

R/V Dana

Cruise 07/2019

"DK IBTS 3Q 2019"



Vessel: R/V DANA

Cruise dates (planned): 30/7 – 16/8 2019

Cruise number: 07/19

Cruise name: DK IBTS 3Q 2019

Port of departure:	Hirtshals	Date:	30 July
Port of return:	Hirtshals	Date:	15 August
Other ports:	Esbjerg	Date and justification:	7 August: Scheduled exchange of scientific staff and crew

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
Tom Svoldgaard	DTU Aqua, Monitoring	Technician, Fish lab
Brian Thomsen	DTU Aqua, Monitoring	Technician, Fish lab
Jesper Knudsen	DTU Aqua, Monitoring	Technician, Fish lab
Ronny Sørensen	DTU Aqua, Monitoring	Technician, CTD, Maintenance
Gitte Høj Jensen	DTU Aqua	Scientist, Fish lab
Peter Munk	DTU Aqua	Scientist, Fish eggs and larvae
Ditte Maja Noach	DTU Aqua	Scientist, Fish eggs and larvae
Nicolas Smith Sanchez	Geomar Kiel	Scientist, Jellyfish

Leg 2: Esbjerg – Hirtshals		
Name	Institute	Function and main tasks
Kai Wieland	DTU Aqua, Monitoring	Cruise leader, Fish lab
Reinhardt Jensen	DTU Aqua, Monitoring	Technician, Fish lab
Lise Sindahl	DTU Aqua, Monitoring	Technician, Fish lab
Dirk Tijssen	DTU Aqua, Monitoring	Technician, Fish lab
Jens Holm	DTU Aqua, Monitoring	Technician, Fish lab
Ronny Sørensen	DTU Aqua, Monitoring	Technician, CTD, Maintenance
Bastian Huwer	DTU Aqua	Scientist, Fish eggs and larvae
Ditte Maja Noach	DTU Aqua	Scientist, Fish eggs and larvae
Nicolas Smith Sanchez	GEOMAR Kiel	Scientist, Jellyfish

Objectives

The survey is part of the 3rd 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 3rd quarter since 1991.

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 3rd 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 collect information of the amount and distribution of marine litter

The area to be covered by Denmark with RV Dana in the 3rd quarter 2019 was allocated during the IBTS Working Group meeting in April 2019. 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 10-IBTS IX. 86 pp.). Additional requests from the IBTS WG for the 3Q survey in 2019 were to collect information on the trawl setting and retrieval duration of the standard 30 minute tows. Additional plankton sampling with a MIK net and collection of water samples was conducted during night.

Itinerary

R/V Dana left Hirtshals on Tuesday 30th July at 10:45 local time. The field work started in the western Skagerrak (Fig. 1). The vessel stayed in the port of Esbjerg on Wednesday 7th August from 8:00 to 13:00 for a scheduled exchange of scientific staff and crew. Favorable weather conditions prevailed in particular during the 1st cruise leg whereas more rough conditions were met during a few days during the 2nd cruise leg (Fig. 2). R/V Dana returned to Hirtshals on Thursday 15th August at 12:45 local time.

Achievements

The original working area consisted of 48 ICES statistical rectangles located in the Skagerrak and the North Sea and in 7 of these rectangles two stations were planned (Fig. 1). The southernmost rectangle 37F0 was not covered because the planned position (in Belgian waters) is no longer accessible (track crossing a cable) and no application for French waters where alternative tracks in this rectangle are located had been made.

The following activities were carried out:

53 valid standard 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 all of hauls two Vonin flyers were used replacing the standard kite.

53 CTD profiles (with additional sensors for dissolved oxygen, fluorescence and turbidity) at standard GOV stations.

Results

Routine sampling

The trawl parameters for the standard tows (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). The remaining deviations from the theoretical values for door spread and in particular net opening are likely due to the high sensibility of the GOV to current effects. Sensors for wing spread have not been available on this survey.

In total, 78 different species of fish and invertebrates were found in catches. The total weight of the catches from the 53 tows has been 26 tons (Tab. 1). Total catch of fish, cephalopods and shellfish and species richness in the standard tows ranged from 34 kg to 3.4 tons and from 10 to 28 different fish and IBTS invertebrate species with low and species-poor catches predominantly recorded in the north-western part of the survey area (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 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 indicate that e.g. whiting but also sprat, mackerel and plaice were widely distributed in the survey area whereas cod was quite rare and it appears noteworthy that only few 0-group cod was caught (Tab. 3).

Total 'fishing' time and additional time the trawl was on the bottom outside the nominal tow duration of the 30 min standard tows ranged from 8 to 15 min and 3 to 8 min, respectively, of which total fishing time is positively correlated to depth, and winch speed during deployment and retrieval amounted to about 1 m/s on average (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 36.8 kg.

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. The 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

Selected fish and squid species collections were taken for education and open ship arrangements at DTU Aqua.

Stomachs of mackerel (both cruise legs) as well as from turbot and cod (for Thünen Institute of Sea Fisheries during the 2nd cruise leg) were collected.

Results of the plankton and water sampling conducted during night will be reported at a later time somewhere else.

Others

A cruise summary report has been delivered online to

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

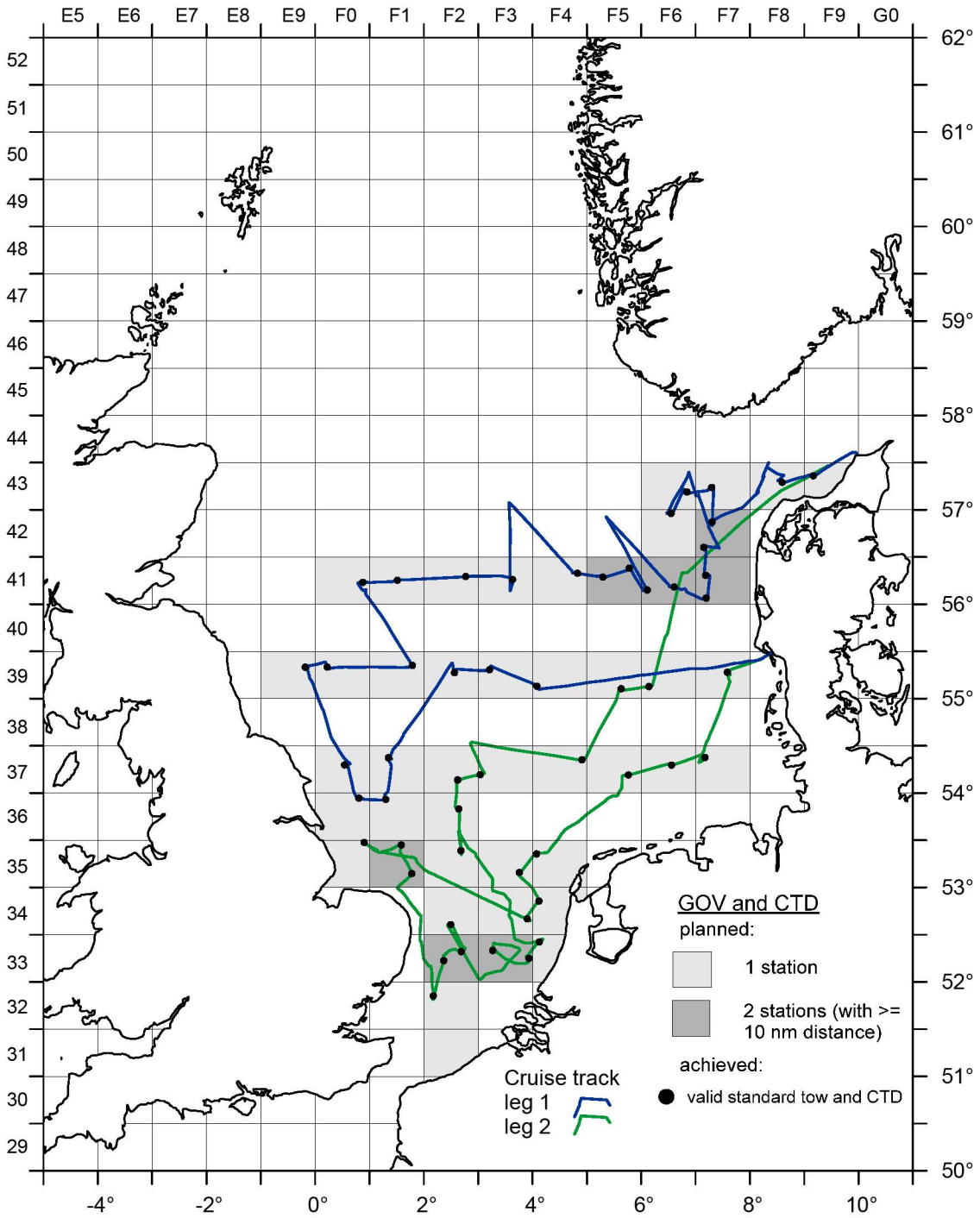


Fig. 1: Survey map with cruise track and sampling locations, Dana DK IBTS 3Q 2019.

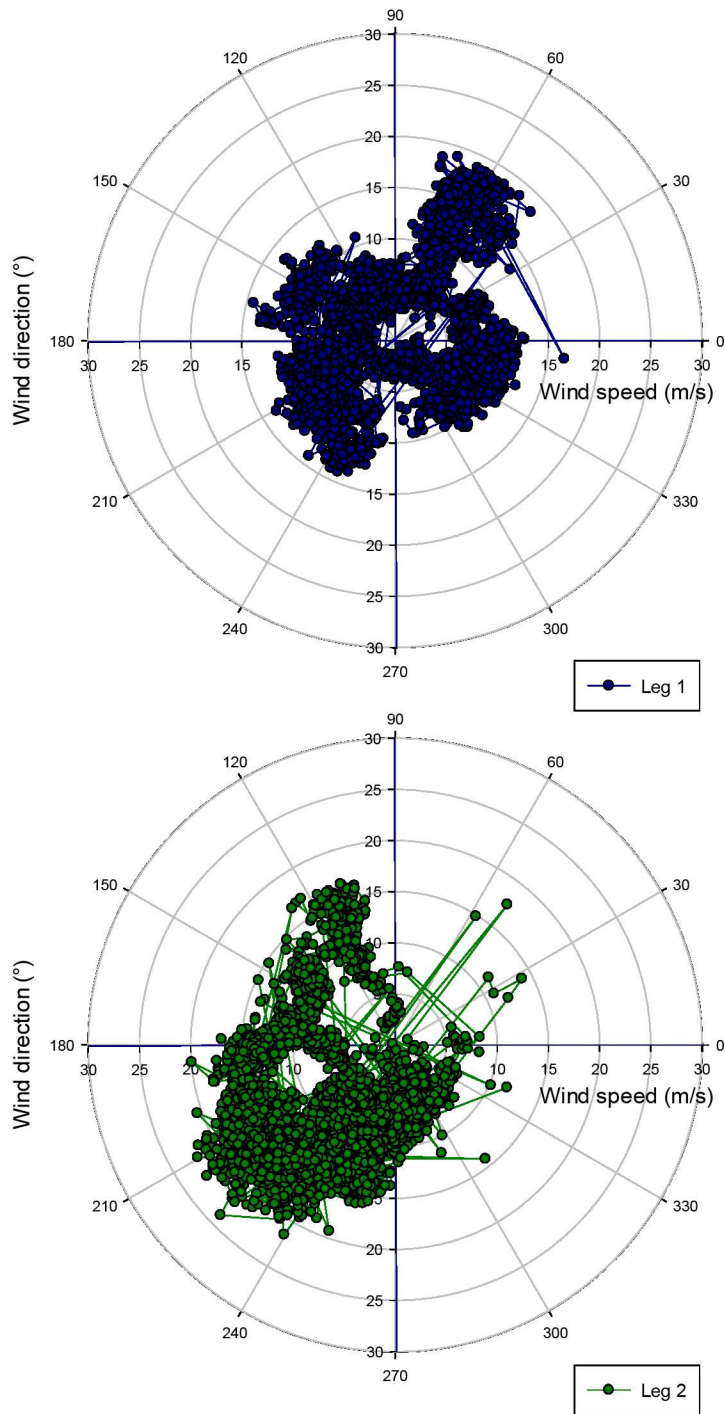


Fig. 2. Wind speed (m/s) and wind direction (°) recorded along the cruise track, Dana DK IBTS 3Q 2019.

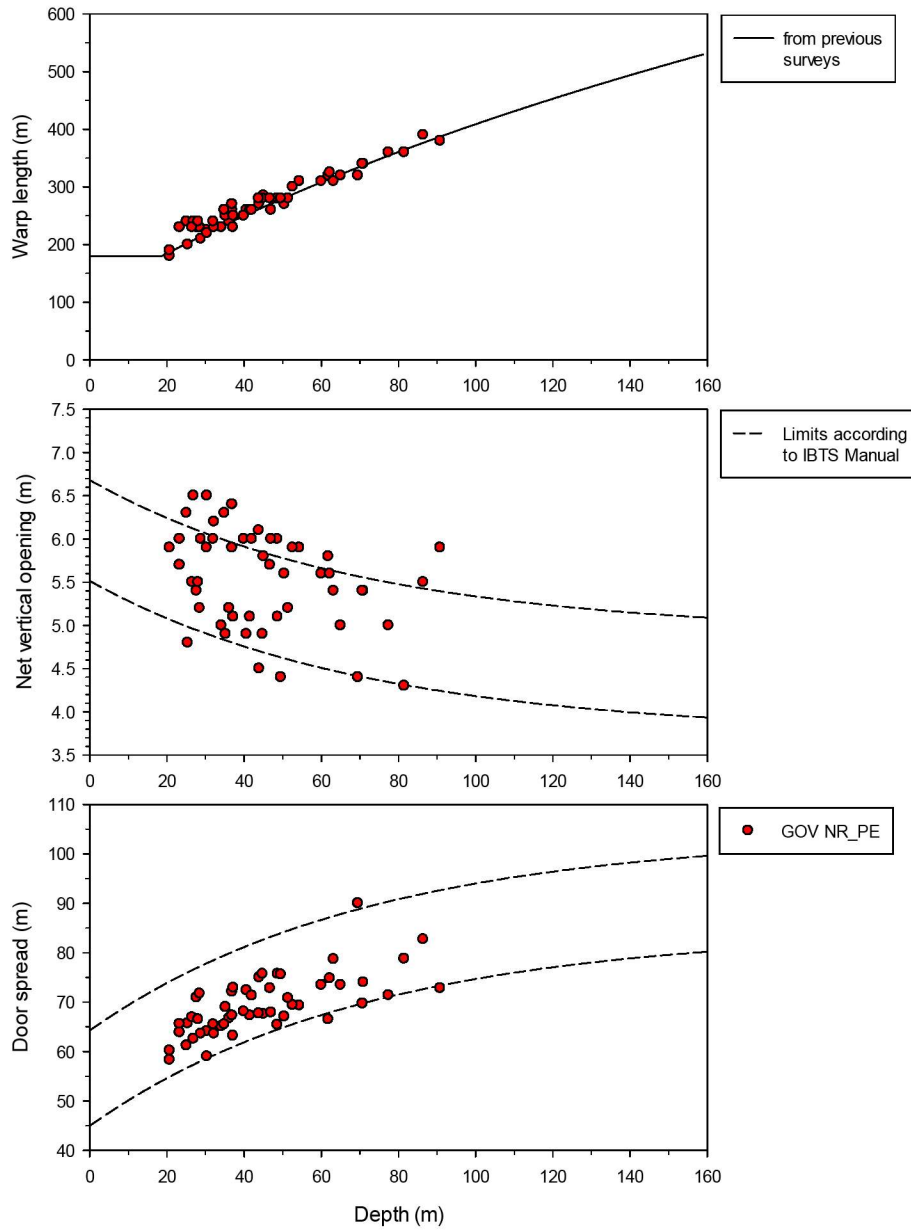


Fig. 3: Warp length, net opening and door spread in relation to depth, Dana DK IBTS 3Q 2019.

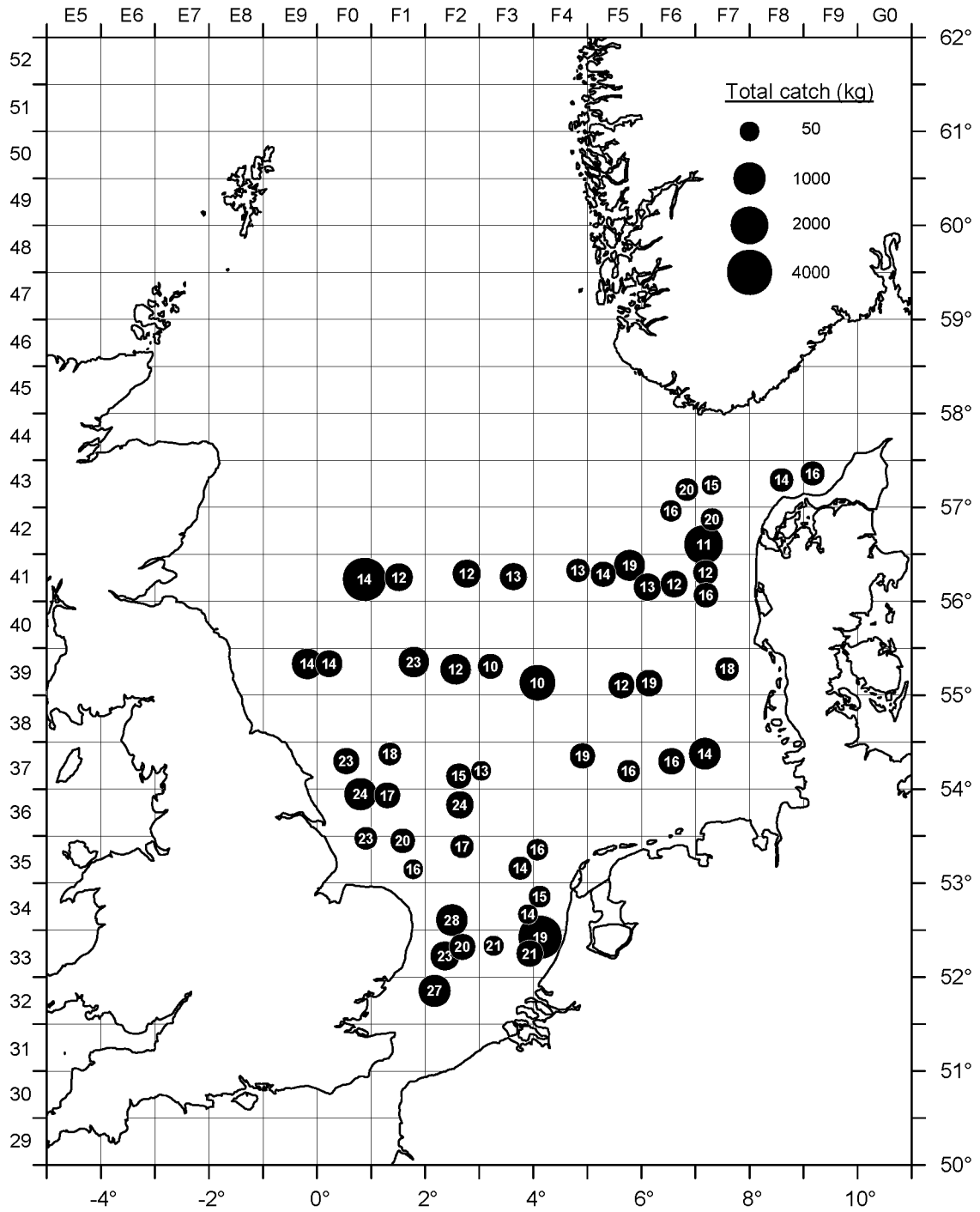


Fig. 4: Total catch (symbols) and species richness (numbers), Dana DK IBTS 3Q 2019.

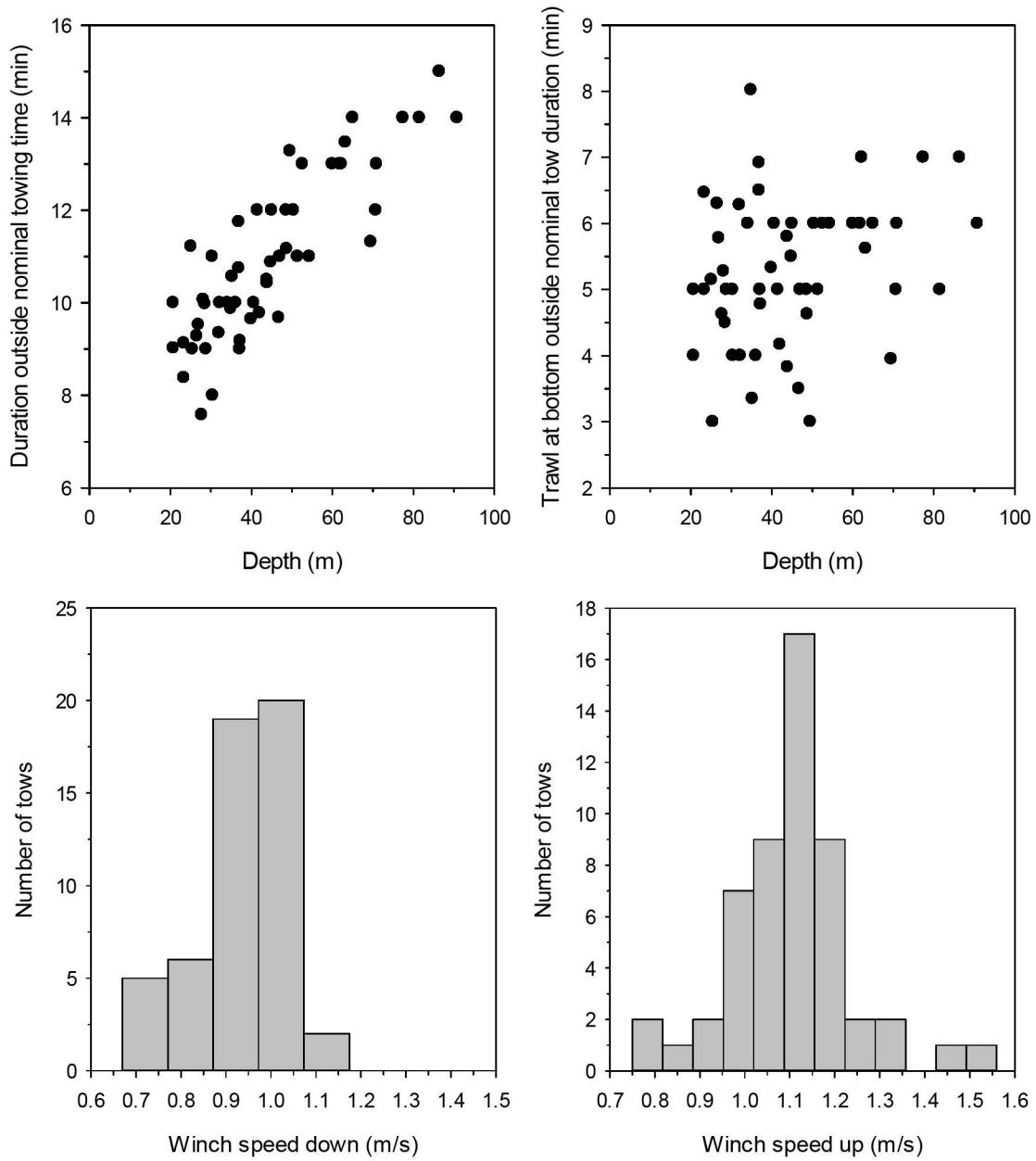


Fig. 5: Fishing times outside the nominal tow duration and winch speeds during descend and ascent, Dana DK IBTS 3Q 2019.

Tab. 1: Species list, Dana DK IBTS 3Q 2019 (L: total length in cm 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} (cm)	L _{max} (cm)	Remark
Aequipecten opercularis	Queen scallop	Jomfrugøsters	1.71	41	-	-	
Agonus cataphractus	Pogge	Panser ulk	0.04	2	12.0	14.0	ML
Alloteuthis subulata	European common squid	Dværgeblæksprutte	30.95	4430	1.0	14.0	
Alosa fallax	Twaite shad	Stavsil	0.58	1	42.0	42.0	
Amblyraja radiata	Starry ray	Tærbe	11.15	26	8.0	46.0	
Ammodytes marinus	Lesser sandeel	Tobis-hav	3.74	373	7.0	19.5	
Anarhichas lupus	Catfish	Stribet havkat	3.82	1	72.0	72.0	
Arnoglossus laterna	Scaldfish	Tungeharve	0.07	5	10.0	12.0	
Bathyraja brachyurops	Blonde ray	Blond rokke	5.74	4	31.0	72.0	
Buglossidium luteum	Solenette	Glastunge	0.25	23	8.0	12.0	
Callionymus lyra	Common dragonet	Stribet fløjfisk	1.82	50	10.0	24.0	
Cancer pagurus	Edible crab	Taskekrabbe	69.17	135	5.0	20.3	CPW
Chelidonichthys cuculus	Red gurnard	Tværstribet knurhane	0.35	3	21.0	26.0	
Chelidonichthys lucerna	Tub gurnard	Rød knurhane	11.45	32	15.0	62.0	
Clupea harengus	Herring	Sild	8053.85	421132	6.5	31.5	
Dicentrarchus labrax	Sea bass	Havbars	32.44	21	38.0	71.0	
Echiichthys vipera	Lesser weever	Fjæsing lille	53.62	2392	6.0	18.0	
Eledone cirrhosa	Horned octopus	Eledone Blæksprutte	0.07	2	4.0	4.0	ML
Enchelyopus cimbrius	Four-bearded rockling	Firetrådet havkvabbe	0.91	28	13.0	23.0	
Engraulis encrasicolus	Anchovy	Ansjos	1.24	41	12.0	18.0	
Entelurus aequoreus	Snake pipefish	Snippe	0.01	1	38.0	38.0	
Eutrigla gurnardus	Grey gurnard	Grå knurhane	602.31	6911	10.0	39.0	
Gadus morhua	Cod	Torsk	42.30	104	8.0	65.0	
Galeorhinus galeus	Tope	Gråhaj	53.78	5	65.0	149.0	
Glyptocephalus cynoglossus	Witch	Skærsing	1.25	4	28.0	40.0	
Gymnammodytes semisquamatus	Smoothed sandeel	Tobis-nøgen	35.59	2531	14.0	20.5	
Hippoglossoides platessoides	American plaice	Håising	49.24	920	10.0	27.0	
Homarus gammarus	Lobster	Almindelig hummer	18.85	32	5.6	14.5	CPL
Hyperoplus lanceolatus	Greater sandeel	Tobiskonge	131.40	5797	14.5	33.0	
Illex coindetii	Southern shortfin squid		5.34	89	6.0	21.0	ML
Lepidorhombus whiffiagonis	Megrim	Glashvarre	0.19	1	24.0	24.0	
Leucoraja naevus	Cuckoo ray	Pletrokke	0.54	2	33.0	38.0	
Limanda limanda	Common dab	Ising	2016.74	29894	10.0	35.0	
Liparis montgoui	Montague's seasnail	Særfinnet ringbug	0.00	1	3.0	3.0	
Lithodes maja	Norway king crab	Troidkrabbe	3.18	10	3.3	11.0	CPL
Loliginidae			25.39	1144	3.0	25.0	ML
Loligo forbesii/vulgaris			0.18	40	2.0	8.0	ML
Loligo forbesii	Northern squid		19.38	191	3.0	36.0	ML
Loligo vulgaris	European squid		3.01	10	15.0	30.0	ML
Lophius piscatorius	Monkfish	Havtaske	9.36	5	20.0	66.0	
Lumpenus lampretaeformis	Snake blenny	Spidshalet langebarn	0.04	1	33.0	33.0	
Melanogrammus aeglefinus	Haddock	Kuller	2140.26	67531	7.0	45.0	
Merlangius merlangus	Whiting	Hvilling	5164.18	104536	4.0	41.0	
Merluccius merluccius	Hake	Kulmule	28.98	28	26.0	89.0	
Microstomus kitt	Lemon sole	Rødtunge	126.30	1012	7.0	35.0	
Molva molva	Ling	Lange	0.44	1	44.0	44.0	
Mullus surmuletus	Striped red mullet	Stribet (rød) Mulle	59.31	739	13.0	29.0	
Mustelus asterias	Starry smooth-hound	Stjernehaj	286.87	113	61.0	112.0	
Mustelus mustelus	Smooth hound	Glathaj	182.43	73	55.0	108.0	
Myoxocephalus scorpius	Sculpin	ULK	1.13	11	12.0	22.0	
Nephrops norvegicus	Norway lobster	Jomfruhummer	5.94	183	2.3	5.7	CPL
Pecten maximus	King scallop	Stor kammusling	0.06	1	-	-	
Pholis gunnellus	Butter fish	Tangspræl	0.06	4	12.0	18.0	
Platichthys flesus	Flounder	Skrubbe	2.26	8	27.0	39.0	
Pleuronectes platessa	Plaice	Rødspætte	337.60	2472	10.0	49.0	
Pollachius pollachius	Pollack	Lyssej	4.90	7	38.0	51.0	
Pollachius virens	Saithe	Sej	13.76	16	34.0	51.0	
Raja clavata	Thornback ray	Sømrrokke	24.85	12	38.0	92.0	
Raja montagui	Spotted Ray	Storpletet Rokke	21.41	24	23.0	73.0	
Rossia macrosoma	Stout bobtail squid	Ross's blæksprutte	0.00	1	-	-	
Sardina pilchardus	Pilchard	Sardin	108.07	6095	9.0	14.0	
Scomber scombrus	Mackerel	Makrel	608.89	3226	20.0	38.0	
Scophthalmus maximus	Turbot	Pighvarre	20.84	29	19.0	48.0	
Scophthalmus rhombus	Brill	Slethvarre	3.87	12	24.0	34.0	
Scyliorhinus canicula	Lesser spotted dogfish	Småpletet rødhaj	195.19	382	32.0	68.0	
Sebastes viviparus	Redfish	Lille rødfisk	0.06	1	14.0	14.0	
Solea solea	Sole	Tunge	0.97	11	19.0	24.0	
Sprattus sprattus	Sprat	Brisling	4306.31	522229	4.5	14.5	
Squalus acanthias	Picked dogfish	Pighaj	0.31	2	30.0	33.0	
Syngnathidae sp.	Pipefish	Tangnål	0.00	1	12.0	12.0	
Todarodes sagittatus	Flyveblæksprutte	Flyveblæksprutte	0.51	3	16.0	17.0	ML
Todaropsis eblanae	Lesser flying squid		0.45	5	9.0	16.0	ML
Trachinus draco	Greater weever fish	Fjæsing	14.72	79	18.0	40.0	
Trachurus trachurus	Horse mackerel	Hestemakrel	1214.87	12223	3.0	36.0	
Trisopterus esmarkii	Norway pout	Sperling	34.11	8180	5.0	19.0	
Trisopterus luscus	Whiting pout	Skægtorsk	111.99	921	13.0	27.0	
Trisopterus minutus	Poor-cod	Glyse	22.20	565	8.0	20.0	
Zeus faber	John dory	Sct. peter fisk	1.58	6	23.0	25.0	

Tab. 2: Number of single fish data (length, individual weight, and sex; maturity for whiting and hake) and samples for ageing, Dana DK IBTS 3Q 2019.

Species	Total
Herring (<i>Clupea harengus</i>)	339
Sprat (<i>Sprattus sprattus</i>)	265
Cod (<i>Gadus morhua</i>)	82
Haddock (<i>Melanogrammus aeglefinus</i>)	197
Whiting (<i>Merlangius merlangus</i>)	582
Saithe (<i>Pollachius virens</i>)	10
Norway pout (<i>Trisopterus ermarkii</i>)	10
Mackerel (<i>Scomber scombrus</i>)	224
Plaice (<i>Pleuronectes platessa</i>)	676
Hake (<i>Merluccius merluccius</i>)	23
Sum:	2408

Tab. 3: Preliminary abundance indices (number per hour trawling) for commercial IBTS species per tow, Dana DK IBTS 3Q 2019.

St No	Age:	COD			HADDOCK			WHITING			NORWAY POUT			HERRING			SPRAT		MACKEREL			SAITHE			PLAICE				
		<18	18-37	≥38	<17	17-29	≥30	<17	17-23	≥24	<13	13-15	≥16	<15.5	15.5-22.4	≥23	<13	≥13	<17	17-29	≥30	<22	22-32	≥33	<10	10-18	≥19		
1	43F9						6	2											48	6						313	799		
3	43F8			2			20	173											14	28							161		
10	42F7		4	2	2		101	4					32	2												8	136		
11	43F7		24		351	2	2	10	98	20			40													4	30		
13	43F6		22	22	484	6	10	6	160	50	60		2	18		4	16					32			2	122			
15	42F6		10	2	48	2	2	2	125	139																	24		
22	42F7						36	6	2			11555	99693		19439	5752										221	201		
24	41F7						16	16				1485	1420		728	105			34	30					80	56			
25	41F7																		532	17						58	44		
27	41F6							26	2			7872	5810		10204	1093			6							80	104		
34	41F6		2	2	8		34	64	6			934	7		94143											42	93		
36	41F5	2	14	2	576		1729	733	165		2	6079	8676	29	82683	984			4						8	16			
37	41F5				10446		574	10	2			2555	3599	2	1719	462										2	30		
39	41F4		2		4705		408	16	2			2	8													4	30		
46	41F3		2		6910	4	6	1273	264	196			2	4	2	4											46		
47	41F2		2		11870	112	38		2163	1187																	22		
49	41F1		16		3665	884	982		175	799																	52		
51	41F0		2		3074	945	626		346	382	16079	6	28		1122	34273											4		
58	39F1		4		40322	517		3250	694	41					6				4		2					2	148		
59	39F0				157		36		42	34	16	8	74		1443	2578	153	153			2						6		
62	39E9		16			162	211		11282	3261					16												4	92	
69	37F0	4			531	9		24	2285	2045					2	2	1248	143								14	54		
70	36F0		4		64			1899	24309	1321							1444	42		2	4					28	46		
72	36F1				98			3430	44	6				24184		39020											18	38	
74	37F1				8			6772	22	6				4		216	10		318	28						6	34		
81	39F2				44448			32034	378	24				2		1033	86										2	111	
83	39F3				2122	58			50	2												1206	15				12		
84	39F4				80			16	86	4				1632	52	289099	4859										2	42	
90	39F7							6	4						2		2		28	630	64						42	4	
98	37F7							7687	628					4322			173373	388									6	24	
100	37F6							7139	113					4886		21605	473	8	166	2							16	26	
101	37F5							1475	11					54	2		86	2		126	2						2	14	
109	35F4							220	28							162	8			16							38	74	
110	35F3								12	2								28	134	4							18	14	
112	34F4							30	20												121	42					10		
114	34F3							10	22											44	8						44	16	
121	35F0	16	4					2	18	40						4				56	4								
122	35F1				2			4	8	2										803	70						48	98	
124	35F1							4	377	54				2		254	10				2						10	18	
130	32F2		14						2837	4000				4	2												44	20	
131	33F2								2770	3731				111	127	40884				143	2						6	10	
133	33F2			2				2	88	36						20				369	12						4	14	
135	34F2		6						8876	5249				10	2					327	55						17	68	
142	33F3							4		4										20	2						12	26	
143	33F3							309	74	2				38405	6	8522	666	660	29								32	36	
146	33F4	2						12036	3811	4				533898	78	123281	2491		182								74	10	
154	35F2							1759	54					1231		16762	13											56	76
155	36F2				2			6707	1359	191				36087	2	30582				4								37	
158	37F2							10828	3332	432	16			1131		2187	6											2	16
160	37F3															30				16								6	64
167	37F4							8683	337					924		6854			2	8								34	88
169	39F5		2		50	4		3016	2094					2306	1176	20	16646											4	150
170	39F6				4			3458	338					2230		2	43298			28	4								