

## Thünen Institute of Baltic Sea Fisheries

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### Cruise report FRV „Solea“ Cruise 720 26.05. - 07.06.2016

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

Scientist in charge: Andrea Rau

#### 1 In a nutshell

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 EEZ of the Baltic Sea. The survey is undertaken annually since 2003 by the Thünen Institute of Baltic Sea Fisheries in fixed reference areas (so-called boxes). 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). In summary 63 fishery hauls and hydrographic stations were conducted.

Overall 34 different fish species were identified. Highest biodiversity with 22 fish species was found at Kiel Bay. Here, most individuals per towed distance were caught, too. The largest biomasses in the catch, referring to towed distance, occurred in the box Arkona Sea due to the high occurrence of cod. Sum of catch biomasses per nautical mile from all boxes and all fish species except clupeids was dominated to 96% by four demersal fish species namely cod (*Gadus morhua*), flounder (*Platichthys flesus*), dab (*Limanda limanda*) and plaice (*Pleuronectes platessa*).

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#### Distribution list:

BLE, Hamburg  
Schiffsführung FFS „Solea“  
BMEL, Ref. 614  
Thünen Institut - Präsidialbüro  
Thünen Institut - Pressestelle, Dr. Welling  
Thünen Institut - Institut für Fischereiökologie  
Thünen Institut - Institut für Seefischerei  
Thünen Institut - Institut für Ostseefischerei  
Thünen - FZ-Fischerei  
Max Rubner-Institut - FB Fischqualität, Hamburg  
Bundesamt für Seeschifffahrt und Hydrographie, Hamburg  
Reiseplanung Forschungsschiffe, Herr Dr. Rohlf  
Fahrteilnehmer

Deutsche Fischfang-Union  
Mecklenburger Hochseefischerei Sassnitz  
Sassnitzer Seefischerei e. G.  
Landesverband der Kutter- u. Küstenfischer MV  
Landesfischereiverband SH  
DFFU Cuxhaven  
Mecklenburger Hochseefischerei Sassnitz  
Doggerbank Seefischerei GmbH, Bremerhaven  
Deutscher Fischerei-Verband e. V., Hamburg  
Helmholtz-Zentrum für Ozeanforschung GEOMAR  
Leibniz-Institut für Ostseeforschung Warnemünde  
Institut für Fischerei der Landesforschungsanstalt  
LfA für Landwirtschaft und Fischerei MV  
Euro-Baltic Mukran

## 2 Cruise objectives

During the survey fixed ecologically characteristic reference areas of the German Baltic Sea are explored (Fig. 1) with regard to composition of and changes in the occurring demersal fish fauna. Investigations take place in areas differing in their hydrographic characteristics ranging from saline Bays in the Belt Sea to the Arkona basin of 50m depth to shallow brackish water areas east of the island Rügen.

During the survey FRV "Solea" 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 conducted 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 in this area. 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. Furthermore all bycaught litter is monitored and documented.

## 3 Cruise narrative and preliminary results

FRV "Solea" was equipped on 26.05.2016 morning and left port Rostock-Marienehe on 26.05.2016 about 10:30 a.m. Survey operations started in the box Mecklenburg Bay.

On 29.05.2016 afternoon the survey had to be interrupted due to fishing a water bomb at Fehmarn Belt with consequent evacuation from the vessel. Scientific work was resumed on 31.05.2016 with re-entering the vessel at port Kiel Sartorikai, FRV Solea left the port about 10:00 a.m., survey operations restarted at Fehmarn Belt.

Due to the time limitations not all boxes could be sampled completely, wherefore only 11 out of 15 stations were sampled at Mecklenburg Bay, 2 out of 3 stations at Fehmarn Belt and 6 out of 8 stations at Darss Sill. Furthermore in the box Oderbank one haul was not fishable due to the occurrence of gill nets.

On 02.06.2016 an exchange of scientific cruise members was made on schedule at port Saßnitz. The survey ended on 07.06.2016 in Rostock-Marienehe.

During the BaltBox Survey 108436 fish were caught with an overall weight of 10942.8 kg (~ 10.9 tons). Largest biomasses in the catch, referring to towed distance, occurred in the box Arkona Sea (262.7 kg/nm), followed by the boxes Adlergrund (102.7 kg/nm) and Kiel Bay (96.4 kg/nm). In the Arkona Sea cod constituted 86% of the catch and in total markedly larger cod biomasses were caught compared to the years before (2016: 225.9 kg/sm; 2015: 154.6 kg/nm; 2014: 127.9 kg/nm; 2013: 101.5 kg/nm; 2012: 76 kg/nm). Overall 98.5% of the total cod catches during the survey occurred in SD24.

Overall plaice catches increased markedly as well – while during the BaltBox survey 2015 only 6.5 kg/nm plaice were caught in total, in 2016 this amount increased almost sixteen times up to 103.1 kg/nm, most of which were caught at Darss Sill and Adlergrund.

For the purpose of age determination 1256 otoliths in SD 22 and 2001 otoliths in SD 24 were taken in total from cod (*Gadus morhua*), dab (*Limanda limanda*), flounder (*Platichthys flesus*), plaice (*Pleuronectes platessa*), turbot (*Scophthalmus maximus*) and brill (*Scophthalmus rhombus*).

The weight and number per distance of the main fish species caught are presented in table 1. For the assessment of the demersal fish fauna herring and sprat are not considered.

Preliminary results show highest fish abundances in the areas Kiel Bay, Mecklenburg Bay and Arkona Basin (671.9 Ind./nm, 644.3 Ind./nm and 595.5 Ind./nm). In SD 22 these numbers are mainly referring to the large amount of dab in the catch (Kiel Bay: 531.3

Ind./nm; Mecklenburg Bay: 544.3 Ind./nm) while in the Arkona basin in SD 24 this is based on a large amount of cod in the catch (429.5 Ind./nm).

Overall 34 different fish species were proven. Highest biodiversity was found at Kiel Bay (22 fish species). Largest biomasses of demersal fish species accounted for cod (39.7 %), followed by flounder (23.7 %), dab (17.0 %) and plaice (15.6 %); 2.6 % of total biomasses refer to whiting, the rest (1.33%) to other species. The fish species for which most ind./nm were caught was dab (40.2 %), followed by flounder (25.9 %) cod (14.6 %) and plaice (13.3 %).

#### **4 Cruise Participants**

Andrea Rau	Cruise leader	TI-OF
Thomas Hogh	Biological-technical assistant	TI-OF
Mario Koth	Biological-technical assistant	TI-OF
Sven Dressler	Biological-technical assistant	TI-OF
Kerstin Schöps	Biological-technical assistant	TI-OF
Diane Enkelmann	Student assistant	Univ. Rostock
Dominik Auch	Student assistant	Univ. Hamburg
Anton Bühler	Student assistant	Univ. Rostock

#### **5 Acknowledgments**

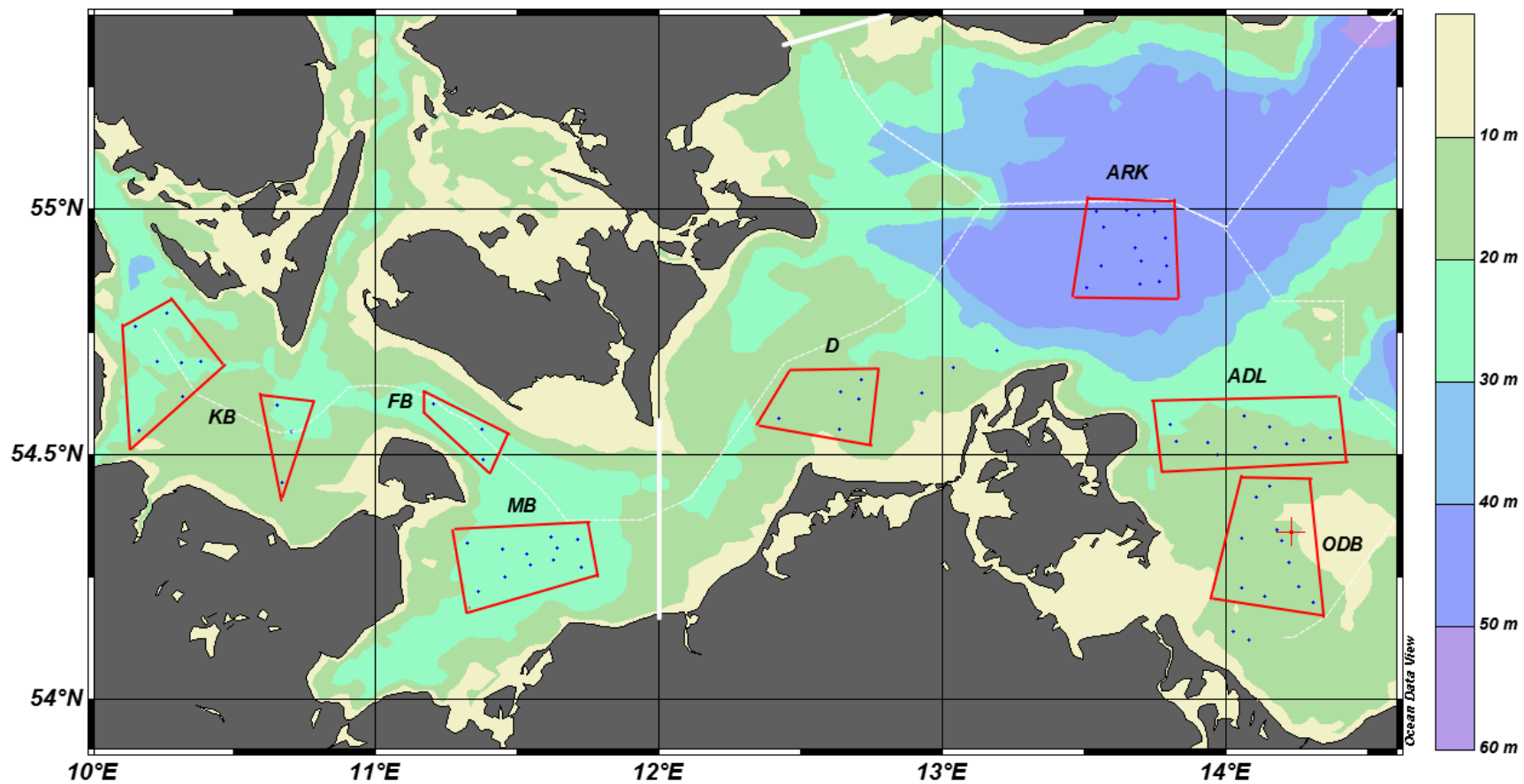
I'm grateful to the captain J. Vandrei and his crew for their very good cooperation and commitment and remaining clearheaded in critical situations. In addition I thank the scientific team for its qualified work and the nice working atmosphere.

sgd. A. Rau  
(Scientist in charge)

Table 1: Main fish species caught in the demersal fish boxes during cruise 720 with FRV „Solea“, referring to towed nautical mile (sm).

Box	Mecklenburg Bay				Kiel Bay				Oderbank				Adlergrund			
Towed nautical mile (nm)	16,5				15,0				13,5				15,0			
Number of hauls	11				10				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>	9,7	0,6	12	1	47,7	3,2	36	2	26,5	1,8	40	3	338,7	22,6	589	39
<i>Merlangius merlangus</i>	65,3	4,4	528	35	14,4	1,0	186	12	0,2	0,0	2	0	1,7	0,1	21	1
<i>Platichthys flesus</i>	180,4	12,0	641	43	147,2	9,8	440	29	809,3	54,0	5680	379	583,1	38,9	3242	216
<i>Limanda limanda</i>	627,0	41,8	8165	544	635,8	42,4	7969	531					2,9	0,2	25	2
<i>Pleuronectes platessa</i>	34,8	2,3	236	16	236,1	15,7	1007	67	80,7	5,4	383	26	571,5	38,1	2890	193
<i>Scophthalmus maximus</i>	8,4	0,6	19	1	3,0	0,2	3	0	19,8	1,3	46	3	8,9	0,6	19	1
<i>Clupea harengus</i>	129,2	8,6	4421	295	105,4	7,0	3771	251	8,4	0,6	315	21	3,9	0,3	121	8
<i>Sprattus sprattus</i>	224,6	15,0	13300	887	244,6	16,3	16429	1095	232,4	15,5	15100	1007	17,9	1,2	1058	71
<i>Others</i>	10,1	0,7	63	4	12,5	0,8	438	29	7,2	0,5	180	12	12,4	0,8	184	12
<b>Sum</b>	1289,6	86,0	27385	1826	1446,6	96,4	30279	2019	1184,6	79,0	21746	1450	1540,9	102,7	8149	543
<b>Sum without Clupeids</b>	935,7	62,4	9664	644	1096,7	73,1	10079	672	943,7	62,9	6331	422	1519,1	101,3	6970	465

Box	Arkona Basin				Fehmarn Belt				Darß				Sum			
Towed nautical mile (nm)	22,5				3,0				9,0							
Number of hauls	15				2				6							
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>	3388,5	225,9	6442	429	-	-	-	-	115,0	7,7	158	11	3926,1	261,7	7277	485
<i>Merlangius merlangus</i>	170,0	11,3	707	47	3,1	0,2	43	3	5,2	0,3	41	3	259,9	17,3	1528	102
<i>Platichthys flesus</i>	315,0	21,0	1485	99	3,5	0,2	13	1	311,4	20,8	1428	95	2349,8	156,7	12929	862
<i>Limanda limanda</i>	0,7	0,0	8	1	279,8	18,7	2831	189	135,4	9,0	1067	71	1681,6	112,1	20065	1338
<i>Pleuronectes platessa</i>	59,1	3,9	281	19	7,8	0,5	74	5	556,9	37,1	1768	118	1547,0	103,1	6639	443
<i>Scophthalmus maximus</i>					9,7	0,6	16	1	13,9	0,9	20	1	63,6	4,2	123	8
<i>Clupea harengus</i>	3,9	0,3	68	5	3,1	0,2	116	8	16,6	1,1	368	25	270,5	18,0	9180	612
<i>Sprattus sprattus</i>	2,2	0,1	153	10	3,0	0,2	215	14	51,3	3,4	3122	208	776,1	51,7	49377	3292
<i>Others</i>	1,8	0,1	10	1	18,4	1,2	226	15	5,9	0,4	217	14	68,3	4,6	1318	88
<b>Sum</b>	3941,2	262,7	9154	610	328,4	21,9	3534	236	1211,6	80,8	8189	546	10942,8	729,5	108436	7229
<b>Sum without Clupeids</b>	3935,1	262,3	8933	596	322,2	21,5	3203	214	1143,7	76,2	4699,0	313	9896,2	659,7	49879	3325



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