

Investigations on mackerel and herring in Faroese, UK and international waters in July 2015

Cruise no. 1552, 2-19 July 2015

By

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INTRODUCTION

The aims of this survey were to investigate the distribution and abundance of mackerel and Norwegian spring-spawning herring during the summer season, since this pelagic group seeks for feeding opportunities in the northern areas. The distribution in Faroese waters were also examined in relation to sea temperature and abundance of plankton.

The survey has been conducted annually since 2009 and is done in collaboration with Norwegian and Icelandic vessels. Data from the survey will be submitted to the ICES WGIPS (Working Group on Internationally Coordinated Surveys) and to the ICES WGWIDE (stock assessment WG on herring, blue whiting and mackerel) in late August 2015.

MATERIALS AND METHODS

A pelagic trawl (Mulpelt 832, **Fig. 1**) was towed at the surface at an average speed of 5 knots for 30 minutes at predefined positions approximately 60 nmi apart. The doors used were 6 m² and weighed 2000 kg, using buoys on the upper wingtips and 400 kg weights on the lower starboard wingtip and 500 kg on portside. Bridle (Dynema) length 120 m and warp (dynema) length about 350- 500 m. All participating vessels are using the Mulpelt 832 trawl.

To obtain plankton samples, a WP-2 plankton dip net (1/2 m in diameter and 200 µm meshes) was used. The dip net was lowered down to 200 m depth and then slowly (0.5 m/s) heaved up to the surface again. Measurements of sea temperature and salinity levels were obtained using a CTD (Seabird 25), which was lowered down to a depth of 500 m.

Acoustic data were recorded with a Simrad EK60 echo sounder. Data from the hull mounted 38, 120 and 200 kHz transducers were logged at sea with EchoView and used in the fish abundance estimation. The area backscattering recordings (S_A) per nautical mile were averaged by each nautical mile and the recordings were scrutinised on a daily basis and allocated to herring or blue whiting or other fish (e.g. pearlside, lantern fish) partly based on the surface trawling. The 38 kHz, 120 kHz and 200 kHz echo sounders were calibrated prior to survey following standard procedures to allow correct estimations of the acoustic registrations.

The whole catch was registered and a subsample of up to 120 kg of each trawl station sorted to species. The biological studies included length and weight measurements of at least 100 fish of each target species (mackerel, herring and blue whiting), as well as determination of sex and maturation stage. Additionally, 20-25 samples of otoliths and 10 stomachs were taken from each target species in every catch. However, more was taken when blue whiting was caught. For ~90 of the herring samples scales were sampled as well. These will be used in a future age-reading workshop on Norwegian spring spawning herring.

The cruise track was on specific stations and the length between each was about 60 nautical miles. On each station the pelagic trawl was towed for 30 minutes. In addition a CTD sample (temperature/salt) was taken and finally using the WP-2 dip net for a sample of zooplankton.

Cruise tracks with pelagic (surface) trawl stations, hydrographic stations (CTD) and plankton stations (WP2) and surface temperature along the cruise-tracks in the surveyed area are shown in (**Fig. 2**).

In total 39 surface trawl hauls were carried out as well as 39 WP-2 plankton and CTD samples. Furthermore, three tows were performed in deeper waters targeting blue whiting acoustic registrations. A total of 687 mackerel, 480 herring and 147 blue whiting otoliths were collected for

age determination. For studying the feeding ecology about 300 mackerel, 150 herring, and 40 blue whiting stomachs were collected during the cruise.

PRELIMINARY RESULTS

Mackerel: The main conclusion from the Faroese investigations in July 2015 was that mackerel was distributed in all sampled positions in the area covered. As compared to previous years, the abundance of mackerel was higher in the southwestern area, i.e. south of the Iceland-Faroe Ridge (**Fig. 3**). The average length was about 34 cm (**Fig. 4**) and the average weight was about 369 g. The largest mackerel was found in the western parts of the surveyed areas.

Herring: The main distribution of herring was seen in a southeast/northwest band from north of Shetland to east of Iceland (**Fig. 6**). This distribution is similar to last year. Most of the herring was Norwegian spring-spawning herring, but in tows in the eastern part of the surveyed area included herring of the autumn-spawning type. These could be either parts of the northern North Sea herring stock or of the Faroese autumn-spawning herring stock. The size distribution of the herring is shown in **Fig. 7**. The largest herring were caught in the western part of the surveyed area (**Fig. 5**)

Blue whiting: Blue whiting was distributed widely in the surveyed area (not shown) and was found in the deeper layers under the mackerel and herring at 100 m to 400 m depth in a loose scatter. The length distribution of blue whiting (**Fig. 8**) had two tops, the smaller about 20 cm (recruiting fish) and the larger about 25 cm.

Plankton: The abundance of plankton will be calculated at a later stage. The species were mainly *Calanus* spp., amphipods (*Themisto* sp.) and arrow worms (*Sagitta* sp.).

Hydrography: The sea-surface temperature (SST) in the surveyed area is shown in **Fig. 2**.

Acknowledgements

Thanks to the skipper and crew on *Christian í Grótinum* for a successful cruise and good teamwork.

Eydna í Homrum
Havstovan

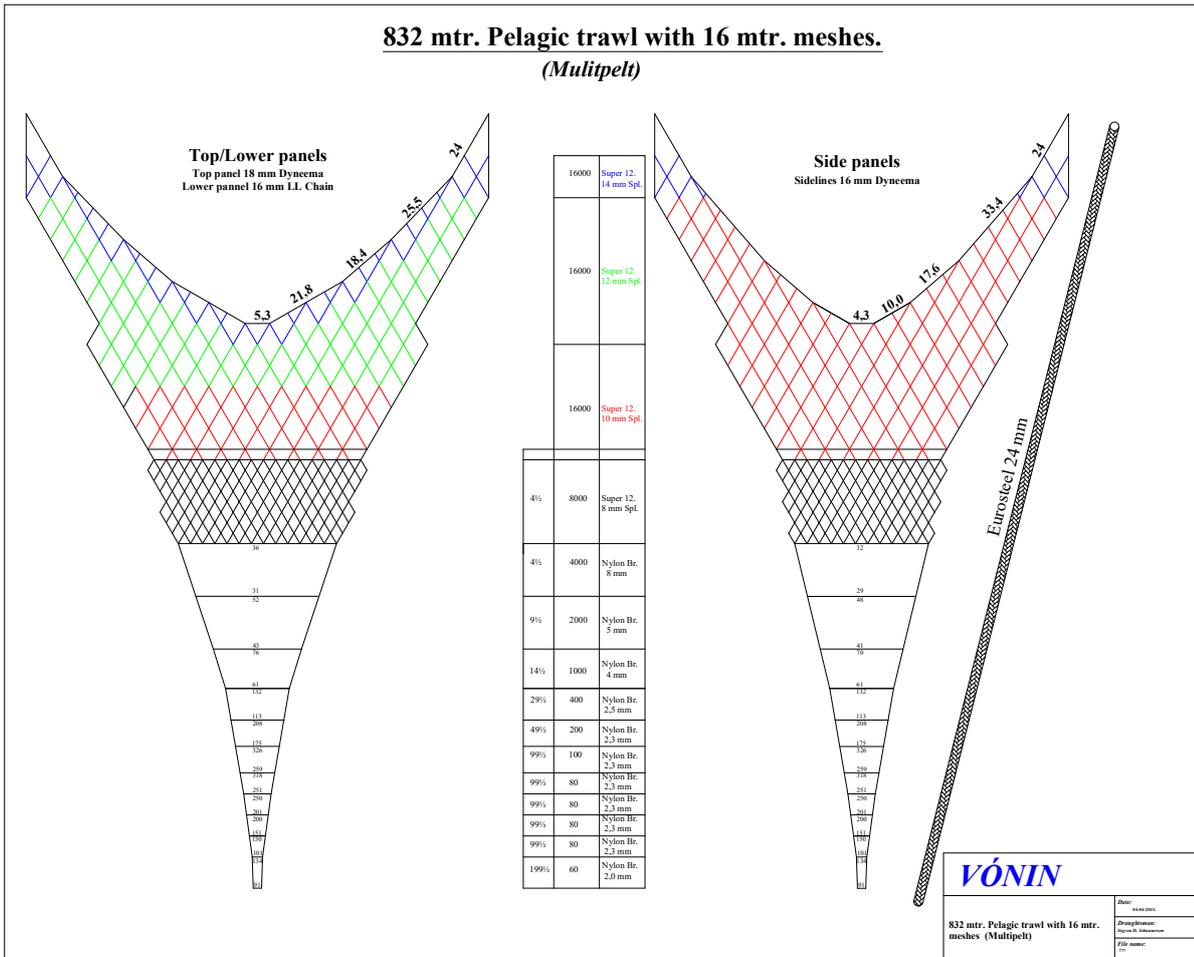


Figure 1. A drawing of the pelagic trawl Múltipelt 832 m. This is a larger trawl, which is 832 m in perimeters and is designed for the mackerel investigations.

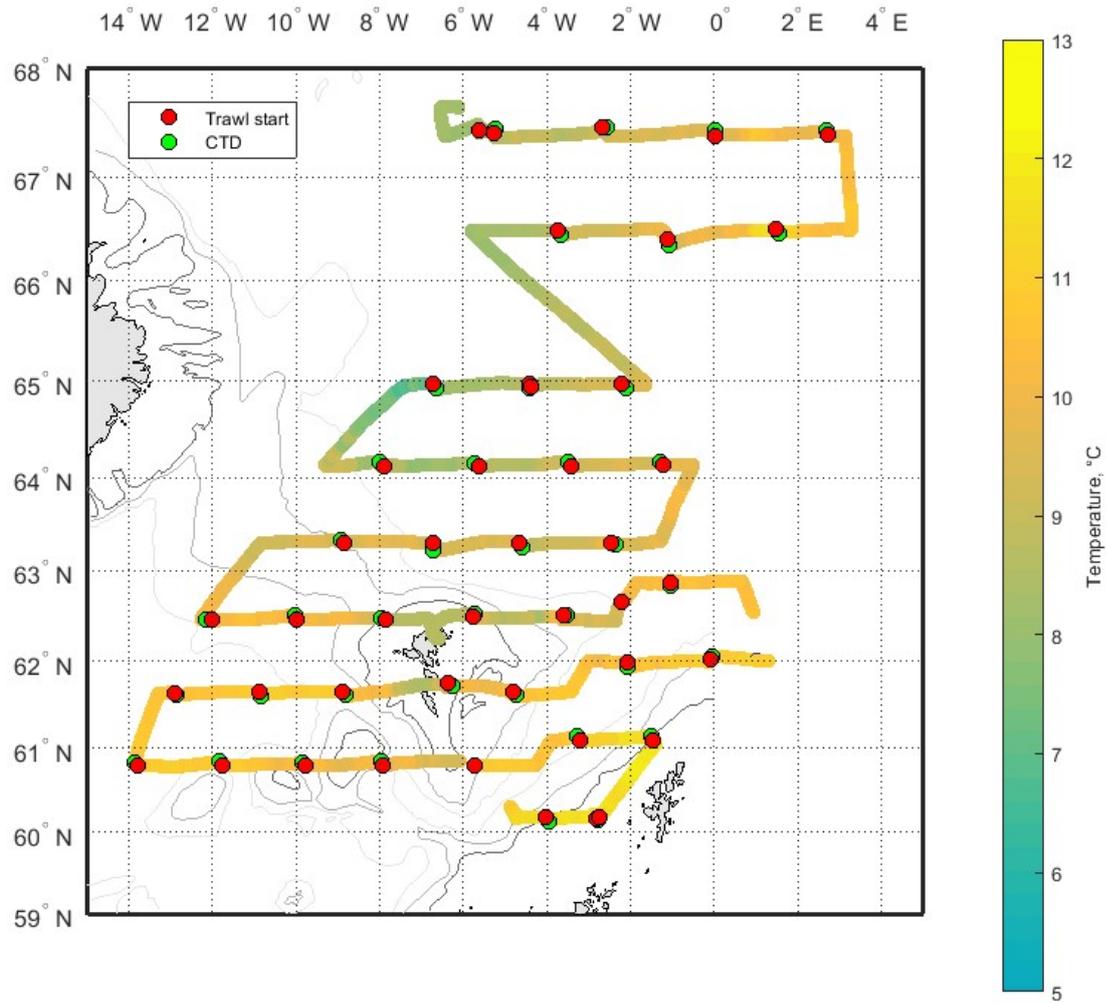


Figure 2. Cruise tracks (colour indicates surface temperature) with trawl stations (red dots), where also a hydrographic and a plankton station was taken (green dots) in the areas north of the Faroes. M/V *Christian í Grótinum* cruise 1552, 2-19/7 2015. About 3000 nm were covered.

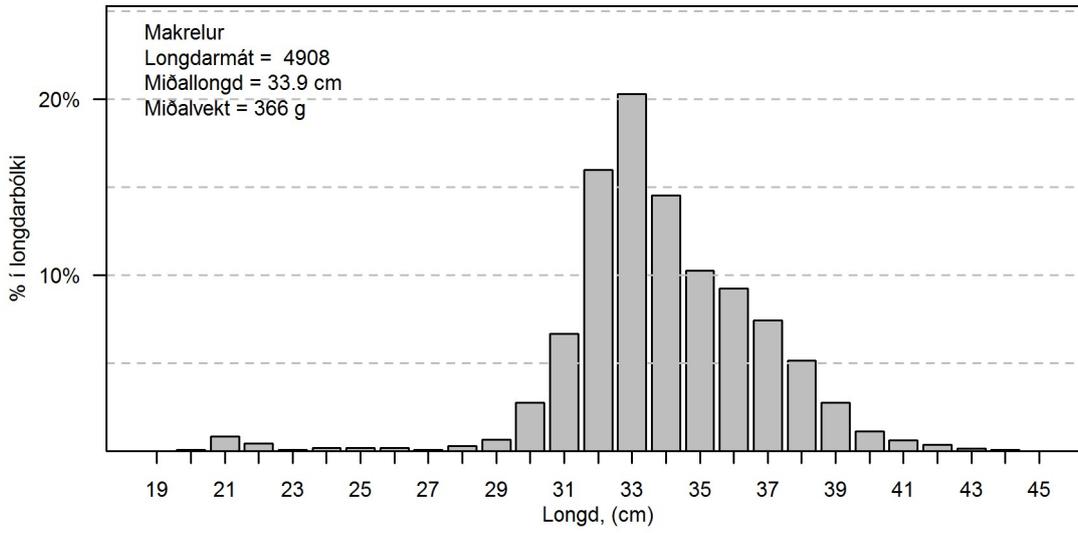


Figure 4. Length distribution cm of mackerel north of the Faroes. *M/V Christian í Grótinum* cruise 1552, 2-19/7 2015. The mean length was 33.9 cm and mean weight was 366 g.

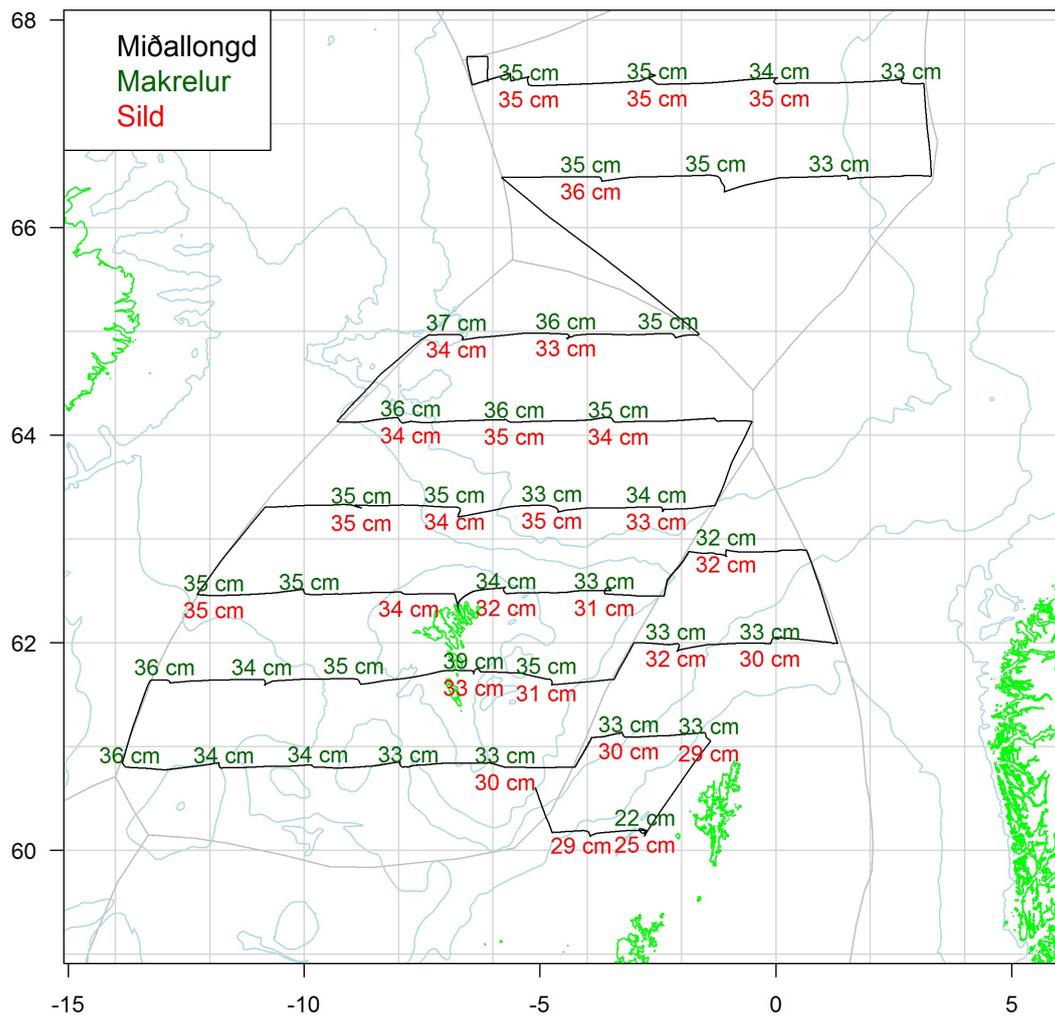


Figure 5. Mean length (cm) of mackerel (green) and herring (red) north of the Faroes. The mean length was 33 cm and mean weight was 334 g. The largest fish was in the western part of the surveyed area. *M/V Christian í Grótinum* cruise 1552, 2-19/7 2015.

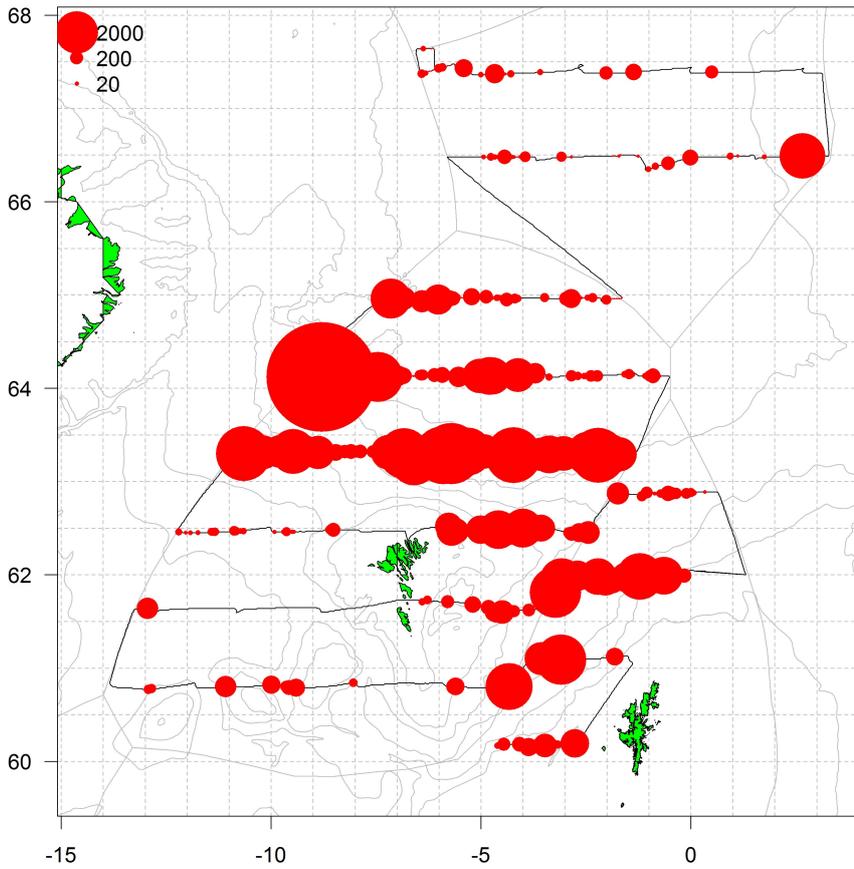


Figure 6. Integration values (s_A , m^2/nm^2) of herring along the cruise tracks, M/V *Christian í Grótinum* cruise 1552, 2-19/7 2015. The size of the circles corresponds to s_A -value of fish.

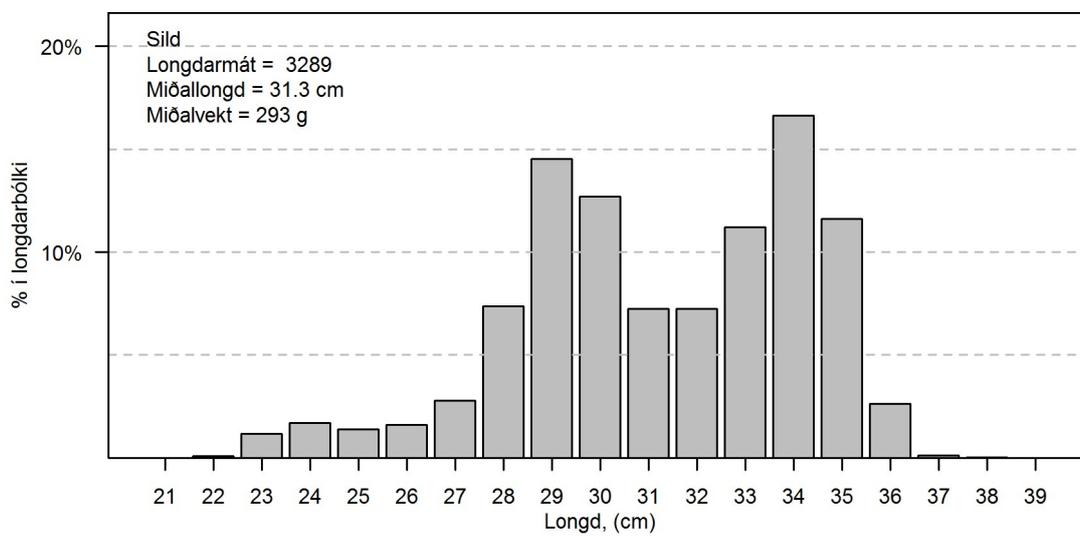


Figure 7. Length distribution (cm) of herring north of the Faroes. M/V *Christian í Grótinum* cruise 1552, 2-19/7 2015. The mean length was 31.3 cm and mean weight was 295 g.

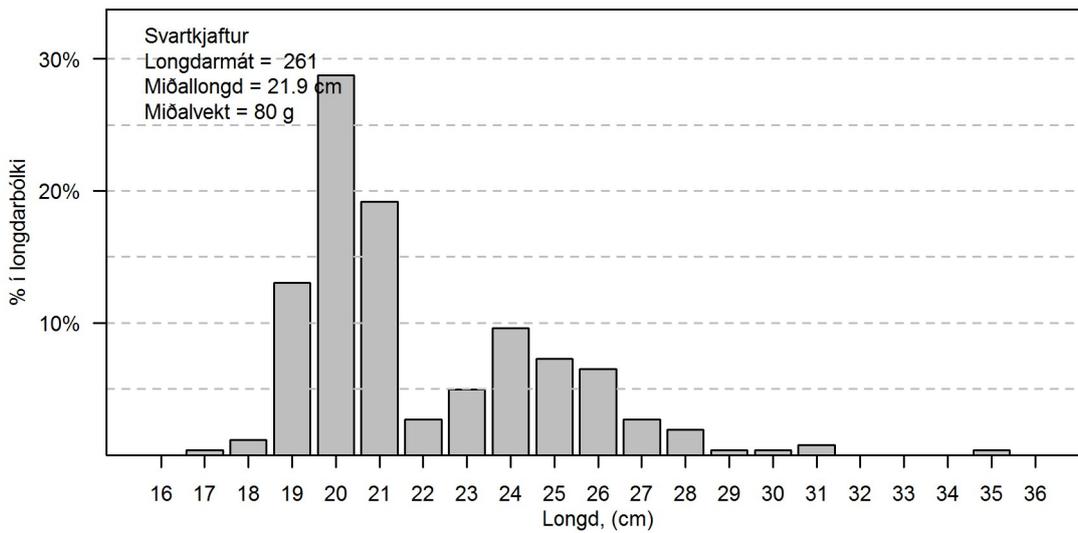


Figure 8. Length distribution (cm) of blue whiting north of the Faroes. M/V *Christian í Grótinum* cruise 1552, 2-19/7 2015. The mean length was 21.9 cm and mean weight was 80 g.