

R/V Dana

Cruise 02/2018

"DK IBTS 1Q 2018"



Vessel: R/V DANA
Cruise number: 02/18

Cruise dates (planned): 1/2 – 19/2 2018
Cruise name: DK IBTS 1Q 2018

Port of departure:	Hirtshals	Date:	01 Feb
Port of return:	Hirtshals	Date:	19 Feb
Other ports:	Esbjerg Hansthalm	Date and justification:	9 Feb: Scheduled exchange of scientific staff and crew 15 Feb: Emergency disembarkation of one crew member

Participants

Leg 1: Hirtshals – Esbjerg		
Name	Institute	Function and main tasks
Helle Rasmussen	DTU Aqua, Monitoring	Cruise leader, Fish lab
Maria Jarnum	DTU Aqua, Monitoring	Technician, Fish lab
Lise Sindahl	DTU Aqua, Monitoring	Technician, Fish lab
Søren L. Grønby	DTU Aqua, Monitoring	Technician, Fish lab
Anders Jensen	DTU Aqua, Monitoring	Technician, Fish lab
Gert Holst	DTU Aqua, Monitoring	Technician, Fish larvae
Christian Petersen	DTU Aqua, Monitoring	Technician, CTD, Maintenance
Bastian Huwer	DTU Aqua, Marine Living Resources	Scientist, Fish larvae and eggs
Florence Cuttat	DTU Aqua, Marine Living Resources	Scientist, Fish eggs and larvae

Leg 2: Esbjerg – Hirtshals		
Name	Institute	Function and main tasks
Kai Wieland	DTU Aqua, Monitoring	Cruise leader, Fish lab
Rene Erlandsen	DTU Aqua, Monitoring	Technician, Fish lab
Lise Sindahl	DTU Aqua, Monitoring	Technician, Fish lab
Tom Svoldgaard	DTU Aqua, Monitoring	Technician, Fish lab
Jan W. Thomsen	DTU Aqua, Monitoring	Technician, Fish lab
Dirk Tijssen	DTU Aqua, Monitoring	Technician, Fish larvae
Christian Petersen	DTU Aqua, Monitoring	Technician, CTD, Maintenance
Bastian Huwer	DTU Aqua, Marine Living Resources	Scientist, Fish larvae and eggs
Anna Boila	DTU Aqua, Marine Living Resources	Scientist, Fish eggs and larvae

Objectives

The survey is part of the 1st quarter International Bottom Trawl Survey (IBTS) in the North Sea, which is coordinated by the ICES International Bottom Trawl Survey Working Group and has been conducted with standard fishing gear in the 1st quarter since 1983.

The IBTS aims to provide ICES assessment and science groups with consistent and standardised data for examining spatial and temporal changes in (a) the distribution and

relative abundance of fish and fish assemblages; and (b) of the biological parameters of commercial fish species for stock assessment purposes. The main objectives in the 1st quarter IBTS are to:

- To determine the distribution and relative abundance of pre-recruits of the main commercial species (cod, haddock, whiting, Norway pout, saithe, herring, sprat, and mackerel) with a view of deriving recruitment indices;
- To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
- To monitor the distribution and relative abundance of all fish species and selected invertebrates;
- To collect data for the determination of biological parameters for selected species;
- To collect hydrographical and environmental information;
- To determine the distribution of in particular herring and sprat larvae;

The area to be covered by Denmark with RV Dana in the 1st quarter 2018 was allocated during the most recent IBTS Working Group meeting. Technical details are described in the current version of the survey manual (ICES 2015: Manual for the International Bottom Trawl Surveys. Series of ICES Survey Protocols. SISP 1-IBTS IX. SISP 2 – MIK2. <http://datras.ices.dk/Documents/Manuals/>).

Itinerary

R/V Dana left Hirtshals on Thursday 1st February at 12:30 local time. The field work started in the western Skagerrak (Fig. 1). The vessel stayed in the port of Esbjerg on Friday 9th February from 7:50 to 13:00 for the scheduled exchange of scientific staff and crew. Favorable weather conditions prevailed during almost the entire 1st leg of the cruise whereas stormy weather in major parts of the survey area caused some delays in the sampling during the 2nd leg of the cruise (Fig. 2). The vessel sailed in to Hanstholm on the morning of 15th February for an emergency embarkation of a crew member. R/V Dana returned to Hirtshals on Monday 19th February at 7:00 local time.

Achievements

The original working area consisted of 41 ICES statistical rectangles located in the Skagerrak and the North Sea (Fig. 1). In addition, 2 and 4 rectangles were fished with the MIK (rectangles 43F4 and 44F4; 2 hauls in each) and the GOV (rectangles 39F8, 45F4, 44F4 and 43F4; 1 haul in each), respectively, to assist another IBTS participation country which had severe technical problems. Furthermore, two gear trial tows with the GOV were done in rectangle 41E8 just off the Scottish coast during the 2nd leg of the cruise as there was the only place in reach where working conditions could be met due to a heavy storm in the other parts of the remaining survey area at that time. The following activities were carried out:

49 valid trawl hauls with a GOV 36/47 (chalut á Grande Overture Verticale), all hauls were carried with the standard groundgear A (see IBTS Manual for specifications) and with 60 m sweeps. In one of hauls one Vonin flyer was used and in eight of these hauls 2 Vonin flyers were used instead of the standard kite. The achieved net geometry was acceptable for each of the Vonin flyer hauls (Fig. 3) and thus they were accepted as valid standard hauls.

47 CTD profiles (with additional sensors for dissolved oxygen, fluorescence and turbidity).

83 valid hauls with a 2 m ring net (MIK, see IBTS manual for specification). All of the of these tows were done with a 20 cm fine-meshed ringnet (MIKey M) attached to the main frame but in three cases no valid samples were received from the small net. 4 additional tows were conducted for flowmeter calibration.

Results

Routine sampling

The trawl parameters (Net opening and door spread) as monitoring with a ScanMar system were in the range or close to the suggested limits specified in the IBTS manual in most cases (Fig. 3). A newly manufactured GOV has been used and this trawl required somewhat more wire at shallower depths than used in previous years. For vertical net opening, 4 outliers were observed when just 1 Vonin flyer was used or when warp length was not appropriately adjusted (Fig. 3). Sensors for wing spread have not been available on this cruise.

In total, about 80 different species of fish and invertebrates were found in catches. The total weight of the catches from the 49 tows has been 6.3 tons (Tab. 1). Total catch and species richness in the standard tows ranged from 4 to 790 kg and from 7 to 30 different fish and IBTS invertebrate species (Fig. 4). Length measurements were made for all commercial and non-commercial fish species. Sharks, skates and rays and selected shellfish species were measured separately by sex (length composition and weight). Single fish data (length, weight, sex and maturity) and otoliths were collected for the main commercial species (cod, haddock, whiting, Norway pout, saithe, herring, sprat, mackerel and plaice) as well as for hake, lemon sole, grey gurnard, dab, and witch flounder in order to fulfil requirements of the national DCF (Data Collection Framework of the European Union) sampling requirements (Tab. 2). The preliminary abundance indices for the main commercial species (Tab. 3) were reported to the coordinator of the 1st quarter IBTS.

Total 'fishing' time and additional time the trawl was on the bottom outside the nominal tow duration of the standard tows with a nominal duration of 30 min ranged from 8 to 21 min and 3 to 10 min, respectively, which is positively correlated to depth and hence also to warp length (Fig. 5).

Marine litter was recorded in each GOV catch using four main categories: plastic, glass, metals and miscellaneous, which were subdivided in several minor categories to meet the request by the IBTS Working Group. The total amount of marine litter was 109 kg of which, however, 96 kg was made up by 4 lobster creels originating from one single station.

The MIK (500 µm cod end mesh size) samples were pre-sorted onboard and herring larvae were counted prior to conservation in 96% ethanol for later detailed analysis and completion of length measurements in the laboratory. The distribution of herring larvae (all sizes pooled) is shown in figure 6. A small fine-meshed (250 µm) ring net for

collecting fish eggs was attached to the main MIK, and the samples from the small ring net were conserved in buffered formaldehyde for later analysis at IMR Bergen in Norway.

Temperature, salinity and dissolved oxygen content at surface and bottom were extracted from the CTD profiles for storage in the institute's fish data base. These temperature and salinity values will be submitted to the ICES DATRAS database together with the GOV catch results to DATRAS, and the complete CTD profiles will be submitted to the ICES hydrographical data center.

Additional activities

Samples of several fish species were collected for genetic analyses (DTU Aqua Silkeborg).

Samples of cod livers were collected for toxicological analysis.

Selected mixed fish and shellfish species collections were taken for education and open ship arrangements at DTU Aqua, and some live fish and invertebrates were brought on shore for the Aquarium in Esbjerg.

Others

A cruise summary report has been delivered online to

http://seadata.bsh.de/csr/online/V1_index.html.

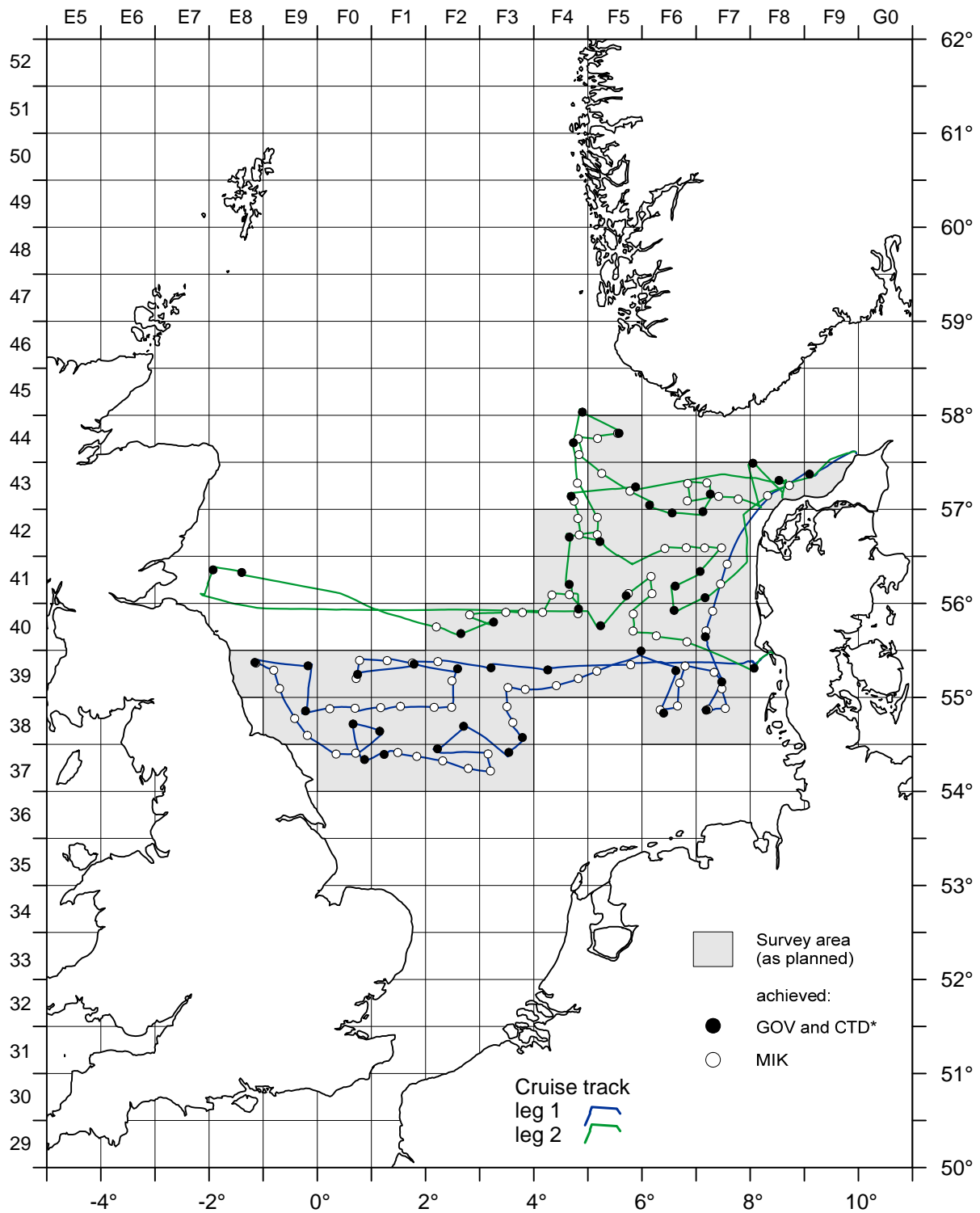


Fig. 1: Survey map with cruise track and sampling locations, Dana DK IBTS 1Q 2018 (*: no CTD's in rectangle 41F8).

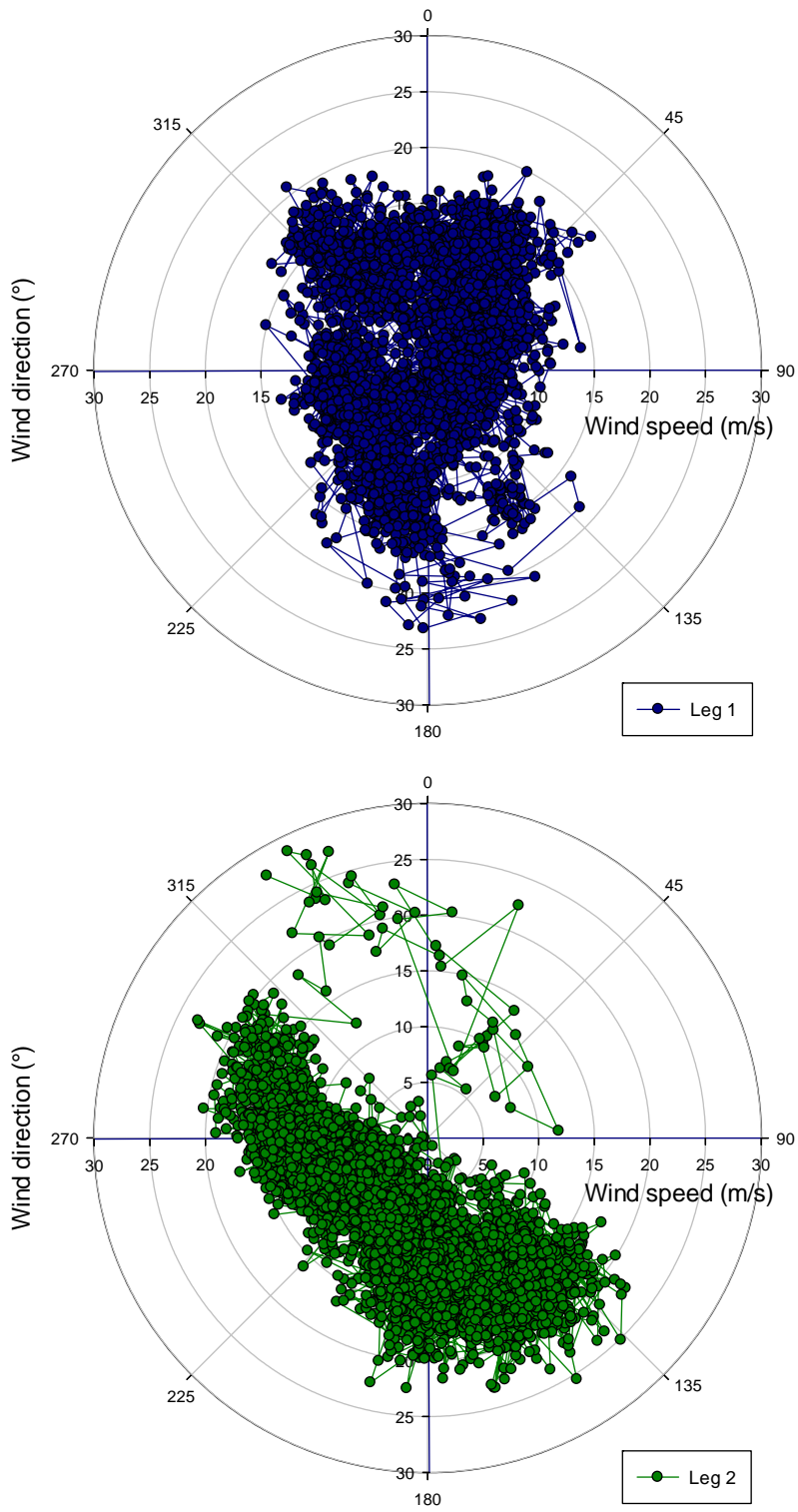


Fig. 2. Wind speed (m/s) and wind direction (°) recorded along the cruise track, Dana DK IBTS 1Q 2018.

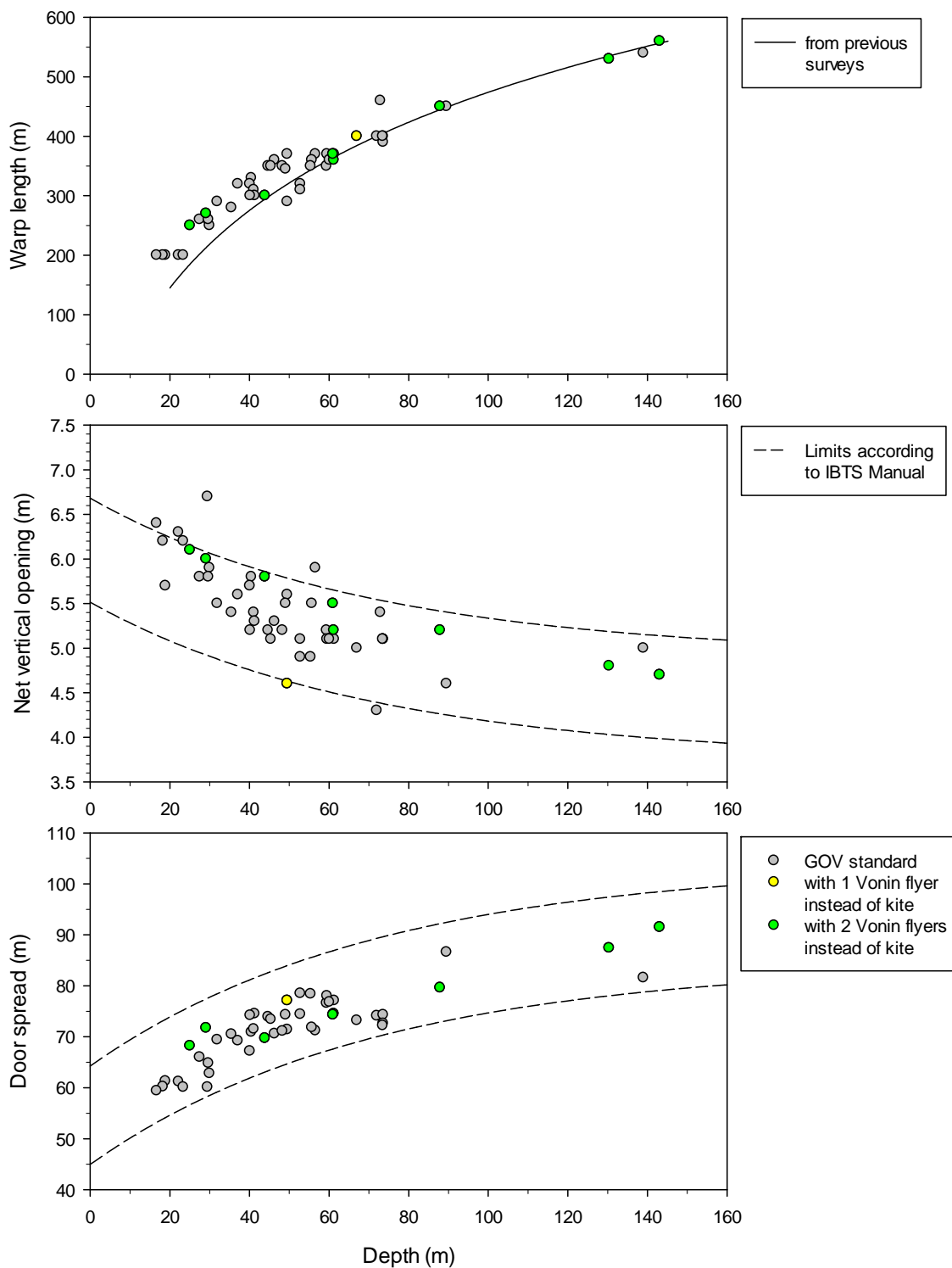


Fig. 3: Warp length, net opening and door spread in relation to depth, Dana DK IBTS 1Q 2018

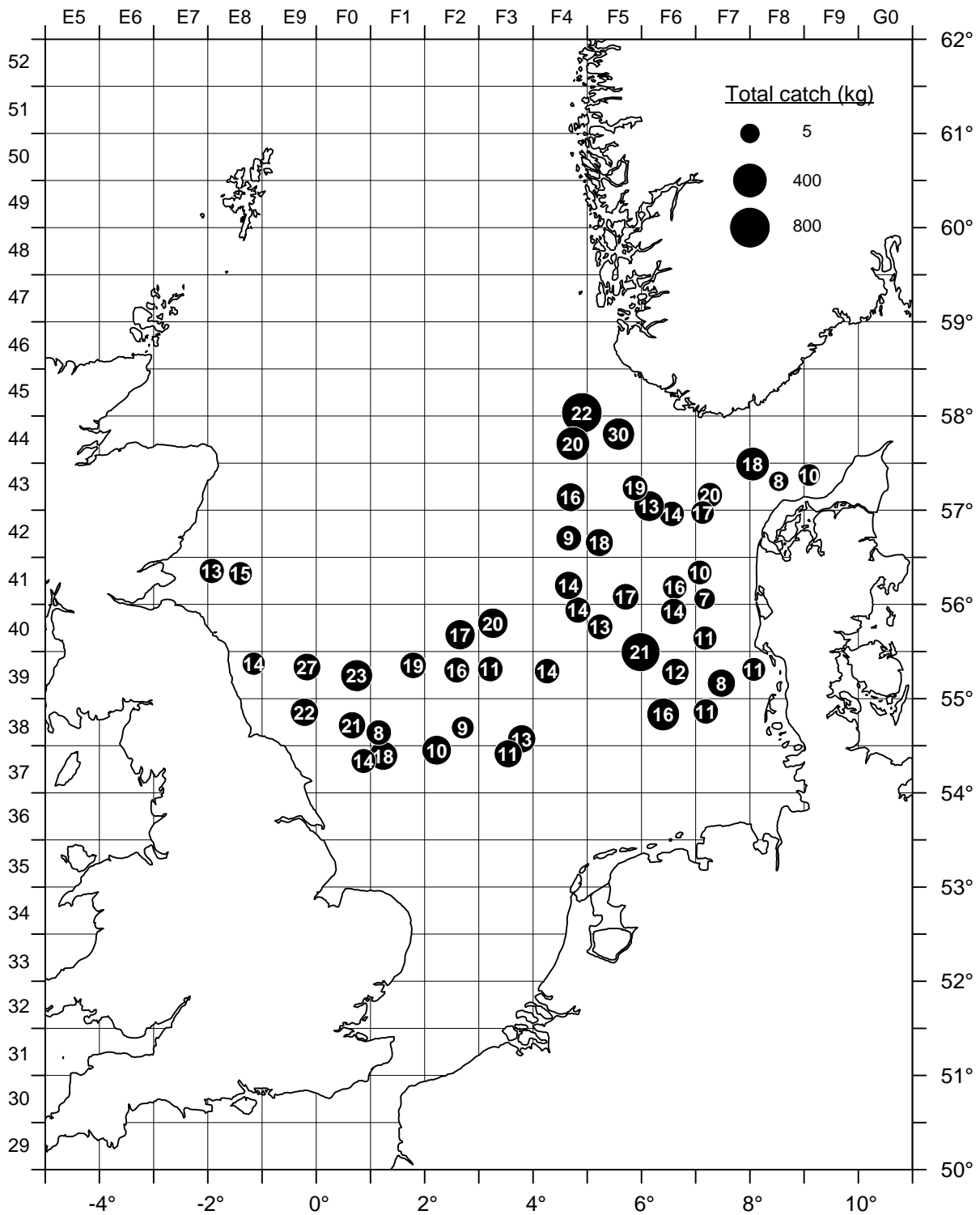


Fig. 4: Total catch (symbols) and species richness (numbers), Dana DK IBTS 1Q 2018.

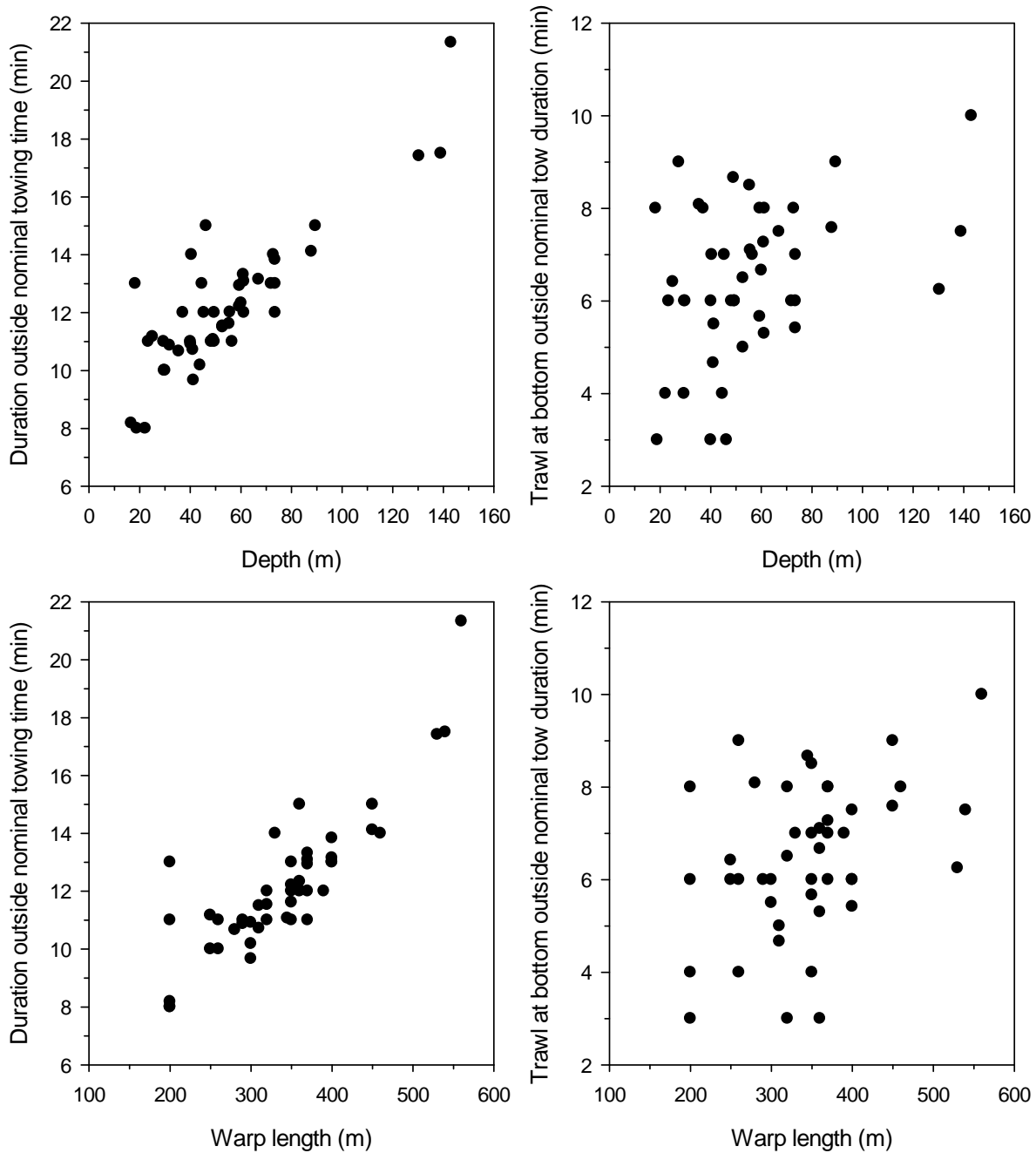


Fig. 5: Total fishing time and trawling time at bottom outside the nominal tow duration of standard 30 min tows, Dana DK IBTS 1Q 2018.

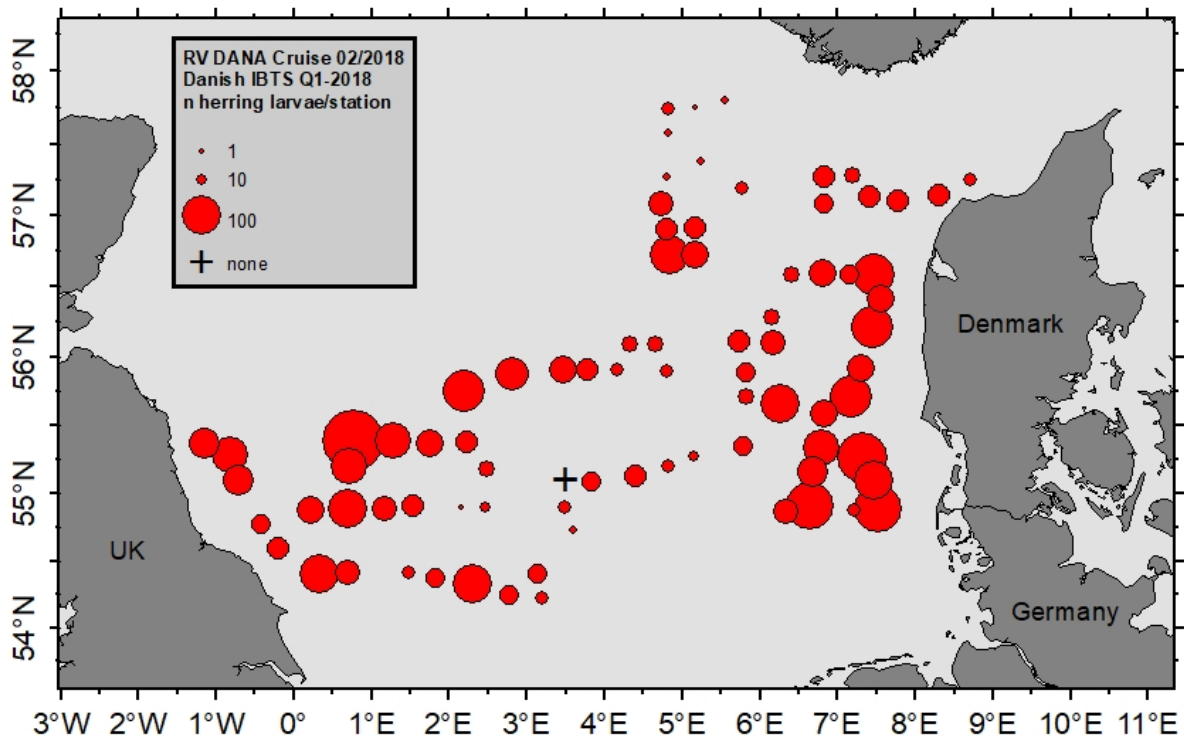


Fig. 6: Distribution of herring larvae, Dana DK IBTS 1Q 2018.

Tab. 1: Species list, Dana DK IBTS 1Q 2018 (L: total length in mm below (fish); ML: mantle length (cephalopods); CPL or CPW: carapace length or width (crustaceans)).

Latin name	English name	Danish name	Weight (kg)	Number	L _{min}	L _{max}	Remark
<i>Aequipecten opercularis</i>	Queen scallop	Jomfrøster	0.204	4			
<i>Agonus cataphractus</i>	Pogge	Panser ulk	0.876	37	60	170	
<i>Alloteuthis subulata</i>	European common squid	Dværgblæksprutte	52.775	13885	20	140	ML
<i>Alosa fallax</i>	Twaited shad	Stavsild	0.832	1	430	430	
<i>Amblyraja radiata</i>	Starry ray	Tærbe	10.037	20	130	520	
<i>Ammodytes marinus</i>	Sandeel	Tobis-hav	24.870	3106	50	190	
<i>Anarhichas lupus</i>	Catfish	Stribet havkat	3.800	3	470	600	
<i>Argentina sphyraena</i>	Lesser silver smelt	Strømsild	4.427	132	130	250	
<i>Arnoglossus laterna</i>	Scaldfish	Tungehvarre	0.157	15	80	130	
<i>Buglossidium luteum</i>	Solenette	Tastunge	0.150	16	60	120	
<i>Callionymus lyra</i>	Common dragonet	Stribet fløjfisk	0.774	20	80	240	
<i>Callionymus maculatus</i>	Spotted dragonet	Plettet fløjfisk	0.056	5	100	140	
<i>Cancer pagurus</i>	Edible crab	Taskekrabbe	18.463	32	94	206	CPW
<i>Capros aper</i>	Boarfish	Havgalt	0.019	1	100	100	
<i>Chelidonichthys lucerna</i>	Tub gurnard	Rød knurhane	0.230	1	270	270	
<i>Ciliata mustela</i>	Five-bearded rockling	Femtrådet havkvabbe	0.124	2	140	210	
<i>Clupea harengus</i>	Herring	Sild	1150.275	48294	65	325	
<i>Cyclopterus lumpus</i>	Lumpfish	Stenbider	0.543	2	170	200	
<i>Echiichthys vipera</i>	Lesser weever	Fjæsing lille	1.849	66	90	170	
<i>Eledone cirrhosa</i>	Horned octopus	Eledone Blæksprutte	0.467	5			
<i>Enchelyopus cimbrius</i>	Four-bearded rockling	Firetrådet havkvabbe	0.668	14	170	260	
<i>Engraulis encrasicolus</i>	Anchovy	Ansjos	0.392	37	70	180	
<i>Entelurus aequoreus</i>	Snake pipefish	Snippe	0.022	1	470	470	
<i>Eutrigla gurnardus</i>	Grey gurnard	Grå knurhane	690.183	8408	80	420	
<i>Gadiculus argenteus</i>	Silvery pout	Søltorsk	0.076	14	70	100	
<i>Gadus morhua</i>	Cod	Torsk	227.903	156	130	980	
<i>Gasterosteus aculeatus</i>	Three-spined stickleback	Trepigget hundestejle	0.022	9	50	70	
<i>Glyptocephalus cynoglossus</i>	Witch	Skærsing	5.219	18	210	450	
<i>Gymnammodytes semisquamatus</i>	Smoothed sandeel	Tobis-nøgen	0.087	12	120	175	
<i>Helicolenus dactylopterus</i>	Blackbelly rosefish	Blåkjefte	0.135	9	90	100	
<i>Hippoglossoides platessoides</i>	American plaice	Håising	38.727	1043	60	300	
<i>Homarus gammarus</i>	Lobster	Almindelig hummer	0.674	1	98	98	
<i>Hyperoplus lanceolatus</i>	Greater sandeel	Tobiskonge	0.159	2	250	320	
<i>Illex coindetii</i>	Southern shortfin squid		1.574	50	60	120	ML
<i>Lampetra fluviatilis</i>	River lamprey	Flodlampret	0.021	1	310	310	
<i>Leucoraja naevus</i>	Cuckoo ray	Pletrokke	1.228	2	370	510	
<i>Limanda limanda</i>	Common dab	Ising	965.194	15383	60	330	
<i>Lithodes maja</i>	Norway king crab	Troldkrabbe	9.341	22	61	109	CPL
<i>Loligo forbesii</i>	Northern squid		10.269	70	70	270	ML
<i>Loligo vulgaris</i>	European squid		7.524	34	140	280	ML
<i>Lophius piscatorius</i>	Monk	Havtaske	34.142	20	160	790	
<i>Maurolicus muelleri</i>	Pearlside	Laksesild	0.002	1	60	60	
<i>Melanogrammus aeglefinus</i>	Haddock	Kuller	137.119	766	150	450	
<i>Merlangius merlangus</i>	Whiting	Hvilling	768.296	7681	70	440	
<i>Merluccius merluccius</i>	Hake	Kulmule	9.061	60	130	330	
<i>Microstomus kitt</i>	Lemon sole	Rødtunge	24.764	163	160	360	
<i>Mullus surmuletus</i>	Striped red mullet	Stribet (rød) Mulle	1.154	34	110	220	
<i>Mustelus asterias</i>	Starry smooth-hound	Stjermehaj	5.252	16	380	620	
<i>Myoxocephalus scorpius</i>	Sculpin	Ulk	2.835	38	80	240	
<i>Myxine glutinosa</i>	Haifish	Slimål	0.025	1	300	300	
<i>Nephrops norvegicus</i>	Norway lobster	Jomfruhummer	7.417	194	23	60	CPL
<i>Pecten maximus</i>	Scallop	Stor kammusling	0.317	2			
<i>Pholis gunnellus</i>	Butter fish	Tangspræl	0.021	1	190	190	
<i>Platichthys flesus</i>	Flounder	Skrubbe	2.129	12	200	310	
<i>Pleuronectes platessa</i>	Plaice	Rødspætte	193.199	1145	110	570	
<i>Pollachius virens</i>	Saithe	Sej	23.395	23	300	730	
<i>Pomatoschistus spp.</i>	Sand gobies	Sand kutlinger	0.002	2	40	60	
<i>Raja clavata</i>	Thornback ray	Sømrøkke	0.978	1	500	500	
<i>Raja montagui</i>	Spotted Ray	Storpletet Røkke	4.315	9	310	550	
<i>Rossia macrosoma</i>	Stout bobtail squid	Ross's blæksprutte	0.047	12			
<i>Sardina pilchardus</i>	Pilchard	Sardin	0.239	26	80	130	
<i>Scomber scombrus</i>	Mackerel	Makrel	1001.752	12476	160	280	
<i>Scophthalmus maximus</i>	Turbot	Pighvarre	2.532	3	320	380	
<i>Scyliorhinus canicula</i>	Lesser-spotted dogfish	Småpletet rødhaj	13.604	19	350	630	
<i>Sepia officinalis</i>	Common cuttlefish	Sepiablæksprutte	0.062	2	50	60	ML
<i>Sepiolla atlantica</i>	Atlantic bobtail squid		0.009	6			
<i>Solea solea</i>	Sole	Tunge	1.976	7	220	340	
<i>Sprattus sprattus</i>	Sprat	Brisling	632.567	153140	50	140	
<i>Todaropsis eblanae</i>	Lesser flying squid		0.058	3	60	70	ML
<i>Trachinus draco</i>	Greater weever fish	Fjæsing	3.194	15	190	380	
<i>Trachurus trachurus</i>	Horsemackerel	Hestemakrel	0.599	11	100	250	
<i>Trisopterus esmarkii</i>	Norway pout	Sperling	133.160	12702	80	210	
<i>Trisopterus minutus</i>	Poor-cod	Glyse	1.718	35	110	210	
<i>Zeus faber</i>	John dory	Sct. peter fisk	0.261	2	190	200	

Tab. 2: Number of single fish data (length, weight, sex and maturity) and samples for ageing, Dana DK IBTS 1Q 2018.

Species	Total number
Herring (<i>Clupea harengus</i>)	529
Sprat (<i>Sprattus sprattus</i>)	319
Cod (<i>Gadus morhua</i>)	121
Haddock (<i>Melanogrammus aeglefinus</i>)	149
Whiting (<i>Merlangius merlangus</i>)	625
Saithe (<i>Pollachius virens</i>)	19
Norway pout (<i>Trisopterus ermarkii</i>)	53
Mackerel (<i>Scomber scombrus</i>)	93
Plaice (<i>Pleuronectes platessa</i>)	457
Hake (<i>Merluccius merluccius</i>)	14
Witch flounder (<i>Glyptocephalus cynoglossus</i>)	18
Dab (<i>Limanda limanda</i>)	207
Lemon sole (<i>Microstomus kitt</i>)	120
Grey gurnard (<i>Eutrigla gurnardus</i>)	207
Sum:	2931

Tab. 3: Preliminary abundance indices (number per hour trawling) for commercial IBTS species per rectangle, Dana DK IBTS 1Q 2018.

Station	Square	SIL	BRS	HVL	KUL	MAK	SPE	TOR
1	43F9	293	610	84				
8	40F7	604	12595	4				
9	39F7	3961	38044	66				
11	38F7	2743	16834	10				
22	38F6	21157	78450	48				
23	39F6	6598	6161	60				
25	39F5	31315	35774	245		4		
35	38F3	271	1653	99				
36	37F3	254	5769	206				
38	38F2		30	2				
40	37F2		8737	2				
50	37F1		48	93			2	
51	37F0		694	2				
53	38F0		14	28		2	239	
55	38F1		925	4				
65	39E8	2	5199	109			20	
66	39E9		42	18	4	2	563	
68	38E9			12			272	
78	39F2	12		22				
79	39F1	2	2	18		16		
81	39F0			37			122	
91	39F3	20						
92	39F4	10		80				
95	39F8	1054	10705	20				
104	41F5	3341	4770	205				2
106	40F5	18	52	202				
108	41E8			1935				8
109	41E8	4	499	187	34		10	
111	40F2	4		32	2	136	867	
113	40F3	16		67	2	122	4	
123	40F4	2		18		331		
124	41F4	2		62		1161		
126	42F4			24				
128	42F5	335	75	195		32	4	
135	41F7	443	1126	10				
136	41F6	1769	6476	30				
138	40F6	3002	15361	28				
140	41F7	332	371	16				
145	43F8	107	253	8				
146	43F8	1311	40	318	56	1821	400	4
153	43F7	2561	1077	65		2	8	
155	42F7	1757	619	6				
157	42F6	118	26	395				2
159	43F6	884		30		4		4
169	44F5	8		11		910	23284	
172	45F4			10	2	4139	535	
173	44F4			28	80	6502		
182	43F4			60	2	305		2
183	43F5			52		871		