

Thünen-Institute of Baltic Sea Fisheries

Cruise report

FRV Clupea, Cruise 281

01.07. to 15.07.2014

Ichthyoplankton and fish in the central Baltic

Person in charge: Dr. Daniel Oesterwind

Cruise leaders: Dr. Daniel Oesterwind (part 1), Paul Kotterba (part 2)

Background

The objective of the first leg of the cruise was to observe the abundance and distribution of fish species in the Bornholm Sea and Gdansk Deep. In detail we focused on the abundance, vertical and horizontal distribution and feeding ecology of herring, sprat and especially cod. In parallel data about hydrography were recorded.

The objective of the second cruise leg was to determine the density and abundance of phytoplankton, zooplankton, ichthyoplankton and gelatinous plankton in the Bornholm Sea in order to analyse their dependence on local hydrographic features in the area, including seawater salinity, temperature and oxygen saturation. The study was the third cruise of FFS Clupea following this specific design of a survey, which was set up to fundamentally increase the knowledge on growth condition of early life stages of cod and of other important fish species in the central Baltic Sea.

Summary

Part 1

The first part of the cruise started on the 1st of July in Rostock port Marienehe and ended on the 6th of July at Rügen port Sassnitz. Except for one blustering day, weather conditions were good and the trip was realized as planned. A total of 44 hydrography stations were conducted and a total of 14 fishing trawls were performed. 1.460 kg of fish were caught and measured. In detail, we measured the length of 4502 clupeids, measured and sampled individual parameters (e.g. length, weight, gonad

weight, sex maturity, stomach fullness, stomachs, otoliths) of 525 individuals of cod and took 514 stomach samples of clupeids.

Part 2

Due to changing wind and weather conditions, only selected stations had been sampled during the second leg. An increasing wind speed during the night between the 08th and 9th of July and expectations of worsening wind conditions for the following days lead to the decision to skip the remaining stations and return to Rostock-Marienehe on Wednesday, July 9th.

Nevertheless, 17 of the 45 stations had been sampled; including a focus station (No. 23) in the centre of the Bornholm Basin (see figure 2). In total, 17 oblique hauls with a Bongonet (335/500µm mesh size) – Baby-Bongonet (150µm mesh size)-combination had been conducted, each of them being accompanied by the recording of a CTD-profile. At station 23, additional samples for the study of phytoplankton- and zooplankton biodiversity and abundance were taken by vertical tows of a WP-2 net (100 µm) and by stratified water sampling with Niskin bottles from various depths.

Cruise schedule and preliminary results

Part 1

FRV Clupea left the port of Marienehe on the 1st of July to steam eastwards to Bornholm. The first transect (T2) were reached in the morning of the 2nd of July and acoustic records started immediately. We performed 11 CTD stations and 3 OTM trawls. After the completion of transect 2 (T2) RV Clupea sailed in eastern direction to the Deep of Gdansk to the next transect (TG) which was started in the morning of the 3th of July. In parallel to acoustic recordings we conducted 11 CTD stations and 3 OTM trawls. From the Deep of Gdansk we shipped back to Bornholm and continued our acoustic records on transect 3 (T3) in the morning of the 4th of July. During the day we performed 12 CTD stations and 3 fishing hauls. During the following night Clupea sailed in western direction to continue the acoustic records on transect 1 (T1) on the 5th of July. On this transect we performed 11 CTD stations and 4 OTM trawls.

The catch composition for the whole trip is shown in table 1.

Besides of the wet weights and individual parameters, we sampled a total of 294 herring, 220 sprat and 272 cod stomachs and 257 tissue samples for genetic analysis.

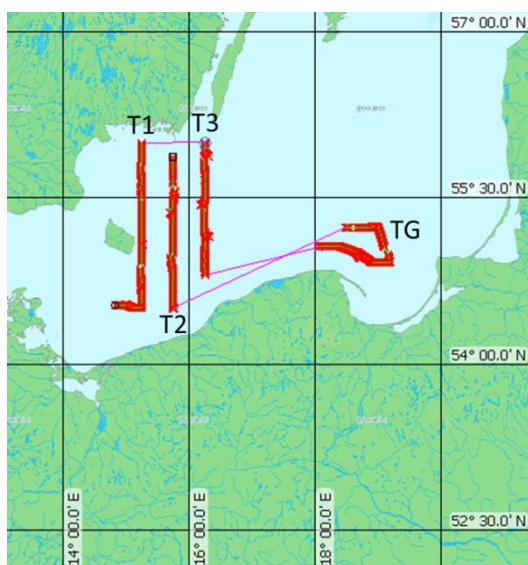


Figure 1: Transects and acoustic records (red) during first cruise leg.

Table 1. Fished wet weight by species.

Species	wet weight (kg)
Cod	198,7
Herring	1088,0
Garfish	22,5
Salmon	0,7
Lumpsucker	1,2
Saithe	0,8
Sprat	127,8
Sticklebacks	18,6
Whiting	3,0
total	1461,3

Part 2

On July 7th, 5 p.m. (local time) FRV Clupea left the port of Sassnitz directly heading towards the Bornholm Basin, where the first station was sampled at 10 p.m. On the morning of July 8th, the focus station 23 in the centre of the Bornholm Basin was sampled while the easterly winds increased during the course of the day. During the night to July 9th, the wind reached a strength of about 7 Bft and the scientific programme had to be interrupted. With regard to bad wind forecasts for the following days and after consultation with the ship's command it was decided to cancel the remaining sampling stations and to return to Rostock.

In total, 17 oblique Bongo Net hauls had been taken and samples were fixed for later detailed analysis of the taxonomic composition, abundance and size distribution of the zooplankton. Another important objective was to determine the frequency of fish larvae within the catches. While numerous pelagic fish eggs could be observed during the cruise, the number of fish larvae within the samples remained relatively small. Those larvae were dominated by clupeid and gobiid species particularly close to the island of Bornholm, while only a few cod larvae had been observed. Initially, several fish larvae were collected and immediately frozen at -80°C for later biochemical analyses. The increasing wind strength, however, impaired the working conditions and made the continuation of the isolation of fish larvae for these purpose impossible. At station 23, the additional sampling included 3 hauls, each with 2 vertical plankton nets (Apstein 55µm mesh size; WP-2 100µm mesh size), water samples for the analysis of phytoplankton density and the determination of oxygen saturation and salinity from different depths (0, 5, 10, 20, 30, 40, 50, 60 and 80 metres).

The catch frequency of gelatinous plankton at the different stations was nearly 100%. The jellyfish were dominated by the genera *Aurelia* and *Cyanea*, while ctenophores like *Mnemiopsis* could not be observed within the samples.

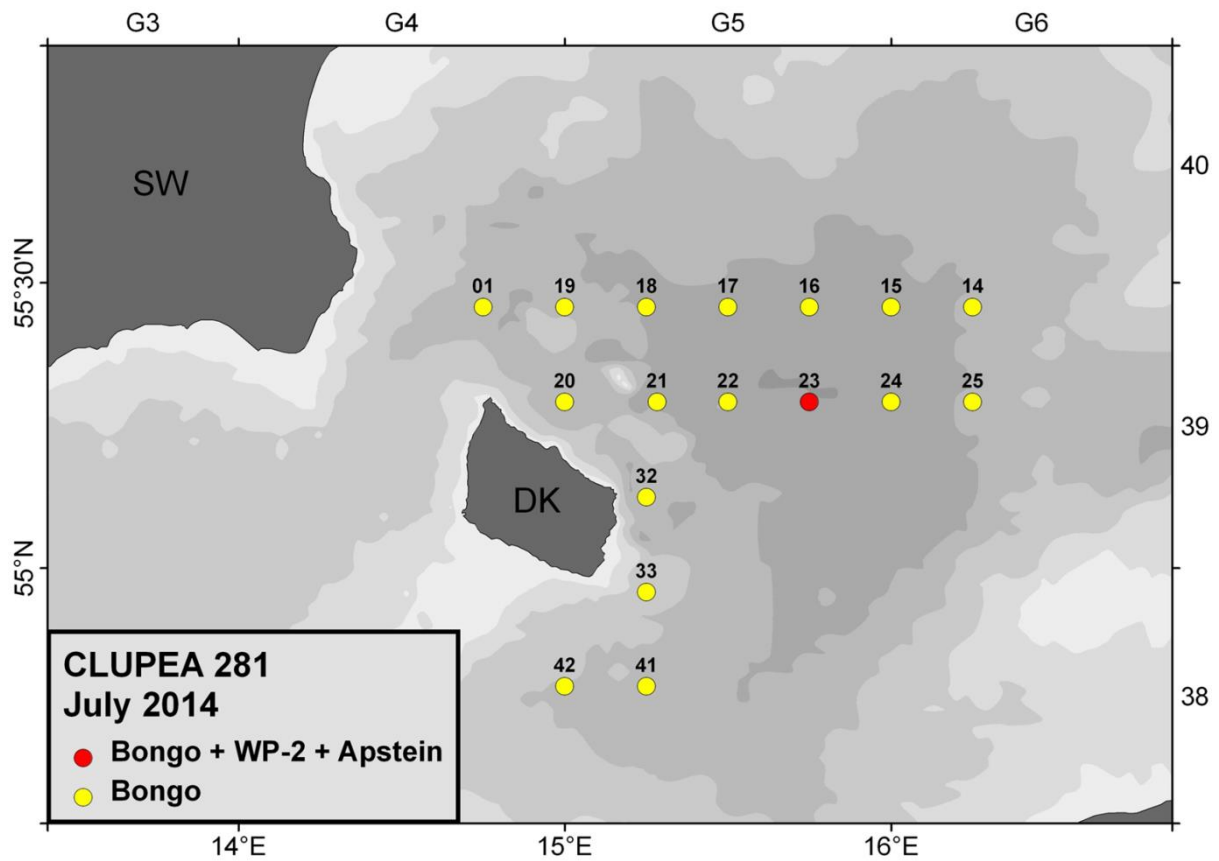


Figure 2. Stations sampled during the second leg of CLU 281.

Cruise participants

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|--------|--|--|
| 1. leg | Dr. Daniel Oesterwind
Dr. Daniel Stepputtis | Senior Scientist (TI-OF)
Senior Scientist (TI-OF) |
| 2. leg | Paul Kotterba
Dr. Jörg Dutz | PhD student (TI-OF)
Senior Scientist (IOW) |

I hereby thank all participants, the captain and the crew of FRV Clupea for their cooperation and support.

Rostock, 14.08.2014

Dr. Daniel Oesterwind
(Scientist in charge)