

## Short communication

# An invasion of the North Sea by blue-mouth, *Helicolenus dactylopterus* (Pisces, Scorpaenidae)

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Blue-mouth (*Helicolenus dactylopterus*) is one of four species of the Scorpaenidae which may be caught in the North Sea. It is known as a typical deep water fish which lives along the shelf edge. Reports from the North Sea have been rare. An invasion of blue-mouth in the northern North Sea that took place in the winter 1990/91 is described. Blue-mouth have spread over a considerable area since and, recently, catches were even reported from the southern North Sea. Length distributions are given as well as age/length information from fish collected in the North Sea and at Rockall.

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## Introduction

Blue-mouth (*Helicolenus dactylopterus* (Delaroche, 1809)) is one of four species of the family Scorpaenidae (scorpionfishes) known to occur in the North Sea. It is a typical shelf-edge species with a wide distribution in the North Atlantic and Mediterranean. The distribution of blue-mouth in the north-west Atlantic extends from the eastern slope of Georges Bank westward and southward to Florida, in depths of 125–690 m (Bigelow and Schroeder, 1953) and “from Nova Scotia to Venezuela” (Eschmeyer, 1969). In the north-east Atlantic, blue-mouth is benthic on the slope of the continental shelf between 200 and 1000 m and occurs from Norway to Morocco, in the Azores, Madeira, the Canaries, and also the Mediterranean except the Black Sea, according to Hureau and Litvinenko (1986). According to Wheeler (1978), blue-mouth is common on the lower continental shelf to the west of the British Isles in depths of 200–800 m, becoming less common off the west coast of Norway.

Catches of blue-mouth in the North Sea (<200 m) have been reported infrequently. Nijssen and de Groot (1987) mention two catches in Dutch coastal waters in 1938 and 1948. Only a single specimen was caught during a comprehensive series of bottom trawl surveys of the North Sea in the years 1985–1987 (Knijn *et al.*, 1993).

This communication documents an invasion of the northern North Sea by blue-mouth in the winter of 1990/91 and tracks the distribution and growth of the invaders.

## Sources of information

The primary data source is the ICES-coordinated International Bottom Trawl Survey (IBTS) (Knijn *et al.*, 1993), which has been carried out annually, in February, since 1965. Although the primary purpose of the survey is the provision of recruitment indices for a number of commercially important species, the length compositions of all species caught during the surveys have been

Table 1. Length distribution (cm) of blue-mouth caught during the International Bottom Trawl Survey in the first quarter and during the English Groundfish Survey in the third quarter of 1991–1995.

| Length<br>(cm)      | IBTS quarter 1<br>year |      |      |      |      | EGFS quarter 3<br>year |     |      |      |      |
|---------------------|------------------------|------|------|------|------|------------------------|-----|------|------|------|
|                     | 91                     | 92   | 93   | 94   | 95   | 91                     | 92  | 93   | 94   | 95   |
| 3                   | —                      | —    | —    | —    | —    | —                      | —   | —    | —    | —    |
| 4                   | 261                    | —    | —    | —    | —    | —                      | —   | —    | —    | —    |
| 5                   | 1680                   | 50   | —    | —    | —    | —                      | —   | —    | —    | —    |
| 6                   | 643                    | 22   | —    | —    | —    | 14                     | 8   | —    | —    | 1    |
| 7                   | —                      | 103  | 4    | —    | —    | 56                     | 16  | —    | —    | —    |
| 8                   | 2                      | 580  | 8    | —    | —    | 33                     | 30  | —    | —    | —    |
| 9                   | —                      | 526  | 80   | —    | —    | 46                     | 32  | 6    | 1    | —    |
| 10                  | —                      | 236  | 94   | 3    | 2    | —                      | 52  | 6    | 5    | 1    |
| 11                  | —                      | 29   | 77   | 24   | 4    | —                      | 26  | 16   | —    | 1    |
| 12                  | 9                      | 4    | 47   | 31   | 11   | 2                      | 10  | 24   | 5    | 6    |
| 13                  | —                      | —    | 20   | 34   | 18   | 2                      | 2   | 10   | 6    | 2    |
| 14                  | —                      | —    | —    | 34   | 17   | 1                      | —   | 4    | 5    | 8    |
| 15                  | —                      | —    | —    | 10   | 19   | —                      | —   | —    | —    | 1    |
| 16                  | —                      | —    | —    | —    | 18   | —                      | —   | —    | 1    | 1    |
| 17                  | —                      | —    | 1    | —    | 8    | —                      | —   | —    | —    | 2    |
| 18                  | —                      | —    | —    | —    | —    | —                      | —   | —    | —    | —    |
| 19                  | —                      | —    | —    | —    | —    | —                      | —   | —    | —    | —    |
| 20                  | —                      | —    | —    | —    | —    | —                      | —   | —    | —    | —    |
| Sum                 | 2595                   | 1550 | 331  | 136  | 97   | 154                    | 176 | 66   | 23   | 23   |
| Average length (cm) | 5.2                    | 8.5  | 10.4 | 12.8 | 14.2 | 7.9                    | 9.3 | 11.6 | 12.3 | 13.1 |

collected on a regular basis. The data are stored in the ICES IBTS Database at the ICES Secretariat in Copenhagen. By-catch data prior to 1983 are incomplete, but from 1983 onwards all data are available.

Additional data were taken from the English Groundfish Survey (EGFS) (Harding *et al.*, 1986) and the Scottish Groundfish Survey (SGFS) (Knijn *et al.*, 1993), both of which take place in August.

## Results

### Abundance and distribution

In the February IBTS since 1970, blue-mouth had only been reported in two hauls in 1980. In 1991, however, a relatively large number of blue-mouth were caught in six hauls in the northern North Sea. During the next four years (1992–1995), there was a gradual decrease in the total number of blue-mouth caught (see Table 1). The number of hauls in which blue-mouth were present increased to a maximum of 48 hauls in 1993 and then decreased again.

In 1991, catches were restricted to the immediate vicinity of Shetland but in subsequent years the fish became widely distributed over the North Sea (Fig. 1). In 1994 and 1995, a single specimen was also caught in the Skagerrak. In 1994, commercial fishermen even reported blue-mouth from the Danish and Dutch parts of the shallow Wadden Sea.

### Length–frequency distributions

The length distributions from the IBTS (Fig. 2 and Table 1) show that blue-mouth entered the North Sea in 1991 as small fish (4–6 cm). During the next four years, there was an increase in the size of the fish. The same pattern was observed in the August surveys (EGFS, SGFS). These data suggest that the invasion was largely by a single strong year class. However, a few larger fish 8–14 cm long, apparently representing another cohort, were also caught in 1991.

### Growth

The growth curve (Fig. 3) is based on a sample of 26 otoliths, 17 from Rockall collected in May 1994, and 9 otoliths from the North Sea collected between May and September 1994. It appears that blue-mouth, like other scorpionfishes, is a slow-growing species that takes approximately 12 years to reach a length of about 30 cm. The fish caught in the North Sea in 1994 were judged to be 4–5 years old. The mean length of the fish caught during the IBTS in each of the years 1991–1995 are also shown in Figure 3. These fit the observed length-at-age data, if it is assumed that the specimens caught in 1991 were one-year-old (1990 year class).

## Discussion

The invasion of the northern North Sea by blue-mouth in 1991 may have represented an overspill from a

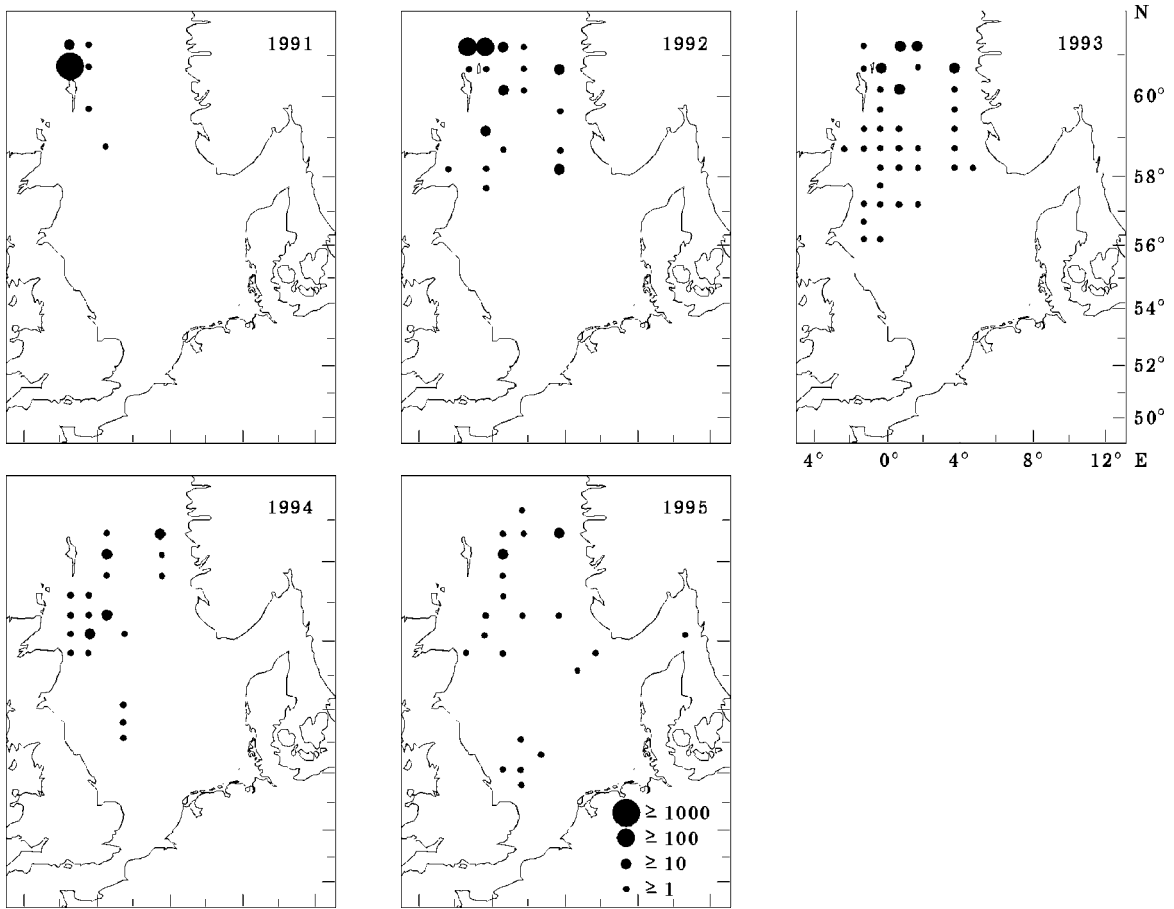


Figure 1. Distribution of blue-mouth during the first quarter International Bottom Trawl Survey in the years 1991–1995. Data from the ICES IBTS Database. Total numbers caught per ICES rectangle.

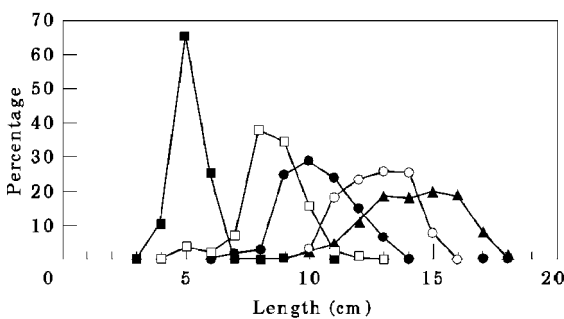


Figure 2. Length–frequency distribution of blue-mouth in the International Bottom Trawl Survey in the years 1991–1995. Data from the ICES IBTS Database. ■ = 1991; □ = 1992; ● = 1993; ○ = 1994; ▲ = 1995.

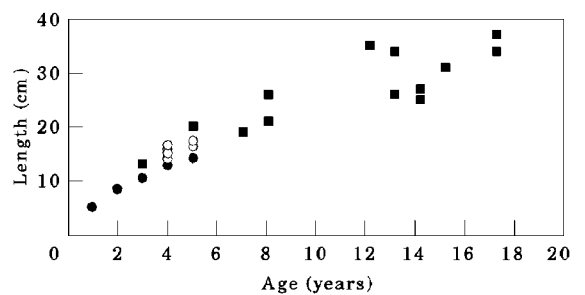


Figure 3. Age–length data for blue-mouth collected at Rockall in May 1994 and in the North Sea between May and September 1994. The average length of fish caught in the first quarter International Bottom Trawl Survey in the years 1991–1995 (Table 1) is also indicated, assuming that these fish were 1-year-old in 1991. ■ = Otoliths Rockall; ○ = otoliths North Sea; ● = calculated average length.

massive 1990 year class to the west of the British Isles, but this is not supported by research vessel catches in that area. A change in larval drift, due to some hydrographical factor, seems a more likely explanation because the length distributions suggest that more than

one year class took part in the invasion. Exceptionally high salinities were observed in the northern North Sea (and in the English Channel) in the winter of 1990/91

(Heath *et al.*, 1991). The northern North Sea is, to a large extent, influenced by the Atlantic Ocean. The causes of the invasion therefore probably lie outside the North Sea rather than within.

Since the specimens caught in the North Sea were mainly from one year class, the material provides an excellent opportunity to validate age-reading of blue-mouth otoliths.

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