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Dedicated to Mrs. W.S.S. van Benthem Jutting

## Otoliths of the wolf-fishes (genus *Anarrhichas* Linnaeus, 1758) from the Northern Atlantic (Pisces, Perciformes)

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While working at the Rijksinstituut voor Visserijonderzoek (R.V.I.O.) at IJmuiden, I received through the courtesy of Mr. C. van Delft some specimens of the three northern Atlantic species of wolf-fishes. At IJmuiden they are brought in by commercial trawlers. The only data in the literature known to me concerning the otoliths of *Anarrhichas* are those furnished by FROST, 1929. This author published only very sketchy illustrations of two of the northern Atlantic species. I thought it useful, therefore, to describe, illustrate and compare in this paper the otoliths of all three *Anarrhichas* species.

The three species of wolf-fishes in the northern Atlantic are: *Anarrhichas lupus*, *A. minor* and *A. latifrons*. The otoliths (sagittae) in this genus are of very small size in relation to the dimensions of the fishes. They could be located only by means of a x-ray photograph, taken with the kind assistance of Mr. W. Heermans.

Table I shows the measurements, age and — if known — sex. The age was determined by counting under a dissecting microscope the number of rings, caused by differences in transparency.

### GENERAL DESCRIPTION

The outline of the otolith is ovate. The lateral side is convex. The dorsal rim is about two-thirds the length of the ventral part of the otolith and is highest in the middle part. The anterior rim is projected into a prominent rostrum and a shorter rounded antirostrum and contains an excisura. The ostium is triangular and becomes deeper posteriorly. Remarkable is the high raised crista superior, which runs from the antirostrum to the centre of the otolith. It can be presumed that the edges of the ventral raised areas form

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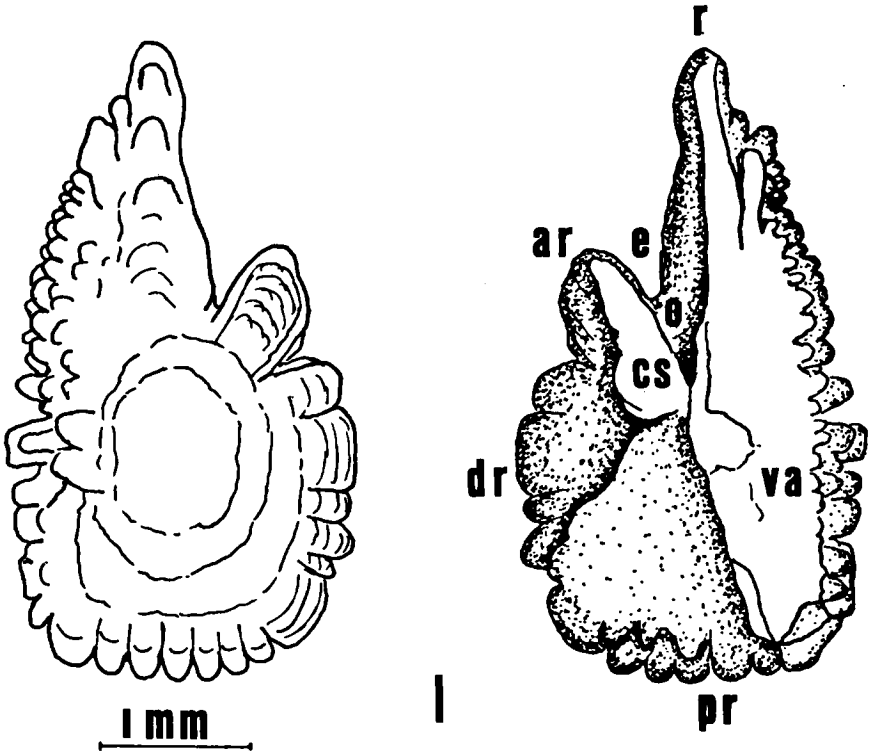


FIG. 1. The left otolith of a specimen of *Anarrhichas lupus* with a total length of 67.8 cm. Left: lateral view; right: median view (ar = antirostrum; cs = crista superior; dr = dorsal rim; e = excisura; o = ostium; pr = posterior rim; r = rostrum; va = ventral area).

the crista inferior, otherwise the cauda is not indicated, for the dorsal areas are depressed ascending to the dorsal rim.

*Anarrhichas lupus* Linnaeus, 1758 — Common Sea-cat (fig. 1).

The ventral rim is nearly straight, heavily serrated and umbonated anteriorly. The dorsal rim is slightly curved and serrated. The posterior rim is serrated and runs vertically. The rostrum is sometimes bicuspidate and provided with a narrow groove on the median side running backwards. The antirostrum and excisura are well-developed.

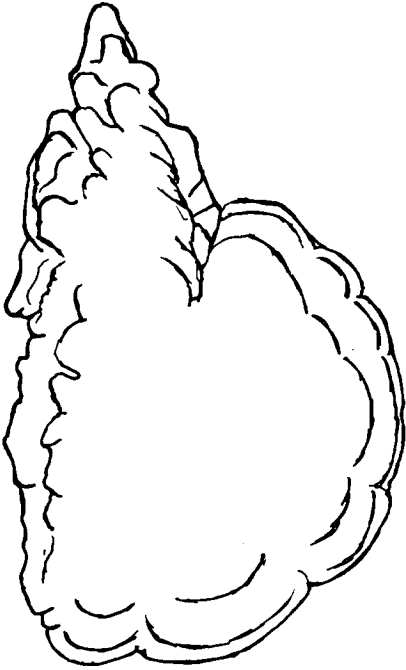
*Anarrhichas minor* Olafsen, 1772 — Spotted Sea-cat (fig. 2).

The ventral rim is nearly straight. The dorsal and posterior rims are rather curved, but not serrated. This otolith differs from the above mentioned in the greater convexity of the lateral side and in the greater thickness. The large antirostrum is strongly curved. The excisura is small and acute.

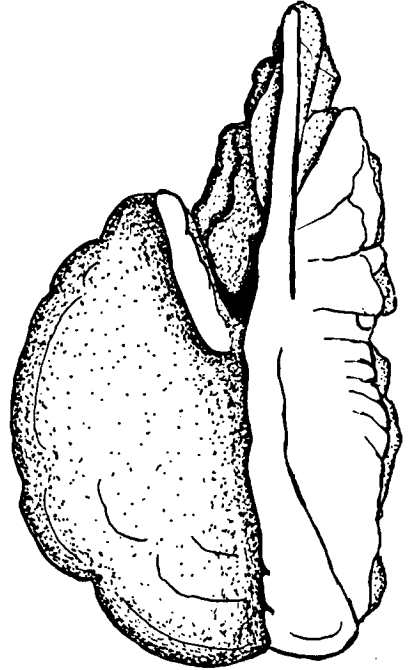
TABLE I. Measurements of various wolf-fishes (in cm), their otoliths (in mm), and their age (in years).

<i>Anarrhichas lupus</i>						<i>Anarrhichas minor</i>						<i>Anarrhichas latifrons</i>					
fish		otolith				fish		otolith				fish		otolith			
l	s	a	l	h	w	l	s	a	l	h	w	l	s	a	l	h	w
41.2	♂	5	3.40	2.05	0.95	55.2	♂	5	4.50	2.80	1.45	81.3	♂	6	4.60	2.50	1.20
54.8	♀	6	3.60	2.15	1.05	61.4	♂	6	5.35	3.55	1.45	82.0	—	6	4.75	2.60	1.25
57.9	♀	6	3.90	2.15	1.10	66.2	♀	6	4.85	2.95	1.40	86.0	—	7	5.05	3.05	1.25
60.5	♂	6	4.00	2.20	1.00	66.8	—	6	4.70	3.35	1.40	96.0	—	8	5.55	3.15	1.50
63.1	♀	6	3.65	2.20	1.00	67.1	♀	7	5.15	3.15	1.55	98.0	—	8	5.35	3.40	1.70
64.0	♂	8	4.35	2.15	1.20	68.5	—	7	5.35	3.20	1.55						
66.5	—	8	4.35	2.30	1.05	69.2	♀	7	5.40	3.00	1.30						
67.8	—	8	4.25	2.35	1.05	70.0	♂	7	5.60	3.60	1.55						
70.3	♂	10	3.95	2.25	1.00	71.0	♀	7	4.70	3.15	1.60						
72.2	♀	9	4.65	2.45	1.15	73.6	♀	7	5.35	3.55	1.70						
84.0	♀	12	4.65	2.35	1.25	80.2	♂	9	5.70	3.65	1.95						

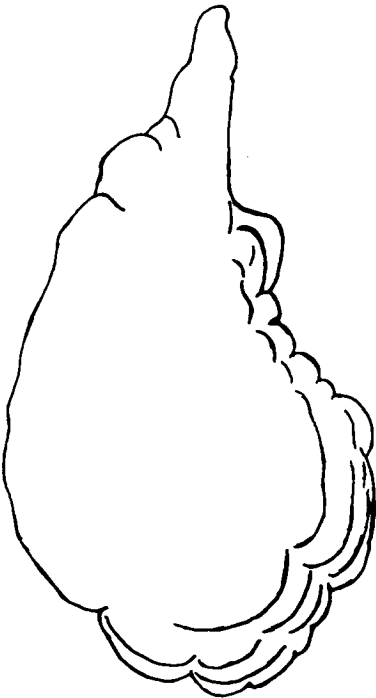
The measurements of the otoliths are the means of the left and right otoliths.  
 l = length; h = height; w = width; a = age; s = sex.



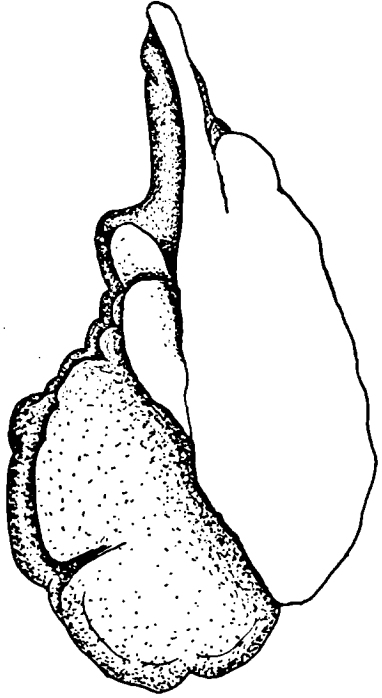
1 mm



2



3



*Anarrhichas latifrons* Steenstrup, 1842 — Blue Sea-cat (fig. 3).

The ventral, dorsal and posterior rims are curved, but not serrated. This otolith differs from those of the first and second species in having a long, slender pointed rostrum. The antirostrum is short. A small rounded excisura is present.

REFERENCE

FROST, G. A.

1929 A comparative study of the otoliths of the neopterygian fishes. — Ann. Mag. nat. Hist., (10) 4 — 19 : 120—130, pls. I & II.

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FIGS. 2—3. The left otolith of a specimen of *Anarrhichas minor* with a total length of 68.5 cm (fig. 2); the same of a 96.0 cm long specimen of *Anarrhichas latifrons* (fig. 3). The left figures give a lateral view, the right ones a median view.