

**Cruise report**  
**FRV „Solea“ Cruise 736**  
**28.06. - 18.07.2017**

Scientist in charge: Dr. E. Bethke

**Hydroacoustic survey for the assessment of small pelagics**  
**in the North Sea**  
**(HERAS North Sea summer acoustic survey)**

**1. In a nutshell**

The cruise was part of an international hydroacoustic survey providing information on stock parameters of small pelagics in the North Sea (*HERAS – North Sea, West of Scotland and Malin Shelf summer acoustic survey*), coordinated by the ICES Working Group of International Pelagic Surveys (WGIPS). Denmark, the Netherlands, Norway, Scotland and Ireland also participated in the survey. In general, this survey provides the most important fisheries independent contribution to the assessment of herring stocks in the North Sea, Western Baltic Sea, Skagerrak/Kattegat as well as areas west of Scotland and the Irish Sea. The total survey area largely covers ICES Divisions IIIa, IVa, IVb and VIa, with the area covered by FRV “Solea” comprising the southern North Sea from 52° to 56°30’ N. Main focus was set on herring (*Clupea harengus*) and sprat (*Sprattus sprattus*), whereas distribution patterns of anchovy (*Engraulis encrasicolus*) as well as pilchard (*Sardina pilchardus*) was another objective of the survey.

---

**Distribution list:**

TI - Institut für Seefischerei

Leibniz-Institut für Meereswissenschaften IFM-GEOMAR  
Deutscher Hochseefischerei-Verband e.V.  
DFFU

**per E-mail:**

Bundesanstalt für Landwirtschaft und Ernährung, Hamburg  
Schiffsführung FFS “Walther Herwig“

BMEL, Ref. 614

BMEL, Ref. 613

TI – Präsidialbüro (Michael Welling)

TI – Personalreferat Braunschweig

TI - Institut für Fischereiökologie

TI - Institut für Ostseefischerei Rostock

TI – FIZ-Fischerei

MRI - BFEL HH, FB Fischqualität

Dr. Rohlf, SF - Reiseplanung Forschungsschiffe

Fahrtteilnehmer

Bundesamt für Seeschifffahrt und Hydrographie, Hamburg

Mecklenburger Hochseefischerei GmbH, Rostock

Doggerbank Seefischerei GmbH, Bremerhaven

Deutscher Fischerei - Verband e. V., Hamburg

To ensure a temporally and spatially consistent coverage of the survey area with newly assigned strata the hitherto used cruise track had been changed. An increased coverage of the area as well as longer hydroacoustic transect mileage (2300 NM) was planned. Due to the unfavorable weather conditions, the cruise track had to be shortened slightly (2205 NM). This allowed the coverage of the whole planned area, however, with greater distances between transects in one area.

Recording of hydroacoustic data usually took place between 04:00 am and 06:00 pm (UTC), with occasional extensions to 09:00 pm (UTC) according to survey progress and echorecordings.

To allocate biological information to echo recordings and for the collection of biological samples, altogether 28 fishery hauls were conducted. Sprat showed the highest presence in the catch and also contributed the bulk biomass to total catch weight. Herring was somewhat more abundant in the survey area when compared to the previous year. Only a very few anchovies were caught during the survey. Pilchards were entirely absent in the trawl hauls.

## **2. Cruise objectives**

- Calibration of hydroacoustic equipment.
- Hydroacoustic measurements for the assessment of small pelagics.
- Biological sampling incl. assessment of species composition and length-frequency/age distribution of key species in the survey area.
- Measurement of hydrographic parameters (e.g. temperature and salinity) in the survey area.

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

### **3.1 Cruise narrative**

After loading and preparing the scientific equipment, FRV "Solea" left Cuxhaven port in the morning of June 29<sup>th</sup>. Calibration of the hydroacoustic equipment was conducted close to Helgoland Island prior to the start of any survey operations. The hydroacoustic measurements started the next morning at 54°30,172' N, 007°48,397' E in the northeastern part of the survey area. Working conditions at sea were mostly moderate, thus only some hours working time were lost due to bad weather. Survey operations were accomplished at position 54°40.96' N, 007°44,96' E. On July 17<sup>th</sup> early afternoon FRV "Solea" arrived at Cuxhaven port. The whole survey area was covered, but with larger transect spacing as initially anticipated. In total, 2205 nautical miles were monitored instead of the primarily planned 2300 NM.

### **3.2 Hydroacoustics**

#### **3.2.1 Calibration**

Several new transducers have been added to the hull of FFS "Solea". All transducers (38 kHz, 70 kHz, 120 kHz and 200 kHz) were calibrated prior to the beginning of the survey in favorable weather conditions, while the vessel drifted near Helgoland Island in both modes (CW- mode and frequency sweep "chirp"-mode). The overall calibration results were considered of good quality for both frequencies. Resulting transducer parameters in the CW-mode were applied for consecutive data-collection and post-processing of hydroacoustic survey data.

#### **3.2.2 Echo recording**

Hydroacoustic data were recorded with a Simrad EK80 scientific echosounder with hull-mounted 38 kHz, 70 kHz, 120 kHz and 200 kHz transducers. Post-processing and analysis of the data was accomplished with the latest EchoView software. Transducer settings applied were in accordance with the specifications provided in ICES (2015). Due to specific diurnal vertical migration of clupeids in the area, concentrations and dense schools of herring/sprat were present largely during daytime. At night, the schools dispersed and often were not discernible from scattering layers originating from plankton or-

ganisms or other vertically migrating scatterers. Thus, echo recording was generally only accomplished during daytime between 4 am and 6 pm (UTC), as in previous surveys. In some instances, the sampling of hydroacoustic data was extended to ca. 9 pm in areas with very low or no clupeid signals. This is considered uncritical, as during this time of year the light intensity at that time is still high with dispersion of schools usually occurring later in the evening. The overall cruise track covered during this survey as well as the assigned survey area are depicted in Fig. 1. The survey effort per ICES rectangle as allocated to each participating research vessel had been assigned by ICES WGIPS prior to the survey and was accomplished as planned.

Clupeids were largely visible on echograms as pole shaped schools. An identification of echo signals was achieved by targeted fishery hauls on detected schools. Altogether, the fish schools and the corresponding echoes were not distributed evenly in the survey areas. Regions with particularly high fish densities values alternated with sometimes long transect sections of zero detections. As in previous years, the highest NASC values (i. e. echo signals) were recorded as usually in coastal areas of the inner German Bight and around Helgoland Island. Herring abundance estimates, however, cannot be assessed before a final combination of acoustic and trawl catch data for the evaluation of survey results. This will be accomplished after biological samples have been worked up in the lab, and results will subsequently presented to ICES WGIPS.

### **3.3 Biological sampling (N. Rohlf)**

Twenty-eight trawl hauls were conducted during the summer acoustic survey. Trawling was carried out using a PSN 388 pelagic trawl ("Krake"). Trawl duration varied between 5 and 46 minutes, but usually was set to 30 minutes. Hauls were conducted according to echo signals. Additionally, exclusion/validation hauls were shot in areas with echo signals of unclear origin. The positions of all hauls are depicted in Fig. 1. Catches were sorted according to species, and length- and weight-distributions of individual species were measured. Of all clupeids (herring, sprat and anchovy were caught), 10 individuals per 0.5 cm length-class were sampled per trawl. Their individual weight, sex and maturity stage was determined and the otoliths were sampled to enable age estimation.

Altogether, 27 different fish species were caught during the survey, plus two cephalopod and two crustacean species. A detailed overview on catch compositions (CPUE in kg 30min<sup>-1</sup>) of all 28 trawl hauls is given in Tab. 1. As in the previous years, sprat dominated the catches (present in 26 hauls or 93 % of the total 30) and contributed the bulk of biomass of total catch weight (23.7 t, i. e. 86 %). Herring was more abundant in the survey area when compared to the previous year. The total catch weight of herring summed up to 1.8 tonnes (2015: 0.5 tonnes, obtained in 30 hauls). However, catches alone are not representative for abundance of small pelagics. Detailed conclusions on abundance cannot be given until echo integration is accomplished and trawl haul and hydroacoustic data are combined.

A detailed overview on numbers, weights and mean lengths of herring, sprat and anchovies sampled is given in Tab. 2a-c, together with their proportion on the total catch. Figures 3 - 5 show length distributions of these species as derived from total catches. Herring lengths ranged from 5 to 29 cm, but the length distribution is dominated by small fish below 10 cm TL. Sprat lengths ranged from 3.5 to 14.5 cm. The larger quantities of small spratt (< 7 cm TL) observed in the survey area in 2015 were not seen again in 2016. The length distribution is more in line with those obtained in previous years.

Only a very few anchovies were caught during the survey. Pilchards were entirely absent in the trawl hauls.

### **3.4 Hydrography**

Vertical profiles of temperature and salinity were measured with a SeaBird SBE CTD-probe on a station grid covering the whole survey area (Fig. 1). Hydrography measurements were conducted in regular intervals along the cruise track. Altogether, 70 CTD casts were conducted during this survey. Surface

temperatures ranged from ca. 14°C in the northernmost survey area to 18°C in the inner German Bight and along the Dutch coast (Fig. 6). Bottom temperatures ranged from 7.5 °C in the North to also 18°C in the southern part of the survey area. While the water column was well mixed south of ca. 54°N, summer thermal stratification with warm surface and cold bottom temperatures was evident northward.

Surface salinity ranged from about 32 psu near the river Elbe estuary to about 35.5 psu in the southern survey area. Levels near the seafloor were mostly similar (Fig. 6).

#### 4. Survey participants


Dr. Eckhard Bethke (Cruise leader)	Hydroacoustics	SF
Michael Sasse	Hydroacoustics	SF
Dr. Norbert Rohlf	Biology	SF
Gitta Hemken	Biology	SF
Jörg Appel	Biology	SF
Simon Wieser	Student assistant	SF

#### 5. References

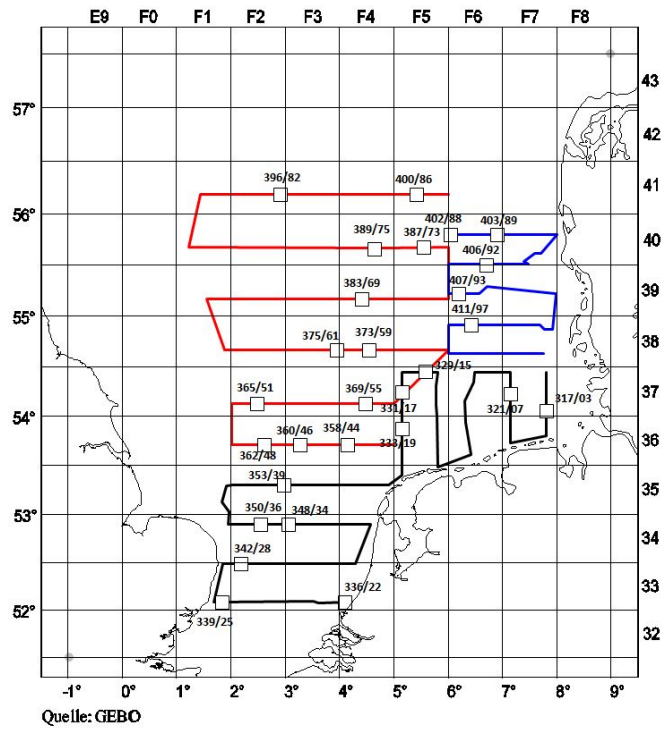
ICES (2015) Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp. (Available via [www.ices.dk](http://www.ices.dk))

#### 6. Acknowledgements

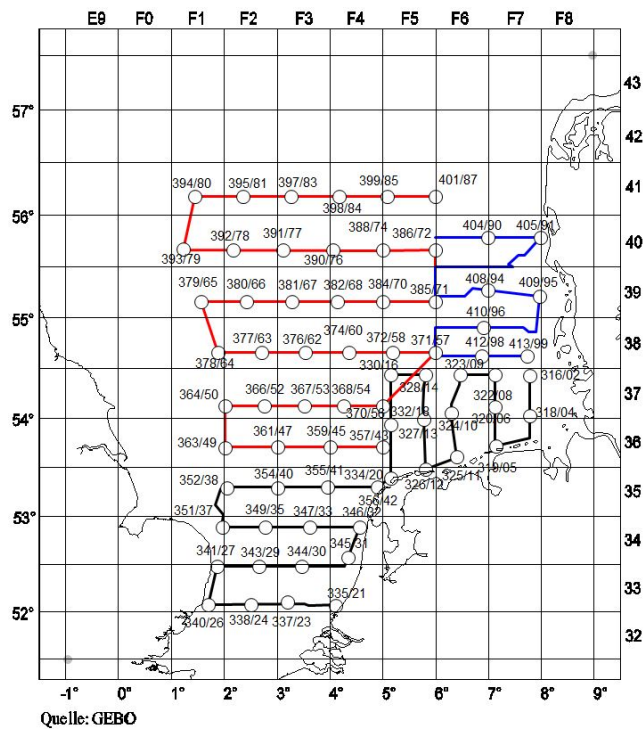
I hereby thank the crew of FRV “Solea” and Captain S. Meier as well as all participants for their outstanding cooperation and commitment that facilitated the successful accomplishment of this survey.



Hamburg, 30.08.2017  
(Dr. E. Bethke, Scientist in charge)



**Fig. 1:** HERAS Herring Acoustic Survey 2017. Cruise track and haul positions of FRV “Solea” cruise 736. ICES statistical rectangles are indicated in the top and right axis.



**Fig. 2:** HERAS Herring Acoustic Survey 2017. Cruise track and CTD stations of FRV “Solea” cruise 736. ICES statistical rectangles are indicated in the top and right axis.

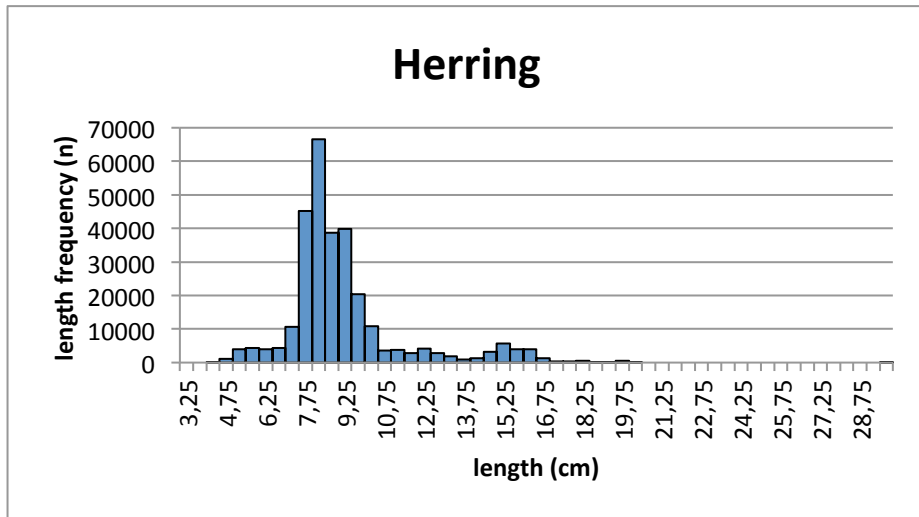


Fig. 3: Herring (*Clupea harengus*) length-frequency distribution FRV “Solea” cruise 736.

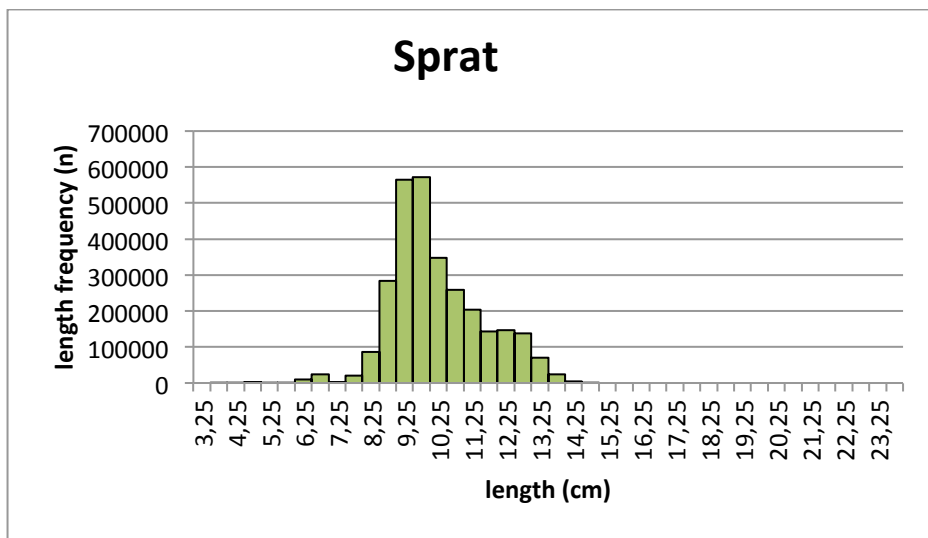


Fig. 4: Sprat (*Sprattus sprattus*) length-frequency distribution FRV “Solea” cruise 736.

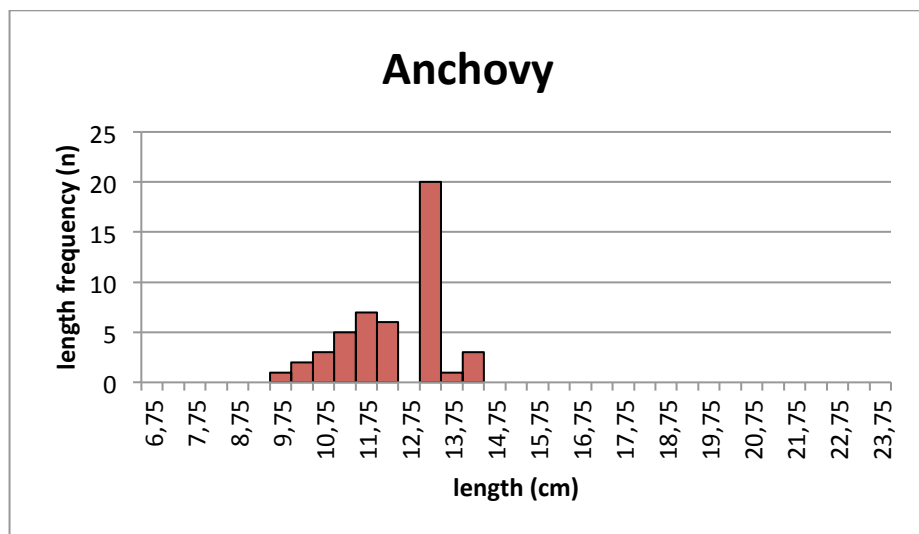
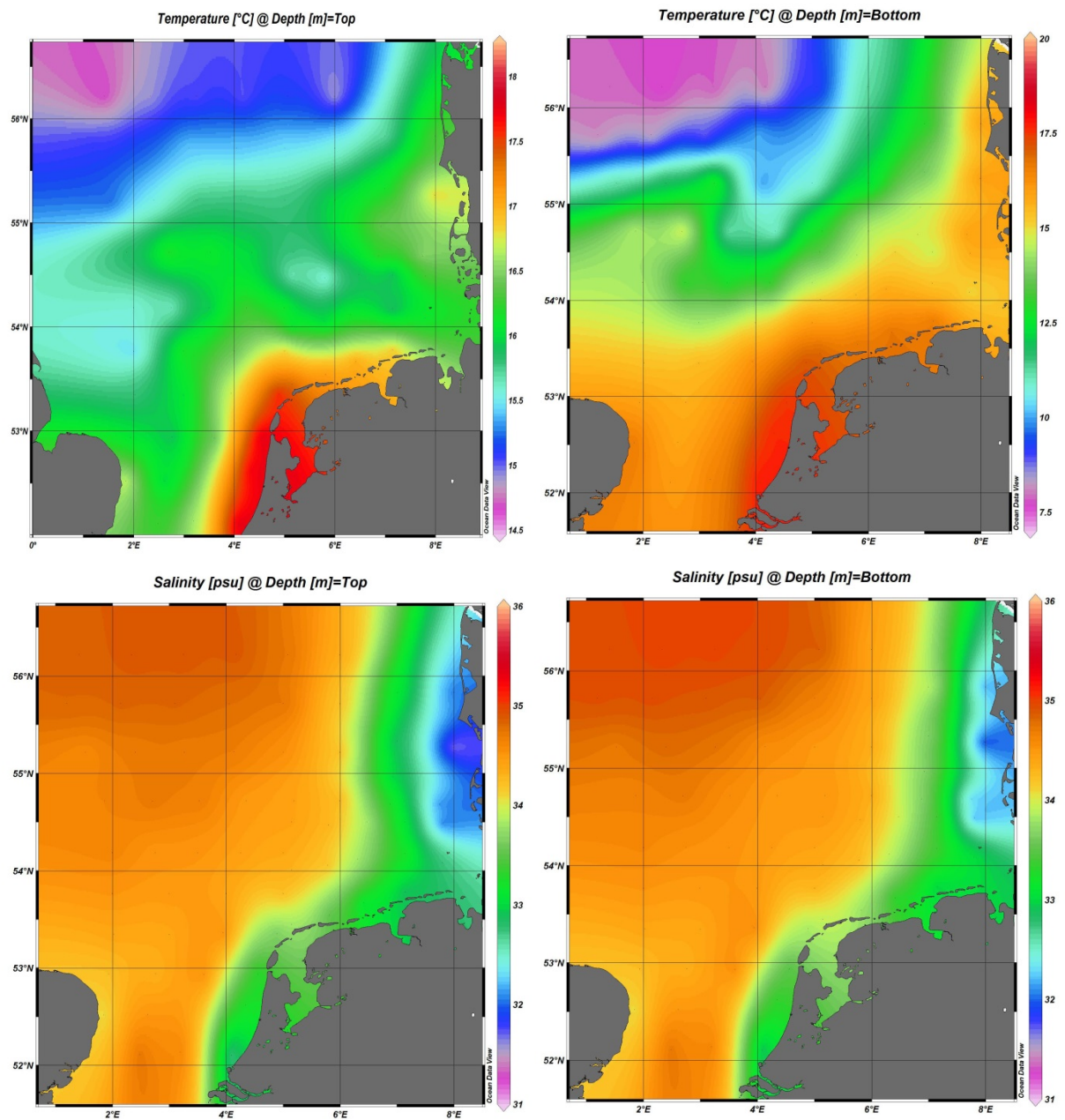


Fig. 5: Anchovy (*Engraulis encrasicolus*) length-frequency distribution FRV “Solea” cruise 736.



**Fig. 6:** Hydrography in the survey area of FRV "Solea" cruise 736. Temperature (°C) near surface (top panel, left) and at seafloor (top panel, right) and salinity (PSU) near surface (lower panel, left) and at seafloor (lower panel, right).

**Tab. 1:** Catch composition (CPUE in kg) FRV "Solea" cruise 736 (standardized to 30 minutes trawl duration).

HAUL	STATION	RECTANGLE	TOTAL (kg/30 min)	AMMODYTES MARINUS	CALLIONYMUS LYRA	CANCER PAGURUS	CLUPEA HARENGUS	CLUPEIDAE	DICENTRARCHUS LABRAX	ECHIICHTHYS VIPERA	ENGRALUS ENCRASICOLUS	EUTRIGLA GURNARDUS	GADUS MORHUA	HIPPOGLOSSOIDES PLATESSOIDES	HYPEROPLUS LANCEOLATUS	LIMANDA LIMANDA	LOLIGO FORBESI
1	317	37F7	250.8				159.18					0.06				0.90	
2	321	37F7	1618.0				231.46					6.67				6.55	0.19
3	329	37F5	120.9		0.11		0.85					4.81			0.03	6.89	
4	331	37F5	168.4		0.06		0.98					8.28			0.03	5.18	
5	333	36F5	391.2				0.45					0.43				0.53	
6	336	33F4	3299.8				582.83								0.21	0.15	
7	339	33F1	44.9				24.94	5.93	8.80	0.39	0.26						
8	342	34F2	101.4				1.04			3.28	0.09					0.05	
9	348	34F3	4601.9							0.22		0.46					
10	350	34F2	82.1				1.99			0.98	0.01						
11	353	35F2	1454.9				0.83			1.88	0.05	4.46				5.23	
12	358	36F4	238.6		0.24		0.17			0.02		6.08				5.81	0.11
13	360	36F3	6497.0		0.11		166.01				0.14	2.45				2.44	
14	362	36F2	11.6	3.41						0.07		2.46			0.85		
15	365	37F2	659.3				9.79					2.41				1.09	
16	369	37F4	1116.4				0.63					2.63				3.25	
17	373	38F4	367.3		0.25		2.26					13.72				2.96	
18	375	38F3	702.6				0.30					3.99				4.53	
19	383	39F4	564.1				5.53					2.96				6.00	
20	387	40F5	1578.7				234.09					13.54		0.37		4.81	
21	389	40F4	364.4		0.35		147.20					8.34			0.12	9.02	0.98
22	396	41F2	762.8									10.63	0.78	0.58		16.63	
23	400	41F5	282.4		0.09		93.29					3.06	0.06	1.09		32.76	
24	402	40F6	252.1				50.06					1.23					
25	403	40F6	141.1				31.96					6.13				21.80	
26	406	40F6	584.9				12.45					1.20			0.08	17.20	
27	407	39F6	1077.7			1.91	20.12					0.94				1.16	
28	411	38F6	93.6		0.05	1.14	41.53					2.47	0.12			5.11	0.55
	<b>total (kg)</b>		<b>27428.9</b>	3.4	1.2	3.0	1819.9	5.9	8.8	6.8	0.6	109.4	1.0	2.0	1.3	160.0	1.8
	<b>proportion (%)</b>			0.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.6	0.0
	<b>number of catches</b>			1	8	2	25	1	1	7	5	24	3	3	6	23	4
	<b>presence (%)</b>			4	29	7	89	4	4	25	18	86	11	11	21	82	14



**Tab. 1 continued:** Catch composition (CPUE in kg) FRV "Solea" cruise 736 (standardized to 30 minutes trawl duration).

STATION	RECTANGLE	TOTAL (kg/30 min)	LOLIGO VULGARIS	MELANOGRAMMUS AEGLEFINUS	MERLANGIUS MERLANGUS	MERLUCCIIUS MERLUCCIIUS	MICROSTOMIUS KITT	MULLUS SURMULETUS	MUSTELUS ASTERIAS	MYOXOCEPHALUS SCORPIUS	NEPHROPS NORVEGICUS	PLEURONECTES PLATESSA	POMATOSCHISTUS MINUTUS	PSETTA MAXIMA	RAJA CLAVATA	RAJA MONTAGUI	SCOMBER SCOMBRUS	SPRATTUS SPRATTUS	TRACHURUS TRACHURUS	TRIGLA LUCERNA	NUMBER OF SPECIES
317	37F7	250.8			1.20								0.01				63.00	26.4			7
321	37F7	1618.0			2.96							1.54					0.50	1368.1			8
329	37F5	120.9			3.87		0.43					1.59					6.17	96.1			10
331	37F5	168.4			44.72							0.30					14.78	94.1			9
333	36F5	391.2			0.64												12.81	376.4			6
336	33F4	3299.8			0.10							1.43					8.90	2706.2			7
339	33F1	44.9																4.5			6
342	34F2	101.4			0.30				2.35				0.00					94.3			8
348	34F3	4601.9															3.22	4598.0			4
350	34F2	82.1										0.19						79.0			5
353	35F2	1454.9			0.98												1.74	1439.8			8
358	36F4	238.6			47.10			0.12			0.07	0.98	0.00				0.46	177.0		0.39	14
360	36F3	6497.0			53.53							3.16			21.43		3.34	6244.4			10
362	36F2	11.6								0.04						1.54	2.93		0.34		8
365	37F2	659.3			135.86		1.33					0.39		1.44			0.59	506.2	0.23		10
369	37F4	1116.4			140.64			0.68			0.10						4.97	963.5			8
373	38F4	367.3			81.12		0.76					3.43						262.8			8
375	38F3	702.6			37.70		0.64	0.37				2.26						652.8			8
383	39F4	564.1			2.21		1.19					0.21						546.0			7
387	40F5	1578.7			73.07													1252.8			6
389	40F4	364.4			16.95		5.26					3.32					0.38	172.5			11
396	41F2	762.8	0.33	66.30	661.98		3.92					1.65									9
400	41F5	282.4			0.95		1.37					0.44						149.3			10
402	40F6	252.1			3.37													197.4			4
403	40F6	141.1			0.12	0.85						2.17					1.09	77.0			8
406	40F6	584.9			0.37							4.89						548.7			7
407	39F6	1077.7			3.71													1049.9			6
411	38F6	93.6	0.11		15.74						0.11	8.04	0.00				7.15	11.5			14
<b>total (kg)</b>		<b>27428.9</b>	0.4	66.3	1329.2	0.9	14.9	1.2	2.3	0.0	0.3	36.0	0.0	1.4	21.4	1.5	132.0	23694.6	0.6	0.4	
<b>proportion (%)</b>			0.0	0.2	4.8	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.5	86.4	0.0	0.0	
<b>number of catches</b>			2	1	24	1	8	3	1	1	3	17	4	1	1	1	16	26	2	1	
<b>presence (%)</b>			7	4	86	4	29	11	4	4	11	61	14	4	4	4	57	93	7	4	

**Tab.2a:** Numbers, weights and mean lengths of **herring** (*Clupea harengus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration)

Haul	Stat	Rect	total catch (kg)	clupeid catch (kg)	clupeid portion (%)	herring					herring (% clups)
						catch (kg)	count (n)	range (cm)			
								min	max	mean	
1	317	37F7	250.8	185.6	74%	159.18	1650	7.25	10.25	8.2	86%
2	321	37F7	1618.0	1599.6	99%	231.46	2541	8.75	13.75	9.4	14%
3	329	37F5	120.9	97.0	80%	0.85	689	10.25	18.75	12.8	1%
4	331	37F5	168.4	95.0	56%	0.98	1160	8.25	18.75	12.2	1%
5	333	36F5	391.2	376.8	96%	0.45	250	5.75	15.25	8.1	0%
6	336	33F4	3299.8	3289.0	100%	582.83	1992	6.75	19.75	8.7	18%
7	339	33F1	44.9	29.7	66%	24.94	1235	4.25	10.25	6.1	84%
8	342	34F2	101.4	95.4	94%	1.04	576	5.25	14.25	6.7	1%
9	348	34F3	4601.9	4598.0	100%	0.00	0	0.00	0.00	0.0	0%
10	350	34F2	82.1	81.0	99%	1.99	3235	5.75	15.25	8.6	2%
11	353	35F2	1454.9	1440.6	99%	0.83	261	6.25	18.75	9.3	0%
12	358	36F4	238.6	177.2	74%	0.17	103	9.25	16.25	12.8	0%
13	360	36F3	6497.0	6410.6	99%	166.01	922	7.25	11.75	9.2	3%
14	362	36F2	11.6	0.0	0%	0.00	0	0.00	0.00	0.0	0%
15	365	37F2	659.3	516.0	78%	9.79	520	13.75	18.25	15.3	2%
16	369	37F4	1116.4	964.1	86%	0.63	84	8.75	11.75	10.5	0%
17	373	38F4	367.3	265.1	72%	2.26	647	11.25	17.75	12.7	1%
18	375	38F3	702.6	653.1	93%	0.30	101	11.75	14.75	12.6	0%
19	383	39F4	564.1	551.5	98%	5.53	1544	10.75	19.25	13.1	1%
20	387	40F5	1578.7	1486.9	94%	234.09	2991	7.75	17.25	13.7	16%
21	389	40F4	364.4	319.7	88%	147.20	3624	12.25	17.75	15.6	46%
22	396	41F2	762.8	0.0	0%	0.00	0	0.00	0.00	0.0	0%
23	400	41F5	282.4	242.6	86%	93.29	4092	11.25	29.75	15.7	38%
24	402	40F6	252.1	247.5	98%	50.06	2661	8.75	17.75	13.6	20%
25	403	40F6	141.1	108.9	77%	31.96	3080	10.75	16.75	12.9	29%
26	406	40F6	584.9	561.2	96%	12.45	1554	7.75	14.75	11.1	2%
27	407	39F6	1077.7	1070.0	99%	20.12	1498	8.75	16.25	11.7	2%
28	411	38F6	93.6	53.0	57%	41.53	3581	10.75	17.25	13.9	78%

**Tab.2b:** Numbers, weights and mean lengths of **sprat** (*Sprattus sprattus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration)

Haul	Rect	Stat	total catch (kg)	clupeid catch (kg)	clupeid portion (%)	sprat					sprat (% clups)
						catch (kg)	count (n)	range (cm)			
								min	max	mean	
1	317	37F7	250.8	185.6	74%	26.4	1649	7.3	11.8	9.3	14%
2	321	37F7	1618.0	1599.6	99%	1368.1	1668	8.8	11.3	9.7	86%
3	329	37F5	120.9	97.0	80%	96.1	2169	8.3	14.3	11.1	99%
4	331	37F5	168.4	95.0	56%	94.1	2423	7.8	12.8	10.6	99%
5	333	36F5	391.2	376.8	96%	376.4	1790	7.8	11.8	9.8	100%
6	336	33F4	3299.8	3289.0	100%	2706.2	2430	6.3	13.8	10.6	82%
7	339	33F1	44.9	29.7	66%	4.5	278	3.8	8.8	4.9	15%
8	342	34F2	101.4	95.4	94%	94.3	2101	5.3	12.8	9.4	99%
9	348	34F3	4601.9	4598.0	100%	4598.0	2982	11.3	14.8	12.7	100%
10	350	34F2	82.1	81.0	99%	79.0	1545	5.8	12.3	8.5	98%
11	353	35F2	1454.9	1440.6	99%	1439.8	2594	8.3	13.3	10.0	100%
12	358	36F4	238.6	177.2	74%	177.0	2096	7.3	10.8	9.1	100%
13	360	36F3	6497.0	6410.6	99%	6244.4	1968	7.8	11.3	9.3	97%
14	362	36F2	11.6	0.0	0%	0.0	0	0.0	0.0	0.0	0%
15	365	37F2	659.3	516.0	78%	506.2	2763	9.8	13.8	11.4	98%
16	369	37F4	1116.4	964.1	86%	963.5	2067	8.3	11.8	9.8	100%
17	373	38F4	367.3	265.1	72%	262.8	2356	9.8	12.8	11.2	99%
18	375	38F3	702.6	653.1	93%	652.8	2770	10.3	13.3	11.5	100%
19	383	39F4	564.1	551.5	98%	546.0	1891	9.8	13.3	11.5	99%
20	387	40F5	1578.7	1486.9	94%	1252.8	1906	8.8	13.3	10.4	84%
21	389	40F4	364.4	319.7	88%	172.5	2424	11.3	13.8	12.8	54%
22	396	41F2	762.8	0.0	0%	0.0	0	0.0	0.0	0.0	0%
23	400	41F5	282.4	242.6	86%	149.3	1914	10.3	13.3	11.6	62%
24	402	40F6	252.1	247.5	98%	197.4	2150	8.8	13.3	11.0	80%
25	403	40F6	141.1	108.9	77%	77.0	2369	8.8	14.3	12.1	71%
26	406	40F6	584.9	561.2	96%	548.7	2186	8.8	12.8	10.4	98%
27	407	39F6	1077.7	1070.0	99%	1049.9	2282	9.3	12.8	10.7	98%
28	411	38F6	93.6	53.0	57%	11.5	3431	9.8	14.8	12.1	22%

**Tab.2c:** Numbers, weights and mean lengths of **anchovies** (*Engraulis encrasicolus*) and according proportion of total clupeid catch (normalized to 30 minutes tow duration)

Haul	Rect	Stat	total catch (kg)	clupeid catch (kg)	clupeid portion (%)	anchovy					anchovy (% clups)
						catch (kg)	count (n)	range (cm)			
								min	max	mean	
7	339	33F1	44.9	29.7	66%	0.26	143	10.3	13.3	11.9	0.89%
8	342	34F2	101.4	95.4	94%	0.09	99	10.8	13.8	12.3	0.09%
10	350	34F2	82.1	81.0	99%	0.01	10	9.8	9.8	9.8	0.01%
11	353	35F2	1454.9	1440.6	99%	0.05	14	14.3	14.3	14.3	0.00%
13	360	36F3	6497.0	6410.6	99%	0.14	27	13.3	13.3	13.3	0.00%