

Distribution and Abundance of Fish Larvae West of Iceland in May 1961

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Introduction

The material discussed in this paper was collected on a cruise with the research vessel "Egir" in the Irminger Sea in May 1961. The main purpose of this cruise was a redfish larvae survey. However, larvae of many species other than redfish were obtained in considerable quantities. Therefore it was thought desirable to work up this material simultaneously to get an outline of the ichthyolarval distribution and abundance in the area investigated at this time. Here, the gadoid larvae will mainly be discussed, but a review of the other larvae will also be given.

The cruise was divided into two parts, in this paper called Part I and Part II (Fig. 1).

Material and methods

For horizontal sampling, the Icelandic high-speed sampler was used at three different depths. For the vertical sampling, the Helgoländer larva net was used. All larvae discussed here were taken from the plankton samples in the laboratory, and were determined, counted and measured. Table 1 shows the composition of species of fish larvae, redfish excepted. During the sorting out of the larvae, attention was paid to the presence of fish eggs in the samples which occurred in great numbers at many stations. But the egg material has not yet been worked up and will not be discussed further in this paper. In order to obtain an impression of the presence of fish eggs on this cruise, a chart was prepared (Fig. 2).

Larvae

Gadoids

The following gadoids are discussed:- Cod (Gadus morhua L.), haddock (Gadus aeglefinus L.), saithe (Gadus virens L.), whiting (Gadus merlangus L.), Norway pout (Gadus esmarkii Nilss.), and blue whiting (Gadus poutassou Risso).

Cod larvae. The distribution of cod larvae was strictly limited to the shelf regions (Fig. 3). No larvae were found outside the 500 m depth line in Icelandic waters. The larvae were much more concentrated in the coastal regions than on the offshore banks where rather few larvae were found. Further, as was to be expected this time of the year, the greatest quantities of cod larvae were found off Reykjanes and in Faxa Bay (Table 2).

In the East Greenland waters, cod larvae were obtained at three stations only, and only in small numbers (St. Nos. 74, 75, 151, Fig. 1). These larvae were the only gadoid larvae found at East Greenland. But in this area a considerable number of eggs were obtained in different places as mentioned above.

Length measurements showed that the majority of cod larvae were newly hatched, e.g. as the length composition of the first three stations of Part I shows:-

mm	Number of larvae	%
7	2	0.9
6	3	1.3
5	37	15.9
4	154	66.4
3	36	15.5
Total	232	100.0

The bulk of the cod larvae material is from the second part of the cruise in late May. From this material we find that the small larvae are most abundant in the southern part of the Icelandic waters while the number of bigger larvae increases towards north, which is probably due to the drift of larvae. This feature is shown in Figure 4. Another characteristic in the size distribution was the average size of cod larvae, which increased with increasing distance from the shore.

Haddock larvae. The distribution of haddock larvae was somewhat more restricted than that of cod, especially towards north. As with cod larvae, the main concentrations were found in Faxa Bay (Fig. 5).

The majority of the haddock larvae had a length of 3-4 mm, i.e. newly hatched (Fig. 6). At the beginning of May (St.Nos. 1-3), the 3-4 mm size group was represented by 95.1%. No larvae were above 5 mm in size. In late May (Part II of the cruise), the size ranged from 3-12 mm but the majority was still below 5 mm. The length distribution was more or less uniform from one area to another. However, the relative number of the 5-6 mm group was a little higher in the northernmost part of the Icelandic waters.

Saithe larvae. The distribution of saithe larvae corresponded on the whole with that of haddock larvae (Fig. 7). But the number of caught larvae was considerably smaller with a maximum of 50 specimens at St.No. 2 (Table 4).

The saithe larvae showed a greater range in the size distribution than cod and haddock. The size frequencies differed, however, from Part I to Part II as shown in Table 5 below:-

Table 5

Size composition of saithe larvae, Cruise B 61, May 1961		
Size mm	Part I Number of larvae	Part II Number of larvae
20-25		2
16-19		4
11-15		14
6-10	20	40
3-5	59	29
	Total 79	89

Whiting larvae. The distribution of whiting larvae showed that these were more bound to the Icelandic coastal waters than the other gadoid larvae (Fig. 8). Thus, whiting larvae were only found within 20 miles off the shore (including Faxa Bay). The number of whiting larvae was small, except in the southern part of Faxa Bay, where 77% of the total number of larvae caught were obtained at four stations (St.Nos. 168-171, Table 6).

The size ranged from 3-8 mm, with a peak at 4 mm (about 28%).

Norway pout larvae. The general distribution of Norway pout larvae corresponds with the other gadoids (Fig. 9). No Norway pout larvae were, however, found north of the Látrabjarg section. On the other hand, its distribution extended more to the south.

The main concentration was again found to be in Faxa Bay (Table 7). As regards the length composition, there is a clear difference between Part I and Part II (Fig. 10). The majority of the Norway pout larvae of Part I was newly hatched which means that about 90% of all larvae measured were of 3 and 4 mm size and the size ranged from 3-7 mm only. In Part II not only the size range increased but also the relative number of bigger larvae, especially at the northernmost stations (Látrabjarg section), where the smallest larvae caught were 4 mm in length. These represented only 5% of the total. The bigger larvae were, however, well represented. It seems, therefore, as if the hatching of eggs takes place before the spawn has drifted so far towards north.

Blue whiting larvae. As is known, the blue whiting belongs to the species which spawns in oceanic regions. Therefore the distribution of blue whiting larvae is quite different from the other gadoid larvae discussed above. As shown in Figure 11, most of the larvae were found on the Reykjanes Ridge and east of it. But we also had a positive station west of the Reykjanes Ridge and a few stations in the coastal region (Faxa Bay and Snæfellsnes). The distribution of blue whiting larvae on this cruise therefore extended from 60°N in the south to the Snæfellsnes section in the north.

Although the blue whiting larvae were spread over a relatively wide area, the number of larvae caught was small with only one to four specimens per station (Table 8). At one station only, the number of larvae caught amounted to 20.

The length distribution was very uniform for the whole area, ranging from 3-7 mm, the 3-5 mm groups being almost equally represented.

#### Other fish larvae

Capelin larvae. As seen from Table 1, more than 70% of all larvae, redfish larvae excepted, were capelin larvae. The distribution of capelin larvae was similar to that of cod larvae (Table 9). Far the greatest concentrations were found in the southernmost part of a zone along the coast, the larvae decreasing in number towards north. At some stations, the density of the capelin larvae was very high, e.g. at St.No. 1, where over 16,000 specimens were caught in all kinds of gear.

Pleuronectidae larvae. Larvae of the following Pleuronectidae were obtained:- Long rough dab (Drepanopsetta platessoides Fabr.), plaice (Pleuronectes platessa L.), dab (Pleuronectes limanda L.), and witch (Pleuronectes cynoglossus L.).

The long rough dab was found to have the widest distribution (Table 10), and the witch the smallest. Because of difficulties in distinguishing plaice and dab larvae from each other due to injury caused by the high-speed samplers, both species are discussed together.

The long rough dab was spread over the continental shelf of Iceland and at two stations at East Greenland. The greatest density of larvae was found off Látrabjarg. But also regarding this species Faxa Bay was the area with the highest number of positive stations. The distribution of plaice and dab larvae was strictly limited to the coastal region, with the greatest density in Faxa Bay (Table 11). Very few specimens of the witch were obtained.

Sand-eel larvae. The sand-eel larvae were spread over a relatively wide area in Icelandic waters and were also caught at three stations off East Greenland. The number of larvae at each station was, however, small, the maximum being 57 larvae at Station 132 (all gear counted).

As can be seen from Table 1, the number of species of fish larvae caught on this cruise was fairly high. All the larvae which have not been discussed in this paper were found in rather small quantities, Onos mustela L. being best represented. Most of the species were caught in Icelandic waters. There are, however, some species which were almost exclusively found in the oceanic area:-

- (1) Myctophum glaciale Reinh., found in the Reykjanes Ridge area,
- (2) Argentina sphyryana L., found at few stations both in the northern and southern oceanic part of the area investigated,
- (3) Molva byrkjelange Walb., also found in the Reykjanes Ridge area.

#### Abundance of gadoid larvae in relation to depth

As in both parts of the cruise, three high-speed samplers were used at different depths, there was an opportunity to study the abundance of larvae in relation to depth. The samplers were towed at the following depths:-

Sampler I	3 m
Sampler II	15 - 20 m
Sampler III	25 - 30 m

The larvae taken in the vertical net are therefore excluded here. Only the cod, haddock and Norway pout larvae were used. Further, only stations where all three samplers were operated and where the total number of each species was higher than ten were used (Table 12).

The relative number of larvae caught at each depth varied considerably from one station to another, but on the whole Sampler II gave the highest results and Sampler I the lowest.

The Norway pout larvae were best represented in Sampler III, considering the whole material. But this is due to one station (No. 112) where the results were quite the reverse of the other stations.

A study of variations in day and night catches showed some notable differences. It should be mentioned that in this region, the difference between day and night at this time of the year is not very pronounced. The samples were divided into: day catches from 06.00 h - 22.00 h and night catches from 22.01 h - 05.59 h. Figure 12 demonstrates the differences between night and day catches in percentages for cod, haddock and Norway pout larvae. As regards cod larvae, it can be seen from Figure 12, that there are no notable changes for the deepest level (Sampler III) between day and night catches. But there seems to be an interchange between Levels II and I for night and day, because in the uppermost layer we obtain more larvae at night but in the second layer the night catches are somewhat lower. There the vertical migration seems at this time of the year to take place in the uppermost layers only. For the other species discussed here, the material was not as extensive as for cod larvae.

We can, however, see from the material that there were few haddock larvae in Sampler I both for day and night. The majority of catches was in Sampler II. The night catches were almost equal in Samplers II and III, which is not to be considered as significant because of the rather poor material.

For the Norway pout larvae we can hardly draw any conclusions from the night catches because of the above-mentioned station and too few night stations.

For day catches, there is fairly good material for all three species. Considering the day catches only, there is a good correspondence among the three species according to depth distribution. The majority of the larvae can be found in Layers II and III. The only notable difference is for Sampler I where we obtain a considerable number of cod larvae but only a low number of the other species.

Table 1

The composition of species of fish larvae, redfish excepted, in the Irminger Sea in May 1961. (All gear)

Species	Cruise B 61				Total number of		%
	Part I Number of stations	larvae	Part II Number of stations	larvae	stations	larvae	
<i>Gadus morhua</i>	6	3,461	24	2,266	30	5,727	11.98
<i>Gadus virens</i>	3	111	19	92	22	203	0.42
<i>Gadus aeglefinus</i>	3	188	19	914	22	1,102	2.30
<i>Gadus esmarkii</i>	5	1,365	15	1,311	20	2,676	5.60
<i>Gadus merlangus</i>	2	11	9	104	11	115	0.24
<i>Gadus poutassou</i>	14	42	3	4	17	46	0.10
<i>Ammodytes</i> sp.	1	22	21	154	22	176	0.37
<i>Mallotus villosus</i>	7	19,344	26	15,951	33	35,295	73.81
<i>Clupea harengus</i>	3	52	7	23	10	75	0.16
<i>Onos cimbrius</i>	3	4	7	80	10	84	0.17
<i>Onos mustela</i>	1	2	11	237	12	239	0.50
<i>Brosmius brosme</i>	0	0	2	3	2	3	0.01
<i>Sebastes viviparus</i>	1	1	5	25	6	26	0.05
<i>Molva byrkelange</i>	7	9	1	1	8	10	0.02
<i>Lumpus lampretta</i>	1	2	3	8	4	10	0.02
<i>Drepanopsetta platessoides</i>	3	59	21	669	24	728	1.55
<i>Pleuronectes cynoglossus</i>	1	9	8	29	9	38	0.08
<i>Pleuronectes linanda</i> )	2	89	12	1,097	14	1,186	2.48
<i>Pleuronectes platessa</i> )							
<i>Myctophum glaciale</i>	10	22	1	2	11	24	0.05
<i>Argentina sphyraena</i>	2	3	3	3	5	6	0.01
<i>Liparis montagui</i>	0	0	4	6	4	6	0.01
<i>Centronotus gunnellus</i>	1	4	1	1	2	5	0.01
<i>Triglops pingeli</i>	1	1	7	10	8	11	0.02
<i>Cottus</i> sp.	0	0	5	13	5	13	0.03
<i>Lebetus orca</i>	0	0	3	8	3	8	0.02
<i>Chirolophis galerita</i>	0	0	1	1	1	1	0.00
<i>Agonus cataphractus</i>	0	0	1	1	1	1	0.00
Indeterminate	1	1	1	1	2	2	0.00
<b>Total</b>	<b>78</b>	<b>24,802</b>	<b>240</b>	<b>23,014</b>	<b>318</b>	<b>47,816</b>	<b>100.01</b>

Table 2

Number of cod larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae	Number per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	
1	370	231.3	450	22.8	1,400	71.1	1,000	50.8	2,850	48.2	3,220
2	80	50.0	55	2.8	-	-	95	4.8	150	2.5	230
3	0	0	8	0.4	-	-	0	0	8	0.1	8
74	1	0.6	0	0	0	0	0	0	0	0	1
75	0	0	0	0	0	0	1	0.05	1	0.02	1
102	0	0	1	0.05	0	0	0	0	1	0.02	1
109	-	-	10	0.5	70	3.6	2	0.1	82	1.4	82
110	-	-	22	1.1	60	3.0	104	5.3	186	3.1	186
111	-	-	42	2.1	16	0.8	17	0.9	75	1.3	75
112	-	-	32	1.6	6	0.3	14	0.7	52	0.9	52
113	-	-	-	-	2	0.1	2	0.1	4	0.1	4
127	0	0	0	0	1	0.05	0	0	1	0.02	1
129	45	28.1	-	-	180	9.1	143	7.3	323	5.3	368
130	0	0	-	-	48	2.4	397	20.2	445	7.5	445
131	10	6.3	-	-	-	-	-	-	-	-	10
132	26	16.3	0	0	3	0.2	10	0.5	13	0.2	39
133	2	1.3	0	0	0	0	0	0	0	0	2
134	7	4.4	0	0	0	0	3	0.2	3	0.1	10
135	2	1.3	0	0	0	0	0	0	0	0	2
139	1	0.6	0	0	0	0	0	0	0	0	1
151	1	0.6	0	0	0	0	0	0	0	0	1
163	1	0.6	3	0.2	0	0	0	0	3	0.1	4
165	0	0	0	0	1	0.05	0	0	1	0.02	1
167	0	0	0	0	2	0.16	2	0.1	4	0.1	4
168	100	62.5	24	1.2	57	2.9	9	0.5	90	1.5	190
169	15	9.4	0	0	14	0.7	4	0.2	18	0.3	33
170	17	10.6	1	0.05	11	0.6	7	0.4	19	0.3	36
171	172	107.5	5	0.3	94	4.8	30	1.5	129	2.2	301
172	100	62.5	48	2.4	140	7.1	45	2.3	233	3.9	333
173	45	28.1	21	1.1	10	0.5	10	0.5	41	0.7	86
Total	995		722		2,115		1,895		4,732		5,727

Table 3

Number of haddock larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae	Number per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	
1	16	10.0	0	0	80	4.1	76	3.9	156	2.6	172
2	5	3.1	2	0.1	-	-	8	0.4	10	0.2	15
3	0	0	1	0.05	-	-	0	0	1	0.02	1
109	-	-	0	0	27	1.4	8	0.4	35	0.6	35
110	-	-	5	0.3	22	1.1	74	3.8	101	1.7	101
111	-	-	2	0.1	3	0.2	2	0.1	7	0.1	7
112	-	-	2	0.1	3	0.2	1	0.05	6	0.1	6
113	-	-	-	-	2	0.1	8	0.4	10	0.2	10
114	-	-	-	-	0	0	1	0.05	1	0.02	1
129	7	4.4	-	-	40	2.0	40	2.0	80	1.4	87
130	7	4.4	-	-	0	0	3	0.2	3	0.1	10
134	1	0.6	0	0	0	0	0	0	0	0	1
165	1	0.6	0	0	0	0	0	0	0	0	1
166	1	0.6	0	0	0	0	0	0	0	0	1
167	2	1.3	0	0	0	0	2	0.1	2	0.03	4
168	47	29.4	0	0	85	4.3	6	0.3	91	1.5	138
169	6	3.8	0	0	1	0.05	1	0.05	2	0.03	8
170	8	5.0	1	0.05	3	0.2	3	0.2	7	0.1	15
171	192	120.0	1	0.05	74	3.8	12	0.6	87	1.5	279
172	46	28.8	8	0.4	86	4.4	16	0.8	110	1.9	156
173	58	36.3	1	0.05	2	0.1	4	0.2	7	0.1	65
Total	397		23		428		265		716		1,113

Table 4

Number of saithe larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae per m <sup>2</sup>	Number larvae per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	
1	7	4.4	0	0	24	1.2	16	0.8	40	0.7	47
2	13	8.1	22	1.1	-	-	28	1.4	50	0.8	63
3	0	0	1	0.05	-	-	0	0	1	0.02	1
110	-	-	0	0	2	0.1	5	0.3	7	0.1	7
111	-	-	0	0	0	0	2	0.1	2	0.03	2
112	-	-	0	0	0	0	4	0.2	4	0.1	4
113	-	-	-	-	0	0	1	0.05	1	0.02	1
114	-	-	-	-	1	0.05	1	0.05	2	0.03	2
127	0	0	0	0	1	0.05	0	0	1	0.02	1
129	1	0.6	-	-	0	0	4	0.2	4	0.1	5
130	2	1.3	-	-	0	0	6	0.3	6	0.1	8
131	7	4.4	-	-	-	-	-	-	-	-	7
132	0	0	0	0	0	0	1	0.05	1	0.02	1
134	0	0	0	0	0	0	2	0.1	2	0.03	2
165	0	0	0	0	0	0	1	0.05	1	0.02	1
167	0	0	0	0	1	0.05	1	0.05	2	0.03	2
168	13	8.1	0	0	3	0.2	0	0	3	0.1	16
169	1	0.6	0	0	0	0	1	0.05	1	0.02	2
170	2	1.3	1	0.05	1	0.05	0	0	2	0.03	4
171	4	2.5	0	0	4	0.2	1	0.05	5	0.1	9
172	4	2.5	4	0.2	2	0.1	5	0.3	11	0.2	15
173	0	0	2	0.1	1	0.05	0	0	3	0.1	3
Total	54		30		40		79		149		203

Table 5

See page 2 in the text

Table 6

Number of whiting larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae per m <sup>2</sup>	Number larvae per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	
1	2	1.3	0	0	0	0	8	0.4	8	0.1	10
2	0	0	1	0.05	-	-	0	0	1	0.02	1
109	-	-	0	0	1	0.05	0	0	1	0.02	1
110	-	-	0	0	0	0	3	0.2	3	0.1	3
130	1	0.6	-	-	0	0	0	0	0	0	1
168	14	8.8	3	0.2	7	0.4	1	0.05	11	0.2	25
169	18	11.3	0	0	2	0.1	2	0.1	4	0.1	22
170	9	5.6	0	0	12	0.6	4	0.2	16	0.3	25
171	4	2.5	0	0	10	0.5	0	0	10	0.2	14
172	0	0	3	0.2	6	0.3	0	0	9	0.2	9
173	0	0	1	0.05	3	0.2	0	0	4	0.1	4
Total	48		8		41		18		67		115

Table 7

Number of Norway pout larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers								All gear No. of larvae
	No. of larvae per m <sup>2</sup>	Number larvae per m <sup>2</sup>	I		II		III		I-III		
			No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	
1	80	50.0	15	0.8	600	30.5	360	18.3	975	16.5	1,055
2	150	93.8	50	2.5	-	-	103	5.2	153	2.6	303
3	0	0	1	0.05	-	-	0	0	1	0.02	1
102	4	2.5	0	0	0	0	0	0	0	0	4
109	-	-	0	0	12	0.6	24	1.2	36	0.6	36
110	-	-	0	0	2	0.1	61	3.1	63	1.1	63
111	-	-	0	0	2	0.1	7	0.4	9	0.2	9
112	-	-	9	0.5	0	0	4	0.2	13	0.2	13
113	-	-	-	-	2	0.1	5	0.3	7	0.1	7
129	13	8.1	-	-	5	0.3	24	1.2	29	0.5	42
130	1	0.6	-	-	0	0	0	0	0	0	1
167	2	1.3	0	0	0	0	4	0.2	4	0.1	6
168	40	25.0	0	0	26	0.6	14	0.7	40	0.7	80
169	26	16.3	0	0	15	0.8	7	0.4	22	0.4	48
170	7	4.4	0	0	6	0.3	19	1.0	25	0.4	32
171	360	225.0	3	0.2	47	2.4	34	1.7	84	1.4	444
172	240	150.0	7	0.4	90	4.6	62	3.1	159	2.7	399
173	95	59.4	7	0.4	22	1.1	7	0.4	36	0.6	131
Total	1,018		92		829		735		1,656		2,674

Table 8

Number of blue whiting larvae by stations and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers								All gear No. of larvae
	No. of larvae per m <sup>2</sup>	Number larvae per m <sup>2</sup>	I		II		III		I-III		
			No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	
52	1	0.6	0	0	0	0	0	0	0	0	1
54	0	0	0	0	2	0.1	0	0	2	0.03	2
58	0	0	0	0	1	0.05	3	0.2	4	0.1	4
59	0	0	0	0	0	0	2	0.1	2	0.03	2
64	0	0	0	0	1	0.05	0	0	1	0.02	1
91	-	-	0	0	1	0.05	0	0	1	0.02	1
93	1	0.6	0	0	1	0.05	0	0	1	0.02	2
96	1	0.6	0	0	0	0	0	0	0	0	1
97	0	0	0	0	2	0.1	0	0	2	0.03	2
98	2	1.3	0	0	0	0	0	0	0	0	2
99	1	0.6	0	0	0	0	0	0	0	0	1
100	19	11.9	0	0	1	0.05	0	0	1	0.02	20
101	0	0	0	0	1	0.05	0	0	1	0.02	1
102	2	1.3	0	0	0	0	0	0	0	0	2
109	-	-	0	0	1	0.05	0	0	1	0.02	1
169	1	0.6	0	0	0	0	0	0	0	0	1
173	0	0	0	0	2	0.1	0	0	2	0.03	2
Total	28		0		13		5		18		46

Table 9

Number of capelin larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae	Number per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	No. of larvae	Number per m <sup>3</sup>	
1	1,670	1,043.8	6,400	324.9	6,000	304.6	2,040	103.6	14,440	244.3	16,110
2	790	493.8	2,030	103.0	-	-	320	16.2	2,350	37.3	3,140
3	11	6.9	75	3.8	-	-	0	0	75	1.3	86
4	2	1.3	0	0	2	0.1	0	0	2	0.03	4
7	0	0	1	0.05	0	0	0	0	1	0.02	1
11	1	0.6	0	0	0	0	0	0	0	0	1
102	0	0	1	0.05	1	0.05	0	0	2	0.03	2
109	-	-	27	1.4	220	11.2	69	3.5	316	5.3	316
110	-	-	13	0.7	21	1.1	216	11.0	250	4.2	250
111	-	-	202	10.3	102	5.2	70	3.6	374	6.3	374
112	-	-	159	8.1	38	1.9	44	2.2	241	4.1	241
113	-	-	-	-	41	2.1	4	0.2	45	0.8	45
114	-	-	-	-	8	0.4	0	0	8	0.1	8
128	0	0	1	0.05	0	0	3	0.2	4	0.1	4
129	16	10.0	-	-	314	15.9	109	5.5	423	7.2	439
130	5	3.1	-	-	2	0.1	24	1.2	26	0.4	31
131	3	1.9	-	-	-	-	-	-	-	-	3
132	0	0	0	0	3	0.2	59	3.0	62	1.0	62
133	70	43.8	0	0	1	0.05	24	1.2	25	0.4	95
134	3	1.9	0	0	0	0	7	0.4	7	0.1	10
135	32	20.0	0	0	0	0	9	0.5	9	0.2	41
140	0	0	0	0	4	0.2	5	0.3	9	0.2	9
163	0	0	1	0.05	1	0.05	1	0.05	3	0.1	3
164	0	0	0	0	28	1.4	16	0.8	44	0.7	44
165	0	0	0	0	13	0.7	100	5.1	113	1.9	113
166	0	0	0	0	19	1.0	49	2.5	68	1.2	68
167	4	2.5	1	0.05	5	0.3	73	3.7	79	1.3	83
168	1,020	637.5	150	7.6	310	15.7	210	10.7	670	11.3	1,690
169	440	275.0	5	0.3	875	44.4	270	13.7	1,150	19.5	1,590
170	250	156.0	36	1.8	500	25.4	485	24.6	1,021	17.3	1,271
171	1,560	975.0	44	2.2	520	26.4	500	25.4	1,064	18.0	2,624
172	730	456.3	360	18.3	1,260	64.0	920	46.7	2,540	43.0	3,270
173	620	387.5	2,367	120.2	110	5.6	170	8.6	2,647	44.8	3,267
Total	7,227		11,873		10,398		5,797		28,068		35,295



Table 10

Number of long rough dab larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae per m <sup>2</sup>	Number larvae per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	
1	4	2.5	0	0	32	1.6	16	0.8	48	0.8	52
2	4	2.5	2	0.1	-	-	0	0	2	0.03	6
3	0	0	1	0.05	-	-	0	0	1	0.02	1
109	-	-	3	0.2	3	0.2	0	0	6	0.1	6
110	-	-	2	0.1	4	0.2	12	0.6	18	0.3	18
111	-	-	3	0.2	1	0.1	3	0.2	7	0.1	7
112	-	-	6	0.3	3	0.2	6	0.3	15	0.3	15
113	-	-	-	-	3	0.2	4	0.2	7	0.1	7
121	0	0	0	0	0	0	1	0.05	1	0.02	1
129	18	11.3	-	-	83	4.2	91	4.6	174	2.9	192
130	37	23.1	-	-	0	0	38	1.9	38	0.6	75
132	3	1.9	0	0	0	0	5	0.3	5	0.1	8
135	1	0.6	0	0	0	0	0	0	0	0	1
139	3	1.9	0	0	0	0	0	0	0	0	3
148	0	0	1	0.05	0	0	0	0	1	0.02	1
162	0	0	1	0.05	0	0	0	0	1	0.02	1
165	0	0	0	0	1	0.05	0	0	1	0.02	1
167	5	3.1	0	0	2	0.1	0	0	2	0.03	7
168	56	35.0	1	0.05	28	1.4	0	0	29	0.5	85
169	15	9.4	0	0	5	0.3	0	0	5	0.1	20
170	6	3.8	0	0	0	0	0	0	0	0	6
171	64	40.0	0	0	16	0.8	5	0.3	21	0.4	85
172	60	37.5	2	0.1	29	1.5	0	0	31	0.5	91
173	32	20.0	0	0	6	0.3	1	0.05	7	0.1	39
Total	308		22		216		182		420		728

Table 11

Number of plaice and dab larvae by station and gear. Cruise B 61, May 1961

Number of stations	Helgoländer larva net		High-speed samplers						All gear No. of larvae		
	No. of larvae per m <sup>2</sup>	Number larvae per m <sup>2</sup>	I		II		III			I-III	
			No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	No. of larvae per m <sup>3</sup>	Number larvae per m <sup>3</sup>	
1	50	31.3	20	1.0	8	0.4	4	0.2	32	0.5	82
2	0	0	7	0.4	-	-	0	0	7	0.1	7
109	-	-	16	0.8	12	0.6	3	0.2	31	0.5	31
110	-	-	0	0	0	0	7	0.4	7	0.1	7
130	3	1.9	-	-	1	0.05	6	0.3	7	0.1	10
132	1	0.6	0	0	0	0	0	0	0	0	1
134	3	1.9	0	0	0	0	1	0.05	1	0.02	4
167	1	0.6	0	0	0	0	0	0	0	0	1
168	130	81.3	4	0.2	106	5.4	24	1.2	134	2.3	264
169	75	46.9	0	0	60	3.0	4	0.2	64	1.1	139
170	190	118.8	0	0	47	2.4	12	0.6	59	1.0	249
171	64	40.0	8	0.4	80	4.1	10	0.5	98	1.7	162
172	44	27.5	12	0.6	80	4.1	23	1.2	115	1.9	159
173	32	20.0	14	0.7	20	1.0	4	0.2	38	0.6	70
Total	593		81		414		98		593		1,186

Table 12

Number of larvae at different depths for three selected species. Given in average percentages

Species	No. of stations	No. of larvae	High-speed sampler I 3 m %	High-speed sampler II 15-20 m %	High-speed sampler III 25-30 m %	
Cod	12	3,788	22.08	48.25	29.66	Day and night catches
Haddock	6	580	2.23	67.81	29.96	
Norway pout	10	1,453	9.82	42.89	47.29	
Total	28	5,821				
Cod	9	3,468	19.93	49.98	30.10	Day catches
Haddock	4	444	2.11	76.98	20.91	
Norway pout	7	1,341	4.14	56.05	39.81	
Total	20	5,253				
Cod	3	320	28.52	43.06	28.42	Night catches
Haddock	2	136	2.47	49.46	48.07	
Norway pout	3	112	23.08	12.16	64.76	
Total	8	568				

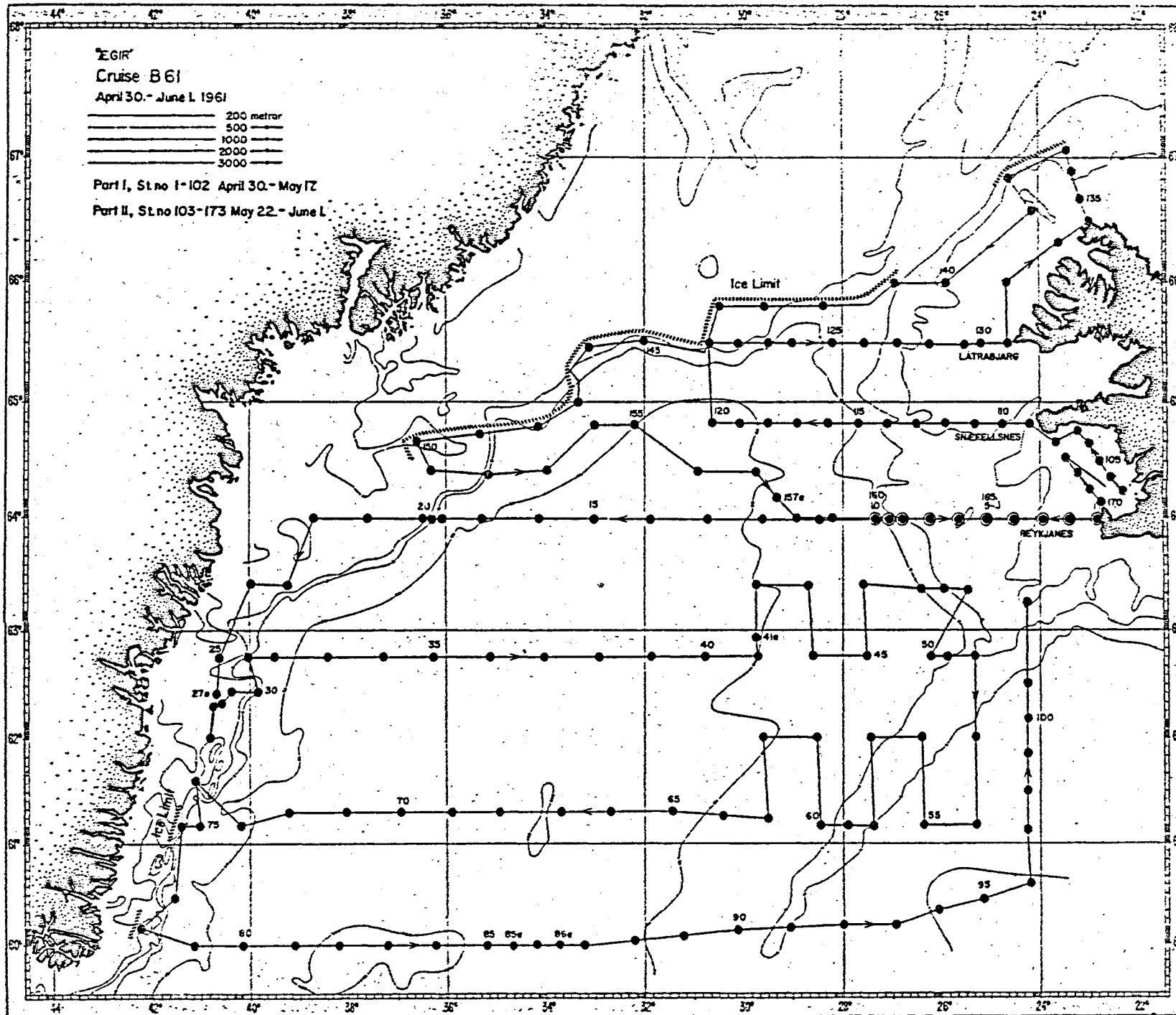


Fig. 1. The Route of the Icelandic Redfish Larvae Cruise in the Irminger Sea in May 1961

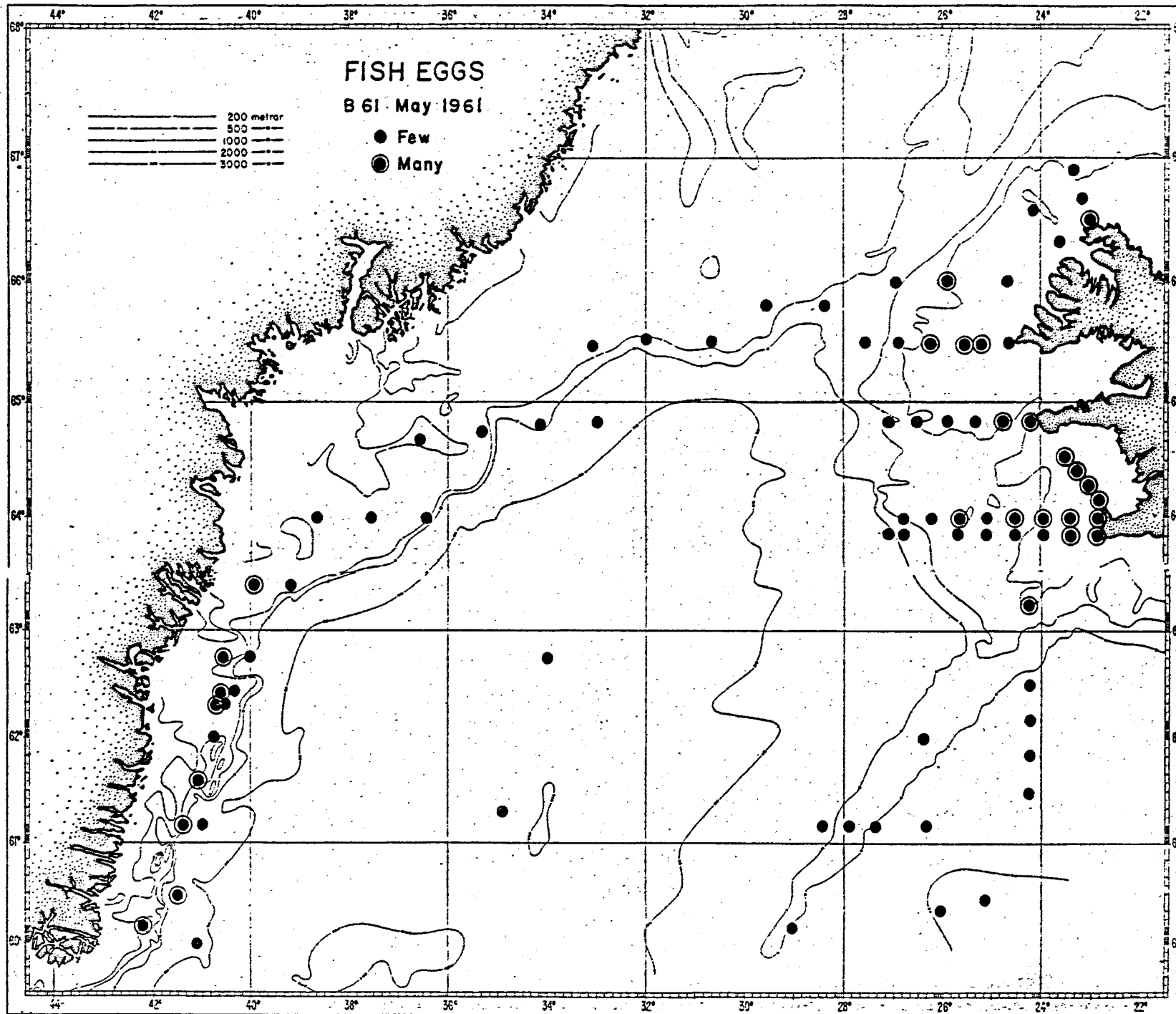


Fig. 2. Chart showing the Distribution of Fish Eggs in the Irminger Sea on Cruise B 61 in May 1961.

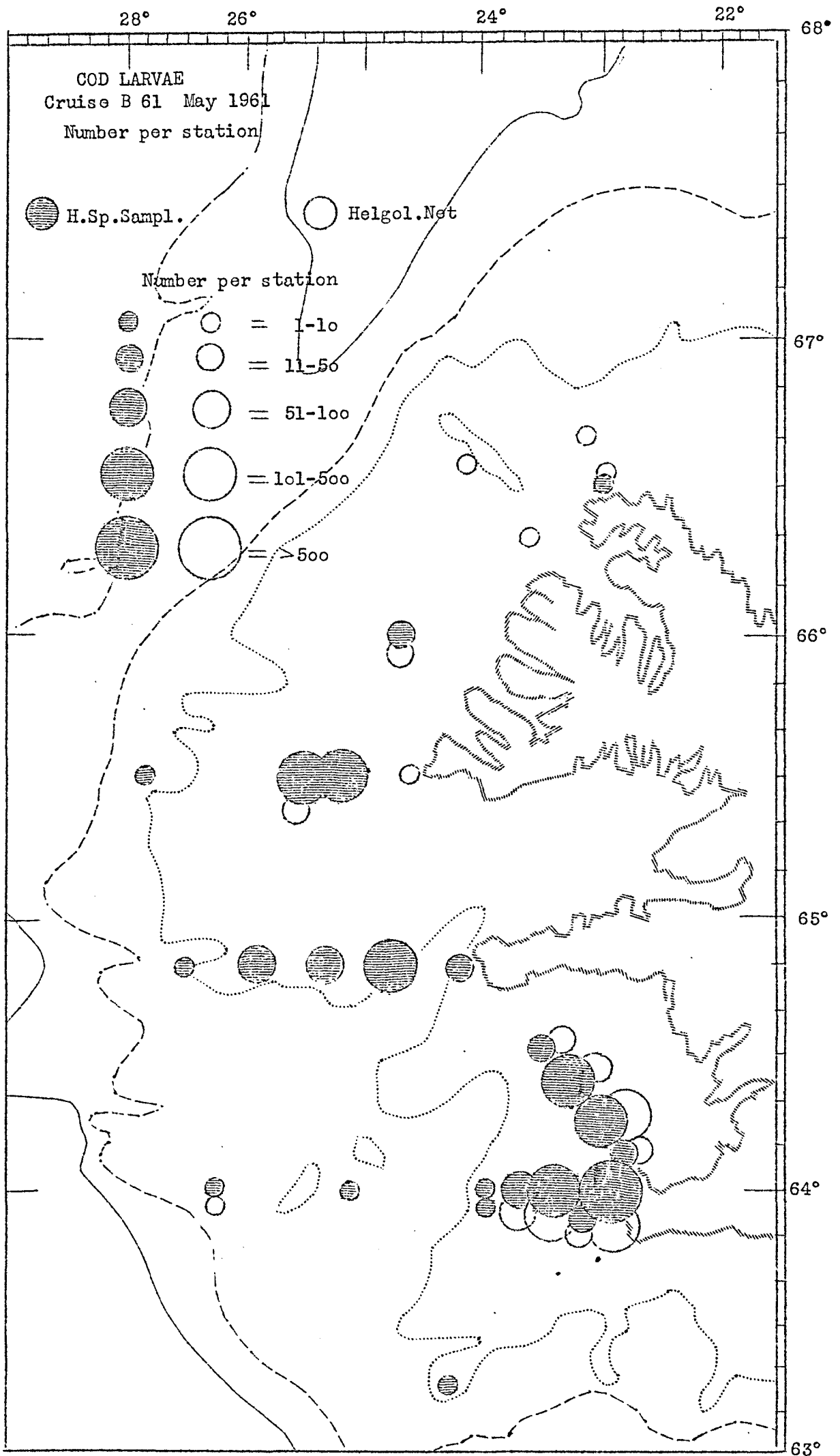


Figure 3. Chart showing the distribution and abundance of cod larvae in May 1961. Negative stations omitted.

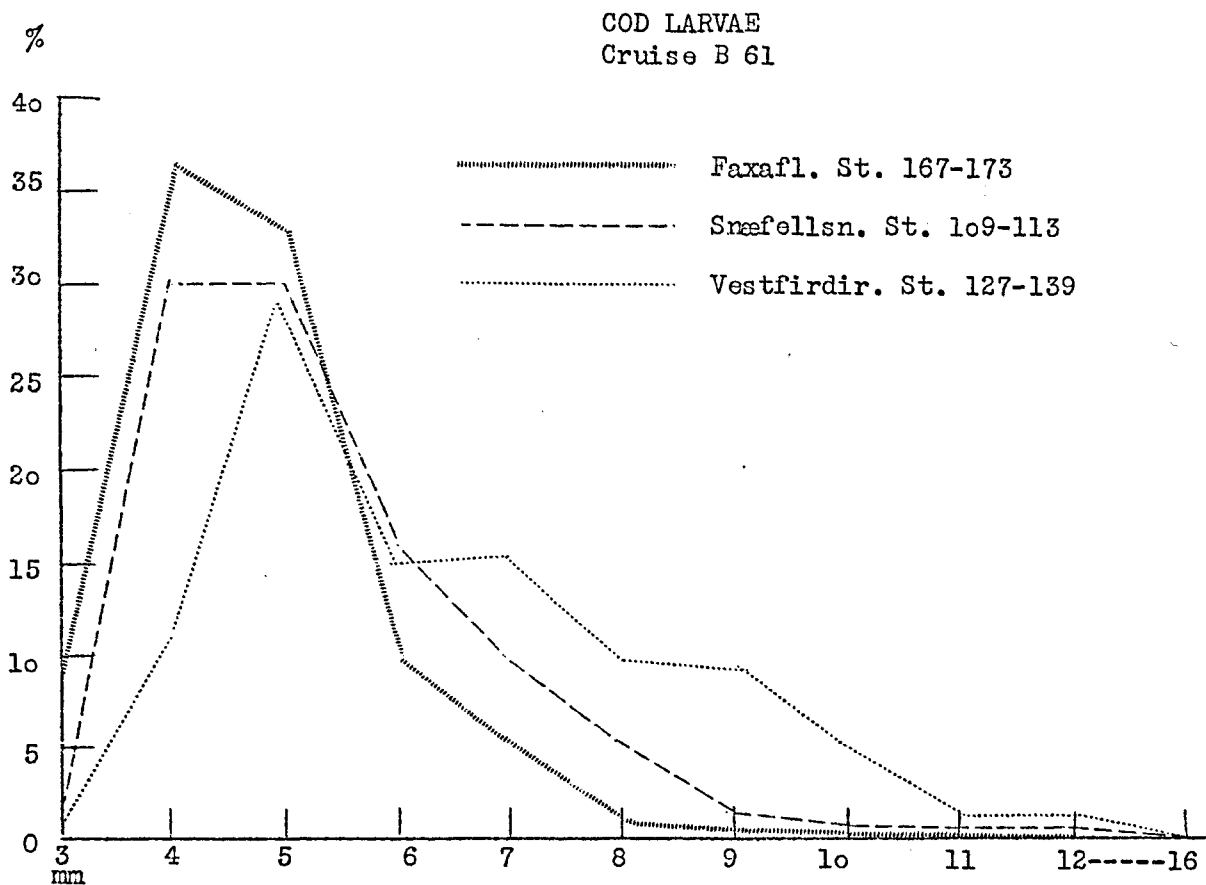


Figure 4. Diagram showing the size frequencies for cod larvae in different areas.

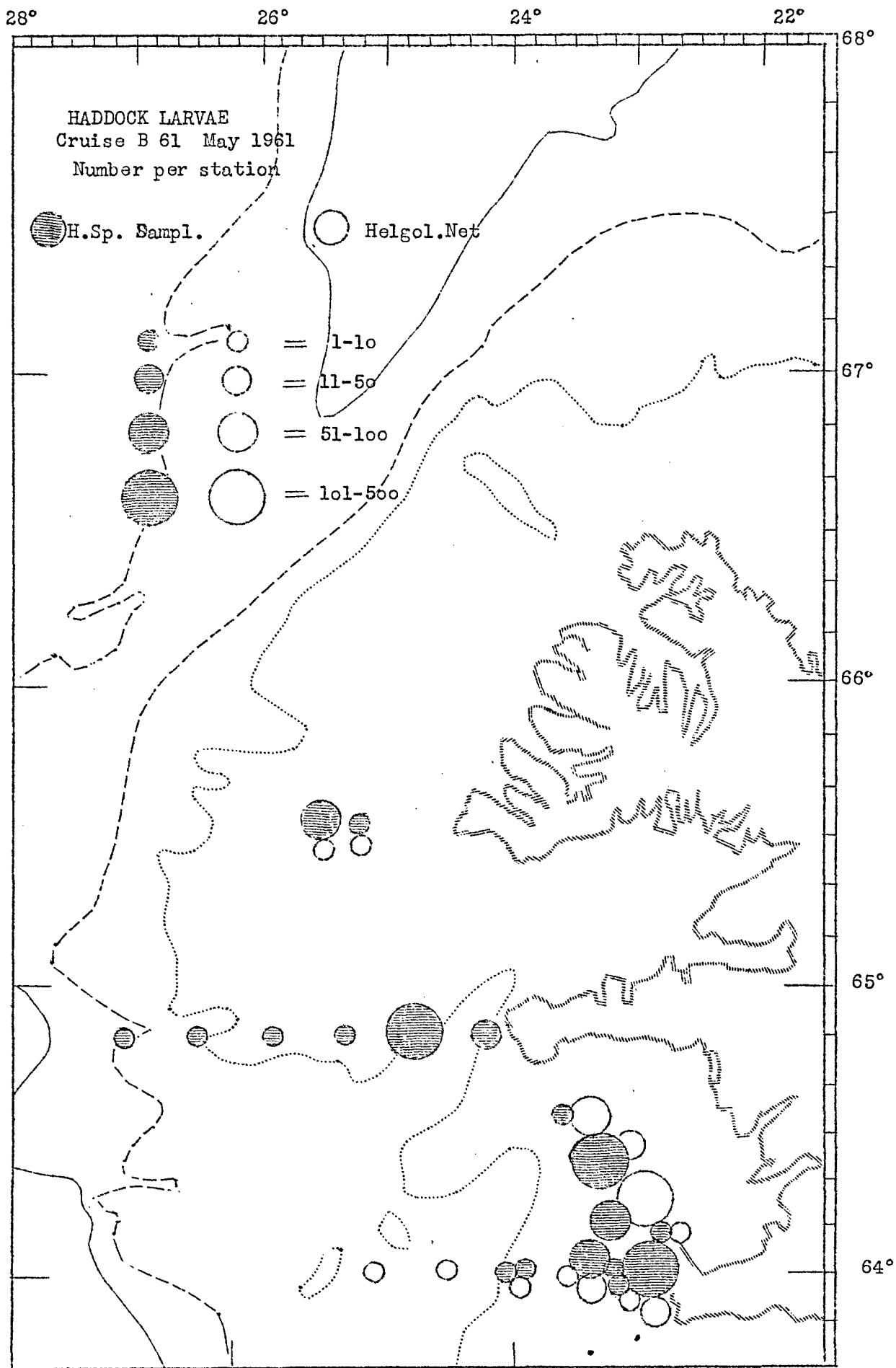


Figure 5. Chart showing the distribution and abundance of haddock larvae in May 1961. Negative stations omitted.

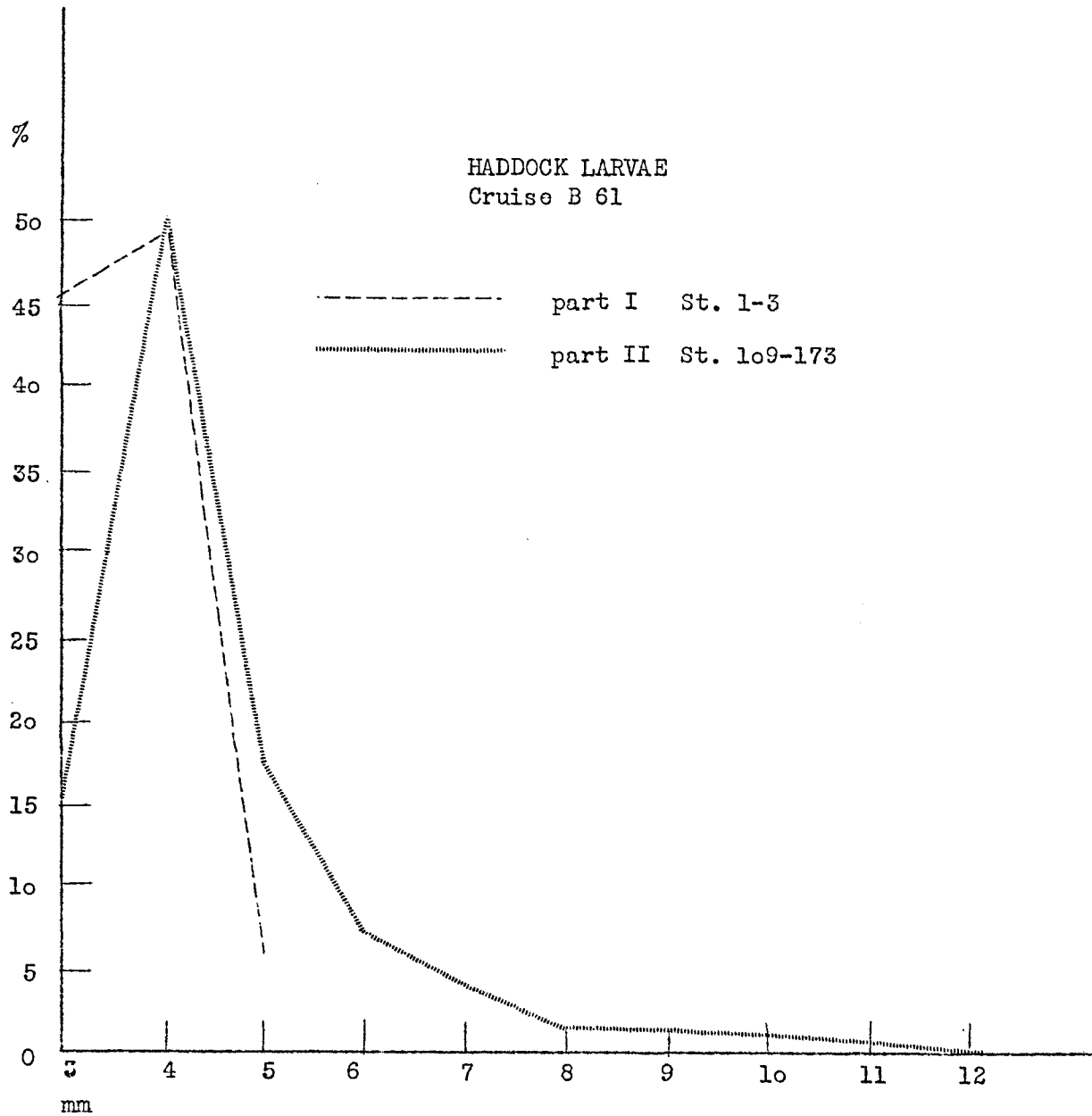


Figure 6. Diagram showing the size frequencies for haddock larvae of Cruise B 61, Part I and Part II separately.



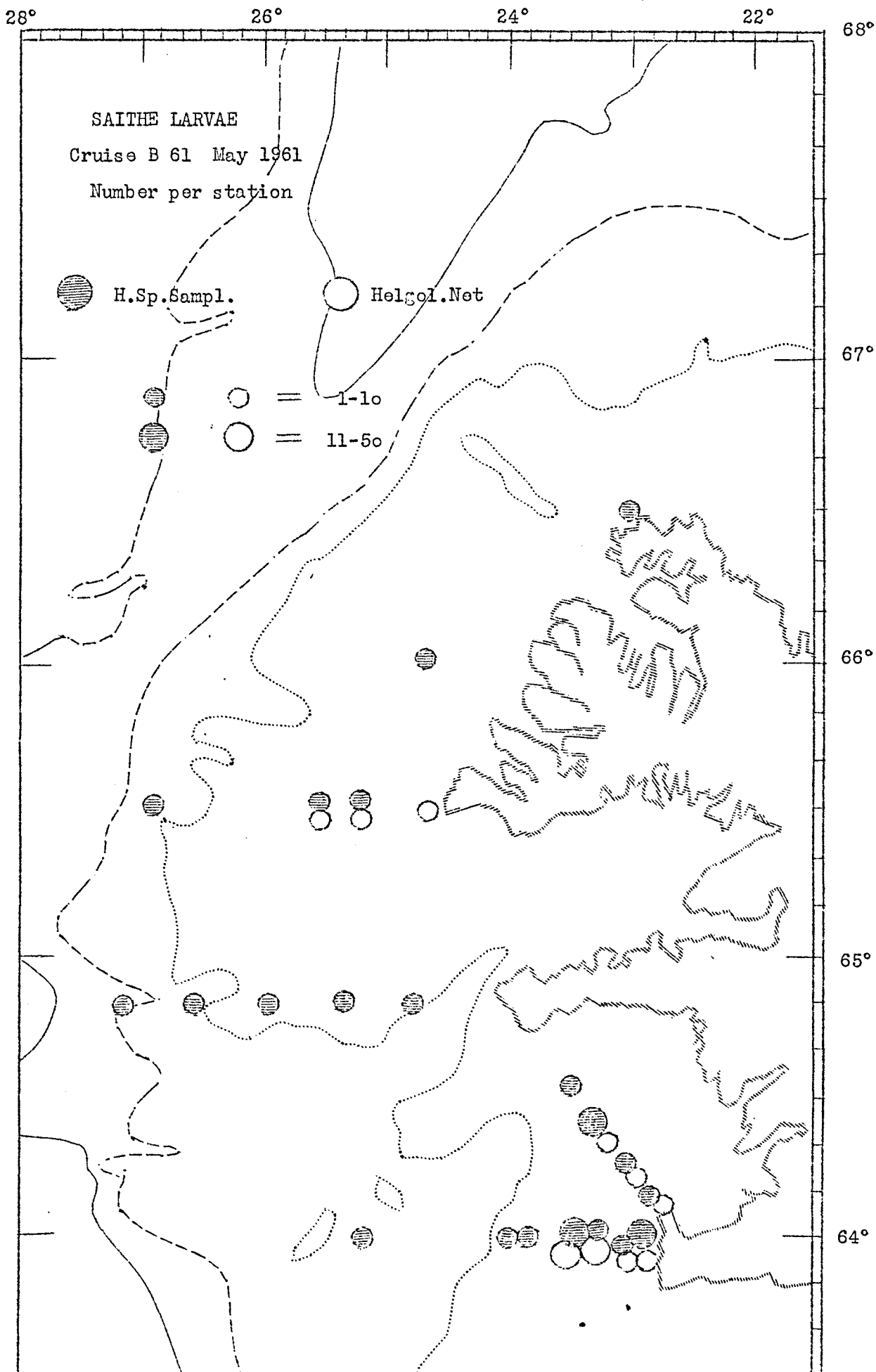


Figure 7. Chart showing the distribution and abundance of saithe larvae in May 1961. Negative stations omitted.

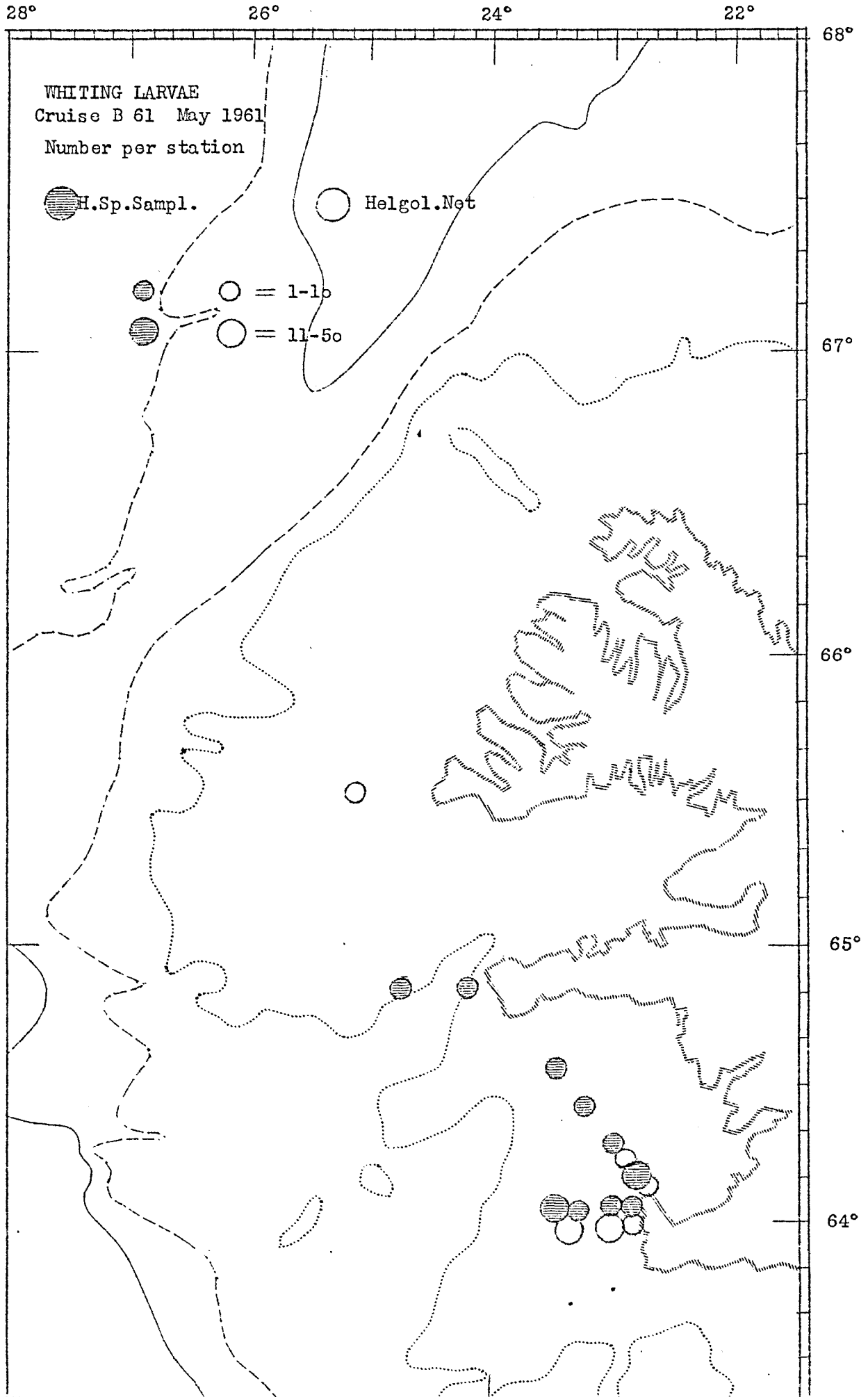
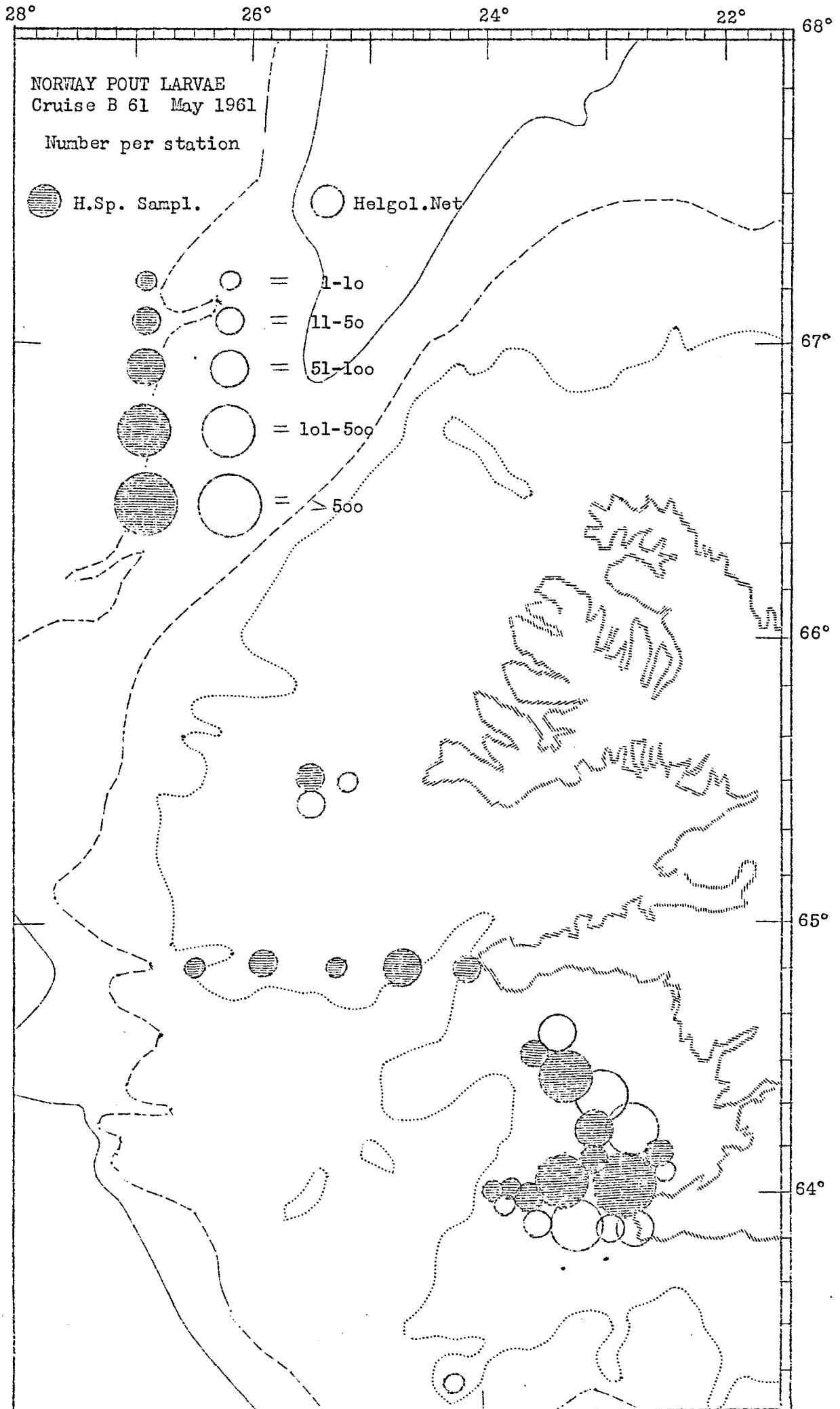


Figure 8. Chart showing the distribution and abundance of whiting larvae in May 1961. Negative stations omitted.



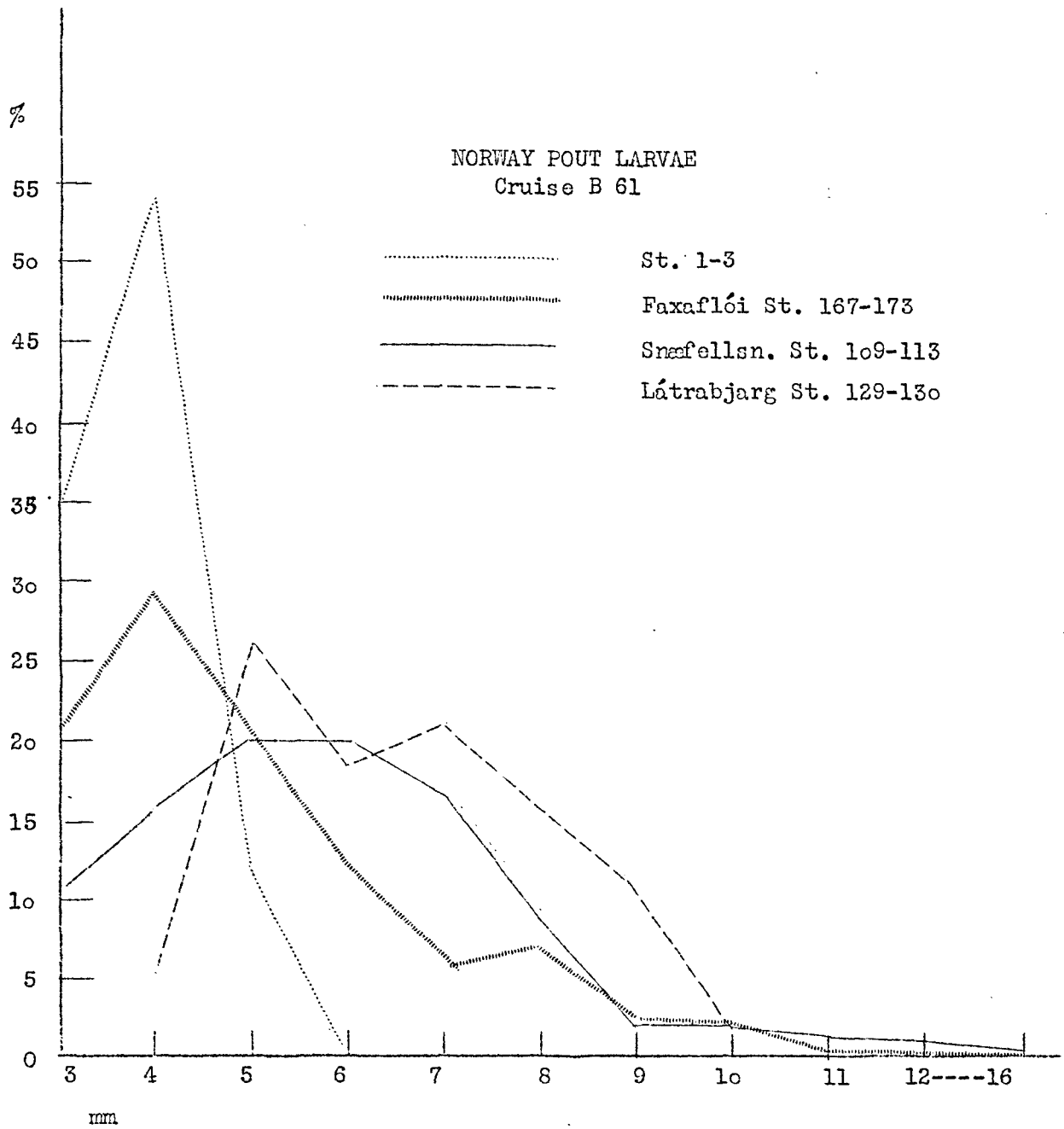


Figure 10. Diagram showing the size frequencies for Norway pout larvae. Cruise B 61, May 1961.

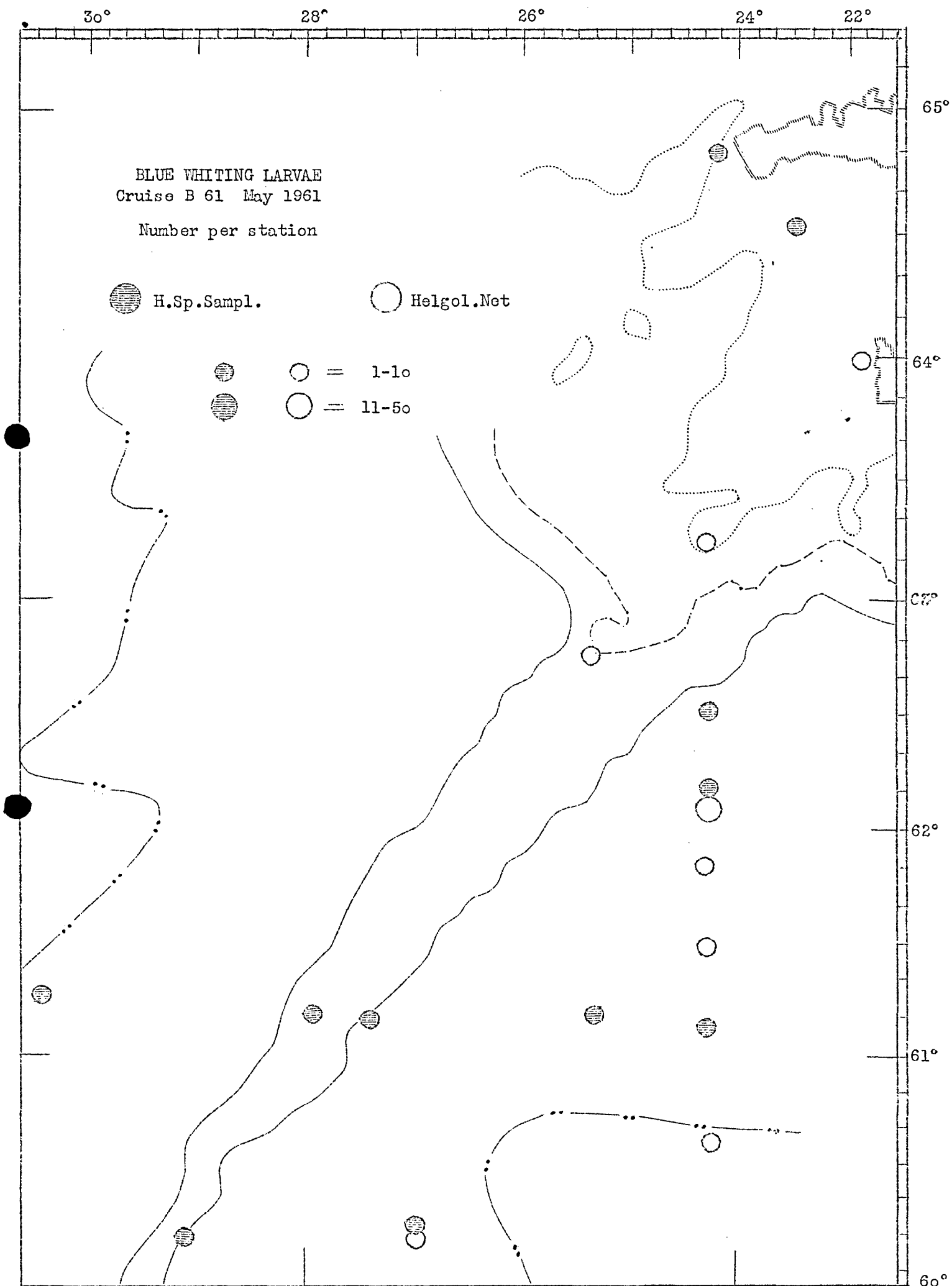


Figure 11. Chart showing the distribution and abundance of blue whiting larvae in May 1961. Negative stations omitted.

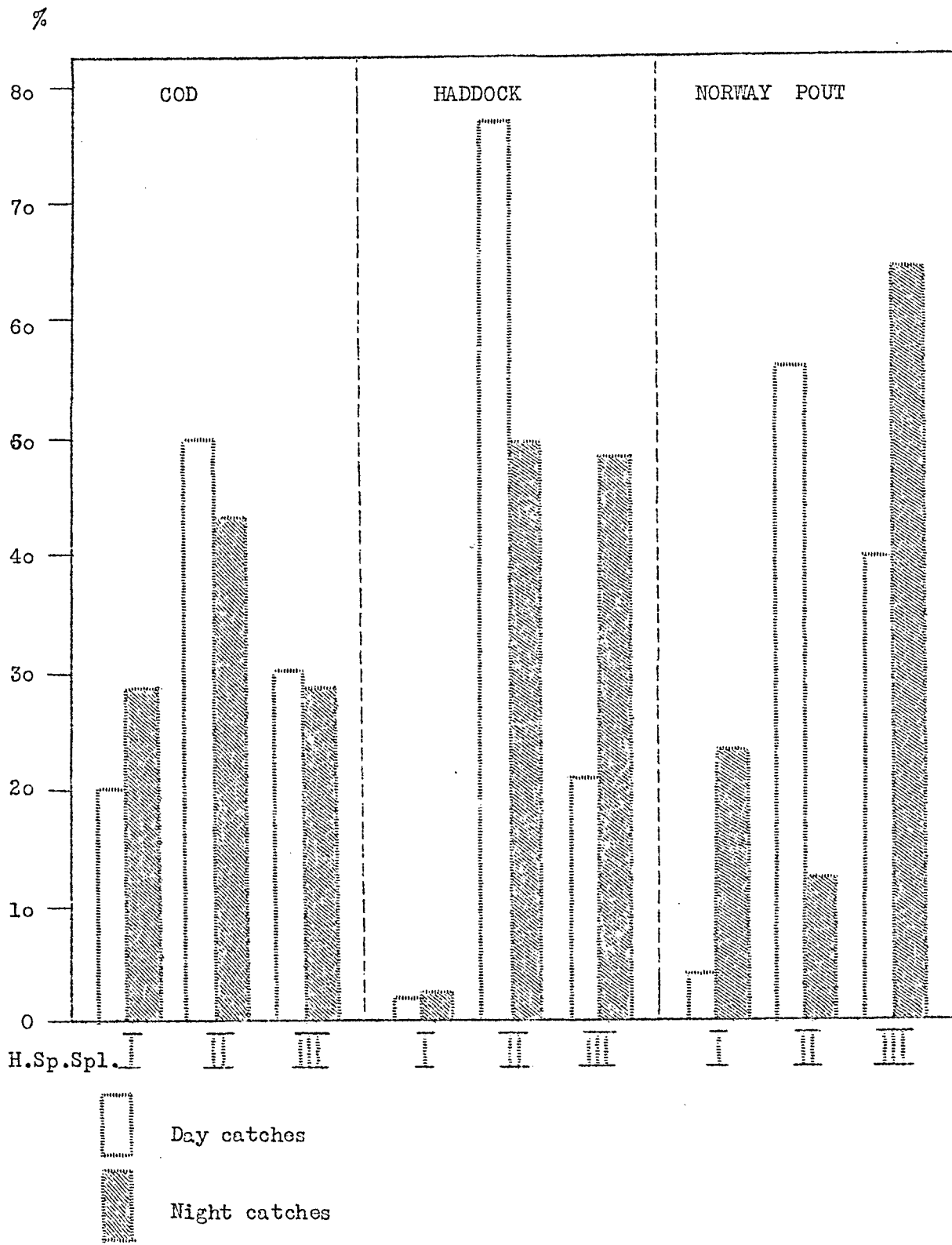


Figure 12. Diagram showing the variation in day and night catches in different depths for cod, haddock and Norway pout larvae.