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Ichthyoplankton off Kodiak Island and the Alaskan Peninsula during Spring 1981

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ICHTHYOPLANKTON OFF KODIAK ISLAND AND THE ALASKAN PENINSULA DURING SPRING 1981

by

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INTRODUCTION

This report describes the distribution and abundance of ichthyoplankton collected during a series of seven cooperative U.S.-U.S.S.R. ichthyoplankton surveys conducted in the northwestern Gulf of Alaska in spring 1981. The overall objective of these cruises was to assess the spatial distribution and abundance of ichthyoplankton, with special emphasis on the walleye pollock (Theragra chalcogramma) population that spawns in Shelikof Strait. Results from these surveys will eventually be used to estimate egg production and spawner biomass of walleye pollock in this area.

METHODS AND MATERIAL

Station grids for the seven ichthyoplankton surveys sampled portions of the Gulf of Alaska from Unimak Pass in the Aleutian Islands to the Kenai Peninsula. A total of 235 stations were occupied during three surveys (1SH81, 2SH81, and 3SH81) conducted aboard the Soviet research vessel SHANTAR, with Dr. N. S. Fadeyev serving as chief scientist. The American effort consisted of four surveys (1MF81, 2MF81, 3MF81, and 4MF81) aboard the NOAA research vessel MILLER FREEMAN that emphasized the Shelikof Strait between Kodiak Island and the Alaska Peninsula and occupied 281 stations.

Sampling dates were (Figure 1):

March 5 - March 18, 1981, for cruise 1SH81;

March 12 - March 20,1981, for cruise 1MF81;

March 30 - April 8, 1981, for cruise 2MF81;

April 16 - April 24, 1981, for cruise 2SH81;

April 26 - May 2, 1981, for cruise 3MF81;

May 20 - May 24, 1981, for cruise 4MF81; and,

May 20 - May 28, 1981, for cruise 3SH81.

On the Soviet vessel hydrographic casts at standard depths (0, 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 400, 500, 600 m) were made where water depth permitted. After each station temperature, salinity, oxygen, phosphate and silicate determinations were made aboard ship. Results of these measurements will be reported elsewhere. The MILLER FREEMAN performed CTD (conductivity, temperature and depth) casts at each station to near bottom.

Plankton was collected at each station using a standard MARMAP bongo tow (Smith and Richardson, 1977) with 60 cm diameter 0.505 mm mesh nets to a maximum target depth of 200 m. On two cruises, 1SH81 and 2SH81, neuston tows using 0.3

high by 0.5 m wide Sameoto samplers (Sameoto and Jaroszynski, 1969) with 0.505 mm mesh nets were also made at approximately 2.0 knots (1.03 m/sec) for 10 minutes. Flowmeters in the mouths of the nets were used to determine the volume of water filtered by each net. Bongo nets were lowered at a rate of 50 m of wire per minute and retrieved at a rate of 20 m per minute. During lowering and retrieval, the ship's speed was adjusted to maintain a 45° wire angle. The Soviets and Americans each retained one of the bongo samples, and one of the neuston samples when taken. The American samples were processed by the Polish Sorting Center in Szczecin, Poland, where displacement volumes were determined (for bongo samples), and all fish eggs and larvae removed. The fish eggs were counted; the larvae were identified, counted, and measured. Fish eggs were later identified under the direction of Ann C. Matarese at NWAFC. Identifications were made to the lowest taxonomic level possible, and in some cases "types" of unidentified eggs or larvae were established, in hopes that with further study their identity could be established. Beverly Vinter at NWAFC checked larval identifications. Counts of fish eggs and larvae were converted to $10m^2$ of surface area for bongo and numbers per $1000m^3$ for the neuston examples. The log of the number of eggs or larvae in the survey areas is based on the Sette and Ahlstrom census as used by Richardson (1981).

RESULTS

The station patterns (Figures 2-6) were occupied as planned. Data associated with these stations are listed in Tables 1-7. A summary of the catches of fish eggs and larvae are presented in Tables 8-14. Totals of 11 taxa of eggs and 79 taxa of larvae were found. Figures 7-17 illustrate the rank abundance of egg and larval catches in bongo and neuston tows for the cruises using several measures of abundance. Figures 18-68 show the geographic distribution, abundance at each station, and length frequencies of larvae for the more abundant taxa.

Relative Abundances

The rank order of abundance among the taxa depends on the measure of abundance examined. Four measures of abundance for each net were used: total number caught, percent occurrence of stations occupied, logarithm of estimated number in survey area, mean number per one thousand cubic meters for neuston and mean number for ten square meters for bongo tows.

Neuston samples were taken during cruises 1SH81 and 2SH81 only (Tables 8 and 11, Figures 7-8). Egg catches were dominated by Theragra chalcogramma, Hippoglossoides elassodon, and pleuronectids. Catches were too few to shed light on seasonal trends in neustonic egg abundances. Larvae in the neuston net were dominated by Hexagrammos decagrammus. Based on numbers caught and percent occurrence Hemilepidotus sp., Pleurogrammus monopterygius, and Mallotus villosus were next in abundance during 1SH81, while Lyconectes aleutensis, Mallotus villosus and Hemilepidotus sp. were next in abundance during 2SH81.

Bongo samples were taken during all seven cruises (Tables 8-14, Figures 9-17). Egg catches were dominated by Theragra chalcogramma during 1MF81, 1SH81, and 2MF81; and by Theragra chalcogramma, Hippoglossoides elassodon,

and pleuronectids during 2SH81, 3MF81, and 4MF81. During 3SH81, the final cruise of the season, Microstomus pacificus and Glyptocephalus zachirus displaced the above species to dominate catches.

Larval catches in the bongo samples were dominated by Ammodytes hexapterus, Mallotus villosus, and Hexagrammos dexagrammus during 1SH81, 1MF81, and 2MF81. By 2SH81 Theragra chalcogramma displaced Ammodytes hexapterus as dominant larval species, and retained this dominance for the remaining cruises. Bathymaster sp., Hippoglossoides elassodon, and Lepidopsetta bilineata were also abundant.

Distribution

While this is not intended to be a definitive report of these data, certain outstanding features in the distribution of the more abundant taxa will be mentioned. Variability in length data is reported in terms of one standard deviation. As appropriate occurrences are compared to those reported by Kendall, et al., (1980), which is the most complete summary of ichthyoplankton of the Kodiak region to date.

Ammodytes hexapterus--Pacific sand lance lay demersal eggs during the winter and larvae are taken in the spring and summer, sometimes with lengths approaching 50 mm (Kendall, et al., 1980). Catches of Ammodytes hexapterus have ranked second after Theragra chalcogramma (Dunn and Naplin, 1974). Larvae were taken during all of the 1981 cruises at widely distributed stations. Percent occurrence ranged from 70 to 95% of stations sampled (Figures 18-21). Abundance in bongo catches varied over three orders of magnitude when expressed in counts per $10m^2$. Average lengths were 6($\pm$1) mm during 1SH81 and 1MF81, 8($\pm$3) mm during 2MF81, 10($\pm$2) mm during 2SH81 and 3SH81, and 19($\pm$5) mm during 4MF81 and 3SH81.

Atheresthes stomias--Arrowtooth flounder (or turbot) spawn bathypelagic eggs in slope water during the winter (Kendall, et al., 1980). Larvae were

taken in low abundance throughout the 1981 sampling period, with mean lengths of 8(±1) mm during 1SH81, 8(±2) mm during 2SH81, 17(±3) mm during 4MF81 and 14(±3) mm during 3SH81. Occurrences of larvae were low over the sampling area (≤10%) with positive stations located offshore (Figures 22-23).

Bathymaster sp.--Larvae of searchers were found throughout the year, but were most abundant during summer (Kendall, et al., 1980). Larvae occurred in moderate abundance and were found at only a few stations during 1SH81, 2SH81, and 3MF81. Eight larvae were captured in neuston nets during 1SH81 and 2SH81, with lengths of about 32(±5) mm. During cruises 4MF81 and 3SH81 larvae were quite ubiquitous and abundant, occurring at about 90% of the stations sampled (Figure 24). Lengths in these bongo catches were 6(±1) mm.

Cottidae--Sculpin larvae were widely distributed during all cruises but abundances were low (Figures 25-26). Lengths averaged approximately 6(±2) mm during 1SH81 and 2MF81, 7(±1.5) mm during 2SH81 and 3MF81, 11(±2) mm during 4MF81 and 9(±2.5) mm during 3SH81.

Cyclopteridae--Snailfish larvae were taken during all cruises, at widely scattered stations but were in low abundance (Figures 27-28). Average lengths over the duration of sampling show little pattern. Larvae less than 4 mm were taken along with larvae greater than 25 mm during many of the cruises.

Gadus macrocephalus--Pacific cod larvae were found throughout the sampling area and in modest abundance (Figures 29-30). They were first taken during 2SH81 when they were 4(±0.7) mm long. During 3MF81 larvae averaged about 5(±0.5) mm, and during 4MF81 and 3SH81 average length was approximately 10(±2) mm.

Glyptocephalus zachirus--Rex sole spawn during spring and summer with eggs occurring over slope water (Kendall, et al., 1980). Eggs were occasionally taken (<5% occurrence) at offshore stations during 2SH81, but were frequently taken (47% occurrence) during 3SH81, these being largely at offshore stations

in shelf and slope waters (Figures 31-32). Larvae averaged 8(±2) mm in length during 3SH81.

Hemilepidotus hemilepidotus--Red Irish lord larvae were rarely taken in bongo samples, but were encountered in moderate abundance in neuston tows taken at widely scattered stations during 1SH81 and 2SH81 (Figure 33). Lengths averaged 14(±2) mm.

Hemilepidotus sp.--Larvae of Irish lords were taken throughout the survey area during 1SH81, 2MF81, and 2SH81 (Figures 34-35). Catches in neuston nets were considerable during 1SH81 but they were only moderately abundant by 2SH81. Lengths averaged 10(2±) mm in neuston samples.

Hexagrammos decagrammus--Kelp greenling larvae were taken in all cruises except 3SH81. Larvae were captured in considerable numbers in neuston catches, occurring at 70% of the stations during 1SH81 and 77% of the stations during 2SH81 (Figure 36). Lengths averaged 12(±2) mm. Larvae were sporadically caught in bongo tows (Figures 37-38). Kelp greenlings occur year round in the neuston achieving greatest abundance in the spring (Kendall, et al., 1980).

Hexagrammos stelleri--Whitespotted greenling larvae were taken principally by neuston nets. Positive stations were mostly inshore, but larvae were also taken in abundance along a transect line located east of the Semidi Islands (Figure 39). Lengths of larvae in neuston samples averaged 21(±2) mm during 1SH81 and 28(±4) mm during 2SH81.

Hippoglossoides elassodon--Eggs of the flathead sole were first found during 2SH81 where they were widely distributed but in low abundance in both neuston and bongo catches (Figures 40-41). During 3MF81 and 4MF81 eggs were found quite frequently (70 - 80% occurrences), with abundances ranging mostly over one order of magnitude (Figures 41-42).

Larvae were first captured during 3MF81, occurring at 20% of the stations sampled, and with lengths averaging 5.6 (±0.7) mm. By late May larvae were much

more frequently encountered (63% occurrence during 3SH81 and 99% occurrence during 4MF81) (Figure 43). Lengths then averaged about 7(±1.5) mm.

Lepidopsetta bilineata--Rock sole lay demersal adhesive eggs during the winter and spring; larvae hatch in 2 to 3 weeks (Kendall, et al., 1980). Larvae were taken over the entire survey period after 1MF81 and throughout the survey area (Figures 44-45). Lengths averaged about 4(±1) mm during 1SH81, 2MF81, and 2SH81; and 9.0(±2.5) mm during 4MF81 and 3SH81.

Leuroglossus schmidti (=Bathylagus schmidti)--Eggs of the northern smooth-tongue were encountered in low abundance and low percent occurrence during 1SH81, 2SH81, and 3SH81. Larvae tended to be found offshore and in low abundance (Figure 46). Average lengths during 1SH81 and 2SH81 were about 11(±4) mm, and 16(±2.5) mm during 3SH81.

Lumpenella longirostris--Longsnout prickleback larvae were rarely taken during 2MF81 and 2SH81, were in modest abundance during 3MF81, and were found less frequently during 4MF81 and 3SH81 (Figures 47-48). Minimum lengths during the cruises was about 12 mm, while maximum length was 12 mm during 2MF81 and 2SH81, 17 mm during 3MF81, and greater than 25 mm during 4MF81 and 3SH81.

Lumpenus maculatus--Daubed shanny larvae were collected in bongo nets in low abundance throughout the survey area (Figure 49). Lengths avaeraged 11(±1) mm during 2MF81, 11(±2) mm during 2SH81, 14(±2) mm during 3 MF81, and 23(±2) mm during 4MF81 and 3SH81. Larvae were not taken by neuston nets.

Lyconectes aleutensis--Dwarf wrymouth spawn demersal eggs; larvae, collected mainly by neuston net, have been found during the winter, spring, and summer (Kendall, et al., 1980). Larvae were taken in low to moderate abundance at widely scattered stations during all cruises except 1MF81 (Figures 50-52). Minimum lengths were about 11 to 13 mm. Highest catches (131 larvae) were made by neuston nets during 2SH81 when lengths averaged about 16 (±2.5) mm.

Mallotus villosus--Capelin larvae were widely distributed throughout the study area and were more abundant in neuston catches than in bongo catches (Figures 53-54). Occurrences typically ranged over 10-20% of the stations occupied. Larval sizes tended to be large with an average length of about 37(±10) mm over the series of cruises. Four juveniles taken at three stations during 1SH81 averaged 53(±5) mm in length.

Microstomus pacificus--Dover sole eggs were taken in low abundance during 1SH81 and 2SH81. By 3SH81 eggs were widespread with a tendency to be found offshore (Figure 55). No larvae were found. Dover sole are summer spawners (Kendall, et al., 1980).

Platichthys stellatus--A total of 11 starry flounder eggs were collected during the cruises 2SH81, 3MF81, and 4MF81. Larvae were moderately abundant during 4MF81 (Figure 56) but were only rarely encountered during 3MF81 and 3SH81. Lengths averaged about 4(±1) mm during 4MF81.

Pleurogrammus monpterygius--Atka mackerel larvae were only abundant in neuston catches during 1SH81 (Figure 57). During this cruise a total of 111 larvae were caught at 31 stations (24% occurrence). Atka mackerel spawn demersal eggs in June or August and larvae hatch in about 45 days; the larvae are taken mainly over deeper water and in areas of strong current (Kendall, et al., 1980). Lengths averaged 18(±2) mm. Sizes of larvae are consistent with those reported by Kendall, et al., (1980) at a similar time of year indicating that these larvae were spawned during the previous summer or fall.

Pleuronectes quadrituberculatus--Eggs of the Alaska plaice were rare and when caught were in low abundance. Greatest abundance was achieved during 3MF81 when 35 eggs were found at 22 stations (Figure 58). Incidental catches of eggs were also taken during 2SH81 and 4MF81. Larvae were taken during 3MF81, 4MF81 and 3SH81. Greatest abundance was achieved during 4MF81 when 14 larvae were taken at 12 stations.

Pluronectidae Eggs of right eye flounders were found sporadically and in low to moderate abundance during all seven cruises. A concentration of eggs is evident off the southwest of Kodiak Island during 3MF81, 3SH81 and 4MF81 (Figures 59-60).

Theragra chalcogramma--Eggs and larvae of the walleye pollock were widely distributed in both neuston and bongo catches. Spawning products were always more abundant in bongo nets.

The 1981 spawning of walleye pollock near Kodiak Island was sucessfully delimited in space and time by the series of seven ichthyoplankton surveys. During 1MF81 and 1SH81 eggs were taken in relatively low abundance at both neuston and bongo stations in Shelikof Strait (Figures 61-62). While catches were small, the eggs occurred over a wide area along the central axis of the Strait.

Highest egg abundances occurred during 2MF81 (Figure 62) and eggs were concentrated toward the west of Kodiak Island as expected (Kendall, et al., 1980; Dunn and Naplin, 1974). The distribution of eggs in this region extended some 150-200 kilometers along the axis of the Strait, declining in abundance in the vicinity of shore and toward the margins of the R/V MILLER FREEMAN's sampling grids.

An offshore concentration of spawning is indicated by the abundance of eggs and larvae to the south of the Trinity Islands during 2SH81 (Figure 63). While eggs of walleye pollock continued to dominate egg catches, egg abundances had decreased markedly by 3MF81 and thereafter they declined at a less rapid rate (Figure 64).

Larvae were found during all cruises except 1MF81 (Figures 65-67). Highest abundances occurred during 3MF81, but larvae were encountered in considerable numbers during 2MF81. The distribution of larvae by 3MF81 retain the dimensions

of the egg patch seen during 2MF81, although the concentration had been transported by some 100 km southwest along the Alaskan peninsula by 3SH81.

Minimum lengths during the seven cruises were commonly between 2.8 to 3.3 mm, suggesting that hatching of eggs was continuous over the survey period. The length of larvae at hatching is about 3 mm (Gorbunova, 1954). Maximum lengths were 4 mm during 1SH81, 5 mm during 2MF81, 10 mm during 2SH81 and 3MF81, and 15 mm during 4MF81 and 3SH81.

These data allow a qualitative description of the 1981 spawning curve for Alaskan pollock in this region. The high concentration of eggs and the presence of a considerable number of larvae during 2MF81, along with the virtual absence of spawning products during 1MF81, indicates that the onset of spawning was sudden and that spawning peaked sometime during the last 10 days of March and the first 10 days of April. Spawning then declined rapidly at first, but persisted for a considerable time with incidental spawning occurring into late May. Peak larval abundance occurred during late April and early May.

Stenobrachius leucopsarus--Larvae of the northern lampfish have previously been taken in low abundance at scattered stations and at all depths throughout the Kodiak region (Kendall, et al., 1980). Larvae in 1981 were found during nearly all cruises in bongo nets; none were taken by neuston tows (Figure 68). Catches were located primarily offshore and in the Shelikoff Strait. Average lengths of larvae during the series of cruises were 5($\pm$1) mm. Ten juveniles were captured at 8 stations during 1SH81 that averaged 27($\pm$7) mm and 9 juveniles were taken at 2 stations during 2SH81 that averaged 24($\pm$4) mm.

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Figure 51.--Distribution of larvae of Lyconectes aleutensis from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

Figure 52.--Distribution of larvae of Lyconectes aleutensis from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

Figure 53.--Distribution of larvae of Mallotus villosus from neuston tows during cruise 1SH81(above) and cruise 2SH81 (below). Abundance expressed as numbers per $1000m^3$.

Figure 54.--Distribution of larvae of Mallotus villosus from bongo tows during cruise 1SH81 (above) and cruise 2MF81 (below). Abundance expressed as numbers per $10m^2$.

Figure 55.--Distribution of eggs of Microstomus pacificus from bongo tows during cruise 3SH81. Abundance expressed as numbers per $10m^2$.

Figure 56.--Distribution of larvae of Platichthys stellatus from bongo tows during cruise 4MF81. Abundance expressed as numbers per $10m^2$.

Figure 57.--Distribution of larvae of Pleurogrammus monopterygius from neuston tows during cruise 1SH81. Abundance expressed as numbers per $1000m^3$.

Figure 58.--Distribution of eggs of Pleuronectes quadrituberculatus from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

Figure 59.--Distribution of eggs of Pleuronectidae from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

Figure 60.--Distribution of eggs of Pleuronectidae from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

Figure 61.--Distribution of eggs of Theragra chalcogramma from neuston tows (above) and bongo tows (below) during cruise 1SH81. Abundance expressed as numbers per $1000m^3$ and numbers per $10m^2$ respectively.

Figure 62.--Distribution of eggs of Theragra chalcogramma from bongo tows during cruise 1MF81 (above) and cruise 2MF81 (below). Abundance expressed as numbers per $10m^2$.

Figure 63.--Distribution of eggs of Theragra chalcogramma from neuston tows (above) and bongo tows (below) during cruise 2SH81. Abundance expressed as numbers per $1000m^3$ and numbers per $10m^2$ respectively.

Figure 64.--Distribution of eggs of Theragra chalcogramma from bongo tows during cruise 3MF81 (above left), cruise 4MF81 (above right), and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

Figure 65.--Distribution of larvae of Theragra chalcogramma from bongo tows during cruise 1SH81 (above) and cruise 2MF81 (below). Abundance expressed as numbers per $10m^2$.

Figure 66.--Distribution of larvae of Theragra chalcogramma from neuston tows (above) and bongo tows (below) during cruise 2SH81. Abundance expressed as numbers per $1000m^3$ and numbers per $10m^2$ respectively.

Figure 67.--Distribution of larvae of Theragra chalcogramma from bongo tows during cruise 3MF81 (above left), cruise 4MF81 (above right) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

Figure 68.--Distribution of larvae of Stenobrachius leucopsarus from bongo tows during cruise 1SH81. Abundance expressed as numbers per $10m^2$.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B	TIME GMT	STANDARD HAUL FACTORS A	B
G001A	59 28.0	149 58.0	81 3 5	840.	2130	0.035	23.123	2200	4.810	3.787
G002A	59 19.5	149 51.0	81 3 6	1259.	100	0.033	21.911	130	3.886	3.160
G003A	59 11.3	149 39.0	81 3 6	1406.	315	0.034	22.648	330	4.108	3.572
G004A	59 3.0	149 28.0	81 3 6	1359.	530	0.050	33.217	625	3.824	2.619
G005A	58 54.7	149 17.0	81 3 7	1333.	830	0.049	32.345	850	4.083	3.070
G006A	58 46.3	149 5.0	81 3 6	1542.	1050	0.087	58.297	1125	4.487	2.933
G007A	58 38.5	148 48.0	81 3 6	1450.	1355	0.061	40.988	1408	3.967	3.051
G008A	58 30.2	148 37.0	81 3 6	1258.	1605	0.052	34.602	1620	4.587	4.369
G009A	58 23.5	148 28.0	81 3 6	2008.	1849	0.030	19.851	1911	4.561	2.606
G010A	58 7.0	148 4.0	81 3 6	2352.	2150	0.027	18.194	2210	3.801	2.775
G011A	57 50.0	147 41.0	81 3 7	1451.	125	0.025	16.434	140	5.183	3.013
G012A	57 33.5	147 19.0	81 3 7	1390.	435	0.028	18.705	445	4.804	2.826
G013A	57 51.0	149 20.0	81 3 7	1109.	1230	0.031	20.377	1250	5.975	2.988
G014A	57 58.0	149 30.0	81 3 7	1332.	1430	0.028	18.645	1448	5.516	2.843
G015A	58 7.5	149 45.0	81 3 7	1274.	1710	0.028	18.845	1735	6.050	3.071
G016A	58 15.5	149 54.0	81 3 7	1146.	1907	0.028	18.934			
G017A	58 23.7	150 5.0	81 3 7	1117.	2045	0.030	20.103	2100	4.920	8.201
G018A	58 31.8	150 15.0	81 3 7	1122.	2300	0.027	17.996	2315	4.373	4.652
G019A	58 40.0	150 26.0	81 3 8	1167.	55	0.026	17.013	108	3.296	2.227
G020A	58 48.0	150 38.0	81 3 8	1244.	245	0.030	19.889	307	4.657	3.146
G021A	58 56.5	150 49.0	81 3 8	1081.	450	0.027	18.226	509	4.841	3.045
G022A	59 5.0	150 55.0	81 3 8	1097.	707	0.040	26.447	725	5.558	2.672
G023A	58 50.5	151 52.0	81 3 9	671.	1830	0.021	13.942			
G024A	58 45.5	151 45.0	81 3 9	920.	2037	0.025	16.687	2210	6.429	4.095
G025A	58 37.5	151 33.0	81 310	1055.	15	0.028	18.771	30	5.674	3.758
G026A	58 29.4	151 21.0	81 310	1012.	245	0.028	18.436	300	5.206	4.132
G027A	58 21.5	151 10.0	81 310	1032.	450	0.031	20.529	510	5.379	4.803
G028A	58 13.4	150 59.0	81 310	1055.	657	0.037	24.896	714	4.212	3.452
G029A	58 5.2	150 47.0	81 312	1506.	910	0.026	17.536	1030	4.725	3.171
G030A	57 49.2	150 24.0	81 312	1910.	1440	0.028	18.934	1500	3.719	6.096
G031A	57 33.0	150 2.0	81 312	1813.	1847	0.031	20.675	1914	3.991	2.494
G032A	57 4.0	150 30.0	81 313	1981.	1300	0.026	17.056	1325	5.375	2.800
G033A	57 20.0	150 55.0	81 313	1858.	1625	0.033	21.920	1655	5.672	6.834
G034A	57 34.7	151 14.0	81 313	1795.	1919	0.024	16.107	1949	6.195	11.264
G035A	57 51.0	151 37.0	81 313	1362.	2242	0.026	17.375	2313	6.955	14.195
G036A	57 59.2	151 48.0	81 314	984.	120	0.027	18.232	150	5.650	4.484
G037A	58 7.3	152 0.0	81 314	412.	345	0.028	18.340	420	4.785	9.029
G038A	57 31.0	152 5.0	81 314	580.	914	0.023	15.345	958	2.865	7.539
G039A	57 22.4	151 56.0	81 314	1392.	1148	0.025	16.598	1221	3.677	7.210
G040A	57 4.8	151 40.0	81 314	1855.	1545	0.025	16.696	1610	4.806	5.721
G041A	56 47.0	151 21.0	81 314	1925.	2157	0.022	14.711	2225	4.424	2.328
G042A	56 30.0	152 0.0	81 315	1670.	230	0.026	17.507	305	5.718	2.803
G043A	56 47.1	152 19.0	81 315	1493.	806	0.029	19.367	836	5.593	5.649
G044A	57 4.3	152 37.0	81 315	1235.	1120	0.033	22.154	1152	5.093	4.588
G045A	57 12.0	152 46.0	81 315	722.	1355	0.026	17.444	1427	4.918	5.653
G046A	56 56.5	153 27.0	81 315	230.	1755	0.025	16.429	1827	4.312	9.582
G047A	56 48.3	153 15.0	81 315	1070.	2012	0.026	17.106	2042	4.501	3.215
G048A	56 30.8	153 2.0	81 316	1645.	733	0.023	15.339	805	4.835	7.438
G049A	56 16.6	152 48.0	81 316	1496.	1048	0.021	14.184	1119	5.150	2.814
G050A	56 3.5	152 34.0	81 316	1395.	1355	0.019	12.648	1430	4.807	2.246
G051A	55 58.0	153 32.0	81 316	1701.	1850	0.024	15.859	1919	5.611	4.676
G052A	56 15.0	153 49.0	81 317	1377.	310	0.021	13.995	340	3.910	4.600
G053A	56 23.8	153 58.0	81 317	962.	532	0.025	16.404	600	4.233	8.639
G054A	55 41.0	154 14.0	81 317	1642.	1147	0.021	14.170	1215	4.916	2.909
G055A	55 57.3	154 34.0	81 317	1804.	1605	0.022	14.942	1633	6.053	2.777
G056A	56 13.5	154 54.0	81 317	1282.	1910	0.021	14.124	1938	4.403	13.760
G057A	56 21.7	155 4.0	81 317	730.	2221	0.020	13.572	2250	3.962	39.616
G058A	56 30.0	155 14.0	81 318	1298.	36	0.021	13.970	105	2.552	11.097
G059A	56 46.0	155 35.0	81 318	1582.	440	0.021	14.187	514	3.290	2.511
G060A	56 46.5	154 35.0	81 318	1048.	1021	0.020	13.663	1054	3.926	6.134
G061A	57 3.0	154 56.0	81 318	1532.	1400	0.027	17.828	1430	4.427	6.149
G062A	57 19.3	155 17.0	81 318	1683.	1655	0.022	14.828	1725	4.270	2.283
G063A	57 32.4	155 34.0	81 318	1002.	2134	0.024	15.765	2202	5.413	3.007

Table 1.--Data associated with bongo and neuston tows during cruise 1SH81, March 3 to March 30, 1981.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA NM2	TIME GMT	STANDARD HAUL FACTORS A	B	TIME GMT	STANDARD HAUL FACTORS A	B
G064A	57 18.2	156 13.0	81 319	374.	112	0.023	15.397	140	5.443	4.285
G065A	57 11.0	156 3.0	81 319	820.	305	0.023	15.157	335	6.223	2.694
G066A	57 3.0	155 53.0	81 319	1239.	508	0.021	14.250	538	5.553	2.670
G067A	56 50.1	156 35.0	81 319	912.	1059	0.021	13.900	1129	5.438	5.279
G068A	56 41.0	156 26.0	81 319	1359.	1305	0.023	15.093	1335	3.897	2.482
G069A	56 24.0	156 6.0	81 319	1791.	1625	0.020	13.485	1655	5.726	2.766
G070A	56 6.8	155 47.0	81 319	1814.	2203	0.022	14.996	2232	4.516	8.521
G071A	55 49.4	155 26.0	81 320	809.	104	0.022	14.431	130	5.392	10.572
G072A	55 40.5	155 19.0	81 320	871.	310	0.023	15.426	340	4.899	2.525
G073A	55 31.5	155 9.0	81 320	946.	630	0.022	14.889	702	5.664	2.846
G074A	55 12.8	155 50.0	81 320	871.	1110	0.024	16.167	1140	4.882	2.441
G075A	55 21.4	155 59.0	81 320	898.	1330	0.021	14.030	1400	4.008	2.505
G076A	55 30.0	156 8.0	81 320	1257.	1650	0.021	14.059	1725	5.664	2.710
G077A	55 47.0	156 27.0	81 321	1315.	6	0.020	13.381	39	4.102	2.242
G078A	55 55.5	156 37.0	81 321	1133.	235	0.023	15.651	305	4.714	2.455
G079A	56 11.0	156 55.0	81 321	661.	655	0.024	16.195	745	3.750	5.281
G080A	56 19.5	157 4.0	81 321	965.	914	0.024	15.702	945	4.957	3.443
G081A	56 28.0	157 14.0	81 321	538.	1155	0.022	14.578	1225	3.857	11.687
G082A	56 11.8	157 54.0	81 321	980.	1555	0.022	14.510	1620	4.302	5.377
G083A	55 58.5	157 40.0	81 321	1123.	1818	0.020	13.570	1845	5.611	6.927
G084A	55 50.0	157 30.0	81 321	919.	2040	0.023	15.634	2108	3.974	5.095
G085A	55 41.0	157 21.0	81 321	895.	2318	0.024	15.702	2347	5.026	6.283
G086A	55 32.5	157 12.0	81 322	1297.	125	0.024	15.781	155	4.294	6.606
G087A	55 16.0	156 54.0	81 322	1390.	410	0.021	13.820	440	3.593	4.922
G088A	55 6.3	156 46.0	81 322	1118.	847	0.026	17.335	915	2.898	3.219
G089A	54 35.0	157 13.0	81 322	1229.	1605	0.022	14.556	1630	4.339	2.508
G090A	54 50.7	157 31.0	81 322	1352.	1910	0.024	15.776	2015	3.528	2.291
G091A	55 0.0	157 41.0	81 322	2165.	2202	0.024	16.126	2228	4.417	8.032
G092A	55 13.8	157 56.0	81 323	1199.	7	0.023	15.313	34	4.988	7.229
G093A	55 21.8	158 6.0	81 323	938.	145	0.025	16.633	215	4.905	5.110
G094A	55 30.0	158 15.0	81 323	933.	315	0.024	16.039	340	5.419	4.479
G095A	55 38.2	158 24.0	81 323	851.	511	0.026	17.251	540	5.654	4.712
G096A	55 46.2	158 33.0	81 323	765.	655	0.023	15.301	724	4.723	6.560
G097A	55 35.7	159 28.0	81 323	698.	1027	0.019	12.898	1059	5.703	6.790
G098A	55 27.2	159 18.0	81 323	1039.	1300	0.021	13.908	1330	4.143	4.023
G099A	55 19.0	159 8.0	81 323	1104.	1553	0.021	13.786	1610	6.199	3.425
G100A	55 10.3	158 58.0	81 323	1590.	1728	0.022	14.883	1809	5.281	7.136
G101A	54 53.7	158 39.0	81 323	1730.	2025	0.022	14.617	2053	5.142	5.910
G102A	54 45.2	158 30.0	81 324	1146.	6	0.022	14.841	34	4.768	3.430
G103A	54 37.0	158 20.0	81 324	1599.	320	0.021	14.050	350	4.552	2.474
G104A	54 20.0	158 1.0	81 324	1515.	708	0.021	13.726	739	5.555	2.750
G105A	54 10.0	158 50.0	81 324	1778.	1155	0.021	13.886	1226	4.211	2.808
G106A	54 28.0	159 9.0	81 324	1582.	1515	0.024	15.906	1550	4.103	2.318
G107A	54 34.0	159 16.0	81 324	1013.	1854	0.023	15.301	1923	5.012	6.113
G108A	54 42.0	159 26.0	81 324	1077.	2054	0.021	14.080	2121	4.951	9.002
G109A	54 3.2	159 45.0	81 325	1670.	150	0.023	15.403	325	5.861	2.765
G110A	54 20.2	160 5.0	81 325	2296.	527	0.020	13.130	556	4.950	2.813
G111A	54 37.5	160 24.0	81 325	1616.	824	0.027	18.195	852	5.360	5.204
G112A	54 45.7	160 34.0	81 325	959.	1022	0.025	16.920	1050	6.220	5.554
G113A	54 53.7	160 44.0	81 325	863.	1228	0.023	15.082	1258	4.967	7.760
G114A	55 2.0	160 53.0	81 325	862.	1435	0.027	17.758	1455	3.781	6.199
G115A	54 41.5	161 32.0	81 325	1221.	1828	0.024	15.844	1908	4.205	6.372
G116A	54 33.5	161 23.0	81 325	1107.	2206	0.022	14.984	2235	2.959	6.164
G117A	54 25.2	161 14.0	81 326	949.	215	0.022	14.971	245	5.229	5.229
G118A	54 16.9	161 4.0	81 326	1862.	523	0.024	15.744	554	4.907	2.653
G119A	54 0.0	160 45.0	81 326	2357.	931	0.025	16.534	1002	5.860	2.676
G120A	53 44.0	161 30.0	81 326	2130.	1346	0.026	17.120	1415	4.389	2.100
G121A	54 3.0	161 52.0	81 326	1577.	1754	0.026	17.572	1823	5.299	2.535
G122A	54 8.5	161 58.0	81 326	951.	1950	0.025	16.671	2019	4.785	5.500
G123A	54 17.0	162 8.0	81 326	1176.	2151	0.023	15.082	2218	3.434	9.540
G124A	54 25.7	162 15.0	81 327	985.	30	0.023	15.618	58	4.455	4.125
G125A	54 37.0	162 33.0	81 327	1109.	320	0.023	15.372	359	4.381	3.947
G126A	54 30.0	163 23.0	81 327	995.	722	0.025	16.854	753	3.572	6.158
G127A	54 20.0	163 19.0	81 327	883.	911	0.024	15.998	942	4.164	10.957
G128A	54 12.7	163 5.0	81 327	1062.	1131	0.025	16.456	1201	4.955	11.523
G129A	54 3.0	162 54.0	81 327	1587.	1420	0.025	16.692	1448	5.823	2.499
G130A	53 46.5	162 35.0	81 327	1798.	1820	0.023	15.248	1849	5.880	2.985
G131A	57 53.4	154 44.0	81 330	644.				205	5.464	2.639
G132A	57 49.8	154 39.0	81 330	625.				330	5.326	2.663
G133A	57 44.2	154 33.0	81 330	515.				500	6.887	3.188

Table 1. (continued)

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G001A	57 20.0	155 52.1	81 312	396.	710	2.040	3.578
G002A	57 16.2	155 37.9	81 312	396.	837	6.980	3.490
G003A	57 13.3	155 22.6	81 312	423.	1120	7.423	3.299
G004A	57 8.9	155 8.5	81 312	470.	1250	12.785	5.811
G005A	57 4.2	154 52.8	81 312	492.	1412	4.265	5.687
G006A	57 53.4	154 3.5	81 314	233.	900	8.473	4.507
G007A	57 56.5	154 11.0	81 314	252.	1139	7.445	3.723
G008A	58 0.1	154 20.1	81 314	290.	1311	4.312	2.582
G009A	57 54.0	154 45.2	81 314	365.	1518	7.793	3.403
G010A	57 49.3	154 36.0	81 314	361.	1805	8.279	3.615
G011A	57 44.0	154 24.5	81 315	377.	339	7.340	3.670
G012A	57 43.0	155 6.6	81 315	354.	1031	6.335	3.600
G013A	57 38.9	154 56.7	81 315	320.	1220	9.139	4.154
G014A	57 34.8	154 45.9	81 315	330.	1400	8.557	4.114
G015A	57 22.9	154 58.8	81 316	312.	1906	8.823	3.853
G016A	57 26.2	155 9.2	81 316	333.	2101	17.556	8.606
G017A	57 28.9	155 20.3	81 316	331.	2256	14.249	6.785
G018A	57 30.6	155 32.1	81 317	390.	42	13.187	7.167
G019A	56 51.5	155 9.5	81 317	482.	1228	6.289	4.278
G020A	56 56.4	155 24.7	81 317	430.	1342	6.513	3.131
G021A	56 59.6	155 36.6	81 317	332.	1536	10.472	5.133
G022A	57 5.4	156 0.4	81 318	442.	346	6.968	3.787
G023A	57 2.2	155 47.9	81 318	381.	525	7.833	3.840
G024A	56 50.2	156 10.6	81 318	397.	1639	5.865	3.491
G025A	56 46.8	155 58.9	81 318	320.	1844	6.253	3.006
G026A	56 44.7	155 49.1	81 318	396.	2051	6.898	3.381
G027A	56 40.7	155 33.5	81 318	527.	2242	5.573	2.903
G028A	56 28.5	155 48.1	81 320	364.	1036	4.233	3.848
G029A	56 31.8	156 1.9	81 320	384.	1224	5.425	2.659
G030A	56 39.8	156 30.1	81 320	551.	1446	5.979	3.249
G031A	56 34.9	156 14.6	81 320	420.	1700	3.993	2.322

Table 2.--Data associated with bongo tows during cruise 1MF81, March 12 to March 20, 1981.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G001A	58 19.7	153 54.8	81 330	246.	30	4.684	2.772
G002A	58 17.0	153 46.9	81 330	132.	220	8.687	4.721
G003A	58 14.1	153 39.7	81 330	106.	356	6.629	4.419
G004A	58 11.0	153 32.4	81 330	241.	520	6.668	3.993
G005A	58 8.9	153 24.6	81 330	302.	655	6.436	3.498
G006A	58 10.3	153 47.4	81 330	235.	905	6.300	3.962
G007A	58 5.3	153 55.2	81 330	244.	1045	6.766	3.677
G008A	57 56.0	153 51.9	81 330	208.	1213	6.472	3.425
G009A	57 59.4	153 58.1	81 330	149.	1325	6.806	3.781
G010A	58 2.6	154 6.5	81 330	113.	1445	6.786	3.462
G011A	58 5.4	154 12.4	81 330	161.	1600	4.955	2.678
G012A	57 56.9	154 13.6	81 330	290.	1734	8.041	4.021
G013A	57 52.9	154 24.1	81 330	263.	1900	5.706	2.839
G014A	57 42.1	154 20.7	81 330	205.	2041	6.637	3.708
G015A	57 45.5	154 21.9	81 330	189.	2158	5.877	3.061
G016A	57 48.3	154 34.9	81 330	143.	2330	6.498	3.384
G017A	57 52.5	154 40.6	81 331	154.	100	5.927	2.963
G018A	57 55.9	154 47.4	81 331	56.	215	2.757	7.070
G019A	57 44.3	154 44.2	81 331	222.	345	6.009	3.050
G020A	57 40.1	154 51.6	81 331	213.	513	5.154	3.143
G021A	57 28.8	154 44.6	81 331	240.	715	5.040	4.581
G022A	57 31.8	154 57.8	81 331	133.	2047	6.951	3.391
G023A	57 35.1	154 59.6	81 331	129.	2205	6.177	3.251
G024A	57 38.8	155 8.5	81 331	105.	2335	5.870	3.207
G025A	57 41.7	155 14.9	81 4 1	103.	50	6.397	2.908
G026A	57 35.1	155 19.2	81 4 1	116.	211	6.501	3.126
G027A	57 24.2	154 56.1	81 4 1	179.	445	6.082	3.168
G028A	57 19.4	155 1.2	81 4 1	192.	647	6.892	3.298
G029A	57 30.6	155 27.2	81 4 2	124.	104	7.354	3.143
G030A	57 29.5	155 42.0	81 4 2	125.	407	3.871	11.060
G031A	57 26.0	155 34.9	81 4 2	98.	238	6.099	3.050
G032A	57 22.5	155 29.7	81 4 1	140.	2322	5.885	2.616
G033A	57 19.6	155 22.5	81 4 1	204.	2214	6.553	2.864
G034A	57 14.3	155 13.9	81 4 1	114.	911	6.550	3.033
G035A	57 10.9	155 8.0	81 4 1	140.	1017	6.178	2.970
G036A	57 6.6	154 59.9	81 4 1	179.	1134	4.491	2.974
G037A	57 4.0	154 52.9	81 4 1	147.	1235	5.664	8.990
G038A	57 0.5	154 46.7	81 4 1	130.	1329	3.407	9.207
G039A	56 56.1	154 39.9	81 4 1	197.	1427	2.269	16.208
G040A	56 55.8	154 57.1	81 4 1	227.	1537	5.633	8.409
G041A	57 9.9	155 22.8	81 4 1	197.	2013	5.656	2.930
G042A	57 20.7	155 43.0	81 4 2	169.	1440	6.690	3.069
G043A	57 16.5	155 52.1	81 4 2	139.	1608	6.210	3.375
G044A	57 5.2	155 29.8	81 4 1	206.	1844	5.439	2.719
G045A	56 50.6	155 4.6	81 4 1	233.	1639	4.727	7.503
G046A	57 11.8	156 1.4	81 4 2	127.	1747	6.239	4.333
G047A	57 8.2	155 55.0	81 4 2	154.	1925	6.519	3.165
G048A	57 4.9	155 48.1	81 4 2	192.	2024	6.353	3.114
G049A	56 59.9	155 39.6	81 4 2	133.	2153	7.252	3.281
G050A	56 56.5	155 32.9	81 4 2	147.	2324	6.906	3.083
G051A	56 52.9	155 26.4	81 4 3	168.	30	6.979	2.995
G052A	56 49.8	155 19.8	81 4 3	151.	150	6.342	3.171
G053A	56 45.8	155 13.0	81 4 3	114.	306	5.586	6.421
G054A	56 42.7	155 6.9	81 4 3	162.	415	5.471	9.272
G055A	56 39.0	155 0.0	81 4 3	235.	510	4.039	18.360
G056A	56 40.3	155 22.2	81 4 3	304.	634	6.104	5.307
G057A	56 54.5	155 47.9	81 4 3	217.	856	7.042	3.386
G058A	57 6.5	156 10.2	81 4 3	204.	1120	4.274	7.772
G059A	57 0.5	156 19.5	81 4 3	225.	1220	5.100	6.801
G060A	56 49.4	155 57.9	81 4 3	201.	1408	6.349	3.052
G061A	56 34.6	155 31.9	81 4 3	284.	1638	6.252	5.532
G062A	56 19.7	155 20.1	81 4 3	341.	1849	4.458	16.510
G063A	56 22.8	155 26.1	81 4 3	488.	1932	4.611	15.372
G065A	56 30.0	155 39.8	81 4 3	199.	2103	6.386	5.366

Table 3.--Data associated with bongo tows during cruise 2MF81, March 30 to April 8, 1981.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G066A	56 33.8	155 47.3	81 4 3	144.	2200	6.811	3.405
G067A	56 37.3	155 53.4	81 4 4	159.	8	6.938	3.320
G068A	56 40.7	156 0.5	81 4 4	193.	124	6.741	3.256
G069A	56 44.6	156 6.8	81 4 4	124.	255	7.259	3.490
G070A	56 48.7	156 12.9	81 4 4	153.	422	6.401	3.721
G071A	56 51.8	156 20.1	81 4 4	186.	537	6.166	4.194
G073A	56 41.4	156 34.8	81 4 4	212.	747	5.880	4.083
G074A	56 37.9	156 28.1	81 4 4	133.	1047	6.043	3.433
G075A	56 39.1	156 18.3	81 4 4	193.	1152	6.165	3.503
G076A	56 34.5	156 20.6	81 4 4	115.	1256	6.037	3.354
G077A	56 29.5	156 14.1	81 4 4	236.	1415	6.943	3.275
G078A	56 25.5	156 7.1	81 4 4	199.	1534	7.012	3.307
G079A	56 28.0	155 53.1	81 4 4	227.	1708	7.446	3.650
G080A	56 21.3	155 58.8	81 4 4	290.	1836	7.171	3.585
G081A	56 44.8	155 41.3	81 4 5	321.	2240	5.877	3.194
G082A	56 57.9	156 3.7	81 4 6	245.	338	6.196	3.178
G083A	56 59.8	155 13.4	81 4 6	302.	1810	7.841	3.548
G084A	57 14.7	155 42.0	81 4 6	111.	2338	6.982	3.357
G085A	57 12.6	155 37.8	81 4 7	167.	50	7.564	3.362
G086A	57 36.4	155 26.8	81 4 7	131.	1916	6.912	3.323
G087A	57 30.1	155 16.6	81 4 7	123.	2039	6.739	3.304
G088A	57 27.9	155 11.0	81 4 7	173.	2147	6.946	3.033
G089A	57 44.0	155 2.0	81 4 8	150.	2154	7.584	3.214
G090A	57 48.0	154 57.3	81 4 8	146.	2014	7.406	3.291
G091A	57 51.9	154 51.1	81 4 8	102.	1843	5.132	3.129

Table 3. (continued)

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B	TIME GMT	STANDARD HAUL FACTORS A	B
G134A	56 56.0	151 30.0	81 416	526.	2056	0.024	16.247	2129	5.591	2.727
G135A	57 4.7	151 39.0	81 417	1209.	410	0.022	14.603	435	5.570	5.515
G136A	57 13.7	151 48.0	81 417	894.	616	0.026	17.512	651	4.604	11.509
G137A	57 22.5	151 56.0	81 417	678.	815	0.023	15.105	846	5.907	9.376
G138A	57 31.2	152 5.0	81 417	375.	1016	0.025	16.773	1048	4.646	10.101
G139A	57 12.0	152 46.0	81 417	436.	1445	0.026	17.407	1515	4.924	4.070
G140A	57 4.2	152 37.0	81 417	852.	1742	0.024	15.895	1813	4.619	5.498
G141A	56 56.0	152 28.0	81 417	848.	2017	0.023	15.176	2044	7.517	4.913
G142A	56 47.2	152 19.0	81 417	525.	2228	0.023	15.469	2256	5.700	5.938
G143A	56 38.6	152 9.0	81 418	695.	34	0.024	16.080	100	6.210	26.999
G144A	56 16.7	152 46.0	81 418	513.	537	0.021	14.245	610	5.246	2.851
G145A	56 25.5	152 57.0	81 418	533.	750	0.024	15.754	831	5.151	13.923
G146A	56 33.8	153 6.0	81 418	952.	1023	0.024	15.802	1100	3.220	3.578
G147A	56 42.5	153 15.0	81 418	505.	1318	0.028	18.371	1721	5.422	3.873
G148A	56 51.2	153 24.0	81 418	811.	1916	0.021	14.072	1944	6.031	4.075
G149A	56 24.0	153 58.0	81 418	989.	2345	0.025	16.363	13	5.517	11.034
G150A	56 15.3	153 49.0	81 419	501.	140	0.025	16.671	208	5.999	6.382
G151A	56 6.5	153 40.0	81 419	557.	405	0.026	17.154	430	5.793	3.033
G152A	55 57.8	153 31.0	81 419	892.	646	0.025	16.409	717	8.120	3.147
G153A	56 0.0	154 32.0	81 419	531.	1155	0.026	17.285	1227	4.261	2.582
G154A	56 8.5	154 41.0	81 419	542.	1435	0.026	17.171	1635	3.685	4.440
G155A	56 16.0	154 57.0	81 419	1081.	1815	0.023	15.301	1845	5.253	26.263
G156A	56 27.7	155 0.0	81 419	873.	2008	0.023	15.632	2034	3.133	31.330
G157A	56 38.5	155 24.0	81 419	1590.	2335	0.024	16.322	2	5.400	5.806
G158A	56 46.5	154 35.0	81 420	849.	258	0.024	16.196	326	3.976	26.507
G159A	56 54.5	154 46.0	81 420	858.	445	0.024	16.302	513	3.291	13.711
G160A	57 2.8	154 56.0	81 420	1034.	652	0.024	16.261	720	3.559	7.909
G161A	57 16.0	155 13.0	81 420	585.	951	0.025	16.639	1022	4.951	3.153
G162A	57 24.2	155 23.0	81 420	783.	1229	0.025	16.409	1300	6.586	3.092
G163A	57 32.5	155 35.0	81 420	628.	1500	0.021	14.249	1530	3.493	3.528
G164A	57 11.0	156 3.0	81 420	720.	2122	0.023	15.252	2149	6.321	7.023
G165A	57 3.0	155 53.0	81 421	804.	0	0.025	16.682	29	6.314	3.095
G166A	56 54.8	155 42.0	81 421	1188.	310	0.022	14.817	338	6.569	3.204
G167A	56 50.0	156 35.0	81 421	799.	848	0.027	17.968	916	4.784	6.738
G168A	56 41.0	156 26.0	81 421	887.	1119	0.026	17.554	1149	5.086	3.413
G169A	56 33.0	156 16.0	81 421	1297.	1415	0.027	17.825	1445	4.977	2.962
G170A	56 16.0	155 58.0	81 421	1807.	1747	0.025	16.348	1816	6.818	3.746
G171A	55 59.0	155 39.0	81 421	1385.	2051	0.025	16.623	2118	5.117	15.989
G172A	55 49.0	155 27.0	81 421	625.	2341	0.025	16.523	16	6.769	25.069
G173A	55 40.4	155 19.0	81 422	544.	425	0.026	17.314	450	6.075	3.574
G174A	55 12.7	155 49.0	81 422	1505.	1130	0.028	18.861	1201	6.355	3.115
G175A	55 29.5	156 8.0	81 422	1735.	1450	0.026	17.401	1521	6.128	3.295
G176A	55 46.0	156 27.0	81 422	1245.	1825	0.026	17.354	1851	6.607	3.287
G177A	55 54.0	156 36.0	81 422	954.	2040	0.017	11.340	2117	7.414	3.634
G178A	56 11.0	156 55.0	81 422	665.	2357	0.025	16.570	25	6.578	7.475
G179A	56 20.0	157 8.0	81 423	927.	212	0.024	16.332	240	5.616	3.873
G180A	56 27.9	157 14.0	81 423	519.	416	0.026	17.638	443	5.975	3.643
G181A	56 11.8	157 54.0	81 423	934.	754	0.031	20.963	823	5.529	7.471
G182A	55 58.5	157 40.0	81 423	1114.	1038	0.029	19.391	1107	4.572	8.466
G183A	55 50.0	157 31.0	81 423	939.	1253	0.028	18.600	1322	6.570	6.704
G184A	55 41.2	157 21.0	81 423	507.	1520	0.026	17.286	1550	5.946	6.914
G185A	55 32.4	157 12.0	81 423	1270.	1856	0.026	17.445	1923	5.689	8.367
G186A	55 15.0	156 54.0	81 423	1554.	2218	0.030	19.992	2257	5.788	6.577
G187A	54 50.8	157 31.0	81 424	1232.	335	0.030	19.683	404	5.218	2.948
G188A	55 5.4	157 47.0	81 424	1231.	624	0.029	19.303	651	6.893	11.118
G189A	55 13.5	157 56.0	81 424	905.	857	0.057	38.177	821	6.245	10.238
G190A	55 22.0	158 5.0	81 424	528.	1039	0.046	30.904	1108	5.257	6.112
G191A	55 30.0	158 14.0	81 424	887.	1251	0.041	27.132	1319	5.076	4.928
G192A	55 38.7	158 24.0	81 424	875.	1525	0.037	24.540	1552	5.820	5.389
G193A	55 46.3	158 33.0	81 424	775.	1924	0.039	26.204	2005	6.501	7.144

Table 4.--Data associated with bongo and neuston tows during cruise 2SH81, April 16 to April 24, 1981.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G001A	58 8.7	153 24.5	81 426	338.	1611	7.417	3.566
G002A	58 11.9	153 31.9	81 426	283.	2253	5.472	3.109
G003A	58 14.2	153 39.3	81 427	249.	25	6.702	3.851
G004A	58 17.6	153 55.4	81 427	135.	145	6.960	3.762
G005A	58 19.8	153 54.8	81 427	84.	557	8.194	3.046
G006A	58 11.1	153 56.2	81 427	240.	810	6.992	3.759
G007A	58 5.1	153 55.2	81 427	265.	935	6.797	3.468
G008A	57 55.3	153 52.3	81 427	336.	1124	8.491	3.968
G009A	57 59.4	153 58.5	81 427	147.	1243	6.769	3.719
G010A	58 2.8	154 6.5	81 427	113.	1404	7.806	3.771
G011A	58 5.3	154 12.6	81 427	149.	1542	7.864	3.799
G012A	57 57.0	154 13.3	81 427	317.	1935	7.229	3.972
G013A	57 53.3	154 24.0	81 427	292.	2105	7.343	3.547
G014A	57 41.8	154 21.1	81 428	392.	45	7.107	3.821
G015A	57 46.3	154 27.9	81 428	172.	207	5.937	3.710
G016A	57 49.1	154 34.5	81 428	93.	330	6.780	3.442
G017A	57 51.7	154 40.6	81 428	158.	455	6.556	3.415
G018A	57 55.0	154 48.0	81 428	276.	630	6.414	7.372
G019A	57 44.0	154 44.0	81 428	278.	800	6.972	3.486
G020A	57 40.3	154 50.5	81 428	260.	939	6.988	3.360
G021A	57 43.2	155 14.5	81 428	243.	1137	6.551	3.412
G022A	57 39.0	155 7.3	81 428	173.	1313	7.778	3.411
G023A	57 35.0	155 1.4	81 428	161.	1446	7.547	3.354
G024A	57 31.5	154 54.3	81 428	163.	1605	4.307	2.175
G025A	57 34.8	155 17.5	81 428	292.	1859	6.357	3.178
G026A	57 31.3	155 27.5	81 428	302.	2030	6.994	3.238
G027A	57 29.5	155 43.2	81 429	243.	8	2.777	11.572
G028A	57 26.4	155 35.6	81 429	142.	55	6.316	2.910
G029A	57 22.4	155 28.1	81 429	196.	228	6.541	3.354
G030A	57 21.1	155 44.5	81 429	259.	410	4.750	2.424
G031A	57 16.9	155 53.0	81 429	253.	600	6.821	3.217
G032A	57 11.8	156 1.1	81 429	152.	730	6.122	4.164
G033A	57 7.9	155 55.3	81 429	216.	846	8.268	3.675
G034A	57 6.6	156 10.1	81 429	272.	1026	4.063	10.419
G035A	57 0.8	156 19.7	81 429	305.	1136	4.758	6.608
G036A	56 52.1	156 20.4	81 429	197.	1252	6.145	3.865
G037A	56 42.3	156 35.3	81 429	229.	1456	6.911	4.214
G038A	56 37.5	156 29.0	81 429	136.	1643	7.521	3.917
G039A	56 39.8	156 17.2	81 429	248.	1808	6.952	4.163
G040A	56 48.9	156 13.6	81 429	214.	2105	7.391	4.106
G041A	56 44.7	156 6.3	81 429	124.	2212	7.404	3.526
G042A	56 49.9	155 57.1	81 429	240.	2340	7.512	3.446
G043A	56 54.9	155 49.1	81 430	308.	105	7.465	3.589
G044A	57 3.9	155 47.9	81 430	225.	525	7.470	3.735
G045A	57 0.1	155 39.5	81 430	142.	700	7.743	3.687

Table 5.--Data associated with bongo tows during cruise 3MF81, April 26 to April 30, 1981.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G046A	57 5.1	155 30.5	81 430	318.	827	7.205	3.532
G047A	57 10.0	155 22.3	81 430	276.	950	7.822	3.760
G048A	57 18.5	155 21.8	81 430	199.	1128	8.147	3.755
G049A	57 28.0	154 45.6	81 430	181.	1425	6.079	5.845
G050A	57 24.2	154 56.0	81 430	280.	1533	7.218	3.573
G051A	57 19.3	155 5.2	81 430	291.	1656	7.650	3.679
G052A	57 14.4	155 15.1	81 430	126.	1820	7.277	3.498
G053A	57 10.7	155 7.5	81 430	195.	1937	7.230	3.475
G054A	57 7.3	155 0.4	81 430	314.	2110	7.348	3.827
G055A	57 3.5	154 53.5	81 430	180.	2200	6.318	9.157
G056A	57 0.2	154 46.2	81 430	103.	2255	5.305	12.632
G057A	56 56.5	154 39.7	81 430	388.	2345	5.034	20.976
G058A	56 55.9	154 55.8	81 5 1	269.	45	5.239	11.389
G059A	56 50.8	155 5.2	81 5 1	296.	158	6.462	9.232
G060A	56 56.3	155 32.4	81 5 1	184.	330	7.467	3.573
G061A	56 52.8	155 26.3	81 5 1	280.	445	6.792	3.519
G062A	56 49.9	155 19.4	81 5 1	181.	600	7.537	3.641
G063A	56 46.3	155 12.6	81 5 1	120.	710	6.697	6.765
G064A	56 43.0	155 6.4	81 5 1	139.	807	5.549	10.090
G065A	56 39.2	154 59.8	81 5 1	235.	854	5.737	24.944
G066A	56 40.5	155 22.7	81 5 1	352.	1021	6.708	6.044
G067A	56 35.3	155 31.9	81 5 1	231.	1135	5.877	4.817
G068A	56 18.8	155 19.2	81 5 1	282.	1338	2.576	11.198
G069A	56 22.9	155 26.9	81 5 1	524.	1436	3.876	9.938
G070A	56 26.8	155 32.8	81 5 1	184.	1527	4.255	8.510
G071A	56 31.0	155 39.6	81 5 1	110.	1643	6.817	5.368
G072A	56 34.5	155 46.1	81 5 1	165.	1731	7.088	3.343
G073A	56 37.7	155 53.3	81 5 1	259.	1847	7.439	3.444
G074A	56 41.3	156 0.1	81 5 1	185.	2005	7.075	3.276
G075A	56 33.8	156 20.8	81 5 1	185.	2208	7.898	3.949
G076A	56 29.1	156 19.5	81 5 1	151.	2320	7.096	3.347
G077A	56 25.3	156 6.4	81 5 2	201.	110	7.064	3.270
G078A	56 28.1	155 53.7	81 5 2	244.	345	6.303	3.105
G079A	56 21.6	155 58.6	81 5 2	312.	500	6.565	3.156

Table 5. (continued)

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G001A	58 9.0	153 24.3	81 520	244.	542	7.558	3.634
G002A	58 11.5	153 32.5	81 520	222.	658	6.855	4.130
G003A	58 14.5	153 39.4	81 520	123.	808	6.765	4.075
G004A	58 16.7	153 48.7	81 520	132.	906	7.078	3.868
G005A	58 19.6	153 54.5	81 520	257.	1032	7.348	4.899
G006A	58 10.1	153 47.7	81 520	217.	1207	8.121	3.905
G007A	58 6.1	153 54.5	81 520	249.	1320	7.440	3.958
G008A	57 56.1	153 50.5	81 520	275.	1458	8.114	3.688
G009A	57 59.5	153 58.0	81 520	159.	1626	6.109	3.748
G010A	58 2.9	154 6.0	81 520	121.	1805	7.045	3.387
G011A	58 5.3	154 11.9	81 520	189.	1916	7.389	3.553
G012A	57 56.9	154 13.0	81 520	469.	2058	7.736	3.967
G014A	57 43.3	154 20.9	81 521	195.	3	7.975	4.583
G015A	57 45.7	154 27.8	81 521	205.	121	7.590	3.974
G016A	57 48.4	154 31.5	81 521	170.	228	7.485	3.598
G017A	57 52.0	154 40.8	81 521	255.	345	6.901	3.318
G018A	57 54.9	154 48.0	81 521	235.	456	7.257	3.115
G019A	57 44.6	154 43.8	81 521	241.	641	7.347	3.532
G020A	57 40.0	154 51.3	81 521	270.	759	7.471	3.592
G021A	57 28.5	154 45.3	81 521	127.	946	7.115	5.647
G022A	57 32.1	154 54.5	81 521	155.	1054	7.905	3.677
G023A	57 35.2	154 59.2	81 521	131.	1210	7.680	3.692
G024A	57 39.1	155 7.4	81 521	164.	1336	7.260	3.490
G025A	57 42.6	155 14.0	81 521	204.	1506	7.480	3.596
G026A	57 34.3	155 17.1	81 521	285.	1642	7.301	3.510
G027A	57 30.2	155 26.5	81 121	288.	1802	7.229	3.476
G028A	57 29.5	155 43.0	81 521	185.	1946	5.807	8.933
G029A	57 24.8	155 37.0	81 521	118.	2028	7.356	3.537
G030A	57 22.7	155 28.5	81 521	175.	2151	7.252	3.487
G031A	57 18.7	155 22.7	81 521	187.	2317	7.551	3.630
G032A	57 23.9	154 57.3	81 522	251.	118	7.211	3.467
G033A	57 18.6	155 5.6	81 522	280.	239	6.803	3.271
G034A	57 14.3	155 14.3	81 522	130.	407	7.105	3.416
G035A	57 10.9	155 8.0	81 522	431.	517	6.961	3.347
G038A	57 1.5	154 47.5	81 522	173.	832	5.139	10.278
G039A	56 56.8	154 40.0	81 522	198.	930	5.274	22.931
G040A	56 55.8	154 55.9	81 522	313.	1033	7.270	9.825
G041A	56 50.9	155 4.5	81 522	347.	1133	6.555	8.513
G042A	56 39.8	155 0.0	81 522	258.	1255	2.665	13.326
G043A	56 42.6	155 5.9	81 522	177.	1345	5.286	9.113
G044A	56 46.2	155 12.9	81 522	121.	1430	6.300	5.527
G045A	56 49.5	155 19.4	81 522	148.	1532	7.269	3.495
G046A	56 52.8	155 25.2	81 522	273.	1655	7.129	3.427
G047A	56 56.3	155 32.4	81 522	215.	1800	7.287	3.504
G048A	57 10.5	155 24.2	81 522	407.	2014	7.135	3.430

Table 6.--Data associated with bongo tows during cruise 4MF81, May 20 to May 24, 1981.

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA KM2	TIME GMT	STANDARD HAUL FACTORS A	B
G050A	57 0.1	155 39.0	81 522	175.	2308	6.997	3.364
G051A	57 4.5	155 47.6	81 523	269.	33	7.597	3.652
G052A	57 8.0	155 54.4	81 523	166.	155	7.526	3.618
G053A	57 20.8	155 44.3	81 523	246.	356	7.710	3.707
G054A	57 15.8	155 52.6	81 523	252.	518	7.212	3.467
G055A	57 11.2	156 1.2	81 523	117.	634	7.065	4.679
G056A	57 6.1	156 9.6	81 523	290.	740	6.491	9.142
G057A	57 0.9	156 18.4	81 523	251.	830	7.642	8.990
G058A	56 49.8	155 57.1	81 523	317.	1022	7.118	3.422
G059A	56 54.8	155 47.6	81 523	316.	1155	7.124	3.425
G060A	56 40.4	155 22.0	81 523	299.	1454	6.772	5.551
G061A	56 35.3	155 31.5	81 523	330.	1611	7.262	4.809
G062A	56 18.7	155 19.1	81 523	383.	1827	4.315	18.762
G063A	56 22.8	155 26.8	81 523	315.	1915	4.625	20.110
G064A	56 26.8	155 33.3	81 523	202.	1955	4.946	11.777
G065A	56 30.0	155 40.0	81 523	121.	2149	6.874	5.412
G066A	56 34.0	155 45.5	81 523	142.	2236	7.213	3.468
G067A	56 37.1	155 52.7	81 523	239.	2350	7.579	3.644
G068A	56 40.5	156 0.5	81 524	182.	112	7.374	3.545
G069A	56 45.0	156 6.2	81 524	189.	234	7.798	3.749
G071A	56 52.1	156 19.5	81 524	265.	457	7.586	4.542
G072A	56 42.0	156 35.1	81 524	221.	635	7.097	4.301
G073A	56 37.5	156 28.0	81 524	112.	744	7.420	4.055
G074A	56 39.1	156 17.1	81 524	215.	855	8.007	4.170
G075A	56 33.7	156 21.4	81 524	117.	1015	7.799	4.062
G076A	56 29.5	156 14.8	81 524	167.	1119	8.040	3.865
G077A	56 25.8	156 6.8	81 524	212.	1252	7.708	3.706
G078A	56 28.2	155 53.2	81 524	196.	1423	7.393	3.554
G079A	56 21.2	155 58.4	81 524	155.	1550	7.373	3.687
G080A	56 16.7	155 50.1	81 524	267.	1706	6.662	8.766

Table 6. (continued)

STATION	POSITION LAT. N.	LONG. W.	DATE YYMMDD	AREA MM2	TIME GMT	STANDARD HAUL FACTORS A	B
G194A	56 30.0	152 0.0	81 520	793.	1848	6.870	3.319
G195A	56 38.5	152 9.0	81 520	910.	2312	8.257	37.533
G196A	56 47.2	152 19.0	81 521	838.	54	6.184	6.722
G197A	56 55.8	152 28.0	81 521	792.	240	6.796	4.195
G198A	57 4.3	152 37.0	81 521	922.	421	4.280	3.963
G199A	57 12.0	152 45.0	81 521	384.	615	5.232	5.285
G200A	56 53.2	153 23.0	81 521	866.	1015	5.321	4.190
G201A	56 42.3	153 14.0	81 521	1101.	1219	5.897	4.607
G202A	56 33.8	153 5.0	81 521	837.	1415	4.842	7.120
G203A	56 25.2	152 57.0	81 521	926.	1537	4.486	12.817
G204A	56 16.8	152 48.0	81 521	860.	1726	5.973	2.928
G205A	56 0.0	153 31.0	81 522	773.	855	5.239	2.878
G206A	56 8.7	153 41.0	81 522	864.	1119	5.095	2.962
G207A	56 15.2	153 49.0	81 522	929.	1405	6.222	6.549
G208A	56 23.8	153 58.0	81 522	981.	1756	4.829	12.708
G209A	56 0.0	154 37.0	81 523	821.	225	4.754	2.641
G210A	56 8.0	154 46.7	81 523	867.	406	5.534	5.764
G211A	56 15.5	154 57.0	81 523	861.	557	4.048	21.304
G212A	56 23.5	155 6.0	81 523	821.	732	5.149	24.518
G213A	56 30.0	155 14.0	81 523	762.	853	5.024	17.325
G214A	56 38.0	155 25.0	81 523	1362.	1035	4.951	5.157
G215A	56 46.5	154 34.0	81 523	862.	1821	6.561	21.869
G216A	56 54.8	154 46.0	81 523	1222.	1950	4.690	15.131
G217A	57 3.0	154 56.0	81 523	828.	2123	5.754	6.187
G218A	57 16.4	155 13.1	81 524	1171.	517	5.314	3.002
G219A	57 24.5	155 24.0	81 524	680.	746	6.847	3.261
G220A	57 32.5	155 35.0	81 524	473.	946	6.055	11.645
G221A	57 11.0	156 4.0	81 524	788.	1343	5.867	5.987
G222A	57 2.8	155 53.0	81 524	778.	1524	6.440	3.236
G223A	56 54.8	155 42.0	81 524	1214.	1729	6.311	3.203
G224A	56 48.8	156 35.0	81 525	502.	245	5.528	8.775
G225A	56 40.8	156 24.0	81 525	930.	415	5.522	3.211
G226A	56 32.0	156 15.0	81 525	937.	612	7.068	3.366
G227A	56 23.2	156 6.0	81 525	935.	812	7.559	3.405
G228A	56 14.5	155 56.0	81 525	914.	1007	5.320	4.626
G229A	56 6.0	155 46.0	81 525	1308.	1205	4.937	10.971
G230A	55 49.0	155 27.0	81 525	767.	1515	4.706	24.770
G231A	55 40.0	155 18.0	81 525	847.	1651	6.011	3.164
G232A	55 29.5	156 8.0	81 525	1109.	2134	6.603	3.386
G233A	55 20.5	155 58.0	81 525	842.	2345	7.803	3.596
G234A	55 15.0	156 53.0	81 526	1675.	335	5.782	6.966
G235A	54 50.8	157 31.0	81 526	1582.	735	6.787	3.311
G236A	55 7.5	157 50.0	81 526	1349.	1040	7.031	9.251
G237A	55 16.0	157 59.0	81 526	933.	1227	6.041	8.630
G238A	55 24.8	158 9.0	81 526	912.	1404	5.753	5.327
G239A	55 33.0	158 18.0	81 526	896.	1540	6.079	4.712
G240A	55 41.8	158 28.0	81 526	775.	1725	6.354	5.124
G241A	55 48.2	158 35.0	81 526	854.	1857	6.007	8.010
G242A	56 3.8	157 45.0	81 526	898.	2303	5.813	5.237
G243A	55 55.5	157 36.0	81 527	751.	52	6.410	8.662
G244A	55 48.0	157 32.0	81 527	1291.	220	6.299	6.701
G245A	55 32.0	157 12.0	81 527	1719.	820	5.936	8.730
G246A	55 54.5	156 36.0	81 527	1313.	1201	5.423	2.947
G247A	55 42.0	156 23.0	81 527	1350.	1458	6.782	3.169
G248A	56 11.0	156 55.0	81 527	874.	2031	5.632	8.405
G249A	56 19.4	157 4.0	81 527	856.	2221	6.942	4.108
G250A	56 27.1	157 13.0	81 528	513.	4	6.566	5.427

Table 7.--Data associated with bongo tows during cruise 3SH81, May 20 to May 28, 1981.

STAGE: EGG

	GEAR: NEUSTON OCCUR. %	NEUSTON LOG NO. IN AREA	GEAR: BONGO OCCUR. %	BONGO LOG NO. IN AREA
LEUROGLOSSUS SCHMIDTI			4.58	9.8761
THERAGRA CHALCOGRAMMA	4.62	7.2580	15.27	11.4390
PLEURONECTIDAE	0.77	6.2762	2.29	9.7736
LIMANDA ASPERA	0.77	6.6756		
MICROSTOMUS PACIFICUS			0.76	8.7291

STAGE: LARVAE

	GEAR: NEUSTON OCCUR. %	NEUSTON LOG NO. IN AREA	GEAR: BONGO OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED			0.76	8.7291
DISINTEGRATED	6.15	8.5068	0.76	9.5529
OSMERIDAE	0.77	6.8513	3.82	9.4843
MALLOTUS VILLOSUS	7.69	8.6107	17.56	10.5095
BATHYLAGIDAE			1.53	9.5581
BATHYLAGUS SP.			0.76	9.4478
BATHYLAGUS PACIFICUS			3.82	9.6823
LEUROGLOSSUS SCHMIDTI			16.79	10.6627
STENOBRACHIUS LEUCOPSARUS			10.69	10.2943
PROTOMYCTOPHUM THOMPSONI			3.82	9.4475
THERAGRA CHALCOGRAMMA			1.53	9.2714
MACROURIDAE			0.76	8.8263
HEXAGRAMMOS SP.	0.77	6.2706		
HEXAGRAMMOS DECAGRAMMUS	70.00	9.4472	6.87	10.3388
HEXAGRAMMOS LAGOCEPHALUS	2.31	7.2035		
HEXAGRAMMOS OCTOGRAMMUS	8.46	7.5572		
HEXAGRAMMOS STELLERI	16.92	8.1353	0.76	8.7158
PLEUROGRAMMUS MONOPTERYGIUS	23.85	8.5884	0.76	9.1773
COTTIDAE			6.87	10.1735
HEMILEPIDOTUS SP.	24.62	9.0452	14.50	10.1427
HEMILEPIDOTUS HEMILEPIDOTUS	2.31	8.2077		
HEMILEPIDOTUS JORDANI	3.08	7.7628		
HEMILEPIDOTUS SPINOSUS			0.76	8.7158
MALACOCOTTUS ZONURUS 1			2.29	9.3622
TRIGLOPS SP.			1.53	9.1028
CYCLOPTERIDAE			3.82	9.6799
BATHYMASTER SP.	3.08	7.0335		
STICHAEIDAE	1.54	6.8173		
CHIROLOPHIS SP.			1.53	8.8708
CHIROLOPHIS DECORATUS	1.54	7.0803		
LUMPENUS SAGITTA			3.05	10.0245
LYCONECTES ALEUTENSIS	0.77	6.3288	0.76	8.7342
PHOLIS SP.			0.76	8.6143
AMMODYTES HEXAPTERUS	5.38	8.2877	67.18	12.2669
ATHERESTHES STOMIAS			11.45	10.4083
LEPIDOPSETTA BILINEATA			3.05	9.3116
HIPPOGLOSSUS STENOLEPIS			5.34	9.8470

Table 8.--Fish eggs and larvae collected in bongo and neuston tows during cruise 1SH81, March 3 to March 30, 1981.

STAGE: EGG

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
THERAGRA CHALCOGRAMMA	80.65	11.0609

STAGE: LARVAE

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
MALLOTUS VILLOSUS	9.68	9.5004
LAMPANYCTUS SP.	3.23	8.3191
HEXAGRAMMOS DECAGRAMMUS	22.58	9.3992
HEMILEPIDOTUS HEMILEPIDOTUS	6.45	8.5777
HEMILEPIDOTUS JORDANI	3.23	8.3191
CYCLOPTERIDAE	9.68	9.1555
CHIROLOPHIS DECORATUS	6.45	8.7001
AMMODYTES HEXAPTERUS	83.87	11.1825

Table 9.--Fish eggs and larvae collected in bongo tows during cruise 1MF81, March 12 to March 20, 1981.

STAGE: EGG

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED	1.12	8.0621
THERAGRA CHALCOGRAMMA	92.13	13.4707

STAGE: LARVAE

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
DISINTEGRATED	2.25	7.9930
MALLOTUS VILLOSUS	15.73	9.5016
STENOBRACHIUS LEUCOPSARUS	3.37	8.5920
THERAGRA CHALCOGRAMMA	23.60	10.0045
HEXAGRAMMOS DECAGRAMMUS	33.71	9.8144
COTTIDAE	2.25	8.2932
ARTEDIUS SP.	1.12	7.9008
ARTEDIUS MEANYI	1.12	7.8460
GYMNOCANTHUS A	1.12	8.1821
HEMILEPIDOTUS SP.	6.74	8.8731
HEMITRIPTERUS SP.	1.12	7.8198
MALACOCOTTUS ZONURUS 1	1.12	8.0333
MYOXOCEPHALUS SP.	1.12	7.9463
CYCLOPTERIDAE	1.12	8.1821
STICHAEIDAE	2.25	8.4395
CHIROLOPHIS DECORATUS	2.25	8.3979
LUMPENELLA LONGIROSTRIS	1.12	8.3808
LUMPENUS SAGITTA	13.48	9.2938
LUMPENUS MACULATUS	5.62	8.5866
DELOLEPIS GIGANTEA	1.12	8.0333
LYCONECTES ALEUTENSIS	3.37	8.5674
PHOLIS SP.	5.62	9.2471
AMMODYTES HEXAPTERUS	93.26	11.3372
LEPIDOPSETTA BILINEATA	1.12	9.6113

Table 10.--Fish eggs and larvae collected in bongo tows during cruise 2MF81, March 30 to April 8, 1981.

STAGE: EGG

	GEAR: NEUSTON OCCUR. %	NEUSTON LOG NO. IN AREA	GEAR: BONGO OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED			3.33	8.8838
TELEOST TYPE A	6.67	7.2706		
DISINTEGRATED			1.67	8.8600
LEUROGLOSSUS SCHMIDTI			1.67	8.8081
THERAGRA CHALCOGRAMMA	35.00	8.7789	51.67	13.0109
MACROURIDAE			1.67	9.4621
PLEURONECTIDAE	10.00	7.6519	13.33	10.0785
GLYPTOCEPHALUS ZACHIRUS	1.67	6.6559	5.00	9.9833
HIPPOGLOSSOIDES ELASSODON	15.00	8.1627	20.00	10.5400
ISOPSETTA ISOLEPIS	1.67	6.5997	1.67	8.7542
MICROSTOMUS PACIFICUS	5.00	7.2148	1.67	8.8081
PLATICHTHYS STELLATUS			3.33	8.5899
PLEURONECTES QUADRITUBERCULATU	3.33	6.7769	3.33	9.1302

STAGE: LARVAE

	GEAR: NEUSTON OCCUR. %	NEUSTON LOG NO. IN AREA	GEAR: BONGO OCCUR. %	BONGO LOG NO. IN AREA
DISINTEGRATED	1.67	7.3950	13.33	9.9533
MALLOTUS VILLOSUS	18.33	8.4298	8.33	9.3837
LEUROGLOSSUS SCHMIDTI			13.33	10.1667
STENOBRACHIUS LEUCOPSARUS			8.33	9.6804
GADIDAE	1.67	6.9364	6.67	10.3131
GADUS MACROCEPHALUS			23.33	10.8182
THERAGRA CHALCOGRAMMA	5.00	8.1280	60.00	12.9951
MACROURIDAE			1.67	8.6803
SEBASTES SP.			3.33	9.3691
ANOPLOPOMA FIMBRIA	3.33	6.8274	1.67	8.6803
HEXAGRAMMOS DECAGRAMMUS	76.67	9.3699	5.00	9.9666
HEXAGRAMMOS LAGOCEPHALUS	3.33	6.6563		
HEXAGRAMMOS STELLERI	8.33	7.2549		
PLEUROGRAMMUS MONOPTERYGIUS	5.00	7.5866		
COTTIDAE	3.33	6.5032	26.67	10.3359
ARTEDIUS HARRINGTONI			5.00	9.3862
ARTEDIUS MEANYI			1.67	8.7370
DASYCOTTUS SETIGER			5.00	9.1340
GYMNOCANTHUS A			5.00	9.2922
HEMILEPIDOTUS SP.	13.33	7.8225	3.33	8.8000
HEMILEPIDOTUS HEMILEPIDOTUS	20.00	8.2858		
HEMILEPIDOTUS JORDANI	6.67	7.5437		
MALACOCOTTUS ZONURUS 1			1.67	9.0450
MYOXOCEPHALUS SP.			3.33	8.9208
MYOXOCEPHALUS B			3.33	9.2570
RADULINUS ASPRELLUS			1.67	8.7542
TRIGLOPS SP.			1.67	8.7521
AGONIDAE			8.33	9.7391
AGONIDAE A			1.67	8.8504
AGONIDAE C			1.67	9.0597
CYCLOPTERIDAE			8.33	9.3305
BATHYMASTER SP.	3.33	7.0808	16.67	10.0225
STICHAEIDAE	13.33	7.7340	18.33	10.2372
LUMPENELLA LONGIROSTRIS	1.67	6.3708	1.67	9.1677
LUMPENUS SAGITTA			1.67	8.7057
LUMPENUS MACULATUS			23.33	10.3042
POROCLINUS ROTHROCKI			1.67	8.9286
DELOLEPIS GIGANTEA	6.67	7.5836	1.67	8.5947
LYCONECTES ALEUTENSIS	31.67	8.4724	3.33	8.6377
PHOLIS SP.			1.67	8.2410
ZAPRORA SILENUS	1.67	6.9569	3.33	9.0027
AMMODYTES HEXAPTERUS	1.67	7.1096	95.00	11.6610
ATHERESTHES SP.			1.67	9.1574
ATHERESTHES STOMIAS			10.00	9.9364
LEPIDOPSETTA BILINEATA			51.67	11.1054
PSETTICHTHYS MELANOSTICTUS			3.33	9.0156
HIPPOGLOSSUS STENOLEPIS			13.33	9.9533

Table 11.--Fish eggs and larvae collected in bongo and neuston tows during cruise 2SH81, April 16 to April 24, 1981.

STAGE: EGG

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED	3.80	9.1018
DISINTEGRATED	1.27	8.1892
THERAGRA CHALCOGRAMMA	96.20	12.2481
PLEURONECTIDAE	16.46	10.2920
HIPPOGLOSSOIDES ELASSODON	73.42	11.1240
ISOPSETTA ISOLEPIS	2.53	8.6939
PLATICHTHYS STELLATUS	2.53	8.8210
PLEURONECTES QUADRITUBERCULATU	27.85	9.7230

STAGE: LARVAE

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED	5.06	8.9165
TELEOST TYPE A	1.27	8.7300
DISINTEGRATED	18.99	9.8047
MALLOTUS VILLOSUS	10.13	9.3402
LEUROGLOSSUS SCHMIDTI	1.27	8.2244
STENOBRACHIUS SP.	3.80	9.1264
STENOBRACHIUS LEUCOPSARUS	15.19	9.3852
GADUS MACROCEPHALUS	11.39	9.4979
THERAGRA CHALCOGRAMMA	97.47	13.3901
HEXAGRAMMOS DECAGRAMMUS	18.99	9.7209
COTTIDAE	21.52	9.6552
ARTEDIUS FENESTRALIS	1.27	8.1482
ARTEDIUS HARRINGTONI	5.06	9.0118
ARTEDIUS MEANYI	1.27	8.0100
DASYCOTTUS SETIGER	3.80	8.5487
GYMNOCANTHUS A	3.80	8.6769
MALACOCOTTUS ZONURUS 1	2.53	8.4297
MYOXOCEPHALUS B	11.39	9.3536
RADULINUS ASPRELLUS	1.27	8.6060
AGONIDAE	13.92	9.3070
AGONIDAE C	5.06	8.8467
CYCLOPTERIDAE	20.25	9.7841
NECTOLIPARIS PELAGICUS	1.27	8.3480
BATHYMASTER SP.	8.86	9.2273
STICHAEIDAE	8.86	9.2754
ANOPLARCHUS SP.	6.33	9.2561
CHIROLOPHIS SP.	1.27	8.5563
CHIROLOPHIS NUGATOR	1.27	8.1482
LUMPENELLA LONGIROSTRIS	44.30	10.2178
LUMPENUS SAGITTA	11.39	9.2045
LUMPENUS MACULATUS	34.18	9.7087
DELOLEPIS GIGANTEA	6.33	8.7813
LYCONECTES ALEUTENSIS	13.92	9.3134
PHOLIS SP.	6.33	9.1383
PTILICHTHYS GOODEI	2.53	8.7070
AMMODYTES HEXAPTERUS	96.20	11.4176
HIPPOGLOSSOIDES ELASSODON	18.99	9.6544
LEPIDOPSETTA BILINEATA	46.84	10.2321
PLATICHTHYS STELLATUS	2.53	8.4387
PLEURONECTES QUADRITUBERCULATU	3.80	8.5171
PSETTICHTHYS MELANOSTICTUS	2.53	8.4655
HIPPOGLOSSUS STENOLEPIS	1.27	8.3598

Table 12.--Fish eggs and larvae collected in bongo tows during cruise 3MF81, April 26 to April 30, 1981.

STAGE: EGG

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED	2.67	8.5505
DISINTEGRATED	12.00	9.1941
THERAGRA CHALCOGRAMMA	89.33	11.2888
PLEURONECTIDAE	21.33	10.4922
HIPPOGLOSSOIDES ELASSODON	84.00	10.8118
ISOPSETTA ISOLEPIS	8.00	9.6388
LIMANDA ASPERA	4.00	8.9575
PLATICHTHYS STELLATUS	5.33	8.8904
PLEURONECTES QUADRITUBERCULATU	1.33	7.9199

STAGE: LARVAE

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED	8.00	8.9017
DISINTEGRATED	16.00	9.5682
CLUPEA HARENGUS PALLASI	8.00	9.5951
MALLOTUS VILLOSUS	1.33	7.9548
BATHYLAGUS SP.	1.33	8.3569
LEUROGLOSSUS SCHMIDTI	1.33	8.3533
STENOBRACHIUS LEUCOPSARUS	8.00	8.9341
GADUS MACROCEPHALUS	41.33	10.1186
THERAGRA CHALCOGRAMMA	100.00	12.7098
MACROURIDAE	1.33	8.1267
SEBASTES SP.	12.00	9.2263
HEXAGRAMMOS DECAGRAMMUS	1.33	8.2888
COTTIDAE	28.00	9.6162
ARTEDIUS FENESTRALIS	2.67	8.4690
ARTEDIUS HARRINGTONI	14.67	9.2965
ARTEDIUS MEANYI	6.67	8.8249
DASYCOTTUS SETIGER	4.00	8.9904
GYMNOCANTHUS A	1.33	8.2771
MALACOCOTTUS ZONURUS 1	5.33	8.8122
MYOXOCEPHALUS SP.	12.00	9.1911
MYOXOCEPHALUS G	1.33	8.2659
NAUTICHTHYS OCULOFASCIATUS	1.33	8.0765
RADULINUS ASPRELLUS	5.33	8.8410
AGONIDAE	36.00	9.7254
CYCLOPTERIDAE	32.00	9.7634
BATHYMASTER SP.	90.67	11.3168
STICHAEIDAE	2.67	8.7816
ANOPLARCHUS SP.	20.00	9.7058
CHIROLOPHIS SP.	1.33	7.9548
LUMPENELLA LONGIROSTRIS	33.33	9.9565
LUMPENUS SAGITTA	5.33	8.7440
LUMPENUS MACULATUS	13.33	9.3277
POROCLINUS ROTHROCKI	8.00	9.3245
STICHAEUS PUNCTATUS	1.33	8.3485
DELOLEPIS GIGANTEA	5.33	8.9469
LYCONECTES ALEUTENSIS	30.67	9.6914
PHOLIS SP.	2.67	8.4108
AMMODYTES HEXAPTERUS	93.33	11.1442
ATHERESTHES STOMIAS	2.67	8.4847
GLYPTOCEPHALUS ZACHIRUS	1.33	8.1673
HIPPOGLOSSOIDES ELASSODON	98.67	11.4036
ISOPSETTA ISOLEPIS	17.33	9.8706
LEPIDOPSETTA BILINEATA	69.33	10.4559
PLATICHTHYS STELLATUS	38.67	10.2405
PLEURONECTES QUADRITUBERCULATU	16.00	9.3015
PSETTICHTHYS MELANOSTICTUS	10.67	9.0775

Table 13.--Fish eggs and larvae collected in bongo tows during cruise 4MF81, May 20 to May 24, 1981.

STAGE: EGG

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
DISINTEGRATED	1.75	8.8598
LEUROGLOSSUS SCHMIDTI	3.51	8.9562
THERAGRA CHALCOGRAMMA	29.82	10.7802
PLEURONECTIDAE	21.05	10.6250
GLYPTOCEPHALUS ZACHIRUS	47.37	11.0395
HIPPOGLOSSOIDES ELASSODON	26.32	10.3603
ISOPSETTA ISOLEPIS	7.02	9.7313
LIMANDA ASPERA	1.75	8.3031
MICROSTOMUS PACIFICUS	40.35	11.2285

STAGE: LARVAE

	GEAR: OCCUR. %	BONGO LOG NO. IN AREA
UNIDENTIFIED	5.26	9.3943
DISINTEGRATED	3.51	9.0669
MALLOTUS VILLOSUS	1.75	8.7510
BATHYLAGUS PACIFICUS	5.26	9.3772
LEUROGLOSSUS SCHMIDTI	12.28	9.7828
STENOBRACHIUS LEUCOPSARUS	7.02	9.5986
GADUS MACROCEPHALUS	26.32	10.4268
THERAGRA CHALCOGRAMMA	68.42	12.8786
MACROURIDAE	1.75	8.9083
SEBASTES SP.	28.07	10.5859
HEXAGRAMMOS OCTOGRAMMUS	1.75	8.8524
COTTIDAE	19.30	10.3566
ARTEDIUS HARRINGTONI	14.04	9.8236
ARTEDIUS MEANYI	1.75	8.8124
DASYCOTTUS SETIGER	1.75	8.8124
GYMNOCANTHUS SP.	3.51	9.2230
HEMILEPIDOTUS HEMILEPIDOTUS	1.75	8.6437
MALACOCOTTUS ZONURUS 2	1.75	8.6437
MYOXOCEPHALUS SP.	8.77	9.6193
MYOXOCEPHALUS B	1.75	8.5492
RADULINUS SP.	1.75	8.5492
RADULINUS ASPRELLUS	10.53	9.6978
TRIGLOPS SP.	1.75	8.8598
ICELUS SP.	1.75	8.6808
AGONIDAE	22.81	10.0136
CYCLOPTERIDAE	19.30	9.9026
BATHYMASTER SP.	85.96	12.2332
STICHAEIDAE	12.28	9.6093
ANOPLARCHUS INSIGNIS	1.75	8.8588
LUMPENELLA LONGIROSTRIS	15.79	9.7855
LUMPENUS SAGITTA	1.75	8.6648
LUMPENUS MACULATUS	5.26	9.1853
POROCLINUS ROTHROCKI	10.53	9.9783
DELOLEPIS GIGANTEA	1.75	8.8288
LYCONECTES ALEUTENSIS	19.30	9.8888
ZAPRORA SILENUS	7.02	9.3683
AMMODYTES HEXAPTERUS	50.88	11.0017
PLEURONECTIDAE	3.51	8.9775
ATHERESTHES SP.	1.75	9.0310
ATHERESTHES STOMIAS	8.77	9.4987
GLYPTOCEPHALUS ZACHIRUS	14.04	10.0165
HIPPOGLOSSOIDES ELASSODON	63.16	11.3481
ISOPSETTA ISOLEPIS	8.77	9.5844
LEPIDOPSETTA BILINEATA	64.91	10.8522
PLATICHTHYS STELLATUS	7.02	9.2437
PLEURONECTES QUADRITUBERCULATU	1.75	8.7002
PSETTICHTHYS MELANOSTICTUS	19.30	10.1411
HIPPOGLOSSUS STENOLEPIS	7.02	9.5972

Table 14.--Fish eggs and larvae collected in bongo tows during cruise 3SH81, May 20 to May 28, 1981.

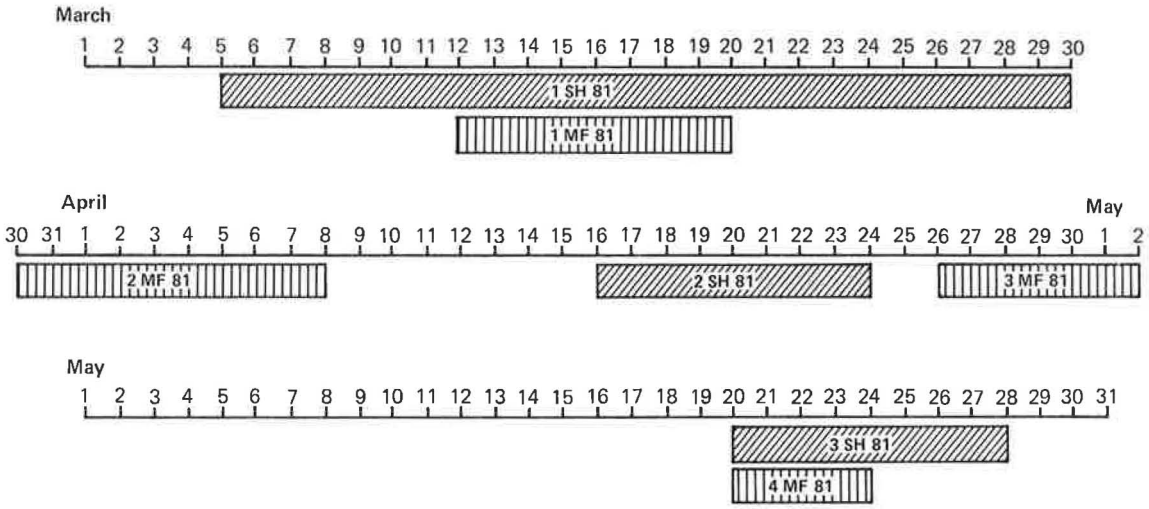


Figure 1.--Diagram of cruise durations and relative positions in time for the three American and four Soviet ichthyoplankton cruises.

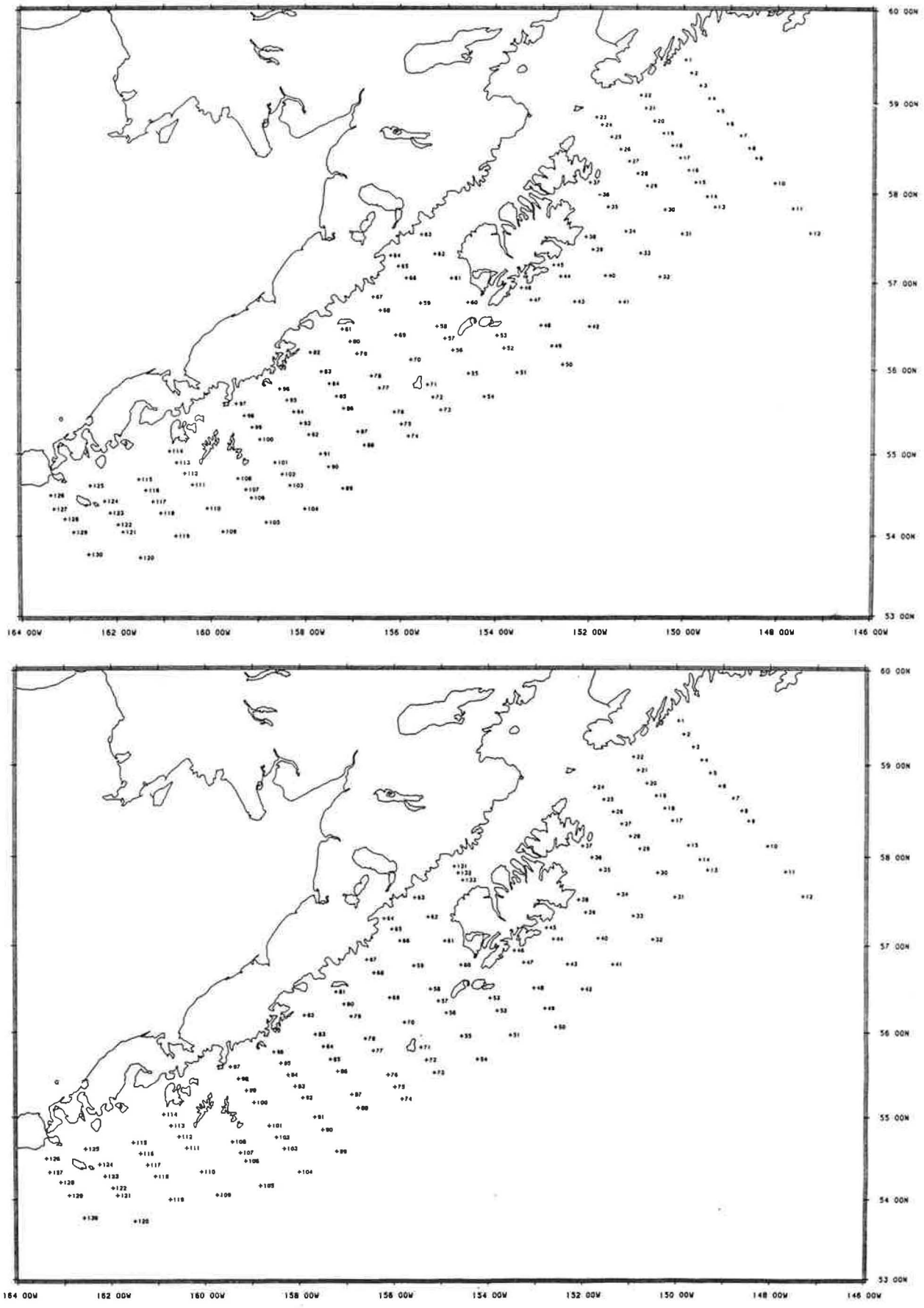


Figure 2.--Locations of neuston stations (above) and bongo stations (below) for cruise 1SH81, March 3 to March 30, 1981.

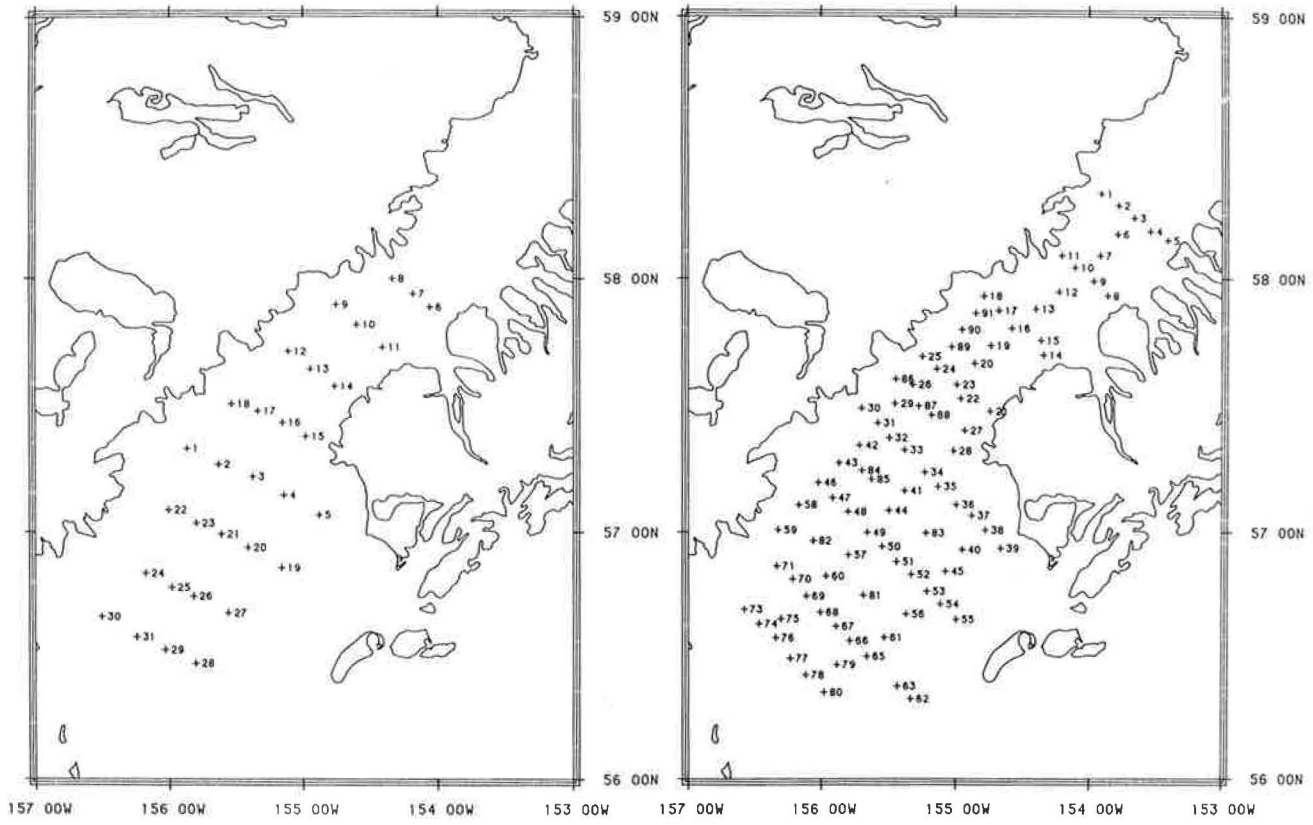


Figure 3.--Locations of bongo stations for cruise 1MF81, March 12 to March 20, 1981 (left) and for cruise 2MF81, March 30 to April 8, 1981 (right).

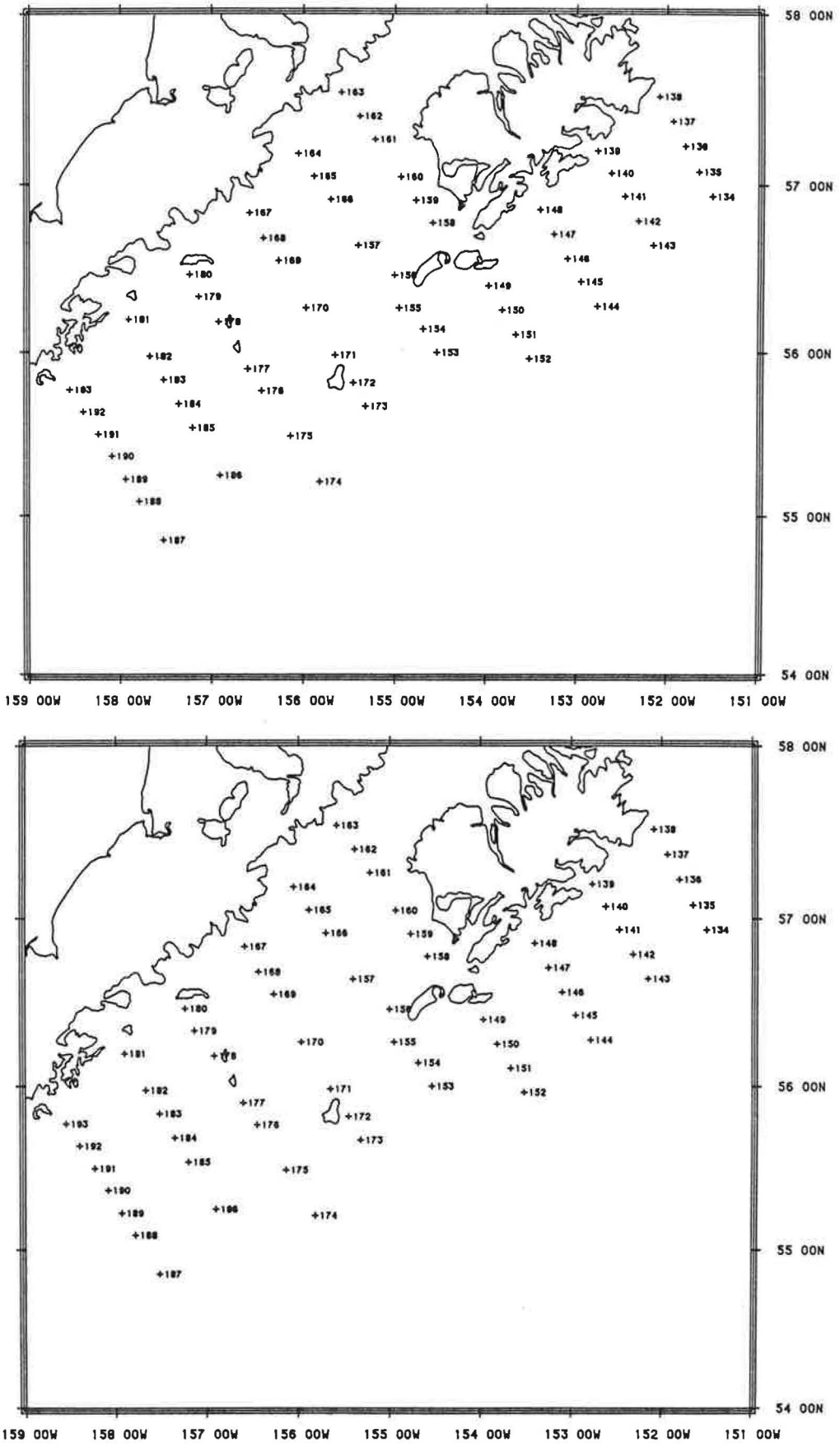


Figure 4.--Locations of neuston stations (above) and bongo stations (below) for cruise 2SH81, April 16 to April 24, 1981.

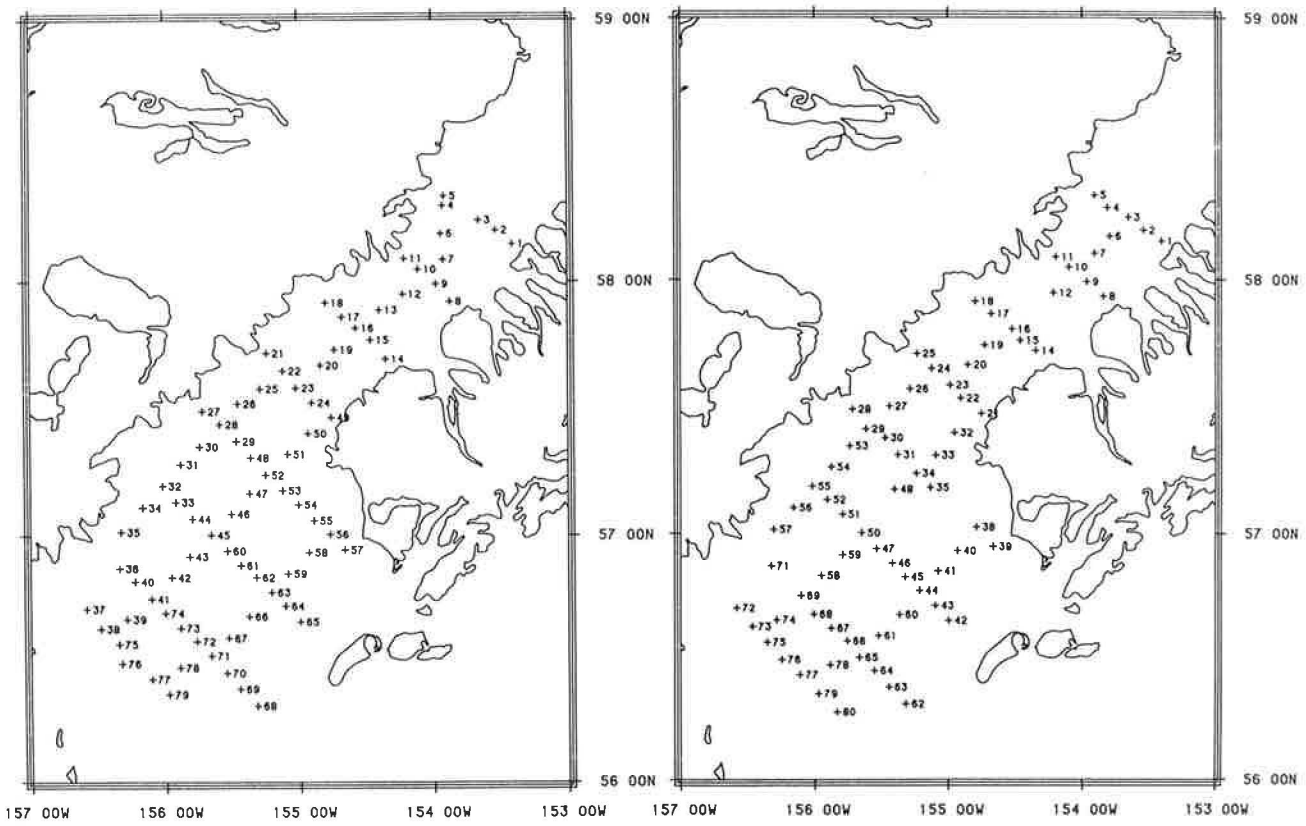


Figure 5.--Locations of bongo stations for cruise 3MF81, April 26 to April 30, 1981 (left) and for cruise 4MF81, May 20 to May 24, 1981 (right).

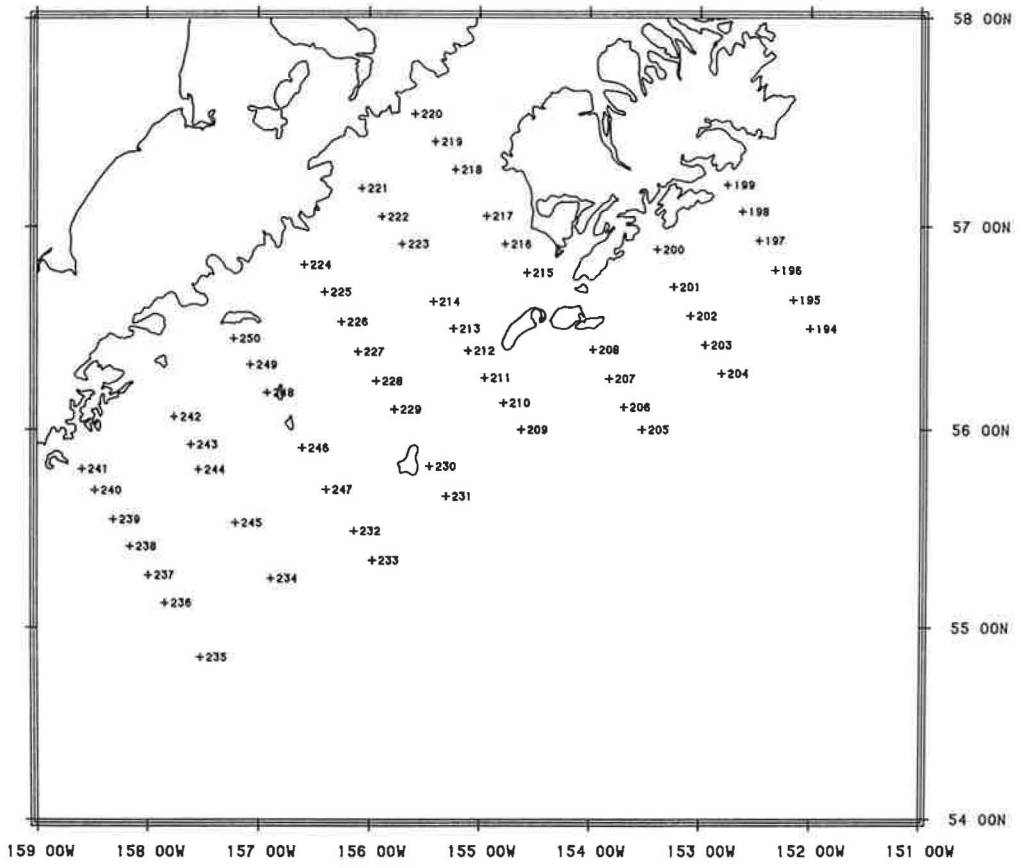
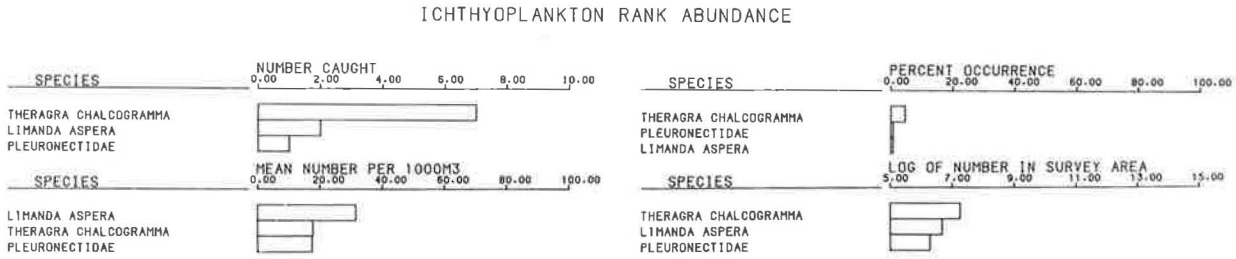


Figure 6.--Locations of bongo stations for cruise 3SH81, May 20 to May 28, 1981.



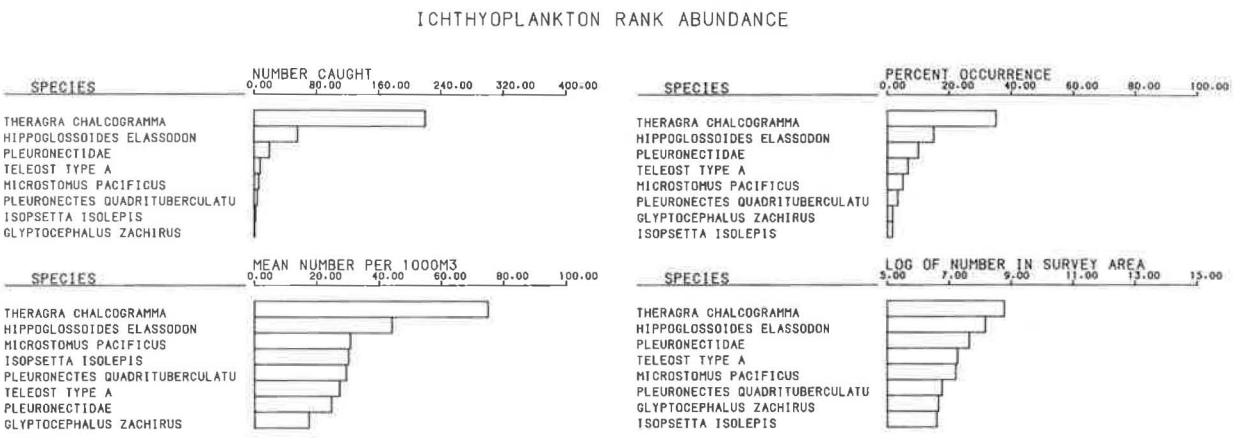
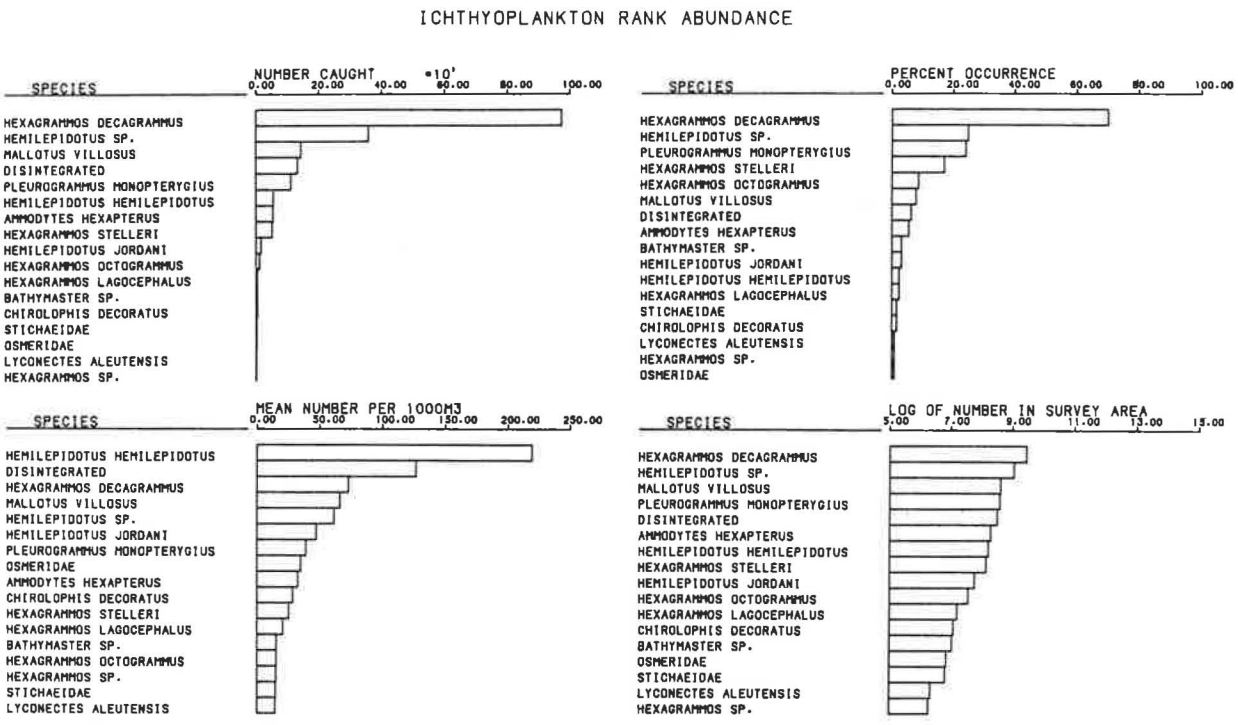


Figure 7.--Rank abundance of eggs caught in neuston tows during cruise 1SH81 (above) and cruise 2SH81 (below).



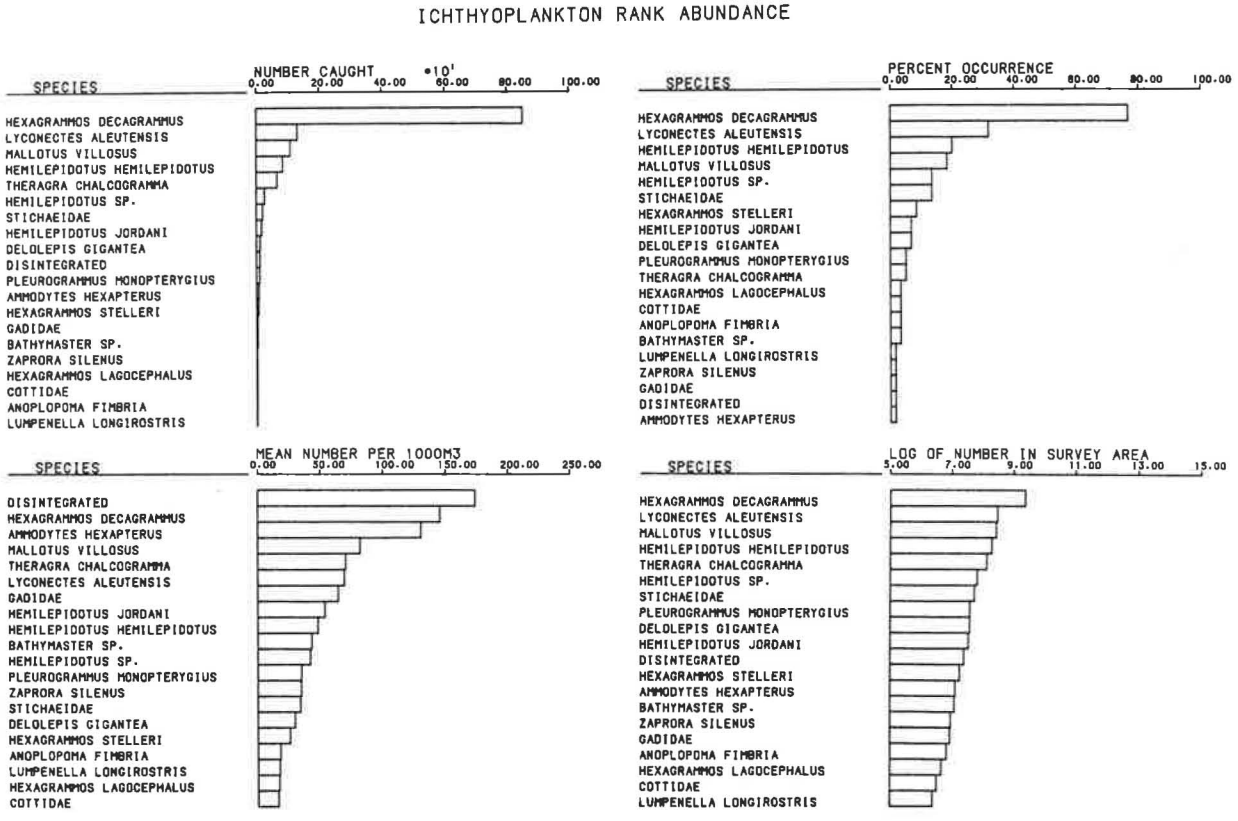
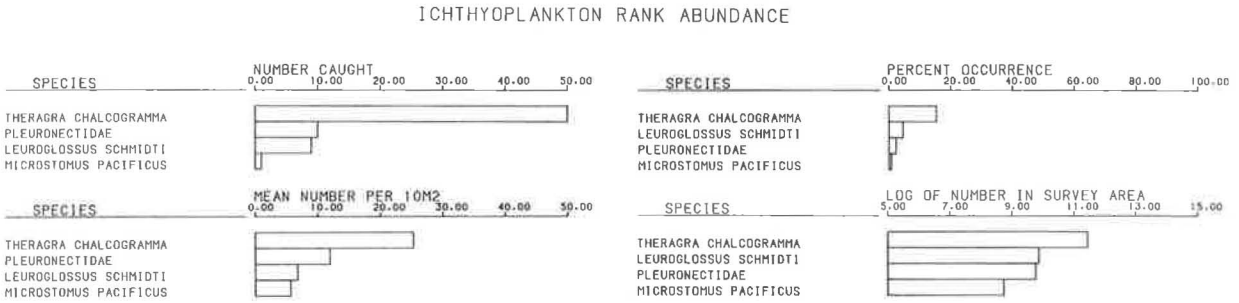
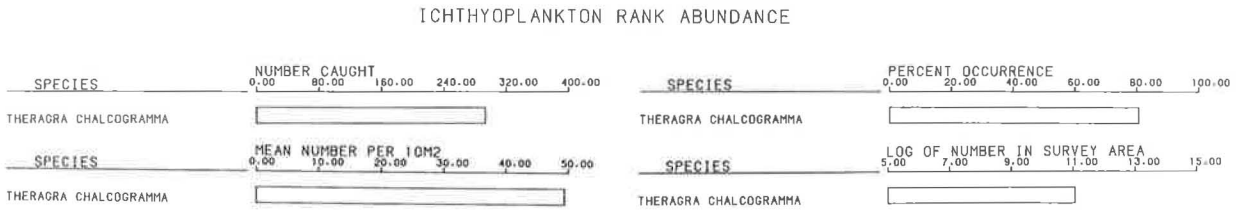


Figure 8.--Rank abundance of larvae caught in neuston tows during cruise 1SH81 (above) and cruise 2SH81 (below).





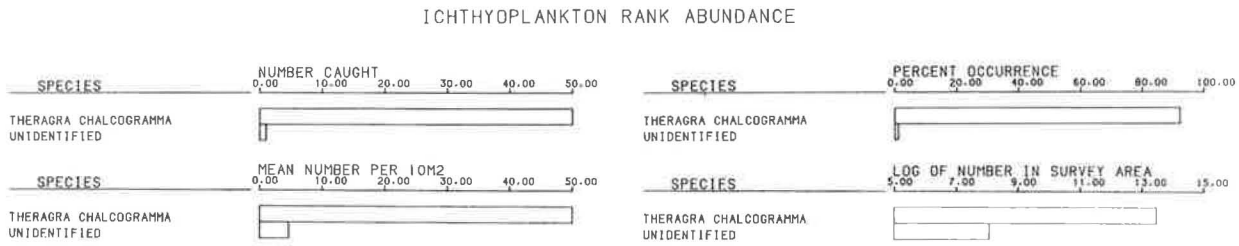
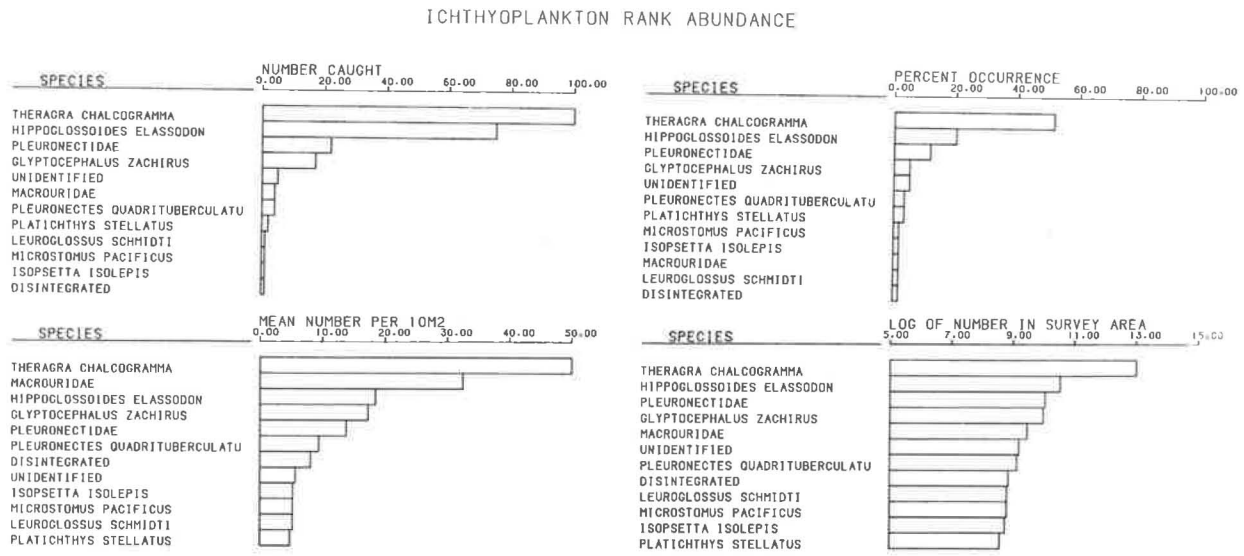


Figure 9.--Rank abundance of eggs caught in bongo tows during cruise 1SH81 (above), cruise 1MF81 (center) and cruise 2MF81 (below).



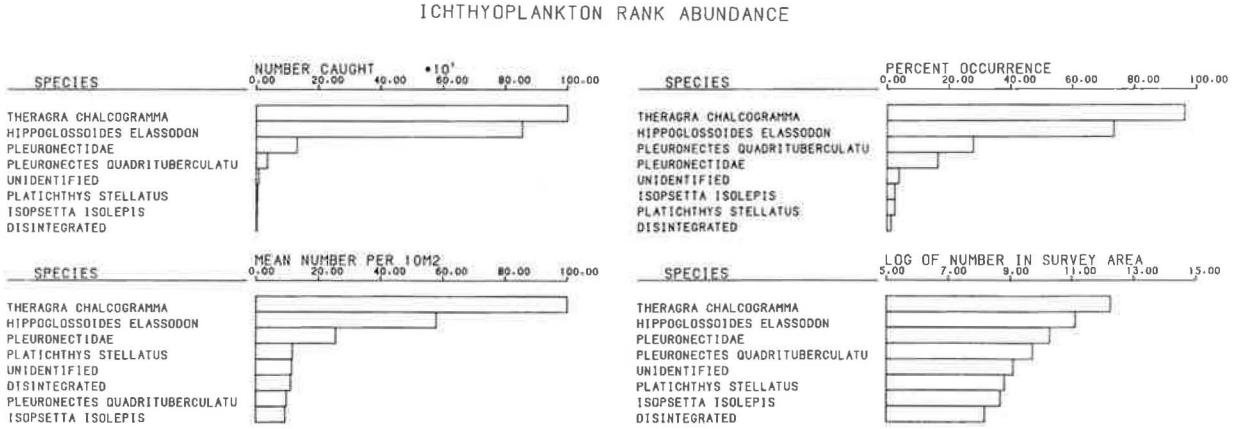


Figure 10.--Rank abundance of eggs caught in bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below).

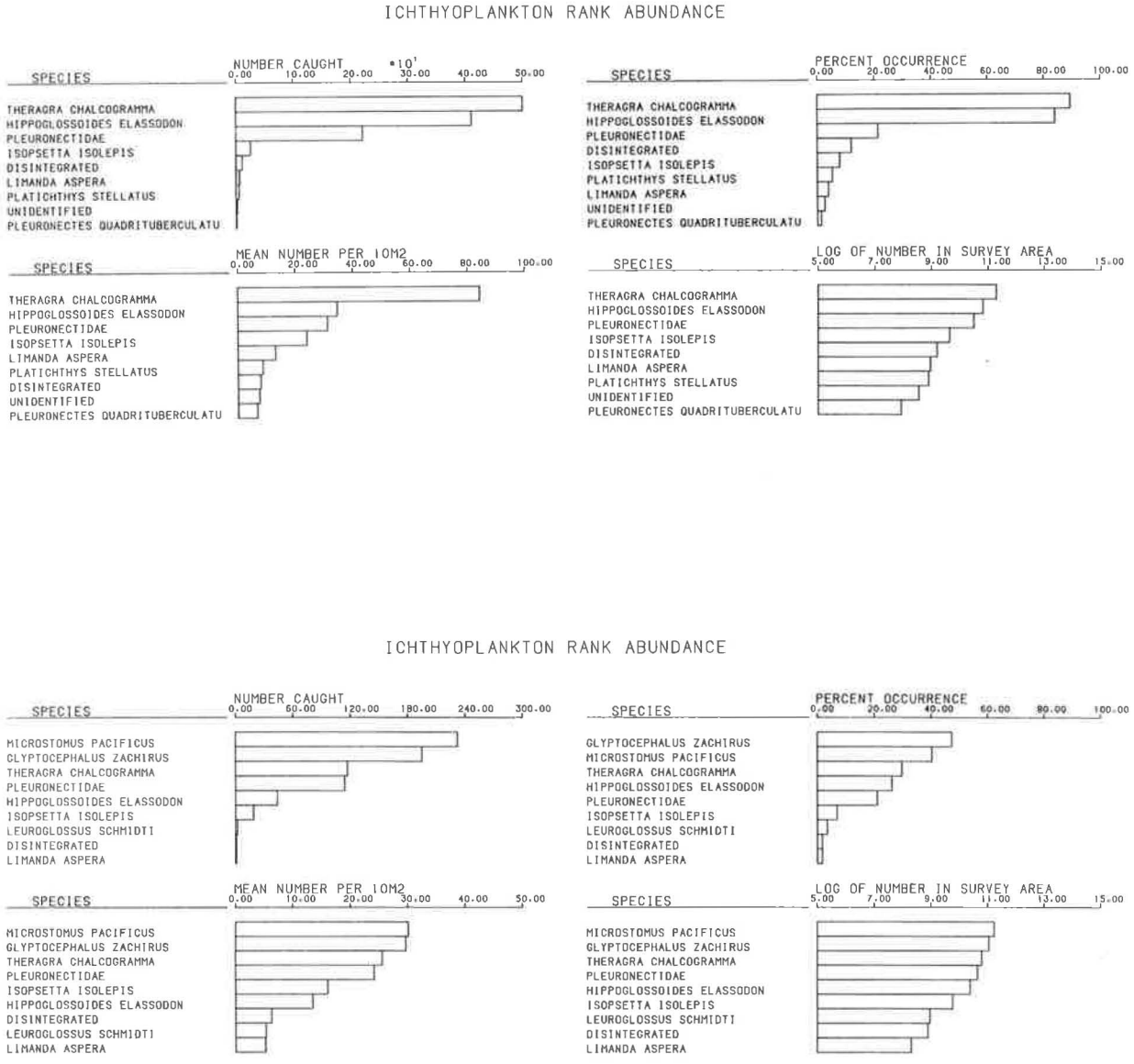


Figure 11.--Rank abundance of eggs caught in bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below).

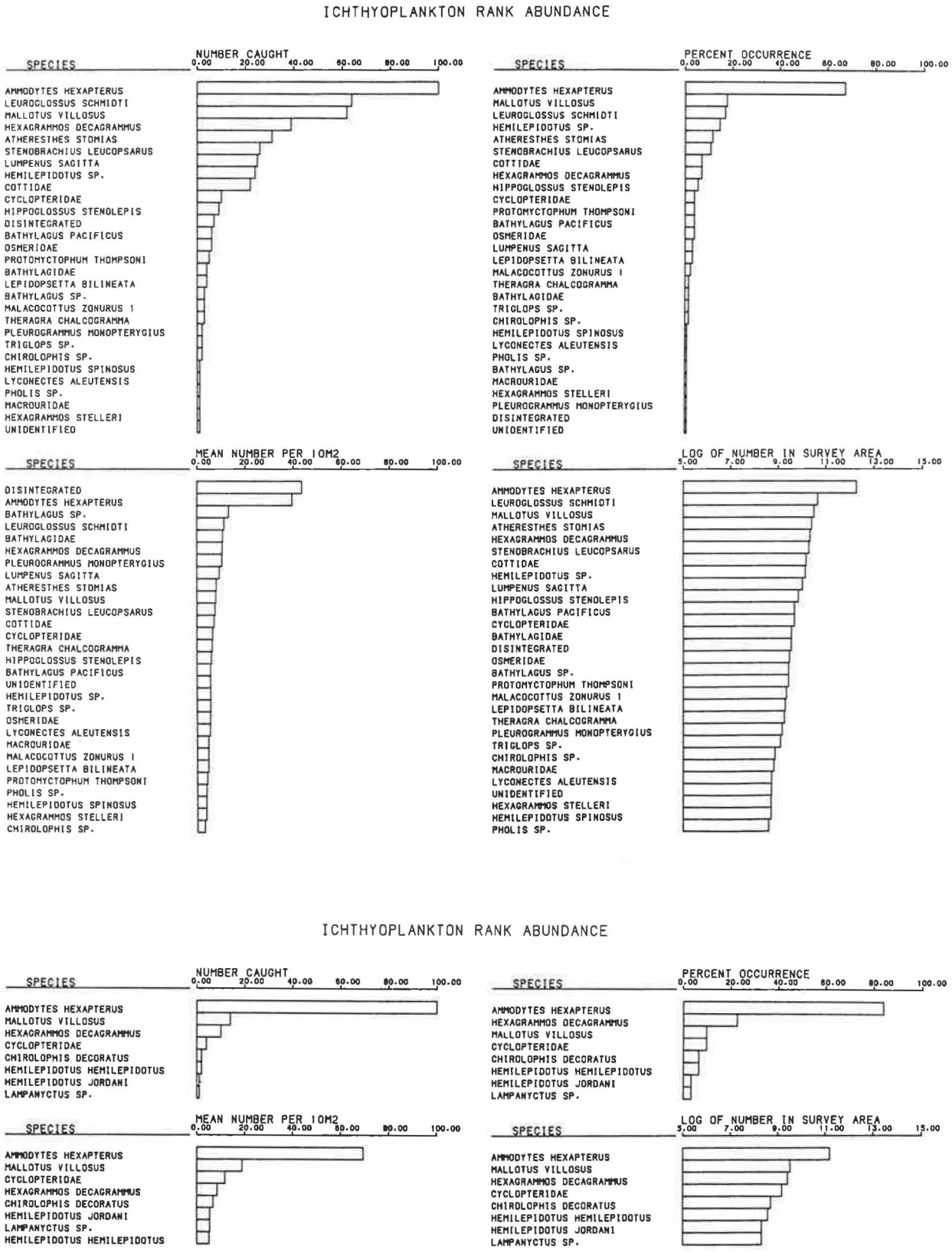


Figure 12.--Rank abundance of larvae caught in bongo tows during cruise 1SH81 (above) and cruise 1MF81 (below).

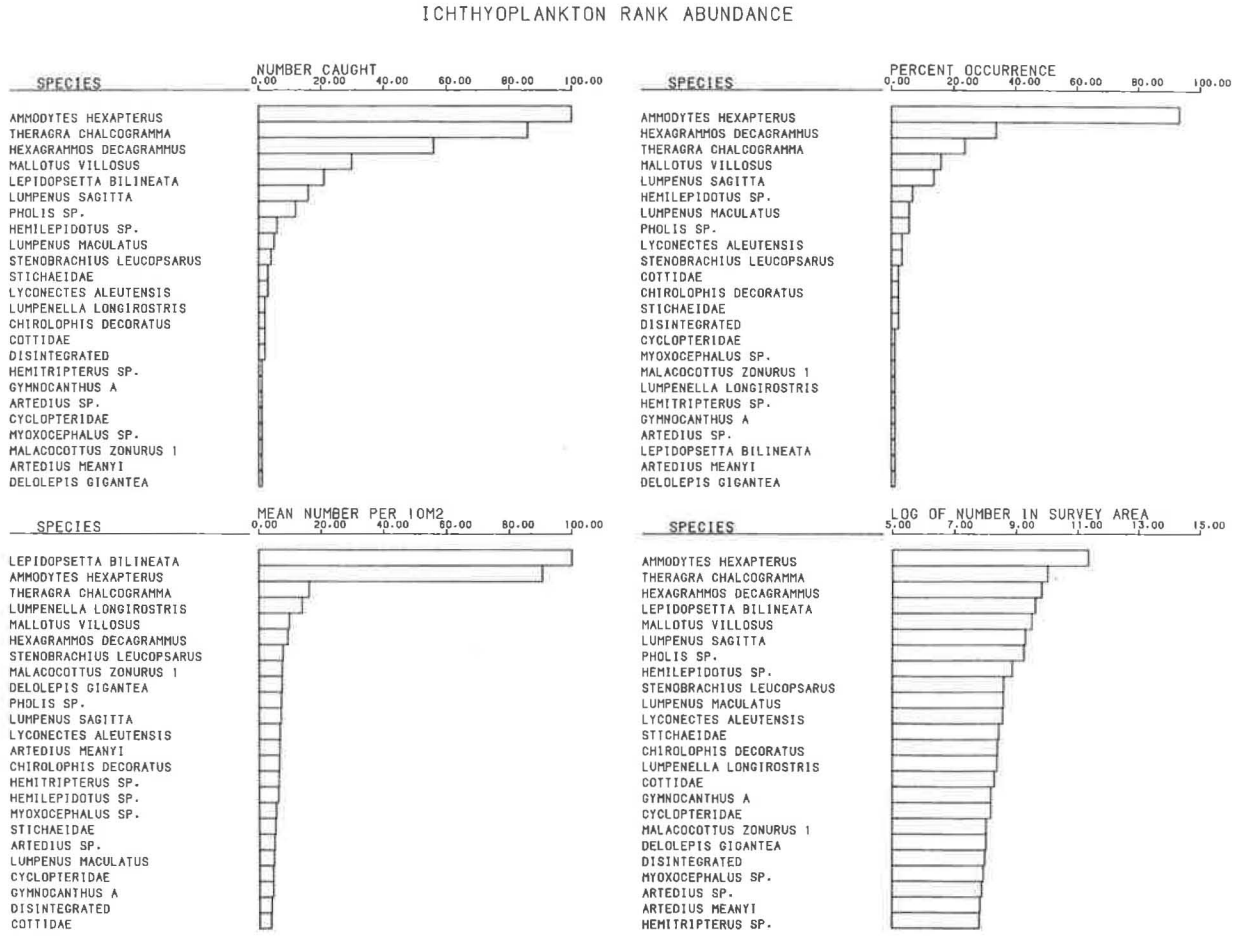


Figure 13.--Rank abundance of larvae caught in bongo tows during cruise 2MF81.

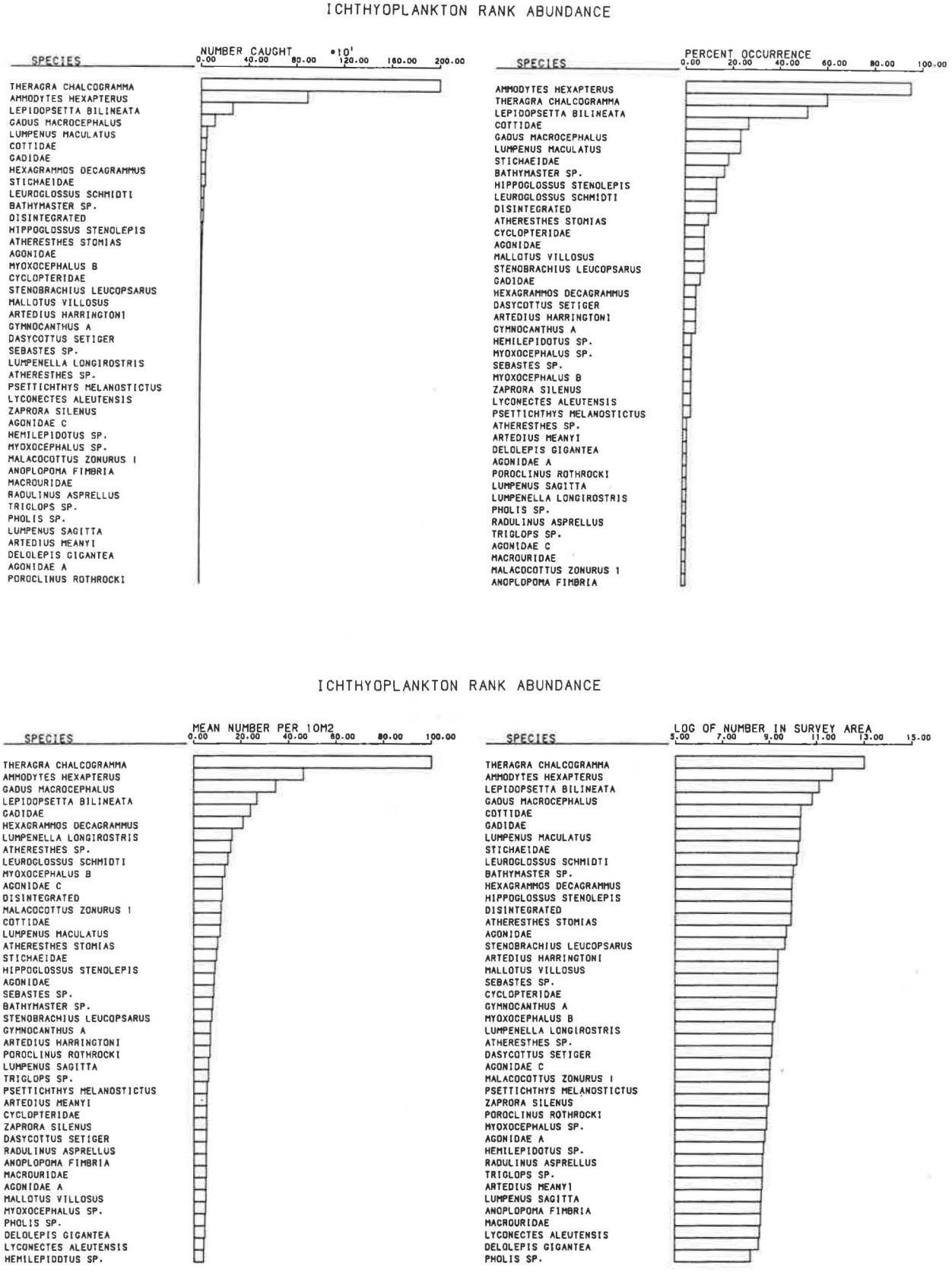


Figure 14.--Rank abundance of larvae caught in bongo tows during cruise 2SH81.

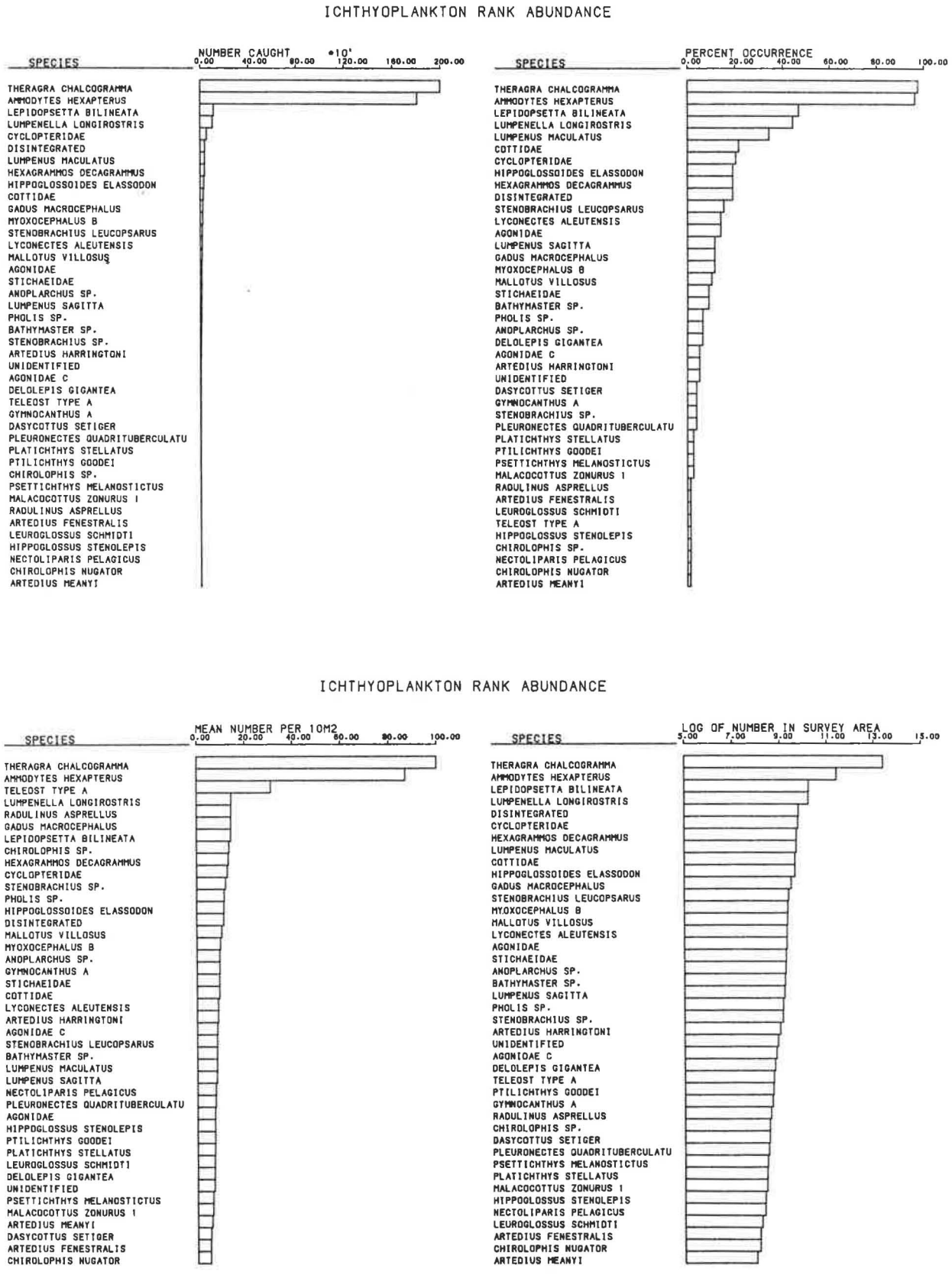


Figure 15.--Rank abundance of larvae caught in bongo tows during cruise 3MF81.

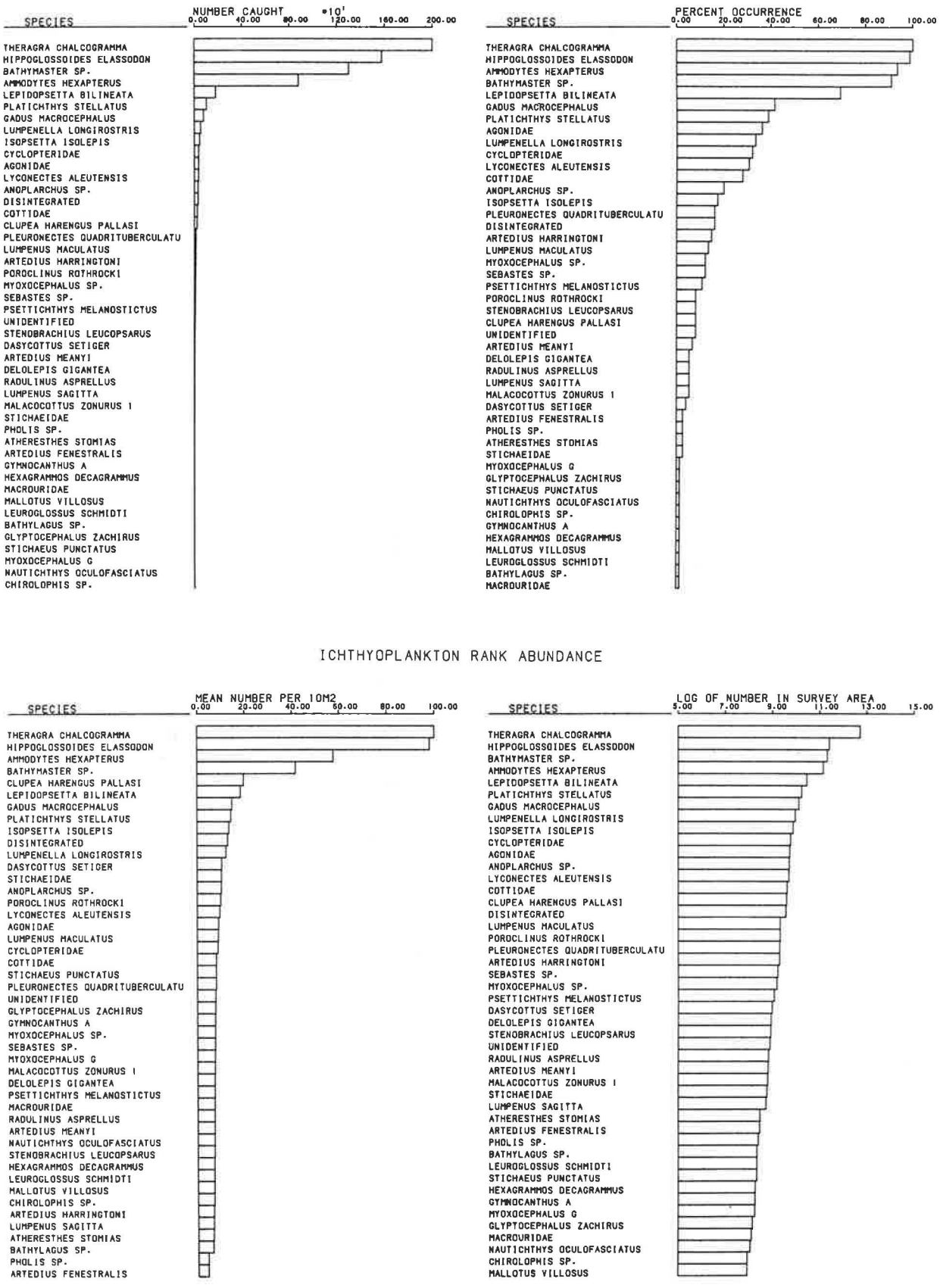
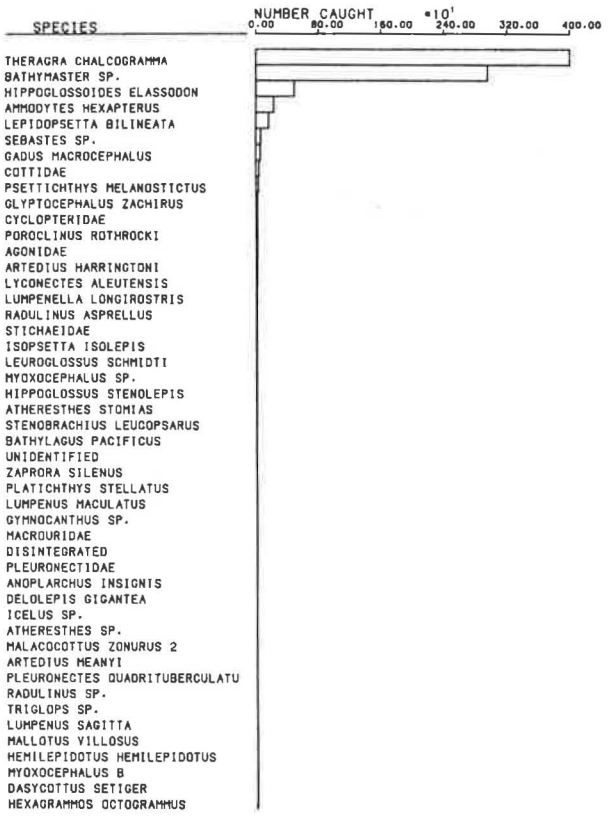
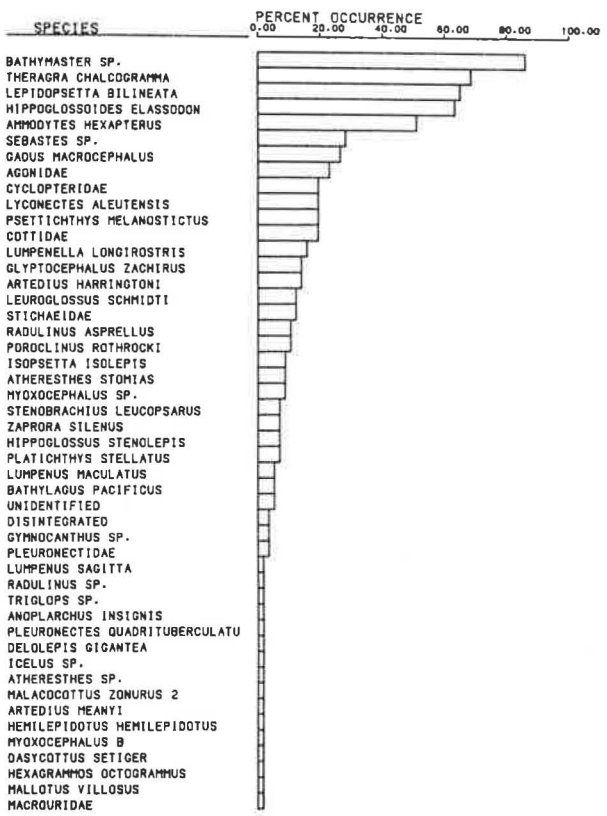


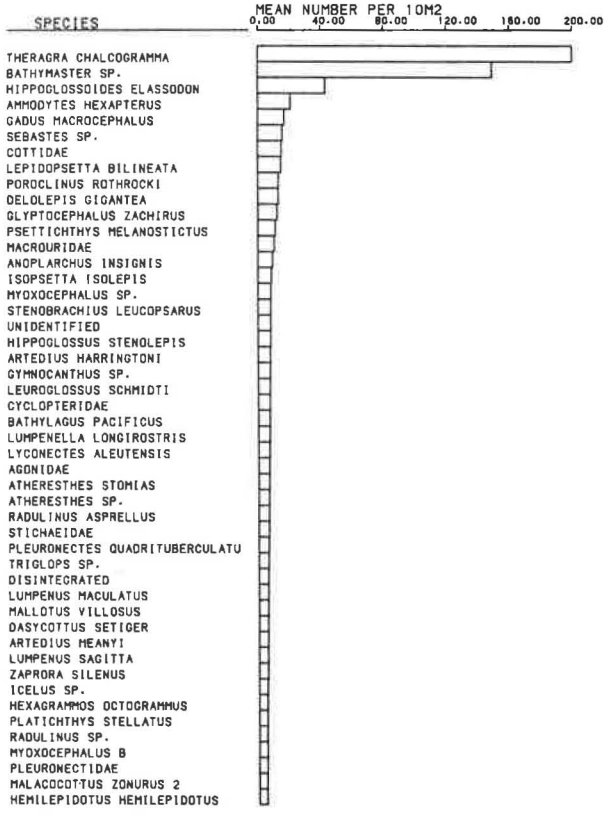
Figure 16.--Rank abundance of larvae caught in bongo tows during cruise 4MF81.

ICHTHYOPLANKTON RANK ABUNDANCE





ICHTHYOPLANKTON RANK ABUNDANCE



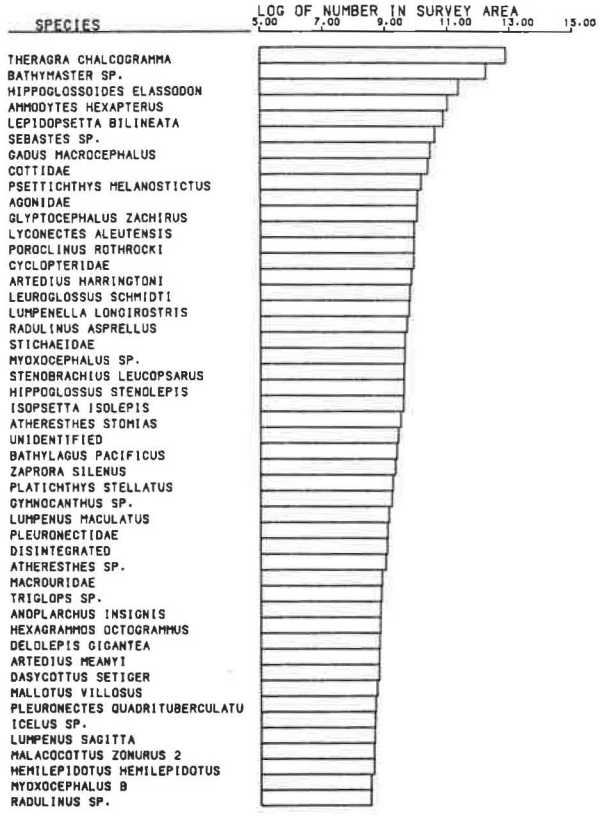
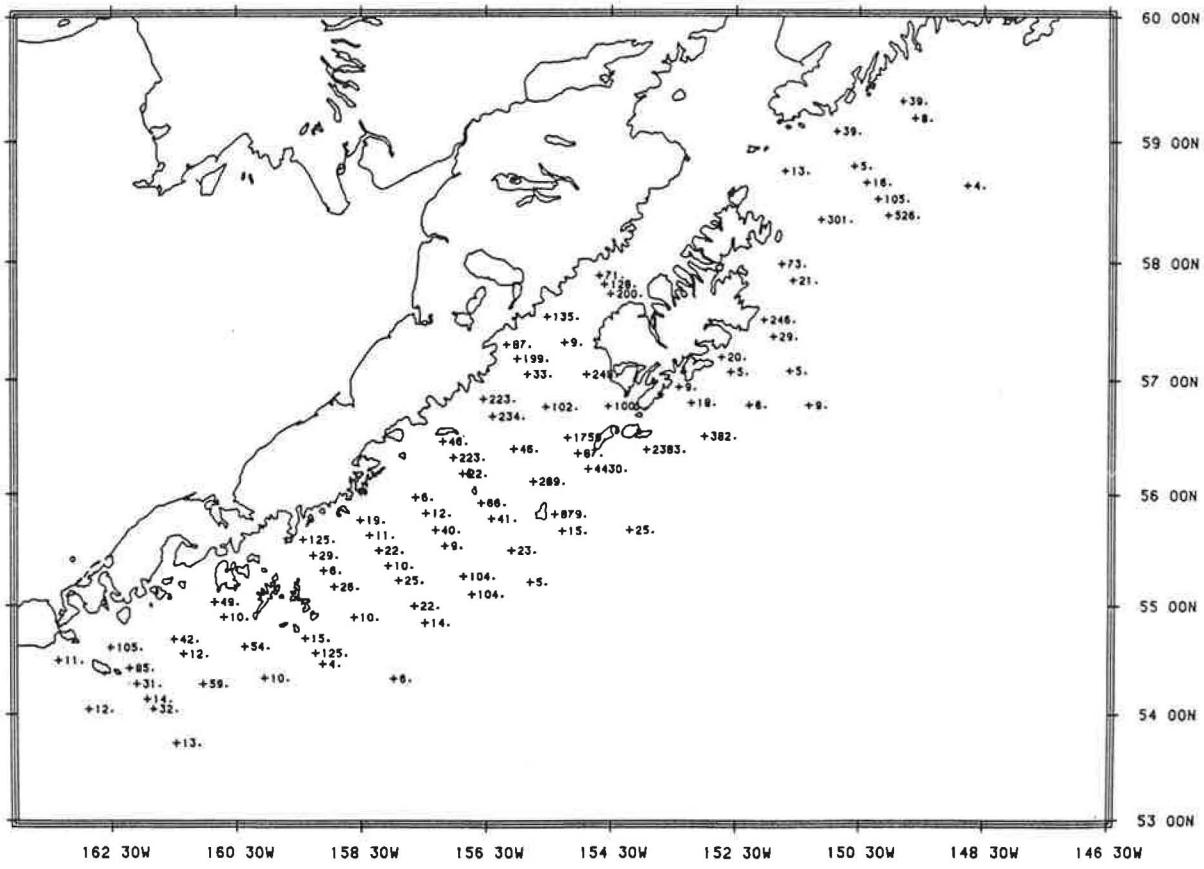


Figure 17.--Rank abundance of larvae caught in bongo tows during cruise 3SH81.



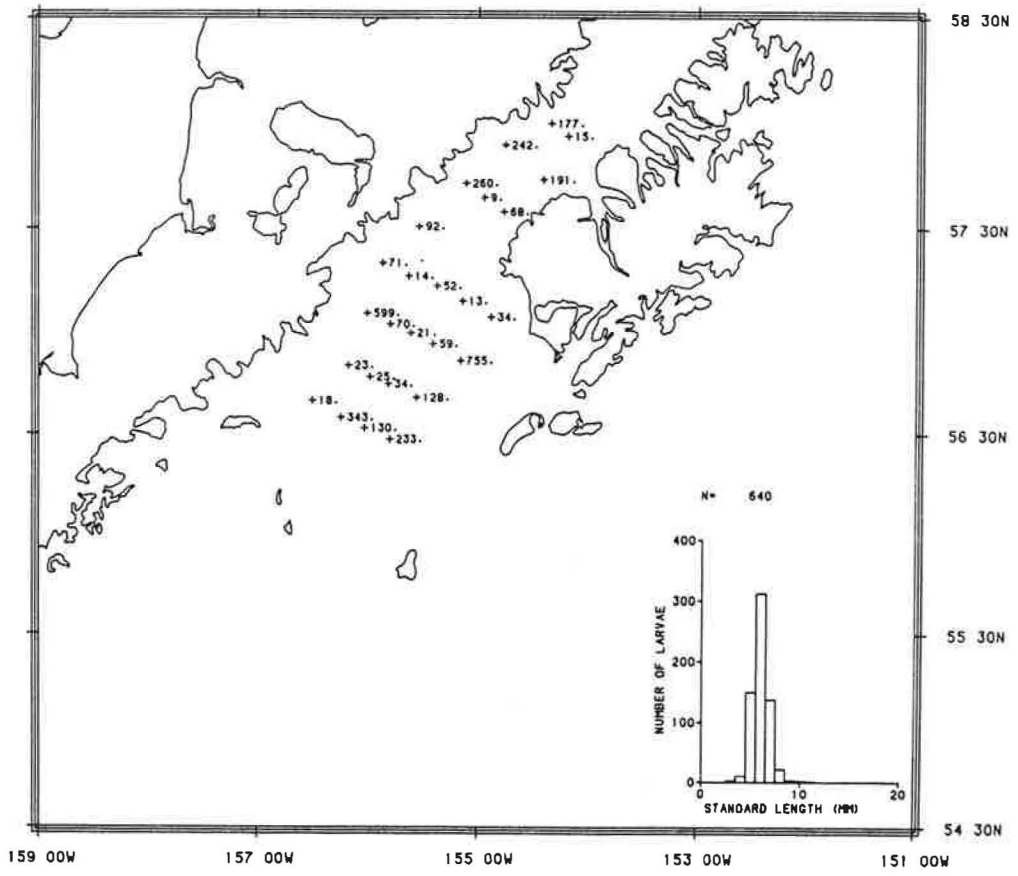


Figure 18.--Distribution of larvae of Ammodytes hexapterus from bongo tows during cruise 1SH81 (above) and cruise 1MF81 (below). Abundance expressed as numbers per $10m^2$.

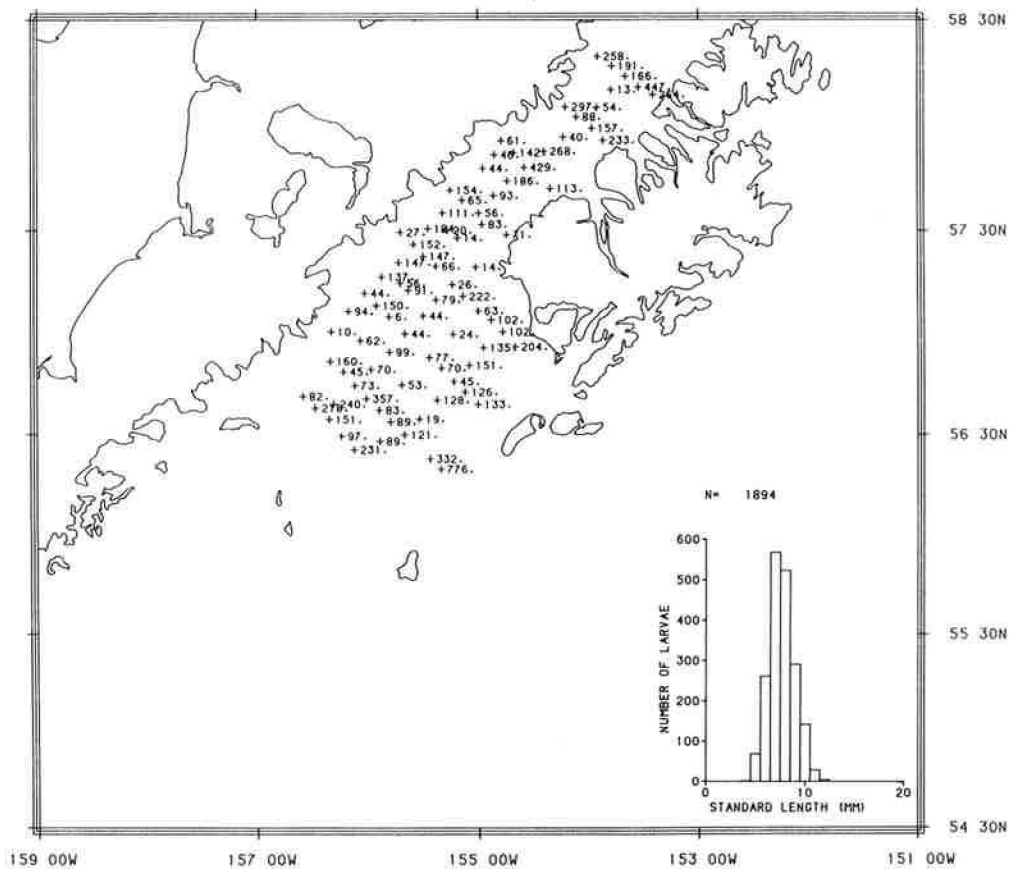


Figure 19.--Distribution of larvae of Ammodytes hexapterus from bongo tows during cruise 2MF81. Abundance expressed as numbers per $10m^2$.

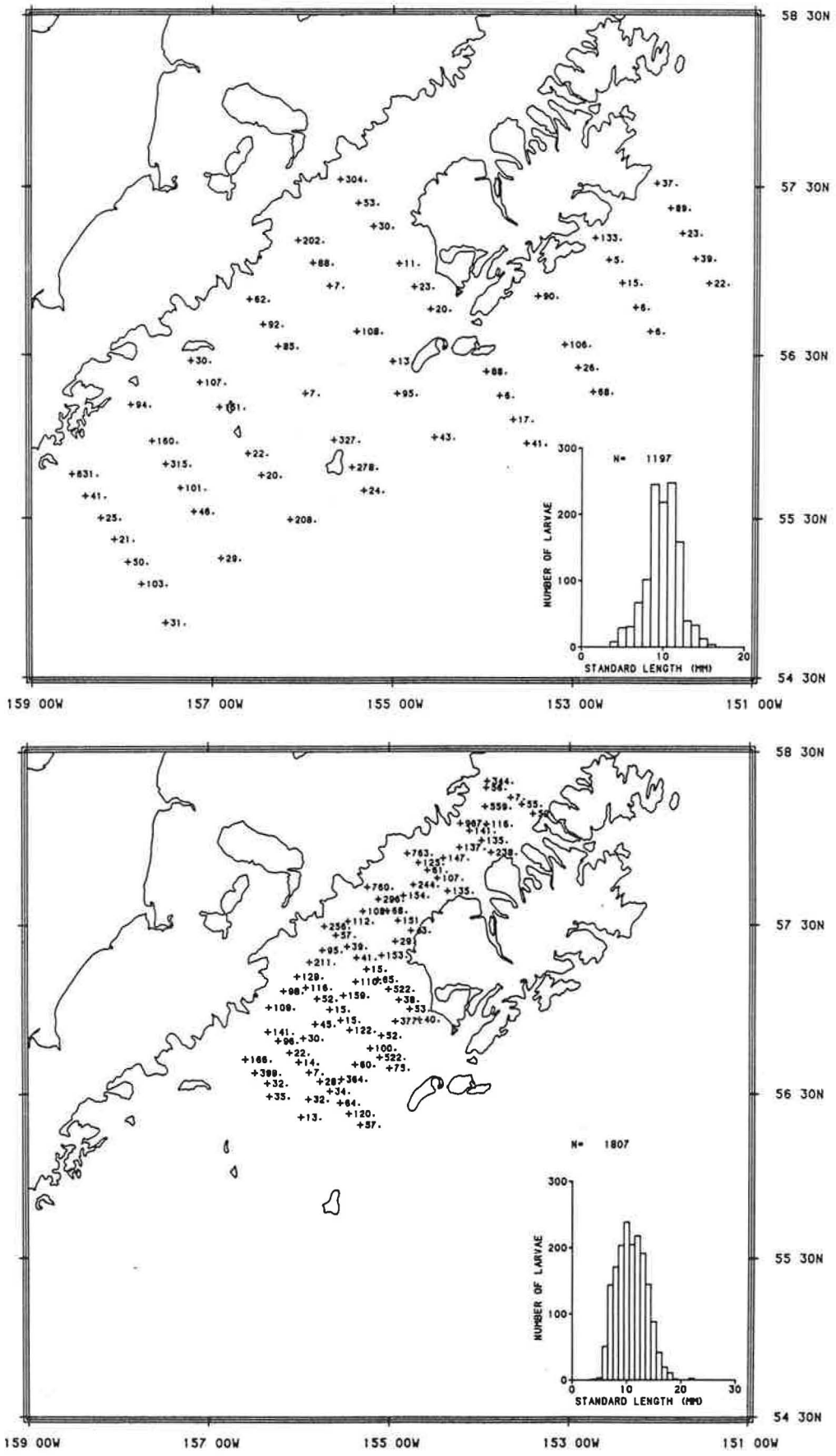


Figure 20.--Distribution of larvae of Ammodytes hexapterus from bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.

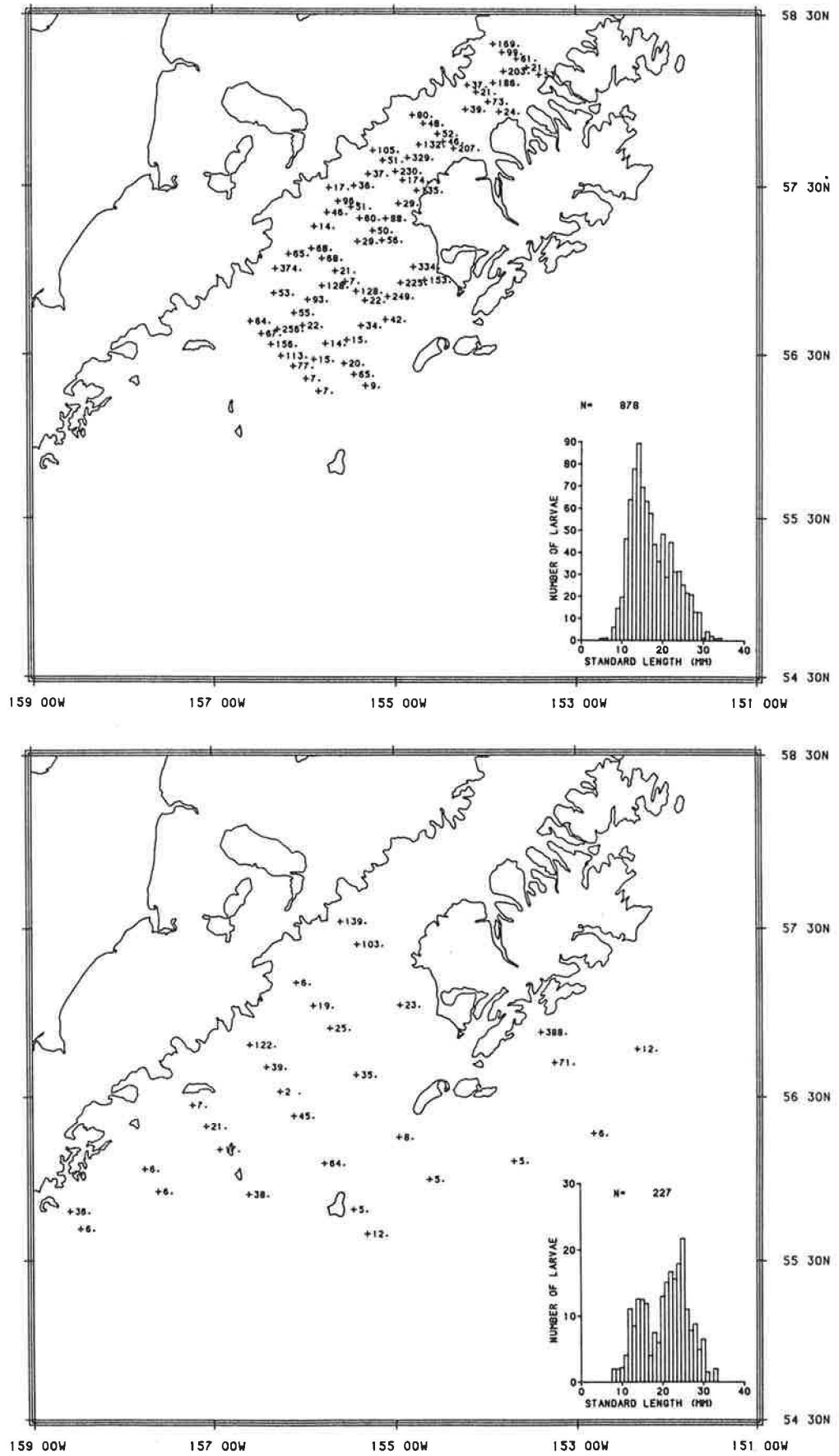


Figure 21.--Distribution of larvae of Ammodytes hexapterus from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

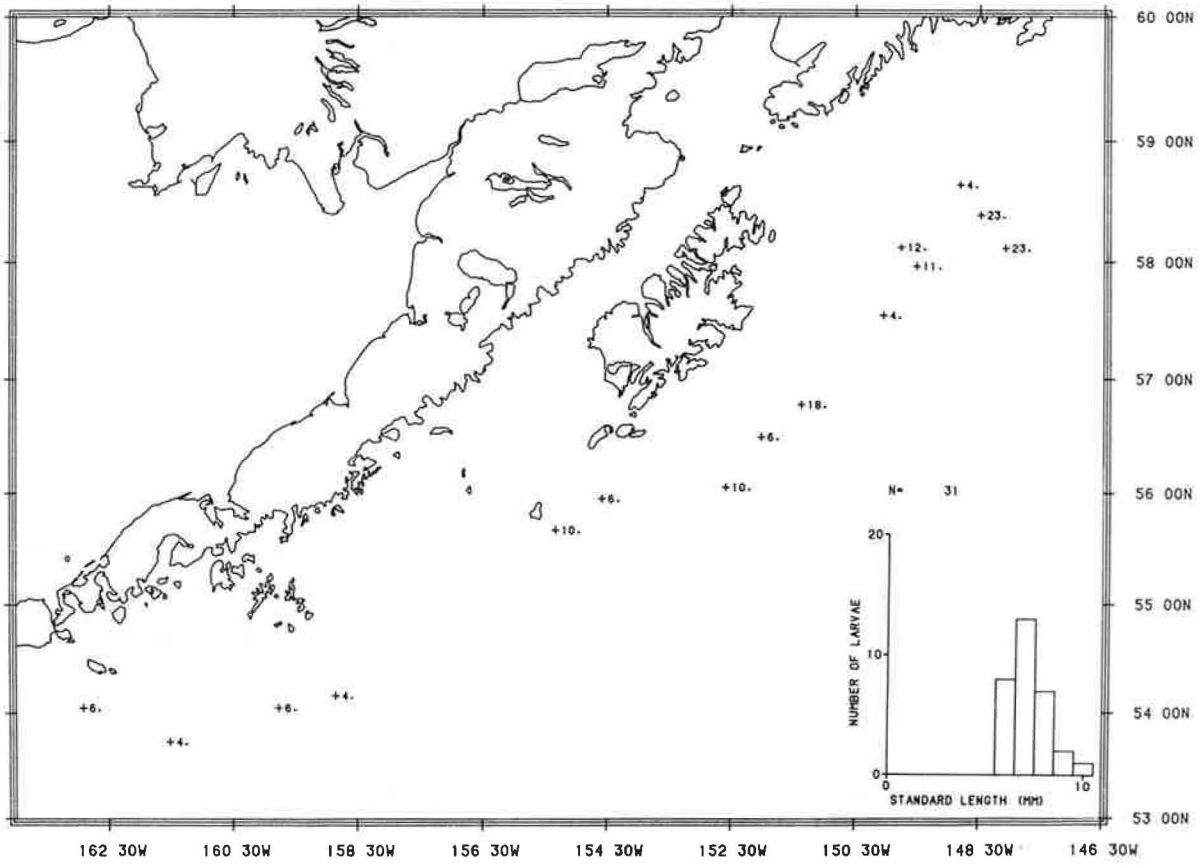
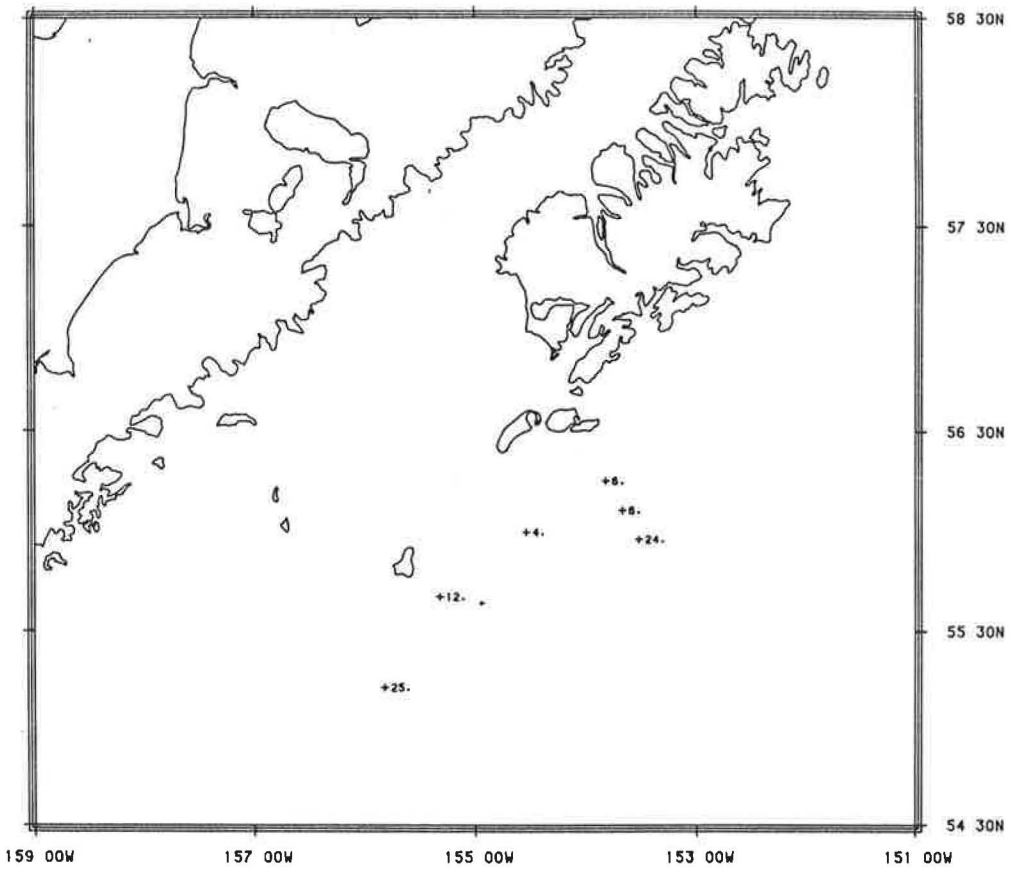


Figure 22.--Distribution of larvae of Atheresthes stomias from bongo tows during cruise 1SH81. Abundance expressed as numbers per $10m^2$.



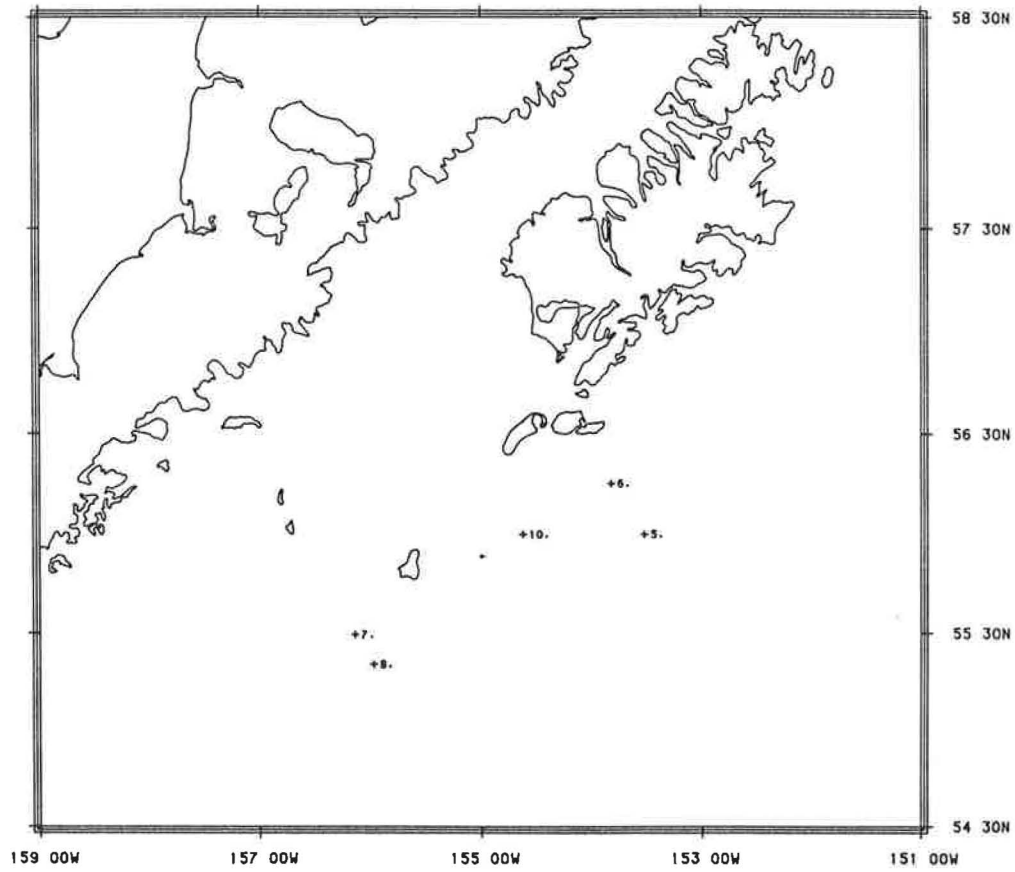


Figure 23.--Distribution of larvae of Atheresthes stomias from bongo tows during cruise 2SH81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

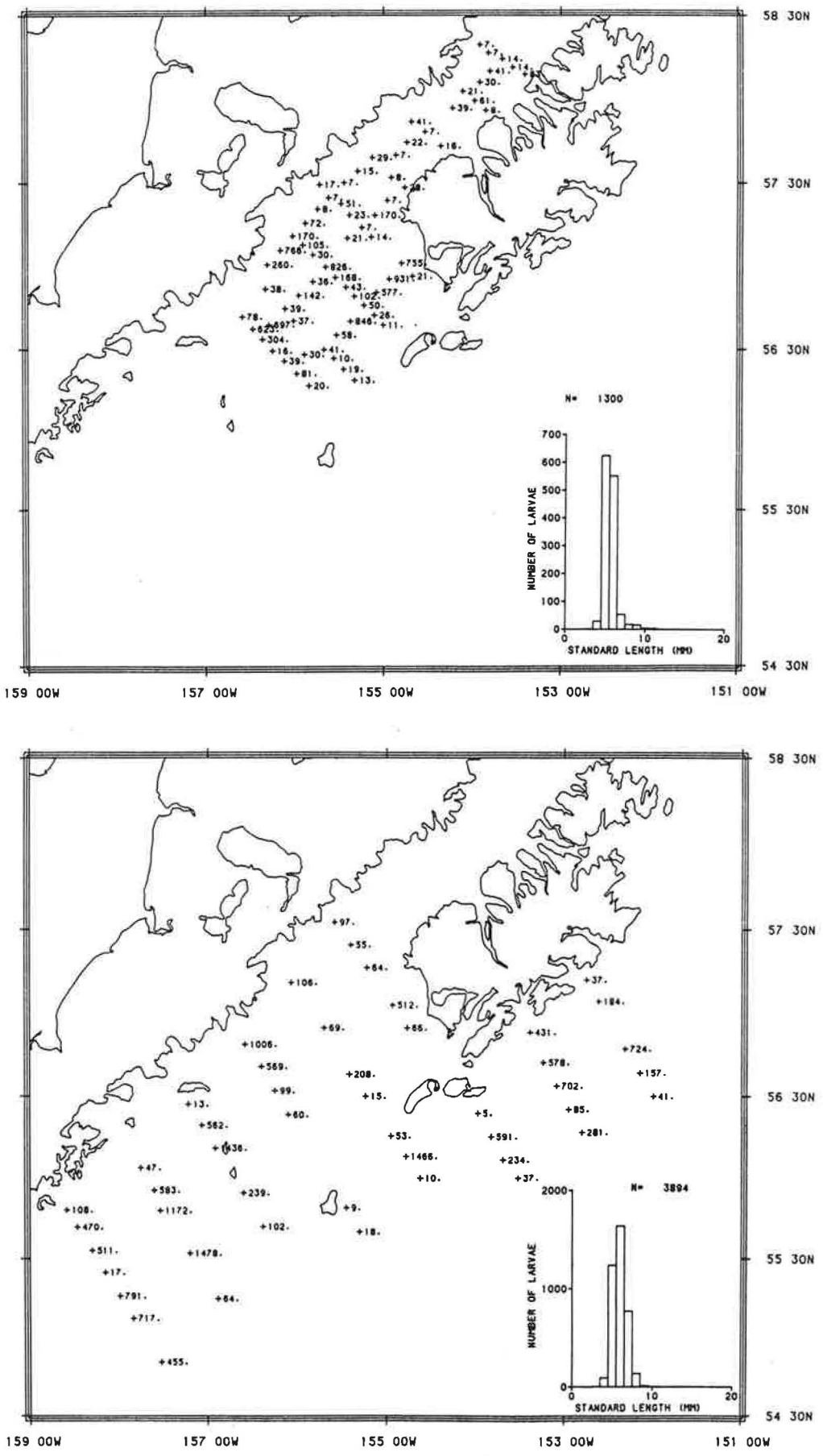


Figure 24.--Distribution of larvae of Bathymaster sp. from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

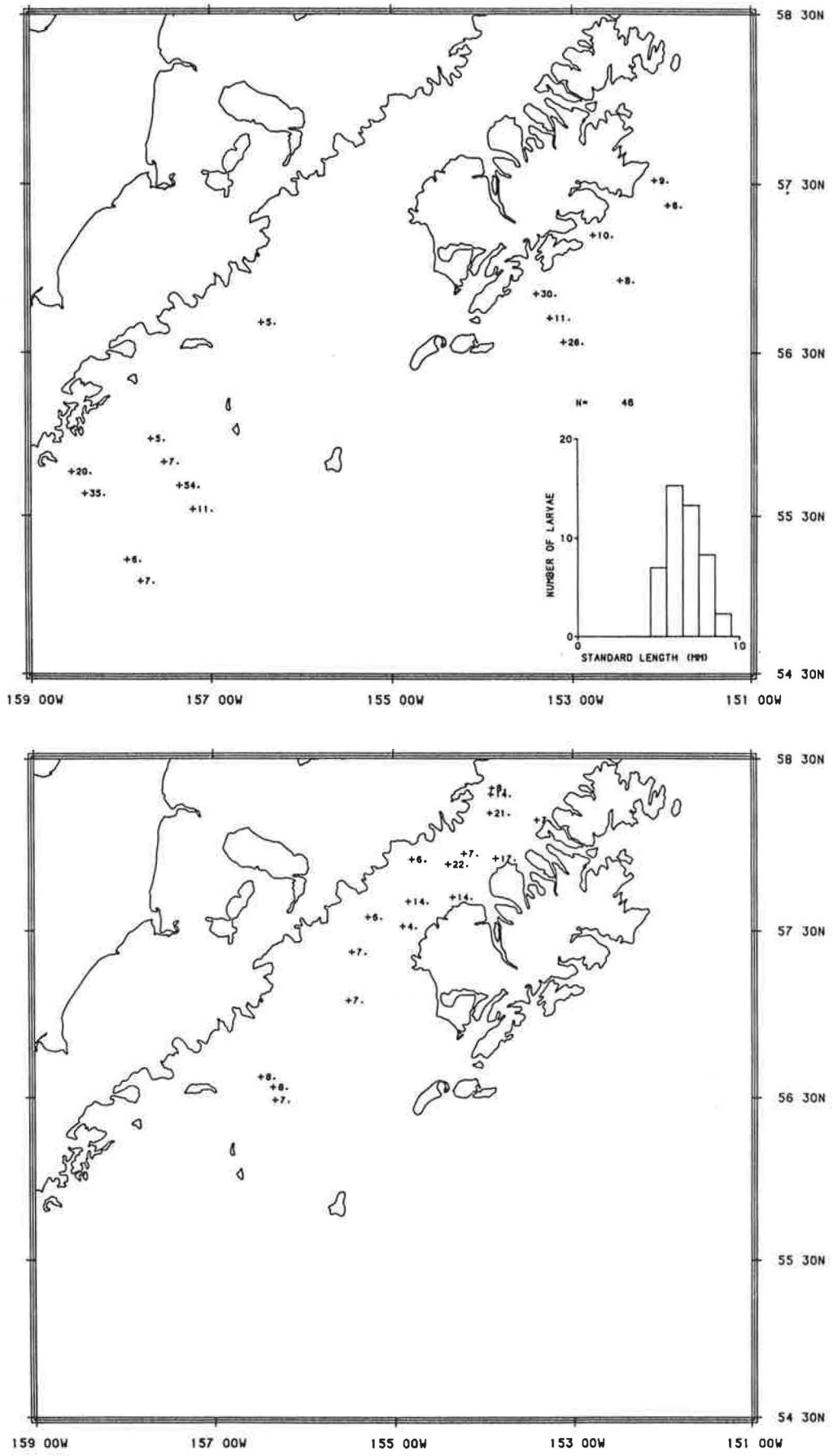


Figure 25.--Distribution of larvae of Cottidae from bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.

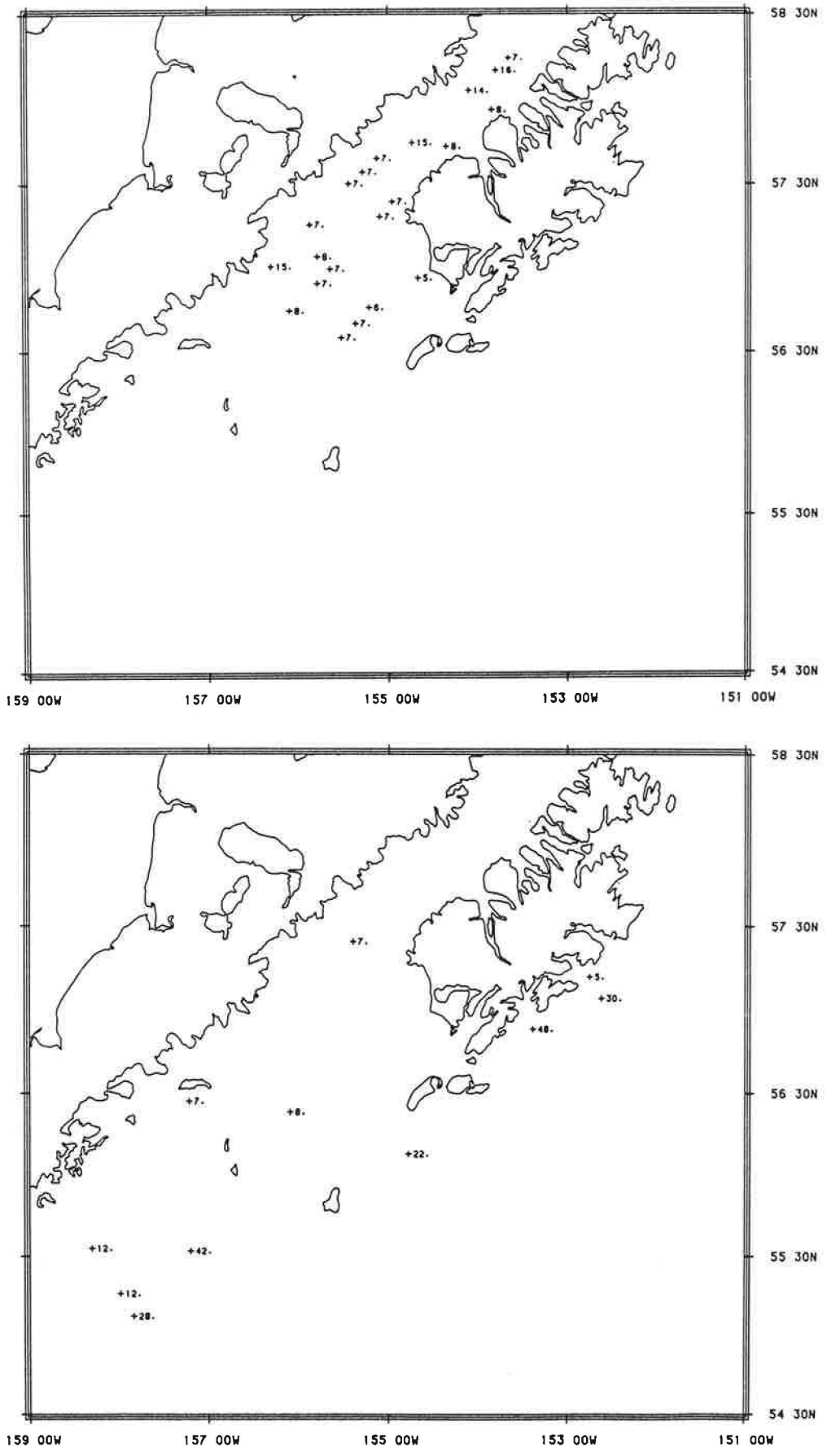
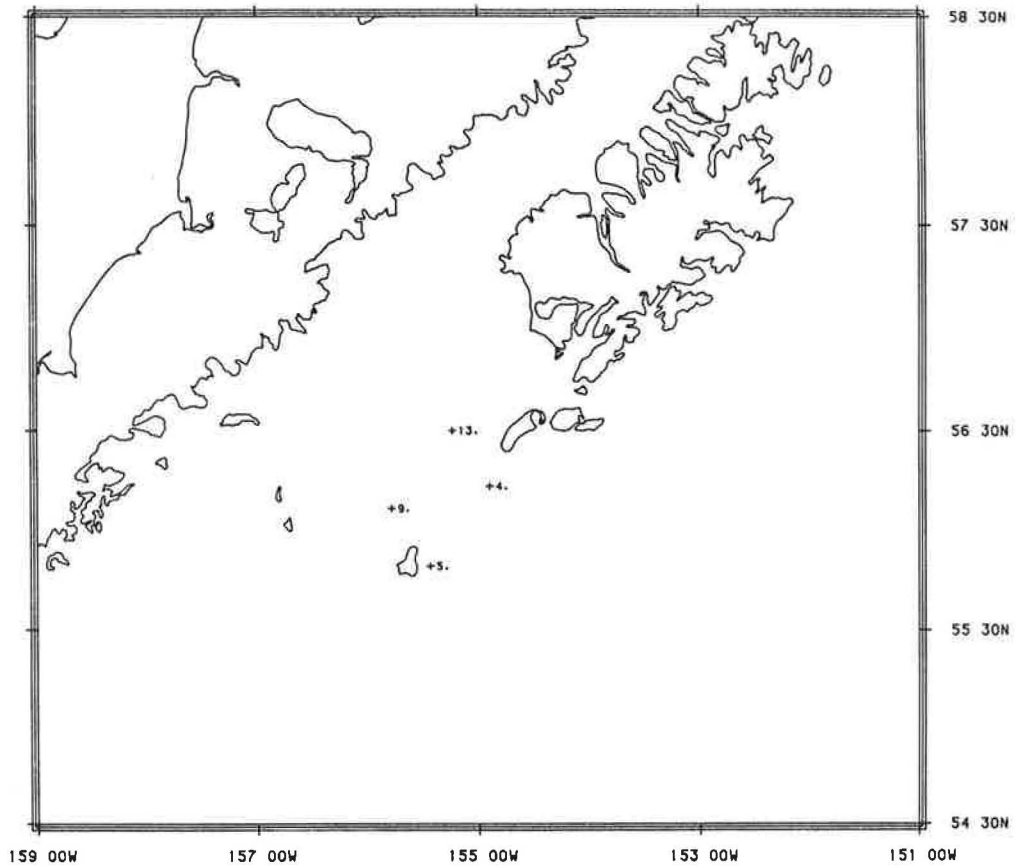


Figure 26.--Distribution of larvae of Cottidae from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.



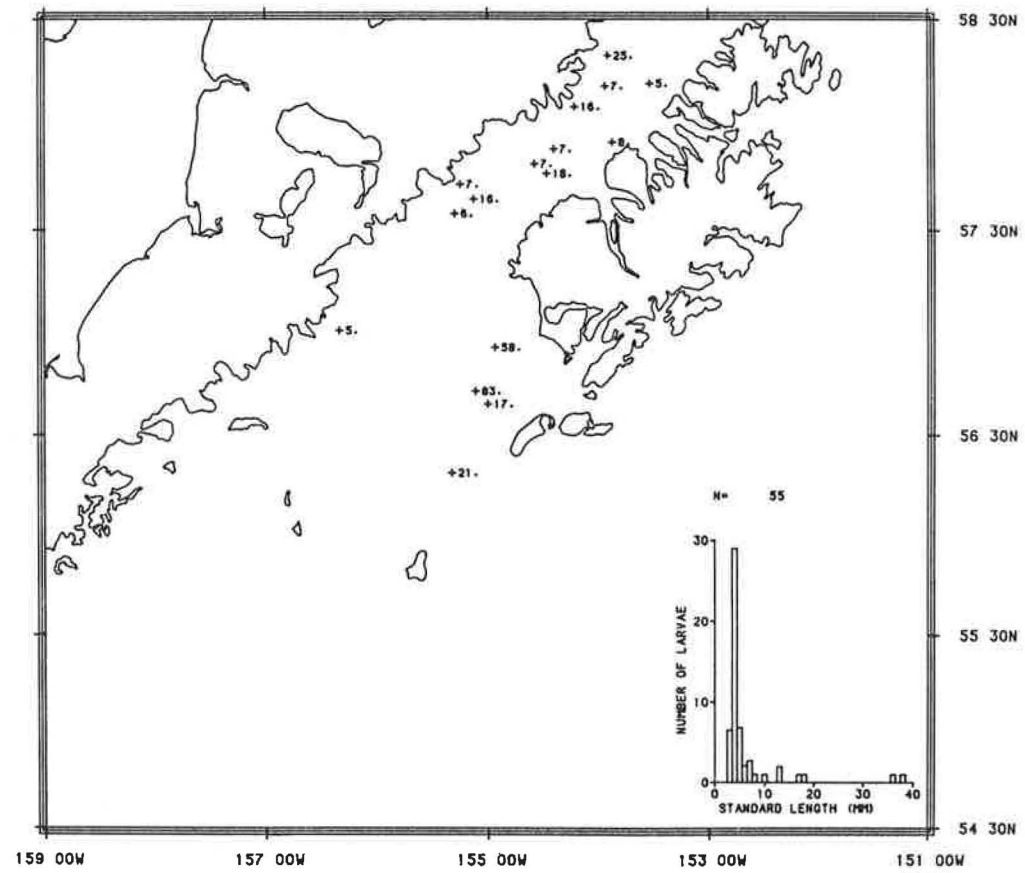
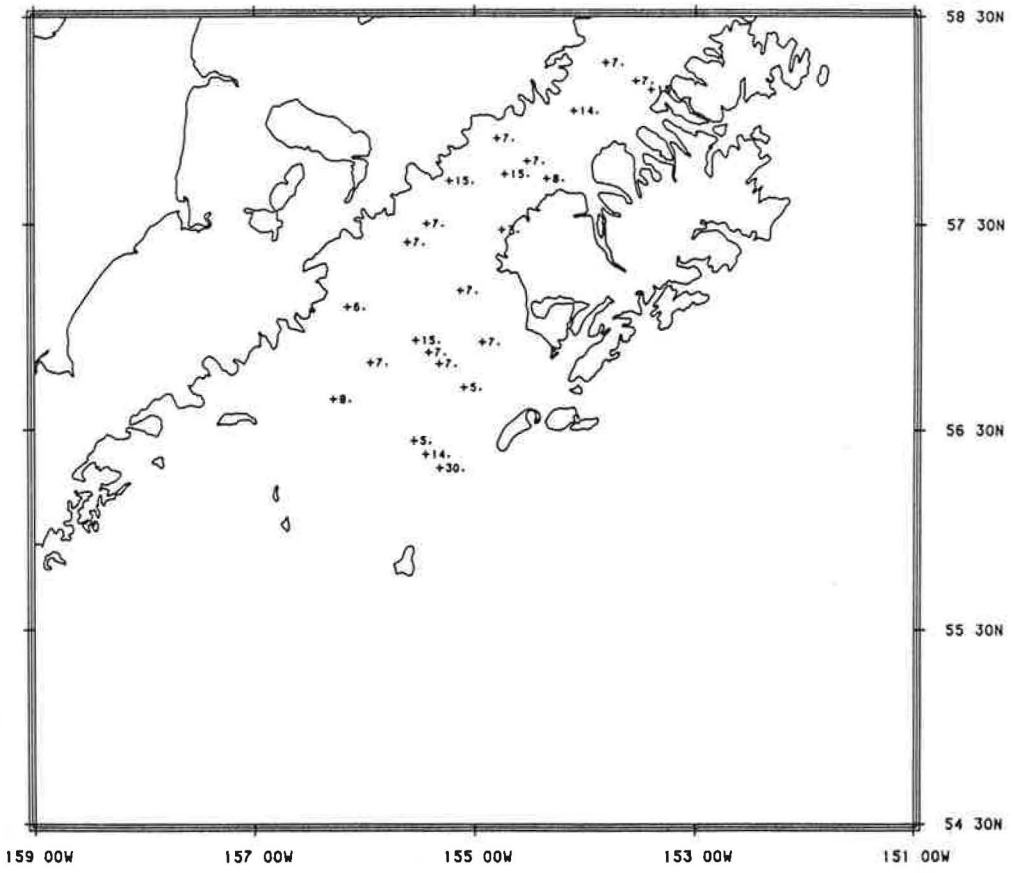


Figure 27.--Distribution of larvae of Cyclopteridae from bongo tows during cruise 1SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.



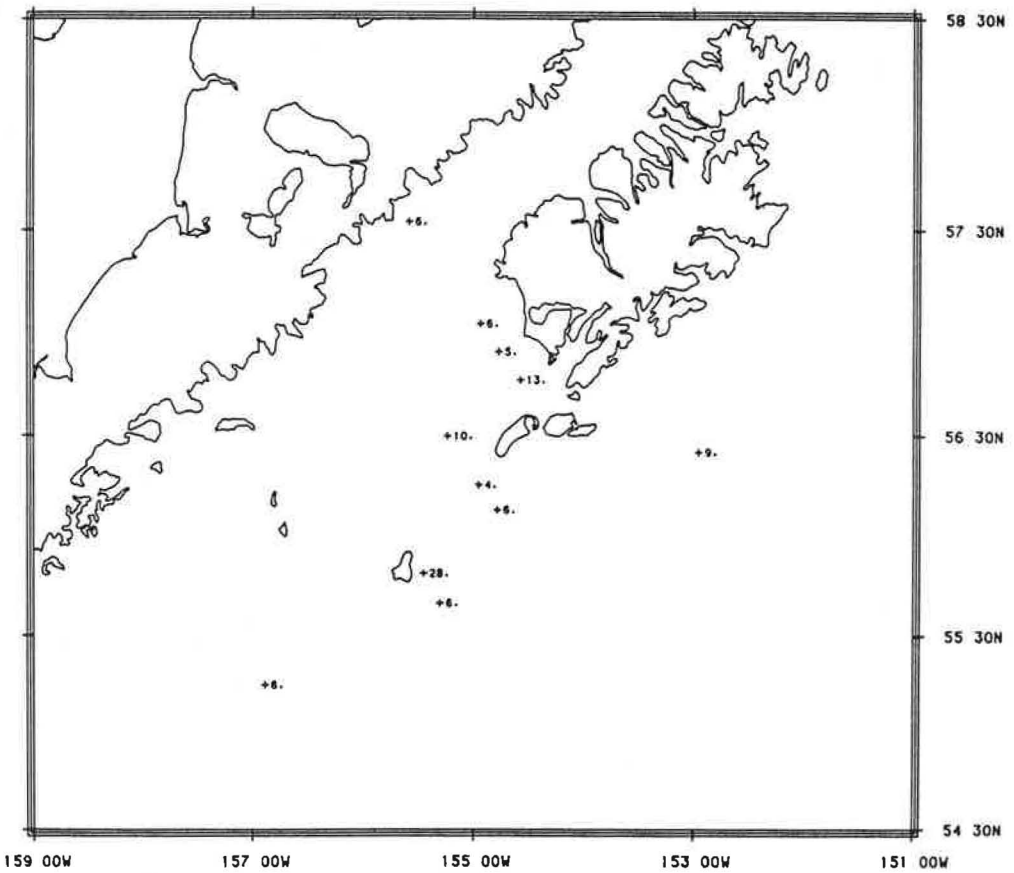
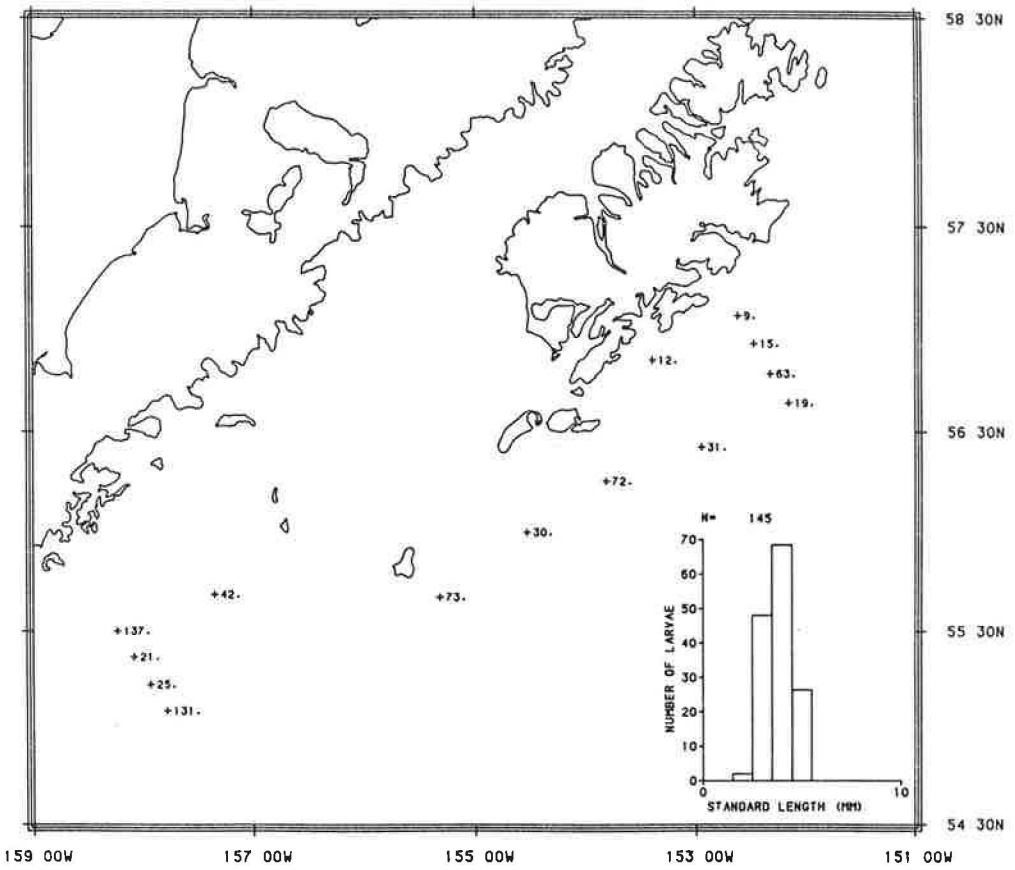


Figure 28.--Distribution of larvae of Cyclopteridae from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.



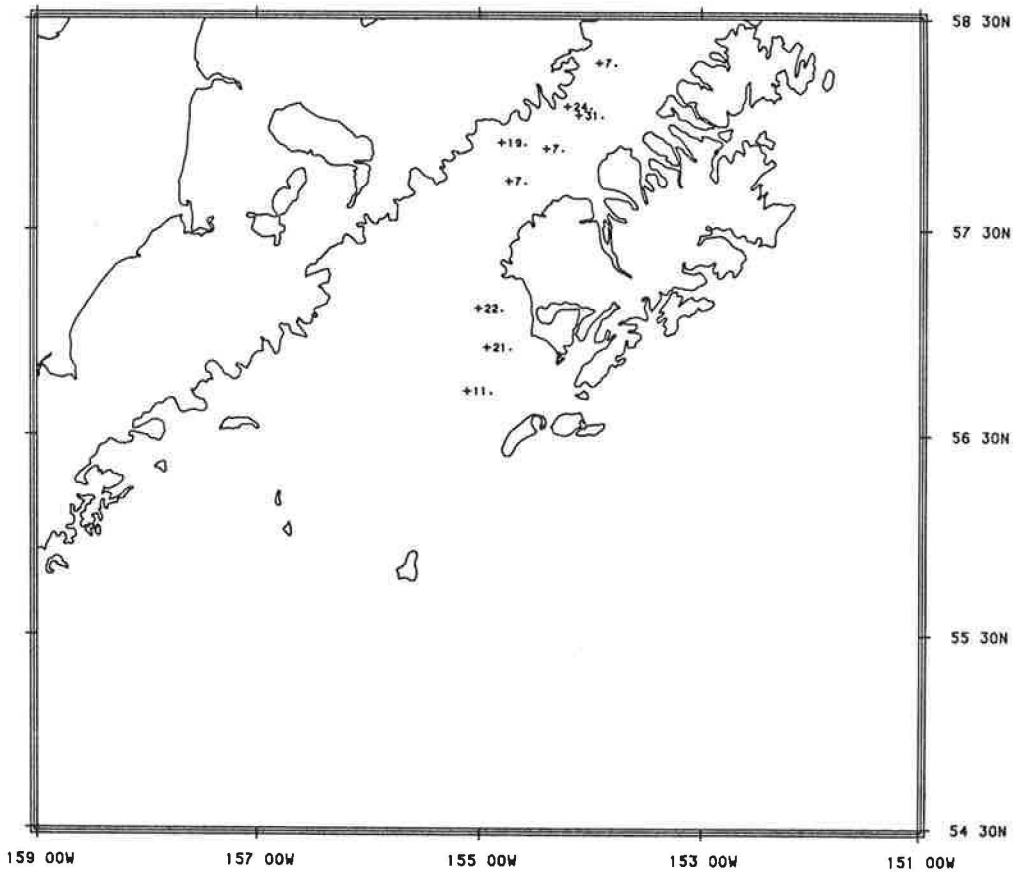
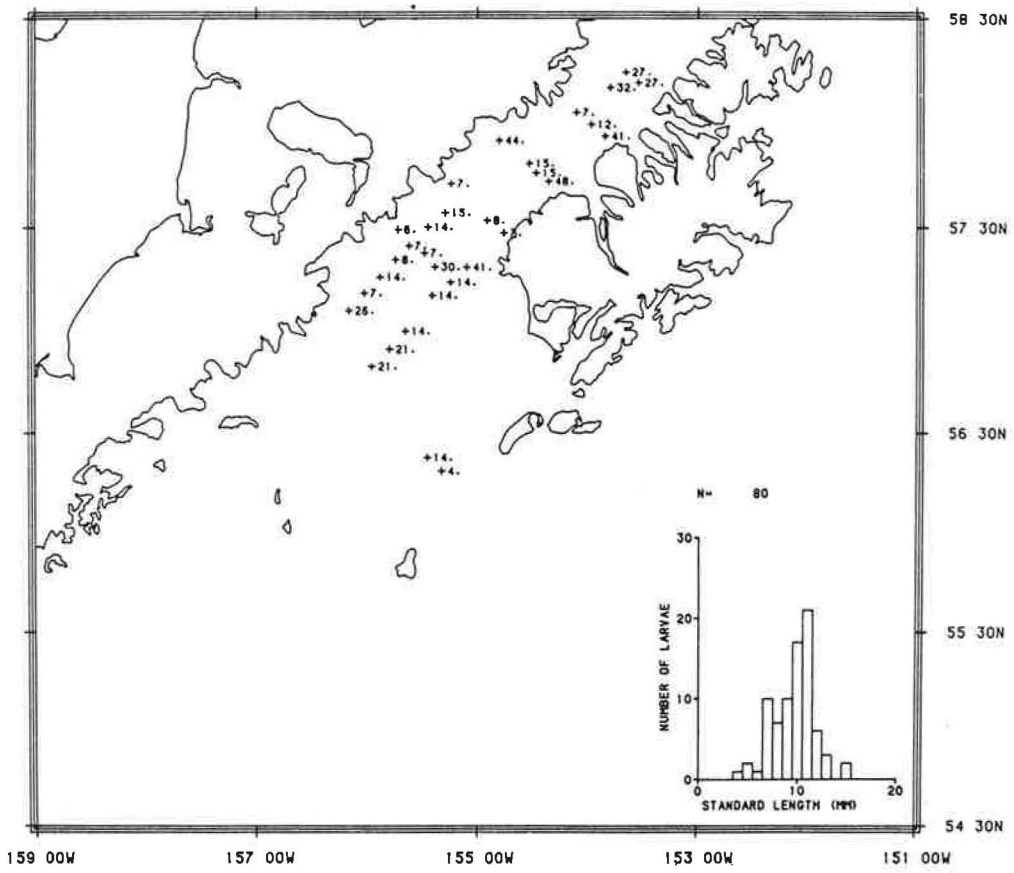


Figure 29.--Distribution of larvae of Gadus macrocephalus from bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.



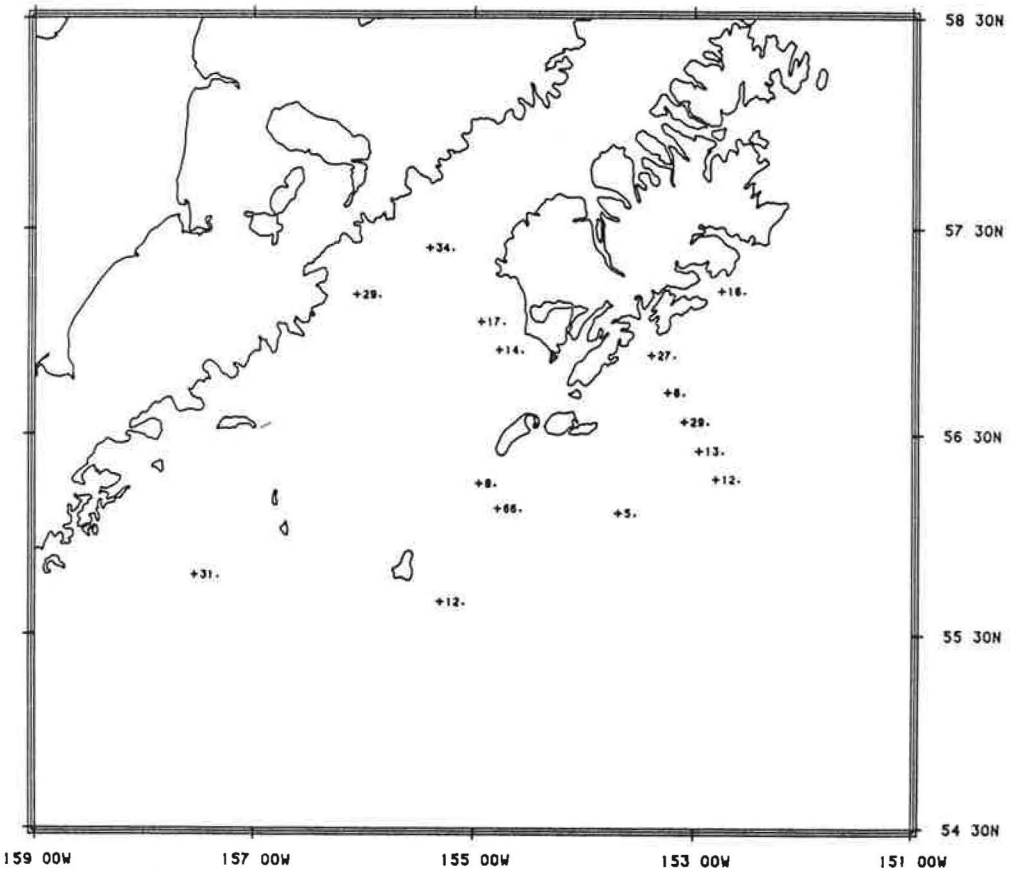


Figure 30.--Distribution of larvae of Gadus macrocephalus from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

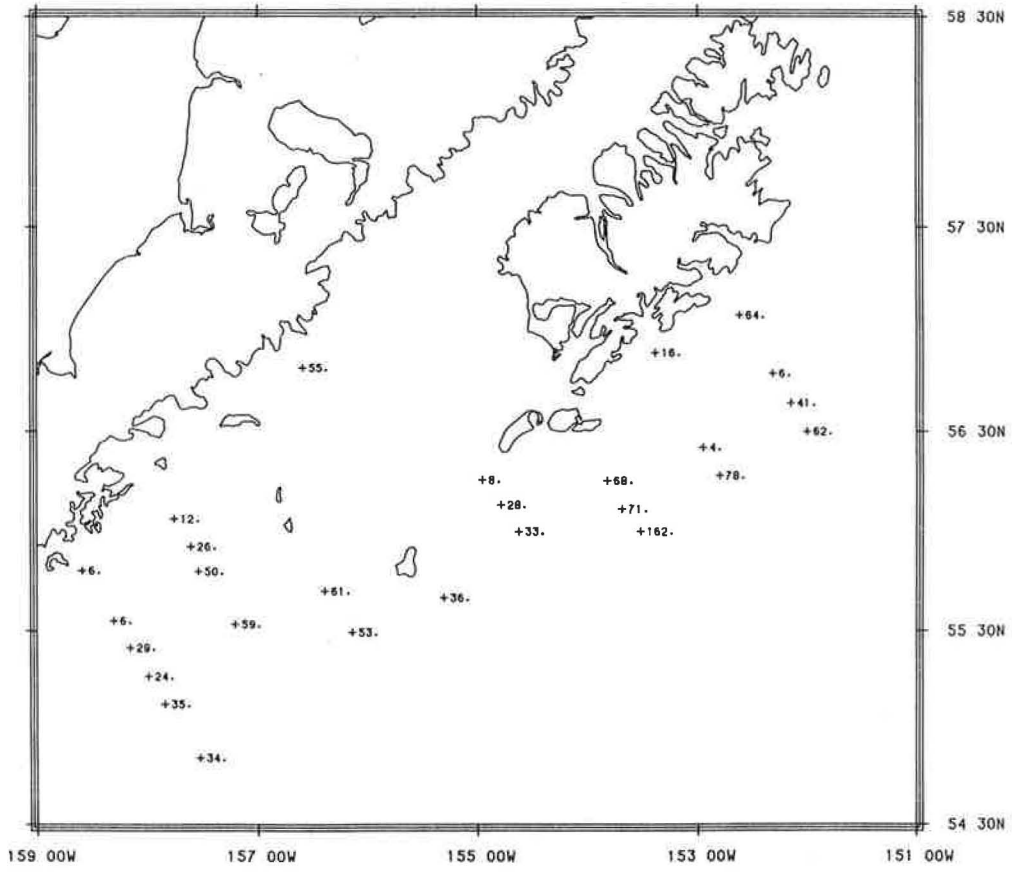


Figure 31.--Distribution of eggs of Glyptocephalus zachirus from bongo tows during cruise 3SH81. Abundance expressed as numbers per $10m^2$.

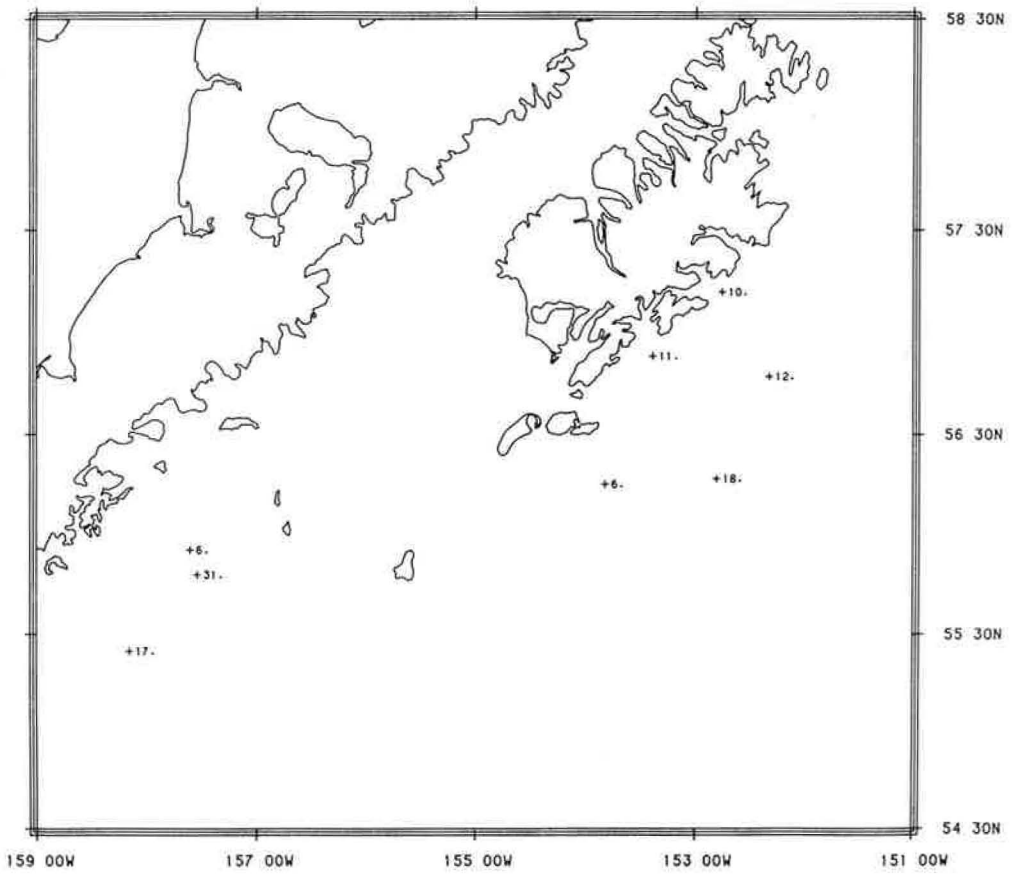


Figure 32.--Distribution of larvae of Glyptocephalus zachirus from bongo tows during cruise 3SH81. Abundance expressed as numbers per $10m^2$.

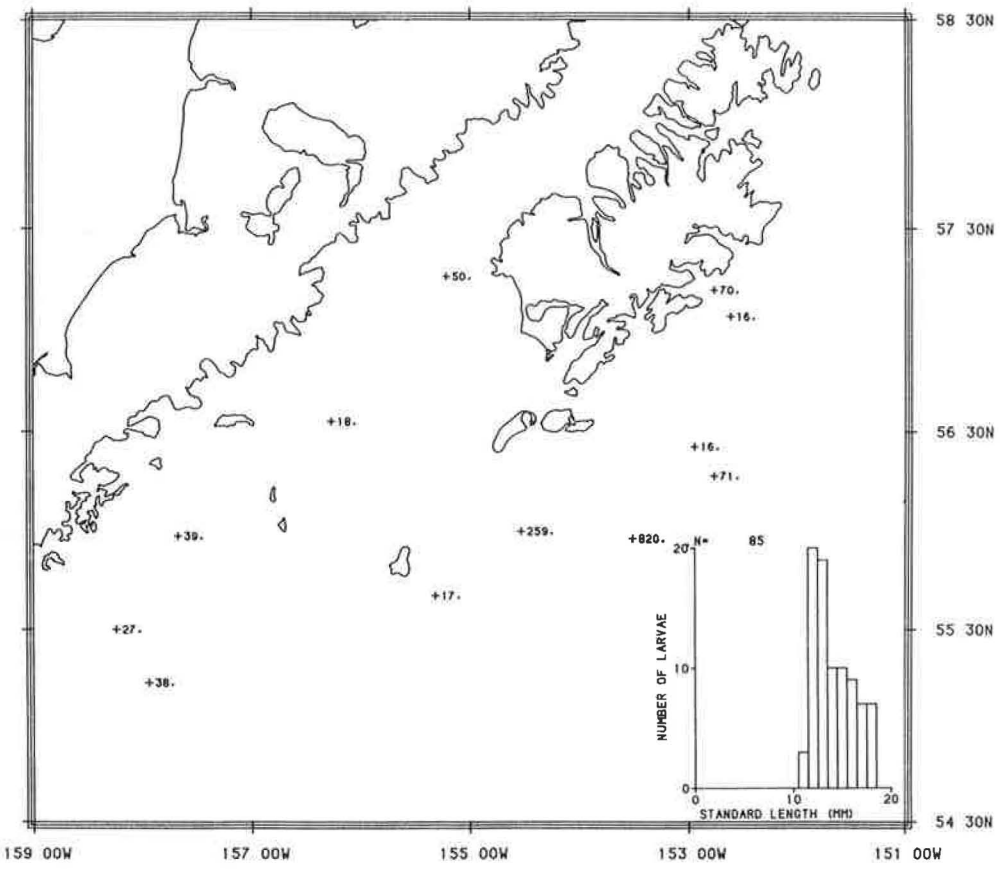
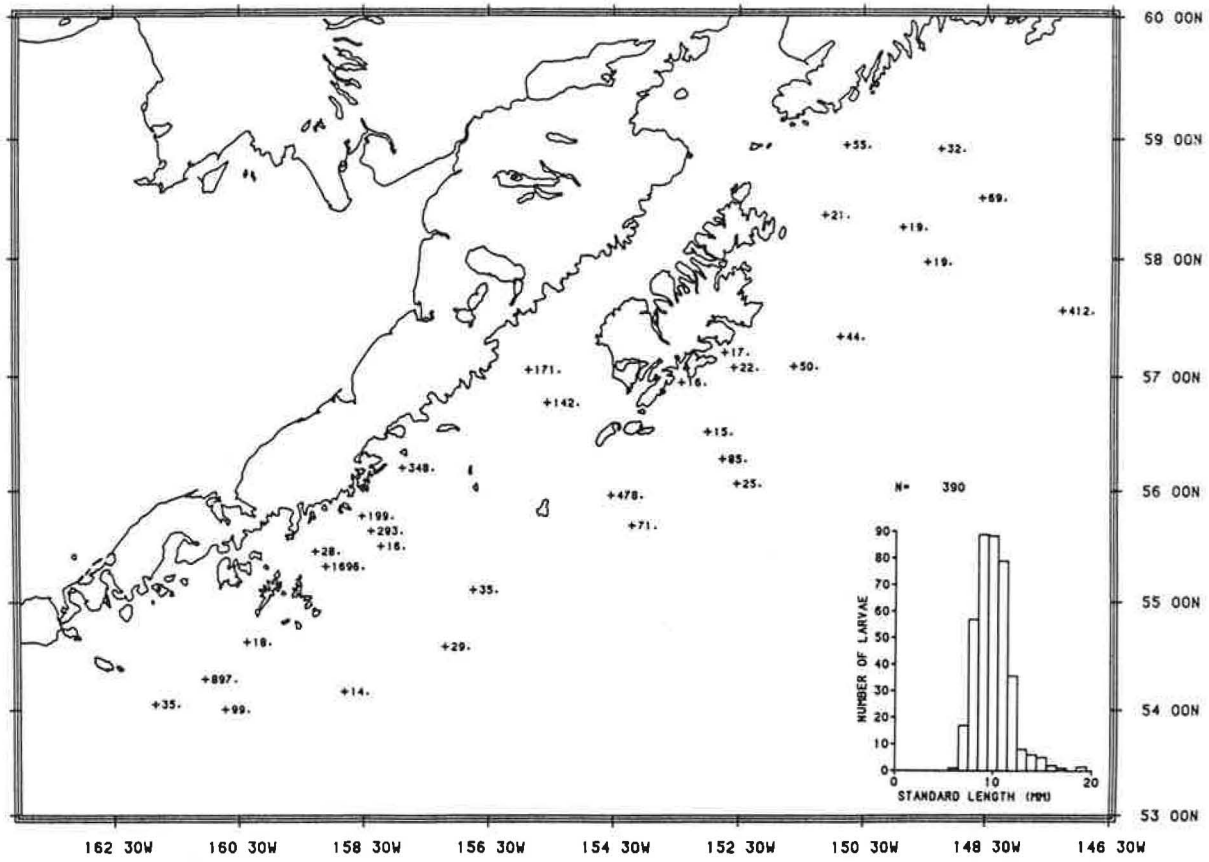


Figure 33.--Distribution of larvae of Hemilepidotus hemilepidotus from neuston tows during cruise 2SH81. Abundance expressed as numbers per 1000m^3.



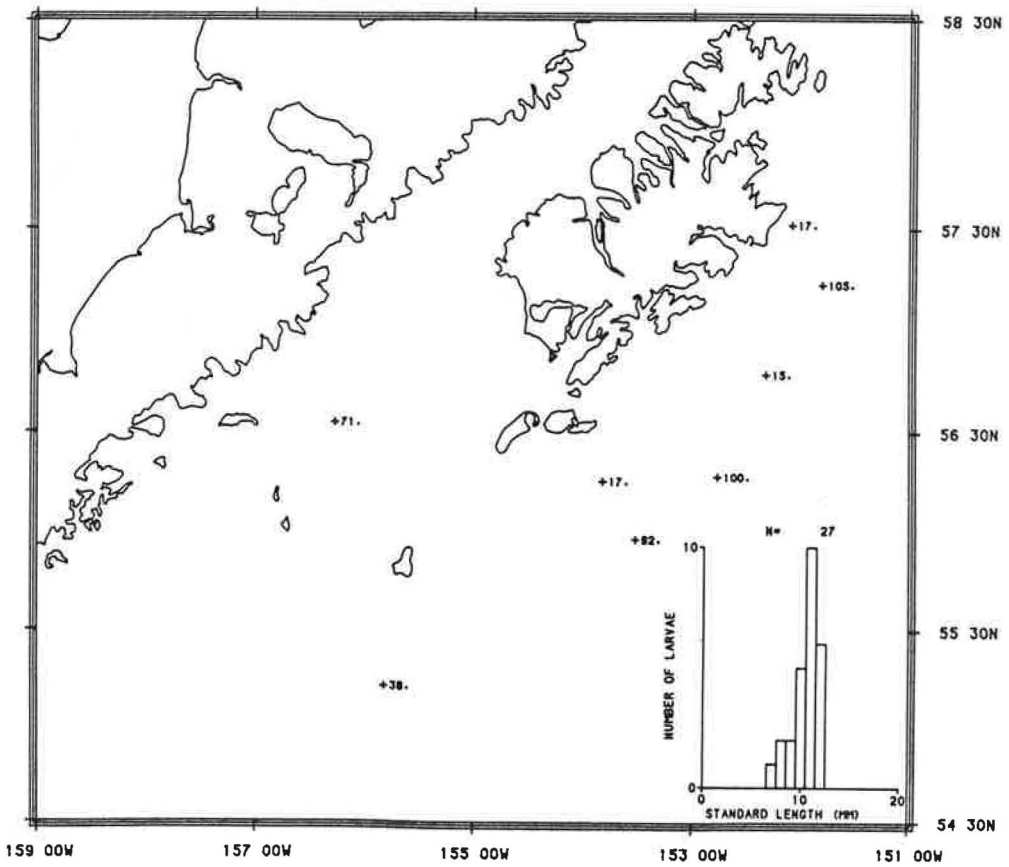


Figure 34.--Distribution of larvae of Hemilepidotus sp. from neuston tows during cruise 1SH81 (above) and cruise 2SH81 (below). Abundance expressed as numbers per 1000m^3.

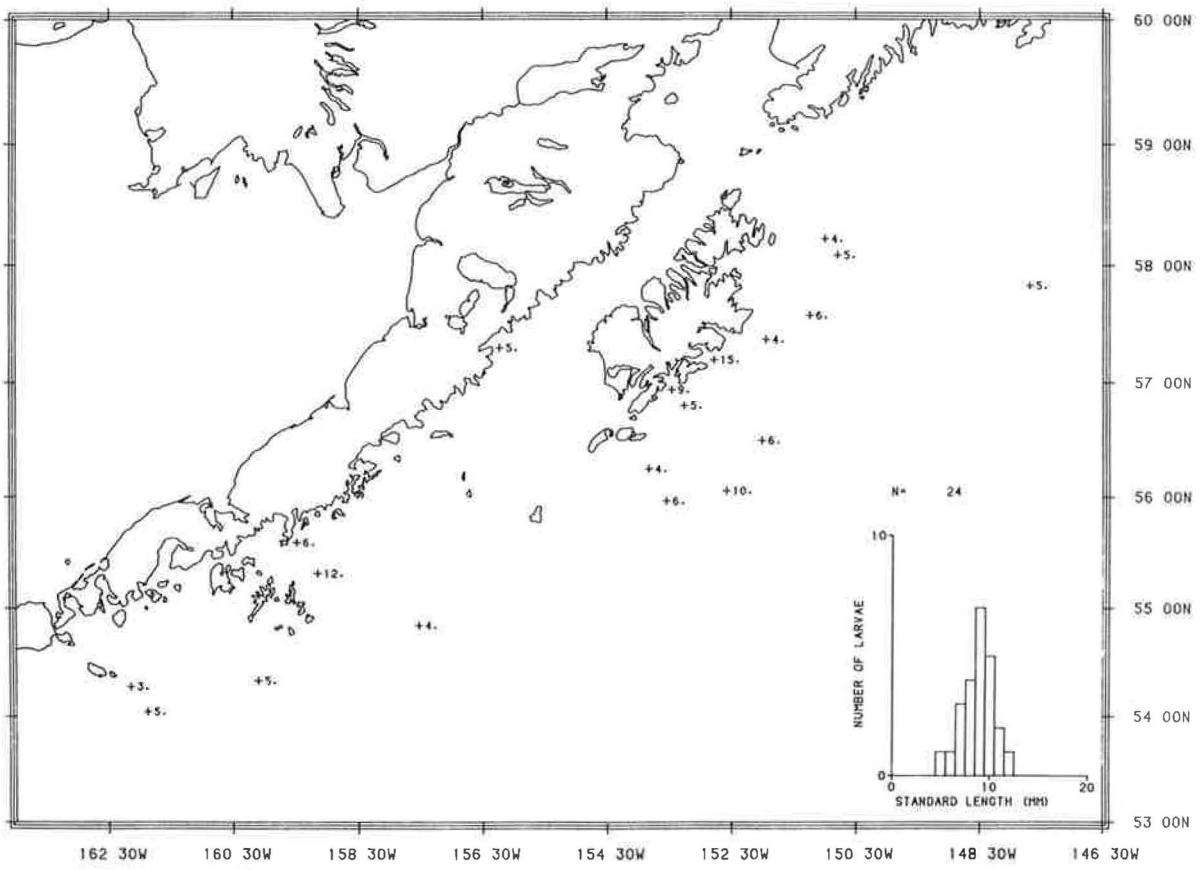
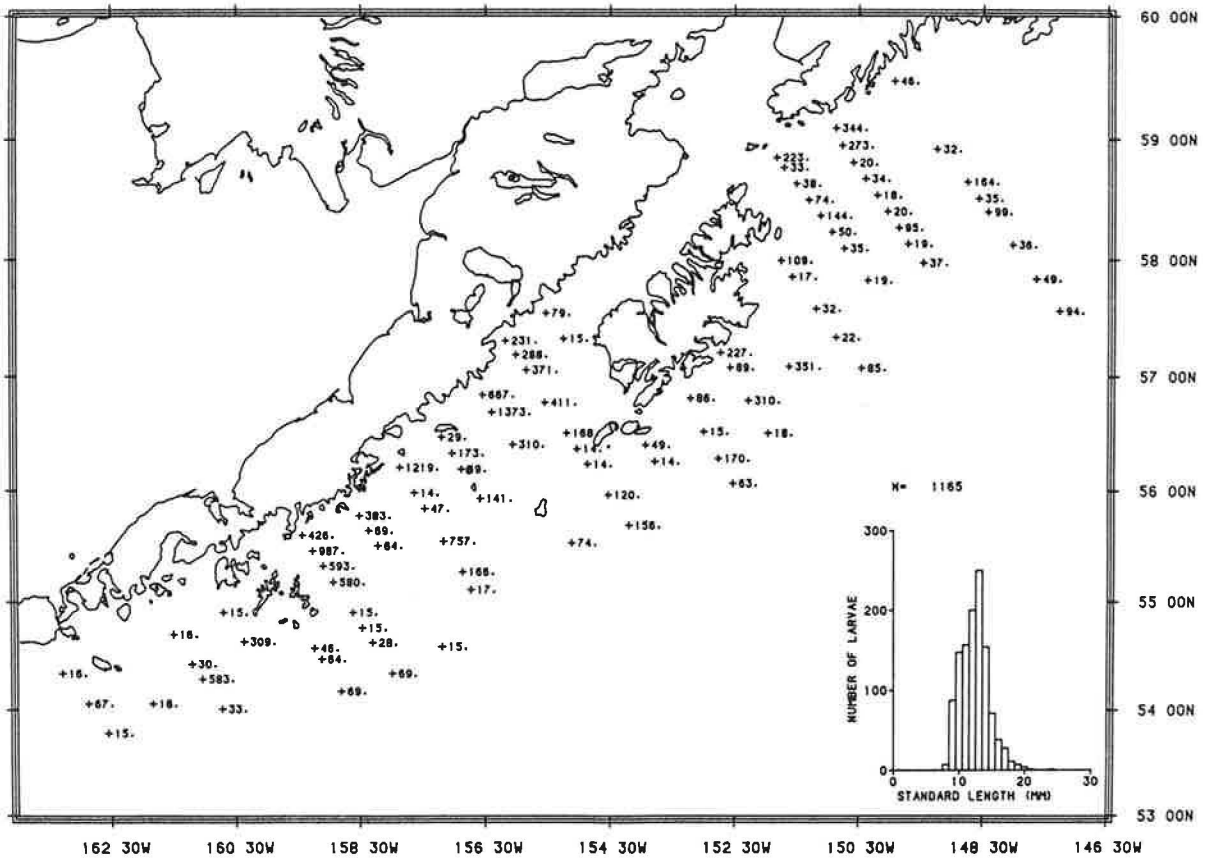


Figure 35.--Distribution of larvae of Hemilepidotus sp. from bongo tows during cruise 1SH81. Abundance expressed as numbers per $10m^2$.



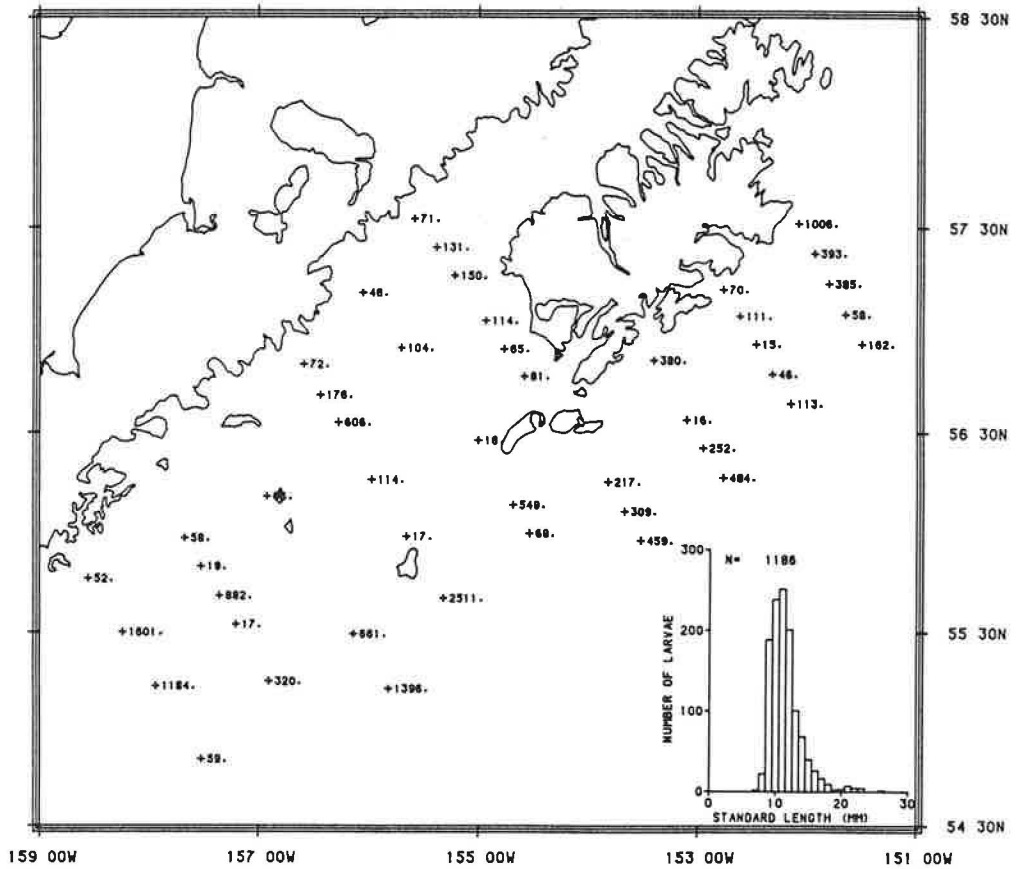
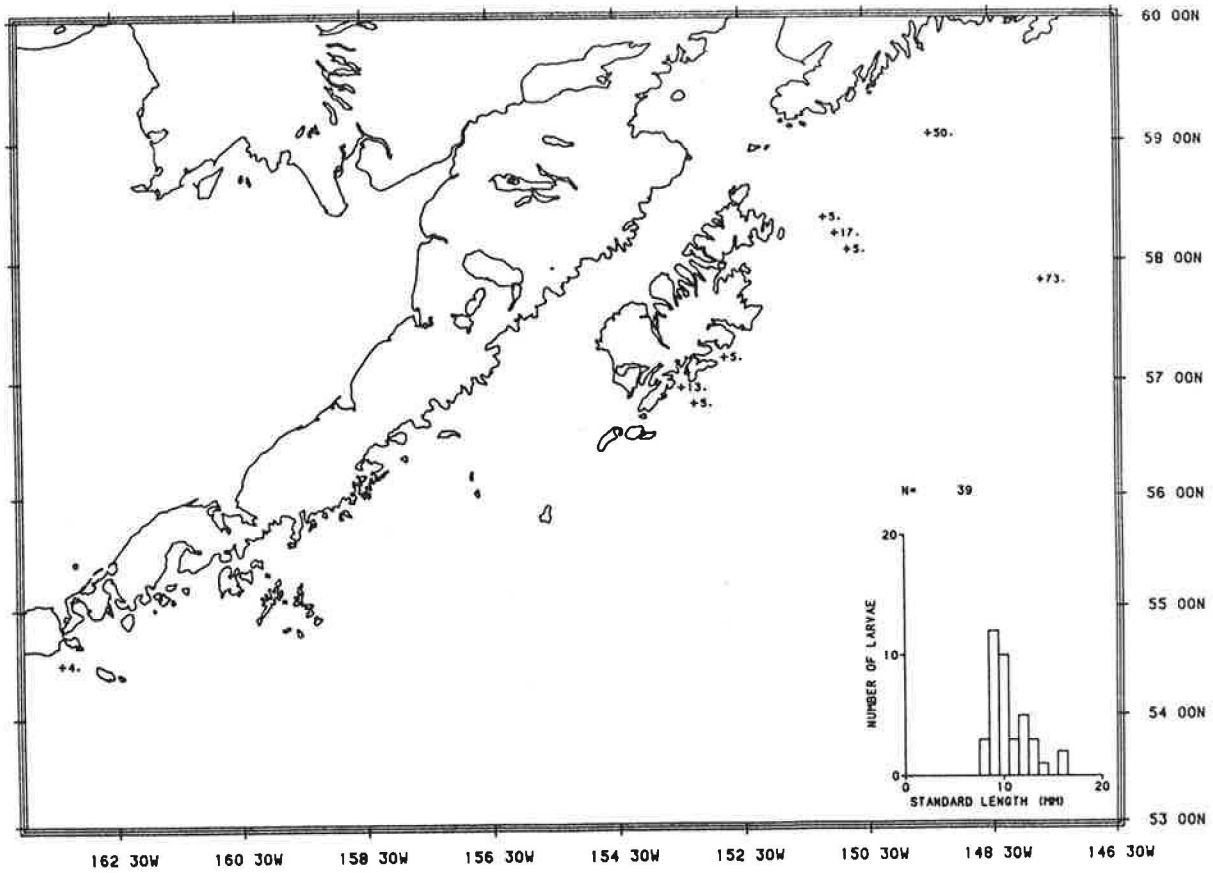


Figure 36.--Distribution of larvae of Hexagrammos decagrammus from neuston tows during cruise 1SH81 (above) and cruise 2SH81 (below). Abundance expressed as numbers per 1000m^3.



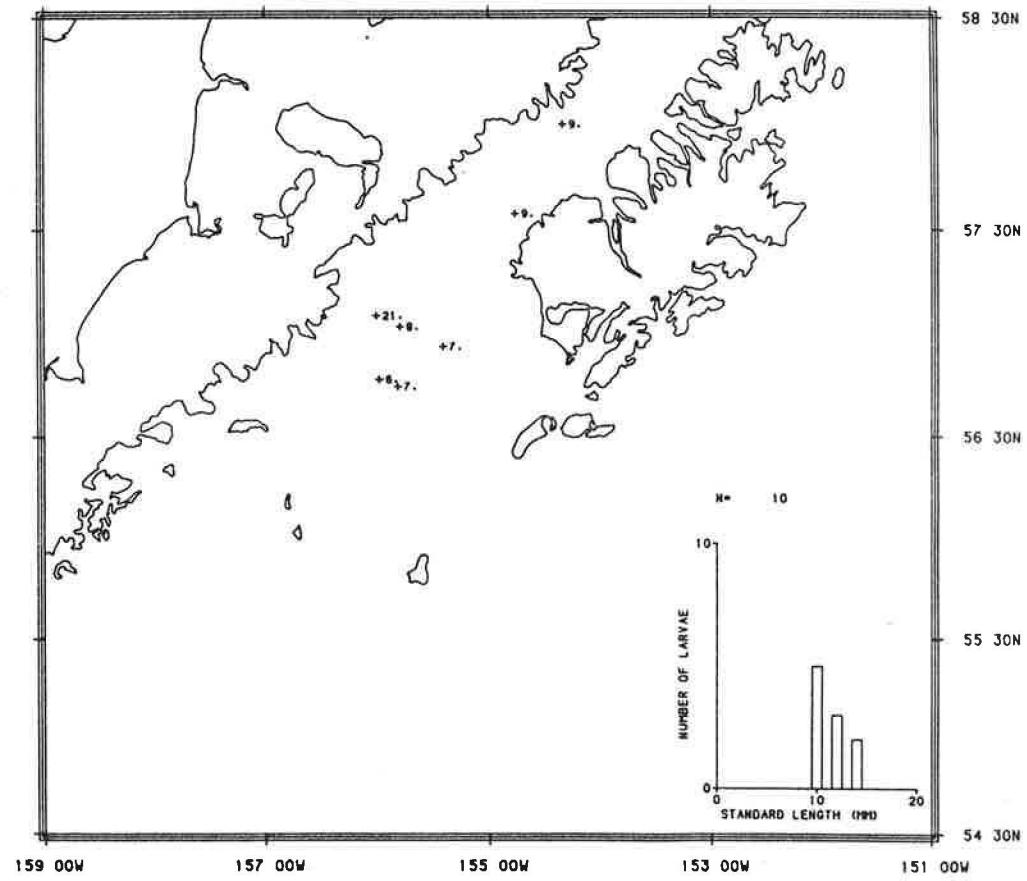


Figure 37.--Distribution of larvae of Hexagrammos decagrammus from bongo tows during cruise 1SH81 (above) and cruise 1MF81 (below). Abundance expressed as numbers per $10m^2$.

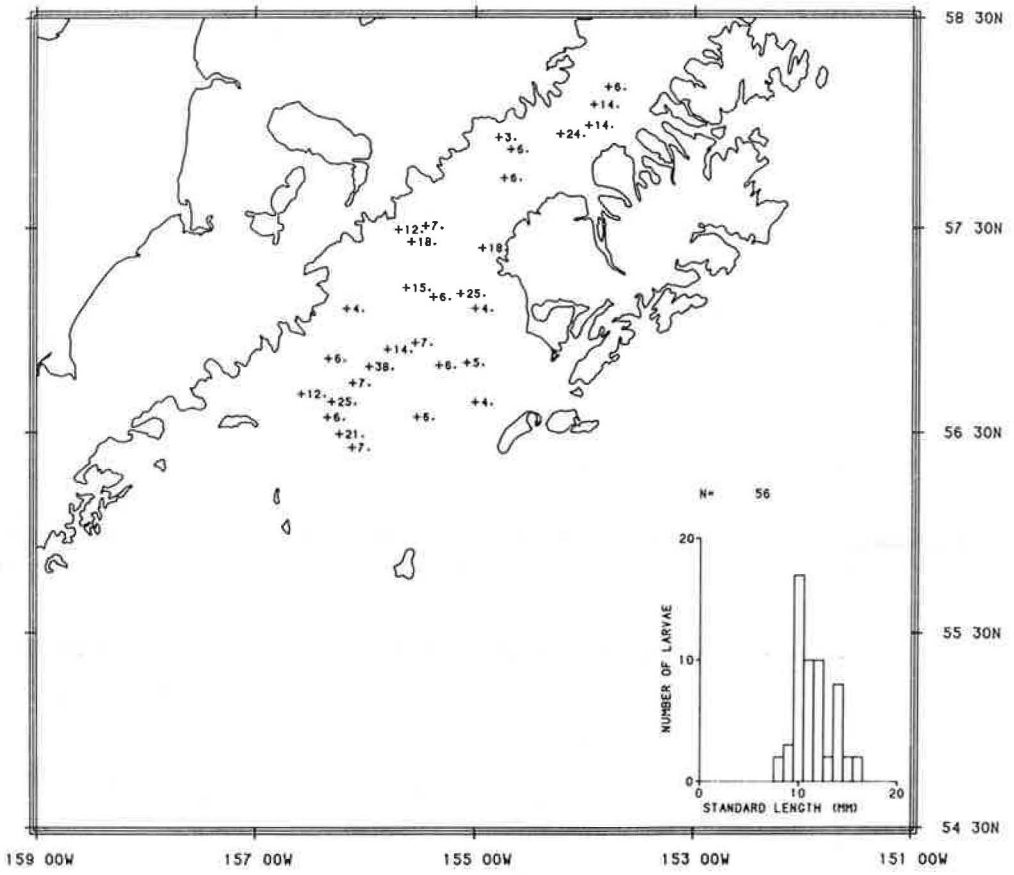


Figure 38.--Distribution of larvae of Hexagrammos decagrammus from bongo tows during cruise 2MF81. Abundance expressed as numbers per $10m^2$.

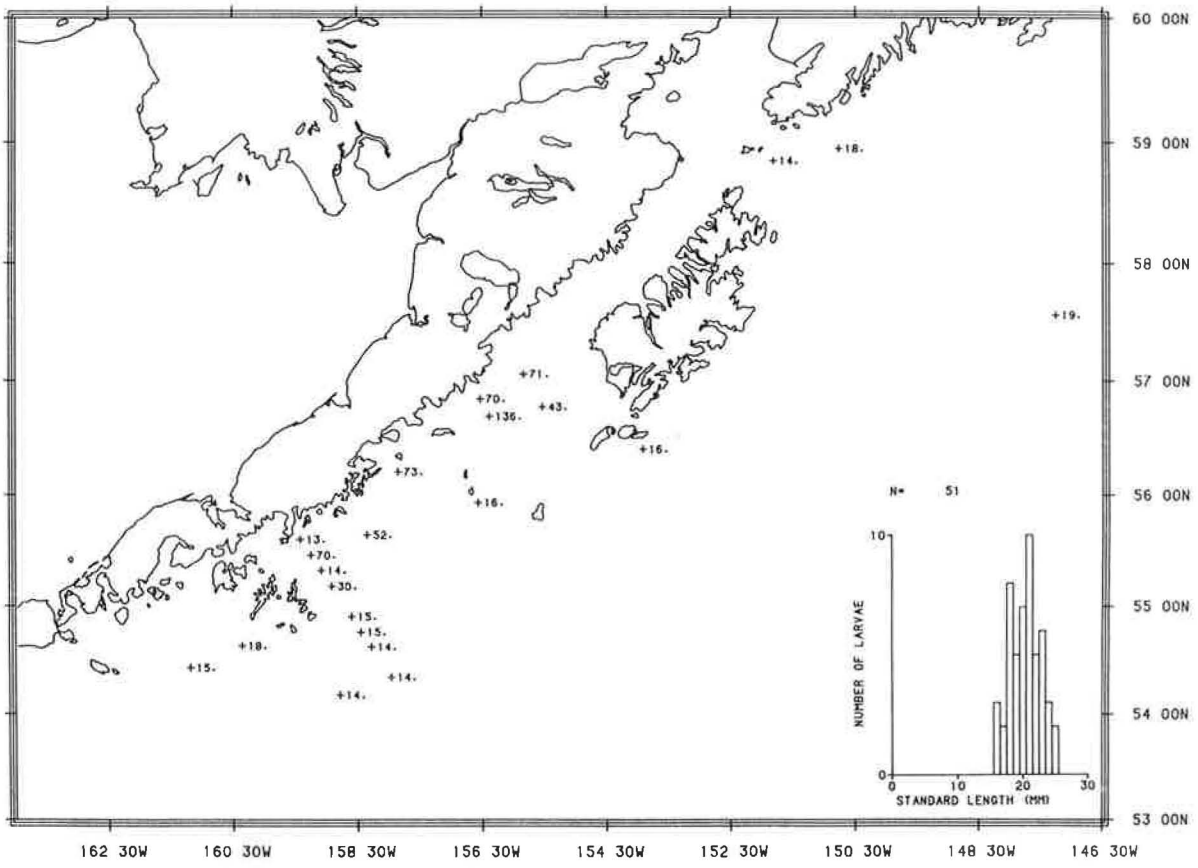


Figure 39.--Distribution of larvae of Hexagrammos stelleri from neuston tows during cruise 1SH81. Abundance expressed as numbers per $1000m^3$.

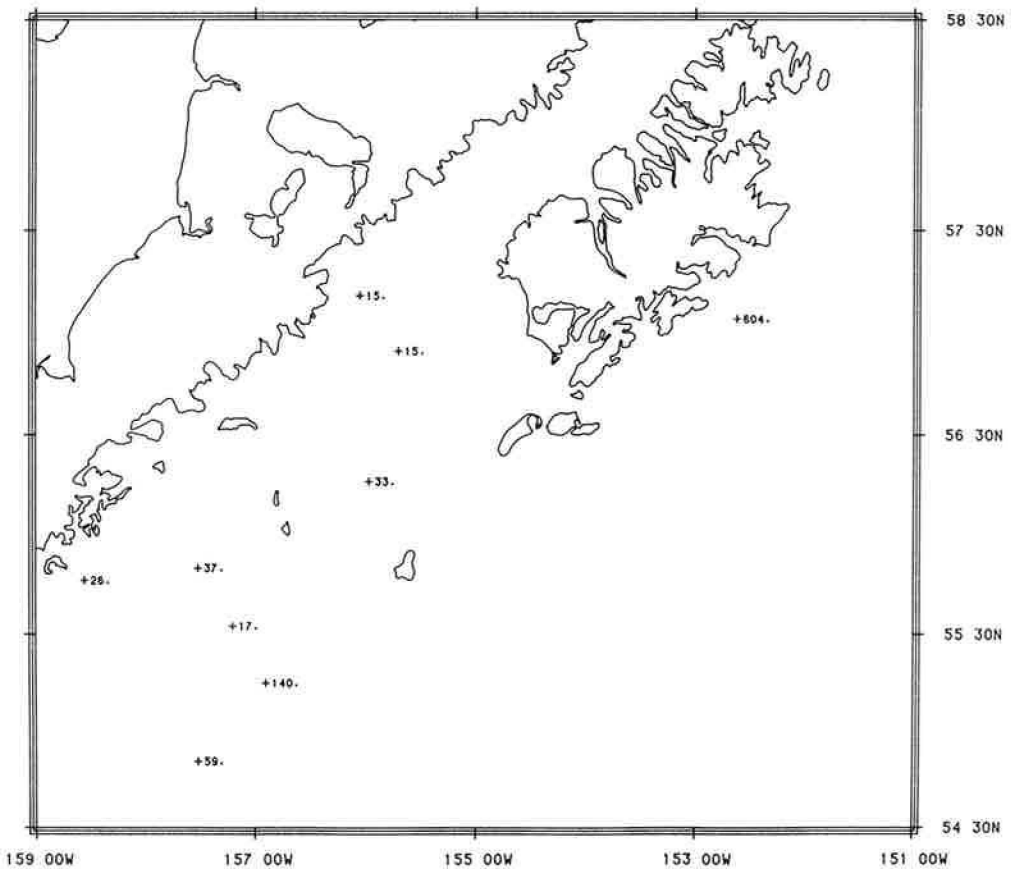


Figure 40.--Distribution of eggs of Hippoglossoides elassodon from neuston tows during cruise 2SH81. Abundance expressed as numbers per $1000m^3$.

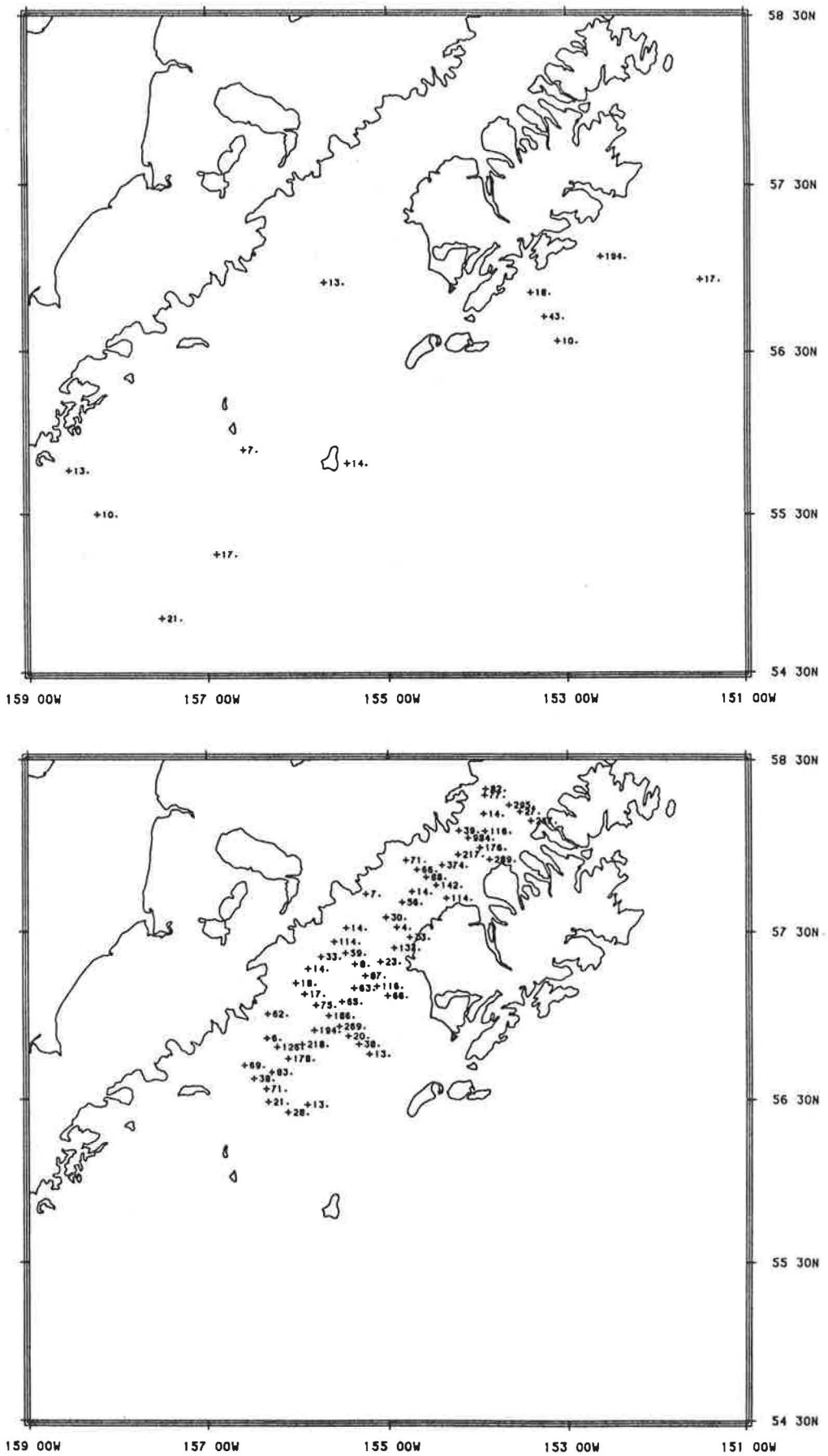


Figure 41.--Distribution of eggs of Hippoglossoides elassodon from bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.

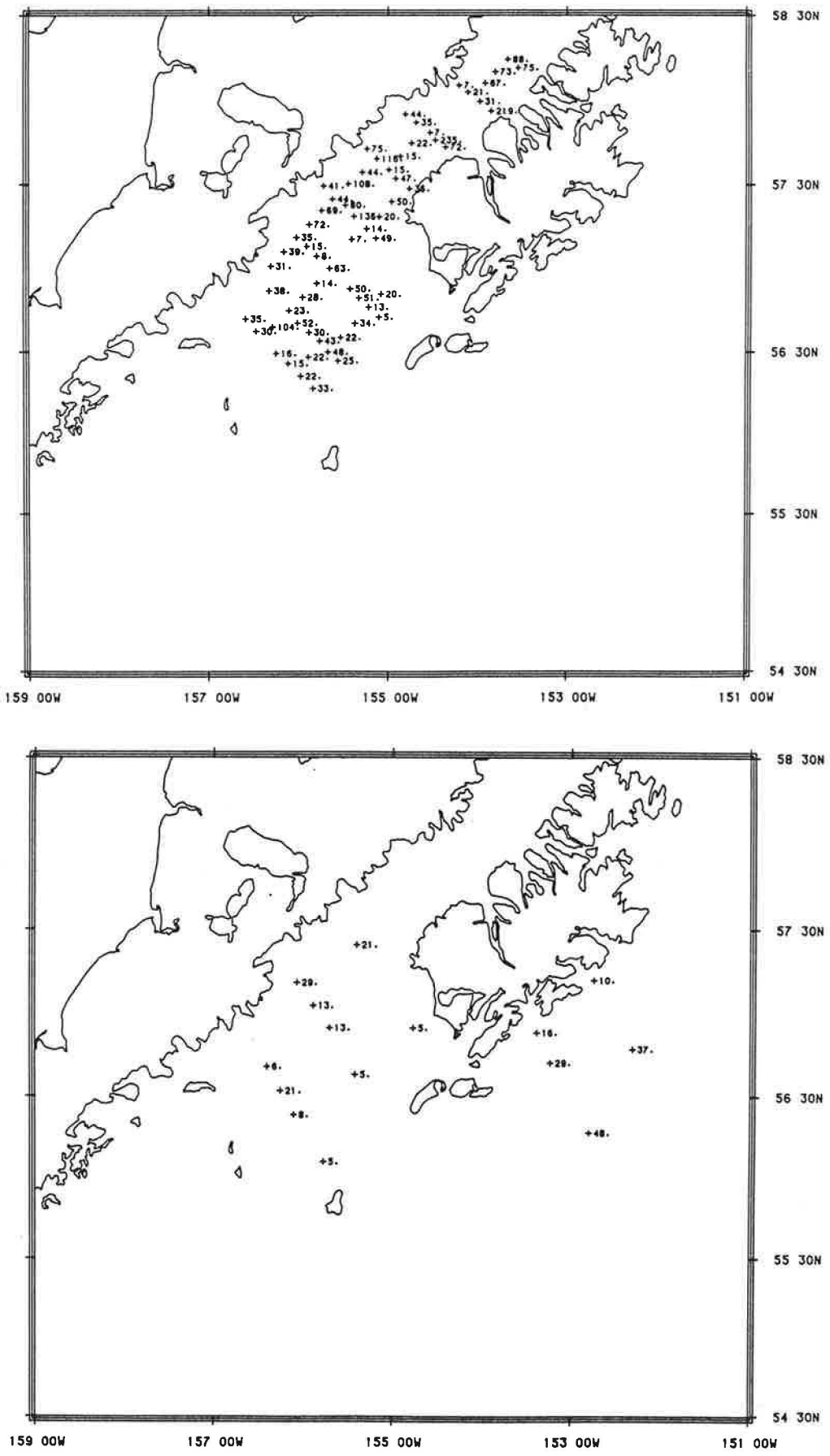


Figure 42.--Distribution of eggs of Hippoglossoides elassodon from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

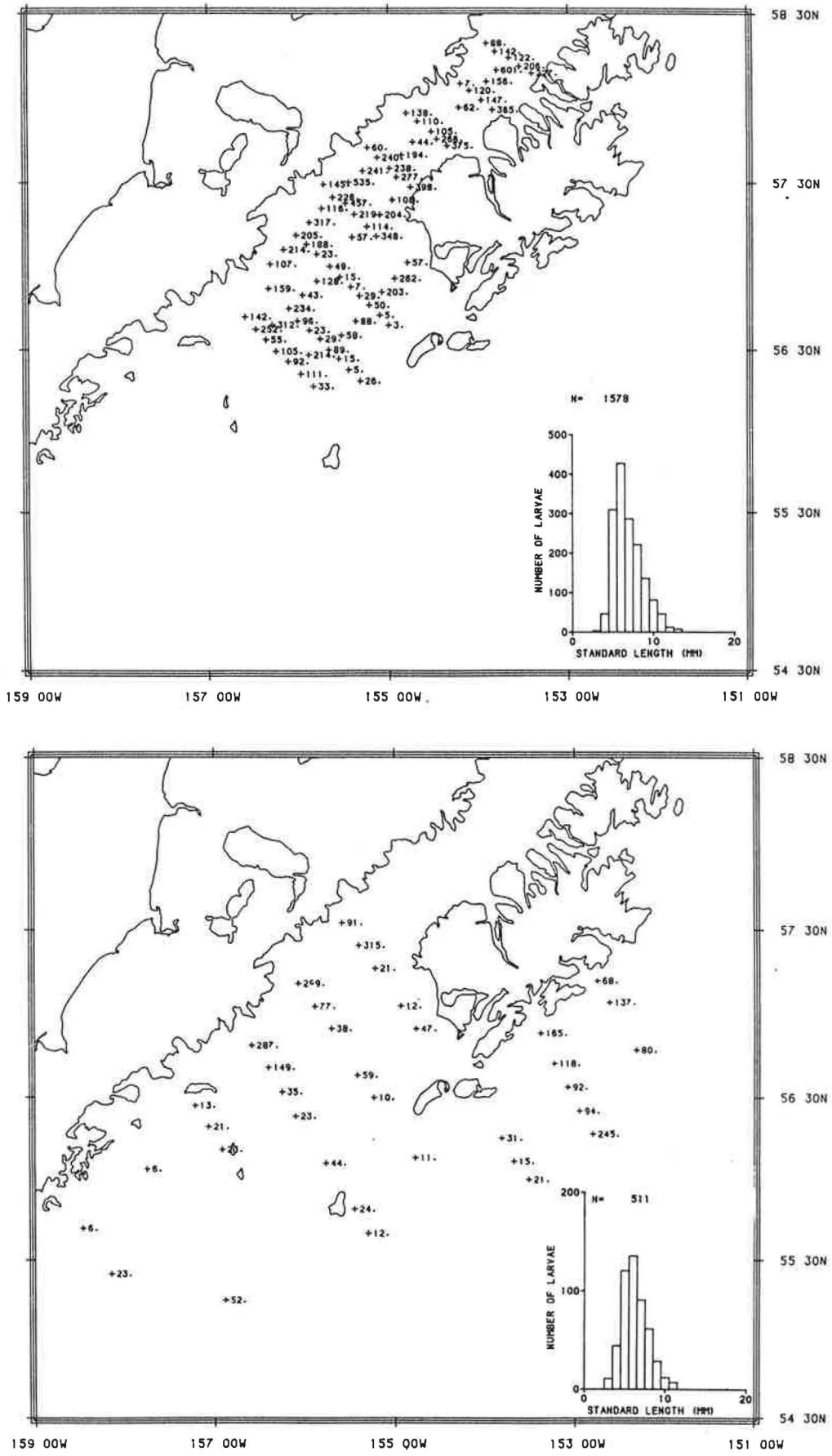


Figure 43.--Distribution of larvae of Hippoglossoides elassodon from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

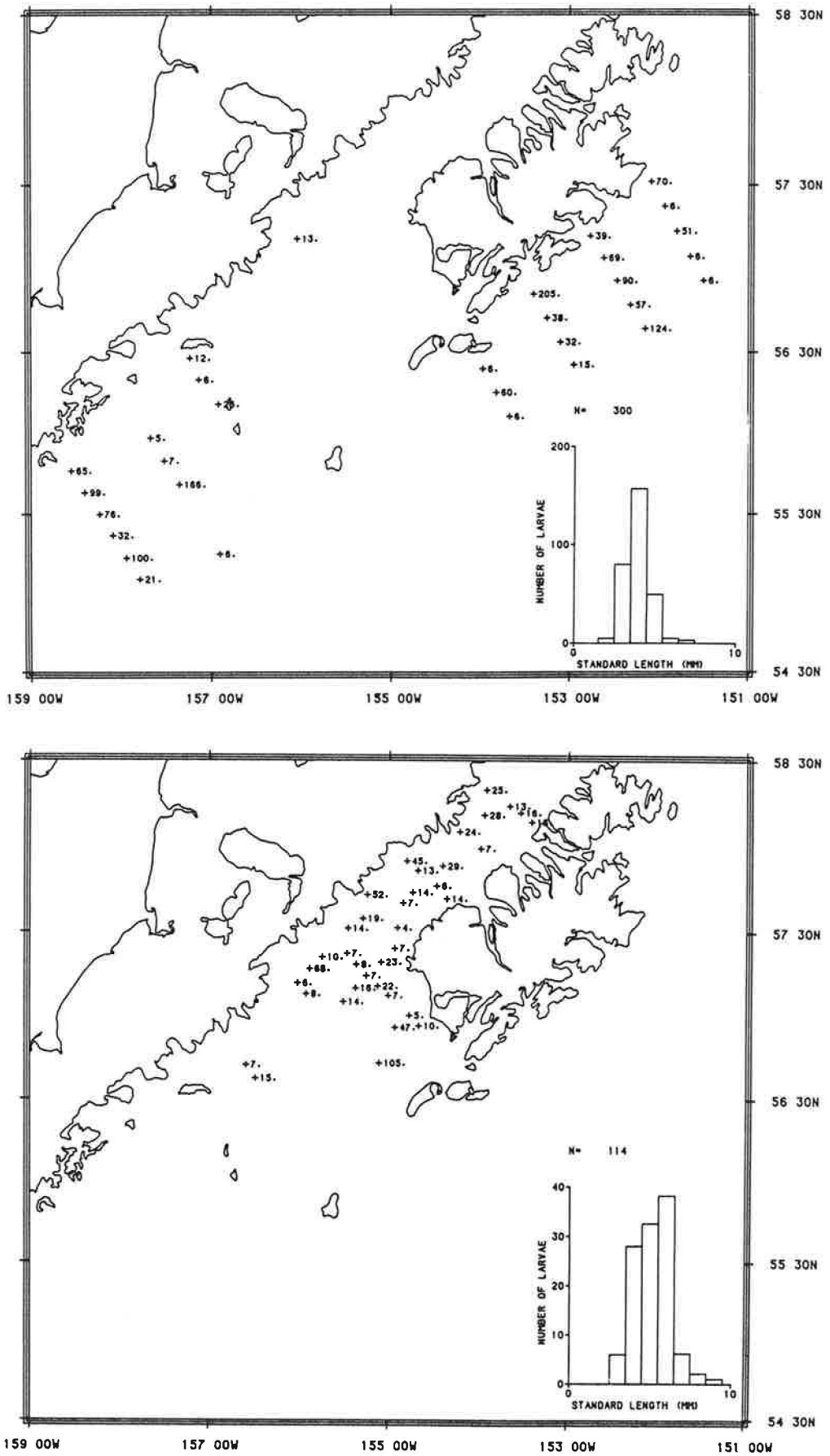


Figure 44.--Distribution of larvae of Lepidopsetta bilineata from bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.

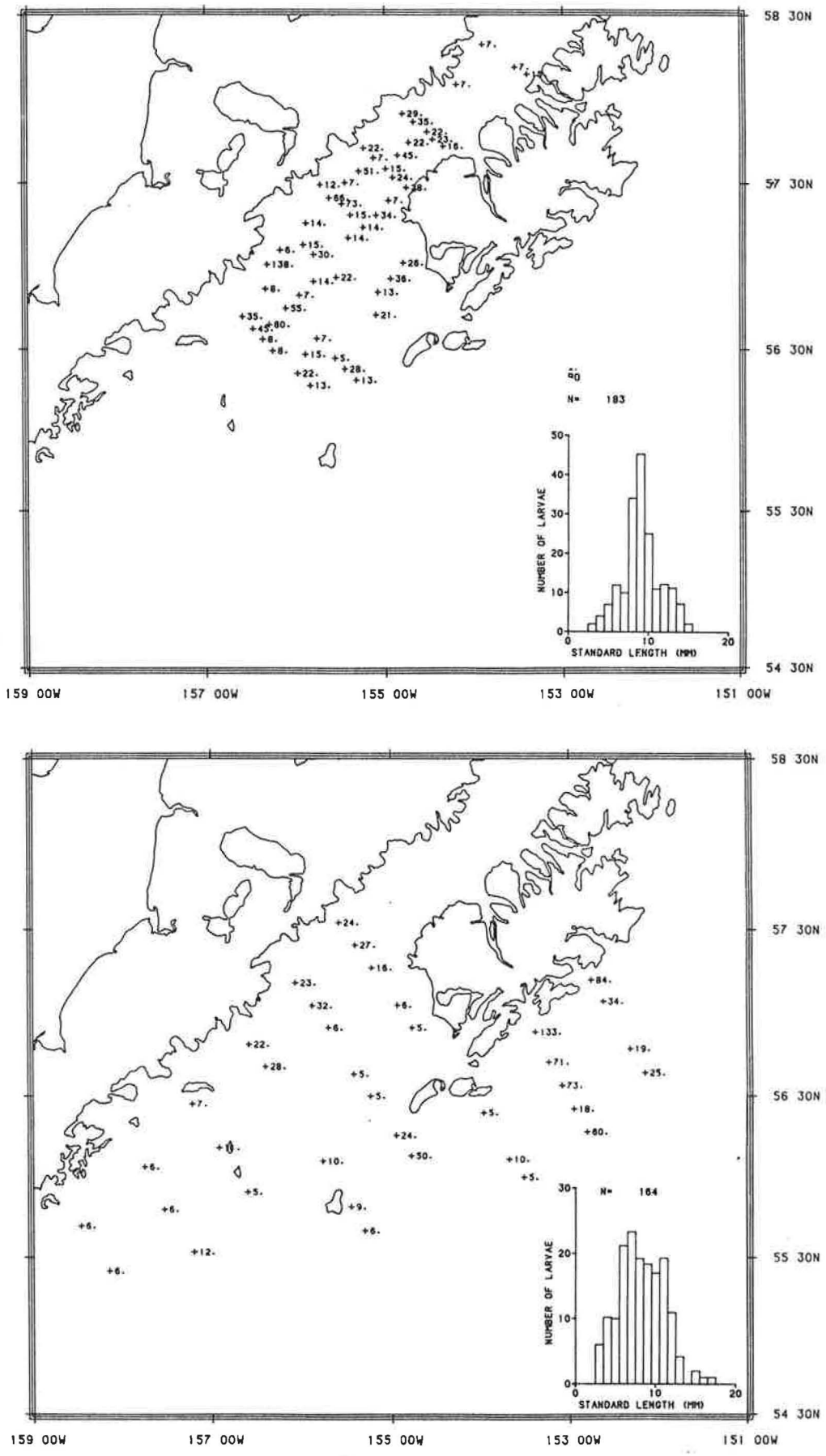


Figure 45.--Distribution of larvae of Lepidopsetta bilineata from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

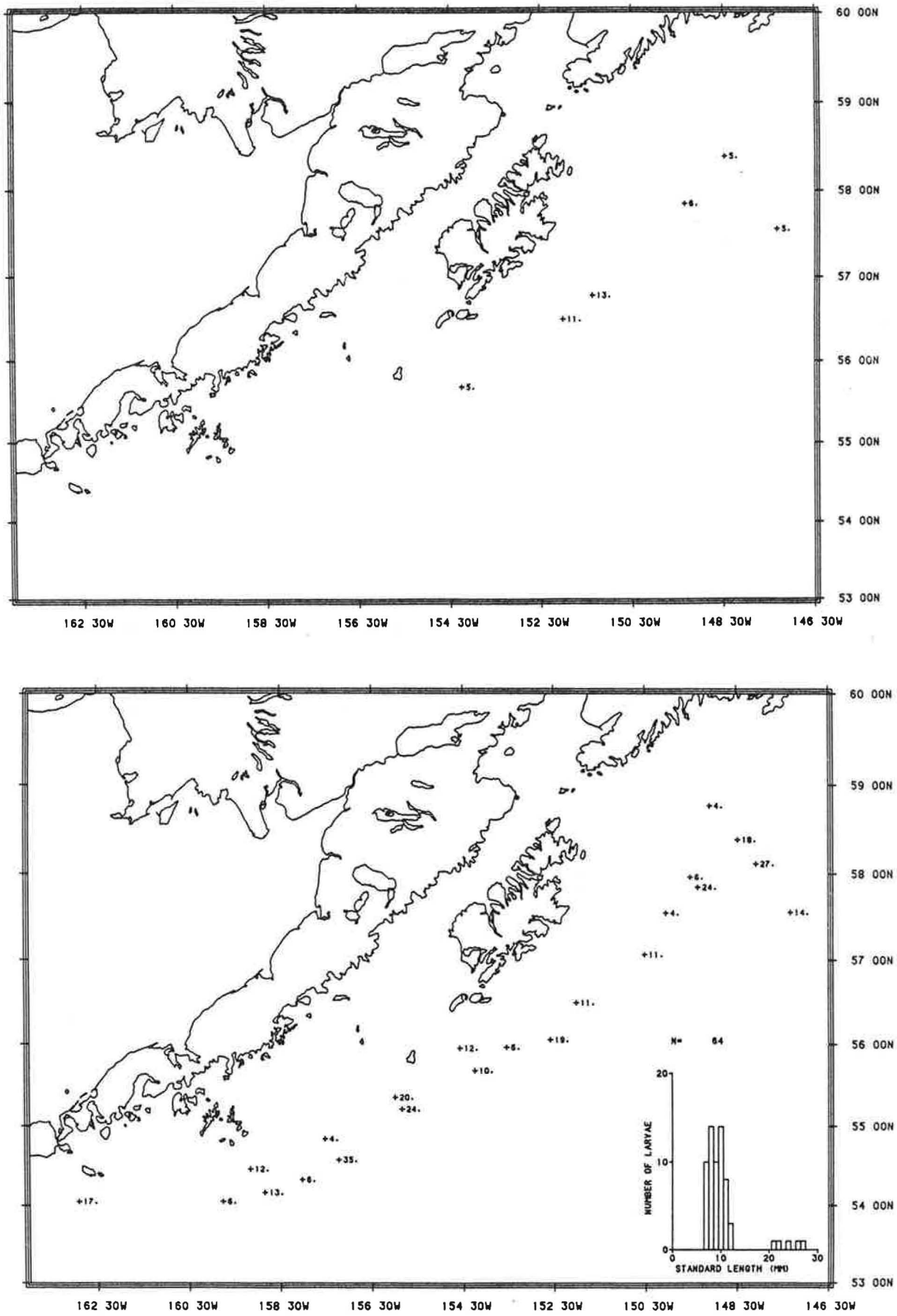


Figure 46.--Distribution of eggs (above) and larvae (below) of Leuroglossus schmidti from bongo tows during cruise 1SH81. Abundance expressed as numbers per $10m^2$.

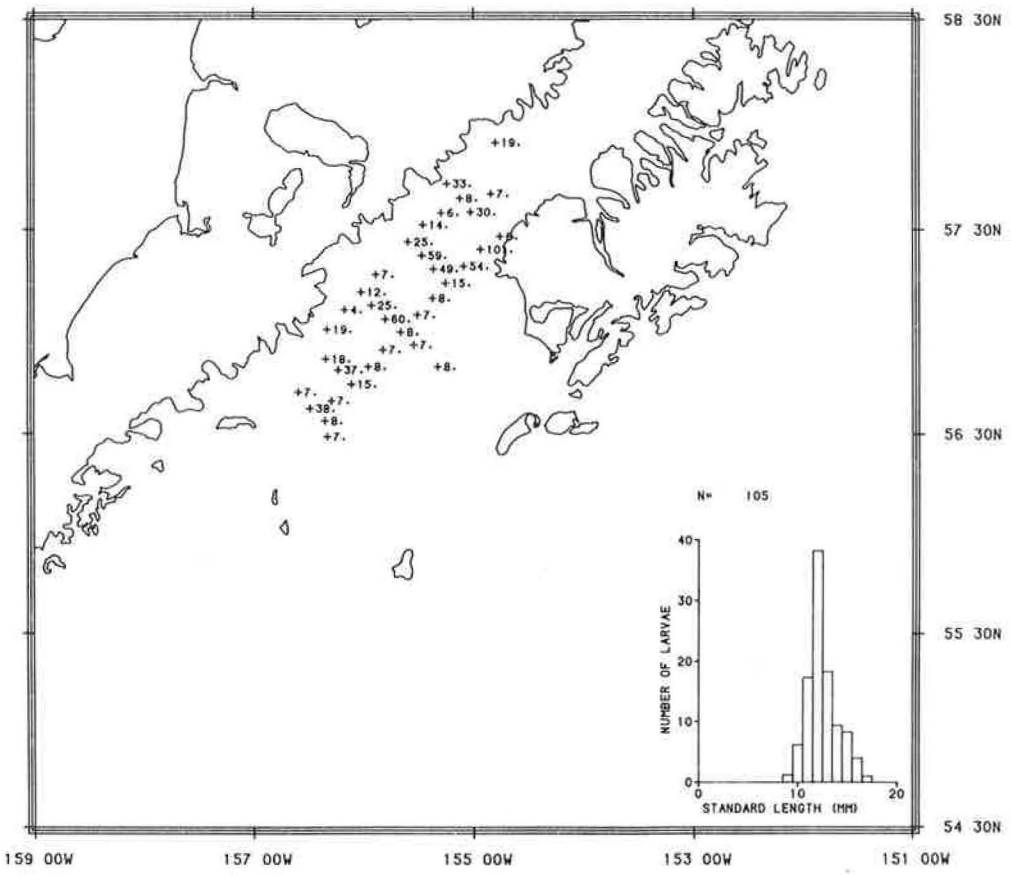


Figure 47.--Distribution of larvae of Lumpenella longirostris from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

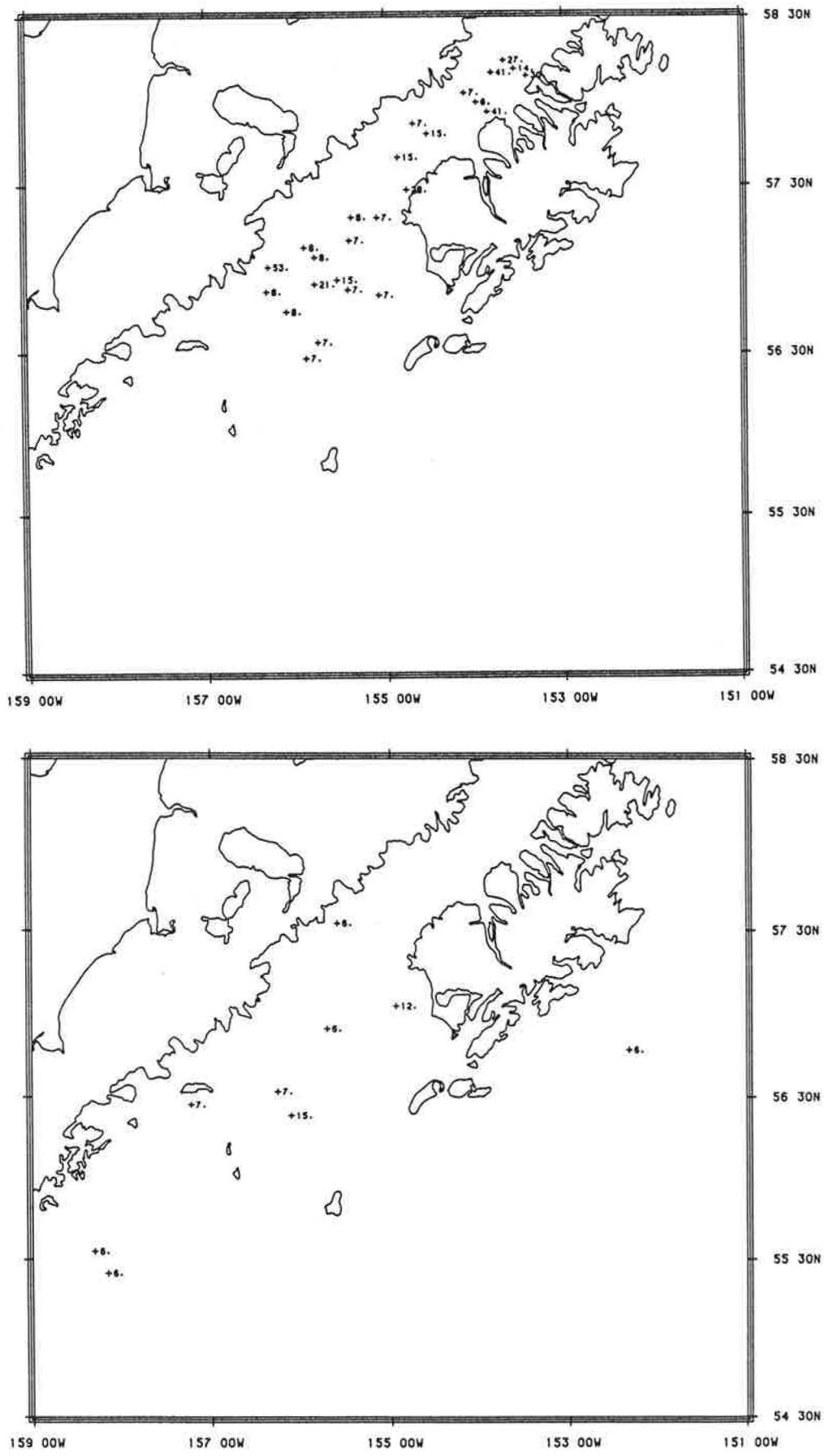
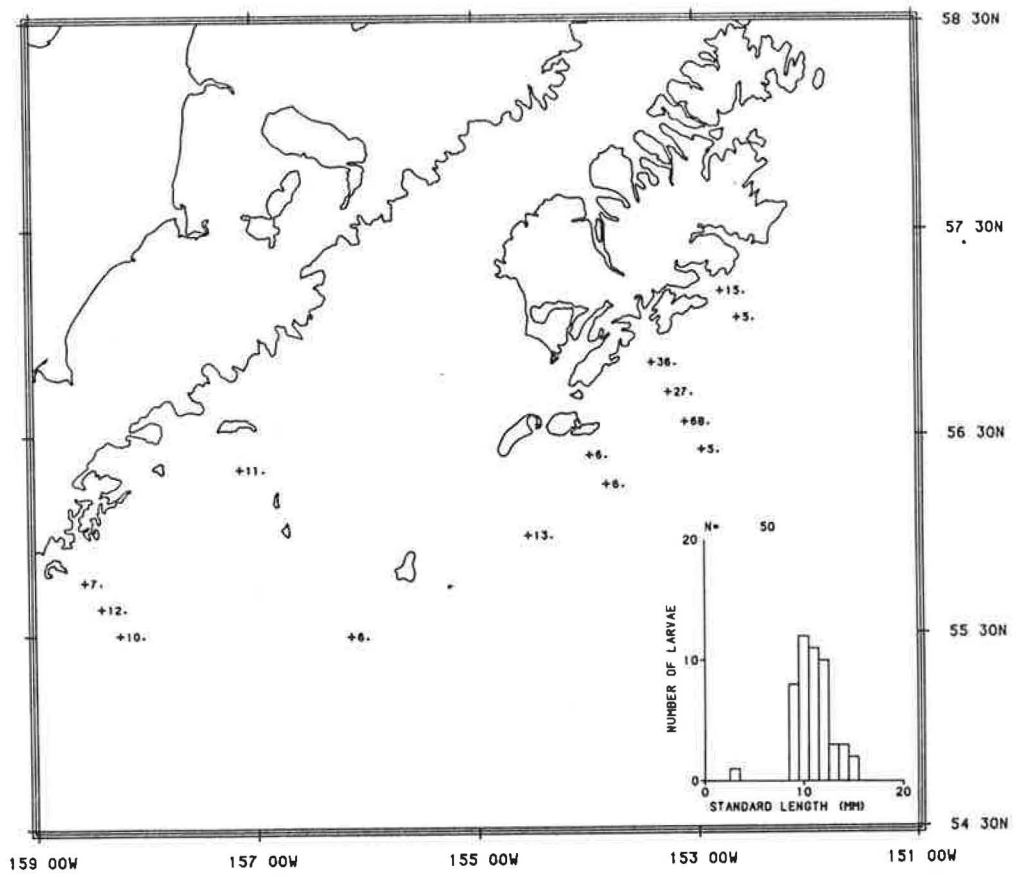


Figure 48.--Distribution of larvae of Lumpenella longirostris from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.



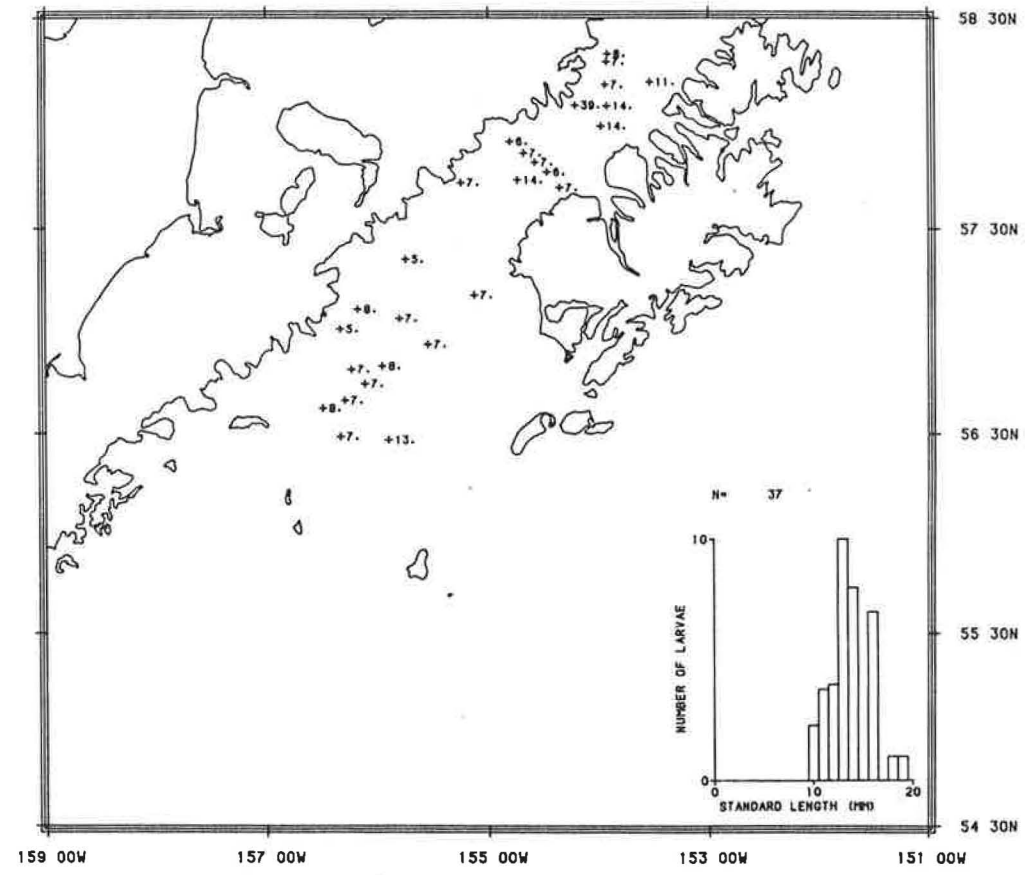


Figure 49.--Distribution of larvae of Lumpenus maculatus from bongo tows during cruise 2SH81 (above) and cruise 3MF81 (below). Abundance expressed as numbers per $10m^2$.

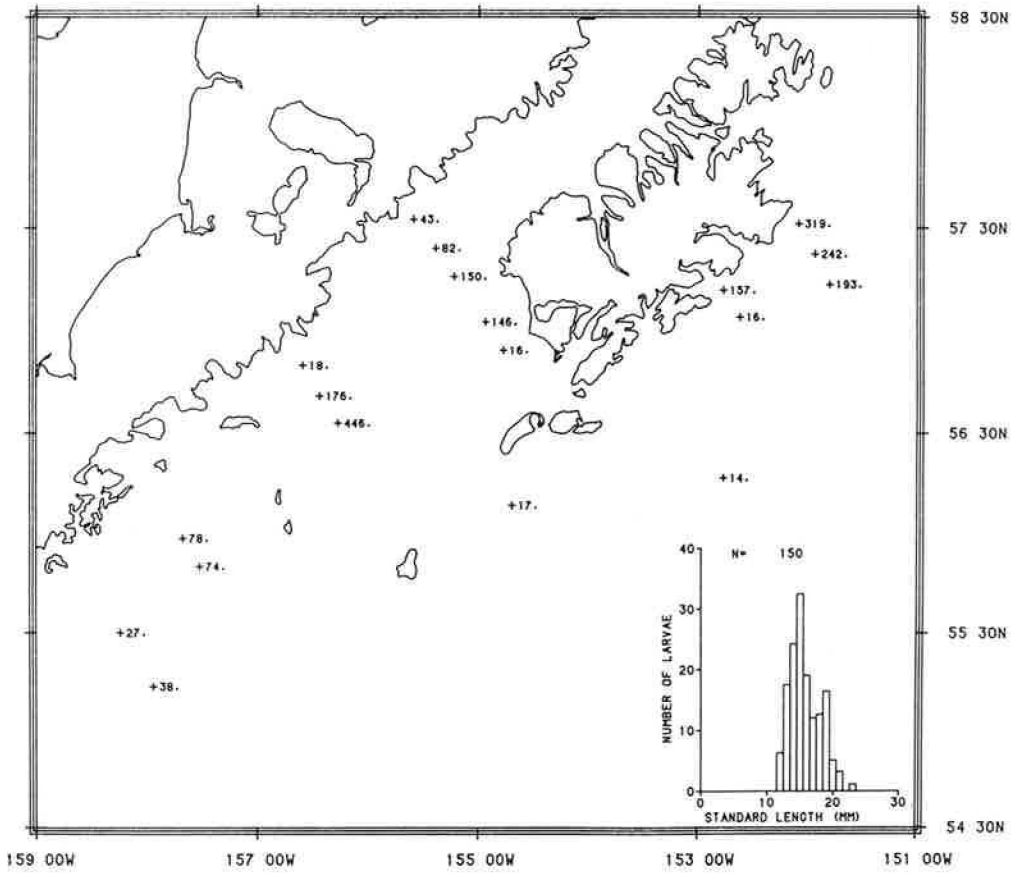


Figure 50.--Distribution of larvae of Lyconectes aleutensis from neuston tows during cruise 2SH81. Abundance expressed as numbers per $1000m^3$.

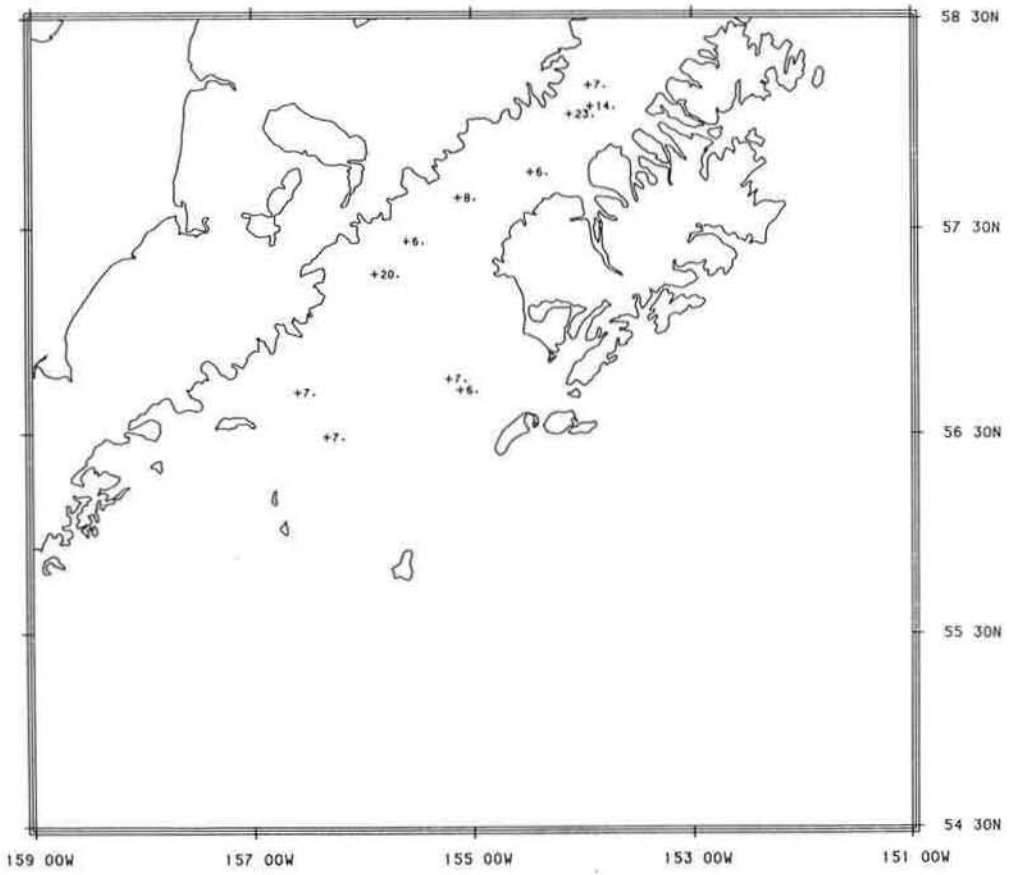


Figure 51.--Distribution of larvae of Lyconectes aleutensis from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

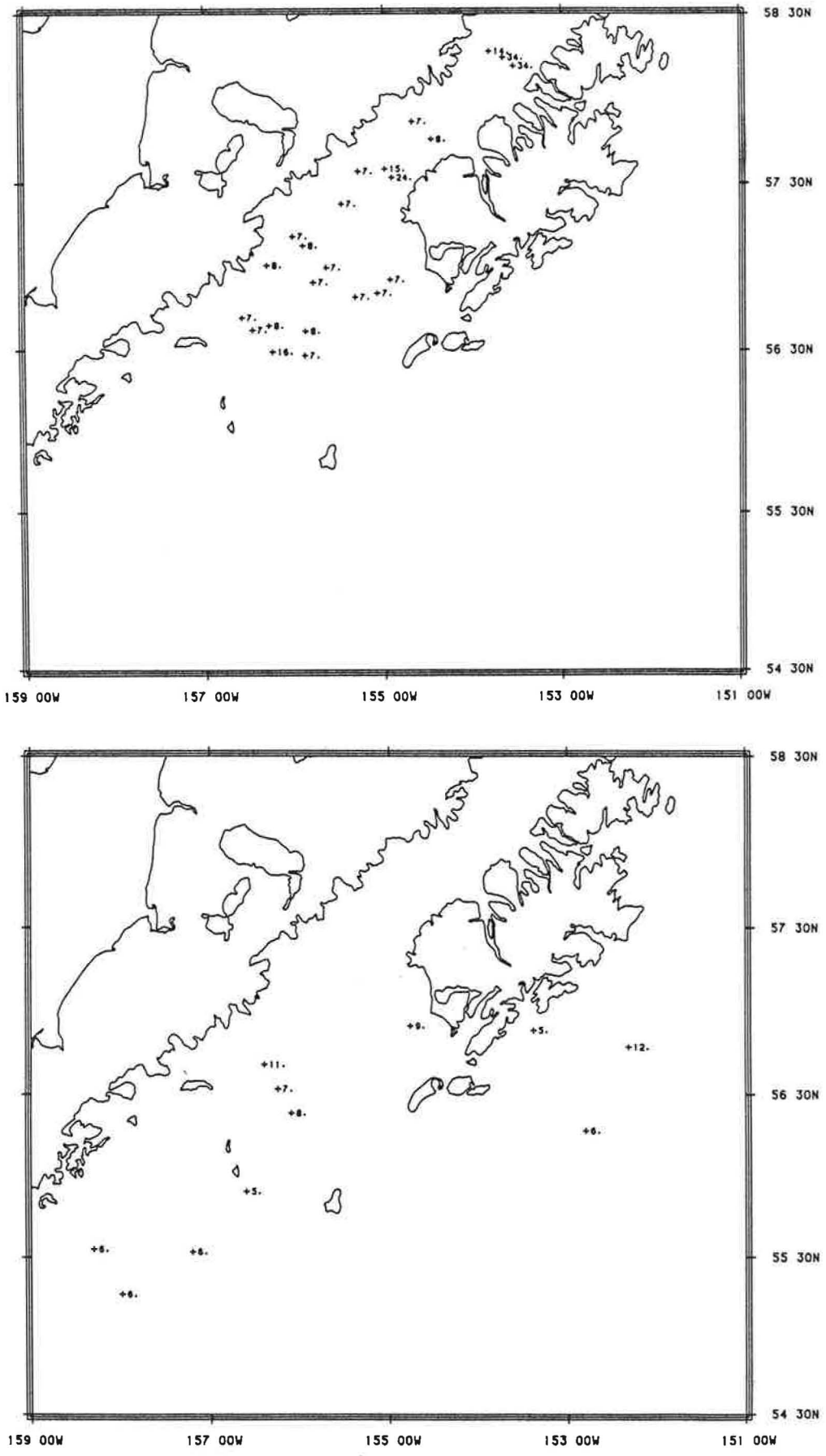


Figure 52.--Distribution of larvae of Lyconectes aleutensis from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.

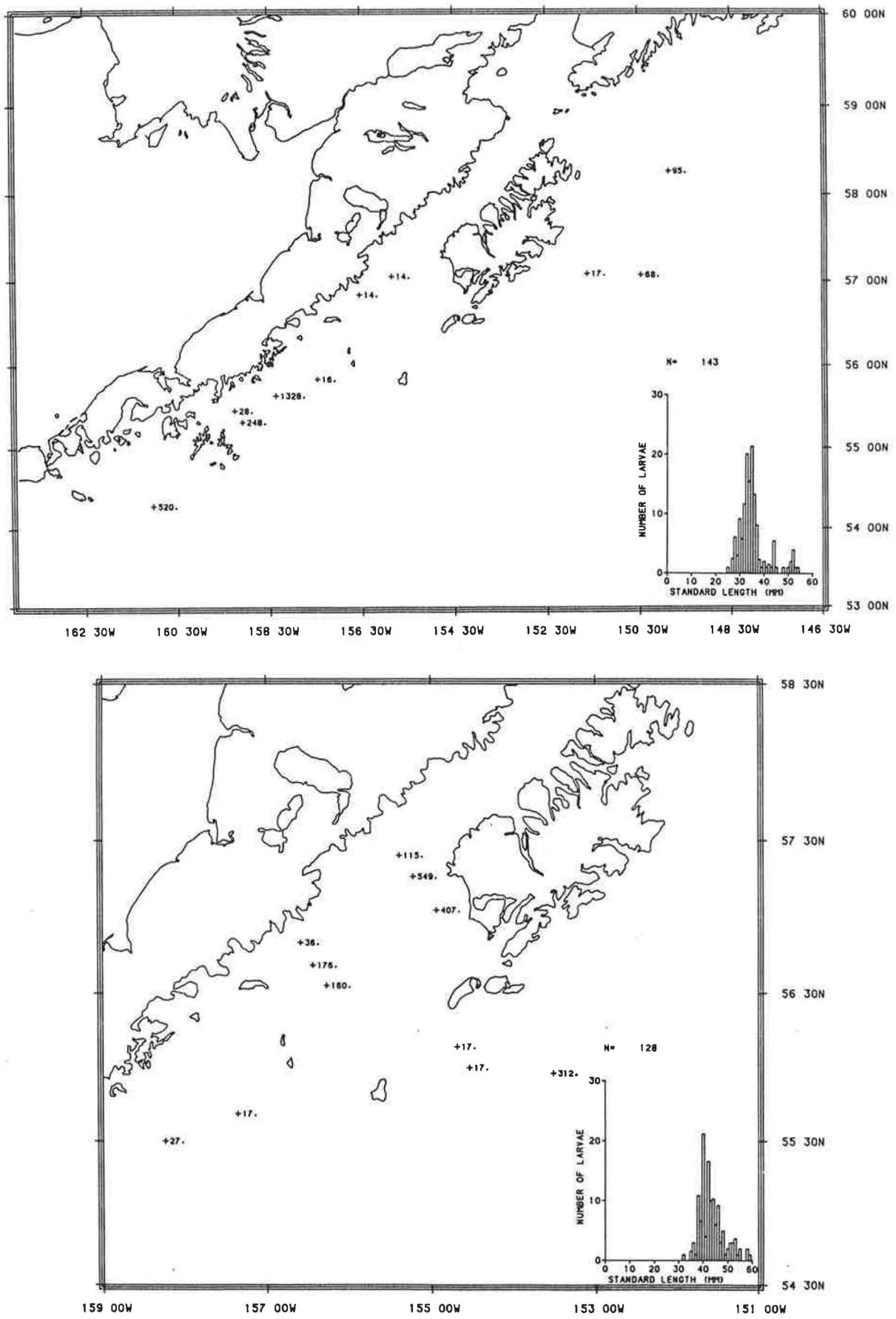
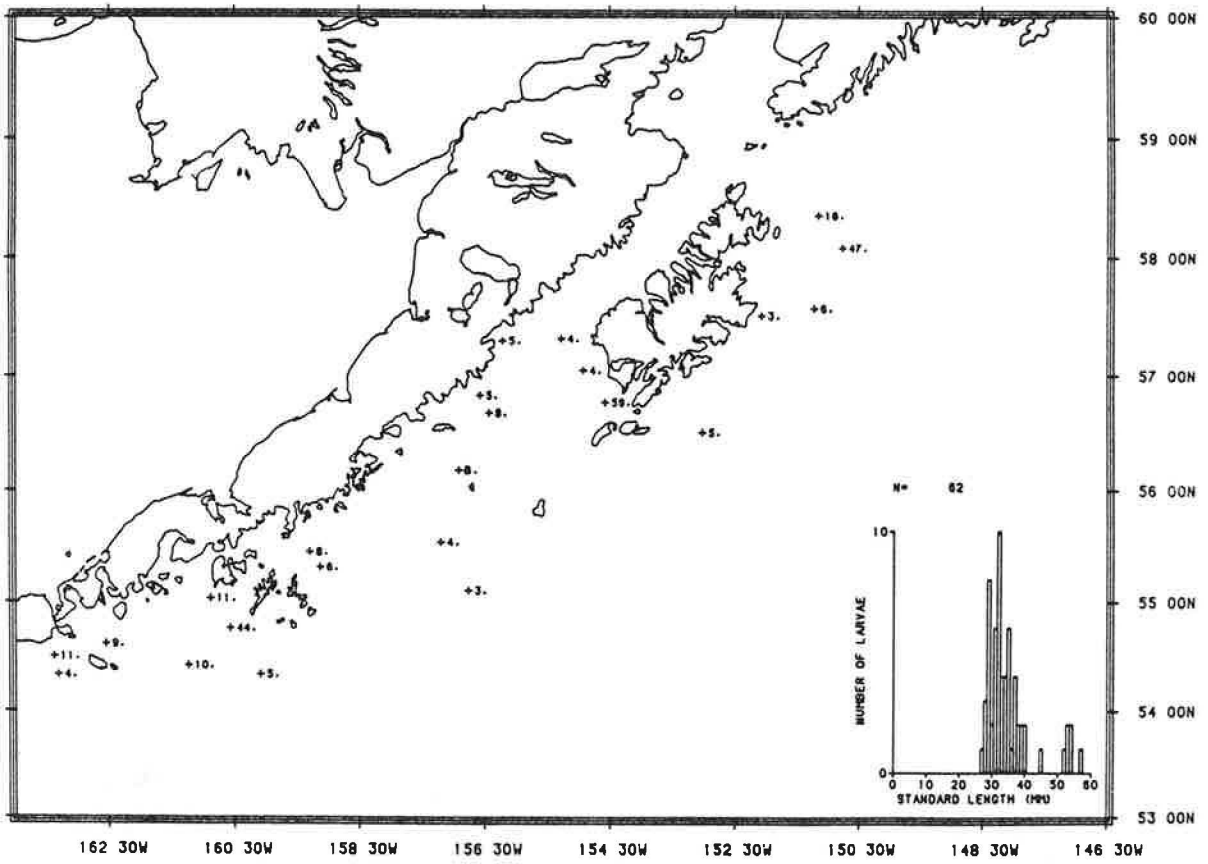


Figure 53.--Distribution of larvae of Mallotus villosus from neuston tows during cruise 1SH81(above) and cruise 2SH81 (below). Abundance expressed as numbers per $1000m^3$.



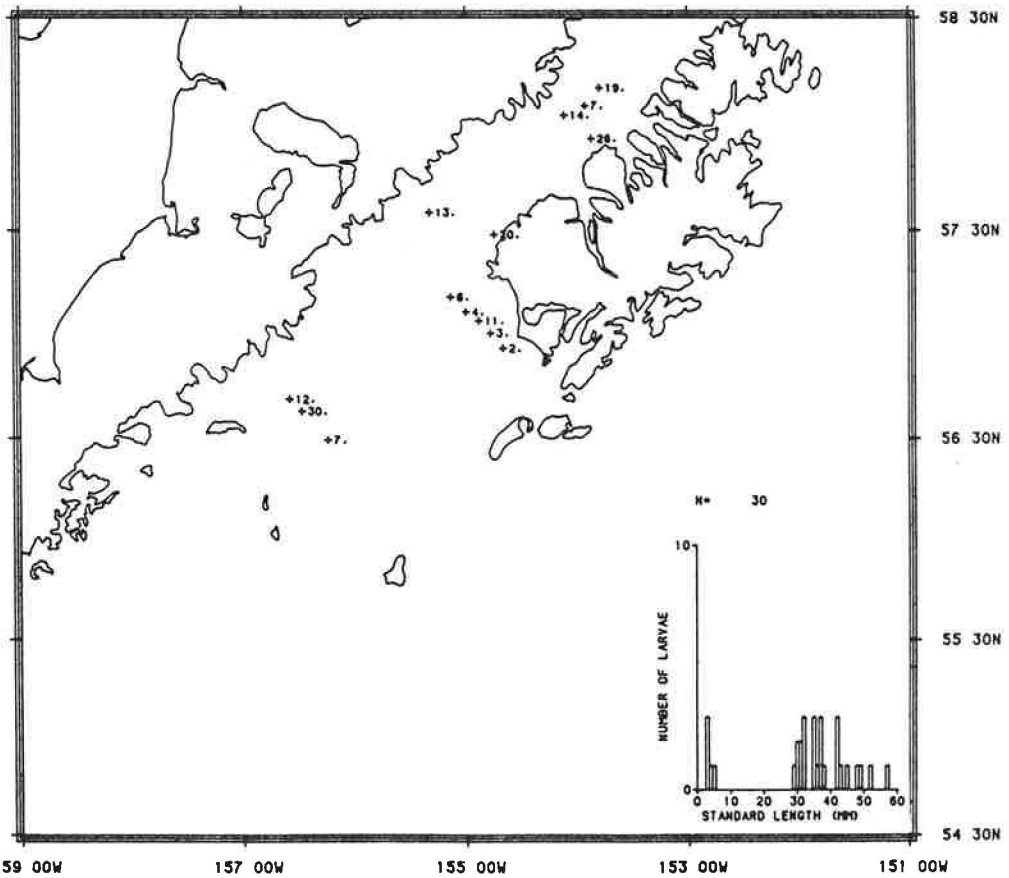


Figure 54.--Distribution of larvae of Mallotus villosus from bongo tows during cruise 1SH81 (above) and cruise 2MF81 (below). Abundance expressed as numbers per $10m^2$.

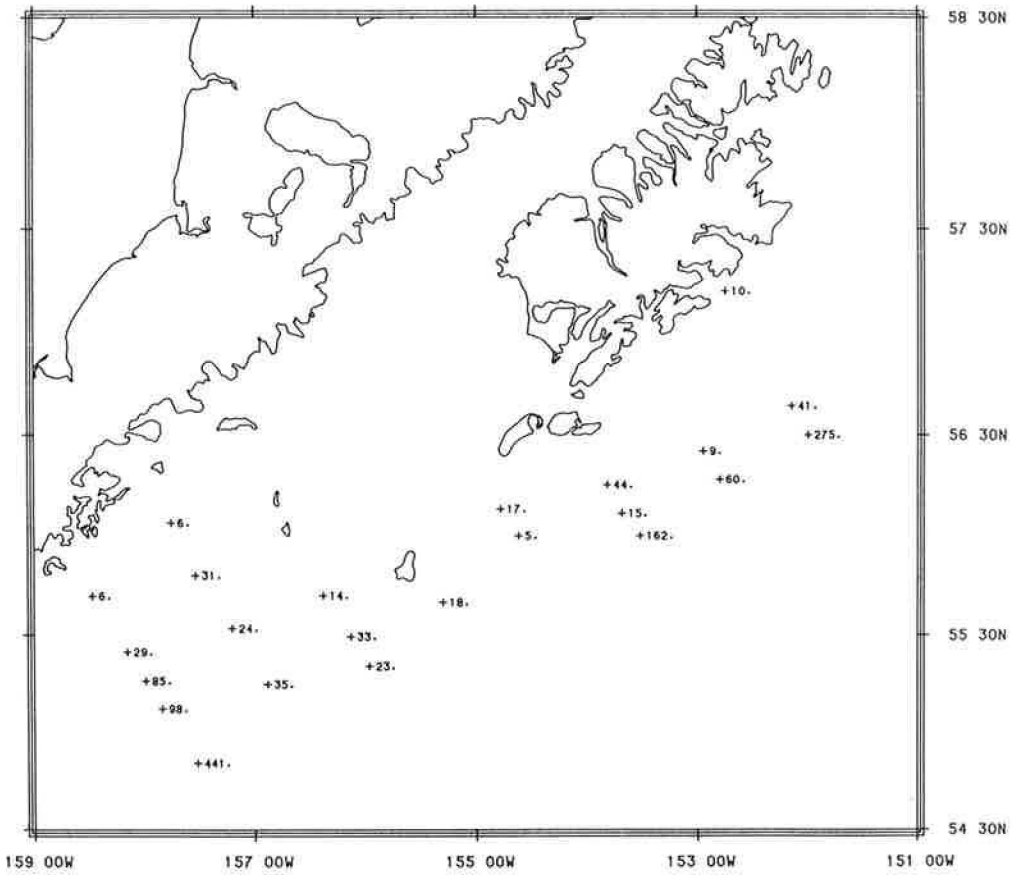


Figure 55.--Distribution of eggs of Microstomus pacificus from bongo tows during cruise 3SH81. Abundance expressed as numbers per $10m^2$.

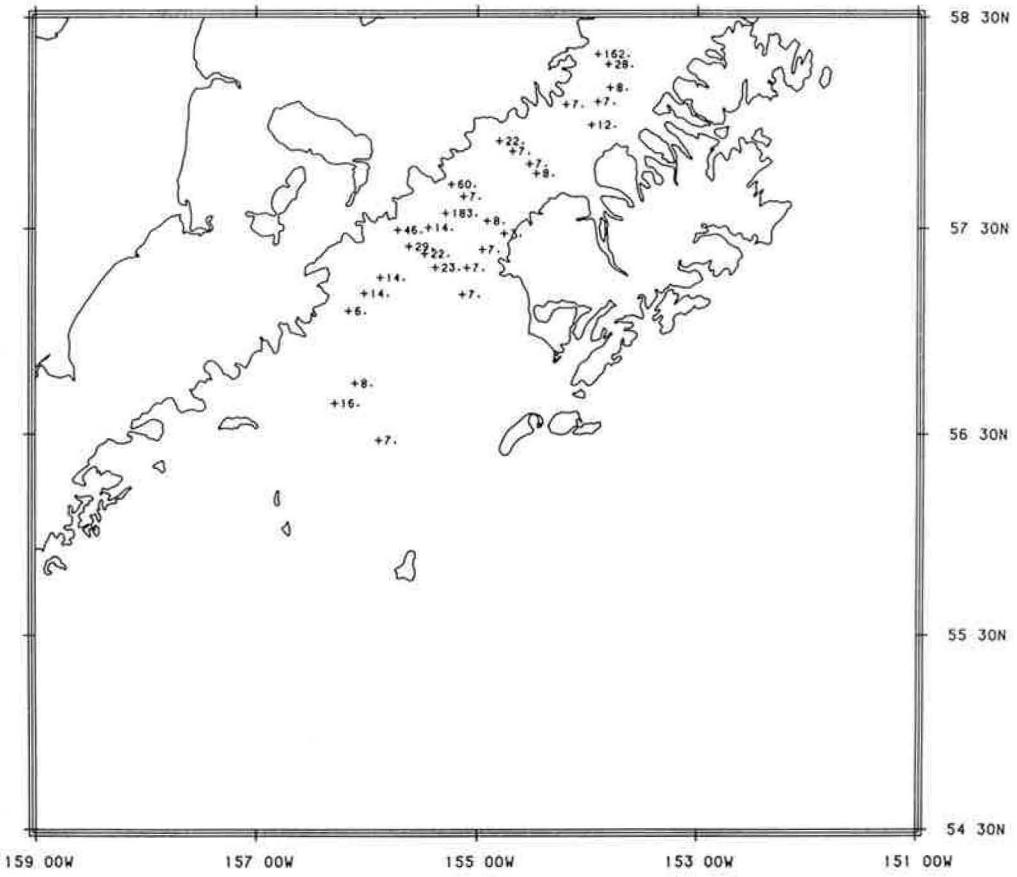


Figure 56.--Distribution of larvae of Platichthys stellatus from bongo tows during cruise 4MF81. Abundance expressed as numbers per $10m^2$.

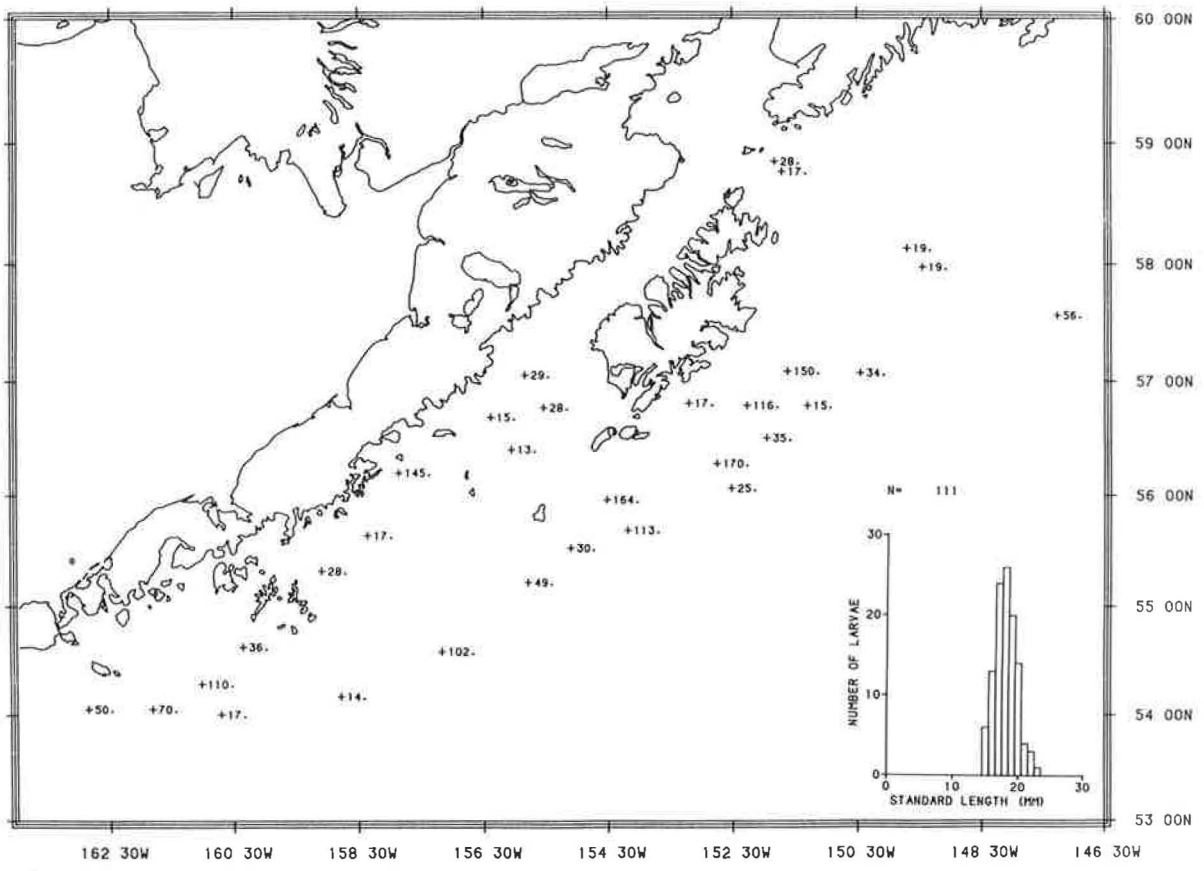


Figure 57.--Distribution of larvae of Pleurogrammus monopterygius from neuston tows during cruise 1SH81. Abundance expressed as numbers per $1000m^3$.

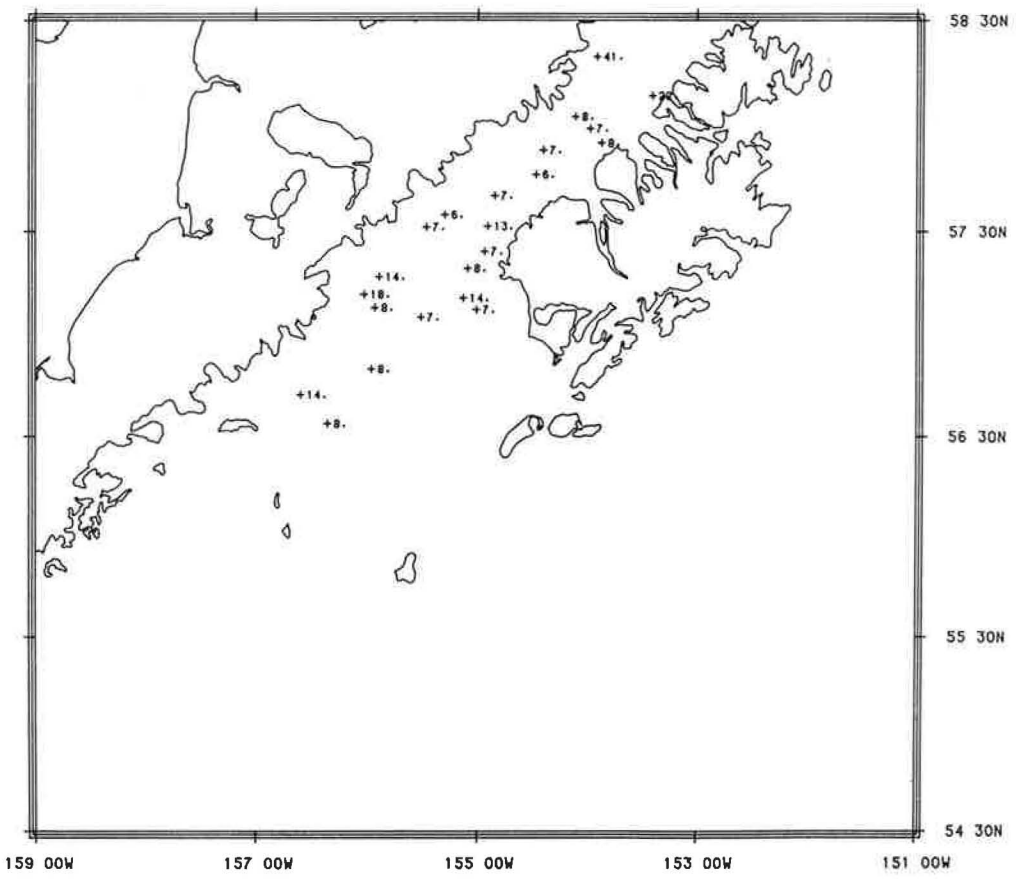


Figure 58.--Distribution of eggs of Pleuronectes quadrituberculatus from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

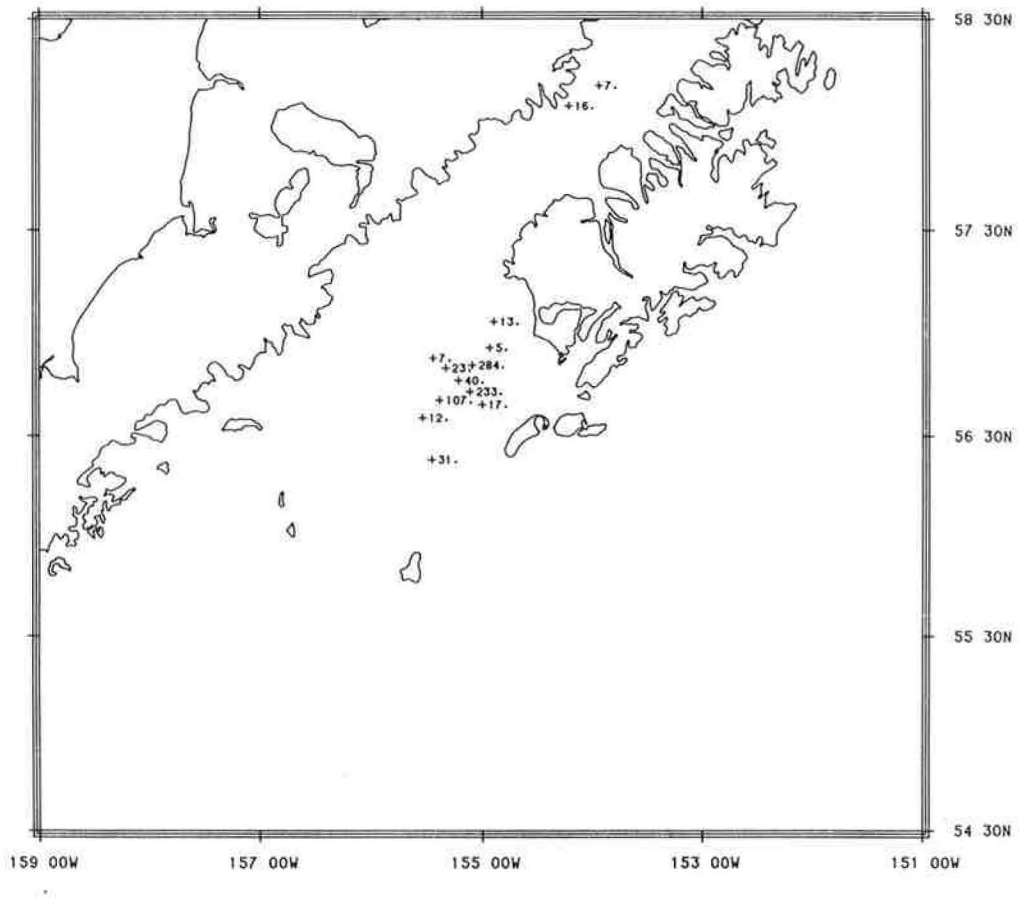


Figure 59.--Distribution of eggs of Pleuronectidae from bongo tows during cruise 3MF81. Abundance expressed as numbers per $10m^2$.

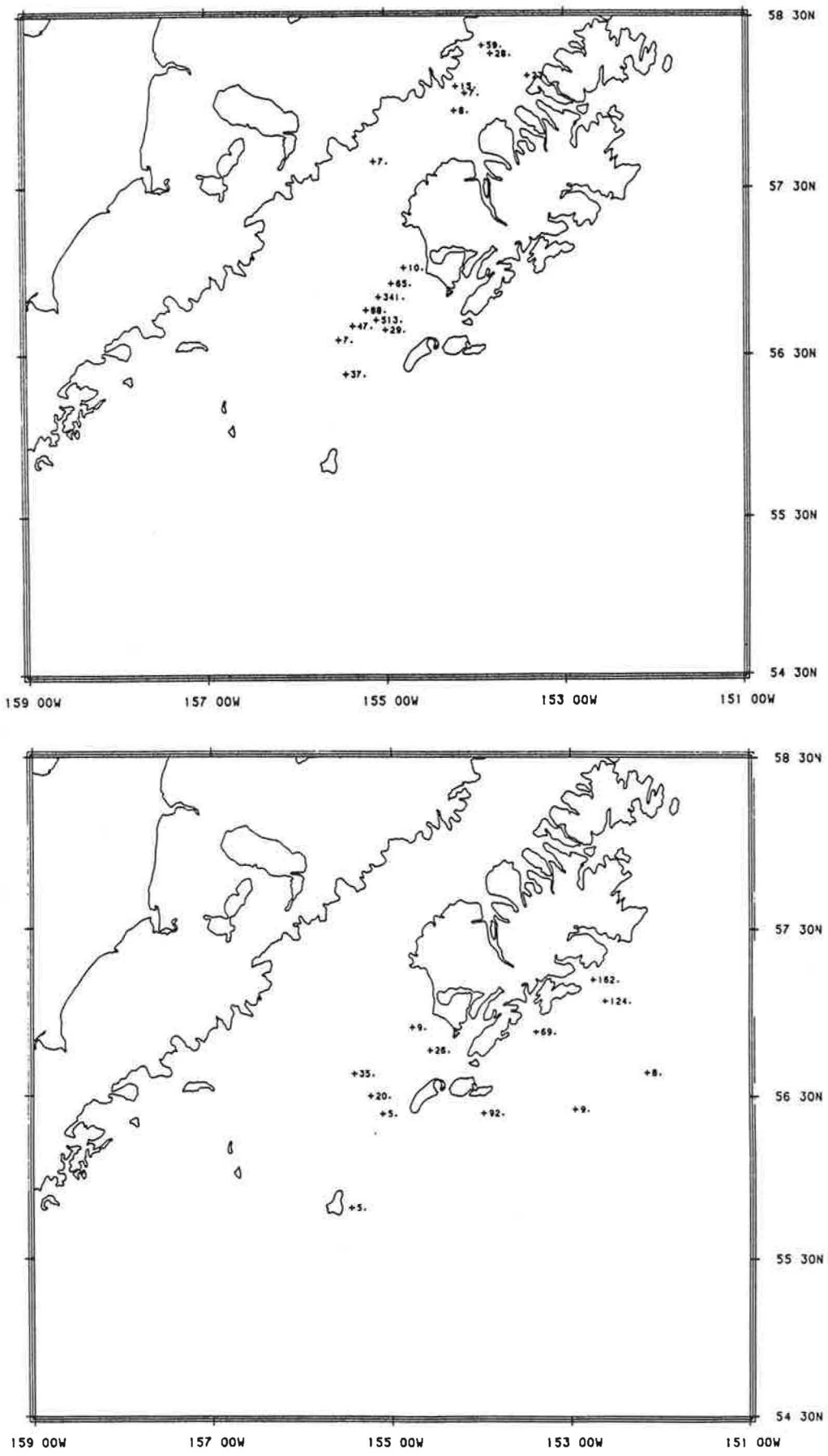
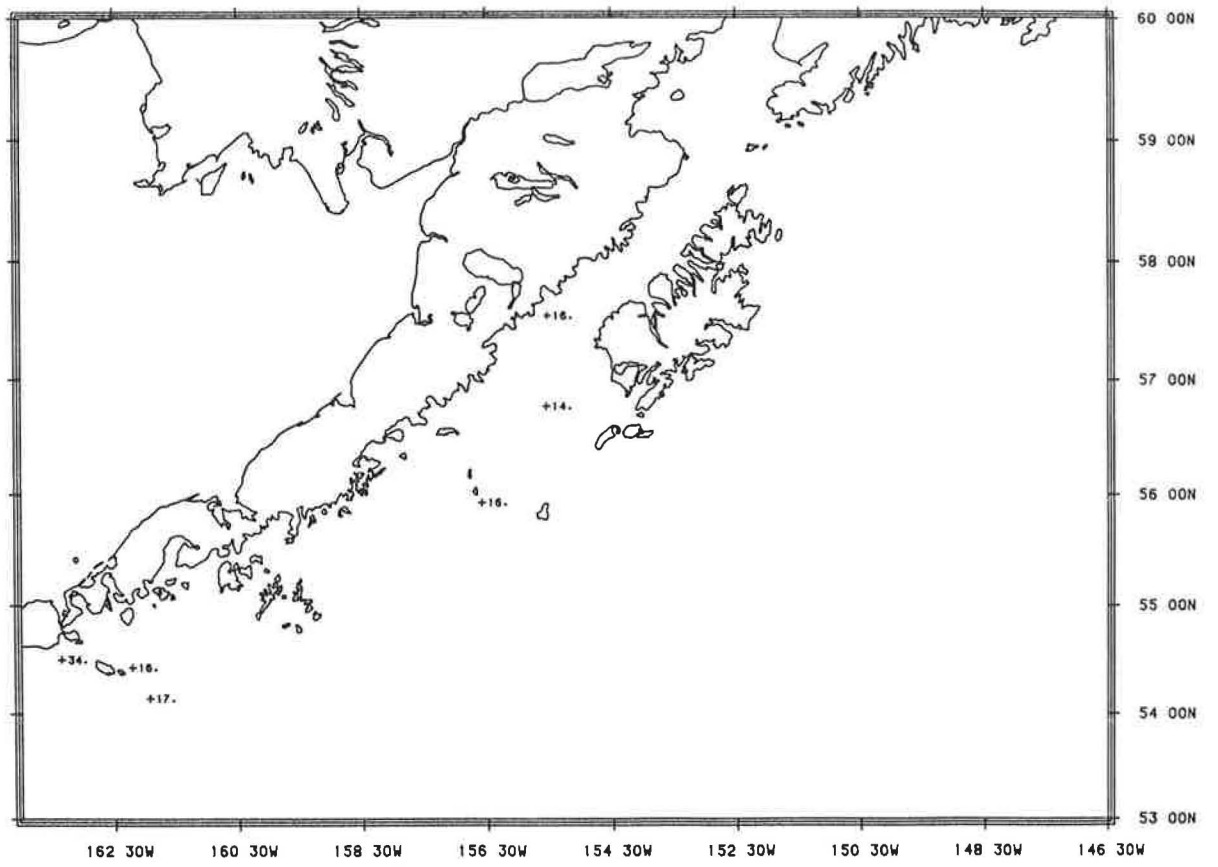


Figure 60.--Distribution of eggs of Pleuronectidae from bongo tows during cruise 4MF81 (above) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.



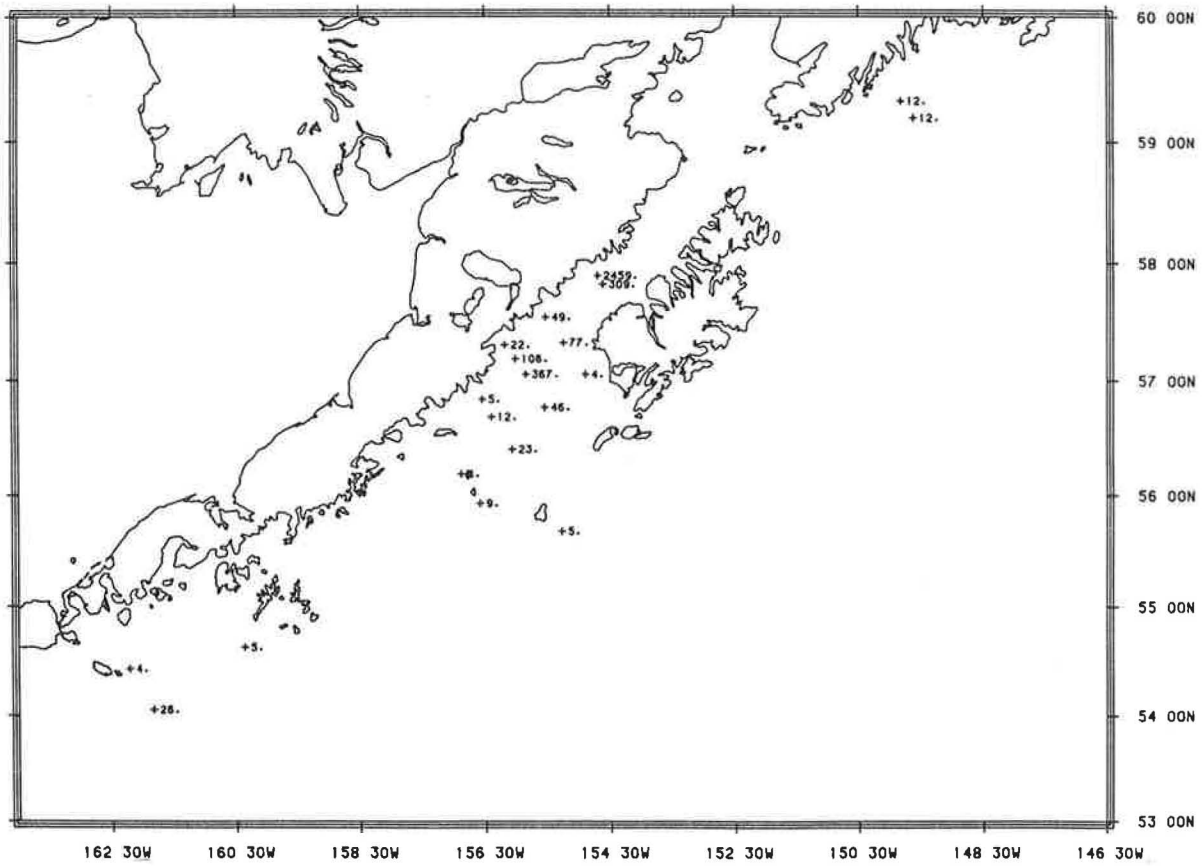


Figure 61.--Distribution of eggs of Theragra chalcogramma from neuston tows (above) and bongo tows (below) during cruise 1SH81. Abundance expressed as numbers per 1000m^3 and numbers per 10m^2 respectively.

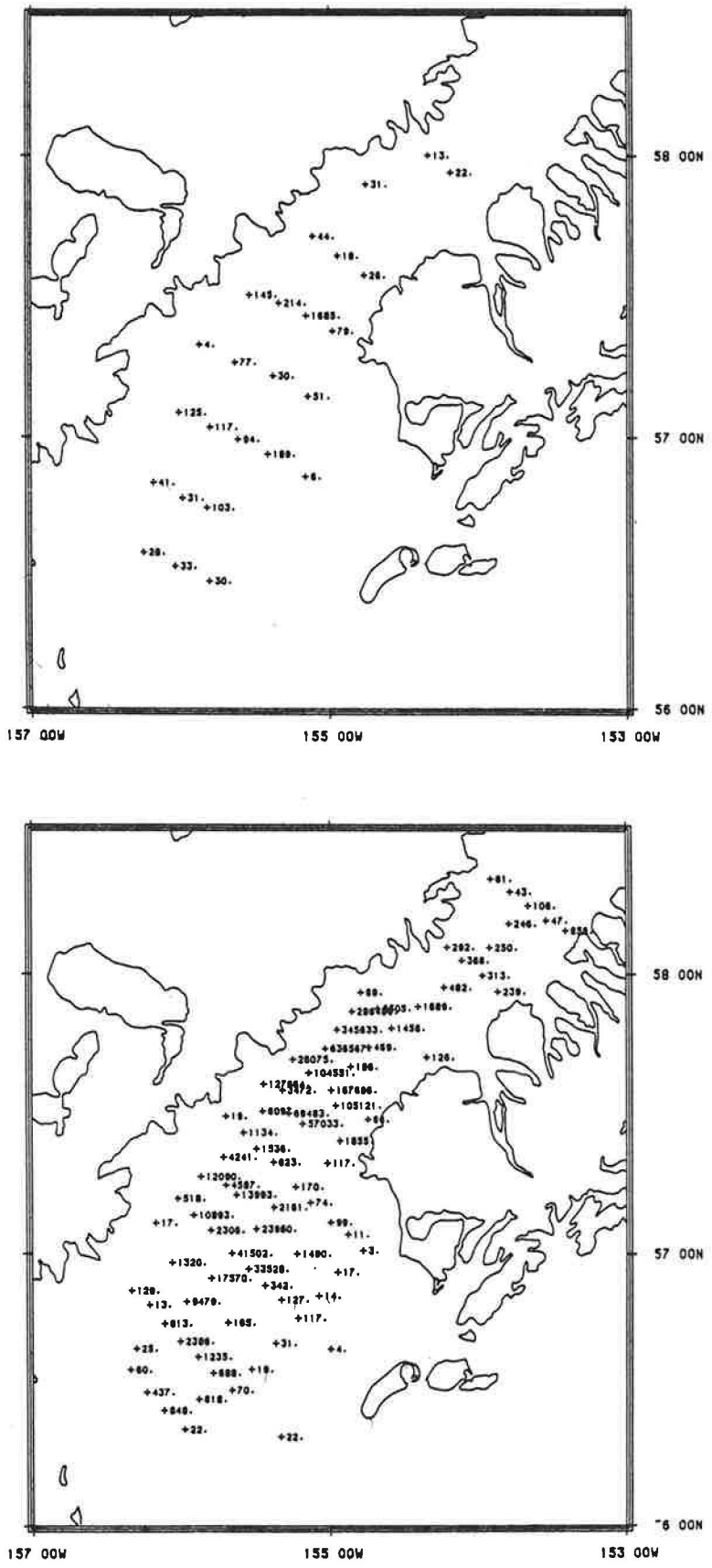
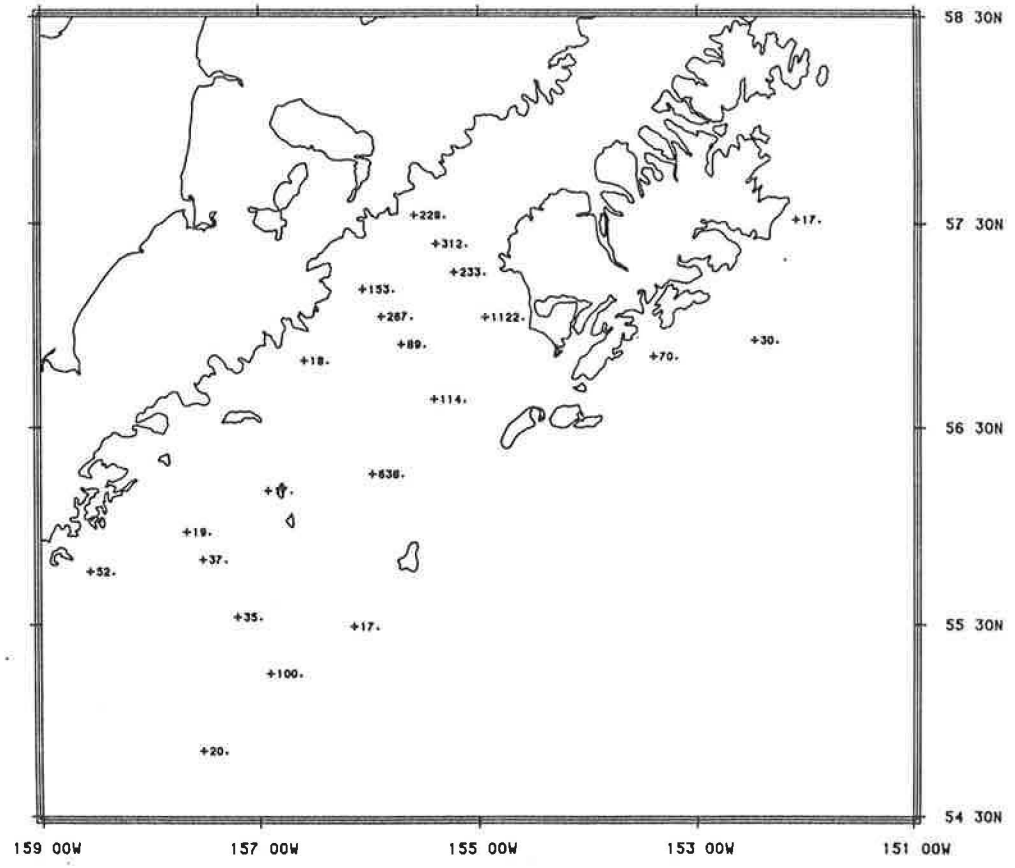


Figure 62.--Distribution of eggs of Theragra chalcogramma from bongo tows during cruise 1MF81 (above) and cruise 2MF81 (below). Abundance expressed as numbers per $10m^2$.



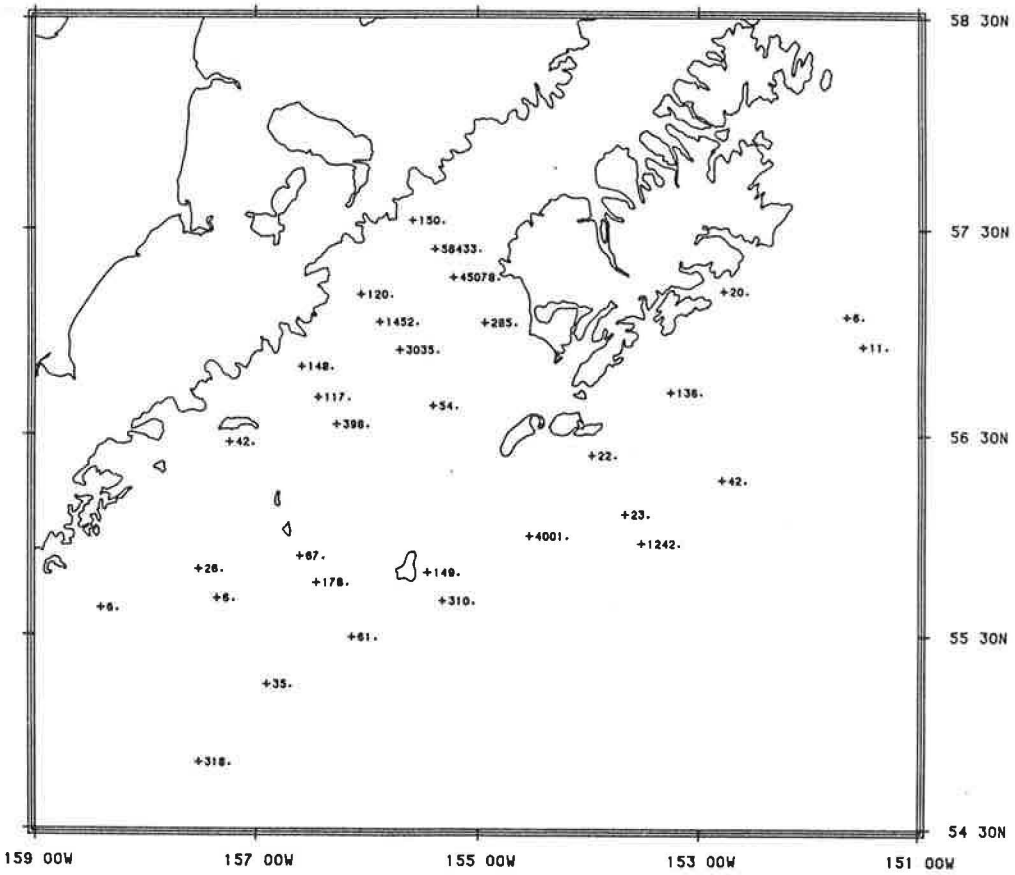


Figure 63.--Distribution of eggs of Theragra chalcogramma from neuston tows (above) and bongo tows (below) during cruise 2S H81. Abundance expressed as numbers per 1000m^3 and numbers per 10m^2 respectively.

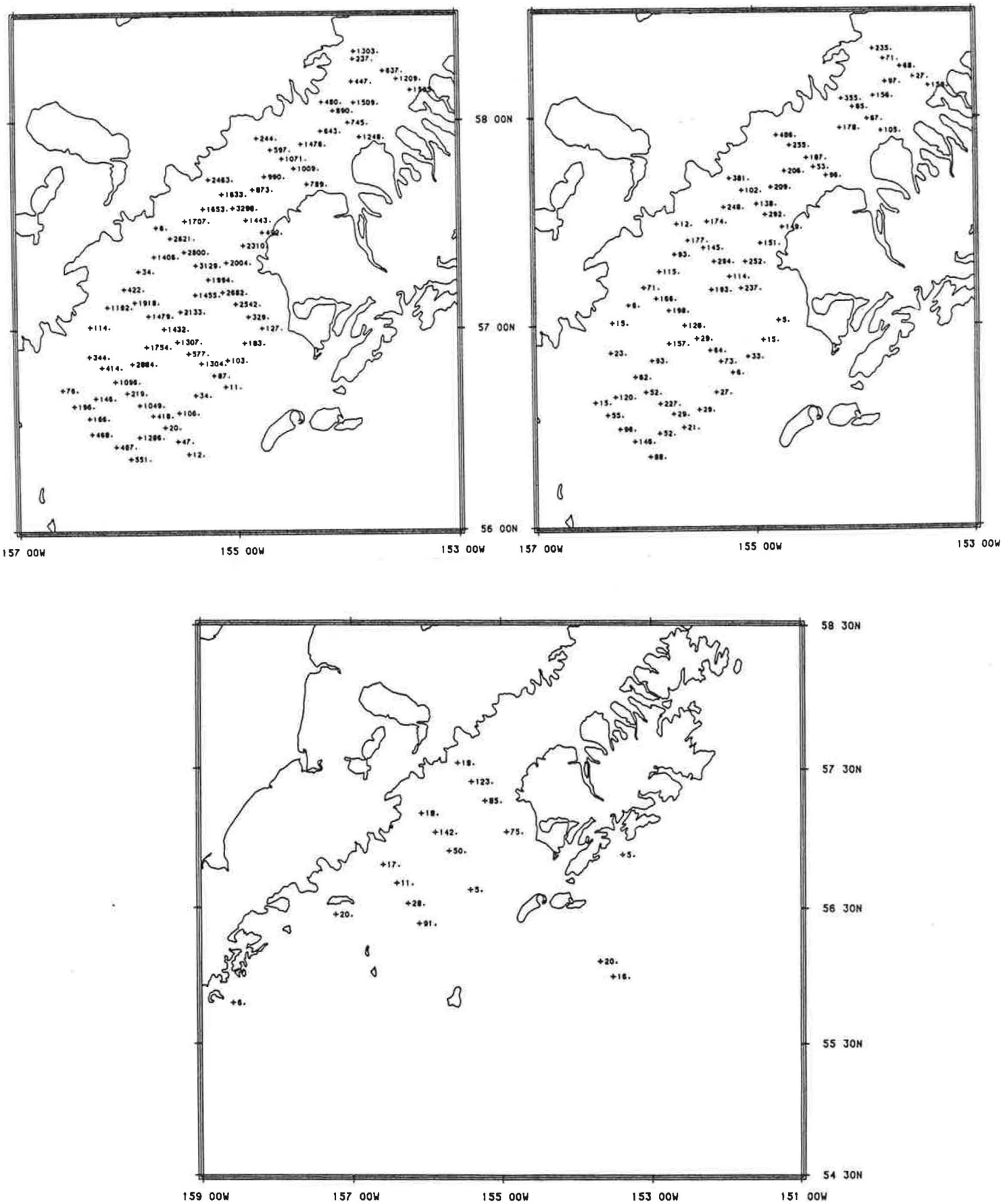
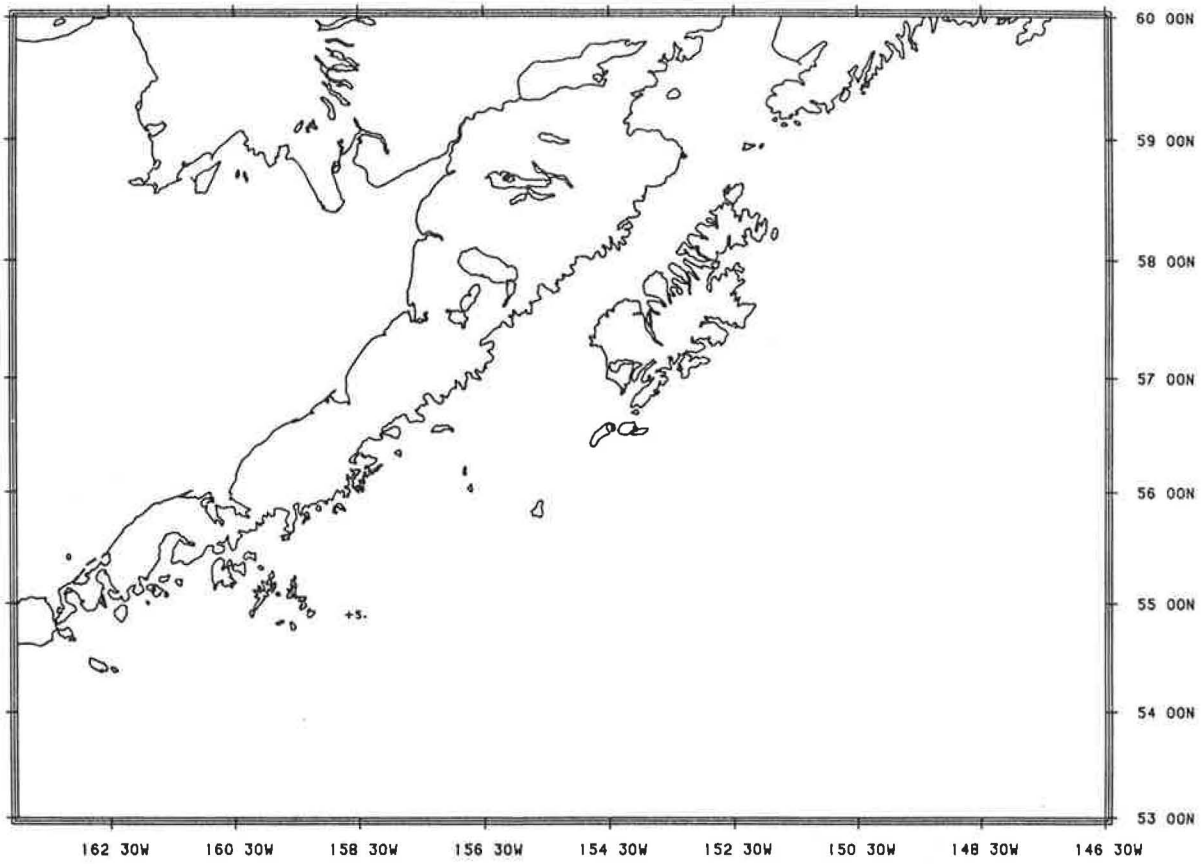


Figure 64.--Distribution of eggs of Theragra chalcogramma from bongo tows during cruise 3MF81 (above left), cruise 4MF81 (above right), and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.



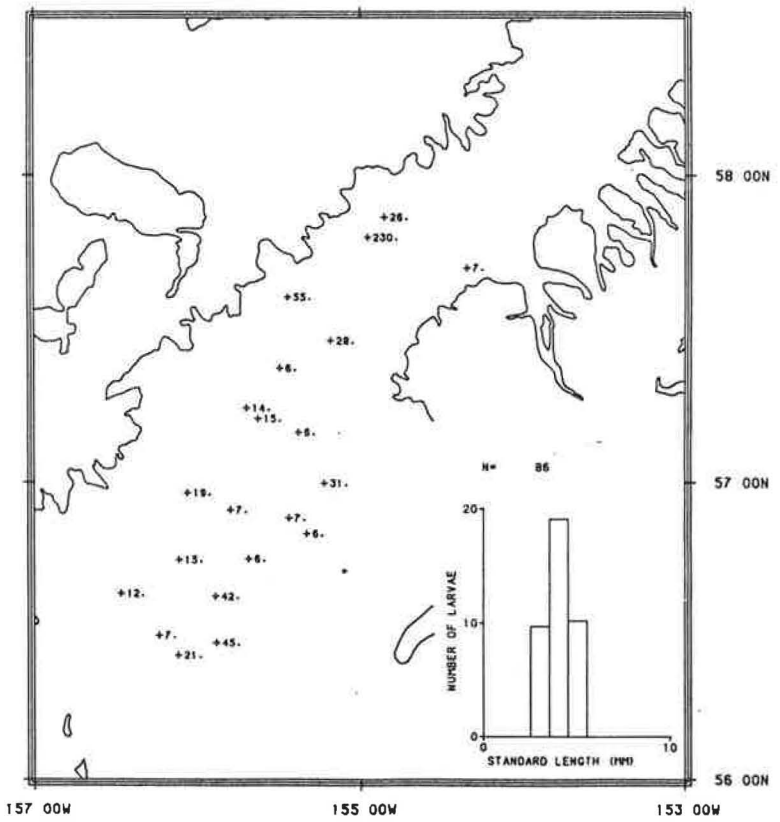
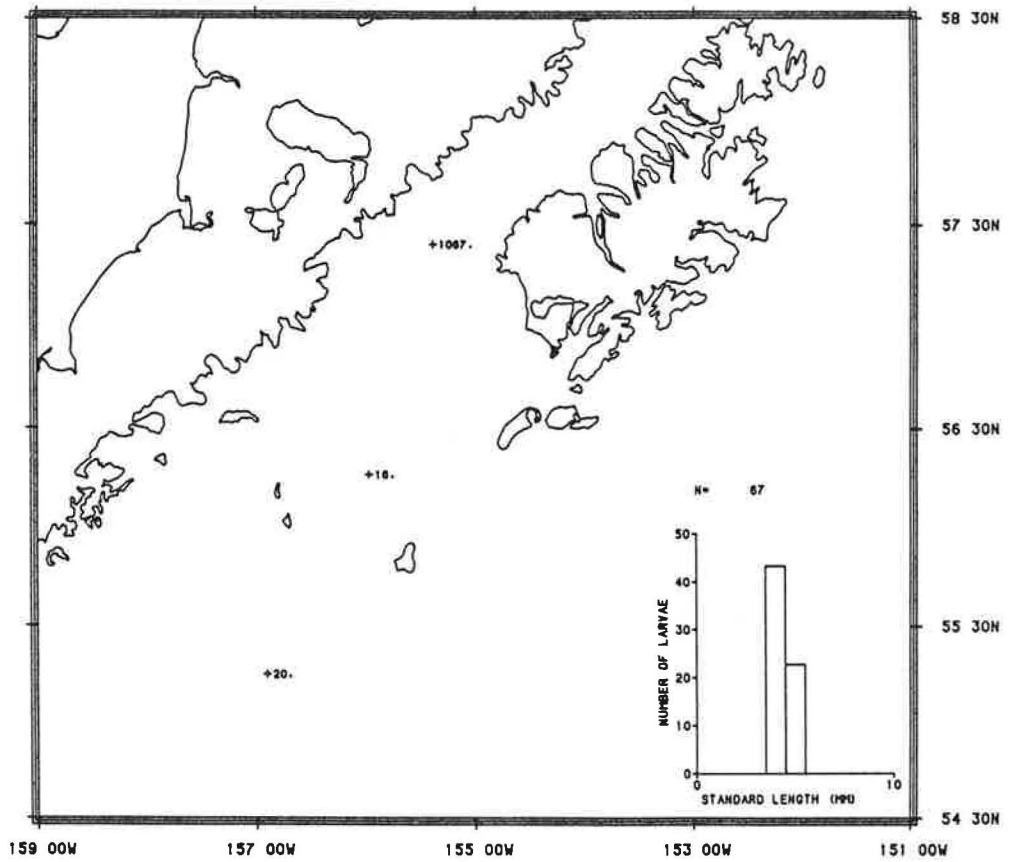


Figure 65.--Distribution of larvae of Theragra chalcogramma from bongo tows during cruise 1SH81 (above) and cruise 2MF81 (below). Abundance expressed as numbers per $10m^2$.



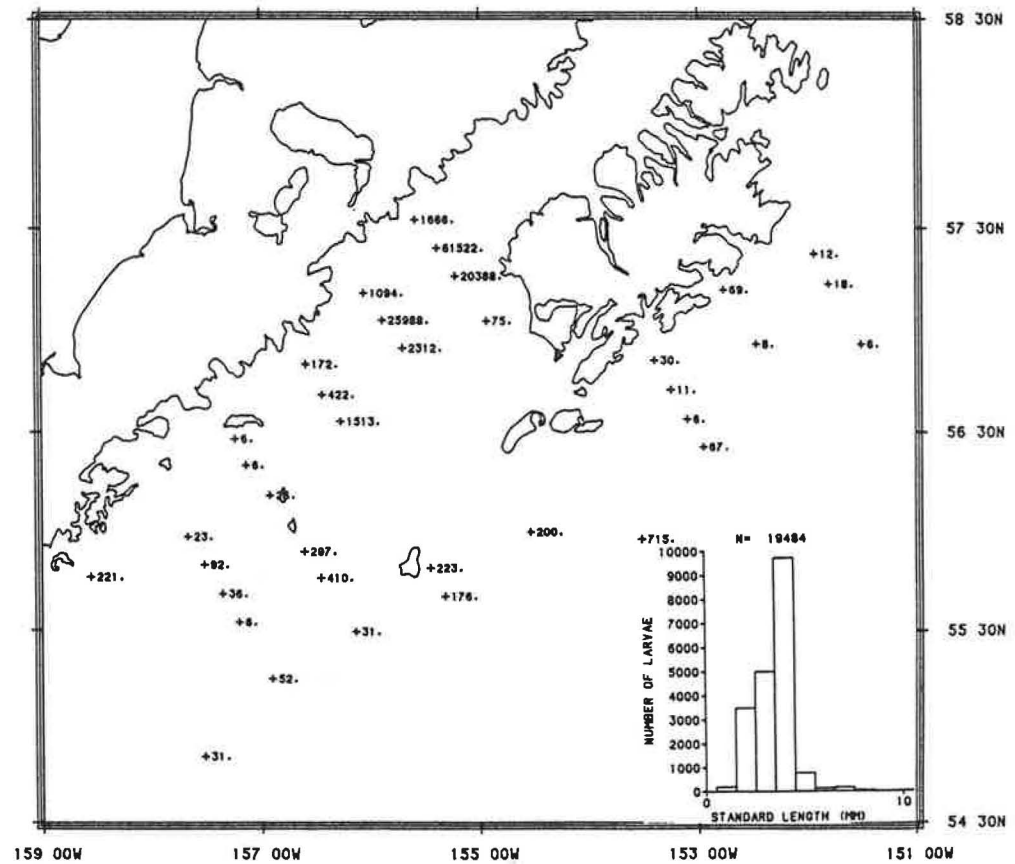
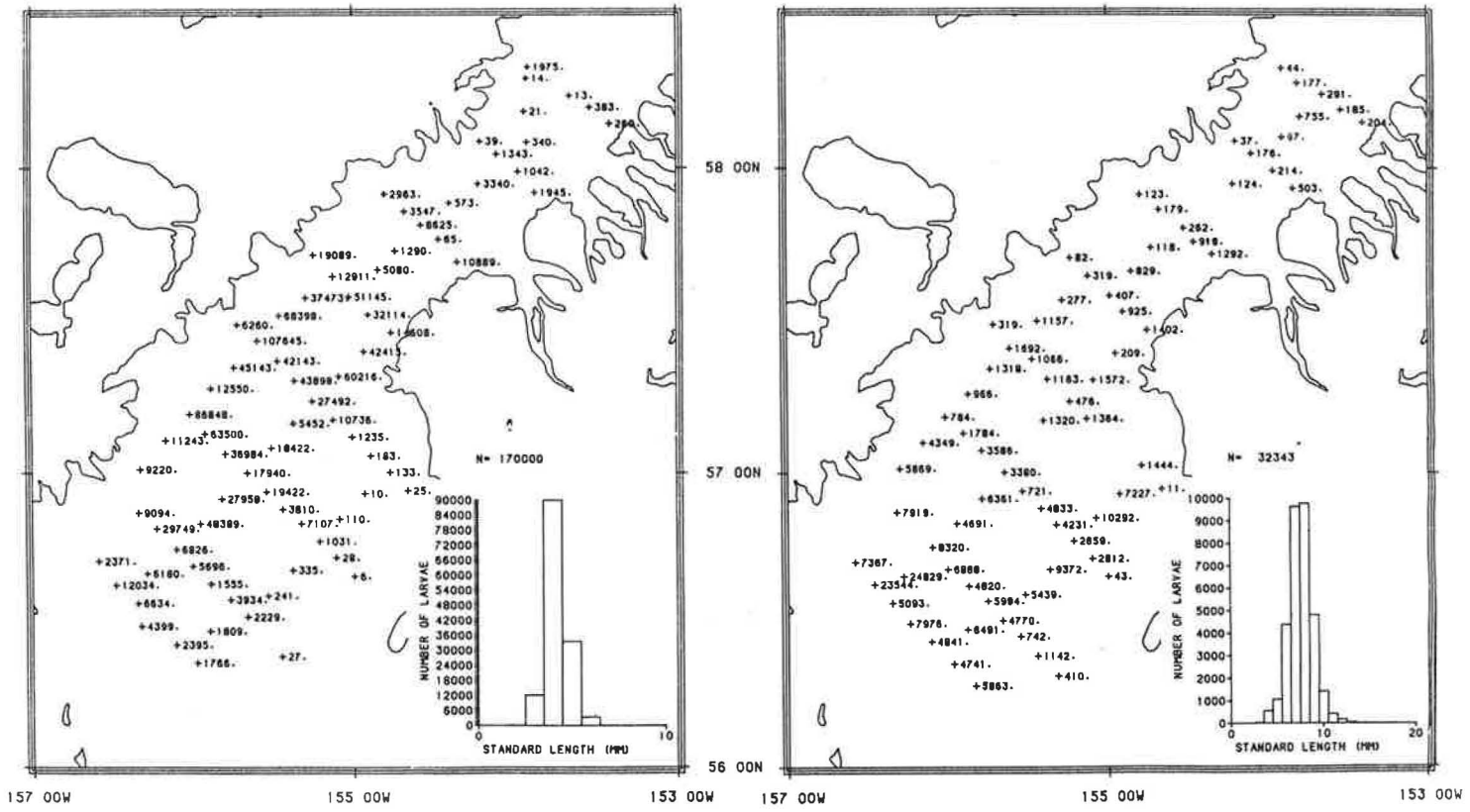


Figure 66.--Distribution of larvae of Theragra chalcogramma from neuston tows (above) and bongo tows (below) during cruise 2S H81. Abundance expressed as numbers per $1000m^3$ and numbers per $10m^2$ respectively.



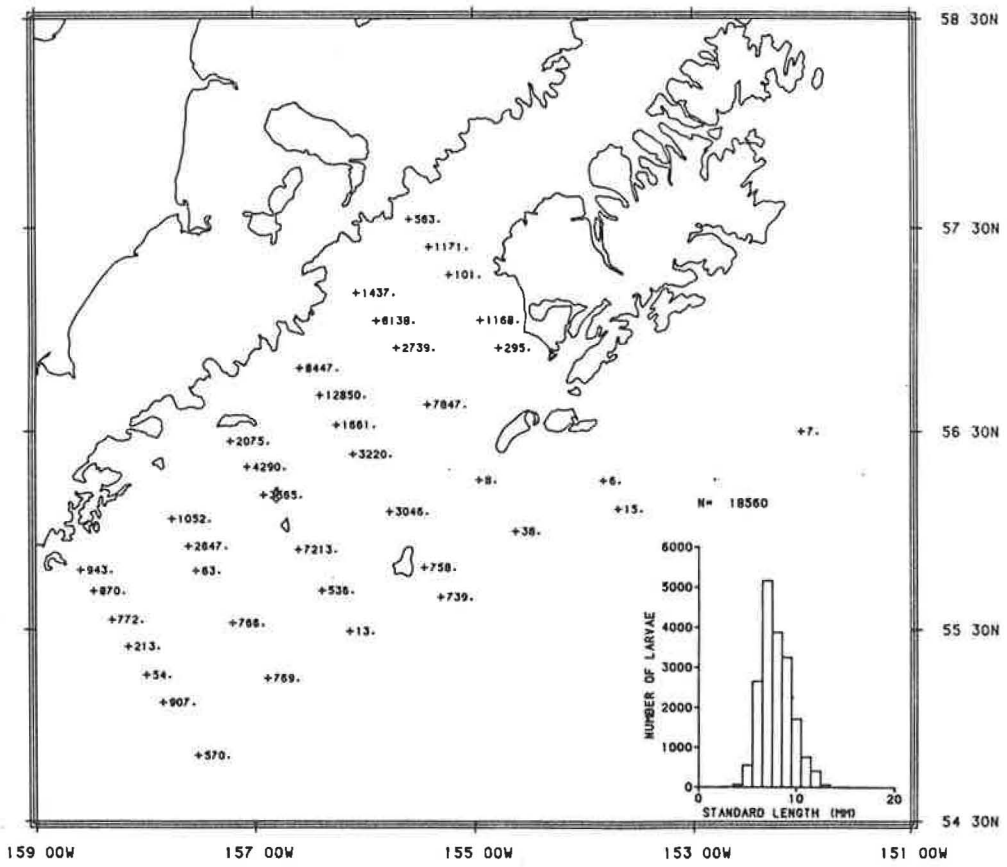


Figure 67.--Distribution of larvae of Theragra chalcogramma from bongo tows during cruise 3MF81 (above left), cruise 4MF81 (above right) and cruise 3SH81 (below). Abundance expressed as numbers per $10m^2$.