

Preliminary Cruise Report

Cruise no. 2118

Faroese part of International Ecosystem Survey in the Norwegian Sea (IESNS) 2021

28 April - 12 May 2021

R/V Jákup Sverri XPZO

Participants:

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INTRODUCTION

The main aim of this cruise was to investigate the distribution and abundance of Norwegian spring spawning herring and blue whiting in the Norwegian Sea west and north of the Faroe Islands (yellow transects in **Figure 1**). In addition, zooplankton and hydrographic data were collected for each 60 nmi along the cruise tracks.

The cruise was part of the joint International Ecosystem Survey in the Norwegian Sea (IESNS). Five parties and research vessels (see text table below) took part in the survey, coordinated by the “Working Group of International Pelagic Surveys” (WGIPS) in ICES. The combined results from all five vessels will be used in the assessment of Norwegian spring spawning herring by the “Working Group on Widely Distributed Stocks” (WGWIDE) in September 2021.

In general, the cruise went as planned. 1547 herring were length measured and 361 herring otoliths were sampled. 706 blue whiting were length measured and 210 blue whiting otoliths were sampled. Mackerel (11 pcs) were only caught in one surface haul.

Ship	Nation
Jákup Sverri	Faroes
Dr. Fridtjof Nansen	Norway
Vilnyus	Russia
Árni Friðriksson	Iceland
Dana	Denmark (EU)

The present survey report is based on data from R/V *Jákup Sverri* only. Therefore no estimate of abundance of Norwegian spring spawning herring is given due to incomplete coverage of the distribution area and varying survey area among years.

MATERIAL AND METHODS

Cruise tracks with preplanned hydrographic stations (CTD and WP2 net), and opportunistic pelagic trawl stations in the surveyed area are shown in **Figure 2**. Acoustic data were recorded with a Simrad EK-80 echo sounder. Data from the keel mounted 38 kHz transducer were logged at sea 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 with the LSSS software and allocated to primarily herring or blue whiting, and to some extent also to other fish (e.g. myctophids) based on pelagic trawling aimed at the various acoustic recordings. The 38 kHz Echo sounder (as well as other frequencies) was calibrated prior to this year’s survey with a standard copper sphere.

Biological data were sampled from the trawl hauls. The catch was sorted to species – by subsampling if the catch was more than ~50 kg. Stomachs were sampled from 5 individuals of herring and blue whiting. Otoliths were sampled from ~25-100 individuals, for which sex and maturity stage was also registered. Length and weight were measured for up to additionally 150 individuals. For non-target species, length and weight was measured.

Zooplankton was sampled by WP2 net (0.25m² - 200µm mesh-size). The samples were split in half – one part was preserved in formalin for taxonomic studies and the other size-fractionated (2000µm, 1000µm and 200µm) and dried for biomass estimates. Salinity and temperature were sampled with CTD.

RESULTS

Norwegian spring spawning herring

The preliminary results from the Faroese investigations in May 2021 indicated higher abundances of Norwegian spring spawning herring in the southern part of Stratum 3 than last year. The transects surveyed by the Faroese vessel change somewhat among years and this can also affect the observed biomass – the transects this year were similar to last year. Generally, the abundance of herring was highest on the two northernmost transects (**Figure 3**) – and this was similar to the distribution last year. On the two southernmost transects, virtually no herring was observed. Herring was mostly observed in schools at 150-300 m depth during the day, while during the night it was mostly distributed in the top 50 metres (**Figure 4**). Only in the easternmost part of the survey area, there was overlap between herring and blue whiting registrations in the echogram, which was also confirmed by trawl hauls. In earlier years, based on the centre of the otoliths, the herring in the southeastern area has been a combination of spring- and autumn spawning stocks; only very few autumn spawners were observed this year – this is linked to the fact that no herring was observed on the two southernmost transects.

The length distribution of Norwegian spring spawning herring (**Figure 5**) shows a mean length of 32.4 cm. Five year old herring constituted half of all age-read herring and eight year old herring more than 20%. The proportion of old herring (older than age 10) is now relatively low as compared to around five years ago.

Blue whiting

The abundance of blue whiting in May 2021 was higher than observed in May 2020 – but less than when large year classes entered the stock around 2015. The sum of the s_A values of blue whiting per nautical mile along the cruise tracks from the *Jákup Sverri* survey are shown in **Figure 6**.

The mean length of blue whiting was 21.9 cm (**Figure 7**). More than 80 % of age-read blue whiting were 1 year old, and 2-3 year old fish constituted most of the remaining 20%. This suggests that the 2020 year class is a relatively good year class compared to the latest four year classes.

Mackerel

Mackerel (11 pcs) were only caught in one surface haul on the first transect.

Pink salmon

Nineteen pink salmon were caught in 5 stations (**Figure 8**). The mean length was 42.1 cm. This is the first time pink salmon has been caught on the Faroese part of the IESNS-survey.

Plankton and hydrography

Temperature and salinity casts down to 1000 m were taken along the track. All the planned 22 CTD-stations were taken and 19 zooplankton stations along the tracks were sampled. Dry weights of zooplankton from WP2 samples are shown in **Figure 9**; in general, the smallest quantities of zooplankton were observed in the southwestern part of the survey area, whereas the highest abundance was seen in the centre of the survey area. Mostly, it was zooplankton in the size-group 1000-2000 μm that dominated the biomass.

Survey effort for *Jákup Sverri* 29 April - 10 May 2021:

Effective survey period	Length of cruise track (nmi)	Trawl stations	CTD stations	Plankton sampling	Aged fish herring/ blue whiting	Length-measured fish
29/4 – 9/5	1334	16	22	19	361/210	1547/706

Trawl specifications for *Jákup Sverri*:

Circumference (m)	832
Vertical opening (m)	45–55
Mesh size in codend (mm)	45
Typical towing speed (kn)	3.8–4.9

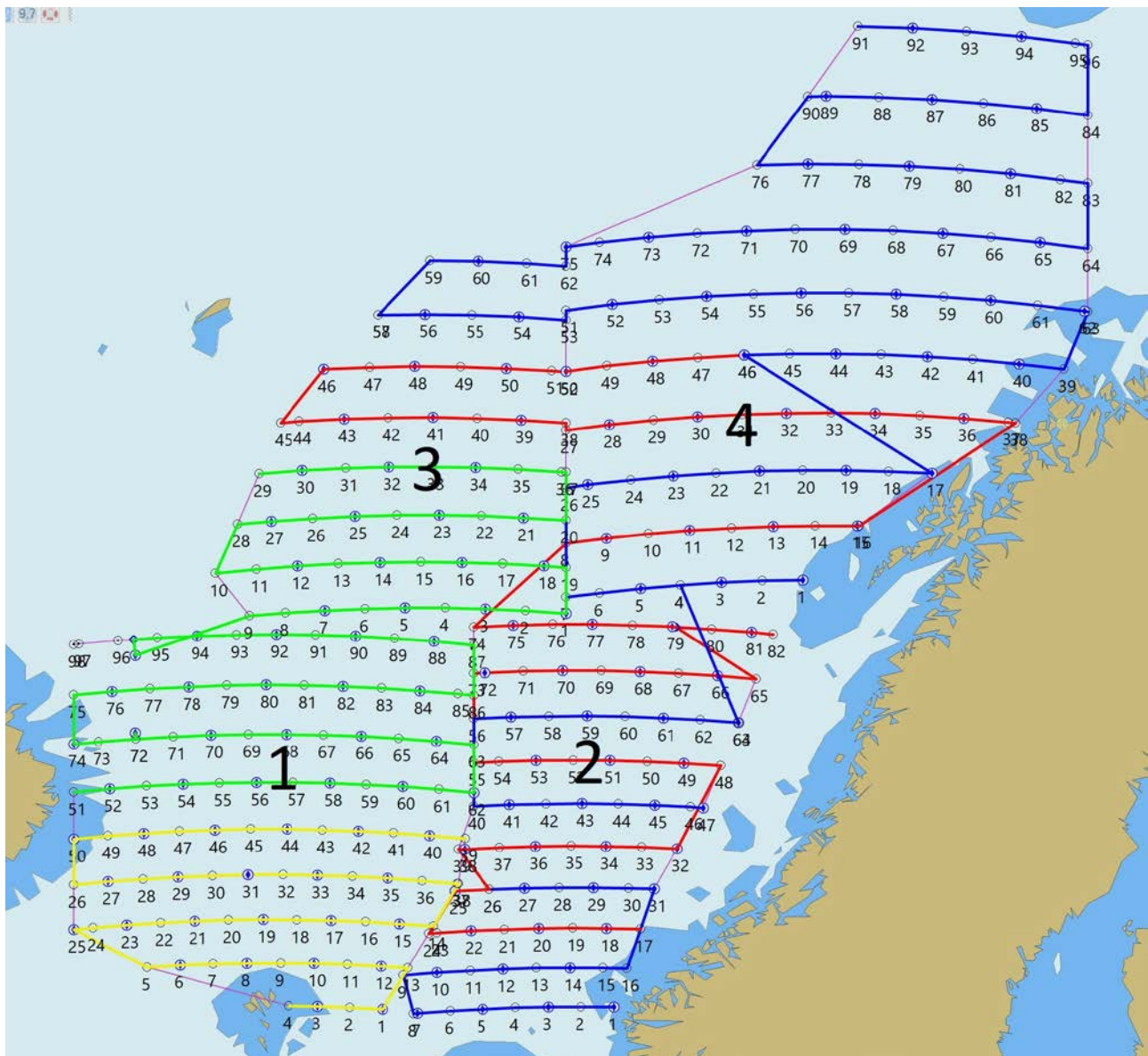


Figure 1. Cruiseplan for the International Ecosystem Survey in the Norwegian Sea in April-May 2021. The participating vessels were: *Árni Friðriksson* IS, *Dr. Fridtjof Nansen* NO, *Dana* EU, *Jákup Sverri* FO and *Vilnyus* RU. *Jákup Sverri* covered the yellow transects north of the Faroes and into Icelandic and international waters.

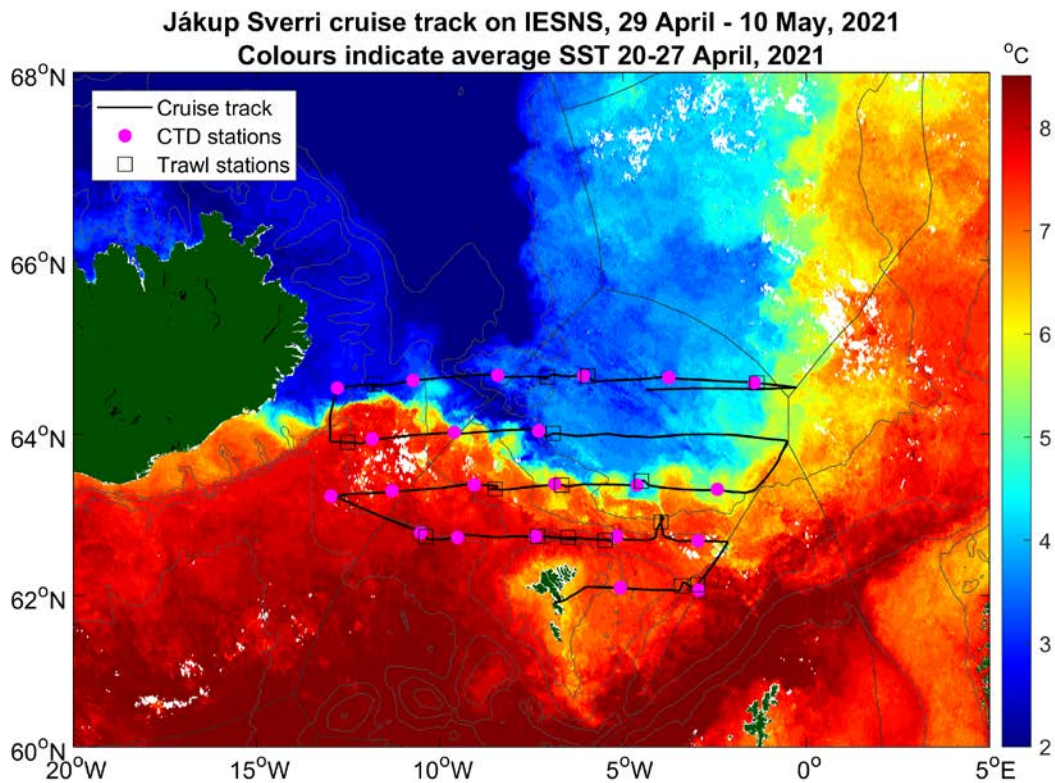


Figure 2. Cruise track, with hydrographic stations (purple circles) and trawl stations (black squares) north of the Faroes, for *Jákup Sverri* cruise 2118, 29 April - 10 May 2021. The surface temperature in the background was based on satellite data 20-27 April 2021. The total covered distance was 1336 nautical miles.

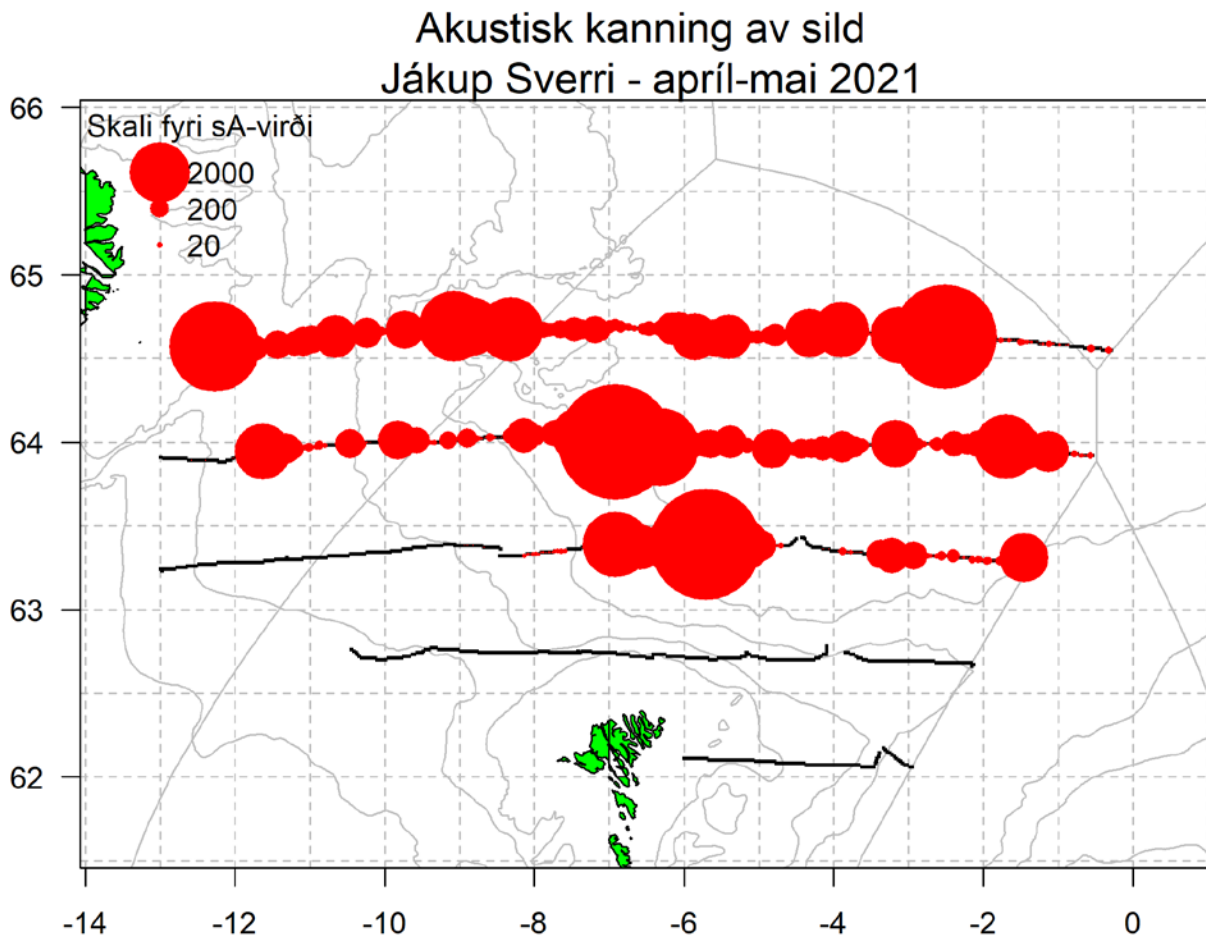


Figure 3. Integration values (s_A , m^2/nm^2) of herring per each nmi along the cruise tracks, *Jákup Sverri* cruise 2118, 29 April - 10 May 2021. The size of the circles corresponds to biomass of fish.

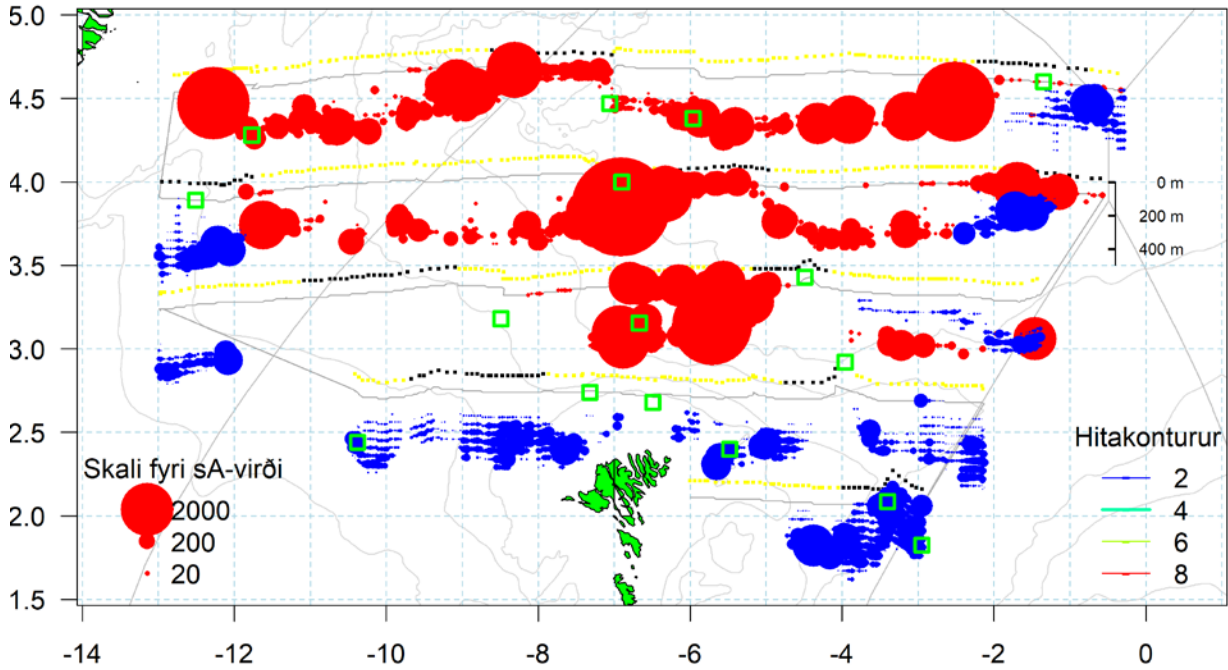


Figure 4. Vertical distribution of herring (red) and blue whiting (blue) per each nmi along the cruise tracks, *Jákup Sverri* cruise 2118, 29 April - 10 May 2021. Time of day is indicated at the top of each transect, showing the darkest hours in black and daytime in yellow. Trawl hauls are indicated by green squares.

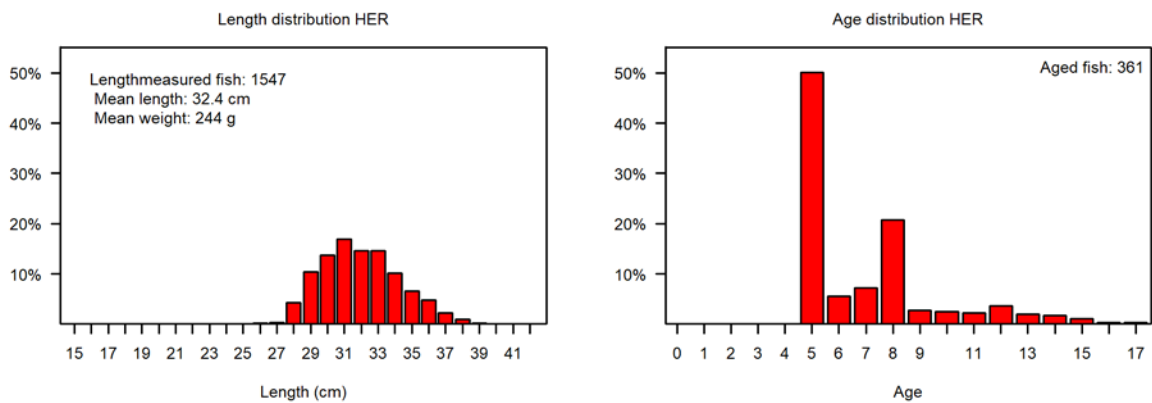


Figure 5. Length and age distribution of Norwegian spring spawning herring north of the Faroes, *Jákup Sverri* cruise 2118, 29 April - 10 May 2021. The age distribution is based on fish classified as spring spawners.

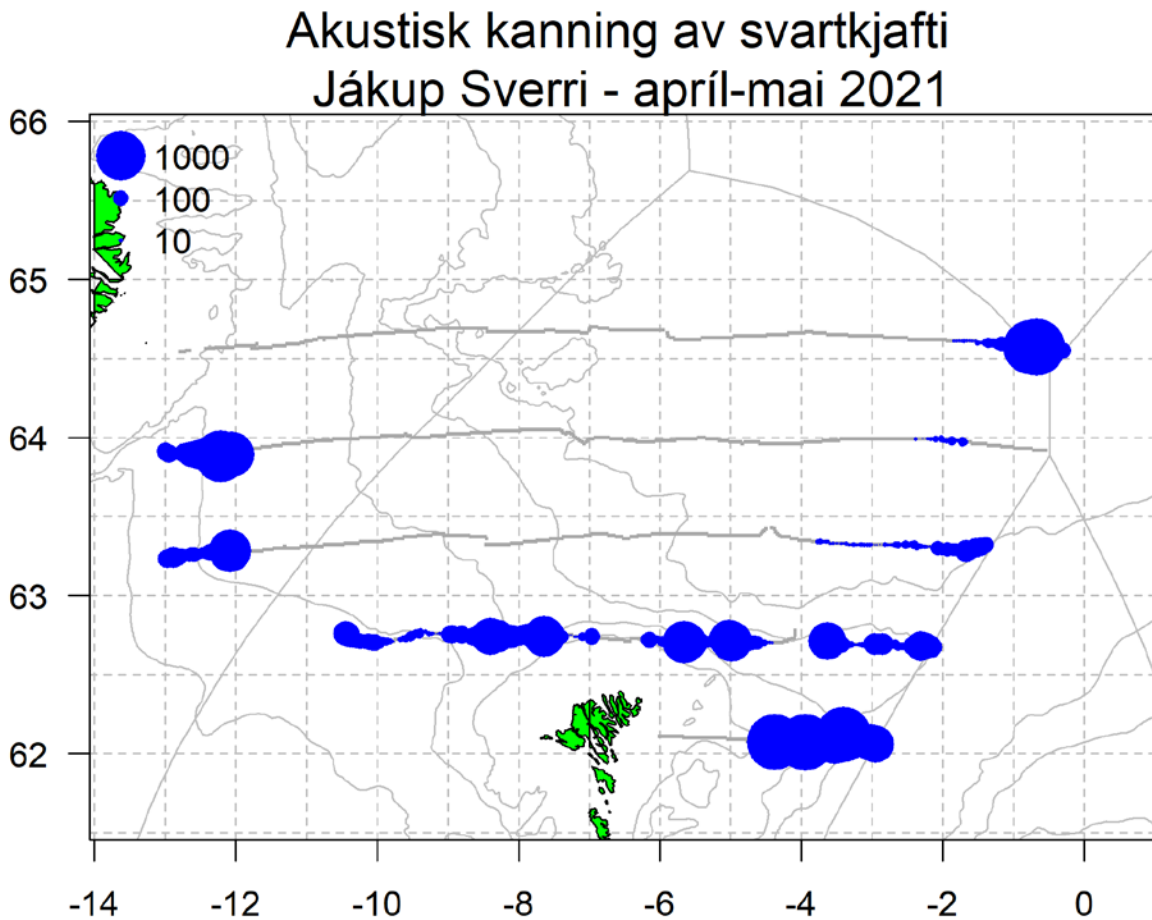


Figure 6. Integration values (s_A , m^2/nm^2) of blue whiting per each nmi along the cruise tracks, *Jákup Sverri* cruise 2118, 29 April - 10 May 2021. The size of the circles corresponds to biomass of fish.

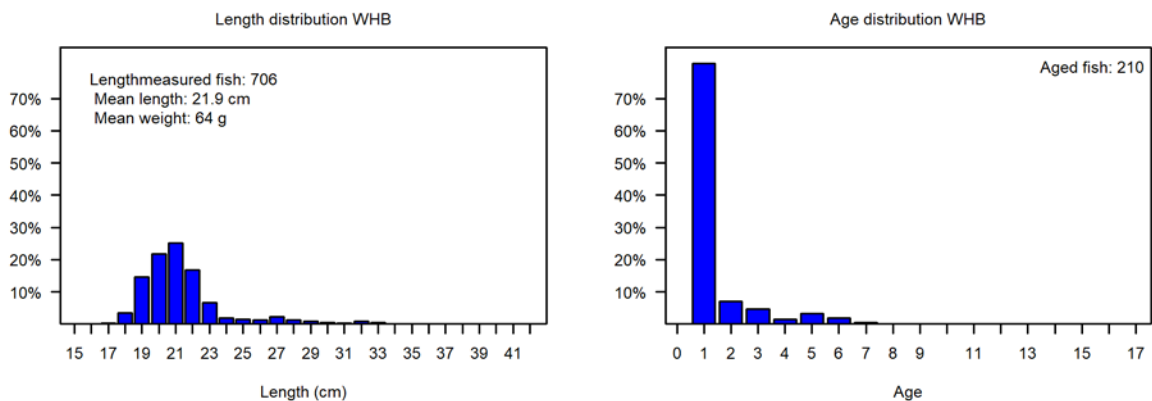


Figure 7. Length and age distribution of blue whiting north of the Faroes, *Jákup Sverri* cruise 2118, 29 April – 10 May 2021.

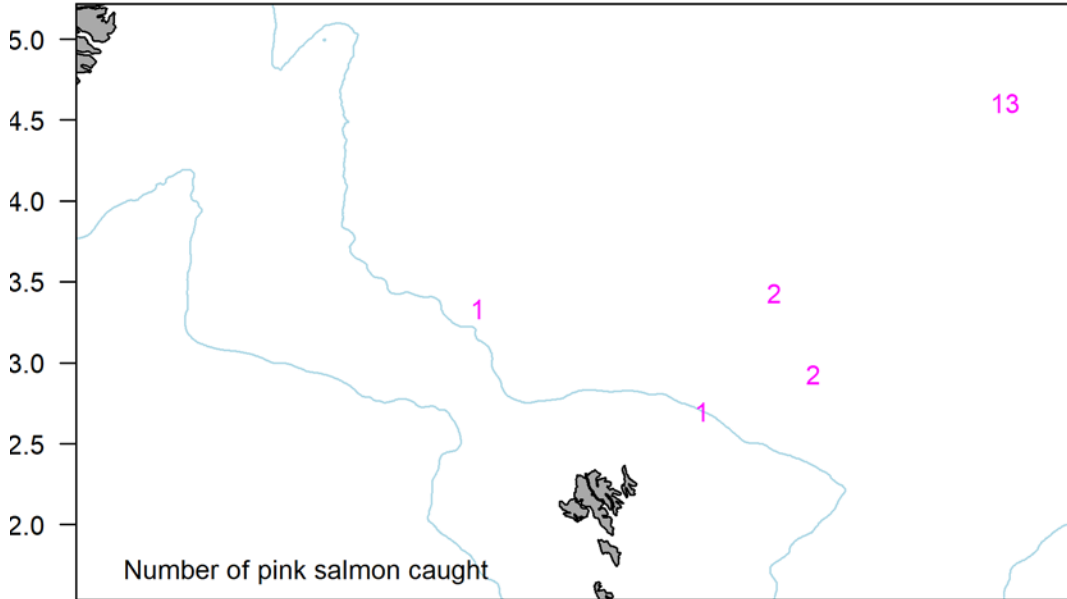


Figure 8. Stations where pink salmon were caught north of the Faroes; the number indicates number of fish, *Jákup Sverri* cruise 2118, 29 April – 10 May 2021.

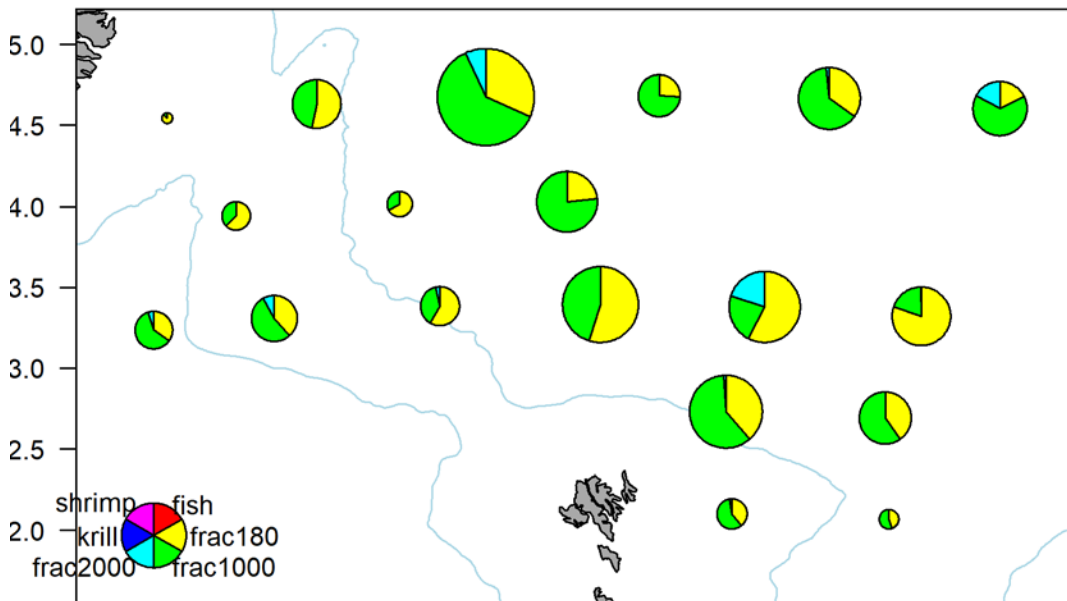


Figure 9. Distribution of zooplankton – size-fractionated WP2 samples, *Jákup Sverri* cruise 2118, 29 April - 10 May 2021.