

## Thünen-Institute of Baltic Sea Fisheries

### Cruise report

#### FRV „Solea“ Cruise 689 07.06. - 19.06.2014 (acc. to schedule)

04.-09.06., 13.-15.06. (FRV Clupea), 16.-19.06.2014 (FRV Solea)  
(actual cruise times)

### Investigation of the demersal fish fauna in the German Baltic Sea (BaltBox)

Scientist in charge: Andrea Rau

## 1 In a nutshell

Due to several technical problems FRV „Solea“ could only be equipped at the port Rostock Marienehe on June 16<sup>th</sup>. Previously FRV „Clupea“ was used as an alternative (in the frame of Clupea cruise 280) next to its regular tasks. Accordingly the cruise took place in three sections:

From 04.-09.06. as well as from 13.-15.06. FRV Clupea, at this time based on Rügen, could be used to sample the nearby boxes in ICES SD 24 (Oderbank, Adlergrund, Arkona Sea). From June 16<sup>th</sup> to 19<sup>th</sup> the boxes in SD 22 were sampled with FRV Solea to the extent possible in the short timeframe (Bay of Mecklenburg, Kiel Bay, Fehmarn Belt).

Altogether 44 fishery hauls could be conducted with TV-3#520 bottom trawl according to BITS standard and 42 CTD hydrography stations were sampled.

#### Distribution list:

BLE, Hamburg  
Schiffsführung FFS „Solea“  
Schiffsführung FFS „Clupea“  
BMEL, Ref. 614  
TI - Präsidialbüro  
TI - Pressestelle, Dr. Welling  
TI - Institut für Fischereiökologie  
TI - Institut für Seefischerei Hamburg  
TI - Institut für Ostseefischerei  
TI - FIZ-Fischerei  
BFEL HH, FB Fischqualität  
Reiseplanung Forschungsschiffe, Herr Dr. Rohlf  
Fahrtteilnehmer  
Bundesamt für Seeschifffahrt und Hydrographie, Hamburg

Mecklenburger Hochseefischerei Sassnitz  
DFFU Cuxhaven  
Doggerbank Seefischerei GmbH, Bremerhaven  
Deutscher Fischerei-Verband e. V., Hamburg  
Deutsche Fischfang-Union  
Sassnitzer Seefischerei e. G.  
Landesverband der Kutter- u. Küstenfischer  
Leibniz-Institut für Meereswissenschaften IFM-GEOMAR  
Leibniz-Institut für Ostseeforschung Warnemünde  
Institut für Fischerei der Landesforschungsanstalt  
LA für Landwirtschaft, Lebensmittels. Und Fischerei  
Euro-Baltic Mukran

## **2 Cruise objectives**

The purpose of this survey is the qualitative and quantitative recording of changes in distribution and composition of the demersal fish fauna in the German Baltic Sea. The survey is undertaken regularly by the Thünen-Institute of Baltic Sea Fisheries in fixed reference areas (so-called boxes) since 2003. The boxes are located in ecologically characteristic areas ranging from Kiel and Mecklenburg Bay in the West via Arkona Sea through to the Oderbank in the East. The exact location of the sampling areas can be inferred from the map in the annex (Fig.1). During the survey both Solea and Clupea fished with a TV-3#520 bottom trawl. Fishing and processing of the catch were realized according to BITS standard (ICES 2007). Hydrographical CTD measurements were planned after each haul to examine how fish distribution depends on temperature, salinity and oxygen contents.

Between 2010 and 2012 the BaltBox Survey was part of the Fehmarn Belt-project thereby providing data on spatio-temporal dynamics of commercially important fish species. Since 2013 the BaltBox Survey is conducted in the frame of the European Marine Strategy Framework Directive (MSFD) for the assessment of variability of the demersal fish fauna in the western Baltic Sea.

Beyond during this year's BaltBox Survey an electronic monitoring system for commercial fisheries was tested on board of Solea in the frame of the BLE-innovative-project Fish'EM. Furthermore all litter caught is monitored and documented as well.

## **3 Cruise narrative and preliminary results**

The cruise started on June 4<sup>th</sup> when FRV Clupea was equipped with TV-3#520 bottom trawl gear in Sassnitz. Leaving of port and start of survey was scheduled for June 5<sup>th</sup>, survey operations started at 10:00 AM in the box Oderbank. Due to gillnets three regular stations could not be fished. Alternatively two additional hauls could be conducted in the margins of the box. Altogether 9 stations of the box Oderbank were sampled. Furthermore 7 stations in the box Adlergrund were sampled as well. The first cruise section ended on June 9<sup>th</sup> in Stralsund to ensure smooth continuance of the Institutes' Rügen survey on herring larvae (RHLS) which was intended to start in Stralsund the following day on board of Clupea.

The BaltBox Survey could continue on June 13<sup>th</sup> with Clupea, starting again from Sassnitz. The last 3 missing stations from the box Adlergrund were sampled so that the second box was completed. Furthermore the box in the Arkona Basin was sampled as well and despite occasionally rough sea (Bft. 6-7) 7 hauls were conducted homogeneously distributed across the box. Due to the unfavorable weather conditions two hydrography stations were cancelled. The second cruise section ended in Stralsund on June 15<sup>th</sup>, again to ensure availability of the vessel for the next sampling in the frame of RHLS.

After repairs a test cruise of Solea on June 15<sup>th</sup> revealed its readiness for action so that Solea could be equipped for the third cruise section in Rostock Marienehe on the morning of 16<sup>th</sup> of June. During the effectively remaining three days the boxes in ICES SD 22 were sampled. On the first day Solea sampled the box Mecklenburg Bay and conducted 6 homogeneously distributed hauls. During the night Solea steamed towards Kiel bay and continued fishing the next morning. In the box Kiel Bay 9 (out of 10) stations were sampled, and box Fehmarn Belt was sampled completely with all three stations. The third cruise section and the survey itself as well ended in the morning of June 19<sup>th</sup> in Rostock Marienehe.

Overall 26 stations were sampled in SD 24 with FRV Clupea during two cruise sections (5 and 3 days, respectively) and 18 stations were sampled in SD 22 with FRV Solea within three days. Sampling standard could be easily maintained with Clupea but due to the smaller vessel size and long steam periods not the same sample size could be reached. Whilst on board of Solea on average 6 hauls per day were conducted, Clupea achieved 3-4 stations per day. In summary on 68.6 nautical miles 44 fishery hauls and 42 hydrographic stations were conducted during 11 days with two vessels according to the same standard. Out of the 7 boxes of the BaltBox Survey, just one the Darss box could not be sampled. From the remaining 6 boxes 4 were sampled completely and two areas (Mecklenburg Bay and Arkona Sea) were assessed with 6 and 7 stations respectively.

During the BaltBox Survey 131021 fish with an overall weight of 3033 kg (~ 9 tons) were caught. The largest biomasses in the catch, referring to towed nautical mile, occurred in the boxes Adlergrund (189.7 kg/nm), Fehmarn Belt (143.5 kg/nm) and Kiel Bay (130.5 kg/nm). In the Arkona Sea markedly larger fish biomasses were caught compared to the years before (2014: 127.9 kg/nm; 2013: 101.5 kg/nm; 2012: 76 kg/nm).

For the purpose of age determination 910 otoliths in SD 22 and 1179 otoliths in SD 24 were taken from cod (*Gadus morhua*), dab (*Limanda limanda*), flounder (*Platichthys flesus*), plaice (*Pleuronectes platessa*) and turbot (*Scophthalmus maximus*)

The weight and number per nautical mile of the main fish species caught are presented in table 1. For the assessment of the demersal fish fauna herring and sprat are left out of consideration.

Preliminary results show highest fish abundances in the areas Adlergrund, Oderbank and Fehmarn Belt (1345 Ind./nm, 1010 Ind./nm and 1006 Ind./nm). In SD 24 this is based on a large amount of flounder in the catch (Adlergrund: 849 Ind./nm; Oderbank: 834 Ind./nm) while in SD 22 in the box Fehmarn Belt this is mainly referring to a large amount of dab (830 Ind./nm).

Overall 32 different fish species were proven. Highest biodiversity was found at the Oderbank (20 fish species). Most common demersal fish species was flounder (42.0%), followed by dab (20.7 %), cod (19.8 %), plaice (9.8 %) and whiting (4.5 %); 3.2 % accounted for other species.

## 4 Cruise Participants

### 280.Clupea – 04.06.-09.06.2014:

Andrea Rau	Cruise leader	TI-OF
Titus Rohde	Biological-technical assistant	TI-OF
Kerstin Schöps	Biological-technical assistant	TI-OF
Jan Göbel	Student assistant	Univ. Hamburg

### 280.Clupea – 13.06.-15.06.2014:

Andrea Rau	Cruise leader	TI-OF
Titus Rohde	Biological-technical assistant	TI-OF
Kerstin Schöps	Biological-technical assistant	TI-OF
Philipp Kutter	Student assistant	Univ. Rostock

### 689.Solea – 16.06.-19.06.2014:

Andrea Rau	Cruise leader	TI-OF
Titus Rohde	Biological-technical assistant	TI-OF

Kerstin Schöps  
Remo Wiechert  
Nadja Schneider  
Jan Göbel  
Diane Enkelmann

Biological-technical assistant  
Biological-technical assistant  
Electronics technician  
Student assistant  
Student volunteer

TI-OF  
TI-OF  
TI-OF  
Univ. Hamburg  
Univ. Rostock

## **5 Acknowledgments**

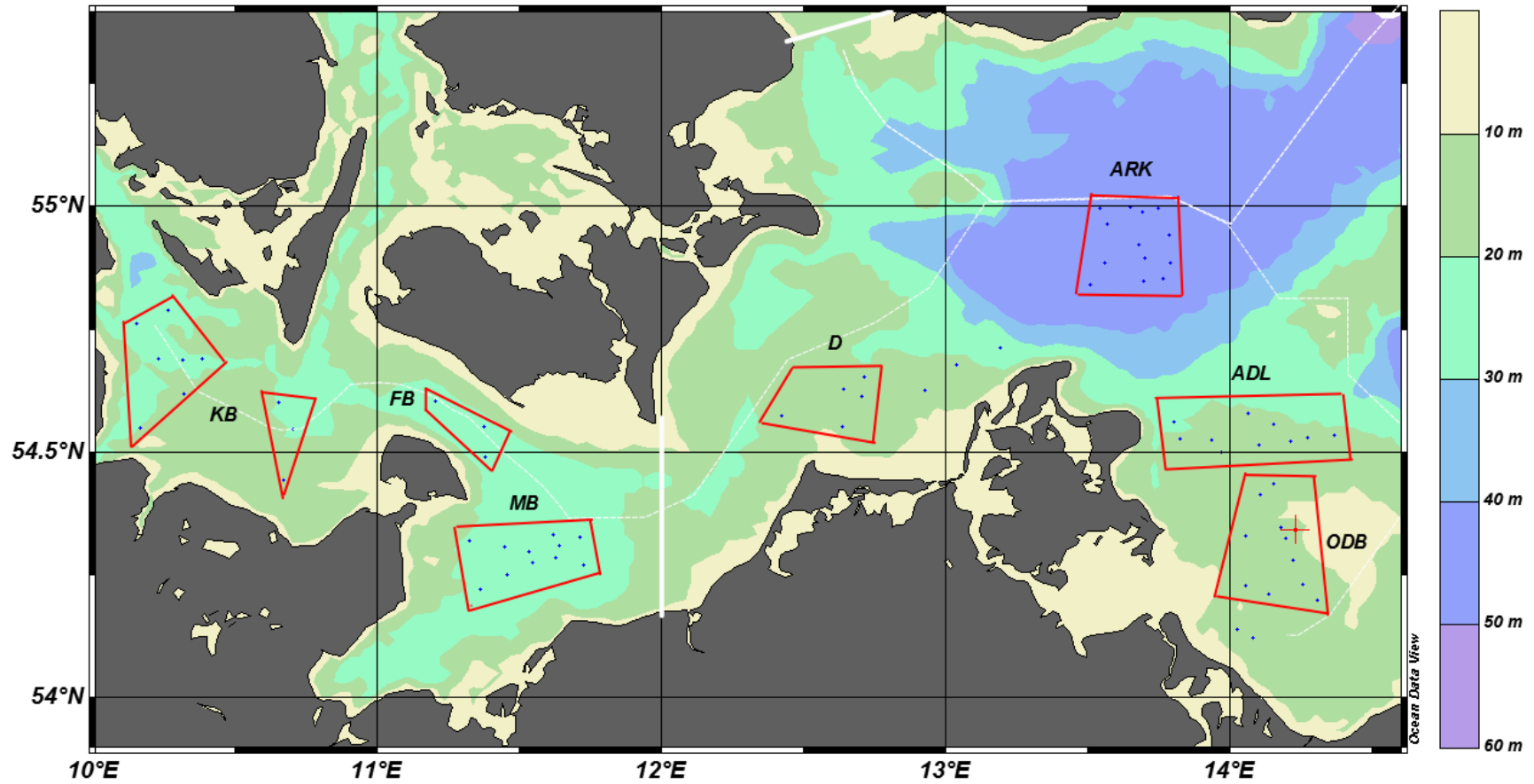
I hereby thank all participants, the captains R. Singer (FRV "Clupea") and S. Meier (FRV "Solea") and their respective crew for their outstanding cooperation and commitment.

sgd. A. Rau  
(Scientist in charge)  
Rostock, 29.07.2014

Table 1: Main fish species caught in the demersal fish boxes during cruise 689 with FRV „Clupea“ and FRV „Solea“, referring to towed nautical mile.

FFH-Box	Mecklenburg Bay				Kiel Bay				Oderbank				Adlergrund			
Towed nautical mile (nm)	9.3				14.0				13.8				15.4			
Number of hauls	6				9				9				10			
Fish species	Weight		Number		Weight		Number		Weight		Number		Weight		Number	
	kg	kg/sm	n	n/sm	kg	kg/sm	n	n/sm	kg	kg/sm	n	n/sm	kg	kg/sm	n	n/sm
<i>Gadus morhua</i>	12.7	1.4	108	12	32.1	2.3	224	16	7.4	0.5	44	3	269.3	17.5	1515	99
<i>Merlangius merlangus</i>	71.7	7.7	669	72	30.5	2.2	522	37	0.5	0.0	6	0	93.1	6.1	1080	70
<i>Platichthys flesus</i>	63.4	6.9	276	30	30.3	2.2	117	8	1172.5	84.7	11555	835	1845.3	120.1	13060	850
<i>Limanda limanda</i>	219.3	23.7	2096	227	1032.1	73.9	10759	771					0.1	0.0	6	0
<i>Pleuronectes platessa</i>	7.3	0.8	33	4	97.9	7.0	366	26	105.6	7.6	1399	101	518.0	33.7	4533	295
<i>Scophthalmus maximus</i>	3.9	0.4	6	1	0.7	0.1	2	0	16.4	1.2	36	3	10.2	0.7	20	1
<i>Clupea harengus</i>	5.2	0.6	130	14	209.5	15.0	8155	584	10.3	0.7	262	19	52.3	3.4	1064	69
<i>Sprattus sprattus</i>	224.3	24.2	11363	1228	379.0	27.1	21979	1574	92.1	6.7	8054	582	102.2	6.6	8862	577
<i>Others</i>	5.0	0.5	51	6	9.8	0.7	64	5	130.4	9.4	943	68	24.5	1.6	467	30
<b>Sum</b>	612.7	66.2	14732.0	1593	1821.9	130.5	42188	3022	1535.2	110.9	22299	1611	2914.9	189.7	30607	1991
<b>Sum without Clupeids</b>	383.2	41.4	3239.0	350	1233.4	88.4	12054	863	1432.8	103.5	13983	1010	2760.5	179.6	20681	1346

FFH-Box	Arkona Basin				Fehmarn Belt				Darß				Sum			
Towed nautical mile (nm)	11.6				4.6				/							
Number of hauls	7				3				/							
Fish species	Weight		Number		Weight		Number		Weight		Number		Gewicht		Anzahl	
	kg	kg/sm	n	n/sm	kg	kg/sm	n	n/sm	kg	kg/sm	n	n/sm	kg	kg/sm	n	n/sm
<i>Gadus morhua</i>	1210.4	104.4	4142	357	2.4	0.5	24	5					1534.2	22.3	6057	88
<i>Merlangius merlangus</i>	138.2	11.9	899	78	12.3	2.7	136	29					346.2	5.0	3312	48
<i>Platichthys flesus</i>	112.0	9.7	653	56	25.1	5.4	169	36					3248.6	47.3	25830	376
<i>Limanda limanda</i>	0.1	0.0	1	0	348.4	75.1	3852	830					1599.9	23.3	16714	243
<i>Pleuronectes platessa</i>	11.3	1.0	76	7	19.6	4.2	119	26					759.8	11.1	6526	95
<i>Scophthalmus maximus</i>					8.7	1.9	16	3					39.8	0.6	80	1
<i>Clupea harengus</i>	6.1	0.5	84	7	160.9	34.7	6568	1416					444.3	6.5	16263	237
<i>Sprattus sprattus</i>	0.2	0.0	16	1	56.9	12.3	4071	877					854.6	12.4	54345	792
<i>Others</i>	4.5	0.4	16	1	31.4	6.8	353	76					205.7	3.0	1894	28
<b>Sum</b>	1482.7	127.9	5887	508	665.8	143.5	15308	3299					9033.1	131.6	131021	1909
<b>Sum without Clupeids</b>	1476.3	127.4	5787	499	447.9	96.5	4669	1006					7734.2	112.7	60413	880



**Figure 1:** Location of fixed sampling areas („boxes“) of the BaltBox-Survey for investigation of the demersal fish fauna in the German Baltic Sea (KB: Kiel Bay, MB: Mecklenburg Bay, FB: Fehmarn Belt, D: Darss, ARK: Arkona Sea, ADL: Adlergrund, ODB: Oderbank).