

Arch. FischWiss.	35	1/2	43-51	Berlin, September 1984
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Results of the research cruises of FRV "Walther Herwig" to South America. LXIII \*). A resurrection of the ceratioid anglerfish *Ceratias tentaculatus* (Norman, 1930) with notes on the occurrence of the species of *Ceratias* in the Atlantic Ocean (Pisces: Lophiiformes)

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with 3 figures

Received April 17, 1984

#### Kurzfassung

Ergebnisse der Forschungsreisen des FFS "Walther Herwig" nach Südamerika. LXIII. Wiedererichtung der ceratoiden Anglerfischart *Ceratias tentaculatus* (Norman, 1930) mit Anmerkungen über das Vorkommen der Gattung *Ceratias* im Atlantischen Ozean (Pisces, Lophiiformes)

Basierend auf Material der "Walther Herwig"-Reisen wird *Ceratias tentaculatus* (Norman, 1930), von BERTELSEN 1951 zur Unterart relegiert, der Artstatus wiedergegeben. Die geographische Verbreitung der *Ceratias*-Arten im Atlantischen Ozean wird beschrieben und diskutiert.

#### Abstract

On the basis of material obtained during the "Walther Herwig" cruises, *Ceratias tentaculatus* (Norman, 1930), which was given subspecific status by BERTELSEN (1951), is resurrected and the distribution of the species of the genus *Ceratias* in the Atlantic Ocean is described and discussed.

#### A. Introduction

Since the last major revision of the ceratioid family Ceratiidae (Bertelsen, 1951), the available material of these fishes has been greatly increased and has furnished a basis for further studies on their systematics and distribution. This note is restricted mainly to the resurrection of a *Ceratias* species, previously known from material which was insufficient to determine its status, and to the distribution of the *Ceratias* species in the Atlantic as indicated by the "Walther Herwig" collections. A world wide revision of the family is in preparation by T. W. PIETSCH.

\*) Hartmann-Schröder, G.: Ergebnisse des FFS "Walther Herwig" nach Südamerika. LXII. Die Polychaeten der 15., 36. und 76. Reise von FFS "Walther Herwig" zum patagonischen Schelf (Südwest-Atlantik). Senckenberg. marit. (im Druck).

## B. Review

(For synonymies and revised family and genera diagnoses cf. BERTELSEN, 1951).

The main background for the present paper is as follows: REGAN (1926) recognized three of six previously described ceratiid genera: *Ceratias* Krøyer, 1845, *Mancalias* Gill, 1878, and *Cryptopsaras* Gill, 1883. BERTELSEN (1943) showed that the specimens of *Mancalias* were young specimens of *Ceratias* and the six species, which at that time were recognized in these two genera, were reduced to two: *Ceratias holboelli* Krøyer, 1845 (tentatively divided into three subspecies) and *C. tentaculatus* (Norman, 1930) (the latter including *Mancalias bifilis* Regan & Trewavas, 1932). The only basis for the separation of the two species was the presence of two esca filaments in *tentaculatus* and none, or a single, branched or unbranched filament, on the esca of the few specimens of *holboelli* which had retained this organ. This was supported by the fact that the specimens of *tentaculatus* were the only known *Ceratias* from southern waters. BERTELSEN (1952: 132) found no basis for retaining the subdivision of *C. holboelli* and included in the synonymy of this species three genera and species described by BARBOUR (1942) and BIGELOW and BARBOUR (1944 A, B) and *Mancalias krøyeri* Koefoed, 1944. Furthermore he found that the separation of *C. holboelli* and *tentaculatus* was "insufficiently well grounded" (1951:133), considering 1) that he had found considerable intraspecific variation in details of esca appendages in several ceratioids, 2) that *tentaculatus*, characterized by having a pair of esca filaments, was known only from two (possibly three) small specimens and that the presence of a single esca filament was observed only in three, adult specimens of *holboelli* and 3) that he found no support for the geographical separation in his study of the larval distribution. However, this opinion was modified when, after the manuscript was completed, he obtained information on two additional adult specimens with preserved escae, one from antarctic waters (CLARKE, 1950) and one from Iceland. In a footnote, BERTELSEN (1951:133) observed that this raised the number of known specimens with a single filament to four, all from the North Atlantic, and to three or four with two filaments, all from southern waters; he concluded that "The probability that this distribution is incidental is small". For this reason he recommended a separation into two subspecies, *C. holboelli holboelli* and *C. holboelli tentaculatus* "until collection of further specimens can decide this point". The first contribution of this kind was presented by PENRITH (1967) who found the remains of 11 specimens of *Ceratias* in stomachs of sperm whales captured in the South Atlantic off Cape Town. The four best preserved were 360 - 534 mm standard length (SL). In the largest, and only specimen which had retained the esca, this had two long, unbranched filaments. He (1967:186) concluded that this suggests "that there is at least racial separation of northern and southern hemisphere stocks of this species". This was con-

firmed by T. W. PIETSCH who reported that the Natural History Museum of Los Angeles County has "a series of *Ceratias holboelli*, which incidentally are from below 54° S lat., and all that have intact esca have the two esca filaments of *C. holboelli tentaculatus*" (personal communication 1968).

### C. Resurrection

During the "Walther Herwig" cruises to South America in 1968 and 1971, and to the Antarctic in 1975/76 and 1978, a total of 13 specimens of *Ceratias* were obtained in the southern Atlantic. They were all caught south of 35° S and in each of the six specimens which have retained the esca, a pair of appendages are present. Since the report by BERTELSEN (1951) the number of North Atlantic specimens of *Ceratias holboelli* with a single esca filament has increased to 16. None of these were caught south of 30° N and no specimens have been found with a development of esca filaments which in any way might be regarded as intermediate between those found in *holboelli* and in *tentaculatus*. As this leaves no doubt about the validity of *Ceratias tentaculatus* (Norman, 1930) as a separate species, this species is hereby resurrected.

### D. Description

#### *Ceratias tentaculatus* (Norman, 1930)

*Mancalias tentaculatus* Norman, 1930:355-356, fig. 45 (original description, single specimen from southern South Atlantic, BMNH 1930.1.12.1100). Regan and Trewavas, 1932:100, fig. 158D, (reference to original description).

*Mancalias bifilis* Regan and Trewavas, 1932:100, fig. 158C, pl. VI, fig. 1 (original description, single specimen from east of New Zealand, ZMUC P92123; a second tentatively referred specimen from east of South Africa).

*Ceratias tentaculatus*: Bertelsen, 1943:202-205 (*Mancalias* Gill, 1878, a synonym of *Ceratias* Krøyer, 1845; *M. bifilis* a synonym of *M. tentaculatus*).

*Ceratias holboelli*: Clarke, 1950:3-32, figs 1-3, 4 a-c, pl. I (comparative study of additional specimen from Antarctic Indian Ocean, including new illustrations of *M. tentaculatus* and *M. bifilis*). Penrith, 1967:185-186 (additional specimens from off Cape Town).

*Ceratias holboelli tentaculatus*: Bertelsen, 1951:133 (*C. tentaculatus* given subspecific status).

## Material

15 specimens (6.2-470 mm SL).

Holotype: BMNH 1931.1.12.1100, 80 mm, Discovery St. 114, 52°25'S, 9°50'E.

Other reexamined specimens: ZMUC P92123, 75 mm, Dana St. 3642, 46°43'S, 176°09'E; BMNH 1932.5.3.37, 15 mm, Dana St. 3964, 25°18'S, 36°13'E.

Specimens from "Walther Herwig" expeditions: 1968: ISH 1657/68, 222 mm, St. 29-III/68, 35°16'S, 49°26'W; 1971: ISH 191/71, 2: 188-253 mm, St. 219/71, 49°58'S, 55°00'W; ISH 85/71, 275 mm, St. 227/71, 52°02'S, 55°20'W; ISH 230/71, 365 mm, St. 239/71, 54°33'S, 59°00'W; ISH 163/71, 190 mm, St. 242/71, 55°06'S, 57°25'W; ISH 435/71, 90 mm, St. 348/71, 38°20'S, 54°33'W; ISH 657/71, 470 mm, St. 363-I/71, 40°18'S, 39°22'W; ZMUC P922158, 400 mm, St. 384/71, 39°45'S, 17°40'W; 1976: ISH 386/76, 122.5 mm, St. 97/76, 54°07'S, 39°59'W; ISH 512/76, 265 mm, St. 102-II/76, 46°27'S, 59°53'W; ISH 540/76, 460 mm, St. 104-II/76, 42°58'S, 39°53'W. 1978: ISH 261/78, 153 mm, St. 657/78, 47°01.5'S, 59°57.5'W.

Specimen from South African Museum: SAM 27806, 6.2 mm, St. SM 138, 30°21'S, 30°16'E.

## Diagnosis

*Ceratias tentaculatus* differs from other members of the genus in having a pair of esca appendages in front of the esca pore, each simple, or divided into 2-8 stout filaments.

## Description of esca

(Fig. 1) Present in ten of the examined specimens 6.2-470 mm SL. Esca bulb pear shaped with proximal part gradually tapering into illicial stem; greatest relative diameter decreasing with increasing length of fish, 11.4% SL at 6.3 mm, 4.7% at 15 mm, 2.1-2.3% at 74-122 mm and 1.2-2.0% at 265-470 mm; except in two smallest specimens (6.2-15 mm), proximally pigmented to a distance from tip about equal to diameter of bulb; internal bulb (photophore) with a distal unpigmented cleft. Esca pore close to apex of bulb, in the specimens 75-470 mm raised on a pigmented papilla. A pair of esca appendages close in front of esca pore: low unpigmented papillae in specimen of 6.2 mm (Fig. 1A), short pigmented papillae in specimen of 15 mm (Fig. 1B from CLARKE, 1950: fig. 4A), a pair of short filaments, distally bifurcated and pigmented at base in specimen of 75 mm (Fig. 1C from BERTELSEN, 1951: fig. 91E), a pair of unpigmented filaments, the left bifurcated in holotype of 80 mm (Fig. 1D from CLARKE, 1950: fig. 4B), larger specimens (90-470 mm) with a pair of pigmented prominences, reach-

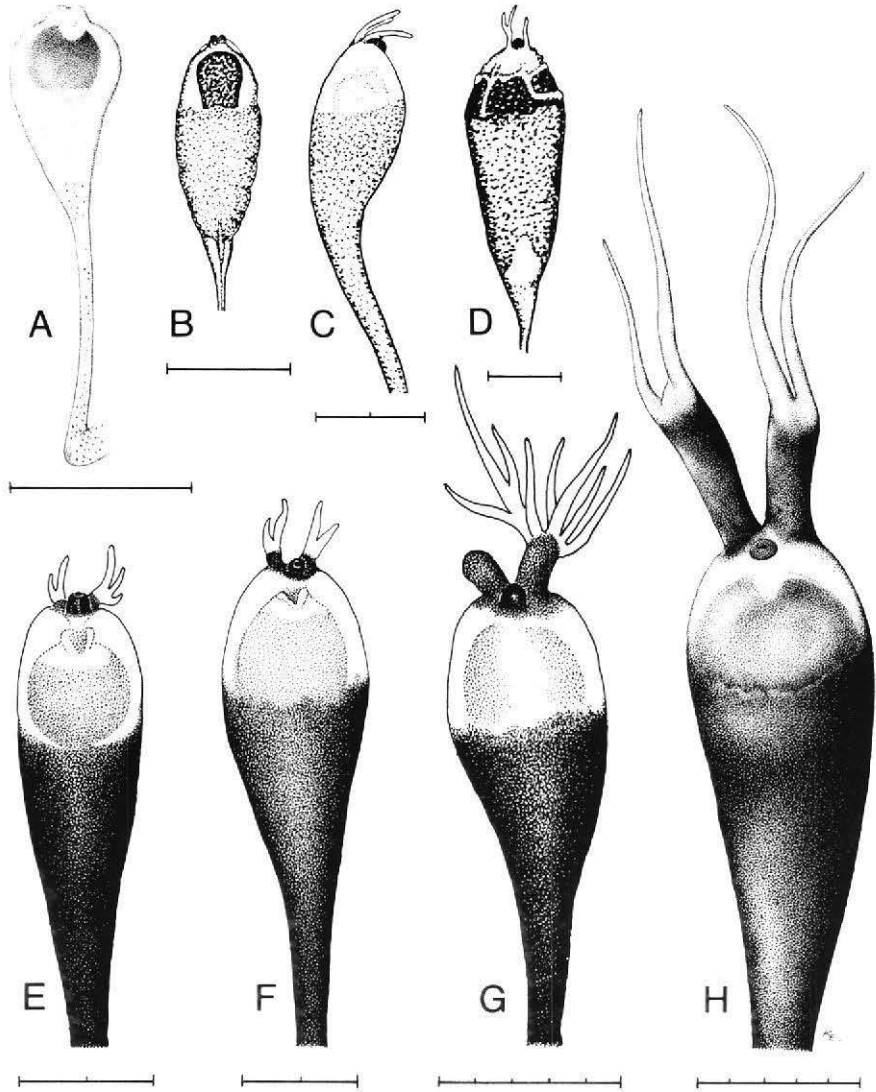


Figure 1: *Ceratias tentaculatus*, escae. A. 6.2 mm, SAM 27806; B. 15 mm, BMNH 1932.5.3.37; C. 75 mm, ZMUC P92123; D. holotype, 80 mm, BMNH 1931.1.12.1100; E. 90 mm, ISH 435/71; F. 122.5 mm, ISH 386/76; G. 265 mm, ISH 512/76; H. 365 mm, ISH 85/71. (B and D from Clarke, 1950; C from Bertelsen, 1951). Unit of scales 1 mm.

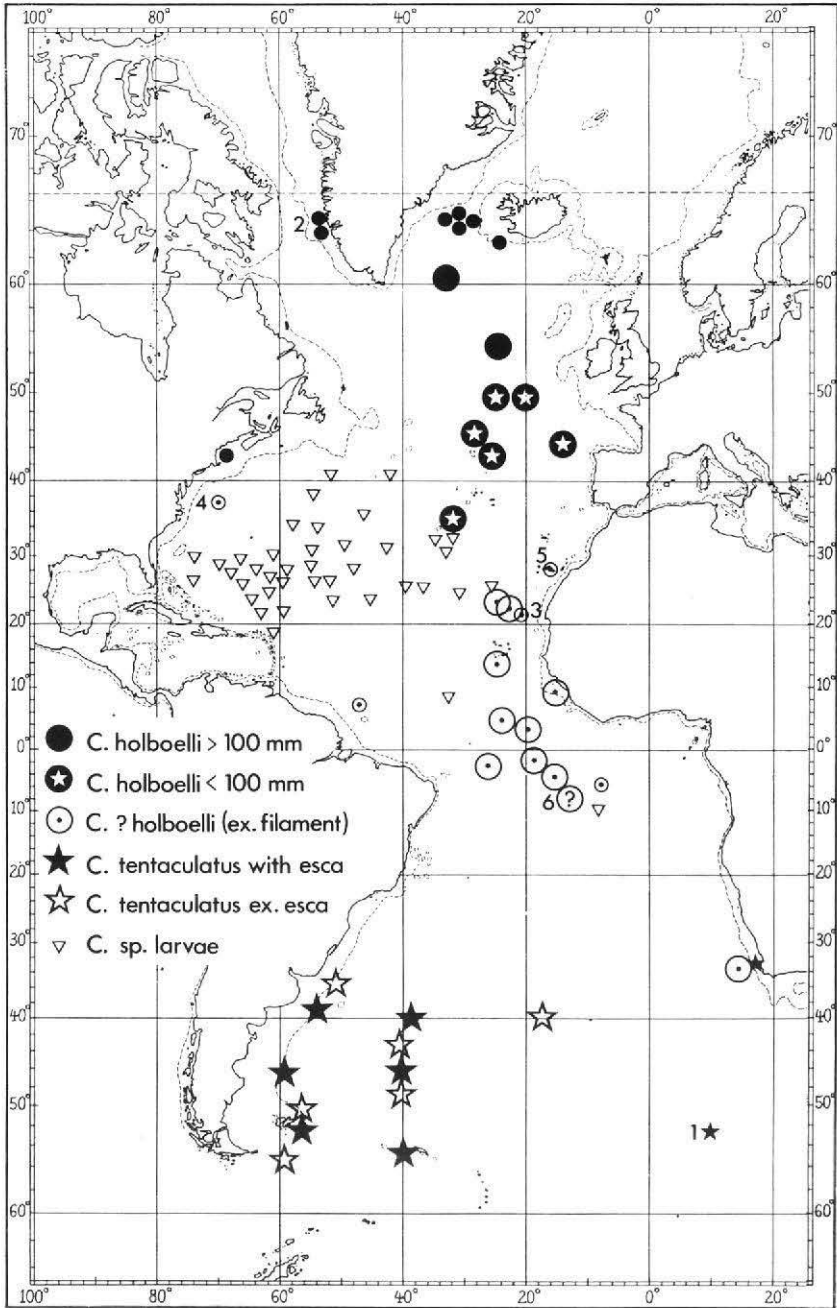


Figure 2: Distribution of *Ceratias* spp. in the Atlantic Ocean.

Large symbols: ISH collections. Specimens from N. of 30°S which have lost the esca not included. 1. holotype of *C. tentaculatus*; 2. holotype of *C. holboelli*; 3-6 cf. text.

ing a length of more than half the diameter of the bulb in the largest (Fig. 1H), carrying a various number of stout unpigmented filaments, two on each appendage in three specimens, two plus three in two (Fig. 1C) and 8 on the right and none on the left in one (Fig. 1B).

## E. Discussion

In the South Atlantic *C. tentaculatus* has been recorded between 32 and 55°S with the southernmost catches near the Polar front (Fig. 2). The two known, recently metamorphosed specimens (6.2 and 15 mm SL) were caught at the east coast of South Africa at 25 and 30°S, respectively. This distribution is a very similar parallel to that of *C. holboelli* in the North Atlantic with large adults reaching the Polar front at about 65°N on both sides of South Greenland, and with the northernmost records of larvae and juveniles at about 40°N.

Half of the now known 16 specimens of *C. holboelli*, in which the esca has been retained and carries a single filament, were obtained on "Walther Herwig" cruises in 1973, 1979 and 1982. They include the first large specimens (565 and 590 mm SL) caught by a research vessel. A freshly preserved esca of an adult is here illustrated for the first time (Fig. 3C). Furthermore, these collections include six young specimens (32-92 mm SL) with a single, well developed esca filament (Fig. 3A, B) all caught south of 50°N, the southernmost and smallest specimen at 35°20'N (Fig. 2). In addition to this, one specimen of 57.5 mm, caught at 8°11'S, 14°10'W (no. 6 in Fig. 2) was found to have a minute esca filament, about 0.08 mm in length.

BERTELSEN (1951:136) presumed that *Ceratias* specimens lacking esca filaments were juveniles of *C. holboelli*, as those at that time known were all less than 100 mm SL, while the smallest known specimen with filaments (the holotype of *M. bifilis* Regan and Trewavas, 1932) was 75 mm SL. BERTELSEN and PIETSCH (1983: 90-91, fig. 10C) observed in material from Australian waters a *Ceratias* specimen of 135 mm SL which lacks esca filament. In connection with the discussion of a possible resurrection of *C. tentaculatus*, they noted that additional material is needed to show whether this specimen "represents merely intraspecific variation or an additional third species". Ten specimens of 24-74 mm SL with escae of this type were obtained on the "Walther Herwig" cruises in 1964, 1968 and 1971. Their distribution is shown in Fig. 2 together with previous records of such specimens, including the holotypes of *Ceratias uranoscopus* Murray, 1877 (3 in Fig. 2), *Typhlopsaras schufeldti* Gill, 1883 (4), and *Mancalias krøyeri* Koefoed, 1944 (5); (3 and 4 synonymized by Regan, 1926 and all referred to *C. holboelli* by Bertelsen, 1951). With two exceptions, they were all caught between 10°S and 30°N, and the southernmost and northernmost records are

on nearly the same latitude as the northernmost record of *C. tentaculatus* and the southernmost record of *C. holboelli* with well developed esca filament, respectively.

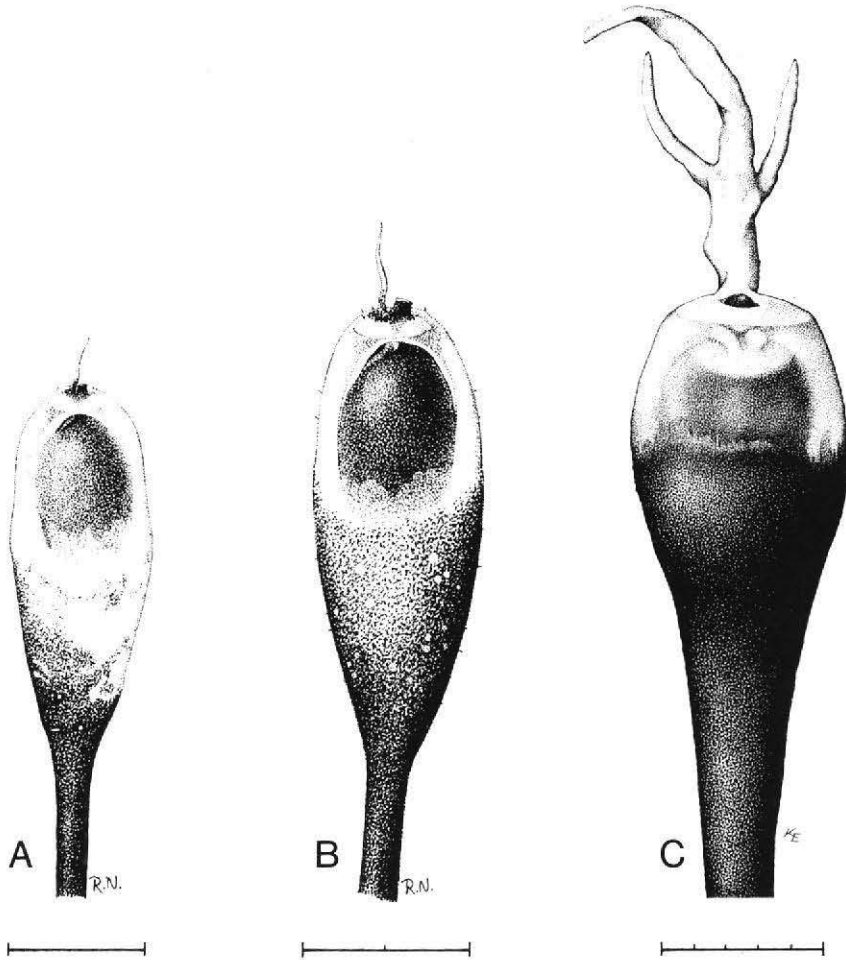


Figure 3: *Ceratias holboelli*, escae. A. 32 mm, ISH 3312/79; B. 66 mm, ISH 3313/79; C. 590 mm, ZMUC P922184. Unit of scales 1 mm.

This separation of the distribution in the Atlantic, combined with the observation of esca filaments in several small *C. holboelli* (32-92 mm SL) and of distinct rudiments of esca appendages in *C. tentaculatus* of only 6.5 and 15 mm SL, might indicate that the specimens without filament represent a separate species. If so, *C. uranoscopus* Murray, 1877, should be resurrected. However, considering that no specimen larger than 92 mm (5 in Fig. 2) lacking esca filament has been found in the Atlantic, the possibility can not be excluded that the body length at which the appendage is developed has a considerable intraspecific variation, and that this length might depend on environmental conditions during the juvenile metamorphosis. For examination of these possibilities, a world wide study of the distribution and characters of all available material is needed.

#### F. Acknowledgements

The senior author (E.B.) is greatly indebted to GERHARD KREFFT and ALFRED POST for the invitations to participate in the Atlantic cruises during which the material was collected, and to the CARLSBERG FOUNDATION for support in connection with this participation. For loan of specimens we are grateful to P.A. HULLEY (SAM) and A.C. WHEELER (BMNH). Thanks are also due to the artists K. ELSMAN and R. NIELSEN for their skilful drawings.

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