

NOTES ON THE DISTRIBUTION OF ELECTRIC RAYS (*TORPEDO* SPP.) IN NORTHERN EUROPEAN WATERS

By ALWYNE WHEELER AND VALERIE DU HEAUME

Department of Zoology, British Museum (Natural History), London

(Text-figs. 1-3)

The true status of the species of electric rays in northern European waters long seems to have been a matter of doubt; most authorities recognizing two, but some admitting three members of the genus *Torpedo* to this fauna. One of these species, *Torpedo nobiliana* Bonaparte, 1835, is undoubtedly widespread; another, *T. marmorata* Risso, 1810 [= *T. torpedo* of Poll (1947) and Marine Biological Assoc. (1957)] is much rarer, while the third, *T. torpedo* (Linnaeus, 1758) [= *T. ocellata* of authors] has probably been recorded erroneously. Although *T. marmorata* has been included in many works of the British fauna from Pennant (1776) onwards, critical examination of these accounts shows that of those not based on incorrect identification, only one gives a definite, fully documented record of the species in British waters.

It is therefore timely to report the recent capture of a specimen of *Torpedo marmorata* on the southern Cornish coast, by Mr R. Davis, who presented the specimen to the British Museum (Natural History). The capture of this specimen has prompted us to review previous reports of this and other *Torpedo* species from European waters north of Biscay, and for the convenience of other workers to prepare a brief synopsis and illustrations of their diagnostic characters.

The nomenclature adopted in this paper follows that of Fraser-Brunner (1949) and Bigelow and Schroeder (1953).

SYNOPSIS OF THE SPECIES

- A. First dorsal fin conspicuously larger than the second, its front edge about 1.5 times that of the second dorsal; dorsal interspace long, hind margin of first dorsal in advance of second dorsal origin; caudal peduncle long, hind edge of second dorsal base to caudal origin about 1.75 times the second dorsal base; spiracles smooth edged, no conspicuous papillae on margin; dorsal colour uniformly dark brown, black or slaty-blue; attains 180 cm in length.

Torpedo nobiliana Bonaparte, 1835* (Figs. 1 and 3A)

* This species was referred to a monotypic subgenus *Tetronarce* by Fraser-Brunner, who placed the species with papillate spiracles in the subgenus *Torpedo*.

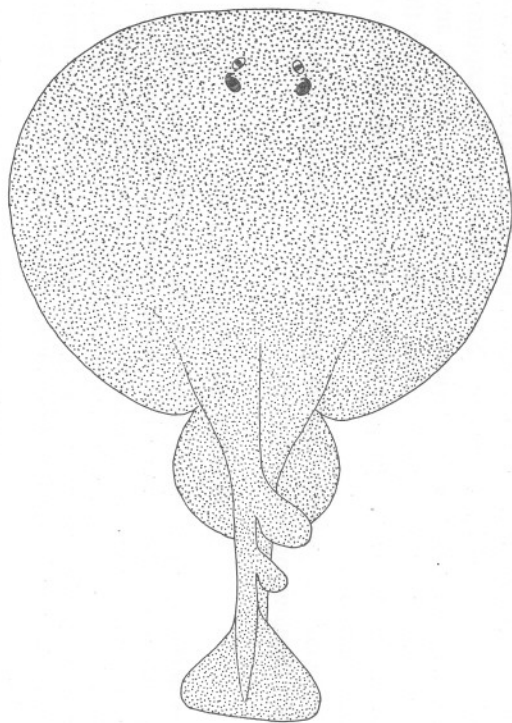


Fig. 1. *Torpedo nobiliana*. Drawn from a specimen 567 mm total length.

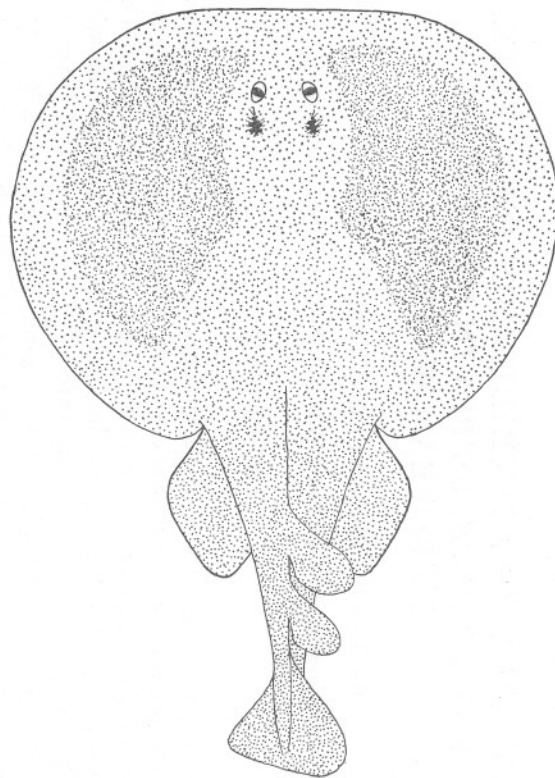


Fig. 2. *Torpedo marmorata*. Drawn from a specimen 405 mm total length.

- AA. First dorsal fin slightly larger than second, its front edge about 1.2 times that of second dorsal; dorsals closely spaced, hind margin of first dorsal reaches, or almost reaches, the second dorsal origin; caudal peduncle short, less than second dorsal fin base; spiracles papillate. B
- B. Spiracles with seven conspicuous papillae which almost meet across the cavity; colour variable but always light mottled on dark brown background, cream ventrally; attains 60 cm in length.

Torpedo marmorata Risso, 1810 (Figs. 2 and 3B)

- BB. Spiracles with small papillae on lateral and hind margins; colour uniformly brown with five (sometimes fewer) conspicuous blue, black edged ocelli on back; attains 60 cm in length. Doubtfully recorded.

Torpedo torpedo (Linnaeus, 1758) (Fig. 3C)

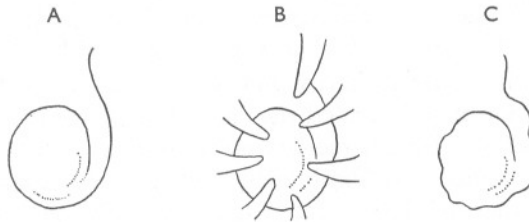


Fig. 3. Diagrammatic views of spiracles of: A, *Torpedo nobiliana*. B, *Torpedo marmorata*. C, *Torpedo torpedo*.

Torpedo nobiliana Bonaparte, 1835

Although this species is undoubtedly the most common of the electric rays in northern European waters, it was not recognized in British waters and identified with Bonaparte's species until 1856 (Thompson), followed by Yarrell (1859). Since then it has been recorded many times, and it is clearly a relatively common member of our fish fauna. Recent records of occurrence published by Went (1959, 1961) from the Irish Coast, and from Scottish waters by Rae & Wilson (1952, 1956a, 1956b) and Rae & Lamont (1962a, b) and Krefft (1960), show that this species can be found constantly throughout the year, even in northern waters. The occurrences in Scottish waters listed by Rae and collaborators probably represent the northward limit of the range of this species. The most northerly occurrence reported is that of a female, 66 cm long, from Mid Yell, Shetland (Rae & Wilson, 1961). On the eastern coasts of the North Sea it appears to be considerably rarer than might be expected; Poll, for instance, knew of no record from the Belgian coast; Bruun & Pfaff (1950) report only one occurrence in Danish waters, in the Skagerrak, 8 December 1926, the same specimen also being reported by Jensen (1941) and Andersson (1942).

South of the British Isles *T. nobiliana* is apparently common along the Atlantic coasts of France (Moreau, 1881), Spain (Lozano y Rey, 1928) and Portugal (Nobre, 1935) and in the Mediterranean (Tortonese, 1956), although

Cantacuzene (1956) gives no record of it from the Roscoff area, where *T. marmorata* is common.

Torpedo marmorata Risso, 1810

Amongst the early accounts of electric rays in British waters is that of Pennant (1776) who described and illustrated as 'the Electric Ray' an 18 in. specimen with 'six small cutaneous rags on the inner circumference of the spiracles', which is clearly referable to *T. marmorata* Risso. This illustration and details of the description were, however, copied from that of Walsh (1773) whose studies on the anatomy and physiology of *Torpedo* were made on specimens of this species collected at La Rochelle, France. Pennant's account was therefore not based on a British specimen. Nevertheless, from that date onwards practically every author of a work on British fishes included *T. marmorata* on this earlier authority and without any original record. Thus Fleming (1842) not only described the characteristic spiracular papillae and suggested that all the British records of electric rays were referable to *T. marmorata*, but claimed that Walsh had found it to be not uncommon on the English coast, whereas Walsh (1774) had admitted that the one English specimen he had seen was different from *T. marmorata*. Yarrell (1836) also figured *T. marmorata* based on Pennant's plate which he was the first to point out was copied from Walsh. Yarrell further admitted that the correct scientific name for the British electric ray was doubtful; although in a posthumously published edition (1859) he differentiated between *T. nobiliana* (as 'the new British Torpedo') and *T. marmorata*, he still gave no proof of the existence of that species on the British coast. Couch (1877) similarly failed to cite proof of its occurrence. Finally, Day (1884) included this species with the following comment.

'Though Pennant certainly figures this species, and it has been admitted into our fauna by all our Ichthyologists since his time, I cannot resist being doubtful of its occurrence off our shores, and that further evidence is required.... The existence of British specimens is doubtful.'

Since this, both Jenkins (1936) and Norman (1935) included *T. marmorata* as a doubtfully occurring species in the British fauna, and there appears to have been no later confirmatory record. Although the Plymouth Marine Fauna (1957) included this species (as *T. torpedo*) with the comment 'single specimens in trawl at very long intervals' it still failed to provide an authenticated fully documented record.

Some records of the occurrence of *T. marmorata* in northern European waters are available in the literature. Listed chronologically they are as follows:

One caught by a fisherman of Blankenberghe, off the Belgian coast (van Beneden, 1871; Poll, 1947). This record is unsupported by proof of identification and we therefore regard it as doubtful.

- (1) Female, 45 cm long, 10 October 1921, in four to five fathoms off Frederikshaven, Northern Kattegat (Jensen, 1941; Poll, 1947; Bruun & Pfaff, 1950).
- (2) Female, 50 cm long, 28 September 1932, 20 miles NW by W from Heligoland, ca. 54° 19' N. 7° 17' E. in 38 m (Duncker, 1960; Jensen, 1941).
- (3) A specimen photographed in the Plymouth Aquarium and which appears in Wilson (1935) was caught in the Plymouth area some time between 1931 and 1935 (D. P. Wilson, personal communication).
- (4) Female, 55 cm long, 28 September 1949, in 30 m off the Dutch coast (Kristensen, 1957).
- (5) Female, 50 cm, 15 October 1956, in 34 m, north of Terschelling, Holland (Kristensen, 1957).
- (6) Female, 52 cm, ca. 20 October 1956, near the Bløden Ground, 'the fourth record of the species from the area' (Krefft, 1958).

The recent specimen thus appears to be the first fully documented record from British waters, and only the seventh authenticated occurrence for northern European waters. It was speared by Mr R. Davis on 5 September 1963 in 70 ft of water off the Manacles Reef, near St Keverne, Cornwall, on a bottom covered with boulders. It is a female, 41 cm long. The stomach contained a large three-bearded rockling, *Gaidropsarus vulgaris* (Cloquet, 1824), of 34 cm total length.

Torpedo marmorata is apparently not uncommon farther south in the Channel; Le Sueur (1959) lists three records from the Channel Islands, and in the area of Roscoff, Brittany, it is not rare (Cantacuzene, 1956). It is apparently common elsewhere in its European range, along the Biscay coasts of France (Moreau, 1881) and Spain (Lozano y Rey, 1928), Portugal (Nobre, 1935) and in the Mediterranean (Tortonese, 1956).

Torpedo torpedo (Linnaeus, 1758)

This species is included in the present paper solely to discuss the single northern European record available, which we believe to be based either on a misidentification, or more likely on the erroneous use of the name *T. torpedo*. Poll (1947) gives this single record as 'a été trouvée échouée sur l'estran à Wenduïne, en avril 1926, par M. W. de Brouwers', although he admitted that he had not seen any Belgian specimens. Norman (1935) lists *T. torpedo* as of doubtful occurrence in the British fauna, but we can find no reference in the literature to this species being reliably recorded from the British Isles.

This reported occurrence off the Belgian coast might be attributed to any of three factors. First, the specimen could have been misidentified, although in view of the conspicuous blue-ringed ocelli in this species this would seem unlikely. Secondly, the specimen could have been attributed to *Torpedo torpedo* in the sense that this name was used by Poll and others for *T. marmorata* Risso, 1810. This confusion arose originally because the original Linnaean *Raja torpedo* was a composite species later restricted in the present sense. This explanation seems most likely to the present authors. Thirdly, it is possible that the identification was correct, but in view of the

normal distribution of this species in European waters, we regard this as a remote possibility.

Torpedo torpedo is, according to authors, the rarest of the European electric rays; Tortonese (1956) claims it to be frequent in Italian seas as did Lozano y Rey (1928) for the Spanish Mediterranean coast, although he noted it as less frequent on the Biscay coast of Spain. Nobre (1935) recorded it from several Portuguese localities, but stated it was rare north of Portugal. Moreau (1881) likewise found it rare on the French coast and gave only Atlantic records from the southern end of the Bay of Biscay, and doubted records of it from the Channel coast as due to confusion with *T. marmorata*. It might be noted here that Cantacuzene (1956) did not report it from the region of Roscoff, Brittany. The distribution of this species is therefore evidently more southerly than either of the other two *Torpedo* species, and while the record from the Belgian coast must still be admitted as a possibility, this general distribution weighs heavily against its full acceptance.

It is a pleasure to thank Mr R. Davis for his efforts in securing this recent specimen of electric ray for the collection of the British Museum (Natural History). Our thanks are also extended to Mr A. Mattacola of the Marine Biological Association, Plymouth, who provided us with a specimen of *T. nobiliana* for comparative purposes; to Dr D. P. Wilson for information on a specimen of *T. marmorata* acknowledged in the text, and to Dr P. H. Greenwood who has read and criticized this note in manuscript.

SUMMARY

The distribution of electric rays (*Torpedo* spp.) in northern European waters is discussed. *Torpedo nobiliana* is admitted as of regular occurrence; records of occurrence of *T. marmorata* are given in detail. The status in these waters of *T. torpedo* is doubtful. A synoptic key is provided together with illustrations of the three species.

REFERENCES

- ANDERSSON, K. A., 1942. *Fiskar och Fiske i Norden*, Vol. 1, 540 pp. Stockholm.
- BENEDEN, P. J. VAN, 1871. Les poissons des côtes de Belgique, leurs parasites et leur commensaux. *Mém. Acad. R. Belg. Cl. Sci.*, T. 38, pp. 1-100.
- BIGELOW, H. B. & SCHROEDER, W. C., 1953. Fishes of the Western North Atlantic. *Mem. Sears Fdn. mar. Res.*, Vol. 1, No. 2, pp. 1-588.
- BRUUN, A. F. & PFAFF, J. R., 1950. *List of Danish Vertebrates*. 180 pp. Copenhagen. [Fishes on pp. 20-60.]
- CANTACUZENE, A., 1956. Inventaire de la faune marine de Roscoff. Poissons. *Trav. sta. biol. Roscoff*, Suppl. 8, pp. 1-67.
- COUCH, J., 1877. *A History of Fishes of the British Islands*, Vol. 1, 245 pp. London: Groombridge & Sons.
- DAY, F., 1884. *The Fishes of Great Britain and Ireland*, Vol. 2, 388 pp. London: Williams & Norgate.
- DUNCKER, G., 1960. *Die Fische der Nordmark*, 2nd ed., 432 pp. Hamburg.

- FLEMING, J., 1842. *A History of British Animals*. 565 pp. London: Duncan & Malcolm.
- FRASER-BRUNNER, A., 1949. Note on the electric rays of the genus *Torpedo*. *Ann. Mag. nat. Hist.*, Ser. 12, Vol. 2, pp. 943-7.
- JENKINS, J. T., 1936. *The Fishes of the British Isles*, 2nd ed., 408 pp. London: F. Warne.
- JENSEN, A. S., 1941. Om nogle for den danske Fauna nye eller sjældne Fiskearter. *Vidensk. Medd. dansk. naturh. Foren. Kbh.*, Bd. 104, pp. 179-206.
- KREFFT, G., 1958. Rare fish from near northern seas—Germany. *Ann. biol., Copenhagen*, Vol. 13 (1956), p. 96.
- 1960. Rare fish. A. Records of the Institut für Seefischerei, Hamburg. *Ann. biol., Copenhagen*, Vol. 15 (1958), pp. 70-2.
- KRISTENSEN, I., 1957. De gemarmerde sidderrog *Torpedo marmorata* Risso. *Levende Nat.*, Bd. 60, No. 2, pp. 39-41.
- LE SUEUR, R. F., 1959. Marine zoological report for 1958. *Bull. Soc. jersiaise*, 1959, pp. 229-32.
- LOZANO Y REY, L. 1928. *Fauna Iberica. Peces*, T. 1, 692 pp. Madrid: Mus. Nat. Cien. Nat.
- MARINE BIOLOGICAL ASSOCIATION, 1957. *Plymouth Marine Fauna*, 3rd ed., 457 pp. Plymouth.
- MOREAU, E., 1881. *Histoire naturelle des poissons de la France*, T. 1, 478 pp. Paris: Masson.
- NOBRE, A., 1935. Vertebrados (Mamíferos, Reptis e Peixes). *Fauna marinha de Portugal*, No. 1, 575 pp. Porto.
- NORMAN, J. R., 1935. Fishes. In *List of British Vertebrates*, pp. 40-66. London.
- PENNANT, T., 1776. *British Zoology*, Vol. 3, 372 pp. London.
- POLL, M., 1947. *Faune de Belgique, Poissons marins*, 452 pp. Bruxelles: Mus. Roy. Hist. Nat. Belg.
- RAE, B. B. & LAMONT, J. M., 1962a. Rare and exotic fishes recorded in Scotland during 1958. *Scot. Nat.*, Vol. 70, pp. 102-10.
- 1962b. Rare and exotic fishes recorded in Scotland during 1959. *Scot. Nat.*, Vol. 70, pp. 111-19.
- RAE, B. B. & WILSON, E., 1952. Rare and exotic fishes recorded in Scotland during 1951. *Scot. Nat.*, Vol. 64, pp. 102-11.
- 1956a. Rare and exotic fishes recorded in Scotland during 1954. *Scot. Nat.*, Vol. 68, pp. 23-38.
- 1956b. Rare and exotic fishes recorded in Scotland during 1955. *Scot. Nat.*, Vol. 68, pp. 92-109.
- 1961. Rare and exotic fishes recorded in Scotland during 1956. *Scot. Nat.*, Vol. 70, pp. 22-33.
- THOMPSON, W., 1856. *The Natural History of Ireland*, Vol. 4, 516 pp. London.
- TORTONESE, E., 1956. *Fauna d'Italia*, Vol. 2, 334 pp. Bologna.
- WALSH, J., 1773. Of the electric property of the *Torpedo*. . . . *Phil. Trans. roy. Soc.*, 1773, pp. 461-80.
- 1774. Of *Torpedos* found on the coast of England. . . . *Phil. Trans. roy. Soc.*, 1774, pp. 464-73.
- WENT, A. E. J., 1959. Ireland's rare sea fishes. *Irish Nat. J.*, Vol. 13, pp. 74-7.
- 1961. Rare fishes taken in Irish waters in 1960. *Irish Nat. J.*, Vol. 13, pp. 204-11.
- WILSON, D. P., 1935. *Life of the Shore and shallow Sea*. 150 pp. London: Nicholson & Watson.
- YARRELL, W., 1836. *A History of British Fishes*, Vol. 2, 472 pp. London: John van Voorst.
- 1859. *A History of British Fishes*, Vol. 2, 3rd ed., 670 pp. London: John van Voorst.