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Distribution of Some Non-Commercial Finfish in the Gulf of St. Lawrence, 1976-1981

D.B. Atkinson

Fisheries Research Branch
Department of Fisheries and Oceans
P.O. Box 5667
St. John's, Newfoundland A1C 5X1



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GULF OF ST. LAWRENCE, 1976-1981

by

D.B. Atkinson

Fisheries Research Branch
Department of Fisheries and Oceans
Northwest Atlantic Fisheries Centre
P.O. Box 5667
St. John's, Newfoundland
A1C 5X1

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ABSTRACT

Atkinson, D.B. 1986. Distribution of Some Non-commercial Finfish in the Gulf of St. Lawrence, 1976-1981. Can. Tech. Rep. Fish. Aquat. Sci. 1423: iv+56 p.

The distribution of forty four non-commercial finfish as determined from stratified-random bottom trawl surveys in the Gulf of St. Lawrence during the summers of 1976 and 1978-1981 is described. There was considerable variation in the abundance as well as the spatial, depth and temperature distribution of the different species.

RÉSUMÉ

Atkinson, D.B. 1986. Distribution of Some Non-commercial Finfish in the Gulf of St. Lawrence, 1976-1981. Can. Tech. Rep. Fish. Aquat. Sci. 1423: iv+56 p.

L'auteur décrit les distributions de 44 espèces de poisson non commerciales dans le golfe du Saint-Laurent qui ont été établies à partir de relevés aléatoires stratifiés par chalut de fond effectués au cours des étés de 1976 et de 1978 à 1981. L'abondance des espèces, leur distribution spatiale et leur répartition en fonction de la profondeur et de la température présentaient une variation considérable.

INTRODUCTION

Stratified-random bottom trawl surveys are conducted routinely in the Northwest Atlantic in order to gather information concerning commercially important groundfish species. The collected data, both quantitative and biological, are used to assist in the formulation of management advice for the different stocks of these species.

In addition to catching the commercially important species, the trawls capture numbers of non-commercial species. Although these catches are recorded, there is little use made of these data.

In the Newfoundland Region of Fisheries and Oceans, the foot gear and mesh sizes of the large otter trawls routinely used are such that catches of many non-commercial species are only sporadic (particularly for the smaller species). However, during the period 1976-1981, a special series of stratified-random bottom trawl surveys aimed at shrimp and juvenile redfish was conducted in the Gulf of St. Lawrence (NAFO Divisions 4RST). A small mesh shrimp trawl with small foot gear was used during these surveys and many non-commercial species were caught in quantities greater than had been previously recorded. This report presents the results of these surveys as they pertain to the distribution of some non-commercial species in the survey area.

MATERIALS AND METHODS

Stratified-random bottom trawl surveys were conducted in the Gulf of St. Lawrence in July-August of 1976 and 1978-1981 following the stratification scheme described by Atkinson (1984a). Fishing was carried out from small chartered trawlers using a No.36 Yankee shrimp trawl. The vessels used, the fishing gear and the towing procedures were described by Atkinson (1984b). The total number and weight (kg.) of each species caught was recorded. The catch weights of many of the small non-commercial species were very low with a resultant unreliability due to the balances in use as well as vessel motion. Therefore, only numbers of fish caught were used for this analysis.

The temperature ($^{\circ}\text{C}$) and depth (m) categories used in the data analysis.

<u>CATEGORY</u>	<u>TEMPERATURE RANGE</u>	<u>CATEGORY</u>	<u>DEPTH RANGE</u>
1	<1.1 $^{\circ}\text{C}$	1	<141m
2	1.1-2.0 $^{\circ}\text{C}$	2	141-180m
3	2.1-3.0 $^{\circ}\text{C}$	3	181-220m
4	3.1-4.0 $^{\circ}\text{C}$	4	221-260m
5	4.1-5.0 $^{\circ}\text{C}$	5	261-300m
6	5.1-6.0 $^{\circ}\text{C}$	6	301-340m
7	>6.0 $^{\circ}\text{C}$	7	>340m

The results from the five year period were combined and the data analysed to indicate spatial distribution and distribution by depth and temperature as indicated above. No temperature data are available from the 1980 survey due to equipment malfunction. The species names (both common and scientific) are according to Akenhead and LeGrow (MS 1981).

RESULTS AND DISCUSSION

THE SURVEYS AND SURVEY AREA

Place names used in the text are shown in Fig. 1. The total number of successful sets made within each unit area as well as the distribution of sets in each bottom temperature category and depth category are shown in Fig. 2. Sampling was poor at depths <141m and >340m but between these, the number of sets was approximately proportional to the geographic area of each range. The average depth in each bottom temperature range and the average bottom temperature in each depth range are shown in Fig. 3. Lower bottom temperatures were associated with shallower depths. Below about 180m, the average bottom temperature was fairly constant.

DISTRIBUTION PATTERNS

Figures 4-47 show the distribution of the various non-commercial species by depth and temperature as well as spatially. Brief descriptions of each follow.

Alligator fish, common (*Aspidophoroides monopterygius*) (Fig. 4)

This species, although present in small numbers, was distributed over a fairly wide area of the Gulf. The greatest concentrations were in the vicinity of Anticosti Island. It was primarily found in relatively shallow water (141-180m) although present at depths up to 340m. The preferred temperature was between 2.1-3.0°C.

Alligator fish, northern (*Agonus decagonus*) (Fig. 5)

The distribution of this species was restricted to the western portion of the Gulf with a few being taken off the southwest coast of Newfoundland. The specimens caught were taken in water 141-180m (2.1-3.0°C) although they have previously been reported from depths of 240-290m off Fox River, Quebec (Liem and Scott 1966).

Alligator fish (NS) (*Agonidae*) (Fig. 6)

This unidentified group tended to be distributed along the southwest coast of Newfoundland. It is possible that this group contains members of the above species which were not identified during the surveys.

Angler, common (Monkfish) (*Lophius americanus*) (Fig. 7)

Although only found in small numbers, this species was widely distributed, both spatially and by depth. There was a tendency for

catches to be somewhat larger in deeper areas, but the fish were caught only in temperatures above 4.1°C thus supporting the suggestion by Koeler and LeGresley (MS 1981) that they avoid cold water.

Barracudina (NS) (*Paralepis* spp.) (Fig. 8)

The fish caught tended to be distributed in deeper water in the western and southern portion of the survey area. These are probably, for the most part, scaled lancetfish discussed below.

Barracudinas (NS) (*Paralepididae*) (Fig. 9)

It is probable that the separation of this group from that above is artificial and a reflection of identification made only at sea. Like the above, this group was found primarily in the western and southern portion of the survey area and in deeper water. Again, these are probably scaled lancetfish.

Cod, Arctic (*Boreogadus saida*) (Fig. 10)

Very few specimens of this species were taken. A few were caught off the west coast of Newfoundland and even fewer north of Anticosti Island. All captured in temperatures greater than 4.0°C although previously they were reported to prefer colder water (Liem and Scott 1966). Liem and Scott also report that this species only occasionally strays into the Gulf of St. Lawrence.

Deepsea sculpin, Arctic (*Cottunculus microps*) (Fig. 11)

This species was found in small numbers over a fairly wide range of depths from 141-340m. They were found predominantly in water of 1.1-2.0°C. This species has previously been taken in about 200m of water off Fox River, Quebec (Liem and Scott 1966).

Deepsea sculpin (NS) (*Cottunculus* spp.) (Fig. 12)

This group is probably the pallid sculpin (*C. thompsoni*) since it seems to prefer warmer water than the deepsea sculpin (above), being found only in temperatures above 4.0°C. There was fairly wide distribution with regard to both geography and depth although they were found predominantly in 141-180m.

Dogfish, Black (*Centroscyllium fabricii*) (Fig. 13)

Fairly large catches of this species were made in the western portion of the survey area. The species prefers deeper water, being found in the greatest numbers at depths below 340m. No specimens were taken in depths less than 221m. They were only caught in temperatures >3.0°C.

Eelpout, Esmark's (*Lycodes esmarki*) (Fig. 14)

Very few specimens were caught. The majority were taken in deep water (>340m) and all were caught off the Gaspé Peninsula. The water

temperatures were they were taken ranged from 4.1-6.0°C.

Eelpout, Laval's (*Lycodes lavalaei*) (Fig. 15)

This species is distributed in the western part of the survey area, primarily west of Anticosti Island. The very large numbers found in unit area C22 were taken in one single set. The species seems to prefer shallower depths (<221m) and temperatures between 2.1 and 3.0°C.

Eelpout, Newfoundland (*Lycodes terraenovae*) (Fig. 16)

Only two specimens of this species were taken, both in the extreme western portion of the survey area. They were both caught at depths between 261 and 300m and in temperatures between 5.1 and 6.0°C.

Eelpout, Vahl's (*Lycodes vahllei*) (Fig. 17)

This species was fairly widely distributed geographically throughout the Gulf. The greatest concentrations were in the western and northeastern areas and also north of Anticosti Island. The largest numbers were taken off Cape Gaspé. These eelpouts favor cool temperatures (1.1-2.0°C) and depths less than about 250m.

Eelpout (NS) (*Lycodes* spp.) (Fig. 18)

This group was found in small numbers in the northeast portion of the survey area only. It is possible that these specimens are one or more of the eelpout species described above.

Eelpout, soft (*Melanostigma atlanticum*) (Fig. 19)

The few specimens caught were located to the west of Anticosti Island (with the exception of a small catch off the northeast end). The greatest concentration was found in unit area A24, off the Gaspé coast. The largest portion of the catches were taken in water >340m. All specimens were taken in 1980, when no temperature data were available.

Eelpouts (NS) (*Zoaridae*) (Fig. 20)

It is probable that this group contains one or more of the species described above. The distribution, geographic as well as depth would suggest that perhaps these are Vahl's eelpout.

Fourbeard rockling (*Enchelyopus cimbrius*) (Fig. 21)

This small fish was very widely distributed throughout the survey area. Although present in the greatest proportion in temperatures between 1.1 and 2.0°C, it was caught at higher temperatures as well. None were caught in depths <141m but they were taken in all depths greater than this, particularly those >220m.

Hagfish, Atlantic (*Myxine glutinosa*) (Fig. 22)

Large numbers of this species were caught in the western and southern portions of the survey area. They were distributed over a wide range of depths and temperatures. The largest concentration was found off Cape Gaspé.

Hake, longfin (*Urophycis chesteri*) (Fig. 23)

This species was found predominantly along the southern edge of Laurentian Channel and off the west coast of Newfoundland. It was present mainly in the deeper portions of the survey area with the greatest percentage located below about 300m. Most of the specimens were caught in water $>5.0^{\circ}\text{C}$.

Hake, silver (*Merluccius bilinearis*) (Fig. 24)

Low numbers of this species were widely distributed throughout the survey area. The largest concentration was located off the southwest coast of Newfoundland. Although previously reported to be present from shallow depths to over 500m (Liem and Scott 1966) the species was concentrated between 181 and 260m in the surveyed area. Its distribution suggests a preference for water $>6.0^{\circ}\text{C}$.

Hookear sculpin (NS) (*Artedidellus* spp.) (Fig. 25)

Although present throughout most of the survey area, two areas of concentration were noted. One was off the southwest of Anticosti Island and the other was off the west and southwest of Newfoundland. These sculpins were distributed over a wide range of depths and temperatures but tended to predominate in water less than 261m with temperatures between 1.1 and 2.0°C .

Lancetfish, scaled (*Notolepis rissoi kroyeri*) (Fig. 26)

Liem and Scott (1966) placed this fish in the Genus *Paralepis*. Its distribution appears to be restricted to the deeper areas to the west of Anticosti Island, but the *Barracudina* and *Barracudinas* are probably this species and thus the geographic distribution is more widespread.

Lumpfish, common (*Cyclopterus lumpus*) (Fig. 27)

Very few specimens were caught but the distribution was fairly widespread both with regard to geography, depth and temperature. They were not caught in temperatures $<2.1^{\circ}\text{C}$, and they were not found in depths $<141\text{m}$ or $>340\text{m}$.

Lumpfish (NS) (*Eumicrotremus* spp.) (Fig. 28)

Very few specimens were encountered. They were only caught to the west and south of Anticosti Island. All specimens were taken in water of 4.1 - 5.0°C and between 141 and 220m depth.

Mailed sculpins (NS) (*Triglops* spp.) (Fig. 29)

Only a few specimens were caught. These were restricted to shallower depths and cooler temperatures along the southern edge of Laurentian Channel and along the south coast of Anticosti Island. One specimen was taken in the southern Esquiman Channel.

Marlin spike (common grenadier) (*Nezumia bairdi*) (Fig. 30)

This species is very common in the Gulf of St. Lawrence. It was found throughout most of the survey area but was most prevalent along the Gaspé coast and south of 49°N. It was present in the deeper areas, predominating at depths >340m. It was not found in water colder than about 2.0°C.

Sculpin, moustache (*Triglops murrayi*) (Fig. 31)

This species was found in the waters around Anticosti Island. It was most abundant in shallow depths (<141m) but was not present in temperatures <2.1°C.

Sculpins (NS) (*Cottidae*) (Fig. 32)

This group was found in fairly shallow water (141-180m) along the southern edge of Laurentian Channel and off the southwest coast of Newfoundland. Its distribution was restricted to temperatures between 4.1 and 5.0°C. Based on the geographical distribution, it is possible that these are hooker sculpins.

Sea raven (*Hemitripterus americanus*) (Fig. 33)

A few specimens were captured in different areas of the Gulf. Their distribution was wide with regard to both depth (141-340m) and temperature (2.1-6.0°C).

Seasnail, gelatinous (*Liparis fabricii*) (Fig. 34)

These were found, in small numbers, to the west and south of Anticosti Island with the exception of one specimen that was taken to the northeast of the island. They were distributed between 141 and 340m, but the majority were caught in depths between 301 and 340m. They were located in temperatures ranging from 3.1-6.0°C.

Seasnail, striped (*Liparis liparis*) (Fig. 35)

This species was caught in only one area-off the Gaspé coast between 65° and 66°N. It was taken in depths between 141 and 180m at temperatures between 1.1 and 2.0°C.

Seasnails (NS) (*Liparis* spp.) (Fig. 36)

It is probable that this group is made up of the two species

described above. The spatial distribution overlapped but was more wide ranging particularly to the east and south. Their distribution by depth and temperature overlaps that of the above species as well.

Shanny (*Lumpenus maculatus*) (Fig. 37)

They were present throughout much of the survey area with the largest numbers being taken in the western Gulf. They were found primarily in the 140 to 180m depth range and seemed to prefer temperatures in the 2.1-3.0°C range.

Skate, smooth (*Raja senta*) (Fig. 38)

This species is very widely distributed, in small numbers, throughout the Gulf. It was found in all depths surveyed but tended to be in greater numbers in water deeper than 220m. It was present in a wide range of water temperatures (1.1-6.0°C) with no indication of any particular preference.

Skate, spinytail (*Raja* (*Bathyraja*) *spinicauda*) (Fig. 39)

Only a few specimens of this species were captured and these were taken in widely separated locations. Liem and Scott (1966) did not report any catches of this species in the Gulf of St. Lawrence. They also reported that the species had not been found in water temperatures greater than about 3°C but those taken during these surveys were present in water temperatures between 4.1-5.0°C.

Skate, thorny (*Raja radiata*) (Fig. 40)

Like the smooth skate, this species was distributed over a very wide area. It was caught in all depth and temperature ranges surveyed. Unlike the smooth skate, the thorny skate seems to prefer depths <260m.

Skate, winter (spotted) (*Raja ocellata*) (Fig. 41)

Only three specimens of this species were caught. These were taken in widely different geographic areas. The temperature range was very restricted, the skate only being present in water between 4.1 and 5.0°C. All specimens were caught in depths between 261 and 340m.

Snake blenny (*Lumpenus lumpretaeformis*) (Fig. 42)

This species was found in small numbers in widely scattered areas of the Gulf. All catches were made in water <221m, with the majority of these taken in depths <180m. They preferred temperatures between 2.1 and 3.0°C.

Wolf eel (NS) (*Lycenchelys* spp.) (Fig. 43)

Small numbers of this group were distributed in in the central and western portions of the Gulf. Its distribution with regard to both depth and temperature was widespread, it being caught in all temperature ranges >2.0°C and all depth ranges <341m. Liem and Scott (1966) did not report

any catches of this species in the Gulf of St. Lawrence.

Wolffish, broadhead (*Anarhichas denticulatus*) (Fig. 44)

Small numbers of this species were taken all along the west coast of Newfoundland. A few specimens were also taken off the southwest part of Anticosti Island and off the Gaspé coast. The species seems to prefer warmer water ($>4.0^{\circ}\text{C}$) and depths greater than about 250m.

Wolffish, spotted (*Anarhichas minor*) (Fig. 45)

This species was distributed in somewhat shallower water than the broadhead. It was also more widely distributed, being found in low numbers throughout much of the eastern and central areas of the Gulf.

Wolffish, striped (*Anarhichas lupus*) (Fig. 46)

Of the three wolffish species, this one was found in the shallowest waters and tended to favor depths $<200\text{m}$. The species was the most abundant and had the widest geographic distribution of the three. It was found in colder water than the other two described above, preferring temperatures in the $1.1\text{--}2.0^{\circ}\text{C}$ range.

Wrymouth (*Cryptacanthodes maculatus*) (Fig. 47)

Only three specimens of this species were captured. Their distribution was between 221 and 300m. This is greater than the maximum of about 110m reported by Liem and Scott (1966). They were found quite far apart spatially, being caught in the extreme east, central and extreme west portions of the survey area. These specimens were only taken in the temperature range of $5.1\text{--}6.0^{\circ}\text{C}$.

ACKNOWLEDGEMENTS

Special thanks is extended to all technical staff who participated in the summer cruises. Great appreciation is also expressed to the captains and crews of the charter vessels. Without the dedicated interest of these people, the objectives of these surveys could not have been successfully met.

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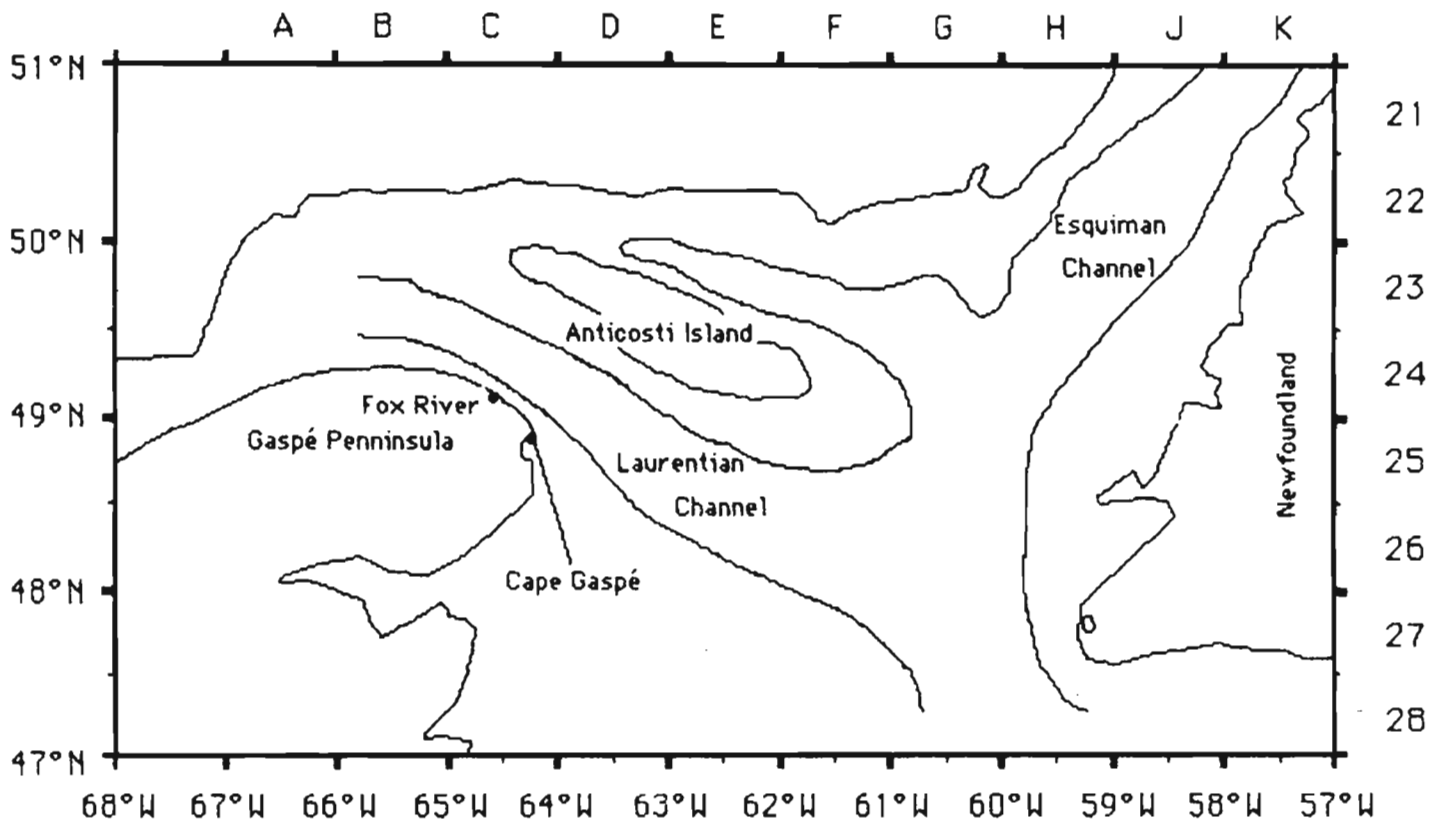


Fig. 1: Survey area showing locations noted in text.

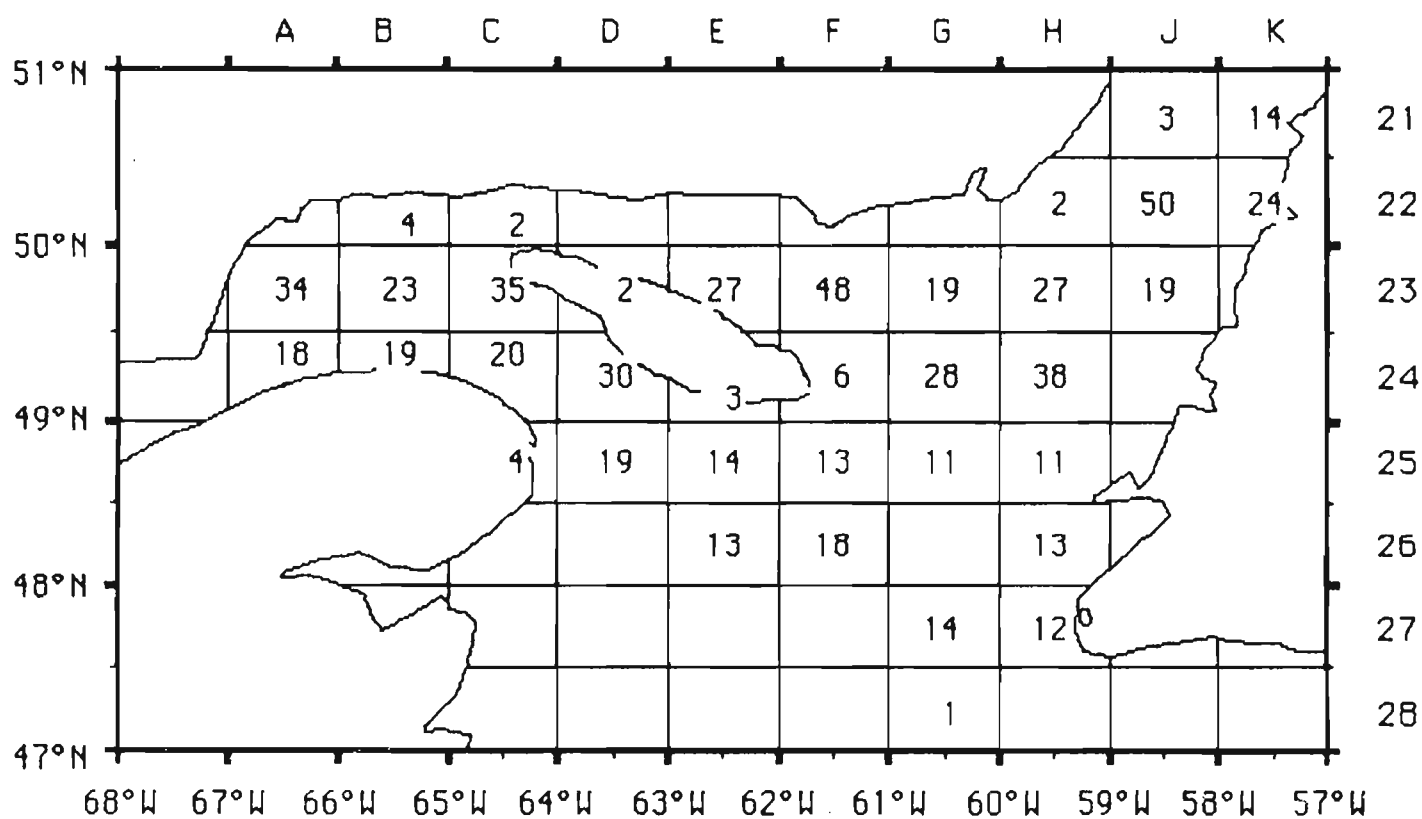
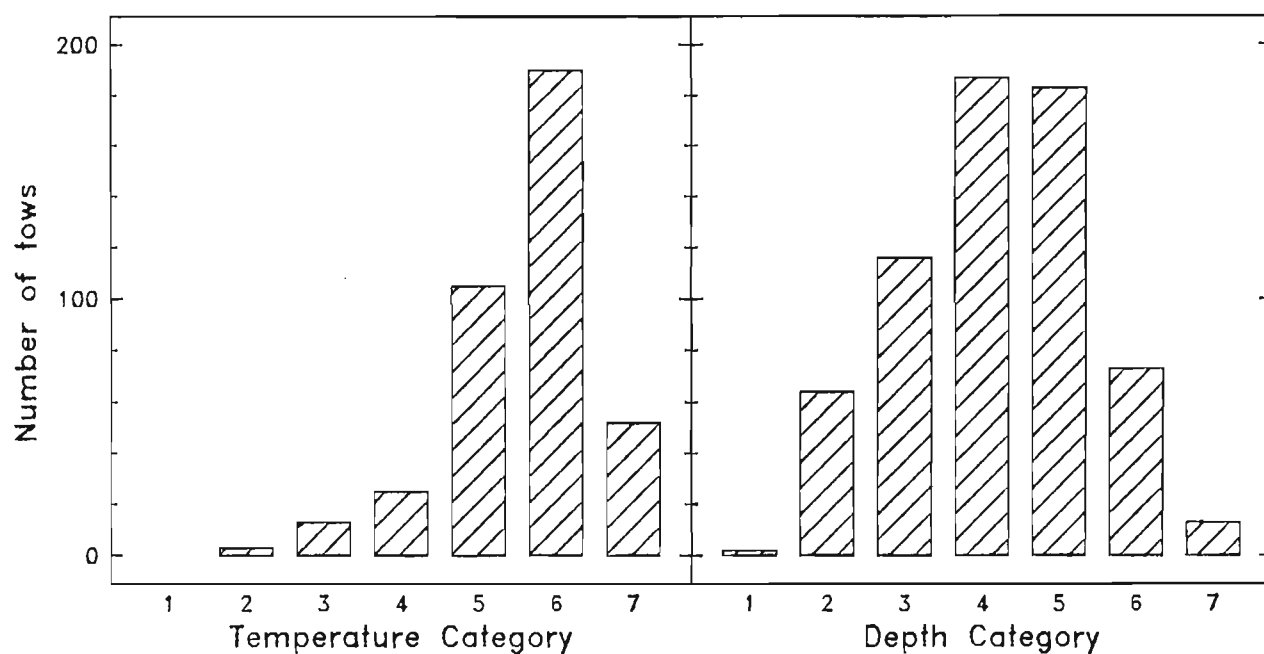


Fig. 2: Distribution of sets by depth and temperature category and by unit area during stratified random surveys in the Gulf of St. Lawrence, 1976 and 1978-1981.

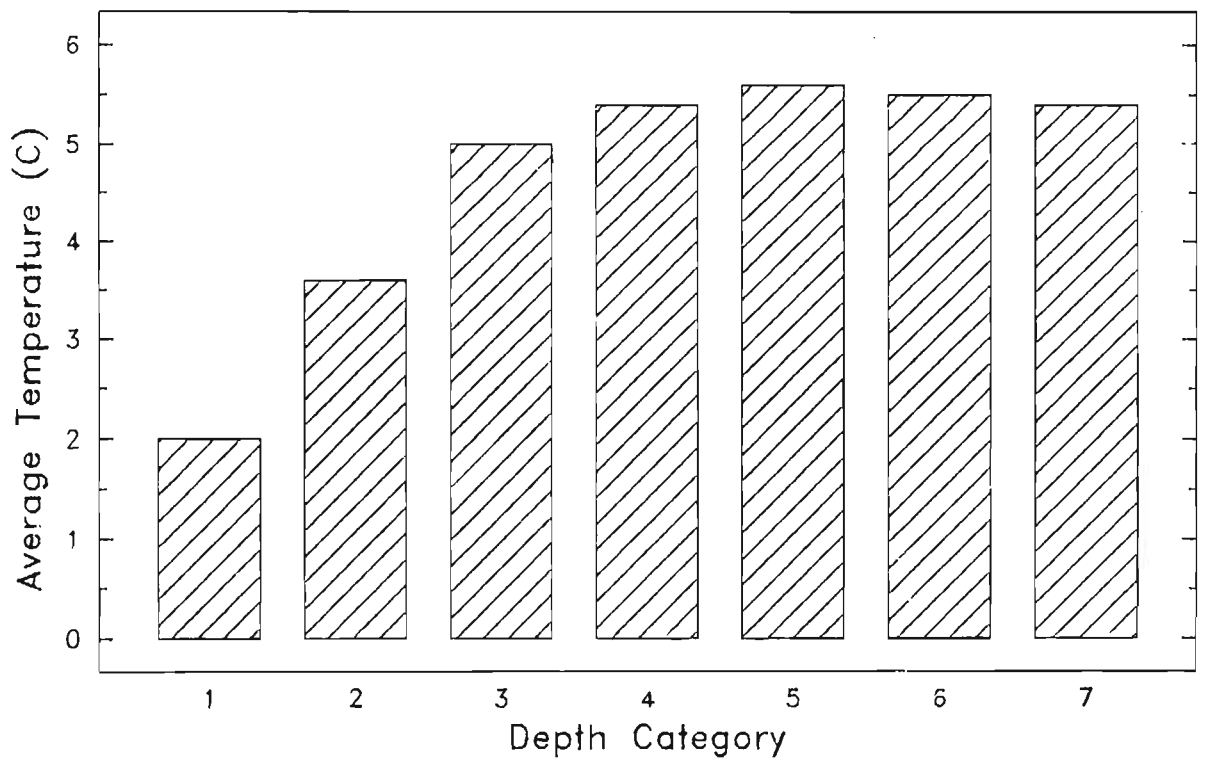
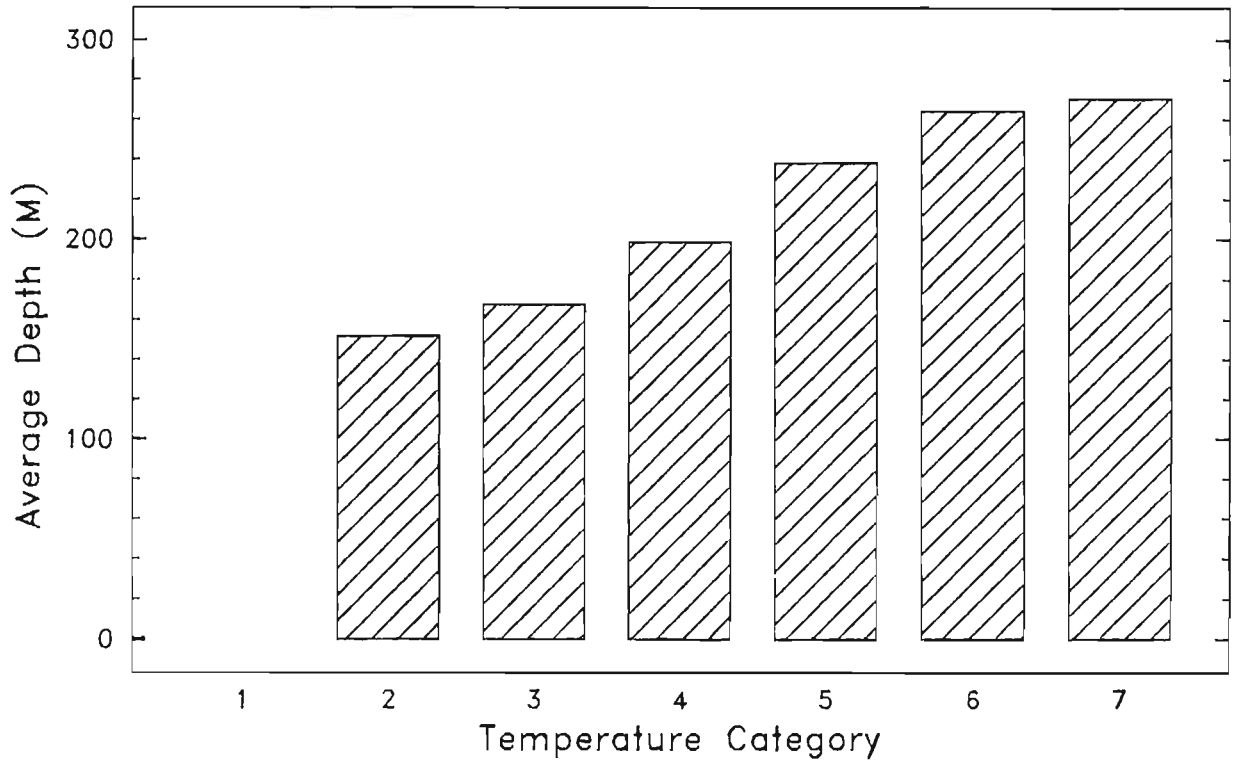


Fig.1: Average depth for each temperature category and average temperature for each depth category, summer surveys, 1976-1981.

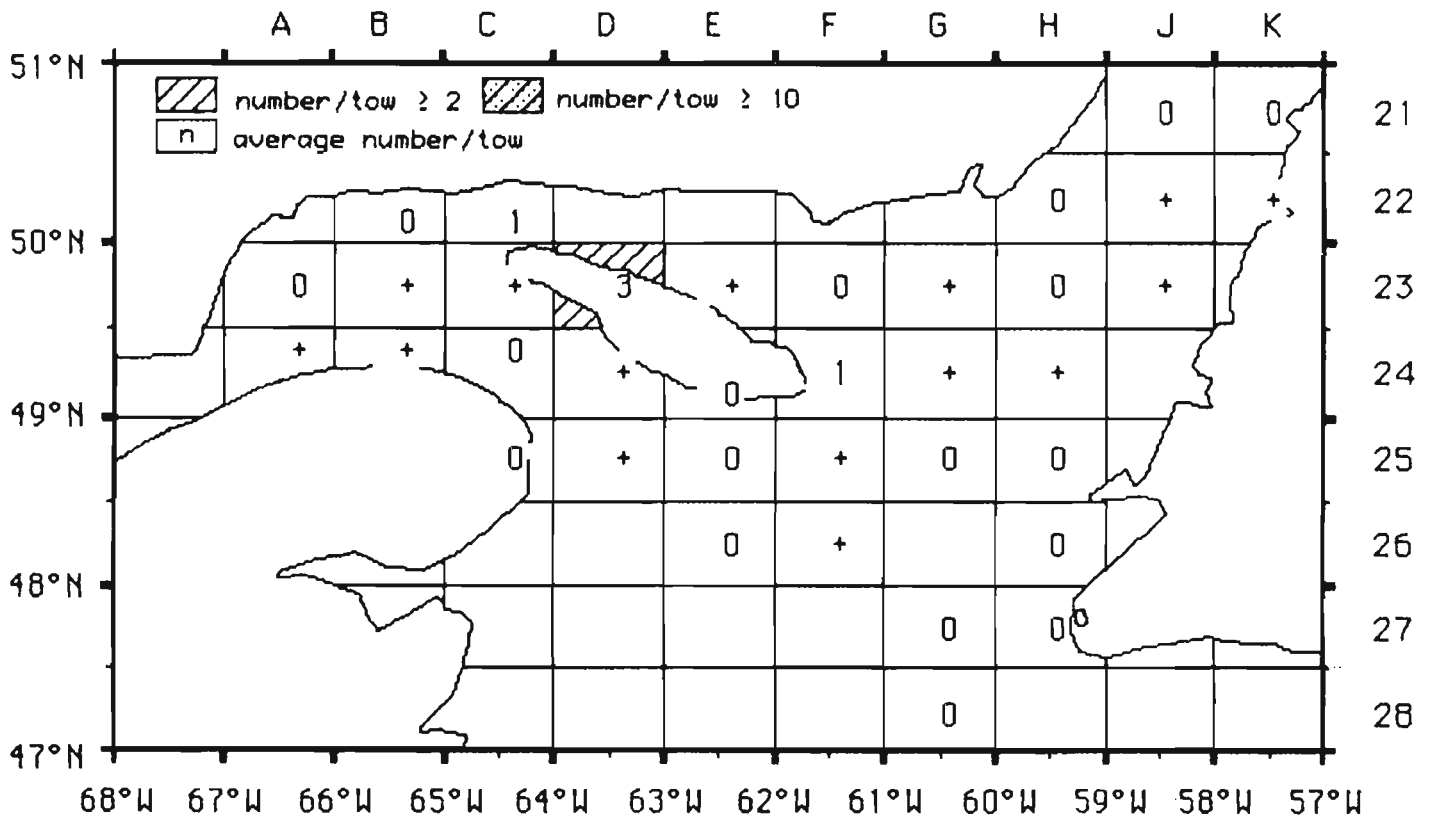
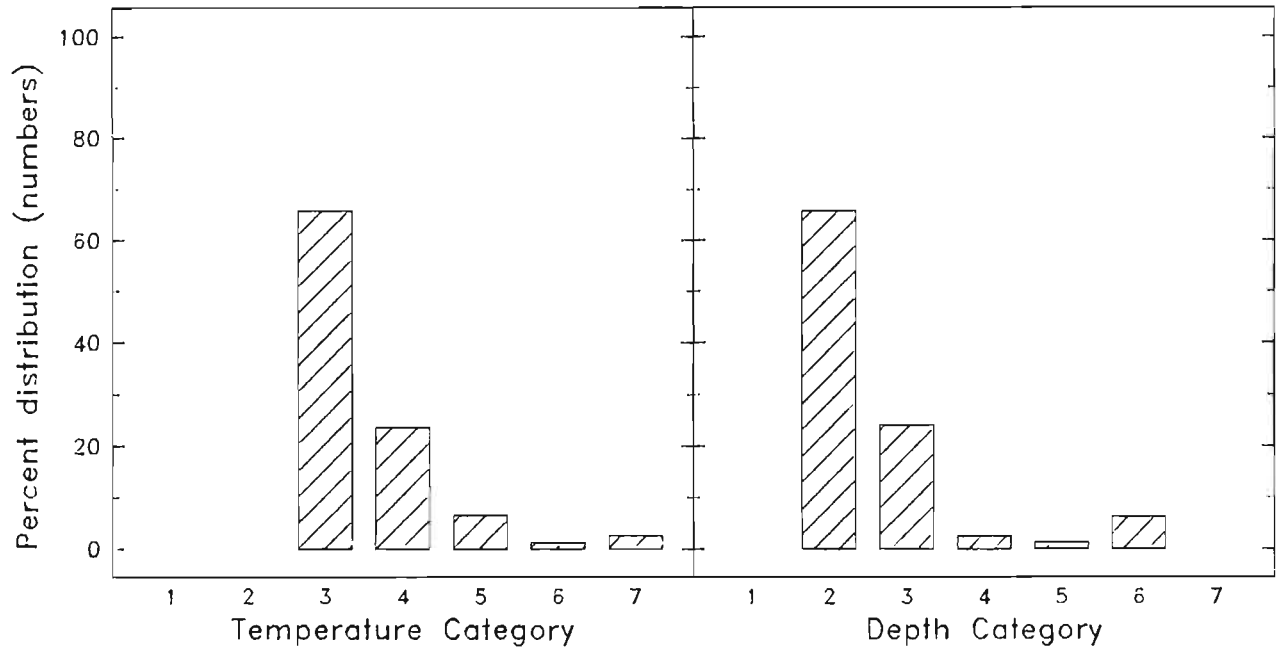


Fig. 4: Alligator fish, common (*Aspidophoroides monopterygius*)

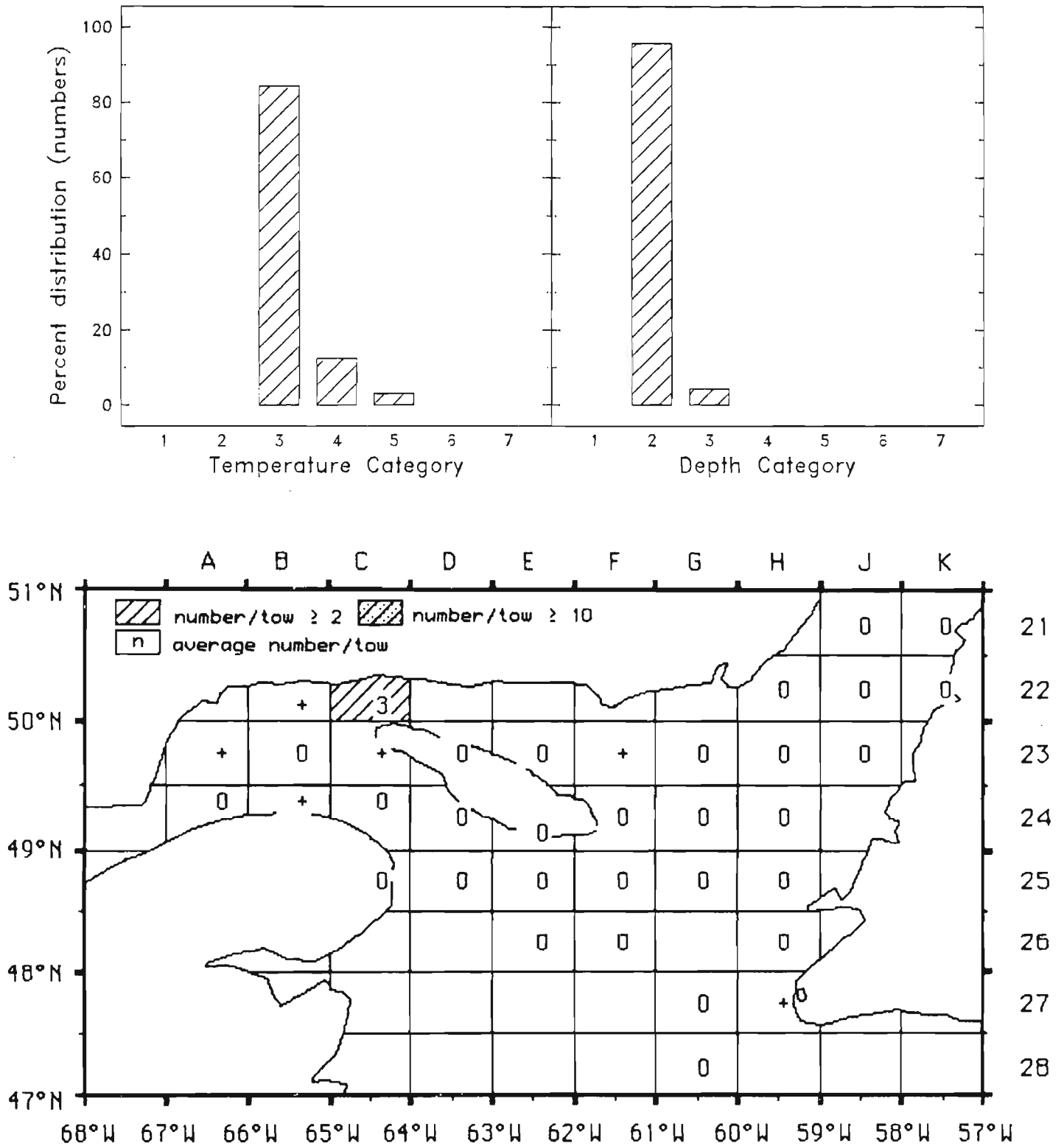


Fig. 5: Alligator fish, northern (*Agonus decagonus*)

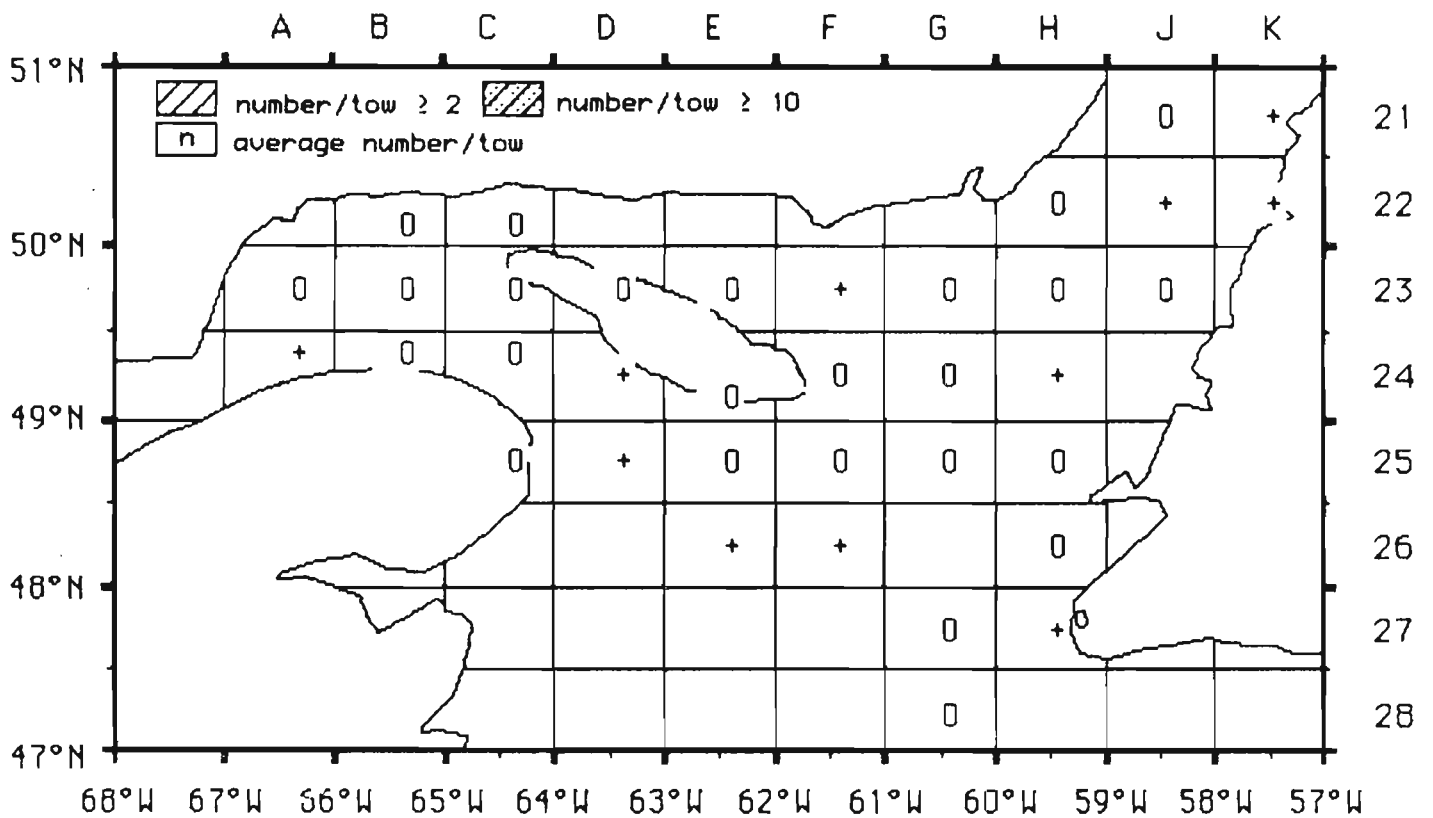
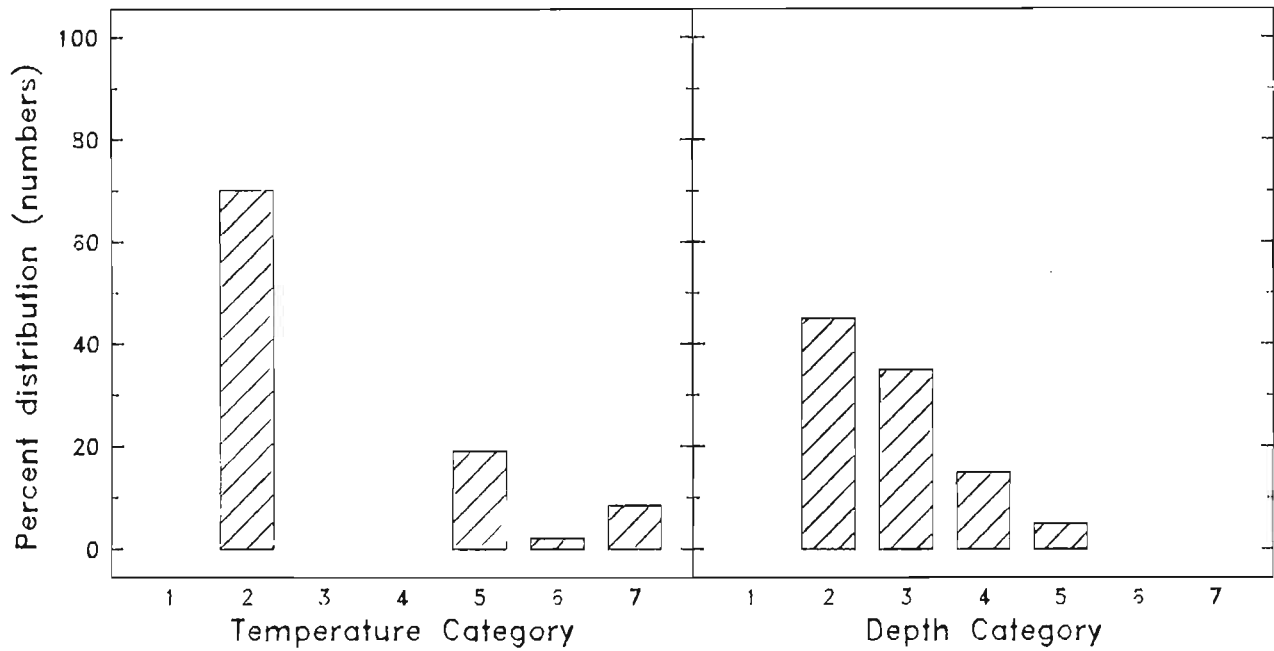


Fig. 6: Alligator fish (NS) (*Agonidae*)

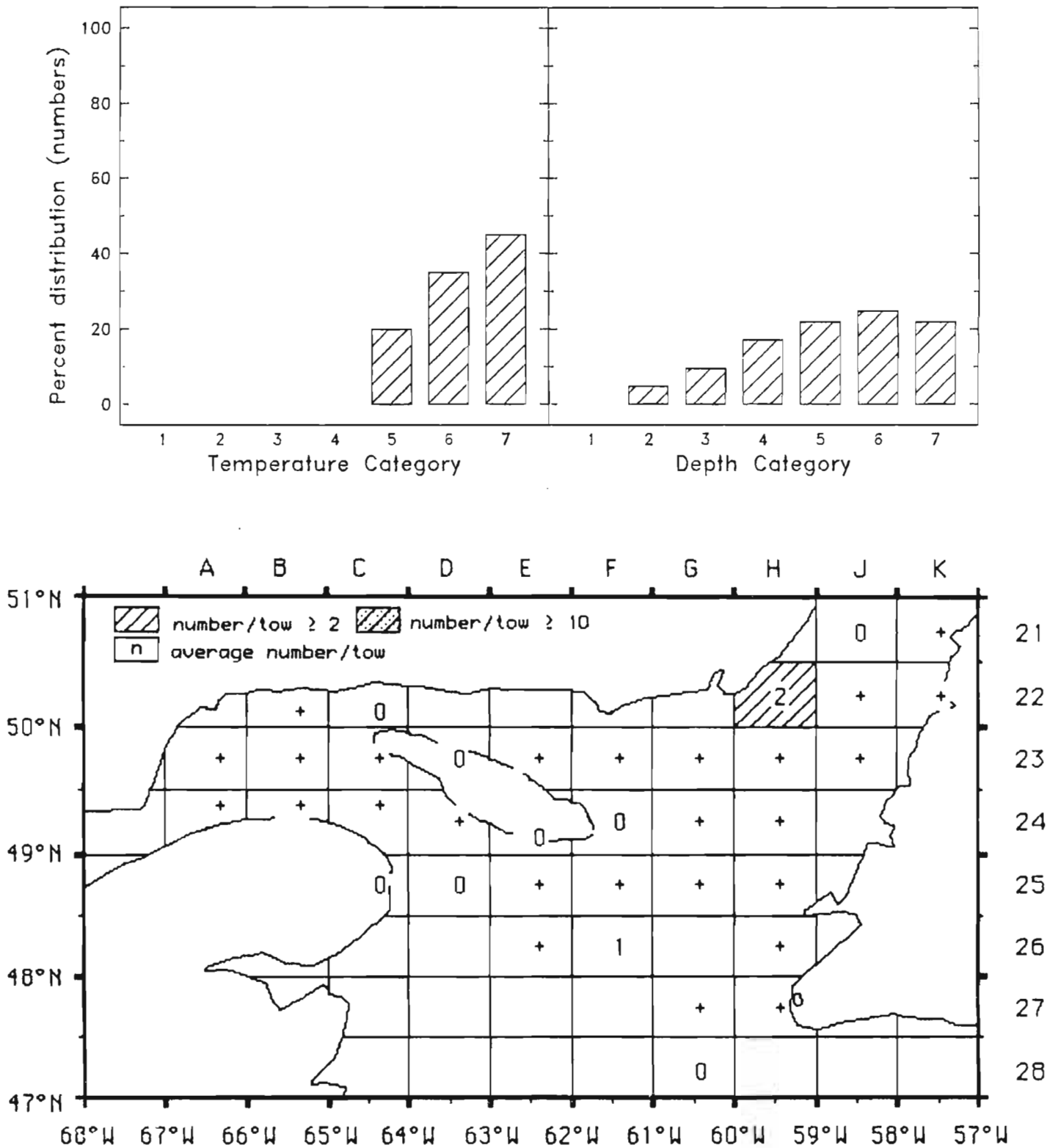


Fig. 7: Angler, common (Monkfish) (*Lophius americanus*)

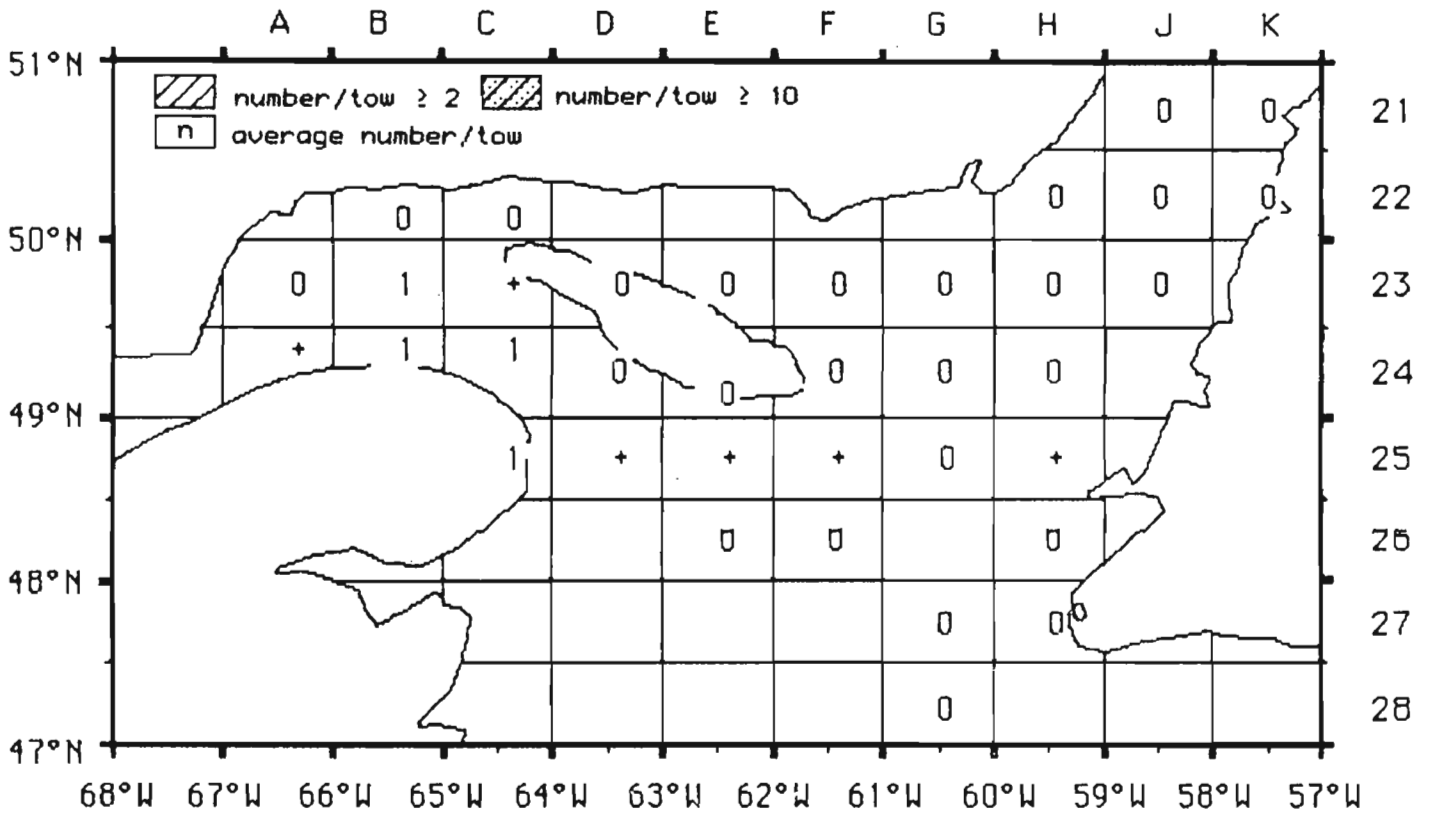
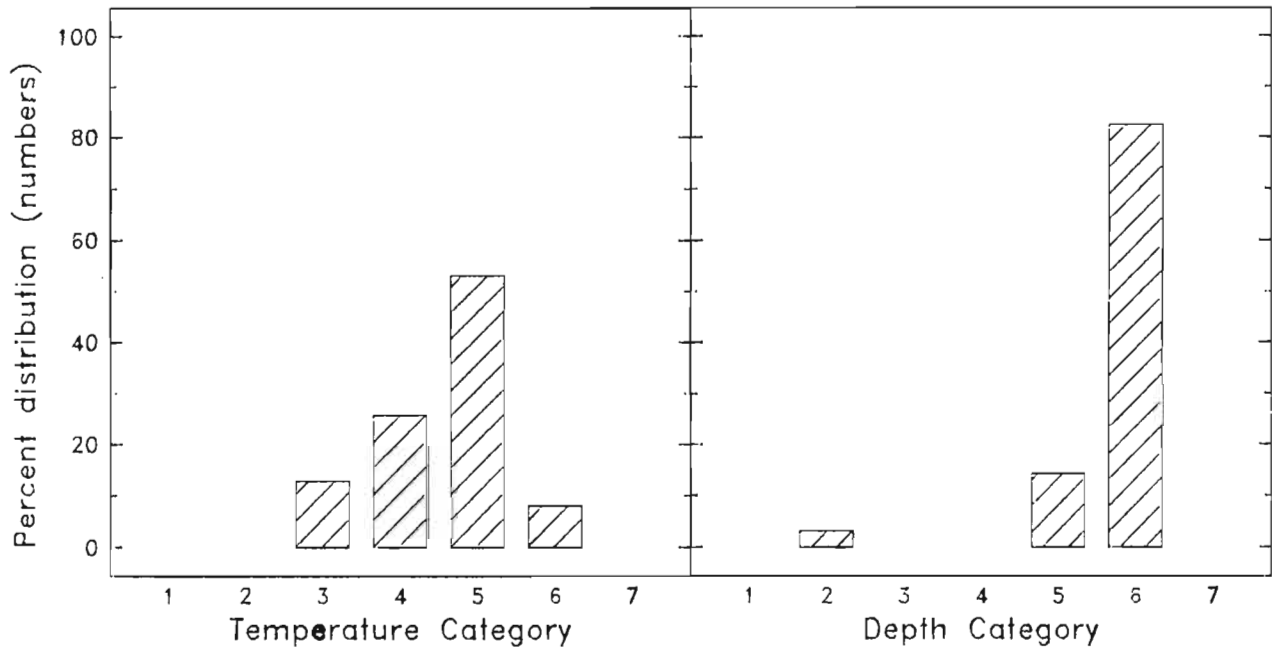


Fig. 8: *Barracudina* (NS) (*Paralepis* spp.)

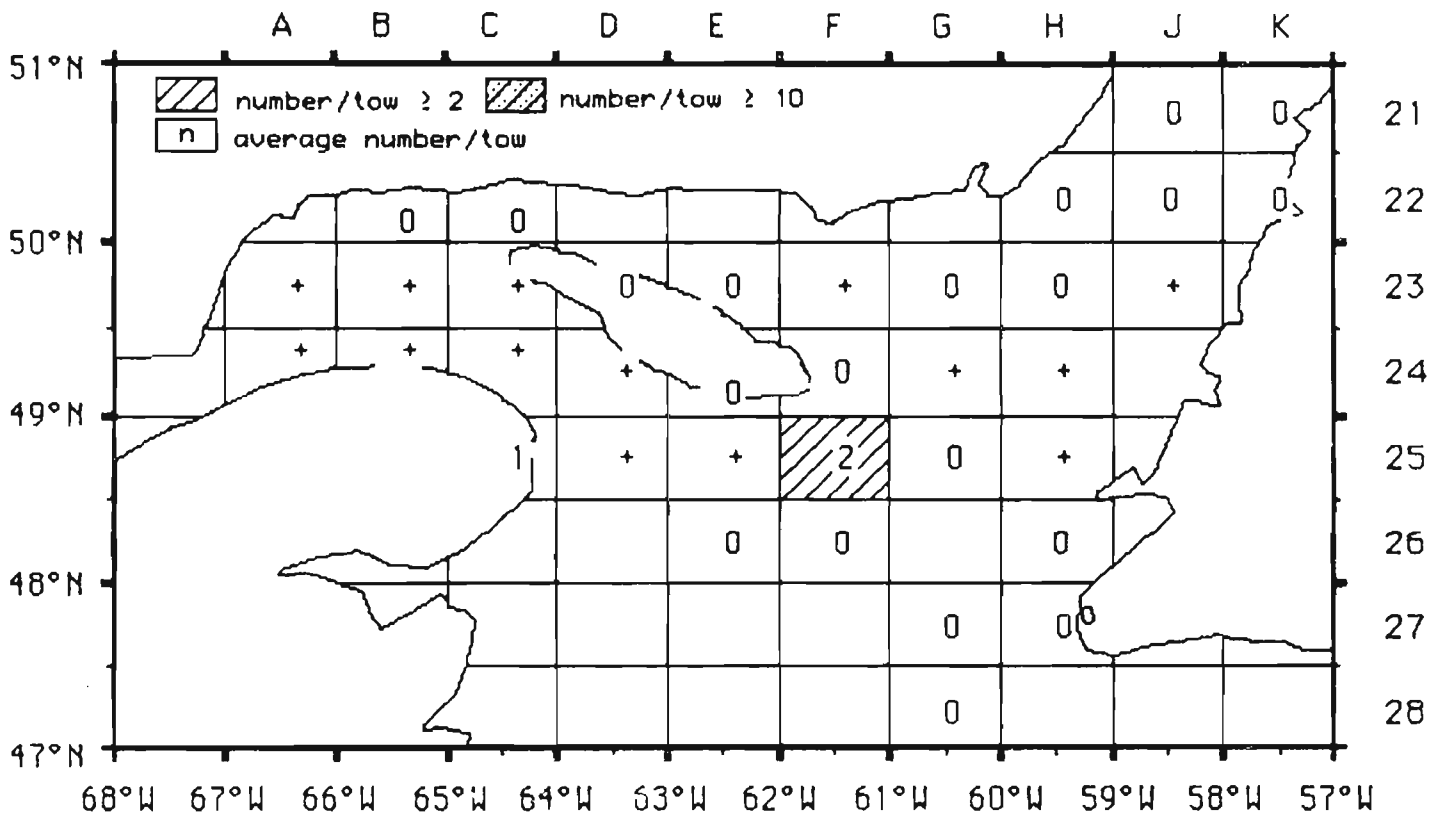
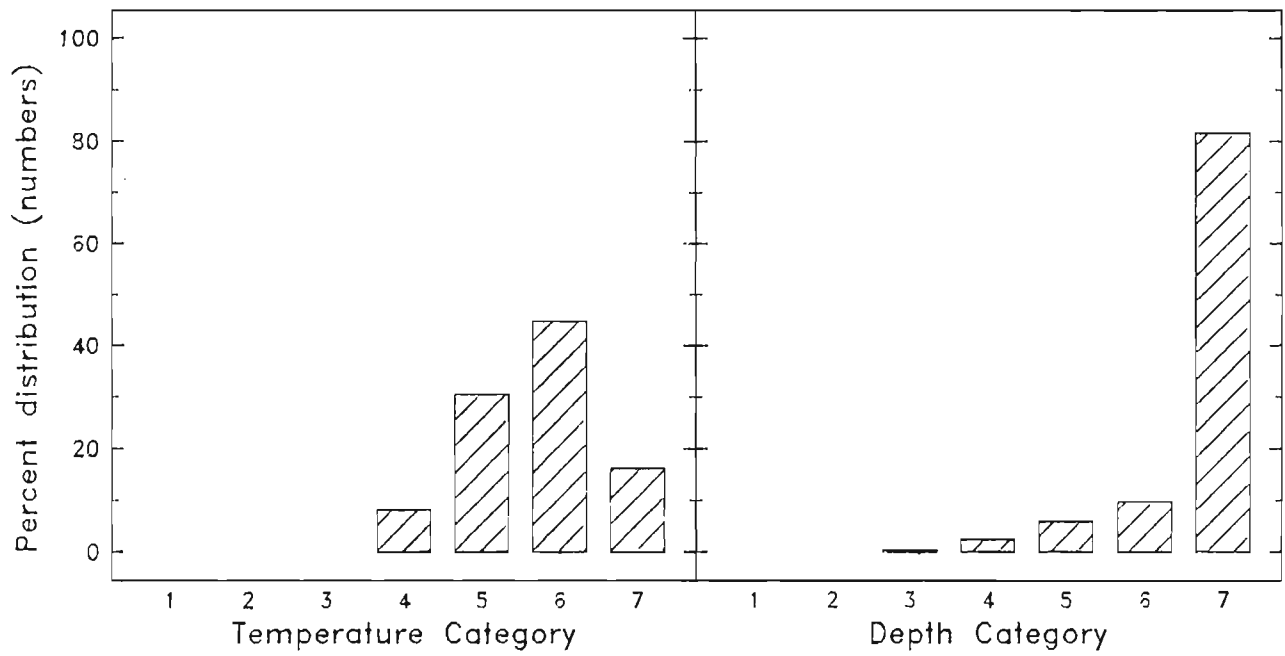
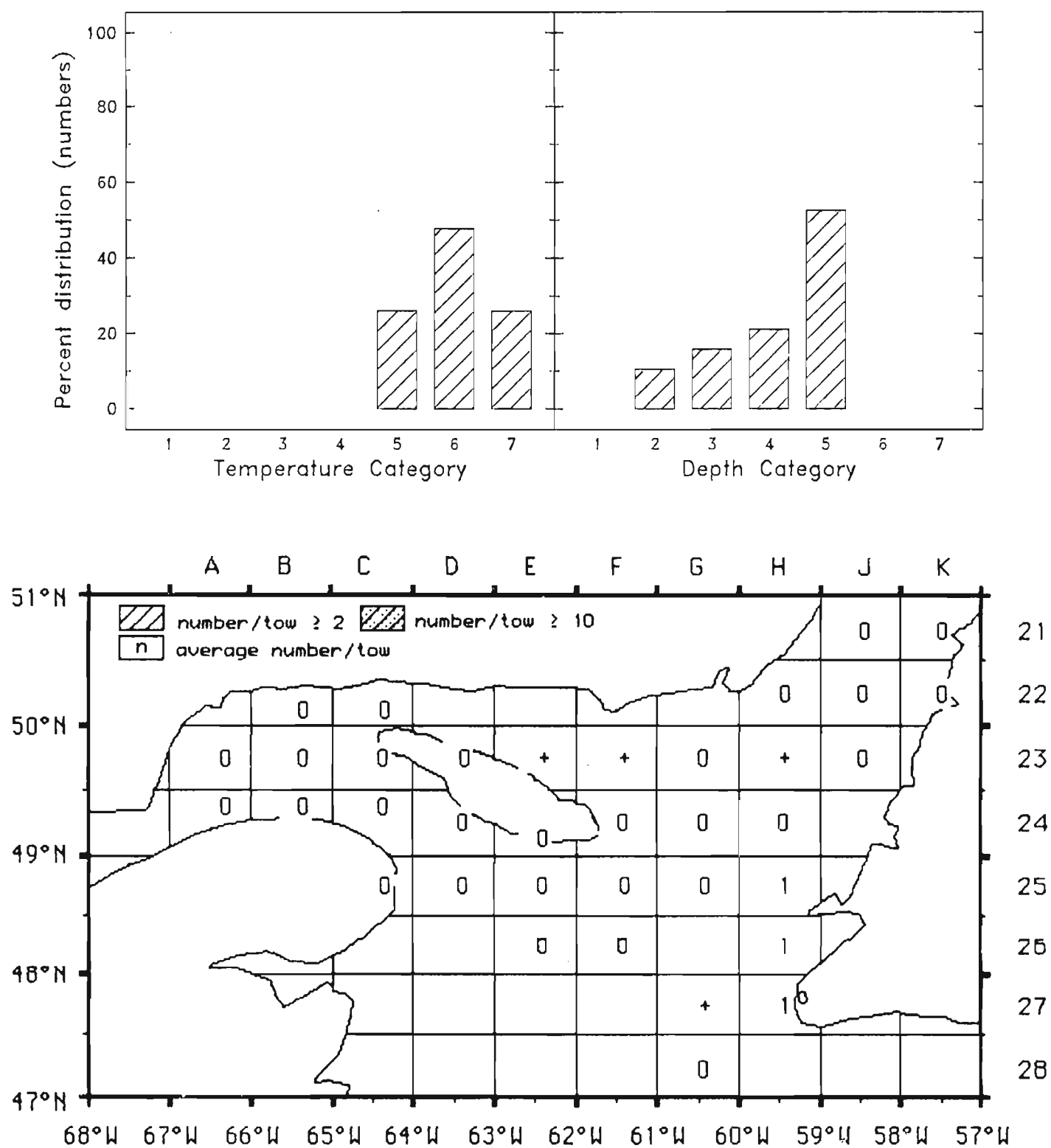


Fig. 9: Barracudinas (*Paralepididae*)

Fig. 10: Cod, Arctic (*Boreogadus saida*)

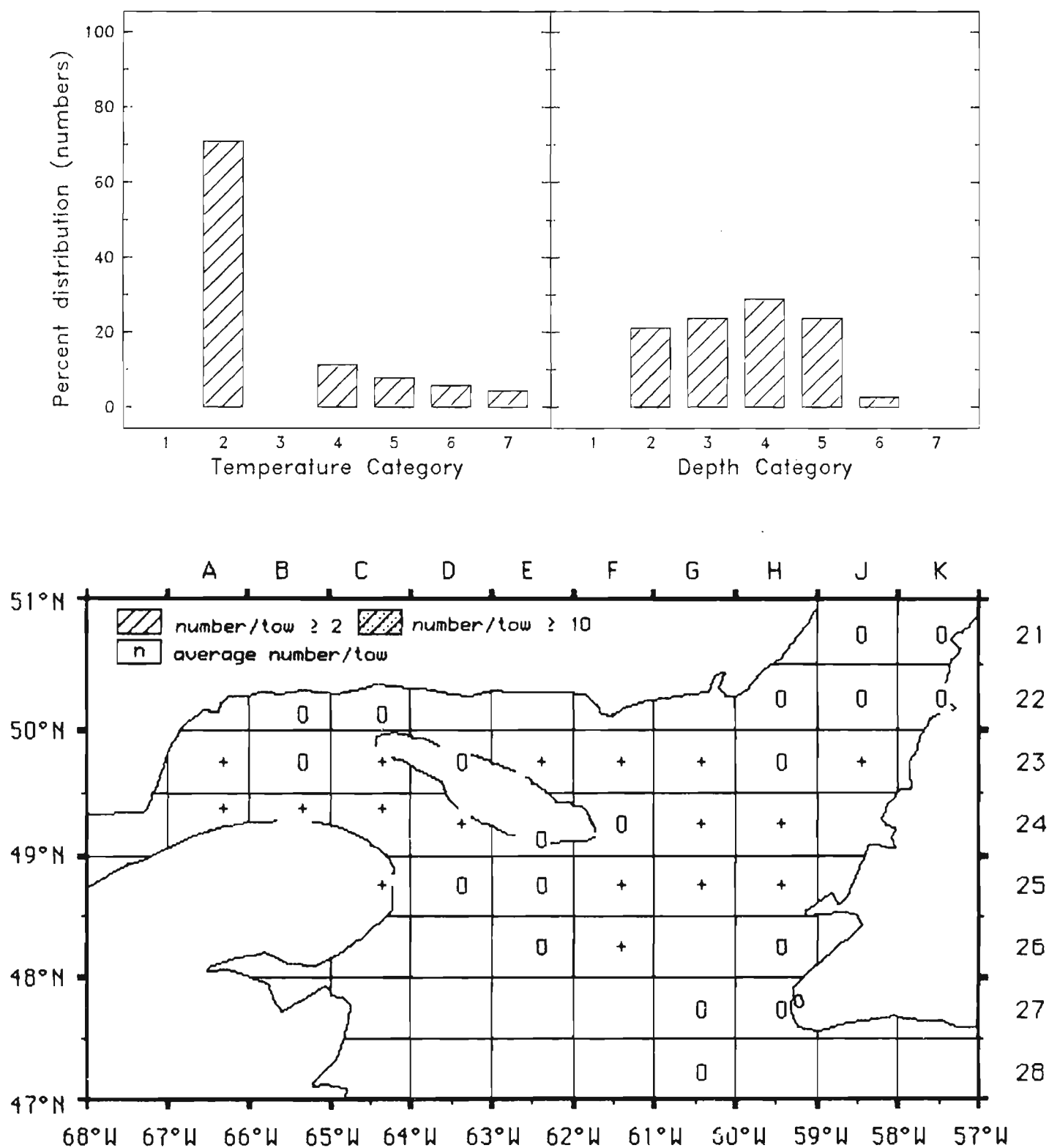


Fig. 11: Deepsea sculpin, Arctic (*Cottunculus microps*)

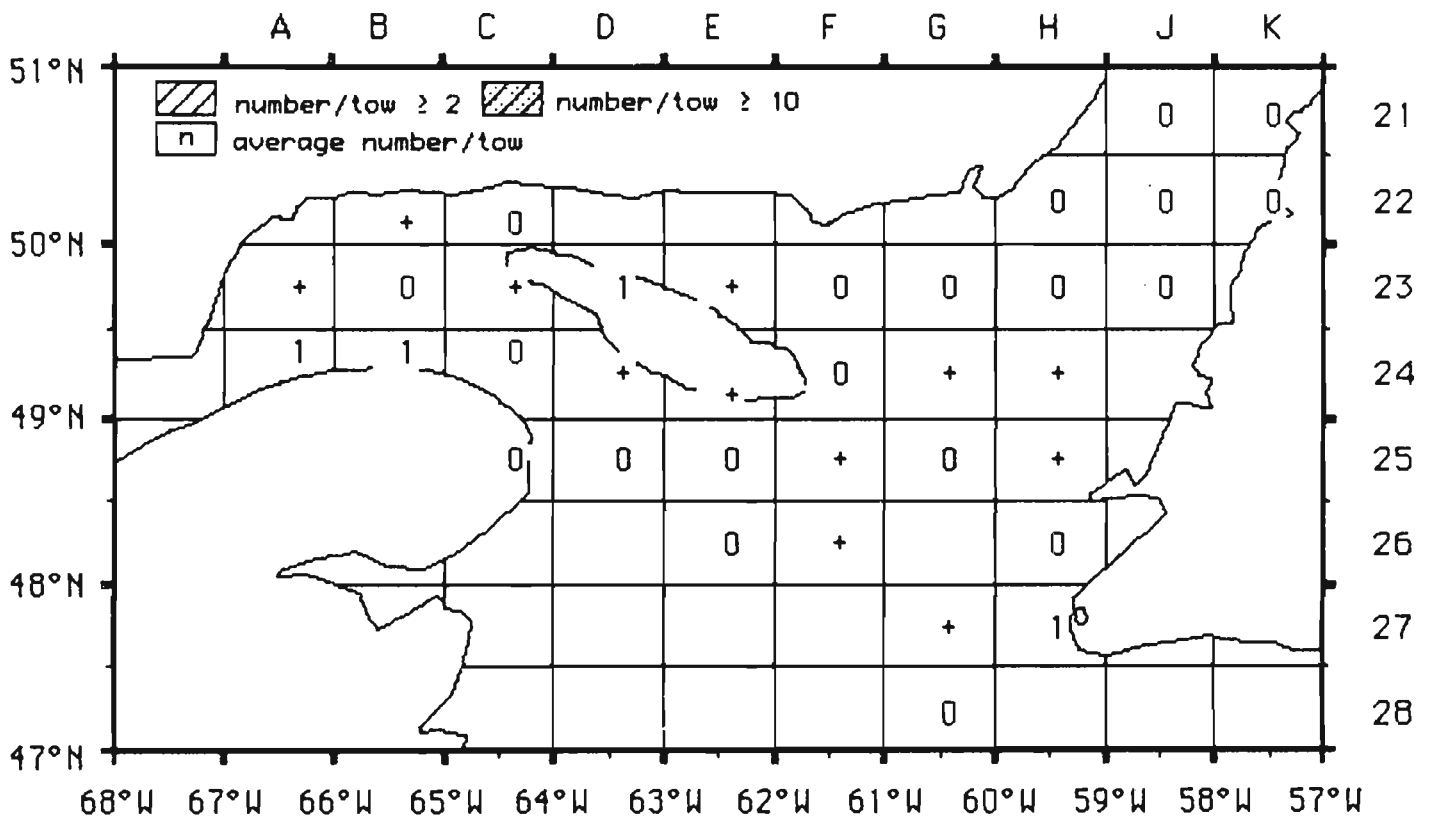
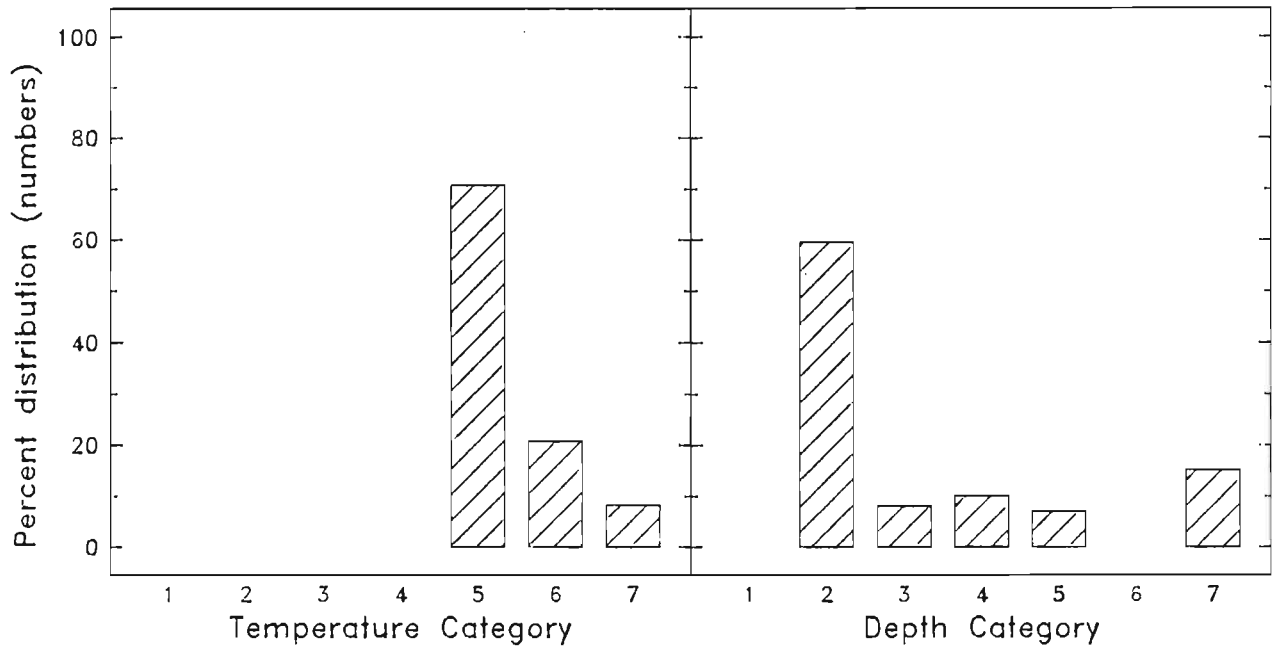


Fig. 12: Deepsea sculpin (NS) (*Cottunculus* spp.)

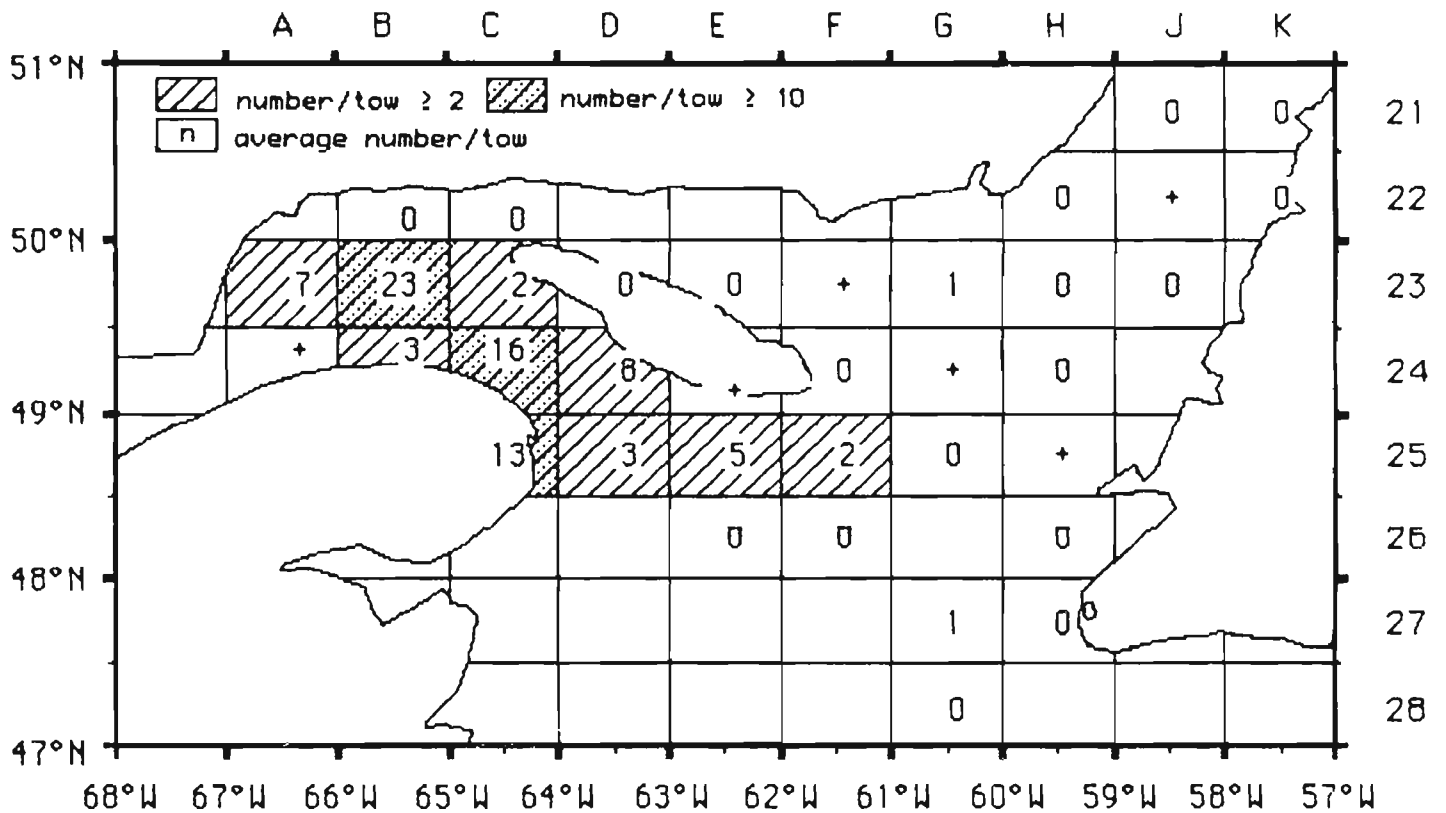
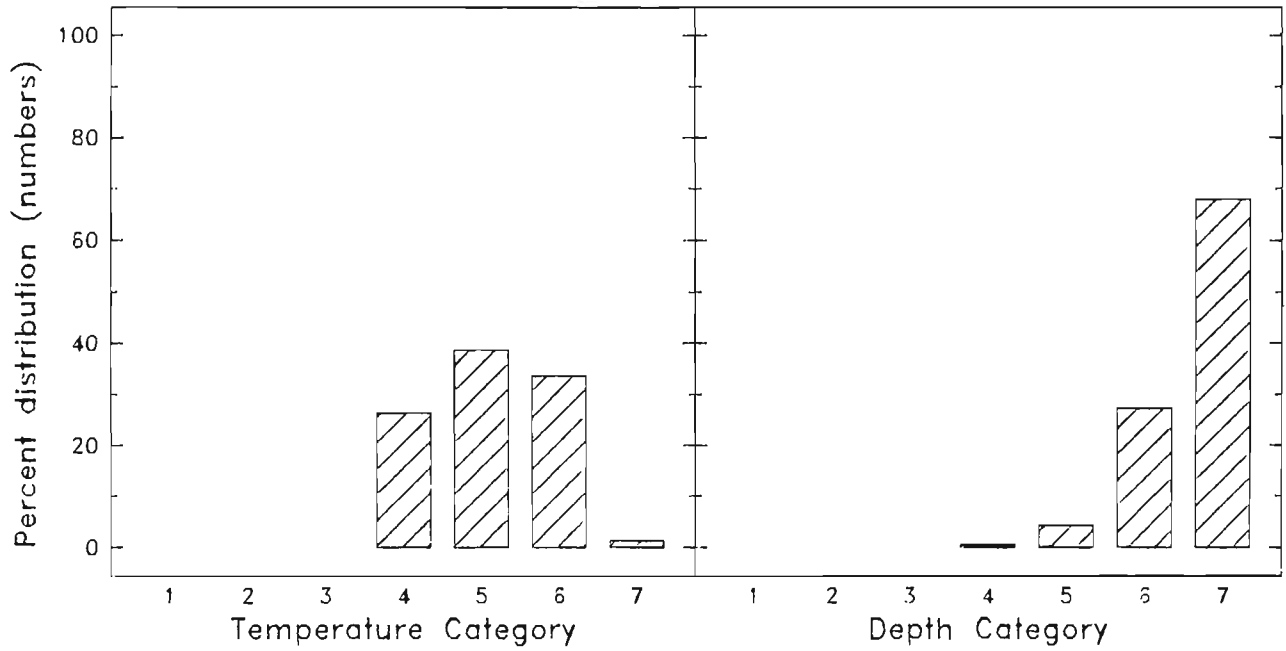


Fig. 13: Dogfish, Black (*Centroscyllium fabricii*)

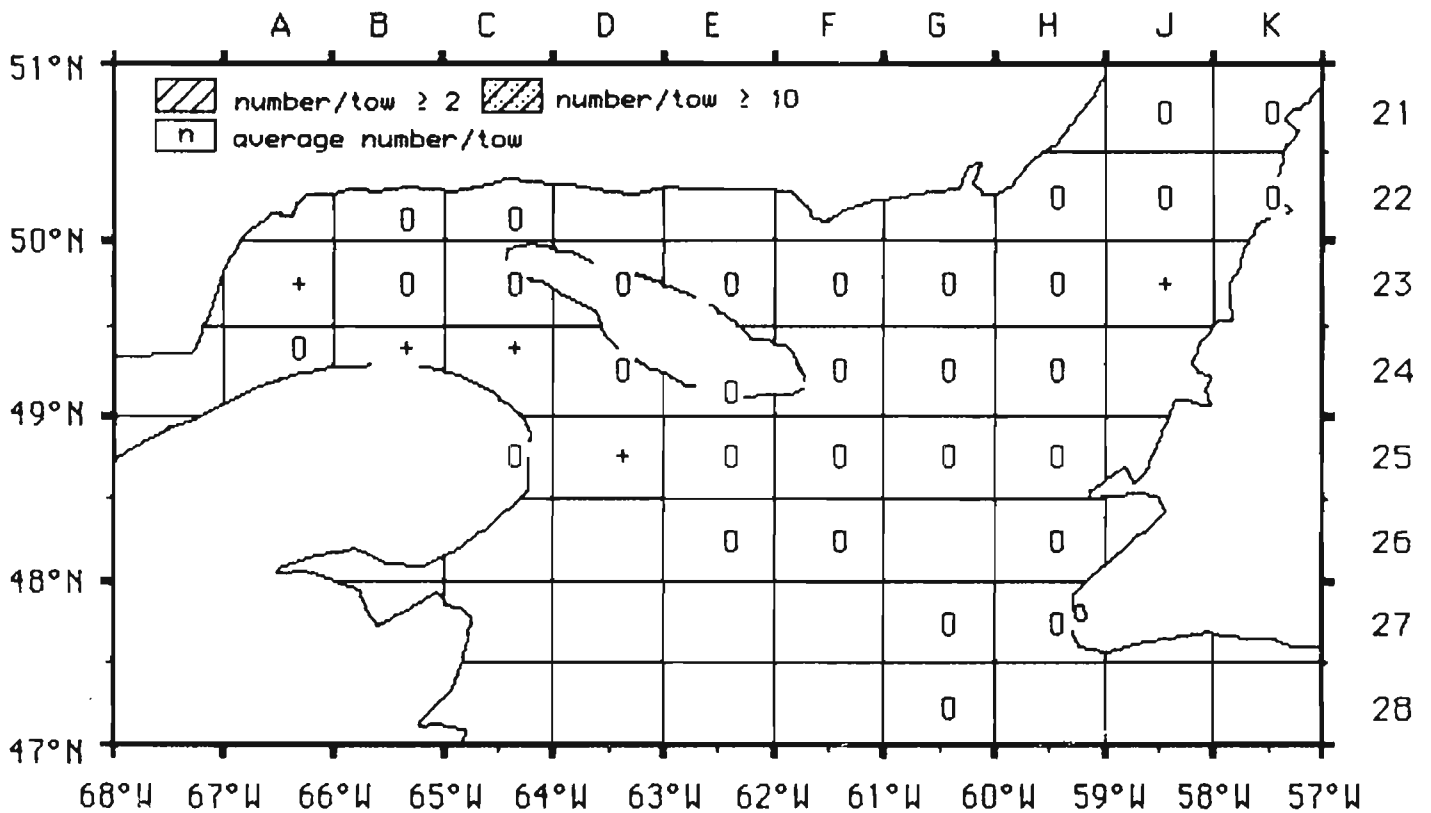
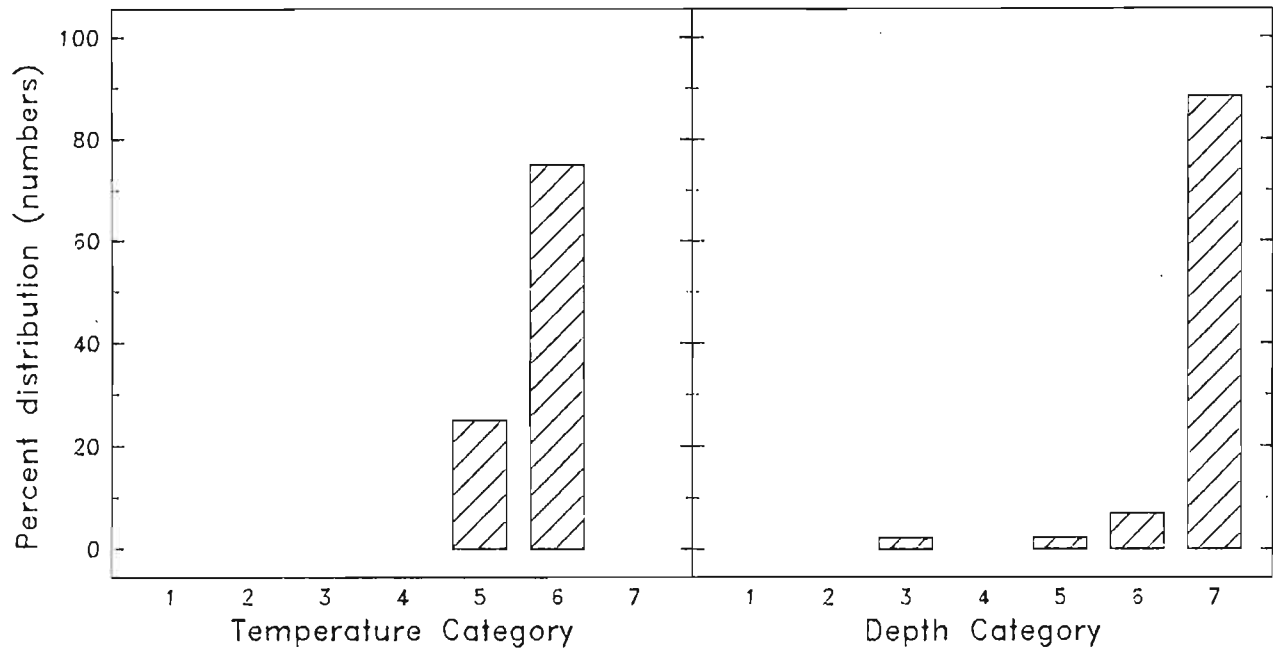


Fig. 14: Eelpout, Esmark's (*Lycodes esmarki*)

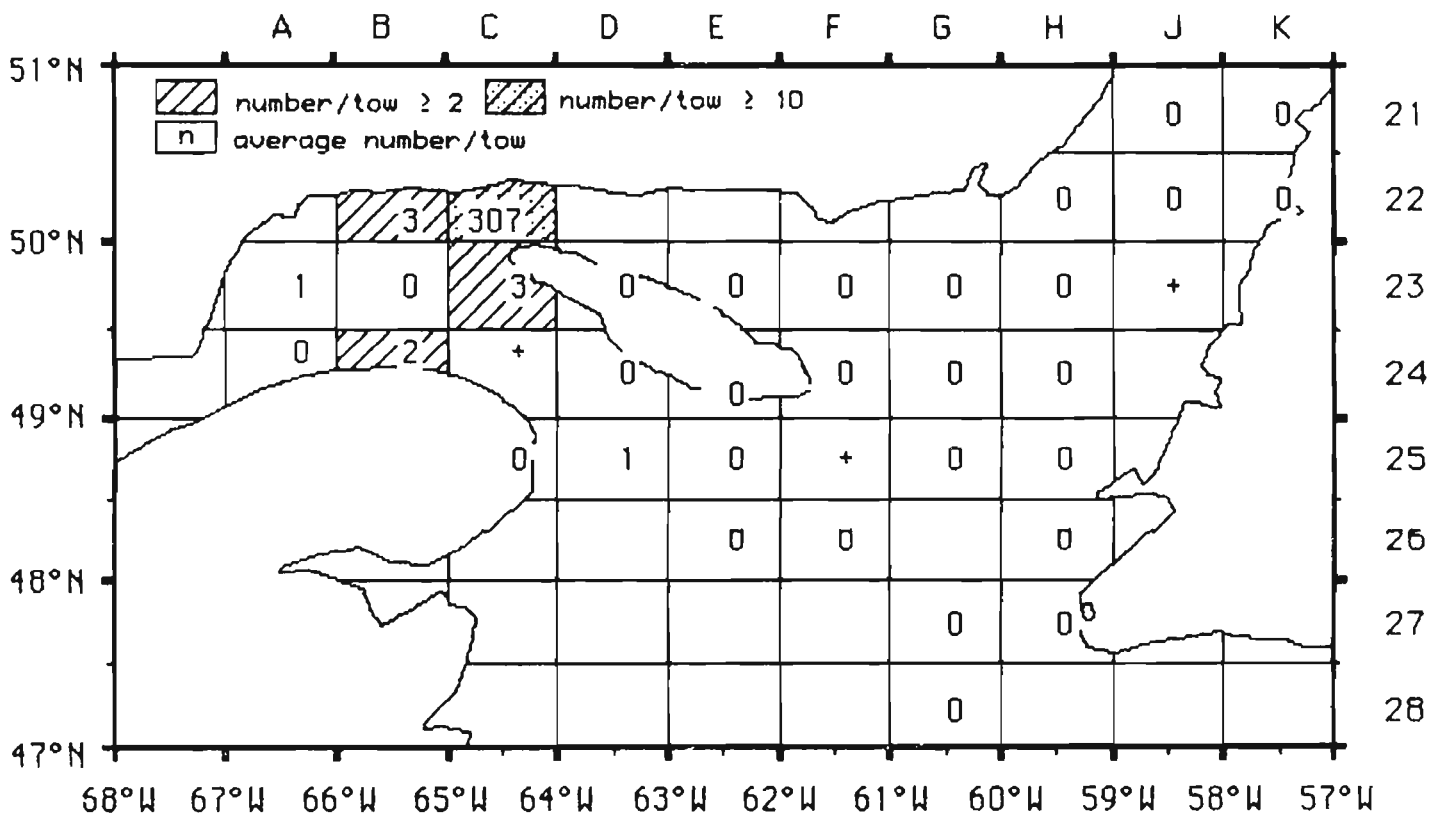
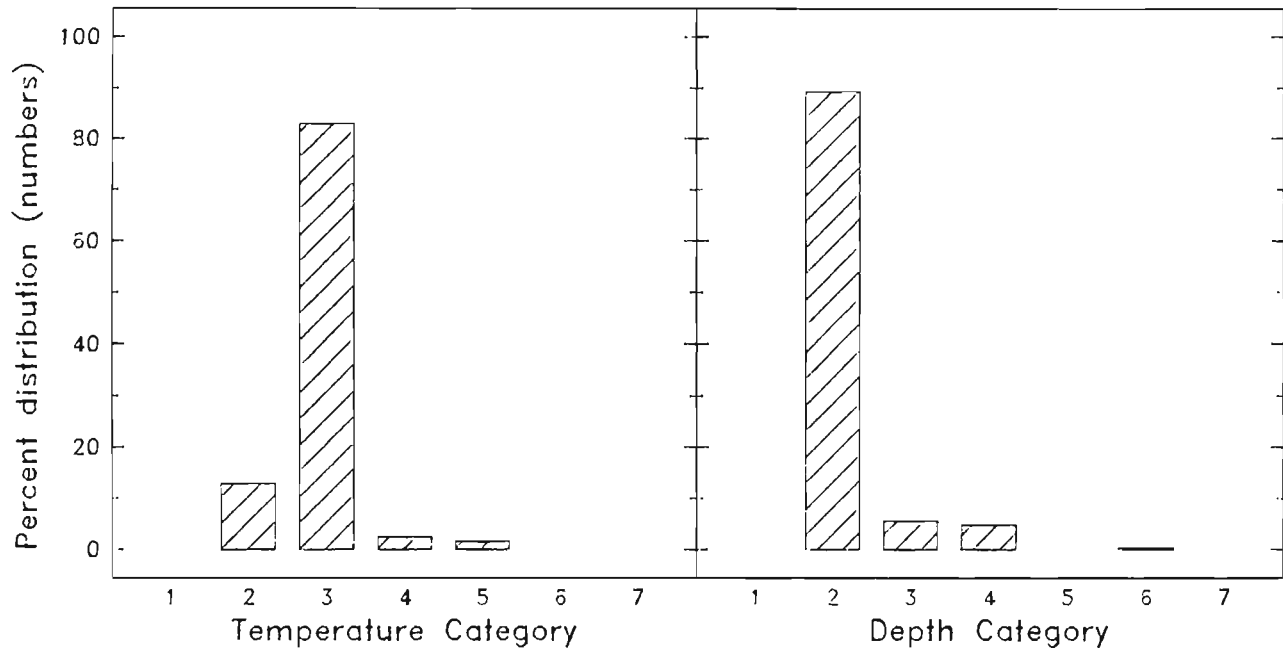


Fig. 15: Eelpout, Laval's (*Lycodes lavalaei*)

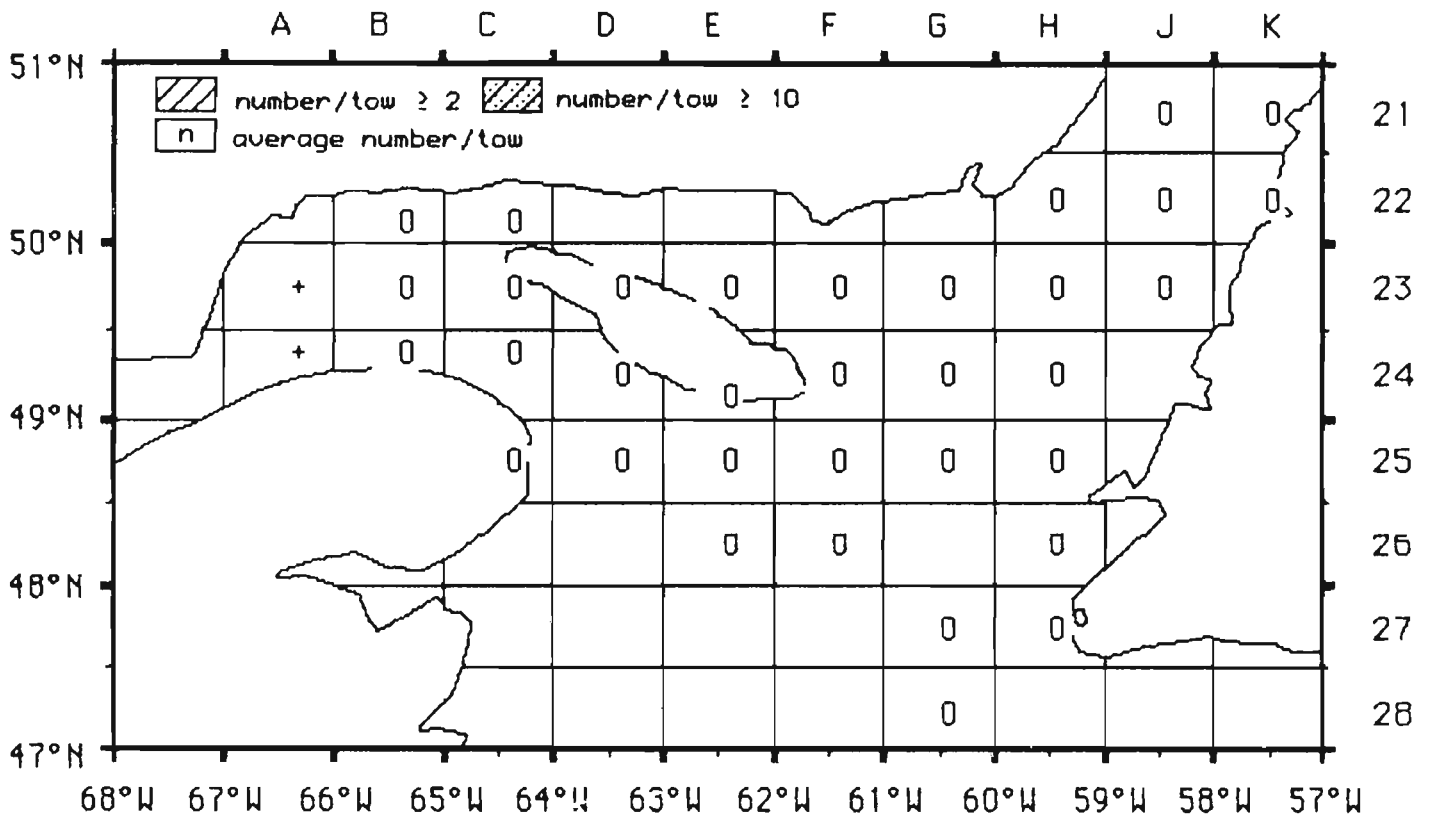
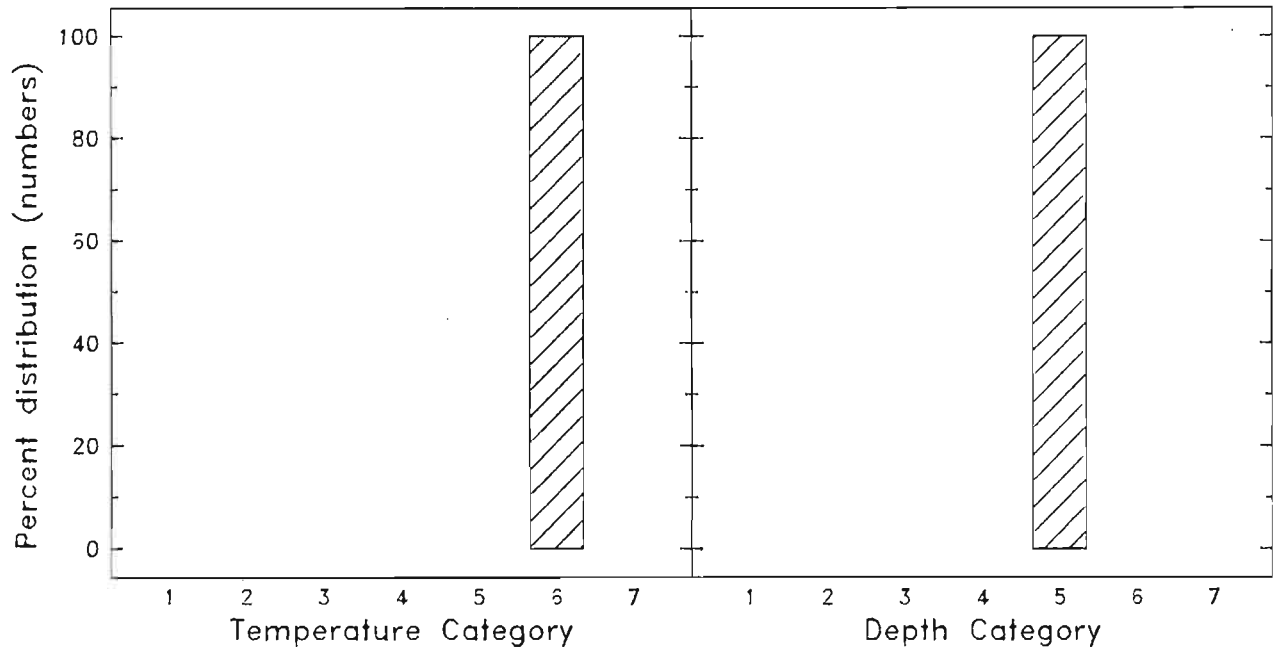


Fig. 16: Eelpout, Newfoundland (*Lycodes terraenovae*)

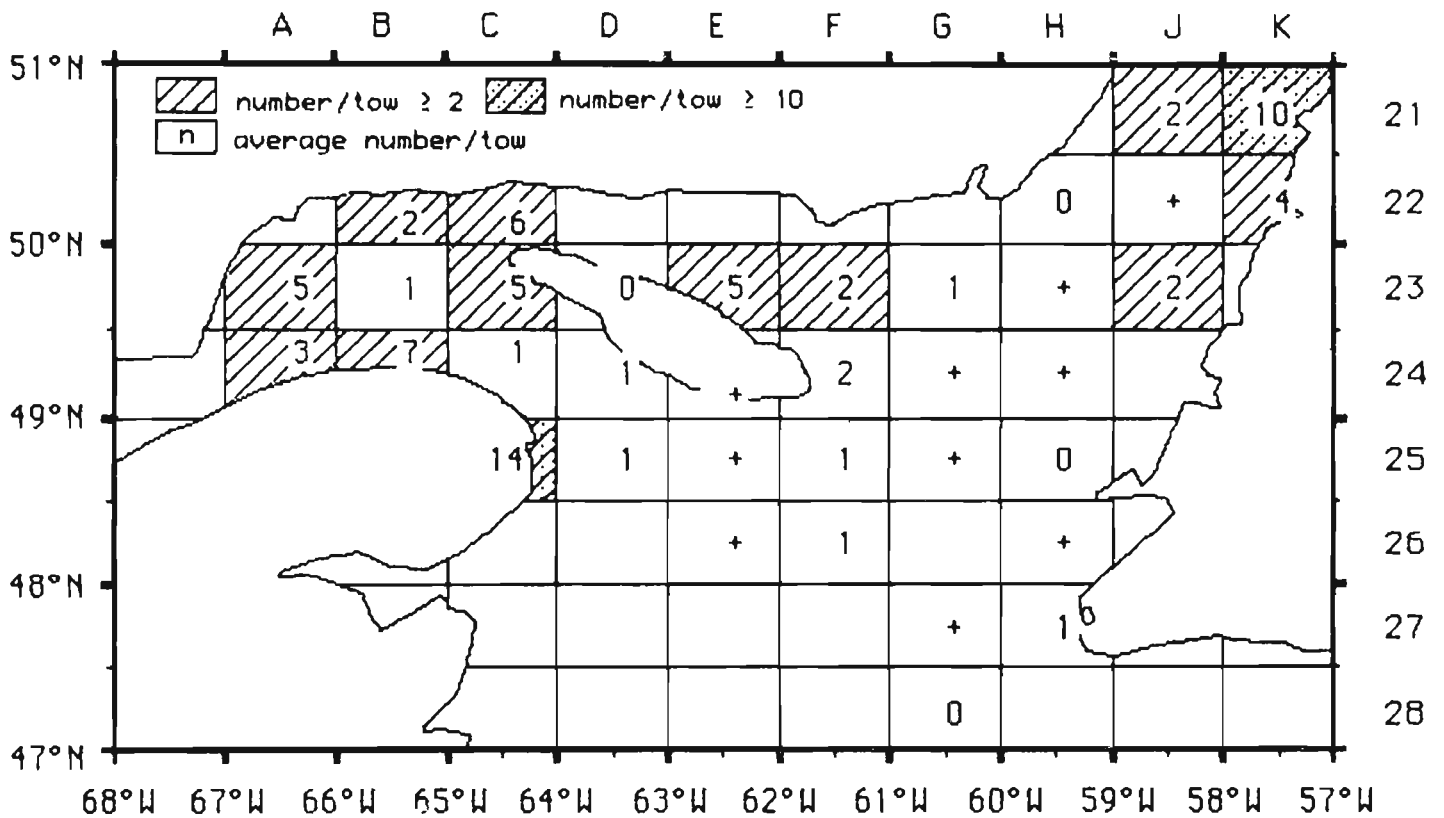
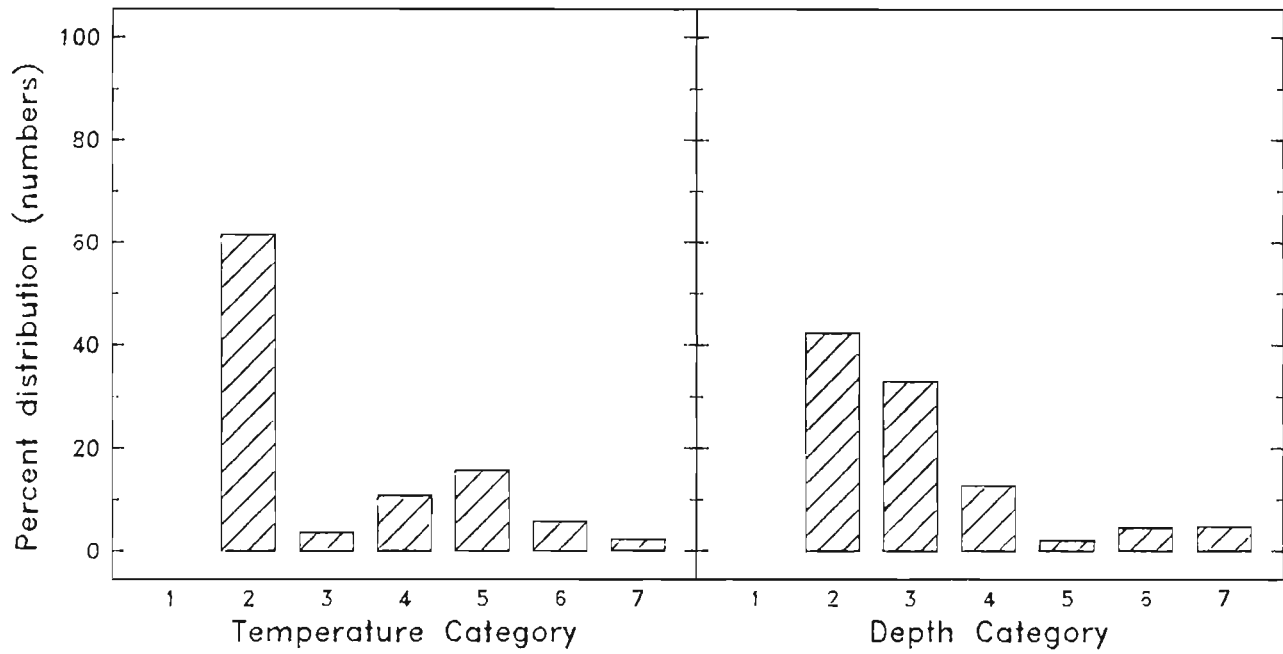


Fig. 17: Eelpout, Vahl's (*Lycodes vahliei*)

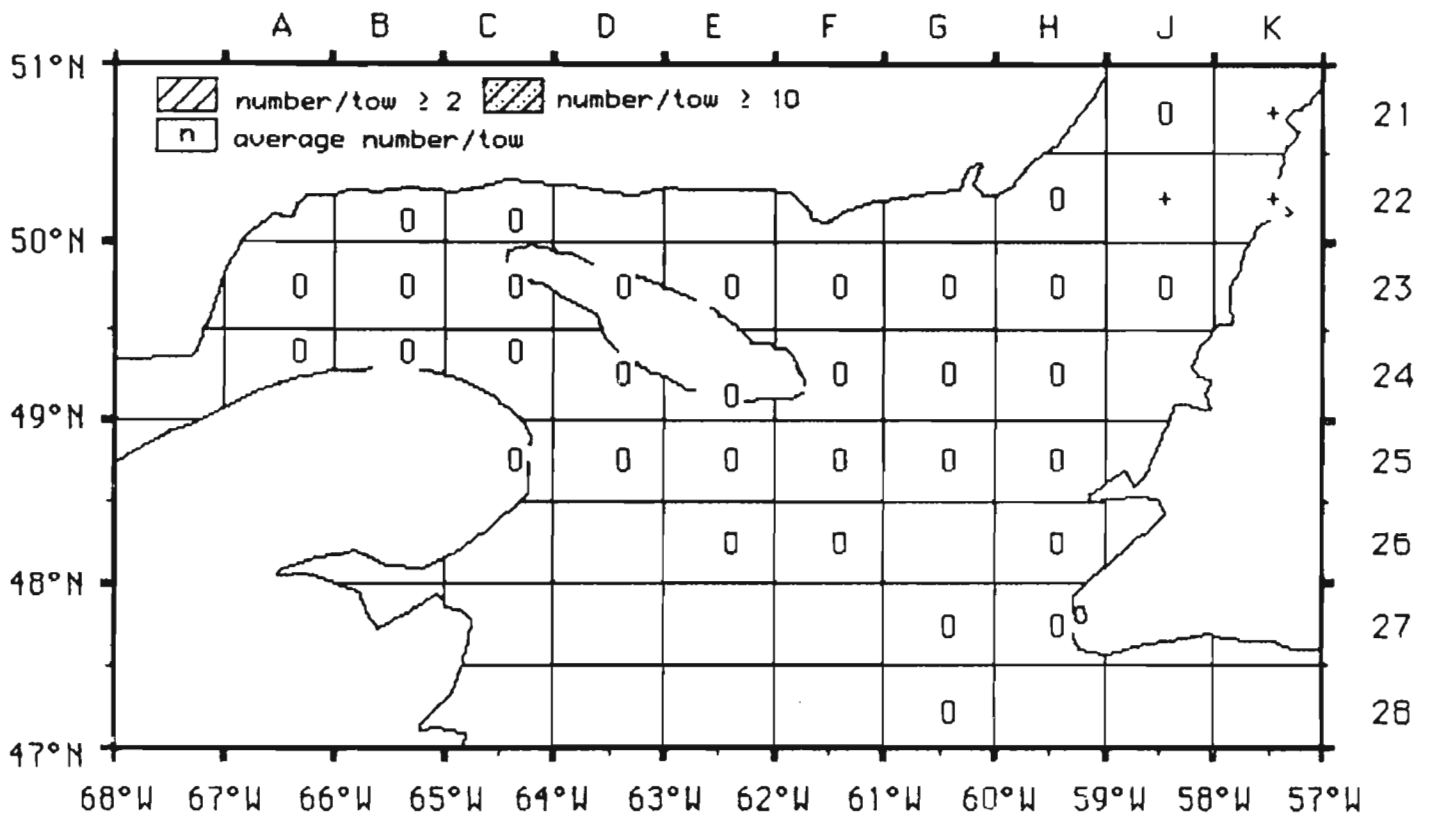
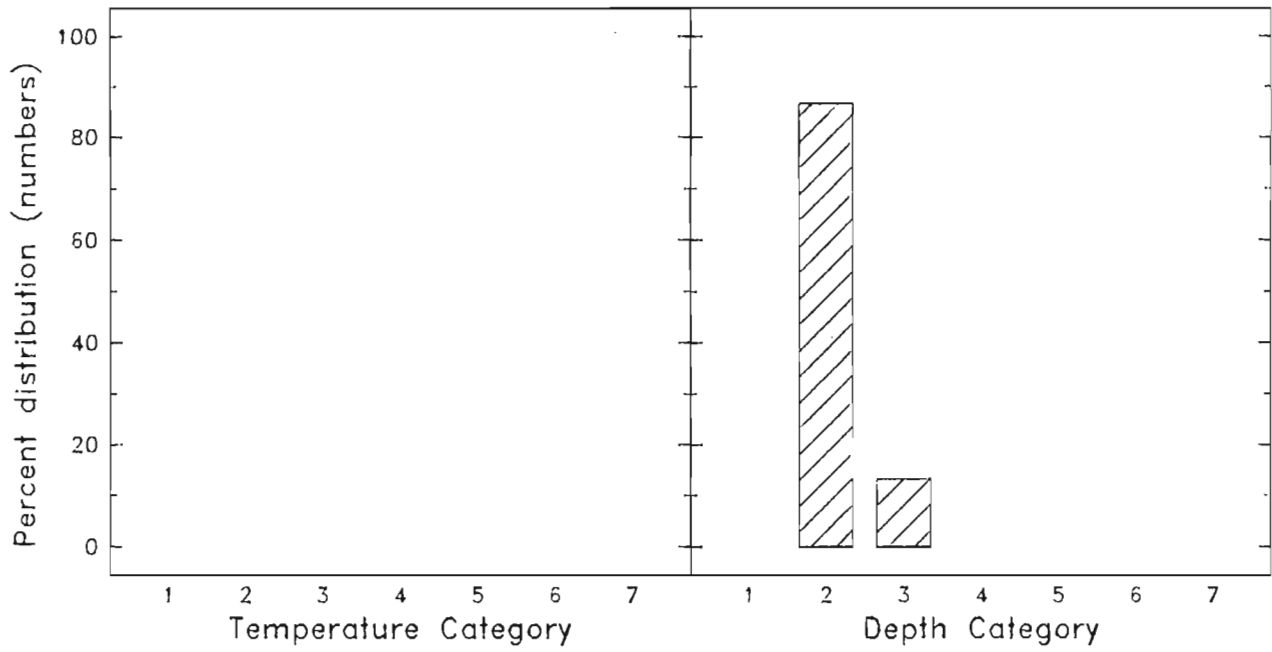


Fig. 18: Eelpout (NS) (*Lycodes* spp.)

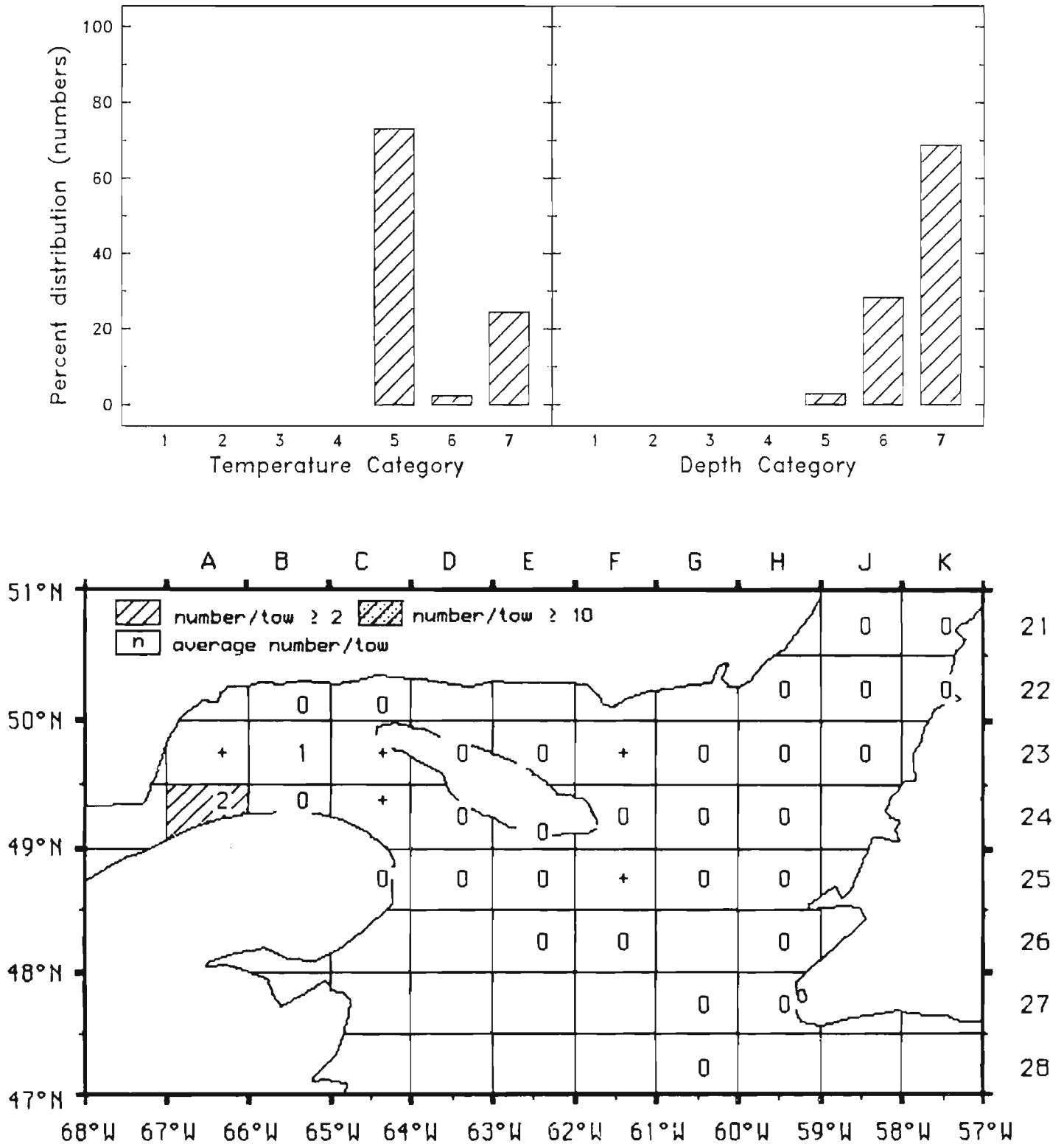


Fig. 19: Eelpout, soft (*Melanostigma atlanticum*)

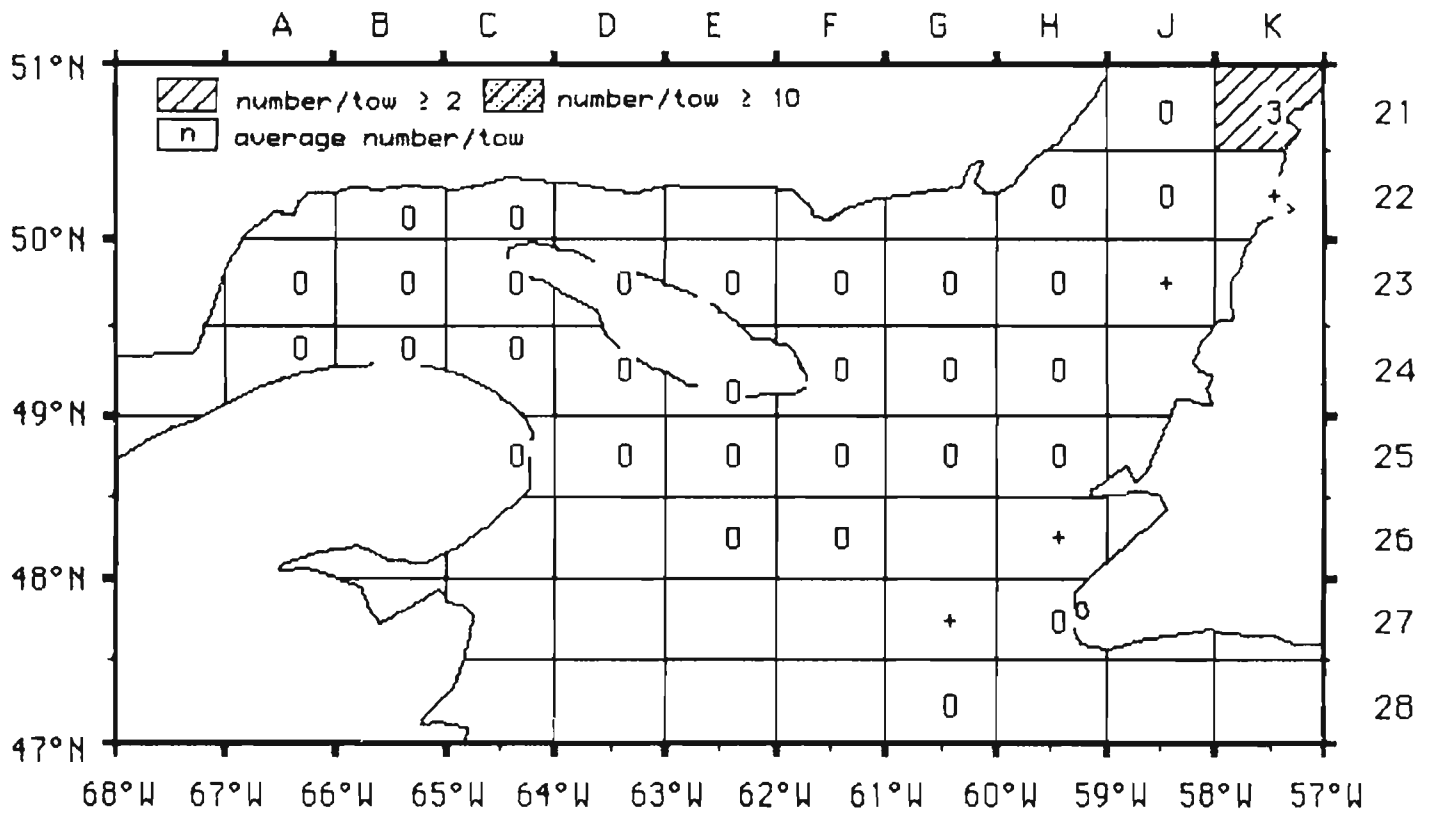
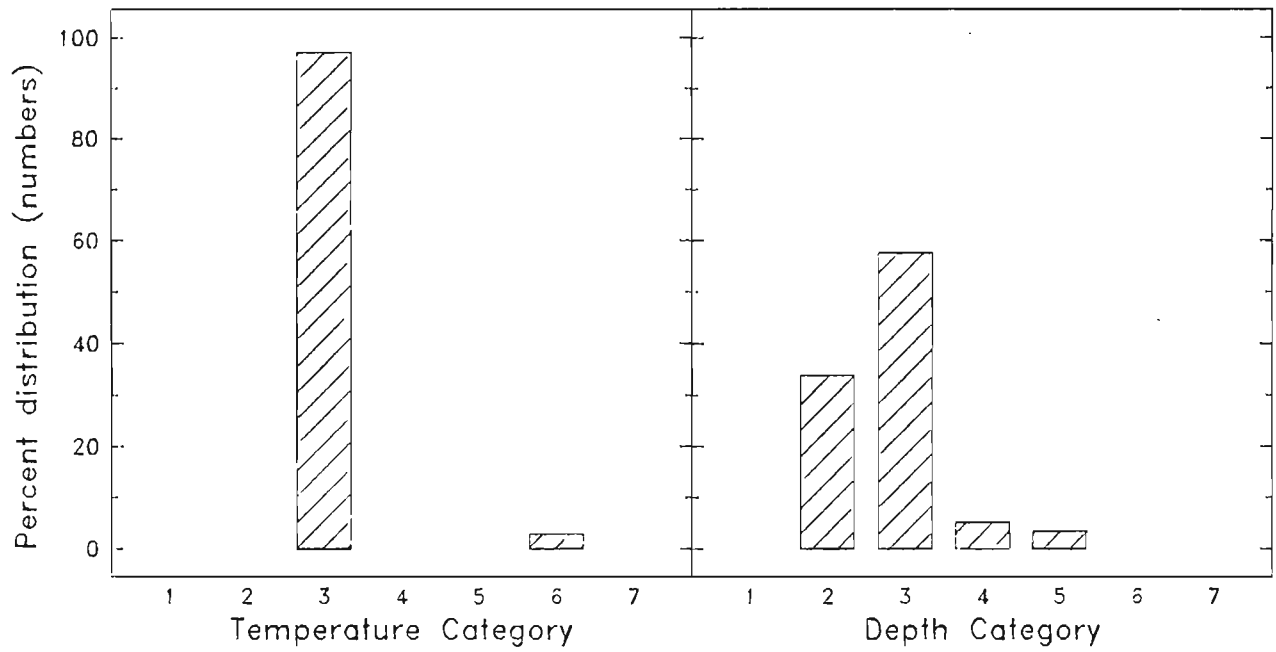


Fig. 20: Eelpouts (NS) (*Zoarcidae*)

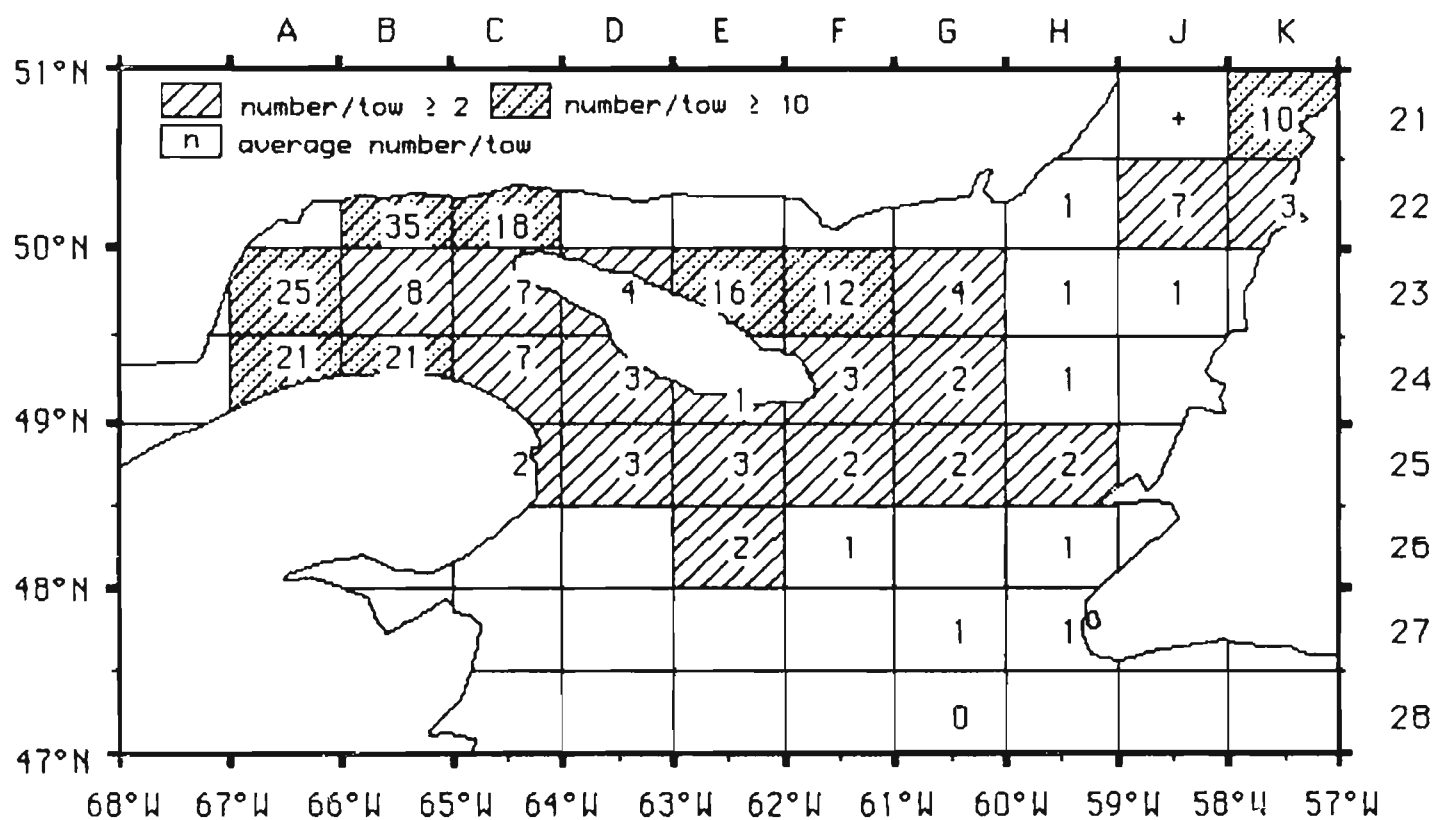
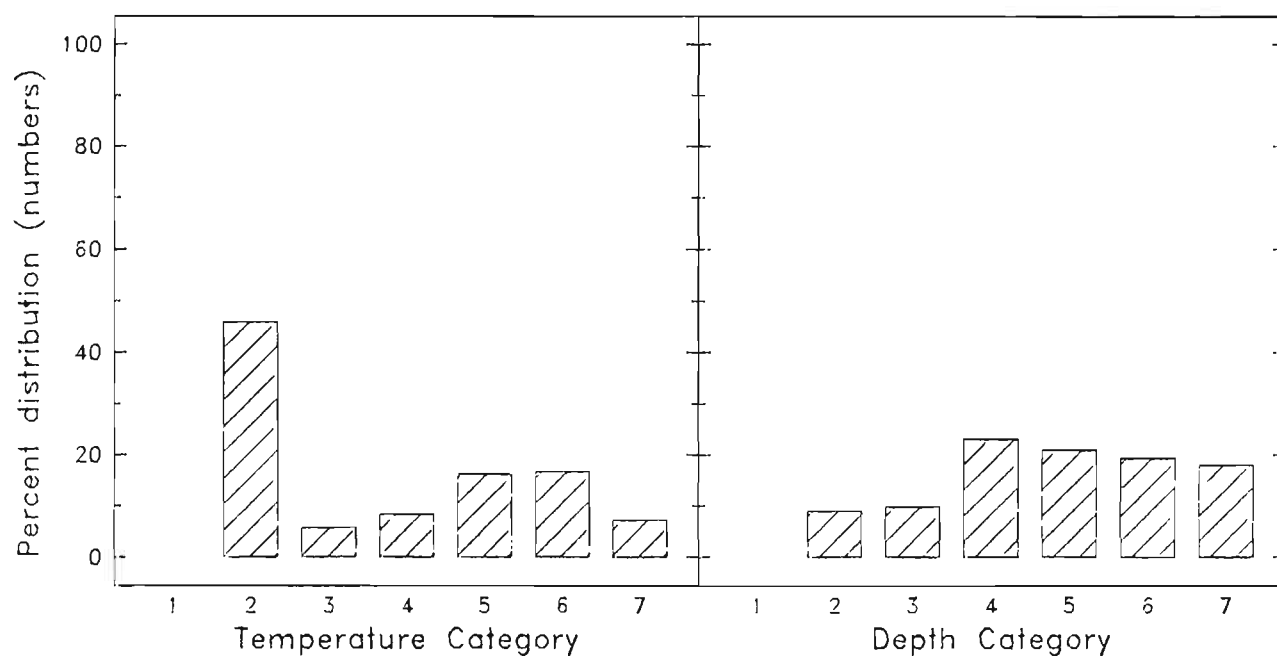


Fig. 21: Fourbeard Rockling (*Enchelyopus cimbrius*)

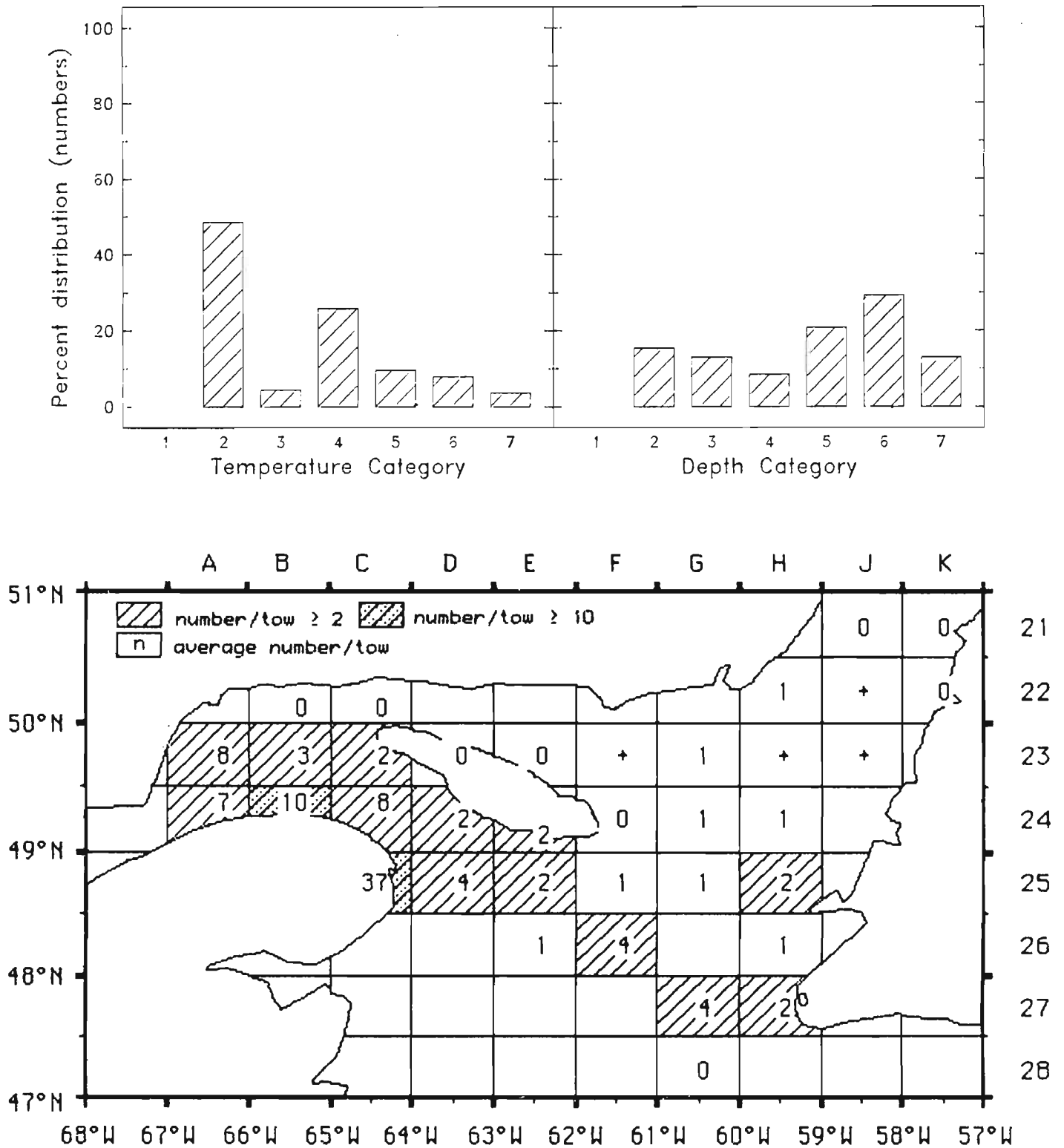


Fig. 22: Hagfish, Atlantic (*Myxine glutinosa*)

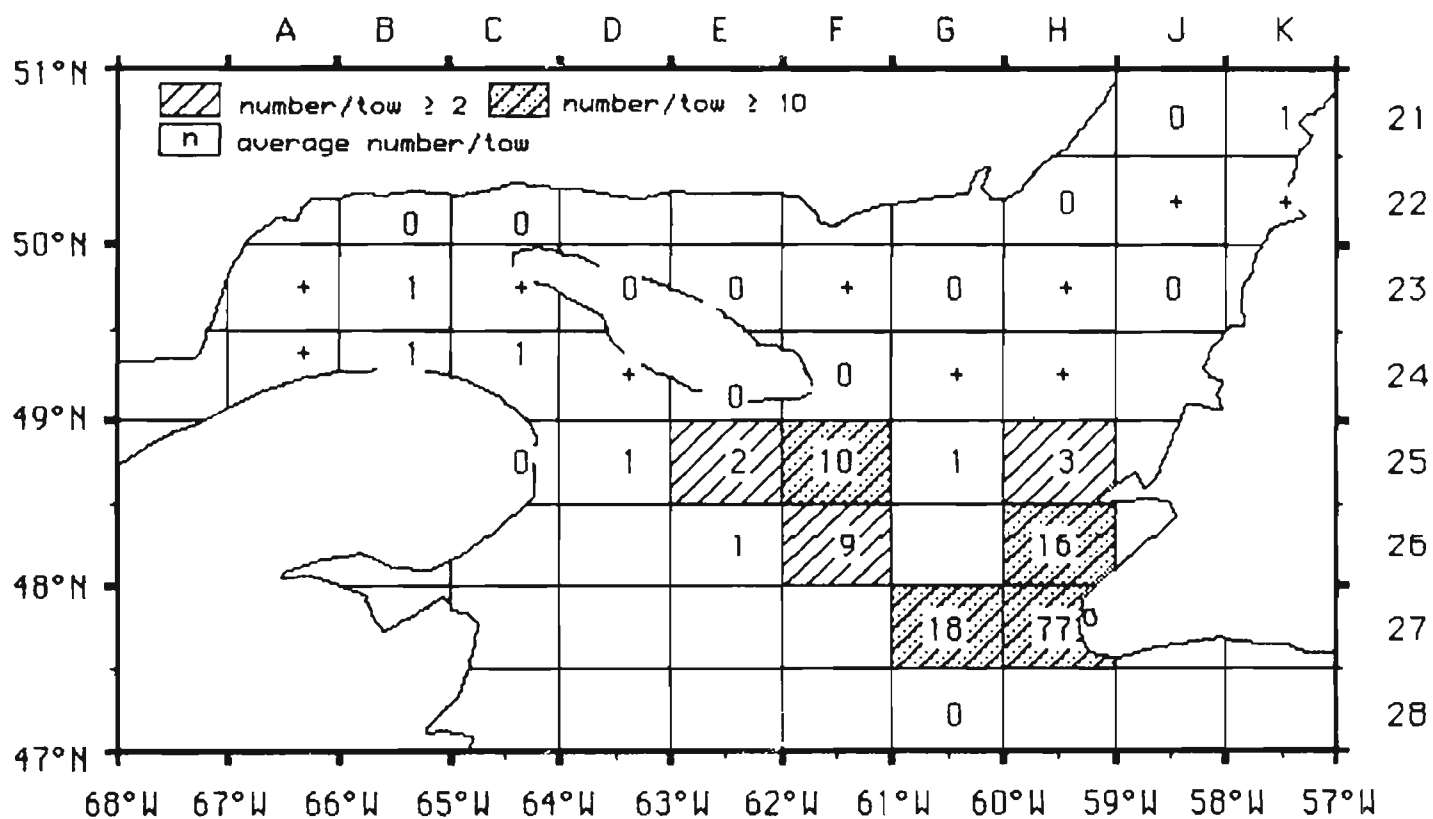
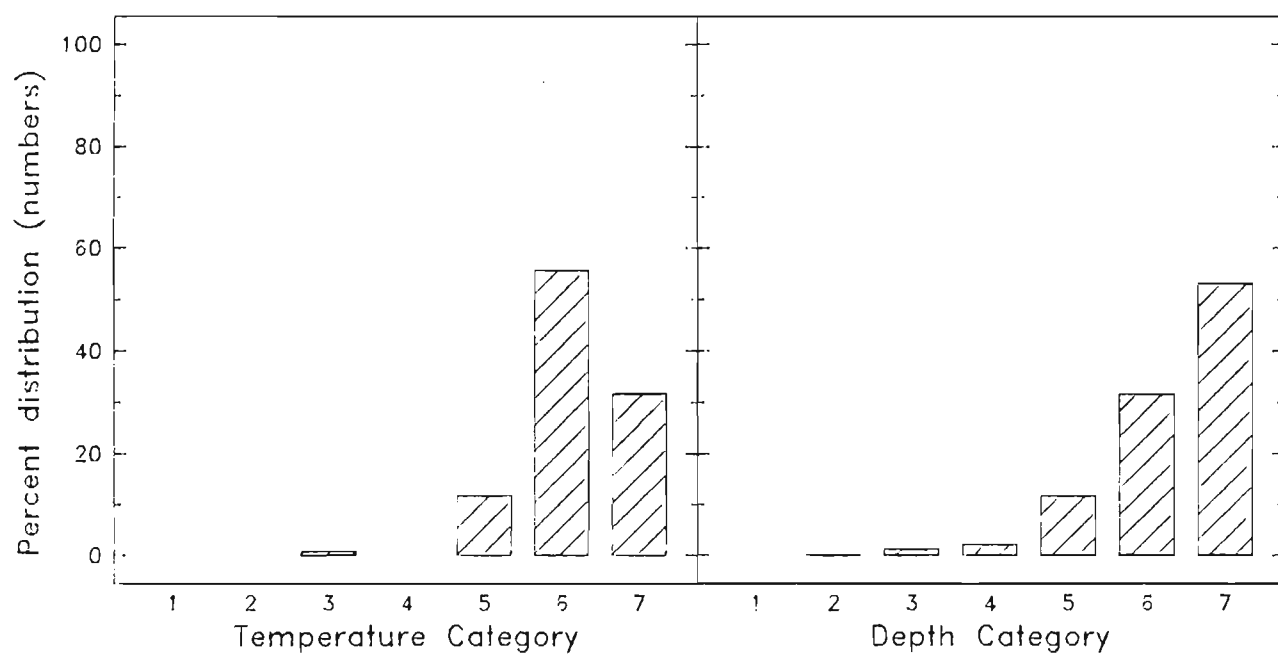


Fig. 23: Hake, longfin (*Urophycis chesteri*)

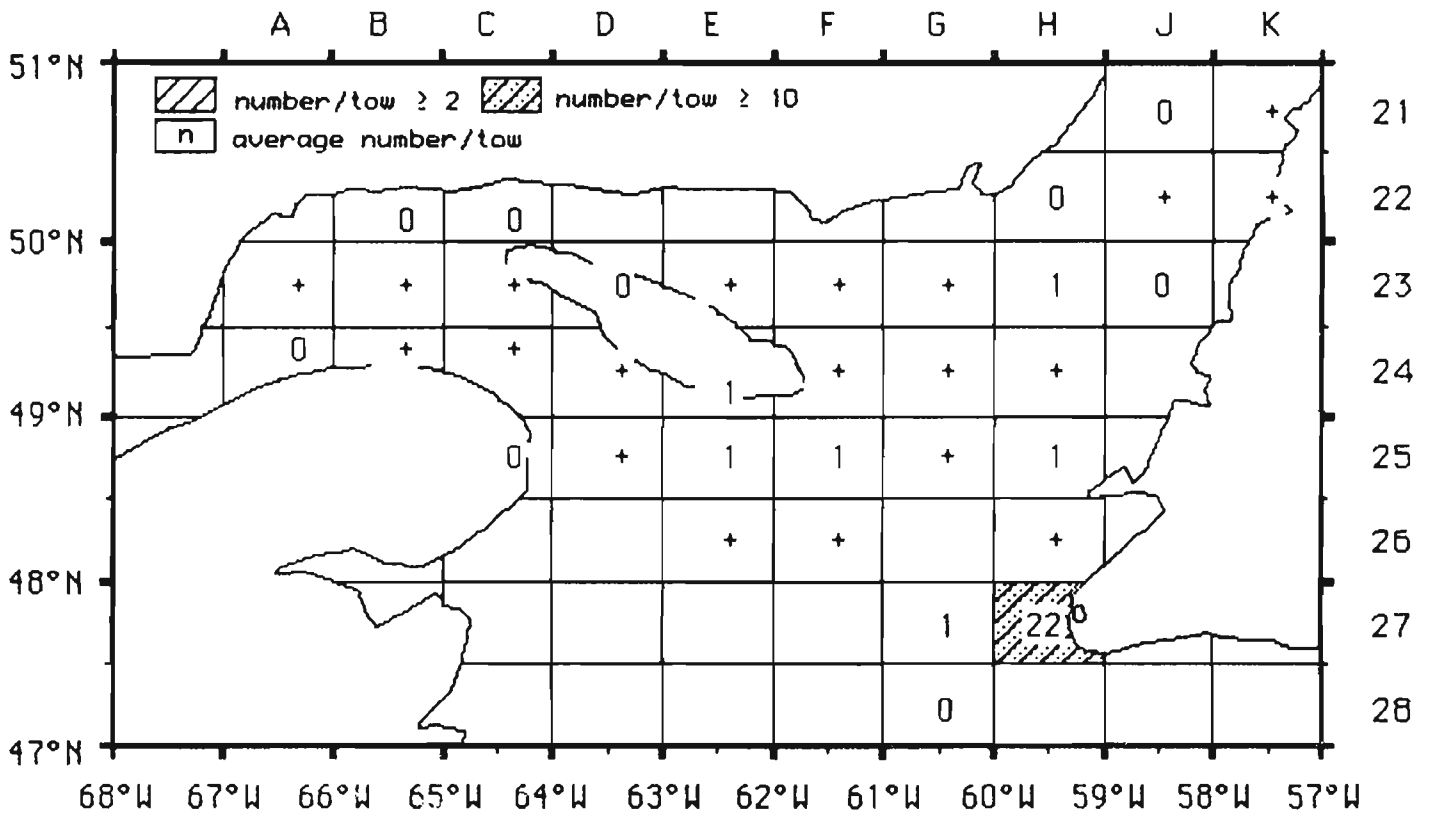
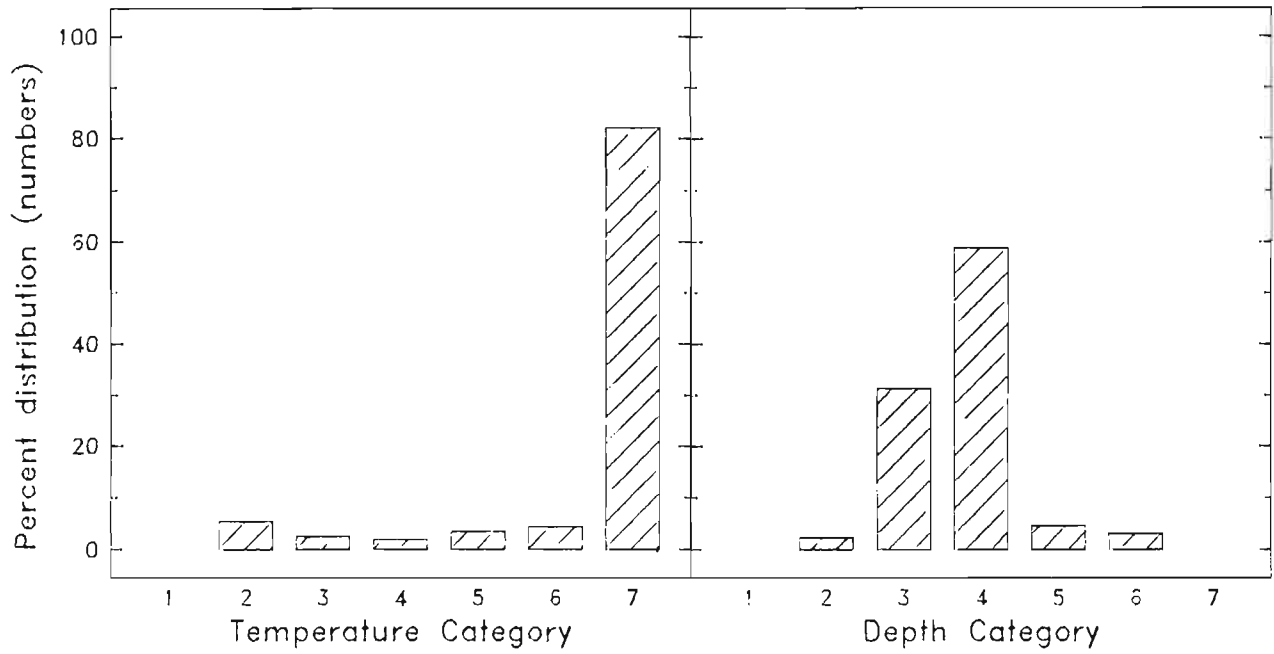


Fig. 24: Hake, silver (*Merluccius bilinearis*)

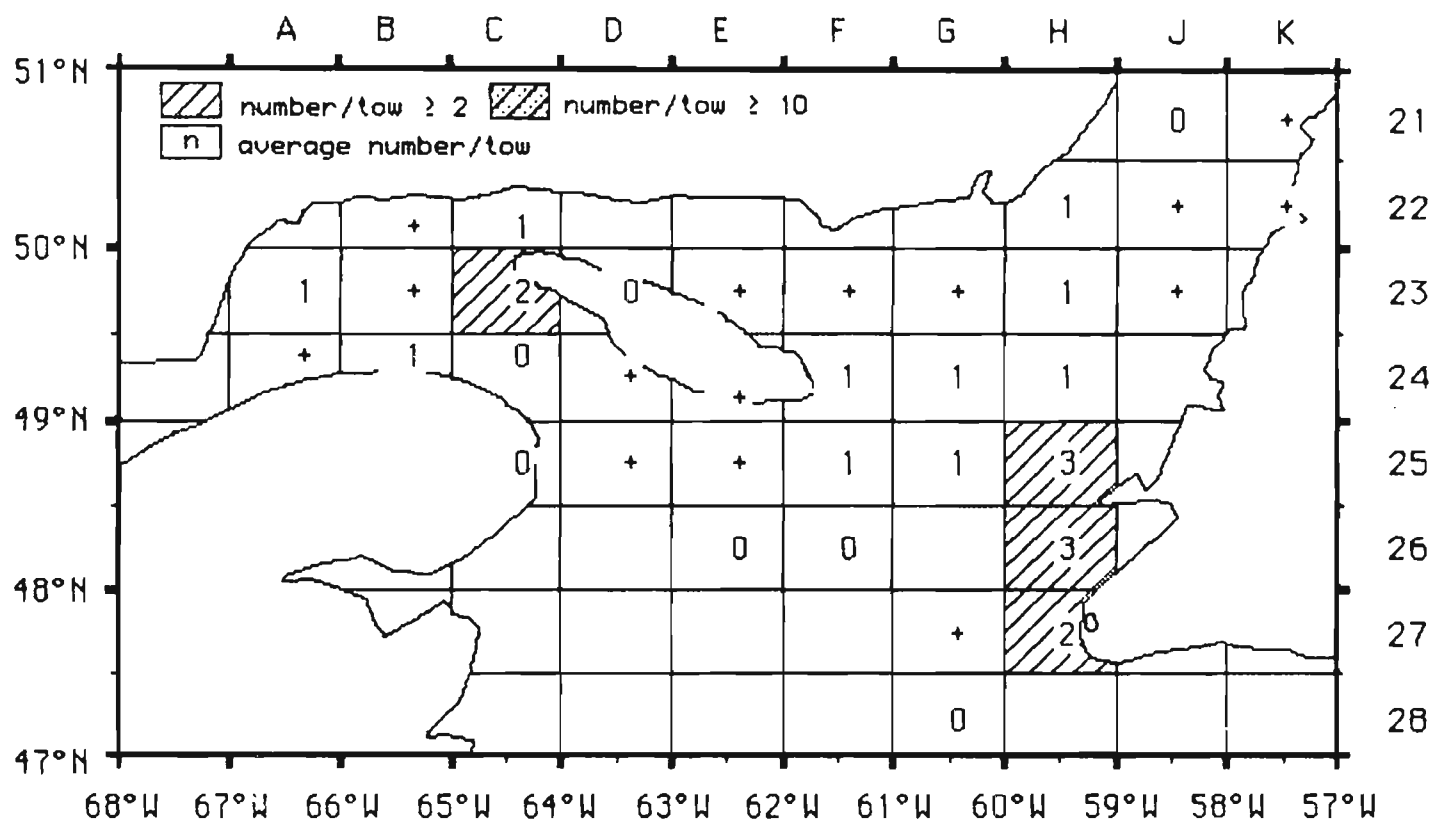
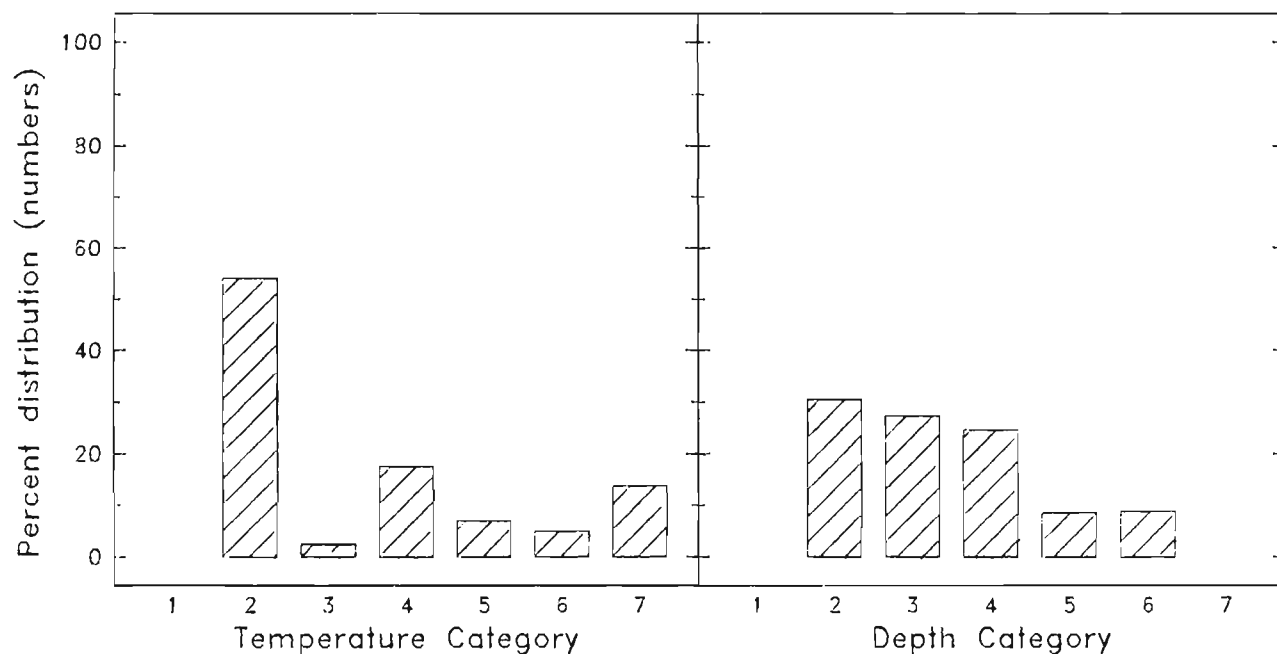


Fig. 25: Hookear sculpin (NS) (*Arctodiellus* spp.)

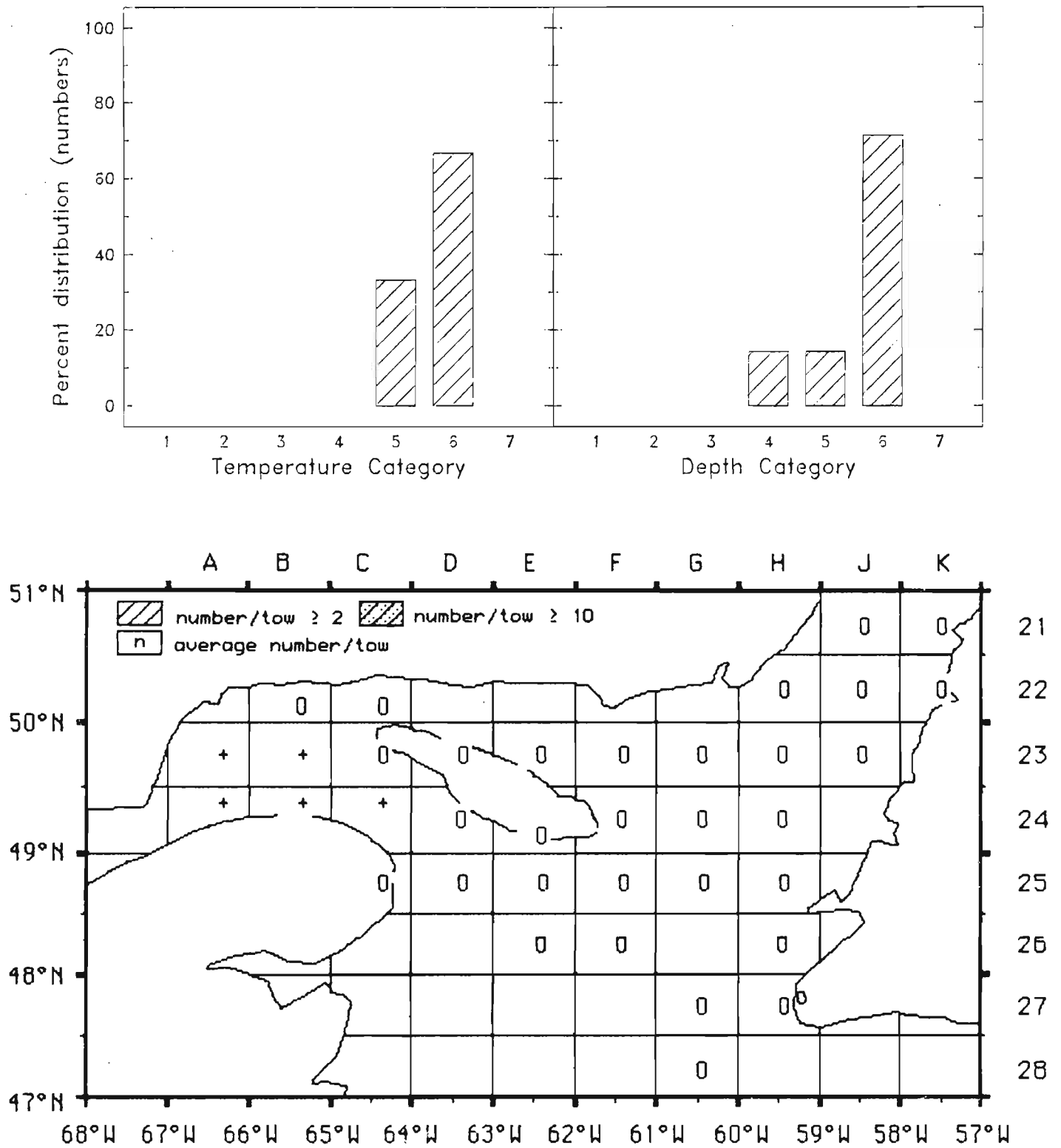


Fig. 26: Lancetfish, scaled (*Notolepis rissoi kroeyeri*)

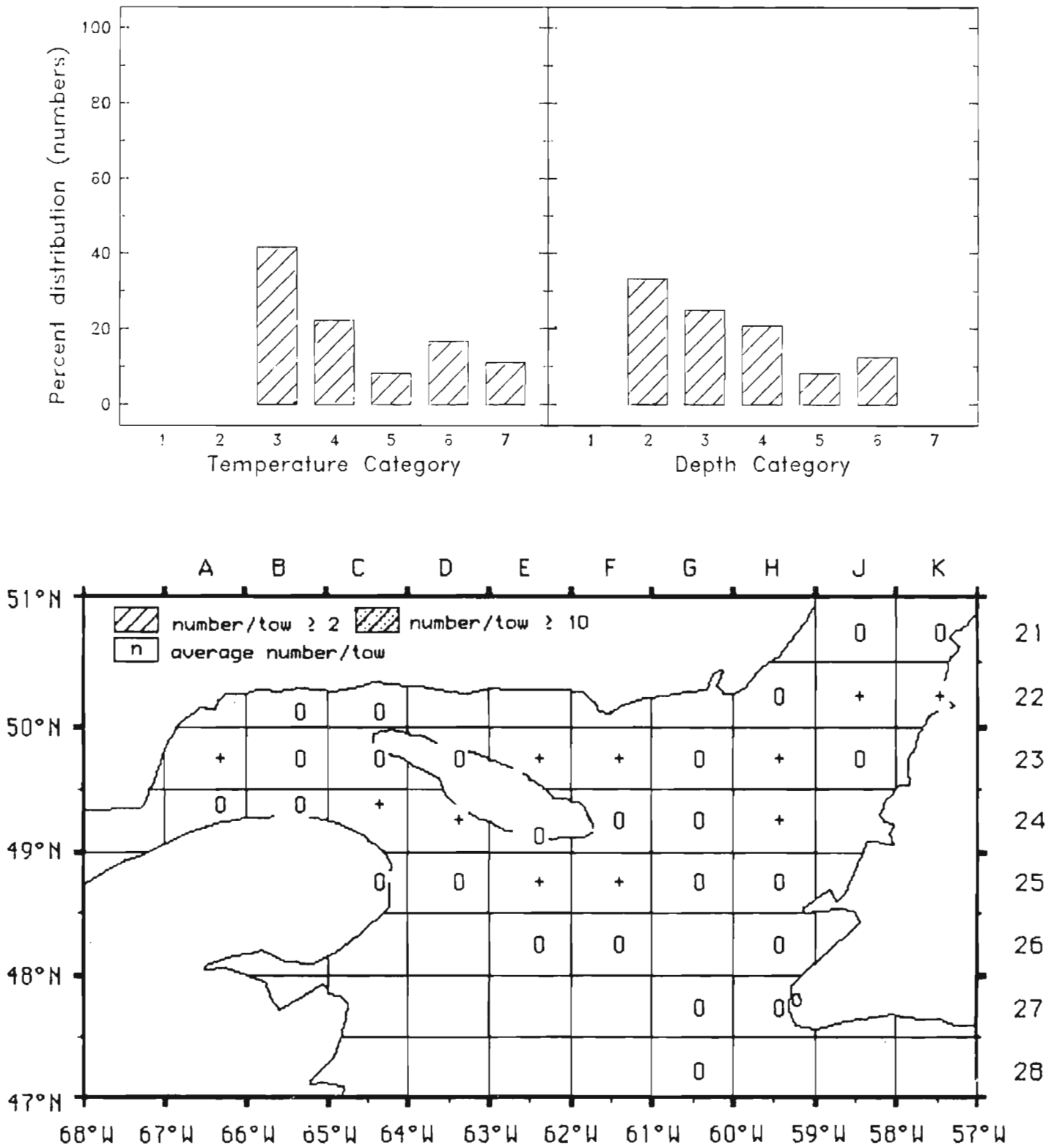


Fig. 27: Lumpfish, common (*Cyclopterus lumpus*)

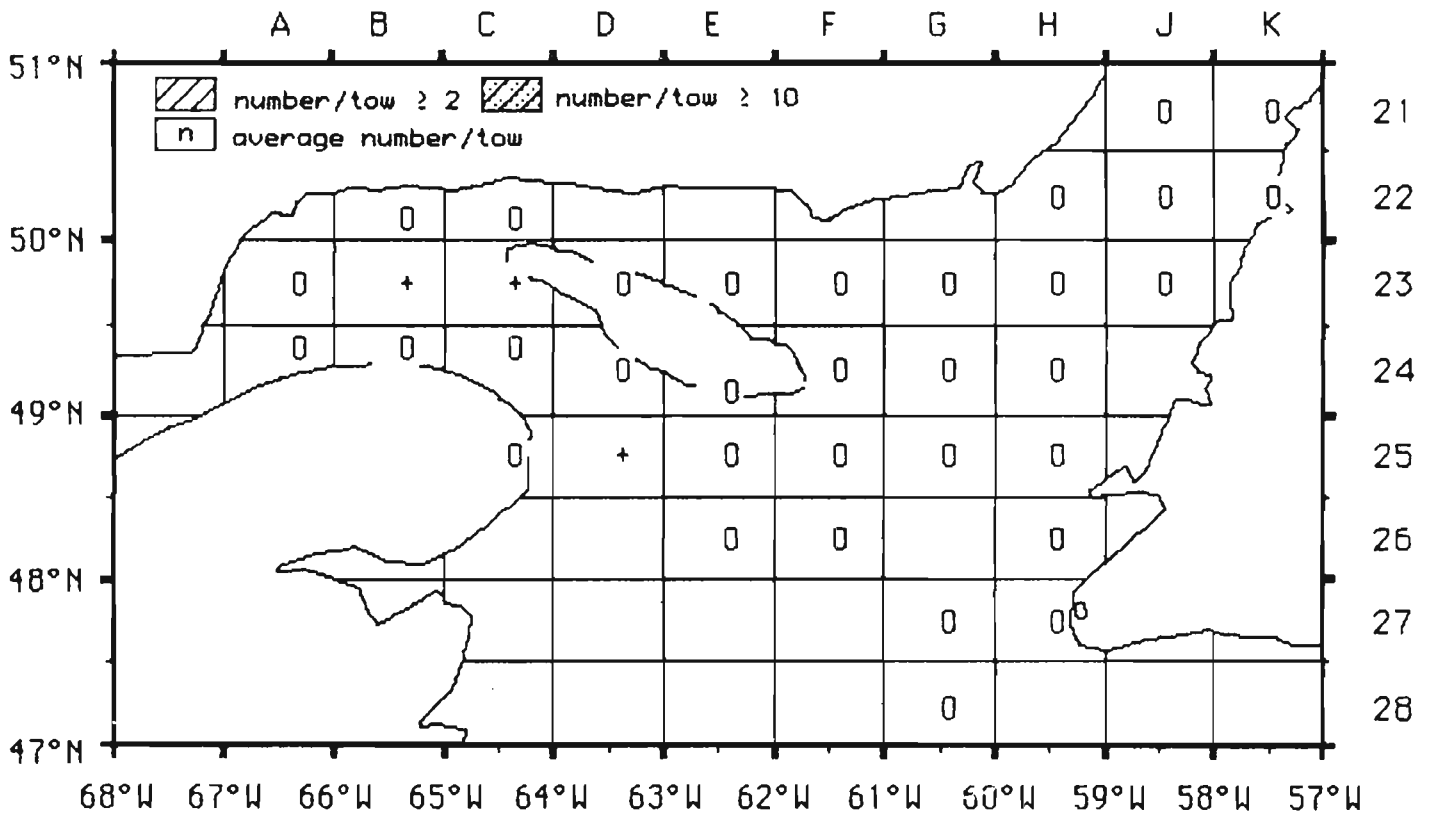
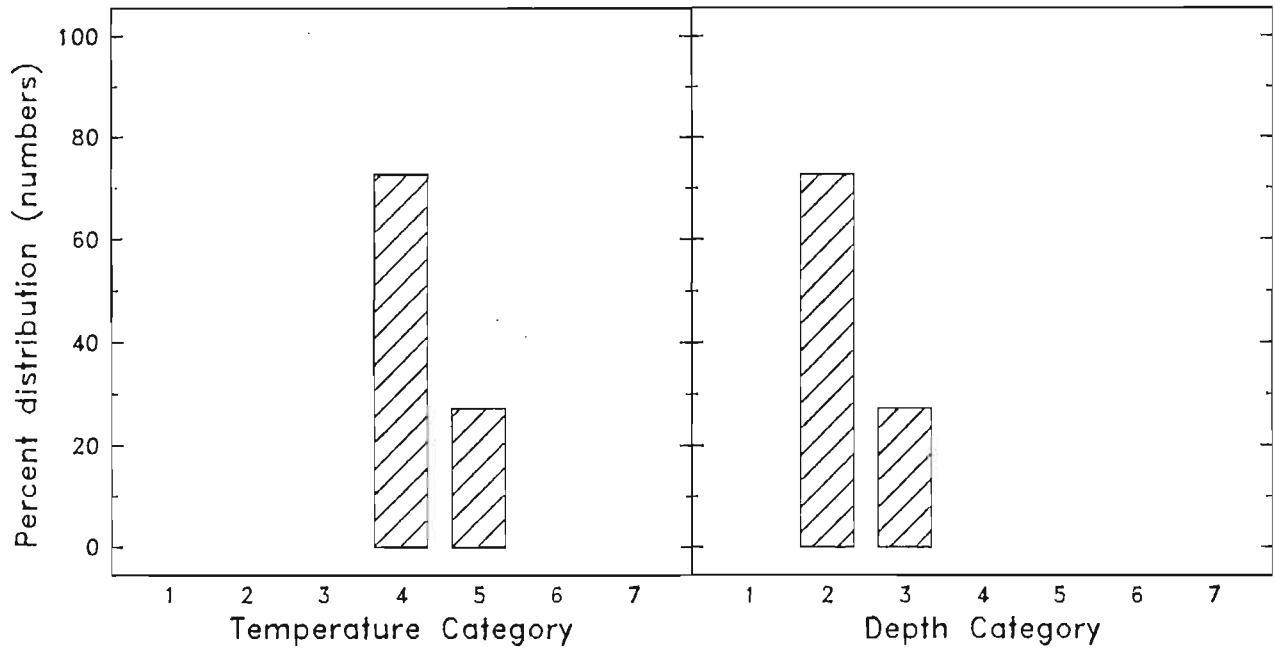


Fig. 28: Lumpfish (NS) (*Eumicrotremus* spp.)

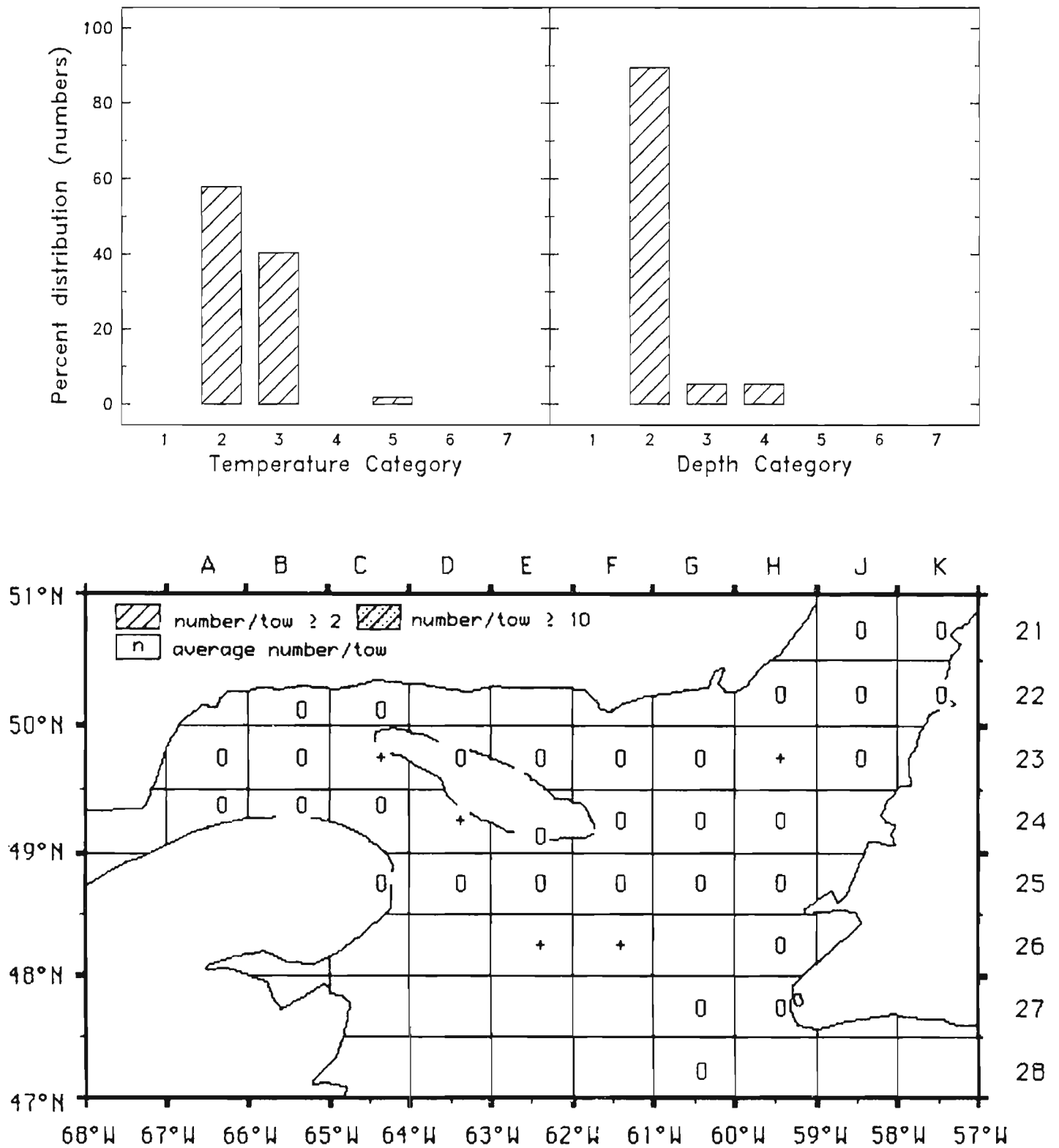


Fig. 29: Mailed sculpins (NS) (*Triglops* spp.)

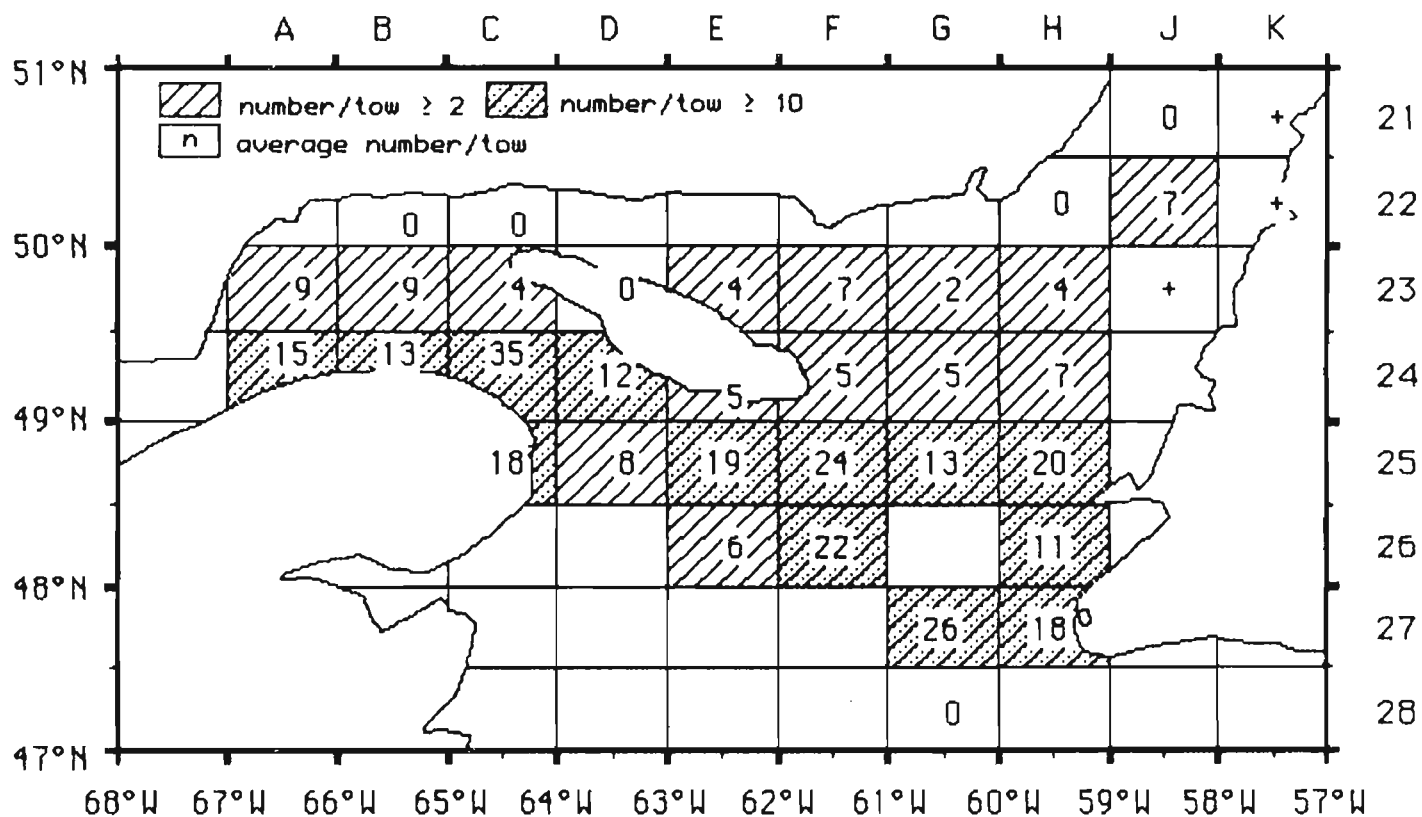
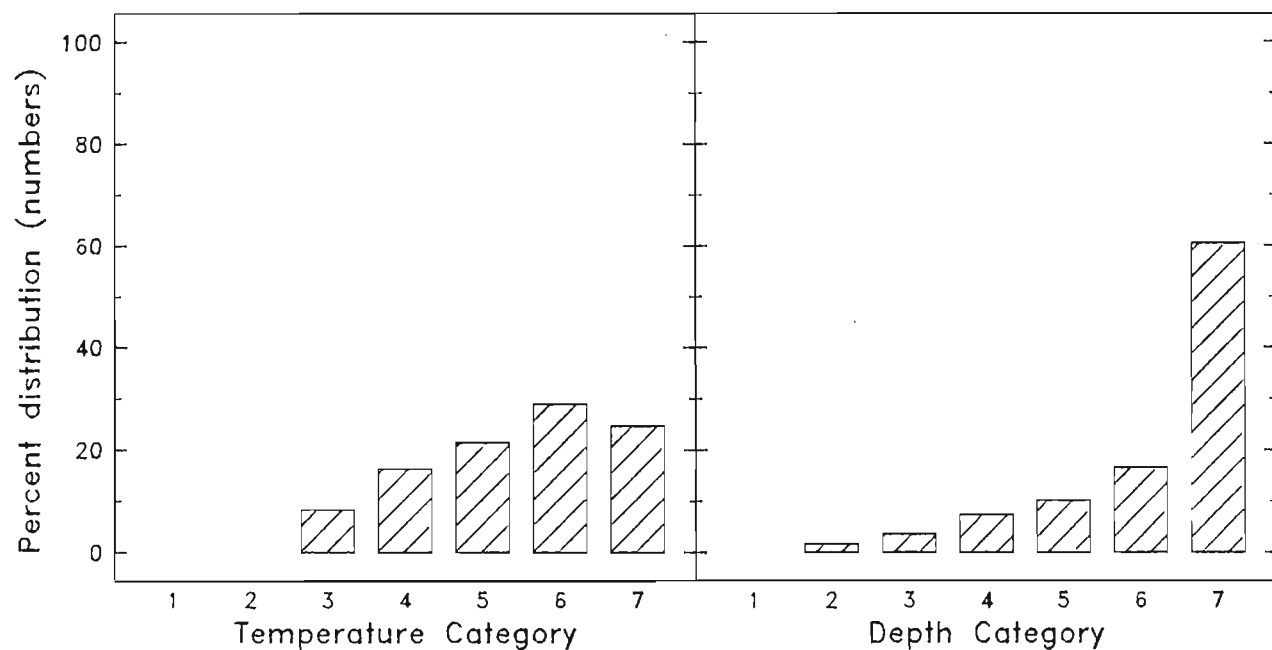


Fig. 30: Marlin spike (common grenadier) (*Nesunia bairdi*)

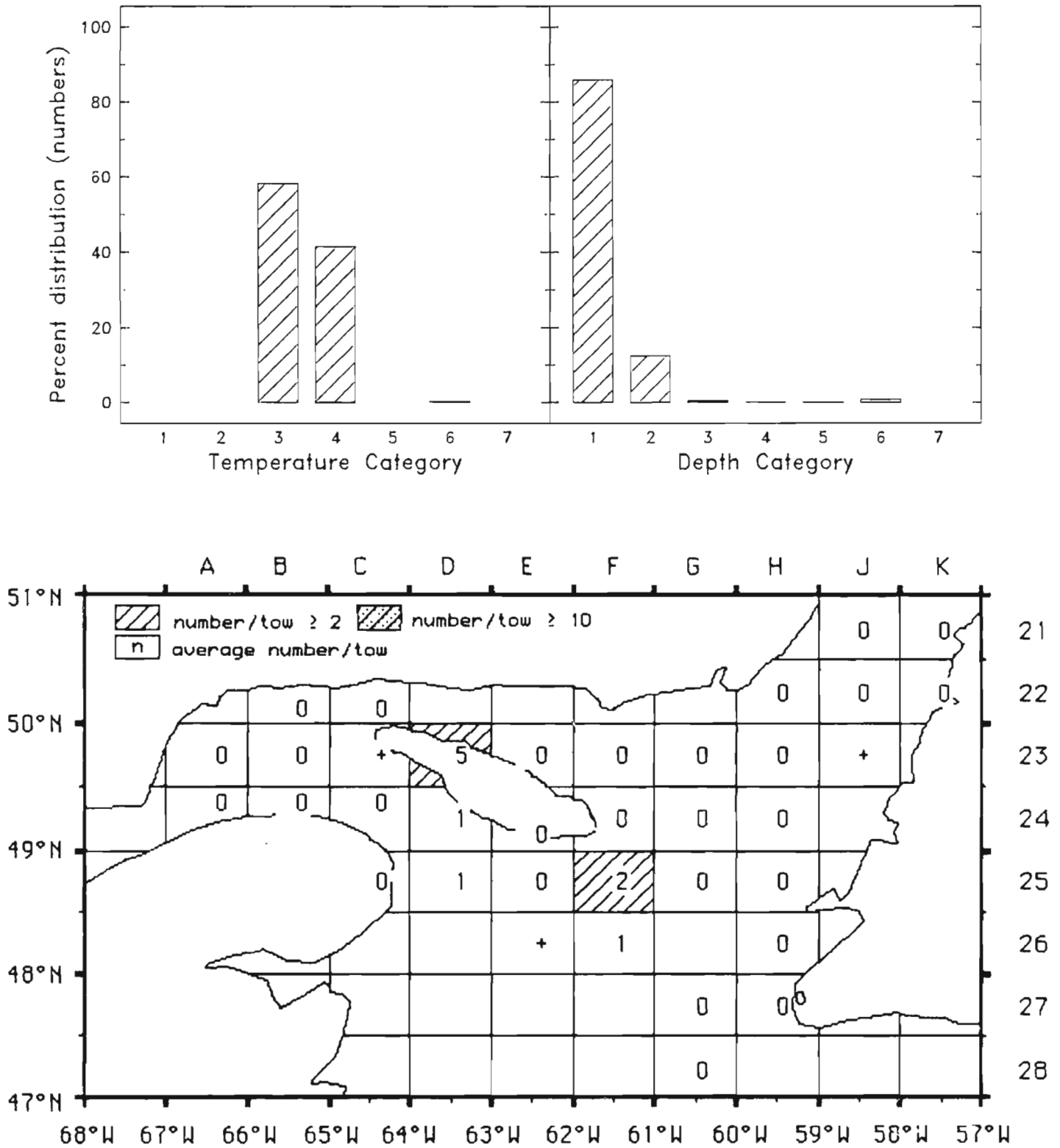


Fig. 31: Sculpin, moustache (*Triglops murrayi*)

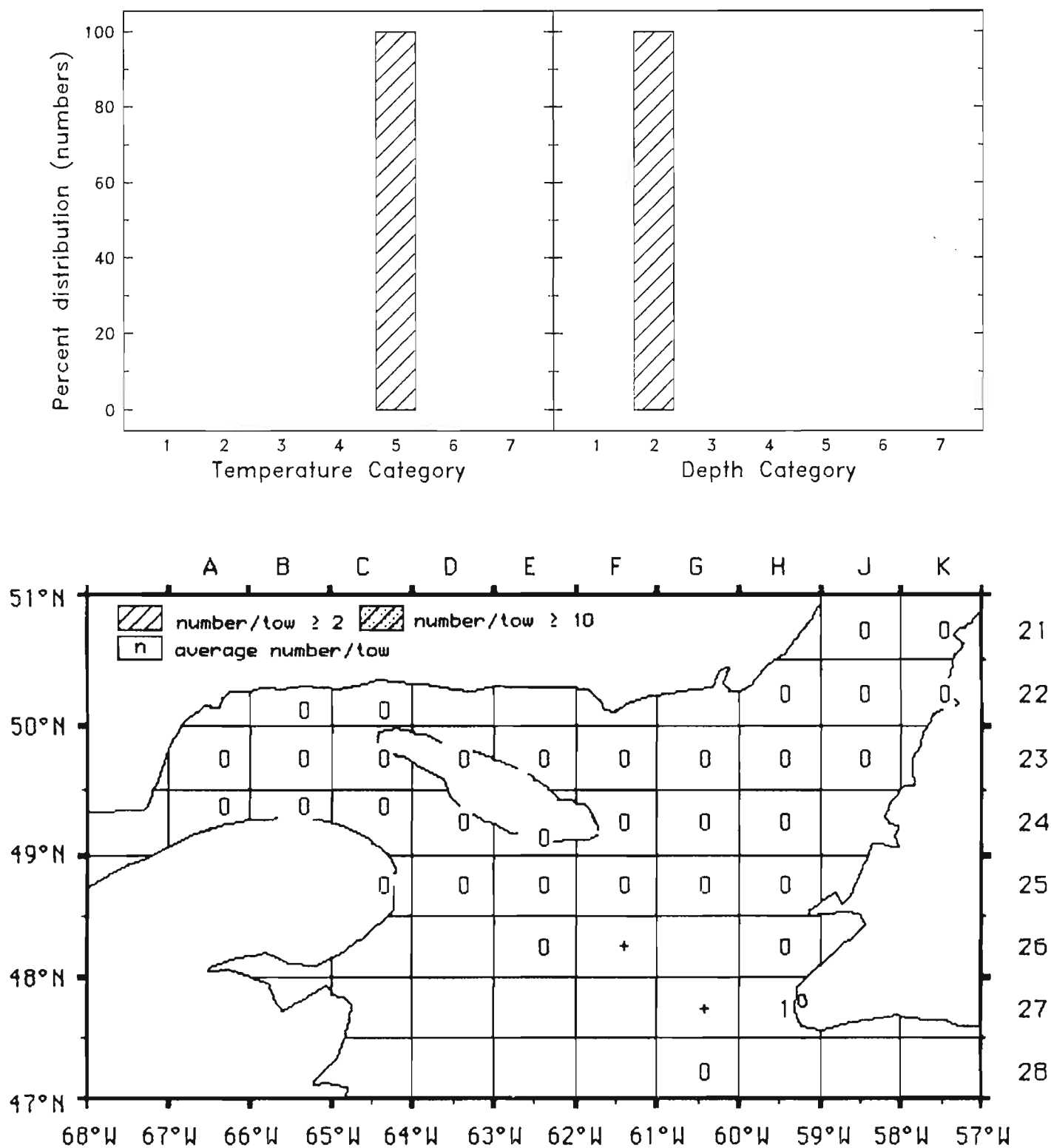


Fig. 32: Sculpins (NS) (*Cottidae*)

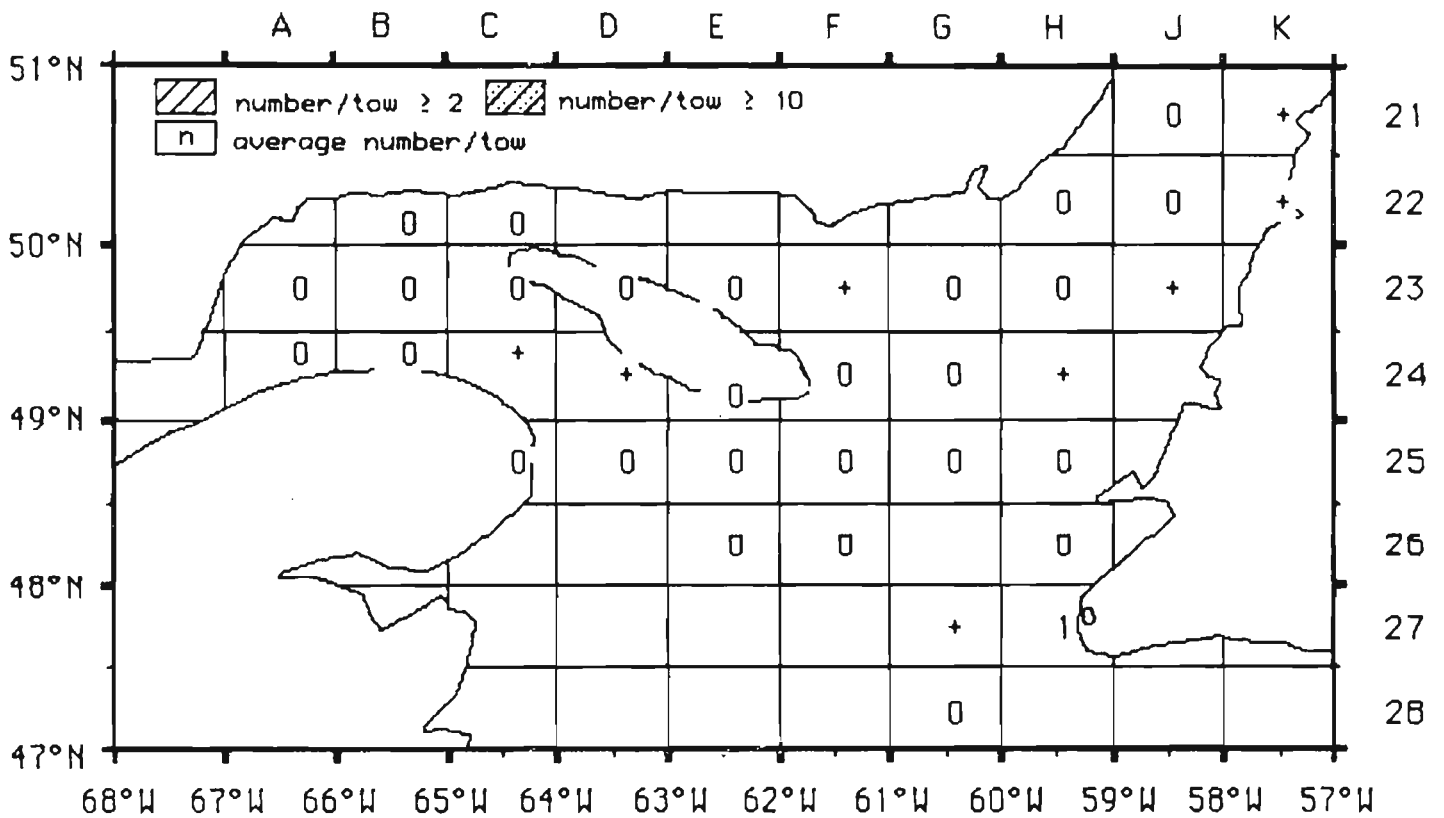
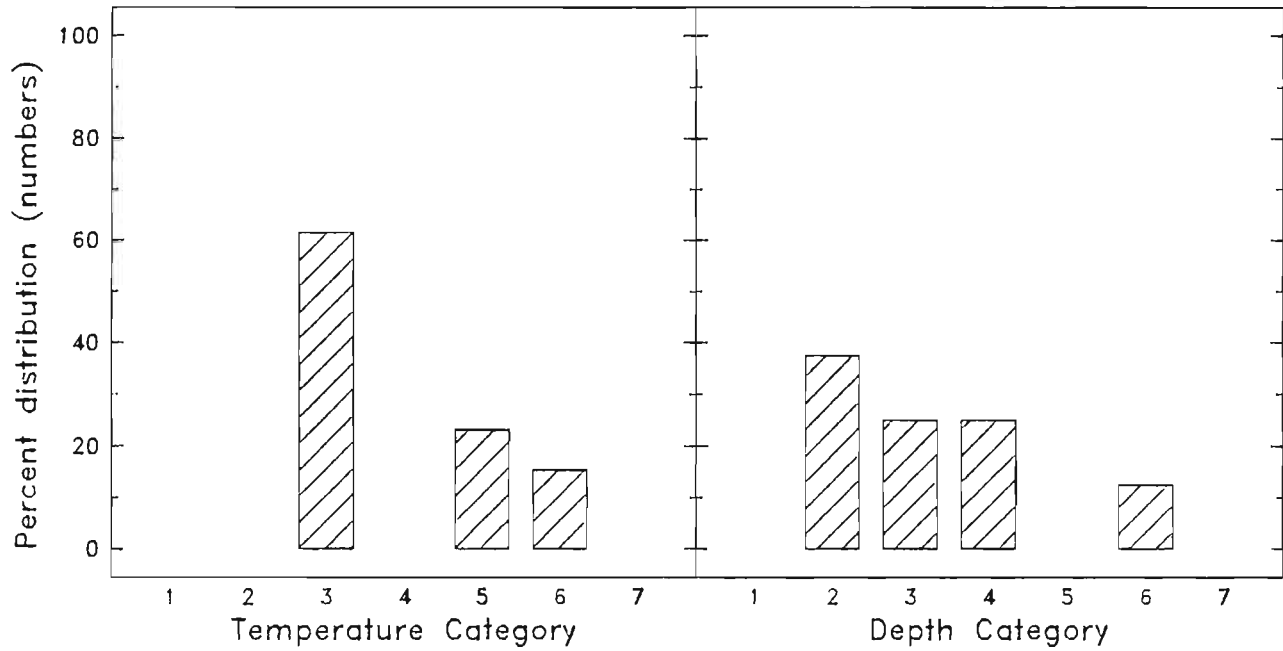


Fig. 33: Sea raven (*Hemitripterus americanus*)

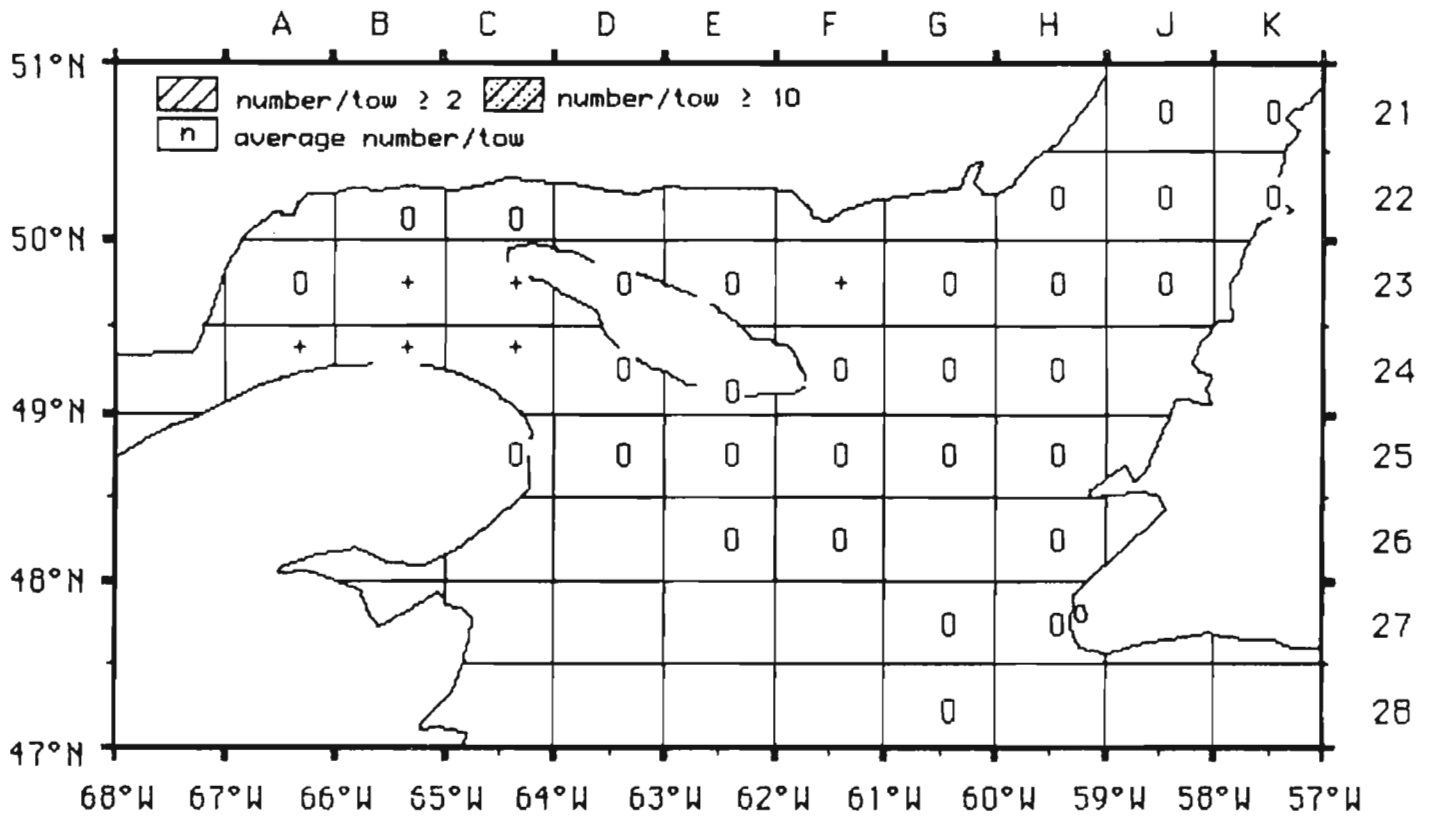
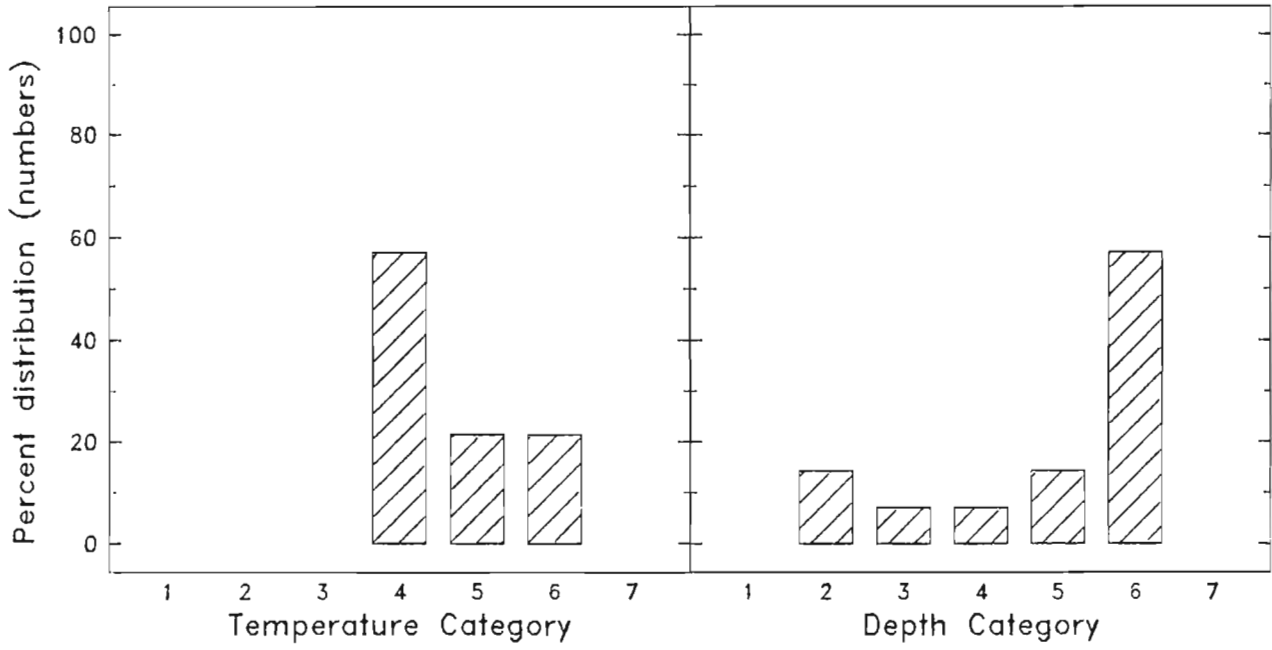


Fig. 34: Seasnail, gelatinous (*Liparis fabricii*)

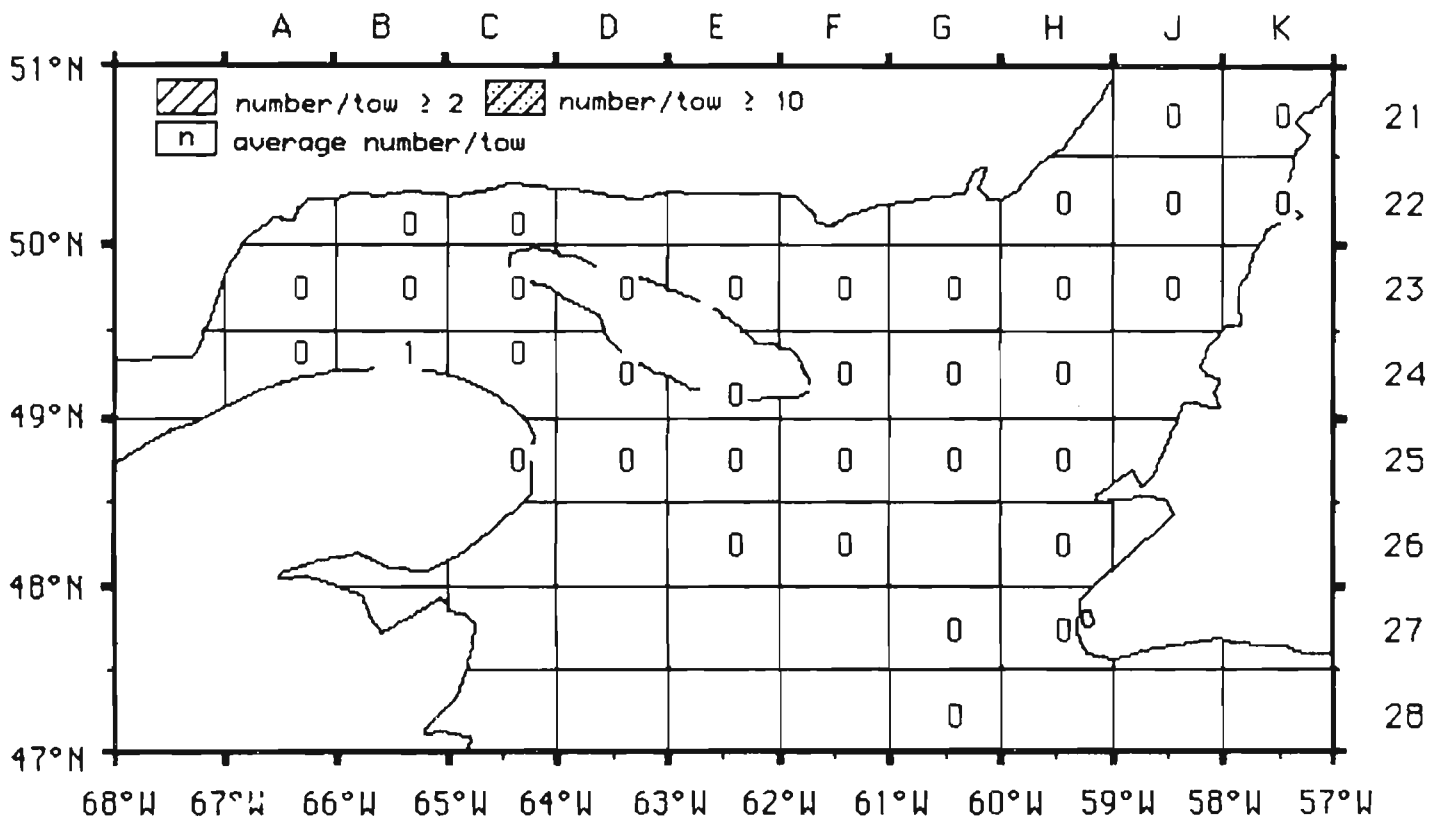
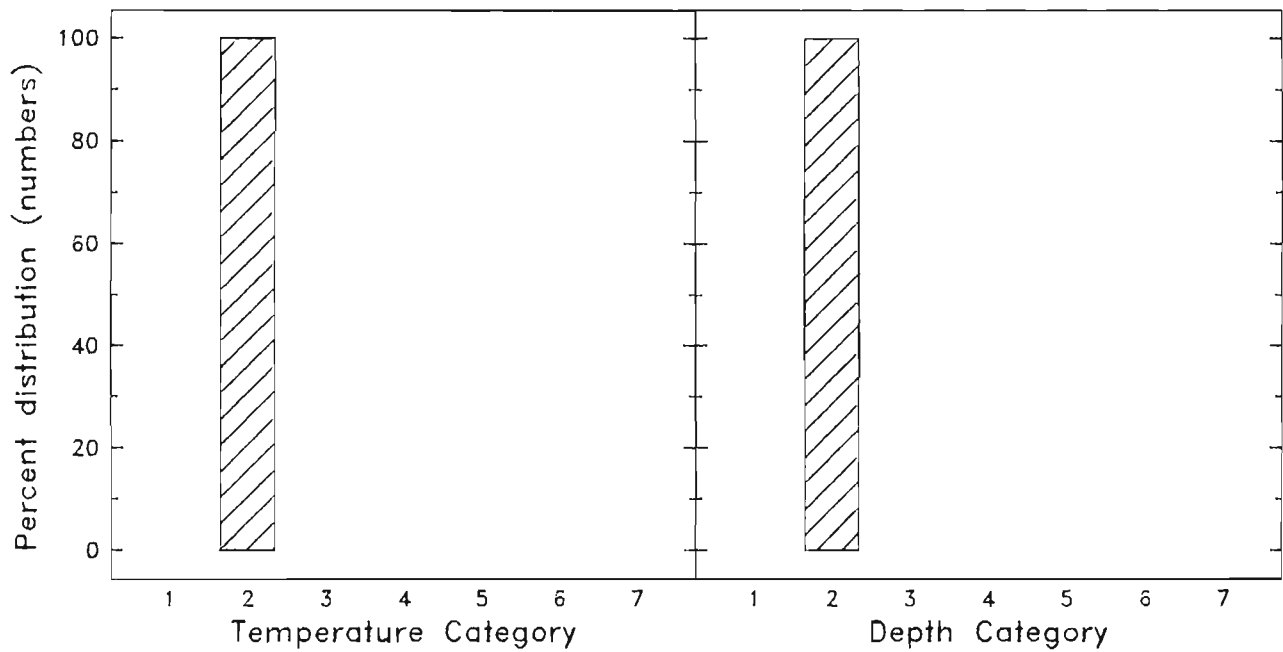


Fig. 35: Seasnail, striped (*Liparis liparis*)

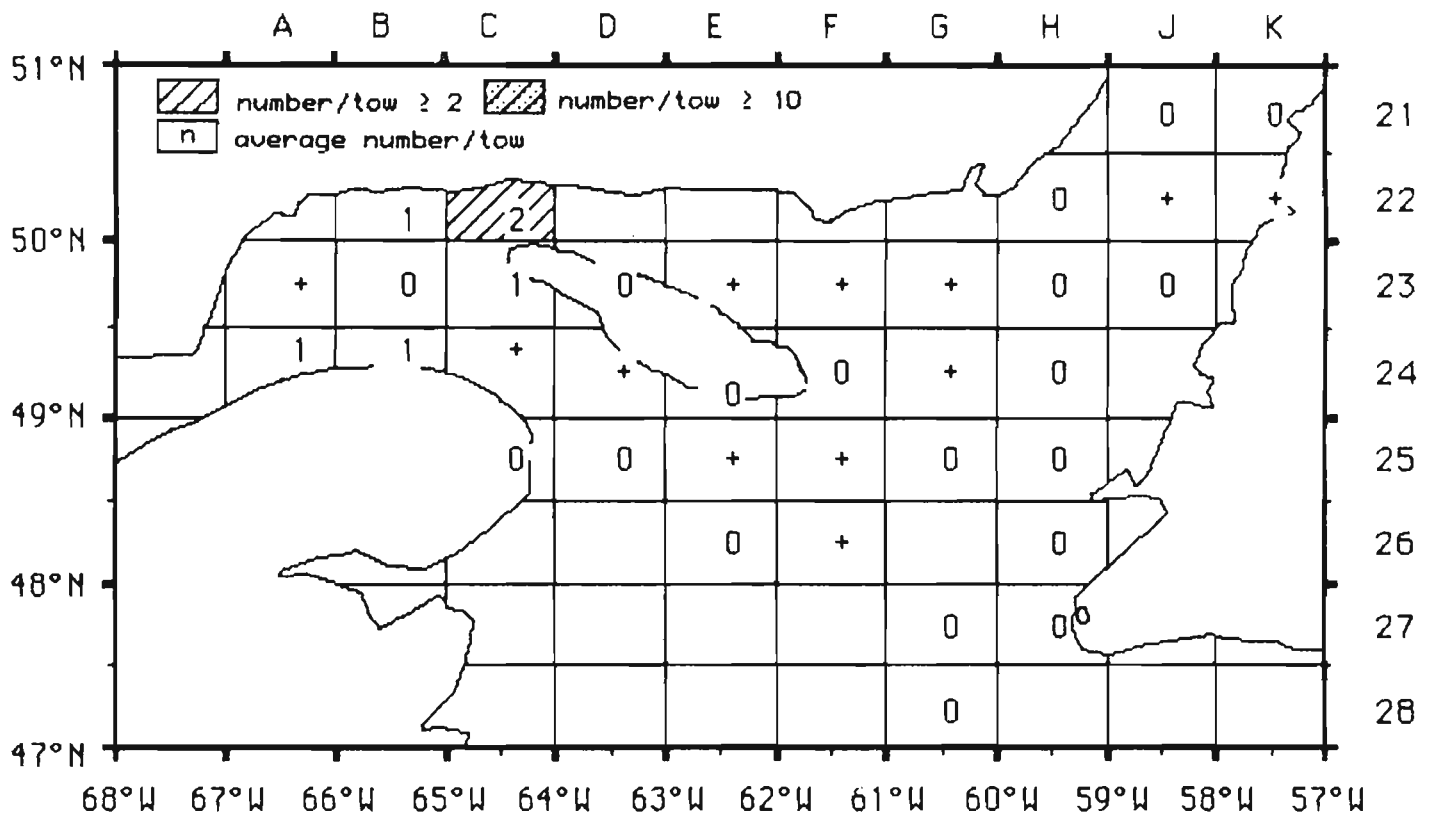
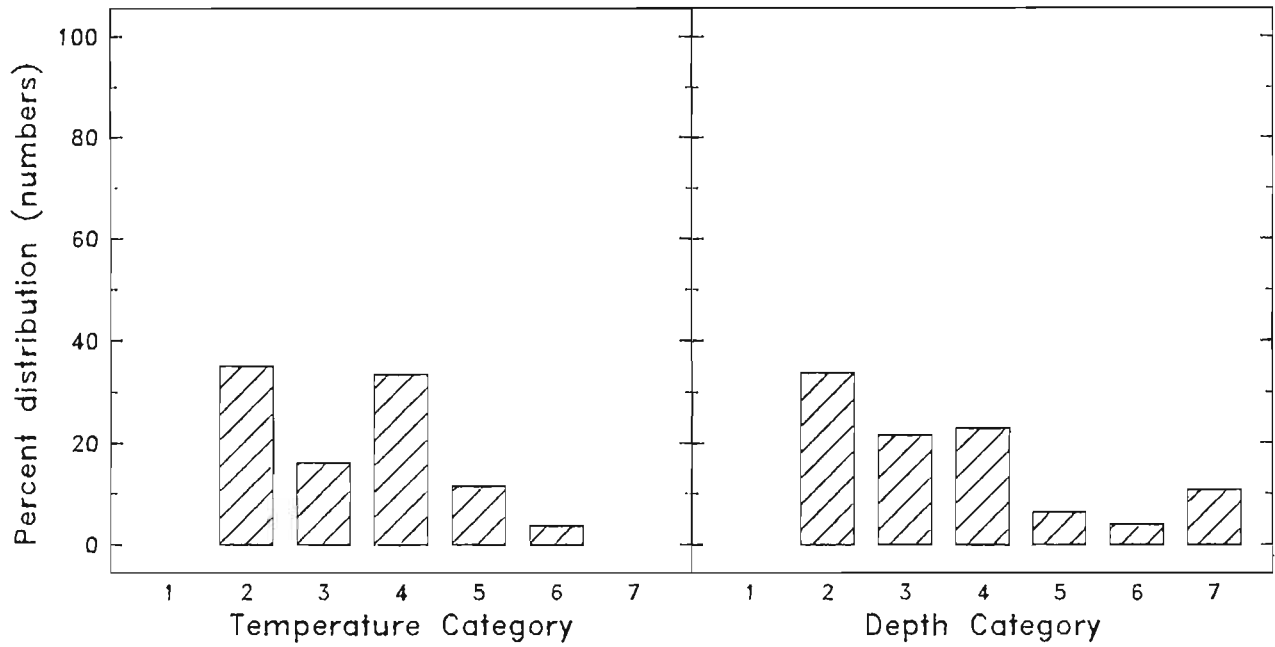


Fig. 36: Seasnails (NS) (*Liparis* spp.)

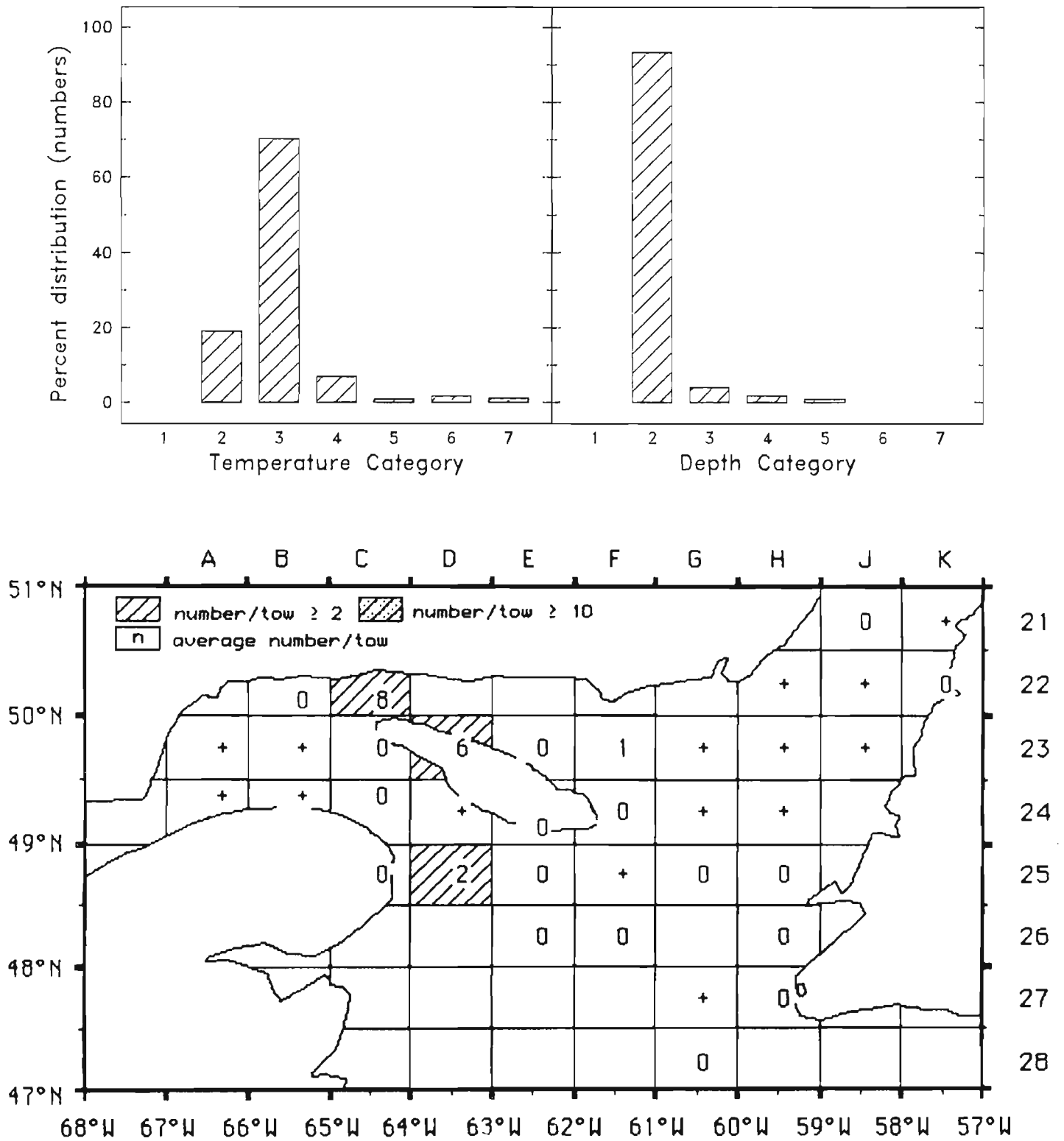


Fig. 37: Shanny (*Lumpenus maculatus*)

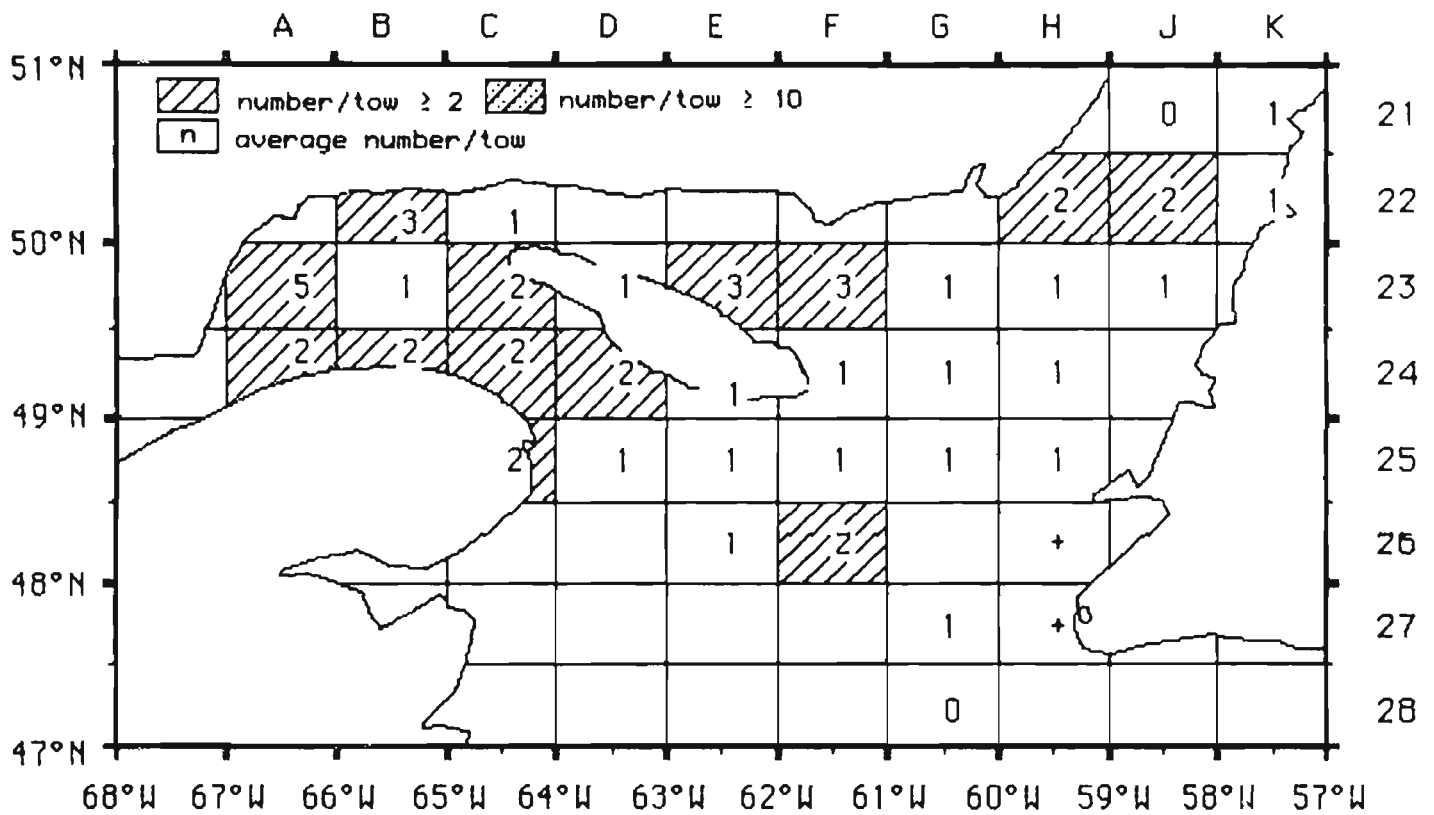
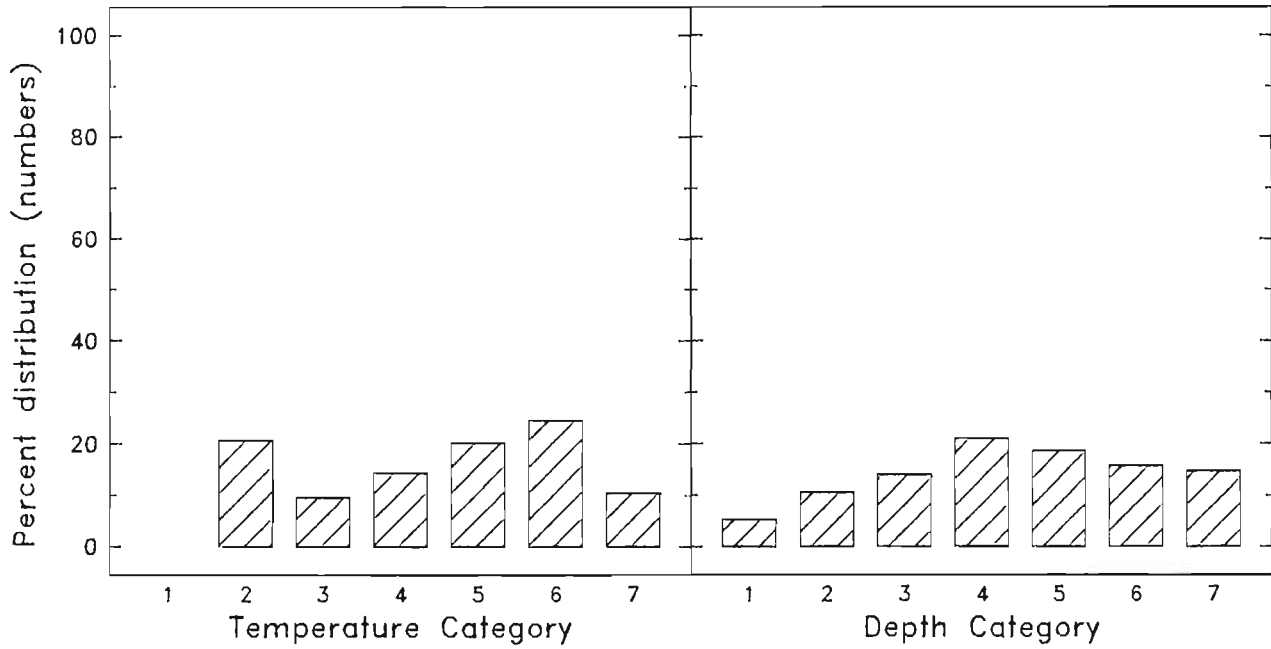


Fig. 38: Skate, smooth (*Raja senta*)

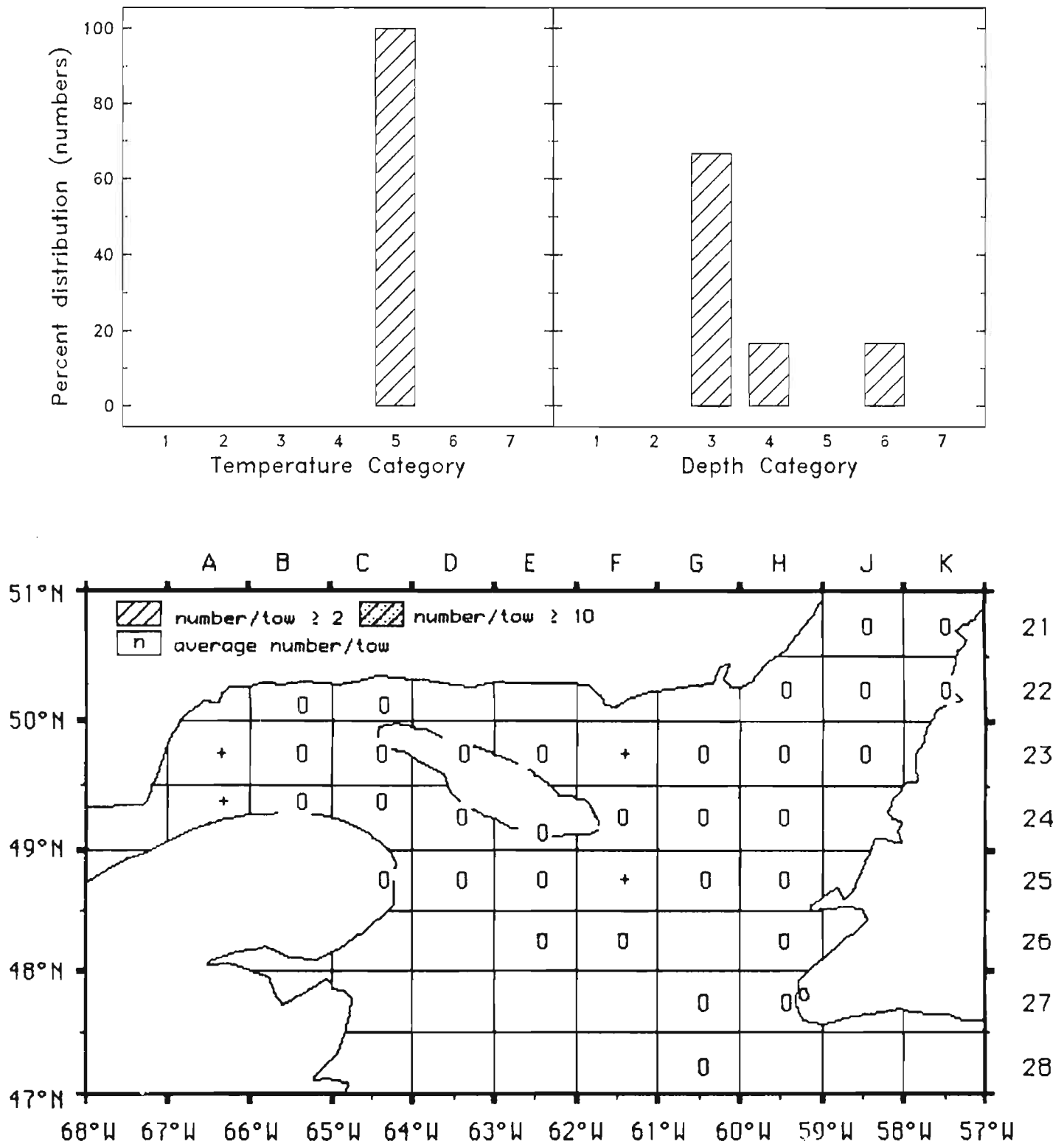


Fig. 39: Skate, spinytail (*Raja* (*Bathyraja*) *spinicauda*)

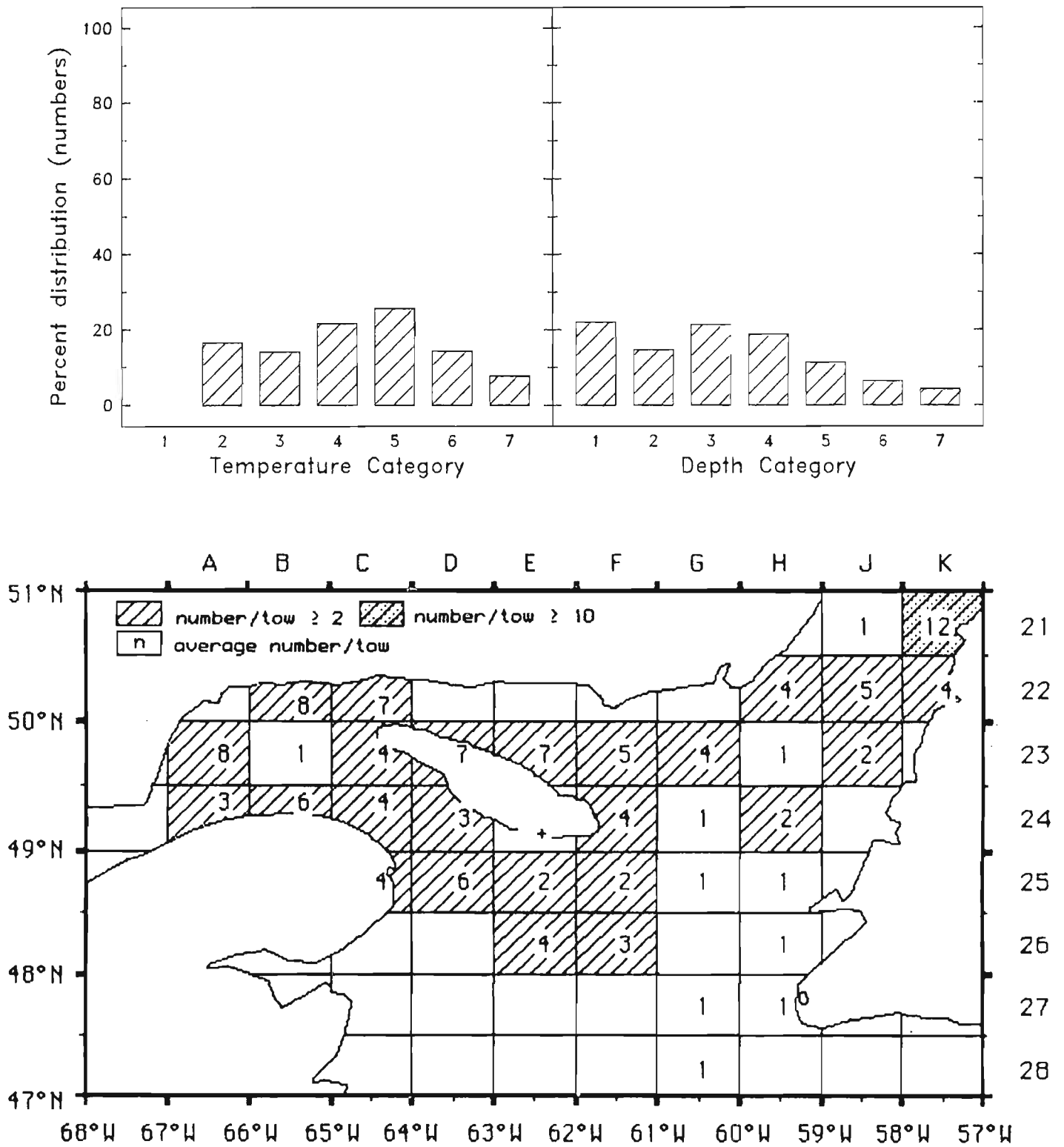


Fig. 40: Skate, thorny (*Raja radiata*)

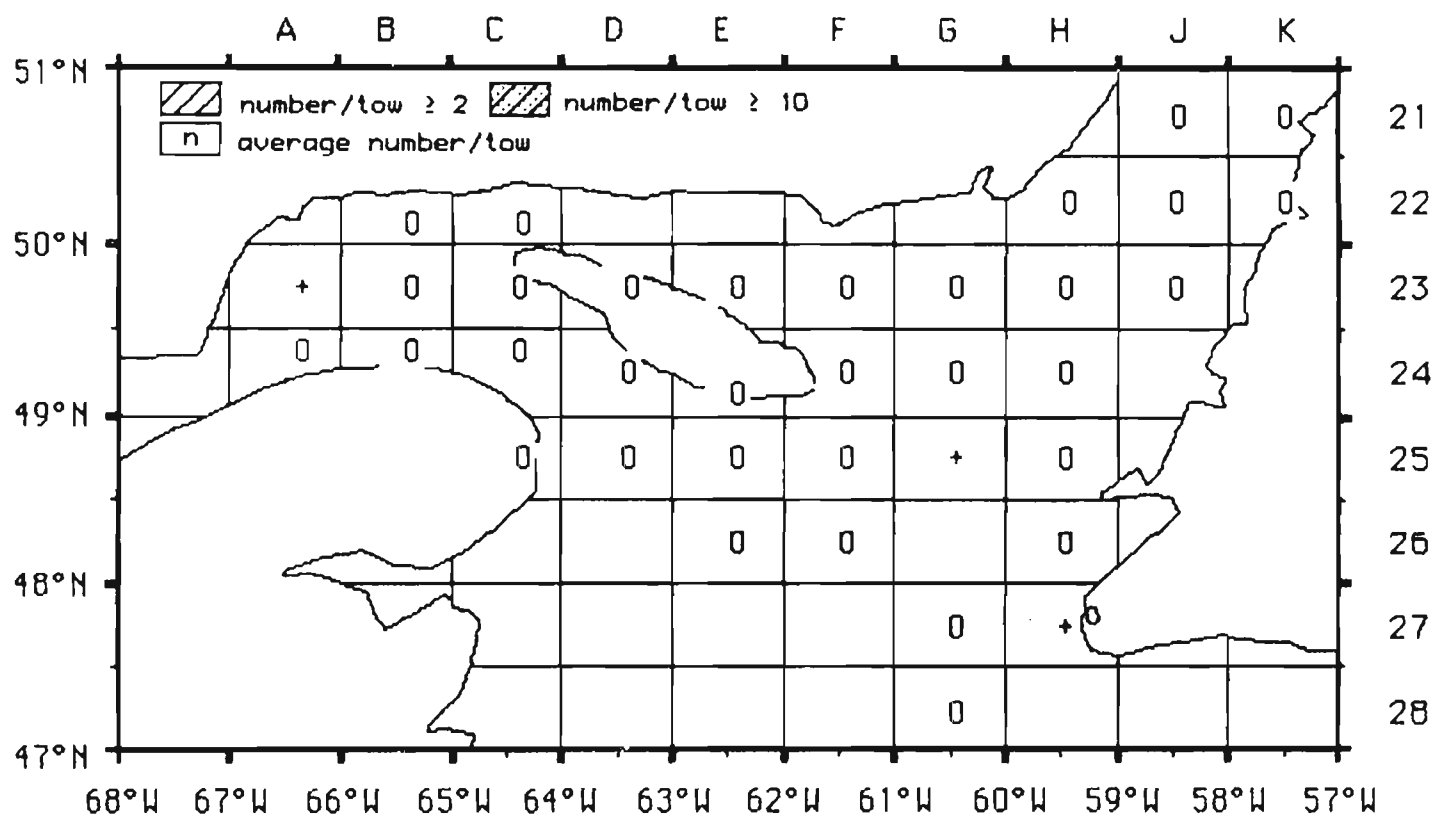
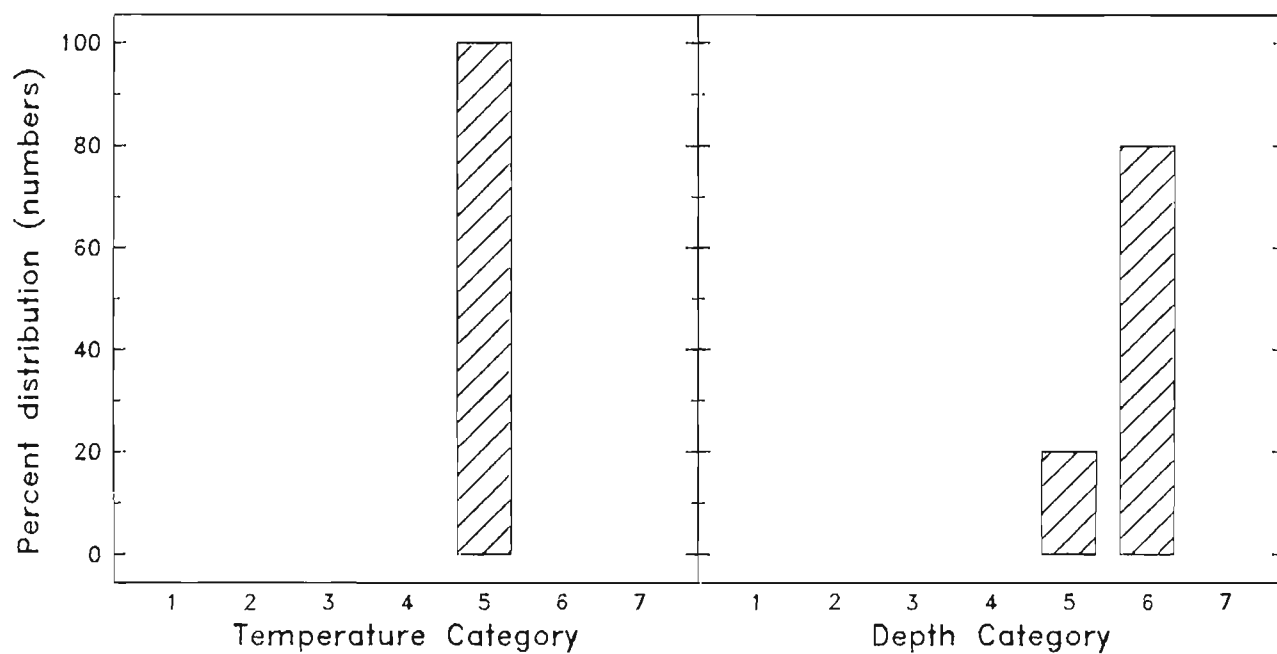


Fig. 41: Skate, winter (spotted) (*Raja ocellata*)

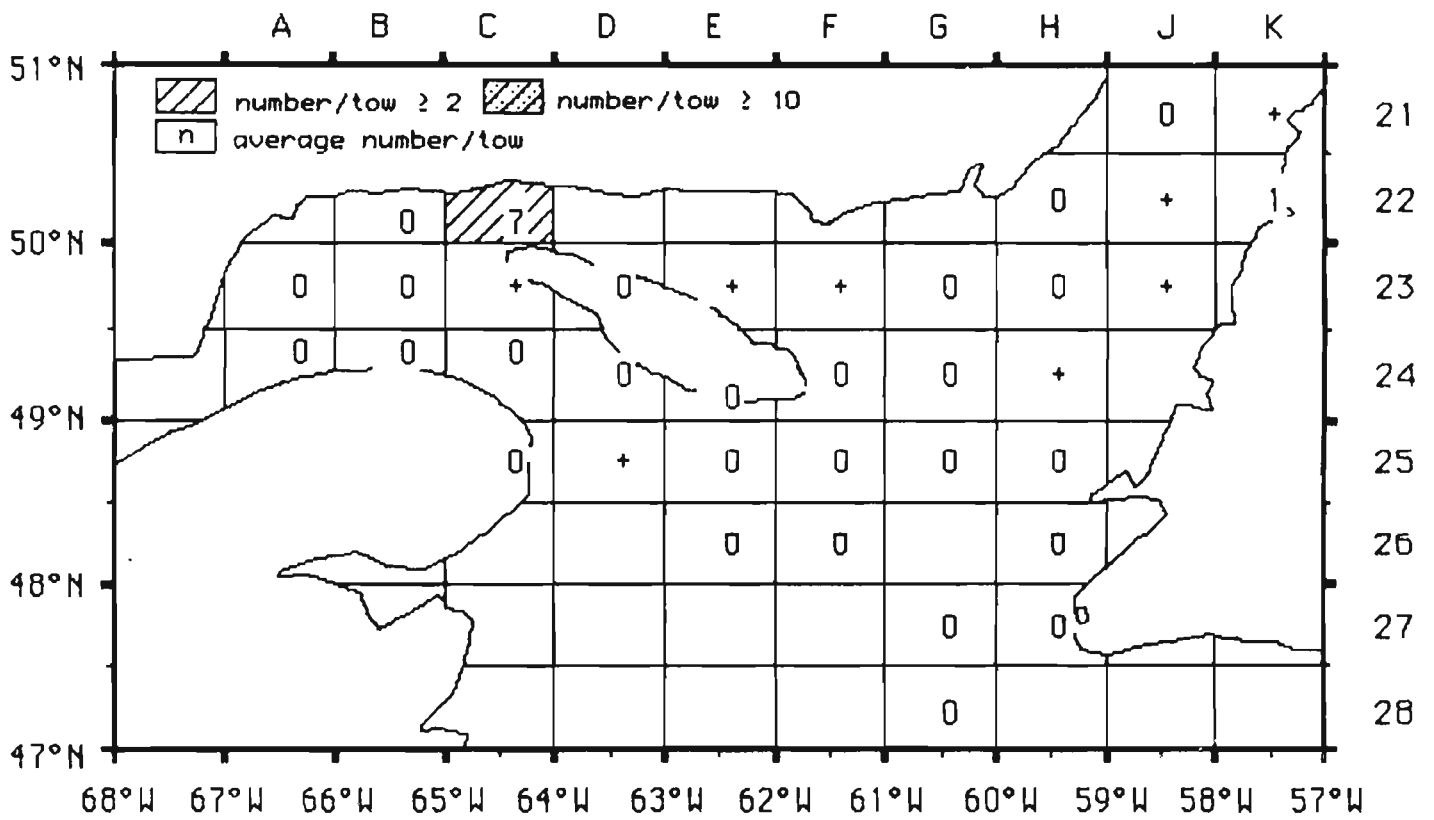
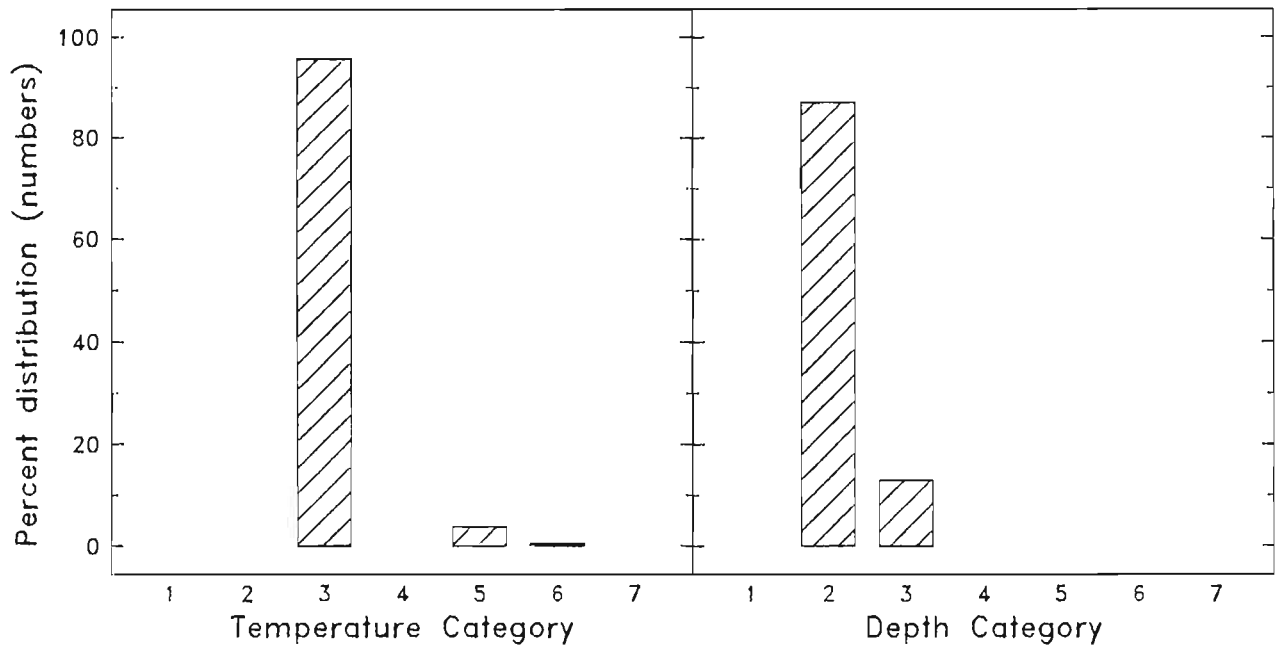


Fig. 42: Snake blenny (*Lumpenus lumpretaeformis*)

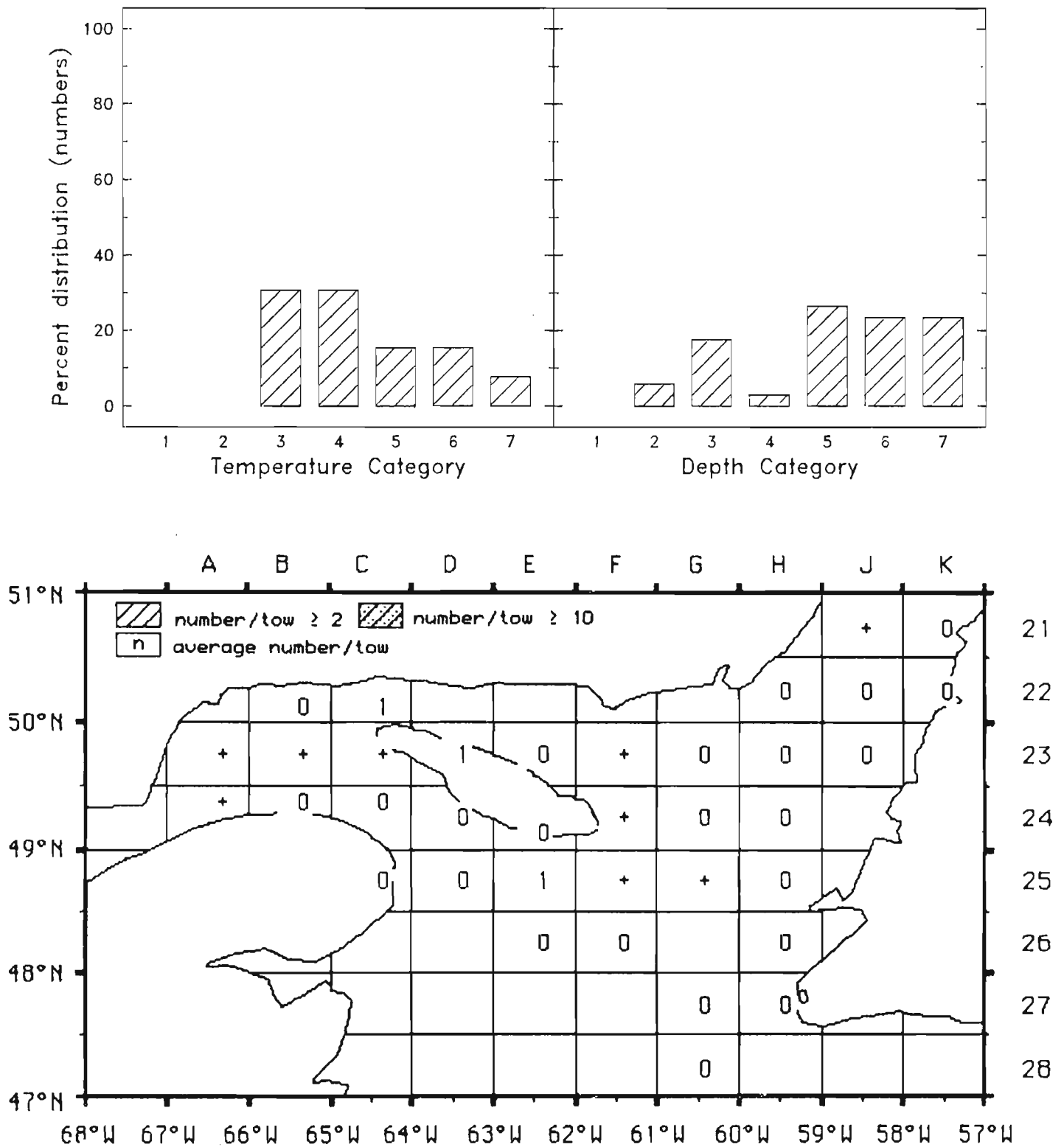


Fig. 43: Wolf eel (NS) (*Lycenchelys* spp.)

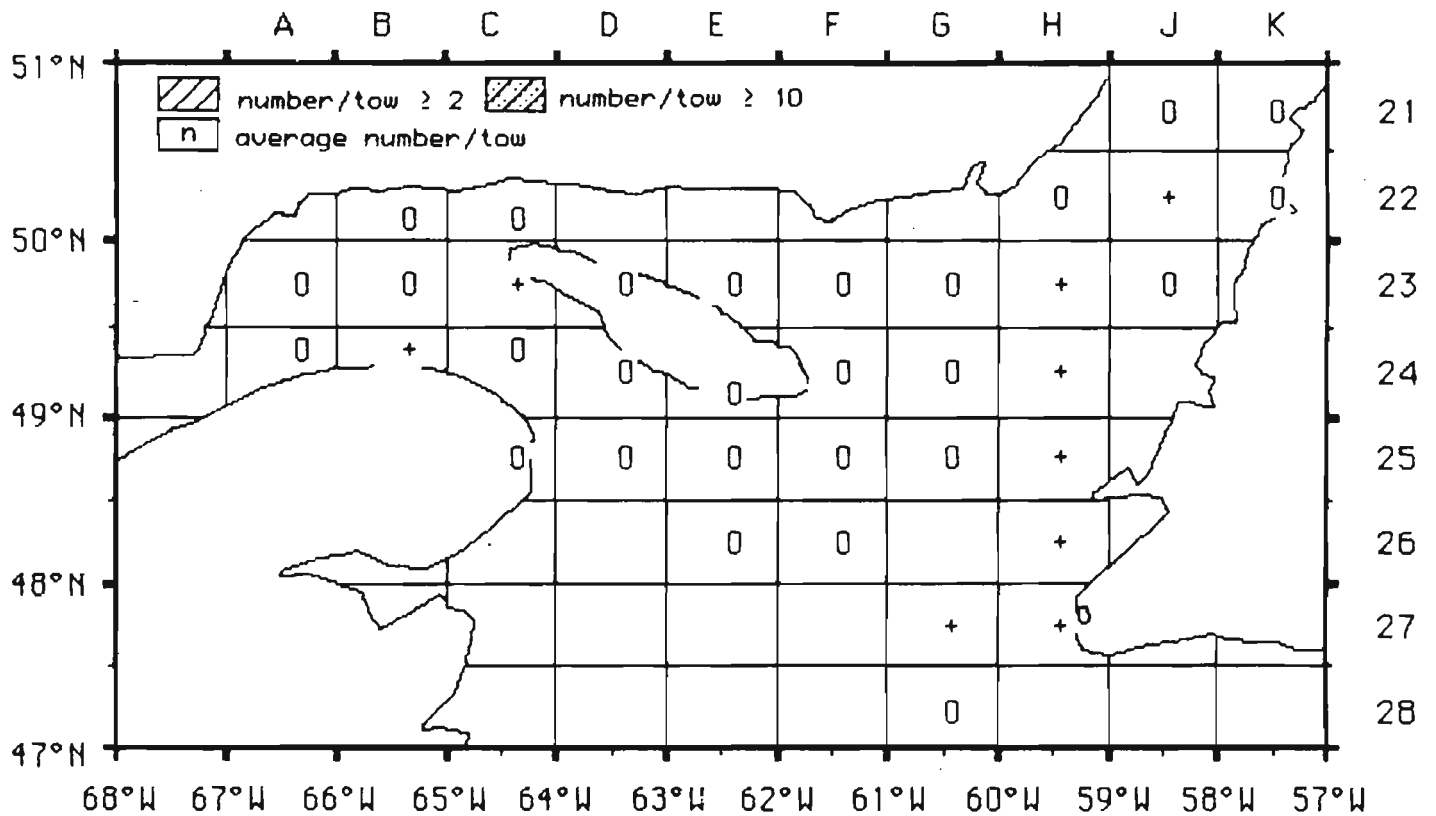
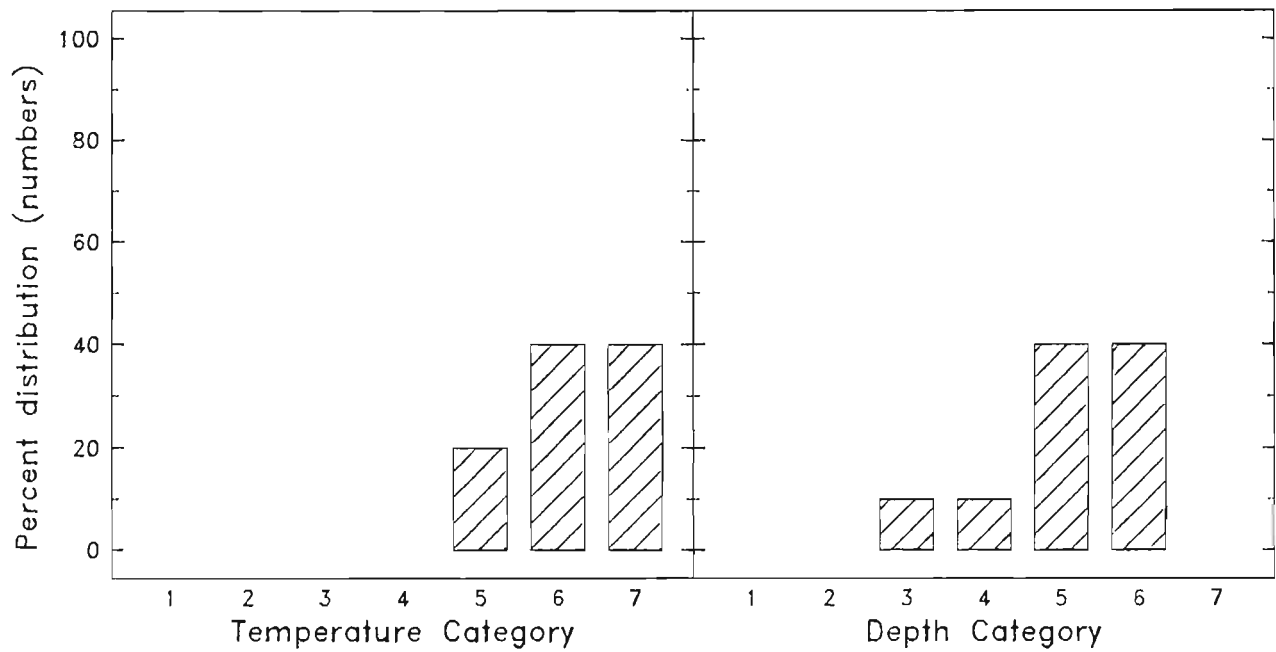


Fig. 44: Wolffish, broadhead (*Anarhichas denticulatus*)

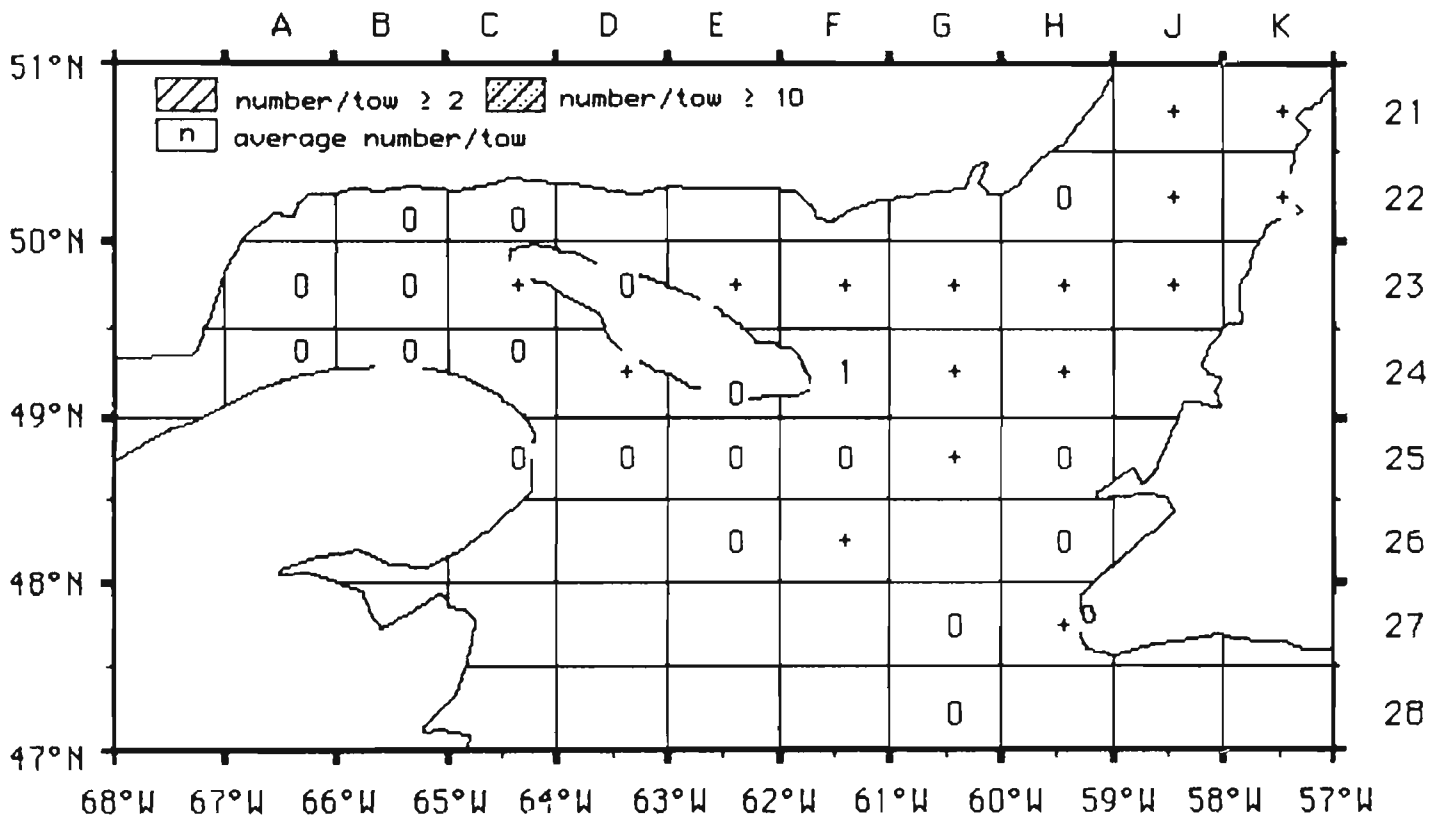
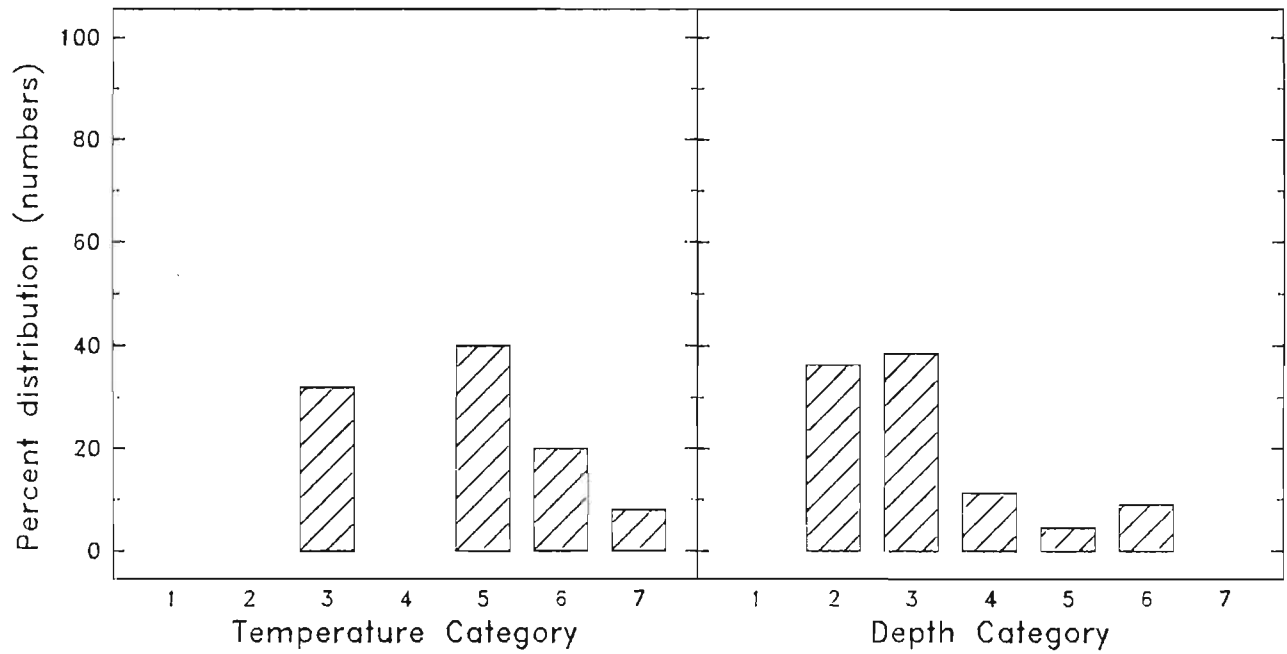


Fig. 45: Wolffish, spotted (*Anarhichas minor*)

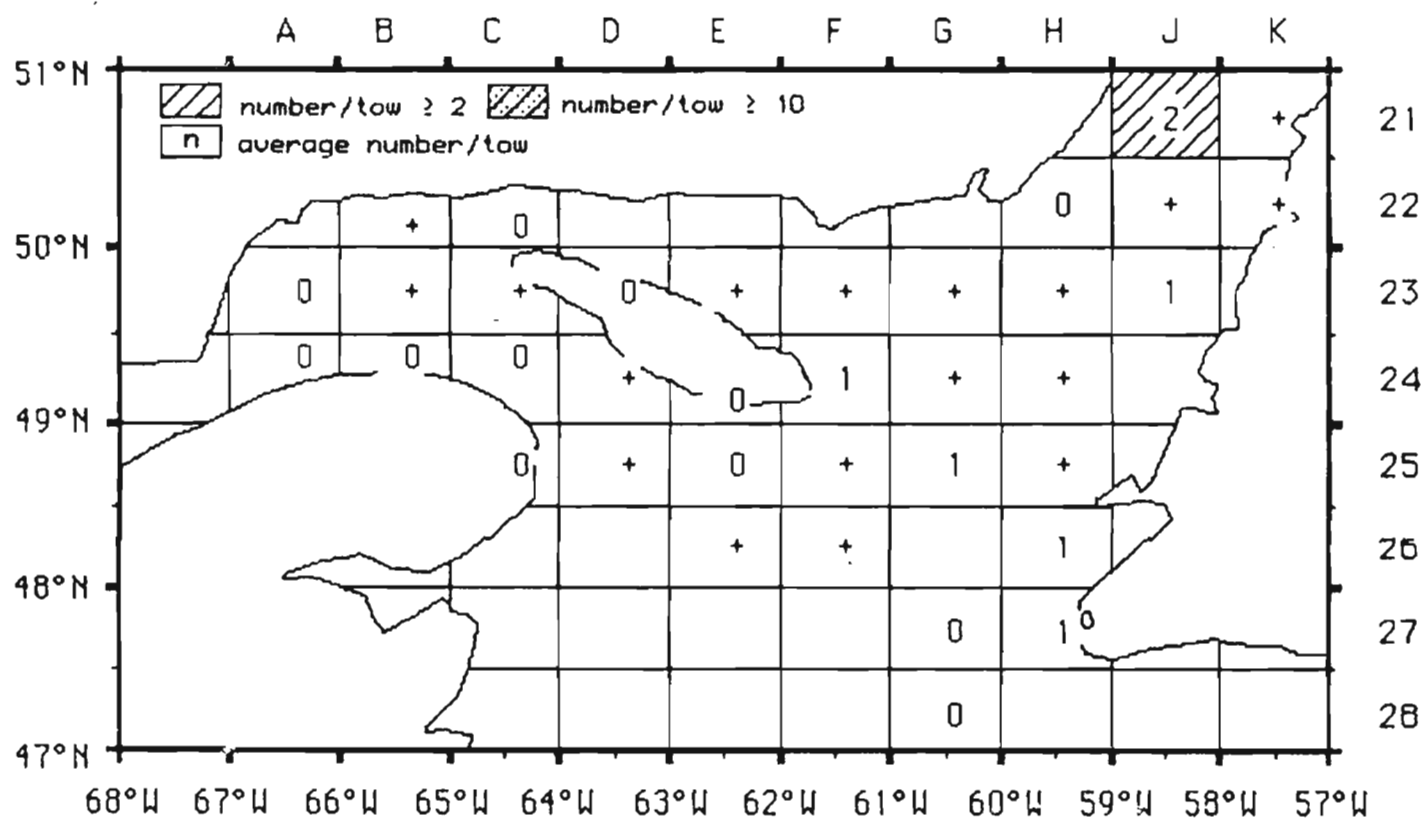
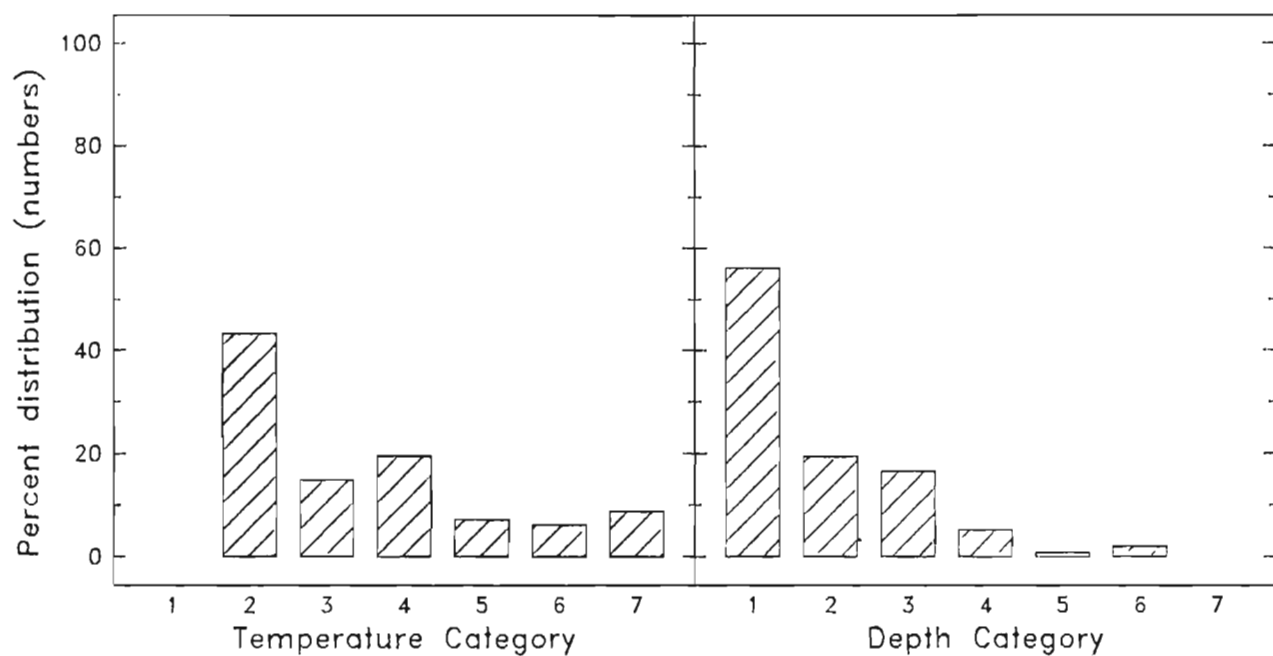


Fig. 46: Wolffish, striped (*Anarhichas lupus*)

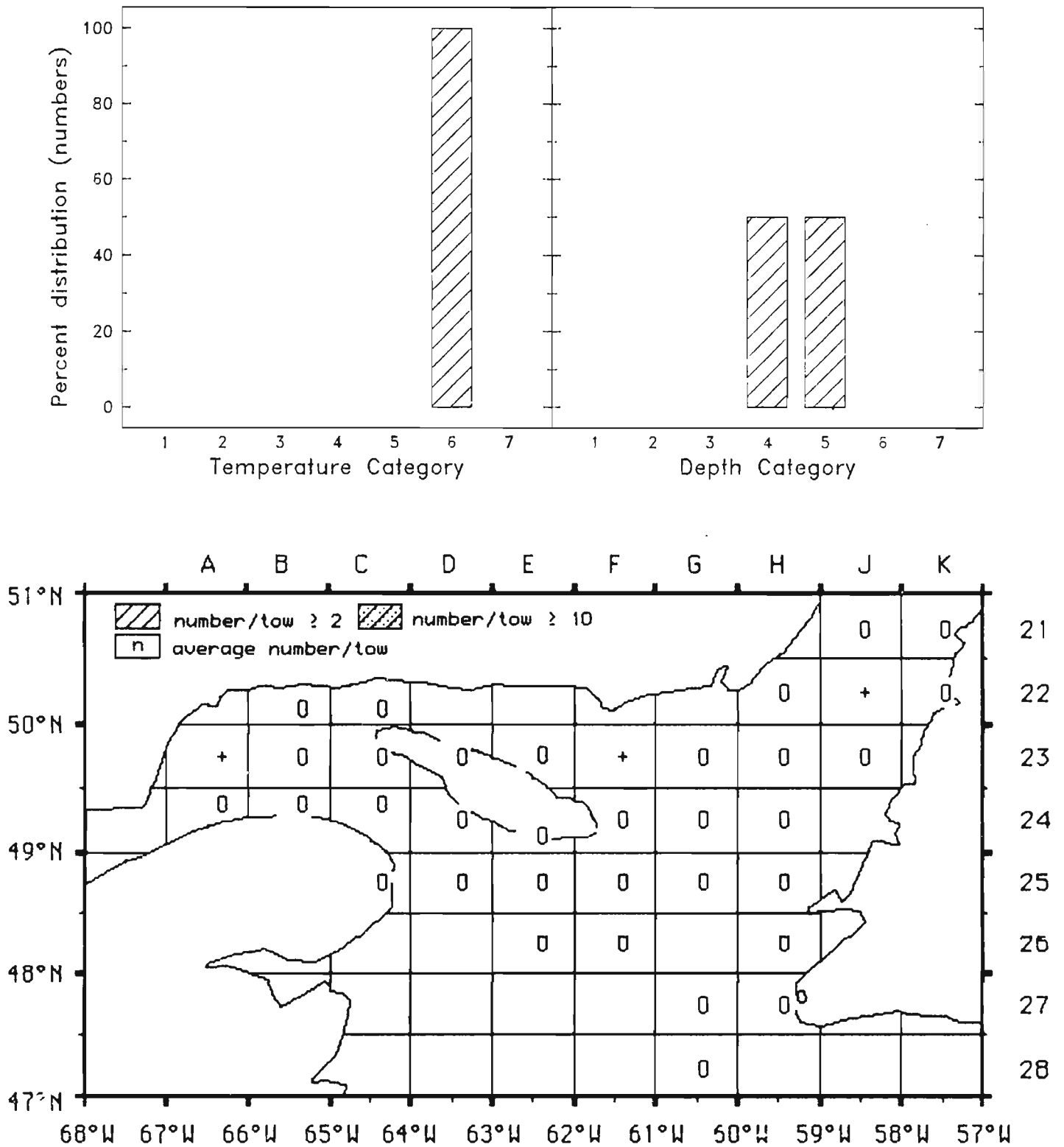


Fig. 47: Wrymouth (*Cryptacanthodes maculatus*)