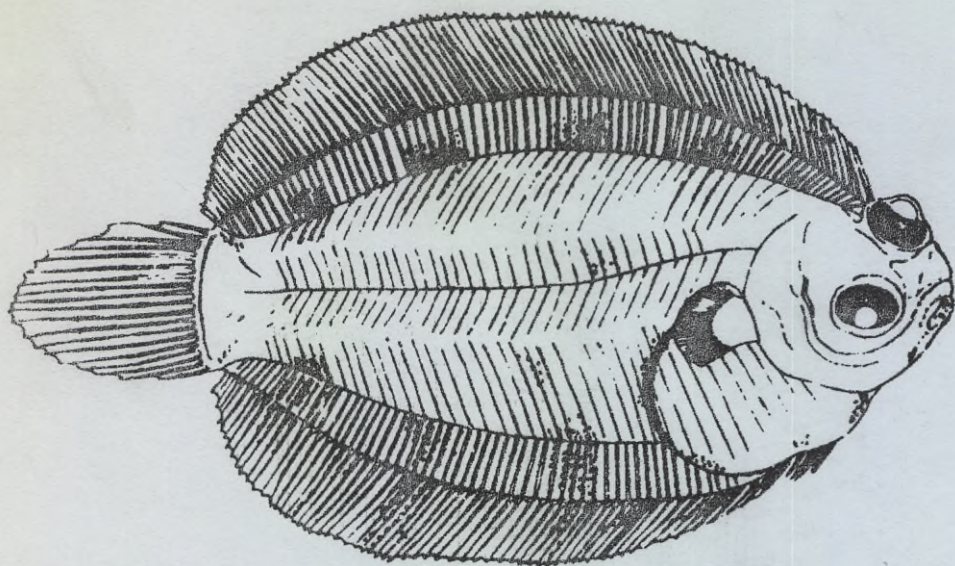




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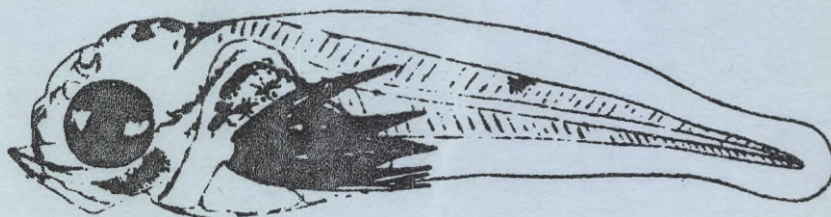
Ichthyoplankton of the Skagerak:  
maps and tables concerning

May and June

by

Armin Lindquist

January, 1968





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Table 3: Number of eggs of *Sprattus sprattus*  
and *Scomber scombrus*

Ships' cruises (double line = work from 2200 to 0400)	Maps No. 1,9,17,21,22,29,36,43,66,83,103,122, 144,163
Ichthyoplankton, species	
<i>Ammodytes</i> sp., larvae	49,70,127,147
<i>Boreogadus esmarki</i> , larvae	61,80,98,117,139,158,176
<i>Callionymus</i> sp., eggs	62,81,99,118,140,159,177
<i>Clupea harengus</i> , larvae	49,70,127,147
<i>C. pilchardus</i> , eggs	32,39
Cyclopteridae, larvae	65,102,121,143,162,180
<i>Engraulis encrasicolus</i> , eggs	25,32,39
<i>Gadus morrhua</i> , larvae	61,80,98,117,139,158,176
<i>Glyptocephalus cynoglossus</i> , larvae	64,101,120,142,161,179
Gobiidae, larvae	65,102,121,143,162,180
<i>Hippoglossoides platessoides</i> , larvae	139,158
Labridae, larvae	65,102,121,143,162,180
<i>Limanda limanda</i> , larvae	63,82,100,119,141,160,178
<i>Maurolicus milleri</i> , eggs	62,81,99,118,140,159,177
<i>Melanogrammus aeglefinus</i> , larvae	61,80,98,117,139,158,176
<i>Merlangius merlangus</i> , larvae	60,97,116,138,157,175
<i>Microchirus boscanion</i> , larvae	64,101,120,142,161,179
<i>Molva molva</i> , larvae	61,80,98,117,139,158,176
<i>Onos</i> sp., eggs	52,73,89,108,131,150,168
" , larvae	53,74,90,109,132,151,169
<i>Platichthys flesus</i> , larvae	64,101,120,142,161,179
<i>Pleuronectes platessa</i> , larvae	64,101,120,142,161,179
<i>Pollachius pollachius</i> , larvae	61,80,98,117,139,158,176
<i>P. virens</i> , larvae	61,80,98,117,139,158,176
<i>Psetta maxima</i> , larvae	64,101,120,142,161,179
<i>Scomber scombrus</i> , eggs	50,71,87,106,128,148,166
" , larvae	51,72,88,107,129,130,149,167
<i>Solea vulgaris</i> , eggs	62,81,99,118,140,159,177
<i>Sprattus sprattus</i> , eggs	2,3,10,21,23,30,37,45,46,68,85,104, 123,124,145,164
" , larvae	11,21,24,31,38,47,48,69,86,105,125, 126,146,165
<i>Trisopterus minutus</i> , larvae	61,80,98,117,139,158,176

Eggs (see also *Callionymus*, *Clupea pilchardus*, *Engraulis*, *Maurolicus*, *Onos*, *Scomber*, *Sprattus*)

Eggs without oil droplet	Maps No.
< 0.75 mm	133, 152, 170
0.75-0.85 mm	134, 153, 171
< 0.88 mm	54, 75, 91, 110
0.85-0.98 mm	135, 154, 172
0.88-0.99 mm	55, 76, 92, 111
> 0.98 mm	136, 155, 173
1.00-1.15 mm	56, 77, 93, 112
> 1.15 mm	57, 94, 113
Eggs with one oil droplet	
< 1.00 mm	137, 156, 174
1.00-1.15 mm	58, 78, 95, 114
Eggs with transparent yolk	59, 79, 96, 115
Chaetognatha	
<i>Eukrohnia hamata</i>	8, 16, 20, 28, 35, 42
<i>Sagitta elegans</i>	6, 7, 14, 15, 19, 21, 27, 34, 41
<i>Sagitta setosa</i>	4, 5, 12, 13, 18, 21, 26, 33, 40
<i>Spadella cephaloptera</i>	28
Echo surveys	44, 67, 84



## Introduction

This paper is based on material collected by the R/V Skagerak and the R/V Thetis during 1959 - 1963. The work represents the Swedish part of the joint Scandinavian studies of the spawning grounds of the sprat. In this publication all the maps concerning the distribution of fish eggs and larvae and of chaetognatha are reproduced.

A detailed interpretation of the material is under preparation. Maps concerning the hydrography of that time will also be made. Part results from these investigations have repeatedly been published, for example see LINDQUIST 1967.

In the material from 1959, 1960 and 1961 only clupeid eggs and larvae, and chaetognatha have been analysed. As the work with the latter group was a very tedious one and did not give much information with regard to the main question, it was abandoned. In the material from 1962 and 1963 all fish eggs and larvae have been examined.

From earlier investigations on the spawning of the sprat (SUND & KOEFOED 1911, HÖGLUND 1938) in our area it is well known that the sprat spawns in surface layers. Therefore, it was decided to restrict the sampling of plankton to tows 50-0 m (in 1959 additional samples were taken from 100-0 m).

At the beginning of the studies an agreement was made between the three countries to use nets with a diameter of 1 m. All samples referred to here have been taken with such a net: in 1959, however, the length of the nets varied and therefore the samples are not quite comparable. In 1960-1963 all samples were taken with a net of the following construction: 1 m diameter, an overall length of 280 cm, of which 200 cm was straining gauze, in 1960 silk gauze No. 3, in 1961-1963 nylon gauze No. 4 with meshes of 280  $\mu$ , equivalent to shrunk silk gauze No. 3.

In most cases two tows 50-0 m were made on each station. The figures on the maps and on table 3 give the mean value of the actual number of organisms found.

As fish eggs develop rapidly in the sea, in a few days, depending on temperature, emphasis was given to visit all the stations during one expedition in a short time. In 1959 we were still unaware of how to put sections and stations in order to get a detailed picture of the spawning and of the drift of eggs and larvae. During further discussions it was then decided to take the old section "P" between Denmark and Sweden as a heart point for constructing a net of stations which then has been used in 1960-1963. The stations were numbered P 1 to P 4 (old section) and 1 to 123. They have all been visited; those in the North Sea, however, only during 1961. Additionally, a number of stations inside the Swedish archipelago have also been visited.

In the open sea, the research vessels Skagerak and Thetis have been on course all around the clock. Which samples were taken at night is seen from the course map given to each expedition: two lines for work done from 2200 to 0400.



All samples have been preserved with sea water and formalin at a final dilution of about 4-5 %. The material has been worked up in the laboratory, first by sorting out all fish eggs and larvae (and chaetognatha), and then by further examination. "Uncertain" eggs have been measured with an ocular micrometer, sprat eggs, mackerel eggs and other which are easily recognizable have only partly been measured. Larvae have been individually determined; the length of larvae is mainly an estimation as the body mostly is curved. All measurements and determinations have been made by the author.

#### Literature

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- LINDQUIST, ARMIN, 1964: Zur Fischereihydrographie der Sprotte (*Clupea sprattus*) an der schwedischen Westküste. - Inst.Mar.Res.Lysekil, Ser.Biol., Rep.No. 15, 87 pp.
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- SUND, OSCAR, 1911: Unersøkelser over brislingen i norske farvand vaesentlig paa grundlag av "Michael Sars" togt 1908 - Med tabeller over forekomst af egg og yngel fra "Michael Sars" togt 1908 af EINAR KOEFOED.- Aarsberetn . vedk.Norges fiskerier for 1910 (3): 357-474



Table. 1.

Expeditions with the R/V Skagerak (Sk) and the R/V Thetis (Th).

Year	May	Maps	June	Maps	Number of plankton samples
1959	19-23 (Sk)	1-8	15-18 (Sk)	9-16	138
1960	29 April- 11 May (Sk) 27 May (Sk)	17-20 21	7-20 (Sk)	22-28	157
1961			a/29 May-1 June & 5-9 (Sk) b/10 & 12-13 (Sk)	29-35 36-42	216
1962			a/4-8 (Sk) b/12-13 (Th) c/14-15 (Th) d/18-20 & 26-28 (Th)	43-65 66-82 83-102 103-121	326
1963	15-17 & 20-21 (Sk)	144-162	a/10-14 & 17-19 (Sk) b/24-27 (Sk)	122-143 163-180	460

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(Less samples which for various reasons have not been analysed = not more than 1200 samples).

Table 2. Position of Stations.

a) Stations with letters

P 1	N	57°53'	E	11°25'
P 2		52'		18'
P 3		50'		04'
P 4		48'	10°	52'
S 5		52'5		49'
S 6		57'		47'
S 7	58°	02'		44'
S 8		07'		42'
S 9		12'		40'
S 10		17'		38'
S 11		20'		36'
H 12		20'		47'
H 13		20'		57'
H 14		20'	11°	06'
H 15		20'		10'
V 16		24'5		08'
V 17		28'5		04'
J 18		32'5		01'
J 19		33'	10°	58'
J 20		33'		48'
J 21		33'5		39'
J 22		33'8		29'
J 23		34'2		13'
J 24		34'5		09'
J 25		37'5		03'
J 26		40'5	09°	57'
J 27		44'		51'
J 28		47'		45'
J 29		49'		41'
U 30		51'5		46'
U 31		51'2		55'
U 32		51'	10°	04'
U 33		51'		13'5
U 34		50'7		22'5
U 35		50'5		32'
U 36		50'2		40'5
U 37		50'		49'
U 38		49'9		58'
R 39		39'	09°	21'
R 40		36'		26'
R 41		32'5		32'
R 42		29'		38'
R 43		25'		44'
R 44		21'5		49'
R 45		18'		55'
R 46		14'	10°	01'
R 47		11'		07'
R 48		07'		12'
R 49		03'		18'
R 50	57°	59'		24'
R 51		56'		30'
R 52		52'		36'
R 53		48'		42'

Fj 26 etc. see Index after p. 87  
in LINDQUIST 1964

b) Stations without letters

1	N	57°34'5	E	11°36'
2		32'5		21'
3		30'4		06'
4		27'6	10°	50'
5		26'4		42'
6		49'5		40'5
7		48'3		30'
8		58°01'		11°20'
9		57°59'		10'
10		57'5		10°58'5
11		55'5		48'
12		54'		36'
13		52'		26'
14		58°08'5		11°14'
15		07'		04'
16		05'		10°52'
17		03'		42'
18		01'5		30'
19		57°59'		10'
20		58°16'		11°09'
21		14'5		10°58'5
22		12'5		46'5
23		10'5		35'
24		08'5		23'
25		06'5		12'
26		24'		11°04'
27		22'		10°53'
28		20'		40'
29		18'5		28'
30		16'5		16'
31		14'5		04'
32		31'5		58'
33		29'5		47'
34		28'		34'5
35		26'		22'
36		24'		09'
37		23'		09°56'
38		39'		10°53'
39		37'5		42'
40		35'		28'
41		33'5		14'5
42		32'		01'5
43		30'		09°48'
44		47'		10°48'5
45		45'		36'
46		43'		22'
47		41'		02'
48		39'5		09°55'
49		37'5		41'
50		41'		37'
51		54'5		10°43'
52		52'5		30'
53		50'5		15'5
54		49'		08'
55		46'5		09°48'



56	N	58°44'5	E	09°33'5
57		57°45'5		10°21'
58		49'		16'
59		56'		08'
60		58°03'		09°59'
61		10'5		51'
62		57°41'5		10°08'
63		40'		04'
64		51'7		09°55'
65		59'		46'
66		58°06'		36'5
67		57°41'		50'
68		47'		41'
69		54'5		31'
70		58°01'		21'
71		08'		11'
72		15'		01'
73		18'		08°57'
74		21'		52'
75		57°34'5		09°31'
76		41'		21'
77		48'		11'
78		55'		01'5
79		21'5		19'
80		28'		10'
81		34'5		00'5
82		41'		08°50'5
83		48'5		40'
84		21'		48'
85		28'		39'
86		35'		30'
87		42'		20'
88		14'		27'
89		21'		18'
90		28'		08'
91		35'		07°59'
92		41'5		41'5
93		47'		44'5
94		51'		39'
95		54'5		34'
96		43'		11°27'
97		39'5		03'
98		36'7		10°42'
99		07'		08°03'
100		20'		07°45'
101		32'		25'
102		56°58'		39'
103		57°10'		10'
104		24'		06°45'
105		56°45'		07°14'
106		58'		06°45'
107		30'		07°40'
108		30'		06°40'
109		45'		10'
110		16'		07°15'

111	N	56°11'	E	06°
112		03'		07°40'
113		03'		06°45'
114		55°45'		10'
115		24'		07°31'
116		33'		06°45'
117		19'		09'
118		05'		45'
119		54°51'		09'
120		32'		45'
121		26'		07°28'
122		26'		06°09'
123		11'		45'

Table.3. Number of eggs of *Sprattus sprattus* and *Scomber scombrus*. Station number without additional figures = tow with the lm net 50-0m; additional figures indicate length of tow in meters.

1959			1960			1961		
Date	Station	<i>Sprattus sprattus</i>	Date	Station	<i>Sprattus sprattus</i>	Date	Station	<i>Sprattus sprattus</i>
V 19	P 1	21	VI 15	V17	11	VI 10	14	72
	P 2	324		J18	0		15	3
	P 3-40	158		J19	2		16	0
	P 4	54	16	J20	0		17	0
	S 5	204		J21	0	11	18	0
	S 6	14		J22	0		19	0
	S 7	0		J23	0	14	26	77
	S 8	0		J24	0		27	0
	S 9	0		J25	0		28	0
20	S10	0		J26	0		29	0
	S11	3		J27	0		30	0
	H12	3		J28	0		36	0
	H13	1		J29	0		42	0
	H14	43		R39	0		48	0
	H15	28		R40	0	15	55	0
	V16	36		R41	0		54	0
	V17-40	0		R42	0		47	0
	J18	6		R43	0		41	0
	J19	0		R44	0		35	0
	J20	0		R45	0		34	0
	J21	4		R46	0		40	0
	J22	6		R47	0		46	0
	J23	7		R48	0	16	53	0
	J24	6		R49	0		52	0
	J25	11	18	P 4-40	46		45	0
	J26	30		P 3	6		39	0
	J27	16		P 2	6		33	1
	J28	0		P 1	21		32	59
21	J29	0	1960				38	36
	U30	1					44	13
	U31	0	VI 7	1-40	11		51	7
	U32	0		2-40	0		Kosterfj.	27
	U33	0		3-30	1		Skålholmen	17
	U34	1		4-35	119	17	Mjölskär-30	17
	U35	2		5-20	16		Tovas	371
	U36	4	8	7	145		ungar-45	
	U37	2		6	213		Fj46-25	11
	U38-25	1		P 4	444		Fj48-25	16
	R39	0		P 3-45	461		Fj49b-15	6
	R40	0	9	P 2	629		Fj49a-15	8
	R41	0		P 1	344		Fj50-15	5
	R42	0		8-40	139		Fj51-20	5
	R43	0		9	249		Fj52-25	16
	R44	0		10	0		Fj53	201
22	R45	0		11	0	20	Fj26	1
	R46	0		12	0		Fj28	0
	R47	0		13	0			
	R48	0		56	0	1961		
	R49	0		50	0	V 29	1-40	32
	R50	0		49	0		2-40	217
	R51	0		43	0		3-35	64
	R52	22		37	0		4-35	79
	R53	97	10	31	0		98-23	68
23	P 4-40	370		25	0		97-30	503
	P 3-45	348		24	0		96-40	940
	P 2	118		23	0	30	P 1	563
	P 1	106		22	0		P 2	164
VI 15	H15-45	72		21	37		P 3-40	415
	V16	2		20	76		P 4-40	306



1961		<i>Sprattus</i>			<i>Sprattus</i>
Date	Station	<i>sprattus</i>	Date	Station	<i>sprattus</i>
V 30	6	0	VI 8	113-30	0
	7	37		111-40	0
	57	90		114-40	0
	58	46		116-30	22
	13	0		115-25	6
	12	0	9	118-35	1
	11	0		120-30	1
	10	3		121-20	29
	9	145		123-30	4
	8-40	602		122-30	0
	14-40	82		119-35	0
	15	35		117	1
	16	1			
	17	0			
31	18	0			
	19	0			
	59	0			
	60	0			
	25	0			
	24	0			
	23	0			
	22	0			
	21	178			
	20-40	325			
	26-40	71			
	27	0			
	28	?			
	29	0			
	30	0			
VI 1	31	0			
	61	0			
5	62-20	14			
	63	0			
	64	0			
	65	1			
	66	0			
6	78	0			
	77	0			
	76-25	2			
	75-20	21			
	79-10	4			
	80-10	14			
	81-20	0			
	82	?			
	83	0			
	87	0			
	86	0			
	85-40	0			
	84-20	0			
	99-25	0			
	100	0			
7	101	0			
	104	0			
	103	0			
	102-20	0			
	106-40	0			
	109-40	0			
	108-40	0			
	105-20	0			
8	107-20	7			
	110-30	1			
	112-30	24			

1962 Date	Station	<i>Sprattus sprattus</i>	<i>Scomber scombrus</i>	Date	Station	<i>Sprattus sprattus</i>	<i>Scomber scombrus</i>
VI 4	1-45	371	186	VI 7	53	3	190
	2-45	372	328		54	3	265
	3-30	119	19		55	0	319
	4	37	0		56	24	488
	98-20	2	0	8	50	1	1030
	97-25	306	19	12	96	839	235
	96	274	76		P 2	64	84
5	P 1	985	333		9	93	126
	P 2	799	52		P 3	52	61
	P 3-43	235	1		10	4	40
	P 4	185	2		P 4	95	50
	6	57	0	13	11	38	48
	7	101	4		6	52	11
	57	73	0		12	55	27
	58	322	2		7	248	35
	13	120	3		13	0	21
	12	64	5		57	225	16
	11	37	39		58	203	11
	10	144	14		62	123	4
	9	505	235		63	107	5
	8-40	718	166	14	57	0	0
	14	603	157		57/58	397	16
	15	633	185		58	724	18
	16	46	44		58/59	394	46
	17	3	25		59	59	50
6	18	18	14		19	0	14
	19	170	0		19/13	46	81
	59	163	6		13	422	87
	60	12	22		13/ 7	456	49
	25	25	3		7	157	11
	24	2	55		6	102	9
	23	0	50		6/12	515	31
	22	5	35		12	150	80
	21	156	136		12/ 8	35	32
	20	369	249		18	0	28
	26	485	551		11	140	39
	27	2	72		P 4	45	2
	28	7	198	15	10	115	44
	29	0	192		P 3	308	12
	30	0	129		9	76	78
	31	0	259		P 2	0	0
	61	0	115		96	199	461
	37	0	143		1	0	0
	36	0	461	18	P 1	154	452
	35	0	1033		8-40	79	51
	34	1	185		14-45	44	103
7	33	0	60		20	70	141
	32	69	422		26	664	488
	38	300	656		27	84	111
	39	3	129		21	35	164
	40	1	102		15	656	104
	41	0	72		9	116	60
	42	0	748	19	P 2	218	42
	43	0	973		P 3-40	624	42
	49	5	255		10	99	198
	48	0	221		16	9	161
	47	0	392		22	7	152
	46	0	200		28	9	440
	45	0	128		29	0	367
	44	105	666		23	0	216
	51	1	58		17	0	56
	52	0	83		11	271	119

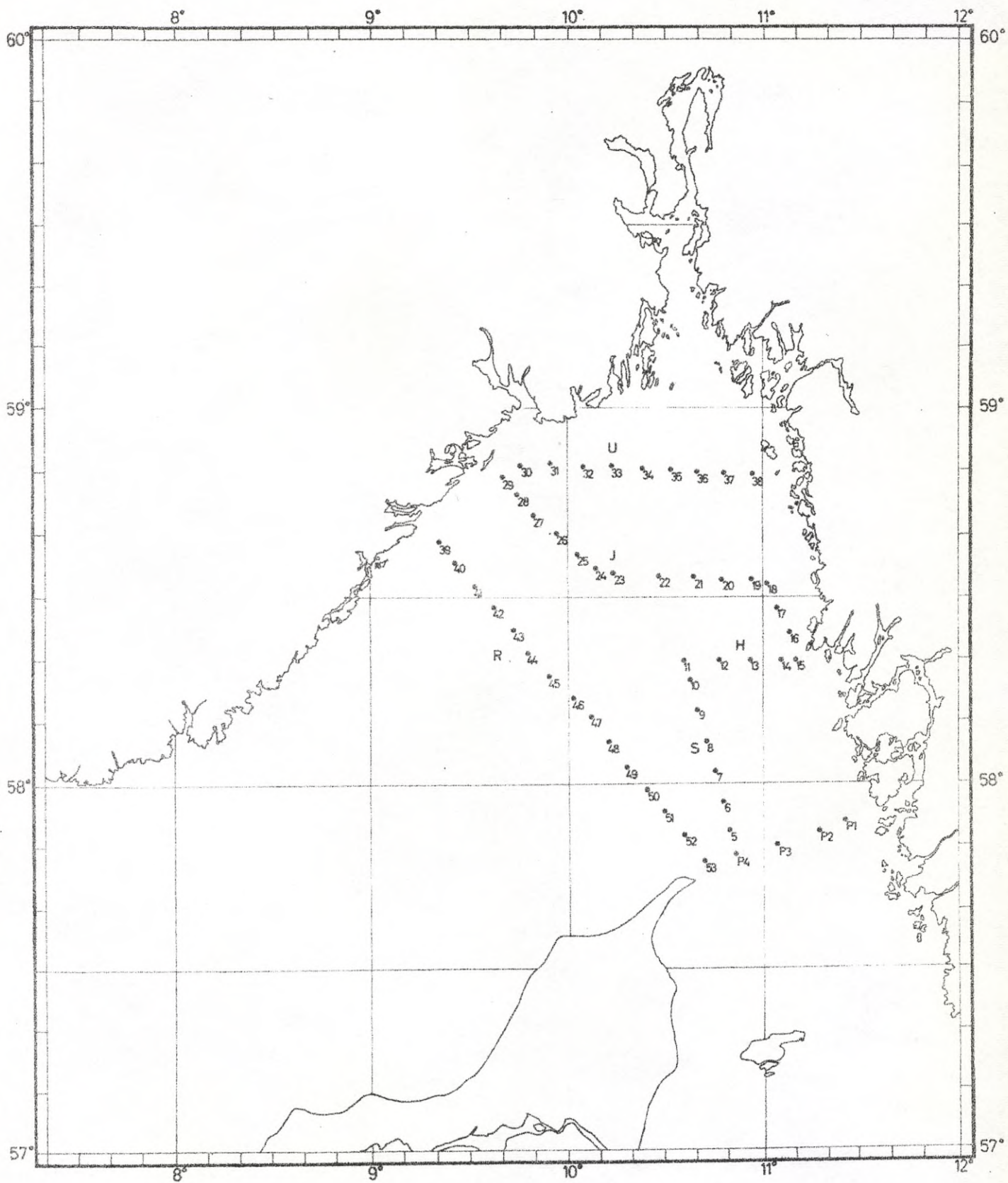


1962		<i>Sprattus sprattus</i>	<i>Scomber scombrus</i>	Date	Station	<i>Sprattus sprattus</i>	<i>Scomber scombrus</i>
VI 19	P 4	460	11	V 15	8	168	1
	6	126	13		9	158	0
	12	85	138		P 2	147	0
	18	0	0		P 3	30	0
	24	0	252		10	348	1
	30	0	93		11	1	0
	31	0	540	16	P 4	6	2
	25	0	376		6	35	0
20	19	0	279		12	0	1
	13	16	295		13	109	3
	7	263	255		7	0	3
	58	332	64		57	19	1
	59	84	81		58	14	0
	60	5	410		62-15	0	1
	61	0	385		63	36	4
	66	0	1497		64	58	2
	65	0	430		65	20	2
	64	558	87		66	0	0
	63	0	0		61	0	0
	62-15	114	6	17	60	8	1
	57	93	4		59	13	0
18	M-35	171	113		19	55	1
	Fj53	131	16		25	1	0
	Fj52-17	13	1		31	0	1
	Fj51-22	11	0		30	0	0
	Fj50-35	8	0		24	9	2
	Fj49a-20	7	0		18	10	5
	Fj49b-20	21	0		17	0	1
	Fj48-25	27	0		23	0	1
19	Fj47-15	12	0		29	0	0
	Fj46-33	86	0		28	0	1
	Fj44	40	1	20	26	86	3
	Fj43	8	1		27	85	2
	Fj42-35	100	0		22	0	8
	Fj28	39	6		21	50	1
	Fj26	9	1		20	95	1
20	Fj63-30	68	23		14	433	2
	Fj62-22	0	0		15	116	2
	Fj61-10	1	0		16	1	1
	Åbyfj.yttre-25	1	0		Fj42-25	12	1
	Mjölskär-25	40	216		Fj43-25	17	0
	Skålholmen	151	577	21	Fj44	22	0
26	67	0	0		Fj46-25	158	0
	68-30	0	20		Fj48-20	19	0
	69	0	18		Fj49-20	6	1
	70	0	28		Fj50-15	7	0
	83	0	47		Fj51-15	3	1
27	82	0	17		Fj52-20	2	0
	81-35	32	94		Fj53-25	36	0
	80-15	3	3		M-25	33	1
	79-10	6	2		Fj61-25	5	0
	88-20	4	16		Fj62-20	2	0
	89-30	4	14		Fj28-40	7	0
	90	0	57		Fj22-30	0	0
	91	0	378		Fj24	1	0
	92	0	622		Fj26	0	0
28	93	0	915	VI 10	1-45	9	384
	94	0	569		2-40	234	147
	95	0	145		3-30	9	133
					4-30	3	92
					5-20	2	11
1963					98	1	6
V 15	P 1	332	0				

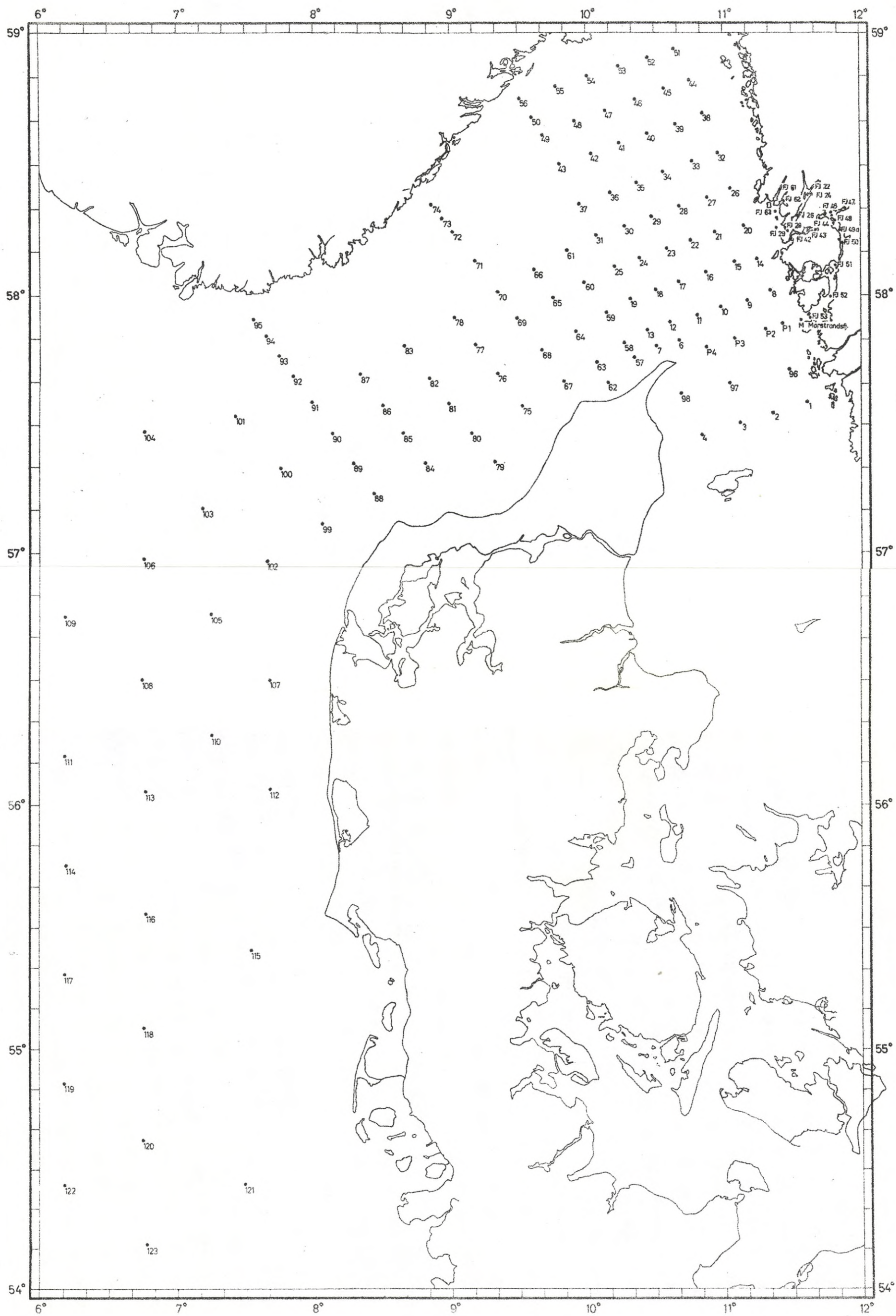
1963		<i>Sprattus sprattus</i>	<i>Scomber scombrus</i>	Date	Station	<i>Sprattus sprattus</i>	<i>Scomber scombrus</i>		
VI	10	97-30	6	121	VI	14	56	0	397
		96	154	88			55	0	799
	11	P 1	134	123			54	0	441
		8-45	79	22			53	0	175
		9	1	64			52	0	265
		P 2	371	123			51	0	256
		P 3-40	230	67	17	67	85	77	77
		10	3	113		68-30	477	24	24
		11	7	85		69-30	0	24	24
		P 4	124	90		70	0	69	69
		6	301	40		71	0	322	322
		12	134	142		72	0	2483	2483
		13	37	12		73	1	419	419
		7	615	5		74	3	3	3
		57	175	13	17-18	78	0	170	170
		58	559	20	18	77	0	15	15
		62-12	2	28		76-30	16	94	94
		63	319	5		75-20	18	9	9
		64	?	?		79-14	21	17	17
	12	59	24	11		80-18	16	28	28
		19	0	35		81-25	2	75	75
		18	0	39		82	0	67	67
		17	0	86		83	0	151	151
		16	?	?		87	0	119	119
		15	1	188		86	0	30	30
		14	384	560		85-40	0	31	31
		20	222	604		84-25	69	84	84
		21	0	140		88-20	12	55	55
		22	0	44		89-35	0	21	21
		23	0	245		90	0	23	23
		24	0	219		91	0	65	65
		25	0	218	19	92	0	501	501
		60	0	26		93	1	1112	1112
		65	0	40		94	0	455	455
		66	1	18		95	0	174	174
12-13		61	0	75		P 4-45	103	19	19
13		31	0	158		P 3-40	99	56	56
		30	0	197		P 2	284	175	175
		29	1	141		P 1	233	179	179
		28	1	51	24	P 1	201	157	157
		27	0	127		8-45	225	93	93
		26	82	568		9	6	154	154
		32	6	90		P 2	99	102	102
		33	5	128		P 3-45	158	96	96
		34	0	97		10	0	206	206
		35	0	47		11	0	460	460
		36	0	123		P 4	204	80	80
		37	0	107	25	6	446	203	203
		43	0	84		12	0	359	359
		42	0	82		13	1	1284	1284
		41	1	340		7	37	156	156
14		40	0	84		57	270	74	74
		39	8	79		58	17	137	137
		38	0	76		62-14	64	194	194
		44	8	82		63	107	275	275
		45	1	115		64	3	49	49
		46	2	38		59	0	49	49
		47	1	370		19	0	105	105
		48	0	347		18	0	81	81
		49	3	1447		17	0	306	306
		50	1	272		16	0	456	456



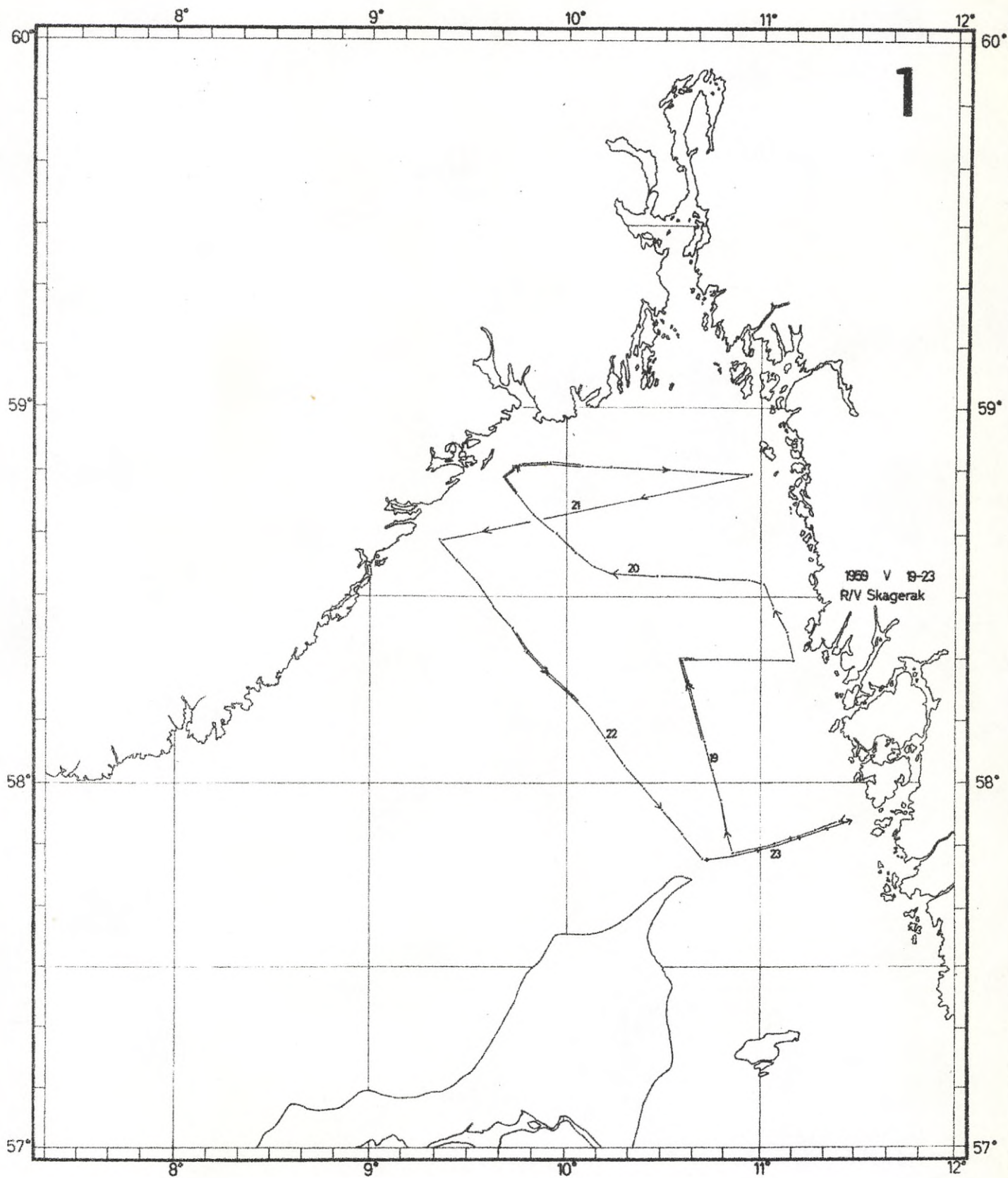
1963		<i>Sprattus</i>	<i>Scomber</i>	
Date	Station	<i>sprattus</i>	<i>scombrus</i>	
VI 25	15	0	190	
	14	0	72	
26	Fj22-30	0	0	
	Fj24	0	1	
	Fj26-100	6	6	
	Fj28-45	21	22	
	Fj29	34	123	
	Fj63-30	?	?	
	Fj62-20	13	6	
	Fj61-15	9	15	
	27	Fj42-30	10	0
		Fj43-40	9	1
		Fj44-40	9	1
		Fj46-30	57	1
Fj47-30		0	0	
Fj48-20		72	4	
Fj49a-20		24	0	
Fj50-18		4	2	
Fj51-18		4	0	
Fj52-18		19	0	
	Fj53-35	16	6	
	M-30	19	5	
	P 1	88	31	
	P 2	3	206	



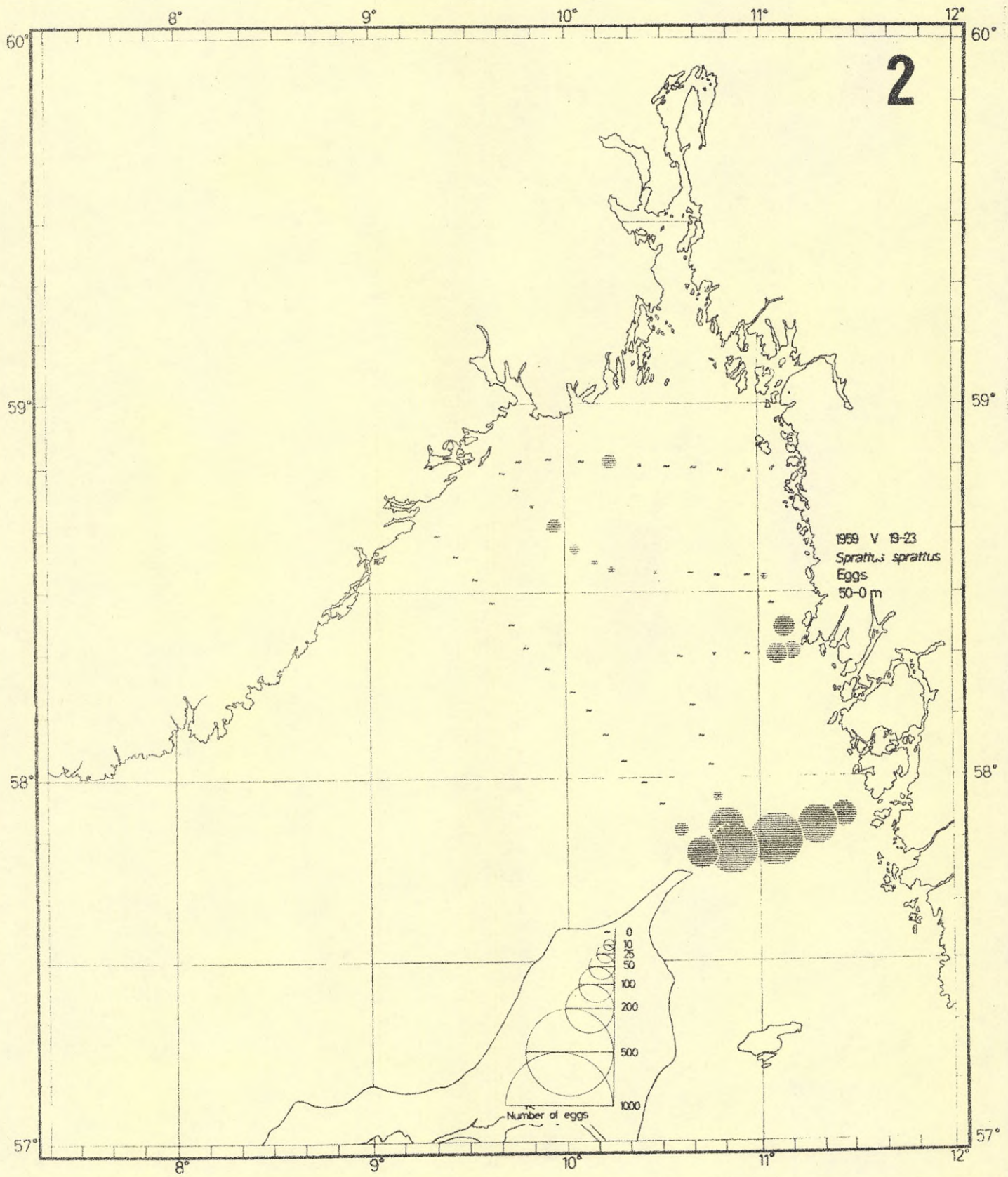




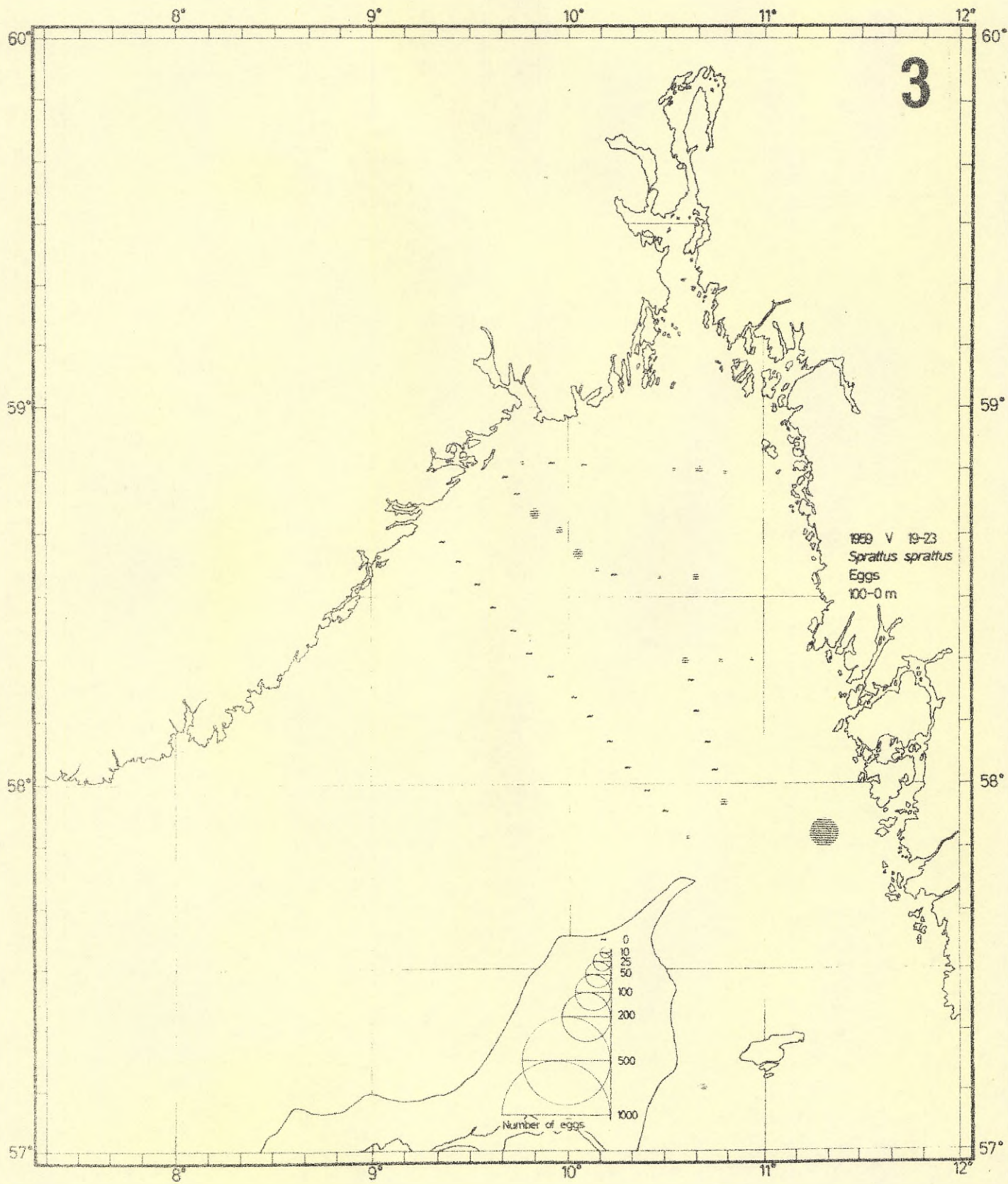




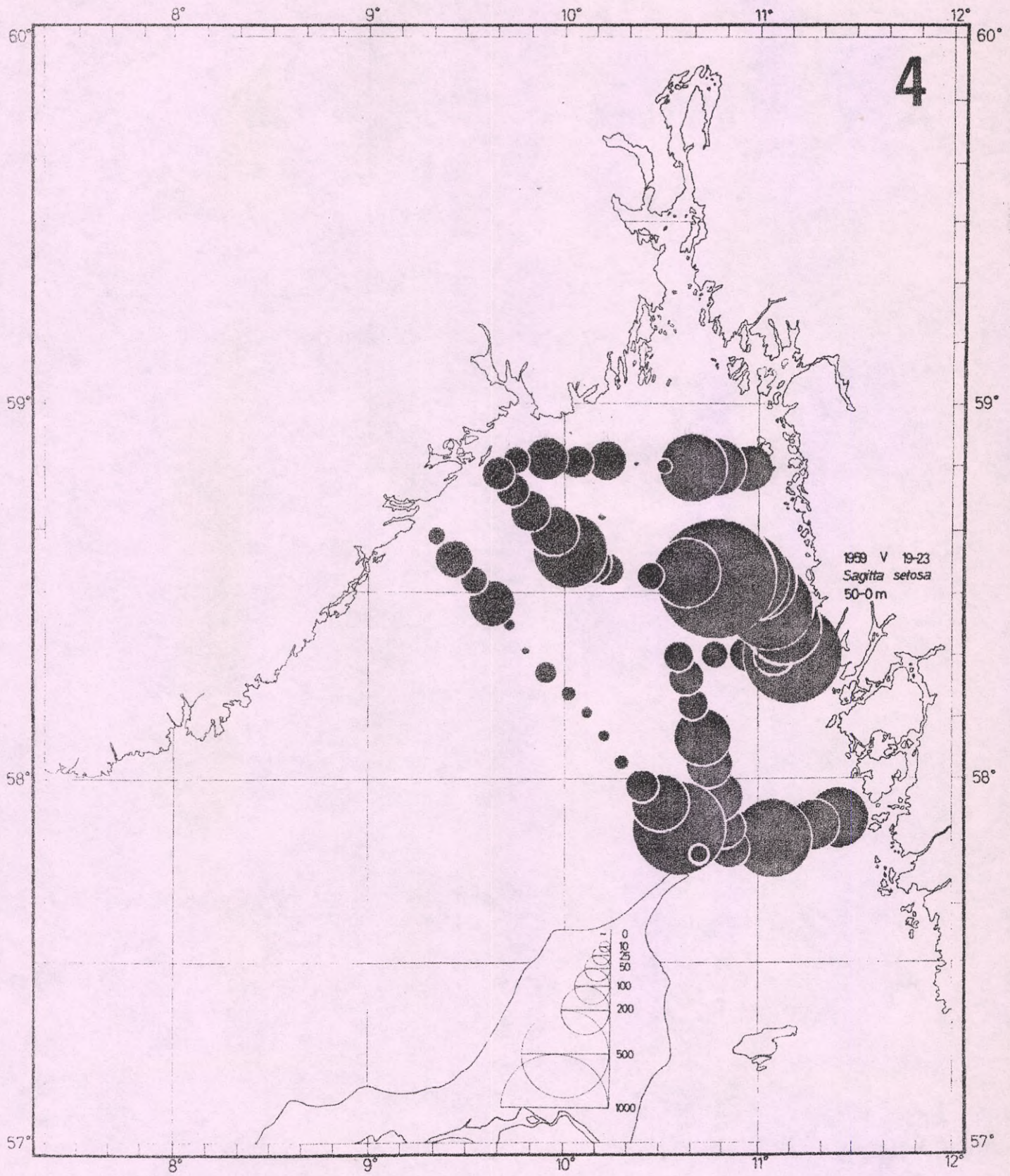




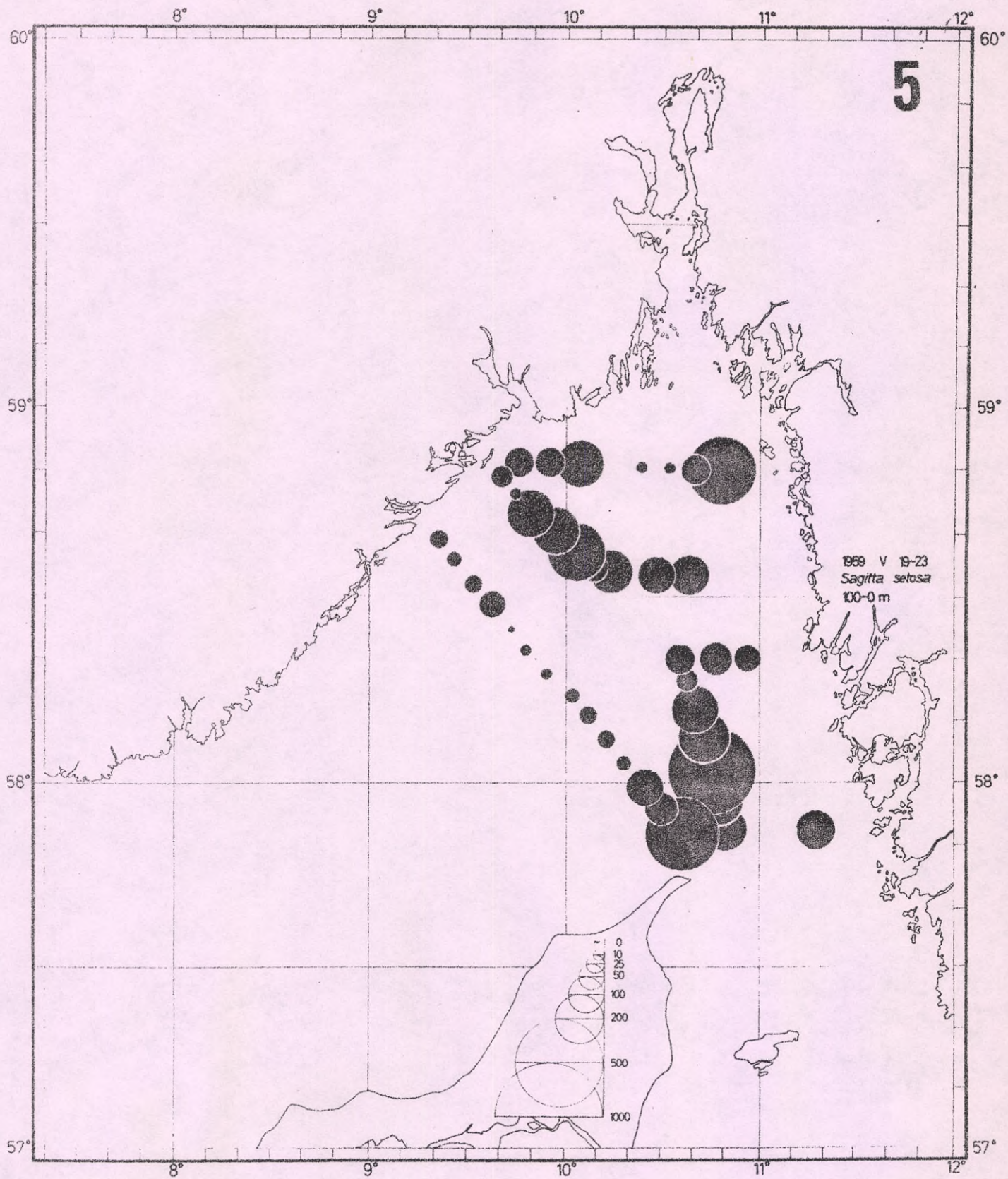




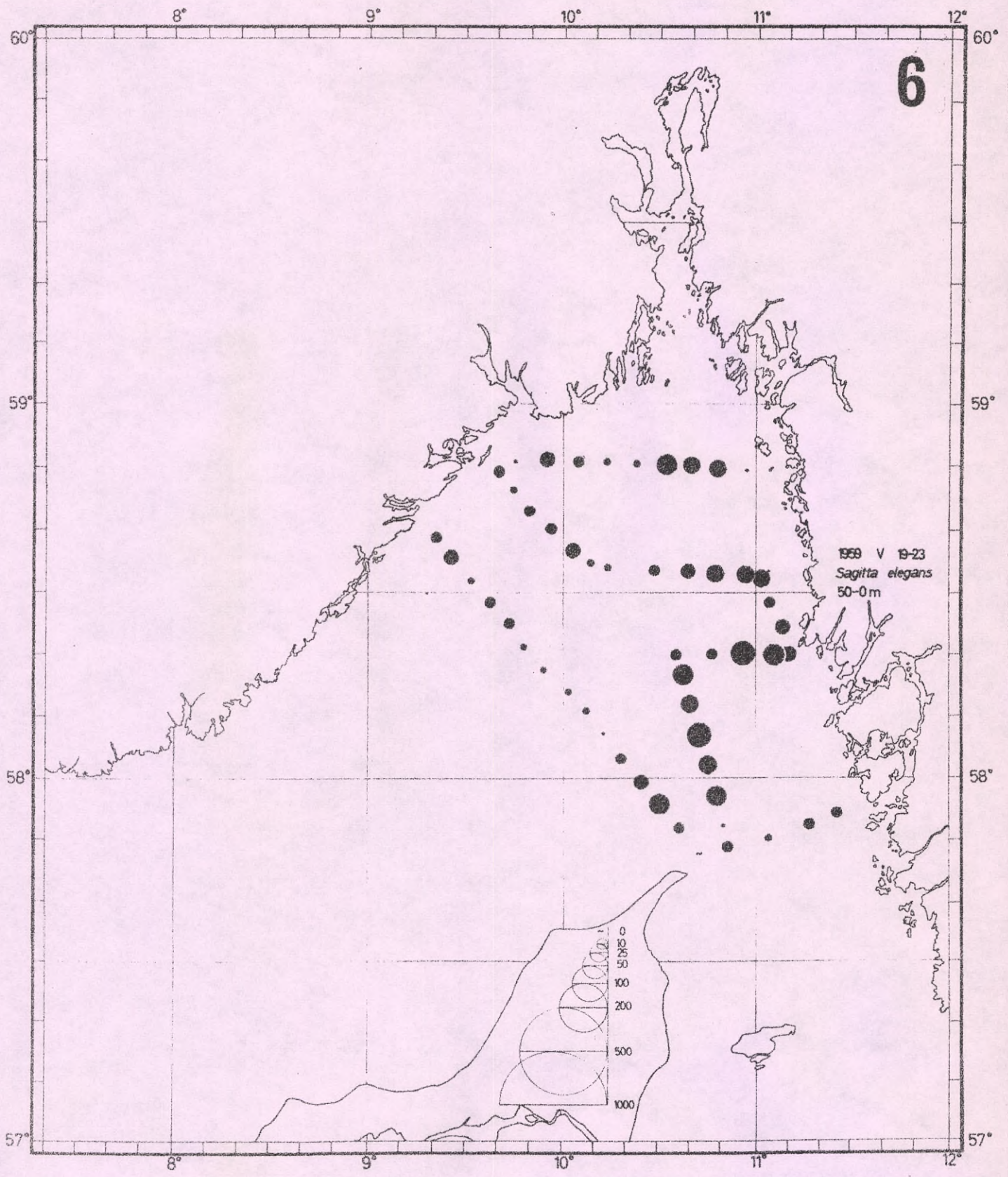




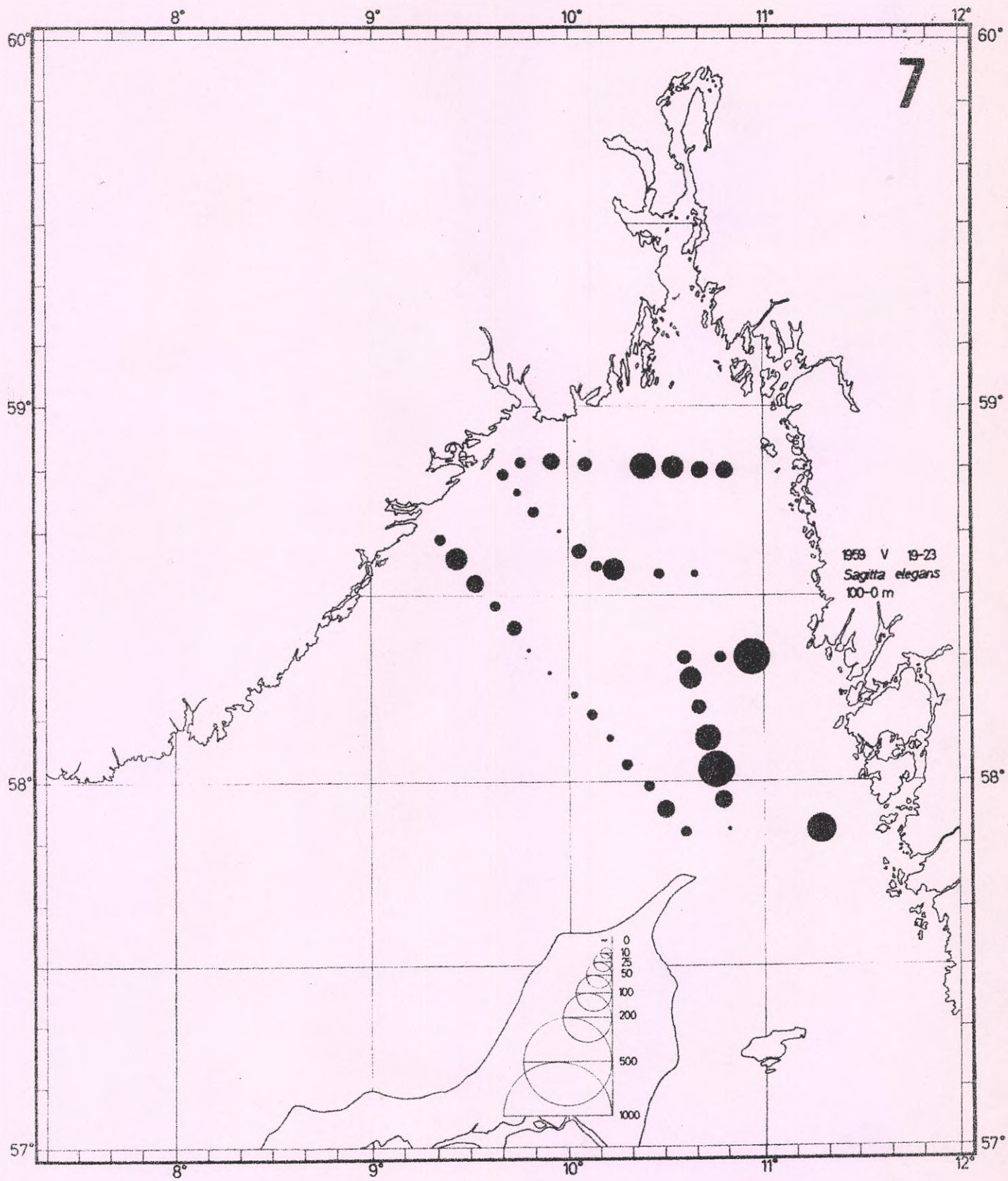




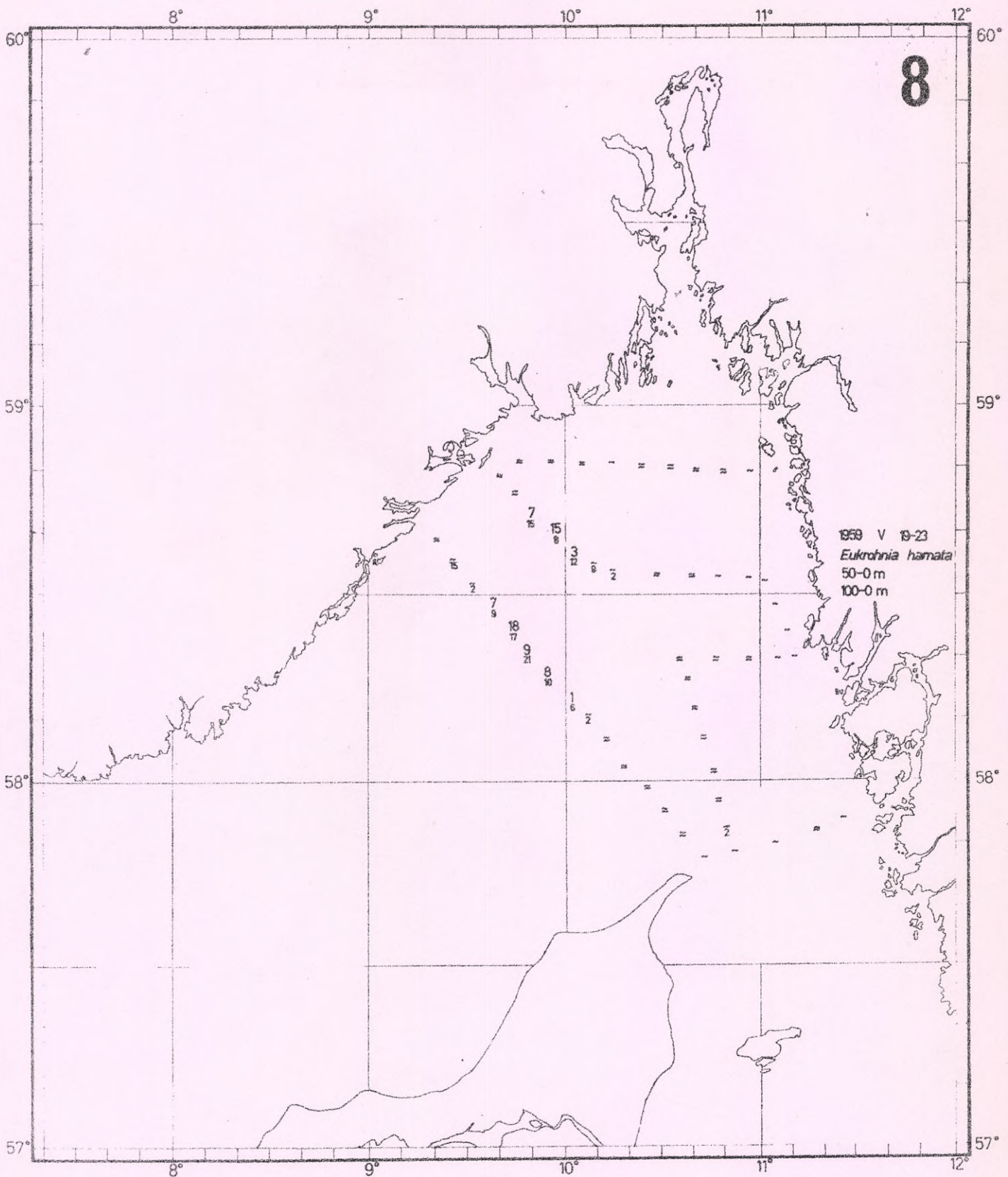


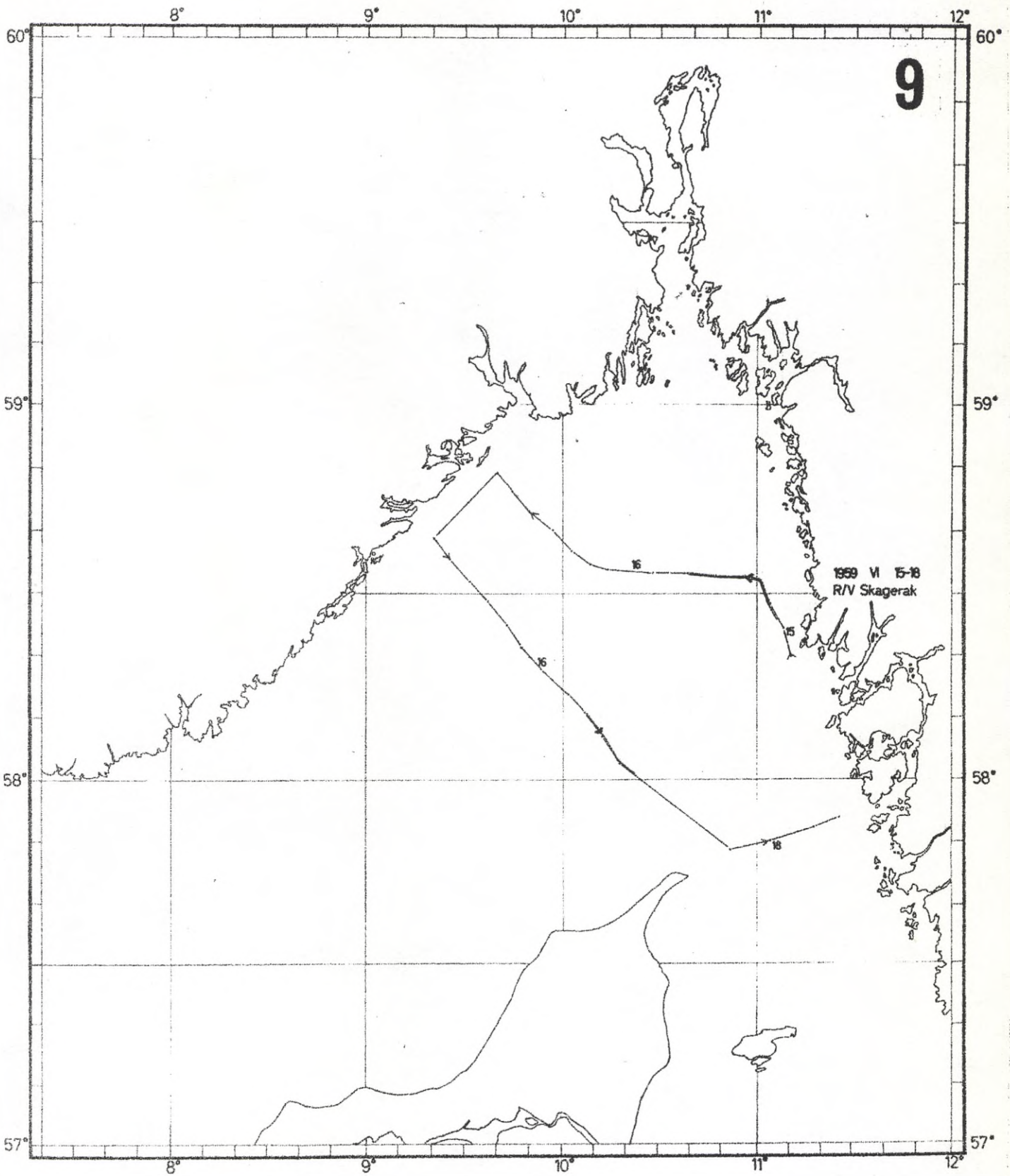




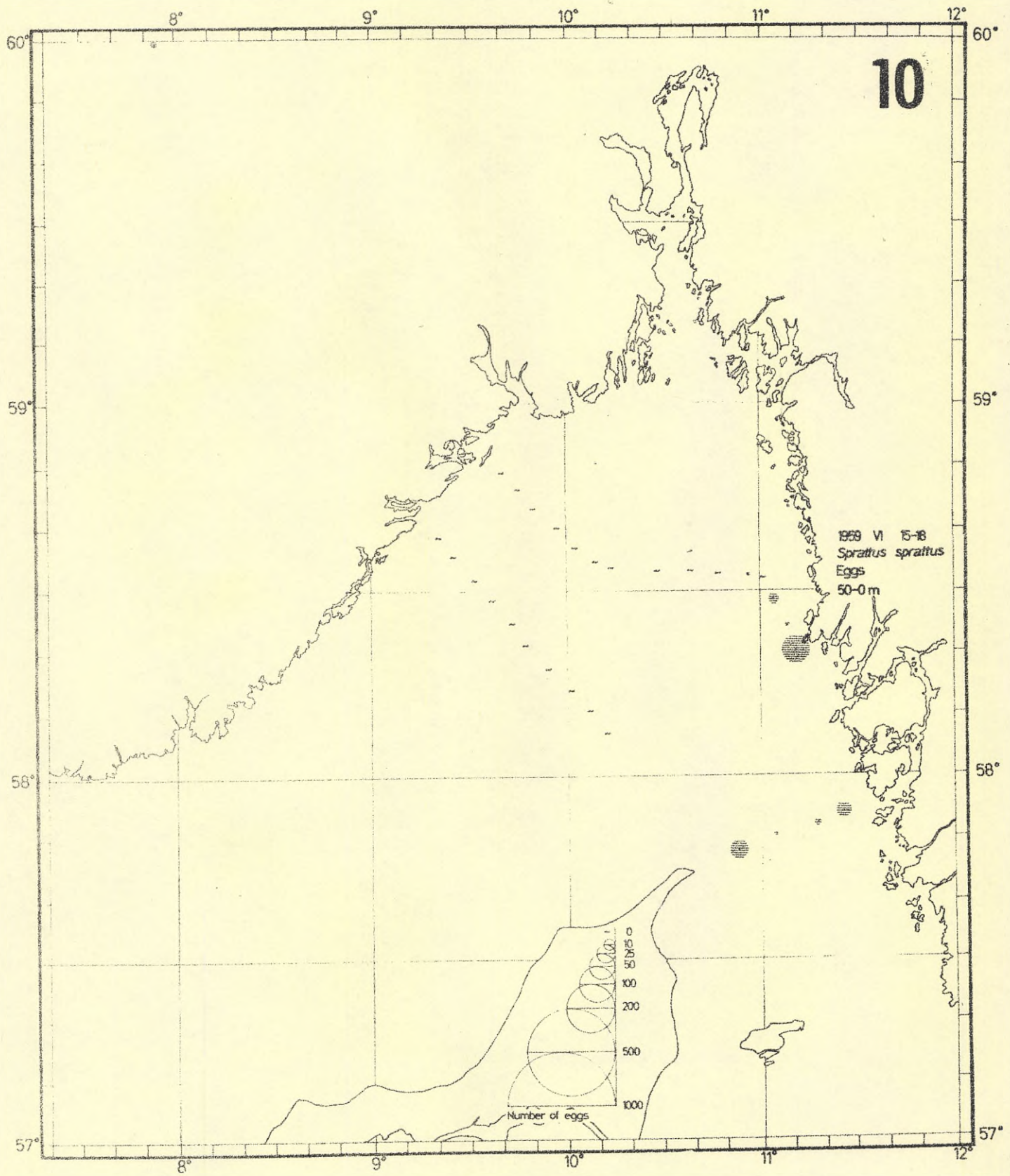




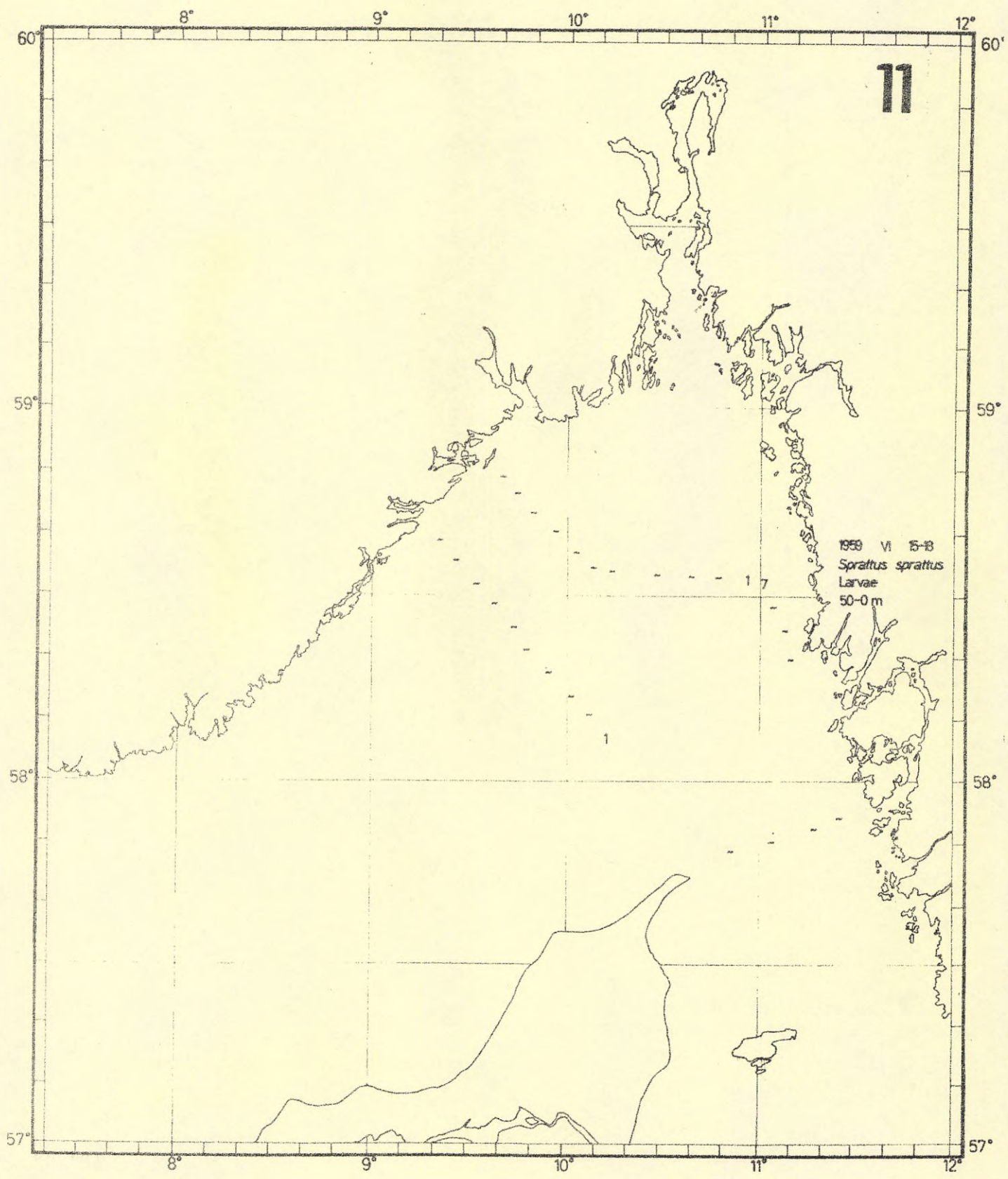




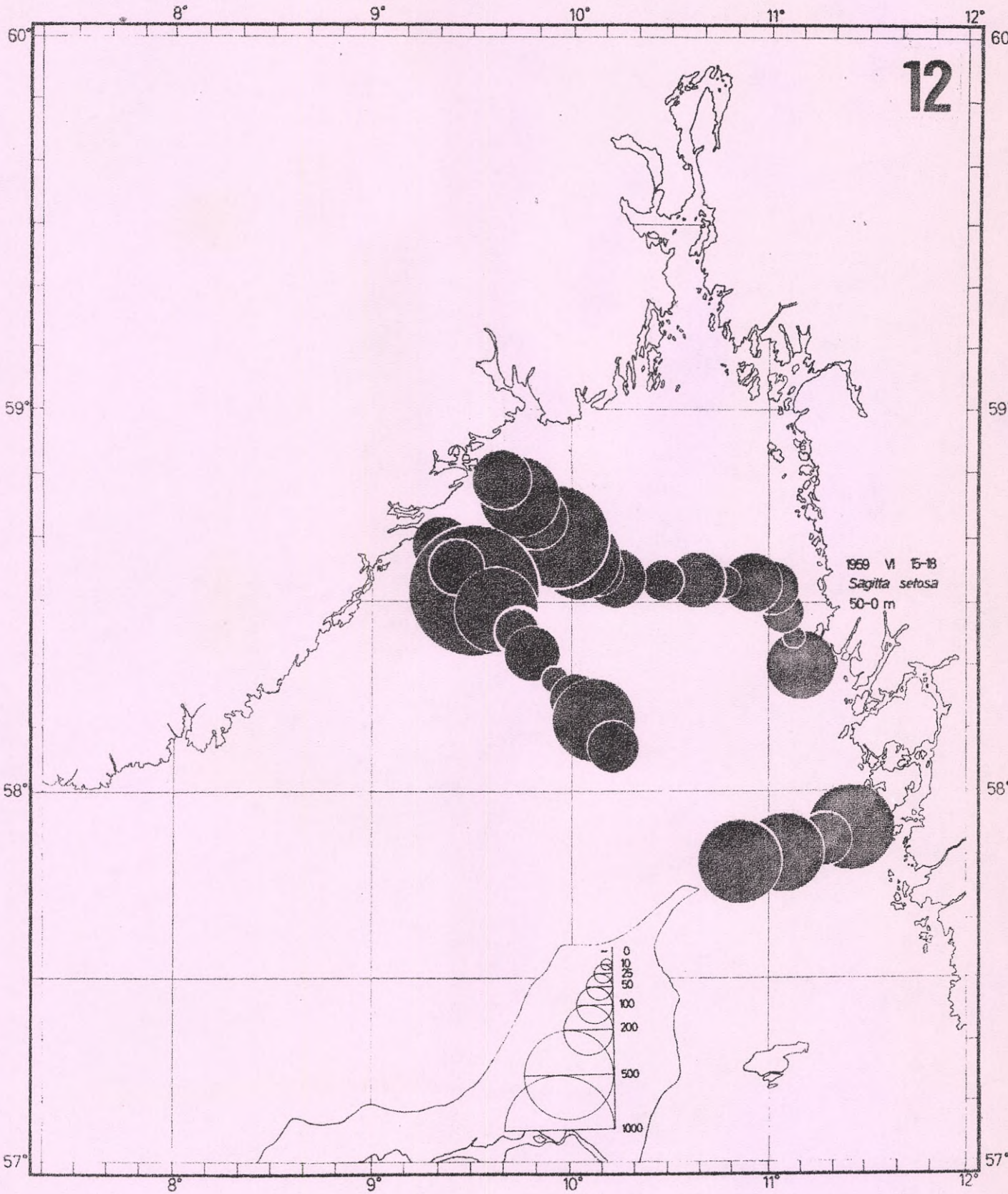




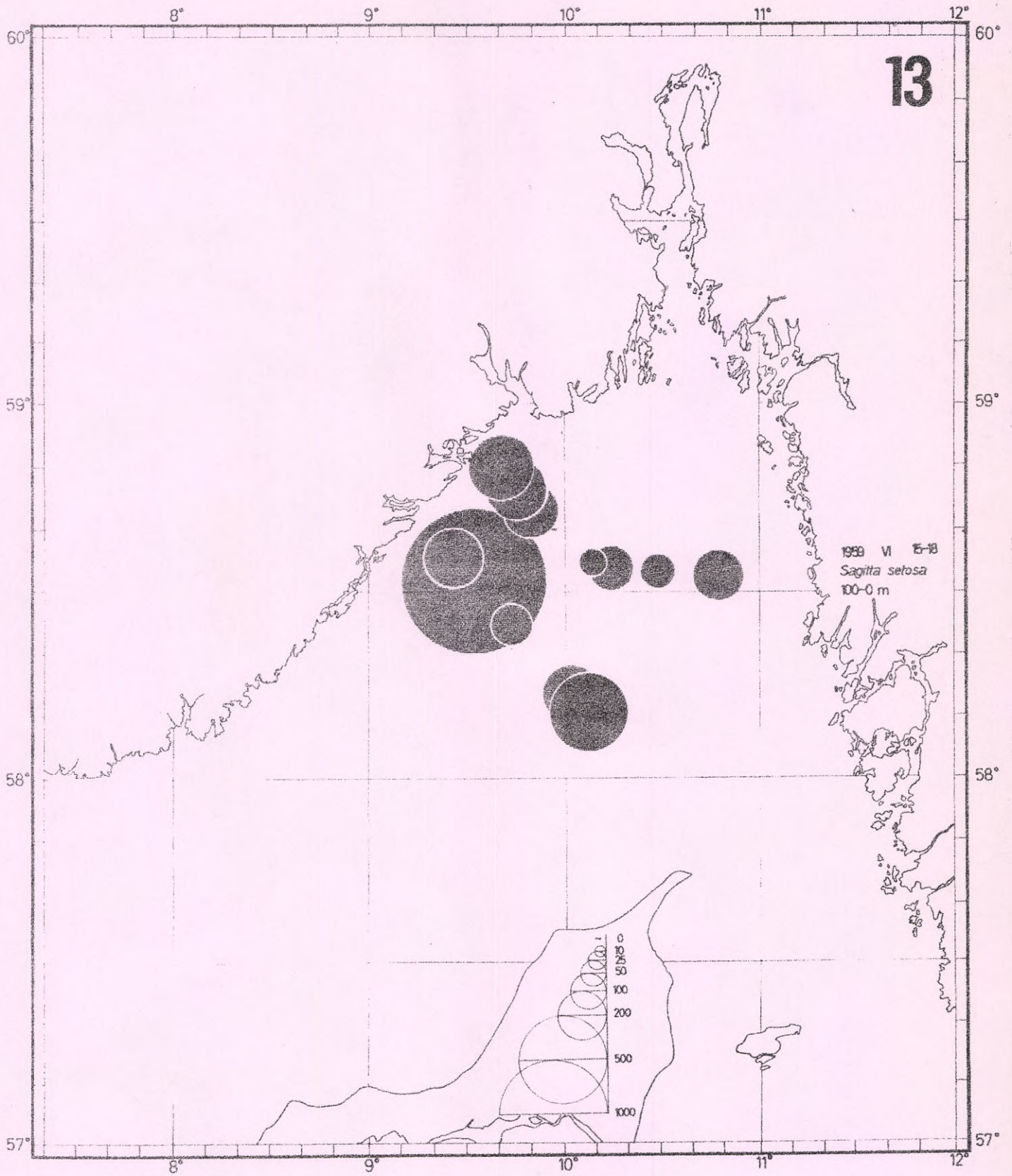




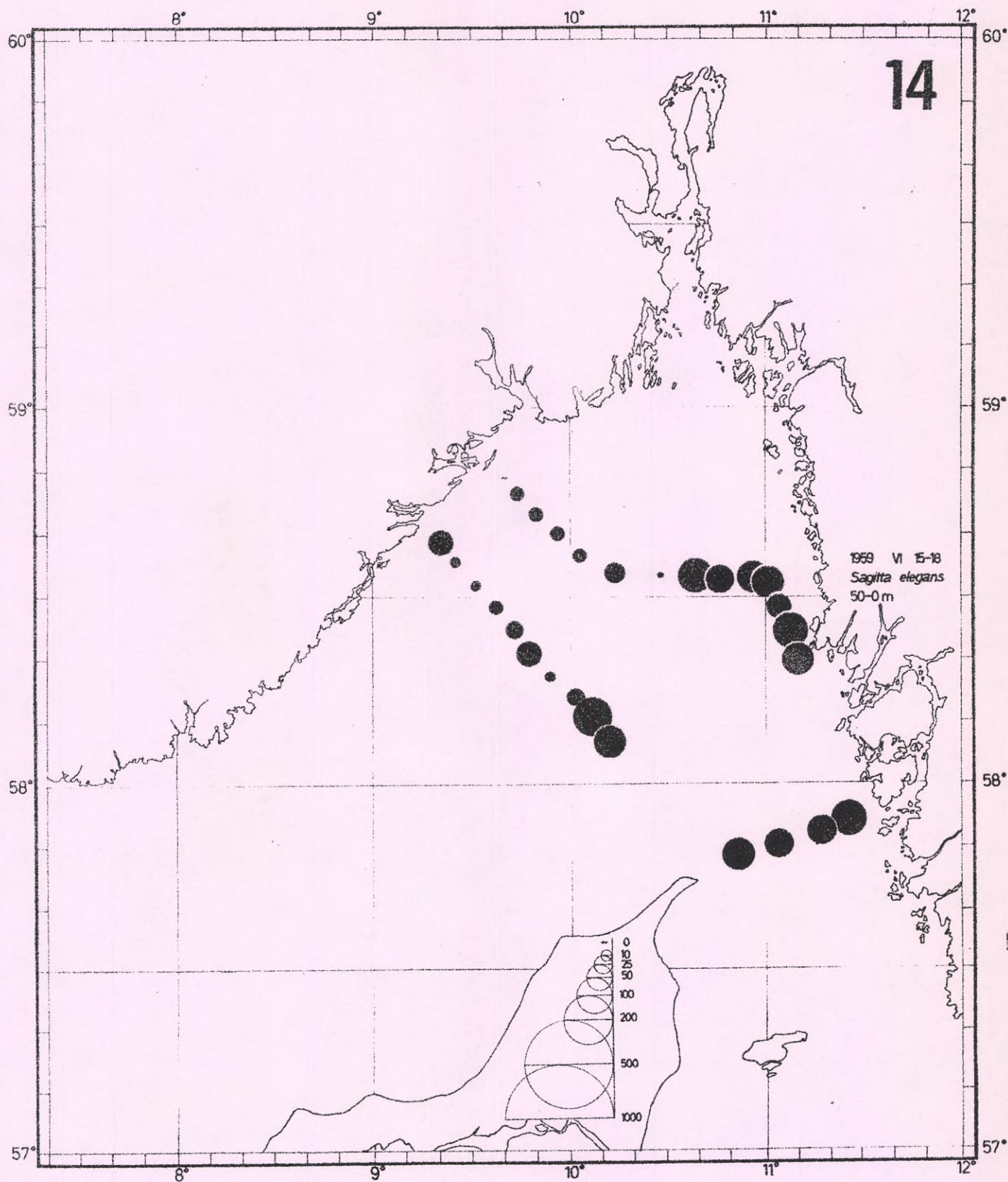






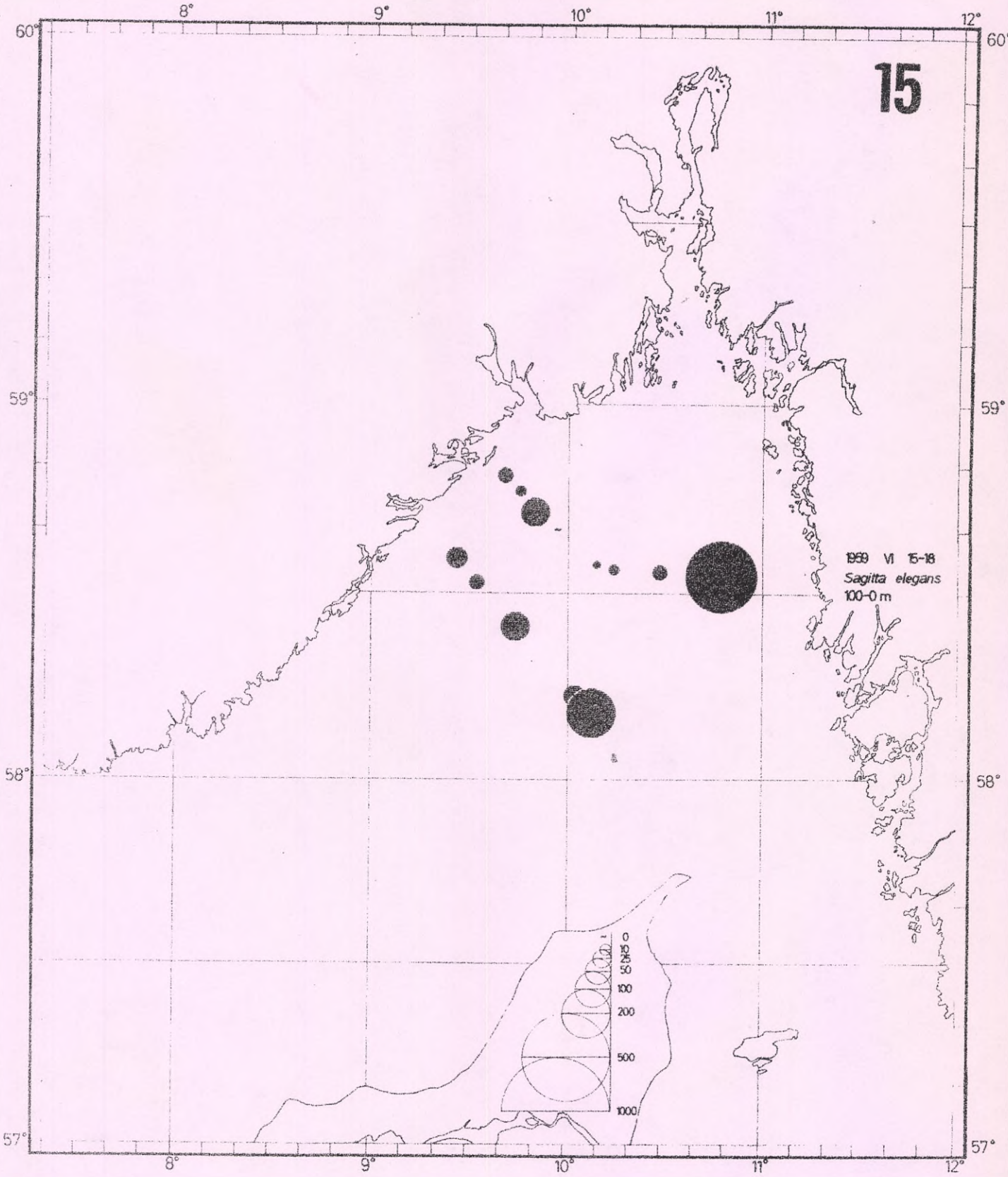




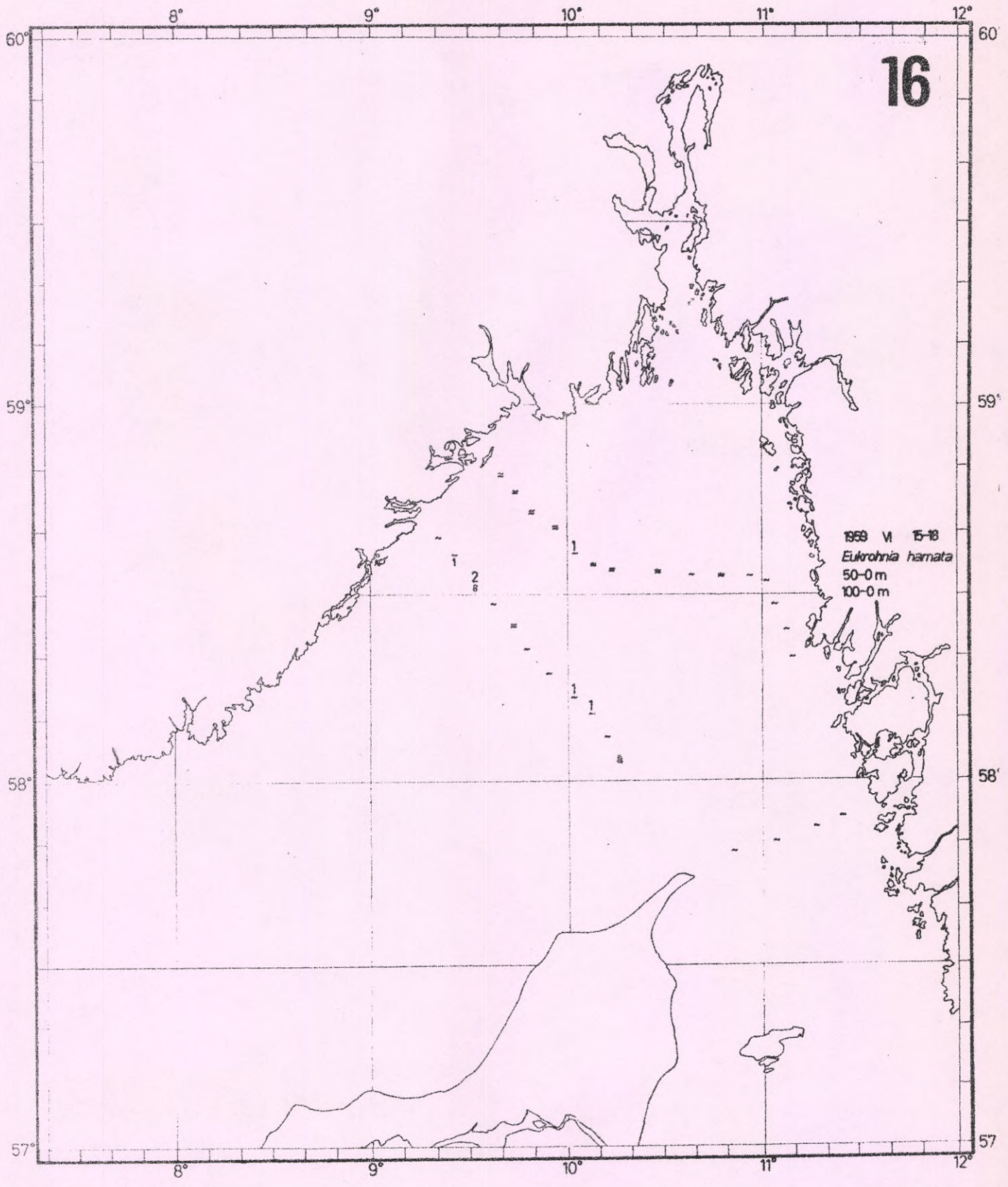




15



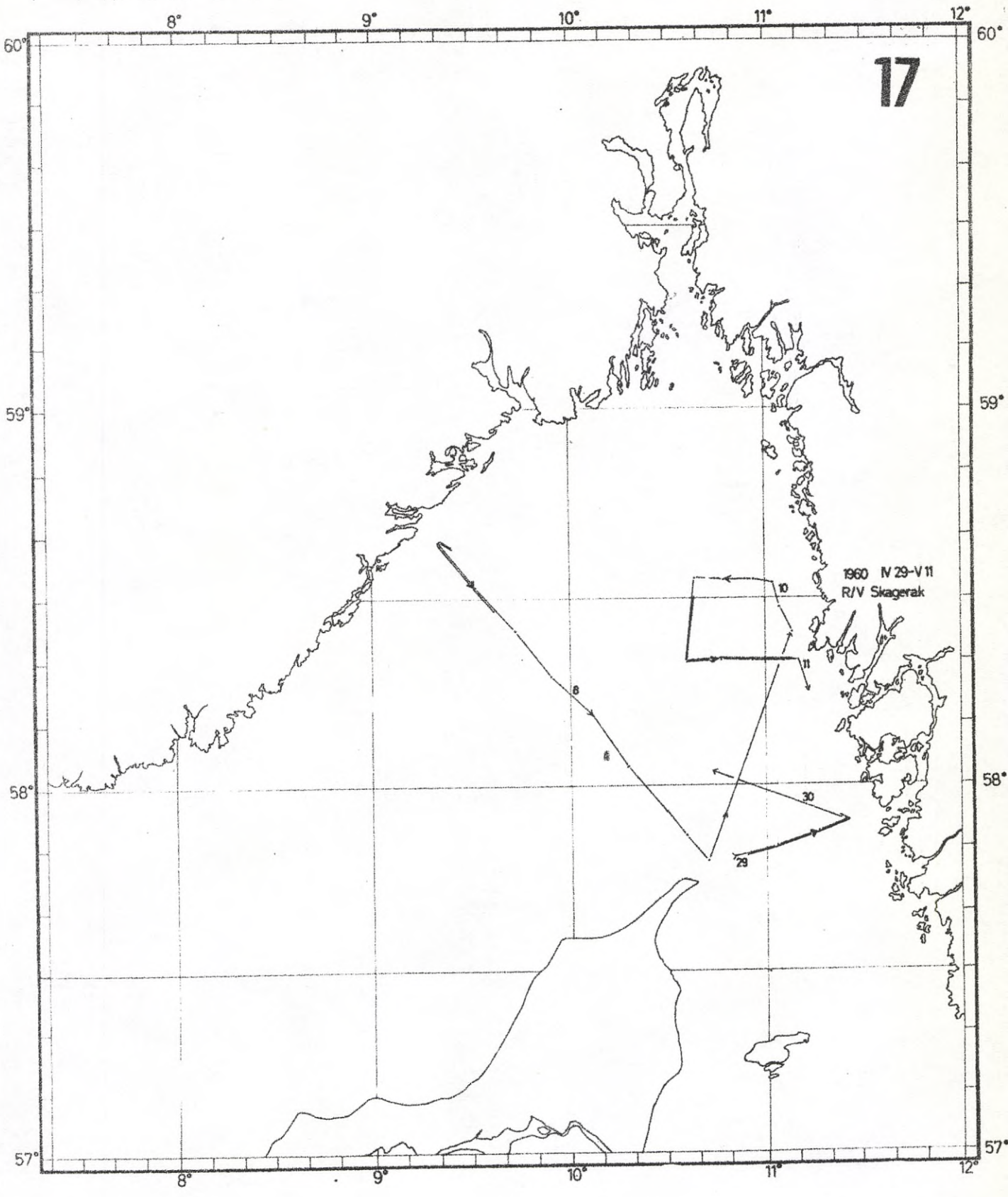




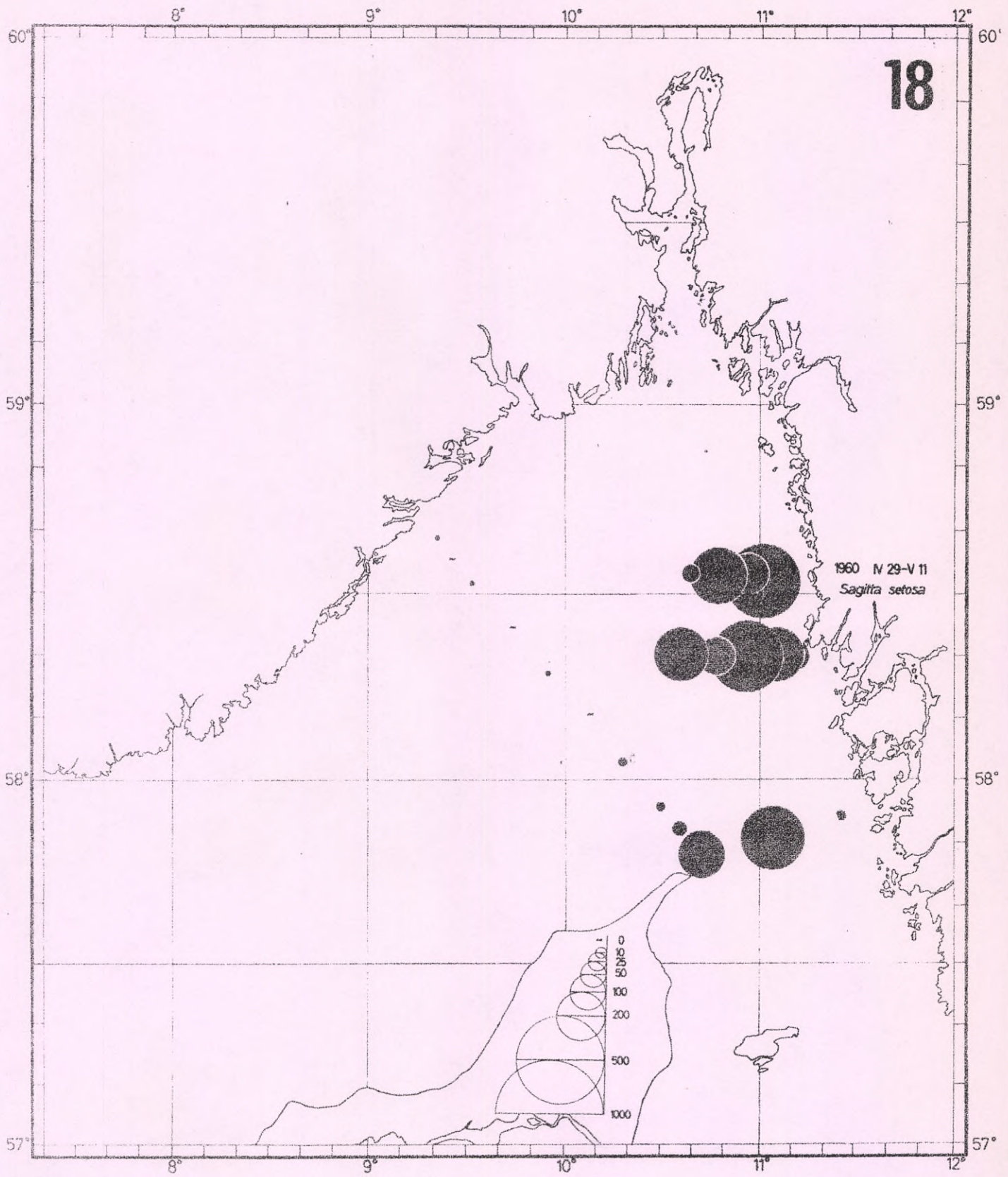
16

1958 VI 15-18  
*Eukrohnia hamata*  
50-0m  
100-0m

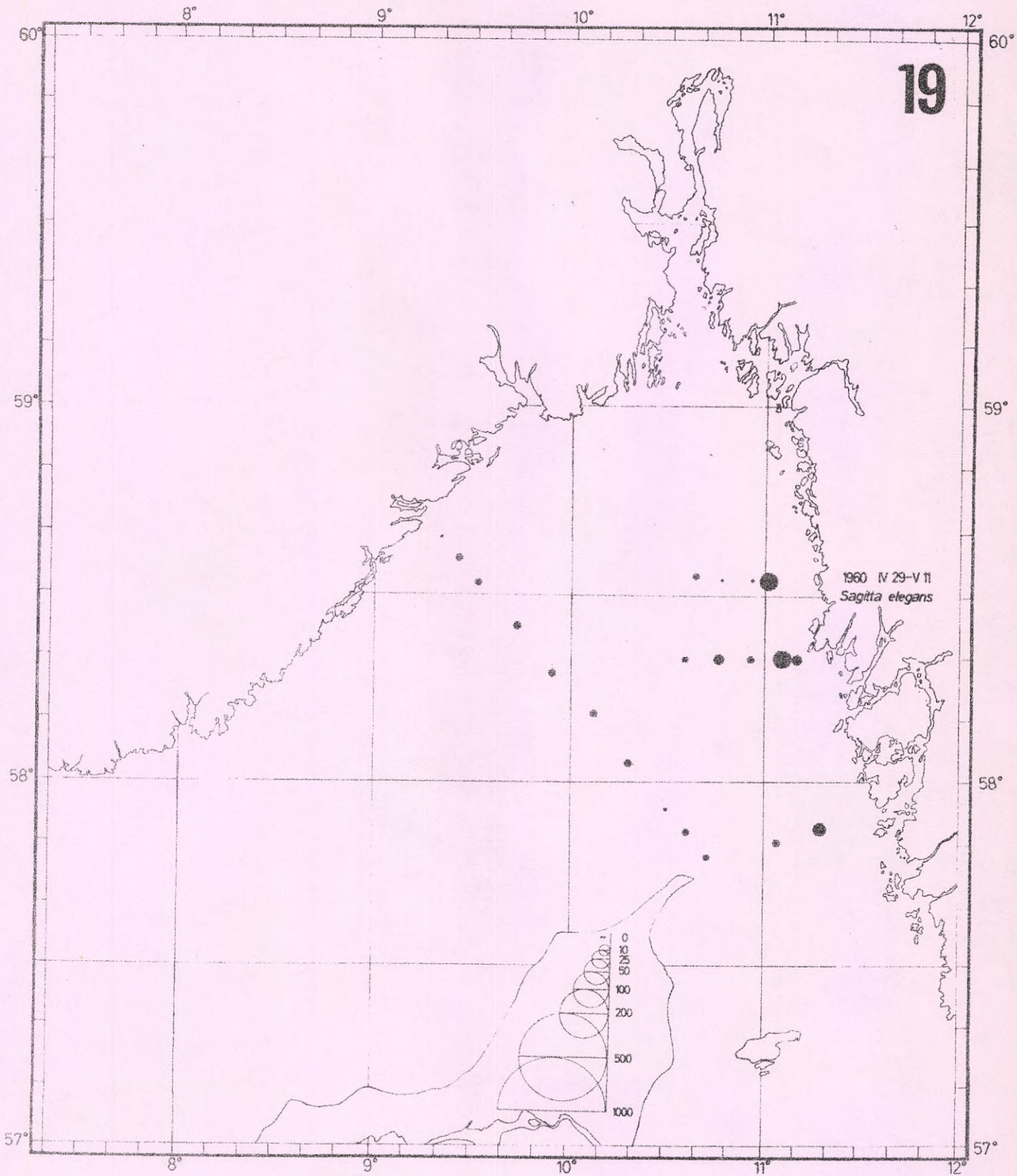




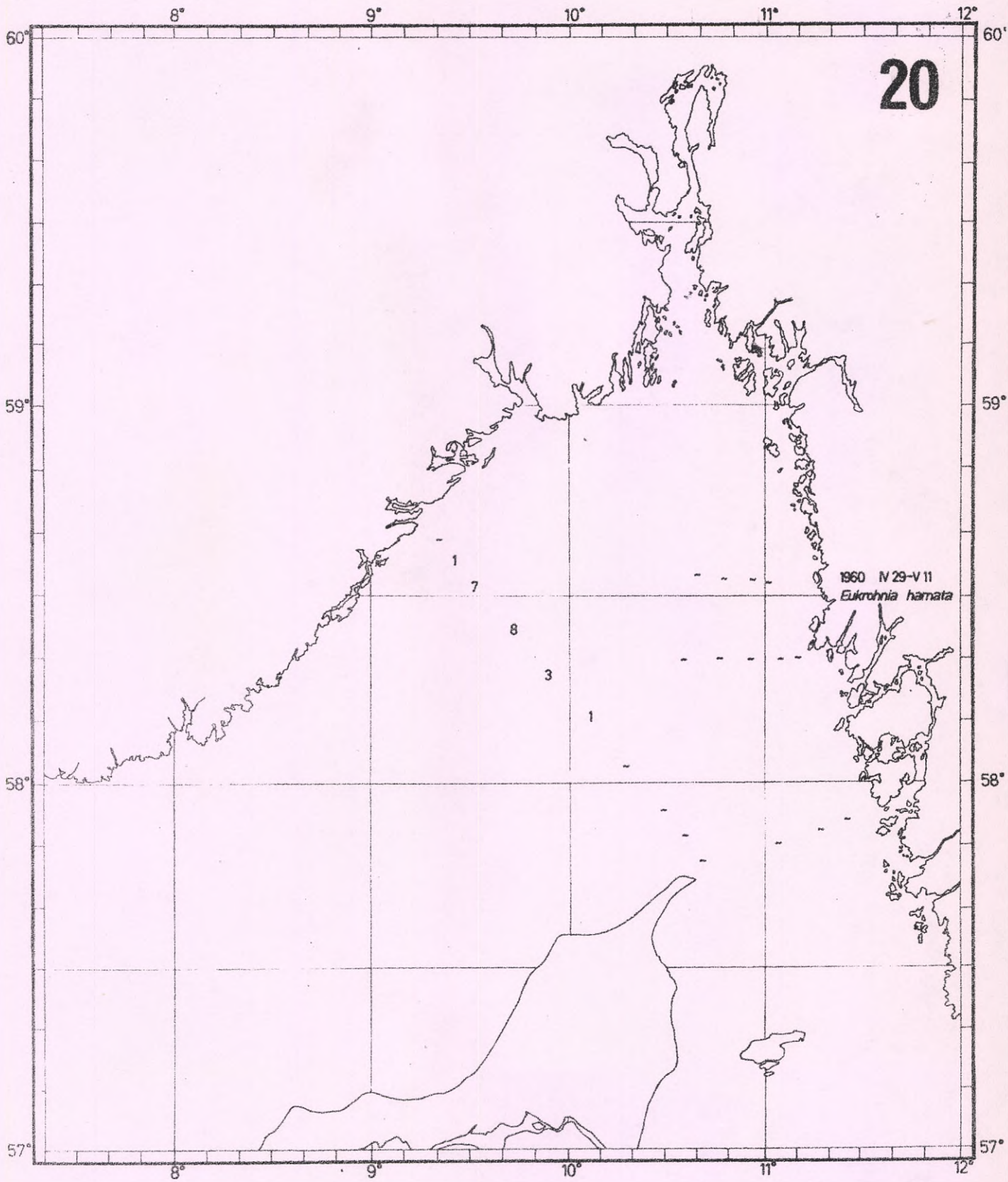




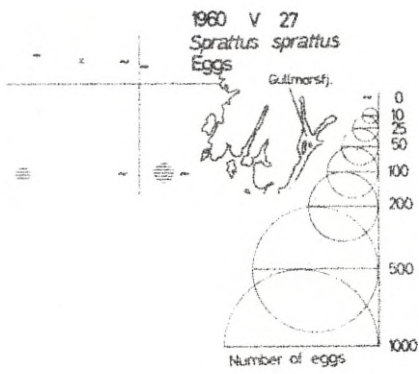
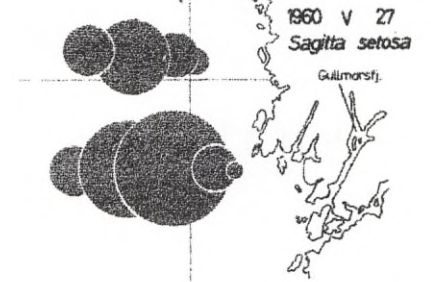
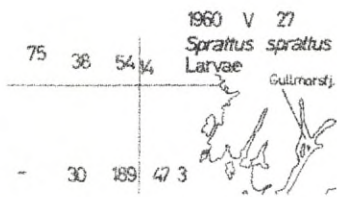
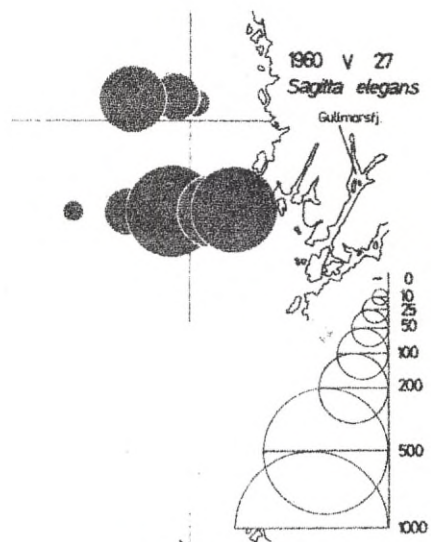
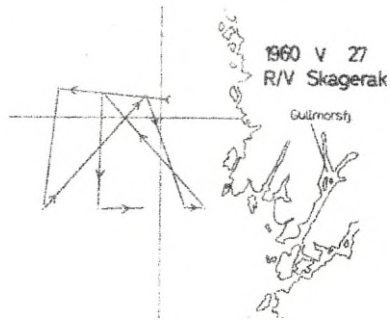




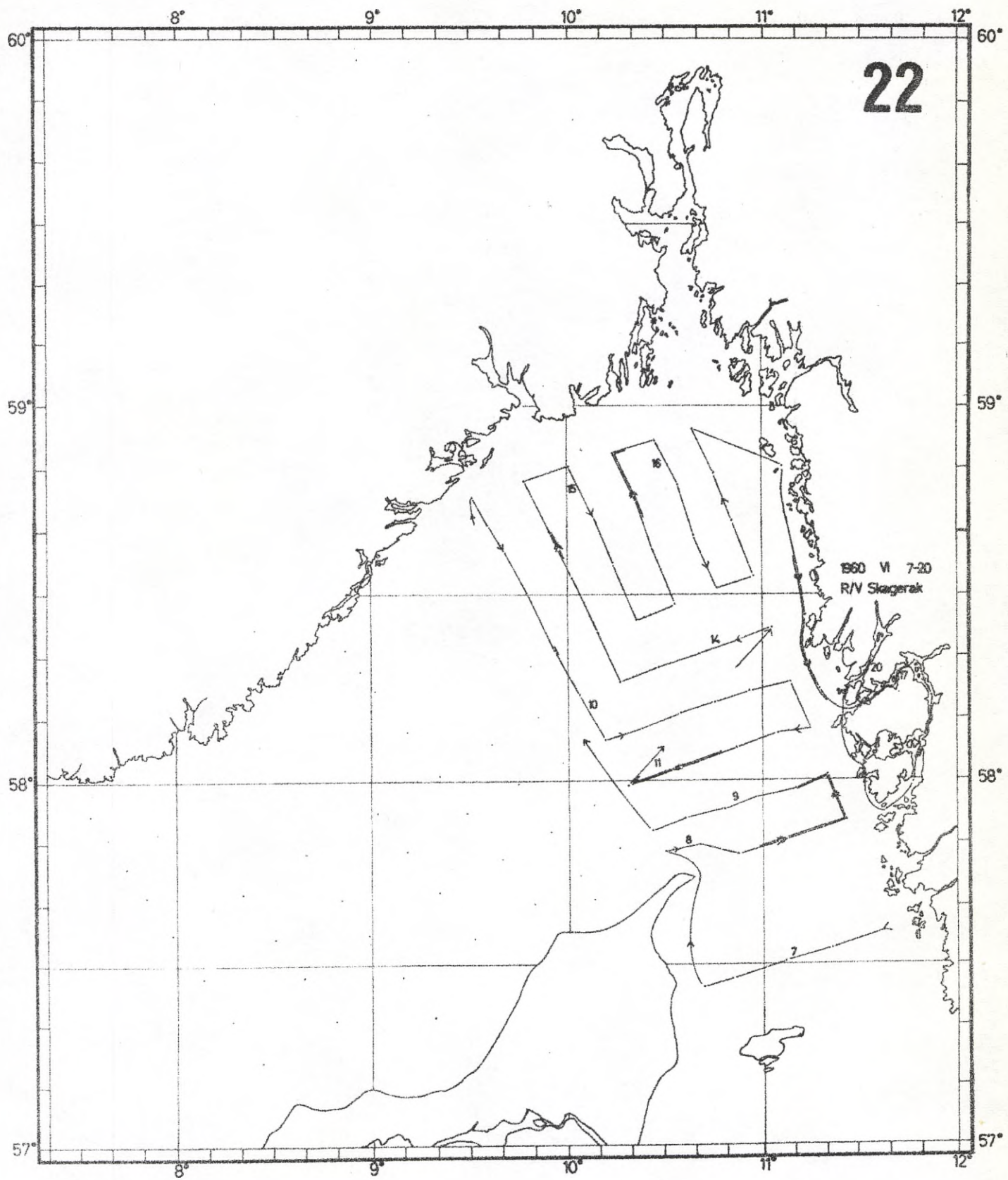








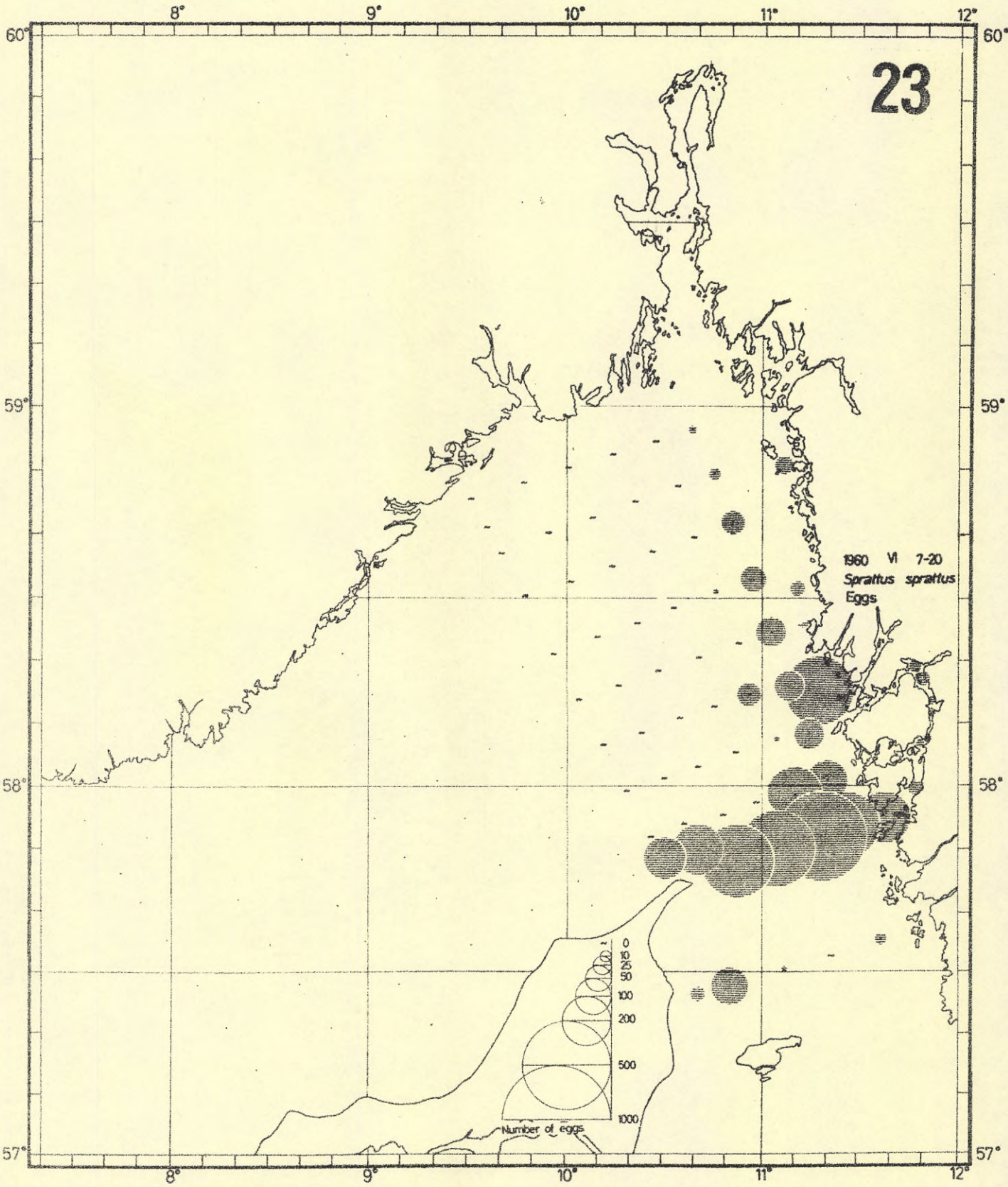
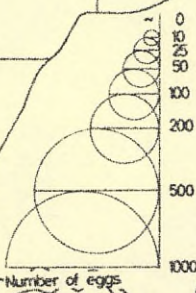




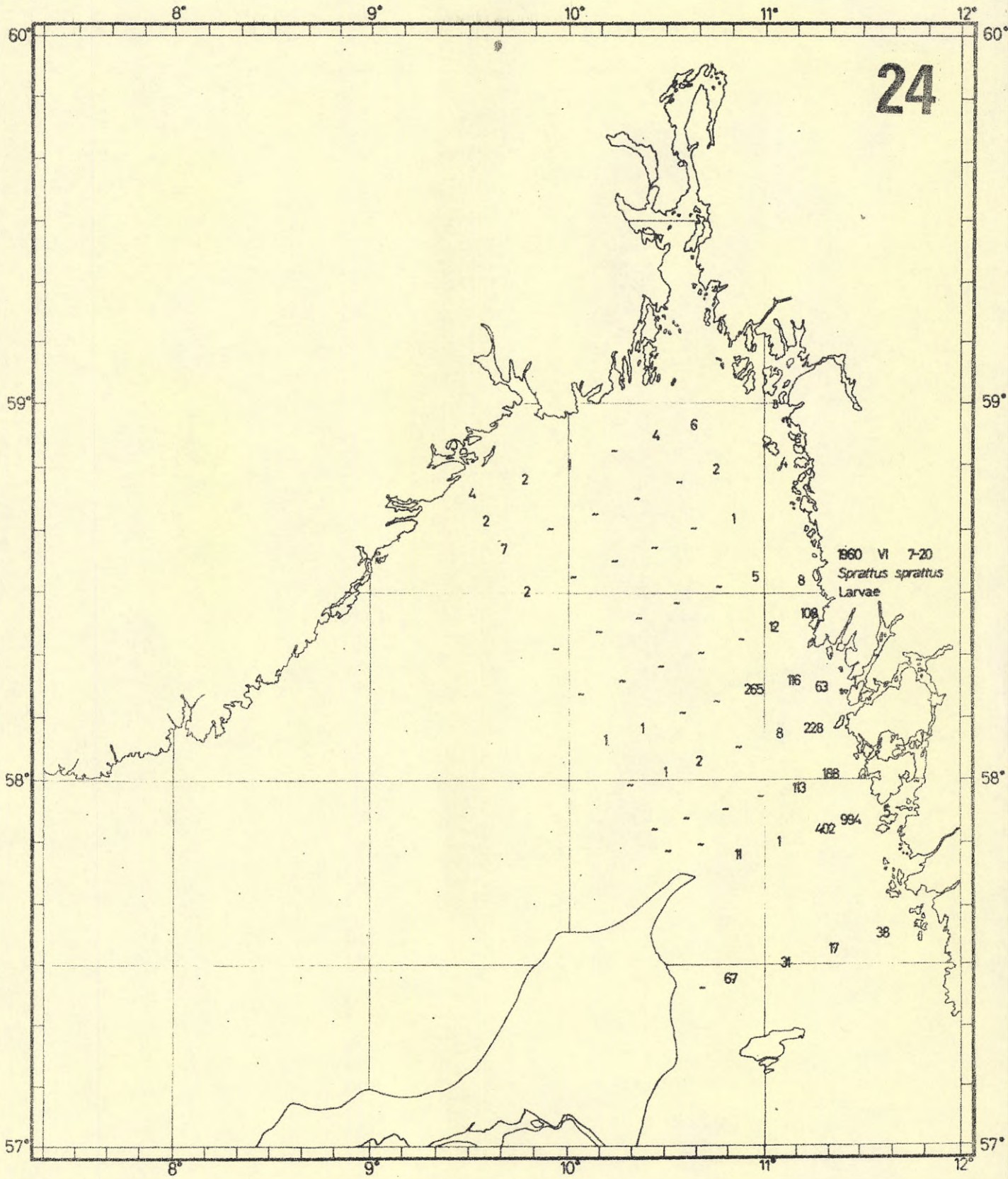


23

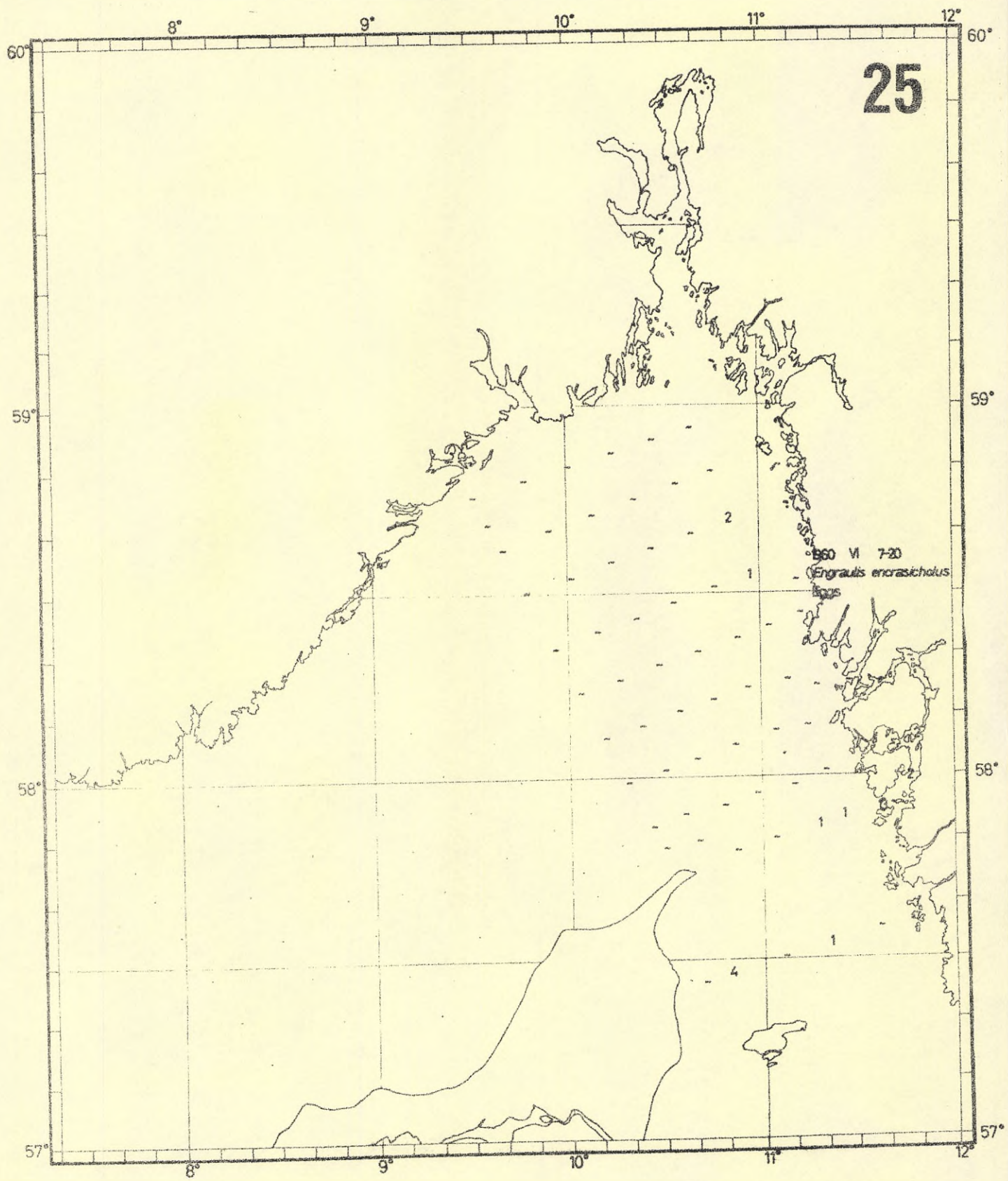
1960 VI 7-20  
*Sprattus sprattus*  
Eggs







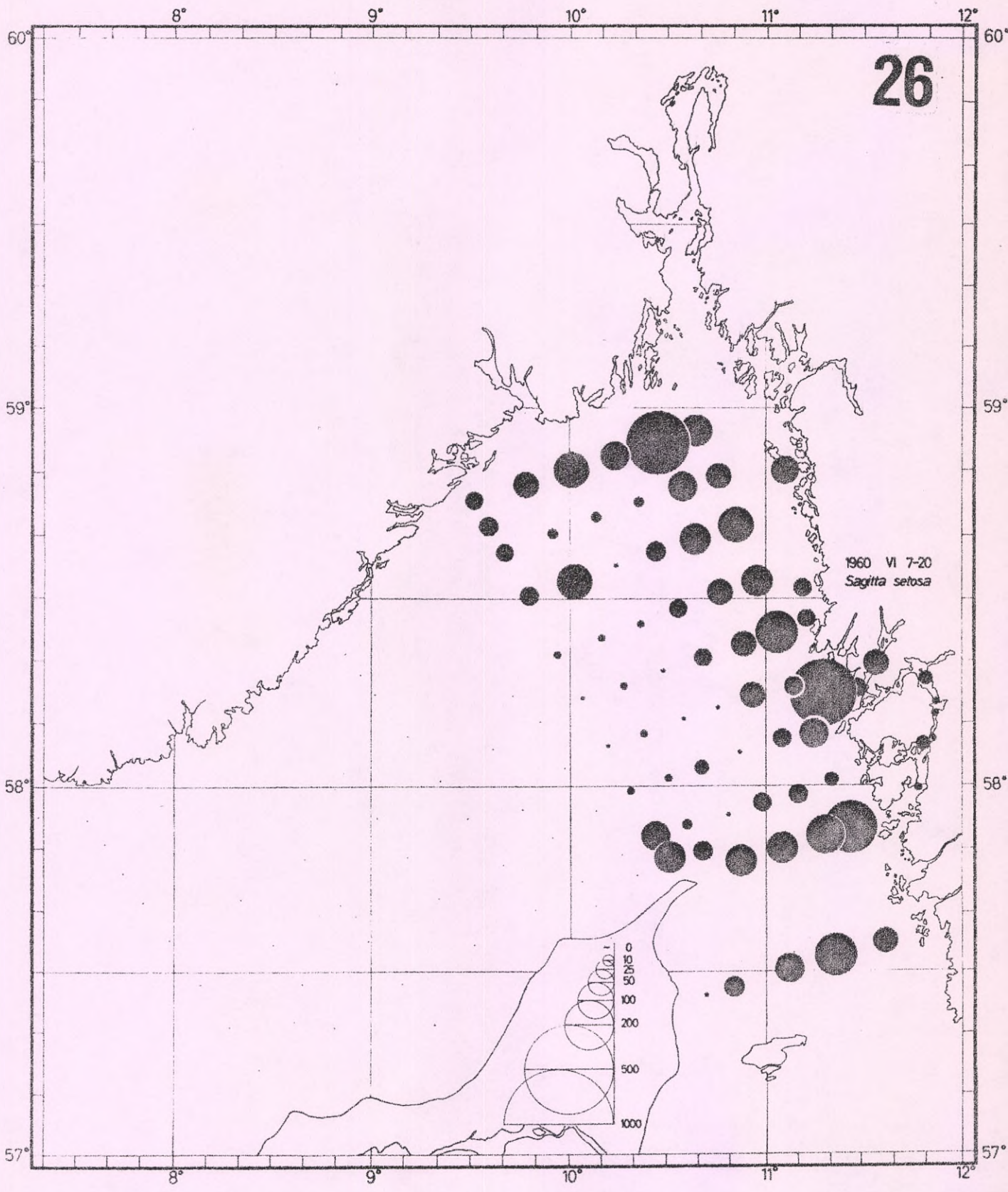




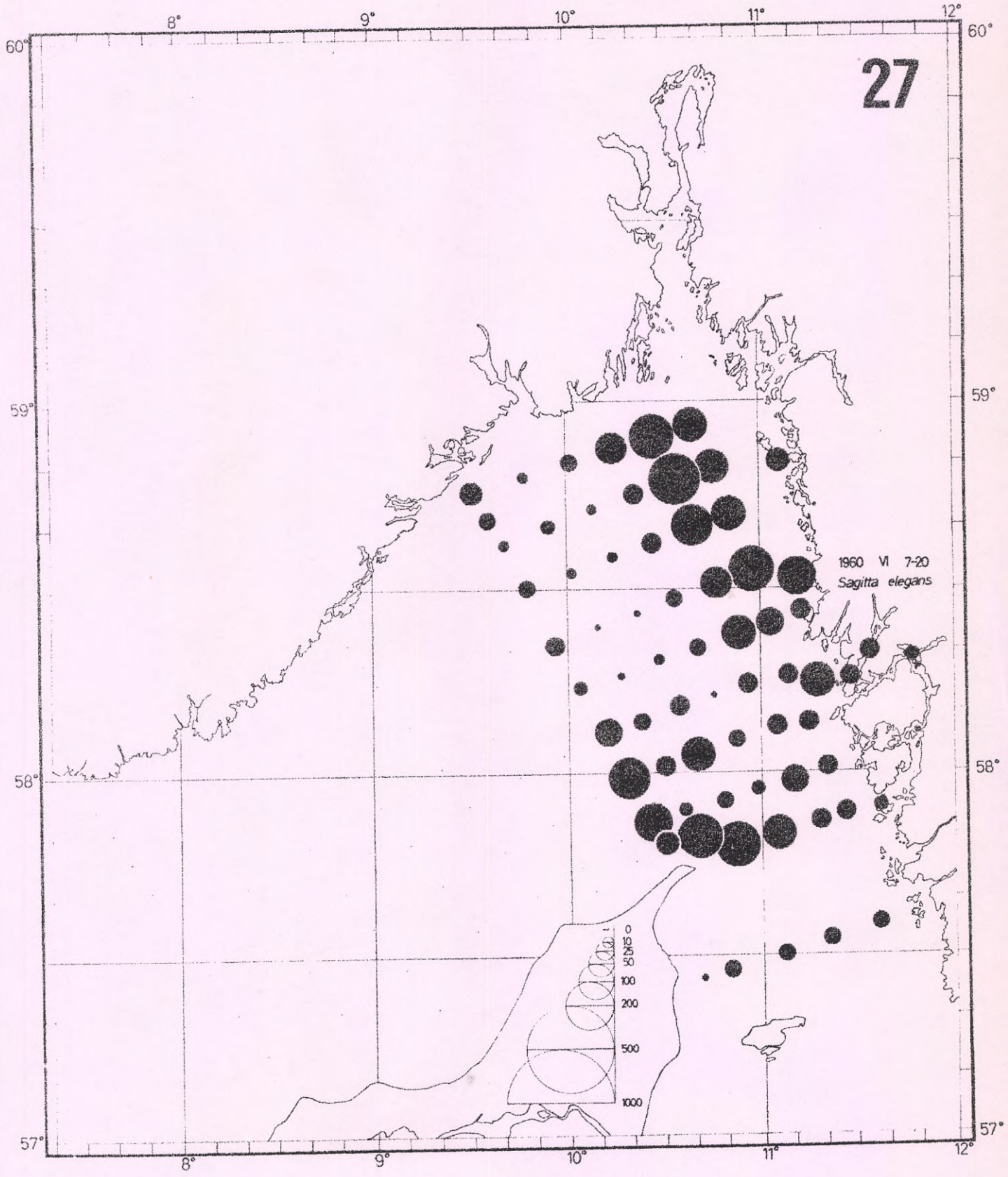


26

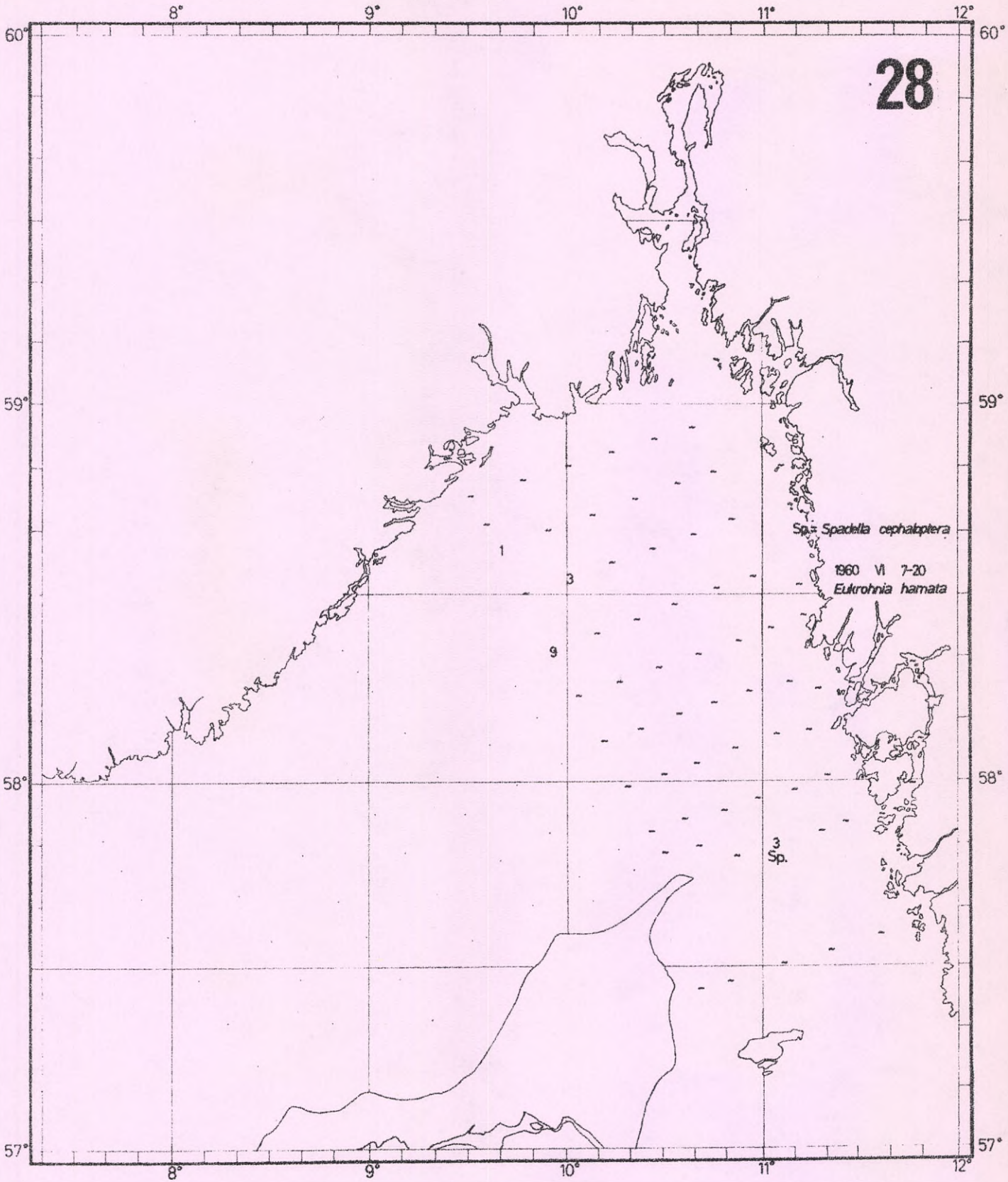
1960 VI 7-20  
*Sagitta setosa*



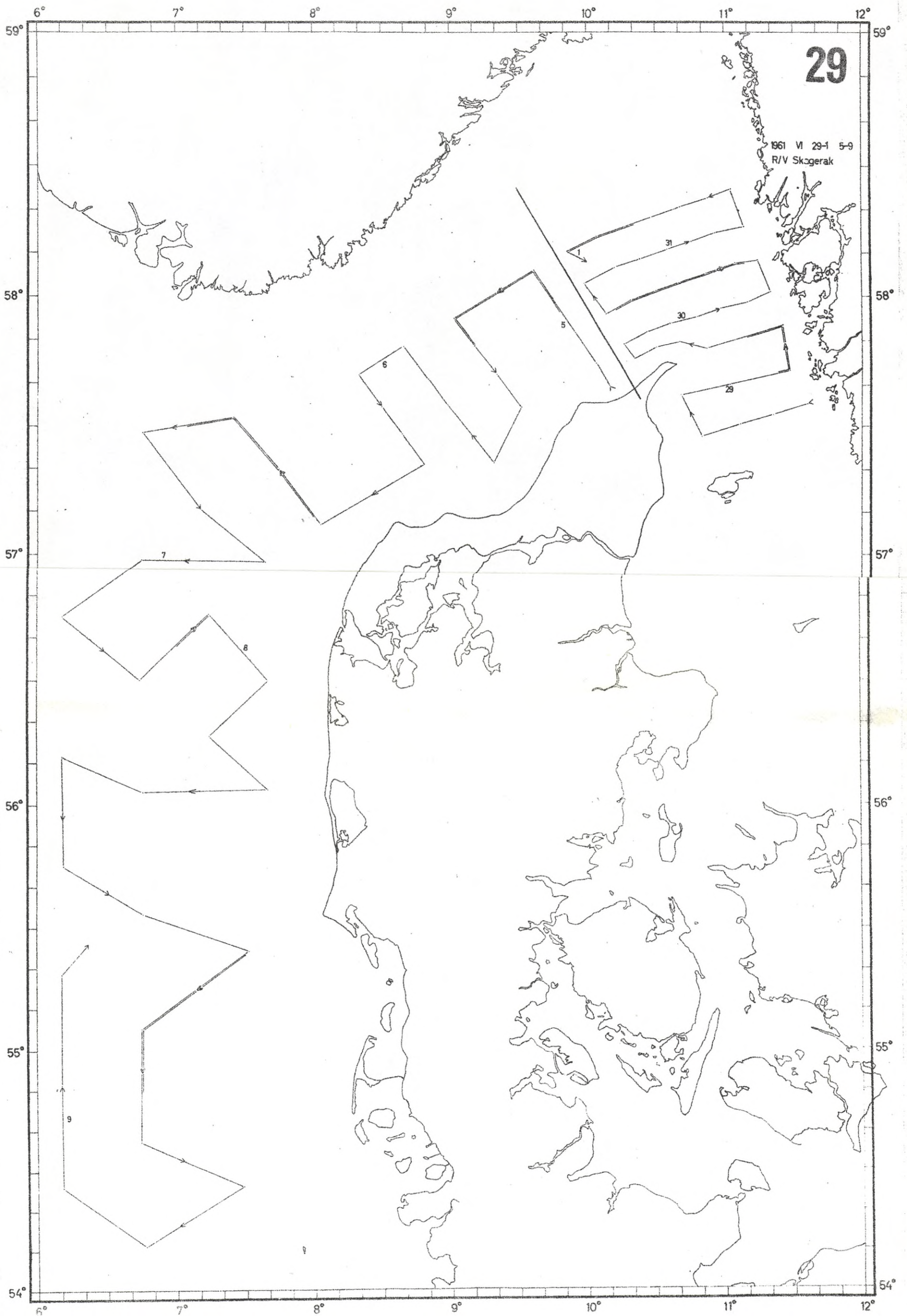




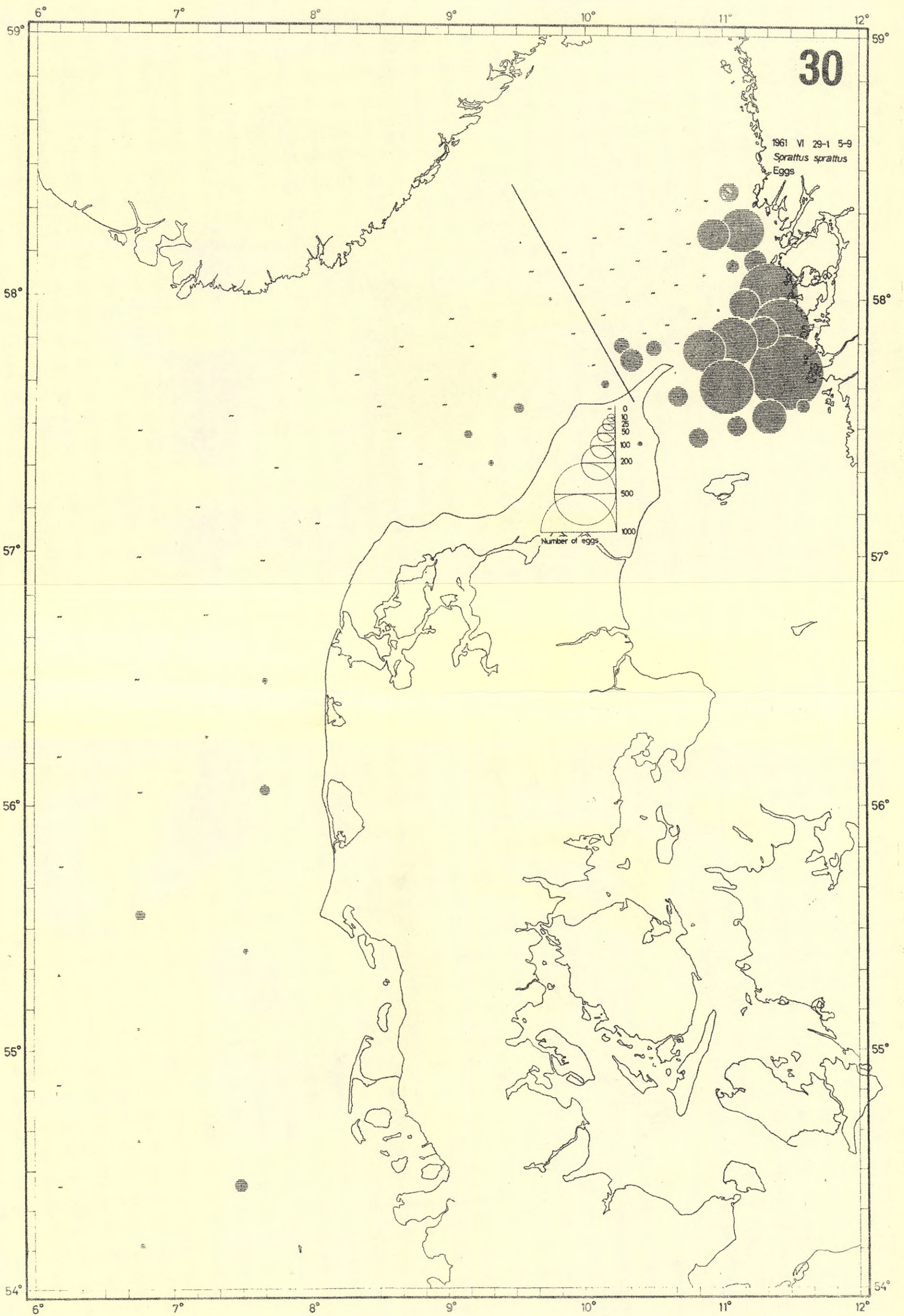




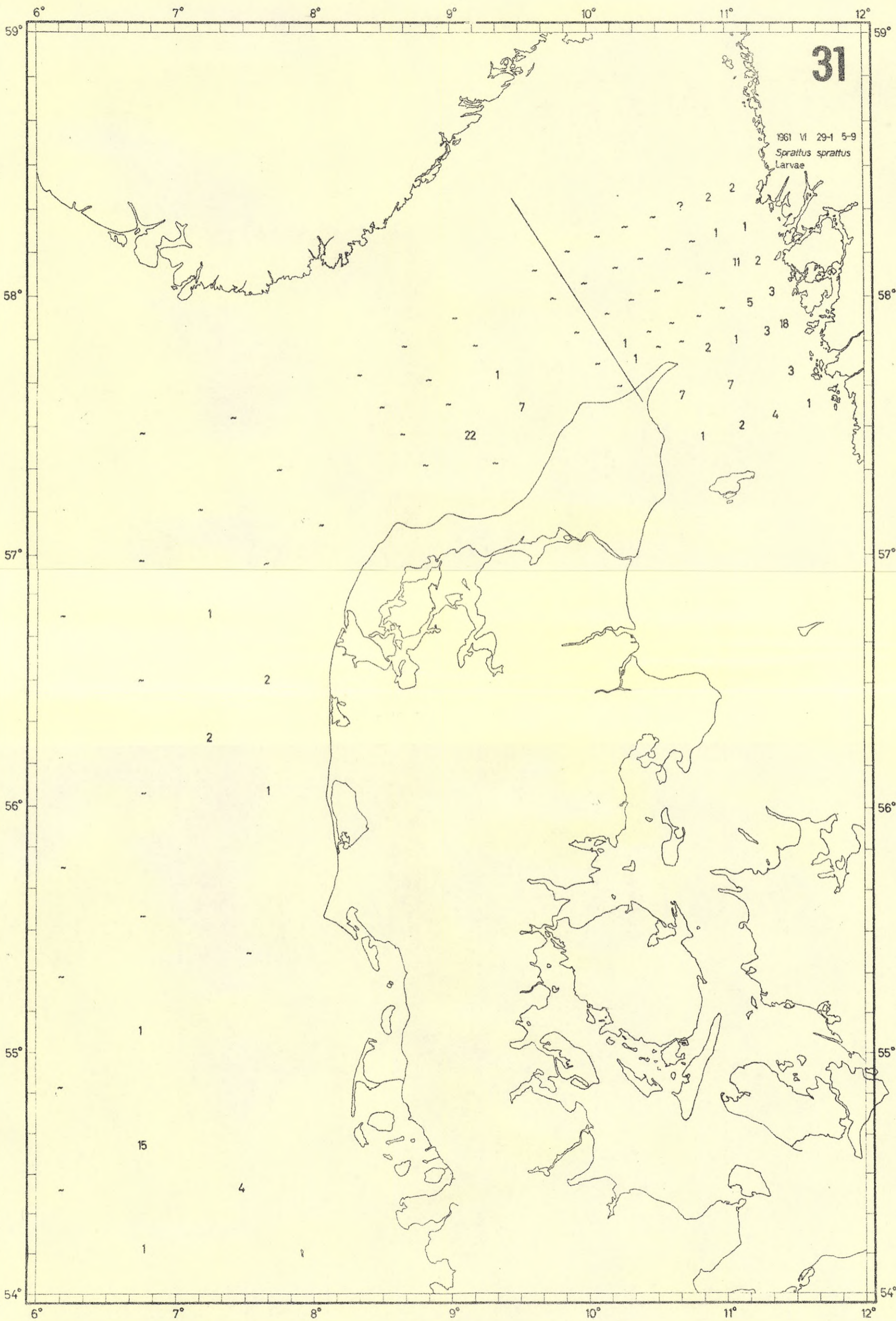




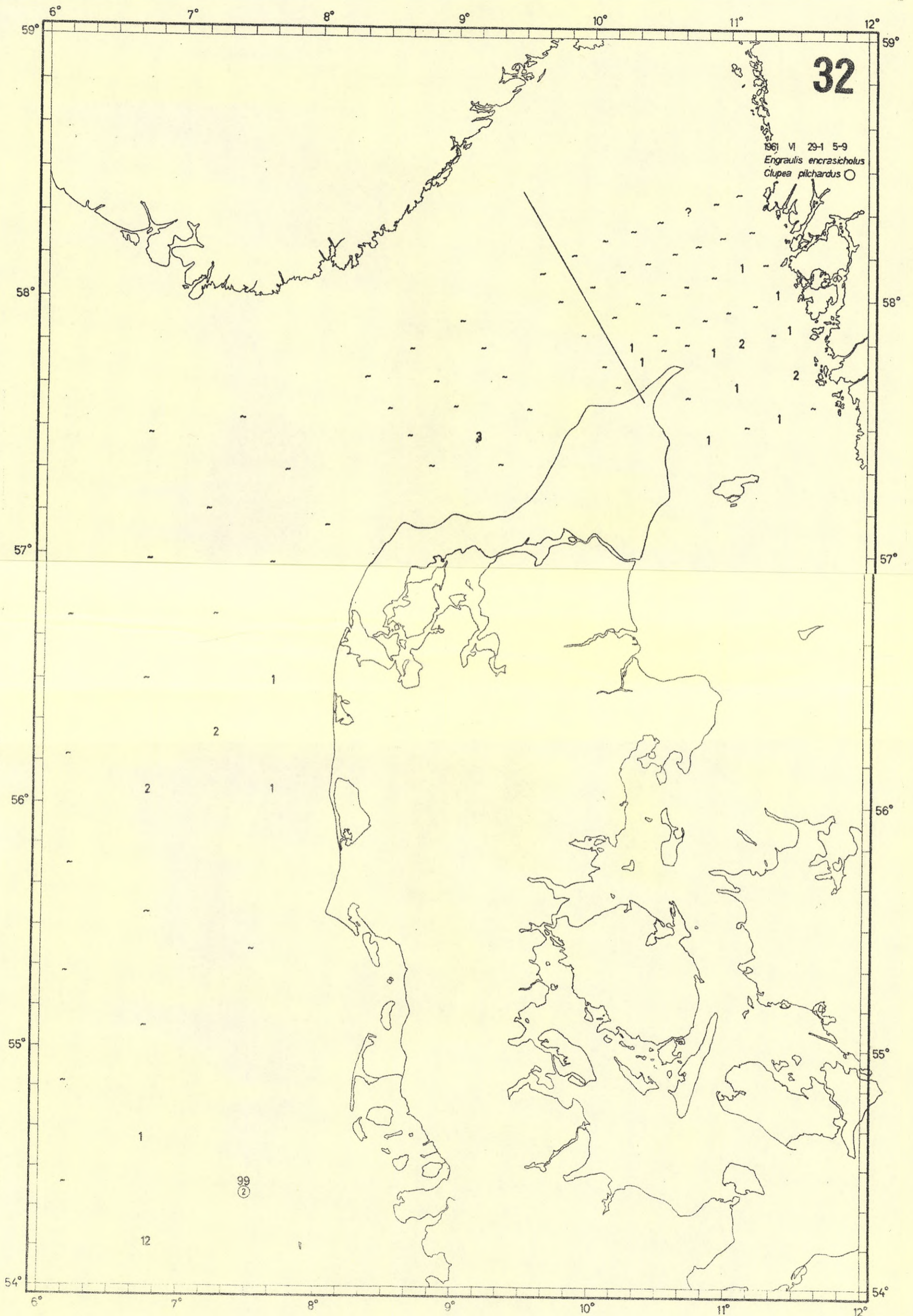




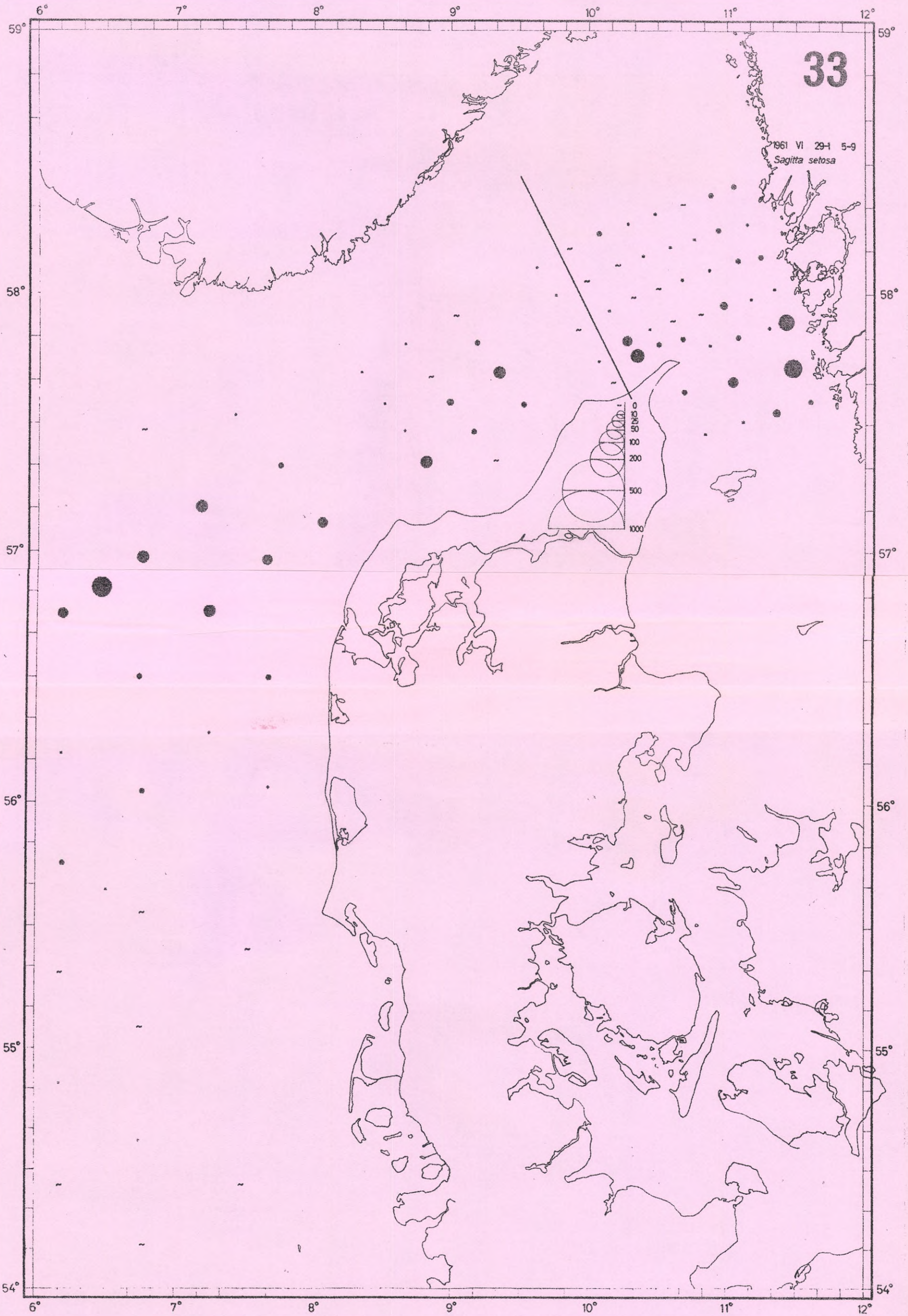




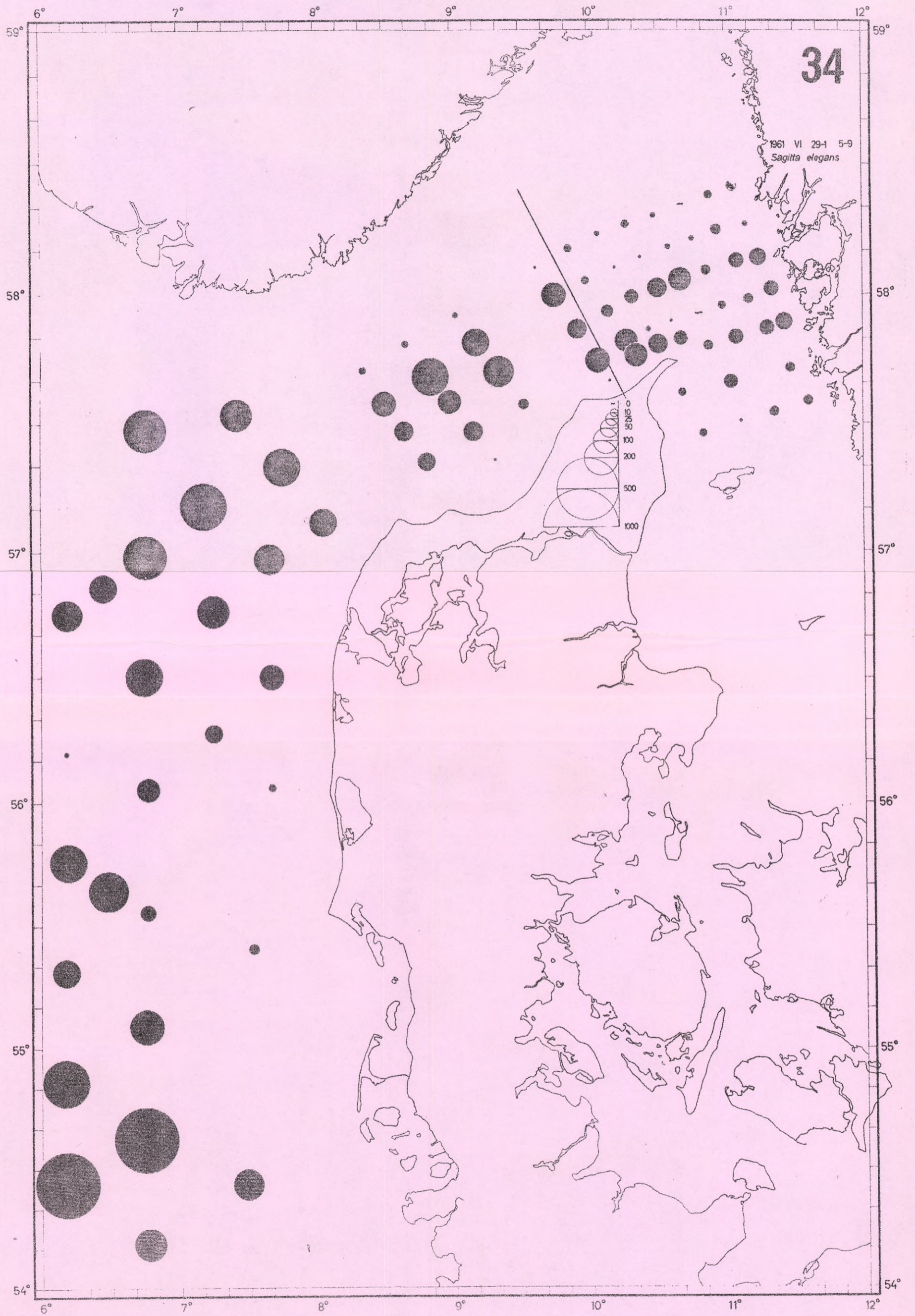




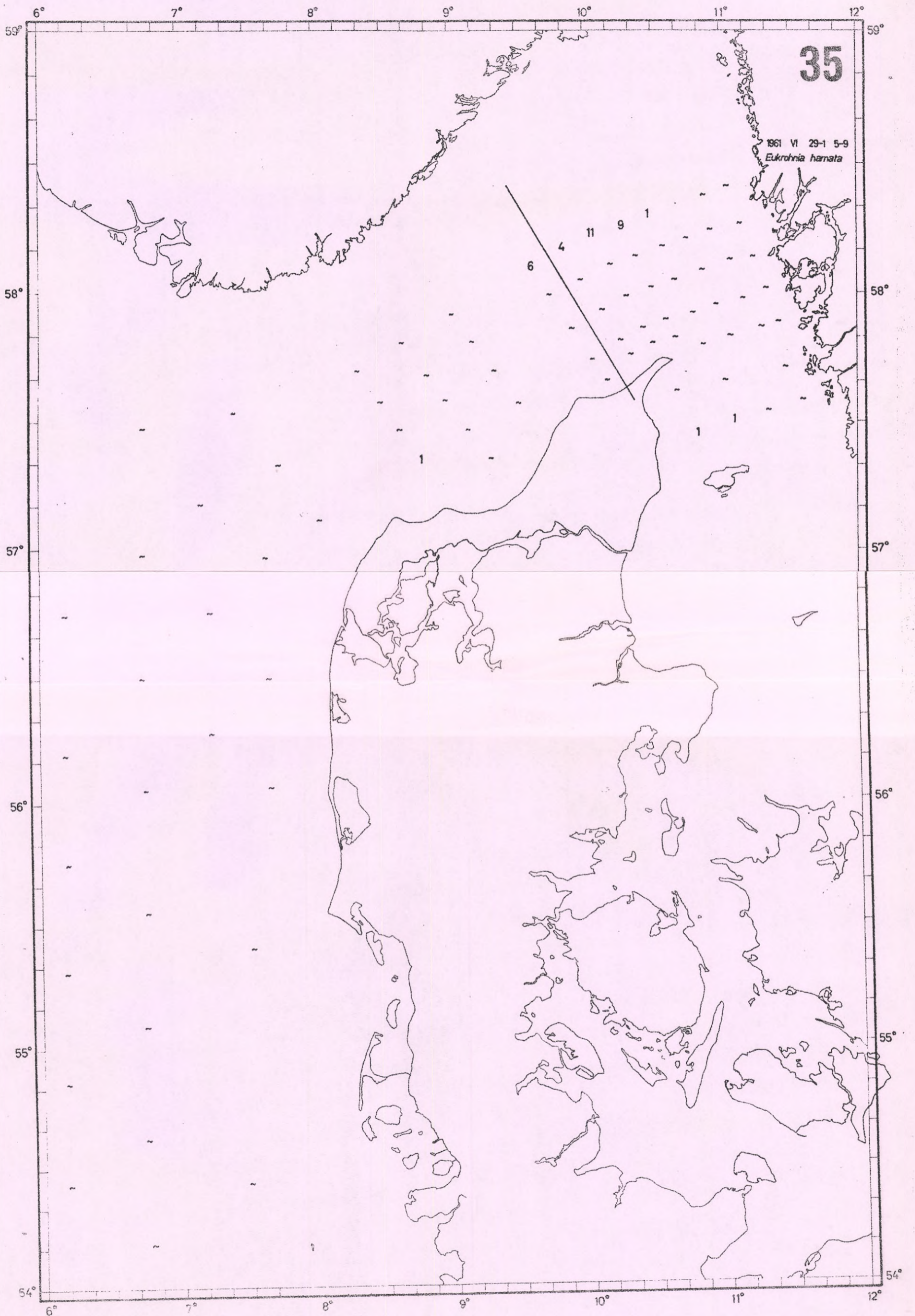




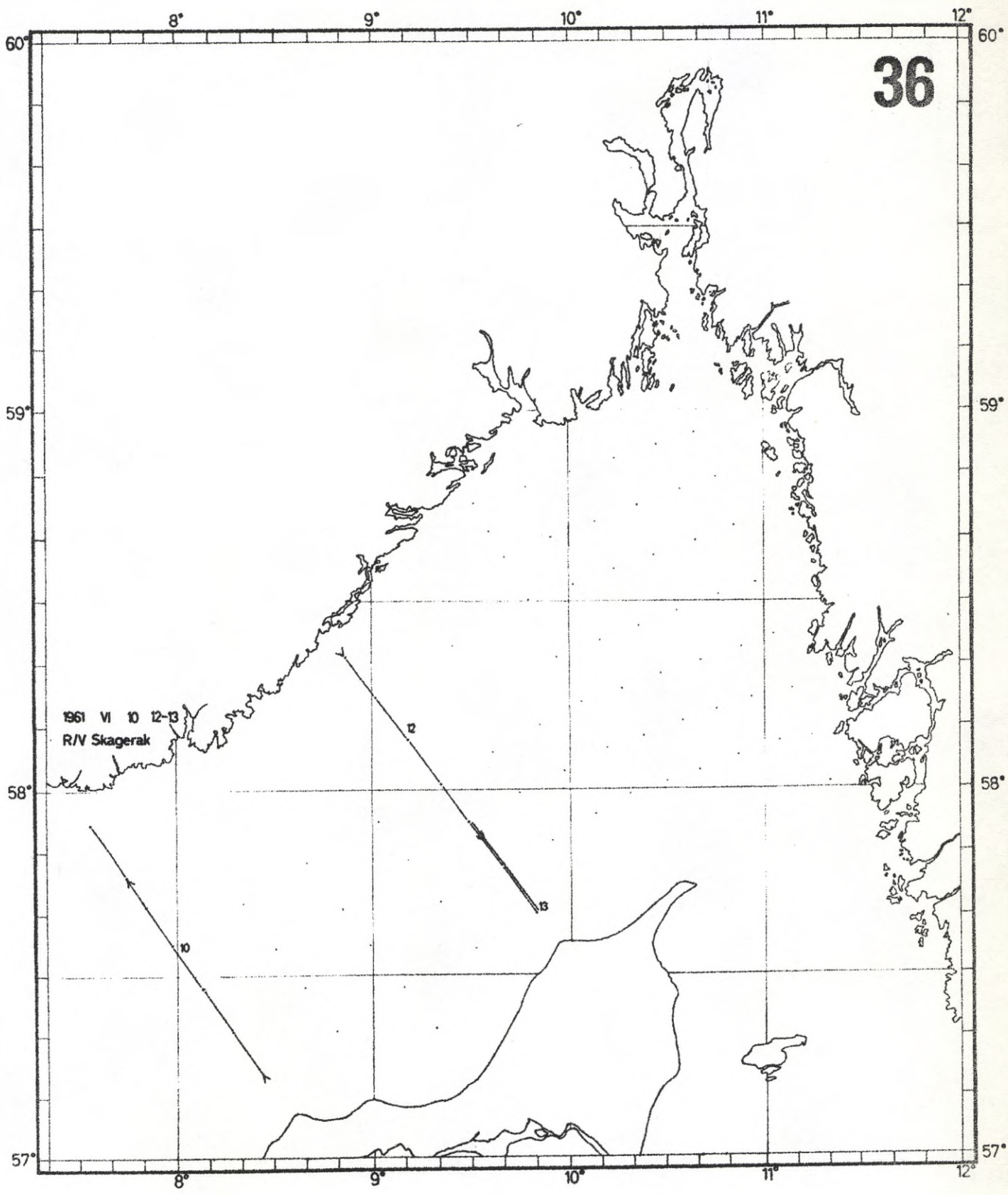












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1961 VI 10 12-13  
R/V Skagerak

12

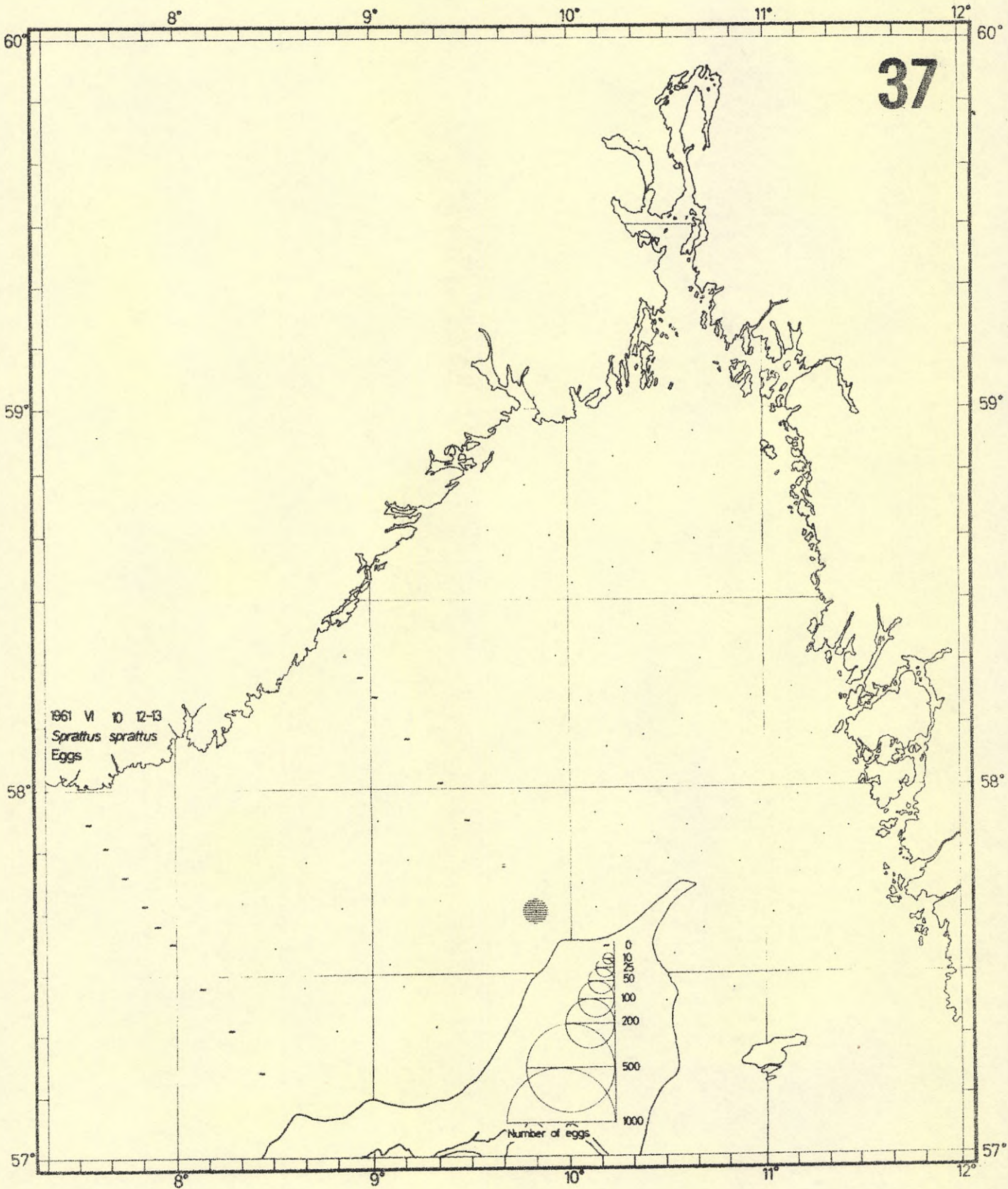
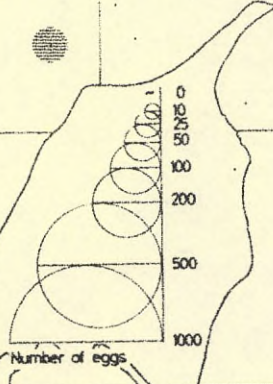
13

10

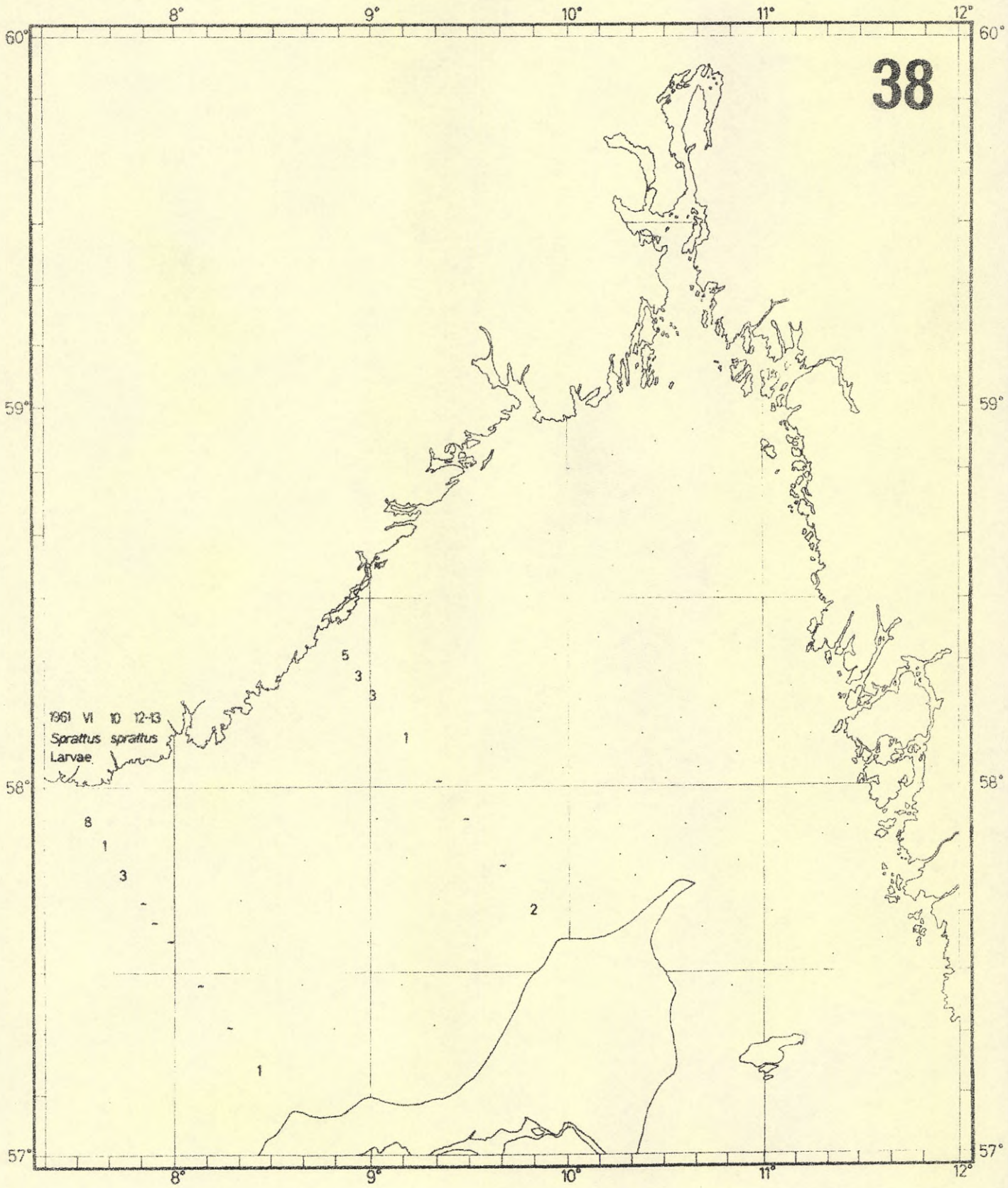


37

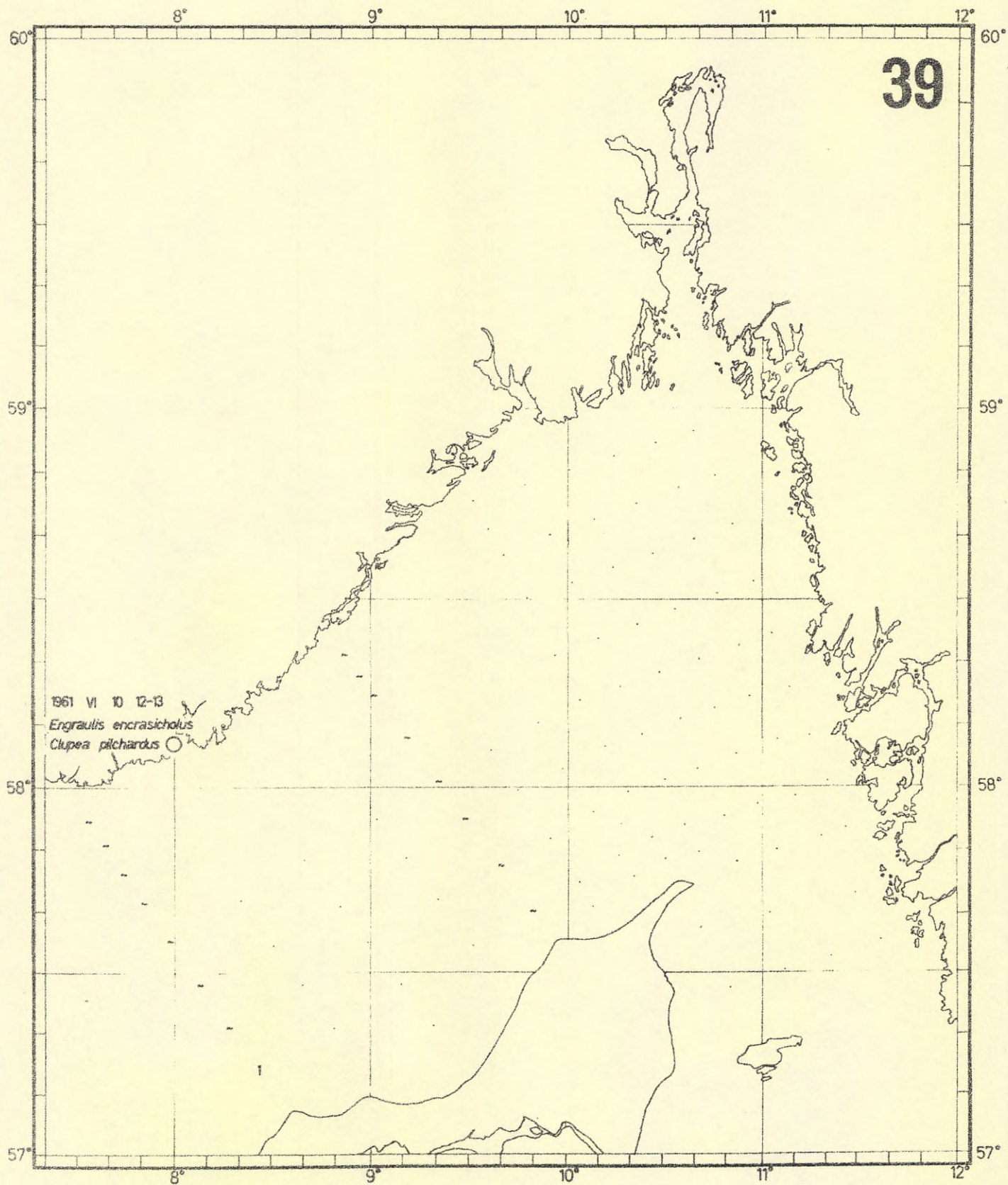
1961 VI 10 12-13  
*Sprattus sprattus*  
Eggs







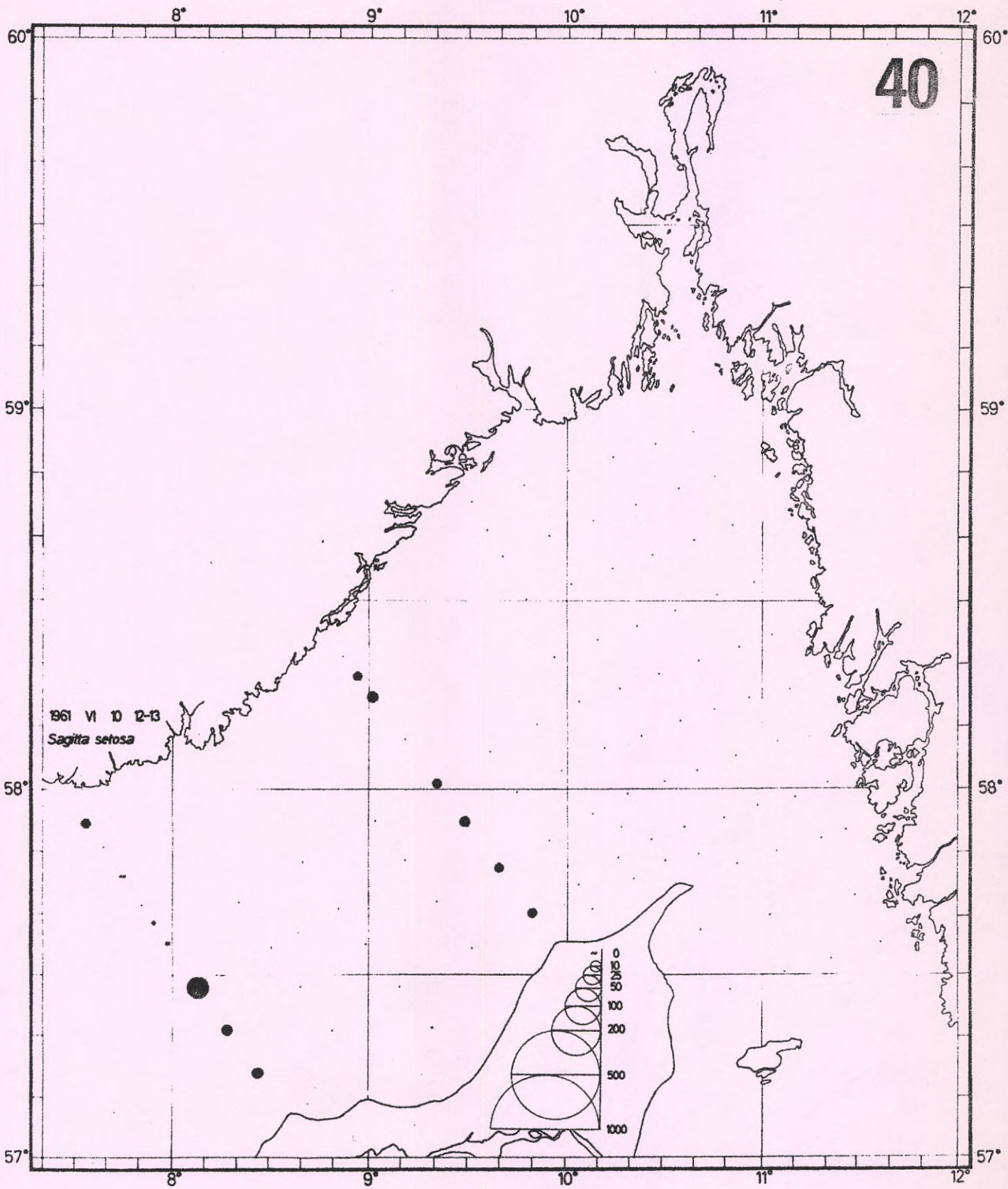






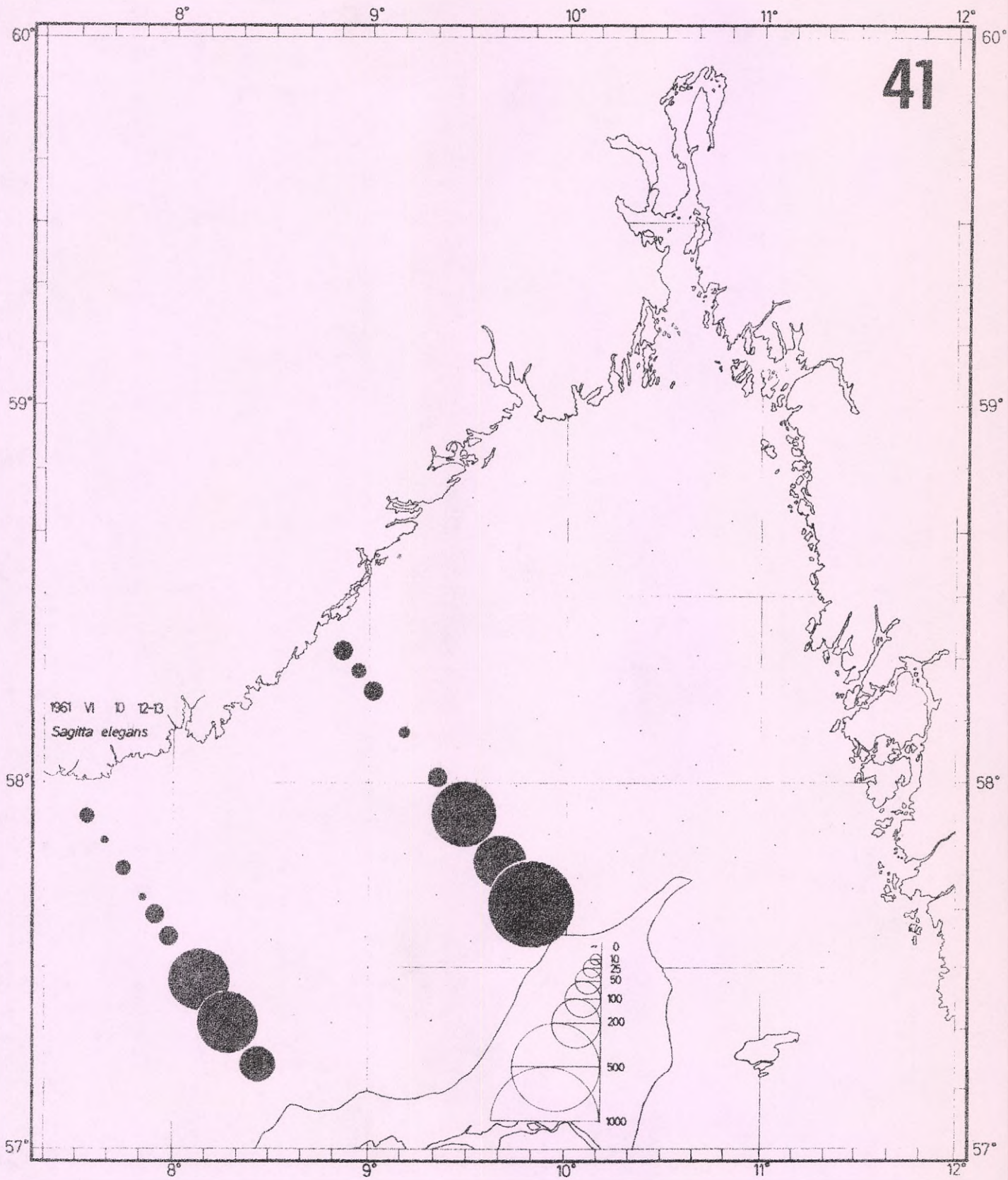
40

1961 VI 10 12-13  
*Sagitta setosa*

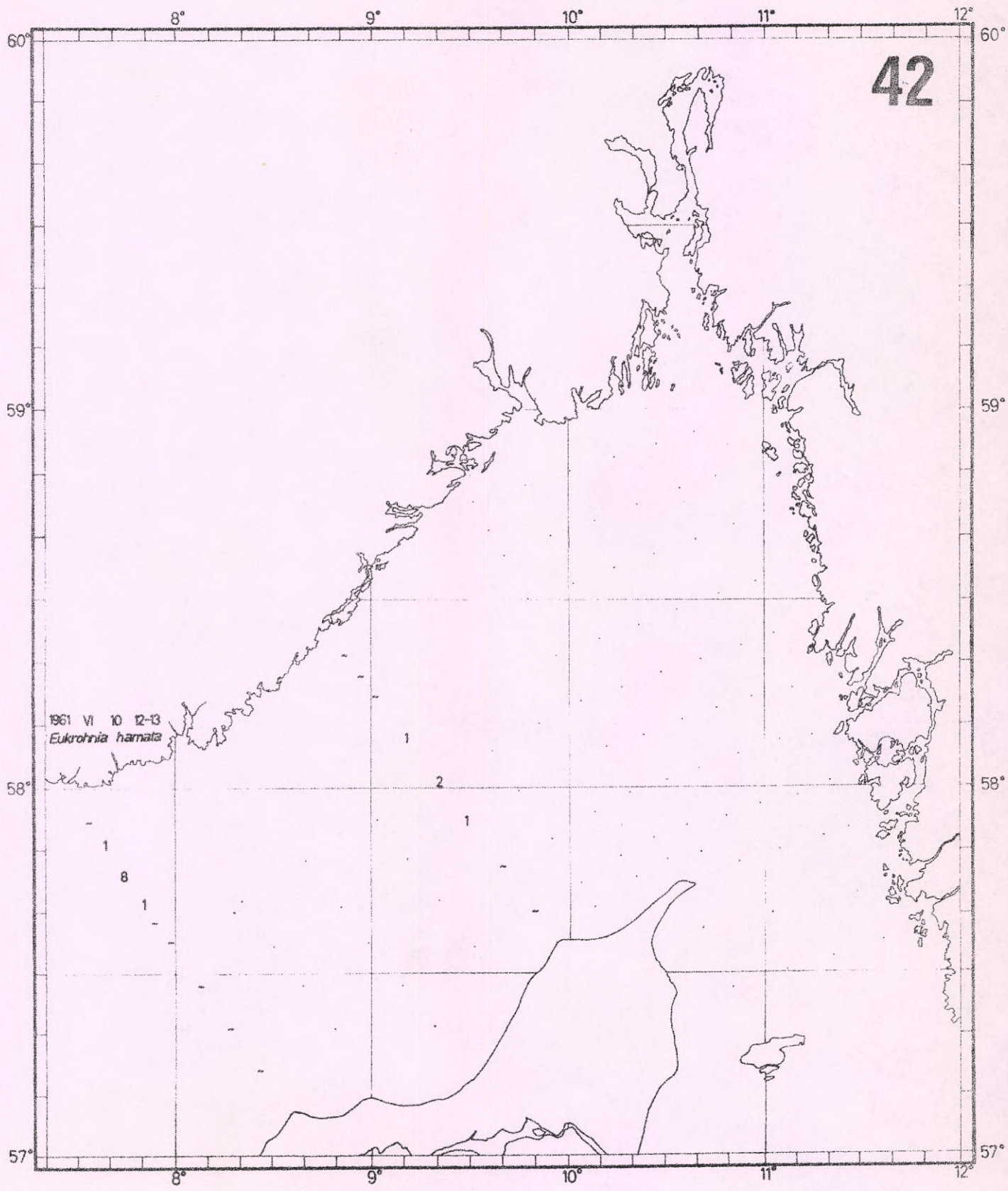




41





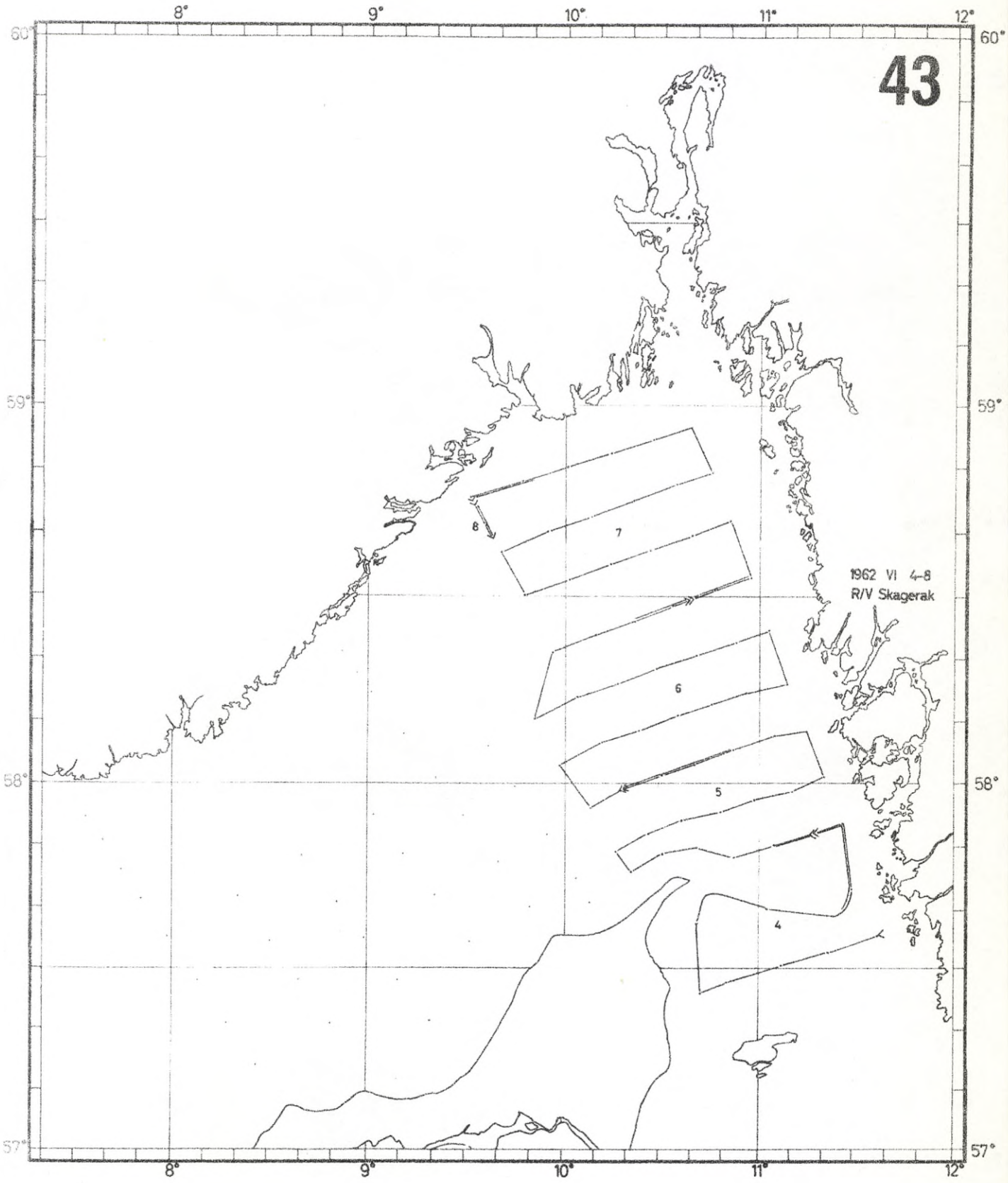


42

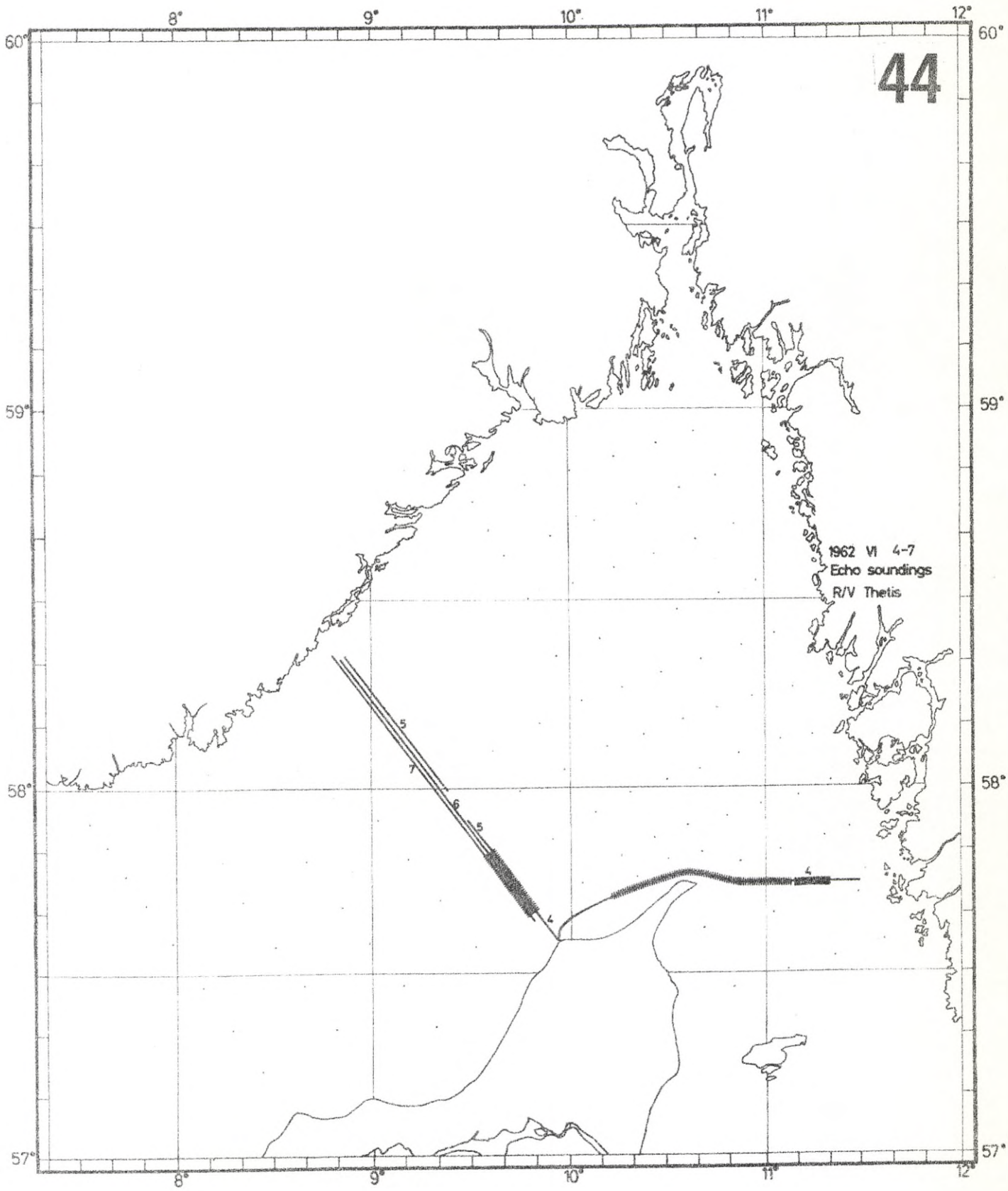
1961 VI 10 12-13  
*Eukrohnia hamata*



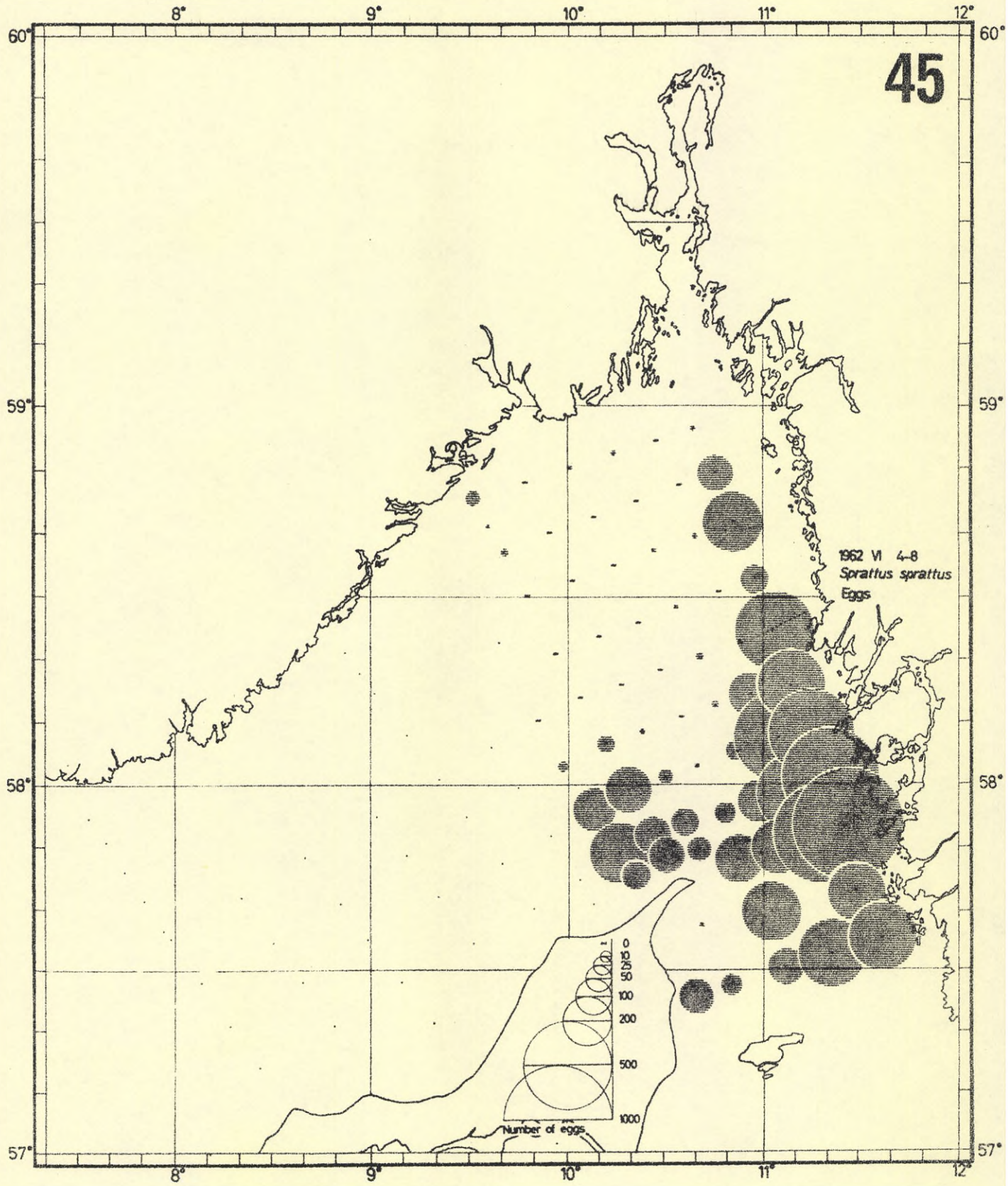
43



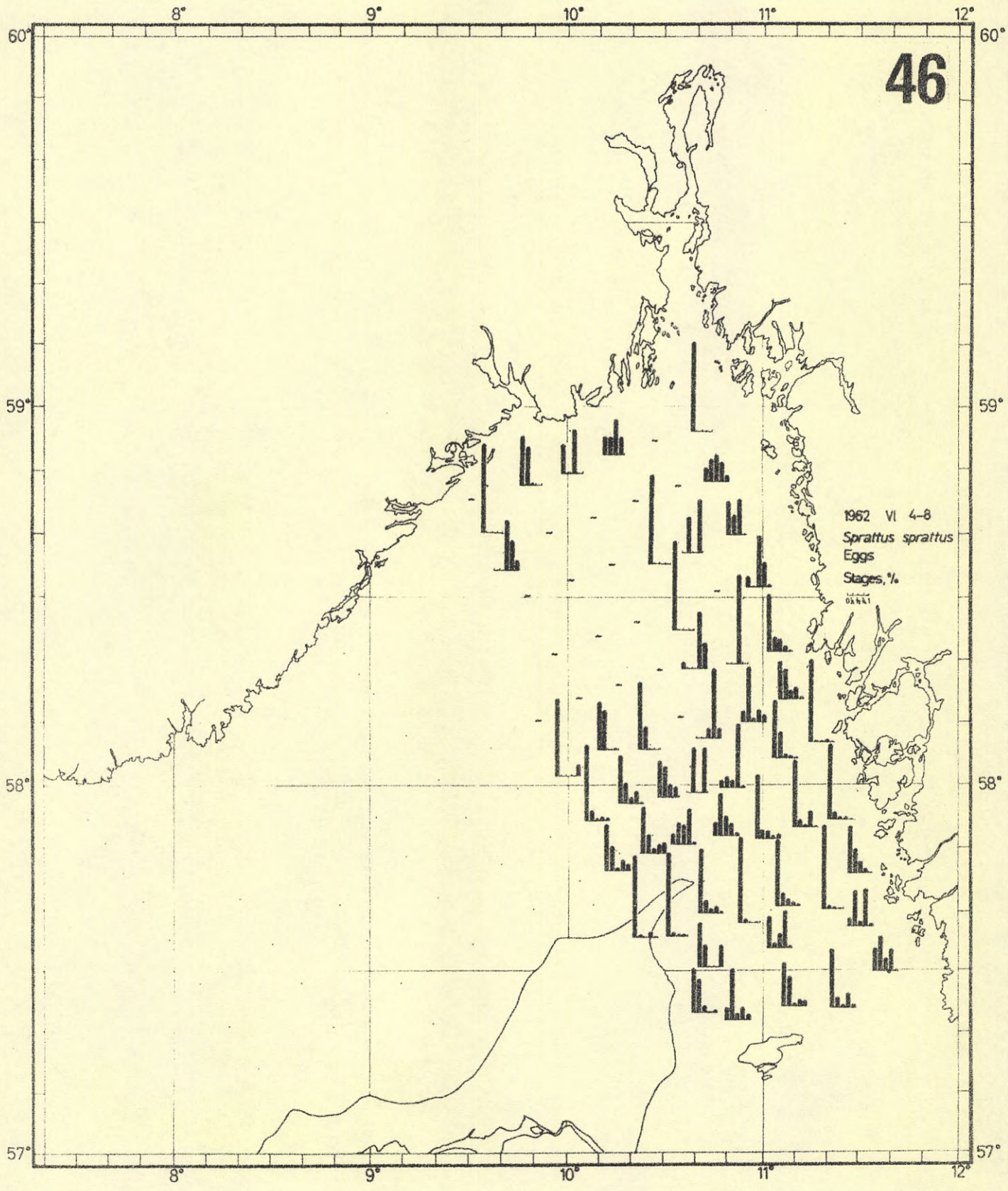




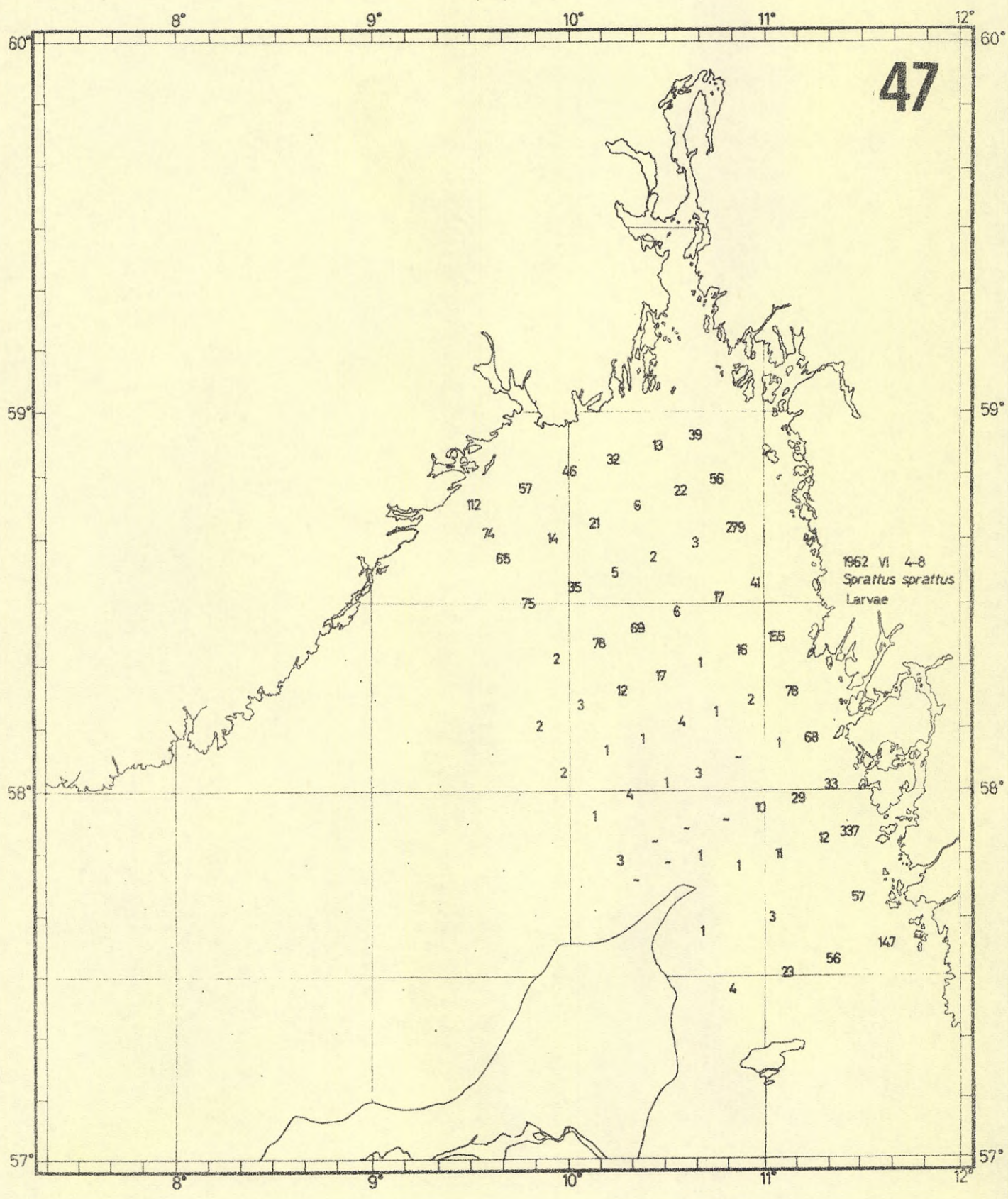




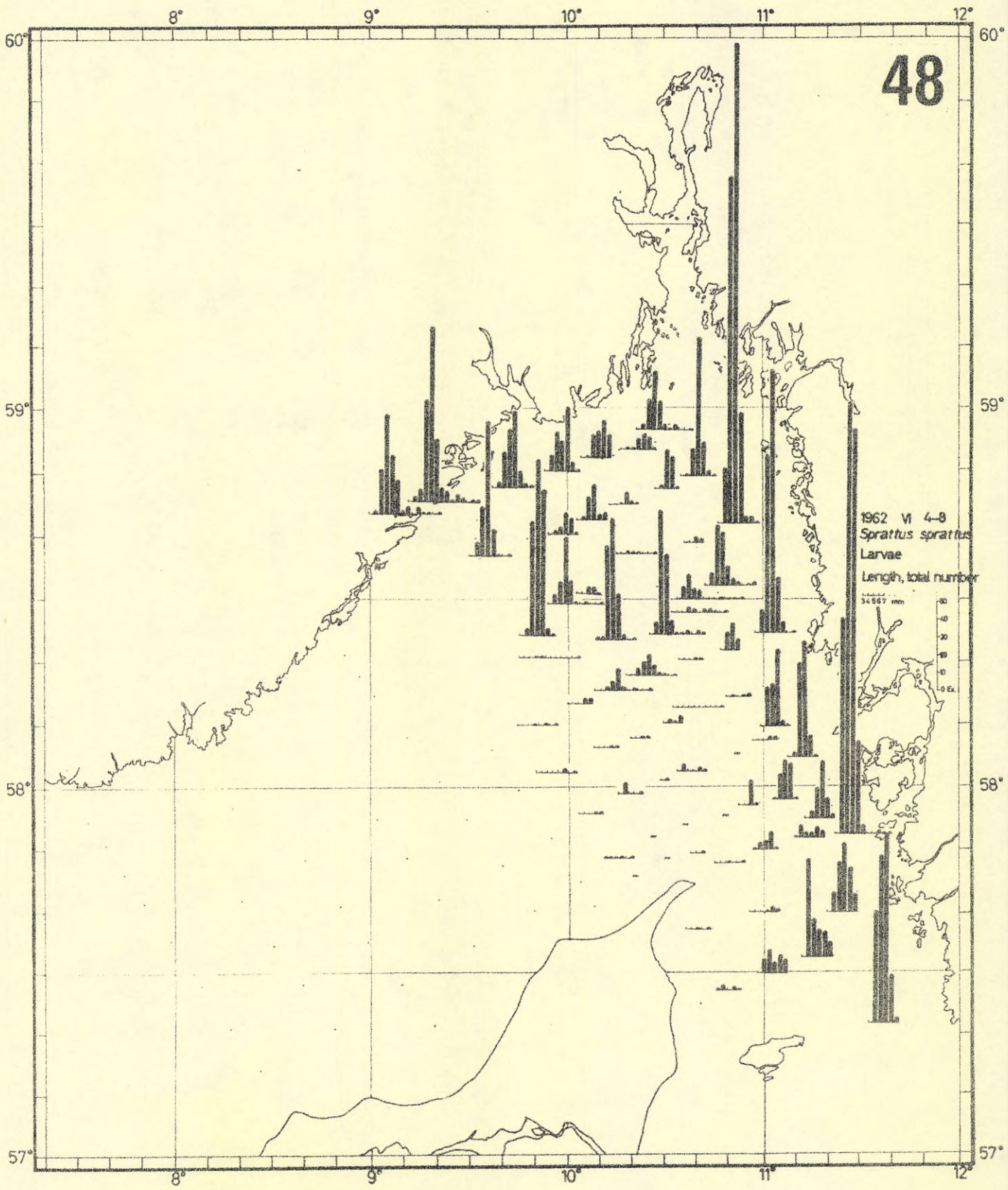










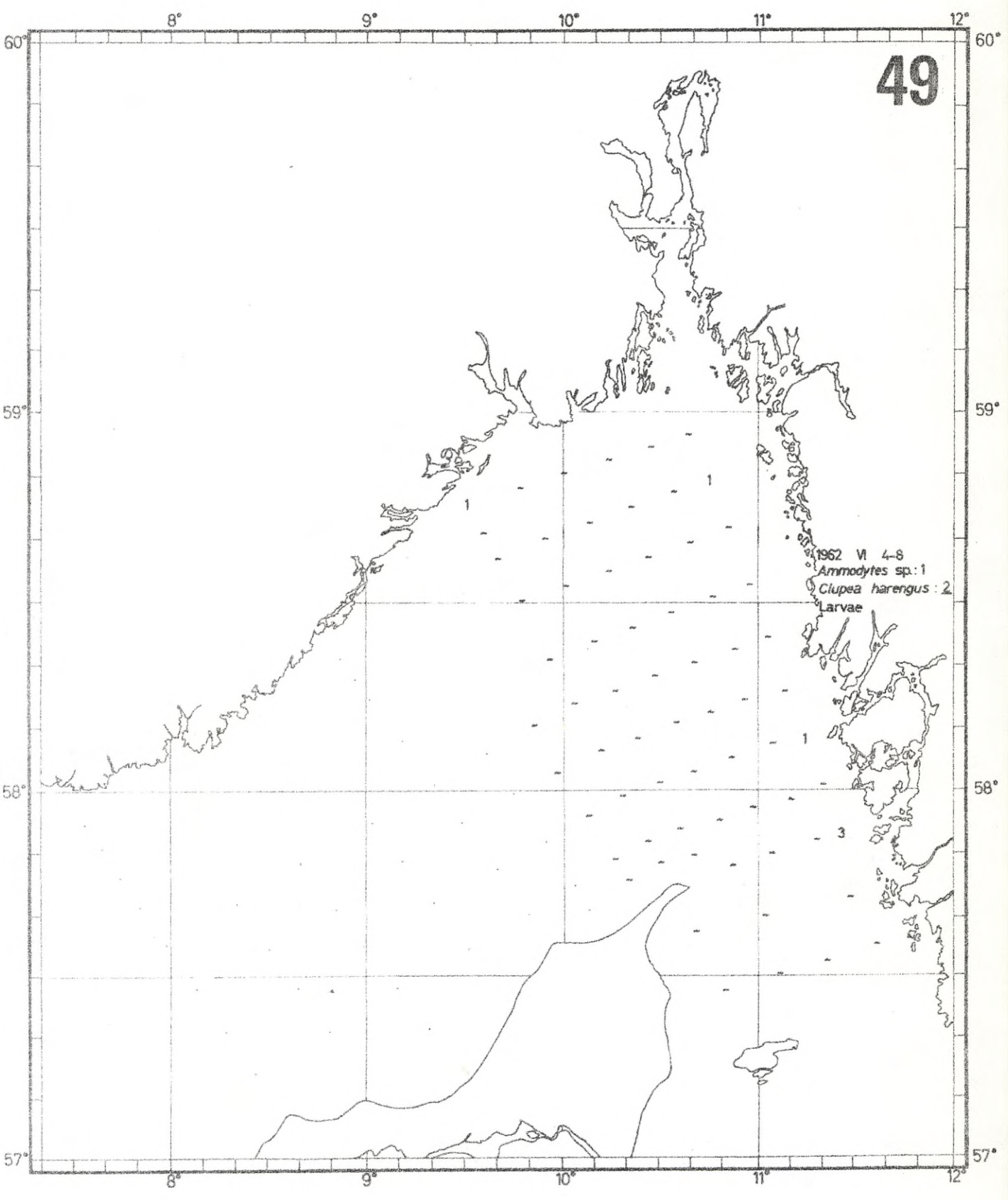


1962 VI 4-8  
*Sprattus sprattus*  
Larvae

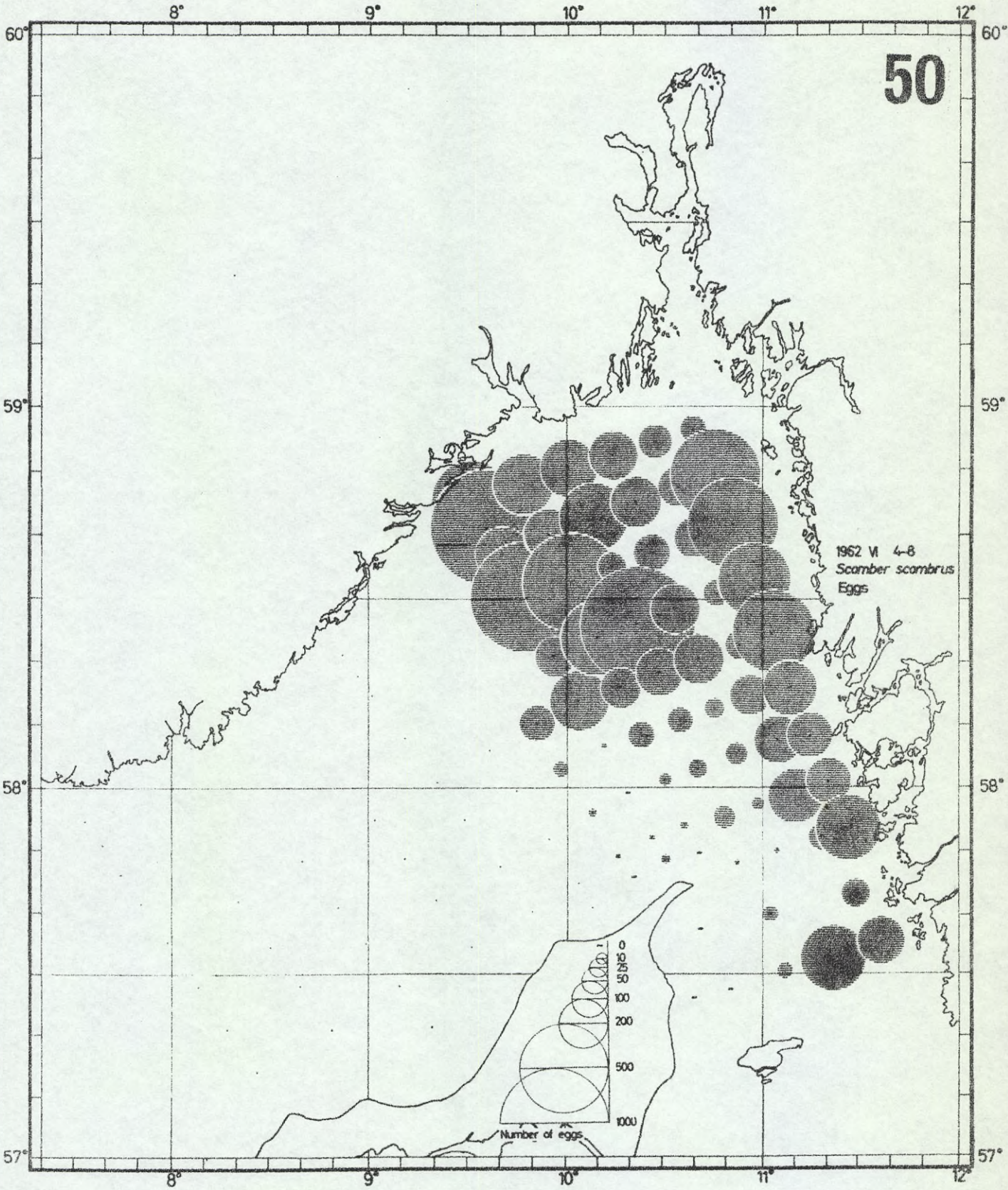
Length, total number

34.867 mm  
60  
40  
20  
0 Ex.

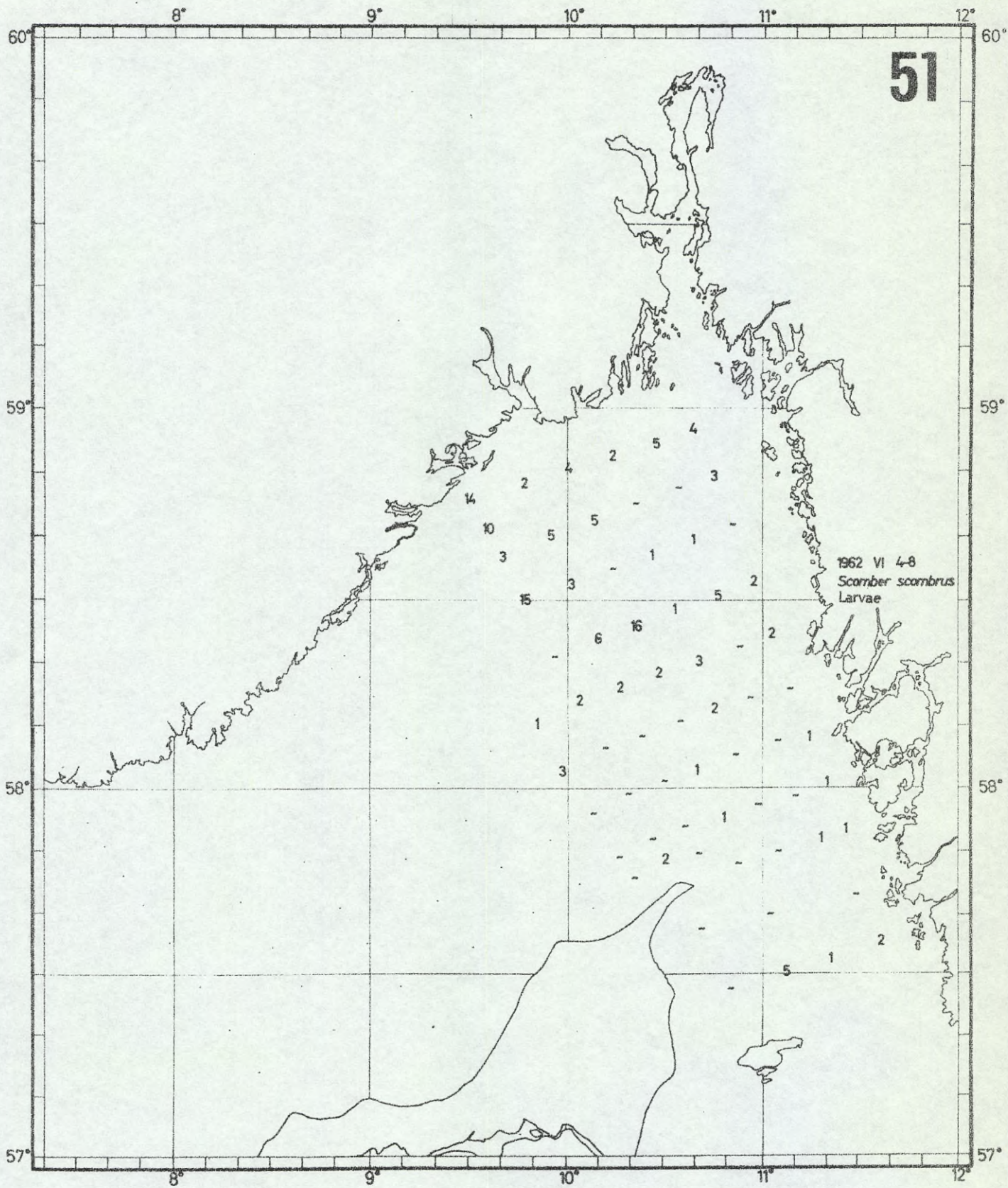




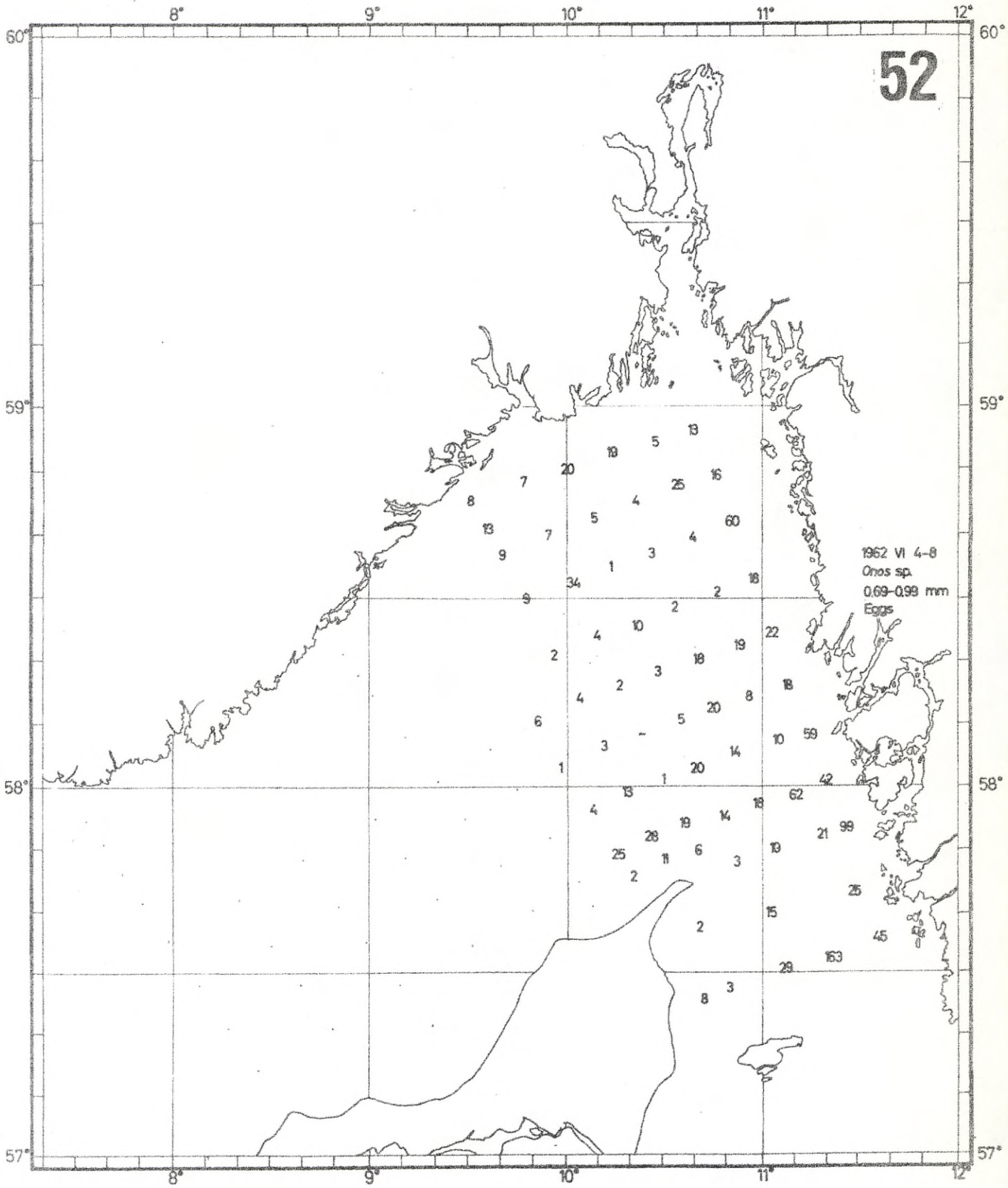




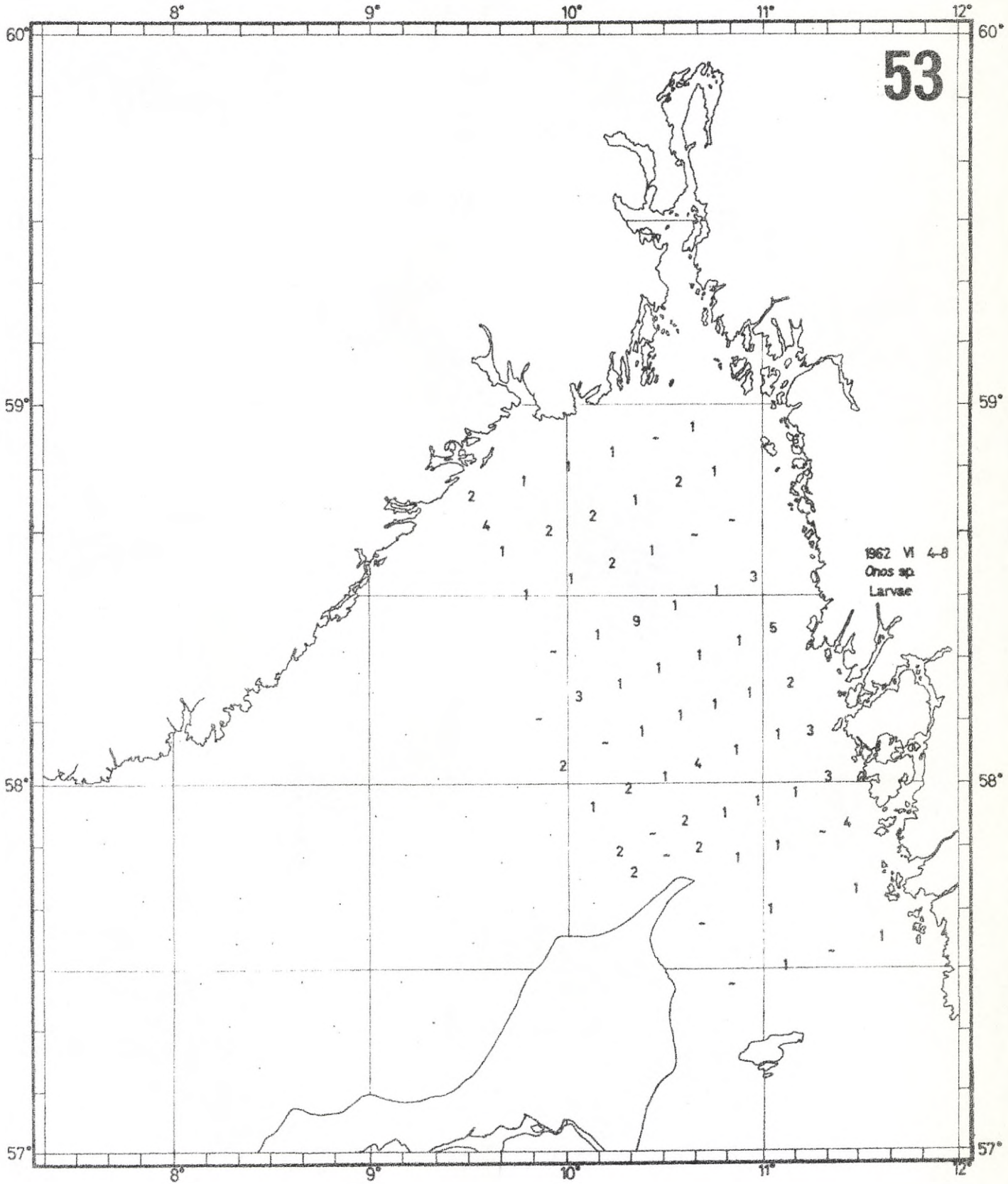




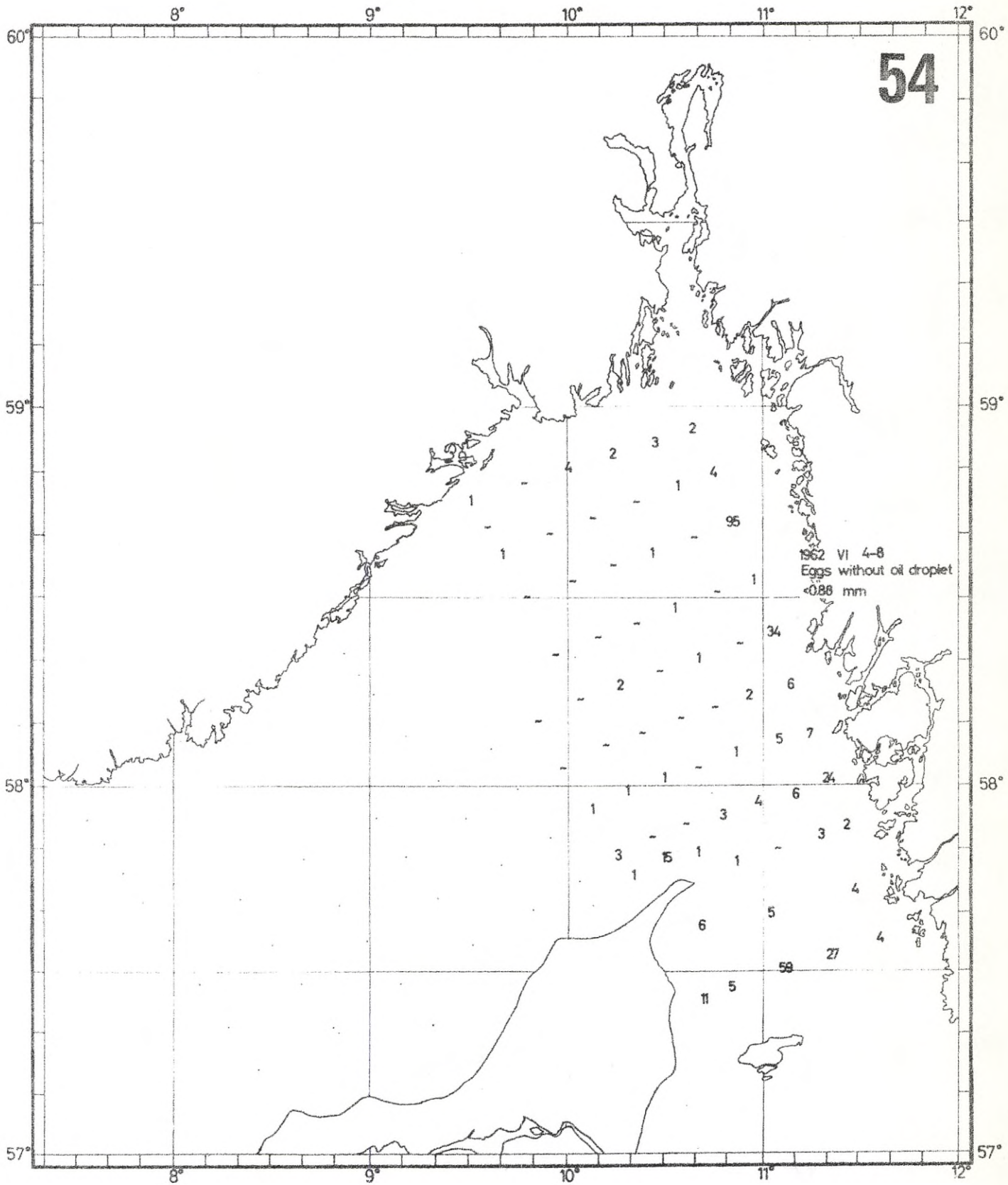










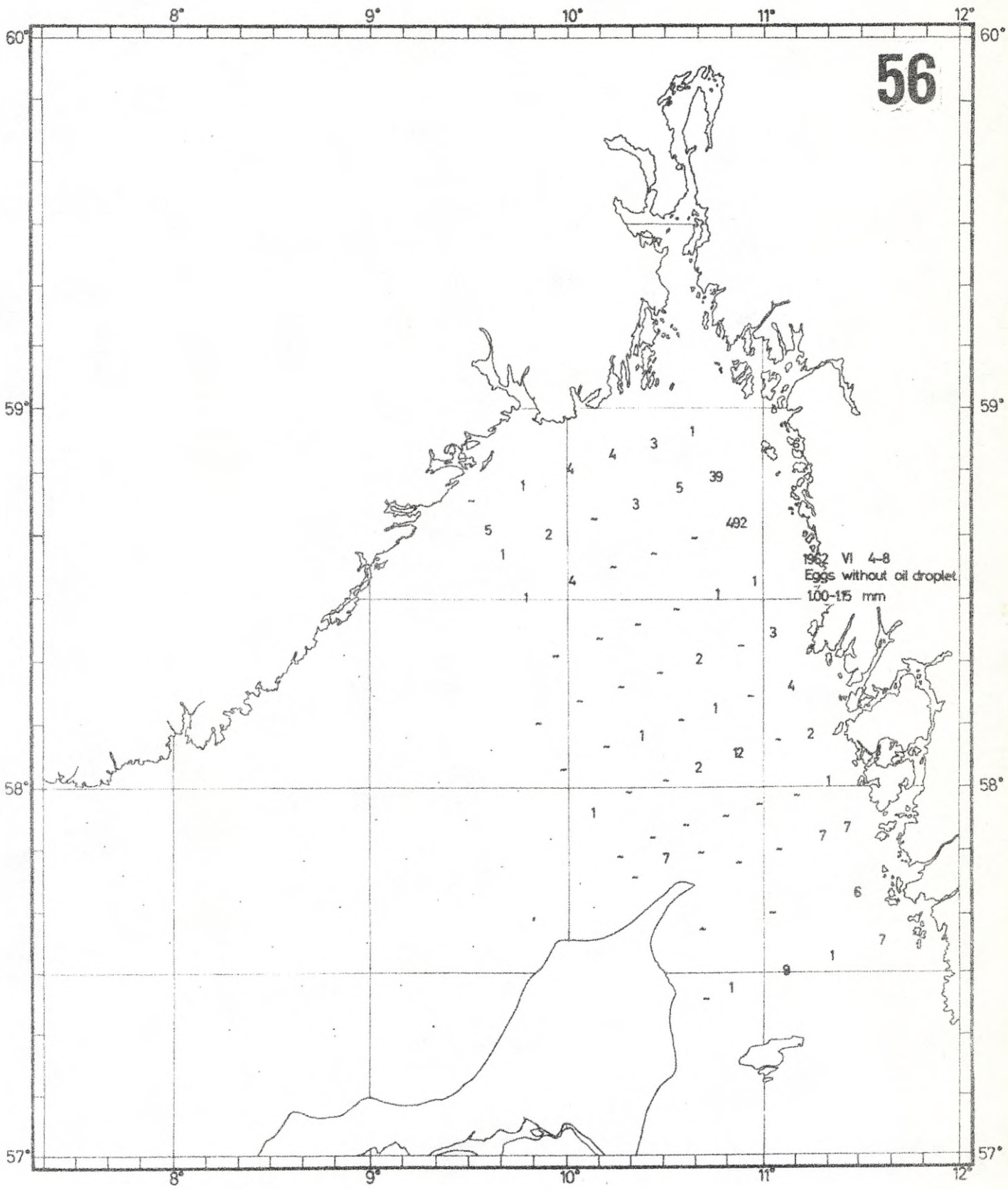






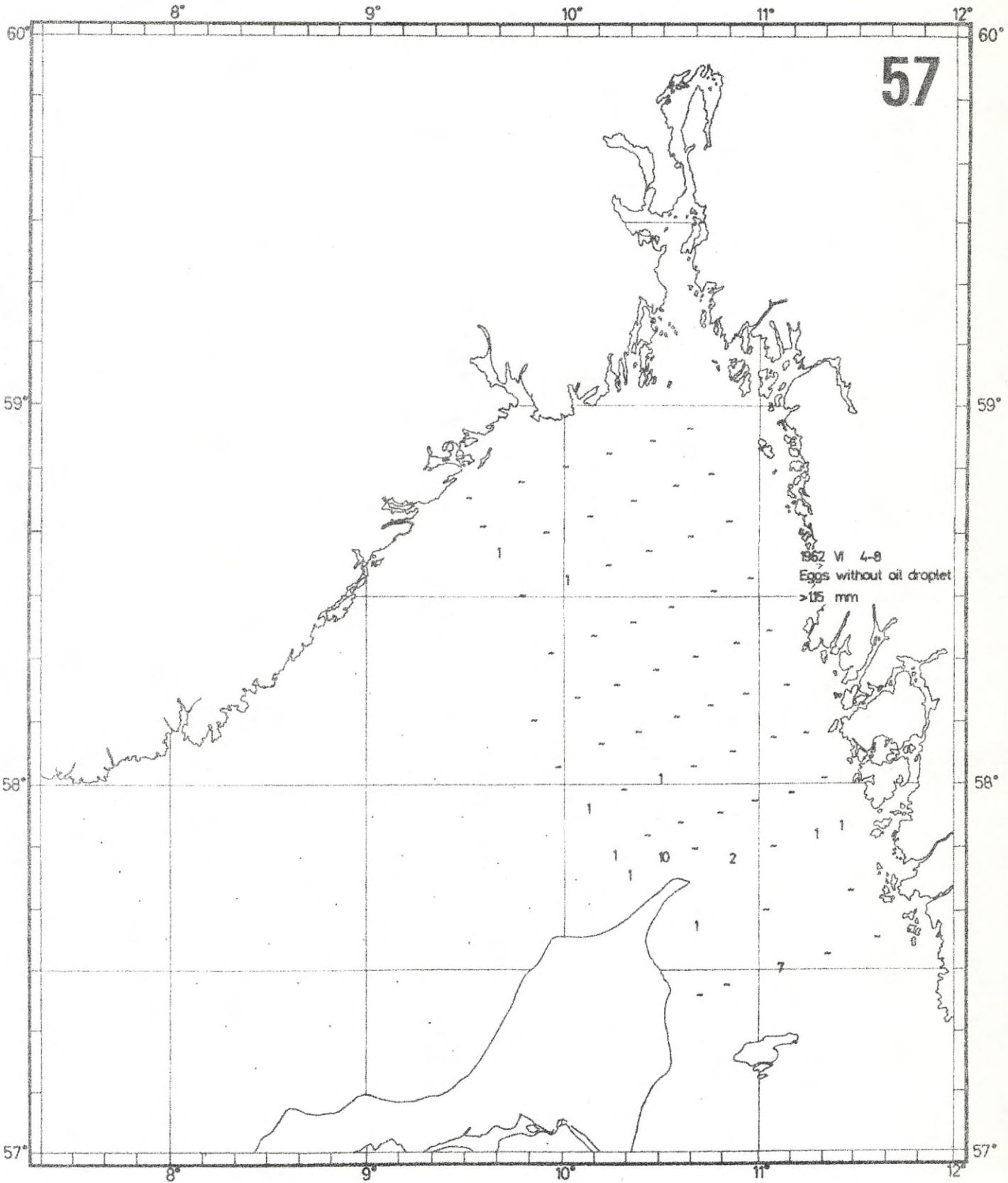


56

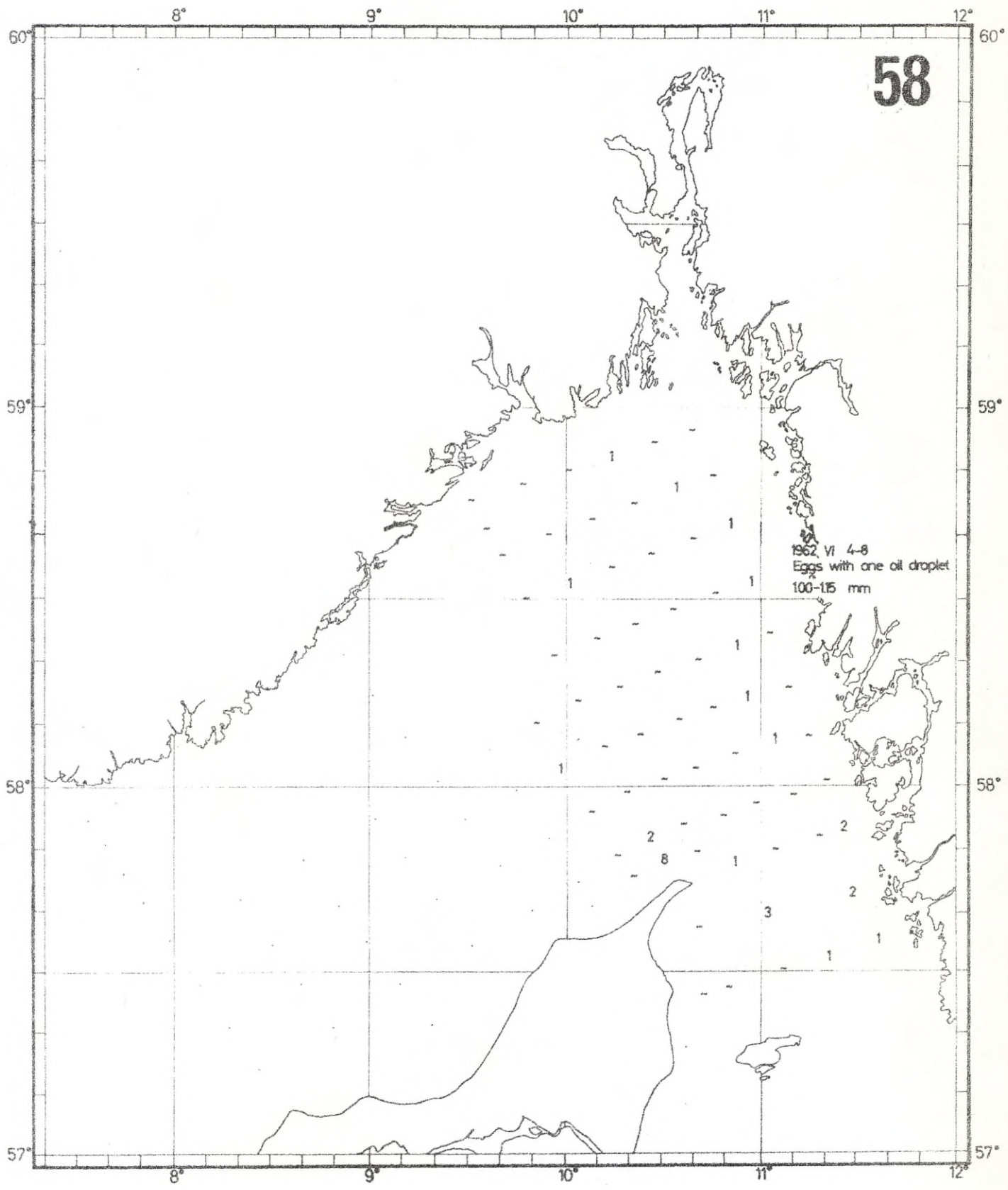




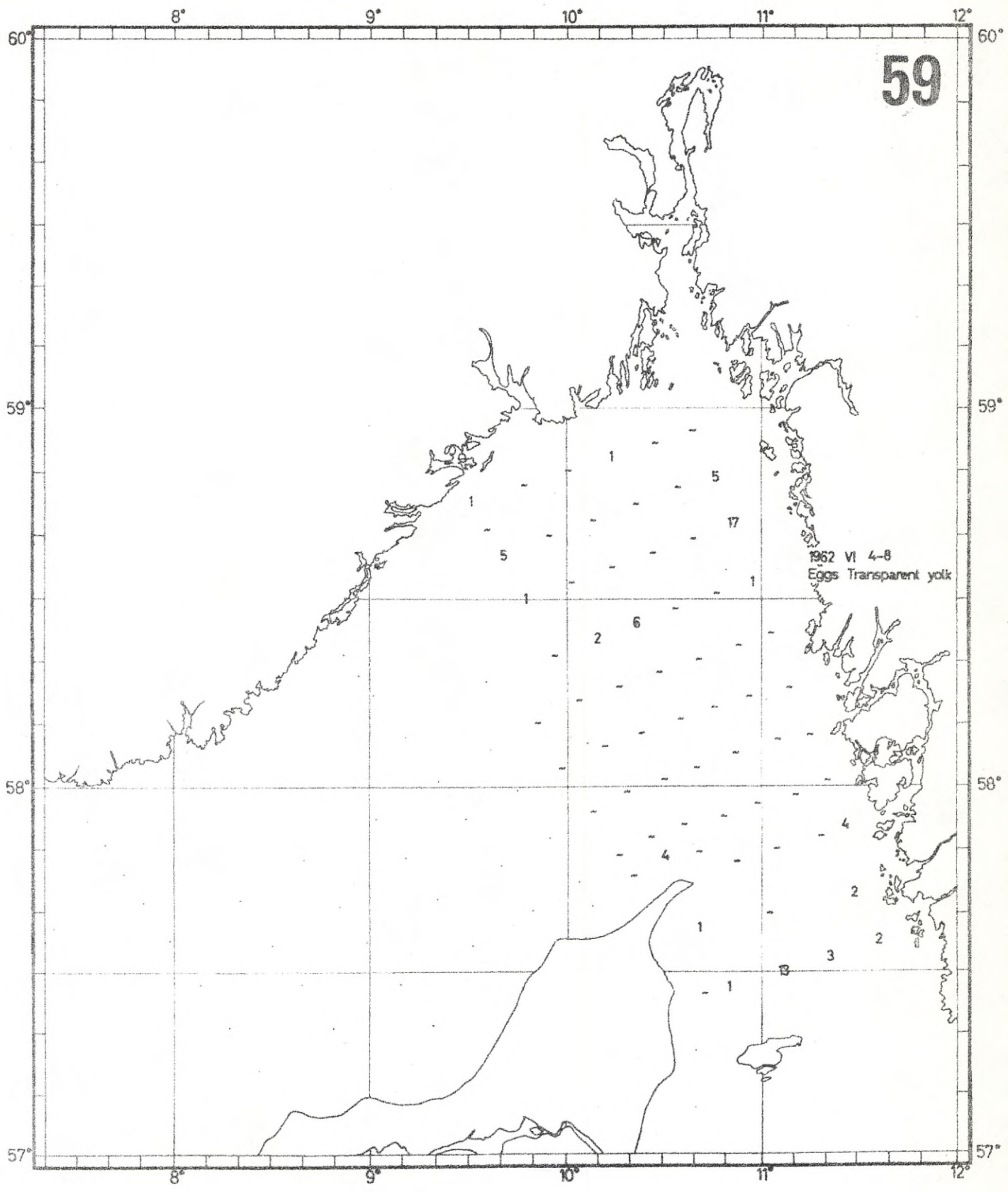
57





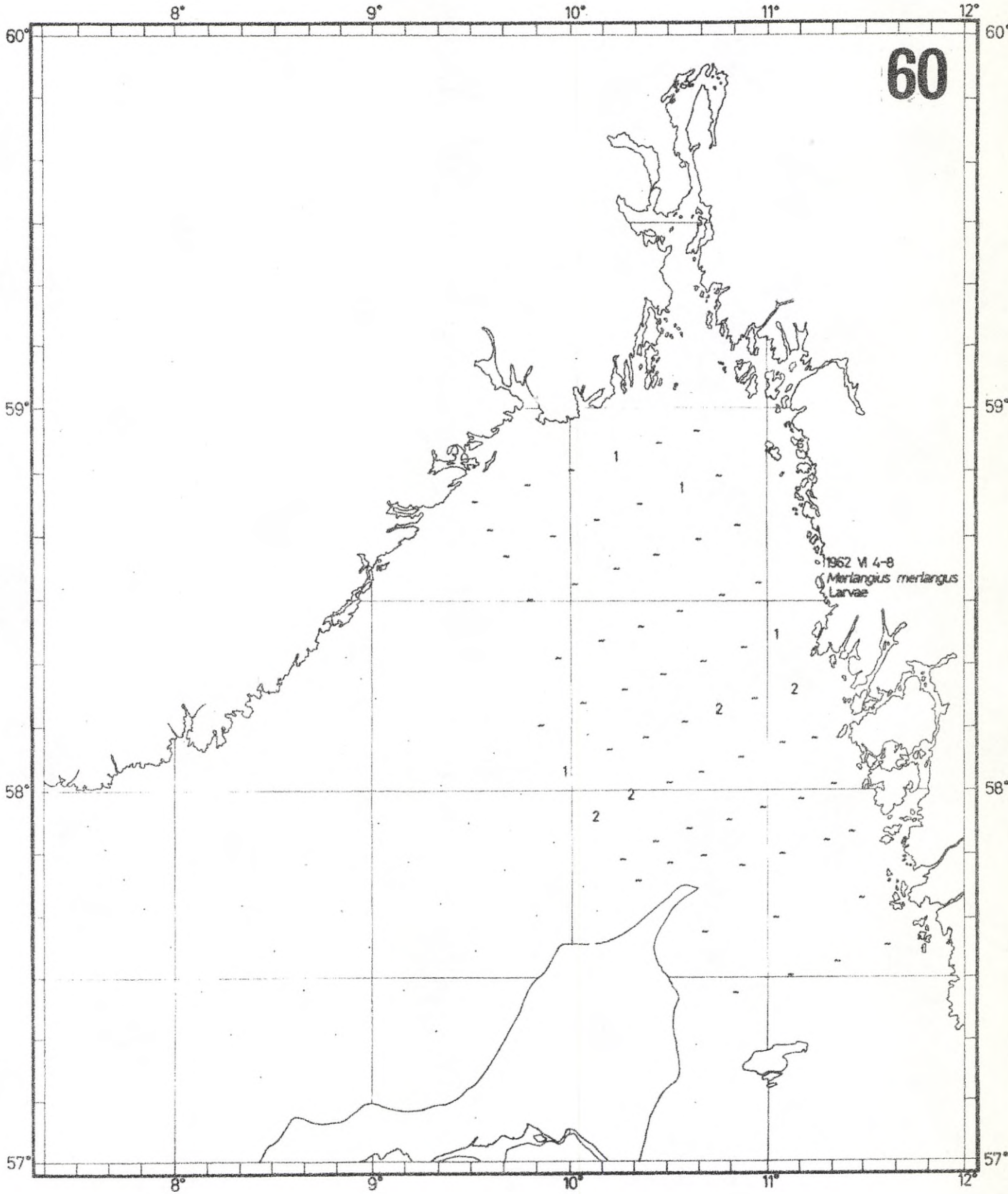








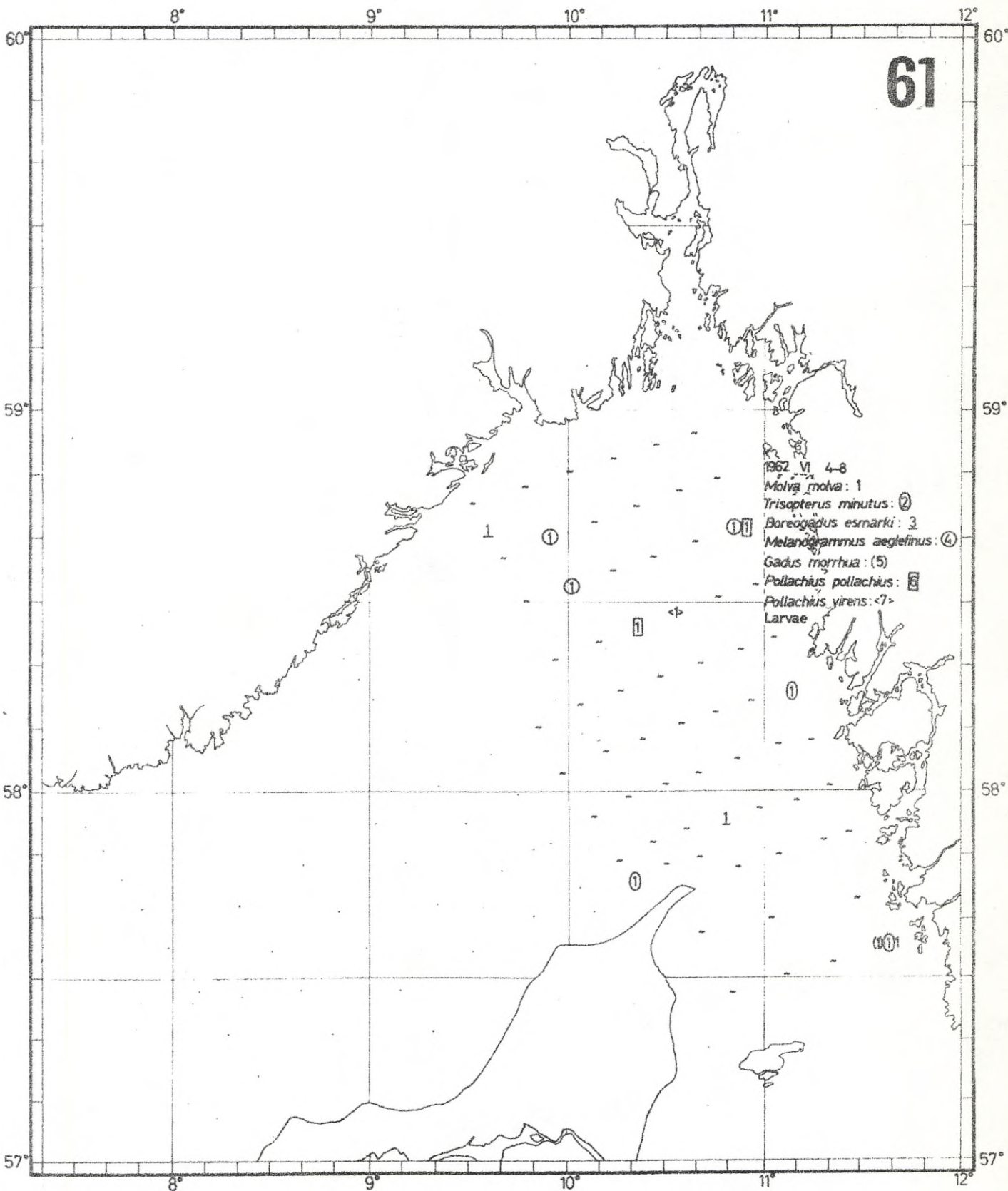
60



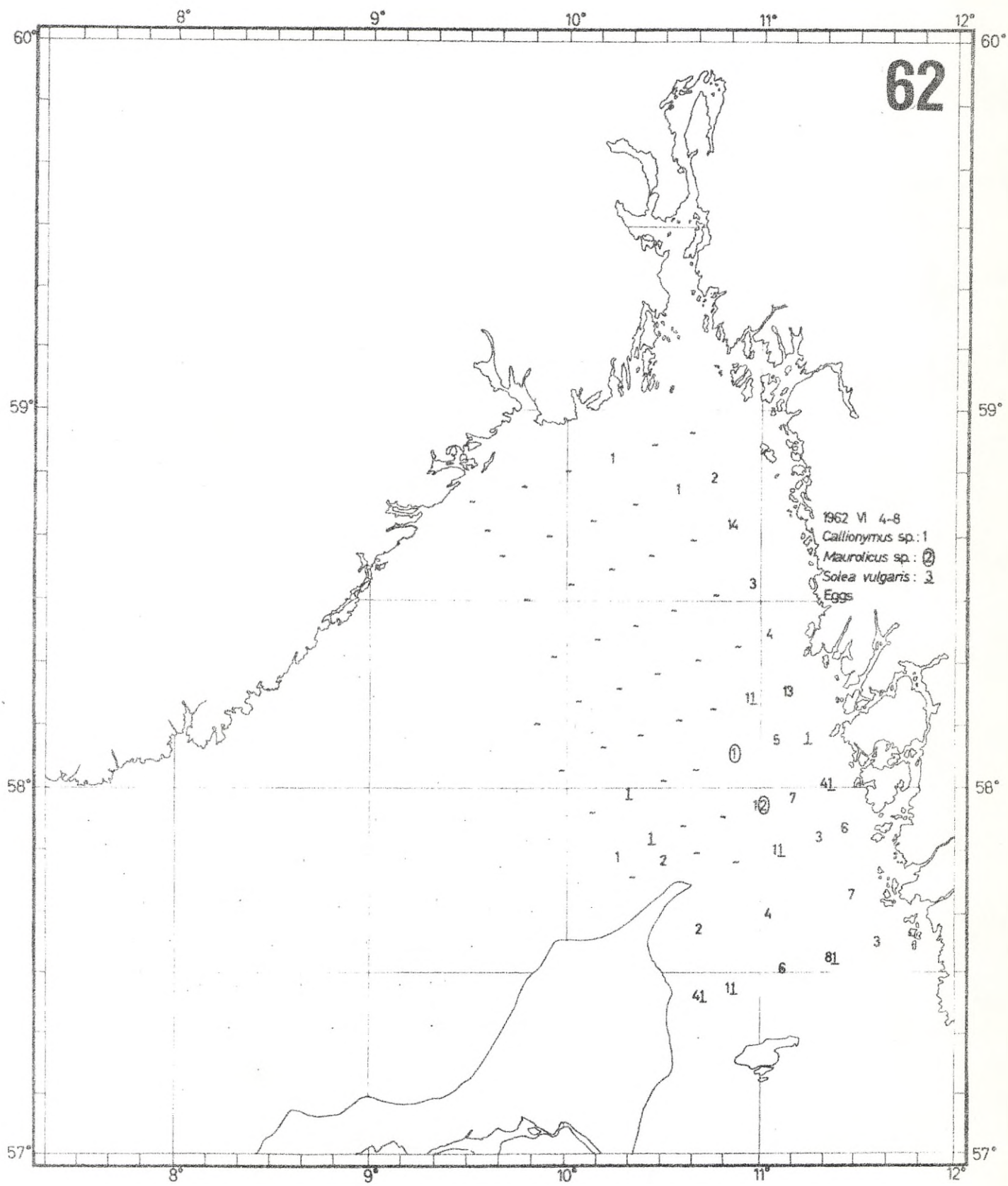


61

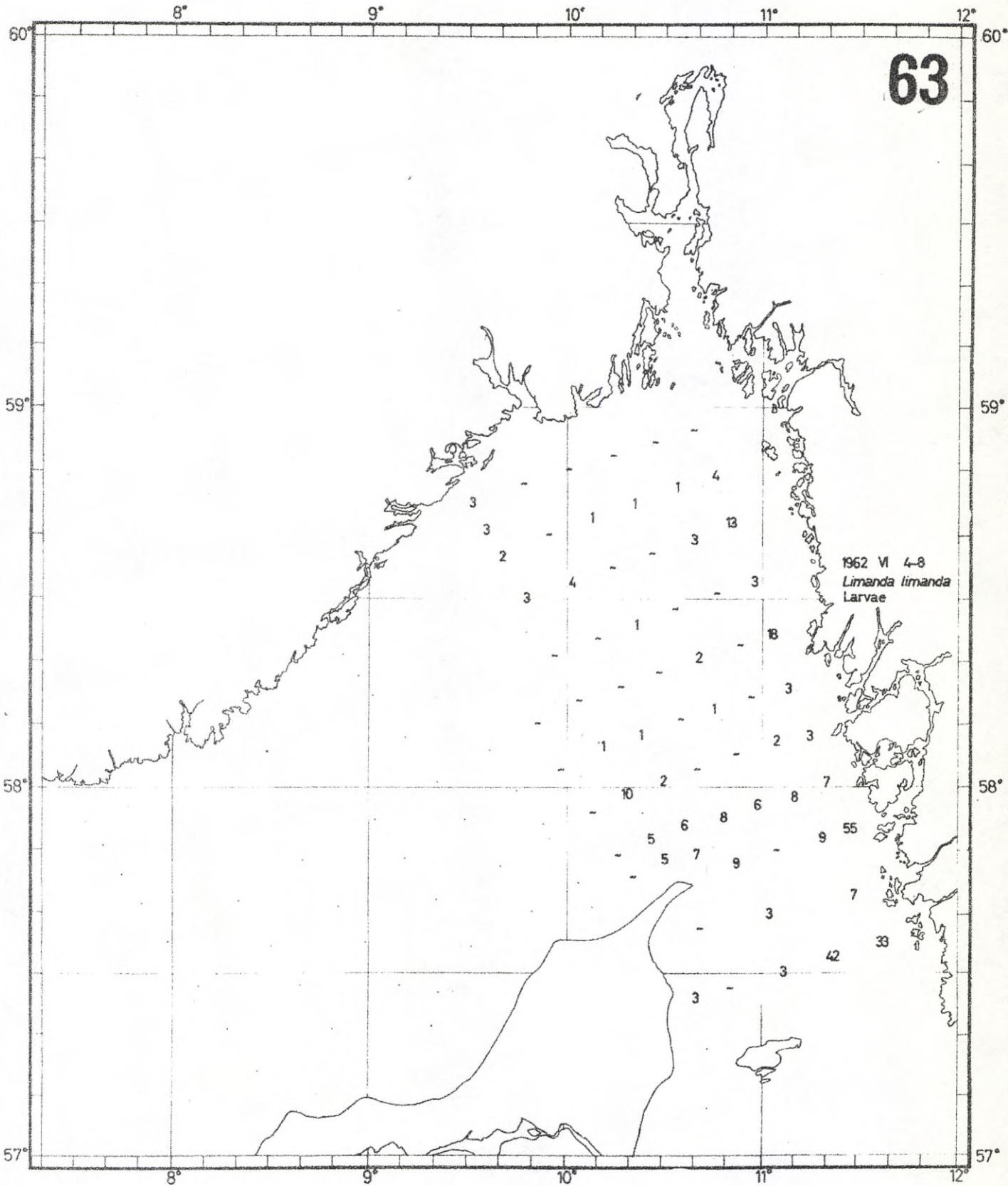
- 1962 VI 4-8  
*Molva molva*: 1  
*Trisopterus minutus*: ②  
*Boreogadus esmarki*: 3  
*Melanogrammus aeglefinus*: ④  
*Gadus morhua*: (5)  
*Pollachius pollachius*: ⑥  
*Pollachius virens*: <7>  
Larvae



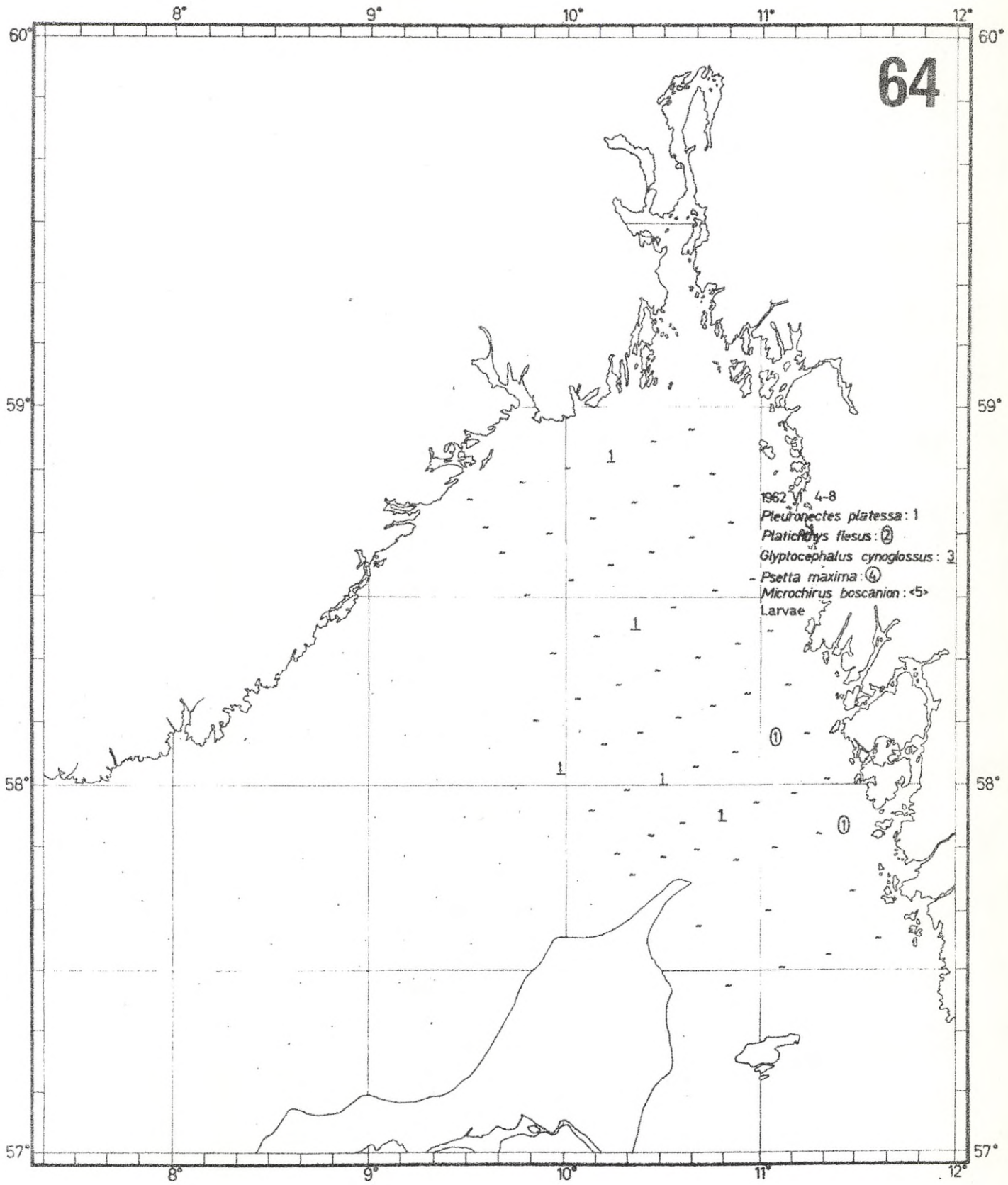




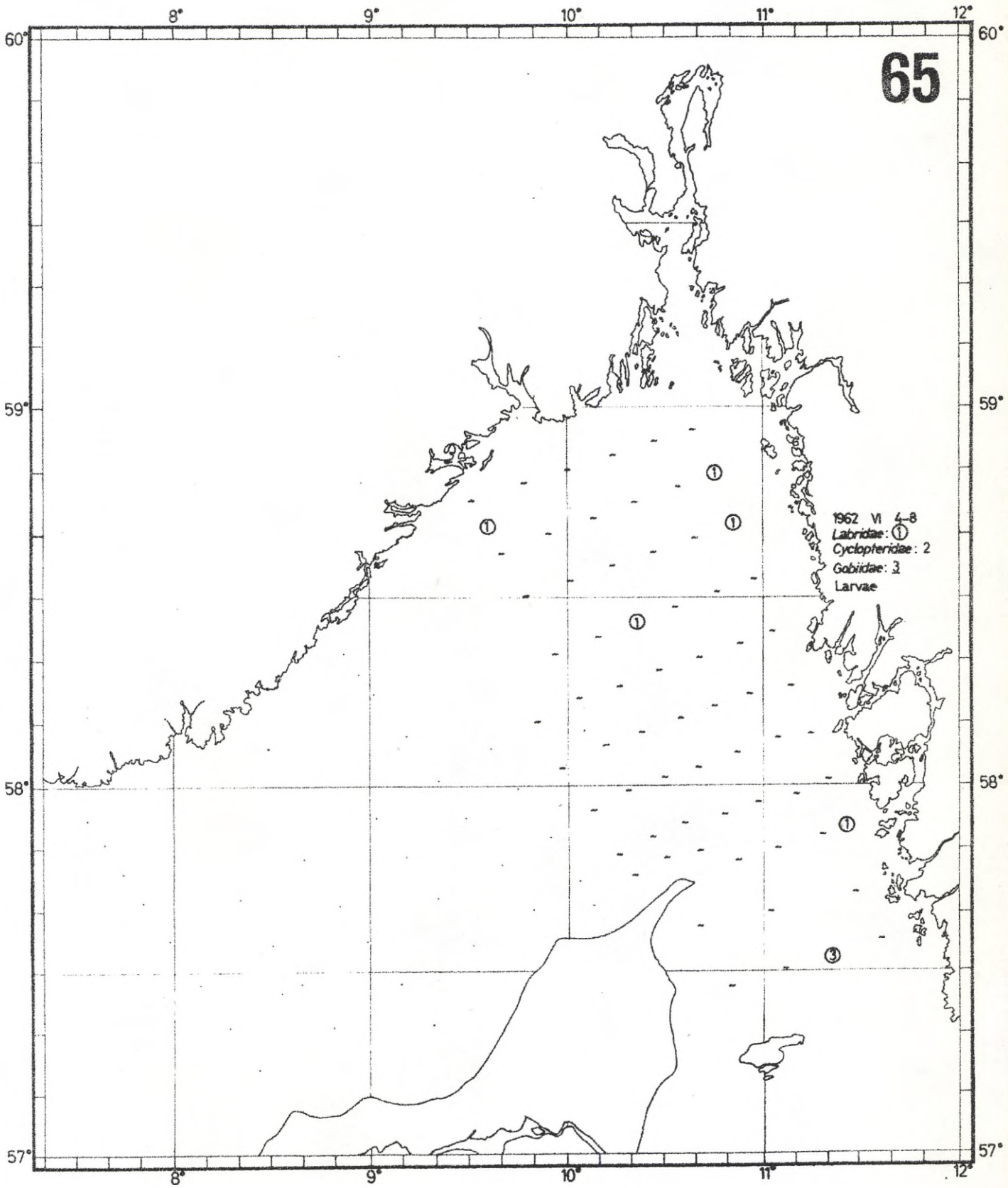




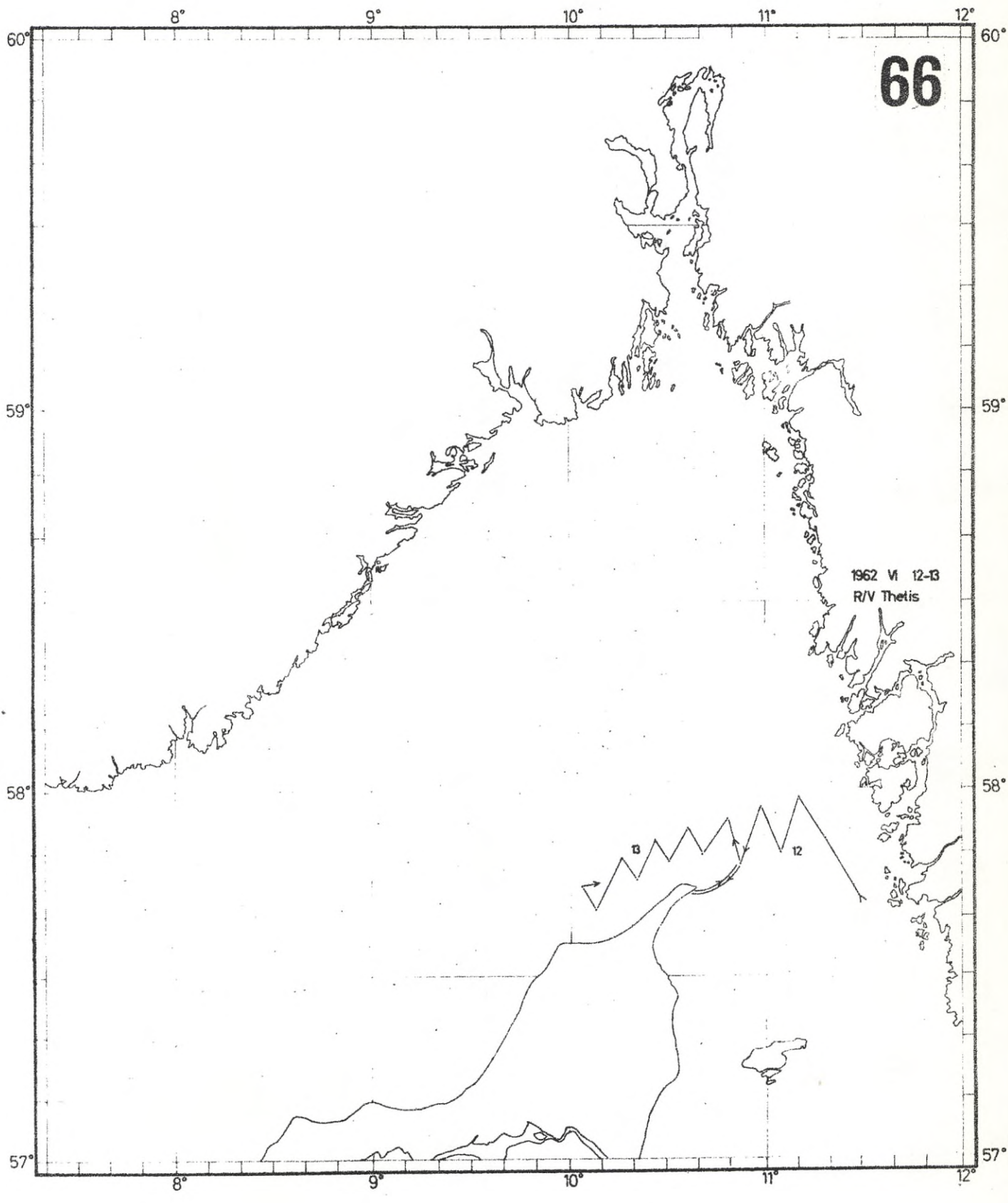








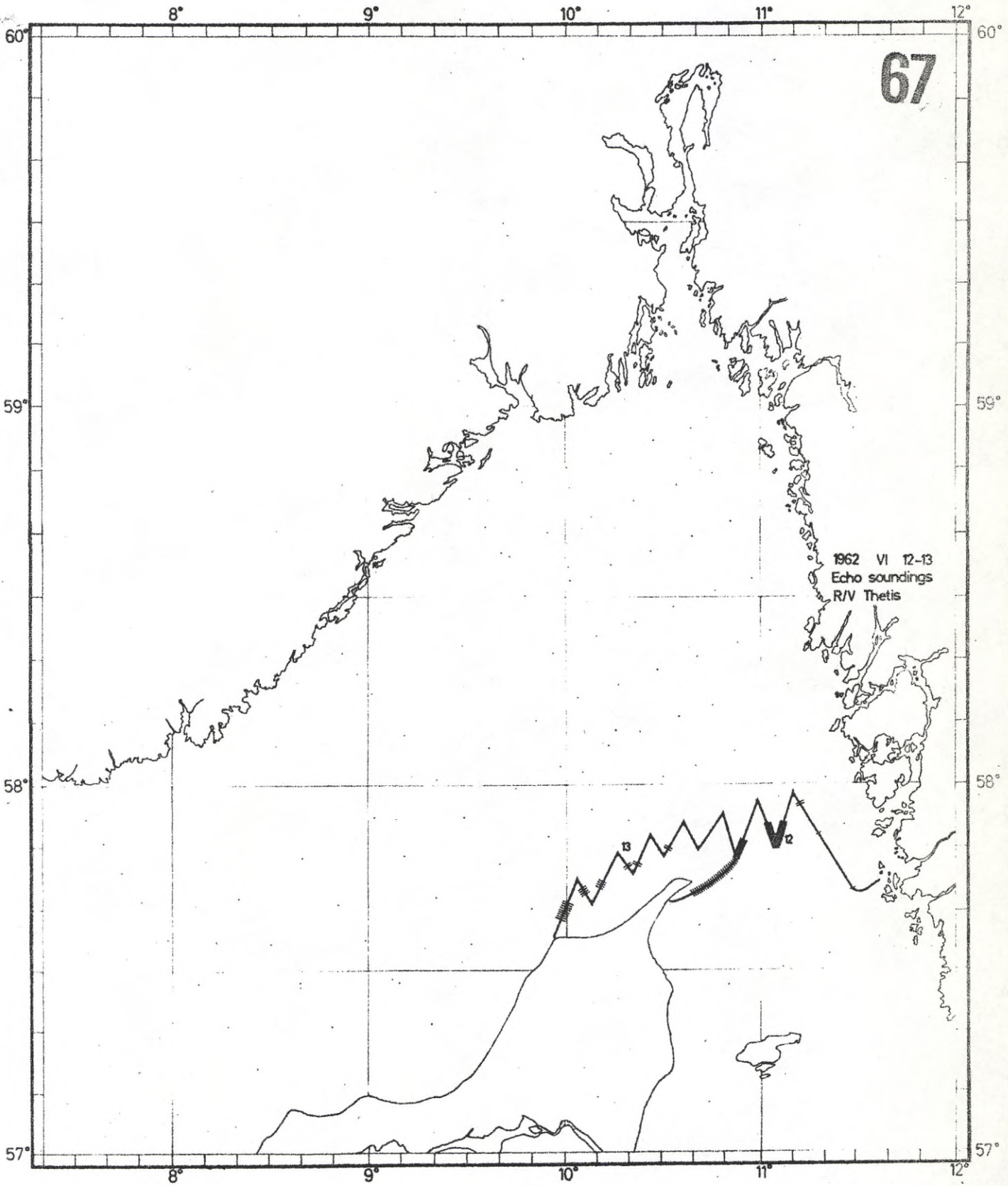






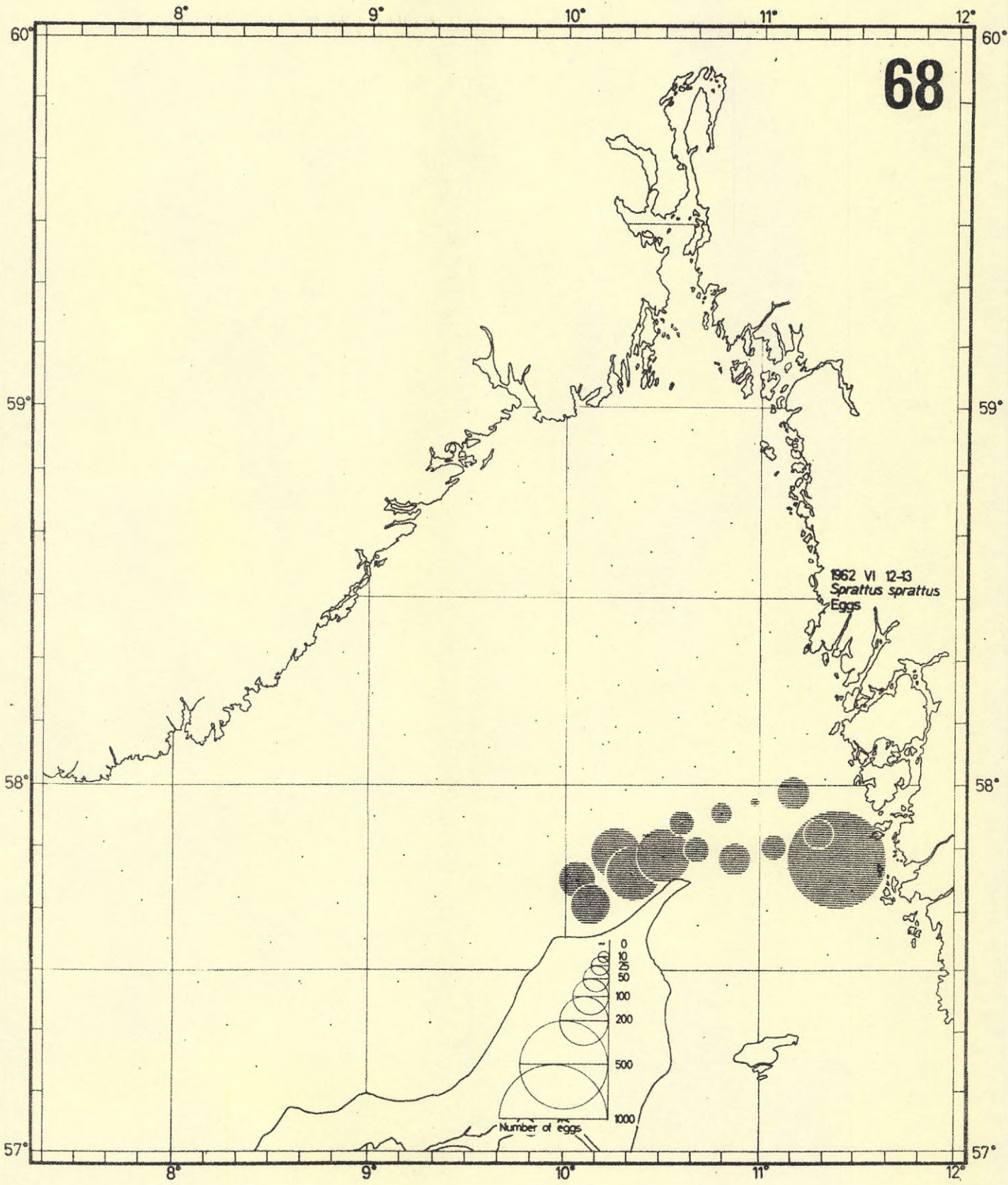
67

1962 VI 12-13  
Echo soundings  
R/V Thetis



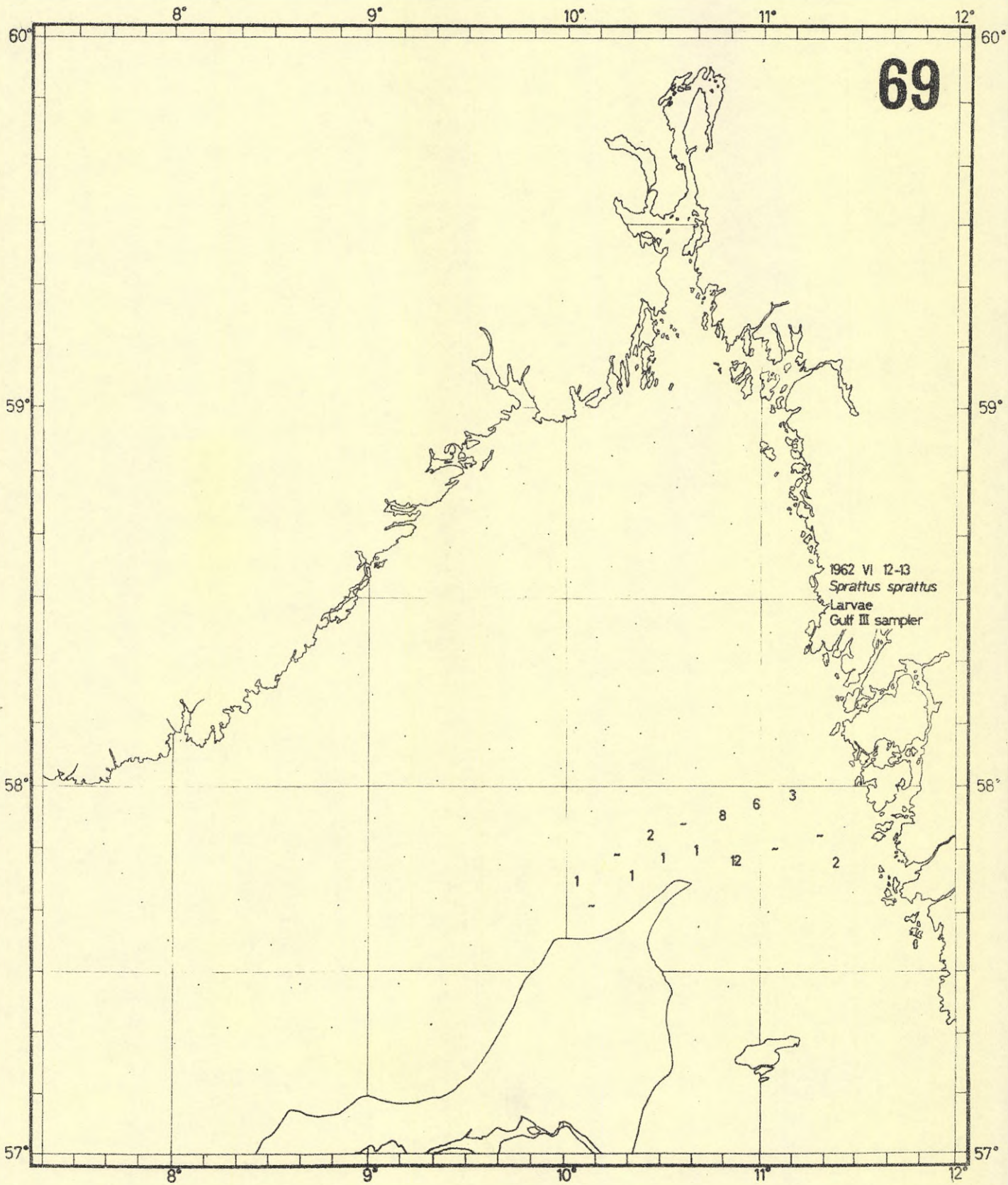


68

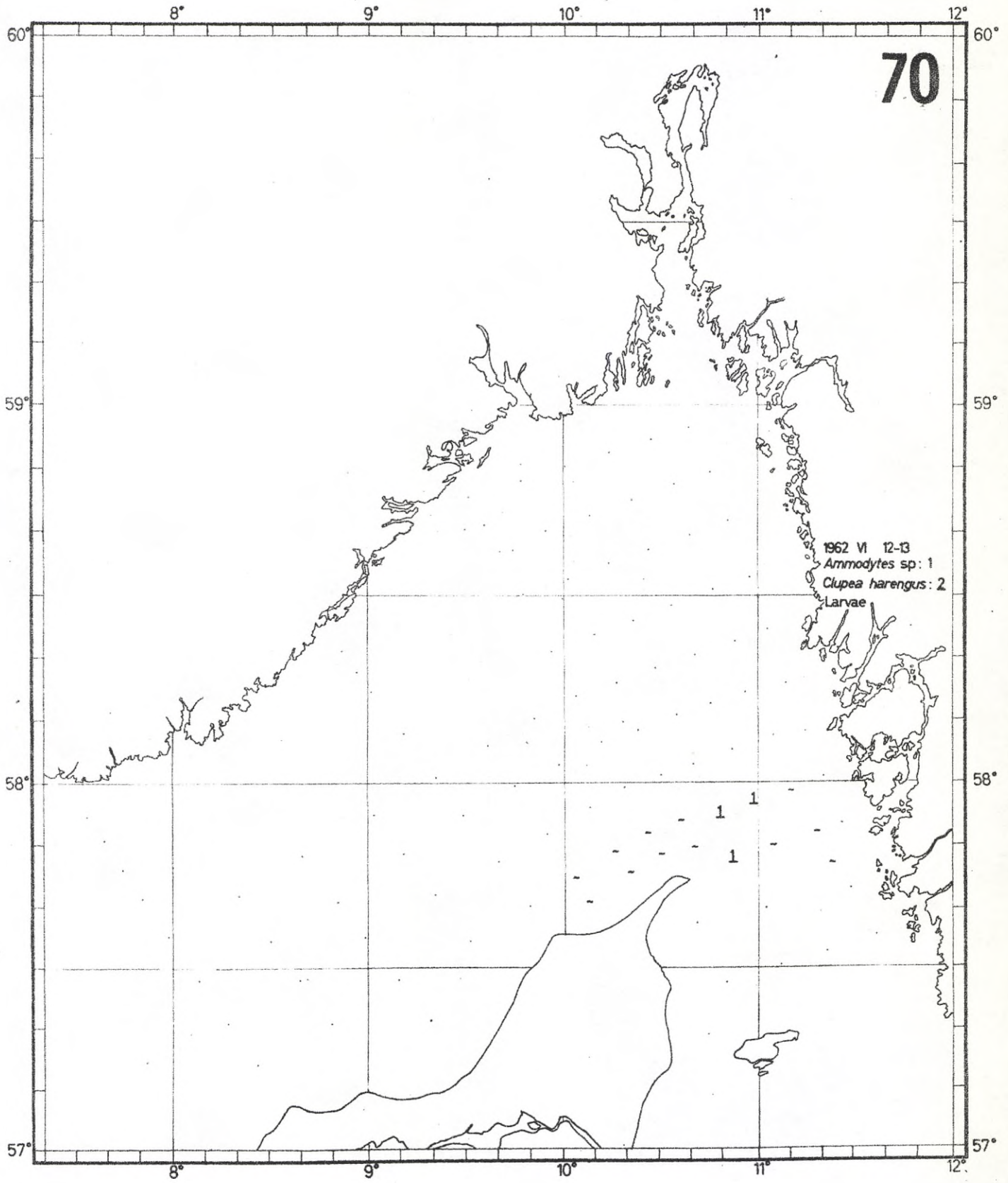




69







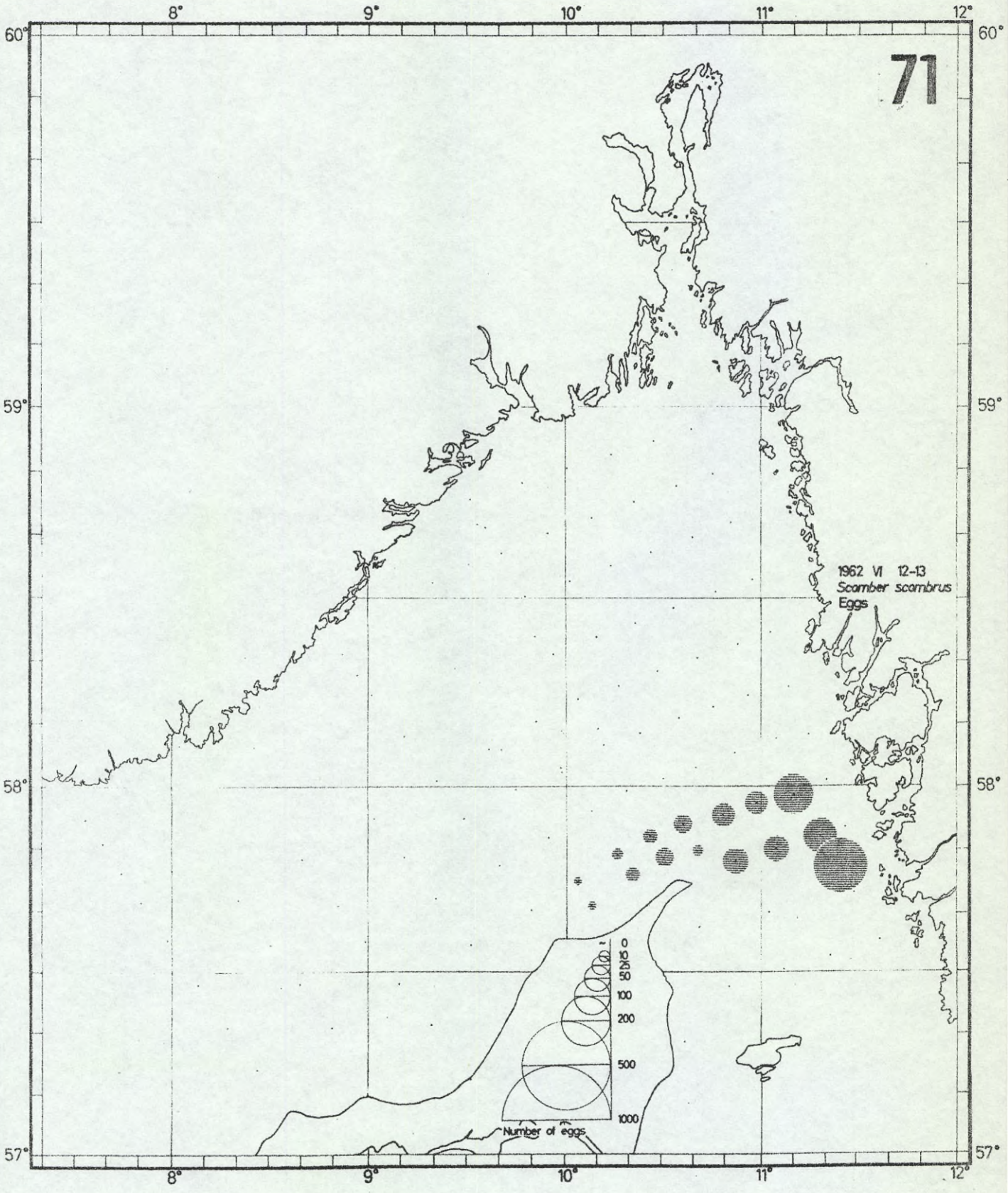
70



71

1962 VI 12-13  
*Scamber scambus*  
Eggs

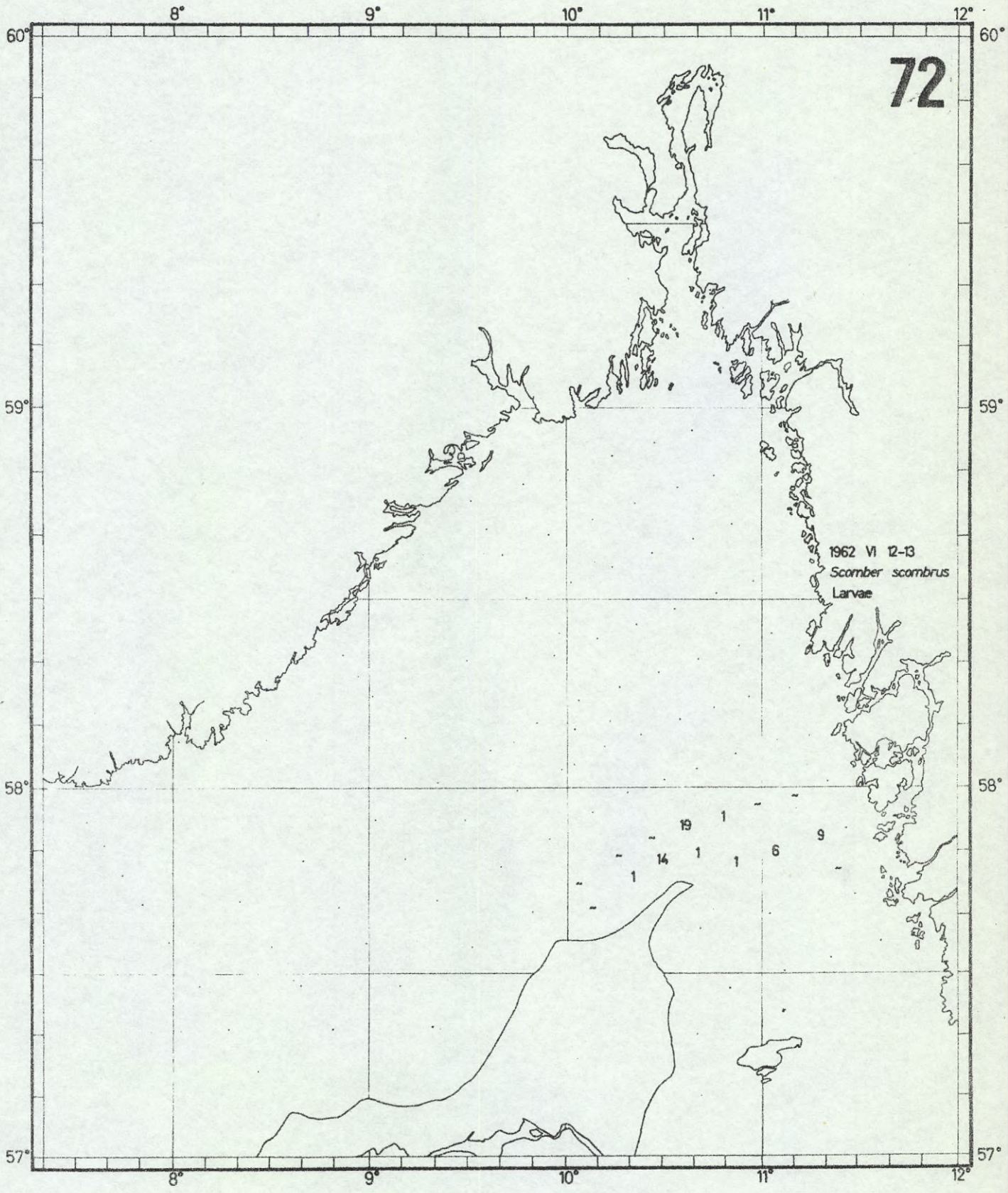
Number of eggs





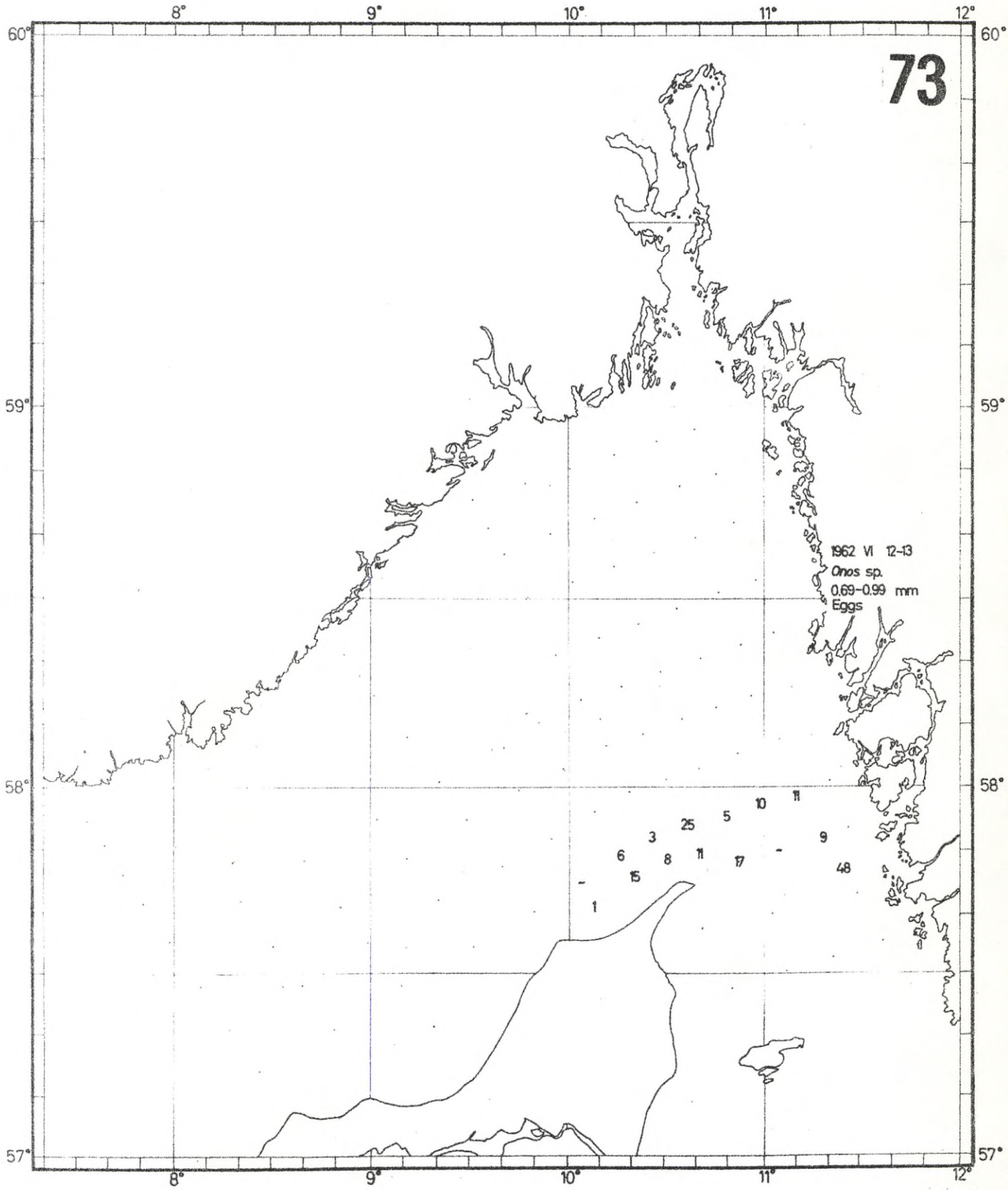
72

1962 VI 12-13  
*Scamber scombrus*  
Larvae

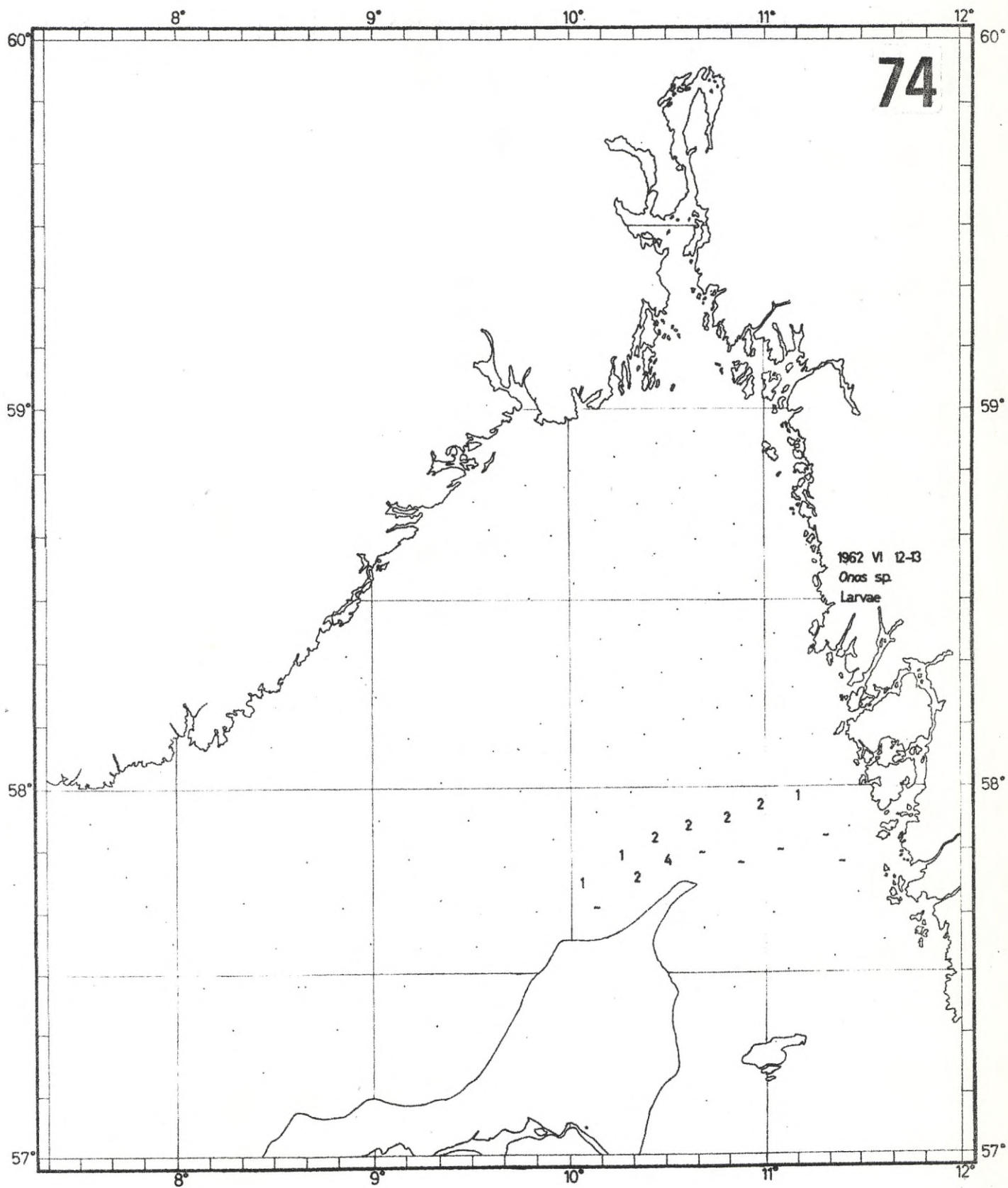




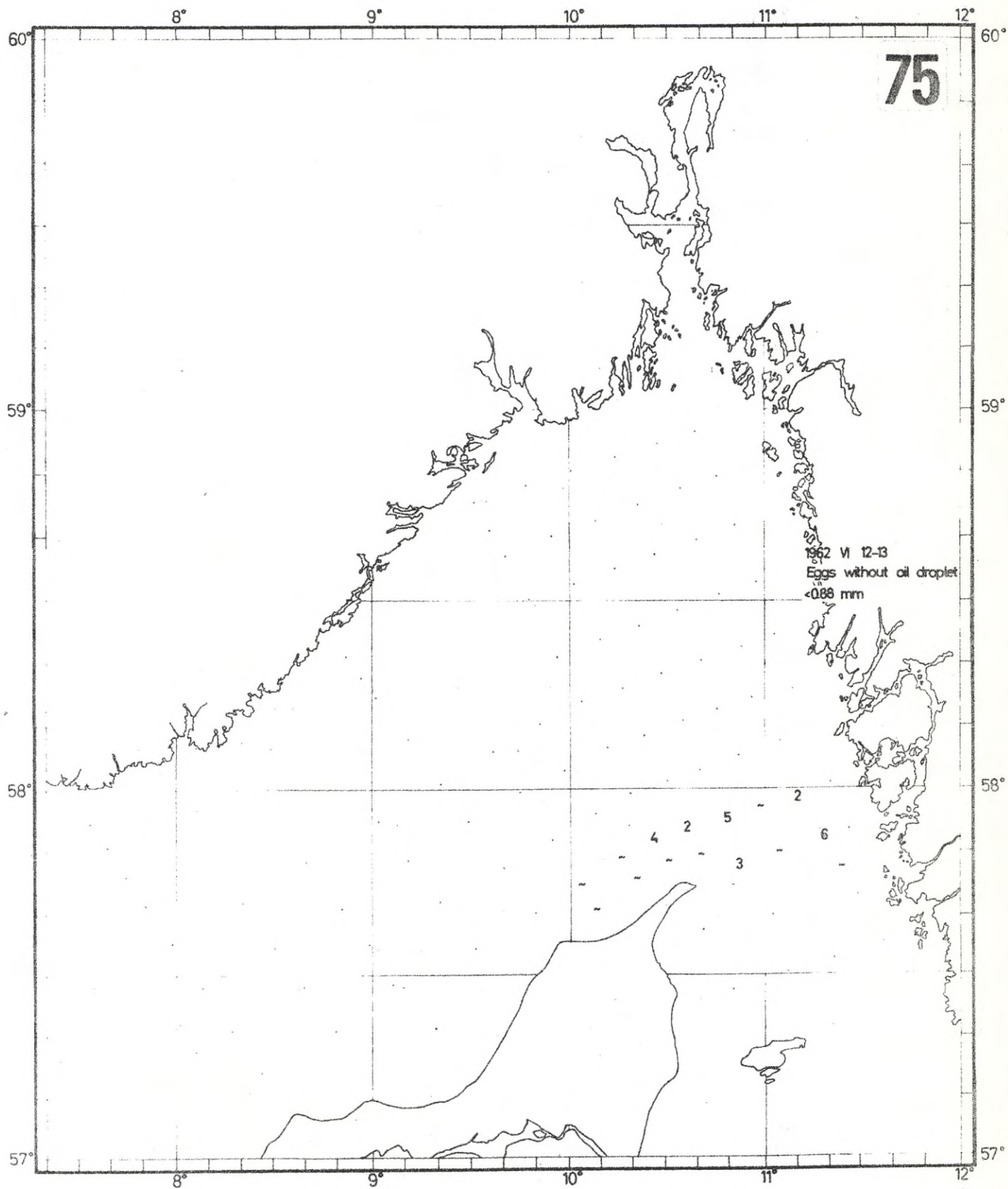
73



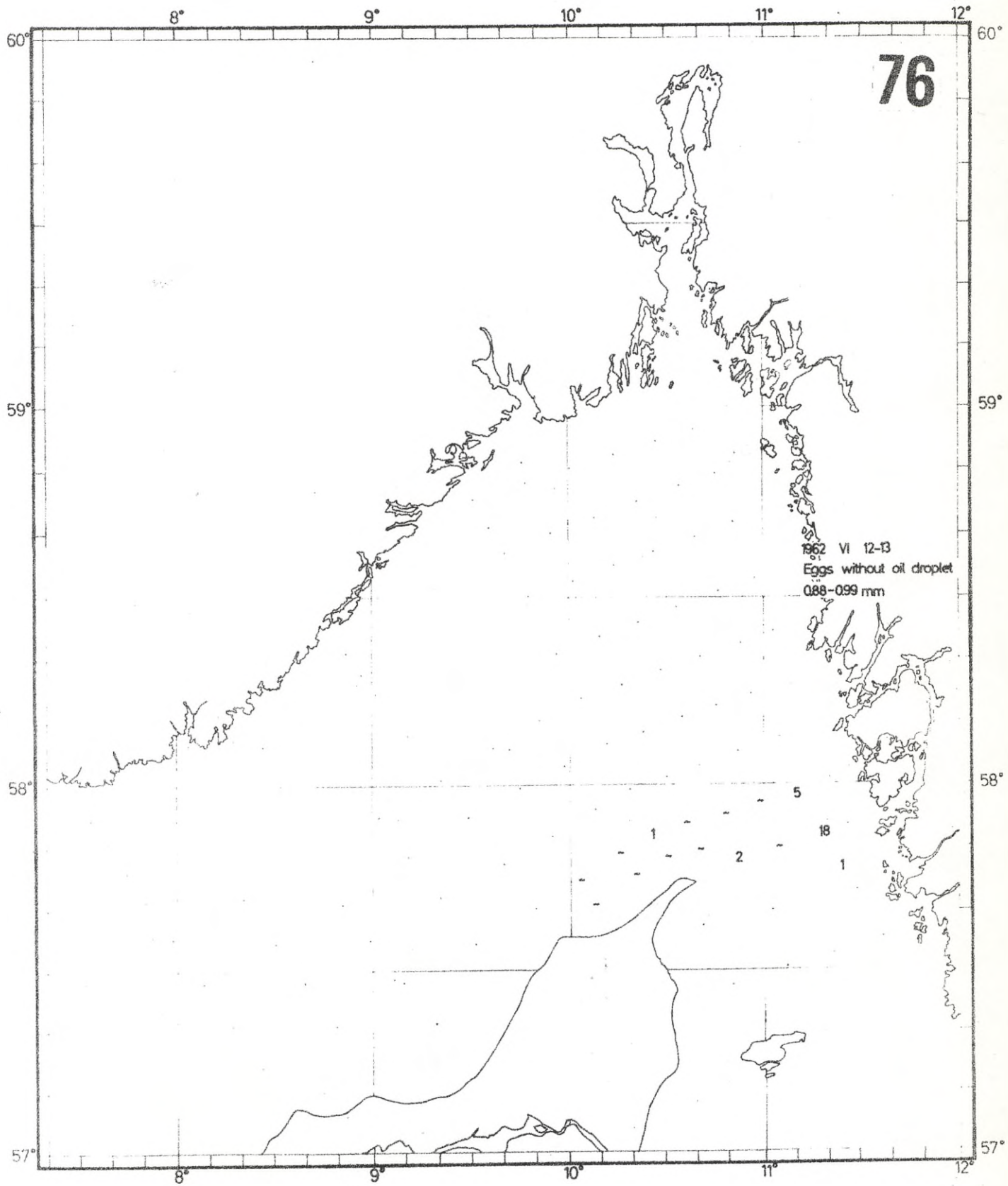




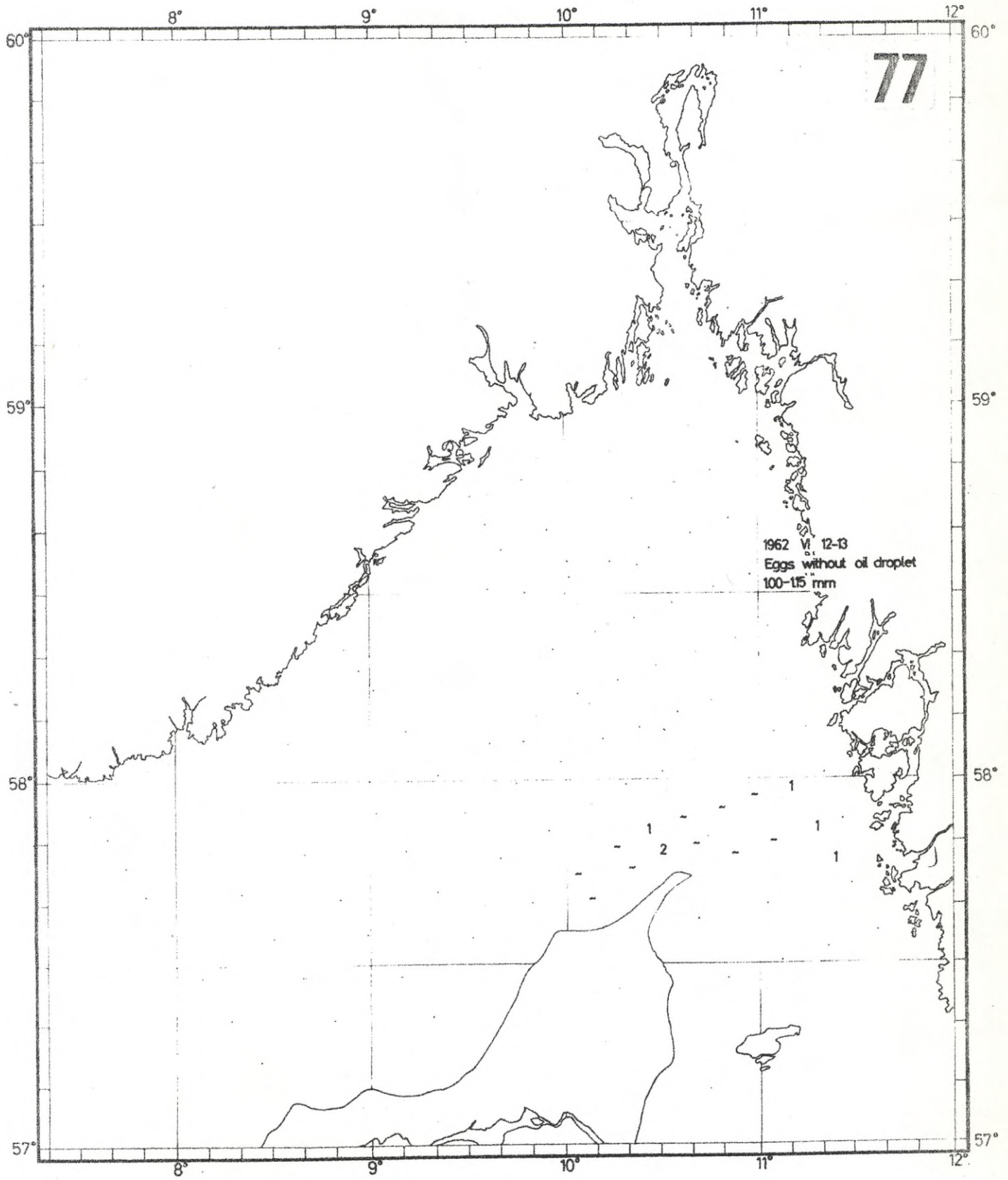




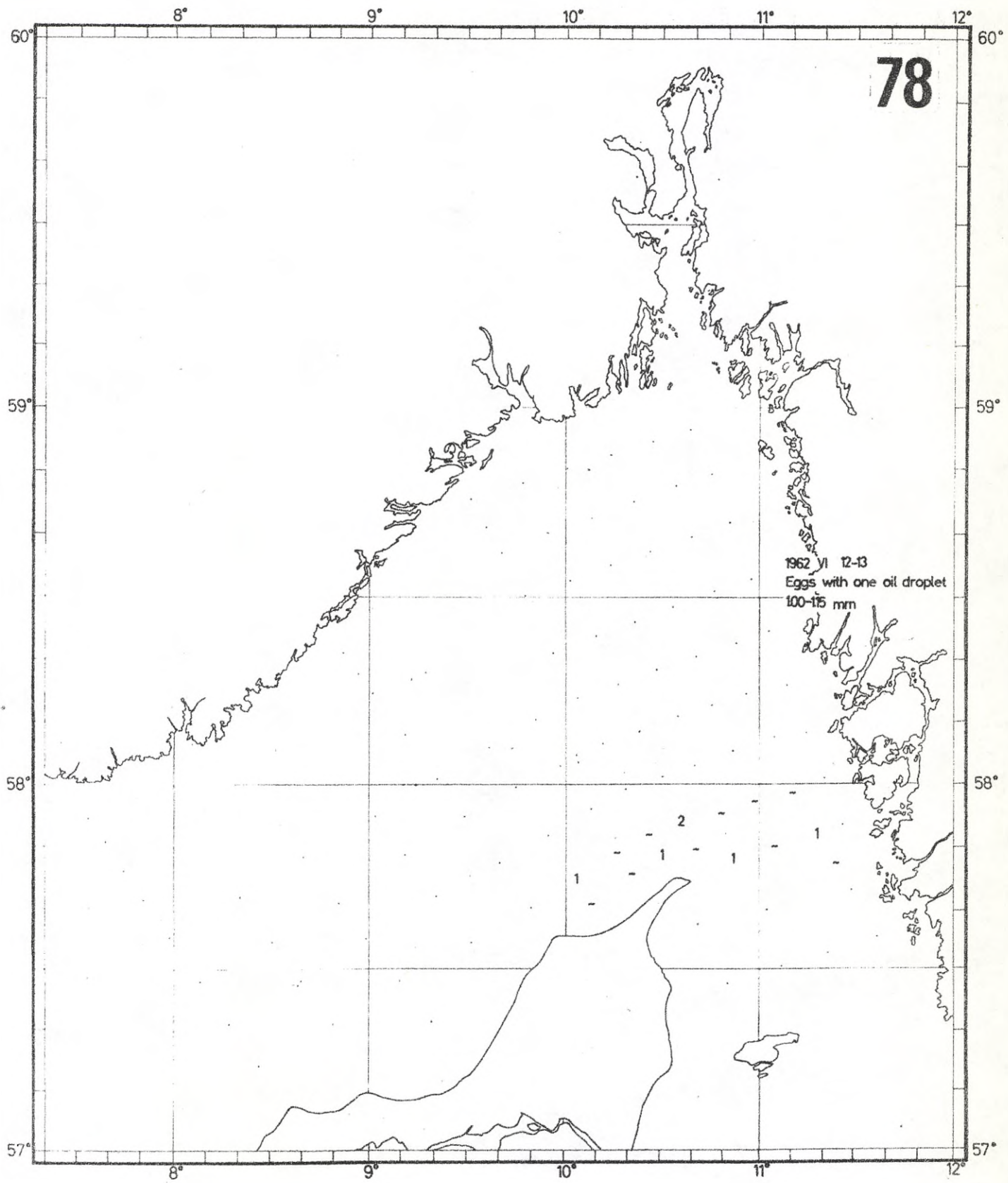




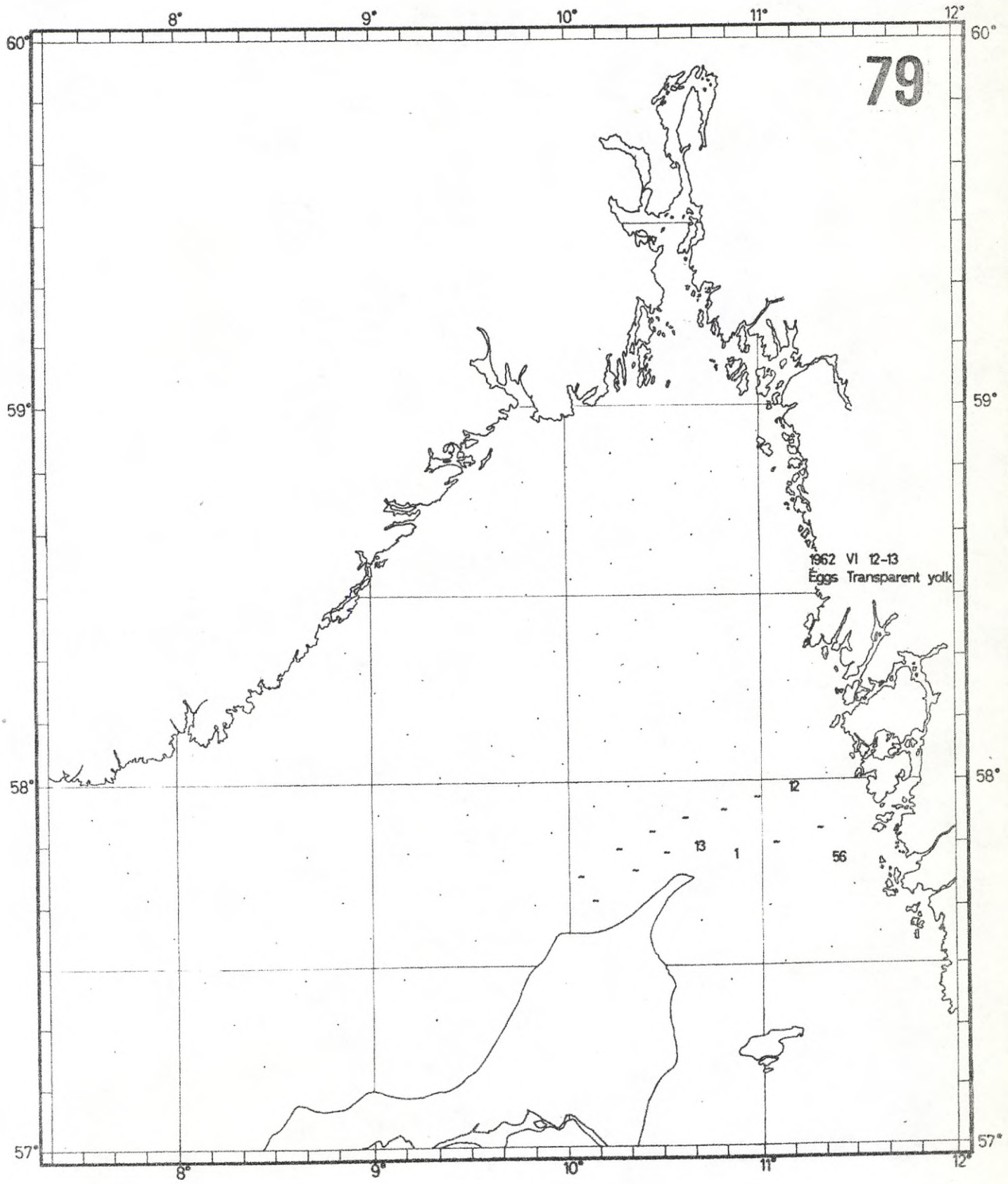




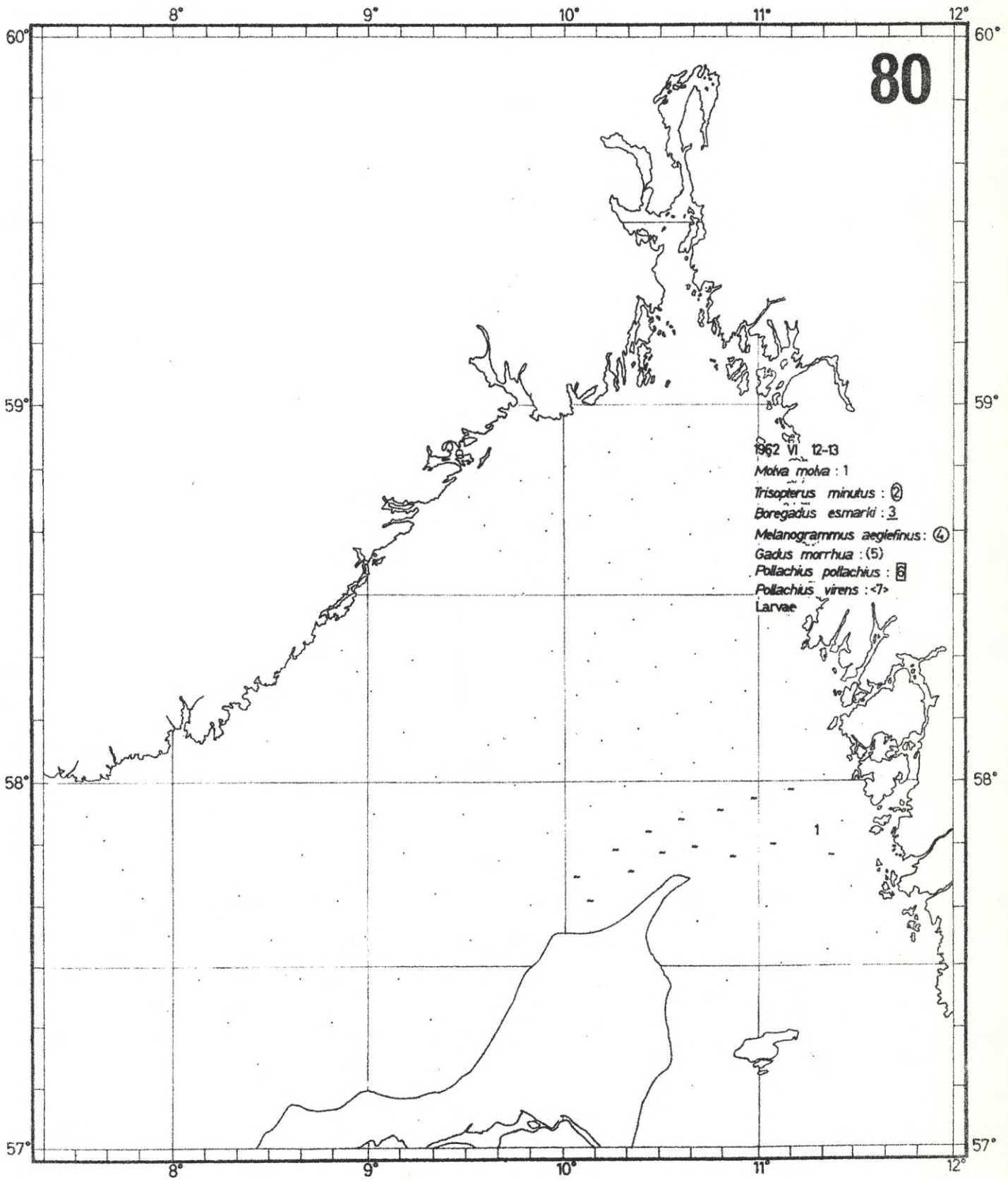




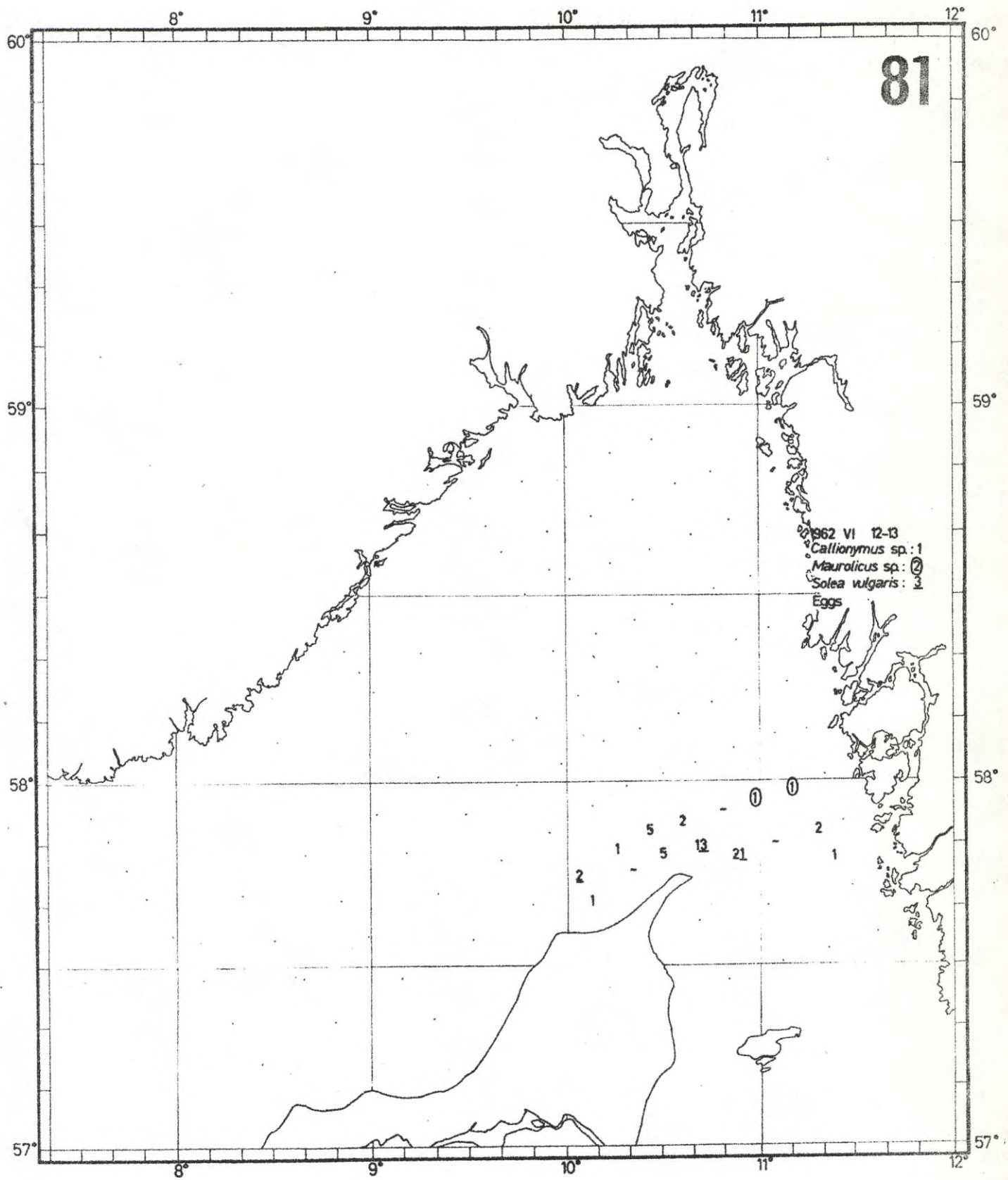




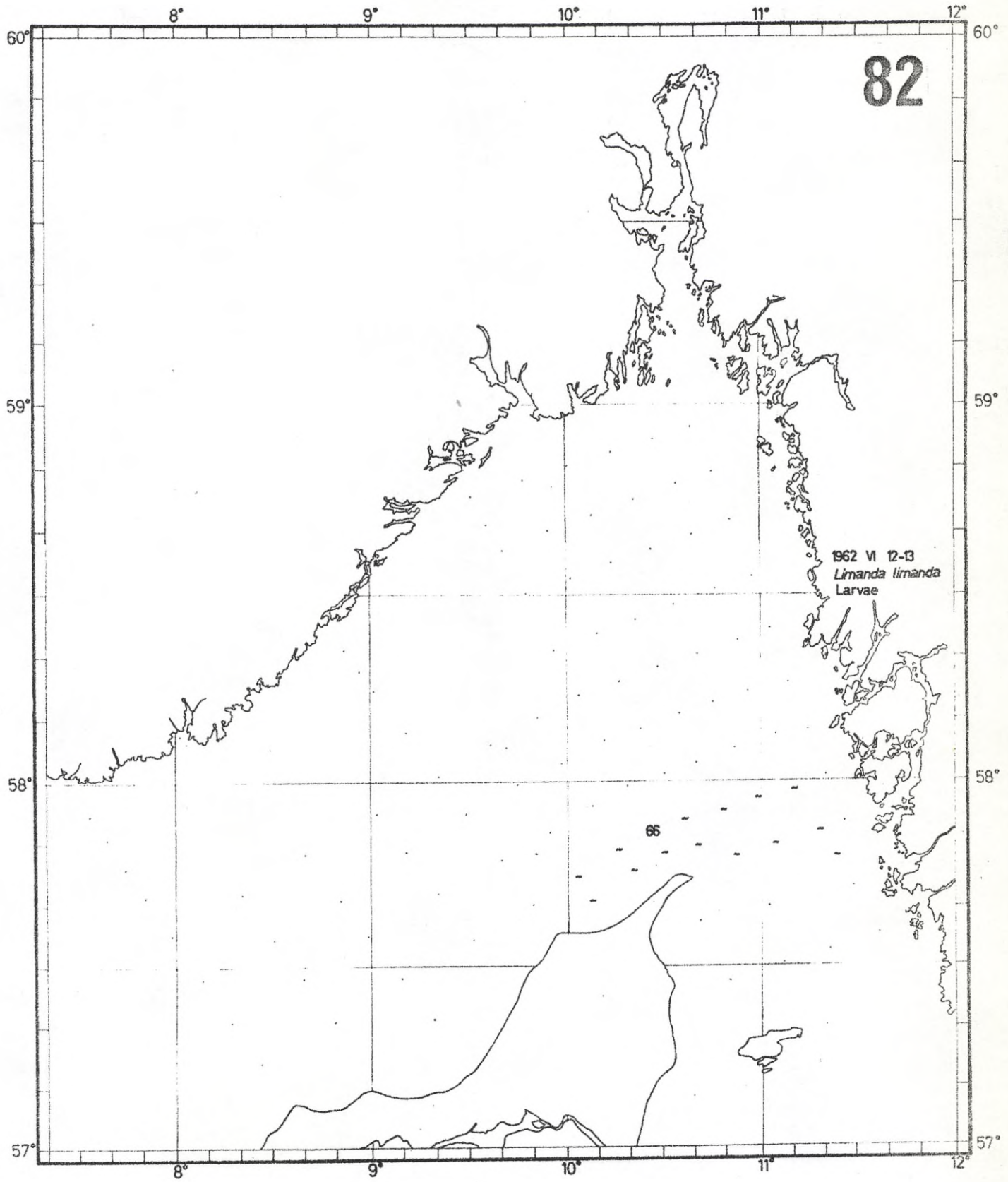




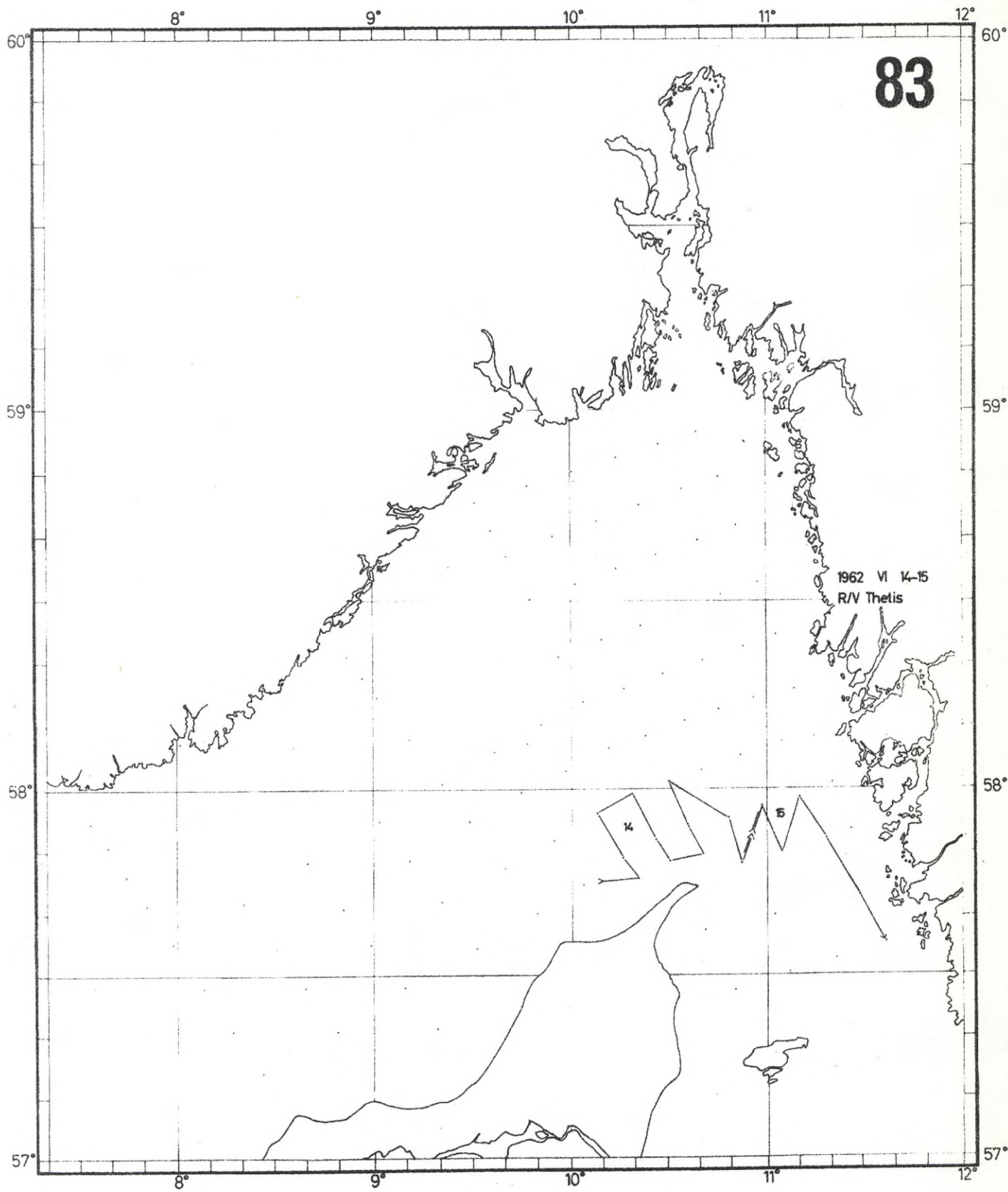




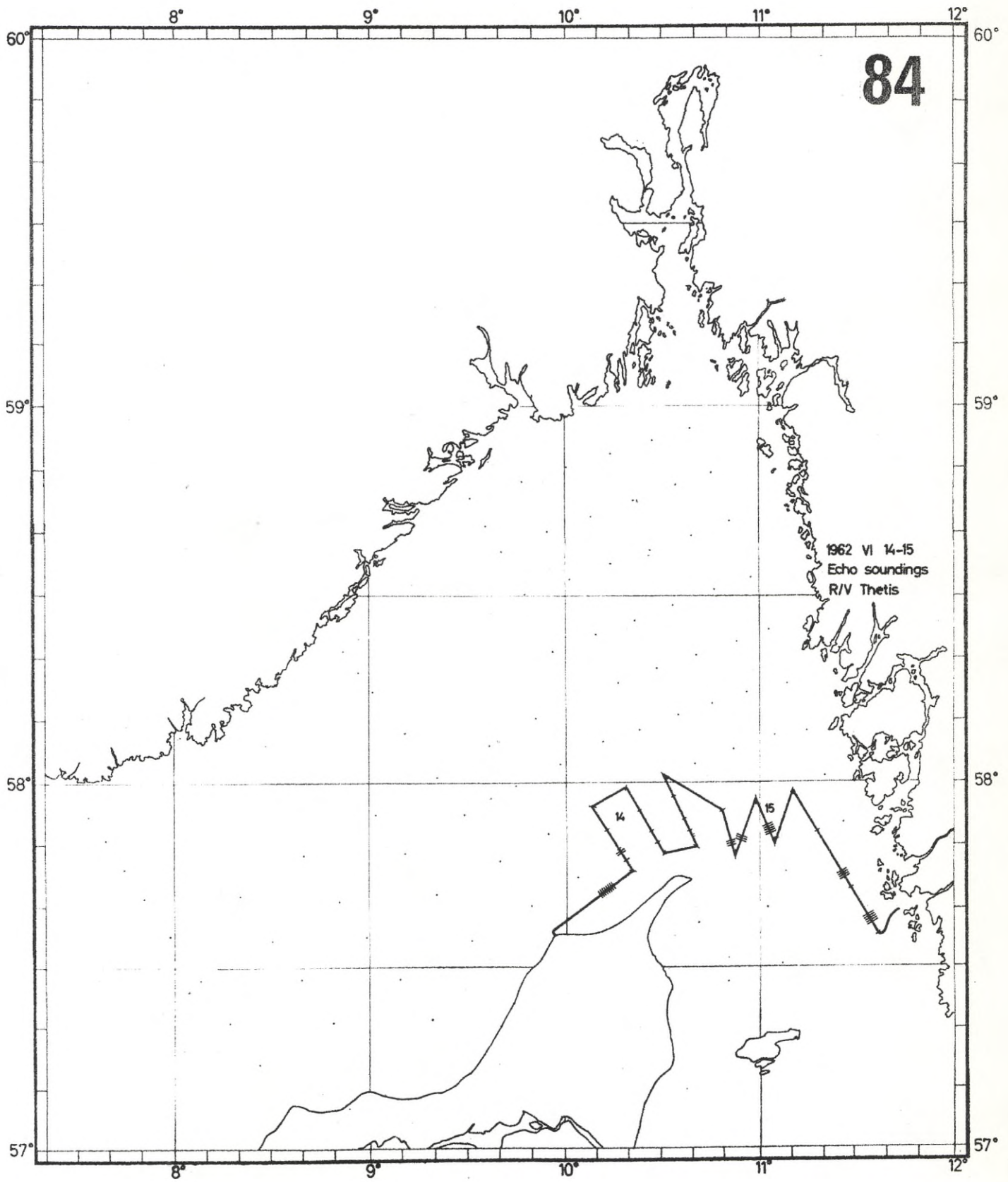




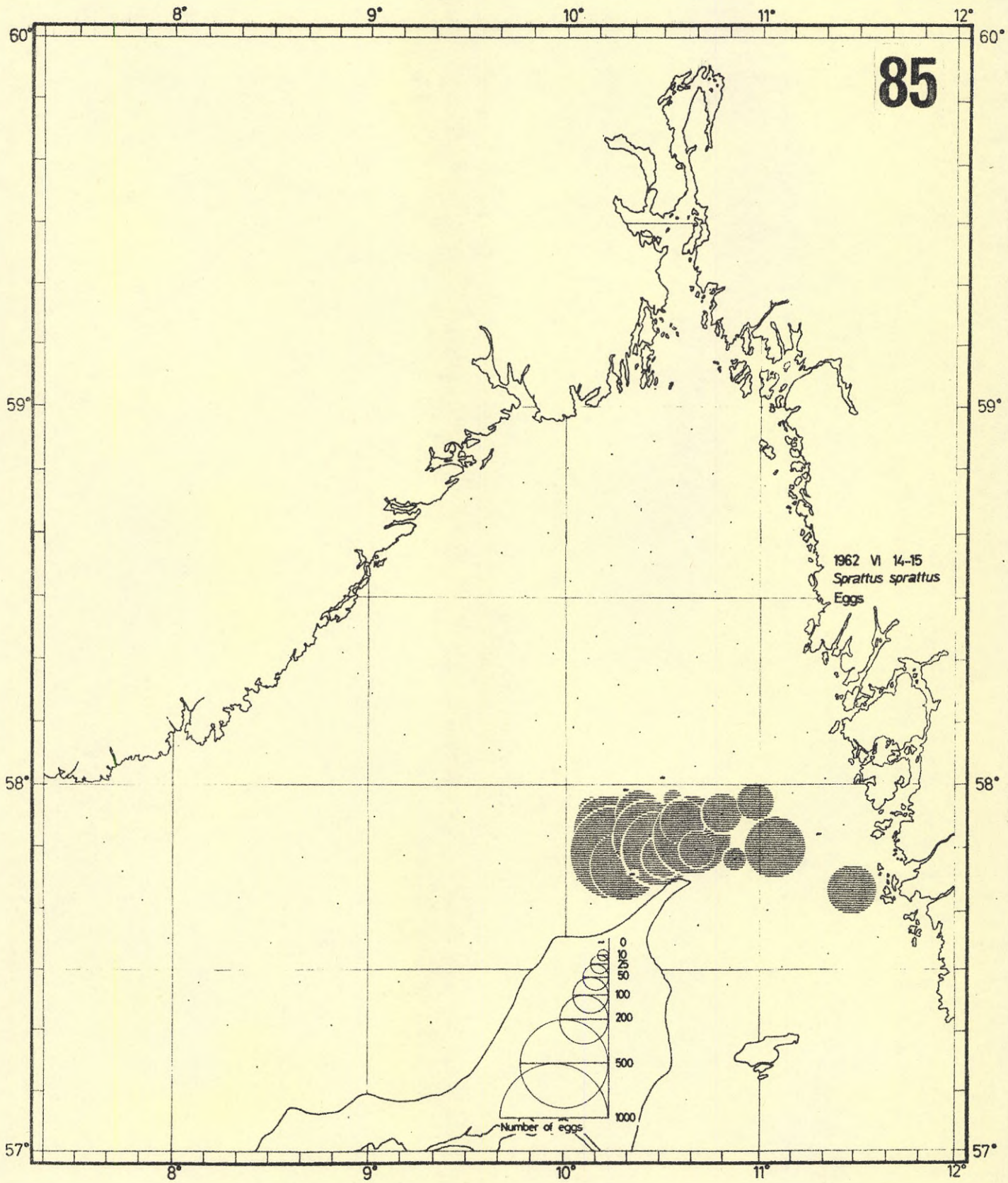




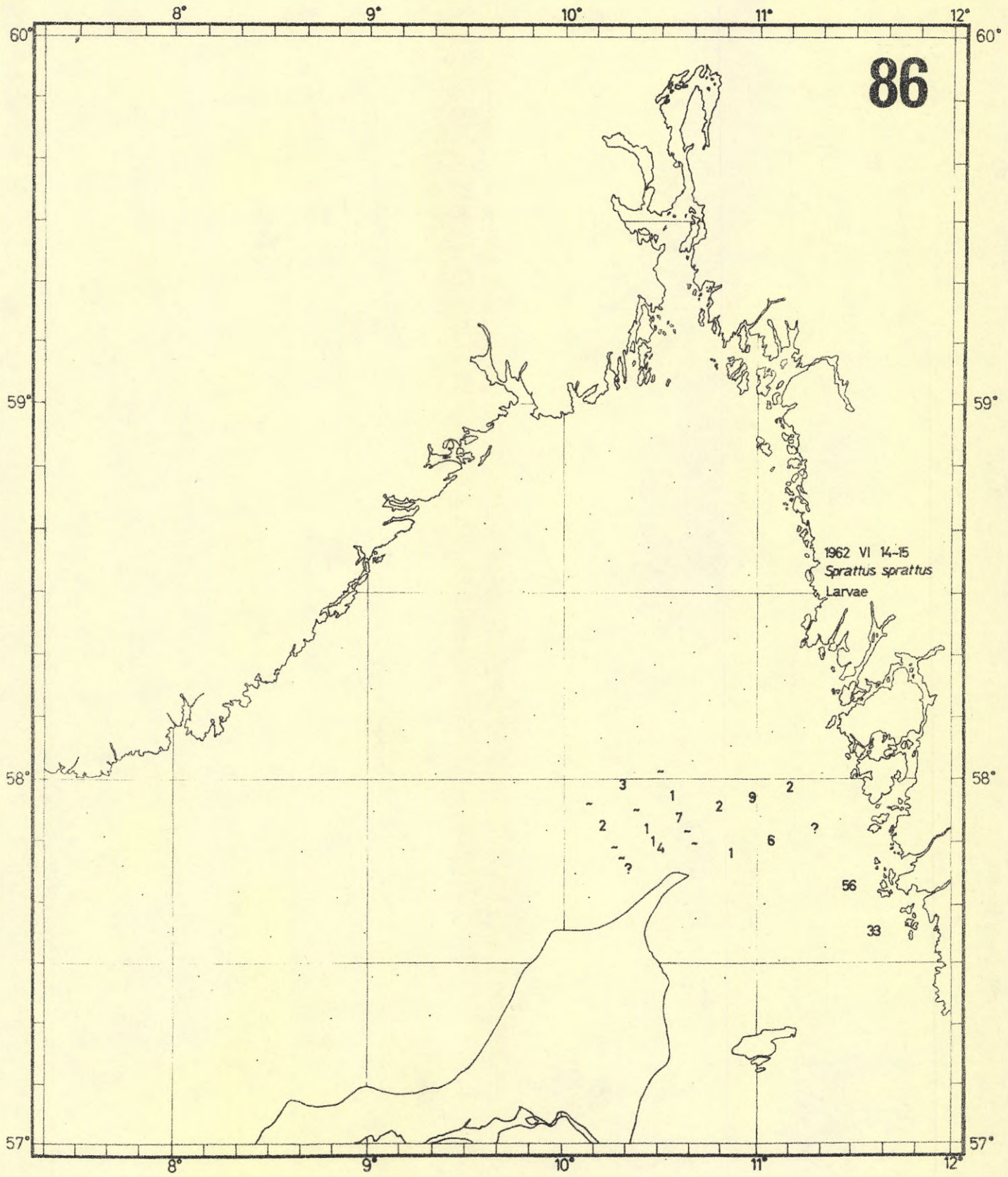




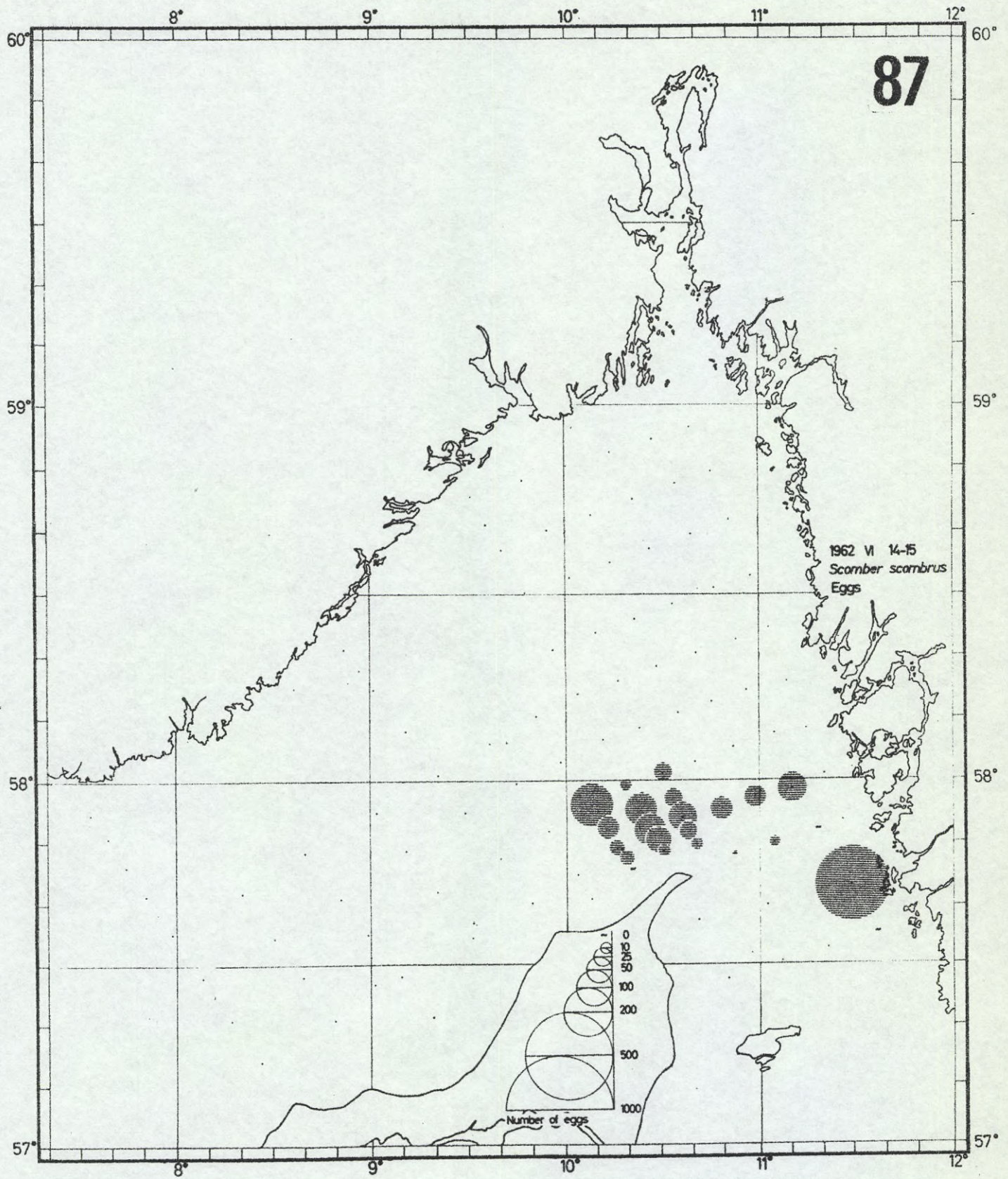
85









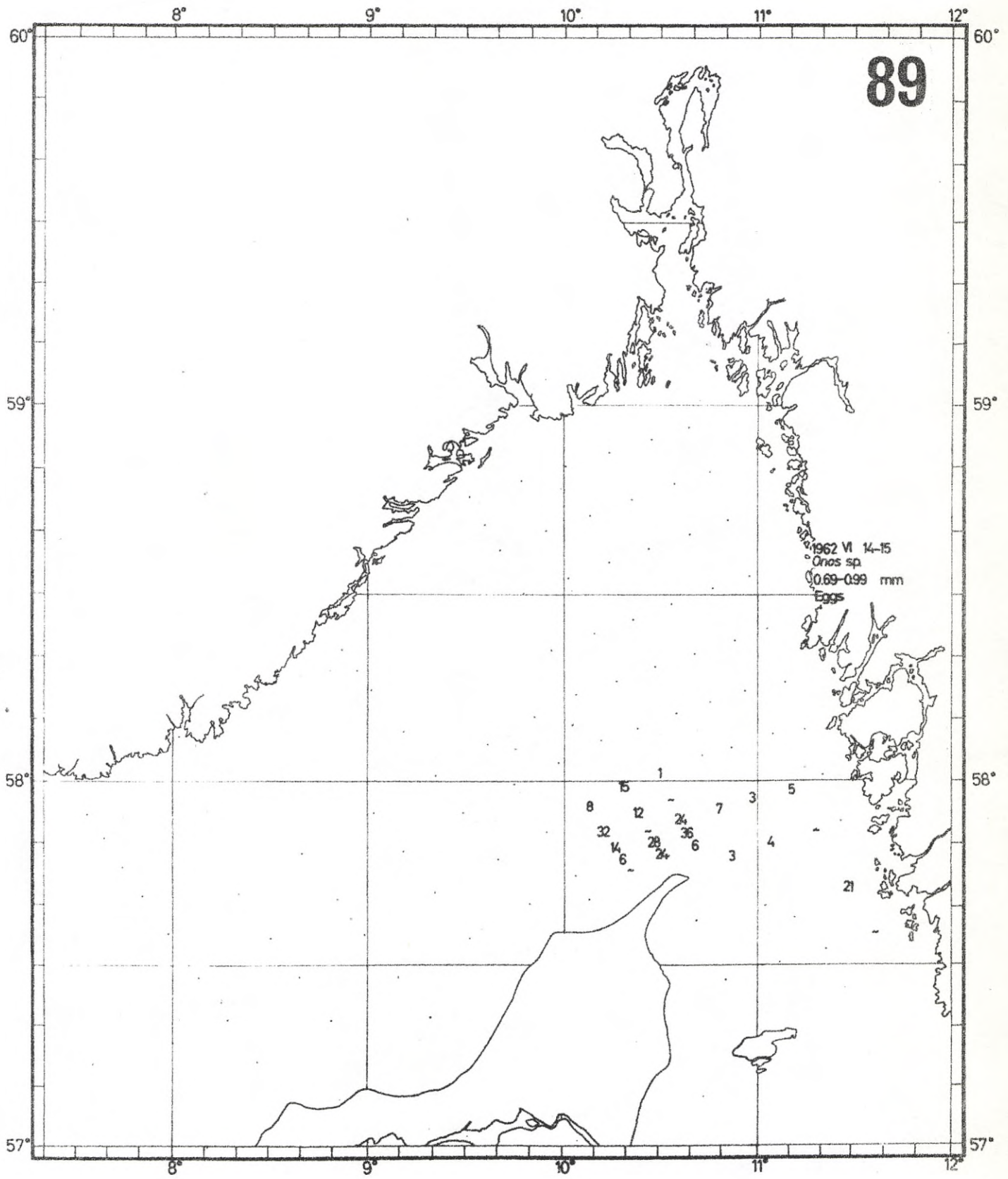






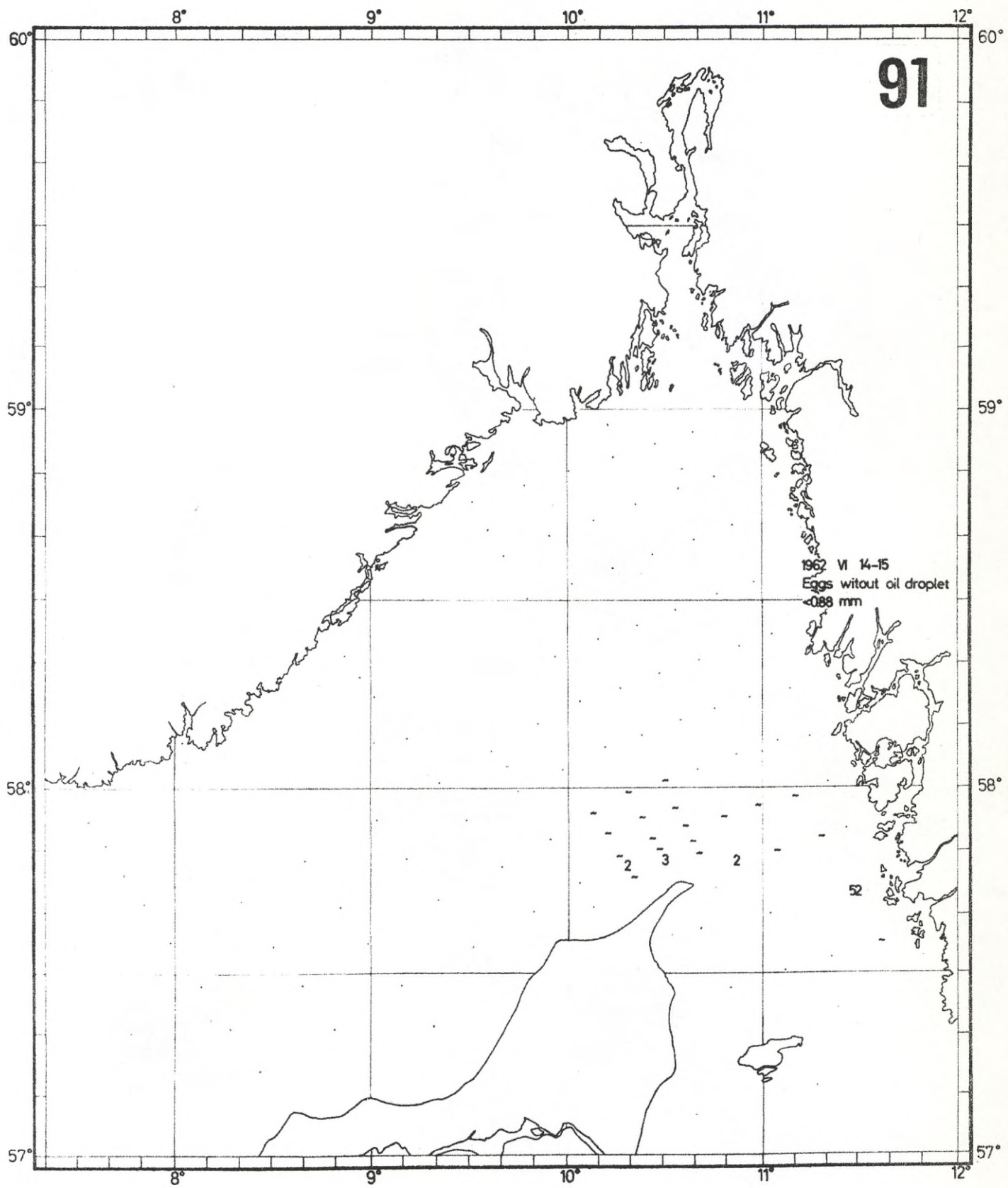


89

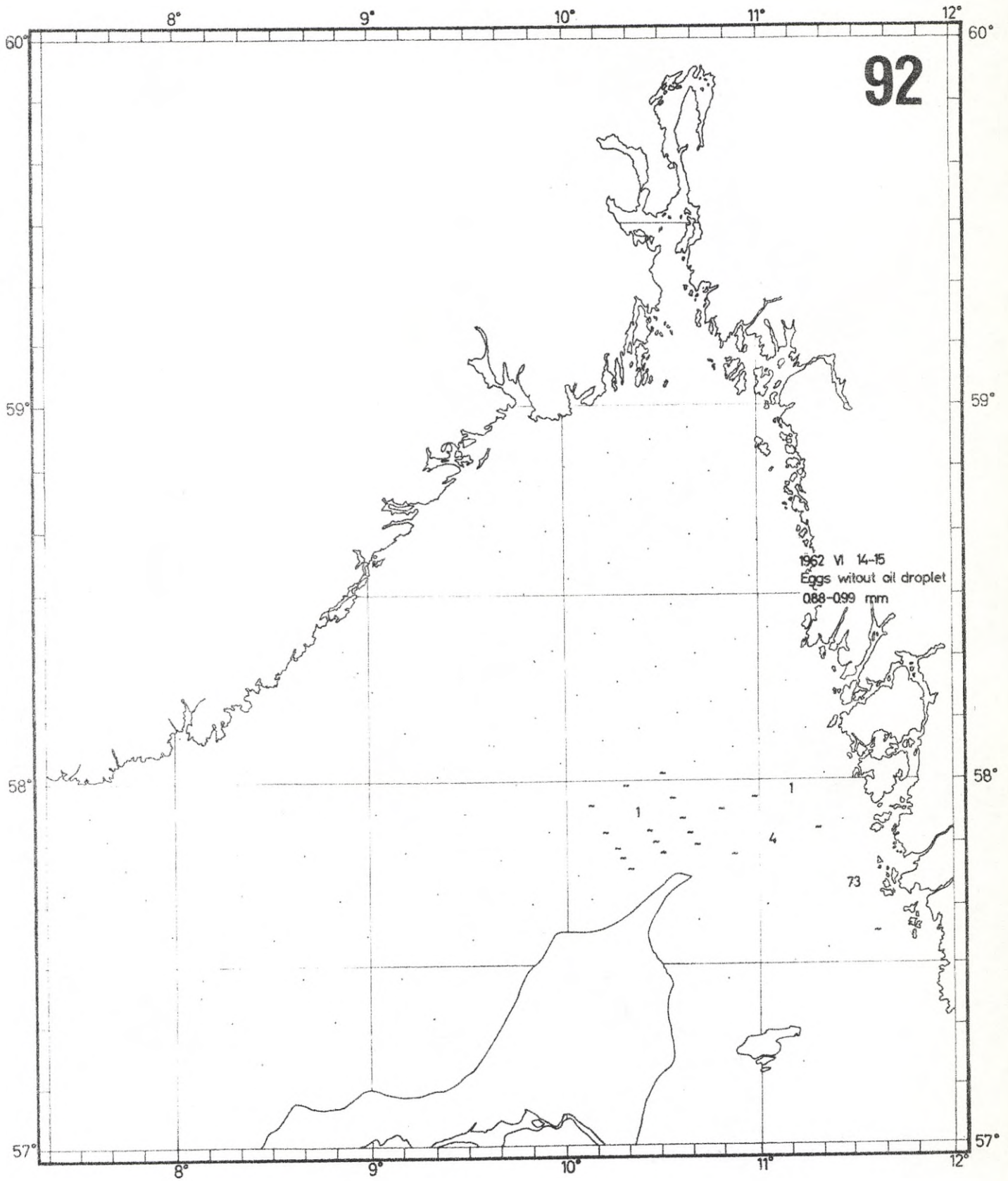




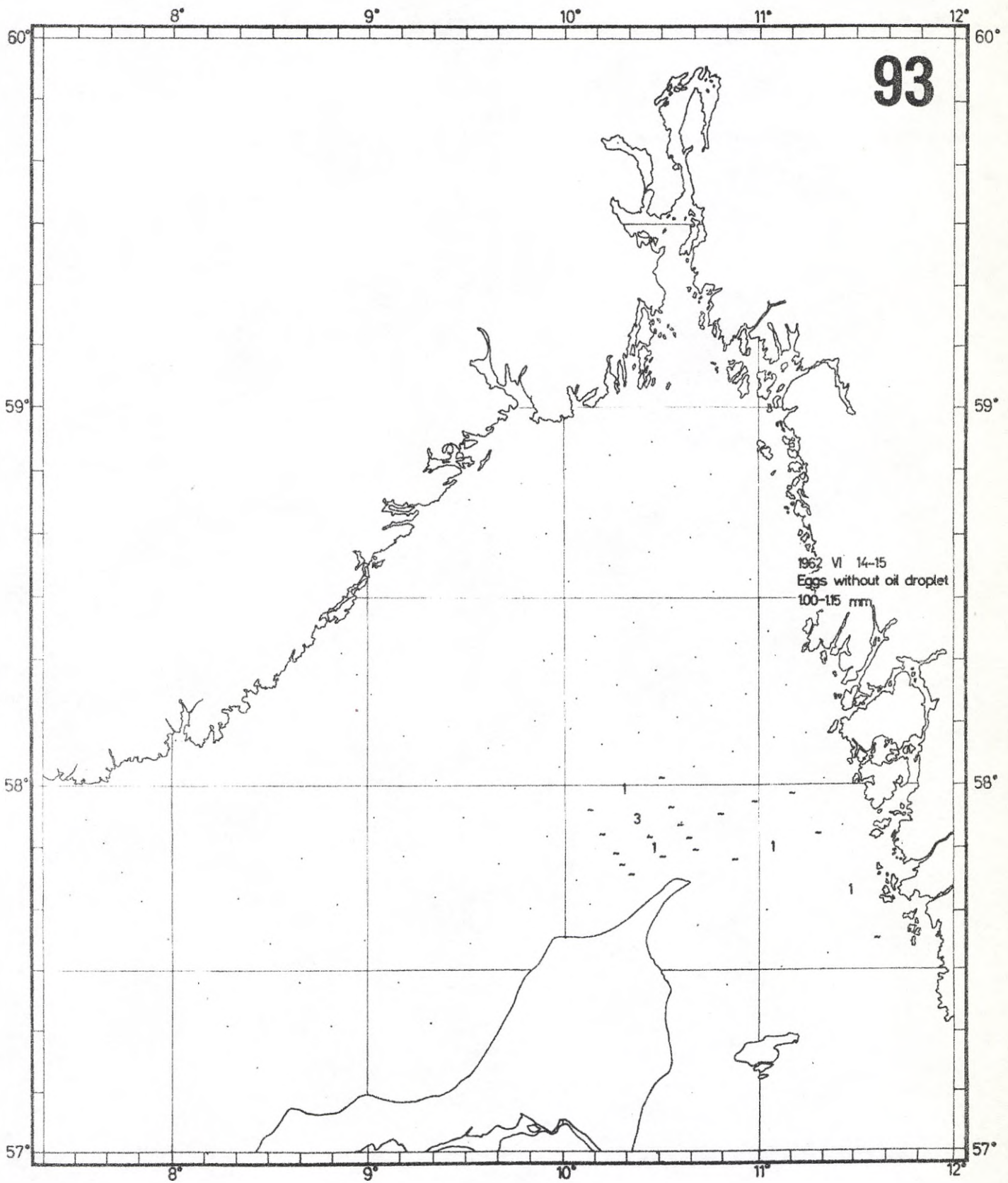


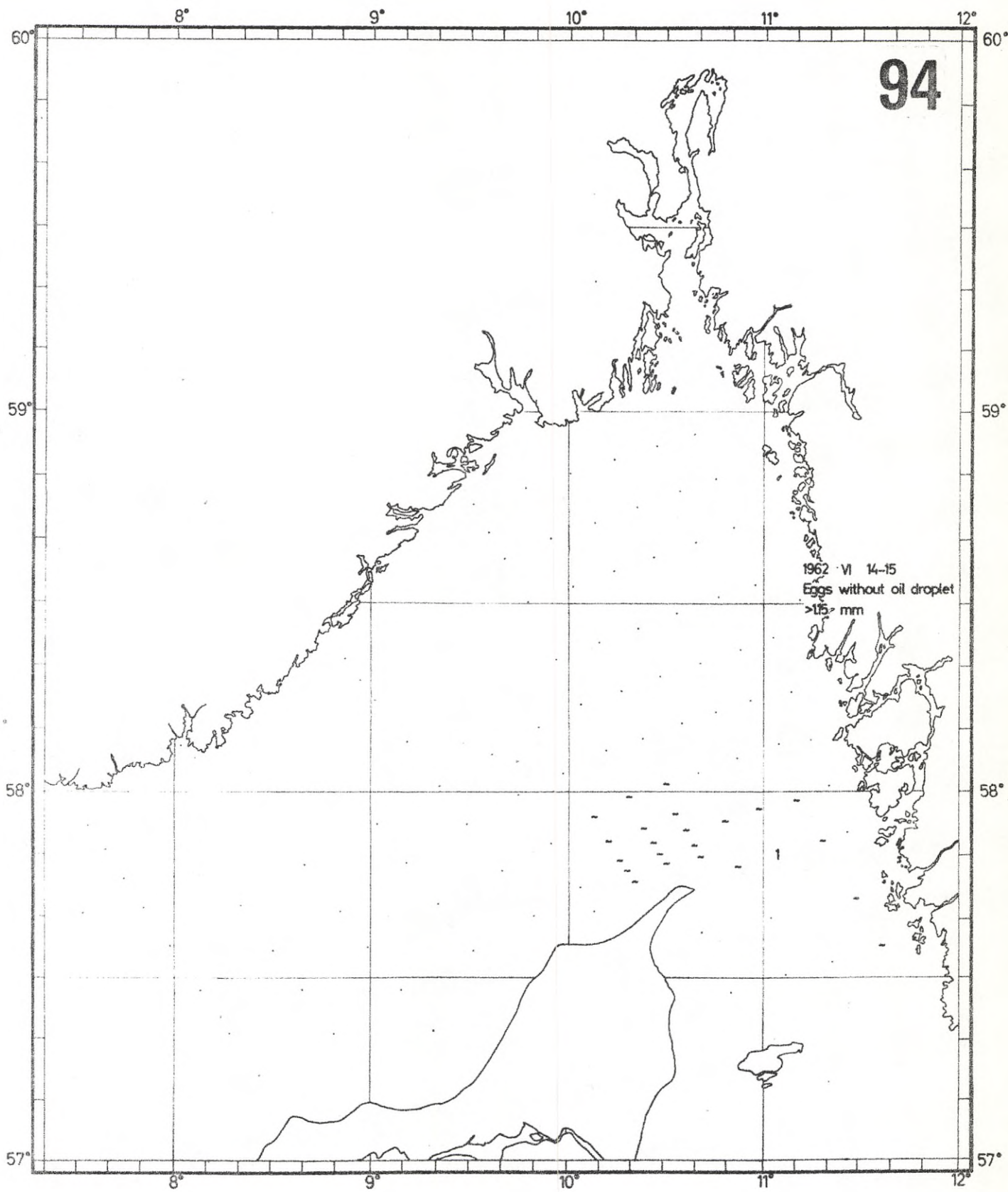




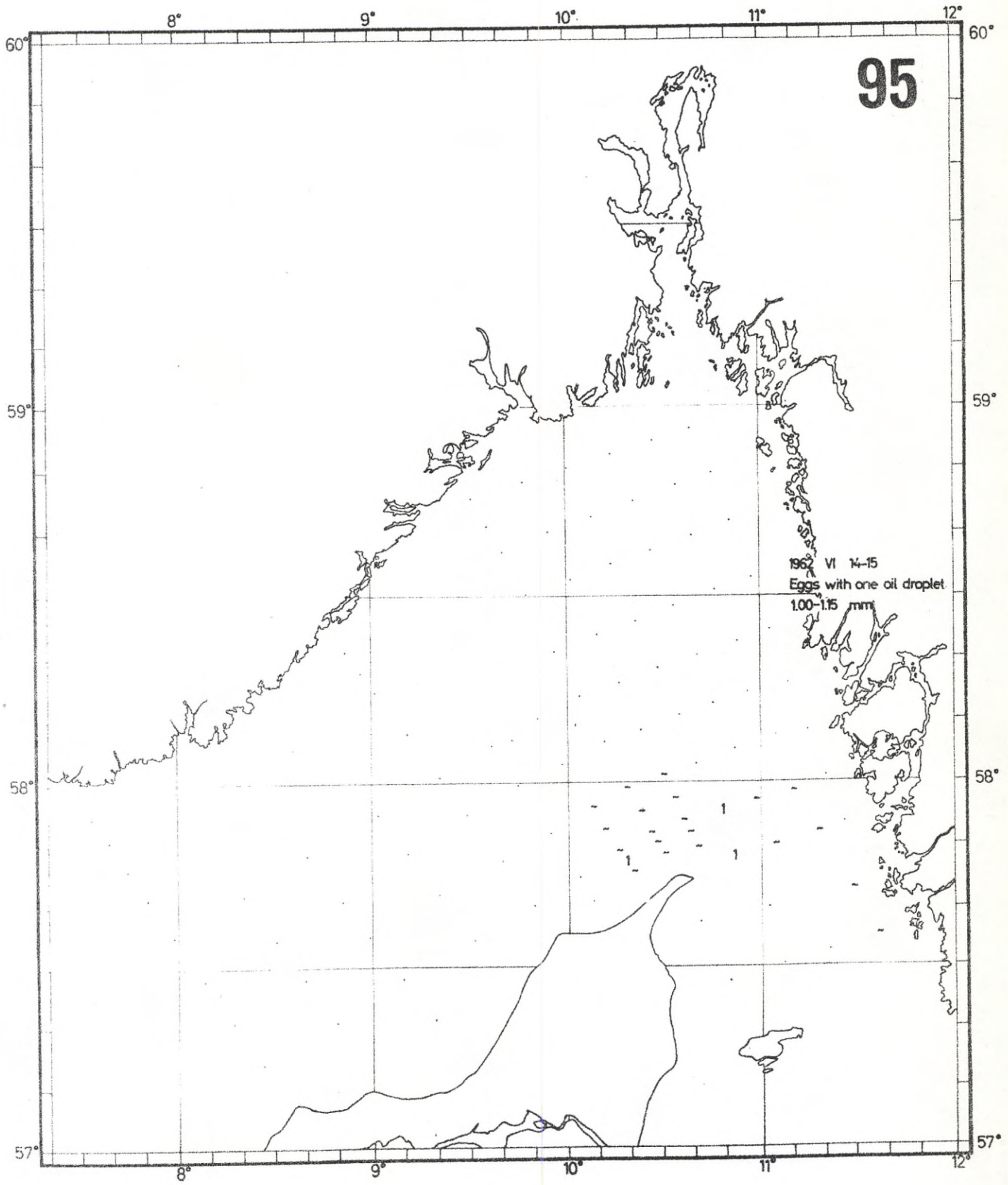


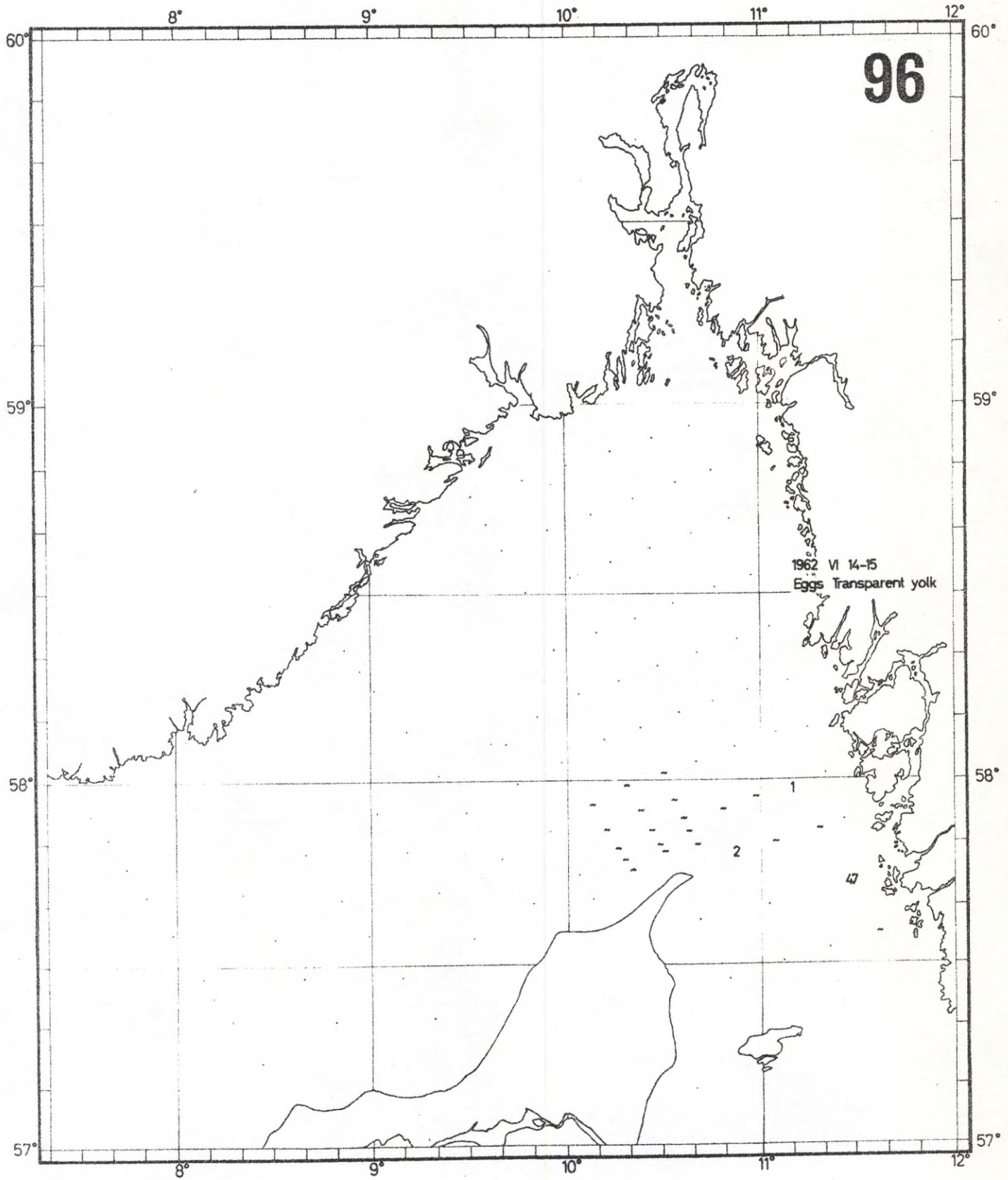




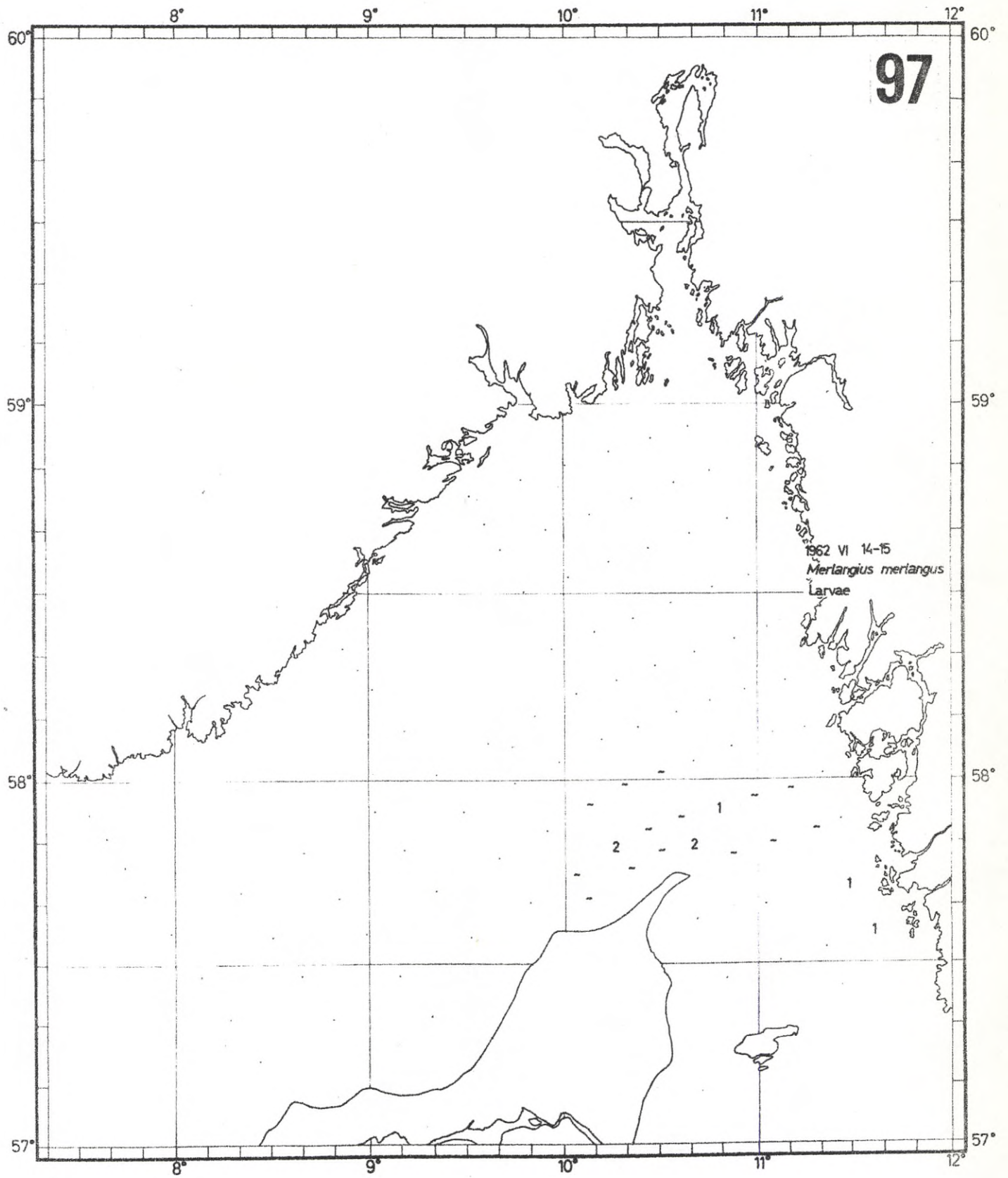


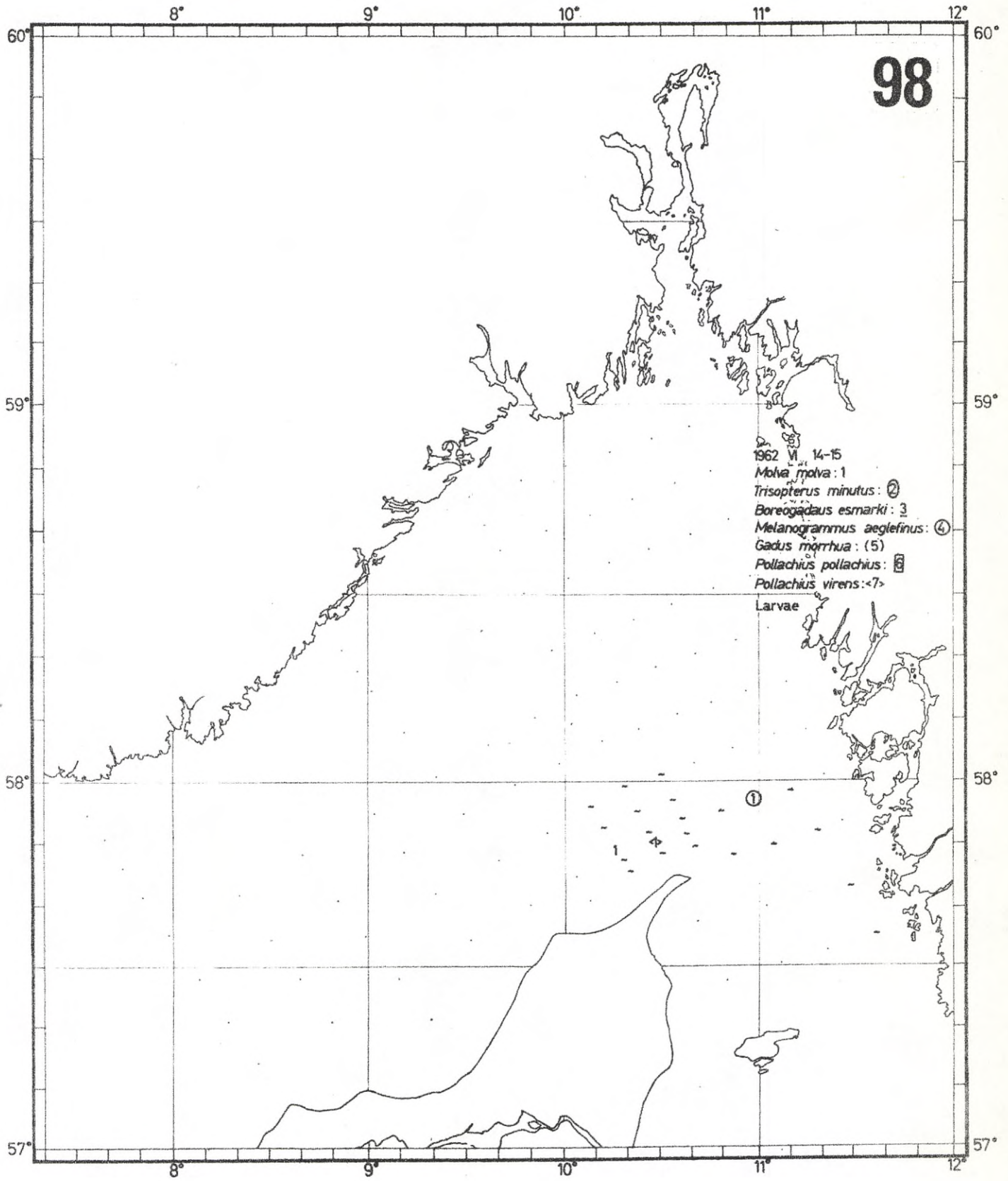




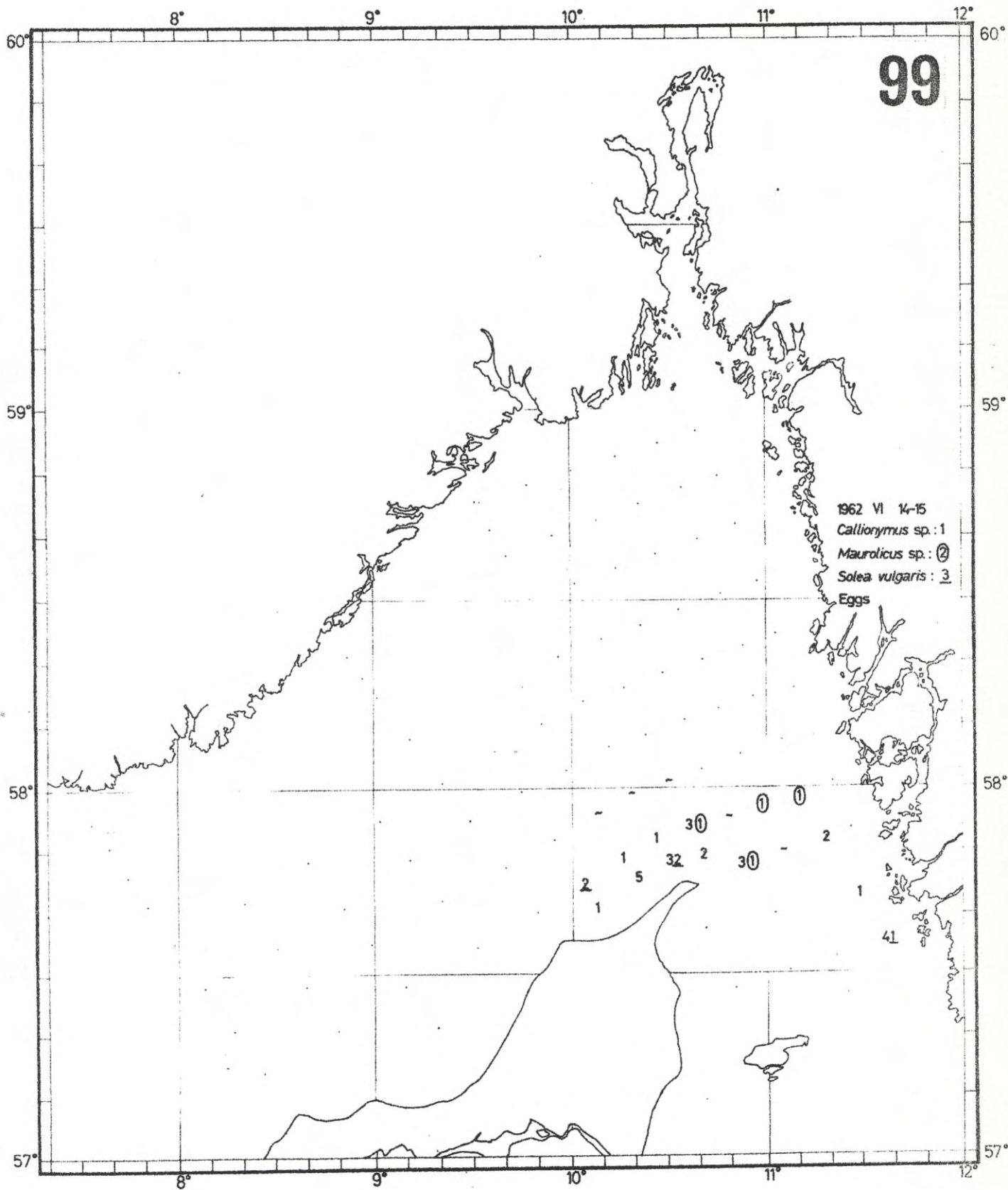


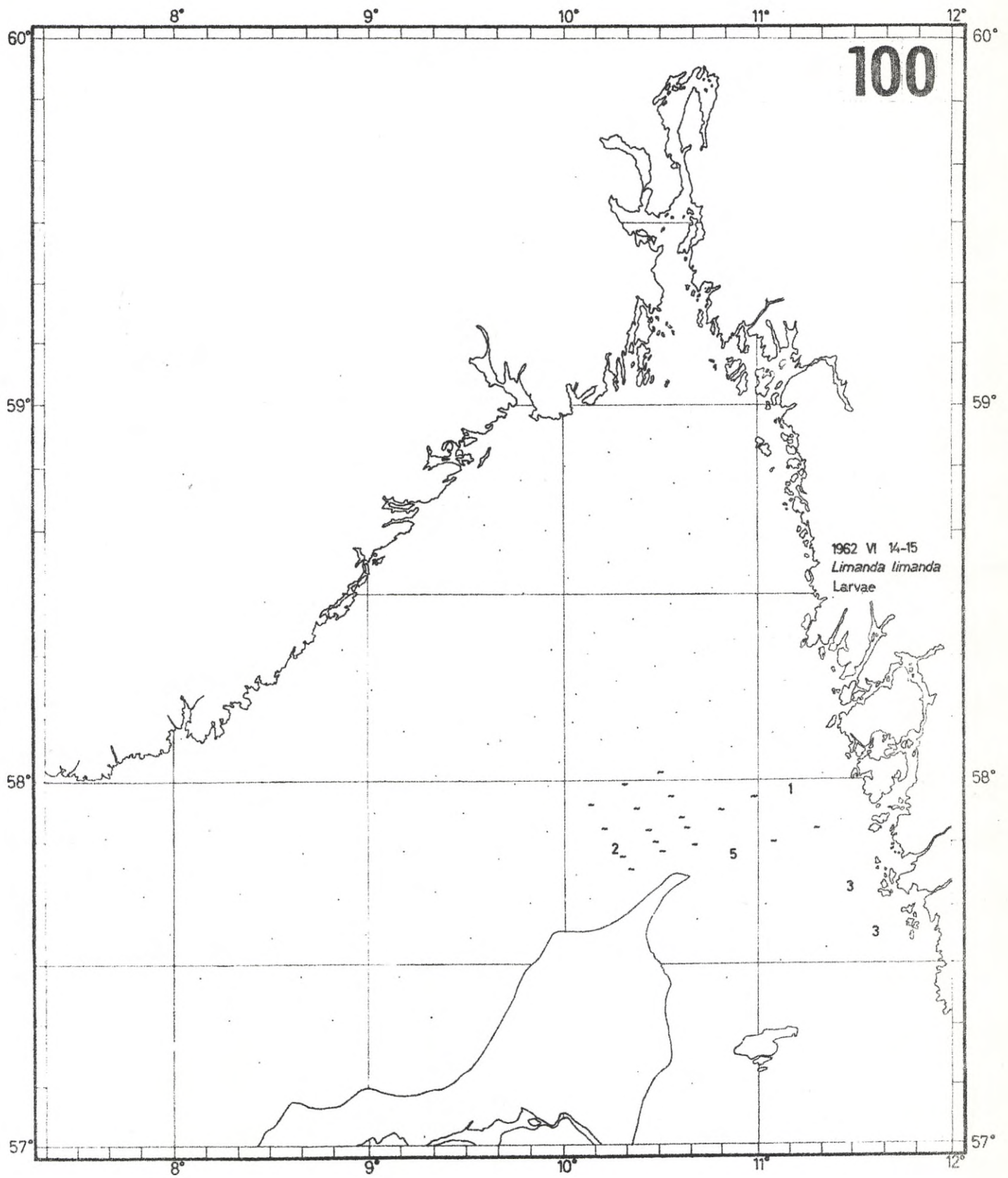




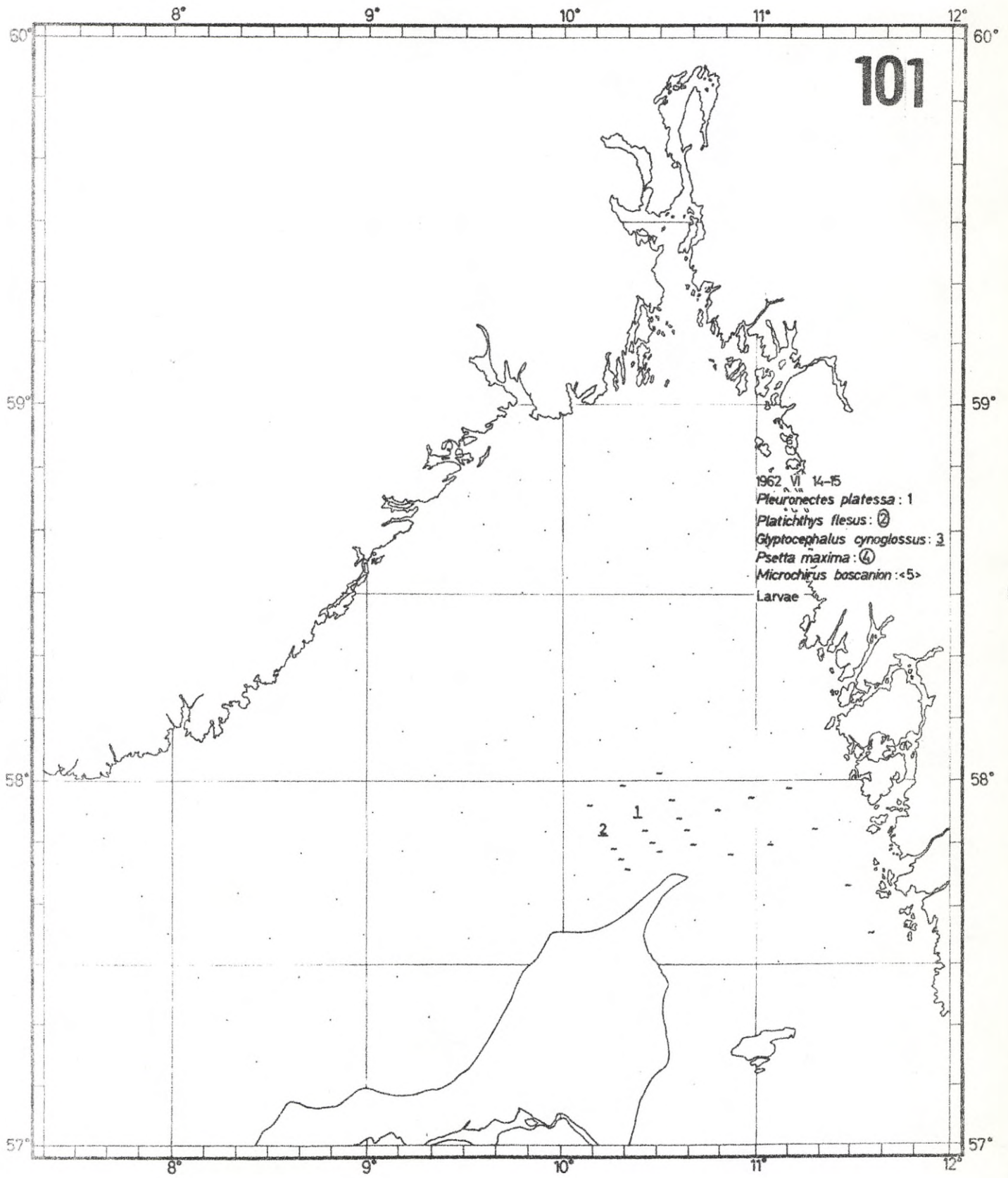


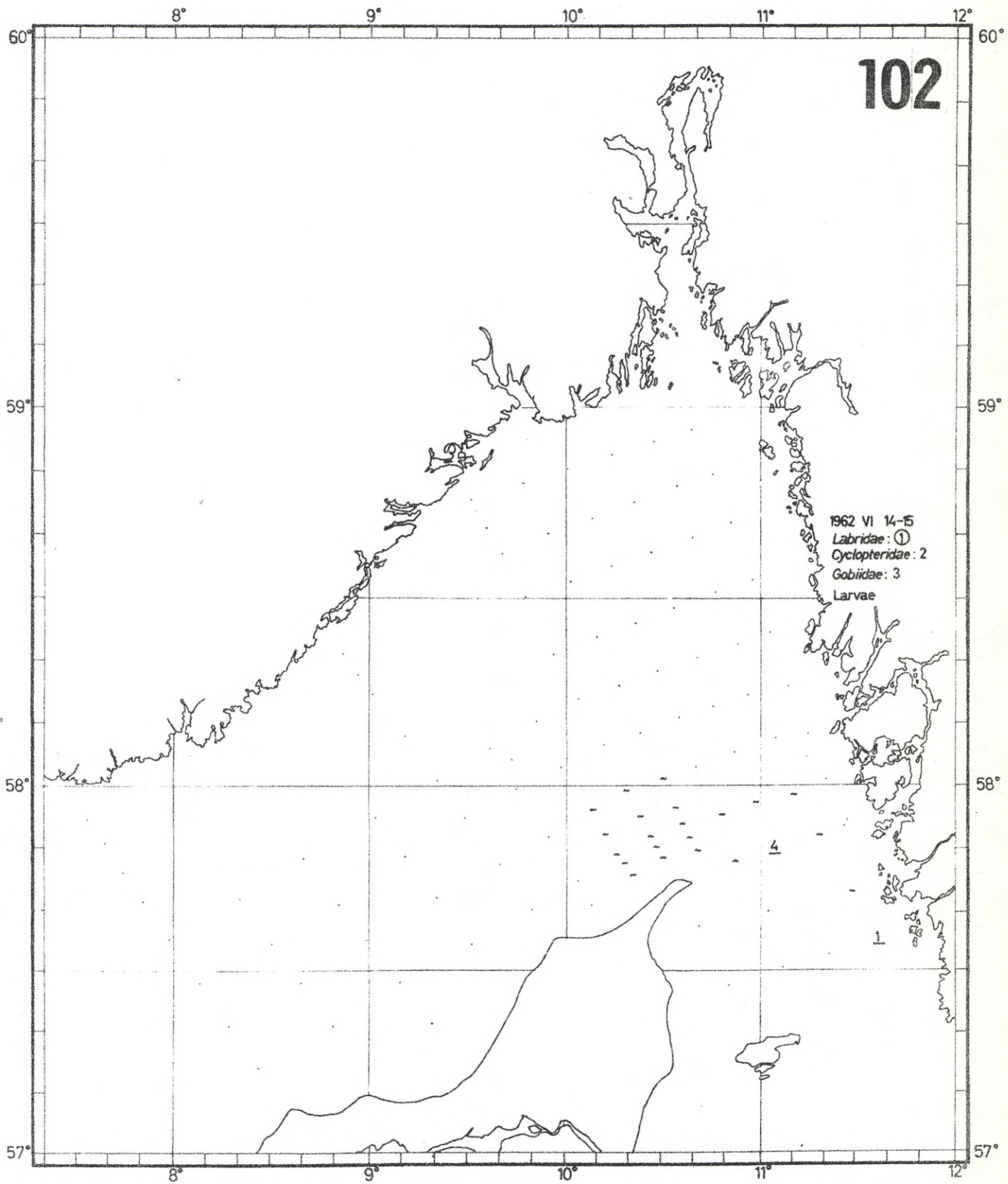




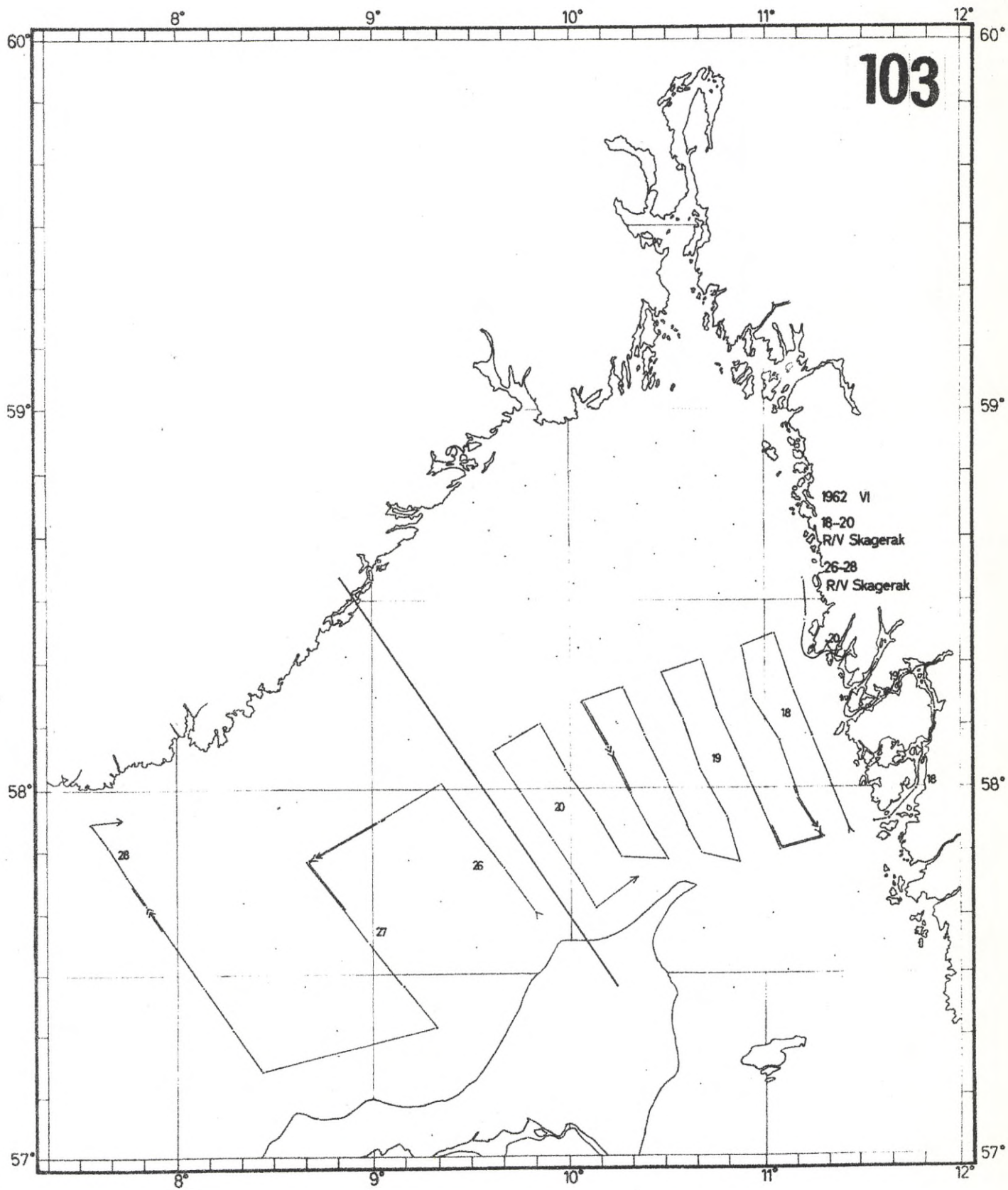


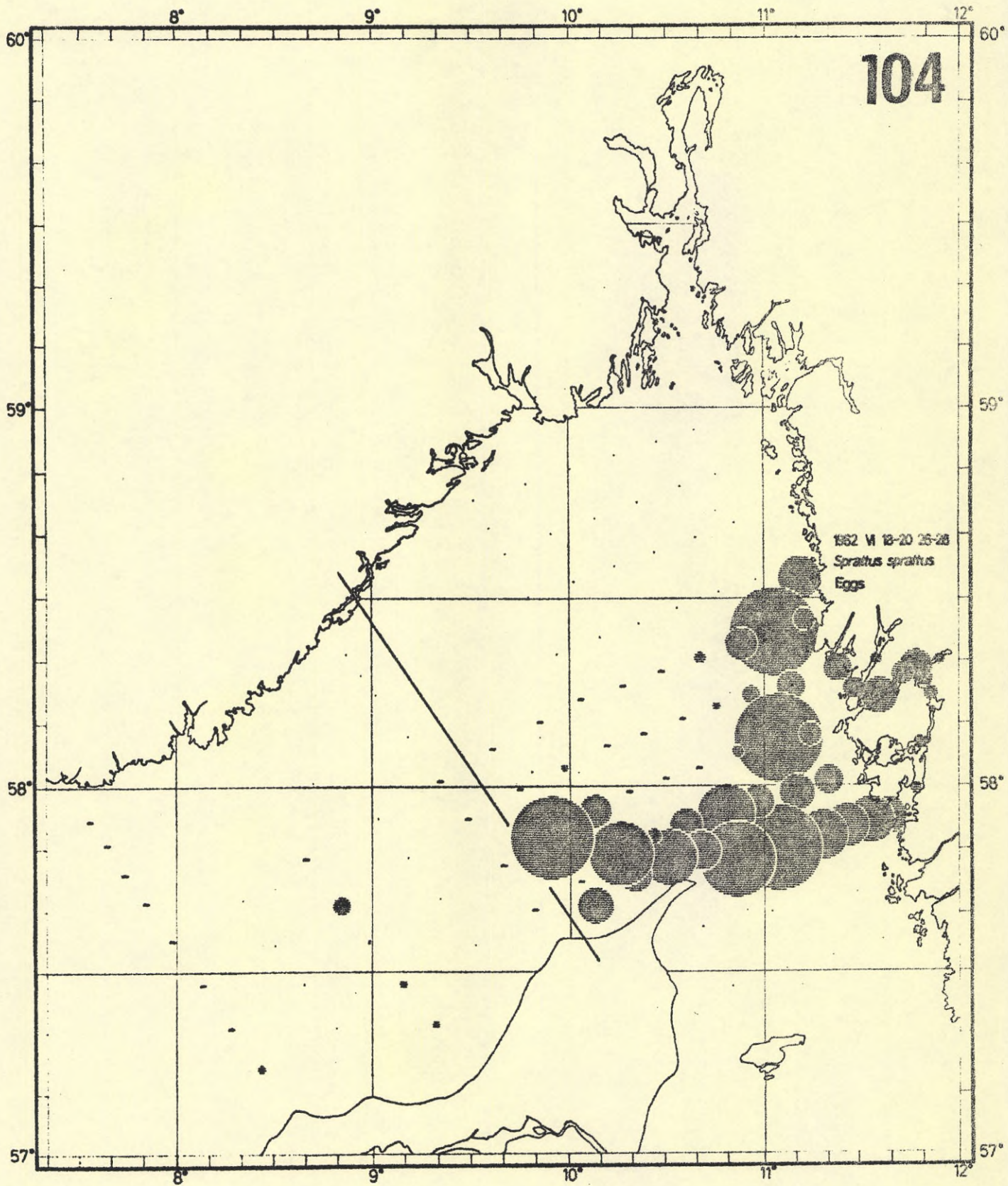




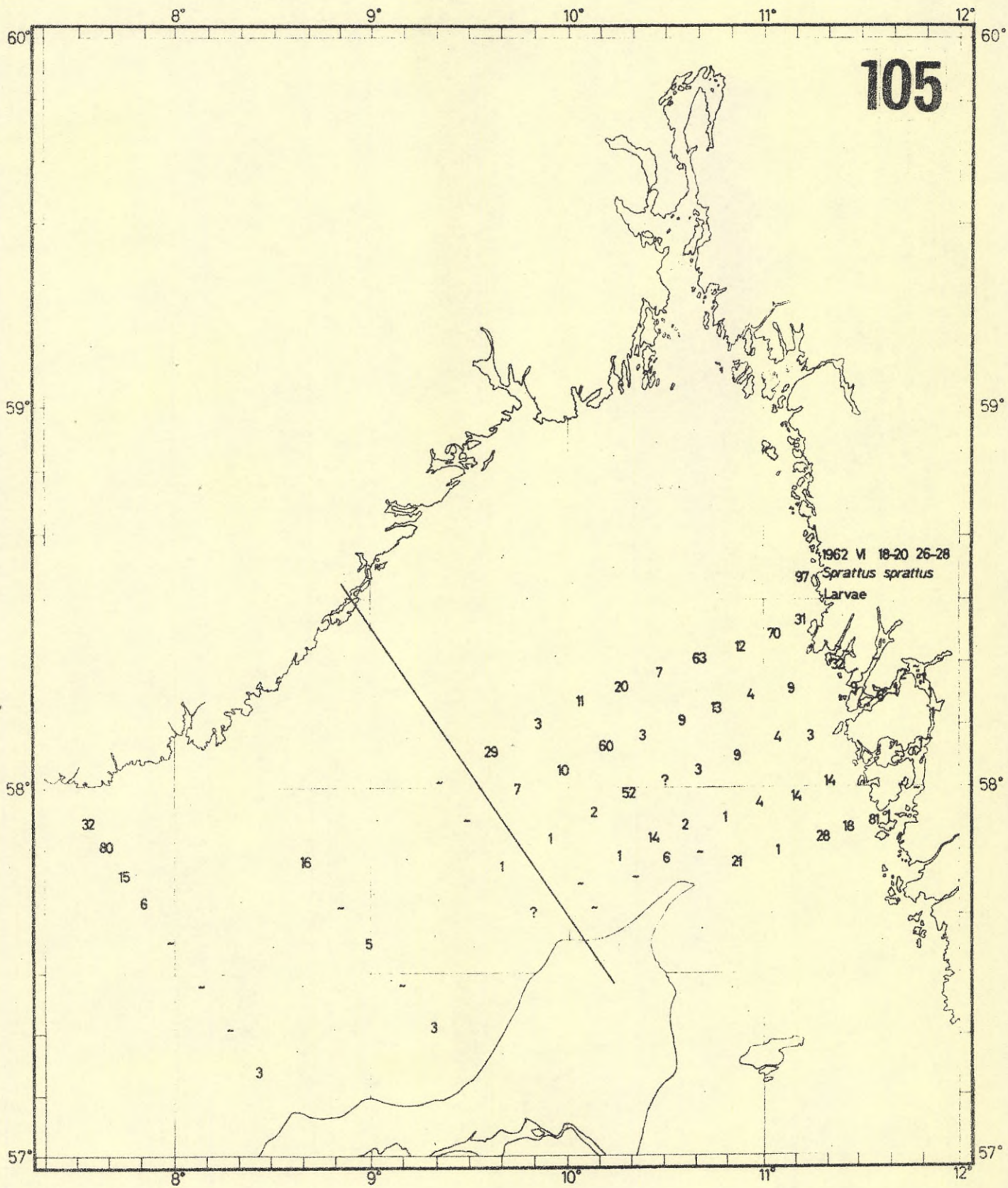




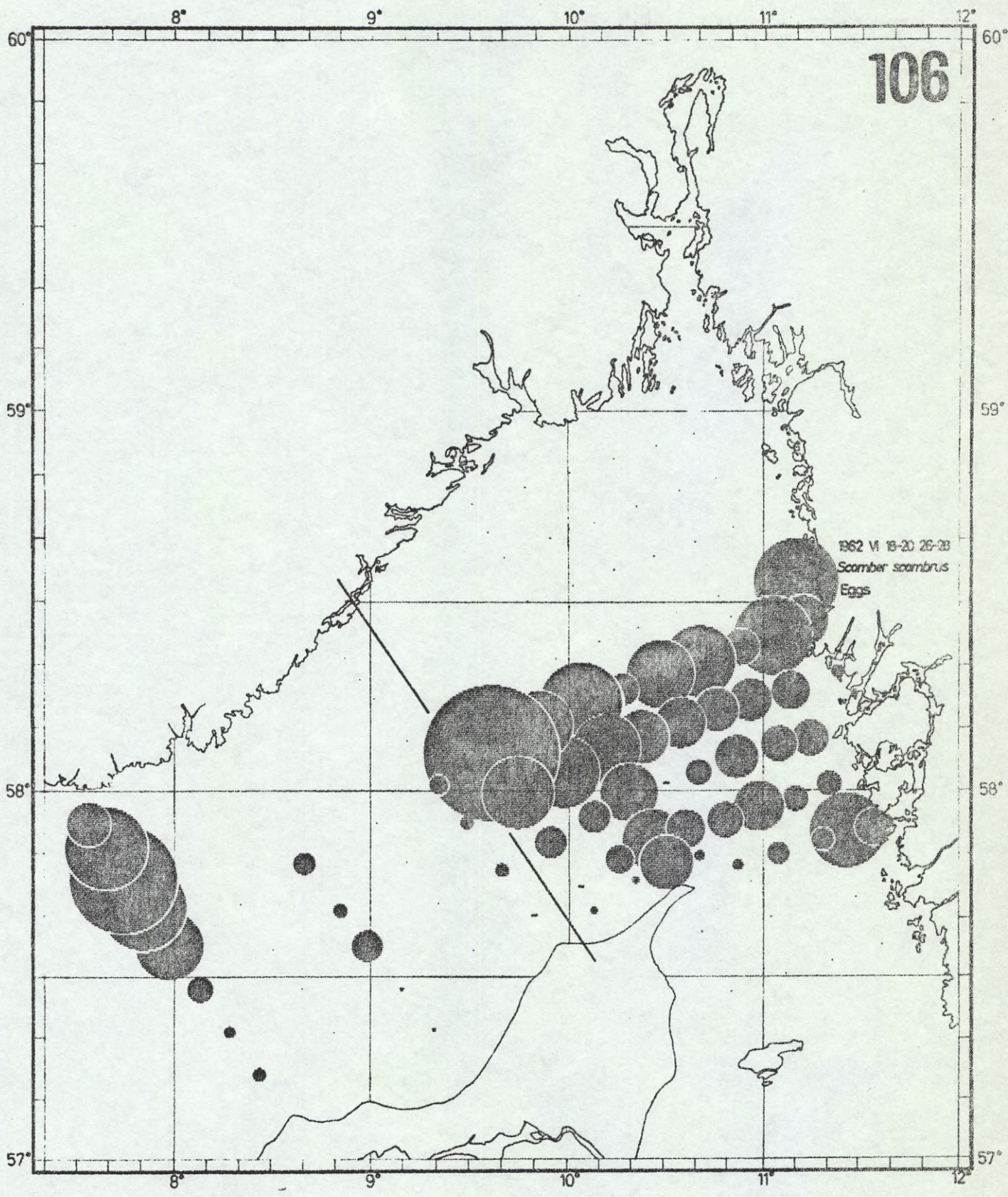








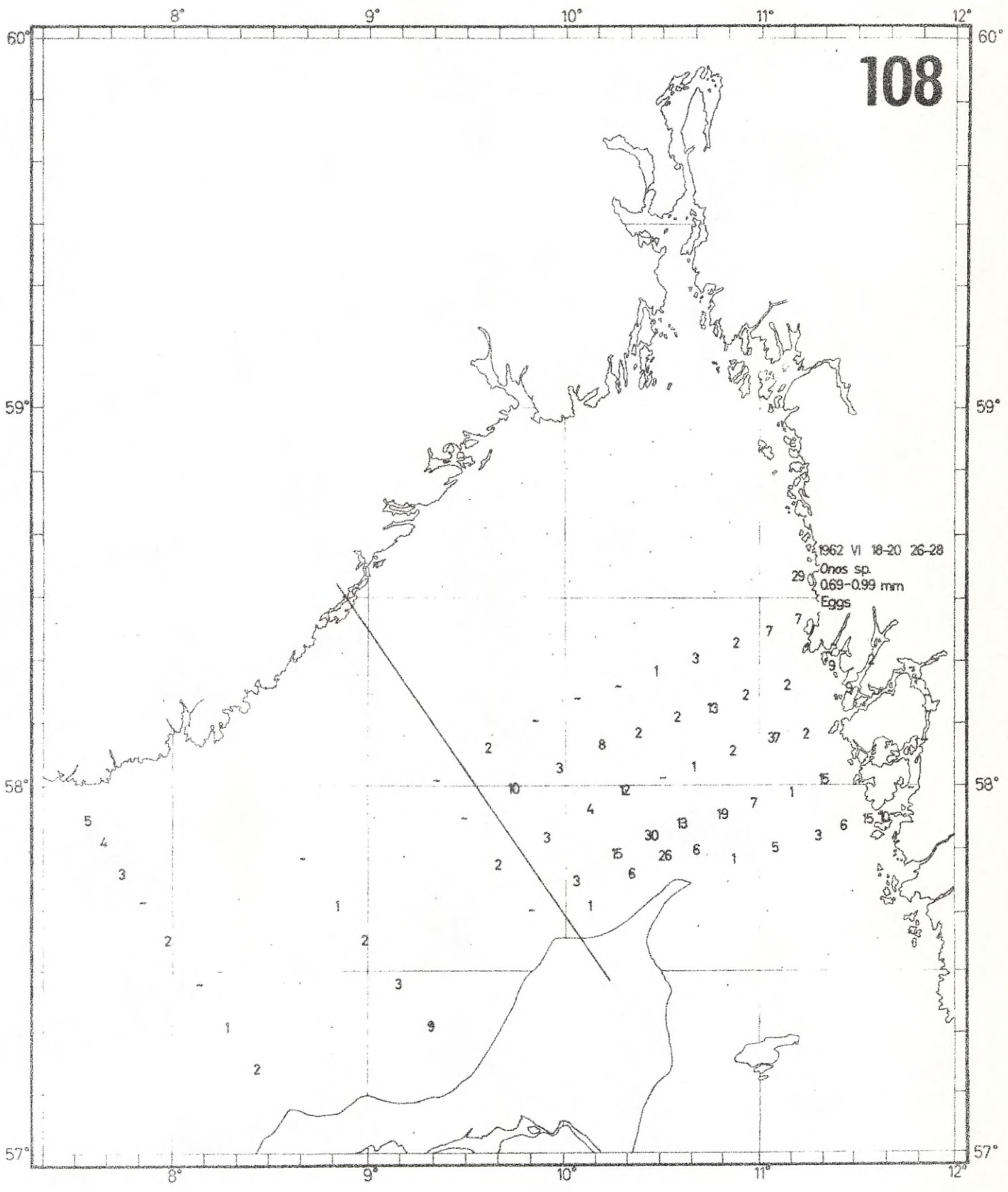










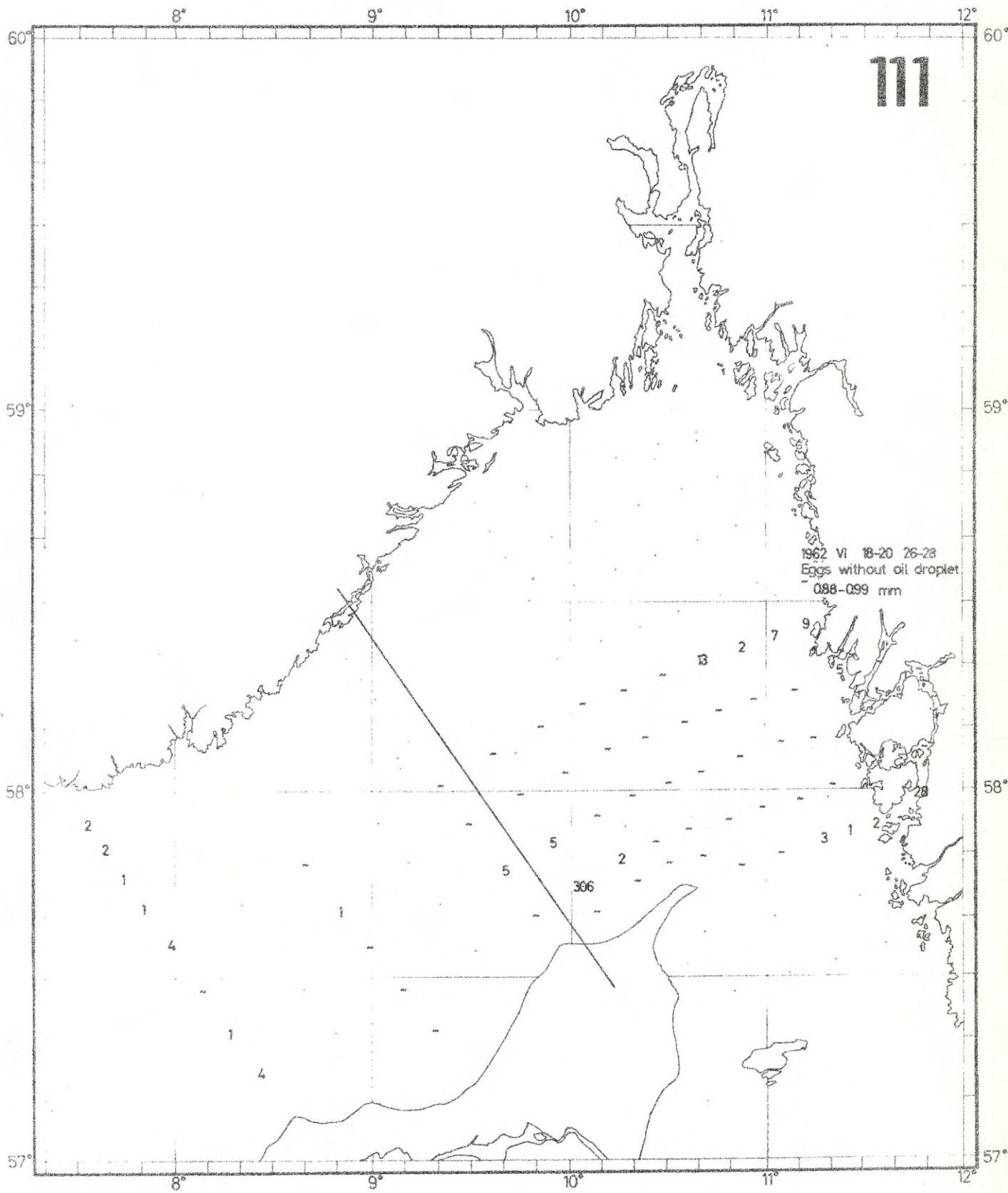


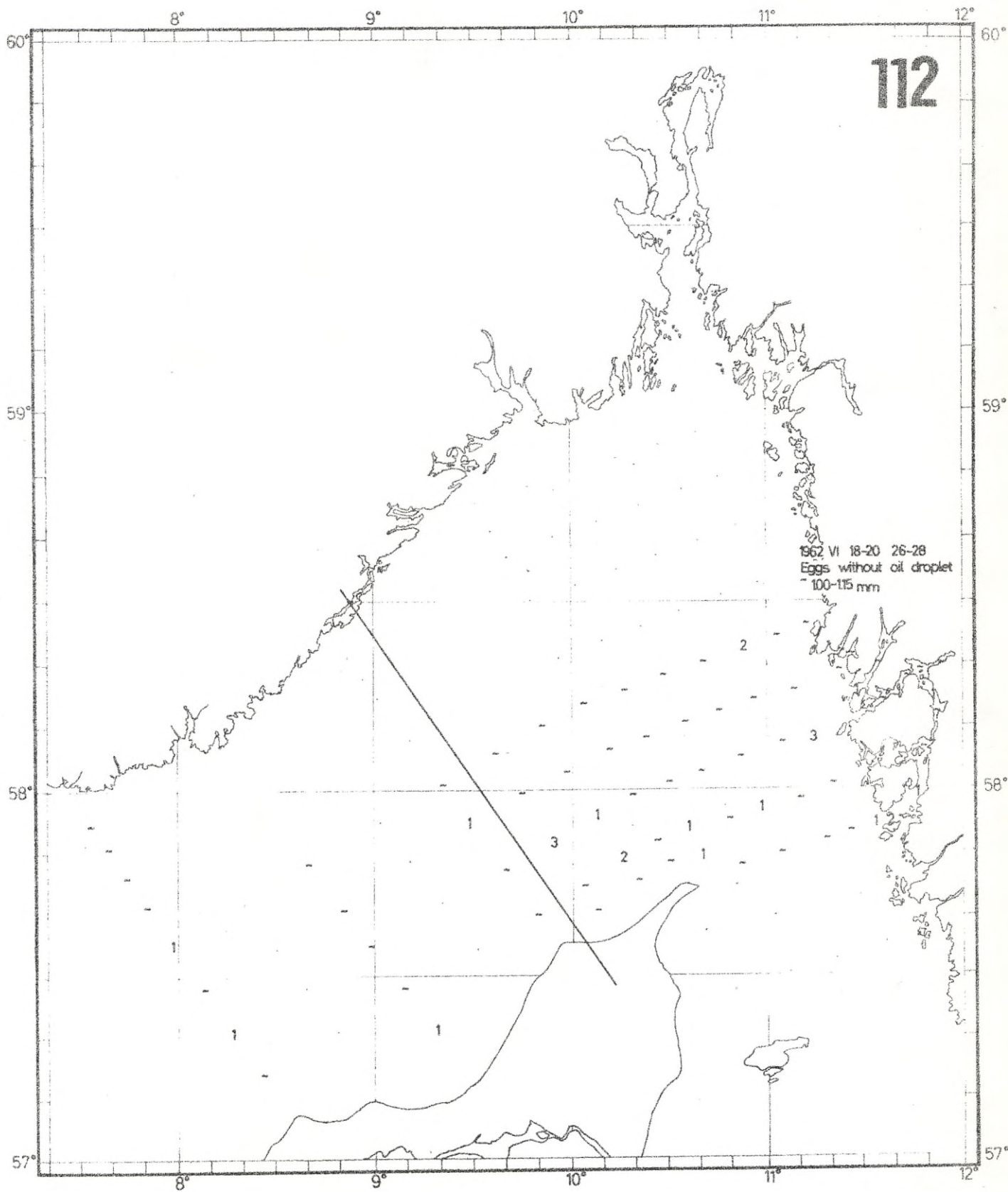




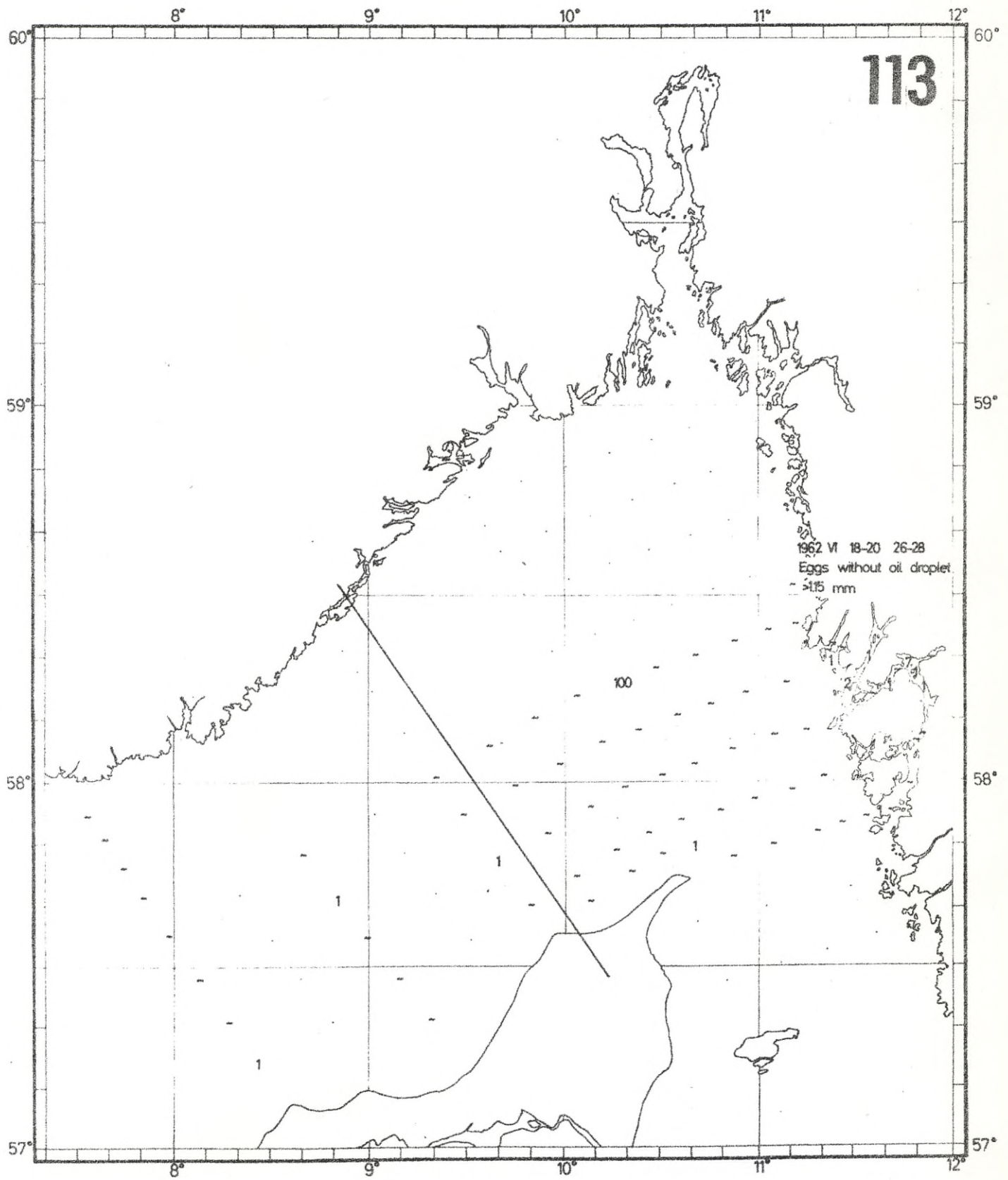








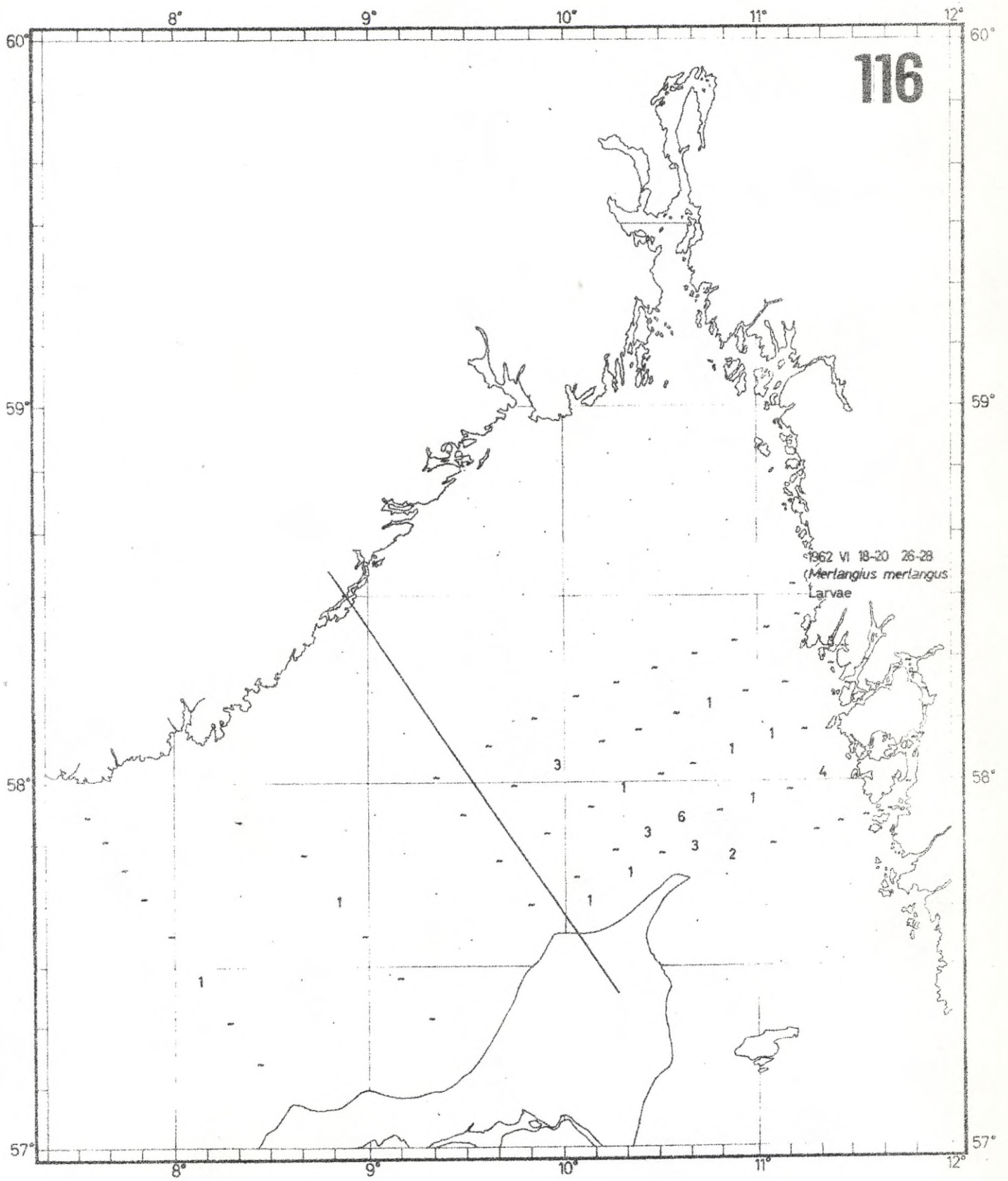




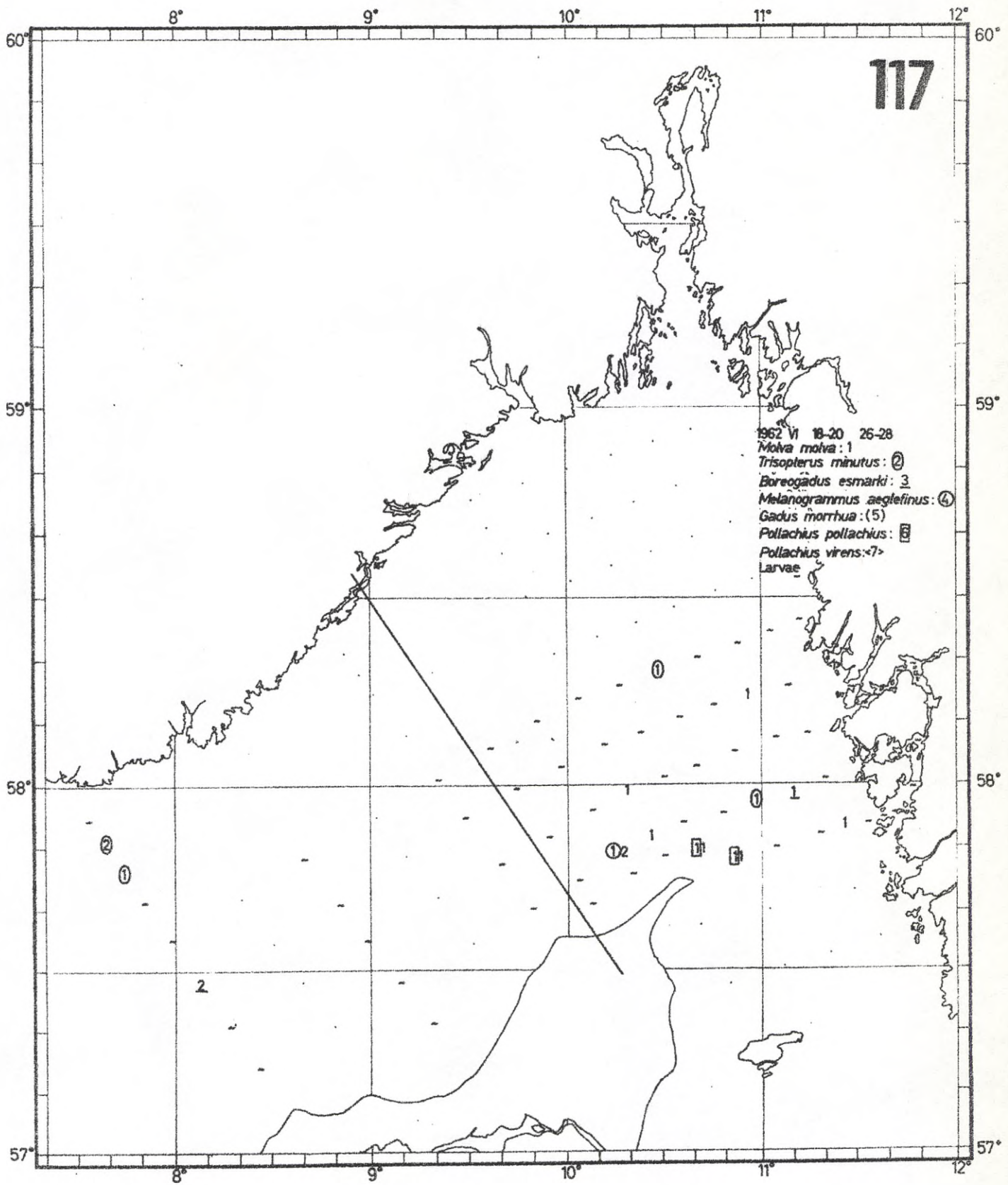




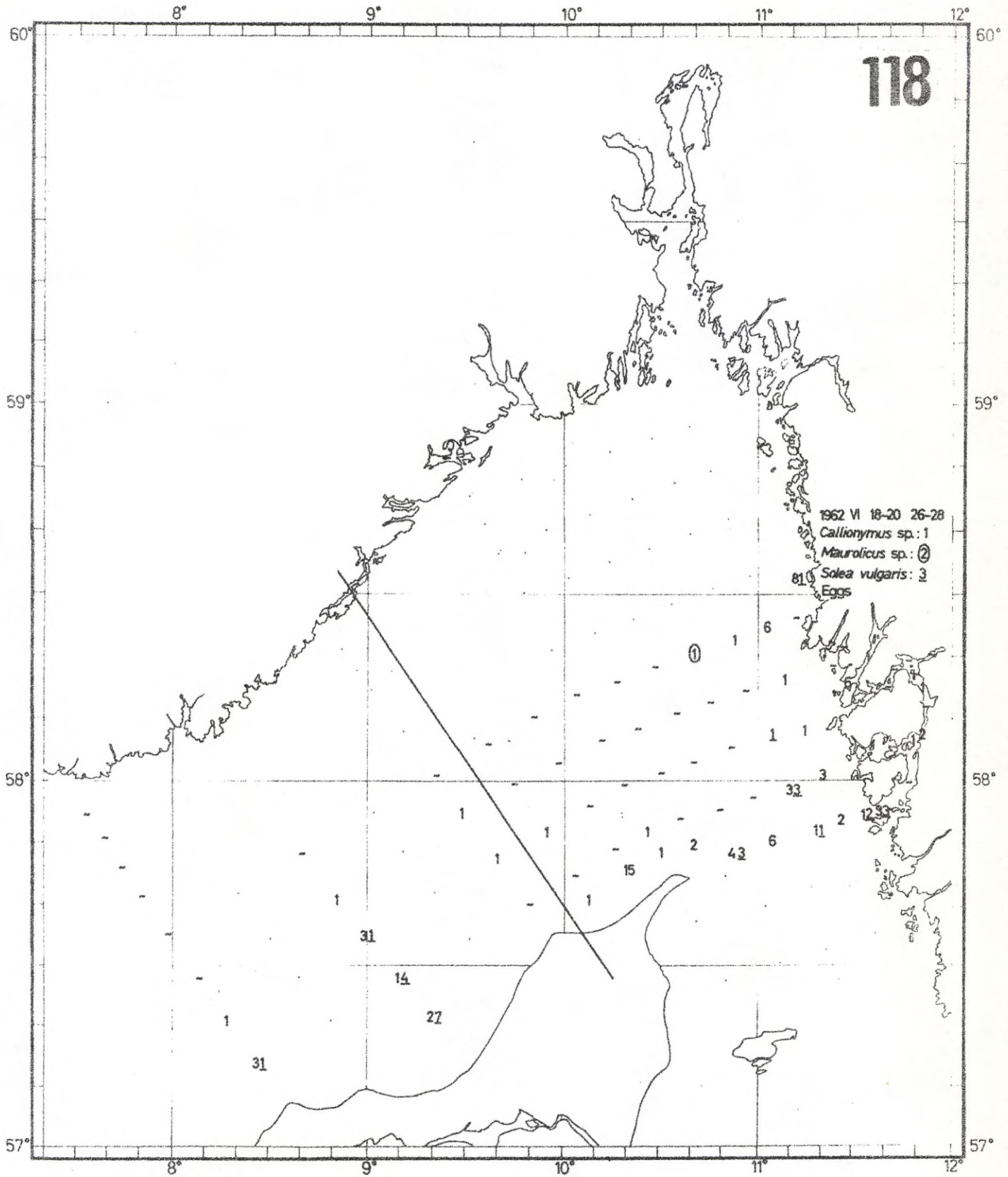




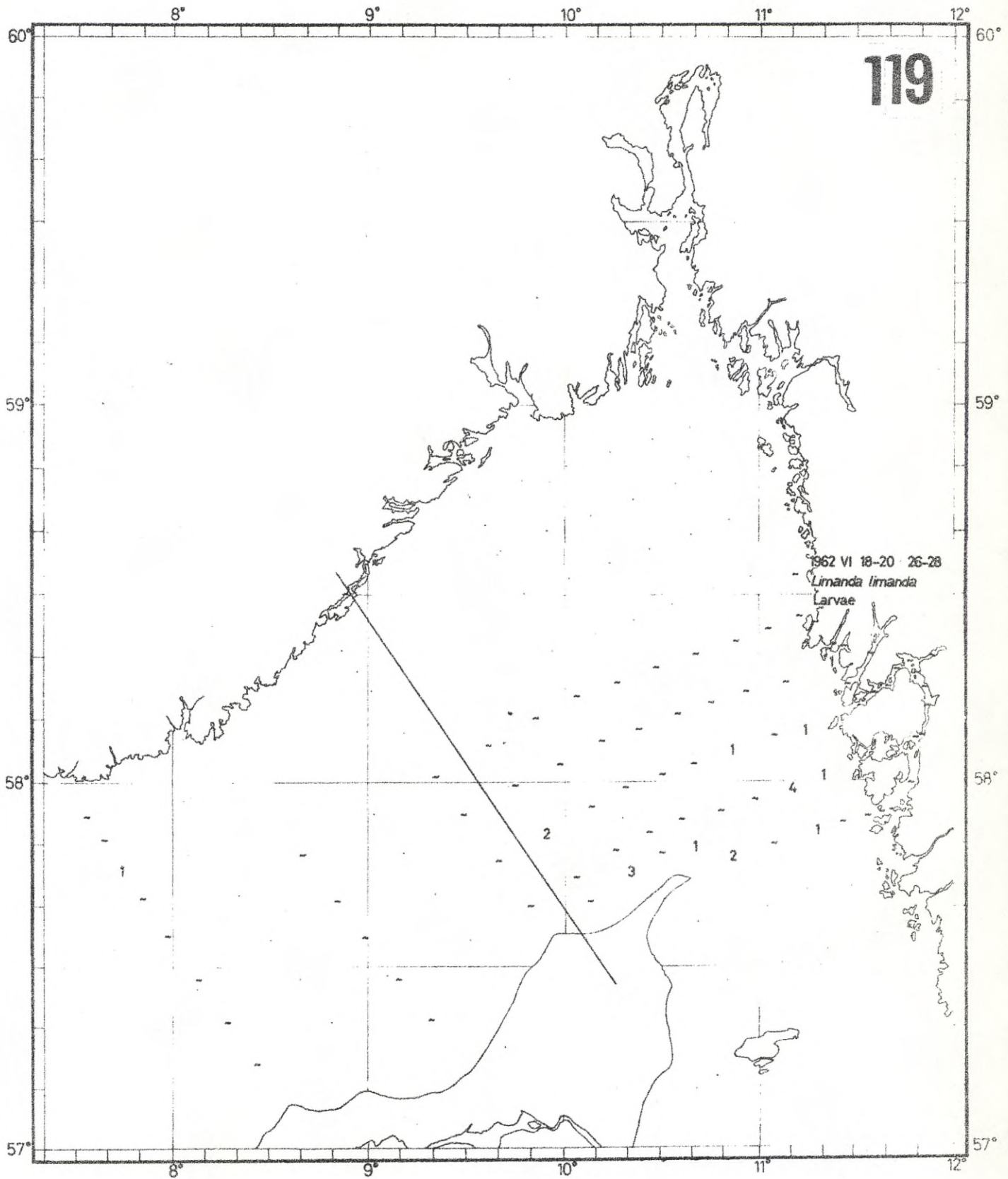


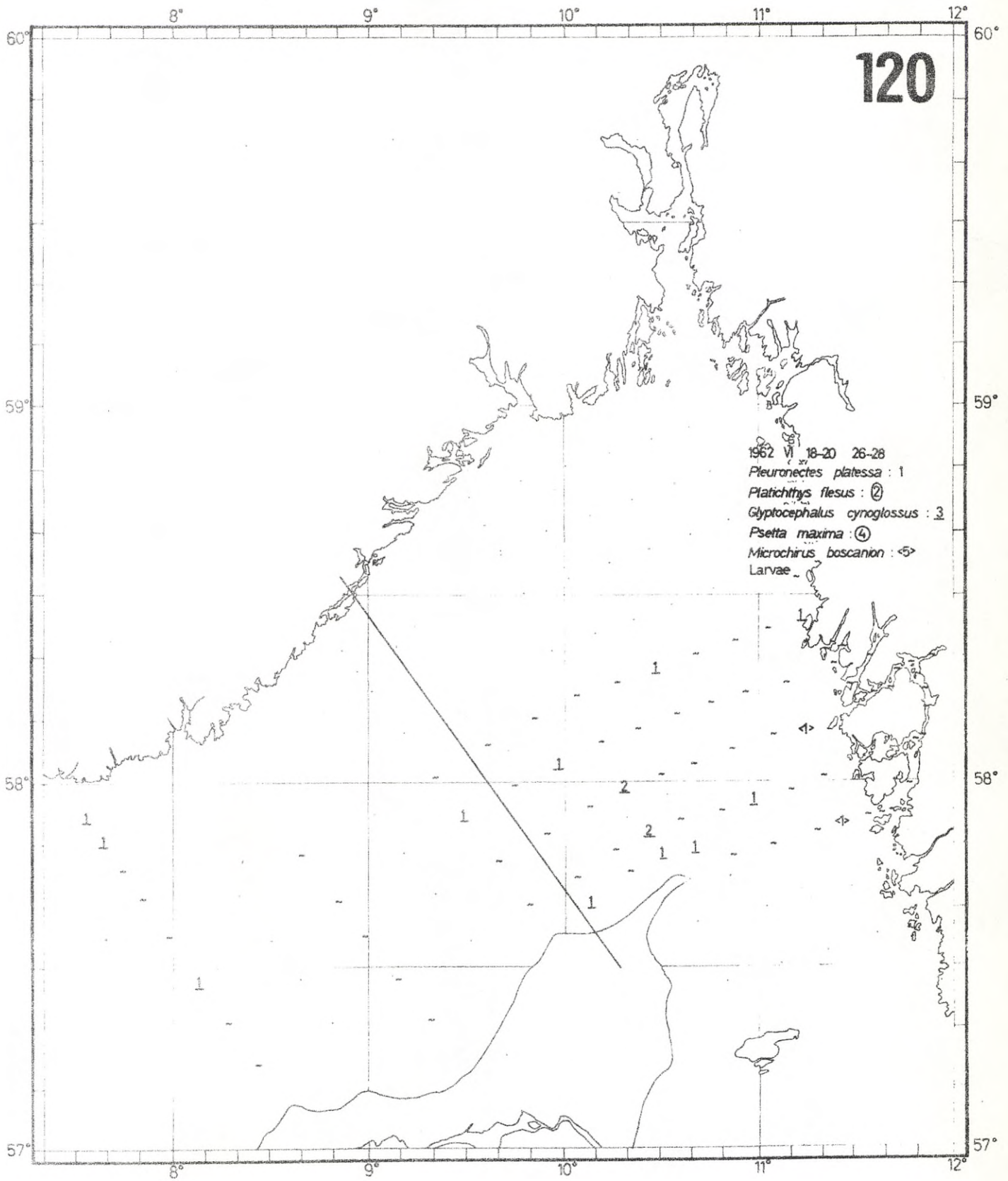


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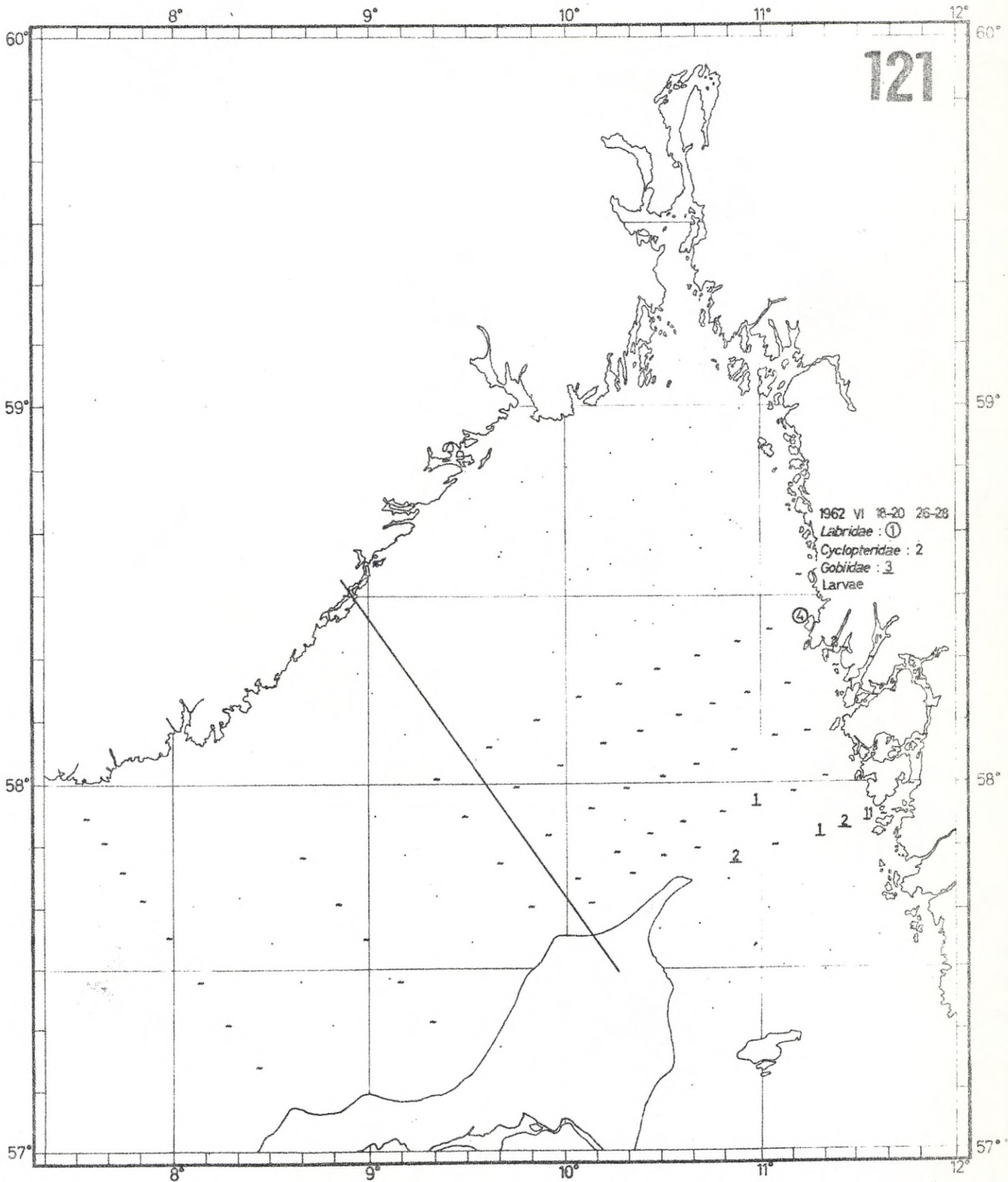


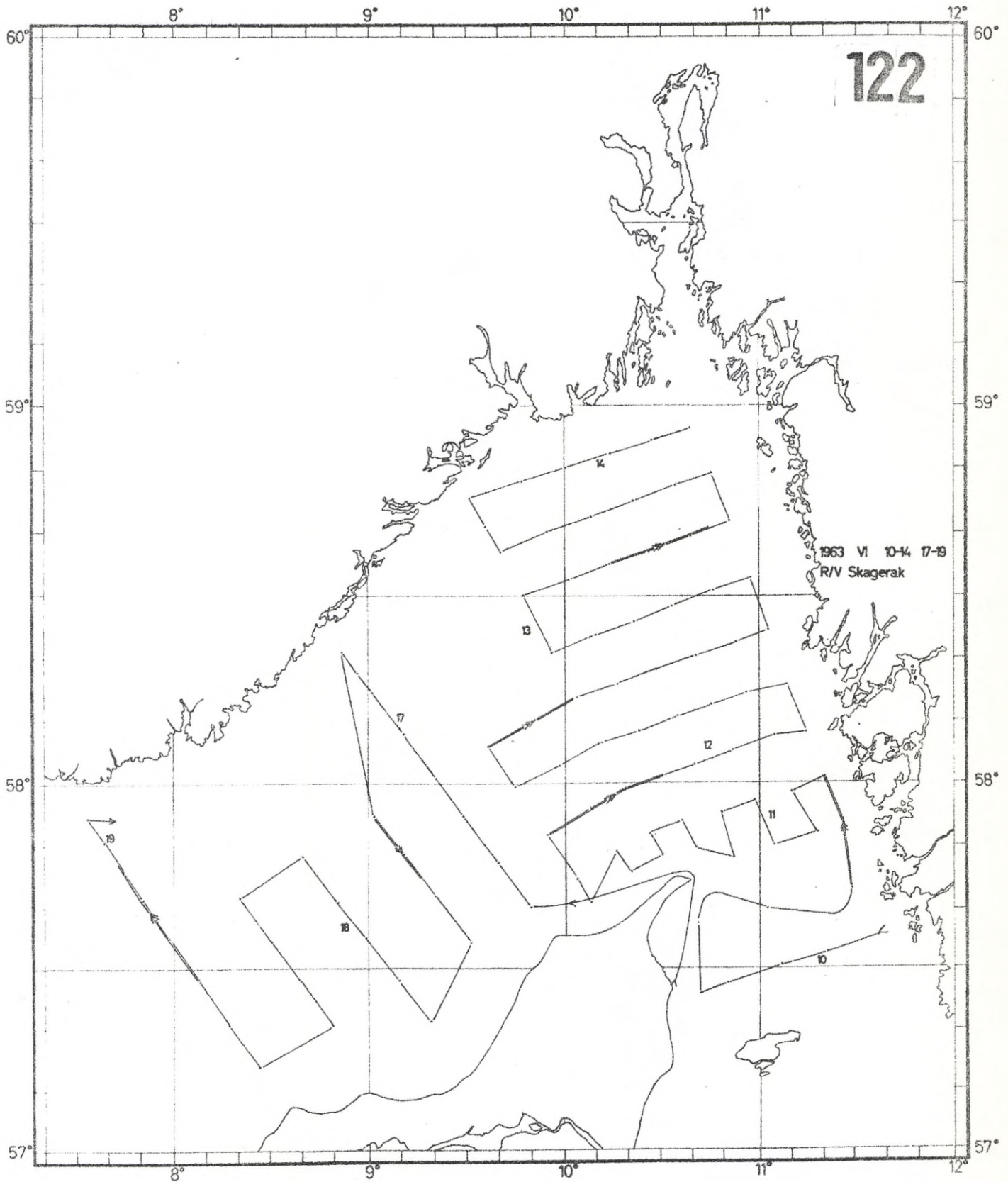




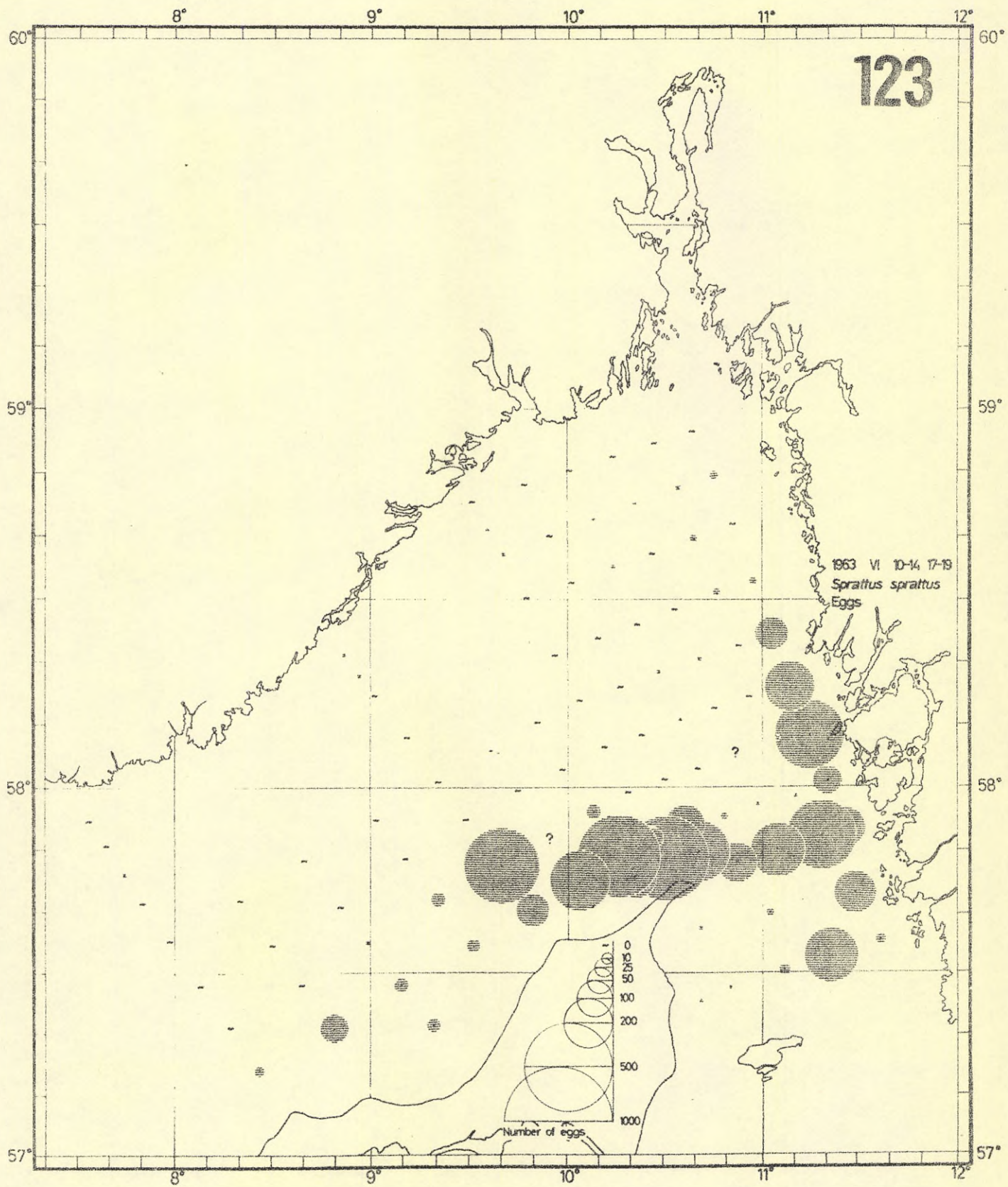






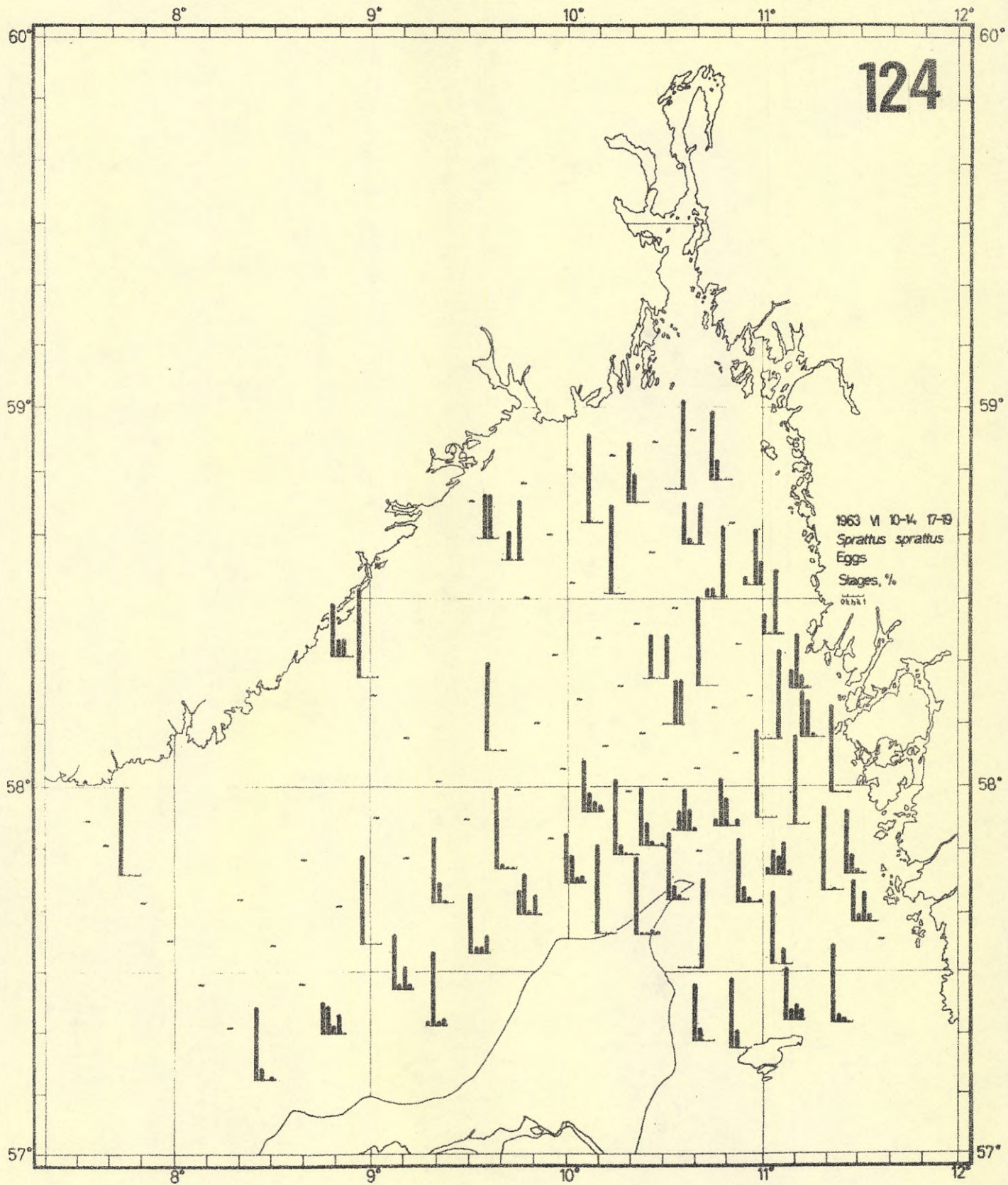




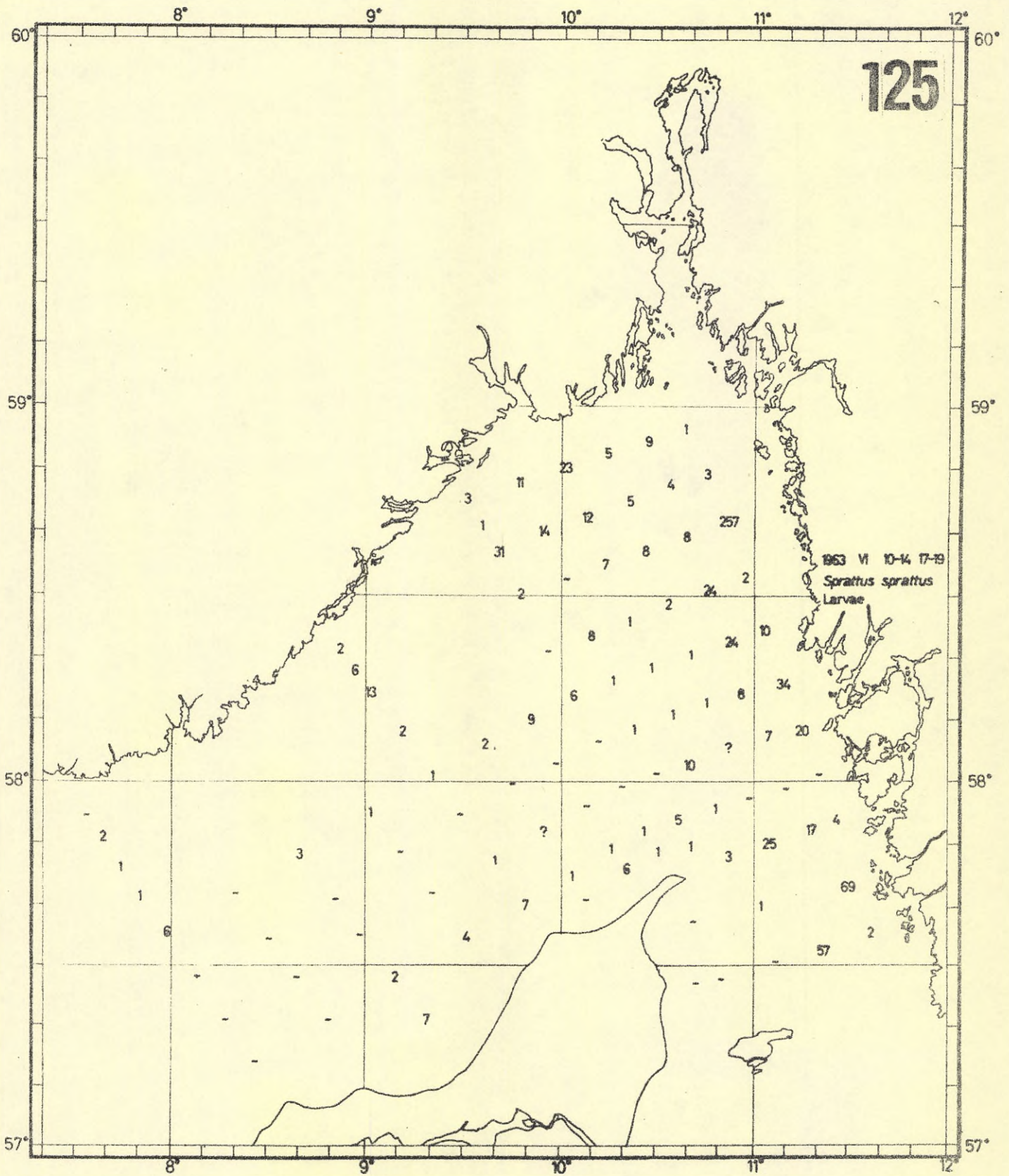




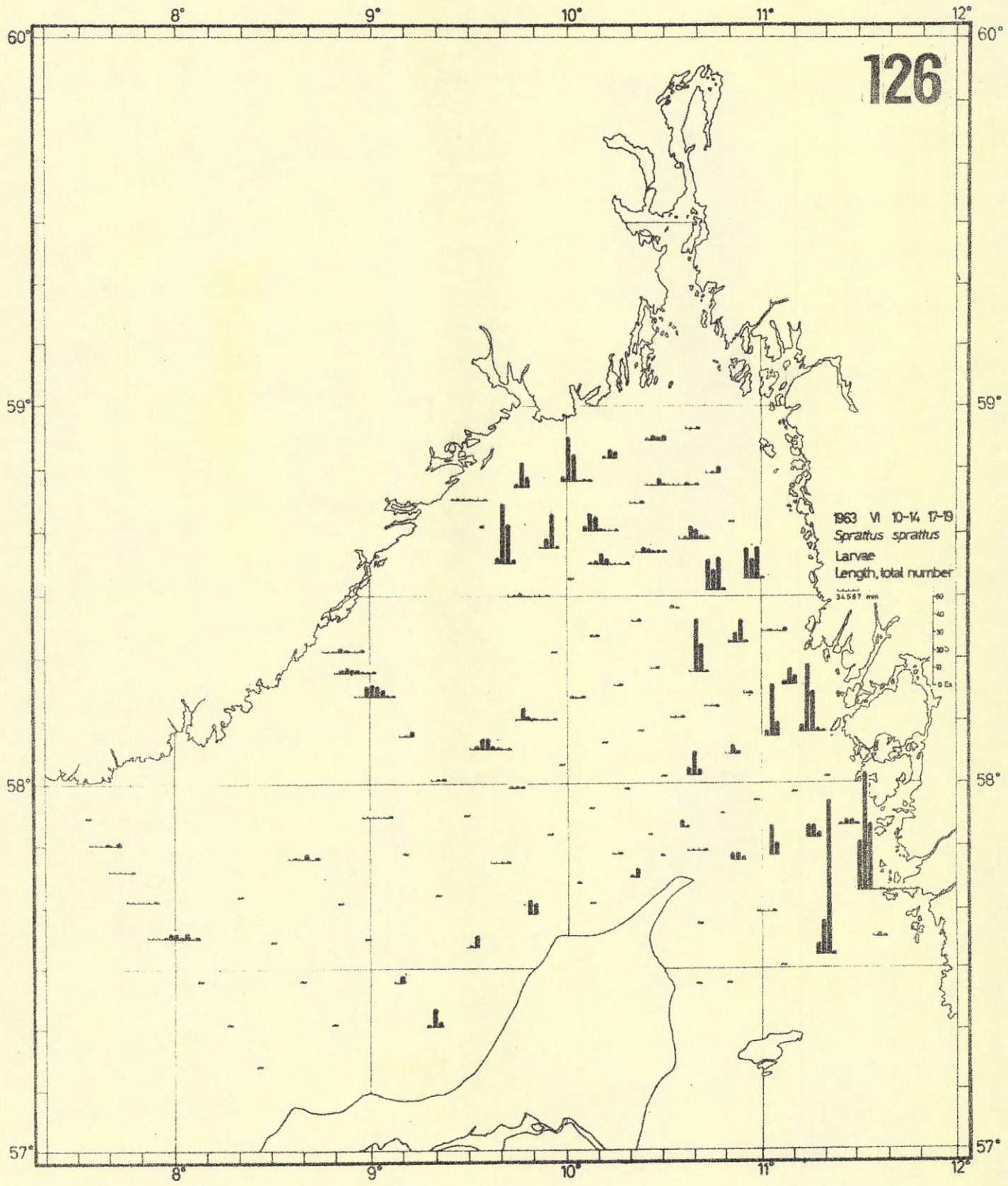
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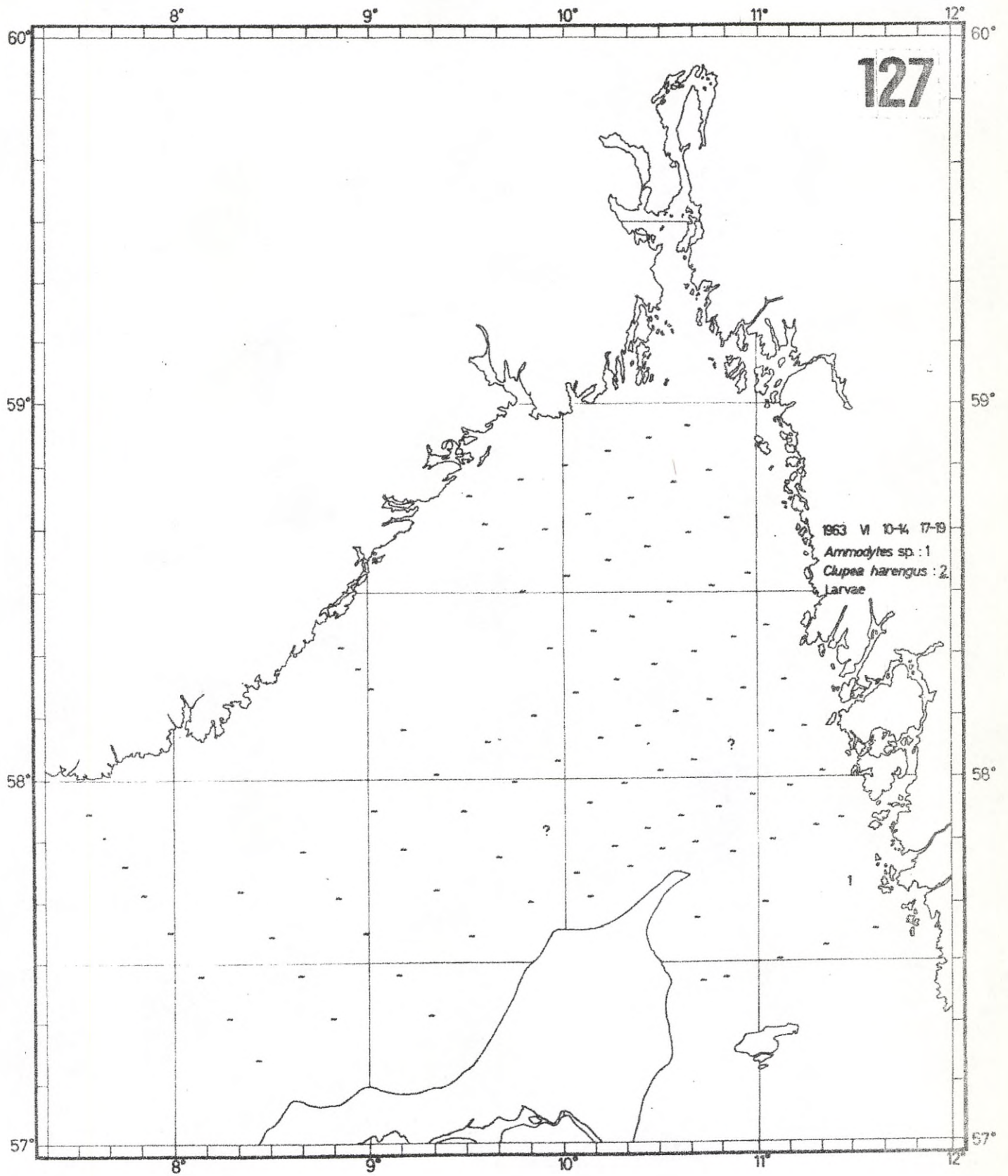






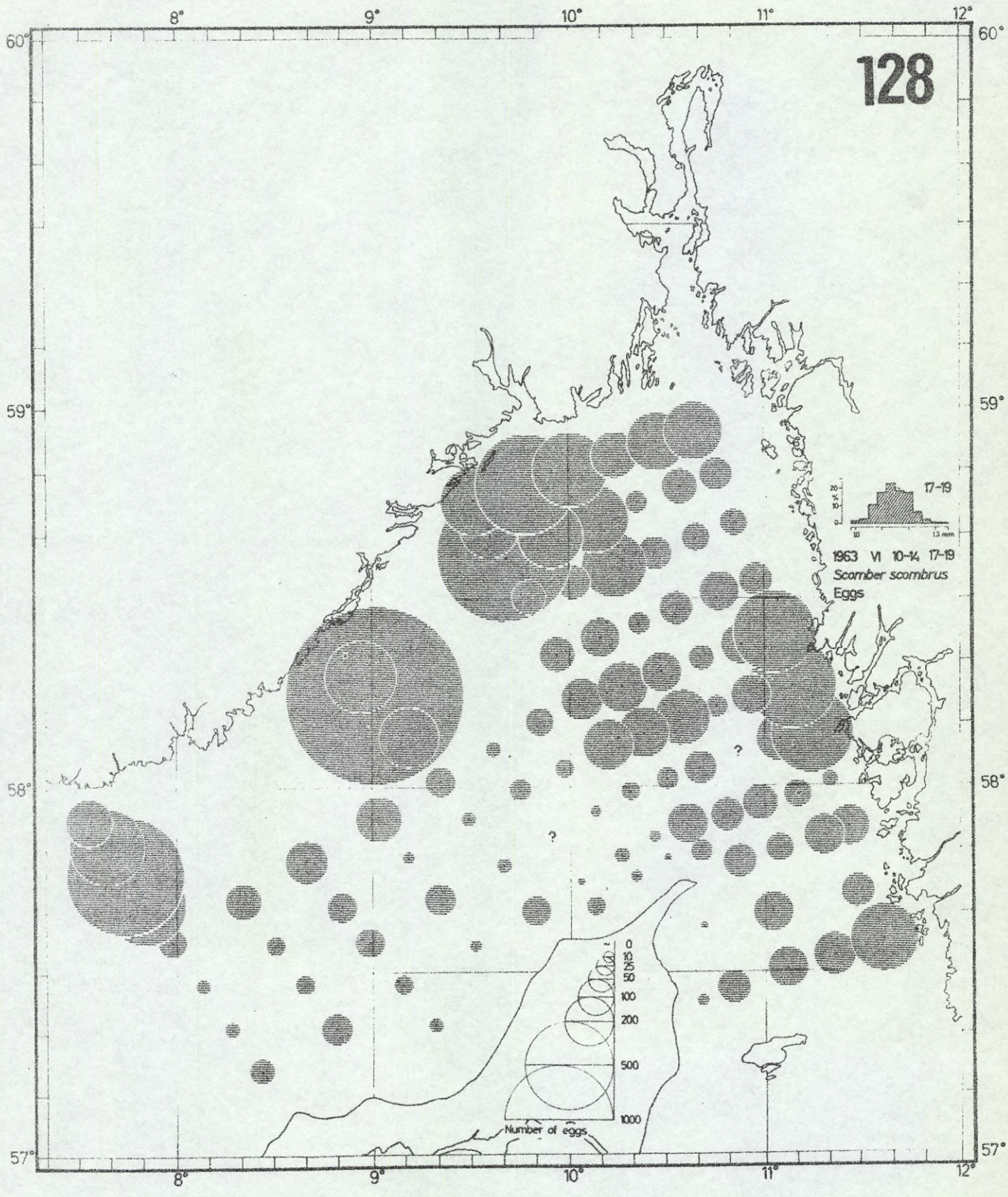








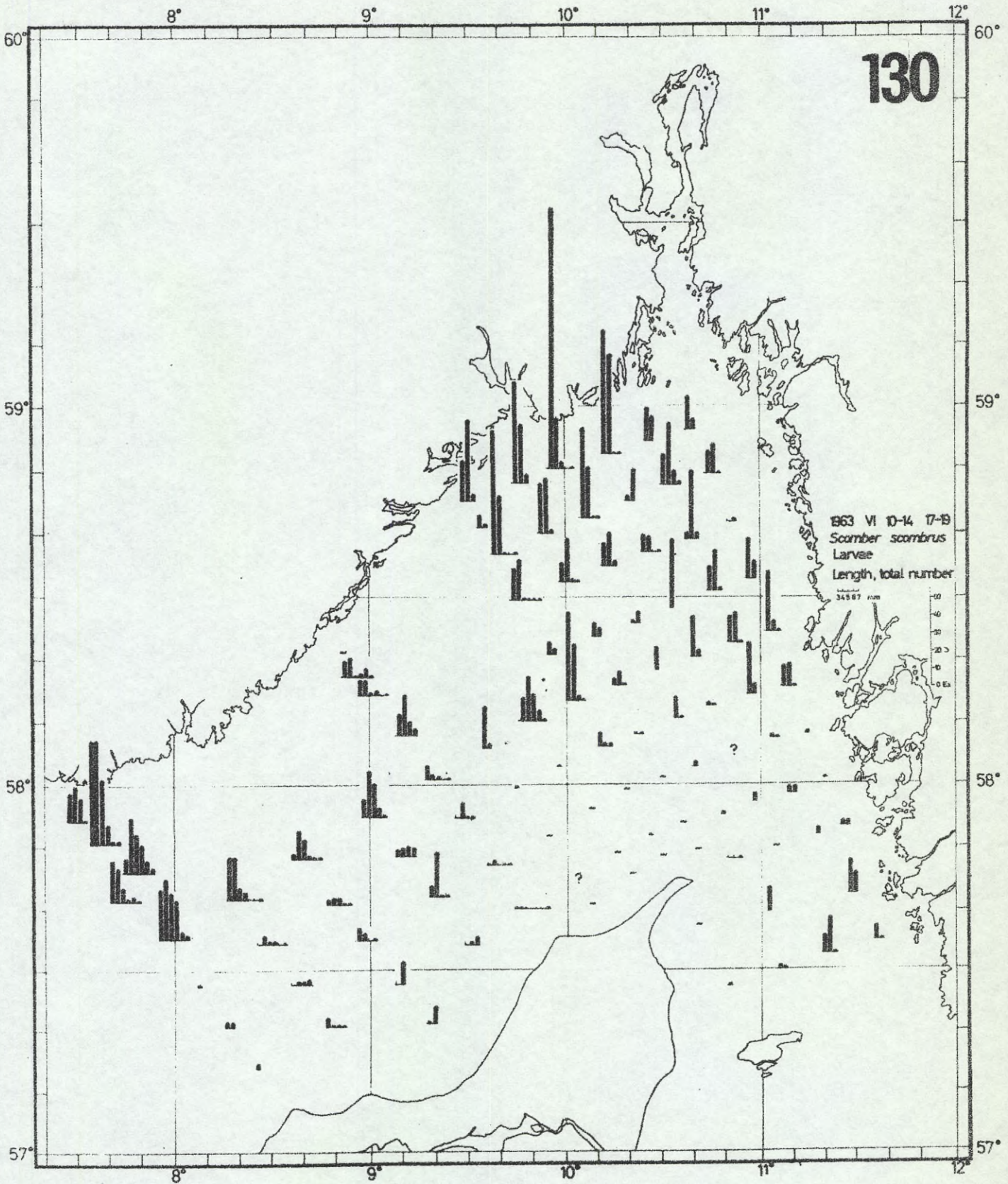
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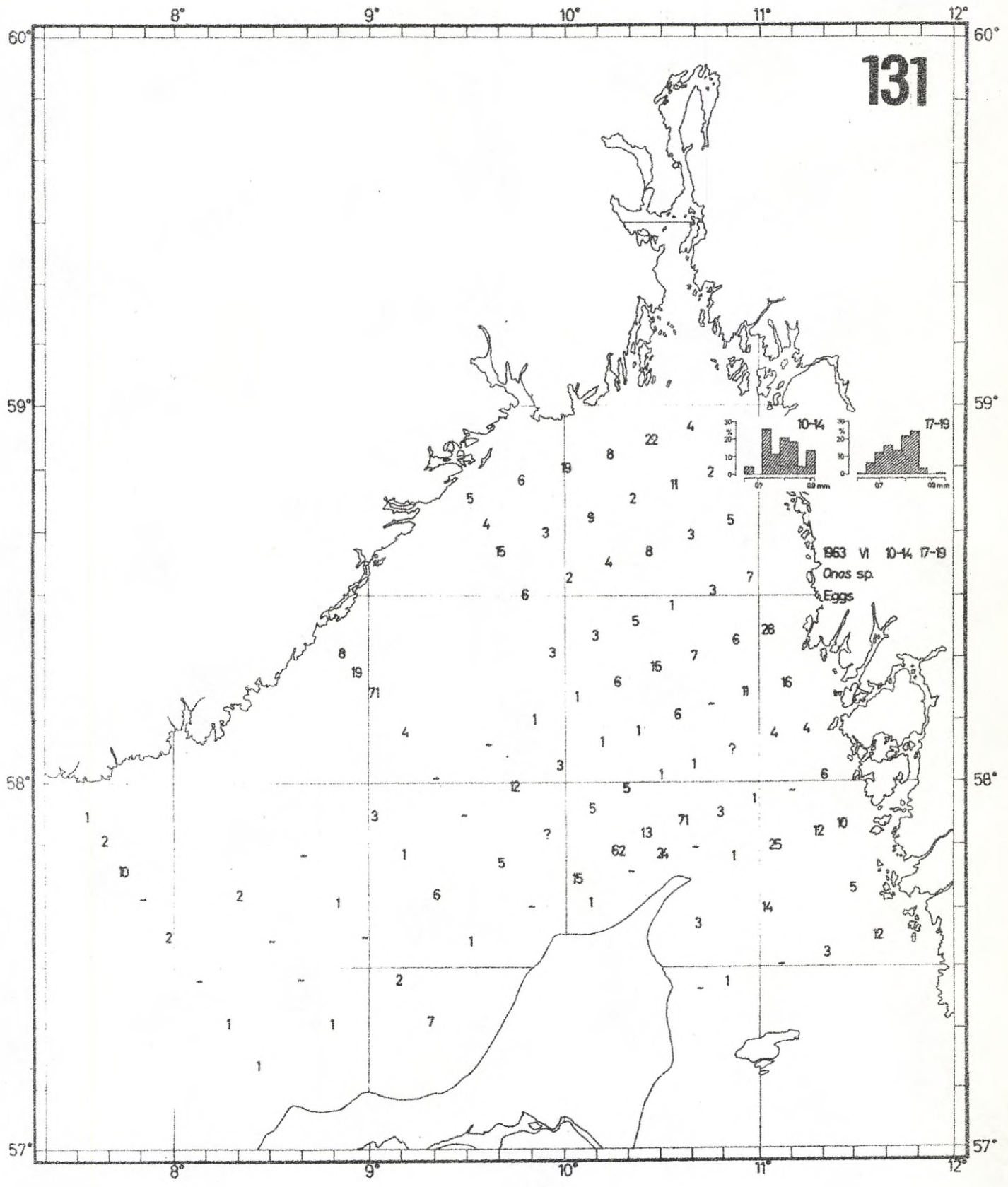


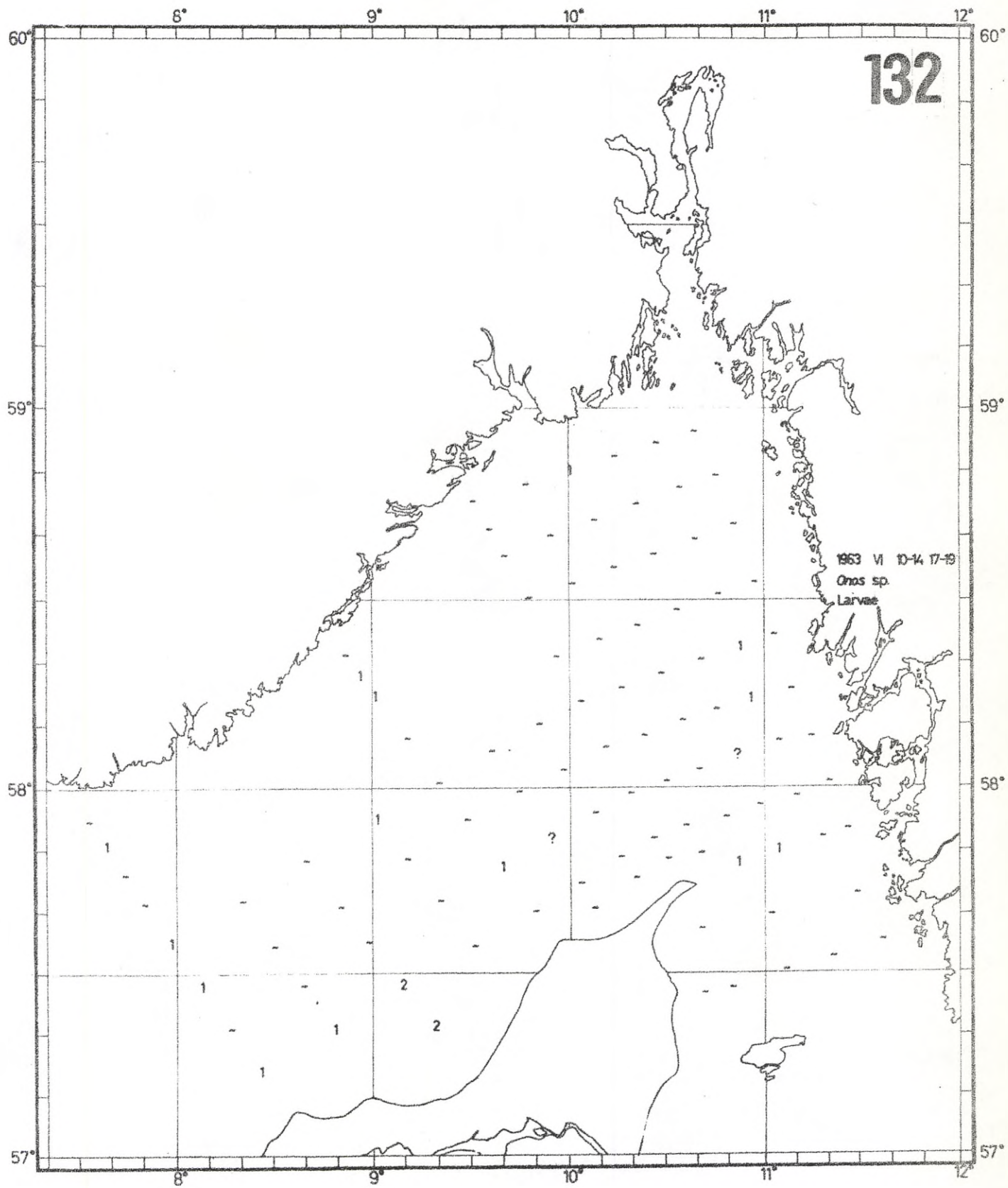




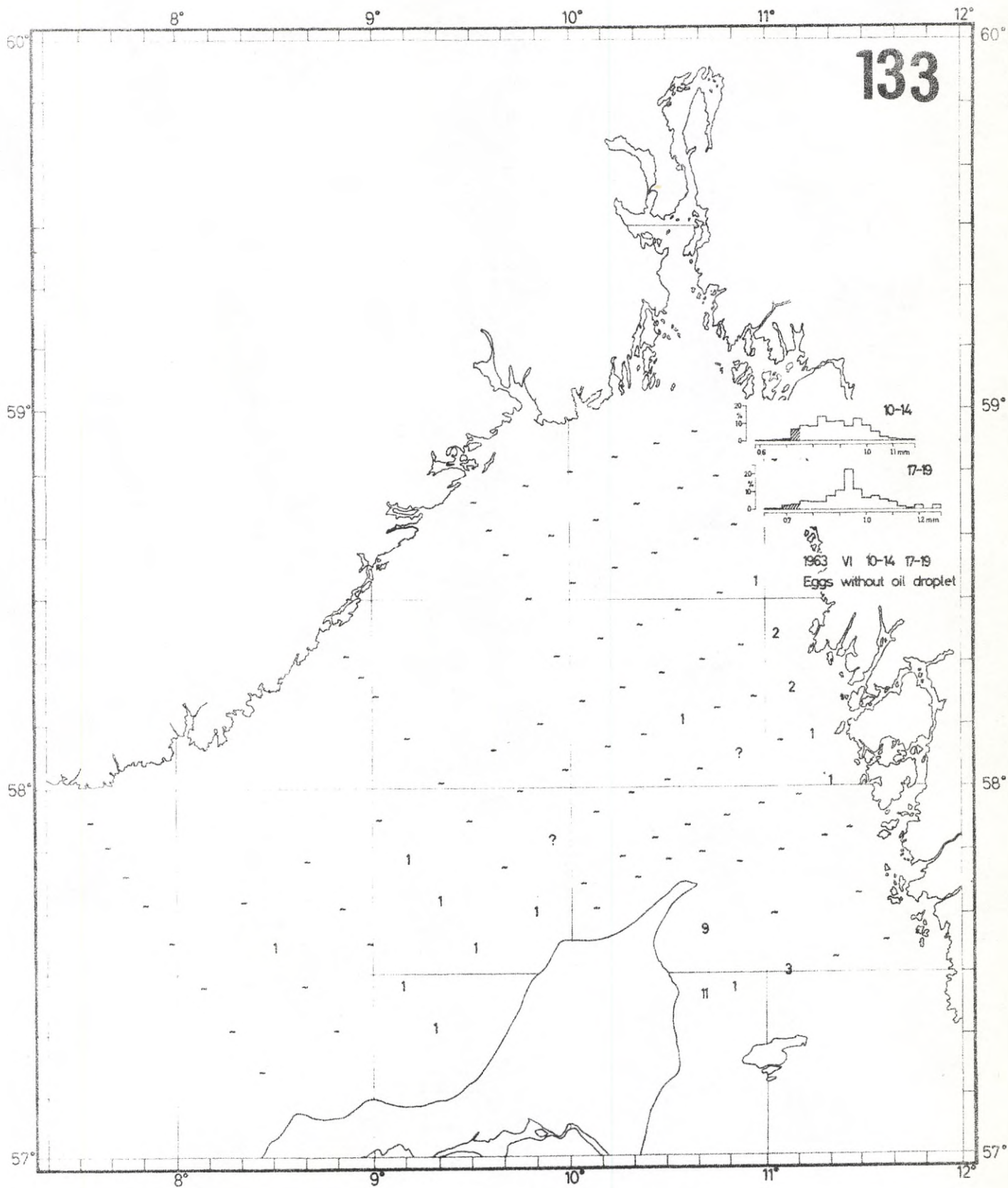


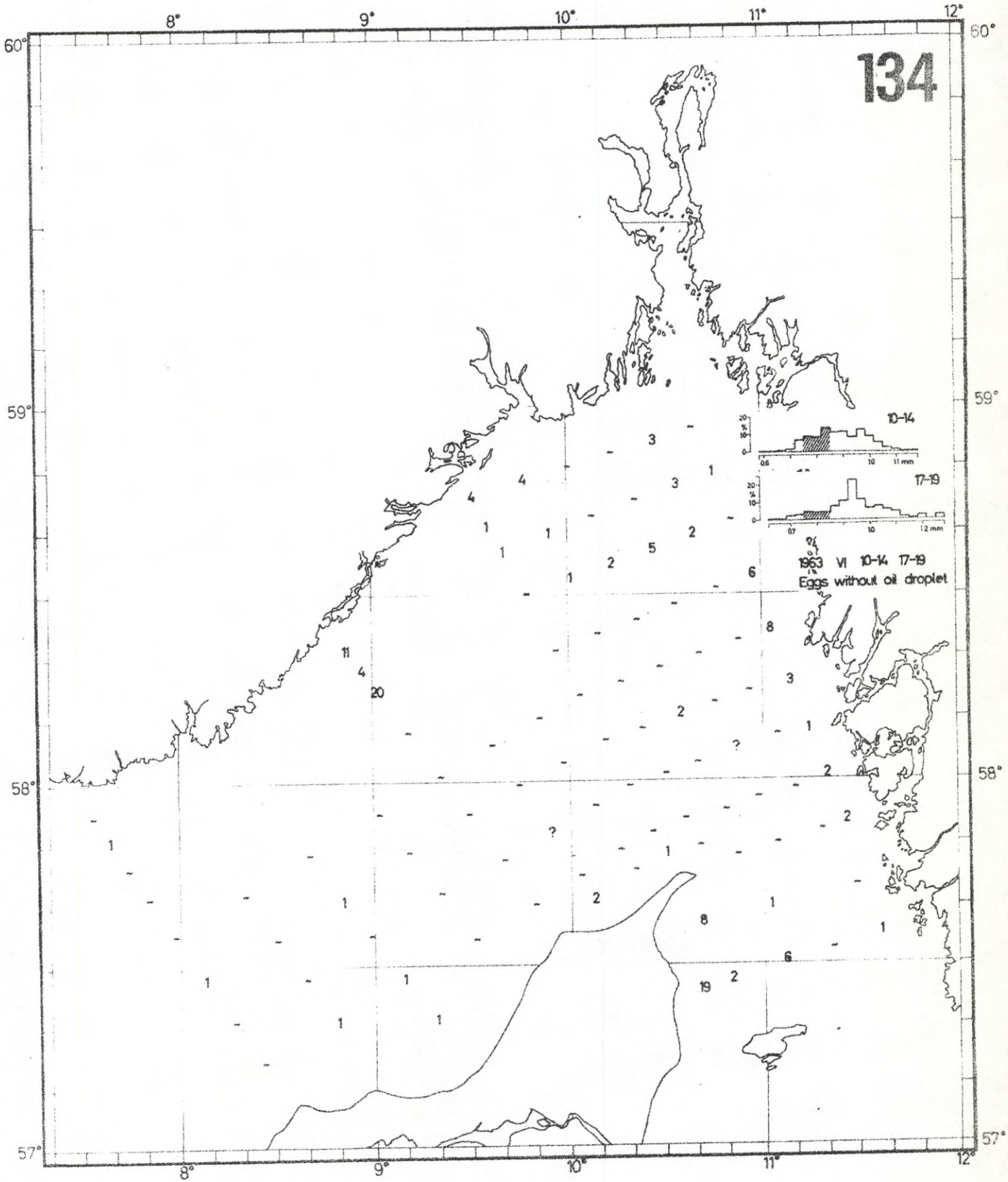




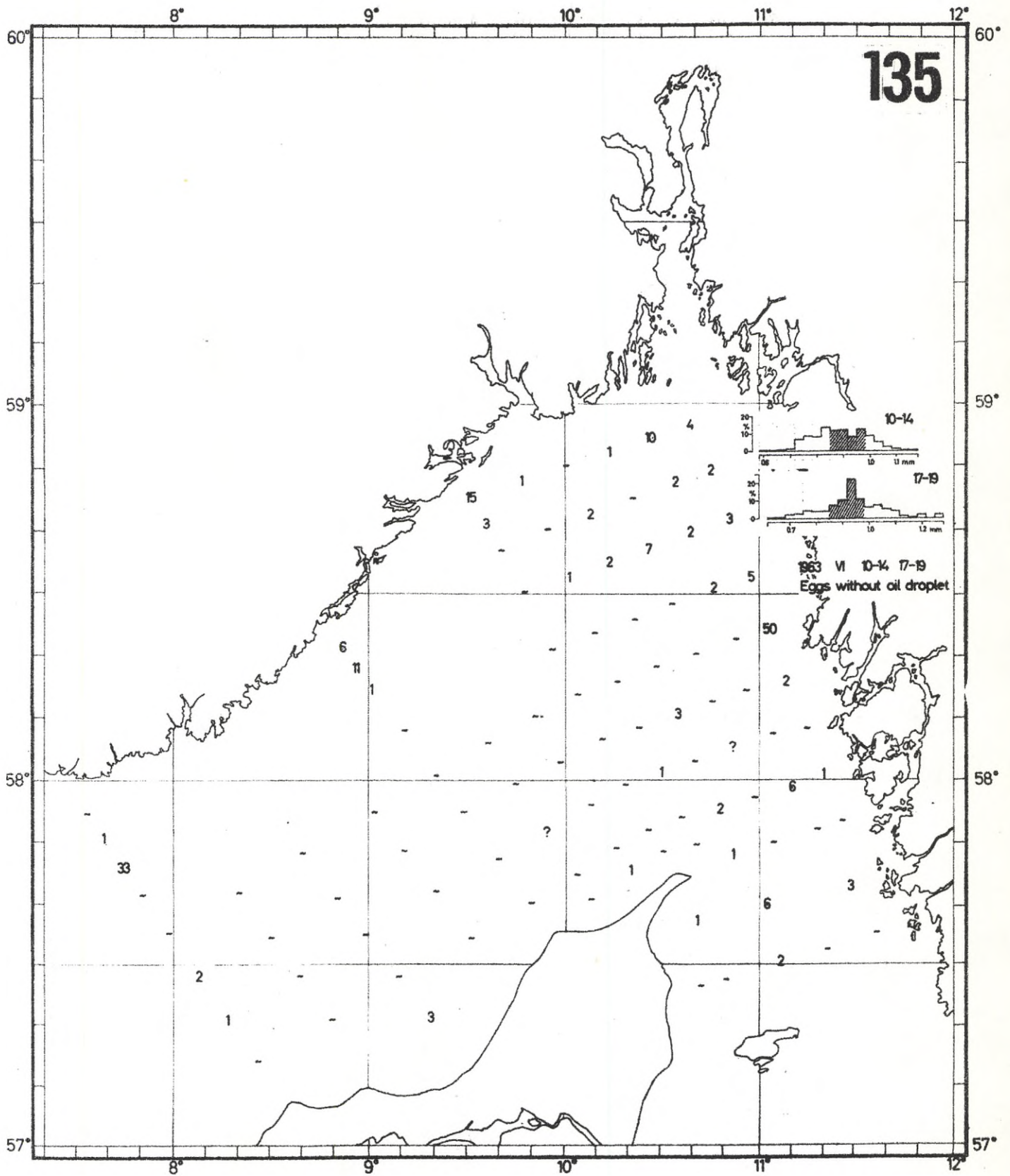




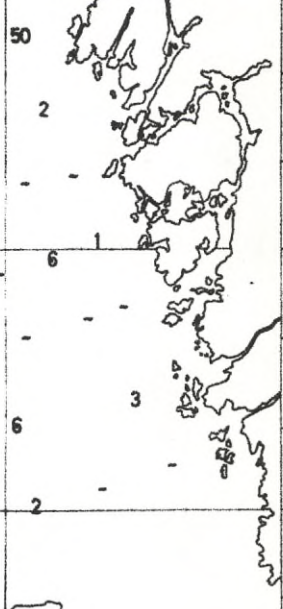
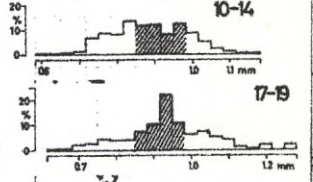








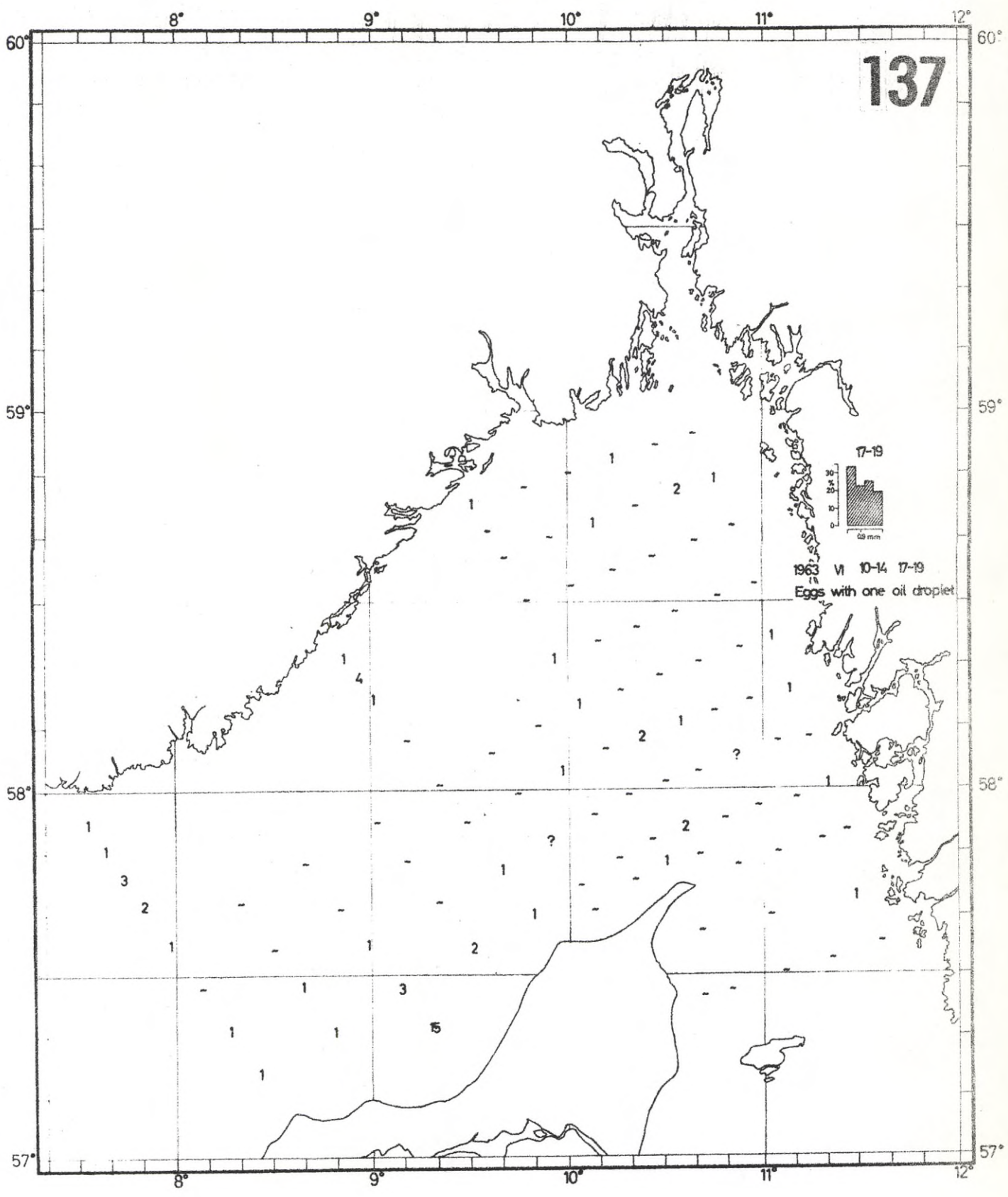
1963 VI 10-14 17-19  
Eggs without oil droplet



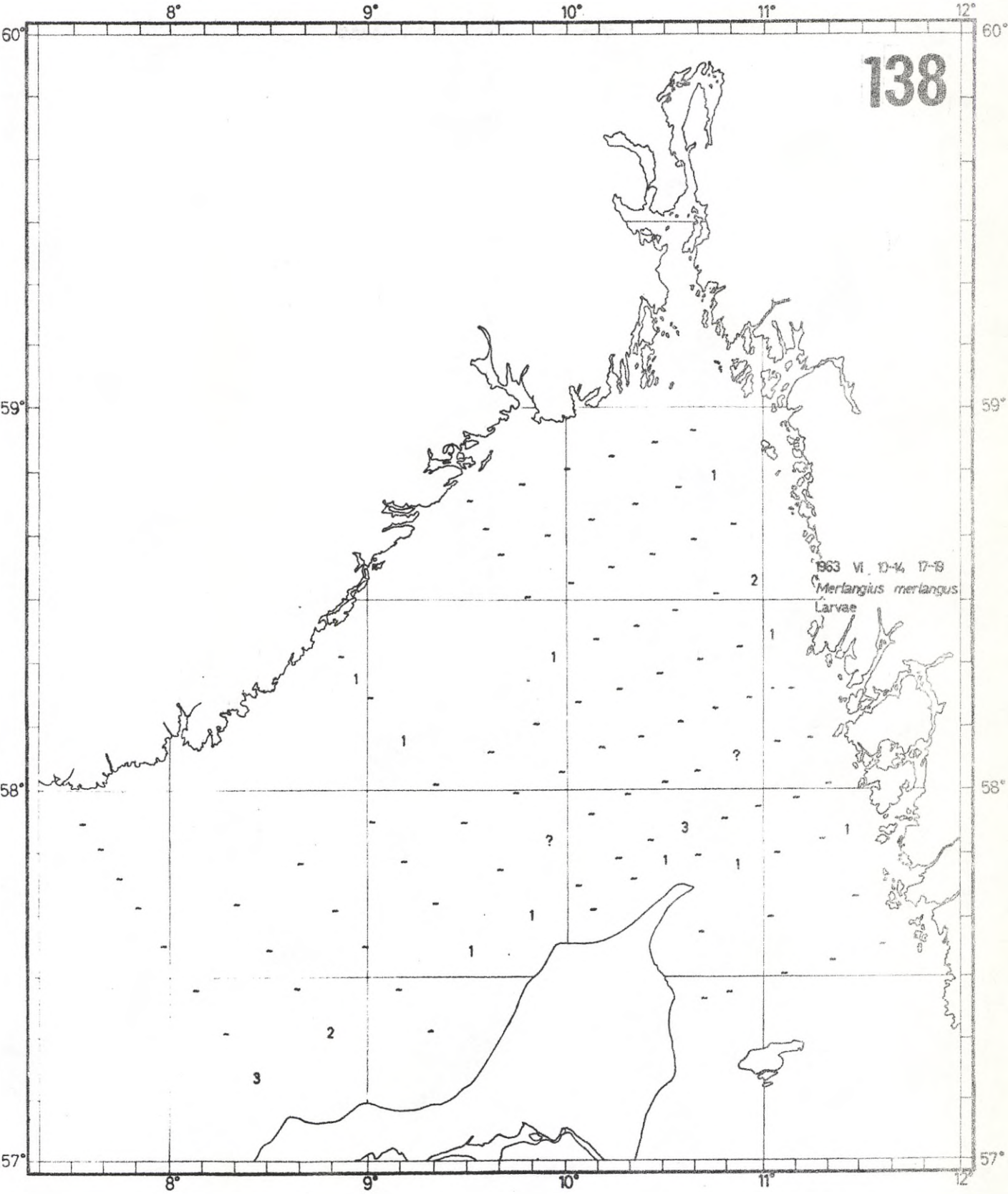




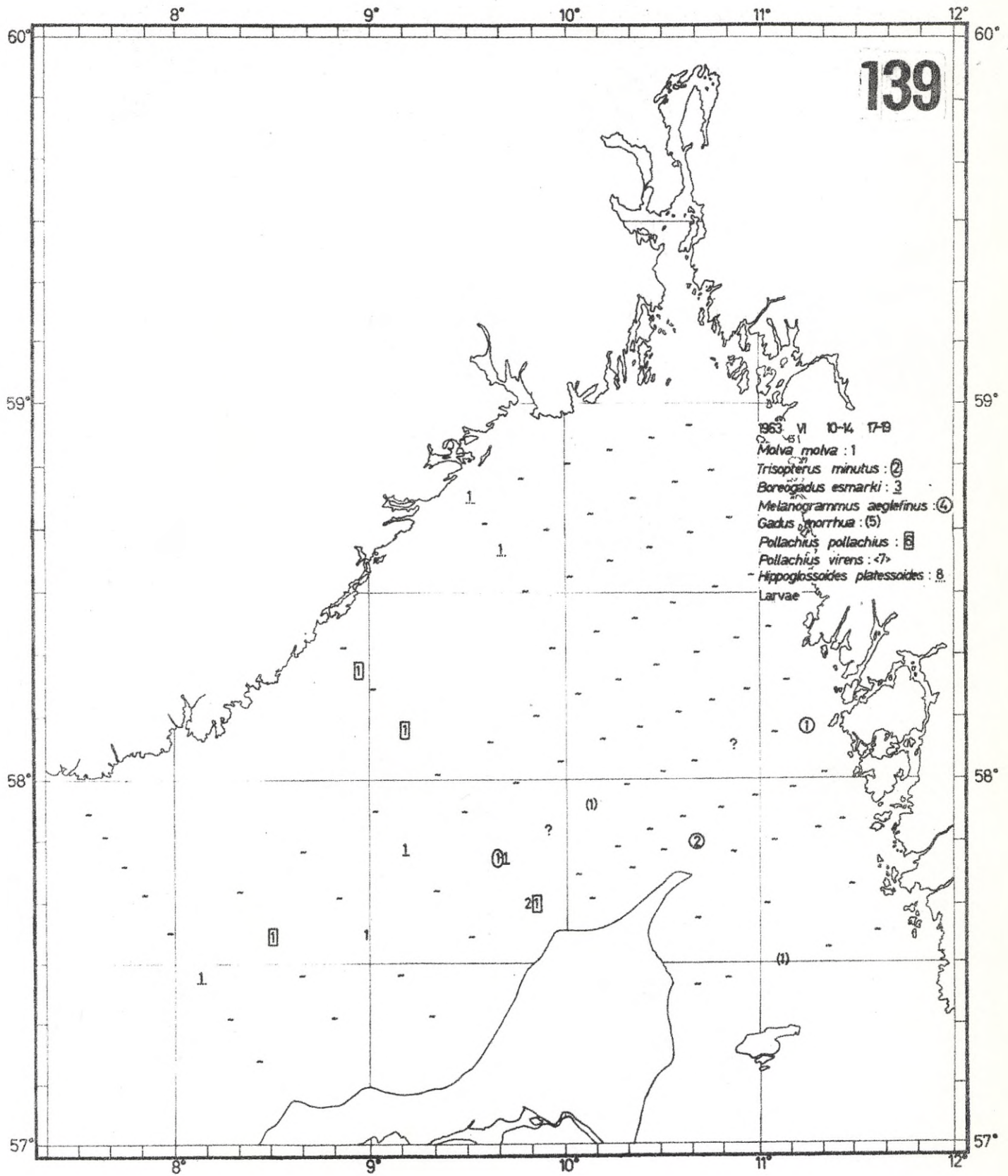
137

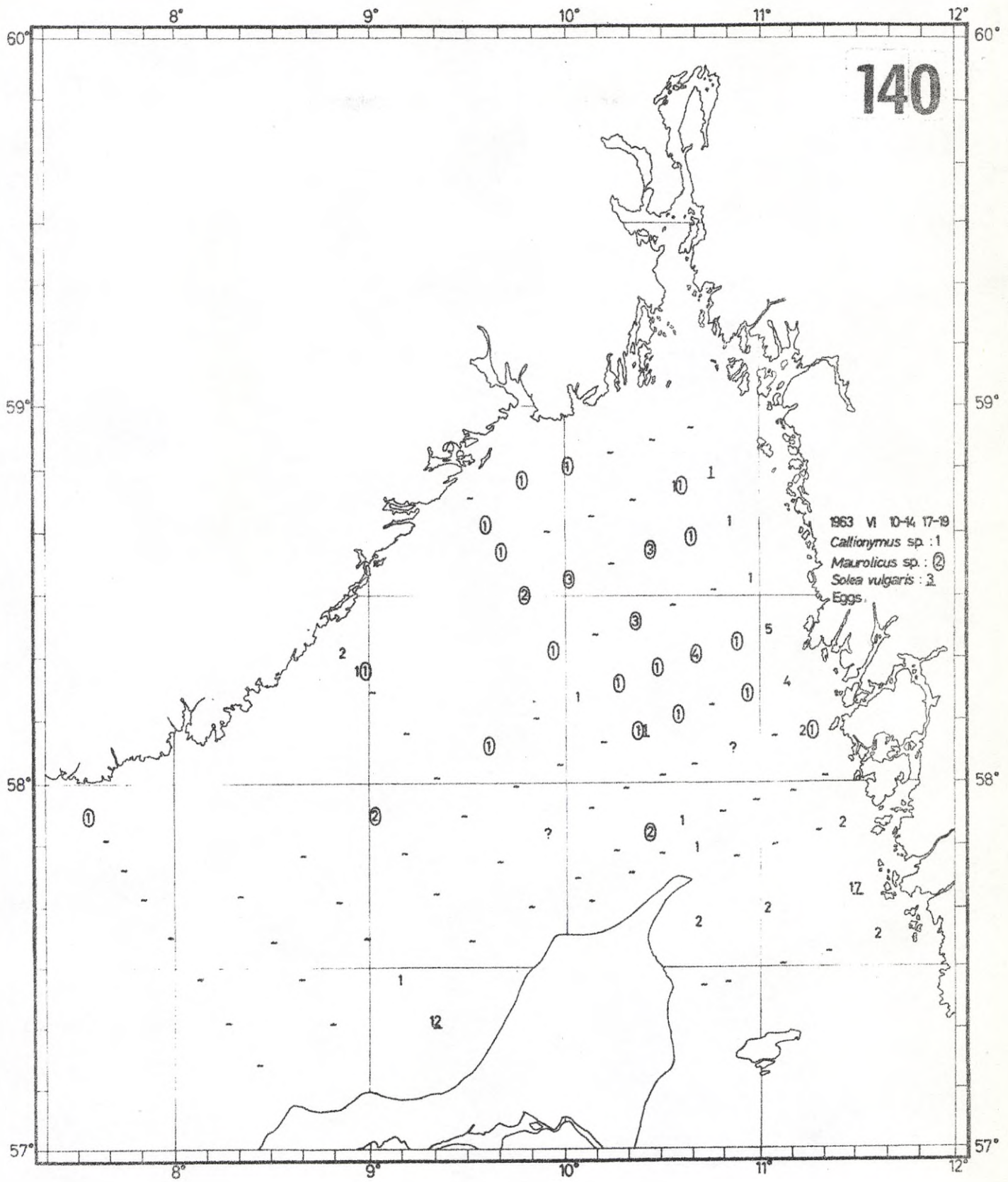


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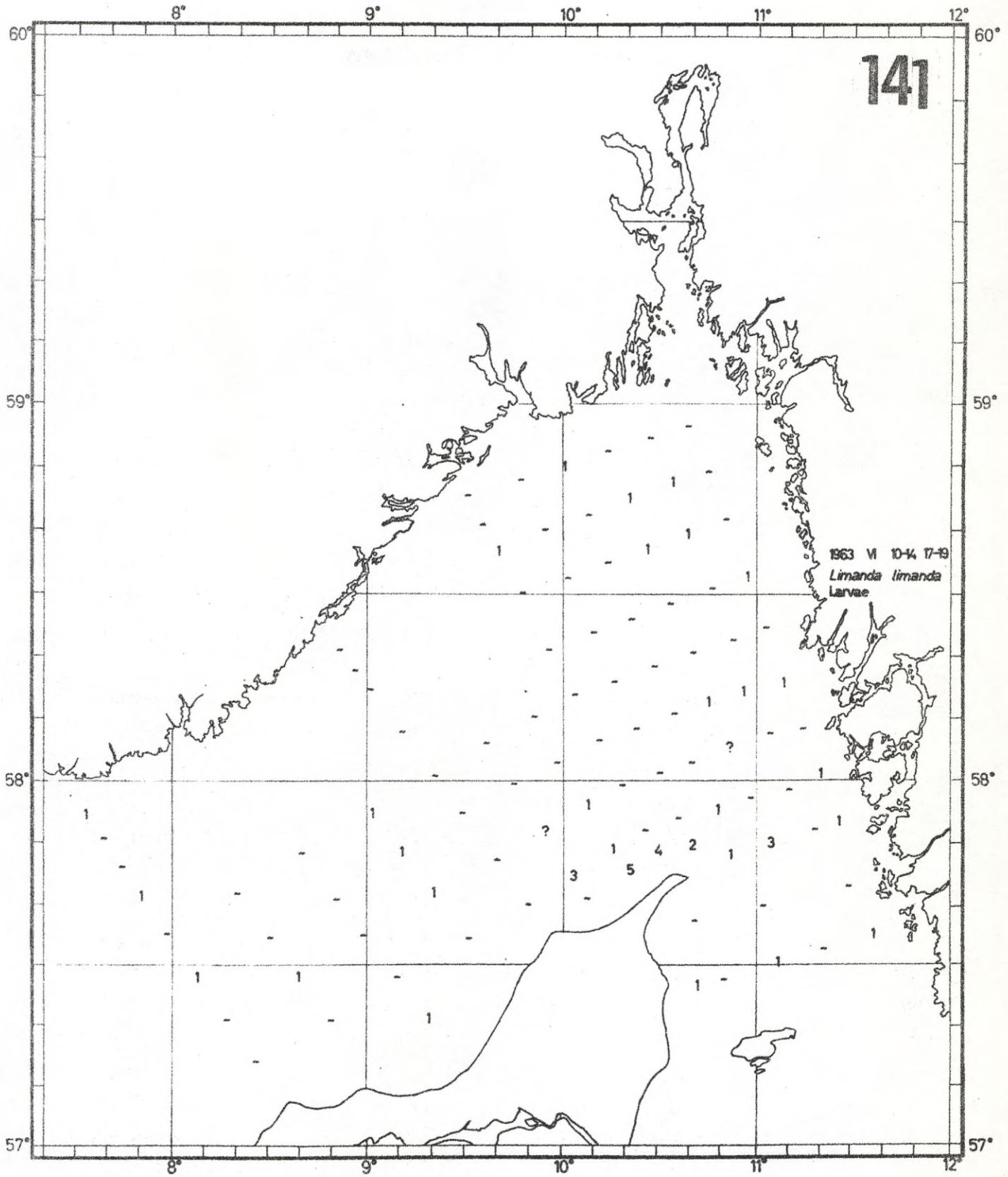


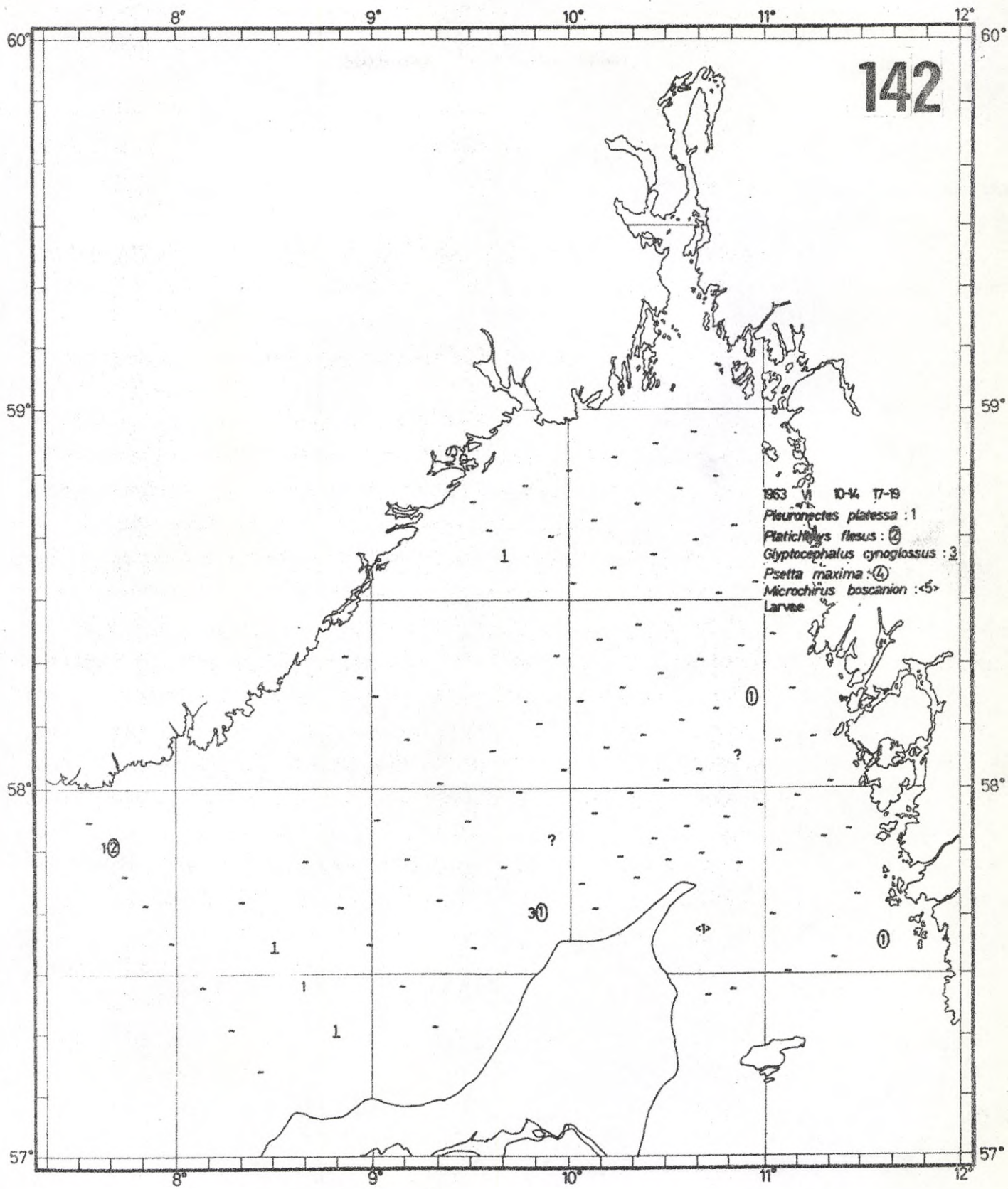






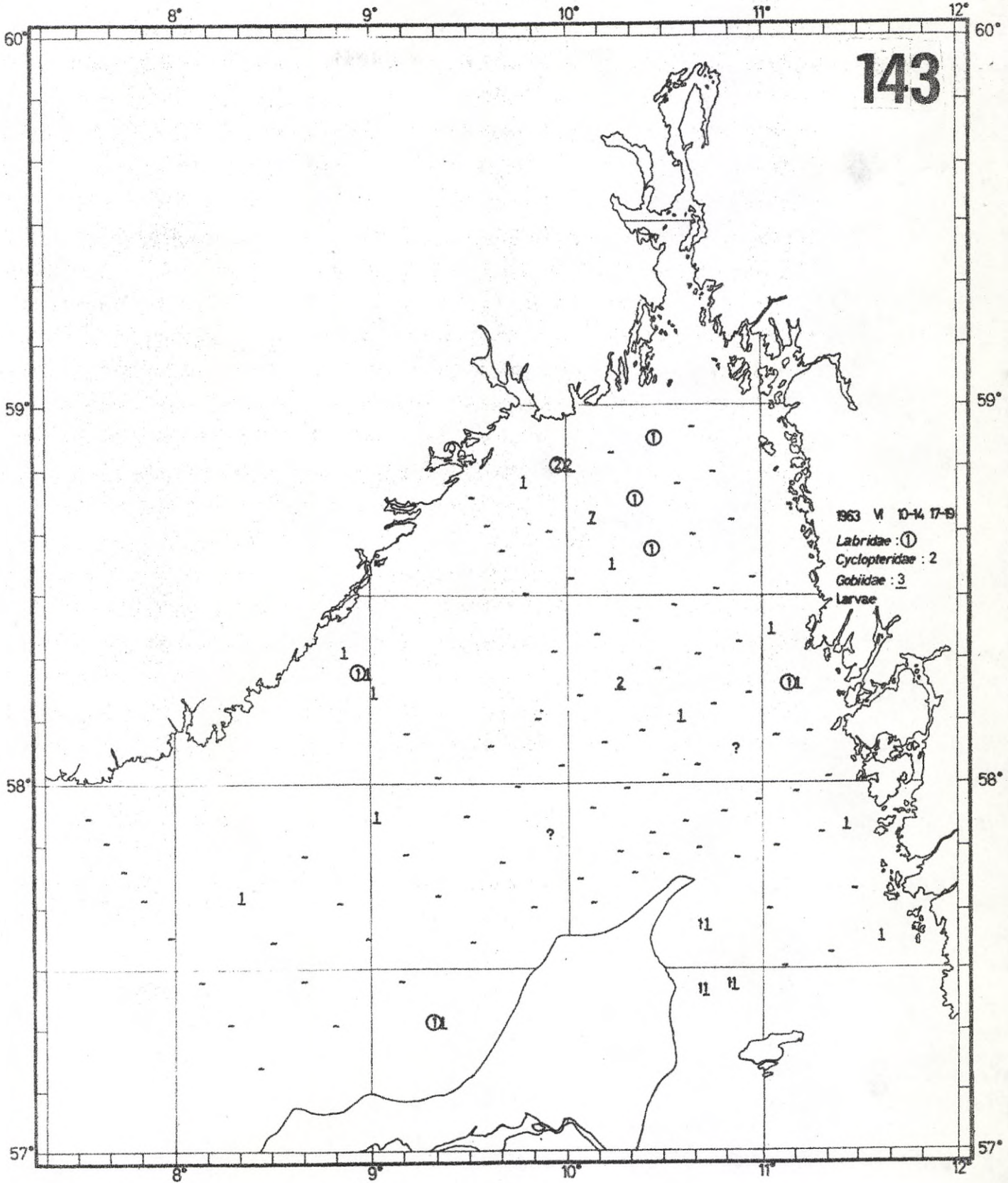


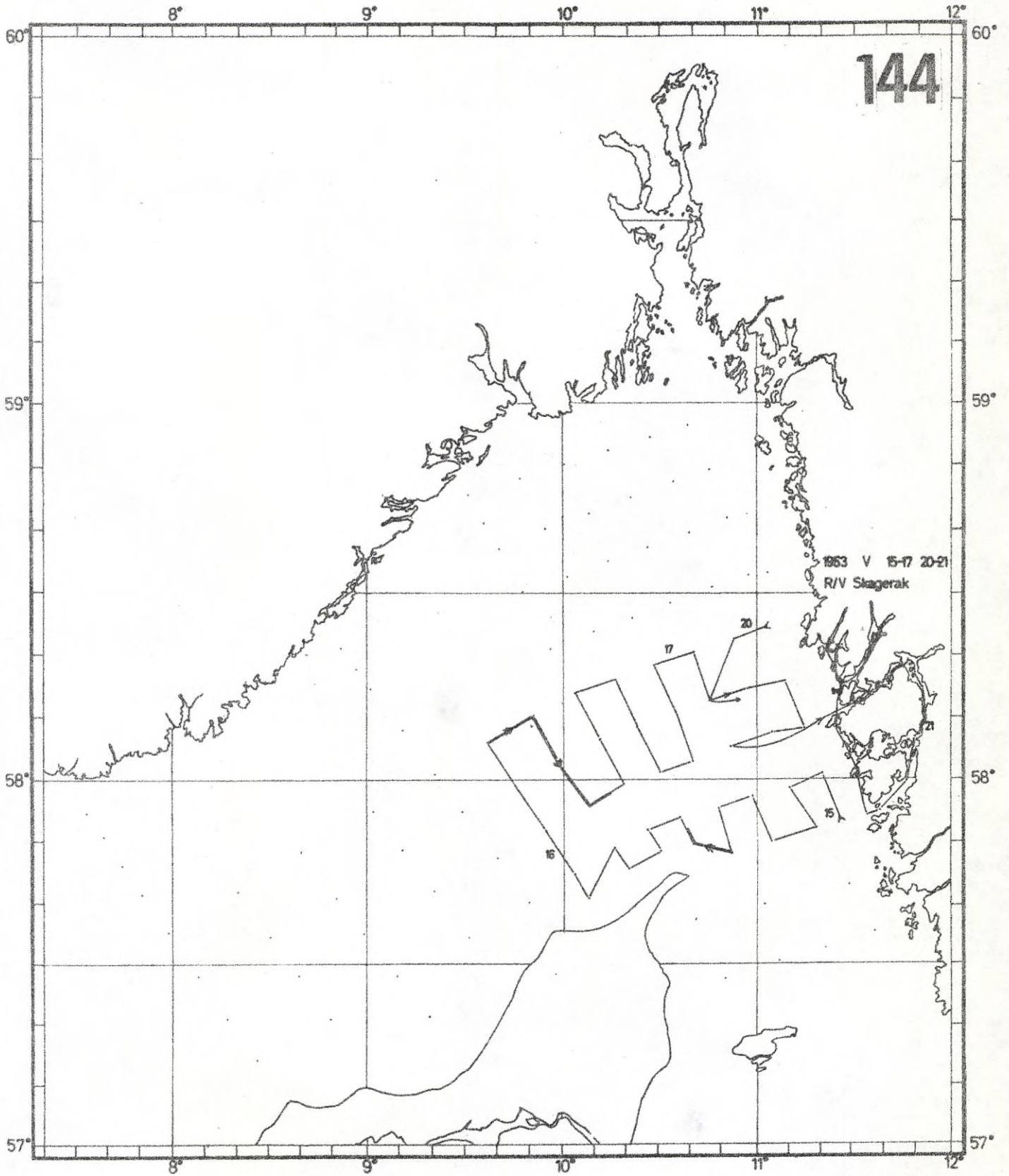




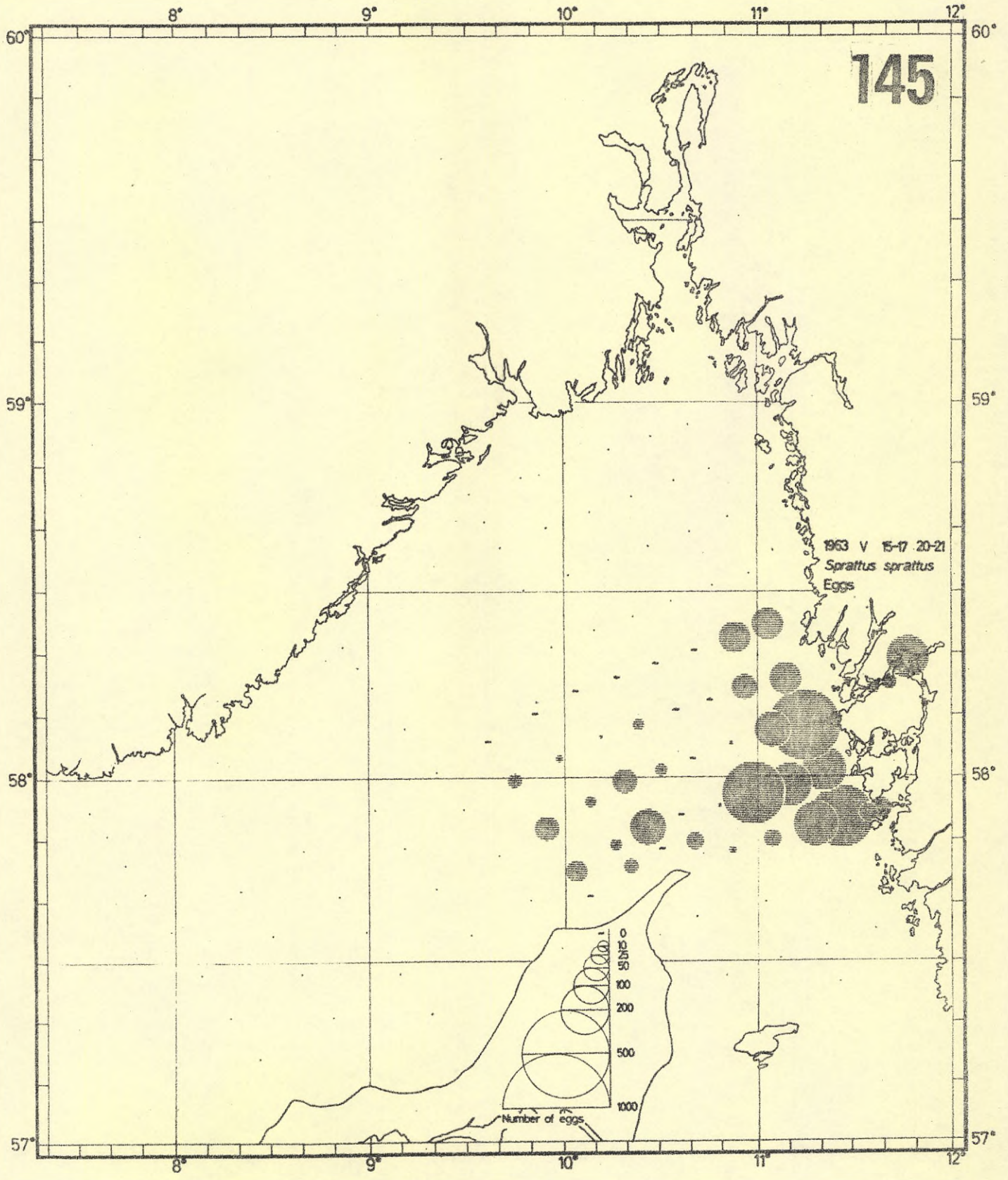


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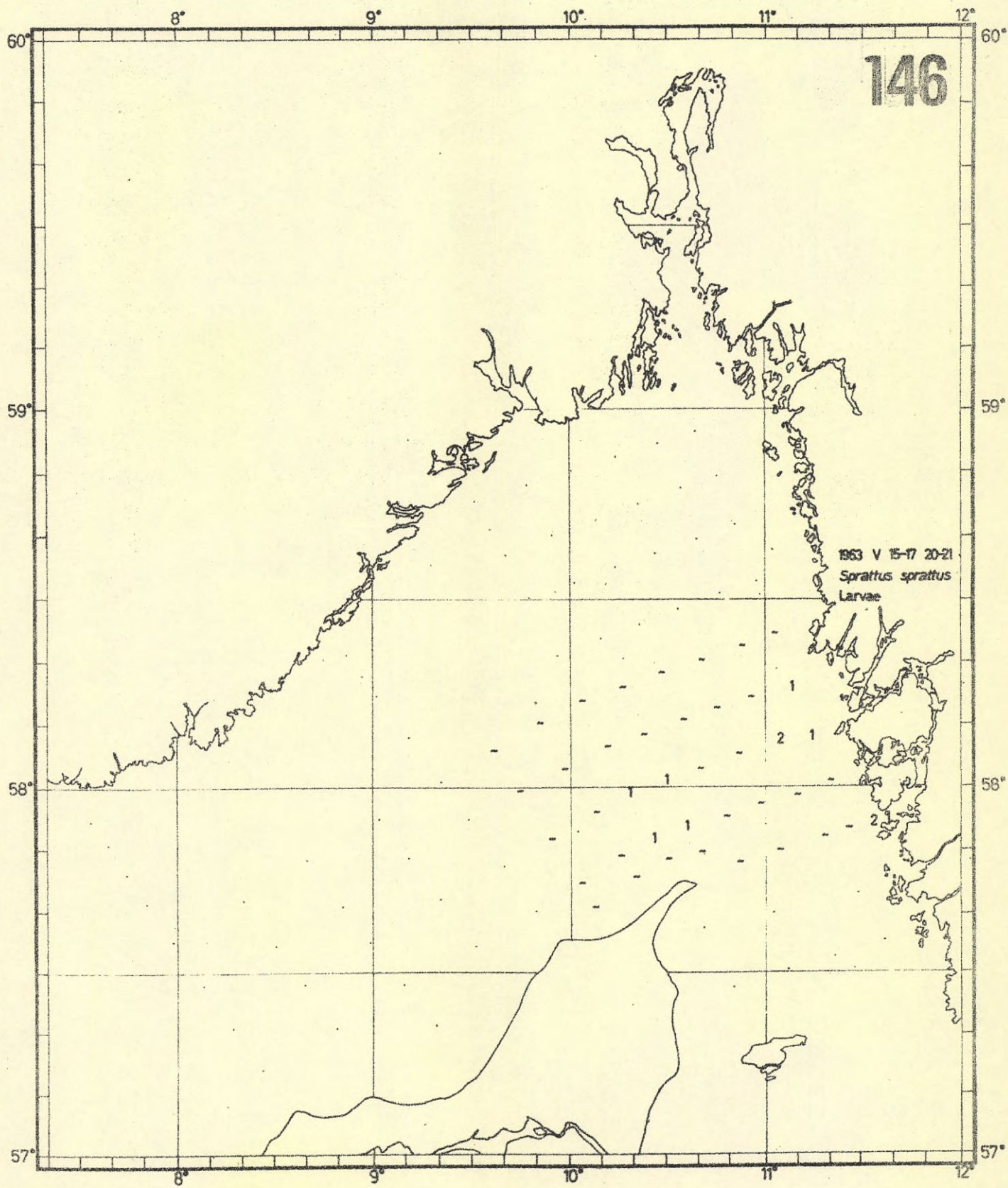




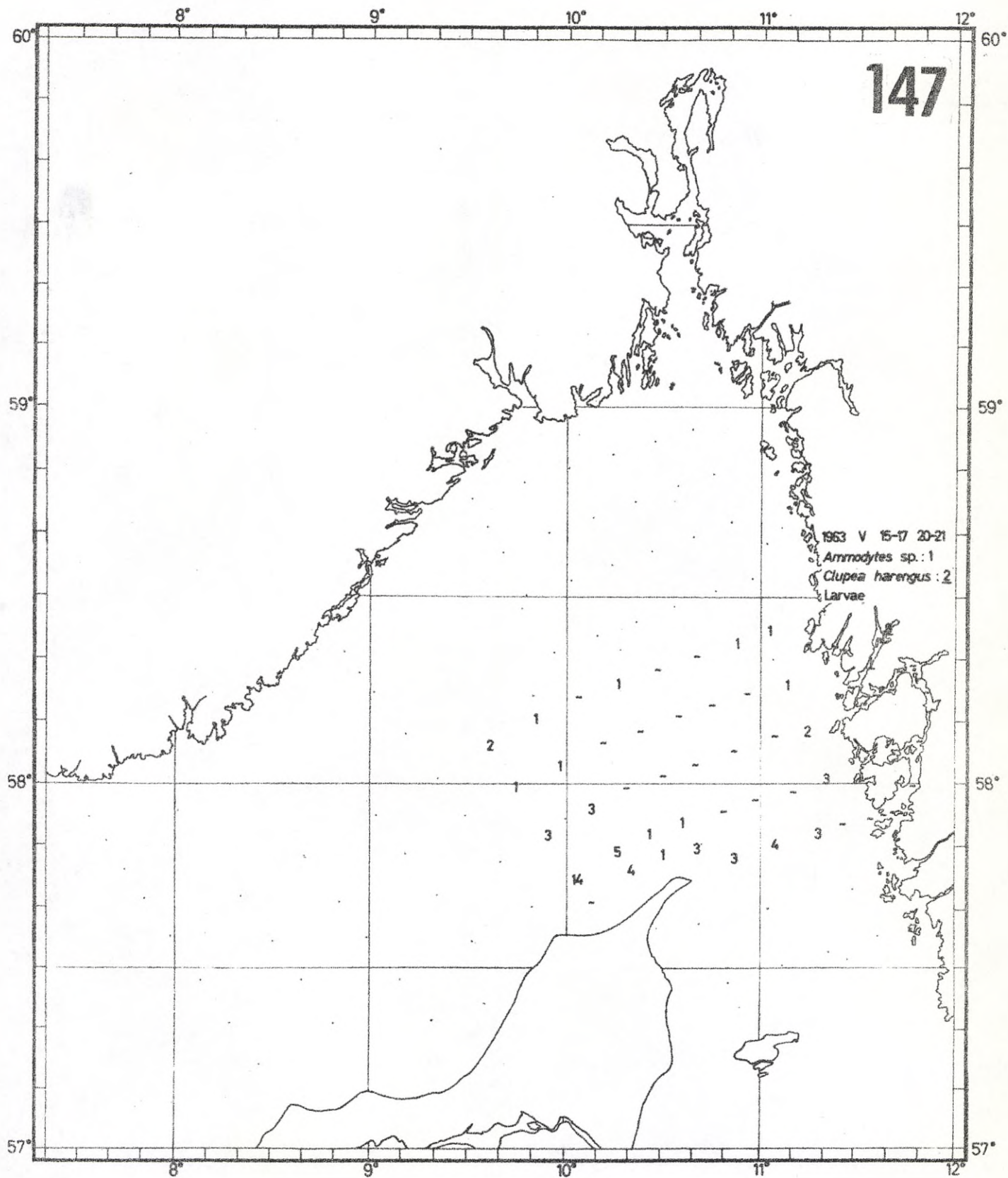




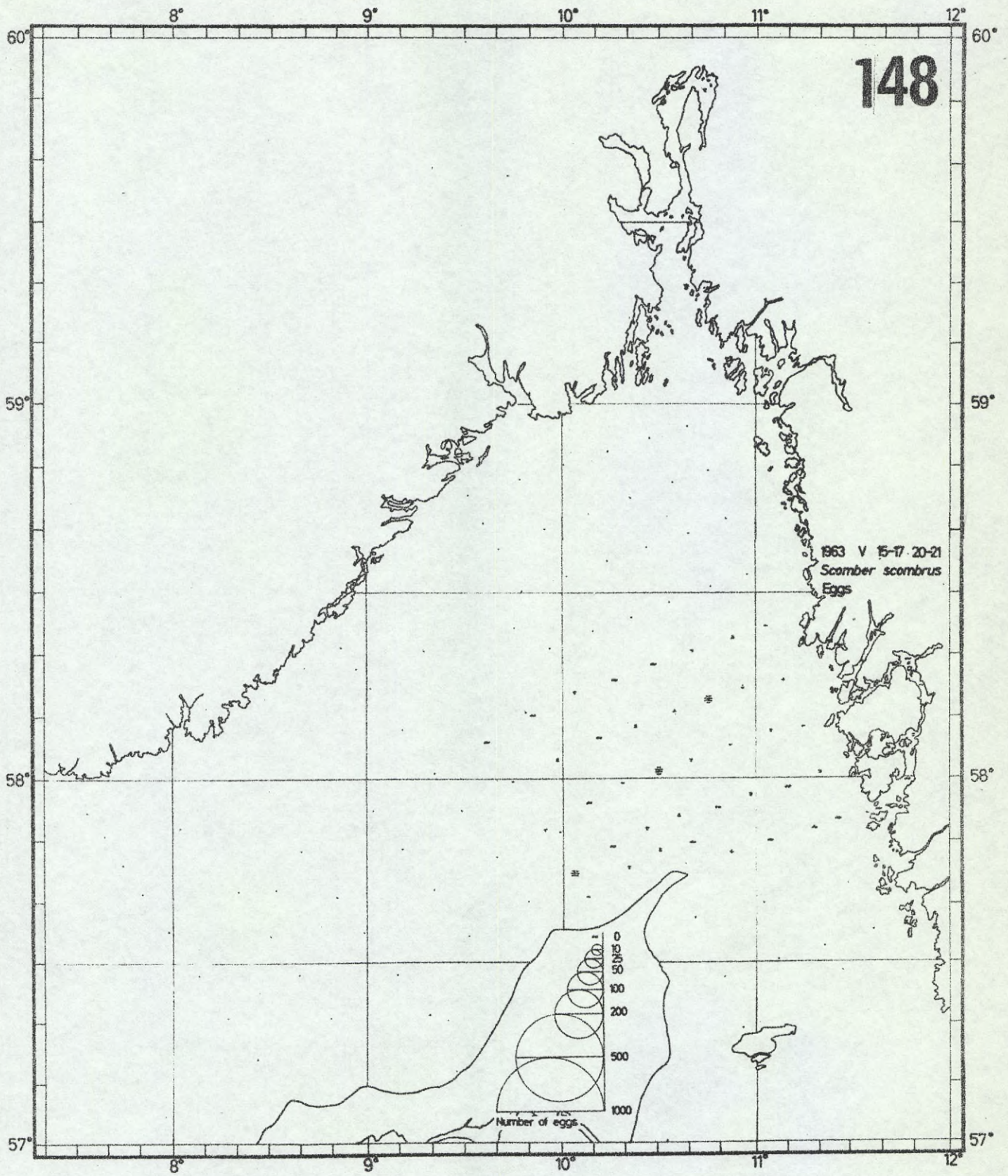




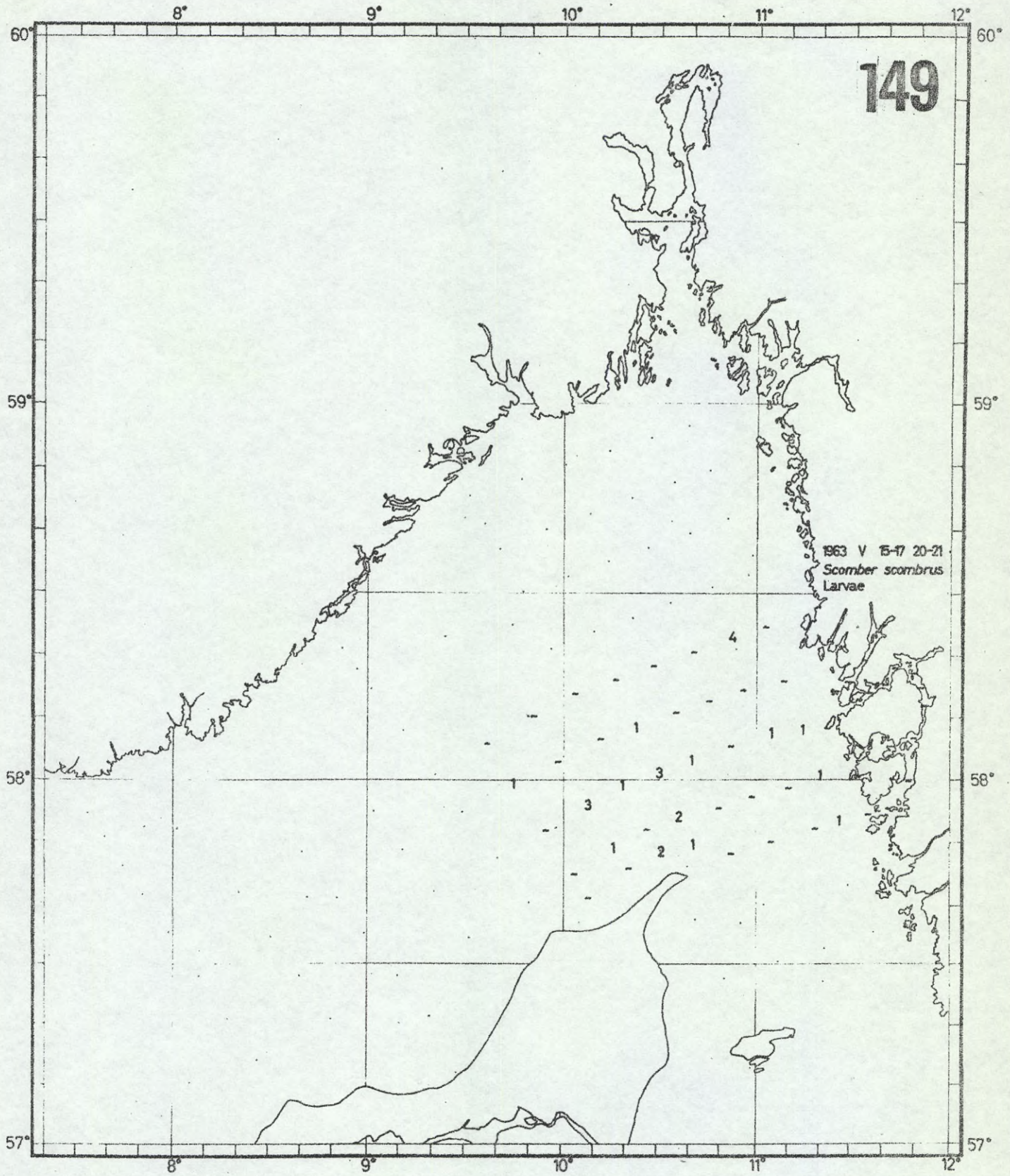






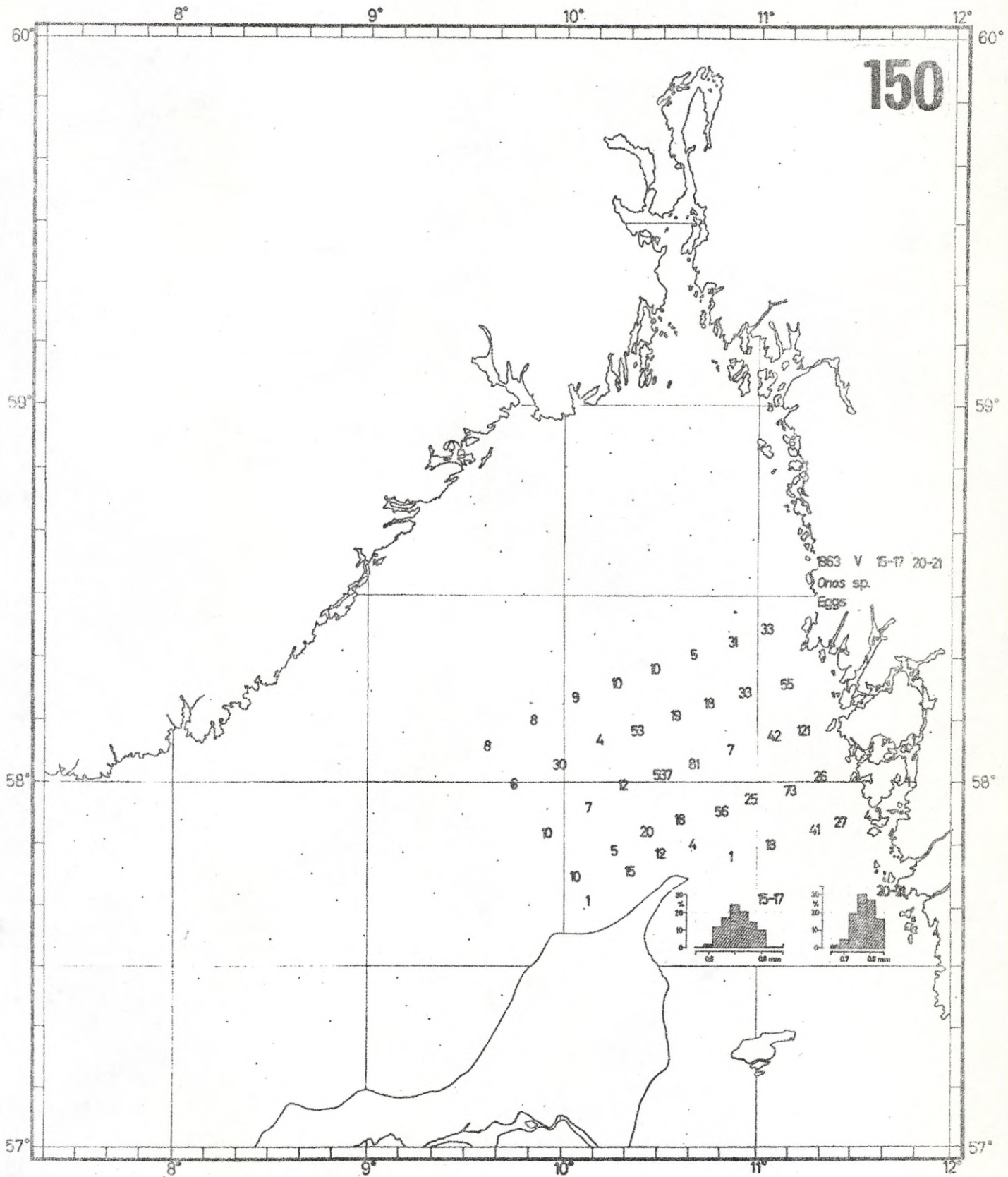




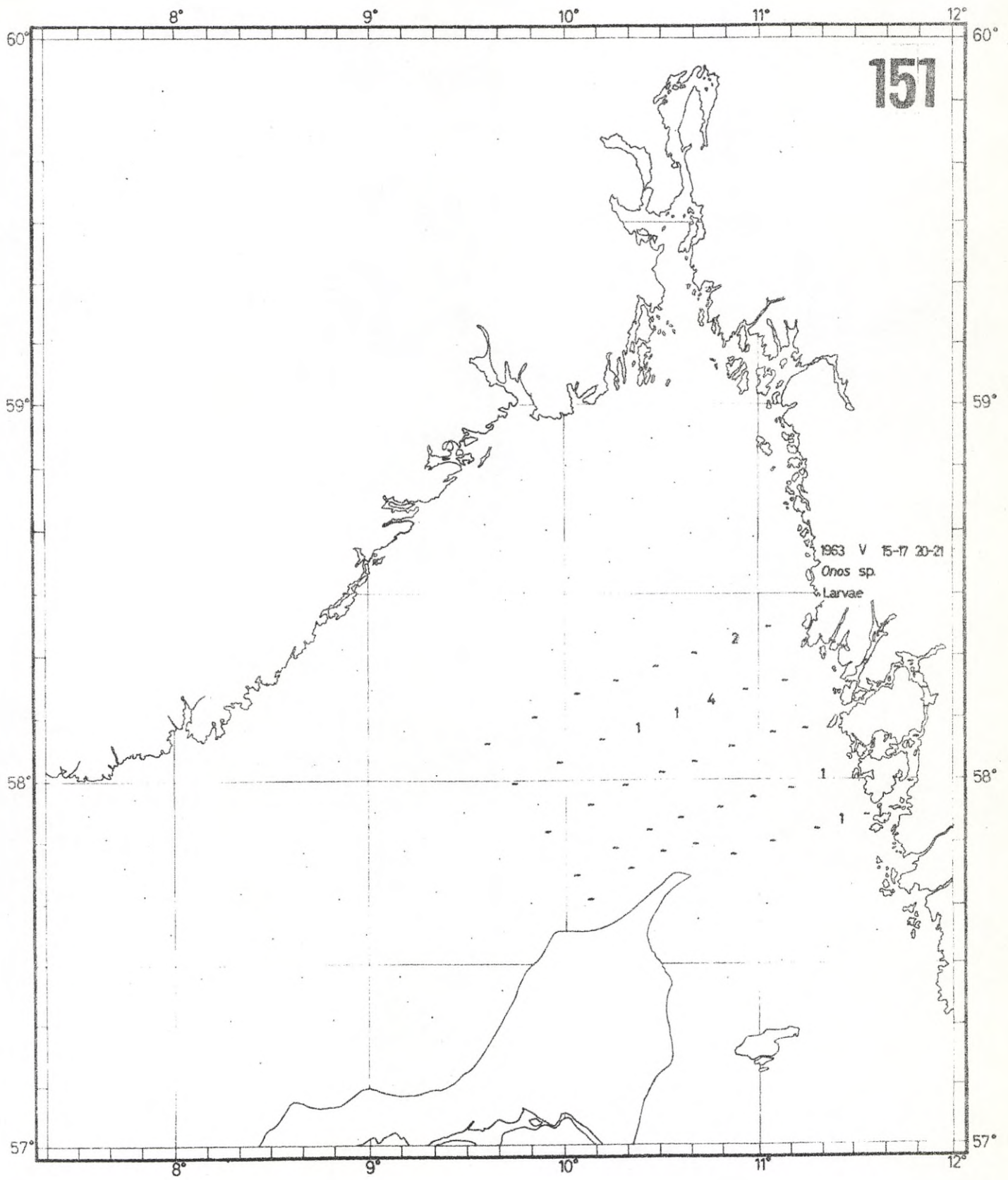


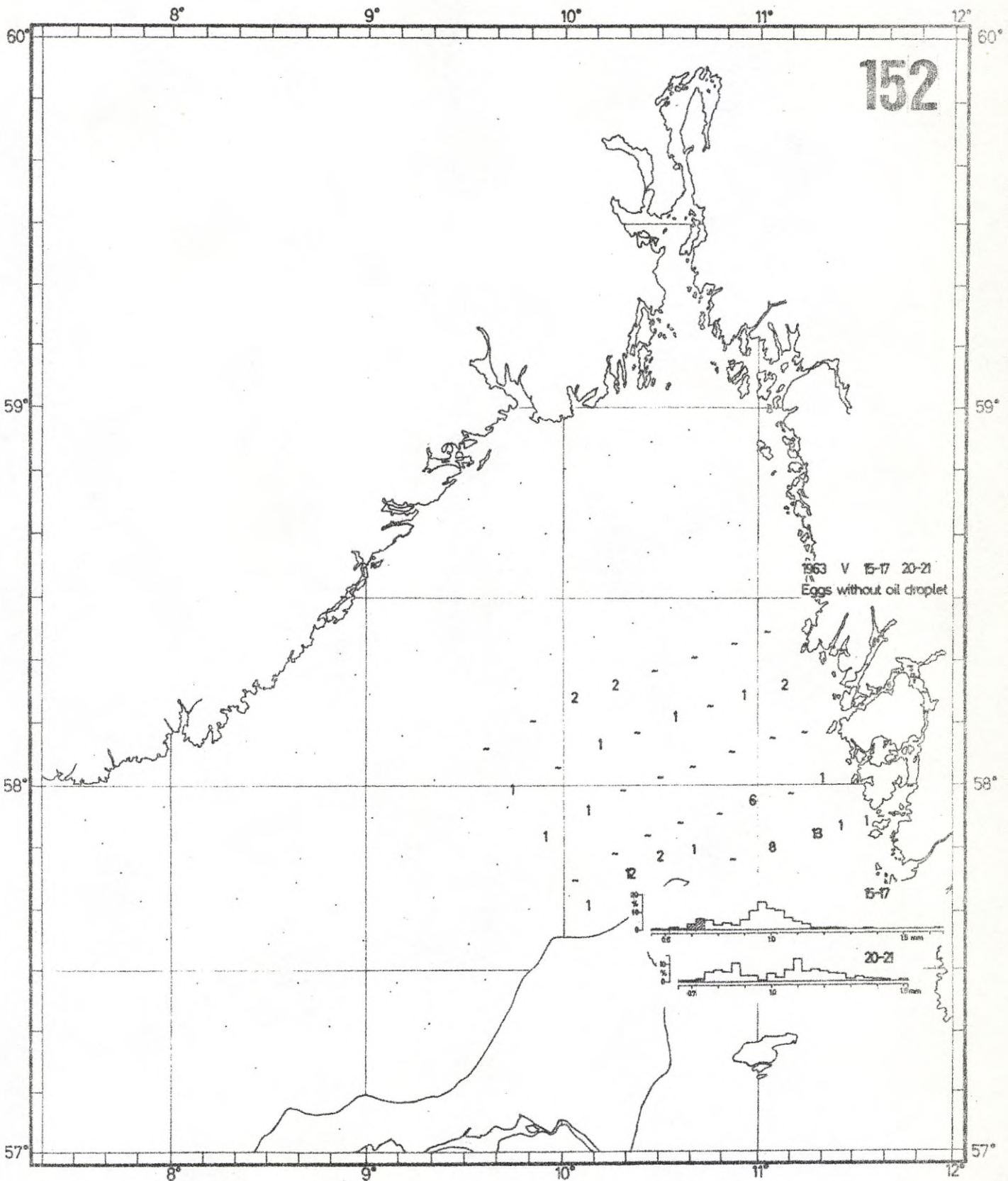


150









152

1963 V 15-17 20-21  
Eggs without oil droplet

15-17

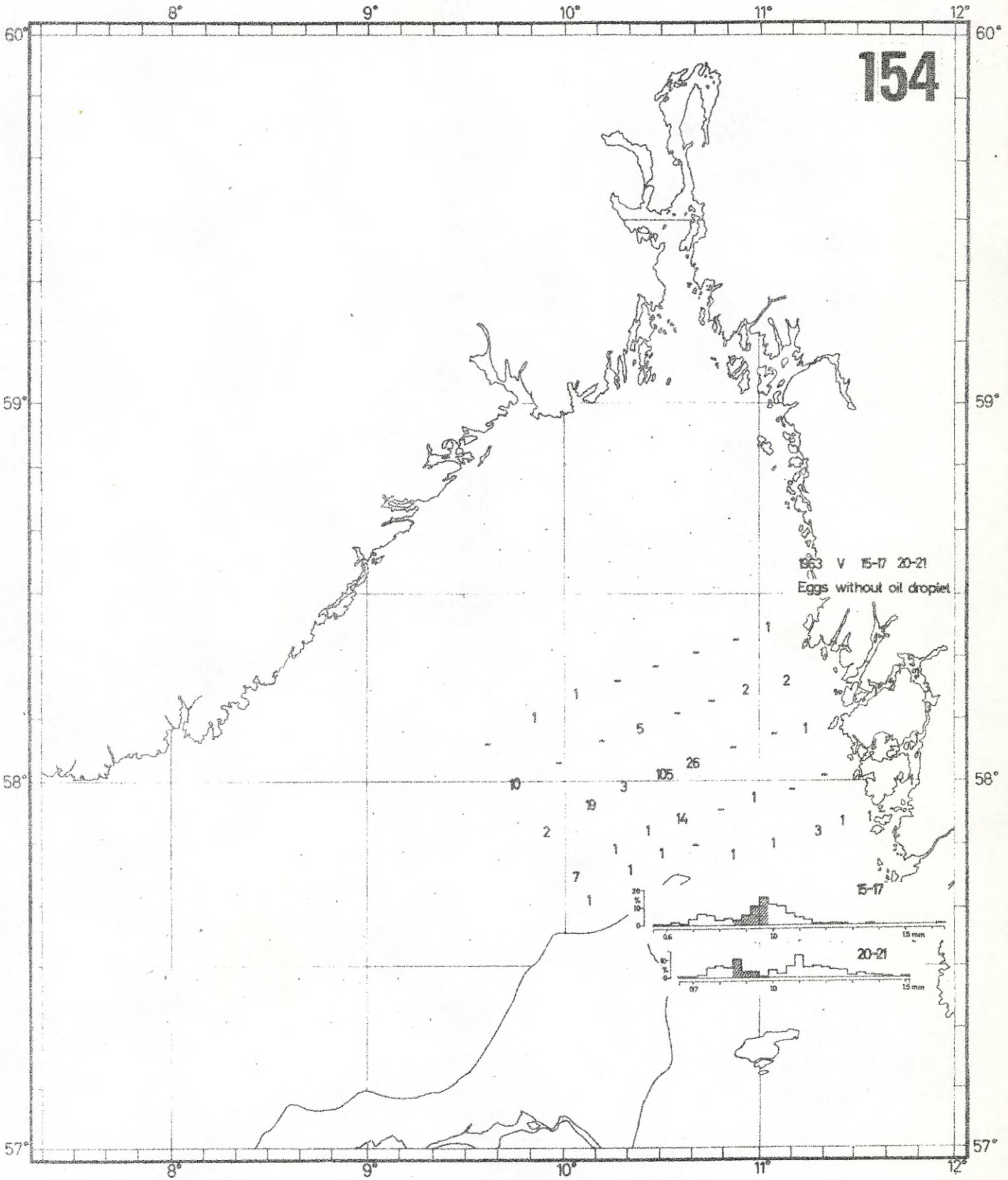
20-21





154

1963 V 15-17 20-21  
Eggs without oil droplet



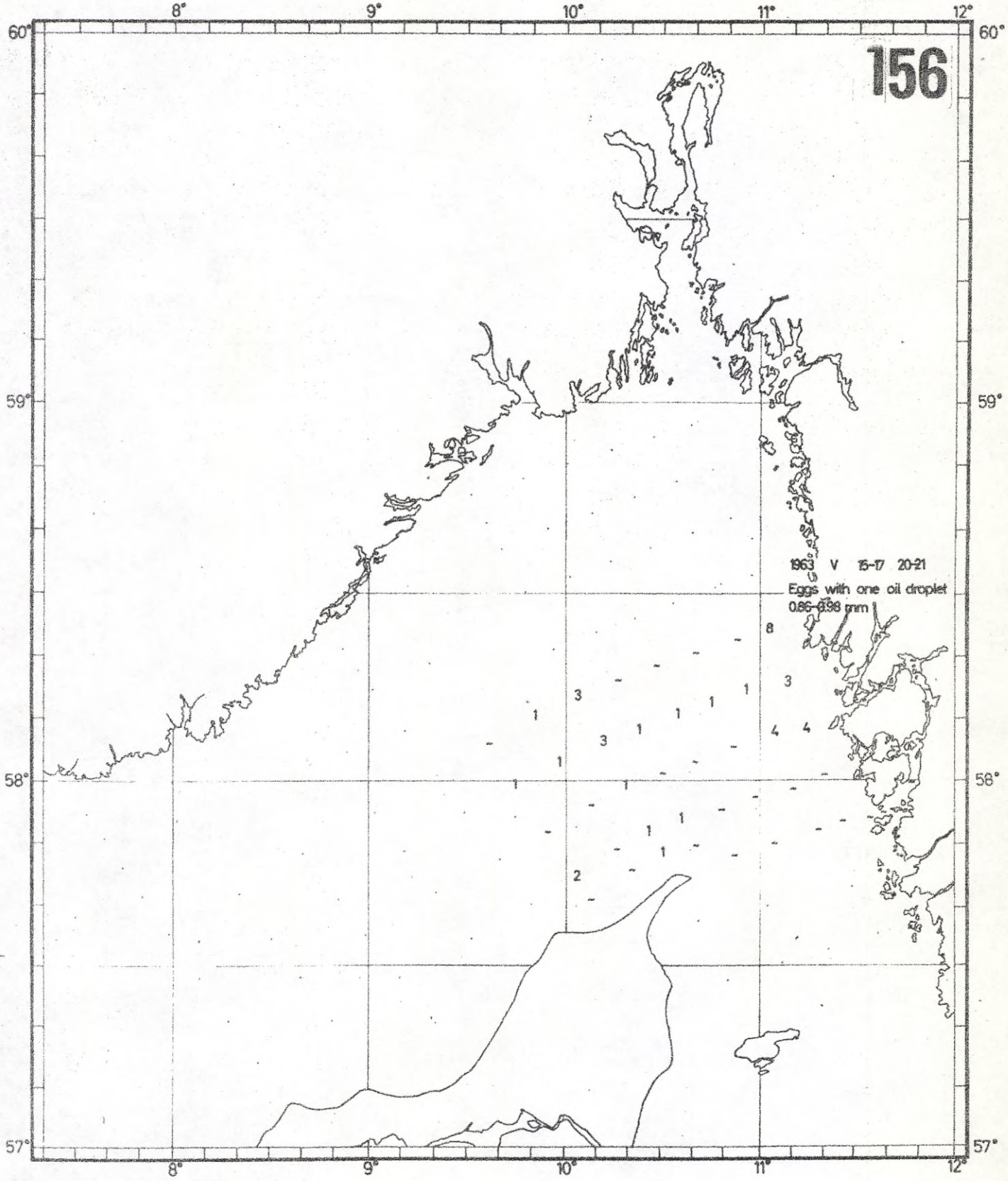




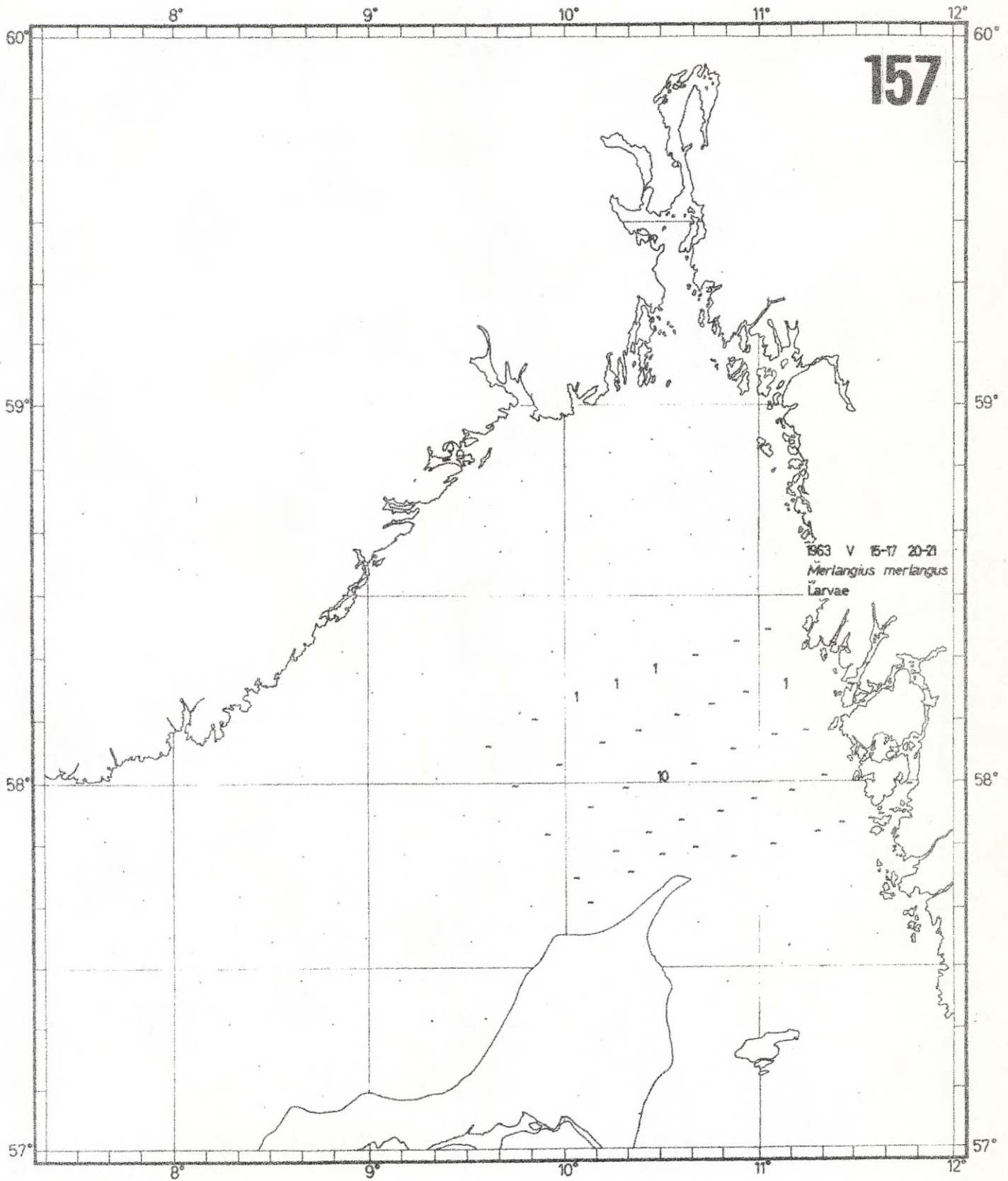


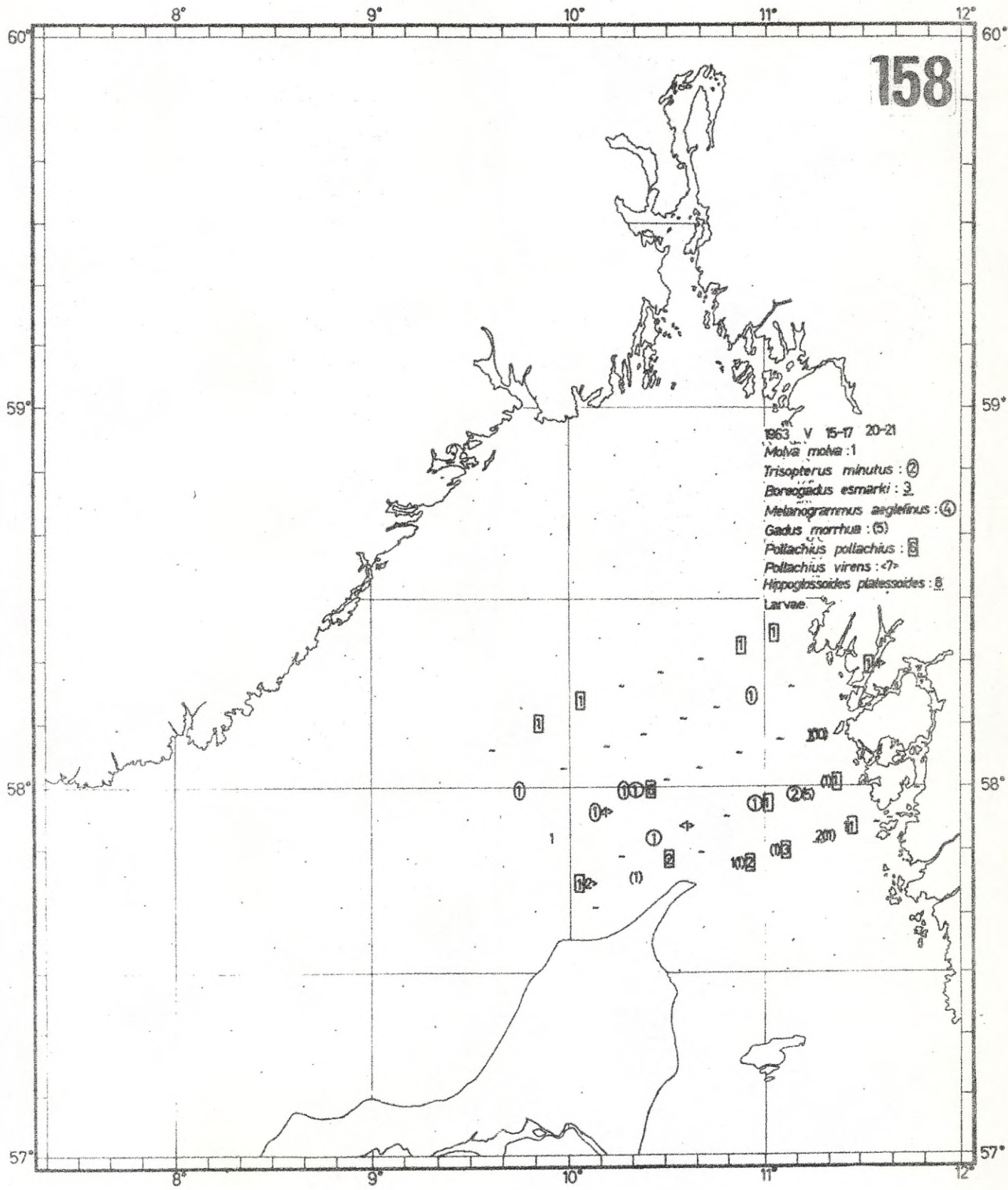
156

1963 V 15-17 20-21  
Eggs with one oil droplet  
0.66-0.98 mm



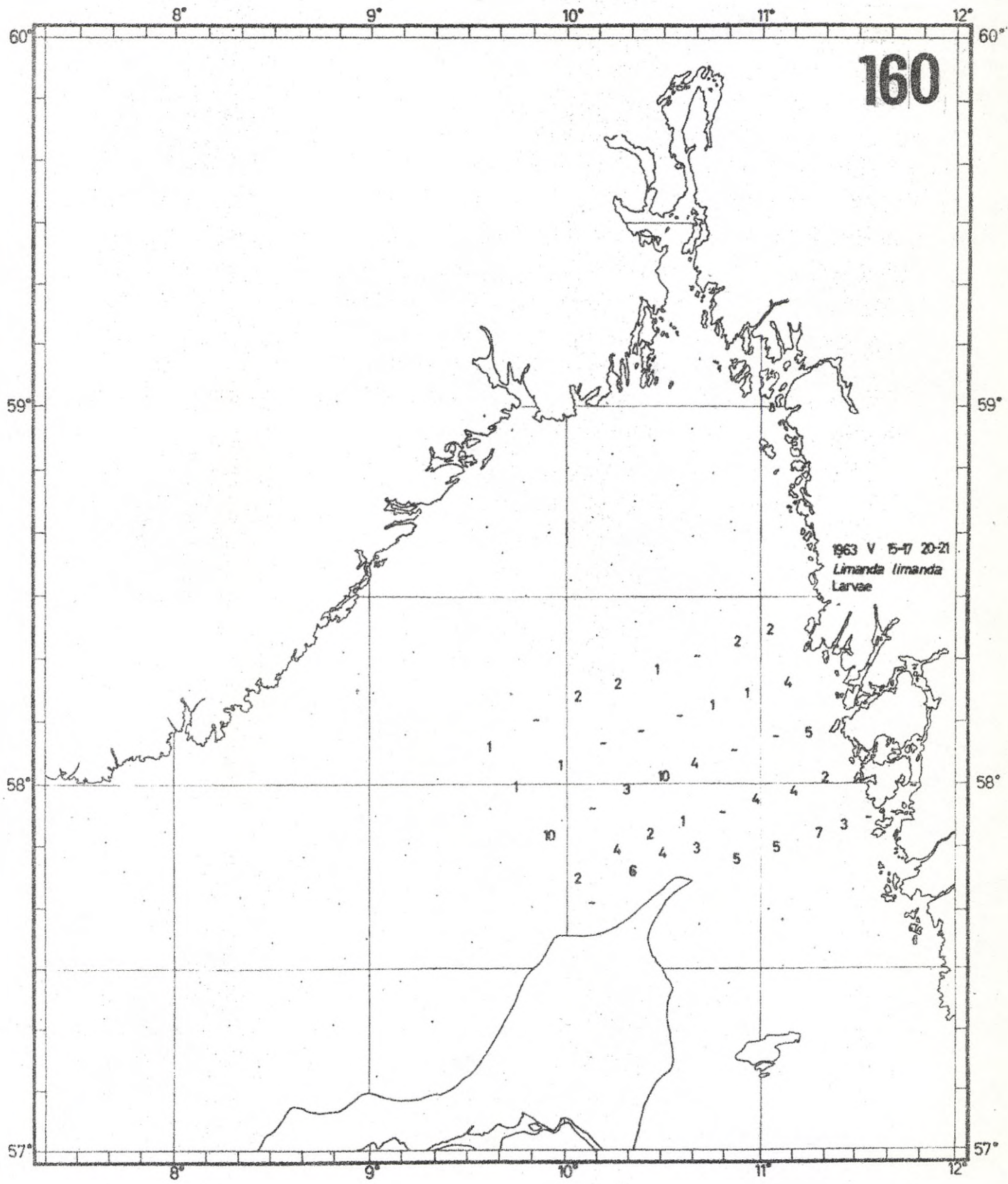




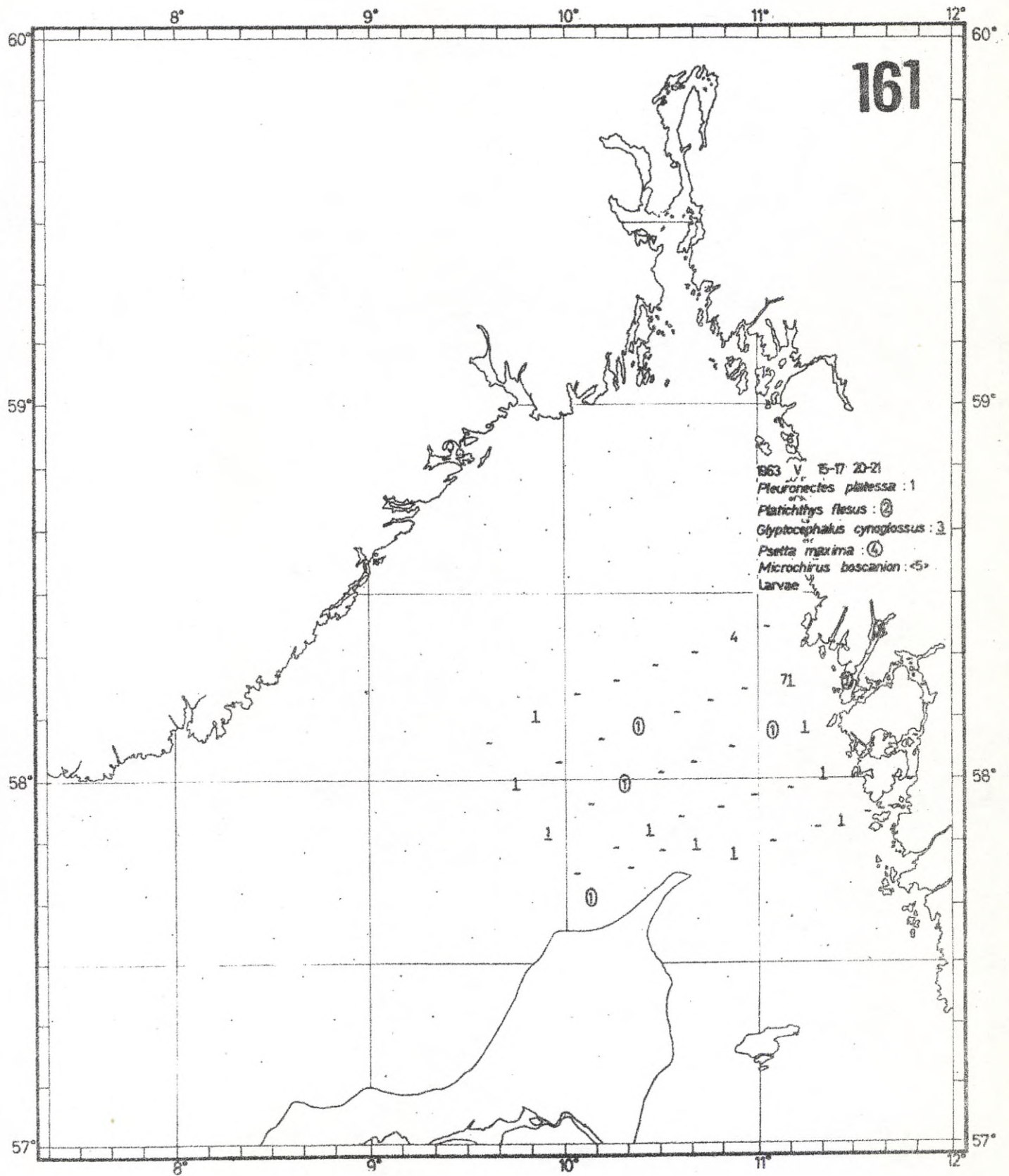


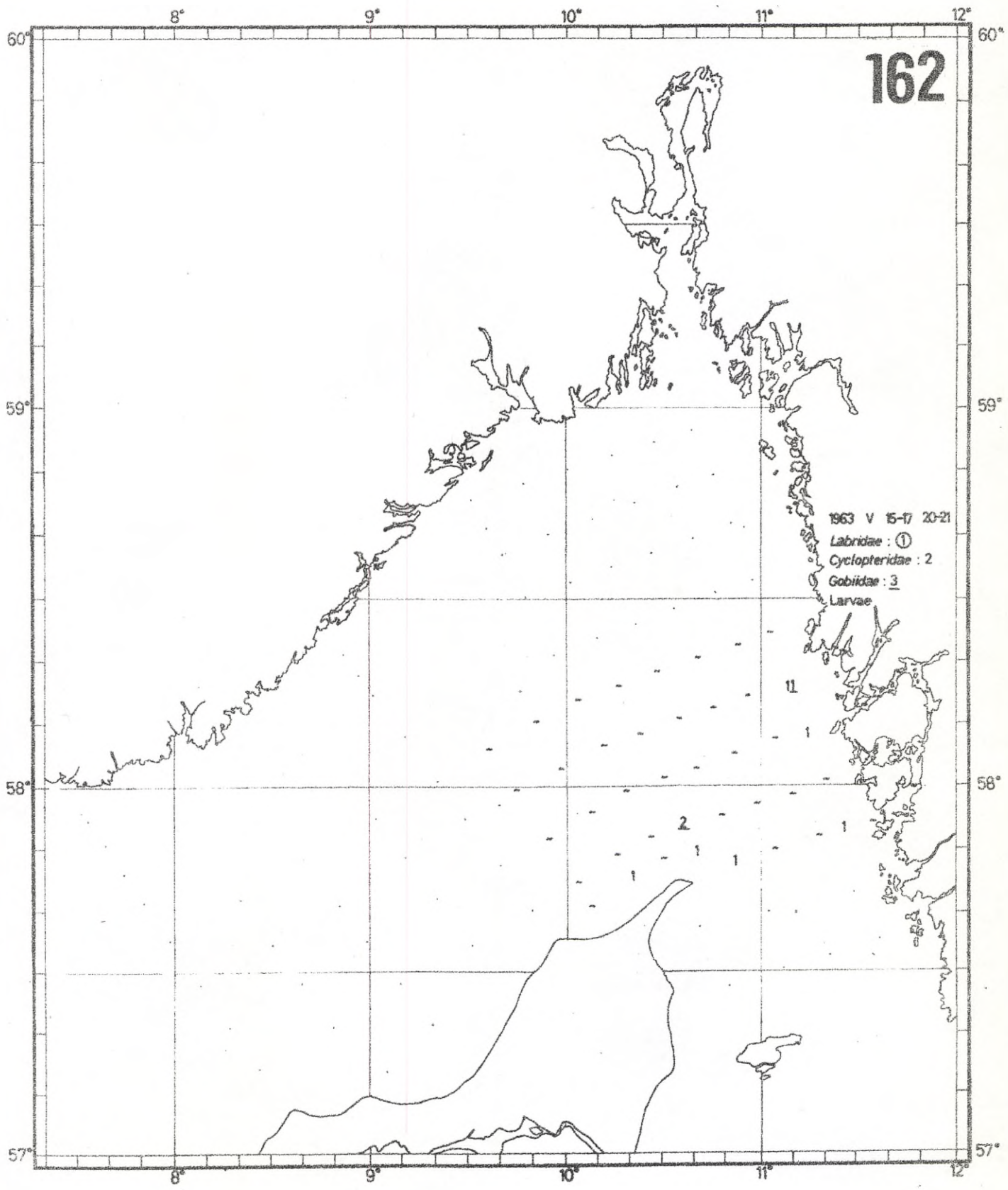




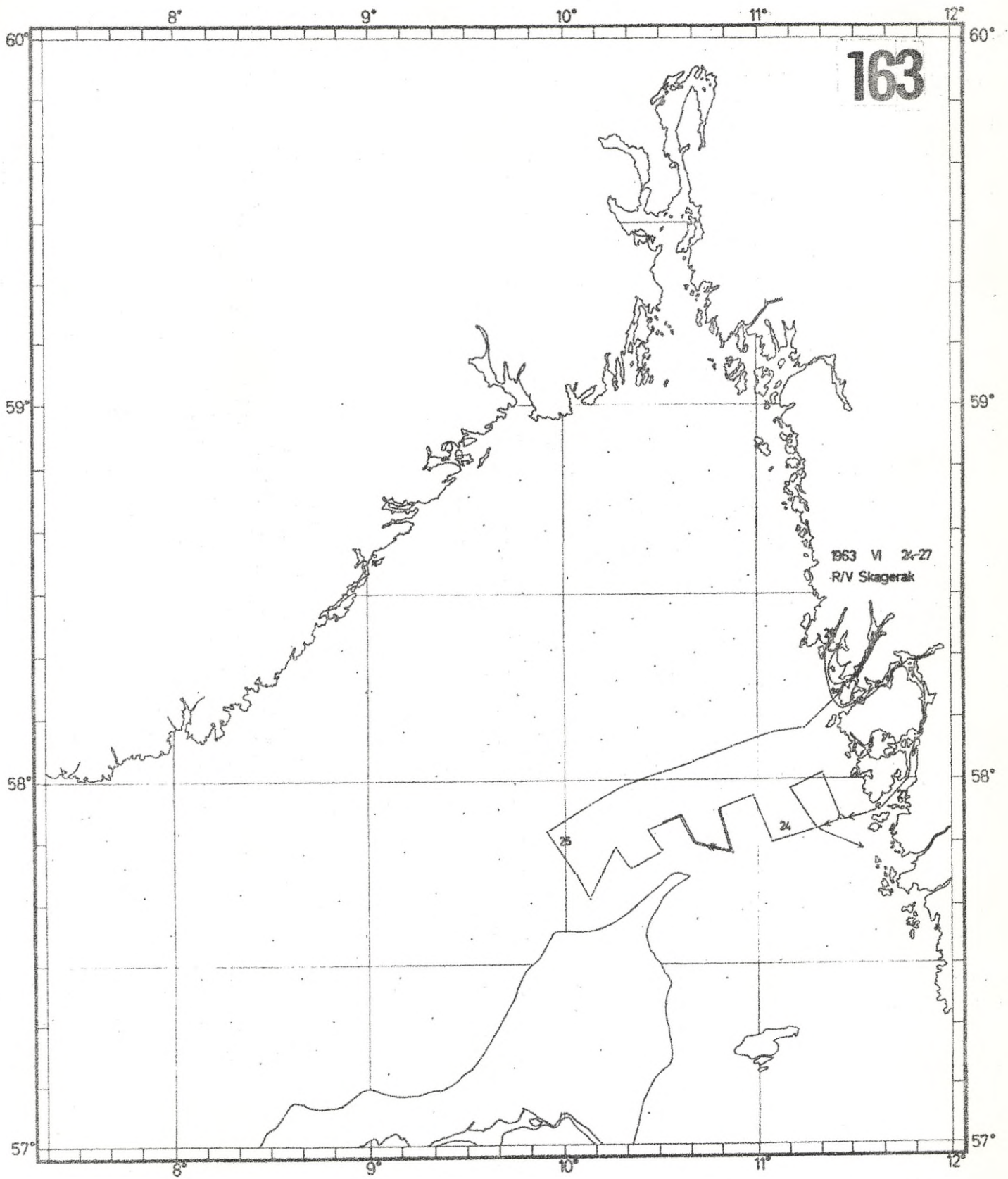


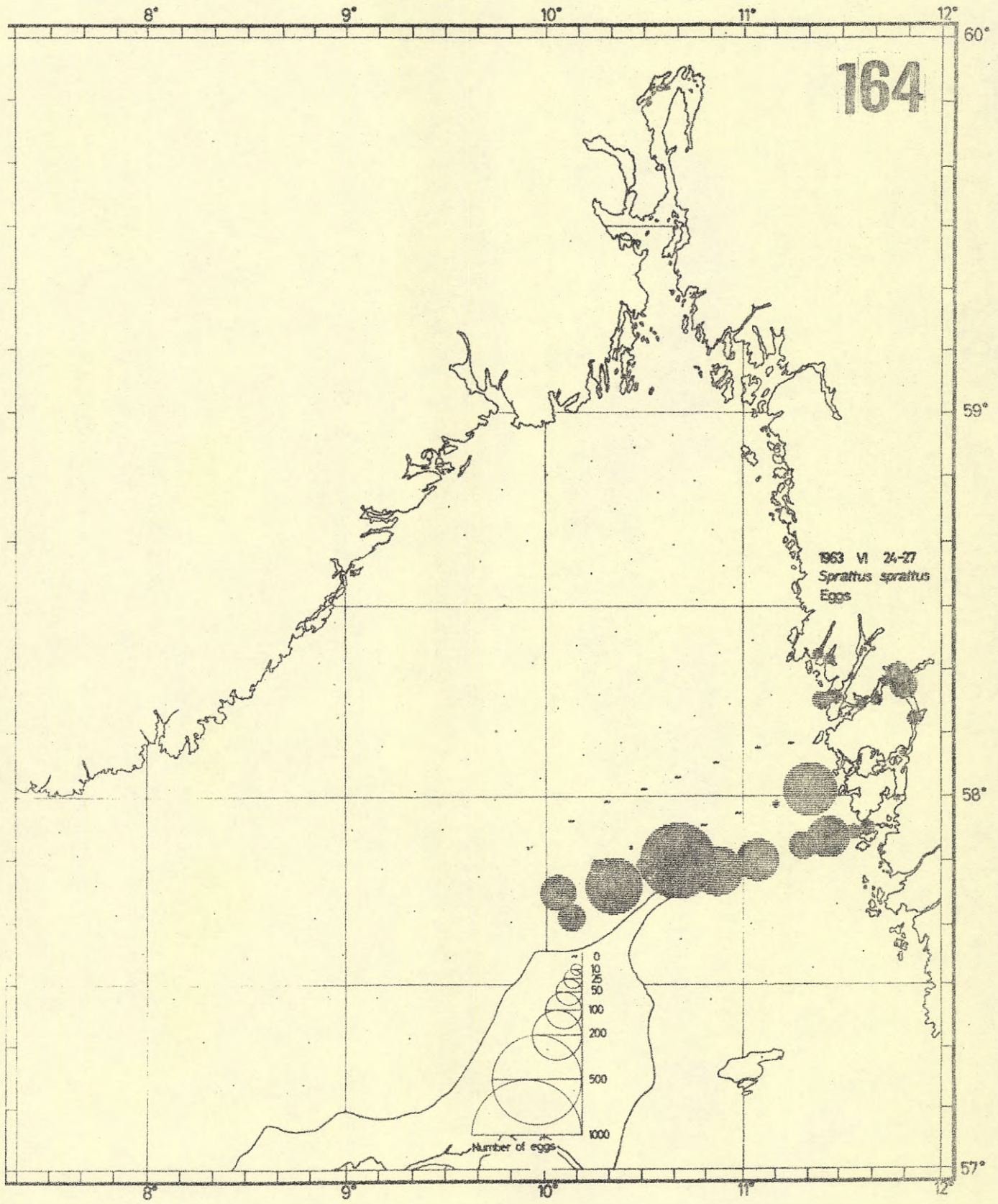




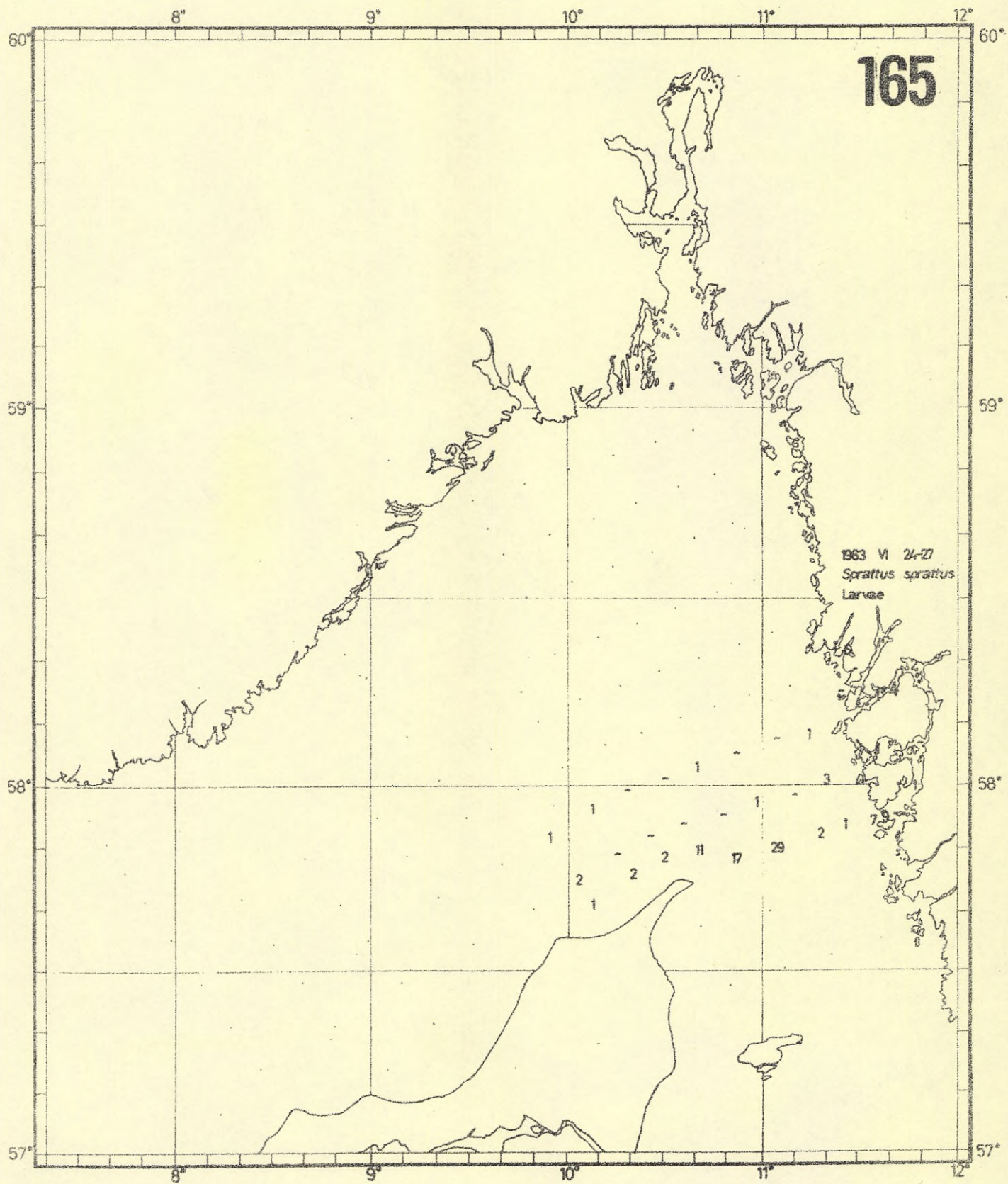




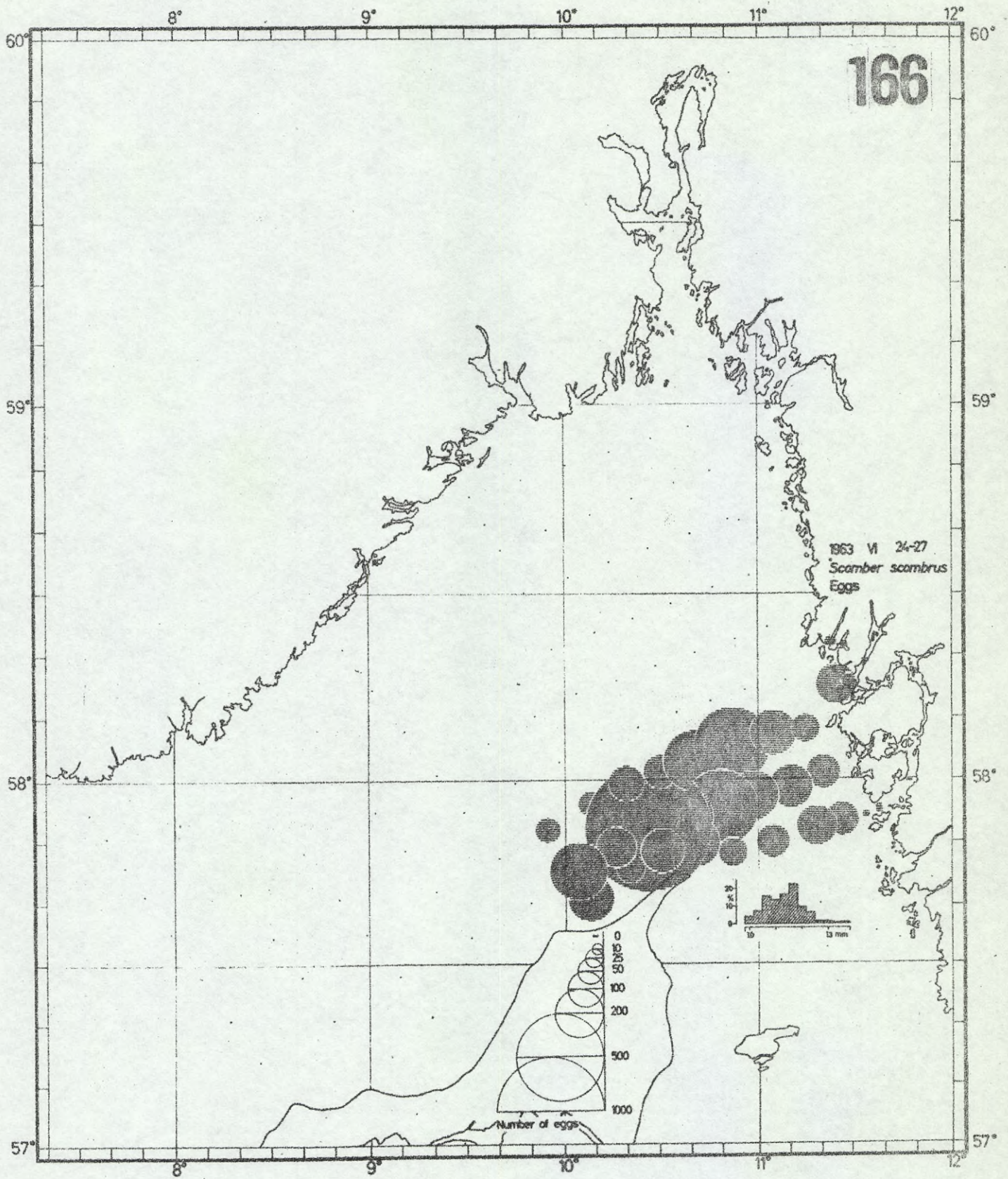






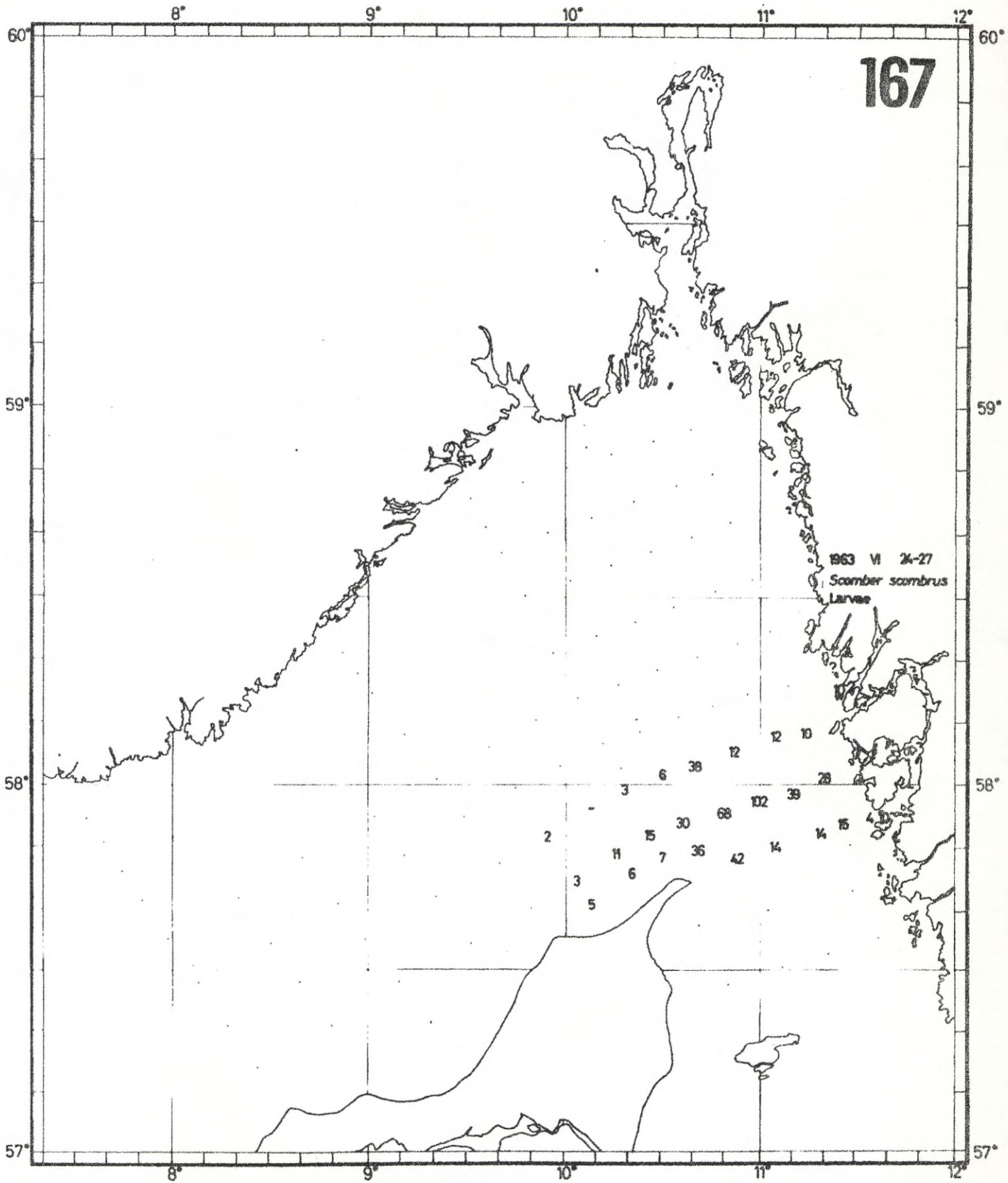








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