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Cruise report FRV Solea, Cruise 699 03.02.2015 to 18.02.2015

Ichthyoplankton and fish in the western Baltic

Person in charge: Dr. Daniel Oesterwind

Cruise leaders: Dr. Daniel Oesterwind / Dr. Matthias Schaber (part 1), Dr. Helmut Winkler (part 2)

Background

In the frame of the ICES-coordinated "Baltic International Acoustic Survey", Germany annually conducts a hydroacoustic survey in September and October to assess the clupeid stocks in the Baltic Sea. The aim of the cruise SO 699 is to complement these existing monitoring programmes with an additional investigation during the spring spawning migration period to reveal migration and pre-spawning aggregation patterns of spring-spawning herring in the Western Baltic Sea. The research is performed within the EU-Project BIO-C³, where herring biology and migration patterns are one important task to cover. Furthermore, we intend to perform an ichthyoplankton sampling focussing on the distribution of herring larvae in the western Baltic Sea. Data from these investigations will be compared with investigations performed by RV Clupea which will investigate herring larvae abundances in important inshore spawning grounds (Greifswalder Bodden) at the same time.

Verteiler:

BLE, Hamburg
Schiffsführung FFS „Solea“
BMEL, Ref. 614
Thünen-Institut, Präsidialbüro
Thünen-Institut, Pressestelle (M. Welling)
Thünen-Institut für Seefischerei
Thünen-Institut für Fischereiökologie
Thünen-Institut für Ostseefischerei
Thünen-Institut, FIZ-Fischerei
Fahrtteilnehmer
Verantw. Seeinsatzplanung, Herr Dr. Rohlf
BFEL Hamburg, FB Fischqualität
IFM-GEOMAR, Kiel
Institut für Fischerei der Landesforschungsanstalt
LA für Landwirtschaft, Lebensmittels. u. Fischerei
BSH, Hamburg

Deutscher Fischerei-Verband e. V., Hamburg
Leibniz-Institut für Ostseeforschung
Doggerbank GmbH
Mecklenburger Hochseefischerei Sassnitz
Kutter- und Küstenfisch Sassnitz
Landesverband der Kutter- und Küstenfischer
Sassnitzer Seefischer
Deutsche Fischfang Union Cuxhaven
Eurobaltic Mukran

The second cruise part was performed to register the biodiversity of the demersal fish fauna around the Island of Rügen within the Bio-C³ frame, therefore fishing with two different gears were conducted at the same stations.

Cruise schedule and preliminary results

Part 1 (03.02.2015 – 13.02.2015)

On the 3th of February FRV Solea was loaded with the scientific equipment at Port Marienehe and steamed North West to the Island of Fehmarn to calibrate the acoustic sensors. Due to problems with the trawl gear sensors a technician was on board to fix the sensors. At the evening FRV Solea shipped back to port Warnemünde to drop off the technician. On the next day, FRV Solea left port Warnemünde in the morning and shipped immediately to the first acoustic transects in SD 24 to start with the acoustic recordings (Fig. 1 & Fig. 2). At the beginning of the transect FRV Solea tried to fish with a Bongo gear, but due to a cable failure no communication between the gear and the vessel was possible. Another try with a gear sensor did not work as well. Therefore the cruise leader decided to cancel the plankton fishing due to the missing Bongo depth information during fishing. At the same day a total of 5 CTD stations and 3 fishing hauls were conducted. From the next day till the 10th of February FRV Solea continued recording along the hydroacoustic transects in SD 24 with the exception of the 8th of February where fishing was interrupted due to bad weather conditions (wind: 18 m/s, wave high 2.5 m) and FRV Solea weathered close to the Island of Møn. Altogether, FRV Solea performed a total of 13 fishing hauls and a total 35 CTD stations in SD 24. At the afternoon of the 10th of February FRV Solea finished the survey in SD 24 and arrived port Warnemünde in the evening, to change some of the scientific personal.

On the next morning FRV Solea started survey work in SD 22 and steamed eastwards with Dr. Matthias Schaber as cruise leader. Within the next 3 days FRV Solea performed 9 fishing hauls and 15 CTD stations. At the afternoon of the 13th of February, the Cruise leader Matthias Schaber was brought to Kiel and FRV Solea shipped eastwards and reached port Marienehe at night.

On the next day the scientific equipment was unload and the next part of the cruise was prepared. A total of eleven different fish species were caught during the acoustic cruise resulting in a total caught biomass of 1046 kg (Tab. 1).

NASC (Nautical Area Scattering Coefficient) values indicating clupeid aggregations were highest in the Arkona Sea (SD 24) with highest measurements north of Rügen Island as well as in the central Arkona Sea. Noteable NASC values were also measured in inshore areas of the western Arkona Sea (Fig. 2). In SD 22, NASC levels were highest in the Mecklenburg Bight and to a lesser degree in southeastern parts of Kiel Bight.

Table 1. Wet weight of the fished species during cruise part one (acoustics).

Species	kg
<i>Aphia minuta</i>	0.029
<i>Clupea harengus</i>	341.763
<i>Cyclopterus lumpus</i>	19.359
<i>Engraulis encrasicolus</i>	3.540
<i>Gadus morhua</i>	33.238
<i>Gasterosteus aculeatus</i>	0.020
<i>Merlangius merlangus</i>	3.930
<i>Platichthys flesus</i>	0.586
<i>Pleuronectes platessa</i>	1.219
<i>Sprattus sprattus</i>	642.700
<i>Syngnathus typhle</i>	0.001
total	1046,385

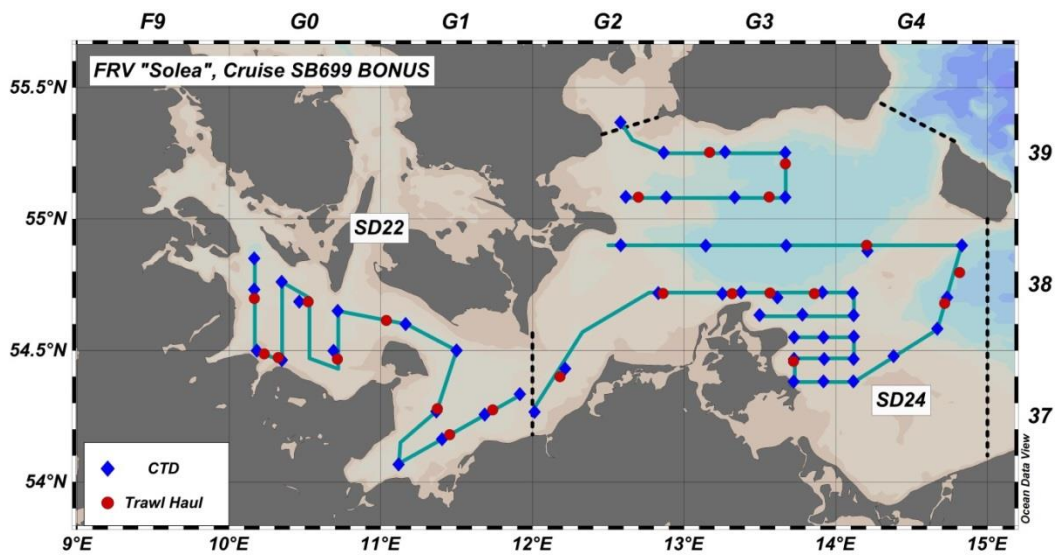


Figure 1. Cruise track with conducted CTD and haul stations.

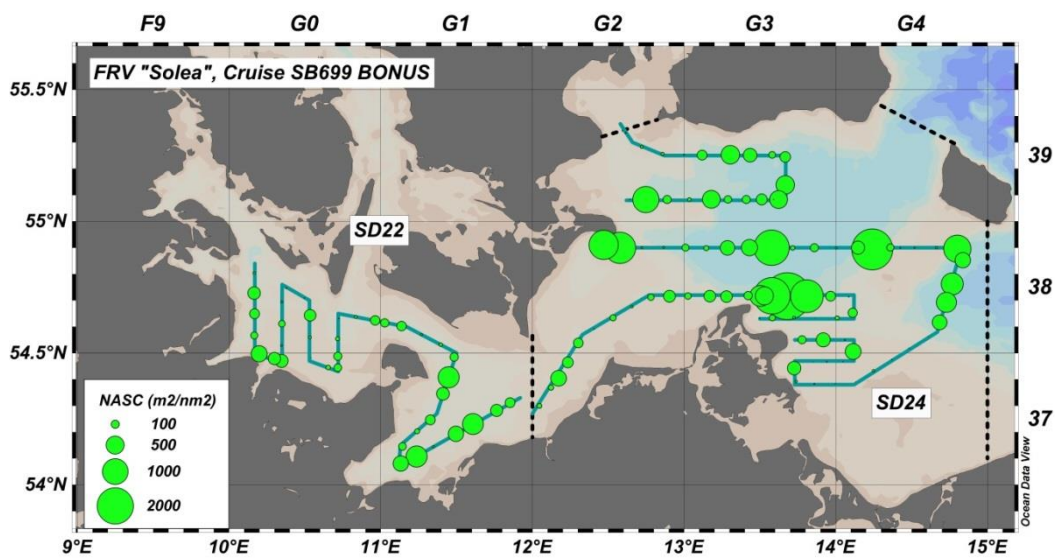


Figure 2. Cruise track and preliminary NASC values.

Part 2 (16.02.2015 – 18.02.2015)

On the 16th of February, the second part of the cruise starts with Dr. Helmut Winkler as cruise leader. FRV Solea left port Marienehe in the morning and steamed eastwards to the fishing area.

During the three cruise days, FRV Solea conducted a total of 12 fishing hauls with a bottom trawl (TV3-520/40-10). In addition to each haul a 20 minute beam trawl and a CTD station were performed resulting in a total of 12 CTD and 12 beam trawl stations. The catch of the bottom trawl was immediately handled while the small fish community in the beam trawl was fixed in alcohol and species will be identified in the lab. A total of 25 different fish species were identified in the bottom trawl. While the number of individuals was dominated by sprat and herring, followed by flounder and cod, the biomass was dominated by cod, followed by herring and flounder (Table 2).

Concerning the round goby, only two individuals could be observed in the beam trawl in the Pomeranian Bay, while close to the Island of Rügen no round goby was caught.

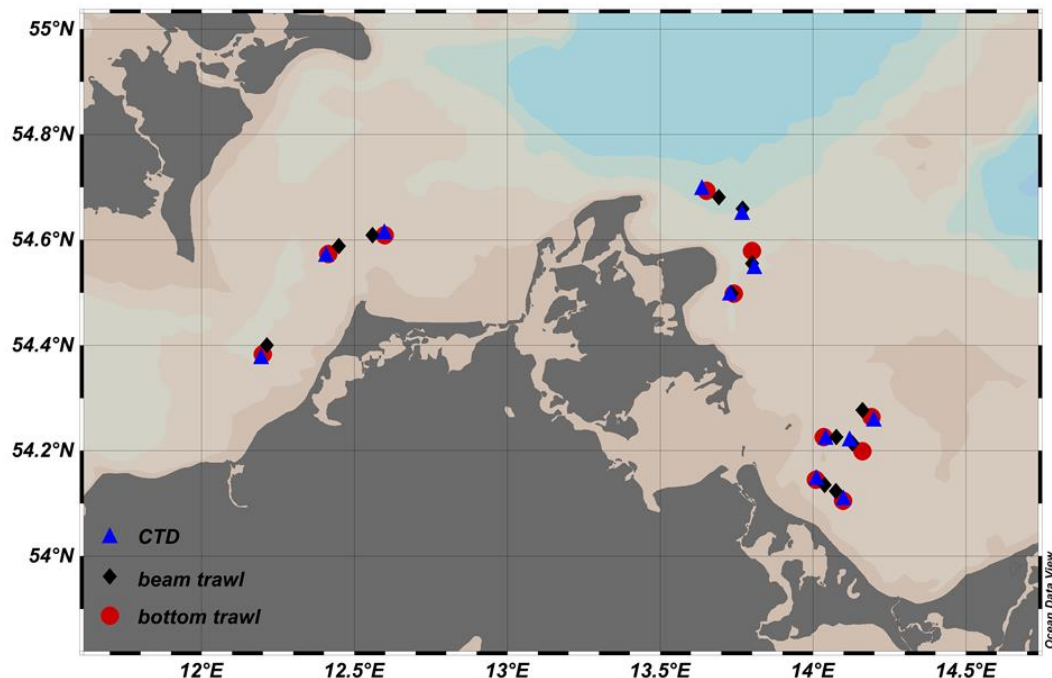


Figure 3. Fishing and CTD stations of the second cruise part.

Table 2. Wet weight of the fished species during cruise part two (bottom trawl).

Species	kg
<i>Clupea harengus</i>	244.472
<i>Gadus morhua</i>	467.010
<i>Perch</i>	122.160
<i>Platichthys flesus</i>	152.650
<i>Pleuronectes platessa</i>	19.847
<i>Limanda limanda</i>	107.362
<i>Sprattus sprattus</i>	46.038
others	51.700
total	1211.239

Concerning the species presence in the bottom trawls *S. sprattus*, *C. harengus* and *P. flesus* were common in every haul, while other species for example *C. maraena*, *G. cernua* and *S. rhombus* could be identified only in single hauls (Annex 2).

Cruise participants

- | | | |
|----------------|-------------------------|---|
| 1. Cruise part | Dr. Daniel Oesterwind | Senior Scientist (TI-OF, 03.02. – 10.02.15) |
| | Dr. Matthias Schaber | Senior Scientist (TI-SF, 03.02. – 13.02.15) |
| | Ina Hennings | Technician (TI-OF, 03.02. – 13.02.15) |
| | Nadja Schneider | Technician (TI-OF, 03.02. – 13.02.15) |
| | Peter Schael | Technician (TI-OF, 10.02. – 13.02.15) |
| | Tim Kirchner | Student (03.02. – 13.02.15) |
| | Vincent Siebert | Student (10.02. – 13.02.15) |
| | Farina Reif | Student (03.02. – 10.02.15) |
| | Ulf Böttcher | Technician (03.02.2015) |
| 2. Cruise part | Dr. Helmut Winkler | Senior Scientist (University of Rostock) |
| | Dennis Wittmann | Student |
| | Robert Rölling | Student |
| | Frederik Kaiser | Student |
| | Christian Küchenmeister | Student |

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

Rostock, 27.04.2015

Dr. Daniel Oesterwind

(Scientist in charge)

Annex 1

A1. Stationsinfomration

Equipment	Operation	Station number	Datum	time	Geog.Breite	Geog.Länge
CTD Seabird	139	78	03.02.15	14:33	54°21,360N	011°16,315E
CTD Seabird	140	79	03.02.15	14:39	54°21,333N	011°16,330E
CTD Seabird	141	80	04.02.15	7:53	54°15,919N	012°00,884E
Bongo	142	1	04.02.15	8:03	54°16,055N	012°00,757E
Bongo	143	2	04.02.15	8:10	54°16,280N	012°00,785E
Pelagic Trawl 'Krake'	144	1	04.02.15	9:43	54°24,026N	012°10,894E
CTD Seabird	145	81	04.02.15	10:30	54°25,804N	012°12,945E
CTD Seabird	146	82	04.02.15	13:35	54°43,037N	012°49,743E
Pelagic Trawl 'Krake'	147	2	04.02.15	13:56	54°42,996N	012°51,675E
CTD Seabird	148	83	04.02.15	15:51	54°42,848N	013°15,097E
Pelagic Trawl 'Krake'	149	3	04.02.15	16:20	54°42,968N	013°19,049E
CTD Seabird	150	84	04.02.15	17:09	54°43,221N	013°22,618E
Pelagic Trawl 'Krake'	151	4	05.02.15	8:10	54°43,155N	013°34,024E
CTD Seabird	152	85	05.02.15	9:04	54°42,047N	013°36,810E
Pelagic Trawl 'Krake'	153	5	05.02.15	10:29	54°42,984N	013°51,527E
CTD Seabird	154	86	05.02.15	11:16	54°43,213N	013°54,593E
CTD Seabird	155	87	05.02.15	12:08	54°43,098N	014°06,711E
CTD Seabird	156	88	05.02.15	12:48	54°38,015N	014°07,030E
CTD Seabird	157	89	05.02.15	14:06	54°38,218N	013°46,811E
CTD Seabird	158	90	05.02.15	15:10	54°38,020N	013°29,846E
CTD Seabird	159	91	05.02.15	16:17	54°33,038N	013°43,446E
CTD Seabird	160	92	05.02.15	17:05	54°32,998N	013°55,194E
CTD Seabird	161	93	05.02.15	17:53	54°33,123N	014°07,123E
CTD Seabird	162	94	05.02.15	18:33	54°28,007N	014°07,003E
CTD Seabird	163	95	05.02.15	19:19	54°28,029N	013°55,357E
CTD Seabird	164	96	06.02.15	8:39	54°27,954N	013°43,472E
Pelagic Trawl 'Krake'	165	6	06.02.15	8:55	54°27,540N	013°43,311E
CTD Seabird	166	97	06.02.15	10:25	54°22,863N	013°43,383E
CTD Seabird	167	98	06.02.15	11:13	54°22,901N	013°55,183E
CTD Seabird	168	99	06.02.15	12:03	54°22,882N	014°06,963E
CTD Seabird	169	100	06.02.15	13:16	54°28,627N	014°22,920E
CTD Seabird	170	101	06.02.15	14:36	54°34,895N	014°40,263E
Pelagic Trawl 'Krake'	171	7	06.02.15	15:22	54°40,741N	014°43,057E
Pelagic Trawl 'Krake'	171	7	06.02.15	15:22	54°40,746N	014°43,059E
CTD Seabird	172	102	06.02.15	16:04	54°42,001N	014°44,160E
Pelagic Trawl 'Krake'	173	8	06.02.15	16:48	54°47,738N	014°47,380E
Pelagic Trawl 'Krake'	175	10	07.02.15	8:19	54°53,978N	014°14,420E
CTD Seabird	176	103	07.02.15	9:10	54°52,602N	014°12,712E
CTD Seabird	177	104	07.02.15	12:03	54°53,788N	013°40,365E
CTD Seabird	178	105	07.02.15	14:44	54°53,803N	013°08,697E

CTD Seabird	179	106	07.02.15	17:51	54°53,942N	012°34,964E
CTD Seabird	180	107	09.02.15	7:40	55°22,021N	012°34,990E
CTD Seabird	181	108	09.02.15	9:07	55°15,058N	012°52,047E
Pelagic Trawl 'Krake'	182	11	09.02.15	10:16	55°15,154N	013°10,053E
CTD Seabird	183	109	09.02.15	11:29	55°15,202N	013°16,278E
CTD Seabird	184	110	09.02.15	13:00	55°15,140N	013°40,149E
Pelagic Trawl 'Krake'	185	12	09.02.15	13:26	55°12,607N	013°40,109E
CTD Seabird	186	111	09.02.15	14:47	55°04,847N	013°40,132E
Pelagic Trawl 'Krake'	187	13	09.02.15	15:26	55°05,062N	013°33,651E
CTD Seabird	188	112	09.02.15	17:40	55°04,891N	013°20,084E
CTD Seabird	189	113	10.02.15	8:51	55°04,934N	012°52,964E
CTD Seabird	190	114	10.02.15	9:52	55°05,046N	012°37,016E
Pelagic Trawl 'Krake'	191	14	10.02.15	10:17	55°04,995N	012°41,936E
CTD Seabird	192	115	11.02.15	7:34	54°19,955N	011°55,067E
Pelagic Trawl 'Krake'	193	15	11.02.15	8:27	54°16,435N	011°44,362E
CTD Seabird	194	116	11.02.15	9:12	54°15,317N	011°41,239E
Pelagic Trawl 'Krake'	195	16	11.02.15	10:13	54°10,781N	011°27,303E
CTD Seabird	196	117	11.02.15	10:57	54°09,698N	011°24,305E
CTD Seabird	197	118	11.02.15	12:13	54°03,952N	011°07,090E
CTD Seabird	198	119	11.02.15	13:54	54°15,986N	011°22,119E
Pelagic Trawl 'Krake'	199	17	11.02.15	14:07	54°16,656N	011°22,419E
CTD Seabird	200	120	11.02.15	16:01	54°30,001N	011°29,912E
CTD Seabird	201	121	11.02.15	17:28	54°36,039N	011°09,852E
Pelagic Trawl 'Krake'	202	18	12.02.15	7:36	54°36,844N	011°02,221E
CTD Seabird	203	122	12.02.15	9:43	54°38,977N	010°43,019E
Pelagic Trawl 'Krake'	204	19	12.02.15	11:01	54°28,029N	010°42,829E
CTD Seabird	205	123	12.02.15	11:45	54°29,905N	010°41,352E
Pelagic Trawl 'Krake'	206	20	12.02.15	14:20	54°41,072N	010°31,263E
CTD Seabird	207	124	12.02.15	15:05	54°41,139N	010°27,787E
CTD Seabird	208	125	12.02.15	16:16	54°45,565N	010°20,913E
CTD Seabird	209	126	12.02.15	18:08	54°27,748N	010°20,928E
CTD Seabird	210	127	13.02.15	7:33	54°51,061N	010°10,045E
Pelagic Trawl 'Krake'	211	21	13.02.15	8:45	54°41,875N	010°09,966E
CTD Seabird	212	128	13.02.15	9:30	54°43,911N	010°10,050E
Pelagic Trawl 'Krake'	213	22	13.02.15	11:21	54°29,246N	010°13,907E
CTD Seabird	214	129	13.02.15	12:11	54°29,986N	010°11,005E
Pelagic Trawl 'Krake'	215	23	13.02.15	12:52	54°28,408N	010°19,517E
CTD Seabird	216	130	16.02.15	10:02	54°22,583N	012°11,718E
Bottom Trawl 'TV3/520'	217	62	16.02.15	10:10	54°22,974N	012°12,012E
Beam Trawl 2 m	218	1	16.02.15	11:07	54°24,021N	012°12,858E
Beam Trawl 2 m	218	1	16.02.15	11:27	54°23,372N	012°12,330E
CTD Seabird	219	131	16.02.15	14:01	54°34,218N	012°24,443E
Bottom Trawl 'TV3/520'	220	63	16.02.15	14:09	54°34,391N	012°24,843E
Beam Trawl 2 m	221	2	16.02.15	15:01	54°35,285N	012°26,948E

Beam Trawl 2 m	221	2	16.02.15	15:21	54°34,753N	012°26,000E
CTD Seabird	222	132	16.02.15	16:12	54°36,784N	012°35,854E
Beam Trawl 2 m	223	3	16.02.15	16:19	54°36,537N	012°35,950E
Beam Trawl 2 m	223	3	16.02.15	16:39	54°35,671N	012°35,979E
Bottom Trawl 'TV3/520'	224	64	16.02.15	16:58	54°36,553N	012°35,951E
Bottom Trawl 'TV3/520'	225	65	17.02.15	7:31	54°08,706N	014°00,563E
Beam Trawl 2 m	226	4	17.02.15	8:20	54°08,123N	014°02,301E
Beam Trawl 2 m	226	4	17.02.15	8:40	54°08,589N	014°00,902E
CTD Seabird	227	133	17.02.15	8:58	54°08,846N	014°00,642E
Beam Trawl 2 m	228	5	17.02.15	9:15	54°07,374N	014°04,518E
Beam Trawl 2 m	228	5	17.02.15	9:35	54°06,854N	014°05,486E
CTD Seabird	229	134	17.02.15	9:46	54°06,487N	014°05,925E
Bottom Trawl 'TV3/520'	230	66	17.02.15	9:57	54°06,321N	014°05,853E
CTD Seabird	231	135	17.02.15	11:12	54°13,364N	014°02,455E
Bottom Trawl 'TV3/520'	232	67	17.02.15	12:01	54°13,547N	014°02,127E
Beam Trawl 2 m	233	6	17.02.15	12:48	54°13,567N	014°04,533E
Beam Trawl 2 m	233	6	17.02.15	13:08	54°13,595N	014°03,320E
Beam Trawl 2 m	234	7	17.02.15	13:44	54°12,835N	014°07,768E
Beam Trawl 2 m	234	7	17.02.15	14:04	54°12,316N	014°08,944E
Bottom Trawl 'TV3/520'	235	68	17.02.15	14:20	54°11,966N	014°09,657E
CTD Seabird	236	136	17.02.15	15:02	54°13,203N	014°07,189E
CTD Seabird	237	137	17.02.15	15:28	54°15,573N	014°11,927E
Bottom Trawl 'TV3/520'	238	69	17.02.15	15:36	54°15,839N	014°11,485E
Beam Trawl 2 m	239	8	17.02.15	16:24	54°16,601N	014°09,738E
Beam Trawl 2 m	239	8	17.02.15	16:44	54°16,027N	014°11,031E
Beam Trawl 2 m	240	9	18.02.15	7:32	54°29,876N	013°44,075E
Beam Trawl 2 m	240	9	18.02.15	7:52	54°29,852N	013°45,869E
CTD Seabird	241	138	18.02.15	8:11	54°29,836N	013°43,705E
Bottom Trawl 'TV3/520'	242	70	18.02.15	8:19	54°29,852N	013°44,449E
Bottom Trawl 'TV3/520'	243	71	18.02.15	9:49	54°34,731N	013°47,993E
CTD Seabird	244	139	18.02.15	10:34	54°32,830N	013°48,457E
Beam Trawl 2 m	245	10	18.02.15	10:43	54°33,281N	013°48,082E
Beam Trawl 2 m	245	10	18.02.15	11:03	54°34,223N	013°48,043E
CTD Seabird	246	140	18.02.15	11:57	54°39,007N	013°46,107E
Beam Trawl 2 m	247	11	18.02.15	12:06	54°39,565N	013°46,210E
Beam Trawl 2 m	247	11	18.02.15	12:26	54°40,440N	013°46,737E
Bottom Trawl 'TV3/520'	248	72	18.02.15	12:48	54°39,773N	013°46,385E
CTD Seabird	249	141	18.02.15	14:05	54°41,815N	013°38,218E
Bottom Trawl 'TV3/520'	250	73	18.02.15	14:14	54°41,580N	013°39,051E
Beam Trawl 2 m	251	12	18.02.15	15:05	54°40,834N	013°41,500E
Beam Trawl 2 m	251	12	18.02.15	15:25	54°41,276N	013°40,116E

Annex 2

A2. Presence (P) and Frenquence (F) for each species in the bottom trawls. Presence: number of total hauls (12); Frequence: percentage of all individuals (13 474)

Species	P	F (%)
marine		
<i>Zoarces viviparus</i>	6	0,1
<i>Hippoglossoides platessoides</i>	2	0
<i>Gadus morhua</i>	11	8,7
<i>Platichthys flesus</i>	12	11,3
<i>Scophthalmus rhombus</i>	1	0
<i>Aphia minuta</i>	1	0,2
<i>Clupea harengus</i>	12	37,7
<i>Limanda limanda</i>	9	4,9
<i>Hyperoplus lanceolatus</i>	1	0
<i>Ammodytes tobianus</i>	3	0
<i>Pomatoschistus minutus</i>	3	0,4
<i>Pleuronectes platessa</i>	11	0,9
<i>Neogobius melanostomus</i>	2	0
<i>Cyclopterus lumpus</i>	2	0,1
<i>Syngnathus typhle</i>	1	0
<i>Myoxocephalus scorpius</i>	7	0,2
<i>Sprattus sprattus</i>	12	35,2
<i>Psetta maxima</i>	7	0,2
<i>Agonus cataphractus</i>	2	0
<i>Merlangus merlangius</i>	4	0,2
diadromous		
<i>Coregonus maraena</i>	1	0
<i>Osmerus eperlanus</i>	6	0,2
limnic		
<i>Perca fluviatilis</i>	5	3,6
<i>Gymnocephalus cernua</i>	1	0
<i>Sander lucioperca</i>	5	0,3