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THE OCCURRENCE OF *ZEUS FABER* (LINNAEUS, 1758) IN THE COASTAL WATERS OF THE NETHERLANDS (PISCES, ZEIFORMES)

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ABSTRACT

The scanty literature data on the natural history of *Zeus faber* along with the recorded catches from 1960 to 1977 in the coastal waters of the Netherlands are reviewed in order to determine the biology and the population structure of this species. The recorded specimens are mainly juveniles with total lengths ranging from 11 to 42 cm, probably due to the fact that the species finds no suitable spawning conditions along the Dutch coast.

In the literature little attention has been paid to *Zeus faber*. Records of specimens caught by Dutch vessels in the North Sea south-east of 54°N, 03°E from 1960 to 1977 were gathered to get an insight in the population structure of *Zeus faber* along the Dutch coast. Literature data on the biology of the species are contradictory. Nevertheless, a general description of the biology of the John Dory can be composed.

INTRODUCTION

According to Nijssen & De Groot (1974: 186) *Zeus faber* (English: John Dory; Dutch: Zonnevis), (fig. 1) is a fairly common species in the coastal waters of the Netherlands which is regularly caught, although not in large numbers. It is remarkable that rarely adult specimens have been brought ashore.

BIOLOGY

Females living up to 12 years, attain a maximum length of 66 cm, weighing about 5 to 8 kg (Desbrosses, 1958: 2385; Wheeler, 1969: 306-307). In the 4th year - at lengths of 34 to 38 cm - the females become sexually mature. Males - with a maximum length of 45 cm - attain sexual maturity at lengths of 25 to 28 cm (Duncker, 1960: 219-221;

Jenkins, 1961: 82-83).

The distributional area of *Zeus faber* ranges from the Mediterranean Sea, along the Atlantic coast of Europe to the English Channel, the coastal waters west of Great Britain, the Irish Sea, and the North Sea to Bergen in Norway (Redeke, 1941: 177-178). The spawning areas in north European Atlantic waters are near the English Channel, along the French coast, and in the Irish Sea (Poll, 1947: 227-229; Desbrosses, 1958: 2385; Wheeler, 1969: 306-307). Spawning takes place during the months June through August. The eggs measure 1.9 to 2.8 mm in diameter. Nine days after hatching the fingerlings have attained a length of 4.3 mm. At a length of 7.0 mm they have already the typical mouth and body structure of the John Dory (Wheeler, 1969: 306-307). No juveniles smaller than 11 cm have been found in the coastal waters of the Netherlands. No pelagic stages have been found in the English Channel and in the German Bight (Mohr, 1927: 98). According to Wheeler (1969: 306-307) the maximum length after the first winter is 9 to 13 cm, after the second winter 24 to 27 cm, after the third winter 32 to 36 cm, and after the fourth winter 40 cm.

The food of *Zeus faber* consists mainly of fishes like Gobies (*Pomatoschistus* spec.), Herring (*Clupea harengus* Linnaeus, 1758), Sand Eels (Ammodytidae), Scad (*Trachurus trachurus* (Linnaeus, 1758)), and Pilchard (*Sardina pilchardus* (Walbaum, 1792)). Also crustaceans and the squid *Alloteuthis subulata* (Lamarck, 1799) have been found in stomach contents.

OCCURRENCE

Zeus faber - a typical southern species (Le Danois, 1915: 92-93) - seems to be a summer visitor to Dutch, Belgian, and German coastal waters. It lives solitarily or in small schools of up to 5 specimens. According to Otterström (in Duncker, 1960: 220), the John Dory is caught in Scandinavian coastal waters only since 1880. Duncker supposes that this species occurs in the German Bight during the last few decennia only. According to Boer (1975: 29-43) a decrease in numbers of this species in the coastal waters of the Netherlands is found. During the period 1946 through 1952 a mean of 272 recorded

specimens a year was brought to Dutch harbors, during the period 1953 to 1960 a mean of 107 specimens a year, and from 1961 through 1968 a mean of 44 specimens a year. The recorded catches during the period 1969 to 1977 show an increase to 158 specimens a year. This increase is mainly caused by the high numbers of catches in 1970 (417 specimens) and in 1972 (462 specimens). This, however, does not necessarily mean that actually more specimens of *Zeus faber* occurred in the coastal waters of the Netherlands during these years compared to other years.

POPULATION STRUCTURE

Since no study on the population structure of *Zeus faber* could be found, a rough estimation has been made based on literature and available catch reports. In this paper only the specimens recorded during the period 1960 to 1977 were used to determine the population structure of the John Dory in the coastal waters of the Netherlands, because only since 1960 data on sex and total lengths were noted.

Zeus faber occurs in the coastal waters of the Netherlands mainly during the months June through November (fig. 2). The data used for fig. 2 also indicate a predominance of females over males (M/F ratio = 0.79).

While using the length-age correlation as given by Wheeler, there seem to be three different year classes of the John Dory in the coastal waters of the Netherlands (fig. 3). Hatching at the spawning areas takes place in June. After one year a total length of 15 cm is attained. From this stage on the John Dory is moving from the spawning area and can be encountered along the Dutch coast. This first year-group grows during June through November of their second year to a total length of about 27 cm. During the next winter months the growth is retarded. After their third summer these fishes attain a length of about 37 cm. Again they do not grow during the next winter. From this stage onwards the males seem to disappear from the coastal waters of the Netherlands. During the winter and in the following summer mainly females are caught along the Dutch coast. These four year old specimens attain a total length of about 42 cm at the end of the year.

According to Wheeler the John Dory becomes sexually mature in its 4th year. This is probably true for females. According to Duncker and Jenkins males become sexual mature after having reached a total length of about 28 cm, which can be attained in their 3rd year.

CONCLUSIONS

Considering the occurrence of specimens of *Zeus faber* in the coastal waters of the Netherlands, it seems feasible that they are merely migrants during the summer at relatively high water temperatures. They originate from south of the English Channel, and migrate while chasing prey-fishes (Duncker). According to Redeke (1941:178) no specimens over 30 cm total length have been recorded from the coastal waters of the Netherlands. Wheeler states that no specimens older than 2 years have been caught in the North Sea. However, fig. 3 shows that specimens up to 42 cm total length were found along the Dutch coast, being four years of age according to Wheeler.

One might assume that the absence of adult specimens in the coastal waters of the Netherlands is connected with the lack of suitable spawning places, which are situated south of the English Channel.

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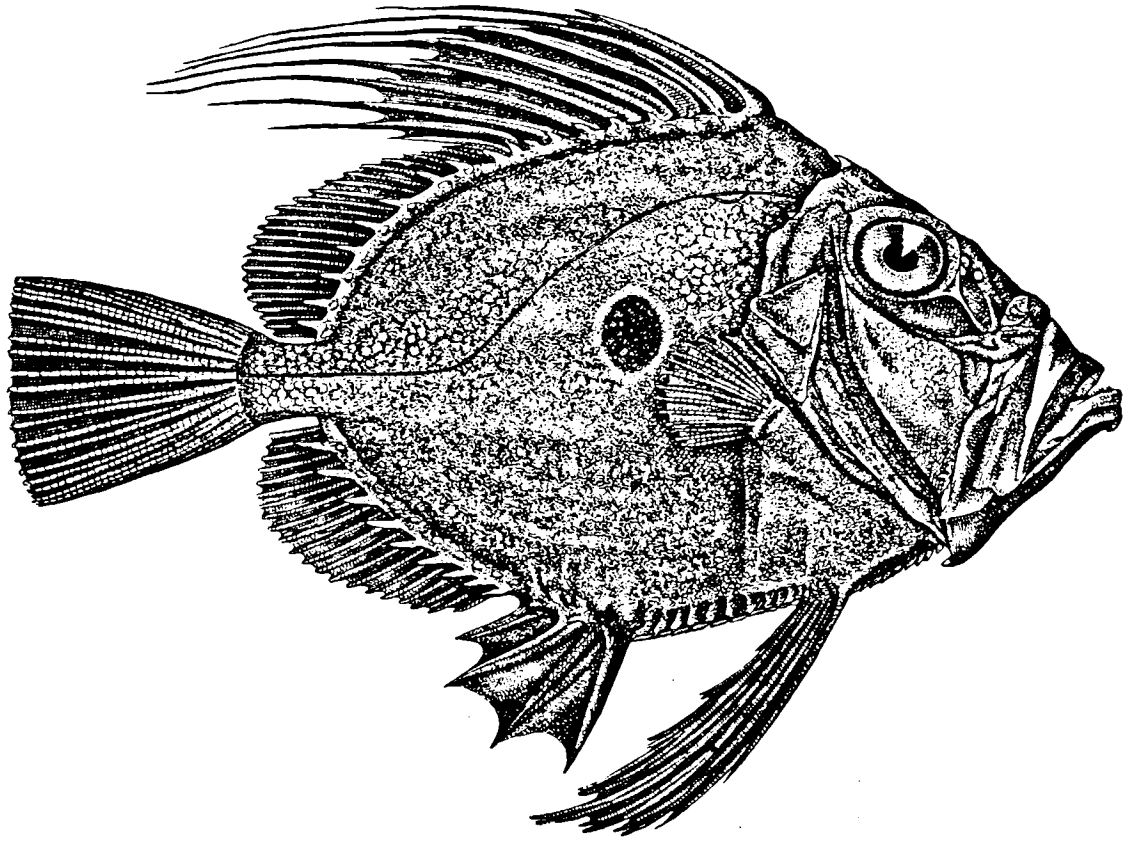


Fig. 1. *Zeus faber* Linnaeus, 1758 (after Poll).

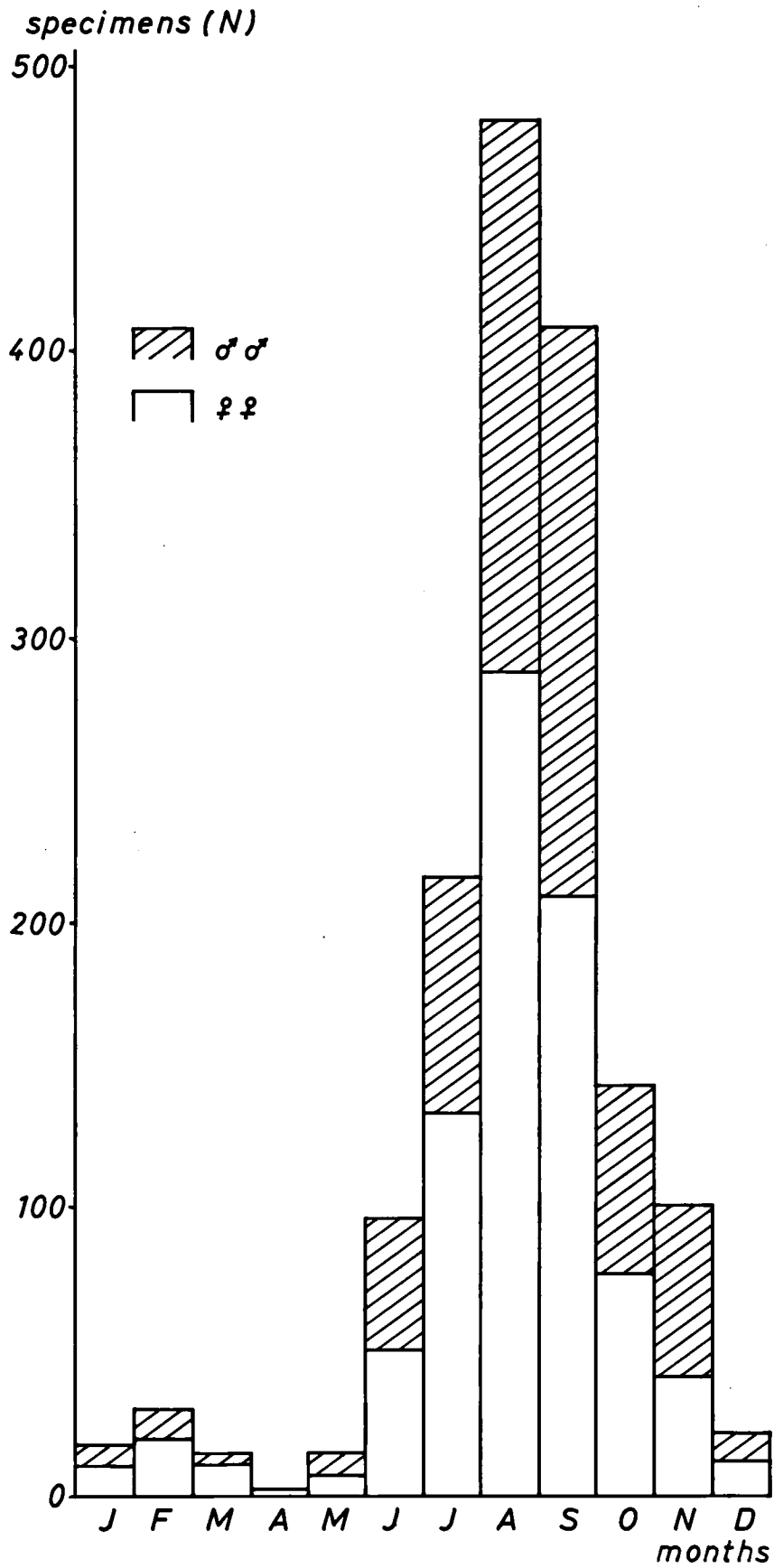


Fig. 2. Occurrence of 1562 specimens of *Zeus faber* per month, caught in the coastal waters of the Netherlands during the period 1960 to 1977. Total number of females 866, of males 686. Sex ratio M/F = 0.79.

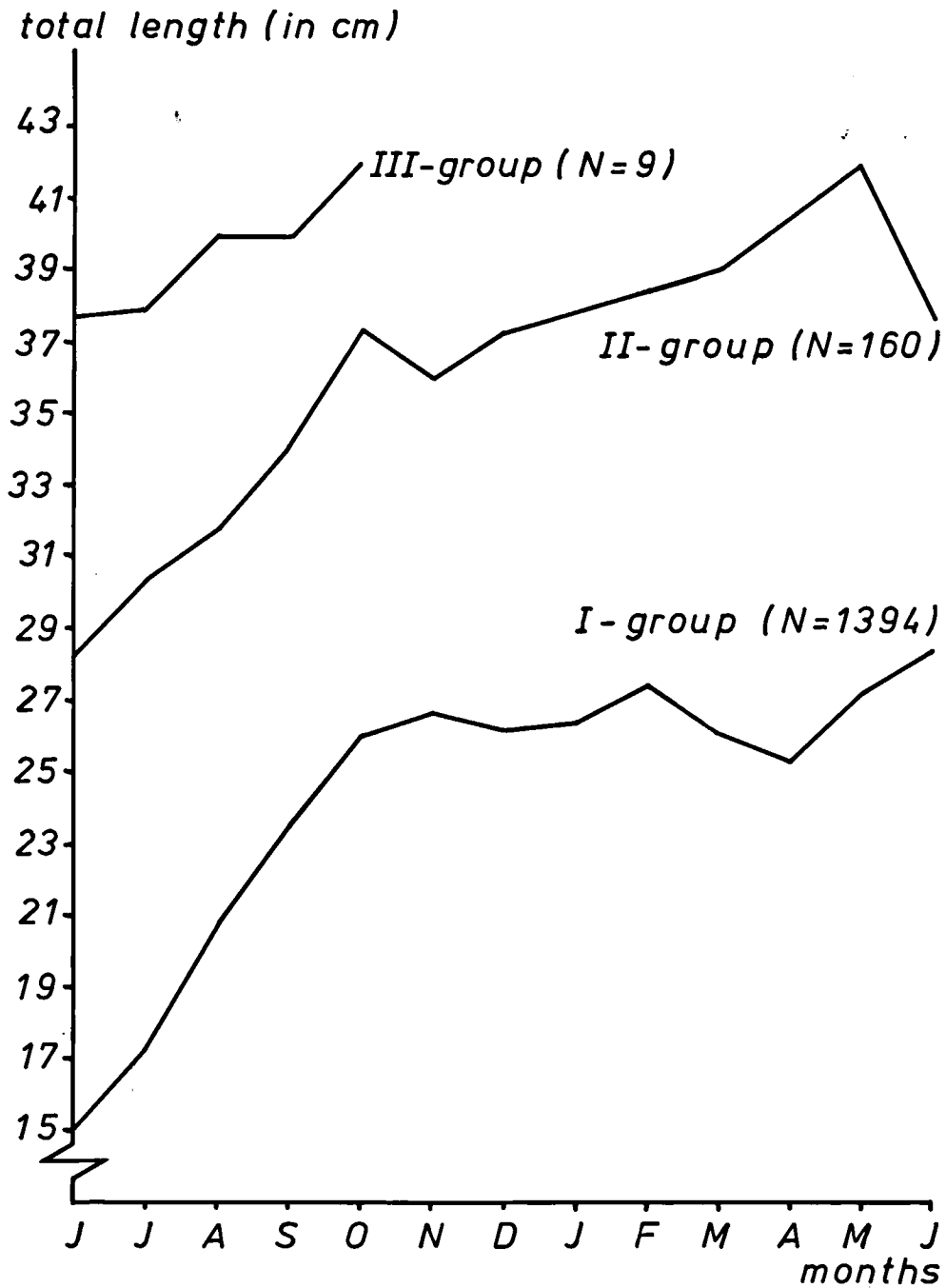


Fig. 3. Annual growth in *Zeus faber* during their second (I), third (II) and fourth (III) year in the coastal waters of the Netherlands during the period 1960 to 1977. Growth-rate (June through October): I-group: 2.75 cm/month, II-group: 2.25 cm/month, III-group: 1.08 cm/month.