

Preliminary Report on Survey A7-2006 – Arni Friðriksson, TFNA

Pelagic fish off W- S- and SE-Iceland and the western Norwegian Sea May 09 - 01 June 2006

Part of the joint Northeast Atlantic Pelagic Ecosystem Surveys in 2006 (see ICES PGNAPES report, August 2006)

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Description

In order to assess blue whiting concentrations west and south of Iceland, the survey began on 10 May at the shelf edge west of Iceland, just south of the Dohrn Bank and from there continued south at and on either side of the shelf break to the Reykjanes Ridge.

South of the Reykjanes promontory (SW-Iceland) the general course was eastwards, running along and just off and in over the outer shelf. From SE-Iceland, course was set to 62°35'N, 13°40'W and from there the survey covered the area from 62°30'N to 64°35'N, between approximately 09°00'W and 12°-13°W, i.e. blue whiting concentrations inside the Icelandic and the western Faroese EEZs.

Having completed the blue whiting part of the survey, the boat had to call in at a port on the Icelandic east coast on 17 May to take on fuel, water and other provisions. As it happened a full storm blew up at the same time and lasted for 2 days during which time all survey work had to be postponed.

On 19 May, surveying was resumed at 64°30'N-65°N and during the following days continued northwards along E/W transects spaced at about 30 n.m. intervals. At 66°05'N and 66°35'N the eastern limits increased from about 05°30'W to 04°W, then decreased to 07°30'W at 68°35'N which was the eastern limit after that and until 69°35'N, the highest latitude covered. The western boundary was generally about 09°20'W, e.e. the survey went well into the cold waters of the East Icelandic Current. An extreme western leg was run south along 11°10'W, from 69°35'N to 68°05'N, from where the ship headed to Reykjavik on 28 May.

Materials and methods

The survey design was of two types. First, when assessing blue whiting west and south of Iceland, a zig-zag course was adopted as in these waters the target fish almost always occur in a narrow strip near the shelf edge. By running diagonally in and out of the recordings this

type of survey setup gives a longer time among blue whiting recordings and thus better coverage in addition to be less time consuming. When coming east to the southwestern Norwegian Sea the survey design was changed to parallel E/W courses spaced at about 30 n.m.. This was according to the predetermined plan and is a better way of surveying an open ocean where fish distribution can be assumed to be random rather than following any predetermined course.

Acoustic scatters were recorded continuously by a Simrad EK500 echo sounder and post-processed using a BI 500 integrator with a plankton sieve threshold of -70dB. The remaining echoes were then stored in their respective categories (mainly herring and blue whiting) as 1 mile averages and averaged again over every 5 miles. In order to get an idea of how well herring densities were represented by the echo sounder, Kaijo Denki low and high frequency sonar were run continuously throughout the survey. However, formal school counts were not made.

Sea temperature and salinity were measured from surface to bottom using a SeaBird CTD. At bottom depths greater than 1000 m, recordings were stopped at that depth. Inter-station distance was generally in the range of 25-45 n.m.. A total of 84 CTD stations were occupied during the cruise.

Measurements of zooplankton volume were made at each CTD location except in a few locations when winds were too strong for the sampling gear. Using a WP2 net, two vertical hauls were, as a rule, made at each station, i.e. from 50 m and 200 m to the surface at 78 stations.

Acoustic records were sampled fairly regularly by two types of pelagic trawls, both produced by Hampidjan, Iceland. These were a Gloria 1024 and Gloria 1907, a wide opening trawl. As usual, the decision to sample was taken by the acoustic watch on the basis of changes of the echo recordings or simply because of the length of time elapsed since the last haul. A total of 45 hauls were made. The fishing gear worked well and there were few empty hauls.

The total catch per species and the treatment of each catch is given in the table below.

Leiðangur	Skip nr		Skip						
	A7-2006		2350				Árni Friðriksson RE-200		
Nr.	Heiti	Talið	Mælt	Kvarnað	Kyngreint	Magas.	Vigtað	Merkt	Afli kg.
1	Porskur	0	1	0	0	0	0	0	0
3	Ufsi	0	79	0	0	0	0	0	0
5	Karfi / Gullkarfi	0	6	0	0	0	0	0	0
19	Gullax / Stóri gullax	0	6	0	0	0	0	0	0
34	Kolmunn	0	2440	2440	1242	0	2438	0	0
36	Makrill	0	13	0	0	0	0	0	0
44	Smokkfiskur	1218	0	0	0	0	0	0	0
48	Hrognkelsi	0	5	0	5	0	0	0	0
60	Litli karfi	0	1	0	0	0	0	0	0
75	Laxsild ógr.	0	20	0	0	0	0	0	0
99	Urrari	0	2	0	0	0	0	0	0
123	Litla geirsíli	0	1	0	0	0	0	0	0
131	Norræni silfur fiskur	0	1	0	0	0	0	0	0
155	Vogmær	0	15	0	0	0	0	0	0
830	Sild/norsk-íslensksild	0	4380	1119	1119	0	1119	0	0
	Samtals	1218	6970	3559	2366	0	3557	0	0

Results

Hydrography

Like in the last few years both temperature and salinity were above average to the south and west of Iceland, while off the north and east coasts conditions were near or just above the long-term mean and the cold low salinity conditions, observed in the surface layers north of Iceland in 2005, were no longer there.

Waters of the East Icelandic Current were present in fairly large areas northeast and east of Iceland and reached south to about 65°N with an eastern border between about 06°30' and 07°30'W. However, south of Langanes conditions in these waters were relatively mild with the exception of the immediate surface layer, where the thermocline was still weak due to cold and cloudy weather of the previous weeks. In the Norwegian Sea east of there, conditions seemed to be about average.

Cruise transects, stations (CTD, WP2 and Pelagic trawl) and the distribution of temperature as well as the relative distribution of herring and blue whiting abundance (Sa-values) at 5 m, 50 m and 200 m, as recorded by Arni Fridriksson east of 16°W, are shown in Figures 1, 2 and 3.

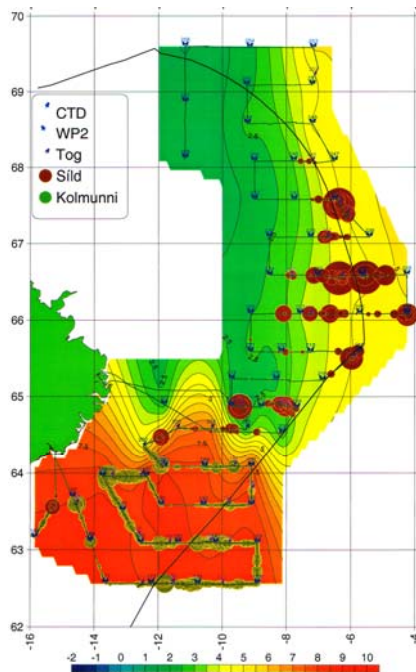


Figure 1. Temperature at 5 m and the relative abundance of herring and blue whiting (Sa-values), May 2006. Note that the Sa scale is the same for both species.

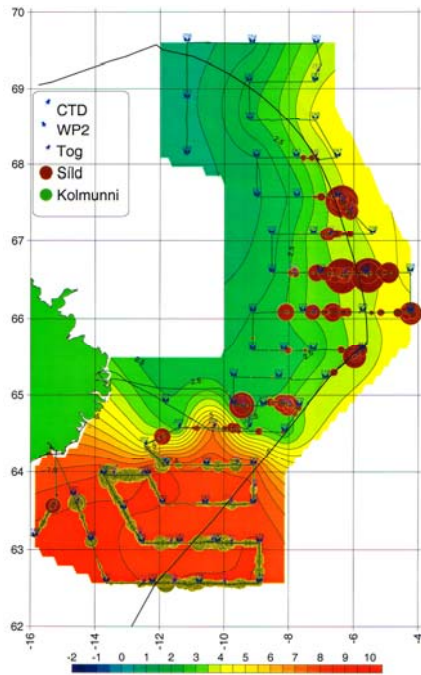


Figure 2. Temperature at 50 m and the relative abundance of herring and blue whiting (Sa-values), May 2006. Note that the Sa scale is the same for both species.

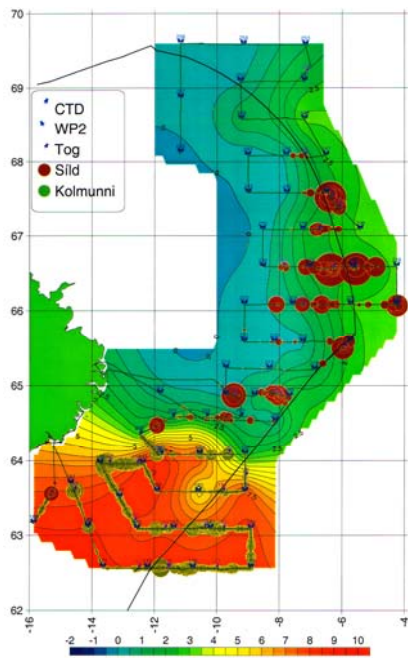


Figure 3. Temperature at 200 m and the relative abundance of herring and blue whiting (Sa-values), May 2006. Note that the Sa scale is the same for both species.

Zooplankton

In general it can be said that zooplankton densities were above average and in fact quite high in most of the area surveyed. The highest values were recorded on the shelf north and northeast of Iceland as well in the cold waters further north and east. This presentation is very preliminary and actual dry weights will not be available until at the August meeting.

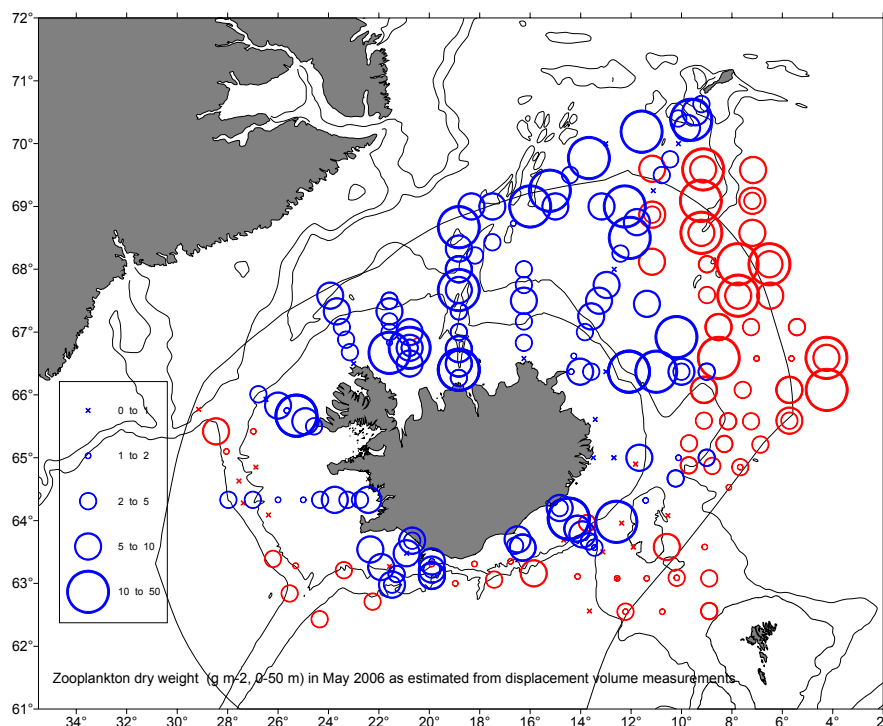


Figure 4. The relative density of zooplankton (converted to dry weight) as recorded by Arni Fridriksson (red) and Bjarni Saemundsson in May 2006

Blue whiting

Practically no blue whiting were recorded west of Iceland. However, after having passed the Reykjanes Ridge blue whiting were recorded more or less continuously in a narrow area east along the shelf break south of Iceland and east of there in an area covered by the survey, i.e. between about 62°30' and 64°30'N, east to 08°W.

South of Iceland there was a dominance of one year olds (year class 2005), while further east there were mainly older fish which in the southernmost part included post spawners migrating north. The total estimated blue whiting abundance was just over 1.8 million t, of which 0.5 million t were located within the Faroese EEZ.

Details of the above estimate are given in Tables 1. and the relative distribution density in Figure 5.

Table 1. Age aggregated abundance of blue whiting in number and weight. SE-Norwegian Sea (upper) and south of Iceland, west of 16°W (lower)

SE - Iceland and Norw.Sea											
	N at age										Total
	1	2	3	4	5	6	7	8	9	10	
Total N (10 ⁶)	1488.7	334.0	2777.5	5644.7	3003.0	749.7	224.3	62.0	14.5	2.7	14301.2
Total B ('000 t)	77.0	23.9	243.6	602.5	388.7	111.4	38.8	11.0	2.5	1.1	1500.5
Average L (cm)	21.2	23.8	25.6	27.3	29.1	30.7	32.8	33.2	33.0	41.0	26.9
Average W (gr)	51.7	71.6	87.7	106.7	129.5	148.6	172.8	177.6	175.6	401.0	104.9
% N	10.4	2.3	19.4	39.5	21.0	5.2	1.6	0.4	0.1	0.0	100.0
Condition (g/dm ³)	5.5	5.3	5.2	5.2	5.3	5.1	4.9	4.9	4.9	5.8	5.3

W of 16°											
	1	2	3	4	5	6	7	8	9	10	Total
	Total N (10 ⁶)	1876.8	666.3	1040.8	264.6	133.8	133.2	21.6	8.4		
Total B ('000 t)	95.9	58.7	108.9	33.5	21.4	24.7	4.6	2.0			349.7
Average L (cm)	20.4	24.6	26.1	27.7	29.8	31.8	33.9	36.1			23.7
Average W (gr)	51.1	88.0	104.7	126.5	160.2	185.2	212.2	242.2			84.4
% N	45.3	16.1	25.1	6.4	3.2	3.2	0.5	0.2			100.0
Condition(g/dm ³)	6.0	5.9	5.9	6.0	6.0	5.8	5.5	5.1			6.0

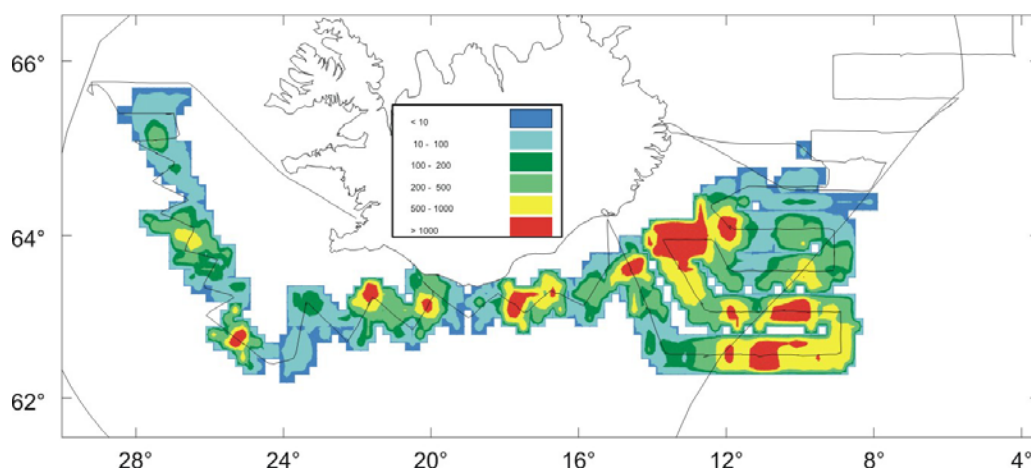


Figure 5. The relative density of blue whiting (Sa values) west and south of Iceland and between SE-Iceland and the Faroes in May 2006.

Herring

Herring were recorded in large areas north of about 64°N, south and east of the cold waters of the East Icelandic Current. In the south the westernmost records reached 11°W, while north of 65°N the western border was at the eastern edge of the cold front where the surface temperature dropped from about 4.5°C to 3.0-3.3°C. The northern border was just north of 68°N, while the eastern limit was not reached. The highest concentrations by far were located in the westernmost part of the distribution area.

The total abundance estimate came to about 2.1 million t. The details are given in Table 2.

The relative density (Sa-values) in relation to temperatures at 5 m 50 m and 200 m depth in Figures 1-3 respectively (see pages 3 and 4)

Discussion

There seems very little point in a lengthy discussion of the results of this survey.

Although the environmental data from the Bjarni Saemundsson are not included here, they have been looked at in a general way. All told, it seems that hydrographic conditions of Icelandic waters in 2006 are fairly mild although temperatures are somewhat lower than the highest we have seen in these series. The main item of interest is perhaps that the waters of the East Icelandic Current (EIC) are fairly mild, i.e. 0°C and lower were not recorded in the upper layers of the water column south of Langanes (66°22'W). On the other hand, temperatures in the upper layers of the EIC were only around 2- 3°C due to a cold spring with little solar warming.

Little blue whiting were recorded west of Iceland, a disappointment since large concentrations were seen in the region of the Dohrn Bank last autumn. They were not assessed and could have left the area migration east to the north of Iceland and then south.

The total estimate came to about 1 800 000 t of which 350 000 were recorded west of 16°W and 1 150 000 t east of that. About 500 000 t of the total were recorded in the Faroese EEZ. The remaining 1 300 000 t, recorded in Icelandic waters exceeds that recorded in 2005. Naturally, a survey in May is too early for recording 0-group of blue whiting.

Herring were recorded between about 64°30N and 65d°N, 8°W-12°W. Furthermore large concentrations were located at the eastern edge of the EEC between about 65°N and 68°15'N. Further east the herring were more scattered, occurring in patches of smaller schools and closer to the surface. These were mostly older herring with little admixture of young fish (Table 2).

On the whole the herring were very sensitive to the approaching vessel and in comparison to sonar records there is little doubt that their abundance was underestimated. The degree of underestimation is, however, impossible to judge. In addition to the above areas, herring were also present in the Faroese EEZ and the southern part of the international area. As described earlier, the Icelandic assessment was conducted under excellent weather conditions and a 2-day storm was simply waited out in a couple of fjords on the east coast.

Epilogue

Because of the slow markets for (low prices of) frozen herring for human consumption there was much less Icelandic interest in the NSPR fishery than ever before. Two or three boats were out in late May and made reasonable catches, mostly according to our directions. In the second week of June the number of fishing boats increased somewhat and the area from and including the Faroese EEZ, the international area and the easternmost part of the Icelandic EEZ, east of the cold front was searched intensively with little being found. At the same time we have been informed that a Norwegian fisher searched the Jan Mayen area, but in vain.

On about 18 June, an Icelandic vessel came across what he described a high number of large schools at a depth of 300-400 m some 60 nautical miles east of Langanes (approximately 66°20'N, 12°W) and made pelagic trawl catches there of 200-400 t per haul there. On coming back about 48 hours later the skipper found little in this location. At the moment (June 21)

there are some 7 boats searching this area. They have not found many large fishable schools yet, but it seems obvious that these herring are moving to the NW and W at this time.

Should it turn out that there is a lot of herring in this area and further west in July there can be little doubt that the herring which in its time stopped at the eastern edge of the EIC must have traversed these cold waters in the surface layers to enter the more hospitable north Icelandic area. If the numbers turn out to be small it is much more likely that some NSPR herring have entered the E- and NE-Icelandic waters from the south.

But whatever the case, it will be interesting to see how the situation develops during the coming weeks – or in other words until the August PGSPEN meeting here in Reykjavik.

Table 2. Age aggregated abundance of herring in number and weight. W-Norwegian Sea and east of Iceland, May 2006.
 Total numbers in 10^{-6} individuals and biomass in 10^{-3} tonnes.

Length (cm)	Age in years														Total numbers	Total biomass	Mean weight (g)
	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
27	0	5.9	0	0	0	0	0	0	0	0	0	0	0	0	5.9	1019.0	172.1
28	0	59.4	0	0	0	0	0	0	0	0	0	0	0	0	59.4	11191.1	188.4
29	8.1	203.7	16.3	8.1	0	0	0	0	0	0	0	0	0	0	236.3	47481.9	201.0
30	0	432.6	63.6	12.7	12.7	0	0	0	0	0	0	0	0	0	521.7	110412.8	211.6
31	0	133.8	133.8	103	92.7	41.2	0	0	0	0	0	0	0	0	504.5	118913.0	235.7
32	0	0	33.4	250.4	584.2	283.8	8.3	8.3	0	0	0	0	0	0	1168.5	301108.2	257.7
33	0	0	0	184	1103.9	951.9	64	32	8	16	0	8	0	0	2367.7	648901.2	274.1
34	0	0	0	25.6	454.8	948	83.3	57.6	6.4	0	25.6	6.4	0	0	1607.7	472795.0	294.1
35	0	0	0	0	66.2	325	66.2	72.2	12	36.1	120.4	72.2	24.1	0	794.6	252757.2	318.1
36	0	0	0	0	4	20.2	12.1	72.6	28.2	20.2	96.8	72.6	24.2	0	351.1	122420.8	348.7
37	0	0	0	0	0	5	0	0	5	15.1	75.4	60.3	20.1	0	181.0	66767.9	368.9
38	0	0	0	0	0	0	0	0	4.1	0	8.2	16.5	8.2	12.3	49.4	19013.9	385.1
39	0	0	0	0	0	0	0	0	0	0	0	0	0.4	0	0.4	187.8	425.1
Total	8.1	835.5	247.1	583.8	2318.5	2575	233.9	242.9	63.8	87.4	326.5	236.1	77.1	12.3	7848.0	2172970.0	
Mean length (cm)	29	29.8	30.7	32.1	32.9	33.5	34	34.7	35.4	35.2	35.8	35.9	36.2	38	33.0		
Mean weight (g)	201	211	230.2	258.8	273.4	285.3	296.9	313.7	332	325.9	338.7	343	348.8	385.1	276.9		