal fin rounded. Two lateral lines, the upper ending under last quarter of second dorsal fin; 26 to 39 tubular scales in upper lateral line; lower lateral line with pored scales only; the body entirely covered with large and ctenoid (rough) scales; scales present on top of head behind eyes; opercles and cheeks with small cycloid scales; remainder of head scaleless. The hypural bones 1 and 2 of the caudal skeleton are fused; the hypural bones 3 and 4 are partially fused. Pectoral foramen bordered by scapula and coracoid.

Colour: body yellow with 5 dark brown bars across back; below midline, a series of 5 dark brown blotches somewhat non-aligned with crossbars; a median dark brown blotch at base of caudal fin; two dark lines on cheeks; a median dark blotch present on first dorsal fin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia nudifrons: upper surface of head scaleless; anal fin origin under base of 7th to 10th ray of second dorsal fin (under 5th to 8th in N. mizops).

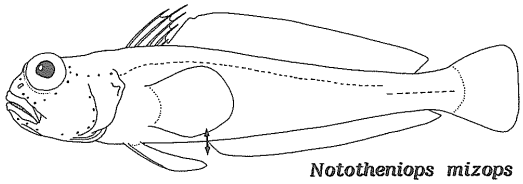
N. larseni, N. loesha, N. nybelini and N. tchizh: preorbital region scaled.



Nototheniops nudifrons

SIZE :

Maximum: 15 cm; common to 10 cm.



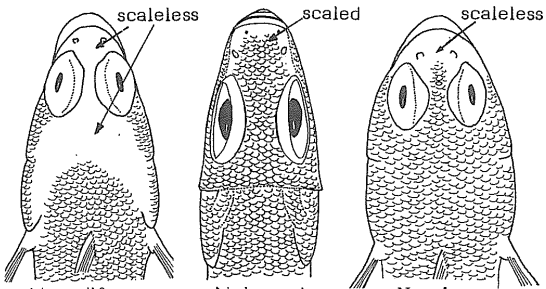
Nototheniops mizops

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported only from Kerguelen and Heard Islands.

Found between 20 to 220 m depth, Nototheniops mizops is a common species in its distribution area.

Feeds on small benthic invertebrates.



N. nudifrons | N. larseni | *N. mizops*

top of head

PRESENT FISHING GROUNDS :

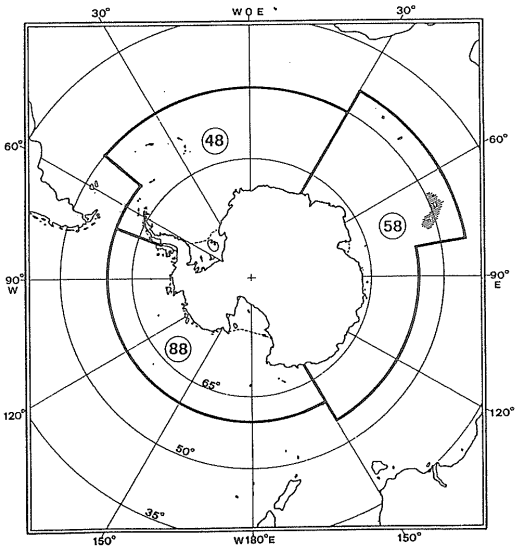
Mainly around the Kerguelen Islands.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught as bycatch with bottom trawls, together with the catches of Notothenia (Lepidonotothen) squamifrons.

Not marketed, except perhaps as fishmeal.



NOT Noto 3

1985

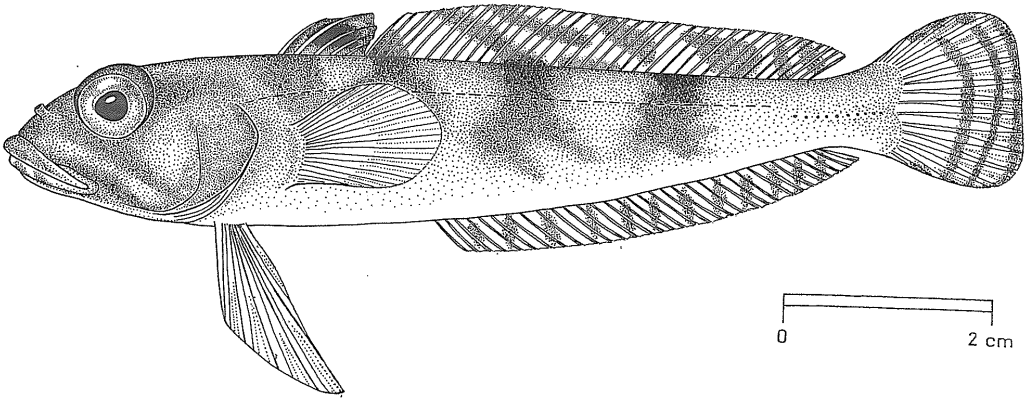
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Nototheniops nudifrons (Lönnberg, 1905)

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia nudifrons Lönnberg, 1905
Lindbergichthys nudifrons (Lönnberg, 1905)



VERNACULAR NAMES :

FAO/CCAMLR : En - Yellowfin notie
Fr - Bocassette dégarnie
Ru - Lysaya nototenia, zvezdochet
Sp - Doradillo pobre

NATIONAL :

DISTINCTIVE CHARACTERS :

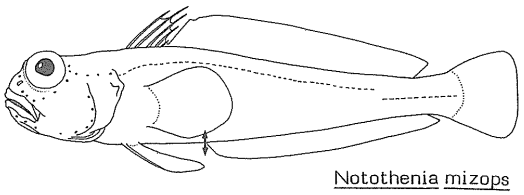
Body compressed, its depth 19 to 22.6% of standard length. Head length shorter than average for nototheniids, 3.4 to 3.6 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 9 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 9 pores; eye 3 or 4 times in head length; interorbital width narrow, 5.5 to 7% of head length; 10 to 13 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below anterior quarter or third of eye; jaws equal anteriorly; teeth all conical in both jaws in two bands, those of the outer band larger. Two dorsal fins, the first with 4 to 6 flexible spines, the second with 36 to 40 soft rays; 33 to 36 anal fin rays; origin of anal fin under base of 7th to 10th ray of second dorsal fin; pectoral fins large, fan-like, with 21 to 23 rays, shorter than the pelvics; caudal fin rounded or subtruncate. Two lateral lines, the upper ending below posterior part of second dorsal fin; 32 to 42 tubular scales in upper lateral line; lower lateral line with a series of pored scales; the body entirely covered with large and ctenoid (rough) scales; upper surface of head and preorbital region scaleless; opercles and cheeks anteriorly to preorbital zone, with small cycloid scales. The hypural bones 1 and 2 of the caudal skeleton are fused; the hypural bones 3 and 4 are partially fused. Pectoral foramen bordered by scapula and coracoid.

Colour: body yellowish or whitish ground colour above and on sides, silvery-white below; sides with 2 or 3 series of large, partly confluent, irregular blackish spots; cheeks with two oblique dark stripes; a round black spot on spinous dorsal fin; soft dorsal, caudal and anal fins with small dark spots; pectoral and pelvic fins pale.

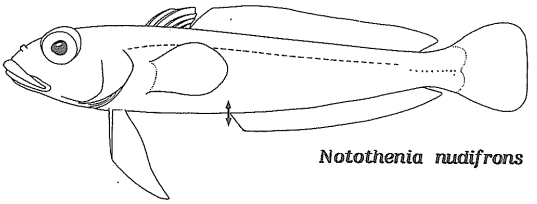
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notothenia mizops: scales present on top of the head behind eyes; origin of anal fin under base of 5th to 8th ray of second dorsal fin (under 7th to 10th ray in N. nudifrons).

N. larseni, N. loesha, N. nybelini and N. tchizh: preorbital region scaled.



Notothenia mizops



Notothenia nudifrons

SIZE :

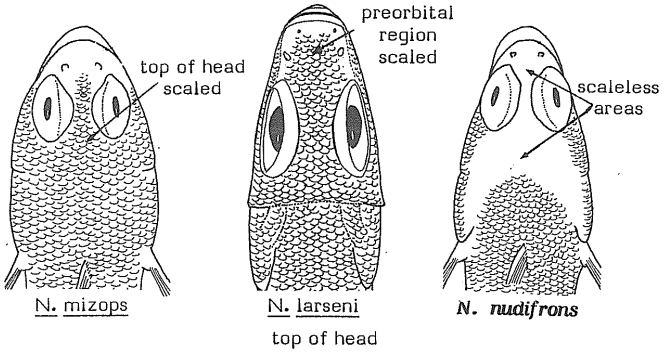
Maximum: 15 cm; common to 10 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported from the shelves of the islands of the Scotia Arc (South Georgia, South Sandwich, South Orkney, South Shetland Islands) and from the Antarctic Peninsula.

Found from the shore to 220 m depth, Notothenios nudifrons is a very common species.

Feeds on small benthic invertebrates.



PRESENT FISHING GROUNDS :

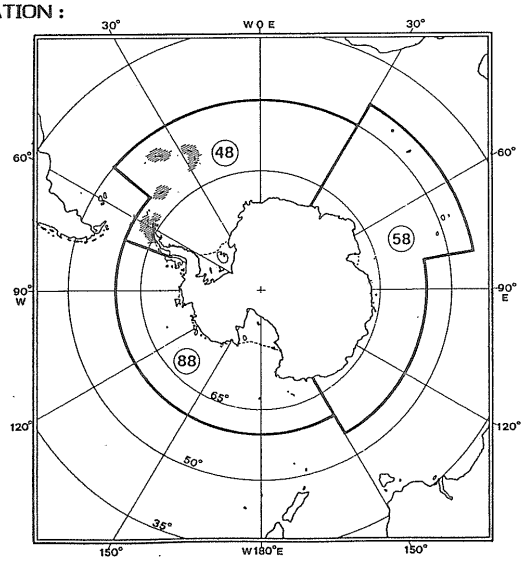
Not yet commercially fished.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Caught only as bycatch with bottom trawls.

Not marketed, except perhaps as fishmeal.



NOT Pag 1

1985

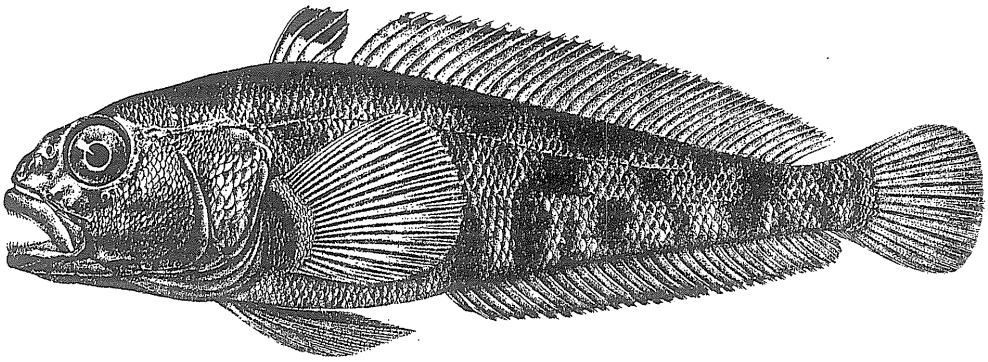
FAO SPECIES IDENTIFICATION SHEETS

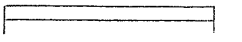
FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pagothenia bernacchii (Boulenger, 1902)

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia (Trematomus) bernacchii (Boulenger, 1902)
Trematomus bernacchii Boulenger, 1902





VERNACULAR NAMES :

FAO/CCAMLR : En - Emerald rockcod
Fr - Bocasson émeraude
Ru - Trematom-pestryak
Sp - Austrobacalao esmeralda

NATIONAL :

DISTINCTIVE CHARACTERS :

Body moderately compressed, its depth 22 to 33% of standard length. Head a little depressed, snout rather shorter than eye; length of head 3.2 to 4 times in standard length; cephalic sensory canals deeply modified; supratemporal canal divided into 3 sections with 1+3+1 pores; infraorbital canal divided into 2 sections with 5+3 pores; temporal canal with 5 pores; supraorbital commissure with one pore; preoperculomandibular canal divided into 2 sections with 4+7 pores; eye 3 to 4.5 times in head length; interorbital width 11 to 20% of head length; 13 to 15 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below middle or anterior part of eye; lower jaw slightly protruding; teeth in both jaws villiform; numerous pitlines well visible on top of head, cheeks, mandibula and snout. Two dorsal fins, the first with 4 to 6 flexible spines, the second with 34 to 39 soft rays; 31 to 35 anal fin rays; pectoral fins large, fan-like, with 22 to 26 rays, as long as the pelvics; caudal fin rounded. Two lateral lines, the lower one usually without tubular scales; 30 to 42 scales in upper lateral line; the body entirely covered with large and ctenoid scales; occiput, cheeks and opercles scaled; interorbital space scaleless or with a median series of scales; snout, lower jaw and preorbital area scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely included in the scapula bone but separated from coracoid by a very narrow bridge of bone.

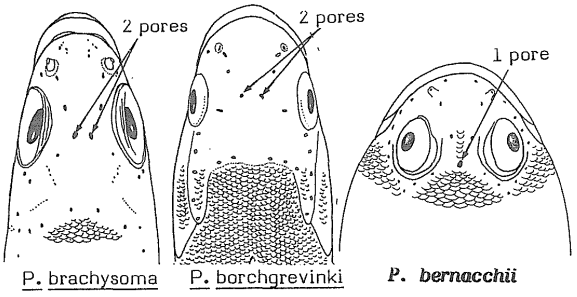
Colour: light brown or pink-brown, darker dorsally; sides of the body with bands or large spots, black or dark brown; dorsal and anal fins uniformly light-brown; pectoral fins, dark, with numerous small light spots; 3 green spots on upper part of pectoral fin base.

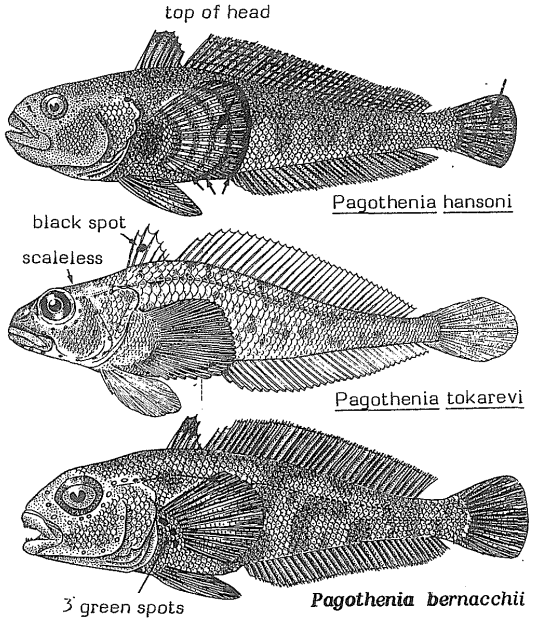
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Pagothenia brachysoma and P. borchgrevinki: supraorbital commissure with 2 pores (1 in P. bernacchii); 30 to 34 caudal vertebrae (33 to 36 in P. bernacchii).

P. hansoni: general colour greenish; dark transversal bands on caudal and pectoral fins; 27 to 33 pectoral fin rays (22 to 26 in P. bernacchii).

P. tokarevi: no green spots on upper part of pectoral fin base; upper surface of head scaleless; one black spot on middle of first dorsal fin; 29 or 30 pectoral fin rays (22 to 26 in P. bernacchii).





SIZE :

Maximum: 30 cm; common to 25 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

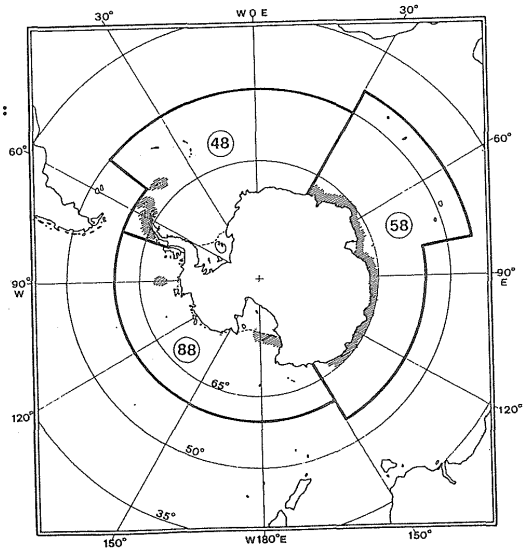
Circum-Antarctic species; Mac Robertson, Queen Mary and Adelie coasts; Davis and Ross Seas; South Shetland, South Orkney and Peter I Islands; Antarctic Peninsula.

Found from the shore to 400 m depth, P. bernacchii spawns in October and November, at the age of about 3 or 4 years. This species mostly lives among moraine rocks covered with algae.

Feeds on polychaetes, gasteropods, isopods, amphipods and few algae.

PRESENT FISHING GROUNDS :

Not commercially exploited.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are not reported for this species.

Can be caught with traps or gillnets.

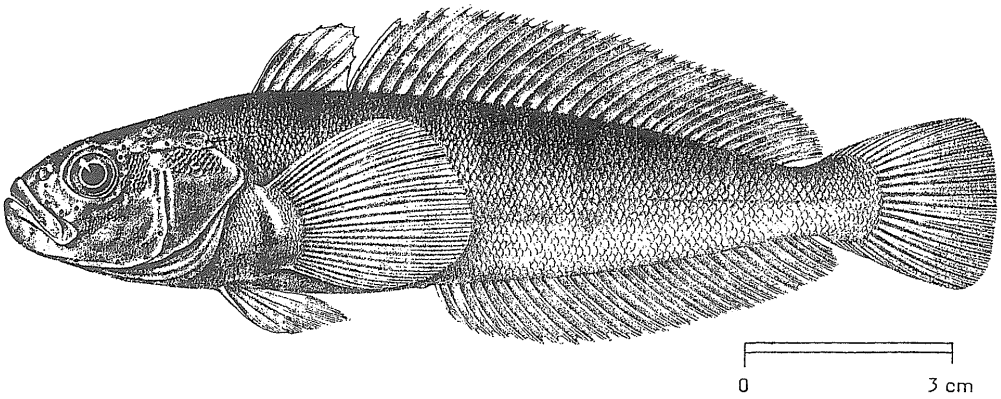
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pagothenia borchgrevinki (Boulenger, 1902)

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia hodgsoni (Boulenger, 1907)



VERNACULAR NAMES :

FAO/CCAMLR : En - Bald rockcod
Fr - Bocasson chauve
Ru - Bolshoi shirokolobik
Sp - Austrobacalao pelado

NATIONAL :

DISTINCTIVE CHARACTERS :

Body compressed, its depth 20 to 25% of standard length. Head a little depressed, snout as long as or a little longer than eye; length of head 3.5 to 4.2 times in standard length; cephalic sensory canals deeply modified; supraorbital commissure absent, interrupted between the 2 coronal pores; infraorbital canal divided into 3 sections with 4+2+1 pores; temporal canal with 5 pores; supratemporal canal divided into 4 sections with 1+2+2+1 pores; preoperculomandibular canal divided into 2 sections with 4+6 pores; eye 3 to 5 times in head length; interorbital width 25 to 33% of head length; 16 to 19 long gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below anterior third of eye; lower jaw slightly protruding; teeth in both jaws villiform; numerous pitlines easily visible on top of head, cheeks, mandible and snout. Two dorsal fins, the first with 5 to 7 flexible spines, the second with 34 to 38 soft rays; 31 to 35 anal fin rays; pectoral fins large, fan-like, with about 23 rays, longer than the pelvics; caudal fin subtruncate or rounded. Two lateral lines, with or without only a few tubular scales; 43 to 52 scales in upper lateral line and 8 to 10 in the lower; the body entirely covered with ctenoid scales; upper surface of head scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely included in the scapula bone but separated from coracoid by a very narrow bridge of bone.

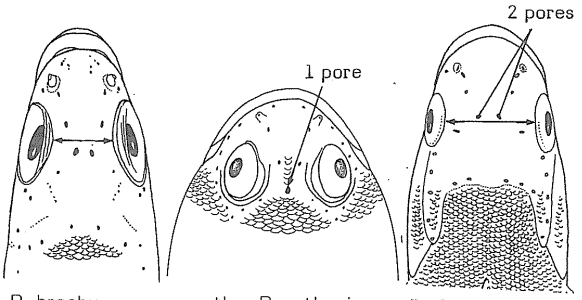
Colour: yellowish with dark spots or irregular crossbars; dorsal and caudal fins with a series of spots but caudal fin without transverse bands.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Pagothenia brachysoma: dark transversal bands on caudal fin; interorbital width 18 to 25% of head length (25 to 33% in P. borchgrevinki).

P. hansoni and P. tokarevi: 27 or more pectoral fin rays (about 23 in P. borchgrevinki).

Other Pagothenia species: supraorbital commissure with only 1 pore (2 pores in P. borchgrevinki); supratemporal canal divided into 3 sections (4 sections in P. borchgrevinki); 35 to 37 caudal vertebrae (30 to 34 in P. brachysoma and P. borchgrevinki).



SIZE :

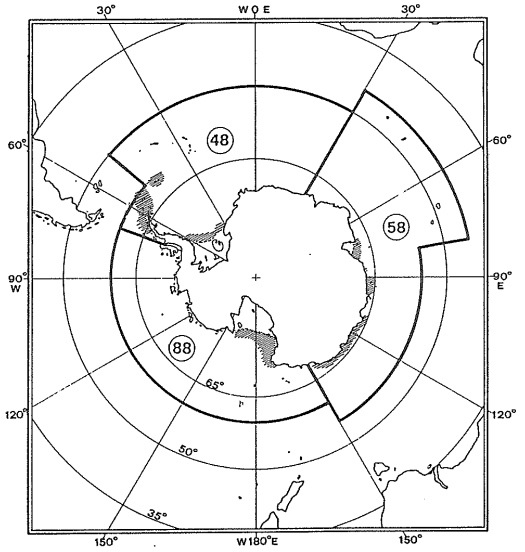
Maximum: 25 cm; common to 15 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar cryopelagic species; Ross Sea, Davis Sea, Weddell Sea, Antarctic Peninsula, South Orkney and South Shetland Islands. Together with Pleuragramma antarcticum and Pagothenia brachysoma, this species is one of the most southern fish.

Found on the upper layer of the Antarctic seas from the surface to about 30 m depth, among the ice or even under the ice.

Feeds on copepods and young krill.



PRESENT FISHING GROUNDS :

Not commercially exploited.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Not yet caught by fishing boats.

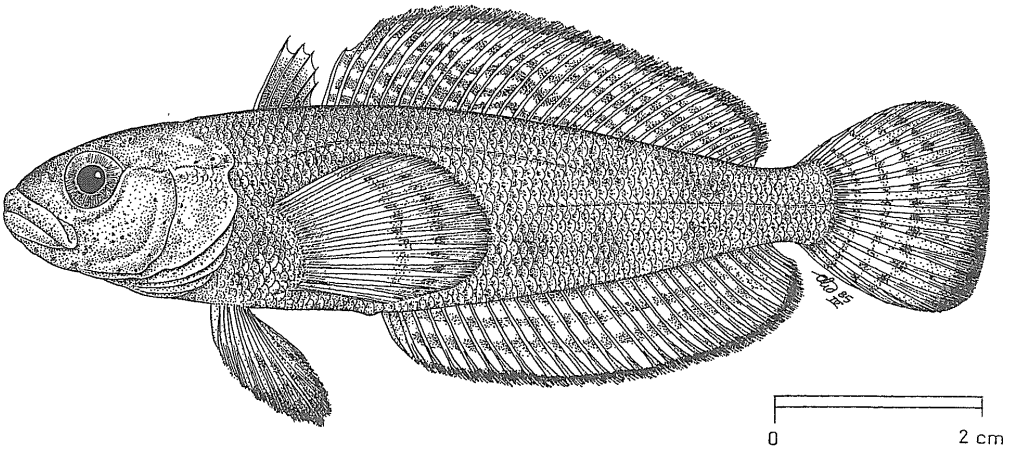
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pagothenia brachysoma (Pappenheim, 1912)

OTHER SCIENTIFIC NAMES STILL IN USE : Pagothenia antarctica Nichols & Lamonte, 1936



VERNACULAR NAMES :

FAO/CCAMLR : En - Stocky rockcod
Fr - Bocasson trapu
Ru - Malyi shirokolobik
Sp - Austrobacalao mocho

NATIONAL :

DISTINCTIVE CHARACTERS :

Body deep and compressed, its depth 20.8 to 24.4% of standard length. Head a little depressed, snout as long as or shorter than eye; length of head 3 to 3.4 times in standard length; cephalic sensory canals deeply modified; infraorbital canal divided into 3 sections with 4+2+1 pores; temporal canal with 5 pores; supraorbital commissure with 2 separate pores; supratemporal canal divided into 4 sections with 1+2+2+1 pores; preoperculo-mandibular canal divided into 2 sections with 4+6 pores; eye 3.4 to 4 times in head length; interorbital width 18 to 25% of head length; 15 to 19 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below anterior margin or middle of eye; jaws equal anteriorly; teeth in both jaws villiform; numerous small pitlines easily visible on top of head, cheeks, mandible and snout. Two dorsal fins, the first with 4 or 5 flexible spines, the second with 29 to 32 soft rays; 29 or 30 anal fin rays; pectoral fins large, fan-like, with 23 or 24 rays, as long as the pelvics; caudal fin rounded. Two lateral lines, without or with only a few tubular scales; the body entirely covered with cycloid or feebly ctenoid scales; upper surface of head scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely included in the scapula bone but separated from the coracoid by a very narrow bridge of bone.

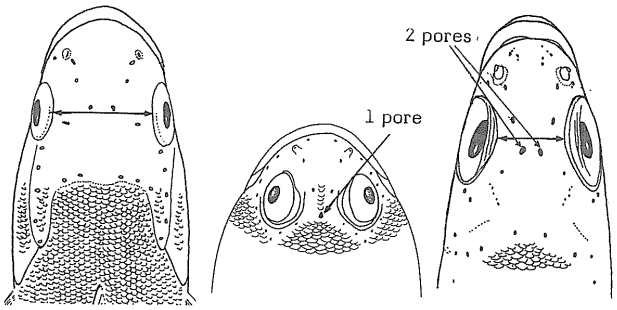
Colour: iridescent blue, with sometimes some patches of coral pink near the head; scattered dark punctuations, larger and more spaced on the top of head; fins with dusky tips or edges; spinous dorsal fin blackish; second dorsal fin and anal fin with spots on membrane; dark transversal bands on caudal fin.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Pagothenia borchgrevinki: no dark transversal bands on caudal fin; interorbital width 25 to 33% of head length (18 to 25% in P. brachysoma).

P. hansoni and P. tokarevi: 27 or more pectoral fin rays (23 or 24 in P. brachysoma).

Pagothenia species other than P. borchgrevinki: supraorbital commissure with only 1 pore (2 in P. brachysoma); supratemporal canal divided into 3 sections (4 in P. brachysoma); 35 to 37 caudal vertebrae (30 to 34 in P. brachysoma and P. borchgrevinki).



SIZE:

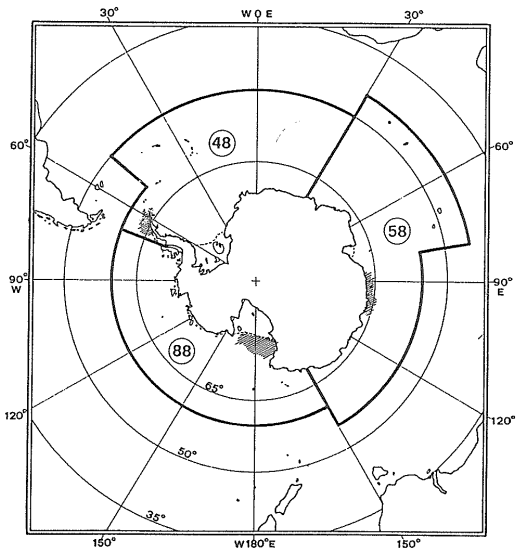
Maximum: 15 cm; common to 10 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Circumpolar cryopelagic species; Ross Sea, Davis Sea, Wilhelm coast and west coast of the Antarctic Peninsula. Together with Pleuragramma antarcticum and Pagothenia borchgrevinki, this species is one of the most southern fish.

This species is only known from the superficial waters to 6 m depth, often found together with krill swarms and in the middle of ice flows.

Feeds on copepods and probably on small euphausiids.



PRESENT FISHING GROUNDS:

Not commercially exploited.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Not yet caught by fishing boats.

NOT Pag 4

1985

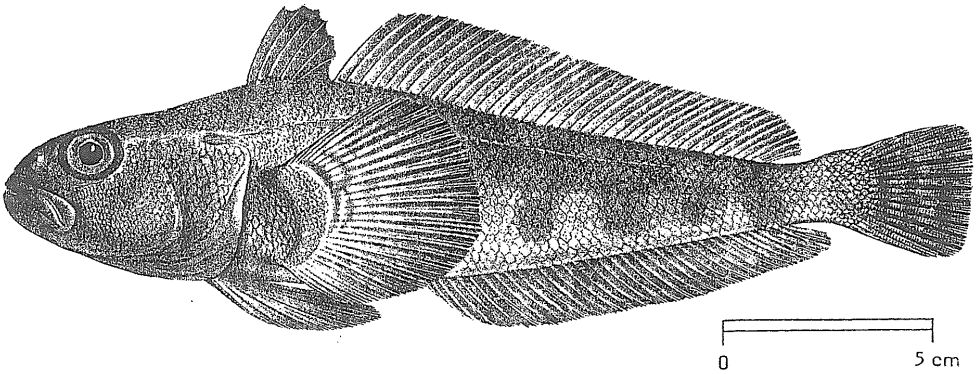
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pagothenia hansoni (Boulenger, 1902)

OTHER SCIENTIFIC NAMES STILL IN USE : Trematomus hansoni Boulenger, 1902
Notothenia (Trematomus) hansoni (Boulenger, 1902)
Trematomus hansoni georgianus Lönnberg, 1905



VERNACULAR NAMES :

FAO/CCAMLR : En - Striped rockcod, green rockcod
Fr - Bocasson rayé
Ru - Trematom-polosatik
Sp - Austrobacalao rayado

NATIONAL :

DISTINCTIVE CHARACTERS :

Body moderately compressed, a little elongate, its depth 18.8 to 28.5% of standard length. Head a little depressed, snout as long as or a little longer than eye; length of head 3 to 4.5 times in standard length; cephalic sensory canals deeply modified; supratemporal canal divided into 3 sections with 1+3+1 pores; infraorbital canal divided into 2 sections with 5+3 pores; temporal canal with 5 pores; supraorbital commissure with one pore; preoperculomandibular canal 10 pores; eye 3.4 to 5 times in head length; interorbital width 13 to 20% of head length; 13 to 19 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below middle or anterior part of eye; jaws about equal anteriorly; teeth in both jaws villiform; numerous pitlines visible on top of head, cheeks, mandible and snout. Two dorsal fins, the first with 5 to 8 flexible spines, the second with 36 to 41 soft rays; 33 to 37 anal fin rays; pectoral fins large, fan-like, with 27 to 33 rays, longer than the pelvics; caudal fin subtruncate. Two lateral lines, the lower one usually without tubular scales; 36 to 48 tubular scales in upper lateral line; the body entirely covered with cycloid or ctenoid scales; occiput, interorbital space, cheeks and opercles scaled; snout, lower jaw and preorbital area scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen variable in position; often included entirely in the scapula bone but separated from coracoid by a very narrow bridge of bone, or bordered by scapula and coracoid, or included in scapula and presence of a second foramen in coracoid.

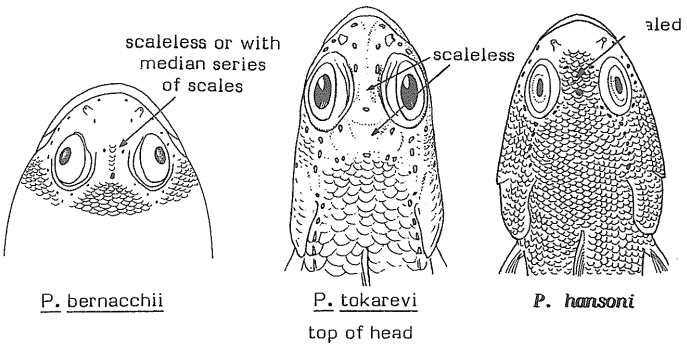
Colour: greenish-grey with large black crossbars; head bluish mauve at lower part; dorsal and anal fins with greyish-green rays and black membrane; caudal fin with dark transversal narrow bands, membrane clear; pectoral fins with light and grey bands, dark membrane between the 4 last rays; pelvic fins punctuated with black spots on the rays.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Pagothenia bernacchii: no dark transversal bands on caudal fin; interorbital space scaleless or with a median series of scales; less than 27 pectoral fin rays (27 to 33 in P. hansoni).

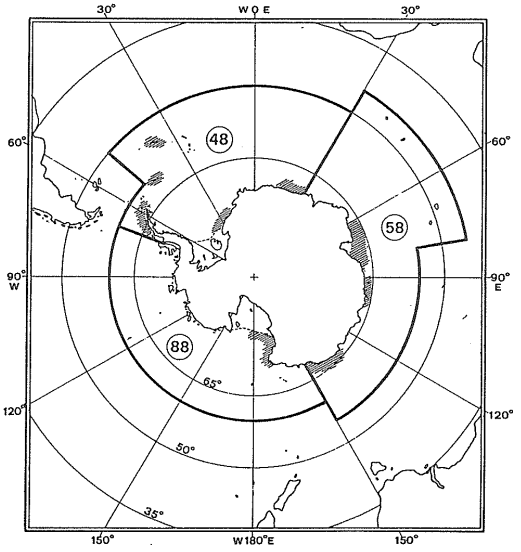
P. brachysoma and P. borchgrevinki: supraorbital commissure with 2 pores (1 in P. hansoni); 30 to 34 caudal vertebrae (35 to 37 in P. hansoni); less than 27 pectoral fin rays. Top of head scaleless.

P. tokarevi: upper surface of head scaleless; one black spot on middle of first dorsal fin; 29 or 30 pectoral fin rays.



SIZE:

Maximum: 40 cm; common to 25 cm.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR:

Circum-Antarctic species; Ross, Davis and Weddell Seas; Victoria, Adelie, Queen Mary coasts; Antarctic Peninsula; South Sheltand, South Orkney and South Georgia Islands.

Found from the shore to 550 m depth, Pagothenia hansoni spawns on the continental shelf in December or January.

Feeds on small fishes, krill and other euphausiids, polychaetes, copepods, amphipods, isopods and small gastropods.

PRESENT FISHING GROUNDS:

Not commercially exploited.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION:

Separate statistics are not reported for this species.

Can be caught with traps or gillnets.

NOT Par 1

1985

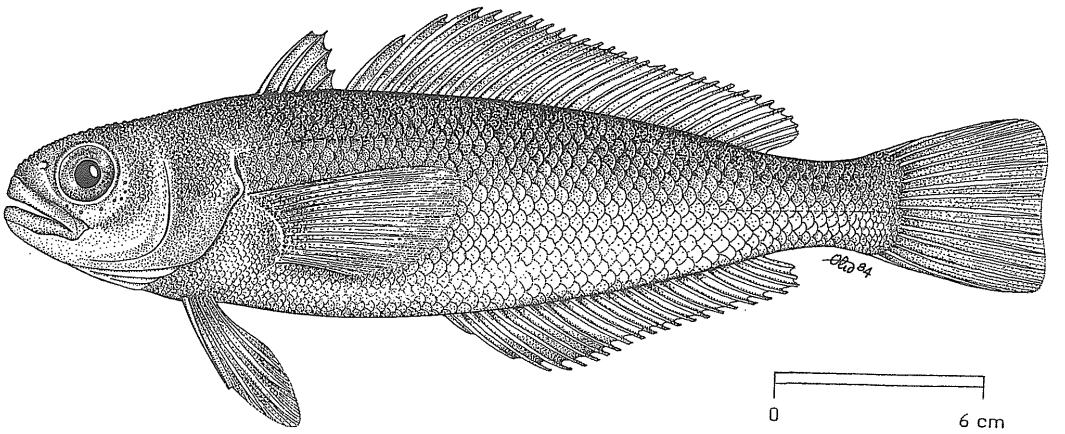
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Paranotothenia magellanica (Forster, 1801)

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia macrocephala Günther, 1860
Notothenia maoriensis Haast, 1873
Notothenia antarctica Peters, 1876



VERNACULAR NAMES :

FAO/CCAMLR : En - Magellanic rockcod
Fr - Bocasse magellanique
Ru - Sinyaya nototenia
Sp - Trama común

NATIONAL :

DISTINCTIVE CHARACTERS :

Body evenly curved both dorsally and ventrally from head to base of caudal fin, compressed posteriorly, its depth 25 to 33% of standard length. Head width and length about equal, dorsal profile of head flat or slightly curved with small tubercles; length of head a little more than 3 times in standard length; snout very bluntly rounded from dorsal view; in lateral view rising steeply from tip of upper jaw to a point above the nostrils; cephalic sensory canals with small pores, difficult to see; 8 or 9 pores in the infraorbital canal; temporal canal with 4 pores; preoperculomandibular canal with 9 pores; eye 3 (young) to 6 times in head length; interorbital width broad and flat, 31 to 42% of head length; 10 to 13 gillrakers on lower part of anterior arch; jaws short but wide, maxilla extending posteriorly to below pupil of eye; jaws equal anteriorly; teeth in both jaws in two almost uniserial bands. Two dorsal fins, the first with 3 to 6 flexible spines, the second with 28 to 31 soft rays; 22 to 26 anal fin rays; pectoral fins large, fan-like, with 16 to 18 rays, much longer than the pelvics; caudal fin emarginate or even rounded in large specimens but deeply forked in very small individuals. Two lateral lines, the upper ending below posterior rays of second dorsal fin; 36 to 46 tubular scales in upper lateral line and 5 to 14 in the lower; the body entirely covered with large and cycloid (smooth) scales; ctenoid scales present in area covered by pectoral fins; head nearly entirely scaleless; uppermost part of opercles scaled, small patches of scales behind eyes, and posterolateral parts of top of head. The hypural bones 1 and 2, of the caudal skeleton are fused, the hypural bones 3 and 4 are partially fused; these 4 bones are fused to the ural vertebral centrum; epurals large and fused also to the ural centrum. Pectoral foramen bordered by scapula and coracoid.

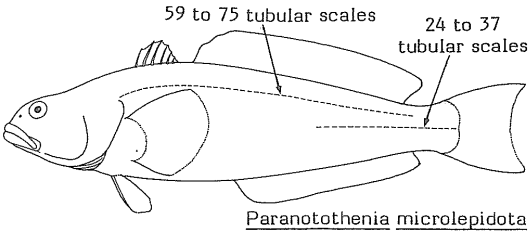
Colour: very bright colour, but most variable; back may be dark brown, dark grey-green, silvery-blue or rich golden brown, passing to golden yellow or reddish on the belly; branchiostegal membranes always bright orange-red or orange-yellow.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

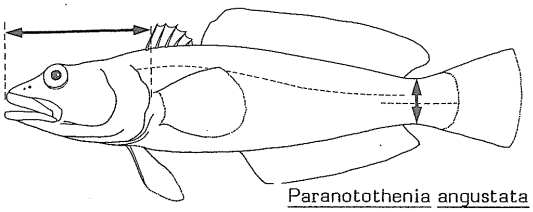
Paranotothenia microlepidota: lower lateral line with 24 to 37 tubular scales (5 to 14 in P. magellanica); upper lateral line with 59 to 75 tubular scales (36 to 46 in P. magellanica).

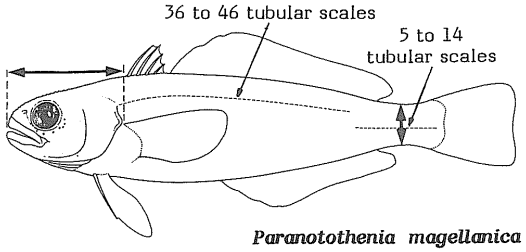
P. angustata: length of caudal peduncle 25.5 to 34.5% of head length (37.0 to 45.5% in P. magellanica).

Notothenions nudifrons, N. mizops, "N. larseni" species group: upper lateral line without tubular scales, but with perforated scales.



Paranotothenia microlepidota


Paranotothenia angustata



Paranotothenia magellanica

SIZE :

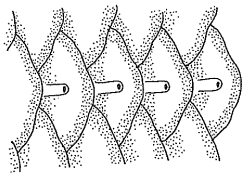
Maximum: 35 cm; common to 30 cm.

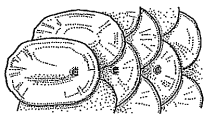
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Reported from the Magellanic region, Patagonia, coast of Chile, Straits of Magellan, Falkland/Malvinas Islands, South Georgia and South Orkneys Islands, Marion-Prince Edward, Crozet, Kerguelen and Heard Islands, Macquarie, Campbell and Auckland Islands, and New Zealand. One specimen has been recorded from the Ross Sea, possibly representing an undescribed subspecies.

Found from the shore to 255 m depth, it seems that this species is not so demersal in habit as most nototheniids (some specimens have been found pelagically in the South Pacific Ocean).

Feeds on benthic and pelagic invertebrates (isopods, amphipods, small crabs, krill, small molluscs, bivalves) and fish.

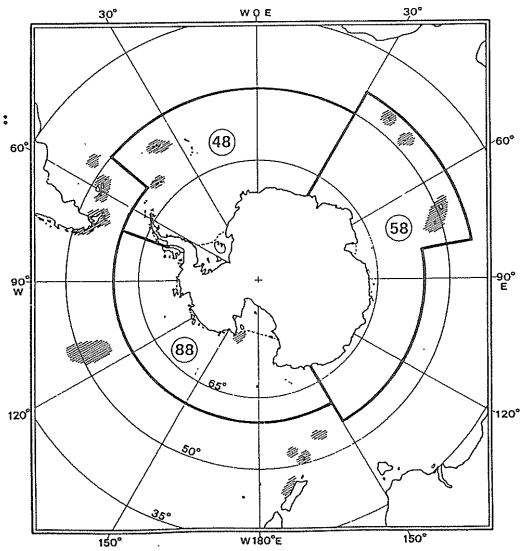

tubular scales


perforated scales

scales of upper lateral line

PRESENT FISHING GROUNDS :

In the areas, mainly around the Kerguelen and Heard Islands and South Georgia.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Not yet commercially exploited.

Rarely caught as bycatch in bottom trawls.

Not yet marketed, this fish has a particularly excellent flesh.

NOT Pat 1

1985

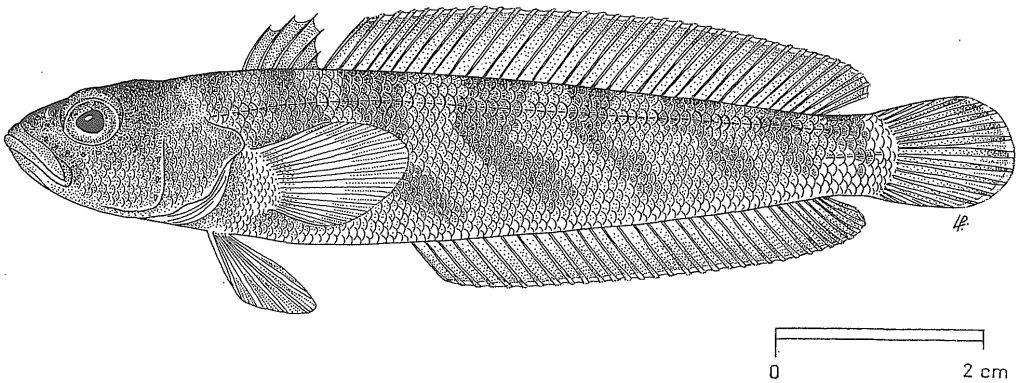
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Patagonothen brevicauda guntheri (Norman, 1937)

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia guntheri Norman, 1937
Patagonotothen guntheri shagensis Balushkin & Permitin, 1982



VERNACULAR NAMES :

FAO/CCAMLR : En - Patagonian rockcod
Fr - Bocasse de Patagonie
Ru - Zheltoperca
Sp - Trama patagónica

NATIONAL :

DISTINCTIVE CHARACTERS :

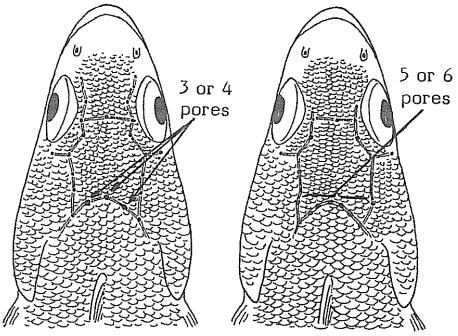
Body compressed throughout, widest at bases of pectoral fins, its depth 16 to 20% of standard length. Head a little depressed, about as deep as wide; length of head a little more than 3 times in standard length; cephalic sensory canals normal with small pores, difficult to see; 8 pores in the infraorbital canal; temporal canal with 4 pores; supratemporal canal with 5 (rarely 6) pores; preoperculomandibular canal with 9 pores; eye 3 to 4.2 times in head length; interorbital width 12 to 15% of head length; 16 to 22 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below 1/4 to 1/2 of eye; lower jaw slightly protruding; teeth in both jaws in two bands, those of the outer band uniserial, and enlarged. Two dorsal fins, the first with 4 to 7 flexible spines, the second with 35 to 37 soft rays; 32 to 35 anal fin rays; pectoral fins large, fan-like, with 22 to 28 rays, as long as the pelvics; caudal fin rounded. Two lateral lines, the upper ending well posterior to end of base of second dorsal fin; 44 to 50 tubular scales in upper lateral line and 3 to 10 in the lower; the body entirely covered with ctenoid scales; upper surface of head, interorbital region, opercles and cheeks with small cycloid scales. The hypural bones 1 and 2 of the caudal skeleton are fused, the hypural bones 3 and 4 are well separated. Pectoral foramen bordered by scapula and coracoid.

Colour: grey brown. On the body 7 or 8 dark transverse stripes; snout and top of head dark; caudal, pectoral and pelvic fins lemon yellow, anal and dorsal fins yellow; the tips of all fins are lighter; 2 or 3 dark stripes on cheeks.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Patagonotothen brevicauda brevicauda: 14 to 20 gillrakers on lower limb of first gill arch (16 to 22 in P. b. guntheri); least depth of caudal peduncle, 30.5 to 32.8% of head length (25.7 to 30.8% in P. b. guntheri).

P. longipes species: supratemporal canal with 3 or 4 pores (5, rarely 6 in P. brevicauda species).



P. longipes P. brevicauda sp.

top of head

SIZE :

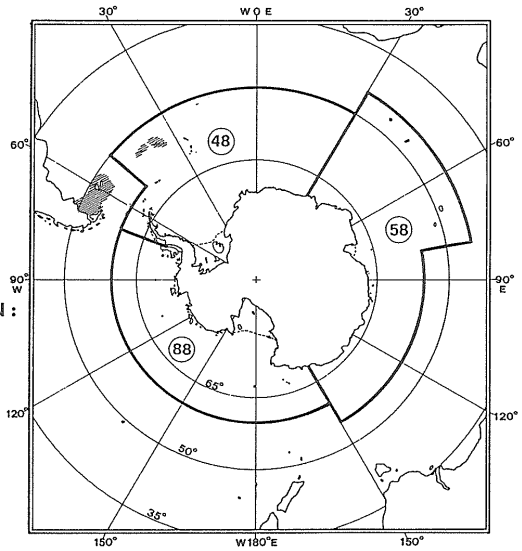
Maximum: 23 cm; common to 20 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Patagonotothen brevicauda guntheri is distributed from the Patagonian shelf south of 49-S and Burdwood Bank to Shag Rocks.

Found from 140 to 320 m depth.

Feeds on small benthic invertebrates.



PRESENT FISHING GROUNDS :

Mainly around Shag Rocks near South Georgia Island.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Recently caught, this species has been reported for 31 000 t in 1981/82 and 5 000 t in 1982/83.

Caught only with bottom and pelagic trawls.

Probably used only for fishmeal.

NOT Pleu 1

1985

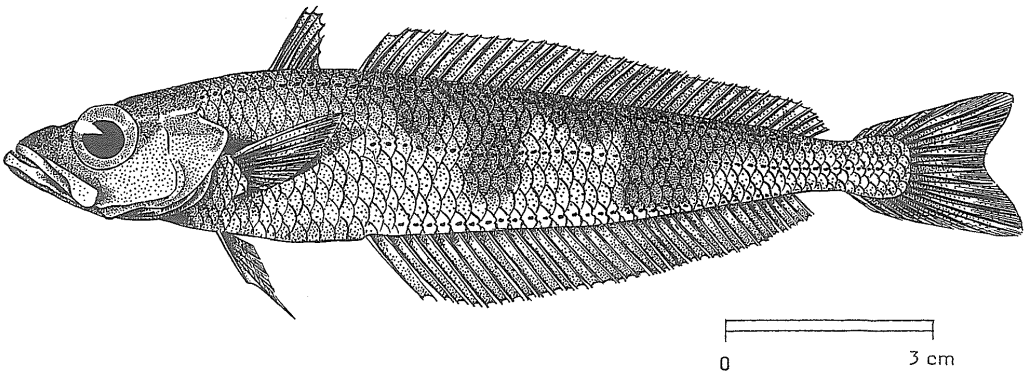
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Pleuragramma antarcticum Boulenger, 1902

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic silverfish
Fr - Calandre antarctique
Ru - *Antarkticheskaya serebryanka*
Sp - Diablillo antártico

NATIONAL :

DISTINCTIVE CHARACTERS :

Body compressed, its depth 12.6 to 17.5% of standard length. Head a little depressed, snout pointed; length of head 3.4 to 4 times in standard length; cephalic sensory canals deeply modified, infraorbital canal in 2 sections with 4 and 2 pores, median part of supratemporal canal lost; temporal canal with 5 pores; supraorbital commisure lost; preoperculomandibular canal with 8 pores; eye 3.1 to 4 times in head length; interorbital width 17 to 25% of head length; 20 to 25 comb-like gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below anterior third of eye; lower jaw protruding; teeth in both jaws pointed. Two dorsal fins, the first with 6 to 8 flexible spines, the second with 33 to 39 soft rays; 36 to 38 anal fin rays; pectoral fins large, fan-like, with 20 or 21 rays, as long as or longer than the pelvics; caudal fin emarginate. Three lateral lines with pored scales, the upper ending below last rays of second dorsal fin; about 45 pored scales in upper lateral line and 35 in both middle and lower; the body entirely covered with large and cycloid (smooth) scales; upper surface of head scaleless; opercles and cheeks scaled. The hypural bones 1 and 2 on one hand, 3, 4 and 5 on the other hand are fused into two wide plates together with the epurals and the ural vertebral centrum. Pectoral foramen entirely located in scapula bone.

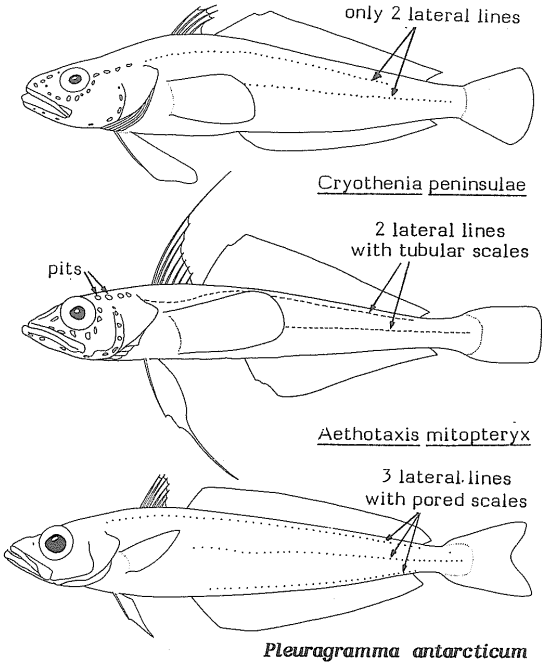
Colour: silvery, back darker; back and sides powdered with blackish dots; fins all pale.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Cryothenia peninsulae: only 2 lateral lines, both without tubular scales.

Aethotaxis mitopteryx: 2 lateral lines but covered with tubular scales; cephalic lateral lines enlarged, the pores appearing as deep pits.

Other nototheniids: hypural 5 never fused with hypurals 3 and 4.



Pleuragramma antarcticum

SIZE :

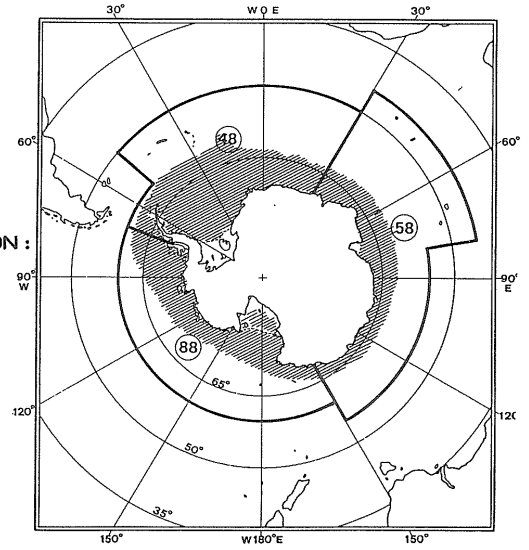
Maximum: 25 cm; common to 15 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circum-Antarctic species in cold waters (less than +2°C), mainly close to the Antarctic Continent. Weddell, Bellinghausen, Ross and Davis Seas. South Shetland, South Orkney.

Pelagic species from the surface to more than 700 m depth. Spawns from October to December.

Feeds on small pelagic organisms, krill and other euphausiids, copepods, postlarval fish.



PRESENT FISHING GROUNDS :

This abundant species is not yet commercially exploited. Small catches are made, mostly in the Pacific sector of the Southern Ocean.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Separate statistics are reported for this species.

Could be caught only with pelagic trawls, and sometimes with bottom trawls.

NOT Trem 1

1985

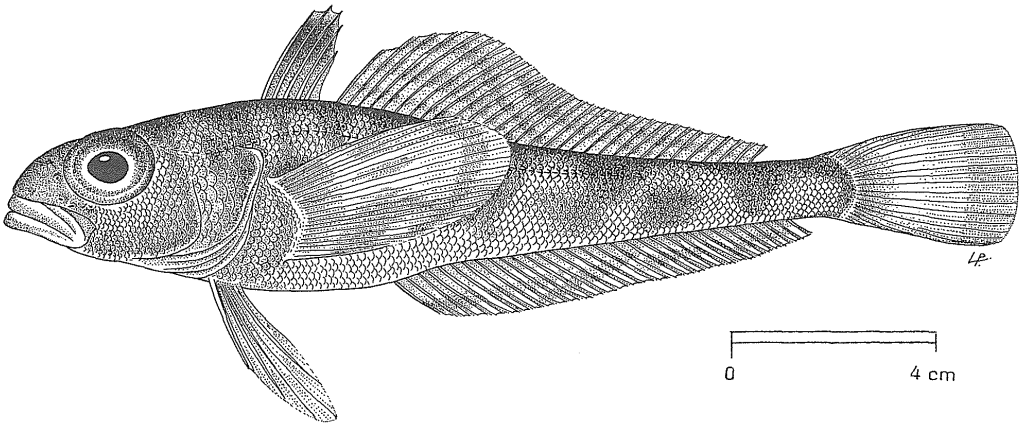
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Trematomus loennbergi Regan, 1913

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia (Trematomus) loennbergi (Regan, 1913)



VERNACULAR NAMES :

FAO/CCAMLR : En - Scaly rockcod
Fr - Bocasson écailleux
Ru - Trematom Lönnberga
Sp - Austrobacalao escamudo

NATIONAL :

DISTINCTIVE CHARACTERS :

Body moderately compressed, its depth 17 to 26% of standard length. Head a little depressed, snout rather shorter than eye; length of head 3 to 3.8 times in standard length; cephalic sensory canals normal; 7 pores in the infraorbital canal; temporal canal with 5 pores; 3 pores in supratemporal canal; preoperculomandibular canal with 10 pores; eye 3 to 4.2 times in head length; interorbital width 10 to 21% of head length; 10 to 14 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below anterior quarter or third of eye; jaws about equal anteriorly; teeth in both jaws villiform. Two dorsal fins, the first with 5 to 7 flexible spines, the second with 31 to 35 soft rays; 31 to 35 anal fin rays; pectoral fins large, fan-like, with 25 to 29 rays, longer than the pelvics; caudal fin subtruncate or rounded. One or two lateral lines; 33 to 49 tubular scales in upper lateral line and 9 to 17 in the lower when developed; the body entirely covered with more or less ctenoid scales; upper surface of head scaled; interorbital space fully scaled; snout, lower jaw and preorbital area scaleless. The hypurals bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely included in scapula bone.

Colour: light brown or reddish, darker dorsally; 4 or 5 irregular darker crossbars through the sides of the body; sometimes one indistinct darker blotch on spinous dorsal fin; inside of mouth and branchial cavity blackish.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OGCURRING IN THE AREA :

Trematomus newnesi and T. nicolai: upper surface of head scaleless.

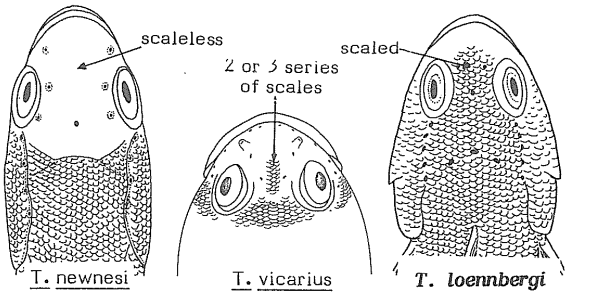
T. pennelli and T. centronotus: 60 or less scales in a longitudinal series (60 to 83 in T. loennbergi).

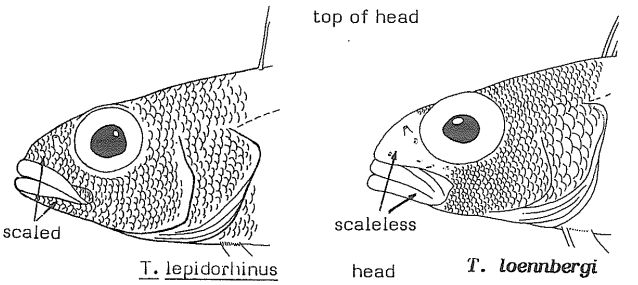
T. scotti: upper lateral line with 10 to 23 tubular scales (33 to 49 in T. loennbergi).

T. lepidorhinus and T. eulepidotus: snout, lower jaw and preorbital area scaled.

T. vicarius: interorbital region with only 2 or 3 series of scales (fully scaled in T. loennbergi).

Pagothenia species: 5 or more pores in supratemporal canal which is divided into 3 or 4 sections (3 pores in T. loennbergi).





SIZE :

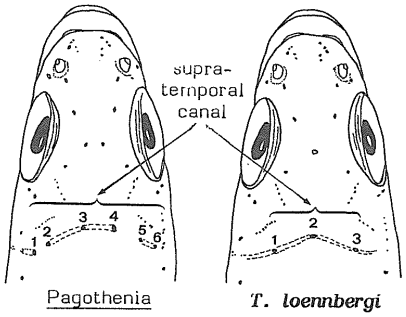
Maximum: 30 cm; common to 20 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar distribution; coast of Antarctic Peninsula, Weddell Sea, Queen Mary, Adelie and South Victoria coasts; Ross Sea, Davis Sea. This species has a benthopelagic behaviour.

Trematomus loennbergi probably spawns at the beginning of austral summer (December). This species, which apparently closely resembles Pagothenia hansoni, lives in deeper water.

Feeds on fishes, isopods and other crustaceans.

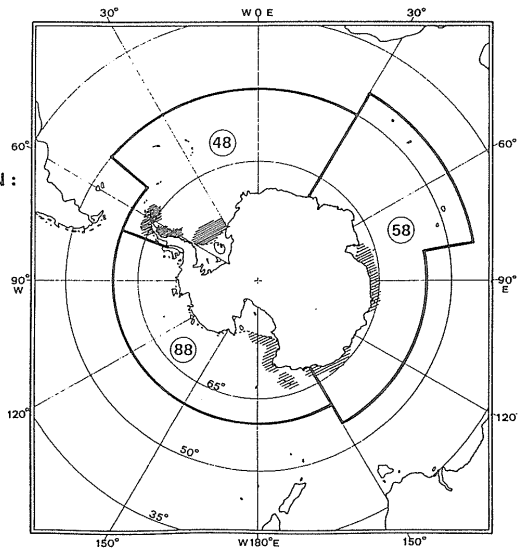


PRESENT FISHING GROUNDS :

Not commercially exploited.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Not yet caught by fishing boats.



NOT Trem 2

1985

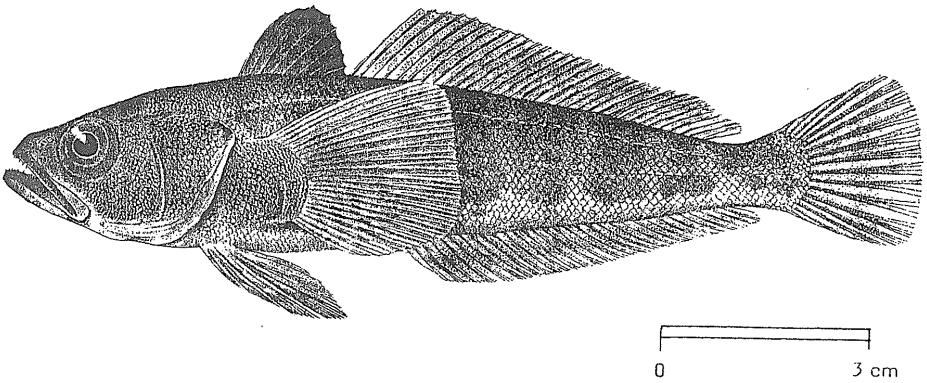
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Trematomus newnesi Boulenger, 1902

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia (Trematomus) newnesi (Boulenger, 1902)



VERNACULAR NAMES :

FAO/CCAMLR : En - Dusky rockcod
Fr - Bocasson terne
Ru - Trematom-gonets
Sp - Austrobacalao oscuro

NATIONAL :

DISTINCTIVE CHARACTERS :

Body moderately compressed, its depth 17 to 25% of standard length. Head a little depressed, snout rather shorter than eye; length of head 3.2 to 4.2 times in standard length; cephalic sensory canals normal; 7 pores in the infraorbital canal; temporal canal with 5 pores; 3 pores in supratemporal canal; preoperculomandibular canal with 10 pores; eye 3 to 4.3 times in head length; interorbital width 20 to 30% of head length; 15 to 20 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below middle or posterior part of eye; lower jaw slightly protruding; teeth in both jaws fine and pointed. Two dorsal fins, the first with 5 to 8 flexible spines, the second with 29 to 38 soft rays; 29 to 36 anal fin rays; pectoral fins large, fan-like, with 24 to 27 rays, longer than the pelvics; caudal fin truncate in large specimens or a little emarginate in young. Two lateral lines; the upper ending below posterior rays of second dorsal fin; 37 to 52 tubular scales in upper lateral line and 10 to 24 in the lower when developed; the body entirely covered with large and feebly ctenoid scales; upper surface of head scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely included in scapula bone.

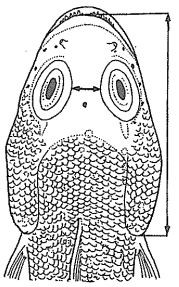
Colour: light brown, darker dorsally, with more or less distinct black spots, or with irregular crossbars spinous dorsal blackish; other fins dusky, often with small dark spots.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

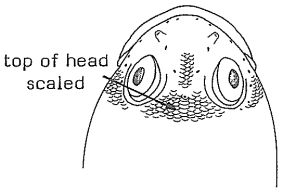
Trematomus nicolai: interorbital width 11.1 to 14.3% of head length (20 to 30% in T. newnesi); first dorsal fin with 4 spines (5 to 8 in T. newnesi).

Other Trematomus species: upper surface of head scaled, at least posteriorly.

Pagothenia borchgrevinki: similar in appearance and in habitat, but easily distinguished by having no obvious lateral lines and 2 pores in the central commissure.



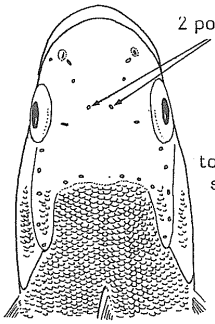
T. nicolai



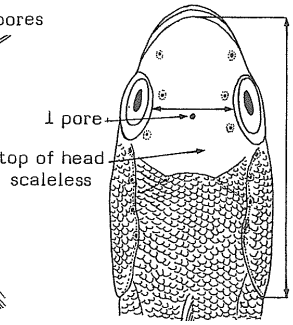
other Trematomus

SIZE :

Maximum: 20 cm; common to 15 cm.



P. borchgrevinki



T. newnesi

top of head

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

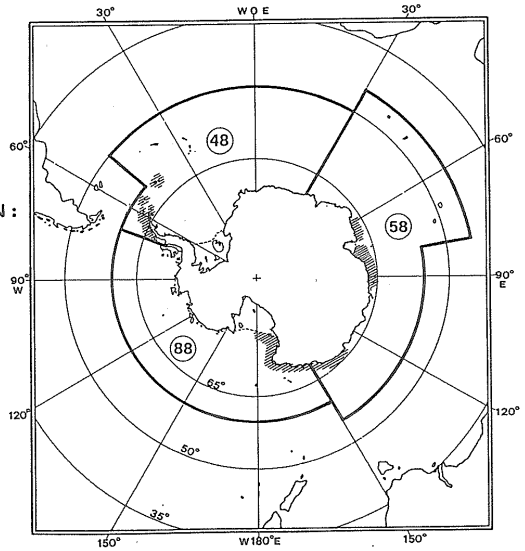
Reported from the west coast of Antarctic Peninsula, coasts of the Antarctic Continent (Mac Robertson, George V, Queen Mary and Adelie coasts, Davis Sea and Ross Sea) also South Shetland and South Orkney Islands. Probably a circumpolar species.

Found from the shore to 160 m depth, rather abundant in the intertidal zone. Trematomus newnesi spawns near shores in September.

Feeds on euphausiids, copepods, amphipods and polychaetes.

PRESENT FISHING GROUNDS :

Not commercially exploited, this species plays an important role in the diet of many Antarctic seabirds.



CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Not yet caught by fishing boats.

NOT Trem 3

1985

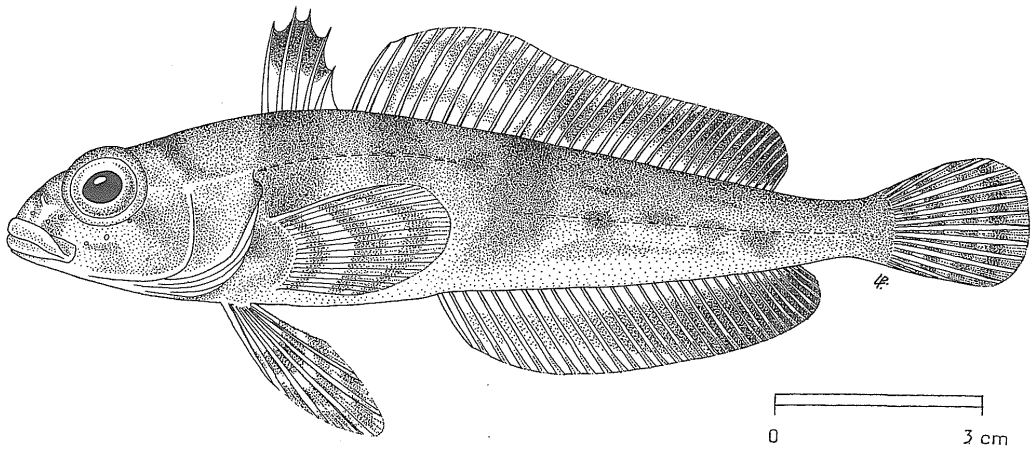
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : NOTOTHENIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Trematomus scotti Boulenger, 1907

OTHER SCIENTIFIC NAMES STILL IN USE : Notothenia (Trematomus) scotti (Boulenger, 1907)



VERNACULAR NAMES :

FAO/CCAMLR : En - *Crowned rockcod*
Fr - Bocasson couronné
Ru - Trematom-skotta
Sp - Austrobacalao coronado

NATIONAL :

DISTINCTIVE CHARACTERS :

Body moderately compressed, its depth 17.5 to 25.6% of standard length. Head a little depressed, snout shorter than eye; length of head 3 to 3.7 times in standard length; cephalic sensory canals normal; 7 pores in the infraorbital canal; temporal canal with 5 pores; 3 pores in supratemporal canal; preoperculomandibular canal with 10 pores; eye 2.6 to 3.5 times in head length; interorbital width narrow 7.4 to 12.5% of head length; 9 to 15 gillrakers on lower part of anterior arch; mouth oblique, maxilla extending posteriorly to below anterior quarter of eye; jaws almost equal anteriorly; teeth in both jaws villiform. Two dorsal fins, the first with 4 to 6 flexible spines, the second with 31 to 36 soft rays; 29 to 33 anal fin rays; pectoral fins large, fan-like, with 19 to 22 rays, as long as the pelvics; caudal fin rounded. Two lateral lines; the upper, short, ending at the level of extremity of pectoral fin; 10 to 23 tubular scales in upper lateral line; lower line without tubular scales; the body entirely covered with ctenoid scales; upper surface of head scaled; interorbital region fully scaled; snout, lower jaw and preorbital area scaleless. The hypural bones 1 and 2, 3 and 4 of the caudal skeleton are fused into two wide plates. Pectoral foramen entirely included in scapula bone.

Colour: brownish, darker dorsally, with black spots or irregular crossbars; spinous dorsal fin with a deep black blotch; soft dorsal and anal fins with a blackish band, broadest and most intense posteriorly; caudal, pectoral and pelvic fins often barred.

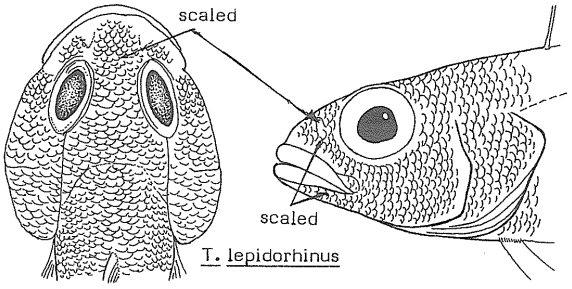
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

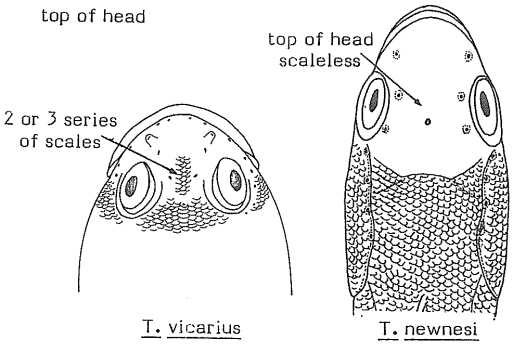
Trematomus loennbergi, T. pennelli and T. centronotus: upper lateral line with 30 or more tubular scales (10 to 23 in T. scotti).

T. lepidorhinus and T. eulepidotus: snout, lower jaw and preorbital area scaled.

T. vicarius: interorbital region with only 2 or 3 series of scales.

T. newnesi and T. nicolai: upper surface of head scaleless.





SIZE :

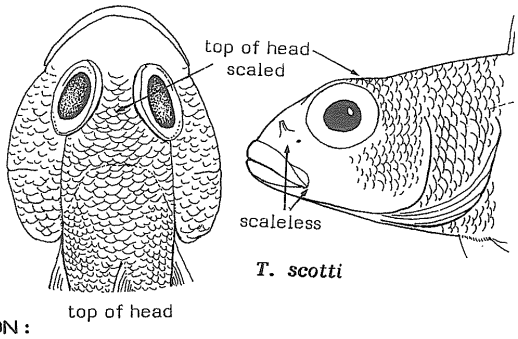
Maximum: 20 cm; common to 15 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar species; coasts of east Antarctica, Weddell Sea, Ross Sea, Antarctic Peninsula and neighbouring islands, South Shetland Islands and Prydz Bay.

Found from 20 to 666 m depth.

Food unknown.

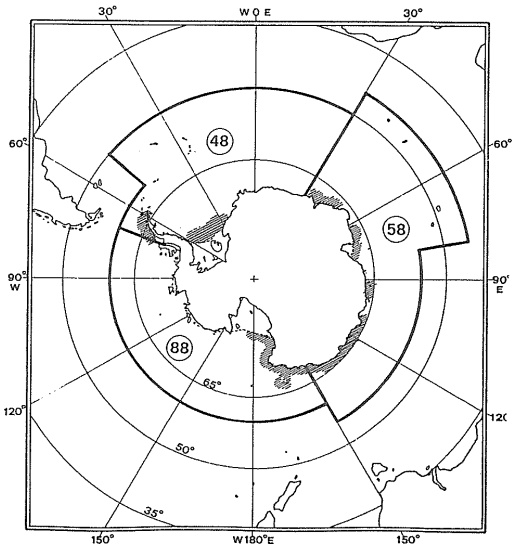


PRESENT FISHING GROUNDS :

Though this species seems to be one of the most abundant circum-Antarctic species, it is not yet commercially exploited.

CATCHES, FISHING GEAR AND FORM OF UTILIZATION :

Not yet caught by fishing boats.



PARALEP

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

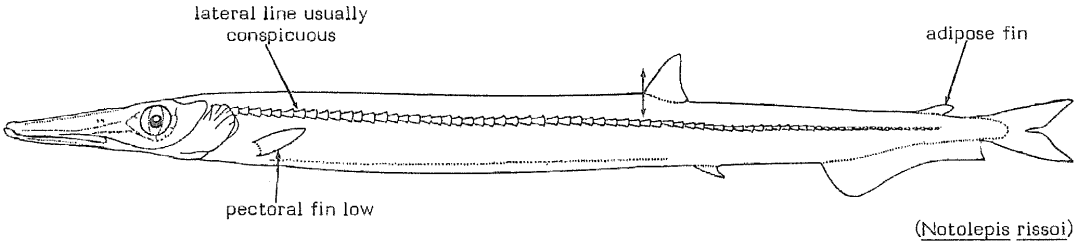
PARALEPIDIDAE

Barracudinas, Jonasfishes

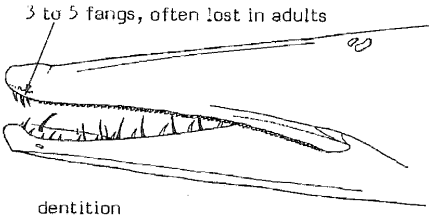
Body elongate and slender, subcylindrical to laterally compressed. Snout pointed, mouth terminal, the lower jaw projecting by a non-ossified process; alternatively fixed and depressible fang-like teeth on dentary (lower jaw) and palatine (roof of mouth); premaxilla of upper jaw with fangs at tip followed by small saw-like canines; gillrakers reduced to teeth or spines in multiple series on a bony shield; disappearing by a fusing process in old adults. No spiny rays in fins; the single short dorsal fin set behind midpoint of body; a dorsal adipose fin always present above last anal fin rays; no ventral adipose fin in Antarctic species; anal fin long, with 20 to 35 rays, its origin well behind dorsal fin; pectoral fins set low on body, short. Lateral line usually conspicuous, except in N. coatsi. Scales cycloid (smooth to touch) and easily shed. No light organs in Antarctic species. No swimbladder. Hermaphrodites.

Colour: adults silvery with a brownish dorsal band; juveniles yellowish transparent.

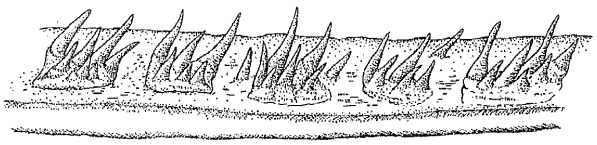
Medium-sized fishes ranging from 25 to 55 cm in total length. They are meso- to bathypelagic and may occur in large numbers from the surface to depths beyond 2 000 m. They are swift swimmers, the adults being able to avoid nets and other collecting gear. The possible interest of barracudinas as a potential resource in future midwater fisheries operations is yet to be tested. In the Southern Ocean, barracudinas are taken as bycatch in offshore trawl-fisheries (pelagic trawls) and krill fisheries.



(Notolepis rissoi)



dentition

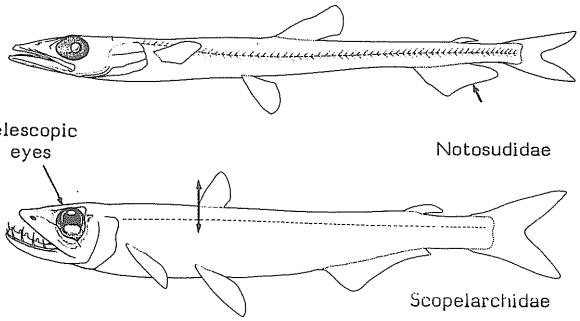


example of gillrakers on first gill arch

SIMILAR FAMILIES OCCURRING IN THE AREA :

Notosudidae: gillrakers lath-like, not in form of teeth or spines; anal fin rather short with 16 to 20 rays (20 to 35 in Paralepididae); hind tip of maxilla below eye (before eye in Paralepididae).

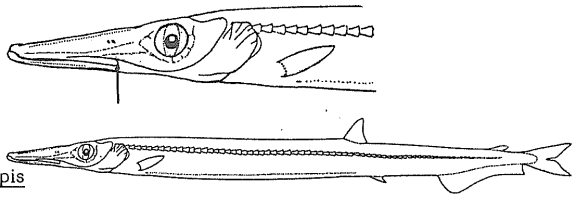
Scopelarchidae: eyes telescopic; dorsal fin set before midpoint of body.



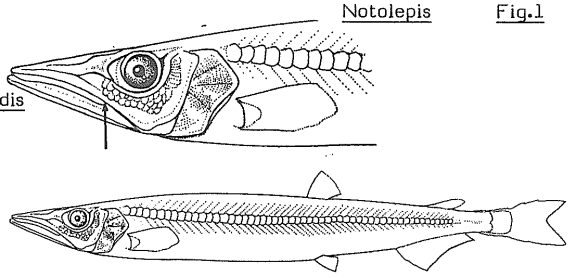
KEY TO GENERA OCCURRING IN THE AREA :

1a. 25 to 33 anal fin rays (rarely 24 in N. annulata); hind tip of maxilla below a vertical from nasal aperture; maximal standard length about 40 cm (Fig.1)..... Notolepis

1b. 20 to 24 anal fin rays; hind tip of maxilla distinctly behind a vertical from nasal aperture; maximal standard length about 50 cm (Fig.2) ..... Magnisudis



Notolepis Fig.1



Magnisudis Fig.2

LIST OF SPECIES OCCURRING IN THE AREA :

Code numbers are given for those species for which Identification Sheets are included

Magnisudis prionosa (Rofen, 1963)	PARALEP Mag 1
Notolepis annulata Post, 1978	PARALEP Not 1
Notolepis coatsi Dollo, 1908	PARALEP Not 2
Notolepis rissoi (Bonaparte, 1840)	PARALEP Not 3

Prepared by A. Post, Ichthyologie, Institut für Seefischerei, am Zool. Institut und Zool. Museum der Universtät Hamburg, Martin-Luther-King Platz 3, D-2000 Hamburg 13, Federal Republic of Germany

PARALEP Mag 1

1985

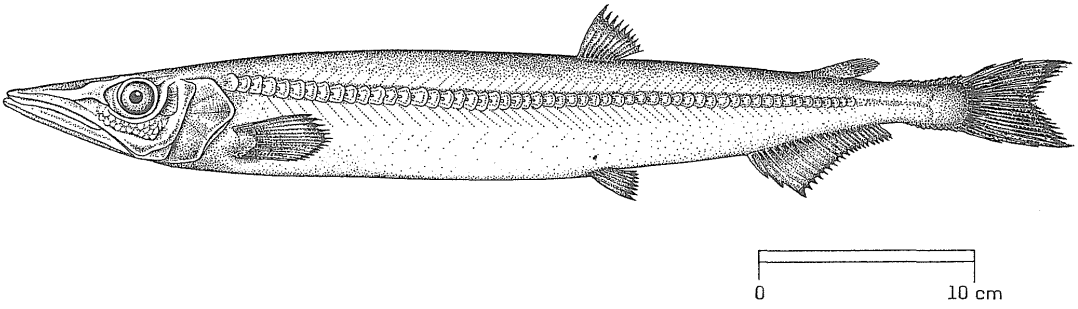
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PARALEPIDIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Magnisudis prionosa (Rofen, 1963)

OTHER SCIENTIFIC NAMES STILL IN USE : Paralepis atlantica prionosa Rofen, 1963



VERNACULAR NAMES :

FAO/CCAMLR : En - Southern barracudina
Fr - Barracudine australe
Ru - Yuzhanaya barrakudina
Sp - Barracudina austral

NATIONAL :

DISTINCTIVE CHARACTERS :

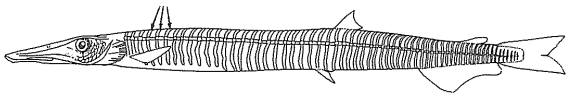
A rather large and compact fish within the family. Head length about 1/4 of standard length; upper jaw extending to slightly before anterior margin of eye. Length of adipose fin base about equal to height of caudal peduncle; anal fin far back on body, with 21 to 24 rays; pectoral fins with 14 to 17 rays; origin of pelvic fins below or slightly behind first dorsal fin ray. Lateral line distinct, visible parts of scales higher than long on anterior part of body; 68 to 73 vertebrae.

Colour: adults silvery when fresh and fully scaled; brown to grey dorsally, light ventrally; pectoral fins black. Juveniles light with the black peritoneum shining through the transparent belly; 3 peritoneal sections in young juveniles (rarely 4).

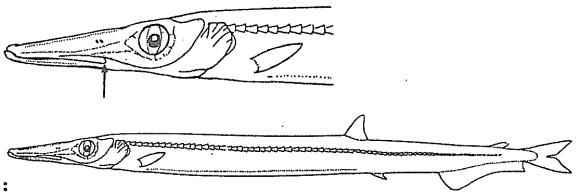
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Notolepis annulata: dorsal and ventral processes of each lateral line scale running to dorsal and ventral midline, forming transverse stripes on body. Ten or 11 pectoral fin rays (14 to 17 in M. prionosa).

N. coatsi and N. rissoi: hind tip of maxilla below nasal aperture; 26 to 33 anal fin rays (21 to 24 in M. prionosa); 9 to 12 pectoral fin rays.



Notolepis annulata



Notolepis rissoi

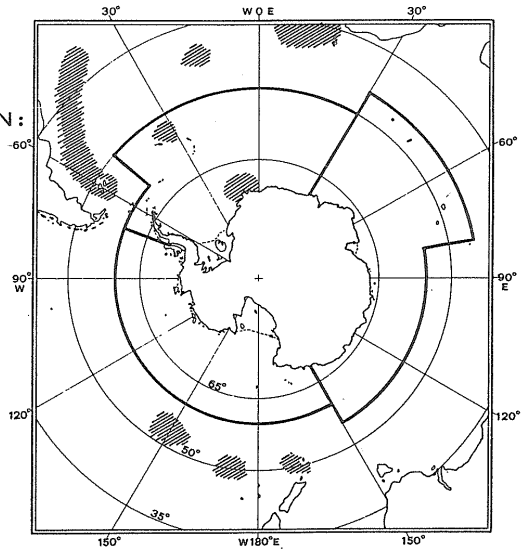
SIZE :

Maximum: 55 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Probably circumglobal in the Southern Ocean from 20°S to 60°S; but not yet reported from the southern Indian Ocean; specimens south of the Antarctic Convergence probably expatriated.

Spawns in temperate and subtropical waters; feeds mainly on fishes.



CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Taken as bycatch in pelagic trawls and used for fishmeal.

PARALEP Not 1

1985

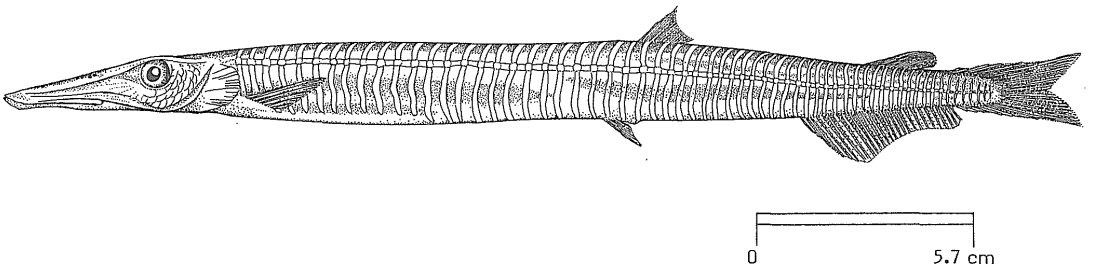
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PARALEPIDIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notolepis annulata Post, 1978

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Ringed barracudina
Fr - Barracudine annelée
Ru - Kolchataya barrakudina
Sp - Barracudina anillada

NATIONAL :

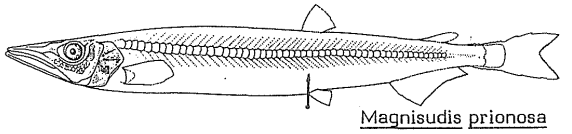
DISTINCTIVE CHARACTERS :

Body elongate, subcylindrical. Snout terminal, pointed; upper jaw extending just below nasal aperture. Base of dorsal adipose fin long, at least twice the height of caudal peduncle; anal fin with 24 to 27 rays, its origin at hindmost fifth of standard length; pectoral fins with 10 or 11 rays; origins of pelvic fins distinctly in front of a vertical from first dorsal fin ray. Lateral line conspicuously modified; dorsal and ventral protrusions of each lateral line scale extend to dorsal and ventral midline, thus forming a transverse striation of the body; 75 to 82 vertebrae.

Colour: brownish to greyish in a continuous sequence of light and dark transverse stripes. Young specimens yellowish with the black peritoneum shining through the belly.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

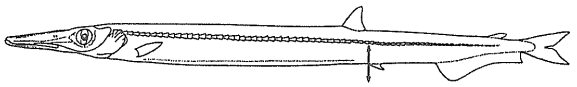
Magnisudis prionosa: no striation on body; 14 to 17 rays in pectoral fins (10 or 11 in N. annulata); base of dorsal adipose fin short; origin of pelvic fins below or slightly behind first dorsal fin ray.



Magnisudis prionosa

Notolepis coatsi: no striation on body; gill chamber black.

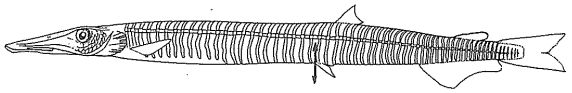
N. rissoi: no striation on body; 28 to 33 rays in anal fin (24 to 27 in N. annulata); origin of pelvic fins behind a vertical from first dorsal fin ray; gill chamber black.



Notolepis rissoi

SIZE :

Maximum: about 30 cm.



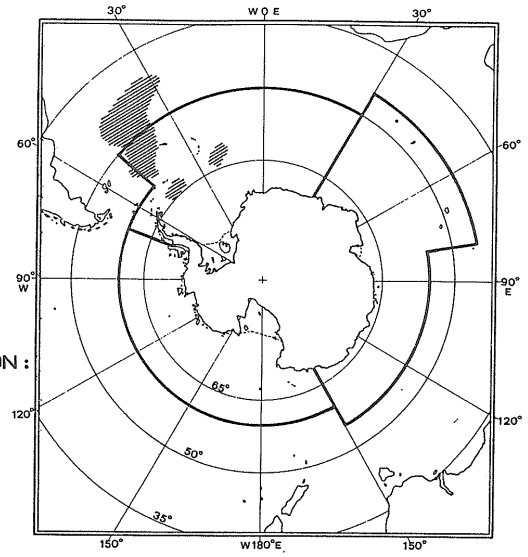
Notolepis annulata

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Only known from the western Atlantic section of the Antarctic between 43°S and 62°S; probably circumglobal in Antarctic waters.

Pelagic between the surface and 2,000 m. Nothing is known about spawning areas.

Feeds on fish, occasionally on krill; the complex lateral line system has been interpreted as a sensory organ to detect fishes (prey or enemies) in a krill-cluster.



CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

This species has been discovered recently; no forecast can as yet be made about its possible commercial importance.

PARALEP Not 2

1985

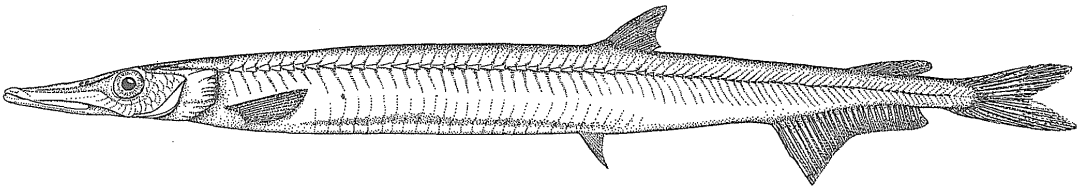
FAO SPECIES IDENTIFICATION SHEETS

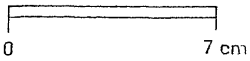
FAMILY : PARALEPIDIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Notolepis coatsi Dollo, 1908

OTHER SCIENTIFIC NAMES STILL IN USE : None





VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic jonasfish
Fr - Barracudine antarctique
Ru - Antarktischeskaya barrakudina
Sp - Barracudina antártica

NATIONAL :

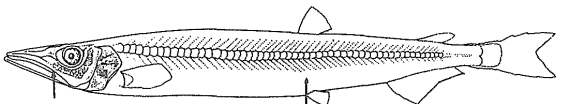
DISTINCTIVE CHARACTERS :

Body elongate, compressed. Snout terminal, pointed; upper jaw extending just below nasal aperture. Base of dorsal adipose fin long, at least twice the height of caudal peduncle; anal fin with 26 to 29 rays, its origin at hindmost fifth of standard length; pectoral fins with 9 to 11 rays; origin of pelvic fins distinctly in front of a vertical from first dorsal fin ray. Lateral line scales almost cryptic; 86 to 89 vertebrae.

Colour: almost colourless, thus looking yellowish except for some brownish areas at tip of snout, base of caudal fin rays, nasal aperture and pectoral fins; this appearance might be artificial as scales and epidermis are easily shed in the fishing gear; the black or dark brownish skin remaining on caudal fin, around nasal apertures and in the gill chamber may in fact indicate that adults of this species are heavily coloured and even black in life.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

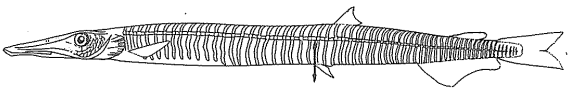
Magnisudis prionosa: 21 to 24 anal fin rays (26 to 29 in N. coatsi); 14 to 17 pectoral fin rays (9 to 11 N. coatsi); lateral line scales distinctly visible; origin of pelvic fins below or slightly behind first dorsal fin ray.



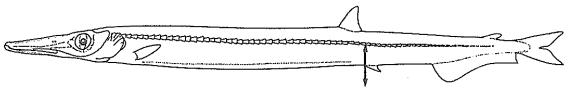
Magnisudis prionosa

Notolepis annulata: conspicuous vertical striation on body; gill chamber light.

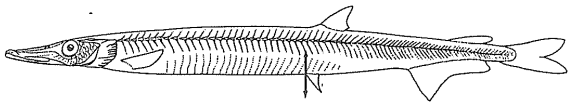
N. rissoi: lateral line scales distinctly visible; dark spots on rear part of body; origin of pelvic fins behind a vertical from first dorsal ray.



Notolepis annulata



Notolepis rissoi



Notolepis coatsi

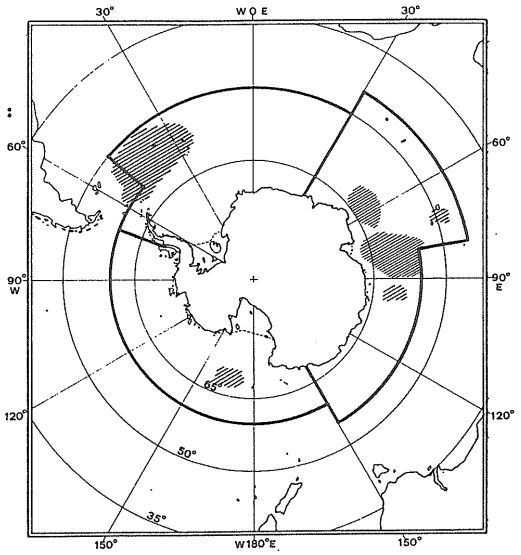
SIZE :

Maximum: about 40 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumglobal in Antarctic waters south to 65°S; most records are from the western Atlantic sector; records from the Indian and Pacific sectors refer to very young specimens collected from the surface to 2 000 m depth.

Seems to feed on krill exclusively.



CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Taken as bycatch in krill trawls and used as fishmeal.

PARALEP Not 3

1985

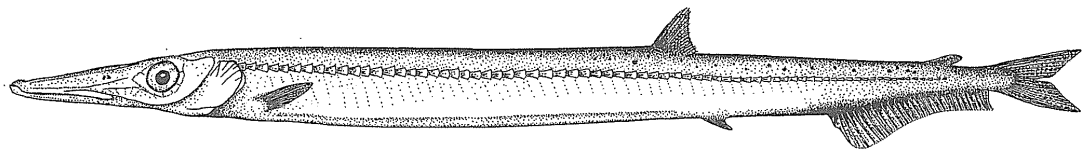
FAO SPECIES IDENTIFICATION SHEETS

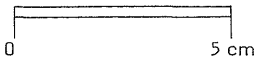
FAMILY : PARALEPIDIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Notolepis rissoi (Bonaparte, 1840)

OTHER SCIENTIFIC NAMES STILL IN USE : None





VERNACULAR NAMES :

FAO/CCAMLR : En - Spotted barracudina
Fr - Barracudine pintade
Ru - Barrakudina Risso
Sp - Barracudina pintada

NATIONAL :

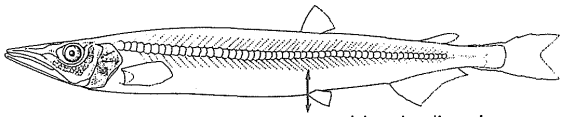
DISTINCTIVE CHARACTERS :

Body elongate, compressed. Snout terminal, pointed; upper jaw extending just below nasal aperture. Length of dorsal adipose fin base about equal to height of caudal peduncle; anal fin with 28 to 33 rays, its origin at hindmost fifth of standard length; pectoral fins with 10 to 12 rays; origin of pelvic fins below last dorsal fin ray; origin of anal fin at hindmost fifth of standard length. Lateral line distinct; 80 to 83 vertebrae.

Colour: silvery when fresh and fully scaled; greyish dorsally, light ventrally; small but distinct black spots scattered along rear part of body; a black area at base of first anal fin rays. Young specimens with at least 7 peritoneal sections shining through the belly, confluent in larger adolescents.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

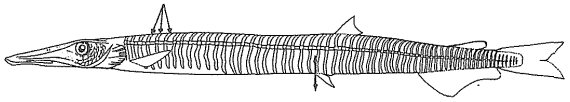
Magnisudis prionosa: 21 to 24 rays in anal fin (28 to 33 in N. rissoi); 14 to 17 rays in pectoral fins (10 to 12 in N. rissoi); pelvic origin below first dorsal fin ray; no scattered black spots on rear part of body; upper jaw extending to below anterior margin or eye.



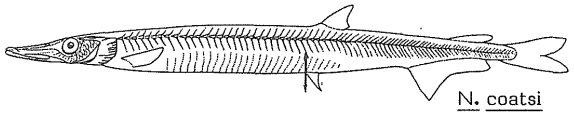
Magnisudis prionosa

Notolepis annulata: processes of lateral line scales forming transverse stripes on body; origin of pelvic fins distinctly in front of a vertical from first dorsal fin ray; gill chamber light; 24 to 27 rays in anal fin.

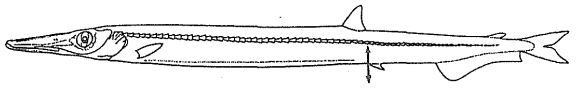
N. coatsi: lateral line scales hardly visible without staining; no scattered spots on rear part of body; origin of pelvic fins distinctly in front of a vertical from first dorsal fin ray.



Notolepis annulata



N. coatsi



N. rissoi

SIZE :

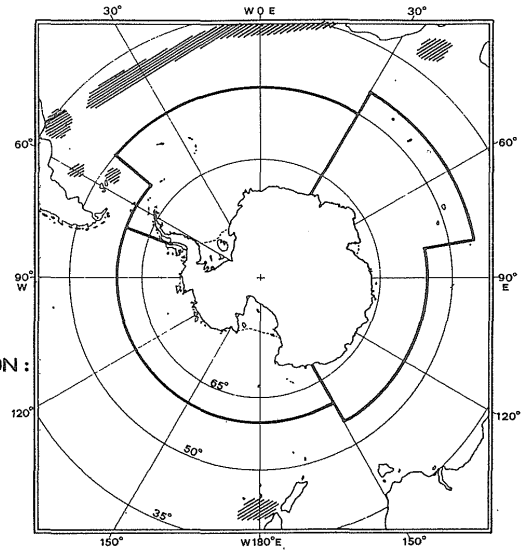
Maximum: about 30 cm; common to 25 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Worldwide in all kinds of waters; in the Atlantic consistently reported from about 60°N to 52°S; within the area probably expatriated; southernmost record from off the Falkland/Malvinas Islands, not yet found in the southern Indian Ocean and eastern South Pacific.

Inhabits open oceans between the surface and about 1 000 m depth; possibly at least temporarily pseudoceanic, found in high concentrations over continental slopes at 600 m depth. Spawns in tropical and subtropical waters.

Feeds mainly on fishes and crustaceans.



CATCHES, FISHING GEAR AND FORMS OF UTILIZATION :

Taken as bycatch in pelagic trawls and used for fishmeal.

ZOAR

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

ZOARCIDAE

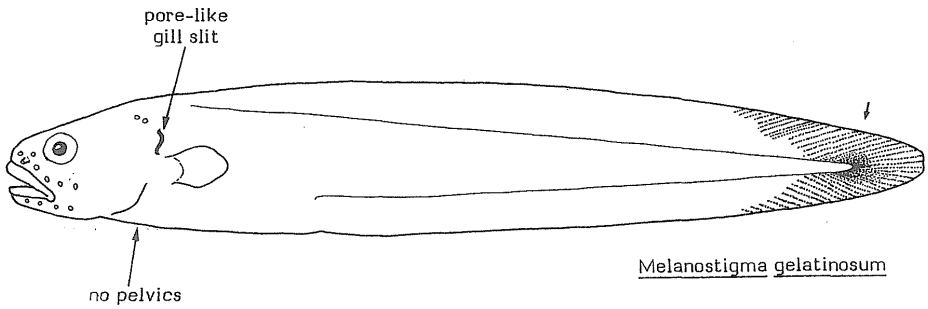
Eelpouts

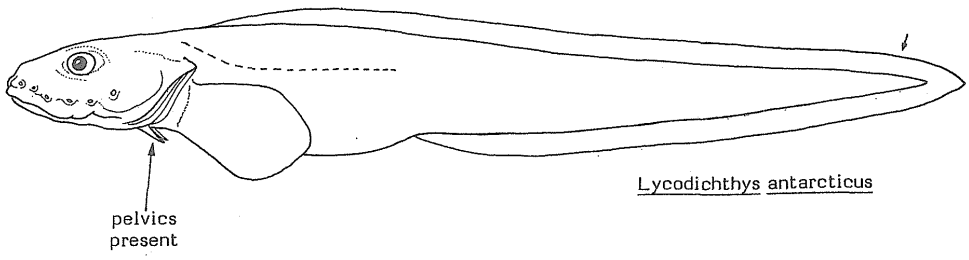
Small to medium-sized fishes recognized by their shortened, eel-like shape. Head ovoid or flattened; eyes very near or on top of head; nostrils single; no spines on head or opercle; supramaxilla and basibranchial teeth absent; mouth small or moderately large; gill openings variable, from a small pore above pectoral fin to a broad fold not connected to isthmus; branchiostegal rays 4 to 7. Dorsal and anal fins confluent with caudal; fin supports in 1:1 relationship with successive vertebrae; dorsal fin usually with no spines (first and second elements sometimes "flexible spines"); anal fin with no spines; pelvic fins rudimentary or absent (with 2 or 3 rays when present). Scales, when present, very small, cycloid, imbedded in the skin. Lateral line on body, when present, consisting of "free lateralis organs" (neuromasts not in a canal). No swimbladder. Head pores prominent.

Colour: Austrolycichthys and Ophthalmolycus uniformly dark brown, abdomen dark bluish, branchiostegal membranes and lower parts of head black; Lycenchelys uniformly dark brown, purplish or black, fins may have black margins; Lycodapus and Melanostigma pearly-white, posterior margins of dorsal and anal fins, as well as anterior portion of head, often black (M. vitiazi is uniformly dark brown). Lycodichthys dark brown above, with lighter brown to yellowish or whitish mottling below.

Most eelpouts are benthic slope dwellers found around the world, but Lycodapus and Melanostigma are meso- or bathypelagic. Benthic forms are usually sexually dimorphic, with males having larger heads, and longer jaws and pectoral fins than females. They eat mostly infaunal invertebrates, and females spawn few very large eggs.

At present, eelpouts have no economic importance in Antarctic regions. In fact, most species from the region are rare in museum collections and the literature on them is poor.





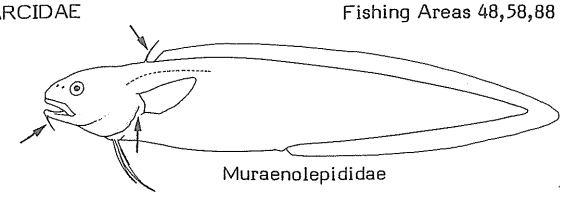
SIMILAR FAMILIES OCCURRING IN THE AREA :

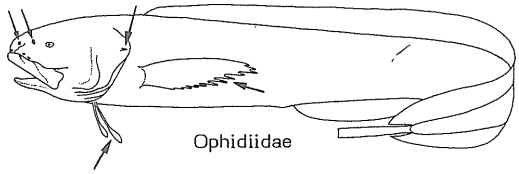
Muraenolepididae: two dorsal fins, the first with one elongate ray; chin barbel and swimbladder present; upper edge of gill slit under pectoral fin.

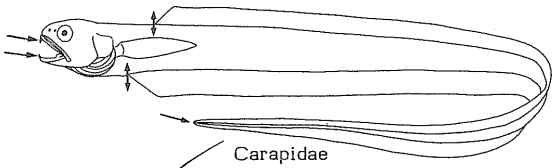
Ophidiidae (Holcomycteronus brucei only): opercular spine and basibranchial teeth present; two pairs of nostrils; branchiostegal rays 8; posterior margin of pectoral fin membrane well separated from ray tips, ventralmost rays more or less free; pelvic fins long, flattened at tips (paddle-shaped).

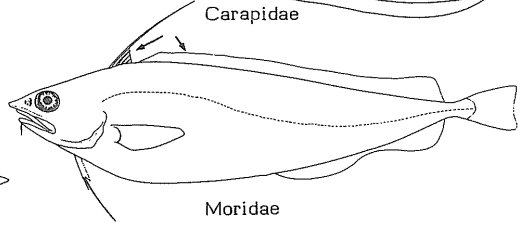
Carapidae: anal fin origin in advance of dorsal origin and under pectoral fin; isolated and enlarged canines at symphysis of both jaws; two pairs of nostrils; swimbladder present; posterior region of tail whip-like.

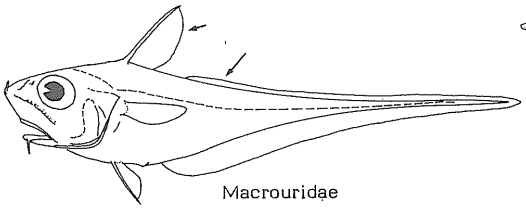
Moridae and Macrouridae: at least 2 dorsal fins; pelvic fins always well developed even if filamentous.


Muraenolepididae


Ophidiidae


Carapidae


Moridae


Macrouridae

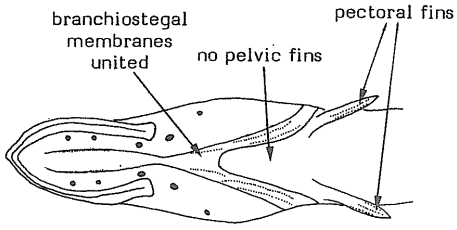
KEY TO GENERA OCCURRING IN THE AREA :

1a. Branchiostegal membranes united, entirely free of isthmus posteriorly (Fig.1); no suborbital pores or palatine membrane (oral valve); mandibular and preopercular "lateralis" canals separated by septum; scales and pelvic fins absent..... Lycodapus

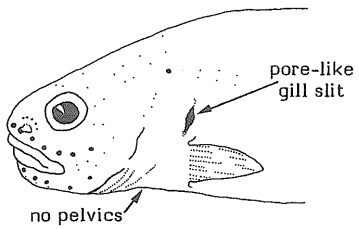
1b. Branchiostegal membranes joined to isthmus; gill slit a small pore above pectoral fin, or extending ventrally to near pelvic or pectoral fin base; suborbital pores present; palatine membrane present; mandibular and preopercular canals joined (except in Lycenchelys antarctica)

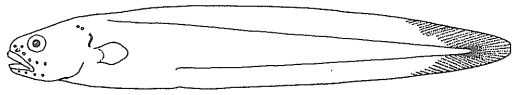
2a. Scales absent; gill slit restricted, either a small pore above pectoral or extending ventrally to middle of pectoral base; pelvic fins absent

3a. Gill slit a small pore above pectoral fin (Fig.2); preopercular pores absent; postorbital pores 0 or 1; one (anterior) nasal pore; body lateral line absent (except in M. vitiazi) ..... Melanostigma



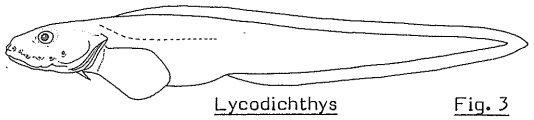
underside of head
Lycodapus Fig. 1




Melanostigma Fig.2

3b. Gill slit extending ventrally to mid-pectoral base; preopercular pores 3; postorbital pores 2 or 3; nasal pores 2; body lateral line present ..... Oidiphorus?*

2b. Scales present; gill slit extending ventrally to lower edge of pectoral base or farther; pelvic fins present (except in Lycenchelys hureaui and Lycodichthys dearborni)

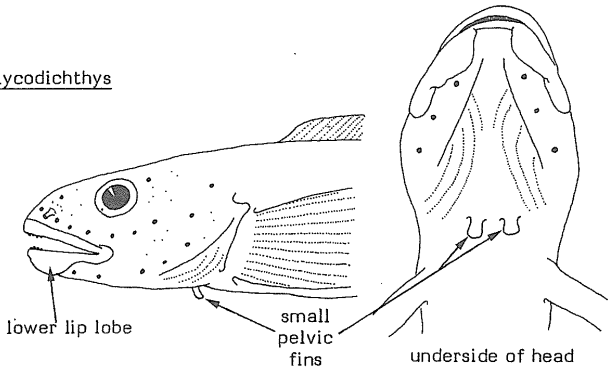


Lycodichthys Fig. 3

4a. Vomerine and palatine teeth absent; pyloric caeca and pseudobranch absent; suborbital bones 5 (Fig.3) ..... Lycodichthys

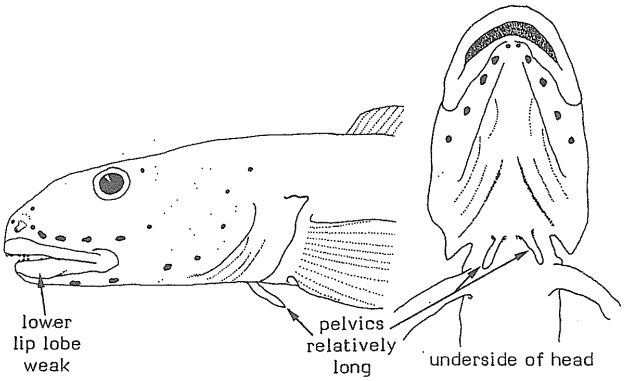
4b. Vomerine and palatine teeth present; pyloric caeca and pseudobranch present; suborbital bones 6 to 10

5a. Body height at anal fin origin 9.3 to 11.6% standard length; lower lip with well developed lobe (Fig. 4); posterior tips of pelvic fins separated from lower edge of pectoral fins by 1 to 2.5 times its length ..... Austrolycichthys**



Austrolycichthys Fig.4

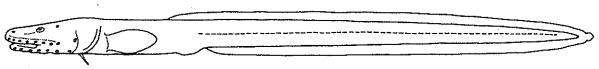
5b. Body height at anal fin origin 2.3 to 9.5% standard length; lower lip without, or with only slight, lobe (Fig.5); posterior tip of pelvic fin separated from lower edge of pectoral fin by its length or less, or overlapping pectoral base entirely (when less than a distance of more than 3/4 pelvic length, body height 2.3 to 6% standard length; Lycenchelys hureaui lacks pelvic fins)



Ophthalmolycus Fig.5

6a. Pyloric caeca relatively long, about 1 eye diameter in length; dorsal fin origin associated with vertebrae 3 to 5; number of vertebrae 94 to 110 (Fig.5) ..... Ophthalmolycus

6b. Pyloric caeca reduced, two small knobs; dorsal fin origin associated with vertebrae 7 to 13; number of vertebrae 102 to more than 120 (Fig.6) ... Lycenchelys***



Lycenchelys Fig.6

* "Oidiphorus" laevifasciatus, described from a single specimen from the South Sandwich Islands, does not belong in Oidiphorus McAllister & Rees, and its status is uncertain

** Status of genus uncertain

*** The gender of Lycenchelys is feminine (but "nigripalatum" is a noun in apposition)

LIST OF SPECIES OCCURRING IN THE AREA :

Austrolycichthys brachycephalus (Pappenheim, 1912)

Lycenchelys amberensis Tomo, Marschoff & Torno, 1977
Lycenchelys antarctica Regan, 1913
Lycenchelys aratrirostris Andriashev & Permitin, 1968
Lycenchelys argentina Marschoff, Torno & Tomo, 1977
Lycenchelys bellingshauseni Andriashev & Permitin, 1968
Lycenchelys hureaui (Andriashev, 1979) (= Apodolychus hureaui)
Lycenchelys nigripalatum DeWitt & Hureau, 1979
Lycenchelys tristichodon DeWitt & Hureau, 1979

Lycodapus antarcticus Tomo, 1981
Lycodapus pachysoma Peden & Anderson, 1978

Lycodichthys antarcticus Pappenheim, 1911
Lycodichthys dearborni (DeWitt, 1962) (= Rhigophila dearborni)

Melanostigma bathium Bussing, 1965
Melanostigma gelatinosum Günther, 1881

"Oidiphorus" laevifasciatus Torno, Tomo & Marschoff, 1977

Ophthalmolycus bothriocephalus (Pappenheim, 1912) (= Austrolycichthys bothriocephalus)
* Ophthalmolycus concolor (Roule & Despax, 1911)

Prepared by M. Eric Anderson, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA

* The name "Lycodes concolor (Roule & Despax, 1911)" is preoccupied by "Lycodes concolor" "Gill & Townsend, 1897". Hence "Ophthalmolycus concolor" will have to be replaced by a new name in the near future

GENERAL REMARKS

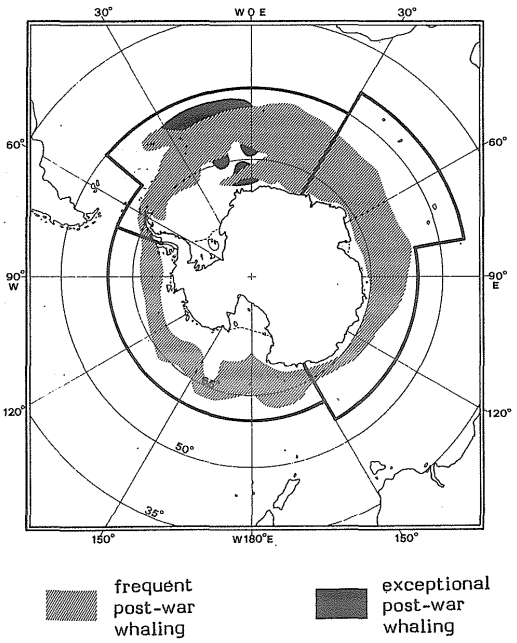
There is a very natural desire on encountering a seal or a whale to try to put a name to the animal. But the identification of marine mammals presents more problems than that of many groups. The characters that distinguish one species from another are not usually those of simple colour patterns, as is often the case with birds, nor is it possible to have the specimen 'in the hand' as one can with fish, for example, so a detailed examination is not usually possible. Very often the best has to be made of a fleeting glimpse of the animal and in these circumstances doubts will certainly remain as to its specific identity.

Seals are most often seen on land or on floating ice, and in those cases where close approach is possible there need never be any difficulty in identifying the Antarctic species, though some northern forms of fur seals straying into the area could pose problems. Whales are very occasionally found cast ashore and in most cases it will be easy to identify these strandings, though with some toothed whales it may not be possible to identify down to species without expert examination of prepared skulls.

At sea seals are rather rarely seen (considering their adundance), though fur seals are in places conspicuous, porpoising on their way to and from their feeding grounds, and occasionally large groups of crabeater seals may be seen swimming purposefully along. Whales are most often seen at sea but identifying them there is a task for a very skilled observer. Although some sightings will be plainly enough of one species or another, there will be many more sightings where it will be impossible to determine the species, genus or even family of cetacean seen. A recently published guide to whales implies that it is possible to identify cetaceans at sea down to species. For most whales this is not possible without a great deal of practical experience; for some it will not be possible even then. The present authors, who have both been familiar with whales in the Antarctic for more than thirty years each, freely admit that only a minority of sightings can be positively identified. Nevertheless, the characters given in the following accounts should assist in many cases in putting a tentative name to a sighting. As a result of the difficulties with identification of sightings, the precise distribution of the large whales are insufficiently known. The Antarctic whaling grounds for these species are shown here.

A further warning must be given. Because of the great difficulty of identification at sea, it is still uncertain which species of toothed whales (particularly dolphins and beaked whales) occur in the Southen Ocean. All species known to occur south of the Antarctic Convergence have been included in these accounts, but the possibility remains that others may turn up from time to time. If this is the case the accounts will be incomplete and the key defective.

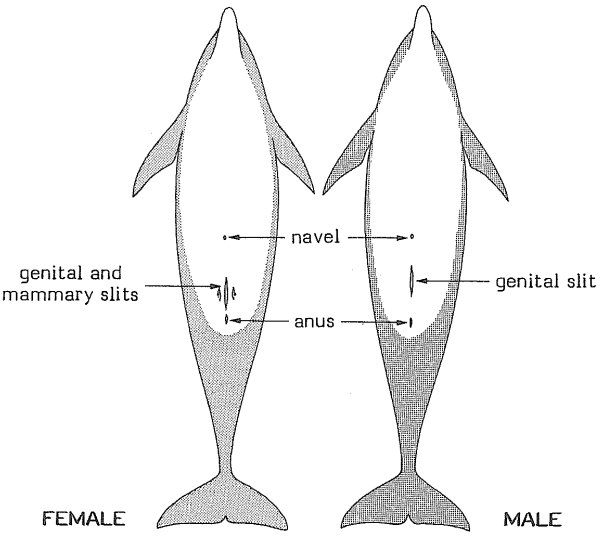
The Antarctic marine mammals comprise major orders: the whales, dolphins and porpoises (Order Cetacea) and the seals, sea lions and walrusses (Order Pinnipedia).



Antarctic whaling grounds

ORDER CETACEA - Whales, dolphins and porpoises

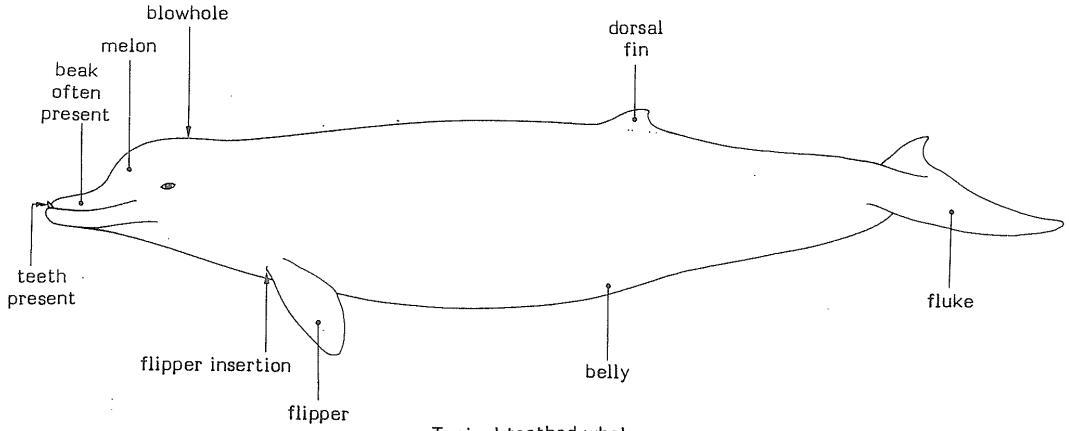
The order Cetacea is made up of two suborders, the Mysticeti (baleen or whalebone whales) and the Odontoceti (toothed whales). A third suborder, the Archaeoceti, became extinct in the Miocene. All are warm-blooded air-breathing mammals, highly adapted for life in the water, which they never leave. The body shape is highly streamlined: the typical mammalian hair coat has been lost (except for a few sensory whiskers in some species); there are no external ear flaps; the male penis at rest is completely internal and the female genitalia and nipples are contained within a common furrow just anterior to the anus. There is no trace of hind limbs (but vestiges of the pelvic girdle are present internally). Locomotion is by means of vertical undulations of the posterior end of the body. Fibrous lateral extensions of the tail tip, unsupported by bony structures, form the tail flukes. In most cetaceans there is a dorsal fin, also entirely fibrous and without skeletal support.



underside of cetacean (schematic)
Adapted from L. Watson, 1981

SUBORDER ODONTOCETI - Toothed whales

The Odontoceti comprise seven families (more or less), of which four have been recorded in the Southern Ocean. All odontocetes are characterized by the presence of teeth (though in some species these do not emerge from the gum), an asymmetrical skull, a single nasal opening, double-headed ribs, sternal ribs present (cartilaginous in some families), and a sternum composed of three or more sternebrae articulating with three or more pairs of ribs. In most odontocetes the area between the front of the mouth and the nasal opening (usually referred to as the "forehead", but actually the upper lip) is expanded to form a rounded body or "melon". This contains a concentration of oil and liquid wax and probably functions as a hydrostatic organ. It may also serve to focus sound beams. The teeth are simple, either conical, flattened plates or spade-shaped (except for the Arctic narwhal, Monodon monoceros). They have single roots and only one set is present throughout life.

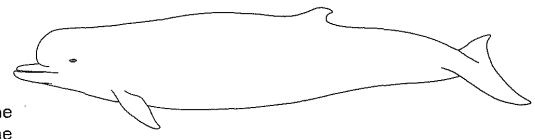


Typical toothed whale

GUIDE TO FAMILIES OF TOOTHED WHALES

ZIPH

ZIPHIIDAE: Beaked whales



(18 species in 5 genera)

Medium-sized (6 to over 12 m) toothed whales with the snout drawn out into a beak. Existing forms (with one exception) all show a strong reduction of dentition, usually with 1 or 2 pairs of visible teeth in lower jaw (usually only in adult males). There are two diverging longitudinal lines on the throat. Flippers are comparatively small and there is a small dorsal fin set well back. There is no central notch between the flukes.

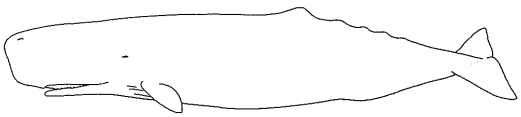
Species known from the Southern Ocean:

Berardius arnuxii Duvernoy, 1851	ZIPH Ber 1
Hyperoodon planifrons Flower, 1882	ZIPH Hyp 1

This group is very imperfectly known. They are believed to be oceanic and to feed mainly on squid and deepsea fish. Mass strandings seldom or never occur.

PHYS

PHYSETERIDAE: Sperm whales



(3 species in 2 genera)

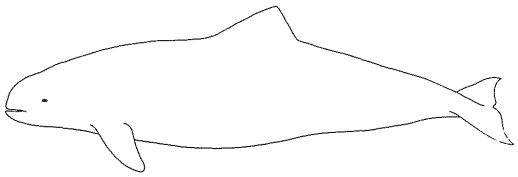
Small (2.7 m) to very large (20.7 m) toothed whales, characterized by the development of a spermaceti organ in place of the melon. The tip of lower jaw does not extend to the end of snout. The two smaller members of the family, the Pygmy sperm whale, Kogia breviceps, and the Dwarf sperm whale, K. simus, resemble the Sperm whale only slightly. They possess prominent dorsal fins and pointed flippers and have not been recorded from the Southern Ocean.

Species known from the Southern Ocean:

Physeter catodon Linnaeus, 1758	PHYS Phys 1

PHOC

PHOCOENIDAE: *Porpoises*



(6 species in 3 genera)

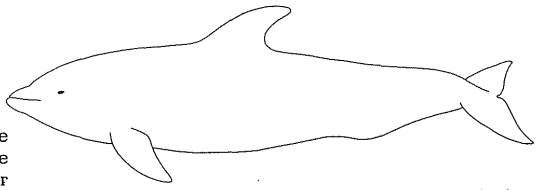
Small (1.2 to 2.25 m) toothed whales, lacking a beak and having spade-shaped teeth in both jaws. They are very similar (apart from these characters) to the Delphinidae and some authorities do not consider them a separate family. They are generally coastal in habit (except Dall's porpoise, Phocoenoides dalli) and are believed to feed largely on fish.

Species known from the Southern Ocean:

Phocoena dioptrica Lahille, 1912	PHOC Phoc 1

DELPH

DELPHINIDAE: True dolphins



(32 species in 17 genera)

Small (1.2 m) to large (8.2 m) toothed whales. The true dolphins form the largest family in the Odontoceti. There is a well-developed beak (except in the Orcininae - Killer whales and Pilot whales, and in Cephalorhynchus) and the jaws are neither exceedingly long nor narrow, with the tooth rows well separated and diverging posteriorly. They are the most abundant and varied of all the Cetacea and are found in all the oceans, from the tropics to the polar seas. Several genera (Delphinus, Stenella, Susa and Sotalia) contain species which at sea are indistinguishable from each other. The genus Cephalorhynchus shows convergence with the Phocoenidae.

Species known from the Southern Ocean:

Cephalorhynchus commersonii (Lacepède, 1804)	DELPH Ceph 1
Globicephala melaena (Traill, 1809)	DELPH Glob 1
Lagenorhynchus cruciger (Quoy & Gaimard, 1824)	DELPH Lag 1
Lissodelphis peronii (Lacepède, 1804)	DELPH Liss 1
Orcinus orca (Linnaeus, 1758)	DELPH Orc 1

NOTE: The Species Identification Sheets which follow are arranged in alphabetical order by family, genera and species.

DELPH Ceph 1

1985

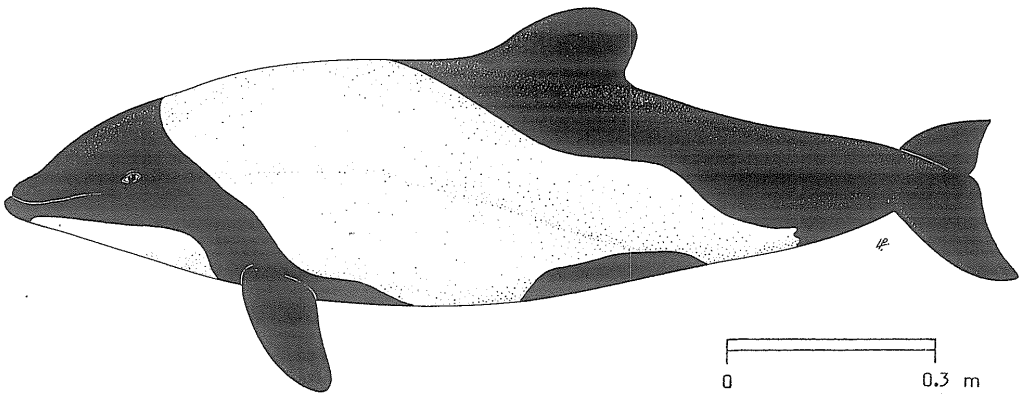
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DELPHINIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Cephalorhynchus commersonii Lacepède, 1804)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

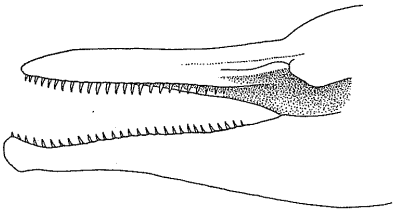
FAO/CCAMLR : En - Commerson's dolphin
Fr - Dauphin de Commerson, Jacobite
Ru - Delfin commersona
Sp - Tonina overa

NATIONAL :

DISTINCTIVE CHARACTERS :

A very small, rather tubby dolphin. Head broad and flat, with no trace of bulbous forehead; 29 to 32 pairs of peg-like teeth in both jaws. Dorsal fin a rounded lobe set well back, flukes slightly hollowed behind, with a definite notch.

Colour: black or dark grey with a large white cape across front half, extending down over belly, leaving a black patch around anus. White on throat and chin, so that the black area in the head region is confined to forehead, snout, lips and a broad area across the neck region to the flippers, which are black. The black colour on back extends over both upper and lower surfaces of flukes and around tail stock.



teeth

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Other small cetaceans: different colour patterns; never a large white cap extending across front half of body; dorsal fin more pointed, set near midpoint of back or before, or absent (Lissodelphis peronii), or straight-edged (Phocoena dioptrica); size much larger in Orcinus orca and Phocoena dioptrica.

SIZE :

Length range 1.35 to 1.65 m, weight 50 to 66 kg.

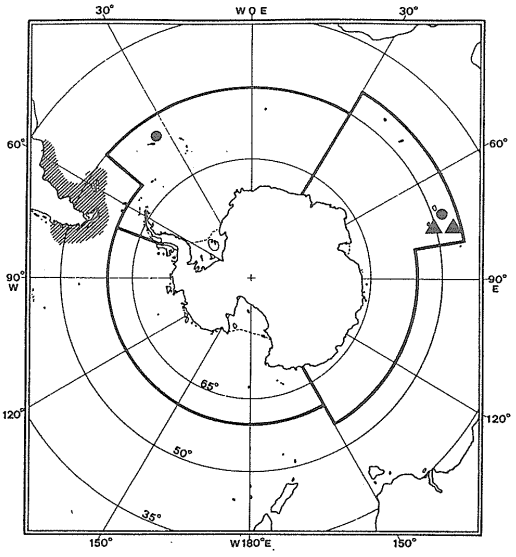
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Found in coastal waters along off Argentina from Peninsula Valdés to Tierra del Fuego, Falkland/Malvinas Islands, South Georgia (very rare), and Kerguelen Islands.

In their general shape, behaviour and coastal habits these dolphins strongly resemble porpoises. They occur in small groups (less than 10 individuals) and are seldom (never?) seen more than a few miles from land. Nothing is known of their breeding or food habits.

EXPLOITATION :

Some hunting for meat, both for bait and human consumption occurs in Argentina, but the species is not exploited in the Southern Ocean. No information exists on stock size. Very uncommon in waters to the south of the Antarctic Convergence.



: observations in this area

: at-sea observations

: specimen

DELPH Glob 1

1985

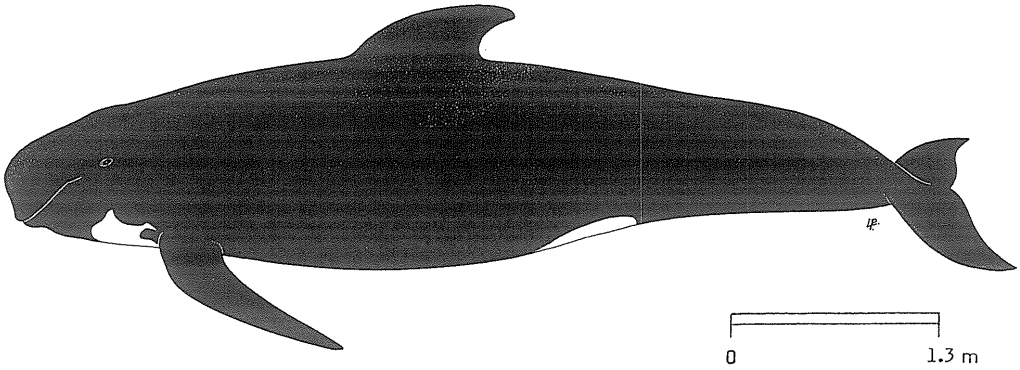
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DELPHINIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Globicephala melaena (Traill, 1809)

OTHER SCIENTIFIC NAMES STILL IN USE : None



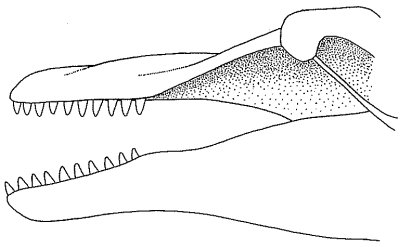
VERNACULAR NAMES :

FAO/CCAMLR : En - Longfinned pilot whale
Fr - Globicéphale noir
Ru - Grinda
Sp - Calderón de aleta larga

NATIONAL :

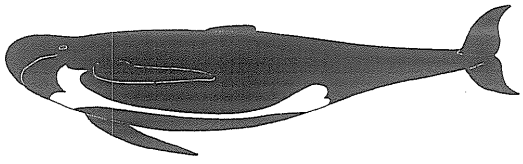
DISTINCTIVE CHARACTERS :

A medium-sized, long, slender whale (or large dolphin) with a characteristic bulging forehead ("pothead") which sometimes overhangs the upper lip (this feature is more pronounced in old males). Dorsal fin distinctive, set forward of midpoint of body, with a long base and a low profile, almost always strongly recurved on trailing edge, and rounded at tip. Flippers long, tapering and pointed, about one fifth of body length, and set well forward. Flukes notched and slightly concave along rear margin. Eight to 11 pairs of conical teeth in both upper and lower jaws.



teeth

Colour: black or dark brown, with a conspicuous anchor-shaped white patch on throat continued tailward to a varying distance. Adult males sometimes heavily scarred.



anchor-shaped pale marking

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Other species of Delphinidae (true dolphins): size smaller; forehead not bulging; dorsal fin located farther back, or taller and short-based (Orcinus orca) or absent (Lissodelphis peronii); more than 27 pairs of teeth in each jaw in all except Orcinus orca (8 to 11 pairs in Globicephala melaena); also different colour patterns.

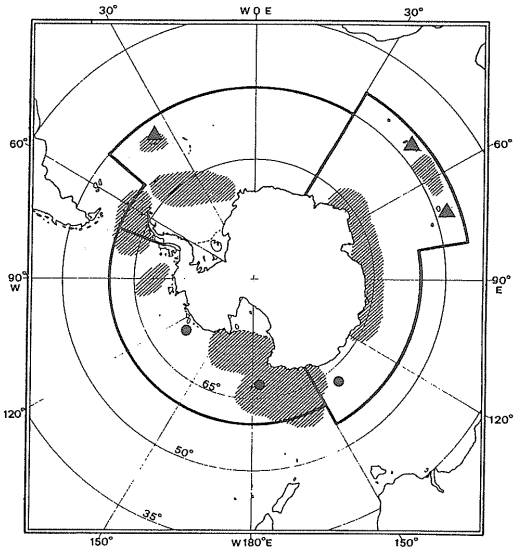
Phocaena dioptrica: teeth spatulate, dorsal fin straight-edged; typical colour pattern including a black ring around eye.

SIZE :

Adult males: length about 6.2 m (though it can be up to 8.5 m); females: length about 5 m (though up to 6 m. A 6 m long pilot whale weighs about 2 900 kg. Newborn: length about 1.8 m, weight 100 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Longfin pilot whales occur in the North Atlantic and around the Southern Hemisphere south of the tropics. In northern latitudes they are migratory, breeding in warm temperate waters and migrating poleward to feed. Probably the same occurs in the Southern Hemisphere.



: observations in this area

● : at-sea observations

▲ : specimen

OBSERVATION AT SEA :

Very gregarious whales, ocurring in schools of many hundreds, swimming slowly and steadily at the surface and rising to blow every 1 or 2 minutes. The bulbous forehead appears first, followed by a strong blow about 1 to 1.5 m high, then the back and dorsal fin arch over as the animal prepares to submerge. Before long dives, the flukes are generally shown. Pilot whales are notorious for mass strandings. These have not been recorded from the shores of the Southern Ocean. In the North Atlantic they feed largely on squid and fish. Their habits are probably similar in the Southern Ocean.

EXPLOITATION :

Subject to drive fisheries in the North Atlantic but unexploited in the south. No data exist on stock sizes.

DELPH Lag 1

1985

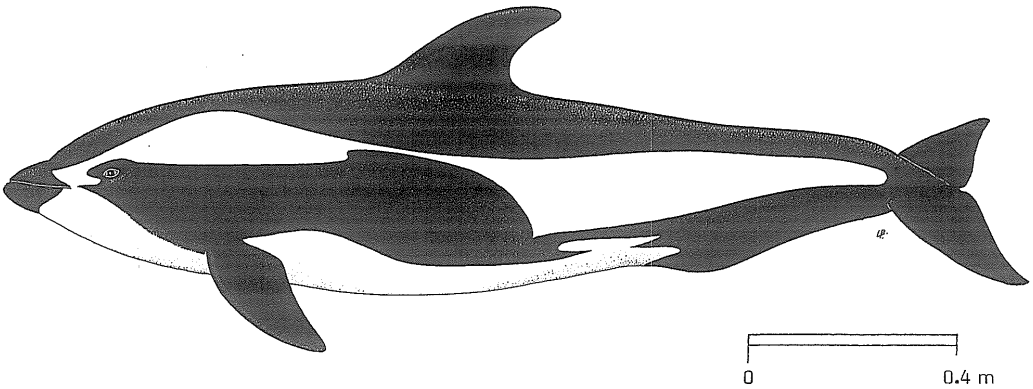
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DELPHINIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Lagenorhynchus cruciger (Quoy & Gaimard, 1824)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

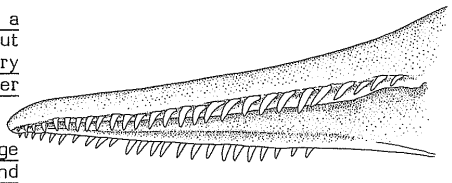
FAO/CCAMLR : En - Hourglass dolphin
Fr - Dauphin crucigère
Ru - Krestovidnyi delfin
Sp - Delffn cruzado

NATIONAL :

DISTINCTIVE CHARACTERS :

A small species of typical streamlined dolphin shape, with a tall, curved dorsal fin, generally very concave on trailing edge, but said occasionally to be more triangular. Snout rounded, with a very short, blunt beak; 28 pairs of small, pointed teeth in upper and lower jaws.

Colour: basically black above with a white belly. Two large white areas on each side, connected by a narrow white band ("hourglass"). Jaws, flippers and flukes black.



teeth in upper jaw

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

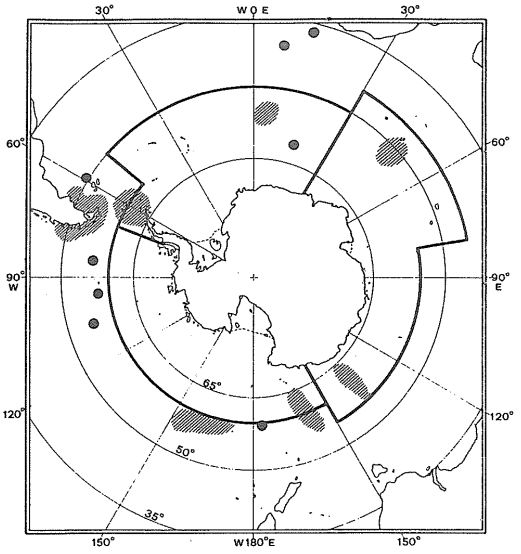
Other small cetaceans: none has the white "hourglass" patch on flanks nor the short blunt beak typical of L. cruciger. Furthermore: dorsal fin low and rounded in Cephalorhynchus commersonii, and absent in Lissodelphis peronii; head bulbous in Globicephala melaena; much larger size, dorsal fin taller and more erect, and typical white patches on sides of head and flanks in Orcinus orca; size much larger, dorsal fin low and straight-edged, teeth spatulate and a typical dark ring around eye in Phocoena dioptrica.

SIZE :

Length range 1.6 to 1.8 m.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Occurs circumpolarly both north and south of the Antarctic Convergence and in the cool waters of the West Wind Drift. Rarely seen near land. Forms groups of 5 to 15 (perhaps more) individuals, often associated with fin whale pods. Nothing is known of breeding or food habits. There is no history of exploitation, nor information on stock size.



: observations in this area

: at-sea observations

DELPH Liss 1

1985

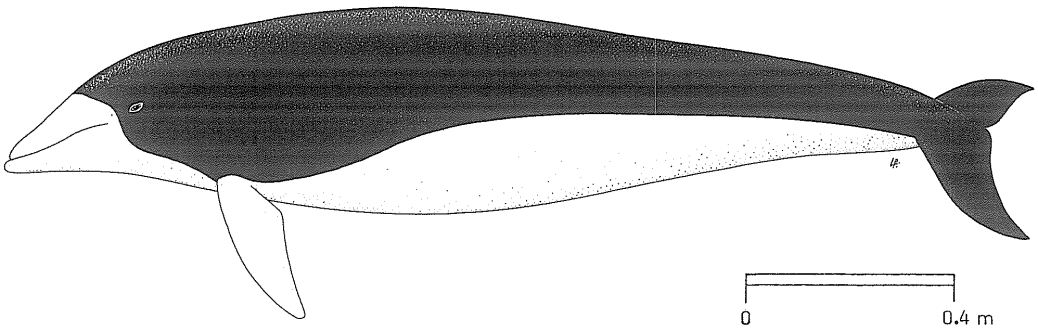
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DELPHINIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Lissodelphis peronii (Lacepède, 1804)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Southern rightwhale dolphin
Fr - Dauphin de Péron
Ru - Yuzhnyi kitovidnyi delfin
Sp - Delfín liso austral

NATIONAL :

DISTINCTIVE CHARACTERS :

A small dolphin, uniquely shaped, with the body somewhat wider than high (other dolphins are laterally compressed). No trace of dorsal fin and an evenly pointed, slender snout. Flukes concave behind with a pronounced notch. Fortythree to 47 pairs of small, conical teeth in both upper and lower jaws.

Colour: black above, white below, the white extending over snout from the insertion of flippers to in front of eyes. Flippers and undersides of flukes white.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Other small cetaceans: body laterally compressed; dorsal fin present; less than 33 pairs of teeth in both jaws (43 to 47 in L. peronii); different colour patterns.

SIZE :

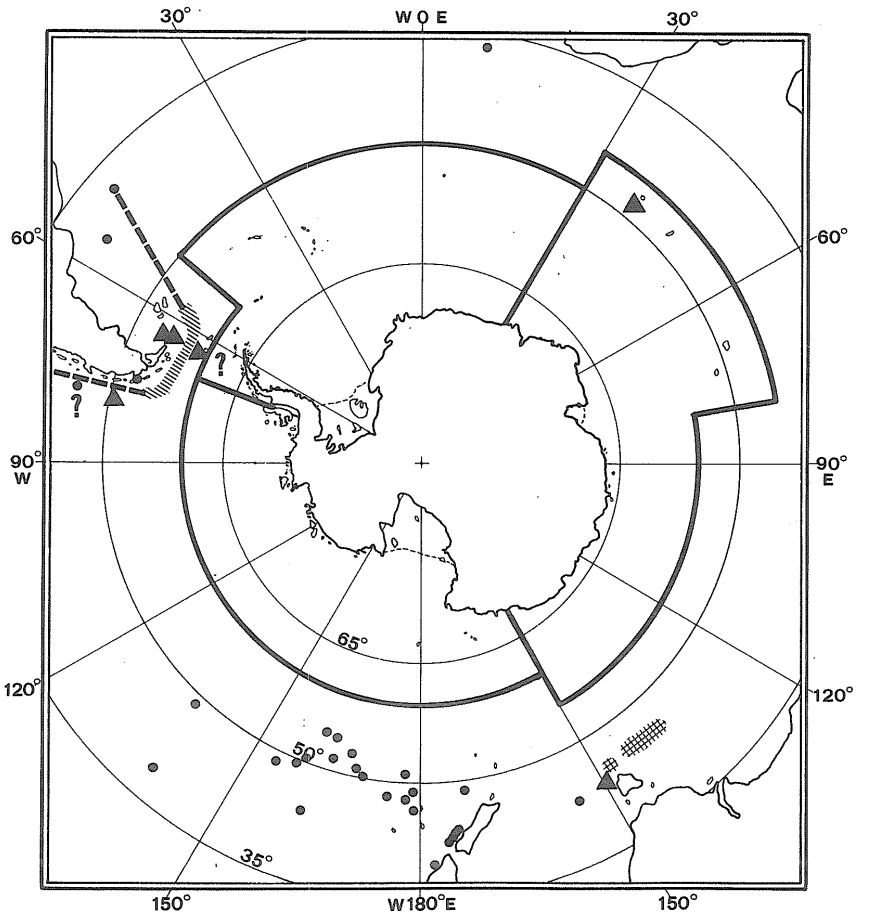
Maximum: 2.4 m length and 82 kg weight; common to 1.8 m length and 60 kg weight.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

A southern circumpolar pelagic species, occurring mainly north of the Antarctic Convergence in the West Wind Drift; also in the Falkland/Malvinas Current, the Humboldt Current, off South Africa and around New Zealand.

Occurs in large schools of 30 to 100, or up to 1 000 individuals, often associated with pilot whales.

Nothing is known of breeding or food habits. There is no history of exploitation nor information on stock size, but perhaps this species is not uncommon.



: observations within this area

: numerous observations along ship track

: at-sea observations

: scattered observations along ship track

: observation, exact locality not known

: specimen

DELPH Orc 1

1985

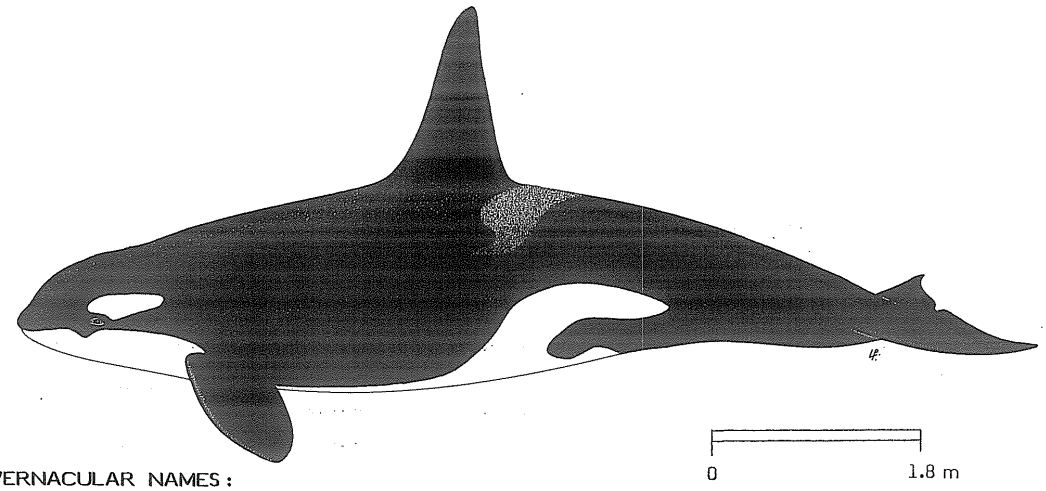
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : DELPHINIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Orcinus orca (Linnaeus, 1758)

OTHER SCIENTIFIC NAMES STILL IN USE : None



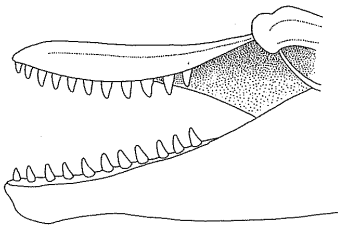
VERNACULAR NAMES :

FAO/CCAMLR : En - Killer whale
Fr - Orque, Epaulard
Ru - Kasatka
Sp - Orca

NATIONAL :

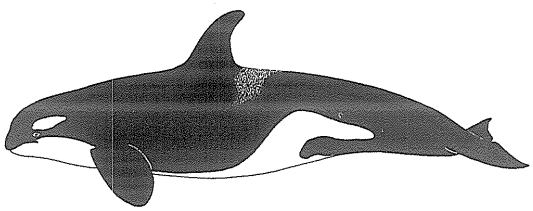
DISTINCTIVE CHARACTERS :

A medium-sized whale (or very large dolphin). Body bulky with a blunt, rounded head. The most conspicuous feature is the prominent dorsal fin situated in the middle of the back, shaped like an isosceles triangle with the height twice or more times the length of base. In adult males this fin may be 1.8 m tall; in females and juvenile males it is much smaller and has a more concave trailing edge. Even in females and juveniles, however, the dorsal fin is much taller than in other similar-sized cetaceans. Flippers broad, rounded and paddle-shaped; they increase from their original length (about one-ninth of body length) to about one fifth of body length in old males. Flukes concave on trailing edge, pointed at tip and with a deep notch. Mouth wide and jaws heavy, with 10 to 13 pairs of stout conical teeth (up to 5 cm protruding from gum) in both upper and lower jaws.



teeth

Colour: strikingly black and white with a sharp demarcation between these zones. A large oval white patch on side of head just above and behind eye; chin and throat white, this white area continuing back along the mid-ventral line. Beyond navel, on each side a broad white lobe reaches up and back while the ventral white area reaches back past these lobes. Most animals have a light grey saddle patch just behind the dorsal fin. In calves white areas are tan to yellow. Underside of flippers usually white. There are regional differences in pattern; animals from the Southern Ocean have not been described. All-black and all-white killer whales have been recorded.



female

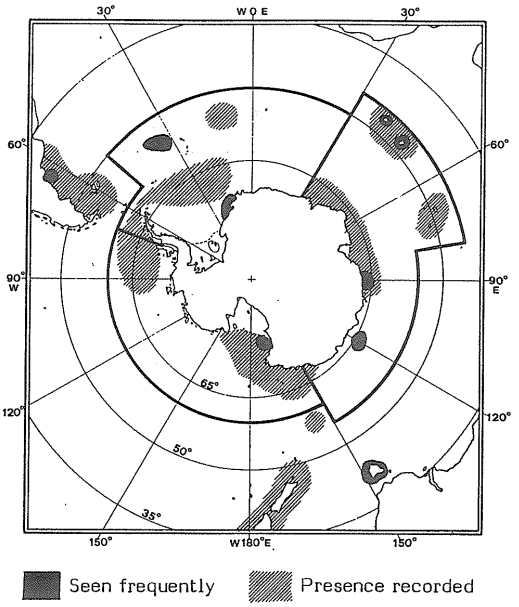
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

None of the other small cetaceans from the Southern Ocean have such a tall and erect dorsal fin, nor the 2 white marks typical of Orcinus orca (1 behind eye and the other on flank beyond the navel). All other true dolphins, except Globicephala melaena, have more than 17 pairs of teeth in each jaw (10 to 13 pairs in O. orca).

SIZE :

Adult males: length up to 8.2 m (possible maximum 9.4 m), weight to 8 t; females: length up to 7 m (possible maximum 8.2 m), weight to 4 t (sexual maturity at 4.9 m length). Newborn: length 2.1 to 2.4 m, weight 180 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :



A cosmopolitan whale, occurring in all parts of the ocean, right up to the pack ice edge and even into dense pack or under fast ice. Usually travels in pods of a few to 25 or 30 individuals. Occasionally the pods coalesce to form herds of over 100 individuals. There is evidence that pods form complex and stable social associations.

Breeding: generally in warmer waters (not described from the Southern Ocean). Sexual maturity: females 8 to 10 years; males probably in excess of 16 years. Gestation period 15 (13 to 16) months, most calves born in autumn. Lactation period about 12 months; birth interval minimum of 3 years, may be much more. Calves may remain with the mother for as long as 10 years.

Killers are extremely fast swimmers, capable of reaching 25 knots or more. Very active at the surface, breaching (leaping clear of water) and spy-hopping (raising head and forequarters out of the water to look around) frequently. Cooperative group hunting behaviour is characteristic. Besides fish and cephalopods, they feed extensively on warm-blooded prey. In the Antarctic, killers have been observed to feed on penguins and crabeater seals. They have been seen to dislodge prey from ice floes by tipping the floe up or, by swimming past, creating a wash that sweeps the prey off. Records of killers attacking large whales are numerous (though none of these are from the Southern Ocean).

EXPLOITATION :

Virtually unexploited in the south. The USSR took some tens of killer whales between 1972 and 1978; in 1979/80, 916 individuals were taken. Other than this, there is no recorded exploitation in the Antarctic. No information is available on stock size, but the killer whale, though conspicuous and frequently recorded, seems to be a relatively scarce species.

PHOCO Phoc 1
1985

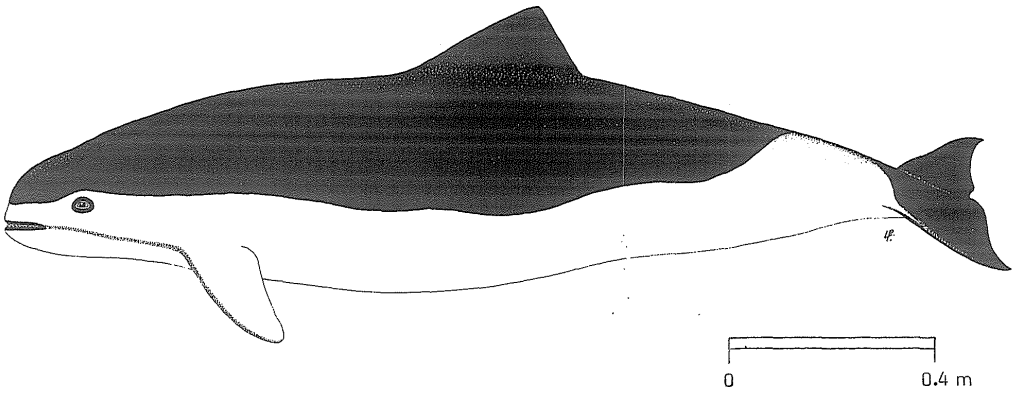
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PHOCOENIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Phocoena dioptrica Lahille, 1912

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

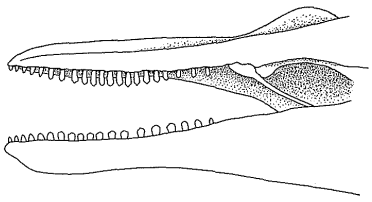
FAO/CCAMLR : En - Spectacled porpoise
Fr - Marsouin de Lahille
Ru - Ochkovaya morskaya svinya
Sp - Marsopa de anteojos

NATIONAL :

DISTINCTIVE CHARACTERS :

A large porpoise, with a typical blunt, beakless snout and a low, straight-edged dorsal fin. Seventeen to 23 pairs of spade-shaped teeth in upper jaw, generally rather fewer in the lower.

Colour: black above and white below. The junction of black and white rises above snout over eye, but the eye is ringed with a broad band of black (hence "spectacled") and the upper and lower lips are edged dark. This pigmented area continues as a thin band to the insertion of the flippers which are usually white, but may be black. The white colour rises up over the stock in older animals.



teeth (schematic)

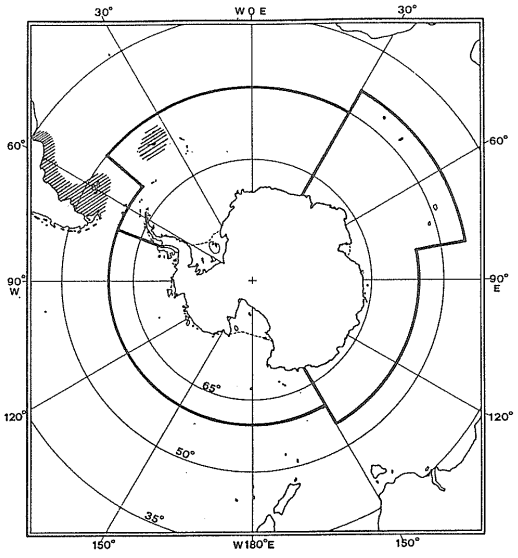
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Family Delphinidae (true dolphins): teeth conical, circular or slightly flattened from front to back in cross-section (spade-shaped, laterally compressed in P. dioptrica; different colour patterns.

None of the smaller cetaceans occurring in the Southern Ocean has the broad black ring around the eye nor the spade-shaped teeth typical of P. dioptrica.

SIZE :

Length within the range of 155 to 204 cm; weight between 60 and 84 kg.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Within the Southern Ocean, only one specimen is known from South Georgia. Also found on the eastern coast of South America from Uruguay to Tierra del Fuego and on the Falkland/Malvinas Islands. A Pacific population is described from Auckland Islands, New Zealand.

Nothing is known about food habits or breeding behaviour. There is no history of exploitation and no information on stock size, but this species is probably not as uncommon as the few records indicate.

PHYS Phys 1

1985

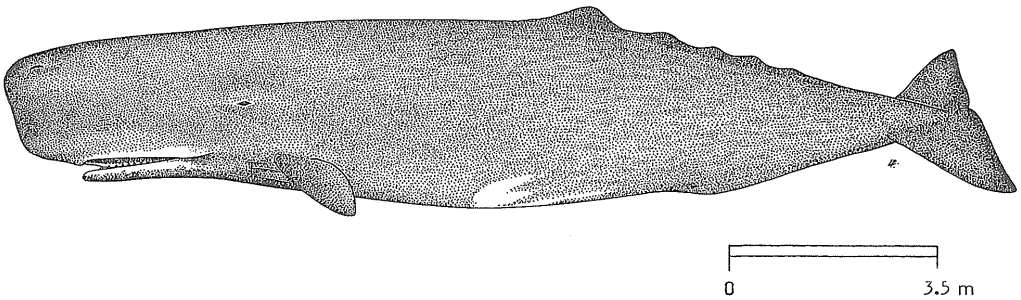
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PHYSETERIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Physeter catodon Linnaeus, 1758*

OTHER SCIENTIFIC NAMES STILL IN USE : Physeter macrocephalus (Linnaeus, 1758)



VERNACULAR NAMES :

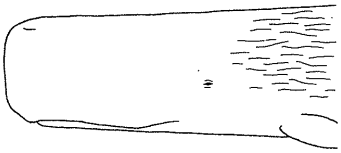
FAO/CCAMLR : En - Sperm whale
Fr - Cachalot
Ru - Kashalot
Sp - Cachalote

NATIONAL :

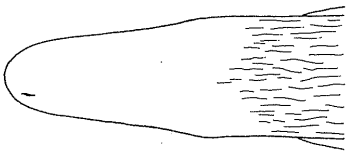
DISTINCTIVE CHARACTERS :

The largest of toothed whales, characterized by a blunt, squarish snout and an enormous head, which makes up a fourth to a third of the bulk of the animal. Dorsal fin (or hump) ill-defined, but followed by a series of 4 or 5 low crenulations. Body surface irregularly corrugated (though this is less evident in fat animals on the feeding grounds), particularly at the anterior end of the body. Numerous short grooves present on throat, most evident in adults. A single blowhole located well to the left of midline and far forward on head. Lower jaw a relatively narrow rod, not reaching to tip of upper jaw; 18 to 28 pairs of large, conical teeth in lower jaw which fit into sockets in the upper jaw; upper jaw either toothless or with a few stunted teeth, often concealed within the gum. Flukes shaped as right triangles with the hypotenuse as leading edge; right and left flukes often overlap slightly at median notch. Flippers short and paddle-shaped, tapering only slightly at tip.

Colour: dark brownish or slaty grey, paler on belly, where white patches often occur. Often extensively scarred, mostly around the head, with long single or groups of parallel scratches. Inside of mouth and lips white, but tongue bright pink.



head from side



head from above

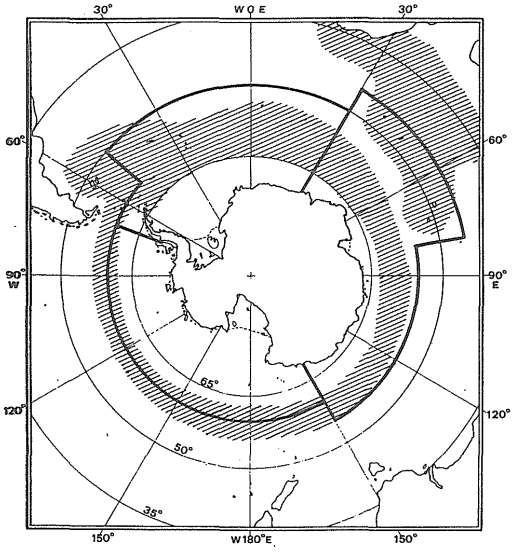
*There is still controversy about the priority of this name over P. macrocephalus

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

The very large head, the squarish snout, the narrow, underslung lower jaw and the crenulations on back make this species more easily recognizable than other cetaceans.

SIZE :

Males much larger than females, occasionally reaching 18.3 m, but more often 15 m, weight 40 to 70 t. Females rarely exceed 11.6 m, 15 to 20 t.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

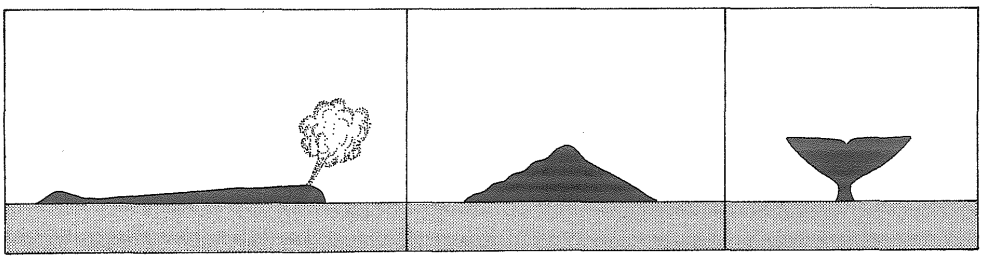
Cosmopolitan in warm waters; in polar waters only adult males occur (from October to March).

Breeding: takes place in tropical waters, in the season from February to March (Southern stocks). Gestation period 14 to 15 months; sexual maturity: females 7 to 12 years, males 18 to 19 years, social maturity: about 26 years. Very complex social structure, with males maintaining large harems. Mass strandings are known to occur, but have not been recorded in the Southern Ocean.

Feeding: based mainly on squid, but also takes demersal and bathypelagic fish, using echolocation to find its prey, and perhaps concentrated sonar pulses to stun it. A very deep diver, reaching depths in excess of 1 000 m, and can remain submerged for more than 1 hour.

OBSERVATION AT SEA :

Large head usually conspicuous; a single blow projected forward at a sharp angle and slightly to the left, short and bushy. Hump and crenulations following it clearly visible as the animal arches its back on diving. Flukes often displayed in final appearance at the surface before a long dive.



Blow from side

Diving sequence

EXPLOITATION :

Extensively harvested in the Southern Ocean, mainly in post-war years. Protected since 1981 from factory ship whaling by the International Convention for the Regulation of Whaling. It is likely that the harvesting (confined to adult males) may have adversely affected the social structure on the breeding grounds. The Southern Hemisphere stock is estimated at 71 000 males and 125 000 females.

ZIPH Ber 1

1985

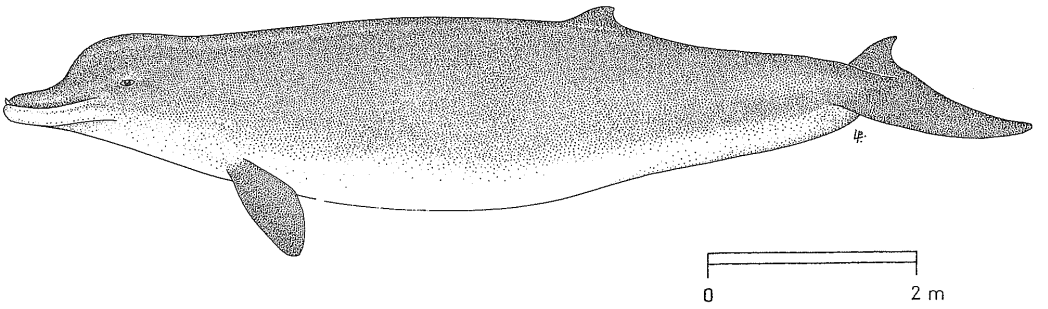
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ZIPHIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Berardius arnuxii Duvernoy, 1851*

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

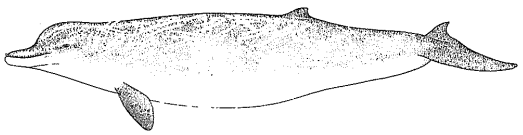
FAO/CCAMLR : En - Arnoux's beaked whale
Fr - Dauphin-à-bec d'Arnoux
Ru - Yuzhnyi plavun
Sp - Ballenato de Arnoux

NATIONAL :

DISTINCTIVE CHARACTERS :

A medium-sized whale with the snout drawn out into a beak; tip of lower jaw markedly protruding beyond upper jaw. A small, rather low dorsal fin located behind midpoint of back. Flippers comparatively short. Two pairs of large, triangular teeth at tip of lower jaw in adult males. Two conspicuous grooves on outer surface of throat forming a V-shape pointing forward. No notch between the flukes.

Colour: blue grey, becoming lighter on flanks; throat and belly pale.



scars typically present

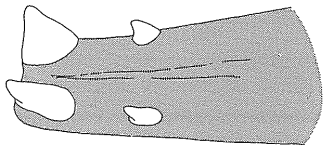
* This species may be conspecific with Berardius bairdii Stejneger, 1883 of the North Pacific

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

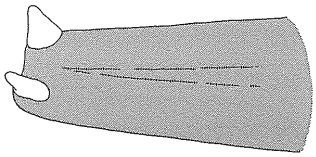
Hyperoodon planifrons: forehead extremely bulbous; tip of lower jaw only slightly longer than upper; dorsal fin higher and distinctly sickle-shaped; a single pair of conical teeth at tip of lower jaw in adult males (possibly also in females).

Females and juvenile males of these two species cannot certainly be separated (in the present state of knowledge) without the examination of prepared skulls. Adult males could be separated on the basis of the teeth.

The beak, together with the bulbous forehead and the absence of a notch between the tail flukes readily distinguish this species from other toothed whales.



B. arnuxii



Hyperoodon planifrons

teeth in lower jaw of adult male (schematic)

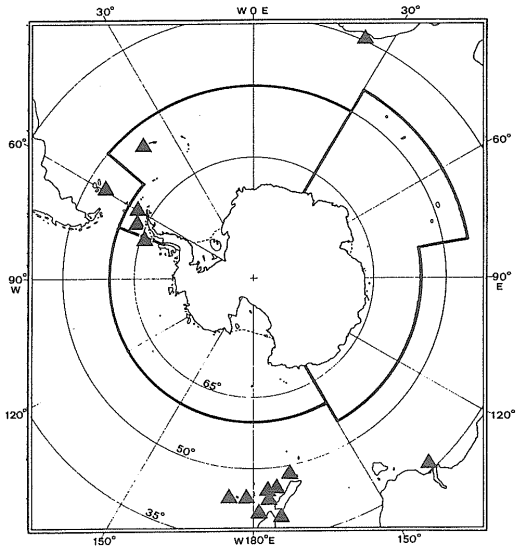
SIZE :

Length probably within the range of 8 to 10 m (longest recorded specimen a female, 9.75 m).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Positive records of this species in the Southern Ocean seem to be restricted to the South Shetlands and the northeastern part of Graham Land, but it is probably more widespread. Also recorded from southern Chile, Argentina, the Falkland/Malvinas Islands, South Africa, southwestern Australia, New Zealand and the Chatham Islands.

The habits of this apparently uncommon species are practically unknown. It is believed to be oceanic and to feed on squid and deepsea fish. Mass strandings unknown.



ZIPH Hyp 1

1985

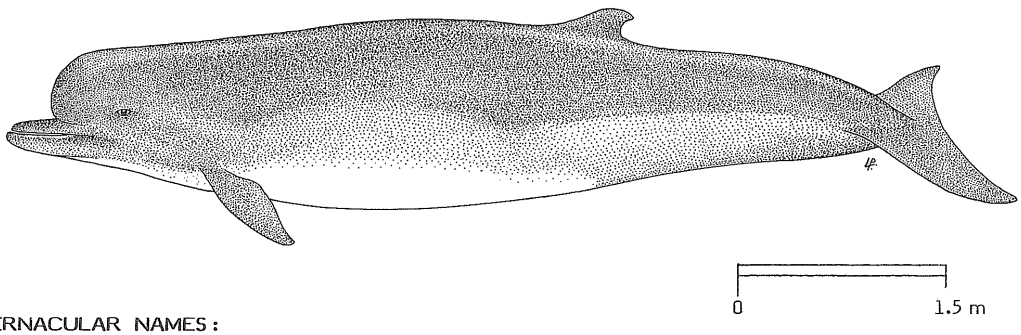
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : ZIPHIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Hyperoodon planifrons Flower, 1882

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Southern bottlenose whale
Fr - Dauphin-à-bec austral
Ru - Ploskolobyi butylkonos
Sp - Gran calderón austral

NATIONAL :

DISTINCTIVE CHARACTERS :

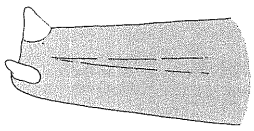
A medium-sized whale with the snout drawn out into a beak, the tip of lower jaw only slightly longer than upper jaw. A small, distinctly sickle-shaped dorsal fin located behind midpoint of back. Flippers comparatively short. A single pair of conical teeth (which erupt only in adult males) at tip of lower jaw. Two conspicuous grooves on outer surface of throat forming a V-shape pointing forward. No notch between flukes.

Colour: probably metallic deep grey, becoming light bluish on flanks; throat and belly rather pale.

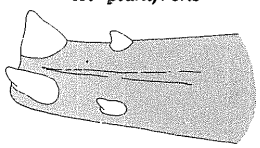
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Berardius arnuxii: forehead not as bulbous as in the southern bottlenose whale; tip of lower jaw more markedly protruding beyond the upper; dorsal fin lower and less curved; two pairs of triangular teeth at tip of lower jaw in adult males (possibly also in females). Females and juvenile males of these two species cannot certainly be separated (in the present state of knowledge) without the examination of prepared skulls.

The beak, together with the bulbous forehead and the absence of a notch between the tail flukes readily distinguish this species from other toothed whales.



H. planifrons



Berardius arnuxii

teeth in lower jaw of adult males (schematic)

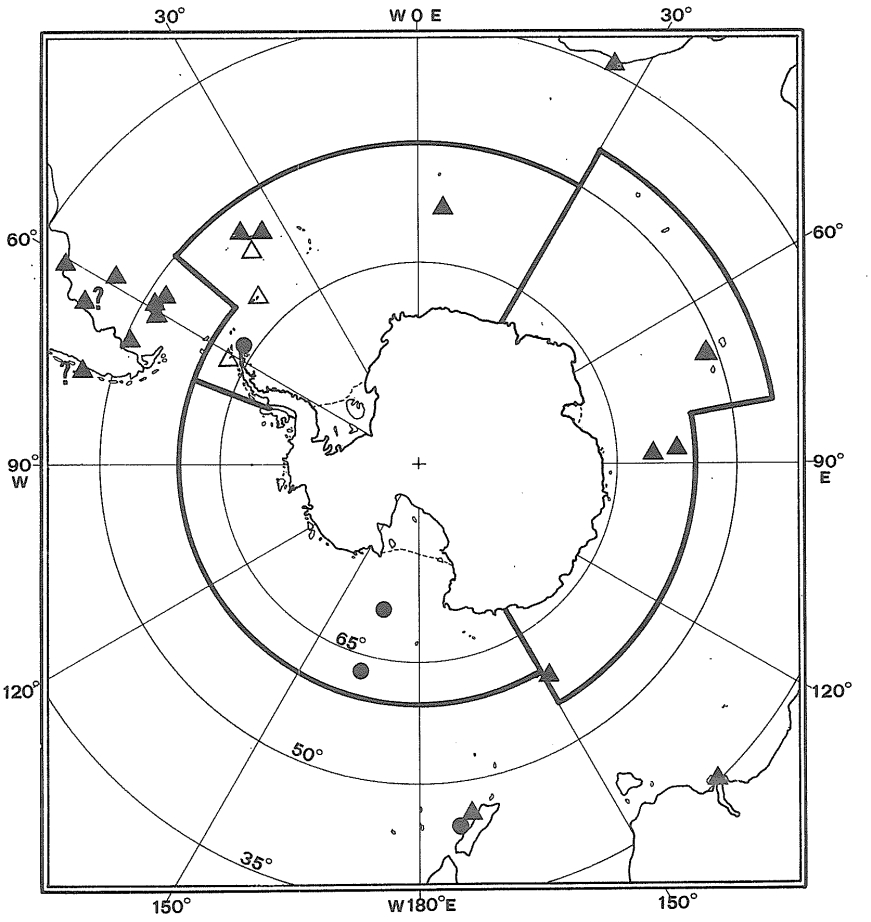
SIZE :

Length probably within the range of 7 to 9 m (largest measured specimens: male 6.94 m, female 7.45 m).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Probably widespread in the Southern Ocean, as well as in the southern parts of the Atlantic, Indian and Pacific Oceans.

The habits of this species are not well-known. It is believed to be oceanic and to feed on squid and deepsea fish. Mass strandings seldom or never occur.



▲ : specimen

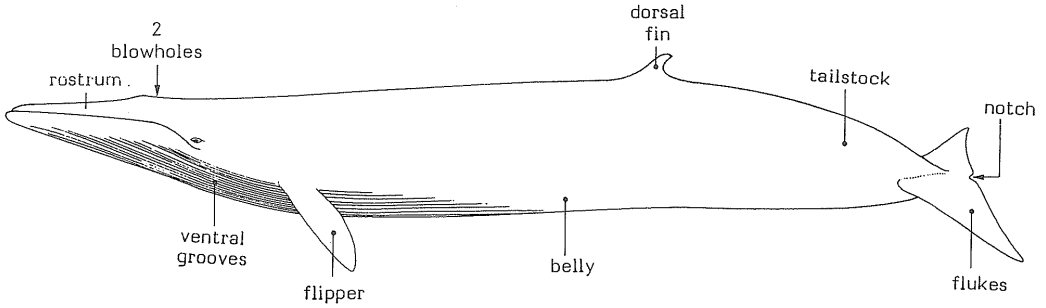
▲? : specimen, exact locality not known

△ : catch record

● : at-sea observation, identification uncertain

SUBORDER MYSTICETI - Baleen (or whalebone) whales

The Mysticeti comprise three families of which two occur in the Southern Ocean. All baleen whales lack teeth (though simple tooth germs are found in the gums of foetal baleen whales) but possess plates of whalebone or baleen hanging from the upper jaw. They have a symmetrical skull, paired external nasal openings, single-headed ribs and a sternum composed of a single bone articulating with the first pair of ribs only. They generally feed on relatively small prey, plankton or schooling fish.



Typical baleen (whalebone) whale

GUIDE TO FAMILIES OF BALEEN WHALES

BAL

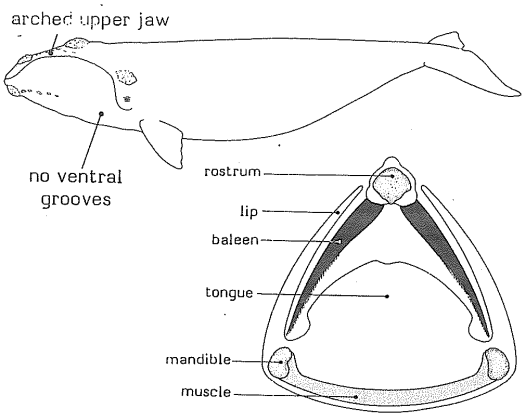
BALAENIDAE: Right whales

(3 species in 2 genera)

The three species forming this family are rather dissimilar. In all three the upper jaw is narrow and arched, the lower lips rising up to meet the upper jaw, and the seven neck vertebrae are fused into a single mass. The two species of Balaena (B. glacialis, Black right whale and B. mysticetus, Bowhead whale) have very large heads, up to one third of body length, strongly arched upper jaws and lack a dorsal fin. The Pygmy right whale, Caperea marginata, has a smaller head (one quarter body length), a less arched upper jaw, a dorsal fin and more ribs that any other cetacea (17 pairs).

Species known from the Southern Ocean:

Balaena glacialis Müller, 1776 BAL Bal 1



cross-section through mouth

Adapted from L. Watson, 1981

BALAEN

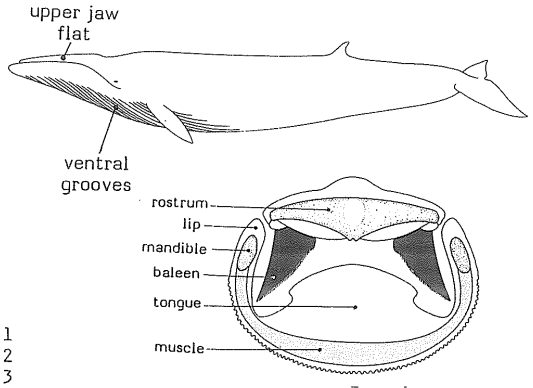
BALAENOPTERIDAE: Rorquals

(6 species in 2 genera)

These whales are characterized by the presence of grooves on the throat and chest which extend a variable distance backward. They permit expansion of the floor of the mouth cavity and are associated with the gulping method of feeding of these whales. All possess dorsal fins. The lower jaw is conspicuously bowed outward and the upper jaw is flat, not arched as in right whales. The genus Balaenoptera contains five species (four of which occur in the Southern Ocean) of long slender whales. the other genus contains a single species, Megaptera novaeangliae, the Humpback whale. This is a stout, thick-bodied whale which also occurs in the Southern Ocean.

Species known from the Southern Ocean :

Balaenoptera acutorostrata Lacepède, 1804	BALAEN Bal 1
Balaenoptera borealis Lesson, 1828	BALAEN Bal 2
Balaenoptera musculus (Linnaeus, 1758)	BALAEN Bal 3
Balaenoptera physalus (Linnaeus, 1758)	BALAEN Bal 4
Megaptera novaeangliae (Borowski, 1781)	BALAEN Meg 1



cross-section through mouth (schematic)

Adapted from L. Watson, 1981

BAL Bal 1
1985

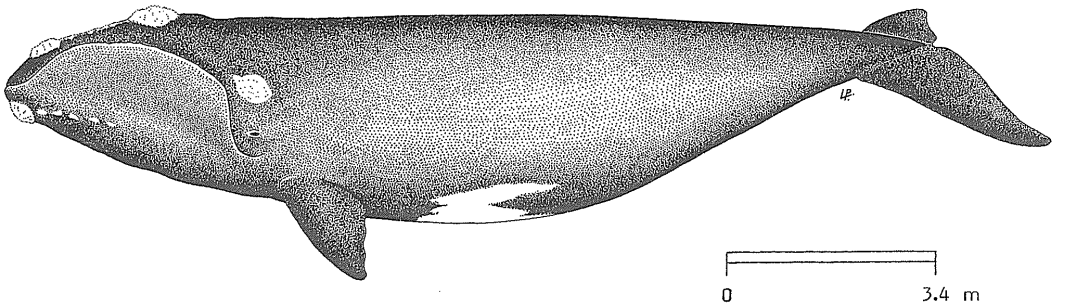
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BALAENIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Balaena glacialis Müller, 1776

OTHER SCIENTIFIC NAMES STILL IN USE : Eubalaena australis (Borowski, 1781)



VERNACULAR NAMES :

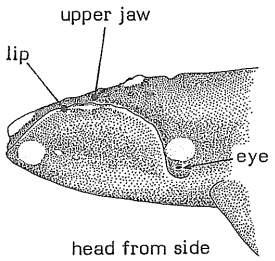
FAO/CCAMLR : En - Black right whale
Fr - Baleine de Biscaye, Baleine franche australe
Ru - Yuzhnyi gladkyi kit
Sp - Ballena franca

NATIONAL :

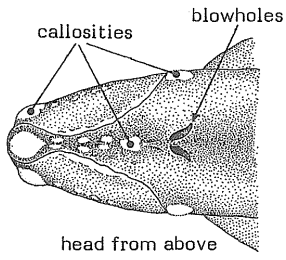
DISTINCTIVE CHARACTERS :

A large bulky whale, the body rotund and completely lacking a dorsal fin. Head very large, 1/4 or more of total length; upper jaw long, arched and narrow, in dorsal view flanked by two huge lips which rise up to meet it; top of head in front of paired blowholes covered with a series of rough whitish lumps, the callosities; these are usually infested with acorn barnacles (Coronula balaenaris) and whale lice (isopod crustacea of the family Cyamidae, generally Cyamus spp.); other callosities occur above the eye, on the tip of the lower jaw and lips and toward the end of the snout; the arrangement of the callosities varies individually and can be used to recognize individual whales. The two blowholes are widely separated, resulting in a blow that appears as two distinct spouts. Baleen plates very large, up to 2.5 m in length, very narrow, variable in colour from dark brown to black; said to look yellowish-grey when the animal is feeding at the surface with the mouth agape. There are no ventral grooves. The flippers show the outline of the digits that make up the limb, the trailing edge being wavy, the waves corresponding to the tips of the digits. Flukes with a deeply concave, deeply notched, smooth trailing edge, pointed at tips, and dark below.

Colour: black, or very dark brown above, callosities whitish-yellow. Often an irregularly shaped patch of white on chest or belly. Undersurface of flukes and flippers always dark.



head from side



head from above

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Other species of baleen whales: dorsal fin present; underside (throat and anterior part of belly) with ventral grooves; upper jaw relatively flat and broad, not strongly arched; baleen plates relatively small; lack the rough whitish callosities characteristic of the black right whale.

SIZE :

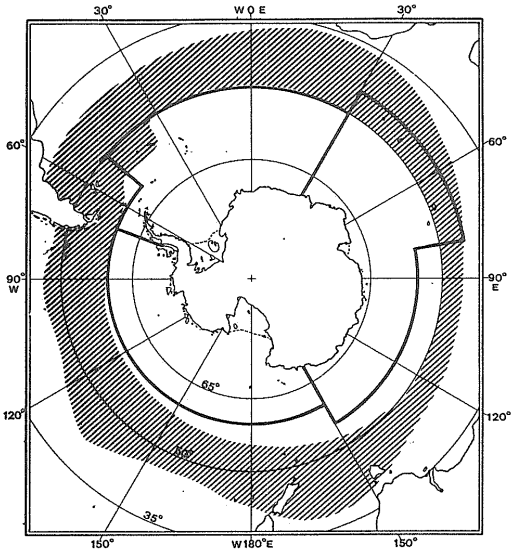
Maximum: 18 m; common length range probably from 15 to 16 m.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Found in both North and South Hemispheres. Strongly migratory, feeding in cold temperate waters and breeding in warmer (but not usually tropical) waters. Recorded off the South Orkney Islands in the Southern Ocean, but probably does not often go so far south. Most often seen in shallow coastal waters, particularly on breeding grounds.

Breeding: mating takes place in mid- to late summer (mating activity also observed in winter). Gestation period 10 to 11 months; calves are born in late spring or early summer. Birth interval 2, probably 3 years.

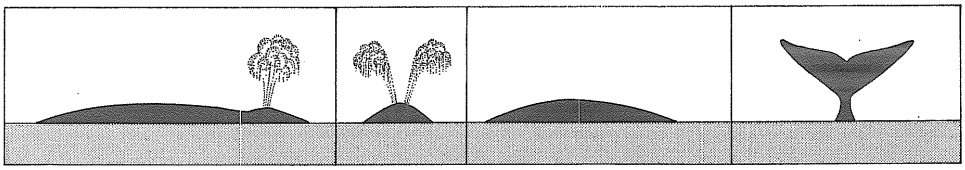
Feeding: right whales feed on concentrated, but not necessarily swarming, plankton. In the Southern Ocean they are often seen surface-skimming in company with seabirds, almost certainly feeding on planktonic crustacea; both copepods and krill (Euphausia superba) have been recorded from stomachs of right whales taken in the Antarctic.



Austral summer distribution

OBSERVATION AT SEA :

Right whales are placid in disposition and easily approached by boat. They rarely swim at more than 5 knots, and usually less. The blow appears as two distinct bushy spouts (unique for this species in the Southern Ocean), about 3 to 5 m high. The typical breathing cycle is made up from a period of 5 to 10 minutes at the surface, blowing every minute or so, followed by a 10 to 20 minutes dive. They characteristically throw the flukes in the air before diving. The only other species of large whales occurring in the Southern Ocean which do this are sperm and humpback whales, but sperm whale flukes are more nearly triangular, and humpback flukes are very jagged on the trailing edge and usually predominantly white below. Furthermore, the other large whales all have a dorsal fin (absent in right whales).



Blow from side | Blow from front | Diving sequence

EXPLOITATION :

Few right whales were killed by whalers in the Antarctic, as this species was already rare at the beginning of the present century, when whalers arrived. This was probably because the right whales had been killed on their breeding grounds off South America, South Africa and Australia by whalers in the previous century. There are indications that the species is recovering, but it is not possible to make a stock assessment. Protected under the International Convention for the Regulation of Whaling.

BALAEN Bal 1
1985

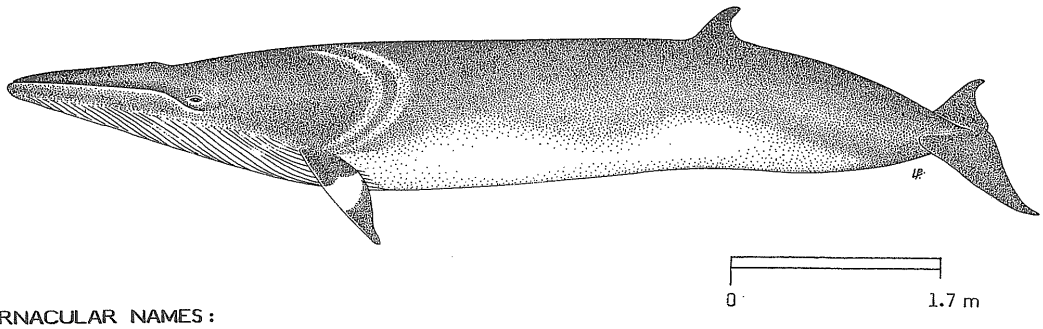
FAO SPECIES IDENTIFICATION SHEETS

FAMILY: BALAENOPTERIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Balaenoptera acutorostrata Lacepède, 1804

OTHER SCIENTIFIC NAMES STILL IN USE: None



VERNACULAR NAMES:

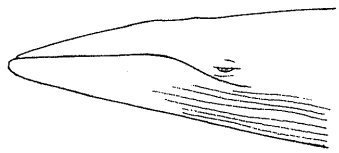
FAO/CCAMLR: En - Minke whale
Fr - Petit rorqual
Ru - Kit-minke, malyi polosatik
Sp - Rorcual aliblanco

NATIONAL :

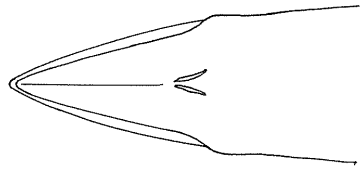
DISTINCTIVE CHARACTERS:

The smallest baleen whale of the Southern Ocean. Snout extremely pointed, triangular when viewed from above. A sickle-shaped dorsal fin on last third of body (as in sei whale) but relatively taller. Flippers relatively long, about 12% of body length, and sharply pointed. Ventral grooves 50 to 70 between flippers, ending well before navel, often just after flippers. Baleen plates very short, up to 20.5 cm, 12 cm wide at base, 260 to 300 pale yellow plates on each side, very finely fringed.

Colour: dark grey on back and white on belly and beneath flippers. Most (but not all) minke whales have a white diagonal band on each flipper, the extent and orientation of which varies individually. There may be a pale chevron on the back behind the head (as in the fin whale), or pale grey bracket marks, like gill slits, above the flipper. In some minke whales there is a patch, or a pair of patches, of pale grey on the flanks.



head from side



head from above

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Other baleen whales: adult size much larger, snout less pointed. Furthermore:

Sei whale: relatively fewer ventral grooves (36 to 50 against 50 to 70 in minke whale); baleen plates uniformly bluish.

Humpback whale: less than 22 ventral grooves, the longest reaching backward to the navel; flippers longer, 1/4 to 1/3 of body length (less than 1/5 in minke whale), knobbed on their leading edges; flukes concave, deeply notched and irregularly jagged on trailing edges.

Black right whale: upper and lower jaws very narrow, strongly arched in profile; colour black with distinct yellowish-white callosities present on head; no ventral grooves; underside of flippers dark.

Blue and fin whales: adult size over 20 m; ventral grooves reach back to navel; flippers less than 1/5 of body length. Furthermore: dorsal fin relatively smaller and further backward, and baleen plates black in the blue whale; back distinctly ridged toward tail in the fin whale.

SIZE :

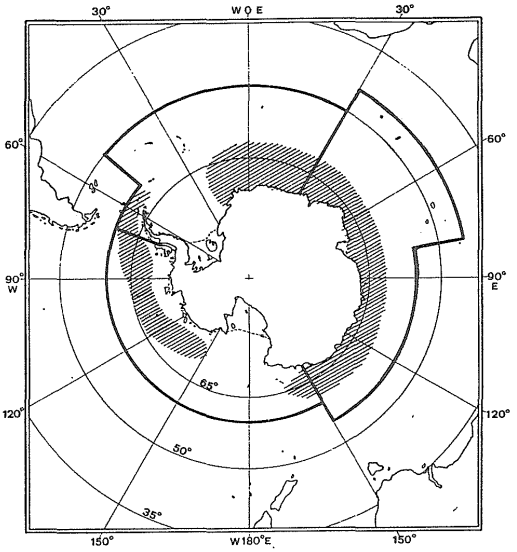
Males: maximum length 9 m, average 8 m; females: maximum length 10.2 m, average 8.2 m.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Cosmopolitan. In the Southern Ocean most often seen near the ice-edge, but probably more generally distributed. Usually found singly or in pairs.

Breeding: both sexes reach maturity at around 6 years, when males are about 7 m and females about 7.6 m long. In 1944, the mean age at sexual maturity was 14 years. The female ovulates twice a year (other whales once only). Gestation period 10 months; lactation period 4 months; birth interval about 18 months.

Feeding: in the Southern Ocean it feeds on Antarctic krill, Euphausia superba, taking predominantly individuals in the size range of 10 to 20 mm.



Map of distribution based on catches between 1973 and 1980 (December to March)

OBSERVATION AT SEA :

This species may come much closer to the shore than other rorquals and shows a tendency to approach ships, particularly when at anchor. The blow is small, low and inconspicuous, hence difficult to sight at sea. It has a breathing sequence of 5 to 8 blows at intervals of less than 1 minute, followed by a dive of up to 20 minutes. When surfacing, the dorsal fin always appears simultaneously with the blow (as in the sei whale). It humps the tail stock high in the air before diving, but the flukes are not shown. It will often breach 2 or 3 times in a row, sometimes falling back with a splash, but more often re-entering the water cleanly.

EXPLOITATION :

Virtually unexploited in the Southern Ocean until the 1970's. Current quotas amount to a few thousand individuals a year, taken mostly for meat for human consumption. (There is a prospect that all commercial whaling will end in 1986 under the moratorium agreed by the International Convention for the Regulation of Whaling).

Reduction of competition for food (krill) caused by the removal of other rorquals in the Southern Ocean by commercial whaling, probably caused the lowering of age at sexual maturity, and this, coupled with the short birth interval, has enabled minke whales to increase rapidly. Stock size in 1930 estimated at about 200 000 individuals. Current stocks estimated to number 323 000*

* Estimated exploitable stock sizes

BALAEN Bal 2

1985

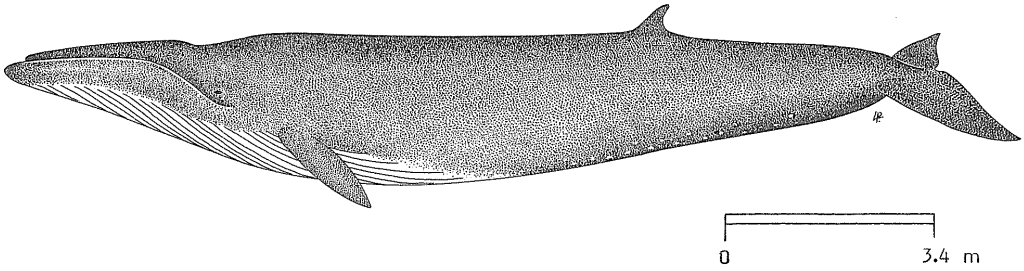
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BALAENOPTERIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Balaenoptera borealis Lesson, 1828

OTHER SCIENTIFIC NAMES STILL IN USE : None



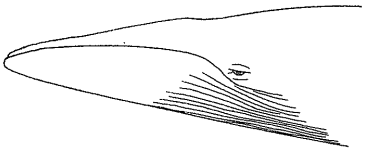
VERNACULAR NAMES :

FAO/CCAMLR : En - Sei whale
Fr - Rorqual de Rudolphi
Ru - Seival, seldyanoi kit
Sp - Rorcual norteño

NATIONAL :

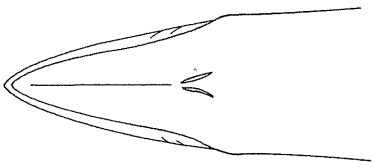
DISTINCTIVE CHARACTERS :

A medium-sized rorqual, rather less slender than the fin whale. Snout less sharply pointed than in the fin whale, intermediate between that species and the blue whale. When viewed from the side, the snout appears slightly arched. Dorsal fin about 61 cm tall, relatively larger than in the fin whale, strongly sickle-shaped and set at an angle of more than 40°, further forward on the body than in other rorquals. Flippers relatively slightly shorter than in other rorquals (about 9% of body length). Ventral grooves 38 to 56 between flippers and ending well short of navel. Baleen plates up to 73 cm long, 318 to 340 on each side, very finely fringed (35 to 60 fibres per cm).



head from side

Colour: dark steel grey on back and sides. Body often with "galvanized" appearance, caused by numerous and often overlapping pale grey scars inflicted by small sharks in warm waters. On the belly there is a region of grey-white confined to the area of the ventral grooves. Neither the flippers nor the flukes are white underneath. Baleen plates uniformly bluish-black with white bristles.



head from above

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Blue and fin whales: adult size considerably larger; ventral grooves more numerous and longer, the longest reaching to about navel. Furthermore, rostrum U-shaped and dorsal fin very small and located near tail in the blue whale; back distinctly ridged and undersides of belly, flippers and flukes white in the fin whale.

Minke whale: adult size much smaller, snout more pointed, triangular (viewed from above), relatively more ventral grooves (50 to 70 against 38 to 56 in sei whale) and white colour on belly and underside of flippers.

Humpback whale: less than 22 ventral grooves, the longest reaching backward to the navel; flippers longer, 1/4 to 1/3 of body length, knobbed on their leading edges; flukes concave, deeply notched and irregularly jagged on trailing edges; some white colour on undersides of chin, belly, flippers and flukes.

Black right whale: upper and lower jaws very narrow, strongly arched in profile; distinct yellowish white callosities on head; no ventral grooves.

SIZE :

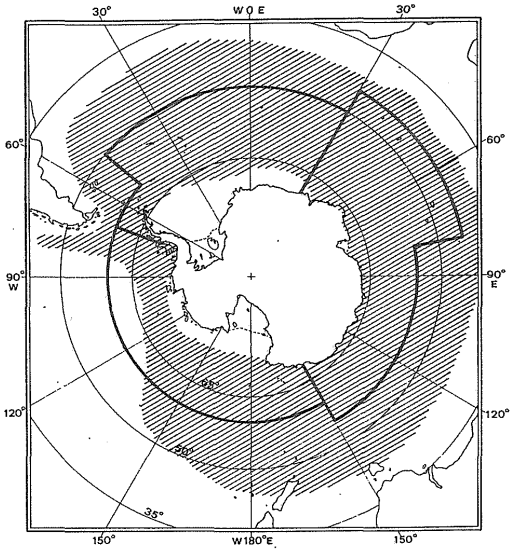
Males: maximum length 18.5 m, average 15 m; females: maximum length 18.3 m, average 16 m; weight 30 t.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Cosmopolitan, but does not extend so far poleward as the blue and fin whales. Enters the cold waters of the Southern Ocean later than these species. Usually found in groups of 4 or 5 individuals, sometimes larger.

Breeding: males are sexually mature at about 12 m (10 years) and females at 13.7 m (10 years). Gestation period 11.5 months; calves are born in warm waters; lactation period 6 months; birth interval 2 years.

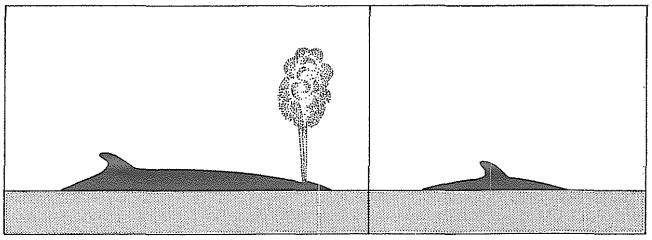
Feeding: like other rorquals, this species feeds on Antarctic krill, Euphausia superba, in the Southern Ocean, but it may also take smaller plankton, including calanoid copepods and the amphipod Parathemisto gaudichaudii.



Map of distribution based on catches between 1935 and 1978 (December to April)

OBSERVATION AT SEA :

This is another very fast-swimming rorqual, claimed to reach 26 knots in short bursts, but often easy to approach with a ship. Usually surfaces at a shallow angle, so that the blowholes and the major part of the back including fin appear simultaneously and remain visible for a relatively long period. The blow is an inverted cone, about 3 m high. It may blow 2 or 3 times at 20 second intervals followed by a dive of 5 to 6 minutes, or may blow more frequently at longer intervals followed by a longer dive. It does not arch the back or show flukes on diving but simply sinks down into the water.



Blow from side Diving sequence

EXPLOITATION :

Largely neglected by Antarctic whalers until after the second world war, but when blue and fin stocks became reduced they turned to sei whales. Peak catches were taken in the mid-1960's followed by a rapid decline. Initial stocks range between 125 000 and 150 000 individuals. The current Southern Hemisphere population is said to be about 54 000. Protected under the International Convention for the Regulation of Whaling.

BALAEN Bal 3
1985

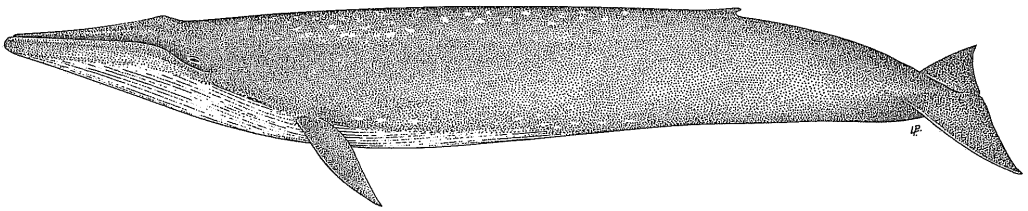
FAO SPECIES IDENTIFICATION SHEETS

FAMILY: BALAENOPTERIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Balaenoptera musculus (Linnaeus, 1758)

OTHER SCIENTIFIC NAMES STILL IN USE: None



0 5.7 m

VERNACULAR NAMES:

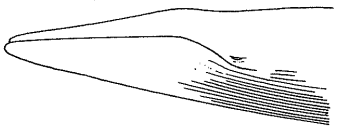
FAO/CCAMLR: En - Blue whale
Fr - Rorqual bleu
Ru - Siniji kit, blyuval
Sp - Ballena azul

NATIONAL :

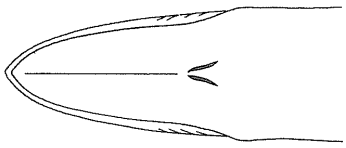
DISTINCTIVE CHARACTERS:

The largest of all animals, living or extinct. Long and streamlined, with a very small triangular or hook-shaped dorsal fin (less than 33 cm high) situated so far back that it is seldom visible before the animal begins to dive. Head less than 25% of body length; viewed from above, the rostrum is broad, flat and nearly U-shaped, rather flattened at tip, with a single ridge extending from the raised area just in front of the paired blowholes toward, but not reaching, snout. Baleen plates black all over, seldom more than 95 to 120 cm long and 270 to 395 on each side. Ventral grooves about 5 cm deep, separated by ridges 5 to 7.5 cm wide, numbering 55 to 88 between flippers, and reaching back about to navel. Flippers about 10% of body length and tapered.

Colour: mottled bluish-grey above and below. Lower surface of flippers and their tips a little lighter. Sometimes blue whales bear a film of yellow diatoms which has given rise to the (obsolete) name "Sulphur bottom whale".



head from side



head from above

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Fin whale (B. physalus): snout sharply pointed (V-shaped) when viewed from above, dorsal fin much longer and further forward on back; back distinctly ridged toward tail; baleen plates yellowish-white and bluish-grey.

Other baleen whales: size smaller; ventral grooves ending well before navel in sei whale and minke whale, fewer in number in humpback whale and absent in the black right whale; dorsal fin absent, upper and lower jaws very narrow and strongly arched in black right whale.

SIZE :

Common length range probably 25 to 28 m, average 27, and 150 t in weight, but specimens have exceeded 30 m (the largest measured was 33.27 m). Females slightly larger than males.

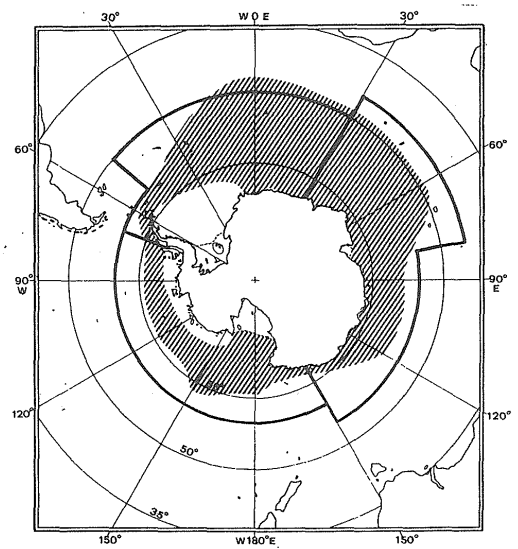
Southern Hemisphere blue whales are slightly larger than those from the north. However, a small form, the pygmy blue whale, Balaenoptera musculus brevicauda, reaching 21 m and 70 t, has been described from the Southern Indian Ocean and the South Pacific. The validity of this sub-species is not recognized by some authorities.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Cosmopolitan, but now greatly reduced in numbers and less frequently seen. Migrates to feeding grounds in the Southern Ocean in spring where it is most frequently seen singly or in pairs.

Breeding: males mature at about 22.5 m and females at 23 m. Gestation period 11 months, calves are born in tropical waters; lactation period 7 months; birth interval usually 3 years, minimum 2 years.

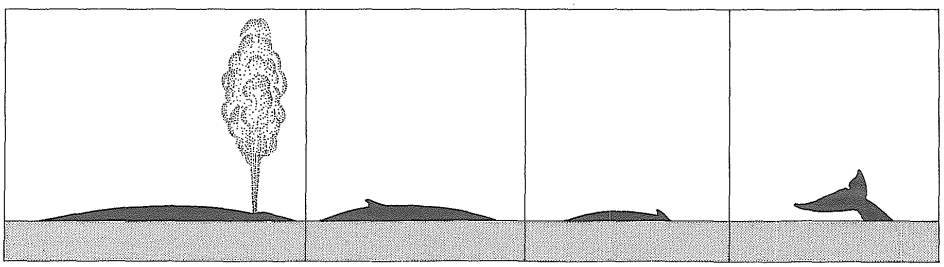
Feeding: in the Southern Ocean it feeds on Antarctic krill, Euphausia superba, taking medium-sized specimens 20 to 30 mm in length. Tends to feed near the ice edge.



Map of distribution based on catches between 1932 and 1967 (December to April)

OBSERVATION AT SEA :

A shy whale. Usually cruises at 3 to 4 knots but sounds readily if disturbed and can accelerate to speeds of 10 to 16 knots. The blow is about 9 m tall, slender, vertical and not bushy; dives for 10 to 30 minutes, surfaces, and blows 8 to 15 times, making series of 12 to 15 second dives between blows, then dives again. When diving scarcely lifts flukes.



Blow from side

Diving sequence

EXPLOITATION :

Heavily exploited in the Antarctic with peak catches (29 000 individuals) in 1930, followed by a smaller peak after the second world war. The original stock size of about 150 000 to 210 000 is now reduced to about 8 000 (with perhaps 5 000 pygmy blue whales). Protected under the International Convention for the Regulation of Whaling.

BALAEN Bal 4

1985

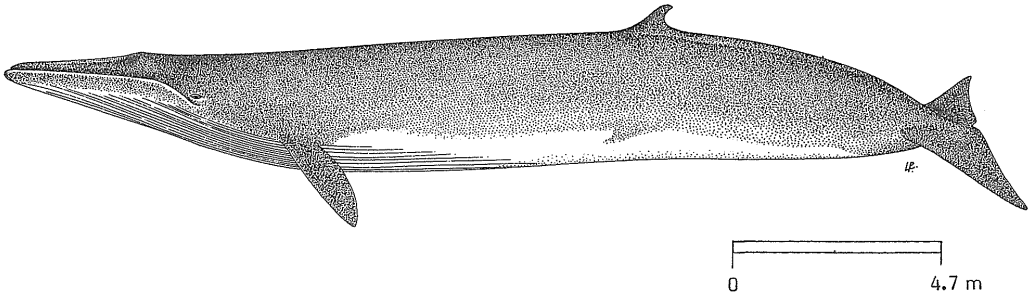
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BALAENOPTERIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Balaenoptera physalus (Linnaeus, 1758)

OTHER SCIENTIFIC NAMES STILL IN USE : None



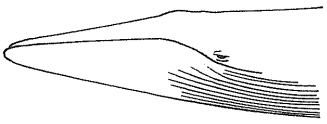
VERNACULAR NAMES :

FAO/CCAMLR : En - Fin whale
Fr - Rorqual commun
Ru - Finval
Sp - Rorcual común, Ballena de aleta

NATIONAL :

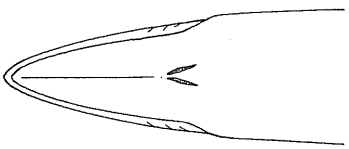
DISTINCTIVE CHARACTERS :

A very large rorqual. Back distinctly ridged toward tail ("Razorback"). Rostrum V-shaped when seen from above, top of head flat (but not so flat as in the blue whale) and with a single ridge running forward from blowholes. A large dorsal fin, up to 61 cm high, angled less than 40° on forward margin, located slightly more than one third forward from tail; appears at surface just after the blow. Baleen plates less than 92 cm long and 262 to 473 on each side. Ventral grooves (56 to 100 between flippers) extend to navel or beyond.



head from side

Colour: dark grey to brownish-black on back and sides with no mottling as in the blue whale (but oval scars, caused by small shark bites, may be present). Undersides, including undersides of flukes and flippers, white. On head, coloration markedly asymmetrical, the dark colour reaching further down on left than on right side. Lower lip on right side, mouth cavity and anterior one third to one fifth of baleen rows yellowish-white; remainder of baleen striped with alternate bands of yellowish-white and bluish-grey. Occasionally right upper lip white also.



head from above

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

None of the other large whales occurring in the Southern Ocean have a distinctly ridged back; all except the sei and minke whales, have a relatively lower dorsal fin. Only the blue whale reaches comparable or greater sizes, but this species has a U-shaped rather than pointed snout (viewed from above), a very small dorsal fin situated far backward near tail, relatively darker colour on the undersides of body, flippers and flukes, and uniform black baleen plates.

SIZE :

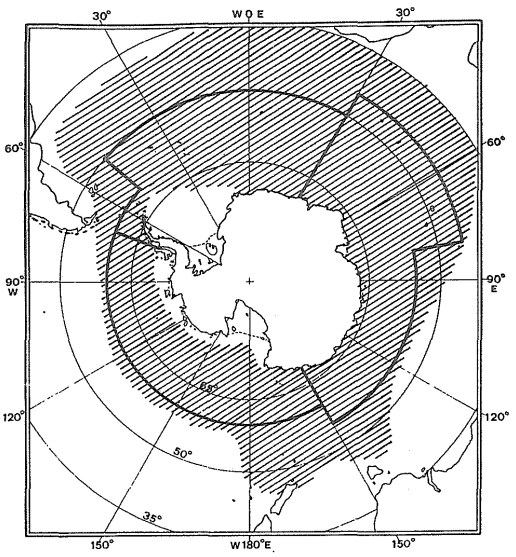
Males: length range 21 to 23 m; females: length range 22 to 26 m; about 80 t in weight.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Cosmopolitan, found on feeding grounds of the Southern Ocean throughout the summer.

Breeding: males mature at about 18 m (about 6 years) and females at 19.5 m (about 7 years). Gestation period 11 months, calves are born in tropical waters; lactation period 7 months; birth interval 2 years.

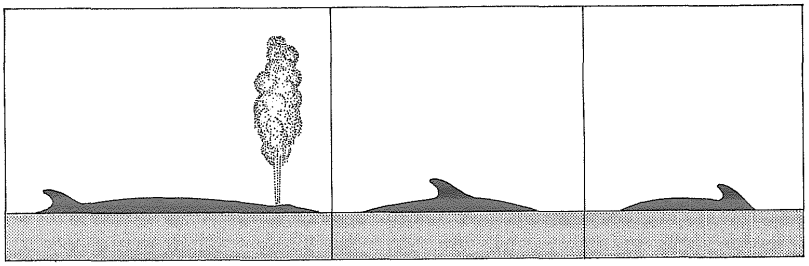
Feeding: in the Southern Ocean it feeds on Antarctic krill, Euphausia superba, concentrating on individuals 30 to 40 mm long and perhaps not approaching the ice edge as closely as blue whales.



Map of distribution based on catches between 1932 and 1976 (December to April)

OBSERVATION AT SEA :

A very fast-swimming whale, can make 20 knots for short bursts. Sometimes breaches, falling back into the water with a splash, never re-entering smoothly (contrary to the minke whale). Usually found singly or in groups of 6, 7 or more individuals. The blow is tall (about 6 m), in the shape of an inverted cone or elongated ellipse. It dives for 5 to 15 minutes (usually 6 to 7 minutes), blows 3 to 7 times at intervals of up to several minutes, then dives again, arching the back as it submerges; the flukes are not raised on dive. The only other large whale not showing the flukes when diving is the sei whale, but this species does not arch the back (simply sinks into the water) and its blow is much lower. The blue whale scarcely shows the flukes and all other species raise the tail clearly above the water on dive.



Blow from side

Diving sequence

EXPLOITATION :

Heavily exploited. Peak catches were taken just before and after the second world war. The original stock size (in the range of 375 000 to 425 000 individuals) is now reduced to about 85 000. Protected under the International Convention for the Regulation of Whaling.

BALAEN Meg 1

1985

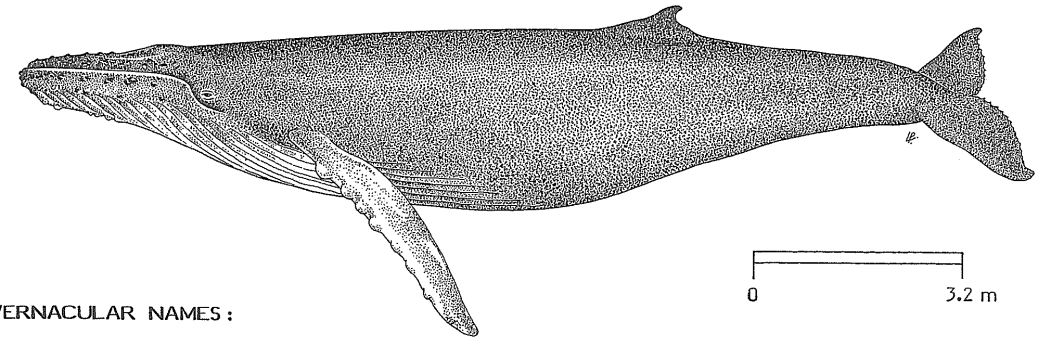
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : BALAENOPTERIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Megaptera novaeangliae (Borowski, 1781)

OTHER SCIENTIFIC NAMES STILL IN USE : Megaptera nodosa



VERNACULAR NAMES :

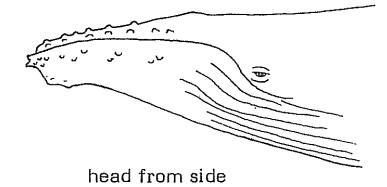
FAO/CCAMLR : En - Humpback whale
Fr - Baleine à bosse
Ru - Gorbache
Sp - Ballena jorobada

NATIONAL :

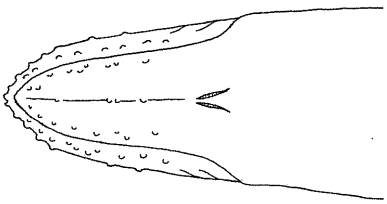
DISTINCTIVE CHARACTERS :

A large, fat whale. The body tapers sharply to the tail stock. Head broad and rounded, with a flattened upper surface. The ridge between blowholes and snout seen in other rorquals is absent or indistinct, but prominent on upper part of head are numerous knobs or tubercles, more or less randomly distributed, also on lower jaw. Fourteen to 21 ventral grooves between flippers, very wide and extending to navel. Dorsal fin set two-thirds of the way back on body, very indeterminate, often appearing as a low fleshy ridge, sometimes with a small triangular top, sometimes sickle-shaped as in other rorquals. Flippers very long, up to 33% of body length, scalloped on leading edge and predominantly white. Tail flukes concave, deeply notched and irregularly jagged on trailing edge. Usually numerous acorn barnacles (Coronula spp.), often in masses on leading edge of flippers. Cyamid whale lice also usually present.

Colour: basically black with very variable amounts of white on flippers, undersides of flukes, chin and belly.



head from side



head from above

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Other baleen whales: either more than 35 ventral grooves or none in the black right whale (less than 22 in humpback whale); flippers shorter, less than 1/5 of body length (1/4 to 1/3 in humpback whale), without knobs on leading edges; 1 or 2 distinct ridges present between blowholes and snout; no knobs or tubercles on head (except for white callosites in the black right whale).

SIZE :

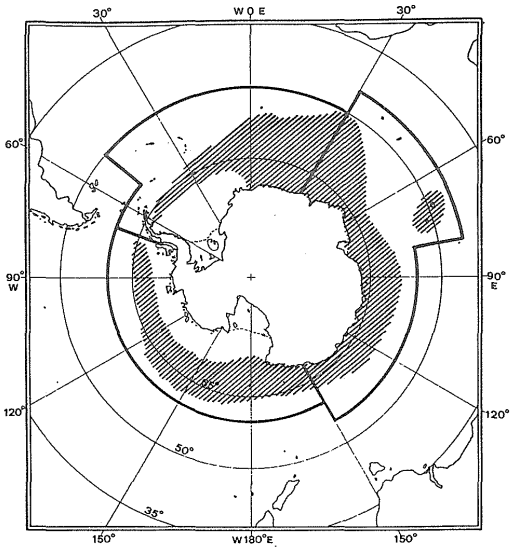
Males: maximum length 15.2 m, average 14.5 m; females: maximum length 19 m, average 16 m. Females may reach about 65 t in weight.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Cosmopolitan and strongly migratory, with well-marked migration routes often taking the whales close inshore. The Southern Hemisphere population enters the Southern Ocean to feed and returns to tropical waters to breed.

Breeding: sexually mature in less than 10 years, the males at about 11 m, the females at about 12 m. Mating takes place soon after birth, so the birth interval may be little over a year. Gestation period 11.5 months; lactation period 10.5 to 11 months. Mothers with calves on feeding grounds are often seen with a third whale, possibly an attendant male or perhaps a calf of the previous year.

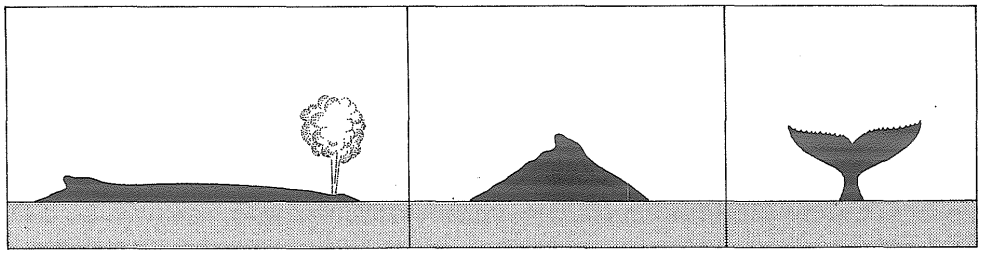
Feeding: in the Northern Hemisphere it feeds largely on schooling fish but in the Southern Ocean on Antarctic krill, Euphausia superba.



Map of distribution based on catches between 1932 and 1963 (December to April)

OBSERVATION AT SEA :

Humpback whales are easily approached by boat. When disturbed they swim slowly away, often remaining at the surface for a little while before diving. The blow is characteristic - short (less than 3 m), very bushy. Typically it remains 2 to 3 minutes at the surface, blowing every 20 to 30 seconds, then dives for 5 to 30 minutes. The dive is very characteristic, the whale jack-knifing ("humpback"), exposing the dorsal fin and raising the tail clear of the surface. None of the other large whales occurring in the Southern Ocean show this "jack-knifing" behaviour. The humpback whale often jumps clear of the surface (breaches), falling back with a huge splash, or slaps the surface with its tail (lobtails), or a flipper. These activities may serve to communicate with other whales. Humpbacks are very vocal but their underwater sounds are not usually audible above the surface.



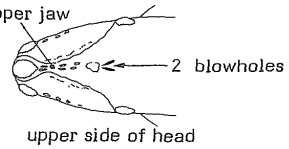
Blow from side

Diving sequence

EXPLOITATION :

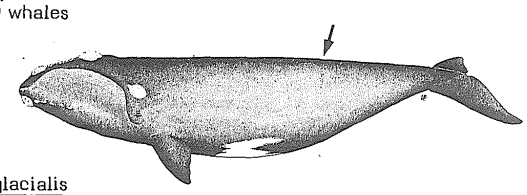
Humpbacks, originally numbering about 100 000 individuals, were among the first of the rorquals to be seriously reduced by whalers in the Southern Ocean. Partial protection was provided before the second world war and complete protection was conferred by the International Convention for the Regulating Whaling. By this time, however, stocks had been very severly reduced and probably only about 2 000 humpbacks remained in the Southern Hemisphere. There are some signs, however, that humpbacks are becoming a little more numerous. The current stock estimate is around 3 000 individuals.

KEY TO THE IDENTIFICATION OF STRANDED CETACEANS IN THE SOUTHERN OCEAN



1a. A double blowhole (Fig.1); no teeth present in either jaw; baleen plates in upper jaw ..... Sub-order Mysticeti
baleen (whalebone) whales

2a. Ventral grooves absent; dorsal fin absent: upper jaw very narrow, in profile upper jaw and lower lips strongly arched (Fig.1); 250 to 390 baleen plates per side with 35 to 70 very fine fibres per cm ..... Balaena glacialis
Black right whale



Black right whale Fig.1

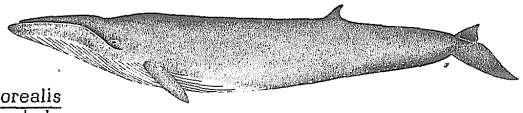
2b. Ventral grooves present; dorsal fin present; upper jaw relatively flat and broad ..... Family Balaenidae-right whales
Family Balaenopteridae-rorquals

3a. Ventral grooves end before navel

4a. 50 to 70 ventral grooves*, the longest often ending between flippers (Fig.2); 300 to 325 baleen plates on each side, less than 20.5 cm long, mostly white or yellowish white (some posterior plates may be dark) with 15 to 25 fibres per cm ..... Balaenoptera acutorostrata
Minke whale

Minke whale Fig.2

4b. 38 to 56 ventral grooves, the longest ending well short of navel (Fig.3); 318 to 340 baleen plates on each side, less than 78 cm long, black (some of the most anterior plates may be pale), with 35 to 60 fine silky fibres per cm ..... Balaenoptera borealis
Sei whale

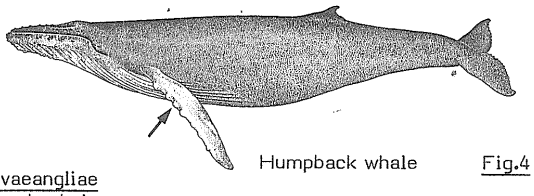


Sei whale Fig.3

3b. Ventral grooves extend to or beyond navel

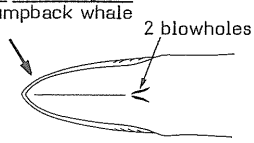
*Counts of ventral grooves are made between the flippers and do not include the short grooves often found on the sides above the flippers

5a. Flippers one quarter to one third of body length and knobbed on leading edges; less than 22 ventral grooves, the longest extending at least to navel; head covered with knobs (Fig.4); 270 to 400 baleen plates on each side, less than 61 cm long, black to olive brown (sometimes whitish), with 10 to 35 greyish-white fibres per cm ... Megaptera novaeangliae
Humpback whale



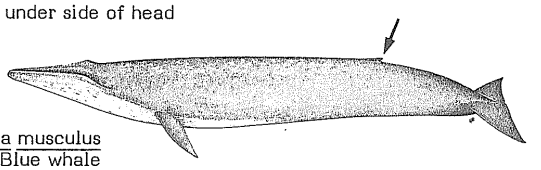
Humpback whale Fig.4

5b. Flippers less than one fifth of body length; no knobs; 55 to 100 ventral grooves, the longest extending at least to navel



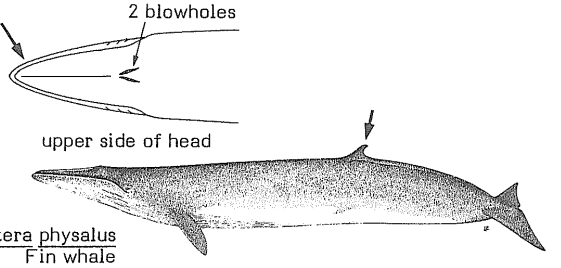
under side of head

6a. Head broad and U-shaped; dorsal fin less than 33 cm high and very far back on tail (Fig.5); 270 to 395 baleen plates on each side, all black with 10 to 30 fibres per cm, barely more than twice as long as wide ..... Balaenoptera musculus
Blue whale



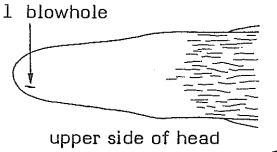
Blue whale Fig.5

6b. Head broad at corners of mouth but sharply pointed at snout; dorsal fin to 61 cm high, slightly more than one third forward from tail (Fig.6); one fifth to one third of baleen plates at right front creamy-white, remainder dark grey or bluish grey streaked with yellowish-white; 262 to 473 plates on each side with 10 to 35 grey or white fibres per cm, each plate narrow relative to length ..... Balaenoptera physalus
Fin whale

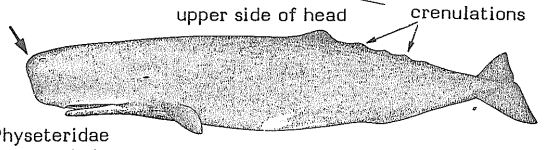


Fin whale Fig.6

1b. A single blowhole; teeth present (or concealed beneath gum) no baleen plates ..... Sub-order Odontoceti
toothed whales



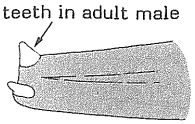
7a. Upper part of head extending well beyond tip of lower jaw, head massive, to one third of body length; lower jaw narrow with 18 to 25 pairs of teeth fitting into sockets in upper jaw (10 to 16 pairs of upper teeth rarely emerge); a low triangular or rounded dorsal fin followed by a series of crenulations (Fig.7) ..... Family Physeteridae
Physeter catodon - Sperm whale



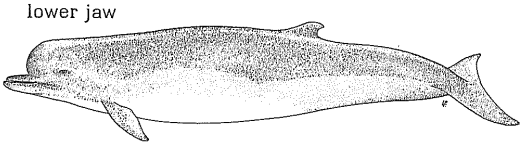
Sperm whale Fig.7

7b. Upper part of head not extending appreciably beyond lower jaw; lower jaw approximately the same width as upper jaw

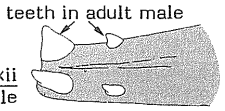
8a. Two conspicuous grooves on outer surface of throat forming a V-shape pointing forward; no notch in flukes ..... Family Ziphiidae
beaked whales



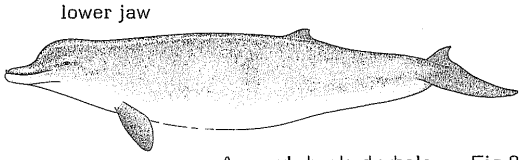
9a. In adult males, a single pair of conical teeth at tip of lower jaw* (Fig.8) ..... Hyperoodon planifrons
Southern bottlenose whale



Southern bottlenose whale Fig.8



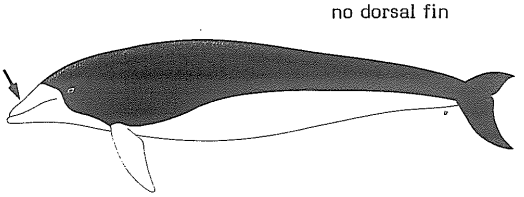
9b. In adult males, two pairs of triangular teeth at tip of lower jaw* (Fig.9) ..... Berardius arnuxii
Arnoux's beaked whale



Arnoux's beaked whale Fig.9

8b. No conspicuous grooves on throat; a deep median notch on trailing edge of flukes

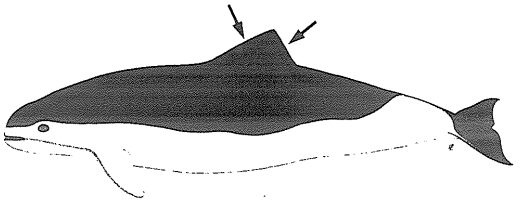
10a. No dorsal fin; snout slender and evenly pointed (Fig.10); 43 to 47 pairs of small conical teeth in both jaws ..... Lissodelphis peronii
Southern rightwhale dolphin



Southern rightwhale dolphin Fig.10

10b. Dorsal fin present

11a. Teeth spade-shaped, laterally compressed, 17 to 23 pairs in upper jaw, generally fewer in lower; dorsal fin low and straight-edged (Fig.11) ..... Phocoena dioptrica
Spectacled porpoise



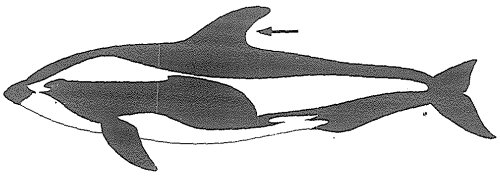
Spectacled porpoise Fig.11

11b. Teeth conical, circular or slightly flattened from front to back in cross section

12a. Less than 2 m in total length

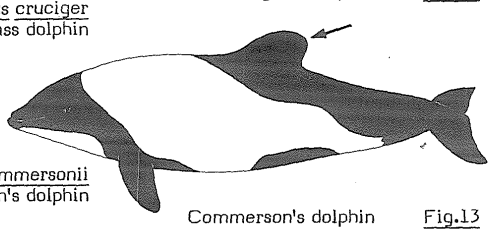
*In females and juveniles it may not be possible to distinguish the species of beaked whales except by examination of prepared skulls

13a. Dorsal fin tall, curved on trailing edge; flippers pointed (Fig.12); 28 pairs of small, pointed teeth in both jaws ..... Lagenorhynchus cruciger
Hourglass dolphin



Hourglass dolphin Fig.12

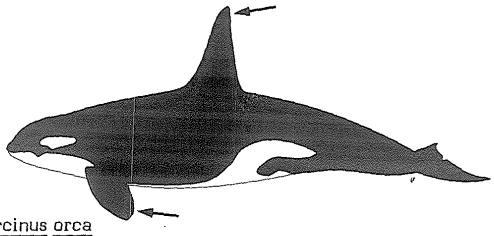
13b. Dorsal fin a rounded lobe; flipper tips rounded (Fig.13); 29 to 32 pairs of peg-like teeth in both jaws (Fig.13) ..Cephalorhynchus commersonii
Commerson's dolphin



Commerson's dolphin Fig.13

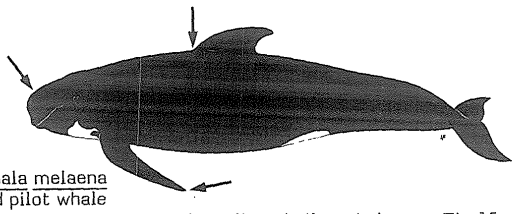
12b. More than 5 m in total length

14a. Flippers large and paddle-shaped, rounded at tips; dorsal fin tall and erect; 10 to 13 pairs of large teeth (up to 2.5 cm in diameter) in both jaws (Fig.14) ..... Orcinus orca
Killer whale



Killer whale Fig.14

14b. Flippers long and pointed, one fifth of body length or more; dorsal fin located on forward one third of body, very broad at base; head bulbous (Fig.15) ..... Globicephala melaena
Longfinned pilot whale



Longfinned pilot whale Fig.15

Prepared by W. Nigel Bonner and R.M. Laws, British Antarctic Survey, Cambridge, UK

Figures based on various sources, i.e., **Watson, L., 1981:** Sea Guide to Whales of the World; **Leatherwood, S. et al., 1982:** Whales, dolphins and porpoises of the Eastern North Pacific and adjacent Arctic waters and **Cagnolaro, L., et al., 1983:** Guide per il riconoscimento delle specie animali delle acque lagunari e costiere italiane - Cetacei.

ORDER PINNIPEDIA - Seals, sea lions and walruses

The Pinnipedia comprise three families: the Odobenidae, which today has only a single species, the Walrus of the Arctic; the Otariidae, the fur seals and sea lions, with 14 species; and the Phocidae, true seals, with 18 species. One otariid (rarely two) and five phocids are found in the Southern Ocean.

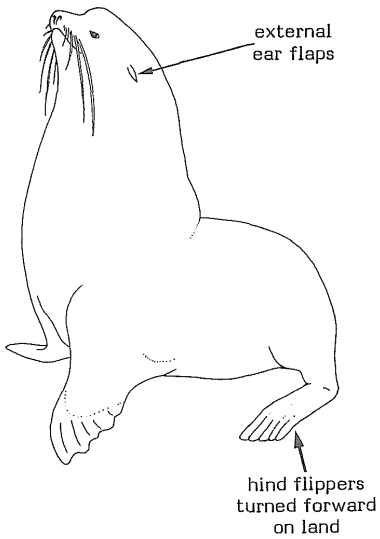
Most biologists believe that the Pinnipedia have a dual origin from Carnivore stock. The walruses, fur seals and sea lions were derived from a dog-like ancestor in the North Pacific about 25 million years ago. The true seals were derived from an otter-like ancestor in the North Atlantic about 15 million years ago.

All pinnipeds are highly adapted to an aquatic life and their bodies show profound changes from the basic mammalian pattern to fit them to life in the sea. However, unlike the whales and dolphins, they have to return to land (or floating ice) to bear their young.

GUIDE TO FAMILIES

OTAR OTARIIDAE: Fur seals and sea lions

All species are marine. The group includes the familiar California sea lion, Zalophus californianus, often seen in circuses, which is fairly typical. Otariids are characterized by the presence of small external ear flaps, in the shape of a tight scroll (and are often called "eared seals"), and the fact that the hind flippers can be turned forward and used to support the body so that the animal can walk, waddle or gallop on land on all fours with the body held clear of the ground. The long neck and well-developed fore-quarters balance the body over the foreflippers during locomotion on land. In the water, swimming is by simultaneous sweeps of the large oar-like foreflippers, the hind flippers being trailed behind. All flippers have naked soles and palms, and the exposed skin is pigmented deeply black. Males are always larger than the females (sometimes much larger) and maintain groups of females ("harems") in large breeding colonies. The young are suckled for extended periods of 4 months to more than a year. Anatomically, otariids can be recognized by the presence of supraorbital processes on the skull and the fact that the first and second upper incisors are transversely grooved. (There are many other less obvious characters.)

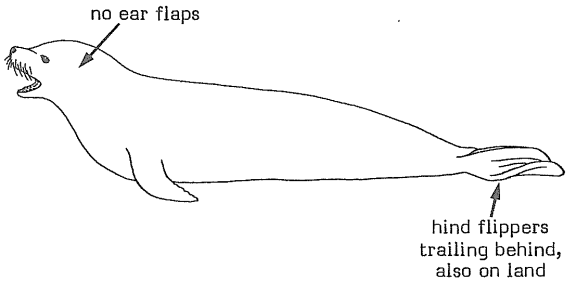


Species occurring in the Southern Ocean :

Arctocephalus gazella Peters, 1875 OTAR Arct 1
Arctocephalus tropicalis (Gray, 1872)*

* Occasionally straggling into the area

PHOC PHOCIDAE: True or earless seals

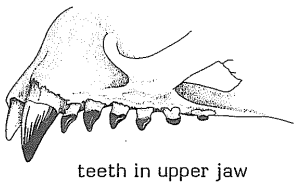


These are mainly marine, but one species and several populations occur in fresh water. There is no external ear flap and the hind flippers cannot be brought forward, but trail behind the animal on land. When moving on land, the animal humps along on its belly, or hitches itself with its foreflippers, its belly being mainly in contact with the ground. In the water, locomotion is by alternate laterally-directed strokes of the hind flippers, accompanied by lateral undulations of the hind end of the body. The foreflippers are held against the sides, but may be used for positioning when the seal is swimming slowly. Both fore and hind flippers are haired on both surfaces. The sexes are generally about equal in size (except in elephant seals, where males are much larger) and they may breed solitarily or colonially. The young are suckled for 10 days to 6 weeks. There are no supraorbital processes on the skull and no grooves on the upper incisors.

Species occurring in the Southern Ocean :

Hydrurga leptonyx (Blainville, 1820)	PHOC Hydr 1
Leptonychotes weddellii (Lesson, 1826)	PHOC Lept 1
Lobodon carcinophagus (Hombron & Jacquinot, 1842)	PHOC Lob 1
Mirounga leonina (Linnaeus, 1758)	PHOC Mir 1
Ommatophoca rossii Gray, 1844	PHOC Omm 1

KEY TO FIELD IDENTIFICATION OF ADULT SEALS

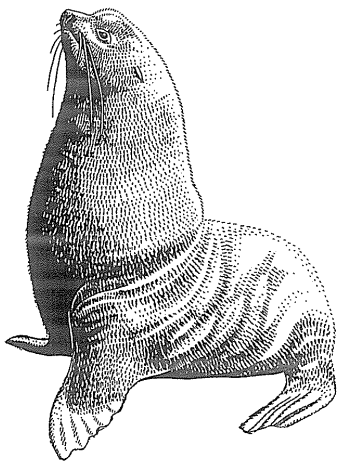


teeth in upper jaw

1a. Colour grey, weathering to brown; no spotting or patterned markings; pup fur black

2a. Hind flippers capable of being turned forward and used in terrestrial locomotion in walking or running movements

3. Claws reduced on foreflippers and small on outer digits of hind flippers, large on inner 3 digits; underside of hind flippers hairless; hind digits with cartilaginous extensions, united proximally. Coat of guard hairs and underfur. Long neck. Small external ears over 1.5 cm long. Testes in scrotum. Teeth not lobed. Adult size 2 m, 100 kg (Fig.1) ..... Antarctic fur seal (Arctocephalus gazella)



Antarctic fur seal Fig.1

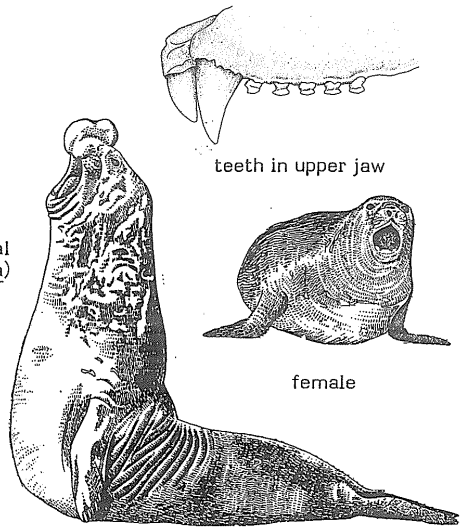
2b. Hind flippers not capable of being turned forward; not used in terrestrial locomotion; movements relatively slow

4. Large claws on foreflippers. Coarse single hair coat. No obvious neck. Teeth not lobed. Size to 2.8 m, 900 kg (female); 4.5 m, 4 000 kg (male) (Fig.2) ..... Southern elephant seal (Mirounga leonina)

1b. Colour pattern of spots, blotches or stripes (may be inconspicuous when faded); pup fur greyish-brown or with patterned markings

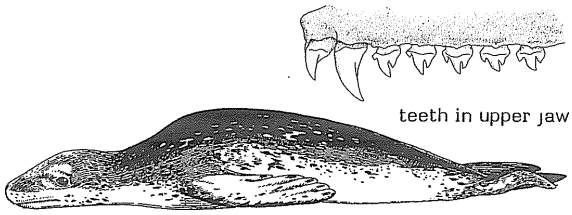
5a. Profile lithe and streamlined with flanks tailing off

6a. Very large head and thorax; distinct neck. Dark and light spots overall



Southern elephant seal Fig.2

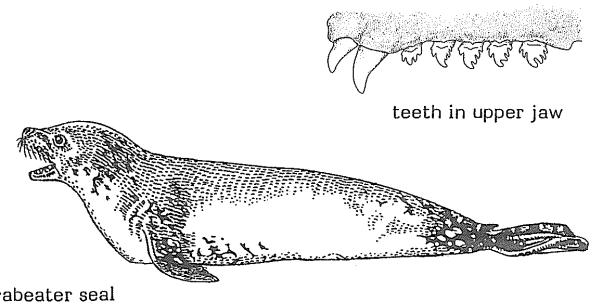
7. Colour silver grey with a very dark dorsal band; foreflippers large, silvery with black markings. Upper edge of mouth with broad grey band - reptilian appearance to head. Molars 3-lobed, sharp, recurved, canines pointed. Adults 3.6 m, 450 kg (exceptionally 500 kg) (Fig.3) ..... Leopard seal (Hydrurga leptonyx)



Leopard seal Fig.3

6b. Head of moderate size; neck not very distinct; coat mainly silver grey or cream with reticulated markings particularly on shoulders and near tail; snout upturned. Often scarred with parallel stripes

8. Markings light circles surrounded by darker markings and spots; flippers dark. When disturbed, raises head as if 'pointing'. Molar teeth 4- or 5-lobed, blunt, canines blunt. Adults to 2.5 m, 225 kg (Fig.4) ..... Crabeater seal (Lobodon carcinophagus)



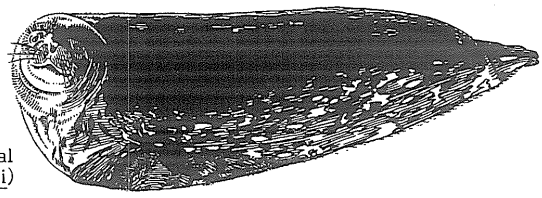
Crabeater seal Fig.4

5b. Profile plump, barrel-shaped

teeth in upper jaw

9a. Colour very dark dorsally, lighter ventrally, large spots or splashes of white, grey and black overall

10. Flippers dark. Rolls when disturbed. Upper incisors procumbent, blunt; incisors and canines often greatly worn; molars with a central prominent cone, and a smaller one behind. Adults to 3 m, 500 kg (Fig.5) .....Weddell seal (Leptonychotes weddellii)

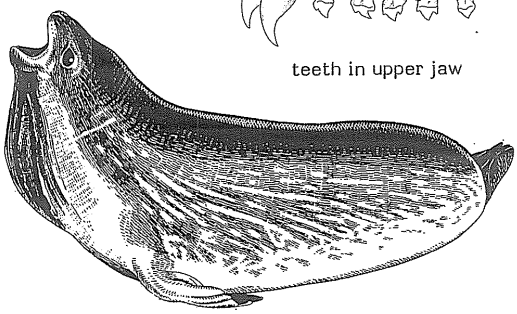


Weddell seal Fig.5

9b. Colour very dark dorsally, lighter ventrally. Little spotting or oblique fleckings on sides. Dark streaks or bands on throat and chest

11. Flippers dark. Head short and broad, eyes protruding. When disturbed, raises head near vertical, inflates neck and 'trilling' vocalization. Teeth very small, sharp, pointed, recurved (Fig.6) .....Ross seal (Ommatophoca rossii)

teeth in upper jaw



Ross seal Fig.6

OTAR Arct 1

1985

FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OTARIIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Arctocephalus gazella (Peters, 1875)

OTHER SCIENTIFIC NAMES STILL IN USE : None

0 0.98 m

VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic fur seal (Kerguelen fur seal)
Fr - Otarie de Kerguelen
Ru - Yuzhnyi morskoi kotik
Sp - Lobo fino antártico

NATIONAL :

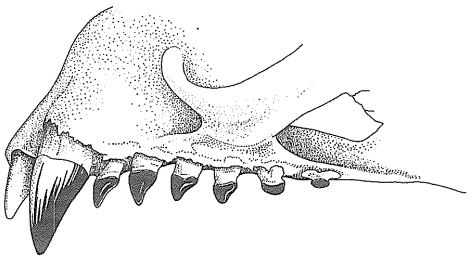
DISTINCTIVE CHARACTERS :

Profile: snout pointed; head small, neck long (but very thick in adult males); foreflippers large and "shoulders" placed further back than in true seals; hind flippers elongated and turned forward, so that the animal can walk or gallop on all four flippers.

Colour: coat composed of an outer layer of relatively stout guard hairs, some black with white tips, others predominantly white; beneath the guard hairs a layer of very fine dark fawn underfur. When seen from more than a couple of metres, the general colour appears grizzled dark grey-brown on back; throat and breast in females and juvenile males creamy, but in adult males a dense grizzled mane containing large numbers of white-tipped guard hairs covers throat and shoulders; belly in both sexes dark ginger. All classes become browner after a long stay ashore. Yearlings are silvery grey above, creamy below; pups very dark brown to black with grey-brown belly. In all fur seals the exposed skin of the flippers is intensely black.

A pale form occurs (about 0.01% of the population) which lacks pigment in the guard hairs, this resulting in white or honey-coloured appearance (all ages, both sexes, but large animals generally darker). Exposed skin mid- to chocolate-brown. Eyes normally pigmented.

Close-up: conspicuous external scroll-like ears, up to 6 cm in males, 4.5 cm in females. Snout elongate with a pointed tip; whiskers very long, 35 cm (but up to 48 cm) in adult bulls; teeth: conspicuous canines but reduced cheek teeth, often worn on inner surfaces and heavily stained dark brown. Five rudimentary nails on foreflippers, but well developed (2.5 cm) nails on middle three toes of hind flippers. In males, a black, wrinkled scrotum. Pelage seen close to shows dual structure.

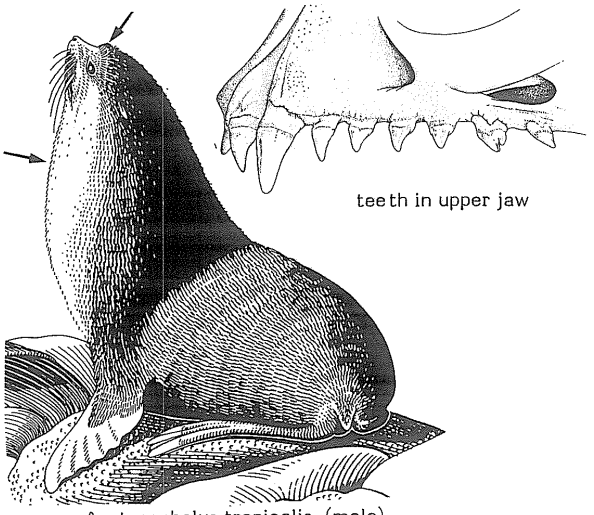


teeth in upper jaw

Pups bleat and females respond with a long haunting call on breeding beaches. Breeding bulls bark, grunt and produce a peculiar, whimper-like sound which may be represented "uh-uh-uh", or occasionally: "uh-chff - uh-chff -uh-chff". This generally conveys some threat and should not be taken to indicate fear.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

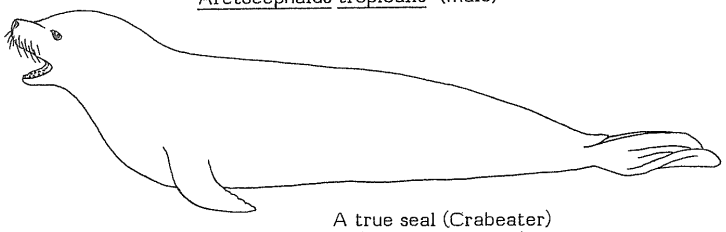
Arctocephalus tropicalis (Gray, 1872) (sub-Antarctic fur seal): this species, which breeds on islands (including Gough, Marion, Crozet, St. Paul, Amsterdam) to the north of the Antarctic Convergence, is occasionally found amongst breeding colonies of Antarctic fur seals. All specimens identified so far have been males which can be recognized by their nicotine-yellow chest and/or prominent tuft of hair (crest) on top of the head. This crest is lacking in females and juvenile males, and it may prove very difficult to distinguish these classes from Antarctic fur seals. However, the latter have relatively longer flippers. The cheek teeth of sub-Antarctic fur seals are stout and sharply pointed. Hybridization is known to occur between these two species.



teeth in upper jaw

Arctocephalus tropicalis (male)

True seals (Family Phocidae): hind flippers extended behind body when lying still; when moving on land they crawl on their belly, the hind flippers never playing any part in locomotion. In the sea, they swim with hind flippers, keeping the fore-flippers close to sides except when manoeuvering. Coat short, often with patterned markings. Snout blunt or rounded, never pointed. No external ear flaps.



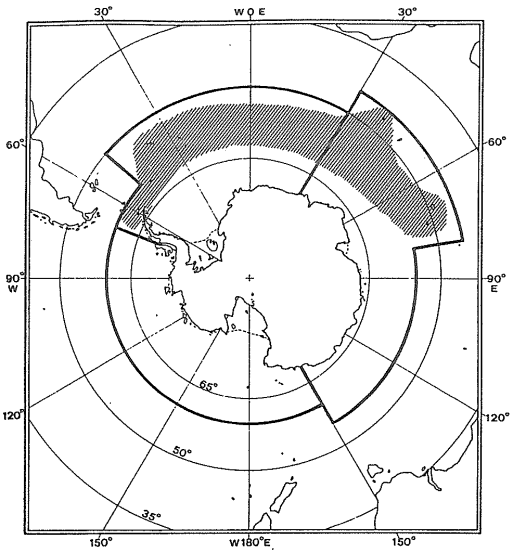
A true seal (Crabeater)
(Family Phocidae)

SIZE :

Adults: There is a very great discrepancy in size between males and females. Males: length 175 to 200 cm (average 184), weight 125 to 200 kg. Females: length 113 to 145 cm (average 128), weight 25 to 50 kg. Newborn: length 60 cm, weight 5.5 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Found breeding on islands south of the Antarctic Convergence and north of about 65°S. The major breeding population concentrates at South Georgia; smaller groups occur at the South Sandwich Island, South Orkney Islands, South Shetland and Bouvet and Marion Island (this is north of the Antarctic Convergence, and here A. gazella overlaps the range of A. tropicalis), Heard and Macdonald Islands and Kerguelen Islands. It possibly once bred at Macquarie Island. Juvenile males and old, spent bulls spread out southward from the breeding islands in summer and occur in large numbers on southern island groups. During winter, only adult bulls are found ashore (at breeding beaches) while the whereabouts of other classes are not known. There is no evidence to indicate directional migration to winter feeding grounds. Generally, fur seals avoid pack ice, but occasionally adult males are seen on floes.



Breeding: fur seals form large aggregations on land in late November-December, preferring rocky coasts. Bulls defend territories containing 5 to 15 females from other bulls and are very aggressive at this time. Non-breeding males occupy areas peripheral to the breeding beach. Pups are born in November-December; the lactation period is about 4 months; pups moult and are weaned in April.

Feeding: during the breeding season, lactating females feed almost exclusively on Antarctic krill, Euphausia superba. Juveniles take krill, but also fish and squid. Young (non-breeding) bulls kill, but generally do not eat, penguins. The diet in winter is not known.

Locomotion: on land fur seals can walk by putting their weight mainly on the fore-flippers, the hind flippers serving only to keep the pelvis (held horizontally) clear of the ground; they also gallop in a series of bounds, the thrust coming from the hind flippers. They move very agilely over rough ground, as fast as a man can run for short distances. On ice or compacted snow they may hitch themselves along with the fore-flippers, the hind flippers trailing like in a true seal. In water they swim with sweeps of the fore-flippers. When swimming fast, "porpoise" - leaping clear of the water and re-entering smoothly occurs. At play in coastal waters they adopt a variety of positions at the surface - head up or down, hind flippers fanned, fore-flipper raised, etc.

When disturbed, fur seals are very aggressive in the breeding season, particularly males (but females can also inflict severe wounds); "whimpering" may precede an attack from a bull.

EXPLOITATION :

Severely reduced by fur hunters from about 1778 onward. The last commercial sealing (at South Georgia) took place in 1907 when the stock was probably reduced to a few tens of animals located at the extreme northwest part of the island. A recovery was noted from the 1930's onward, the current stock (1984) being estimated at about 1.2 million individuals. Protected by the Convention for the Conservation of Antarctic Seals and by local legislation in South Georgia, Bouvet and elsewhere.

PHOC Hydr 1

1985

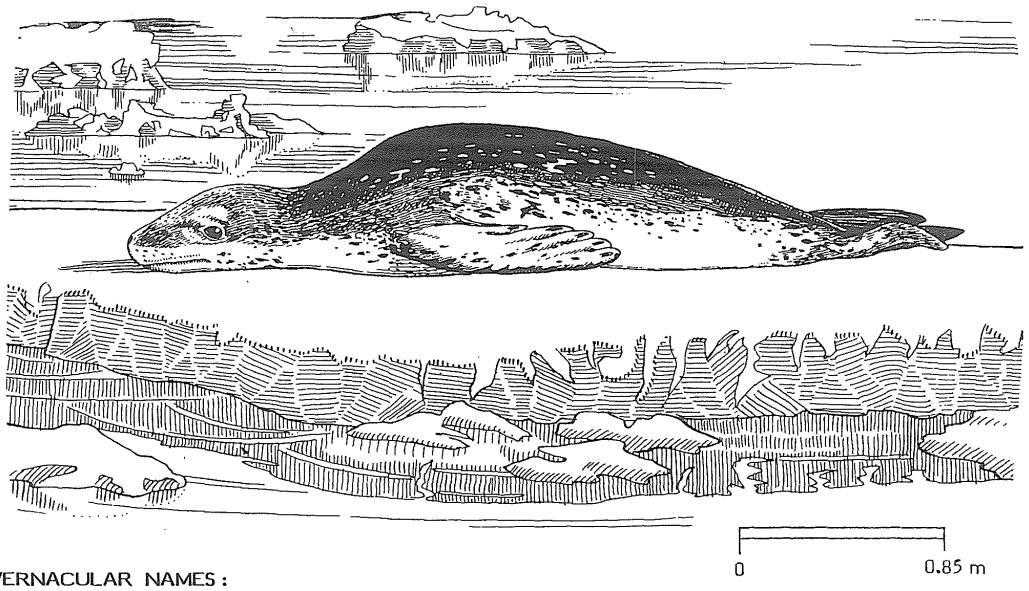
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PHOCIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Hydrurga leptonyx (Blainville, 1820)

OTHER SCIENTIFIC NAMES STILL IN USE : Ogmorhinus leptonyx (rare)



VERNACULAR NAMES :

FAO/CCAMLR : En - Leopard seal (Sea leopard)
Fr - Leopard de mer
Ru - Tyulen-leopard
Sp - Foca leopardo

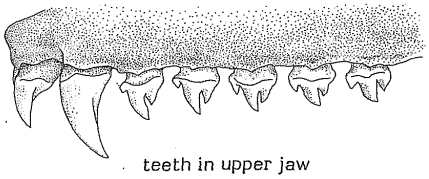
NATIONAL :

DISTINCTIVE CHARACTERS :

Profile: large, very long and slender, with a humped outline caused by the large thorax; a disproportionately large reptile-like head with a long snout, a marked constriction at neck and flanks tailing off. Build more like the Crabeater seal than other species, but distinctive.

Colour: usually very dark (black or dark grey) dorsally, silver ventrally. Liberally spotted or flecked with small, light and dark grey spots on back and black spots on belly; a relatively sharp demarcation along sides. Foreflippers light with dark spots, hind flippers dark. Head with a broad silver band along upper lip. Pup: patterned similarly to adult (unlike other species), the fur thicker and softer than in adult. Moults in January or February.

Close-up: very large, sharply pointed incisors and canines; gape huge, showing large 3-cusped, recurved cheek teeth. Cheek teeth interlock to form strainer when jaws are closed, as in the Crabeater seal. Foreflippers very long in relation to body length. Underwater sound a pulsed narrow band, about 300 cps, of an unmistakable haunting quality once heard. Occasionally vocalizes and throbs in the throat on land.



teeth in upper jaw

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

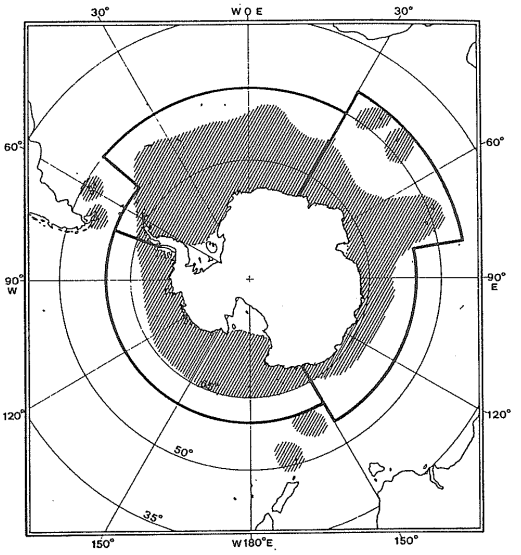
Other seals of the family Phocidae: back not humped in profile; head smaller and not reptile-like, snout shorter; cheek teeth either with 4 or 5 cusps (Lobodon carcinophagus), or simple with only 1 or 2 cusps (other species); foreflippers shorter; different colour patterns.

Arctocephalus gazella (Antarctic fur seal): foreflippers long and oar-like, walk with both fore and hind flippers, body clear of ground; head with pointed muzzle and scroll-like ear flaps. Very dense 2-layered fur coat. Adults to 200 cm (male), 145 cm (female).

SIZE :

Adults: length to 360 cm (males slightly smaller), weight about 370 kg, but exceptionally to 500 kg.
Newborn: length 150 cm, weight 35 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :



The most widely distributed of all Antarctic seals - from continental shores to sub-Antarctic islands and found in all densities of pack ice from open to closed. The main population parallels the Crabeater seal distribution. During winter it migrates north (most sightings in sub-Antarctic occur in winter or spring) and is occasionally reported from Patagonia, South Africa, southern Australia, Tasmania and New Zealand. Usually solitary.

Breeding: peak of births occur in November-December (but young pups are seen from September to January). Females with pups stay on floes and males are seen cruising in water at this time, but interactions with females have not been observed. Mating takes place at the end of the lactation period, probably 4 to 6 weeks later.

In the water it often holds the head raised above the surface and shoves back when submerging head first, like a porpoise, if stationary in water, it sometimes submerges tail first. Follows small boats with evident curiosity. When disturbed, it will raise the head in a deliberate direct gaze, the flippers pressed to the sides. Its actions are slow and deliberate; it performs sinuous lateral movements like the Crabeater, but makes little use of its foreflippers. Easily frightened and not known to attack men on land or in water.

Feeding: eats a wide variety of food species. Often seen chasing and eating penguins at rookery landing places, and the faeces may contain penguin feathers. However, only a small proportion of the population feeds at penguin rookeries. The Leopard seal is an important predator of young Crabeater seals (up to the end of first year of their life); as Crabeaters grow, they become more successful in avoiding Leopards but nevertheless, 63% of adult Crabeaters bear scars of Leopard teeth. Krill, strained through the teeth like in the Crabeater seal, amount to about 50% of their diet; birds, seals and carrion make up about 34%, 15% are fish and squid, and other invertebrates make up the remainder.

EXPLOITATION :

No recorded substantial exploitation. Permissible catch of 12 000 individuals a year under the Convention for the Conservation of Antarctic Seals, about 5.4% of the calculated stock of 222 000 individuals.

PHOC Lept 1

1985

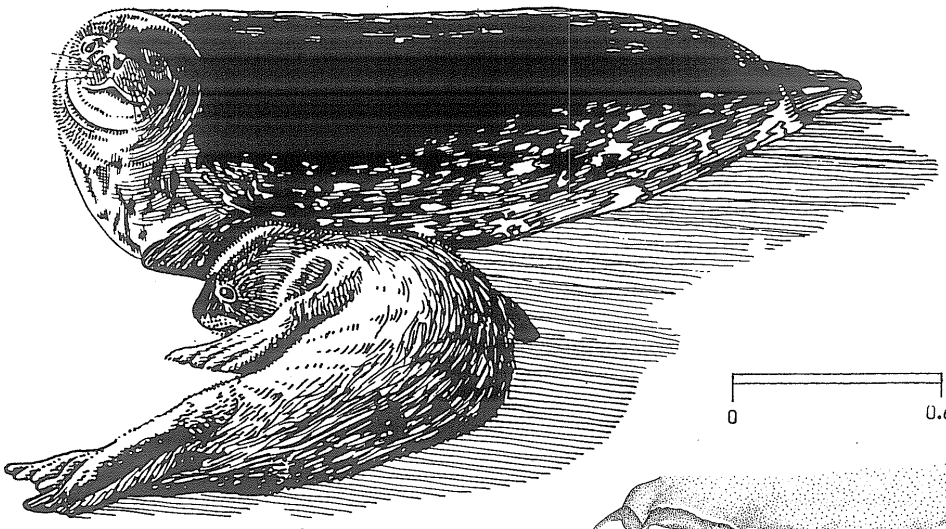
FAO SPECIES IDENTIFICATION SHEETS

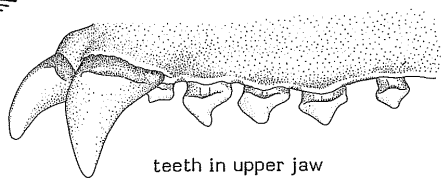
FAMILY : PHOCIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Leptonychotes weddellii (Lesson, 1826)

OTHER SCIENTIFIC NAMES STILL IN USE : None





teeth in upper jaw

VERNACULAR NAMES :

FAO/CCAMLR : En - Weddell seal
Fr - Phoque de Weddell
Ru - Tyulen ueddella (Weddella)
Sp - Foca de Weddell

NATIONAL :

DISTINCTIVE CHARACTERS :

Profile: large, heavy, 'barrel-shaped', head relatively small, with a moderately short and rather wide snout, and no distinct neck.

Colour: background very dark brown, lighter ventrally, mottled with large darker and lighter patches, those on the belly silvery-white. Immediately after moulting (December-March) the colour appears as gun-metal to steely blue. Some individuals are lighter generally, but never bleach to the whiteness of the Crabeater seal. The dark areas of the premoult coat fade to a rusty brown. Pups are soft grey, grey-brown or golden, often with indistinct darker mottling.

Close-up: posterior corners of mouth turn up, giving a benign appearance; whiskers often strongly curled when dry. Teeth blunt; upper incisors procumbent for ice-sawing and, together with canines, often greatly worn; cheek teeth with a central prominent cusp and a smaller one behind. Foreflippers small in relation to body length; in a fat animal it is difficult for both flippers to touch the ground at the same time. Voice: on land it is generally voiceless, but may make hooting noises or a dull glottal 'clopping' or gulping sound in the throat while opening and closing its mouth. The underwater repertoire consists of a broad array of calls from low-pitched buzzes to pulsed trills and whistles, but these calls are seldom readily audible to man on the ice surface.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Ommatophoca rossii (Ross seal): general shape similar, but snout extremely short and eyes larger and protruding; teeth very small, canines not procumbent, hind flippers much longer; a mask-like light and dark pattern about eyes; often dark stripes on throat and chest; little spotting or oblique fleckings on sides. When disturbed, raises head near to vertical, "inflates" neck and utters "trilling" sounds. Size smaller, to 217 cm (female), 207 cm (male).

Lobodon carcinophagus (Crabeater seal): profile lithe and streamlined, flanks tailing off; head larger, snout elongate, slightly up-turned, cheek teeth with 4 or 5 blunt lobes; coat mainly silver grey or cream with reticulated markings (light circles surrounded by darker markings and spots), or indistinct. Adults to 250 cm.

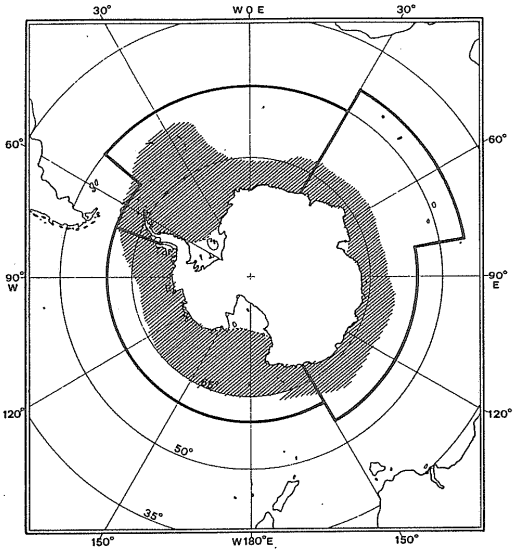
Hydrurga leptonyx (Leopard seal): body very long and slender, with humped outline and marked constriction at neck; head very large and reptile-like; canines larger and sharply pointed; cheek teeth with 3 sharp, recurved cusps; foreflippers large. Colour silvery grey with a very dark dorsal band, liberally flecked with small spots. Size larger, to 360 cm.

Mirounga leonina (Southern elephant seal): huge, bulky seal, characteristic proboscis in adult males and transverse wrinkles over snout of females and juvenile males; coarse hair coat. Incisors 2/1 (2/2 in all other southern phocids), canines massive, cheek teeth not cusped and small in relation to jaw; large claws on foreflippers. No pattern of spotting (but often pale scars in females). Adults to 450 cm (male), 280 cm (female).

Arctocephalus gazella (Antarctic fur seal): foreflippers long and oar-like, walk with both fore and hind flippers, body clear of ground; head with pointed muzzle and scroll-like ear flaps. Very dense 2-layered fur coat. Adults to 200 cm (male), 145 cm (female).

SIZE :

Adults: length to 320 cm, but usually around 260 cm, weight to 500 kg. Females generally larger than males. Newborn: length 120 cm, weight 25 kg.



GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar and coastal around the Antarctic but occasional wanderers are found as far north as Uruguay, New Zealand and South Australia. Breeds on continental ice shelves and on coasts and islands of the Antarctic Peninsula, the South Shetland Islands and South Orkney Islands. A small relict breeding population (about 100 individuals) exists around Larsen Harbour, South Georgia.

Characteristically a seal of the inshore fast ice and coasts, but found singly in pack-ice, occassionally in association with Crabeater seals. It hauls out on beaches during the summer, usually singly or in scattered groups, occasionally in close aggregations of up to 100 individuals.

Breeding: from September to mid-November. Colonies may number several hundreds, often aggregated along pressure cracks and tide cracks in fast ice. The seals can keep breathing holes open in the ice by sawing it with their canines and incisors but they prefer naturally open water for breeding. Several females may share a breathing hole, giving birth on the ice around it. Mothers actively defend their young and mothers with young are more widely spaced than seals at other times of the year. Breeding males spend most of their time in water where they defend aquatic territories against other males. Mating takes place underwater, probably around the time of weaning, some six weeks after birth.

In water, the Weddell seal floats vertically in leads with the head pointing upward or level. It submerges by sinking tail-first without showing its back. Under ice it "hangs" in a curved posture, tail down. On land it travels slowly by small "humping" movements with both foreflippers pressed to the sides; the head usually slides along the ice on the chin (but it occasionally moves by lateral movements like the Crabeater seal). When wishing to turn, it usually rolls over until facing in the right direction. If disturbed, it may raise a foreflipper in "salute". Often claps its jaws while making dull glottal "clops".

Feeding: feeds mainly on fish (about 60%) together with some cephalopods and various crustacea such as the larger shrimps and amphipods. Both sluggish benthic and active pelagic fish are eaten. A Weddell seal was seen to bring in a large nototheniid fish, Dissostichus mawsoni, about 1.5 m long and estimated to weigh 31 kg and consume it entirely within 3 hours. It has the ability to dive deeply and does not usually stay under water for more than 15 minutes, but the longest observed dive extended over 73 minutes. Dives of 300 to 400 m are common and it seems that some favoured food fishes are most often caught at these depths.

EXPLOITATION :

The only recorded substantial commercial exploitation of this species occurred in 1892 and 1893 when whaling ships took several thousand seals, probably including some Weddells. Subsequently it was much used by Antarctic expeditions as a source of meat for sledge dogs and men, but this practice is now largely abandoned. Should sealing begin in the Antarctic, the permissible catch limit is set at 5 000 individuals a year (about 0.7% of the estimated total population of 732 000) and with a limited open season.

PHOC Lob 1

1985

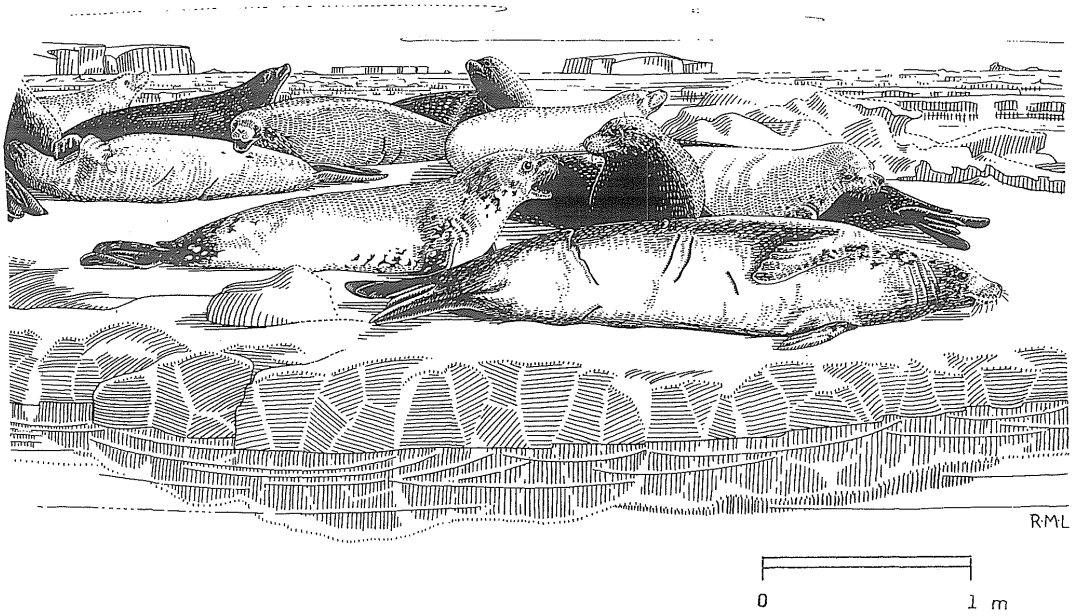
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PHOCIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Lobodon carcinophagus (Hombron & Jacquinot, 1842)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Crabeater seal
Fr - Phoque crabier
Ru - Tyulen-kraboed
Sp - Foca cangrejera

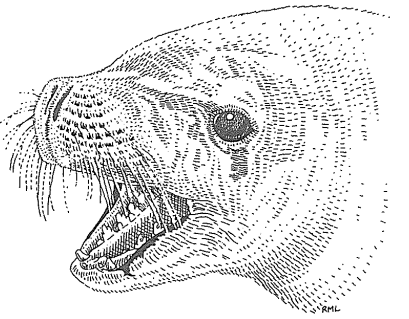
NATIONAL :

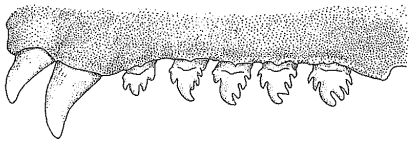
DISTINCTIVE CHARACTERS :

Profile: relatively slim, lithe and streamlined; snout elongated, slightly tip-tilted or pig-like. Raises head and "points" when disturbed.

Colour: background mainly silvery grey (newly moulted) to golden or creamy white (faded); sometimes brown; back darker than belly. Older animals become progressively paler, even when freshly moulted. Reticulated (net-like) chocolate brown markings and fleckings on shoulders, sides and flanks shading into predominantly dark hind and foreflippers and head. The pattern is strongest on flanks behind foreflippers and around hind end of body, and most conspicuous on young animals. Coat often conspicuously scarred with typically obique, parallel scars, mainly on sides and flanks in 63% of adults. These scars result from Leopard seal attacks on animals when young. Pups are light greyish brown with dark hind flippers and indistinct spots on body.

Close-up: line of mouth level, with no up-turn at corners as in the Weddell seal; whiskers straight or moderately curved, short. Canines and incisors moderate but sharp-pointed; cheek teeth extraordinarily elaborate with 4 or 5 recurved, lobe-like cusps forming a sieve-like structure for straining food. Fore-flippers moderate, about 1/5 of body length. Faeces usually bright pink from pigments derived from food remains (krill). Sound production: out of water sounds are few and simple. When disturbed, much hissing and blowing through the nose, but no musical sounds. Underwater sounds a deep monosyllabic call, almost like a groan.





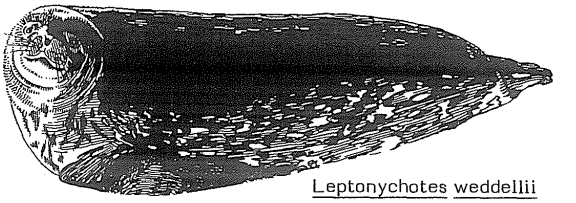
teeth in upper jaw

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA:

Hydrurga leptonyx (Leopard seal): body very long and slender, with humped outline and marked constriction at neck; head very large and reptile-like; canines larger and sharply pointed; cheek teeth with 3 sharp recurved cusps; foreflippers large. Colour silvery grey with a very dark dorsal band, liberally flecked with small spots. Size larger, to 360 cm.

Hydrurga leptonyx

Leptonychotes weddellii (Weddell seal) and Ommatophoca rossii (Ross seal): Body plump and barrel-shaped without a distinct neck; head small, snout short; teeth much smaller, those on cheek uni- or at most bicuspidate; canines procumbent in L. weddellii; colour very dark dorsally with large patches (L. weddellii); and spots and streaks (O. rossii) on body; a mask-like light and dark pattern about eyes in O. rossii.



Leptonychotes weddellii

Mirounga leonina (Southern elephant seal): huge, bulky seal, characteristic proboscis in adult males and transverse wrinkles over snout of females and juvenile males; coarse hair coat. Incisors 2/1 (2/2 in all other southern phocids), canines massive, cheek teeth not cusped and small in relation to jaw; large claws on foreflippers. No pattern of spotting (but often pale scars in females). Adults to 450 cm (male), 280 cm (female).

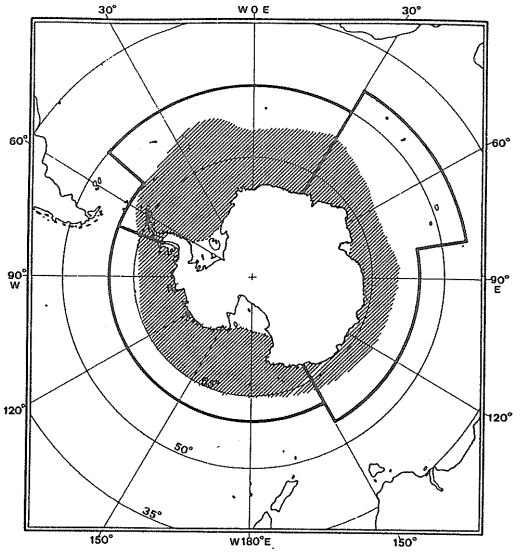
Arctocephalus gazella (Antarctic fur seal): foreflippers long and oar-like, walk with both fore and hind flippers, body clear of ground; head with pointed muzzle and scroll-like ear flaps. Very dense 2-layered fur coat. Adults to 200 cm (male), 145 cm (female).

SIZE:

Adults: length 260 cm, weight to 225 kg. The largest females may slightly exceed the largest males in size. Newborn: length 120 cm, weight 20 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Virtually confined to the Antarctic pack ice. During summer, Crabeater seals retreat to the area of residual pack (about 4 million km^2), but they are occasionally seen hauled out on glacier ice or less commonly on shore on Antarctic beaches. However, occasional specimens have been recorded as stragglers from New Zealand, Tasmania and southern Australia. The most northerly records are from Rio de la Plata and the tip of South Africa. Occasionally found as mummified carcasses far inland and at considerable altitudes on the Antarctic Continent.



Breeding: the pupping season is highly synchronized, with a peak in early to mid-October. The basic social unit is the mother/pup pair, joined by an adult male to form a triad which persists till the pup is weaned at about 4 weeks. Males are very aggressive and defend an area with a radius of about 50 m around the female from other males. Family groups are separated by about 1 to 2 km, but despite this wide spacing, there is frequent competition for reproductive rights and most adult males are scarred from intraspecific encounters. Females are also very aggressive to the male and violently reject him until near the end of the lactation period when they become less resistant. Copulation has not been observed, but is believed to take place on ice.

If disturbed, the Crabeater seal raises its head as if "pointing" but remains belly down; closer disturbance results in open mouth display and hissing and snorting. When turning rapidly, it occasionally rolls like the Weddell seal or pivots like the Elephant seal. If pressed, it travels rapidly over ice with lateral swimming undulations and alternate strokes of the foreflippers, but can keep moving with the foreflippers pressed back against the body like the Weddell seal, or spread in unison like the Elephant seal.

Feeding: a specialist feeder, over 90% of the diet being Antarctic krill, Euphausia superba with only trivial amounts of fish, squid and other invertebrates. There is no indication of special diving adaptations, so food is probably obtained near the surface, presumably at night. Highly ornate teeth function as strainers for separating water from krill in the mouth.

The Crabeater seal is a key species in the Southern Ocean and now the major consumer of krill, having overtaken baleen whales following the reduction of the latter by commercial whaling. Growth rates of Crabeater seals accelerated so that in the 1960's they matured earlier, at 2.5 years as compared with 4 years before 1950. This is believed to be the result of lessening competition for the common food base, krill, after reduction of the whale stocks. However, the age at maturity increased again in the 1970's as competition for krill increased as a result of growing stocks of krill consumers.

EXPLOITATION :

There is no certain history of substantial commercial exploitation, though some Crabeaters were taken by the Norwegian sealing expedition in 1964. Occasionally used as a source of sledge-dog food by Antarctic expeditions. Permissible catch of 175 000 individuals per year under the Convention for the Conservation of Antarctic Seals, but there is little likelihood of economic exploitation.

ABUNDANCE :

The most abundant seal in the world, with a population probably numbering between 15 and 40 million (more than equal to all other seals put together).

PHOC Mir 1

1985

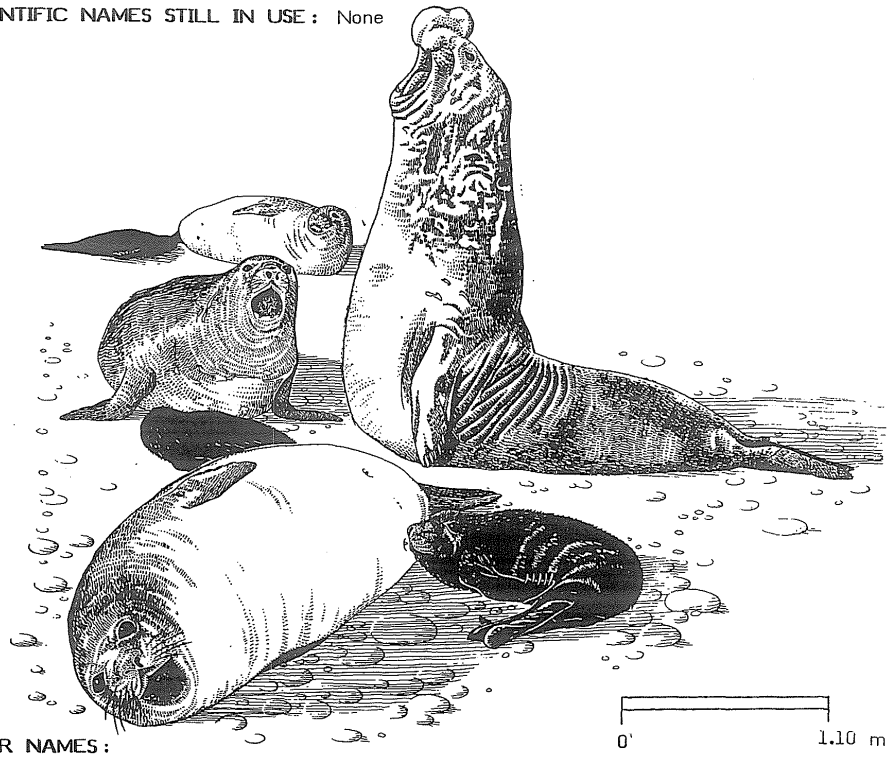
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PHOCIDAE

FISHING AREAS 48,58,88 (Southern Ocean)

Mirounga leonina (Linnaeus, 1758)

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

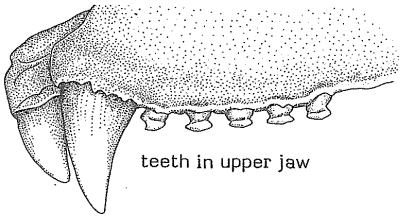
FAO/CCAMLR : En - Southern elephant seal (Sea elephant)
Fr - Eléphant de mer austral
Ru - Yuzhnyi morskoi slon
Sp - *Elefante marino del sur*

NATIONAL :

DISTINCTIVE CHARACTERS :

Profile: very heavy build, neck inconspicuous, chest large. Males over three years are clearly larger than females; adult males with a characteristic inflatable, erectile proboscis that enlarges during the breading season; females and younger males have a more pointed snout than other Antarctic seals.

Colour: dark grey, sometimes with a darker vertebral stripe, lighter ventrally, fading to various shades of brown, but considerable variation occurs from almost yellow to almost black. No superimposed pattern of spots or other markings, but adult males with scars about neck and chest, and females with a lighter yoke around neck from bites during mating. Pups with black neonatal woolly fur, fading to a very dark brown; a prenatal moult of this fur occurs in about 3% of individuals. Yearlings medium grey, lighter ventrally, with yellowish staining. Adults moult in summer to autumn, the females from January onward, and the males in March-April, but this is subject to considerable variation.

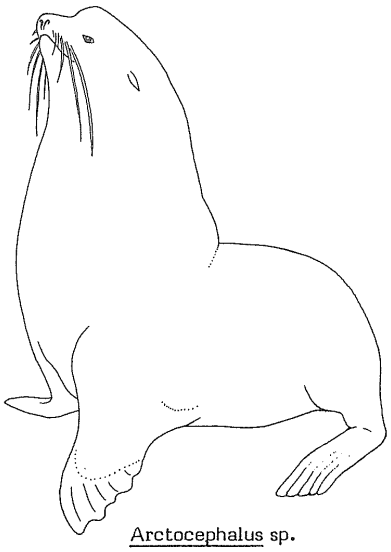

teeth in upper jaw

Close-up: 2 upper and 1 lower incisors on each side; canines massive, especially in males, cheek teeth simple and small in relation to the size of jaws. Foreflippers relatively small (less than one fourth of body length), with large nails (to about 5 x 1 cm); hair stiff, short and sparse. When moulting, the hair and superficial layer of the skin come away in large sheets.

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Other seals of the family Phocidae: snout less pointed, not capable of great enlargement in males; 2 upper and 2 lower incisors on each side (2 upper and 1 lower in M. leonina); female slightly larger than male. Usually with colour markings on body. Furthermore, the behaviour patterns of these species are rather distinctive.

Fur seals (Arctocephalus sp.): very much smaller; foreflippers oar-like and long (more than one fourth of body length); hind flippers capable of being turned forward, so as to walk with both fore and hind flippers, keeping the body clear of the ground. Head with a pointed muzzle and scroll-like ear flaps. A very dense, two-layered coat.



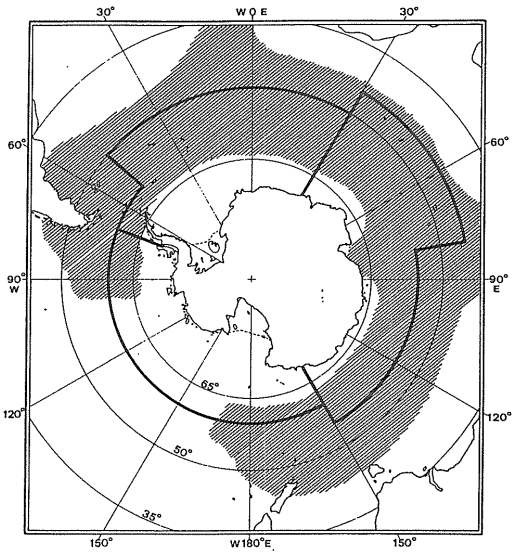
Arctocephalus sp.

SIZE :

Adults: males: length 420 to 450 cm, weight 3 000 to 4 000 kg; females: length 260 to 280 cm, weight 400 to 900 kg. Newborn: length 127 cm, weight 40 to 46 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Nearly circumpolar in Antarctic waters, large males reaching the continental shores. Typically an animal of sub-Antarctic oceanic islands, notably South Georgia, Kerguelen and Macquarie Islands, with occasional individuals coming from Australia and South Africa (furthest north Angola). Breeds on the South American mainland in Chubut, reaching Uruguay.



Southern sea elephants have virtually never been observed in the open sea, not even around South Georgia where the stock numbers about 300 000 individuals; in inshore waters they are often seen with the head and flippers floating clear of water; they submerge tail-first, and active swimming is by means of the hind flippers. Rarely seen in pack ice, and then only solitarily. On land, they crawl in clumsy, lumping motion, with the foreflippers spread out to lift the body, then thrusting the pelvis to straighten out, like a looper caterpillar; they move in short bursts of activity with frequent halts, and stop by falling onto the chest; to turn, they often arch their tail and head upward and pivot on belly, swivelling with the aid of a foreflipper. They flip sand, and shingle, onto (and over) their back with the foreflippers as a reaction to heat and dryness, also when disturbed or frustrated.

Breeding: they form dense aggregations on land (primarily on sub-Antarctic islands) in September-November; dominant and subordinant males maintain position amongst herds of up to 4 000 breeding cows by means of challenging roars, threat displays (rearing up on hinder third of body) and fights; cows pup about a week after arrival; the lactation period is about 3 weeks, followed by mating on land just before the dispersal of the harem and return to the sea. The gestation period is around 350 days. In South Georgia, females sexually mature at 3 years (rarely at 1, 2 or 4 years) and males at 4 years (but they are not socially mature before 6 years). On Macquarie Island maturity is reached later.

Feeding: little is known, but they are believed to feed mainly on fish in inshore waters and on cephalopods elsewhere (probably about 75% cephalopods and 25% fish). Young Elephant seals also take amphipods.

The Southern elephant seals are generally aggressive to each other (and to man) during the breeding season, but during moulting they will lie about in heaps, remaining inactive for 30 to 40 days, often in muddy wallows.

EXPLOITATION :

Extensively hunted in the past for blubber oil. The peak of hunting activities occurred in the nineteenth century, but continued (as a rationally managed operation) at South Georgia until 1964. Hunting there was restricted to 6 000 bulls of over 3.5 m each year. The average oil yield was about 330 kg/seal, and it was used like whale oil in the manufacture of edible fats. The current stock consists of about 700 000 individuals. Protected under the Convention for the Conservation of Antarctic Seals.

PHOC Omm 1

1985

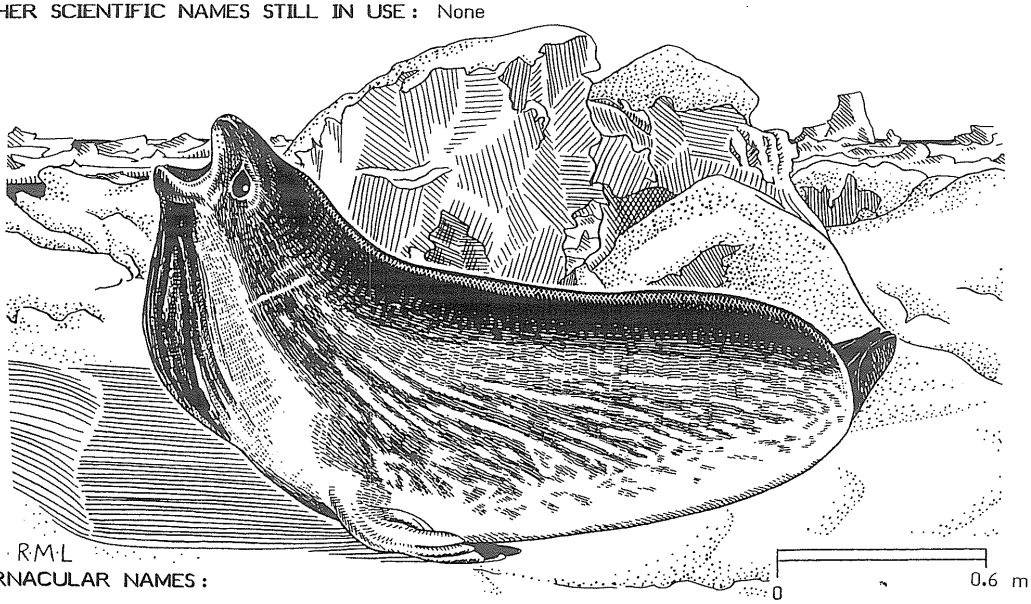
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : PHOCIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Ommatophoca rossii Gray, 1844

OTHER SCIENTIFIC NAMES STILL IN USE : None



VERNACULAR NAMES :

FAO/CCAMLR : En - Ross seal
Fr - Phoque de Ross
Ru - Tyulen Rossa
Sp - Foca de Ross

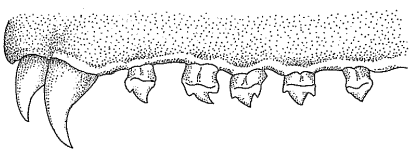
NATIONAL :

DISTINCTIVE CHARACTERS :

Profile: plump and rather shapeless; at a distance superficially like the Weddell seal and may be confused with it. Head short and wide; can be withdrawn into rolls of fat about neck; no external appearance of neck, however. Raises its head vertically, with chest enlarged and back arched when disturbed.

Colour: dark grey to chestnut dorsally with little spotting and a sharp line of demarcation from the silvery white underside. A light and dark pattern about eyes gives the head a mask-like appearance; often broad dark stripes from chin to chest, and on sides of head; spotted or obliquely striped on sides and flanks. Fore and hind flippers dark. Most adults have small pale scars on neck and shoulders. Pups have a dark brown fur (not white, as described sometimes).

Close-up: an extraordinarily short snout set in a wide head. Teeth: small sharp canines and very small cheek teeth (in contrast to other Antarctic phocids). Mouth relatively small, eyes large and protruding. Foreflippers with claws reduced and terminal joints greatly elongated, but flippers not proportionately longer than in the Crabeater seal. Hind flipper digits elongated with cartilaginous extensions; these flippers may reach 22% of the body length (greatest for any phocid). Voice: can produce pulsed musical sounds underwater but characteristically utters an unpulsed moan of varying frequency, or similar "buzzing". In the air, it inflates the windpipe and soft palate and with the mouth wide open makes unique trilling, cooing, chugging sounds.



teeth in upper jaw

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Leptonychotes weddellii (Weddell seal): general shape similar, but corners of mouth up-turned, long, curved whiskers, procumbent upper incisors (ice-sawing); hind flippers shorter, and conspicuous large spots on splashes of white, grey and black overall. Rolls when disturbed. Size larger, to 320 cm.

Lobodon carcinophagus (Crabeater seal): profile lithe and streamlined, flanks tailing off; head larger, snout elongate, slightly up-turned, cheek teeth with 4 or 5 blunt lobes; coat mainly silver grey or cream with reticulated markings (light circles surrounded by darker markings and spots), or indistinct. Adults to 250 cm.

Hydrurga leptonyx (Leopard seal): body very long and slender, with humped outline and marked constriction at neck; head very large and reptile-like; canines larger and sharply pointed; cheek teeth with 3 sharp, recurved cusps; foreflippers large. Colour silvery grey with a very dark dorsal band, liberally flecked with small spots. Size larger, to 360 cm.

Mirounga leonina (Southern elephant seal): huge, bulky seal, characteristic proboscis in adult males and transverse wrinkles over snout of females and juvenile males; coarse hair coat. Incisors 2/1 (2/2 in all other southern phocids), canines massive, cheek teeth not cusped and small in relation to jaw; large claws on foreflippers. No pattern of spotting (but often pale scars in females). Adults to 450 cm (male), 280 cm (female).

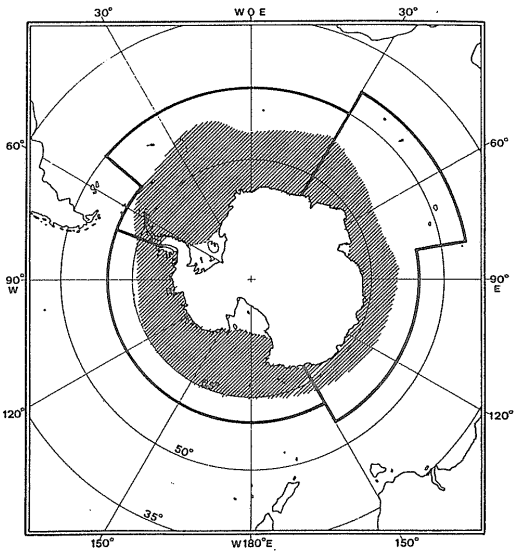
Arctocephalus gazella (Antarctic fur seal): foreflippers long and oar-like, walk with both fore and hind flippers, body clear of ground; head with pointed muzzle and scroll-like ear flaps. Very dense 2-layered fur coat. Adults to 200 cm (male), 145 cm (female).

SIZE :

Adults: males: length to 2.07 m*, weight 177 kg; females: length to 2.17 m*, weight to 169 kg (the smallest of Antarctic phocids). Newborn: length 105 to 120 cm, weight 16.5 kg.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Circumpolar around the Antarctic but there is evidence that it is much more abundant in some areas, such as the King Haakon VII Sea, than in others. It may be more abundant near Cape Adare than further south in the Ross Sea. Usually found in heavy pack ice, 6 to 8 oktas, preferring smaller smooth floes; occasionally on fast ice. Usually solitary, but rarely in groups of up to 5 on a single floe. It has a placid disposition and can be easily approached.



Breeding: births peak in the first half of November and mating is deduced to take place after the beginning of February. Lactation period 4 to 6 weeks (deduced).

It usually travels slowly over ice, "humping" like the Weddell seal with its head raised. But it can move fast, thrashing the hind flippers from side to side, with the foreflippers pressed against the body.

Feeding: believed to feed largely on squid (about 57 to 64%) and fish (about 22 to 34%). The rather weak jaws and teeth are caracteristic of squid feeders.

EXPLOITATION :

No exploitation is known. Protected under the Convention for the Conservation of Antarctic Seals. Population estimated at 220 000 to 650 000 individuals.

---

*Curvilinear lengths

INDEX OF SCIENTIFIC AND VERNACULAR FAMILY AND SPECIES NAMES

EXPLANATION OF THE SYSTEM

Type faces used:

Italics	:	Valid scientific names (genera and species)
	:	Synonyms (preceded by an asterisk)
ROMAN (caps)	:	Family Names
Roman	:	International (FAO) species names
	:	Local names

B

D

E

L

M

N

O

P

R

S

T

U

V

W

X

Y

Z

ADDENDUM TO INDEX OF SCIENTIFIC AND VERNACULAR FAMILY AND SPECIES NAMES

ISBN 92/5/102358/1