

Thünen Institute of Baltic Sea Fisheries

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Cruise report FRV „Solea“ Cruise 705 10.06.-21.06.2015

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 69 fishery hauls and hydrographic stations were conducted.

Overall 36 different fish species were identified. Highest biodiversity was found at Kiel Bay. Most individuals per towed distance were caught in the box Fehmarn Belt. 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 from all boxes (without clupeids) was dominated to 97% by the five demersal fish species cod (*Gadus morhua*), flounder (*Platichthys flesus*), dab (*Limanda limanda*), plaice (*Pleuronectes platessa*) and whiting (*Merlangius merlangus*).

Distribution list:

BLE, Hamburg
Schiffsführung FFS „Solea“
BMEL, Ref. 614
Thünen-Institut - Präsidialbüro
Thünen-Institut - Pressestelle, Dr. Welling
Thünen-Institut - FIZ
Thünen-Institut für Fischereiökologie
Thünen-Institut für Seefischerei
Thünen-Institut für Ostseefischerei
MRI - FB Fischqualität, Hamburg
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 MV
Landesfischereiverband SH
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. 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 litter caught is monitored and documented.

3 Cruise narrative and preliminary results

FRV "Solea" was equipped on 08.06.2015 and the cruise started as scheduled on 10.06.2015 with leaving the port Rostock-Marienehe. Survey operations started in the box Mecklenburg Bay. During the whole survey all stations were fishable, only at the Darss Sill high agglomerations of algae led to net clogging and finally to net rupture. This is the reason that from the box Darss Sill only 6 (of 8) stations were sampled. Out of these one haul was not applicable due to the net breaking and another haul had to be interrupted before expiration of time, since there were too many problematic displays due to algae, which were judged to have the potential to restrict catchability. All other boxes could be sampled completely. The survey ended on 21.06.2015 one day earlier than planned for the reason of sickness of a crew member.

During the BaltBox Survey 135908 fish with an overall weight of 11654.4 kg (~ 11.6 tons) were caught. Largest biomasses in the catch, referring to towed distance, occurred in the boxes Arkona Sea (185.4 kg/nm), Fehmarnbelt (151.1 kg/nm) and Adlergrund (121.3 kg/nm). In the Arkona Sea markedly larger fish biomasses were caught compared to the years before (2015: 154.6 kg/nm; 2014: 127.9 kg/nm; 2013: 101.5 kg/nm; 2012: 76 kg/nm).

For the purpose of age determination 1341 otoliths in SD 22 and 1755 otoliths in SD 24 were taken in total from cod (*Gadus morhua*), dab (*Limanda limanda*), flounder (*Platichthys flesus*), plaice (*Pleuronectes platessa*) and turbot (*Scophthalmus maximus*)

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 Fehmarn Belt, Adlergrund and Kiel Bay (1306 Ind./nm, 859 Ind./nm and 730 Ind./nm). In the box Adlergrund in SD 24 this is based on a large amount of flounder in the catch (655 Ind./nm) while in SD 22 this is mainly referring to a large amount of dab (Fehmarn Belt: 1009 Ind./nm; Kiel Bay: 596 Ind./nm).

Overall 36 different fish species were proven. Highest biodiversity was found at Kiel Bay (22 fish species). Most common demersal fish species was cod (35.2 %), followed by flounder (32.3%), dab (20.0 %), plaice (6.4 %) and whiting (3.3 %); 2.9% accounted for other species.

4 Cruise Participants

Andrea Rau	Cruise leader	TI-OF
Titus Rohde	Biological-technical assistant	TI-OF
Britta Preuß	Biological-technical assistant	TI-OF
Nakula Plantener	Biological-technical assistant	TI-OF
Marcel Bächtiger	Student assistant	Univ. Kiel
Felix Quade	Student assistant	Univ. Göttingen
Eric Luther	student intern	Univ. Rostock

5 Acknowledgments

I'm grateful to the captain V. Koops and his crew for their very good cooperation and commitment. 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 705 with FRV „Solea“, referring to towed nautical mile (sm).

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>	24.6	1.1	59	3	7.4	0.5	32	2	0.1	0.0	5	0	95.9	6.4	421	28
<i>Merlangius merlangus</i>	227.9	10.3	1692	76	18.6	1.3	259	18	-	-	-	-	26.7	1.8	255	17
<i>Platichthys flesus</i>	383.0	17.2	1252	56	206.7	14.0	660	45	647.0	44.0	6141	418	1361.1	90.9	9796	654
<i>Limanda limanda</i>	853.3	38.4	7404	333	794.4	54.0	8770	596	0.2	0.0	18	1	0.7	0.0	21	1
<i>Pleuronectes platessa</i>	18.7	0.8	122	5	151.5	10.3	771	52	20.3	1.4	484	33	250.8	16.8	1595	107
<i>Scophthalmus maximus</i>	7.6	0.3	17	1	2.9	0.2	3	0	11.9	0.8	29	2	6.0	0.4	19	1
<i>Clupea harengus</i>	112.2	5.0	3194	144	26.9	1.8	1104	75	2.6	0.2	56	4	6.0	0.4	88	6
<i>Sprattus sprattus</i>	464.1	20.9	23485	1057	366.9	24.9	26716	1816	116.8	7.9	8498	578	40.1	2.7	2488	166
<i>Others</i>	14.9	0.7	97	4	13.7	0.9	246	17	150.4	10.2	1722	117	28.7	1.9	746	50
Sum	2106.3	94.8	37322.0	1679	1588.9	108.0	38561	2621	949.3	64.5	16953	1153	1816.0	121.3	15429	1031
Sum without Clupeids	1530.0	68.8	10643.0	479	1195.2	81.2	10741	730	830.0	56.4	8399	571	1769.9	118.2	12853	859

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>	3489.6	154.6	8392	372	2.3	0.5	12	3	24.0	3.0	102	13	3643.8	35.9	9023	89
<i>Merlangius merlangus</i>	52.5	2.3	274	12	8.9	2.0	76	17	4.9	0.6	47	6	339.5	3.3	2603	26
<i>Platichthys flesus</i>	546.9	24.2	2810	125	68.4	15.4	328	74	131.6	16.6	642	81	3344.8	32.9	21629	213
<i>Limanda limanda</i>	1.2	0.1	9	0	355.4	80.0	4482	1009	63.7	8.0	496	62	2068.9	20.4	21200	209
<i>Pleuronectes platessa</i>	76.3	3.4	439	19	43.7	9.8	412	93	101.8	12.8	359	45	663.1	6.5	4182	41
<i>Scophthalmus maximus</i>					5.7	1.3	9	2	3.3	0.4	5	1	37.4	0.4	82	1
<i>Clupea harengus</i>	15.3	0.7	238	11	106.8	24.0	4444	1000	1.4	0.2	28	4	271.3	2.7	9152	90
<i>Sprattus sprattus</i>	0.4	0.0	33	1	36.4	8.2	3102	698	0.4	0.1	25	3	1025.1	10.1	64347	634
<i>Others</i>	1.5	0.1	7	0	43.6	9.8	482	108	7.6	1.0	390	49	260.5	2.6	3690	36
Sum	4183.7	185.4	12202	541	671.4	151.1	13347	3004	338.8	42.6	2094	263	11654.4	114.7	135908	1338
Sum without Clupeids	4168.0	184.7	11931	529	528.1	118.9	5801	1305	337.0	42.4	2041.0	257	10358.1	102.0	62409	614

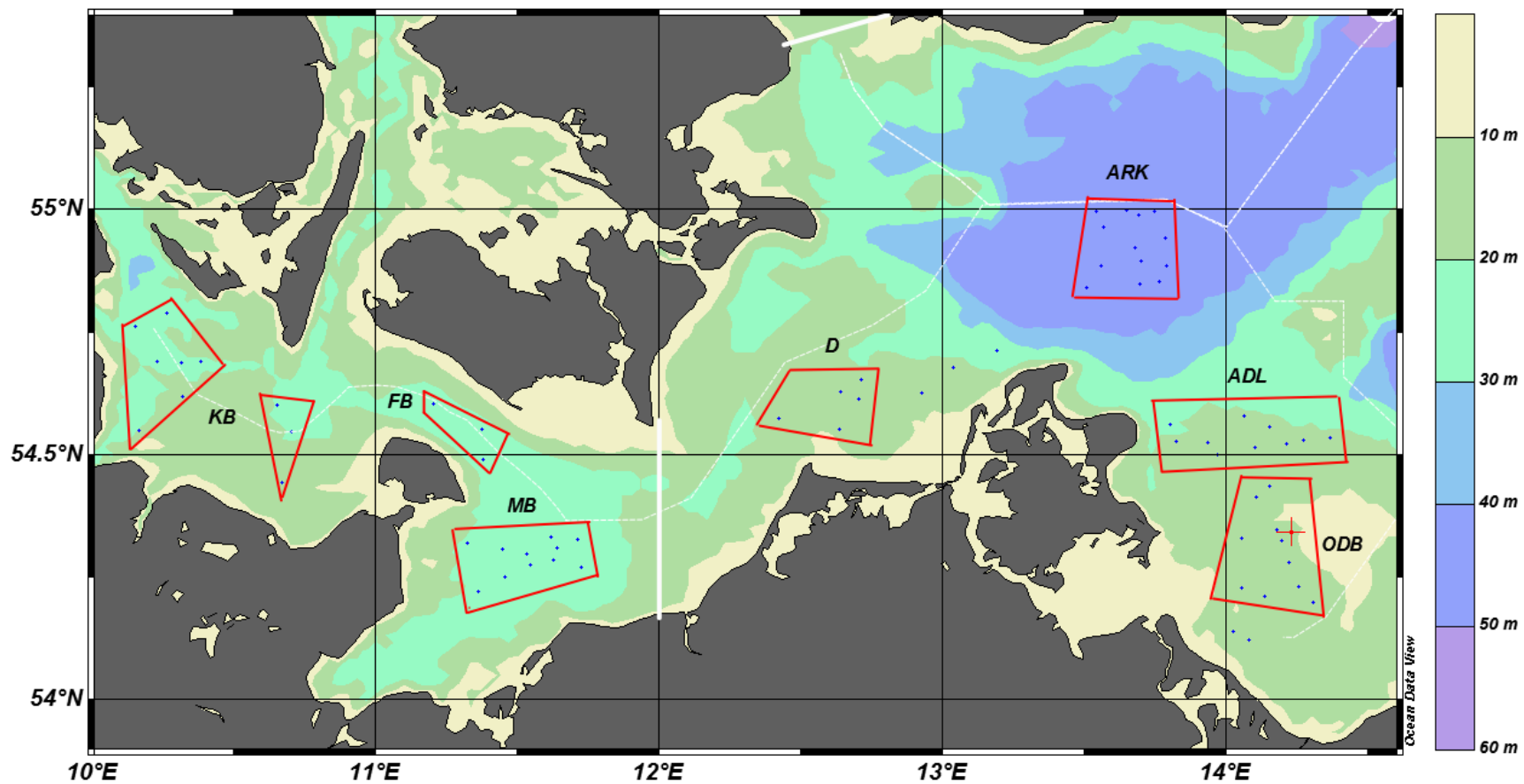


Figure 1: Location of fixed sampling areas („boxes“) of the BaltBox-Survey for investigation of the demersal fish fauna in the German EEZ of the Baltic Sea (KB: Kiel Bay, MB: Mecklenburg Bay, FB: Fehmarn Belt, D: Darss, ARK: Arkona Sea, ADL: Adlergrund, ODB: Oderbank).