

Cruise Report
FRV „Walther Herwig III“
Cruise 494
23.09. – 04.10.2025

Cruise lead: Dr. Lara Kim Hünenlage

International Herring Larvae Survey in the North Sea

1. Summary

This cruise is part of Germany's contribution to the International Herring Larvae Surveys (IHLS) in the North Sea. These surveys take place during the autumn and winter spawning period of herring. Coordinated by ICES, the program monitors the yearly spatial distribution and abundance of herring larvae. The findings offer insights into the spawning stock biomass and the relative contribution of different spawning groups to overall hatching success. These results are crucial for herring stock assessments and the determination of fishing quotas.

The spatial distribution of herring larvae was found somewhat more south-easterly than usual. Most larvae hatched east of the Orkneys. However, the overall abundance of herring larvae was relatively low in the whole area.

Conclusions about North Sea herring spawning stock dynamics can only be made once larval abundance data from all spawning areas are available - i.e., before the meeting of the herring assessment working group in March 2026.

2. Cruise objective

The cruise contributes to the International Herring Larvae Surveys (IHLS) to obtain estimates of herring larval abundance and map their spatial distribution.

Distribution list:

Schiffsführung FFS „Solea“, „Walther Herwig III“
BA für Landwirtschaft und Ernährung (BLE) Fischereiforschung
BM für Landwirtschaft, Ernährung und Heimat (BMLEH),
BA für Seeschifffahrt und Hydrographie (BSH), Hamburg
Deutscher Angelfischerverband e.V.
Deutsche Fischfang-Union, Cuxhaven
Deutscher Fischereiverband Hamburg
Doggerbank Seefischerei GmbH, Bremerhaven
Erzeugergemeinschaft der Deutschen Krabbenfischer GmbH
GEOMAR Helmholtz-Zentrum für Ozeanforschung Kiel
Kutter- und Küstenfisch Sassnitz
LA für Landwirtschaft, Lebensmittels. und Fischerei (LALLF)

LFA für Landwirtschaft und Fischerei MV (LFA)
Landesverband der Kutter- u. Küstenfischer MV e.V.
Leibniz-Institut für Ostseeforschung Warnemünde
Thünen-Institut - Institut für Fischereiökologie
Thünen-Institut - Institut für Seefischerei
Thünen-Institut - Institut für Ostseefischerei
Thünen-Institut - Pressestelle
Thünen-Institut - Präsidialbüro
Thünen-Institut - Reiseplanung Forschungsschiffe, Dr. Rohlfs
Fahrteilnehmer*innen

3. Cruise narrative

FRV "Walther Herwig III" was embarked on Tuesday, 23 September 2025, and left the port of Bremerhaven at noon.

The first survey area, Orkney/Shetlands, which was considered the highest priority area, was reached early in the morning on Thursday, 25 September 2025. The 24-hour sampling began at 2 a.m. (UTC) and continued for 37 stations until the evening of 26 September 2025, when poor weather conditions forced an interruption of the survey. The sampling resumed on Saturday 27 September until the Orkney/Shetlands area was completed after 92 hauls on 30 September.

The second survey area, Central North Sea, was reached before midnight (UTC) the same day. Owing to adverse weather forecasts indicating a risk of gale-force winds, the number of stations scheduled for sampling in the area had to be reduced. The remaining time was used as efficiently as possible to ensure a timely return to the home port, during which 41 stations in the area were successfully sampled.

With a total of 133 stations sampling was completed on Thursday evening, 2 October 2025 after which the vessel steamed back to the port of Bremerhaven. The cruise ended on Saturday, 4 October 2025.

4. Methodology and preliminary results

Plankton sampling was conducted using the "Nackthai" (a modified GULF III sampler) following the guidelines of the herring larvae survey manual. Physical parameters such as temperature, salinity, and conductivity were measured using a CTD unit mounted directly on the Gulf sampler. After the cruise, fish eggs and larvae were separated from the plankton samples. Herring larvae were counted, and their abundance per square meter was estimated. Length measurements are still ongoing, so length-frequency distributions are not yet available.

The spatial distribution of herring larvae was found more south-easterly than in previous years. (Figure 2). However, the overall abundance of herring larvae was low in the whole area, especially in the Central North Sea ("Banks"). It is unclear if this is a result of low hatching success or the timing of the cruise, referring to possible shifts in spawning and hatching time.

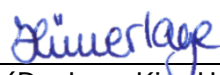
Information on stations, including water temperatures at the surface and near the sea bed and larval abundance estimates, is provided in Table 1 for Orkney/Shetlands and Table 2 for Central North Sea Area.

5. Cruise participants

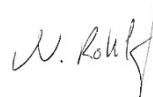
Name	Institution	Function
1. Lara Kim Hünerlage	TI-SF	Cruise lead
2. Birgit Suer	TI-SF	Technician
3. Karin Krüger	TI-SF	Technician
4. Martina Hefter-Siebold	TI-SF	Technician
5. Jörg Appel	TI-SF	Technician
6. Jesse Ramm	TI-SF	Student Assistant
7. Amalia Klein	TI-SF	Student Assistant

6. Acknowledgements

Sincere thanks are given to Captain Werner Stumpp and FRV "Walther Herwig III" crew members for their excellent support and hospitality and to all participants for their reliable and responsible teamwork.



(Dr. Lara Kim Hünerlage)



(Dr. Norbert Rohlf)

7. Tables and Figures

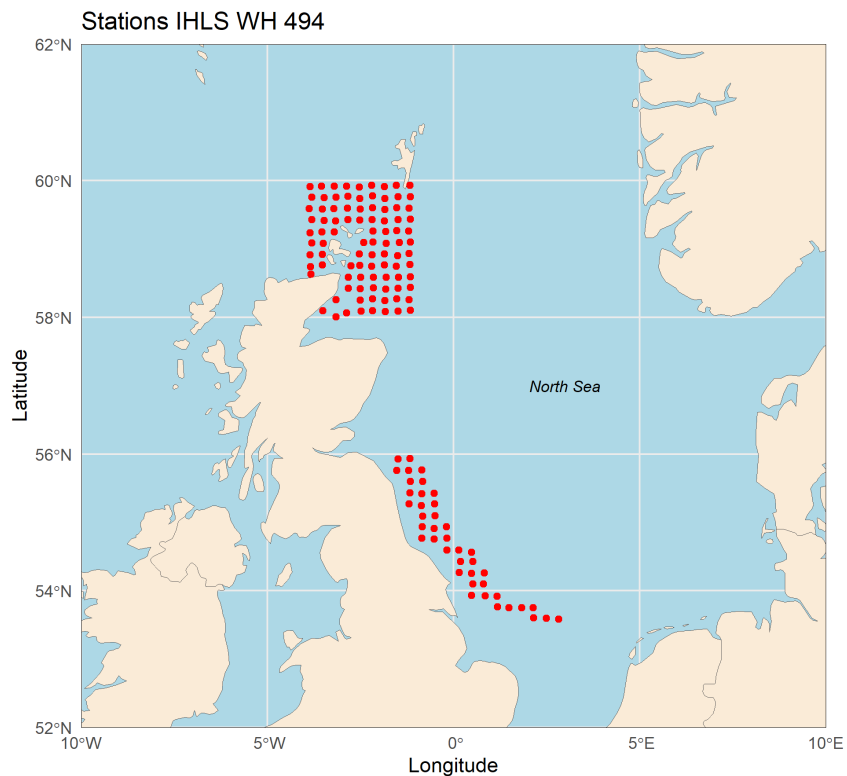


Figure 1: Overview of stations sampled during WH 494. For more details see Figure 2 and 3.

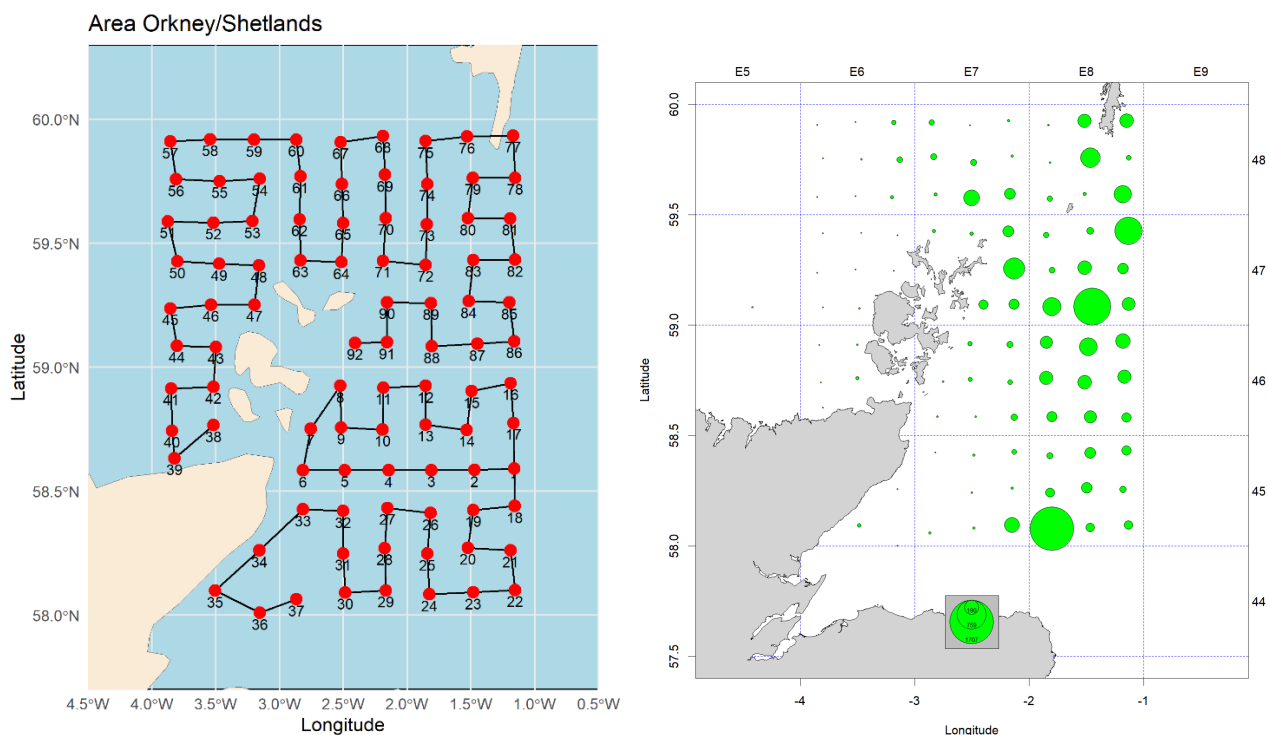


Figure 2: Stations sampled during WH 494 in the Orkney/Shetland area: station track with station number (left panel) and herring larvae abundance (n/m^2 ; right panel). See Table 1 for more information. In the right panel, the grey shaded box shows the reference circles representing 190, 759 and 1707 larvae per square metre.

Table 1: Information on stations, including larval abundance estimates ("Hela") and water temperature during WH 494 in the sampling area "Orkney/Shetlands".

Stat. Nr.	Haul Nr.	Lat. (° N)	Long.	E/ W	Date (UTC)	Time (UTC)	Dura tion (min)	Water depth (m)	Catch depth (m)	Flow (m³)	Hela (n/m²)	Sur- face T (°C)	Bottom T (°C)
550	1	58°34.87	001°09.33	W	25.09.25	02:12	20.31	108	104	122.5	87	13.46	11.39
551	2	58°35.06	001°28.24	W	25.09.25	03:18	20.26	111	108	117.2	141	13.47	12.04
552	3	58°35.03	001°48.41	W	25.09.25	04:26	17.32	97	94	102.9	100	13.61	13.44
553	4	58°35.00	002°08.45	W	25.09.25	05:32	14.35	78	75	87.1	44	13.74	13.74
554	5	58°35.05	002°28.83	W	25.09.25	06:36	13.20	74	72	81.8	6	13.83	13.8
555	6	58°35.02	002°48.66	W	25.09.25	07:42	10.19	67	63	59.6	6	13.81	13.82
556	7	58°44.66	002°45.15	W	25.09.25	08:45	10.24	71	68	54.7	5	13.84	13.85
557	8	58°54.90	002°31.27	W	25.09.25	09:58	12.31	75	72	75.8	21	13.87	13.89
558	9	58°45.25	002°31.02	W	25.09.25	11:04	11.50	76	72	69.4	19	13.89	13.83
559	10	58°44.54	002°10.91	W	25.09.25	12:06	13.04	81	79	75.7	25	13.88	13.77
560	11	58°54.63	002°10.66	W	25.09.25	13:11	13.38	80	77	78.4	39	13.88	13.5
561	12	58°55.29	001°51.13	W	25.09.25	14:15	17.54	91	87	116.5	143	13.74	13.24
562	13	58°45.66	001°51.23	W	25.09.25	15:25	16.01	90	87	95.7	169	13.78	13.26
563	14	58°44.50	001°31.62	W	25.09.25	16:30	20.48	110	107	120.4	182	13.55	12.06
564	15	58°54.11	001°29.47	W	25.09.25	17:36	19.59	108	106	113.4	295	13.48	13.26
565	16	58°55.68	001°11.24	W	25.09.25	18:55	22.39	120	117	139.2	198	13.4	10.49
566	17	58°45.91	001°10.00	W	25.09.25	20:07	18.04	111	108	109.2	165	13.44	11.46
567	18	58°25.83	001°09.23	W	25.09.25	22:06	18.11	102	99	106.5	83	13.38	12.48
568	19	58°25.26	001°28.59	W	25.05.25	23:15	20.06	105	102	112.3	111	13.51	12.76
569	20	58°15.76	001°30.84	W	26.09.25	00:22	22.11	141	120	124.0	106	13.46	12.66
570	21	58°15.38	001°11.24	W	26.09.25	01:33	16.24	96	93	89.9	44	13.37	12.7
571	22	58°05.64	001°08.74	W	26.09.25	02:36	18.57	103	100	107.6	72	13.42	12.61
572	23	58°04.91	001°28.55	W	26.09.25	03:46	14.04	84	81	77.9	73	13.55	13.38
573	24	58°04.59	001°48.91	W	26.09.25	04:53	15.42	89	86	88.7	1707	13.65	13.59
574	25	58°14.51	001°49.94	W	26.09.25	05:55	14.58	97	94	76.5	75	13.7	13.51
575	26	58°24.42	001°49.01	W	26.09.25	06:56	16.24	99	96	87.9	37	13.71	13.4
576	27	58°25.57	002°08.70	W	26.09.25	08:06	12.36	79	77	72.6	24	13.79	13.66
577	28	58°15.70	002°09.95	W	26.09.25	09:17	11.05	65	62	62.7	8	13.73	13.72
578	29	58°05.56	002°09.66	W	26.09.25	10:26	10.21	67	64	60.1	210	13.83	13.78
579	30	58°04.87	002°29.02	W	26.09.25	11:28	10.24	67	64	58.6	7	13.86	13.82
580	31	58°14.53	002°30.09	W	26.09.25	12:30	8.03	56	54	43.4	3	13.84	13.81
581	32	58°24.70	002°29.71	W	26.09.25	13:32	9.57	65	62	53.7	7	13.85	13.83
582	33	58°25.34	002°49.00	W	26.09.25	14:34	12.05	67	63	72.1	2	13.85	13.83
583	34	58°15.37	003°09.27	W	26.09.25	16:00	9.46	63	60	54.1	2	13.97	13.88
584	35	58°05.53	003°29.73	W	26.09.25	17:29	6.16	43	40	37.1	14	13.98	13.98
585	36	57°59.93	003°09.12	W	26.09.25	18:48	6.15	51	49	36.0	1	14.08	14.07
586	37	58°03.48	002°52.09	W	26.09.25	19:47	8.36	56	53	49.3	8	14.02	13.83
587	38	58°45.58	003°30.66	W	27.09.25	19:18	15.18	89	86	91.9	13	13.55	13.69
588	39	58°37.58	003°48.85	W	27.09.25	20:42	12.17	77	74	69.3	0	13.4	13.43
589	40	58°44.36	003°49.98	W	27.09.25	21:28	10.52	81	77	56.4	0	13.5	13.65
590	41	58°54.51	003°50.61	W	27.09.25	22:27	16.30	94	91	92.5	0	13.58	13.62
591	42	58°54.74	003°30.70	W	27.09.25	23:32	13.44	77	73	76.5	4	13.6	13.63
592	43	59°04.52	003°29.59	W	28.09.25	00:32	13.48	78	75	69.9	4	13.55	13.62
593	44	59°04.72	003°48.13	W	28.09.25	01:35	17.46	103	100	103.1	0	13.7	13.7
594	45	59°14.13	003°51.17	W	28.09.25	02:40	21.23	110	106	125.4	0	13.63	13.37
595	46	59°15.09	003°31.72	W	28.09.25	03:47	16.19	91	88	92.5	0	13.65	13.68
596	47	59°14.69	003°11.46	W	28.09.25	04:52	10.02	67	65	56.4	1	13.54	13.58

Table 1 (continued): Information on stations, including larval abundance estimates ("Hela") and water temperature during WH 494 in the sampling area "Orkney/Shetlands".

Stat. Nr.	Haul Nr.	Lat. (° N)	Long.	E/ W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m³)	Hela (n/m²)	Surface T (°C)	Bottom T (°C)
597	48	59°24.38	003°09.36	W	28.09.25	05:54	12.55	75	73	77.5	1	13.58	13.66
598	49	59°25.02	003°28.22	W	28.09.25	06:55	17.44	110	106	91.5	0	13.64	13.67
599	50	59°24.97	003°48.09	W	28.09.25	08:02	21.57	148	121	123.6	0	13.61	12.35
600	51	59°34.77	003°51.87	W	28.09.25	09:17	23.70	159	121	129.2	0	13.4	12.3
601	52	59°35.01	003°31.09	W	28.09.25	10:27	25.05	128	121	139.1	2	13.63	13.29
602	53	59°34.81	003°12.47	W	28.09.25	11:31	24.11	120	117	138.9	11	13.68	13.67
603	54	59°44.95	003°08.72	W	28.09.25	12:46	9.06	60	57	48.3	32	13.63	13.57
604	55	59°45.04	003°28.09	W	28.09.25	13:48	15.42	92	89	83.7	4	13.64	13.5
605	56	59°45.28	003°48.34	W	28.09.25	14:56	22.46	135	120	125.6	0	13.3	12.08
606	57	59°54.37	003°51.17	W	28.09.25	16:11	22.53	150	120	122.2	0	13.01	12.13
607	58	59°55.12	003°31.96	W	28.09.25	17:22	22.09	119	117	128.8	0	13.05	11.95
608	59	59°55.02	003°11.59	W	28.09.25	18:29	12.51	83	80	70.5	22	13.46	13.31
609	60	59°55.04	002°51.71	W	28.09.25	19:33	10.50	76	73	54.9	28	13.48	13.47
610	61	59°45.72	002°50.04	W	28.09.25	20:37	10.41	70	67	59.3	38	13.51	13.48
611	62	59°35.49	002°49.94	W	28.09.25	21:41	11.59	75	72	66.3	11	13.63	13.64
612	63	59°25.53	002°50.06	W	28.09.25	22:43	8.13	53	49	46.1	13	13.59	13.6
613	64	59°24.86	002°30.48	W	28.09.25	23:41	5.59	46	43	31.0	16	13.61	13.63
614	65	59°34.53	002°30.03	W	29.09.25	00:37	16.04	87	83	92.9	231	13.66	13.67
615	66	59°44.20	002°29.96	W	29.09.25	01:40	15.03	89	86	82.0	35	13.43	13.45
616	67	59°54.28	002°31.19	W	29.09.25	02:45	15.23	89	86	84.6	1	13.32	13.28
617	68	59°55.58	002°11.28	W	29.09.25	03:50	16.08	91	87	90.9	8	13.33	13.36
618	69	59°45.94	002°09.89	W	29.09.25	04:53	16.42	104	100	93.5	8	13.38	13.4
619	70	59°35.65	002°10.03	W	29.09.25	05:57	13.22	93	90	65.5	115	13.5	13.52
620	71	59°25.47	002°11.17	W	29.09.25	07:03	12.12	78	75	65.3	116	13.6	13.62
621	72	59°24.47	001°51.18	W	29.09.25	08:11	16.50	98	95	87.0	29	13.45	13.47
622	73	59°34.35	001°49.98	W	29.09.25	09:16	15.46	96	93	84.0	30	13.44	13.41
623	74	59°44.20	001°49.95	W	29.09.25	10:15	20.15	108	105	110.8	4	13.37	13.36
624	75	59°54.43	001°50.77	W	29.09.25	11:20	18.46	102	99	103.1	4	13.29	13.12
625	76	59°55.49	001°31.46	W	29.09.25	12:26	18.40	111	108	101.2	171	13.04	12.92
626	77	59°55.64	001°09.76	W	29.09.25	14:02	17.21	101	97	94.7	174	13.27	12.97
627	78	59°45.49	001°08.74	W	29.09.25	15:07	20.32	108	105	112.3	23	13.23	11.57
628	79	59°45.49	001°28.69	W	29.09.25	16:16	12.37	77	73	69.6	354	12.98	12.9
629	80	59°35.64	001°31.21	W	29.09.25	17:26	14.54	89	85	84.8	13	13.46	13.4
630	81	59°35.60	001°11.31	W	29.09.25	18:31	19.57	114	111	104.8	284	13.05	11.25
631	82	59°25.60	001°08.76	W	29.09.25	19:41	21.04	124	120	107.8	675	13.07	10.4
632	83	59°25.58	001°28.58	W	29.09.25	20:49	15.08	89	86	82.9	45	13.31	13.2
633	84	59°15.58	001°31.08	W	29.09.25	21:59	17.05	94	94	94.6	182	13.35	13.18
634	85	59°15.39	001°11.52	W	29.09.25	23:05	18.02	108	105	96.1	109	13.27	10.02
635	86	59°05.76	001°08.98	W	30.09.25	00:13	26.00	119	115	159.2	154	13.24	10.34
636	87	59°04.98	001°27.00	W	30.09.25	00:13	15.42	102	99	79.5	1223	13.28	12.94
637	88	59°05.02	001°48.22	W	30.09.25	01:19	14.08	80	76	80.6	314	13.63	13.62
638	89	59°14.91	001°48.48	W	30.09.25	02:29	12.16	76	73	71.0	34	13.54	13.54
639	90	59°15.43	002°08.87	W	30.09.25	03:42	14.45	84	80	86.7	409	13.61	13.64
640	91	59°05.63	002°08.91	W	30.09.25	04:45	13.30	82	79	74.1	96	13.66	13.76
641	92	59°05.52	002°24.28	W	30.09.25	05:50	9.50	68	65	51.0	87	13.66	13.73

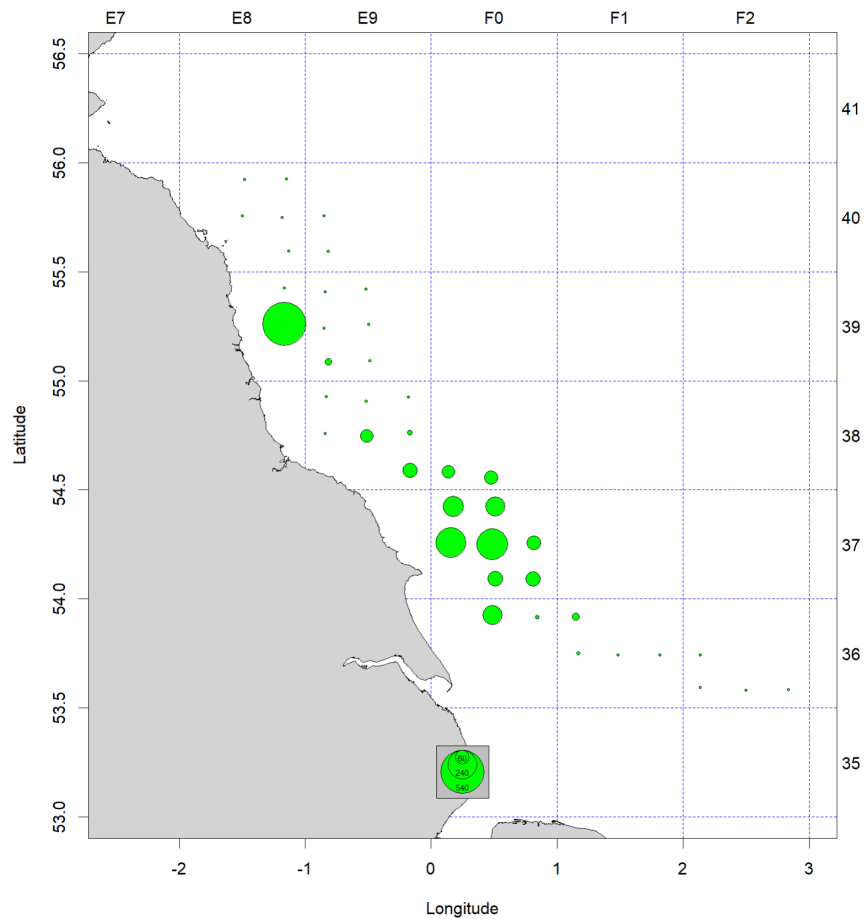
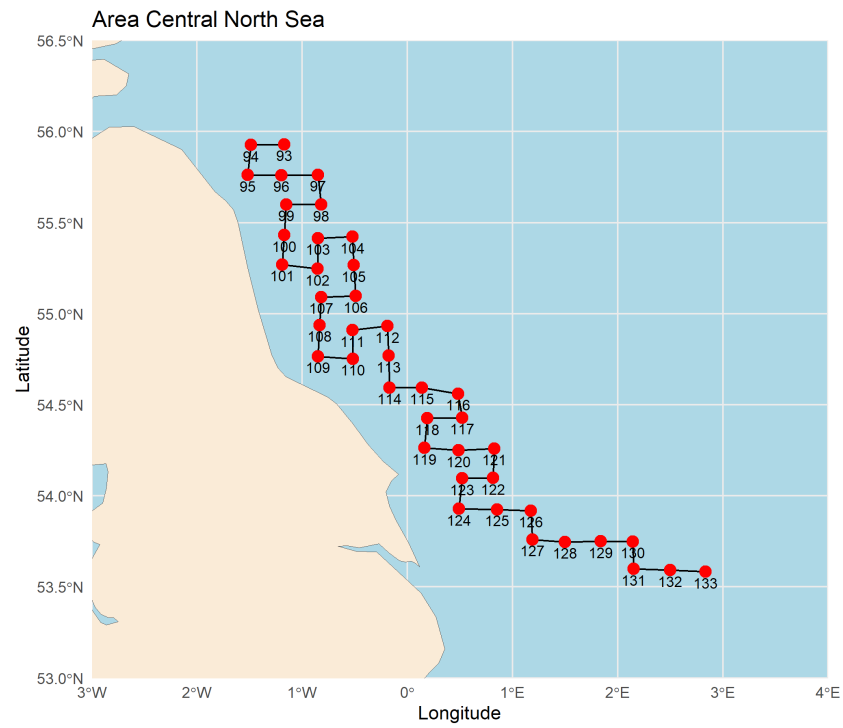


Figure 3: Stations sampled during WH 494 in the Central North Sea area: station track with station number (upper panel) and herring larvae abundance (n/m^2 ; lower panel). See Table 2 for more information. In the lower panel, the grey shaded box shows the reference circles representing 60, 240 and 540 larvae per square metre.

Table 2: Information on stations, including larval abundance estimates ("Hela") and water temperature during WH 494 in the area "Central North Sea".

Stat. Nr.	Haul Nr.	Lat. (° N)	Long.	E/ W	Date (UTC)	Time (UTC)	Duration (min)	Water depth (m)	Catch depth (m)	Flow (m³)	Hela (n/m²)	Surface T (°C)	Bottom T (°C)
642	93	55°55.49	001°09.78	W	30.09.25	23:51	10.30	63	60	57.8	0	13.33	13.73
643	94	55°55.37	001°29.14	W	01.10.25	00:55	15.30	79	76	85.8	0	13.21	11.98
644	95	55°45.44	001°30.66	W	01.10.25	02:00	9.38	62	59	54.3	1	13.25	11.92
645	96	55°44.97	001°11.56	W	01.10.25	03:05	11.47	71	68	66.7	0	13.42	11.96
646	97	55°45.45	000°51.00	W	01.10.25	04:15	13.51	87	83	75.0	1	13.86	11.38
647	98	55°35.56	000°49.08	W	01.10.25	05:21	16.35	93	90	96.2	3	14.32	9.56
648	99	55°35.61	001°08.70	W	01.10.25	06:31	15.52	100	97	83.0	0	14.16	9.22
649	100	55°25.53	001°10.11	W	01.10.25	07:39	12.51	85	82	70.6	0	14.05	9.37
650	101	55°15.72	001°10.86	W	01.10.25	08:40	15.53	88	85	96.1	540	12.88	9.91
651	102	55°14.47	000°51.14	W	01.10.25	09:51	16.42	88	85	99.4	0	13.12	10.09
652	103	55°24.53	000°50.62	W	01.10.25	10:56	16.50	96	93	98.5	0	13.54	9.68
653	104	55°25.20	000°31.20	W	01.10.25	12:04	11.33	68	65	66.7	0	14.16	9.18
654	105	55°15.61	000°29.91	W	01.10.25	13:07	12.27	70	66	71.4	1	14.33	9.04
655	106	55°05.49	000°29.34	W	01.10.25	14:08	13.28	77	74	78.8	0	14.05	9.26
656	107	55°05.29	000°49.14	W	01.10.25	15:18	10.31	65	61	63.1	15	13.66	9.37
657	108	54°55.76	000°50.00	W	01.10.25	16:18	11.56	69	66	72.1	2	13.6	11.17
658	109	54°45.57	000°50.66	W	01.10.25	17:19	9.38	57	54	48.5	0	13.32	11.34
659	110	54°44.70	000°30.61	W	01.10.25	18:27	9.05	62	59	55.3	48	13.31	11.74
660	111	54°54.35	000°30.77	W	01.10.25	19:25	10.02	66	63	62.7	3	13.46	10.92
661	112	54°55.57	000°10.89	W	01.10.25	20:33	10.57	68	65	65.1	1	13.95	10.78
662	113	54°45.68	000°09.94	W	01.10.25	21:32	11.17	66	64	69.2	9	13.63	9.75
663	114	54°35.39	000°10.19	W	01.10.25	22:32	10.54	64	61	63.1	62	13.66	10.1
664	115	54°34.99	000°08.24	E	01.10.25	23:34	13.36	73	70	82.8	49	13.62	10.63
665	116	54°33.41	000°28.62	E	02.10.25	00:42	10.41	61	58	62.5	56	13.98	10.05
666	117	54°25.44	000°30.70	E	02.10.25	01:41	14.09	70	67	86.2	110	14.3	10.54
667	118	54°25.35	000°10.79	E	02.10.25	02:51	10.42	65	61	62.8	124	13.18	11.03
668	119	54°15.47	000°09.44	E	02.10.25	03:52	9.05	58	55	53.9	264	12.89	10.91
669	120	54°15.00	000°29.11	E	02.10.25	04:49	10.04	62	59	61.5	282	12.76	12.49
670	121	54°15.34	000°48.99	E	02.10.25	06:07	6.09	44	42	36.7	60	13.12	12.29
671	122	54°05.55	000°48.47	E	02.10.25	07:06	5.33	38	36	33.9	64	13.15	12.51
672	123	54°05.46	000°30.71	E	02.10.25	08:04	8.07	53	50	50.5	66	12.93	13.13
673	124	53°55.43	000°29.30	E	02.10.25	09:04	7.06	48	46	44.1	113	13.22	12.86
674	125	53°54.93	000°50.69	E	02.10.25	10:27	6.49	46	43	39.7	6	13.59	13.06
675	126	53°55.06	001°09.93	E	02.10.25	11:35	4.59	37	35	29.8	16	14.43	13.51
676	127	53°44.97	001°10.80	E	02.10.25	12:32	5.01	33	30	32.4	4	14.61	14.43
677	128	53°44.50	001°29.53	E	02.10.25	13:31	4.07	33	30	24.6	0	15.73	14.56
678	129	53°44.59	001°49.86	E	02.10.25	14:33	3.47	29	26	22.2	0	15.79	15.71
679	130	53°44.57	002°08.39	E	02.10.25	15:32	3.36	33	30	20.8	0	15.69	15.79
680	131	53°35.56	002°08.62	E	02.10.25	16:24	2.16	23	20	13.6	0	15.85	15.67
681	132	53°34.93	002°30.01	E	02.10.25	17:34	3.09	27	24	18.8	0	15.87	15.85
682	133	53°35.00	002°50.03	E	02.10.25	18:44	3.52	32	30	25.0	0	15.9	15.87