FAO SPECIES IDENTIFICATION SHEETS

FOR FISHERY PURPOSES

SOUTHERN OCEAN

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

For bibliographic purposes the section on Cephalopoda should be sited as follows:
Clyde F.E. Roper, Michael J. Sweeney & Malcolm R. Clarke 1985. Cephalopoda pp. 117-205. In: Fischer, W. & J.C. Hureau (eds.) ..... see p. iv.

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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

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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).

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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 1985 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.

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

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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 bodias, and it is hoped that they will ultimately becoma regional standard species names and will generally remain unchanged, although there may be instances whera 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 unchangad as far as possible. However, for reasons of space, national names cannot be included in tha 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. "hunchad" 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 tha 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 suppliad 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 tha 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 tha 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 appeared 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

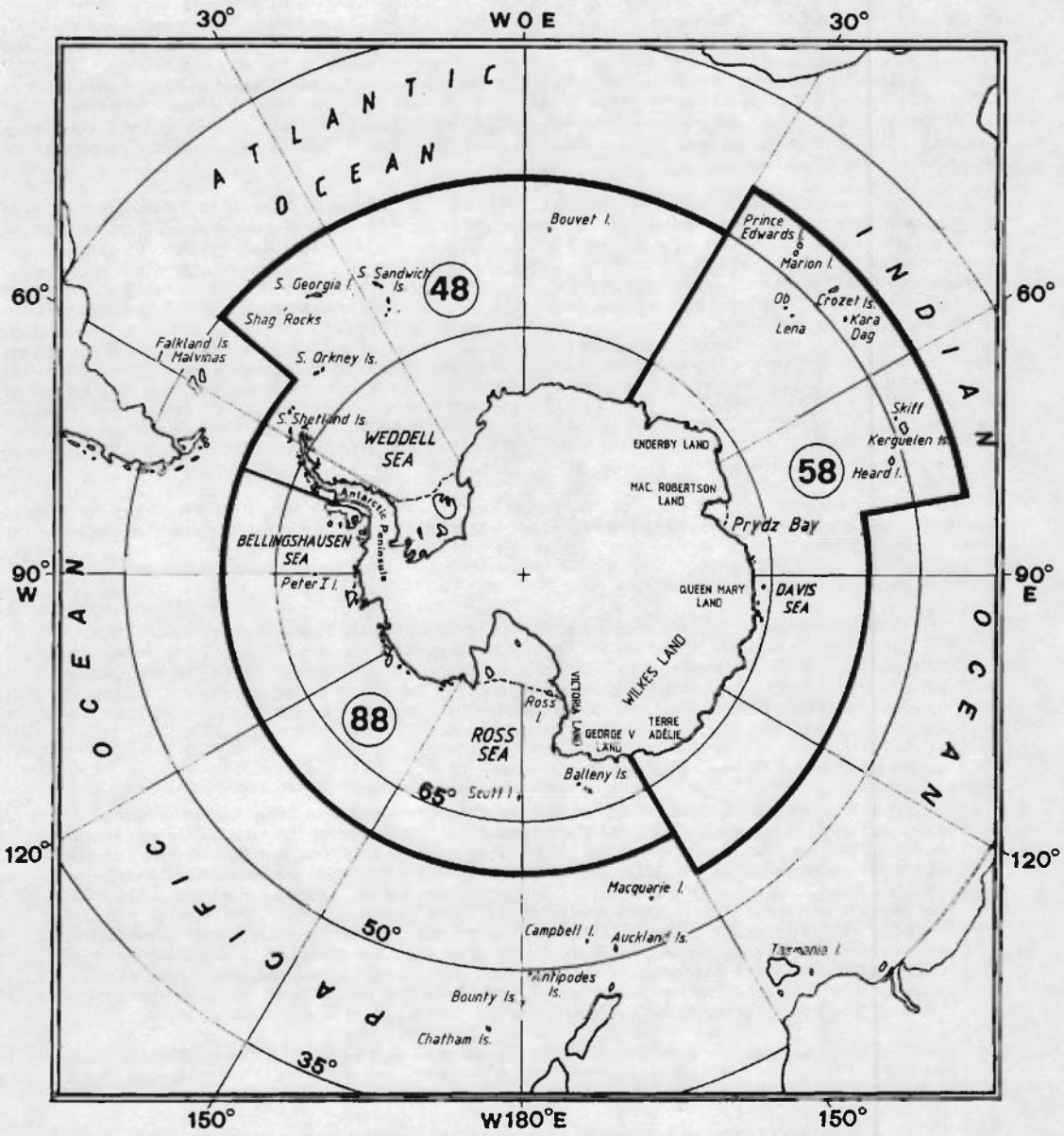
It is obviously impossible, in the context of the present work, to cover all major groups of plants and animals integrating the Antarctic ecosystem. The choice of the groups here included is based, on the one hand, on present and potential interest to fisheries, and on the other, on the aspects of conservation 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 Identificatlon 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°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°C near the continent to 3.5°C at the Antarctic Convergence in summer, and from -1.8° to 0.5°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°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 x 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).

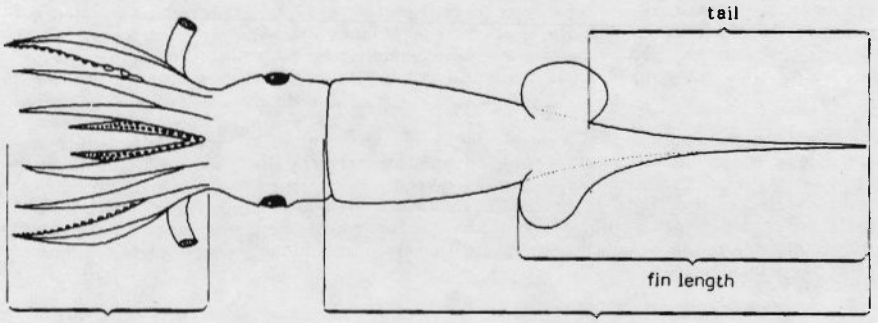
CEPHALOPODS

FAO Sheets

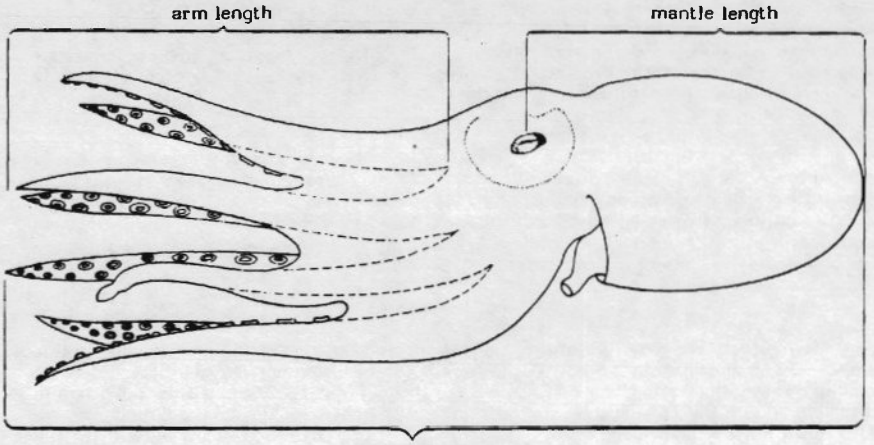
Fishing Areas 48,58,88

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).

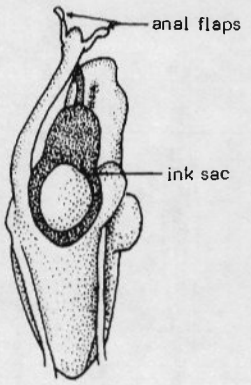


Fig.1

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)

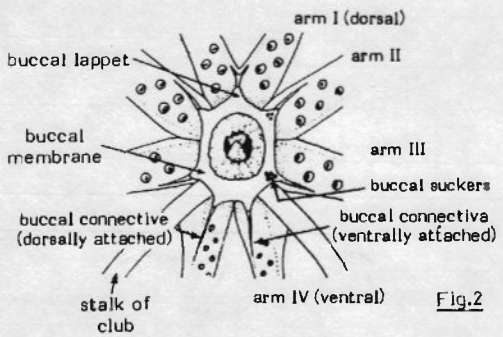


Fig.2

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).

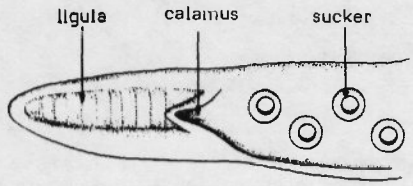


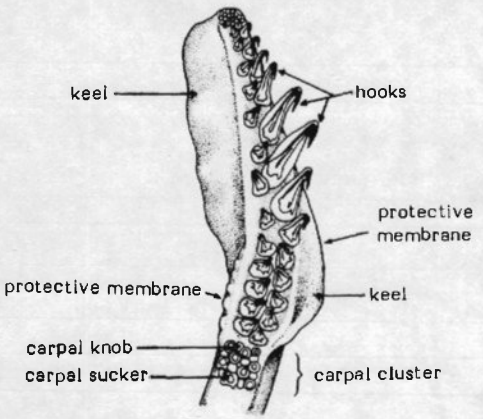
Fig.3

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.

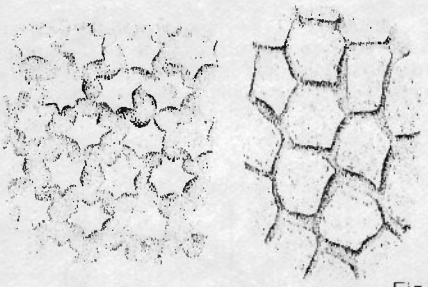


Fig.5.

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).

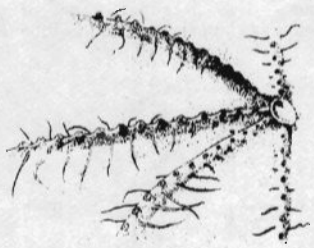


Fig.6

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

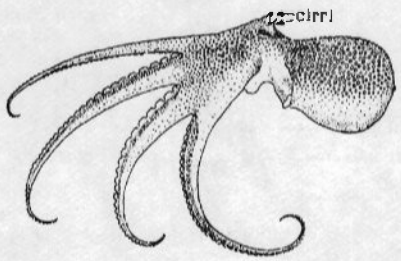
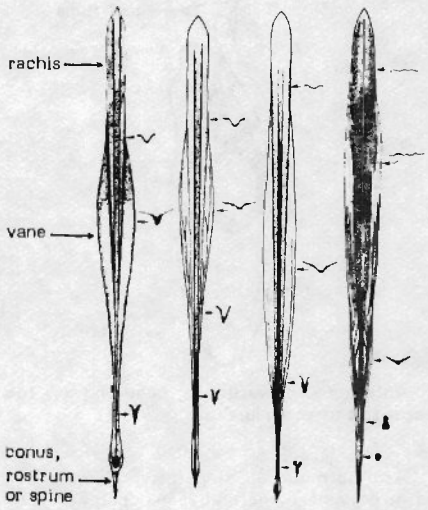


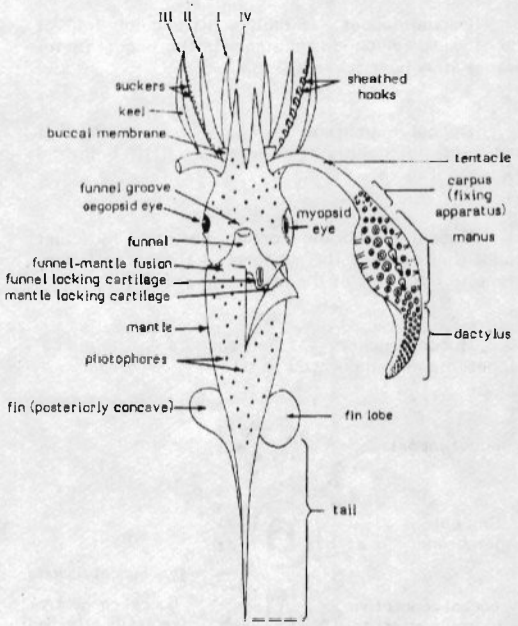
Fig.7

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).



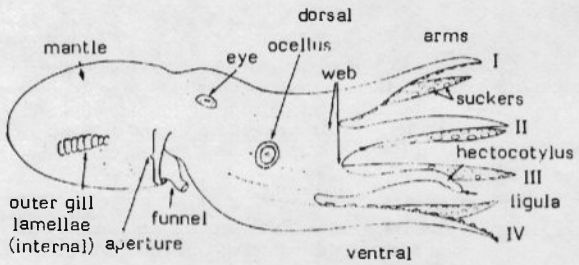
a composite diagram illustrating basic squid (teuthoid) features

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).

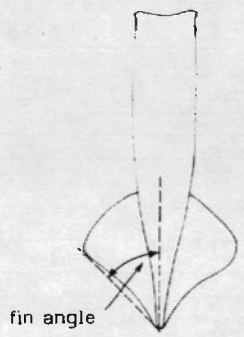


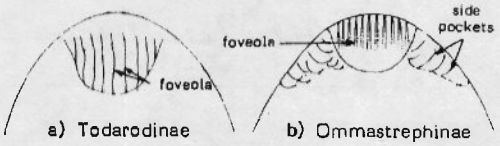
Fig.11

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).

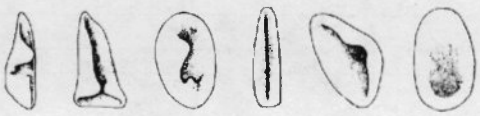


funnel groove Fig.12

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).

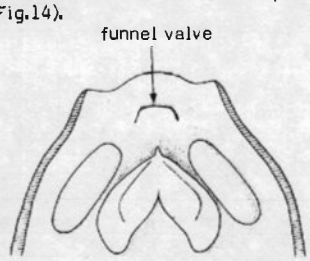
Funnel-locking cartilage - The cartilaginous groove, pit, pocket, or depression on each ventrolateral side of the posterior part of the funnel that joins with the mantle component to lock the funnel and mantle together during locomotion, so water is expelled only through the funnel and not around the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

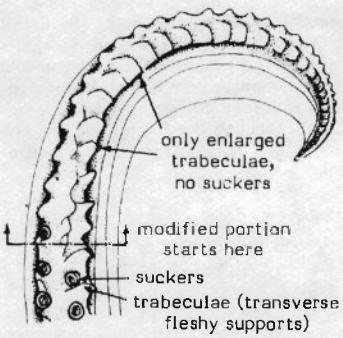
Gill lamellae - The leaf-like convoluted individual components of the gill through which gas exchange occurs (Figs 15,18).

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).

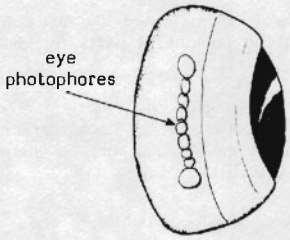


Fig.17

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**).

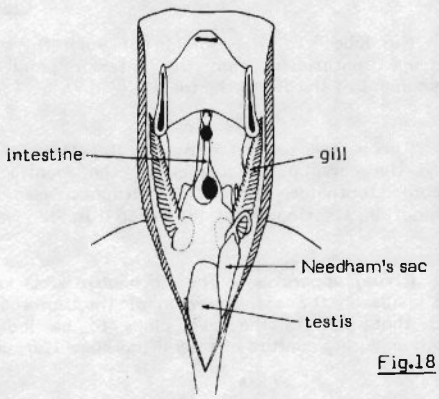


Fig.18

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).

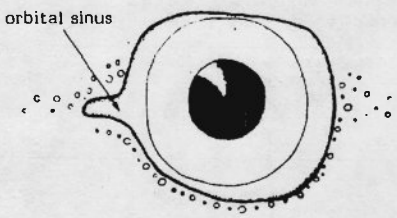
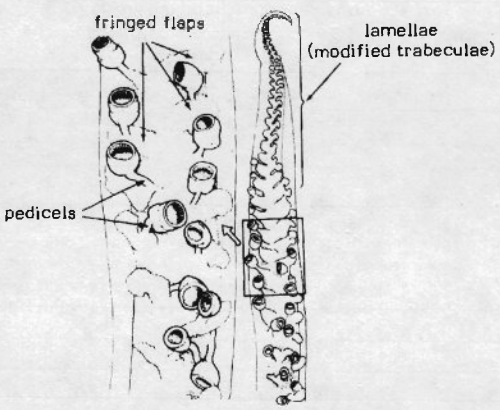


Fig.19

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



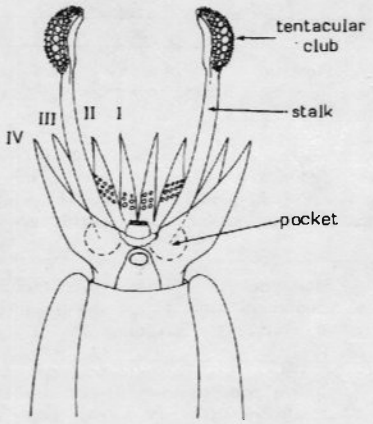
hectocotylized arm
in males

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 antero-ventral 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).

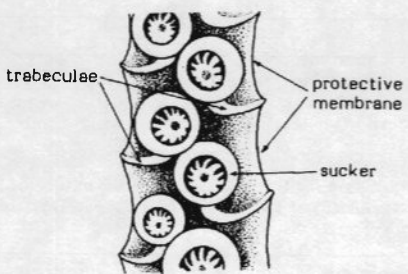
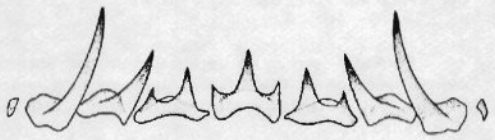


Fig.22

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).

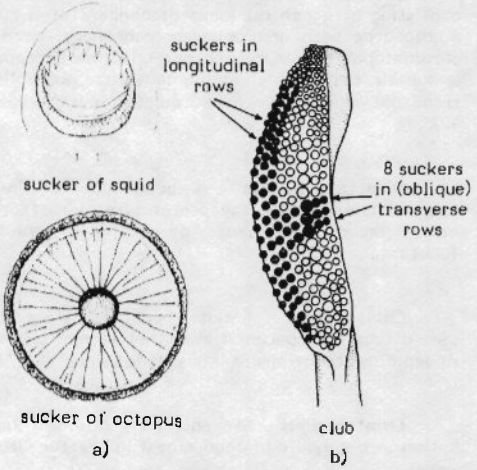


Fig.25

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

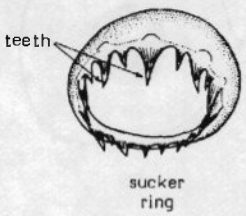


Fig.26

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).

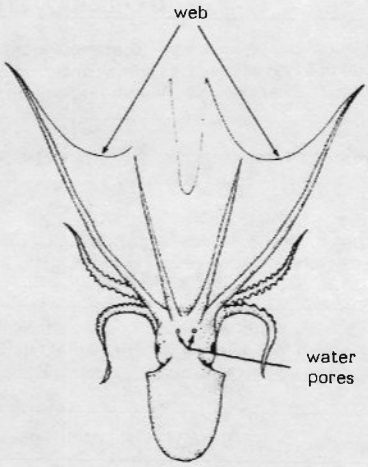
Trabeculae - Muscular rods that support the protective membranes on the arms and clubs of cephalopods; occasionally membranes are reduced and/or trabeculae are elongated, so they extend beyond the edge of the membrane, papilla-like (Fig. 22).

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).

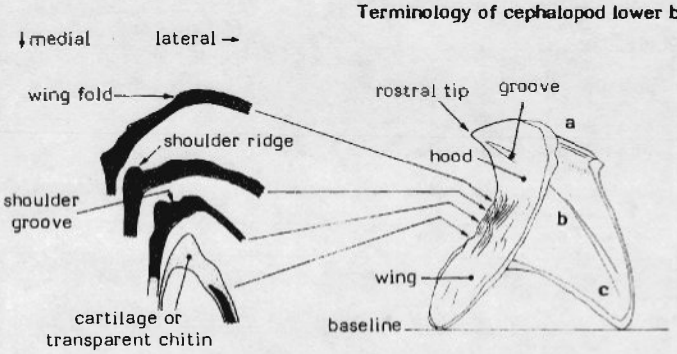
Web - A membranous sheet of greater or lesser extent that extends between the arms of many octopuses, giving an umbrella-like appearance when the arms are spread out, e.g., on cirroteuthids (Figs 10, or 27).



dorsal view

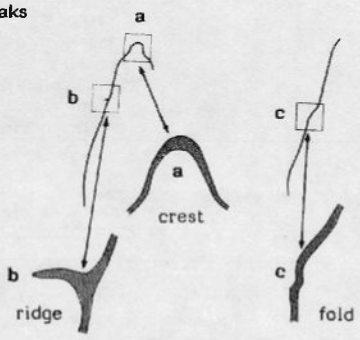
Fig.27

Terminology of cephalopod lower beaks

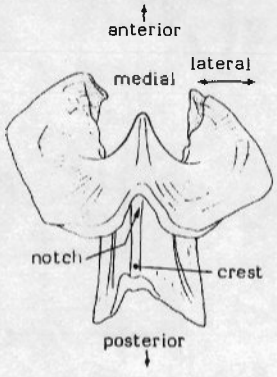


four sections across shoulder

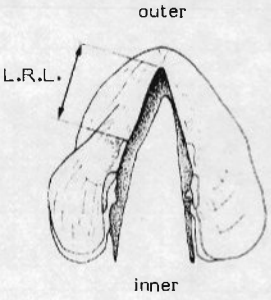
profile



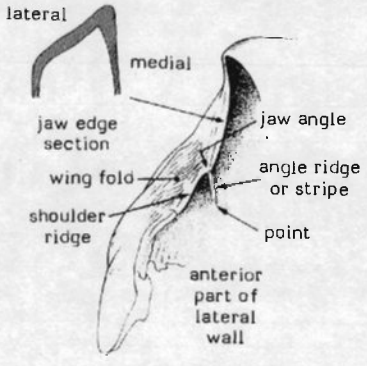
two sections across lateral wall



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)

4a. Arms with hooks or with suckers in 4 rows on proximal half of ventral arms

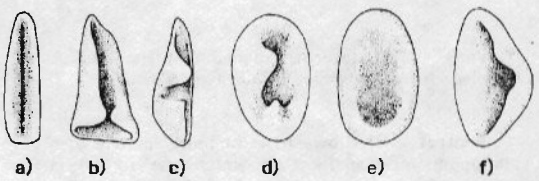
5a. Armature (suckers, hooks) of arms in 2 rows

6a. Tentacles present; fully developed clubs present (Fig.2) ..... Family Enoploteuthidae

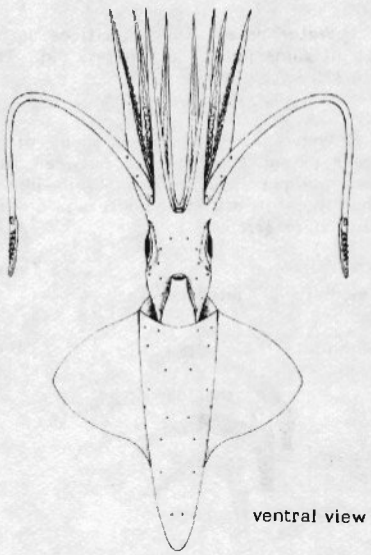
6b. Tentacles and clubs absent in adults although present in larvae or occasionally in juveniles (Taningia) but always with rudimentary clubs (Fig.3) ..... Family Octopoteuthidae

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

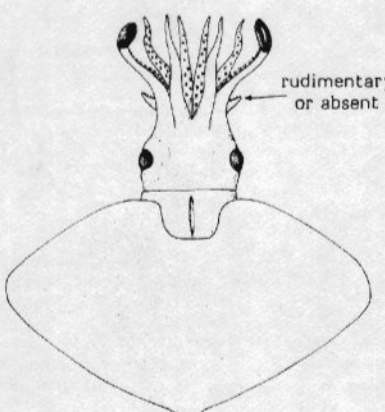


shapes of funnel-locking cartilage Fig.1



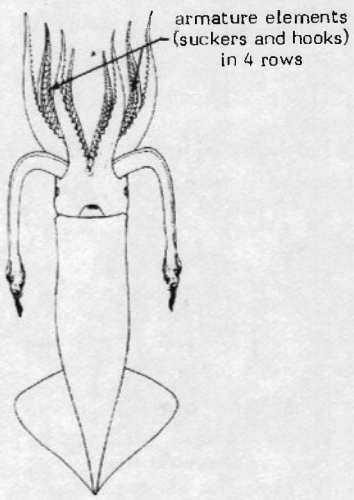
ventral view

Enoploteuthidae (Ancistrocheirus) Fig.2



dorsal view

Octopoteuthidae (Taningia) Fig.3



ventral view

Gonatidae (Gonatus) Fig.4

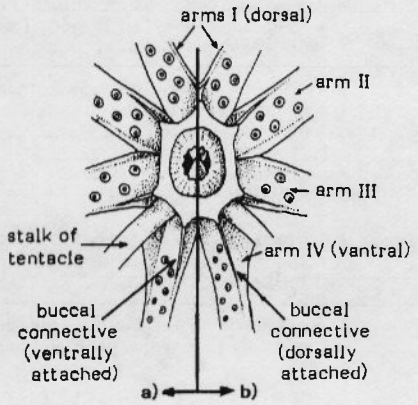
7a. Buccal membrane connectives attach to ventral sides of arms IV (Fig.5a)

8a. Hooks present on tentacular clubs (Fig.6) ..... Family Onychoteuthidae

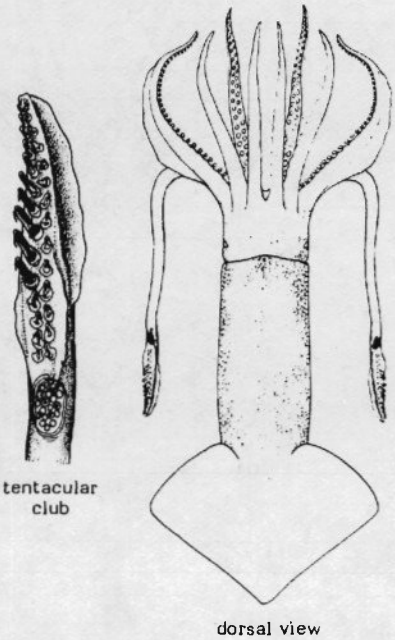
8b. Hooks lacking on tentacular clubs

9a. "Cartilaginous" scales present on mantle (may be minute); tentacular clubs with 4 longitudinal rows of suckers (Fig.7) .... Family Lepidoteuthidae*

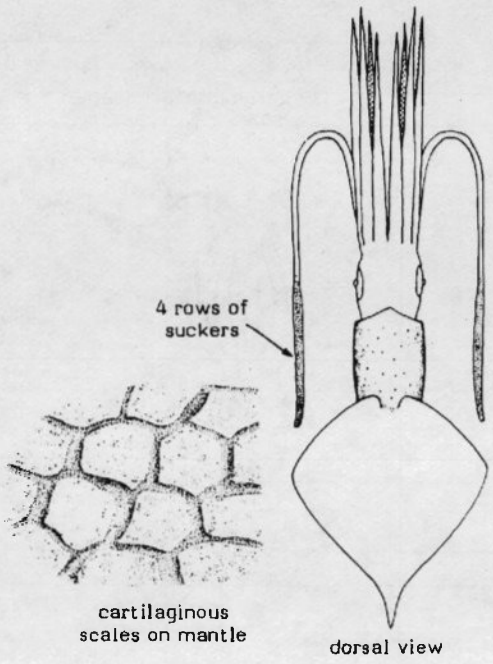
9b. "Cartilaginous" scales lacking; tentacular clubs with more than 4 longitudinal rows of suckers on some areas



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

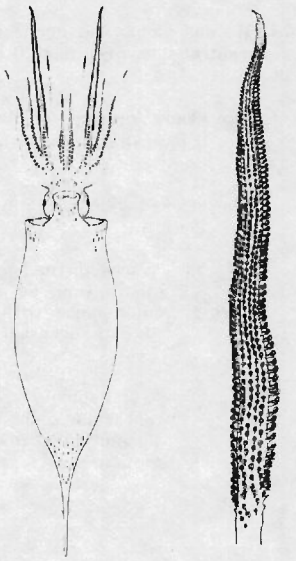
10a. Tentacular clubs with 6 uniform rows of suckers; a long, spike-like tail present (greater than fin length) (Fig.8) ..... Family Batoteuthidae

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

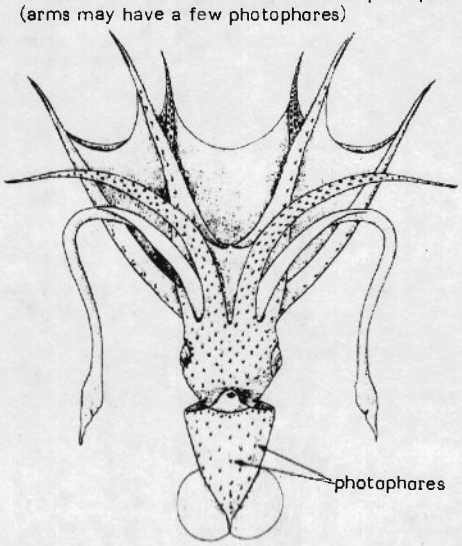
7b. Buccal membrane connectives attach to dorsal sides of arms IV (Fig.5b)

11a. Surface of mantle, head and arms covered with numerous photophores (usually large and distinct) (Fig.10) ..... Family Histioteuthidae

11b. Surface of mantla and head without photophores (arms may have a few photophores)

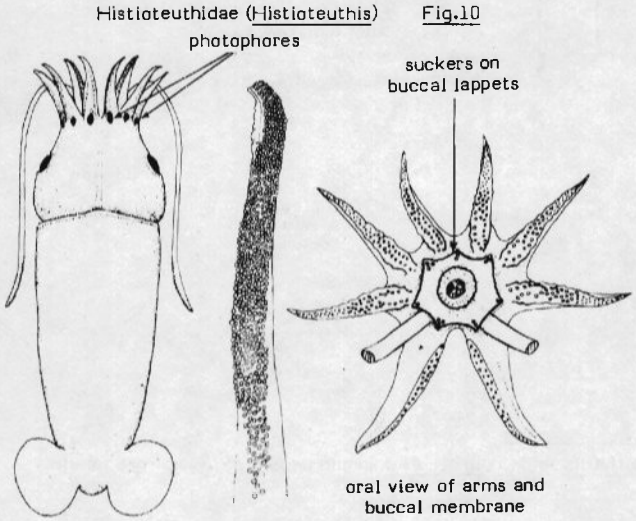


Batoteuthidae (Batoteuthis) Fig.8

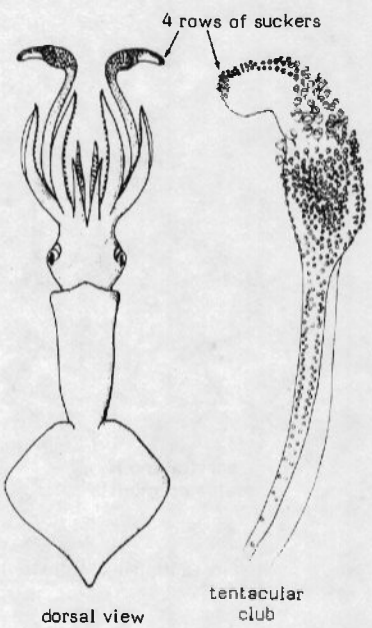


ventral view

Histioteuthidae (Histioteuthis) Fig.10



Bathyteuthidae (Bathyteuthis) Fig.11



Brachioteuthidae (Brachioteuthis) Fig.9

12a. Minute suckers present on oral surface of buccal lappets (Fig.11).. Family Bathyteuthidae

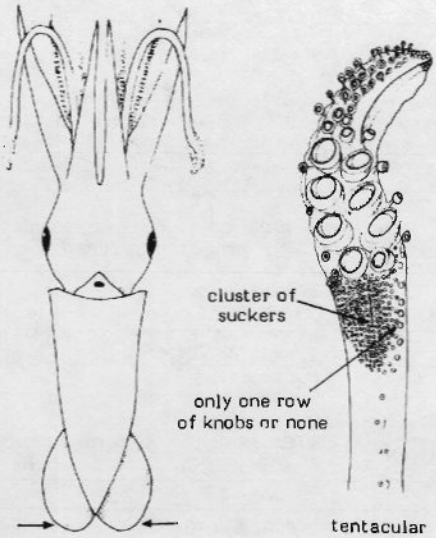
12b. No suckers on oral surface of buccal lappets

13a. Many small to minute suckers (or suckers and knobs) at proximal end of manus (Figs 12,13)

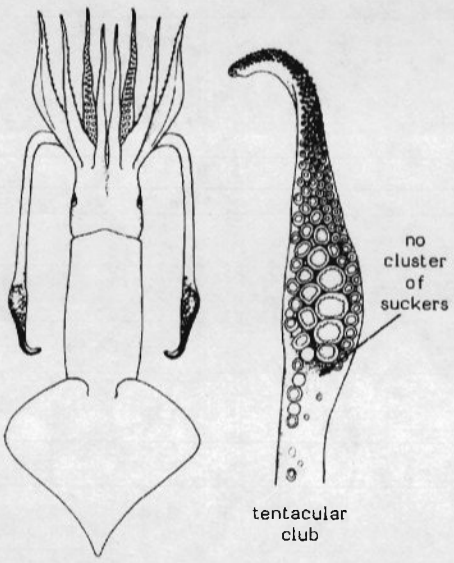
14a. Medial posterior borders of fins convex; carpal knobs in a single dorsal row or absent; small size (Fig.12) ..... Family Neoteuthidae

14b. Medial posterior borders of fins concave; carpal knobs in a cluster alternating with carpal suckers; attains very large size (Fig.13) ..... Family Architeuthidae

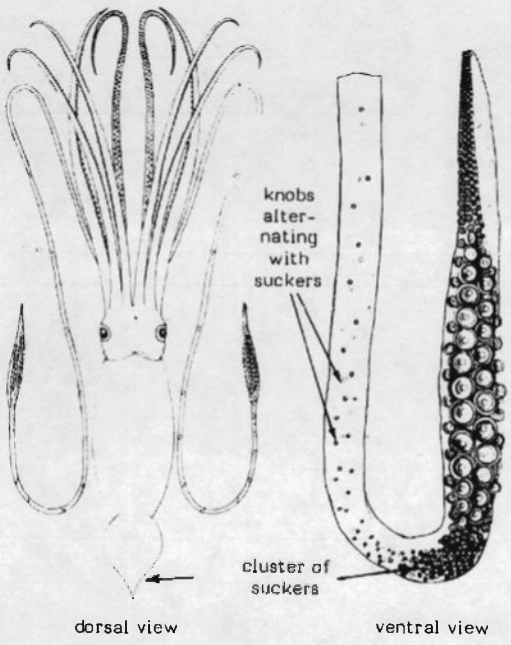
13b. No cluster of small suckers at proximal end of manus (Fig.14) ..... Family Psychroteuthidae



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

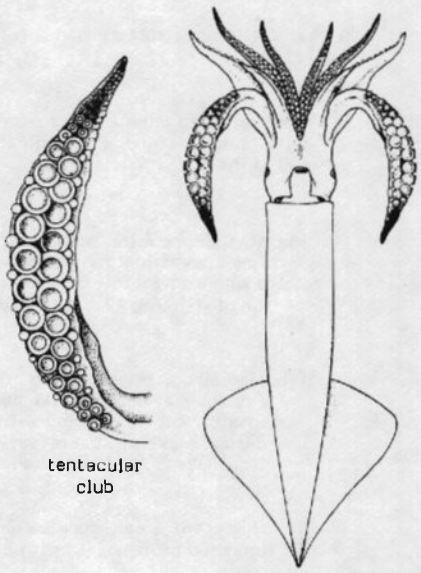
15b. Funnel-locking cartilage oval, triangular or oval with inward projecting knobs (Figs 1d,e,f)

16a. Funnel-locking cartilage oval with 1 or 2 knobs directed toward the centre of the concavity (Fig.1d)

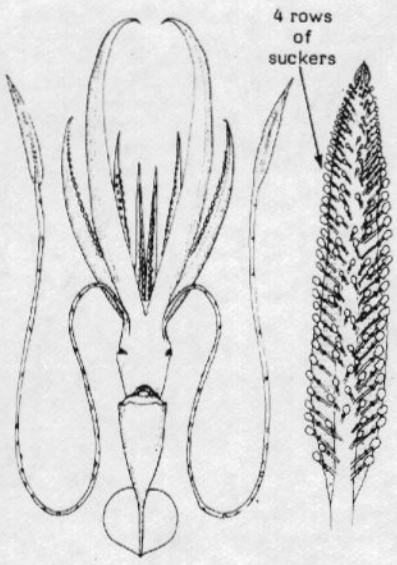
17a. Club with only 4 rows of suckers (Fig.16) ..... Family Chiroteuthidae

17b. Club with many (more than 15) rows of minute suckers (Fig.17) ..... Family Mastigoteuthidae

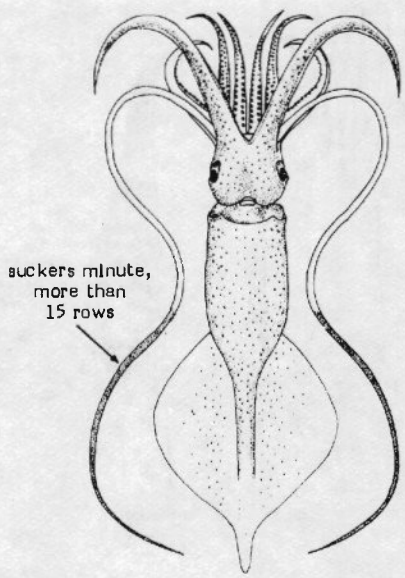
16b. Funnel-locking cartilage oval or subtriangular, without knobs (Fig.1e,f)



Ommastrephidae (Todarodes) Fig.15



Chiroteuthidae (Chiroteuthis) Fig.16



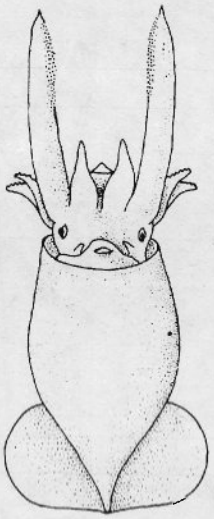
Mastigoteuthidae (Mastigoteuthis) Fig.17

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

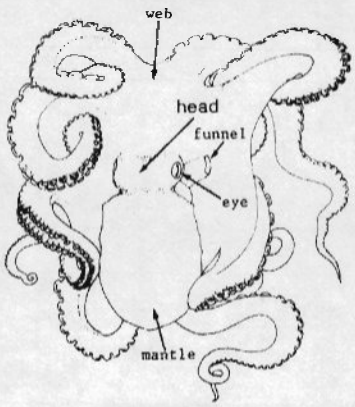
1b. Eight circumoral arms (no tentacles); internal shell vestage, either a small cartilaginous rods or a U-shaped support (Fig.21) ..... Order Octopoda
Family Octopodidae



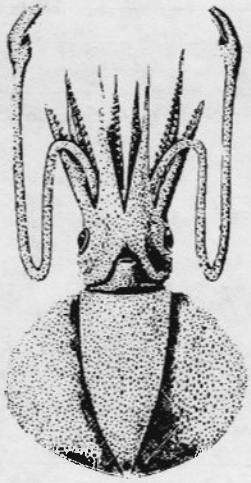
ventral view

tentacular club

Promachoteuthidae (Promachoteuthis) Fig.19



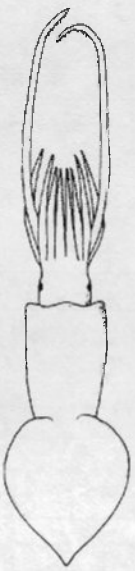
Octopodidae Fig.21



ventral view

tentacular club

Cycloteuthidae (Discoteuthis) Fig.18



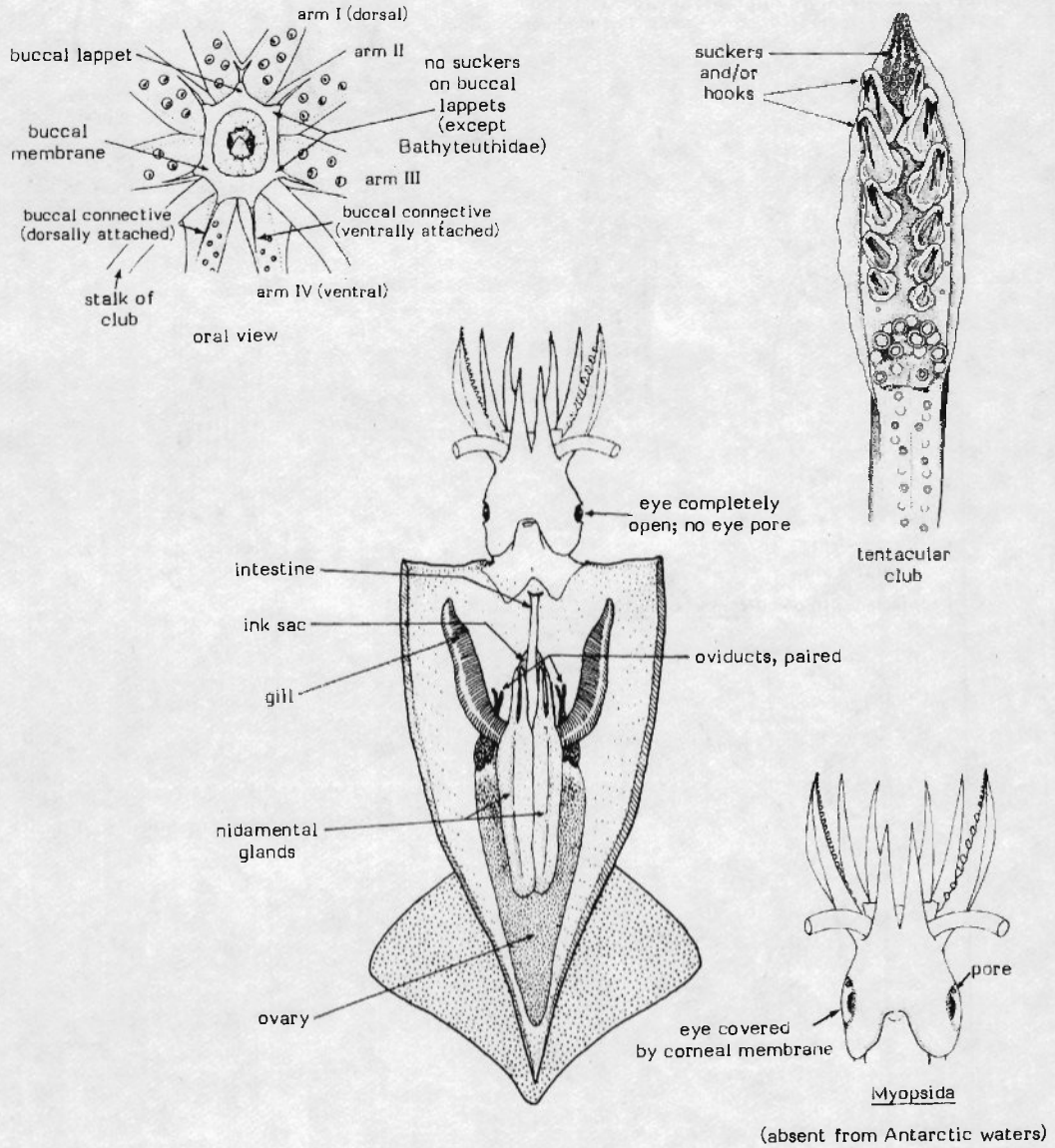
dorsal view

Cranchiidae (Mesonychoteuthis) Fig.20

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.



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 Lapid 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	BRACHIO Brachio 1
Brachioteuthis sp.	
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)	CRANCH Gali 1
Galiteuthis spp.	
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 :

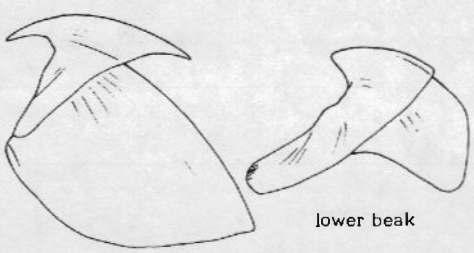
FAO/CCAMLR : En - Crown squid
Fr - Loutène couronnée
Ru - Abyssalnyi kalmar
Sp - Batiluria coronada

NATIONAL :

DISTINCTIVE CHARACTERS :

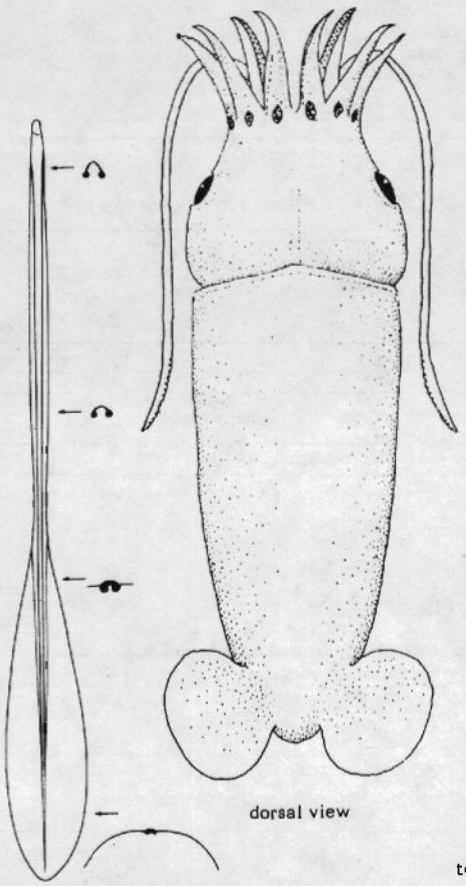
Mantle robust, bluntly rounded posteriorly. Fins subterminal, paddle-like, round, small, separate. Eyes oriented slightly anteriorly. Funnel-locking apparatus straight; buccal connectives attached to dorsal borders at arms IV, suckers present on the buccal lappets. Clubs small, unexpanded, short, with 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)

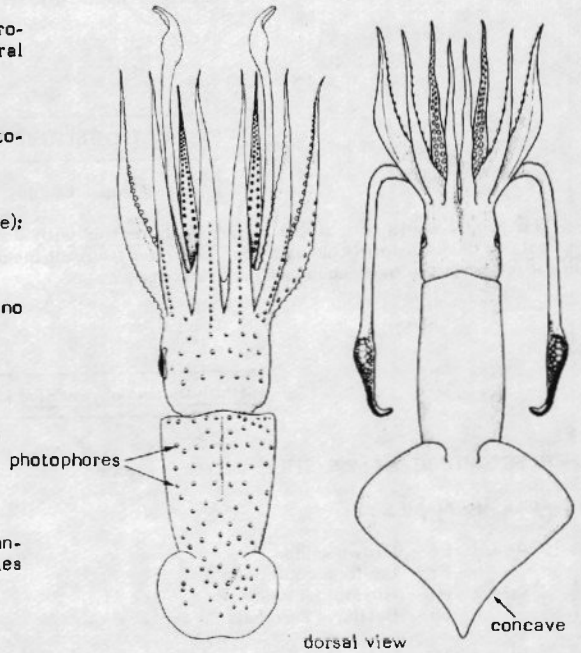
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

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.



Histioteuthidae Psychroteuthidae

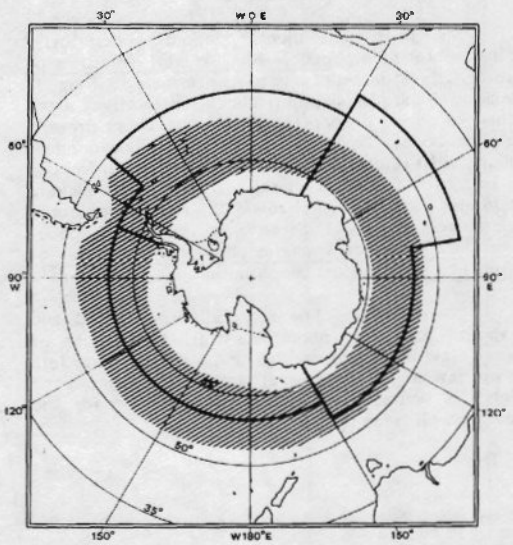
SIZE :

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

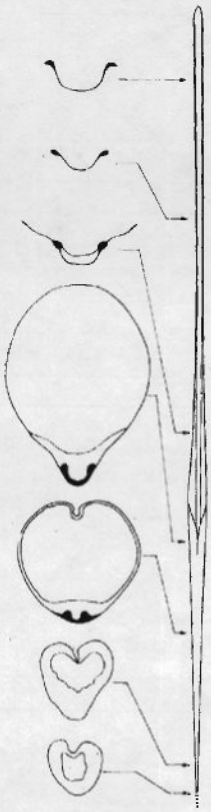
NATIONAL :

DISTINCTIVE CHARACTERS :

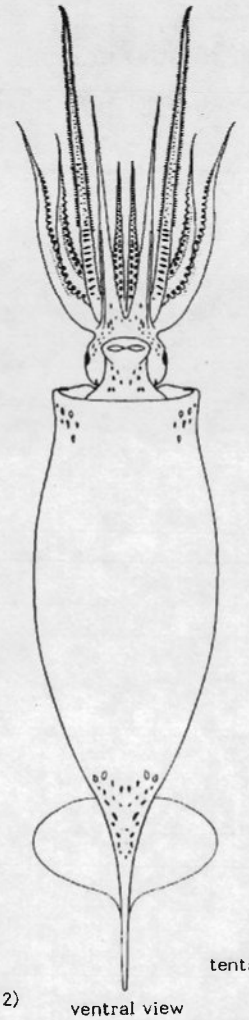
Mantle thin, muscular and fusiform, with a tapering posterior end forming a tail. Fins small, lacking the anterior lobe, together oval in outline. Head narrow with large eyes. Buccal connectives attached to ventral borders of arms IV. Funnel-locking apparatus with a straight, simple groove. Arms long, 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)



tentacular club

ventral view
(after Young & Roper, 1968)

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.

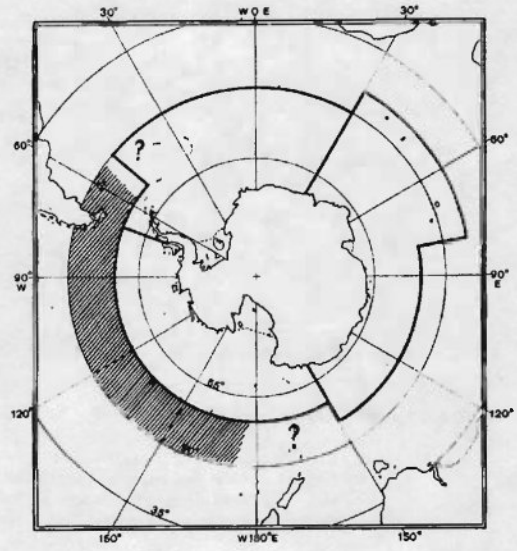
SIZE :

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.

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 : Nona

VERNACULAR NAMES :

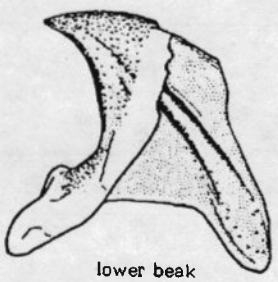
FAO/CCAMLR : En - Ornate arm squid
Fr - Encornet bras courts orné
Ru - Pyostryi kalmar
Sp - Braquiluria moteada

NATIONAL :

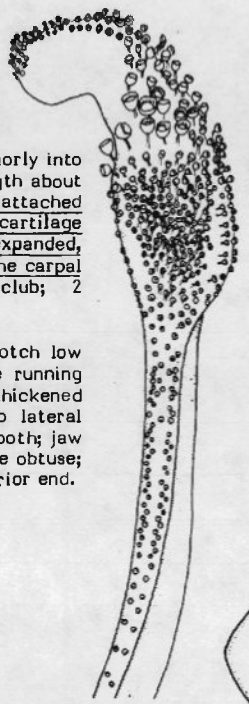
DISTINCTIVE CHARACTERS :

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.

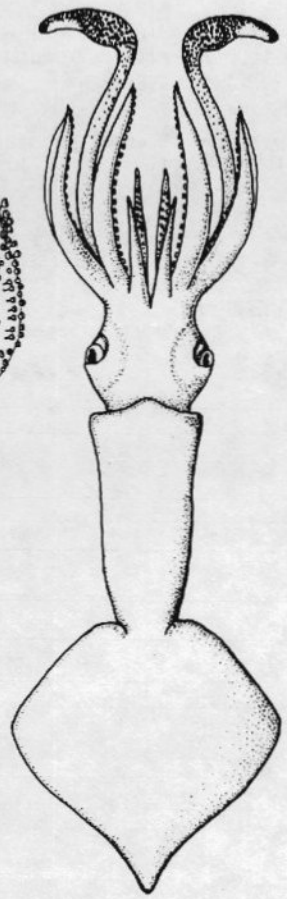
Lower beak: hood with a shallow notch low over the crest; a distinct, thickened ridge running toward the free corner of lateral wall; a thickened crest and distinctly curved lower edge to lateral wall; shoulder may form a short ridge or tooth; jaw edge about as long as hood length; jaw angle obtuse; wing fold very low, often prominent at anterior end.



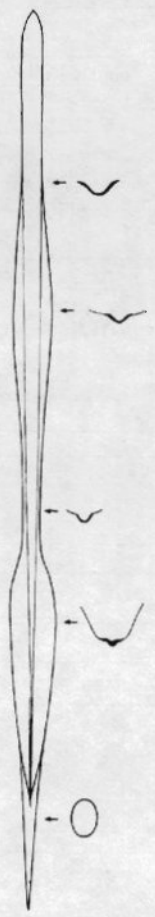
lower beak



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

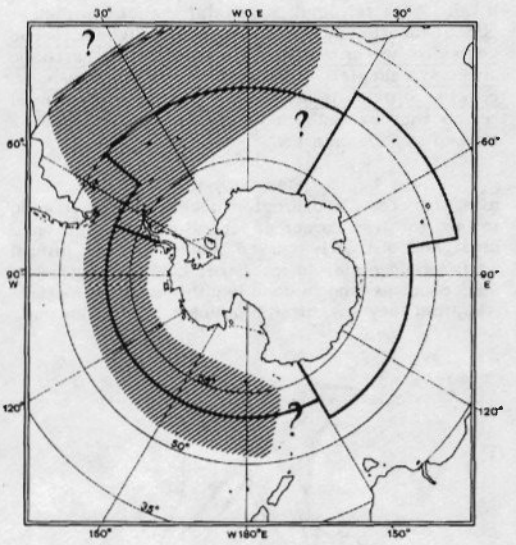
SIZE :

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 genara: 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

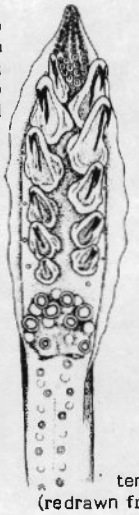
NATIONAL :

DISTINCTIVE CHARACTERS :

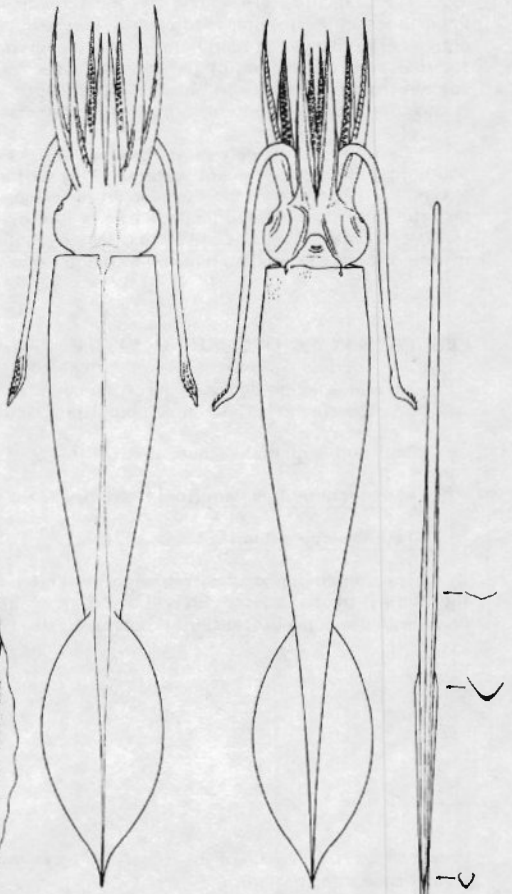
A moderately large species. Mantle long, slender, tapering to a slender posterior point, with cartilaginous tubercles on the surface of subadults and adults; funnel-mantle and nuchal-fusion cartilages with multiple tubercles. Fins long, lanceolate, terminal. Large, protruding, anterolaterally oriented 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)



tentacular club
(redrawn from McSweeny, 1978)



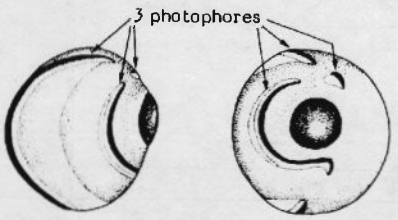
dorsal view ventral view
(redrawn from McSweeny, 1978)

gladius
(from Toll, 1982)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

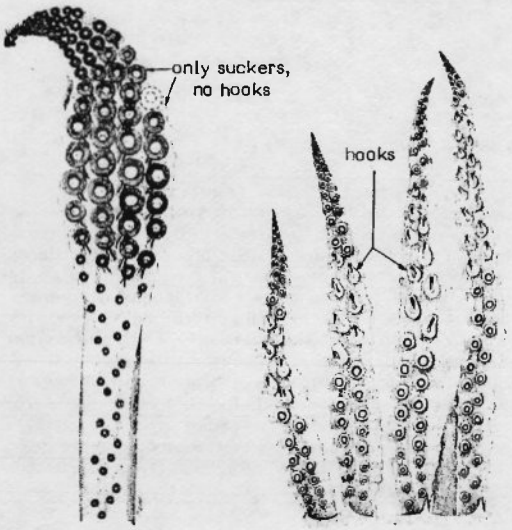
Teuthowenia pellucida: no hooks on the tentacular clubs, no tubercles on the nuchal cartilage, 3 rather than 2 photophores on the eyes, and fins terminal-lateral rather than terminal.

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

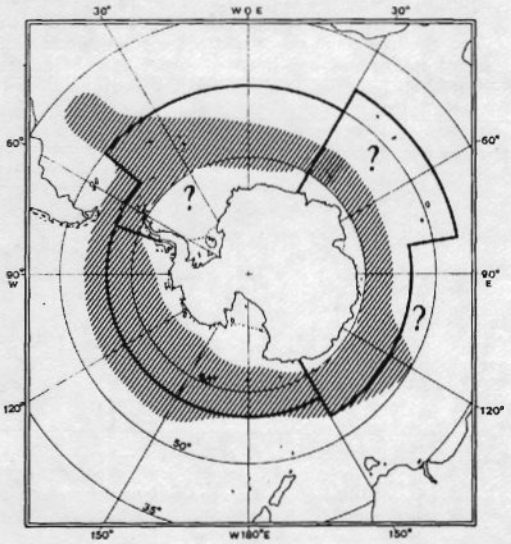
SIZE :

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; scatterad 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:

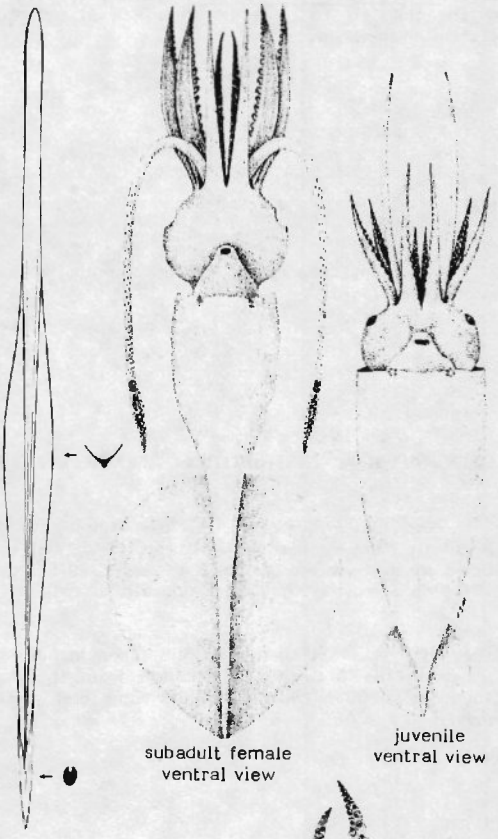
FAO/CCAMLR: En - Giant cranch squid
Fr - Encornet outre commun
Ru - Antarkticheskyi gigantskyi kalmar
Sp - Cranquiluria antártica

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.

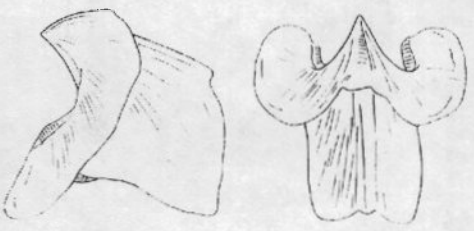
Lower beak stiff with thick chitin; cartilage forms the anterior half of the shoulder; low wing fold obscures obtuse jaw angle from side; a line, perpendicular from the rostrum tip, cuts the baseline near the wing tip; the hood has a distinct medial notch; hood length less than one-third of crest length; 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



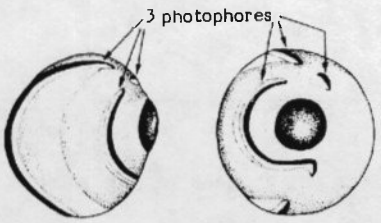
profile ventral view

lower beak
(redrawn from Clarke, 1980)

left arms I to IV
(from Voss, 1980)

DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

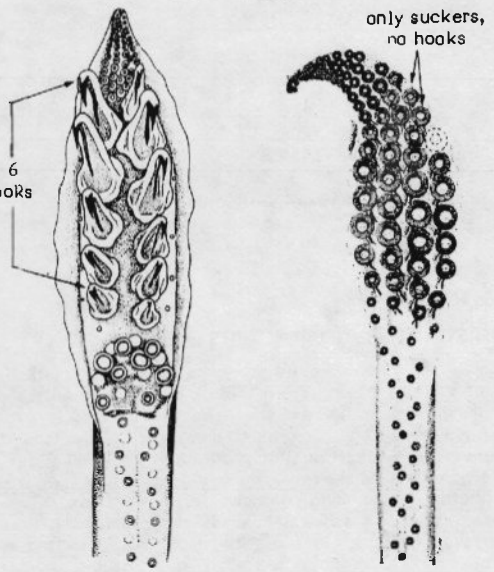
None of the other cranchiid species has hooded hooks on the arms. Furthermore, Galiteuthis glacialis has fewer pairs of hooks on the tentacular club (5 or 6 rather than 10 to 13); Teuthowenia pellucida lacks hooks on the club and has 3 instead of 2 photophores on the eyes.



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.



(from Voss, 1985)

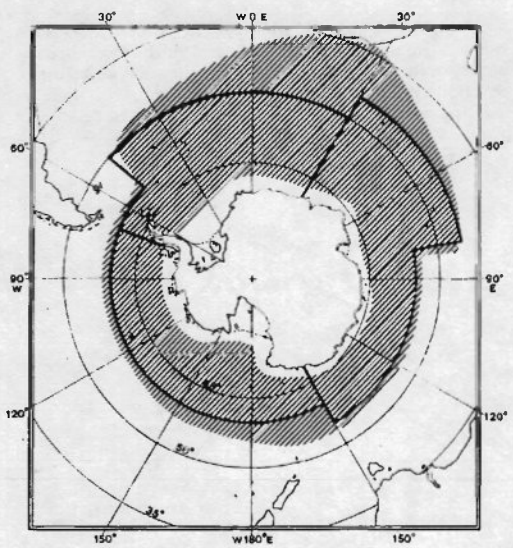
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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 :

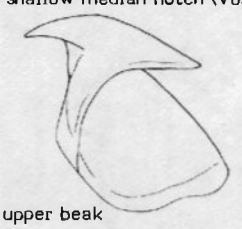
FAO/CCAMLR : En - Pellucid cranch squid
Fr - Encornet outre pellucide
Ru - Prozrachnyi kalmar
Sp - Cranquiluria lúcida

NATIONAL :

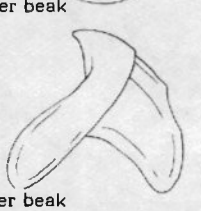
DISTINCTIVE CHARACTERS :

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.

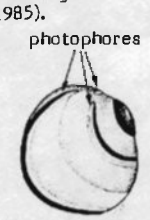
Lower beak with wing fold prominent; shoulder ridge low, sometimes developed into low, broad-based, triangular tooth; hood set low above straight or slightly curved crest; distal edge of hood with shallow median notch (Voss, 1985).



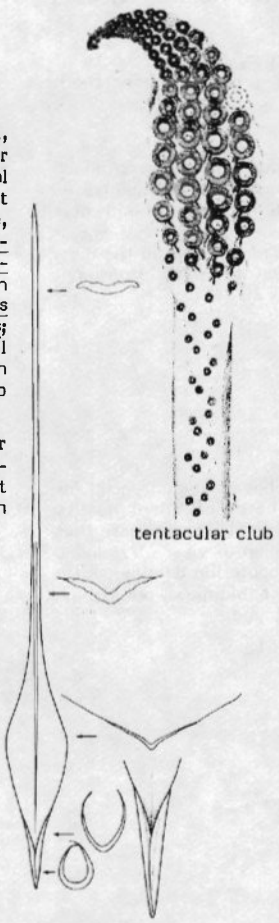
upper beak



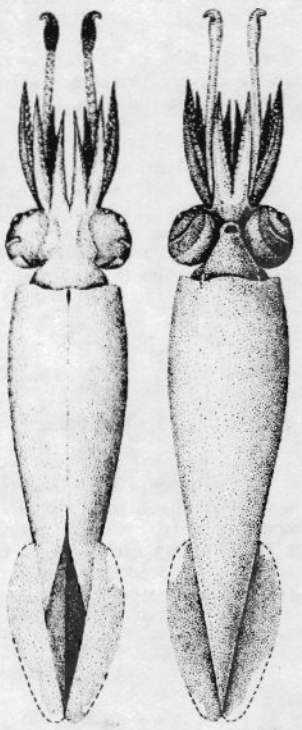
lower beak
(redrawn from Voss, 1985)



eye
(redrawn from Voss, 1985)



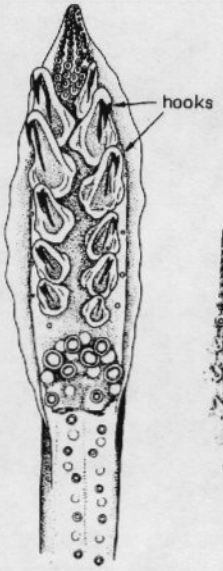
gladius
(redrawn from Voss, 1985)



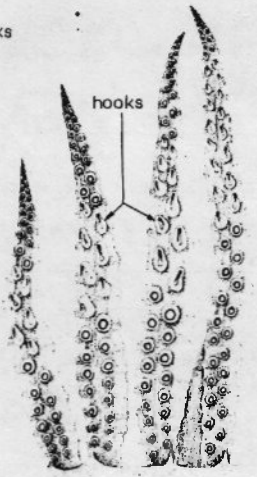
dorsal view ventral view
subadult
(from Voss, 1985)

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



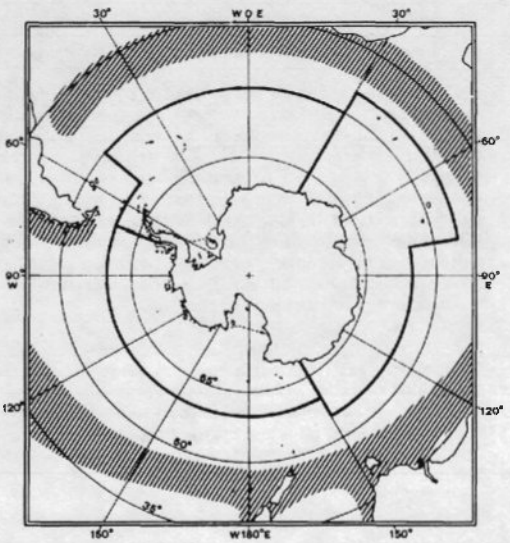
left arms I to IV
M. hamiltoni

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 :

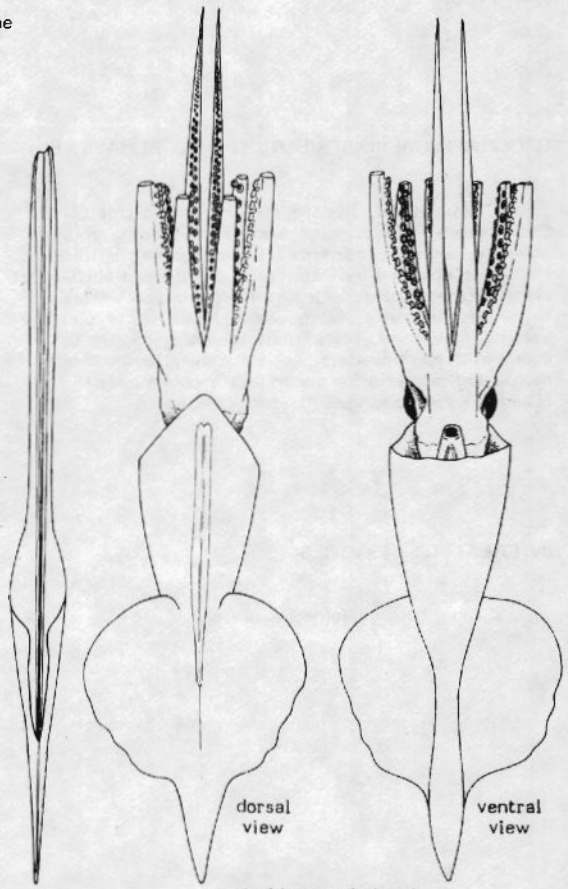
FAO/CCAMLR : En - Long-tail disc-fin squid
Fr - Encornet outre austral
Ru - Kruglopyoryi kalmar Akimushkina
Sp - Discoluria austral

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.



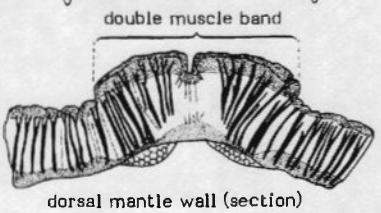
gladius
ventral view


profile


ventral view

lower beak

(all after Clarke, 1980)

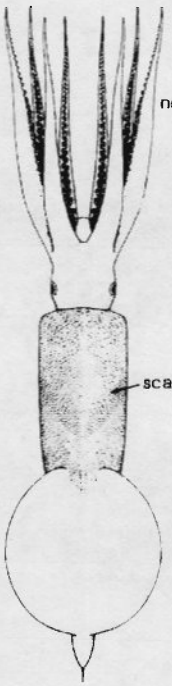


dorsal mantle wall (section)

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)

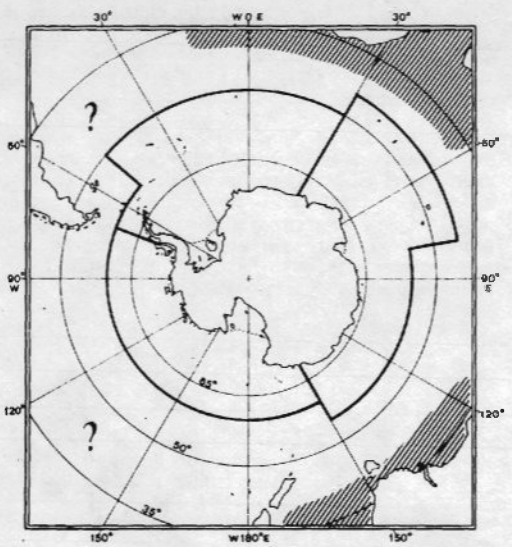
SIZE :

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°S, and possibly further south), and north to 30°N in the Atlantic to at least 9°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 :

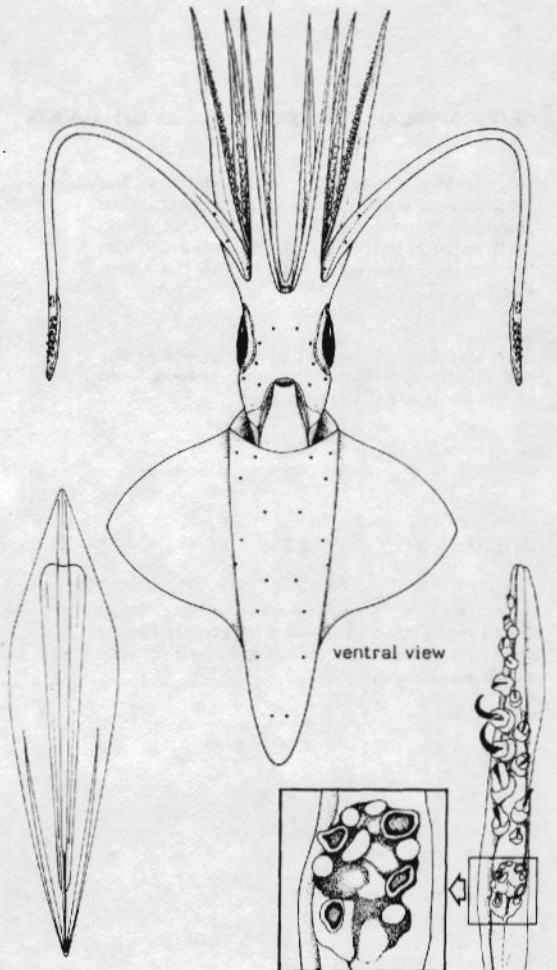
DISTINCTIVE CHARACTERS :

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

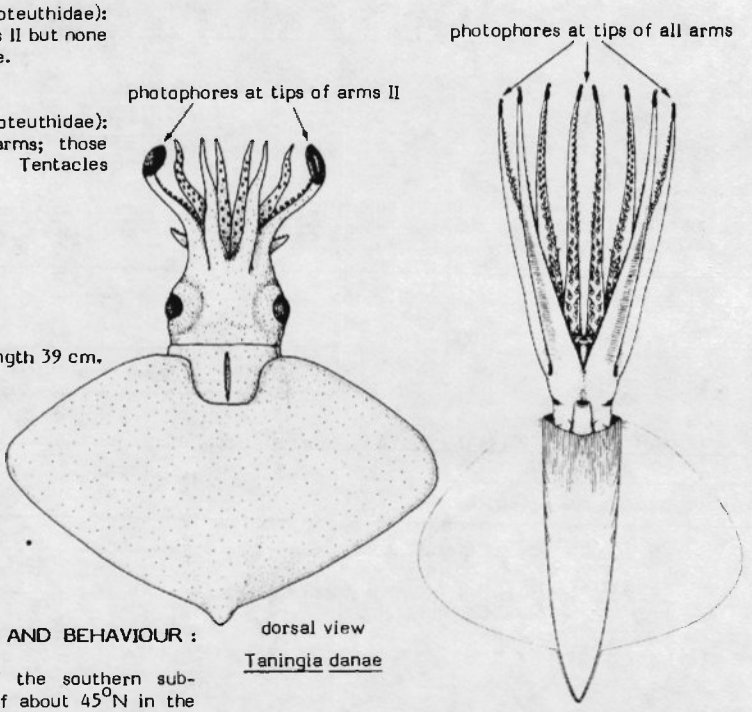


(all redrawn from Clarke, 1980)

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

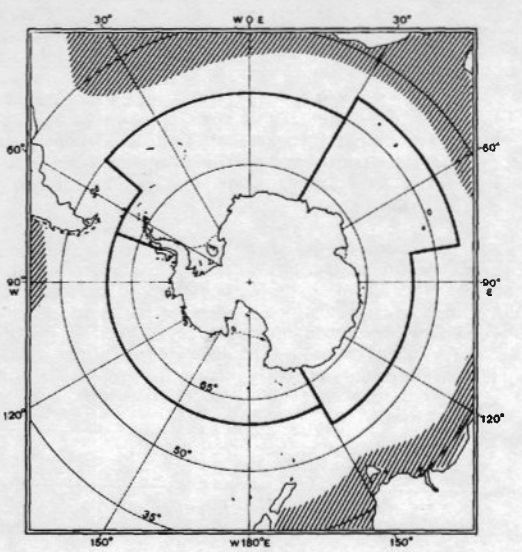
SIZE :

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 :

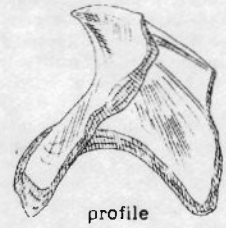
FAO/CCAMLR : En - Antarctic gonate squid
Fr - Encornet antarctique
Ru - Antarkticheskyi gonatus
Sp - Gonalura antártica

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 :

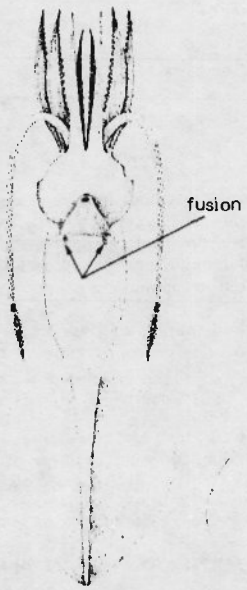
The other squids in the area with hooks on all appendages are:

Cranchiidae (Mesonychoteuthis): ventral lateral fusion of anterior mantle-margin (funnel-locking aparatus).

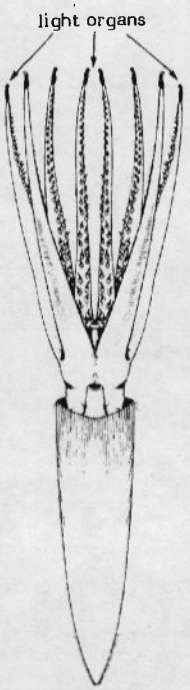
Octopoteuthidae: no tentacles in adults. Light organs at tips of arms II (Taningia) or on tips of all arms (Octopoteuthis).

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)



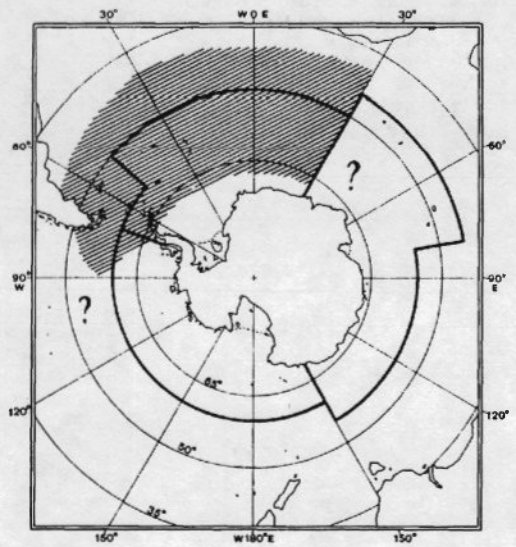
ventral view
Octopoteuthis
(Octopoteuthidae)

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 0.1×10^6 t. Some potential for a specialized market might exist.

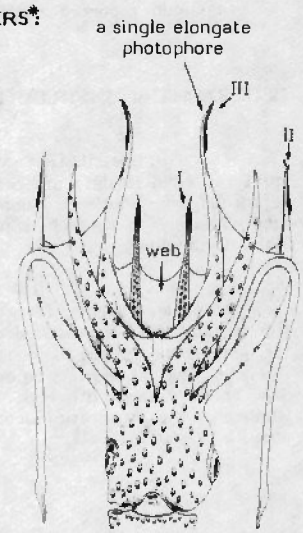
KEY TO SPECIES FROM THE SOUTHERN OCEAN AND ADJACENT WATERS*:

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

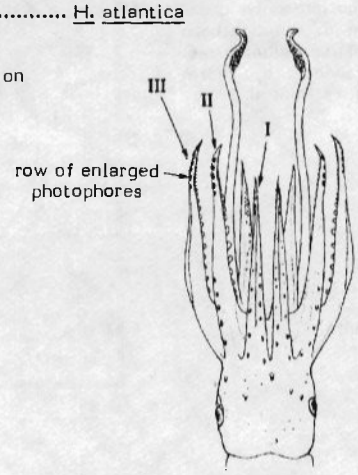
2a. Distal third of arms I to III with a ventral row of separate enlarged photophores (Fig.2) ..... H. atlantica

2b. No enlarged photophores on arms



ventral view

H. macrohista Fig.1



(redrawn from Voss, 1968)

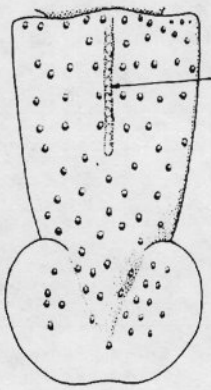
dorsal view

H. atlantica Fig.2

* 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 :

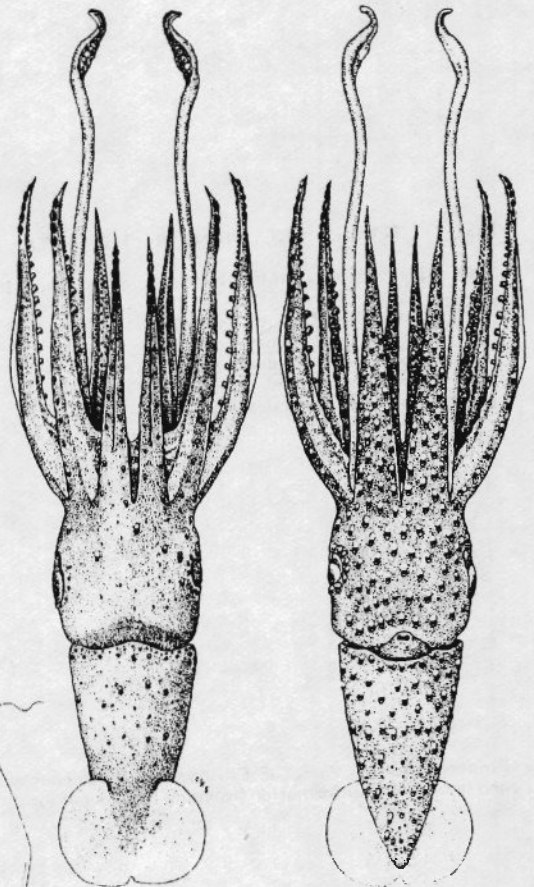
FAO/CCAMLR : En - Spotlight jewel squid
Fr - Loutène lumignon
Ru - Atlanticheskyi brillyantovyi kalmar
Sp - Joyeluria farolera

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)

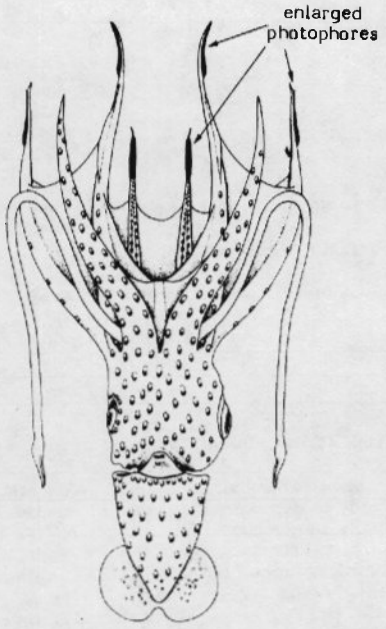
upper and lower beak
(after Voss, 1969)

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. altaninae 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

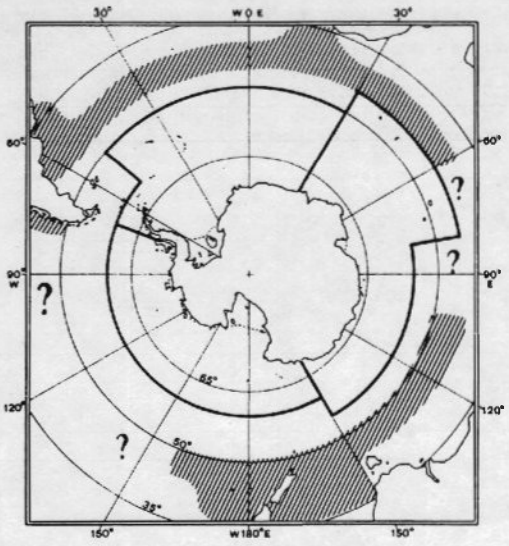
SIZE :

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 :

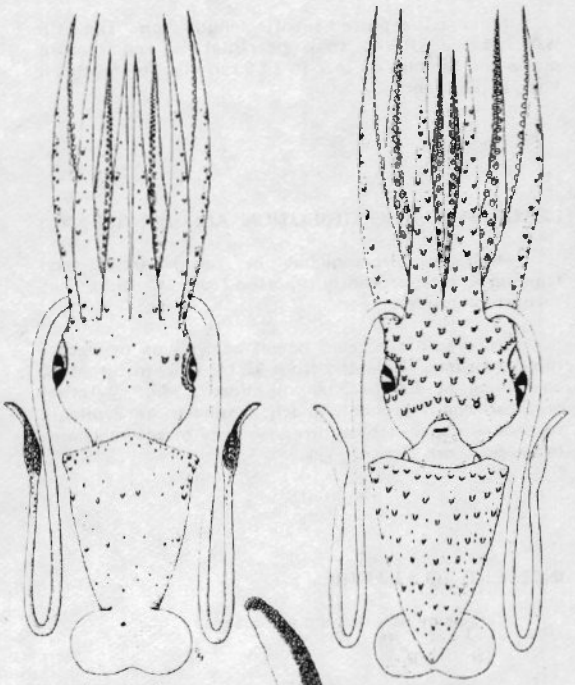
FAO/CCAMLR : En - Eltanin jewel squid
Fr - Loutène eltanine
Ru - Brilliantovyi kalmar Eltenina
Sp - Joyeluria eltanina

NATIONAL :

DISTINCTIVE CHARACTERS :

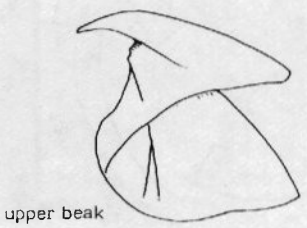
Mantle conical, moderately elongate. Head typically large, exceeding width of mantle; left eye typically larger than right. Eighteen (17 large, 1 small) photophores around right eyelid; 10 to 12 photophores around left eyelid. Fin width approximately 3/4 to 1/2 and length 1/3 to 1/2 that of mantle length. 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)

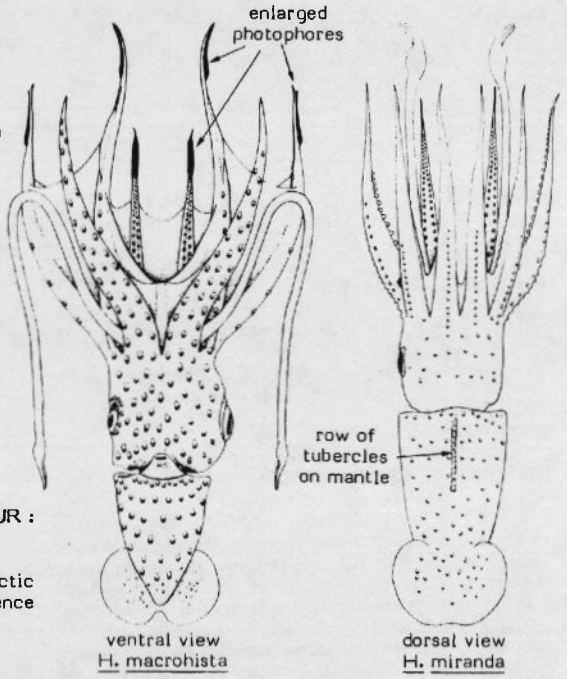
gladius
(redrawn from Toll, 1982)

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.



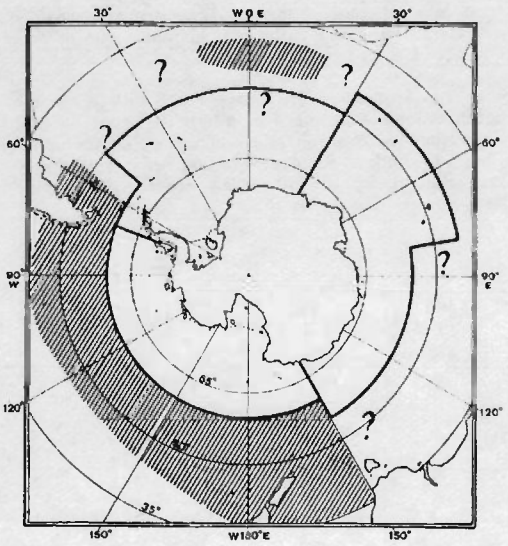
SIZE :

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
?A1 Histioteuthis meleagroteuthis, Clarke, 1980

VERNACULAR NAMES :

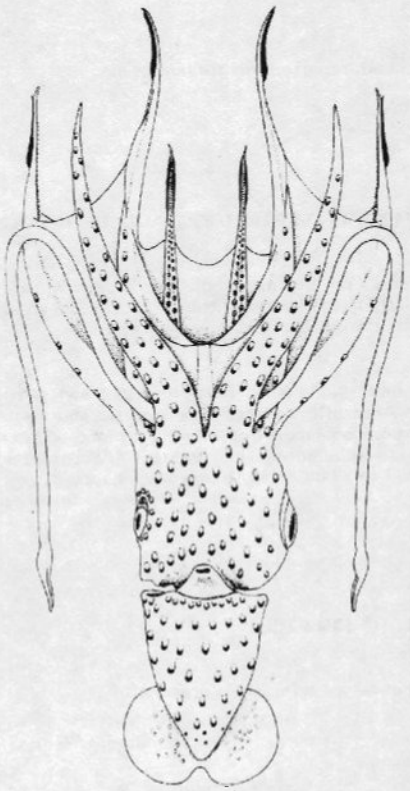
FAO/CCAMLR : En - Deep-webbed jewel squid
Fr - Loutène ombrelle
Ru - Zontichnyi brilliantovyi kalmar
Sp - Joyeluria membranosa

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.

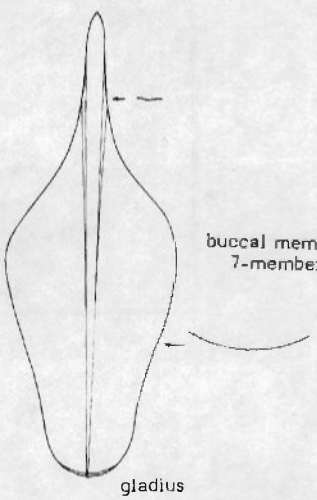


ventral view
(redrawn from Voss, 1969)

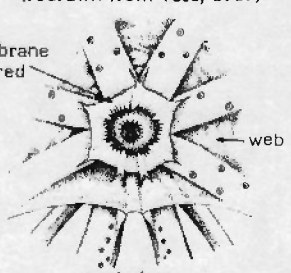
upper beak

lower beak

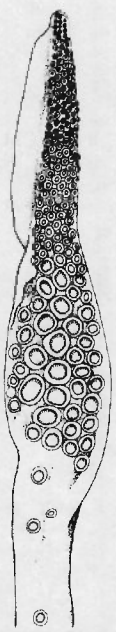
beaks (profile)
(after Voss, 1969)



gladius
(redrawn from Toll, 1982)



oral view
(redrawn from Voss, 1969)

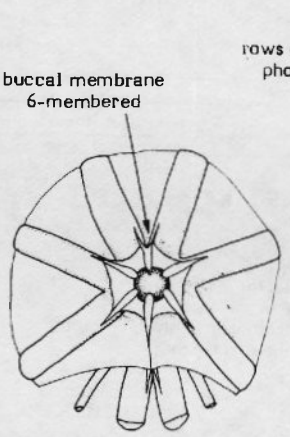


tentacular club
(redrawn from Voss, 1969)

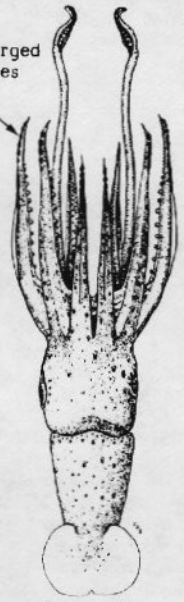
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

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

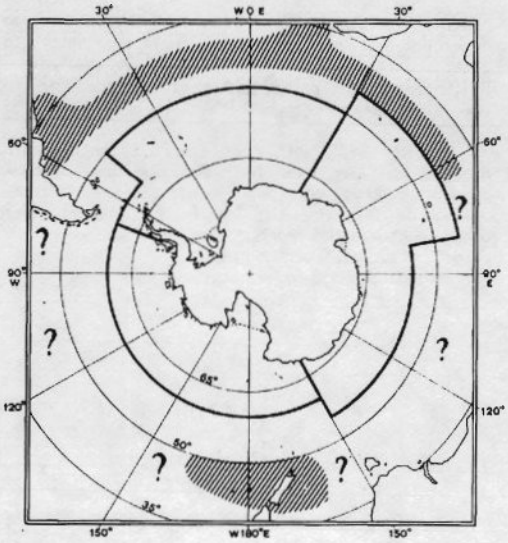
SIZE :

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 :

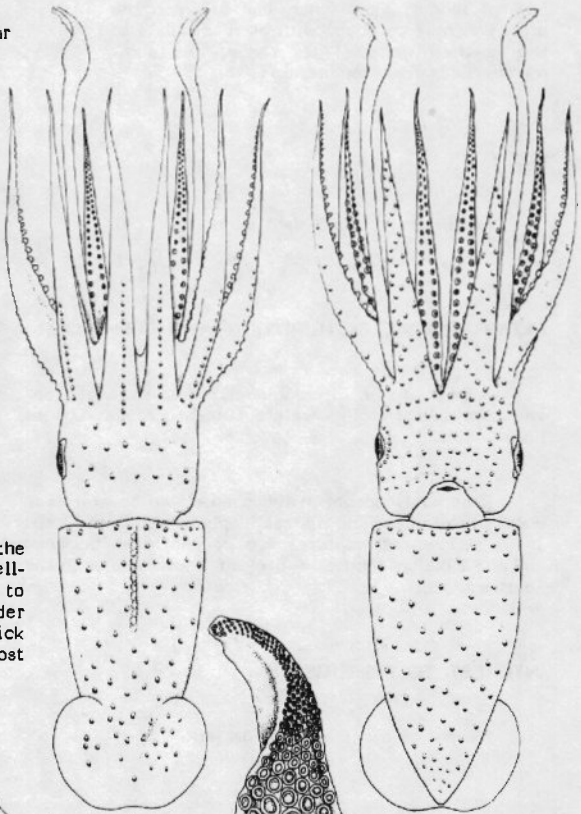
FAO/CCAMLR : En - Wonderful jewel squid
Fr - Loutène miranda
Ru - Udivitelnyi brilliantovyi kalmar
Sp - Joyaluria miranda

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.

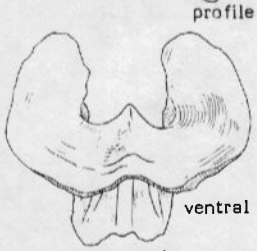
Lower beak with hood distinctly notched in the midline and less than half of crest length; a well-developed ridge forms a distinct fin running to corner of lateral wall; a distinct broad shoulder groove with high borders; wing fold has a high, thick ridge on lateral border hiding jaw angle and almost half of rostral edge from side.



dorsal view
(redrawn from
Voss, 1969)

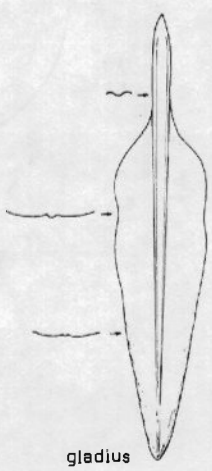
ventral view

profile

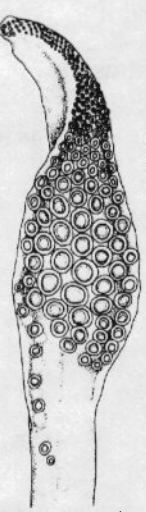


ventral view

lower beak
(after M.R. Clarke, 1980)



gladius
(redrawn from Toll, 1982)

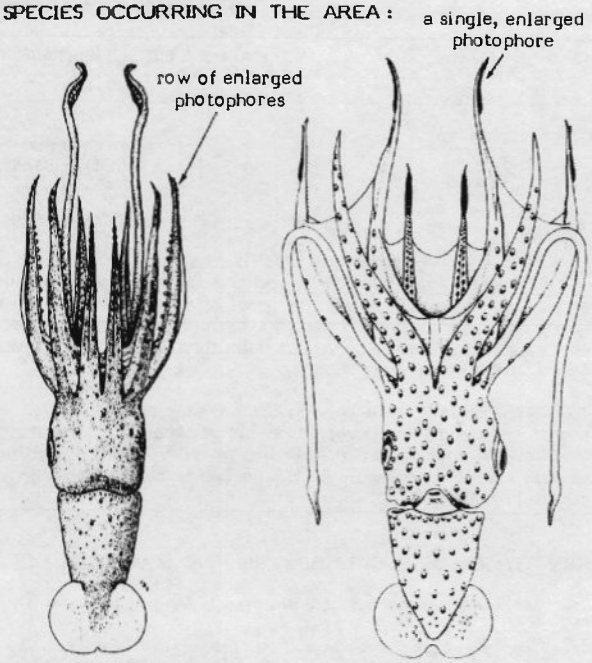


tentacular club
(redrawn from Voss, 1969)

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.



dorsal view H. atlantica — ventral view H. macrohista

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.

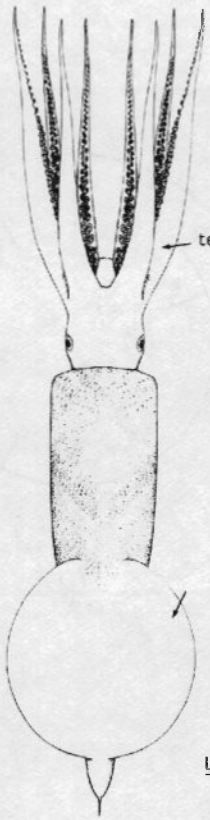
The "scales" occur only on the surfaces of the mantle. The posterior end of the mantle, however, is devoid of "scales". The scaleless area on the dorsal side extends nearly to the anterior margin of the fins, but on the ventral side it occurs only on the posterior half or two-thirds of the area covered by the fins.

example of "scales"

KEY TO SPECIES OCCURRING IN THE SOUTHERN OCEAN AND ADJACENT WATERS:

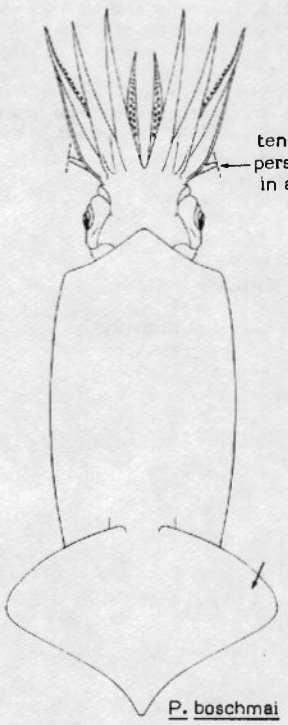
1a. Tentacles lost at about 8 cm mantle length; fins oval (Fig.1) ..... Lepidoteuthis grimaldii LEPIDO Lepid 1

1b. Tentacles persistent in adults; fins not oval (Fig.2) ..... Pholidoteuthis boschmai LEPIDO Pholi 2



dorsal view

L. grimaldii Fig.1



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 :

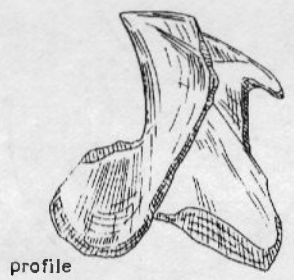
FAO/CCAMLR : En - Soft-bodied scaled squid
Fr - Loutène mollette
Ru - Cheshuityi kalmar
Sp - Luria escamuda blanda

NATIONAL :

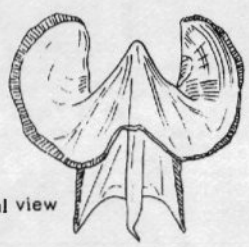
DISTINCTIVE CHARACTERS :

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° or slightly obtuse jaw angle; jaw edge long, slightly curved, nearly vertical to baseline, rostrum narrow.

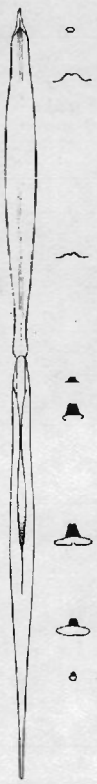


profile

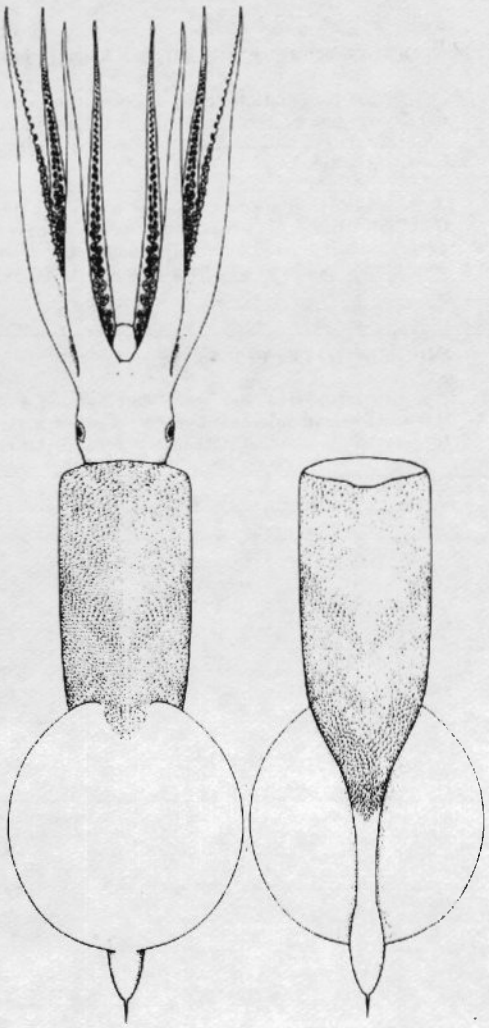


ventral view

lower beak



gladius



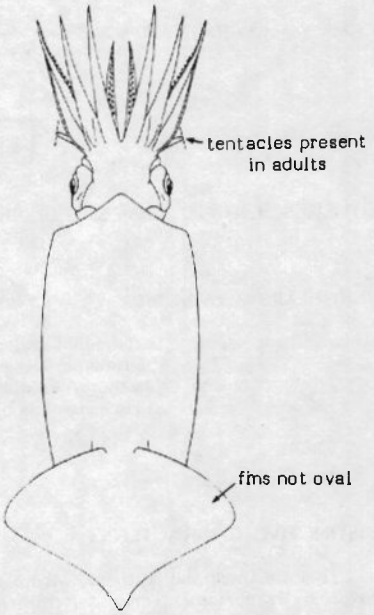
dorsal view

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).

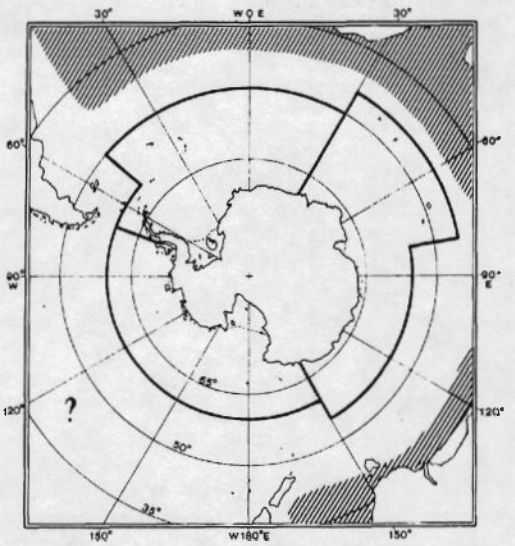
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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 :

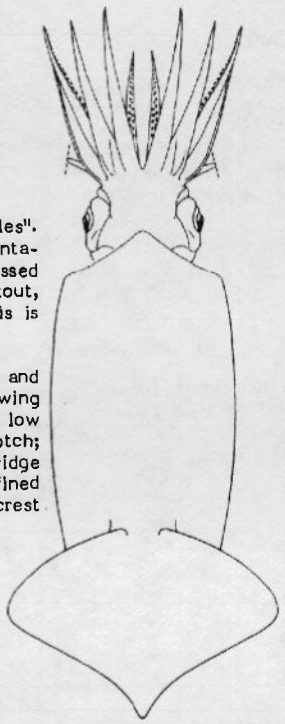
Mantle elongate, covered with small "scales". Fins 40 to 50% of mantle length, muscular. Tentacular clubs unexpanded, with laterally compressed suckers with bluntly toothed rings; arms stout, sucker rings with about 18 sharp teeth. (This is known to be a composite of several species.)

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

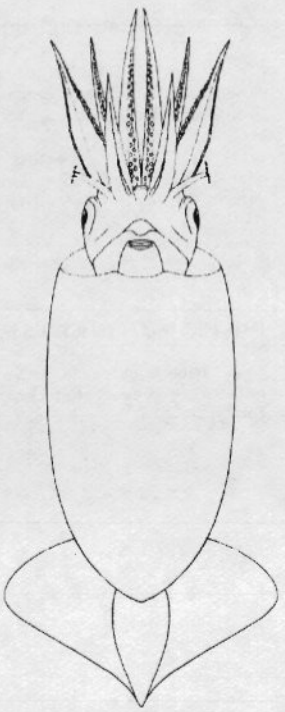
ventral view
lower beak

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.

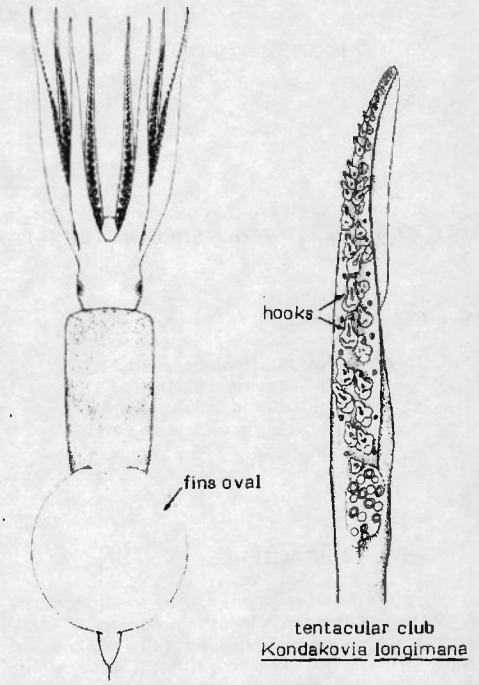
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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.

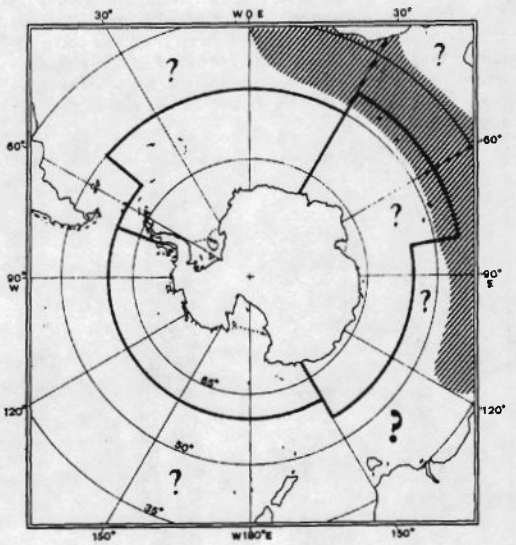
INTEREST TO FISHERIES :

This species is believed to have some fishery potential because of its large size and muscular consistency.



dorsal view
Lepidoteuthis grimaldii

tentacular club
Kondakovia longimana



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 :

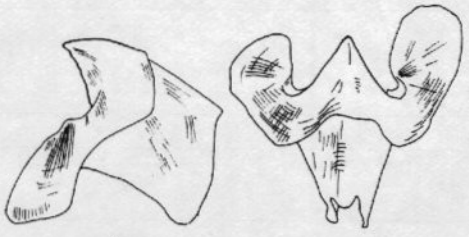
FAO/CCAMLR : En - Antarctic neosquid
Fr - Loutène australe
Ru - Antarkticheskyl myagkotelyi kalmar
Sp - Neoluria antártica

NATIONAL :

DISTINCTIVE CHARACTERS :

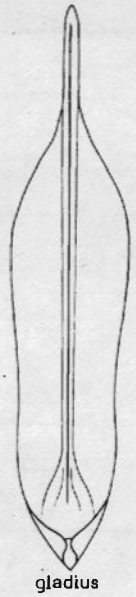
Mantle conical. Fins oval, anterior lobes absent, posterior lobes free. Head and eyes large; buccal connectives attach to dorsal borders of arms IV. Funnel-locking cartilage straight, simple. No photophores. Tentacles relatively thin; clubs with 6 to 8 enlarged suckers on median rows of manus, many rows 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.

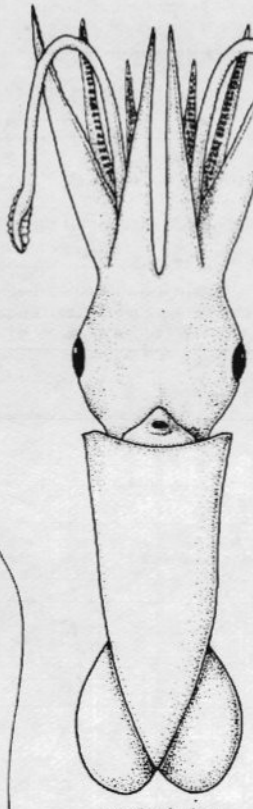


profile ventral view

lower beak
(after M.R. Clarke, 1982)



gladius
(redrawn from Toll, 1982)



ventral view

tentacular club

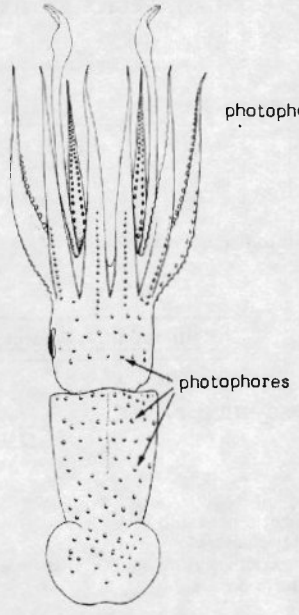
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

Several families (Histioteuthidae, Bathyteuthidae and Psychroteuthidae) have similar general characters, but can be differentiated as follows:

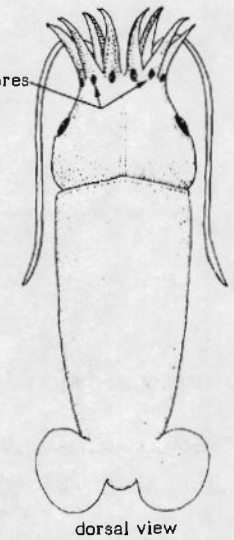
Histioteuthis species (Histioteuthidae): photophores present on mantle.

Bathyteuthis abyssicola (Bathyteuthidae): photophores present at bases of arms.

Psychroteuthis glacialis (Psychroteuthidae): posterior fin attachment concave.



dorsal view
Histioteuthis



dorsal view
Bathyteuthis abyssicola

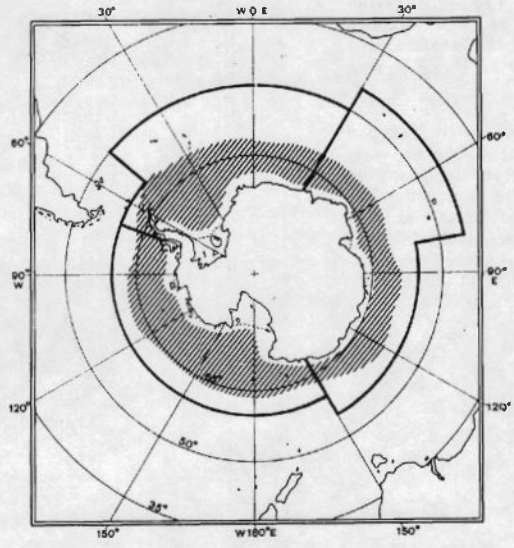
SIZE :

Maximum reported mantle length 11 cm.

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

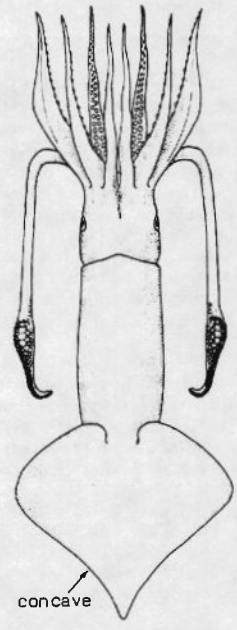
All sectors of the Antarctic Ocean; circumpolar.

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

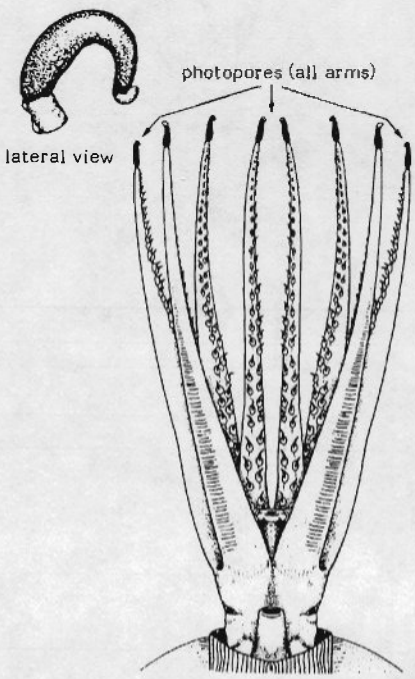
Characterized by biserial hooks on the arms (usually replaced by small biserial suckers near the arm tips); a lack of tentacles (in adults), buccal connectives that attach to the ventral borders of arms IV; a simple, straight, slightly broad funnel-locking cartilage; very large fins; light organs at 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.

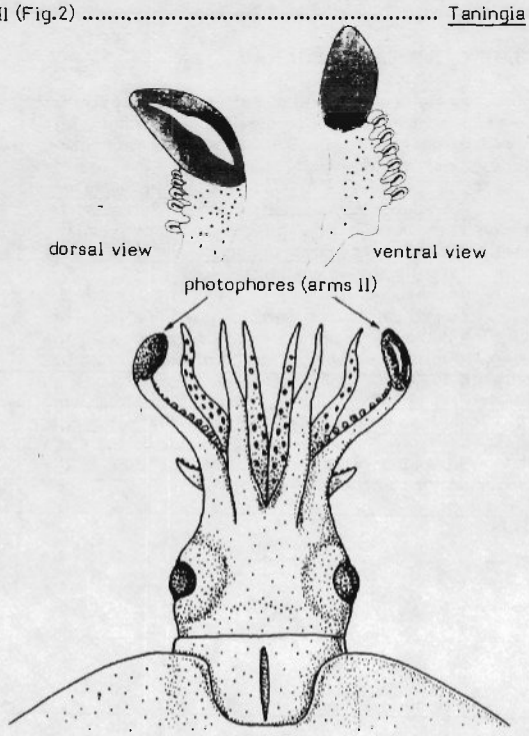
KEY TO GENERA OCCURRING IN THE AREA :

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 :

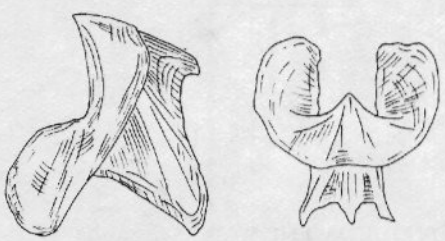
FAO/CCAMLR : En - Rough-skin octopus squid
Fr - Encornet poulpe râpe
Ru - Morshinistyi vosmirukyi kalmar
Sp - Pulpota lijera

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.

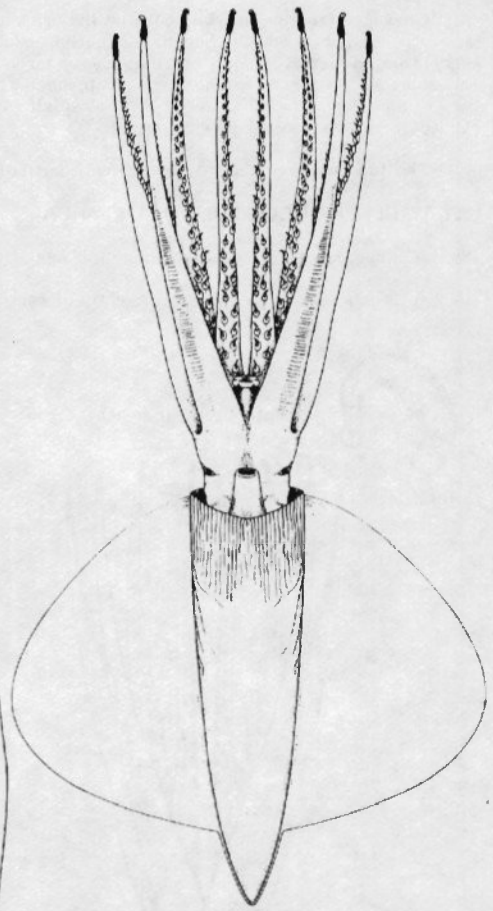
Lower beak rather narrow; jaw edge from the side is of about the same length or longer than the wing; baseline shorter than depth of beak; hood lies close to the crest which is narrow and thicker than the lateral wall immediately to the side of it; wing fold absent or barely prominent enough to hide 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

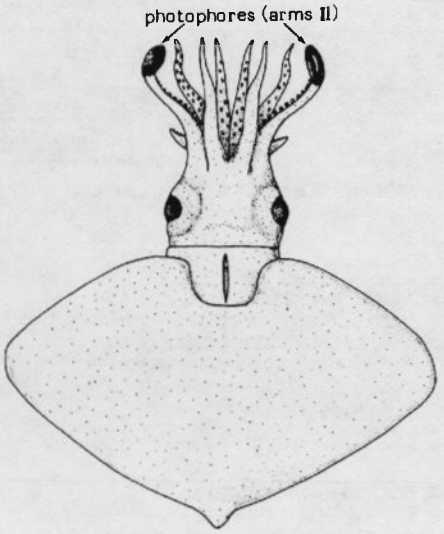


ventral view

(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.

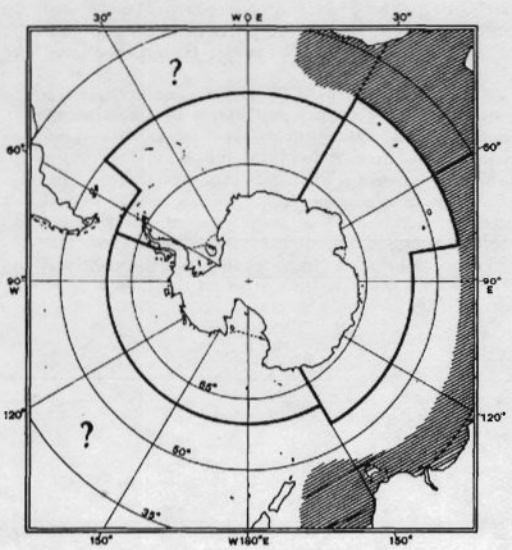
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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.



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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 :

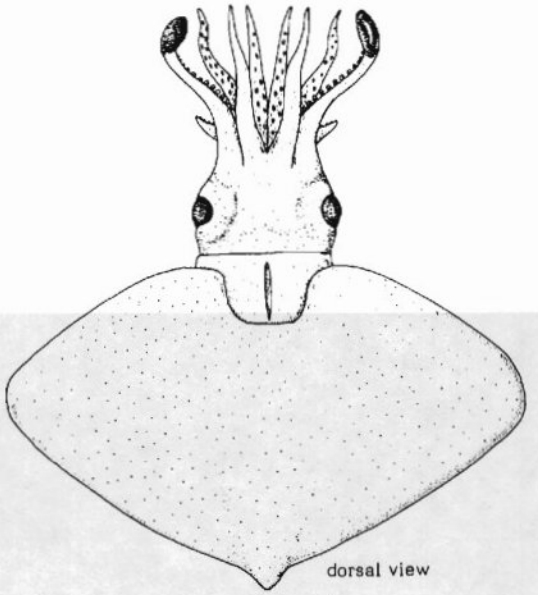
FAO/CCAMLR : En - Dana octopus squid
Fr - Encornet poulpe dana
Ru - Kalmar taningia
Sp - Pulpota

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.

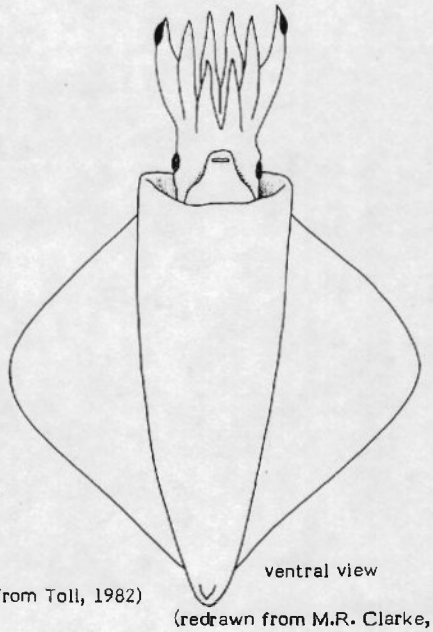
Lower beak broad; jaw edge visible from side is slightly longer than wing length in small specimens or slightly shorter in larger specimens; hood broad, with a distinct medial notch; wing fold poorly developed, covered with cartilage and hardly concealing jaw angle in profile; the shoulder is mainly 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.

SIZE :

Maximum reported mantle length 1.4 m, over 20 kg in weight.

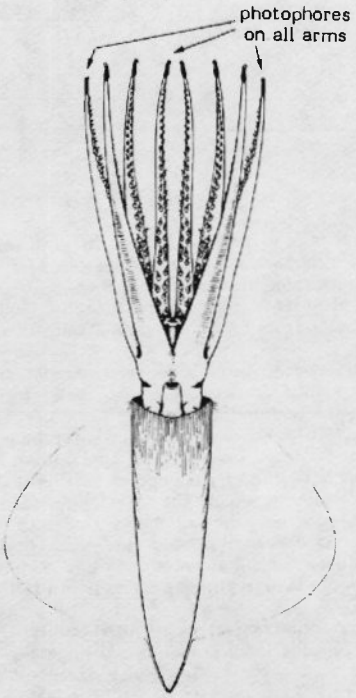
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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.

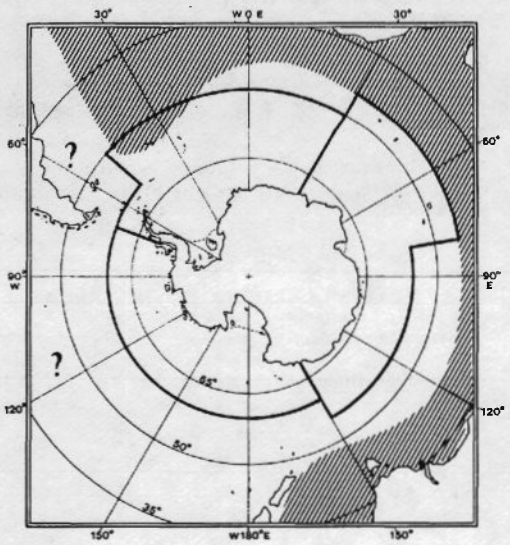
A primarily oceanic midwater species, believed to spawn on the bottom, deep on the slope. It is heavily preyed upon by sperm whales throughout their range and to a lesser extent by wandering albatrosses.

INTEREST TO FISHERIES :

This species is believed to have some fishery potential.



ventral view
Octopoteuthis rugosa



OMMAS

1985

FAO SPECIES IDENTIFICATION SHEETS

FISHING AREAS 48,58,88
(Southern Ocean)

OMMASTREPHIDAE

Flying squids

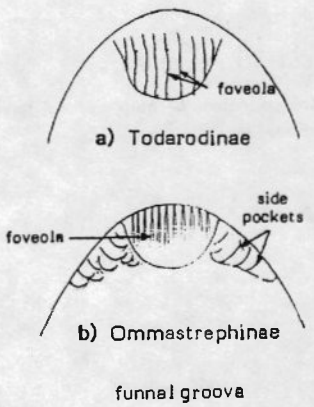
The family is characterized by an inverted T-shaped funnel-locking cartilage, which easily distinguishes it from all others, even in the youngest stages; biserial suckers on the arms; tetraserial suckers on the tentacular clubs (except for Illex which has 8 rows of suckers on the dactylus); buccal connectives 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 :

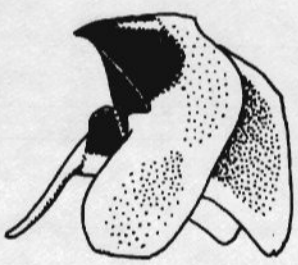
FAO/CCAMLR : En - Sevenstar flying squid
Fr - Encornet étoile
Ru - Kalmar martialia
Sp - Pota festoneada

NATIONAL :

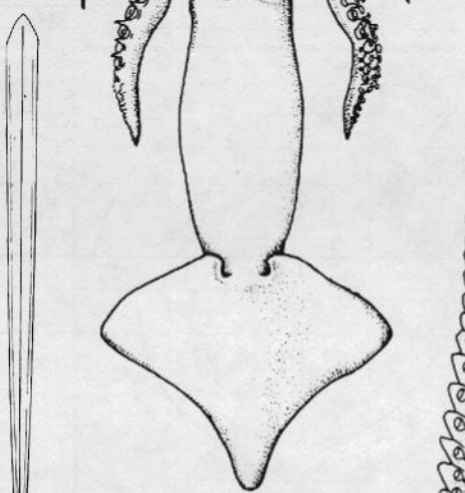
DISTINCTIVE CHARACTERS :

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



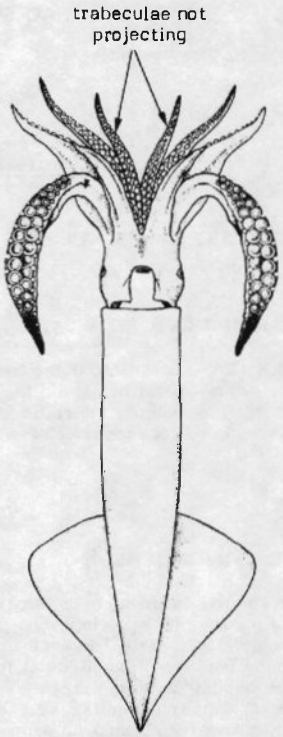
dorsal view

gladius
(redrawn from
Toll, 1982)

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.

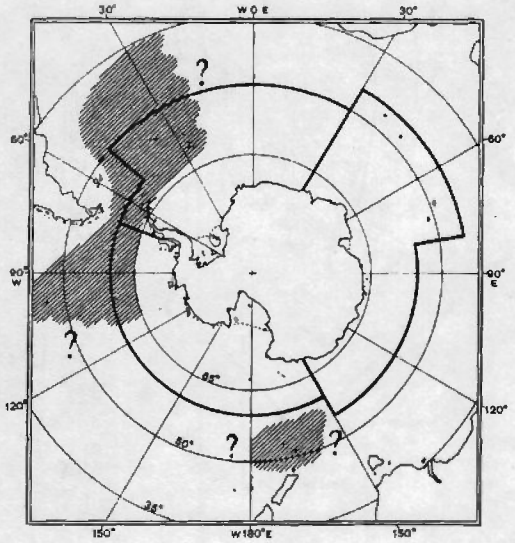
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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 :

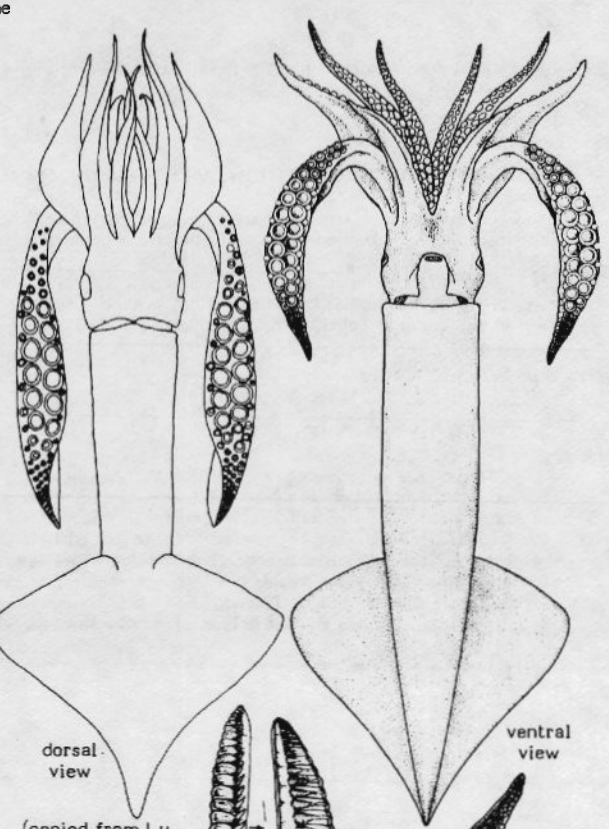
FAO/CCAMLR : En - Antarctic flying squid
Fr - Toutenon antarctique
Ru - Kalmar-strelka Filippovoy
Sp - Jibia antártica

NATIONAL :

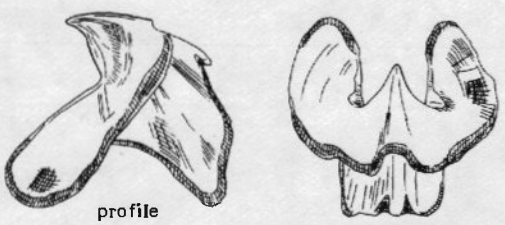
DISTINCTIVE CHARACTERS :

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^{0} to 35^{0} (60^{0} to 70^{0} 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.

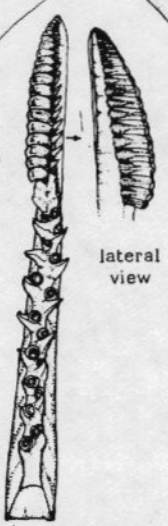
Lower beak: baseline length about equal to depth of beak; a low wing fold hides the jaw angle from side; hood covers about half the crest in the midline and is broad on either side of the deep medial notch; rostral edge usually sharply curved near tip; wing fold thickened; shoulder ridge well developed; 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)



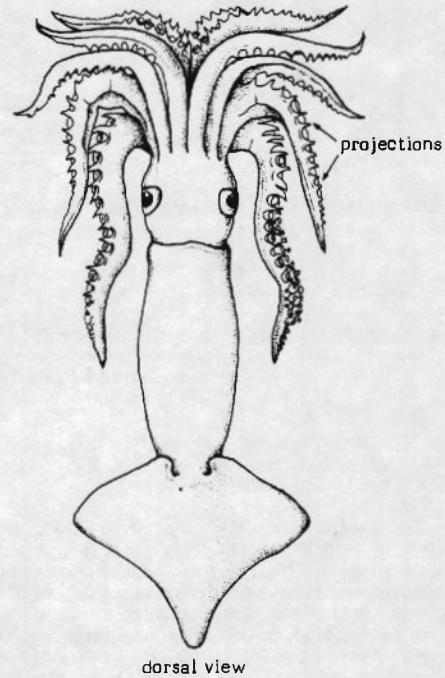
right arm IV of male
hectoctylized

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.

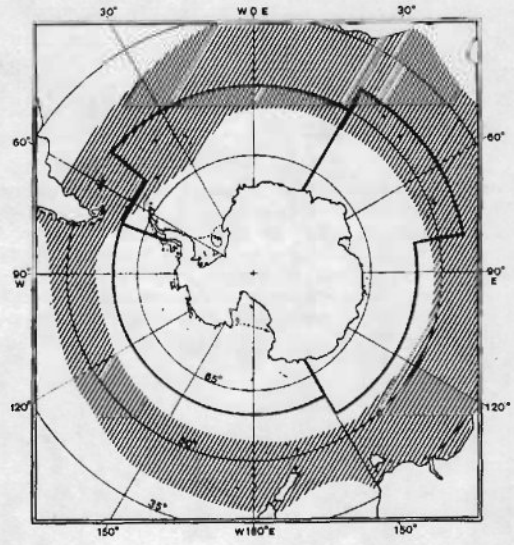
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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

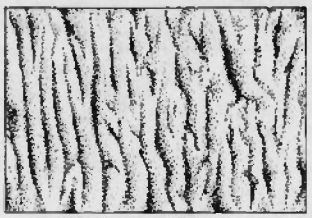
1b. Mantle either smooth or with round fleshy warts (Fig.1b), but not with longitudinal ridges; no marginal rows of suckers on tentacular clubs

2a. Mantle smooth; fin angle 45 to 50°, length of fins about 50% of mantle length (Fig.3a).... Moroteuthis knipovitchi
ONYCHO Moro 2

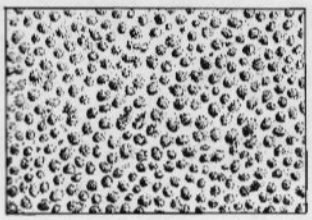
2b. Mantle with round, fleshy warts; fin angle and relative length of fins not as in 2a

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

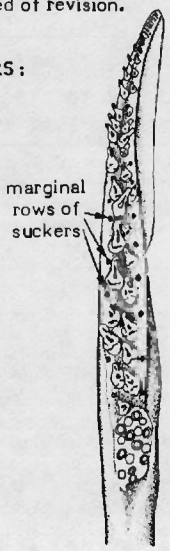


a) K. longimana

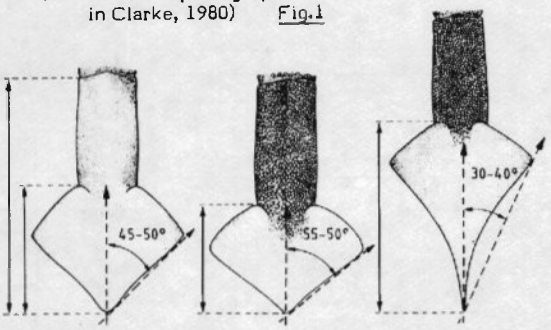


b) M. robsoni

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 :

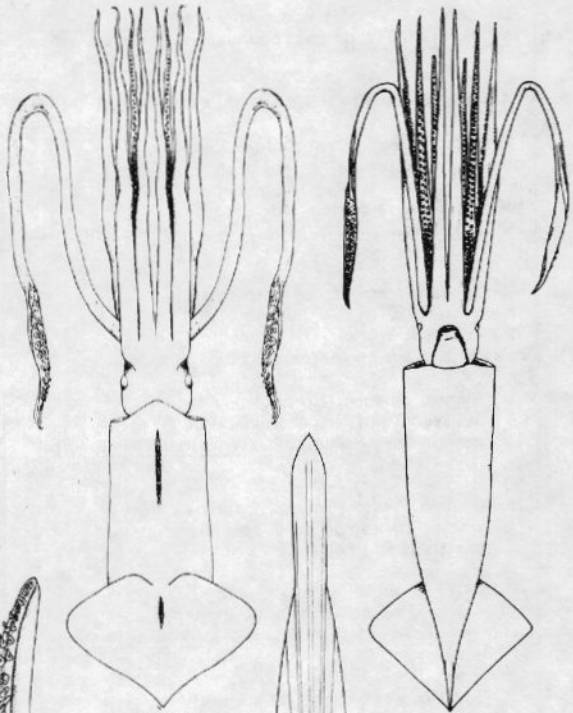
FAO/CCAMLR : En - Longarm octopus squid
Fr - Encornet-poulpe longbras
Ru - Kalmar kondakova
Sp - Pulpota brazolargo

NATIONAL :

DISTINCTIVE CHARACTERS :

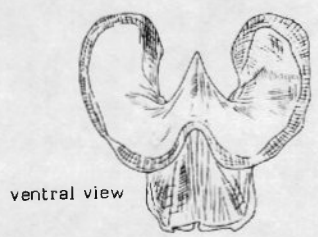
Mantle muscular, covered with dermal ridges which develop longitudinal orientation in larger specimens. Fins with straight-sided posterior margin, their width about 60% and their length about 40% of mantle length. Tentacular clubs with approximately 33 hooks and 33 marginal suckers on manus and with 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)



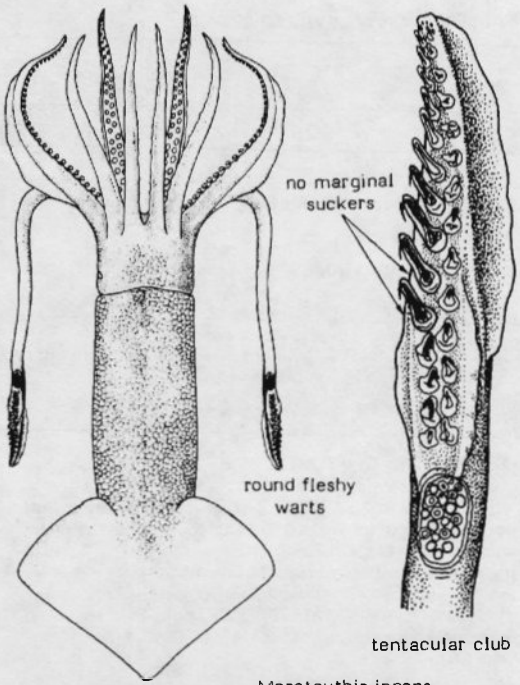
lower beak
(redrawn from Clarke, 1980)

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.

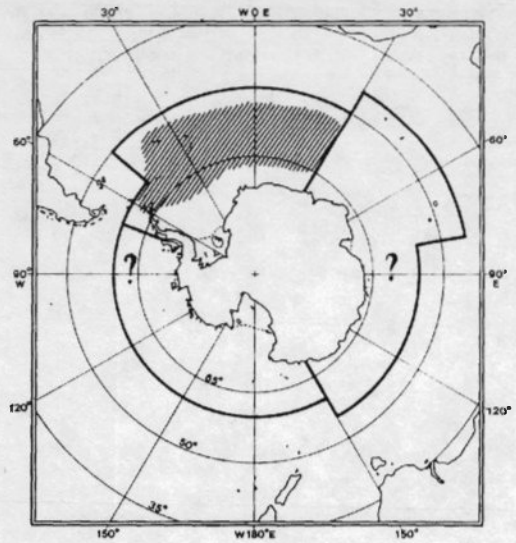
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

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 :

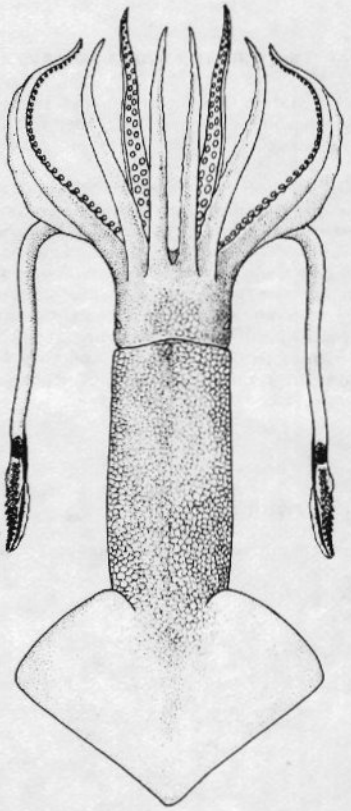
FAO/CCAMLR : En - Greater hooked squid
Fr - Cornet commun
Ru - Gigantskyi kryuchienosnyi kalmar
Sp - Lurión común

NATIONAL :

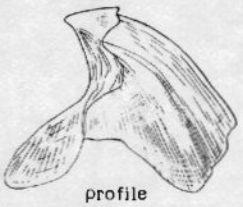
DISTINCTIVE CHARACTERS :

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.

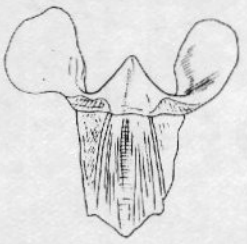
Lower beak with a distinct angle ridge; crest long and curved; hood extremely short; narrow, extremely thickened or cartilaginous region of the hood-wing structure to side of jaw angle; jaw angle obtuse; lateral wall fold very thick anteriorly.



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 :

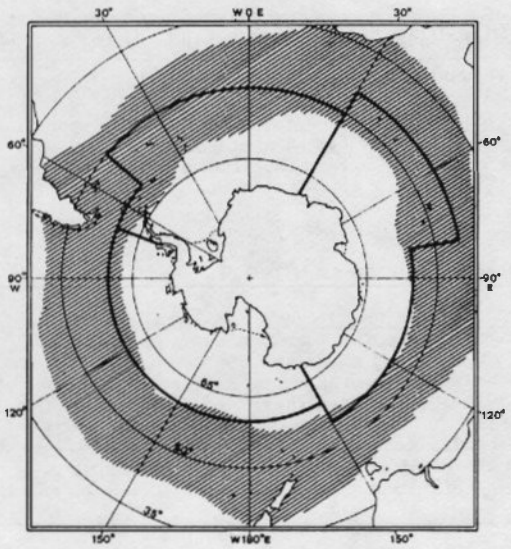
Moroteuthis knipovitchi: mantle smooth; fin angle 45 to 50°; length of fins about 50% of mantle length.

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 :

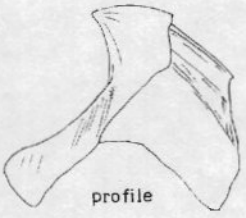
FAO/CCAMLR : En - Smooth-hooked squid
Fr - Cornet lisse
Ru - Gladkokozhyi kryuchienosnyi kalmar
Sp - Lurión liso

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.

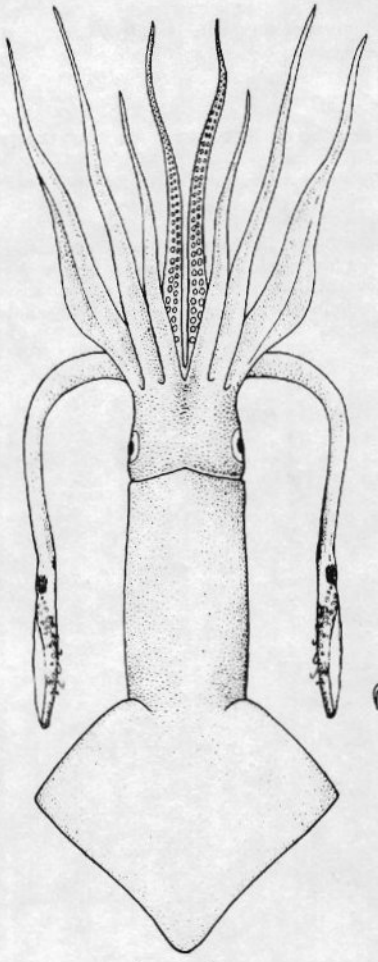


profile

ventral view

lower beak
(after Clarke, 1980)

gladius
(after Toll, 1982)



dorsal view

tentacular club

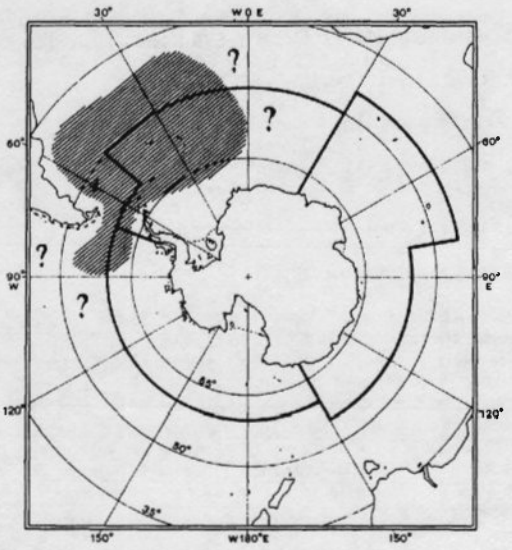
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

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 0.48×10^6 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 :

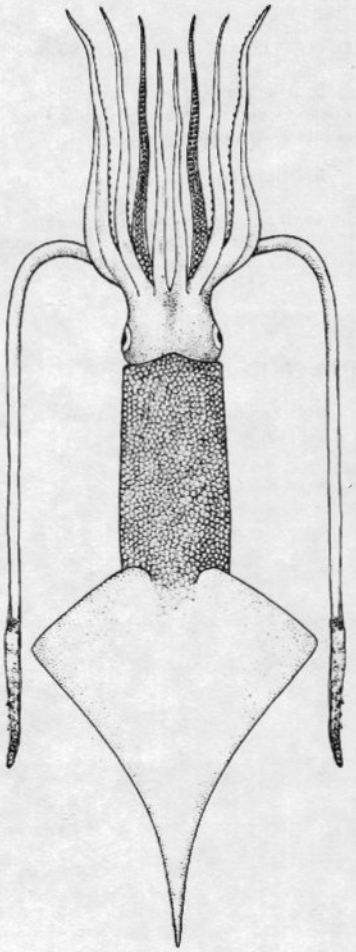
FAO/CCAMLR : En - Rugose hooked squid
Fr - Cornet rugueux
Ru - Sherokhovatyi kryuchienosnyi kalmar
Sp - Lurión rugoso

NATIONAL :

DISTINCTIVE CHARACTERS :

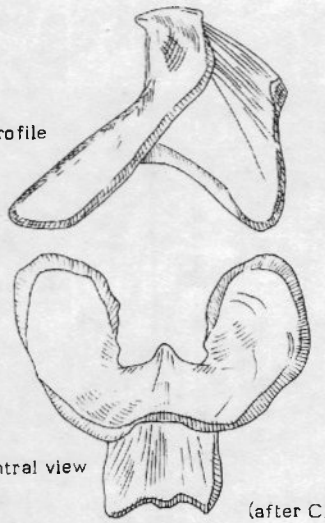
Mantle long, slender, covered with fleshy warts, its tip drawn out to a long, sharp tail. Fins relatively narrow, width 45% of mantle length, their length 58 to 60% of mantle length, forming a very sharply pointed lanceolate tail; fin angle 30^0 to 40^0 each. Tentacular clubs very narrow, unexpanded, 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.



dorsal view

tentacular club



profile

ventral view

lower beak

(after Clarke, 1980)

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.

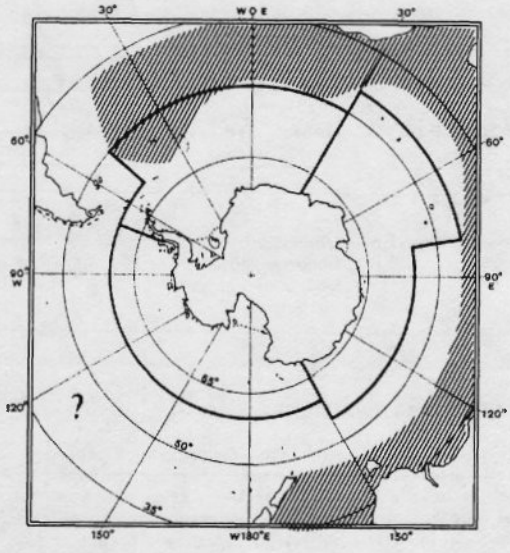
SIZE :

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 :

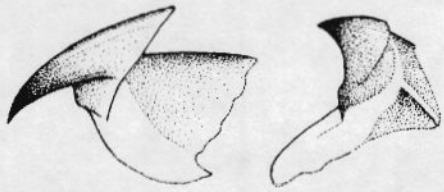
FAO/CCAMLR : En - Glacial squid
Fr - Encornet austral
Ru - Ledyanoy kalmar
Sp - Luria glacial

NATIONAL :

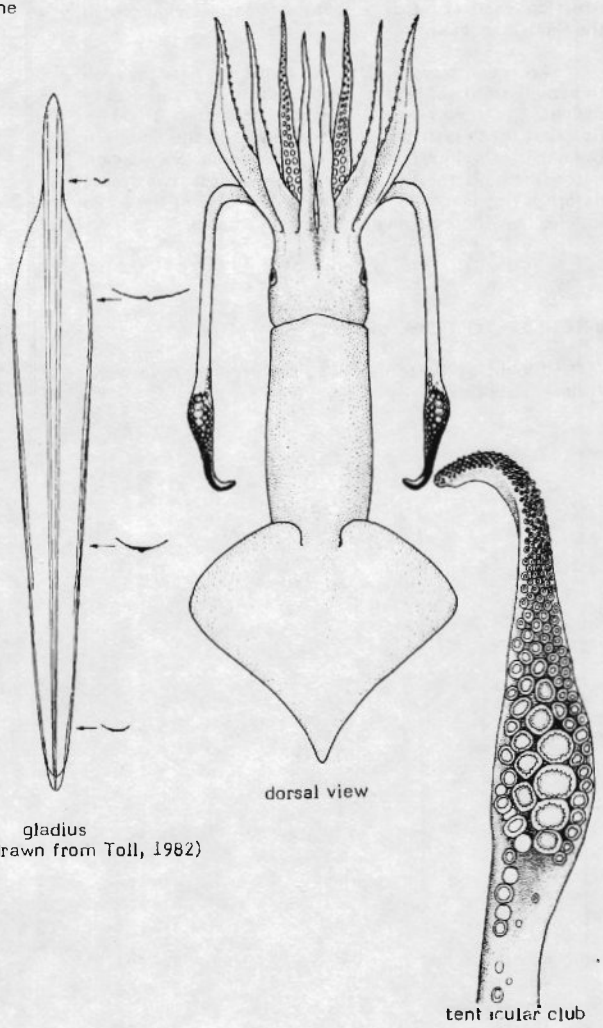
DISTINCTIVE CHARACTERS :

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)



dorsal view

gladius
(redrawn from Toll, 1982)

tentacular club

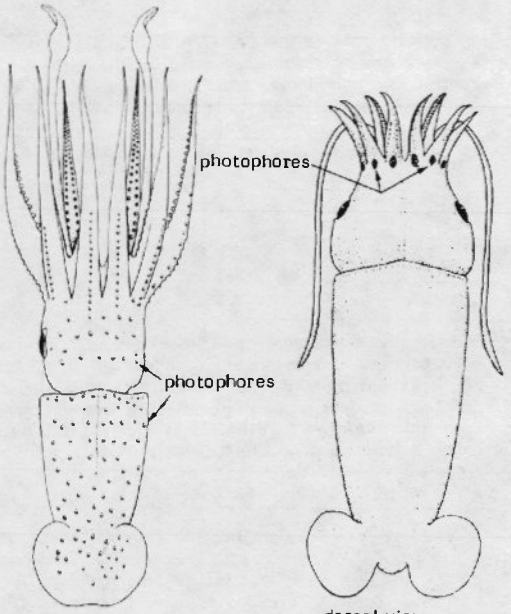
DISTINGUISHING CHARACTERS OF SIMILAR SPECIES OCCURRING IN THE AREA :

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

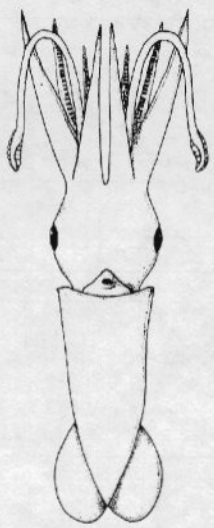
SIZE :

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.

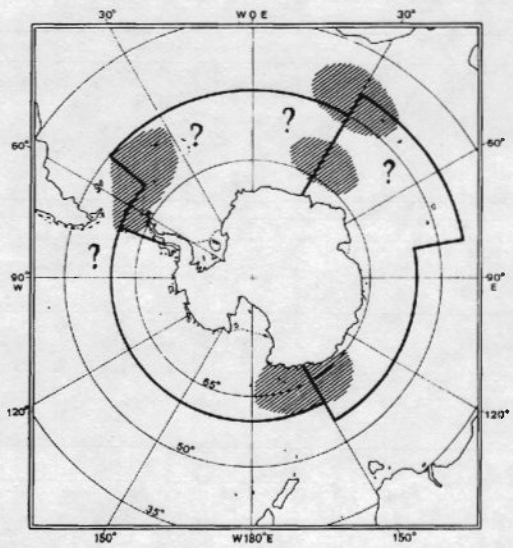


ventral view

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.

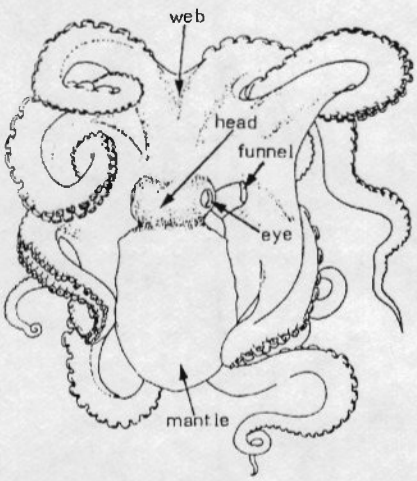
Only one family, the Octopodidae are known to occur in the Southern Ocean and adjacent waters.

OCTOPODIDAE — OCT

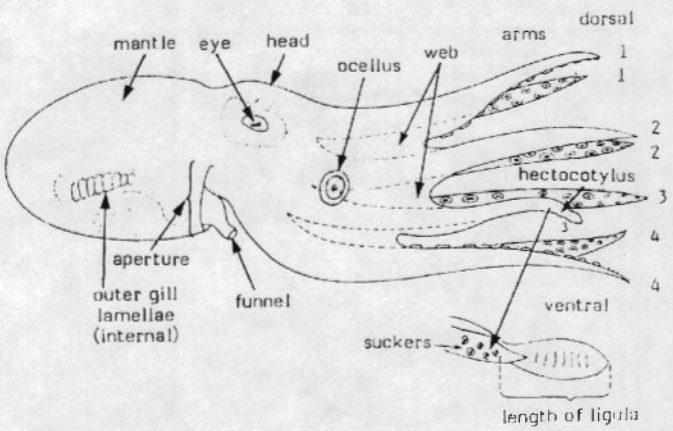
Octopuses

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

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1985

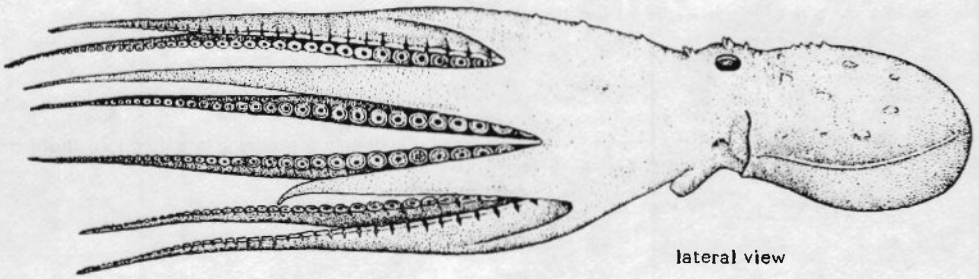
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

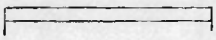
FISHING AREAS 48,58,88
(Southern Ocean)

Eledone massyae Voss, 1964

OTHER SCIENTIFIC NAMES STILL IN USE : Moschites brevis Massy, 1916



lateral view



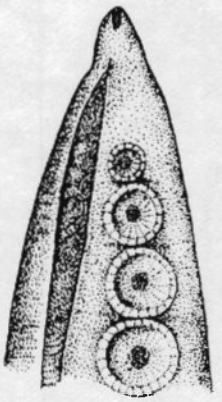
VERNACULAR NAMES :

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.

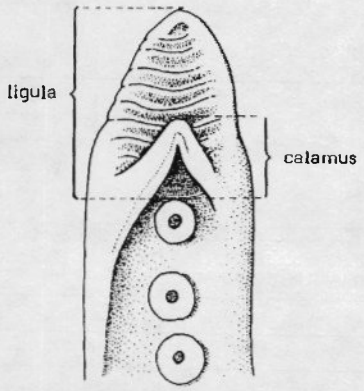


tip of hectocotylized right arm III of male

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)

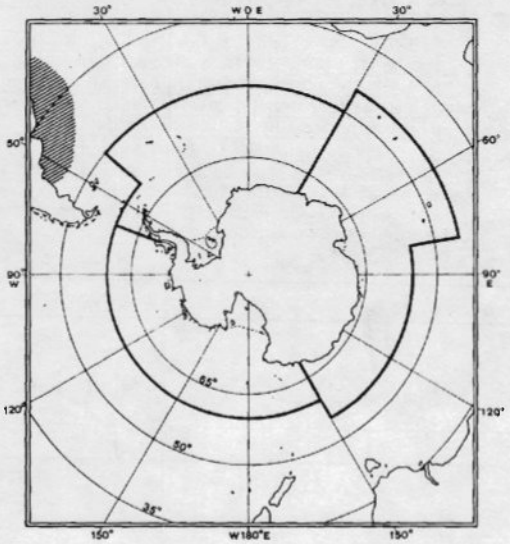
SIZE :

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.

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FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

Graneledone antarctica Voss, 1976

OTHER SCIENTIFIC NAMES STILL IN USE : None

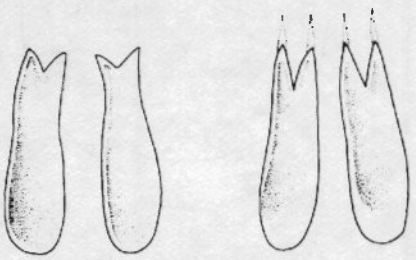
VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic papillose octopus
Fr - Elédone antarctique papilleuse
Ru - Antarkticheskyi borodavchatyi osminog
Sp - Pulpo antártico papiloso

NATIONAL :

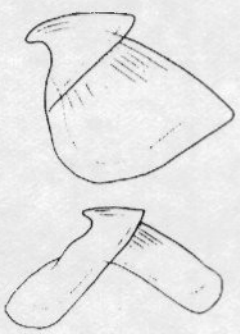
DISTINCTIVE CHARACTERS :

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.

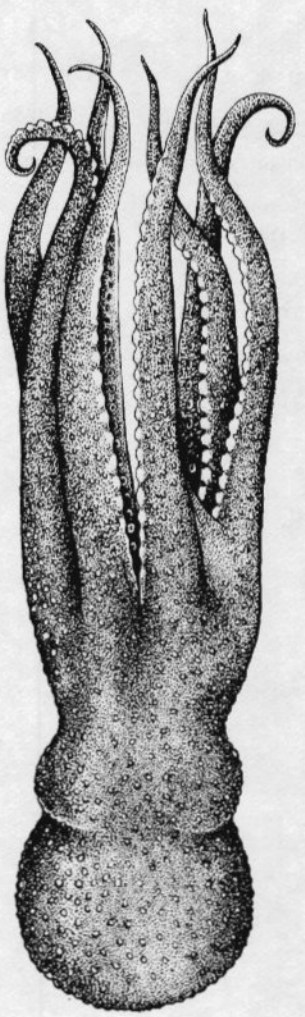


funnel organs

hectocotylus with ligula



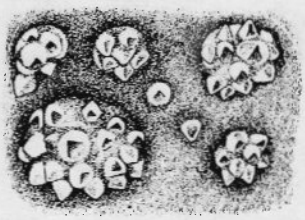
upper and lower beak



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.

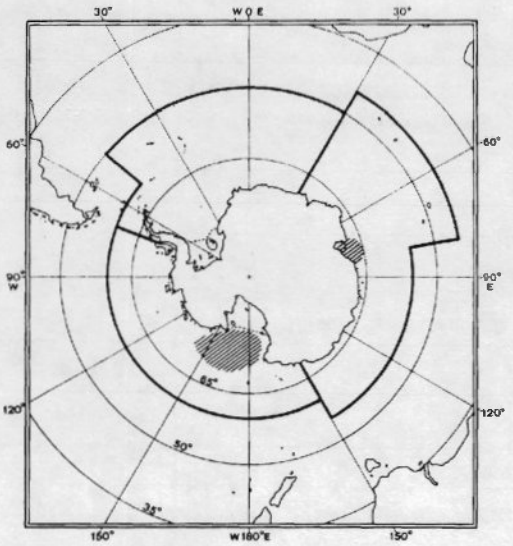
funnel organ

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.



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1985

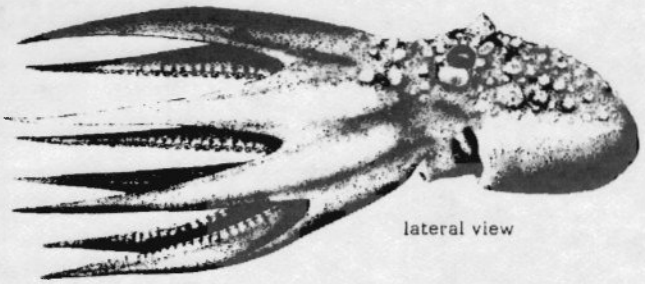
FAO SPECIES IDENTIFICATION SHEETS

FAMILY : OCTOPODIDAE

FISHING AREAS 48,58,88
(Southern Ocean)

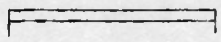
Graneledone macrotyla Voss, 1976

OTHER SCIENTIFIC NAMES STILL IN USE : None



lateral view

dorsal view



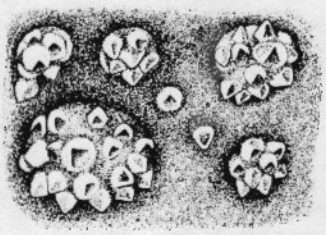
VERNACULAR NAMES :

FAO/CCAMLR : En - Cauliflower octopus
Fr - Elédone chou-fleur
Ru - Osminog-tsvetnaya kapusta
Sp - Pulpo coliflor

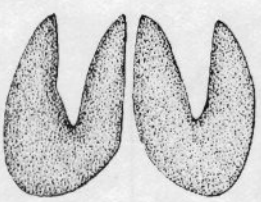
NATIONAL :

DISTINCTIVE CHARACTERS :

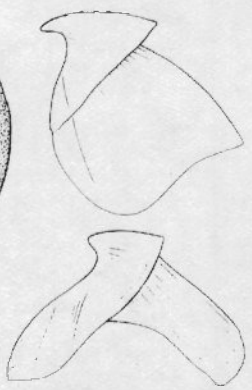
Mantle large, round, very wide with no head/mantle constriction. Dorsum of head and mantle covered with large multipapillose tubercles; one large multipapillose tubercle above each eye. Funnel organ VV-shaped, stout, with broad lateral limbs slightly stouter than median limbs. Arm formula 2.3.1.4. Web 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.



details of multipapillose tubercles



funnel organ

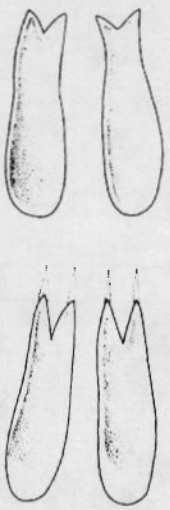


upper and lower beak

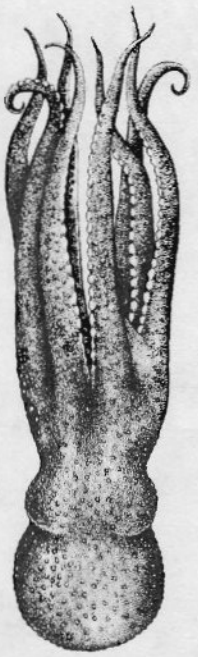
All illustrations redrawn from G.L. Voss, 1976

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 :

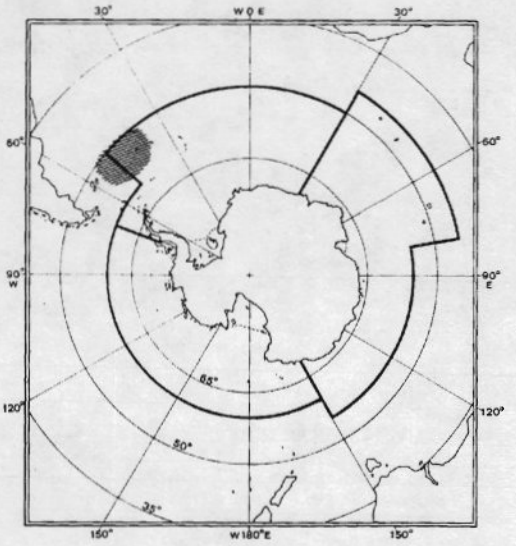
Maximum reported mantle length 3.4 cm.

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.



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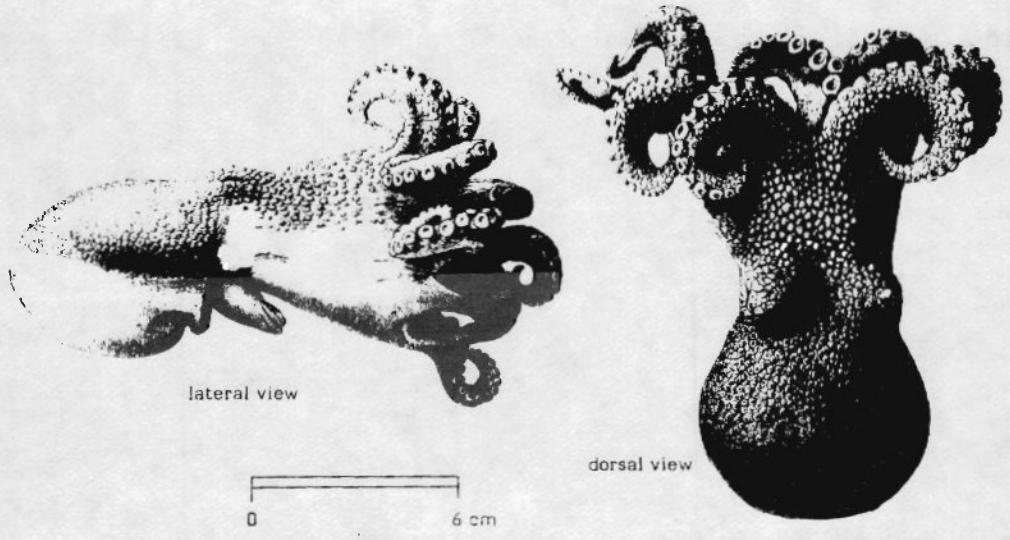
FAO SPECIES IDENTIFICATION SHEETS

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



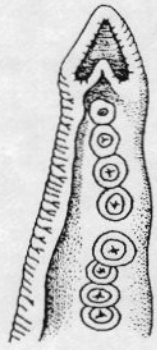
VERNACULAR NAMES :

FAO/CCAMLR : En - Charcot's octopus
Fr - Elédone de Charcot
Ru - Osminog 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.

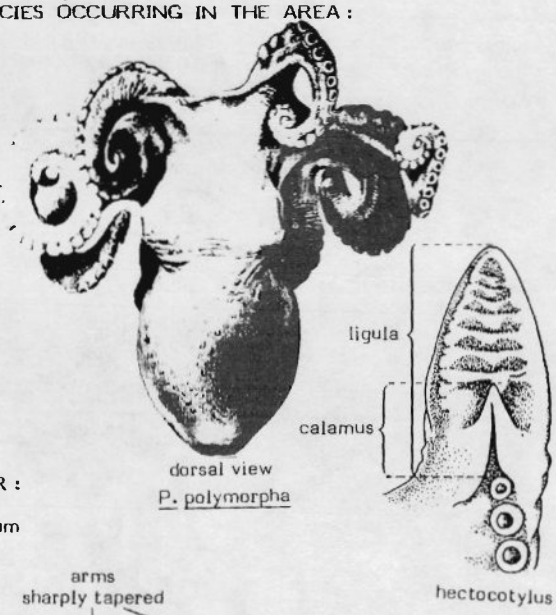


hectocotylus
(redrawn from Hoyle, 1912)

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.

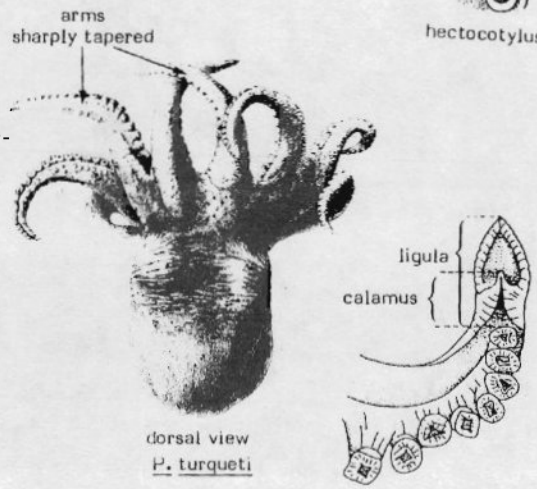


SIZE :

Maximum reported mantle length 7.4 cm.

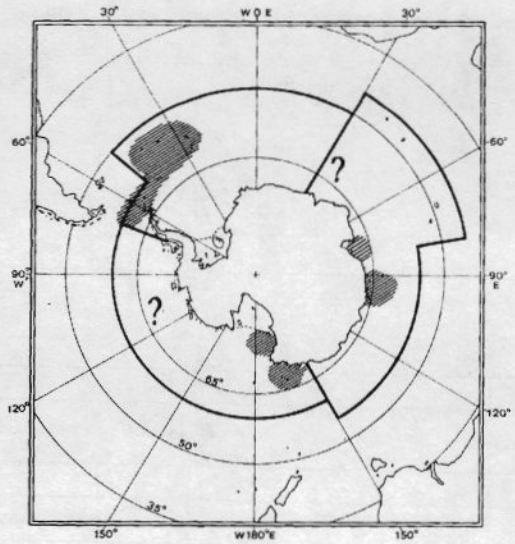
GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

Most likely a circumpolar species. Maximum reported depth 420 m.



INTEREST TO FISHERIES :

Potential for commercial utilization undetermined at present.



OCT Par 2

1985

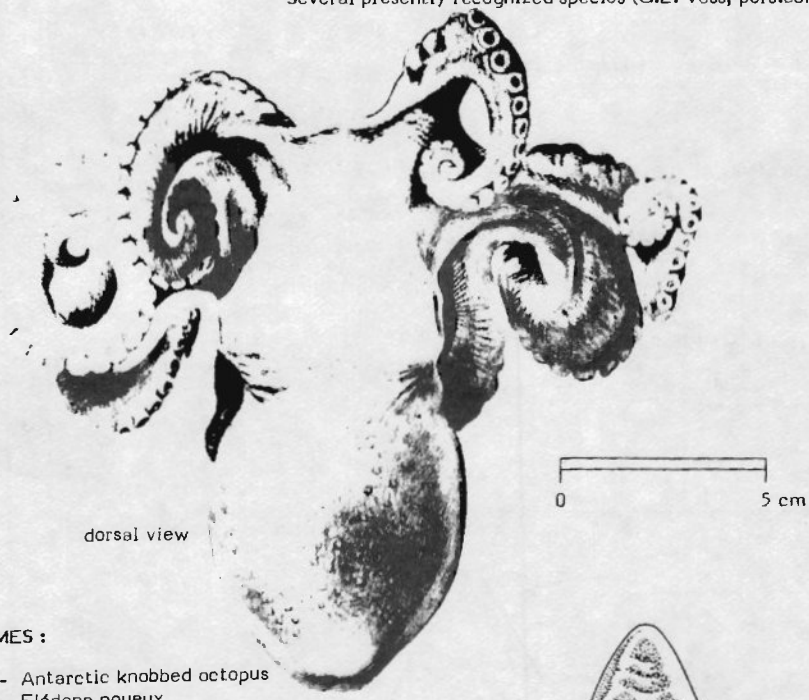
FAO SPECIES IDENTIFICATION SHEETS

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)



dorsal view

VERNACULAR NAMES :

FAO/CCAMLR : En - Antarctic knobbed octopus
Fr - Elédone noueux
Ru - Antarkticheskyi bugorchatyi osminog
Sp - Pulpo nodoso

NATIONAL :

DISTINCTIVE CHARACTERS :

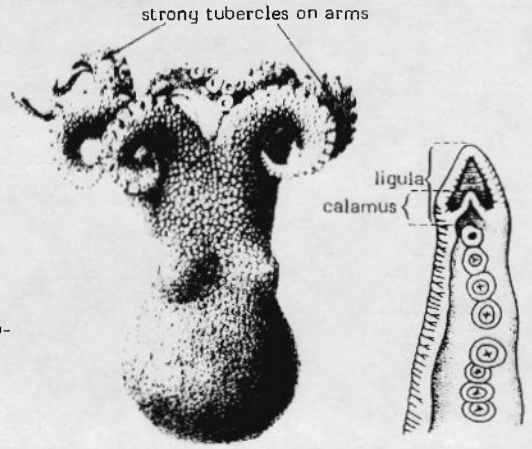
Robson (1932) described 2 forms (P. oblonga and P. affinis) for this species. The mantle is either narrow and oblong, or ovoid and wide. Arms subequal, robust, suckers uniserial, small. Funnel short; funnel organ W-shaped. Ink sac completely imbedded in the liver. Gill demibranch with 6 to 10 filaments. 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.



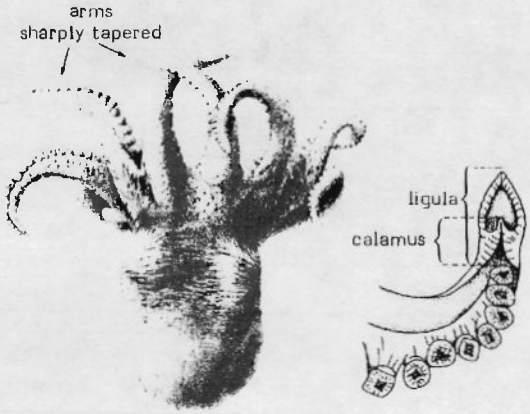
P. charcoti

SIZE :

Maximum reported mantle length 7.0 cm (unpublished data).

GEOGRAPHICAL DISTRIBUTION AND BEHAVIOUR :

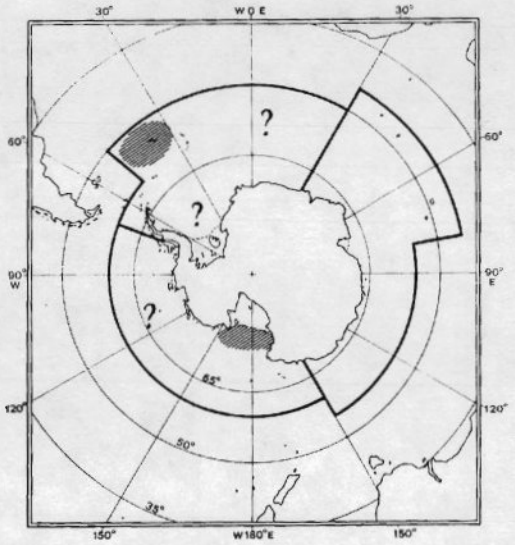
Currently found in the Atlantic sector of the Southern Ocean and in the Ross Sea. Maximum reported depth approximately 850 m (unpublished data).



P. turqueti

INTEREST TO FISHERIES :

Potential for commercial utilization undetermined at present.



OCT Par 3

1985

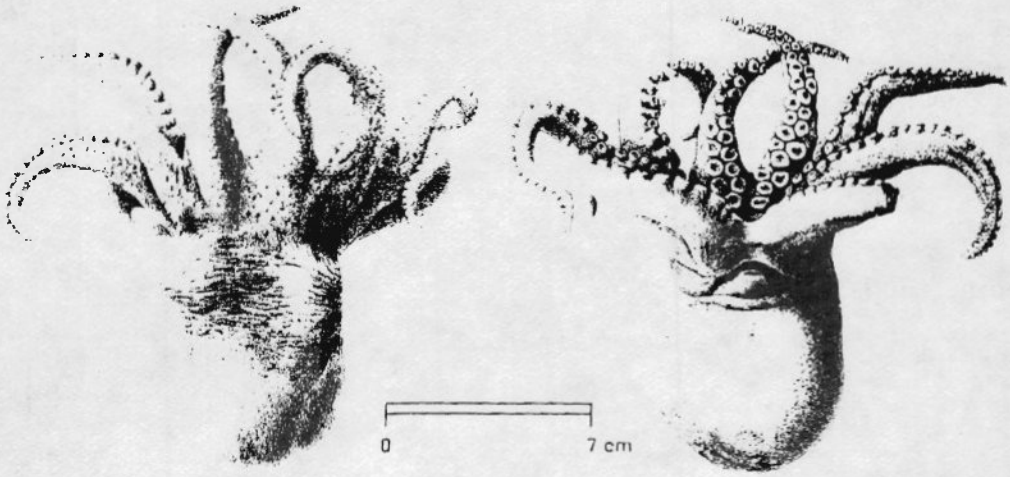
FAO SPECIES IDENTIFICATION SHEETS

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

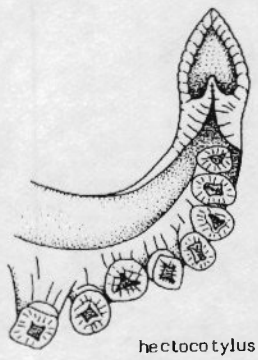
VERNACULAR NAMES :

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.

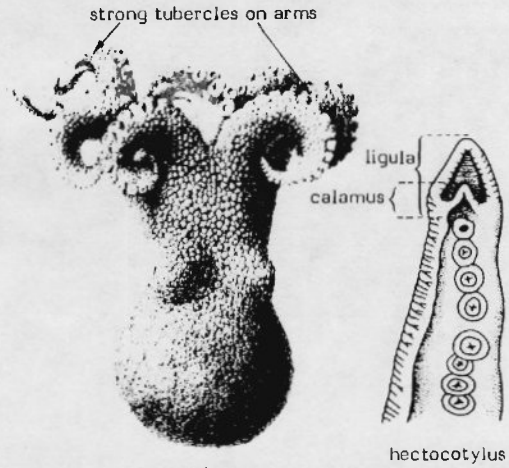


hectocotylus
(redrawn from Massy, 1916)

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 :

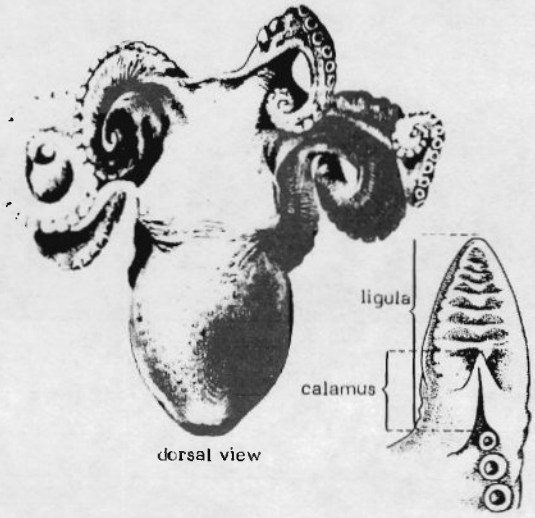
Maximum reported mantle length 8.0 cm (unpublished data).

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).

INTEREST TO FISHERIES :

Potential for commercial utilization undetermined at present; because of its large size it may be exploitable.



P. polymorpha