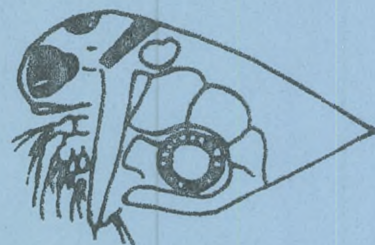
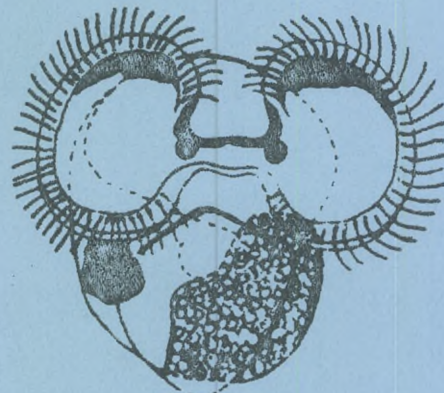
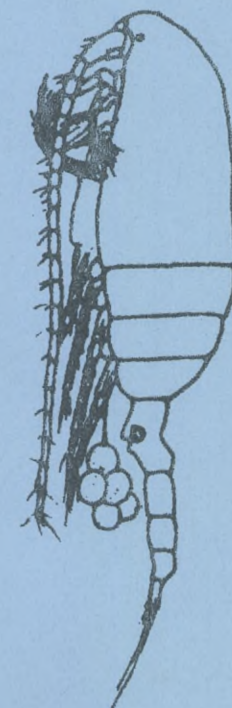






MEDDELANDE från
HAVSFISKELABORATORIET · LYSEKIL

nr 184

The distribution and biomass of zooplankton off the coast in the Baltic proper in 1972

by

Hans Ackefors & Lars Hernroth

July, 1975

The distribution and biomass of zooplankton off the coast in the Baltic proper in 1972

by

Hans Ackefors & Lars Hernroth

CONTENTS

ABSTRACT

Zooplankton sampling took place on four occasions in 1972 in seven subareas of the Baltic proper off the coast from 55°N to 59°18'N. The horisontal and vertical distribution of the plankton fauna as well as the species composition and biomass were studied. 1972 was the last year in a five year study beginning in 1968. The sampling was performed with fractionated Nansen net hauls. The mesh-size of the net was 0.09 mm.

The biomass fluctuated from 1.72 to 7.24 g m^{-2} (wwt) in February-March, 5.52 - 30.24 g m^{-2} in May, 10.97 - 57.76 g m^{-2} in August and 5.02 - 11.94 g m^{-2} in October. There were thus considerable differences between the different subareas. As usual the Bornholm Basin was by far the most productive area (yearly mean value 25.5 g m^{-2}) followed by the area in the southeastern Baltic proper (18.3 g m^{-2}) and the area east of Gotland (17.2 g m^{-2}). In the Arkona Sea (the southwestern part of the Baltic proper) as well as the two most northern subareas the biomass values were rather low (8.0 - 11.5 g m^{-2}). The maximum value in August in the Bornholm Basin was 57.8 g m^{-2} (wwt). 1972 was by far the most productive year in our five year study.

The zooplankton fauna consisted only of about 40 species excluding the microzooplankton ($<$ 0.2 mm). The dominating groups were the rotifers, the cladocerans and the copepods. The most important species, which contributed most to the biomass in 1972 were the cladoceran Bosmina coregoni maritima, the copepods Pseudocalanus minutus elongatus and Temora longicornis. Other important species were Synchaeta spp., Acartia spp., Eurytemora sp., Centropages hamatus and Fritillaria borealis. The most frequent larvae were Harmothoe sarsi and Mytilus edulis.

INTRODUCTION

As a result of the increasing interest in the Baltic proper, a long-term biological investigation on the ecology of the planktonic fauna was started in 1968 by the Institute of Marine Research in Lysekil. The general aim of the investigation was to obtain a better knowledge of both the horisontal and the vertical distribution of the zooplankton fauna in the Baltic proper. An additional aim was to follow the seasonal variations in both species composition and biomass. 1972 was unfortunately the last year during which regular sampling occurred at the seven standard stations representing seven different subareas of the Baltic proper. Since 1973 a comprehensive program for primary and secondary production studies at other stations has been carried out (ACKEFORS & LINDAHL, 1975). However, we have not succeeded in getting financial support to include the very important zooplankton fraction in this program. Despite this fact continuous sampling for both microzooplankton and zooplankton have taken place hoping that financial support will be available in the future. The sampling takes place 12-18 times a year at two stations in the Baltic proper, one station in the Åland Sea and one station in the Gulf of Bothnia.

ACKNOWLEDGEMENTS

This investigation has been supported by grants from the National Swedish Environment Protection Board (Statens Naturvårdsverk, kontrakt 7-71/73, 7-71/74), which is greatfully acknowledged. The authors are greatly indebted to the crew of the R/V"Skagerak" and to Mr Sven Engström, who has been responsible for the work on board. We also want to wxpress our thanks to Mr Lars Lind, Mr Ulf Persson and Mr Thomas Ferm who have been responsible for some analyses and calculations.

MATERIAL AND METHODS

In 1972 four cruises were carried out in the Baltic proper and zooplankton sampling was performed at seven stations (fig. 1) as in previous years (ACKEFORS & HERNROTH, 1970 a, b, 1971, 1973). The sampling occurred in February+March, May, August and October. All samples were collected with a Nansen net with a mesh-size of 0.09 mm. The aim was to make fractioned hauls from thermocline to surface and from 100 m to thermocline. Due to various reasons there are some exceptions from this sampling scheme. The samples were preserved in formaldehyde (40 %) diluted with sea water in such a way that the final concentration is 4 %.

In the laboratory the samples were sub-sampled in the modified whirling apparatus constructed by KOTT(1953) and then counted and analysed to species. The copepods were analysed also to developmental stages.

The biomass was calculated by using the volume technique employed by LOHMANN (1908). The values used for different species and developmental stages in the Baltic are evident in ACKEFORS (1972). In order to convert volume values to biomass, the density of zooplankton is considered to be 1 g/cm^3 expressed as wet weight per m^2. Roughly the values can also be converted to $g\ C\ m^{-2}$ if a standard value for the carbon content of the biomass of about 5 % are applied for zooplankton.

In the figures 2-57 the number of individuals caught in the net hauls are given according to a special scale with circles. In the text the abundance is described as ind. m^{-2}, which is about five times the number caught in the net.

RESULTS

HYDROGRAPHY

In a sea area like the Baltic proper with low and stable brackish water, a lot of euryhaline marine organisms live under osmotic stress. Good oxygen conditions are therefore extremely important for such organisms. Unfortunately however, stagnation periods with decreasing oxygen concentration and the forming of hydrogen sulphide occur in the deep basins of the Baltic now and then. Even small changes in temperature and especially salinity greatly influence the populations of various species, which live in the upper range of their tolerance limits.

The environmental conditions can therefore strongly change the prerequisites of marine life in the Baltic from year to year.

The oxygen conditions in 1971-72

In the summer of 1971 hydrogen sulphide had developed at station S 41 as well as at station S 24 (Bornholm Deep) and F 81 (Gotland Deep). At the end of 1971 considerable masses of water from the Kattegat entered the Bornholm Basin and slowly the oxygen content increased. In December there was only hydrogen sulphide left at station F 81. The hydrogen sulphide was still present at station F 81 in March, 1972, between 240 m and 150 m depth (table 2). During the same time hydrogen sulphide had developed in the bottom layer of the Landsort Deep (F 78). In the southern Baltic the oxygen conditions improved very much due to the influx of saline and oxygen-rich bottom water in the end of the winter through the Belts. In March the oxygen concentration was still low in the Bornholm Deep but already in May the concentration was slightly above 6 ml/l (table 3).

In the Gotland Deep there were still high concentrations of hydrogen sulphide in the bottom water in May. The conditions slightly deteriorated also in the Landsort Deep (F 78) as well as at stations S 41 and F 72 where hydrogen sulphide now occurred in the bottom water.

The inflow through the Belts gradually renewed the bottom water in the Gotland Deep during the summer. Oxygen now occurred through the whole water column (table 4). In the northern Baltic proper (stations F 78 and F 72) there were still hydrogen sulphide in August, 1972. (Probably also at station S 41 which was not visited on that occasion,)

During the last cruise in October there was still hydrogen sulphide in the northern Baltic proper and at station S 41 in the western part of the middle Baltic proper (table 5). FONSELIUS (1974) presumed that the inflow of new water, which had replaced the bottom water in the southern Baltic proper and in the Gotland Area would replace even the bottom water in the Landsort Deep in 1973. In January, 1973, the Landsort Deep still contained hydrogen sulphide. But in May this situation had changed and only in the area west of Gotland (S 41) there was still hydrogen sulphide (ENGSTRÖM & FONSELIUS, 1975).

The temperature and salinity in 1972

The winter of 1970/71 was very mild and the surface temperature was 0.7 - 0.9°C higher than the long-term mean. The winter of 1971/72 on the other hand, had normal surface temperatures (KALEIS & YULA, 1974).

In March the surface temperatures were in the range 0.46 - 2.27°C at the various stations (table 2). Drifting ice occurred in a narrow strip along the Latavian coast. Later in summer temperatures were very high or about 2.0 -2.5°C higher than the long-term mean (KALEIS & YULA, 1974). At our stations the surface temperatures increased to 4.95 - 7.23°C in May (table 3). In August the temperatures increased to values mostly above 18°C (table 4). At the south-eastern station, 8 A, the temperature was close to 19°C. Such a high summer temperature also occurred in 1968 (ACKEFORS & HERNROTH, 1970 a). At the last sampling occasion in October the temperature was in the range 8-11°C.

The salinity conditions in the surface water were rather normal. 6-7 ‰ appeared at the northern stations and 7-8 ‰ at the southern stations. The salinity in the bottom layers of the large basins increased due to the above mentioned inflow of saline bottom water from the Kattegat through the Belts. In the Bornholm Deep (S 24) the salinity increased from 15.34 ‰ (March), to 17.65 ‰ (May) and 17.81 ‰ (August).

ZOOPLANKTON

Cnidaria

Sarsia tubulosa (M. SARS)

Two specimens about 1 mm in diameter were found in the beginning of March at station 8 A between 85 and 55 m. The salinity fluctuated between 8 and 11 ‰ in that depth range.

It is rather conspicuous that no other species of Cnidaria was caught. Previous years we have usually got ephyra larvae of Aurelia aurita and Cyanea capillata. Nor were any larvae caught of the ctenophoran Pleurobrachia pileus.

Rotatoria

Synchaeta spp.

The authors have not distinguished between the six different species in the Baltic proper: S. baltica, S. curvata, S. fennica, S. gyrina, S. monopus and S. triopthalma (BERZINS, 1960).

Only single specimens occurred in February-March (fig. 2). Later in May the species was rather abundant over the whole Baltic proper except in the Arkona Sea (S 12) (fig. 3). In August as well as in October (figs. 4-5) it was not abundant except in the Landsort Deep on the latter occasion.

The main part of the population occurred in the surface (20-0 m) in May. The temperature was in the range 4-6 ^{o}C. Later in October Synchaeta spp. were also abundant but only in the Landsort Deep (F 78) where the surface temperature was 8-9 ^{o}C. At that station 125 000 ind. m^{-2} occurred in May and 87 250 ind. m^{-2} in October.

No individuals of the genus Keratella appeared in the samples in 1972 as was the case in 1971 in the northern Baltic proper (ACKEFORS & HERNROTH, 1973).

Polychaeta

Pygospio elegans CLAPARÈDE

Larvae occurred at stations S 12 and S 24 in February-March and later in August larvae again occurred at station S 12. The main part of the larvae occurred in surface water, e.g. at station S 12; 725 ind. m^{-2} between 20 and 0 m and 200 ind. m^{-2} between 45 and 20 m depth. The occurrence at different seasons are in accordance with previous experience. The present five year sampling (1968-1972) indicates a spawning from February to November.

Harmothoe sarsi KINBERG

Larvae were found on all sampling occasions (figs. 6-9). The main part of the larvae were caught in net hauls below the thermocline. The greatest concentration of larvae (10 750 ind. m^{-2}) appeared at station S 24 in October. 91 % of the larvae were then found between 85 and 45 m depth. All our previous experience of this species also indicate that spawning occurs from February to the end of the year

Cladocera

Bosmina coregoni maritima (P.E. MÜLLER)

This species occurs very sparsely in cold and moderately warm waters in the Baltic proper. But it is normally extremely abundant in warm waters above 15°C. It is evident from figs. 10-13 that B. cor. maritima was very abundant in August when surface temperature was in the range 17-19°C. The greatest density occurred at stations S 24, 8 A, F 81 and F 78, i.e. both in the northern and southern Baltic proper. At those stations 615 000 - 1 350 000 ind. m^{-2} occurred in August. The main part of the population was distributed in surface water above the thermocline.

Podon spp.

Three species occur in the Baltic, viz. Podon intermedius LILLJEBORG, P. polyphemoides (syn. Pleopsis polyphemoides, cf. GIESKES, 1971) and P. leuckarti G.O.SARS. The species were not separated this year in the analysis. Most of the specimens, however, belonged to the species P. polyphemoides.

In 1972 single specimens occurred in February at station S 12 (fig. 14). Later in May as well as in August the species was rather abundant in the south-western part of the Baltic proper (figs. 15-16). In October the species occurred sparsely (fig. 17). The main part of the population appeared in surface water.

Evadne nordmanni LOVÉN

This species is an eurytherm cladoceran and the distribution is normally extended over a long period of the year (figs. 18-21). In 1972 the greatest concentration occurred in May in the Bornholm Sea (S 24) where 18 950 ind. m^{-2} was found (fig. 19). In August the concentration was in the order of 5 000 - 7 500 ind. m^{-2} (fig. 20) and in October in the order of 1 000 - 3 000 ind. m^{-2} (fig. 21). The main part of the population usually appeared in net hauls from 20 m to surface.

Copepoda

Limnocalanus macrurus SARS

Limnocalanus macrurus (syn. L. grimaldii (DE GUERNE)) appeared very sparsely in our samples from 1972. In March single specimens of adult males and females occurred in net hauls from 20 m to 65 m depth at stations F 72 and S 41. In August and in October males and females were found at station F 78.

Acartia bifilosa GIESBRECHT and A. longiremis LILLJEBORG

Due to the difficulties of distinguishing between young stages of A. bifilosa and A. longiremis no separation of the two species has been made for nauplii and stages I-V of the copepodites. Only adult specimens have been analysed to species.

From figs. 22-25 it is evident that Acartia spp. are present during the whole year and its distribution is rather even from south to north. In February-March the main part of the samples consisted of nauplii, e.g. at station S 41 95 % of the individuals were nauplii.

In May the highest concentration of Acartia spp. was found at station S 12 and S 24, where 135 000 - 210 000 ind. m^{-2} appeared. The nauplii made 60 %, the copepodites 30 % and the adults 10 % of the samples on those stations. In the northern Baltic proper (stations F 78 and F 72) the adults were more numerous than both copepodites and nauplii during the sampling time in May.

In August the species were abundant over the whole Baltic proper. The various developmental stages nauplii, copepodites and adults dominated at various stations. The number of individuals at each station was in the order of 50 000 - 100 000 ind. m^{-2}. The same abundance appeared at most stations in October (fig. 25). The main part of the populations consisted of nauplii or copepodites. The appearance of nauplii in great densities during all sampling times indicates a long spawning for the two species.

Eurytemora sp.

The distribution of Eurytemora sp. showed the same pattern in 1972 as in our previous investigations, viz. a low number of specimens were found during the year except for an obvious maximum in August (figs. 26-29). The main occurrence of this copepod, Eurytemora sp., which is a brackish water copepod, is in the northern Baltic proper and in the Bothnian Sea. At the stations F 78 and F 72 about 150 000 ind. m^{-2} were found, mainly above 20 m. During August the copepodites dominated in the samples (c. 50 %) but the nauplii were also very numerous (c. 39 %).

In October the main part of the population consisted of copepodites. The species appeared most frequently in the upper 20 m.

Centropages hamatus (LILLJEBORG)

Centropages hamatus is an euryhaline marine copepod and its distribution is restricted to the isohalines for 6-7 ‰ which coincides with the border line between the northern Baltic proper and the Åland Sea.

In February-March the species occurred sparsely over the whole Baltic proper (fig. 30). The copepodite stages were very dominant and only a few adults occurred but not a single nauplie. In May it was rather abundant in the south-western part of the Baltic proper or about 50 000 ind. m^{-2}. The main part of the population consisted now of nauplii (fig. 31). In August about 50 000 - 100 000 ind. m^{-2} occurred over the whole Baltic proper. Most stages from adults to nauplii were numerous.(fig. 32).

In October the species had about the same abundance in the south-western part of the Baltic proper but the abundance in the north was a magnitude lower (fig. 33). Rather few adults appeared at the southern stations but none in the north. Copepodites dominated at stations F 81 and F 78 but nauplii were also abundant.

Pseudocalanus minutus elongatus (BOECK)

Pseudocalanus m. elongatus is together with Temora longicornis the most common species in the Baltic proper. They are both euryhaline marine copepods and their distribution in the Baltic is limited to the north at the border line between the Baltic proper and the Gulf of Bothnia which coincides with the isohaline of about 6 ‰ in the surface water. In 1972 Ps. m. elongatus was abundant at all stations on all sampling occasions (figs. 34-37). Minimum values (20 000 - 75 000 ind. m^{-2}) occurred in February-March and maximum values (135 000 - 770 000 ind. m^{-2}) in August. The species prefers cold water in the Baltic and never occurs above thermocline in the summertime. In February-March when the surface temperature was less than 2.5 $^{\circ}$C about 50 % of the population occurred in water between 20 m and surface. In May (5-8 $^{\circ}$C) 20-60 % of the population was found in surface water. In August (17-19 $^{\circ}$C) more than 97 % of the population was caught in net hauls below the thermocline. In October (8-11 $^{\circ}$C) less than 30 % of the population was found above the 30 m level.

In February-March the copepodites dominated but adults as well as nauplii were also abundant. There was a decreasing number of nauplii from south to north. In May the nauplius stages dominated at all stations except at station S 12. The adults made only 2-7 % of the population. In August the copepodites made more than 85 % of the population while the adults made less than 0.01 % at all stations except one where they made 5 %. In October the main part or more than 95 % of the population consisted of copepodites. Very few adults occurred and about 2-4 % of the population were nauplii. It is obvious from this investigation that the main spawning time is in the end of spring and the overwintering stages are copepodites. This year as well as on all previous sampling occasions the adults seem to occur in small numbers in the Baltic. The life span of the adults are therefore probably very short in a brackish water like the Baltic.

Temora longicornis P. MÜLLER

Temora longicornis is one of the two dominating species in the Baltic plankton fauna. From figs. 38-41 it is evident that the smallest numbers of specimens were found in February-March (5 000 - 20 000 ind. m^{-2}). In May a maximum appeared at station S 24. During this sampling time a great difference in density appeared from a minimum of 7 000 ind. m^{-2} at station 8 A to a maximum of 620 000 ind. m^{-2} at station S 24. In August the number of specimens fluctuated from 70 000 - 220 000 ind. m^{-2} at the various stations. In October the density at most stations was in the order of 150 000 - 300 000 ind. m^{-2}.

Temora longicornis performs a diurnal migration which means that the vertical distribution varies considerably. The main part of the population however, was found above the 50 m level.

In February-March the adults as well as copepodites were the most common developmental stages. In May the nauplius stages dominated at all stations or made more than 90 % of the population. In August there were rather even proportions between adults, copepodites and nauplii. In October the copepodites and nauplii were abundant and a very small proportion of the population were adults.

Oithona similis CLAUS

The occurrence of Oithona similis in 1972 is evident in figs. 42-45. The main distribution of this species is usually restricted to the southern part of the Baltic proper where the salinity is higher. In 1972 we got O. similis as far to the north as the Landsort Deep (F 78), which never has happened before in this five year study of Baltic zooplankton. The distribution of O. similis in the Baltic proper is closely connected with the inflow of salt bottom water from the Arkona Sea (S 12), through the Bornholm Basin (S 24) eastwards to the area of station 8 A and then northwards to the area east of Gotland (F 81).

The occurrence of O. similis in 1972 was concentrated at stations S 12 and S 24. The main part of the population was caught in net hauls from bottom to 50 m or in net hauls from bottom to thermocline. The maximum occurrence was in August and October (11 500 - 38 500 ind. m^{-2}).

Harpacticoida

Single specimens of unidentified harpacticoids were caught in March at station 8 A and in August at station F 78.

Gastropoda

As is evident from our previous investigations (ACKEFORS & HERNROTH, 1970 a, b, 1971, 1973), the appearance of Gastropod larvae is concentrated to the summer and autumn months. In 1972, larvae were only found in August at station F 78. They were caught in a net haul from 19 m to surface.

Lamellibranchiata

Mytilus edulis (L.)

Only four bivalves in the Baltic proper have pelagic larvae. The larvae of Mytilus edulis can easily be distinguished from the others. From figs. 46-49 it is evident that the larvae of M. edulis were distributed over the whole Baltic proper. The maximum abundance in 1972 was as usual found in August in the southern Baltic proper. At station S 12 the density of larvae was 24 250 ind. m^{-2}. The main part of the larvae occurred in the surface water above 30-40 m depth.

Macoma baltica (L.), Cardium lamarcki REEVE, Mya arenaria (L.)

In this investigation no separation of the three species has been made. Larvae occurred as early as in February-March over the whole Baltic proper (fig. 50). The highest frequency of larvae occurred in May (fig. 51). At station S 41 the density of larvae was as great as 45 000 ind. m^{-2}. The main part of the larvae occurred above 20 m level. In August and in October the number of larvae were rather small (figs. 52-53).

Chaetognatha

Sagitta elegans baltica RITTER-ZAHONY

The distribution of Sagitta elegans baltica is restricted to the areas with high salinity in the Baltic proper. In 1972 the species was only found at station S 24 in March. Most of the specimens were caught in a net haul between 85 and 50 m depth, where the salinity fluctuated from 15 to 9 ‰.

Copelata

Fritillaria borealis LOHM

From figs. 54-57 it is obvious that Fritillaria borealis is rather evenly distributed over the whole Baltic proper. The highest abundance appeared in winter and spring. Especially in May F. borealis was very abundant (fig. 55). At station 8 A no less than 183 000 ind. m^{-2} occurred. During winter and spring a great deal of the specimens were found above 20 m level. In August a small number of individuals occurred. They were always caught in net hauls below the thermocline, as they prefer cold water. In October they were again more close to the surface. The abundance was similar or a little less than in February.

The biomass of zooplankton

The biomass of zooplankton (exluding microzooplankton) has been calculated according to ACKEFORS(1972)(figs. 58-61). The results of the investigation indicate a considerably higher biomass 1972 compared to 1971 (ACKEFORS & HERNROTH, 1973) as well as to the three year mean for 1968-1970 (ACKEFORS & HERNROTH, 1972). In table 7 below the amount of biomass is given for each station on the various sampling occasions. This is also reproduced in figs. 58-61.

Table 7. The biomass of zooplankton in 1972 off the coast in the Baltic proper at seven different stations. The values are corrected for a filtration coefficient of 0.7 and are expressed as g m^{-2} (wwt). At the bottom of the table the mean ($\bar{m}$), range (r), variance (s^2) and standard deviation (s) are given for each sampling month. e.= estimated value only included in the mean value for each station in the right column.

Station \ Month	Febr.-March	May	August	October	$\bar{m}$
S 12	1.7	10.2	11.0	11.0	8.5
S 24	3.0	30.2	57.8	11.0	25.5
8 A	5.5	11.5	45.2	10.9	18.2
S 41	4.8	7.0	e.20.0	5.0	9.2
F 81	7.2	8.0	41.6	11.9	17.2
F 78	4.6	8.5	24.7	8.0	11.5
F 72	3.5	5.5	17.3	e.5.6	8.0
$\bar{m}$	4.32	11.54	32.91	9.64	14.0
r	1.72-7.24	5.52-30.24	10.97-57.76	5.02-11.94	
s^2	3.26	71.83	327.25	6.91	
s	1.80	8.48	18.09	2.63	

It is evident that the amount of zooplankton was considerably higher in 1972 than previous years. Let us compare three stations during the most productive time of the year (August-September)

Year	Station	S 24 $g\ m^{-2}$	8 A $g\ m^{-2}$	F 81 $g\ m^{-2}$	$\bar{m}$
1968		41.01	27.29	21.75	30.02
1970		20.09	23.09	18.73	20.64
1971		22.97	37.88	19.29	26.71
1972		57.76	45.17	41.58	48.17
$\bar{m}$		35.46	33.35	25.34	31.39

The mean value for 1972 was 60-130 % higher than the corresponding mean values for 1968, 1970 and 1971. Especially at station F 81 the amount of zooplankton was considerably higher than the previous years. This indicates that 1972 must have been an extremely high productive year in the Baltic proper.

It is obvious from table 7 and figs. 58-61 that there were considerable differences between the seven subareas in 1972. The Arkona Sea (S 12) seems to be a low productive area and the amount of biomass is about 1/3 of the amount in the Bornholm Sea (S 24). It is not surprising that the values are lower in the Arkona Sea. This subarea is a typical transition area between the Belt Sea and the Baltic proper and has always lower amounts of zooplankton. However, it is surprising that the differences are so great.

The Bornholm Sea is always the most productive area in our investigations. The mean value of 25.5 g m^{-2} (wwt) for 1972 is, however, very high in comparison with the three year mean for 1968-1970, which was 13.4 g m^{-2} (ACKEFORS & HERNROTH, 1972). Stations 8 A and F 81 had similar mean values (18.3 and 17.2 resp.) for 1972. The values are about 100 % higher than the three year mean. Comparative low values from station S 41 are difficult to explain. Unfortunately this station was not visited in August and the estimated value for this month might be too low. The two most northern stations F 78 and F 72 showed values in the same magnitude as the three year mean. The comparisons are difficult to make since the sampling times the previous years were not exactly the same. The cruises in 1972 may have taken place in a more favourable time concerning the production of plankton. The least productive time of the year seems to be March and April and next to those months the periods November-February. In 1972 only one sampling time occurred during the mentioned periods. However, the sampling occurred the last day of Fabruary and the first week of March, which is a more favourable time than the end of March and April.

The species which contributed most to the biomass in the high productive period in August were Bosmina coregoni maritima, Pseudocalanus minutus elongatus and Temora longicornis. At the stations S 24-F 81 B. cor. maritima occurred in the range of 1.1 - 1.4 milj. ind. m^{-2}, Ps. m. elongatus 0.3 - 0.6 milj. ind. m^{-2} and T. longicornis 0.2 milj. ind. m^{-2}.

REFERENCES

ACKEFORS, H., 1972: The amount of zooplankton expressed as numbers, wet weight and carbon content in the Askö area (The Northern Baltic proper). - Medd. Havsfiskelab., Lysekil, nr 129, 10 pp., 2 figs., 5 tables (mimeo.).

ACKEFORS, H. & HERNROTH, L., 1970 a: Seasonal and vertical distribution of zooplankton off the coast in the Baltic proper in 1968. - Medd.Havsfiskelab., Lysekil, nr 76, 13 pp., 125 figs., 6 tables (mimeo.).

ACKEFORS, H. & HERNROTH, L., 1970 b: Ecological zooplankton studies in the Baltic proper in connection with oceanographic studies in 1969 during the Baltic Year. - Medd.Havsfiskelab., Lysekil, nr 89, 9 pp., 61 figs., 4 tables (mimeo.).

ACKEFORS, H, & HERNROTH, L., 1971: Seasonal and vertical distribution of zooplankton off the coast in the Baltic proper in 1970. - Medd.Havsfiskelab., Lysekil, nr 113, 10 pp., 113 figs., 5 tables (mimeo.).

ACKEFORS, H. & HERNROTH, L., 1972: Estimations of the amount of zooplankton and fish in the Baltic proper. - Medd.Havsfiskelab., Lysekil, nr 139, 16 pp., 2 figs. (mimeo.).

ACKEFORS, H. & HERNROTH, L., 1973: Changes in productivity and distribution of zooplankton off the coast in the Baltic proper in 1971. - Medd.Havsfiskelab., Lysekil, nr 147, 17 pp., 65 figs., 5 tables (mimeo.).

BERZINS, B., 1960: Rotatoria I. - Cons. Int. L'Explor. Mer. Zooplankton Sheet 84.

ENGSTRÖM, S.G. & FONSELIUS, S.H., 1975: Hydrography of the Baltic, Swedish observations in 1973. - Ann. Biol., 30 (1973):48-51.

FONSELIUS, S.H., 1974: Observations along the Swedish coast and in the deep basins in the Baltic, 1972. - Ann. Biol., 29(1972): 30-33.

GIESKES, W.W.C., 1971: Removal of "Podon" polyphemoides from the genus Podon. - Hydrobiologia 38(1):61-66.

KALEIS, M.V. & YULA, E.A., 1974: Hydrographic regime of the Baltic in 1971 and 1972. - Ann. Biol., 29(1972):33-36.

KOTT, P., 1953: Modified whirling apparatus for the subsampling of plankton. - Austr. J. Mar. Freshw. Res., 4:387-393.

LOHMANN, H., 1908: Untersuchungen zur Feststellung des vollständigen Gehaltes des Meeres an Plankton. - Wiss. Meeresunters., Abt. Kiel, N.F., 10:129-370.

WATTENBERG, H., 1949: Entwurf einer naturlicher Einteilung der Ostsee. - Kieler Meeresf., 6:10-15.

LEGENDS

Fig. 1. Chart of the Baltic proper.

Figs. 2-57. The most common species and their seasonal distribution. Winter (Feb.-March) is reproduced as white charts, spring (May) as yellow charts, summer (August) as green charts and autumn (October) as blue charts. The size of the circle represents the number of specimens collected in the hauls from bottom to surface, viz. below a surface area of approx. 0.2 m^2.

	Feb.-March	May	August	October
Synchaeta spp.	2	3	4	5
Harmothoe sarsi	6	7	8	9
Bosmina coregoni maritima	10	11	12	13
Podon sp.	14	15	16	17
Evadne nordmanni	18	19	20	21
Acartia bifilosa } Acartia longiremis }	22	23	24	25
Eurytemora sp.	26	27	28	29
Centropages hamatus	30	31	32	33
Pseudocalanus minutus elongatus	34	35	36	37
Temora longicornis	38	39	40	41
Oithona similis	42	43	44	45
Mytilus edulis	46	47	48	49
Macoma baltica } Cardium lamarcki } Mya arenaria }	50	51	52	53
Fritillaria borealis	54	55	56	57

Figs. 58-61. Charts illustrating the biomass as $g \cdot m^{-2}$ wwt.

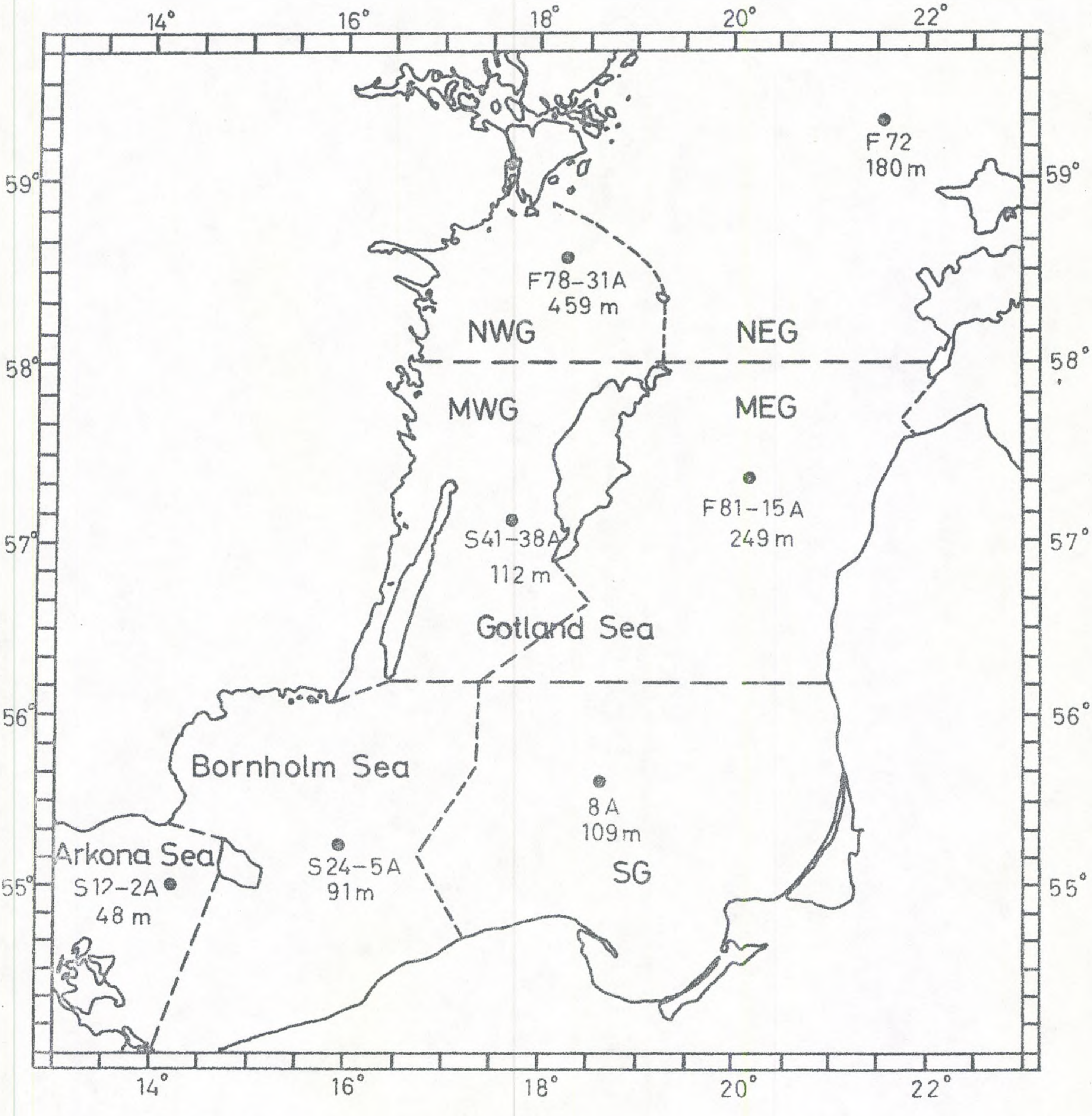
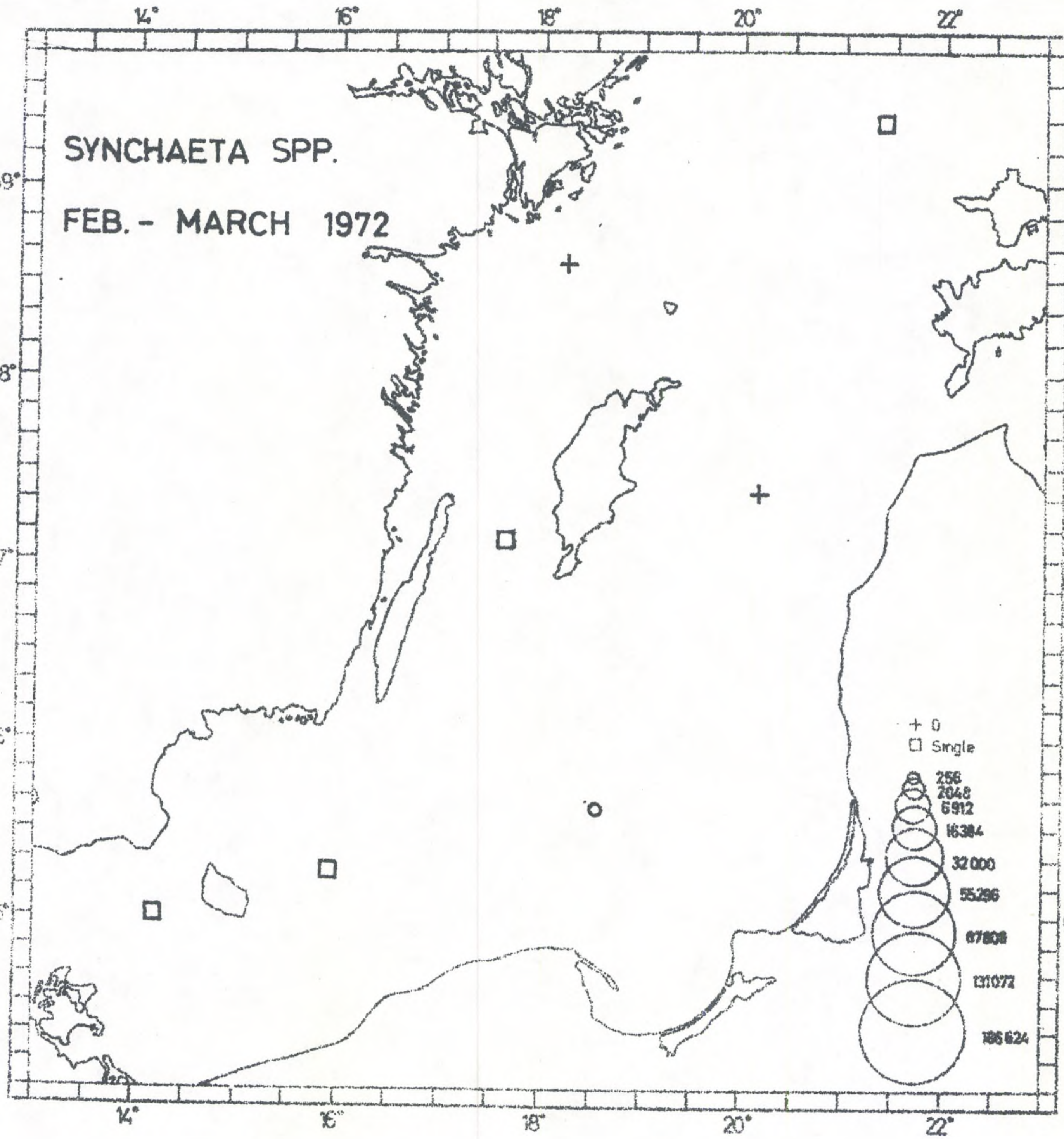


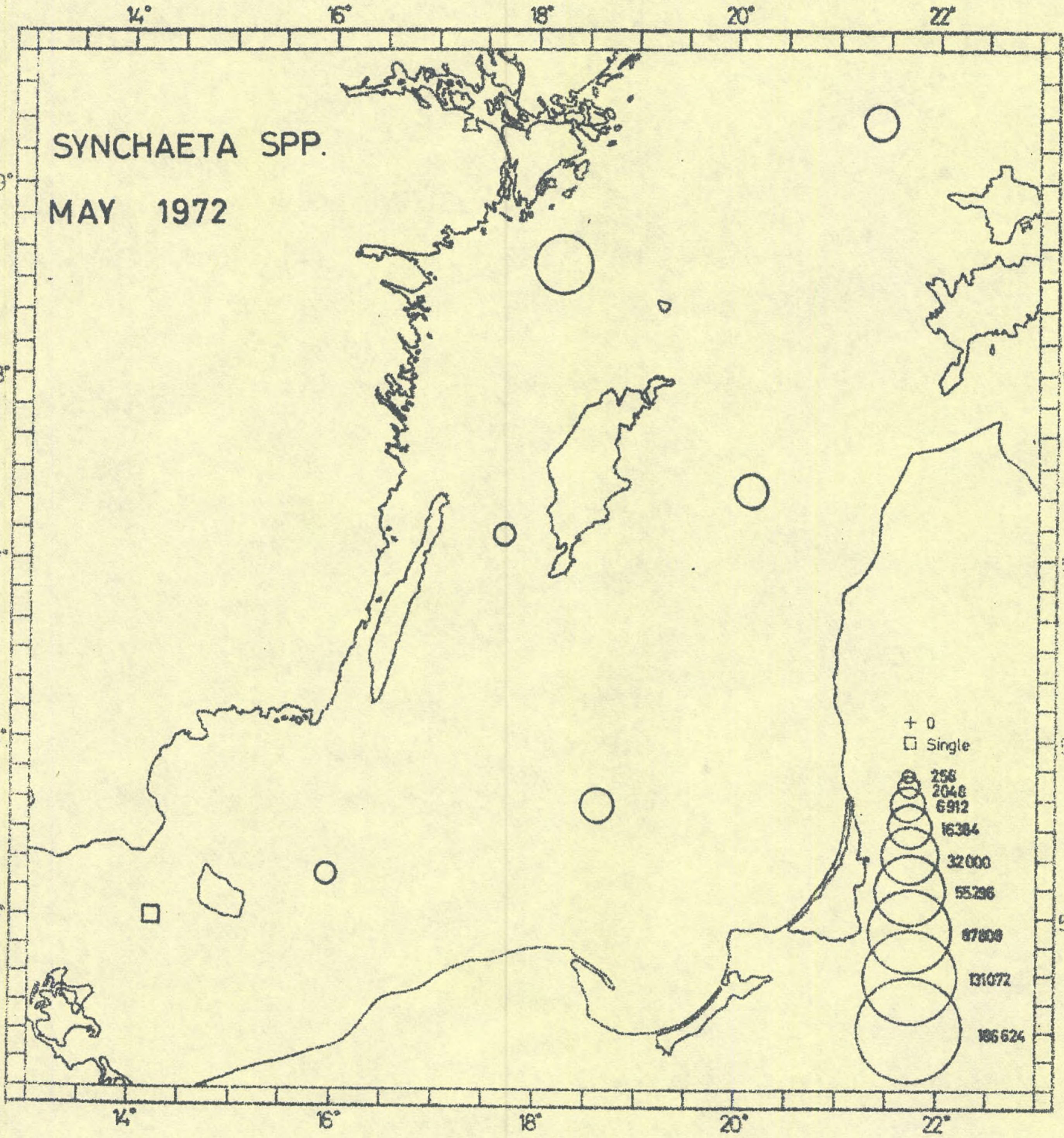
Fig. 1. Chart of the Baltic proper and the three subareas, the Arkona Sea, the Bornholm Sea and the Gotland Sea according to WATTENBERG (1949). The Gotland Sea is devided into an eastern and western part by WATTENBERG. According to ACKEFORS (1969a) the Gotland Sea may be devided into five subareas; the southern (SG), the middle eastern and western (MEG and MWG) and the north-eastern and north-western (NEG and NWG). The seven plankton stations are evident from the chart, in some cases with both old and new symbols as well as the depths.

Fig. 2



SYNCHAETA SPP.
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 3



SYNCHAETA SPP.
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 4

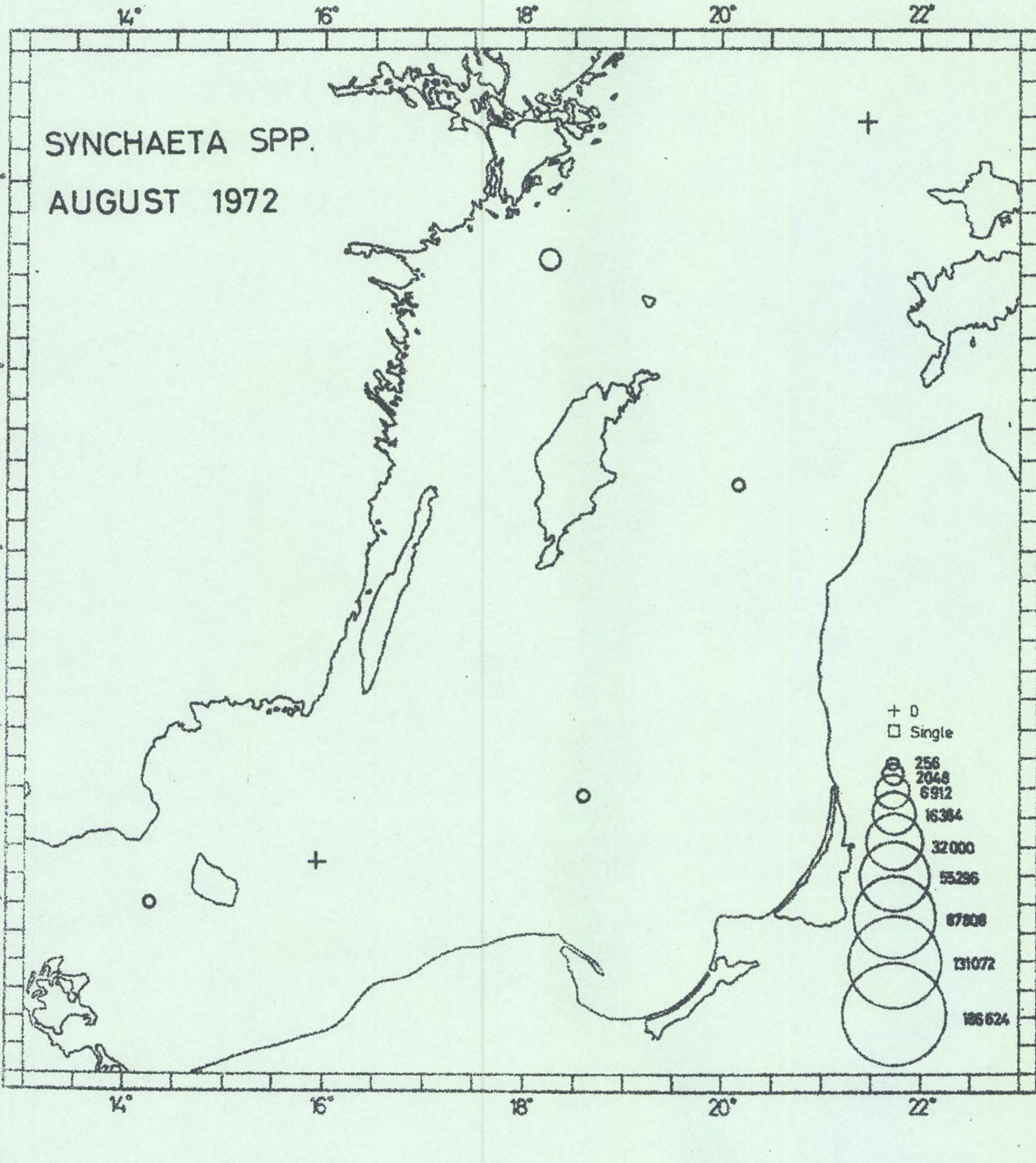

SYNCHAETA SPP.
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 5

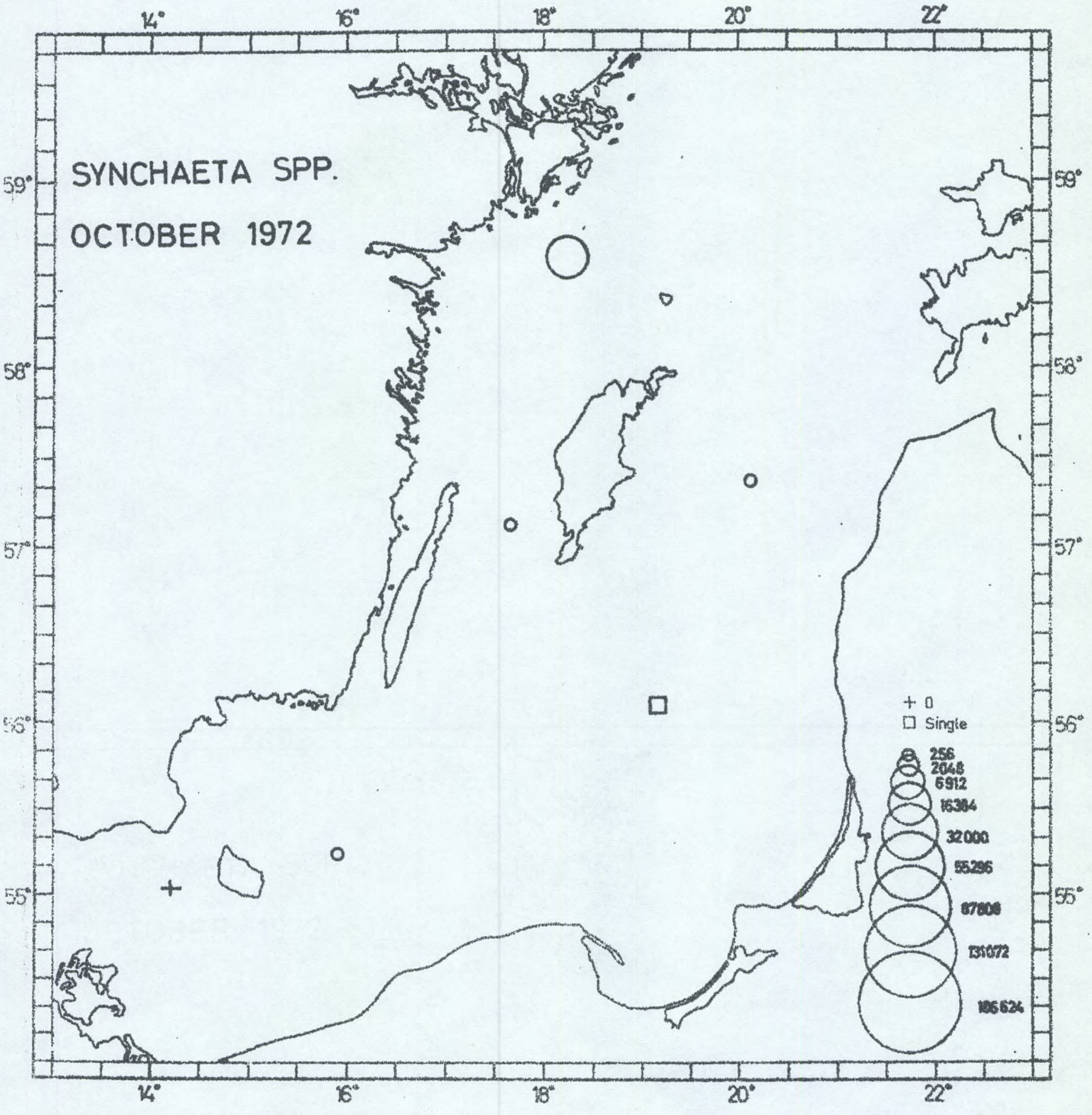

SYNCHAETA SPP.
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 6

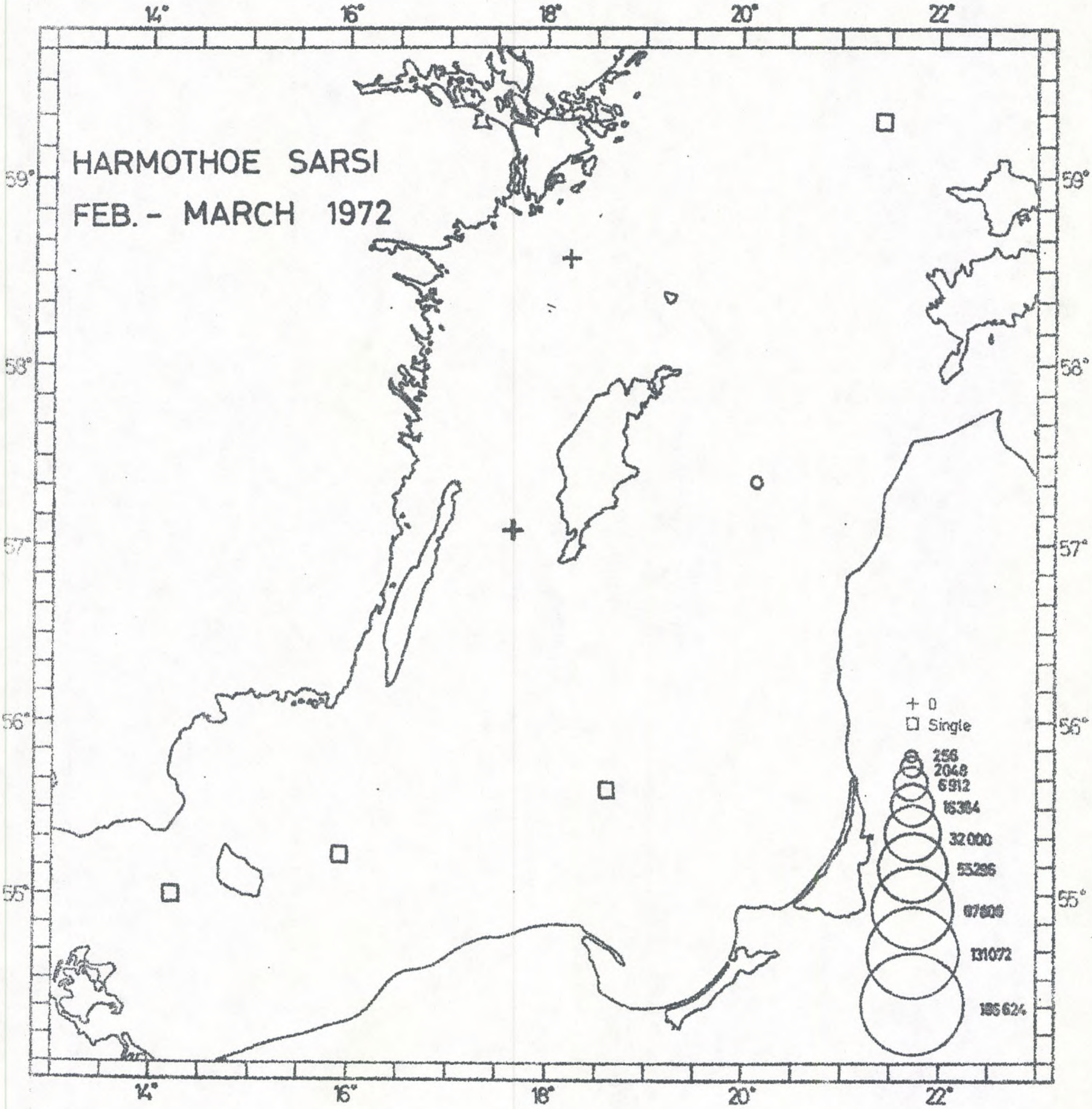
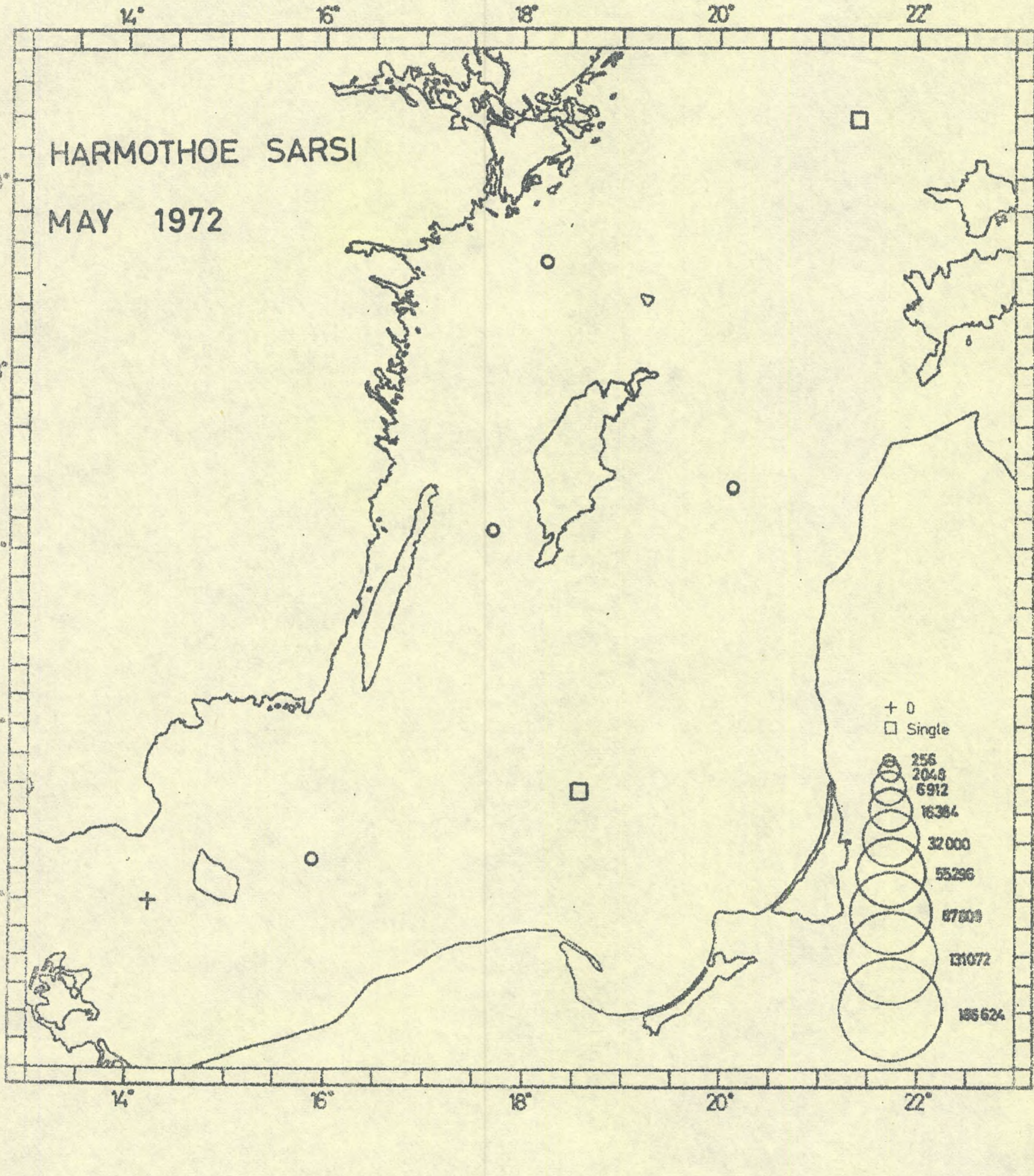

HARMOTHOE SARSI
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186 624

Fig. 7



HARMOTHOE SARSI
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 8

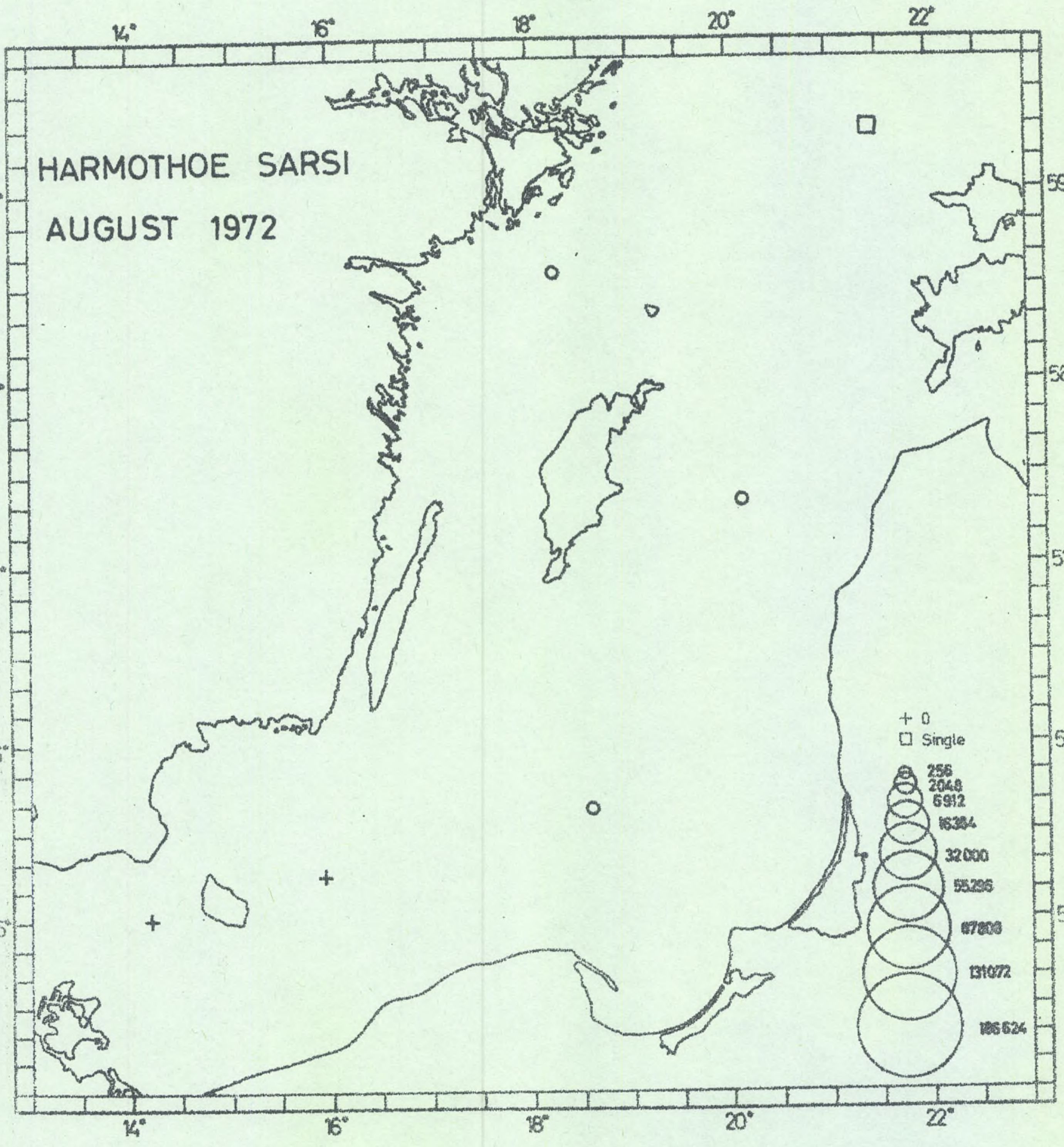
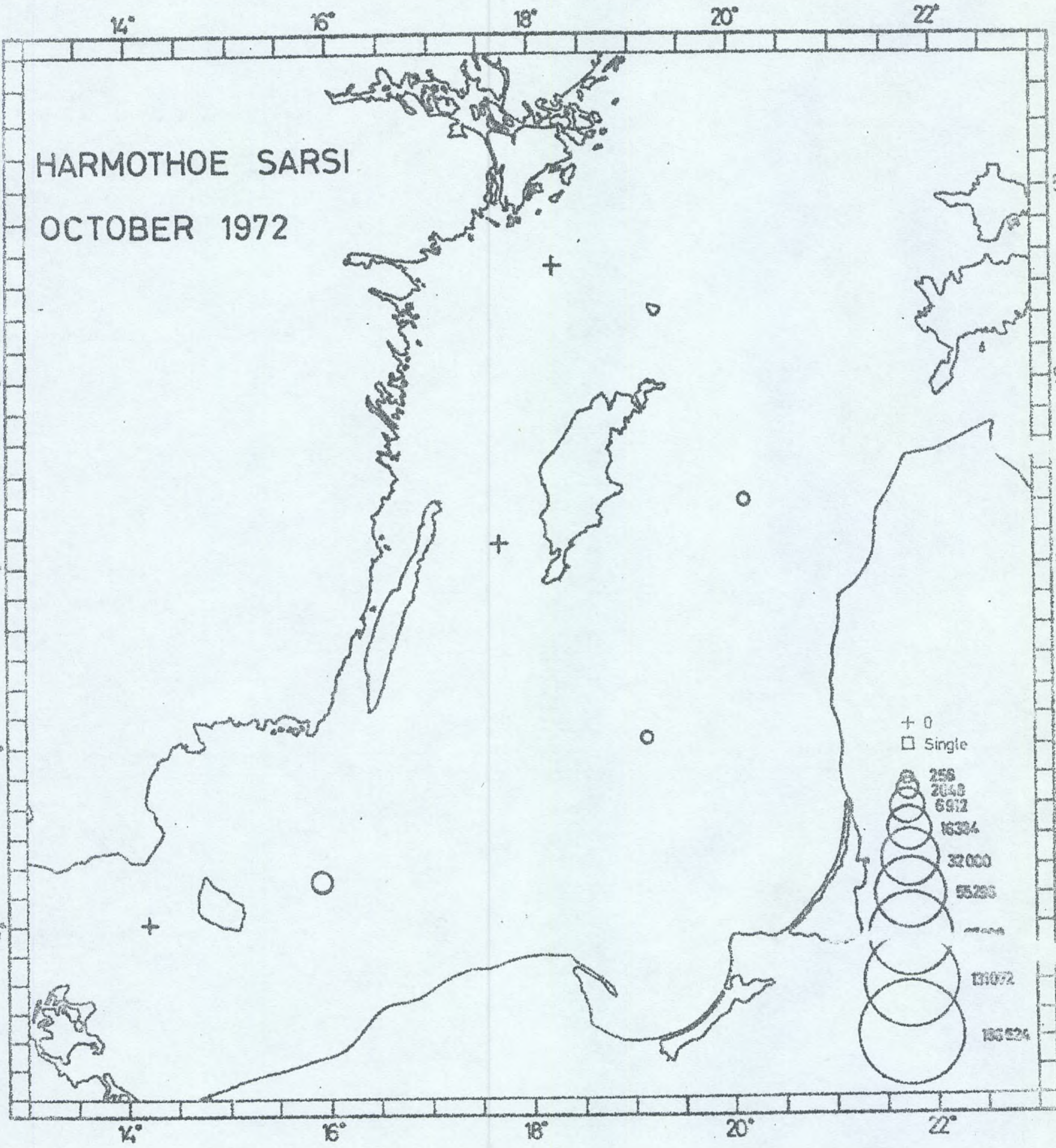
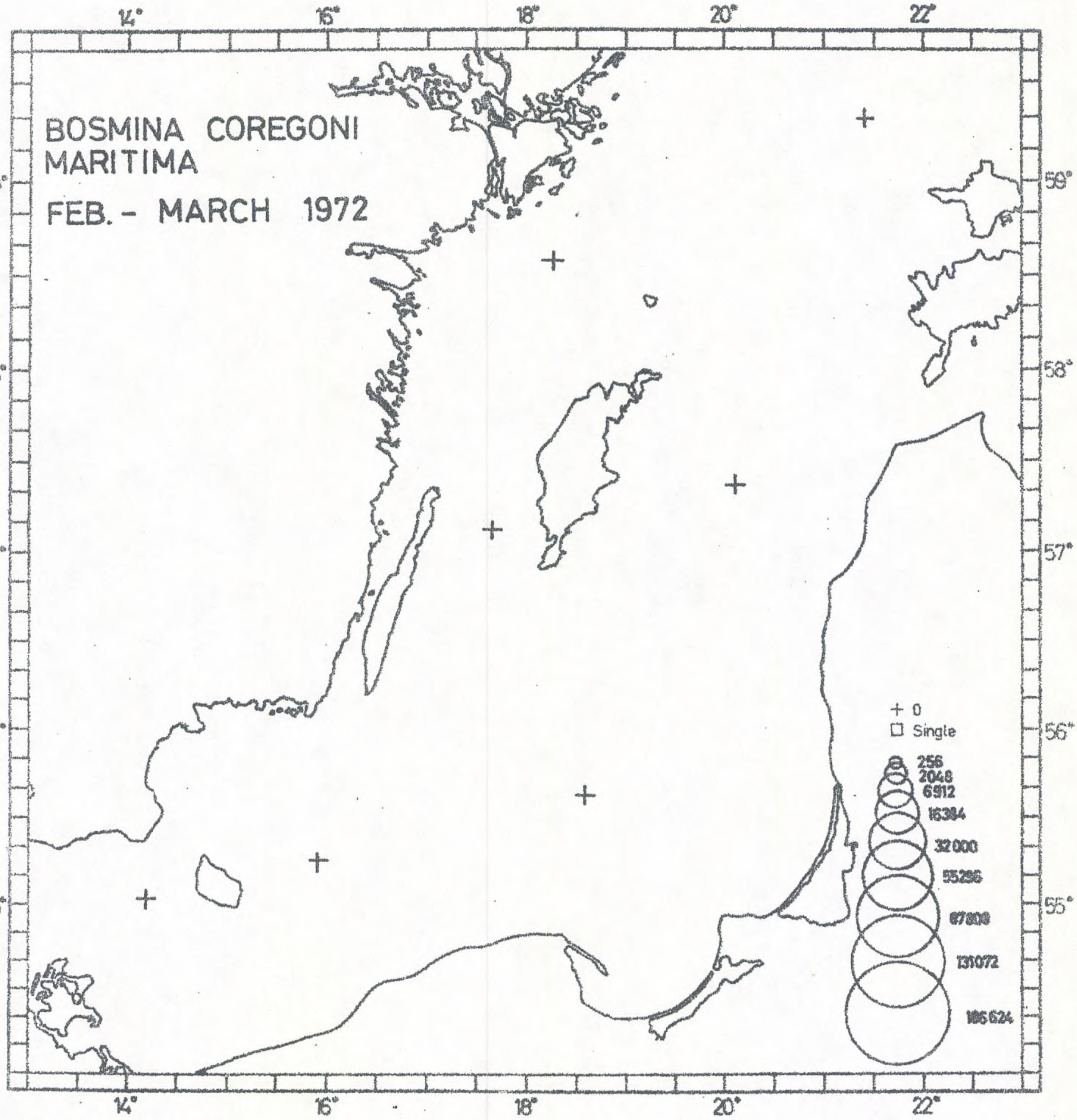

HARMOTHOE SARSI
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 9



HARMOTHOE SARSI
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
131072

Fig. 10



BOSMINA COREGONI
MARITIMA
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
185624

Fig. 11

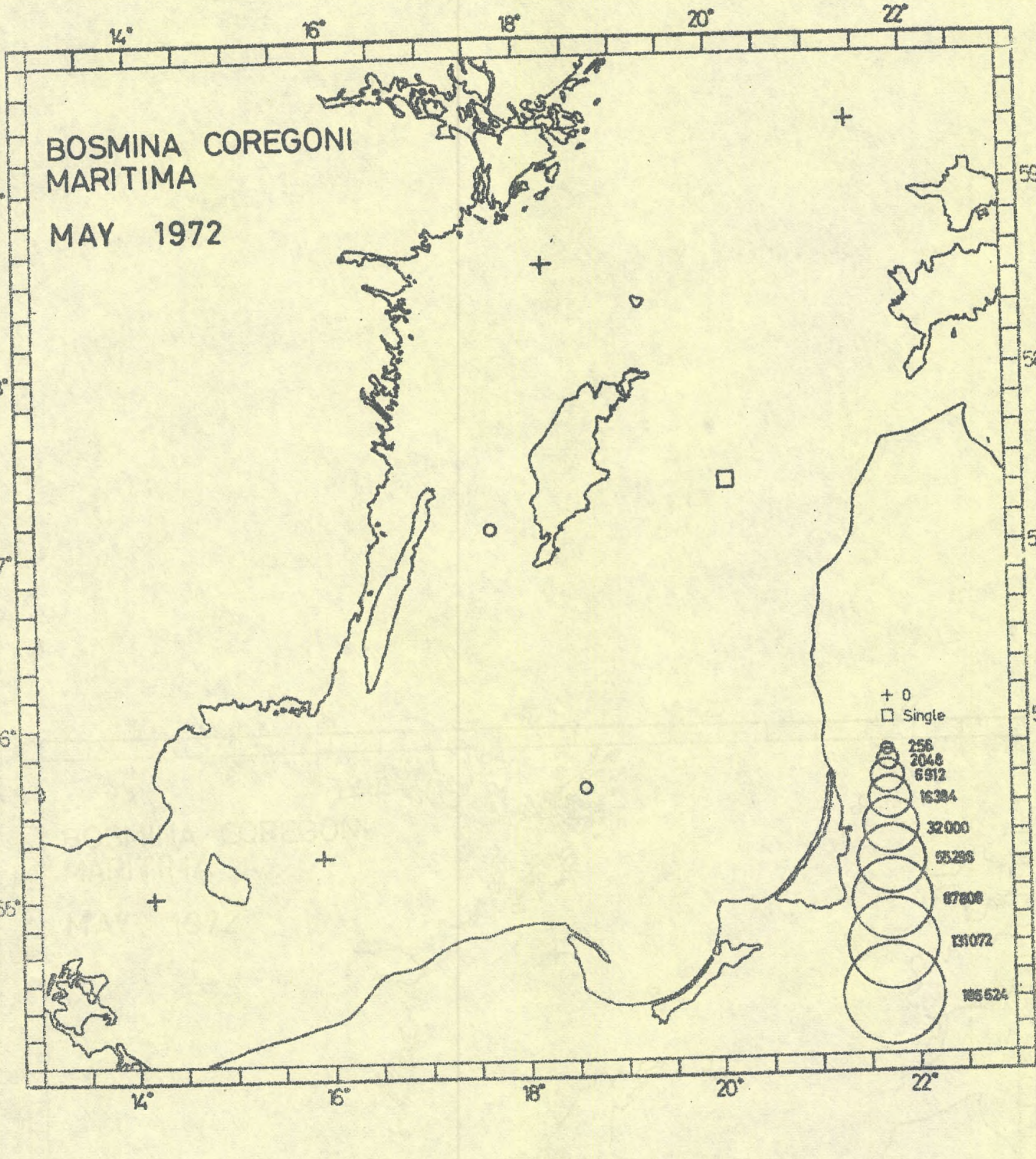

BOSMINA COREGONI
MARITIMA
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 12

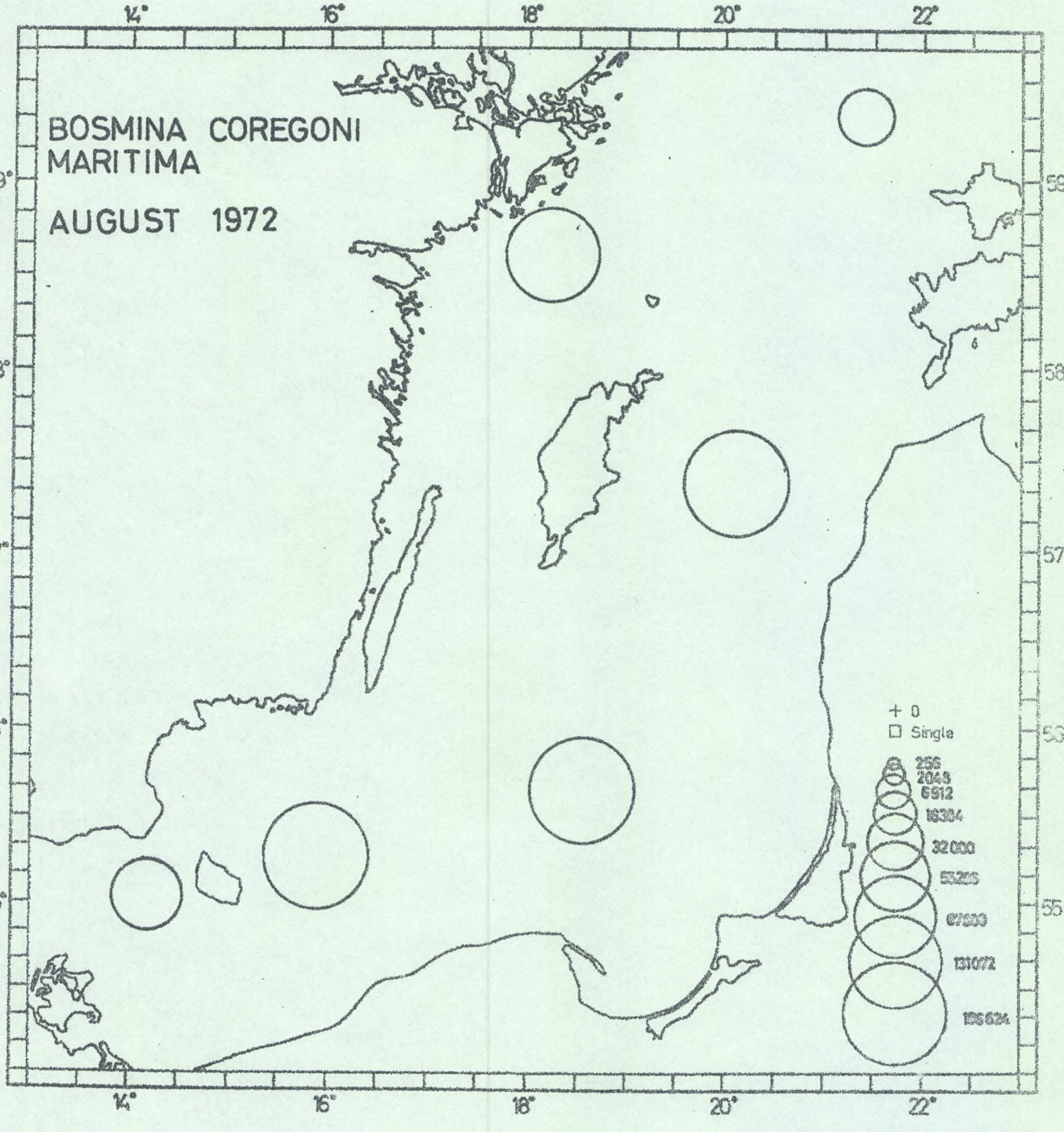
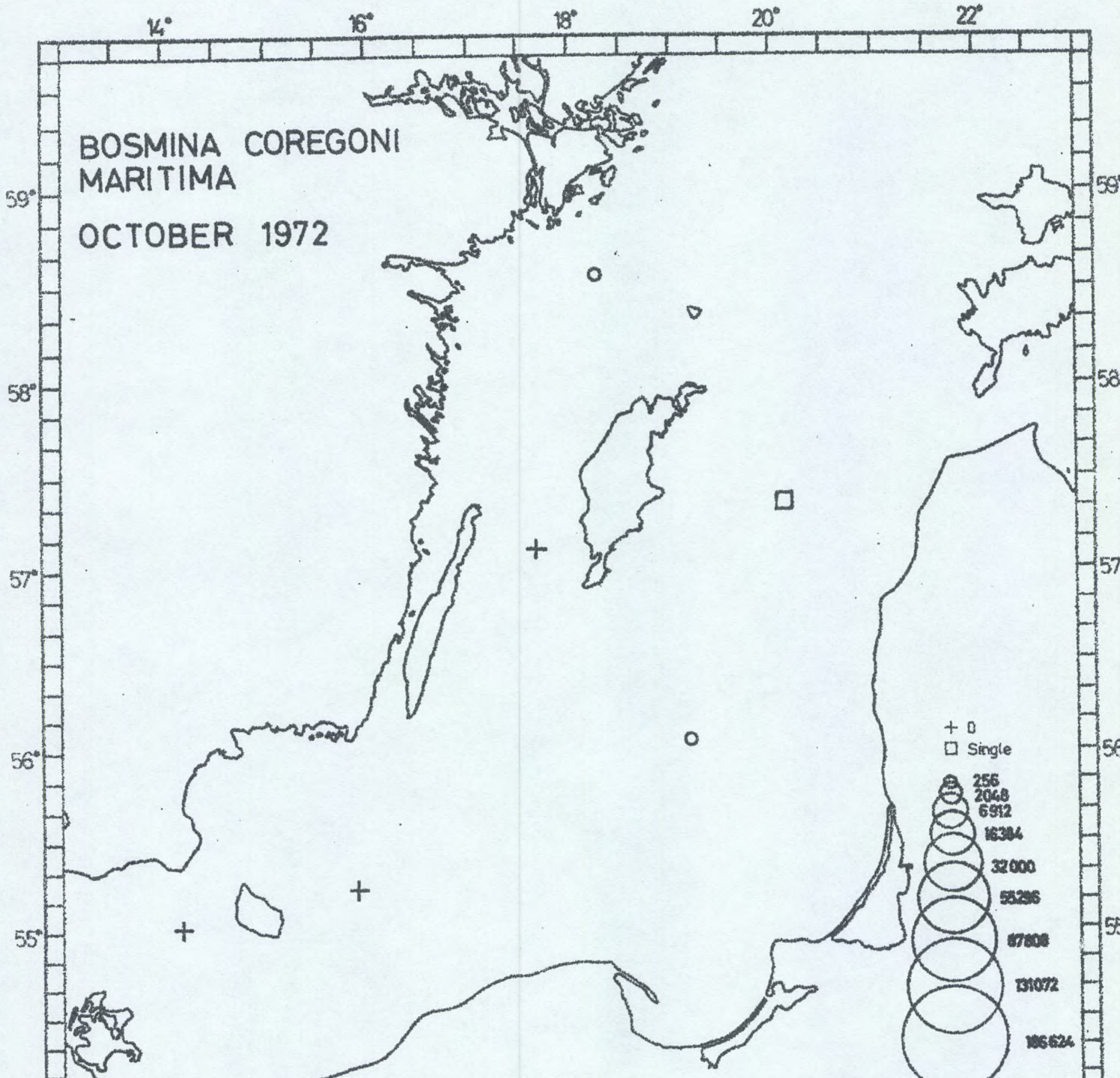

BOSMINA COREGONI
MARITIMA
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
131072
186624

Fig. 13



BOSMINA COREGONI
MARITIMA
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 14

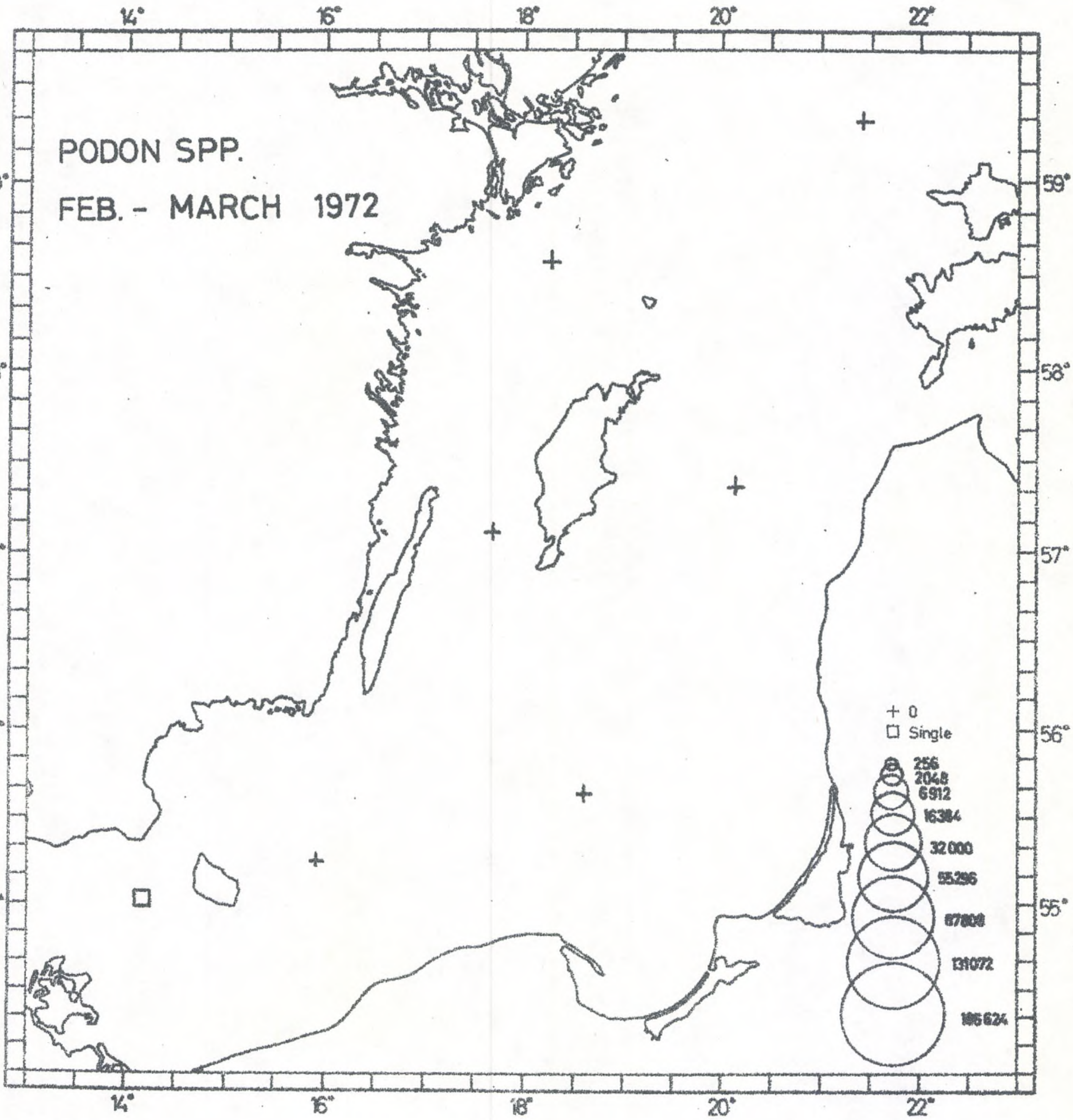

PODON SPP.
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 15

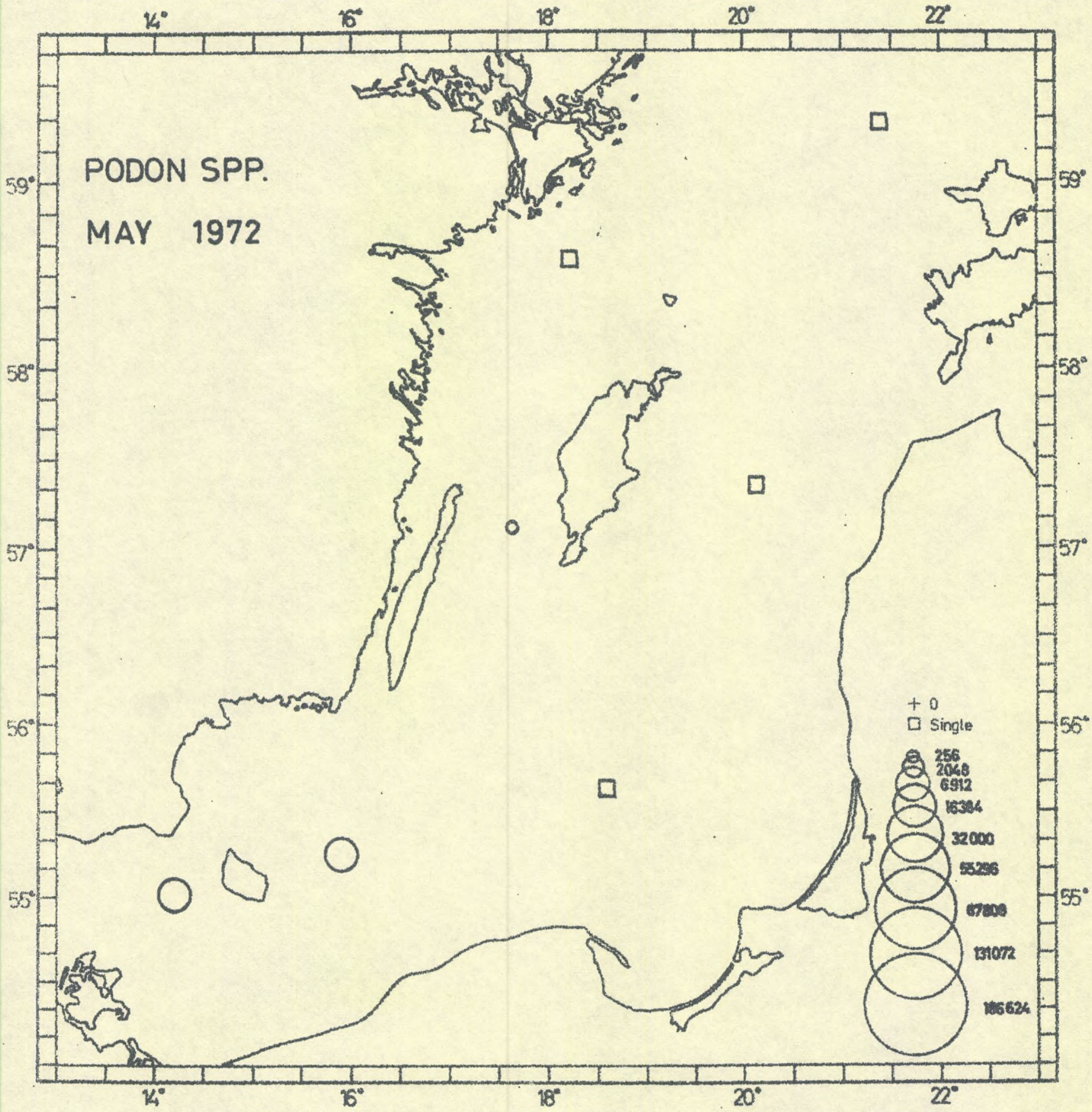
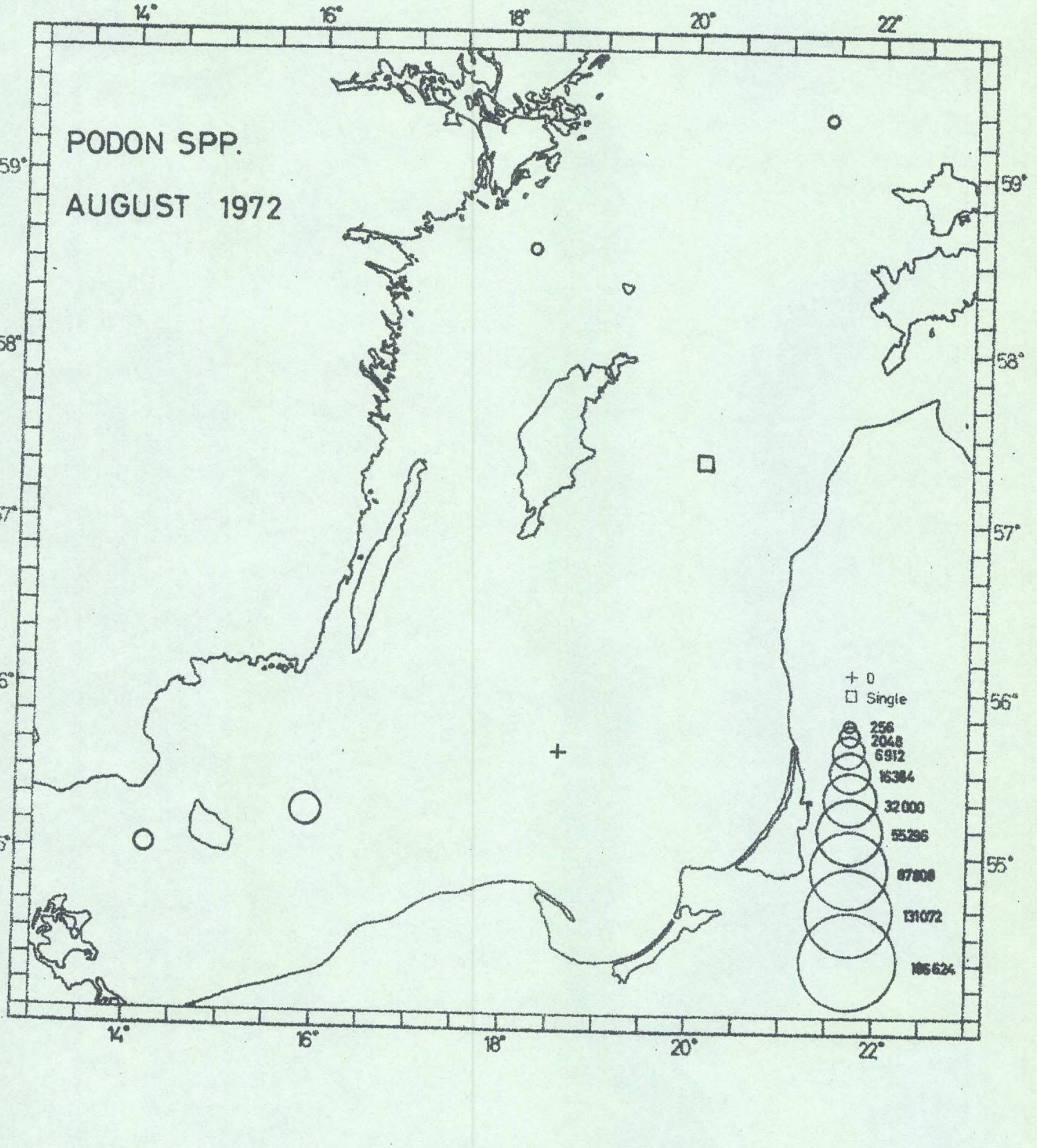
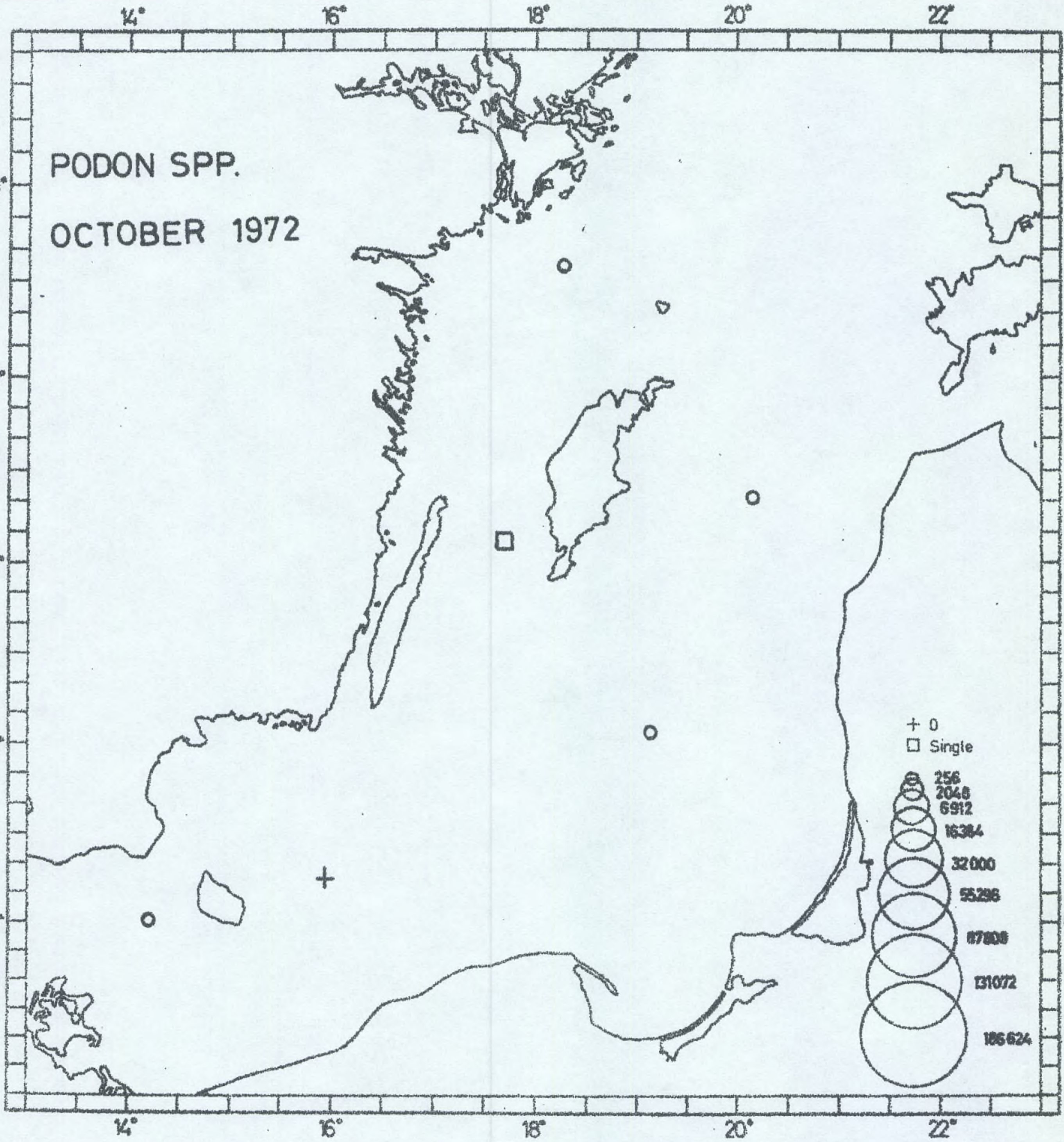

PODON SPP.
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 16



PODON SPP.
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 17



PODON SPP.
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 18

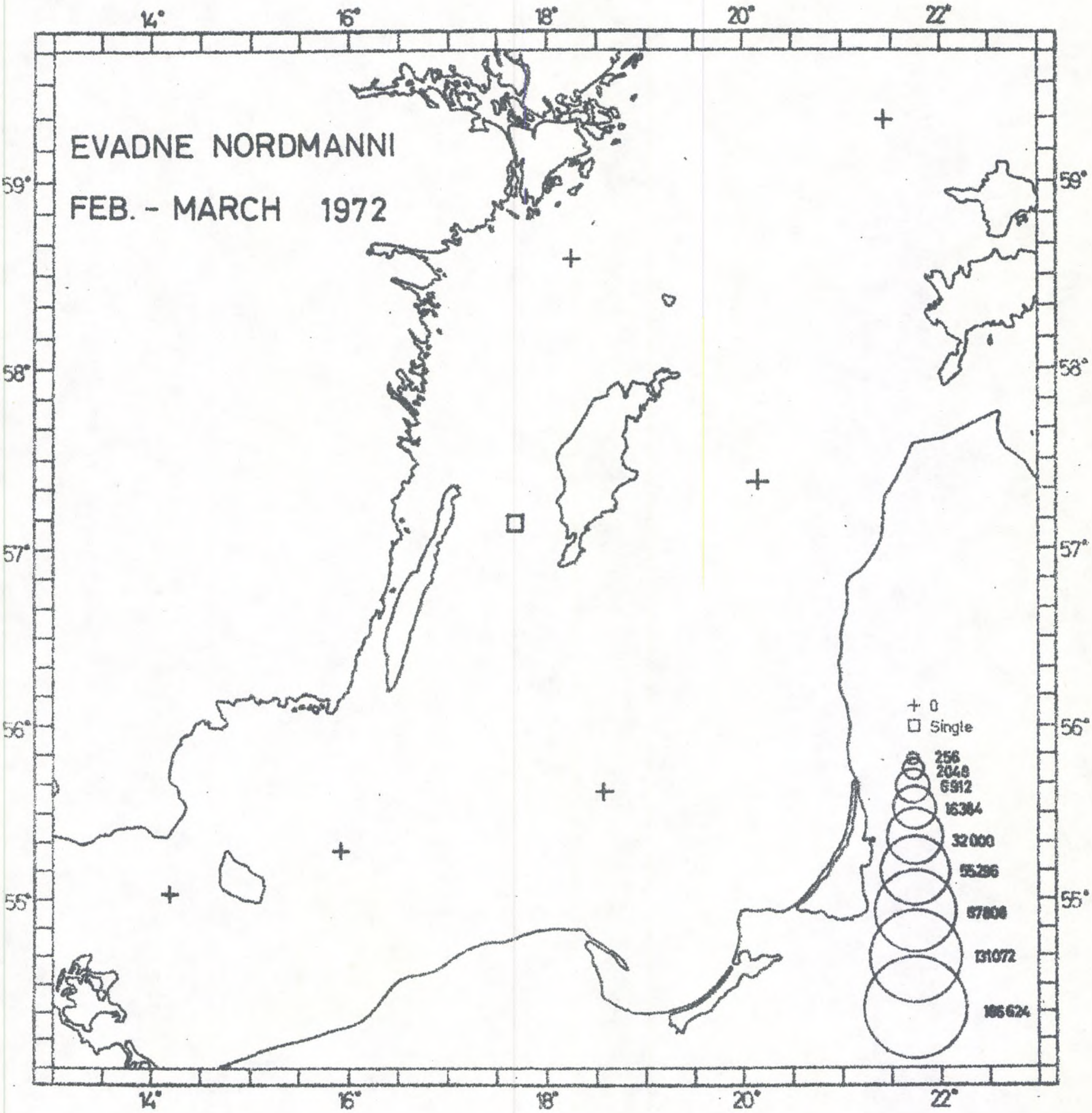

EVADNE NORDMANNI
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 19

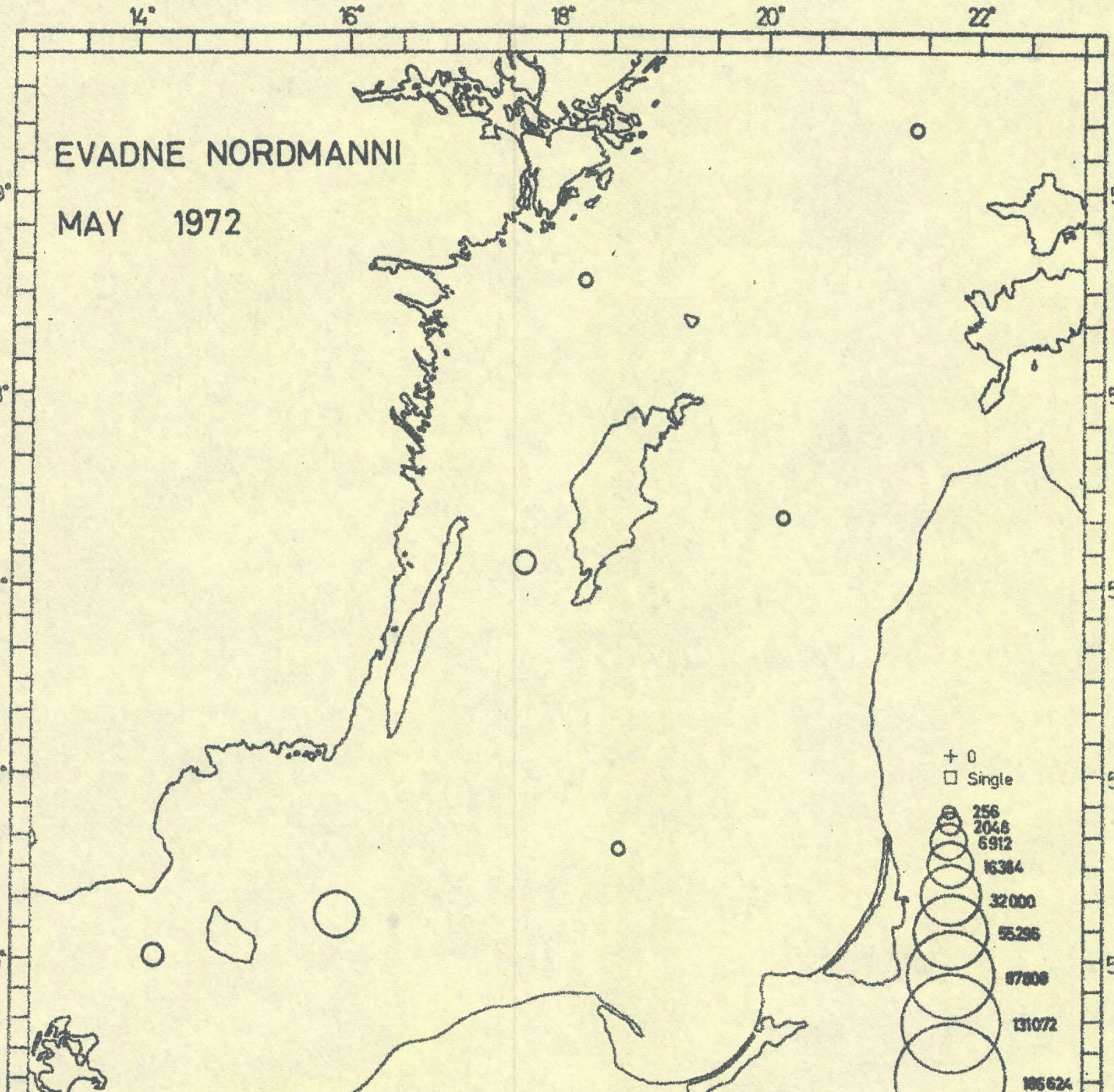
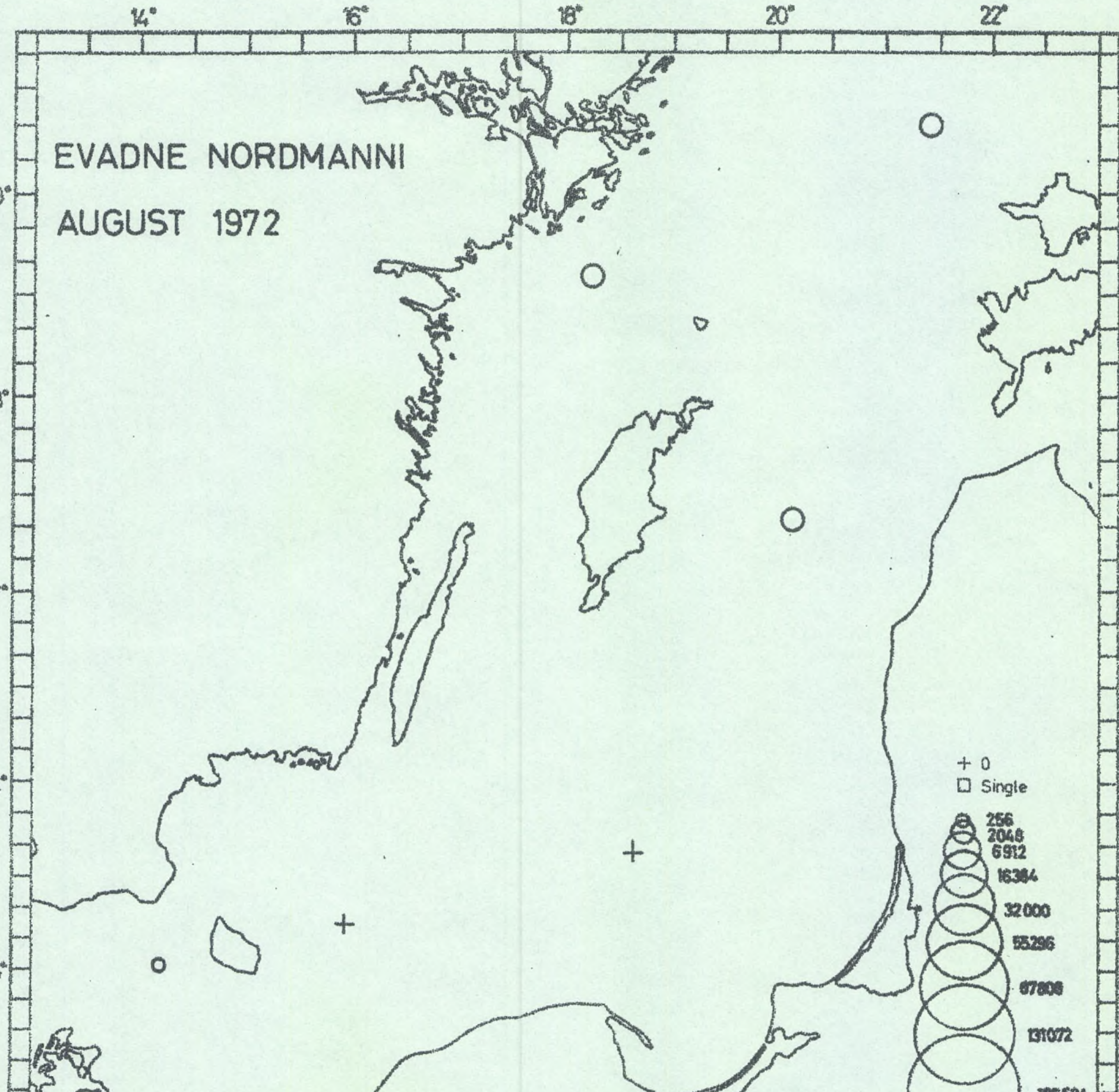
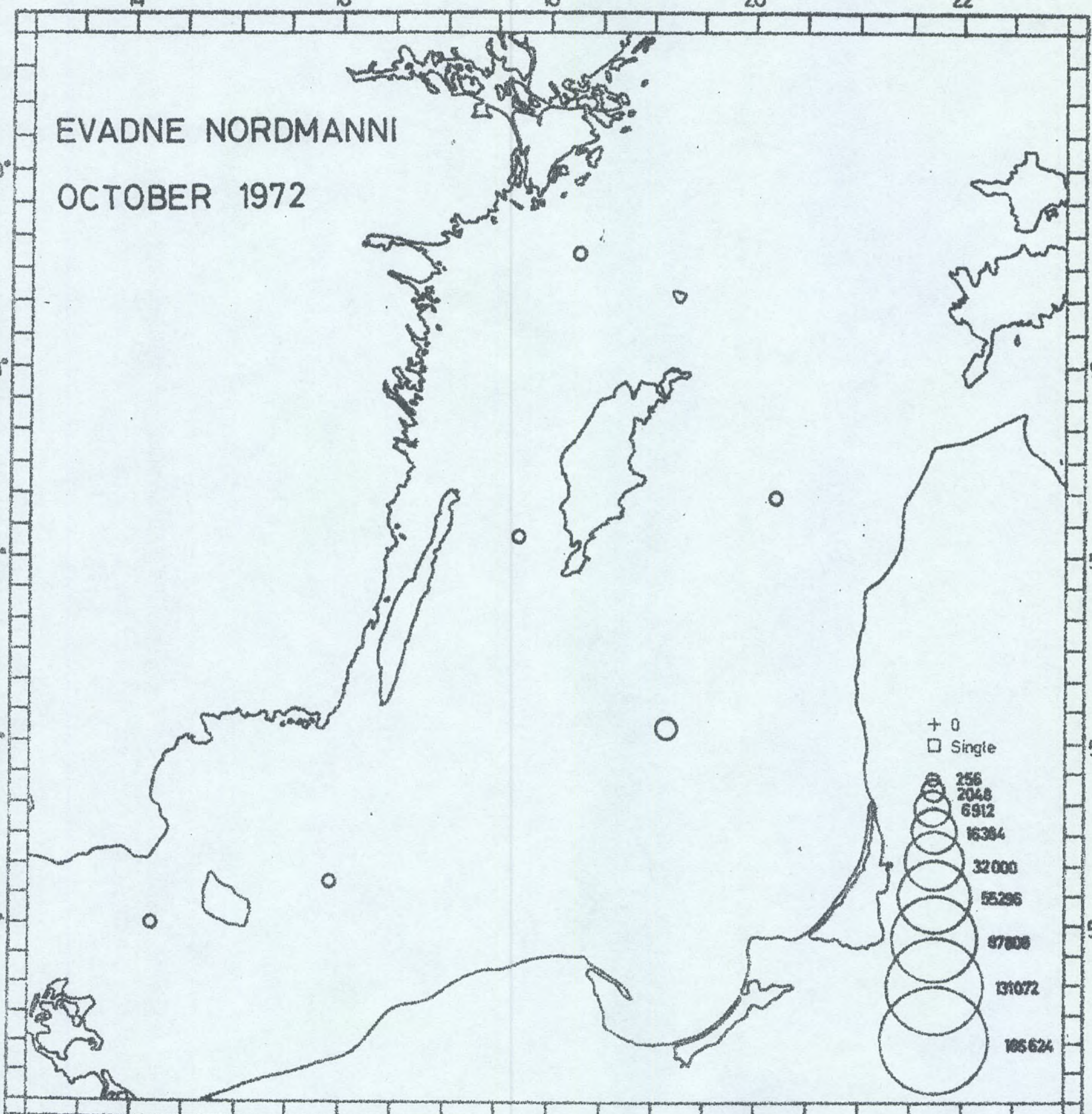

EVADNE NORDMANNI
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 20



EVADNE NORDMANNI
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
☐ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 21



EVADNE NORDMANNI
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 21

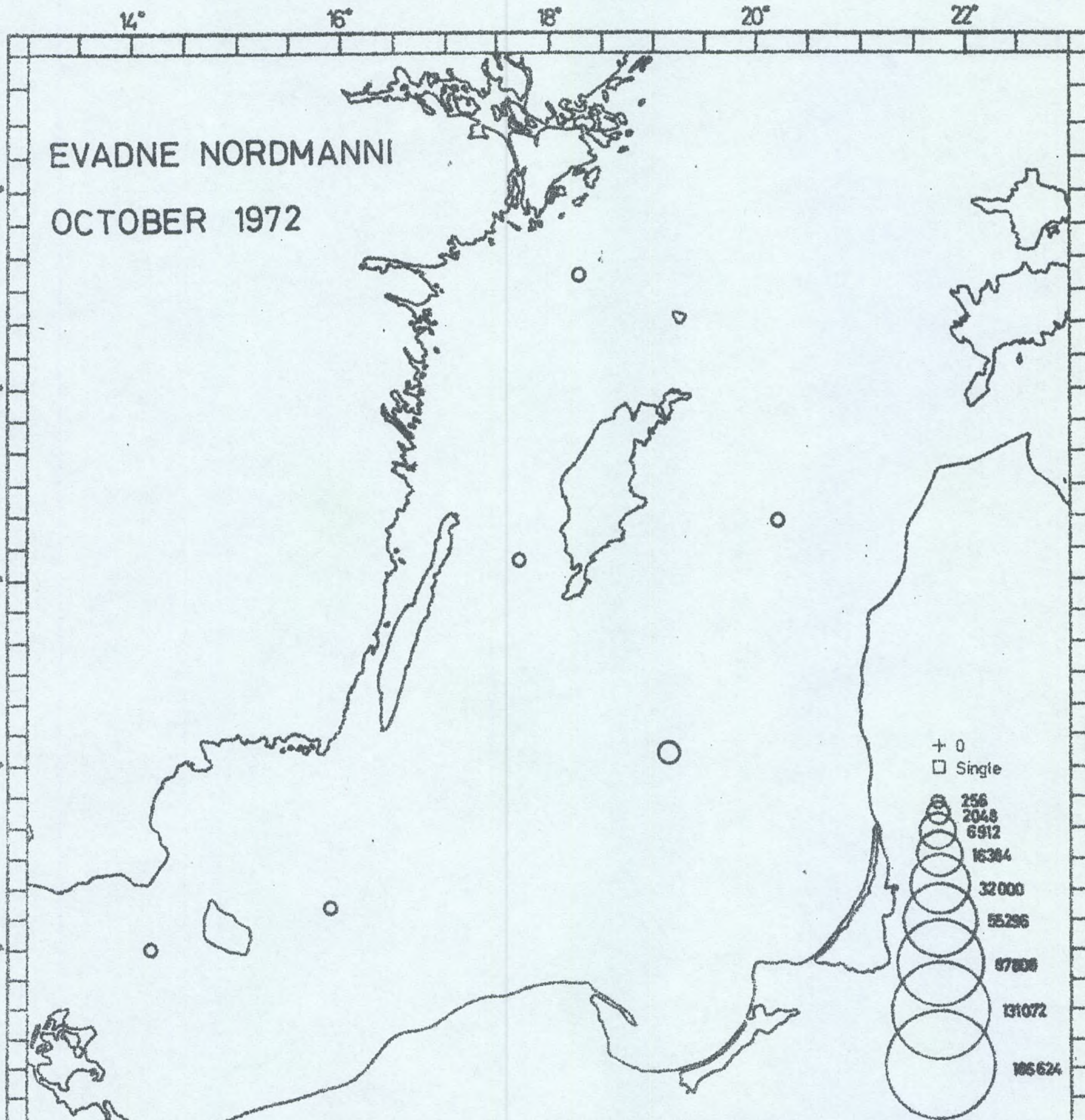

EVADNE NORDMANNI
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 22

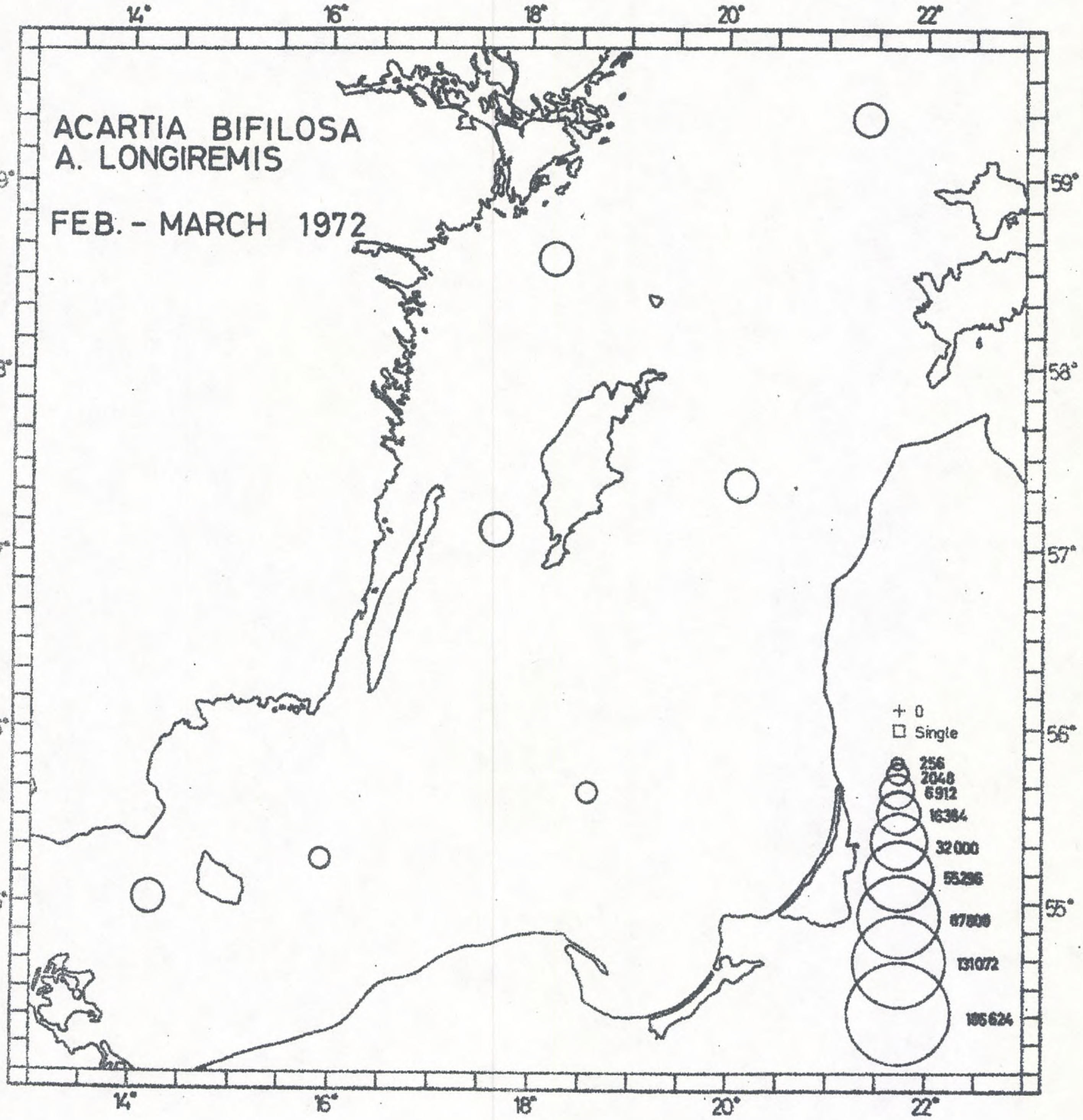

ACARTIA BIFILOSA
A. LONGIREMIS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 23

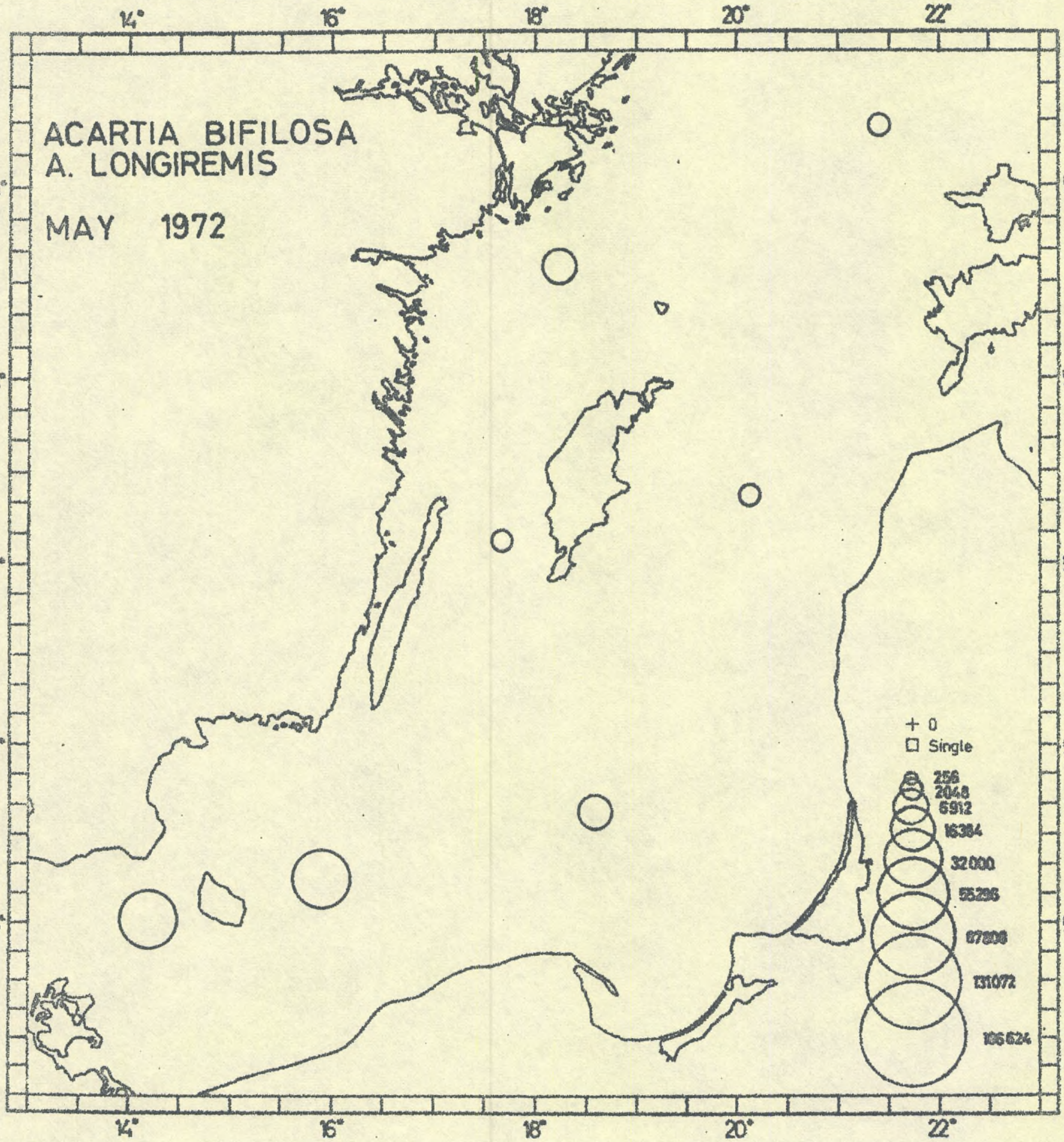

ACARTIA BIFILOSA
A. LONGIREMIS
MAY 1972
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
55°
56°
57°
58°
59°

Fig. 24

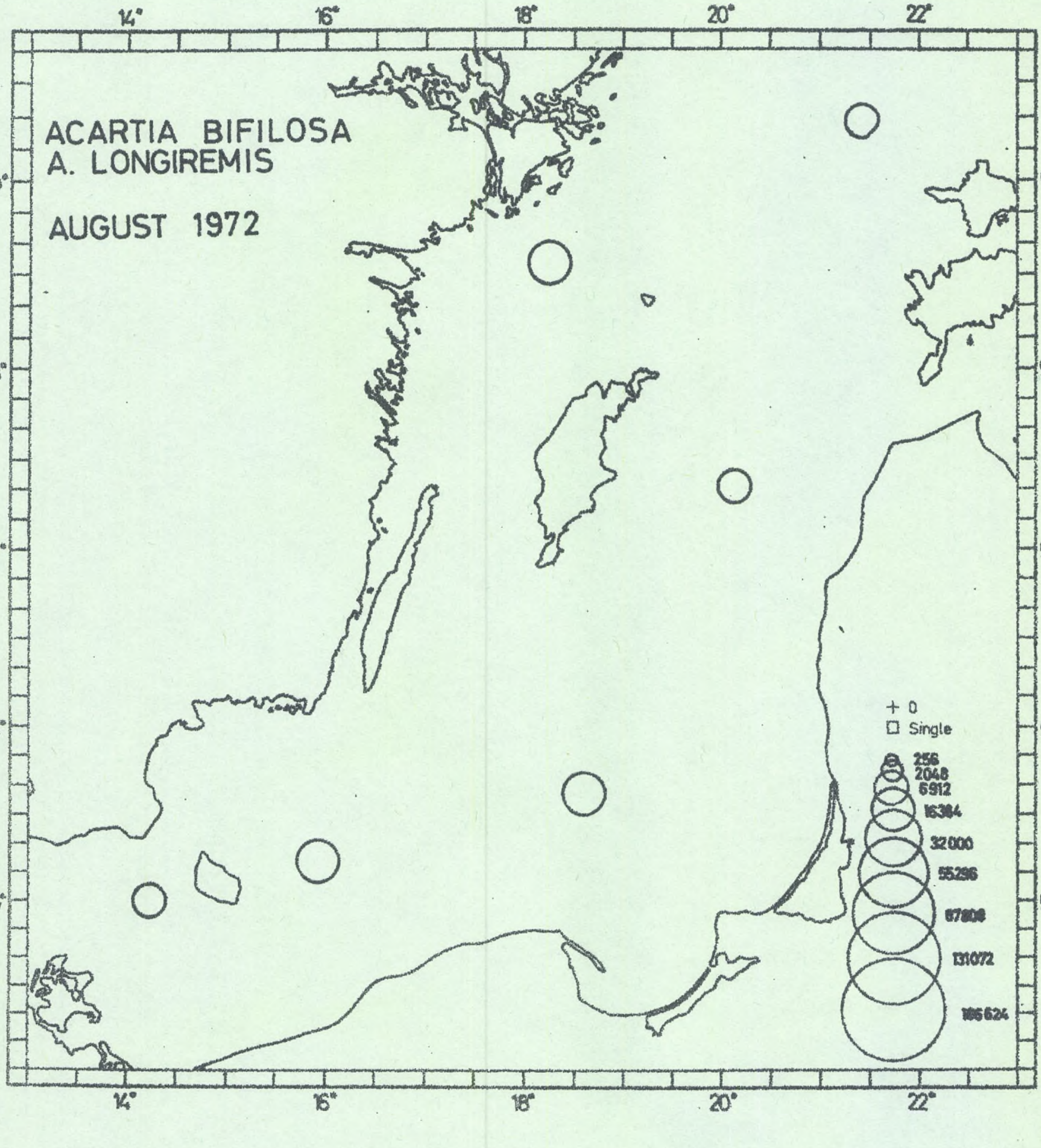
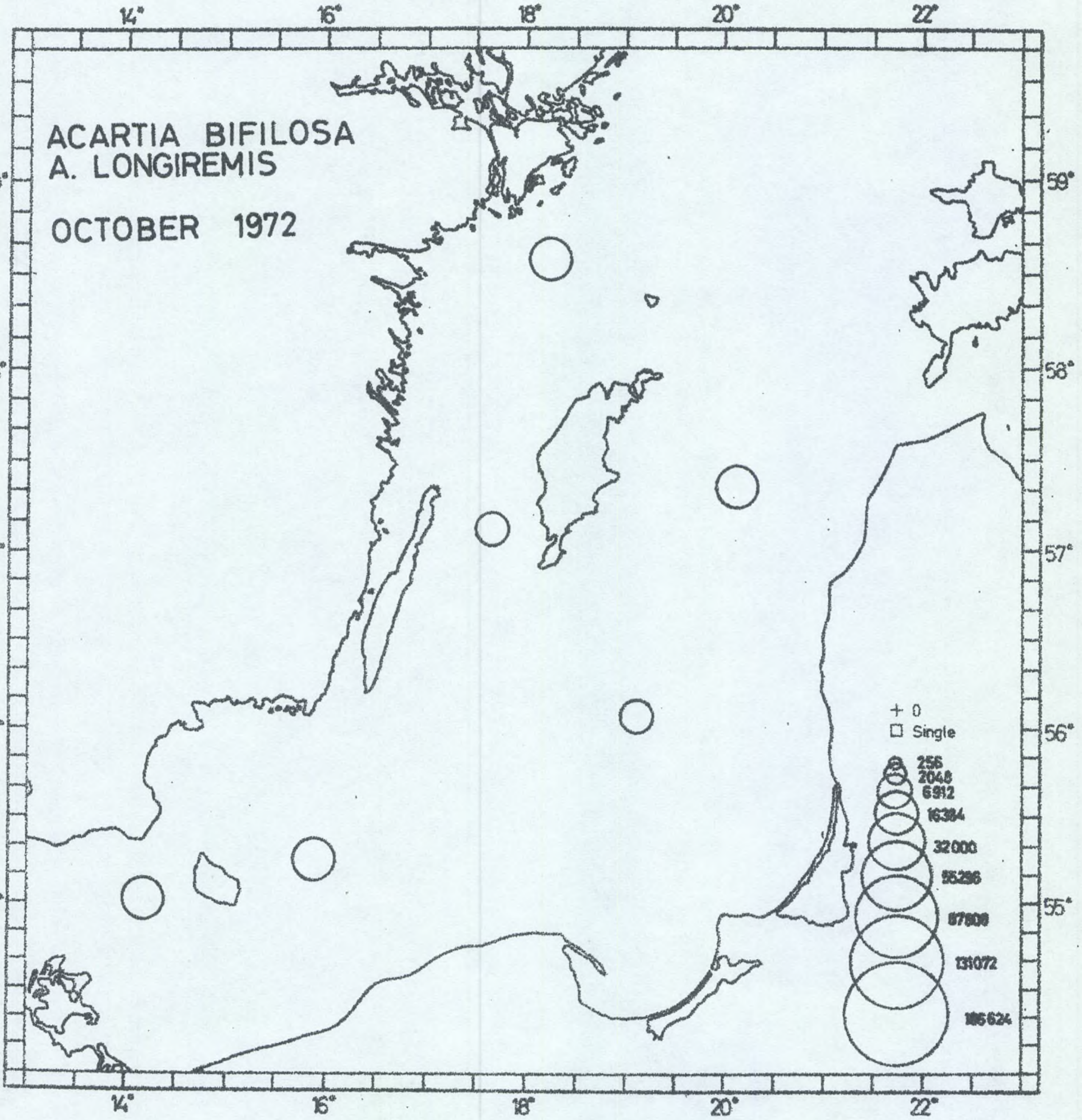

ACARTIA BIFILOSA
A. LONGIREMIS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186 624

Fig. 25



ACARTIA BIFILOSA
A. LONGIREMIS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
185624

Fig. 26

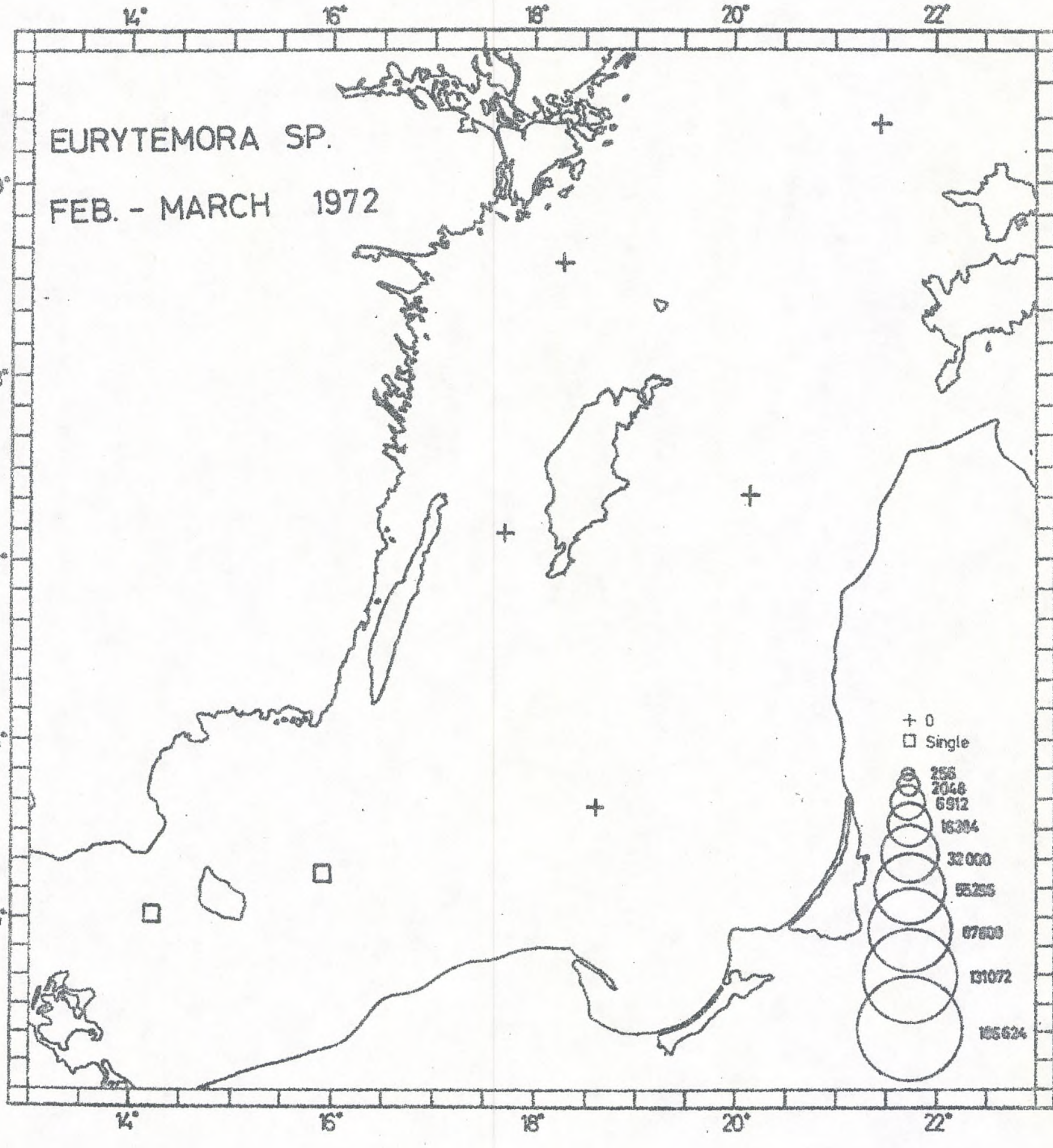

EURYTEMORA SP.
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 27

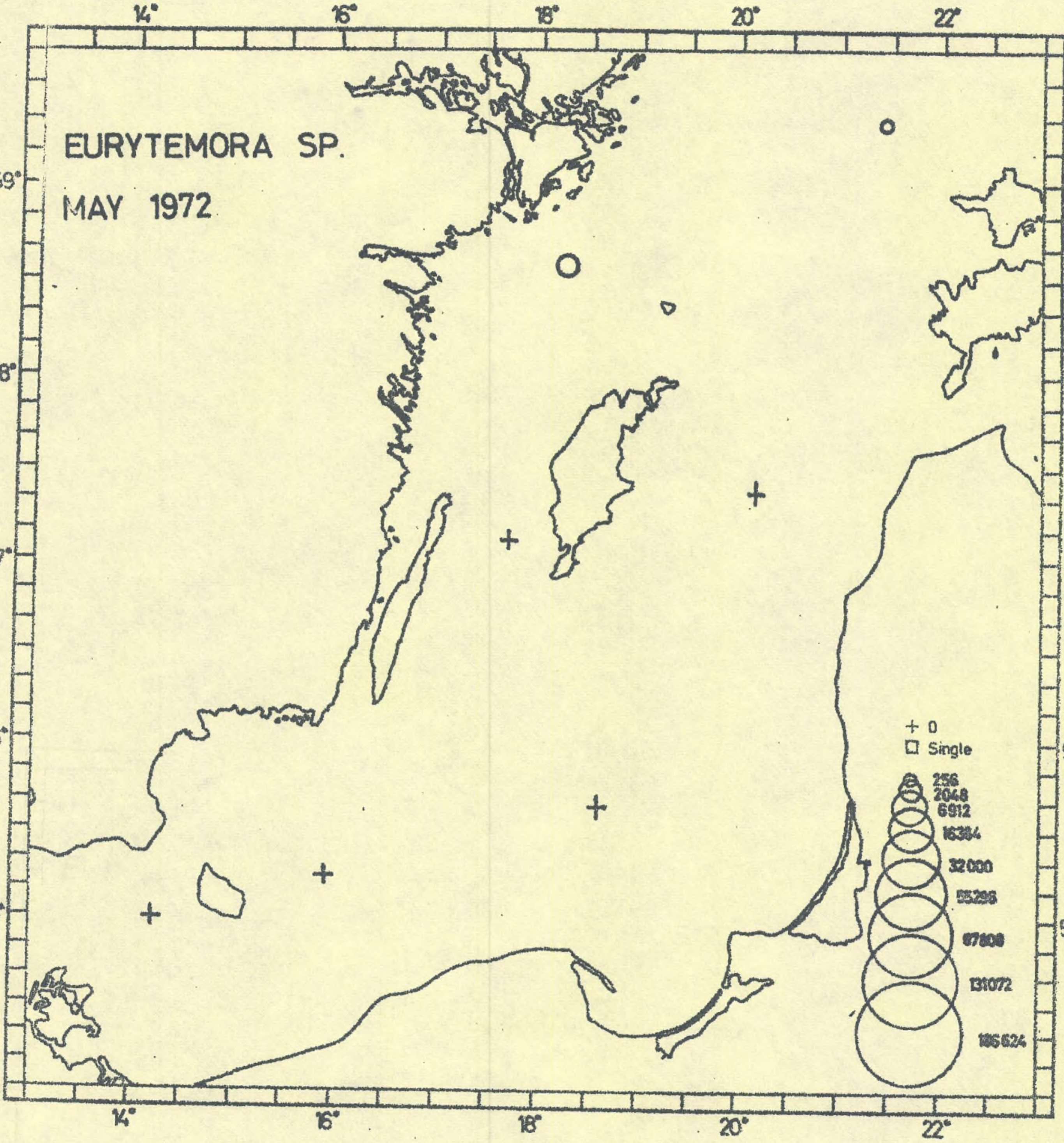

EURYTEMORA SP.
MAY 1972
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°

Fig. 28

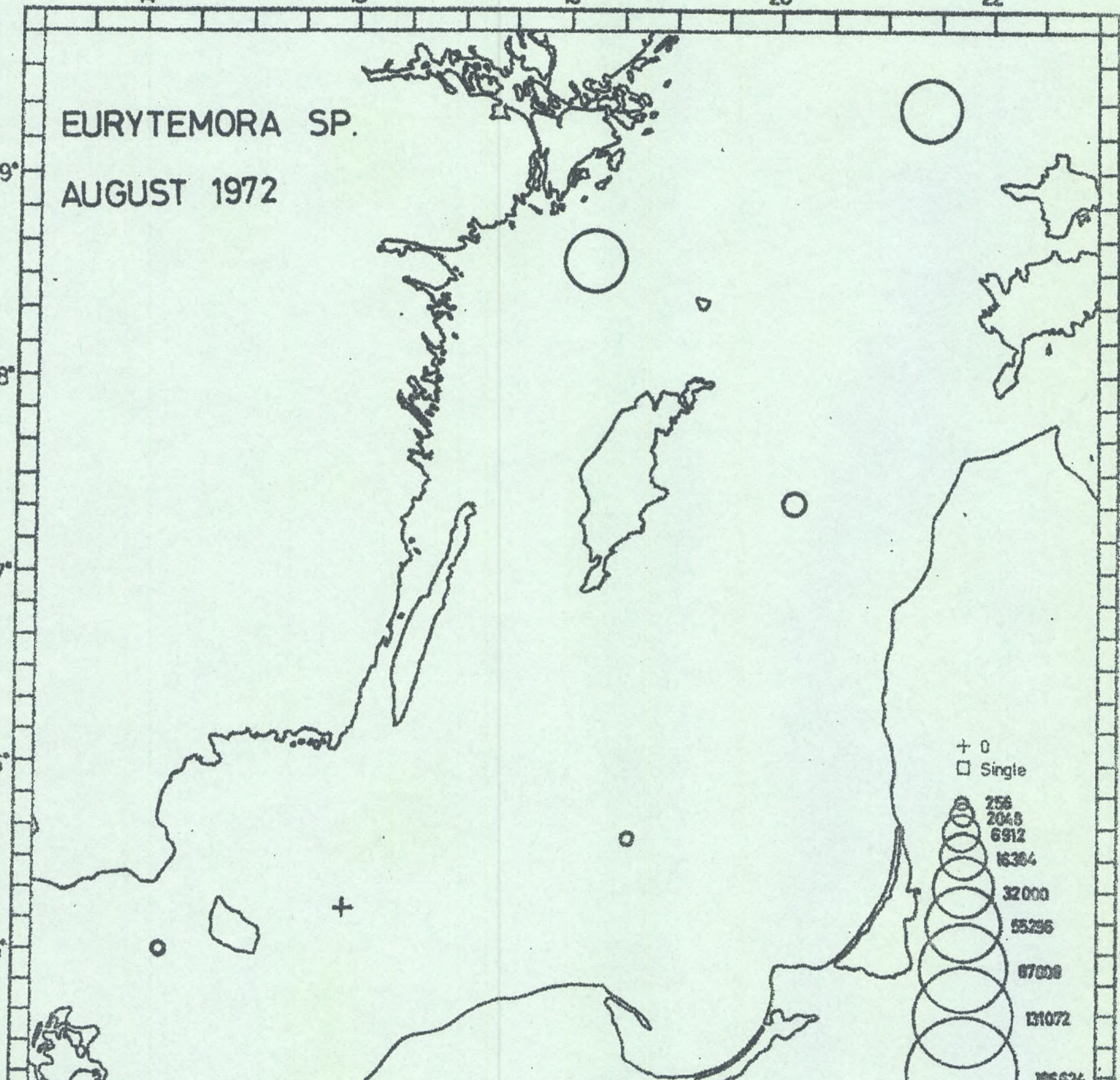

EURYTEMORA SP.
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 29

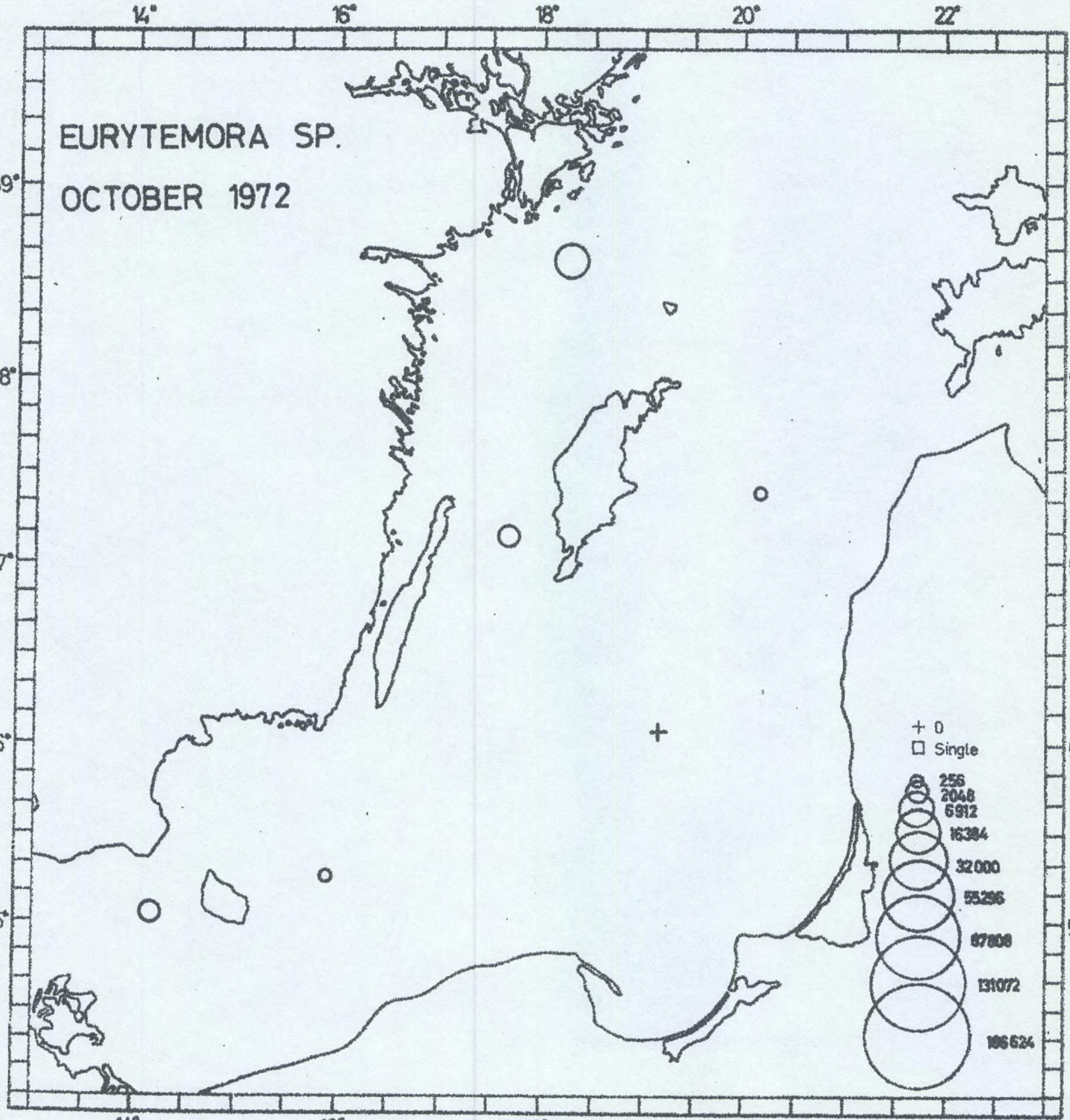
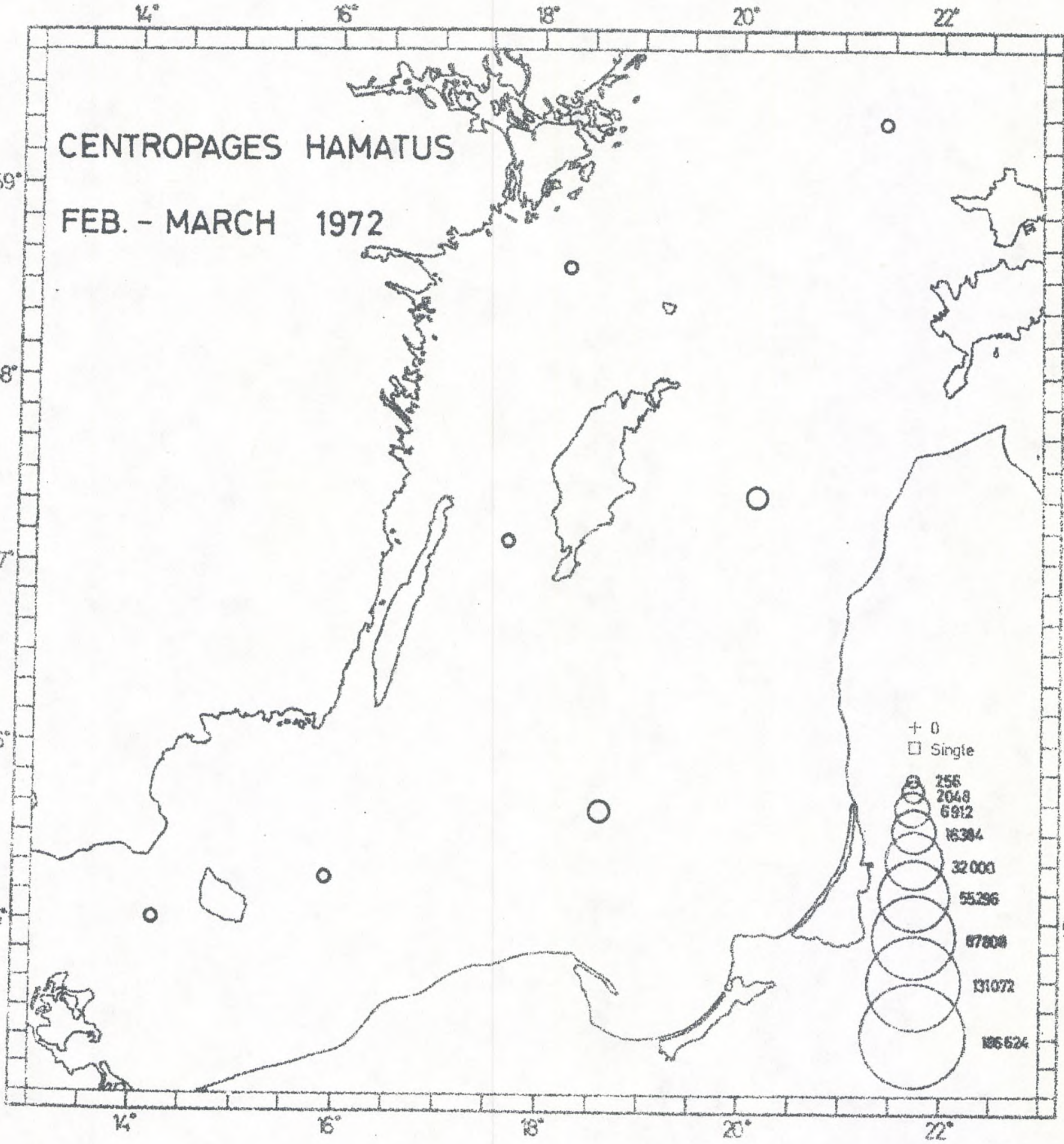

EURYTEMORA SP.
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 30



CENTROPAGES HAMATUS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 31

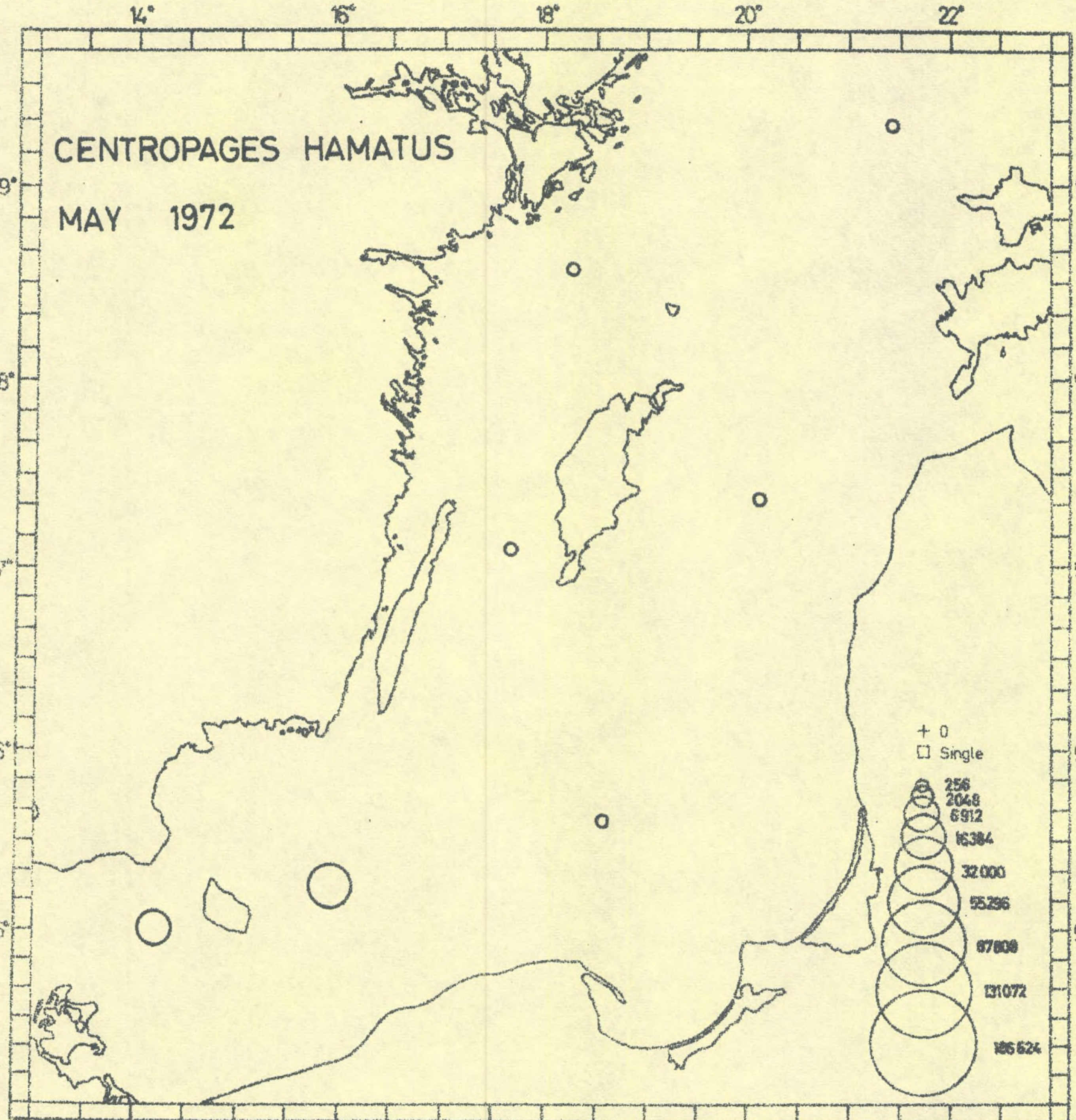
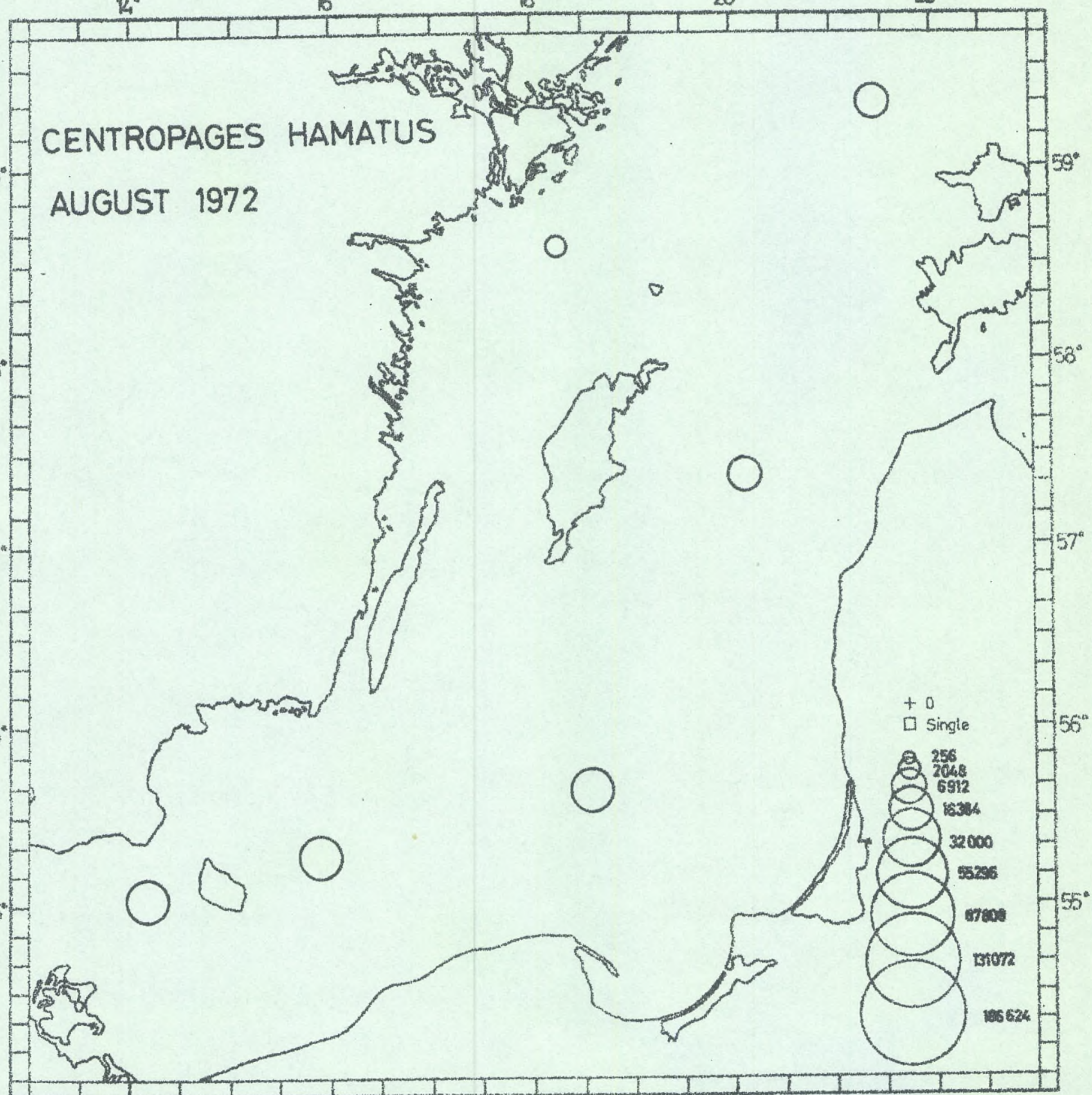

CENTROPAGES HAMATUS
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 32



CENTROPAGES HAMATUS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 33

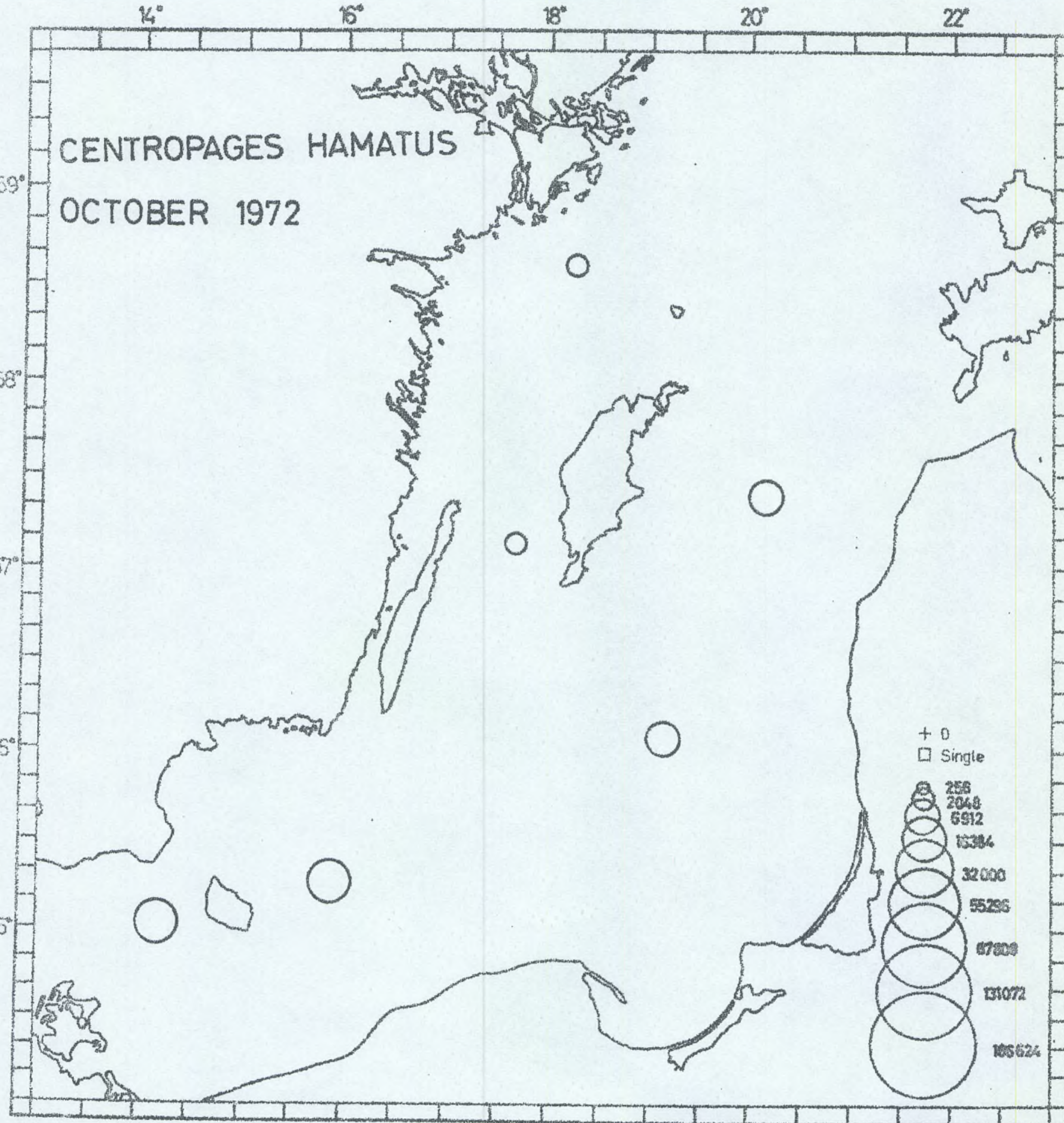

CENTROPAGES HAMATUS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 34

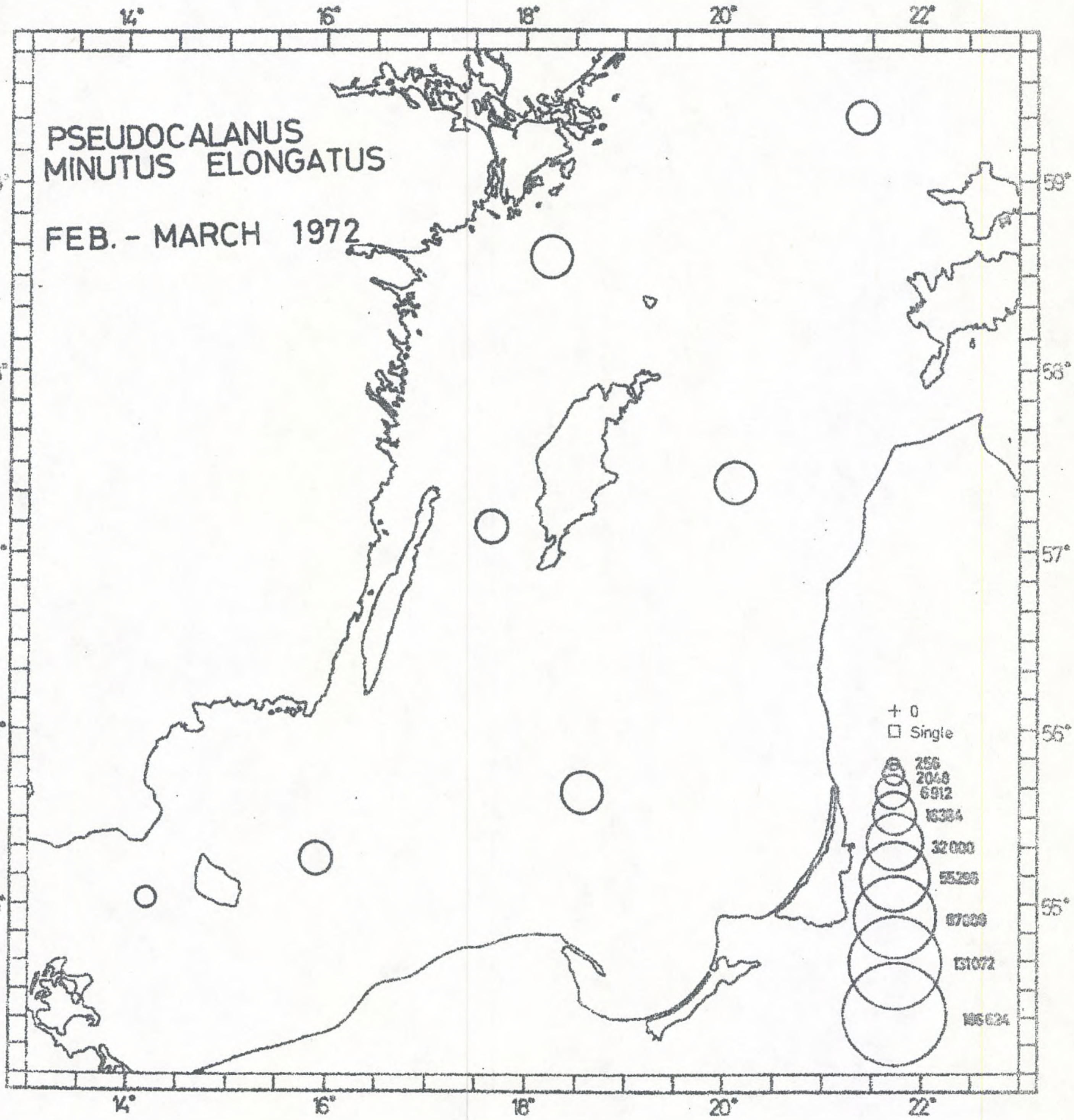
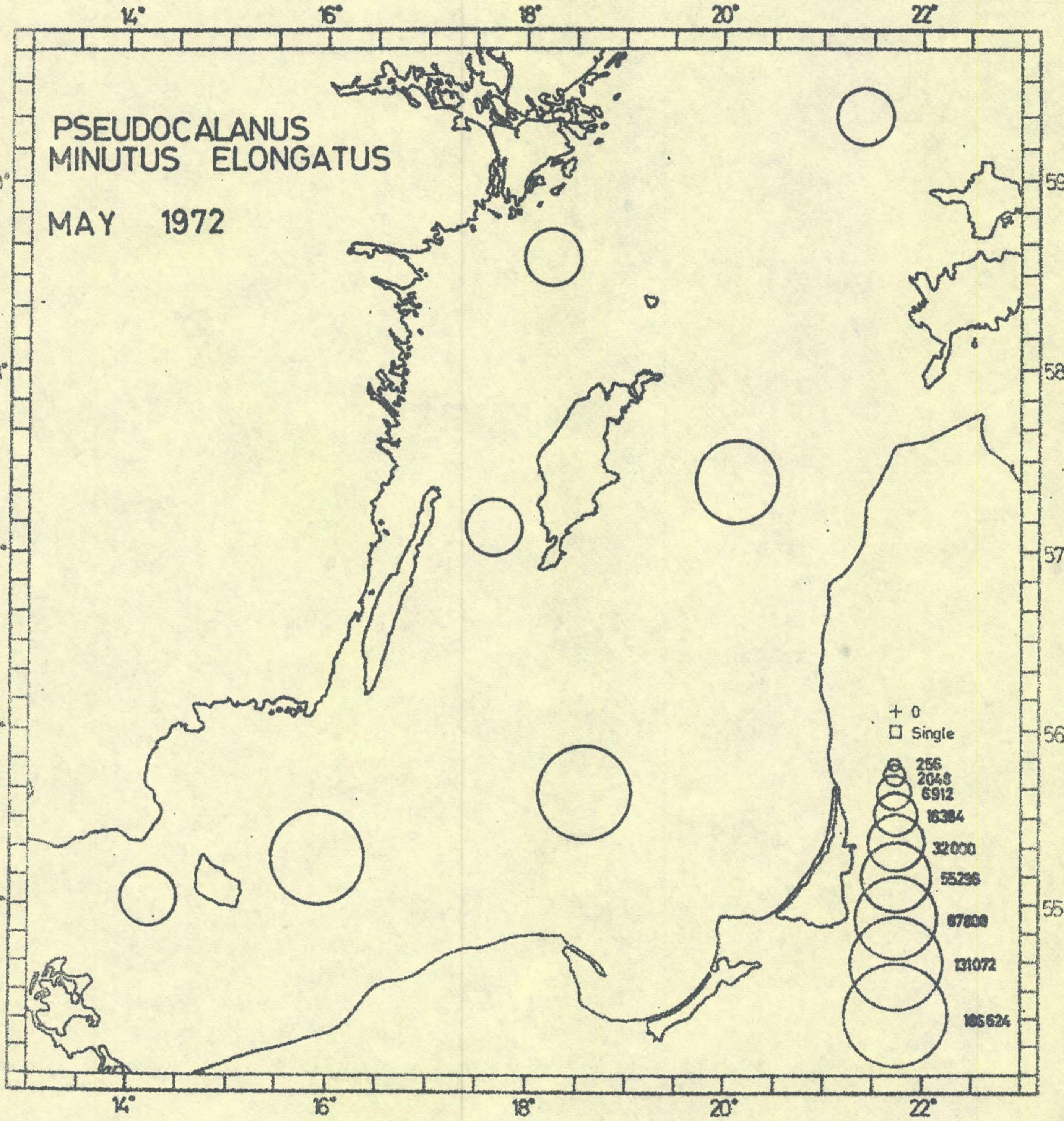

PSEUDOCALANUS
MINUTUS ELONGATUS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
131072

Fig. 35



PSEUDOCALANUS
MINUTUS ELONGATUS
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 36

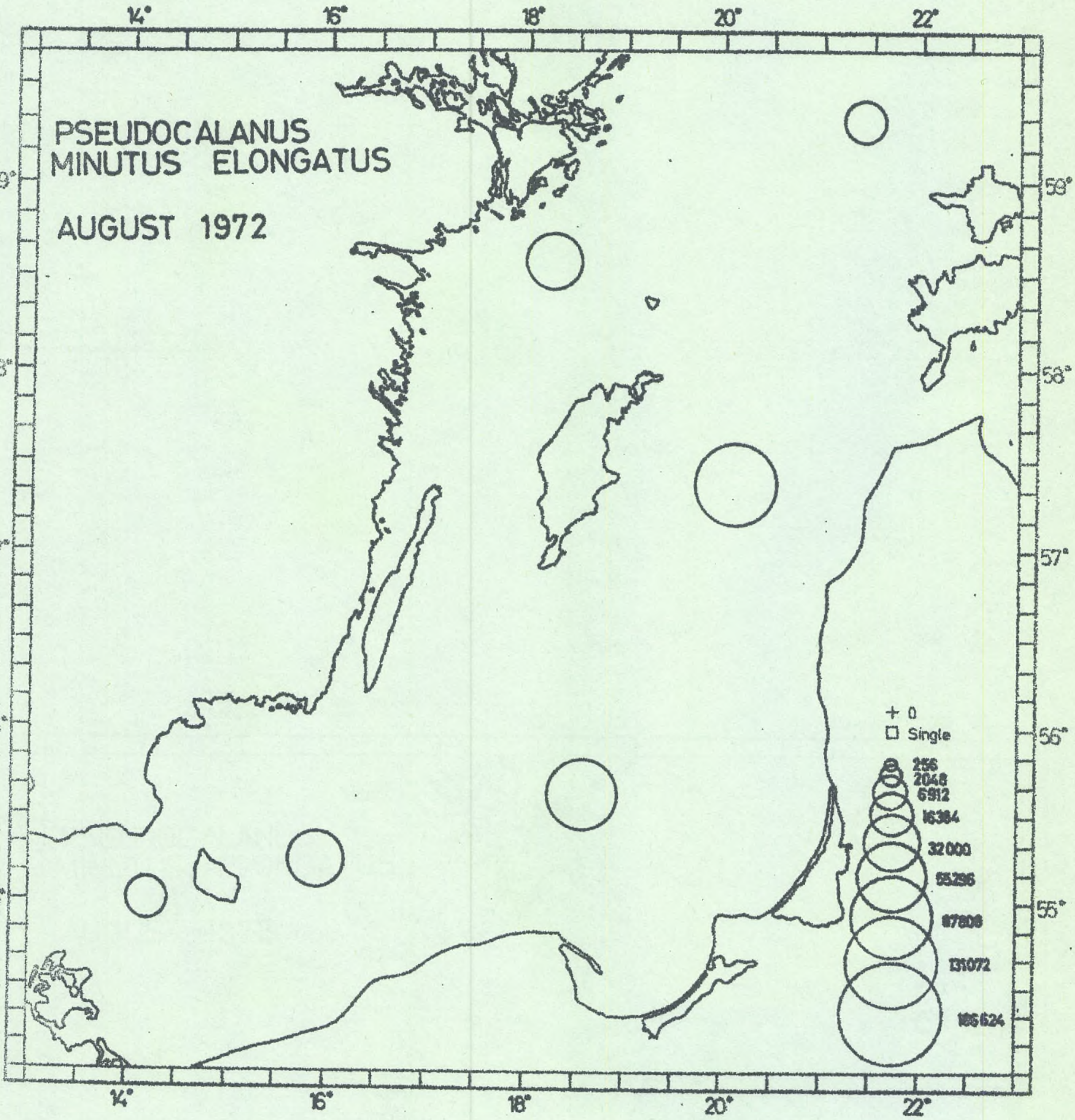

PSEUDOCALANUS
MINUTUS ELONGATUS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 37

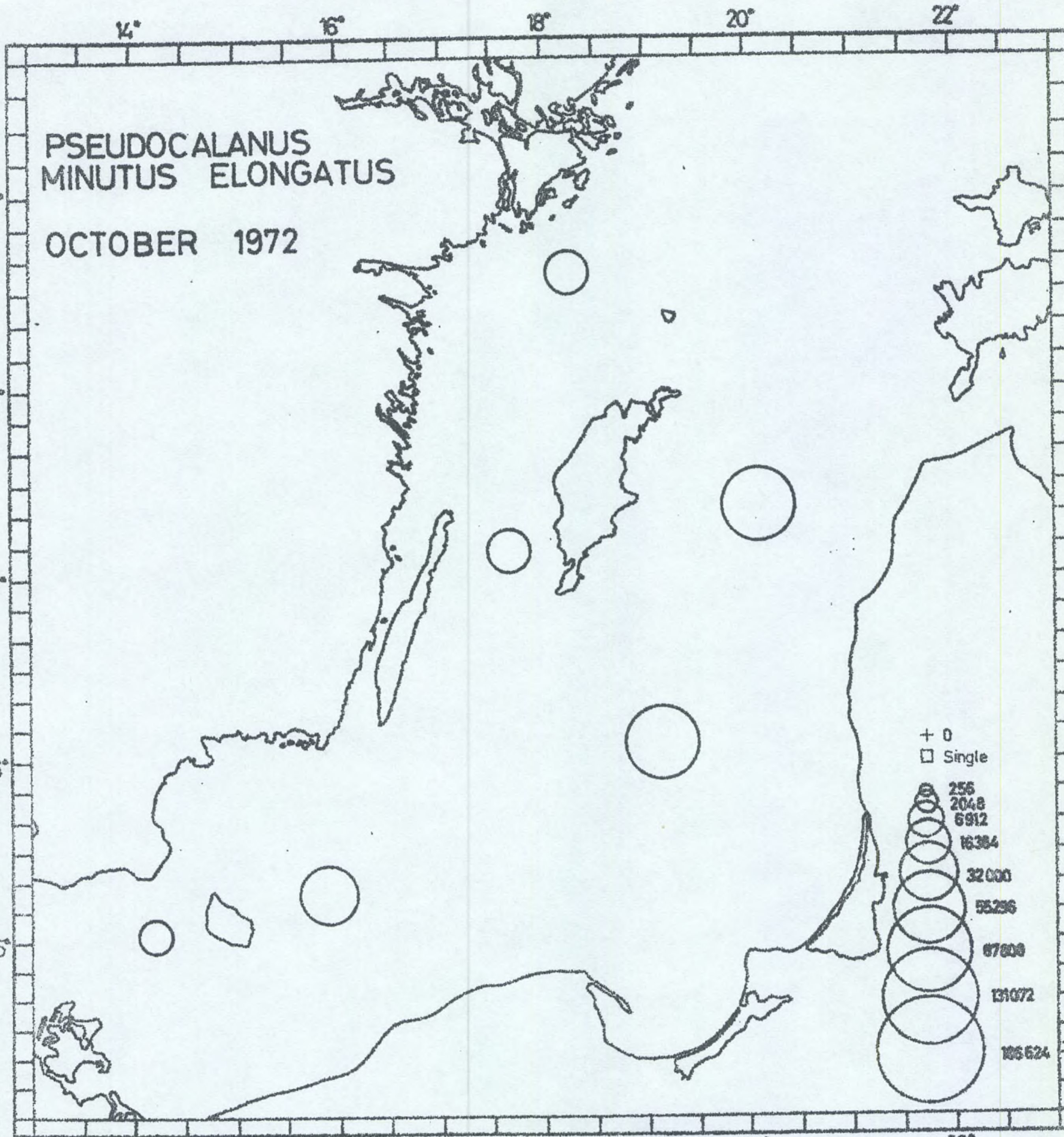
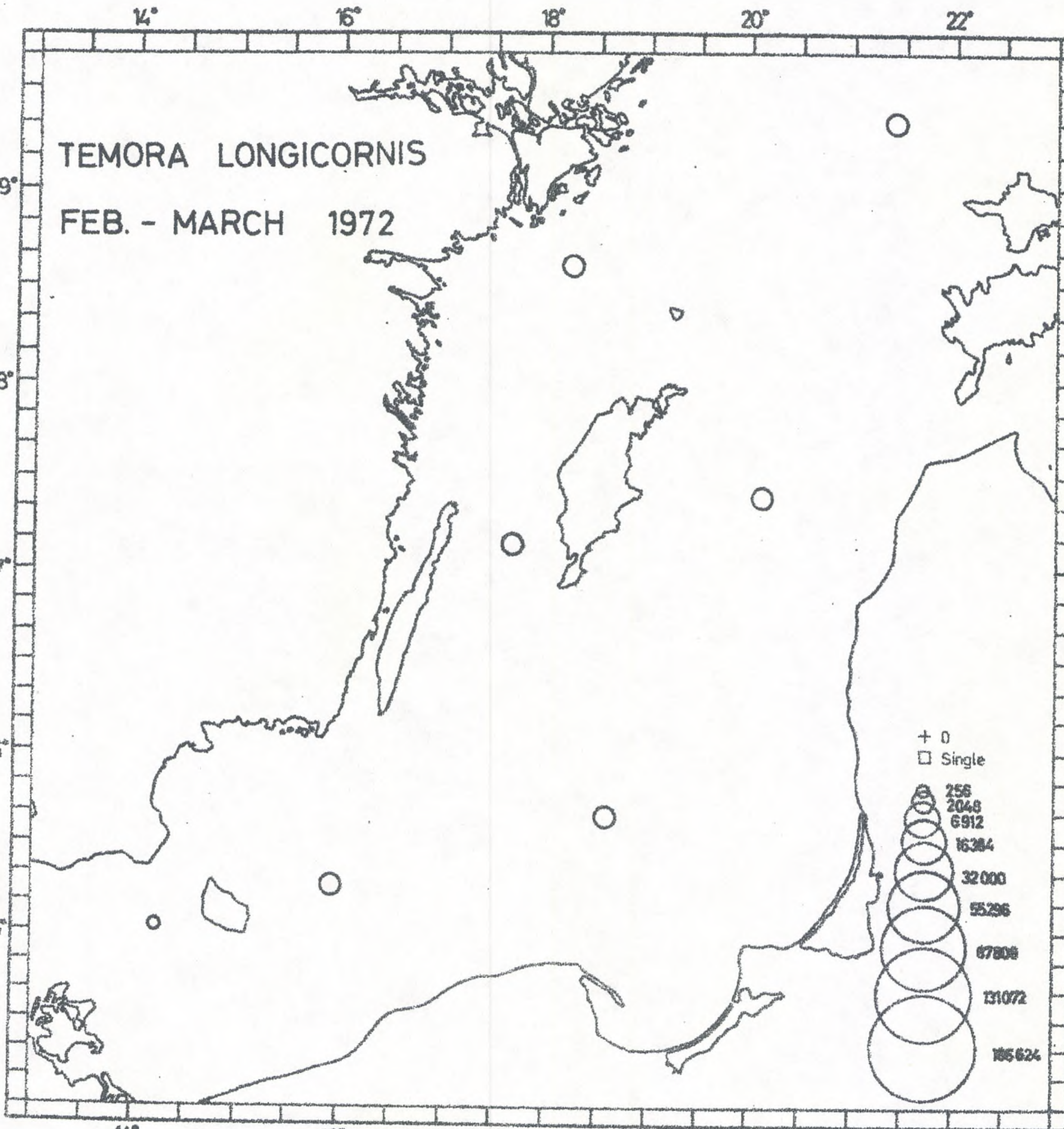
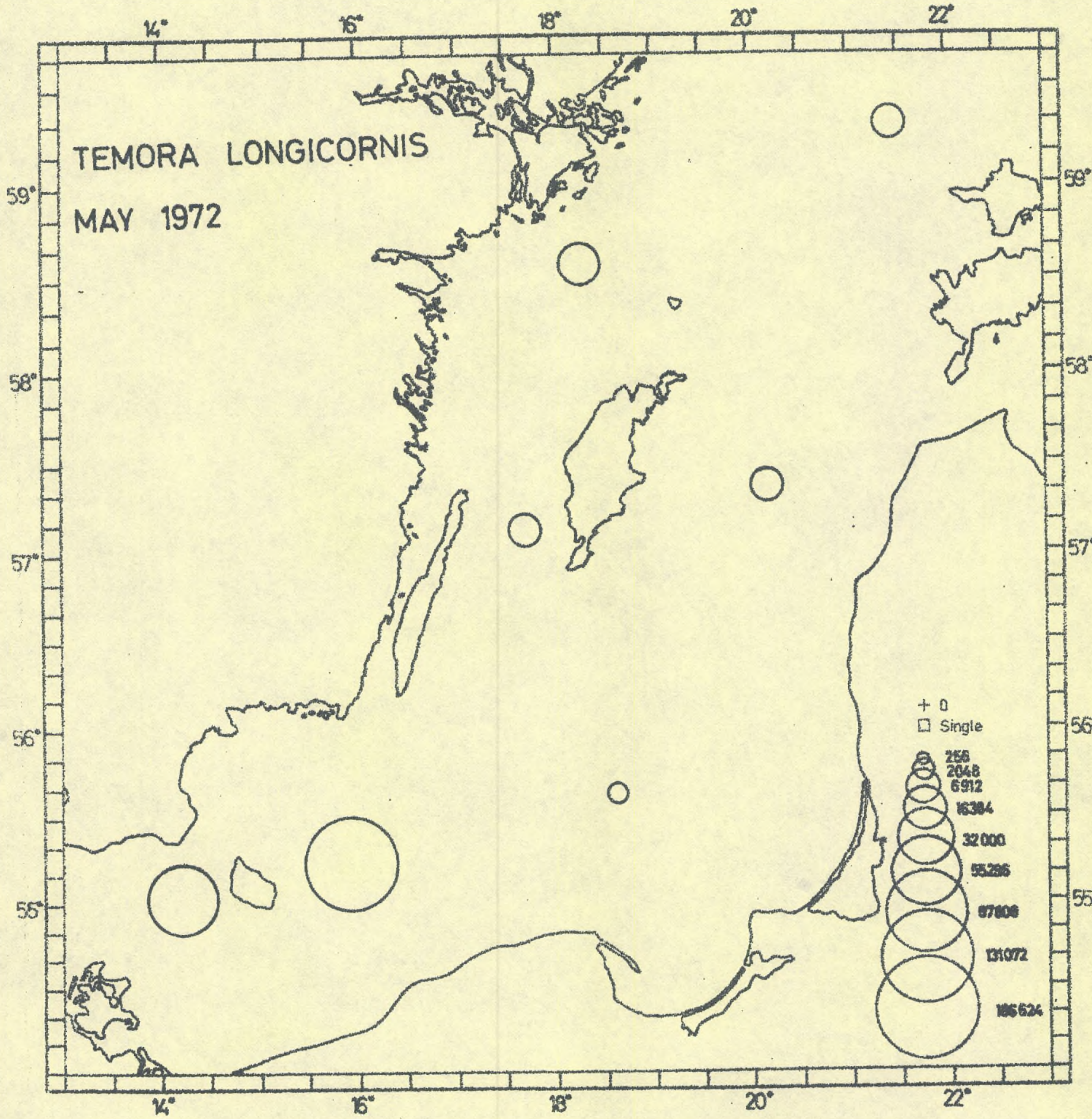

PSEUDOCALANUS
MINUTUS ELONGATUS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 38



TEMORA LONGICORNIS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 39



TEMORA LONGICORNIS
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 40

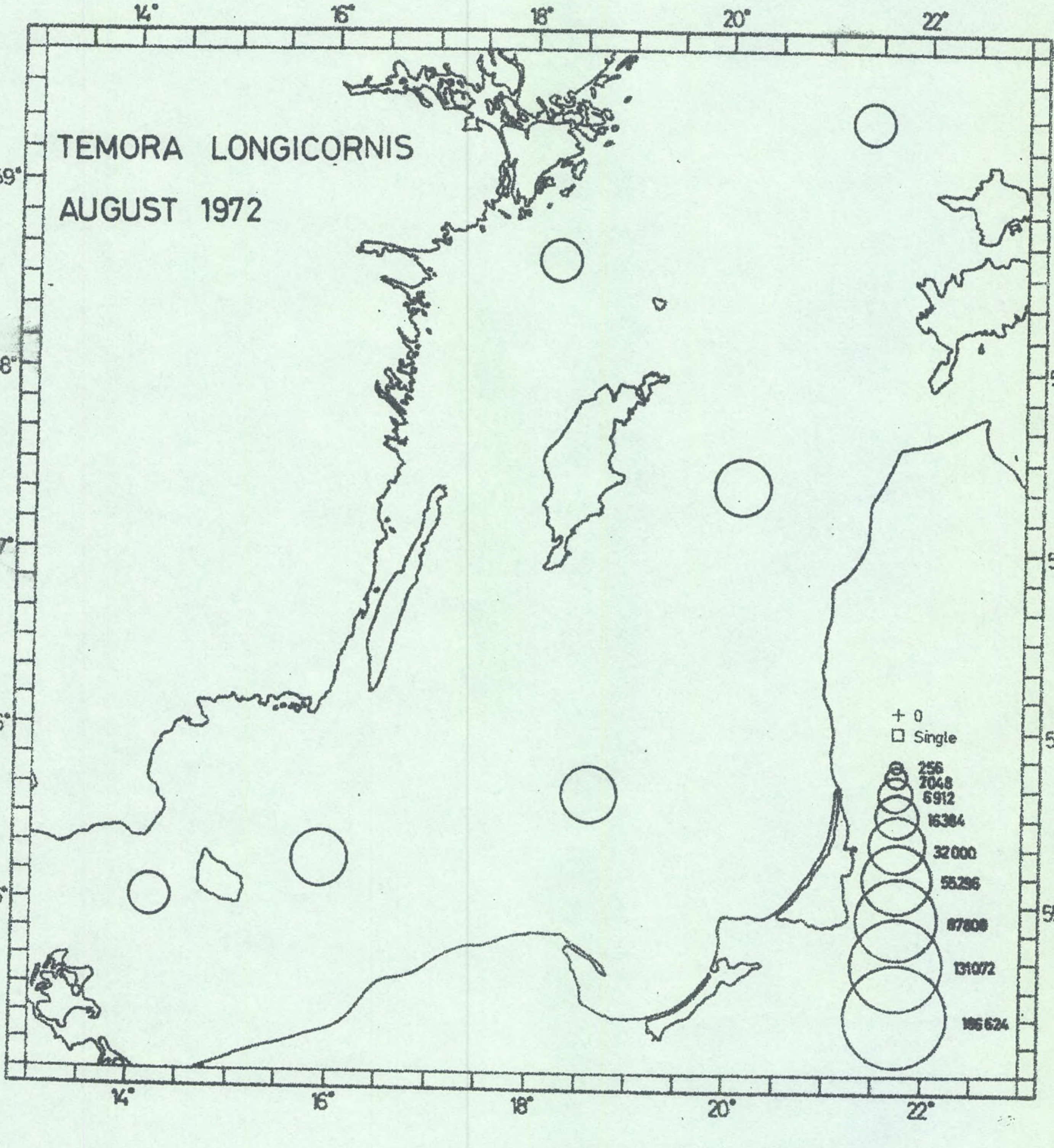

TEMORA LONGICORNIS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 41

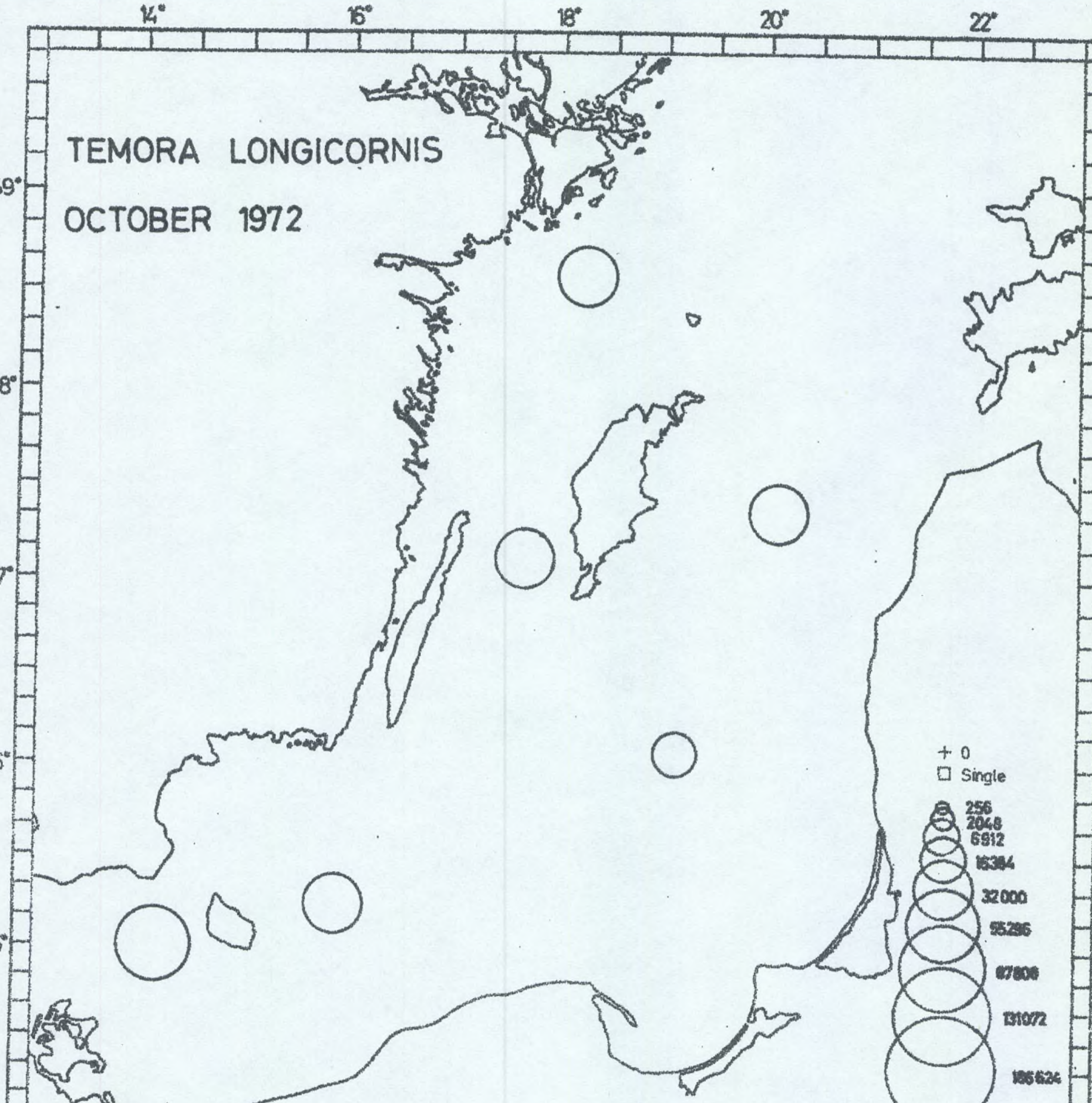
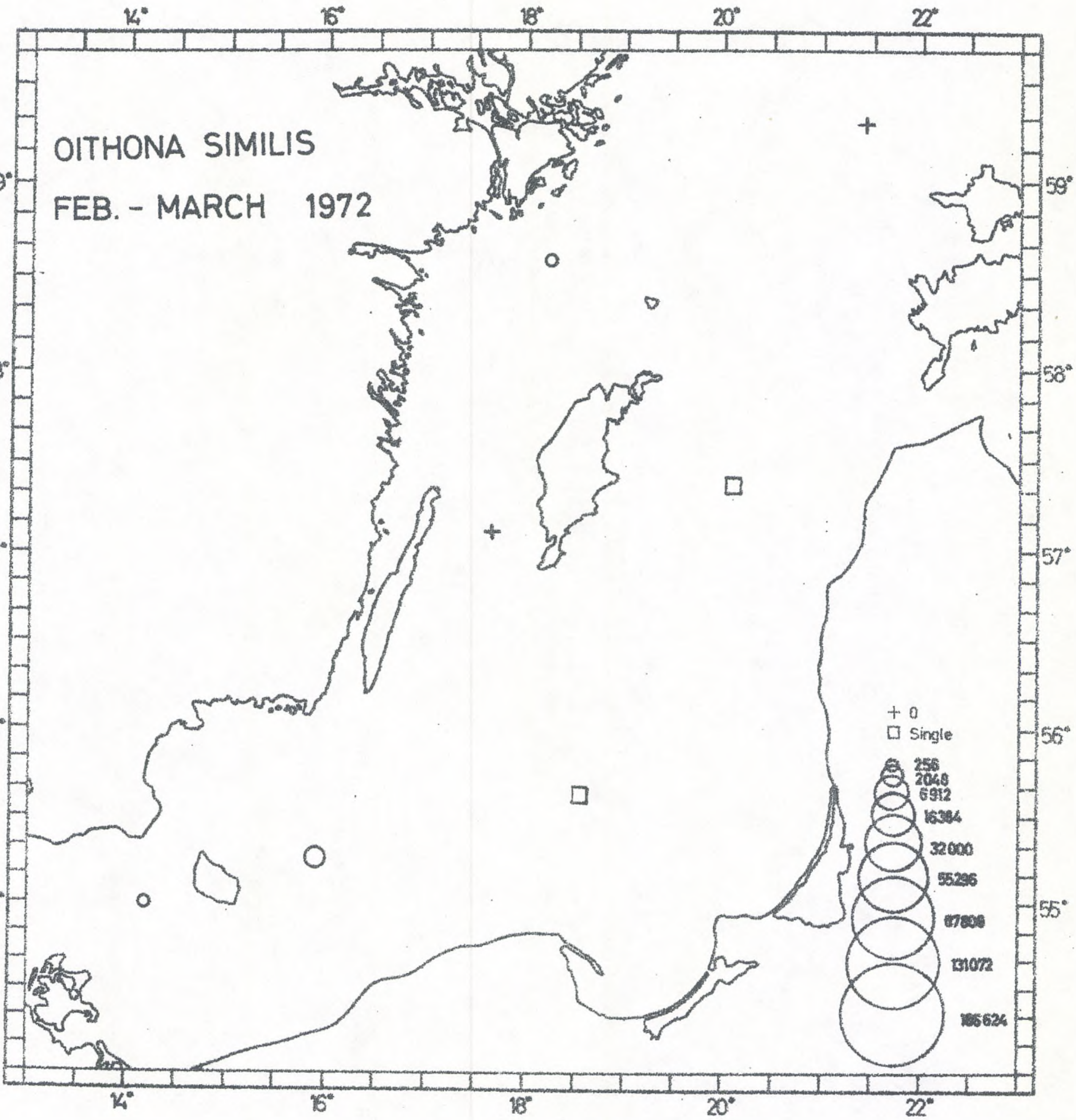
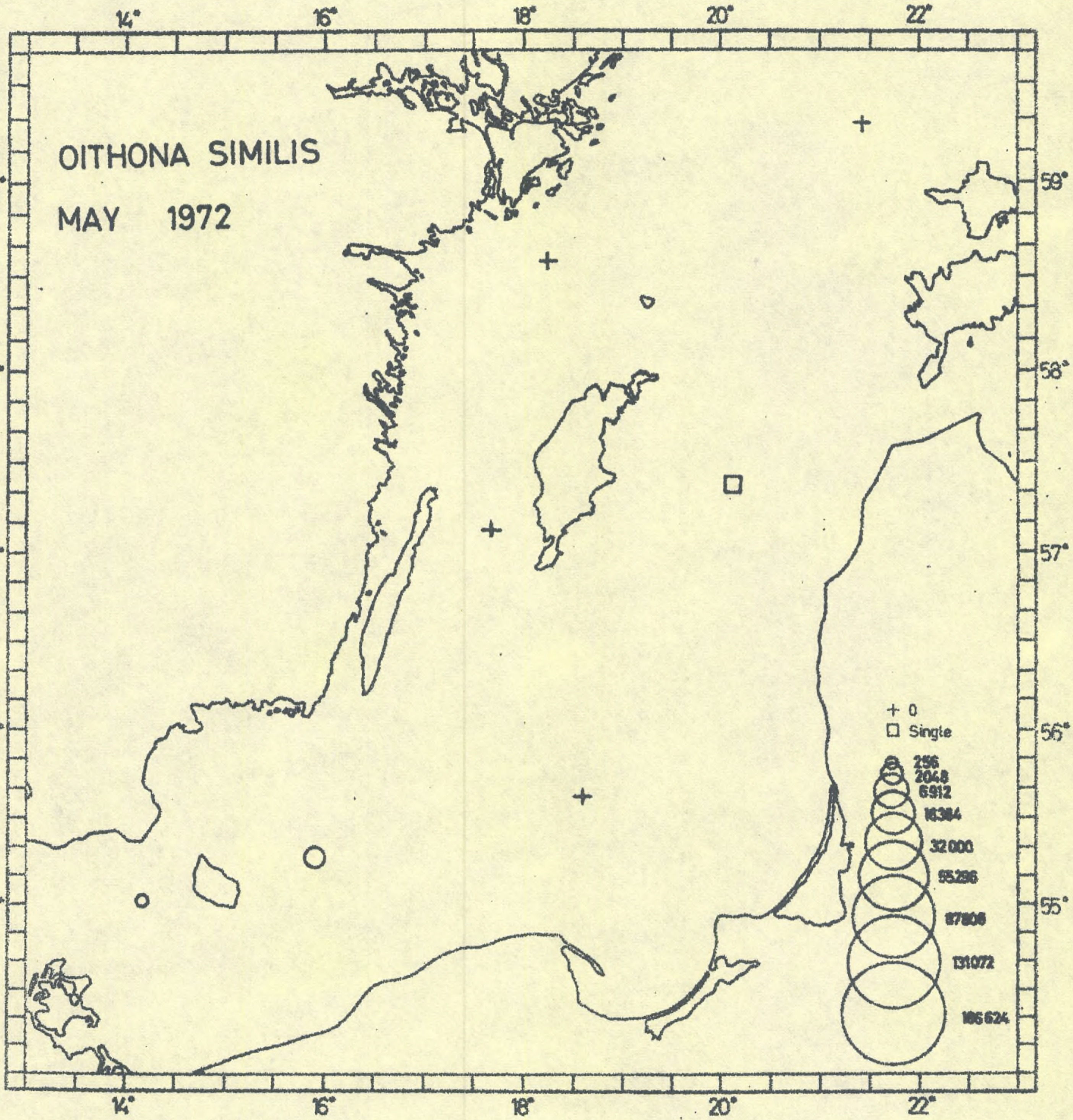

TEMORA LONGICORNIS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 42



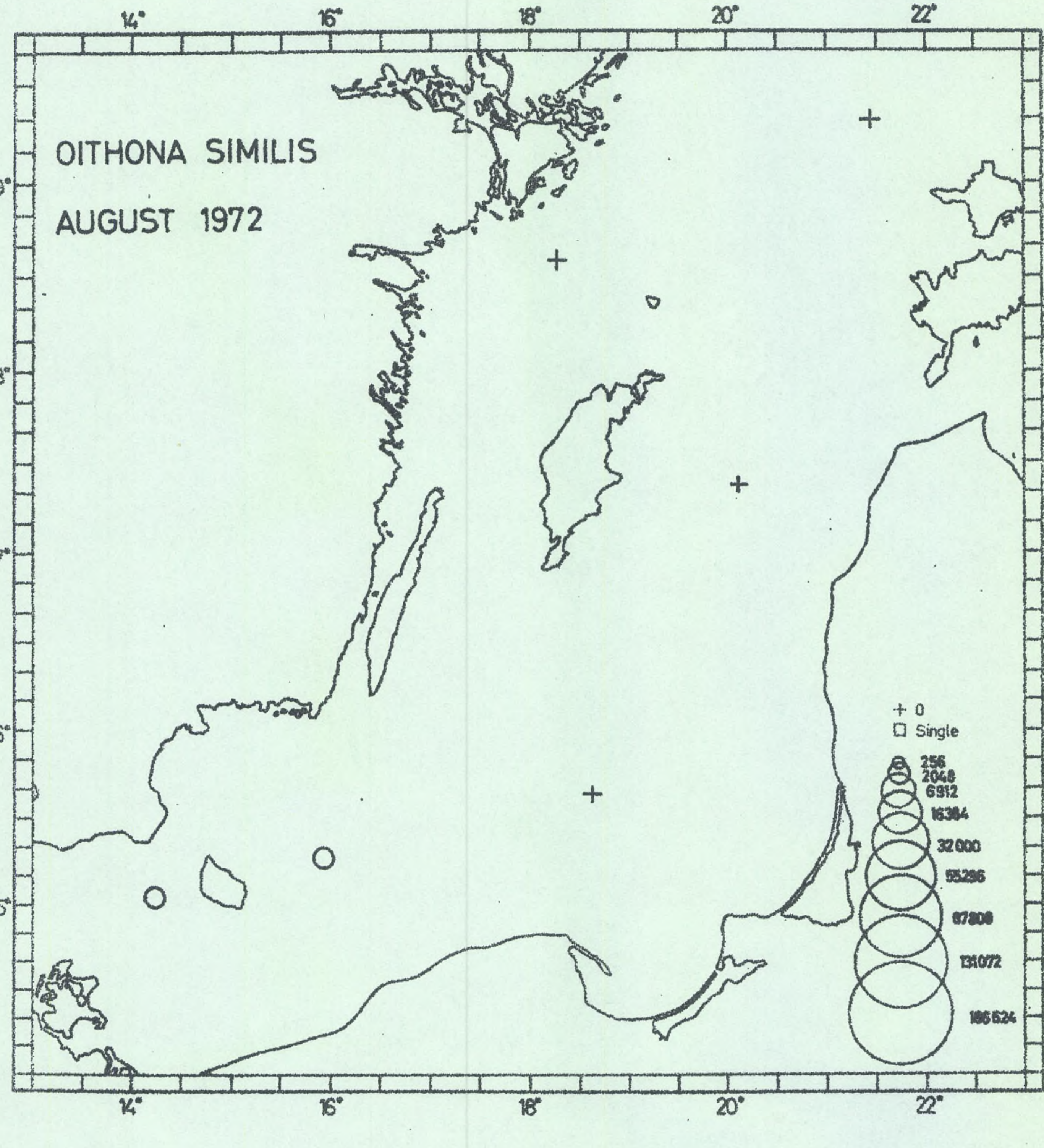
OITHONA SIMILIS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072

Fig. 43



OITHONA SIMILIS
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 44



OITHONA SIMILIS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 45

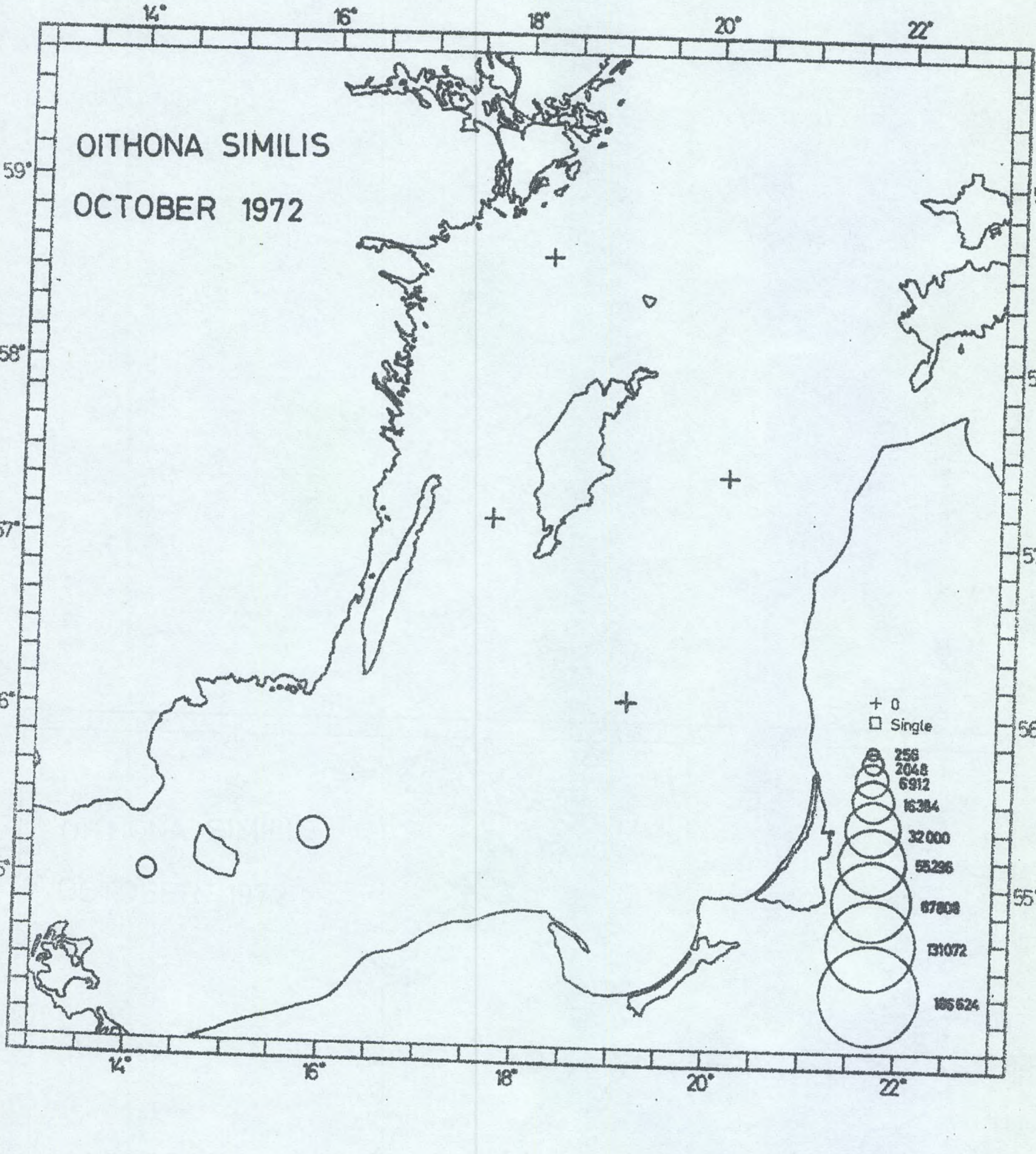

OITHONA SIMILIS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 46

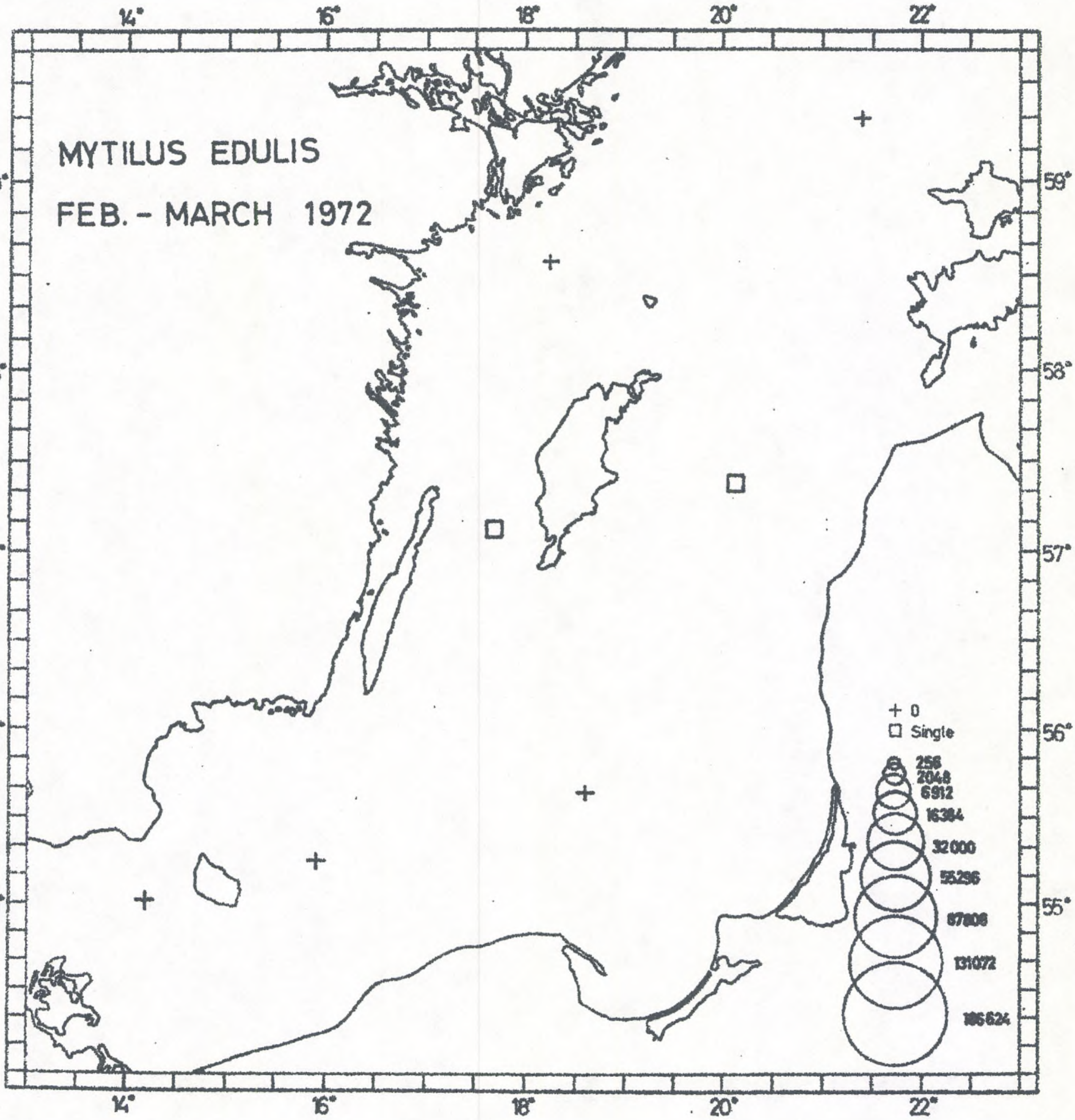

MYTILUS EDULIS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 47

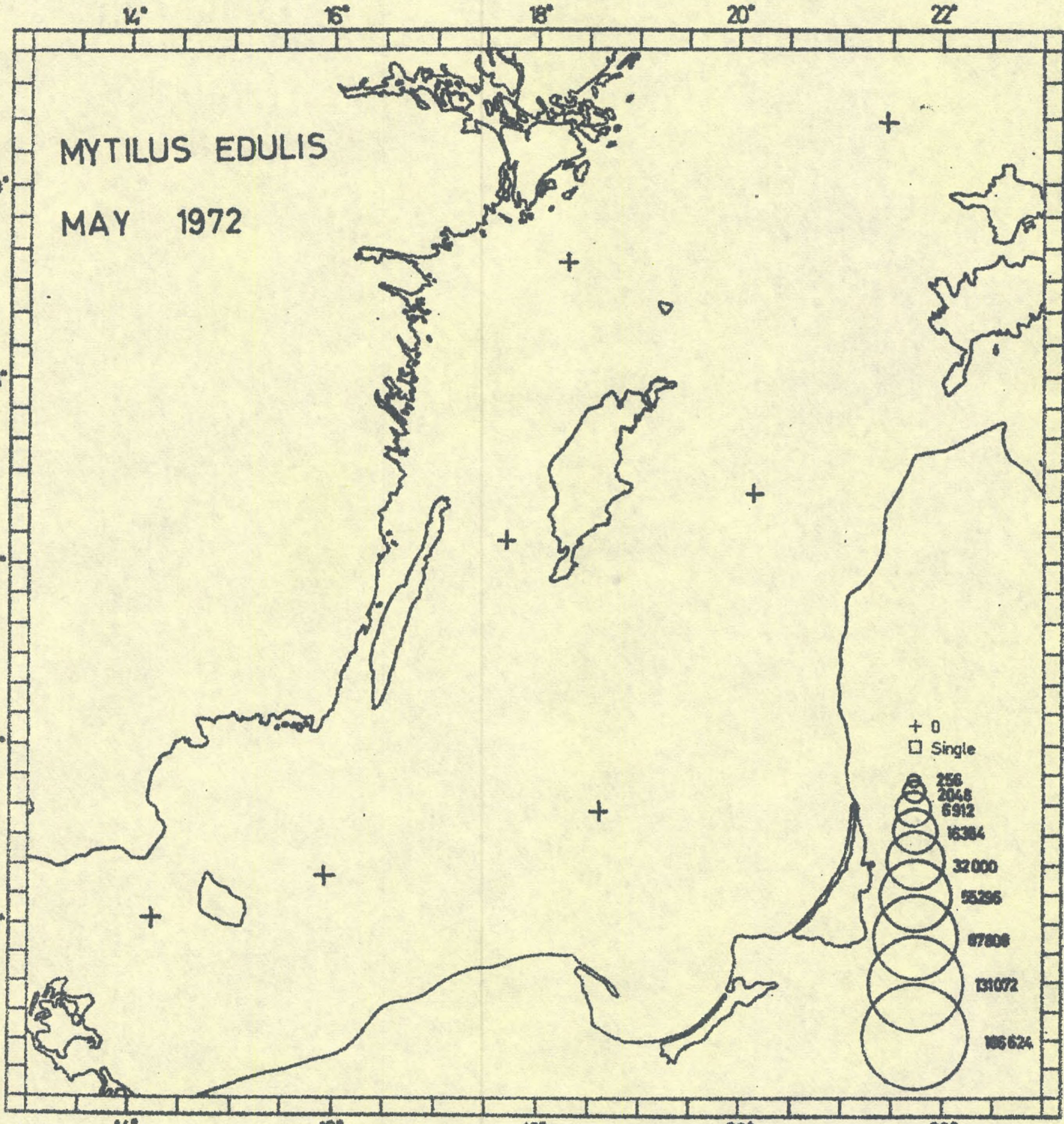
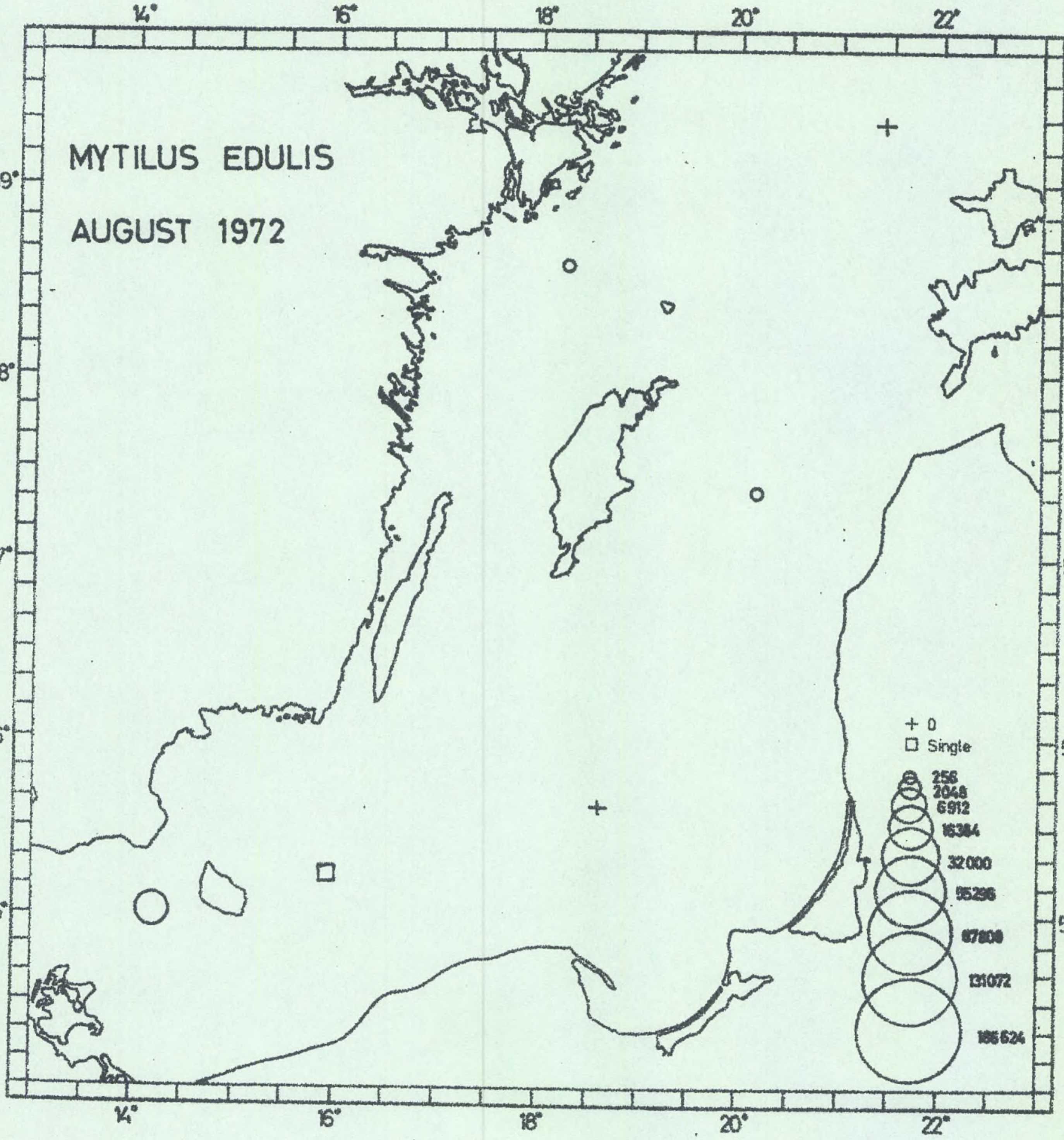
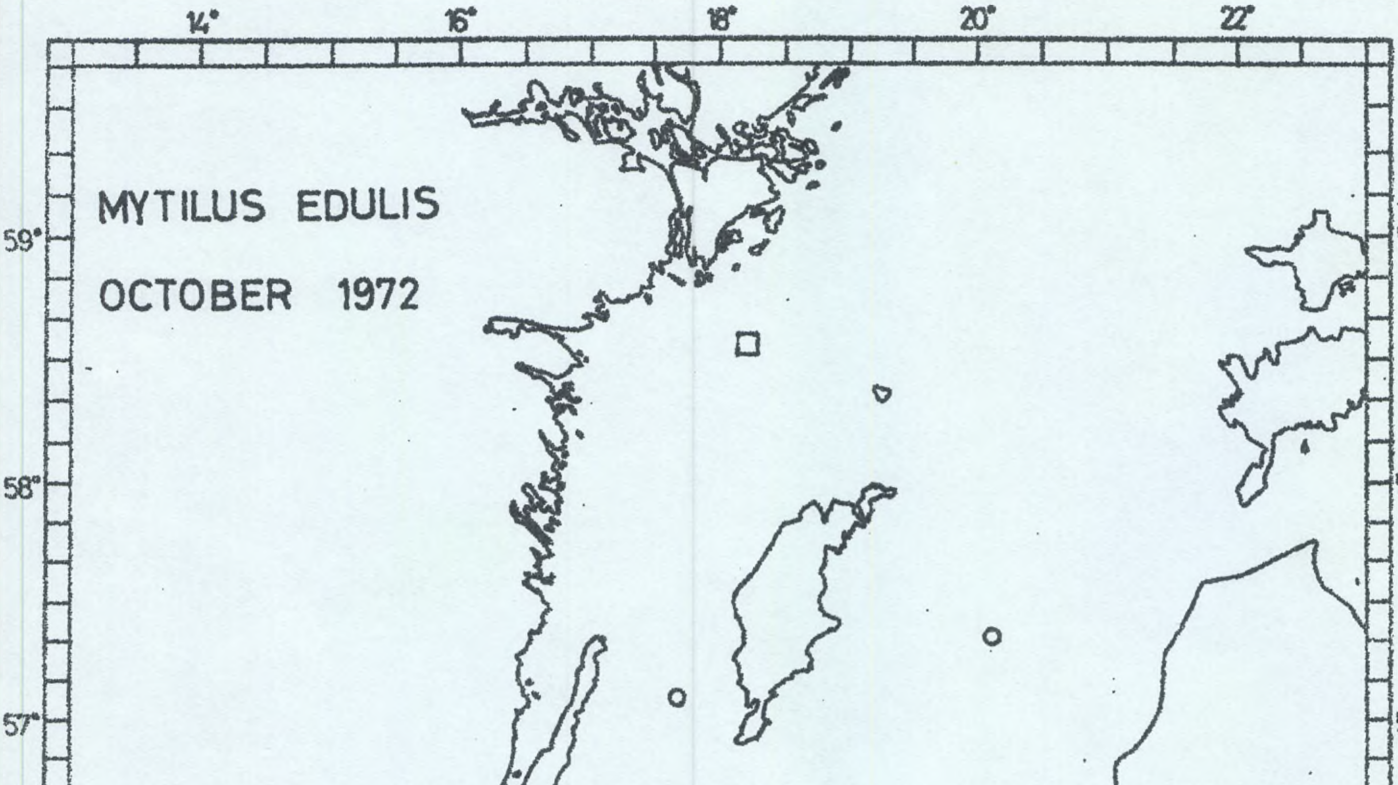

MYTILUS EDULIS
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32 000
55296
87808
131072
186 624

Fig. 48



MYTILUS EDULIS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 49



MYTILUS EDULIS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 50

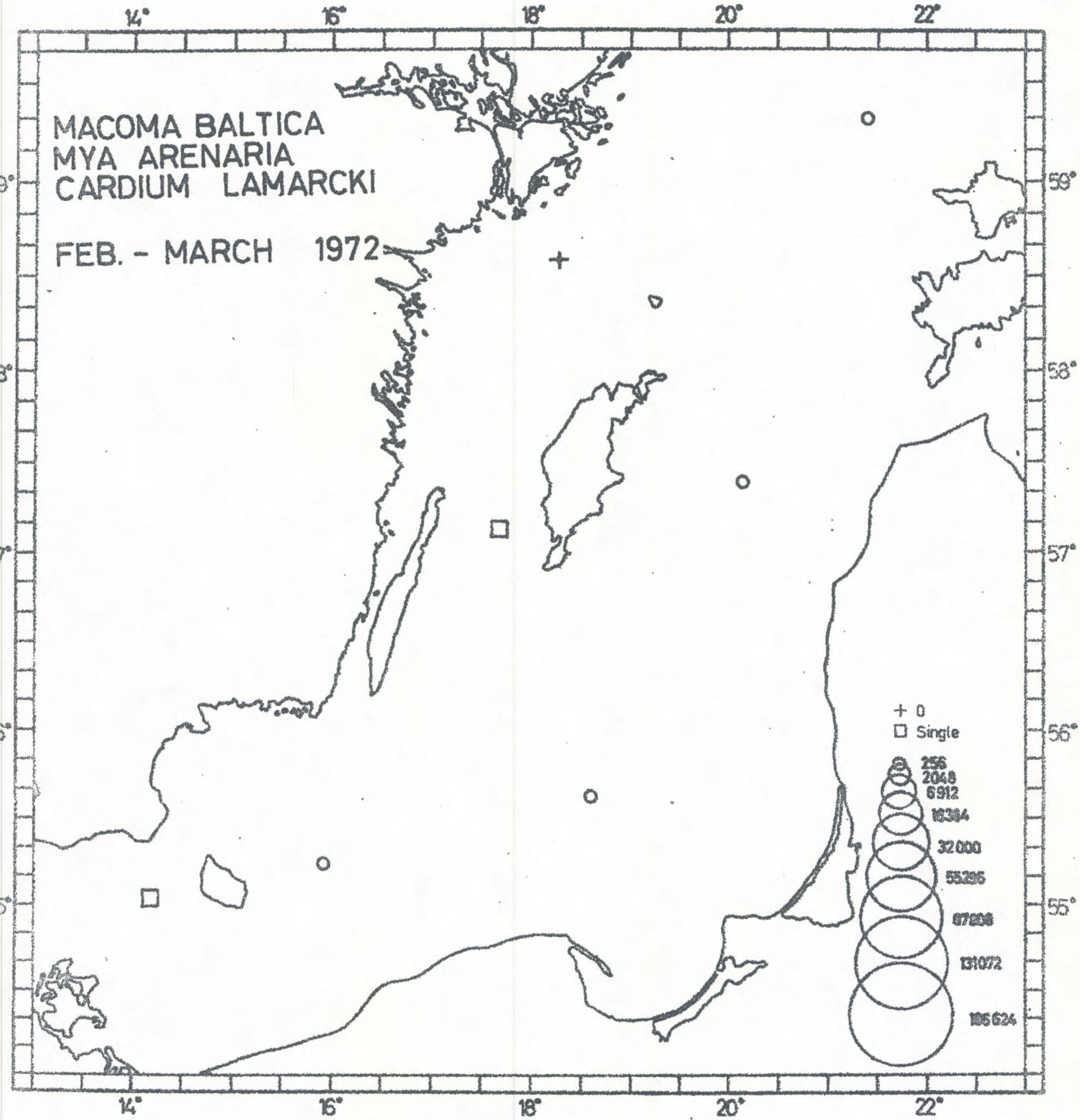
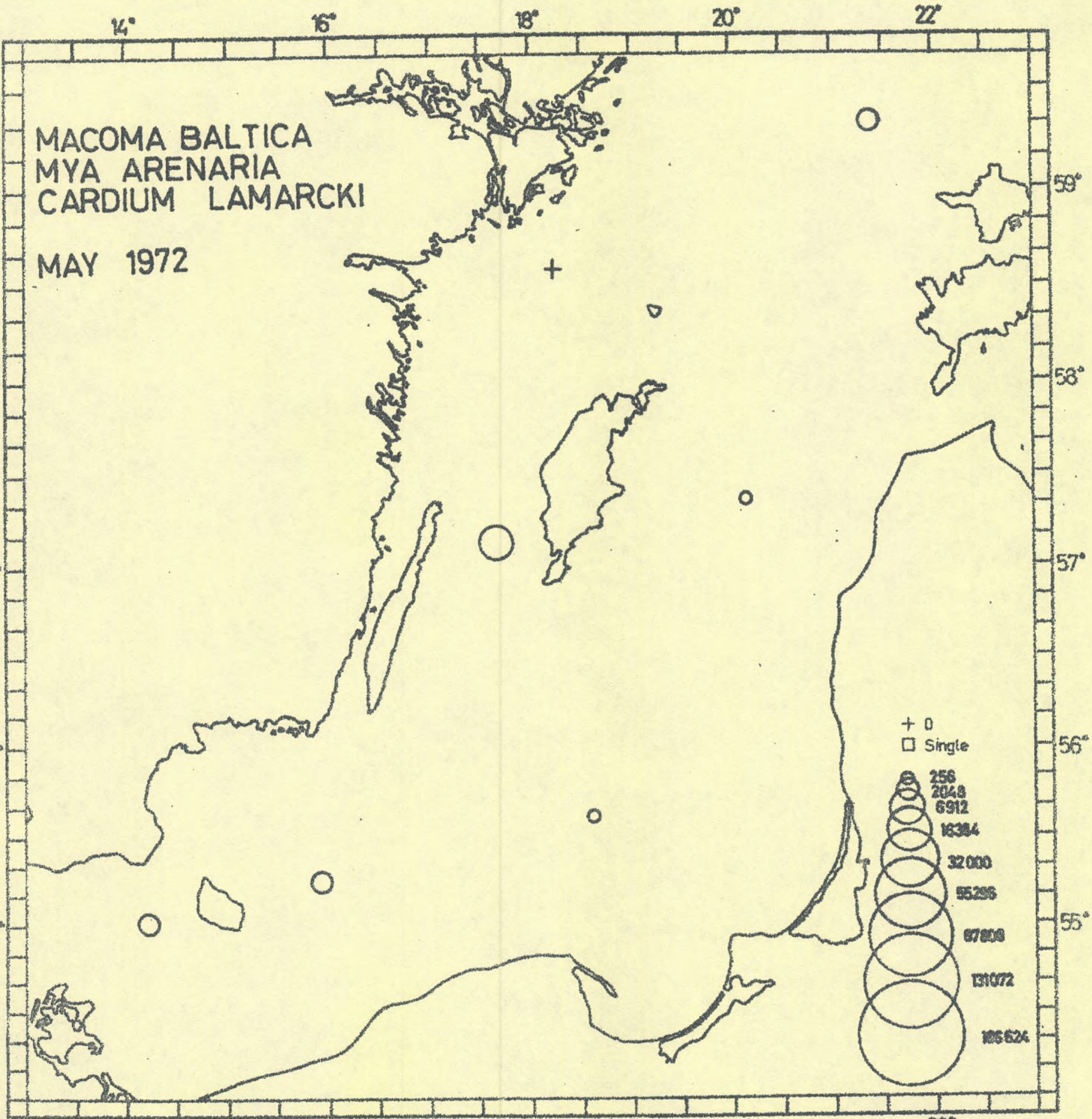
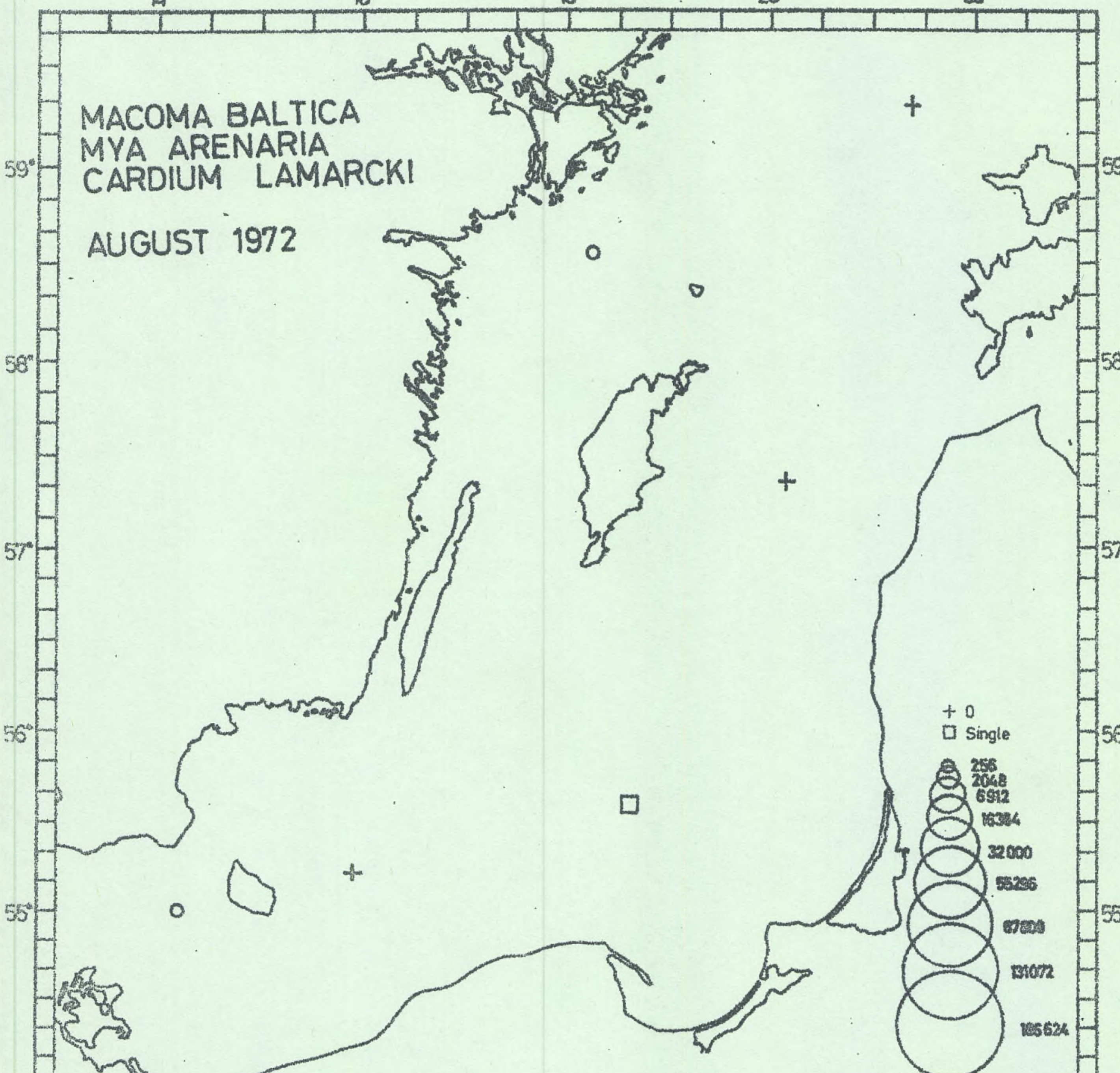

MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 51



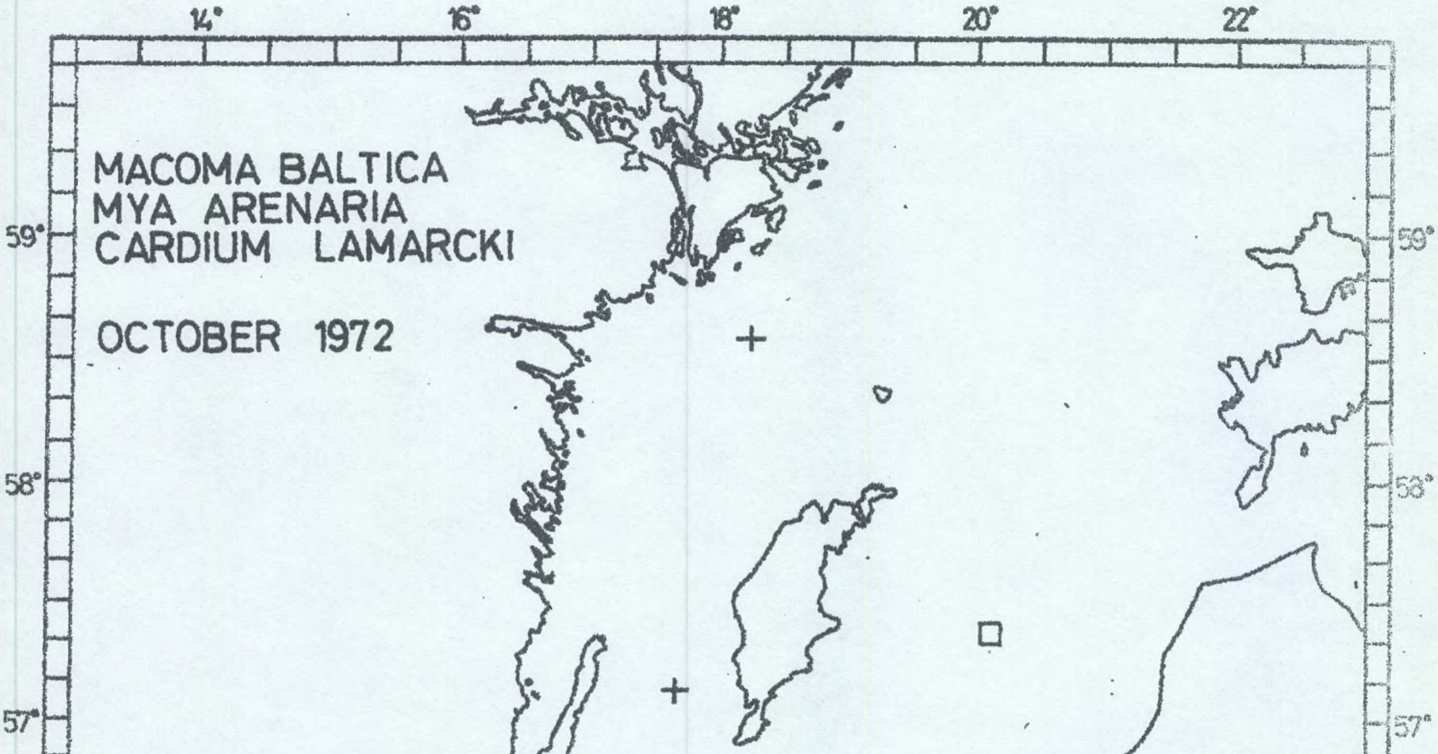
MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 52



MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig, 53



MACOMA BALTICA
MYA ARENARIA
CARDIUM LAMARCKI

OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

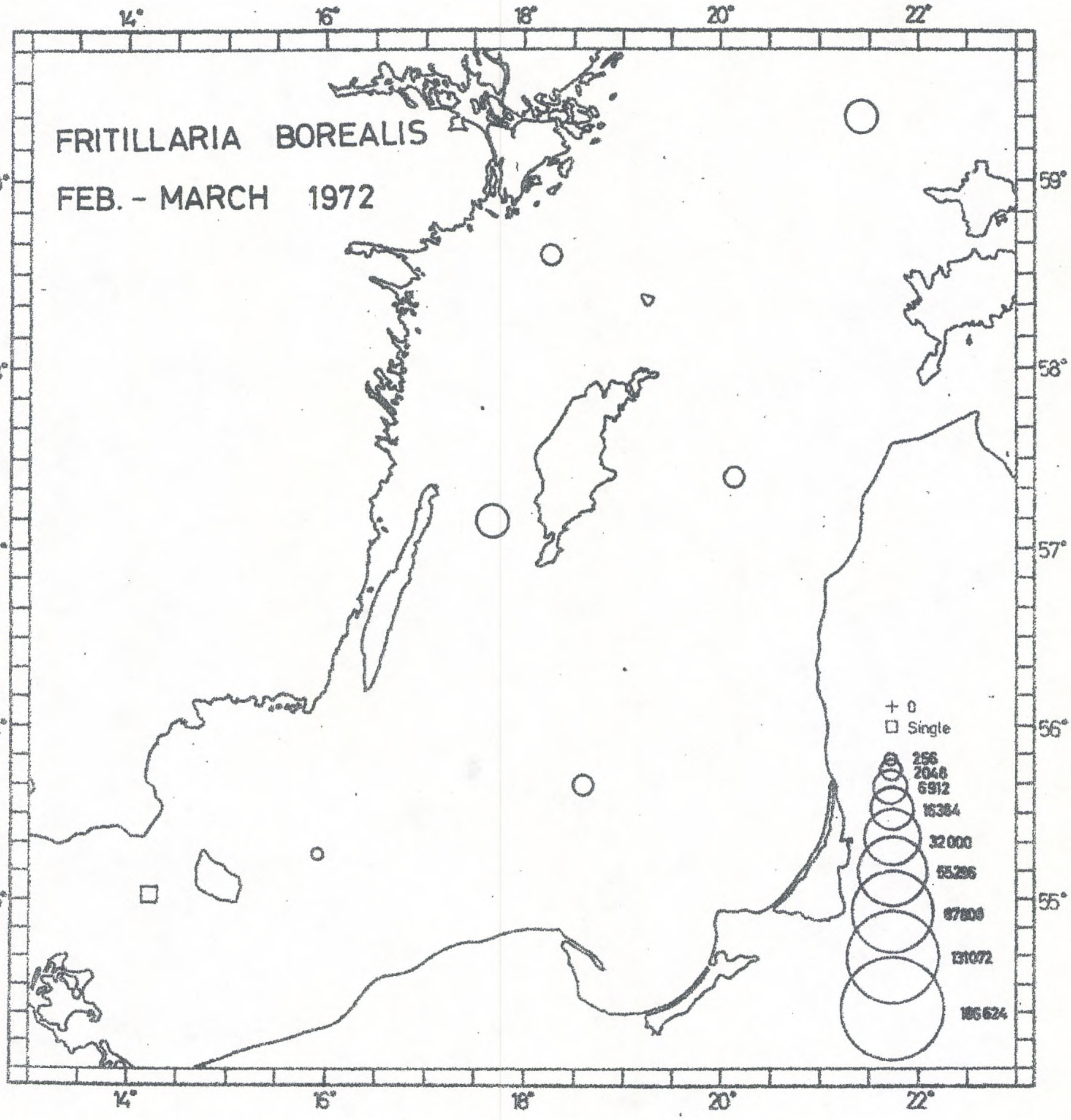

FRITILLARIA BOREALIS
FEB. - MARCH 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 55

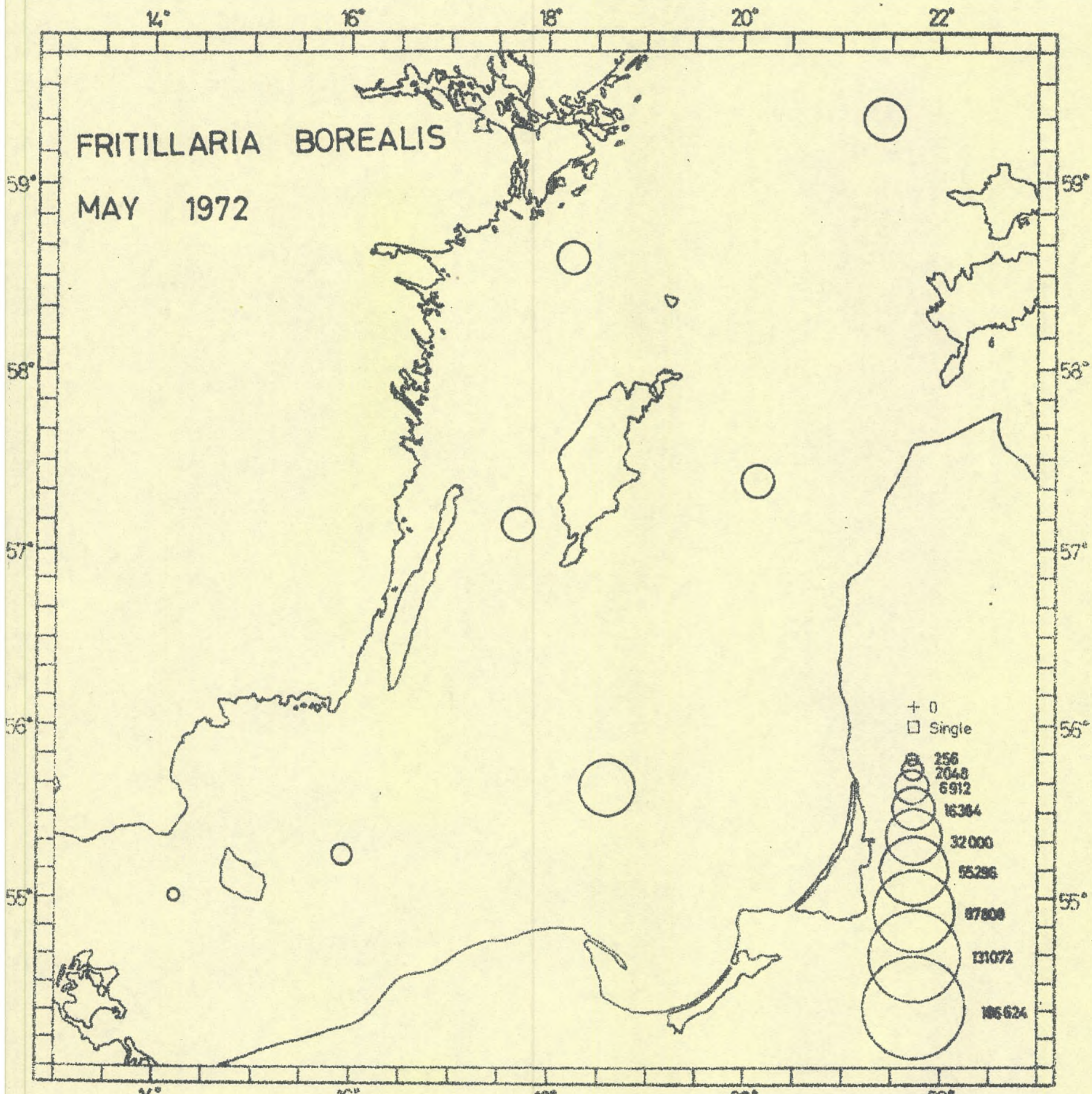

FRITILLARIA BOREALIS
MAY 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 56

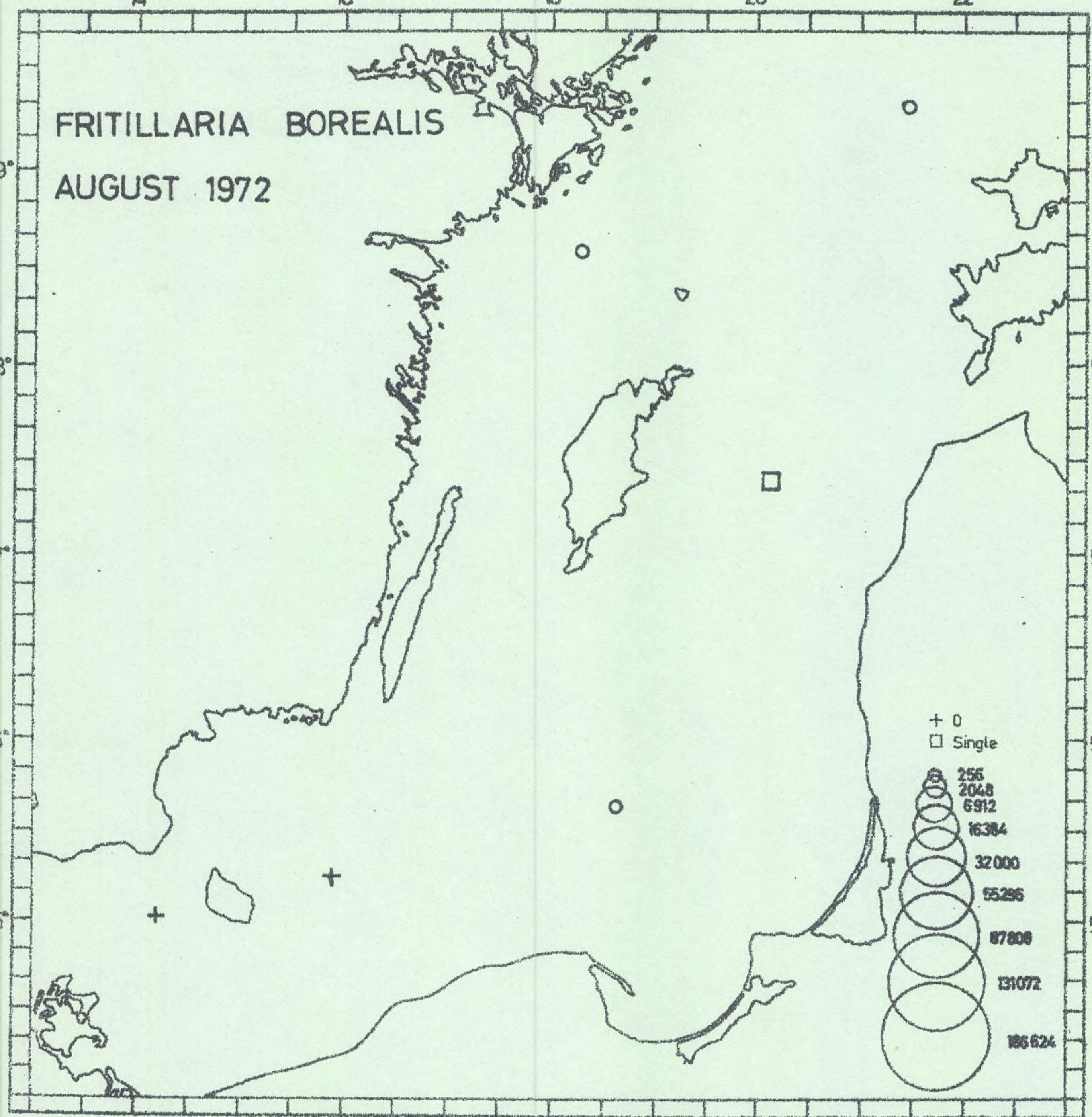

FRITILLARIA BOREALIS
AUGUST 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
6912
16384
32000
55296
87808
131072
186624

Fig. 57

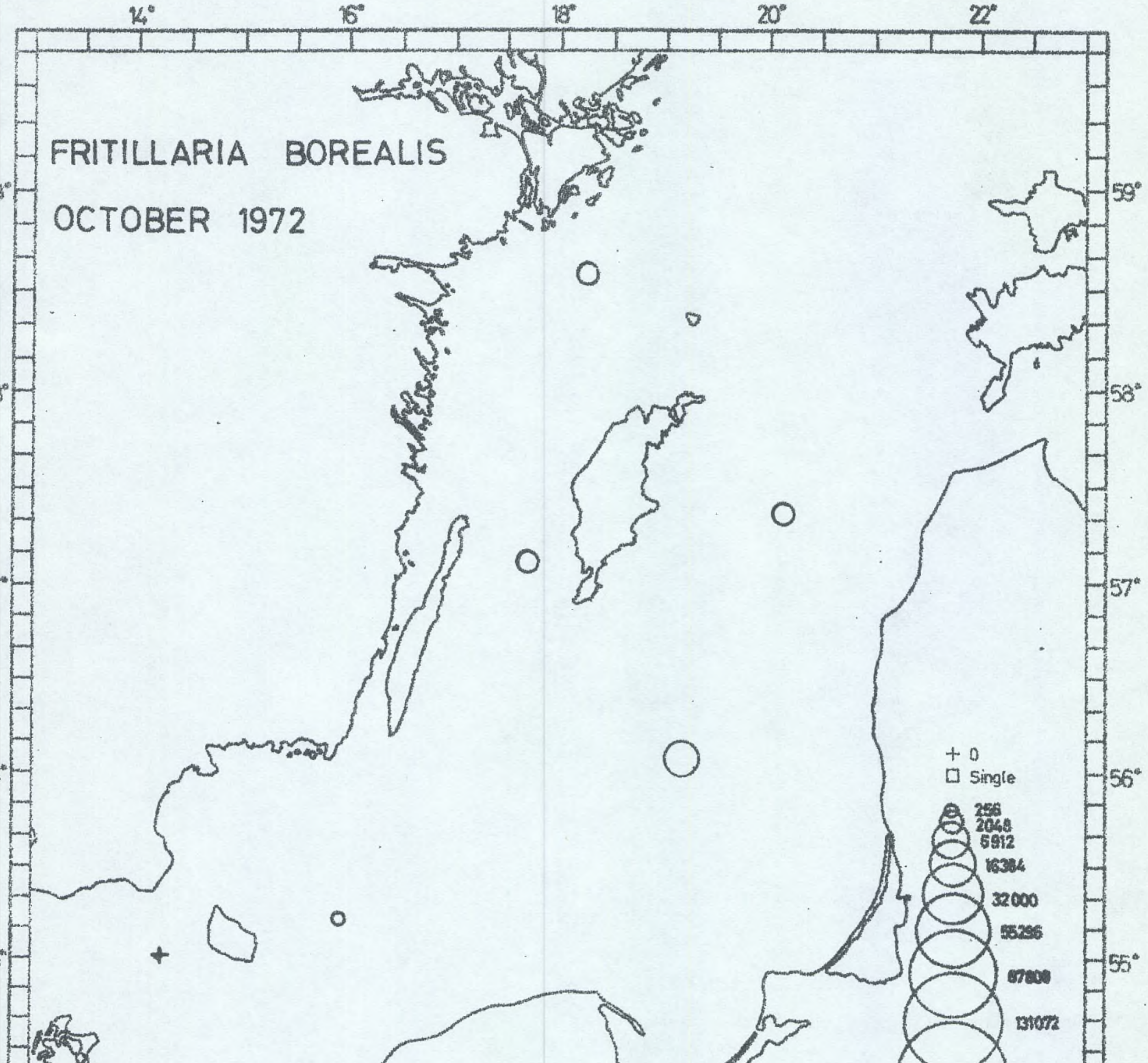

FRITILLARIA BOREALIS
OCTOBER 1972
14°
16°
18°
20°
22°
59°
58°
57°
56°
55°
+ 0
□ Single
256
2048
5912
16384
32000
55296
87808
131072
186624

Fig. 58

ZOOPLANKTON BIOMASS AS $G \cdot M^{-2}$

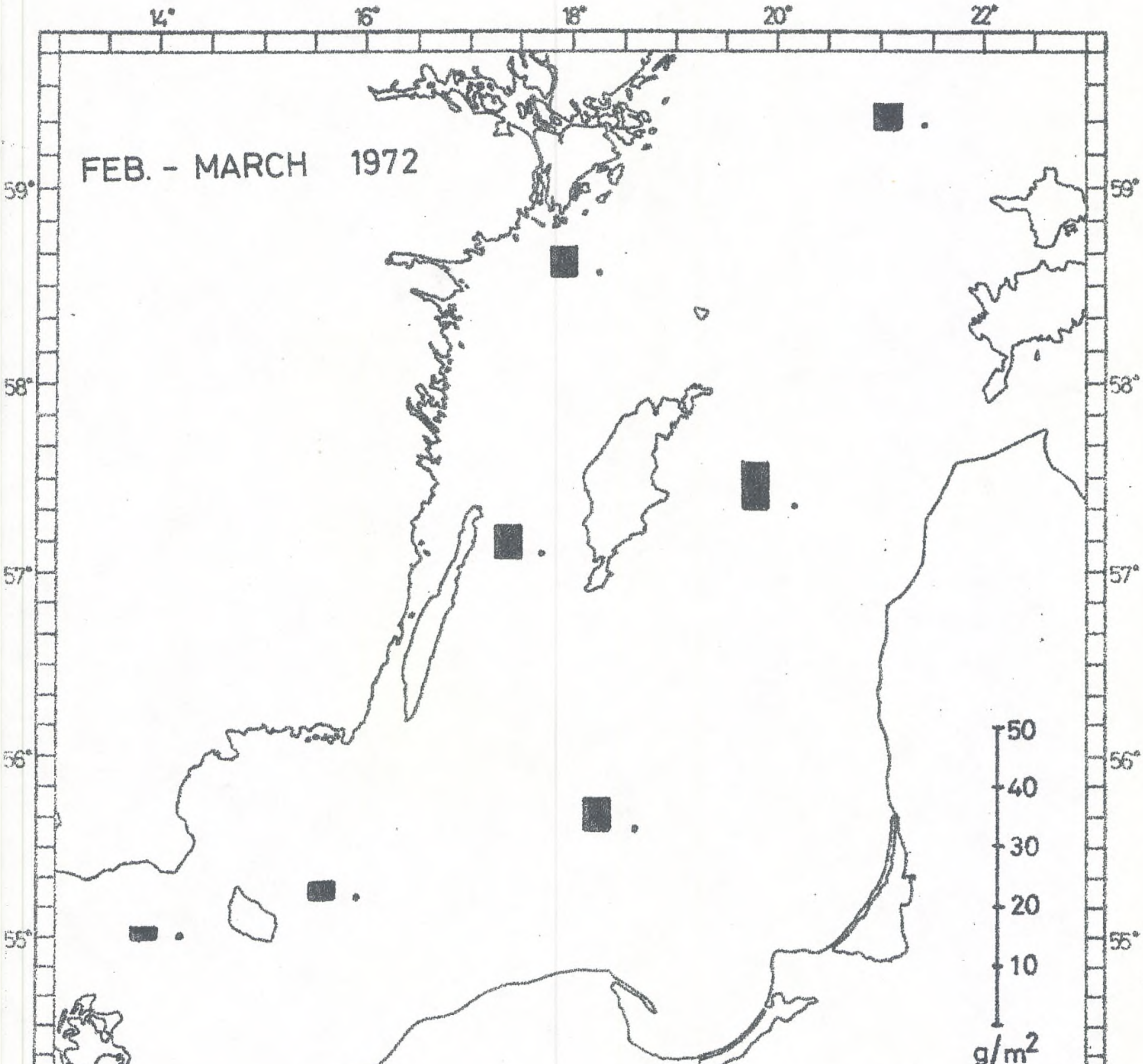


Fig.59

ZOOPLANKTON BIOMASS AS $G \cdot M^{-2}$

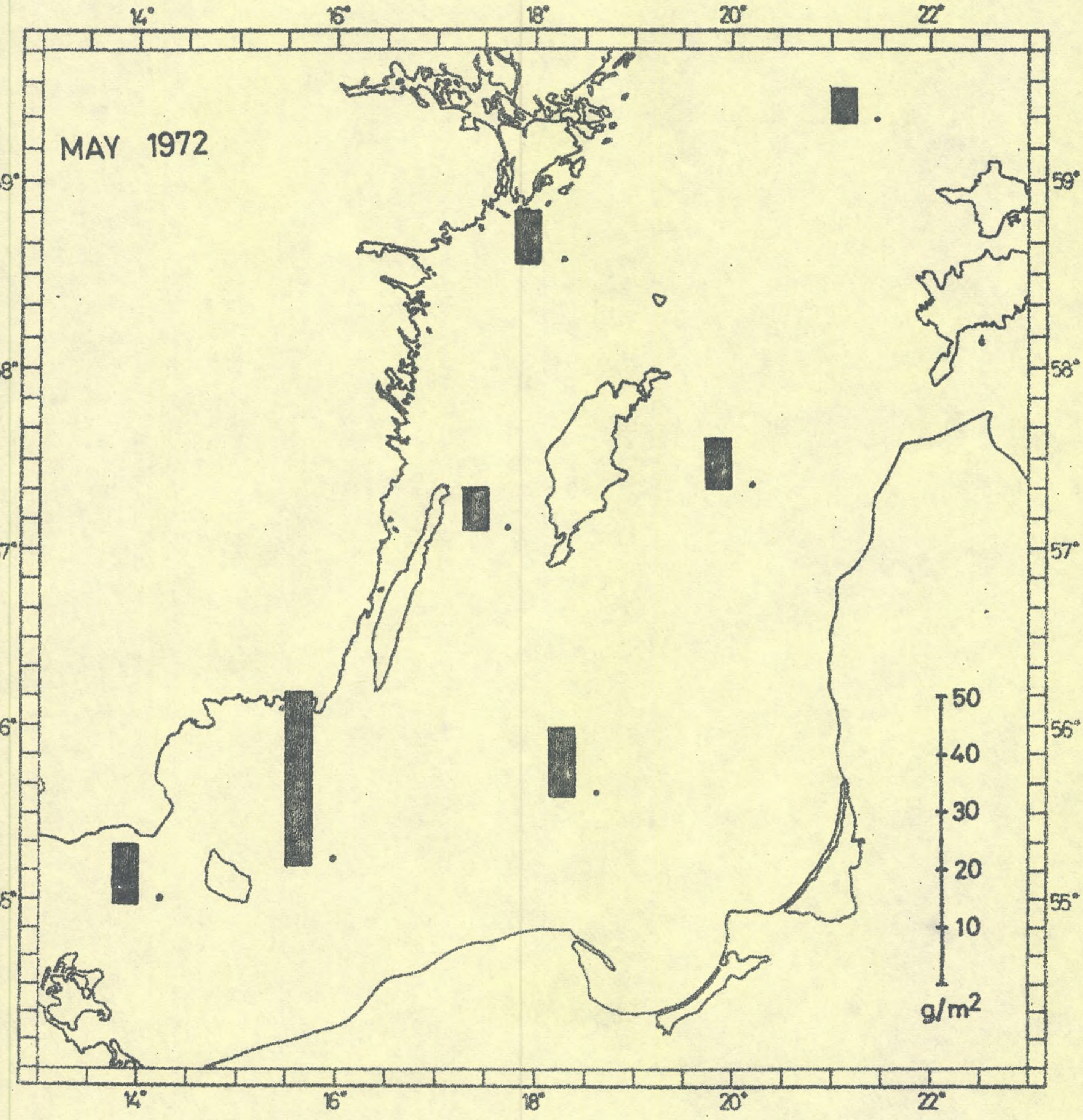


Fig. 60

ZOOPLANKTON BIOMASS AS $G \cdot M^{-2}$

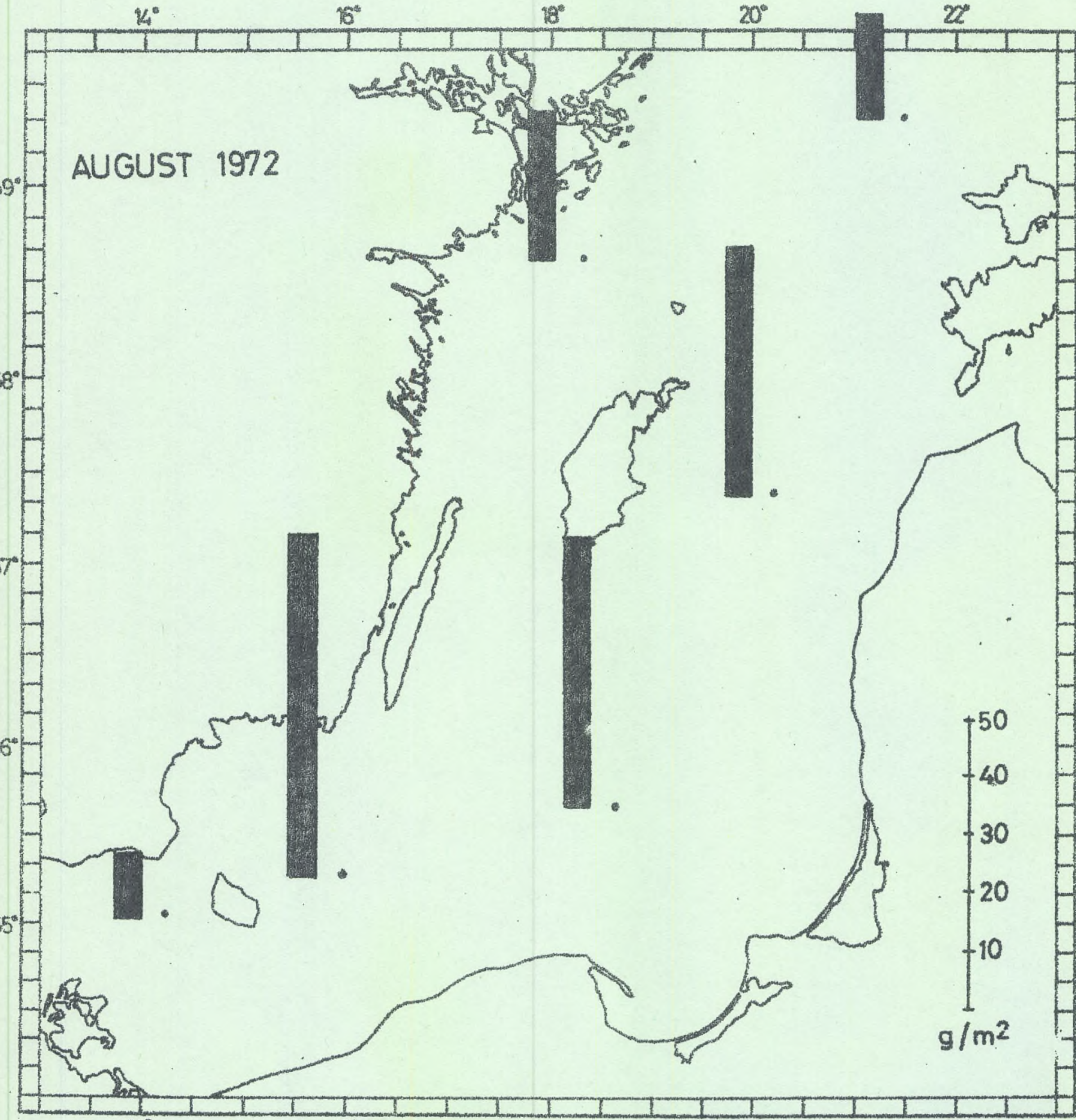


Fig.61

ZOOPLANKTON BIOMASS AS $G \cdot M^{-2}$

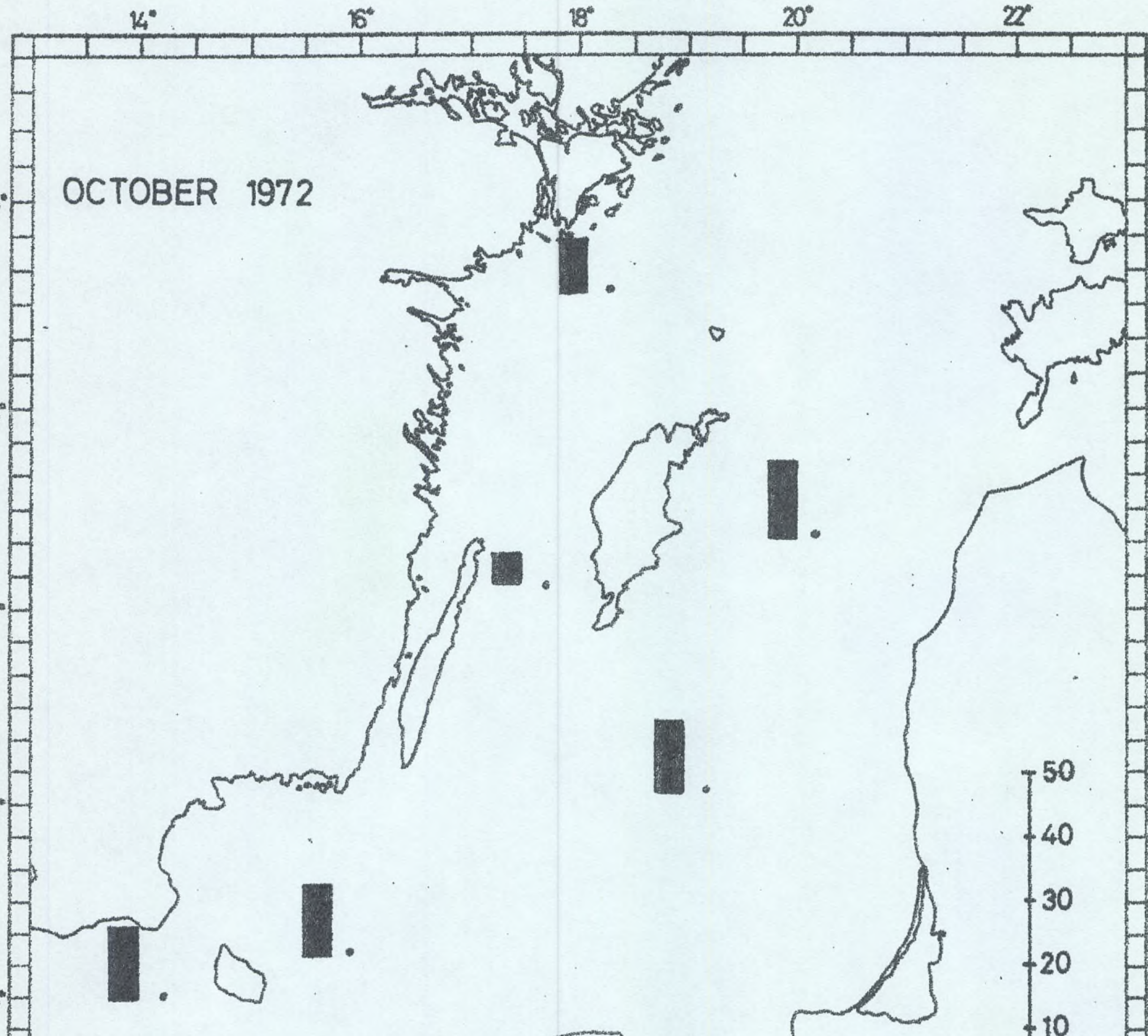


Table 1. Plankton stations visited in 1972.

S 12 (2A)	Arkona	55°00'N	14°05'E
S 24 (5A)	Bornholm Deep	55°15'N	15°59'E
8A	"Ryсsshålan"	55°38'N	18°36'E
F 81 (15A)	Gotland Deep	57°20'N	20°03'E
F 72		59°18'N	21°34'E
F 78 (31A)	Landsort Deep	58°35'N	18°14'E
S 41 (38A)		57°07'N	17°40'E
9A	Klaipeda	56°05'N	19°10'E

Table 2. Temperature, salinity, oxygen and hydrogen sulphide values at stations S12, S24, 8A, F81, F78, S41 and F72, Feb.-March 1972.

Station S 12, 29 February 1972

Depth m	t°C	S ‰	O_2 ml/l
0	1.28	8.13	9.67
5	1.28	8.13	9.64
10	1.25	8.14	9.64
15	1.13	8.35	9.67
20	0.99	8.55	9.67
30	0.63	9.34	9.48
40	0.75	13.74	8.94
48	1.25	14.95	8.28

Station S 24, 1 March 1972

Depth m	t°C	S ‰	O_2 ml/l
0	1.72	7.71	9.44
5	1.69	7.71	9.45
10	1.78	7.75	9.27
15	1.81	7.84	9.36
20	1.85	7.87	9.31
30	1.95	7.96	9.33
40	1.89	8.16	9.14
50	1.20	8.73	9.31
60	7.49	11.95	4.67
70	8.66	14.48	1.36
80	8.34	15.29	0.28
90	7.72	15.34	0.12

Station 8 A, 1 March 1972

Depth m	t°C	S ‰	O_2 ml/l
0	2.27	7.72	9.18
5	2.19	7.72	9.26
10	2.18	7.72	9.27
15	2.17	7.72	9.21
20	2.20	7.72	9.27
30	2.13	7.72	9.22
40	2.06	7.77	9.29
50	2.07	7.83	9.15
60	2.63	8.25	7.89
70	4.62	10.18	1.38
80	5.06	10.66	1.17
90	7.10	11.93	2.44
95	7.12	11.96	2.22

Station F 81, 2 March 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	1.45	7.63	9.55	
5	1.45	7.63	9.56	
10	1.44	7.63	9.58	
15	1.48	7.63	9.51	
20	1.48	7.63	9.53	
30	1.58	7.64	9.43	
40	1.69	7.66	9.36	
50	1.80	7.67	9.29	
60	2.09	7.71	9.23	
70	2.11	7.73	9.23	
80	3.12	8.55	6.15	
90	4.51	10.33	0.72	
100	4.63	10.65	0.47	
125	5.25	11.46	0.41	
150	5.25	12.06		0.1
175	5.45	12.40		8.3
200	5.51	12.56		13.6
225	5.57	12.65		21.2
240	5.63	12.68		30.6

Continued

Table 2. (Continued)

Station F 78, 3 March 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	0.78	7.16	9.78	
5	0.72	7.16	9.79	
10	0.75	7.16	9.79	
15	0.76	7.16	9.84	
20	0.80	7.16	9.78	
30	1.44	7.33	9.42	
40	1.62	7.40	9.39	
50	1.79	7.44	9.23	
60	1.84	7.50	9.16	
70	3.11	8.06	6.88	
80	4.12	9.54	2.10	
90	4.29	9.99	0.98	
100	4.46	10.30	0.52	
125	4.52	10.44	0.37	
150	4.60	10.65	0.33	
175	4.65	10.84	0.10	
200	4.72	10.92	0.21	
300	4.76	11.00	0.13	
400	4.80	11.06	0.12	
440	4.83	11.06		0.9

Station S 41, 8 March 1972

Depth m	t°C	S ‰	O_2 ml/l
0	1.30	7.42	9.62
5	1.38	7.42	9.57
10	1.36	7.42	9.58
15	1.36	7.42	9.56
20	1.39	7.42	9.53
30	1.39	7.43	9.52
40	1.47	7.45	9.51
50	1.47	7.45	9.47
60	1.48	7.46	9.43
70	2.11	7.57	8.82
80	3.30	8.30	5.85
90	4.14	9.38	2.09
100	4.39	10.05	0.52
112	4.31	10.12	0.43

Station F 72, 3 March 1972

Depth m	t°C	S ‰	O_2 ml/l
0	0.46	7.27	9.85
5		7.27	9.81
10	0.48	7.27	9.83
15	0.40	7.27	9.86
20	0.82	7.31	9.68
30	1.21	7.36	9.50
40	1.31	7.40	9.43
50	1.55	7.44	9.35
60	1.54	7.46	9.31
70	1.73	7.50	9.16
80	3.26	8.69	5.03
90	4.50	10.30	0.86
100	4.62	10.69	0.36
125	4.64	10.77	0.29
150	4.70	10.77	0.24

Table 3. Temperature, salinity, oxygen and hydrogen sulphide values at stations S12, S24, 8A, F81, F78, S41 and F72, May 1972.

Station S 12, 24 May 1972

Depth m	t°C	S ‰	O_2 ml/l
0	7.92	8.09	8.80
5	7.42	8.08	8.89
10	6.50	8.09	8.85
15	6.42	8.09	8.68
20	6.42	8.09	8.70
30	6.29	8.10	8.65
40	4.02	11.53	7.11
48	4.02	14.95	5.44

Station S 24, 25 May 1972

Depth m	t°C	S ‰	O_2 ml/l
0	7.23	7.71	9.12
5	7.18	7.71	9.12
10	6.91	7.72	9.20
15	5.60	7.72	9.11
20	5.62	7.75	8.97
30	5.79	7.79	9.10
40	4.66	8.09	8.76
50	3.95	11.76	6.91
60	4.58	14.70	5.24
70	3.76	16.05	6.67
80	3.75	17.03	6.23
89	3.79	17.65	6.06

Station 8 A, 25 May 1972

Depth m	t°C	S ‰	O_2 ml/l
0	6.19	7.68	10.37
5	6.15	7.68	10.56
10	4.92	7.68	10.21
15	4.66	7.68	9.68
20	4.49	7.68	9.53
30	4.35	7.69	9.43
40	4.30	7.69	9.50
50	4.34	7.70	9.42
60	2.93	7.78	9.07
70	2.74	8.24	7.61
80	4.12	9.95	2.07
90	4.60	13.24	4.44

Station F 81, 26 May 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	4.95	7.65	9.73	
5	4.93	7.65	9.68	
10	4.91	7.65	9.71	
15	4.88	7.65	9.71	
20	4.75	7.65	9.65	
30	4.45	7.65	9.43	
40	4.32	7.66	9.38	
50	2.68	7.73	9.15	
60	2.31	7.92	8.29	
70	3.44	9.10	4.38	
80	4.56	10.28		
90	5.04	10.78	0.90	
100	5.35	10.97	0.67	
125	5.29	11.48	0.23	
150	5.55	12.18		3.1
175		12.41		12.7
200	5.52	12.54		20.6
225	5.56			19.2
240	5.58	12.65		36.7

Continued

Table 3. (Continued)

Station F 78, 30 May 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	6.25	6.57	9.06	
5	6.30	6.57	9.12	
10	6.31	6.57	9.09	
15	4.80	6.94	9.26	
20	4.22	7.23	9.34	
30	3.15	7.31	9.35	
40	2.96	7.40	9.35	
50	1.73	7.53	8.70	
60	2.47	7.96		
70	3.91	9.46	2.00	
80	4.35	10.10	0.55	
90	4.42	10.28	0.35	
100	4.46	10.35	0.44	
125	4.55	10.55	0.27	
150	4.56	10.64	0.20	
200	4.66	10.86	0.10	
300	4.80	10.99	0.10	
400	4.79	11.01		0.4
425	4.80	11.02		0.6
440	4.80	11.02		1.5

Station S 41, 26 May 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	5.63	7.47	8.98	
5	5.57	7.47	8.97	
10	5.65	7.46	9.00	
15	5.63	7.46	9.02	
20	5.45	7.46	8.95	
30	4.85	7.49	8.95	
40	4.64	7.51	9.01	
50	4.51	7.52	9.02	
60	4.20	7.56	8.91	
70	2.65	8.07	6.44	
80	3.86	9.32	2.01	
90	4.32	9.98	0.28	
100	4.40	10.25	0.10	
114	4.40	10.29		9.0

Station F 72, 31 May 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	5.40	7.03	9.30	
5	5.41	7.03	9.29	
10	5.41	7.03	9.28	
15	5.33	7.03	9.31	
20	5.26	7.05	9.33	
30	3.77	7.34	9.48	
40	2.01	7.38	9.49	
50	1.95	7.55	8.81	
60	2.09	7.89	7.49	
70	3.78	9.60	2.30	
80	4.28	10.26	0.64	
90	4.34	10.38	0.32	
100	4.38	10.40	0.28	
125	4.45	10.43	0.35	
150	4.61	10.74		4.2
161	4.59	10.75		8.0

Table 4. Temperature, salinity, oxygen and hydrogen sulphide values at stations S12, S24, 8A, F81, F78 and F72, August 1972.

Station S 12, 15 August 1972

Depth m	t°C	S ‰	O_2 ml/l
0	17.06	7.87	7.16
5	17.07	7.87	7.21
10	15.98	7.87	6.93
15	12.91	7.93	6.94
20	11.32	8.01	6.92
30	8.42	9.24	6.03
40	10.06	14.00	4.60
48	9.30	18.35	2.92

Station S 24, 18 August 1972

Depth m	t°C	S ‰	O_2 ml/l
0	17.97	7.67	6.47
5	17.97	7.67	6.49
10	17.98	7.67	6.46
15	17.98	7.67	6.46
20	6.19	7.75	7.47
30	5.46	7.92	7.72
40	5.48	8.11	7.44
50	4.75	9.83	6.34
60	7.59	12.65	5.28
70	4.74	15.14	4.06
80	4.06	17.25	4.30
93	4.08	17.81	3.65

Station 8 A, 19 August 1972

Depth m	t°C	S ‰	O_2 ml/l
0	18.97	7.58	6.52
5	18.93	7.58	6.45
10	18.90	7.58	6.29
15	18.92	7.58	6.46
20	15.93	7.60	6.17
30	6.19	7.65	7.65
40	4.67	7.71	8.05
50	4.27	7.82	7.80
60	3.46	7.93	7.67
70	3.45	8.97	3.92
80	4.75	10.50	0.79
90	4.85	11.65	1.83
96	4.81	11.80	2.28

Station F 81, 20 August 1972

Depth m	t°C	S ‰	O_2 ml/l
0	18.29	7.23	6.49
5	18.27	7.23	6.57
10	18.33	7.23	6.54
15	11.25	7.28	7.36
20	6.11	7.36	8.19
30	4.36	7.51	8.42
40	4.29	7.61	8.19
50	3.44	7.73	8.19
60	2.70	7.96	7.52
70	3.53	9.15	3.05
90	4.92	10.64	0.61
100	5.43	11.07	0.46
125	5.14	11.83	1.00
150	5.28	12.34	0.57
175	5.26	12.53	0.56
200	4.94	12.63	1.77
225	4.99	12.76	1.96
240	5.03	12.84	0.04

Continued

Table 4. (Continued)

Station F 78, 21 August 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	18.21	6.56	6.65	
5	18.19	6.55	6.60	
10	18.15	6.56	6.66	
15	18.12	6.59	6.41	
20	11.06	6.77	6.66	
30	5.21	7.17	7.90	
40	4.10	7.36	8.11	
50	2.73	7.77	7.06	
60	3.89	9.54	1.44	
70	4.26	10.06	0.40	
80	4.45	10.35	0.23	
90	4.57	10.49	0.10	
100	4.64	10.62	0.10	
125	4.72	10.82	0.11	
150	4.77	10.93		3.4
200	4.92	11.02		4.4
300	4.96	11.05		3.6
400	4.96	11.07		3.6
425	4.99	11.09		3.7
440	5.01	11.09		3.7

Station F 72, 21 August 1972

Depth m	t°C	S ‰	O_2 ml/l	H_2S µgat/l
0	18.49	6.52	6.68	
5	18.48	6.51	6.65	
10	18.49	6.50	6.61	
15	12.40	6.43	6.89	
20	5.27	6.63	7.88	
30	4.30	7.19	8.40	
40	3.78	7.33	8.64	
50	3.14	7.50	8.52	
60	2.53	7.92	6.95	
70	3.56	9.31	2.19	
80	4.26	10.20	0.22	
90	4.35	10.33	0.06	
100	4.37	10.36	0.10	
125	4.62	10.65		9.0
150	4.69	10.72		13.6
176	4.64	10.74		16.4

Table 5. Temperature, salinity, oxygen and hydrogen sulphide values at stations S12, S24, F81, F78, S41 and 9A, October 1972.

Station S 12, 26 October 1972

Depth m	t°C	S ‰	O_2 ml/l
0	11.21	8.21	7.30
5	11.19	8.20	7.38
10	11.17	8.19	7.33
15	11.20	8.19	7.29
20	11.18	8.21	7.05
30	10.80	8.64	7.29
40	11.13	9.91	6.77
48	12.66	16.97	2.53

Station S 24, 26 October 1972

Depth m	t°C	S ‰	O_2 ml/l
0	10.91	7.45	7.43
5	10.90	7.44	7.42
10	10.88	7.44	7.45
15	10.92	7.44	7.39
20	10.91	7.44	7.24
30	10.90	7.44	7.36
40	10.62	7.53	7.36
50	6.05	8.84	5.97
60	9.73	12.00	4.27
70	6.05	15.40	3.58
80	5.16	17.08	3.46
90	4.50	17.77	2.51

Continued

Table 5. (Continued)

Station F 81, 31 October 1972

Depth m	t °C	S ‰	O_2 ml/l
0	8.04	7.54	8.00
5	8.03	7.51	7.96
10	8.03	7.52	8.03
15	8.02	7.56	7.76
20	7.93	7.58	7.78
30	7.90	7.63	7.70
40	5.37	7.59	7.66
50	3.76	7.86	7.20
60	3.32	8.12	6.69
70	3.77	8.94	4.83
80	4.74	10.62	0.83
90	5.03	11.02	0.99
100	5.16	11.28	1.08
125	5.05	11.91	1.84
150	5.24	12.34	0.43
175	5.31	12.49	0.10
200	5.24	12.62	0.34
225	5.07	12.69	1.02
240	5.04	12.72	1.10

Station F 78, 30 October 1972

Depth m	t °C	S ‰	O_2 ml/l	H_2S µgat/l
0	9.02	6.70	7.80	
5	9.02	6.70	7.77	
10	9.01	6.70	7.77	
15	9.50	6.70	7.82	
20	8.96	6.70	7.76	
30	8.85		7.84	
40	8.78	6.72	7.81	
50	4.24	8.09	5.56	
60	4.14	9.83	1.23	
70	4.33	10.11	0.82	
80	4.41	10.31	0.41	
90	4.49	10.42	0.28	
100	4.53	10.44	0.30	
125	4.66	10.67	0.11	
150	4.74	10.78		2.1
200	4.84	10.94		5.3
300	4.89	11.06		7.4
400	4.91	11.02		8.0
425	4.90	11.03		8.0
440	4.93	11.03		8.4

Station S 41, 27 October 1972

Depth m	t °C	S ‰	O_2 ml/l	H_2S µgat/l
0	8.49	6.80	7.90	
5	8.46	6.80	7.94	
10	8.46	6.80	7.90	
15	8.25	6.82	7.86	
20	8.22	6.84	7.88	
30	8.18	6.84	7.91	
40	4.26	7.40	8.05	
50	3.63	7.59	7.53	
60	3.84	8.53	4.08	
70	4.10	9.77	0.50	
80	4.36	10.18		1.6
90	4.43	10.36		9.4
100	4.48	10.38		10.7
110	4.44	10.38		12.9

Station 9 A, 31 October 1972

Depth m	t °C	S ‰	O_2 ml/l
0	9.61	7.62	7.86
5	9.63	7.62	7.80
10	9.58	7.62	7.81
15	9.40	7.61	7.83
20	9.51	7.57	7.88
30	8.36	7.71	7.42
40	3.57	7.87	7.27
50	3.14	8.35	5.95
60	4.06	9.77	
70	4.90	10.76	3.46
80	4.97	11.06	3.28
90	5.15	11.50	2.58
100	5.15	11.69	2.34
129	6.28	12.83	3.15

Table 6. Date and local time of the day when the samples were collected. (Deepest samples at the top of each table.)

Feb.-March

S 12	S 24	8 A	F 81
72 02 29 1645	72 03 01 0420	72 03 01 1600	72 03 02 1415
72 02 29 1650	72 03 01 0430	72 03 01 1610	72 03 02 1425
	72 03 01 0435	72 03 01 1615	72 03 02 1430

F 78	S 41	F 72	
72 03 03 2335	72 03 08 1955	72 03 03 0730	
72 03 03 2345	72 03 08 2005	72 03 03 0740	
72 03 03 2350	72 03 08 2010	72 03 03 0745	

May

S 12	S 24	8 A	F 81
72 05 24 1910	72 05 25 0550	72 05 25 1530	72 05 26 0340
72 05 24 1915	72 05 25 0600	72 05 25 1535	72 05 26 0350

F 78	S 41	F 72	
72 05 30 0300	72 05 26 1315	72 05 31 0200	
72 05 30 0310	72 05 26 1325	72 05 31 0210	

August

S 12	S 24	8 A	F 81
72 08 15 1140	72 08 18 2235	72 08 19 0830	72 08 20 0630
72 08 15 1150	72 08 18 2245	72 08 19 0840	72 08 20 0640

F 78		F 72	
72 08 21 1520		72 08 21 0125	
72 08 21 1525		72 08 21 0135	

October

S 12	S 24		F 81
72 10 26 1125	72 10 26 2000		72 10 31 1510
	72 10 26 2005		72 10 31 1520

F 78	S 41		9 A
72 10 30 1830	72 10 27 1450		72 10 31 2330
72 10 30 1840	72 10 27 1455		72 10 31 2340