Thünen-Institut für Seefischerei

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Report
FRV Walther Herwig III - Cruise 386. IBTS Q3 and GSBTS 2015“ vom 27.07. bis 21.08.2015

Fahrtleiter: Dr. M.H.F. Kloppmann

Objectives:

IBTS

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:

- To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
- To monitor the distribution and relative abundance of all fish species and selected invertebrates;
- To collect data for the determination of biological parameters for selected species;
- To collect hydrographical and environmental information;

At the ICES International Bottom Trawl Survey Working Group (IBTSWG) there is currently a discussion on the effects of trawling time on the catch w.r.t. length composition within species and on species composition itself. In order to investigate those effects, it was agreed that for each participating nation a number of specially allocated hauls should be shortened to 15 min instead of the standard 30 min towing time.

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GSBTS

The German Small Scale Bottom Trawl (GSBTS) is a national program to monitor small scale variability as well as long term changes in demersal fish assemblages in relation to hydrography its benthic environment in specially assigned 10 x 10 nm^2 areas of the differing North Sea oceanographic provinces. In some boxes, particularly in Box B, sampling was also done to supplement the haul duration experiment of the IBTS.

Another objective for the GSBTS was the possible replacement for Box D, where in recent year several oil drilling installations did severely affect sampling. An alternative box was, therefore, located in the vicinity of Box D which had comparable characteristics w.r.t. hydrography and sediment type.

Methods:

- Trawl hauls in allocated ICES statistical rectangles as well as in the specially assigned boxes A – M by means of the ICES standard bottom trawl GOV during daytime, one haul per rectangle. Tow duration was either 15 or 30 minutes. Additionally in Box B, a systematic comparison between short (9 hauls) and standard (10 hauls) tow durations was carried out.
- One CTD per each ICES rectangle as well as additional casts in boxes A - M with a Seabird SBE 911 for hydrographical data
- Dredging with 2 m beam trawl for epi-benthos sampling
- Van Veen Grab sampling for infauna
- Bird observations

Itinerary:

27.07.2015 (10:30) Embarkation of cruise participants
27.07.2015 (20:00) Depart Bremerhaven
28.07. – 07.08.15 Sampling / fishing in southern North Sea and Box A
07.08.2015 (15:00) Staff Exchange at Helgoland Roads
08. – 18.08.2015 Sampling / fishing in Boxes A, C, L, M, D and B.
20.08.2015 (18:00) Arrive Bremerhaven
21.08.2015 (10:15) Disembarkation of cruise participants, end of survey

Results:

Fish

Altogether, 115 trawl haul were carried out with the GOV of which 28 were solely dedicated to the IBTS, 5 hauls were combined IBTS/GSBTS hauls and the remaining 32 hauls were done for the GSBTS. The total catch added up 43.8 t of fish of which 73.1 % or 32.0 t were pelagic species. Consequently, the most abundant species in the catches were herring (17.4 t) and sprat (8.1 t).

Standardized total catches of the GOV hauls were between 50.1 and 4676 kg per 30 min trawling time, on average about 590 kg. Mean standardized total catch during the IBTS in the southern North Sea was 522 kg and during GSBTS 612 kg per 30 min towing time.

The **IBTS** in the southern North Sea yielded 36 different fish species of which the 5 most abundant species were sprat, dab, horse mackerel, whiting and mackerel at mean standardized catches of 302, 59, 51, 34 and 32 kg, respectively.

In **Box A**, the 16 trawl hauls yielded 25 different fish species and maximum species count was reached after 13 hauls. The 5 most abundant species were sprat, mackerel, dab, herring and whiting with mean CPUE of 319, 82, 64, 9 and 5 kg per 30 min trawling time.

In **Box B**, 21 fish species were found in 19 Hauls and whiting was the most abundant with almost 120 kg per 30 min trawling time. Maximum species count was reached after 17 hauls. Herring, haddock, sprat and dab at mean abundances of 67, 45, 20 and 5 kg, respectively were the next 4 most abundant species in that area. Comparison between 30 and 15 min du-

ration tows revealed that while in the 10 long hauls 19 species were collected, only 16 species were caught within the 9 short hauls. Five species (spotted dragonet, monkfish, saithe, stary ray and poor cod) were found only in the 30 min hauls while 2 species (mackerel and horse mackerel) occurred solely in the shorter ones. The CPUE for those species that occurred in both haul types was comparable between two times (fig. 2).

Only 16 fish species were collected in **Box C** and the maximum number was reached already after 7 hauls. Most abundant species was herring with a mean standardized catch of 677 kg/30 min. Sprat, dab, whiting and plaice followed with values of 44, 42, 11 and 9 kg per 30 min.

Box D was split into 2 sections on 2 consecutive days with 7 hauls each. On the first day, 7 hauls were carried out in the old Box D at positions where safe trawling was still possible around existing oil drilling sites and artifacts of past oil research activities. On the second day, the nearby 10 x 10 nm^2 area (Box D') that could potentially replace Box D was sampled. Altogether, 27 species were caught with those 14 hauls of which 6 species occurred solely in the new Box D'. Otherwise, the species composition was quite similar and abundance values did not show conspicuous difference between the 2 boxes in the more common species (fig 3). Combined results for both areas are that herring was the most abundant species at a mean CPUE of 1001 kg/30min, followed by haddock, whiting, mackerel and Norway pout at mean CPUE of 117, 101, 78 and 69 kg/30min, respectively.

After 9 of altogether 13 hauls in **Box L** the maximum number of 24 species was reached. Again, herring was the most abundant species at a mean CPUE of 397 kg/30 min, followed by haddock (mean CPUE 72 kg), mackerel (29 kg), Norway pout (21 kg), and whiting (20 kg). Catches in Box L were also characterized by the occurrence of few but large specimens of hake.

Catches in **Box M** were also dominated by pelagic species. However, in this Box horse mackerel and mackerel were most abundant at mean CPUEs of 151 and 49 kg/30min followed by haddock at 32 kg/30min. Herring was only the fourth most abundant species at 26 kg/30min followed by hake and saithe at mean CPUE of 17 kg/30min for both species. There were 22 species in that Box and the maximum species count was reached after 12 of 14 hauls.

For further details and results of the complete IBTS with participations from England, 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 4.1 of next year's IBTSWG report.

Benthos (Senckenberg Res. Inst.)

During the **IBTS**, samples were taken in all 24 ICES rectangles. Generally, abundance and biomass of species was high at the coast and decreased towards offshore areas. Six invertebrate species were found in all rectangles: The starfishes *Asterias rubens* and *Astropecten irregularis,* the brittle star *Ophiura ophiura* as well as the crustaceans *Liocarcinus holsatus, Pagurus bernhardus and Crangon allmanni.* Mean abundance of the shrimp *Crangon allmanni* and the swimming crab decreased remarkably compared to previous years. Common fishes were the goby *Pomatoschistus minutus*, the dab *Limanda limanda* and the solenette *Buglossidium luteum.* Abundances of the goby and the solenette were generally declining in the area, in particular when compared to the high abundances in 2014. Many sponges together with high abundances of the associated brittle star *Ophiothrix fragilis* were – as last year - found along the slope of the Dogger Bank. High abundance of the non-indigenous Angular crab *Goneplax rhomboides* was found indicating a successful establishment of this species in the southern North Sea since its first appearance in 2008.

Eight replicates were taken in **Box A** in 2015. Epifauna assemblages in 2015 were dominated by the starfish *Asterias rubens,* the solenette *Buglossidium luteum* and the brittle stars *Ophiura ophiura* and *O. albida*. Exceptional low abundance was found for the shrimp *Crangon allmanni* and the goby *Pomatoschistus minutus*, which were both very abundant species in previous years.

Nine replicates were taken in **Box B** in 2015. Generally, Box B is characterized by very low abundances and biomasses of epibenthic species, but by high epibenthic diversity due to high numbers of sessile species (Hydrozoa, Bryozoa and Anthozoa). The hermit crab *Pagurus bern-*

hardus and the shrimp *Crangon allmanni* were the most frequently found species in Box B. Abundance of *Crangon allmanni* decreased remarkably compared to the last year. In contrast, high abundance of the edible sea urchin *Echinus esculentus* was found in 2015.

Six replicates were taken in **Box C** in 2015. The assemblages in Box C were generally characterised by the hermit crab *Pagurus bernhardus* and the starfish *Astropecten irregularis.* However, abundance of *Astropecten irregullaris* was remarkably low in 2015, which holds also for the sea urchin *Brissopsis lyrifera* and the gastropod *Turritella communis*. The shrimp *Crangon allmanni* was not found in Box C after exceptional high numbers in 2014.

Four replicates were taken in **Box D** and three in **Box D'** in 2015. Box D was characterized by the regular occurrence of the shrimp *Crangon allmanni* as well as the hermit crabs *Pagurus bernhardus* and *Anapagurus laevis*. Abundance of hermit crabs was lower than in previous years, while abundance of *Crangon allmanni* increased. Sessile species of Hydrozoa, Bryozoa and Anthozoa were also relatively common. The bobtail squid *Sepiola atlantica* revealed the highest abundance since the beginning of sampling in Box D. Species composition in Box D and D' was nearly identical. Slightly higher abundances in general, but especially for *Crangon allmanni* and *Pagurus bernhardus* were found in Box D'.

Six replicates were taken in **Box L** in 2015. Box L is characterized by exceptional abundance of the sea urchin *Gracilechinus acutus* accompanied by larger numbers of the shrimp *Crangon allmanni* and the starfish *Astropecten irregularis*. Additionally, many sessile species such as *Verruca stroemia*, *Hydroides norwegica* and *Heteranomia squamula* occurred in Box L. Generally, species composition, abundance and biomass were very similar to the preceding years. However, abundance of the shrimp *Crangon allmanni* increased remarkably.

Six replicates were taken in **Box M** in 2015. Box M is the most diverse area of all Boxes. Common species were the hermit crabs *Anapagurus laevis, Pagurus pubescens and P. prideaux* as well as the sea urchin *Spartangus purpureus* and the polycheate *Thelepus cincinnatus.* A rich sessile fauna was also characteristic. Similar to Box C, abundance of the shrimp *Crangon allmanni* was low in 2015 after exceptional high numbers in 2014. Abundance of the squat lobster *Galathea dispersa* and the brittle star *Ophiocten affinis* also decreased compared to preceding years.

Participants

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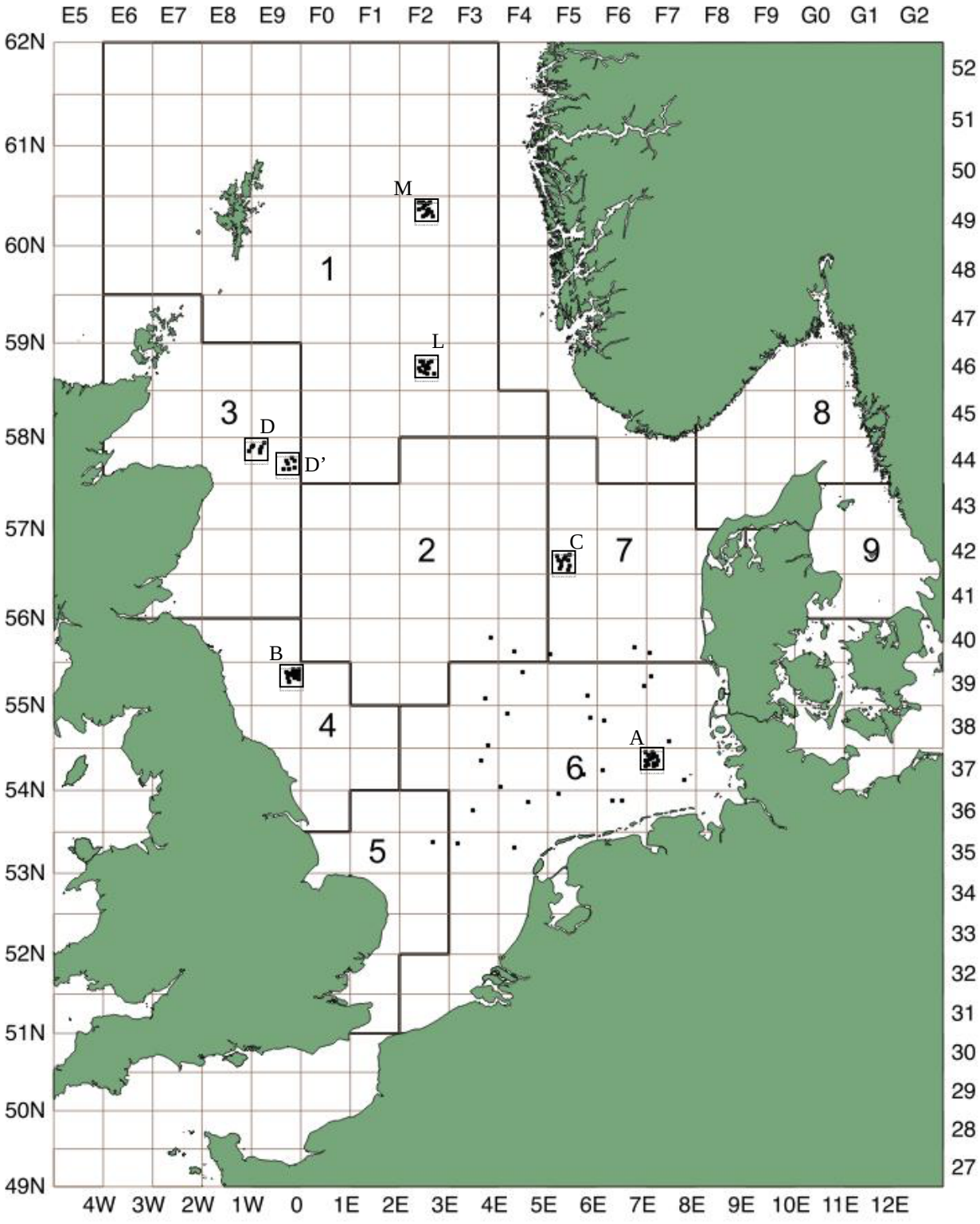

Fig. 1: GOV-hauls and CTD-Stations of FFS WALTHER HERWIG III cruise 386, IBTS station and stations in Boxes A – D, L and M.

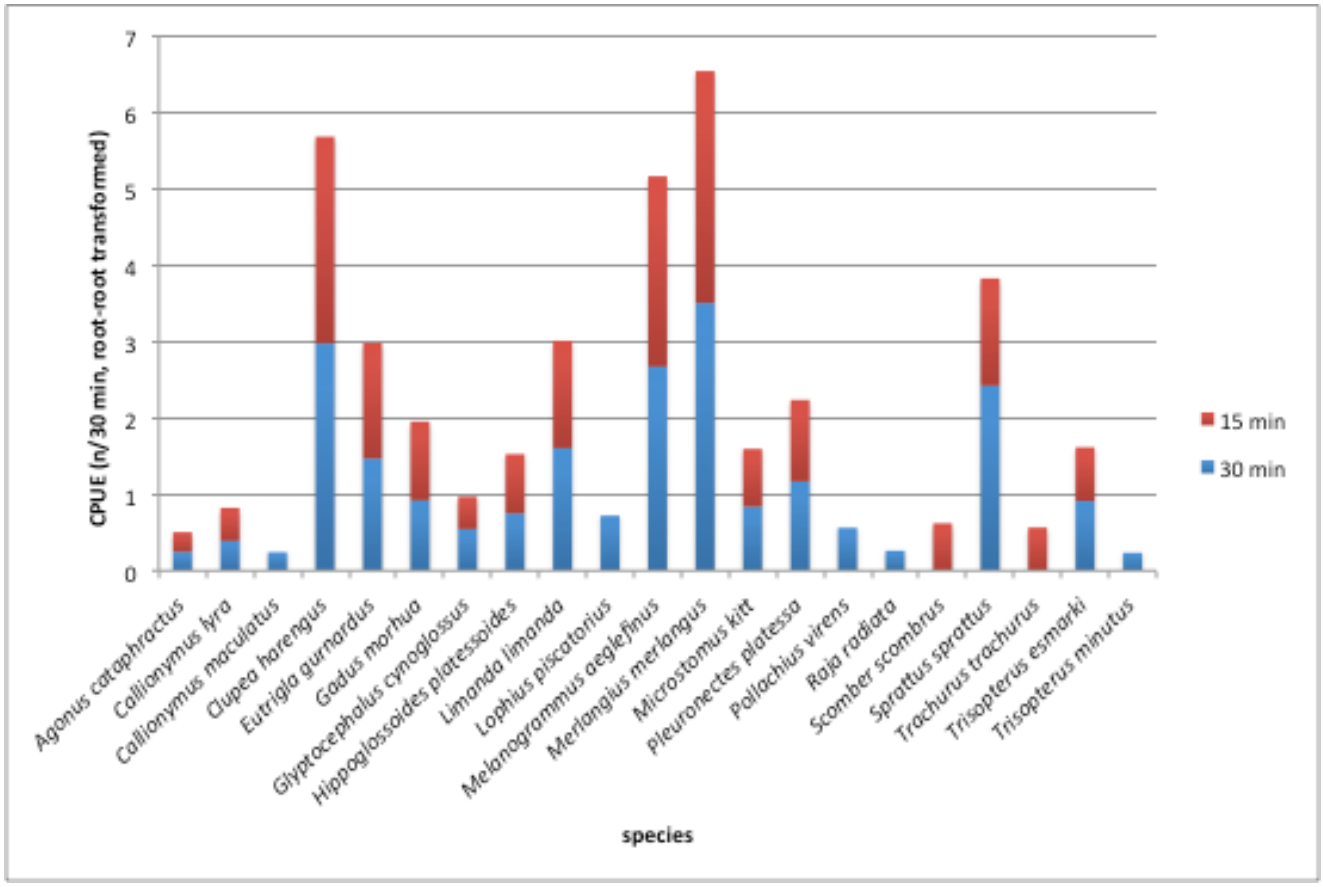

Fig. 2: Comparison of mean catch per unit of effort (CPUE) between 30 min and 15 min hauls in Box B. $N_{30min}=10$, $N_{15min}=9$

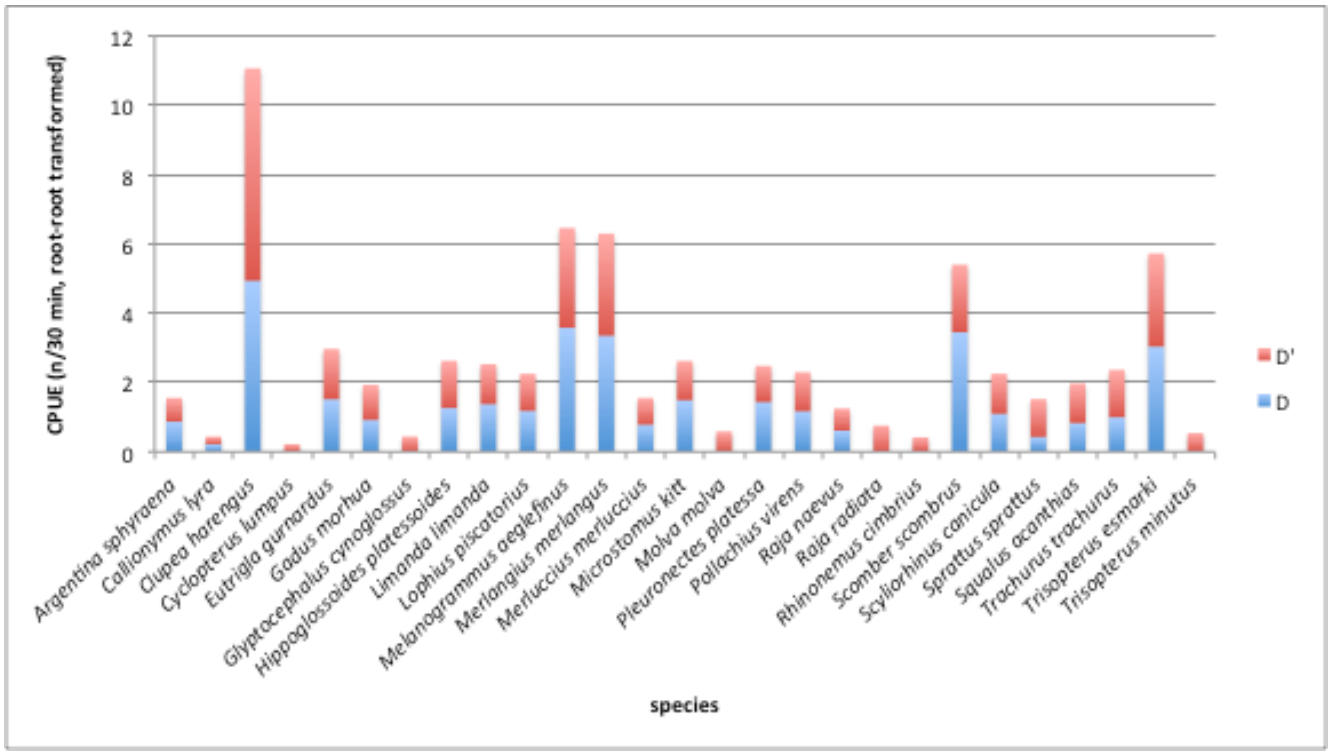

Fig. 3: Comparison of mean catch per unit of effort (CPUE) between original Box D (blue) and its possible replacement Box D' (red). $N_{BoxD}=7$, $N_{BoxD'}=7$