

# Occurrence of Eggs of *Echiodon drummondi* Thompson on the Coast of County Kerry

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## INTRODUCTION

As part of a programme of research on the spawning of bass *Dicentrarchus labrax* (L), tow-netting for pelagic fish eggs has been carried out on various parts of the Irish coast during the years 1967 to 1971 inclusive.

In May, 1970, in the course of tow-netting in Blasket Sound, Co. Kerry, eggs of the pearlfish *Echiodon drummondi* Thompson were taken in three hauls. Most of the eggs were hatched out and the larvae reared for some days. This appears to be the first record of the eggs of this species on the Irish coast. Eggs and vexillifer larvae from the Irish Atlantic Slope attributed to this species by Holt and Byrne (1907) were considered by Ehrenbaum (1905-1909), to belong to the dealfish *Trachipterus arcticus*.

The material obtained during the present investigations has been deposited in the National Museum, Dublin (Reg. No. 20/70).

## NATURAL HISTORY OF PEARLFISHES

Pearlfishes, family Carapidae (formerly Fierasferidae), are small, slender fishes which, as adults, are found sheltering in sea cucumbers or other echinoderms, or, in the case of some species, in bivalve molluscs (Wheeler 1969). Adults are rather infrequently captured; the post-larvae are more often captured, usually in tow-nets.

Two species are known in the Mediterranean. One, *Carapus acus* (Brünnich), is not uncommon there. The other, *Echiodon dentatus* Cuvier (= *Fierasfer dentatus*), is much less frequently taken (Padoa 1956). An Atlantic pearlfish *Echiodon drummondi* Thompson, which has been recorded from the Bay of Biscay to southern Scandinavia, was at one time believed to be the same species as the Mediterranean *E. dentatus*, but is now considered to be distinct from it, though closely related to it (Wheeler, pers. comm.)

The Atlantic species was first described by Thompson (1837), who examined an adult cast ashore at Carnlough, Co. Antrim in June 1836.

The development of *Carapus acus* has been described in detail by Emery (1880). The small ellipsoidal eggs are embedded in masses of transparent slime. These egg-masses float. The slime disintegrates before the eggs hatch and the eggs are then found drifting free and separate in the water. Soon after hatching, the larvae develop a slender projecting appendage some distance behind the head. This progressively elongates during the larval and post-larval stages, developing a leaf-like expansion at its tip and other leaf-like flaps along its length.

Similar but larger eggs, also embedded in masses of slime, were described from the Mediterranean by Raffaele (1888) and Sparta (1926) and were attributed to *E. dentatus*. The larvae hatched from them were bigger than those of *Carapus acus* and differed from them in pigmentation. The flagellate appendage, when developed, was proportionately shorter.

The post-larval pelagic stage of species of Carapidae is believed to last a long time. Post-larvae of *E. drummondi* bearing the flagellate appendage (and consequently known as vexillifer larvae) have been taken to a length of more than 90 mm. Larger post-larvae, in which the appendage has been lost, also occur in the upper water layers.

Detailed descriptions of Atlantic material have been given by Ehrenbaum (1905-1909).

## IRISH RECORDS OF PEARLFISH

Previous shallow-water occurrences of *Echiodon drummondi* on the Irish coast are as follows:—

- (1) Carnlough, Co. Antrim, June 1836. Adult, about 280 mm, cast ashore (Thompson 1837).
- (2) Valentia Harbour, Co. Kerry, February 1852. Adult, about 200 mm, cast ashore (Day 1880-84).
- (3) Valentia Harbour, September 1897. Post-larva 76 mm. (O'Riordan 1965).
- (4) Valentia Harbour, 1900. Post-larva 60 mm. (O'Riordan 1965)
- (5) Off Cork Harbour, in 14 fathoms (25.6 m), November 2, 1905. Post-larva, 6.0 mm.

Specimen (3) was sent by Miss Delap to McIntosh and was described by him (McIntosh 1898). Both it and specimen (4) are in the Irish National Museum and are referred to by Ehrenbaum (1905-1909). Specimen (5) was sent by Holt to Ehrenbaum and is described and figured by the latter.

There are, in addition, records of the capture of this species in deep water over the Irish Atlantic slope. These include 25 specimens taken on June 24, 1905 by the Danish research vessel *Thor* at two stations viz:— 48° 55'N, 12° 20'W, soundings 1360-1450 m, 2 specimens, 88 and 94 mm; 49° 25'N, 12° 20'W, soundings 1360-1432 m, 23 specimens, 49 to 124+ mm.

More recent records include an example got at the north edge of the Sole Bank 50° 2½'N, 10° 59'W, depth 403-436 m, on July 4, 1968 (Wheeler, pers. comm.). A specimen 210 mm long was taken in Dingle Bay on July 2, 1971.

## BLASKET SOUND

The Blasket Islands lie off the tip of the Dingle Peninsula. The outermost islands are about 8 miles offshore. The largest island, the Great Blasket, is nearest shore; it is separated from the mainland by the Blasket Sound, which is about 1 mile wide. The islands stand on a narrow tongue of sea-bed bounded by the 20 fathom (36 m) line and extending south-westwards out from the mainland. To the north and south, and still more rapidly to the westwards, the sea bed slopes away quickly to 40 fathoms (73 m) and over.

Depths in the Sound are variable and there are several shoals. Tides are strong and there are overfalls under certain conditions of wind and tide.

In May 1970, the surface salinity in Blasket Sound was 35.2‰. The surface temperature on May 25 and 26, when eggs were obtained, was 11.1 to 12.0°C; during the previous week it had varied between 10.8 and 13.5°C.

## HAULS IN WHICH PEARLFISH EGGS OCCURRED

Hauls made in the Blasket Sound were all surface hauls with a 45 cm diameter zooplankton tow-net. They were usually of about 1 hour's duration each. On completion of each haul, all fish eggs which could be detected were removed and placed in jars of sea water to hatch. Formalin was then added to the balance of the sample, comprising invertebrates, fish larvae and post-larvae and any undetected fish eggs.

Eggs of *Echiodon drummondi* occurred in the following hauls:—

- |         |               |            |          |
|---------|---------------|------------|----------|
| Haul 5. | May 26, 1970. | Late ebb.  | 1 egg.   |
| Haul 7. | May 27, 1970. | Early ebb. | 1 egg.   |
| Haul 8. | May 27, 1970. | Half ebb.  | 56 eggs. |

## PEARLFISH EGGS AND LARVAE

Of the total of 58 eggs obtained, 50 had been picked off alive and had hatched on arrival in the laboratory in Dublin on the evening of May 29. Eight eggs were, however, present in the preserved material from Haul 8.

The eggs, when obtained, were all free and separate and to the naked eye presented no unusual features. On microscopic examination, the preserved eggs were found to be ellipsoidal. Their dimensions varied from 1.254 × 1.079 mm to 1.32 × 1.079 mm. One small egg of 1.254 mm long axis measured 1.1 mm across, while one large egg of 1.3 mm long axis was also 1.1 mm across. The single oil-globule measured 0.132 to 0.165 mm. All eggs contained advanced embryos.

The larvae which had hatched from the unpreserved eggs showed a little variation in development. In one or two, the dorsal appendage was as yet only a small flap, marked with a black spot and not projecting beyond the dorsal marginal fin. Most, however, were in the stage illustrated in Fig. 1, A (drawn from material preserved on May 29). The size-range was 4.5 to 4.7 mm. The eyes were unpigmented. The minute amber or golden oil-globule was anterior in position in the yolk-sac and the vent opened immediately behind the yolk-sac. Black pigment only was present, distributed as indicated in the figure. Fig 1, B and C illustrate older and larger stages, drawn when alive on May 30 and May 31. There was some individual variation amongst the larvae in the two large touches of black pigment in the post-anal region—in some examples one or other of these was represented by two separate, smaller patches of pigment.

It was not possible to continue observation of development after May 31, because of further field work. In anaesthetised examples, the dorsal appendage was limp and might point in any direction. In jars of sea water, the active larvae swam head downwards, at an angle of 70 to 80 degrees, with the appendage straight and projecting more or less at right angles to their bodies.

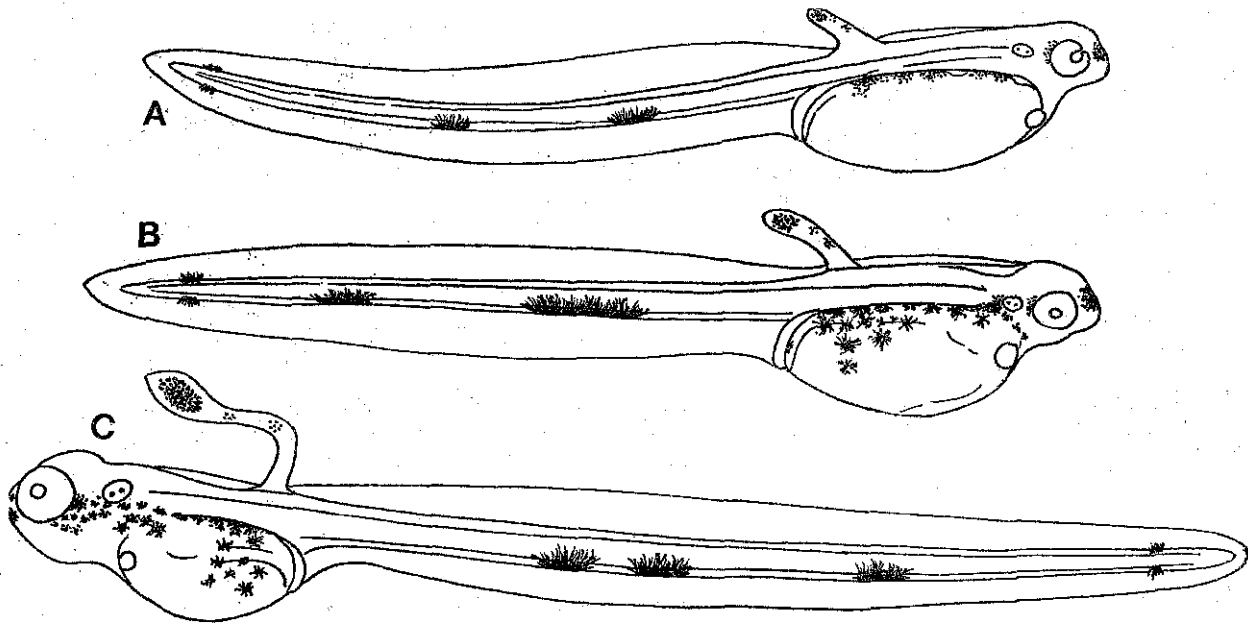


Fig. 1.—Larvae of *Echiodon drummondi* Thompson, hatched from eggs taken in Basket Sound, Co. Kerry, on May 27, 1970. A, May 29, 4.7 mm. B, May 30, 5.0 mm. C, May 31, 6.1 mm.

## DISCUSSION

The larvae from the Blasket eggs were very close in many respects to those of *E. dentatus* as figured by Sparta (1926). The eggs, however, were smaller than those of *E. dentatus* as described by Raffaele (1888) who gives the dimensions as  $1.43 \times 0.89$  mm; or by Sparta, who gives the dimensions as  $1.4 \times 1.0$  mm. The Irish eggs were also less markedly ellipsoidal, having the long axis, 1.0857 to 1.25 times the short axis (mostly 1.162 to 1.223 times the short axis), as compared with corresponding Mediterranean ratios of 1.4 (Sparta) to 1.6 (Raffaele).

The amount of shrinkage or distortion in shape produced by preservation cannot be estimated but is unlikely to have been very great.

The Irish eggs were very similar in size and proportions to eggs taken off the Scottish coast in 1903 (Williamson 1911):—

	<i>Ireland, 1970</i>	<i>Scotland, 1903</i>
Eggs	... $1.254 \times 1.079$ mm to $1.32 \times 1.079$ (1.1) mm	... $1.25 \times 1.07$ mm to $1.37 \times 1.1$ mm
Oil globule	... $0.132 - 0.165$ mm	... $0.12 - 0.17$ mm
Axis ratio	... $1.0857 - 1.25:1$	... $1.125 - 1.285:1$

The Scottish eggs (which were also measured after preservation) were attributed by Williamson to the common or red sea bream *Pagellus bogaraveo* (Brünnich). Williamson gives drawings of the eggs and of advanced embryos removed from them; the eggs are clearly those of *Echiodon*. These eggs were taken in May 1903, 40 miles east of the Shetlands and also 15–20 miles west of the Shetlands; in June 1903 20 miles west of the Shetlands; and in August 1903 off Kinnaird Head (Moray Firth).

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## SUMMARY

On May 26–27, 1970, a total of 58 eggs of *Echiodon drummondi* Thompson was taken in surface tow-nets in Blasket Sound, Co. Kerry. The eggs, when taken, were free and separate and contained advanced embryos. After preservation in formalin, eight of the eggs measured  $1.254 \times 1.079$  mm to  $1.32 \times 1.079$  mm. They contained a single small oil-globule 0.132 to 0.165 mm across. Unpreserved eggs had hatched by May 29; the larvae then measured 4.5 to 4.7 mm and showed the beginnings of the dorsal appendage characteristic of the vexillifer stages of pearlfishes. By May 31, the larvae had increased in length to 6.1 mm and the dorsal appendage had elongated.

## REFERENCES

- Day, F. 1880-84. *Fishes of Great Britain and Ireland*. London: Williams and Margate.
- Ehrenbaum, 1905-09. Eier und Larven von Fischen. *Nordisches Plankton: Zoologischer Teil*, 1.
- Emery, C. 1880. Le specie del genere *Fierasfer* nel golfo di Napoli e regioni limitrophe. In *Fauna e Flora del Golfo di Napoli: Monogr. II*.
- Holt, E. W. L. and Byrne, L. W., 1907. *Rep. Sea and Inland Fish. Ireland 1905, Part II, App. II*, 29—54.
- McIntosh, W. C. 1898. *Irish Nat.*, 7, 63.
- O'Riordan, C., 1965. *A catalogue of the collections of fishes in the National Museum of Ireland*. Dublin: Stationery Office.
- Padoa, E., 1956. Carapidae. In *Fauna e Flora del Golfo di Napoli. Monogr. 38*.
- Raffaele, F., 1888. *Mitt zool. Stat. Neap.*, 8, 1—84.
- Sparta, A., 1926. Uova e larve di *Fierasfer dentatus* Cuv. *Mem. R. Com. Thalass. It.*, CXXII.
- Thompson, W., 1837. *Trans. zool. Soc.*, II.
- Wheeler, A., 1969. *Fishes of the British Isles and North-West Europe*. London: MacMillan.
- Williamson, H. C., 1911. *Fisheries Scotland Sci. Invest.*, 1910, 1.