Agri-Food and Biosciences Institute
Agriculture, Food and Environmental Science Division
Fisheries and Aquatic Ecosystems Branch

Cruise Report: CO 3109
Vessel: RV *Corystes*
Date: 30th July – 10th august 2009
Area: Irish Sea (north); ICES div. VIIa
Survey Type: Nephrops Trawl and UWTV Survey

Personnel:

R Briggs (SIC)	PSO	
P McCorriston	TSO	
J Peel	ASO	
I McCausland	ASO	
P Stewart	NIEA	30 July – 3 August
R McAlister	TASO	30 July – 3 August
D Garland	SO	30 July – 3 August
C Murray	IWDG	30 July – 3 August
G Brady	TSO	4 – 10 August
M Service	PSO	4 – 10 August
R Bunn	Mar Inst	4 – 10 August
J Elson	CEFAS	4 – 10 August
A Leocadio	CEFAS	4 – 10 August

Circulation	✓
DCEO & CEO	✓
Ship Managers	✓
Fisheries Division	✓
ANIFPO	✓
NIFPO	✓

Comments

Signed Head of Branch

Objectives:
This cruise forms part of an ongoing study of the population dynamics of *Nephrops* of the Irish Sea. There were two phases: - Phase 1: trawl/beam trawl survey at established stations; Phase 2-an ongoing cross border collaborative camera survey of the *Nephrops* grounds with the Marine Institute and CEFAS. Data on marine mammal sightings were also collected during Phase 1.

Methods:
The fishing gear was the same as that used in earlier cruises and was a custom made 20-fathom *Nephrops* net of nominal mesh size 50mm throughout. Catch bulk at stations fished during previous surveys (Fig. 1) was quantified by counting baskets filled from the catch. Sample baskets of catch after approximately 30 minutes trawling were sorted to provide an assessment of species composition. The *Nephrops* in sub-samples of 6-7kg were divided into male and female components and the ovary maturity stage of female animals noted. Carapace length frequency distributions of both male and female *Nephrops* were measured and the prevalence of the parasitic dinoflagellate *Hematodinium* was assessed. Stratified sampling procedures used for sampling whitefish were similar to those used during AFBI groundfish surveys. The contribution of finfish to catches was quantified; their length compositions measured and the otoliths of cod were retained for age determination. Although it was planned to deploy the two-metre beam trawl for 5 minutes at each trawl station, irreparable damage to the beam and net at station 2 forced a premature end to this objective.

During the UWTV survey the camera and sledge was deployed at stations within a randomized fixed grid design as in the 2003-2008. A grid of stations was also surveyed on the eastern Irish Sea as in 2007 and 2008. Film data from 10-minute tows at each station were stored on DVDs and re-counts of burrow cluster abundance were performed as proposed by WKNEPH09. Two re-count stations were established on the ship and staff performing recounts attended a one day refresher course whilst in Dublin on 4 August. A new USBL system was used to enable the course taken by the sledge during tows to be tracked. This information is an essential input to calculation of the area of seabed swept during each tow. Sampling continued 24 hours a day with scientific staff operating a rota system of 4 hrs on and 8 hours off.

Cruise Narrative:

Wednesday 29 July
Scientific staff boarded during the evening. RV Corystes sailed at 23.00 and a safety briefing was given to scientific staff by the Chief Officer.

Thursday 30 July
The first haul was at station **1** followed by stations **2, 35, 17, 30 15, 109** and **20.** Unfortunately the beam trawl was seriously damaged at station 2 resulting in a premature end to the beam trawl survey.

Friday 31 July
Despite threats of strong southerly winds work commenced at station **208** followed by station **209** and **10.** A deterioration in the weather resulted in a suspension of work for 4 hours, whereupon a slight moderation allowed station **108** (Tow 12) to be fished. The catch had few Nephrops which was partly attributed the net not fishing properly due to weather conditions. Worsening weather resulted in no further trawling. The night was spent dodging.

Saturday 1 August

Stations **103, 102, 210, 101, 7, 8** and **207** were trawled. The night was spent off the County Down coast.

Sunday 2 August

Stations **107, 104, 106**, **200** and **105** were fished in fine weather conditions and with all objectives of this phase of the survey complete (apart from the beam trawl survey) RV Corystes set course for Dublin for the cruise break.

Monday 3 August

The day was spent in Dublin preparing for the second phase of the survey and scientific staff changeovers took place.

Tuesday 4 August

With the arrival of Marine Institute and Cefas staff a one day training course on burrow identification and counting techniques was run by Jennifer Doyle (MI) according to protocols agreed by WKNEPHBID for UWTV Nephrops surveys. With the training complete and equipment installed RV Corystes sailed at 22.00.

Wednesday 5 August

Dr Briggs attended a meeting of RV Corystes Health and Safety Committee on behalf of AFBI.

Work started at station **175** and continued eastward in a zig-zag manner through stations **176, 159, 160 177** and **178** whereupon the decision was made to return to more sheltered western stations, commencing at Stn **191** and once again working eastward. Scientific staff operated the planned 4hrs on 8 hrs off watch regime throughout the night.

Thursday 6 August

A faulty light bulb on the sledge was replaced at 08.30 and work continued in an easterly direction in fine weather. Dolphins were observed around the ship at stn 181. The trawl warp became trapped at the stern of the ship during hauling at stn 164 but was extracted with no damage to warp or video cable. Work started on re-counts of the video footage according to the agreed protocol.

Friday 7 August

Fine weather enabled good progress to be made with camera tows moving steadily northward. Occasional shut down of the hyper-terminal data flow caused a slight hindrance. The new USBL system was the main source of navigational data and continued to provide the required data.

Saturday 8 August

Station 66 was completed at 13.00 and with over 70 western stations completed course was set for Wigton Bay in the eastern Irish Sea. Work commenced at 07.00 with stn 1 followed by stn 2 and 3 (Fig. 7). RV Corystes then moved south to stn 4 and preceded south, towing stations in a zig-zag manner throughout the night.

Sunday 9 August

As stn 36 proved to be Nephrops ground an additional station (stn 38) was inserted at the southern extremity in order to map the extent of the grounds, but visibility was too poor to indentify the bottom type. Likewise stn 39 was established to provide data on westward extent of the grounds. The system was calibrated by measuring the camera laser spot spacing (17.5 cm) during darkness. The survey continued a zig-zag course northward.

Monday 10 August

With 38 tows eastern stations completed by 02.30 RV Corystes returned to the western Irish Sea grounds and commenced work at station 85 at 06.00, working westward to stn 116 followed by "redo" stations 97 and 63. With all planned objectives completed by 16.30 RV Corystes proceeded to Belfast and docked at 20.00.

Results:

Trawl Survey

During the fishing phase of this cruise all 24 stations (Fig 1) were sampled by *Nephrops* trawl and the 2-metre beam trawl was deployed at stations 1 and 2 whereupon it was irreparably damaged. Station details are presented in Table 1 and Table 2 shows the mean size, catch rate, proportion of female *Nephrops* and percentage (by number) of animals infected by *Hematodinium*. A total of 11,440 *Nephrops* were measured and a comparison of average *Nephrops* catch rate with those of earlier cruises is shown in Fig 2. This demonstrates similar levels (57.2 kg nm^{-1}) to those obtained in 2007 (56.8 kg nm^{-1}) and lower than in 2009 (68.7 kg nm^{-1}). It is important to note that the stations with highest catches varied between surveys (Fig 3) and reinforces the need for caution when interpreting these data. By-catch consisted of a wide range of taxa and details of the major groups are shown in Table 3. The predominant commercial species was whiting, though these were mainly below the minimum landing size of 27cm. The otoliths of cod caught during the survey were removed for age determination. Length frequency distributions of the major commercial fish species are shown in Figure 4 and especially noteworthy was higher than usual quantity of 0-group cod in catches as indicated in Figure 5.

UWTV Survey

The UWTV sledge was deployed 129 times during the cruise. In the western Irish Sea 88 stations were surveyed, 2 were repeated. (Figure 6). A total of 38 stations with one "redo" were completed in the eastern Irish Sea and good video footage was obtained. These data included new information on the extent of the ground. This is the third time the eastern Irish Sea *Nephrops* stock has been surveyed and is an expansion of the western Irish Sea study. All recordings made during the cruise were re-counted whilst at sea, though some stations will need to be re-surveyed by the *RV Celtic Voyager* leg of the survey due to poor visibility. Burrow cluster counts will be combined with those from the Marine Institute's *RV Celtic Voyager* survey to take place at the end of August. After further analysis *Nephrops* density estimates will contribute to the provision of fisheries management advice through the ICES forum.

Acknowledgements:

The Officers and Crew of *RV Corystes* are thanked for their enthusiastic help towards the success of this challenging cruise. The scientific staff are commended for their teamwork and the valuable contribution by Robert Bunn (MI), Jon Elson (Cefas) and Ana Leocadio (Cefas) is sincerely acknowledged. Bill Clarke is thanked for installing the UWTV equipment and Jennifer Doyle (MI) is thanked for organizing a comprehensive training day in Dublin.

Richard Briggs
Scientist in Charge
11 August 2009

Alan Hughes (seen in draft)
Master

Table 1: Trawl details

Date	Stn	Haul	Time shot	Shooting Position				Hauling Position				Mean Depth (m)	Distance towed (nm)	Wind Speed
				Latitude		Longitude		Latitude		Longitude				
30/07/2009	1	1	06h.25	54	17.1	5	15.99	54	15.7	5	15.34	81	1.46	18
30/07/2009	2	2	08h.24	54	14.9	5	18.96	54	13.4	5	18.94	69	1.46	20
30/07/2009	35	3	09h.36	54	13.6	5	22.41	54	12.2	5	22.57	98	1.43	18
30/07/2009	17	4	11h.27	54	10.1	5	27.22	54	8.87	5	27.43	91	1.2	15
30/07/2009	30	5	12h.51	54	7.42	5	35.04	54	6.22	5	35.75	45	1.29	15
30/07/2009	15	6	14h.00	54	4.9	5	31	54	6.11	5	30.38	67	1.27	15
30/07/2009	109	7	15h.29	54	7.13	5	19.46	54	5.9	5	18.85	63	1.27	15
30/07/2009	20	8	17h.04	54	2.85	5	21.65	54	1.6	5	21.52	97	1.26	12
31/07/2009	208	9	06h.20	54	7.91	5	1.37	54	6.77	5	2.32	77	1.29	20
31/07/2009	209	10	07h.45	54	6.58	5	9.61	54	7.74	5	8.68	113	1.29	22
31/07/2009	10	11	10h.03	53	59.7	5	23.66	53	58.4	5	23.82	90	1.3	28
31/07/2009	108	12	13h.56	53	51.4	5	6.98	53	52.6	5	6.07	63	1.31	28
01/08/2009	103	13	06h.12	53	39.8	5	24.98	53	38.8	5	25.88	94	1.22	12
01/08/2009	102	14	07h.56	53	46.9	5	21.81	53	48.1	5	20.78	91	1.33	12
01/08/2009	210	15	09h.29	53	54.5	5	14.65	53	55.6	5	13.42	78	1.29	17
01/08/2009	101	16	11h.15	53	55.4	5	21.26	53	54.1	5	21.74	108	1.36	17
01/08/2009	7	17	12h.39	53	52.5	5	28.39	53	53.7	5	27.83	93	1.3	15
01/08/2009	8	18	14h.18	53	51.5	5	39.25	53	52.8	5	38.96	86	1.31	15
01/08/2009	207	19	16h.30	53	59.3	5	45.83	54	0.4	5	45.03	45	1.25	20
02/08/2009	107	20	06h.13	53	48.1	5	40.46	53	46.8	5	40.86	85	1.3	12
02/08/2009	104	21	07h.46	53	39.1	5	38.85	53	37.8	5	38.78	92	1.33	12
02/08/2009	106	22	08h.57	53	37.5	5	43.05	53	36.2	5	43.22	76	1.3	10
02/08/2009	200	23	10h.26	53	35.3	5	53.54	53	34	5	52.83	48	1.33	8
02/08/2009	105	24	11h.59	53	29.8	5	41.63	53	29.6	5	39.55	70	1.26	

Table 2: Details of *Nephrops* catch by station

TOW	1	2	3	4	5	6	7	8	9	10	11	12
STATION	1	2	35	17	30	15	109	20	208	209	10	108
MALE CL	23.7	25.3	29.1	26.5	28.6	26.1	26.5	25.7	25.3	27.0	26.6	29.3
FEMALE CL	23.8	23.7	23.8	25.4	26.8	24.7	25.2	23.6	24.2	26.0	24.9	26.3
No per Nm	11123	2350	322	1323	112	1166	2833	4496	12273	3472	5135	155
kg per Nm	112.3	26.2	4.9	16.4	1.8	14.1	35.6	51.2	164.7	51.2	65.2	2.3
% female	71.7	65.2	70.2	60.9	72.9	56.5	62.9	57.1	57.8	68.0	58.1	61.6
% Hem Males	2.8	1.4	2.2	3.9	2.6	5.9	2.5	1.7	0.5	2.0	3.7	9.0
% Hem Females	1.8	0.7	0.9	0.9	0.0	1.0	0.6	0.9	0.4	0.6	0.7	0.0
% Hem Overall	2.1	1.0	1.3	2.1	0.7	3.1	1.3	1.3	0.4	1.1	2.0	3.4

TOW	13	14	15	16	17	18	19	20	21	22	23	24
STATION	103	102	210	101	8	207	107	104	104	106	200	105
MALE CL	26.1	23.5	26.0	26.5	26.3	24.6	29.4	24.1	24.4	26.2	30.7	30.8
FEMALE CL	25.2	23.6	24.7	25.2	24.8	23.7	27.4	23.7	23.9	24.5	26.1	29.8
No per Nm	7848	3053	1706	10331	8182	8136	86	10318	14101	2156	120	1517
kg per Nm	100.8	29.8	20.7	128.6	96.4	81.3	1.5	101.5	149.4	27.3	2.3	31.4
% female	62.1	68.3	62.6	69.1	68.8	59.7	48.6	60.3	63.9	57.6	54.7	50.0
% Hem. Males	1.6	0.9	2.0	3.6	3.7	1.6	3.6	1.2	1.4	0.0	0.0	0.0
% Hem. Females	0.0	0.4	0.0	1.6	0.6	1.1	1.9	0.0	0.8	0.0	0.0	0.0
% Hem. Overall	0.6	0.6	0.7	2.2	1.6	1.3	2.8	0.5	1.0	0.0	0.0	0.0

Table 3: Summary of catches by station (kg)

Species / Stn	GADOIDS					PELAGIC		FLATFISH			OTHER TELEOSTS	ELASMONBRANCHS		INVERTEBRATES		
	COD	HADDOCK	HAKE	WHITINGG	OTHER GADOIDS	HERRING	OTHER PELAGIC	DAB	PLAICE	OTHER FLATS		SKATES + RAYS	SHARKS+ DOGFISH	NEPHROPS	CEPHA-LOPODS	OTHER INVERTS
1	0.348	15.6		41.8	5.9	0.4			0.7	5.6	1.2		10.1	163.9	0.8	1150.7
2		9.5		91.7	4.2	14.8	0.3	0.2	1.1	1.7	0.8		0.5	38.3	2.8	192.1
7	0.701	4.1		2.9	7.9	0.3				0.5	0.0			126.2	0.4	887.2
8	0.951	4.6		40.2	26.6	1.3		0.2		2.2	0.1		0.7	106.6	0.2	641.5
10	0.096	0.3	0.9	162.5	42.5	42.5				0.7	1.1			84.8	0.2	510.2
15	0.469	10.0		26.1	2.8	6.1	0.2	1.0	1.3	3.4	3.0			20.0	2.0	101.6
17	0.04	5.7	0.4	37.9	3.0	0.2	3.1	2.0	1.1	8.8	11.2			19.7	0.8	120.2
20	0.068	0.8		19.4	18.4	0.2				4.1	5.6		0.8	64.5		391.7
30	0.022	11.4		38.6	1.0	1.0	1.3	2.8	16.4	5.0	6.0		5.7	2.3	1.2	15.2
35		13.8		68.8	5.2	4.3	0.4	1.0	2.7	2.8	6.7			7.0	0.3	52.1
101	0.533	1.0		20.1	12.3	12.3				1.0	0.0		0.4	174.9	1.6	1231.1
102		2.4		129.8	80.1	80.1				5.5	0.8		4.0	186.8	3.8	1307.8
103	0.172	10.4		54.3	30.3	30.3		0.3		1.4	1.6		3.2	123.0		616.2
104	0.084	29.8		23.4	3.6	3.6	0.4			0.1	1.4			198.7	2.1	1193.1
105	4.905	17.7		116.7	4.2	4.2		4.6	3.4	4.3	28.3	2.9	64.2	39.5	0.1	301.2
106	0.78	9.3		34.6	10.7	0.2	0.0		0.1	8.9	27.9			184.3	0.4	1111.7
107	0.059	14.1		33.4	15.2	0.2	2.4	1.5	0.2	4.9	2.0			131.0		655.3
108	0.32	3.8	4.6	56.1	1.7	1.7		1.5	8.7	2.7	4.7		34.1	3.0	4.3	18.1
109	0.025	4.2		14.9	4.0	0.5		0.0	0.0	1.3	0.4		0.3	45.3	0.1	273.4
200	2.23	15.3		45.4	13.9	0.0	0.2	30.8	50.0	6.3	36.5		40.5	3.0	0.0	28.6
207	0.452	28.5		22.9				13.5	34.1	2.7	52.7			1.8	3.0	17.8
208		1.0		200.9	30.8	1.4		0.3	2.4	5.5	0.6	0.7	45.6	212.5	0.6	1281.2
209	3.367	3.5		0.5	10.6	10.6		0.2		1.1				66.1	0.1	398.0
210	0.638			38.6	75.4	75.4				5.2	0.3		16.2	26.8	2.3	133.8

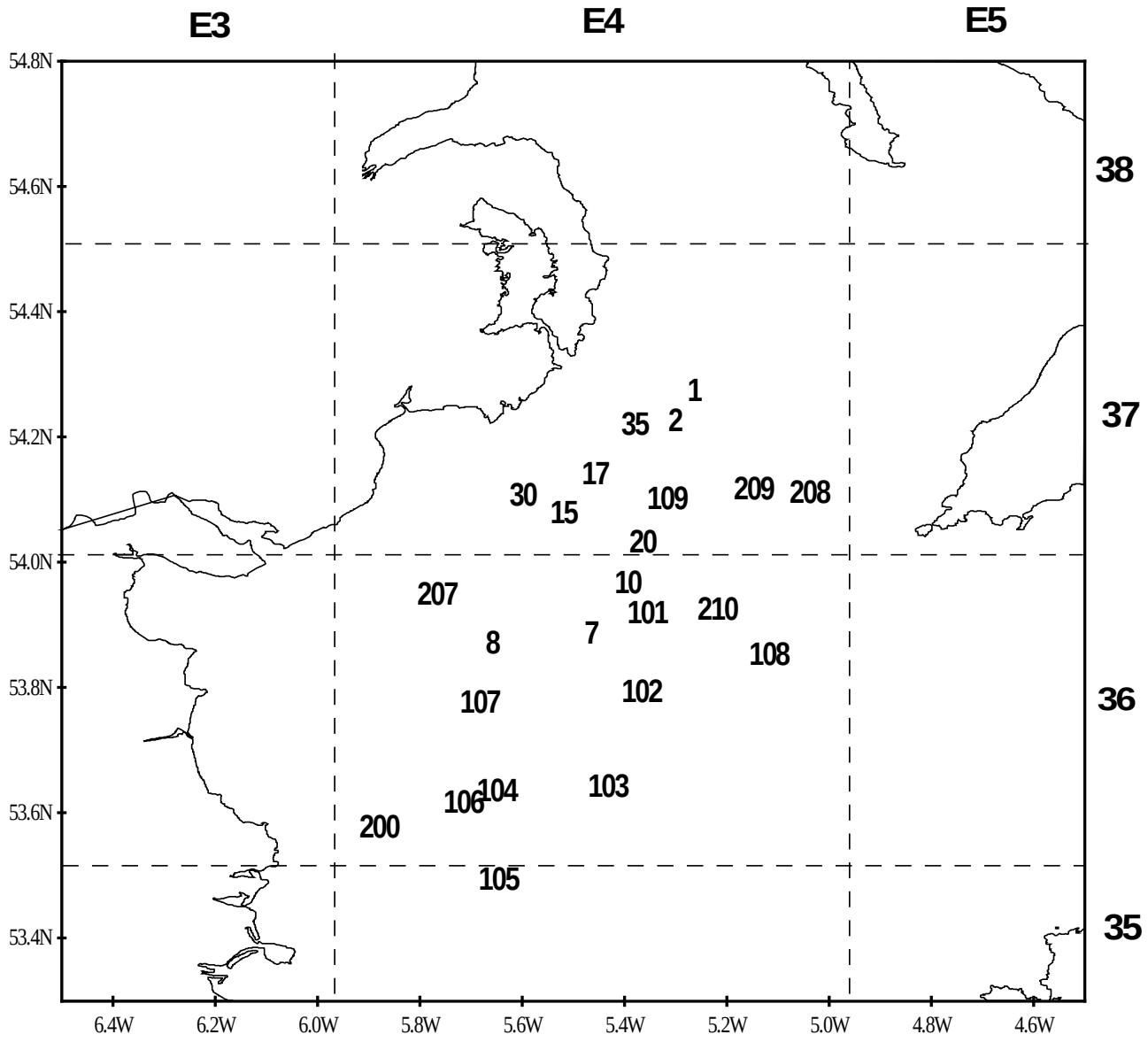

Figure 1: Western Irish Sea Nephrops stations

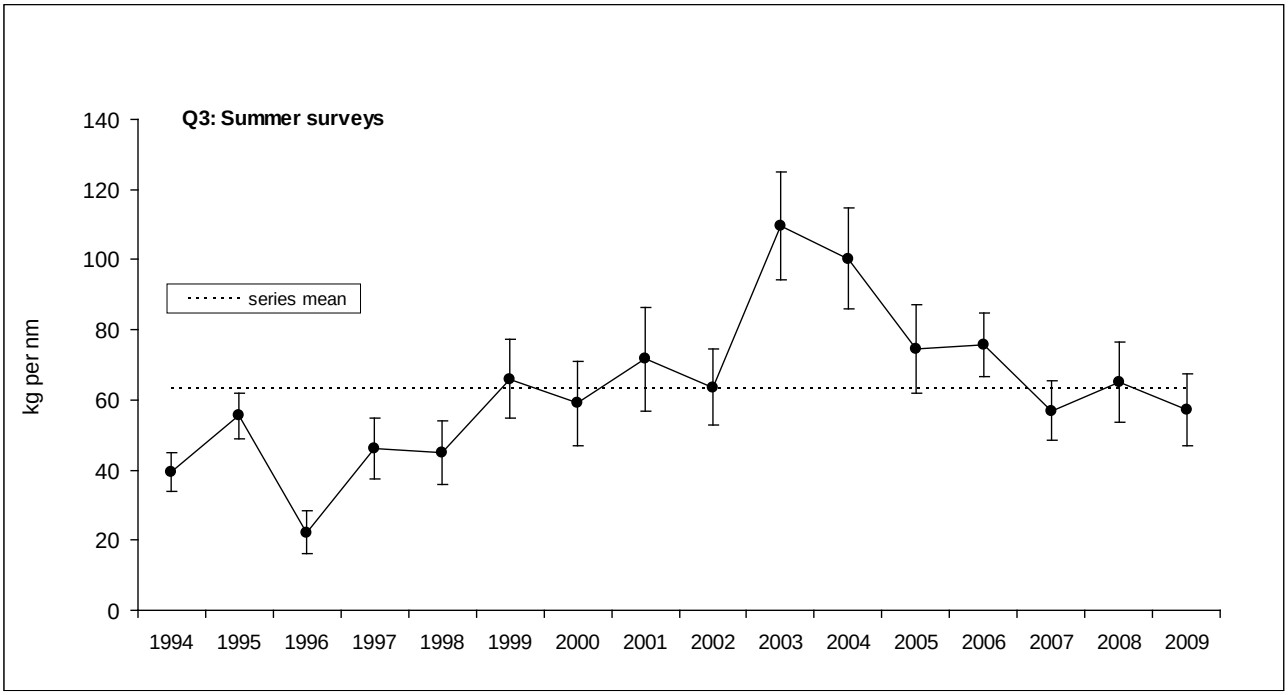

Figure 2: Mean *Nephrops* catch (Kg nm^{-1}) 1994-2009 (error bars = SE)

Stn	2001	2002	2003	2004	2005	2006	2007	2008	2009
1	▨		▨	▨	▨		▨		▨
2				▨		▨		▨	
7		▨	▨	▨	▨		▨		▨
8	▨	▨	▨	▨	▨	▨	▨	▨	▨
10	▨	▨	▨	▨	▨				▨
15			▨	▨		▨	▨		
17		▨	▨					▨	
20		▨	▨		▨		▨		
30			▨	▨	▨		▨	▨	
35			▨	▨				▨	
101			▨	▨	▨	▨			▨
102	▨	▨	▨		▨	▨	▨		
103	▨	▨	▨						▨
104		▨				▨			▨
105									
106	▨		▨			▨			
107	▨	▨		▨	▨		▨	▨	▨
108	▨	▨	▨	▨	▨	▨	▨	▨	
109		▨	▨	▨	▨	▨		▨	
200						▨			
207			▨		▨				
208	▨		▨	▨	▨	▨		▨	▨
209							▨		
210	▨			▨		▨	▨	▨	

Figure 3: Stations with *Nephrops* catches above the long term mean of kg nm^{-1} shown as shaded squares

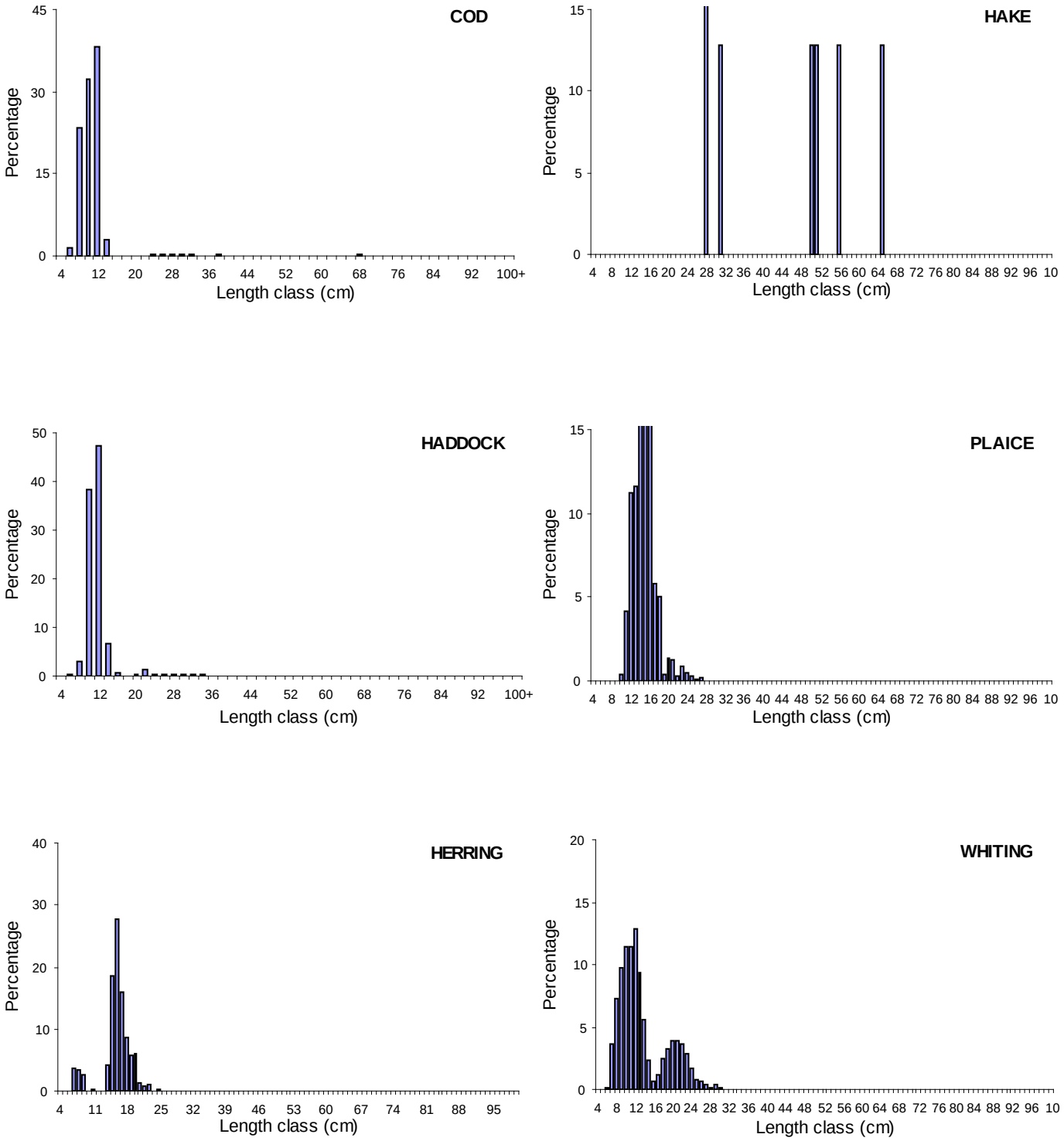

Figure 4: Length frequency of fish for the Western Irish Sea

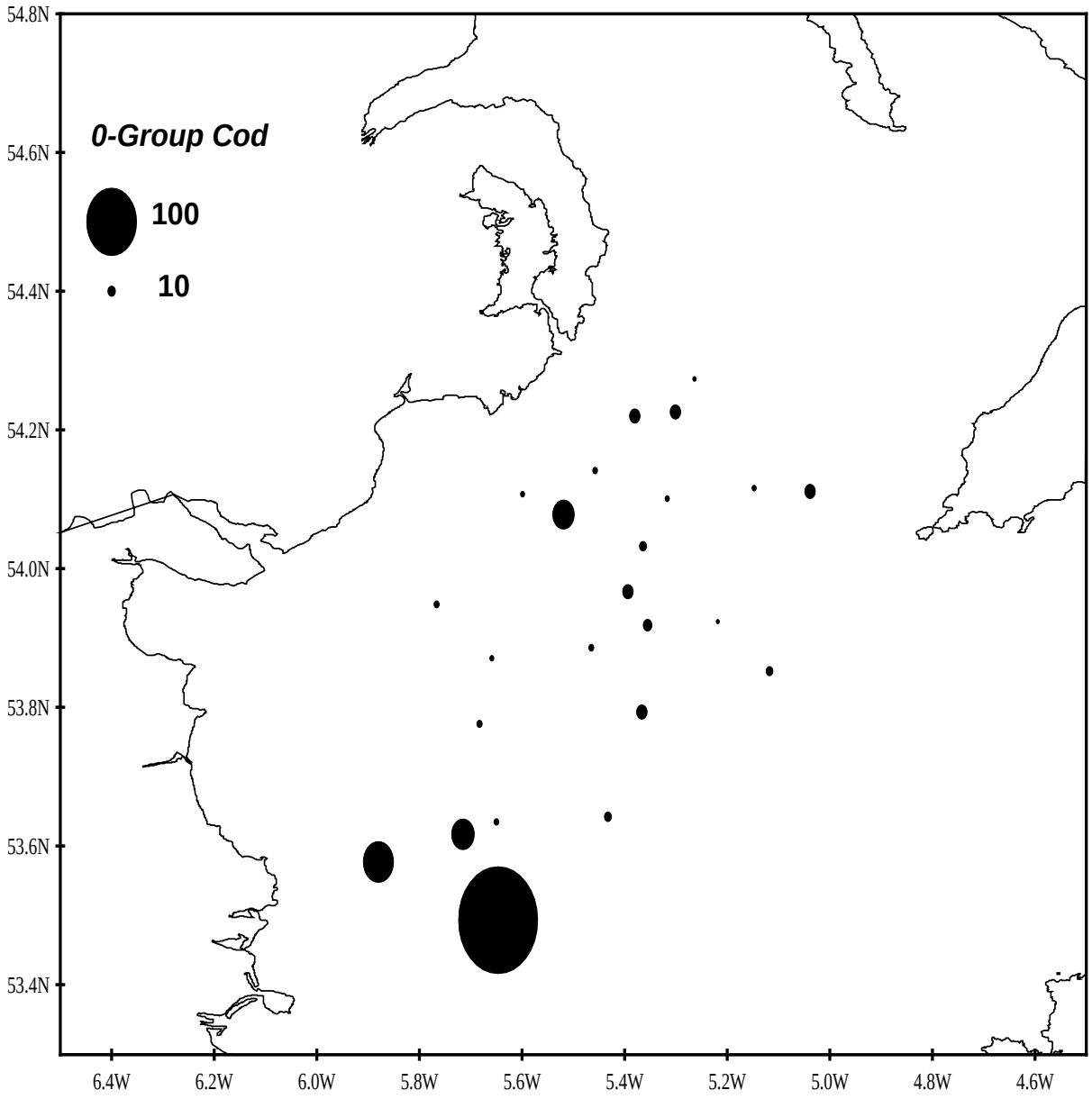

Figure 5: Number of 0-group cod caught by station per nautical mile

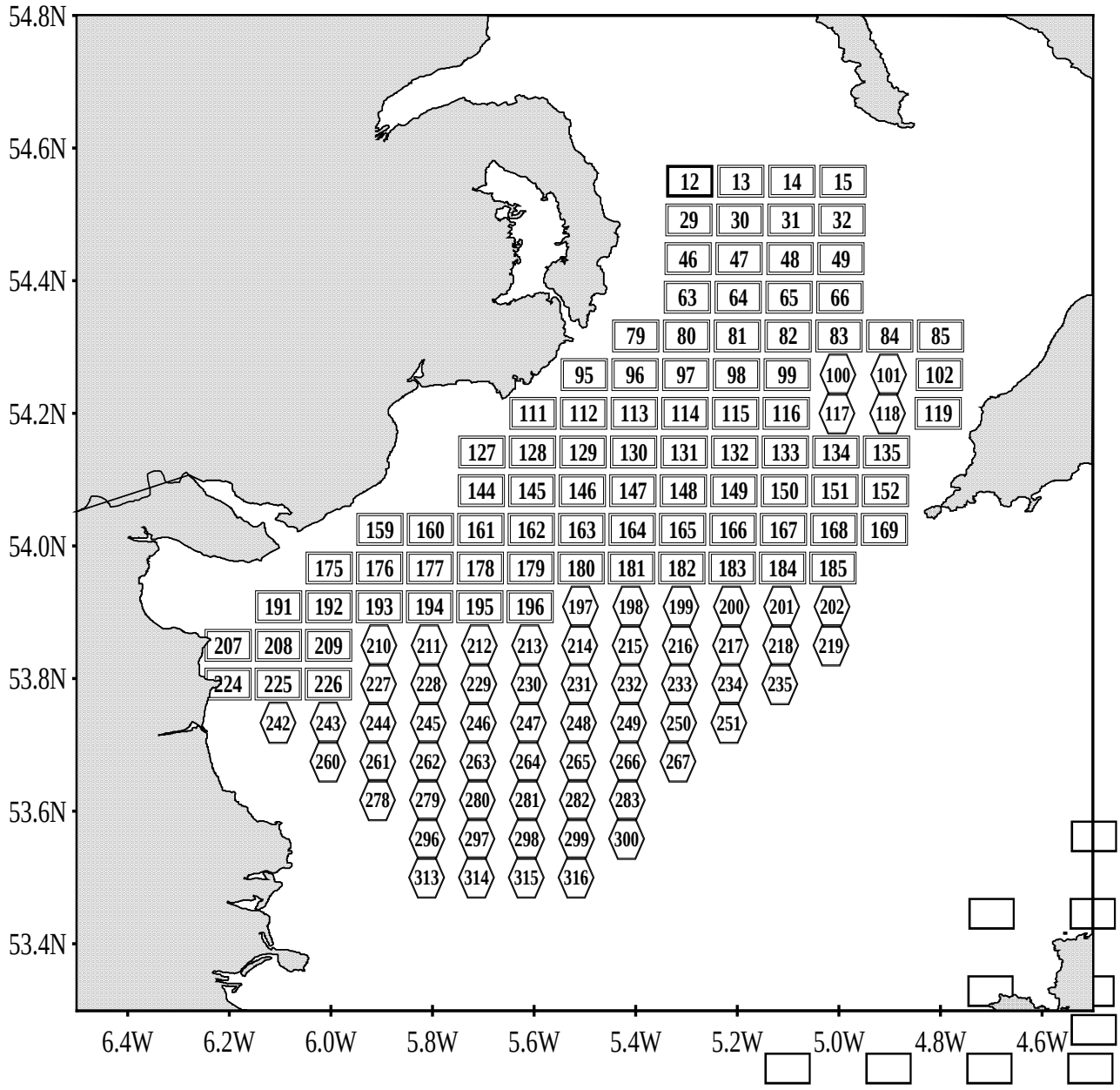

Figure 6: Western Irish Sea UWTV stations.
(Rectangle = Sampled stations. Hexagons = Stations not sampled and to be surveyed *RV Celtic Voyager*.)

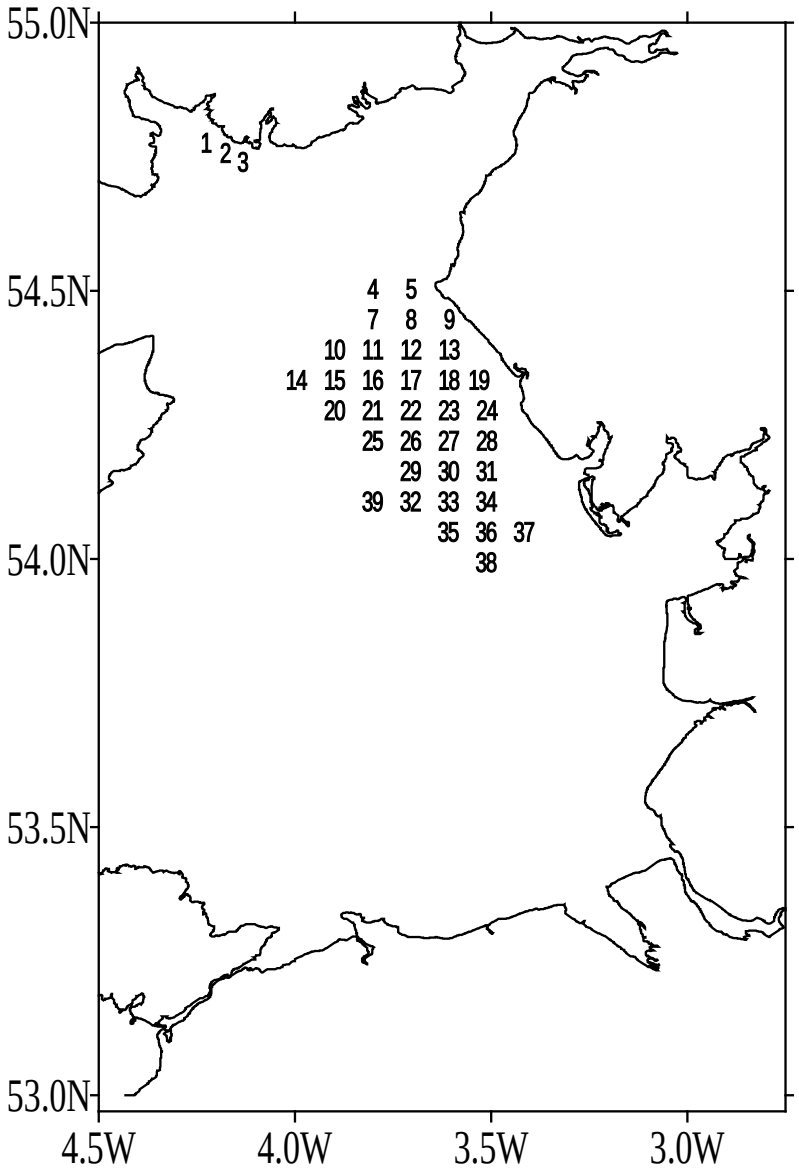

Figure 7: Eastern Irish Sea UWTV stations.