Marine Fishes of the Arctic Region
Volume I

C. W. Mecklenburg, A. Lynghammar, E. Johannesen, I. Byrkjedal, J. S. Christiansen, A. V. Dolgov, O. V. Karamushko, T. A. Mecklenburg, P. R. Moller, D. Steinke, R. M. Wienerroither

Marine Fishes of the Arctic Region
Volume II

C. W. Mecklenburg, A. Lynghammar, E. Johannesen, I. Byrkjedal, J. S. Christiansen, A. V. Dolgov, O. V. Karamushko, T. A. Mecklenburg, P. R. Moller, D. Steinke, R. M. Wienerroither

Arctic Biodiversity Congress
9th-12th October 2018, Rovaniemi, Finland
Marine Fishes of the Arctic Region
What is it?
• Outcome of a three year project (Dec.2014- Feb.2018) funded by the Norwegian Ministry of Foreign Affairs

• Synthesize years of research around the Arctic by the project participants

• First comprehensive and unified treatment of the marine fish fauna in the whole Panarctic region

• Information on 229 species of marine fish

• Totally 749 pages organized in two volumes (pdfs)
ATLAS

Marine Fishes of the Arctic Region
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Cottidae — Sculpins

Myoxocephalus scorpius (Linnaeus, 1758) shorthorn sculpin

Zoogeography: Arctic-Boreal
Distribution: Circumpolar.

In all Arctic seas and southwest to southern England, Bay of Biscay, Sea of Okhotsk off southeastern Kamchatka, Commander and Aleutian Islands Gulf of Alaska to northern British Columbia.

The most widespread and abundant sculpin is Arctic, especially on the inner and middle are the continental shelves. The northernmost record includes a 63-mm TL specimen taken north of Sbergen at 81°20’N, 15°32’E, in 2015 (MNHN del BPS-3257). Recorded in Canada at least to Sjord, Ellefson Island, at 80°39’N, 86°00’W (H et al. 1984; CMNF1 1960-0445C, CMNF1 1962-0566). Distribution further north off Canada, to the exit of Ellefson Island, and northernmost Greer is assumed. Other sculpins and smallfishes have recorded there (e.g., Arctes biceros, M. quadrirr Liparis fabricii, L. tunicatus; Hunter et al. 1984; M. scorpius would logically also be present. Rec. northward off eastern Greenland as far north as 76°23’N (Jørgensen et al. 2011). Commonly recorded from the New Siberian Islands at 76°06’N, 153°06’E (Andriashev 1954; ZIN 20674). In the Chukchi Sea, to 72°17’N, 165°10’W (UAM 1287).

Common in Bering, Chukchi, and Beaufort seas (e.g., Barsukov 1950, Alverson and Wilmovsky 1964, Mecklenburg et al. 2002, Rand and Logerwell 2011). The 4th most abundant of 62 identified species in recent Chukchi Sea bottom trawl collections (Mecklenburg and Steinke 2015). Common across Arctic North America (Walters 1953a, 1955), throughout the Canadian high Arctic archipelago to Hudson and James Bays (Vladyslov 1933, Morin et al. 1980, Morin and Dodson 1986) and southward to Labrador (Backus 1957, Ellis I Hunter et al. 1984, Scott and Scott 1988) and the Gulf of St. Lawrence (Nozères et al. 2016). The most common fish inshore waters of Ungava Bay (Dunbar and Hidebrand 1952), common along the entire coastline of the Gulf of B (Klein-MacPhee 2002). Common around Greenland (Møller et al. 2010); the most common shore sculpin in north Greenland (Nichols 1918). Occasionally taken around Jan Mayen Island (Wienerroither et al. 2011b). Common in Iceland (Sæmundsson 1949, Jønsen and Pálsson 2013); the Faroe Islands, along the coast of Norway (Pethon 2007). In the Barents Sea (Byrkjedal and Hansen 2007; Wienerroither et al. 2011a, 2013). The most abundant identified fish species in the western north Atlantic, comprising 74.9% of total specimens caught, in 2012 and 2013 (Kongsfjorden, Spitsbergen; Brand and Fischer 2016). Common also in the Kara, Laptev, and East Siberian Seas (Ei 1940, 1952; Andriashev 1948, 1954; Borkin et al. 2006; Nelyov 2008; Dolgov 2013; Heidal et al. 2017).

Southward to Welcome Harbour, British Columbia in the eastern Pacific (Feden and Wilson 1976; Mecklenburg 2002, 2016); southern Kamchatka in the western Pacific (Park et al. 2014); southern New England and to New to as a stray in the western Atlantic (Klein-MacPhee 2002); and Bay of Biscay in the eastern Atlantic (Fedorov 1986).
GUIDE

Marine Fishes of the Arctic Region
Volume II

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Myxocephalus scorpius  shorthorn sculpin

Ventral and occipital tubercles present, often scaled, pointed or wedge-shaped

3 indistinct brown bands

Lateral prickle plate-like scales with depressed centers above lateral line

257 mm, male

275 mm male

3 or 4 preopercular spines; uppermost straight, unbranched, does not reach margin of operculum

Postocular and occipital tubercles low in some specimens

255 mm male

188 mm, male

176 mm

43 mm

43 mm

547
• Pdf’s of the atlas and guide freely available: https://www.caff.is/marine/marine-monitoring-publications/marine-fishes-of-the-arctic-region

• 11 authors from five countries:
  – USA : CW Mecklenburg – lead author
• Pdf’s of the atlas and guide freely available: https://www.caff.is/marine/marine-monitoring-publications/marine-fishes-of-the-arctic-region

• 11 authors from five countries:
  - USA: CW Mecklenburg – lead author
    TA Mecklenburg
  - Canada: D. Steinke
  - Russia: OV Karamushko, AV Dolgov
  - Denmark/Greenland: PR Møller
  - Norway: A Lynghammar, JS Christiansen
    R Wienerroither, I Byrkjedal,
    E Johannesen)
Why was it made?
• Fill **knowledge gaps** on marine fishes identified in the Arctic Biodiversity Assessment (2013)

• Need of overall view of the **whole panarctic region**

Example: *Lycodes adolfi*

from Mecklenburg et al 2014
• Knowledge on distribution and species identity is needed to assess changes caused by warming.

Distribution shifts
=> Baseline distributions

New areas open to investigation
=> Identification tools
How was it made?
• Extensive **literature** search and **review**:  
  - Finding the primary source of information  
    => detective work!

• **Validating and evaluating information** from:  
  - literature  
  - data bases  
  - collections  
    => including checking museum specimens
• Collecting and using **barcoding** information:
Taking photos for the guide:

Photo - Simonetta Corsolini
Family: Zoarcidae — Eelpouts

**Gymnelus hemifasciatus** — halfbarred pout

- Chin crests absent
- Pelvic fins absent
- One or more ocelli often present on dorsal fin in both forms
- Bands narrow or wide but relatively uniform in solid-band form
- Bands disintegrate into checkered or mottled pattern toward tail in typical form
- Bands narrow or wide but relatively uniform in solid-band form

Dorsal fin origin usually above anterior half of pectoral fin

Anal fin black in adult males of both forms

Pectoral fin rays usually 10–11

- Adult males of typical form turn orange
- Female of solid-band form
- Juveniles of solid-band form
- Juvenile of typical form

- Typical (variegated) form
- 176 mm, female
- 140 mm, female
- 142 mm, male
- 128 mm, male
- 159 mm, female
- 114 mm, male
- 76 mm, female
- 54 mm, male
- 63 mm
Family: Cottidae — Sculpins

*Myxocephalus scorpius*  
**shorthorn sculpin**

- Postocular and occipital protuberances present, often paired; pointed or wedge-shaped
- 3 indistinct brown bands
- 215 mm female
- 257 mm, male
- 273 mm male
- 181 mm, male
- 76 mm
- 49 mm
- 43 mm
- Large prickly plate-like scales with depressed centers above lateral line
- 1 or 4 preopercular spines; uppermost straight, unbranched, does not reach margin of operculum
- Postocular and occipital tubercles low in some specimens
Family: Liparidae — Snailfishes

Liparis tunicatus  kelp snailfish

Gill opening short, usually not extending down in front of pectoral fin rays

Potentosome pale (requires dissection)

Anterior nostril much larger than posterior

Caudal fin usually with 1 prominent broad black bar and 1 or more vague narrow bars

Coloration nearly monotone brown to boldly striped or mottled

582
Family Gadidae — Cods

*Arctogadus glacialis*

Oral cavity usually greater than snout length

Caudal fin slightly to moderately emarginate, lobes rounded

Maxilla not reaching or barely reaching to below pupil

Olive brown to bluish gray, including underside, with darker fins and head

Lateral line interrupted along entire length

Cheek bare to longer than pupil diameter

Scales overlapping, elliptical, easily fall off

Palatine teeth present, usually well developed

Jaws about equal or lower jaw slightly protruding

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What next?
• Atlas&guide available since 14.02.2018
  – Vol 1: 4812 downloads
  – Vol 2: 1679 downloads

• Increased knowledge - comprehensive, well referenced, compiled information
  “Definite treatment” ..”authoritative volumes” (Eastman 2018 Polar Biology)

• Improved species identification and data quality
  => Better information on distributions and habitat use

• Stimulate research
  – Climate change impacts
  – Fish taxomomy
Mallotus capelin

Osmeridae — Smelts

*Mallotus villatus* (Müller, 1776)

**Zoogeography:** Arctic-Boreal

**Distribution:** North Atlantic and adjacent Arctic.

Genus *Mallotus* is known from the Barents Sea, White Sea, and western Kara Sea. Its range overlaps with the *Mallotus* species in the eastern Atlantic Ocean and the Barents Sea. The two species are not separated in this account because their distributions and morphological differences have not been completely resolved.

In Canadian waters, *Mallotus* is found in the Barents Sea, White Sea, and western Kara Sea. It is also found in the Newfoundland and Labrador provinces, as well as in the Gulf of St. Lawrence and the Bering Sea.

Abundant in Greenland waters (Freirol et al. 2010). Recorded northward on the west coast of the Barents Sea, where it is found near 76°30'N and 76°30'W. It is also found in the Barents Sea and the Bering Sea, as well as in the Gulf of St. Lawrence and the Bering Sea. The two species are not separated in this account because their distributions and morphological differences have not been completely resolved.

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**Lycodes rossi**

Family: Boardidae — Eelpouts

- **Lycodes rossi** threespot eelpout
- Chin crests low in head, anteriorly, high rounded
- Head narrow: specimens collected and photographed, internal examination
- Chin crests widely separated at symphysis
- Usually 9 or 10 spines and fin rays
- 5-10 spines included from sides on dorsal fin
- Top of head does not become reticulated, at anterior, reticulation
- Head broader, anteriorly, lower with spines anteriorly, belly, and fin
- Ventral spines 9 or 10
- Usually 9 or 10 spines in series
- 20-100 mm

**Lycodes reticulatus**

Family: Boardidae — Eelpouts

- **Lycodes reticulatus** Arctic eelpout
- Chin crests low in head, anteriorly, high rounded
- Head narrow: specimens collected and photographed, internal examination
- Chin crests widely separated at symphysis
- Usually 9 or 10 spines and fin rays
- 5-10 spines included from sides on dorsal fin
- Top of head does not become reticulated, at anterior, reticulation
- Head broader, anteriorly, lower with spines anteriorly, belly, and fin
- Ventral spines 9 or 10
- Usually 9 or 10 spines in series
- 20-100 mm

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Cyclopteropsis mcalpini

- Family: Cyclopteridae — Lumpscupers
- Cyclopteropsis mcalpini
- Arctic lump sucker

Cyclopteropsis jordani

- Family: Cyclopteridae — Lumpscupers
- Cyclopteropsis jordani
- Smooth lumpfish

Note: Images of specimens are shown with annotations identifying key features.