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Atlas of the Barents Sea Fishes

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Foreword

Russia and Norway are the countries responsible for fisheries management and research in the Barents Sea. Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO) and Institute of Marine Research (IMR) are the two scientific organisations that have conducted most of the investigations in this area. These institutions have organized and conducted joint surveys in the Barents Sea since the 1960's. Furthermore, Russia and Norway have cooperated on management of the resources in the Barents Sea for even longer. The long lasting cooperation between Norway/IMR and Russia/PINRO has formed the basis for the making of this fish atlas.

The idea of making a fish atlas for the Barents Sea fishes came about when organizing and working with fish data from the Joint IMR–PINRO ecosystem survey. The Joint IMR–PINRO ecosystem survey is the most comprehensive survey that IMR and PINRO have conducted together, and is carried out with 4-5 research vessels each year in August-September. The data from this survey in the years of 2004-2009 was used in here. The structure and content of the "Atlas of Barents Sea fishes" is strongly influenced by the "Atlas of the North Sea Fishes" by Knijn et al (1993), brought to our attention by O.A. Bergstad.

We strongly recommend the readers and users of this atlas to read the following chapters describing the methods used to acquire the data on which the maps of fish distributions are based. In particular, it should be noted that the distribution maps shown in this Atlas is the average distribution from 2004-2009 of the component of each species that is catchable by bottom trawl (although in some cases we have also included acoustics and pelagic trawl data). Further, the distributions are from the time of year with the least ice coverage (August-September) when species like cod have its northernmost distribution within the Barents Sea. Finally, the distributions were probably also influenced by the fact that the years 2004-2009 were exceptionally warm, the warmest recorded for the Barents Sea since 1900 (start of measurements). Therefore, the maps probably show the most northern distribution of many species, especially those associated with warmer water.

Systematic order and species nomenclature are according to Eschmeyer (2011), common names follow www.fishbase.com (English, FAO names if stated), www.artsdatabanken.no (Norwegian) and various sources (Russian). The ecological and zoogeographical characterisation of fish species are mostly in accordance with Andriashev and Chernova (1995).

The authors thank all the crew on the PINRO and IMR research vessels that participated in the surveys, the crew on the F/F Jan Mayen and the scientists and technical staff from PINRO and IMR that participated on the surveys. Furthermore, we thank Elin Hjelset for making the map grid, Trude Thangstad for making the sediment map, Jaime Alvarez for preparing the acoustic maps and Randi Ingvaldsen for making the map on bottom temperatures and salinities. We also thank Arve Lynghammer and Camilla Ottesen for useful comments. Finally, we thank Elen Hals for the layout and technical preparation of this Atlas. The work with the Atlas is part of projects supported by the Norwegian research council and The Norwegian ministry of foreign affairs.

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1 The Barents Sea ecosystem

The Barents Sea is a high latitude shelf sea in the northeast Atlantic, situated between ~70º N - ~80º N. It is roughly 1.6 million km^2 and borders the deep Norwegian Sea and Greenland Sea basins in the west and the Arctic Ocean basin in the north, and coastal areas in the South and East. Here the "Barents Sea" is treated as a large marine ecosystem rather than a geographical term (e.g. the "Barents region" or defining the western border of the Barents Sea as the line from Nordkapp to southern Spitsbergen). The Barents Sea is one out of totally 64 Large Marine Ecosystems (LMEs) of the world (Figure 1). From the LMEs, 80% of the world's fisheries catches are taken. The Barents Sea is located adjacent to three other LMEs: the Norwegian Sea in the west, the Kara Sea in the east and the Arctic Ocean in the north (Figure 1).

The Barents Sea is highly productive. *In situ* plankton production and advection from the Norwegian Sea sustain large populations of fish, benthos, sea birds and marine mammals. Currently (2011) it holds the largest cod stock in the world (the North East Arctic cod), and is the nursery area for Norwegian Spring Spawning herring, which for some years was the largest fish stock in the world.

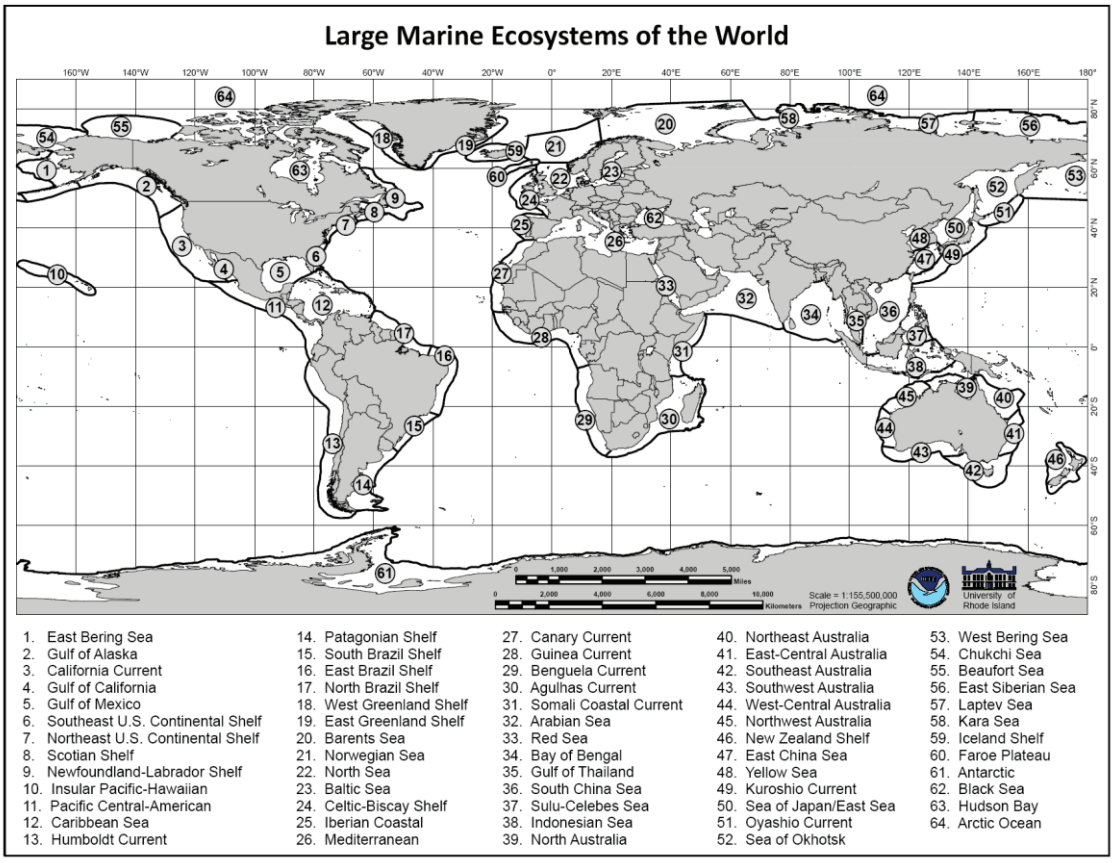


Figure 1. Large Marine Ecosystems (LMEs) of the world. Large marine ecosystems are defined as relatively large areas of ocean space of approximately 200,000 km² or greater, adjacent to the continents in coastal waters where primary productivity is generally higher than in open ocean areas (www.lme.noaa.gov).

1.1 Physical characteristics

1.1.1 General description

The general circulation pattern is characterized by inflow of relatively warm, saline Atlantic water from the west. The Atlantic current divides into southern and northern branches (Figure 2).

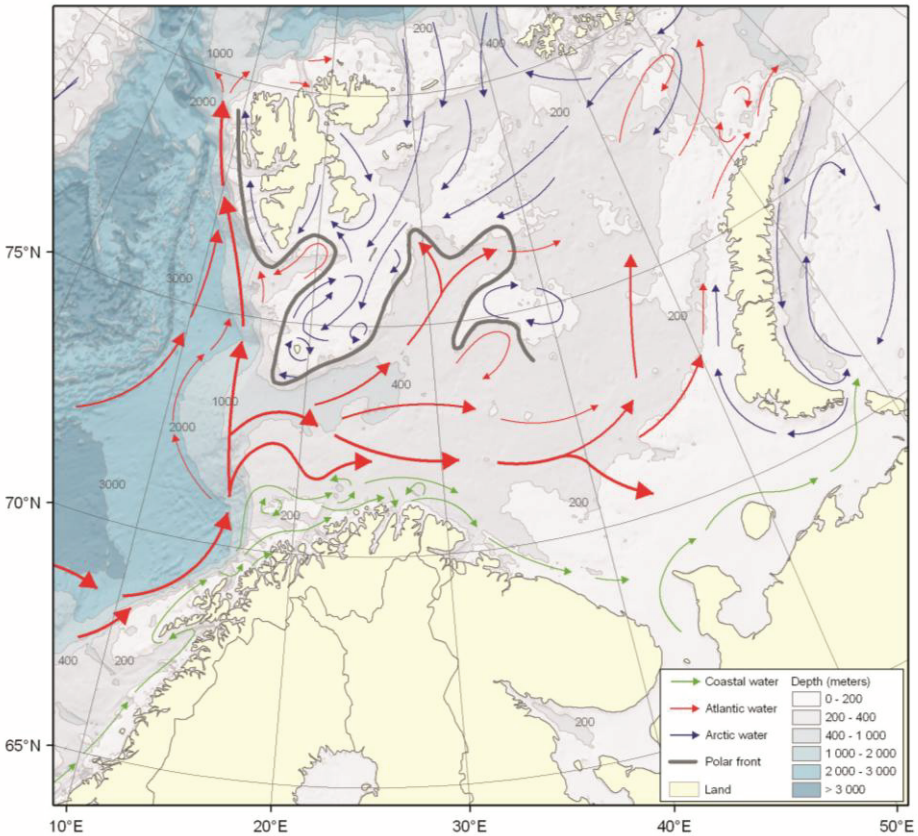


Figure 2. General circulation pattern in the Barents Sea (after Loeng 1991).

Less saline water flows from the southwest along the coast. This fresher Coastal Water has a stronger seasonal temperature signal than the Atlantic water. In the northern part of the Barents Sea, fresh and cold Arctic water flows from northeast to southwest. The Atlantic and Arctic water masses are separated by the Polar Front, which is characterized by strong gradients in both temperature and salinity. There is large inter-annual variability in ocean climate related to variable strength of the Atlantic water inflow and exchange of cold Arctic water. There is also a strong seasonal variation in the hydrographic conditions, with a maximum ice extent and minimum temperatures in April and minimum ice and maximum temperature in September. The average depth of the Barents Sea is 230 m, with a maximum depth of about 500 m at the western entrance. There are several bank areas, with depths around 50-200 m (Figure 3).

The distribution of different sediments is strongly influenced by the depth; generally there are finer particles in the deeper areas (Figure 4).

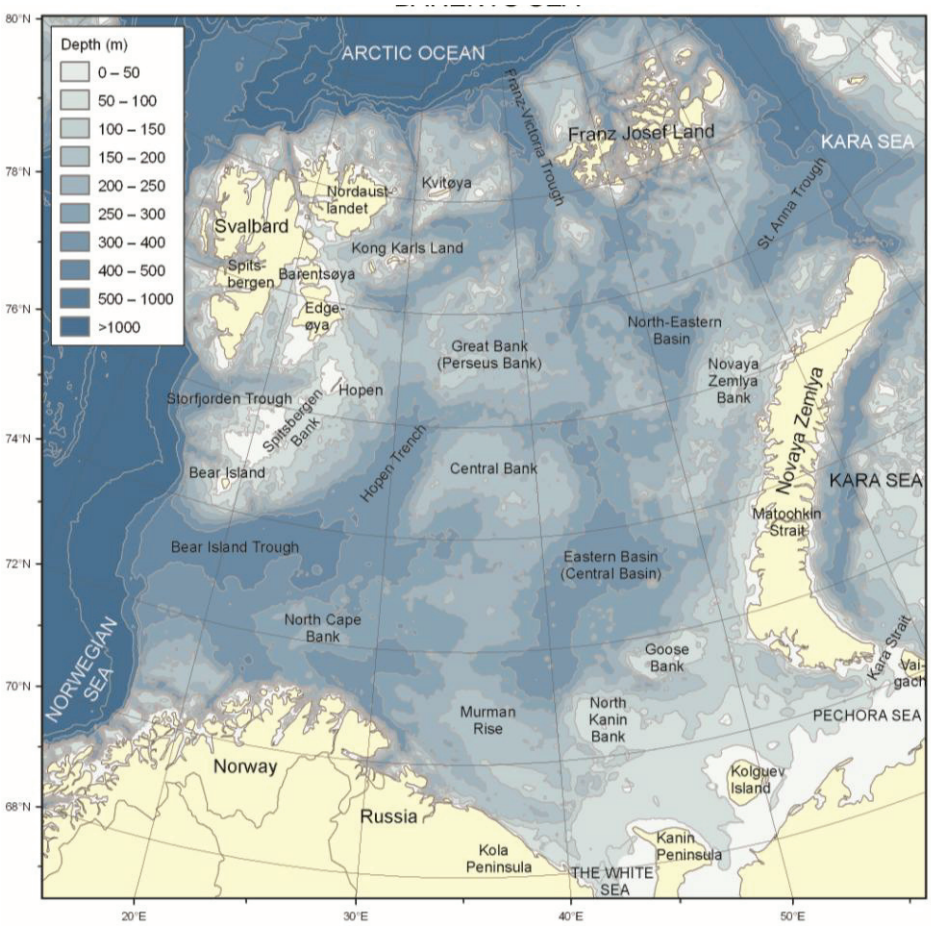


Figure 3. Depth contours and names of main trenches and banks in the Barents Sea.

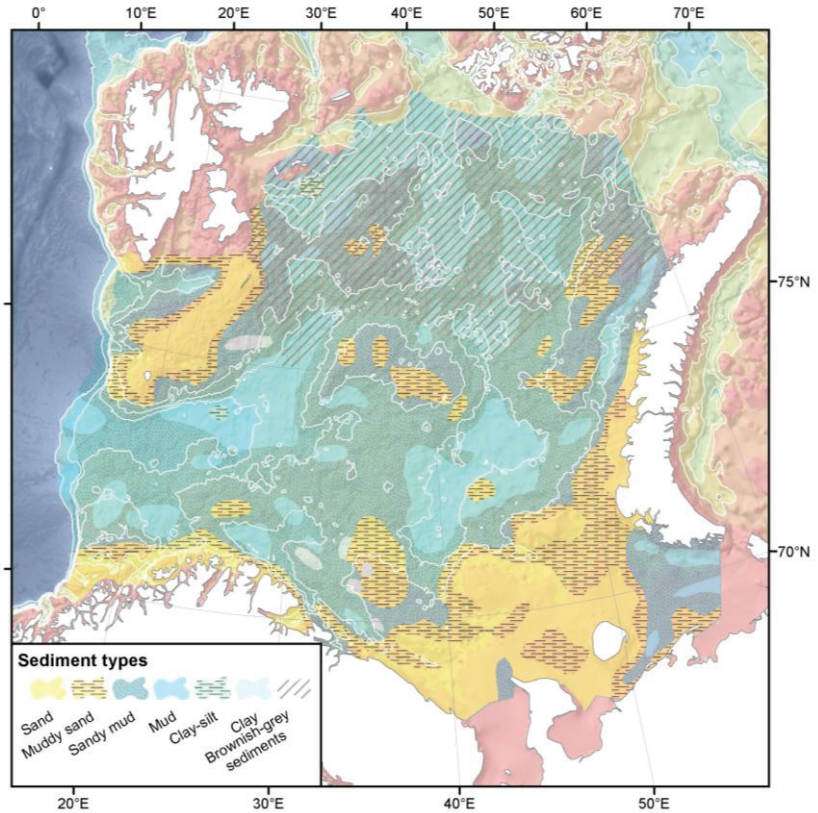


Figure 4. Bottom topography with sediments types redrawn from Vinogradova & Litvin (1960).

1.1.2 Physical conditions during the study period

The data included is from the time of year with the least ice extent (August-September). The study years (2004-2009) have been the warmest, and have had the smallest ice cover, since 1900. Some areas that were previously covered by ice have been exposed for the first time and we therefore present data on fish species composition from areas not previously surveyed. Since 1970 temperatures have been measured using a grid of CTD stations taken by PINRO and IMR, from bottom to surface, and these data indicate that the observed temperature increase has been strongest at the bottom. The warming is closely linked to the inflow of Atlantic water, and has resulted in relatively high bottom temperatures in the northwestern parts. While the northwestern Barents Sea in earlier years often had bottom temperatures below -1 ºC, the temperature was above 1 ºC in large areas during 2004-2009 (Figure 5).

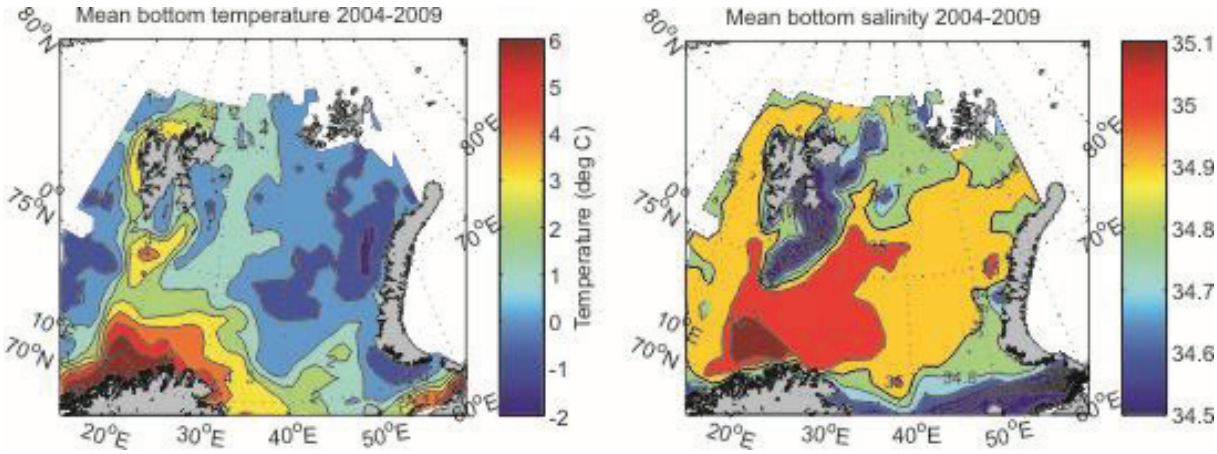


Figure 5. Mean bottom temperature (left) and bottom salinity (right) in August-September 2004-2007.

1.2 The Barents Sea fish community

The number of fish species registered in the Barents Sea has risen as the ichthyological research effort has increased. Knipovich (1926) noted 114 species in this area, while Andriashev (1954) raised the number to 149. According to data from the past decade, more than 200 fish species from 66 families are found in the Barents Sea (Dolgov 2004; Bogstad et al. 2008). The predominant families are: eelpouts (Zoarcidae), snailfishes (Liparidae), codfishes (Gadidae), sculpins (Cottidae), flatfishes (Pleuronectidae), and rockling, ling, and tusk (Lotidae). These families account for nearly 80 % of the species that occur regularly in the Barents Sea, and more than 40 % of the species recorded in this region. The taxonomic status of some species is still unclear, like in the genera *Careproctus* (Liparidae), *Gymnelus* (Zoarcidae), and some of the sculpins (Cottidae).

Around 100 fish species turn up regularly in trawl catches during scientific surveys in the Barents Sea. The total biomass and number are dominated by a few species; the ten most abundant fish species usually account for more than 90 % of the total number of all specimens that are caught in surveys using demersal trawls. Some species occur in the Barents Sea throughout their life cycle and spawn there (e.g. capelin, Greenland halibut, long rough dab). Others have their main feeding area in the Barents Sea but spawn elsewhere (e.g. juvenile

herring, Norway pout). Yet other species, whose main feeding areas are elsewhere, regularly visit the Barents Sea during the feeding migration in summer (e.g. blue whiting), and some species occasionally occur in the Barents Sea due to inflow of warm currents (e.g. spotted barracudina *Arctozenus risso*). Many species from this latter group are rarely recorded, and at least 40-50 of the species do not occur in the Barents Sea every year (e.g. king of herrings *Regalescus glesne*, sea breams *Brama brama*, *Pterycombus brama, Taractes asper,* etc.). However, for many of the species found in the Barents Sea, their life cycle, migration pattern and spawning areas are still poorly known.

Both Arctic cold-water species characteristic of Arctic water masses and boreal temperate water species characteristic of Atlantic (also called boreal) water masses, are found in the Barents Sea. According to Andriashev & Chernova (1995), fish species inhabiting the Barents Sea can be classified into seven zoogeographical groups: **Arctic**, **Mainly arctic, Arcto-boreal**, **Mainly boreal**, **Boreal, South boreal** and **Widely distributed**, based on their distribution and their water mass association. Further, the fishes can be classified based on their vertical distribution: demersal fish are linked to the bottom, but can also migrate vertically e.g. when feeding, whereas pelagic fish is found in the free water masses. Most of the fishes found in the Barents Sea are demersal. The distribution of both pelagic and demersal fish is determined by water mass distribution, water temperatures and salinity, in addition to the distribution of their prey. For demersal fish, the bottom depth and sediment type are also important for their distribution. The fishes can also be classified according to their diet. Most pelagic fish feed on zooplankton, whereas most demersal fish feed on fish or benthic organisms. However, the diet changes with fish size and most demersal fish have larvae and juveniles that lives pelagically and feeds on plankton, and e.g. cod can include a large proportion of large zooplankton in their diet even at a large size.

1.3 Fisheries in the Barents Sea

The Barents Sea ecosystem is strongly influenced by fishing and has been so for many decades. Fishing influences the targeted species directly, but also non-targeted species are affected because they are taken as by-catch. More indirect effects are disturbance of habitat, especially by demersal trawls. Fisheries also influence species interactions, since removing targeted species impacts their predators and prey. Some fish species benefit from fisheries by including a large proportion of fisheries waste in their diet, e.g. Greenland halibut, long rough dab, starry ray, Arctic skate, roughhead grenadier, glacial eelpout (e.g. Bjelland et al. 2000).

The most widespread gear used in the central Barents Sea is bottom trawl, but also long line and gillnets are used in the demersal fisheries. The pelagic fisheries use purse seine and pelagic trawl (Table 1). The fishing activity varies strongly geographically.

Table 1. Gear used by the Norwegian and Russian groundfish fishery in the Barents Sea and the Svalbard/Spitsbergen area in 2007. Note that the purse seine in the groundfish fishery is solely used in a coastal fishery for saithe. The last two columns give the gear composition used in the pelagic fishery for capelin in 2000-2008.

	Groundfish fishery							Pelagic fishery	
	Demersal trawl	**Longline**	**Handline**	**Gillnet**	**Purse seine**	**Danish seine**	**Traps**	**Purse Seine**	**Pelagic trawl**
Norway	37%	17%	4%	23%	8%	11%	0.02%	87%	13%
Russia	93%	7%	0.07%	-	-	-	-	16%	84%

Norway and Russia are the most important nations fishing in the Barents Sea, taking 80-90 % of the catches of most species. The major demersal fishery is on cod, haddock, saithe, and shrimp. In addition, there is a fishery on redfish (two species), wolffish (3 species), Greenland halibut and other flatfishes (mainly long rough dab and plaice). Fishery on other demersal species in the Barents Sea region is minor. For instance, in 2007, more than 800 000 tonnes were reported caught from the stocks of cod, haddock, redfish, saithe and Greenland halibut (ICES 2010). An additional catch of about 40 000 tonnes was taken from the stocks of wolffish and shrimp. The pelagic fishery in the Barents Sea is mainly on capelin, but due to the large stock fluctuations of capelin the quotas and catches varies greatly. Norway and Russia are the only nations fishing capelin in the Barents Sea. Polar cod is caught by Russian fisheries only. Fishery for herring is done outside the Barents Sea, but fishing on herring affects the Barents Sea since juvenile herring has a strong influence on the Barents Sea ecosystem as predator and prey.

Advice on quotas and fishery regulations for the main stocks are given by ICES where the basis for the advice are given by the Arctic Fisheries Working Group (AFWG) on cod, haddock, saithe, golden redfish, beaked redfish, Greenland halibut, and capelin. Background work for the management of herring is given by the Working Group on Widely Distributed Stocks (WIDE) and data on shrimp is prepared in the NAFO/ICES Pandalus Assessment Group. After the work is done in these expert working groups, the advice is given by ACOM (ICES) and then the Joint Russian-Norwegian fishery commission sets the quotas.

2 Data used in the Atlas

2.1 The Joint IMR-PINRO ecosystem survey 2004-2009:

2.1.1 Background and history

We used data from demersal trawls taken at the Joint IMR-PINRO ecosystem survey 2004-2009, run in August-September with Norwegian and Russian vessels (Table 2).

The Joint ecosystem survey is a continuation and extension of international 0-group survey and the acoustic survey for pelagic fish. These surveys were joined in 2003. These two surveys have been conducted since 1965 (0-group survey) and 1972 (acoustic survey, including CTD measurements on oceanography). The main method used on these surveys was acoustics in combination with pelagic trawls taken at predetermined positions (during the 0-group survey in August) and pelagic trawls performed on dense registrations of pelagic fish (during acoustic survey in September). One Norwegian demersal survey run in the central Barents Sea and west of Spitsbergen in summer was included in the ecosystem survey in 2003. Also a Norwegian-Russian demersal trawl survey for juvenile Greenland halibut and redfish run north and east of Svalbard was included in the ecosystem survey in 2003. Since 2004 the same demersal trawl was used on Norwegian and Russian vessels and demersal trawling was then a standard part of the survey. In 2004 the Norwegian demersal trawl survey for shrimp was discontinued and in 2005 included as a part of the ecosystem survey. The ecosystem survey was also conducted in 2010 and is planned for 2011.

Table 2. Vessels used during the Joint IMR PINRO ecosystem survey 2004-2009.

	2004	2005	2006	2007	2008	2009
IMR	Johan Hjort Jan Mayen	GO Sars Johan Hjort Jan Mayen	GO Sars Johan Hjort Jan Mayen	GO Sars Johan Hjort Jan Mayen	GO Sars Johan Hjort Jan Mayen	GO Sars Johan Hjort Jan Mayen
PINRO	Smolensk Fridtjof Nansen	Smolensk Fridtjof Nansen	Smolensk Fridtjof Nansen	Smolensk Vilnyus	Vilnyus	Vilnyus

2.2 Methods used in demersal investigations at the ecosystem survey

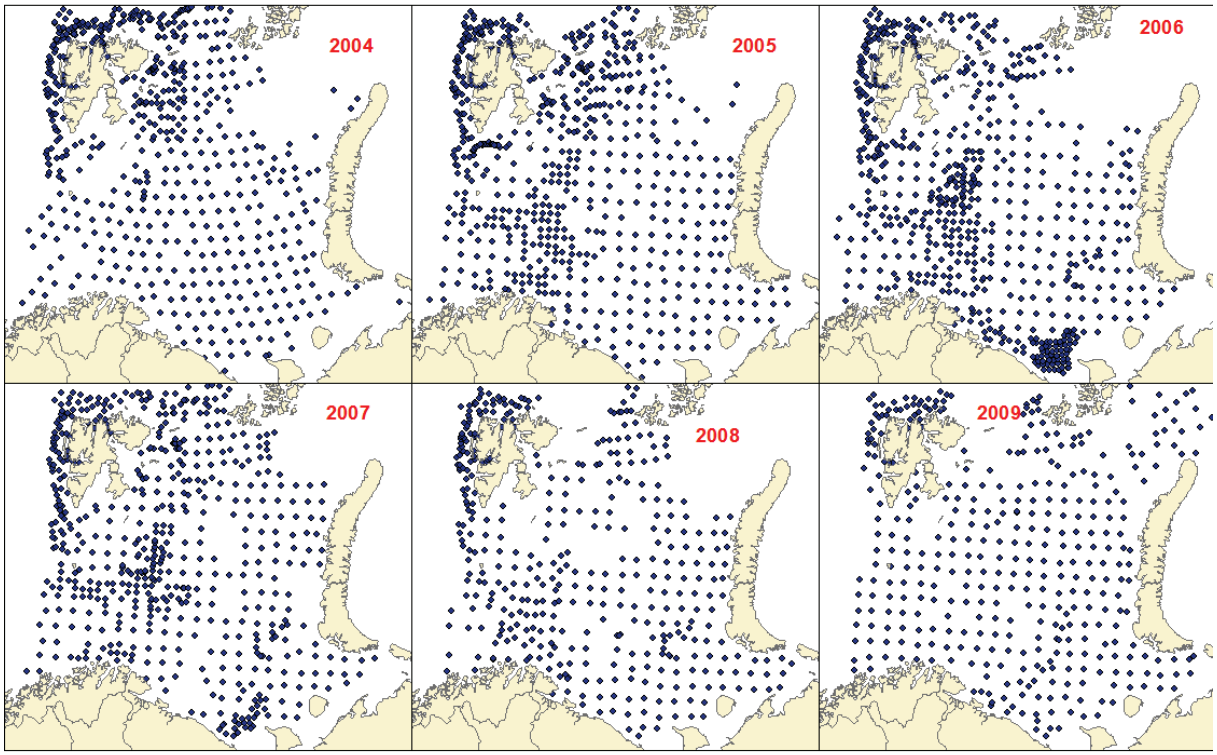
2.2.1 Survey design

The survey has covered the shelf area of the Barents Sea in August and September, the period of the year with the least ice coverage. The study years have been the warmest on record, exposing new areas to investigation. The data set from this survey is the spatially most extensive from the Barents Sea, allowing the study of the distribution of fishes over the entire shelf.

The survey design of the ecosystem survey is a compromise between the available ship hours and the time needed to cover the whole ice free shelf area. Bottom trawl stations have been 30-40 nautical miles apart. The station grid is not made using a well defined geographic projection, but was based on the layout of stations (distance, position) of the preceeding surveys. The shrimp survey was run by IMR in April-May from 1981 in the Hopen trench and

the distance between the demersal stations at this survey was 15-20 nm. When this survey was discontinued in 2004, the sampling design of the shrimp survey was maintained in the Hopen area in 2005-2008. The survey design used in the juvenile Greenland halibut and redfish survey, and a shrimp survey west of Spitsbergen was partly maintained in the ecosystem survey. These surveys were depth stratified and the stations were much denser around Svalbard than for the rest of the ecosystem survey. A Russian flatfish survey was included as part of the ecosystem survey in 2006 and 2007 with a denser demersal trawl grid. Investigations in the northwestern part of the Kara Sea were included in the survey in 2009 (Figure 6).

More details on the ecosystem survey can be found in the second volume of the Extended survey report from the joint Norwegian/ Russian ecosystem Survey in the Barents Sea in August-October 2004 (Anon. 2005).



Bottom trawl stations at the ecosystems surveys from 2004-2009.

Figure 6. The bottom trawls taken at the ecosystem survey from 2004-2009. There were in total 3282 stations taken, including 262 stations performed in response to large registrations on the echo sounder (excluded from the data and not shown in the figure). Note that there are some "holes" in the coverage. These are either due to some stations had to be omitted because of time constraints, or that the stations were rejected afterwards because of trouble with the gear (68 hauls, including 16 stations with less than 8 minutes towing time).

2.2.2 Trawling

Fish were sampled with a Campelen 1800 shrimp trawl with a rockhopper gear. The mesh size was 80 mm (stretched) in the front and 16-22 mm in the codend. The horizontal opening was 17 m and the vertical opening was 4-5 m. The standard towing time was 15 minutes at 3 knots, equivalent to a towing distance of 0.75 nautical mile (1390 m), but hauls ranged from 5 minutes to 1 hour.

Our main data is the bottom trawl data. However, some pelagic species (see section 4.3) were not or only poorly sampled by the bottom trawl. For these species we include data from the pelagic trawl used in the 0-group investigations. Distributions from these data were either presented on the same maps as the demersal samples or in separate maps. The pelagic trawling procedure used for the 0-group investigations consists of tows on predetermined positions at 35 nautical miles apart. The pelagic trawl used is a "Harstad" trawl with 20 by 20 m mouth opening, and 7 panels and a cod end. The panels have mesh sizes varying from 100 mm in the first to 30 mm in the last panel, and 7 mm in the cod end. The trawling procedure consists of tows at three or more depths, each of 0.5 nautical miles, with the head-line at 0 m, 20 m and 40 m and with a trawling speed of 3 knots. According to the procedure, additional tows at 60 and 80 m, also of 0.5 nm, were made where a dense concentration of fish was recorded deeper than 40 m depth on the echo-sounder (Anon. 1980).

2.2.3 Sampling and measuring

Both catch numbers and weights were recorded. On Norwegian vessels large catches were subsampled; only a part (e.g. 1/4 or 1/8) was sorted, counted and weighed and the total catch weight and number was then extrapolated from this fraction. All species were length measured, but if the catches were large only a subsample was length measured.

2.3 Species identification

Species identification of difficult species can be time consuming. The workload at the survey has at times been high, which has reduced the time used for species identification and thus the quality of the data.

According to the standard protocols, all fishes should be identified to the species level, except juveniles of redfish (*Sebastes* spp., Sebastidae), that are very difficult to separate and therefore the protocols is to only identity to the species levels for specimens larger than 10 cm. However, some other groups are problematic too. Four families of fish in the Barents Sea are particularly difficult to identify to the species level: Liparidae, Zoarcidae, Cottidae and Rajidae (skates, especially juveniles). Therefore, these groups were in some cases determined only to the family or genus level.

In particurly, there are two species in the genus *Icelus* (Cottidae) which are difficult to separate morphologically and therefore often misidentified. Further, the genera *Careproctus* (Liparidae) and *Gymnelus* (Zoarcidae) are under taxonomic revision (Chernova 1998, 1999, 2005).

2.3.1 Species identification on Russian vessels

According to the procedures, all fish should be identified to the species level. Exceptions are *Careproctus* (where three species were usually identified: long-finned *C. reinhardti* and short-finned *C. microps* and *C. ranula* according to Chernova (1991)), *Liparis* (where only *L.*

fabricii and *L. gibbus* were more or less reliable identified, while other species usually are registered as *Liparis* sp.) and *Gymnelus*. In some cases there were problems with *Lycodes* species identifications too. On board, species identification literature is available and Andriashev (1954) is used. In addition, species identification keys for difficult species groups developed by PINRO based on the latest literature sources are used. Due to the work on species identification that started on PINRO surveys 1997-1998 and because mainly PINRO scientists participated on this survey, Russian data on species identifications can be considered as rather good.

2.3.2 Species identification on Norwegian vessels

According to the procedures, all fish should be identified to the species level. Exceptions are fish from the genus *Careproctus* and juveniles of *Sebastes* (<10 cm). In some instances, when the identification was problematic the staff on board identified also other groups to the family or genus level (in particular Liparidae). The species identification has improved on Norwegian vessels. In the start, the survey was staffed with inexperienced staff and students on some boats. From 2007 onwards, a dedicated annual workshop in species identification was held by taxonomists at IMR. With few exceptions only trained experienced staff was used on the survey after this revision. The workshops are popular and many of the technical staff participates every year.

On board, species identification literature is available, and Pethon (2005) is used on all boats. In addition, species identification keys for difficult species groups developed by Bergen museum, the museum in Copenhagen and by the annual workshop at IMR, are used.

2.3.3 Identified by taxonomists

Species identifications done by taxonomists at IMR and Bergen Museum are marked in the maps for the different species.

For several decades Bergen Museum has obtained fish material from IMR for the collections. This contact was strengthened in 1997 with an emphasis on fish from the Barents Sea and Svalbard areas, and has continued over the period covered by this atlas. Taxonomist from Bergen Museum has participated at the Juvenile Greenland halibut and redfish survey around Svalbard (see 3.1.2) since 2000 and this participation has continued when this survey was included in the ecosystem survey. In 2007, IMR established a routine that certain species which are difficult to identify or not known to the area should be frozen for later identification on shore by taxonomists. We also included specimens identified by Bergen Museum that were sampled prior to the ecosystem survey on surveys run August-September from 2000-2003 (Byrkjedal and Høines 2007).

In Russia unidentified individuals of some taxons (mainly *Careproctus*, *Liparis* and *Gymnelus*) were provided to the Zoological Institute in Sankt Petersburg (ZIN) for further confirmation of identification (not shown on the maps).

2.4 Data preparation

We included bottom trawls taken at the ecosystem survey from 2004-2009. There were in total 3282 stations taken, but 262 stations were excluded because they were carried out in response to large registrations on the echo sounder. We also excluded 68 hauls due to problems with trawling (among these 16 stations with less than 8 minutes towing time).

The raw data was plotted in Google Earth and critically evaluated. We chose to remove some data points based on the following criteria: Recordings of new species to the area were removed if the specimens were not verified by specialists either from photo or from samples. We removed observations that were clearly outside the distribution area, as judged from the overall distribution, the depth and the temperature. We also put less confidence on observations from stations with inexperienced staff. However, it is difficult to evaluate the observations in a consistent and objective manner since e.g. the distribution and depth and temperature preference is unknown for many of these species at this time of year. We therefore chose a conservative approach and removed only 79 out of 35681 recordings. In addition**,** we excluded data on Zoarcidae from Norwegian ships from 2004-2006, because we realised from visualisation in Google Earth that there were large problems with species identification of this family on Norwegian boats before 2007.

We pooled species from the genera *Careproctus* and *Gymnelus*, since they are under taxonomic revision. Furthermore, we pooled species from the genus *Ammodytes* because they are difficult to distinguish and because there are no confirmed observations of *A. tobianus* after 1998. We pooled all Myctophidae since they are in a poor condition after trawling and difficult to identify to the species level. However, we show observations at the species level verified by taxonomists, indicating that most of the Myctophidae in the Barents Sea is *Benthosema glaciale*. Furthermore, we pooled two species from the genus *Icelus* (*I. spatula* and *I. bicornis*), since they are difficult to separate morphologically. Furthermore, we show data on *Cottunculus microps* and *Cottunculus sadko* on the same maps since recent research indicates that these are indeed one species. In addition to maps of the *Sebastes* species, we also provide a map on *Sebastes* spp., representing juveniles.

The catches were standardised to number of individuals per nautical miles towed by dividing by the towed distance (standard tow=15min, equivalent to 0.75 nautical mile, catching 1 individual in a tow corresponds to 1.25 individuals per nautical mile towed). We have not standardising by the width of the trawl (swept area) since the efficient trawl opening will vary from species to species based on their behaviour and their size. The efficient trawl opening has been studied for cod and haddock but not for other species.

Due to the unequal station distance, that also varied by year, we gridded our data into a 35 nm by 35 nm grid with 384 grid cells based on our survey design (Figure 7) and calculated average catch rates per grid cell. These averages are presented in the maps. The maps are made in the Manifold software version 8 (**Manifold® System,** www.manifold.net) and

presented in the projection and layout used for the ecosystem survey reports **(**Albers Conical Equal Area, central Latitude: 75, central longitude: 35)**.**

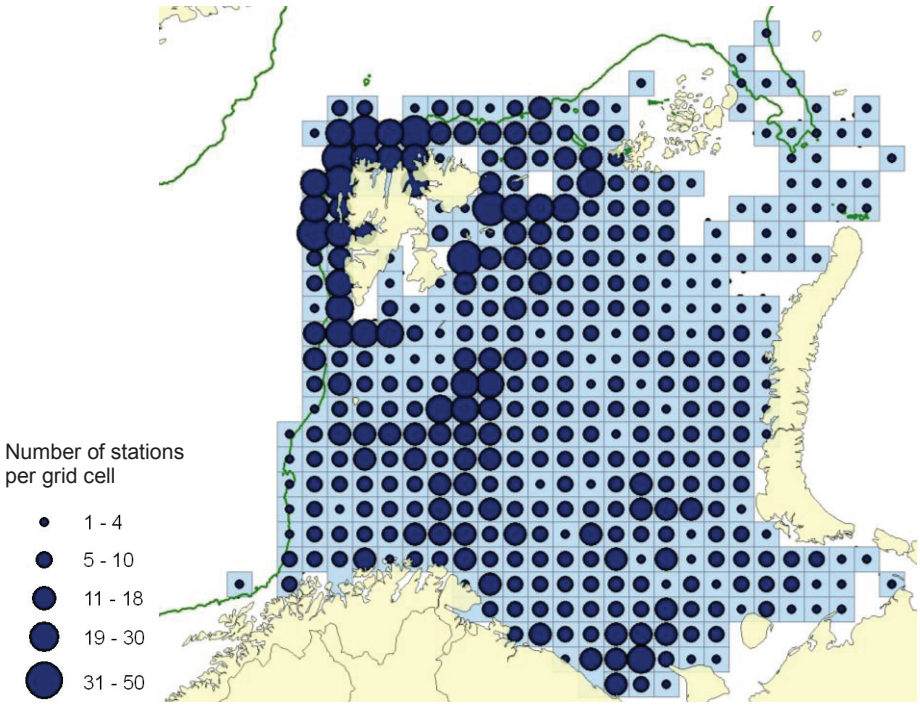


Figure 7. Grid used for the maps. The size of the circles in the grid are proportional to the number of bottom trawl stations within each grid cell from 2004-2009. The green line is the 500 m depth contour often used to delimit the Barents Sea shelf. The grid was made using the North pole stereographic projection with 35°E as central meridian and 75°N as latitude of origin.

3 Limitations

3.1 Species identification

Some of the species groups are very difficult to identify and the staff was sometimes inexperienced. Time constraints on the survey also have influence on quality of the species identification. Species identification and distribution of non-targeted fishes were not the primary goal of the survey, and therefore often not prioritised. Even though we carefully examined our data afterwards, there might be some misidentifications. Furthermore, there is different practice on Russian and Norwegian vessels, traditionally PINRO has had a stronger focus on taxonomy, but in recent years the species identification has improved on IMR vessels, due to dedicated workshops and cooperation with Bergen museum.

3.2 Distribution by season

The fish distribution varies seasonally, and our maps show the distribution in summer/autumn which can be very different from the distribution in winter, e.g. for species like capelin and cod. The period study here (August-September) is the main feeding period for migratory species which migrates northwards form spring to autumn. Since the study years have been exceptionally warm, the distribution of many of the warmer water migrating species shown here has been the northernmost and easternmost recorded in the Barents Sea.

3.3 Catchability issues and additional species observed

Our main source of data was demersal trawl catches. The demersal trawl samples species and individuals associated with the bottom. In addition, we have data from pelagic trawls sampling the upper part of the water column and down to 60 m, and for a few species we have acoustic data, representing most of the water column except the upper surface and the area closest to the bottom (acoustic blind zone).

For capelin, herring and polar cod we included additional maps based on acoustics. Further, we included pelagic trawl data for additional 14 species poorly sampled by the bottom trawl. Some of these species (*Belone belone*, *Eutrigla gurnardus*, *Schedophilus medusophagus*, *Scomber scombrus*, *Trachipterus arcticus*) were caught only in pelagic tows during our survey. Exclusion of these data would result in loss of interesting information on new species findings in the Barents Sea. For other mostly pelagic species (*Ammodytes* spp., *Arctozenus risso*, *Cyclopterus lumpus*, *Entelurus aequoreus*, *Lethenteron camtschaticum*, *Maurolicus muelleri*, Myctophidae, *Salmo salar*, *Somniosus microcephalus*) we included pelagic trawl data in addition to the demersal tows because this gives a more complete distribution.

The demersal trawl catches of various species differ according to the size of the fishes, their vertical migration and their behaviour. For most species we do not know the catchability and how it varies, e.g. with size. Consequently we only capture an unknown proportion of each species, and most likely the smaller specimens are probably underrepresented in our demersal

trawl samples. Besides, some coastal fish species like *Pholis gunnellus*, *Chirolophis ascanii* and *Zoarces viviparus*, are only found in shallow areas (usually <20-30 m). There is very restricted trawling at these depths during the survey and thus these shallow water species are poorly sampled.

One species was registered only by visual observation. A basking shark (*Cetorhinus maximus*) was seen near a Norwegian vessel southwest of Bear Island in 2006 (Anon., 2006). This is one of the northernmost records of this species.

We have not included data from 2010 in our maps. It should also be noted that one specimen of sea lamprey (*Petromyzon marinus*) with a length of 73 cm occurred in the survey in 2010 at 74º37' N 23º59' E).

4 Species descriptions and maps

4.1 List of species included

Order	Family	Species	Page
Petromyzontiformes	Petromyzontidae	*Lethenteron camtschaticum*	24
Squaliformes	Dalatiidae	*Etmopterus spinax*	26
		Somniosus microcephalus	28
Rajiformes	Arhynchobatidae	*Bathyraja spinicauda*	30
	Rajidae	*Amblyraja hyperborea*	33
		Amblyraja radiata	35
		Dipturus linteus	38
		Rajella fyllae	40
Chimaeriformes	Chimaeridae	*Chimaera monstrosa*	43
Anguilliformes	Synaphobranchidae	*Diastobranchus capensis*	45
Clupeiformes	Clupeidae	*Clupea harengus*	47
		Clupea pallasii suworowi	50
Osmeriformes	Argentinidae	*Argentina silus*	52
	Microstomatidae	*Nansenia groenlandica*	54
	Osmeridae	*Mallotus villosus*	56
		Osmerus eperlanus	59
Salmoniformes	Salmonidae	*Salmo salar*	61
Stomiiformes	Sternoptychidae	*Maurolicus muelleri*	63
Aulopiformes	Paralepididae	*Arctozenus risso*	66
Myctophiformes	Myctophidae	*Benthosema glaciale*	69
		Lampanyctus macdonaldi	69
		Notoscopelus kroyeri	69
Lampriformes	Trachipteridae	*Trachipterus arcticus*	72
Gadiformes	Macrouridae	*Coelorinchus labiatus*	74
		Coryphaenoides rupestris	76
		Macrourus berglax	78
	Gadidae	*Arctogadus glacialis*	80
		Boreogadus saida	82
		Eleginus nawaga	85
		Gadiculus argenteus	87
		Gadus morhua	89
		Melanogrammus aeglefinus	92
		Merlangius merlangus	95
		Micromesistius poutassou	97
		Pollachius pollachius	100
		Pollachius virens	102
		Trisopterus esmarkii	105
	Lotidae	*Brosme brosme*	107
		Enchelyopus cimbrius	109
		Gaidropsarus argentatus	111
		Molva molva	113
	Phycidae	*Phycis blennoides*	115

Order	Family	Species	Page
Gadiformes cont.	Merlucciidae	*Merluccius merluccius*	117
Lophiiformes	Lophiidae	*Lophius piscatorius*	119
Beloniformes	Belonidae	*Belone belone*	121
Gasterosteiformes	Gasterosteidae	*Gasterosteus aculeatus*	123
		Pungitius pungitius	125
Syngnathiformes	Syngnathidae	*Entelurus aequoreus*	127
Scorpaeniformes	Sebastidae	*Sebastes marinus*	130
		Sebastes mentella	133
		Sebastes viviparus	136
		Sebastes spp.	138
	Triglidae	*Eutrigla gurnardus*	139
	Cottidae	*Artediellus atlanticus*	141
		Artediellus scaber	143
		Gymnocanthus tricuspis	145
		Icelus spp.	147
		Myoxocephalus scorpius	149
		Triglops murrayi	151
		Triglops nybelini	153
		Triglops pingelii	155
	Psychrolutidae	*Cottunculus microps*	157
	Agonidae	*Agonus cataphractus*	159
		Aspidophoroides olrikii	161
		Leptagonus decagonus	163
	Cyclopteridae	*Cyclopterus lumpus*	165
		Eumicrotremus derjugini	168
		Eumicrotremus spinosus	170
	Liparidae	*Careproctus* spp.	172
		Liparis bathyarcticus	174
		Liparis fabricii	176
		Liparis tunicatus	178
		Paraliparis bathybius	180
		Rhodichthys regina	182
Perciformes	Zoarcidae	*Gymnelus* spp.	184
		Lycenchelys kolthoffi	186
		Lycenchelys muraena	188
		Lycodes adolfi	190
		Lycodes esmarkii	192
		Lycodes eudipleurostictus	194
		Lycodes frigidus	196
		Lycodes gracilis	198
		Lycodes luetkenii	200
		Lycodes paamiuti	202
		Lycodes pallidus	204
		Lycodes polaris	206
		Lycodes reticulatus	208

Order	Family	Species	Page
Perciformes cont.	Zoarcidae cont.	*Lycodes rossi*	210
		Lycodes seminudus	212
		Lycodes squamiventer	214
		Lycodonus flagellicauda	216
	Stichaeidae	*Anisarchus medius*	218
		Leptoclinus maculatus	220
		Lumpenus fabricii	222
		Lumpenus lampretaeformis	224
	Anarhichadidae	*Anarhichas denticulatus*	226
		Anarhichas lupus	229
		Anarhichas minor	232
	Ammodytidae	*Ammodytes* spp.	234
	Scombridae	*Scomber scombrus*	237
	Centrolophidae	*Schedophilus medusophagus*	239
Pleuronectiformes	Scophthalmidae	*Lepidorhombus whiffiagonis*	241
		Phrynorhombus norvegicus	243
	Pleuronectidae	*Glyptocephalus cynoglossus*	245
		Hippoglossoides platessoides	247
		Hippoglossus hippoglossus	249
		Limanda limanda	251
		Liopsetta glacialis	253
		Microstomus kitt	255
		Pleuronectes platessa	257
		Reinhardtius hippoglossoides	259

Lethenteron camtschaticum (Tilesius 1811)

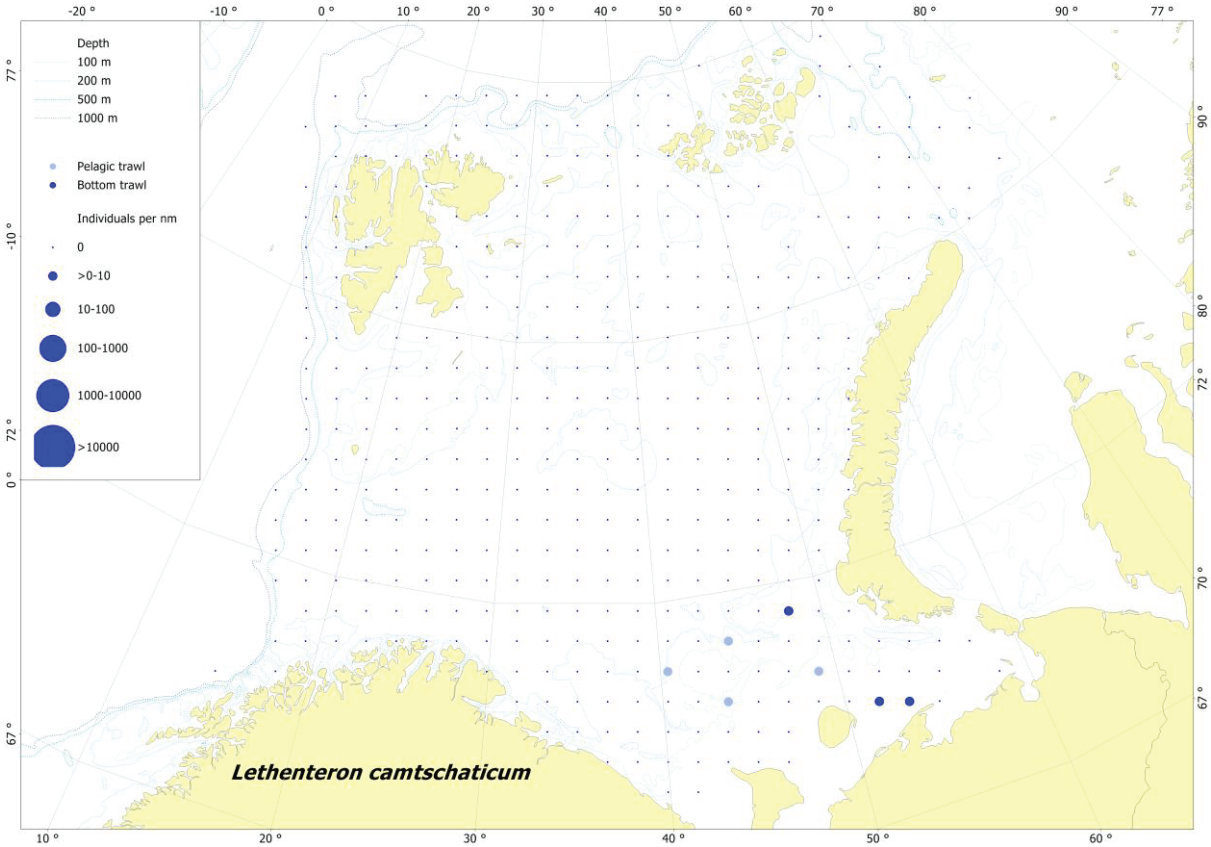
Family: Petromyzontidae
English name: Arctic lamprey
Norwegian name: arktisk niøye
Russian name: японская минога
(yaponskaya minoga)

Photo: PINRO

Spatial distribution

Anadromous species known from northeastern Norway eastward to the Bering Sea, and the northwestern Pacific Ocean.

Found in the southeastern part of the surveyed area.



Length composition

Four specimens (34-36 cm, mean length 34.8 cm) were caught by bottom trawl and four (29-37 cm, mean length 33.5 cm) by pelagic trawl.

Life history

Mainly boreal, anadromous, some landlocked populations in Asia and North America, migrating only in rivers. Maximum length in its western distribution area 25-30 cm, up to 62.5 cm in the Sea of Japan. Parasite on different types of marine and freshwater fishes. Depending on size females spawn 80 000-107 000 eggs in rivers in autumn and winter, all specimens die after spawning. Juveniles migrate to sea after transformation, where coastlands are the nursery grounds.

Population and exploitation

Of no economic importance.

References

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Vladykov VD. 1984. Petromyzonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 64-67

***Etmopterus spinax* (Linnaeus 1758)**

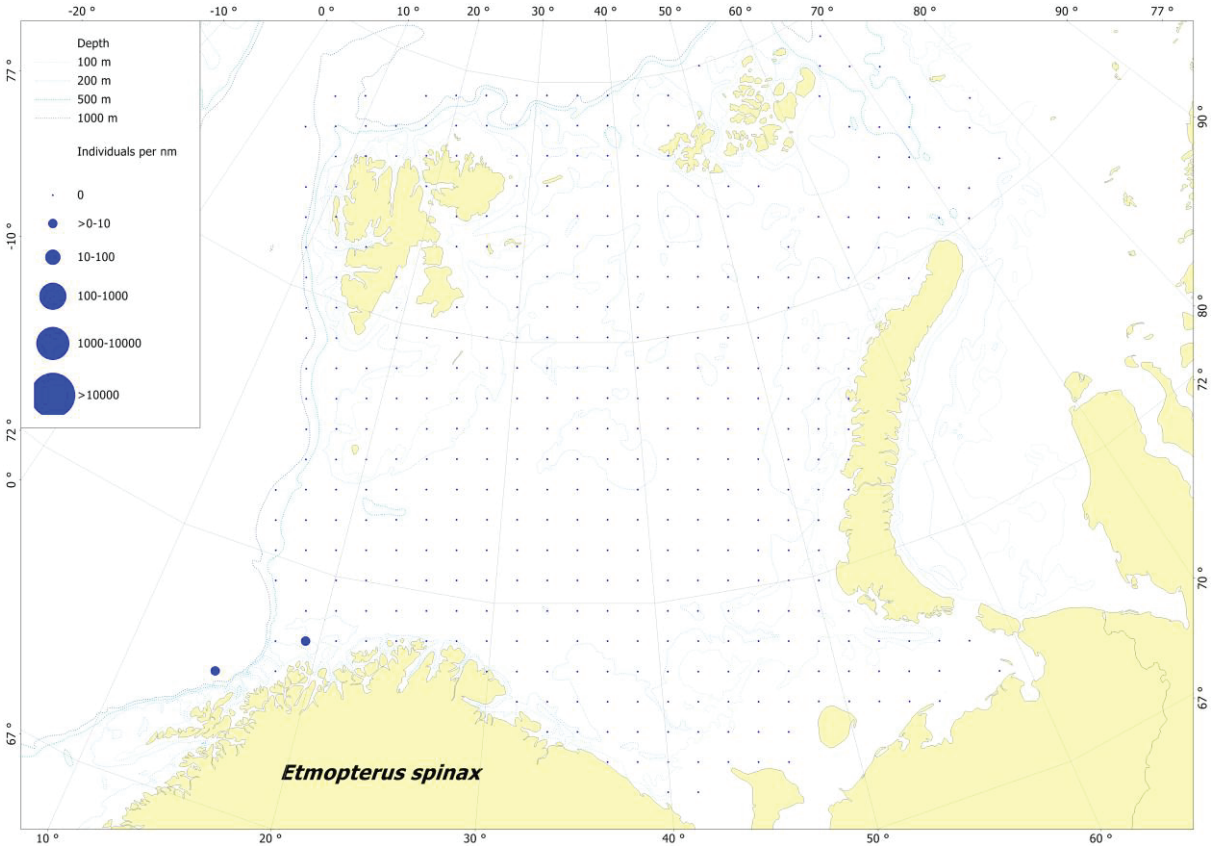
Family: Dalatiidae
English name: velvet belly
Norwegian name: svarthå
Russian name: черная колючая акула
(tchernaya koliutchay akula)

Photo: Rupert Wienerroither

Spatial distribution

Known from Senegal to Iceland and northern Norway, the western Mediterranean and off southern Africa.

Found in the southwestern part of the surveyed area.



Length composition

Four specimens (31-50 cm, mean length 40.0 cm) were caught.

Life history

Widely distributed, demersal on soft bottom, common on the continental shelf and in deep fjords at depths of 200-500 m. Specimens occur shallower in the northern distribution area then further south. Females can reach 60 cm, males 50 cm, but more than 40 cm are uncommon. Shows size-depth stratification, with larger specimens occurring deeper. Feeds on small fishes, cephalopods and crustaceans. Ovoviviparous; 6-20 young are born in summer, 12-14 cm long.

Population and exploitation

Uncommon in the Barents Sea. Of no economic importance, but a common bycatch in both longline and trawl fishery. Catch rate has declined by about 20 % between the 1970 and 1998-2004 in the Northeast Atlantic and the North Sea.

References

Compagno LJV. 1984. FAO species catalogue. Sharks of the world. An annotatedand illustrated catalogue of shark species known to date. Part 1 Hexanchiformes to Lamniformes. FAO Fisheries Synopsis No 125, Vol.4, Pt.1:249 pp

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

Somniosus microcephalus (Bloch & Schneider 1801)

Family: Dalatiidae
English name: Greenland shark
Norwegian name: håkjerring
Russian name: полярная акула
(polyarnaya akula)

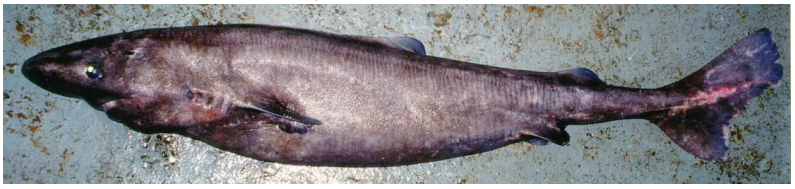
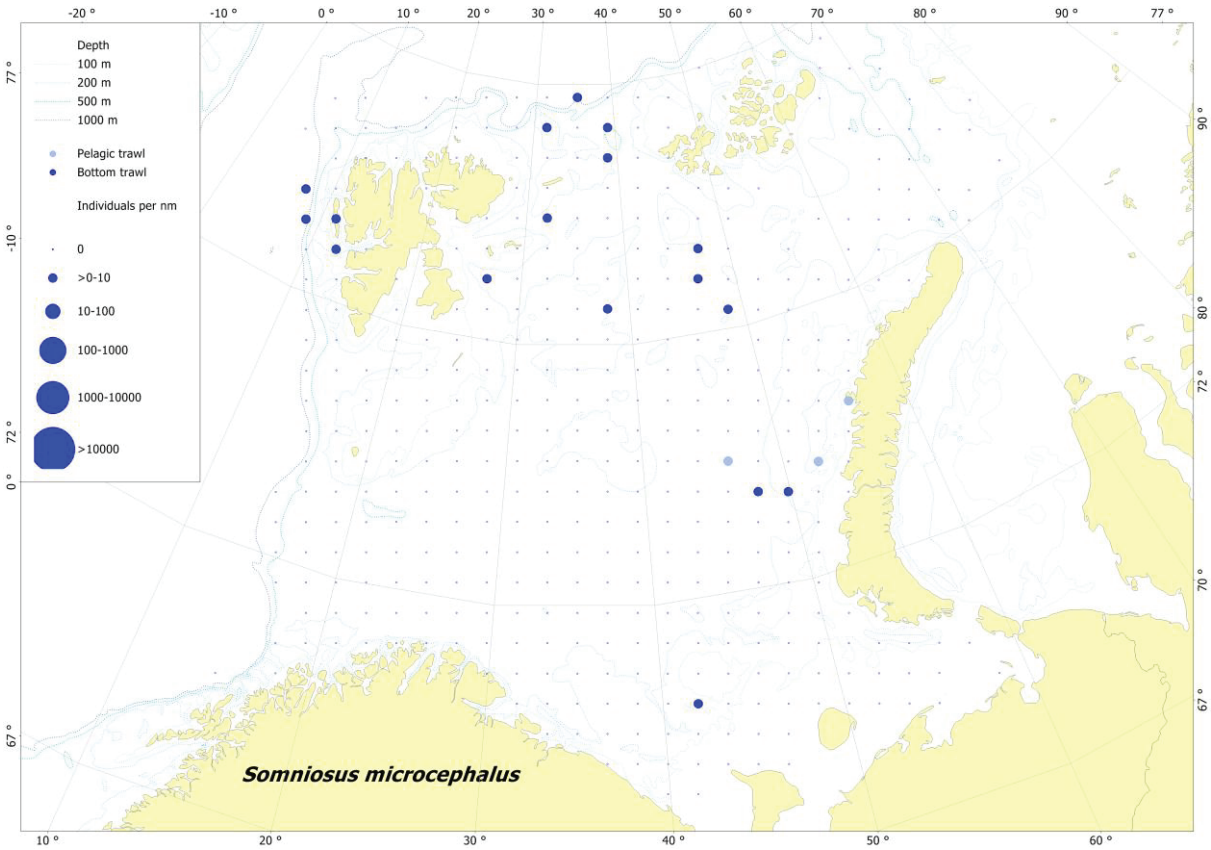


Photo: Andrey Dolgov

Spatial distribution

Known from the British Isles northward in the whole Norwegian and Greenland Sea to the Barents, Kara and White Sea; also in the western North Atlantic and in the South Atlantic and Antarctic.

Found in colder water masses of the surveyed area.



Length composition

18 specimens (131-416 cm, mean length 276 cm) were caught by bottom trawl and three (207, 262 and 276 cm) by pelagic trawl.

Life history

Mainly boreal, usually demersal on muddy bottom and common at depths of 200-600 m, but also found down to 1200 m and near the surface in arctic areas. Prefers 0-2 ºC, tolerates temperatures up to 7 ºC. Can reach 8 m (but 244-427 cm are more common) and up to 1400 kg, females grow larger than males. Growth rates very low, maximum age and maturation age high, therefore vulnerable for accumulation of PCB and other environmental toxins. Feeds on various fish and large bottom invertebrates, near the surface also on birds, mammals and fish offal from fishing boats. Ovoviviparous, females bear about 10 young, 40-70 cm long. Extensive migrations in the Barents Sea, occurs near the Norwegian and Murman coast during the winter and spring, before migrating northward to Bear Island and Svalbard/Spitsbergen.

Population and exploitation

Catch rates of the species in the Northeast Atlantic are very low. Listed on the Norwegian Red list 2010 as 'near threatened', the decline in populationsize is expected to continue.

Historically a highly targeted species, especially for its large liver rich in vitamin A. Nowadays no direct fishing, but taken as bycatch.

References

Compagno LJV. 1984. FAO species catalogue. Sharks of the world. An annotatedand illustrated catalogue of shark species known to date. Part 1 Hexanchiformes to Lamniformes. FAO Fisheries Synopsis No 125, Vol.4, Pt.1:249 pp

Gjøsæter J, Hesthagen T, Borgstrøm R, Brabrand Å, Byrkjedal I, Christiansen JS, Nedreaas K, Pethon P, Uiblein F, Vøllestad LA, Wienerroither R. 2010. Fisker – Pisces. In: Kålås JA, Viken Å, Henriksen S, Skjelseth S. (eds) The 2010 Norwegian Red List for Species. Norwegian Biodiversity Information Centre, Norway, pp 403-412

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Strid A, Jörundsdóttir H, Päpke O, Svavarsson J, Bergman Å. 2007. Dioxins and PCBs in Greenland shark (*Somniosus microcephalus*) from the North-East Atlantic. Marine Pollution Bulletin 45:1514-1522

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

Bathyraja spinicauda (Jensen 1914)

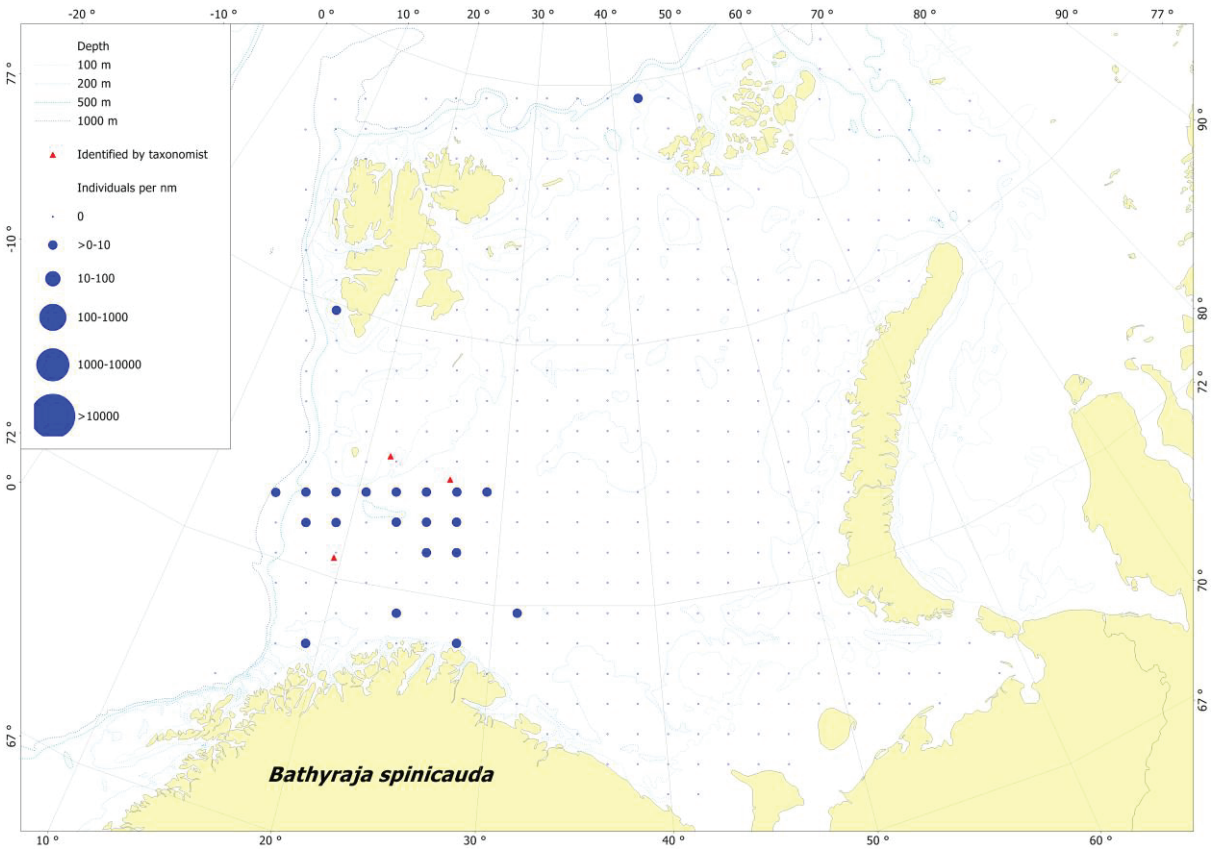
Family: Arhynchobatidae
English name: spinetail ray
Norwegian name: gråskate
Russian name: шипохвостый скат
(shypokhovstiy skat)

Photo: Andrey Dolgov

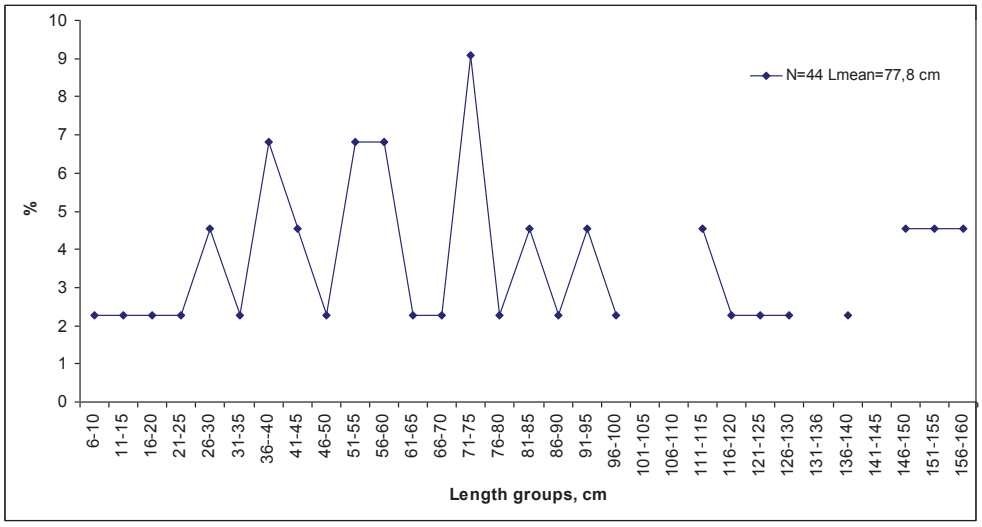
Spatial distribution

Known from the northern North Sea to the Barents Sea, also off Iceland and Greenland and in the western North Atlantic.

Found in deeper areas in the western part of the surveyed area.



Length composition



Life history

Mainly boreal, demersal at 160-2000 m, most common deeper than 400 m. Prefers temperatures above 2 ºC and higher salinity. Reaches up to 172 cm and about 40 kg. Feeds on fish and large crustaceans. Oviparous, low fecundity. Demersal egg cases are probably laid during summer and measure about 13 by 9 cm, the young hatch after about one year.

Population and exploitation

Non-targeted. Based on Russian annual surveys between 1999 and 2003 the average biomass of the species in the Barents Sea was estimated to 810 tonnes. Hardly reproducing in the Barents Sea, stock is maintained by migrations from southern areas.

Data from surveys (1997-2009) along the slope between the Barents Sea shelf and the Norwegian Sea as well as in the polar basin show that this species is uncommon. Vulnerable to fishing since it is a common bycatch species in the slope fishery for Greenland halibut. There are no clear trends in population size recognizable but abundance is low and it is listed on the Norwegian Red list 2010 as 'near threatened'.

References

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Skates. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 265-274 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Drevetnyak KV, Dolgov AV, Sokolv KM, Gusev EV, Grekov AA. 2005. Skates in the Barents Sea: stock status and catch by fishing fleet. ICES Document CM 2005/N:11, 7 pp

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Gjøsæter J, Hesthagen T, Borgstrøm R, Brabrand Å, Byrkjedal I, Christiansen JS, Nedreaas K, Pethon P, Uiblein F, Vøllestad LA, Wienerroither R. 2010. Fisker – Pisces. In: Kålås JA, Viken Å, Henriksen S, Skjelseth S. (eds) The 2010 Norwegian Red List for Species. Norwegian Biodiversity Information Centre, Norway, pp 403-412

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stehmann M, Bürkel DL. 1984. Rajidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 163-196

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

***Amblyraja hyperborea* (Collett 1879)**

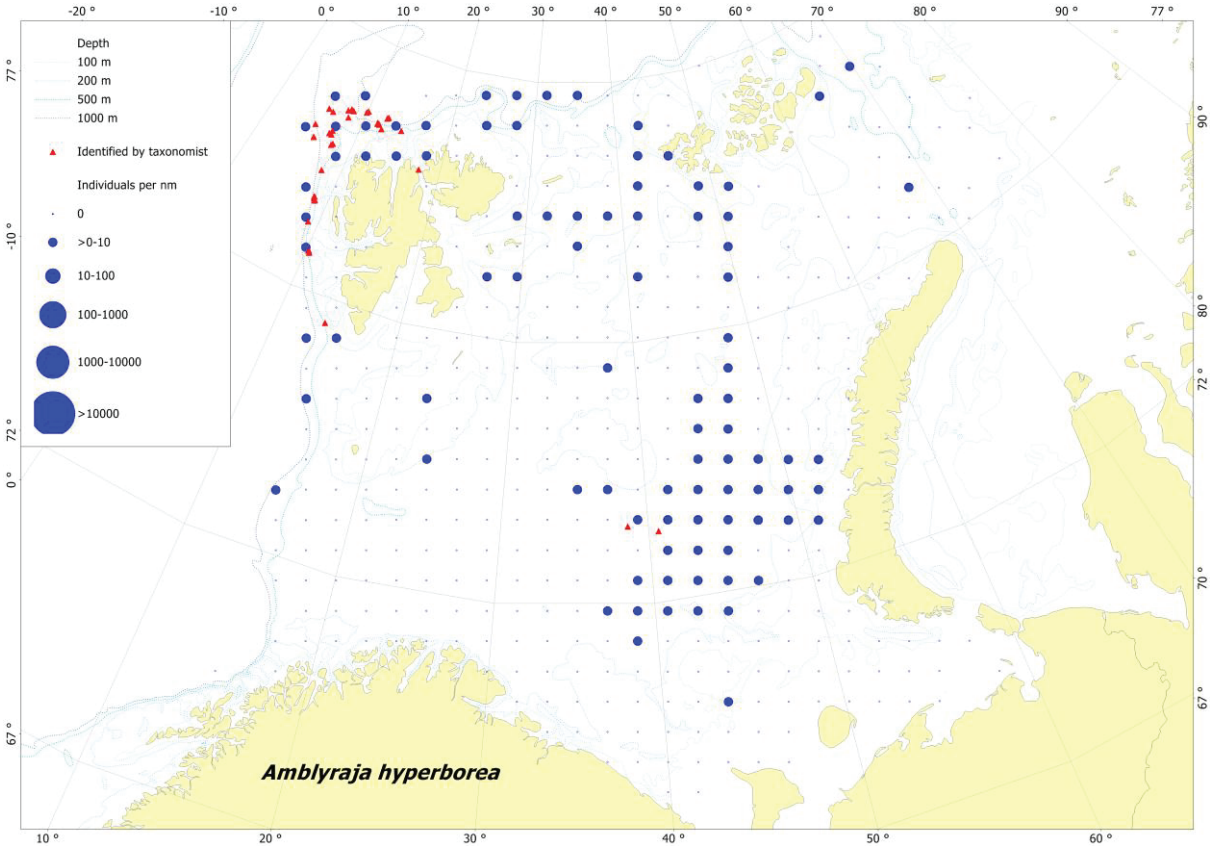
Family: Rajidae
English name: Arctic skate
Norwegian name: isskate
Russian name: северный скат
(severniy skat)

Photo: Thomas. de Lange Wenneck

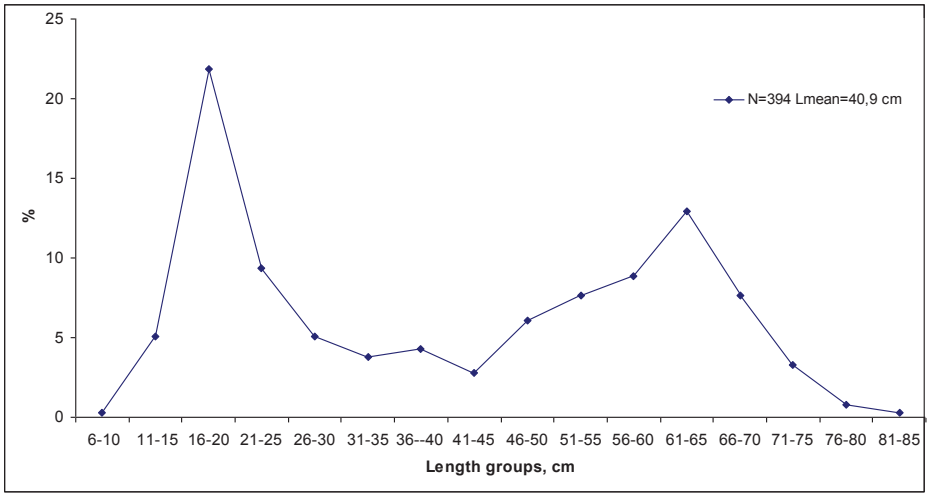
Spatial distribution

Known from Iceland and the Faroese Islands northward to the Barents Sea and the Svalbard/Spitsbergen archipelago, also in the western North Atlantic, off South Africa, southern Australia and New Zealand, in the Southwest and East Pacific.

Found in deeper waters along the shelf edge towards the Norwegian Sea and Polar basin, and in Arctic water in the deeper parts of the eastern Barents Sea.



Length composition



Life history

Arctic, demersal on muddy bottom at 280-2460 m (deeper in its southern distribution area) in cold water (mainly between -1.0 and +1.5 ºC). Reaches at least 92 cm and 5.2 kg. Feeds on demersal and pelagic crustaceans as well as on fishes. Oviparous, egg cases measure 8-12.5 by 5-8 cm, the young 15-16 cm when hatched.

Population and exploitation

Based on Russian annual surveys between 1997 and 2003 the average biomass in the Barents Sea was estimated to approximately 3 000 tonnes. Of no economic importance, bycatch in trawl and long-line fisheries, but due to living in great depths less affected.

References

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Skates. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 265-274 (in Russian)

Dolgov AV, Grekov AA, Shestopal IP, Sokolov KM. 2005. By-catch of Skates in Trawl and Long-Line Fisheries in the Barents Sea. Journal of Northwest Atlantic Fishery Science, 35:357-366

Drevetnyak KV, Dolgov AV, Sokolv KM, Gusev EV, Grekov AA. 2005. Skates in the Barents Sea: stock status and catch by fishing fleet. ICES Document CM 2005/N:11, 7 pp

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM. (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

Amblyraja radiata (Donovan 1808)

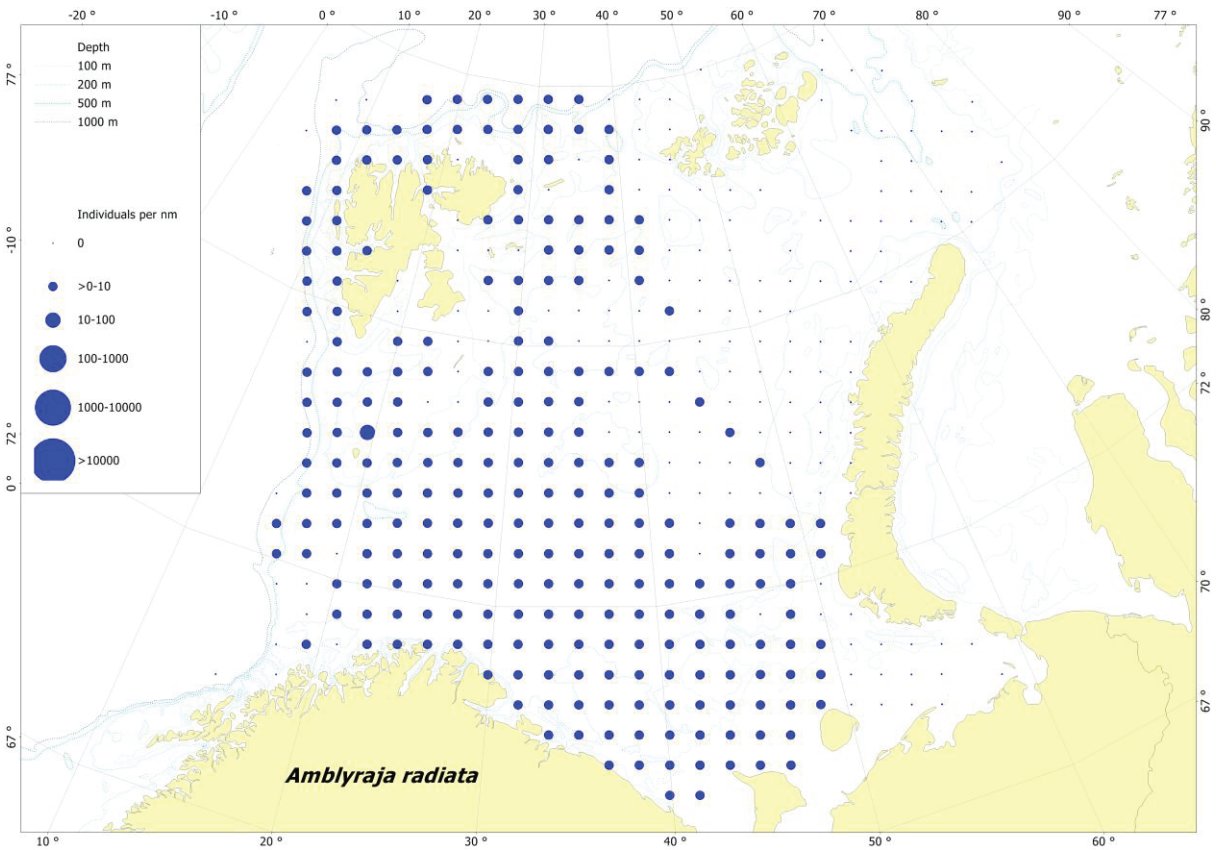
Family: Rajidae
English name: starry ray
Norwegian name: kloskate
Russian name: звездчатый скат
(zvezdtchatiy skat)

Photo: Thomas de Lange Wenneck

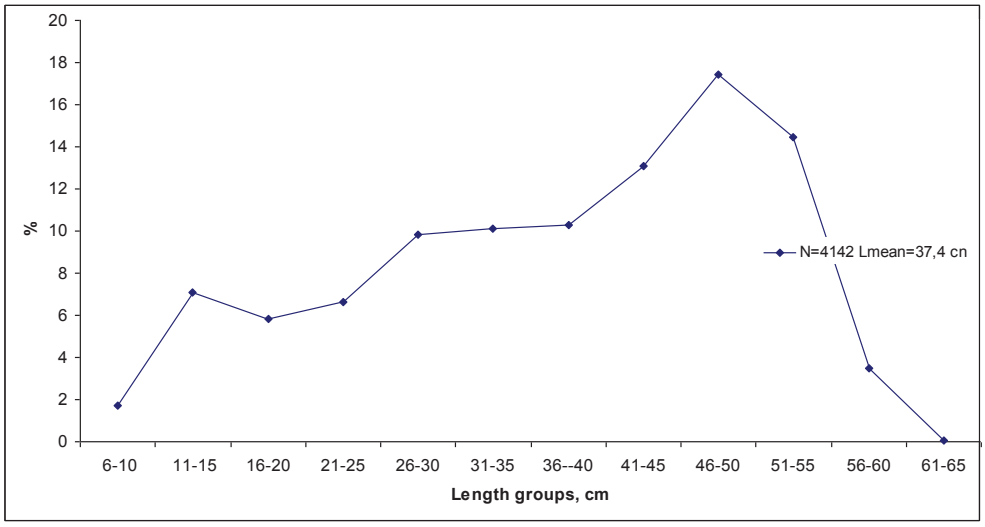
Spatial distribution

Known from the British Isles northward to Svalbard/Spitsbergen, the Barents and the White Sea; also off Iceland, Greenland and in the western North Atlantic.

Widely distributed in the surveyed area, except in arctic waters.



Length composition



Life history

Mainly boreal, demersal on sandy and muddy bottom at 20-400 m, known down to 1000 m in arctic latitudes, also common in fjords. Prefers temperatures from -1 to +8 ºC (most common at 1-4 ºC). Reaches up to 90 cm, 17 kg (in the Barents Sea commonly up to 65 cm and 3.2 kg), and 20 years. Most of the specimens larger than 40 cm have reached maturity. Feeds on benthic and pelagic fish and crustaceans. In spring mature females migrate to coastal areas, followed by mature males. 15-20 egg cases are disposed at a time, with a disposal peak in March-August. Egg cases measure 4-7 by 2.5-5 cm, 9-11 cm long young hatch after 16-20 weeks, but observations under aquarium conditions showed incubation period of up to 2-2.5 years.

Population and exploitation

Based on Russian annual surveys between 1997 and 2003 the average biomass of the species in the Barents Sea was estimated to 98 000 tonnes. The most common of all skate species occurring in the Barents Sea and the stock is in stable condition.

Of no economic importance. A common bycatch species, 200-1 500 tonnes were caught in Russian bottom trawl fisheries during the past years.

References

Berestovskiy EG. 1990. Feeding in the skates, *Raja radiata* and *Raja fyllae*, in the Barents and Norwegian Seas. Journal of Ichthyology 29:88-96

Berestovskiy EG. 1994. Reproductive biology of skates from family Rajidae in high North seas. Voprosy ikhtyologii 34:212-218 (in Russian)

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Skates. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 265-274 (in Russian)

Dolgov AV, Grekov AA, Shestopal IP, Sokolov KM. 2005. By-catch of Skates in Trawl and Long-Line Fisheries in the Barents Sea. Journal of Northwest Atlantic Fishery Science, 35:357-366

Drevetnyak KV, Dolgov AV, Sokolv KM, Gusev EV, Grekov AA. 2005. Skates in the Barents Sea: stock status and catch by fishing fleet. ICES Document CM 2005/N:11, 7 pp

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stehmann M, Bürkel DL. 1984. Rajidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 163-196

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

Dipturus linteus (Fries 1838)

Family: Rajidae
English name: sailray
Norwegian name: hvitskate
Russian name: парусный скат
(parusniy skat)

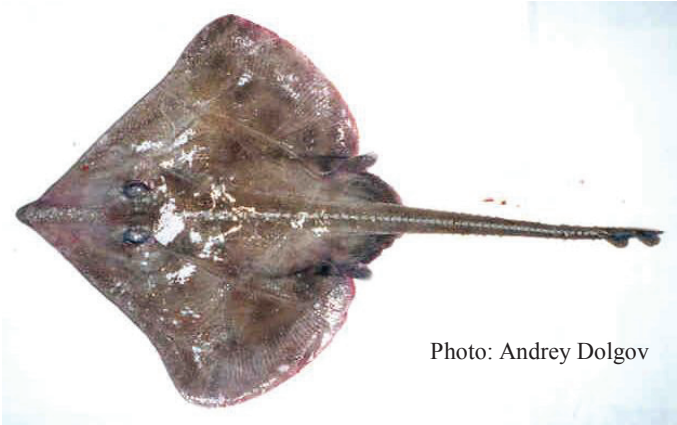
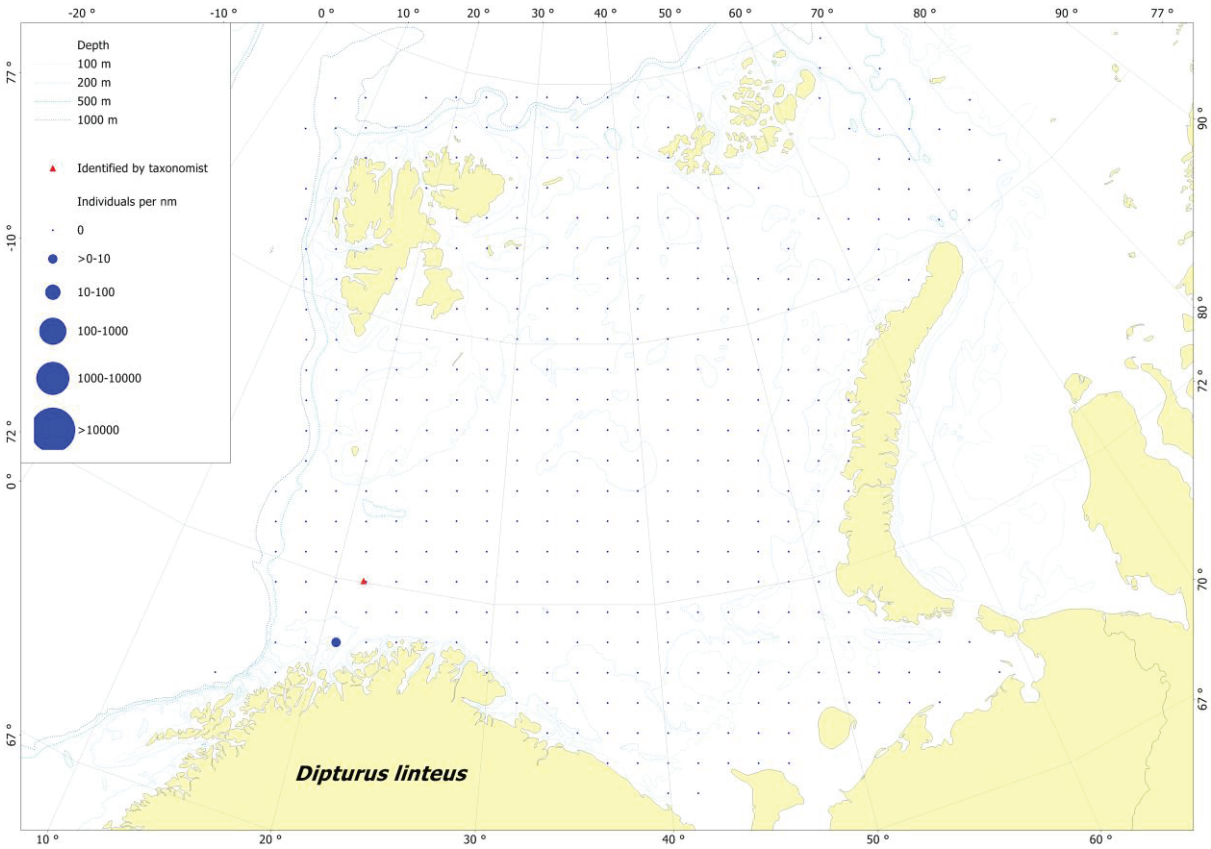


Photo: Andrey Dolgov

Spatial distribution

Known from Iceland westward to the Norwegian coast, also off western Greenland.

Found in the southwestern part of the surveyed area.



Length composition

Nine specimens (12-77 cm, mean length 49.4 cm) were caught.

Life history

Boreal, demersal on soft bottom at 150-1900 m, commonly deeper than 400 m, prefers higher temperatures (4-6 ºC) and salinities. Reaches up to 124 cm, males mature at length 100 cm. Feeds on a variety of demersal crustaceans and fishes. Oviparous, egg cases measure about 11 by 8 cm.

Population and exploitation

Catches of this species are rare, and it is suggested that the majority occurs in deeper waters than usually surveyed and fished. Of no economic importance. Bycatch in trawl and long-line fisheries along the continental shelf slope between the Norwegian coast and the Svalbard/Spitsbergen archipelago.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Skates. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 265-274 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Dolgov AV, Grekov AA, Shestopal IP, Sokolov KM. 2005. By-catch of Skates in Trawl and Long-Line Fisheries in the Barents Sea. Journal of Northwest Atlantic Fishery Science, 35:357-366

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stehmann M, Bürkel DL. 1984. Rajidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 163-196

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

***Rajella fyllae* (Lütken 1887)**

Family: Rajidae
English name: round ray
Norwegian name: rundskate
Russian name: круглый скат
(krugliy skat)

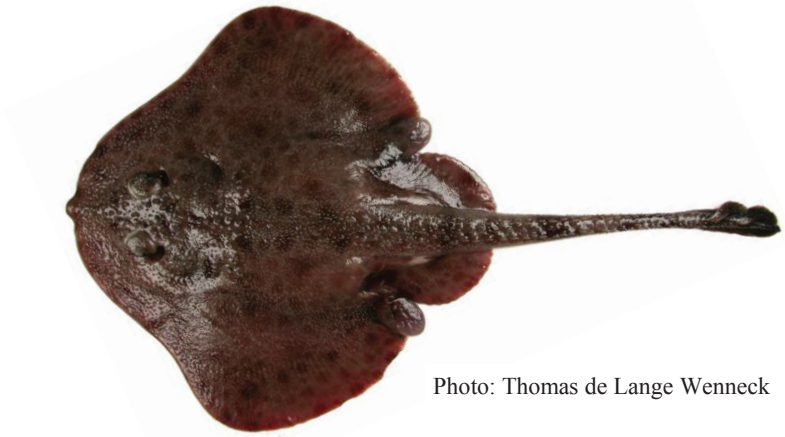
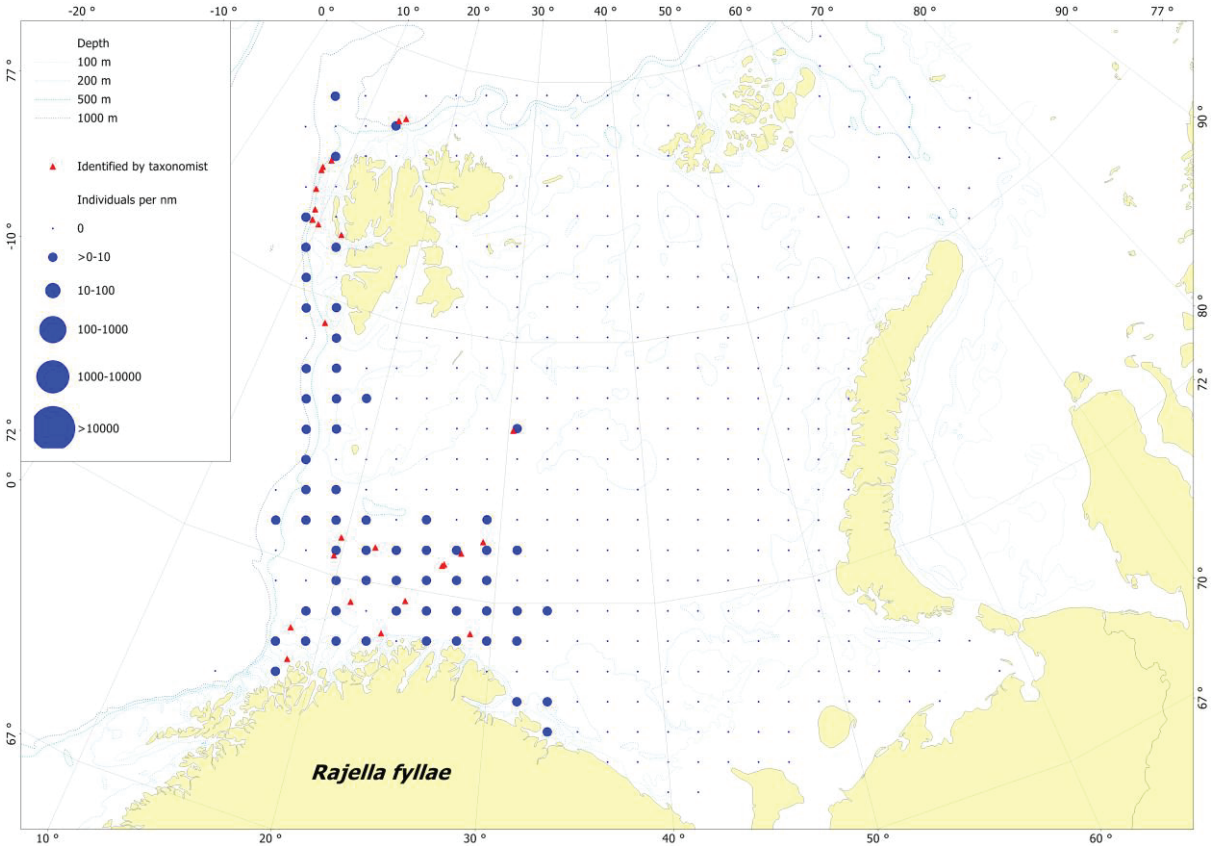


Photo: Thomas de Lange Wenneck

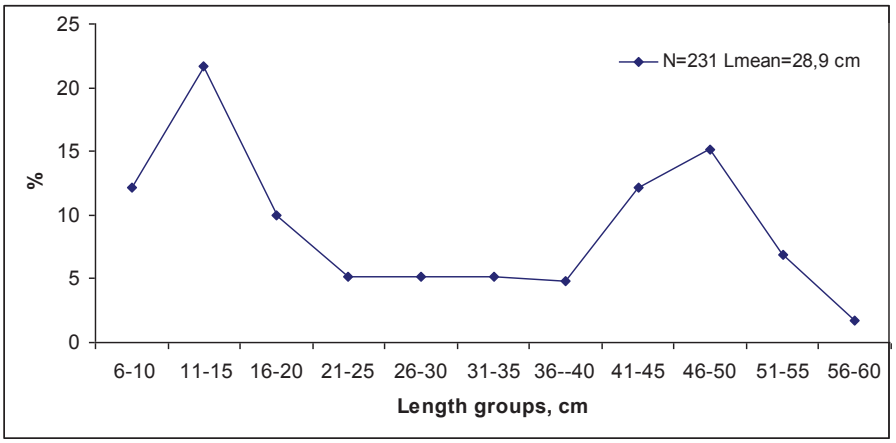
Spatial distribution

Known from Iceland eastward, along the whole Norwegian coast, northward to the Barents Sea, also west of the British Isles and in the western North Atlantic.

Found in warm water areas in the southwestern part of the surveyed area and along the slope west of Svalbard/Spitsbergen.



Length composition



Life history

Boreal, demersal along the continental slope at 170-2050 m, most common between 300-800 m, prefers temperatures above 2 ºC and high salinities. Reaches up to 68 cm, in the Barents Sea up to 52 cm and 925 g. Feeds on small demersal animals, preferring invertebrates. Oviparous; egg cases measure about 4.2 by 2.5 cm, newly hatched young about 7 cm. Egg capsules are biconvex, observations under aquarium conditions showed an incubation period of up to 1-1.5 years.

Population and exploitation

Based on Russian annual surveys between 1997 and 2003 the average biomass of the species in the Barents Sea was estimated to 1 400 tonnes.

Taken as bycatch in trawl and longline fisheries, but of no economic importance and discarded. Due to the wide depth range, the population is considered to be stable.

References

Berestovskiy EG. 1990. Feeding in the skates, *Raja radiata* and *Raja fyllae*, in the Barents and Norwegian Seas. Journal of Ichthyology 29:88-96

Berestovskiy EG. 1994. Reproductive biology of skates from family Rajidae in high North seas. Voprosy ikhtyologii 34:212-218 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Skates. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 265-274 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Dolgov AV, Grekov AA, Shestopal IP, Sokolov KM. 2005. By-catch of Skates in Trawl and Long-Line Fisheries in the Barents Sea. Journal of Northwest Atlantic Fishery Science, 35:357-366

Drevetnyak KV, Dolgov AV, Sokolv KM, Gusev EV, Grekov AA. 2005. Skates in the Barents Sea: stock status and catch by fishing fleet. ICES Document CM 2005/N:11, 7 pp

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM. (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing, pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Skjæraasen JE, Bergstad OA. 2001. Notes on the distribution and length composition of *Raja lintea*, *R. fyllae*, *R. hyperborea* and *Bathyraja spinicauda* (Pisces: Rajidae) in the deep northeastern North Sea and on the slope of the eastern Norwegian Sea. ICES Journal of Marine Science 58:21-28

Stehmann M, Bürkel DL. 1984. Rajidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 163-196

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science, 65:1161-1174

Chimaera monstrosa Linnaeus 1758

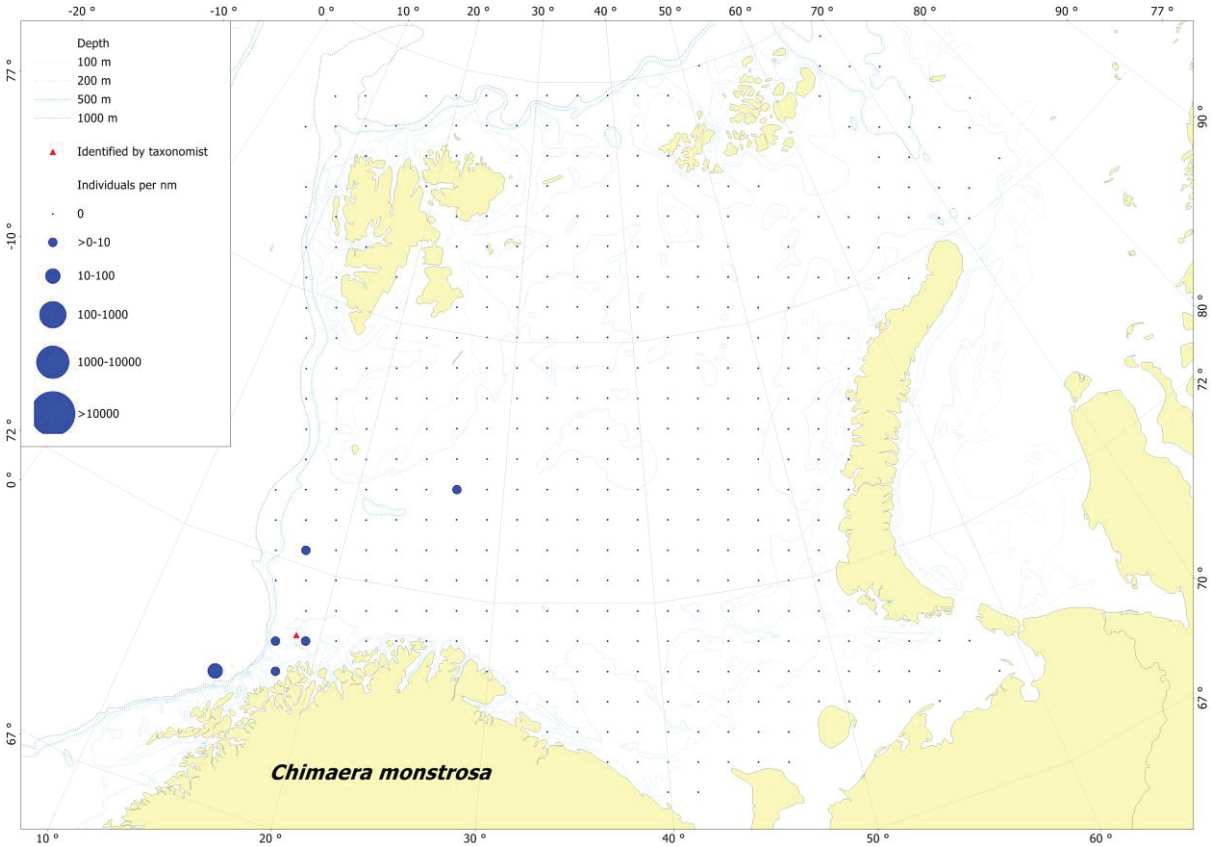
Family: Chimaeridae
English name: rabbit fish
Norwegian name: havmus
Russian name: европейская химера
(evropeyskaya khimera)

Photo: Andrey Dolgov

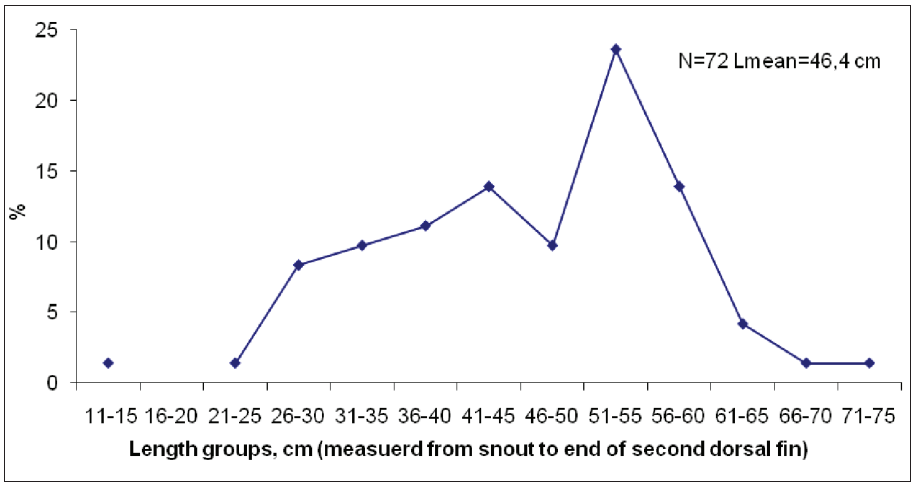
Spatial distribution

Known from northwestern Africa northward to Iceland and the southern Barents Sea, also in the Mediterranean.

Found in the deeper southwestern part of the surveyed area.



Length composition



Life history

Boreal, benthopelagic, preferring soft bottom on the upper continental slope. During winter most common at depths of 300-500 m, found deeper in its southern distribution area and performing inshore migrations to 40-100 m depth during summer in its northern distribution area. Can reach 1.5 m (including caudal filament) and 2.5 kg, females grow larger than males. Feeds on bottom invertebrates (echinoderms, crustaceans, mollusks) and small fish. Oviparous with internal fertilization, each ovary contains about 100 eggs, but not all develop. Egg capsules are slender (16-18 by 3 cm) and deposited in spring and summer in shallow waters. Juveniles are about 11 cm long when hatched and similar in appearance to adults.

Population and exploitation

Common bycatch species with low economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stehmann M, Bürkel DL. 1984. Chimaeridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 212-215

Diastobranchus capensis Barnard 1923

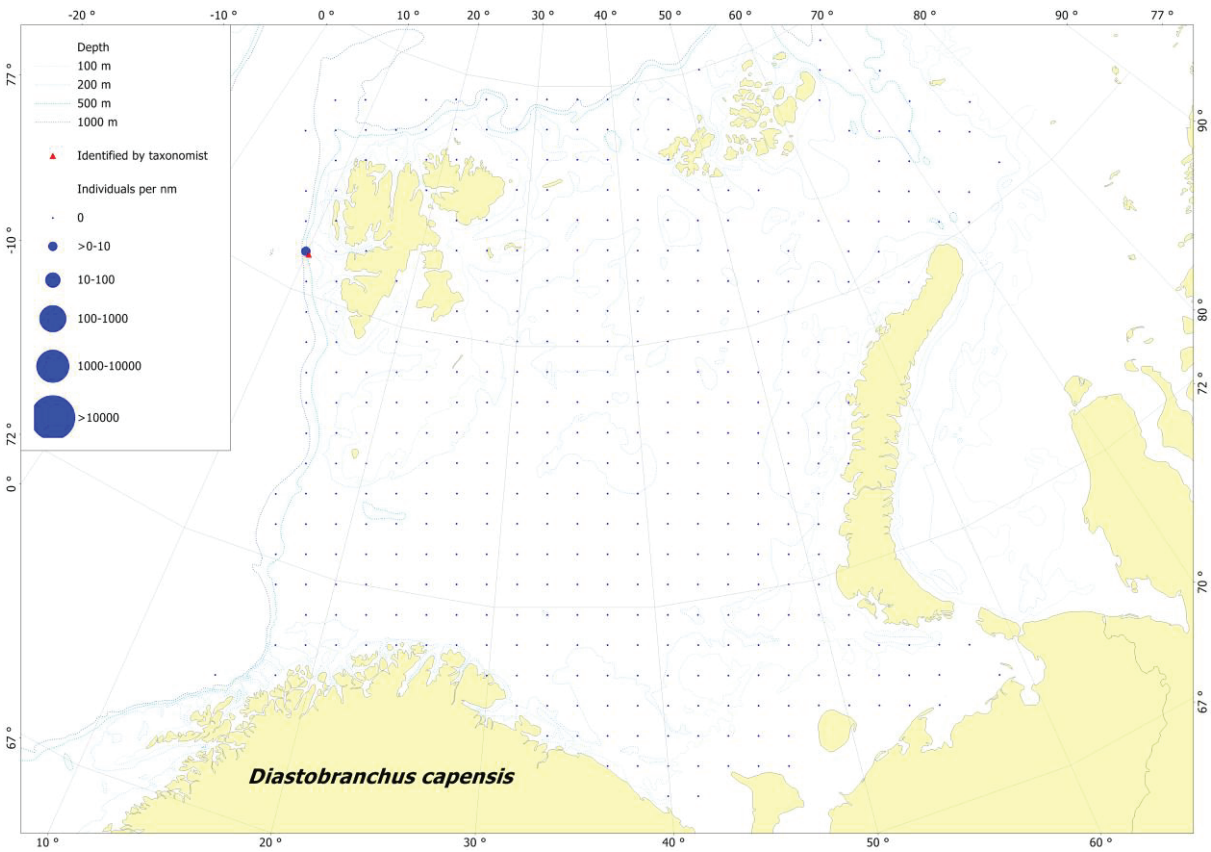
Family: Synaphobranchidae
English name: basketwork eel
Norwegian name: kappål
Russian name: слитножаберниковый угорь
(slitnozhabrnikoviy ugor)

Photo: Gunnar Langhelle

Spatial distribution

Widely distributed in the southern hemisphere, previously caught on the northern hemisphere at Bear Seamount.

The specimen caught west of the Svalbard/Spitsbergen archipelago represents the world's northernmost known record.



Length composition

One specimen (91 cm) was caught.

Life history

Bathydemersal at 180-2000 m, usually found on continental slopes.

Population and exploitation

Of no economic importance.

References

Moore JA, Vecchione M, Collette BB, Gibbons R, Hartel K, Galbraith JK, Turnipseed M, Southworth M, Watkins E. 2003. Biodiversity of Bear Seamount, New England Seamount Chain: Results of exploratory trawling. Journal of Northwestern Atlantic Fishery Science 31:363-372

Sulak KJ, Shcherbachev YN. 1997. Zoogeography and systematics of six deep-living genera of synaphobranchid eels, with a key to taxa and description of two new species of *Ilyophis*. Bulletin of Marine Science 60:1158-1194

Clupea harengus Linnaeus 1758

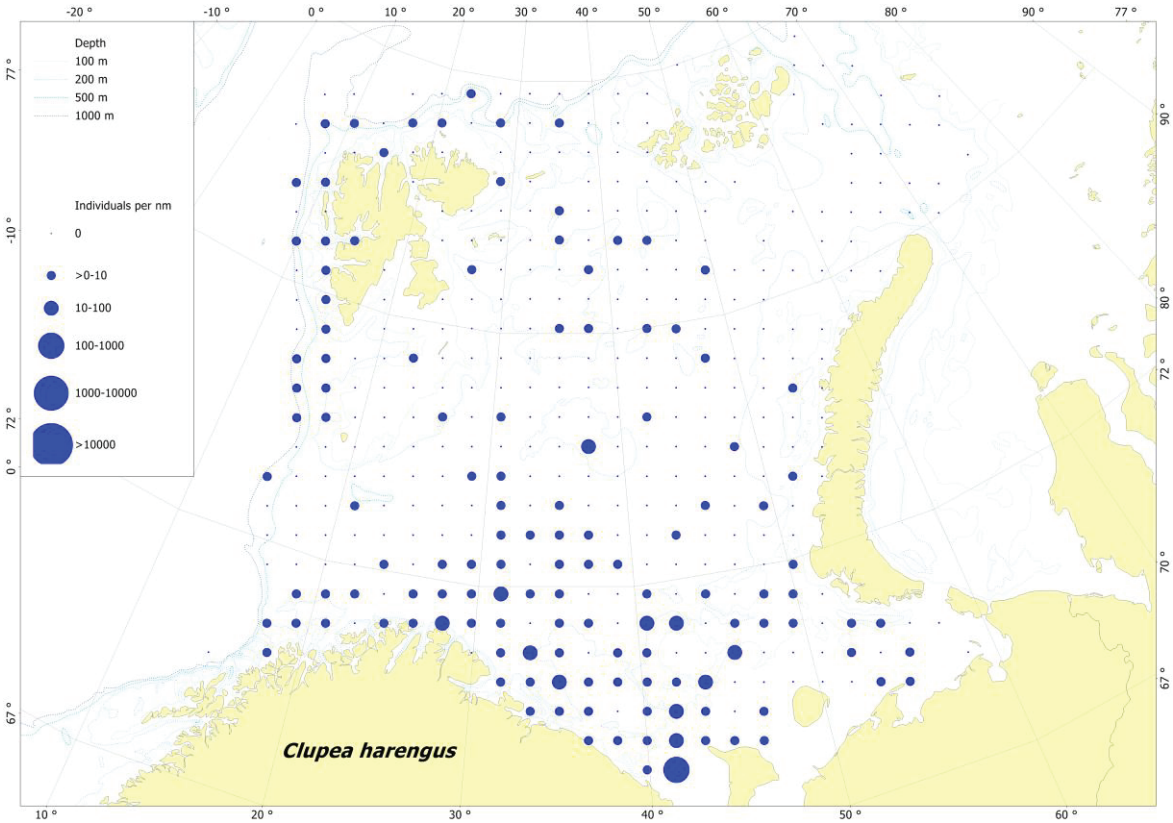
Family: Clupeidae
English name: Atlantic herring
Norwegian name: sild
Russian name: атлантическая сельдь
(atlanticheskaya seld)

Photo: Andrey Dolgov

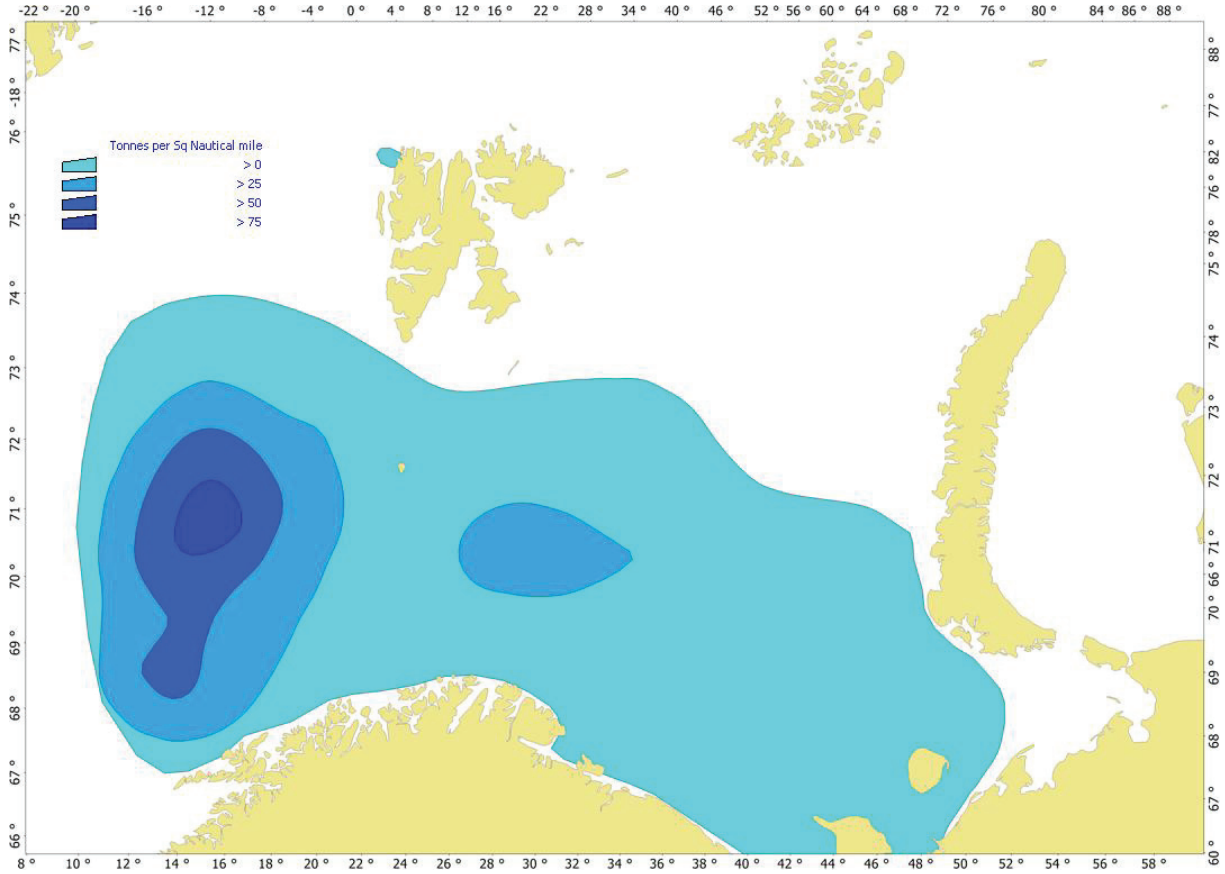
Spatial distribution

Known from the Gulf of Biscay northward to Iceland, the Barents Sea, the White Sea and the Kara Sea, also on the west side of the North Atlantic. Within *C. harengus* several subspecies, populations, and stocks are recognized, differing in average size, growth rate, migration and spawning behavior, number of finrays and vertebrae. In the Barents Sea and the eastern Norwegian Sea the Norwegian spring-spawning herring is found, which compared to other stocks has a wider distribution, performs more extensive migrations, possesses a longer life cycle and has a greater stock abundance and a higher vertebrae count. Information on life history and population given below refers to this stock.

As a highly pelagic species, the distribution of herring in the Barents Sea is not completely reflected by demersal trawl catches, especially in the central part.

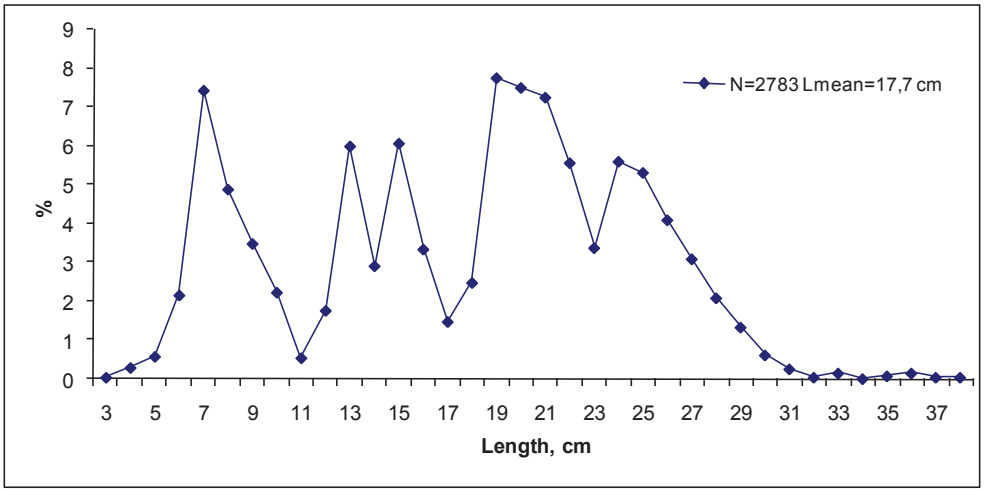


Distribution pattern based on bottom trawls.



Average biomass of Atlantic herring in the period 2004-2009 based on acoustic survey data.

Length composition



Life history

Mainly boreal, nerito-pelagic, forming schools of up to 500 million specimens at depths of 0-200 m. Can reach 40 cm, 0.5 kg and up to 25 years. Growth rates vary within and between years, as well as between areas. Matures at age 3-9 years. Key species in the ecosystem, feeds on plankton organisms, food source for many other fish and whale species. Demersal spawning takes place in February and March off the Norwegian coast between Møre and Vesterålen, primarily at 150-250 m. In winter the gonads account for about 20 % of the fish's weight, thus spawning products provide an enormous food source for animals along the coast. A female of 32-33 cm length spawns 50 000 demersal eggs, after 3 weeks hatch 7-9 mm long larvae. The newly hatched larvae drift northward to their nursery areas in northern Norway and the Barents Sea. They migrate back to their spawning area after 3-4 years and join the spawning stock. After spawning they undertake long feeding migrations into the central and western Norwegian Sea, where they forage on copepods. The stock aggregates off Troms and Finnmark in autumn where it also overwinters, before returning to the spawning areas. Migration patterns are quite complex and have been researched repeatedly.

Population and exploitation

The Norwegian spring-spawning herring is presently (2011) the largest herring stock in the world. Due to a high spawning stock and an efficient management plan the stock is in good condition and on the same level as in the 1950s. The spawning stock in 2009 was estimated to 9 million tonnes with full reproductive capacity. Studies based on historic samples of scales have shown that when stock level is high, a larger proportion of a given year class seems to originate from the Barents Sea than when stock level is low.

The fishery takes place all the year round (except March and April), but the fish quality is best at the spawning and overwintering areas.

References

Dragesund O, Østvedt OJ, Toresen R. 2008. Norwegian spring-spawning herring: history of fisheries, biology and stock assessment. In: Nakken O (ed) Norwegian spring-spawning herring & Northeast Arctic cod. Tapir, Trondheim, pp 41-82

Holst JC, Røttingen I, Melle W. 2004. The Herring. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 203-226

Nøttestad L, Fernö A, Misund OA, Vabø R. 2004. Understanding herring behavior: Linking individual decisions, school patterns and population distribution. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 227-262

Krysov AI. 2008. Atlanto-Scandian herring: biology and fishery. PINRO Publishing House, Murmansk, 189 pp (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stenevik EK. 2010. Sild - Norsk vårgytende sild. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:145 (in Norwegian)

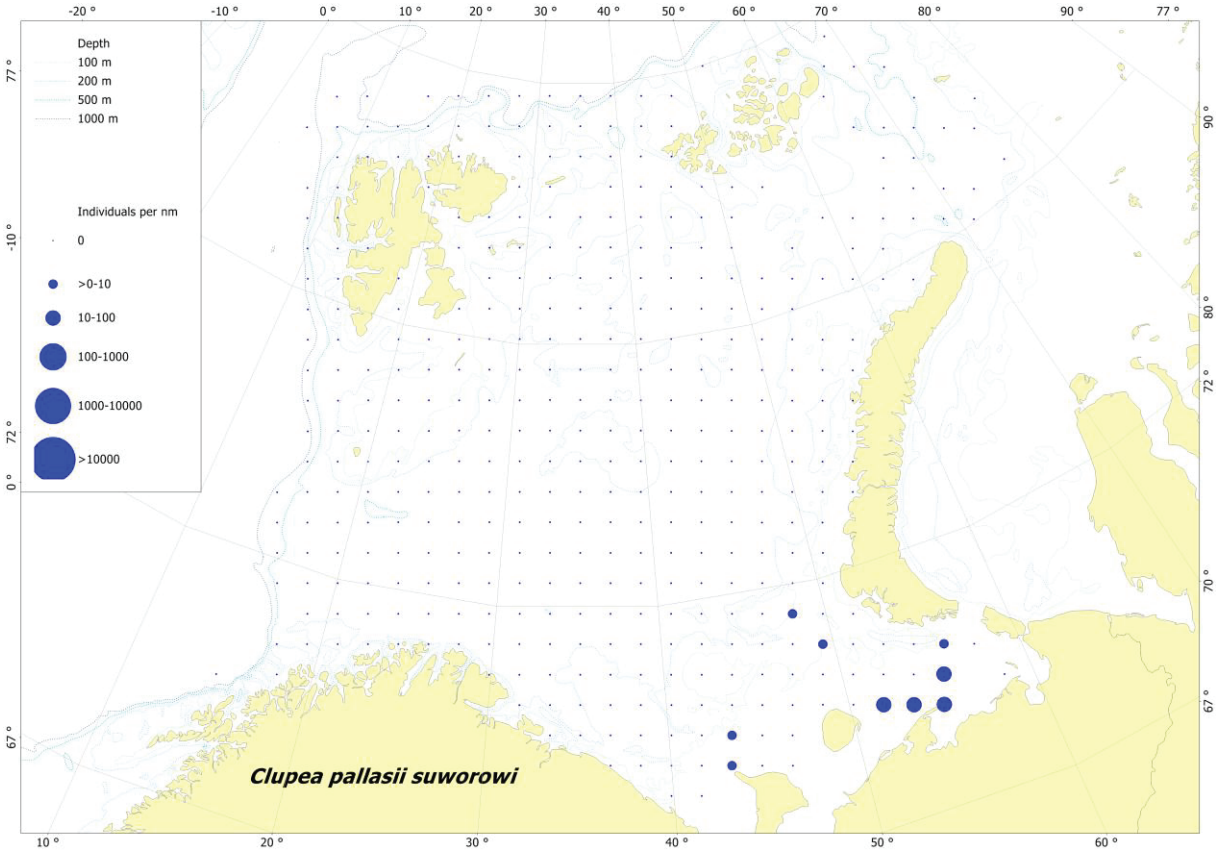
Clupea pallasii suworowi Rabinerson 1927

Family: Clupeidae
English name: Chosa herring
Norwegian name: kaninsild
Russian name: чёшско-печорская сельдь, канинско-печорская сельдь
(cheshsko-pechorskaya seld), (kaninsko-petchorskaya seld)

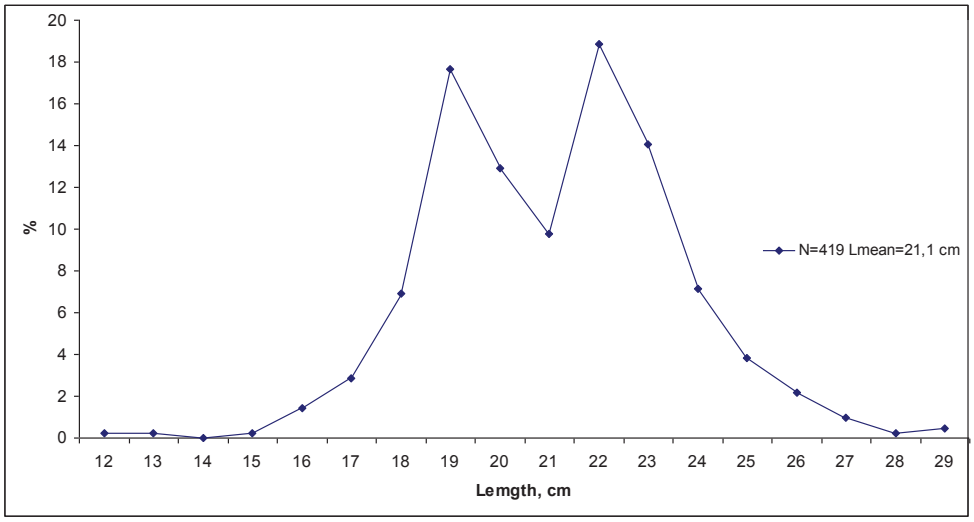
Spatial distribution

The subspecies occurs in the southeastern Barents Sea, the northern White Sea and the southwestern Kara Sea.

Found in the southeastern part of the surveyed area.



Length composition



Life history

Nerito-pelagic, arctic. Reaches 30 cm, 300 g and up to 15 years, matures at age 4-5 years. Feeds on euphausiids, copepods, mysids as well as juvenile fish. Spawning takes place in spring-summer in coastal areas of the Barents, White and Kara Sea (mainly in Chesha Bay and Mezen Bay) at depths of less than 5-10 m and in waters with low salinity. Fecundity up to 92 000 eggs. During summer-autumn extensive feeding migrations in the southeastern Barents Sea, overwinters on the Goose bank.

Population and exploitation

Since the 1990s the fishery has practically stopped or became irregular. Stock size varied between 1 500-188 000 tonnes during 1978-1994, mean annual catch during the past years (1995-2008) varied between 0.6-4 200 tonnes (mean annual catch 490 tonnes).

References

Stasenkova NI. 2009. Ecology, biology and fisheries of cheshsko-pechor herring. Arkhangelsk, Kira Publishing. 167 pp (in Russian)

Svetovidov AN. 1952. Clupeidae. In: Fauna of the USSR. Fish. Vol. 2. Issue 1. Academy of Sciences of the USSR, Moscow. pp 163-166 (in Russian)

Argentina silus (Ascanius 1775)

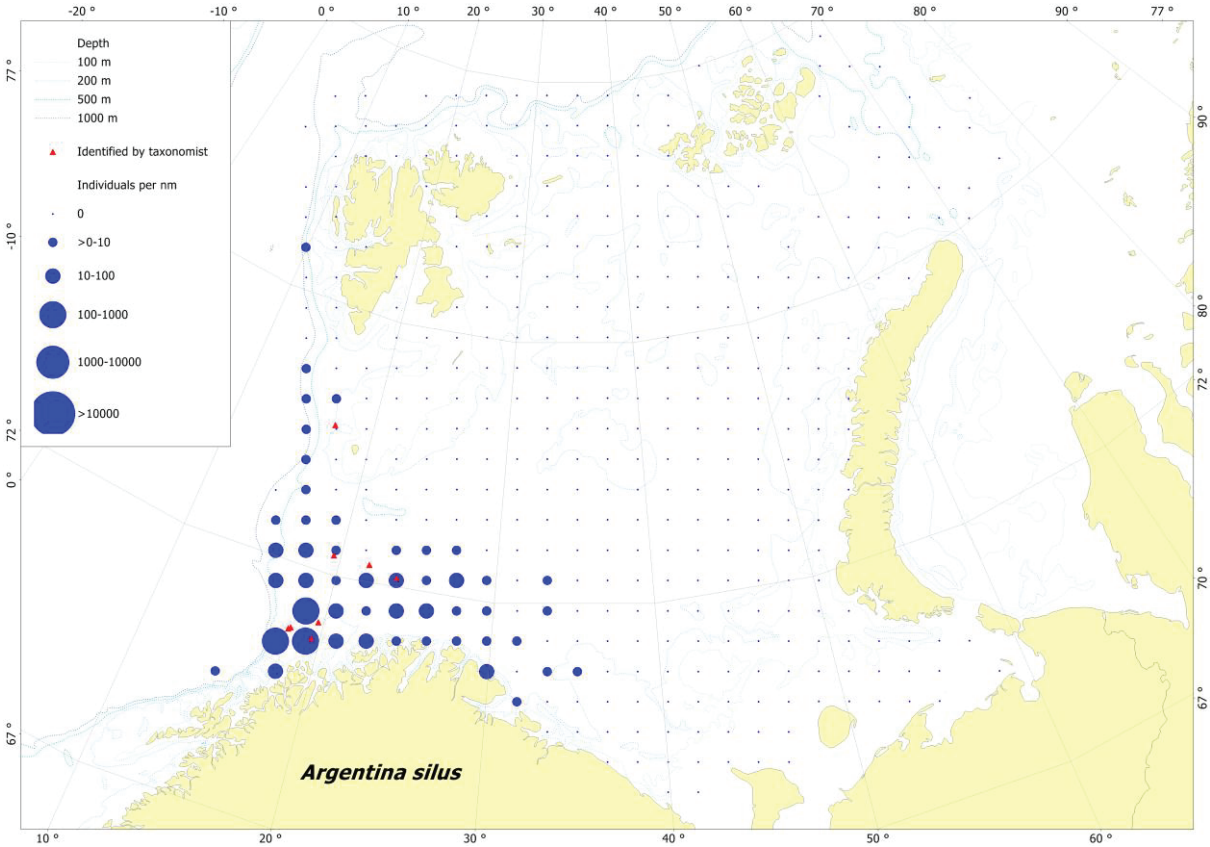
Family: Argentinidae
English name: greater argentine
Norwegian name: vassild
Russian name: североатлантическая аргентина
(severoatlantitcheskaya argentina)

Photo: Andrey Dolgov

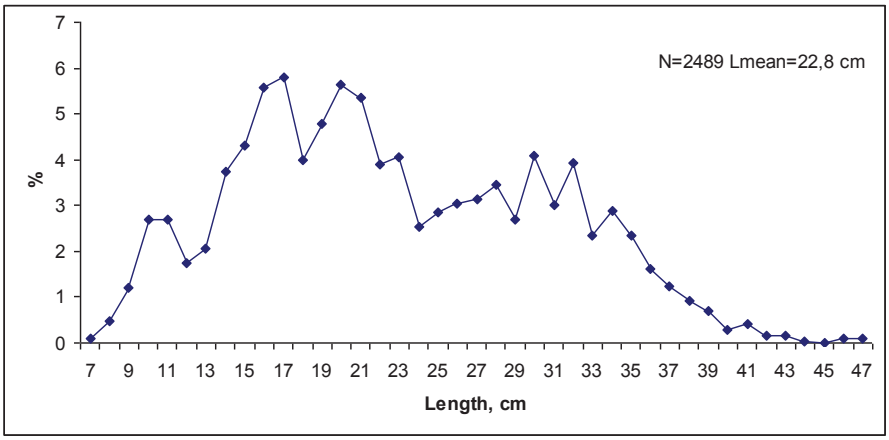
Spatial distribution

Known from the British Isles northward to the western and southern Barents Sea and westward to Iceland and southern Greenland; also in the western North Atlantic.

Found mainly in deeper Atlantic water masses in the southwestern part of the surveyed area.



Length composition



Life history

Boreal, schooling, pelagic at depths of 100-900 m. In Norwegian waters common at 200-600 m along the continental slope, but also found in deeper fjords above muddy bottom. Can reach 70 cm (commonly less than 50 cm) and about 35 years. Growth rates low, a specimen of 50 cm is usually more than 20 years old. Matures at age 8-15 years (depending on area). Feeds on plankton invertebrates (euphausiids, chaetognaths, copepods), small pelagic fishes and cephalopods. Spawns on the continental shelf in spring, fecundity up to 7 500 eggs (3-3.5 mm in diameter). Eggs and juveniles are pelagic at 400-500 m. During autumn and winter found shallower in coastal areas.

Population and exploitation

Commercially used in Norway, caught along the coast of Norway and at Trænabanken with semipelagic trawl, no economic importance in Russia.

References

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Nansenia groenlandica (Reinhardt 1840)

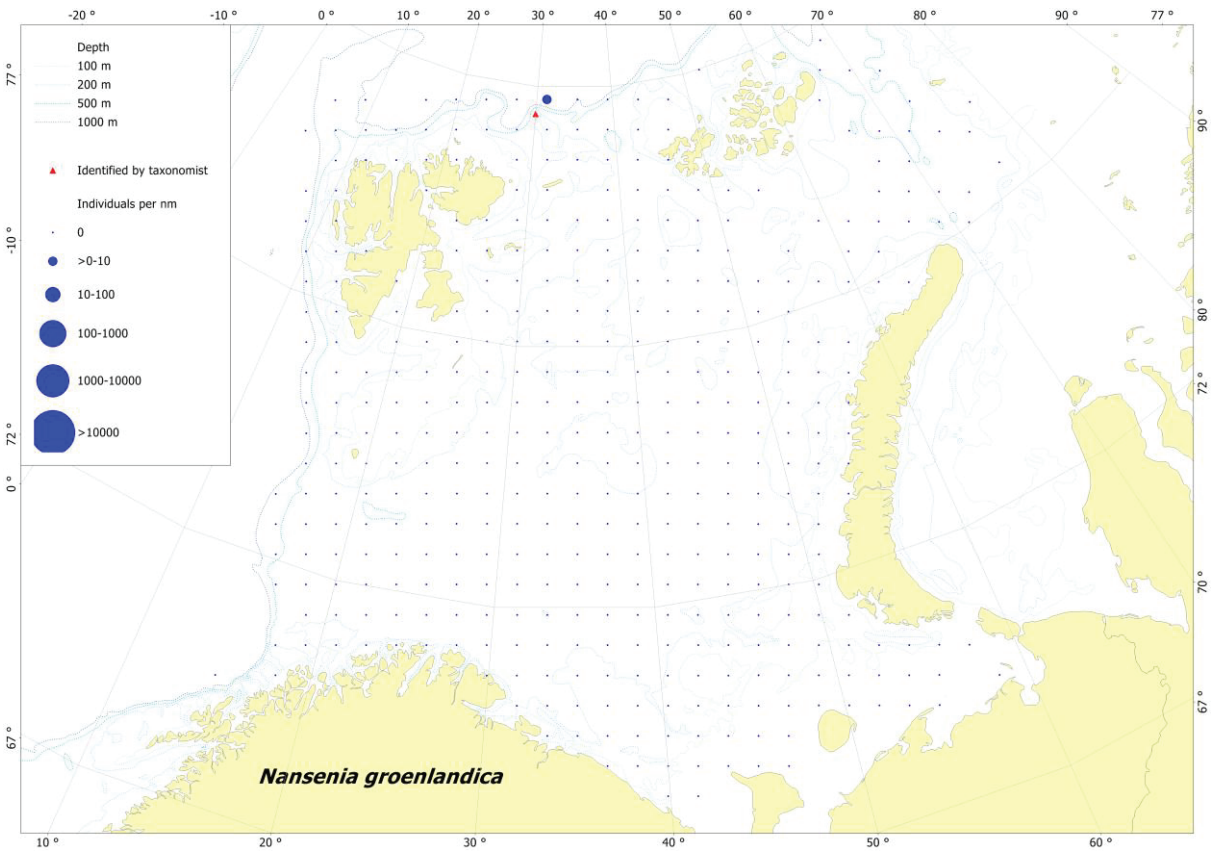
Family: Microstomatidae
English name: Greenland argentine
Norwegian name: grønlandshavkrøkle
Russian name: нансения гренландская
(nansenia grenlandskaya)

Photo: Andrey Dolgov

Spatial distribution

Known from arctic and subarctic waters of the North Atlantic, with southern limits at about 40º N. Observed from southern Greenland and southern Iceland eastward and southward, occasionally in the Barents Sea in Atlantic water masses; also in the eastern South Pacific.

Found northeast of the Svalbard/Spitsbergen archipelago.



Length composition

One specimen (16 cm) was caught.

Life history

Mesopelagic at 200-1000 m. Can reach 25 cm, spawns in spring and early summer.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Lemvig S. 2002. Grønlandshavkrøkle *Nansenia groenlandica* (Reinhardt, 1840) funnet i det sørlige Barentshav. Fauna 55:57-59 (in Norwegian)

Cohen DM. 1984. Argentinidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 386-391

Kawaguchi K, Butler JL. 1984. Fishes of the genus *Nansenia* (Microstomatidae) with descriptions of seven new species. Contributions in Science 352:1-22

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Mallotus villosus (Müller 1776)

Family: Osmeridae
English name: capelin
Norwegian name: lodde
Russian name: мойва
(moyva)

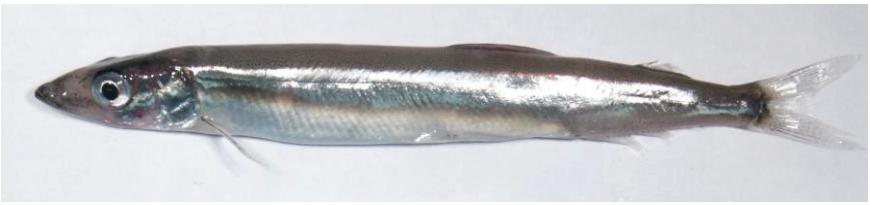


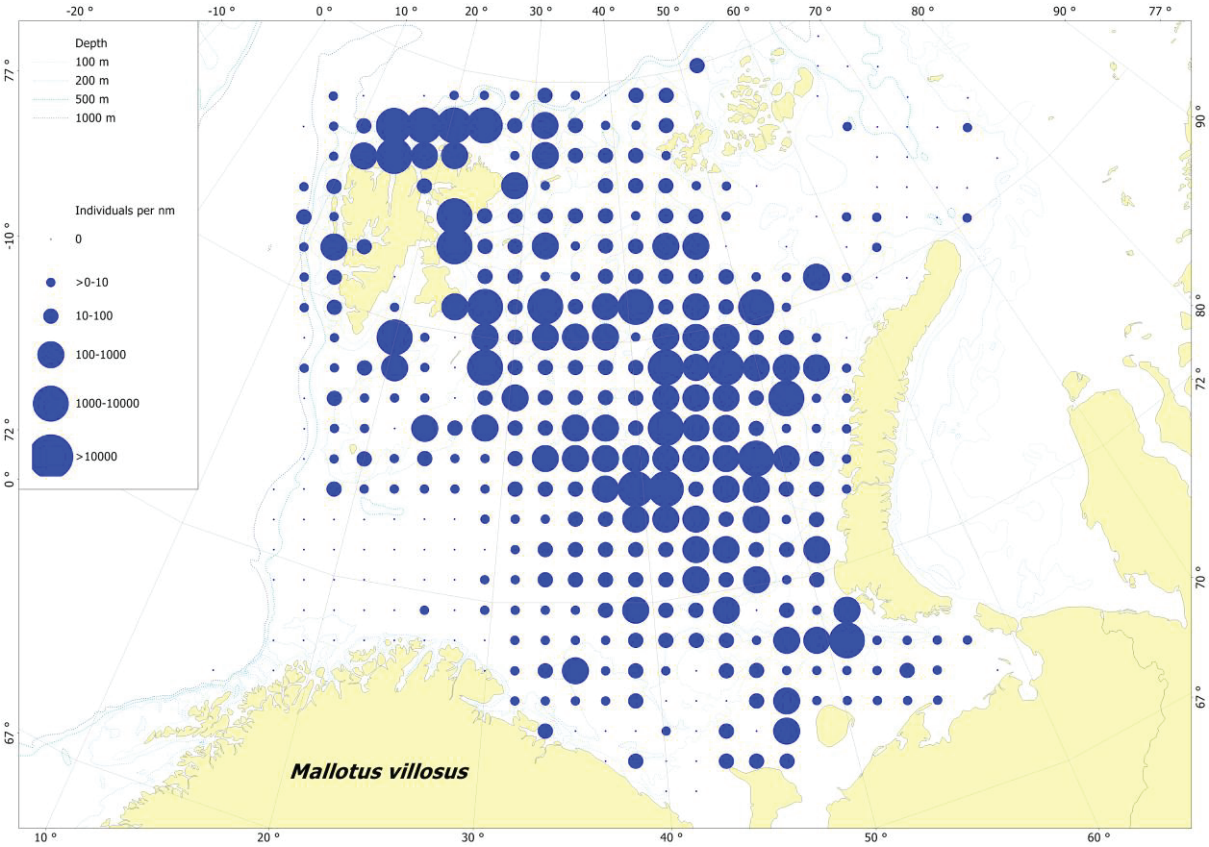
Photo: Andrey Dolgov

Spatial distribution

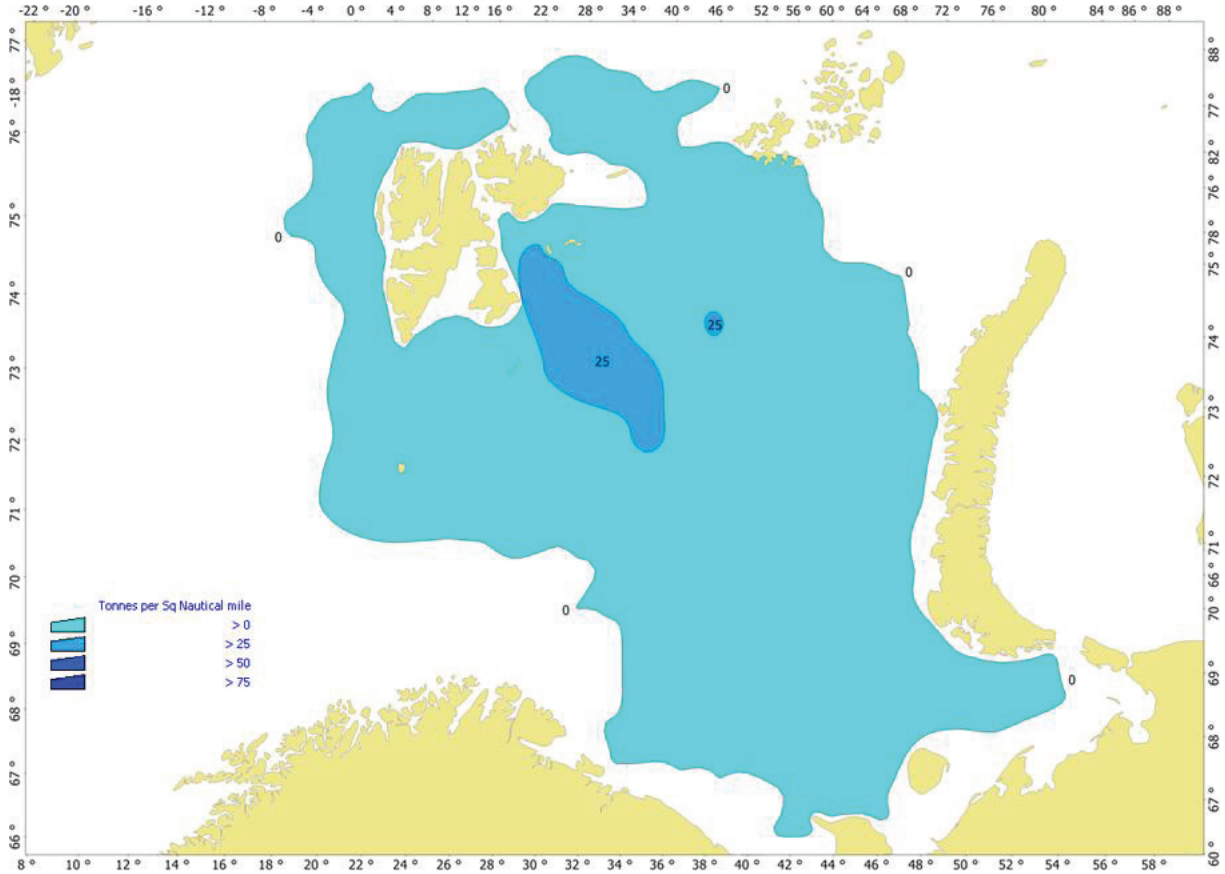
Found circumpolar in the Arctic, including the Norwegian and the Barents Sea.

Within *M. villosus* several populations and stocks are recognized, the Barents Sea stock being one of the largest. Information on life history and population given below refers to this stock.

Although capelin is a highly pelagic species, its overall distribution in the Barents Sea is well reflected by demersal trawl catches. The distribution of capelin varies seasonally, during feeding season capelin is found in a very wide area. The main densities are usually found along the Polar front. Primarily large specimens are caught by bottom trawls, and these have a more northern distribution during feeding season.

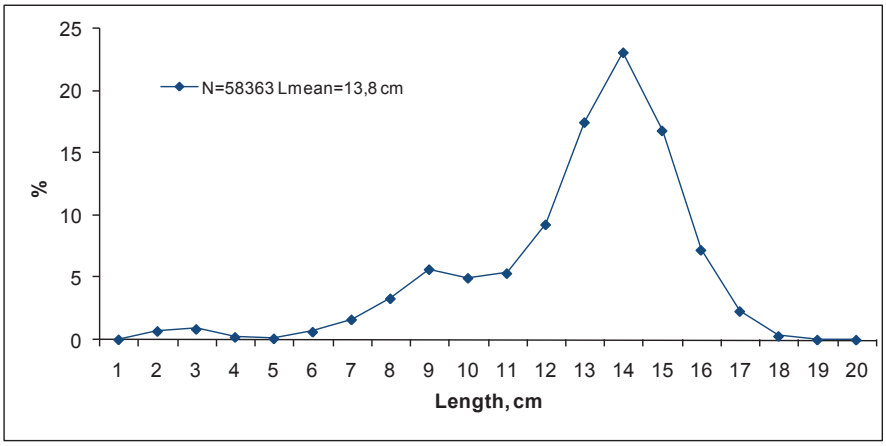


Distribution pattern based on bottom trawls



Average biomass of capelin in the period 2004-2009 based on acoustic survey data

Length composition



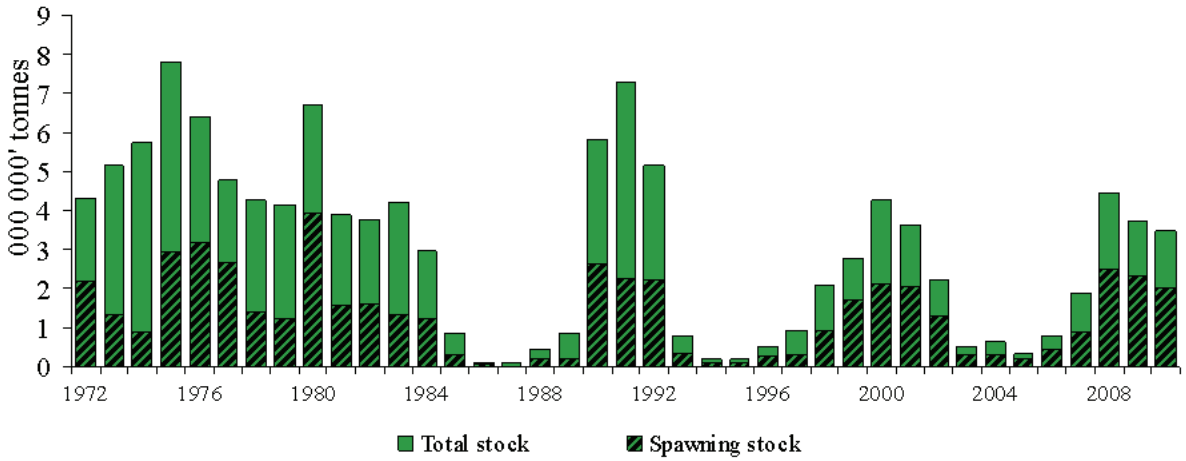
Life history

Mainly boreal, nerito-pelagic, schooling at depths of 0-300 m. Reaches rarely more than 20 cm, 50 g, and 5 years. Matures at age 3-5 years (about 14 cm), most of the specimens die after their first spawning. Feeds primarily on copepods and krill, important food source for many other fish species and sea mammals. Main feeding grounds in the northern Barents Sea, demersal spawning takes place in the southern coastal areas at depths of 15-70 m, mainly in March and April. Females spawn 10 000-30 000 demersal eggs. 4-5 mm long larvae hatch

after one month and drift in surface layers north- and eastwards into the central and eastern Barents Sea.

Population and exploitation

The Barents Sea capelin is a joint stock of Russia and Norway and the largest of all capelin stocks (2010). Population size shows large variations which is due to the short life span, considerable consumption by different predators and the fishery. In the past 20 years the fishery for capelin has been closed three times, but the stock is now on a sustainable level. The total catch in 2009 was 306 000 tonnes, maximum catch in 1977 was 3 million tonnes.



References

Gjøsæter H. 1998. The population biology and exploitation of capelin (*Mallotus villosus*) in the Barents Sea. Sarsia 83:453-496

Gjøsæter H, Ushakov NG. 2003. Capelin in the Barents Sea. pp 6-15. In: Bjordal A, Gjøsæter H, Mehl S. (eds) Management strategies for commercial marine species in northern ecosystems. The Proceeding of the 10th Norwegian-Russian symposium, Bergen, 27-29 August 2003. IMR/PINRO Joint Report Series. No.1. 2004. 168 pp

Gjøsæter H, Ushakov NG, Prozorkevich DV. 2011. Capelin. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Tjelmeland S. 2010. Lodde – Barentshavet. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:128 (in Norwegian)

Osmerus eperlanus (Linnaeus 1758)

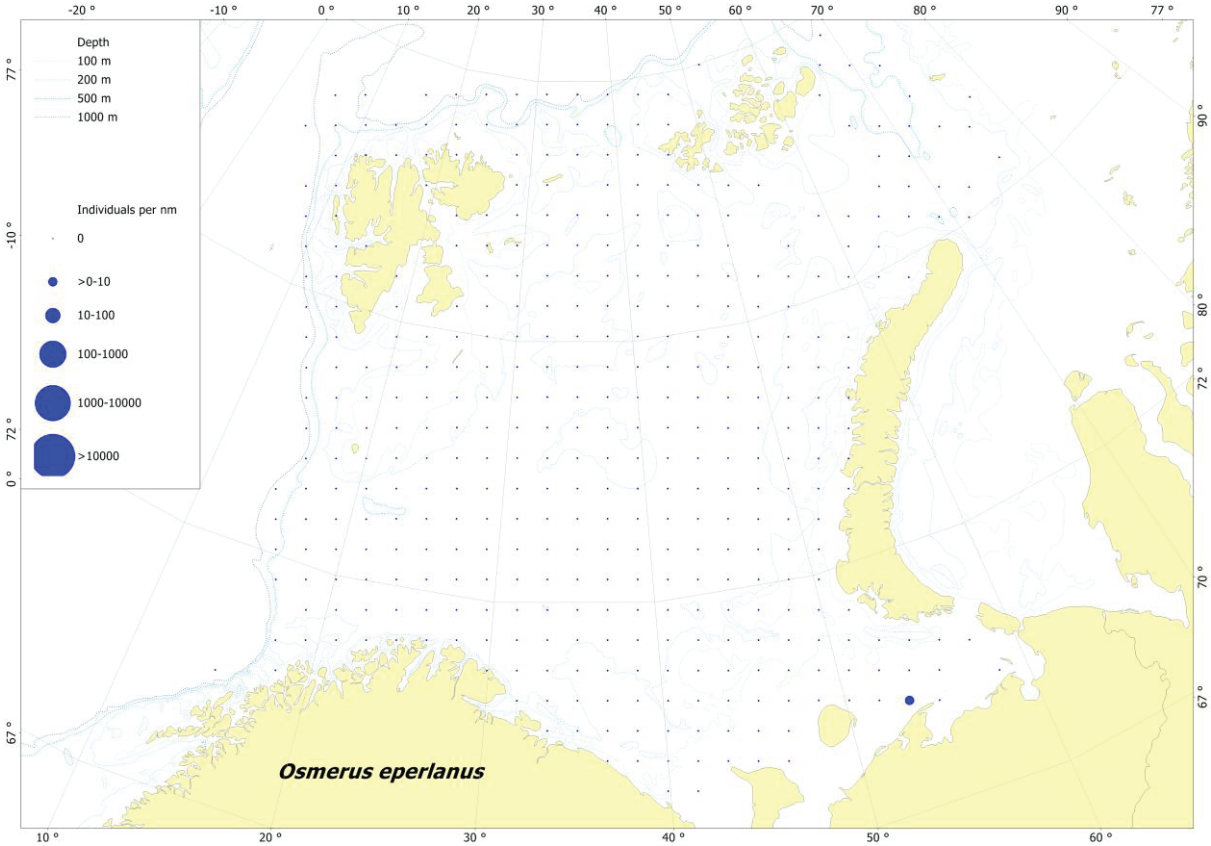
Family: Osmeridae
English name: European smelt
Norwegian name: krøkle
Russian name: европейская корюшка
(evropeyskaya koryushka)

Photo: O.Yu.Chetyrkina

Spatial distribution

Known from the northwestern coast of France, the British Isles, the southern North Sea, the Baltic Sea and the White Sea. Occasionally found in fresh or brackish waters in southeastern part of the Barents Sea.

Found in the southeastern part of the surveyed area.



Length composition

Three specimens (20, 21 and 22 cm) were caught.

Life history

Boreal, anadromous/lacustrine, found close to the coast preferably in brackish waters at depths of 0-30 m. Reaches 34 cm, 0.25 kg, and 10-12 years, stationary freshwater populations are smaller in body length. Growth rates low, brackish water populations mature at age 3-4 years. Feeds on benthic invertebrates (crustaceans, polychaetes), larger specimens also on eggs, larvae and small fishes. In southern Norway spawning takes place in estuaries in May, in Siberia in the northern rivers in May-June. Females spawn up to 104 000 demersal eggs, larvae hatch after 3-5 weeks. Juveniles remain in the estuaries for the rest of the summer. Many fishes die after spawning.

Population and exploitation

Irregular fluctuations in the size of the population due to changing spawning conditions. Of no economic importance in Norway, but targeted in Russian freshwaters (annual catch 60 tonnes) and bycatch in fishery for navaga.

References

McAllister D. 1984. Osmeridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 399-402

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Reshetnikov YS. (ed) Atlas of freshwater fishes of Russia. 2 vol. Moscow, Nauka Publishing. 379+253 pp (in Russian)

Salmo salar Linnaeus 1758

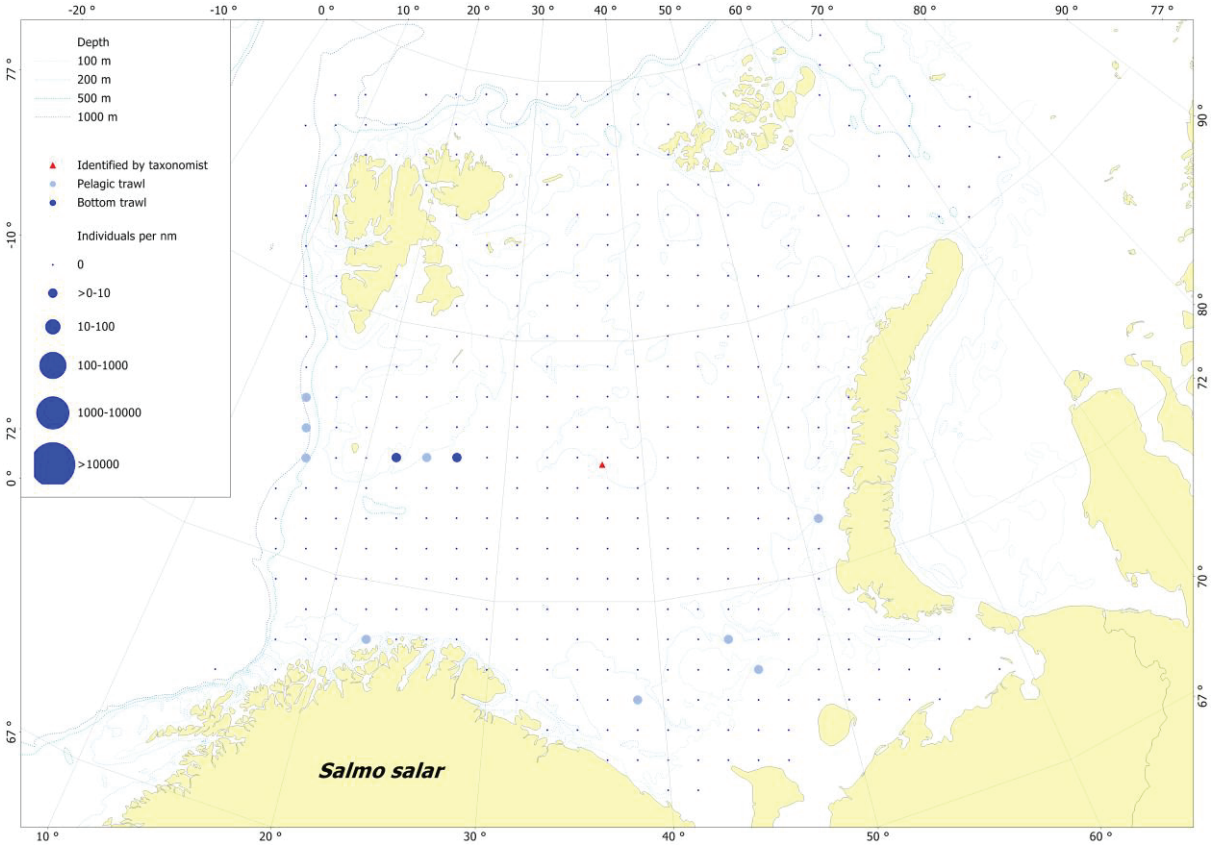
Family: Salmonidae
English name: Atlantic salmon
Norwegian name: laks
Russian name: семга
(syomga)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known in the eastern North Atlantic from Portugal northward to Iceland, Greenland, Svalbard/Spitsbergen and Novaya Zemlya; also in the western North Atlantic.

Found in Atlantic water masses in the surveyed area.



Length composition

Two specimens (32 and 85 cm) were caught by bottom trawl and ten (28-64 cm, mean length 43.7 cm) by pelagic trawl.

Life history

Mainly boreal, anadromous, reproduces in freshwater whereas its somatic growth occurs mainly in marine environments in the upper pelagic layers, occasionally caught in demersal trawls. Males reach 150 cm and 40 kg, females 120 cm and 20 kg, maximum age 13 years, but most specimens die younger. Growth rates in the sea high, from 25 g to 1-3 kg within one year. Feeds mainly on fish, but also on cephalopods and krill. Returns to the home river for spawning after 2-5 years in the sea. The populations of the rivers draining into the Barents Sea spawn in late autumn. 10 000 to 16 000 eggs are buried in batches in the sand where they overwinter. In April-May hatch 2 cm long larvae. Growth rates in freshwater are low, and after 3-5 years 15-20 cm long fishes migrate into the sea. Most of the specimens die after their first spawning; only 4-6 % return to the sea and spawn for a second time, much less for a third time. During their homing migration the fishes stop foraging, living on their fat reserves. In the sea the species migrates over long distances and with fairly high speed.

Population and exploitation

The Barents Sea stock contributes to more than 67 % of the world catch of wild Atlantic salmon and also the healthiest and largest river populations are found in this area. In Norway 150-250 tonnes are caught along the coast of Finnmark every year, although fishery for the species has declined over the past 20 years. In Russia caught by commercial and recreational fishery, annual commercial catches over the past decade 2-30 tonnes.

Coastal fishery might exploit the spawning salmon heading for their home rivers. There is clearly a need for management plans for the individual stocks or river populations and ICES recommends stopping all commercial fisheries to protect the wild stock of *S. salar*.

References

Holm M, Holst JC, Hansen LP. 2000. Spatial and temporal distribution of post-smolts of Atlantic salmon (*Salmo salar* L.) in the Norwegian Sea and adjacent areas. ICES Journal of Marine Science, 57:955-964

Holm M, Hansen LP, Holst JC, Jacobsen JA. 2004. Atlantic salmon (*Salmo salar* L.). In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 315-356

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Prusov SV. 2011. Atlantic Salmon. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Reshetnikov YS. (ed) Atlas of freshwater fishes of Russia. 2 vol. Moscow, Nauka Publishing. 379+253 pp (in Russian)

Maurolicus muelleri (Gmelin 1789)

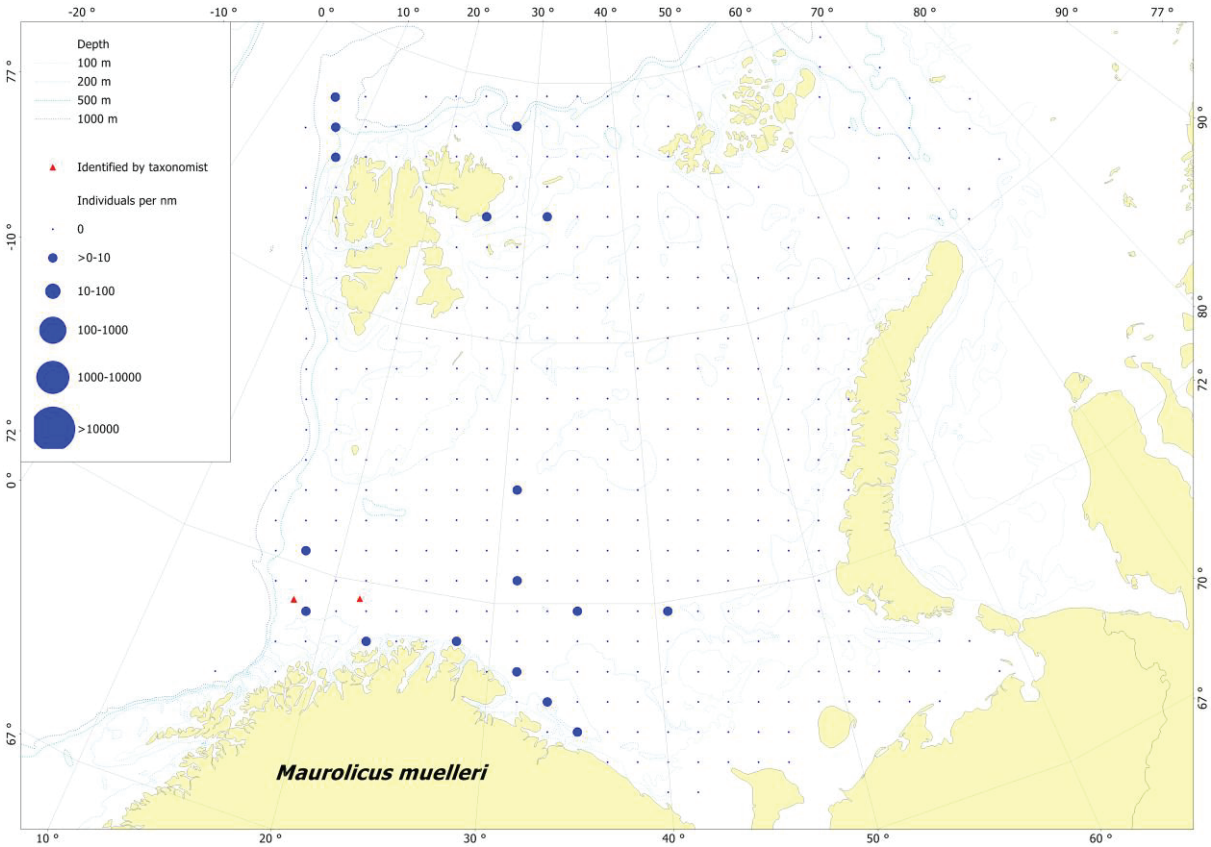
Family: Sternoptychidae
English name: silvery lightfish
Norwegian name: laksesild
Russian name: мавролик
(mavrolik)

Photo: Ingvar Byrkjedal

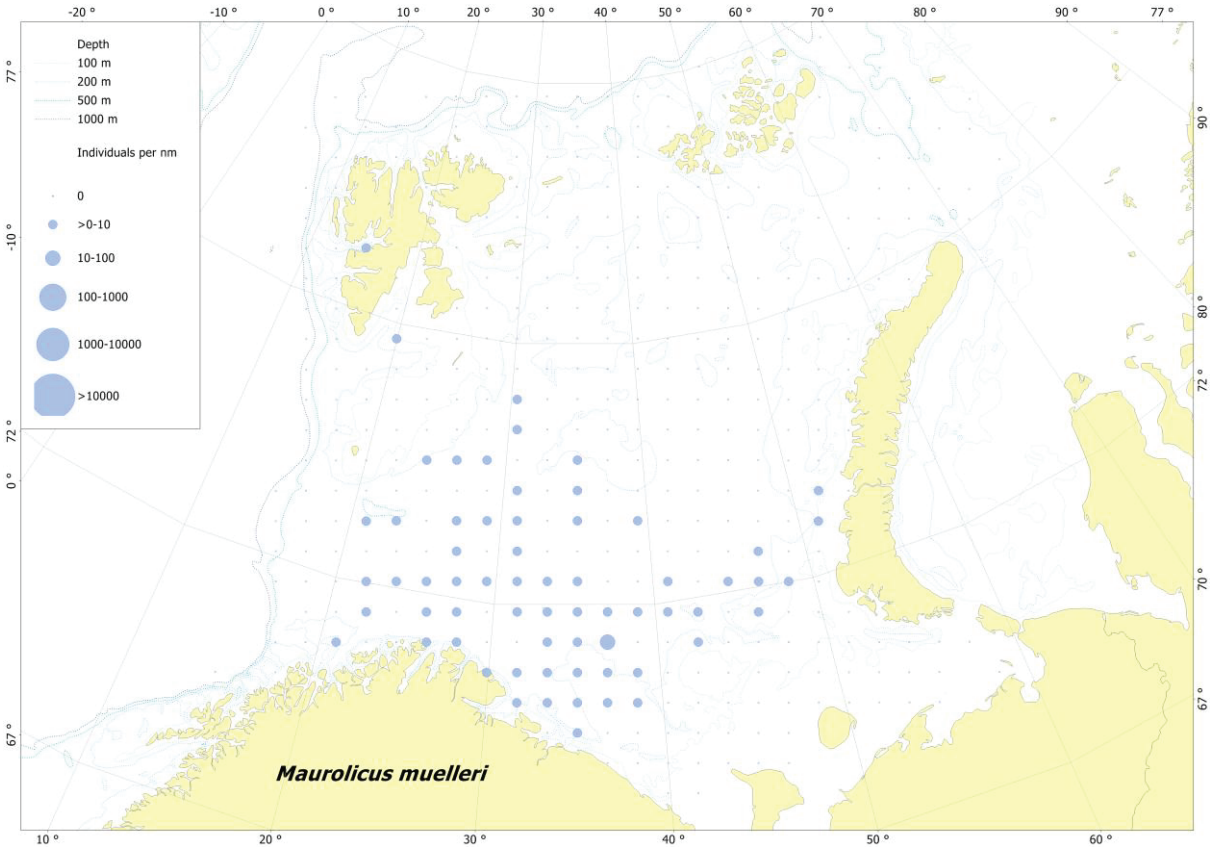
Spatial distribution

Known in the North Atlantic from 40-45º N to Svalbard/Spitsbergen and Novaya Zemlya. Common along the Norwegian coast, fewer specimens further north. Local populations in many Norwegian fjords.

Found in Atlantic water masses in the surveyed area. As highly pelagic species, its overall distribution in the Barents Sea is poorly reflected by demersal trawl catches.

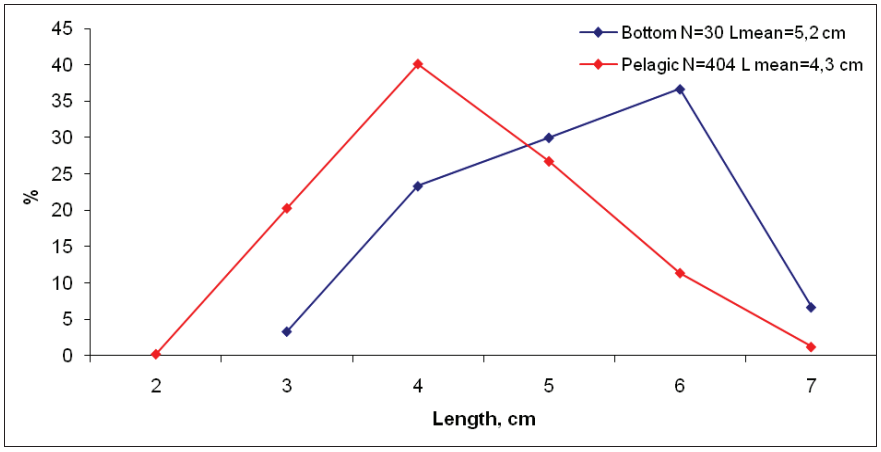


Distribution pattern based on bottom trawls



Distribution pattern based on pelagic trawls

Length composition



Life history

Boreal, mesopelagic, schooling, commonly found at depths between 100-500 m. Can reach 7.6 cm and 3 years in the Norwegian Sea, 4.9 cm and 5 years in fjords. Females grow larger than males, with increasing size the sex ration skews towards females. Matures at age 1 year (about 2.5 cm). Feeds on small zooplankton, fish eggs and all kind of larvae, important food source for larger fish. Batch spawner that releases 200-500 pelagic eggs per batch in the upper part of the water column from March to September, the number of batches is unknown.

Performs diel vertical migrations, found near the surface during night and at mesopelagic depths during day. These migrations are adapted to the light conditions in the Arctic, i.e. there are no specimens found near the surface during the light nights, when schools are formed at 20-40 m depth. There are differences in life history and genetics between populations, e.g. fjord populations have lower adult mortality, larger gonads and smaller maximum size than Norwegian Sea populations.

Population and exploitation

The total biomass in the Nordic Seas (Norwegian, Greenland, Iceland and western-most part of the Barents Sea) in 1994 was estimated to 0.25 million tonnes. The Barents Sea population represents probably only a small percentage.

Of no economic importance.

References

Borkin IV, Grigoryev GV. 1986. On capture of silvery lightfish near Novaya Zemlya. Voprosy ikhtyologii 26:857-859 (in Russian)

Dalpadado P, Ellertsen B, Melle W, Skjoldal HR. 1998. Summer distribution patterns and biomass estimates of macrozooplankton and micronekton in the Nordic Seas. Sarsia 83:103-116

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Gjøsæter J. 1981. Life history and ecology of *Maurolicus muelleri* (Gonostomatidae) in Norwegian waters. FiskDir. Skr. Ser. Havunders. 17:109-131

Kaartvedt S, Knutsen T, Holst JC. 1998. Schooling of the vertically migrating mesopelagic fish *Maurolicus muelleri* in light summer nights. Marine Ecology Progress Series 170:287-290

Kristoffersen JB, Salvanes AGV. 1998. Life history of *Maurolicus muelleri* in fjordic and oceanic environements. Journal of Fish Biology 53:1325-1341

Parin NV, Kobyliansky SG. 1996. Diagnoses and distribution of fifteen species recognized in genus *Maurolicus* Cocco (Sternoptychidae, Stomiiformes) with a key to their identification. Cybium 20:185-195

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Salvanes AGV. 2004. Mesopelagic fish. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 301-314

Arctozenus risso (Bonaparte 1840)

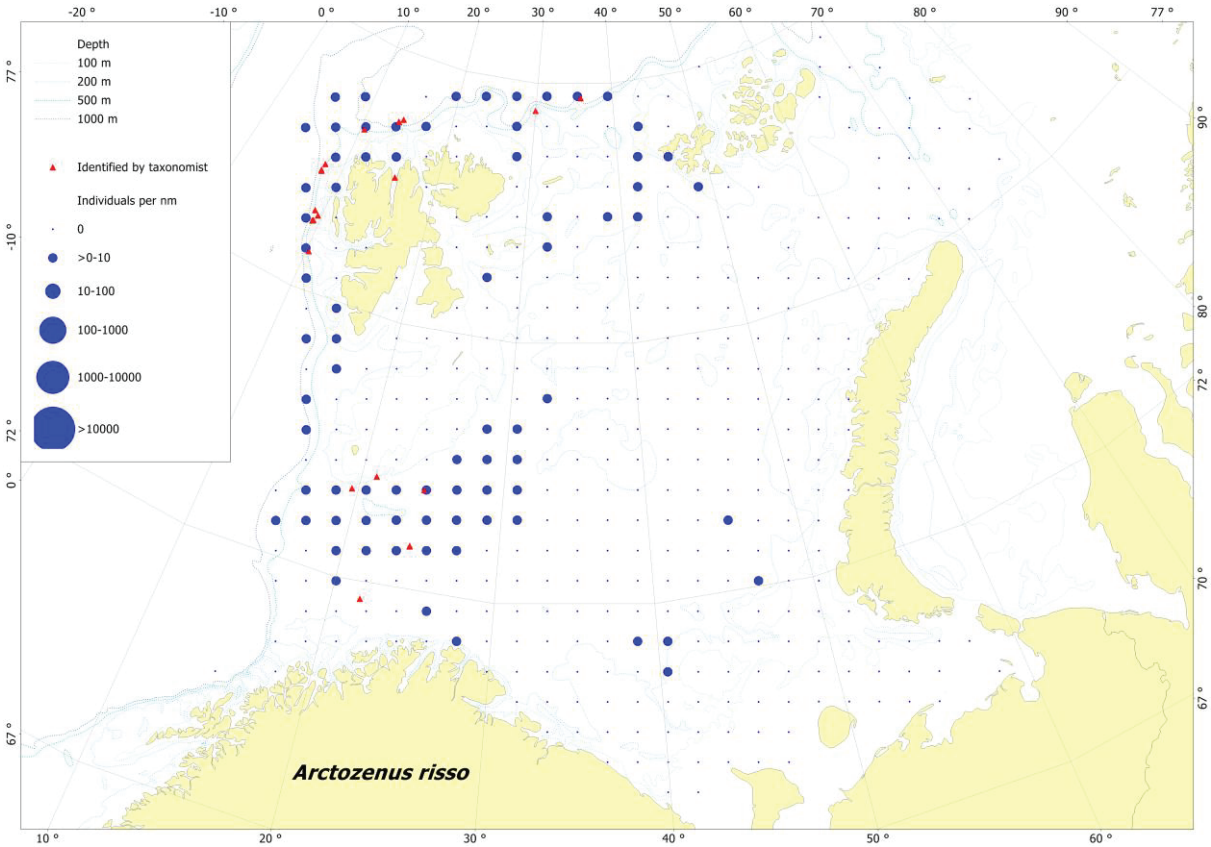
Family: Paralepididae
English name: spotted barracudina
Norwegian name: liten laksetobis
Russian name: северный веретенник
(severniy veretennik)

Photo: Andrey Dolgov

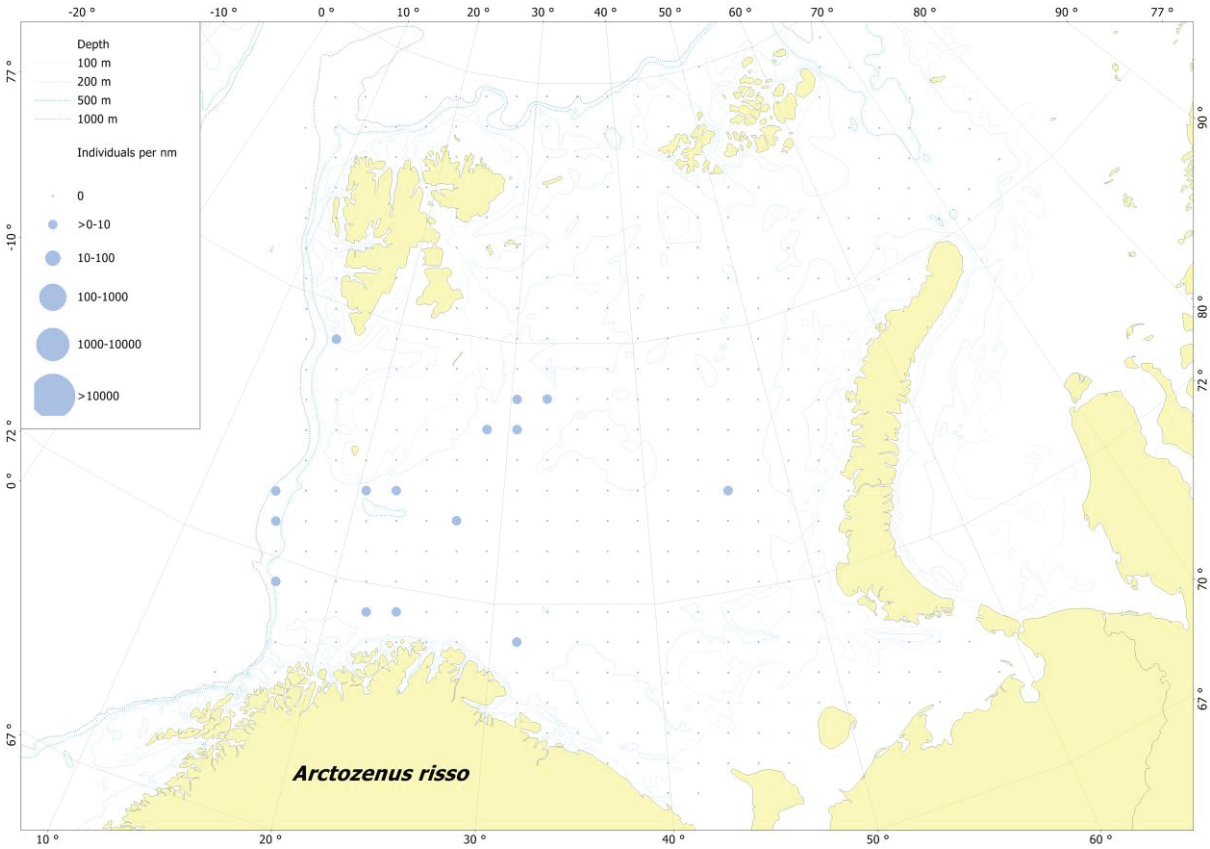
Spatial distribution

Occurs worldwide from the Arctic to the Antarctic.

Found in deeper, Atlantic water masses in the surveyed area.

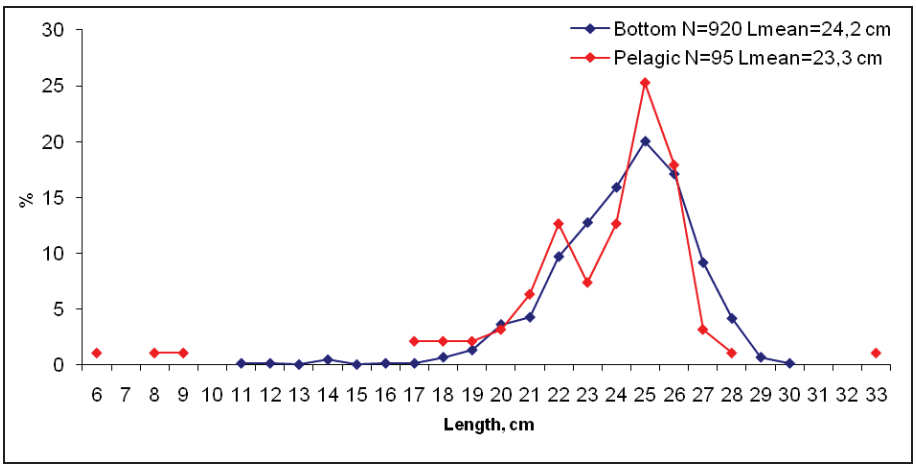


Distribution pattern based on bottom trawls



Distribution pattern based on pelagic trawls

Length composition



Life history

Mesopelagic, mainly at 200-700 m. Reaches up to 30 cm, females grow larger than males. Maximum age is uncertain (5 years at 23 cm), but 11 years and more are likely. Feeds on other mesopelagic fish species, krill and shrimps, mainly plankton in the Barents Sea. Little known about life cycle, probably not reproducing in Norwegian waters or the Barents Sea.

Population and exploitation

The total biomass in the Nordic Seas (Norwegian, Greenland, Iceland and western-most part of the Barents Sea) in 1994 was estimated to 1.3 million tonnes. The Barents Sea population represents probably only a small percentage.

Of no economic importance.

References

Dalpadado P, Ellertsen B, Melle W, Skjoldal HR. 1998. Summer distribution patterns and biomass estimates of macrozooplankton and micronekton in the Nordic Seas. Sarsia 83:103-116

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Salvanes AGV. 2004. Mesopelagic fish. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 301-314

Myctophidae

Note on identification: Specimens of mesopelagic fish are often in a bad shape when coming on board, thus complicating the species identification. The most abundant species in the Barents Sea is *Benthosema glaciale*, scattered observations of other species have been made.

Benthosema glaciale (Reinhardt, 1837)

Family: Myctophidae
English name: glacier lanternfish
Norwegian name: nordlig lysprikkfisk
Russian name: северная бентозема
(severnaya bentozema)

Photo: Andrey Dolgov

Lampanyctus macdonaldi (Goode & Bean, 1896)

Family: Myctophidae
English name: rakery beaconlamp
Norwegian name: brun lysprikkfisk
Russian name: лампаникт Макдональда
(lampanikt Makdonalda)

Photo: Rupert Wienerroither

Notoscopelus kroyeri (Malm, 1861)

Family: Myctophidae
English name: lancet fish
Norwegian name: stor lysprikkfisk
Russian name: северный нотоскопел
(severniy notoskopel)

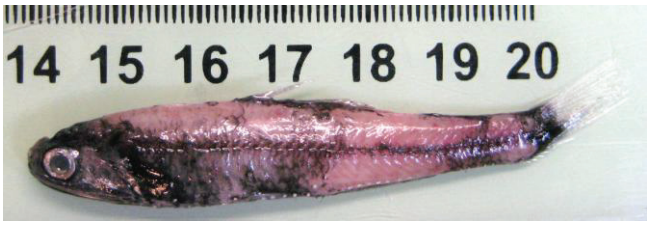


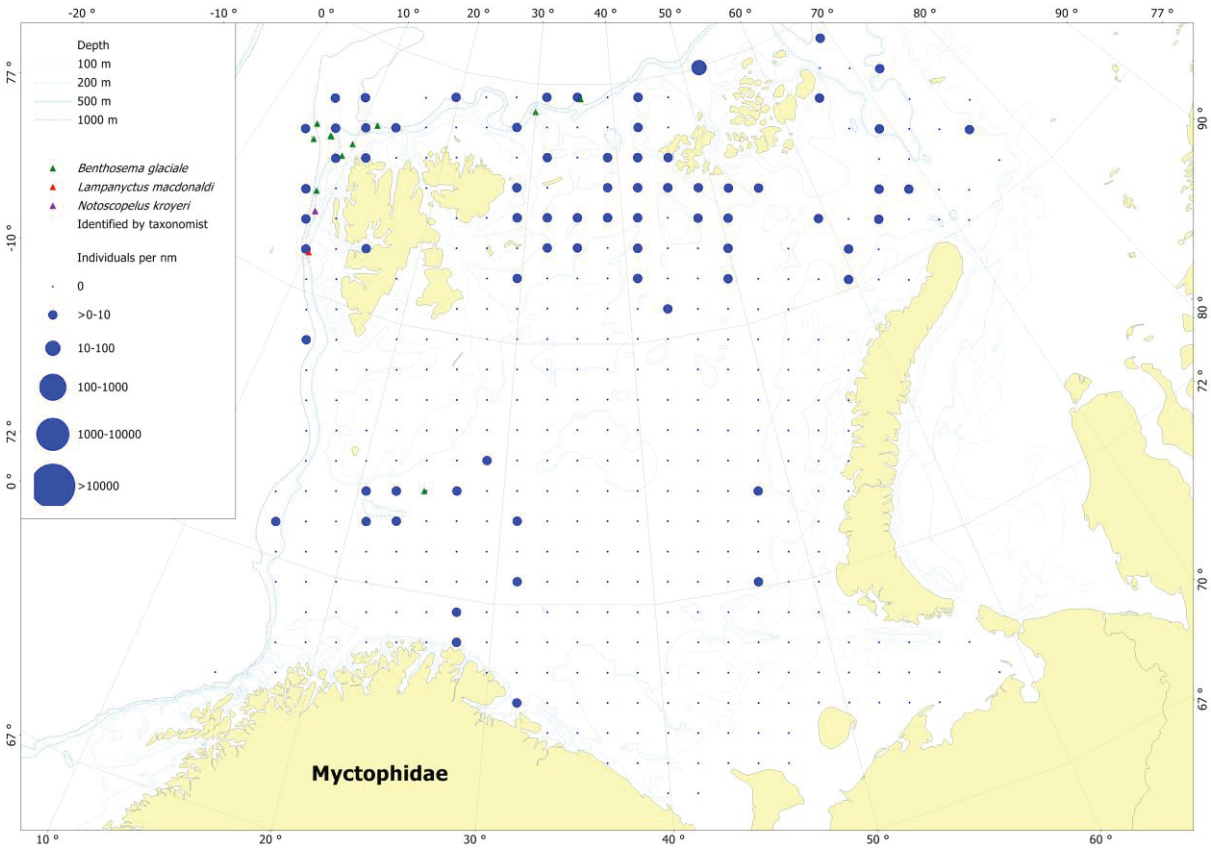
Photo: Rupert Wienerroither

Spatial distribution

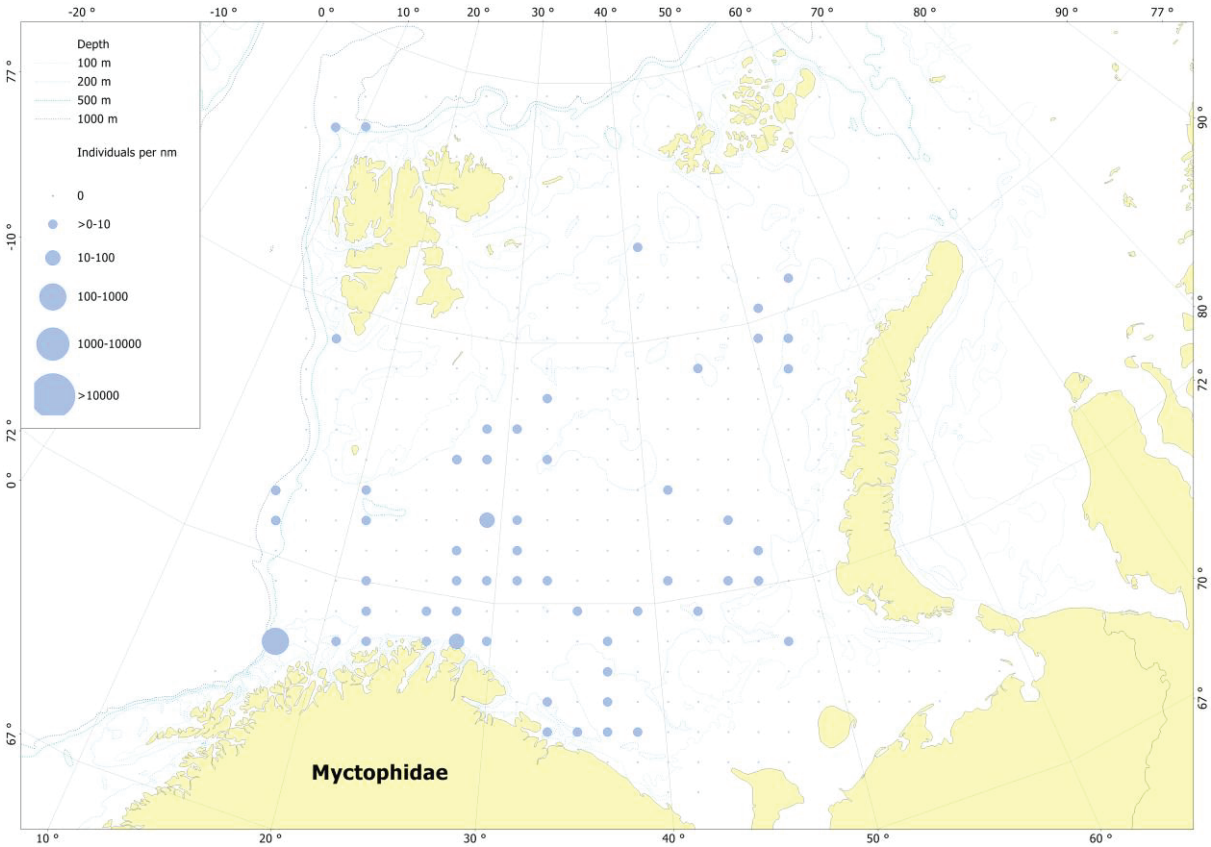
B. glaciale: widely distributed in the whole North Atlantic, including the Barents Sea. Although an oceanic species and mainly absent in areas with bottom depths of less than 300 m, there are local populations in some Norwegian fjords. Found in deeper, Atlantic water masses in the surveyed area.

L. macdonaldi: known from off northwestern Africa northward to the British Isles and Iceland, scattered reports further north; also in the western North Atlantic and the southern hemisphere. In the surveyed area found west of the Svalbard/Spitsbergen archipelago.

N. kroyeri: known in the eastern North Atlantic from 37º N to the Arctic Circle, also in the western North Atlantic. In the surveyed area found west of the Svalbard/Spitsbergen archipelago.

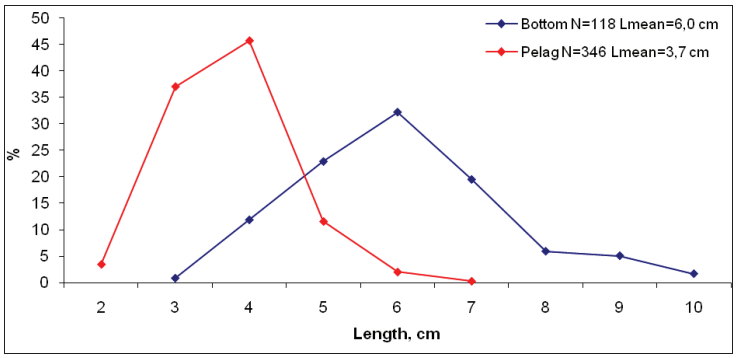


Distribution pattern based on bottom trawls



Distribution pattern based on pelagic trawls

Length composition



Life history

B. glaciale: mainly boreal, mesopelagic, schooling at depths of 0-1000 m. Can reach 9.5 cm and 8 years, both in the open ocean and in the fjords, but fjord populations grow faster. Matures at age 2-3 years (4.5-5.0 cm). Filter feeder mainly on zooplankton and krill, important food source for many larger fish species of economic importance. Spawning takes place pelagically in June-July, on average females spawn 750-800 eggs. Performs diel vertical migrations, found near the surface during night and at mesopelagic depths during day. These migrations are adapted to the light conditions in the Arctic, i.e. there are no specimens found near the surface during the light nights. Life history can vary between populations. *L. macdonaldi* and *N. kroyeri*: mainly boreal, mesopelagic, perform daily vertical migrations, probably not reproducing in Norwegian waters or the Barents Sea.

Population and exploitation

The total biomass of *B. glaciale* in the Nordic Seas (Norwegian, Greenland, Iceland and western-most part of the Barents Sea) in 1994 was estimated to 2.3 million tonnes. The Barents Sea population represents probably only a small percentage. Of no economic importance.

References

Borkin IV, Shevelev MS. 1980. Glacier lanternfish *Benthosema glaciale* Reinhardt (Myctophiformes, Myctophidae) near Novaja Zemlya. Voprosy ikhtyologii 20:345-346 (in Russian)

Dalpadado P, Ellertsen B, Melle W, Skjoldal HR. 1998. Summer distribution patterns and biomass estimates of macrozooplankton and micronekton in the Nordic Seas. Sarsia 83:103-116

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Kristoffersen JB, Salvanes AGV. 2009. Distribution, growth, and population genetics of the glacier lanternfish (*Benthosema glaciale*) in Norwegian waters: Contrasting patterns in fjords and the ocean. Marine Biology Research 5:596-604

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In : Kotlyakov V.M. (ed.) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Salvanes AGV. 2004. Mesopelagic fish. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 301-314

Trachipterus arcticus (Brünnich 1788)

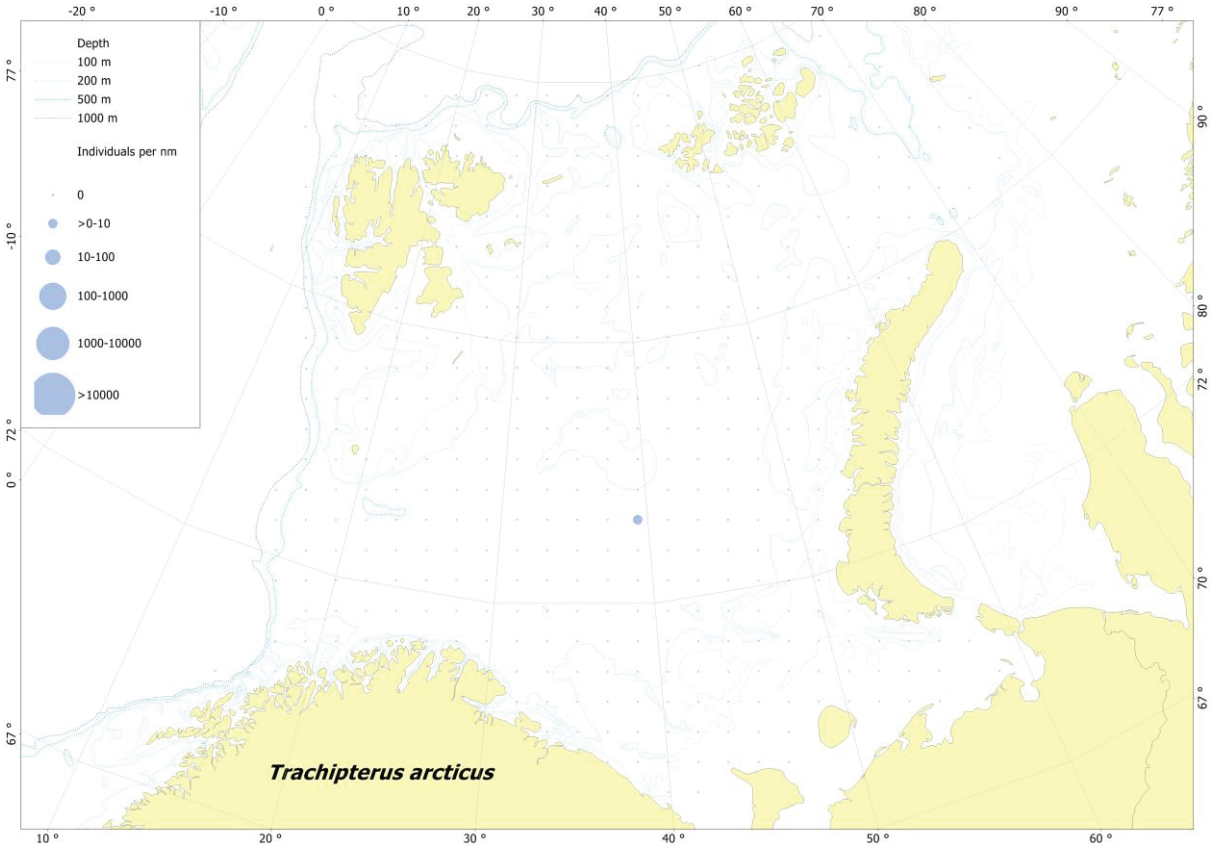
Family: Trachipteridae
English name: dealfish
Norwegian name: sølvkveite
Russian name: северный вогмер
(severniy vogmer)

Photo: Erik Olsen

Spatial distribution

Known in the eastern North Atlantic from Madeira to Iceland and Norway, including the southern Barents Sea; also in the western North Atlantic.

In the surveyed area caught by pelagic trawl in the central part.



Length composition

One specimen (150 cm) was caught by pelagic trawl.

Life history

Widely distributed, mesopelagic down to 900 m. Can reach 3 m, matures with 14 years (more than 2 m). Feeds on small fishes, shrimps and cephalopods. Spawns probably in late spring 485 000-580 000 pelagic eggs, larvae and young pelagic in deep waters.

Population and exploitation

Of no economic importance.

References

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Palmer G. 1986. Trachipteridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 729-732

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Coelorinchus labiatus (Köhler 1896)

Family: Macrouridae
English name: spearsnouted grenadier
Norwegian name: piggskjellet skolest
Russian name: полорыл
(poloryl)

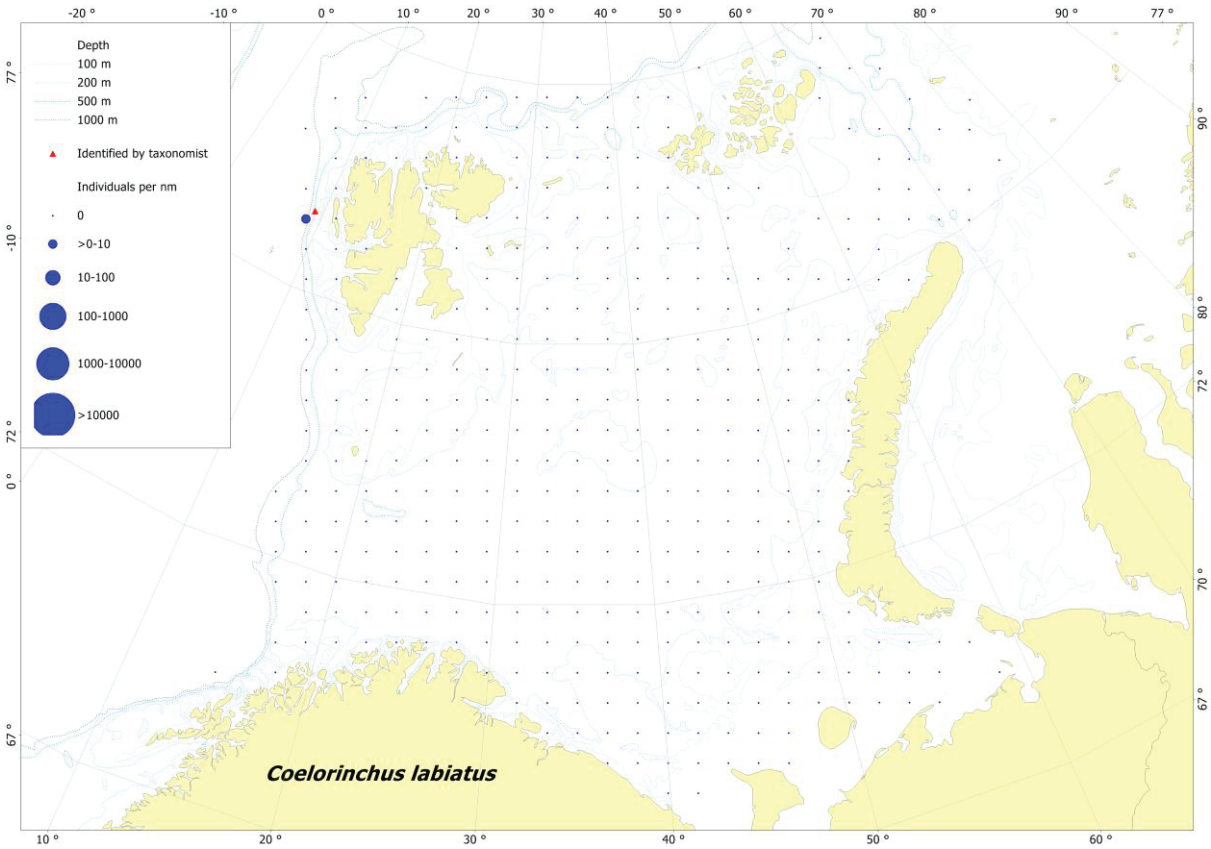
Photo: Rupert Wienerroither

Note on taxonomy: Erroneously synonymized with *Coelorinchus occa* (Goode & Bean 1886), but differs in morphology and distribution area.

Spatial distribution

Known in the eastern North Atlantic from the Canary Islands to north of the British Isles.

In the surveyed area found west of the Svalbard/Spitsbergen archipelago.



Length composition

One specimen (6 cm preanal length) was caught.

Life history

Benthopelagic at 460-2200 m. Reaches at least 50 cm, feeds primarily on fish and demersal crustaceans. Findings of 7 cm long specimens in the Faroese-Shetland area might indicate spawning in northern areas.

Population and exploitation

Of no economic importance.

References

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Geistdorfer P. 1986. Macrouridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 644-676

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Coryphaenoides rupestris Gunnerus 1765

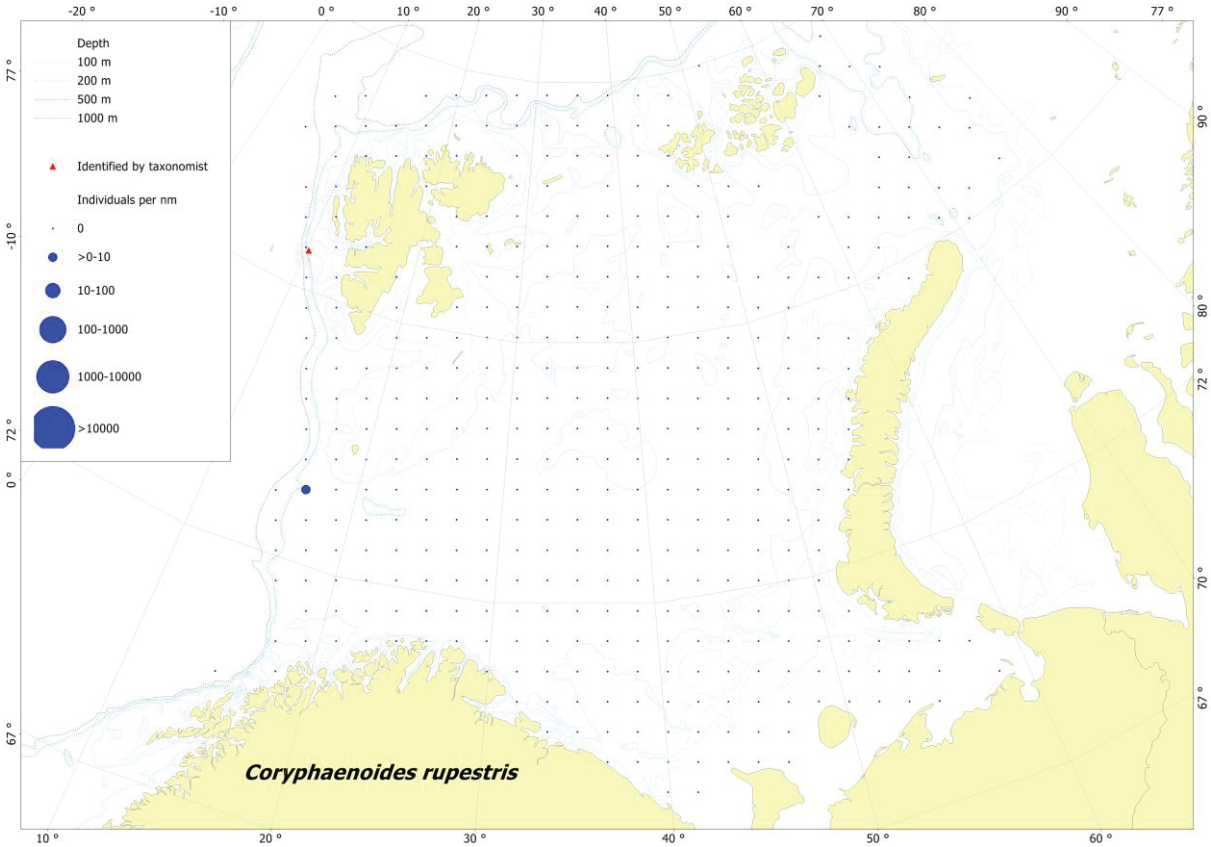
Family: Macrouridae
English name: roundnose grenadier
Norwegian name: skolest
Russian name: тупорылый макрурус
(tuporyliy makrurus)

Photo: Andrey Dolgov

Spatial distribution

Known from the Bay of Biscay to Greenland, Iceland and southern Norway, also in the western North Atlantic.

Found in the western part of the surveyed area.



Length composition

Two specimens (one with 5 cm preanal length) were caught.

Life history

Boreal, benthopelagic at 400-1200 m, occasionally shallower (especially in fjords) or deeper, in general shallower during winter, deeper during summer. Can reach 150 cm, males mature at length 40 cm, females at 60 cm. Feeds on a variety of invertebrates and fish. Spawning takes place in summer and autumn in Icelandic waters, 12 000-35 500 eggs are spawned per female, pelagic larvae. Performs diurnal vertical feeding migrations.

Population and exploitation

Of no economic importance in the Barents Sea.

References

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Geistdorfer P. 1986. Macrouridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 644-676

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Macrourus berglax Lacepède 1801

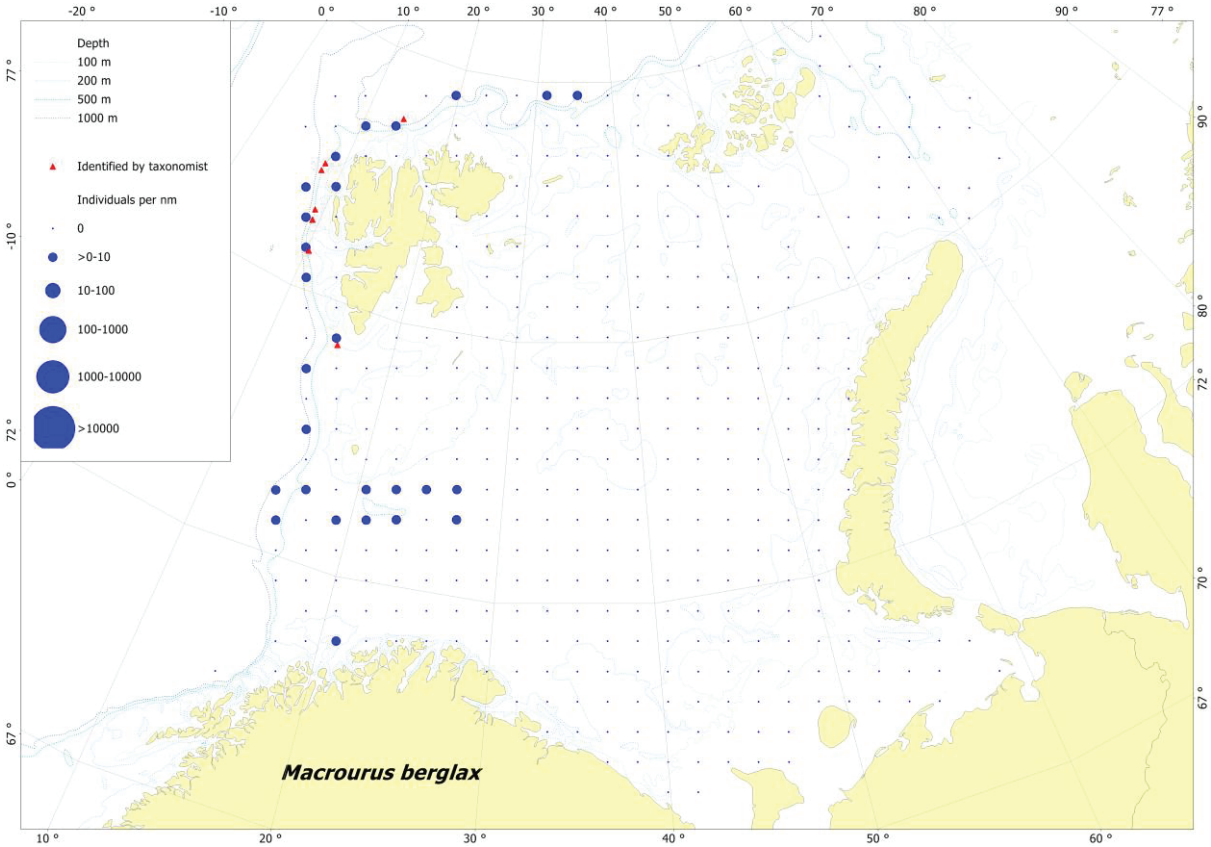
Family: Macrouridae
English name: roughhead grenadier
Norwegian name: isgalt
Russian name: северный макрурус
(severniy makrurus)

Photo: Thomas de Lange Wenneck

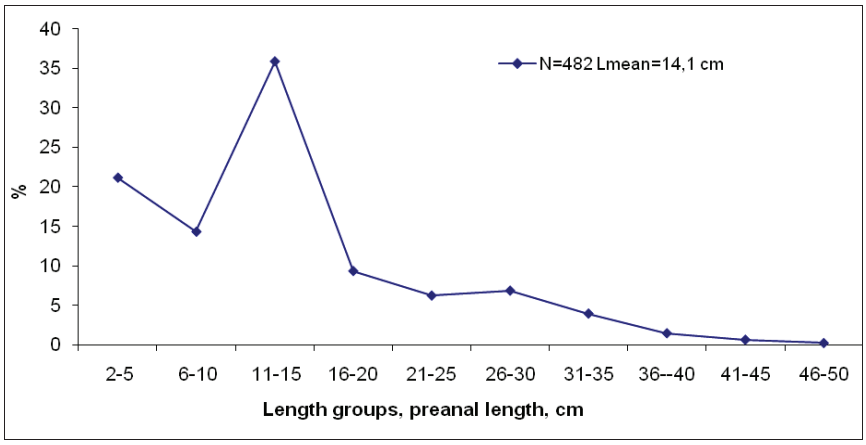
Spatial distribution

Known from the northern North Sea northward to the Barents Sea and northwestward to Iceland and Greenland, also in the western North Atlantic.

Found in deeper, Atlantic water masses of the surveyed area.



Length composition



Life history

Boreal, benthopelagic, on soft bottom at 100-1000 m, prefers temperatures around 0 ºC. Can reach 110 cm, 4-5 kg and at least 25 years. Growth rates for both sexes are the same until an age of 8-9 years (about 16 cm pre-anal length), matures at age 15 years (males at 53.7 cm, females at 42 cm). However, age and length at the change in growth rates as well as at reaching maturity may vary with prevailing temperature conditions and region, respectively. Feeds mainly on shrimp and other bottom invertebrates (ophiurids, mollusks, gammarids), also on fish. Spawning varies with region, taking place off Troms in January, depending on female's size, 2 000-71 000 eggs are spawned.

Population and exploitation

Of minor economic importance in the Barents Sea, occurs as bycatch on bottom trawl and long-line fisheries of Greenland halibut, sometimes landed by Russian vessels.

References

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Dolgov AV, Drevetnyak KV, Sokolov KM, Grekov AA, Shestopal IP. 2008. Biology and fisheries of Roughhead grenadier in the Barents Sea. In: Orlov AM, Iwamoto T (eds) Grenadiers of the World Oceans: Biology, Stock Assessment, and Fisheries. American Fisheries Society Symposium, 63. AFS Publication, 2008. pp 343-363

Geistdorfer P. 1986. Macrouridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 644-676

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Rodríguez-Marín E, Ruiz M, Sarasua A. 2002. Validation of roughhead grenadier (*Macrourus berglax*) otolith reading. Journal of Applied Ichthyology 18:70-80

***Arctogadus glacialis* (Peters 1872)**

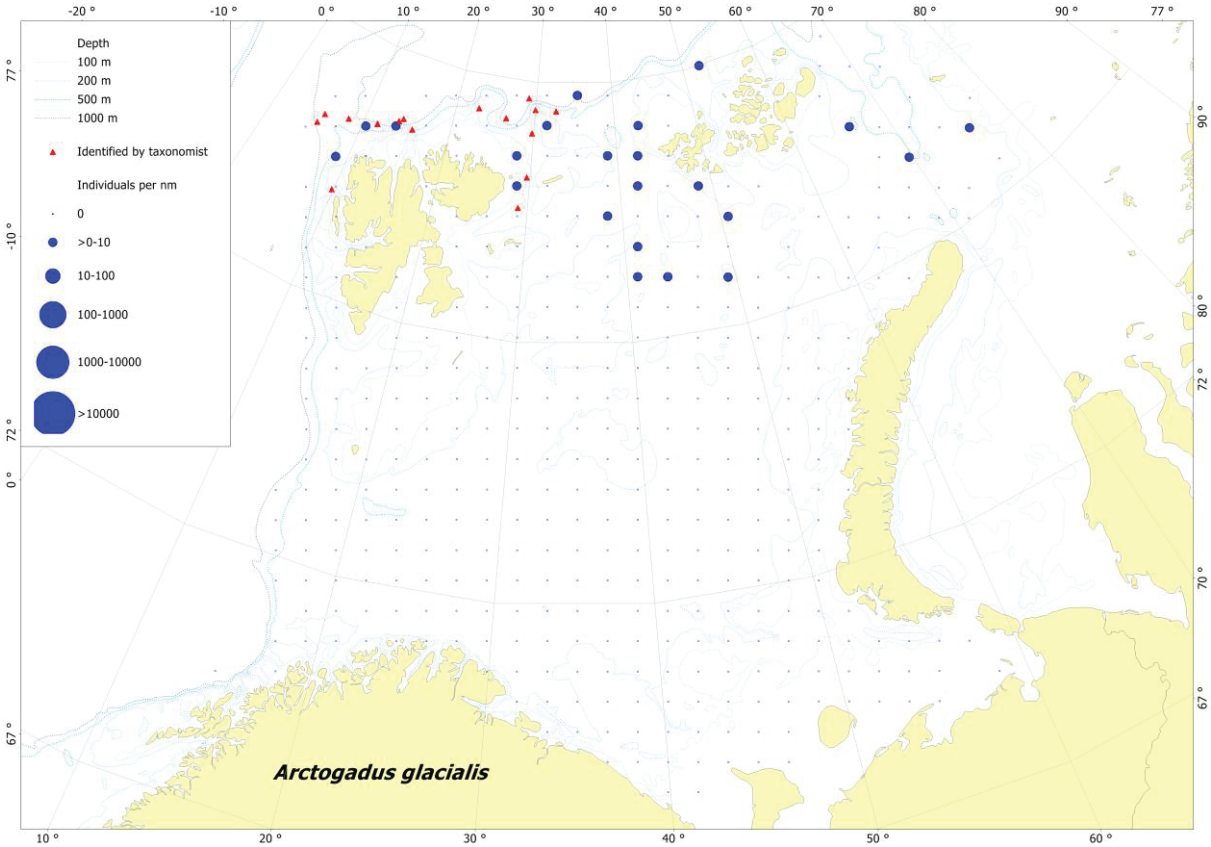
Family: Gadidae
English name: Arctic cod
Norwegian name: istorsk
Russian name: ледовая (черная) треска
(ledovaya (tchernaya) treska)

Photo: Thomas de Lange Wenneck

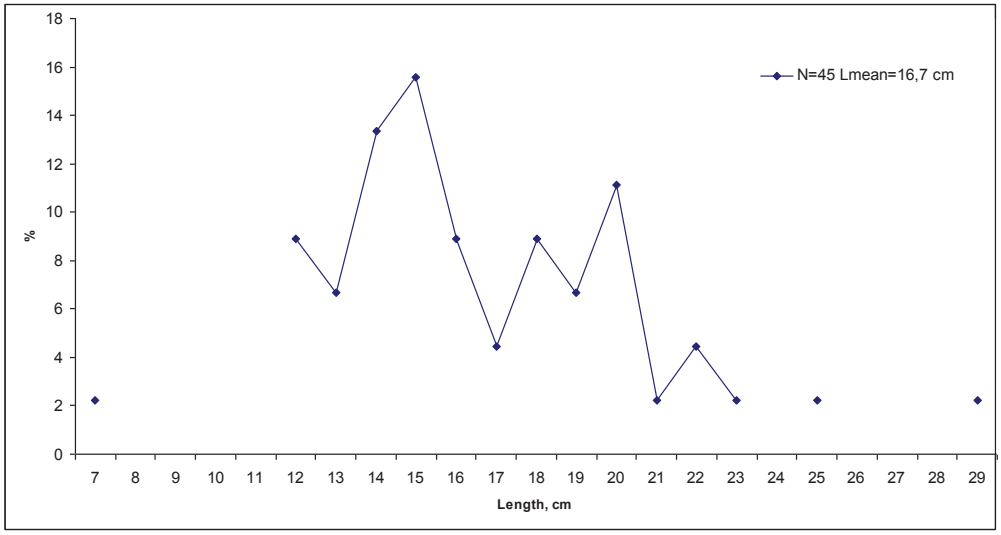
Spatial distribution

Occurs circumpolar in the Arctic.

Found in the northern parts of the surveyed area, off Svalbard/Spitsbergen and Franz Josef Land, close to the slope towards the polar basin.



Length composition



Life history

Arctic, cryopelagic, often associated with ice at sea, generally found at depths down to 1000 m and in waters with low temperature (commonly below 0 ºC), in the European Arctic at 155-741 m, with highest abundances at 300-400 m and associated with the continental shelves. Can reach 52 cm, 1.2 kg, and more than 11 years, commonly less than 30 cm and 7 years. Females with a length of 25-26 cm have been found with ripening gonads, one (29.4 cm, 5 years) with post-spawning gonads. Opportunistic feeder, mainly on pelagic crustaceans. Information on spawning patterns is scarce, spawning in the European Arctic is likely taking place during summer.

Population and exploitation

Of no economic importance, verified records in the European Arctic are rare.

References

Aschan M, Karamushko OV, Byrkjedal I, Wienerroither R, Borkin IV, Christiansen JS. 2009. Records of the gadoid fish *Arctogadus glacialis* (Peters, 1874) in the European Arctic. Polar Biology 32:963-970

Jordan AD, Møller PR, Nielsen JG. 2003. Revision of the Arctic cod genus *Arctogadus*. Journal of Fish Biology 62:1339-1352

Svetovidov AN. 1986. Gadidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 680-710

***Boreogadus saida* (Lepechin 1774)**

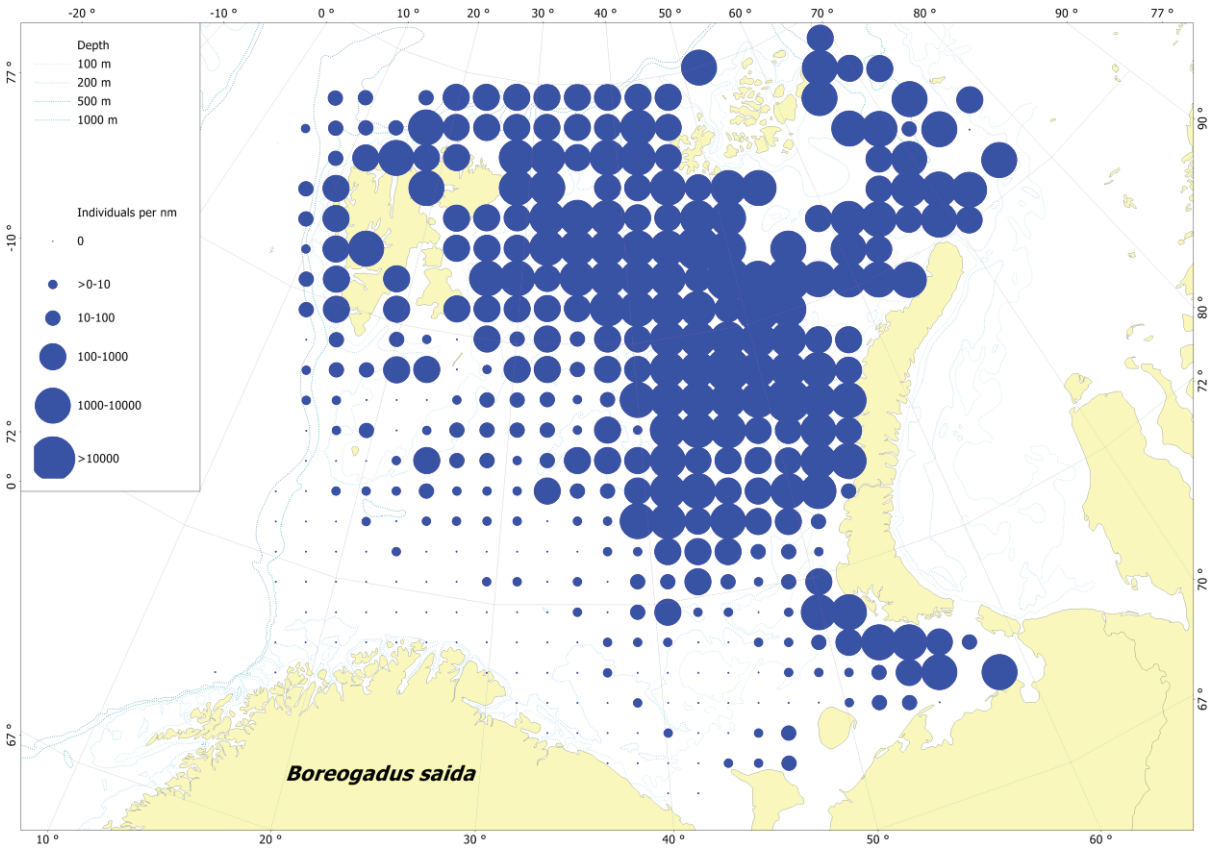
Family: Gadidae
English name: Polar cod
Norwegian name: polartorsk
Russian name: сайка, полярная тресочка
(saika), (polyarnaya tresochka)

Photo: Thomas de Lange Wenneck

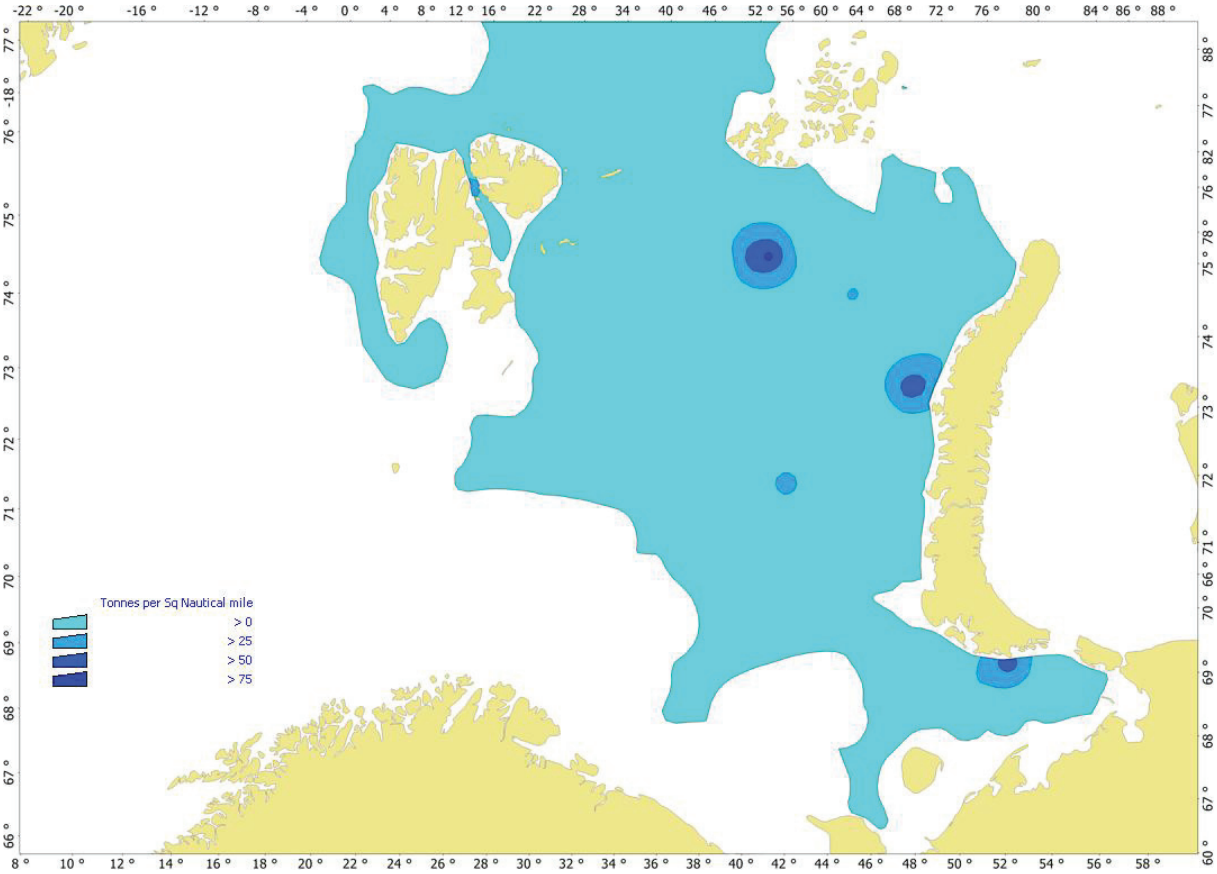
Spatial distribution

Known throughout the entire North Polar Basin, also in the areas around Greenland and Iceland.

Found almost throughout the surveyed area, highest numbers in the north and east. Although often found in the pelagic, the distribution pattern based on demersal trawl catches reflects the overall distribution well.

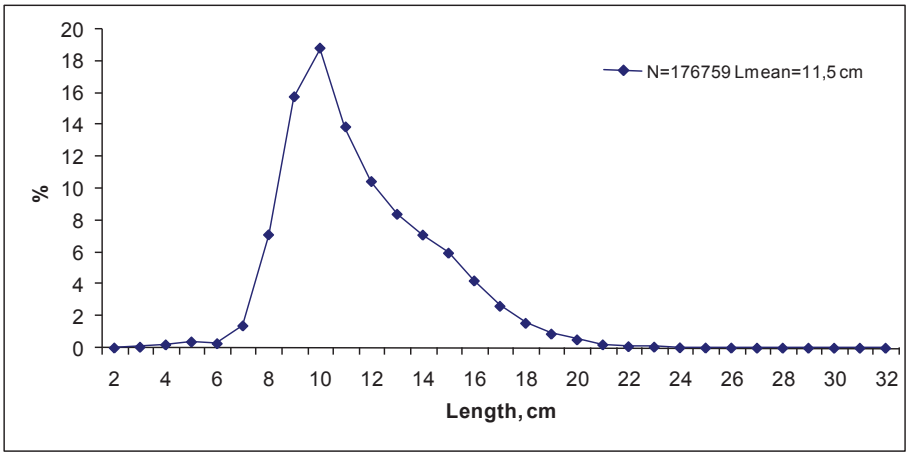


Distribution pattern based on bottom trawls.



Average biomass of Polar cod in the period 2004-2009 based on acoustic survey data.

Length composition



Life history

Arctic, pelagic to benthopelagic, often found in high concentrations, tolerates temperatures below 0 ºC. Can reach 46 cm (commonly 20-30 cm), 0.1 kg, 5 years, and matures usually at age 2 years. Feeds on larger plankton and is an important food source for many other fish, sea mammal and bird species. Spawns near the ice edge from December to March in the southeastern and northeastern Barents Sea and east of Svalbard/Spitsbergen. Females spawn

9 000-21 000 pelagic eggs, hatching after 1.5-2 months. During the winter found closer to the Norwegian and Murman coast.

Population and exploitation

Highest densities are found in the eastern Barents Sea and the area off the Svalbard/Spitsbergen archipelago. The stock in the Barents Sea varies from year to year and was estimated to more than one million tonnes in 2010. There is a separate small population in the Porsangerfjord.

Since the early 1980s only Russia is catching the species for commercial purposes.

References

Ajiad A, Oganin IA, Gjøsæter H. 2011. Polar cod. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Borkin IV, Karasev AB, Oganin IA, Shatalov PA. 2010. Polar Cod of the Eastern Barents Sea. In: Development of national fisheries in the North Basin after the introduction of the 200-mile zones. PINRO Press, Murmansk, pp. 256-264 (in Russian)

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Tjelmeland S. 2010. Polartorsk. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:132 (in Norwegian)

Eleginus nawaga (Walbaum 1792)

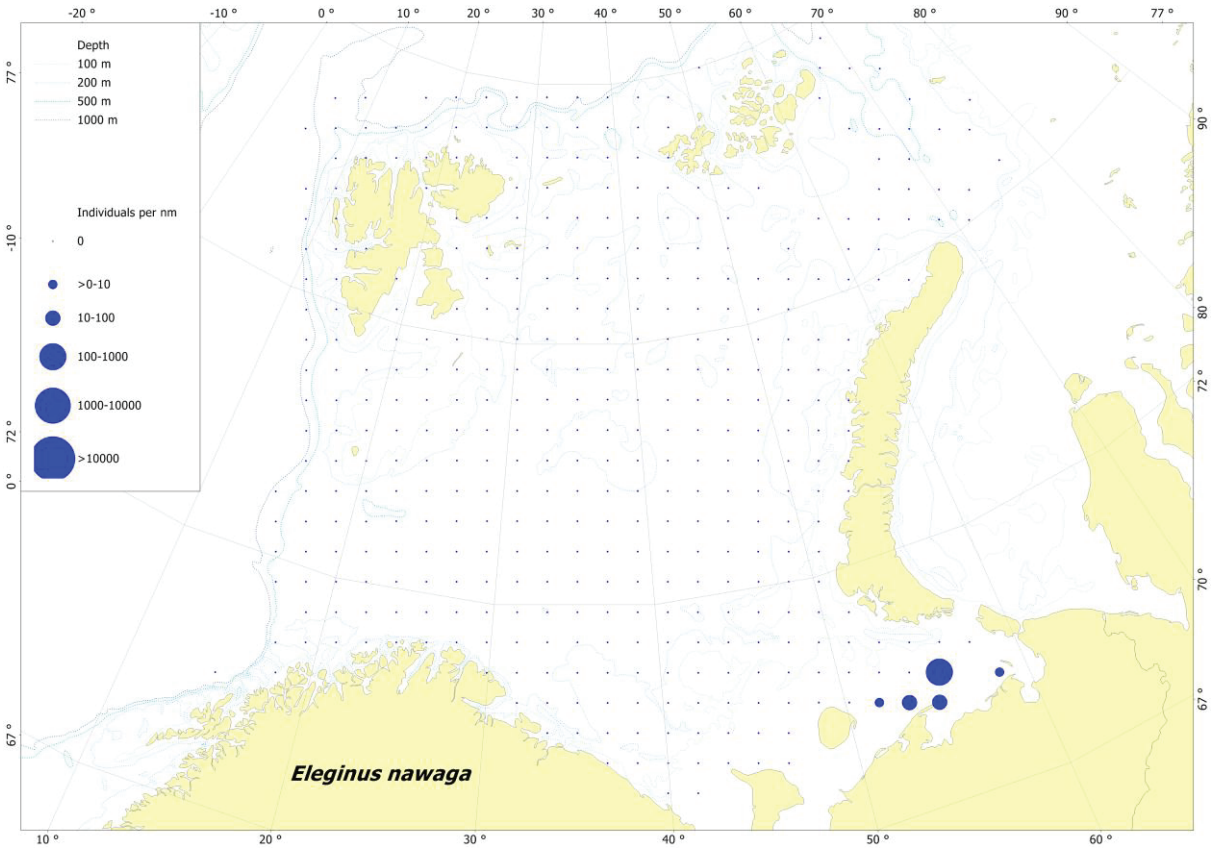
Family: Gadidae
English name: navaga
Norwegian name: nawagatorsk
Russian name: навага
(navaga)

Photo: O.Yu.Chetyrkina

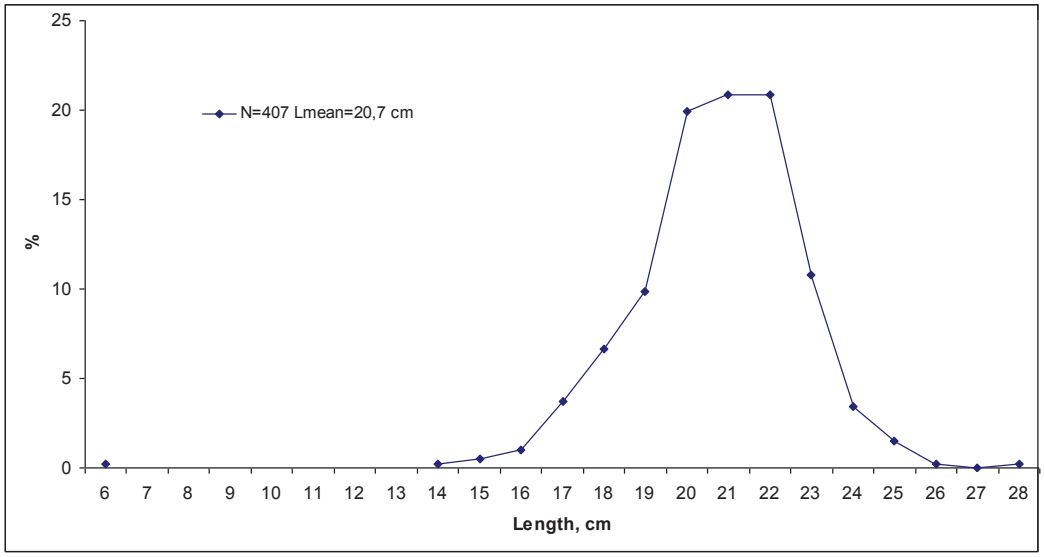
Spatial distribution

Known in the White Sea, the southeastern Barents Sea and the southwestern Kara Sea.

Found in the southeastern part of the surveyed area.



Length composition



Life history

Arctic, inshore, coastal, preferring shallow depths over soft bottom. Sometimes large schools can be found under the ice, also found in brackish waters and entering the mouth of rivers. Reaches up to 42 cm (commonly 30-35 cm), 0.7 kg and 5-6 years. Growth rates and maximum sizes differ between stocks. Matures at age 2-4 years. Feeds on benthic invertebrates (polychaets, gammarids, mysids, mollusks) and small fish, food source for many fish, mammal and bird species. Forages hardly during summer when water temperature is higher than 10 ºC. Females spawn 6 000-90 000 demersal eggs (1.5-1.9 mm in diameter) at 8-15 m depth over sandy and stony grounds. Spawning takes place in January and only in salt water. Except for daily feeding no migrations are known.

Population and exploitation

Caught by traps, nets and bottom trawls from November to January during mass gatherings before spawning. Catch rates are decreasing, annual catch in the past decade: 90-360 tonnes.

References

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Svetovidov AN. 1986. Gadidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 680-710

Gadiculus argenteus Guichenot 1850

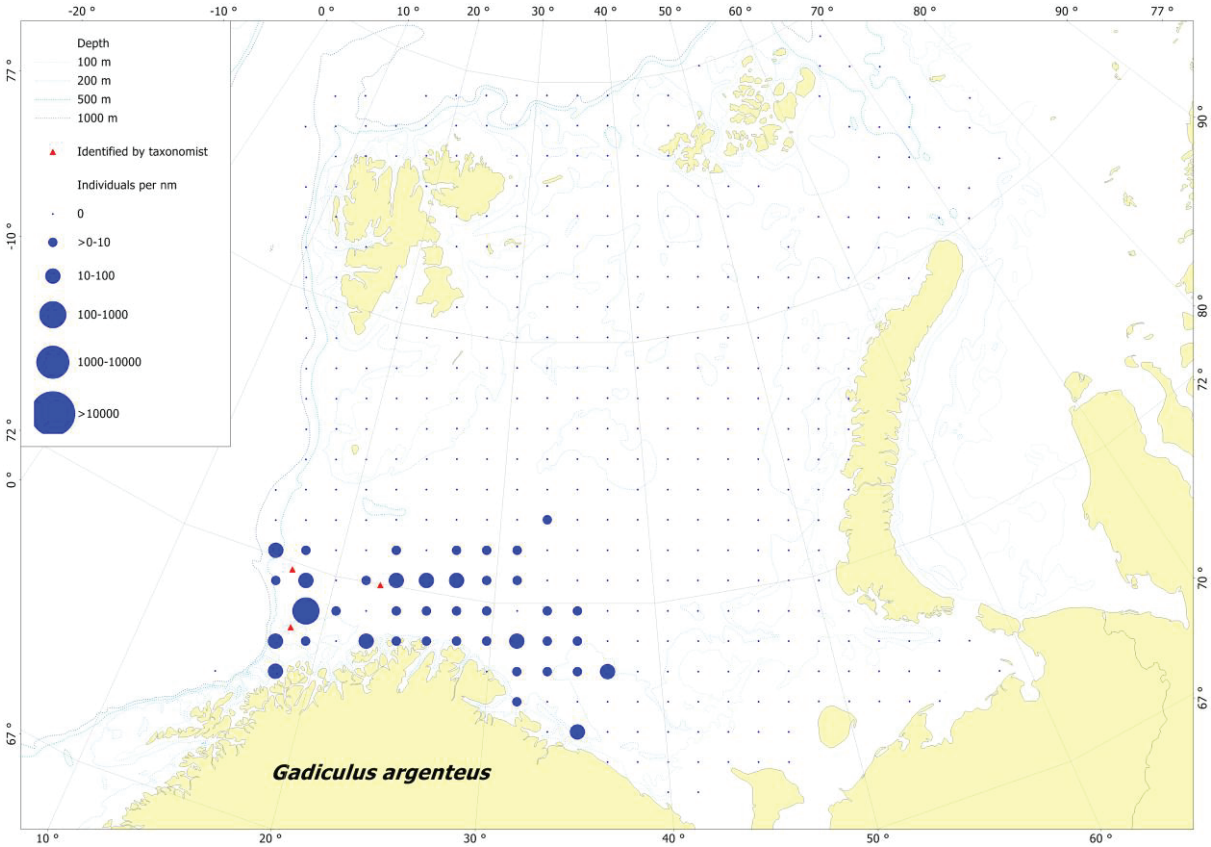
Family: Gadidae
English name: silvery pout
Norwegian name: sølvtorsk
Russian name: большеглазая тресочка
(bolsheglazaya tresotchka)

Photo: Andrey Dolgov

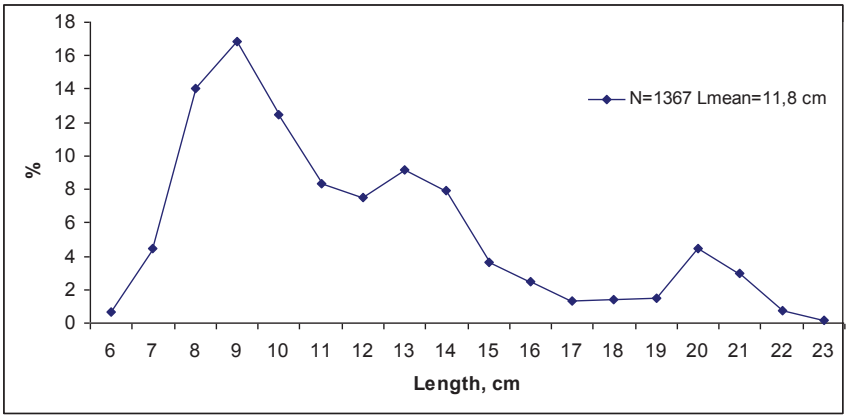
Spatial distribution

Known in the eastern North Atlantic from the northwestern African coast, in the Mediterranean up to the southwestern Barents Sea.

Found in the southwestern part of the surveyed area.



Length composition



Life history

Boreal, pelagic, schooling, over soft bottom at 60-1000 m, most common in 200-500 m along the continental slope, but also abundant in the fjords. Can reach 15 cm (commonly not more than 13 cm) and 3 years. Growth rates in the first year very high. Feeds on planktonic crustaceans as well as polychaetes, food source for other commercially important fish species. Spawning takes place in deep waters, in Norway in the area south of Møre and Romsdal in spring. Eggs and larvae pelagic, normally found deeper than 200 m.

Population and exploitation

Of no particular economic importance, but bycatch rates can be very high.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Gadus morhua Linnaeus 1758

Family: Gadidae
English name: Atlantic cod
Norwegian name: torsk
Russian name: треска
(treska)

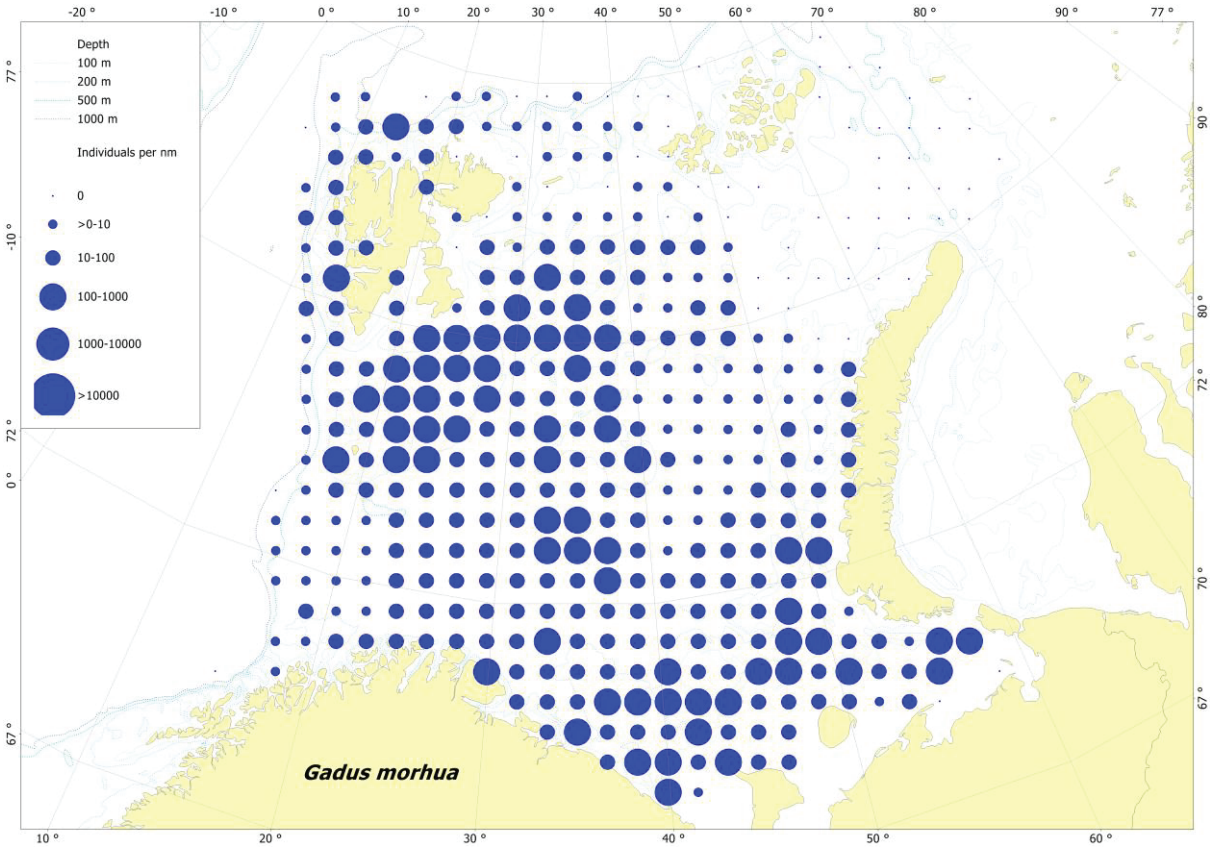
Photo: Thomas de Lange Wenneck

Spatial distribution

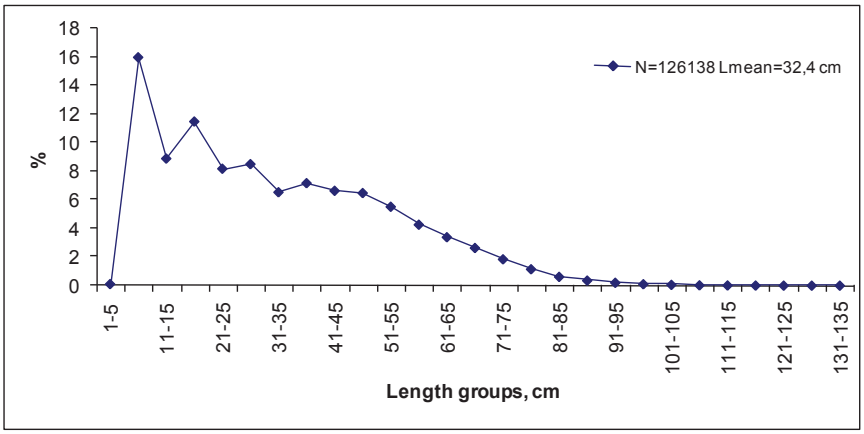
Known from the Bay of Biscay northward to Iceland, Svalbard/Spitsbergen, and Novaya Zemlya, also around Greenland and in the western North Atlantic.

There are two ecological groups distinguished within *G. morhua*: migrating oceanic cod and a more stationary coastal cod, both divided into several stocks. The Northeast Arctic cod is the oceanic stock in the Barents Sea, while the Norwegian coastal cod is a mixture of several more stationary stock components in fjords and coastal areas north of 62° N. Apart from migration behaviour the oceanic and coastal cod differ in the structure of the growth zones in the otoliths.

Atlantic cod is distributed throughout the surveyed area, except from the coldest waters between Franz Josef Land and Novaya Zemlya. Catch rates are highest in the Bear Island-Hopen area, the central parts and the southeastern Barents Sea.



Length composition



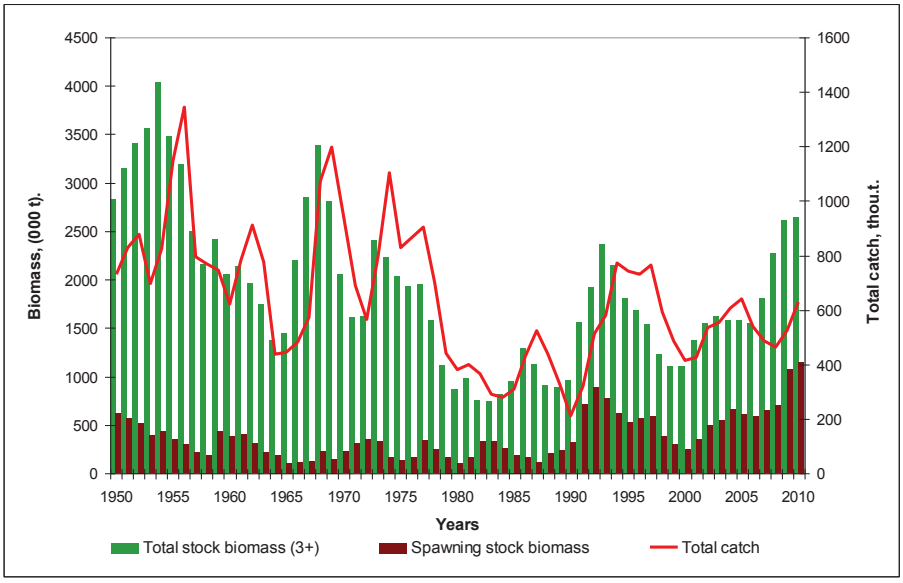
Life history

Northeast Arctic cod: found on the warmer side of the polar front in the Barents Sea, benthopelagic from the surface down to 600 m depth. Can reach 1.69 m, 55 kg, and 30 years. Matures at age 8-10 years (80-90 cm), age at maturity and growth rates have shown large changes over time. Juveniles up to 2 years feed mainly on zooplankton, older cod on fishes, large crustaceans, zooplankton and demersal fauna. Spawning takes place in February-May in the area off Lofoten and Vesterålen at 50-200 m. A large female can spawn portionally up to 9 million pelagic eggs, 4 mm long larvae hatch after 2-5 weeks (depending on temperature). Eggs and larvae drift into the Barents Sea, arriving there in autumn and changing to a more benthic way of living. They stay in their nursing area until 3-4 years old, before starting feeding migrations towards the Finnmark and Murman coast, following the capelin. Temperature- and climate-related changes in the distribution of the stocks have been observed several times previously.

Norwegian coastal cod north of 62º N: benthopelagic from the kelp belt down to 500 m depth. Can reach 1.3 m, 40 kg, and 20 years (commonly less than 15), matures at age 3-6 years. Matures earlier, growths faster but lives shorter than Northeast Arctic cod. Top predator, feeding on everything from plankton to fish. Depending on age females spawn 400 000 to 15 million pelagic eggs. Juveniles benthic at 0-20 m, hardly deeper before older than 2 years. Stationary, with spawning, nursing and feeding grounds in the fjords and coastal areas.

Population and exploitation

Northeast Arctic cod is the world's largest stock of cod. Between 1950 and 2009 the biomass varied from 738 000 to 4 039 000 tonnes (mean 1 898 000 tonnes). Currently (2010) it is in good condition and above the long-time average. The spawning stock is increasing and close to the historical high level.



There are indications for several separate populations within the stock of Norwegian coastal cod, differing in growth rate and maturity age. However, the assessment is done for the whole stock and is now on a low level after a decline from 1994 to 2003. The calculated spawning stock of 2009 is one of the lowest and is not expected to increase in the coming years.

References

Aglen A, Drevetnyak K, Sokolov K. 2004. Cod in the Barents Sea (North-East Arctic cod), a review of the biology and the history of fisheries and management. In: Bjordal Å, Gjøsæter H, Mehl S (eds) Management Strategies for Commercial Marine Species in Northern Ecosystems. Proceedings of the 10th Norwegian-Russian Symposium, Bergen, 27-29 August 2003, pp 27-39

Berg E. Torsk – Norsk kysttorsk nord for 62°N. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:153 (in Norwegian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Bogstad B. 2010. Torsk – Nordaustarktisk torsk. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:155 (in Norwegian)

Boitsov VD, Lebed NI, Ponomarenko VP, Ponomarenko IY, Tereshchenko VV, Tretyak VL, Shevelev MS, Yaragina NA. 1996. The Barents Sea Cod: Biological and Fisheries Outline. PINRO Press, Murmansk. 285 pp (in Russian)

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Hylen A, Nakken O, Nedreaas K. 2008. Northeast Arctic cod: fisheries, life history, stock fluctuations and management. In: Nakken O (ed) Norwegian spring-spawning herring & Northeast Arctic cod. Tapir, Trondheim, pp 83-118

Melyantsev RV, Yaragina NA. 1986. Atlantic cod. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea, KFAN Press, Apatity, pp 23-29 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Svetovidov AN. 1948. Gadiformes. In: Pavlovsky EN (ed) Fauna of the USSR. Fishes, 9 (4). USSR Academy of Sciences Press, Moscow-Leningrad. 222 pp (in Russian)

Yaragina NA, Aglen A, Sokolov KM. 2011 Cod. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Melanogrammus aeglefinus (Linnaeus 1758)

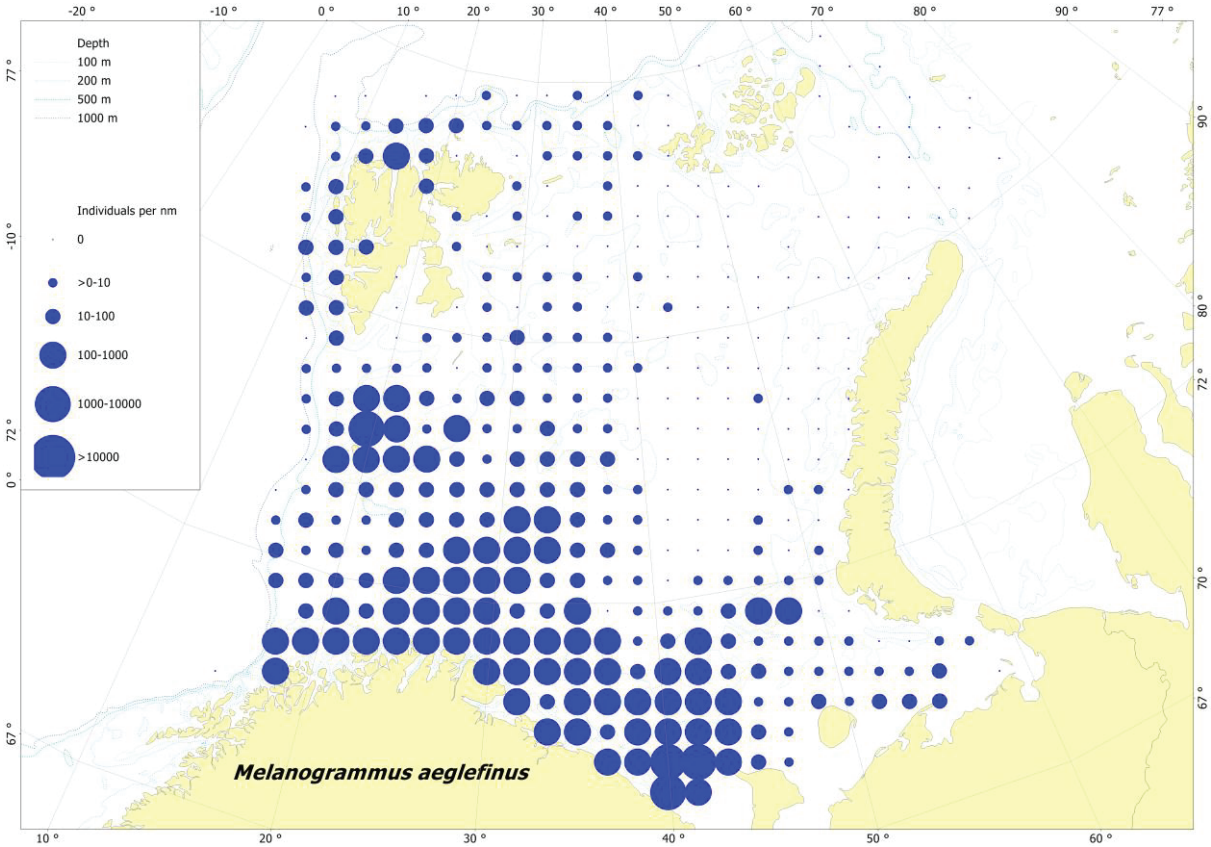
Family: Gadidae
English name: haddock
Norwegian name: hyse
Russian name: пикша
(piksha)

Photo: Andrey Dolgov

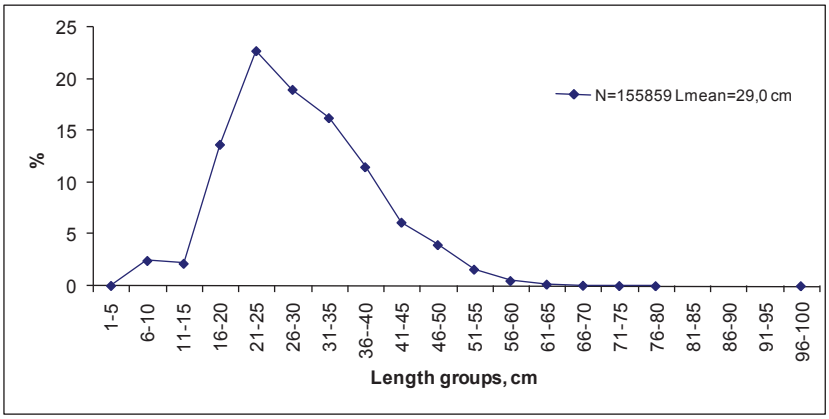
Spatial distribution

Known from the Bay of Biscay northward to Iceland, Svalbard/Spitsbergen and Novaya Zemlya, also in the western North Atlantic. Northeast Arctic haddock, the largest stock of the species, is found along the Norwegian coast north of 62° N, in the Barents Sea, and west of the Svalbard/Spitsbergen archipelago.

Found mainly in the southern and northwestern part of the surveyed area, high catch rates also in waters around Bear Island.



Length composition

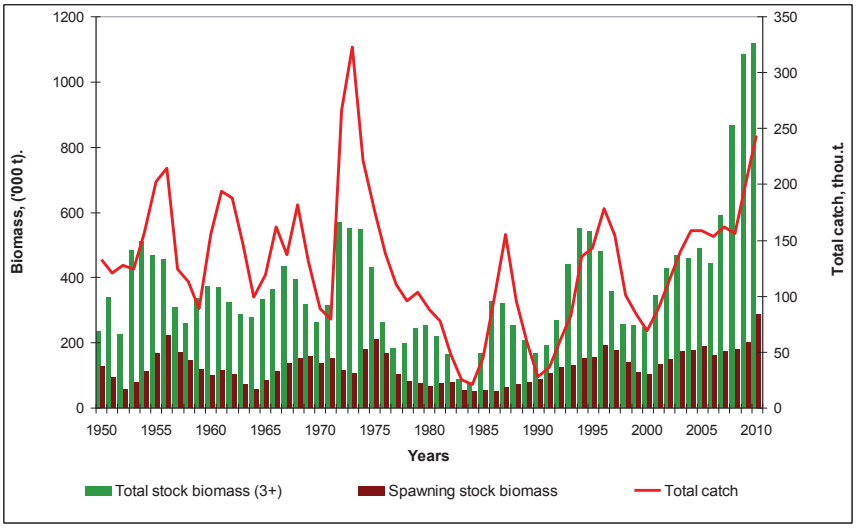


Life history

Mainly boreal, benthopelagic at depths of 40-300 m, also found pelagic, prefers higher temperatures. Reaches 110 cm, up to 19 kg and 20 years, matures at age 4-7 years (40-60 cm). Average growth in the Barents Sea: 17.6 cm (1 year), 24.7 cm (2 years), 41-46 cm (4-5 years), and 61.3 cm (8 years). Juveniles and medium sized fish feed primarily on benthic invertebrates (ophiuroids, polychaetes, mollusks) and large plankton (euphausiids), adult fishes also on fish. Spawning takes place between March and June at 100-150 m off the Norwegian coast. Large and old females can spawn up to 3 million pelagic eggs (1.2-1.7 mm in diameter). Larvae are 3.5-4 mm long when hatched after 12-14 days. Small fishes in the Barents Sea are stationary, whereas large fishes undertake extensive migrations in the Barents Sea and spawning migrations southward.

Population and exploitation

Between 1950 and 2009 the biomass varied from 70 000 to 1 085 000 tonnes (mean 361 000 tonnes). The stock is at a historically high level (2010), caused by several strong year-classes since 2000. Mainly Norway and Russia are harvesting the stock commercially. Some of the catches are bycatch when trawling for cod, but there is also a directed trawl and long-line fishery.



References

Aanes S. 2010. Hyse – Nordøstarktisk hyse. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:117 (in Norwegian)

Berestovsky EG, Mukhina NV. 1986. Haddock. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 32-34 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Russkikh AA, Dingsør GE. 2011. Haddock. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Merlangius merlangus (Linnaeus 1758)

Family: Gadidae
English name: whiting
Norwegian name: hvitting
Russian name: мерланг
(merlang)

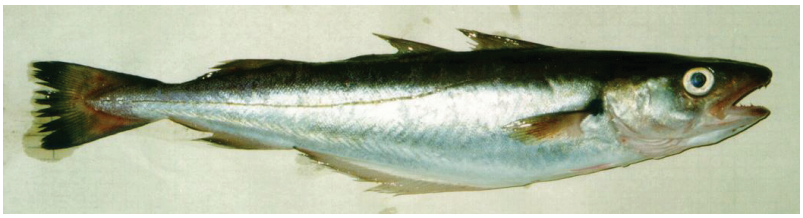
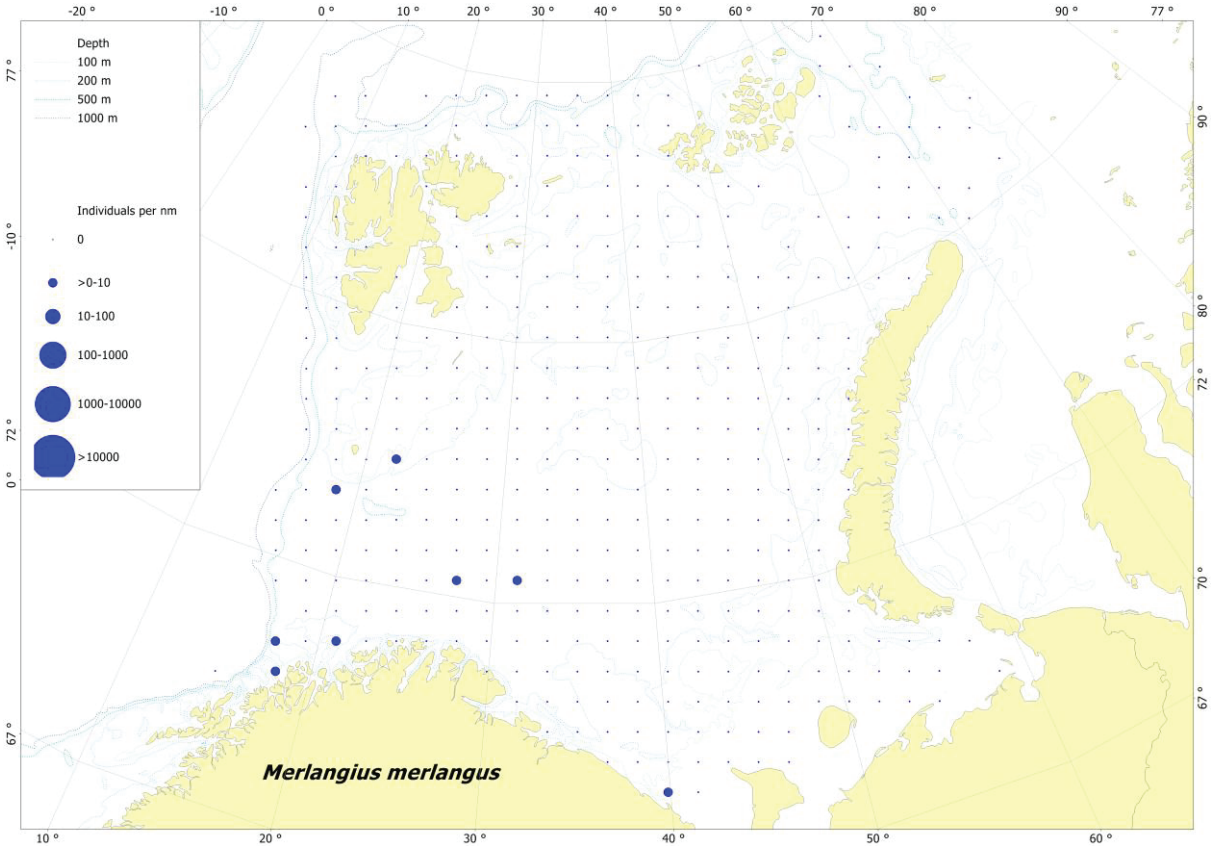


Photo: Andrey Dolgov

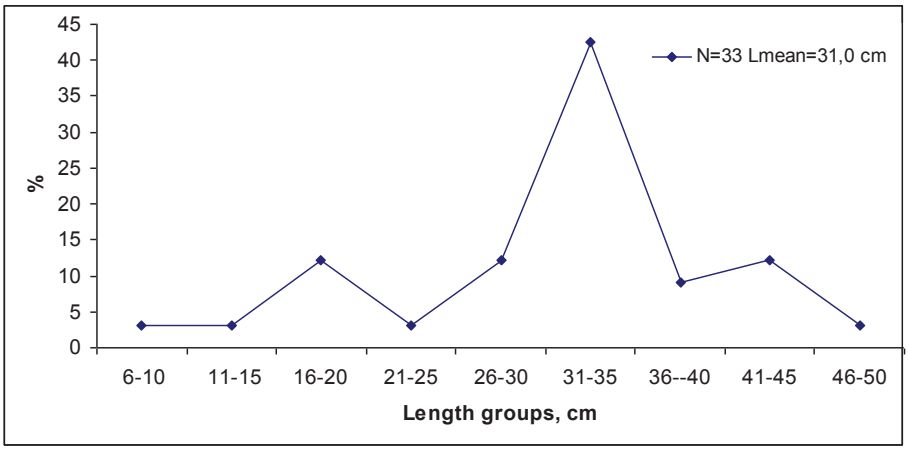
Spatial distribution

Endemic in the eastern North Atlantic from Gibraltar to Iceland and the southwestern Barents Sea, also in the Mediterranean and Black Sea.

Found in warmer water mainly along the coast of Norway and Russia.



Length composition



Life history

Boreal, benthopelagic at 10-200 m, to some extent pelagic. Can reach 55 cm, 1.5 kg, and 20 years, matures at age 2 years (25-30 cm). Feeds mainly on fish and crustaceans. The main spawning area is the North Sea (but it can spawn as far north as Trøndelag), taking place during several months from January to July. A female spawns up to 300 000 pelagic eggs (1.0-1.3 mm in diameter) at 40-100 m. Newly hatched larvae measure 3.2-3.5 mm, juveniles hiding below jellyfish when 12 mm long, changing to benthopelagic at length 5-10 cm. Large specimens are known to migrate but migration patterns are poorly known.

Population and exploitation

The population in the North Sea has reached a low and recruitment was low the past years.

No fishery for the species in the Barents Sea.

References

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Jakobsen T. 2010. Hvitting. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:118 (in Norwegian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Micromesistius poutassou (Risso 1827)

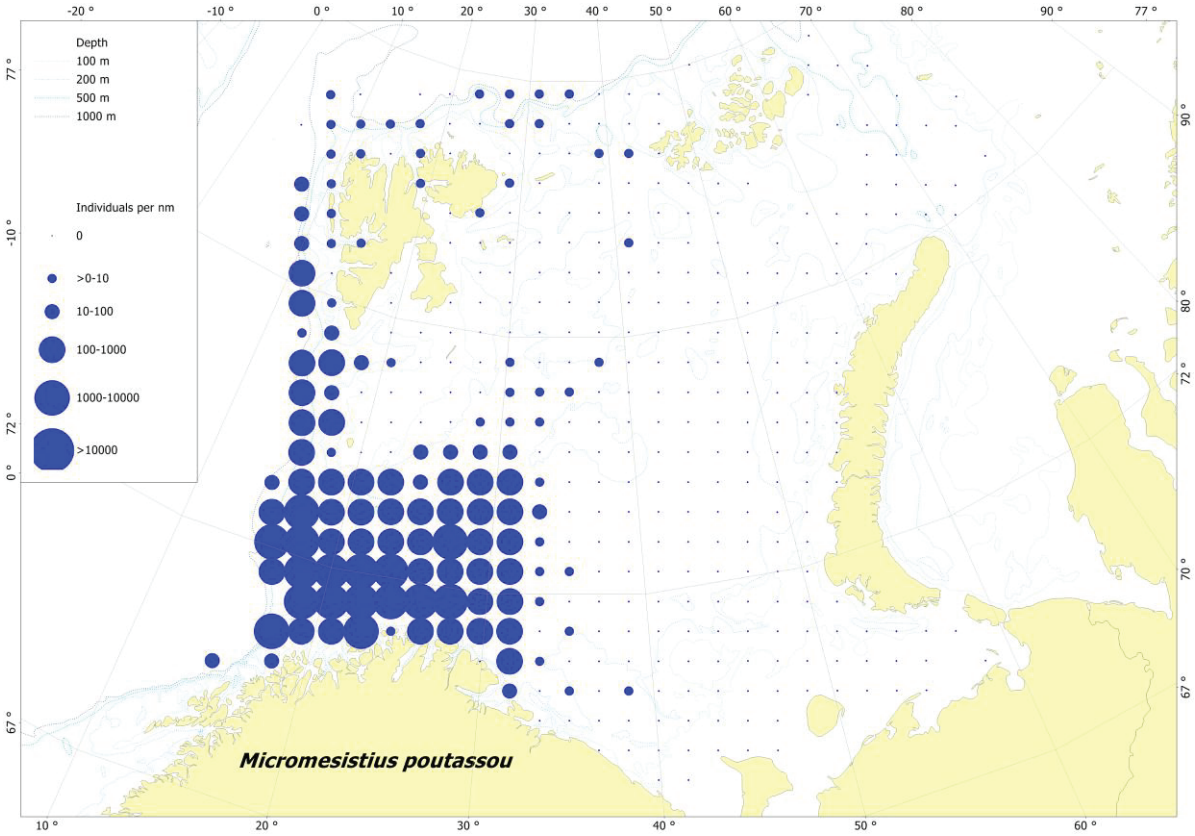
Family: Gadidae
English name: blue whiting
Norwegian name: kolmule
Russian name: путассу
(putassu)

Photo: Andrey Dolgov

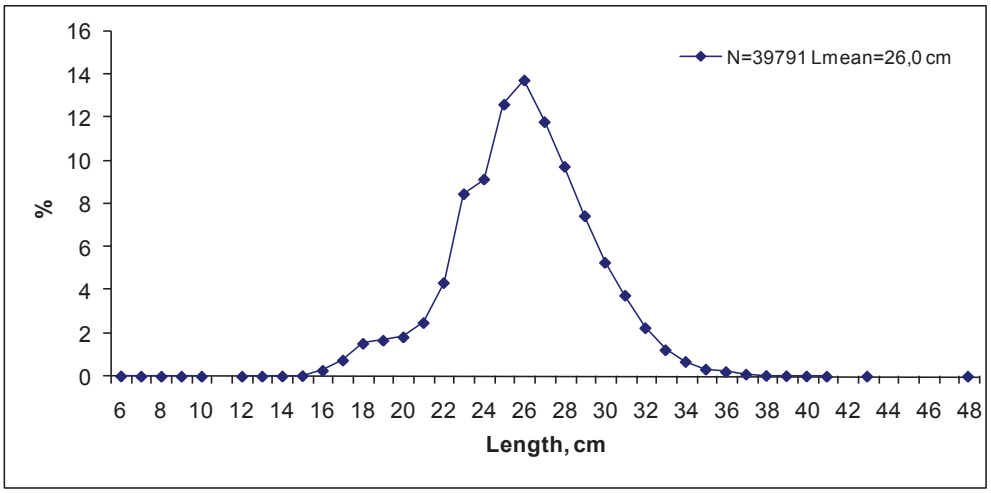
Spatial distribution

Known in the eastern North Atlantic from North Africa to Greenland, Iceland and Svalbard/Spitsbergen, also in the Mediterranean and occasionally in the western North Atlantic.

In the surveyed area found mainly in the southwestern part and north along the slope west of Svalbard/Spitsbergen. Catches rates highest in the deeper parts associated with the warmer Atlantic water. Demersal trawl might not reflect the overall distribution of this semipelagic species well, however, in the shallow Barents Sea it is found close to the bottom and consequently the distribution is believed to be well represented by the surveys included here.



Length composition



Life history

Mainly boreal, nerito-pelagic, highly abundant in the northeastern Atlantic, common at depths of 100-600 m, but as daily vertical migrator also observed in surface waters. Reaches 50 cm, 0.8 kg, and up to 20 years (rarely more than 10 years and 35-40 cm), matures at age 2-7 years. Feeds on krill, amphipods and small fish, food source for saithe, halibut and whales. The main spawning area is west of the British Isles, where it spawns from February to April. Eggs and larvae drift with the currents. Drifting patterns vary from year to year, but the Norwegian Sea is the most important feeding and nursing ground. Dense schools can be found in early summer from Iceland and Jan Mayen to the Svalbard/Spitsbergen archipelago, with the largest fishes furthest north and east.

Population and exploitation

It is managed as one stock, even if there is a northern and a southern population with a rough boundary at the Porcupine bank west of Ireland. There are small local populations in the Barents Sea and in some fjords which hardly migrate at all, but the bigger part belongs to the oceanic, Atlantic, main population. Stock size reached a top in the mid 2000s and has decreased since, influencing the ecosystem in the Norwegian and the Barents Sea. The abundance in the Barents Sea is dependent on recruitment to the stock, in years of high recruitment more migration into the area is observed.

References

Belikov S, Oganin I, Høines Å. 2011. Blue whiting. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147
Dolgov AV, Johannesen E, Heino M, Olsen E. 2010. Trophic ecology of blue whiting in the Barents Sea. ICES Journal of Marine Science 67:483-493
Høines Å. 2010. Kolmule. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:119 (in Norwegian)
Monstad T. 2004. Blue Whiting. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 263-288
Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Pollachius pollachius (Linnaeus 1758)

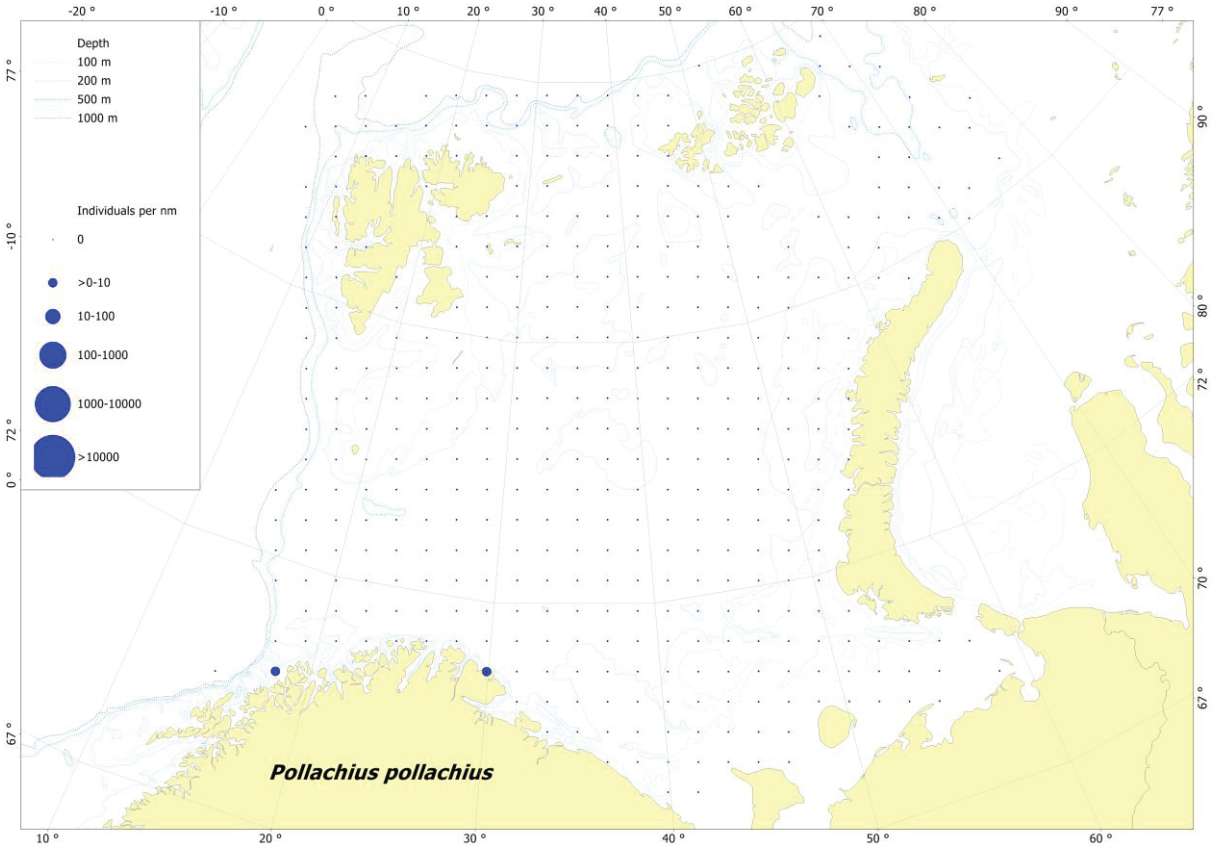
Family: Gadidae
English name: pollack
Norwegian name: lyr
Russian name: серебристая сайда, люр (serebristaya saida), (ljur)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known from the Bay of Biscay northward to the southern Barents Sea, including the British Isles and Iceland.

Occasionally found along the coast in the southern part of the surveyed area.



Length composition

Four specimens (30-54 cm, mean length 43.0 cm) were caught.

Life history

Boreal, neritopelagic to benthopelagic over hard bottoms from coastal zones down to 200 m. Can reach 1.3 m (rarely over 75 cm), 10 kg and 8 years. Growth rates are higher in the southern distribution area, in Norwegian waters 50 cm after 5 years. Feeds on fish and crustaceans. In southern Norway spawning takes place in May, other important spawning areas are west of the British Isles and in the Gulf of Biscay. Spawns at about 100-150 m, eggs and juveniles are pelagic. Juveniles are found near the coast during the first 2-3 years, often in schools with other fishes of the same size, also larger specimens can form schools. Avoids the cold coastal waters during the winter and migrates to deeper waters.

Population and exploitation

Caught in recreational fishery and often as bycatch in the fishery for cod and saithe, but of lower economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Pollachius virens (Linnaeus 1758)

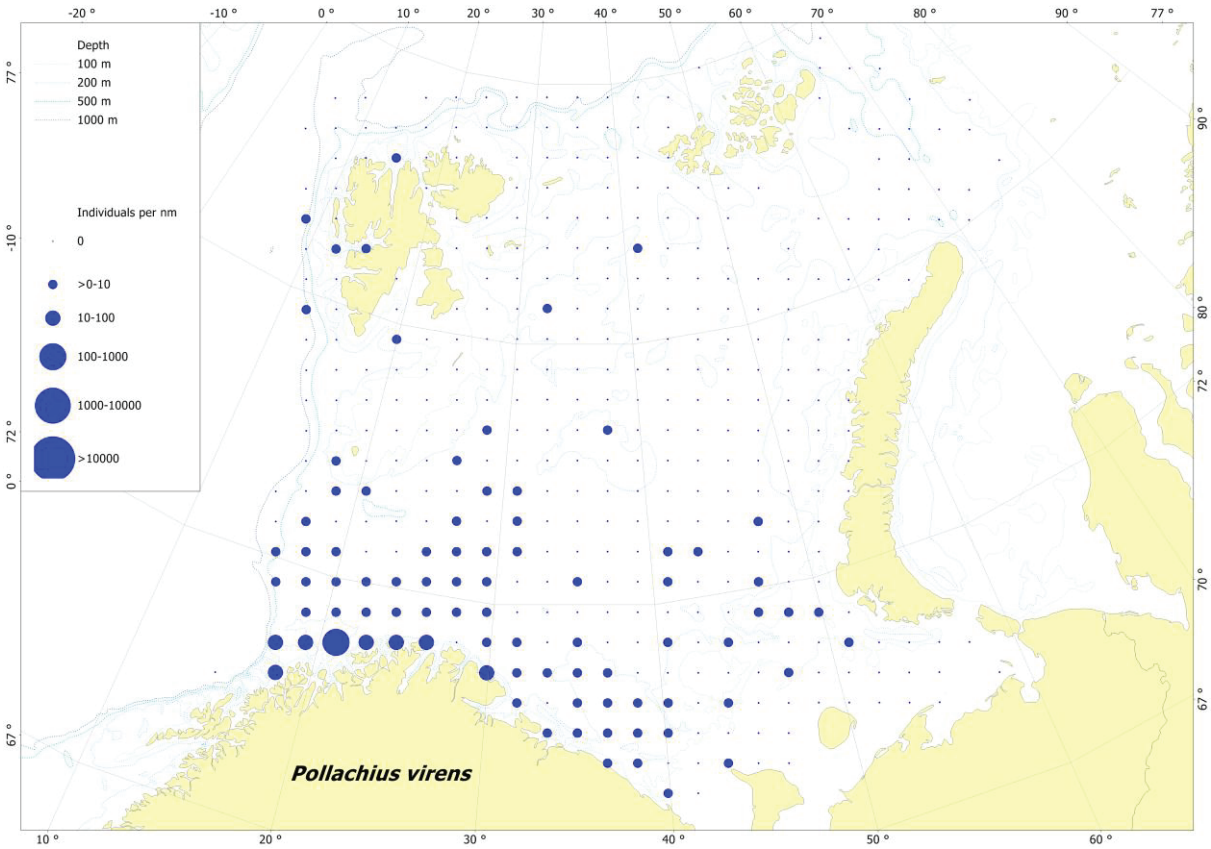
Family: Gadidae
English name: saithe
Norwegian name: sei
Russian name: сайда
(saida)

Photo: Andrey Dolgov

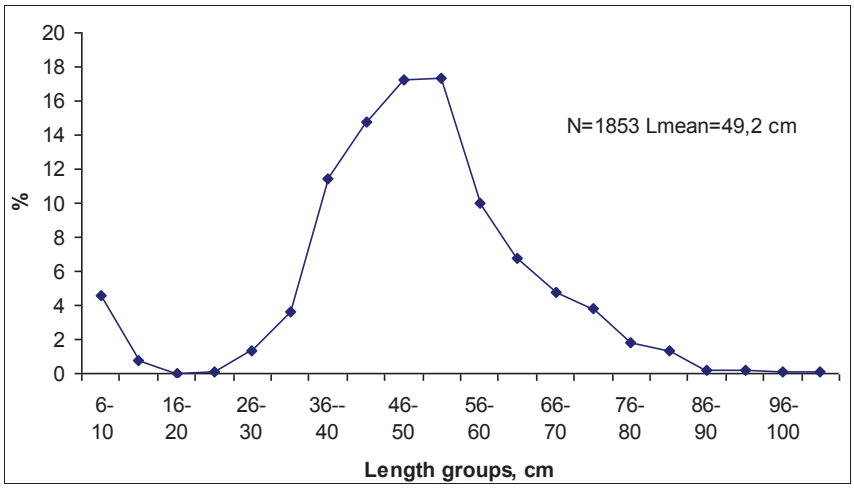
Spatial distribution

Known in the eastern North Atlantic from Spain to Novaya Zemlya, including Iceland and the Faroe Islands, also off western Greenland and in the western North Atlantic on the border area between Canada and USA. In the northeastern Atlantic six stocks of the species are recognized, the Barents Sea population belongs to the Northeast Arctic saithe, which is found along the Norwegian coast north of 62° N to the Kola Peninsula.

Found in western, southern and central parts of the surveyed area, in higher numbers only along the coast of Finnmark.



Length composition

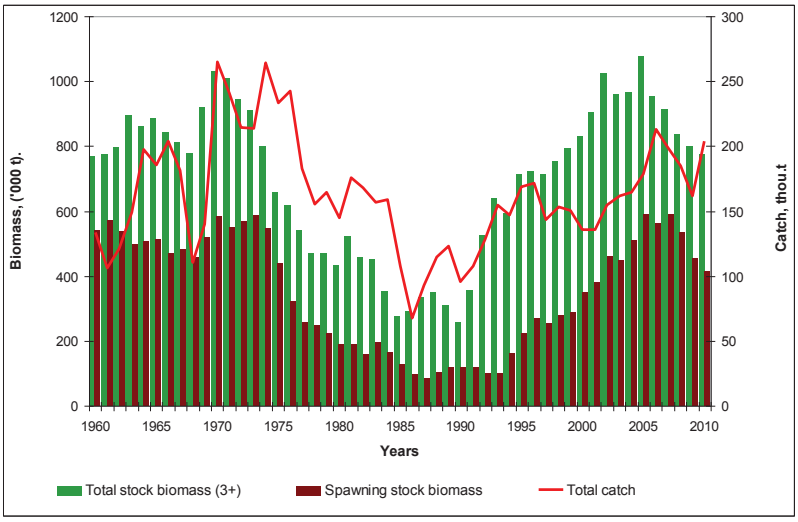


Life history

Pelagic and benthopelagic at 0-300 m, often in schools where prey assembles. Can reach 130 cm, 20 kg, and up to 30 years, matures at age 5-6 years. Juveniles prey on planktonic crustaceans, adults on a variety of crustaceans and fish, food source for sea mammals. Spawning takes place during the winter (peak in February) on the coastal banks from Lofoten to the North Sea. Females spawn 5-8 million pelagic eggs, 3.2 mm long larvae hatch after 6-15 days, juveniles live in coastal areas until 2-4 years old. Highly migratory between spawning, nursing and feeding grounds. Large specimens follow Norwegian spring-spawning herring far into the Norwegian Sea.

Population and exploitation

Between 1960 and 2009 the biomass varied from 257 000 to 1 075 000 tonnes (mean 670 000 tonnes). The stock size was on a high level from 2000 to 2005, but has been decreasing since. Fishery quotas are adjusted accordingly. The main catches are taken by Norwegian and Russian bottom trawl fisheries.



References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Mehl S. 2010. Sei – Nordaustarktisk sei. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:138 (in Norwegian)

Lukmanov EG. 1986. Saithe. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity pp 29-32 (in Russian)

Lukmanov EG, Baranenkova AS, Klimenkov AI. 1975. Biology and Fishery of Saithe in the North European Seas. PINRO Press, Murmansk. 64 pp (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Mehl S, Zuykova NV, Drevetnyak KV. 2011. Northeast Arctic saithe. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Trisopterus esmarkii (Nilsson 1855)

Family: Gadidae
English name: Norway pout
Norwegian name: øyepål
Russian name: тресочка Эсмарка
(tresotchka Esmarka)

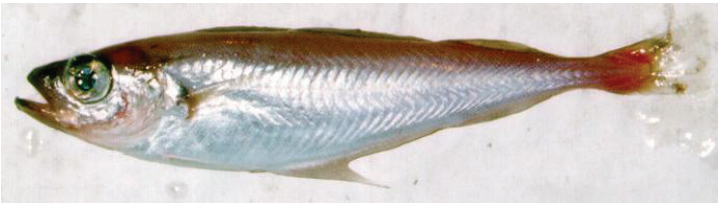
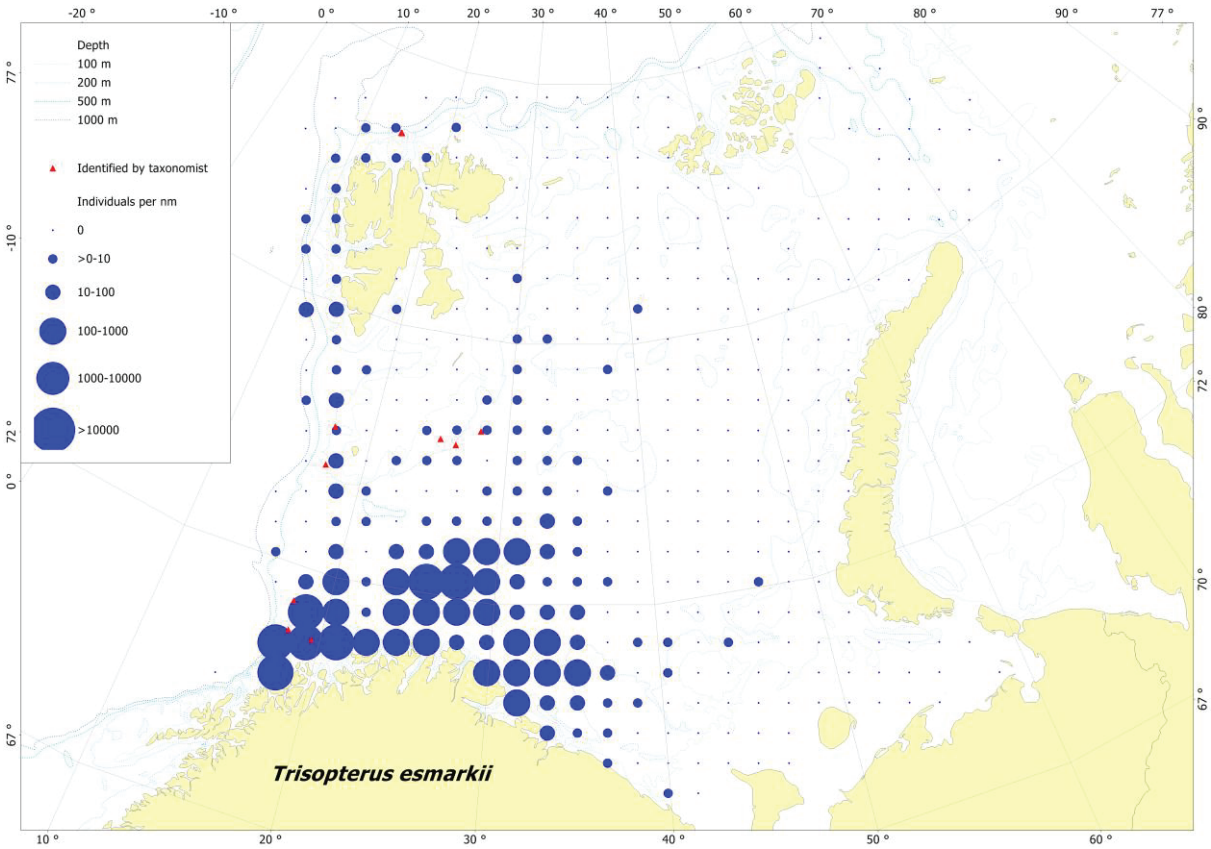


Photo: Andrey Dolgov

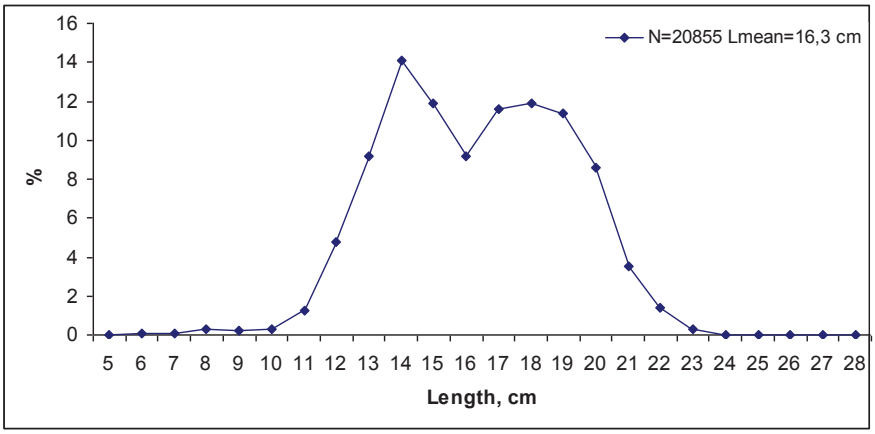
Spatial distribution

Known around the British Isles and northward to Iceland and the Barents Sea.

Found in coastal and Atlantic waters in the surveyed area.



Length composition



Life history

Boreal, nerito- to benthopelagic, forms schools at 50-250 m, usually above muddy bottom. Can reach 25 cm, 0.1 kg, and up to 5-6 years (rarely more than 3 years), matures at age one (10 %) or two (90 %) years. Feeds on planktonic crustaceans (copepods, euphausiids) as well as fishes, important food source for larger fish and marine mammal species. Spawning takes place between January and May in the northern North Sea. Females spawn 60 000-380 000 pelagic eggs, which drift like the juveniles with the currents.

Population and exploitation

There are likely separate populations west of the British Isles, off Iceland, along the Norwegian coast, and the largest one in the North Sea. The species is short-lived, has high variation in recruitment and is foraged by a number of other species. This causes high variations in the size of the stock, making prognoses difficult.

The fishery was temporarily closed in recent years, no fishery in the Barents Sea.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Johannessen T. 2010. Øyepål. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:159 (in Norwegian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Brosme brosme (Ascanius 1772)

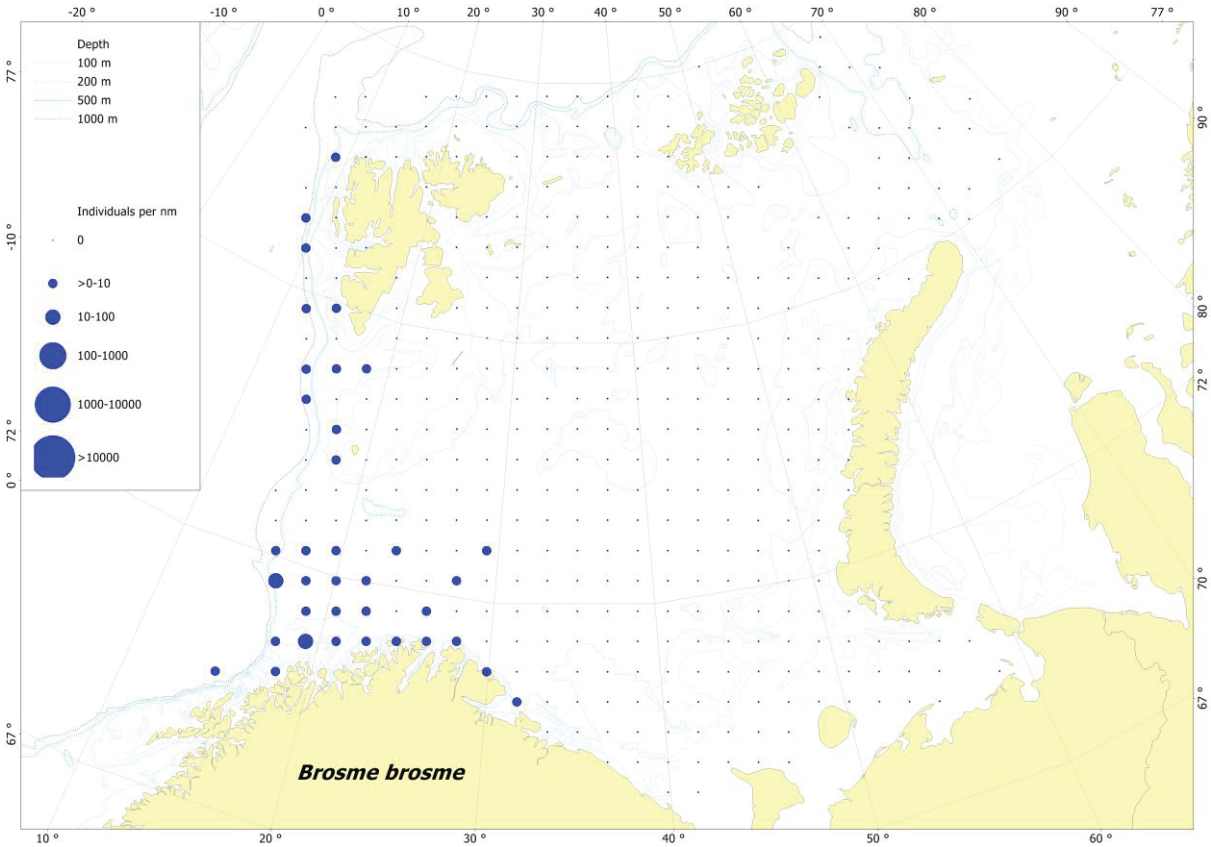
Family: Lotidae
English name: tusk
Norwegian name: brosme
Russian name: менек
(menyok)

Photo: Thomas de Lange Wenneck

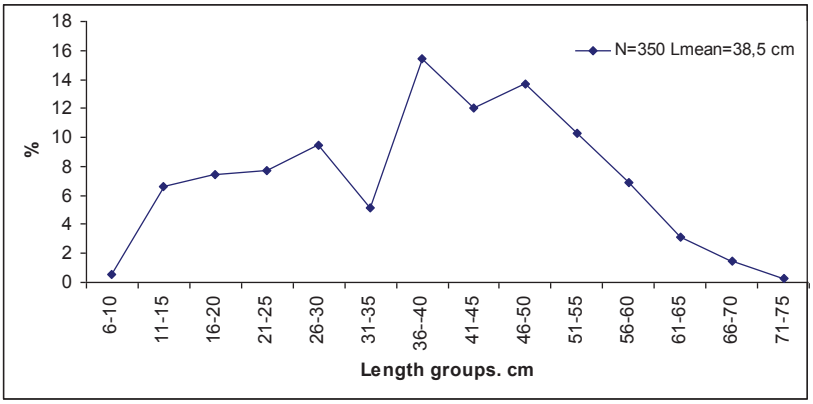
Spatial distribution

Known from the British Isles, the northern North Sea and along the coast of Norway to the Murman coast and Svalbard/Spitsbergen, also from off Iceland and in the western North Atlantic.

Found in the southern and western parts of the surveyed area, mostly in deeper water influenced by Atlantic water masses.



Length composition



Life history

Mainly boreal, demersal, solitary or in small schools on hard, rocky grounds along the continental slope and shelf as well as in the fjords at depths of 100-1000 m. Reaches 110 cm, at least 15 kg, and more than 20 years. Growth rates are low, matures at age 8-10 years (50 cm). Feeds on large crustaceans, polychaetes, mollusks and fish. Spawning takes place from April to June, the main spawning areas are the coasts of south and mid Norway, as well as the areas south and southwest of Iceland and the Faroe Islands. A female can spawn up to 2.3 million eggs (1.2-1.5 mm in diameter); 4 mm long larvae hatch after 9 days. Eggs and juveniles up to a length of about 5 cm are pelagic. Larger fishes live in deeper waters.

Population and exploitation

A decrease in number of fishing vessels and hours of fishery influenced the population size positively. The most recent assessments (2010) by ICES indicate an increasing stock size in the north-east Arctic waters. Bycatch in Russian fisheries.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Helle K. 2010. Lange, brosme og blålange. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:124-125 (in Norwegian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Enchelyopus cimbrius (Linnaeus 1766)

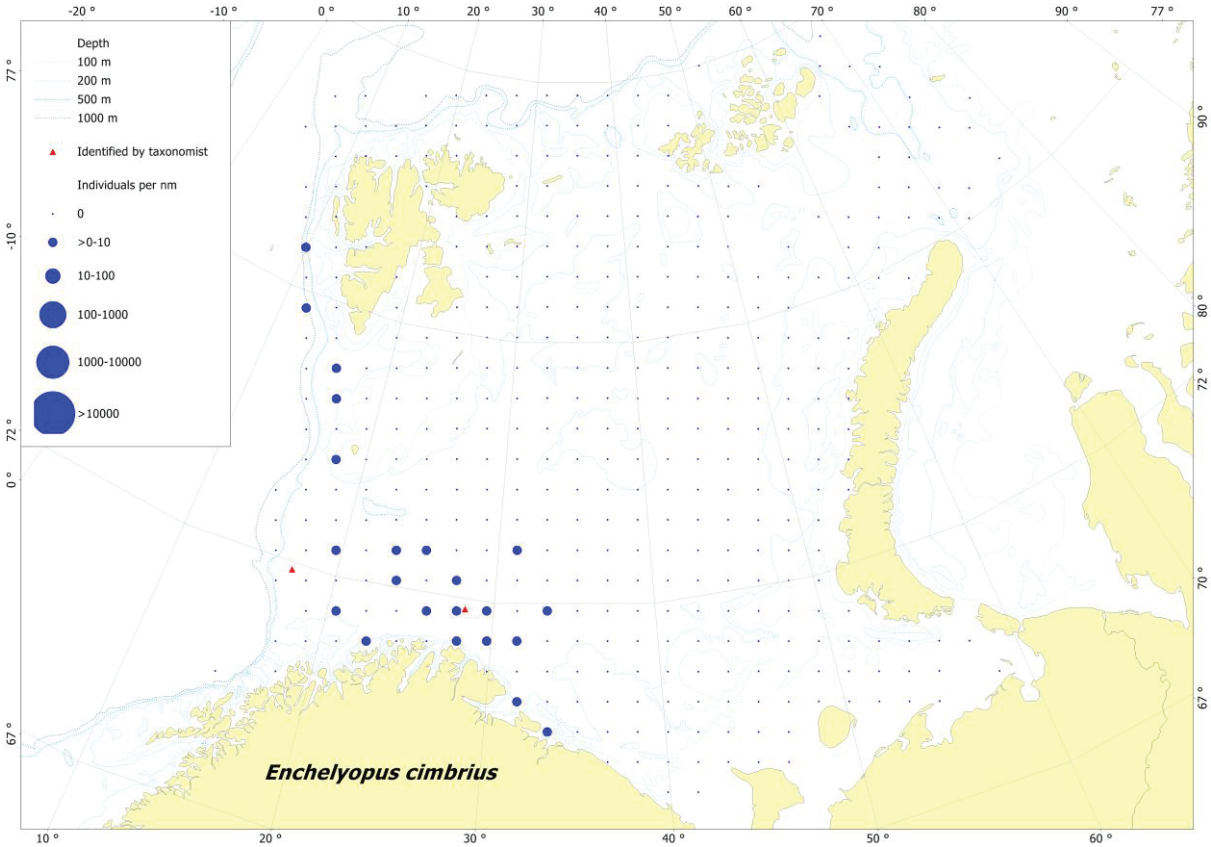
Family: Lotidae
English name: fourbeard rockling
Norwegian name: firetrådet tangbrosme
Russian name: четырехусый налим
(tcheteryokh-usiy nalim)

Photo: Andrey Dolgov

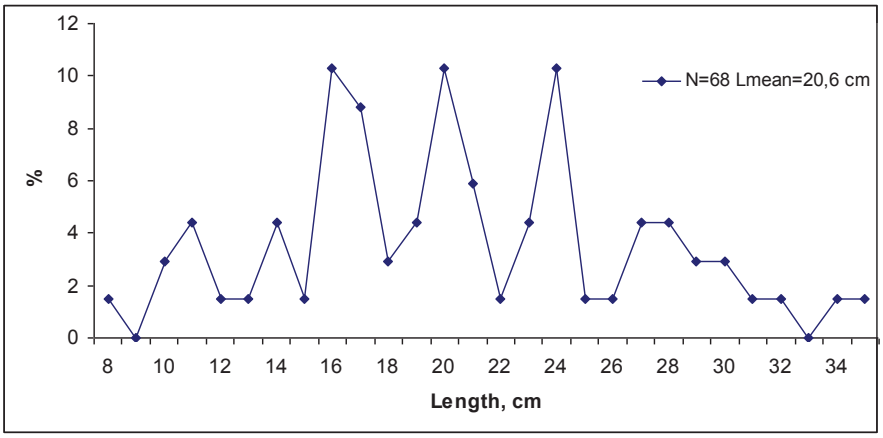
Spatial distribution

Known from the Gulf of Biscay to the southern Barents Sea, including off Iceland and the Baltic Sea; also found in the western North Atlantic.

Found in warm Atlantic waters in the southwestern part of the surveyed area.



Length composition



Life history

Boreal, demersal to benthopelagic, preferring muddy or sandy bottom at 20-50 m, found down to 650 m. Can reach 42 cm (rarely more than 30 cm) and 9 years. Growth rate low, matures at age 3 years (about 15 cm). Feeds on benthic crustaceans, polychaetes and small fishes. Depending on size, females spawn up to 500 000 eggs (0.7-1.0 mm in diameter). Spawning season ranges from June to September, eggs and juveniles are pelagic. Apart from local inshore migrations in autumn and offshore migrations in spring quite stationary.

Population and exploitation

Caught as bycatch but of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Gaidropsarus argentatus (Reinhardt 1837)

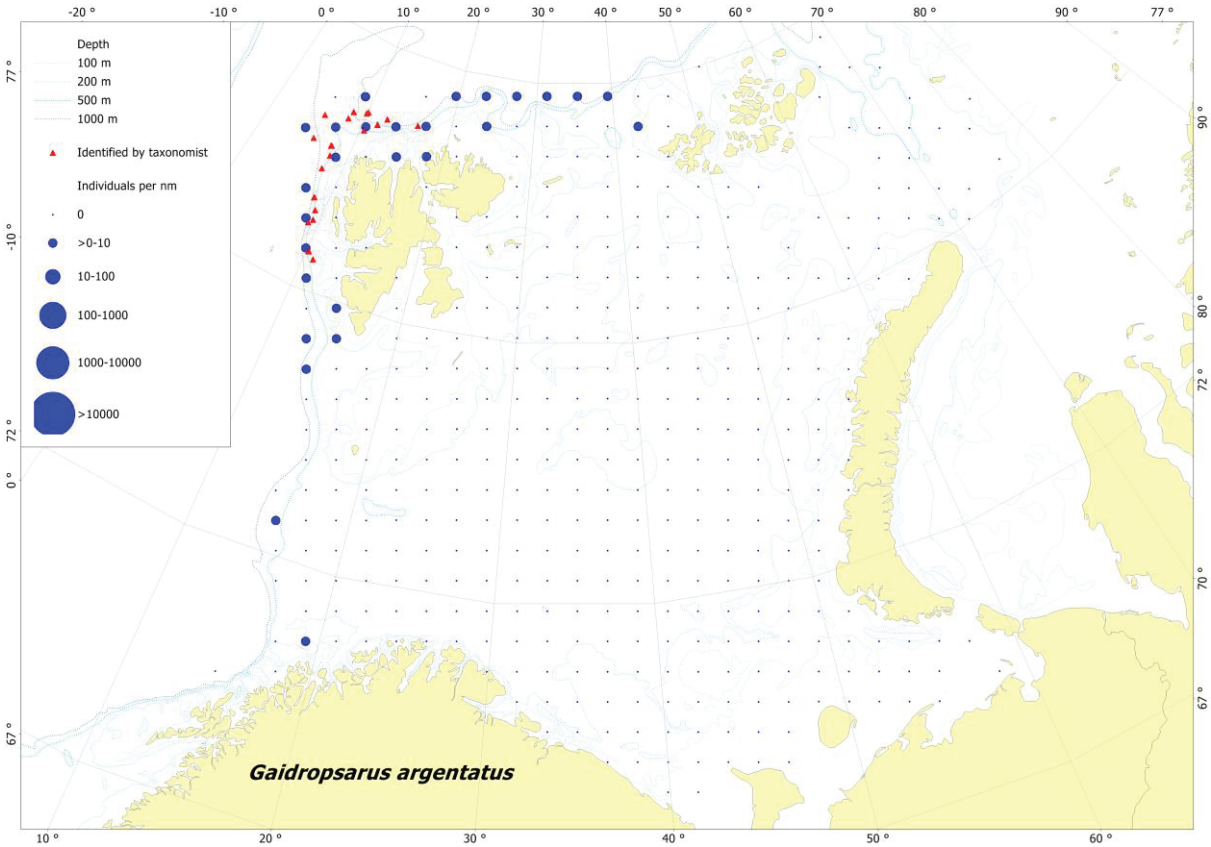
Family: Lotidae
English name: Arctic rockling
Norwegian name: sølvtangbrosme
Russian name: полярный налим
(polyarniy nalim)

Photo: Thomas de Lange Wenneck

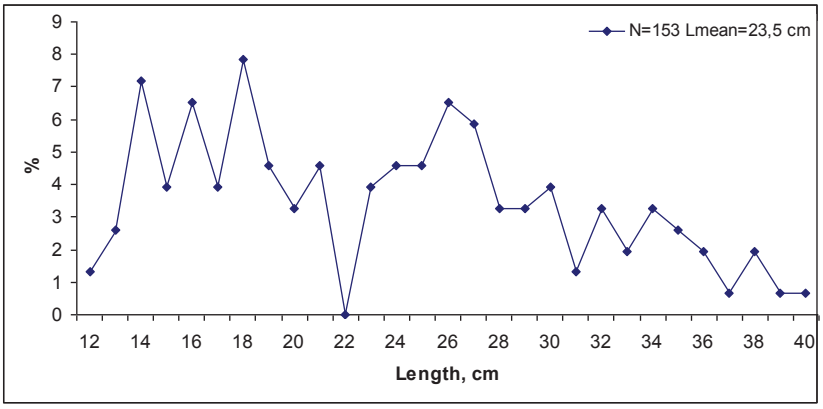
Spatial distribution

Known from off southeastern Greenland, off Iceland and the Faroe Islands to the Norwegian coast and northward to the Barents Sea.

In the surveyed area found along the continental slope between the Norwegian coast and Svalbard/Spitsbergen and eastward to Franz Josef Land.



Length composition



Life history

Arctic, benthopelagic to pelagic at depths of 150-2000 m (usually deeper than 500 m), prefers low temperatures (around 0 ºC). Can reach 45 cm, 8-9 years, males mature at age 2, females at age 4 years. Feeds on demersal and bathypelagic crustaceans (shrimp, gammarids and hyperiids) as well as fish. Larvae are pelagic and have been found near the Arctic Circle in June-August.

Population and exploitation

Of no economic importance, but bycatch in bottom-trawl and longline fisheries for cod and Greenland halibut in depths below 300-400 m.

References

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In : Kotlyakov VM. (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Svetovidov AN. 1986. Gadidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 680-710

Molva molva (Linnaeus 1758)

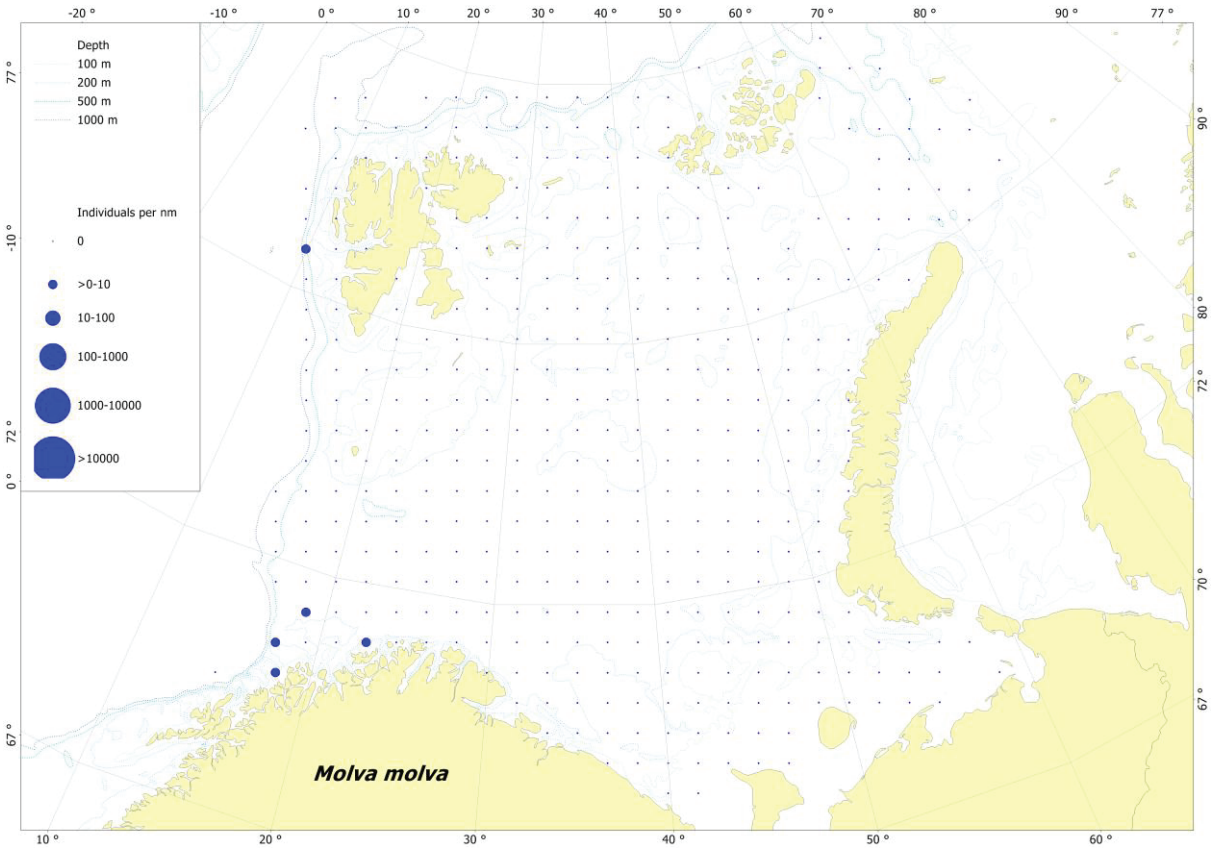
Family: Lotidae
English name: ling
Norwegian name: lange
Russian name: мольва (molva)

Photo: Otte Bjelland

Spatial distribution

Known from the Gulf of Biscay to Island, the northern North Sea and along the Norwegian coast to the southern Barents Sea.

Found in the southwestern part of the surveyed area, and west of the Svalbard/Spitsbergen archipelago. Norwegian longliners get ling as bycatch along the shelf edge in this western area, and the distribution is more continuous than the present map indicates.



Length composition

Seven specimens (51-95 cm, mean length 73.7 cm) were caught.

Life history

Boreal, demersal on the continental shelf and in the fjords, mainly on hard bottom at 300-400 m, but also found shallower and deeper. Reaches 2 m, 40 kg, and 30 years, matures at age 5-7 years (80-100 cm). Juveniles feed on benthic invertebrates, adults on fish, large crustaceans, cephalopods and echinoderms. Spawning areas are in the North Sea, off Faroese Islands, west of the British Isles and southwest of Iceland, with spawning taking place from March to July. A large female can spawn 20-60 million eggs. Eggs and larvae are pelagic, never found shallower than at 50 m. Juveniles live pelagic near the coast, migrating with age and size to deeper areas.

Population and exploitation

A decrease in number of fishing vessels and hours of fishery influenced the population size positively. The most recent assessments (2010) by ICES indicate an increasing stock size in the north-east Arctic waters.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Helle K. 2010. Lange, brosme og blålange. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:124-125 (in Norwegian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Phycis blennoides (Brünnich 1768)

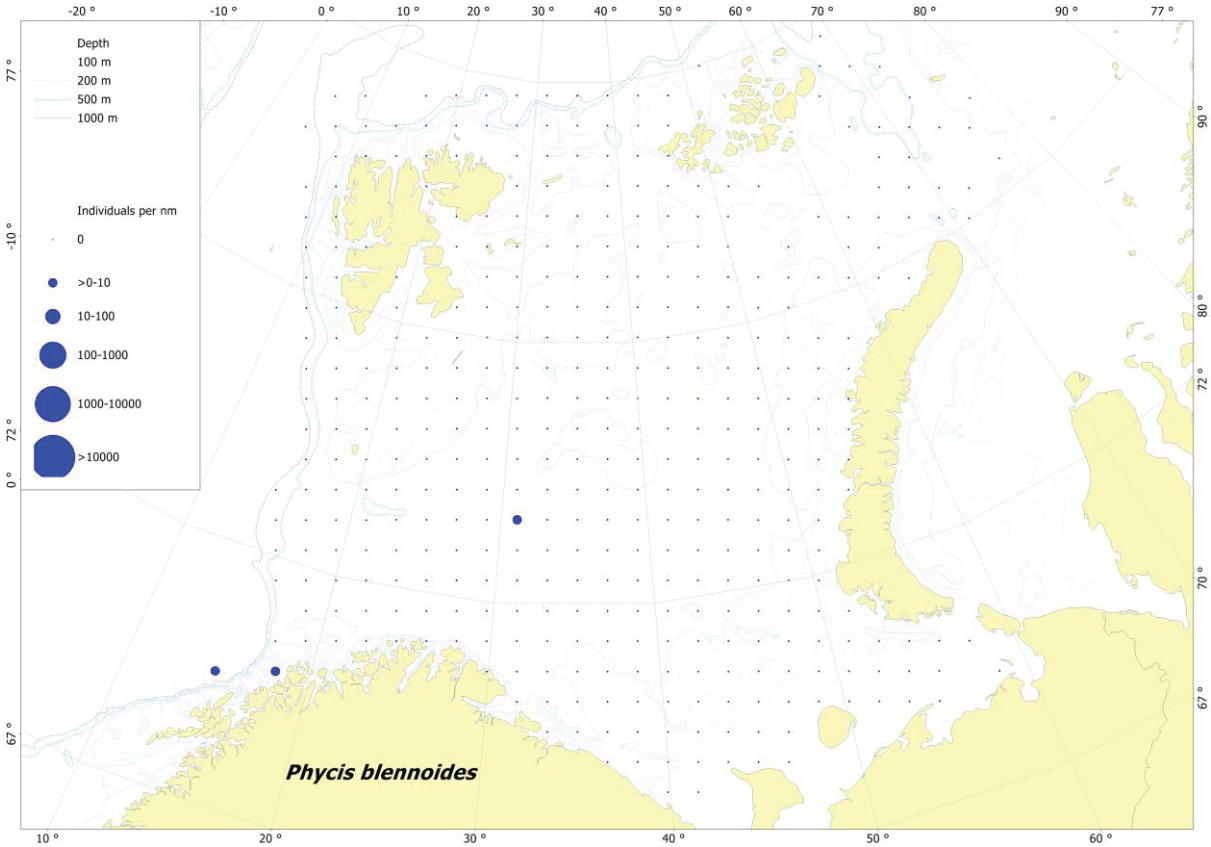
Family: Phycidae
English name: greater forkbeard
Norwegian name: skjellbrosme
Russian name: нитеперый налим
(nitepioriy nalim)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known from the northwestern African coast to northern Norway, also off Iceland and in the Mediterranean.

In the surveyed area found in deeper Atlantic water masses.



Length composition

Four specimens (31-51 cm, mean length 37.3 cm) were caught.

Life history

Boreal, benthopelagic, preferring soft bottom at 100-450 m. Young occur shallower and are more coastal, whereas adults migrate along the slope. Can reach up to 110 cm (but rarely more than 45 cm) and 20 years. Growth rates are low, females grow faster than males, matures at age 3-4 years. Feeds on crustaceans and small fish. Reproduction in Norwegian waters doubtful.

Population and exploitation

Of minor economic importance, taken as bycatch.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Svetovidov AN. 1986. Gadidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 680-710

Merluccius merluccius (Linnaeus 1758)

Family: Merlucciidae
English name: European hake
Norwegian name: lysing
Russian name: мерлуза
(merlouza)

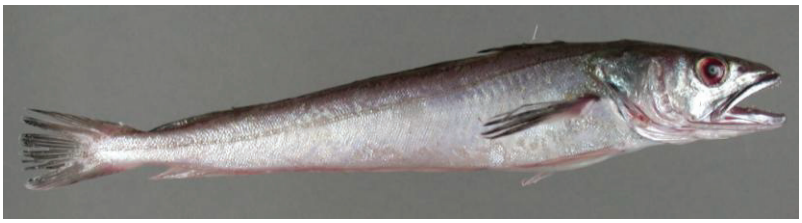
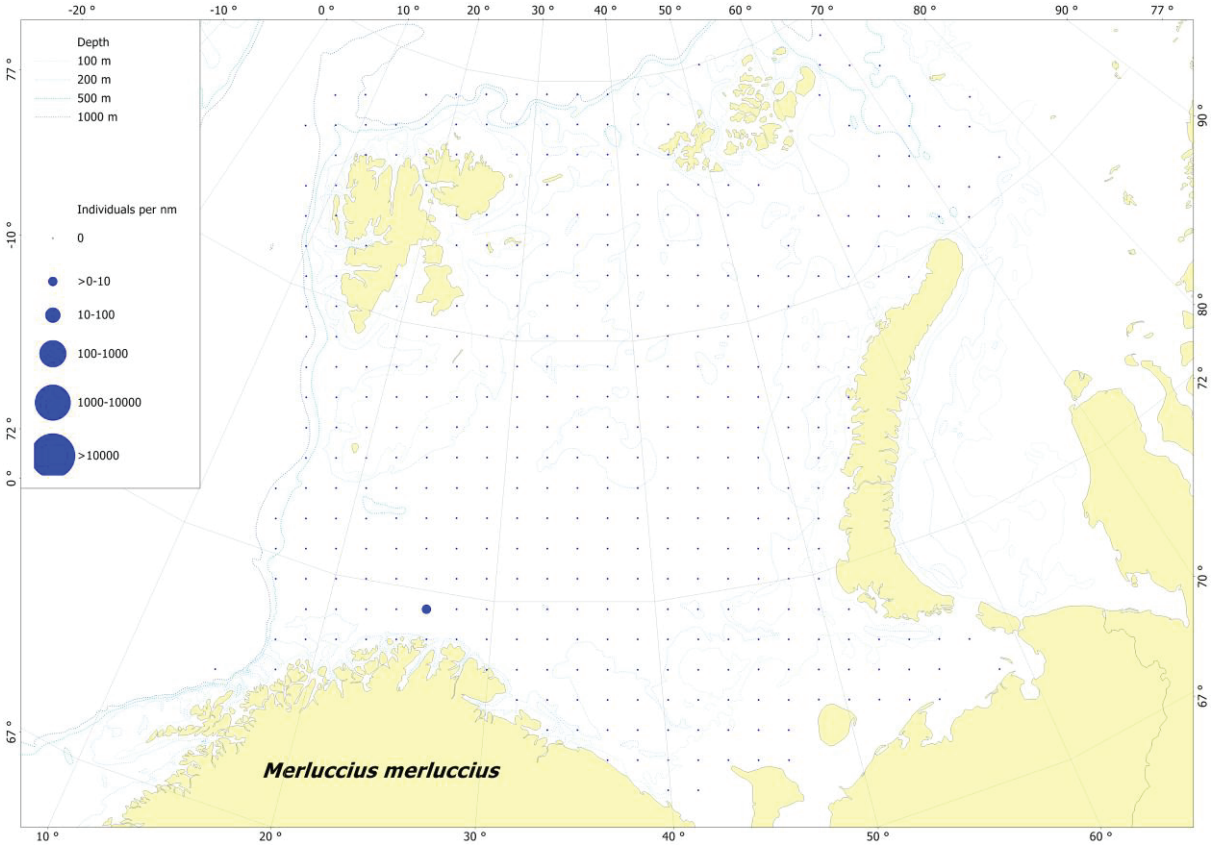


Photo: Thomas de Lange Wenneck

Spatial distribution

Known from northwestern Africa northward to Iceland and Norway, including the Mediterranean and southern Black Sea.

Found in Atlantic water masses of the surveyed area.



Length composition

Three specimens (26-29 cm, mean length 27.3 cm) were caught.

Life history

Boreal, pelagic to benthopelagic, usually found at 70-500 m, but also shallower and deeper. Performs daily vertical migrations, often found near the bottom at daytime. Reaches up to 135 cm (but males over 80 cm and females over 100 cm are rarely found), 15 kg and 20 years. Length after two years 24-25 cm, females grow faster than males. Males of the Atlantic population mature at age 4 years (40 cm), females at age 7 years (57 cm). Feeds on schooling fish like herring and sprat, other young fish and cephalopods. Spawns in Atlantic waters at depths of 100-300 m during spring and summer, the further north the later. A female spawns 2-7 million pelagic eggs, 3 mm long pelagic larvae hatch after 2-3 days. Juveniles are pelagic and often found in coastal areas before they relocate to deeper waters with age.

Population and exploitation

Of high economic importance in southern and western Europe, Norwegian catch rates are low.

References

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Svetovidov AN. 1986. Merlucciidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 677-679

Lophius piscatorius Linnaeus 1758

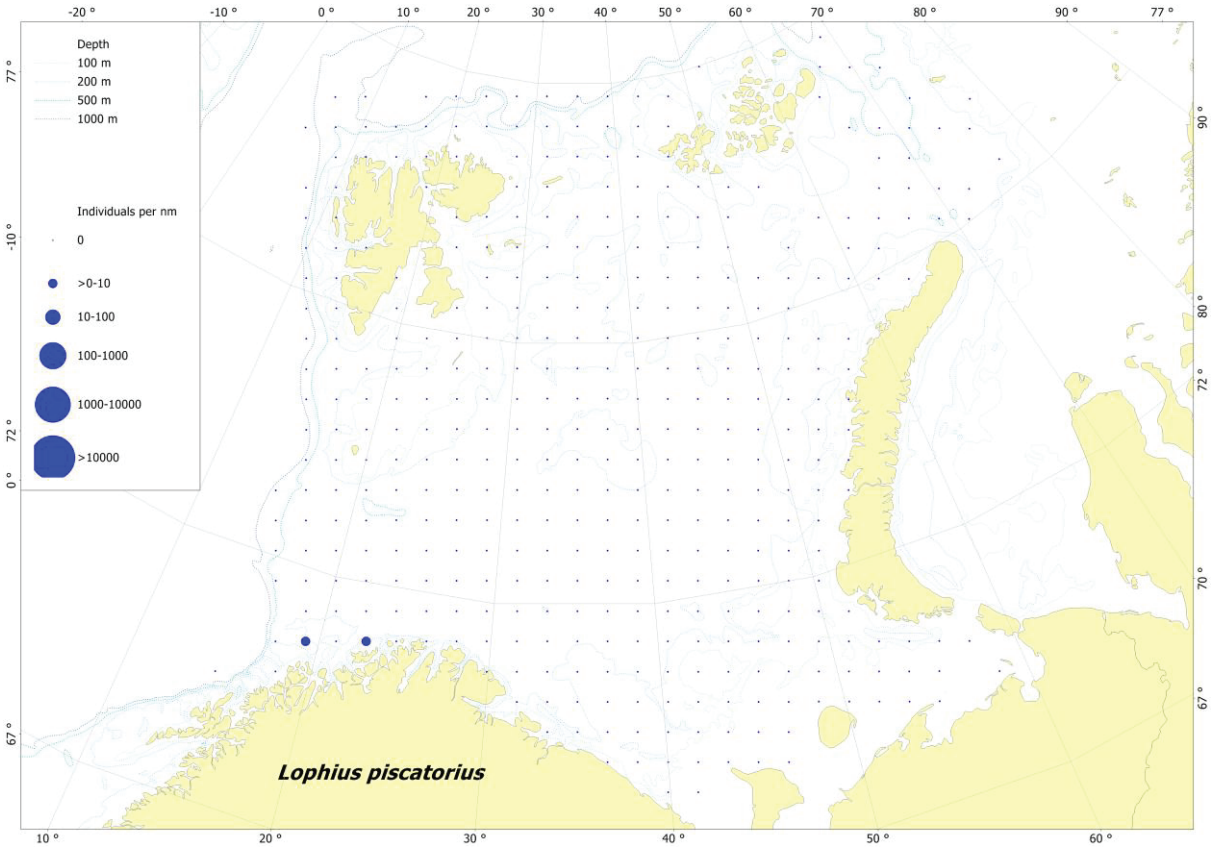
Family: Lophiidae
English name: angler
Norwegian name: breiflabb
Russian name: морской черт
(morskoy tchert)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known in the eastern Atlantic from the Barents Sea south to Mauritania, including the Mediterranean and Black Sea, with Iceland as its western border.

Uncommon in the Barents Sea, but the recent northward expansion of the distribution area has brought the species into the southernmost part along the coast of Finnmark.



Length composition

Three specimens (45, 77 and 106 cm) were caught.

Life history

Boreal, demersal, found from the littoral zone down to more than 1000 m depth, primarily on sandy and stone bottom, occasionally found in the pelagic zone. Can reach 2 m, 100 kg, and more than 25 years. Males mature at age 4 years (50 cm), females at 8 years (90 cm). Top predator, feeds mainly on fish, crustaceans and cephalopods. Spawns at great depths (1000-1800 m) at the continental slope west of the British Isles, but also in Norwegian fjords and deeper parts of the continental shelf. Eggs are laid in up to 15 m long and 60-90 cm broad gelatinous bands, containing 1 500 000 eggs, sometimes observed drifting pelagically. Newly hatched larvae are 4.5 mm long and pelagic, becoming demersal at the length of 60-80 mm, growth rates are poorly known. Tagging experiments have shown that longer migrations than previously thought are undertaken (specimens tagged in the North Sea have been found at Vesterålen, Iceland, and the Faroe Islands). The dynamics behind the feeding and spawning migrations are not yet known, but obviously the species takes advantage of currents when found in the pelagic zone.

Population and exploitation

Catch rates in the northern distribution area increased since 2001, suggesting a shift to a more northern distribution of the species.

References

Bjelland O. 2010. Breiflabb. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:111 (in Norwegian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Belone belone (Linnaeus 1761)

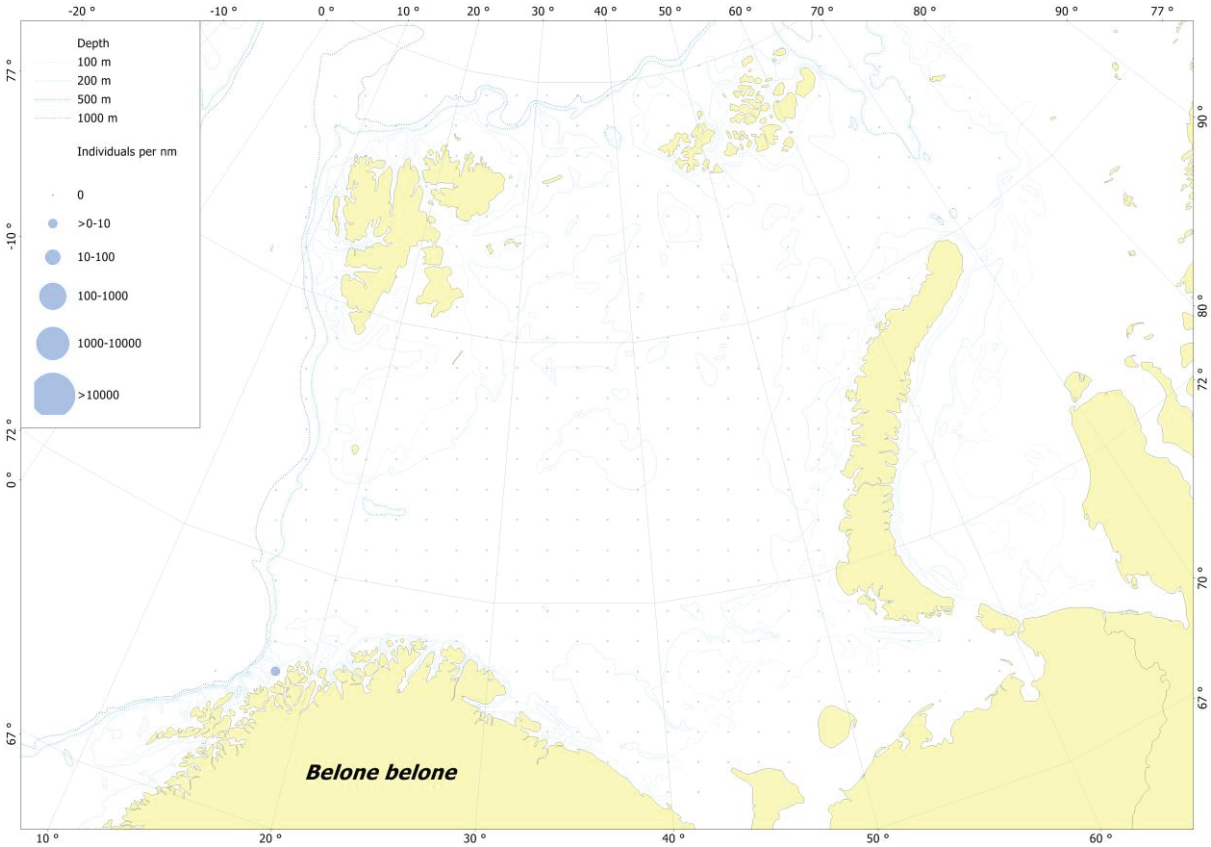
Family: Belonidae
English name: garfish
Norwegian name: horngjel
Russian name: сарган
(sargan)

Photo: Rupert Wienerroither

Spatial distribution

Known in the eastern Atlantic from the Canary Islands to Iceland and Norway, also in the Mediterranean; occasionally found in the Barents Sea and White Sea.

In the surveyed area caught by pelagic trawl in warm waters along the Norwegian coasts.



Length composition

Two specimens (43, 56 cm) were caught by pelagic trawl.

Life history

Boreal, neritopelagic. Can reach up to 94 cm, 1.3 kg and at least 18 years; 25 cm after one year, matures 2 years old (45 cm). Feeds on small fishes and planktonic invertebrates. Spawns in coastal waters in April-May, 30 000-45 000 eggs (3.0-3.5 mm in diameter) are spawned in patches, eggs attach to vegetation and floating objects, 9-13 mm long larvae hatch after 2-3 weeks. Spends the winter southwest of the British Isles, migrates northward for feeding and spawning in spring, no reproduction in the Barents Sea.

Population and exploitation

Of no economic importance.

References

Collette BB 2003. Family Belonidae Bonaparte 1832 – needlefishes. California Academy of Sciences, Annotated Checklists of Fishes 16, 22 pp

Collette BB, Parin NV. 1986. Belonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 604-609

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Gasterosteus aculeatus Linnaeus 1758

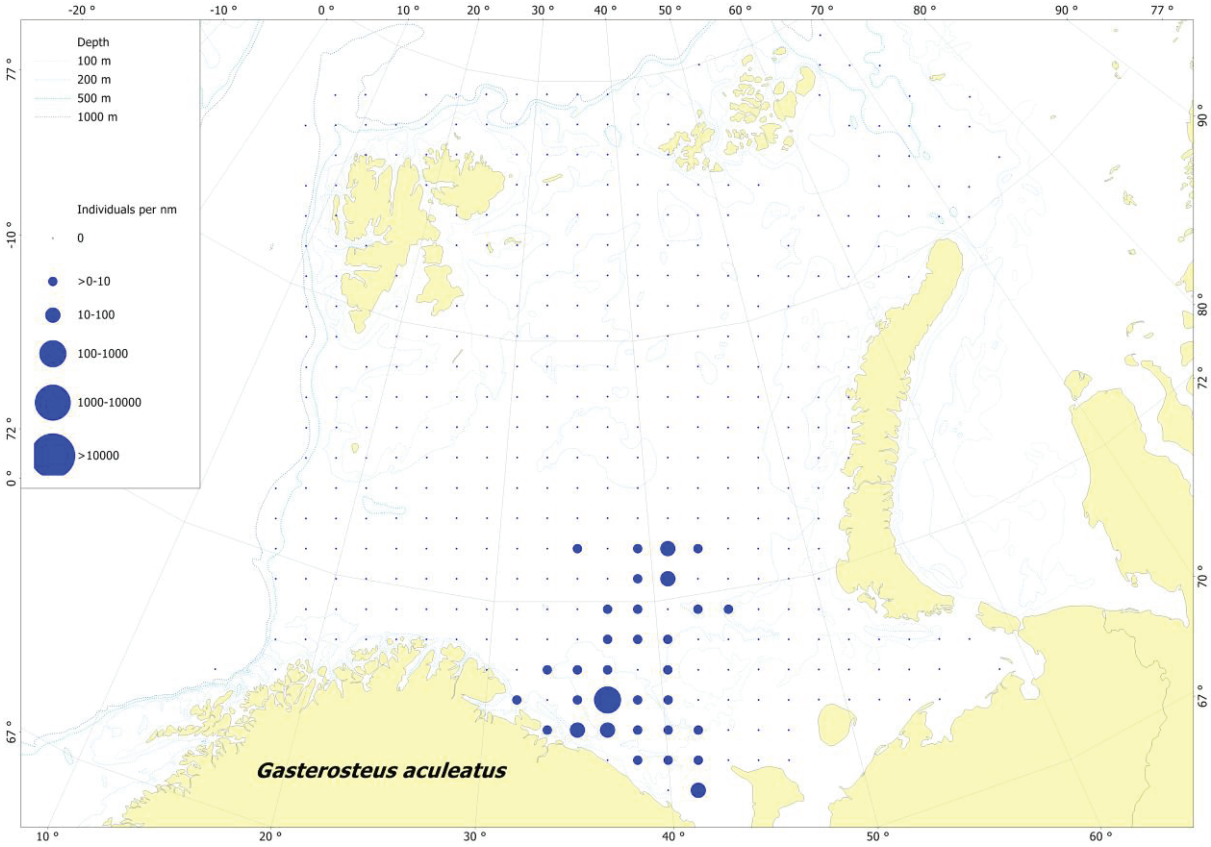
Family: Gasterosteidae
English name: three-spined stickleback
Norwegian name: trepigget stingsild
Russian name: трехиглая колюшка
(trekh-iglaya koliushka)

Photo: Andrey Dolgov

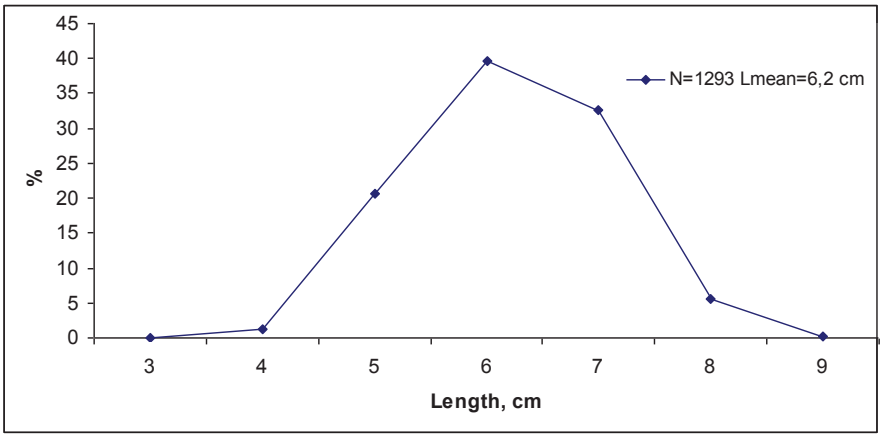
Spatial distribution

Occurs circumpolar from about 35º N to 70º N, in most of European rivers. Usually confined to coastal areas in the sea, but occasionally in the open sea.

Found in the southeastern part of the surveyed area, in areas influenced by estuaries.



Length composition



Life history

Nerito-pelagic, mainly boreal, highly adaptable, found in rivers, brackish water and in coastal seas; stocks can be marine, lacustrine or anadromous as well as stationary or migratory. Schooling, especially when young and outside the spawning season. Can reach 11 cm (8 cm in freshwater) and up to 5 years, but only few individuals grow older than 3 years. Matures at age one year. Feeds on small insects and larvae, small crustaceans, worms and mollusks as well as fish eggs and fry, preyed upon by other fish species and birds. Spawning takes place in May-June, males build a nest on sandy bottom using plant parts. Several females lay their eggs in the nest until it is full with 300-1000 eggs. The males guard the nest and care for the spawn. 2-4.5 mm long larvae hatch after 8-15 days, and stay in or close to the nest for 4-6 days, still guarded by the males. The species is an intermediate host for tapeworms and thus contributing to the extension of the parasites distribution area.

Population and exploitation

Of no economic importance, but caught in the Baltic Sea and the White Sea and used as fishmeal and -oil and as fertilizer.

References

Banister K. 1986. Gasterosteidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 640-643

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Reshetnikov YS. (ed) Atlas of freshwater fishes of Russia. 2 vol. Moscow, Nauka Publishing. 379+253 pp (in Russian)

Pungitius pungitius (Linnaeus 1758)

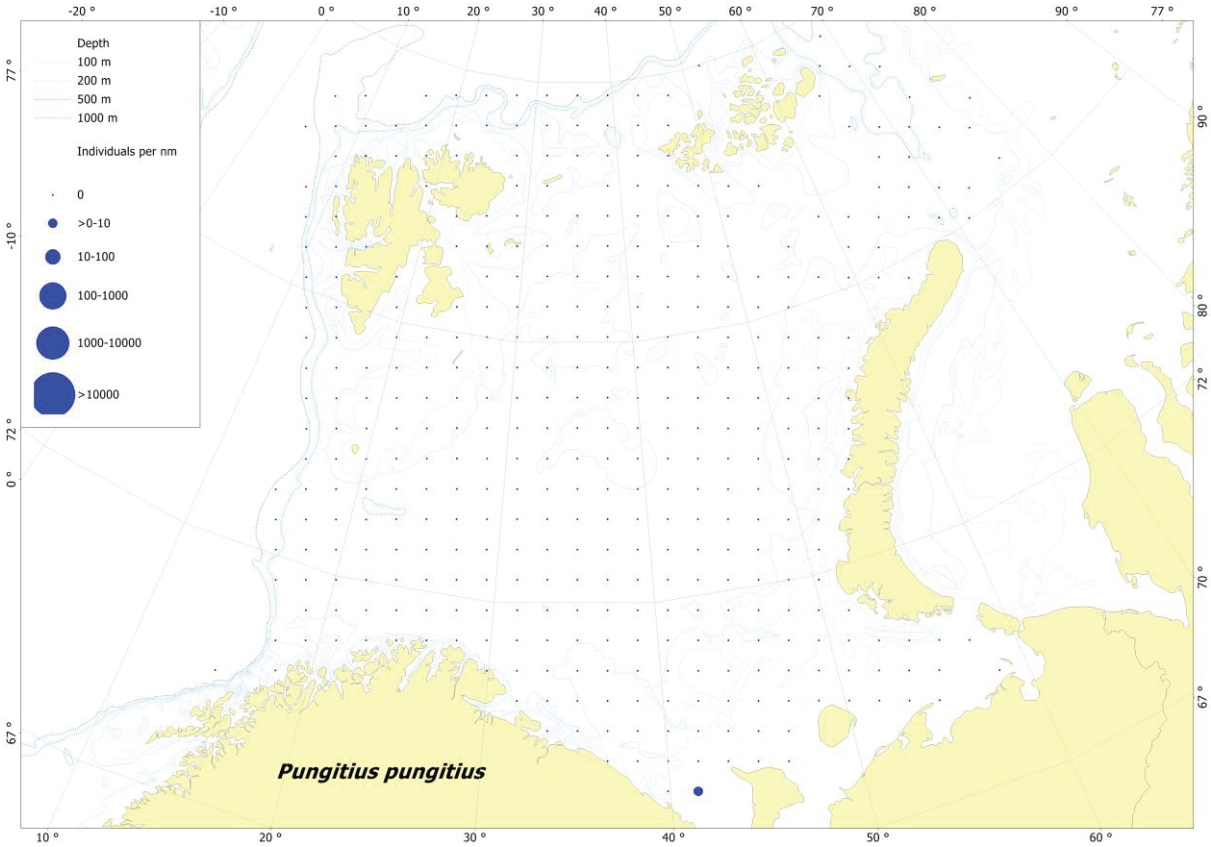
Family: Gasterosteidae
English name: ninespine stickleback
Norwegian name: nipigget stingsild
Russian name: девятииглая колюшка
(devyati-iglaya koliushka)

Photo: V.N. Chernov

Spatial distribution

Circumpolar across northern Europe, northern Asia and northern America.

In the surveyed area found near the Murman coast.



Length composition

One specimen (6 cm) was caught.

Life history

Lacustrine to semi-anadromous, sometimes found in brackish waters, rare in sea water, prefers dense vegetation. Can reach up to 9 cm, 5 years (usually 2-3 years), and matures at age one year. Feeds on fish eggs and fry, small crustaceans and insects. In April-June and August-September several females lay eggs into the nest built by the males in the vegetation or on the bottom of estuaries or rivers. Males guard and care for the up to 200 eggs and later the larvae.

Population and exploitation

Of no economic importance in the Barents Sea.

References

Banister K. 1986. Gasterosteidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 640-643

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Reshetnikov YS. (ed) Atlas of freshwater fishes of Russia. 2 vol. Moscow, Nauka Publishing. 379+253 pp (in Russian)

Entelurus aequoreus (Linnaeus 1758)

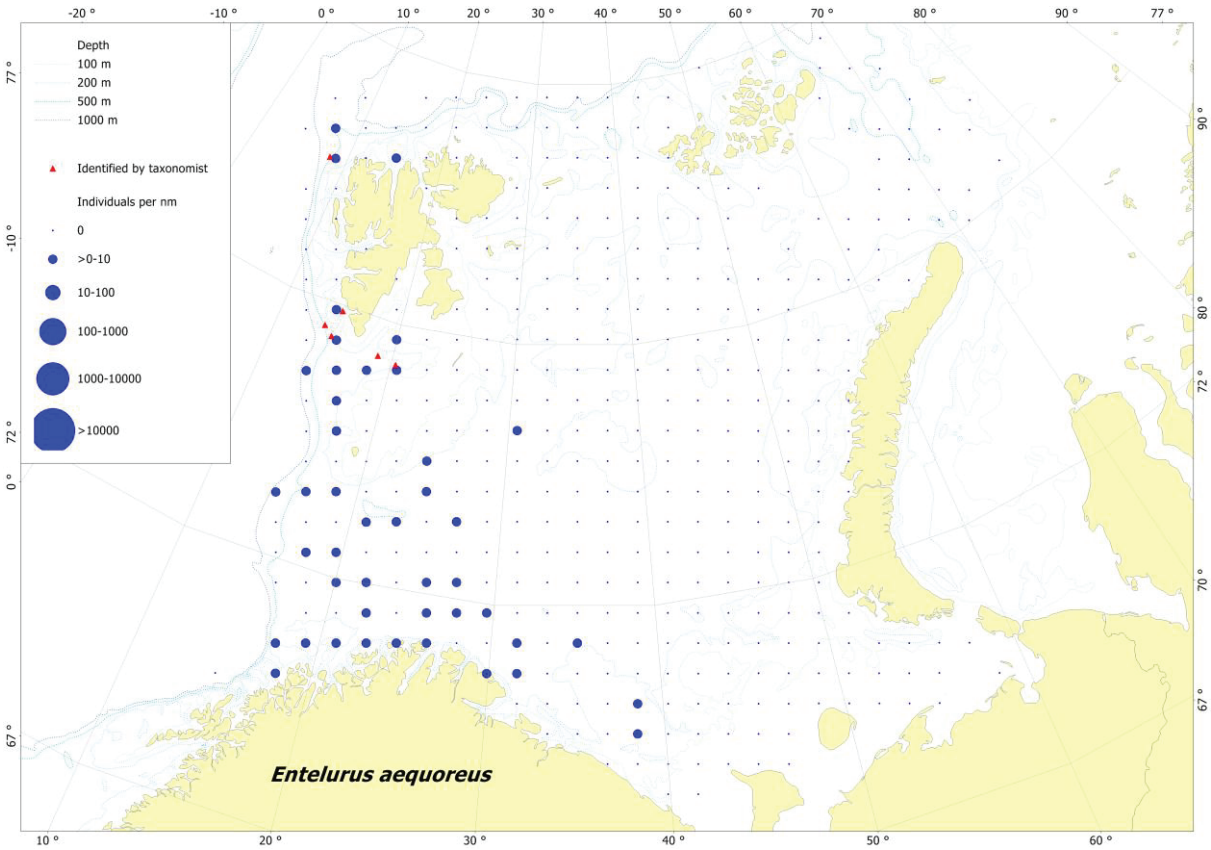
Family: Syngnathidae
English name: snake pipefish
Norwegian name: stor havnål
Russian name: змеевидная рыба-игла
(zmeevidnaya ryba-igla)

Photo: Andrey Dolgov

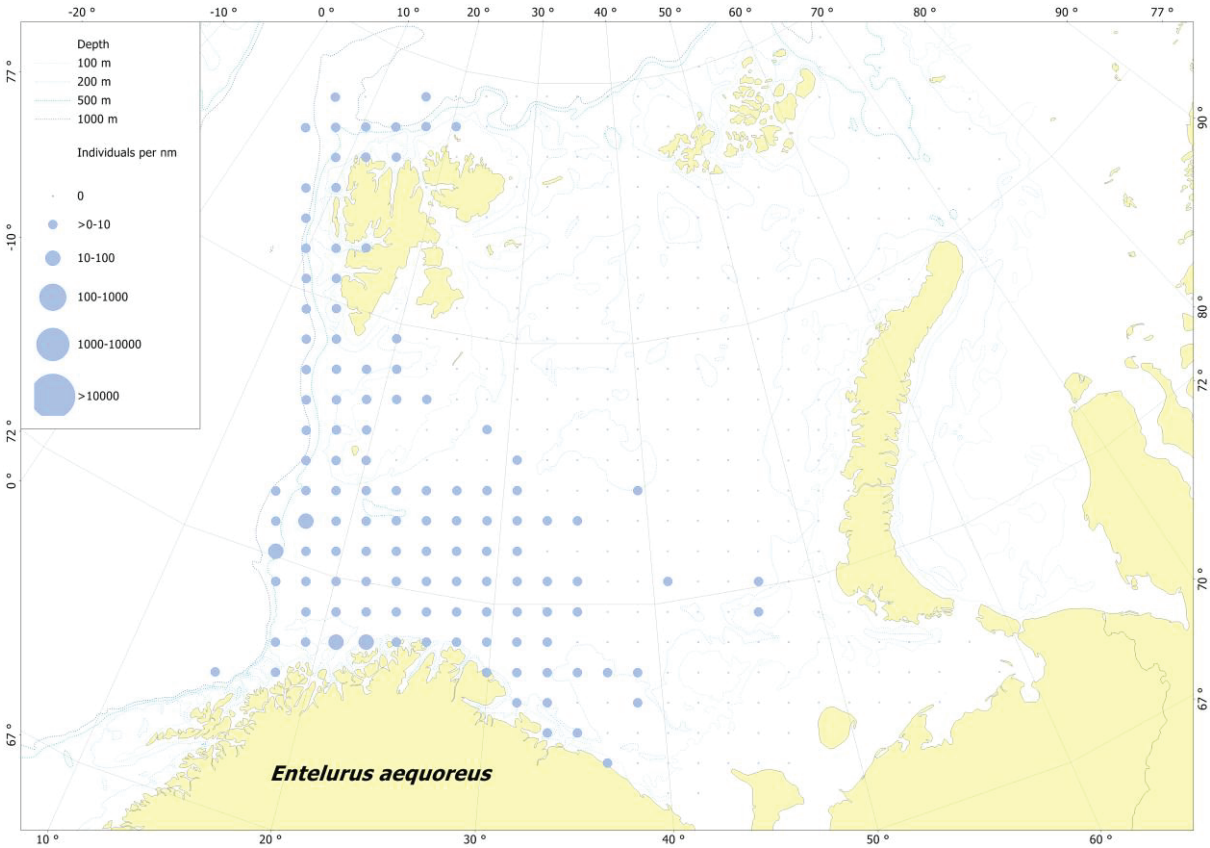
Spatial distribution

Known from the Azores and Portugal northward to Iceland and Norway. Expanded its distribution area to the north and was also found in the Greenland and Barents Sea.

In the surveyed area found between 2004 and 2008 in warm Atlantic water masses in the southern and western part.

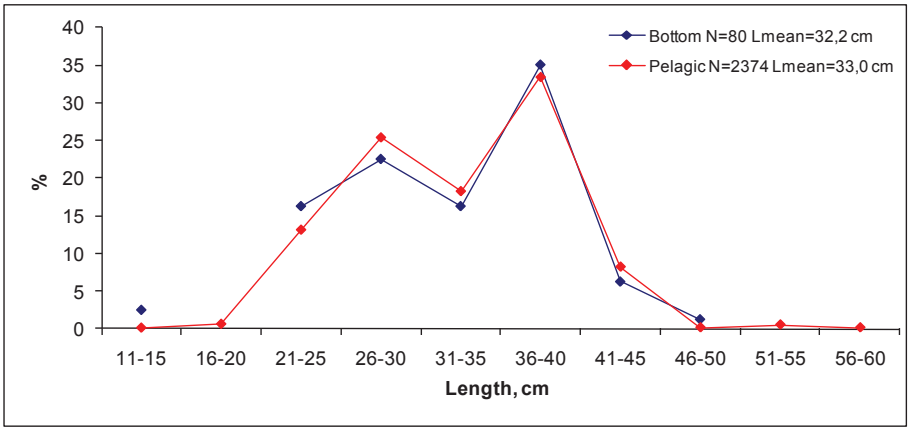


Distribution pattern based on bottom trawls



Distribution pattern based on pelagic trawls

Length composition



Life history

Boreal, nerito-pelagic, usually found in inshore waters among algae at 5-100 m, but occurs also pelagic in the open ocean. Females can reach 61 cm, males 40 cm. Matures at age 2 years, feeds on small crustaceans and fish fry. Spawning takes place in June-July in dense algae vegetation. As males have no brood pouch, females attach their 200-1000 eggs in irregular rows on the belly of several males from right behind the head to before the anal opening. 11-12 mm long juveniles hatch after about 4 weeks.

Population and exploitation

Since 2002 the population shows a dramatic increase in the northeastern Atlantic. The increased abundance of larvae and juveniles west of the British Isles was linked to the beneficial effect of a higher sea temperature on the early developmental stages of the species.

First recorded in the Barents Sea in 2004, abundance peaked in 2007, probably due to increased abundance in the North Sea and increased inflow of Atlantic water. Has not been recorded in the Barents Sea in 2009 and 2010.

Of no economic importance.

References

Fleischer D, Schaber M, Piepenburg D. 2007. Atlantic snake pipefish (*Entelurus aequoreus*) extends its northward distribution range to Svalbard (Arctic Ocean). Polar Biology 30:1359-1362

Kirby RR, Johns DG, Lindley JA. 2006. Fathers in hot water: rising sea temperatures and a Northeastern Atlantic pipefish baby boom. Biology Letters 2:597-600

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Rusyaev SM, Dolgov AV, Karamushko OV. 2007. Captures of Snake Pipefish *Entelurus aequoreus* in the Barents and Greenland Seas. Journal of Ichthyology 47:544-546

Sebastes marinus (Linnaeus 1758)

Family: Sebastidae
English name: golden redfish
Norwegian name: vanlig uer
Russian name: золотистый окунь, морской окунь
(zolotistiy okun), (morskoy okun)

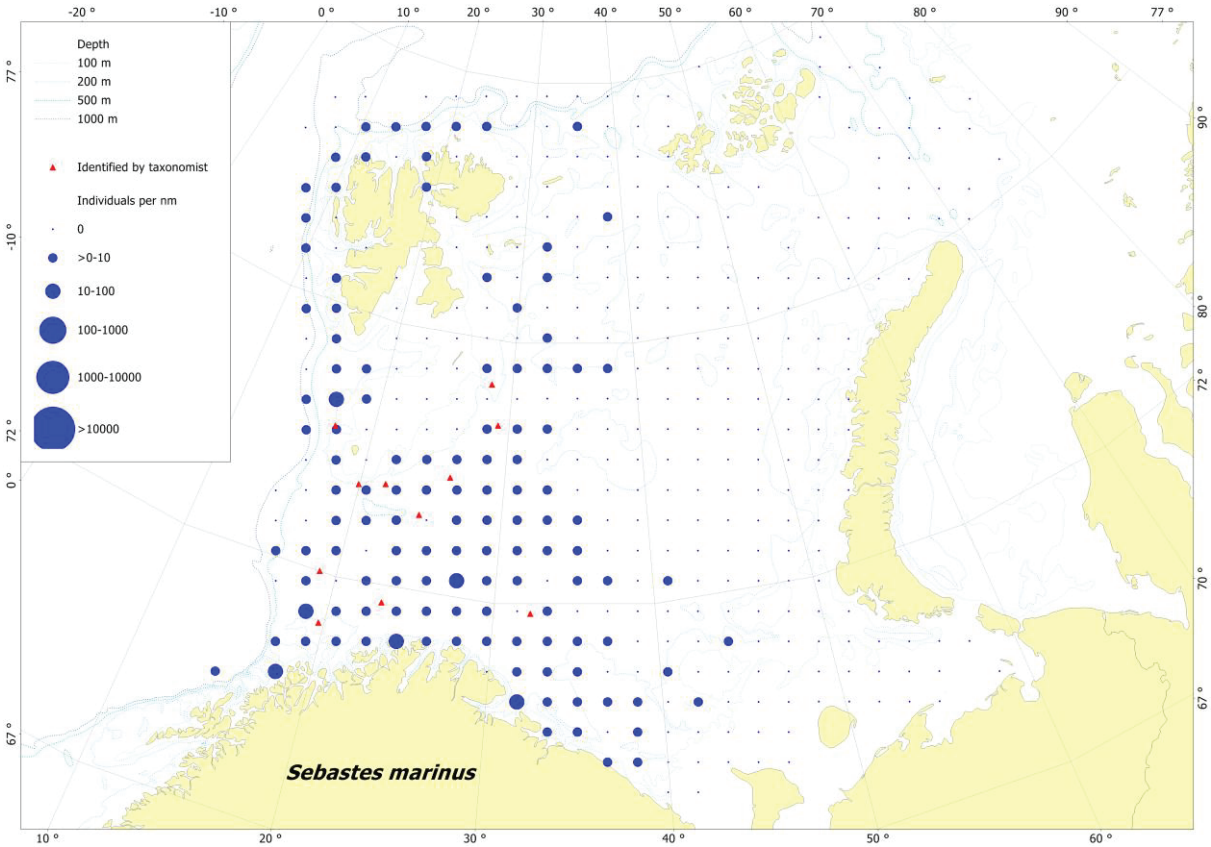
Photo: Thomas de Lange Wenneck

Note on taxonomy and identification: Valid name for this species is currently *Sebastes norvegicus* (Ascanius 1772) while *S. marinus* has been and is still the prevailing name used in scientific literature and management. *S. norvegicus* might be regarded as a 'nomen oblitum' in the future. Juvenile redfishes are difficult to identify to species, and partly pooled to *Sebastes* spp.

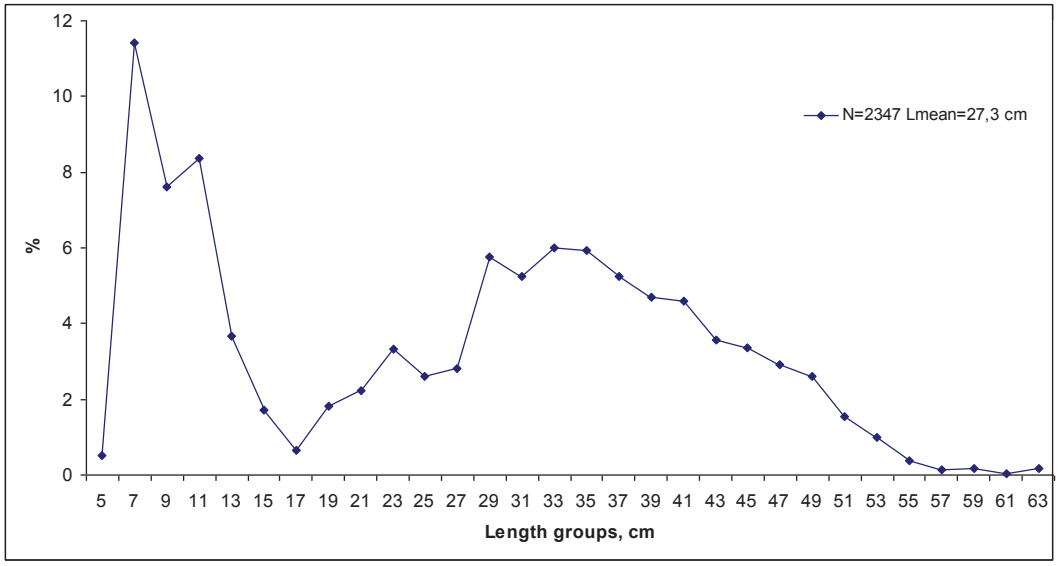
Spatial distribution

Known from the northern part of the North Sea to the Barents Sea and north of Svalbard/Spitsbergen and Novaya Zemlya, also in Norwegian fjords, off Iceland, the Faroese, Greenland and in the western North Atlantic.

Most frequently encountered in the warmwater southern and western parts of the surveyed area, scattered observations also in central and northern parts.



Length composition



Life history

Mainly boreal, pelagic to benthopelagic at 100-500 m on the continental shelf, along the coast and in certain fjords, primarily at temperatures between 2-5 ºC. Maximum registered length 122 cm, with a weight of 19 kg, longevity over 60 years. Measures 2-10 cm after one year, 12-30 cm at the age of five and more than 40 cm and 1.5 kg at the age of 20-21 years. Half of the population reached maturity at age 11 years (30 cm). Juveniles feed on zooplankton, adult on fish and large plankton, prey for other species like cod and halibut. Ovoviviparous, insemination in February-March, in April-May a single female can release up to 360 000 larvae. The larval extrusion takes place along the continental shelf break, off the Lofoten Islands, and also north of Bear Island. Larvae are 6-8 mm long when released and drift pelagically northward and eastward into the Barents Sea. Compared with *Sebastes mentella* the larvae are more concentrated in the southern Barents Sea. Adult fishes migrate to feeding areas in the Barents Sea after releasing the larvae.

Population and exploitation

The stock has been at a low level since the early 1990s. Age cohorts in the past decade were low and number of immature fish continues to decline. As a result the species classification in the Norwegian red list was raised from ‘vulnerable’ in 2006 to ‘endangered’ in the 2010. Taken as bycatch in Russian fisheries.

References

Barsukov VV, Shestova LM, Mukhina NV. 1986. Redfish of *Sebastes* genus. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 48-52 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Gjøsæter J, Hesthagen T, Borgstrøm R, Brabrand Å, Byrkjedal I, Christiansen JS, Nedreaas K, Pethon P, Uiblein F, Vøllestad LA, Wienerroither R. 2010. Fisker – Pisces. In: Kålås JA, Viken Å, Henriksen S. Skjelseth S. (eds) The 2010 Norwegian Red List for Species. Norwegian Biodiversity Information Centre, Norway, pp 403-412

Hureau J-C, Litvinenko NI. 1986. Scorpaenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1211-1229

Nedreaas KH, Drevetnyak KV. 2011. Redfish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Planque B. 2010. Vanleg uer. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:157 (in Norwegian)

Sebastes mentella Travin 1951

Family: Sebastidae
English name: beaked redfish
Norwegian name: snabeluer
Russian name: окунь-клювач
(okun-kluvatch)

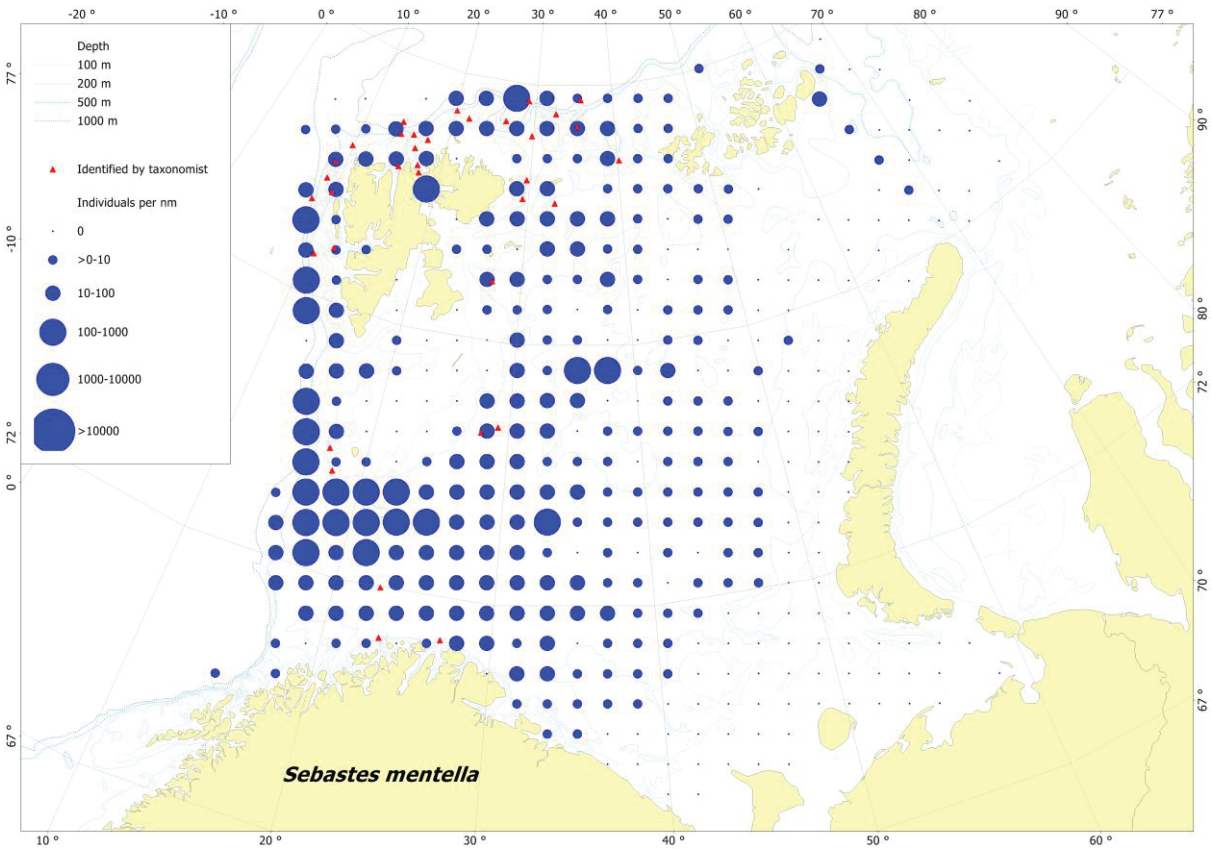
Photo: Thomas de Lange Wenneck

Note on identification: Juvenile redfish are difficult to identify to species, and partly pooled to *Sebastes* spp.

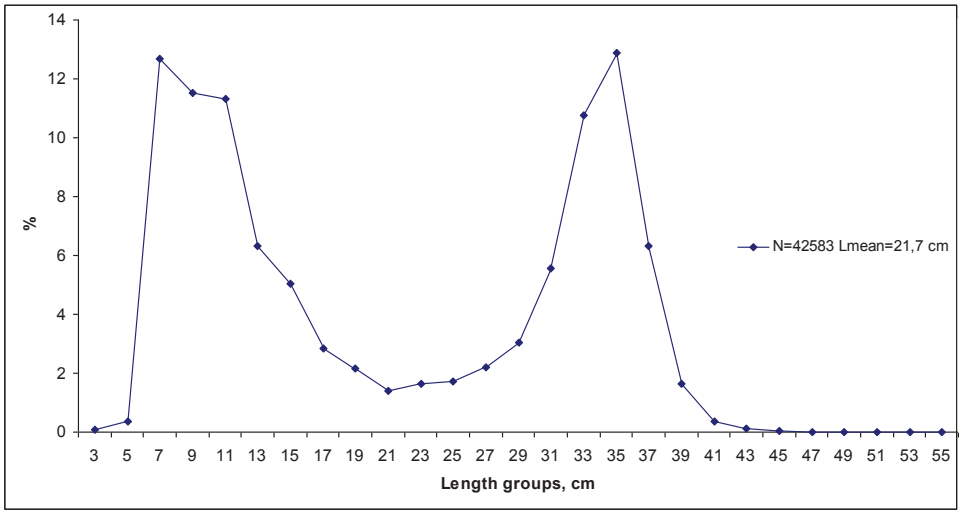
Spatial distribution

Known in the Barents Sea and the Norwegian Sea, also around the Faroe Islands, off Iceland, Greenland and in the western North Atlantic.

Found in deeper parts influenced by Atlantic water masses, highest catch rates along the shelf edge towards the Norwegian Sea and the Polar Basin and the Bear Island Trough. Juveniles are primarily found in northern and eastern areas. Although often found in the pelagic, the distribution patterns based on demersal trawl catches probably reflect the overall distribution well.



Length composition



Life history

Mainly boreal, pelagic to benthopelagic, in the Barents Sea and along the continental slope mostly found at depths of 400-600 m and at temperatures of primarily 2-4 ºC. Adult specimens pelagic at 300-450 m during extensive food migrations into the Norwegian Sea. Can reach 47 cm, 1.3 kg, and over 70 years. At the age of 11 years, half of the individuals are sexually mature. Growth rates low, weights of fish of the same lengths as well as lengths and weights of fish of the same age vary widely. Feeds on plankton, fish and squids, juveniles are an important food source for cod, Greenland halibut and herring. Ovoviviparous, insemination in August-November, release of up to 150 000 larvae in March-April along the continental shelf between 62° N and Bear Island. The larvae are transported by currents to the nursery areas in the eastern Barents Sea and the Svalbard/Spitsbergen shelf, where the juveniles settle. At the age of five years they migrate southward to the continental shelf and immingle with the mature population. Important feeding areas are the Norwegian Sea and the southwestern Barents Sea.

Population and exploitation

The stock has reached a historical low and recruitment to the spawning stock was extremely low after 1995. The species is listed on the Norwegian Red list 2010 as ‘vulnerable’. Since 2005, there have been signs of improved recruitment, probably resulting from effective, protective fisheries regulations. No direct fishery in Russia, but taken as bycatch.

References

Barsukov VV, Shestova LM, Mukhina NV. 1986. Redfish of *Sebastes* genus. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 48-52 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Gjøsæter J, Hesthagen T, Borgstrøm R, Brabrand Å, Byrkjedal I, Christiansen JS, Nedreaas K, Pethon P, Uiblein F, Vøllestad LA, Wienerroither R. 2010. Fisker – Pisces. In: Kålås JA, Viken Å, Henriksen S. Skjelseth S. (eds) The 2010 Norwegian Red List for Species. Norwegian Biodiversity Information Centre, Norway, pp 403-412

Hureau J-C, Litvinenko NI. 1986. Scorpaenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1211-1229

Nedreaas KH, Drevetnyak KV. 2011. Redfish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Planque B. 2010. Snabeluer. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:148 (in Norwegian)

Sebastes viviparus Krøyer 1845

Family: Sebastidae
English name: Norway redfish
Norwegian name: lusuer
Russian name: малый окунь, окунь вивипарус (maliy okun), (okun viviparus)

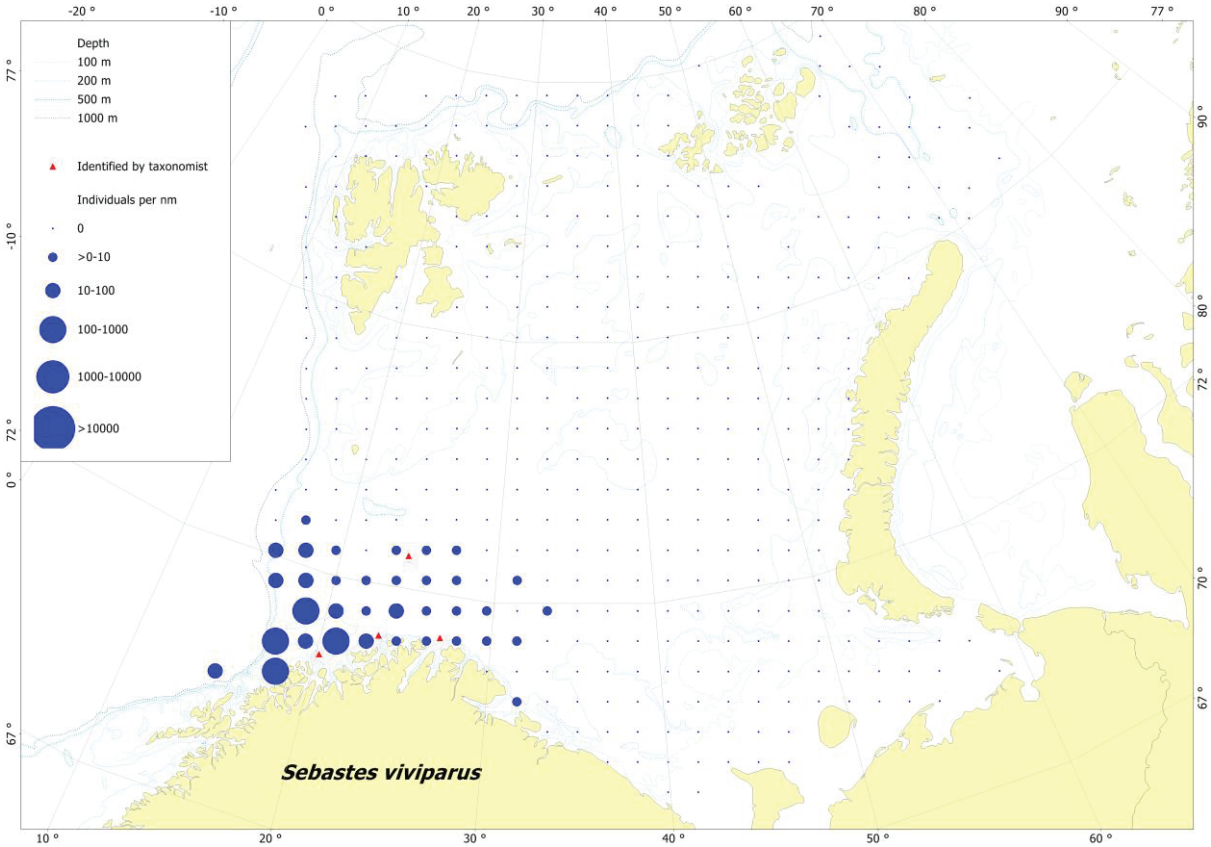
Photo: Thomas de Lange Wenneck

Note on identification: Juvenile redfish are difficult to identify to species, and mostly pooled to *Sebastes* spp.

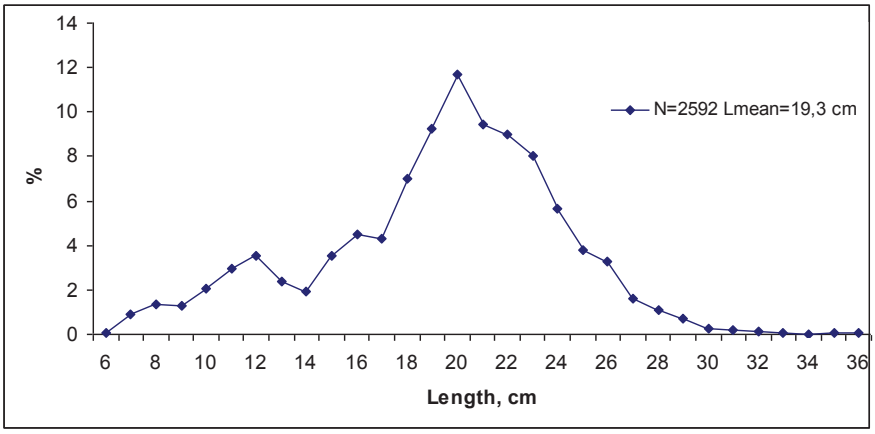
Spatial distribution

Known from Iceland, the British Isles, the northern North Sea and northwards, also off southern Greenland.

Found in the southwestern part of the surveyed area.



Length composition



Life history

Boreal, demersal to benthopelagic in coastal areas, preferring rocky bottom at depths of 10-300 m. Can reach 36 cm (although rarely longer than 30 cm), 1 kg, and 40 years (but rarely older than 30). Growth rate very low, a 27 cm long fish can be 18 years old. Matures at age 10-15 years (18-20 cm). Feeds on crustaceans, clams and small fishes. Ovoviviparous, 12 000-30 000 larvae are released in coastal Norwegian areas in June-August. Larvae are 4-5 mm long when released and live pelagically until 60 mm long.

Population and exploitation

Bycatch in other fisheries and used as industrial fish, but of low economic importance.

References

Barsukov VV, Shestova LM, Mukhina NV. 1986. Redfish of *Sebastes* genus. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 48-52 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Hureau J-C, Litvinenko NI. 1986. Scorpaenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1211-1229

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

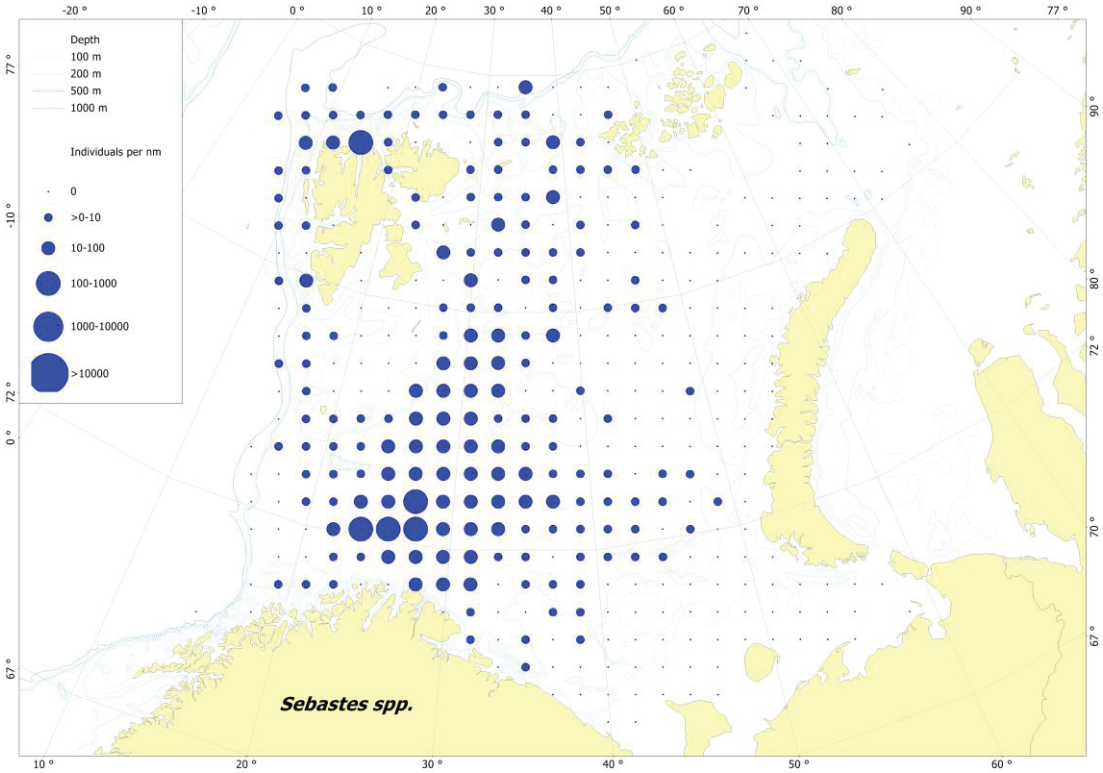
Sebastes spp.

Family: Sebastidae

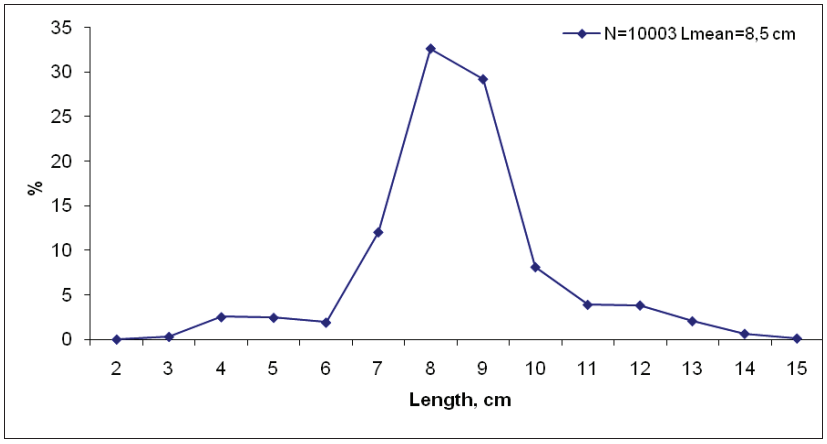
Note on identification: Juvenile redfish are difficult to identify to species, and mostly pooled to *Sebastes* spp.

Spatial distribution

Found throughout the surveyed area, except the northeastern and southeastern part.



Length composition



Eutrigla gurnardus (Linnaeus 1758)

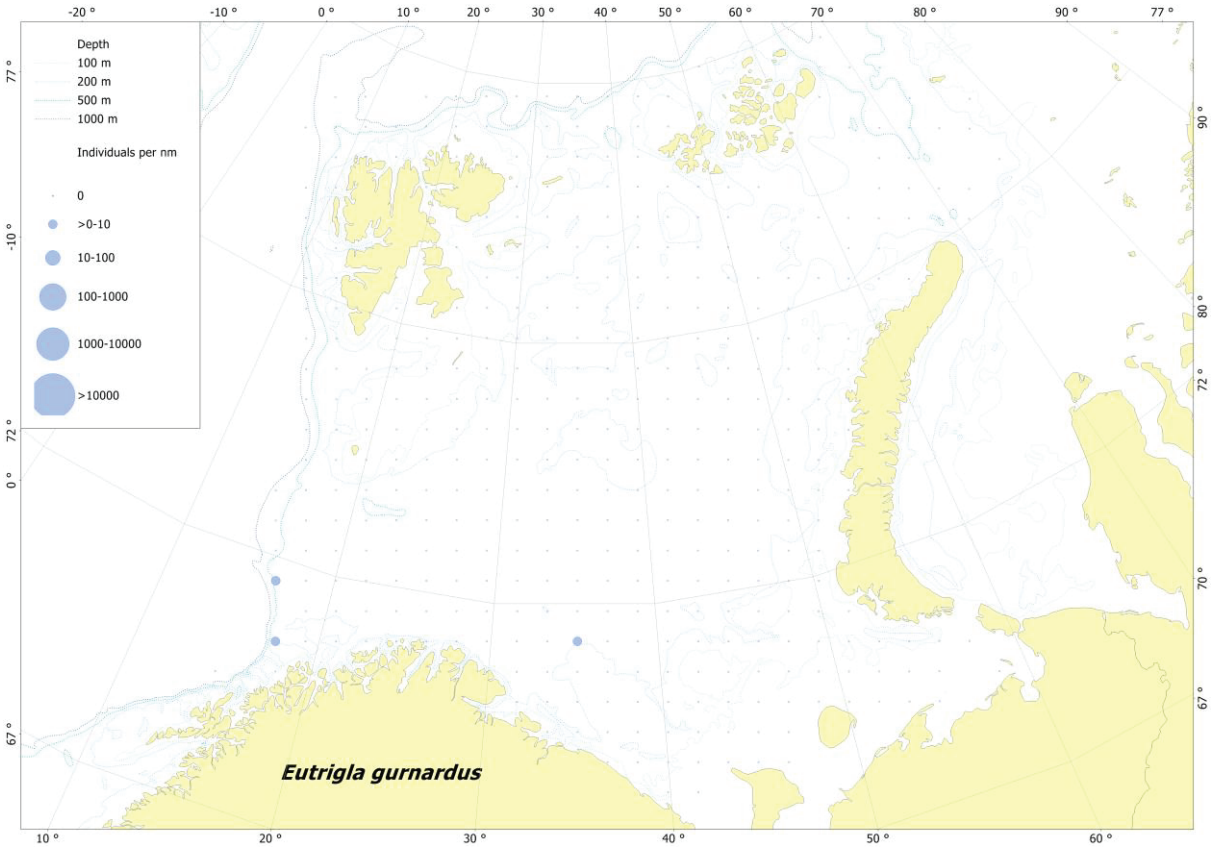
Family: Triglidae
English name: grey gurnard
Norwegian name: knurr
Russian name: серая тригла, морской петух (seraya trigla), (morskoy petukh)

Photo: Andrey Dolgov

Spatial distribution

Known in the eastern Atlantic from Morocco northward to Iceland and Norway, also in the Baltic and Mediterranean Sea.

In the surveyed area caught by pelagic trawl off the Norwegian and Murman coast.



Length composition

Three specimens (34-42 cm, mean length 37.7 cm) were caught by pelagic trawl.

Life history

Southern boreal, benthic on sandy and other bottom down to 140 m, caught near the surface during night. Can reach up to 50 cm, 1.2 kg and hardly more than 6 years. Reaches 10-15 cm within one year, males mature 3 years old (17 cm), females 4 years old (24 cm). Feeds on crustaceans and fishes. Females spawn in April-August at the coasts of southern Norway up to 300 000 eggs (1.2-1.6 mm in diameter), 3-4 mm long larvae hatch after 5 days. Eggs and larvae pelagic until 3 cm long.

Population and exploitation

Of no economic importance in the Barents Sea.

References

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Hureau J-C. 1986. Triglidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1230-1238

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Rusyaev SM, Shatsky AV. 2001. New data on distribution of grey gurnard *Eutrigla gurnardus* (Triglidae) in the Barents Sea. Voprosy Ikhtyologii 41:265-267 (in Russian)

Artediellus atlanticus Jordan & Evermann 1898

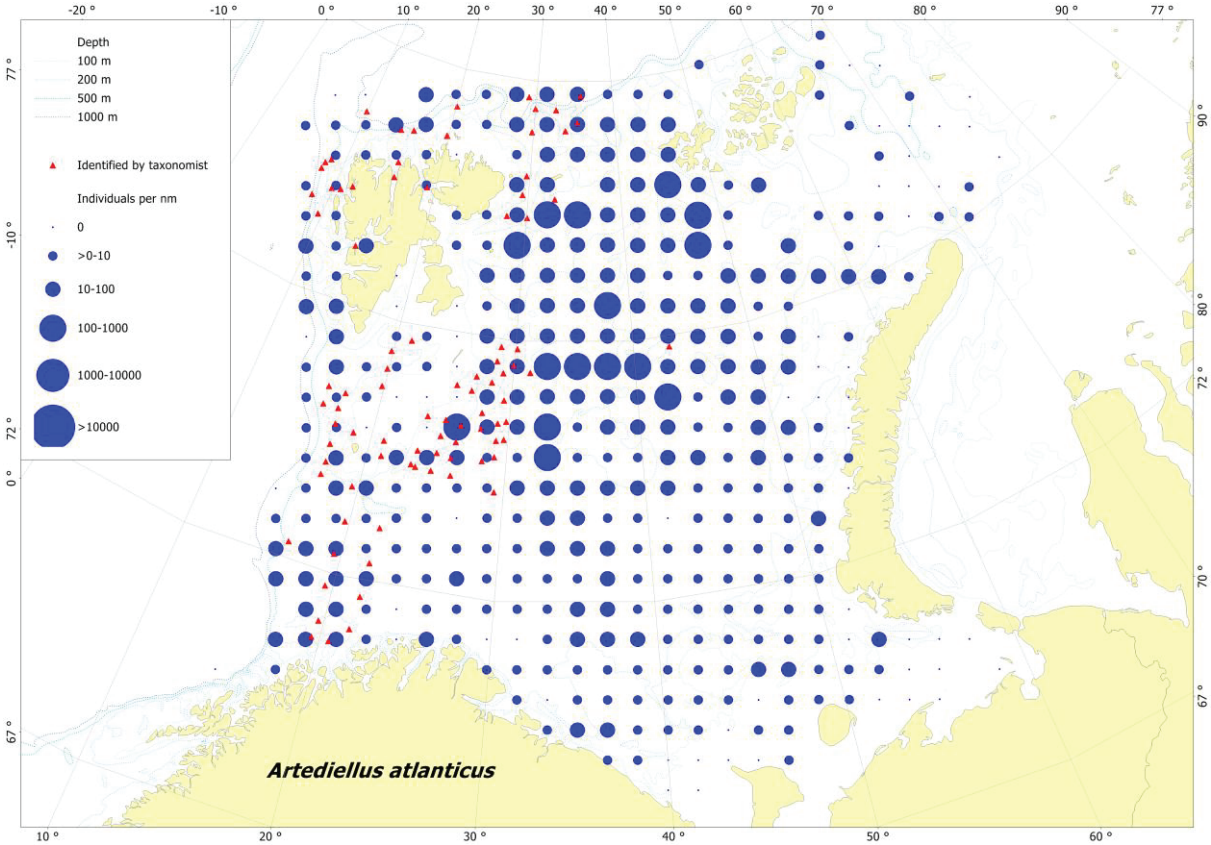
Family: Cottidae
English name: Atlantic hookear sculpin
Norwegian name: krokulke
Russian name: европейский крючкорогий бычок
(evropeyskiy kryutchkorogiy bytchyok)

Photo: Thomas de Lange Wenneck

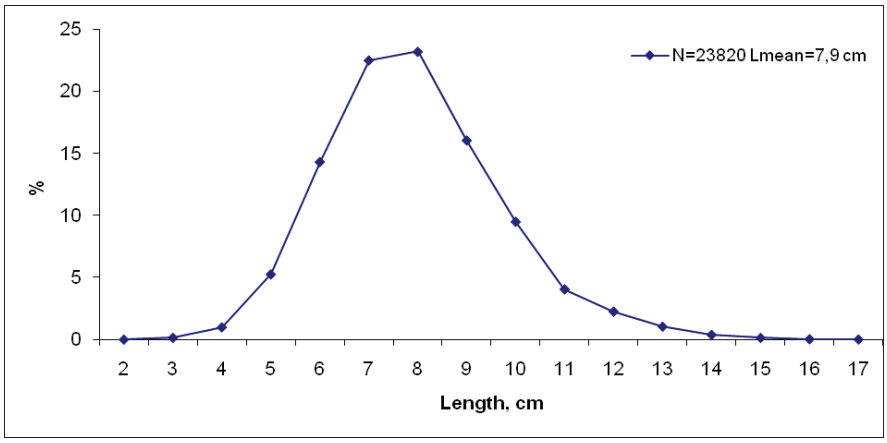
Spatial distribution

Known along the European coast from Skagerrak northward to the Barents Sea, off Iceland, Greenland and in the western North Atlantic.

Widely distributed in the surveyed area, especially north of the Polar Front.



Length composition



Life history

Mainly boreal, demersal on soft bottom at 35-410 m, in the Barents Sea off Svalbard/Spitsbergen also in the littoral zone. Occurs in the Barents Sea at temperatures between -1.8 and +9.4 ºC (primarily at around 1.5 ºC), and at salinities above 34 ‰. Can reach up to 16 cm (bur rarely more than 10 cm). 9.5 cm long fishes are 8 years, 13 cm long 17 years old, females mature at age 3-4 years (6.5 cm). Unlike other species in the family males grow larger than females. Feeds on burrowing polychaetes, gammarids and other benthic invertebrates. Spawning in the Barents Sea takes place in August-September, females lay 60-200 large demersal eggs. Larvae hatch after more than 200 days, are benthic and similar in appearance and behavior to adults.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

von Dorrien CF. 1996. Reproduction and larval ecology of the Arctic fish species *Artediellus atlanticus* (Cottidae). Polar Biology 16:401-407

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Artediellus scaber Knipowitsch 1907

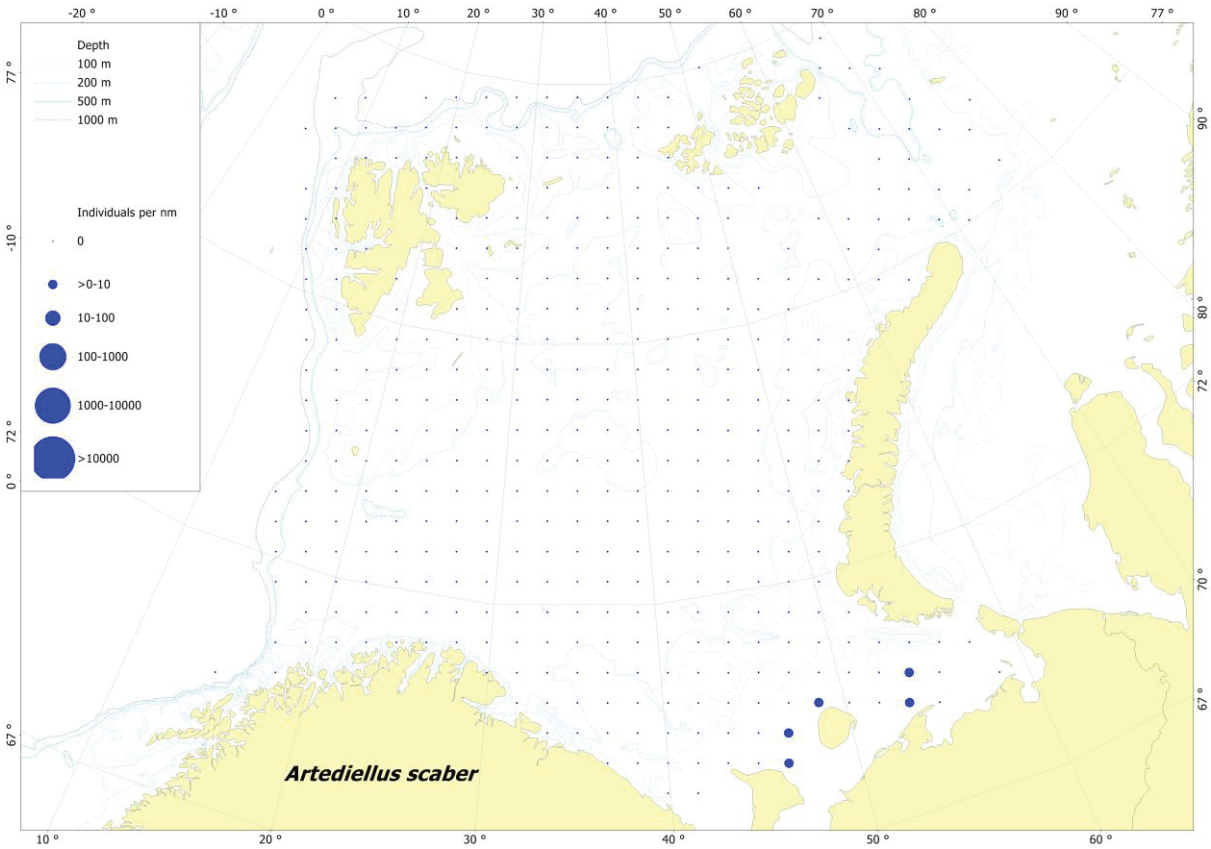
Family: Cottidae
English name: hamecon
Norwegian name: sibirkrokulke
Russian name: шероховатый бычок
(sherokhovatiy bytchyok)

Photo: PINRO

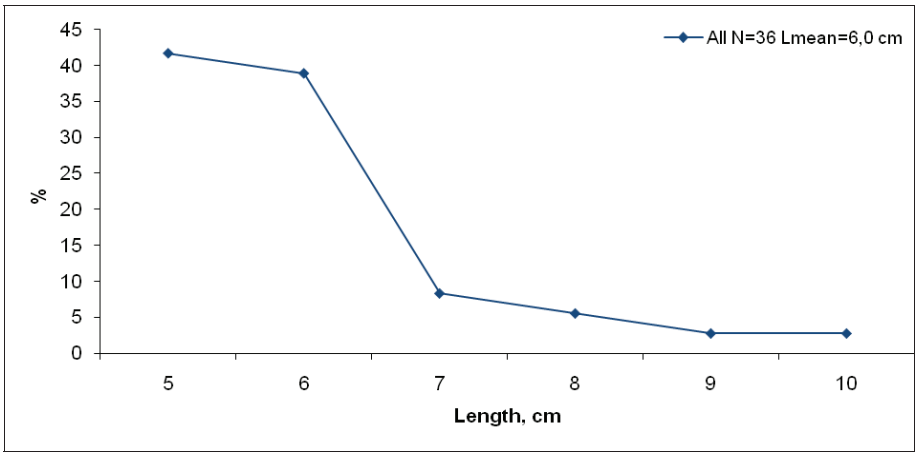
Spatial distribution

Known from the Barents Sea, Kara Sea and eastwards to the northern Bering Sea.

Found in the southeastern part of the surveyed area.



Length composition



Life history

Arctic, demersal, on sand and mud bottoms, primarily in brackish waters at 0-50 m (occasionally 100 m) and temperatures below 0 ºC. Can reach 8.4 cm, feeds on small bottom invertebrates. Spawning takes place in August-September, females lay about 80 demersal eggs.

Population and exploitation

Of no economic importance.

References

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Gymnocanthus tricuspis (Reinhardt 1830)

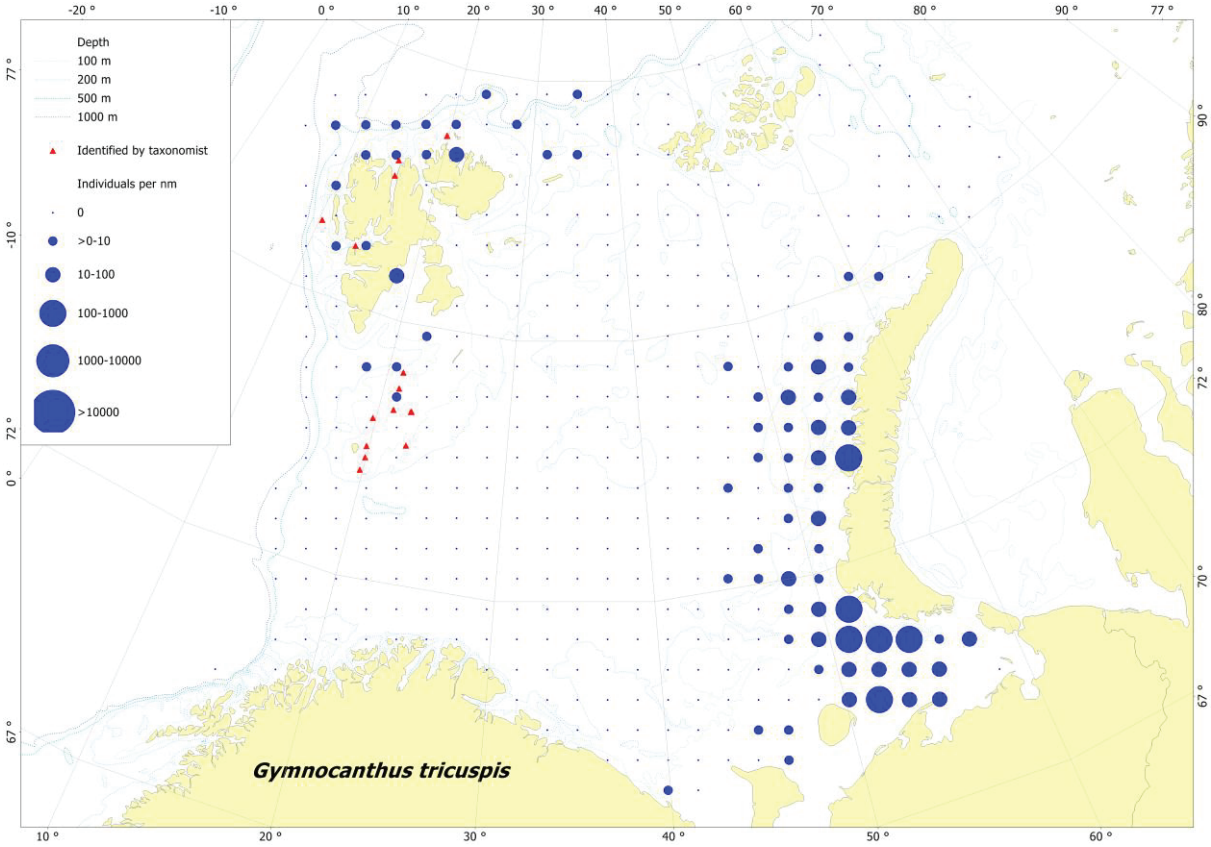
Family: Cottidae
English name: Arctic staghorn sculpin
Norwegian name: glattulke
Russian name: арктический шлемоносный бычок
(arktitcheskiy shlemonosniy bytchyok)

Photo: Thomas de Lange Wenneck

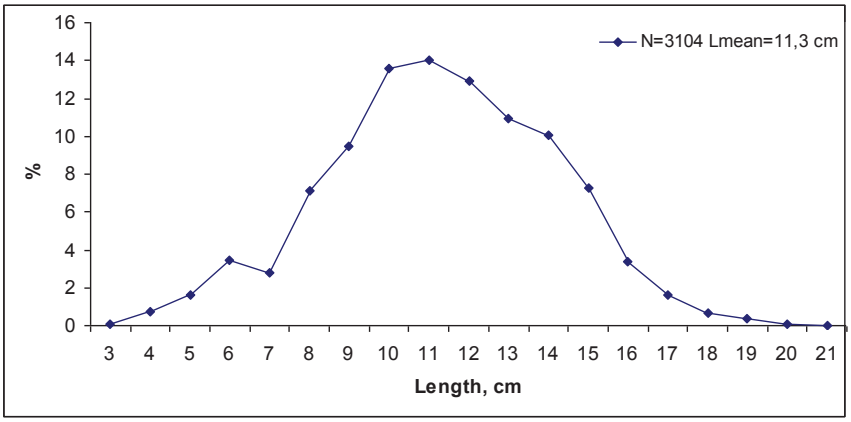
Spatial distribution

Circumpolar in the Arctic, occurs in the Barents and Kara Seas, off Iceland and Greenland and in the western North Atlantic.

In the surveyed area mainly found off Svalbard/Spitsbergen and Novaya Zemlya.



Length composition



Life history

Mainly arctic, demersal, living partly buried in sand or gravel bottom and in the kelp belt. Most common at 10-35 m, occasionally deeper. Prefers temperatures below 0 ºC, but tolerates wide range. Can reach 30 cm (usually 11-20 cm and not more than 25 cm in the Barents Sea). At age 2 years specimens are 7-8 cm long, afterwards females grow faster than males. Matures in the fourth summer (14 and 11 cm). Feeds on benthic and burrowing polychaetes and crustaceans. Spawning takes place in autumn, females lay 2 000-4 500 eggs (1 mm in diameter), larvae are pelagic until 20-30 mm long.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Icelus spp.

Family: Cottidae
English name: twohorn sculpin, spatulate sculpin
Norwegian name: tornulke, spateltornulke
Russian name: ицел, двурогий бычок
(itsel), (dvurogiy bytchyok)

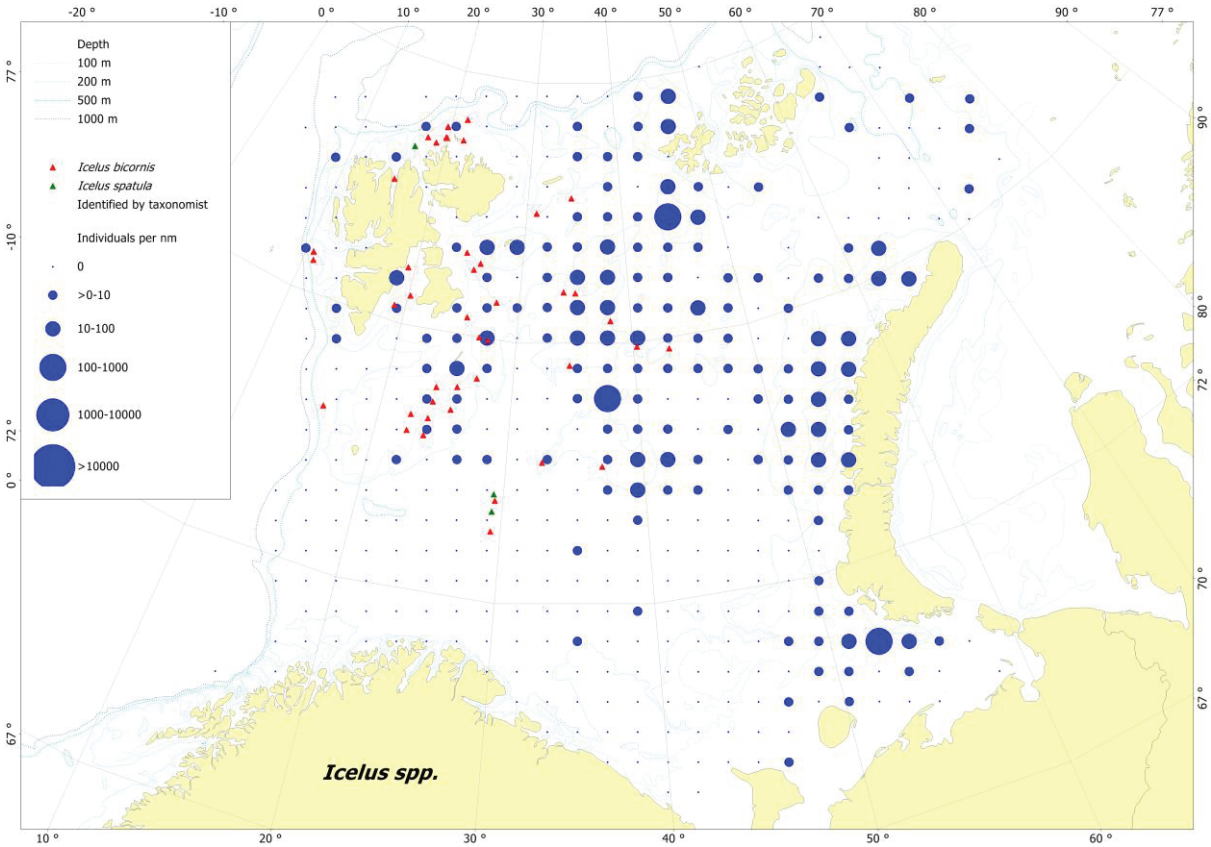
Photo: Andrey Dolgov

Note on identification: Two species occur in the Barents Sea: *Icelus bicornis* (Reinhardt 1840) and *Icelus spatula* Gilbert & Burke 1912. The species differ in the structure and distribution of the scales along the lateral line and the shape of the male urogenital papilla. Apart from some verified specimens the distribution data are presented for the genus only.

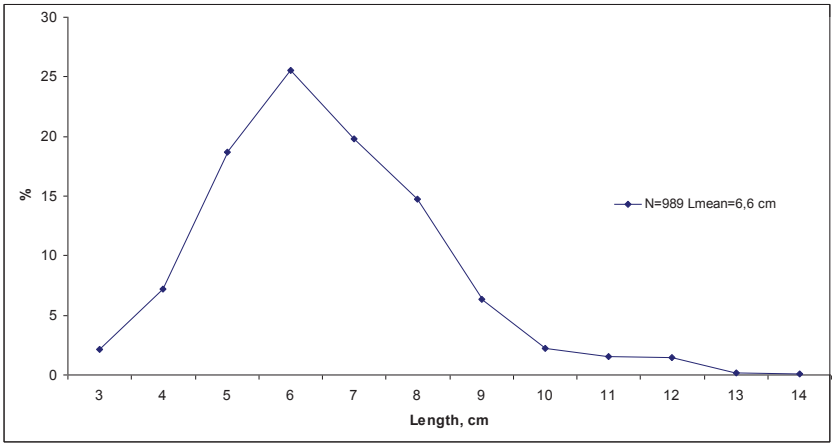
Spatial distribution

I. bicornis is known off the coasts of eastern Greenland, Iceland, Jan Mayen, and Norway. It is widely distributed in the Barents Sea, the White Sea and eastward to the Canadian Arctic; also known in the western North Atlantic. *I. spatula* occurs in the southeastern Barents Sea, the Kara Sea and eastward to the Canadian Arctic and western Greenland, also known in the western North Atlantic.

Genus *Icelus* has a wide distribution in the colder parts of the surveyed area.



Length composition



Life history

I. bicornis: mainly arctic, demersal on muddy, sandy or rocky bottoms at depths of 40-180 m (occasionally shallower or deeper). Reaches up to 15.7 cm (commonly 8-9 cm), females grow larger than males and a fish of 5.7 cm length is at most 5 years old. Feeds on benthic polychaetes and crustaceans. Internal fertilization, females spawn 150-1 300 demersal eggs (more than 3 mm in diameter) in August-October, juveniles are found in the coastal kelp belt.

I. spatula: arcto-boreal, demersal on sand or sandy-mud bottom with stones at depths of 30-70 m (occasionally shallower or deeper). Can reach up to 11.8 cm (commonly 6-9 cm). Feeds on large bottom invertebrates (crustaceans, polychaetes, mollusks). Internal fertilization, females spawn 1 000-1 500 demersal eggs (1.4 mm in diameter) in August-September.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Myoxocephalus scorpius (Linnaeus 1758)

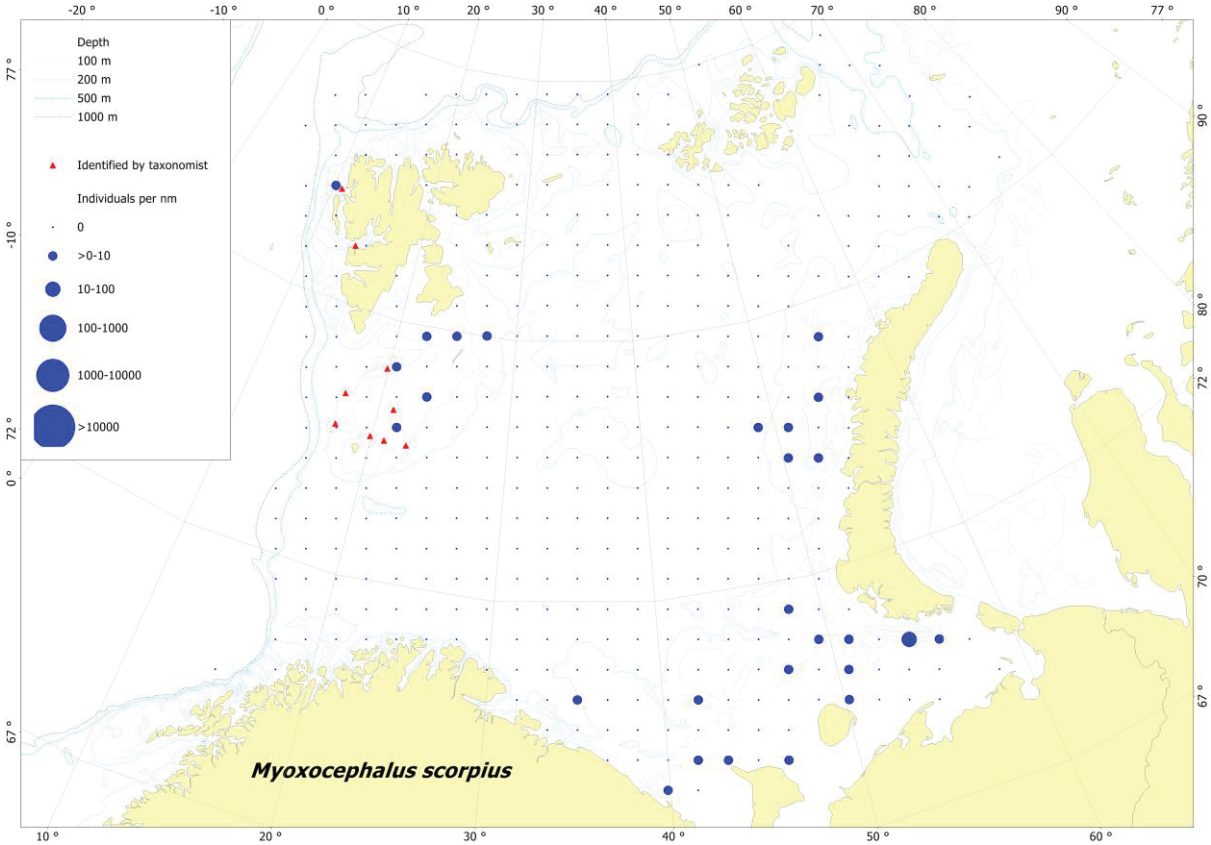
Family: Cottidae
English name: shorthorn sculpin
Norwegian name: vanlig ulke
Russian name: европейский керчак
(evropeyskiy kertchak)

Photo: Andrey Dolgov

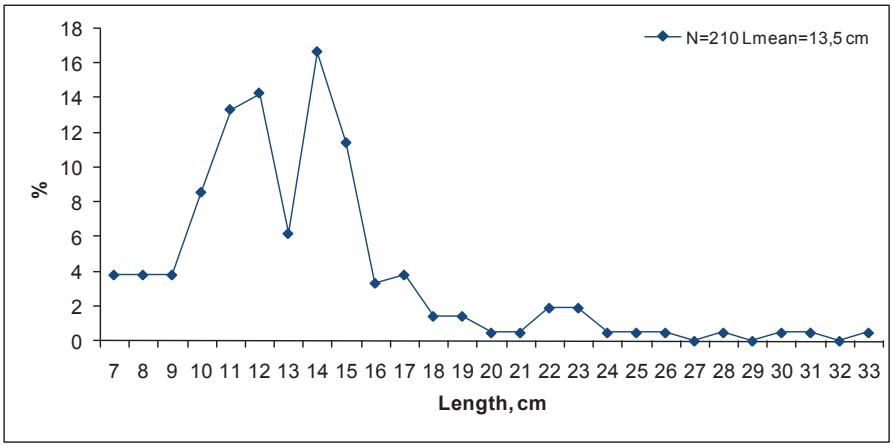
Spatial distribution

Known from the Bay of Biscay to the Svalbard/Spitsbergen archipelago, the Kara Sea and the Arctic Ocean, off Iceland, Greenland, and in the western North Atlantic.

Found off Svalbard/Spitsbergen and Novaya Zemlya and in the southeastern part of the surveyed area.



Length composition



Life history

Mainly boreal, demersal on all types of bottom, often among seaweed, most common at 0-25 m, in the Barents Sea at 40-300 m, prefers temperatures above 1 ºC. Can reach 60 cm and 1.1 kg in arctic waters, but less in the Barents Sea (29.5 cm, 7 years) and in the southern part of its distribution area. Matures at age 3-4 years (males 15-17 cm, females 20-21 cm). Feeds on large demersal crustaceans (crab, shrimp) and fish. Spawning takes place in December-March, egg clumps with up to 2 700 eggs (2-2.5 mm in diameter) are laid between rocks and algae and guarded by the males, total fecundity up to 12 000 eggs. 6-8 mm long larvae hatch after 4-12 weeks and live pelagically some months until 2 cm long. Stationary, forming local stocks.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Triglops murrayi Günther 1888

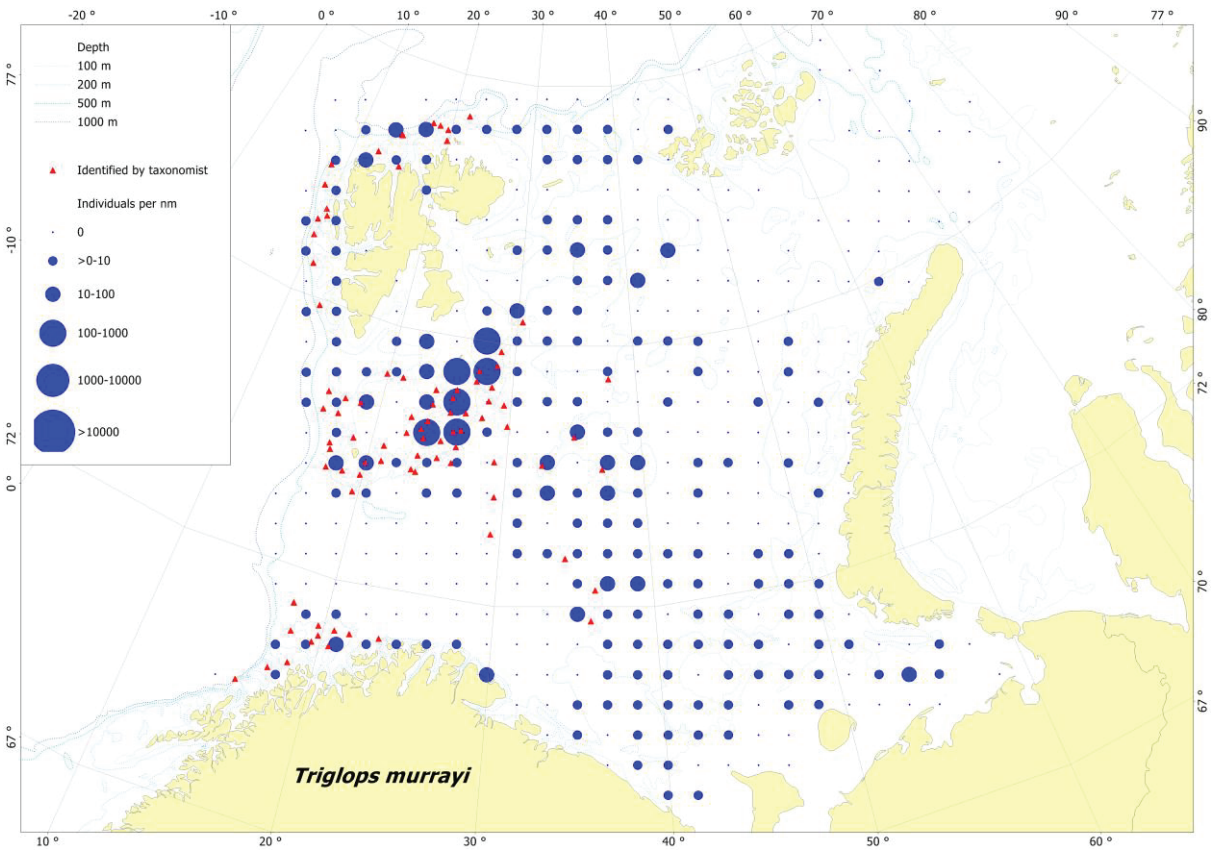
Family: Cottidae
English name: moustache sculpin
Norwegian name: nordlig knurrulke
Russian name: атлантический триглопс
(atlantitcheskiy triglops)

Photo: Thomas de Lange Wenneck

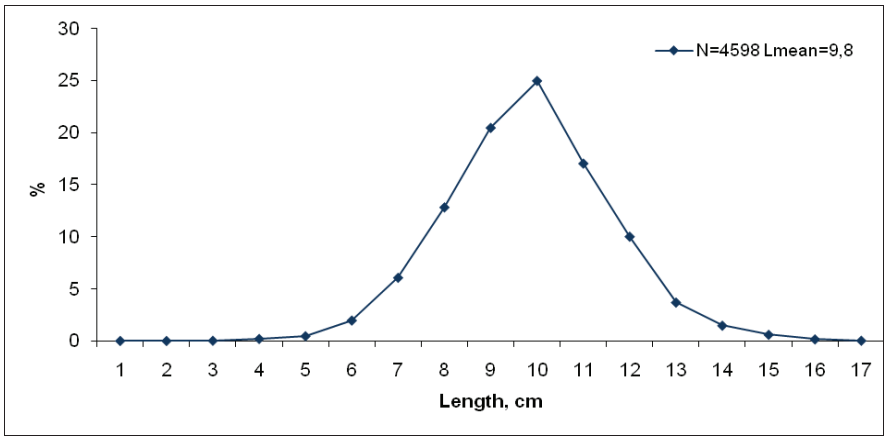
Spatial distribution

Known north of the British Isles and northward to the Barents Sea and the White Sea as well as to Iceland and Greenland, also in the western North Atlantic.

Widely distributed in the surveyed area, mostly north of the Polar front; lacking in the northeastern and southwestern part, except the Norwegian coast.



Length composition



Life history

Boreal, demersal on sandy bottom at 50-250 m, rarely down to 300 m, and in the White Sea as shallow as 7 m. Prefers low temperatures (below 2-3 ºC), but tolerates a wide range. Can reach 20 cm (commonly 8-14 cm) and 10 years. Females grow larger than males, matures at age 2-5 years. Feeds on fish, polychaetes and small crustaceans. Spawning takes place in late autumn/winter, females lay 100-450 demersal eggs (1.5-2.0 mm in diameter). Pelagic juveniles (7-15 mm) have been found in the coastal area of the Barents Sea in April-June.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Pietsch TW. 1993. Systematics and distribution of cottid fishes of the genus *Triglops* Reinhardt (Teleostei: Scorpaeniformes). Zoological Journal of the Linnean Society 109:335-393

Triglops nybelini Jensen 1944

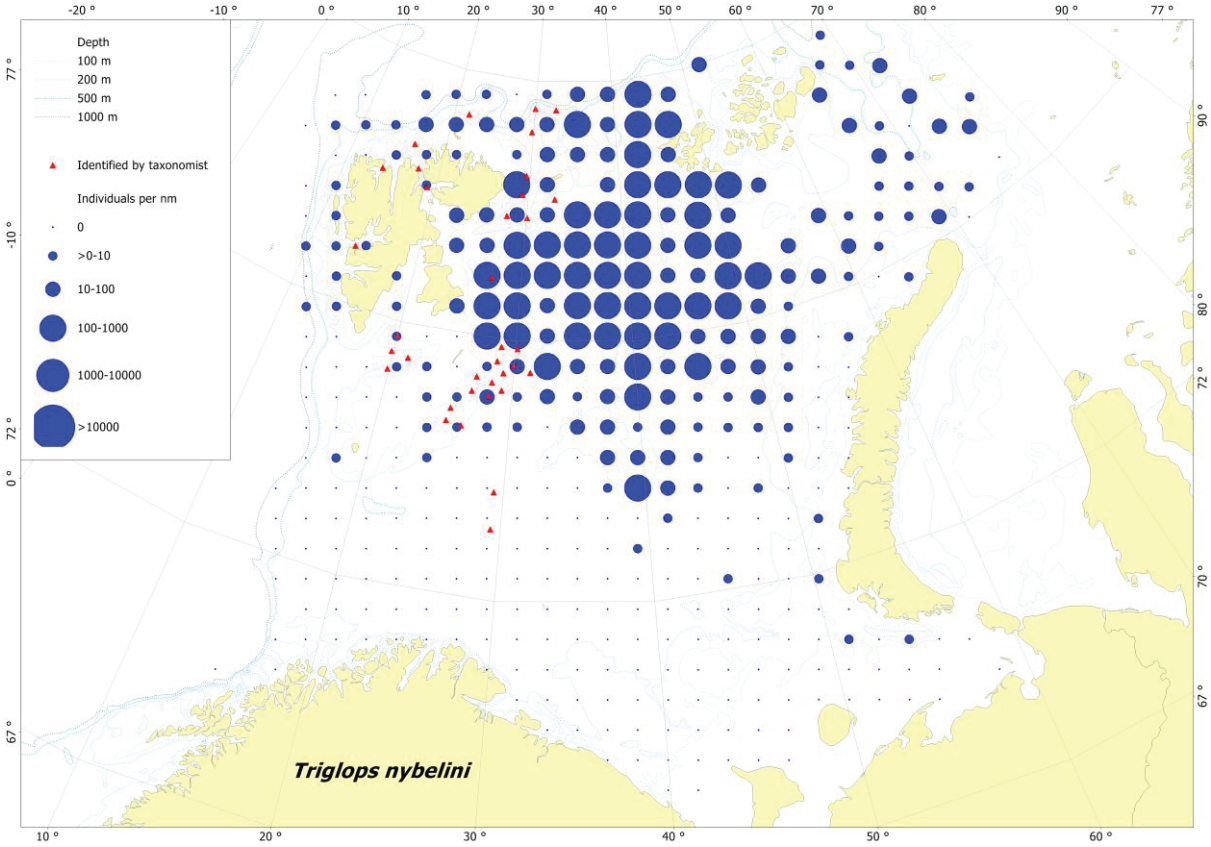
Family: Cottidae
English name: bigeye sculpin
Norwegian name: grønlandsknurrulke
Russian name: полярный триглопс
(polyarniy triglops)

Photo: Thomas de Lange Wenneck

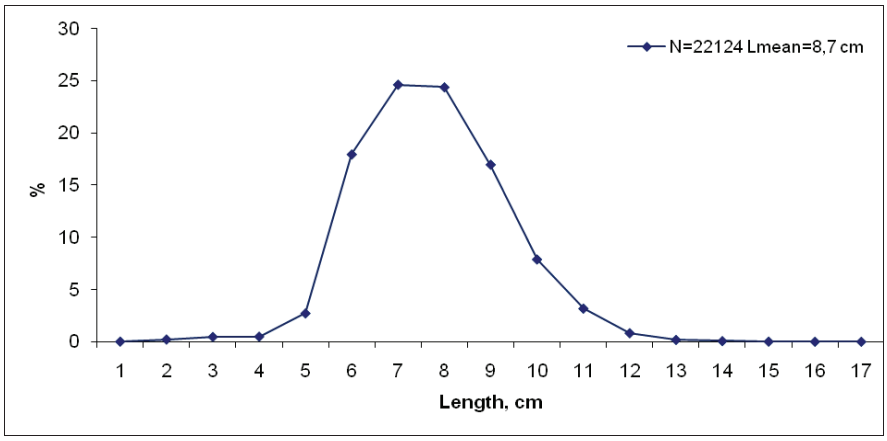
Spatial distribution

Nearly circumpolar in the Arctic and off Greenland and Jan Mayen, absent in the North Pacific.

Found in the northern parts of the surveyed area, north of the Polar front.



Length composition



Life history

Arctic, demersal on muddy bottom at 200-600 m, occasionally shallower or deeper. Prefers temperatures below 0 ºC and salinities above 34 ‰. Can reach 17 cm (commonly 7-11 cm), females grow larger than males. Matures at age 3-4 years, at most 7 years old when 14 cm long. Feeds on planktonic crustaceans (hyperiids, euphausiids) and fish. Spawning takes place in late summer/early autumn, females lay about 600-1 000 demersal eggs (3 mm in diameter).

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pietsch TW. 1993. Systematics and distribution of cottid fishes of the genus *Triglops* Reinhardt (Teleostei: Scorpaeniformes). Zoological Journal of the Linnean Society 109:335-393.

Triglops pingelii Reinhardt 1837

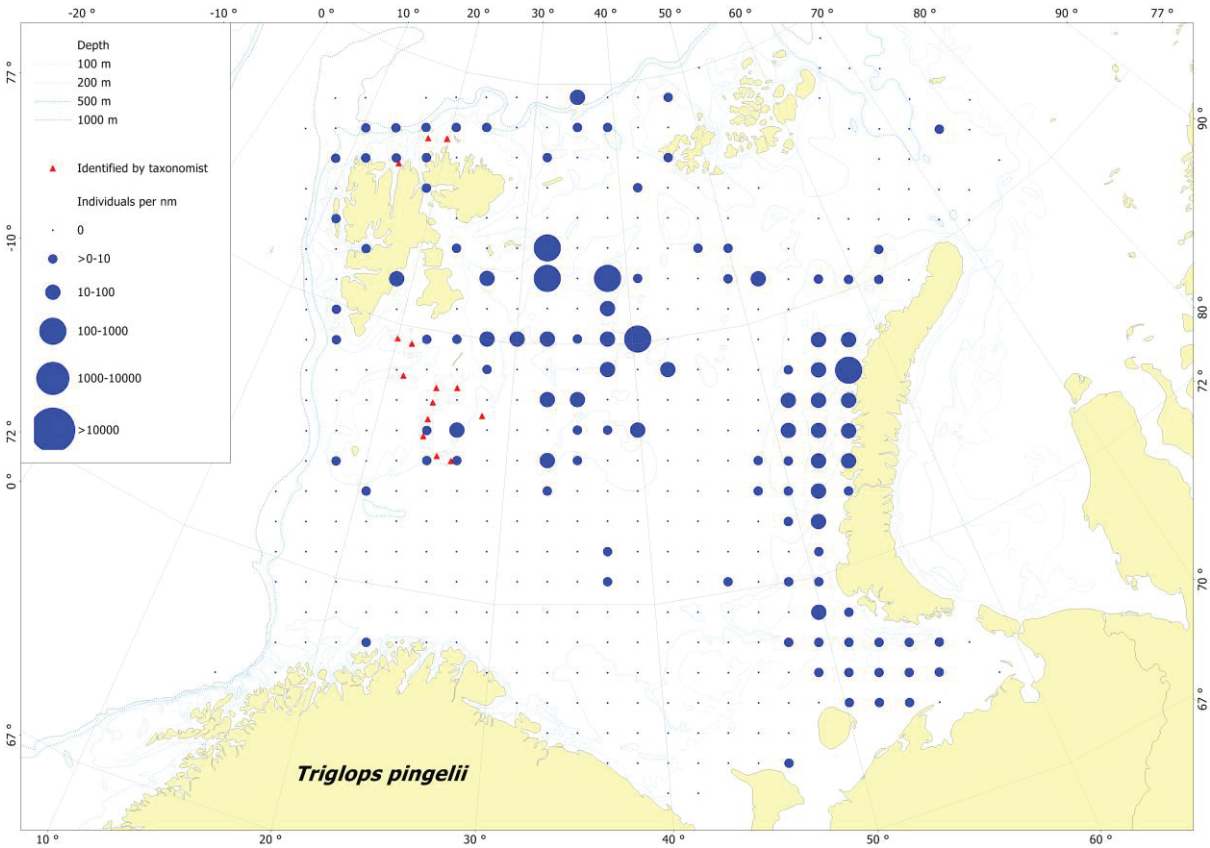
Family: Cottidae
English name: ribbed sculpin
Norwegian name: arktisk knurrulke
Russian name: остроносый триглопс
(ostronosiy triglops)

Photo: Andrey Dolgov

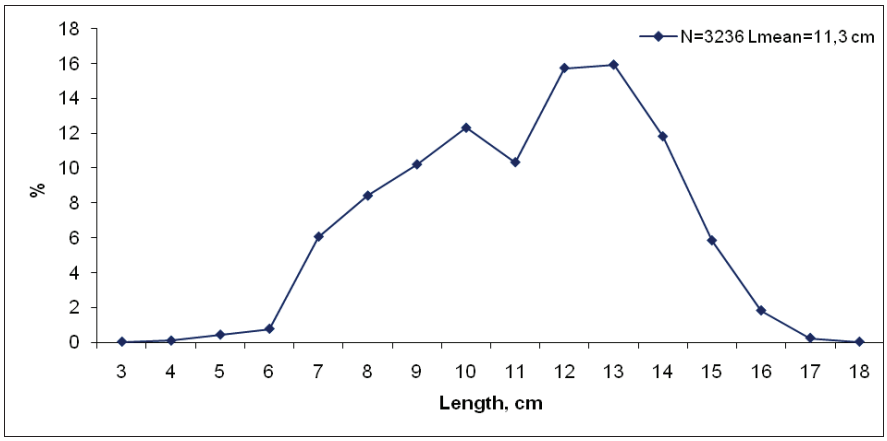
Spatial distribution

Widely distributed from the coastal waters of the Arctic, as well as the North Pacific and North Atlantic, including the Barents Sea and off Greenland.

Found mainly in the northern parts of the surveyed area, north of the Polar front.



Length composition



Life history

Arcto-boreal, demersal on different bottom types, also in brackish waters, at depths of 5-190 m, most common in 10-100 m, prefers temperatures below 0 ºC. Can reach 20 cm (females), 14.5 cm (males), and 9 years. Matures at age 3-5 years (7-9 cm). Feeds mainly on crustaceans (hyperiids, gammarids, shrimp) and fish. Spawning takes place in late autumn, 300-450 demersal eggs (3 mm in diameter) are laid.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Pietsch TW. 1993. Systematics and distribution of cottid fishes of the genus *Triglops* Reinhardt (Teleostei: Scorpaeniformes). Zoological Journal of the Linnean Society 109:335-393

Cottunculus microps Collett 1875

Family: Psychrolutidae
English name: Polar sculpin
Norwegian name: paddeulke
Russian name: малоглазый коттункул
(maloglaziy kottunkul)

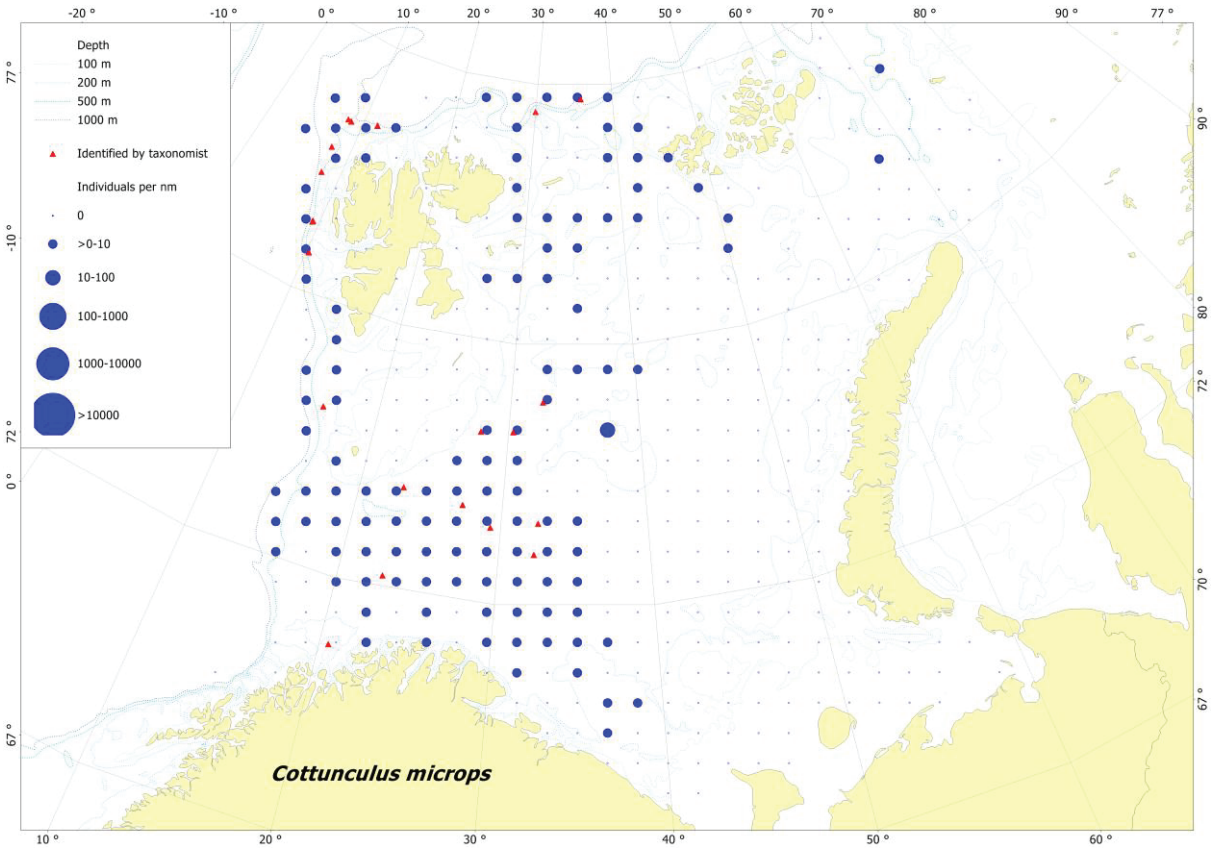
Photo: Andrey Dolgov

Note on taxonomy: Based on taxonomic revision in progress *Cottunculus sadko* Essipov 1937 is treated as a synonym of *C. microps*. Specimens originally identified as *C. sadko* are included here.

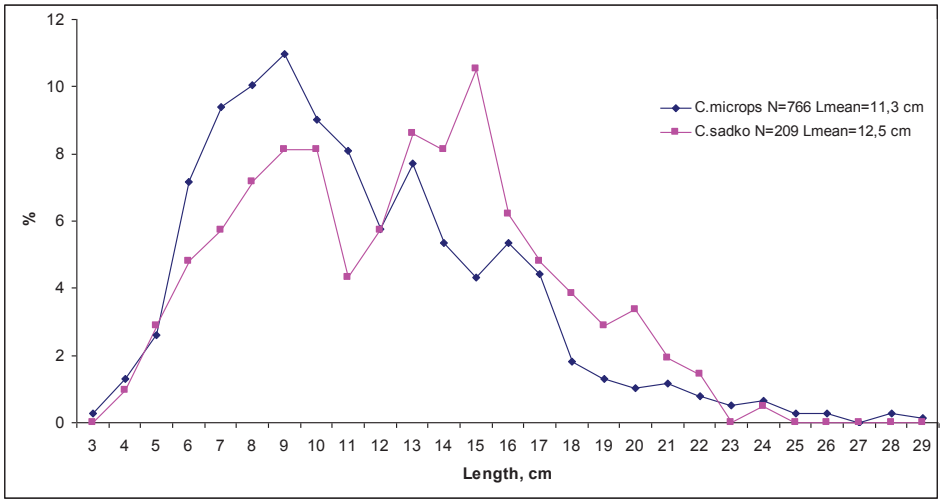
Spatial distribution

Known from the British Isles northward to the Barents Sea and to Iceland and Greenland, also known in the western North Atlantic.

Widely distributed in the western and northern part of the surveyed area.



Length composition



Life history

Mainly arctic, demersal on soft bottom at 170-400 m, occasionally down to 1 000 m (especially in the southern parts of its distribution area), prefers temperatures above 0 ºC and high salinity (34.5-35 ‰). Can reach up to 33 cm (commonly 6-16 cm), 0.7 kg, and 8-10 years. Males grow larger than females. Feeds on benthic invertebrates (pantopods, gammarids, polychaetes, mollusks etc.). Spawning takes place in summer-autumn, females lay 125-435 eggs (3-5 mm in diameter).

Population and exploitation

Of no economic importance, bycatch in fisheries.

References

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Fedorov VV, Nelson JF. 1986. Psychrolutidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1261-1264

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Agonus cataphractus (Linnaeus 1758)

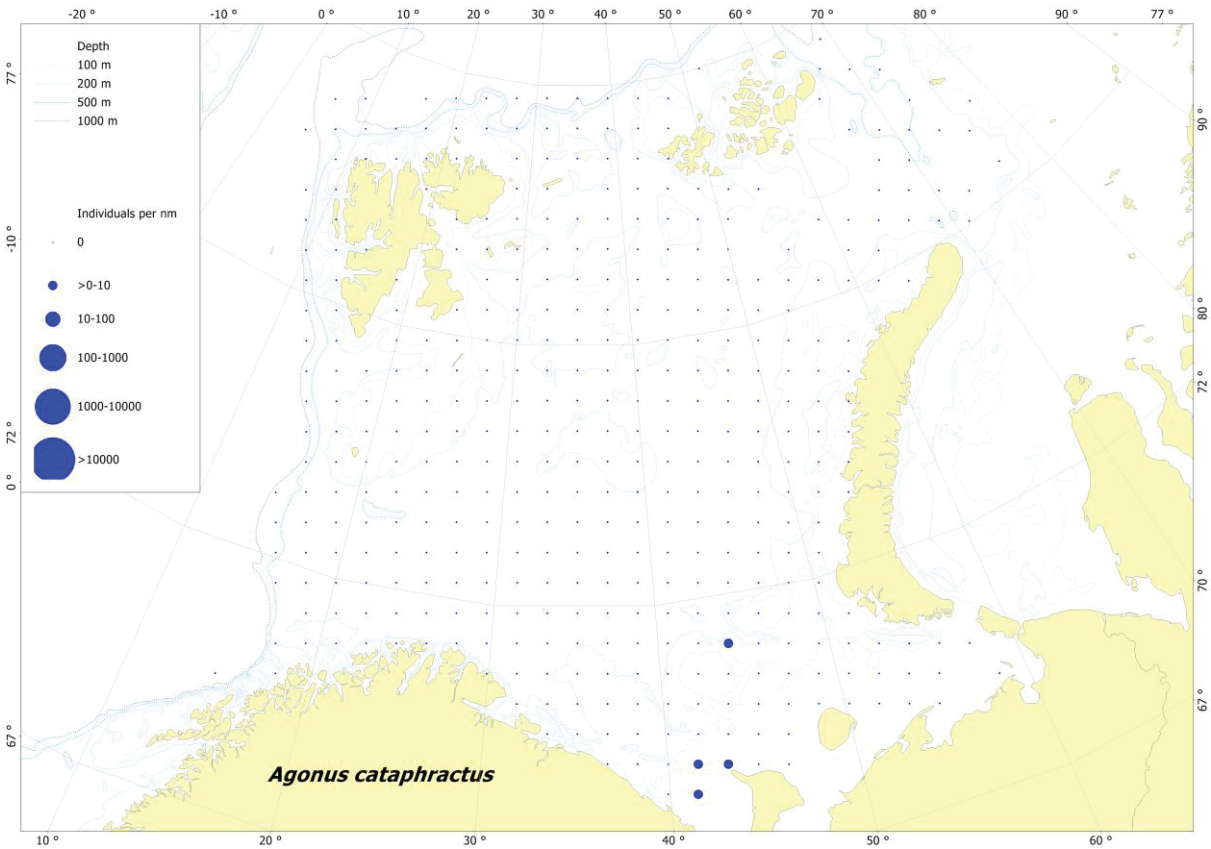
Family: Agonidae
English name: hooknose
Norwegian name: panserulke
Russian name: европейская лисичка
(evropeyskaya lisitchka)

Photo: Andrey Dolgov

Spatial distribution

Known in coastal waters of the eastern North Atlantic and the adjacent Arctic from the British Isles northward to the southern Barents Sea and the White Sea as well as to Iceland.

Found in the southeastern part of the surveyed area. The northernmost record might be a misidentified specimen of *Leptagonus decagonus*.



Length composition

Five specimens (8-15 cm) were caught.

Life history

Boreal, demersal, preferring soft and sand bottom in inshore waters during the summer, down to 270 m during the winter, and higher temperatures (4-12 ºC). Can reach 21 cm (commonly 15 cm). Feeds on benthic crustaceans, polychaetes, and mollusks. Spawning takes place in shallow waters and in the North Sea from February-May, females lay up to 3 000 eggs in clumps among the holdfasts of brown algae. 6-8 mm long larvae hatch after 10-11 months and live pelagically until approx. 20 mm long.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Agonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1265-1268

Kanayama T. 1991. Taxonomy and phylogeny of the family Agonidae (Pisces: Scorpaeniformes). Memoirs of the Faculty of Fisheries Hokkaido University 38:1-199

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Sheiko BA, Mecklenburg CW. 2004. Family Agonidae Swainson 1839 – poachers. California Academy of Sciences, Annotated Checklists of Fishes 30, 27 pp

Aspidophoroides olrikii Lütken 1877

Family: Agonidae
English name: Arctic alligatorfish
Norwegian name: arktisk panserulke
Russian name: ледовитоморская лисичка
(ledovitomorskaya lisitchka)

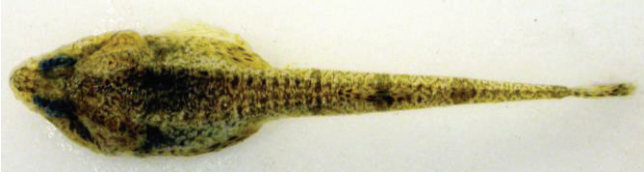


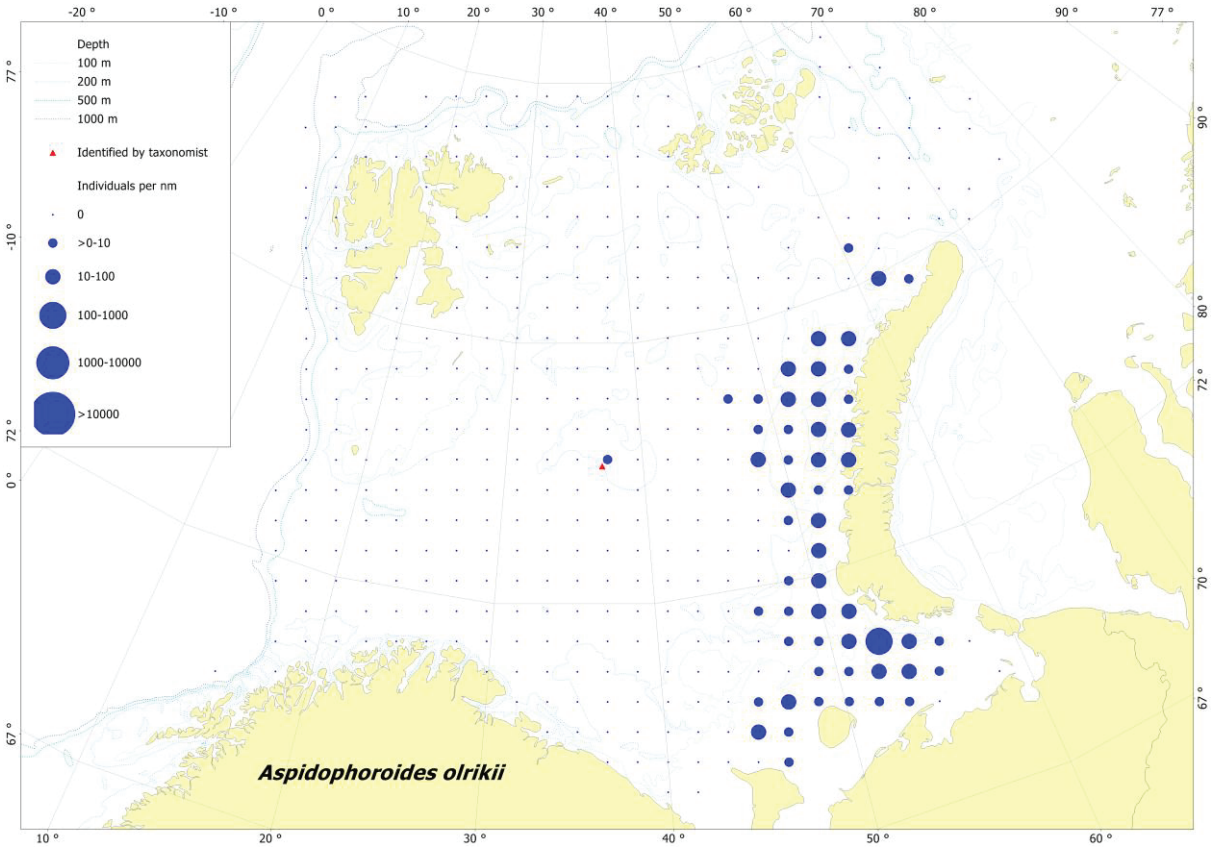
Photo: Bergen Museum

Note on taxonomy: Previously known as *Ulcina olrikii*, but results of DNA barcoding do not support the validity of the genus *Ulcina*.

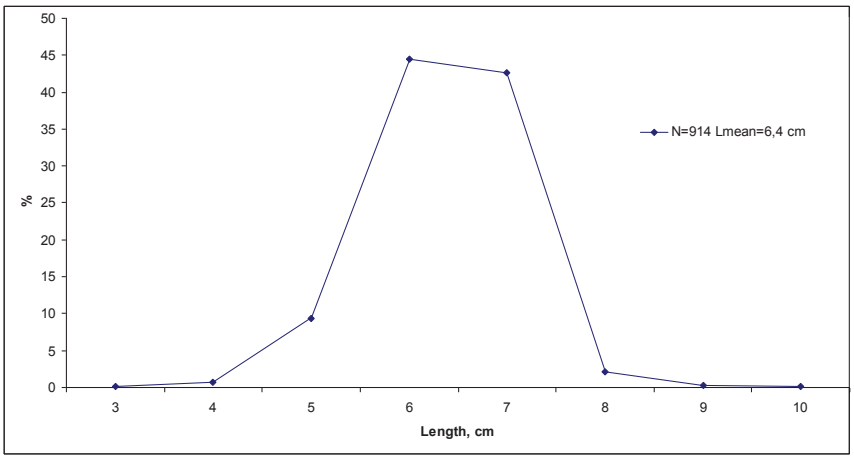
Spatial distribution

Almost circumpolar, known in the Barents, Kara and White Seas, off western Greenland.

Found in the eastern part of the surveyed area.



Length composition



Life history

Arctic, demersal, on muddy or sandy bottoms, most common at 20-100 m (occasionally found deeper in the Barents and Kara Sea), prefers temperatures around 0 ºC and 33-35 ‰ salinity. Can reach 8.6 cm (commonly less than 7 cm). Feeds on small benthic crustaceans and other invertebrates. Females spawn 110-250 demersal eggs.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Agonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1265-1268

Kanayama T. 1991. Taxonomy and phylogeny of the family Agonidae (Pisces: Scorpaeniformes). Memoirs of the Faculty of Fisheries Hokkaido University 38:1-199

Mecklenburg CW, Møller PR, Steinke D. 2011. Biodiversity of arctic marine fishes: taxonomy and zoogeography. Marine Biodiversity 41:109-140

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Sheiko BA, Mecklenburg CW. 2004. Family Agonidae Swainson 1839 – poachers. California Academy of Sciences, Annotated Checklists of Fishes 30, 27 pp

***Leptagonus decagonus* (Bloch & Schneider 1801)**

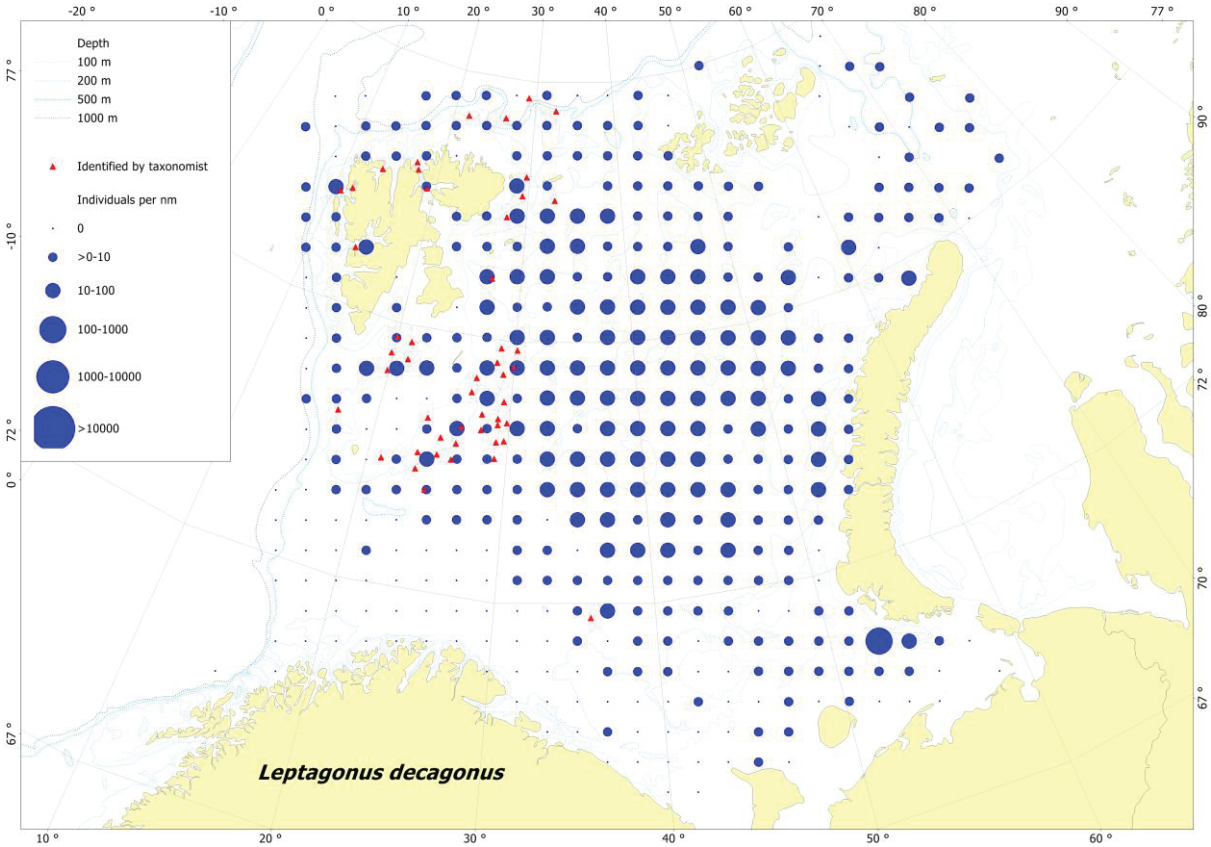
Family: Agonidae
English name: Atlantic poacher
Norwegian name: tiskjegg
Russian name: атлантическая морская лисичка
(atlantitcheskaya morskaya lisitchka)

Photo: Thomas de Lange Wenneck

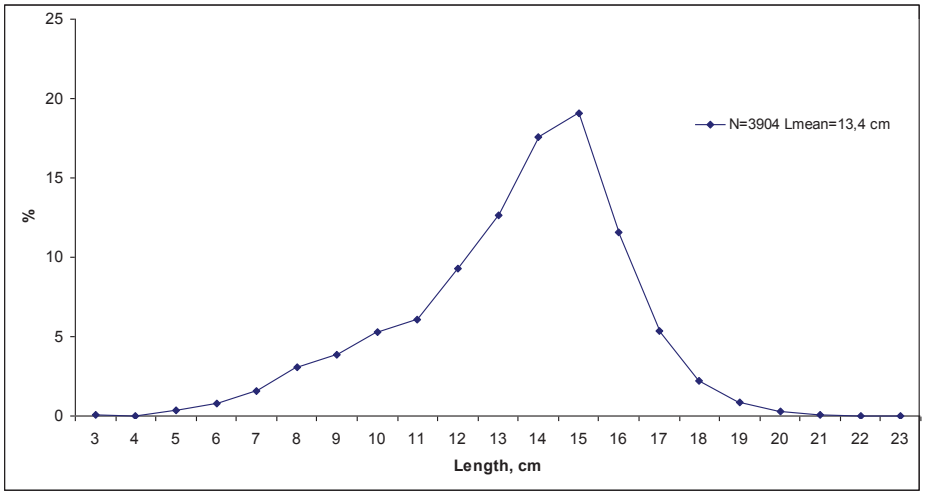
Spatial distribution

Known in the Arctic and the adjacent North Atlantic and North Pacific, including the Barents Sea, off Iceland and Greenland.

Widely distributed in the surveyed area, most abundant in the central part and frontal areas.



Length composition



Life history

Arcto-boreal, demersal on sandy and muddy bottoms at 120-350 m, but has been found at 1475 m off the Svalbard/Spitsbergen archipelago. Tolerates temperatures from -1.7 to +7.4 ºC, prefers salinities above 34.5 ‰. Can reach 21 cm (commonly 15-20 cm), measures 16-17 cm when 7 years old, females mature at age 3 years (11-12 cm). Feeds primarily on benthic gammarids and polychaetes as well as pelagic crustaceans. Spawning takes place in May-July, females lay 480-1 750 demersal eggs (1.5 mm in diameter). Larvae pelagic until at least 28 mm long.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Agonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1265-1268

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Kanayama T. 1991. Taxonomy and phylogeny of the family Agonidae (Pisces: Scorpaeniformes). Memoirs of the Faculty of Fisheries Hokkaido University 38:1-199

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Sheiko BA, Mecklenburg CW. 2004. Family Agonidae Swainson 1839 – poachers. California Academy of Sciences, Annotated Checklists of Fishes 30, 27 pp

Cyclopterus lumpus Linnaeus 1758

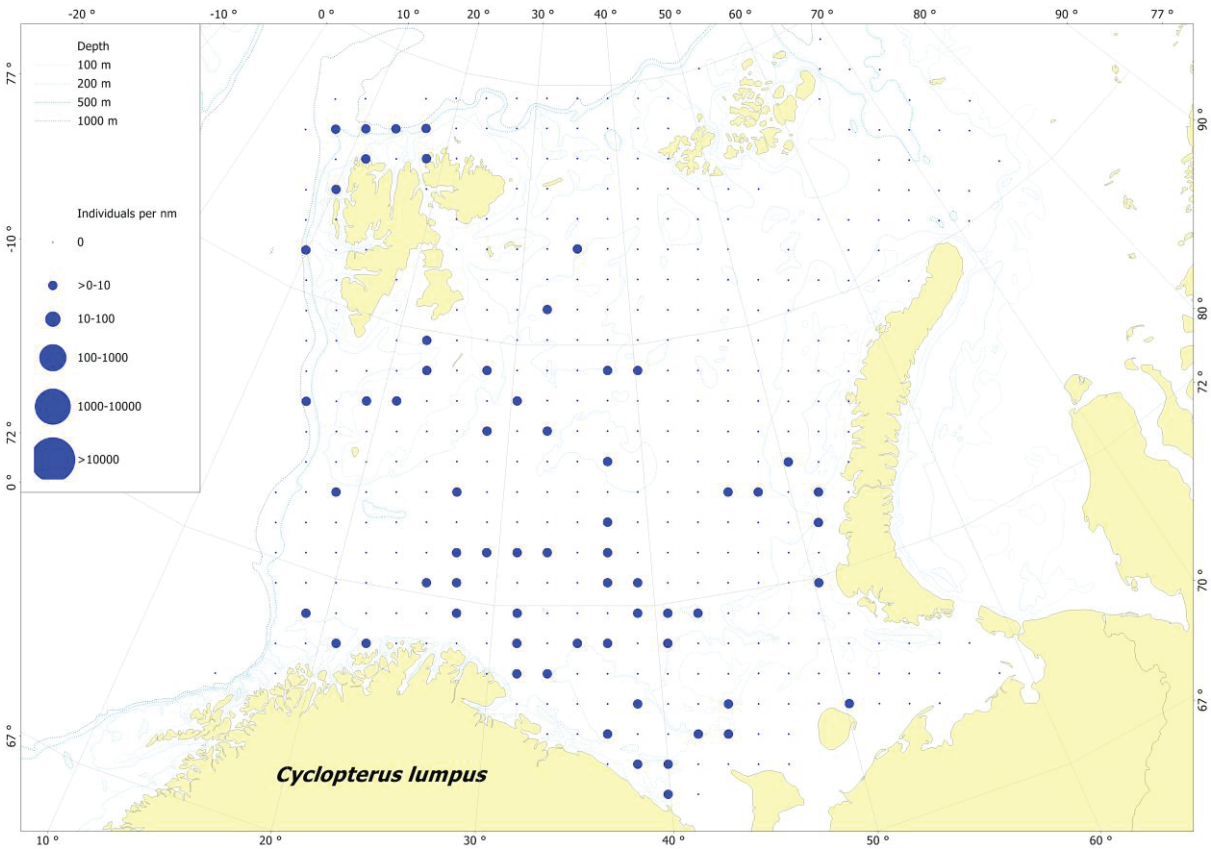
Family: Cyclopteridae
English name: lumpfish
Norwegian name: rognkjeks (female), rognkall (male)
Russian name: пинагор
(pinagor)

Photo: Andrey Dolgov

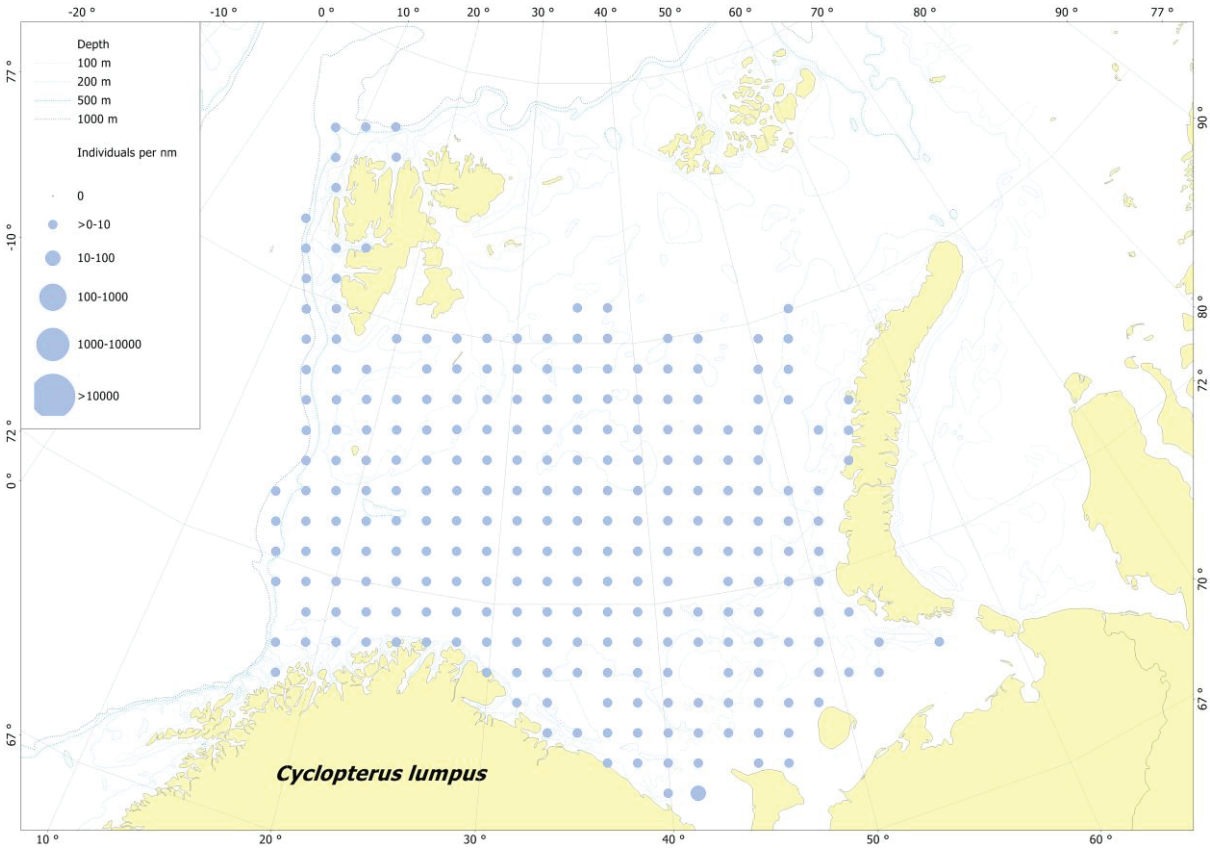
Spatial distribution

Known from the Bay of Biscay northward to Iceland and the northern Barents Sea, also in the western North Atlantic. Widely distributed in the Norwegian Sea with largest concentrations close to the polar front.

Widely distributed in the surveyed area except for the cold-water northeastern part.

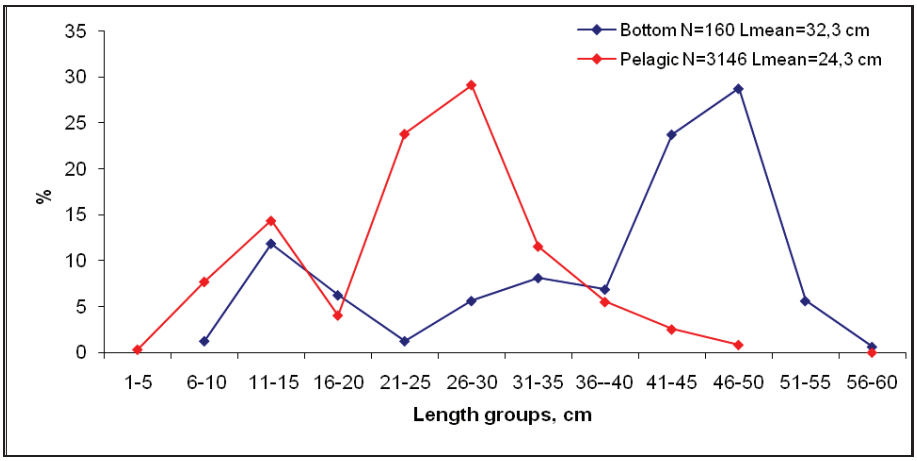


Distribution pattern based on bottom trawls.



Distribution pattern based on pelagic trawls.

Length composition



Life history

Mainly boreal, pelagic, primarily at 50-150 m depth, apart from during spawning season when migrating to the coast. Caught in most pelagic surface hauls during IMR surveys in the entire northeast Atlantic and although living solitary often found in high numbers. Reaches 63 cm, 8.1 kg, and possibly up to 15 years. Matures at length 29 cm (females) and 23 cm (males). Growth rates poorly known, females grow larger than males. Feeds mainly on plankton (crustaceans, jellyfish) in the open sea, not foraging in the coastal area during spawning season. Spawns between February and May in shallow waters along the coasts of its whole

distribution area. Females lay up to 220 000 eggs (1.6-2.7 mm in diameter), which can account for up to 38 % of the female's weight. Eggs are spawned in portions of large lumps, attached to rocks and stones and aggressively guarded by the males until they hatch after about 60 days. Larvae and juveniles live in or close to the kelp, before they become pelagic after 1-2 years and migrate into the open sea, returning when they have reached maturity after 2-4 years.

Population and exploitation

Can perform long migrations in the open sea, not known if there are separated populations and how large these are. The stock has reached a historical low (2010), but is expected to have stabilized, based on Russian data the biomass varies between 15 000 and 250 000 tonnes.

In Norway only the roe is of commercial interest, bycatch and targeted in Russia.

References

Bjelland O, Holst JC. 2004. Other fish species and fish communities. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 357-370

Holst JC. 1993. Observations on the distribution of lumpsucker (*Cyclopterus lumpus*, L.) in the Norwegian Sea. Fisheries Research 17:369-372

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Sunnanå K. 2010. Rognkjeks/-kall. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skil brei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:136 (in Norwegian)

Kudryavtzeva OY. 2008. Lumpsucker of the Barents Sea and adjacent waters. Moscow, Nauka publishing, 164 pp (in Russian)

Eumicrotremus derjugini Popov 1926

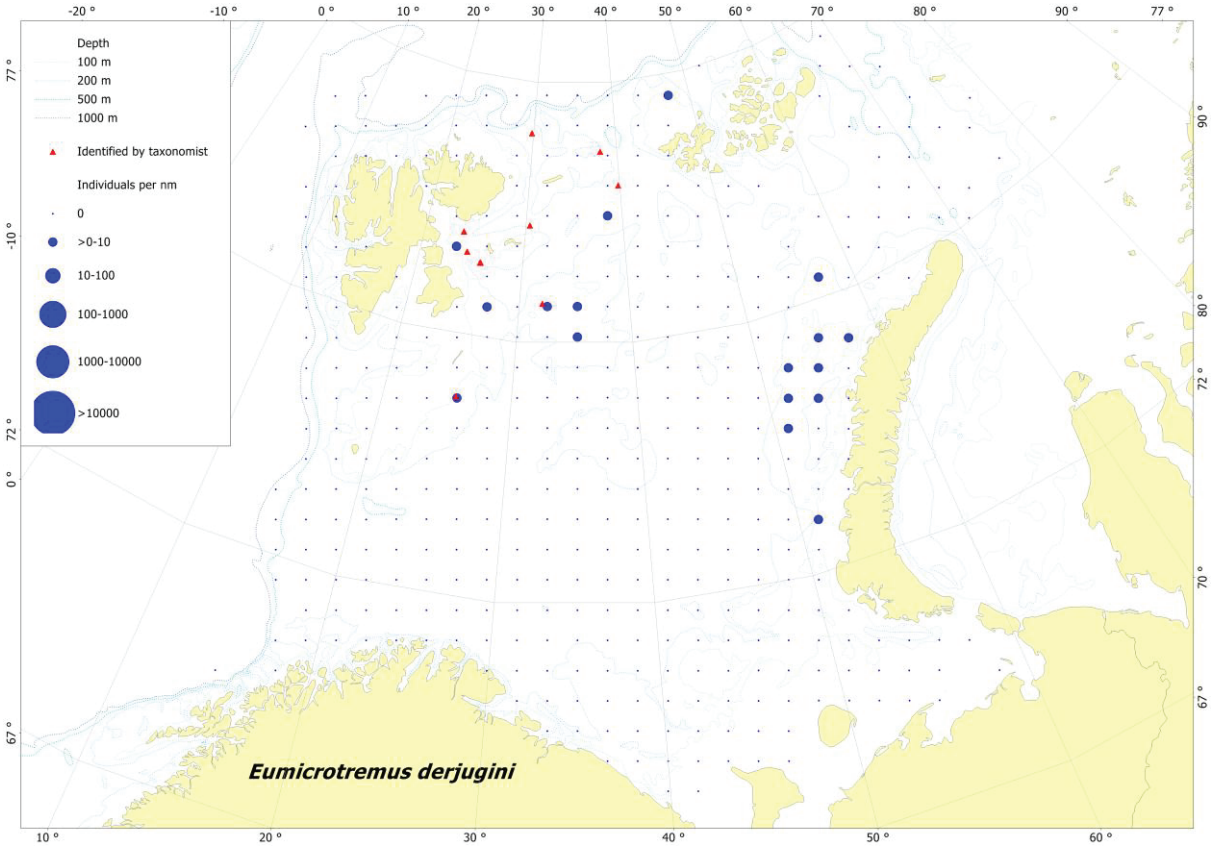
Family: Cyclopteridae
English name: leatherfin lumpsucker
Norwegian name: svartkjeks
Russian name: круглопер Дерюгина
(krugloper Derjugina)

Photo: Thomas de Lange Wenneck

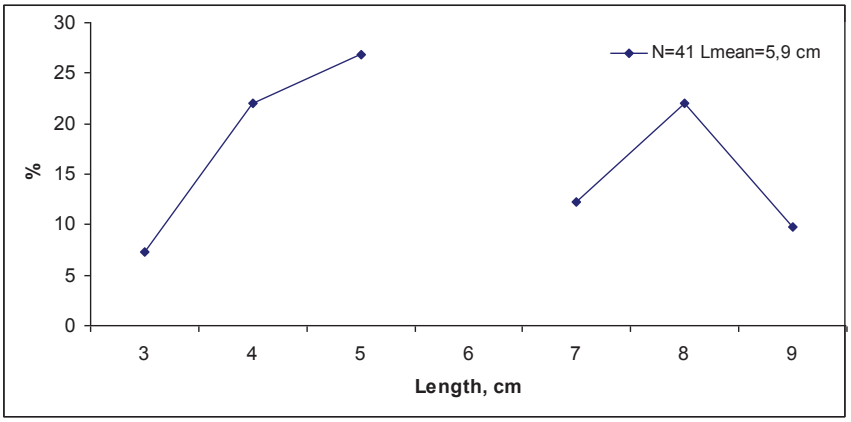
Spatial distribution

Circumpolar in the Arctic and the adjacent North Atlantic and North Pacific, including the Barents and Kara Seas and off northern Greenland.

Found in the northern parts of the surveyed area.



Length composition



Life history

Arctic, demersal on gravel and stone bottom at 50-275 m depth, prefers temperatures below 0 ºC. Can reach 10 cm. Feeds mainly on planktonic crustaceans (hyperiids) and spawns in autumn. The larvae hatch the following summer and stay in coastal areas until about one year old and 3-4 cm long.

Population and exploitation

Of no economic importance.

References

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Mecklenburg CW. 2003. Family Cyclopteridae Bonaparte 1831 – lumpsuckers. California Academy of Sciences, Annotated Checklists of Fishes 6, 17 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stein DL. 1986. Cyclopteridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1269-1274

Eumicrotremus spinosus (Fabricius 1776)

Family: Cyclopteridae
English name: Atlantic spiny lumpsucker
Norwegian name: vortekjeks
Russian name: шиповатый круглопер
(shipovatiy krugloper)

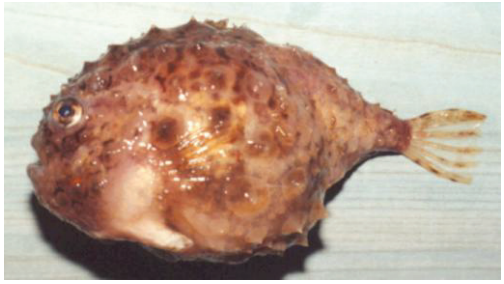
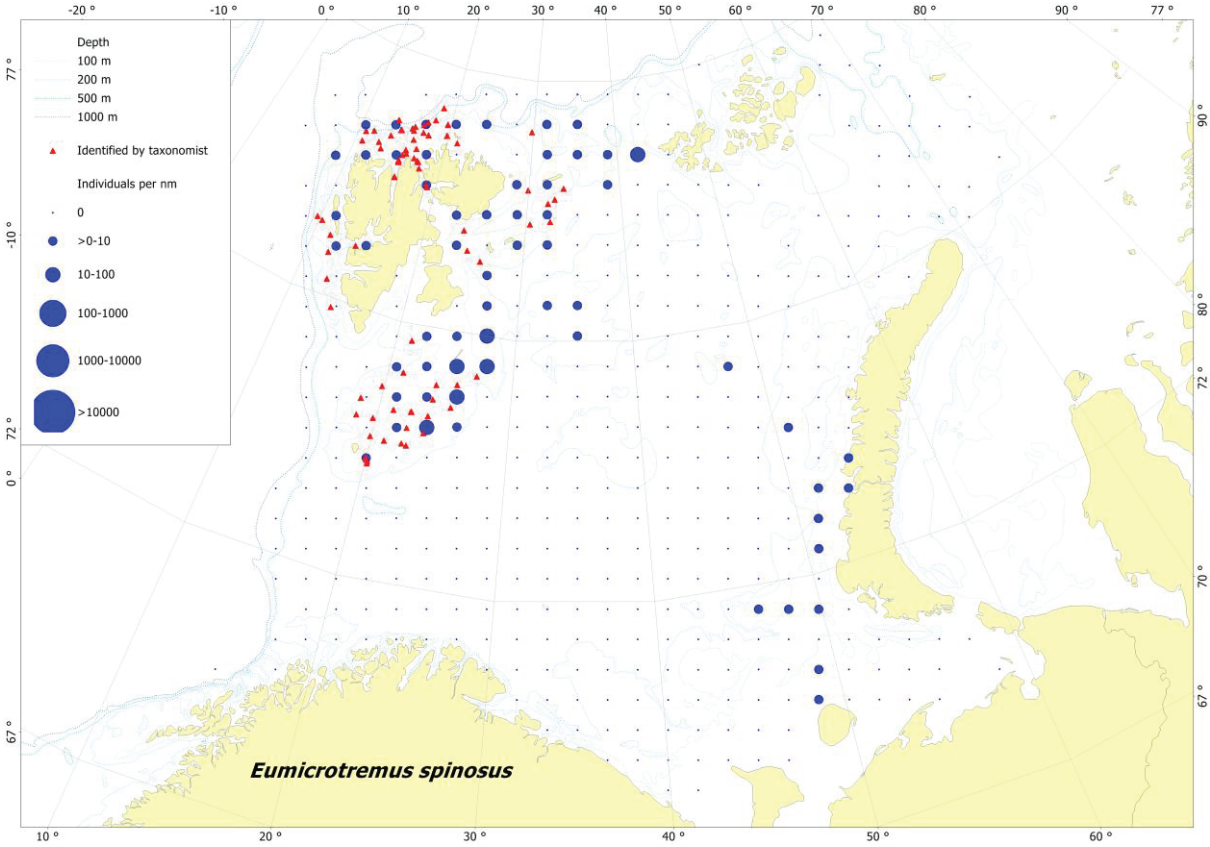


Photo: Andrey Dolgov

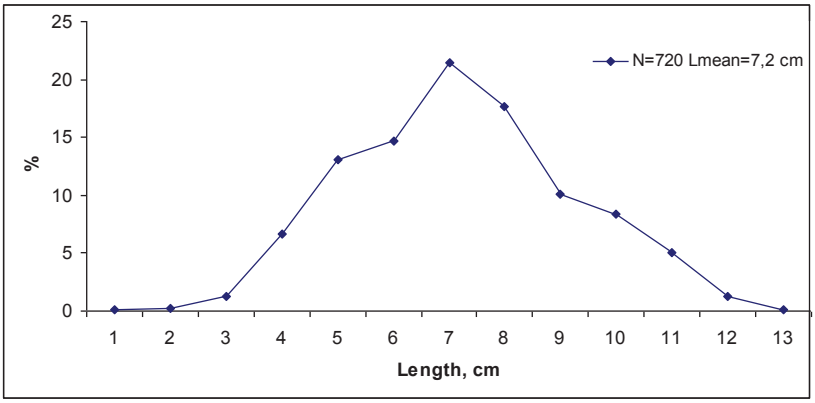
Spatial distribution

Known in the Arctic Ocean and the North Atlantic, including the Barents and Kara Seas, off Greenland, Iceland and Jan Mayen.

Found in shallow waters off Svalbard/Spitsbergen and Novaya Zemlya.



Length composition



Life history

Arctic, demersal on stony bottom at 60-200 m (occasionally deeper), prefers temperatures around 0 ºC. Can reach 13.2 cm (commonly less than 10 cm), at most 3 years old when 11-13 cm long. Feeds on planktonic crustaceans (mostly hyperiids), and other invertebrates. Spawns in summer-autumn, hatching in spring-summer, fecundity up to 2 000 eggs (3-4 mm in diameter). Larvae and juveniles are found in shallow waters among kelp until 3.5-4 cm long.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Mecklenburg CW. 2003. Family Cyclopteridae Bonaparte 1831 – lumpsuckers. California Academy of Sciences, Annotated Checklists of Fishes 6, 17 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Rostchin EA. 2006. New data on morphometry, feeding and parasite fauna of Atlantic spiny lumpsucker *Eumicrotremus spinosus* (Cyclopteridae) from the Barents Sea. Voprosy ikhtyologii 46:611-615 (in Russian)

Stein DL. 1986. Cyclopteridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1269-1274

Careproctus spp.

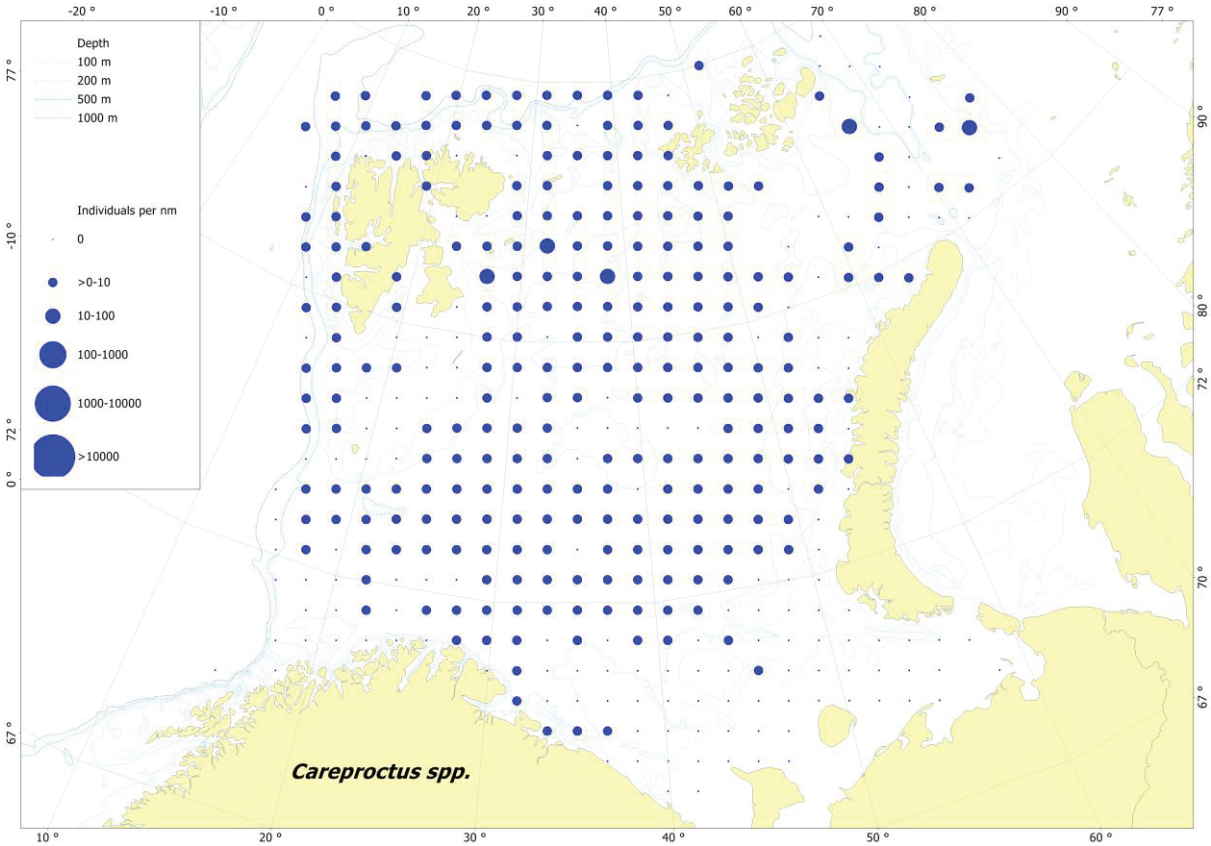
Family: Liparidae
English name: snailfish/tadpole
Norwegian name: snottfisk
Russian name: карепрокт
(kareprokt)

Photo: Thomas de Lange Wenneck

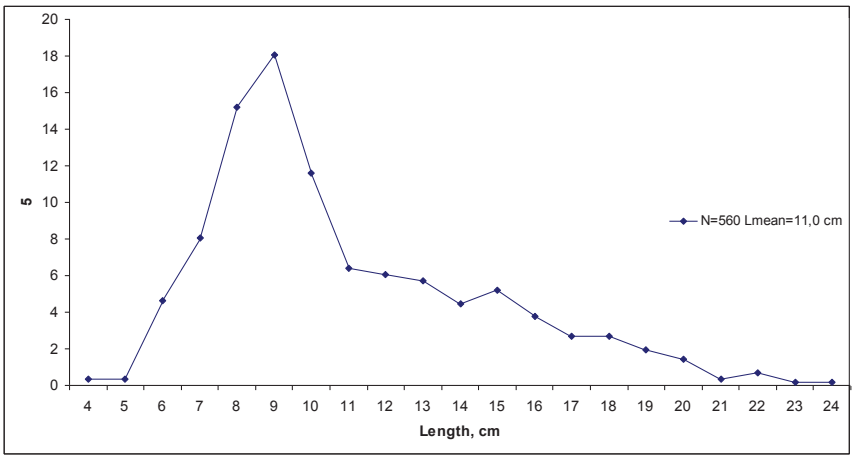
Note on identification: Species identification is demanding and as the genus is subject to extensive taxonomic revisions, we present data for the genus only. So far six species of the genus *Careproctus* are reported in the Barents Sea: *Careproctus derjugini* Chernova 2005, *Careproctus dubius* Zugmayer 1911, *Careproctus knipowitschi* Chernova 2005, *Careproctus macrophthalmus* Chernova 2005, *Careproctus tapirus* Chernova 2005, and *Careproctus telescopus* Chernova 2005.

Spatial distribution

Overall distribution of the single species is poorly known, but the genus is widely distributed in the Barents Sea.



Length composition



Life history

Arctic, demersal to benthopelagic. Can reach at least 22 cm (*C. derjugini*). Fecundity up to 150-200 eggs. Feed primarily on gammarids, also on small invertebrates and fishes.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Chernova NV. 2005. Review of *Careproctus* (Liparidae) of the North Atlantic and adjacent Arctic, including the generic type *C. reinhardti*, with rehabilitation of *C. gelatinosus* (Pallas) from Kamchatka. Journal of Ichthyology 45, Supplement 1:S1-S22

Chernova NV. 2005. New species of *Careproctus* Liparidae from the Barents Sea and adjacent waters. Journal of Ichthyology 45:689-699

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Liparis bathyarcticus Parr 1931

Family: Liparidae
English name: -
Norwegian name: pukkelringbuk
Russian name: горбатый липарис
(gorbatiy liparis)

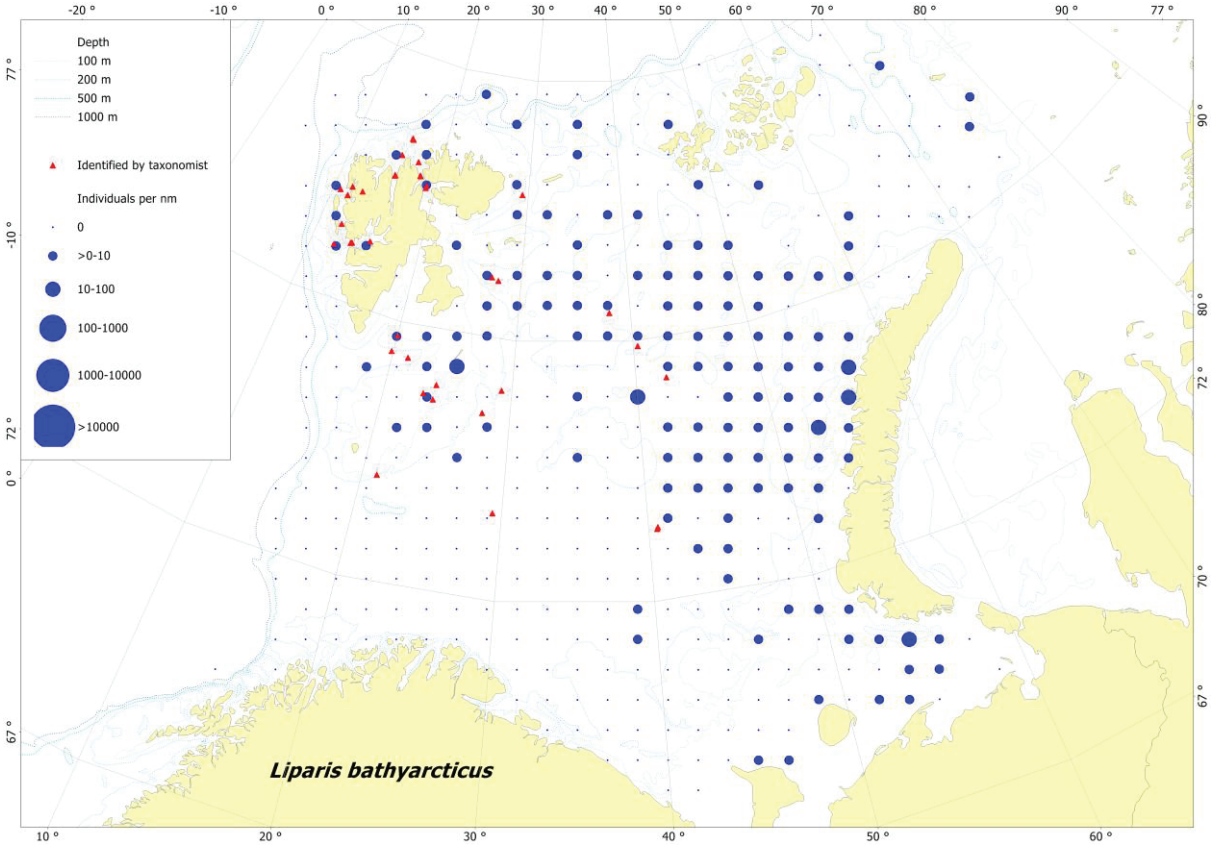
Photo: Thomas de Lange Wenneck

Note on taxonomy: Previously considered as junior synonym of *Liparis gibbus* Bean 1881.

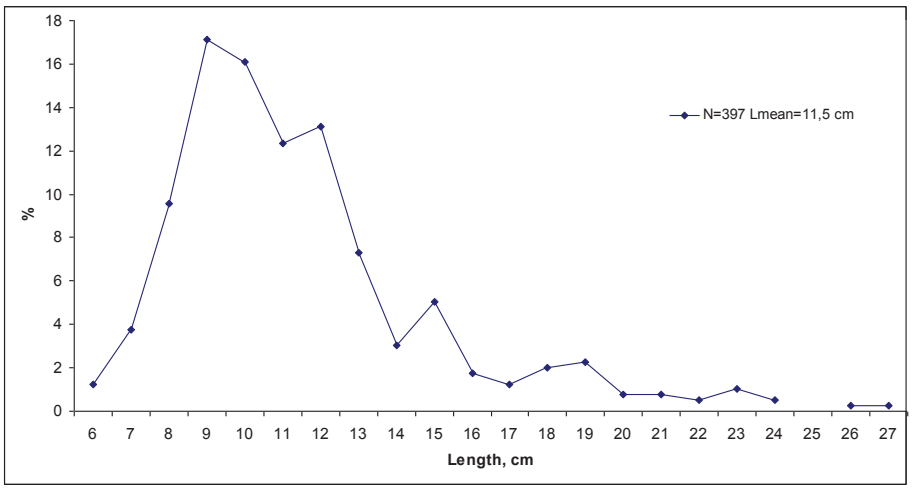
Spatial distribution

Occurs throughout the Arctic regions, the northern parts of the Pacific and Atlantic Ocean, including the Barents Sea.

Found in the surveyed area from Svalbard/Spitsbergen to Novaya Zemlya, mainly north of the Polar Front.



Length composition



Life history

Mainly arctic, demersal, at depth between 0-647 m. Can reach at least 168 mm. Juveniles feed on plankton and benthic crustaceans (euphausiids, shrimps, gammarids), adults on fishes and large decapods.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Chernova NV. 1989. Materials on feeding of *Liparis gibbus* (Scorpaeniformes: Liparidae). In: Podrazhanskaya SG (ed) Daily rhythms and food intakes of commercially important fishes in the World Ocean. Moscow, VNIRO Press, pp 89-96

Chernova NV. 2008. Systematics and phylogeny of fish of the genus *Liparis* (Liparidae, Scorpaeniformes). Journal of Ichthyology 48:831-852

Liparis fabricii Krøyer 1847

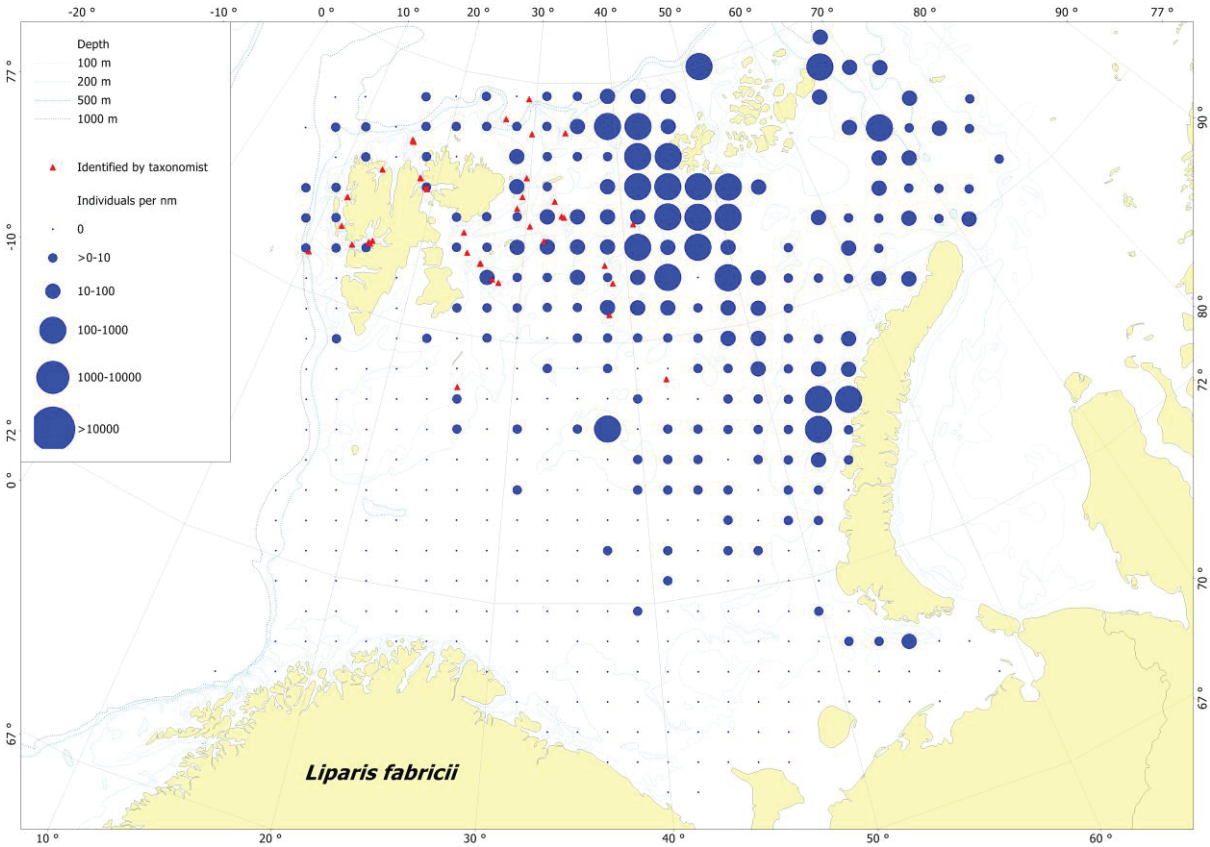
Family: Liparidae
English name: gelatinous snailfish
Norwegian name: polarringbuk
Russian name: чернобрюхий липарис
(tchernobryukhiy liparis)

Photo: Andrey Dolgov

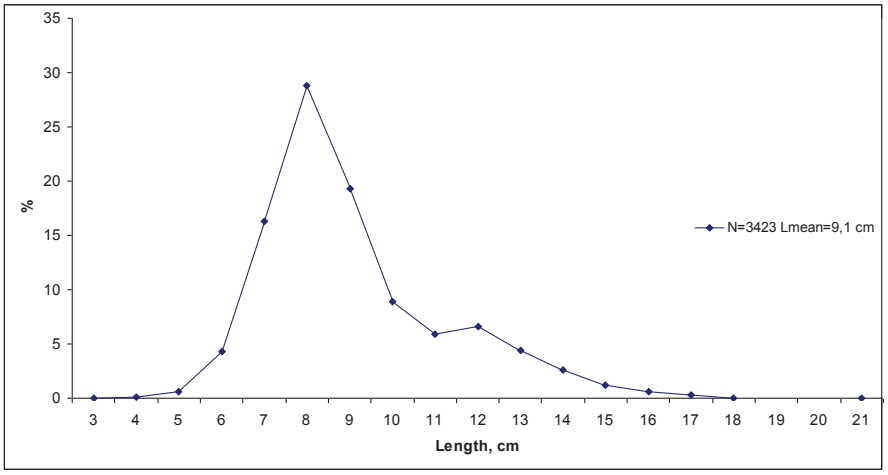
Spatial distribution

Circumpolar in the Arctic waters.

Widely distributed in the surveyed area north of the Polar Front.



Length composition



Life history

Arctic, benthopelagic at 40-600 m depth, prefers temperatures usually below 0 ºC, and 30-34 ‰ salinity. Can reach 21 cm and 117 g, at most 6 years old when 16 cm long. Feeds on plankton, benthic crustaceans, pteropods and fishes. Females spawn 450-750 eggs (2.1-2.7 mm in diameter) in autumn, larvae are pelagic, larval development probably takes one year.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Chernova NV. 2008. Systematics and phylogeny of fish of the genus *Liparis* (Liparidae, Scorpaeniformes). Journal of Ichthyology 48:831-852

Chernova NV, Stein DL, Andriashev AP. 2004. Family Liparidae Scopoli 1777 – snailfishes. California Academy of Sciences, Annotated Checklists of Fishes 31, 72 pp

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stein DL, Able KW. 1986. Liparidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1275-1283

Liparis tunicatus Reinhardt 1836

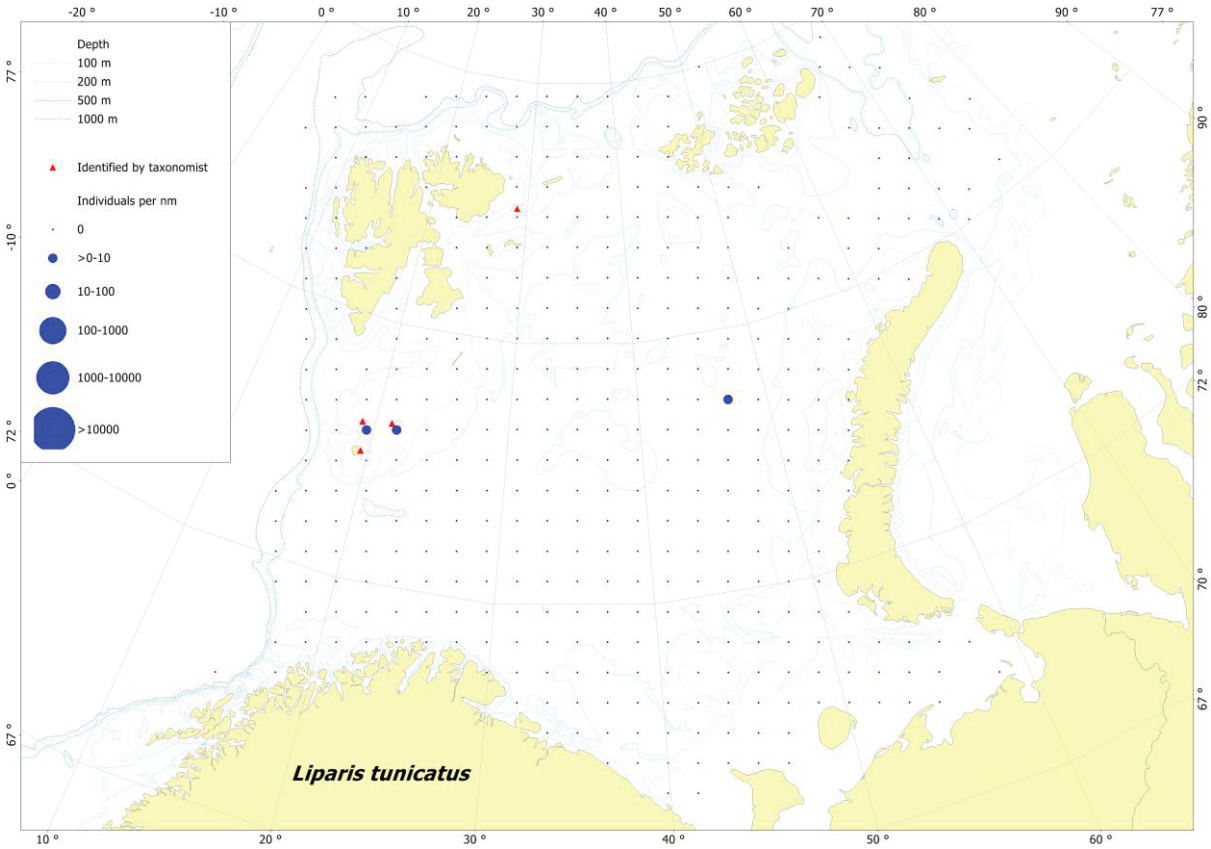
Family: Liparidae
English name: kelp snailfish
Norwegian name: tangringbuk
Russian name: арктический липарис
(arktitcheskiy liparis)

Photo: Andrey Dolgov

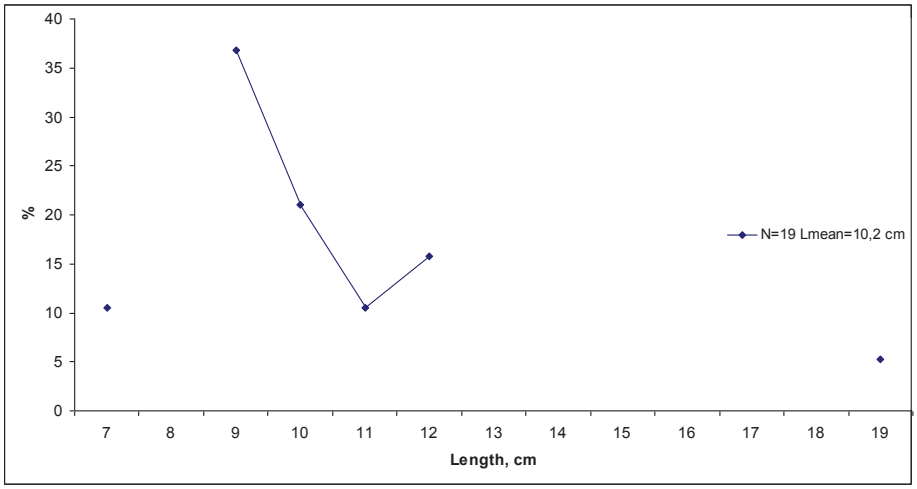
Spatial distribution

Circumpolar in the Arctic and the Subarctic.

Found off Bear Island, previously also in the Olga Strait. The identification of the specimen west of Novaya Zemlya is uncertain.



Length composition



Life history

Arctic, demersal, at depths down to 90 m (occasionally 150 m). Can reach at least 16 cm.

Population and exploitation

Of no economic importance.

References

Chernova NV. 2008. Systematics and phylogeny of fish of the genus *Liparis* (Liparidae, Scorpaeniformes). Journal of Ichthyology 48:831-852

Chernova NV, Stein DL, Andriashev AP. 2004. Family Liparidae Scopoli 1777 – snailfishes. California Academy of Sciences, Annotated Checklists of Fishes 31, 72 pp

Paraliparis bathybius (Collett 1879)

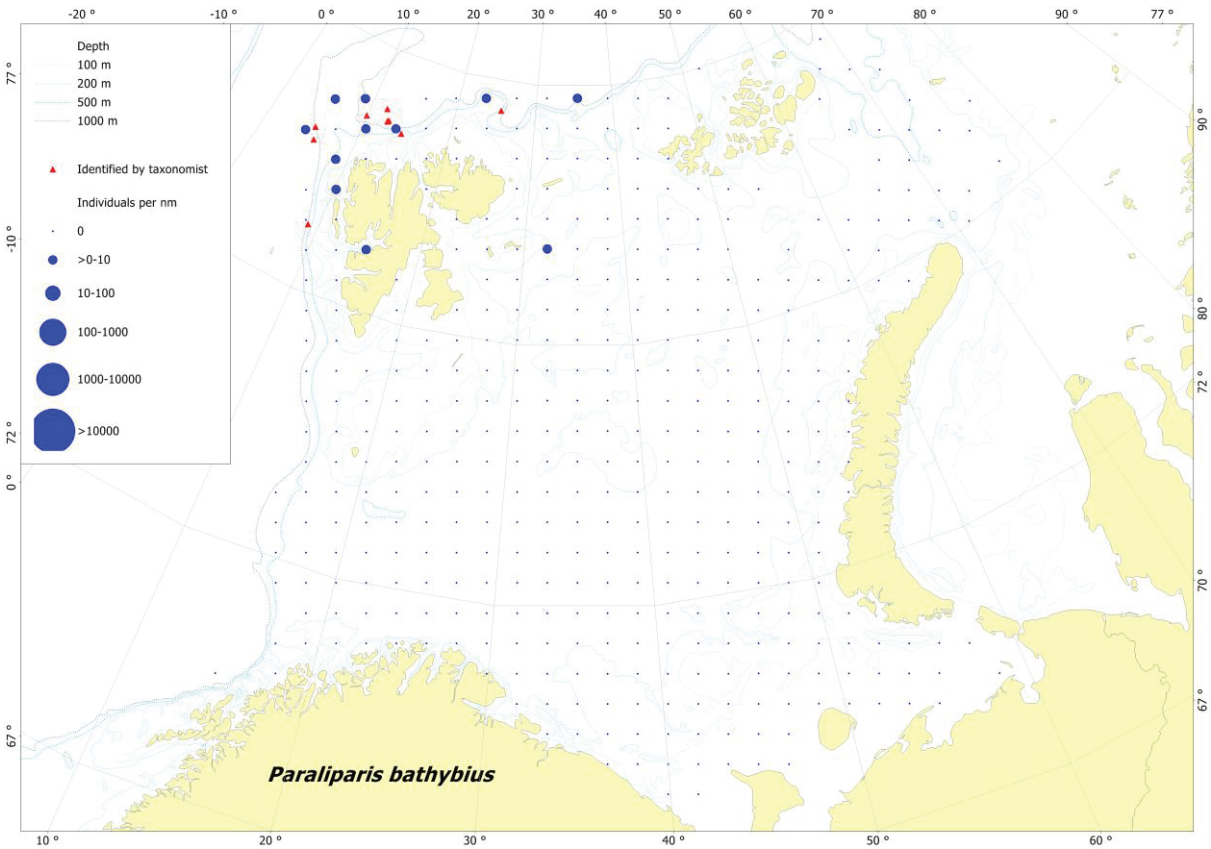
Family: Liparidae
English name: black seasnail
Norwegian name: svart ringbuk
Russian name: полярный паралипарис
(polyarniy paraliparis)

Photo: Thomas de Lange Wenneck

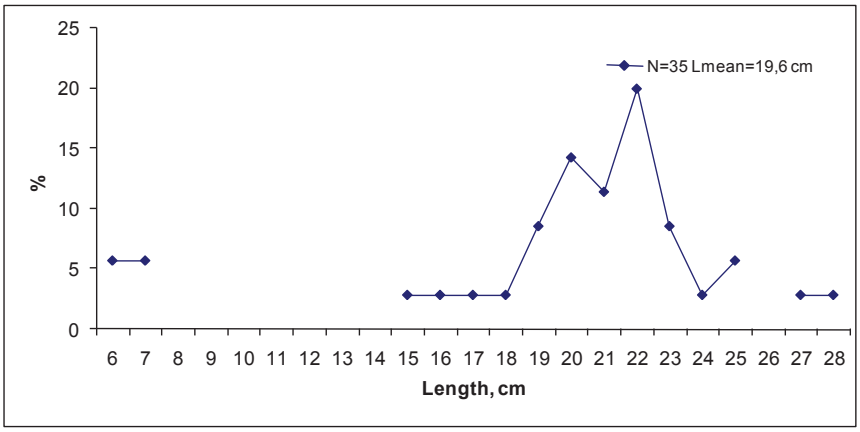
Spatial distribution

Known in the Arctic Basin, the Norwegian and Greenland Sea, as well as in the Baffin Bay.

In the surveyed area mainly found off Svalbard/Spitsbergen.



Length composition



Life history

Arctic, benthopelagic below 600 m and at temperatures below 0 ºC. Can reach up to 26 cm. Feeds on pelagic and benthic crustaceans as well as on benthic gastropods, also sediment rich in foraminiferans was found as stomach content. During spawning from June-September, the species is probably gregarious. Females spawn up to 435 large eggs (about 4 mm in diameter), representing about 25 % of the body weight.

Population and exploitation

Of no economic importance.

References

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Chernova NV, Stein DL, Andriashev AP. 2004. Family Liparidae Scopoli 1777 – snailfishes. California Academy of Sciences, Annotated Checklists of Fishes 31, 72 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian).

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stein DL, Able KW. 1986. Liparidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1275-1283

Rhodichthys regina Collett 1879

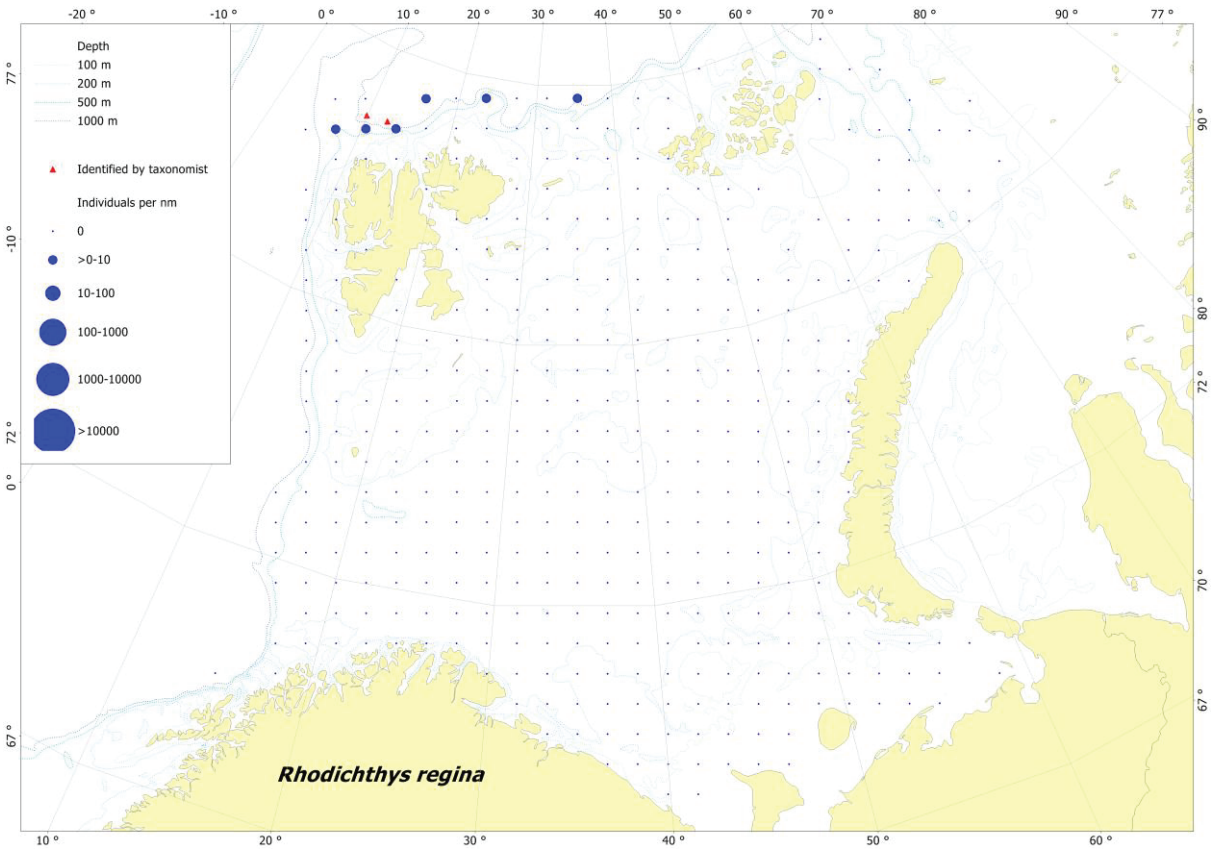
Family: Liparidae
English name: threadfin seasnail
Norwegian name: kongeringbuk
Russian name: королевскй родихт
(korolevskiy rodikht)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known from the Arctic Ocean, the Norwegian, Barents and Greenland Seas as well as in the Baffin Bay.

Found along the continental slope of the Polar Basin between the Svalbard/Spitsbergen archipelago and Franz Josef Land.



Length composition

18 specimens (8-26 cm, mean length 18.7 cm) were caught.

Life history

Arctic, benthopelagic over muddy bottom and pelagic at depths below 1 000 m, prefers temperatures below 0 ºC. Can reach 31 cm. Feeds on benthic and pelagic crustaceans, also sediment rich in foraminiferans was found as stomach content. Fecundity low, females spawn 40-70 large eggs. Females with ripe eggs have been found in June and December, small pelagic larvae in August at 1 500 m depth.

Population and exploitation

Of no economic importance.

References

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Chernova NV, Stein DL, Andriashev AP. 2004. Family Liparidae Scopoli 1777 – snailfishes. California Academy of Sciences, Annotated Checklists of Fishes 31, 72 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Stein DL, Able KW. 1986. Liparidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1275-1283

Gymnelus spp.

Family: Zoarcidae
English name: -
Norwegian name: -
Russian name: гимнел (gimnel)

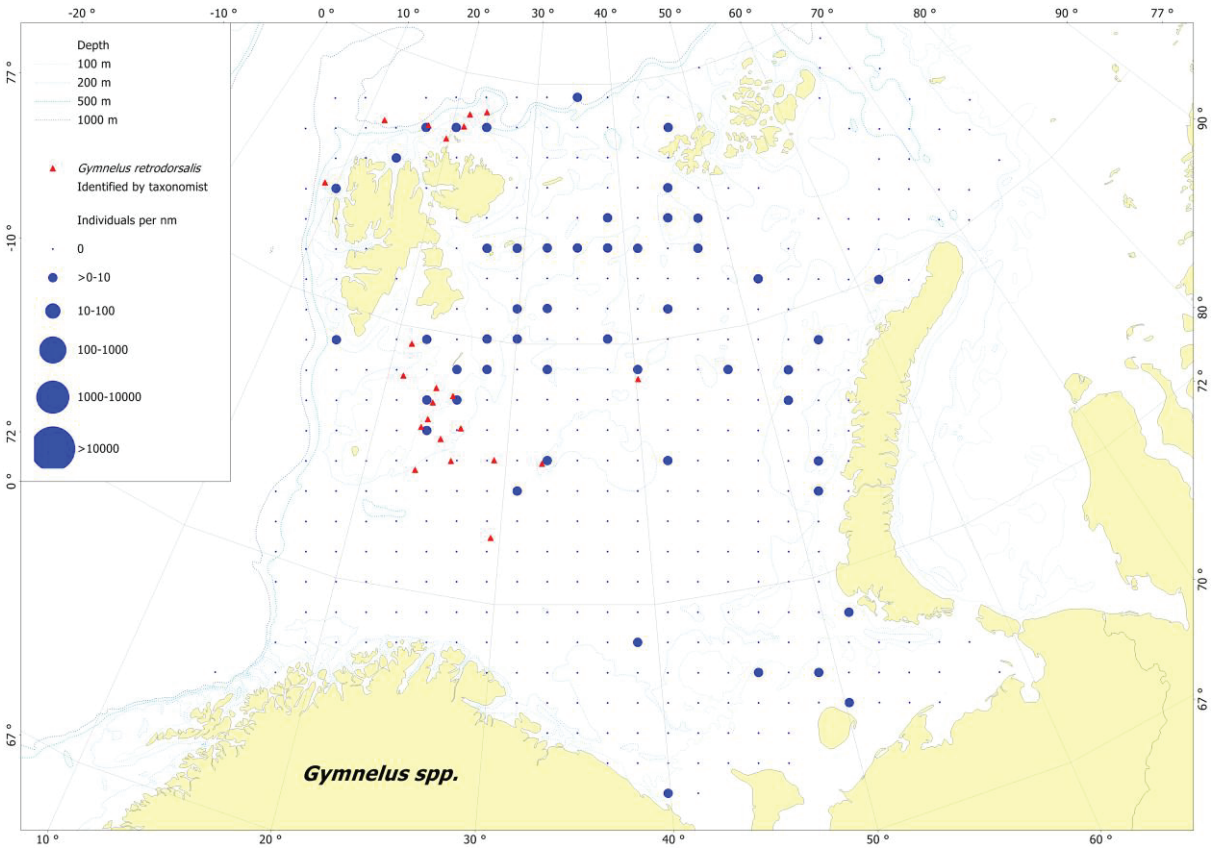
Photo: Andrey Dolgov

Note on identification and taxonomy: Five species of *Gymnelus* are reported in the Barents Sea: *Gymnelus andersoni* Chernova 1998, *Gymnelus esipovi* Chernova 1999, *Gymnelus hemifasciatus* Andriashev 1937, *Gymnelus retrodorsalis* Le Danois 1913, and *Gymnelus taeniatus* Chernova 1999. Present data do not distinguish between the species. Voucher specimens indicate that *G. retrodorsalis* is the dominant species in the area.

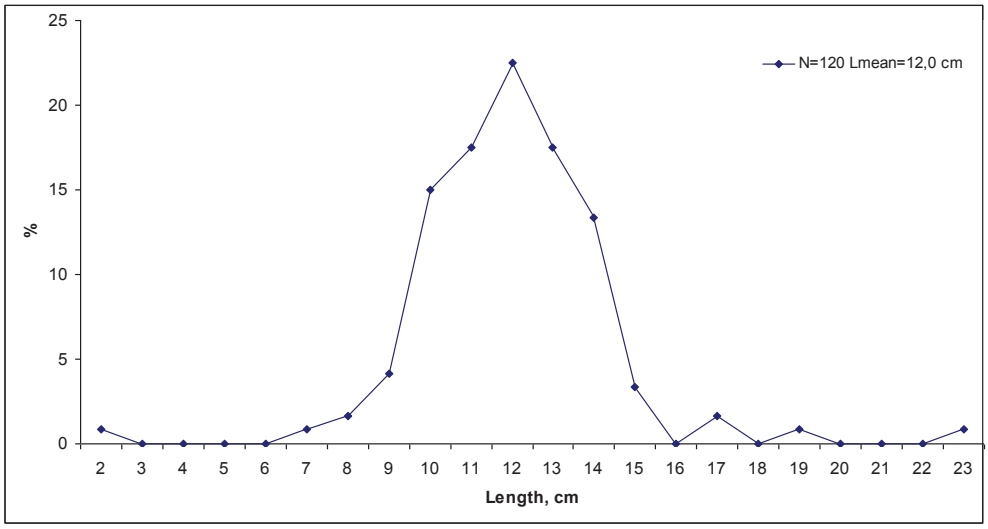
Spatial distribution

G. andersoni is known in the northern, central and eastern Barents Sea, in the Kara and Laptev Sea; *G. esipovi* in northern parts of the Barents and the Kara Sea; *G. hemifasciatus* from the eastern Barents Sea eastward to northwestern Canada, *G. retrodorsalis* in the Barents Sea, off Jan Mayen, Iceland, Greenland, in the western North Atlantic and arctic Canada, *G. taeniatus* has been reported from the northeastern Barents Sea off Franz Joseph Land.

Found widely distributed in the surveyed area, mainly in arctic waters.



Length composition



Life history

Arctic, demersal on soft muddy or muddy-sandy bottom at depths down to 300 m and temperatures below 0 ºC. Can reach up to 15.9 cm, males grow larger than females, matures at about 10 cm length. Juveniles of *G. andersoni* occur in shallow depths, a demersal egg clutch was found in August in the Kara Sea. Otherwise, little is known about the life history of the species in this genus.

Population and exploitation

Of no economic importance.

References

Anderson ME, Fedorov VV. 2004. Family Zoarcidae Swainson 1839 eelpouts. California Academy of Sciences Annotated Checklist of Fishes 34:1-58

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Chernova NV. 1998. A new species *Gymnelus andersoni* sp. nova, from the Arctic Seas with refinement of the species status of *G. retrodorsalis* Le Danois and *G. pauciporus* Anderson (Fam. Zoarcidae). Journal of Ichthyology 38:708-715

Chernova NV. 1999. Four new species of *Gymnelus* (Zoarcidae) from the Arctic regions. Journal of Ichthyology 39:343-352

Chernova NV. 1999. New species *Gymnelus knipowitschi* from the Arctic Ocean and a Redescription of *G. hemifasciatus* Andriashev (Zoarcidae). Journal of Ichthyology 39:1-9

Chernova NV. 2000. Four new species of *Gymnelus* (Zoarcidae) from the far Eastern Seas with genus diagnosis and key to species. Journal of Ichthyology 40:1-12

Mecklenburg CW, Møller PR, Steinke D. 2011. Biodiversity of arctic marine fishes: taxonomy and zoogeography. Marine Biodiversity 41:109-140

Lycenchelys kolthoffi Jensen 1904

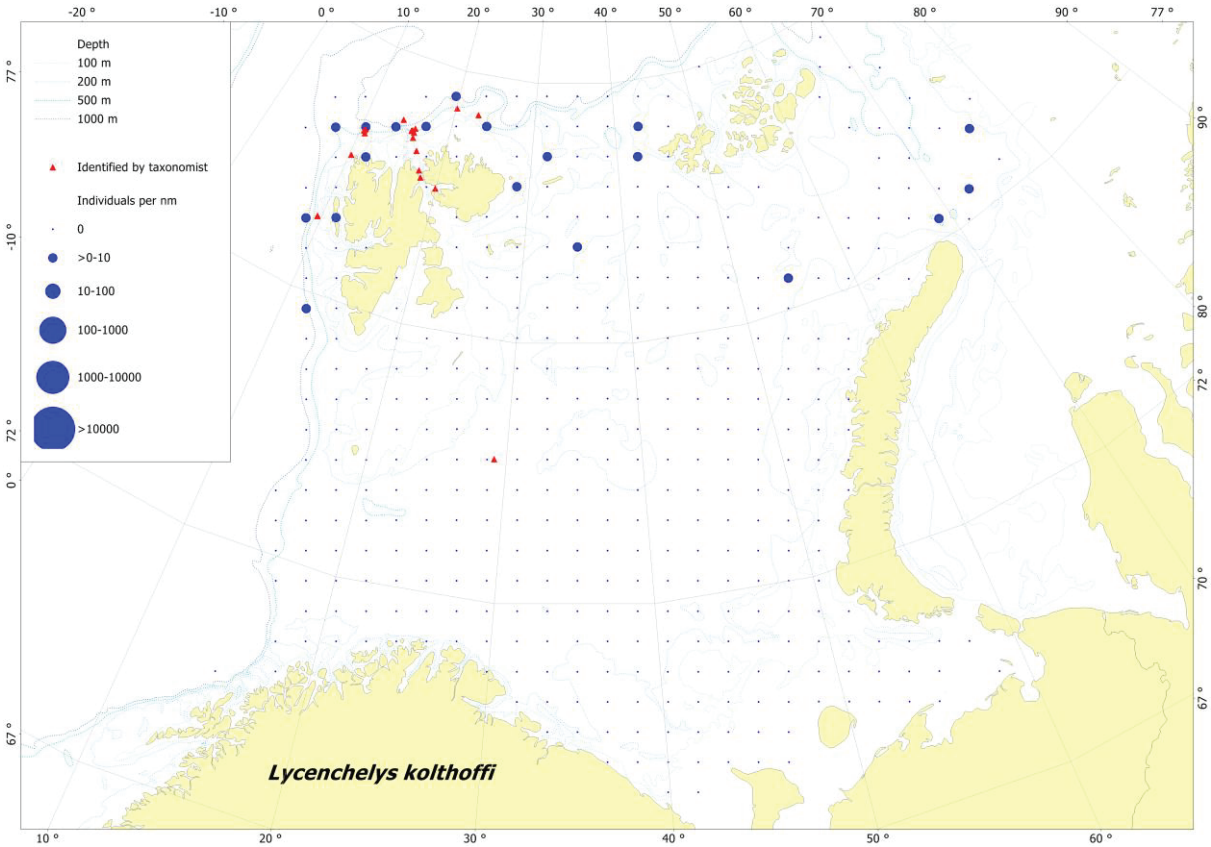
Family: Zoarcidae
English name: checkered wolf eel
Norwegian name: marmorert ålebrosme
Russian name: пятнистый лиценхел
(piatnistiy litzenkhel)

Photo: Thomas de Lange Wenneck

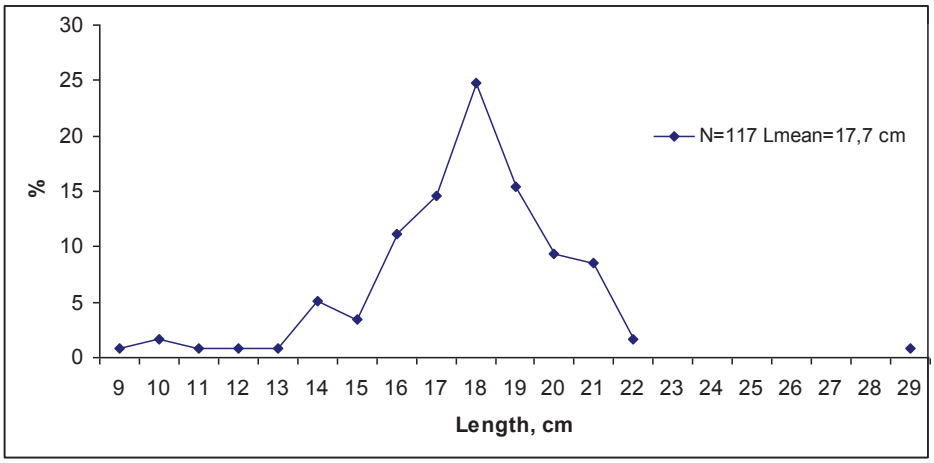
Spatial distribution

Known from the Kara Sea to Greenland and the western North Atlantic.

In the surveyed area found mainly north of 77° N.



Length composition



Life history

Arctic, demersal, prefers stony sand and mud bottom at 202-930 m. Can reach up to 20 cm and 7 years. Feeds on small bivalves.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Møller PR. 1995. First record of *Lycenchelys kolthoffi* Jensen from the Svalbard region, Norway. Fauna 48:42-44

Neyelov AV, Chernova NV. 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycenchelys muraena (Collett 1878)

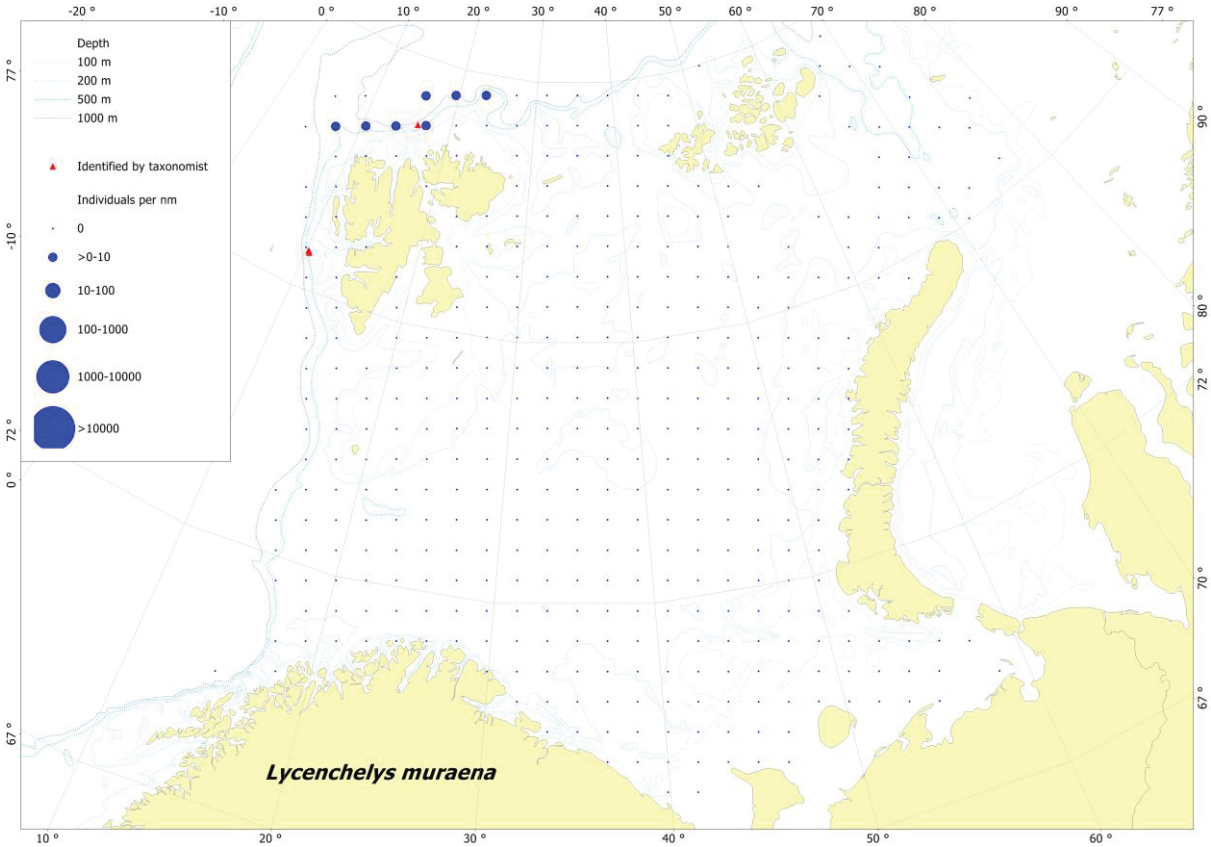
Family: Zoarcidae
English name: moray wolf eel
Norwegian name: havålebrosme
Russian name: мureновидный лиценхел
(murenovidniy litzenkhel)

Photo: Andrey Dolgov

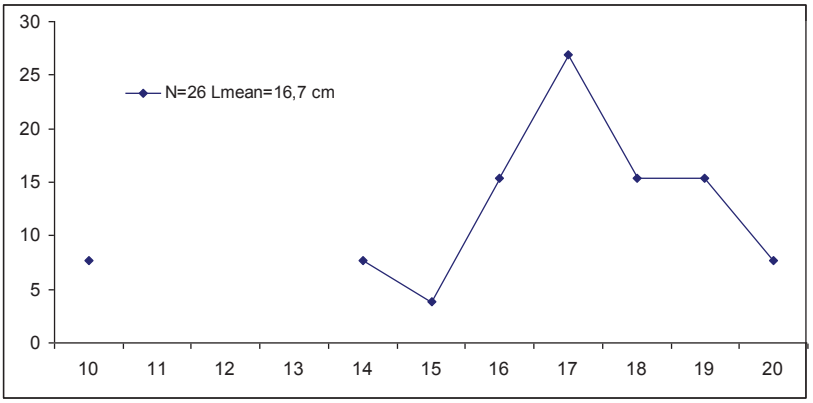
Spatial distribution

Known in the Greenland and Norwegian Sea north to Svalbard/Spitsbergen, also in the Kara Sea.

In the surveyd area found west and north of the Svalbard/Spitsbergen archipelago.



Length composition



Life history

Arctic, demersal on soft bottom at 350-1400 m and temperatures below 0 ºC. Can reach up to 20 cm. Feeds on small crustaceans.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes adolfi Nielsen & Fosså 1993

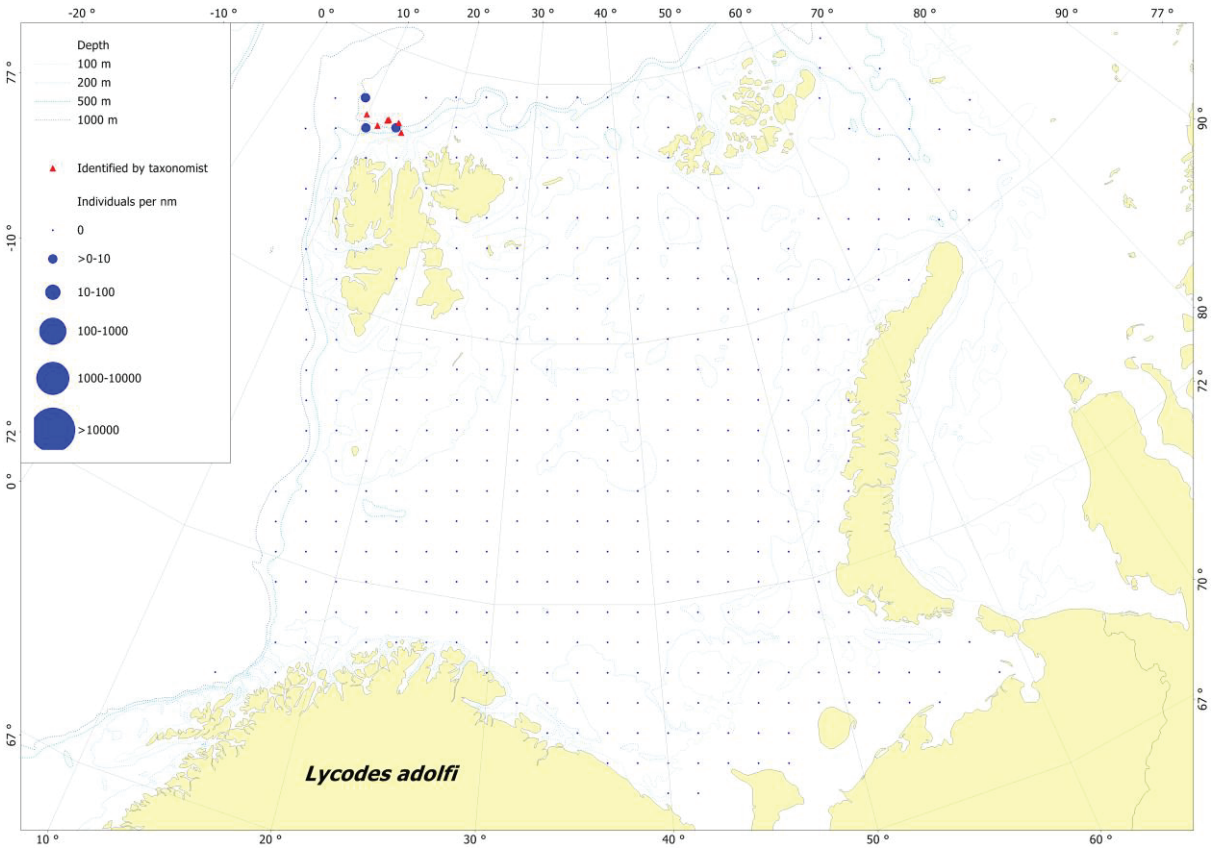
Family: Zoarcidae
English name: Adolf's eelpout
Norwegian name: silkeålebrosme
Russian name: ликод Адольфа
(likod Adolfa)

Photo: Andrey Dolgov

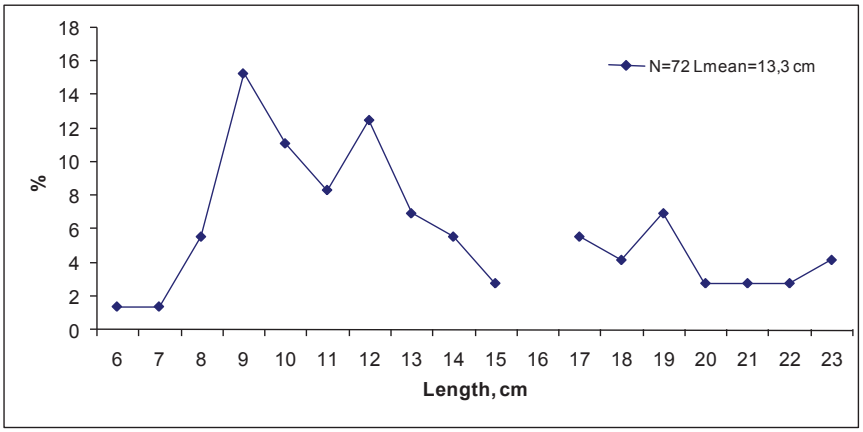
Spatial distribution

Known from waters around Greenland, south of Iceland and the southeastern and eastern part of the Norwegian Sea.

The present data showing its occurrence north of the Svalbard/Spitsbergen archipelago are the first records in the Arctic Ocean, although a wider distribution in this ocean might be expected.



Length composition



Life history

Arctic, demersal at depths below the photic zone at 700 m and deeper, and in temperatures below 0 ºC. Reaches at least 23 cm, feeds on crustaceans.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Brattegard T, Møller PR. 2009. *Lycodes adolfi* Nielsen and Fosså, 1993 (Teleostei: Zoarcidae) recorded near Jan Mayen and on the eastern side of the Norwegian Sea. Fauna norvegica 28:1-3

Byrkjedal I, Langhelle G, de Lange Wenneck T, Wienerroither R. 2010. *Lycodes adolfi* Nielsen and Fosså, 1993 (Teleostei: Zoarcidae) found in the Arctic Ocean. Polar Biology 34:465-467

Nielsen JG, Fosså SA. 1993. *Lycodes adolfi*, a new species of eelpout (Zoarcidae) from Greenland. Cybium 17:39-44

Lycodes esmarkii Collett 1875

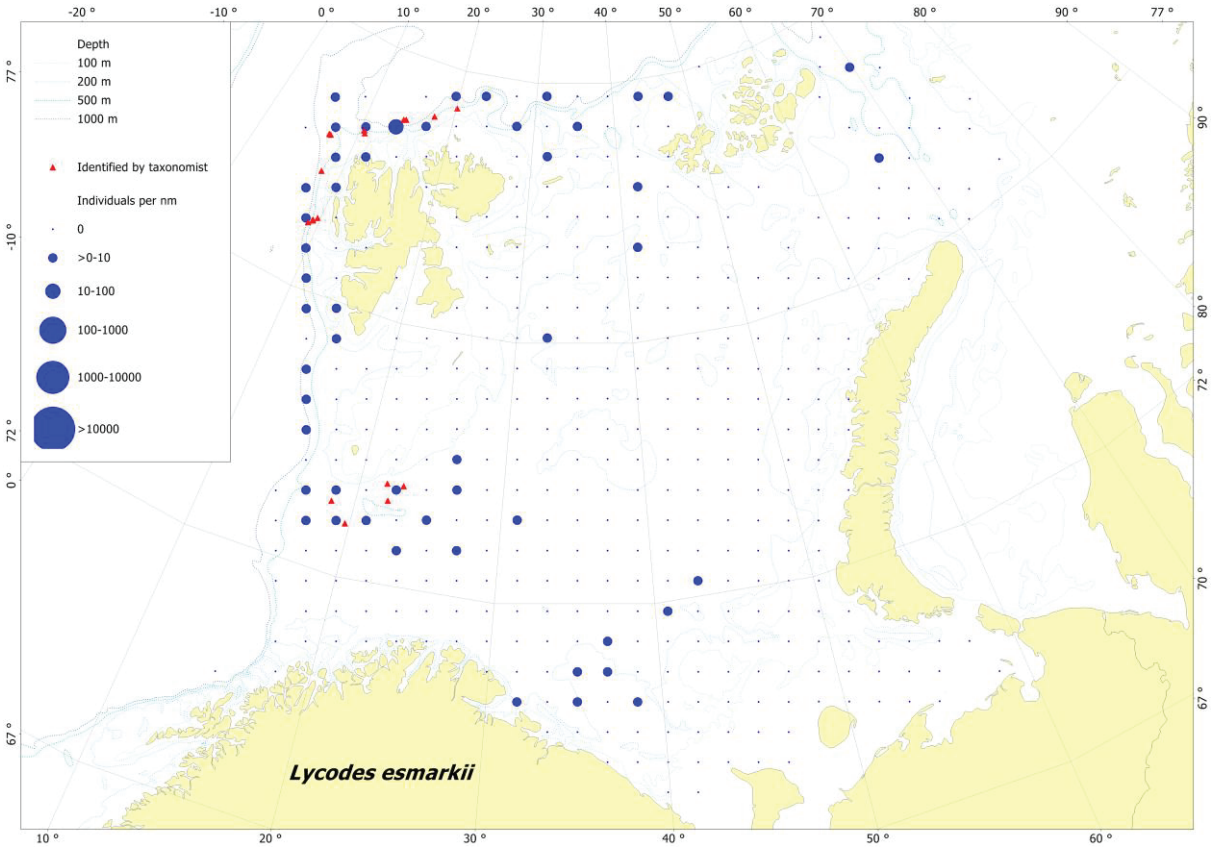
Family: Zoarcidae
English name: greater eelpout
Norwegian name: ulvefisk
Russian name: узорчатый ликод, ликод Эсмарка
(uzortchatiy likod), (likod Esmarka)

Photo: Thomas de Lange Wenneck

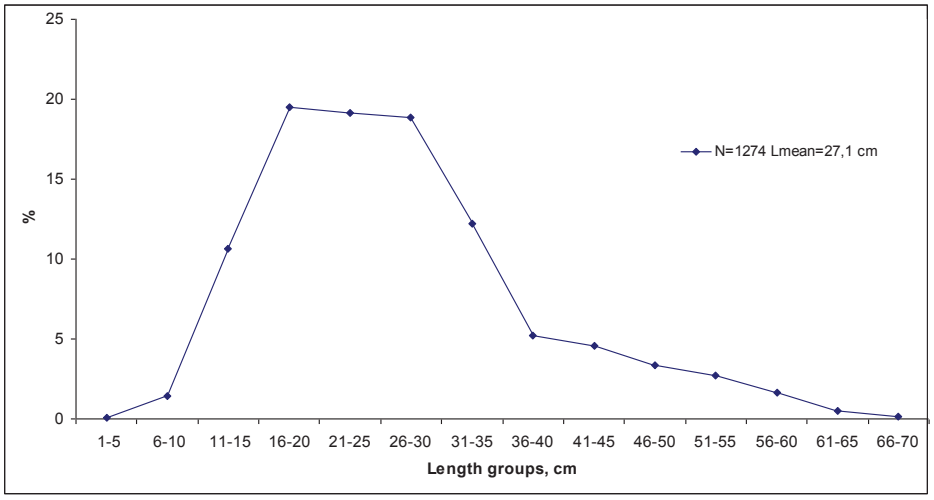
Spatial distribution

Known from the Barents Sea to Iceland and Greenland, also in the western North Atlantic.

In the surveyed area recorded on the western margin and in the southeastern part. Records north of the Svalbard/Spitsbergen archipelago and near Franz Josef Land are probably a result of recent influx of warmer water in this area.



Length composition



Life history

Mainly boreal, demersal on mud bottom at 275-770 m, temperatures above 0 ºC and salinities above 34.5 ‰. Occurs occasionally deeper, but in general shallower in its northern distribution area. Can reach up to 74.5 cm and 12 years. Feeds primarily on echinoderms, crustaceans, bivalves, fish and fish offal. Females spawn up to 1 200 demersal eggs (6 mm in diameter) in autumn.

Population and exploitation

Of no economic importance, but common bycatch in the longline and bottom trawl fishery.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150.

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes eudipleurostictus Jensen 1902

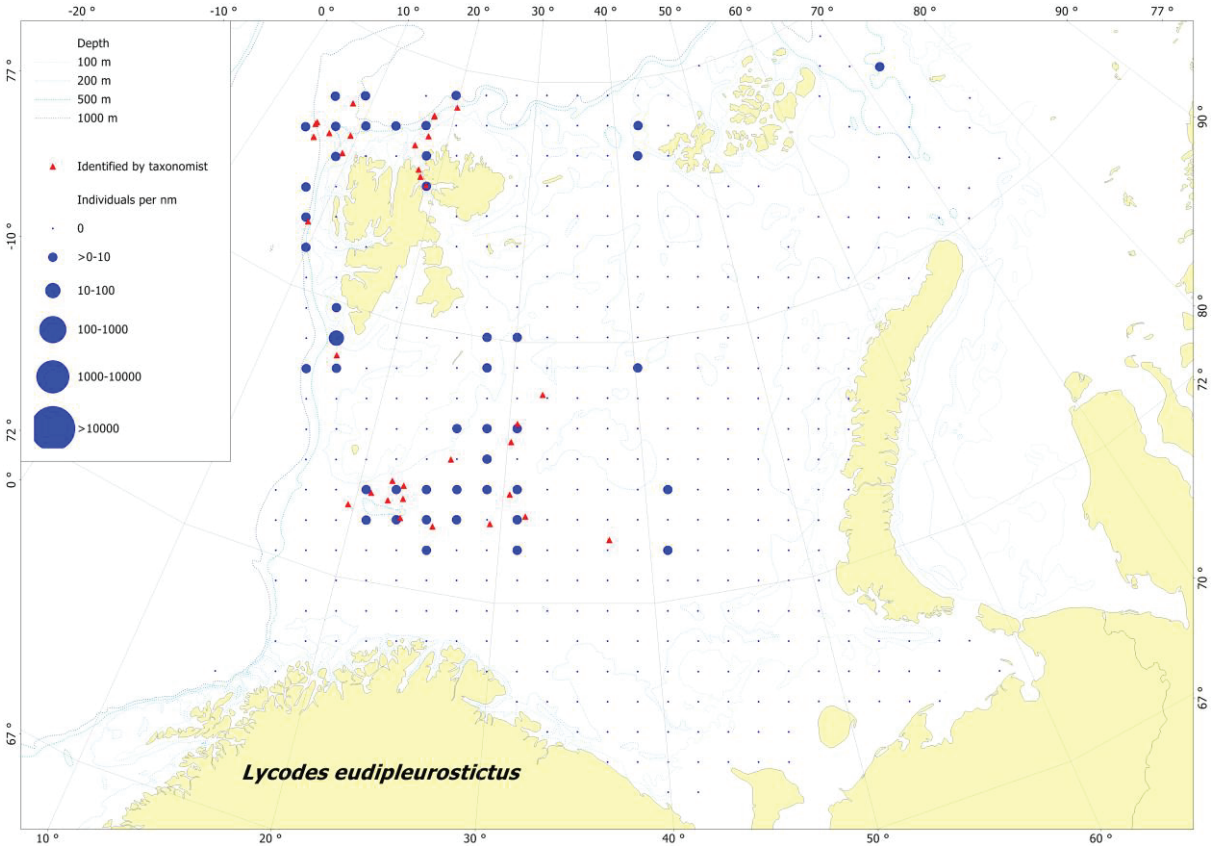
Family: Zoarcidae
English name: doubleline eelpout
Norwegian name: båndålebrosme
Russian name: двупёрый ликод
(dvupyoriy likod)

Photo: Thomas de Lange Wenneck

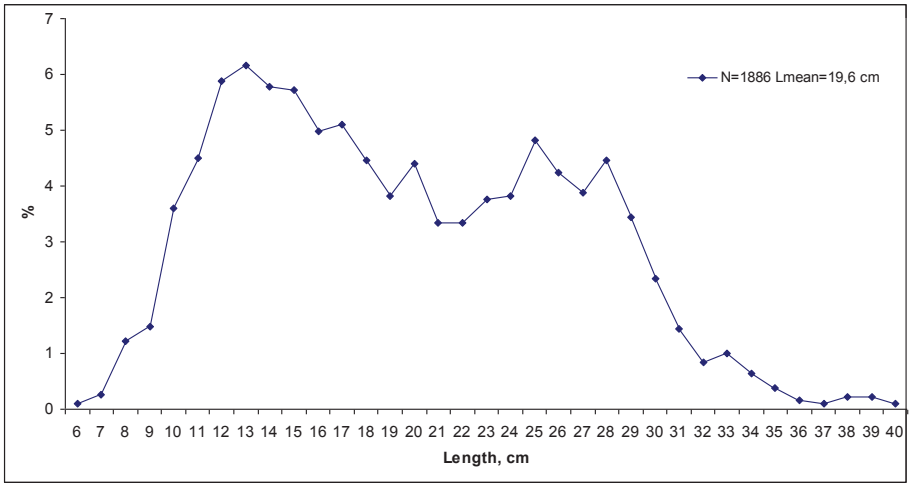
Spatial distribution

Known on both sides of the northern North Atlantic and off arctic Alaska.

Found off Svalbard/Spitsbergen and at the Bear Island Through. Scattered records in the cold-water areas in central and northeastern parts may need confirmation.



Length composition



Life history

Arctic, demersal, preferring muddy bottom at 350-914 m and temperatures below 0 ºC. Can reach up to 45 cm and 9 years. Feeds on polychaetes, bottom crustaceans, ophiuroids, and other bottom animals. Depending on their own size females spawn 125-260 large eggs (approx.5 mm diameter) in autumn.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes frigidus Collett 1879

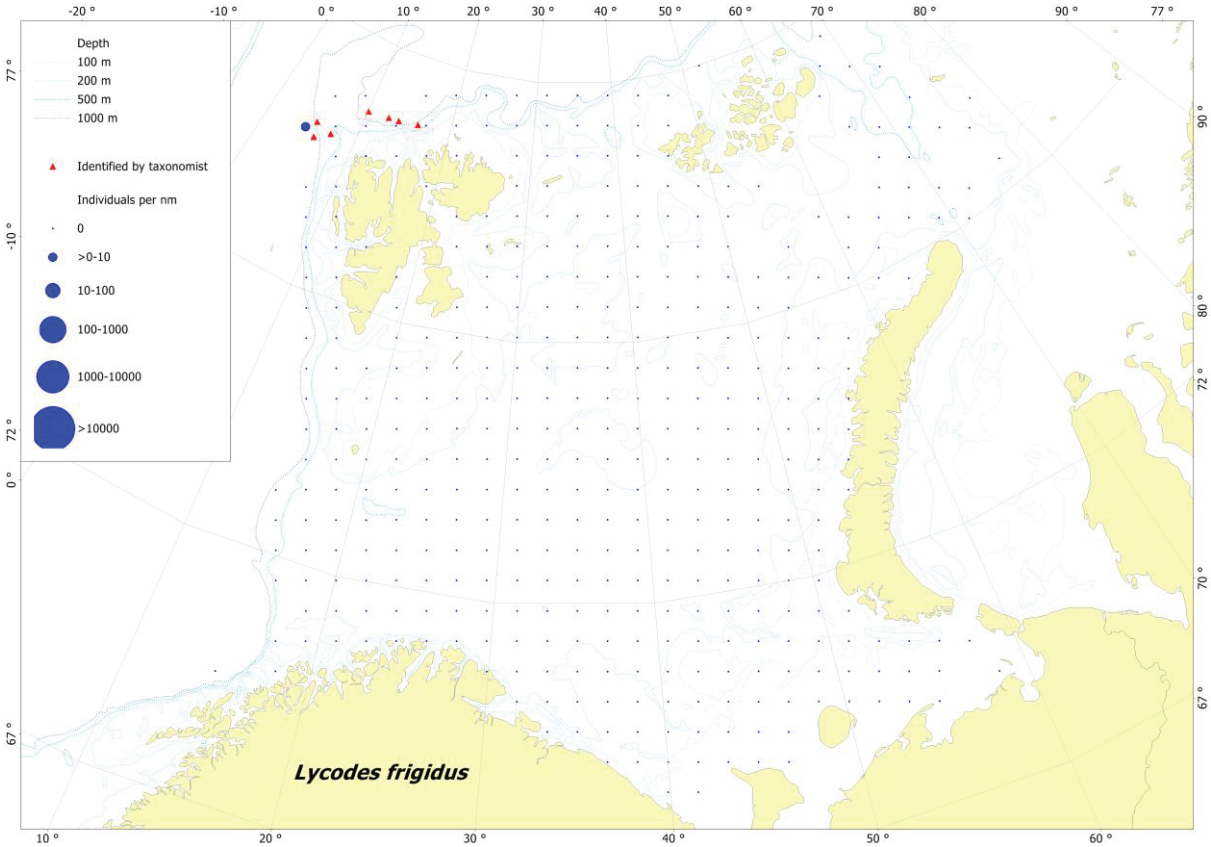
Family: Zoarcidae
English name: glacial eelpout
Norwegian name: arktisk ålebrosme
Russian name: абиссальный ликод
(abissalniy likod)

Photo: Gunnar Langhelle

Spatial distribution

Known in deep waters of the Norwegian and Greenland Seas.

In the surveyed area found north of the Svalbard/Spitsbergen archipelago on the slope to the Arctic Ocean.



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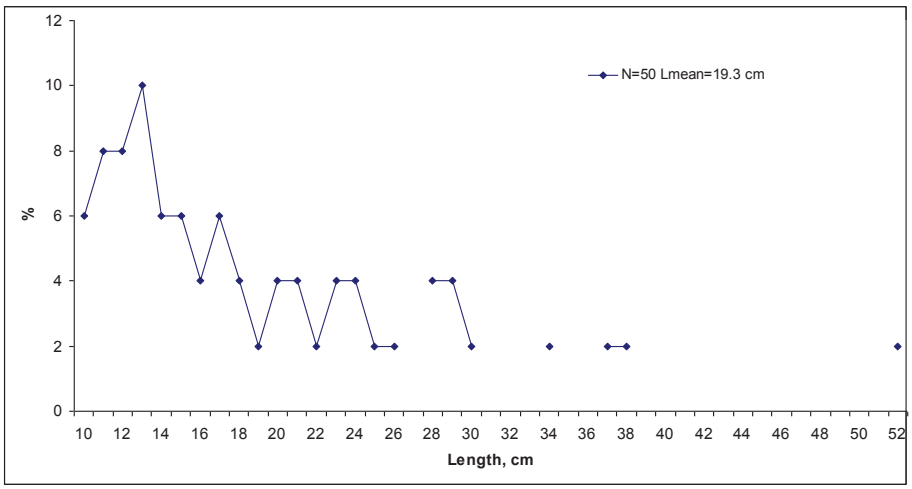


Life history

Arctic, demersal, preferring muddy bottom at 900-3000 m and temperatures below -0.6 ºC. Can reach up to 69 cm. Small individuals feed primarily on polychaetes and small crustaceans, large individuals on large crustaceans, cephalopods and fish (most probably scavenging). Females spawn about 500 large demersal eggs (7 mm in diameter) in autumn.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes gracilis Sars 1867

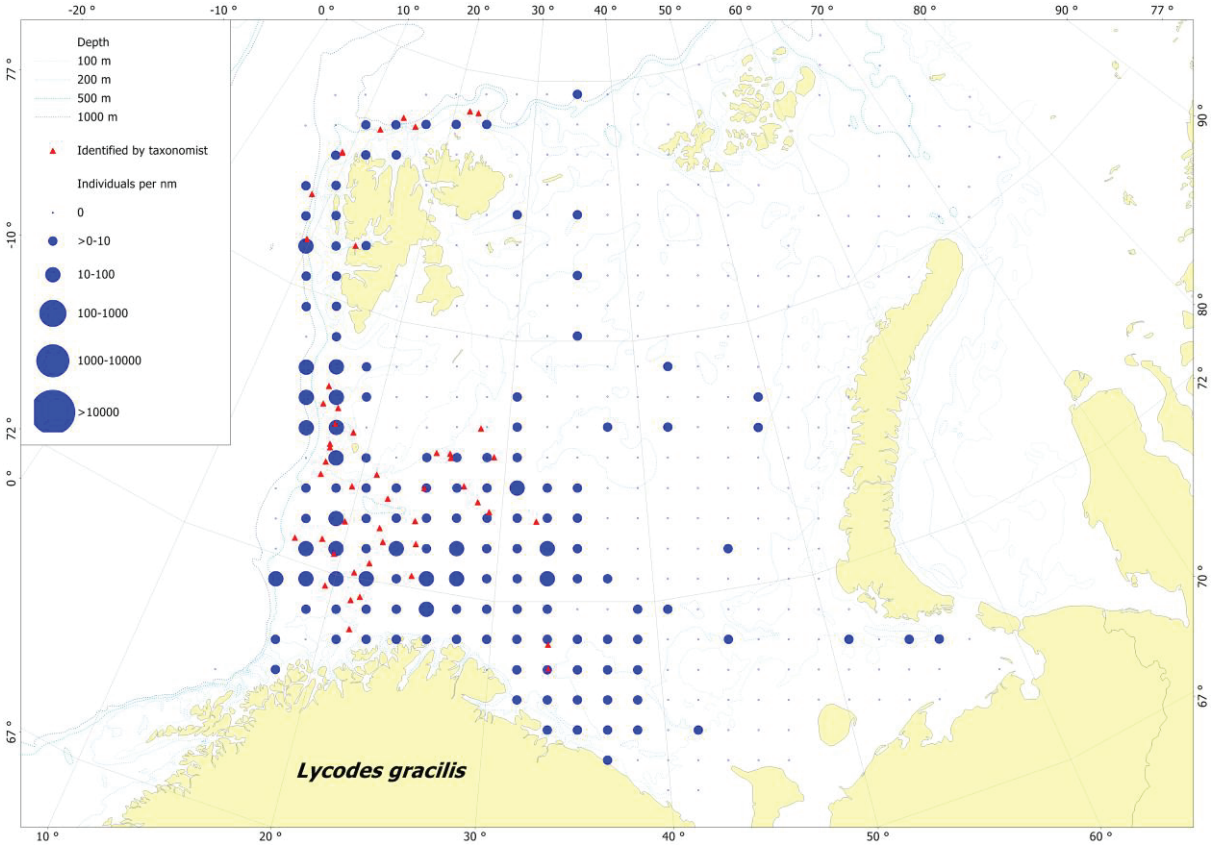
Family: Zoarcidae
English name: -
Norwegian name: vanlig ålebrosme
Russian name: тонкий ликод
(tonkiy likod)

Photo: Andrey Dolgov

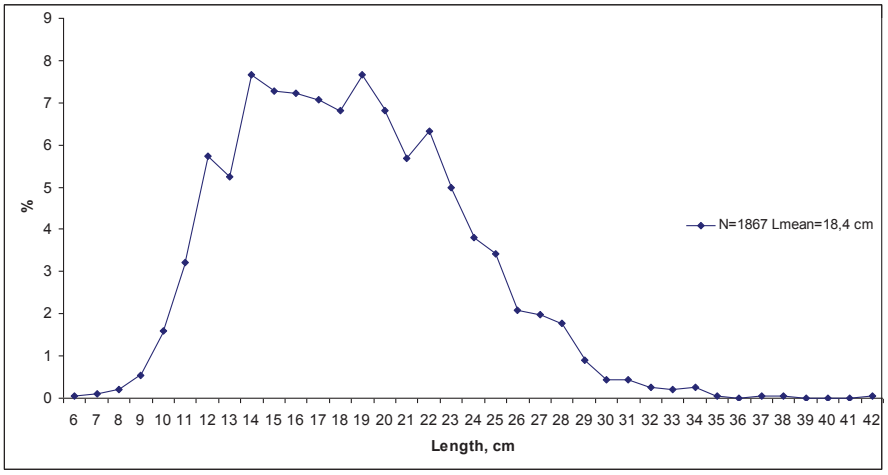
Spatial distribution

Known along the Scandinavian Peninsula and Iceland.

Widespread in the western Barents Sea, from the Russian and Norwegian coasts to north of Svalbard/Spitsbergen. Scattered records in the colder parts may need confirmation.



Length composition



Life history

Mainly boreal, demersal, on muddy bottom at 100-365 m depth and temperatures above 0 ºC. Can reach up to 35 cm and 7 years, matures at length 20 cm. Feeds on polychaetes, bivalves, ophiuroids, crustaceans and foraminiferas. Spawns in late summer - early autumn 50-120 eggs (4.5 mm in diameter).

Population and exploitation

Of no economic importance, but frequently taken as bycatch in the shrimp fishery.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes luetkenii Collett 1880

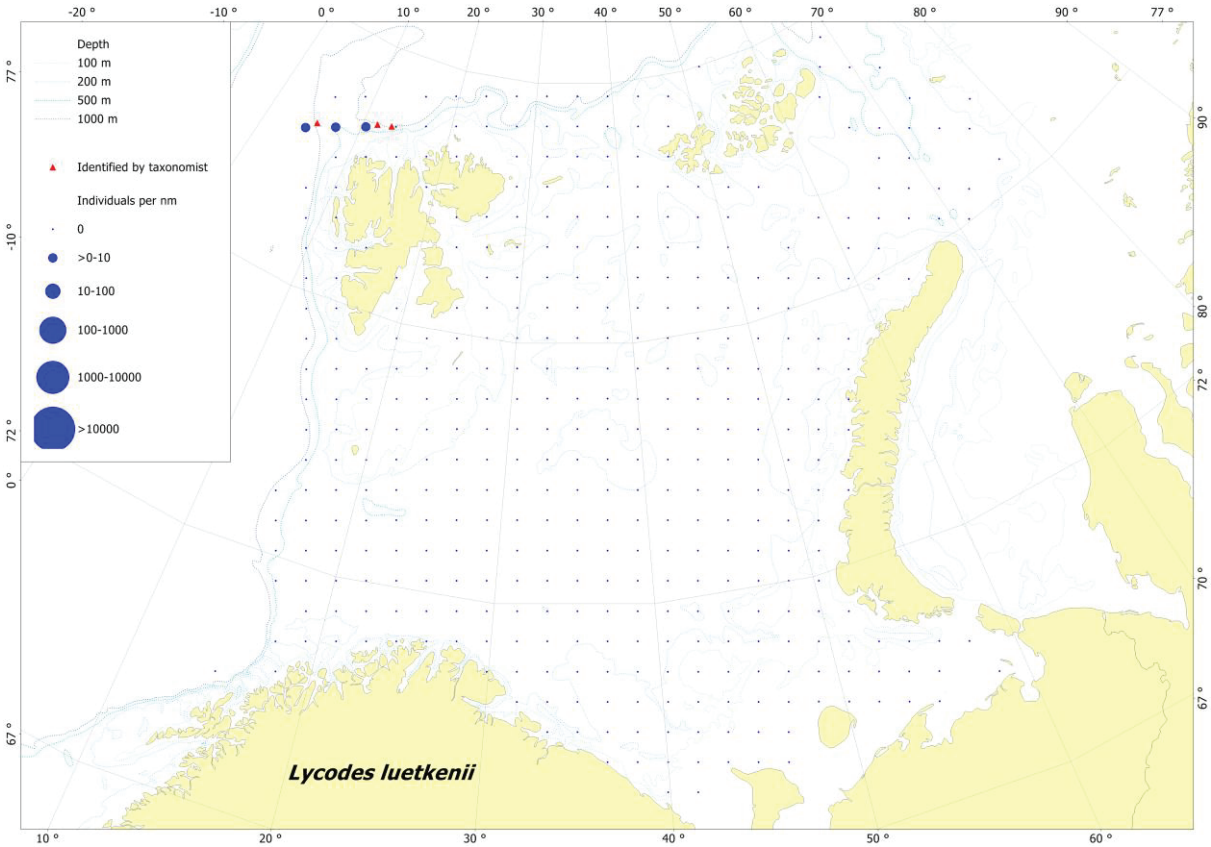
Family: Zoarcidae
English name: Lütken's eelpout
Norwegian name: lütkenålebrosme
Russian name: ликод Люткена
(likod Lyutkena)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known from the northern Barents and Kara Seas, near the Faroese Islands and off Greenland.

Found north of the Svalbard/Spitsbergen archipelago, near the type locality of the species.



Length composition

Eight specimens (16-53 cm, mean length 39.3 cm) were caught.

Life history

Arctic, demersal, preferring muddy bottom at larger depths. Reaches 59 cm, feeds on fish and invertebrates.

Population and exploitation

Of no economic importance, occurs as bycatch on long-line fisheries of Greenland halibut.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Møller PR, Nielsen JG, Knudsen SW, Poulsen JY, Sünksen K, Jørgensen OA. 2010. A checklist of the fish fauna of Greenland waters. Zootaxa 2378:1-84

Lycodes paamiuti Møller 2001

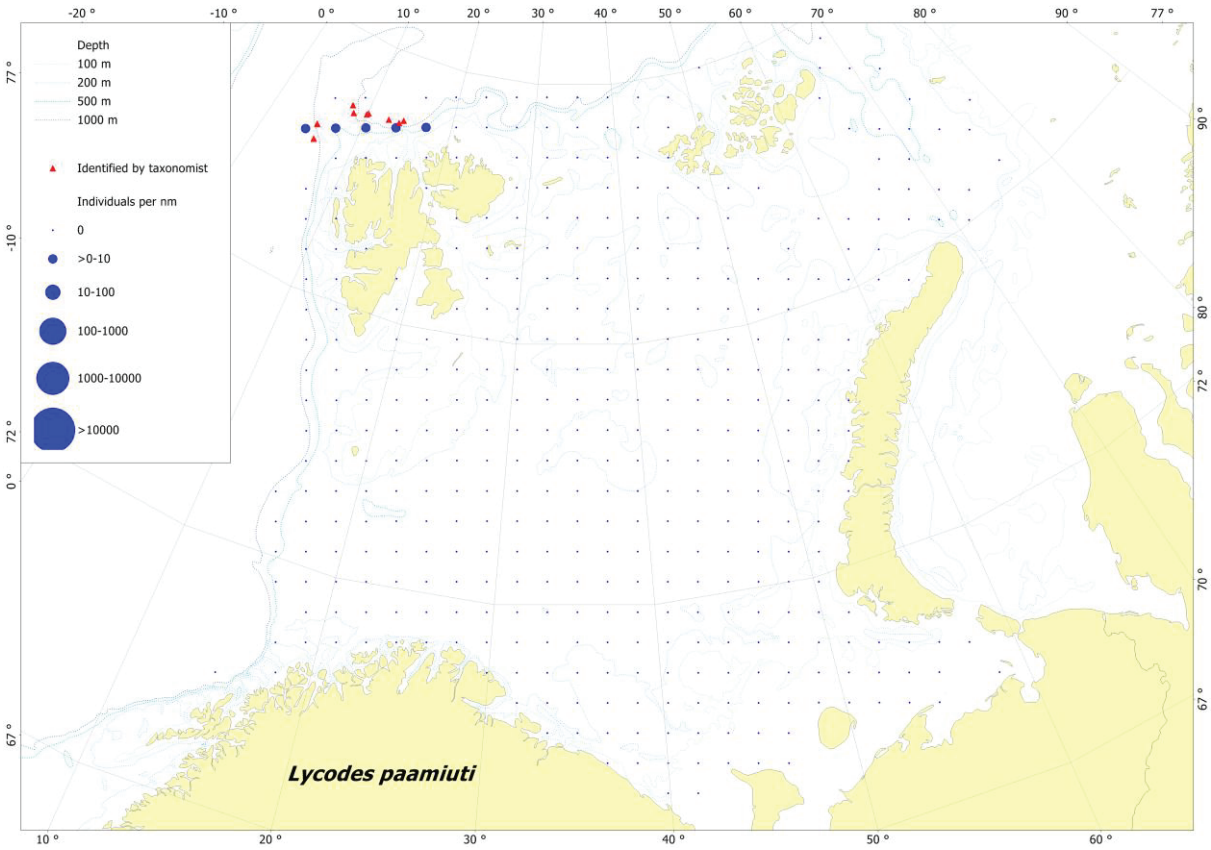
Family: Zoarcidae
English name: Paamiut eelpout
Norwegian name: paamiutålebrosme
Russian name: -

Photo: Ingvar Byrkjedal

Spatial distribution

Known from off northeast Canada, Greenland and in the Norwegian Sea.

Found north of the Svalbard/Spitsbergen archipelago along the slope of the Arctic Ocean. These are the first records from the Barents Sea region.



Length composition

Eleven specimens (13-22 cm, mean length 17.5 cm) were caught.

Life history

Arctic, demersal, in deeper waters. Can reach at least 24 cm, matures about at length 15 cm.

Population and exploitation

Of no economic importance.

References

Møller PR. 2001. Redescription of the *Lycodes pallidus* species complex (Pisces, Zoarcidae), with a new species from the Arctic/North Atlantic Ocean. Copeia:972-996

Lycodes pallidus Collett 1879

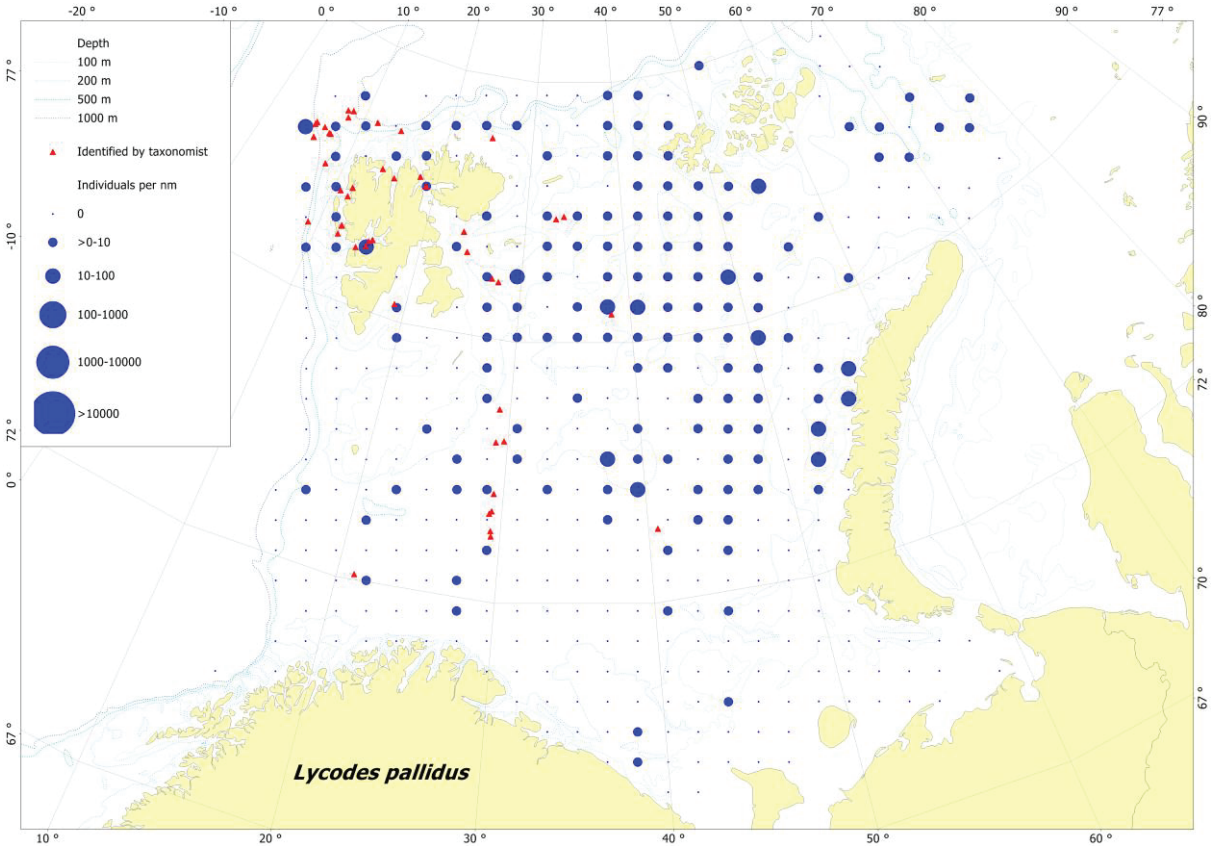
Family: Zoarcidae
English name: pale eelpout
Norwegian name: blek ålebrosme
Russian name: бледный ликод
(bledniy likod)

Photo: Thomas de Lange Wenneck

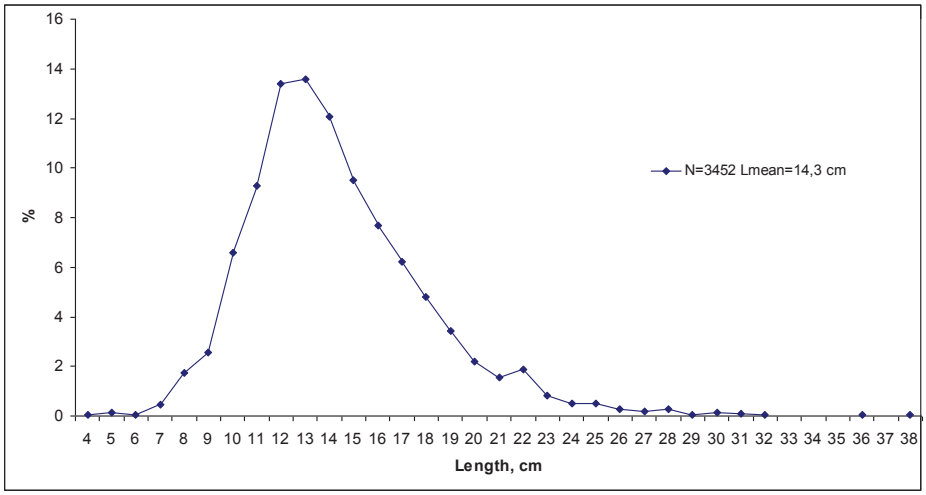
Spatial distribution

Known in the northern North Atlantic including Iceland and Greenland, the Kara and Laptev Sea, but has often been confused with several other eelpout species.

Widely distributed in the surveyed area, mainly north of the Polar Front.



Length composition



Life history

Arctic, demersal, preferring muddy bottom at 60-960 m, temperatures below 0 ºC and 34-35 ‰ salinity. Reaches at least 28.7 cm, matures about at length 13 cm. Feeds on ophiuroids, polychaetes, bivalves and amphipods. Ripe females where found in the Kara Sea in September, fecundity low (30-50 demersal eggs, 5.0-5.8 mm in diameter).

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Møller PR. 2001. Redescription of the *Lycodes pallidus* species complex (Pisces, Zoarcidae), with a new species from the Arctic/North Atlantic Ocean. Copeia:972-996

Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes polaris (Sabine 1824)

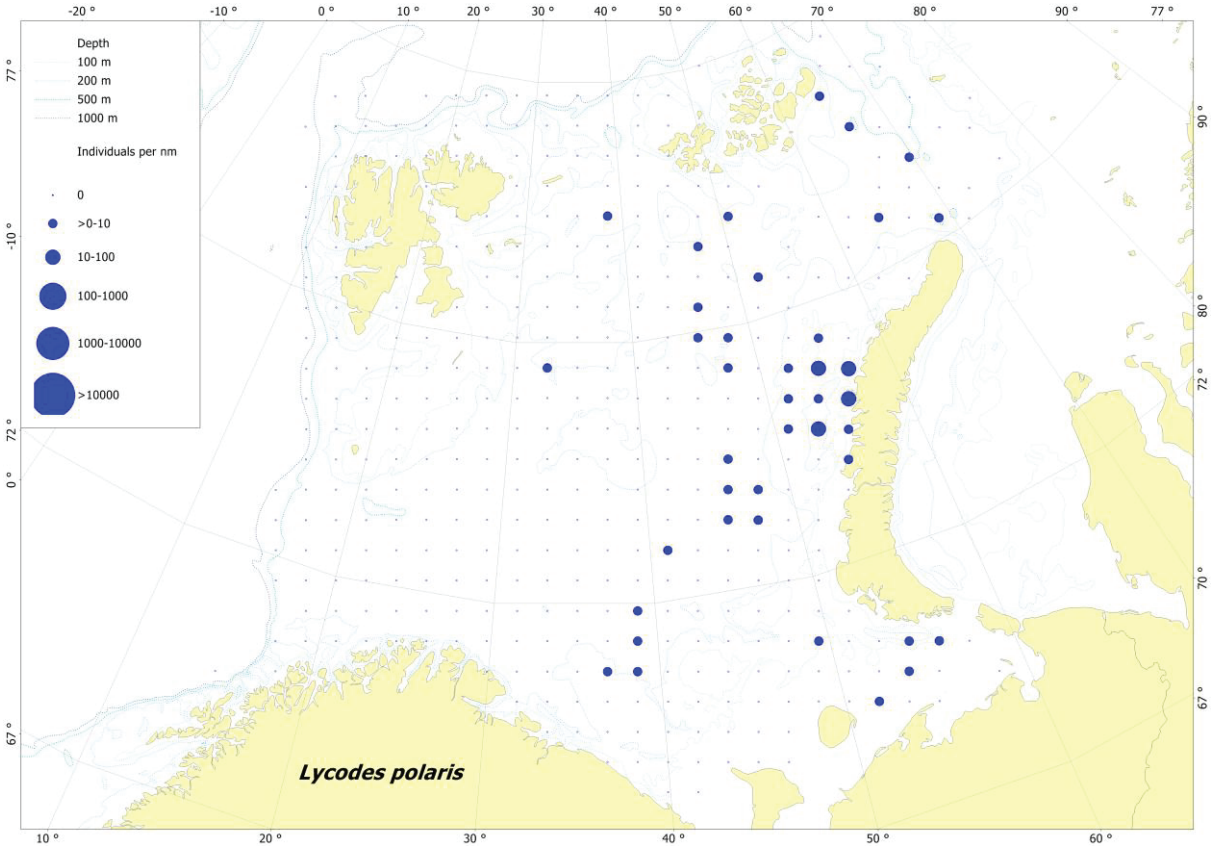
Family: Zoarcidae
English name: Canadian eelpout
Norwegian name: polarålebrosme
Russian name: полярный ликод
(poliarniy likod)

Photo: Andrey Dolgov

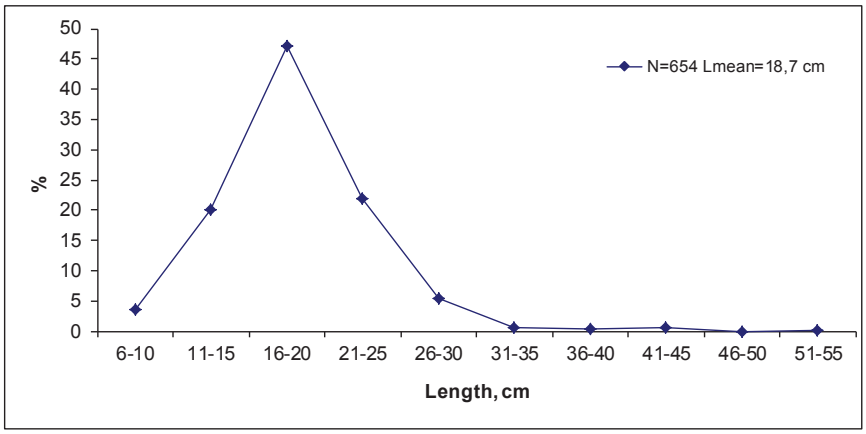
Spatial distribution

Known along arctic coasts from the White Sea eastward to North America and Greenland.

In the surveyed area found in the eastern parts and along the coast of Novaya Zemlya. Scattered records in the central and northern parts may need confirmation



Length composition



Life history

Arctic, demersal, on muddy bottoms at 10-200 m, prefers temperatures below 0 ºC, avoids salinities below 25-30 ‰. Burrows into the mud tail first. Reported to reach 25 cm, present data indicate at least 55 cm. Feeds primarily on gammarids, also polychaetes and bivalves. Spawns in late autumn 100-200 demersal eggs (4-5 mm in diameter).

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Lycodes reticulatus Reinhardt 1835

Family: Zoarcidae
English name: Arctic eelpout
Norwegian name: nettålebrosme
Russian name: сетчатый ликод
(settchatiy likod)

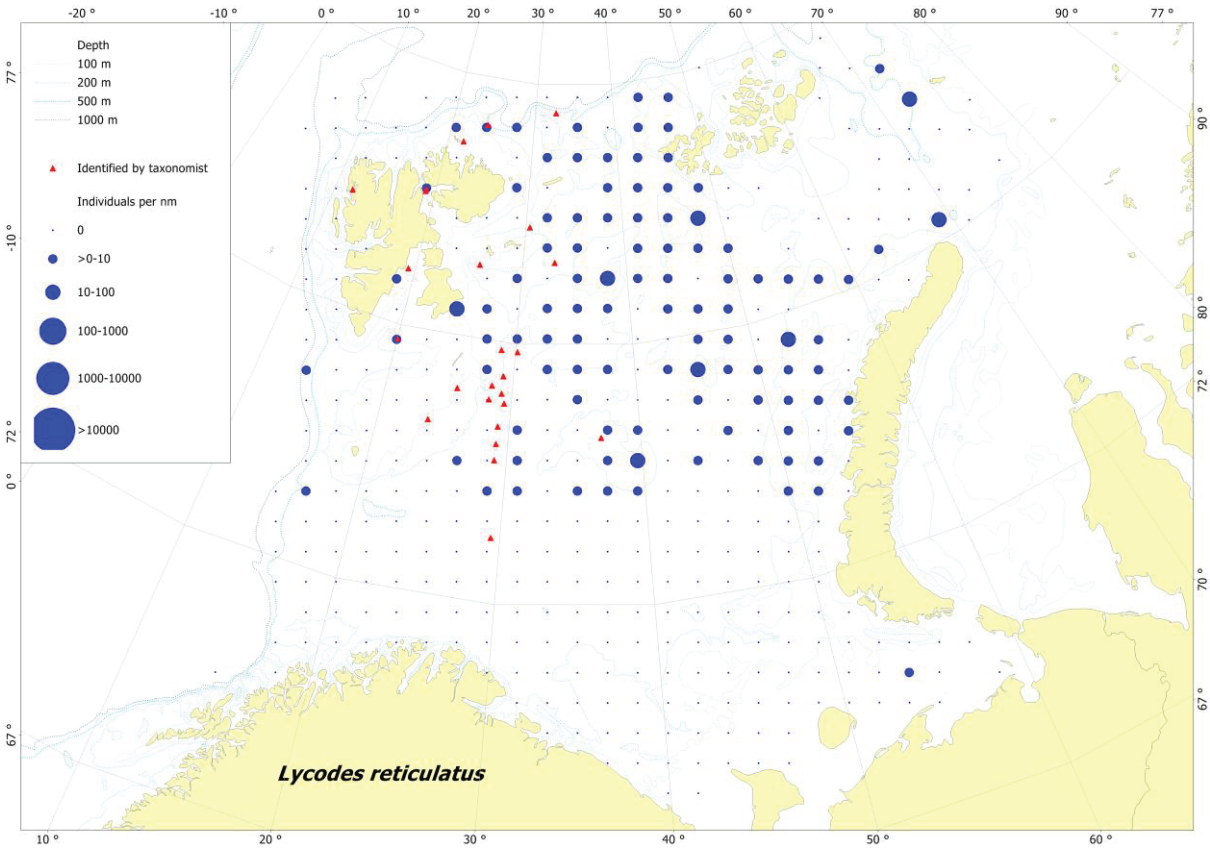
Photo: Thomas de Lange Wenneck

Note on identification: *L. reticulatus* and *L. rossi* are difficult to distinguish, especially when young.

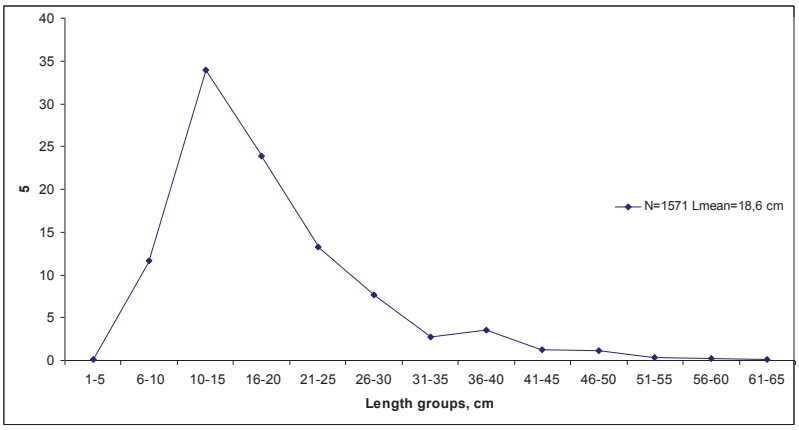
Spatial distribution

Known in the Arctic, from northeastern Canada east to the Laptev Sea.

Widespread in cold waters in the northern part of the surveyed area.



Length composition



Life history

Arctic, demersal, on soft bottom at 100-380 m (young fishes may occur shallower), and at temperatures below 0 ºC. Can reach 55 cm and 10 years. Feeds on fish and bottom invertebrates.

Population and exploitation

Of no economic importance, occurs as bycatch in longline and bottom trawl fisheries.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Mecklenburg CW, Møller PR, Steinke D. 2011. Biodiversity of arctic marine fishes: taxonomy and zoogeography. Marine Biodiversity 41:109-140

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes rossi Malmgren 1865

Family: Zoarcidae
English name: threespot eelpout
Norwegian name: nordlig ålebrosme
Russian name: ликод Росса
(likod Rossa)

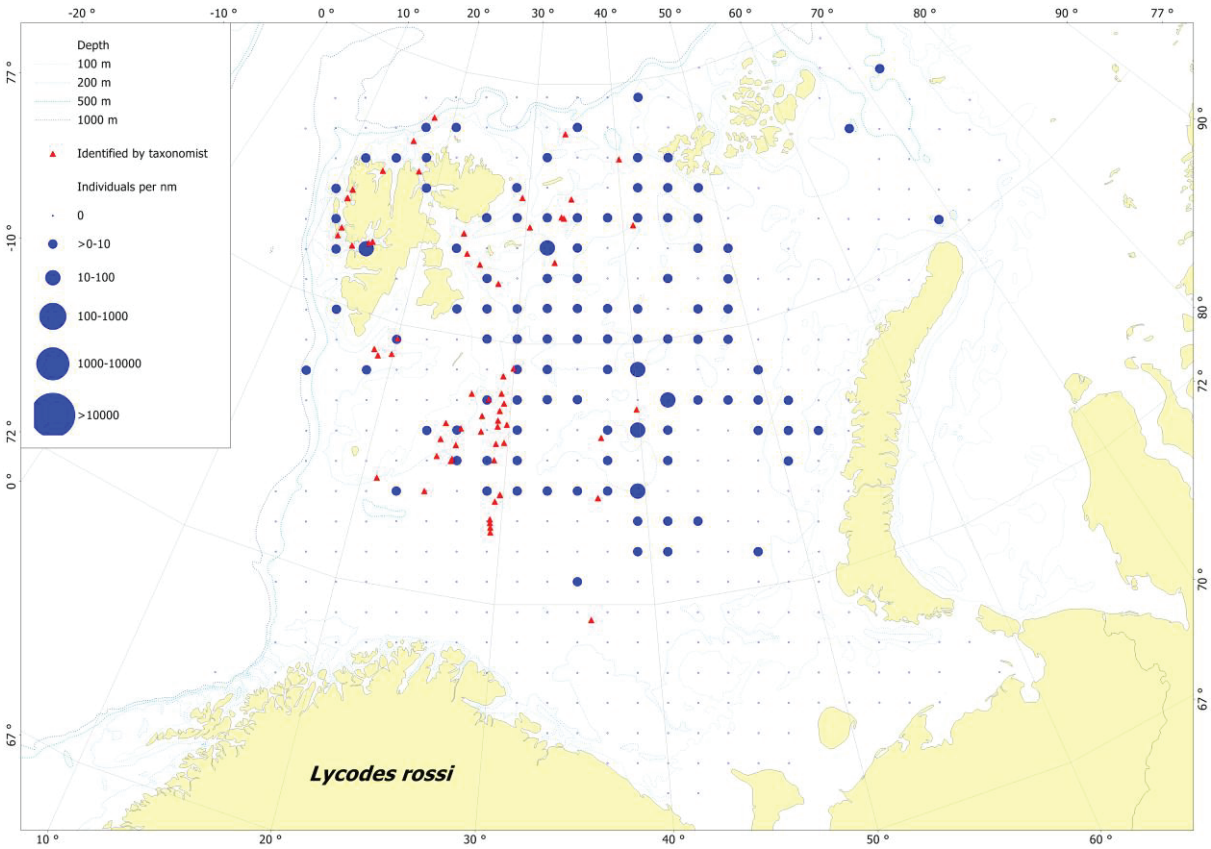
Photo: Thomas de Lange Wenneck

Note on identification: *L. reticulatus* and *L. rossi* are difficult to distinguish, especially when young.

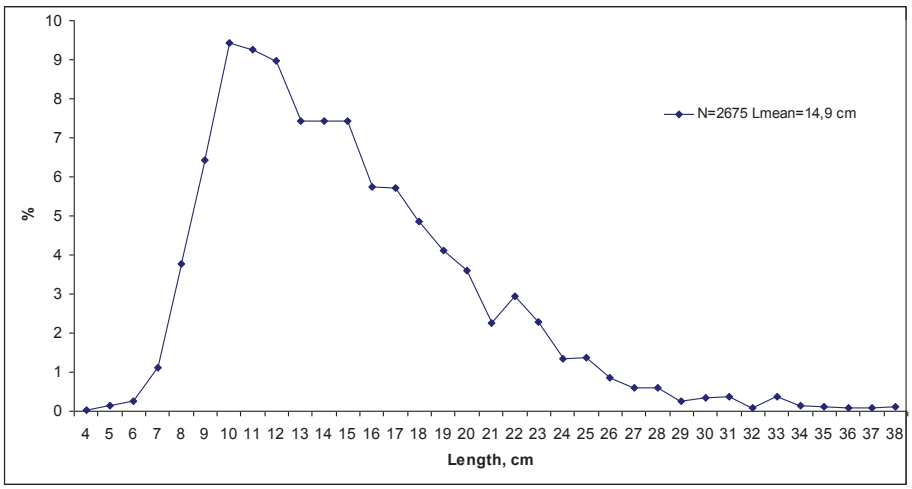
Spatial distribution

Known in the Barents Sea, the Kara Sea, off Iceland, and in the Beaufort Sea.

Widespread in central and northwestern parts of the surveyed area.



Length composition



Life history

Arctic, demersal, on soft bottoms at 45-365 m (young fishes may occur shallower), and temperatures below 0 ºC. Can reach 31 cm and 9 years. Feeds on crustaceans, polychaetes and bivalves. Spawns probably in winter or early spring up to 390 eggs (3-4 mm in diameter).

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Mecklenburg CW, Møller PR, Steinke D. 2011. Biodiversity of arctic marine fishes: taxonomy and zoogeography. Marine Biodiversity 41:109-140

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes seminudus Reinhardt 1837

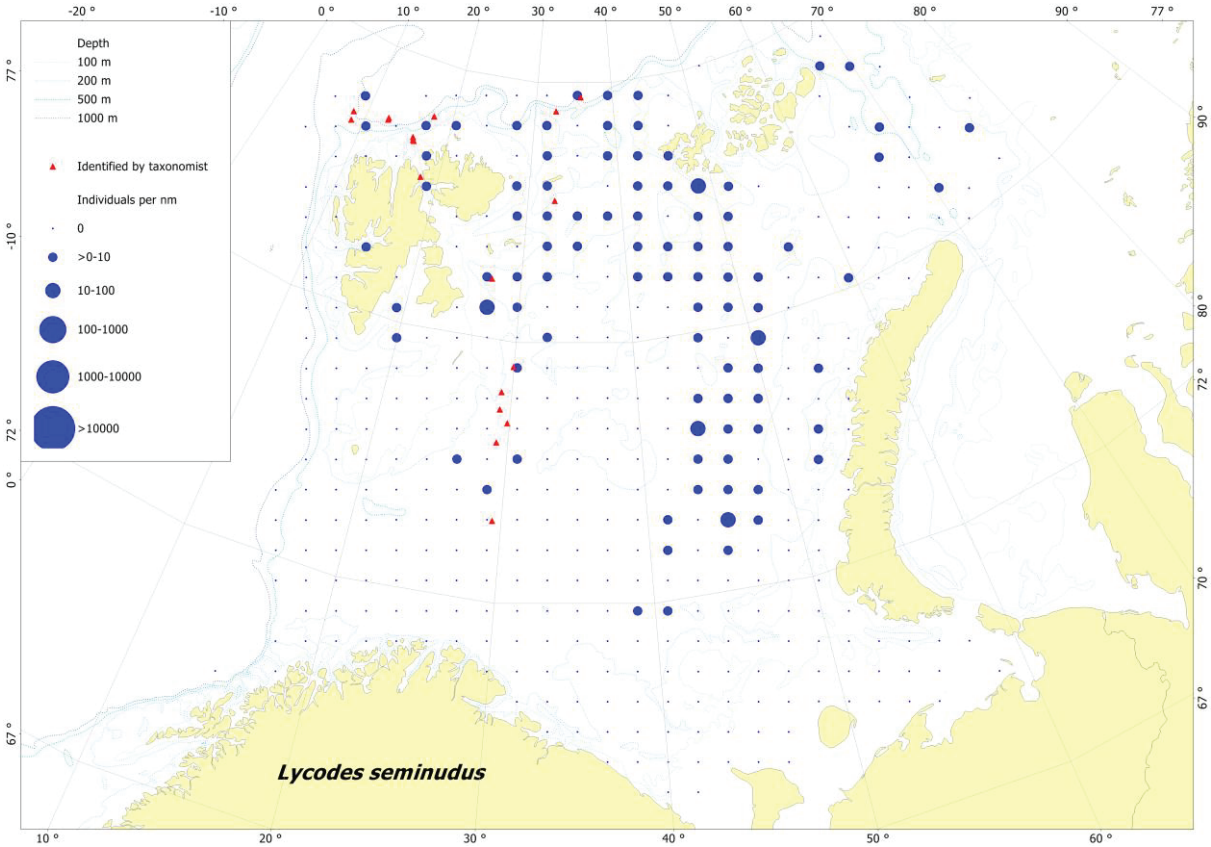
Family: Zoarcidae
English name: longear eelpout
Norwegian name: halvnaken ålebrosme
Russian name: полуголый ликод
(polugoliy likod)

Photo: Thomas de Lange Wenneck

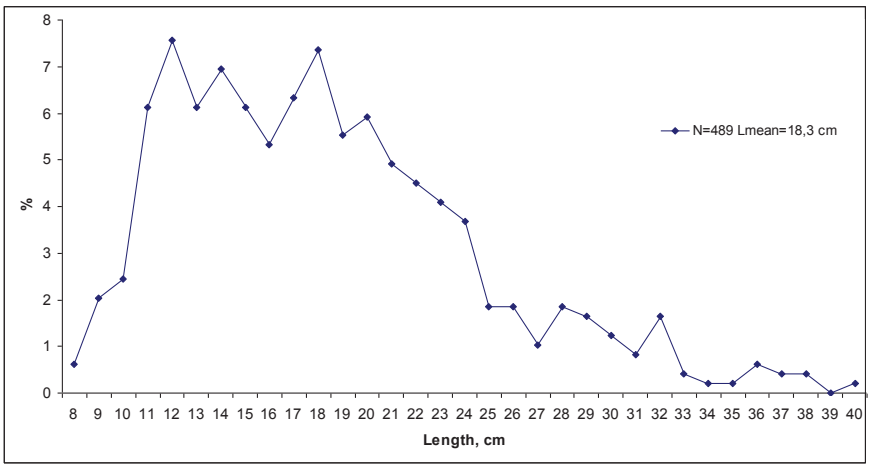
Spatial distribution

Known in the Norwegian, Barents, Kara, and Beaufort Seas, also off Iceland, Greenland, and the arctic Canada and Alaska.

Found in cold-water parts of the surveyed area.



Length composition



Life history

Arctic, demersal, preferring soft muddy bottom at 100-1200 m depth, temperatures below 0 ºC and salinity above 34.5 ‰. Can reach 51 cm (commonly less than 30 cm), and up to 8 years. Feeds on bottom crustaceans and polychaetes as well as fishes. Ripe females were recorded in June and September-October; up to 380 demersal eggs (5-6 mm in diameter).

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodes squamiventer Jensen 1904

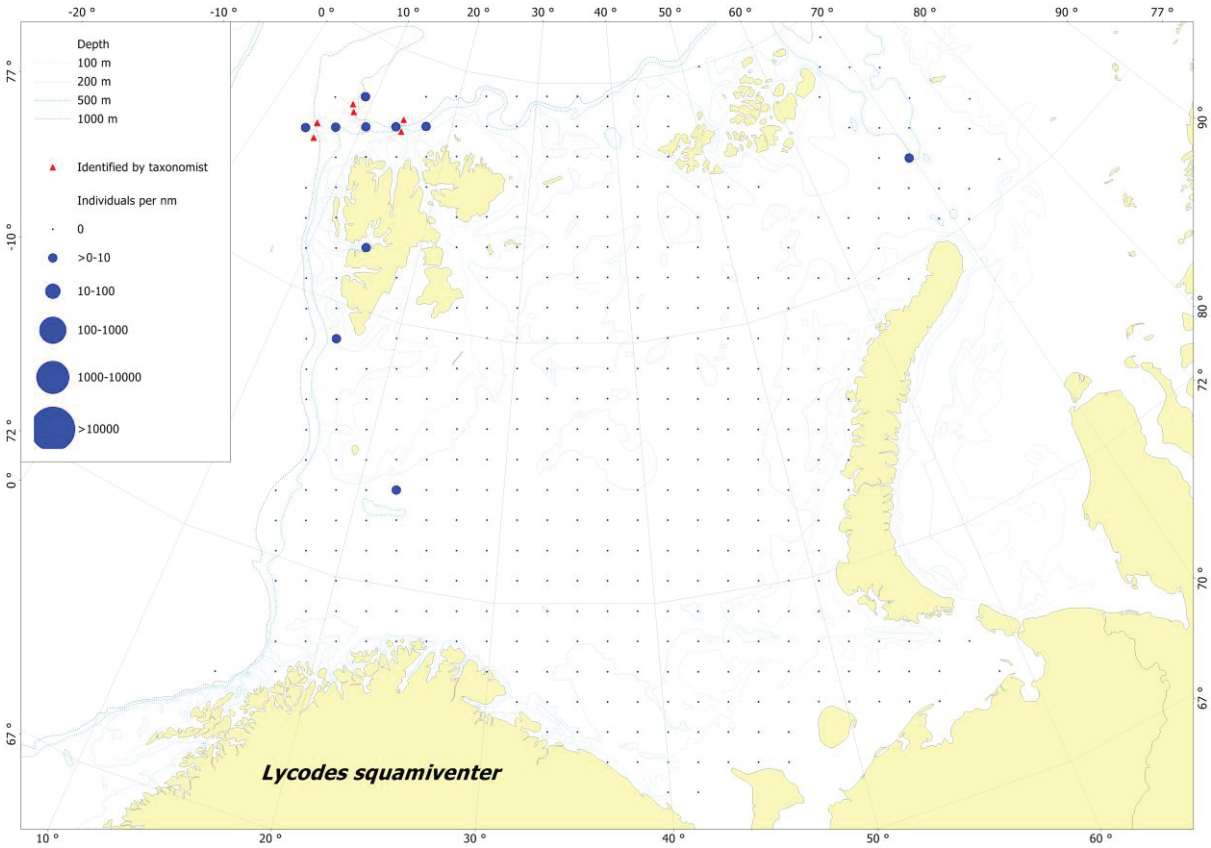
Family: Zoarcidae
English name: scalebelly eelpout
Norwegian name: skjellålebrosme
Russian name: чешуебрюхий ликод
(tcheshuyebryukhiy likod)

Photo: Ingvar Byrkjedal

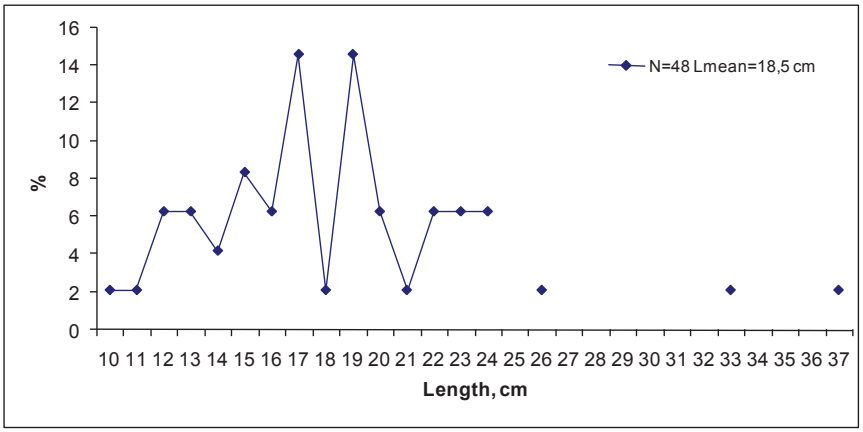
Spatial distribution

Known in the Norwegian Sea, Kara Sea, off Faeroese-Shetland Ridge as well as in the Beaufort Sea and Davis Strait.

Found mainly on the slopes to the Arctic Ocean north of Svalbard/Spitsbergen. The record in Isfjorden, Svalbard/Spitsbergen, may need confirmation.



Length composition



Life history

Arctic, demersal, on muddy bottoms at 160-1750 m depth and temperatures below 0 ºC. Reaches at least 26 cm, females mature at length 14 cm, males at 17.9 cm. Feeds on polychaetes, ophiuroids, bivalves and crustaceans. Spawning takes place in autumn, 50-60 demersal eggs, ripe females have also been found in June.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Møller PR. 2001. Redescription of the Lycodes pallidus species complex (Pisces, Zoarcidae), with a new species from the Arctic/North Atlantic Ocean. Copeia:972-996

Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lycodonus flagellicauda (Jensen 1902)

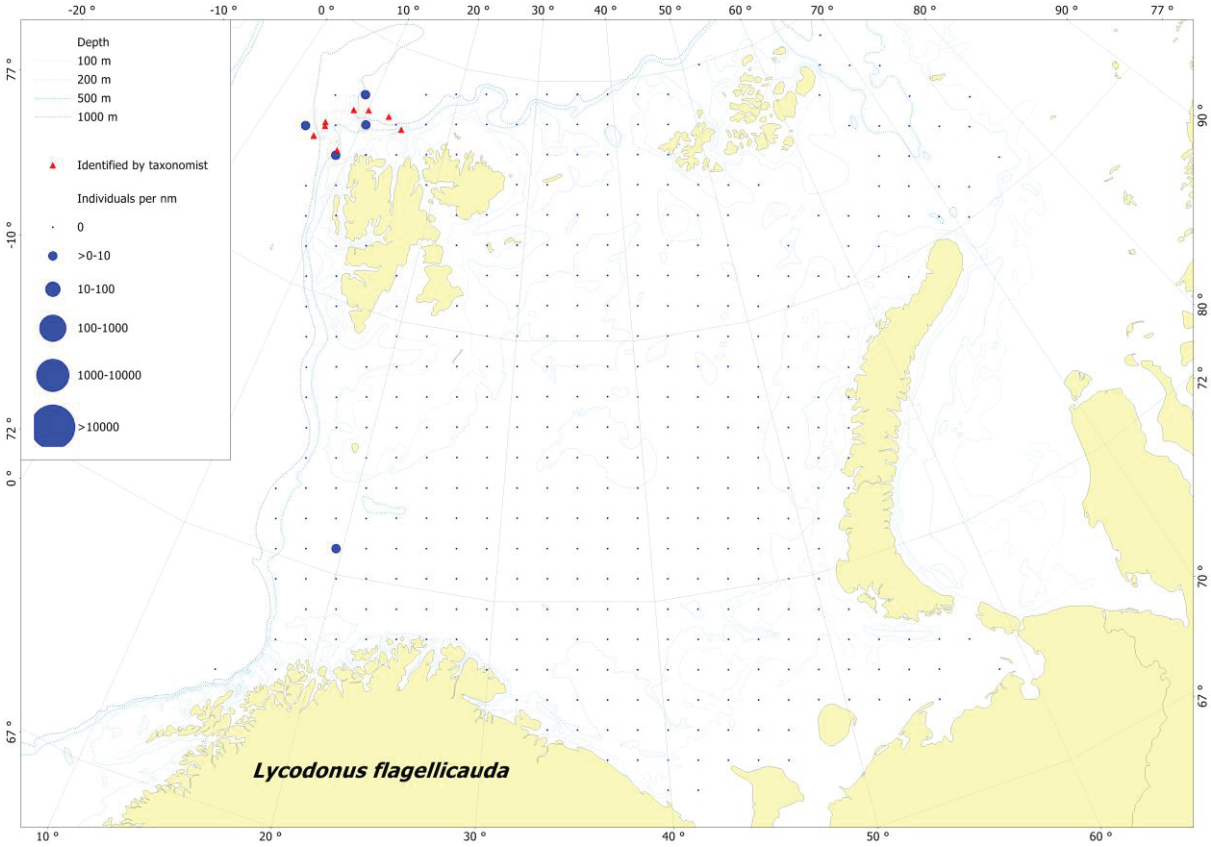
Family: Zoarcidae
English name: -
Norwegian name: spisshalet ålebrosme
Russian name: тонкохвостый ликодон
(tonkokhvostiy likodon)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known in the Norwegian and Greenland Seas from the Faroe Channel and Iceland to the Svalbard/Spitsbergen archipelago.

In the surveyed area found mainly northwest of the Svalbard/Spitsbergen archipelago.



Length composition

26 specimens (12-23 cm, mean length 18.3 cm) were caught.

Life history

Arctic, demersal, on muddy bottom at 839-1846 m depth and temperatures below 0 ºC. Can reach up to 24 cm. Feeds on small benthic and pelagic crustaceans.

Population and exploitation

Of no economic importance.

References

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Anisarchus medius (Reinhardt 1837)

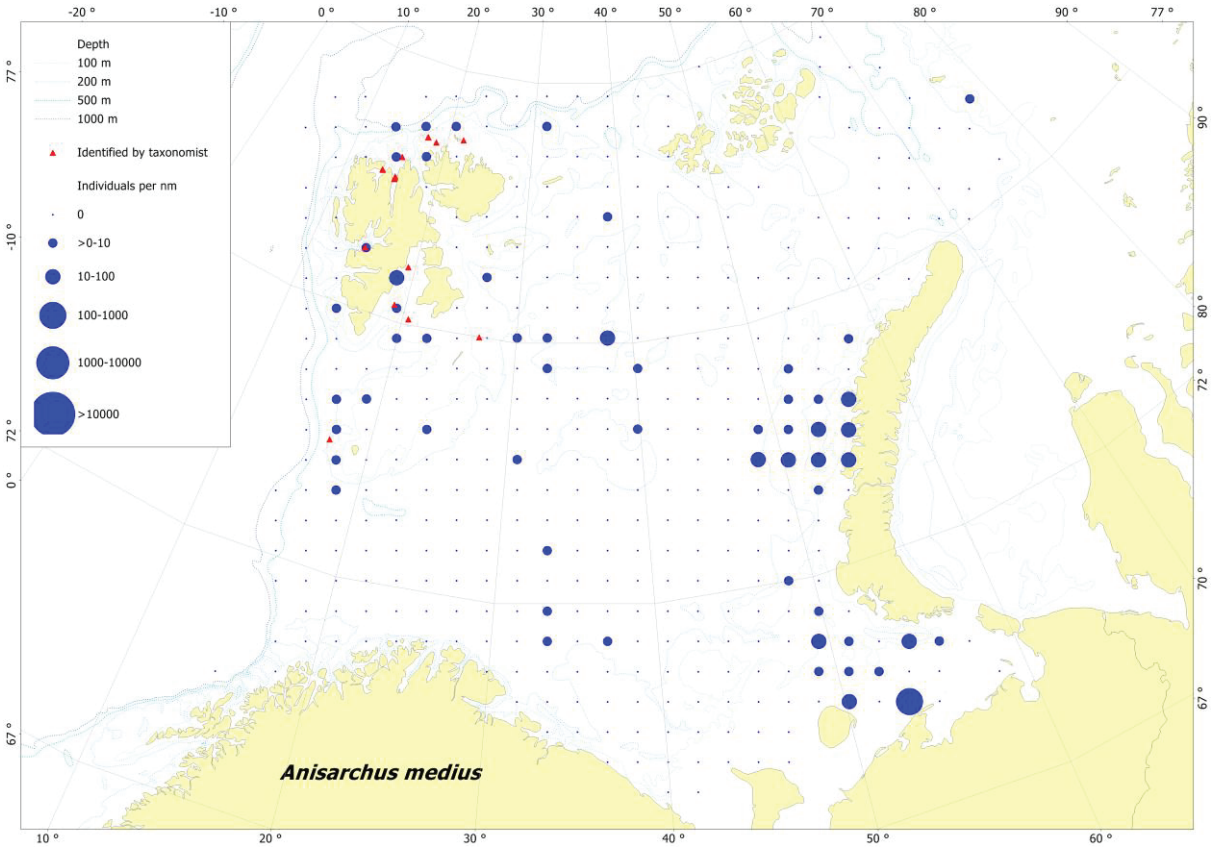
Family: Stichaeidae
English name: stout eelblenny
Norwegian name: rundhalet langebarn
Russian name: средний люмпен
(sredniy lyumpen)

Photo: Thomas de Lange Wenneck

Spatial distribution

Circumpolar, from the Barents and White Sea, along the Siberian coasts and off southern Greenland; also in the western North Atlantic and the North Pacific.

Widely distributed in the surveyed area, mainly north of the Polar Front. Records in the central part might need confirmation.



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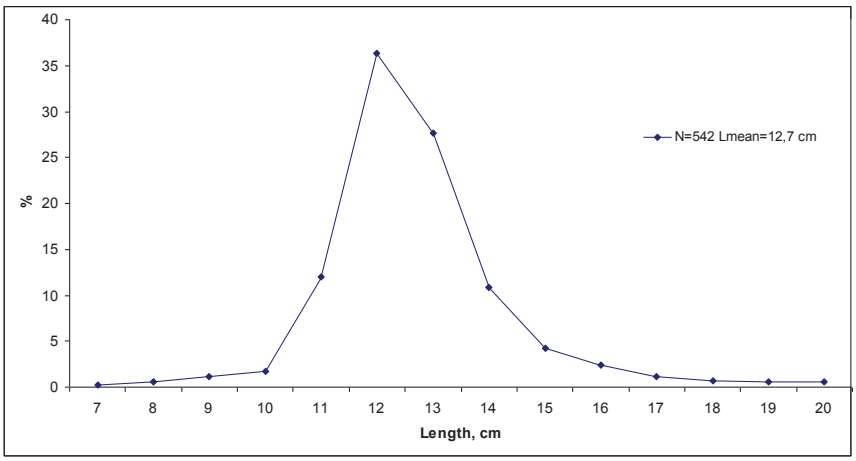


Life history

Arctic, demersal, on mud bottom at depths of 10-150 m, preferring temperatures below 0 ºC and salinities above 30 ‰. Can reach 18 cm (commonly 10-15 cm). Feeds on small polychaetes, crustaceans and bivalves.

Population and exploitation

Of no economic importance.

References

Makushok VM. 1986. Lumpenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1126-1129

Mecklenburg CW, Sheiko BA. 2004. Family Stichaeidae Gill 1864 - pricklebacks. California Academy of Sciences, Annotated Checklists of Fishes 35, 36 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Leptoclinus maculatus (Fries 1838)

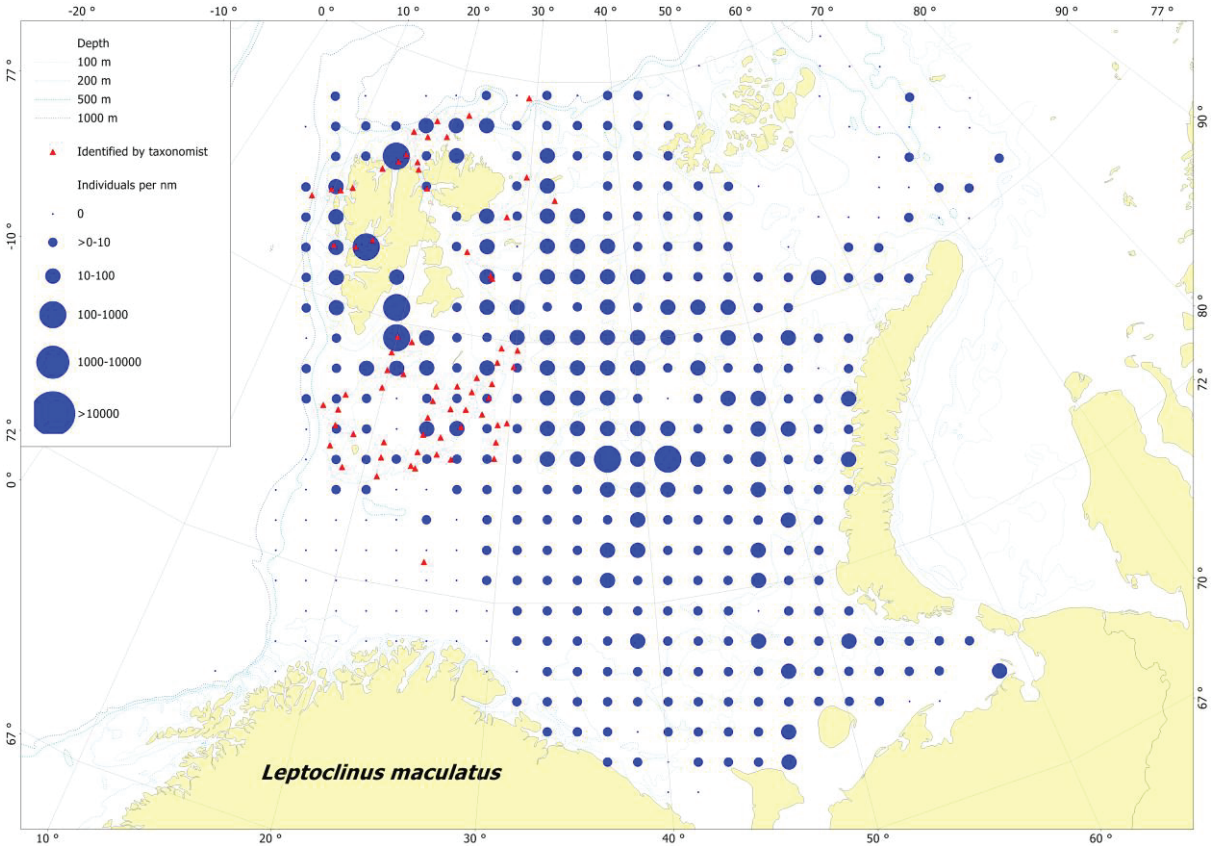
Family: Stichaeidae
English name: daubed shanny
Norwegian name: tverrhalet langebarn
Russian name: пятнистый лептоклин
(piatnistiy leptoklin)

Photo: Thomas de Lange Wenneck

Spatial distribution

Known off the Norwegian coast, in the Barents, Kara, and White Seas, also off Iceland, Jan Mayen, southern Greenland, the western North Atlantic and the North Pacific.

Widely distributed in the surveyed area, except southwestern and northeastern parts.



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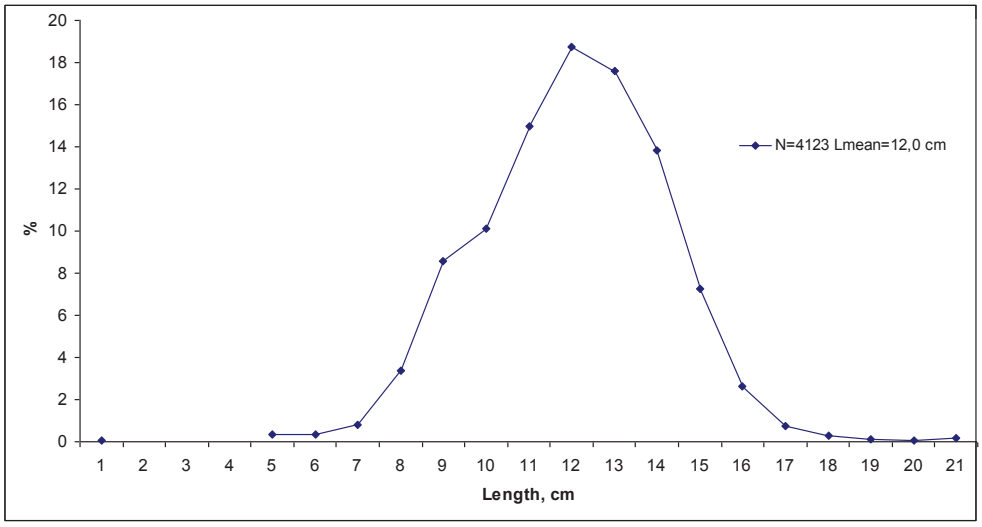


Life history

Arcto-boreal, demersal, on mud and pebble bottom at depths of 2-475 m, usually in less than 170 m and generally shallower during winter. Prefers low temperatures (around 0 ºC) and high salinities (33.5-35 ‰) in the Barents Sea, tolerates wider ranges in other areas. Can reach 20 cm (commonly less than 15 cm), matures at length 9 cm. Feeds on small polychaetes, crustaceans and echinoderms. About 1 000 demersal eggs are spawned in winter, larvae are pelagic.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Makushok VM. 1986. Lumpenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1126-1129

Mecklenburg CW, Sheiko BA. 2004. Family Stichaeidae Gill 1864 - pricklebacks. California Academy of Sciences, Annotated Checklists of Fishes 35, 36 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lumpenus fabricii Reinhardt 1836

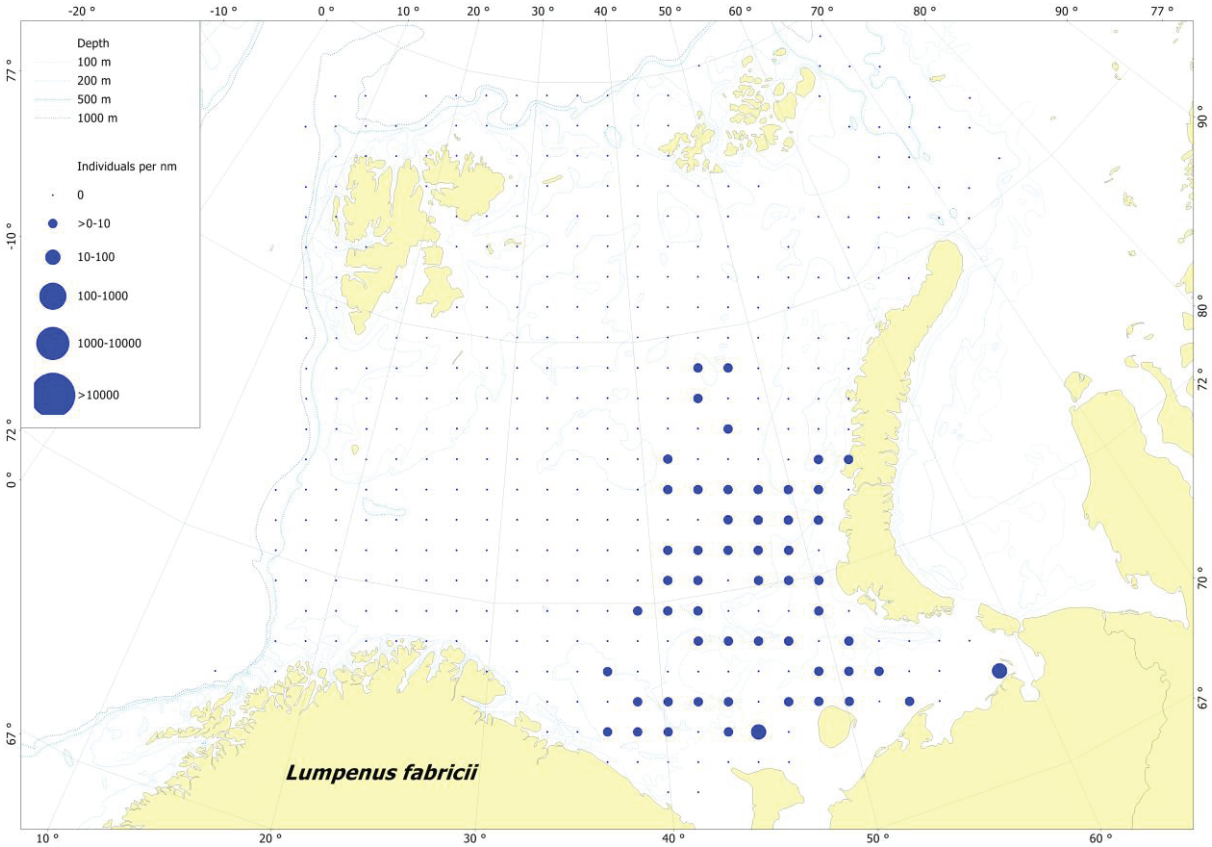
Family: Stichaeidae
English name: slender eelblenny
Norwegian name: arktisk langebarn
Russian name: люмпен Фабрициуса
(lyumpen Fabritsiusa)

Photo: Gunnar Langhelle

Spatial distribution

Circumpolar from the southeastern Barents Sea eastward to western Greenland; further south in the western North Atlantic and the North Pacific.

Found in the southeastern part of the surveyed area.



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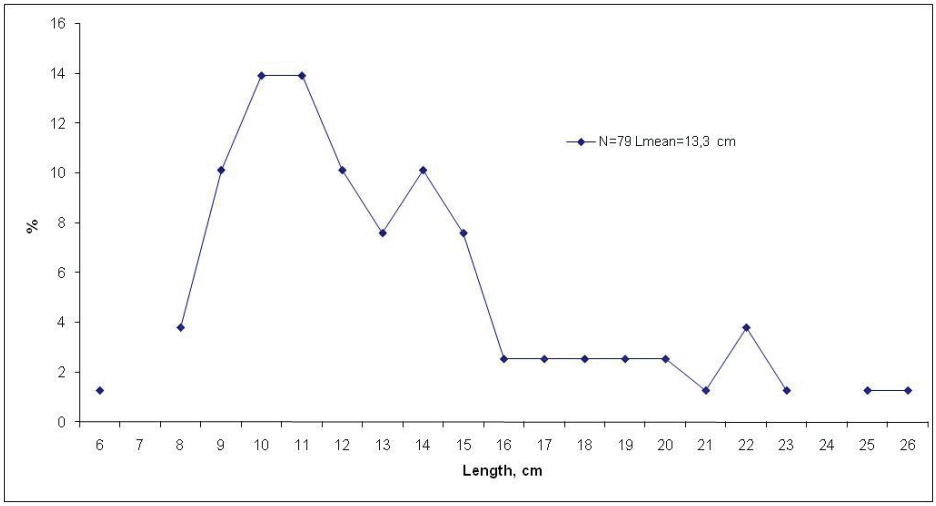


Life history

Mainly arctic, demersal, on sandy and rocky bottoms, often in sea grass or algae and down to 175 m depth, in the Barents Sea at temperatures around 0 ºC. Reaches up to 36.5 cm (commonly 20-23 cm). Feeds on crustaceans, annelids and fish eggs. A 16.4 cm long female was found with 490 nearly ripe eggs in the Kara Sea in October/November.

Population and exploitation

Of no economic importance.

References

Makushok VM. 1986. Lumpenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1126-1129

Mecklenburg CW, Sheiko BA. 2004. Family Stichaeidae Gill 1864 - pricklebacks. California Academy of Sciences, Annotated Checklists of Fishes 35, 36 pp

Lumpenus lampretaeformis (Walbaum 1792)

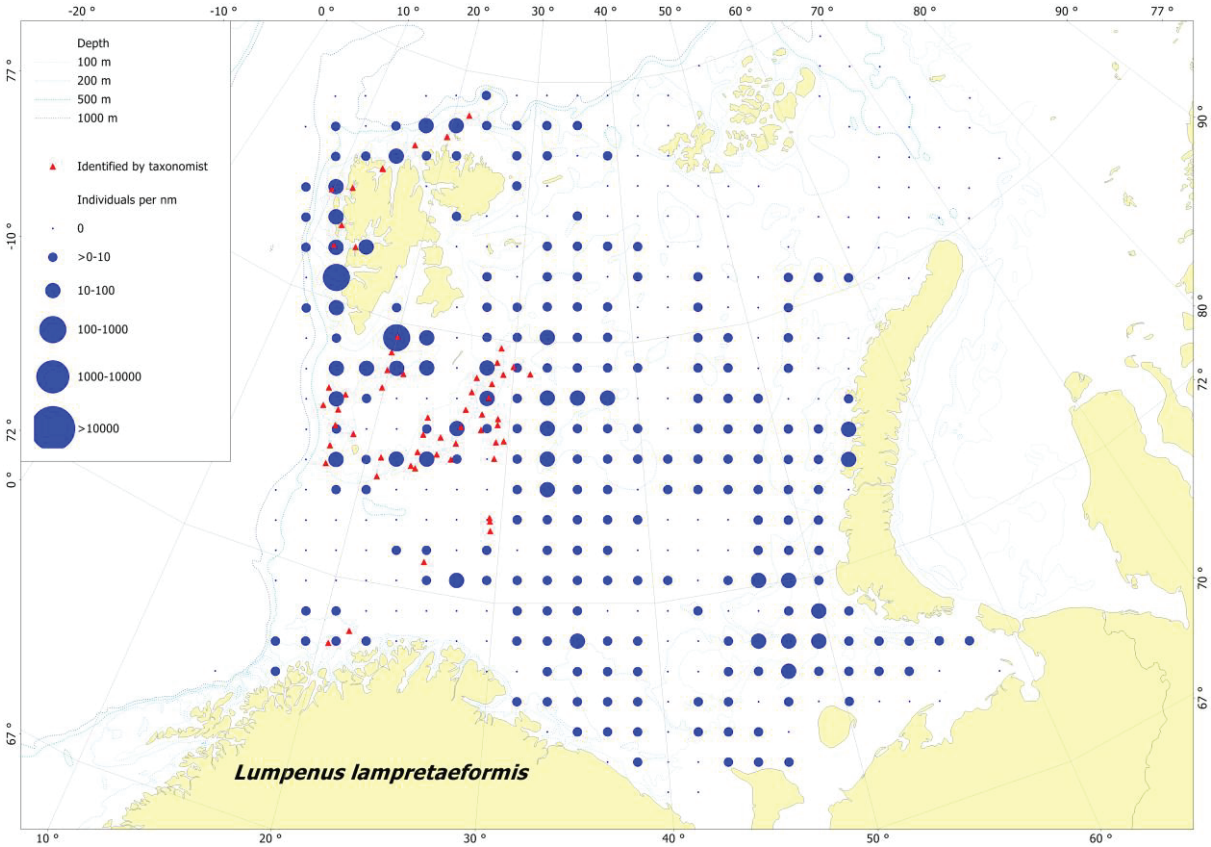
Family: Stichaeidae
English name: snakeblenny
Norwegian name: langhalet langebarn
Russian name: миноговидный люмпен
(minogovidniy lyumpen)

Photo: Andrey Dolgov

Spatial distribution

Known off the coasts of the North Atlantic, including the Baltic, North, Norwegian, Greenland, and Barents Seas; also in the western North Atlantic.

Widely distributed in the surveyed area, except northeastern and deeper parts.



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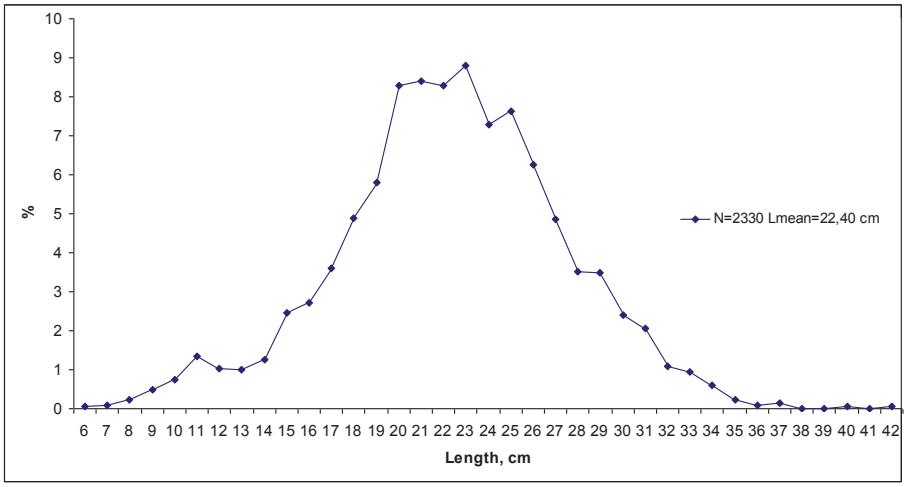


Life history

Mainly boreal, demersal, burrows in muddy bottom at 30-330 m depths, most common at 40-100 m, prefers low temperatures (around 0 ºC) and salinities above 34 ‰. Can reach 49 cm (commonly less than 30 cm). Matures at age 3 years, measures 5-6 cm at 1 year, 13 cm at 2, 17-24 cm at 3, and 23-28 at 4 years. Feeds on small crustaceans, polychaetes, echinoderms and bivalves. Spawns in December/January up to 1 100 demersal eggs. Larvae are pelagic in upper layers until 3-4 cm long.

Population and exploitation

Of no economic importance.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Makushok VM. 1986. Lumpenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1126-1129

Mecklenburg CW, Sheiko BA. 2004. Family Stichaeidae Gill 1864 - pricklebacks. California Academy of Sciences, Annotated Checklists of Fishes 35, 36 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Anarhichas denticulatus Krøyer 1845

Family: Anarhichadidae
English name: Northern wolffish
Norwegian name: blåsteinbit
Russian name: синяя зубатка
(siniaya zubatka)

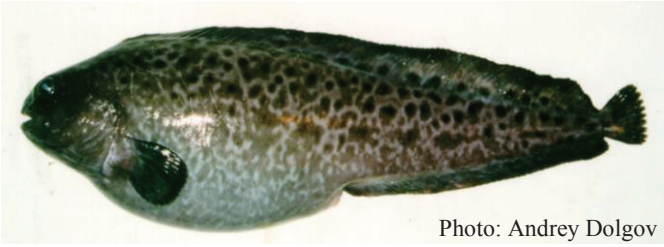


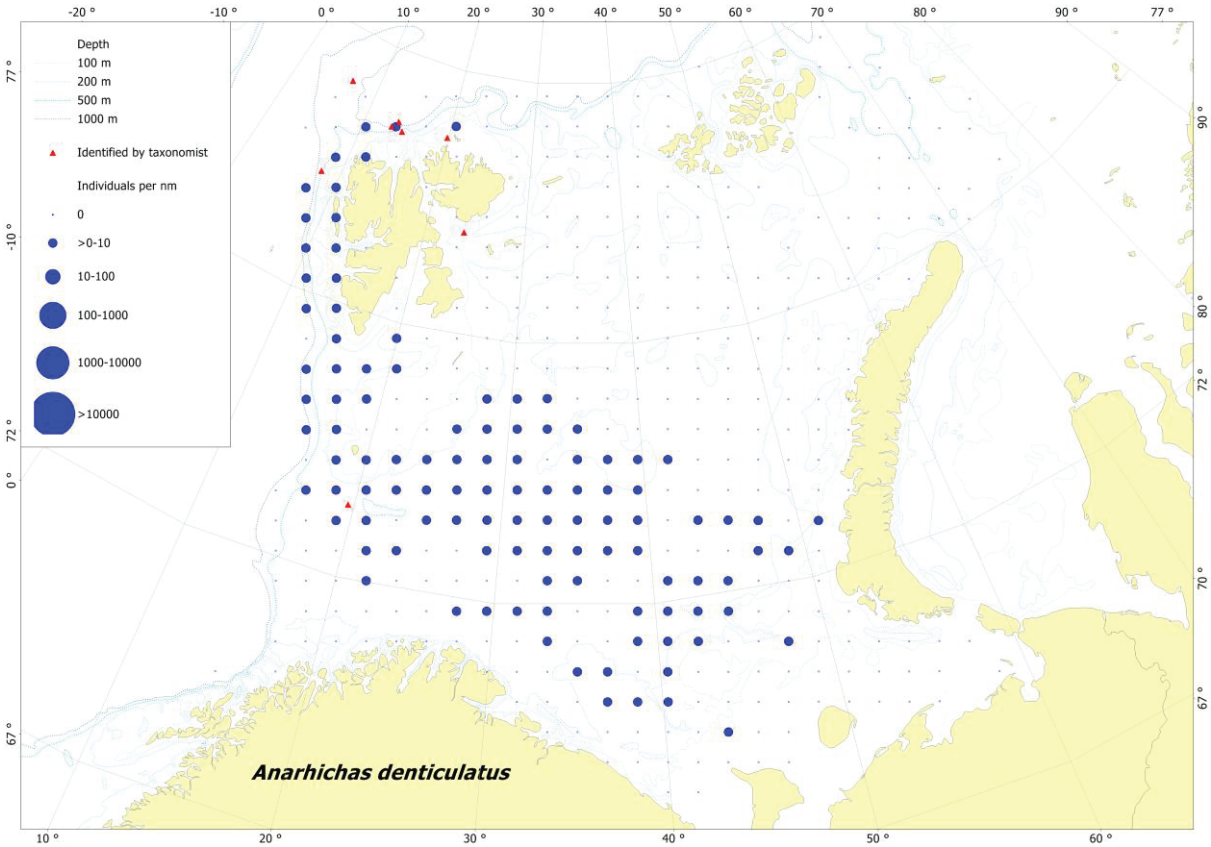
Photo: Andrey Dolgov

Note on identification: Species identification of small specimens might be doubtful.

Spatial distribution

Known in the North Atlantic and the Arctic, from Iceland, the Faroe Island, the Norwegian and Barents Seas, also in the western North Atlantic.

Found in deeper, Atlantic water masses of the surveyed area.



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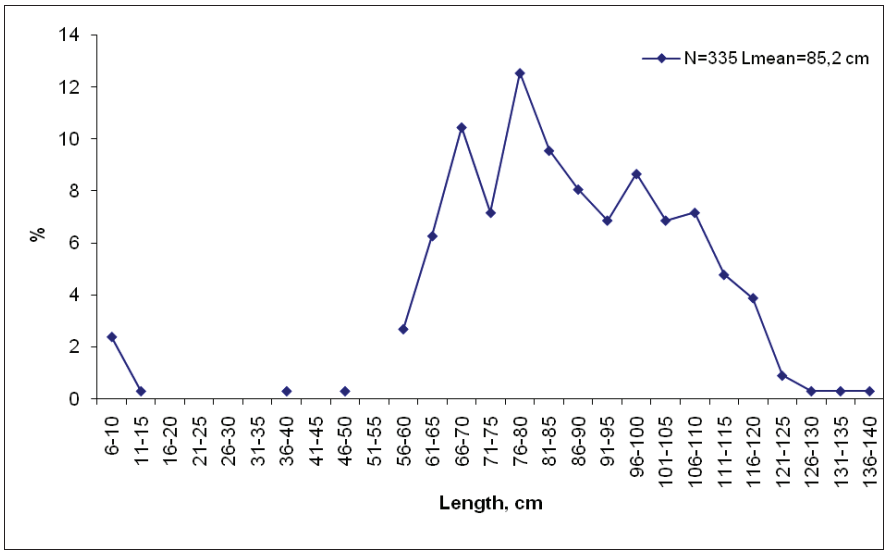


Life history

Mainly boreal, pelagic to benthopelagic, solitary on muddy bottom and at depths down to 1325 m. Tolerates temperatures from -1.4 to +7 ºC and prefers high salinity. Reaches 138 cm, 32 kg and up to 16 years. Females mature at age 6-8 years (about 80 cm). The fastest growing of the three wolffish species in the Barents Sea, reaching 110 cm in 10 years. Feeds on soft shelled bottom invertebrates, fish, ctenophores and jellyfish. No foraging in February-March when teeth are shed. Spawns between April and October (peak in summer) on the continental slope of the Barents Sea and Norwegian Sea at depths below 400 m up to 42 500 eggs (6-8 mm in diameter), which account for 25-35 % of the body weight. Performs extensive daily vertical migrations and seasonal migrations between spawning, feeding and wintering grounds.

Population and exploitation

The Barents Sea population is not isolated from other populations in the North Atlantic. Compared to the other wolffish species it has the lowest stock abundance but the highest biomass. Based on Russain data stock biomass decreased over the past decades from 130 000 to approx. 10 000-20 000 tonnes.

Of low economic importance, targeted in Russia (annual catch 16 000-32 000 tonnes) and marginally in Norway. Bycatch in line and trawl fishery.

References

Barsukov VV, Shevelev MS. 1986. Wolffishes. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 34-40 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Mecklenburg CW. 2003. Family Anarhichadidae Bonaparte 1846 - wolffishes. California Academy of Science, Annotated Checklists of Fishes 10, 6 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Shevelev MS, Johannesen E. 2011. Wolffish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Anarhichas lupus Linnaeus 1758

Family: Anarhichadidae
English name: Atlantic wolffish
Norwegian name: gråsteinbit
Russian name: полосатая зубатка
(polosataya zubatka)

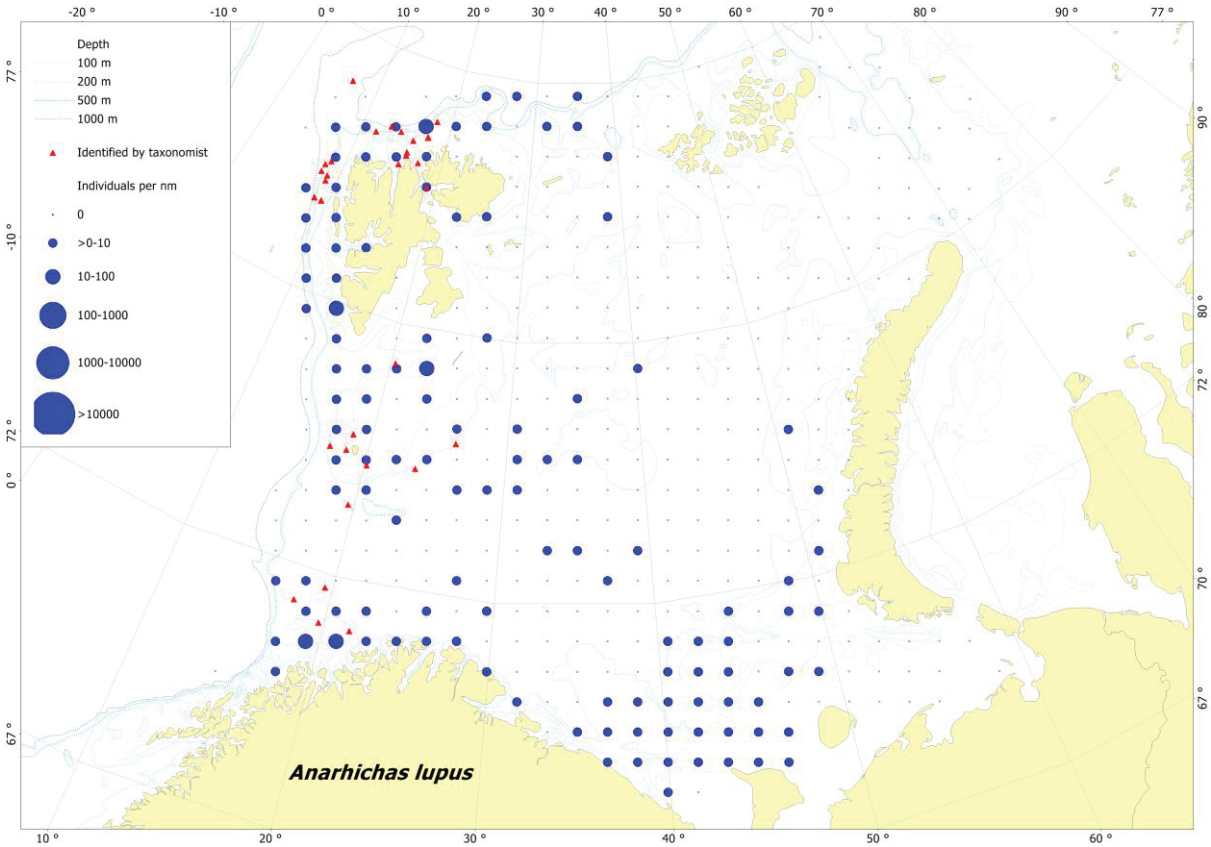
Photo: Andrey Dolgov

Note on identification: Identification of small specimens and the northeasternmost observations might be doubtful.

Spatial distribution

Known in the North Atlantic and the Arctic from off Greenland, the British Isles, the North Sea and northward to the Barents Sea and White Sea; also in the western North Atlantic.

Found in coastal and shallow waters of the surveyed area.



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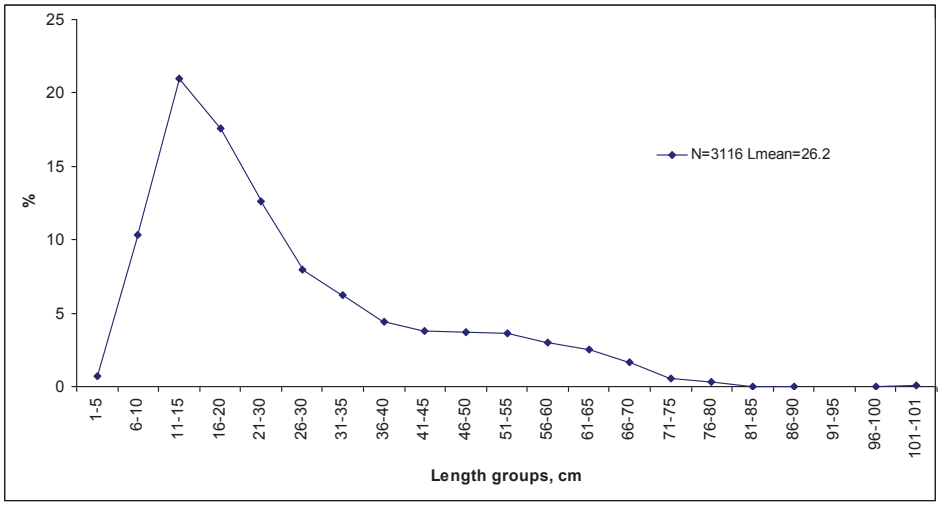


Life history

Mainly boreal, demersal, solitary, preferring rocky bottom in coastal areas from 0-540 m depth, tolerates temperatures from -1.5 to +7.4 ºC). Reaches 125 cm, 20 kg and 20 years. Growth rates high, but lowest within the three wolffish species: measures 10-15 cm after one year, 18 cm after 2, 23 cm after three years. Matures at age 6-7 years (50-60 cm), females earlier and smaller than males. Feeds on hard-shelled bottom invertebrates (mollusks, crabs and echinoderms), sheds its teeth every year. Spawns in July-October (peak in summer) near the coast in inlets and bays at 50-150 m depth. Demersal eggs, number of eggs size-dependent, up to 25 000 (5-7 mm in diameter). Males guard the egg batch until hatching in March-June the next year. Stationary, performing only small seasonal migrations from coastal to deeper areas in winter.

Population and exploitation

The population is probably isolated from other populations in the North Atlantic, and consists of four stocks with different spawning grounds in the Barents Sea. Based on Russian data total stock biomass varies between 5 000 and 25 000 tonnes, slightly rising during the past years. Highest stock abundance but lowest biomass of the wolffish species.

Of minor economic importance, due to coastal habitat bycatch rates are low, annual Russian catch 300-900 tonnes.

References

Barsukov VV, Shevelev MS. 1986. Wolffishes. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 34-40 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Mecklenburg CW. 2003. Family Anarhichadidae Bonaparte 1846 - wolffishes. California Academy of Science, Annotated Checklists of Fishes 10, 6 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Shevelev MS, Johannesen E. 2011. Wolffish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Anarhichas minor Olafsen 1772

Photo: Andrey Dolgov

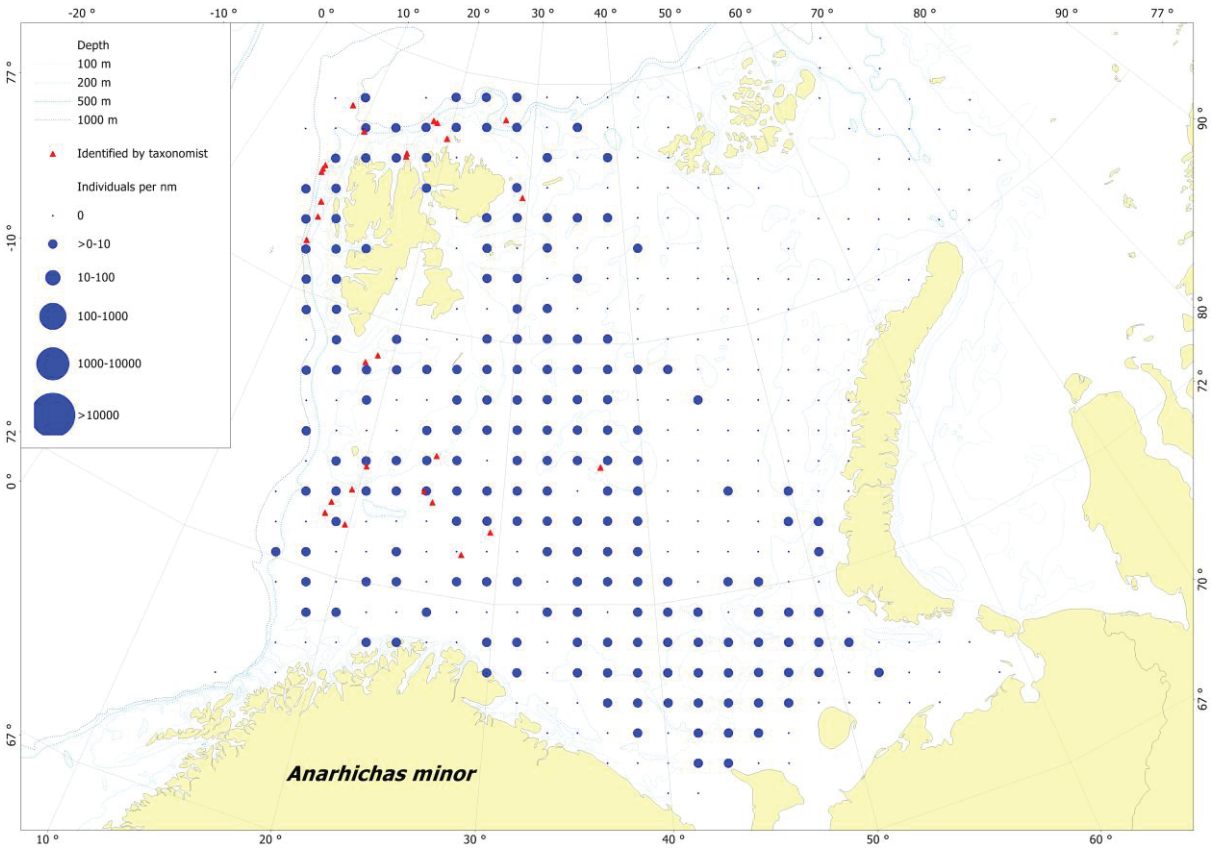
Family: Anarhichadidae
English name: spotted wolffish
Norwegian name: flekksteinbit
Russian name: пятнистая зубатка, пестрая зубатка (piatnistaya zubatka), (piostraya zubatka)

Note on identification: Identification of small specimens might be doubtful.

Spatial distribution

Known in the North Atlantic and the Arctic from off Greenland, Iceland, Faroe Islands, the Norwegian Sea and Barents Seas, also in the western North Atlantic.

Widely distributed in the surveyed area, except for the coldest Arctic water masses.



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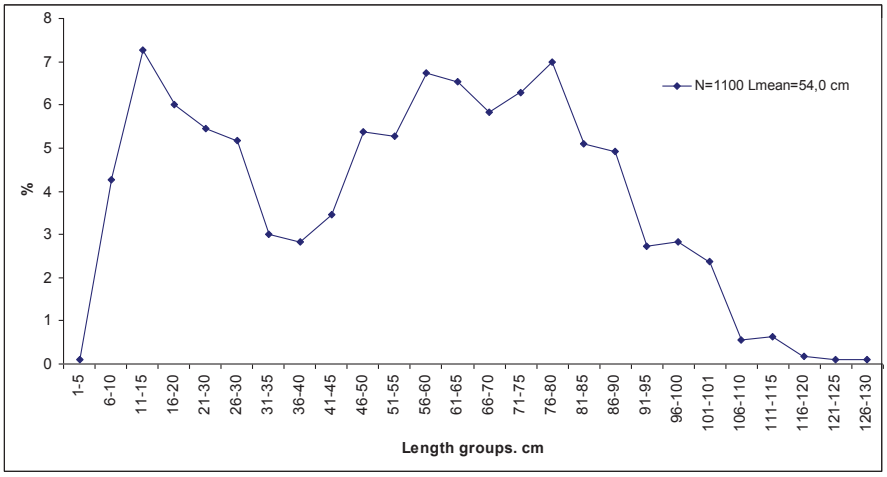


Life history

Mainly boreal, demersal to benthopelagic, solitary on muddy and muddy-sand bottom, on the continental shelf at 50-450 m depth. Tolerates temperatures from -1.3 to +7.3 ºC. Reaches at least 140 cm, 26 kg and 40 years. Measures 15-20 cm after one year, 45-60 after 5 years and matures at age 7-10 years (70-90 cm). Feeds on bottom invertebrates (primarily echinoderms, mollusks and crustaceans). Spawns between April and September (peak in summer) in the southwestern part of the Barents Seas at 300-400 m depth. Number of eggs size dependent, up to 50 000 demersal eggs (5.5-6.7 mm in diameter) in several batches, pelagic larvae. Performs extensive seasonal migrations between wintering and spawning grounds and the feeding areas in the northern and eastern Barents Sea.

Population and exploitation

Probably only one stock in the Barents Sea, isolated from other populations in the North Atlantic. Based on Russian data total stock biomass varies between 10 000 and 70 000 tonnes, slightly increasing lately.

Of minor economic importance in Norway. In Russia bycatch in long-line and bottom trawl fisheries (3 000-17 000 tonnes annual catch). Distribution and habitat overlaps with cod, the fishery on cod has a larger impact on this than on the other two wolffish species.

References

Barsukov VV, Shevelev MS. 1986. Wolffishes. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 34-40 (in Russian)

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Mecklenburg CW. 2003. Family Anarhichadidae Bonaparte 1846 - wolffishes. California Academy of Science, Annotated Checklists of Fishes 10, 6 pp

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Shevelev MS, Johannesen E. 2011. Wolffish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Ammodytes spp.

Family: Ammodytidae
English name: sandeel
Norwegian name: sil
Russian name: песчанка
(pestchanka)

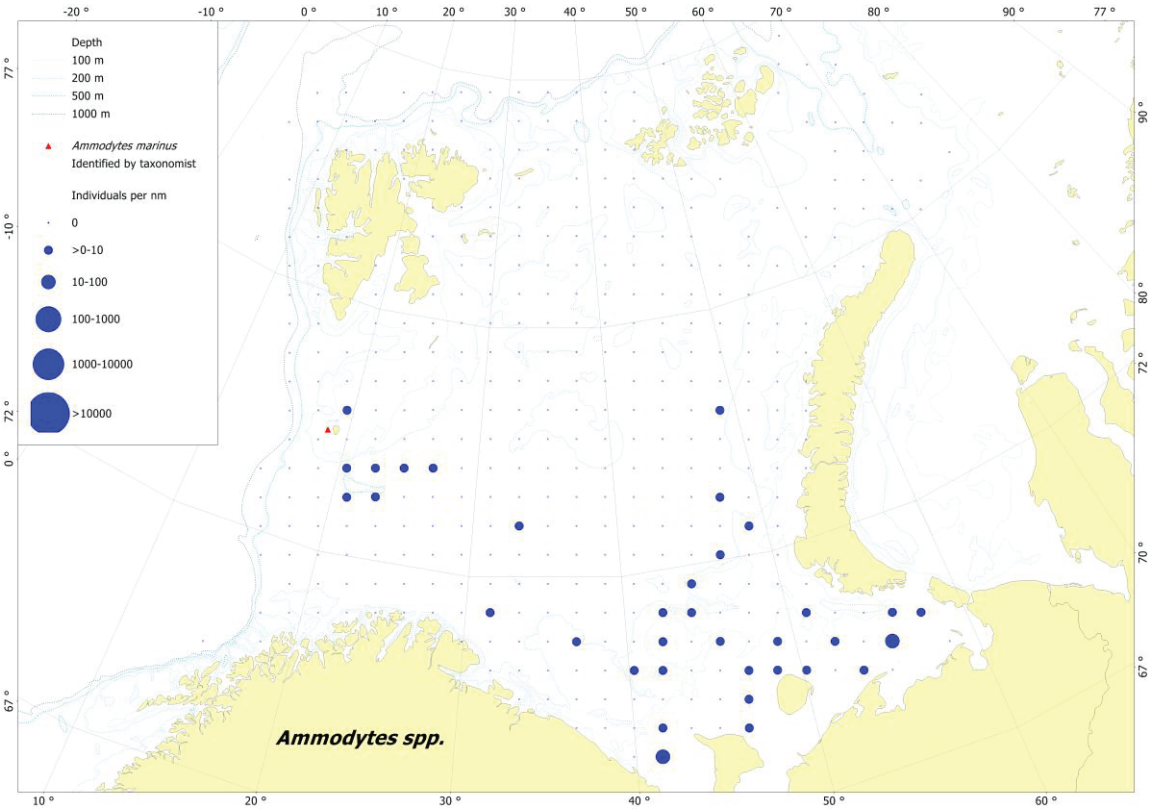
Photo: Thomas de Lange Wenneck

Note on identification: *Ammodytes marinus* Raitt 1934 and *Ammodytes tobianus* Linnaeus 1758 differ primarily in the number of dorsal finrays (49-55 in *A. tobianus*, 56-67 in *A. marinus*) and vertebrae (60-66 versus 67-75). Due to the demanding species identification on board the specimens have not been identified to species level and the data are presented for the genus. *A. tobianus* and *Hyperoplus lanceolatus* (Le Sauvage 1824) were previously reported from the Murman and the Norwegian coasts as well as the Svalbard/Spitsbergen archipelago. However, verified specimens from the present data do not confirm the presence of these species in the Barents Sea.

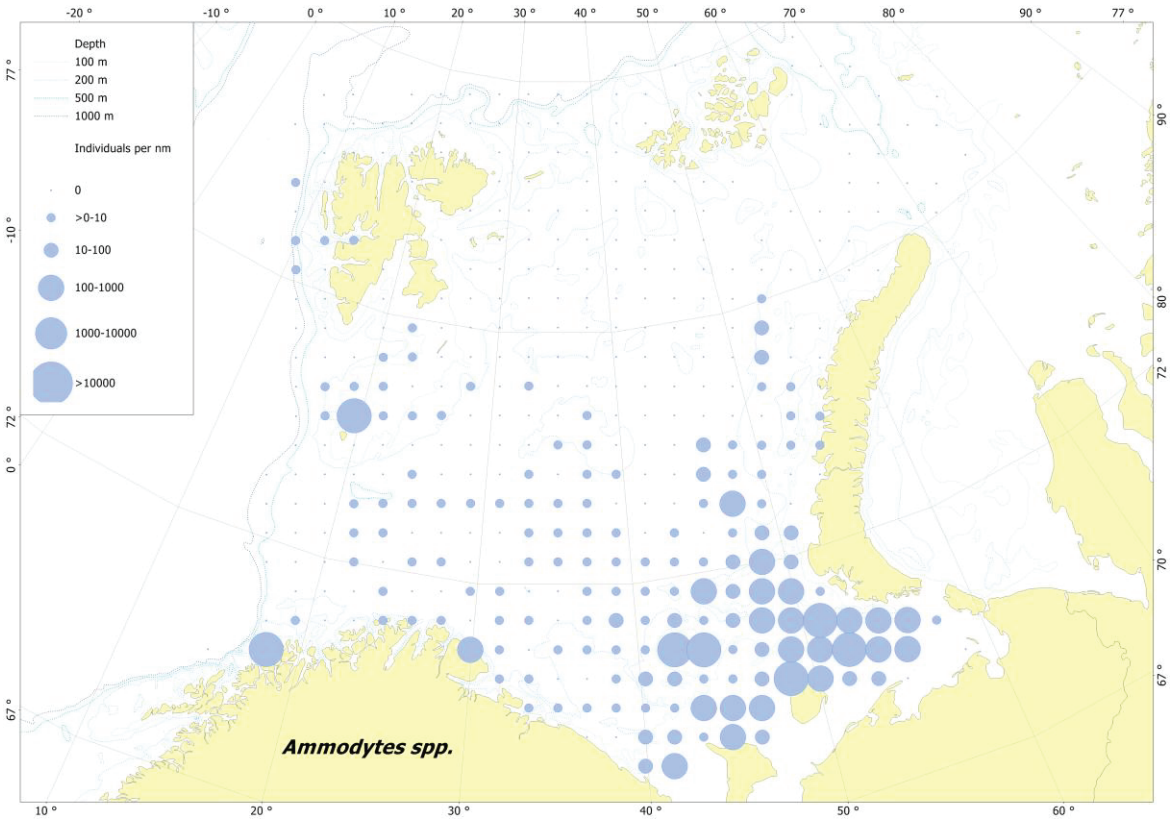
Spatial distribution

A. marinus is known from the British Isles to the Kola Peninsula, off Iceland, eastern Greenland and in the southern Baltic.

In the Barents Sea, *Ammodytes* is mainly found on shallow banks in the southeastern area.

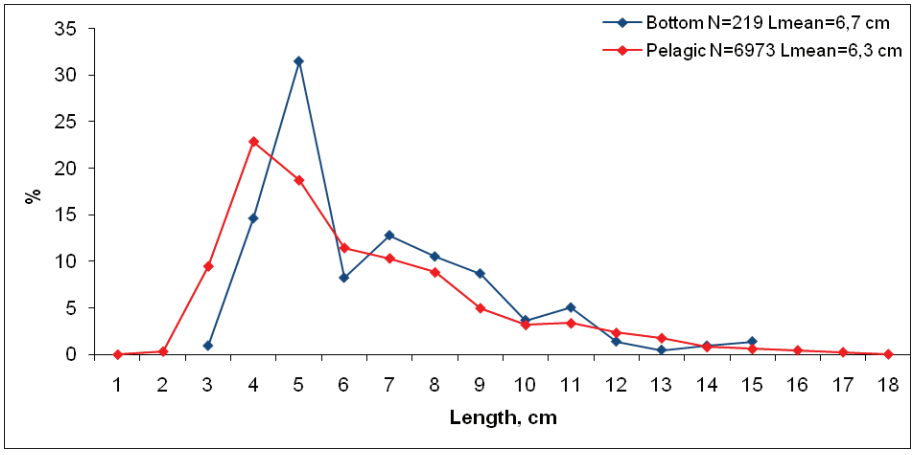


Distribution pattern based on bottom trawls



Distribution pattern based on pelagic trawls.

Length composition



Life history

Boreal (*A. tobianus*) and mainly boreal (*A. marinus*), demersal, highly adapted to and dependant on sandy habitat, spending nights and dark days buried in sand, also hiding when alarmed. Can rest in the sand for several months, found at depths down to 40 m. Reaches 20 cm (*A. tobianus*), 24 cm (*A. marinus*), 0.1 kg, and hardly more than 10 years. Forages pelagically and often in dense schools on planktonic crustaceans, fish eggs and larvae. Important food source for other fish species as well as birds and sea mammals. Spawning period varies with geographic area, eggs are laid in the sand, larvae pelagic.

Ammodytes marinus matures at age 1-2 years, spawns in portions 4 000-25 000 eggs, which hatch after 10 days.

Population and exploitation

Several populations in the North Sea, the spawning stock decreased during the past 10 years. Norwegian authorities have repeatedly stopped exploitation in Norwegian waters, mostly because of the spatial limitations of the stocks.

Of no economic importance in the Barents Sea.

References

Andriashev AP, Chernova NV. 1995. Annotated list of fishlike vertebrates and fish of the Arctic Seas and adjacent waters. Journal of Ichthyology 35:81-123

Berger TS, Nizovtsev GP. 1965. Record of great sandeel in the waters off Western Spitsbergen. Voprosy ikhthyologii 34:722-726 (in Russian)

Johannessen T. 2010. Tobis. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:152 (in Norwegian)

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Nævdal G, Thorkildsen S. 2002. Genetic studies on species composition and population structure of sand eels (Genera: *Ammodytes*, *Hyperoplus* and *Gymnammodytes*) in Norwegian waters. Journal of Applied Ichthyology 18:124-126

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Reay PJ. 1986. Ammodytidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 945-950

Scomber scombrus Linnaeus 1758

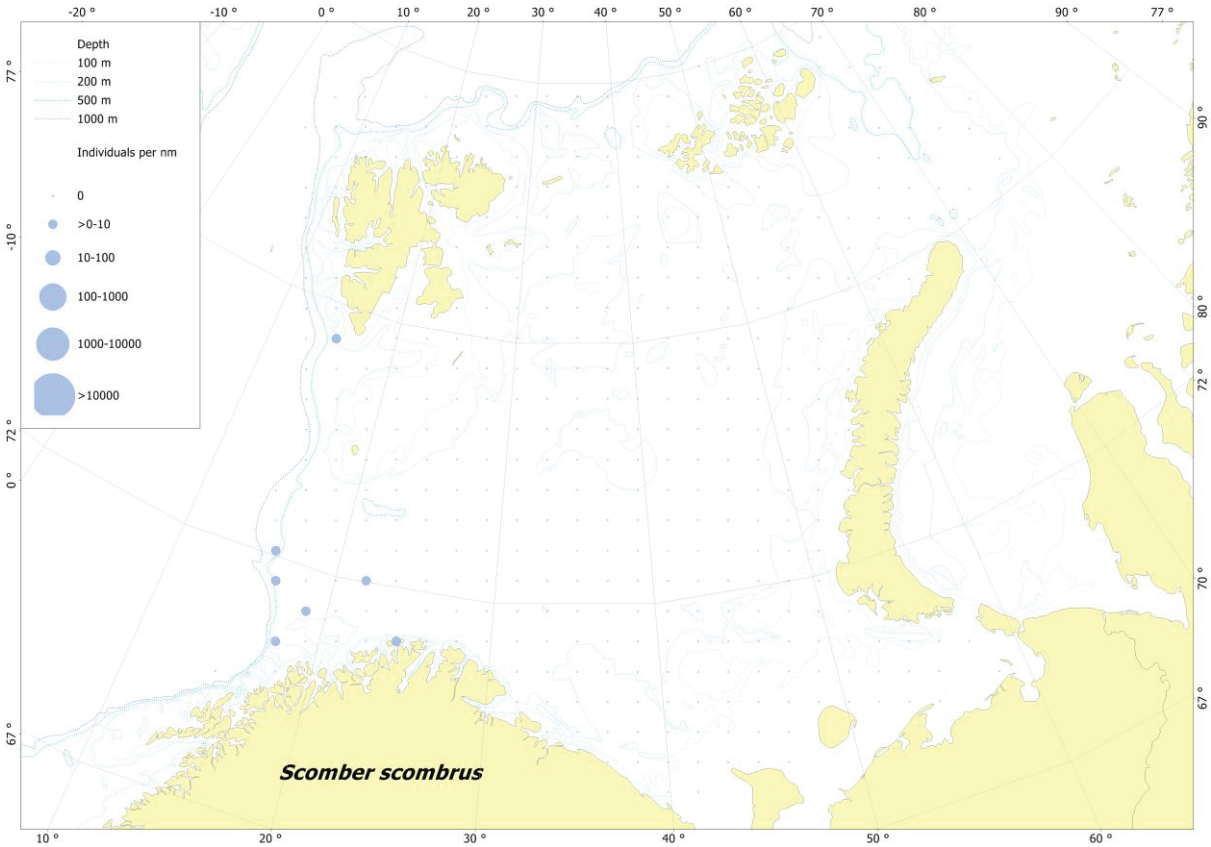
Family: Scombridae
English name: Atlantic mackerel
Norwegian name: makrell
Russian name: атлантическая скумбрия
(atlantitcheskaya skumbria)

Photo: Andrey Dolgov

Spatial distribution

Known in the eastern North Atlantic from Morocco to Iceland, Norway, and the Murman coast, also in the Mediterranean, Baltic Sea, and in the western North Atlantic. In warmer years occasionally eastward to Novaya Zemlya and in the White Sea. Distribution areas have expanded in the past years.

In the surveyed area caught by pelagic trawl in warmer waters between the Norwegian coast and the Svalbard/Spitsbergen archipelago.



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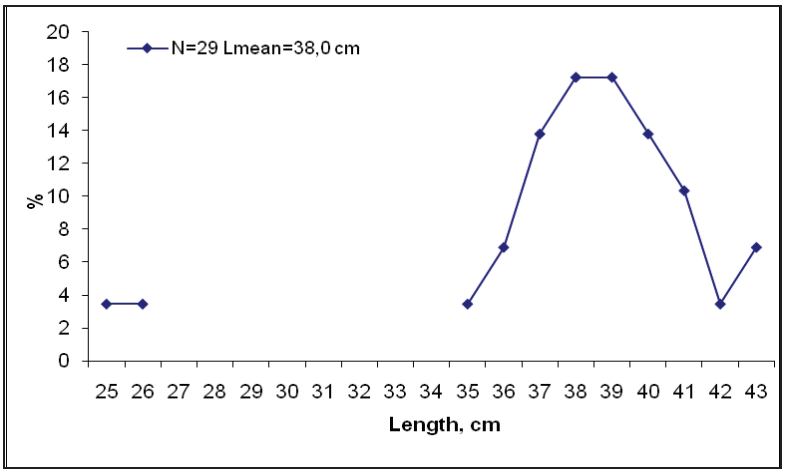


Life history

Southern boreal, neritopelagic down to 250 m, schooling. Can reach up to 65 cm (rarely more than 40 cm), 3.5 kg (rarely more than 0.7 kg), and 25 years. Measures 21 cm after one year, 28 cm after two, matures with 4 years (30 cm). Feeds on zooplankton (especially crustaceans), young and small fishes and is preyed upon by large fish species. Overwinters close the bottom and restricts foraging. Spawns in batches near the surface up to 1 000 000 pelagic eggs (1.0-1.4 mm in diameter), 3.5-4.2 mm long larvae hatch after 5-7 days. Spawning period depends on area, in the North Sea from May to July. After spawning the stocks migrate northward into the Norwegian Sea, then to the North Sea and in winter back to the respective spawning areas. Migration patterns have changed in the past years. Three different spawning areas (North Sea, west and south of Ireland, off Portugal/Spain), but the spawning stocks immingle during their migrations and are therefore managed as a single stock.

Population and exploitation

The spawning stock has increased from 1 700 000 tonnes in 2002 to 2 500 000 tonnes in 2008 and is assumed to have full reproductive capacity (2009). Nevertheless, there might be a risk that catch rates are above sustainability and that bymortality is higher than assumed. No commercial fishery in the Barents Sea.

References

Collette BB. 1986. Scombridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 981-997

Marti YY. 1952. Scombridae. In: Commercial fish of the Barents and White Sea. Leningrad, pp 181-183

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Nøttestad L. 2010. Holy mackerel – hva skjer med makrellens vandringsmønster? In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:45-48 (in Norwegian)

Nøttestad L. 2010. Makrell – Nordøstatlantisk makrell. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:130 (in Norwegian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Shamray EA, Sentyabov EV, Seliverstova EI, Kalashnikov YN. 2010. Russian mackerel fishery in the Norwegian Sea: history, present and perspectives. In: Problem of fisheries 11:681-693

Schedophilus medusophagus (Cocco 1839)

Family: Centrolophidae
English name: Cornish blackfish
Norwegian name: engelsk svartfisk
Russian name: исландский шедоф
(islandskiy shedof)

Photo: Rupert Wienerroither

Spatial distribution

Known in temperate waters of the northern Atlantic, including the western Mediterranean.

Caught by pelagic trawl in warm water masses of the surveyed area.

Length composition

Three specimens (42-54 cm, mean length 47.3 cm) were caught by pelagic trawl.

Life history

Widely distributed, oceanic, mesopelagic, can reach a length of up to 58 cm. Feeds on medusae and small crustaceans. Reproduction in its southern area of distribution, young up to 20 cm commonly associated with medusae in surface layers.

Population and exploitation

Of no economic importance.

References

Haedrich RL. 1986. Centrolophidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1177-1182

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Lepidorhombus whiffiagonis (Walbaum 1792)

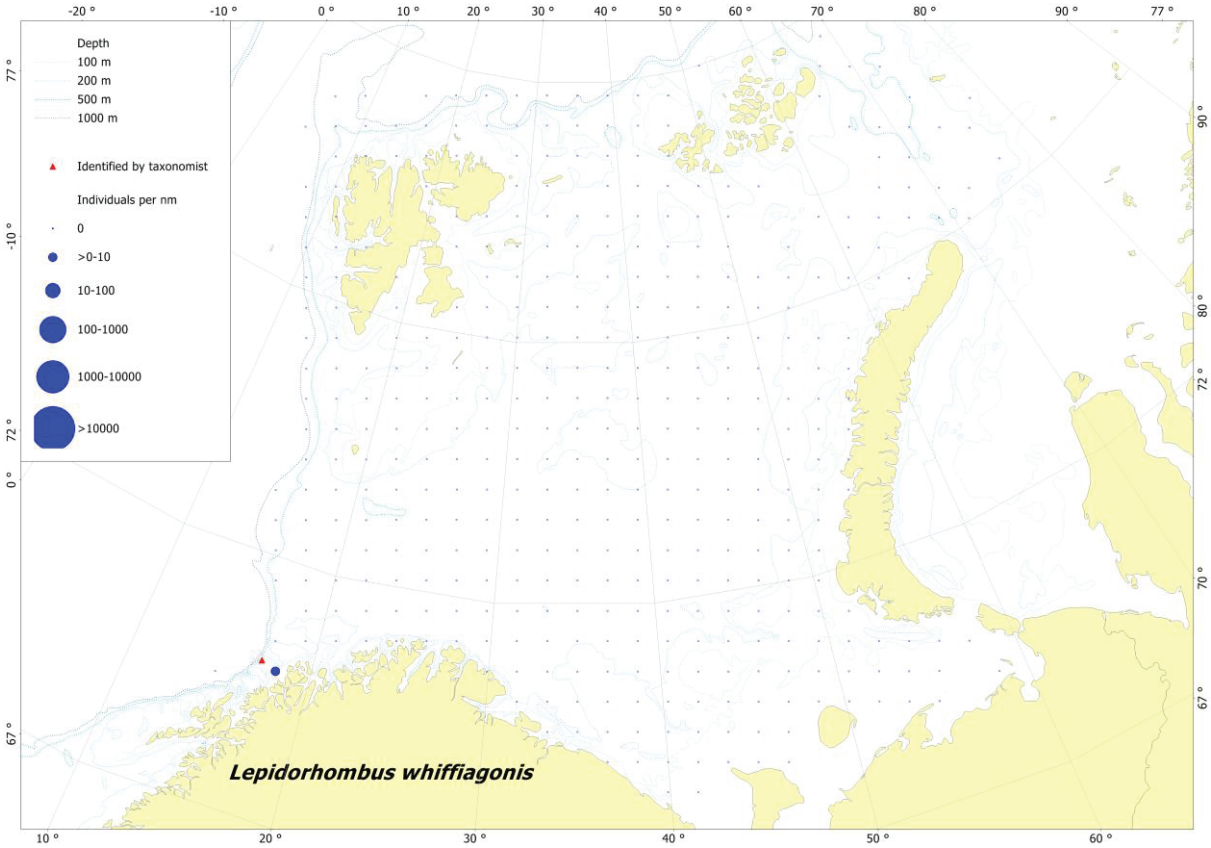
Family: Scophthalmidae
English name: megrim
Norwegian name: glassvar
Russian name: мегрим
(megrim)

Photo: Andrey Dolgov

Spatial distribution

Known from the Atlantic coasts off northern Africa to Norway, including the Mediterranean, the British Isles and Iceland.

Found in the southwestern part of the surveyed area.



Length composition

Two specimens (24 and 26 cm) were caught.

Life history

Demersal, on mixed bottom at 50-300 m. Can reach of 61 cm, commonly 35-45 cm. Feeds on small bottom living fishes as well as on squids and crustaceans. In the North Sea spawning takes placed from March-May. Eggs and larvae are pelagic, settling at a length of around 20 mm.

Population and exploitation

Of no economic importance in the Barents Sea.

References

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo
Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Phrynorhombus norvegicus (Günther 1862)

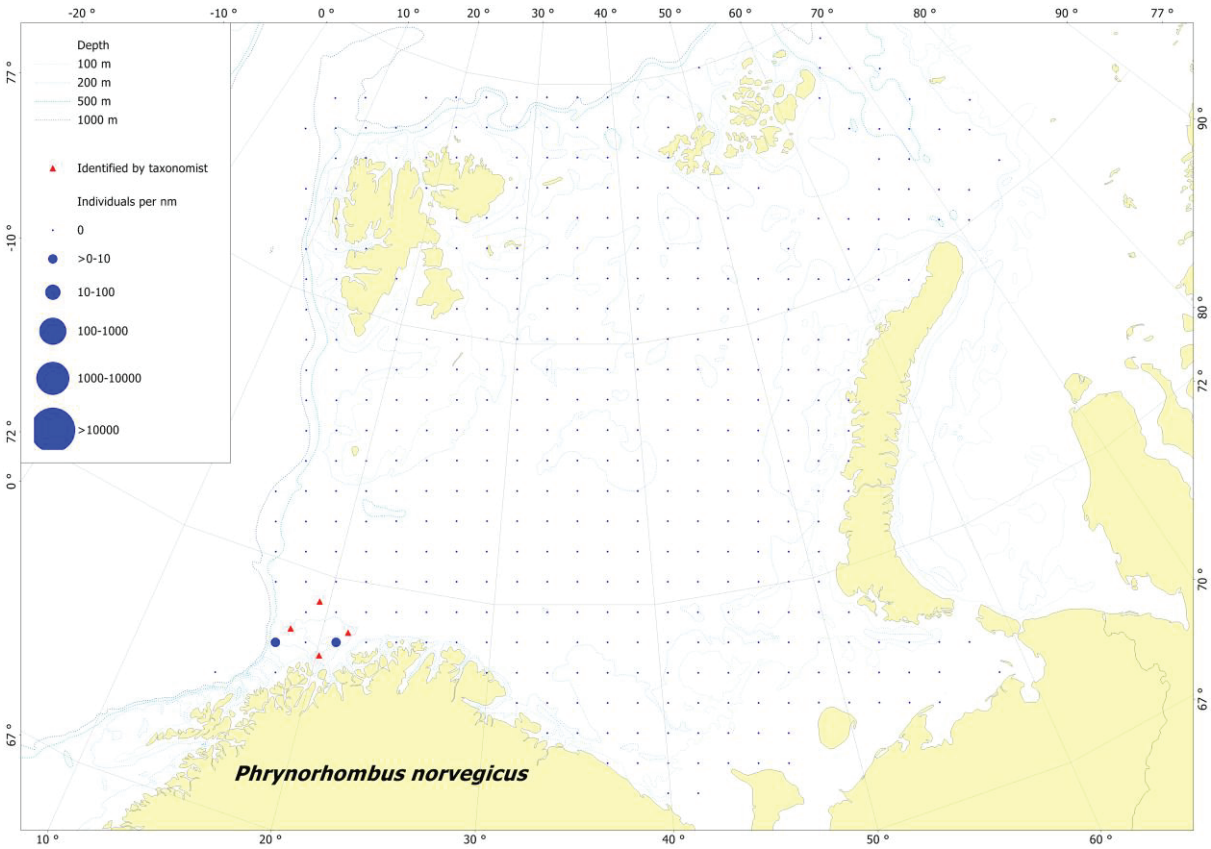
Family: Scophthalmidae
English name: Norwegian topknot
Norwegian name: småvar
Russian name: норвежская карликовая камбала
(norvezhskaya karlikovaya kambala)

Photo: Gunnar Langhelle

Spatial distribution

Known from the British Isles northward to the Murman coast, also off Iceland.

Found in the southwestern part of the surveyed area.



Length composition

Two specimens (7 and 8 cm length) were caught.

Life history

Boreal, demersal, preferring hard and rocky bottom at 10-200 m depth and higher temperatures. Can reach 12.5 cm, females mature at length 8.5 cm and grow larger than males. Feeds on small benthic crustaceans, polychaetes and fish fry. Spawns in April-August, eggs (0.7-0.9 mm in diameter) and larvae are pelagic. 2.5-2.9 mm long larvae hatch after 6 days, settling at a length of 13 mm.

Population and exploitation

Of no economic importance.

References

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo
Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Glyptocephalus cynoglossus (Linnaeus 1758)

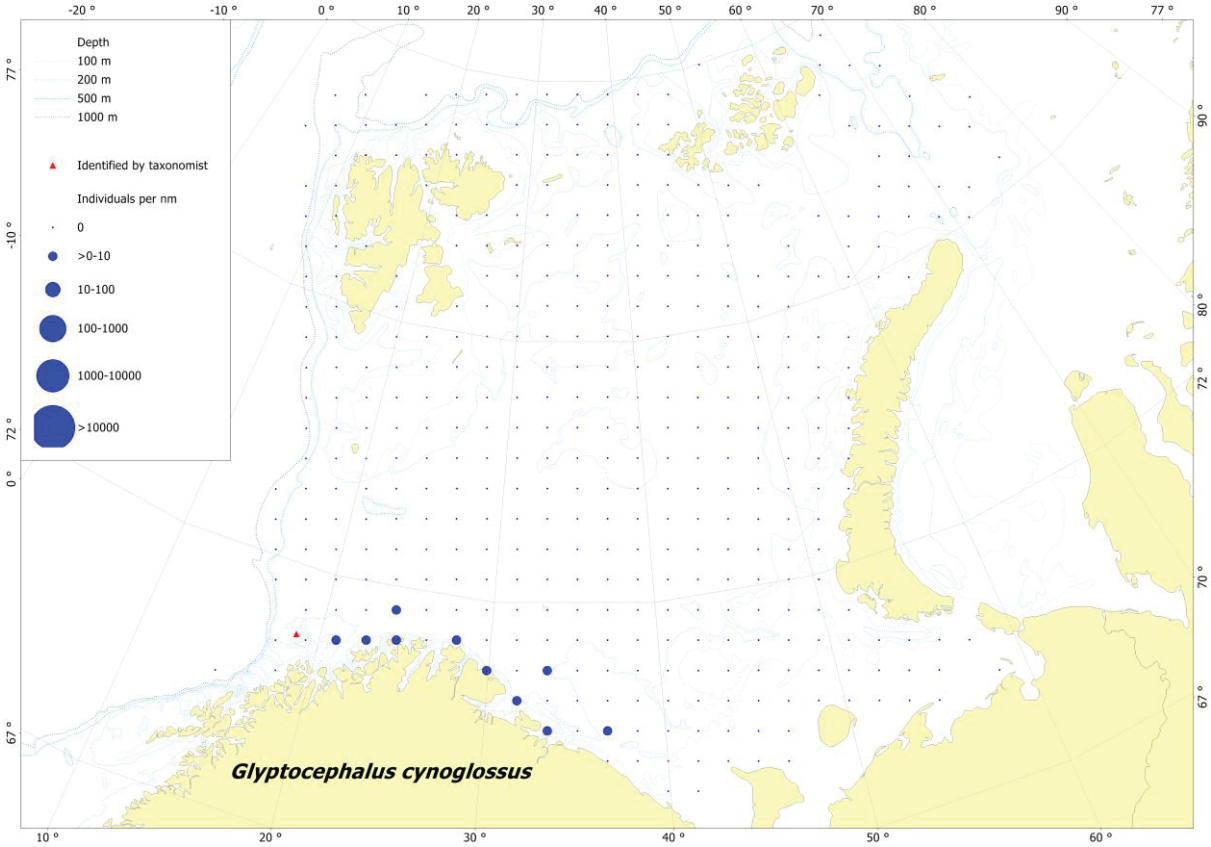
Family: Pleuronectidae
English name: witch flounder
Norwegian name: smørflyndre
Russian name: красная (длинная) камбала
(krasnaya (dlinnaya) kambala)

Photo: Andrey Dolgov

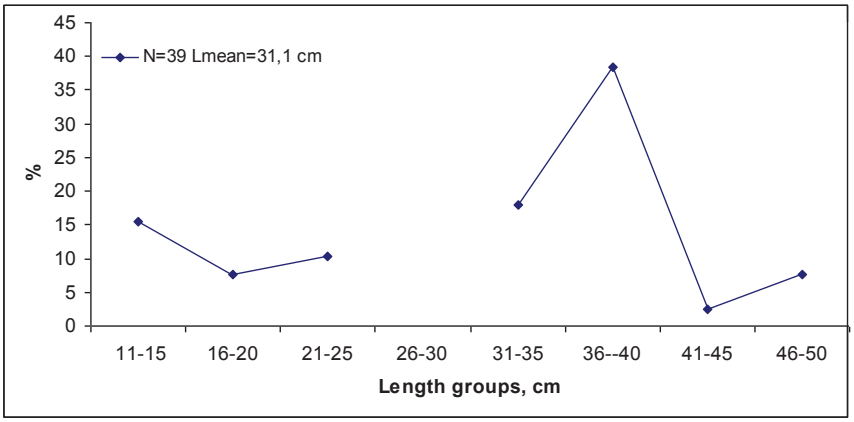
Spatial distribution

Known from the Gulf of Biscay northward to Iceland and the Barents Sea, also in the western North Atlantic, common in deep fjords.

Found in the southern part of the surveyed area.



Length composition



Life history

Mainly boreal, demersal, preferring soft bottom at depths of 40-1500 m, and high temperatures (4-7 ºC). In contrast to other flatfish species, smaller individuals are often found deeper than larger ones. Reaches 62 cm (commonly less than 50 cm), 2.5 kg, and 18 years. Growth rates vary between areas, in the North Sea 29 cm long fishes are 5 years old. Matures at age 4-5 years (25-35 cm). Feeds on bottom invertebrates (polychaetes, crustaceans, mollusks) and fishes. Spawns in March-September at 50-150 m depth. Eggs and larvae pelagic, 4 mm long larvae hatch after 7-8 days and settle at around 40 mm length.

Population and exploitation

Of no economic importance in the Barents Sea, bycatch in bottom trawls.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Kovtsova MV. 1990. Flatfishes of the Barents Sea and adjacent waters. In: Biological resources of shelf and border seas. Moscow, Nauka Publishing. pp 250-268 (in Russian)

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Hippoglossoides platessoides (Fabricius 1780)

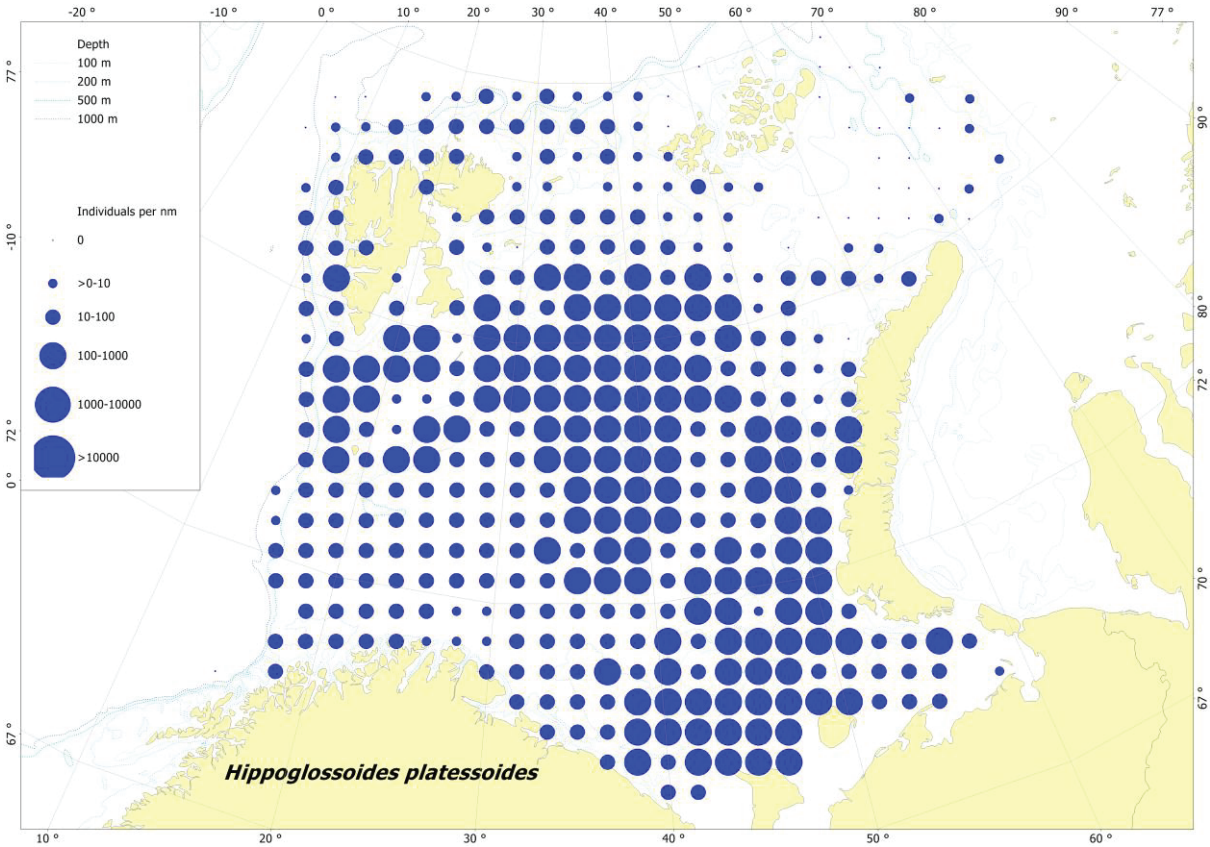
Family: Pleuronectidae
English name: long rough dab
Norwegian name: gapeflyndre
Russian name: камбала-ерш
(kambala-yorsh)

Photo: Andrey Dolgov

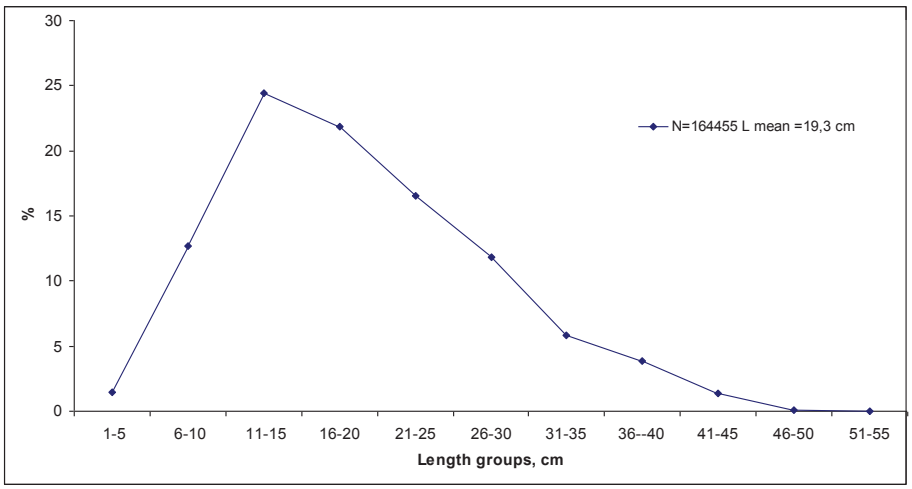
Spatial distribution

Known in the North Atlantic, with two recognized subspecies: Long rough dab, *Hippoglossoides platessoides limandoides* (Bloch 1787) in the northeastern Atlantic (from off Iceland, the British Isles to the Barents Sea) and American plaice, *Hippoglossoides platessoides platessoides* (Fabricius 1780) in the northwestern Atlantic (off western Greenland and Labrador to Rhode Island).

Found throughout the surveyed area, with highest abundance in the central and southeastern parts.



Length composition



Life history

Mainly boreal, demersal, on soft and sandy bottom at 100-300 m, tolerates wide range of temperature (-1 to +8 ºC). Can reach 54 cm, 1.5 kg, and 20 years. Growth rates low (1-3 cm per year), females grow faster, larger and older than males. Matures at age 4 (males) and 5-6 (females) years. Feeds on benthic fish (e.g. capelin, polar cod, small cod) and demersal invertebrates (shrimp, echinoderms, polychaetes, mollusks). Spawns in warm Atlantic currents in a wide area in the western Barents Sea from March to July at 125-250 m. Depending on size females spawn 33 000-370 000 pelagic eggs (2.6-3.3 mm in diameter), 4-5 mm long larvae hatch after 11-14 days. Juveniles are only found in the open sea, transported by the Spitsbergen Current northward to the Svalbard/Spitsbergen archipelago and then eastward to Franz Joseph Land, where they settle, having reached a length of about 3 cm. Migration behavior is hardly known but migration activity is believed to be low.

Population and exploitation

Very abundant and widely distributed in the Barents Sea. Based on Russian data total stock biomass varied from 70 000 to 200 000 tonnes and increased over the past years. Frequent bycatch in the trawl fishery, but rates are low. In Russia catches up to 5 000 tonnes per year.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Dolgova NV, Albert OT. 2011. Long rough dab. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Kovtsova MV. 1990. Flatfishes of the Barents Sea and adjacent waters. In: Biological resources of shelf and border seas. Moscow, Nauka Publishing. pp 250-268 (in Russian)

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Simacheva IA, Berestovsky EG, Mukhina NV. 1986. Long rough dab. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity, pp 43-45 (in Russian)

Hippoglossus hippoglossus (Linnaeus 1758)

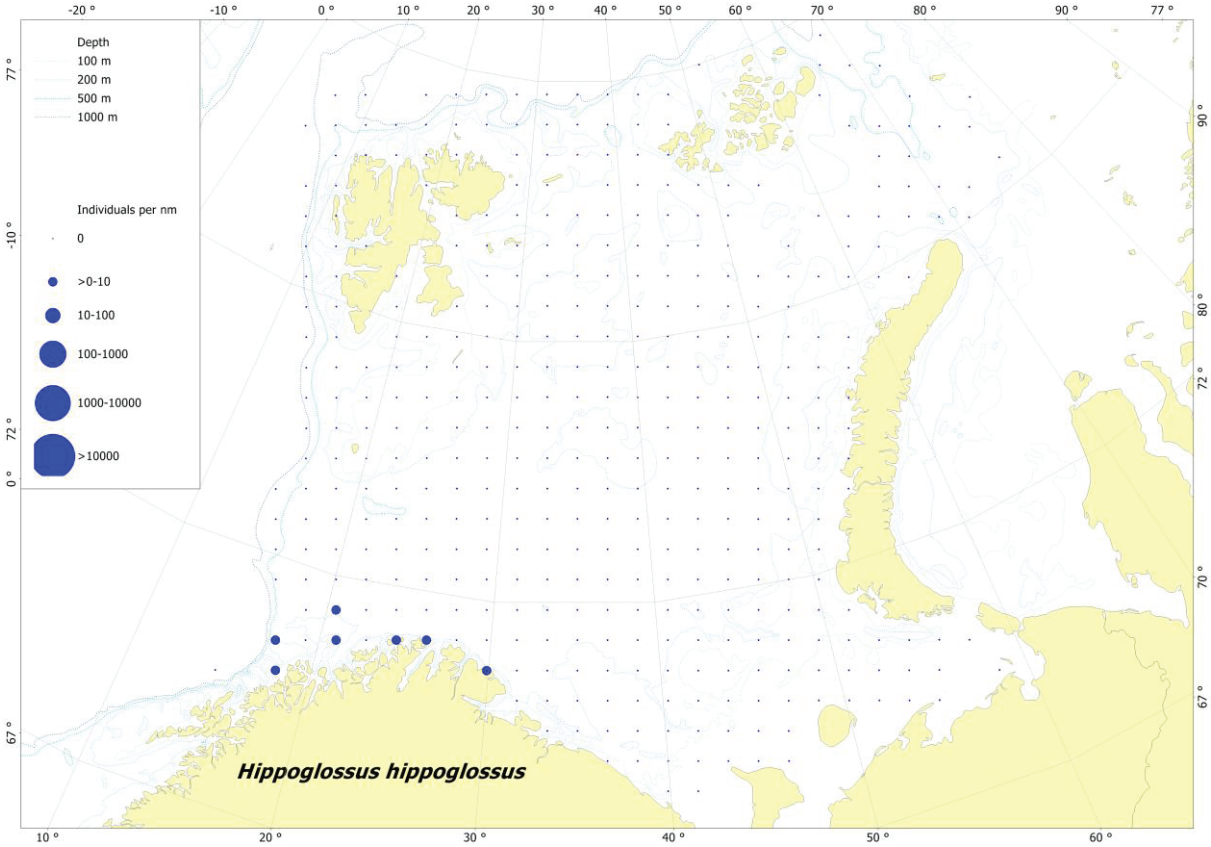
Family: Pleuronectidae
English name: Atlantic halibut
Norwegian name: kveite
Russian name: белокорый палтус
(belokoriy paltus)

Photo: Andrey Dolgov

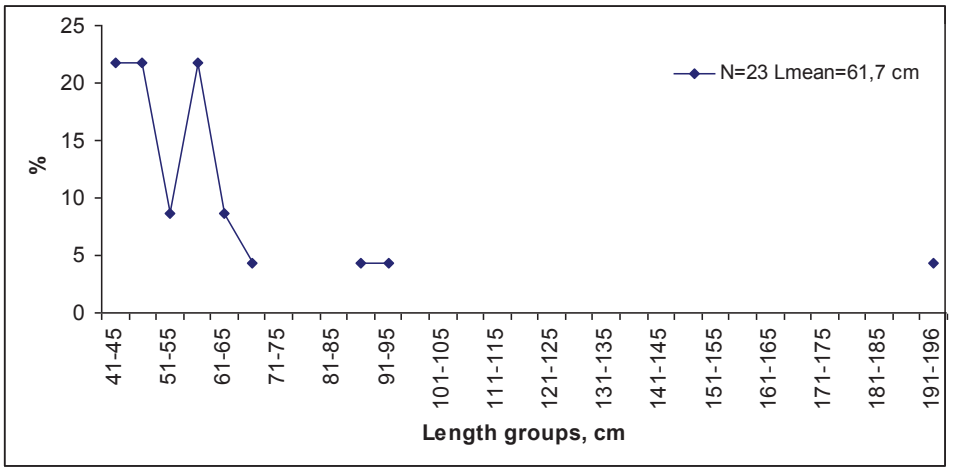
Spatial distribution

Known from the Gulf of Biscay northward to Svalbard/Spitsbergen and Novaya Zemlya, also off Iceland and in the western North Atlantic.

Found in the southwestern part of the surveyed area.



Length composition



Life history

Mainly boreal, demersal to benthopelagic, juveniles close to the coast in relatively shallow waters, adults in the open sea at depth of 300-2000 m and temperatures between 0-10 ºC. Females can reach more than 3.5 m and up to 350 kg, males up to 1.8 m and 50 kg. Females grow faster and considerably older than males, reaching an age of 60 years. Males mature earliest at age 7 years (about 70 cm), females earliest at age 8 years (about 125 cm), but the majority matures not before the age of 12-13 years. Juveniles feed on large crustaceans (crabs, shrimp) and fish, adults on benthic and pelagic fish. Spawning takes place between December and March along the coast in deep pits and in the fjords at 300-700 m depth, as far north as Hammerfest. Females spawn at or near the bottom up to 7 million eggs, 6.5-7 mm long larvae hatch after about 18 days. Eggs, larvae and juveniles are pelagic until a length of 4.5-7 cm. No or only little foraging during spawning. Mainly stationary, some individuals might migrate southward.

Population and exploitation

Population structure is unknown; due to the high age at maturity the stock is vulnerable. Size of the stock in the North Atlantic is low. There are no quota regulations, but fishery is forbidden in spawning season between 20th December and 31st March, and the minimum size was increased to 80 cm in 2010. The species is mainly taken as bycatch in fisheries for other species; its commercial catch has increased since 1997.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Kovtsova MV. 1990. Flatfishes of the Barents Sea and adjacent waters. In: Biological resources of shelf and border seas. Moscow, Nauka Publishing. pp 250-268 (in Russian)

Michalsen K. 2010. Kveite - Atlantisk kveite. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:122 (in Norwegian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Limanda limanda (Linnaeus 1758)

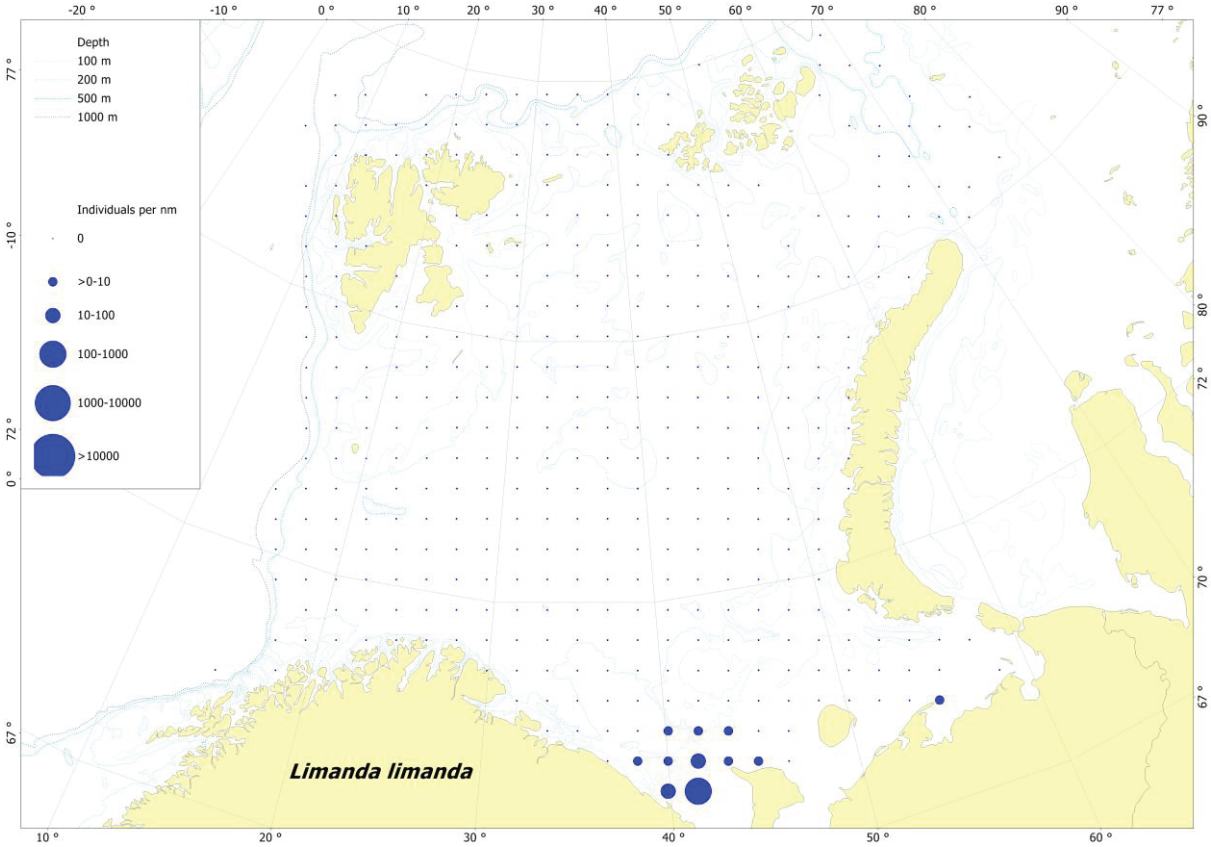
Family: Pleuronectidae
English name: common dab
Norwegian name: sandflyndre
Russian name: лиманда, ершоватка
(limanda), (ershovatka)

Photo: Andrey Dolgov

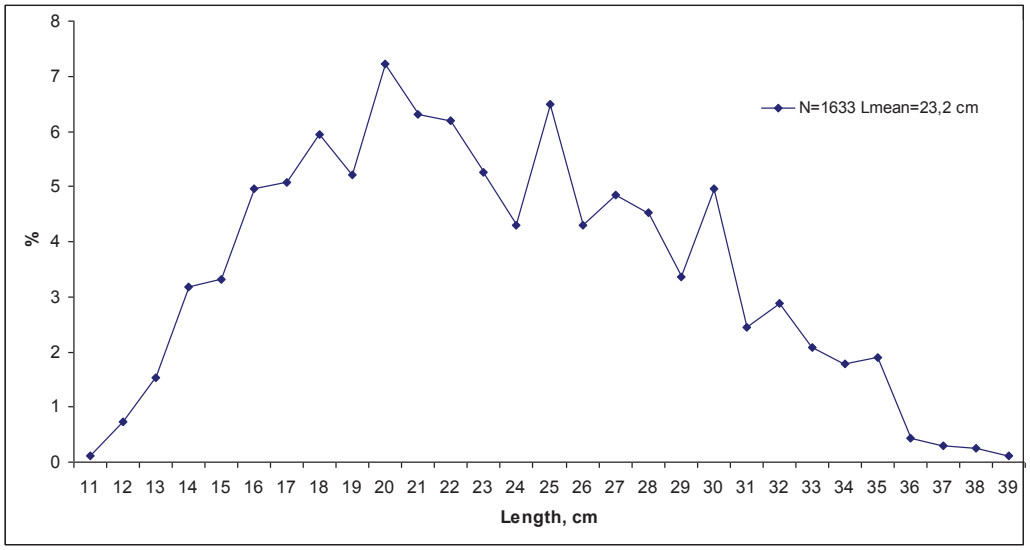
Spatial distribution

Known from the Gulf of Biscay to the White Sea, also off Iceland.

Found in the southeastern shallow part of the surveyed area. Commonly caught in shallow areas along the Norwegian coast of the Barents Sea, not covered by the ecosystem surveys.



Length composition



Life history

Mainly boreal, demersal, coastal, preferring sandy and soft bottoms at 2-150 m, adults found deeper than young. Can reach 42 cm (commonly less 30 cm), 1.3 kg, and 13 years. Females grow larger than males, growth rates are variable, in the southern Barents Sea 8 year old specimens measure 27 cm. Specimens in northern Norway mature at age 4 (males) and 5 years (females), in Russian waters at age 5-6 years (22-24 cm). Feeds primarily on benthic invertebrates (polychaetes, ophiuroids, mollusks), and in the Barents Sea on capelin and sandeels. Spawning takes place along the Murman coast in May-August at 20-40 m depth. Females spawn up to 150 000 pelagic eggs (0.7-1.0 mm in diameter), 2.5 mm long larvae hatch after 3-12 days and settle at a length of 13-16 mm, migrating to deeper waters with increasing length.

Population and exploitation

Of minor economic importance, common bycatch in bottom trawl fishery for plaice.

References

Kovtsova MV. 1990. Flatfishes of the Barents Sea and adjacent waters. In: Biological resources of shelf and border seas. Moscow, Nauka Publishing. pp 250-268 (in Russian)

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Liopsetta glacialis (Pallas 1776)

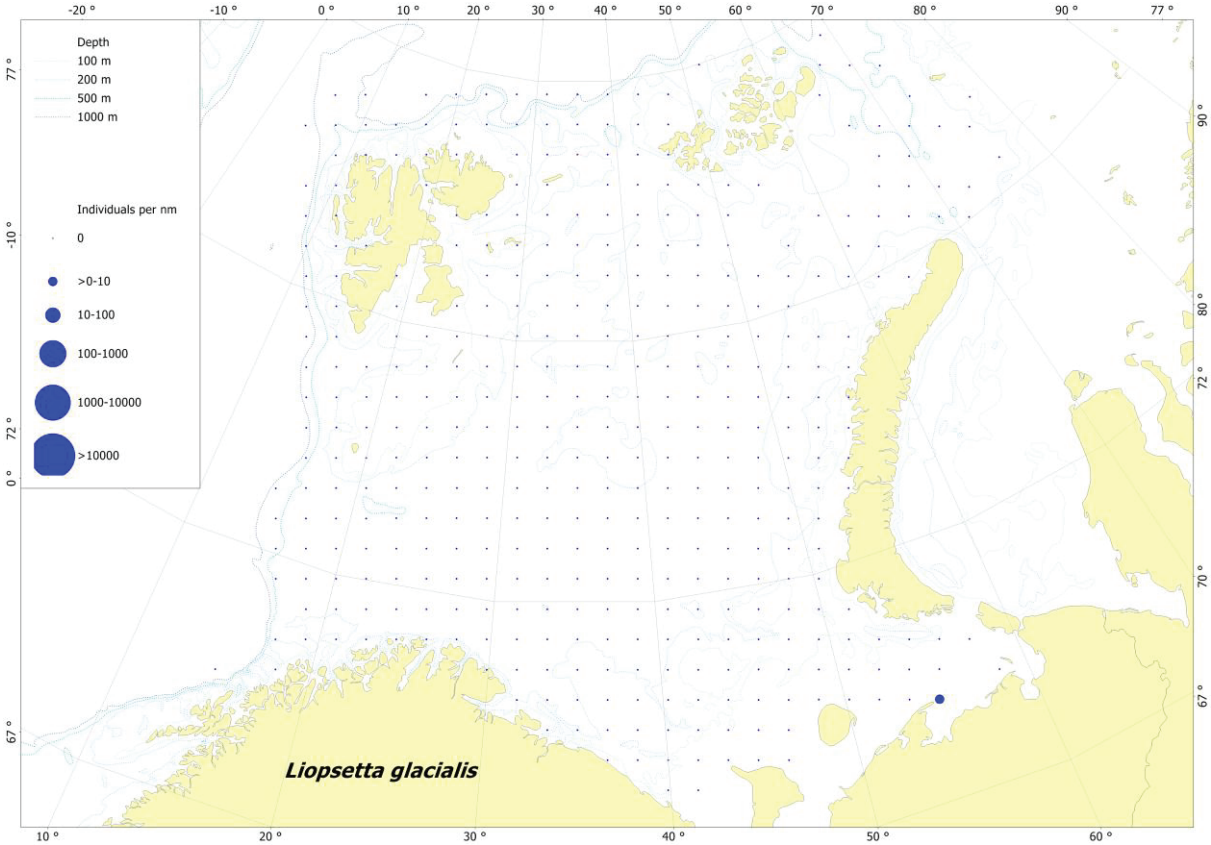
Family: Pleuronectidae
English name: Arctic flounder
Norwegian name: arktisk flyndre
Russian name: полярная камбала
(polyarnaya kambala)

Photo: PINRO

Spatial distribution

Known from the southeastern Barents Sea, the White Sea and eastwards, generally found in all arctic waters except Greenland.

Found in the southeastern part of the surveyed area.



Length composition

Three specimens (17-18 cm) were caught.

Life history

Mainly arctic, demersal, in coastal areas on muddy bottom and at shallow depths, tolerates brackish and freshwater, prefers temperatures below 0 ºC. Can reach up to 35 cm and 12 years, matures at age 4-5 years. Feeds on bottom invertebrates (mollusks, polychaetes, crustaceans). Spawns in January-March under the ice 52 000-200 000 eggs (1.0-1.5 mm in diameter). Performs daily migration related to tide cycle.

Population and exploitation

Of no economic importance.

References

Nielsen JG. 1986. Pleuronectidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1299-1307

Microstomus kitt (Walbaum 1792)

Family: Pleuronectidae
English name: lemon sole
Norwegian name: lomre
Russian name: малоротая камбала
(malorotaya kambala)

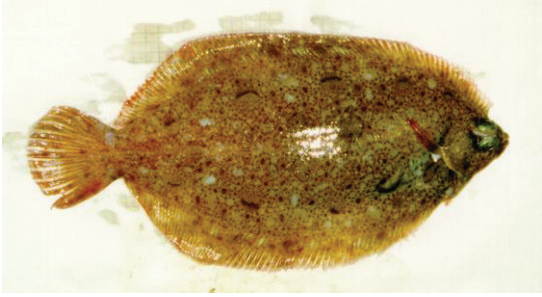
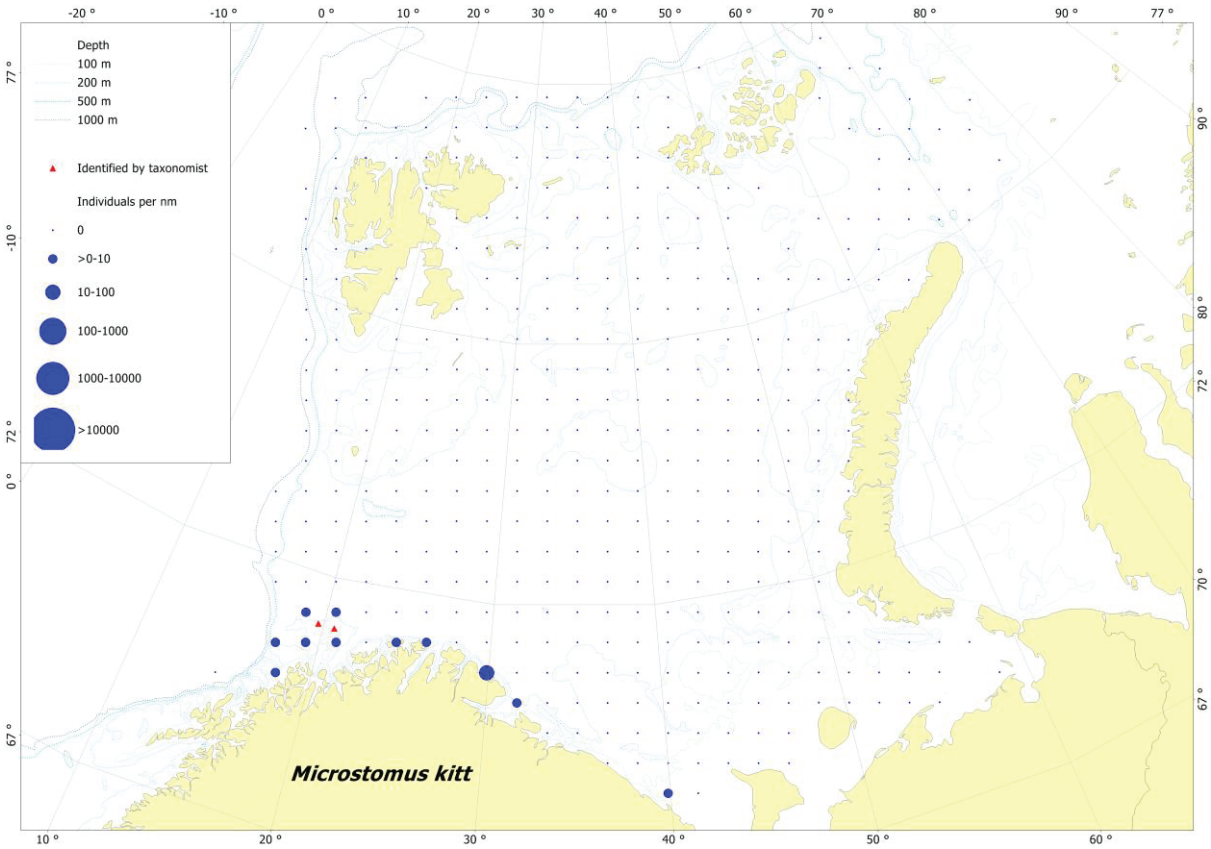


Photo: Andrey Dolgov

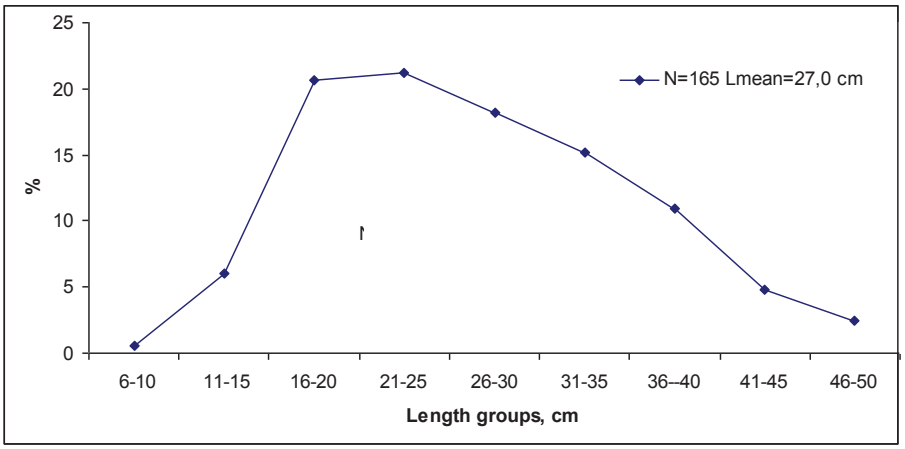
Spatial distribution

Known from the Gulf of Biscay to the White Sea, also off Iceland.

Found in the southwestern part of the surveyed area.



Length composition



Life history

Boreal, demersal, prefers sandy and rocky bottoms at 10-260 m, higher temperatures (4-10 °C) and salinities above 34 ‰. Can reach 60 cm (commonly less than 40 cm), 2 kg, and 10 years. Females grow larger than males. Matures at length 20-30 cm, males at age 3-4 and females at 4-6 years. Feeds mainly on polychaetes and other invertebrates (crustaceans, mollusks, ophiuroids). Spawns at 40-100 m depth from April-September, earliest in southern areas. Eggs are pelagic, 4-5 mm long larvae hatch after 6-8 days and live pelagically at 50-100 m until they settle at a length of 15-25 mm.

Population and exploitation

Of no economic importance in the Barents Sea.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Pleuronectes platessa Linnaeus 1758

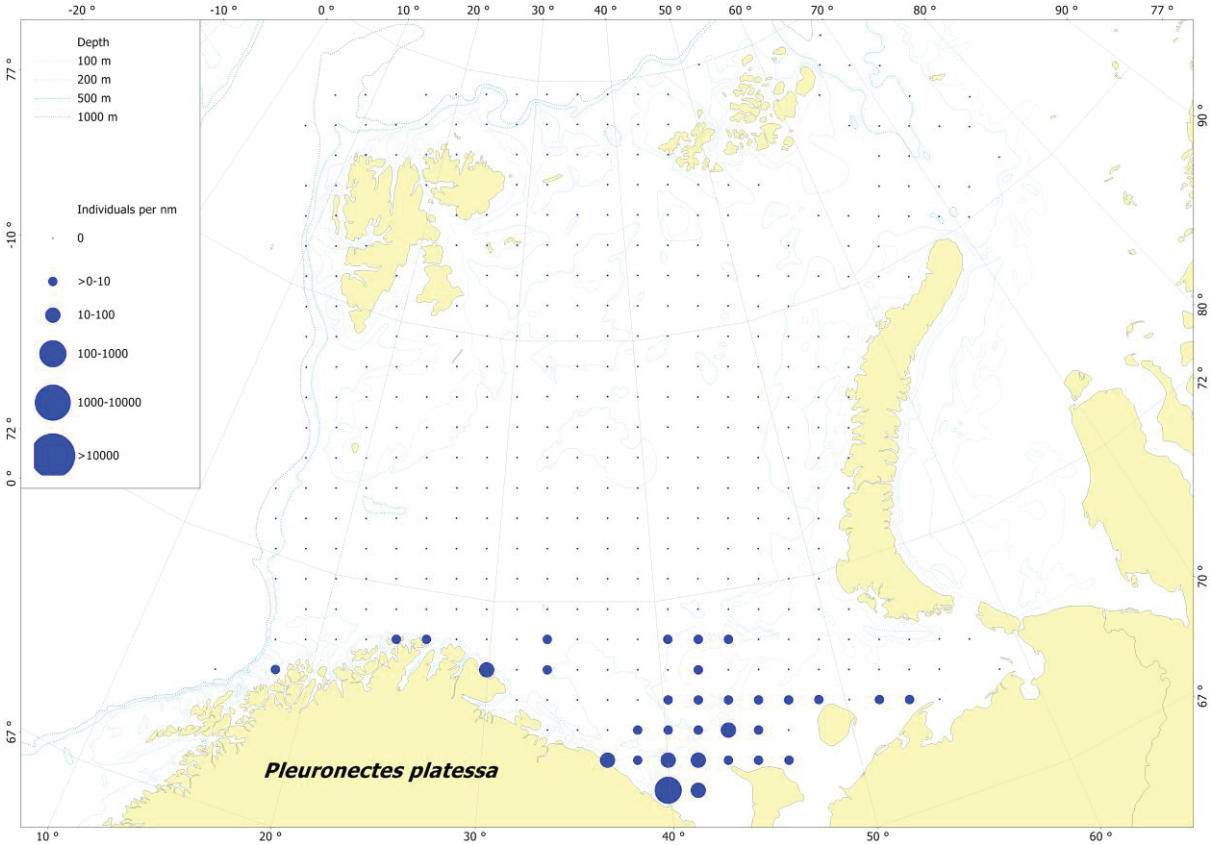
Family: Pleuronectidae
English name: European plaice
Norwegian name: rødspette
Russian name: морская камбала
(morskaya kambala)

Photo: Andrey Dolgov

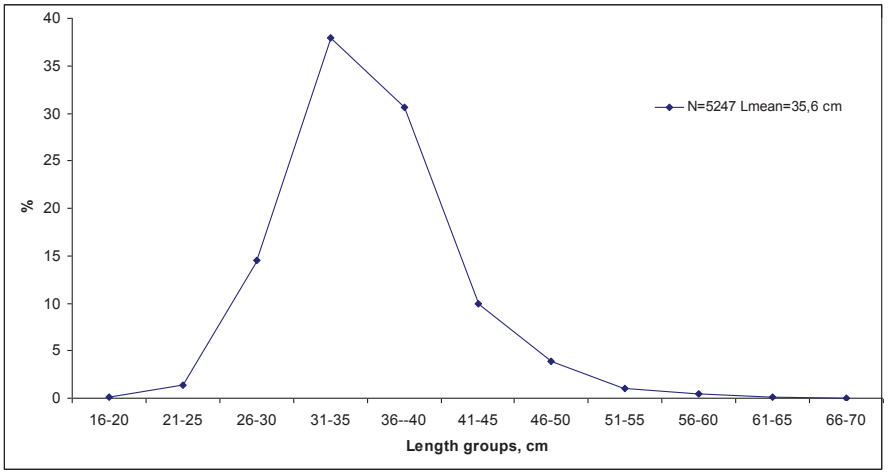
Spatial distribution

Known from the Mediterranean, the northwestern African coast and northward to the White Sea, most abundant in the North Sea.

Found in the southern part of the surveyed area. Highest catches rates just north of the inlet to the White Sea.



Length composition



Life history

Mainly boreal, demersal, prefers soft bottom at 0-250 m, juveniles at 0-10 m, and temperatures between 1-3 ºC. Can reach at least 86 cm, 7 kg, and 36 years, but commonly less than 0.5 m, 2-3 kg and 15 years. Females grow larger and older than males. Matures at age 6-9 (males) and 9-11 (females) years. Growth rates vary considerably, depending on food availability, being highest during the first 6 years. Feeds on bivalves and polychaetes. In the Barents Sea spawning takes place in the southern coastal areas from January to July (peak in March-May). Depending on size, females spawn up to 600 000 eggs at the bottom in several batches. Pelagic eggs and larvae, hatching after about 20 days (depending on temperature), settling at a length of about 12-14 mm. Juveniles less than 20-22 cm dwell in shallow coastal waters. Feeding areas are further north, migrates at least partly pelagically.

Population and exploitation

There are several stocks, the one in the North Sea being the largest and in good condition. Based on Russian data, the biomass in the Barents Sea varied between 60 000 and 70 000 tonnes during past decade.

The Barents Sea stock is exploited by different fisheries. In Russia caught by direct bottom trawl fisheries and as bycatch in bottom trawl fishery for cod and haddock, 1 000-4 000 tonnes annual Russian catch.

References

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Jakobsen T. 2010. Rødspette. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:137 (in Norwegian)

Kovtsova MV. 1986. Plaice. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity, pp 40-42 (in Russian)

Kovtsova MV. 1990. Flatfishes of the Barents Sea and adjacent waters. In: Biological resources of shelf and border seas. Moscow, Nauka Publishing. pp 250-268 (in Russian)

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Reinhardtius hippoglossoides (Walbaum 1792)

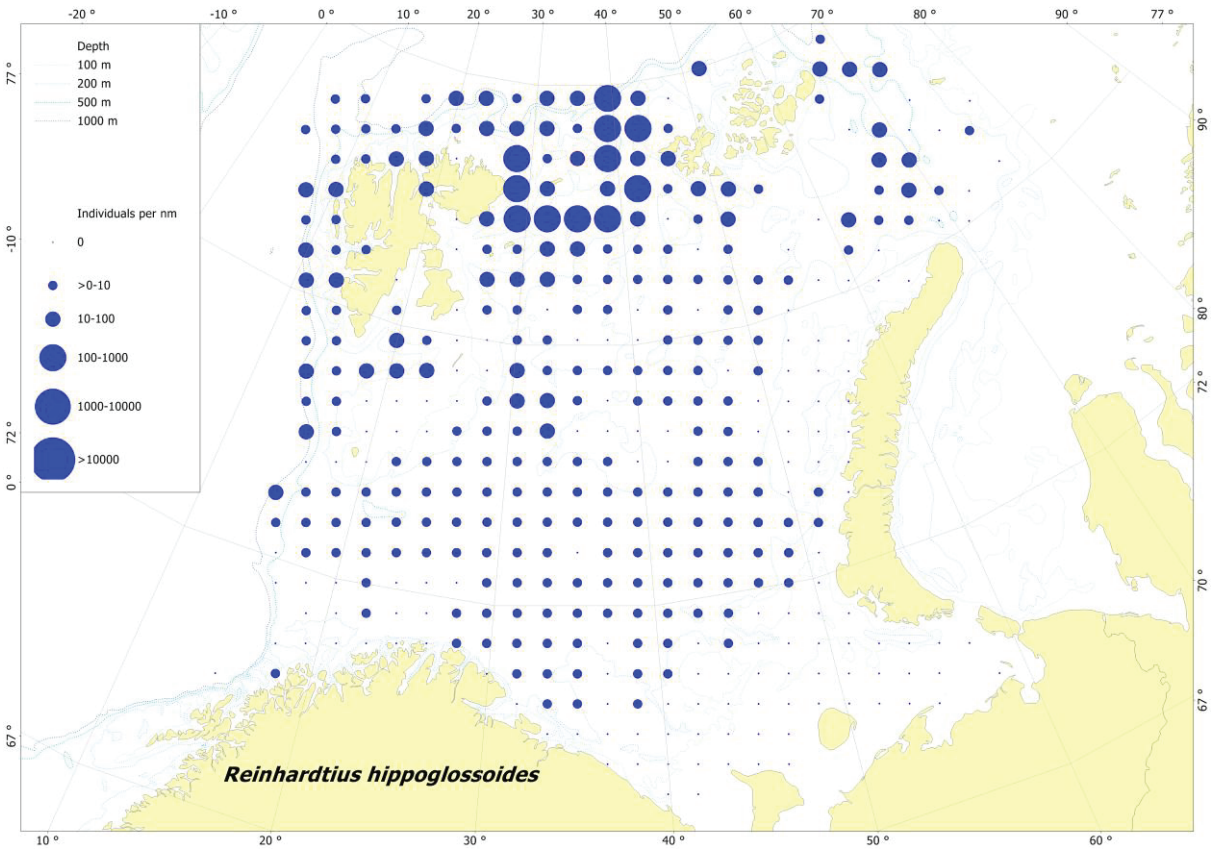
Family: Pleuronectidae
English name: Greenland halibut
Norwegian name: blåkveite
Russian name: черный (синекорый) палтус
(tcherniy (sinekoriy) paltus)

Photo: Thomas de Lange Wenneck

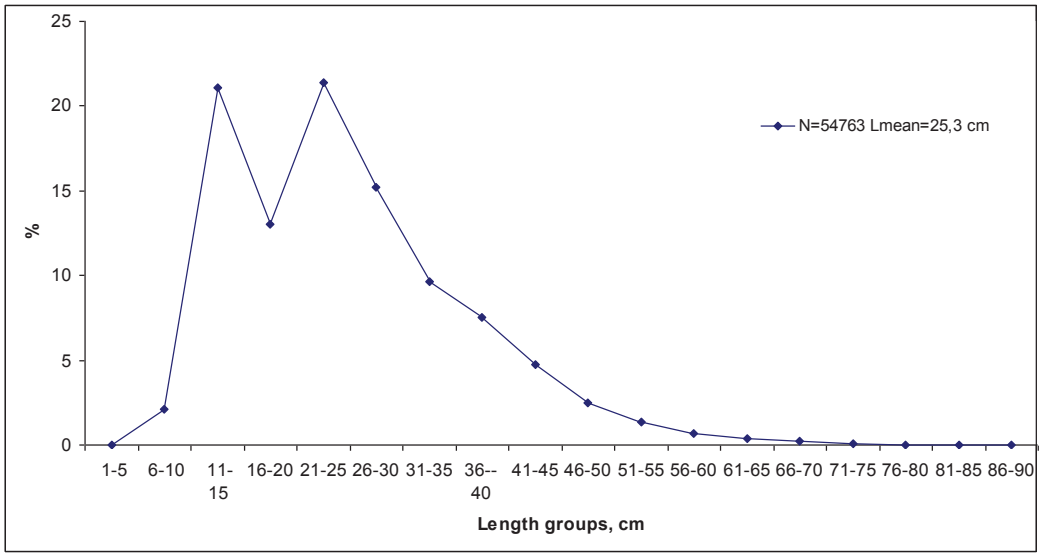
Spatial distribution

Known from Greenland, Iceland, the British Isles and northward to the Barents and Kara Seas including Svalbard/Spitsbergen and Novaya Zemlya, also in the western North Atlantic and the North Pacific.

Found in all intermediate and deeper parts of the surveyed area.



Length composition



Life history

Mainly boreal, demersal to benthopelagic, adults most abundant in the area between Norway and Bear Island at depths of 500-800 m, hardly found in waters warmer than 4 ºC. Can reach 1.2 m, 44 kg, and more than 30 years, but age determination is difficult and uncertain. Females grow slightly faster and older than males. Females mature at age 7 (about 55 cm), males at 5 years (about 40 cm). Feeds on fish, crustaceans and cephalopods. Compared to other flatfishes fecundity is rather low (6 400-94 400 eggs). Eggs and larvae are pelagic. Spawns in the area between Norway and Bear Island with a peak in December-January. Juveniles are found in the northern and eastern parts of the Barents Sea, migrating southward with age. Despite of being a flatfish, Greenland halibut is an excellent and fast swimmer and frequently found in the pelagic.

Population and exploitation

The Northeast Arctic Greenland halibut (i.e. the Barents and Norwegian Sea) is managed as one stock unit. The biomass varied from 45 000 to 312 000 tonnes during 1964-2009 (mean biomass 126 000 tonnes). The spawning stock has been slowly recovering from a historic low in the early 1990s. Abundance of juveniles in the nursery area (north and east of the Svalbard/Spitsbergen archipelago) is increasing since 2000. Norwegian and Russian authorities agreed in 2009 to regulate the fishery for the species, deciding on a total catch quota of 15 000 tonnes per year in the years 2010-2012.

References

Albert OT, Høines Å, Smirnov OV. 2011. Greenland halibut. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Hallfredsson EH. 2010. Kveite – Blåkveite. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:123 (in Norwegian)

Kovtsova MV. 1986. Greenland halibut. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea, KFAN Press, Apatity. pp 46-48 (in Russian)

Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo

Nizovtsev GP. 1989. Recommendations on Rational Exploitation of Greenland Halibut Stocks in the Barents and Norwegian Seas. PINRO Press, Murmansk. 93 pp (in Russian)

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Smirnov OV. 2006. Greenland halibut of the Norwegian and Barents Sea population. Murmansk, PINRO Press, 113 pp (in Russian)

5 References

Aanes S. 2010. Hyse – Nordøstarktisk hyse. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:117 (in Norwegian)

Aglen A, Drevetnyak K, Sokolov K. 2004. Cod in the Barents Sea (North-East Arctic cod), a review of the biology and the history of fisheries and management. In: Bjordal Å, Gjøsæter H, Mehl S (eds) Management Strategies for Commercial Marine Species in Northern Ecosystems. Proceedings of the 10th Norwegian-Russian Symposium, Bergen, 27-29 August 2003, pp 27-39

Ajiad A, Oganin IA, Gjøsæter H. 2011. Polar cod. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Albert OT, Høines Å, Smirnov OV. 2011. Greenland halibut. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Anderson ME, Fedorov VV. 2004. Family Zoarcidae Swainson 1839 eelpouts. California Academy of Sciences Annotated Checklist of Fishes 34:1-58

Andriashev, AP. 1954. Fishes of the northern seas of the USSR. Academy of Science Press, Moscow-Leningrad. 566 pp (in Russian)

Andriashev AP. 1986. Agonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1265-1268

Andriashev AP. 1986. Zoarcidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1130-1150

Andriashev AP, Chernova NV. 1995. Annotated list of fishlike vertebrates and fish of the Arctic Seas and adjacent waters. Journal of Ichthyology 35:81-123

Anon. 1980. Preliminary report of the international 0-group fish survey in the Barents Sea and adjacent waters in August-September 1980. Annales biologiques, Conseil international pour l'exploration de la Mer 37:259-266

Anon. 2005. Extended survey report from the joint Norwegian/ Russian ecosystem Survey in the Barents Sea in August-October 2004 (vol. 2). IMR/PINRO Series, No. 1/2005. 83 pp

Anon. 2006. Survey report from the joint Norwegian/Russian ecosystem Survey in the Barents Sea August-October 2006 (vol.1). IMR/PINRO Joint Report Series, No. 2/2006. 97 pp

Aschan M, Karamushko OV, Byrkjedal I, Wienerroither R, Borkin IV, Christiansen JS. 2009. Records of the gadoid fish *Arctogadus glacialis* (Peters, 1874) in the European Arctic. Polar Biology 32:963-970

Banister K. 1986. Gasterosteidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 640-643

Barsukov VV, Shestova LM, Mukhina NV. 1986. Redfish of *Sebastes* genus. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 48-52 (in Russian)

Barsukov VV, Shevelev MS. 1986. Wolffishes. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 34-40 (in Russian)

Belikov S, Oganin I, Høines Å. 2011. Blue whiting. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Berestovskiy EG. 1990. Feeding in the skates, *Raja radiata* and *Raja fyllae*, in the Barents and Norwegian Seas. Journal of Ichthyology 29:88-96

Berestovskiy EG. 1994. Reproductive biology of skates from family Rajidae in high North seas. Voprosy ikhtyologii 34:212-218 (in Russian)

Berestovsky EG, Mukhina NV. 1986. Haddock. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity. pp 32-34 (in Russian)

Berg E. Torsk – Norsk kysttorsk nord for 62°N. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:153 (in Norwegian)

Berger TS, Nizovtsev GP. 1965. Record of great sandeel in the waters off Western Spitsbergen. Voprosy ikhthyologii 34:722-726 (in Russian)

Bjelland O. 2010. Breiflabb. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:111 (in Norwegian)

Bjelland O, Bergstad OA, Skjæraasen JE, Meland K. 2000. Trophic ecology of deep-water fishes associated with the continental slope of the eastern Norwegian Sea. Sarsia 85:101-117

Bjelland O, Holst JC. 2004. Other fish species and fish communities. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 357-370

Bogstad B. 2010. Torsk – Nordaustarktisk torsk. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:155 (in Norwegian)

Bogstad B, Byrkjedal I, Dolgov AV, Drevetnyak KV, Gjøsæter H, Johannesen E, McBride MM, Mehl S, Høines Å, Shevelev MS, Smirnov OV. 2008. Fishes species. In: Stiansen JE, Filin AA. (eds). Joint PINRO/IMR Report on the State of the Barents Sea Ecosystem in 2007, with Expected Situation and Considerations for Management. IMR-PINRO Joint Report Series 2008(1): 30-42, 182-187. Institute of Marine Research, Bergen, Norway

Boitsov VD, Lebed NI, Ponomarenko VP, Ponomarenko IY, Tereshchenko VV, Tretyak VL, Shevelev MS, Yaragina NA. 1996. The Barents Sea Cod: Biological and Fisheries Outline. PINRO Press, Murmansk. 285 pp (in Russian)

Borkin IV, Grigoryev GV. 1986. On capture of silvery lightfish near Novaya Zemlya. Voprosy ikhtyologii 26:857-859 (in Russian)

Borkin IV, Karasev AB, Oganin IA, Shatalov PA. 2010. Polar Cod of the Eastern Barents Sea. In: Development of national fisheries in the North Basin after the introduction of the 200-mile zones. PINRO Press, Murmansk, pp. 256-264 (in Russian)

Borkin IV, Shevelev MS. 1980. Glacier lanternfish *Benthosema glaciale* Reinhardt (Myctophiformes, Myctophidae) near Novaja Zemlya. Voprosy ikhtyologii 20:345-346 (in Russian)

Byrkjedal I, Brattegard T, Møller PR. 2009. *Lycodes adolfi* Nielsen and Fosså, 1993 (Teleostei: Zoarcidae) recorded near Jan Mayen and on the eastern side of the Norwegian Sea. Fauna norvegica 28:1-3

Byrkjedal I, Høines Å. 2007. Distribution of demersal fish in the south-western Barents Sea. Polar Research 26:135-151

Byrkjedal I, Langhelle G, Wenneck T. de Lange, Wienerroither R. 2011. *Lycodes adolfi* Nielsen and Fosså, 1993 (Teleostei: Zoarcidae) found in the Arctic Ocean. Polar Biology 34:465-467

Byrkjedal I, Lemvig S. 2002. Grønlandshavkrøkle *Nansenia groenlandica* (Reinhardt, 1840) funnet i det sørlige Barentshav. Fauna 55:57-59 (in Norwegian)

Chernova NV. 1989. Materials on feeding of *Liparis gibbus* (Scorpaeniformes: Liparidae). In: Podrazhanskaya SG (ed) Daily rhythms and food intakes of commercially important fishes in the World Ocean. Moscow, VNIRO Press, pp 89-96

Chernova NV. 1991. Snailfishes of the Euro-Asian Arctic. Apatity, Kola Sc.Centre of the USSR Acad.Sc. 111 pp (in Russian)

Chernova NV. 1998. A new species *Gymnelus andersoni* sp. nova, from the Arctic Seas with refinement of the species status of *G. retrodorsalis* Le Danois and *G. pauciporus* Anderson (Fam. Zoarcidae). Journal of Ichthyology 38:708-715

Chernova NV. 1999. Four new species of *Gymnelus* (Zoarcidae) from the Arctic regions. Journal of Ichthyology 39:343-352

Chernova NV. 1999. New species *Gymnelus knipowitschi* from the Arctic Ocean and a Redescription of *G. hemifasciatus* Andriashev (Zoarcidae). Journal of Ichthyology 39:1-9

Chernova NV. 2000. Four new species of *Gymnelus* (Zoarcidae) from the far Eastern Seas with genus diagnosis and key to species. Journal of Ichthyology 40:1-12

Chernova NV. 2005. New species of *Careproctus* Liparidae from the Barents Sea and adjacent waters. Journal of Ichthyology 45:689-699

Chernova NV. 2005. Review of *Careproctus* (Liparidae) of the North Atlantic and adjacent Arctic, including the generic type *C. reinhardti*, with rehabilitation of *C. gelatinosus* (Pallas) from Kamchatka. Journal of Ichthyology 45, Supplement 1:S1-S22

Chernova NV. 2008. Systematics and phylogeny of fish of the genus *Liparis* (Liparidae, Scorpaeniformes). Journal of Ichthyology 48:831-852

Chernova NV, Stein DL, Andriashev AP. 2004. Family Liparidae Scopoli 1777 – snailfishes. California Academy of Sciences, Annotated Checklists of Fishes 31, 72 pp

Cohen DM. 1984. Argentinidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 386-391

Cohen DM, Inada T, Iwamoto T, Scialabba N. 1990. FAO species catalogue. Vol. 10. Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date. FAO Fish Synop 10 (125), 442 pp

Collette BB. 1986. Scombridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 981-997

Collette BB 2003. Family Belonidae Bonaparte 1832 – needlefishes. California Academy of Sciences, Annotated Checklists of Fishes 16, 22 pp

Collette BB, Parin NV. 1986. Belonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 604-609

Compagno LJV. 1984. FAO species catalogue. Sharks of the world. An annotatedand illustrated catalogue of shark species known to date. Part 1 Hexanchiformes to Lamniformes. FAO Fisheries Synopsis No 125, Vol.4, Pt.1:249 pp

Dalpadado P, Ellertsen B, Melle W, Skjoldal HR. 1998. Summer distribution patterns and biomass estimates of macrozooplankton and micronekton in the Nordic Seas. Sarsia 83:103-116

Dolgov AV. 1994. Some aspects of biology of non-target fish species in the Barents Sea. ICES C.M. 1994/O:12. 23 pp

Dolgov AV. 2004. Non-target fishes. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 230-265 (in Russian)

Dolgov AV. 2004. Skates. In: Shevelev MS (ed) Investigations by PINRO in the Spitsbergen archipelago area. Murmansk, PINRO Press pp 265-274 (in Russian)

Dolgov AV. 2004. Species composition of ichthyofauna and the structure of ichthyocenoses of the Barents Sea. Izvestia TINRO 137:177-195 (in Russian)

Dolgov AV. 2006. New Data on the Distribution of Rare and New Fish Species in Russian Waters of the Barents Sea. Journal of Ichthyology 46:139-147

Dolgov AV, Drevetnyak KV, Sokolov KM, Grekov AA, Shestopal IP. 2008. Biology and fisheries of Roughhead grenadier in the Barents Sea. In: Orlov AM, Iwamoto T (eds) Grenadiers of the World Oceans: Biology, Stock Assessment, and Fisheries. American Fisheries Society Symposium, 63. AFS Publication, 2008. pp 343-363

Dolgov AV, Grekov AA, Shestopal IP, Sokolov KM. 2005. By-catch of Skates in Trawl and Long-Line Fisheries in the Barents Sea. Journal of Northwest Atlantic Fishery Science, 35:357-366

Dolgov AV, Johannesen E, Heino M, Olsen E. 2010. Trophic ecology of blue whiting in the Barents Sea. ICES Journal of Marine Science 67:483-493

Dolgova NV, Albert OT. 2011. Long rough dab. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Dragesund O, Østvedt OJ, Toresen R. 2008. Norwegian spring-spawning herring: history of fisheries, biology and stock assessment. In: Nakken O (ed) Norwegian spring-spawning herring & Northeast Arctic cod. Tapir, Trondheim, pp 41-82

Drevetnyak KV, Dolgov AV, Sokolv KM, Gusev EV, Grekov AA. 2005. Skates in the Barents Sea: stock status and catch by fishing fleet. ICES Document CM 2005/N:11, 7 pp

Eschmeyer WN, Fricke R. (eds) Catalog of Fishes electronic version (31 July 2011). http://research.calacademy.org/ichthyology/catalog/fishcatmain.asp

Fedorov VV. 1986. Cottidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1243-1260

Fedorov VV, Nelson JF. 1986. Psychrolutidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1261-1264

Fleischer D, Schaber M, Piepenburg D. 2007. Atlantic snake pipefish (*Entelurus aequoreus*) extends its northward distribution range to Svalbard (Arctic Ocean). Polar Biology 30:1359-1362

Geistdorfer P. 1986. Macrouridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 644-676

Gibson C, Valenti SV, Fordham SV, Fowler SL. 2008. The Conservation of Northeast Atlantic Chondrichthyans: Report of the IUCN Shark Specialist Group Northeast Atlantic Red List Workshop. viii + 76pp

Gjøsæter H. 1998. The population biology and exploitation of capelin (*Mallotus villosus*) in the Barents Sea. Sarsia 83:453-496

Gjøsæter H, Ushakov NG. 2003. Capelin in the Barents Sea. pp 6-15. In: Bjordal A, Gjøsæter H, Mehl S. (eds) Management strategies for commercial marine species in northern ecosystems. The Proceeding of the 10th Norwegian-Russian symposium, Bergen, 27-29 August 2003. IMR/PINRO Joint Report Series. No.1. 2004. 168 pp

Gjøsæter H, Ushakov NG, Prozorkevich DV. 2011. Capelin. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Gjøsæter J. 1981. Life history and ecology of *Maurolicus muelleri* (Gonostomatidae) in Norwegian waters. FiskDir. Skr. Ser. Havunders. 17:109-131

Gjøsæter J, Hesthagen T, Borgstrøm R, Brabrand Å, Byrkjedal I, Christiansen JS, Nedreaas K, Pethon P, Uiblein F, Vøllestad LA, Wienerroither R. 2010. Fisker – Pisces. In: Kålås JA, Viken Å, Henriksen S, Skjelseth S. (eds) The 2010 Norwegian Red List for Species. Norwegian Biodiversity Information Centre, Norway, pp 403-412

Haedrich RL. 1986. Centrolophidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1177-1182

Hallfredsson EH. 2010. Kveite - Blåkveite. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:123 (in Norwegian)

Helle K. 2010. Lange, brosme og blålange. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:124-125 (in Norwegian)

Høines Å. 2010. Kolmule. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:119 (in Norwegian)

Holm M, Hansen LP, Holst JC, Jacobsen JA. 2004. Atlantic salmon (*Salmo salar* L.). In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 315-356

Holm M, Holst JC, Hansen LP. 2000. Spatial and temporal distribution of post-smolts of Atlantic salmon (*Salmo salar* L.) in the Norwegian Sea and adjacent areas. ICES Journal of Marine Science, 57:955-964

Holst JC. 1993. Observations on the distribution of lumpsucker (*Cyclopterus lumpus*, L.) in the Norwegian Sea. Fisheries Research 17:369-372

Holst JC, Røttingen I, Melle W. 2004. The Herring. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 203-226

Hureau J-C. 1986. Triglidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1230-1238

Hureau J-C, Litvinenko NI. 1986. Scorpaenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1211-1229

Hylen A, Nakken O, Nedreaas K. 2008. Northeast Arctic cod: fisheries, life history, stock fluctuations and management. In: Nakken O (ed) Norwegian spring-spawning herring & Northeast Arctic cod. Tapir, Trondheim, pp 83-118

ICES. 2010. Report of the Arctic Fisheries Working Group (AFWG), 22-28 April 2010, Lisbon, Portugal/Bergen, Norway. ICES CM 2010/ACOM:05. 664 pp

Jakobsen T. 2010. Hvitting. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:118 (in Norwegian)

Jakobsen T. 2010. Rødspette. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:137 (in Norwegian)

Johannessen T. 2010. Øyepål. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:159 (in Norwegian)

Johannessen T. 2010. Tobis. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:152 (in Norwegian)

Jordan AD, Møller PR, Nielsen JG. 2003. Revision of the Arctic cod genus *Arctogadus*. Journal of Fish Biology 62:1339-1352

Kaartvedt S, Knutsen T, Holst JC. 1998. Schooling of the vertically migrating mesopelagic fish *Maurolicus muelleri* in light summer nights. Marine Ecology Progress Series 170:287-290

Kanayama T. 1991. Taxonomy and phylogeny of the family Agonidae (Pisces: Scorpaeniformes). Memoirs of the Faculty of Fisheries Hokkaido University 38:1-199

Kawaguchi K, Butler JL. 1984. Fishes of the genus *Nansenia* (Microstomatidae) with descriptions of seven new species. Contributions in Science, 352:1-22

Kirby RR, Johns DG, Lindley JA. 2006. Fathers in hot water: rising sea temperatures and a Northeastern Atlantic pipefish baby boom. Biology Letters 2:597-600

Knijn RJ, Boon TW, Heessen HJL, Hislop JRG. 1993. Atlas of North Sea Fishes. ICES Cooperative Research Report No. 194

Knipovich NM. 1926. Identification guide on fishes of the Barents, White and Kara seas. Proceedings of the Institute on Investigations of the North 27:1-170 (in Russian)

Kovtsova MV. 1986. Greenland halibut. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea, KFAN Press, Apatity. pp 46-48 (in Russian)

Kovtsova MV. 1986. Plaice. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity, pp 40-42 (in Russian)

Kovtsova MV. 1990. Flatfishes of the Barents Sea and adjacent waters. In: Biological resources of shelf and border seas. Moscow, Nauka Publishing. pp 250-268 (in Russian)

Kristoffersen JB, Salvanes AGV. 1998. Life history of *Maurolicus muelleri* in fjordic and oceanic environements. Journal of Fish Biology 53:1325-1341

Kristoffersen JB, Salvanes AGV. 2009. Distribution, growth, and population genetics of the glacier lanternfish (*Benthosema glaciale*) in Norwegian waters: Contrasting patterns in fjords and the ocean. Marine Biology Research 5:596-604
Krysov AI. 2008. Atlanto-Scandian herring: biology and fishery. PINRO Publishing House, Murmansk, 189 pp (in Russian)
Kudryavtzeva OY. 2008. Lumpsucker of the Barents Sea and adjacent waters. Moscow, Nauka publishing, 164 pp (in Russian)
Lukmanov EG. 1986. Saithe. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity pp 29-32 (in Russian)
Lukmanov EG, Baranenkova AS, Klimenkov AI. 1975. Biology and Fishery of Saithe in the North European Seas. PINRO Press, Murmansk. 64 pp (in Russian)
Makushok VM. 1986. Lumpenidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1126-1129
Marti YY. 1952. Scombridae. In: Commercial fish of the Barents and White Sea. Leningrad, pp 181-183
McAllister D. 1984. Osmeridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 399-402
Mecklenburg CW. 2003. Family Anarhichadidae Bonaparte 1846 – wolffishes. California Academy of Science, Annotated Checklists of Fishes 10, 6 pp
Mecklenburg CW. 2003. Family Cyclopteridae Bonaparte 1831 – lumpsuckers. California Academy of Sciences, Annotated Checklists of Fishes 6, 17 pp
Mecklenburg CW, Møller PR, Steinke D. 2011. Biodiversity of arctic marine fishes: taxonomy and zoogeography. Marine Biodiversity 41:109-140
Mecklenburg CW, Sheiko BA. 2004. Family Stichaeidae Gill 1864 - pricklebacks. California Academy of Sciences, Annotated Checklists of Fishes 35, 36 pp
Mehl S. 2010. Sei – Nordaustarktisk sei. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:138 (in Norwegian)
Mehl S, Zuykova NV, Drevetnyak KV. 2011. Northeast Arctic saithe. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim
Melyantsev RV, Yaragina NA. 1986. Atlantic cod. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea, KFAN Press, Apatity, pp 23-29 (in Russian)
Michalsen K. 2010. Kveite - Atlantisk kveite. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:122 (in Norwegian)
Møller PR. 1995. First record of *Lycenchelys kolthoffi* Jensen from the Svalbard region, Norway. Fauna 48:42-44
Møller PR. 2001. Redescription of the *Lycodes pallidus* species complex (Pisces, Zoarcidae), with a new species from the Arctic/North Atlantic Ocean. Copeia:972-996
Møller PR, Nielsen JG, Knudsen SW, Poulsen JY, Sünksen K, Jørgensen OA. 2010. A checklist of the fish fauna of Greenland waters. Zootaxa 2378:1-84
Monstad T. 2004. Blue Whiting. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 263-288
Moore JA, Vecchione M, Collette BB, Gibbons R, Hartel K, Galbraith JK, Turnipseed M, Southworth M, Watkins E. 2003. Biodiversity of Bear Seamount, New England Seamount Chain: Results of exploratory trawling. Journal of Northwest Atlantic Fishery Science 31:363-372
Muus BJ, Nielsen JG. 1998. Våre saltvannsfisker. NKS, Oslo
Nedreaas KH, Drevetnyak KV. 2011. Redfish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim
Nelson JS. 2006. Fishes of the world. 4th ed. Wiley & Sons, Hoboken, New Jersey
Neyelov AV, Chernova NV 2005. Results of fish investigations of the Spitsbergen shelf and continental slope waters during the cruise of RV "Polarstern" ARK VIII/2 1991 ('EPOS II'='SEAS'. In: Kotlyakov VM (ed) Arctic and Antarctic, 4(38). Moscow, Nauka Publishing. pp 130-170 (in Russian)
Nielsen JG. 1986. Pleuronectidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1299-1307
Nielsen JG, Fosså SA. 1993. *Lycodes adolfi*, a new species of eelpout (Zoarcidae) from Greenland. Cybium 17:39-44
Nizovtsev GP. 1989. Recommendations on Rational Exploitation of Greenland Halibut Stocks in the Barents and Norwegian Seas. PINRO Press, Murmansk. 93 pp (in Russian)

Nævdal G, Thorkildsen S. 2002. Genetic studies on species composition and population structure of sand eels (Genera: *Ammodytes*, *Hyperoplus* and *Gymnammodytes*) in Norwegian waters. Journal of Applied Ichthyology 18:124-126

Nøttestad L. 2010. Holy mackerel – hva skjer med makrellens vandringsmønster? In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:45-48 (in Norwegian)

Nøttestad L. 2010. Makrell – Nordøstatlantisk makrell. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:130 (in Norwegian)

Nøttestad L, Fernö A, Misund OA, Vabø R. 2004. Understanding herring behavior: Linking individual decisions, school patterns and population distribution. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 227-262

Palmer G. 1986. Trachipteridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 729-732

Parin NV, Kobyliansky SG. 1996. Diagnoses and distribution of fifteen species recognized in genus *Maurolicus* Cocco (Sternoptychidae, Stomiiformes) with a key to their identification. Cybium 20:185-195

Pethon P. 2005. Aschehougs store fiskebok. Aschehoug, Oslo

Pietsch TW. 1993. Systematics and distribution of cottid fishes of the genus *Triglops* Reinhardt (Teleostei: Scorpaeniformes). Zoological Journal of the Linnean Society 109:335-393

Planque B. 2010. Snabeluer. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:148 (in Norwegian)

Planque B. 2010. Vanleg uer. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:157 (in Norwegian)

Prusov SV. 2011. Atlantic Salmon. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Reay PJ. 1986. Ammodytidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 945-950

Reshetnikov YS. (ed) Atlas of freshwater fishes of Russia. 2 vol. Moscow, Nauka Publishing. 379+253 pp (in Russian)

Rodríguez-Marín E, Ruiz M, Sarasua A. 2002. Validation of roughhead grenadier (*Macrourus berglax*) otolith reading. Journal of Applied Ichthyology 18:70-80

Rostchin EA. 2006. New data on morphometry, feeding and parasite fauna of Atlantic spiny lumpsucker *Eumicrotremus spinosus* (Cyclopteridae) from the Barents Sea. Voprosy ikhtyologii 46:611-615 (in Russian)

Russkikh AA, Dingsør GE. 2011. Haddock. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Rusyaev SM, Dolgov AV, Karamushko OV. 2007. Captures of Snake Pipefish *Entelurus aequoreus* in the Barents and Greenland Seas. Journal of Ichthyology 47:544-546

Rusyaev SM, Shatsky AV. 2001. New data on distribution of grey gurnard *Eutrigla gurnardus* (Triglidae) in the Barents Sea. Voprosy Ikhtyologii 41:265-267 (in Russian)

Salvanes AGV. 2004. Mesopelagic fish. In: Skoldal HR (ed) The Norwegian Sea ecosystem. Tapir, Trondheim, pp 301-314

Shamray EA, Sentyabov EV, Seliverstova EI, Kalashnikov YN. 2010. Russian mackerel fishery in the Norwegian Sea: history, present and perspectives. In: Problem of fisheries 11:681-693

Sheiko BA, Mecklenburg CW. 2004. Family Agonidae Swainson 1839 – poachers. California Academy of Sciences, Annotated Checklists of Fishes 30, 27 pp

Shevelev MS, Johannesen E. 2011. Wolffish. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

Simacheva IA, Berestovsky EG, Mukhina NV. 1986. Long rough dab. In: Matishov GG (ed) Ichthyofauna and its Living Conditions in the Barents Sea. KFAN Press, Apatity, pp 43-45 (in Russian)

Skjæraasen JE, Bergstad OA. 2001. Notes on the distribution and length composition of *Raja lintea*, *R. fyllae*, *R. hyperborea* and *Bathyraja spinicauda* (Pisces: Rajidae) in the deep northeastern North Sea and on the slope of the eastern Norwegian Sea. ICES Journal of Marine Science 58:21-28

Smirnov OV. 2006. Greenland halibut of the Norwegian and Barents Sea population. Murmansk, PINRO Press, 113 pp (in Russian)

Stasenkova NI. 2009. Ecology, biology and fisheries of cheshsko-pechor herring. Arkhangelsk, Kira Publishing. 167 pp (in Russian)

Stehmann M, Bürkel DL. 1984. Chimaeridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 212-215

Stehmann M, Bürkel DL. 1984. Rajidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 163-196

Stein DL. 1986. Cyclopteridae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1269-1274

Stein DL, Able KW. 1986. Liparidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 1275-1283

Stenevik EK. 2010. Sild - Norsk vårgytende sild. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:145 (in Norwegian)

Strid A, Jörundsdóttir H, Päpke O, Svavarsson J, Bergman Å. 2007. Dioxins and PCBs in Greenland shark (*Somniosus microcephalus*) from the North-East Atlantic. Marine Pollution Bulletin 45:1514-1522

Sulak KJ, Shcherbachev YN. 1997. Zoogeography and systematics of six deep-living genera of synaphobranchid eels, with a key to taxa and description of two new species of *Ilyophis*. Bulletin of Marine Science 60:1158-1194

Sunnanå K. 2010. Rognkjeks/-kall. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skil brei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:136 (in Norwegian)

Svetovidov AN. 1948. Gadiformes. In: Pavlovsky EN (ed) Fauna of the USSR. Fishes, 9 (4). USSR Academy of Sciences Press, Moscow-Leningrad. 222 pp (in Russian)

Svetovidov AN. 1952. Clupeidae. In: Fauna of the USSR. Fish. Vol. 2. Issue 1. Academy of Sciences of the USSR, Moscow. pp 163-166 (in Russian)

Svetovidov AN. 1986. Gadidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 680-710

Svetovidov AN. 1986. Merlucciidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 677-679

Tjelmeland S. 2010. Lodde – Barentshavet. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:128 (in Norwegian)

Tjelmeland S. 2010. Polartorsk. In: Gjøsæter H, Haug T, Hauge M, Karlsen Ø, Knutsen JA, Røttingen I, Skilbrei O, Sunnsett BH (eds) Havforskningsrapporten 2010. Fisken og havet I-2010:132 (in Norwegian)

Vinogradova PS, Litvin VM. 1960. Studies of bottom relief and sediments in the Barents and Norwegian Seas. In: Marty JJ. (ed) Soviet Fisheries investigations in Northern European seas, Moscow, pp 101-110 (in Russian)

Vladykov VD. 1984. Petromyzonidae. In: Whitehead PJP, Bauchot M-L, Hureau J-C, Nielsen J, Tortonese E (eds) Fishes of the North-eastern Atlantic and the Mediterranean. Unesco, Paris, pp 64-67

von Dorrien CF. 1996. Reproduction and larval ecology of the Arctic fish species *Artediellus atlanticus* (Cottidae). Polar Biology 16:401-407

Williams T, Helle K, Aschan M. 2008. The distribution of chondrichthyans along the northern coast of Norway. ICES Journal of Marine Science 65:1161-1174

Yaragina NA, Aglen A, Sokolov KM. 2011 Cod. In: Jakobsen T, Ozhihin V (eds) The Barents Sea – Ecosystem, Resources and Management. Half a Century of Russian-Norwegian Cooperation. Tapir Academic Press, Trondheim

6 Alpabetic species index

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JOINT

REPORT

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