FISHERIES AND MARINE SERVICE

Translation Series No. 3228

On the occurrence of some fish species in the western north Atlantic (Newfoundland - Baffin Land)

by Christine Karrer

Original title: Uber das Vorkommen von Fischarten im Nordwestatlantik (Neufundland - Baffinland)

From: Fischerei-Forschung Wissenschaftliche Schriftenreihe (Fisheries Research Series of Scientific Reports), 11(1) : 73-90, 1973

Translated by the Translation Bureau(OK)
Multilingual Services Division
Department of the Secretary of State of Canada

Department of the Environment
Fisheries and Marine Service
Biological Station
St. John's, Nfld.

1974

50 **pages typescript**

DEPARTMENT OF THE SECRETARY OF STATE
TRANSLATION BUREAU

MULTILINGUAL SERVICES DIVISION

CANADA

SECRÉTARIAT D'ÉTAT
BUREAU DES TRADUCTIONS

DIVISION DES SERVICES MULTILINGUES

FoM 3228

TRANSLATED FROM – TRADUCTION DE	INTO – EN
German	English

AUTHOR – AUTEUR

K a r r e r , Christine

TITLE IN ENGLISH – TITRE ANGLAIS

On the occurrence of some fish species in the western North Atlantic (Newfoundland - Baffin Land)

TITLE IN FOREIGN LANGUAGE (TRANSLITERATE FOREIGN CHARACTERS)
TITRE EN LANGUE ÉTRANGÈRE (TRANSCRIRE EN CARACTÈRES ROMAINS)

Uber das Vorkommen von Fischarten im Nordwestatlantik (Neufundland - Baffinland)

REFERENCE IN FOREIGN LANGUAGE (NAME OF BOOK OR PUBLICATION) IN FULL. TRANSLITERATE FOREIGN CHARACTERS.
RÉFÉRENCE EN LANGUE ÉTRANGÈRE (NOM DU LIVRE OU PUBLICATION), AU COMPLET, TRANSCRIRE EN CARACTÈRES ROMAINS.

Fischerei-Forschung
Wissenschaftliche Schriftenreihe

REFERENCE IN ENGLISH – RÉFÉRENCE EN ANGLAIS

Fisheries Research
Series of Scientific Reports

PUBLISHER – ÉDITEUR	DATE OF PUBLICATION / DATE DE PUBLICATION			PAGE NUMBERS IN ORIGINAL / NUMÉROS DES PAGES DANS L'ORIGINAL
----	YEAR / ANNÉE	VOLUME	ISSUE NO. / NUMÉRO	73-90
PLACE OF PUBLICATION / LIEU DE PUBLICATION				NUMBER OF TYPED PAGES / NOMBRE DE PAGES DACTYLOGRAPHIÉES
Berlin	1973	11	1	5o

REQUESTING DEPARTMENT / MINISTÈRE-CLIENT: Environment
Fisheries & Marine Service

BRANCH OR DIVISION / DIRECTION OU DIVISION: Biological Station

PERSON REQUESTING / DEMANDÉ PAR: Mr. A.M. F l e m i n g
St.-John's, Nfld.

YOUR NUMBER / VOTRE DOSSIER N°: 784494

DATE OF REQUEST / DATE DE LA DEMANDE: 3 June, 1974

TRANSLATION BUREAU NO. / NOTRE DOSSIER N°: 784494

TRANSLATOR (INITIALS) / TRADUCTEUR (INITIALES): ok

UNEDITED TRANSLATION
For Information only
TRADUCTION NON REVISEE
Information seulement

OCT 29 1974

SOS-200-10-6 (REV. 2/68)
7530-21-029-6333

DEPARTMENT OF THE SECRETARY OF STATE
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CLIENT'S NO. / N° DU CLIENT	DEPARTMENT / MINISTÈRE	DIVISION/BRANCH / DIVISION/DIRECTION	CITY / VILLE
784494	Environment Fisheries & Marine Service	Biological Station	Saint John's Nfld.
BUREAU NO. / N° DU BUREAU	LANGUAGE / LANGUE	TRANSLATOR (INITIALS) / TRADUCTEUR (INITIALES)	
784494	German	ok	OCT 29 1974

K a r r e r , Christine: "Uber das Vorkommen von Fischarten im Nordwestatlantik (Neufundland - Baffinland)." Fischerei-Forschung, Wissenschaftliche Schriftenreihe, Band 11, Heft 1, pp. 73-90, Berlin,1973.

Christine K a r r e r *)

ON THE OCCURRENCE OF SOME FISH SPECIES IN THE WESTERN NORTH ATLANTIC

(Newfoundland - Baffin Land)

ON THREE TRIPS (1968-70), THE RESEARCH VESSEL "ERNST HAECKEL" CAPTURED A TOTAL OF 77 FISH SPECIES IN THE AREA FROM NEWFOUNDLAND TO BAFFIN LAND (51-65° N , 50-63° W). OF THESE, 25 SPECIES ARE KNOWN FROM NEWFOUNDLAND SOUTHWARDS, FROM WEST OF GREENLAND AND ALSO FROM DAVIS STRAIT; IN THE INTERMEDIATE ZONE, HOWEVER, THEY HAVE BEEN ASCERTAINED BUT RARELY UP TO NOW OR EVEN NOT AT ALL. AMONG 18 OF THESE SPECIES, SOME HAVE A FAR MORE EXTENSIVE RANGE OF DISTRIBUTION NORTHWARD (UP TO 23°); ONE SPECIES IS NEW AND MORE PRECISE DATA ARE PRESENTED ON THE MATERIAL AT HAND. THE OTOLITHS OF 14 SPECIES ARE DESCRIBED.

I N T R O D U C T I O N

The waters around Newfoundland and Labrador belong to areas where intensive fishing activities have been conducted for a long time and, therefore, the dispersion ranges of the economically useful fish species are

*) Zoological Museum at Humboldt University, Berlin

widely known. This, however, does not apply to species not possessing an immediate commercial significance. Thus, LEIM & SCOTT, in their "Fishes of the Atlantic coast of Canada" (1966), can cite in quite a number of their descriptions but one or at best some few finds of such fishes.

On three trawling trips of the research vessel "ERNST HAECKEL" into the western Labrador Sea and Davis Strait (51-65° N, 50-63° W), 77 fish species were captured; more than 50% thereof are remarkable for the localities involved. The following expositions deal with these species; brief supplementary notes are added on a few other species frequently found in the area.

Aside from the named book by LEIM & SCOTT, detailed elaborations concerning nearly all systematic groups up to the Lyomeri can be found in "Fishes of the western North Atlantic" (1948 ff.). In several works, JENSEN (1942-52) reports on the fauna of western Greenland.

In the biology of fishes, the otoliths play an important part for age determinations; being species-specific, they have, moreover, a considerable systematic significance because it is possible to determine a fish exclusively by their distinctive characters. Due to their chemical constitution, the otoliths are frequently the only available fish remains, for instance, in stomach contents or fossil deposits. For this reason, the sagitta (the largest of the 3 otoliths found in every labyrinth) are also described for some fish species and traced in text figures (although photographs provide an outline of the sagitta, the essential details of its inner side are scarcely recognizable).

Having been invited by the Institute of High Sea Fisheries and Fish Processing, the present author took part in the first trip of the "ERNST HAECKEL" (August - October, 1968) and wishes to express her sincerest gratitude for having been offered this opportunity. To the colleagues of the

Institute, also present on the ship, as well as the latter's crew heartfelt thanks are addressed for their untiring assistance. From the subsequent trips (April - July 1969, May - August 1970) of the research vessel, Mr. L. Danke, Mr. W. Mahnke, Mr. P. Ernst and Mrs. B. Kossurok were kind enough to send samples from a few stations, which was most warmly appreciated. Thanks are also addressed to Dr. D.M. Cohen (Washington), Dr. M.M. Dick (Cambridge, Mass.), Dr. O. Frøiland (Zoologisk Museum Universitetet i Bergen - ZMUB), Dr. G. Krefft (Institut für Seefischerei, Hamburg - ISH), Mr. G.E. Maul (Museu Municipal do Funchal - MMF), Dr. W.R. Taylor (US National Museum, Washington - USNM), Dr. W. Templeman (St. John's); a particular acknowledgment is due to Dr. M.L. Bauchot (Paris) for identifying the species of Serrivomer.

M A T E R I A L

All the material was captured by otter trawl (140' net at stations 340, 341 and 343/70 - a 90' net on a long line. The preserved specimens are kept at the Zoological Museum Berlin - (ZMB). Measurements were made from point to point; unless otherwise indicated, length measurements of the specimens refer to total length. Where measurements diverge from the natural state due to crookedness or shrinkage of body parts the values given in the Tables are enclosed in parentheses.

The systematic sequence of LEIM & SCOTT (1966) has been adhered to.

In the listings of otoliths, the number of the investigated sagittae and the mean values of the ratios (length:height:thickness - L:H:D) are given in per cent of length; nomenclature of the otolith structures according to CHAINE & DUVERGIER (1934) and WEILER (1942).

D E S C R I P T I O N S

MYXINIFORMES

M y x i n i d a e

Myxine glutinosa L.

JENSEN 1926, 98. BIGELOW & SCHROEDER 1948, 34, fig. 4. LEIM & SCOTT 1966, 20, fig.

St. 414/68 : 63°55′ N, 58°52′ W, 800 m; 1 spec. Expl. (345 mm), ZMB 22482.

M. glutinosa is frequent in the western Atlantic, from North Carolina to the Gulf of Saint Lawrence. In Davis Strait it has been captured just once.

In a fresh state, the animal is chocolate brown; the anterior fourth part of the head is whitish.

HYPOTREMATA

R a j i d a e

Raja senta GARMAN

BIGELOW & SCHROEDER 1953, 264, fig. 57, 58; 1954, 65. LEIM & SCOTT 1966, 61, fig. TEMPLEMAN 1966, 115.

St. 271/68: 50°40′ N, 50°53′ W, 340-335 m; 1 ♀ (470 mm), ZMB 22516.

The dispersion of R. senta is restricted to the western North Atlantic (South Carolina to the Gulf of Saint Lawrence); according to TEMPLEMAN, the species is occasionally encountered as far as to the southern Labrador shelf.

Raja fyllae LUTKEN

JENSEN 1948, 43. BIGELOW & SCHROEDER 1953, 194, fig. 39, 40; 1954, 54, fig. 3. LEIM & SCOTT 1966, 53, fig.

St. 351/68: 58°50′ N, 59°56′ W, 520-530 m; 1 ♂ (468 mm), ZMB 22517.

Known in the western Atlantic from the area between La Have and Georges Banks; also in Davis Strait.

CHIMAERIFORMES

Rhinochimaeridae

Harriotta haeckeli KARRER (Fig. 1)

H. raleighana GOODE & BEAN (part.) 1895b, 472, pl. 19, fig. 3, 4. MURRAY & HJORT (part.) 1912, 76, fig. 307. KOEFOED (part.) 1927, 29, text-fig. 5, pl. 3, fig. 2.

(74)

St. 343/70: 63°21' N, 57°00' W, 1970-2020 m; 1 ♂ (Holotypus, 496 mm), ZMB 22591; 1 ♀ (Paratypus, 650 mm), ZMB 22592.

The so far single species of the genus Harriotta - H. raleighana GOODE & BEAN - is encountered in the western Atlantic along the American coast from 37 - 43° N (BIGELOW & SCHROEDER 1953, 551; 1954, 81. LEIM & SCOTT 1966, 70). At one station, the "ERNST HAECKEL" captured 23 Rhinochimaeres, 2 specimens of which were given to the Zool. Museum, Berlin. They turned out to be a new species, described in a different publication (KARRER 1972, p. 210).

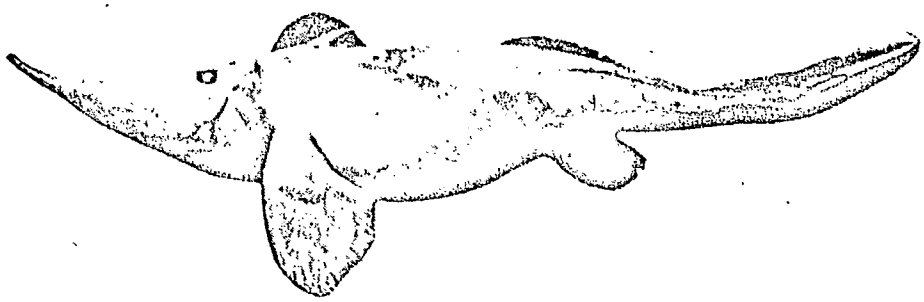


Fig. 1. Harriotta haeckeli (Phot. by P. Ernst, Rostock)

The most important differences in comparison with H. raleighana are the following: Caudal filament short; eye small; interorbital space wide and arched; first dorsal short and low; spine short, curved, both of its rear margins smooth; interdorsal space much longer than base of the first dorsal; both caudal fins of the same height as 2nd dorsal; upper caudal longer than lower caudal. According to a slide and statements of the Rostock colleagues, fresh animals are brown-whitish, becoming darker ventrally and towards the tip of the snout; inner side of the pectorals blue-grey, the rest of the fins dark.

Two specimens described as H. raleighana belong to the new species: the smallest of the syntypes (39°38' N, 71°19' W) and the specimen captured near the Canary Islands.

ISOSPONDYLI

A l e p o c e p h a l i d a e

Alepocephalus bairdi GOODE & BEAN (F i g s . 2 , 3)

A. bairdii GOODE & BEAN 1880, 55; 1895c, 38, fig. 47. PARR 1952, 258 (nur Bestimmungsschlüssel). KREFFT 1953, 269. BIGELOW 1963, fig. 69B. *)

A. giardi HOLT & BYRNE 1908, 36, pl. III, fig. 2, pl. IV, fig. 1, 2. KOEFOED 1927, 35. SAEMUNDSSON 1949, 103.

St. 303/68: 56°24′ N, 57°56′ W, 720-750m; 1 Expl. (330 mm SL), ZMB 22540.

St. 323/68: 56°59′ N, 58°36′ W, 960-1000 m; 1 Expl. (460 mm SL), ZMB 22541.

St. 413/68: 63°53′ N, 59°02′ W, 690 m; 2 Expl. (140, 292 mm SL), ZMB 22542.

*) (only key to determination)

S E E page 7

F i g . 2 .
Alepocephalus bairdi
ZMB 22540

The species was described from a single specimen, captured at a depth of 200 fathoms "on the Grand Banks;" LEIM & SCOTT (1966, p. 99) mention it merely in a footnote, because its occurrence has not been confirmed since.

All of the Alepocephalus species have a very soft, easily injured epidermis, so that in most cases they arrive aboard without scales. As a distinguishing feature from the next species, the very smooth dermis of A. bairdi displays straight, vertically arranged light striae; it differs furthermore from the two species ascertained in the western North Atlantic (A. productus GILL and A. agassizi) by the high number of its dorsal and anal rays.

Dorsal 21-23, anal 22-25, pectoral 11-12, ventral 1/8-9, lateral line about 65, C. pyl. 12-15. Height (centre pectoral - ventral, measured in preserved specimens) 5.0-5.8 times, head 3.3-3.7 times within SL. Head relatively low, as it does not attain maximum body height; it gradually narrows in the rostrate direction, thereby resembling the eastern Atlantic A. rostratus RISSO.

Proportional measurements very variable; thus, for example (according to our specimens and the measurements in HOLT & BYRNE as well as in KOEFOED), the post-orbital length corresponds in juveniles to the length of snout and eye, while it considerably increases in large animals.

The scaleless skin of fresh animals is grey-brown; head (eyes included) and fins (except the caudal) black.

Range: Eastern Atlantic, from Biscay to Iceland; captured just once in the western Atlantic.

Sagitta (4 otoliths, L:H:D - 100:64:16): About triangular, pointed end directed forward, thin. Edges angular, in small specimens nearly smooth, while larger ones display increasingly deep angular indentations, particularly at the ventral edge. In small sagittae, the transition from the dorsal into the ventral edge is indicated posteriorly by a notch, in larger specimens by a projection. With growing size, the antirostrum lengthens and becomes pointed, so that the excisura ostii deepens. Inner side faintly convex. Sulcus open at both ends, it deepens generally in larger sagittae, but in the ostium it is always much more deeply sunk than in the shallow cauda, faintly curved in the dorso-caudate direction. Ostium and cauda are of a differing configuration: The deep and

Fig. 2
Alepocephalus bairdi
ZMB 22540

widely open ostium is bordered by the angular superior crista (in large otoliths, the latter has a stronger projection) and the inferior crista, recognizable only by its differing surface structure; both of them terminate at the collum. The cauda is a shallow depression in the inner side. Only one flat colliculum is present in the ostium, while the collum is denoted by the differing depth of ostium and cauda. With its deepest spot, the area is positioned above the collum and it merges directly with the dorsal field. In small otoliths, the ventral field is unstructured,

in large ones, the central inner zone thickened where not cleft by the indentations of the marginal structures. At the outer side the centre is positioned somewhat laterally of the collum; proceeding from the latter, the surface slopes uniformly on all sides towards the edge, and a faint thickening runs to the rostrum. Otoliths were prepared of all 4 fish; the sagittae of the two medium-sized specimens display the continuous transition of the form. Large otoliths are relatively thinner than small ones (thickness of the smallest sagitta 21, of the largest 12 per cent). SCHMIDT (1968, p. 9) has already described the sagitta of A. bairdi, but its characteristics were set forth here in detail in order to explain the extreme form in the species following next. Large otoliths correspond fairly well to those of A. rostratus (VAILLANT 1888, p. 149); even by this character a separate genus Mitchillina for A. bairdi (JORDAN & EVERMANN 1896, McALLISTER 1960) cannot be accepted.

Fig. 3. Alepocephalus bairdi, left sagitta; at left of a 140 mm specimen, inner side; at right of a 460 mm long specimen - inner and outer sides; 4 x

(75)

Alepocephalus agassizi GOODE & BEAN (Fig. (Abb. 4, 5)

GOODE & BEAN 1833, 218; 1895c, 37, fig. 45. KOEFOED 1927, 36. SCHROEDER 1940, 231. JENSEN 1948, 64. PARR 1952, 258 (nur Bestimmungsschlüssel). BIGELOW 1963, fig. 60C (only determ.key).

St. 296/68: 56°10′ N, 57 16′ W, 960-1000 m; 1 Expl. (466 mm SL), ZMB 22543.

St. 323/68: 56°59′ N, 58°36′ W, 960-1000 m; ca. 10 Expl. (davon 4: 472-698 mm SL), 1 Expl. ZMB 22544.

St. 343/70: 63 21′ N, 57 00′ W, 1970-2020 m; 1 Expl. (300 mm SL), ZMB 22602.

Uninjured animals are of a deep black colour and the milky-white, parchmentlike scales come loose easily; in injured specimens, remains of the dark scale pockets can be recognized on the part of the dermis which is not smooth.

Dorsal 15-17, anal 16-17, pectoral 1/11, ventral 7, lat.line 95-103. Height (mid point pectoral-ventral, measured in fresh specimens) 4.2 - 4.9 times, head 2.7 - 3.4 times in SL. Dorsal head profile rounded, so that the snout is

higher and, thus, the head less pointed than in A. bairdi. Eye 4.0 - 4.5 times, snout 3.9 - 4.2 times in head length; snout just a little bit shorter than eye, while the relationship is inverse in the few so far known specimens of A. productus. Upper jaw higher than centre of eye. Dorsal and anal - shorter than in A. bairdi - are inserted in the body slightly more backward.

One female (678 mm) contained r i pe eggs. The stomachs of four animals were investigated: 3 were empty, one contained a medusa.

Range: along the N E American coast from 36-42° N; known from W Greenland and NE Atlantic.

Sagitta (5 otoliths of specimens 577-698 mm long, L:H:D - 100:76:22); roundish, thick. Dorsal margin smooth, in very large specimens very wide. Ventral edge partly with small curvatures. Rostrum and antirostrum relatively short, rounded. Due to the fact that the cauda is not closed, a deeper opening is produced with both a dorsal and ventral projection than represented by the excisura ostii. Inner side convex. Sulcus of a very deep dip, widely open at both ends, not structured; collicula not recognizable. Superior crista developed above the entire sulcus, with a dorso-caudate bending at its termination; it

F i g . 4 .
Alepocephalus agassizi
ZMB 22543

overtops the sulcus as a wide bulge from the dorsal direction and so considerably that the base of the sulcus is no longer visible. In its middle part, the area is set off against the superior crista with a furrow; and without a boundary, the area passes into the dorsal field. An inferior crista is lacking; corresponding to the thickening of the dorsal part, the entire ventral field arches upward into a wide bulge. Outer side flat; both dorsally and ventrally,

F i g . 5 . Alepocephalus agassizi, left sagitta; at left inner side, at right outer side, 5 x.

a small depression the middle. Shape of the posterior margin variable due to the extending width in the opening of the cauda with the increasing size of the sagitta.

A r g e n t i n i d a e

Argentina silus (ASCANIUS)

COHEN 1964, 7, fig. 4. LEIM & SCOTT 1966, 122, fig. EMERY & McCRACKEN 1966, 1145. BORODULINA 1968, 54.

In 1968, one to several adult Argentina silus were captured at 4 stations (56°N, 58° W, 390-640 m; 1 specimen ZMB 22483); they confirm the occurrence of the species in the Labrador waters where, up to now, they have been encountered but occasionally.

The abdominal cavity of a 460 mm long female was tightly filled with ripe eggs.

B a t h y l a g i d a e

Bathylagus euryops GOODE & BEAN (Abb. 6)

B. benedicti JENSEN 1948, 93.

B. euryops COHEN 1964, 42, fig. 14. LEIM & SCOTT 1966, 124, fig. HALLIDAY & SCOTT 1969, 2692. GEISTDOERFER et al. 1971, 1181.

At 5 stations between 56-57°N, 57-58° W and 11 stations between 62-65° N, 57-63° W, one to several specimens of the species were captured at depths of from 600 to 1120 m (ZMB 22520-22522); maximum length 210 mm (female with ripe eggs). B. euryops is known from South Labrador southward and from western Greenland.

F i g . 6 . Bathylagus euryops, right-hand sagitta; inner side at left, outer side at right, 8 x

(76)

Sagitta (26 otoliths, L:H:D - 100:41:14); elongate, with a long, very pointed rostrum, thin. Dorsal edge above the ostium horizontal, partly arched, partly smooth, ascending vertically above the collum; edges in the area of the cauda smooth and rounded. Ventral edge below the

ostium angular, with numerous small curvatures. An antirostrum and an excisura occasionally suggested. Inner side plane. Sulcus median, dipping moderately in the ostium, deeply in the cauda. Ostium and cauda of an approximately equal length. Collicula not recognizable; collum indicated only by an elevation of the sulcate bottom. Entire superior crista distinct, inferior crista becoming distinct only from the collum, both flattening in the caudate direction. Area a shallow depression above the cauda, dorsal field might be slightly inclined medially towards the edge. Ventral field structureless. Proceeding from a rounded centre beyond the collum, the outer side slopes very gradually to the edge, with a peripheral rounding; an inconsiderable stiffening runs towards the rostrum. The height of the sagitta varies markedly (33-51 per cent of length) and, therewith, the curvature of the ventral edge. Otoliths of B. longirostris (KOTTHAUS 1967, Fig. 14) do not display essentially diverging characters from the species under discussion, but the rostrum of the figured specimen is broken off.

G o n o s t o m a t i d a e

Cyclothone microdon (GÜNTHER)

JENSEN 1948, 107. GREY 1964, 184, fig. 47, 50. LEIM & SCOTT 1966, 127. GEISTDOERFER et al. 1971, 1178.

St. 405/68: 63°22′ N, 60°02′ W, 960-980 m; 6 Expl. (50-58 mm SL), ZMB 22526.

According to LEIM & SCOTT, the species occurs in the Canadian area up to the Gulf of Saint Lawrence. GEISTDOERFER et al. mention it, among others, from 55°33′ N, 51°58′ W; JENSEN has already described it from Davis Strait and Baffin Bay. A few single specimens from 4 more stations (63-65° N, 56-60° W) have not been investigated more closely because they were severely injured.

Gonostoma bathyphilum (VAILLANT) (Abb. 7)

GREY 1964, 180, fig. 41, 42. GEISTDOERFER et al. 1971, 1179.

St. 430/68: 64°38′ N, 57°33′ W, 880 m; 1 Expl. (145 mm SL), ZMB 22471.

St. 435/68: 64°04′ N, 56°14′ W, 820-810 m; 1 Expl. (132 mm SL), ZMB 22472.

Gonostoma bathyphilum differs from G. elongatum (LEIM & SCOTT 1966, p. 128) by the high number of the branchiospinae on the first branchial arch (24-27), the lesser number of anal rays and the arrangement of the luminous organs on the sides (OA), situated in the form of a curved line high on the

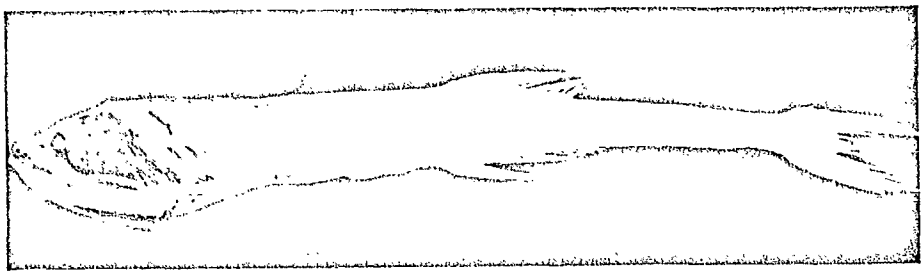


Fig. 7
Gonostoma bathyphilum
ZMB 22472

body. Scales were not observed on any spot of the very well preserved specimen. Coloration of fresh animals deep black. Fin formula: D 13, A 23, P 12-14, V 7-8.

Range: In the NW Atlantic up to 43° N. A specimen from the southern tip of Greenland, listed by GEISTDOERFER et al., and the two relatively large animals captured on our trips demonstrate that the species penetrates even into arctic waters.

Stomiatidae

Stomias boa ferox (REINHARDT)

JONSEN 1948, 111. MORROW 1964b, 296, fig. 75A, D, F. LEIM & SCOTT 1966, 134, fig. HALLIDAY & SCOTT 1969, 2694. GIBBS 1969, 1. GEISTDOERFER et al. 1971, 1180.

St. 270/68: 50°31′ N, 50°41′ W, 440-380 m; 1 Expl. (148 mm SL), ZMB 22538.

St. 286/68: 54°13′ N, 52°59′ W, 720-780 m; 3 Expl. (163-180 mm SL), ZMB 22539.

St. 401/68: 63°26′ N, 60°22′ W, 720-690 m; 1 Expl. (158 mm SL), ZMB 22639.

St. 340/70: 63°56′ N, 57°55′ W, 1100-1120 m; 1 Expl. (155 mm SL), ZMB 22600.

Known from the American coast as far as 48° N and from west of Greenland.

Chauliodontidae

Chauliodus sloani BLOCH & SCHNEIDER

MORROW 1964a, 283, fig. 74. LEIM & SCOTT 1966, 136, fig. HALLADAY & SCOTT 1969, 2694. GEISTDOERFER et al. 1971, 1180.

St. 275/68: 51°52′ N, 50°38′ W, 800-840 m; 1 Expl. (228 mm), ZMB 22498.

St. 283/68: 52°36′ N, 51°44′ W, 320-360 m; 1 Expl.

St. 395/68: 62°44′ N, 60°54′ W, 680-720 m; 1 Expl. (254 mm), ZMB 22499.

St. 145/69: 50°04′ N, 50°12′ W, 710-725 m; 4 Expl. (220-270 mm SL), ZMB 22572.

St. 199/70: 56°16′ N, 57°30′ W, 840-980 m; 2 Expl. (244 mm SL, 306 mm), ZMB 22598.

The species, universally distributed in the tropical and temperate parts of the oceans, is frequent in the NW Atlantic up to 48°N; quite recently one specimen has been reported from 56° N, 49° W. In the fresh animal ZMB 22499, a dark red luminosity was observed at the photophores near the branchiostegal rays.

A s t r o n e s t h i d a e

Borostomias antarcticus (LÖNNEBERG) (Abb. 8)

GIBBS 1964, 334, fig. 85 (Kiefer, Bulbus). GEISTDOERFER et al. 1971, 1180. jaw

St. 374 68: 62°31′ N, 60°45′ W, 900 m; 1 Expl. (148 mm SL), ZMB 22523.

St. 405/68: 63°22′ N, 60°02′ W, 960-980 m; 1 Expl. (136 mm SL), ZMB 22524.

St. 411/68: 63°17′ N, 59°06′ W, 920 m; 1 Expl. (236 mm SL), ZMB 22525.

In most places of the 3 specimens, the skin was worn to the corium, so that it was no longer possible to ascertain the number of photophore bands; no doubts exist, however, in regard to the specific position of the animals, since they were identified by the fin formulae (D 11-13, A 15-16, P 8, V 7), the proportional body measurements and the structure of the barbel (ZMB 17429 and ZMUB 5258 served for the comparison).

B. antarcticus has a bipartite postorbital photophore. In young specimens the barbel is considerably shorter than the head, but with the growing age of the animals the barbel increases in length; it terminates in a longish white bulbus with 1-2 short, very thin filaments. The specimen ZMB 22525 is a female with broad flat ovaries, containing a great number of minute eggs. Skin naked and deep black at the noninjured spots.

Range: Northernmost locality in the western Atlantic near 52°03' N, 45°36' W; a Borostomias sp. (ANON 1957, p. 63) is reported as one single specimen "from the Newfoundland and Labrador area." With the present captures, a (77)

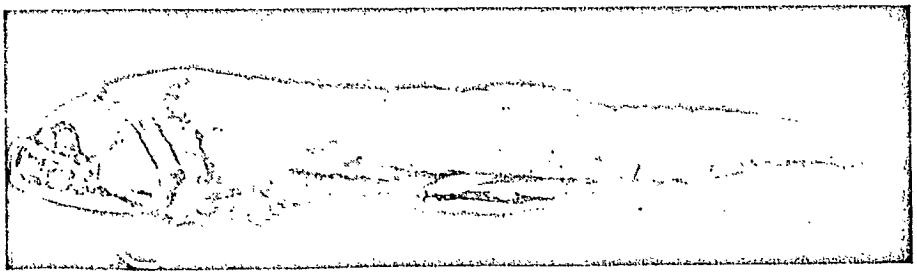


Fig. 8. Borostomias Antarcticus ZMB 22525

representative of the Astronesthidae - a family dwelling preponderantly in tropical and subtropical latitudes - has been ascertained for the first time in arctic areas.

M a l a c o s t e i d a e

Malacosteus niger AYRES

MORROW 1964c, 545, fig. 144. LEIM & SCOTT 1966, 137, fig. GEISTDOERFER et al. 1971, 1180.

St. 199 70: 56°16′ N, 57°30′ W, 840-980 m; 1 Expl. (201 mm SL), ZMB 22594.

So far captured in the Canadian area only east and southeast of Newfoundland.

I N I O M I

B a t h y s a u r i d a e

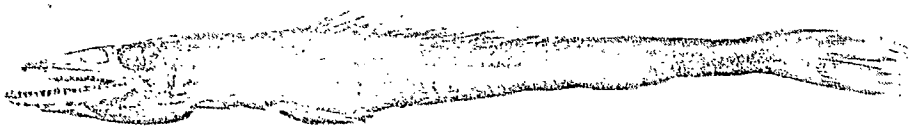
Bathysaurus agassizi GOODE & BEAN (Abb. 9,10)

GOODE & BEAN 1883, 215. MEAD 1966, 105, fig. 36.

St. 343 70: 63°21′ N, 57°00′ W, 1970-2020 m; 2 Expl., ZMB 22590.

Species of the genus Bathysaurus, attaining a length up to 60 cm which is rare among the fish of this order, are typical bottom dwellers; they have a flattened ventral face, a flat head and ventral fins arising laterally. The snout is more than double the length of the eye and both in front and laterally the lower jaw protrudes far beyond the upper one; both jaws carry (above 2, below 5) irregular rows of sturdy teeth. B. agassizi displays a long dorsal fin, occupying the central third part of the body; one to several of the middle pectoral rays are prolonged and there is no adipose fin.

F i g . 9
Bathysaurus agassizi
ZMB 22590



Both specimens are uninjured. There are insignificant divergences from the data provided by MEAD (based on 4 specimens). (See T a b l e 1 for values of the present specimens). The two first rays of the dorsal fin do not branch;

the first very short ray (about 1/8 the length of the second) is lacking in the Text Fig. of MEAD, but is already mentioned in GOODE & BEAN; the second ray is half the length of the fourth one - the longest of the fin. The dorsal originates at a distance rearward of the pectorals corresponding to the length of the snout; the ventral fins arise closely anterior to the vertical from the origin of the dorsal. Rear margin of the caudal fin faintly notched, tips somewhat pointed, longest upper ray insignificantly longer than longest lower ray.

T a b l e 1. Bathysaurus agassizi (ZMB 22590), fin formulae and proportional body measurements (in per cent SL)

D	18	17
A	11	12
P	15	15
V	8	8
Seitenlinie	66+5	65+5
Totallänge (mm) length	513	523
Standardlänge (mm)	440	452
Höhe (an V-Basis) height	(10.9)	(10.8)
Höhe (Schwanzstiel) *)	(4.9)	(4.5)
Kopf head	26.6	24.8
Schnauze snout	8.5	7.9
Auge eye	3.9	3.3
Interorbitalraum space	5.2	4.9
Oberkieferupper jaw	16.6	15.8
Schnauze – Dorsalis	35.0	33.4
Schnauze – Pectoralis	26.8	25.9
Schnauze – Ventralis	32.3	32.5
Schnauze – Analis	71.6	70.2
D-Basis	31.7	30.7
A-Basis	13.5	14.3

*) (caudal peduncle)

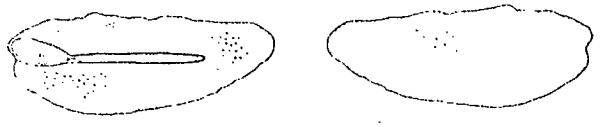
Coloration of the deep-frozen animals: head, back and sides uniformly grey-brown; ventral face, anal, pectorals and ventral surfaces of ventral fins black. The bases of the ventral fins are not pigmented and they appear as flesh-coloured half-moons anterior to the fins; upper side of the ventral fins, except for the outer margin, whitish. Oral and gill cavities lined black.

Range: Caught in the western North Atlantic in few specimens between 33-40° N, always in depths of more than 1000 m.

Sagitta (1 otolith, L:H:D - 100: 38: 16): Longish-oval, somewhat pointed towards the back. Thin; proceeding from the centre, situated above the middle of the cauda near the dorsal edge, the otolith becomes most delicately thin, particularly in the ventrate direction. Margins, except for the posterior half

of the dorsal edge, angular. Dorsal edge with two insignificant elevations, running horizontally. Ventral edge strongly curved, almost smooth. Rostrum and antirostrum faintly indicated, both overtopped by the ostium; excisura ostii lacking. Inner side slightly convex. Sulcus median, dipping deeply. The broad ostium wide open, filled by an oval flat colliculum, which terminates anteriorly closely behind the margin. Cauda narrow, twice as long as the ostium, both collicula merging with each other. Superior crista distinct only from collum, inferior crista underneath the entire sulcus. The area slopes from the superior crista as far down as to the edge, and a dorsal field is developed merely above the ostium. Postcaudal region unstructured. Ventral field arched in its totality, a groove running near the edge, below the posterior half of the cauda. The widely spaced centre forms a plane surface on the outer side and the growth strips are set off distinctly on the surface. In front of the centre lies dor- (78)
sally a deep depression.

Fig. 10.
Right-hand sagitta of Bathysaurus agassizi, inner and outer sides 4 x



Myctophidae

Myctophum punctatum RAFINESQUE (Abb. 11)
Scopelus punctatus SAEMUNDSSON 1949, 100.
Myctophum punctatum FRASER-BRUNNER 1949, 1056, fig. KOTTHAUS & KREFFT 1957, 172, 186. BOLIN 1959, 13. LEIM & SCOTT 1966, 144, fig. HALLIDAY & SCOTT 1969, 2696. GEISTDOERFER et al. 1971, 1182. ZURBRIGG & SCOTT 1972.

During the 1968 trip, 19 specimens were captured at 5 stations in the area from 51-53° N, 51-52° W (84-107 mm, ZMB 22545-22548). Although Myctophum punctatum is frequent from the Grand Bank southward, it has been found but rarely off southern Labrador. SEAMUNDSSON reports the species from Greenland, without a defined locality, while KOTTHAUS & KREFFT mention it from the Noname Bank.

Sagitta (23 otoliths, L:H:D - 100:82:18): Roundish, thin, edges smooth, almost angular; dorsal edge curved less considerably than ventral edge. Rostrum

and antirostrum of a nearly equal length, both rounded, excisura ostii a small incision. Inner side faintly convex. Sulcus broad and flat, it terminates closed within the dorsately curved cauda, narrowed at at the collum by a lower corner of the inferior crista. Ostium longer than cauda, characterized anteriorly by a short ostial groove; the origin of the anterior colliculum is not always recognizable. The posterior colliculum is very slightly higher than the anterior one and it extends closely underneath the superior crista. The latter is rounded within the antirostrum, angular towards the collum and gradually flattening above the cauda. The inferior crista is scarcely visible anteriorly, below the cauda it rises as a narrow contrasting bulge. Area above the collum a shallow depression, without a delimitation against the dorsal field. Ventral field structureless. Outer side almost plane, the surface abruptly sloping towards the edge. Length of rostrum and antirostrum as well as curvature of the ventral edge variable; in the dorsal edge, 1 - 2 shallow depressions might be present above the cauda, and on the outer side they run out as short grooves. The sagitta of M. punctatum has already been figured by SHEPHERD (1922, but the scale is so small that details are not recognizable) and by FROST (1926a, p. 468, Pl. 20, Fig. 13; M. caninianus C.V. is a synonym of M. punctatum, according to FRASER-BRUNNER). The remark by FROST that the sulcus is not defined contradicts the facts.

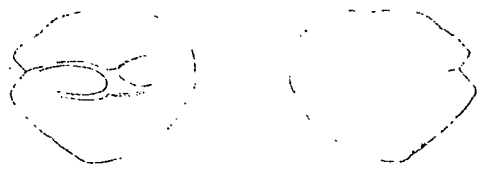


Fig. 11. Myctophum punctatum, right-hand sagitta, inner & outer sides, 8 x

Notoscopelus kroyeri MALM (Abb. 12, 13)

Lampanyctus elongatus JENSEN 1948, 106.

Notoscopelus elongatus FRASER-BRUNNER 1949, 1096, fig.

N. kroyeri BOLIN 1959, 40. LEIM & SCOTT 1966, 145, fig. HALLIDAY & SCOTT 1969, 2696.

St. 383/68: 62°52′ N, 62°32′W, 290-300 m; 1 Expl. (127 mm), ZMB 22556.

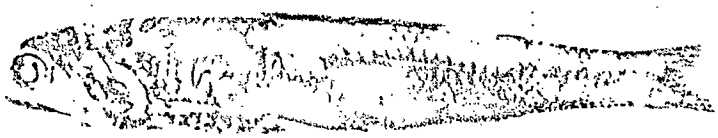
St. 405/68: 63°22′ N, 60°02′ W, 960-980 m; 2 Expl. (ca. 140 mm), ZMB 22632.

St. 408/68: 63°43′ N, 59°47′ W, 640-600 m; 1 Expl.

St. 409 68: 63°44′ N, 60°24′ W, 400-410 m; 1 Expl.

St. 417/68: 64°24′ N, 59°34′ W, 350 m; 4 Expl. (150-189 mm), ZMB 22557.

Fig. 12.
Notoscopelus kroyeri
ZMB 22557



Numerous specimens have also been captured at 11 additional stations near 51° N, 51° W and 59° N, 60° W. In contradiction to the Text Figure in LEIM & SCOTT, N. kroyeri has two horizontally arranged pol; the distance between the lower and middle SAO is less than between the middle and upper one; moreover, these three luminous organs do not lie on a straight line, but angled against one another; the line of the AOa slopes slightly anteriorly and, at its termination, it is somewhat curved upwards. Known along the American coast up to northern Labrador, also from western Greenland.

Sagitta (36 otoliths, L:H:D - 100:60:14); elongate-oval, with a long rostrum, thin. Dorsal edge straight or with a few shallow depressions, mostly somewhat rising above the cauda, rounded; a notch in the margin, lying at the height of the termination of the superior crista, indicates the transition from the dorsal to the ventral edge. Ventral edge with small flat indentations and scallops, angular. Rostrum and the much shorter antirostrum rounded. Excisura ostii deep, sometimes displaying excisural formations at the lower margin. Inner side almost plane. Sulcus broad and shallow, closed at the rear, post-caudal region short; not narrowed at the collum by a minute projection of the inferior crista. Ostium twice as long as the cauda, an ostial groove possibly extending as far as to its centre. Both collicula flat, following each

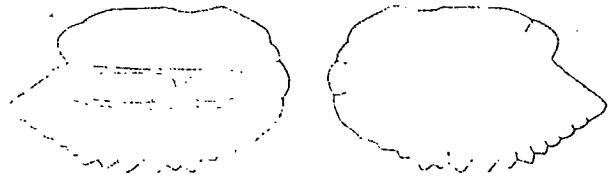


Fig. 13. Notoscopelus kroyeri
right-hand sagitta, inner and outer side, 8 x

other closely, the rostral delimitation of the anterior one difficult to make out. Superior crista of an over-all angularity, with an insignificant dorsate bending at the end of the cauda. Inferior crista flat, rounded. Area a long shallow depression, extending into the antirostrum and merging without a boundary with the dorsal field. The uniform ventral field slopes down, faintly arched, from the inferior crista to the margin. Outer side almost smooth, the thickest place lies laterally to the ostial termination; from here, the surface slopes uniformly down to the ventral edge, while the slope to the dorsal edge is gradual and more pronounced only in the marginal area. Shallow furrows might run towards the centre from the indentations of the edges or also from the excisura. The shape of the antirostrum as well as position and number of the indentations in the dorsal edge vary; the same holds true for the depth of the notch at the boundary dorsal - ventral margin.

(79)

Lampanyctus macdonaldi (GOODE & BEAN) (Abb. 14, 15)

FRASER-BRUNNER 1949, 1084, fig. BOLIN 1959, 31, fig. 7.

St. 411/68: 63°17′ N, 59°06′ W, 920 m; 1 Expl. (96 mm) ZMB 22559.

St. 341/70: 63°50′ N, 57°05′ W, 1296-1290 m; 2 Expl. (115, 132 mm), ZMB 22601.

Lampanyctus macdonaldi belongs to the species of the genus Lampanyctus, the pectoral fins of which are so short that they do not reach the ventral fins. L. macdonaldi differs from the single species named in LEIM & SCOTT (1966, p. 143), L. crocodilus (RISSO), by its more thickset body and the anal fin originating approximately underneath the 10th ray of the dorsal. Coloration of fresh specimens (scaleless) dark brown. Fin formula: D 13-14, A 16-17, P 13, V 8, Brsp. /‾?‾/ 5+1+15. *)[1]

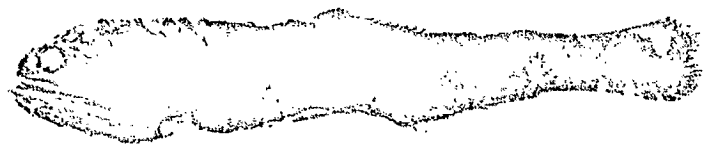


Fig. 14
Lampanyctus macdonaldi
ZMB 22601

*)[1] In accordance with the meanwhile published work by KOTTHAUS (1972, Research Results of the "METEOR", Series D, No. 11, 1) it is most likely that L. macdonaldi will have to be classed with the new genus Paralampanyctus.

Fig. 15. Lampanyctus macdonaldi right sagitta, inner and outer side, 8 x

Sagitta (1 otolith, L:H:D - 100:131:46): Very small (1% of fish length), upright-oval, dorsally somewhat narrower than ventrally; very thick. Edges angular, smooth, without any kind of interruption. Rostrum, antirostrum and excisura lacking. Inner side plane. Sulcus median, closed at the rear, post-caudal region short; broad and deeply sunk, the sulcus terminates anteriorly wide open; it is not subdivided, a uniformly high colliculum leaves free a relatively wide marginal area. Superior crista rounded, inferior crista well recognizable only in the middle; the cristae flatten out caudately, but merge with each other. Area deeper posteriorly than anteriorly, bounded against the dorsal field by an elevation. A shallow ventral groove is vaguely indicated in the middle between inferior crista and ventral edge. Outer side completely unstructured, almost globose, the thickest spot lying excentrically in the rostro-ventral area. LAVENBERG & FITCH (1966, p. 103, Fig. 3) figure the sagittae of 3 Pacific Lampanyctus species; these sagittae essentially differ in their shape, and only L. regalis corresponds in its otolith form with that of the species discussed here. LAVENBERG & FITCH emphasize that the otoliths should also be taken into account at a revision of the genus.

Scopelosauridae

Scopelosaurus lepidus (KREFFT & MAUL) (Abb. 16, 17)

Notosudis lepida (part.) KREFFT & MAUL 1955, 305, Fig. 1, 2.

POSTOLAKII 1965, 622, Fig. 1, 2. FEDOROV 1967, 957. KOTTHAUS 1972. 16. Abb.

Scopelosaurus lepidus MARSHALL 1966, 202, fig. 54.

St. 268/68: 50°39′ N, 50°43′ W, 510-520 m; 1 Expl. (386 mm), ZMB 22511.

St. 279/68: 52°14′ N, 51°05′ W, 800-840 m; 1 Expl. (362 mm), ZMB 22512.

St. 323/68: 56°59′ N, 58°36′ W, 960-1000 m; 1 Expl. (350 mm), ZMB 22513.

St. 339/68: 58°35′ N, 60°06′ W, 500-480 m.

St. 404/68: 63°27′ N, 60°00′ W, 880 m; 1 Expl. (416 mm).

St. 405/68: 63°22′ N, 60°02′ W, 960-980 m; 1 Expl. (345 mm).

St. 411/68: 63°17′ N, 59°06′ W, 920 m; 1 Expl. (361 mm).

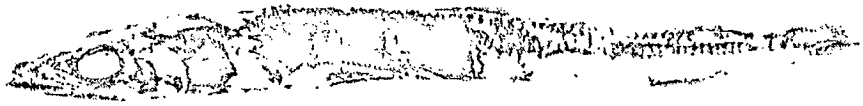
St. 430/68: 64°38′ N, 57°33′ W, 880 m; 1 Expl. (351 mm).

St. 110/69: 63°09′ N, 60°30′ W, 700-720 m; 1 Expl. (305 mm), ZMB 22573.

Except for the specimen of station 339/68, the animals were relatively well preserved; several of them were suspended in the wings of the net.

Resembling the Paralepididae in their aspect, these fish differ from the latter as follows: The cross-section of their body is almost round, they have large eyes, long pectoral fins and large scales covering the entire body and shedding easily. In comparison with the considerably smaller typus and its original description, our specimens display the following characters: the upper jaw extends to behind the posterior margin of eye and in most of the animals it carries teeth in two irregular series. Stomach samples contained exclusively crustaceans. Fresh specimens black-brown. Fin formula: D 10-12, A 15-19, P 14-15, V 9. Lateral line 57-60, Brsp. 1 + 1 + 17 - 18. The following were used for comparison: ISH 89/58, 84/65; also S. smithi (MMF 5862).

Fig. 16.
Scopelosaurus lepidus
ZMB 22573



Range: By MARSHALL - based on yet unpublished material of the "DANA" campaign - the species is said to be frequent in the North Atlantic, especially in its eastern part; from the western Atlantic, however, just one specimen has been described up to now (western Greenland, 64° N). The finds as listed above result in a continuous area of distribution in the western part of the Labrador Sea, from Newfoundland to Davis Strait.

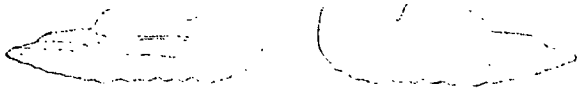


Fig. 17. Scopelosaurus lepidus
right sagitta, inner and outer side, 5 x

Sagitta (11 otoliths, L:H:D - (80)
100:38:11): longishly extended, with a very pointed rostrum that might show a faint outward curve; thin, only dorsal edge rounded in the anterior part, otherwise angular. The dorsal edge runs nearly horizontally above the ostium, at the end of which it rises and is mostly smooth; above the termination of the cauda, a deep incision; at the post-dorsal corner, the dorsal edge bends at a right angle in the ventrate direction and, without any marking,

merges with the undulate ventral edge. An antirostrum might be suggested, while the excisura ostii is lacking. Inner side faintly convex. Sulcus median, narrowing and slightly ascending in the forward direction, deeply sunk. The collum lies a little posterior to the origin of the superior crista; in the inferior crista it can be recognized only by the interrupted collicula and a minimal height difference. The narrow anterior colliculum extends to the edge, the posterior colliculum widens after the termination of the inferior crista. Both cristae very high and, when looked at from the dorsal side, appearing as projections on the inner side. Superior crista originating abruptly at the end of the ostium and terminating likewise above the posterior cauda; superior crista angular. Inferior crista, representing a broad, flat bulge at the rostrum, narrows towards the collum and runs, slightly elevated, to the middle of the cauda. Area above the superior crista a deep depression, somewhat ascending towards the narrow dorsal field. Ventral field unstructured. Upon the relatively long post-caudal region, the dorsal area displays in all specimens a rough surface, while the rest of the inner side is smooth and glossy. Outer side almost plane. From the centre, lying laterally to the middle of the cauda and being scarcely elevated, a stiffening might run towards the rostrum. The incision in the dorsal edge might be continued on the outer side as a shallow depression. The shape of the rostrum and the course of the dorsal edge up to the post-dorsal corner are subject to variations.

P a r a l e p i d i d a e

In 1968, the two following species were caught at numerous stations and partly in considerable numbers. The invariable length measurement of the animals was between 250-340 mm.

Notolepis rissoi (BONAPARTE) (Abb. 18)

Paralepis rissoi kroyeri JENSEN 1942, 7. LEIM & SCOTT 1966, 149, fig.

Notolepis rissoi ROFEN 1966, 280, fig. 85-91. POST 1968, 103.

N. rissoi kroyeri HALLIDAY & SCOTT 1969, 2697.

The species of a cosmopolitan dispersion was encountered up to now merely as isolated specimen in waters north of Newfoundland - except off Greenland. Fourteen specimens are now at hand, either preserved (ZMB 22508-22510)

or as otoliths; they originate from 7 stations in the area from 51-57° N, 51-59° W (330-840 m).

The establishing of the subspecies was based on the counts of vertebrae; POST has demonstrated that the vertebrae and, correspondingly, also the number of the anal rays depend on the water temperature, so that the splitting up into subspecies is unjustified.

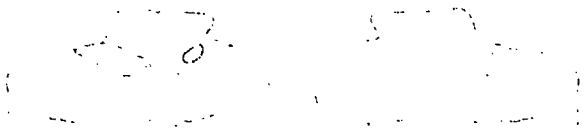


Fig. 18. Notolepis rissoi, right sagitta, inner and outer side, 10 x

Sagitta (16 otoliths, L:H:D - 100:46:13): longishly-extended, the part lying dorsally of the sulcus very thin, low and only about 2.5 of the length of the much larger and thicker ventral part which, anteriorly, might be insignificantly bent in the ventrate direction. Edges almost smooth, rounded, the dorsal and ventral edges being separated posteriorly by the open cauda. According to the definition, one might designate as rostrum the anterior section of the ventral part. Since, however, the structures of the inner side otherwise accompanying the sulcus are also lacking (see below), this is disregarded. No antirostrum and excisura. Inner side nearly plane. In the middle area of the otolith, the sulcus runs an arcuate course, it is open at both ends and of a very peculiar shape: it contrasts with the surface of the inner side only by a line which, at times, is difficult to make out. A slightly raised anterior colliculum fills the ostium close to its borders. In the central part of the cauda is a small oval recess with an islandlike elevation - the posterior colliculum. The region separating ostium and cauda is ventrally raised and displays a bounded area with a rough surface; presumably, this corresponds to the collum. The inner side is structureless, except for the sulcus, hence, the cristae, an area and a ventral groove are missing. Dorsal part flat, sloping down uniformly to the edge; ventral part faintly convex. Outer side almost plane, the concentric growth lines also distinctly marked in the surface structure. Surface towards the anterior section of the ventral part sloping. The otoliths vary insignificantly in the shape of the ventral part.

Paralepis coregonoides RISSO (Abb. 19)

P. coregonoides borealis JENSEN, 1942, 7. KOTTHAUS & KREFFT 1957, 172.

P. coregonoides ROFEN 1966, 259, fig. 77-84.

St. 263/68: 51°05′ N, 50°35′ W, 570-600 m.
St. 270/68: 50°31′ N, 50°41′ W, 440-380 m; 3 Expl. (260-270 mm), ZMB 22504.

St. 277/68: 52°08′ N, 51°13′ W, 380-360 m; 1 Expl. (279 mm), ZMB 22505.

St. 280/68: 52°33′ N, 51°36′ W, 320-350 m.

St. 297/68: 56°22′ N, 57°46′ W, 760-750 m.

St. 307/68: 56°29′ N, 58°09′ W, 390-400 m.

St. 308/68: 56°32′ N, 58°20′ W, 300-320 m; 1 Expl. (287 mm), ZMB 22506.

St. 320/68: 56°54′ N, 58°51′ W, 560-650 m.

St. 325/68: 57°04′ N, 58°52′ W, 560-610 m.

St. 357/68: 61°10′ N, 62°08′ W, 620-640 m; 5 Expl. (bis 340 mm).

St. 380/68: 62°50′ N, 60°43′ W, 660-630 m; 1 Expl. (verletzt), ZMB 22507.

St. 383/68: 62°52′ N, 61°32′ W, 290-300 m.

St. 417/68: 64°24′ N, 59° 34′ W, 350 m.

LEIM & SCOTT (1966, p. 148) mention the subspecies P. coregonoides borealis only in the key to determinations. P. coregonoides differs from P. atlantica (KRØYER) (the species named P. borealis borealis ZUGMAYER in LEIM & SCOTT is a synonym) in the arrangement of the denticles on the praemaxilla (in adult animals), here in a continuous series, while in P. atlantica, they appear in groups of 3 to 4.

Several specimens were present in all of the hauls, and at station 280, the species was caught in great numbers together with P. atlantica. Stomach samples of animals from stations 308, 357 and 408 contained exclusively crustaceans (copepods and hyperiids).

Range: By maps of both JENSEN and ROFEN, the species is found in the W Atlantic in an area between 30-40° N and off western Greenland. *)[1]

Sagitta (47 otoliths, L:H:D: - 100:52:13): arched outward in its to- (81)
tality, resembles the shape of the Notoleptis sagitta, but differences exist in the proportions. Dorsal part relatively higher, mostly with a depression

*)[1] LEAR & MAY (1971, J. Fish. Res. Board, Canada 28, 1199) have identified the species under discussion in stomach samples of Salmo salar, captured in Davis Strait and the Labrador Sea.

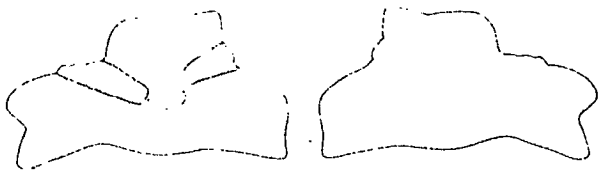


Fig. 19. Paralepis coregonoides right sagitta, inner & outer side, 10 x

in the middle and slightly rising in the caudate direction. Ventral part with a stronger ventrate curving anteriorly and being two-lobed due to a ± deep indentation. Horizontal part of the ventral edge with 1 - 2 shallow sinuosities. Rostrum (see description of Notolepis). Antirostrum and excisura ostii lacking. Inner side convex, the highest point being the collum. Sulcus recognizable only in the bounding of the collicula. Ostium and the shorter cauda terminate wide open; both are filled with upwardly embossed collicula protruding considerably beyond the edge of the otolith and thus being visible also from the outer side. Ostium and cauda are entirely separate. The collum is of a similar shape as in Notolepis, but higher. There are no further structures of the inner side. Outer side concave, especially the posterior section of the ventral part; the thickest place of the otolith is laterally inclined and glossy. The centre is a small raised curvature; the growth lines, minimally differing in their height, are, moreover, capped by a finely frilled structure. The variability concerns the outline of the ventral part and the projections of the collicula beyond the otolith edge. Otoliths of the Paralepidid genera Uncisudis and Maculisudis, figured by KOTTHAUS (1967, Figs. 86 and 90), display a less differentiated outline, and in Maculisudis a subdivision into a dorsal and ventral part seems to suggest itself; regrettably, the structures of the inner side are not recognizable.

L Y O M E R I

E u r y p h a r y n g i d a e

Eurypharynx pelecanoides VAILLANT

LEIM & SCOTT 1966, 152. BÖHLKE 1966, 611, fig. 219.

St. 343/70: 63°21' N, 57°00' W, 1970-2020 m; 1 Expl. (450 mm), ZMB 22589.

This species is widely distributed in the Atlantic, although as yet not found in higher latitudes than 40° N; the excellently preserved specimen demonstrates that Eurypharynx pelecanoides penetrates as far as into arctic areas.

A P O D E S

S e r r i v o m e r i d a e

Serrivomer beani GILL & RYDER

BERTIN 1944, 106, fig. 2A (Hyoid und Branchiostegalstrahlen), BAUCHOT-BOUTIN 1954, 306, LEIM & SCOTT 1966, 159, fig. *)

St. 272/68; 51°17' N, 50°31' W, 360-400 m; 1 Expl. (560 mm), ZMB 22502.

*) (hyoid and branchiostegal rays).

For Canadian waters, Serrivomer beani is reported up to Flemish Cap (48° N); (see also species following next)

Serrivomer parabeani BERTIN

Paraserrivomer hasta ROULE & ANGEL 1933, 70, pl. IV, fig. 33.

Serrivomer parabeani BERTIN 1940, 76 (Umbenennung der von ROULE & ANGEL beschriebenen Exemplare); 1944, 106, fig. 2C (Hyoid und Branchiostegalstrahlen), BAUCHOT-BOUTIN 1953, 366; 1954, 305. **)

St. 275/68; 51°52' N, 50°38' W, 800-840 m; 1 Expl. (580 mm), ZMB 22503.

St. 340/70; 63°56' N, 57°55' W, 1100-1120 m; 2 Expl. (ca. 360 und 495 mm), ZMB 22597.

**) (renamed specimens described by ROULE & ANGEL)

Outwardly, Serrivomer parabeani does not differ from S. beani either in its shape or coloration; in a fresh state, these fish are reddish-brown and coppery lustrous.

The two species cannot be differentiated but by one single character: while in S. parabeani the first branchiostegal ray terminates at the hypohyal, it overtops this bone forward by a + long piece in S. beani; rays 2-5 are always prolonged.

Range: ROULE & ANGEL name 43° N, 59-63° W as northernmost localities from the American coast; reports of later captures in the western Atlantic were not ascertained in the literature.

Additional specimens of Serrivomer were captured at three stations (52-56° N, 51-57° W, 600-980 m); due to the fact that they were not preserved, their specific position remains unclarified.

Synaphobranchidae

Synaphobranchus kaupi JOHNSON

JENSEN 1948, 58. LEIM & SCOTT 1966, 163, fig.

St. 266/68: 50°42′ N, 50°40′ W, 820-800 m; 1 Expl. (480 mm), ZMB 22527.

St. 287/68: 54°11′ N, 52°55′ W, 800-880m; 1 Expl. (263 mm), ZMB 22478.

St. 292/68: 55°21′ N, 54°51′ W, 680-720 m; 1 Expl. (432 mm), ZMB 22528.

St. 294/68: 55°51′ N, 57°22′ W, 690-680 m; 1 Expl. (222 mm), ZMB 22479.

St. 320/68: 56°54′ N, 58°51′ W, 560-650 m; 1 Expl. (402 mm), ZMB 22529.

St. 322/68: 56°59′ N, 58°36′ W, 960-1000 m; 1 Expl.

St. 380/68: 62°50′ N, 60°43′ W, 660-630 m; 1 Expl. (196 mm), ZMB 22480.

St. 391/68: 62°48′ N, 60°46′ W, 680-670 m; 1 Expl. (357 mm), ZMB 22481.

St. 399/68: 62°59′ N, 60°12′ W, 850-830 m.

Synaphobranchus kaupi is frequent from Grand Bank southwards and near western Greenland; it has evidently not been ascertained as yet off Labrador and Baffin Land.

HETEROMI

Notacanthidae

Notacanthus sp.

St. 274/68: 51°57′ N, 50°46′ W, 640-600 m.

St. 275/68: 51°52′ N, 50°38′ W, 800-840 m; 1 Expl. (680 mm), ZMB 22637.

St. 276/68: 51°58′ N, 50°46′ W, 550-600 m; 2 Expl. (540, 930 mm).

St. 368/68: 61°25′ N, 60°44′ W, 560-550 m.

St. 394/68: 63°02′ N, 60°33′ W, 640 m.

St. 428/68: 64°53′ N, 57°54′ W, 690-670 m.

St. 441/68: 65°06′ N, 58°00′ W, 700-650 m.

St. 442/68: 64°47′ N, 58°14′ W, 640 m.

Three species of Notacanthus GILL have been described from the NW Atlantic; from among them, merely N. analis appears to be unambiguously characterized by its thickset shape. According to the literature (GOODE & BEAN 1895a; JORDAN & EVERMANN 1896, 1900; BIGELOW & SCHROEDER 1935; TUCKER & JONES 1951; LEIM & SCOTT 1966; BERGERON 1968), the variability of the fin rays is so extensive in the two other species - due to the fact that, at times, the tail end is

lacking, this variability is increased for the anal fin - that the specific boundaries overlap. Consequently, a specific attribution of the one single preserved specimen (D 10 + 1, A 20, about 140; P 17, V 3/6) does not seem sensible at the present moment. At the occasion of a future trawling trip it will be endeavoured to obtain a sufficient material for clarifying this question.

LEIM & SCOTT designate the species encountered in Canadian waters northward up to Grand Bank as N. nasus and state in a footnote that N. phasganorus GOODE and N. chemnitzi BLOCH are probably synonyms. The valid name of the species, described by BLOCH as "inhabiting the Northern Sea," is N. chemnitzi, since this description is dated 1787, while BLOCH has described N. nasus (from the East Indies!) only in 1795.

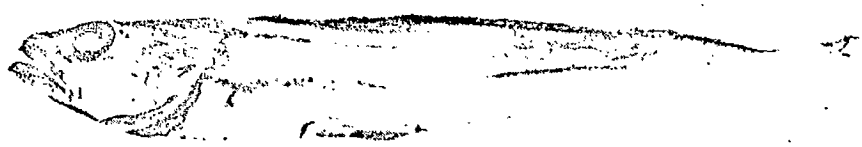
KOTTHAUS & KREFFT (1957) report to have captured two N. phasganorus from Davis Strait.

ANACANTHINI (82)

M o r i d a e

Antimora rostrata (GÜNTHER)
KOEFOED 1927, 118, fig. 44, 45. JENSEN 1948, 173.
LEIM & SCOTT 1966, 187, fig.

Antimora rostrata is not infrequent along the North American coast; in 1968, the "ERNST HAECKEL" captured the species at 24 stations (51-65° N, 51-61° W, 550 - 1000 m). KOEFOED provides the body measurements of numerous specimens, whithout, however, noting anything in regard to the variability of the fin rays. Therefore, the following were ascertained in 35 animals (239-552 mm): D 4-5 /53-58, A 40-45, P 18-21, V 6. The stomach content could not be investigated in anyone of the specimens, because all the stomachs were either evaginated or empty.



F i g . 20 .
Halargyreus johnsoni
ZMB 22566

Halargyreus johnsoni GÜNTHER (Abb. 20)
KREFFT, 1967, 185. TEMPLEMAN 1968, 877. HAEDRICH & HORN 1970, 391.
St. 110/69: 63°09' N, 60°30' W, 700-720 m; 4 Expl. (248-290 mm), ZMB 22566.

Halargyreus johnsoni - according to the revision by TEMPLEMAN, the genus is monotypical - differs from other morid fishes by its elongate and slender shape, the deeply forked anal fin and the prognathous lower jaw with a tubercle at the symphysis. A barbel, as possessed by most of the morid fishes, among them also Lepidion, is lacking in Halargyreus.
D 1 + 7/51-54 (the first ray of the first dorsal is very small; this is also the case in the species described next), A 43-45, P 17-19, V 5. Coloration of the deep-frozen animals whitish-silvery (the scarcely pigmented scale pockets are no longer recognizable in all places), snout blackish, mouth and branchial cavity lined black.

Range: In the NW Atlantic ascertained only in most recent times with 3 specimens each time, from Grand Bank and New York Bay. Finds from Iceland (more than 700 specimens, KREFFT) are from the same northern latitude as the "ERNST HAECKEL" specimens.

Lepidion eques (GÜNTHER) (Abb. 21)

Haloporphyrus eques JENSEN 1948, 174.

Lepidion eques TEMPLEMAN 1970, 457.

St. 389 68: 62 52' N, 60 43' W, 660-630 m: 2 Expl. (größeres 250 mm), ZMB 22465.

St. 397 68: 62 49' N, 60 41' W, 680-720 m: 1 Expl. (294 mm).

St. 61 69: 63 05' N, 52 14' W, 480 m: 1 Expl. (294 mm), ZMB 22567.

F i g . 21
Lepidion eques
ZMB 22568

In comparison with Halargyreus, the relatively high-backed Lepidion eques*) tapers towards the snout into a pointed shape, and yet more strongly so towards the tail. The second ray of the short first dorsal (according to

*) TRANSLATOR's NOTE: The uppermost line of the German text on p.82 is as much as illegible and only with a magnifying glass the meaning could be guessed. "Halargyreus" is correct, but the generic capital letter for "eques" is a sheer blank; acc. to F i g . 21, however, it should be "L. eques."

the specimens at hand, up to 42% of SL) and in a lesser measure the two outermost ventral rays are prolonged; mouth faintly rearward of upper jaw, eye large.

D 1 + 4/52-57, A 49-54, P 21-24, V 8. In the well-preserved specimens the scales were still present in many places and, therefore, the numbers along the lateral line could be ascertained ± correctly; in three specimens (including one from 63° N, 21° W) they were 150-156; but this character is not suitable for a differentiation from the Mediterranean species L. lepidion (RISSO) or at least improbably so (see TEMPLEMAN).

Fresh specimens yellowish-brown, eye framed black; nonpaired fins grey-blue, darker towards the border.

Range: L. eques too is known from Canadian waters since recently (Grand Bank - Hamilton Inlet Bank, 1 specimen from Cap Chidley); JENSEN mentions the species from Davis Strait.

G a d i d a e

Brosme brosme (MÜLLER)

JENSEN 1948, 175. LEIM & SCOTT 1966, 161, fig. KOHLER 1968.

St. 270/68: 50°31′ N, 50°41′ W, 440-380 m; 1 Expl. (640 mm).

St. 291/68: 55°09′ N, 54°52′ W, 480-520 m.

St. 293/68: 55°35′ N, 57°04′ W, 420-400 m; 1 Expl. (580 mm), ZMB 22461.

St. 300/68: 56°21′ N, 57°46′ W, 430-450 m.

LEIM & SCOTT name Belle Isle Strait as the northernmost locality along the American coast.

Gaidropsarus ensis (REINHARDT) (Abb. 22)

JENSEN 1948, 166, pl. IVa, LEIM & SCOTT 1966, 201, fig.

The species is not uncommon from northern Labrador northward; in 1968, "ERNST HAECKEL" captured it at 11 stations (63-65° N, 56-62° W, 290-980 m).

Gaidropsarus ensis differs from G. argentatus (REINHARDT), occurring in the same area, by the length of the single ray of the first dorsal; 16-22% of SL were measured in 18 specimens of a 291 to 431 mm length. For 2 juvenile specimens (109 and 140 mm), the percentages were 12.3 and 13; but here too, the ray of the ray of the first dorsal exceeds in length the origin of the 2nd dorsal, while, in 14 specimens of G. argentatus (74-88 mm), the ray is not longer than half the distance from 1st to 2nd dorsal. Colour of adult animals bright brick-red, juveniles light beige.

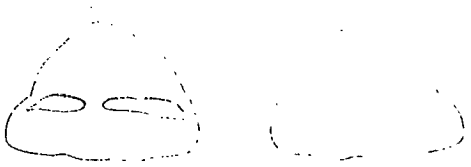


Fig. 22. Gaidropsarus ensis, right sagitta, inner and outer side, 8 x

Sagitta (16 otoliths, L:H:D - 100:68:29): very small (1 percent of fish length), resembling a triangle with rounded corners, thick. Edges nearly smooth, rounded off strongly. Above the collum, the dorsal edge rises to a high tip. Rostrum very wide, antirostrum sometimes suggested as a shallow arching of the dorsal edge; the excisura ostii is a minute depression in the edge. A small indentation might indicate the caudal transition dorsal-ventral edge. Inner side almost plane. Sulcus median, flattening forward and backward and mostly terminating closed; at the collum it is interrupted by a broad bridge that connects both cristae with each other. Flat collicula fill the bottom of ostium and cauda close to the borders. Both cristae are feebly developed and rounded. Dorsal and ventral area of the inner side unstructured. Outer side throughout strongly curved and without any depressions. The height fluctuates between 64-72% of the length. The course of the dorsal edge above the cauda varies insignificantly. Otoliths of G. argentatus are relatively larger if referred to the fish length (SCHMIDT 1968, p. 19, about 1:60), also flatter and considerably thinner (1: 0.51 : 0.19).

Phycis chesteri GOODE & BEAN (Abb. 23)

Phycis chesteri GOODE & BEAN 1878, 256. SVETOVIDOV 1948, 103.

Urophycis chesteri LEIM & SCOTT 1966, 215, fig.

St. 110/69: 63°09′ N, 60°30′ W, 700-720 m; 1 Expl. (334 mm), ZMB 22571.

Although the original description indicates 56 rays for the anal fin (partly this has been retained in the literature to this day), the authors list 47 rays for all 3 specimens in the T a b l e. Our specimen is: D 11/55, A 44, P 17, V 3.

The distribution of Ph. chesteri is confined to the NW Atlantic (North Carolina to the Canal of Saint Lawrence).

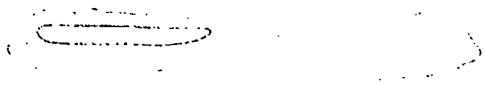


Fig. 23. Phycis chesteri, right sagitta, inner and outer side. 2 x

Sagitta (1 otolith, L:H:D - 100:35:14): extended and elongate, caudally more strongly pointed than rostrally, thin. Edges with a few small sinuosities, mainly in the area of the cauda, rounded. Dorsal edge, following the rise at the anterior end, almost horizontal, ventral edge curved. Rostrum, antirostrum and excisura ostii lacking. Inner side convex, sloping particularly towards the caudo-ventral edge. The shallow sulcus runs nearer the dorsal edge, extends as much as the whole length of the otolith and is closed at both ends. The boundary ostium/cauda is suggested by a tiny notch in the dorsal margin of the sulcus. Colliculum undivided, flat. Cristae scarcely developed, inferior crista below the boundary ostium/cauda represented by a low bulge that flattens both forward and backward. Area a narrow depression above the cauda, without a transition into the dorsal field. From the middle of the ostium, the ventral field shows an elevation, running caudally; approximately at the centre of the otolith originates a ventral groove, the outer margin of which slopes steeply down to the ventral edge. Outer side ± plane throughout, with the thickest spot lying near the anterior end. From the sinuosities of the edges shallow depressions run to the centre. The otoliths of Phycis phycis (L.) (SANZ ECHEVERRIA 1935) are more compact than those of Ph. chesteri; in them, moreover, like in the otoliths of Ph. blennoides (BRUNNICH) (FROST 1926b; SANZ ECHEVERRIA 1935; SCHMIDT 1968), the outer side is strongly sculptured, although the sinuosities grow shallower with the increasing length of the otolith, according to SANZ ECHEVERRIA.

Macrouridae

Nezumia bairdi (GOODE & BEAN)

PARR 1946, 37, fig. 11 A, 12. LEIM & SCOTT 1966, 223, fig.

By data from the literature, this North Atlantic species is occurring in the west from the West Indies to Saint Lawrence River; in 1968, the "ERNST HAECKEL" captured Nezumia bairdi at 21 stations, in 1969 at 2 stations, between 51-63° N, 50-61° W, in depths of 380-900 m, each time one to several specimens per haul (ZMB 22458-59, 22564-65).

In 26 specimens (303-434 mm) the fin rays were counted: first dorsal 11-13, 2nd dorsal max. 159, anal max. 138, P 16-20, V 6-7. Stomach samples of the animals contained mainly crustaceans, moreover polychaetes, mussels, remains of a cephalopod jaw and isolated fish scales. Coloration dark, brown-violet, stomach bluish-silvery

Trachyrincus murrayi GÜNTHER

JENSEN 1948, 176. LEIM & SCOTT 1966, 225, fig.

St. 275/68: 51°52′ N, 50°38′ W, 800-840 m; 4 Expl. (341-436 mm), 2 Expl. ZMB 22447.

St. 279/68: 52°14′ N, 51°05′ W, 800-840 m; 1 Expl. (386 mm).

St. 296/68: 56°10′ N, 57°16′ W, 960-1000 m; 1 Expl. (434 mm).

St. 405/68: 63°22′ N, 60°02′ W, 960-980 m; 2 Expl. (462, 482 mm), 1 Expl. ZMB 22446.

The range of this North Atlantic species is, as yet, scarcely known in the west; one single specimen was caught off Labrador (55° N, 53° W), 2 off western Greenland.

Colour grey, nonpaired fins blue-grey, mouth and gill cavity coated with a dark shade.

PERCOMORPHI

Chiasmodontidae

Chiasmodon niger JOHNSON (Abb. 24)

NORMAN 1929, 538, fig. 8a. KOEFOED 1952, 11, fig. 3, pl. I, fig. C, pl. II, fig. B. KOTTHAUS & KREFFT 1957, 177, 188. LEIM & SCOTT 1966, 271, fig.

St. 287/68: 54° 11′ N, 52°55′ W, 800-880 m; 1 Expl., ZMB 22638.

The very large, well-preserved specimen was taken from the wings of the net.

First dorsal 10, 2nd dorsal 30, A 32, P 13, V 1/5, lateral line approximately 90 + 3. Differences exist between data from the literature and the ascertained fin formulae and proportional body measurements (see Table 2).

They might, however, be partly explained by the considerably smaller (84) size of the specimens captured thus far; thus, possibly, the short first anal ray in small animals might have been overlooked.

T a b l e 2 . Chiasmodon niger (ZMB 22638) body proportions (in per cent SL)

Totallänge (mm) length	218
Standardlänge (mm)	188
Höhe (an V-Basis) height at V base	14.5
Höhe (Schwanzstiel) caudal peduncle	4.5
Kopf head	25.3
Schnauze snout	6.2
Orbita	4.6
Interorbitalraum space	6.4
Postorbitallänge	14.9
Oberkiefer upper jaw	20.2
Schnauze – 1. Dorsalis	31.9
Schnauze – 2. Dorsalis	49.5
Schnauze – Pectoralis	26.8
Schnauze – Ventralis	28.4
Schnauze – Analis	51.3
D_1-Basis	16.0
D_2-Basis	38.3
A-Basis	36.2

The specimen was compared with: ISH 13/55(KOTTHAUS & KREFFT), 1010/68 and 1593/68.

Range: Only 2 specimens are known from the NE American coast; they were found drifting upon the surface near La Have Bank and south of Browns Bank.

F i g . 24 . Chiasmodon niger, right sagitta, inner and outer side, 8 x

Sagitta (1 otolith, L:H:D - 100:62:17); approximately triangular, caudo-ventral corner medially curved, thin. Edges smooth, rounded. The dorsal edge rises up to the centre of the otolith, whereafter it slopes down in the same measure and encloses the end of the otolith; a notch separates it from the ventral edge,which runs horizontally and, widely rounded, forms the rostrum. Antirostrum and excisura are suggested. Inner side uneven. The broad sulcus, sunk deeply in the cauda, is open both anteriorly and posteriorly and not narrowed down at the collum. An obliquely running zone at the bottom of the sulcus separates a shorter posterior from a longer anterior colliculum, not reaching the edge. Superior crista feebly developed in the antirostrum, both cristae arched upward with a rough surface in the region of the collicula. Area as a shallow short groove between the superior crista and the dorsal field. A deep ventral groove surrounds the

inferior crista in an arcuate shape, the outer edge is concavely curved. Outer side flat and smooth, with a but minimally elevated centre; anterior thereto, the surface slopes gradually to the ventral edge, while it descends towards the dorsal edge only near the margin. Rostrum inconsiderably thickened.

T r i c h iu r i d a e

Aphanopus carbo LOWE

TUCKER 1956, 83, fig. 6, 7. TEMPLEMAN & SQUIRES 1963, 273. LEIM & SCOTT 1966, 277, fig.

St. 322/68: 56°45′ N, 58°29′ W, 890-840 m; 2 Expl. (831, 1100 mm), kleines Expl. ZMB 22500. small spec.

St. 396/68: 62°44′ N, 60°54′ W, 640 m; 1 Expl.

Only a short while ago it has been ascertained in the Canadian area; its northernmost locality lying at 52° N, 51° W.

Colour of fresh animals uniformly black, with a metallic lustre. The Fig. in LEIM & SCOTT is not quite correct. Aphanopus carbo is somewhat more elongate (head 5 times in SL), and the hard- and soft-ray parts of the dorsal are interrupted above the origin of the anal fin.

Z o a r c i d a e

Lycodonus mirabilis GOODE & BEAN (Abb. 25)

GOODE & BEAN 1883, 208; 1895c, 312, fig. 280. JORDAN & EVERMANN 1898, 2474; 1900, fig. 862. KOEFOED 1927, 137, pl. V, fig. 6. JENSEN 1952a, 27, kl. I. fig. 2a, pl. II, fig. 2b-d.

St. 357/68: 61°10′ N, 62°08′ W, 620-640 m; 1 Expl., ZMB 22469.

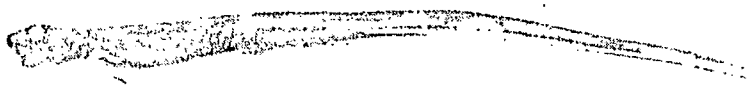
St. 104/69: 64°03′ N, 58°42′ W, 840-870 m; 1 Expl., ZMB 22576.

St. 341/70: 63°50′ N, 57°05′ W, 1296-1290 m; 1 Expl., ZMB 22595.

St. 343/70: 63°21′ N, 57°00′ W, 1970-2020 m; 2 Expl., ZMB 22596.

Five species of small, eel-shaped Zoarcidae, very much resembling the Lycenchelys, belong to the genus Lycodonus; but they are distinguished by ectodermal bony plates at the bases of the dorsal and anal fins. The original description of Lycodonus mirabilis is based on a single, 112 mm long specimen; since this description and later data are incomplete, the following supplementary remarks might be added (as to particulars concerning our specimens, see T a b l e 3).

Fig. 25.



Lycodonus mirabilis

ZMB 22576

Head 9 times in TL; eye 3.6 - 4.3 times in head length, approximately 2 times in the post-orbital length. Vomer and palatine carrying teeth; the 2-7 vomerine teeth, uniformly distributed, form a round patch, the 2-5 palatine teeth are predominantly arranged in a series. The bony plates of the dorsal originate closely posterior to the insertion of the pectorals, the dorsal rays begin after 8-9 free bony plates (by GOODE & BEAN and also JENSEN, they may be 10-11 plates) above the termination of the pectorals. The anal fin arises below the 6th to 9th dorsal ray. In all specimens, the pectoral fins are half as long as the distance pectoral - anal fin. Head and all fins black, underside bluish-grey, rest of the body ± light-coloured.

Table 3. Lycodonus mirabilis, fin formulae and proportional body measurements (in per cent of SL)

D	99	103	105	107	102
A	94	96	98	102	96
P	15	15	15,16	17	16
V	3	3	3	3	3
Totallänge (mm)	130	219	246	260	282
Standardlänge (mm)	126	214	241	253	275
Höhe (an A-Beginn)	4.0	4.8	(3,9)	(4.0)	4,9
Kopf	12.7	10.8	11,6	11,7	10.9
Schnauze	3.4	3.3	3,2	2,7	2,9
Auge	3.2	2.8	3,3	2.8	2.8
Interorbitalraum	0.9	0.6	0,7	0.7	0.6
Postorbitallänge	5.2	5.2	5,4	5.6	5.1
Schnauze – Beginn der dorsalen Knochenplatten *)	13.3	12.0	12.9	12.6	12,4
Schnauze – Ventralis	9.6	9.4	9.3	8.7	9 0
Schnauze Analis	25.6	26.4	25,3	25.3	26,2
D-Basis	79,4	81.3	81.0	81.5	80.7
A-Basis	74.6	72.8	73.8	75.2	73,1

*) snout - orig.dorsal bone plates

Range : Along the American coast, the species is known from 35° N to south of Grand Bank; 2 specimens were captured off W Greenland. With one single exception, all specimens mentioned in the literature were caught in

depths exceeding 1100 m. [See omitted paragraph following here]

[Inadvertently omitted paragraph from text page 84]

Affinities: Lycodonus mirabilis differs from L. flagellicauda and L. ophidium (JENSEN 1904) from the NE Atlantic and L. vermiformis from the SE Atlantic (BARNARD 1927, possibly the synonym of a NE Atlantic species, since BARNARD does not mention both species) by the free bony plates anterior of the dorsal fin. In the Japanese species L. dorsoscutatus (OSHIMA 1957) the bony plates at the anal fin (only 48 rays) are lacking; moreover, the species is relatively high.

Lycodes vahli REINHARDT

JENSEN 1952a, 6. LEIM & SCOTT 1966, 325, fig.

St. 260 68: 51°06′ N, 50°36′ W, 270 m; 2 Expl. (340, 410 mm), ZMB 22634.

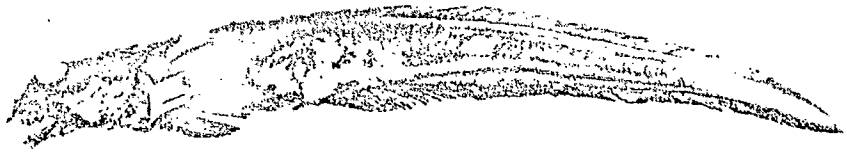
According to LEIM & SCOTT, the range of the species in Canadian waters is confined to the region of the Gulf of Saint Lawrence.

Lycodes terraenovae COLLETT (Abb. 26)

COLLETT 1896, 54. JENSEN 1904, 27. JORDAN & EVERMANN 1898, 2466. KOEFOED 1927, 134, pl. II, fig. 3. VLADYKOV & TREMBLAY 1936, 11 23, 44.

St. 104'69: 64°03′ N, 58°42′ W, 840-870 m; 1 Expl., ZMB 22642.

Fig. 26.
Lycodes terraenovae
ZMB 22642



The specimen was preserved in alcohol. Parts of the skin are very soft and, therefore, they have fallen off; also, organs of the abdominal cavity have come out.

L. terraenovae belongs to the long-tailed Lycodes species; furthermore, it is characterized by the following features: the high number of pectoral rays, one single lateral line (positioned ventrally; for small specimens, KOEFOED mentions an additional dorsal L. lateralis) and a uniform colouring (deep-frozen specimen black-brown).

T a b l e 4 . Lycodes terraenovae (ZMB 22642) proportional body measurements (in per cent TL)

Totallänge (mm) length	356
Höhe (an Anus) height	9.8
Kopf head	19.4
Schnauze snout	6.7
Auge eye	3,7
Interorbitalraum (Haut)	3.1
Postorbitallänge	9.6
Oberkiefer upper jaw	7.0
Schnauze – Dorsalis	25.0
Schnauze – Anus	35.9
Schnauze – Pectoralis	19.1
Schnauze – Ventralis	14.6
D-Basis	76.4
A-Basis	62 3
Pectoralis-Länge	11.5

Fin formula : D 109, A 97 (both without caudal rays) P 23, V 3; proportional body measurements summarized in T a b l e 4. Vomerine teeth 7; palatine teeth 2 and/or 7; they are positioned in a series half as long as that of the praemaxilla. Head, pectoral fins included, naked, rest of the body covered with relatively large scales.

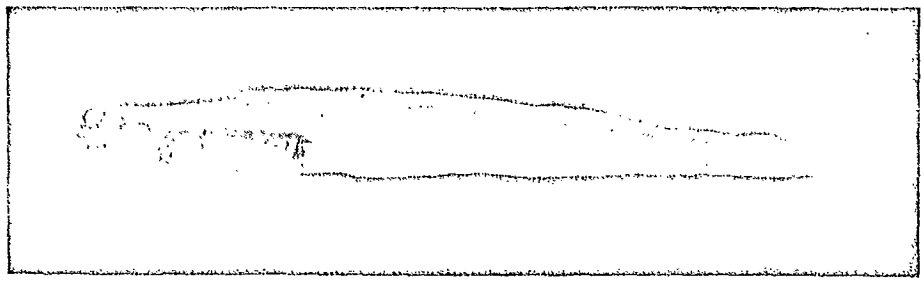
Range and affinities: The species was described from four specimens caught at the northern border of Grand Bank and, provisionally, COLLETT named it L. terraenovae. In 1901, JENSEN, subsequent to the investigation of one specimen, promoted L. frigidus GOODE & BEAN (1895c, of COLLETT) to a new species - L. atlanticus (listed by LEIM & SCOTT 1966, p. 316, in the determining key); in a footnote of 1904, /¯JENSEN _/¯ indicated as distinguishing character to L. terraenovae differences in the body proportions and the number of palatine teeth. Near to the original locality, L. terraenovae was captured again in but 12 small specimens (KOEFOED, maximum 112 mm); an amalgamation of the two species, as carried out by VLADYKOV & TREMBLAY, does not seem justified before a sufficient material is available and the animals can be directly compared.

Melanostigma atlanticum KOEFOED (Abb. 27)

McALLISTER & REES 1964, 93, figs. LEIM & SCOTT 1966, 328, fig

St. 322/68: 56°45′ N, 58°29′ W, 800-840 m; 1 ♀ (143 mm), ZMB 22470.

McALLISTER & REES note for femals that, usually, they are lacking larger teeth on their jaws. Our specimen, however, has on each side of the



F i g . 27 .
Melanostigma atlanticum
ZMB 22470

lower jaw two large canine teeth; on the upper jaw too, there are two teeth larger than the other ones upon the dorsal process of the praemaxilla. Fresh animals flesh-coloured, dorsal and anal fins translucent; head and tail - especially towards the end - blackish; eye and the transparent peritonaeum blue-silvery.

Widely distributed in the shelf region of the NW Atlantic from 39-49°N; longest known specimen 138 mm.

C o t t i d a e

Artediellus atlanticus JORDAN & EVERMANN (86)

A. atlanticus JENSEN 1952b, 6, pl. I, fig. 2. McALLISTER 1963, 50, fig.

A. uncinatus (part.) LEIM & SCOTT 1966, 346.

St. 383/68: 62°52′ N, 61°32′ W, 290-300 m; 3 Expl., ZMB 22484.

JENSEN as well as McALLISTER separate the two species Artediellus atlanticus and A. uncinatus (REINHARDT), combined by different authors, among them by LEIM & SCOTT. The species are differentiated by the numbers of the dorsal and anal rays and the pores of the lateral line (for our specimens see T a b l e 5); mature males of A. atlanticus have striate dorsal fins, those of A. uncinatus display dots; furthermore, according to the cited figures, the proportions of the head differ, in particular the position and size of the eyes.

A. atlanticus occurs from the Gulf of Saint Lawrence and Grand Bank southward; at the west coast of Greenland from 67° N northward.

T a b l e 5 . Artediellus atlanticus (ZMB 22484), dorsal and anal rays, pores of lateral line

Totallange (mm)	137	89	81
Dorsalis	8/13	8/14	8/14
Analis	12	11	12
Seitenlinienporen	20.21	23	25

lat.line pores

Cottunculus microps COLLETT

JENSEN 1952b, 13. LEIM & SCOTT 1966, 347, fig.

St. 292/68: 55°21′ N, 54°51′ W, 680-720 m; 1 Expl. (262 mm), ZMB 22490.

St. 350/68: 56°42′ N, 60°18′ W, 295-310m; 1 Expl. (185 mm), ZMB 22491.

St. 380/68: 62°50′ N, 60°43′ W, 660-630 m; 2 Expl. (1 Stück 210 mm), ZMB 22492.

St. 383/68: 62°52′ N, 61°32′ W, 290-300 m; 1 Expl. (165 mm), ZMB 22495.

St. 396/68: 62°44′ N, 60°54′W , 640 m.

Additional 8 specimens were captured at 6 stations in the region of 64-65°N, 58-61° W. Cottunculus microps is found in the W Atlantic along the American coast from New Jersey to the Gulf of Saint Lawrence and near western Greenland from 64° northward.

Cottunculus thomsoni (GÜNTHER)

JENSEN 1952b, 12. LEIM & SCOTT 1966, 348, fig.

St. 405/68: 63°22′ N, 60°02′ W, 960-980 m; 1 Expl. (105 mm), ZMB 22494.

St. 410/68: 63°27′ N, 59°30′ W, 850-900 m; 1 Expl. (280 mm), ZMB 22493.

St. 413/68: 63°53′ N, 59°02′ W, 690 m; 1 Expl. (260 mm).

St. 415/68: 64°00′ N, 58°52′ W, 715-680 m.

St. 430/68: 64°38′ N, 57°33′ W, 880 m; 1 Expl. (430 mm).

This species is known from the same areas of the western Atlantic as the preceding one; since, however, it is encountered further to the south than Cottunculus microps and has been captured near Greenland but rarely, it is considered as preferring a higher range of temperatures. For this reason, the repeated captures in Davis Strait are notable.

Triglops nybelini JENSEN (Abb. 28)

JENSEN 1944, 24, pl. III. McALLISTER 1963, 55, fig. LEIM & SCOTT 1966, 361, fig.

St. 383/68: 62°52′ N, 61°32′ W, 290-300 m; 15 Expl. (8 davon 100-121 mm), ZMB 22486.

St. 417/68: 64°24′ N, 59°34′ W, 350 m.

Up to now, Triglops nybelini has been captured in Canadian waters only in isolated specimens, and near western Greenland only northward of 70° N. The stomach content of 7 specimens displayed crustacean remains, mostly hyperiids.

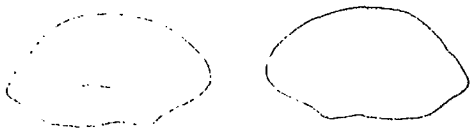


Fig. 28. Triglops nybelini, right sagitta, inner and outer side, 10 x

Sagitta (11 otoliths, L:H:D - 100:56:24); oblong-oval, pointed at both ends, moderately thick. Edges almost smooth and rounded; dorsal edge more strongly curved than ventral edge. Rostrum and antirostrum rounded, the length of the rostrum increasing with the length of the otolith; excisura ostii a tiny depression, the lower edge possibly displaying a slight arch by way of an excisural structure. Inner side faintly convex. Sulcus approximately 2/3 of otolith length and very shallow. Ostium and cauda of about the same length. Collicula seem to be lacking, the collum suggested by the inferior crista. Superior crista and antirostrum rounded, otherwise scarcely recognizable, inferior crista below the central sulcus as a mediate projection. Area only in small otoliths a very shallow depression above the cauda. Ventral field unstructured. Outer side convex, the thickest spot being the ventral region, and the surface sloping down to the edge only at the periphery. Variations exist in the curvature of the dorsal edge and the length of the rostrum. Otoliths of T. murrayi GUNTHER are more extended (SCHMIDT 1968, p. 57 - 1:0.58:0.24); in otoliths of the Pacific T. beani GILBERT the dorsal edge has several shallow sinuosities (SKALKIN 1963, p. 178).

Cyclopteridae

Paraliparis garmani BURKE (Abb. 29)

BURKE 1930, 176, fig. 93 (Zähne).

St. 391/68: 62°48′ N, 60°46′ W, 680-670 m; 1 Expl. (55 mm), ZMB 22647.

St. 394/68: 63°02′ N, 60°33′ W, 640 m; 2 Expl. (58, 67 mm), ZMB 22643.

St. 430/68: 64°38′ N, 57°33′ W, 880 m; 1 Expl. (64 mm), ZMB 22644.

St. 435/68: 64°04′ N, 56°14′ W, 820-810 m; 1 Expl. (90 mm), ZMB 22645.

In contrast to Careproctus and Liparis, the genus Paraliparis lacks the modified ventral fins to form an adhesive disk. P. garmani has an oblique, deeply cleft mouth, and the lower jaw projects considerable beyond the snout.

Teeth as a broad band on each of the two jaws, arranged in oblique series. Gill opening long, its lower half running anterior to and along the base of the pectoral. The middle 2-4 widely separated pectoral rays are reduced to minute lumps of bone. The values of the fin rays (D 56-59, A 51-53, P 13-14/2-4,2-3, C 8) diverge slightly from the single value mentioned by BURKE. The specimen ZMB 22645 is a female with ripe 2 mm sized eggs. It was compared with USNM 186146.

Fresh animals of a translucent light shade; under the binocular widely dispersed dark pigment spots are recognizable on the head, in lesser numbers also on the body; peritonaeum and eye black.

Range: So far captured only on the northeastern American coast near 40^0 N.

Paraliparis copei GOODE & BEAN (Abb. 29)

GOODE & BEAN 1895c, 279, fig. 253. BURKE 1930, 181, fig. 99 (Zähne). JENSEN 1950, 246. SCHROEDER 1955, 363. LEIM & SCOTT 1966, 367 (nur im Bestimmungsschlüssel).(teeth)(only determ.key)

St. 435/68: 61°04′ N, 56°14′ W, 820-810 m; 2 Expl. (85 mm — ♀, 101 mm — ♂). ZMB 22641.

More elongate than P. garmani and with a small mouth backward from the snout, Paraliparis copei, according to BURKE, is characterized among the Atlantic species (the species P. wilsoni RICHARDS, described 1966 from the Gulf of Guinea, has a greater number of pectoral rays) by single-seried teeth on both jaws.

(87)

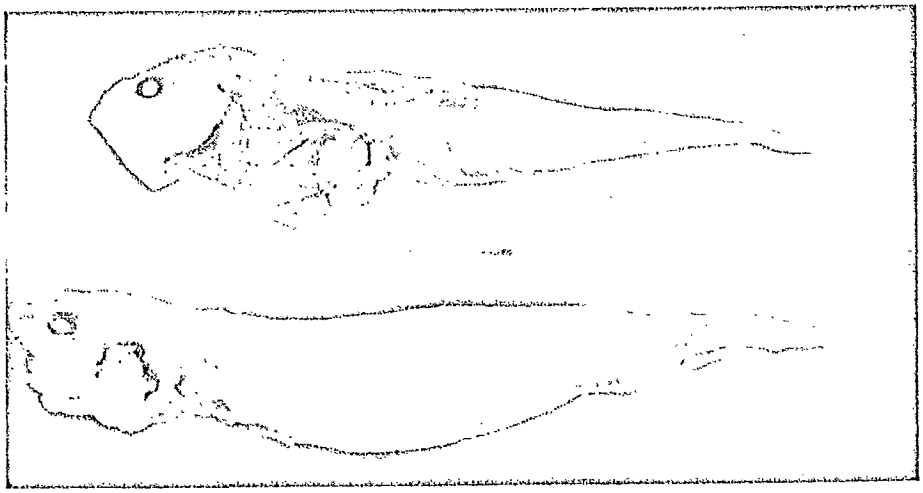


Fig. 29.
Paraliparis garmani
ZMB 22645 (top)
Paraliparis copei
ZMB 22 641 (bottom)

In the original description, GOODE & BEAN mention 2 series of teeth; in our specimens the upper jaw carries one, the lower jaw in front 2 (irregular) series. Gill opening small, above the pectoral fin. Fins: D 65-68, A 58-60, P 20-22,

C 9. The lower 3-4 pectoral rays are long, stand close together, and their distal ends are free; thereafter follow two shorter ones lying far apart. The specimen was compared with USNM 186151.

Head to about posterior edge of eye and the area surrounding the gill opening blackish, trunk and origin of tail whitish, rest of the tail flesh-coloured; peritonaeum and eye black.

Range: Known along the North American Atlantic coast at 40° N and caught once in Davis Strait.

Paraliparis sp. (Abb. 30)
St. 430/68: 64°38' N, 57°33' W, 880 m: 1 ♀ (69 mm), ZMB 22646.

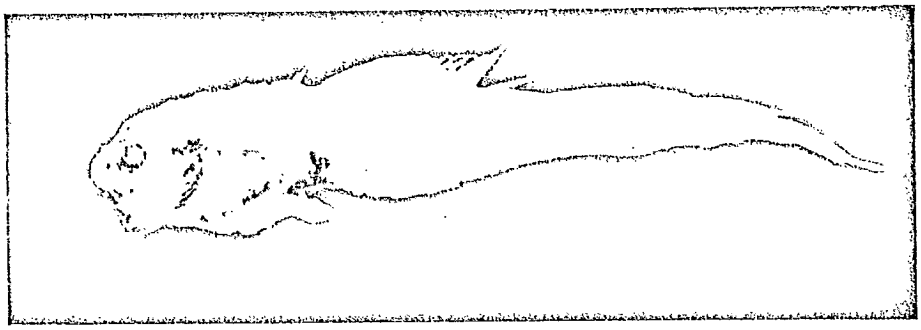


Fig. 30. Paralepis sp. ZMB 22646

At station 430/68, one other Paralepis species was captured in addition to Paralepis garmani. The specimen is in a relatively fair state, but prior to being preserved, the skin at the head and the pectoral fins has detached and displaced itself, so that the normal position of structures cannot be ascertained with precision.

In all its characters, the animal is strikingly similar to P. copei, so that, originally, it was regarded as belonging thereto: proportional body measurements, fin formula (D 65, A 58, P 22, 23, C 8), central pectoral rays only slightly shorter, a small mouth and jaws with single-seried teeth, a short gill opening above the pectoral, plus a similar coloration. The only difference in comparison with P. copei: nine barbels at the snout and one barbel (at left) laterally at the lower jaw.

The assumption that the specimen might belong to the genus Rhinoliparis was eliminated by comparing it with the two species of the named genus, Rh. barbulifer GILBERT (ZMB 14299) and Rh. attenuatus (BURKE USNM 77457). The species

of Rhinoliparis have a more protruding snout, the teeth of the jaws are arranged in oblique rows, about 4 teeth in succession, the last vertebrae of the long, thin, filamentous tail are longer than high (in our specimen length and height are equal), the number of caudal rays is reduced (maximum 3); furthermore, the distal ends of the pectoral rays are free. This does not seem to be the case in our animal, but since the skin has desplaced itself, this feature cannot be determined with certainty. Consequently,the specific position of the fish in question must remain open for the time being.

PEDICULATI

Oneirodidae

Oneirodes sp. (Abb. 31, 32)

O. eschrichtii (sensu lato) MAUL 1949, 34, fig. 13-17.

O. eschrichti-Gruppe BERTELSEN 1951, 79, fig. 31E-G, 32, 37. MAUL 1961, 125, fig. 19-21.

St. 405/68: 63°22' N, 69°02'W, 960-980 m; 1 Expl. (195 mm), ZMB 22640.

Numerous species belong to the genus Oneirodes, many of which have been described from one single very small specimen. The structure of the bulbus at the end of the long tentacle on the snout (illicium) is regarded as the distinguishing character, but neither the variability in the tassellike bulbous appendages in adult animals nor growth-conditioned modifications of the animals are known. Consequently and for the time being, only few species have been left standing by BERTELSEN, while he has combined most of them in groups; the specimen captured by the "ERNST HAECKEL" belongs to the Oneirodes eschrichti group. D 6, A 4, P 17, C 9. On each side of the upper jaw 16 or 18, on the lower jaw 12 or 13, laterally on the vomer 3 teeth each. The suboperculum (see Fig. 32) displays two indentations at its posterior edge.

The basal bone of the illicium (49% SL) is pushed far forward, so that its caudal section does not protrude from the spinal skin. Posterior to the central point sphenotic spine - origin of dorsal fin, there is, however, the opening of a long, forwardly directed dermal tube that can be extroverted, when the basal bone plate is pulled backward; the end of the basal bone is connected with the dermal tube by a ligament. From the basal bone to the tip of the bulbus, the illicium measures (without the appendages) 21.9 percent SL;

Fig. 31
Oneirodes sp.
ZMB 22640

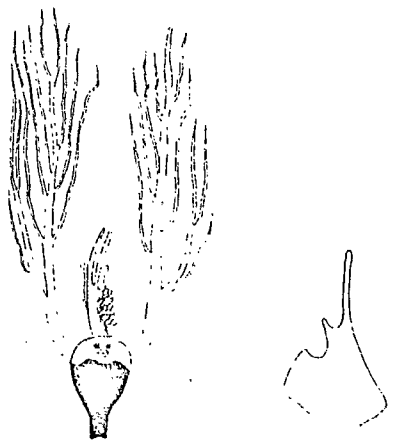


Fig. 32. Oneirodes sp., ZMB 22640, right suboperculum (at right); bulbus with appendages (at left)

The bulbus with appendages 26.4%. In the structure of the bulbus (see Fig 32), our specimen conforms to that of MAUL 1949; also to the one figured again in 1961. MAUL (1961) identifies his specimen with Dolopichthys anisacanthus REGAN from the O. eschrichti group.

Skin naked and black; only the tip of the bulbus and its appendages are white.

The typus of O. eschrichti LUTKEN originates from Greenland and numerous additional species of the O. eschrichti group are known from the North Atlantic; the genus has not been encountered as yet in Canadian waters.

Ceratiidae

Ceratias holboelli KROYER

LEIM & SCOTT 1966, 428, fig.

St. 268/68: 50°39' 50 43' W, 510-520 m; 1 Expl. (460 mm), ZMB 22501.

Thus far only 2 specimens are mentiond from the Canadian area (Gulf of Saint Lawrence and Nova Scotia).

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