

FIRST RECORDS OF THE GOLDEN REDFISH *SEBASTES NORVEGICUS* (ASCANIUS, 1772) [*S. MARINUS* (NON LINNAEUS, 1758)] (SCORPAENIFORMES: SEBASTIDAE: SEBASTINAE) FROM IRISH WATERS

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Abstract

Although there are unconfirmed reports of juvenile Golden Redfish *Sebastes norvegicus* (Ascanius, 1772) from Irish waters dating back to 1849, the occurrence of the species was not confirmed until 2005 and 2014 when the first two adult size specimens were captured off the north-west and west coasts respectively. The status of all known species of Sebastinae in Irish waters is reviewed.

Key words: Golden Redfish, *Sebastes norvegicus*, *Sebastes*, Irish waters.

Introduction

Redfishes, Scorpionfishes and Rockfishes belong to a large family (Sebastidae) of fishes within the order Scorpaeniformes. The sub-family Sebastinae is represented by seven genera and about 133 species worldwide, the vast majority occurring in the North Pacific (Nelson, 2006). In the NE Atlantic, the Sebastinae is represented by three genera and five indigenous species (Quigley, 2011a, b): Blue-mouth Rockfish *Helicolenus dactylopterus* (Delaroche, 1809), Golden Redfish *Sebastes norvegicus* (Ascanius, 1772), Deepwater Redfish *S. mentella* Travin, 1951, Norway Haddock *S. viviparus* Krøyer, 1845, and Spiny Scorpionfish *Trachyscorpia echinata* (Köhler, 1896). The Arcadian Rockfish *S. fasciatus* Storer, 1854, which is common in the NW Atlantic (Scott and Scott, 1988; Klein-MacPhee and Collette, 2002), has occasionally been captured in western Icelandic waters (Garabana Barro, 2005). Two non-indigenous NW Pacific species, the Korean Rockfish *S. schlegelii* Hilgendorf, 1880, and the False Kelpfish *Sebastes marmoratus* (Cuvier, 1829) have been recorded from Dutch (Kai and Soes, 2009) and U.K. waters (Norman 1935; Wheeler and Eschmeyer, 1968) respectively.

There is a long history of taxonomic confusion and frequent misidentifications amongst *Sebastes* species (Eschmeyer, 1969; Power and Ni, 1985; Trottier *et al.*, 1988; Kendall, 2000; Joensen and Grahl-Nielsen, 2000; Johansen and Dahle, 2004; Garabana Barro, 2005; Hyde and Vetter, 2007; Bunke *et al.*, 2012), primarily due to significant overlaps in external morphometric and meristic characters, the occurrence of phenotypic eco-morphs (Johansen *et al.*, 2000), introgressive hybridization (Roques *et al.*, 2001), and in some cases, the indiscriminate use of synonyms and shared common names. Furthermore, due to low genetic

diversity, molecular methods have generally failed to satisfactorily discriminate between North Atlantic species (Mecklenburg *et al.*, 2018). Although the internal attachment pattern of the gas-bladder musculature to the vertebral column is generally considered to be a reliable discriminatory character, the temporal stability and suitability of this character is not applicable in all areas of *Sebastes* distribution within the North Atlantic (Garabana Barro, 2005).

Although *H. decadactylus* (Plate 1), *S. mentella* (Plate 2), *S. viviparus* (Plate 3), and *T. echinata* (Plate 4) have all been recorded from Irish waters (Holt and Calderwood, 1895; Holt and Byrne, 1908; O’Riordan, 1965; Wheeler and Blacker, 1972; Went and Kennedy, 1976; Holmes, 1994; Connolly and Kelly, 1994a, b; Kelly *et al.*, 1997; Briggs, 1998; Nolan, 2004a, b; Iglésias, 2014; Heessen and Blasdale, 2015), the occurrence of *S. norvegicus* has remained ambiguous.

***Sebastes norvegicus* (Ascanius, 1772) [*S. marinus* (non Linnaeus, 1758)]**

Fernholm and Wheeler (1983) noted that the type specimen of *Sebastes marinus* was erroneously described by Linnaeus in 1758 as *Perca marina* based on a specimen of the Painted Comber *Serranus scriba* (L.) obtained from the Mediterranean Sea and that an alternative scientific name was required. They noted that although Ascanius had first described the Golden Redfish from Norwegian waters as *Perca norvegica* in 1772, the species should be reassigned to the genus *Sebastes*, which led to the adoption of the official scientific name *S. norvegicus* by the International Commission on Zoological Nomenclature. Nevertheless, the incorrect synonym *S. marinus* remains in common use.

S. norvegicus is a benthopelagic (100-1000m) species which is found on both sides of the North Atlantic. The species is ovoviparous, giving birth to live pelagic larvae, slow-growing, long-lived (*circa* 60 years), attains a maximum size of 100cm TL (total length) and 15kg, and is commercially important in northern latitudes (Wheeler, 1969, 1978; Hureau and Litvinenko, 1986; Scott and Scott, 1988; Klein-MacPhee and Collette, 2002; Garabana Barro, 2005; Wienerroither *et al.*, 2013; Heessen and Blasdale, 2015; Mecklenburg *et al.*, 2018). In the NW Atlantic, *S. norvegicus* extends from New Jersey (rarely) northwards via SE Labrador (Canada) to Greenland (Scott and Scott, 1988; Klein-MacPhee and Collette, 2002). In the NE Atlantic, the species generally extends from northern parts of the North Sea and Kattegat to Spitsbergen, eastwards to Novaya Zemlya, and westwards to Iceland (Hureau and Litvinenko, 1986). The species has occasionally been reported (as *S. marinus*) from the Faeroe-Shetland Channel (Boyd and Lordan, 1998), W of Shetland (Nolan, 2004b), Rockall Trough (Clarke *et al.*, 1997), southern North Sea (Hoek, 1896; Redeke, 1941; Poll, 1947; Wheeler and Blacker, 1969; Wheeler *et al.*, 1975), Isle of Man - Irish Sea (Bruce *et al.*, 1963), and NW France (Du Buit and Quero, 1989; Quero *et al.*, 2003; Heessen and Blasdale, 2015).

***Sebastes norvegicus* in Irish waters**

During March 1849, two specimens of *Sebastes norvegicus* were reported to have been taken on long lines set for Ling *Molva molva* (L.) in deep waters off the Wild Bank, Dingle Bay, County Kerry. Several more specimens were subsequently reported from the same area. During the summer of 1850, two specimens were taken on long lines set for Cod *Gadus morhua* L. at a depth of 162m off the Foze Rocks, SW Blasket Islands, County Kerry (Andrews, 1860a, b, c; Andrews, 1870). Four of Andrews' specimens, which are in the collections of the National Museum of Ireland – Natural History (NMINH) (O'Riordan, 1965; Holmes, 1994), were re-examined by Scharff (1891) who discovered that they were all *H. dactylopterus* (as *Sebastes dactyloptera*), and concluded that *S. norvegicus* had never been obtained from Irish waters. Indeed, the specimen figured by Andrews (1860c) is clearly *H. dactylopterus* (Plate 5). A number of authors subsequently remarked that Irish specimens of *H. dactylopterus* (as *Scorpaena dactyloptera*) had been repeatedly confused with *S. norvegicus* (Holt and Calderwood, 1895; Holt and Byrne, 1908; Went 1953). *Helicolenus dactylopterus* is now known to be quite common off Dingle Bay (Quigley, 2011a).

During the 1960s and 1970s, seven juvenile specimens (100-185mm TL; 4.8-50.0g) of *S. marinus* were reported from relatively shallow inshore waters (depths <100m) in Dingle Bay (Went, 1969, 1972; Minchin and Molloy, 1976, 1978, 1980). The specimens were poorly described and only one was preserved (NMINH: 1968.45.1; Went, 1969). The latter specimen (Plate 6), measuring 130mm TL, was re-examined by the author and confirmed as *S. viviparus* based on the backward orientation of the pre-opercular spines and the estimated number of oblique scale rows (<55) below the lateral line. The following fin ray counts were recorded: dorsal XV+14; anal III+7; and pectoral 18. Although there was a prominent symphyseal knob on the lower jaw, this was considered to be an artefact following 50 years preservation in industrial methylated spirits (Wienerroither and Nedreaas, pers. comm.). While it cannot be confirmed, it is possible that the other six unpreserved juveniles reported from Dingle Bay may also have been *S. viviparus*. There is only one previously confirmed record of *S. viviparus* from Irish waters; an unpreserved specimen weighing 340g was captured by an angler near the mouth of Larne Lough at the Maidens, County Antrim, NE Ireland (Briggs, 1998).

During the early 1990s, three adult size specimens of *Sebastes* (Plates 7-8), which were captured at a depth of *circa* 200m W of Slyne Head, County Galway (*circa* 53.0°N, 11.5°W) during November 1992 and October 1993, were registered as *S. norvegicus* in the NMINH collections (NMINH: 1992.61.1; 1992.61.2; 1993.67.1). These specimens, measuring 405, 385 and 540mm TL, weighing 850, 750 and 2125g respectively, were re-examined by the author, and all were confirmed as *S. mentella* based on the presence of a prominent symphyseal knob on the lower jaw, and the obliquely forward direction of the lower pre-opercular spine. Each of the specimens had the following fin ray counts: dorsal XV+16; anal III+9; and pectoral 19.

During early April 2005, a heavily pregnant female specimen of *S. norvegicus* (Plate 9), measuring 680mm TL and weighing 6.83kg, was captured by the MFV ‘Roselend’ (CC 911294) [Skipper: Armand Breton, Trégunc, France] while demersal trawling at depths of 240-880 m along the edge of the continental slope off NW Ireland (ICES Division VIa, 41-44E0; 56-58°N, 09-10°W). The specimen was identified as *S. norvegicus* based on the keys provided by Hureau and Litvinenko (1986). The symphyseal knob on the lower jaw was poorly developed, and the lower pre-opercular spine was pointing downwards and slightly backwards. The following fin ray counts were recorded: dorsal XV+15; anal III+8; and pectoral 19. The specimen represents the first authenticated record of *S. norvegicus* from Irish waters. It is interesting to note that during the course of the eight-day fishing trip (3-10 April 2005), the vessel logged 90kg of unspecified *Sebastes* sp., representing only 0.4% of the total weight (20713kg) of fish landed into Killybegs, County Donegal on 11 April 2005.

During mid-July 2014, the MFV ‘Ocean Harvester II’ (G688) [Skipper: Tomas Conneely, Ragoon, County Galway] captured a specimen of *S. norvegicus* (Plate 10), measuring 690mm TL, 670mm FL (fork length) and weighing 5.88kg (5.65kg gutted), while demersal trawling for *Nephrops* prawns at a depth of *circa* 100m west of the Aran Islands, County Galway, off the west coast of Ireland (ICES Division VIIb, 35D9; *circa* 53.25°N, 10.5°W). The symphyseal knob on the lower jaw was absent, and the lower pre-opercular spine was pointing downwards and slightly backwards. The following fin ray counts were recorded: dorsal XV+15; anal III+8; and pectoral 19. The identity of the specimen and its estimated age (40 +/- 1 years, based on otolith analysis) was confirmed by Kjell Nedreaas and Arne Storaker (pers. comm.) at the Institute of Marine Research, Bergen, Norway. The specimen represents the second authenticated record of *S. norvegicus* from Irish waters.

Discussion

It is possible that *Sebastes norvegicus* may occur more frequently in Irish waters, particularly in deep offshore waters (depths >200m), than the current paucity of records would suggest. Indeed, the occurrence of *S. norvegicus* in Irish waters is not surprising considering that the species has also been recorded, albeit rarely, from continental shelf waters (420m) off NW France (ICES Division VIIIa). Indeed, it is interesting to note that specimens of *S. viviparus* have also been reported from the same area, including the Porcupine Bank and off NW Ireland (Heessen and Blasdale, 2015), and during October 2009, a mature male specimen of *S. mentella* (445mm TL) was captured in a demersal trawl at a depth of 684m off the Galician coast (44° 06’N, 08° 56’W), NW Spain (Fernandez-Zapico *et al.*, 2012).

Considering the long history of taxonomic confusion and frequent misidentifications amongst *Sebastes* species, it is recommended that all specimens should be preserved for detailed examination. Indeed, historical and unverified records on public databases (e.g. GBIF),

particularly from the southern limits of their known distribution, should be interpreted with caution (Maldonado *et al.*, 2015), particularly inshore (<40m) observational records of *S. norvegicus* reported by SCUBA-divers which could be confused with either *H. dactylopterus* or *S. viviparus*.

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PLATE 1. Blue-mouth Rockfish *Helicolenus dactylopterus* from Dingle Bay, County Kerry, 30 January 2011. Photograph © Declan MacGabhann.



PLATE 2. Deepwater Redfish *Sebastes mentella*, Norway, 8 February 2006 (NMINH 2007.28.1 & 29.1). Photograph © Declan Quigley.



PLATE 3. Norway Haddock *Sebastes viviparus*, Norway, 10 November 2004. Photograph © Jonathan Ready.



PLATE 4. Spiny Scorpionfish *Trachyscorpia echinata*, Galician Bank, North West Spain. Photograph © Rafa Banon Diaz.

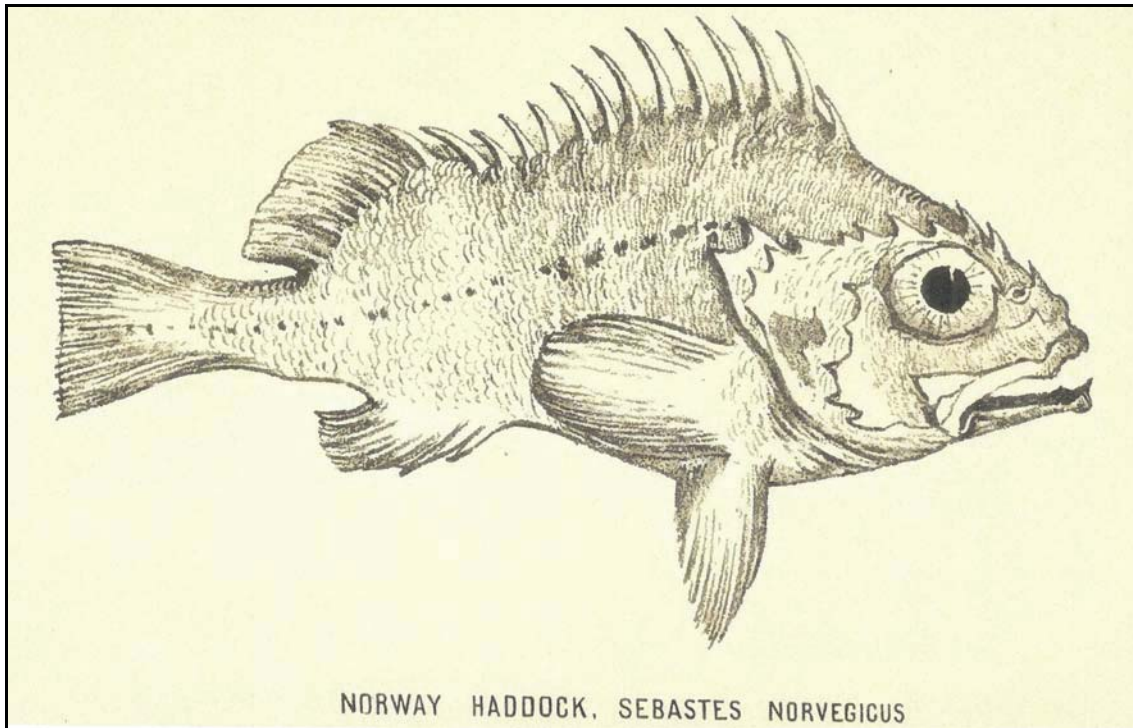


PLATE 5. Blue-mouth *Helicolenus dactylopterus* (*Sebastes norvegicus* sic) Andrews (1860c).



PLATE 6. Norway Haddock *Sebastes viviparus*, Dingle Bay, County Kerry (NMINH 1968.45.1; Went, 1969). Photograph Declan © Quigley.



PLATE 7. Deepwater Redfish *Sebastes mentella*, West of Slyne Head, County Galway (NMINH 1992.61.1 & 2). Photograph © Declan Quigley.



PLATE 8. Deepwater Redfish *Sebastes mentella*, West of Slyne Head, County Galway (NMINH 1993.67.1). Photograph © Declan Quigley.



PLATE 9. Golden Redfish *Sebastes norvegicus*, North West Ireland, April 2005. Photograph © Declan Quigley.



PLATE 10. Golden Redfish *Sebastes norvegicus*, West of the Aran Islands, County Galway, July 2015. Photograph © Stephane Griesbach.