

Cruise Report

**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

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

## Participants

<b>Leg 1: Hirtshals – Esbjerg</b>		
<b>Name</b>	<b>Institute</b>	<b>Function and main tasks</b>
Helle Rasmussen	DTU Aqua, Monitering	Cruise leader, Fish lab
Maria Jarnum	DTU Aqua, Monitering	Technician, Fish lab
Tom Svoldgaard	DTU Aqua, Monitering	Technician, Fish lab
Brian Thomsen	DTU Aqua, Monitering	Technician, Fish lab
Jesper Knudsen	DTU Aqua, Monitering	Technician, Fish lab
Ronny Sørensen	DTU Aqua, Monitering	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

<b>Leg 2: Esbjerg – Hirtshals</b>		
<b>Name</b>	<b>Institute</b>	<b>Function and main tasks</b>
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 3<sup>rd</sup> 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 3<sup>rd</sup> 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 3<sup>rd</sup> 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 3<sup>rd</sup> 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 30<sup>th</sup> 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 7<sup>th</sup> August from 8:00 to 13:00 for a scheduled exchange of scientific staff and crew. Favorable weather conditions prevailed in particular during the 1<sup>st</sup> cruise leg whereas more rough conditions were met during a few days during the 2<sup>nd</sup> cruise leg (Fig. 2). R/V Dana returned to Hirtshals on Thursday 15<sup>th</sup> 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 à 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 2<sup>nd</sup> 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](http://seadata.bsh.de/csr/online/V1_index.html).

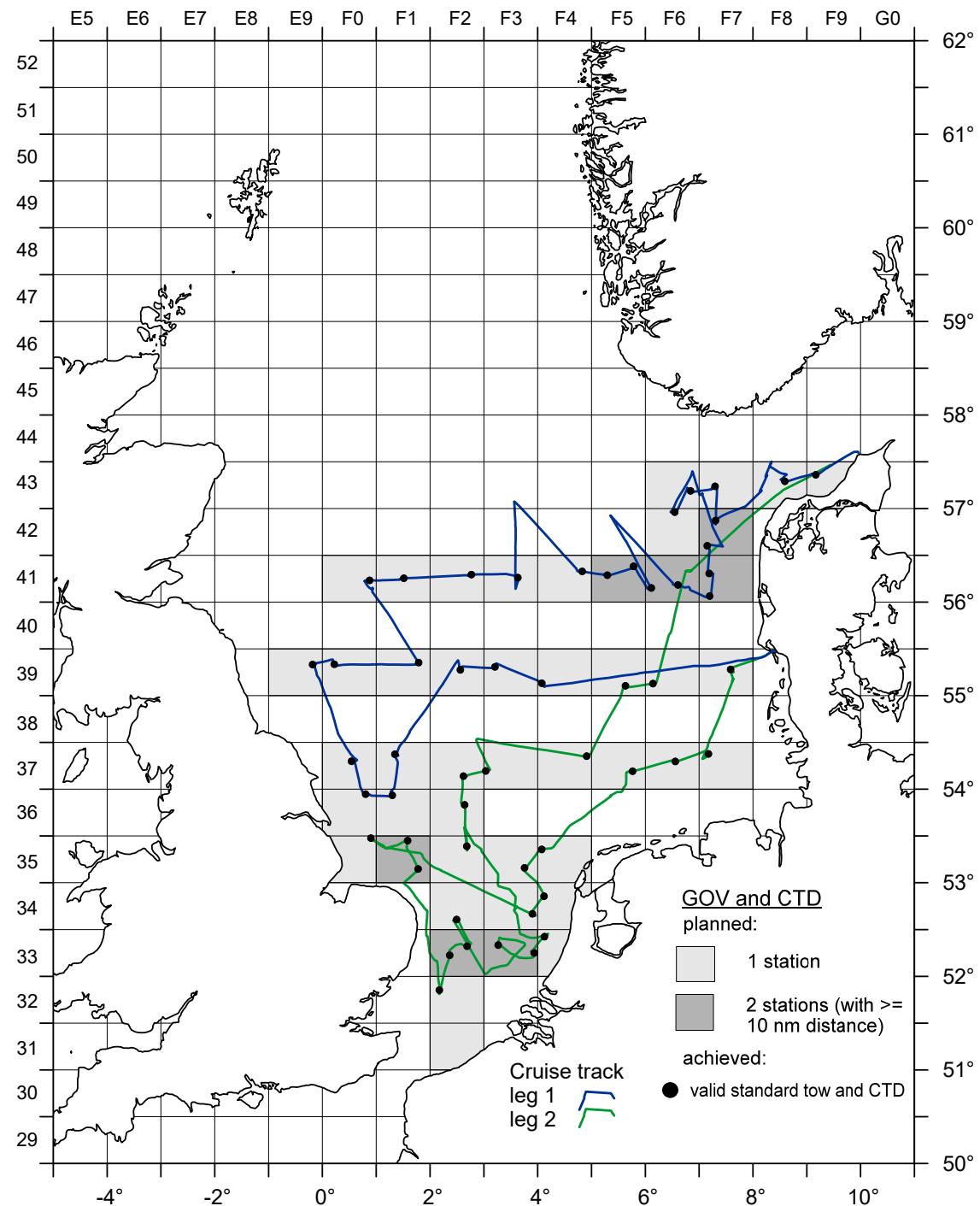


Fig. 1: Survey map with cruise track and sampling locations, Dana DK IBTS 3Q 2019.

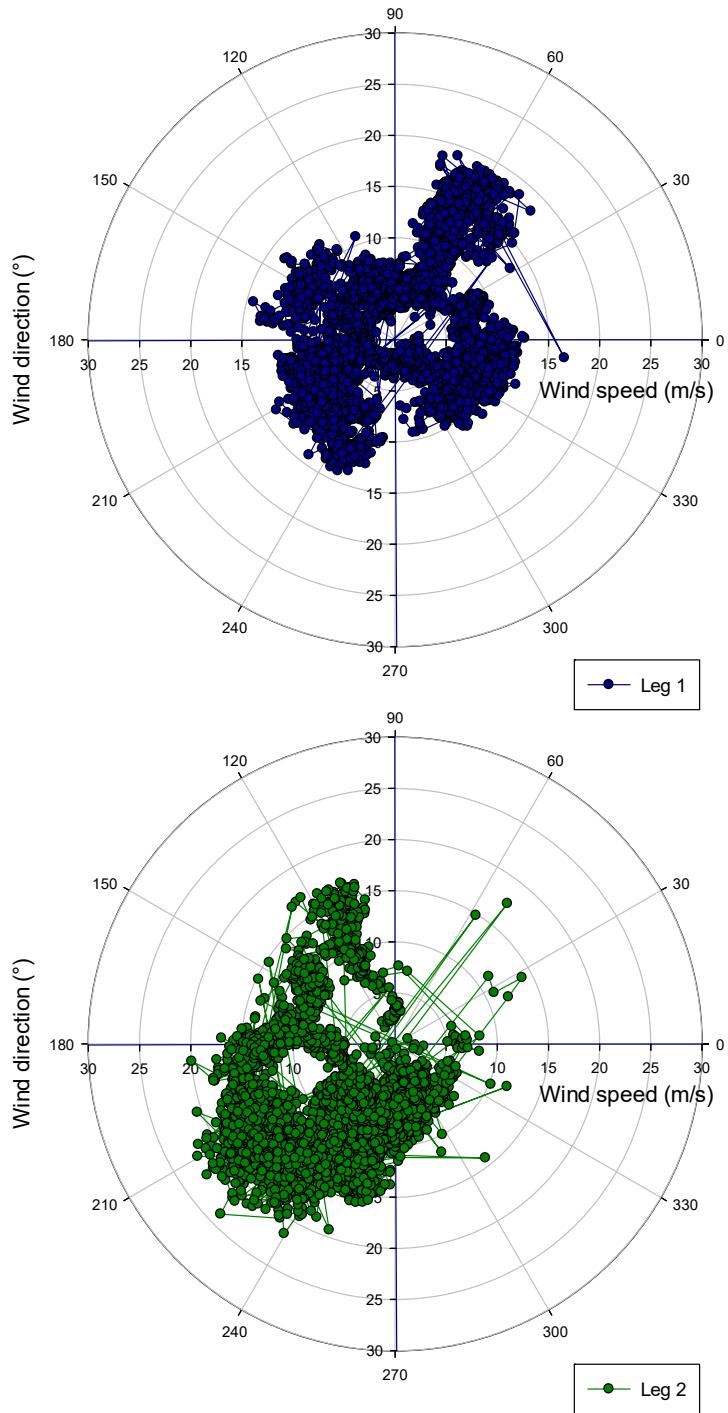


Fig. 2. Wind speed (m/s) and wind direction ( $^{\circ}$ ) recorded along the cruise track, Dana DK IBTS 3Q 2019.

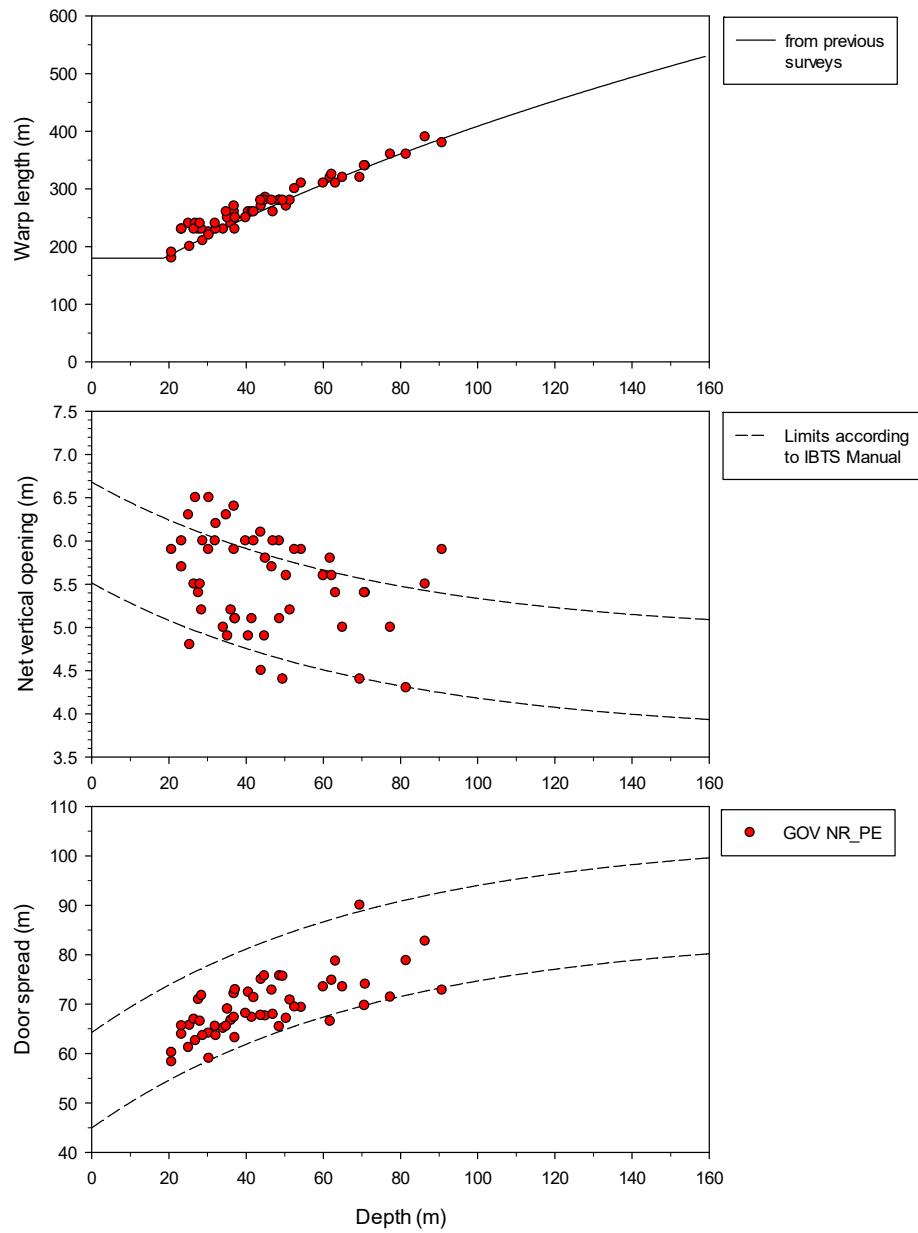


Fig. 3: Warp length, net opening and door spread in relation to depth, Dana DK IBTS 3Q 2019.

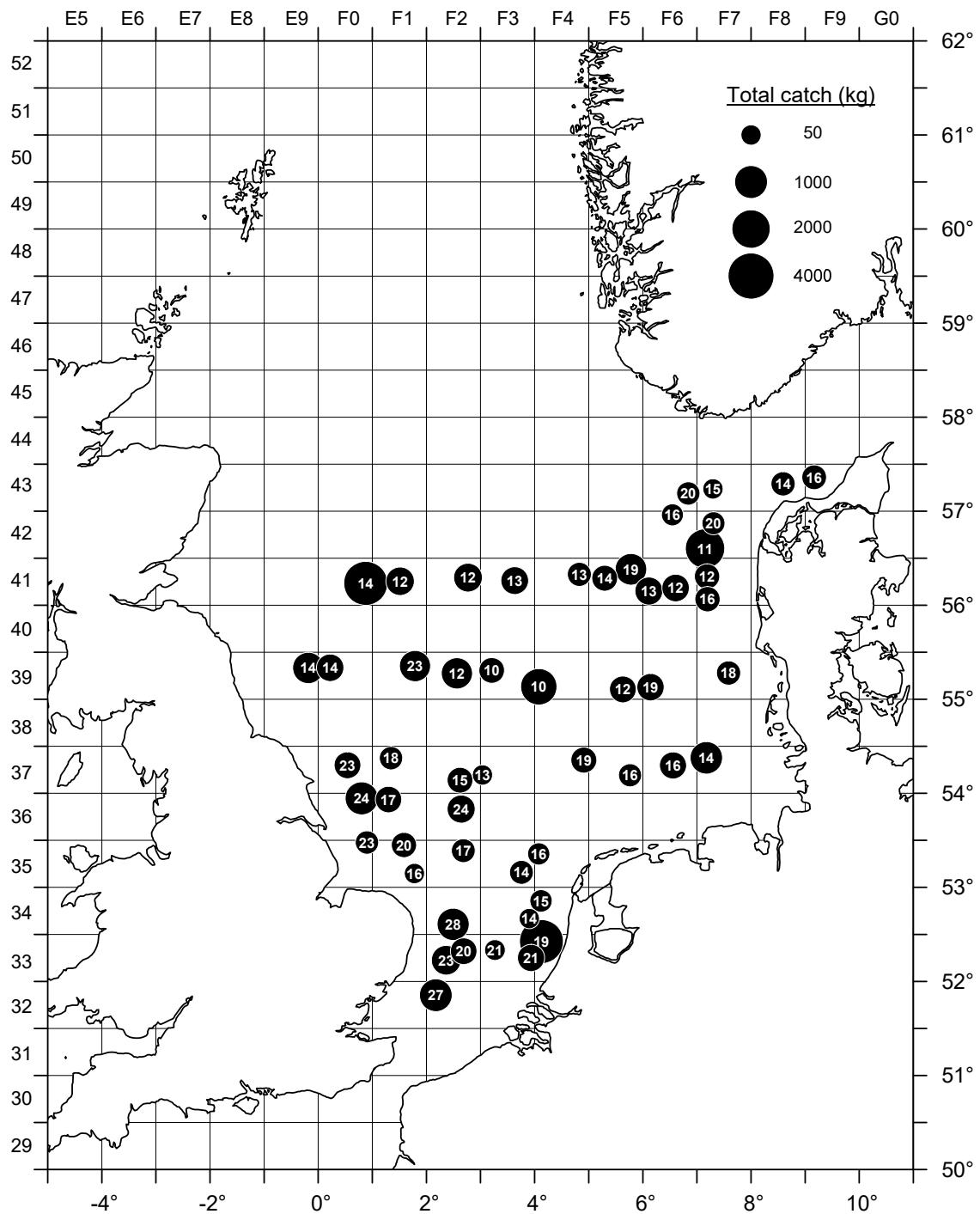


Fig. 4: Total catch (symbols) and species richness (numbers), Dana DK IBTS 3Q 2019.

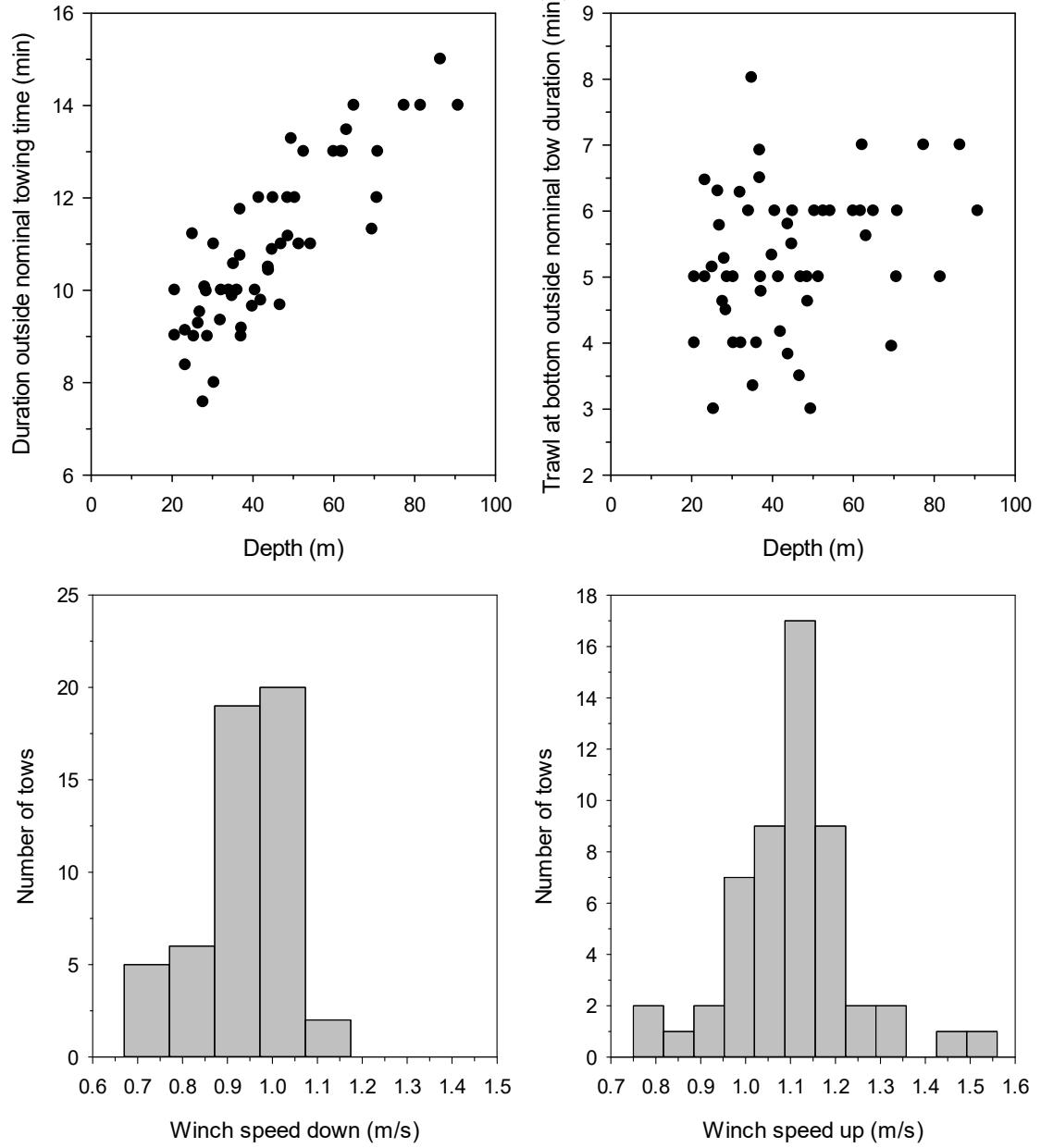


Fig. 5: Fishing times outside the nominal tow duration and winch speeds during descend and ascent, Dana DK IBTS 3Q 2019.

Tab. 1: Species list, Dana DK IBTS 3Q 2019 (L: total length in cm below (fish); ML: mantle length (cephhalopods); CPL or CPW: carapace length or width (crustaceans)).

Latin name	English name	Danish name	Weight (kg)	Number	L <sub>min</sub> (cm)	L <sub>max</sub> (cm)	Remark
<i>Aequipecten opercularis</i>	Queen scallop	Jomfrusters	1.71	41	-	-	
<i>Agonus cataphractus</i>	Pogge	Panser ulk	0.04	2	12.0	14.0	ML
<i>Alloteuthis subulata</i>	European common squid	Dværgbækspritte	30.95	4430	1.0	14.0	
<i>Alosa fallax</i>	Twaite shad	Stavslid	0.58	1	42.0	42.0	
<i>Amblyraja radiata</i>	Starry ray	Tærbe	11.15	26	8.0	46.0	
<i>Ammodytes marinus</i>	Lesser sandeel	Tobis-hav	3.74	373	7.0	19.5	
<i>Anarhichas lupus</i>	Catfish	Stribet havkat	3.82	1	72.0	72.0	
<i>Arnoglossus laterna</i>	Scaldfish	Tungehvarre	0.07	5	10.0	12.0	
<i>Bathyraja brachyurops</i>	Blonde ray	Blond rokke	5.74	4	31.0	72.0	
<i>Buglossidium luteum</i>	Solenette	Glastunge	0.25	23	8.0	12.0	
<i>Callionymus lyra</i>	Common dragonet	Stribet fløjfisk	1.82	50	10.0	24.0	
<i>Cancer pagurus</i>	Edible crab	Taskekrabbe	69.17	135	5.0	20.3	C PW
<i>Chelidonichthys cuculus</i>	Red gurnard	Tværstribet knurhane	0.35	3	21.0	25.0	
<i>Chelidonichthys lucerna</i>	Tub gurnard	Rød knurhane	11.45	32	15.0	52.0	
<i>Clupea harengus</i>	Herring	Sild	8053.85	421132	6.5	31.5	
<i>Dicentrarchus labrax</i>	Sea bass	Havbars	32.44	21	38.0	71.0	
<i>Echiichthys vipera</i>	Lesser weever	Fjæsing lille	53.62	2392	6.0	18.0	
<i>Eledone cirrhosa</i>	Horned octopus	Eledone Blæksprutte	0.07	2	4.0	4.0	ML
<i>Enchelyopus cimbrius</i>	Four-bearded rockling	Firetrådet havkabbe	0.91	28	13.0	23.0	
<i>Engraulis encrasicolus</i>	Anchovy	Ansjos	1.24	41	12.0	18.0	
<i>Entelurus aequoreus</i>	Snake pipefish	Snippe	0.01	1	38.0	38.0	
<i>Eutrigla gurnardus</i>	Grey gurnard	Grå knurhane	602.31	6911	10.0	39.0	
<i>Gadus morhua</i>	Cod	Torsk	42.30	104	8.0	65.0	
<i>Galeorhinus galeus</i>	Tope	Gråhaj	53.78	5	65.0	149.0	
<i>Glyptocephalus cynoglossus</i>	Witch	Skærising	1.25	4	28.0	40.0	
<i>Gymnammodytes semisquamatus</i>	Smoothed sandeel	Tobis-nøgen	35.59	2531	14.0	20.5	
<i>Hippoglossoides platessoides</i>	American plaice	Häising	49.24	920	10.0	27.0	
<i>Homarus gammarus</i>	Lobster	Almindelig hummer	18.85	32	5.6	14.5	CPL
<i>Hyperoplus lanceolatus</i>	Greater sandeel	Tobiskonge	131.40	5797	14.5	33.0	
<i>Illex coindetii</i>	Southern shortfin squid		5.34	89	6.0	21.0	ML
<i>Lepidorhombus whiffiagonis</i>	Megrim	Glashvarre	0.19	1	24.0	24.0	
<i>Leucoraja naevus</i>	Cuckoo ray	Petrokke	0.54	2	33.0	38.0	
<i>Limanda limanda</i>	Common dab	Ising	2016.74	29894	10.0	35.0	
<i>Liparis montagui</i>	Montague's seasnail	Særfinnet ringbug	0.00	1	3.0	3.0	
<i>Lithodes maja</i>	Norway king crab	Troldkrabbe	3.18	10	3.3	11.0	CPL
<i>Loliginidae</i>			25.39	1144	3.0	25.0	ML
<i>Loligo forbesi/vulgaris</i>			0.18	40	2.0	8.0	ML
<i>Loligo forbesii</i>	Northern squid		19.38	191	3.0	36.0	ML
<i>Loligo vulgaris</i>	European squid		3.01	10	15.0	30.0	ML
<i>Lophius piscatorius</i>	Monkfish	Havtaske	9.36	5	20.0	66.0	
<i>Lumpenus lacteus</i>	Snake blenny	Spidsblalet langebarn	0.04	1	33.0	33.0	
<i>Melanogrammus aeglefinus</i>	Haddock	Kuller	2140.26	67531	7.0	45.0	
<i>Merlangius merlangus</i>	Whiting	Hvilling	5164.18	104536	4.0	41.0	
<i>Merluccius merluccius</i>	Hake	Kulmule	28.98	28	26.0	89.0	
<i>Microstomus kitt</i>	Lemon sole	Rødtunge	126.30	1012	7.0	35.0	
<i>Molva molva</i>	Ling	Lange	0.44	1	44.0	44.0	
<i>Mullus surmuletus</i>	Striped red mullet	Stribet (rød) Mulle	59.31	739	13.0	29.0	
<i>Mustelus asterias</i>	Starry smooth-hound	Stjernehaj	286.87	113	61.0	112.0	
<i>Mustelus mustelus</i>	Smooth hound	Glatlhaj	182.43	73	55.0	108.0	
<i>Myoxocephalus scorpius</i>	Sculpin	Ulk	1.13	11	12.0	22.0	
<i>Nephrops norvegicus</i>	Norway lobster	Jomfruhummer	5.94	183	2.3	5.7	CPL
<i>Pecten maximus</i>	King scallop	Stor kammsuling	0.06	1	-	-	
<i>Pholis gunnellus</i>	Butter fish	Tangspræl	0.06	4	12.0	18.0	
<i>Platichthys flesus</i>	Flounder	Skrubbe	2.26	8	27.0	39.0	
<i>Pleuronectes platessa</i>	Plaice	Rødspætte	337.60	2472	10.0	49.0	
<i>Pollachius pollachius</i>	Pollack	Lysej	4.90	7	38.0	51.0	
<i>Pollachius virens</i>	Saithe	Sej	13.76	16	34.0	51.0	
<i>Raja clavata</i>	Thornback ray	Sømrøkke	24.85	12	38.0	92.0	
<i>Raja montagui</i>	Spotted Ray	Størpletet Rokke	21.41	24	23.0	73.0	
<i>Rossia macrosoma</i>	Stout bobtail squid	Ross's blæksprutte	0.00	1	-	-	
<i>Sardina pilchardus</i>	Pilchard	Sardin	108.07	6095	9.0	14.0	
<i>Scomber scombrus</i>	Mackerel	Makrel	608.89	3226	20.0	38.0	
<i>Scophthalmus maximus</i>	Turbot	Pighvarre	20.84	29	19.0	48.0	
<i>Scophthalmus rhombus</i>	Brill	Slethvarre	3.87	12	24.0	34.0	
<i>Scyliorhinus canicula</i>	Lesser spotted dogfish	Småpletet rødhaj	195.19	382	32.0	68.0	
<i>Sebastes viviparus</i>	Redfish	Lille rødfisk	0.06	1	14.0	14.0	
<i>Solea solea</i>	Sole	Tunge	0.97	11	19.0	24.0	
<i>Sprattus sprattus</i>	Sprat	Brisling	4306.31	522229	4.5	14.5	
<i>Squalus acanthias</i>	Picked dogfish	Pighaj	0.31	2	30.0	33.0	
<i>Syngnathidae sp.</i>	Pipefish	Tangnål	0.00	1	12.0	12.0	
<i>Todarodes sagittatus</i>	Flyveblæksprutte	Flyveblæksprutte	0.51	3	16.0	17.0	ML
<i>Todaropsis elongata</i>	Lesser flying squid		0.45	5	9.0	16.0	ML
<i>Trachinus draco</i>	Greater weever fish	Fjæsing	14.72	79	18.0	40.0	
<i>Trachurus trachurus</i>		Hestemakrel	1214.87	12223	3.0	36.0	
<i>Trisopterus esmarkii</i>	Norway pout	Sperling	34.11	8180	5.0	19.0	
<i>Trisopterus luscus</i>	Whiting pout	Skægtorsk	111.99	921	13.0	27.0	
<i>Trisopterus minutus</i>	Poor-cod	Glyse	22.20	565	8.0	20.0	
<i>Zeus faber</i>	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.

		COD			HADDOCK			WHITING			NORWAY POUT			HERRING			SPRAT			MACKEREL			SAithe			PLAICE				
Age:		0	1	2+	0	1	2+	0	1	2+	0	1	2+	1	2+	0	1	2+	0	1	2+	0	1	2+	0	1	2+			
Length:		<18	18-37	≥38	<17	17-29	≥30	<17	17-23	≥24	<13	13-15	≥16	<15.5	5.5-22.5	≥23	<13	≥13	<17	17-29	≥30	<22	22-32	≥33	<10	10-18	≥19			
St No	Rec																													
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										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		6							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						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								2		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							1	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							60		