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Cruise Report
FRV Walther Herwig III, WH 443
26/01 to 16/02/2021
IBTS Q1 2021

Cruise Leader: Dr. Hermann Neumann

Summary

The cruise was part of the International Bottom Trawl Survey (IBTS), which is an internationally coordinated ICES program aiming to provide fish population data and biological parameters of commercial fish species for stock assessment purposes. Sampling of fish was conducted by trawl hauls in allocated ICES statistical rectangles by means of the ICES standard bottom trawl GOV. In total, 67 GOV hauls were taken during the cruise. Fish sampling was accompanied by taking 67 CTD profiles, 144 MIK plankton samples and 36 microzooplankton samples. Standardized total catches of the GOV hauls were on average about 347 kg. Highest pre-recruit number were found for mackerel <25cm (248469 ind./hr.) and lowest for cod <25cm (6 ind./hr.). Except for cod and herring, all recruitment indices of the major target species haddock, whiting, Norway pout, sprat and mackerel were higher than the long-term average from 1980-2020. Standard length (SL) of the herring larvae from the night time MIK sampling varied between 7- and 41-mm. Abundance of large herring larvae in the potential nurseries was lower than last year. The 2021 index for the 2020 year-class is 95.2, which is higher than for the 2019, but still much lower than observed in the early and late 1990s.

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1. Objectives and methods

The International Bottom Trawl Survey (IBTS) is an internationally coordinated ICES program. The survey aims to provide ICES assessment and science groups with consistent and standardized data for examining spatial and temporal changes in (a) the distribution and relative abundance of fish and fish assemblages; and (b) of the biological parameters of commercial fish species for stock assessment purposes.

The main objectives are to:

- determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices;
- monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
- monitor the distribution and relative abundance of all fish species and selected invertebrates;
- collect data for the determination of biological parameters for selected species;
- collect hydrographical and environmental information;
- determine the abundance and distribution of late herring larvae.

Sampling of fish was conducted by trawl hauls in allocated ICES statistical rectangles by means of the ICES standard bottom trawl GOV during daytime. One GOV haul per rectangle was applied with 30 minutes towing duration at 4 knots. Fish sampling was accompanied by physical measurements (e.g. temperature, salinity and conductivity) via a CTD mounted directly onto the CTD-rosette system in every rectangle. Additionally, water bottle samples in selected rectangles were taken for microzooplankton sampling. During nighttime, two plankton hauls per each rectangle were conducted with a standardized 2 m midwater ring trawl (MIK) to a maximum depth of 100 m.

2. Cruise schedule

FRV "Walther Herwig III" was embarked and prepared for the cruise on Tuesday, 26/01/21, and left Bremerhaven at the same day. Trawling started on Wednesday morning (27/01/21) at rectangle 38F6 (Fig. 1). With exception of three rectangles the activities in the southern North Sea could be finished within four days before storm came up. The rest of the program in the central and northern North Sea was processed counterclockwise and ended on February 12 in Rectangle 44F1. Thanks to the exceptionally good weather conditions, we were well on schedule and were able to take over 10 MIK stations from other nations participating in the IBTS (45E6, 42-44F4, 37F7, 37F8). We finished the entire program on February 14th in Rectangle 38F8 (Fig. 1). Due to technical problems, the Walther Herwig went straight to the shipyard in Wilhelmshaven on February 15th. **In total, 67 GOV hauls, 67 CTD profiles, 144 MIK plankton samples and 36 microzooplankton samples were taken.**

4. Preliminary results

Standardized total catches of the GOV hauls were between 5 kg (39F8) and 6647 kg (45E8) per 30 min trawling time, on average about 347 kg. Only three hauls were above 1000 kg. Total number (ind./30min) and distribution of important species caught during the survey were given in Figure 2.

One important objective of the IBTS Q1 is to determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices. Figure 3 shows the total number of pre-recruits caught during the survey. Highest number were found for mackerel <25cm (248469 ind./hr.) and lowest for cod <25cm (6 ind./hr.). Except for cod and herring, all recruitment indices of the major target species haddock, whiting, Norway pout, sprat and mackerel were higher than the long-term average from 1980-2020 (Table 1).

The herring larvae from the night time MIK sampling measured between 7- and 41-mm standard length (SL). Again, and as in most years, the smallest larvae <10 mm were the most numerous. Larger larvae >18 mm SL were rarer and were caught in higher densities than last year. The smallest larvae were chiefly caught in 7.d and in the Southern Bight. The large larvae appeared in moderate to high quantities in both, the central western and southern parts of the North Sea. In the southeastern and eastern part of the North Sea, the potential nurseries, abundance of large herring larvae was lower than last year. The 2021 index for the 2020 year-class is 95.2, which is higher than for the 2019, but still much lower than observed in the early and late 1990s.

For further details and results of the complete survey with participations from France, the Netherlands, Denmark, Scotland, Sweden, Norway, and Germany, please refer to the CSR (cruise summary report) site of BSH http://seadata.bsh.de/csr/retrieve/sdn2_index.html as well as to the respective chapter 5.1 of this year's IBTSWG report.

5. Participants

Name	Institution	Function
1. Dr. Hermann Neumann	TI-SF	Cruise leader
2. Annika Elsheimer	TI-SF	Technician/Fish+Data
3. Andrij Martynenko	TI-SF	Technician/CTD
4. Sakis Kroupis	TI-SF	Technician/MIK
5. Sergej Schachray	TI-SF	Technician/MIK
6. Samira Kadhim	TI-SF	Technician/Fish
7. Valeska Borges	TI-SF	Technician/Fish
8. Simon Wieser	TI-SF	HiWi/Fish
9. Laura Niewendick	TI-SF	HiWi/Fish
10. Frederike Schmachtl	TI-SF	HiWi/Fish
11. Reuven Bender	TI-SF	HiWi/Fish

6. Acknowledgement

Thanks to Captain Arne Schwegmann and FRV "Walther Herwig III" crew members for their great support and hospitality and to all participants for their reliable and responsible teamwork.

(Dr. H. Neumann)

7. Tables and Figures

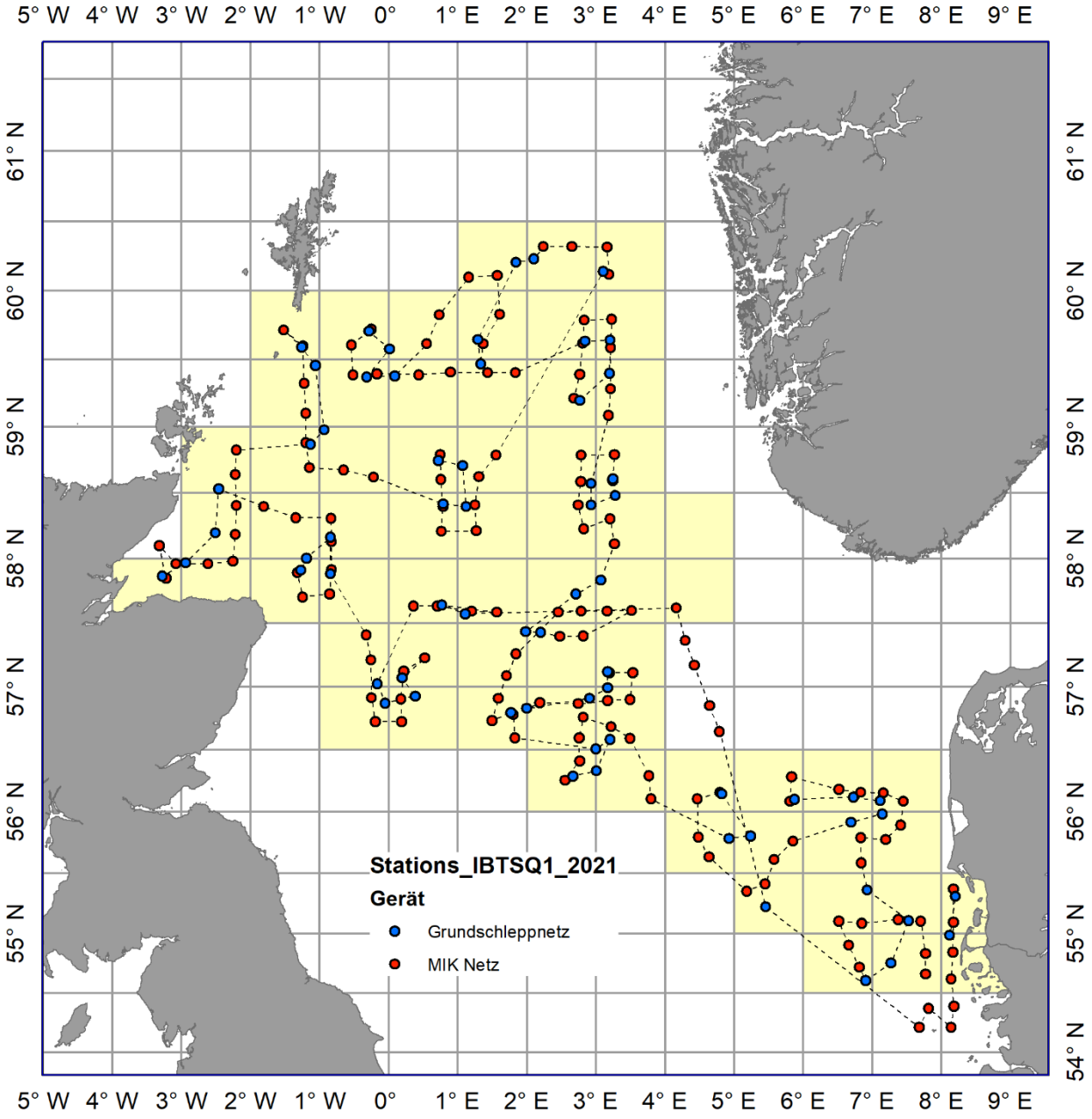

Fig. 1: WH443 cruise track with sampling stations. Blue dots: combined CTD and GOV-trawl stations, red dots: MIK stations. The dotted line indicates the traveled routes between stations.

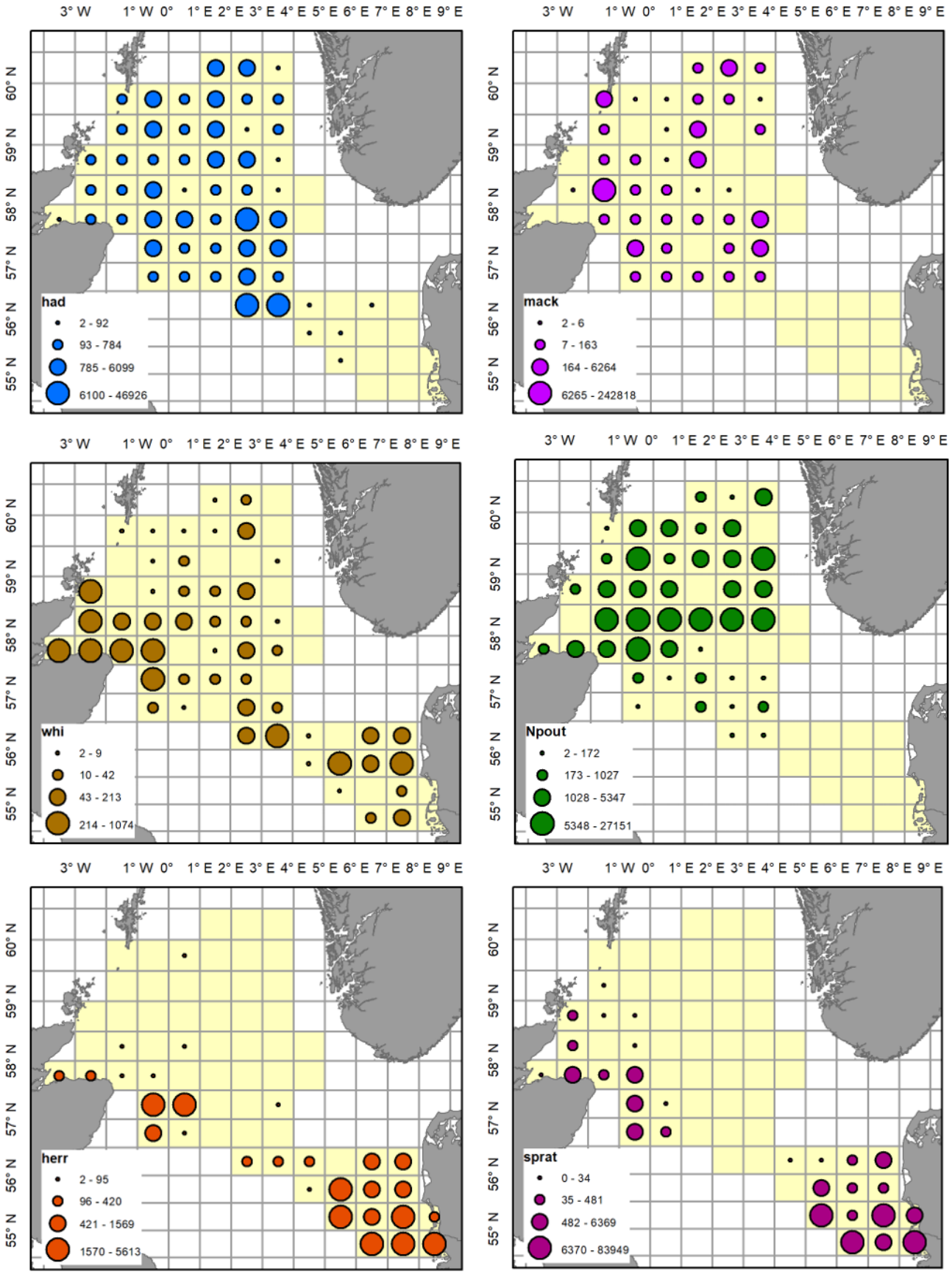

Fig. 2: Number [ind. / 30min] and distribution of Haddock (had); Mackerel (mack); Whiting (whi); Norway pout (Npout); Herring (herr) and Sprat (sprat) caught by at IBTS Q1 2021.

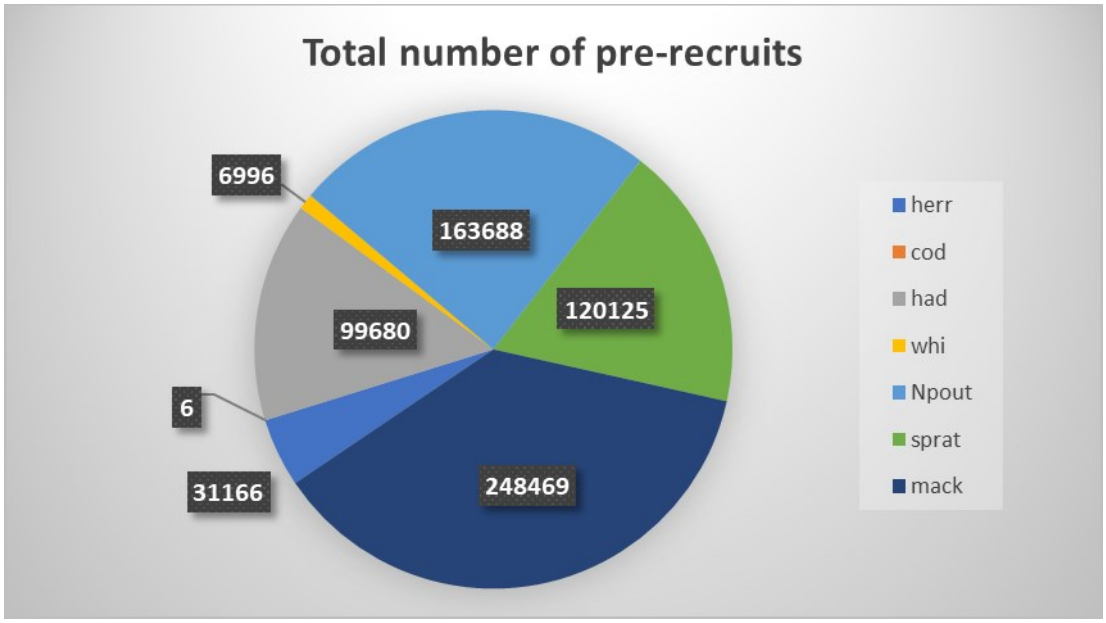

Fig. 3: Summed number per hour of pre-recruit Herring (< 20 cm); Cod (< 25 cm); Haddock (< 20 cm); Whiting (< 20 cm); Norway pout (< 15 cm); Sprat (< 10 cm); Mackerel (< 25 cm) caught at IBTS Q1 2021.

Table 1: IBT-Survey: Comparison of pre-recruit abundance indices (n/h) of 2020 (final), 2021 (preliminary) with the long term mean, 1980 – 2020 (catches of all participating nations):

	final 2020	prelim. 2021	1980-2020
cod	3.7	**1.7**	7
haddock	2355.8	**1166**	492
whiting	519	**504**	445
Norway pout	3901.2	**4015**	2900
herring	1020.6	**805**	1975
sprat	2908.2	**2058**	1369
mackerel	697.5	**1017**	107