

**NEW RECORDS OF CHIMAEROID FISHES
FROM GREENLAND WATERS (NORTH ATLANTIC),
WITH DESCRIPTION OF JUVENILE
CHIMAERA MONSTROSA AND HYDROLAGUS AFFINIS
(HOLOCEPHALI, CHIMAERIDAE)**

by

Peter R. MØLLER (1), Troels KULLBERG (1) & Ole A. JØRGENSEN (2)

ABSTRACT. - Until about 15 years ago, the holotype of *Harriotta haeckeli* Karrer, 1972 was the only chimaeroid fish recorded from Greenland waters. Between 1988 and 2002, several specimens of four additional chimaeroid species were caught in deep-sea trawl surveys (400-1500 m) for Greenland halibut: 65 specimens of *Hydrolagus affinis* (Capello, 1868), 1 specimen of *H. pallidus* Hardy & Stehmann, 1990, 1 specimen of *Chimaera monstrosa* Linnaeus, 1758 and 2 specimens of *Rhinochimaera atlantica* Holt & Byrne, 1909. The new records extend the distribution ranges considerably to the north and/or west. All specimens are adults except for a juvenile *C. monstrosa* (80 mm body length-BL) and a juvenile *H. affinis* (140 mm BL). Juveniles of chimaeroid fishes are very rarely caught, so they are here described with comments on dermal denticles, allometric growth and colouration.

RÉSUMÉ. - Nouveaux signalements de chimères dans les eaux du Groenland (Atlantique Nord) et description des juvéniles de *Chimaera monstrosa* et d'*Hydrolagus affinis* (Holocephali, Chimaeridae).

Depuis environ 15 ans, la seule chimère signalée du Groenland était représentée par l'holotype de *Harriotta haeckeli* Karrer, 1972. Entre 1988 et 2002, plusieurs spécimens de quatre espèces de chimères ont été capturés dans les chalutages profonds (400-1500 m) des pêcheries au flétan: 65 spécimens d'*Hydrolagus affinis* (Cappello, 1868), 1 spécimen d'*H. pallidus* Hardy & Stehmann, 1990, 1 spécimen de *Chimaera monstrosa* Linnaeus, 1758, et 2 spécimens de *Rhinochimaera atlantica* Holt & Byrne, 1909. Ces nouveaux signalements étendent considérablement les distributions de ces espèces vers le Nord et l'Ouest. Tous les spécimens sont des adultes sauf deux: un juvénile de *C. monstrosa* (80 mm longueur du corps -BL) et un d'*H. affinis* (140 mm BL). Les juvéniles de chimères étant rarement capturés, ces spécimens sont décrits, et des commentaires sur les denticules cutanés, les allométries de croissance et la coloration sont donnés.

Key words. - Chimaeroid - *Chimaera monstrosa* - *Hydrolagus pallidus* - *Hydrolagus affinis* - *Rhinochimaera atlantica* - Rabbitfishes - Ghost sharks - AN - Greenland - Dermal denticles - New records.

Despite increased fishing activity in the last 10-20 years, detailed distribution patterns of the seven northern North Atlantic chimaeroid species (*Chimaera monstrosa* Linnaeus, 1758; *Hydrolagus affinis* (Capello, 1868); *Hydrolagus mirabilis* (Collett, 1904); *Hydrolagus pallidus* Hardy & Stehmann, 1990; *Rhinochimaera atlantica* Holt & Byrne, 1909; *Harriotta haeckeli* Karrer, 1972; *Harriotta ralaighana* Goode & Bean, 1895) are poorly known. Most species are rarely caught and eggs and newly hatched specimens of *H. affinis* and *H. pallidus* are unknown (Hardy and Stehmann, 1990). The reason for the rarity of caught early life stages are not clear, but could probably be explained by environmental conditions such as deep and rough bottom habitats, where most of the currently used sampling gear rarely are used.

From Greenland waters only two records are published: the holotype of *H. haeckeli* by Karrer (1972) and a specimen

of *H. affinis* by Jónsson (1992), indicating that chimaeroid fishes are rare in this area. During deep-sea trawl surveys (400-1500 m) in Greenland waters between 1988 and 2002, conducted by the Greenland Institute of Natural Resources (GINR) and Japan Marine Fishery Resources Research Center (JAMARC) 69 specimens of four species (*C. monstrosa*, *H. affinis*, *H. pallidus* and *R. atlantica*) of chimaeroid fishes were caught (Fig. 1). The present paper summarizes the Greenland records of these species, which have not previously been published or mentioned with accurate locality (Nielsen and Bertelsen, 1992; Nakaya, 1995). The catches extend the known distribution ranges of all four species to the north and/or west. Small juveniles were caught of *C. monstrosa* (80 mm BL) and *H. affinis* (140 mm BL) and they are here described, with special attentions to dermal denticles, allometric growth and colouration.

(1) Zoological Museum, University of Copenhagen (ZMUC), DK 2100, Copenhagen Ø, DENMARK. [pdrmoller@zmuc.ku.dk]

(2) Danish Institute for Fisheries Research, Charlottenlund Slot, DK 2920, Charlottenlund, DENMARK.

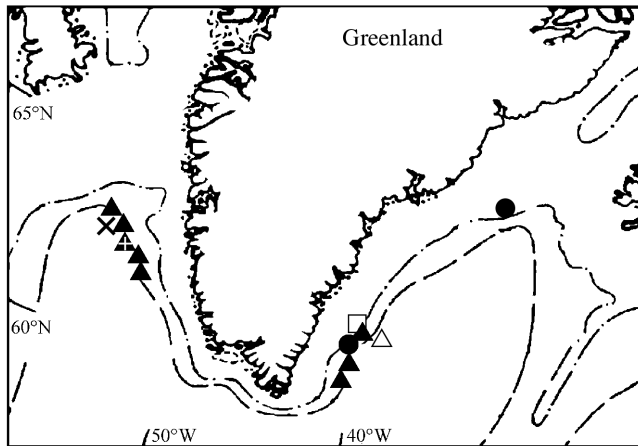


Figure 1. - New records (1988-2002) of Chimaeroid fishes in Greenland waters: *Chimaera monstrosa* (□), *Hydrolagus affinis* (▲), *Hydrolagus pallidus* (+) and *Rhinochimaera atlantica* (●). Previous records: *Harriotta haeckeli* (×) (Karrer, 1972) and *Hydrolagus affinis* (△) (Jónsson, 1992). One symbol may represent more than one record. Depth curves indicated for 1000 m and 1500 m.

MATERIAL AND METHODS

All Chimaeroid fishes were identified onboard, during 16 bottom trawl surveys, conducted by GINR and JAMARC, with the research vessels R/V Paamiut and R/V Shinkai Maru. Thirteen specimens were kept and are now stored at Zoological Museum, University of Copenhagen (ZMUC) and Academy of Natural Sciences, Philadelphia (ANSP). The total length (TL, snout to end of caudal fin including caudal filament if present) was measured onboard. This measure is often inaccurate, since the caudal filament is usually broken. The TL measurements of discarded specimens should therefore be taken with precaution. Morphometric measures are given as % of body length (BL, distance from lower gill opening to supracaudal origin). Methods of measurements and nomenclature of head pores follow Didier (1998). The dermal denticles are defined as 1) Head denticles - distributed on the head top; 2) Body denticles - distributed on the upper body from below origin of and along second dorsal fin; 3) Tail denticles - distributed dorsally between second dorsal fin and caudal fin.

The kept specimens were fixed in 4% formaldehyde and stored in 70% alcohol. For further information about vessels and gear and the results of the surveys see Jørgensen (1999) and Møller and Jørgensen (2000).

Comparative material

Callorhinchus milii. - ZMUC P0909, male 160 mm BL; ZMUC 1, male 105 mm BL.

Chimaera monstrosa. - ZMUC P0959-0962, males 85 and 136 mm BL, females 68 and 97 mm BL; ZMUC P0963-0964, females 113 and 122 mm BL.

Hydrolagus affinis. - ZMUC P0943, male 68 cm BL, 96 cm TL, 63°07'N 53°40'W; ZMUC P0945 and P0947, 87 and 76 cm BL, 130.5 and 113 cm TL, 63°25'N 55°22'W; ZMUC P0944, 70 cm BL, 108 cm TL, 63°11'N 54°23'W; ZMUC P0946 and P0948, 82 and 72 cm BL, 122.5 and 107.5 cm TL, 63°11'N 53°51'W; ZMUC P0954, 80 cm BL, 113 cm TL, 63°44'N 57°16'W; ZMUC P0957, 92 cm BL, 136 cm TL, 21.6kg, 61°50'N 40°09'W.

Hydrolagus colliei. - ZMUC P0920, female 102 mm BL; ZMUC P0928-30, female 89 mm BL, male 102 mm BL and male 105 mm BL.

Hydrolagus mirabilis. - ZMUC P0932-33, female 133 mm BL and male 192 mm BL.

Neohariotta pinnata. - ZMUC 0923, male 85 mm BL.

RESULTS

Chimaera monstrosa

One juvenile specimen (Fig. 2A-C): ZMUC P0958, male 80 mm BL, 166 mm TL, 62°86'N-40°34'W, Denmark Strait, 907m, 4.0° C, R/V Paamiut, haul 34, 25 June 2002.

Description of juvenile

The presence of an anal notch in the subcaudal fin shows that this juvenile belongs to the genus *Chimaera* (Didier, 1995). It generally fits the literature descriptions of *C. monstrosa* (e.g., Stehmann and Bürkel, 1984; Didier, 1998). The posterior edge of the dorsal fin spine is strongly serrated, with 8 paired teeth. Head pores at supratemporal ampullary pore field (STP) 9, infraorbital ampullary pore field (IOP) 13, angular ampullary pore field (APF) 6, suprarostal ampullary pore field (SRP) 25 and preorbital ampullary pore field (POP) 21. The measures of several morphometric characters are outside the range of adults: longer head, eye, first dorsal fin, pectoral fins and pelvic fins (Fig. 3, Tab. I).

Dermal denticles

A short row of eight short denticles penetrate skin on upper flank, just below origin of second dorsal fin; one supracaudal spine is present dorsally between second dorsal fin and caudal fin; six short denticles penetrate skin on each side of upper forehead above eyes and supraorbital lateral line canals (SO); a seventh head denticle is located just below SO (Fig. 2B). Five specimens (68-113 mm BL) from the North Sea and Skagerrak have 4+1 denticles on top of the head indicating some variability in the number of denticles (Tab. II). The denticles disappear with growth: a 136 mm BL specimen from Skagerrak (ZMUC P0961) has only one head denticle, but all body and tail denticles.

Colour

Head greyish brown, darkest on top of head; trunk part

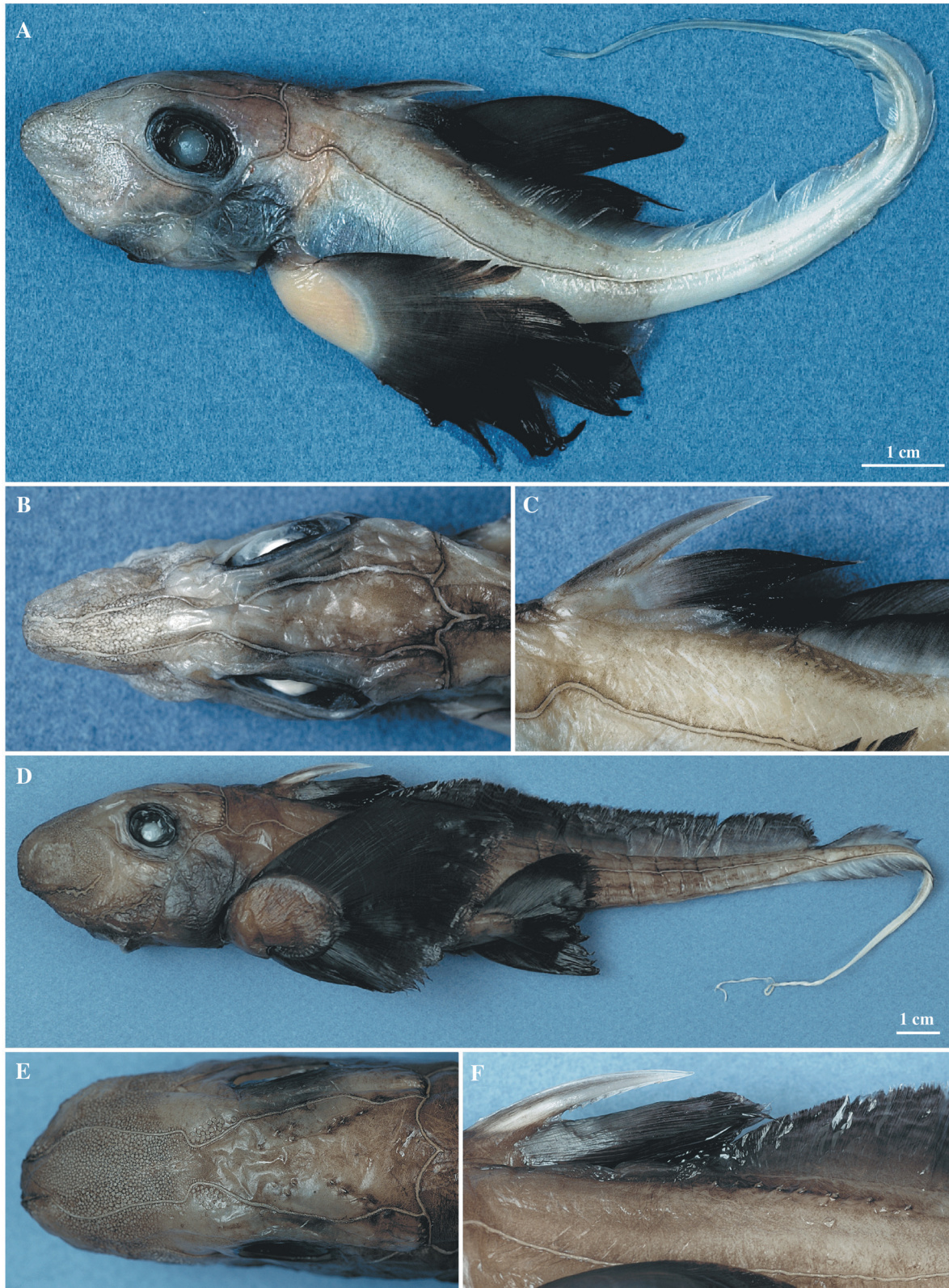


Figure 2. - A-C: *Chimaera monstrosa*. ZMUC, P0958, 80 mm BL, juvenile male, Denmark Strait; A: Lateral view; B: Head from above; C: Lateral view of trunk; D-F: *Hydrolagus affinis*. ZMUC P0966, 140 mm BL, juvenile male, Denmark Strait; D: Lateral view; E: Head from above; F: Lateral view of trunk. Photos Geert Brovad.

| | <i>Chimaera monstrosa</i> | | <i>Hydrolagus affinis</i> | |
|-------------------------------|---------------------------|-----------------------------|---------------------------|------------------|
| | ZMUC P0958 | Range (n = 17) ¹ | ZMUC P0966 | Range (n = 8) |
| Sex | male | | male | |
| Total length (TL) | 166 | 277 (610) 804 | 301 | 960 (1158) 1360 |
| Gill-supracaudal origin (BL) | 80 | 109 (306) 462 | 140 | 680 (784) 920 |
| Morphometric characters (%BL) | | | | |
| Snout-gill opening | 38.5 | 20.3 (24.7) 30.4 | 32.1 | 23.8 (26.3) 29.3 |
| Eye diameter, horizontal | 13.5 | 7.1 (9.2) 13.7 | 9.8 | 4.6 (5.3) 5.9 |
| 1st dorsal fin length | 20.7 | 11.9 (16.1) 20.2 | 12.4 | 11.1 (12.6) 14.4 |
| 1st dorsal spine length | 21.9 | 18.3 (21.8) 25.0 | 19.8 | 15.3 (16.9) 17.8 |
| 2nd dorsal fin length | 75.8 | 60.1 (75.9) 84.8 | 77.2 | 72.0 (75.8) 80.4 |
| Ant. margin of pectoral fin | 54.9 | 29.2 (38.7) 49.5 | 44.1 | 28.7 (31.8) 33.3 |
| Ant. margin of pelvic fin | 24.3 | 14.7 (19.2) 23.2 | 25.1 | 17.4 (19.0) 20.7 |
| Pelvic clasper length | 4.8 | 2.8 (8.8) 22.8 | 3.3 | 12.5 (14.3) 15.7 |

Table I. - Selected morphometric characters of juvenile *Chimaera monstrosa* and *Hydrolagus affinis* from Greenland waters. 1: Data from Didier (1998).

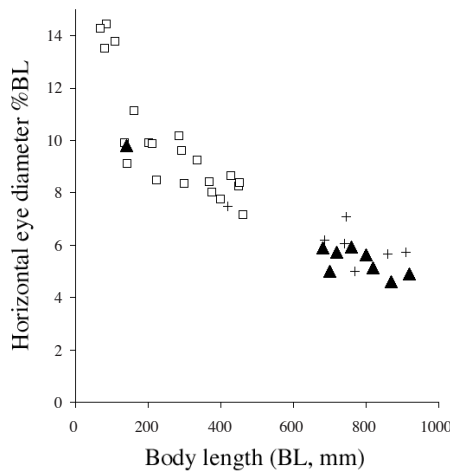


Figure 3. - Body length-eye diameter correlation in *Chimaera monstrosa* (□), *Hydrolagus affinis* (▲) and *Hydrolagus pallidus* (+). Data from Didier (1998) and Hardy and Stehmann (1990) included.

of body light grey and first dorsal and anterior part of second dorsal fin black; caudal part of body and posterior part of second dorsal and caudal fins pale, almost white. Margin of lateral line canal black on head and trunk, pale on tail. Peritoneum, mouth- and gill chambers black. Pectoral fin base creamy white, fins black (Fig. 2A).

Distribution

According to Didier (1998) *C. monstrosa* occurs from the North Sea to the Mediterranean and the Azores. It has, however, also been reported from the coast of Norway including southern Barents Sea and along the Scotland-Faeroe-Iceland Ridge including the Icelandic part of the Denmark Strait (63°13'-63°23'N, 25°20'-25°53'W, 280-955 m, 4.6-6.9°C) (Stehmann and Bürkel, 1984; Krefft and Haedrich, 1978). Thus, the new Greenland record extends the known range of the species about 15° to the west into

colder waters (4.0°C). Furthermore, the small size of the specimen indicates that it reproduces even in the northernmost part of distribution.

Hydrolagus affinis

Sixty-five specimens (30-145 cm TL): seven from off East Greenland (61°50'-62°25'N 39°53'-40°95'W, 1436-1471 m, 1.8-3.0°C) and 58 from off West Greenland (63°04'-63°66'N 53°22'-57°35'W, 1129-1495 m, 2.9-3.5°C), of which nine (30-136 cm TL, 140-920 mm BL) were stored and examined at ZMUC. These include one juvenile (Fig. 2D-F): ZMUC P0966. 140 mm BL, 301 mm TL, male, 62°69'N; 40°13' W, Denmark Strait, 1304 m, 2.0°C, R/V Paamiut, Bottom trawl, haul 40, 26 June, 2002.

Description

The specimen was identified on the basis of the lack of an anal notch in the subcaudal fin (present in *Chimaera*) and the dark colour. The latter is the only known character to separate non-male *H. affinis* from the closely related and pale *H. pallidus*. In many species of chimaeroids fishes, however, juveniles are much darker than adults, leaving some uncertainty to the identification of the present juvenile until more juveniles of *H. affinis* and *H. pallidus* have been caught. Males of the two species differ by the morphology of the copulatory organs. The juvenile specimen generally fits the redescription of Hardy and Stehmann (1990) based on 20 specimens from 151 to 860 mm. Head pores of the juvenile at supratemporal ampullary pore field (STP) 12, infraorbital ampullary pore field (IOP) 11, angular ampullary pore field (APF) about 30, suprarostreal ampullary pore field (SRP) about 70, and preorbital ampullary pore field (POP) 23. It differs from adults by the relatively larger head, eyes, dorsal fin spine, pectoral fins and pelvic fins, shorter pelvic claspers and by the long caudal filament (lost in adults) (Figs 2D, 3, Tab. I).

| Species | N | Size (mm BL) | Head denticles | Body denticles | Tail denticles |
|---|---|--------------|-------------------------|-----------------------|-----------------------|
| Callorhynchidae | | | | | |
| <i>Callorhynchus miliii</i> | 2 | 105-160 | 15-23+3-4 | 12-15 | 8-15 |
| <i>Callorhynchus callorhynchus</i> ¹ | 1 | 160 (TL) | 11+2 | 15 | 10 |
| Rhinochimaeridae | | | | | |
| <i>Rhinochimaera atlantica</i> ² | ? | ? | 3 | 7-8 | 6-8 |
| <i>Harritta raleighana</i> ² | ? | ? | 3 | 3-4 | 4-6 |
| <i>Harriotta haeckeli</i> ³ | ? | ? | 3 | 6 | 6 |
| <i>Neoharriotta carri</i> ² | ? | ? | 3 | 3-4 | 6-7 |
| <i>Neoharriotta pinnata</i> | 1 | 85 | 2+1 (4-6 ⁴) | 6 (5-6 ⁴) | 6 (7-8 ⁴) |
| Chimaeridae | | | | | |
| <i>Chimaera monstrosa</i> | 6 | 68-122 | 4-6+1 | 4-8 | 1 |
| <i>Hydrolagus mirabilis</i> | 2 | 133-192 | 0 | 0 | 1 |
| <i>Hydrolagus affinis</i> | 1 | 140 | 6+1 | 11 | 2 |
| <i>Hydrolagus colliei</i> | 4 | 89-105 | 2-3+0 | 5-7* | 1* |

Table II. - Dermal denticles on juveniles of selected chimaeroid fishes. Head denticles include denticles above SO line plus denticles below SO line. Additional data from: Dean, 1906 (1); Karrer, 1972 (2); Goode and Bean, 1895 (3); Bullis and Carpenter, 1966 (4).

Dermal denticles

A relatively long row of 11 short denticles penetrates skin on the upper flank, just below origin of second dorsal fin; two supracaudal denticles are present dorsally between second dorsal fin and caudal fin; six short denticles in two distinct patches on each side of upper forehead above the SO line canals above eyes and one denticle below the SO canal (Fig. 2E, Tab. II).

Colour

All adult specimens from Greenland waters are dark, olive brown in accordance with Hardy and Stehmann (1990). The juvenile, however, is dark brown on the body, but with several not previously described narrow longitudinal light bands on the pectoral fins and dorsal fin (Fig. 2D, F).

Distribution

According to Hardy and Stehmann (1990) *H. affinis* occurs from off Portugal to Rockall Trough in the East Atlantic and from Newfoundland to Cape Cod in the West Atlantic. However, three specimens of *H. affinis* were recorded much further north in the Canadian part of the Davis Strait (60°44'N-60°43'W and 62°55'N-58°00'W) (Karrer, 1976) close to the nearest West Greenland record (63°44'N-57°16'W). Jónsson (1992) reported the species from the Greenland part of the Denmark Strait (63°25'N-38°40'W), so the present East Greenland specimens extend the distribution only about 2° to the west (to 61°50'N-40°95'W). The species has also been reported from the Mid-Atlantic Ridge (37°17'N) (Marques and Porteiro, 2000).

New records of *Hydrolagus pallidus* and *Rhinochimaera atlantica*

Hydrolagus pallidus. - ZMUC P0949, 86 cm BL, 130 cm TL, adult female, 63°11'N-54°23'W, 1336m, Davis Strait,

R/V Shinkai Maru, bottom trawl, haul 4, 11 Aug. 1992. Photo in Møller (2001). The measurements and pale colour of the Greenland specimen is in accordance with the description given by Hardy and Stehmann (1990). The smallest reported *H. pallidus* measured 420 mm BL (Hardy and Stehmann, 1990), so the number of juvenile dermal denticles is unknown. The species was described from the Bay of Biscay to off Western Scotland, and was later reported from most of the North Atlantic: off Iceland (63°50'N-13°08'W) (Jonsson, 1992), the Azores (Santos *et al.*, 1997) and Bear Seamount (39°54'N-67°26'W) (Moore *et al.*, 2003). The Greenland specimen here reported expands the distribution about 23° to the north (from Bear Seamount) and about 41° to the west (from off Iceland).

Rhinochimaera atlantica. - ZMUC P0955, adult male, 822 mm TL, 290 mm BL, 65°22'N-31°11'W, 901m, R/V Paamiut, haul 15, 26 June 1999. Another specimen caught at 62°08'N-40°34'W, 918m was unfortunately not kept. The elongated snout, body proportions and number of tubercles along upper edge of caudal fin (25) are in accordance with previous descriptions (Inada and Garrick, 1979). The species has an anti-tropical distribution in the NE Atlantic along the Iceland-Faeroe-Scotland ridge and the continental slope to the Bay of Biscay and off southern Africa (Krefft, 1990) and is found off Nova Scotia and New England in the NW Atlantic (Stehmann and Burke, 1984). It was caught in the Icelandic part of the Denmark Strait (63°13'N-25°53'W, 945 m, 4.6° C) (Krefft and Haedrich, 1978), which is the record closest to the new Greenland specimens. The distribution range is thus, extended about 2° to the north and 7-15° to the west.

Remarks

The juvenile dermal skin denticle configuration, described here for the first time for *H. affinis* and *C. monstrosa* is lost with growth, but it might represent a valuable morphological

character to be used in future taxonomic and phylogenetic studies of Chimaeroid fishes. Counts of dermal skin denticles from the present study and from species found in the literature are summarized in table II.

Allometric change is observed in all species with sufficient number and size range (Fig. 3). *Hydrolagus pallidus* fall out with *H. affinis* in all characters indicating a very close relationship of the two species.

The present study shows that five Chimaeroid fishes have their recorded northern limits in southern Greenland waters. Four species are known from only very few specimens in Greenland waters, whereas *H. affinis* is more numerous in two limited areas (Fig. 1). The presence of juvenile *C. monstrosa* and *H. affinis* indicates that spawning occurs at these high latitudes. Despite of the scarcity of most species the extended distribution ranges here reported seems to indicate that the well-known amphi-Atlantic distribution pattern for most Chimaeroid species is replaced by a continuous Atlantic distribution (at least for *H. affinis*, *H. pallidus* and *R. atlantica*). The lack of records on the deep southernmost Greenland continental slope is explained by a very limited fishing effort due to rough bottom.

Acknowledgments. - Thanks to the officers, scientists and crew onboard R/V Paamiut and R/V Shinkai Maru for help with the collection and handling of the specimens, to Dominique Didier (ANSP) for comments and inspiration and to Jørgen G. Nielsen for helpful comments on the manuscript.

REFERENCES

- BULLIS H. & J.C. CARPENTER, 1966. - *Neoharriotta carri* - A new species of Rhinochimaeridae from the Southern Caribbean Sea. *Copeia*, 1966: 443-450.
- CAPELLO F. DE BRITO, 1868. - Descrição de dois peixes novos provenientes dos mares de Portugal. *J. Sc. Math. Phys. Nat. Lisboa*, 1: 314-317.
- COLLETT R., 1904. - Diagnoses of four hitherto undescribed fishes from the depths south of the Feroe Islands. *Forh. Vidensk. Selsk. Christiania*, 9: 1-7.
- DEAN B., 1906. - Chimaeroid Fishes and their Development. 156 p. Washington Publ. 32.
- DIDIER D.A., 1995. - Phylogenetic systematics of extant chimaeroid fishes (Holocephali, Chimaeroidei). *Am. Mus. Novit.*, 3119: 1-86.
- DIDIER D.A., 1998. - The leopard Chimaera, a new species of chimaeroid fish from New Zealand (Holocephali, Chimaeriformes, Chimaerida). *Ichthyol. Res.*, 45(3): 281-289.
- GOODE G.B. & T.H. BEAN, 1895. - Oceanic ichthyology. 553 p. Spec. Bull. U.S. Natl. Mus. Washington, D.C.: Gov. Printing Office.
- HARDY G.S. & M. STEHMANN, 1990. - A new deep-water ghost shark, *Hydrolagus pallidus* n.sp. (Holocephali, Chimaeridae), from the Eastern North Atlantic, and a redescription of *Hydrolagus affinis* (Brito Capello, 1876). *Arch. Fisch. Wiss.*, 40(3): 229-248.
- HOLT E.W.L. & L.W. BYRNE, 1909. - Preliminary note on some fishes from the Irish Atlantic slope. *Ann. Mag. Nat. Hist.*, 3(15): 279-280.
- INADA T. & J.A.F. GARRICK, 1979. - *Rhinochimaera pacifica*, a long-snouted Chimaera (Rhinochimaeridae), in New Zealand waters. *Japan. J. Ichthyol.*, 25(4): 235-243.
- JONSSON G., 1992. - Islenskir fiskar. 568 p. Reykjavik: Fiolvi.
- JØRGENSEN O.A., 1999. - Results of the Joint Japan-Greenland Trawl Surveys at West Greenland, 1987-95, on Greenland Halibut (*Reinhardtius hippoglossoides*) and Roundnose grenadier (*Coryphaenoides rupestris*). *NAFO Sci. Coun. Stud.*, 31: 1-36.
- KARRER C., 1972. - Die Gattung *Harriotta* Goode and Bean, 1895 (Chondrichthyes, Chimaeriformes, Rhinochimaeridae) mit Beschreibung einer neuen Art aus dem Nordatlantik. *Mitt. Zool. Mus. Berlin*, 48(1): 203-221.
- KARRER C., 1976. - Über Fischarten aus der Davisstrasse und Labradorsee. *Mitt. Zool. Mus. Berlin*, 52(2): 371-376.
- KREFFT G., 1990. - Chimaeridae. In: Check-List of the Fishes of the Eastern tropical Atlantic (CLOFETA) (Quéro J.-C., Hureau J.-C., Karrer C., Post A. & L. Saldanha, eds.), Vol. 1, pp. 111-113. Lisbon: JNICT; Paris: SEI and UNESCO.
- KREFFT G. & R.L. HAEDRICH, 1978. - Bottom Fishes from the Denmark Strait and Irminger Sea: Species list and individual Data. 15 p. Technical report. Woods Hole Oceanographic Institution, Massachusetts.
- LINNAEUS C., 1758. - Systema Naturae, Ed. X. (Systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis. Tomus I. Editio decima, reformata.) Holmiae. Systema Nat. ed. 10 v. 1, p. i-ii+1-824.
- MARQUES A. & F. PORTEIRO, 2000. - Hydrothermal vent mussel *Bathymodiolus* sp. (Mollusca: Mytilidae): Diet item of *Hydrolagus affinis* (Pisces: Chimaeridae). *Copeia*, 3: 806-807.
- MOORE J.A., HARTEL K.E., CRADDOCK J.E. & J.K. GALBRAITH, 2003. - An annotated list of deepwater fishes from all the New England region, with new area records. *Northeast. Nat.*, 10(2): 159-248.
- MØLLER P.R., 2001. - Nyt om Grønlands fiskefauna. *Dansk Naturhist. Forenings årsskrift*, 2000: 35-39. (In Danish).
- MØLLER P.R. & O.A. JØRGENSEN, 2000. - Distribution and abundance of eelpouts (Pisces, Zoarcidae) off West Greenland. *Sarsia*, 85: 23-48.
- NAKAYA K., 1995. - Chimaeridae - *Hydrolagus affinis*. In: Fishes collected by R/V SHINKAI MARU in the Waters around Greenland (Okamura O., Amaoka K., Takeda M., Yano K., Okada K. & S. Chikuni, eds.), p. 46. Tokyo: JAMARC.
- NIELSEN J.G. & E. BERTELSEN, 1992. - Fisk i grønlandske farvande. 65p. Nuuk, Greenland: Atuakkiorfik. (in Danish).
- SANTOS R.S., PORTEIRO F.M. & J.P. BARREIROS, 1997. - Marine fishes of the Azores: annotated checklist and bibliography. *Bull. Univ. Azores*, Suppl. 1: 1-244.
- STEHMANN M. & D.L. BÜRKELE, 1984. - Chimaeridae and Rhinochimaeridae. In: Fishes of the North-Eastern Atlantic and the Mediterranean. Vol. 1 (Whitehead P.J.P., Bauchot M.-L., Hureau J.-C., Nielsen J. & E. Tortonese, eds.), pp. 212-215, 216-218. Paris: UNESCO.

Reçu le 05 mars 2003.

Accepté pour publication le 13 septembre 2003.