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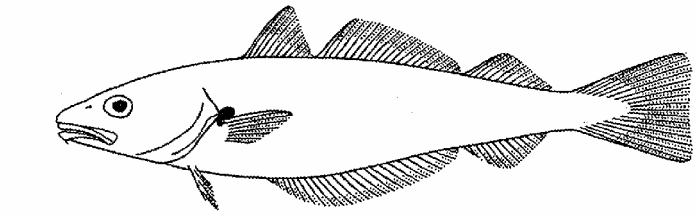
ICES-FishMap

Whiting

Merlangius merlangus
Family Gadidae

Max size: 70 cm
Max age: 20 years



Introduction

Taxonomy: Whiting *Merlangius merlangus* (Linnaeus, 1758) (Order: Gadiformes, Family: Gadidae) belongs to the family of the cod-like fishes and is the only representative within the genus. Two subspecies have been identified in the Mediterranean area, in the western part *M. merlangus merlangus*, and in the Adriatic, Aegean and Black Sea *M. merlangus euxinus* [1].

common names			
Danish	Hvilling	*Icelandic*	Lýsa
Dutch	Wijting	*Latvian*	Merlangs
English	Whiting	*Norwegian*	Hvitting
Estonian	Merlang	*Polish*	Witlinek
Faroese	Hvítingur	*Portuguese*	Badejo
Finnish	Valkoturska	*Russian*	Мерланг
French	Merlan	*Spanish*	Merlán
German	Wittling	*Swedish*	Vitling

General: Whiting is a commercial species of secondary commercial importance that is caught in large numbers throughout the entire North Sea, of which large quantities are discarded. Since the late 1970s commercial landings have declined gradually to a historic minimum. Whiting is a verocious fish predator that feeds heavily on many commercially important species, including its own offspring (cannibalism).

Minimum Landing Size: 27 cm in the North Sea; 23 cm in the Skagerrak and Kattegat.

Distribution

Biogeographical distribution: Whiting is distributed in the North-east Atlantic from the northern coast of Portugal to Iceland and the south-western Barents Sea. The species is also present in the western Mediterranean Sea, Black Sea, Aegean Sea and Adriatic Sea , where two subspecies are distinguished [1].

The species is commonly found near the bottom in waters from 10 to 200 m, but may move into midwater in the pursuit of its prey.

Spatial distribution in North Sea: Whiting is widely distributed throughout the North Sea, Skagerrak and Kattegat. High densities of both small and large whiting may be found almost everywhere, with the exception of the Dogger Bank, which generally shows a marked hole in the distribution (Fig. 1). During summer, juveniles are particularly abundant in the German Bight and off the Dutch coast (Fig. 3). Large whiting occur in high densities south of Shetland during the winter, when densities are relatively low in the central North Sea (Fig. 1). During summer, the entire southern half of the area is densely populated by adult whiting, as is the area off the Scottish coast (Fig. 3).

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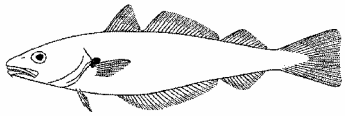

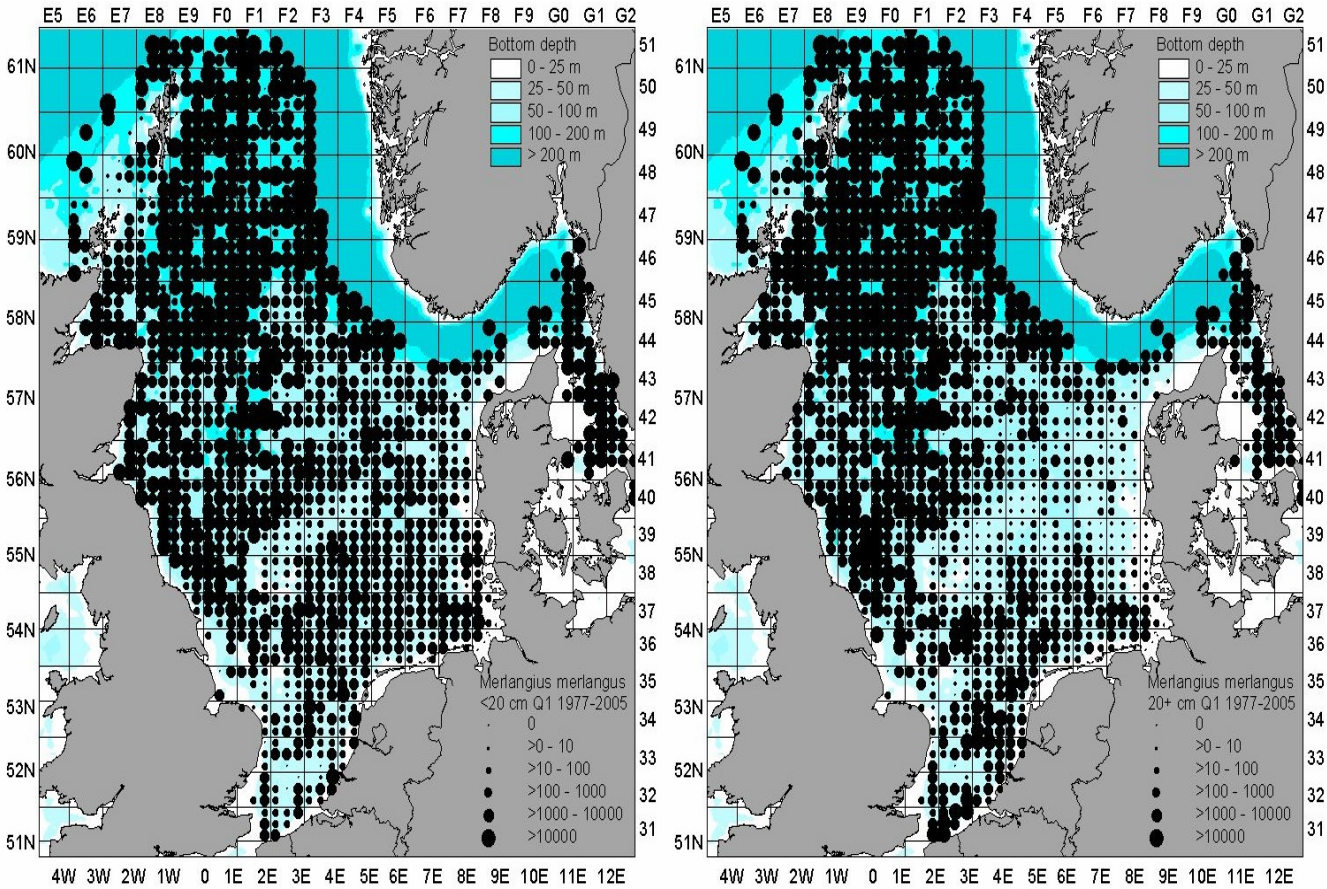

Figure 1. Average annual catch rate (number per hour fishing) for juvenile (<20cm, left) and adult (≥20cm, right) whiting in the quarter 1 IBTS survey, 1977–2005.

Habitat characteristics: The spatial pattern of the sea surface temperature (SST) appears to affect the spatial distribution of whiting in the northern North Sea during winter and spring (December-April) [2]. Where the water is relatively warm, whiting abundance is relatively high, probably reflecting the indirect influence of North Atlantic waters entering the northern North Sea. This positive relationship between abundance and SST breaks down in summer.

Life history

Age, growth rates, length-weight relationship: Whiting grow relatively slowly after their first year of life, and there is a great individual variation in growth rates [3]. Thus, a 30 cm fish in February may be from one to six years old. Females grow to a larger size than males (Fig. 2). Most whiting are sexually mature when they are two years old and a small proportion spawns during their second year of life (Fig. 2). The mean annual relationship [4] between gutted weight (GW) and total length (L) has been estimated to be: $GW=0.0093*L^{2.9456}$.

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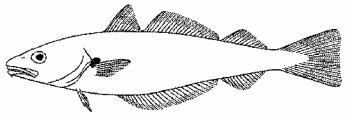


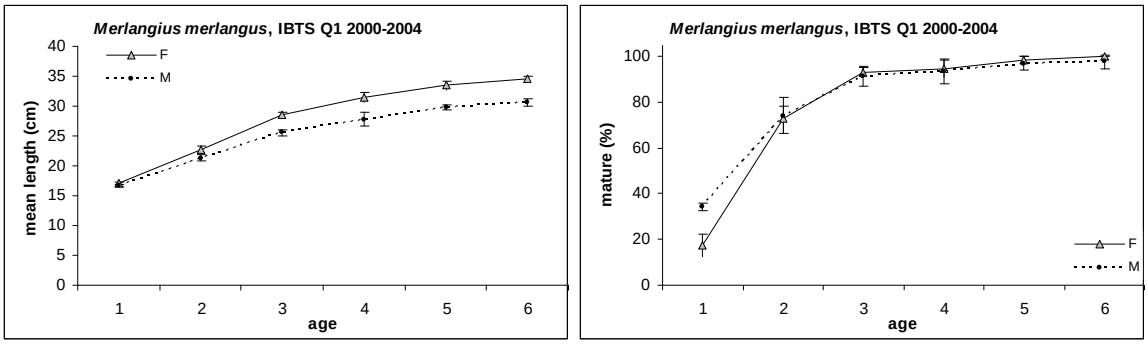


Figure 2. Mean length (left) and percentage mature (right) with standard errors per age group in the North Sea and Skagerrak/Kattegat in February 2000-2004, based on IBTS-data.

Reproduction: Among the gadoids, whiting has a relatively high fecundity, but the eggs are relatively small (1.0-1.3 mm in diameter) [5]. A female of 30 cm length may produce 400,000 ripe eggs during the spawning season [6], which is equivalent to 1,700 eggs per gram body weight [3,6]. The pelagic eggs, which take about ten days to hatch [5], are shed in numerous batches over a period that may last for up to fourteen weeks [3].

Spawning takes place from January in the southern North Sea to July in the northern part [1].

Migrations: Movements of whiting in the northern North Sea are directed mainly along the Scottish coast [7], rather than inshore/offshore as in the South-eastern area. Part of the Skagerrak population is thought to migrate into the north-eastern North Sea to spawn [8]. Furthermore, movements occur between the southern North Sea and the eastern Channel [9].

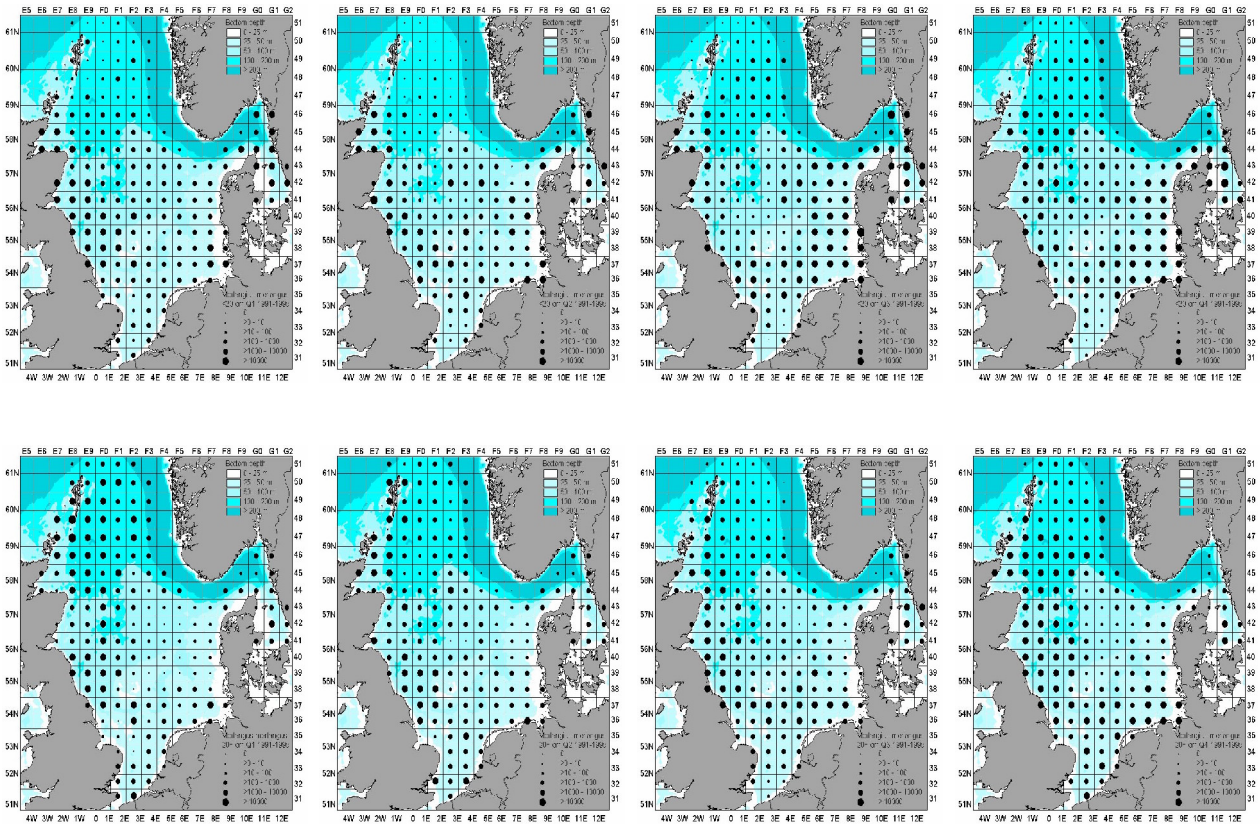
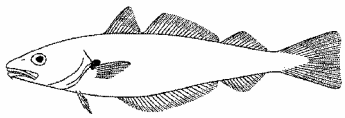


Figure 3. Average quarterly catch rate (number per hour fishing) for juvenile (<20cm, above) and adult (≥20cm, below) whiting in the IBTS survey, 1991-1995.



Food habits: Pelagic larvae start feeding when they are 2.4 mm long, and their main prey are the nauplii and copepodite stages of copepods [10]. Immature whiting (< 20 cm) feed on crustaceans such as euphausids, mysids and crangonid shrimps. The diet varies according to season. For example, during part of the year annelids or cephalopods can form a significant part of the diet [3]. The importance of fish prey increases with size (Fig. 4). Whiting >30cm feed almost entirely on fish, including a variety of small species like Norway pout, sprat, and sandeel, and the younger age classes of larger species such as herring, cod, and haddock. On the basis of diet and size of the stock, whiting is considered to be one of the major predators of fish in the North Sea.

Whiting feeds more on bottom-dwelling prey at night, whereas pelagic and free swimming prey are captured mainly during daylight [11].

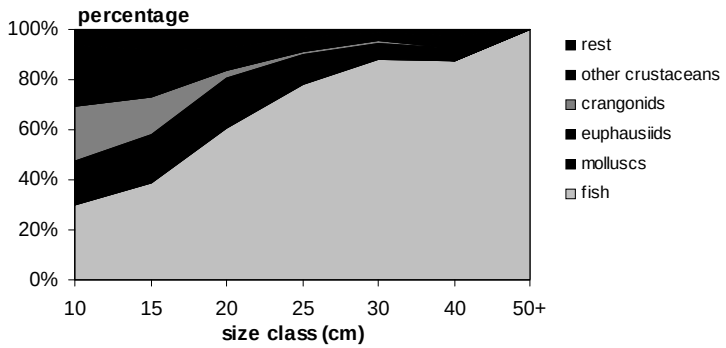


Figure 4. Average stomach contents as percentage weight by size class in 1981 [3].

Predation: Whiting, especially juveniles, are an important prey for larger gadoids and other demersal fishes. Cannibalism is a common feature [3].

Population structure

Length composition: In the North Sea area, 1 and 2+ years old whiting can be found in more or less equal amounts, as shown by two peaks in the relative length-frequency distribution around 15 and 26 cm (Fig. 5). In contrast, catches in the Skagerrak/Kattegat are dominated by 1-year-old whiting.

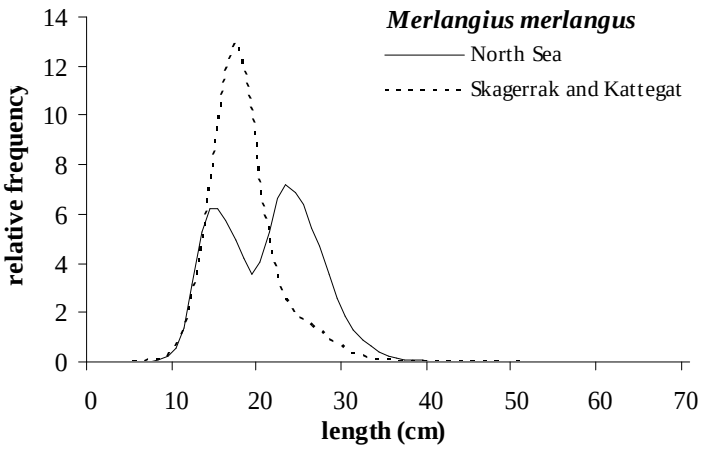
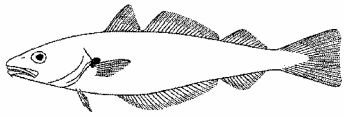


Figure 5. Relative length-frequency of whiting in the North Sea and Skagerrak/Kattegat, based on IBTS Q1 data, 1977–2005.

	Whiting	*Merlangius merlangus* Family Gadidae	

Changes in abundance: The catch rate of whiting during the IBTS Q1 survey in the North Sea and the Skagerrak/Kattegat has fluctuated widely throughout the period 1975-2005, and no consistent trend is apparent.

Stock structure: On the basis of tagging experiments and analyses of incidence of infection by parasites, it has been suggested that whiting to the north and south of the Dogger Bank form two separate stocks that mix very little [7]. This separation seems to be supported by the clear gap in the distribution running oblique over the Dogger Bank. Whiting in the North Sea and eastern Channel are assessed by ICES as one unit stock.

Exploitation

Main metiers targeting the stock: Whiting is caught in mixed trawl fisheries along with cod and haddock. They are also taken in *Nephrops* fisheries. Spatial information on landings (based on 70% of the total) suggests that most of the catch can be attributed to three distinct areas: a northern zone, an area off the eastern English coast, and a southern area extending into the English Channel (with the largest catches, and prosecuted predominantly by French vessels). The southern whiting fishery uses 80-mm nets, whereas the other fisheries use larger mesh sizes. Northern catches have declined most, whilst southern landings have been maintained [9].

Landings: The average annual catch over the period 1999–2005 was approximately 40 000 t. This is composed of 17 000 t human consumption landings, 5 000 t industrial landings and 18 000 t discards (Fig. 6) [12].

Status of the stocks: The information available to ICES has been insufficient to evaluate the spawning stock size (SSB) or fishing mortality. Nearly all catch-at-age analyses indicate that the stock is at or near the lowest observed level, and that SSB is below the limit biomass (B_{lim}) of 225 000 t. Research vessel surveys indicate a stable or declining stock since 2001 in the northern and southern areas (Fig. 7) [12].

The fishers' North Sea survey is an initiative to evaluate the fishers perception of the state of the stock as part of the assessment process. This survey indicated different stock trends in different parts of the North Sea: a decreasing stock in the north, and a stable or increasing stock further south. Fishers suggest that the reduction in catches in the north reflects technical changes imposed by new regulations (such as an increase in mesh size), rather than a change in stock size [14].
The 2002-2005 year classes on the other hand are all estimated to be well below the long-term average (Fig. 8) [13].

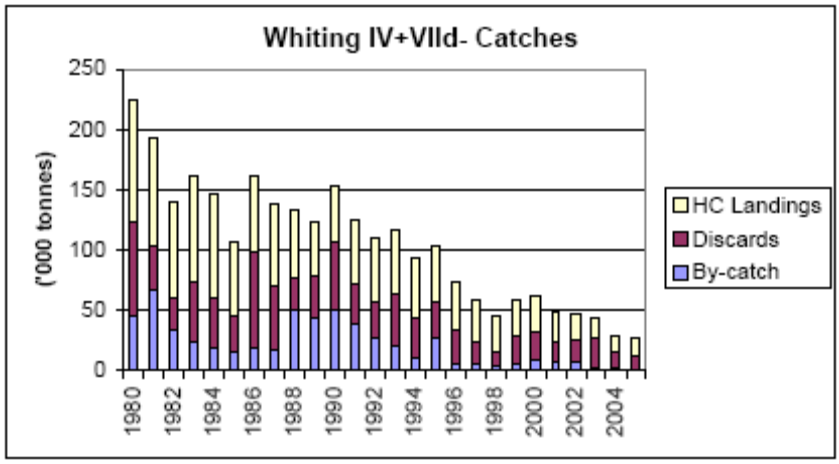


Figure 6: Time series of catch (incl. discards) of whiting in the North Sea.

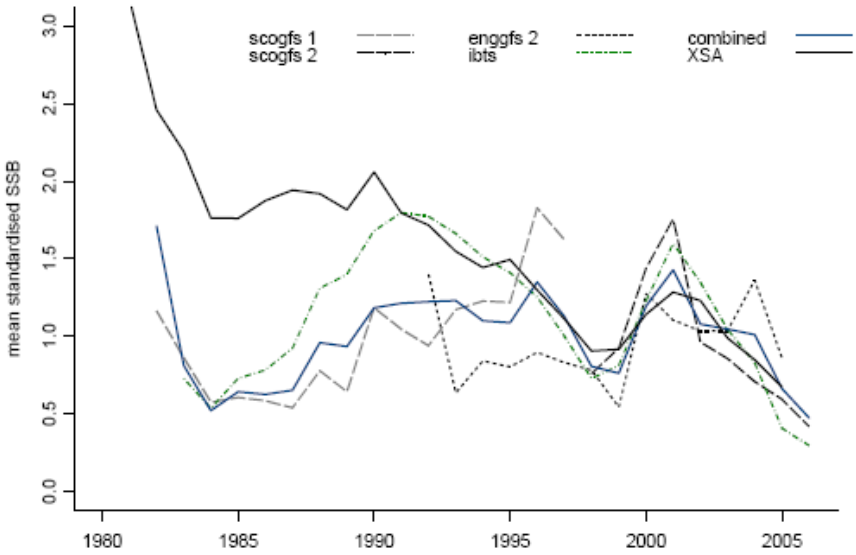


Figure 7. Comparison of SSB time-series estimated from catch-at-age model runs (SURBA and a multi-fleet XSA) and empirical survey SSB, standardized over the means 1992–2003 [12].

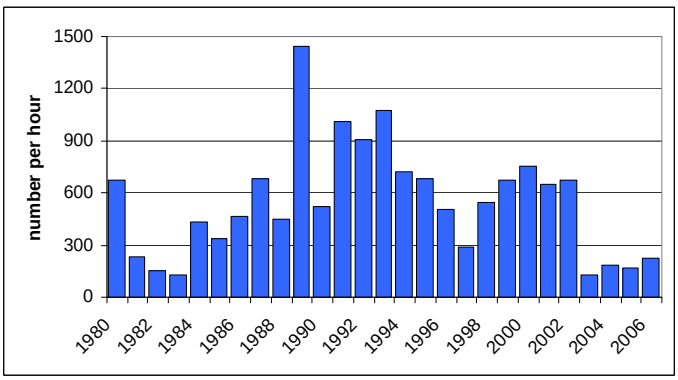


Figure 8. Time series of indices for 1-group fish caught during the IBTS Q1 survey in the North Sea.

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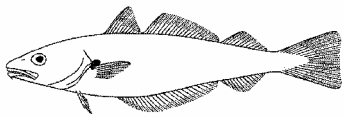

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