

Cruise Report
Cruise no. 2428

Faroese part of International Ecosystem Summer Survey in the Norwegian Sea 2024

27st June-14th July 2024

Jákup Sverri



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INTRODUCTION

The main aim of this survey was to investigate the distribution and abundance of Northeast Atlantic mackerel (mackerel), Norwegian spring-spawning herring (herring) and blue whiting in the Northeast Atlantic. Zooplankton and hydrographic data were collected along the cruise tracks. This year two extra projects were included in the work: the coordinated whale-monitoring by NAMMCO (the Faroese part was partly conducted as part of IESSNS) and sampling for a phd-project on eDNA.

The cruise was part of the joint International Ecosystem Summer Survey in the Nordic Seas (IESSNS). Four parties and five research vessels (see text table below) took part in the survey, coordinated by the “Working Group of International Pelagic Surveys” (WGIPS) in ICES. The results from all vessels combined were used in the assessment of mackerel, herring and blue whiting by the “Working Group on Widely Distributed Stocks” (WGWIDE) in August-September 2023.

Vessel	Nation
Jákup Sverri	Faroes
Vendla	Norway
Eros	Norway
Árni Friðriksson	Iceland
Ceton	Denmark

The present survey report is based on data from Jákup Sverri only. Therefore, no biomass estimate is given due to incomplete coverage of the area. Only the results from the Faroese survey are presented. The combined results with biomass estimates will be available in the survey report presented to WGWIDE in late August 2024, and which will be part of the WGIPS report from the upcoming WGIPS meeting in January 2025.

MATERIAL AND METHODS

Cruise tracks with stations, i.e. predefined pelagic trawl stations and hydrographical stations (CTD and WP2 plankton) are shown in **Figure 1**. For mackerel, the surface swept-area trawl survey method was used based on 30 min trawling at regularly spaced (approximately 60 nmi apart) trawl stations on equally spaced latitudinal tracks with a randomly selected starting latitude. The specifically designed standard MULTPELT 832 survey trawl (Table 1) with standardised rigging was used conforming to standard operational settings. For herring and blue whiting standard acoustic survey methods were used. The acoustic data were recorded with a Simrad EK-80 echosounder. Data from the 38 kHz transducer mounted on a drop keel 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 herring and blue whiting based on pelagic trawling aimed at the various acoustic recordings. The trawl gear was monitored during trawling

with designed trawl sensors measuring depth of the trawl and spread of the trawl doors. Light measurements were done during trawling. The 38 kHz Echo sounder was calibrated prior to survey (in February) with a standard copper sphere.

RESULTS

The total survey effort (number of trawl stations and biological sampling) is shown in **Table 2** and **3**. The various trawl settings and operation details are given in **Table 4** the reported values were all within the standards recommended for the MULTPELT trawl. The acoustic settings are shown in **Table 5**.

There were initially 35 planned surface trawl stations, however one of these (in the southernmost survey area) was skipped due to proximity to land. Thus, there were 34 predetermined stations on the cruise. In addition, 5 deep hauls were taken, targeting blue whiting, and one station was disqualified and retaken.

Mackerel

Mackerel was caught in 28 of the 34 predetermined surface trawl stations in the survey area. The catches of mackerel on each surface trawl station are shown in **Figure 1**, left panel, with average length per station of mackerel; herring and blue whiting shown in the right panel. The average catches of mackerel in the Faroese survey area 2024 were on average approximately the same as in 2023 and somewhat lower than in 2022, but no large differences compared to the last two years could be identified. It should, however, be noted that the covered area this year was significantly different from earlier years. The largest catches (per ½ hour trawl haul) were observed along the slopes of the northern Faroe Plateau, the Iceland-Faroe Ridge and north towards the northern limit of the survey area. The catch rates in the southwestern area were low in 2024 – as is generally the pattern.

The mean length of mackerel was 36.3 cm and mean weight 424 g (**Figure 2**). The age distribution was characterised by several equally large age groups – both young (3-5 year olds) and older mackerel (6-13 year olds).

Norwegian spring spawning herring

Herring was mainly observed close to Shetland (**Figure 3**) and on the northernmost transect in the survey area. The herring around Shetland was of autumn-spawning type.

The length distribution of herring was bimodal with one peak around 25 cm (probably autumn spawners around Shetland) and on around 33 cm (**Figure 4**). The age distribution shows that the 2016 year class was well represented, with more than 50% of the aged spring spawners being 8 years old. Relatively few specimens were older than 10 years. (Herring of autumn spawning type was excluded from the age-distribution in Figure 4, but the data exist in databases).

Blue whiting

Blue whiting was distributed in the whole area along the slopes and over the Norwegian basin as continuous scattering layers from 100 m down to about 350-400 m (**Figures 5 and 7**). In the south, schools of 0-group blue whiting were observed and in 2024 these schools were observed over a wider area than usual – although not in particularly high concentrations – as has been observed in some other years.

The length and age distribution of blue whiting is shown in **Figure 6**. The mean length was 20.9 cm and the mean weight was 61 g; however, the size composition was in two separate groups with the 0-group blue whiting comprising one, and the 3-4-year-old blue whiting dominating the other group.

Overlap between species

Herring was entirely distributed in the top 40-50 meters of the water column this year (**Figure 7**). Blue whiting was mostly distributed from 100 m and deeper – but some indications of diurnal migration (up in the darkest hours) were seen. Since the herring was only seen in the uppermost layers, one could speculate if there is an underestimation of herring (transducer depth is 9 m); but herring was also only sporadically caught in the surface where limited acoustic registrations were seen, so the described pattern appears to be consistent.

Other species

Lumpfish of all sizes were caught in small numbers in the upper 30 m of the water column in several stations throughout the surveyed area. One salmon was caught on the Iceland-Faroe Ridge.

Hydrography and zooplankton

Temperature and salinity casts down to 500 m were taken on the 34 predetermined trawl stations as well as zooplankton, which was sampled with WP2 200 µm zooplankton net. The surface temperature was logged all along the cruise track.

The main zooplankton abundancies were observed in the northern part of the survey area – north off the Faroe Plateau and the Iceland-Faroe Ridge (**Figure 9**); this was consistent with the fish distribution.

Where larger abundance of meso-zooplankton was observed the, the bulk of the biomass constituted of individuals smaller than 1 mm.

Table 1. Trawl specifications for the Faroese MULTPELT 832 in July 2023.

Circumference (m)	832
Vertical opening (m)	36.4
Mesh size in codend (mm)	45
Typical towing speed (kn)	4.4

Table 2. Survey effort for Jákup Sverri 27.June.-14 July 2024.

Effective survey period	Length of cruise track (nmi)	Trawl stations	CTD stations	Plankton sampling	Aged fish mackerel/herring/blue whiting	Length-measured fish
27/6-12/7	2825	39	34	34	504/61/295	1681/1218/1487

Table 3. Summary of biological sampling in the Faroese IESSNS survey from 27 June -14 July 2024 on each station. Numbers denote the maximum number of individuals sampled for each species for the different determinations.

	Species	Number
Length and weight measurements	Mackerel	100
	Herring	100
	Blue whiting	100
	Other fish sp.	20-50
Sexed and maturity determination	Mackerel	15-25
	Herring	25-50
	Blue whiting	15-50
	Other fish sp.	0-20
Otoliths/scales collected	Mackerel	15-50
	Herring	25-50
	Blue whiting	15-50
	Other fish sp.	0
Stomach sampling	Mackerel	5
	Herring	5
	Blue whiting	5
	Other fish sp.	0

Table 4. Trawl settings and operation details during the IESSNS survey in 2024.

Properties	Jákup Sverri
Trawl producer	Vónin
Warp in front of doors	Dynex – 38 mm
Warp length during towing	350(350-380) m
Difference in warp length (m) port/starboard	0 m
Weight at the lower wing ends	2*400 kg
Setback in metres	6
Type of trawl door	Twister
Weight of trawl door (kg)	1650
Area trawl door (m ²)	4.5
Towing speed (knots)	4.4 (3.6-5.3)
Trawl height (m)	36.4 (30-46)
Door distance (m)	116.5 (110 - 130)
Turn radius	5 degrees turn Prt/Stb
A fish lock in front end of cod-end	Yes
Headline depth	0 m
Float arrangements on the headline	Kite with + 1 buoy (fender) on each wingtip (occasional hauls without buoys)
Weighing of catch	All catch weighed

Table 5. Acoustic instruments and settings for the primary frequency in the IESSNS survey in 2023.

Parameter	Jákup Sverri
Echo sounder	Simrad EK80
Frequency (kHz)	18,38,70,120,200,333
Primary transducer	ES38-7
Transducer installation	Drop keel
Transducer depth (m)	6-9
Upper integration limit (m)	12 m
Absorption coeff. (dB/km)	10.5
Pulse length (ms)	1.024
Band width (kHz)	3.06
Transmitter power (W)	2000
Angle sensitivity (dB)	21.9
2-way beam angle (dB)	-20.7
TS Transducer gain (dB)	26.93
sA correction (dB)	-0.05
alongship:	6.52
athw. ship:	6.53
Maximum range (m)	500
Post processing software	LSSS 2.16.0

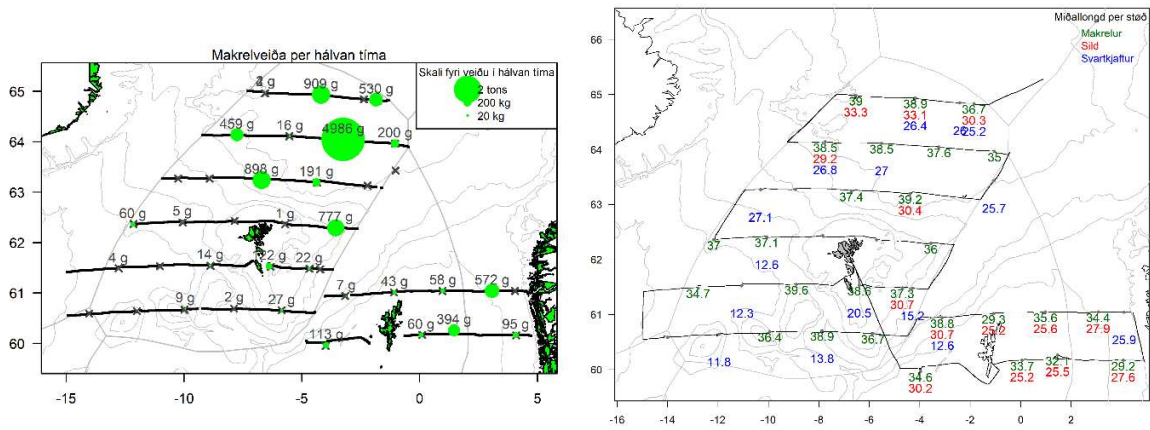


Figure 1. Cruise tracks with predetermined trawl/CTD/WP2 stations (grey crosses and green circles) approximately 66 nmi apart during the IESSNS 2024 cruise with Jákup Sverri cruise 2428, 27 June – 14 July 2024 with catch of mackerel (left panel) by ½ hour trawl haul and (right panel) average length pr station of mackerel, herring and blue whiting. The size of the circles corresponds to total amount of fish caught (in tonnes).

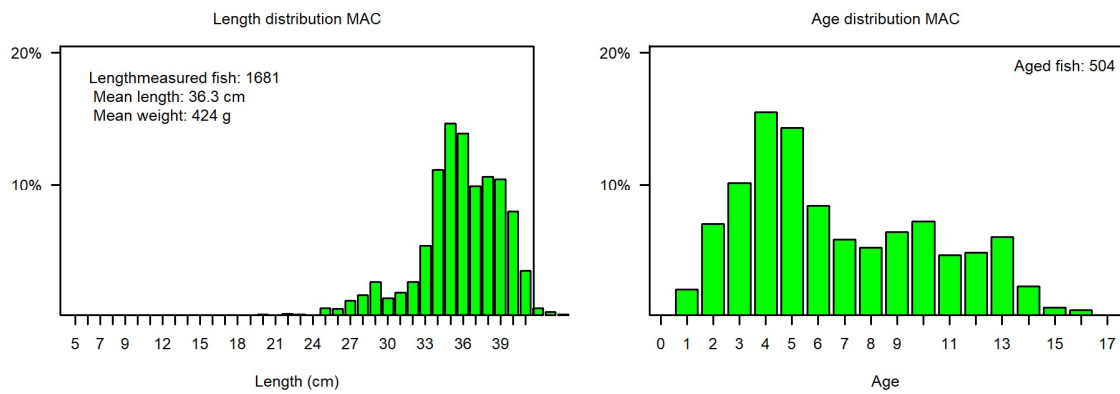


Figure 2. Length- (left) and age- (right) distribution of mackerel during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June – 14 July 2024.

Akustisk kanning av sild Jákup Sverri - juli 2024

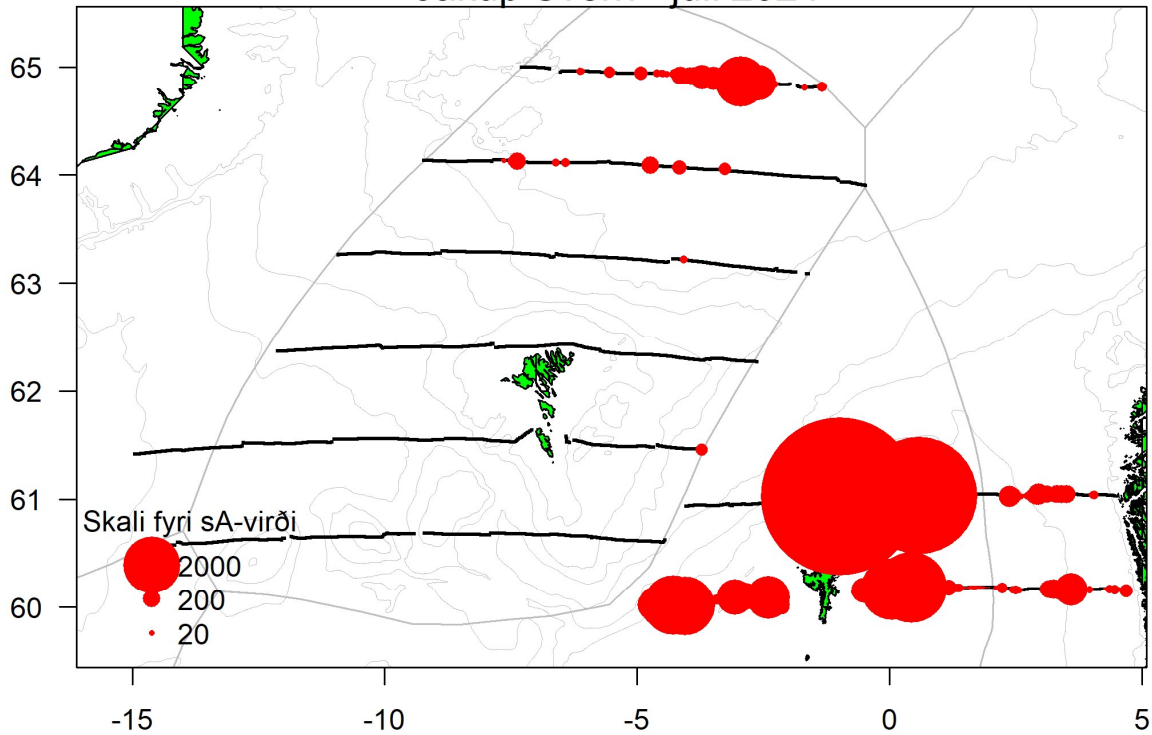


Figure 3. Acoustic registrations of herring (sA) during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June – 14 July 2024.

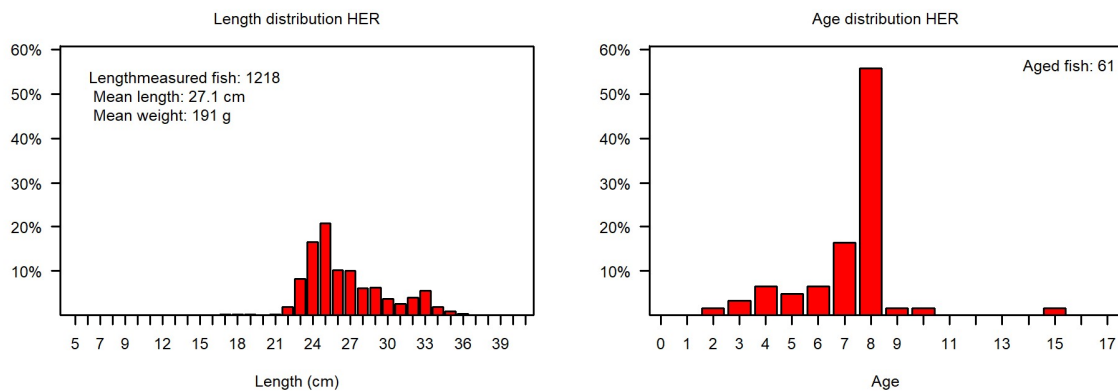


Figure 4. Herring length- (left) and age- (right) distribution during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June – 14 July 2024. (In the age distribution, only otoliths with opaque centres are presented, as these are assumed to be the Norwegian spring spawning type – all measured herring are included in the length distribution and it is therefore probably skewed towards autumn spawning herring).

Akustisk kanning av svartkjafti Jákup Sverri - juli 2024

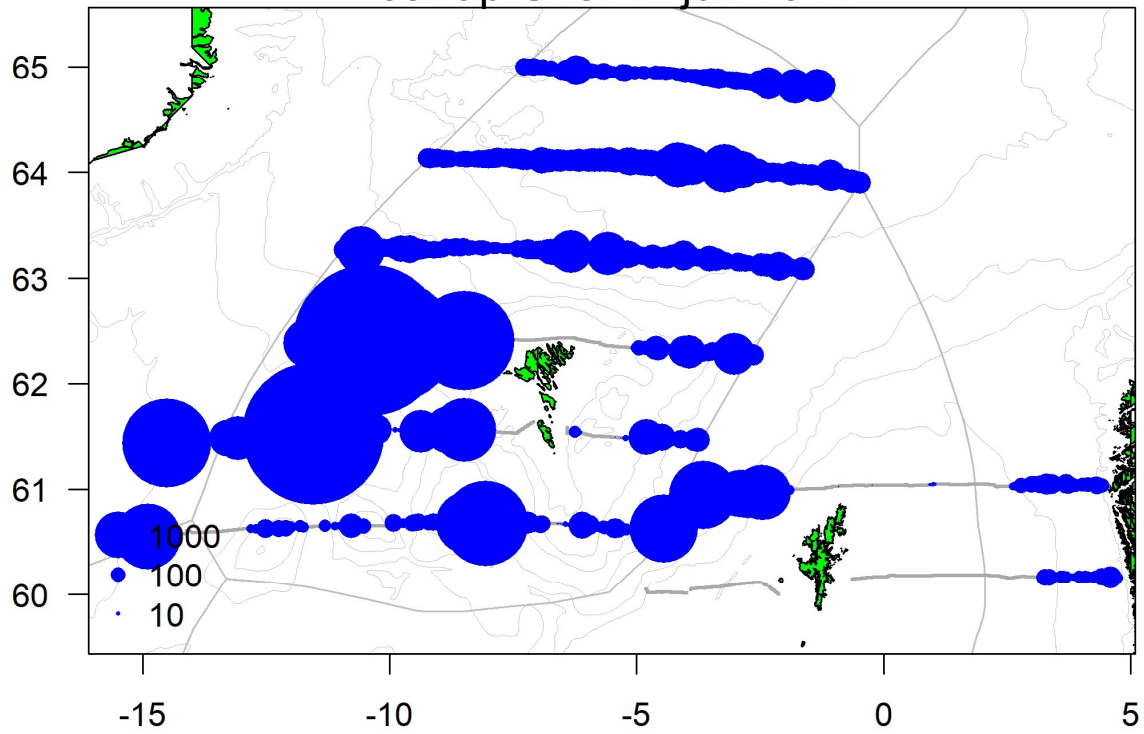


Figure 5. Acoustic registrations of blue whiting (SA) during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June – 14 July 2024.

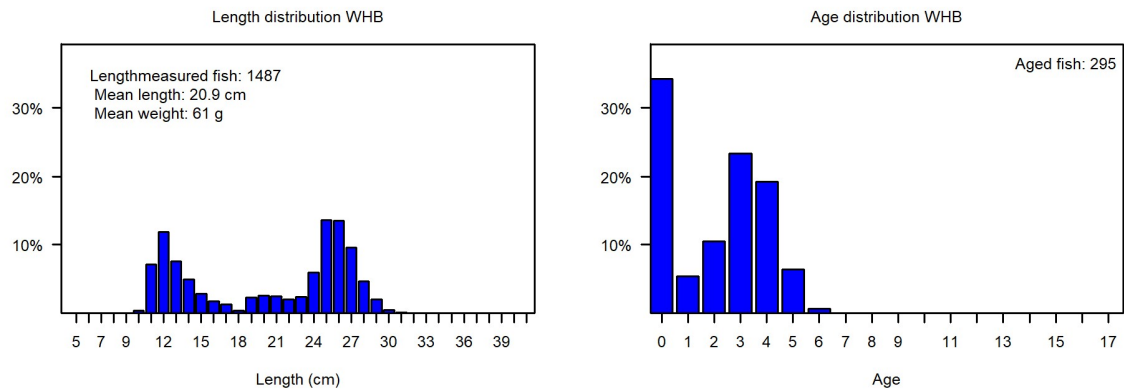


Figure 6. Blue whiting length distribution (left panel) and age distribution (right panel) during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June – 14 July 2024.

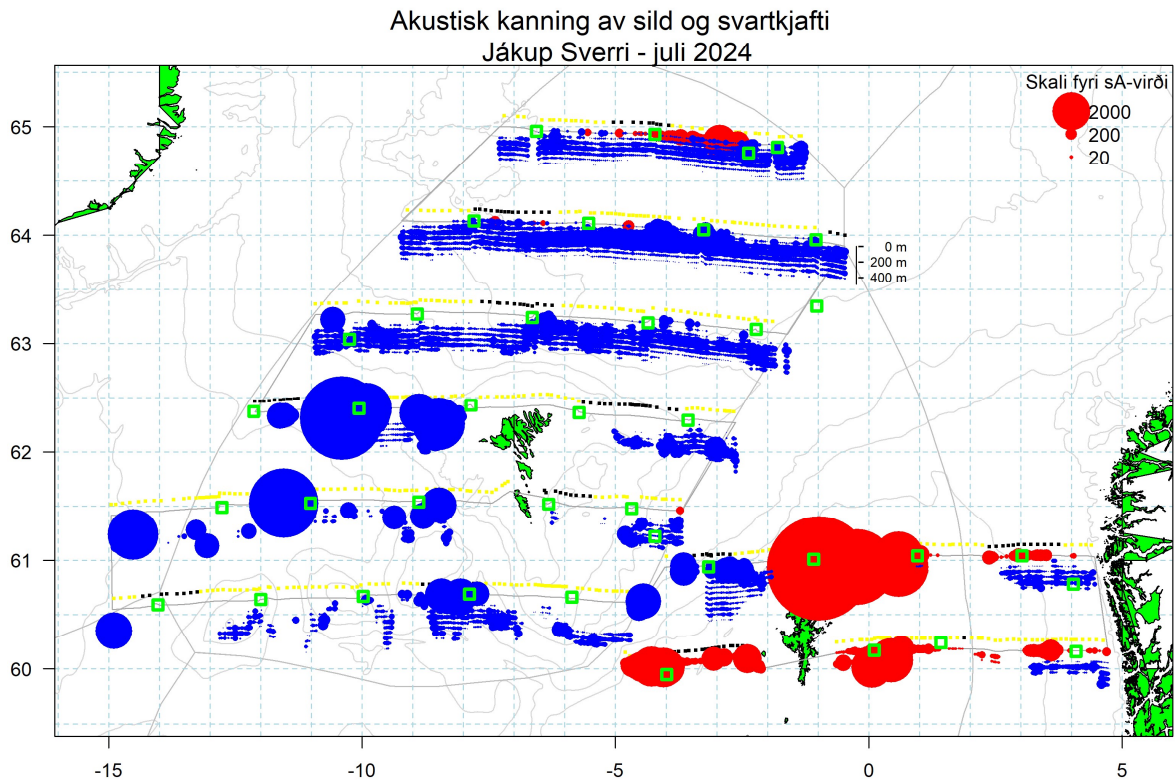


Figure 7. Vertical distribution of acoustic registrations of herring and blue whiting during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June – 14 July 2024. Yellow/black colours above the cruise tracks indicate day/night time.

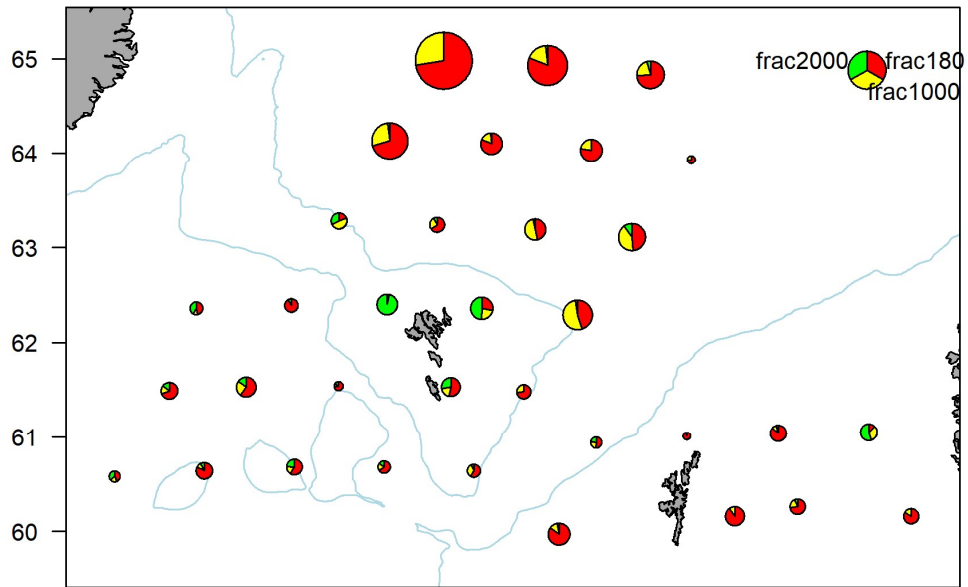


Figure 8. Zooplankton sampling during the IESSNS 2024 cruise, Jákup Sverri cruise 2428, 27 June -14 July 2024.