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The Distribution and Abundance of Redfish (Sebastes marinus and S. mentella) in Davis Strait (NAFO Subareas 0+1)

by

D. B. Atkinson

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

Introduction

The fishery for redfish in Subarea 1 is primarily directed at S. marinus (NAFO Sci. Coun. Reports 1985, page 60). The 1979 assessment (ICNAF Redbook 1979, page 74) indicated a maximum sustainable yield (MSY) of about 10,000 t and an equilibrium yield at ⅔ effort MSY of about 9,000 t. More recent assessments have not been possible due to the limited commercial data base.

It has been noted that small S. mentella are usually taken as a by-catch in the shrimp directed trawl fishery. They are thought to be distributed deeper than S. marinus and are not taken in the commercial cod fishery.

In 1986, Canada mounted a research cruise to the Davis Strait area (NAFO Subareas 0+1) surveying depths of 200-1250 m. This paper briefly describes the distribution and abundance of S. marinus and S. mentella as determined from the results of this survey.

Materials and Methods

The survey was conducted by the Newfoundland Region of the Department of Fisheries and Oceans in depths of 200-1250 m from about Cape Chidley, Labrador in the south (61° N) to Disko Island in the north (70° N) following the stratification scheme shown in Figure 1 and described by Bowering (MS 1987a). Details of the survey design are described by Bowering (MS 1987b). Overall, a total of 194 successful 30 min. tows were made (Figure 2). It should be noted that the redfish caught were examined to determine if S. fasciatus were present but none were found.

Results

Sebastes marinus

S. marinus were only taken in small numbers during the survey but the majority of these were taken in SA 1 (Figure 3). Most of the fish (numbers) were taken in depths of 200-399 m (Figure 4a) although the catches by weight were fairly evenly distributed between depths of 200-599 m (Figure 4b). The fish ranged in size from 15 to 61 cm and there was a tendency for larger fish to be found in the deeper water (Figure 5). None of the fish taken were sexually mature supporting the hypothesis that these fish may originate south or east of Greenland (Anon. MS 1983). The total estimated trawlable biomass was 3,013 t, 68% of which was found in SA 1. The distribution of this species in SA 1 is such that a major proportion of the stock resides in waters shallower than those covered by the survey (ie. <200 m). There is also thought to be discrete stocks residing in the fjords of Greenland (anon. MS 1983).

Sebastes mentella

The survey results (Figure 6) indicate that this species was widely distributed throughout the survey area. The greatest numbers were found in depths of 300-399 m (Figure 7a) but the greatest weights were taken in depths of 500-599 m (Figure 7b) indicating an increase in size with depth. This species was generally found in deeper water than S. marinus similar to their relative distributions in more southerly areas (Ni and McKone MS 1983).

The total estimated trawlable biomass, 24,873 t, was mainly present in SA 0 (68%). The fish ranged in size from about 6-45 cm (Figures 8a and 8b) but the majority of those taken had modes of 8 and 11 cm (Figure 9). Besides the decrease in fish size with shallower depths, there is an apparent geographic cline in the size of these fish with smaller fish predominating in the more northerly areas. This has been noted previously and it has been hypothesized that the area between about 66° N and 70° N may be a nursery area (Anon. MS 1983) although the source of the larvae is not known.

Relatively few mature fish were encountered during the survey but these were present, in small numbers, as far north as about 67°N. Of these, only one was female (46 cm and in spent condition). Most of the males were maturing for the current year but it could not be determined if this was first or repeated maturation. Ni and Sandeman (1984) reported that the size of 50% maturity of this species is greater in more northern areas of the Northwest Atlantic, and the results of this survey confirm this. Whether the mature fish eventually spawn in this area or migrate south and east of Greenland first is not known but the absence of mature females might suggest the latter as has been hypothesized previously (Anon., 1983).

References

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Ni, I-Hsun and W.D. McKone. MS 1983. Distribution and Concentration of Redfishes in Newfoundland and Labrador Waters. NAFO Sci. Coun. Studies, 6:7-14.

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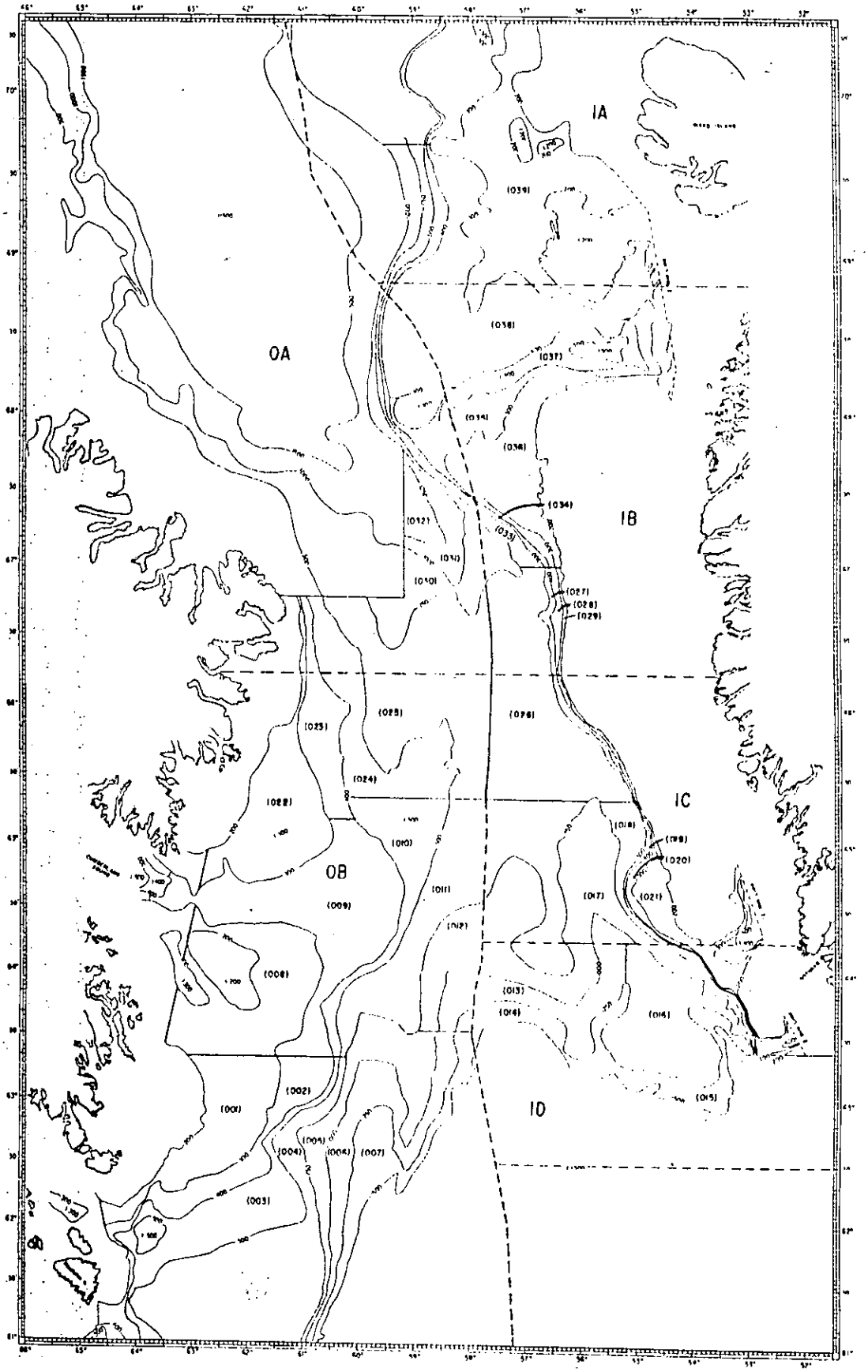

Fig. 1. Stratification scheme developed for a selected portion of NAFO Subareas Ø and 1.

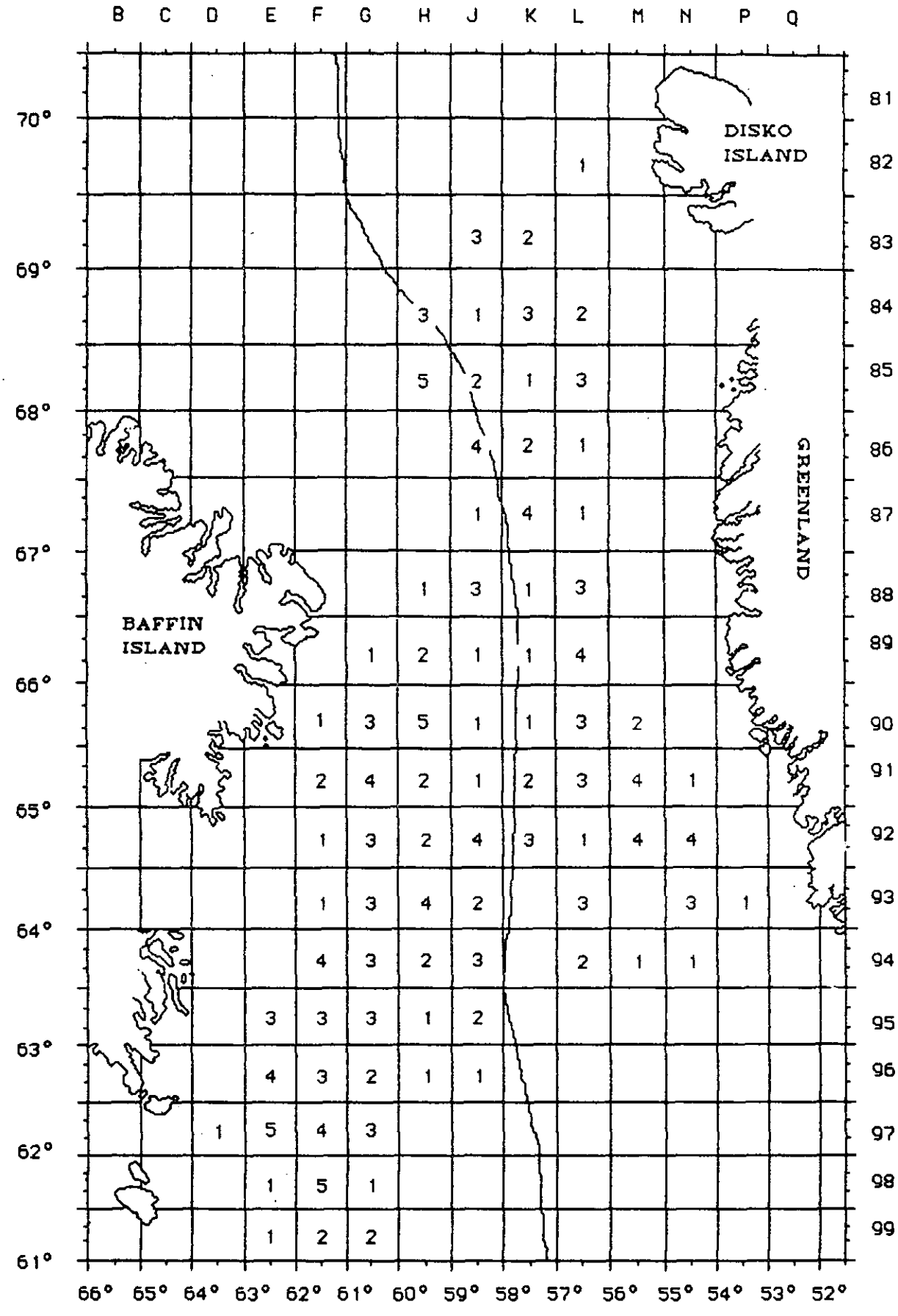

Fig. 2 Map of the Davis Strait area showing the International Boundary as well as the number of successful sets per Unit Area during the 1986 Canadian groundfish cruise to NAFO Subareas 0 and 1.

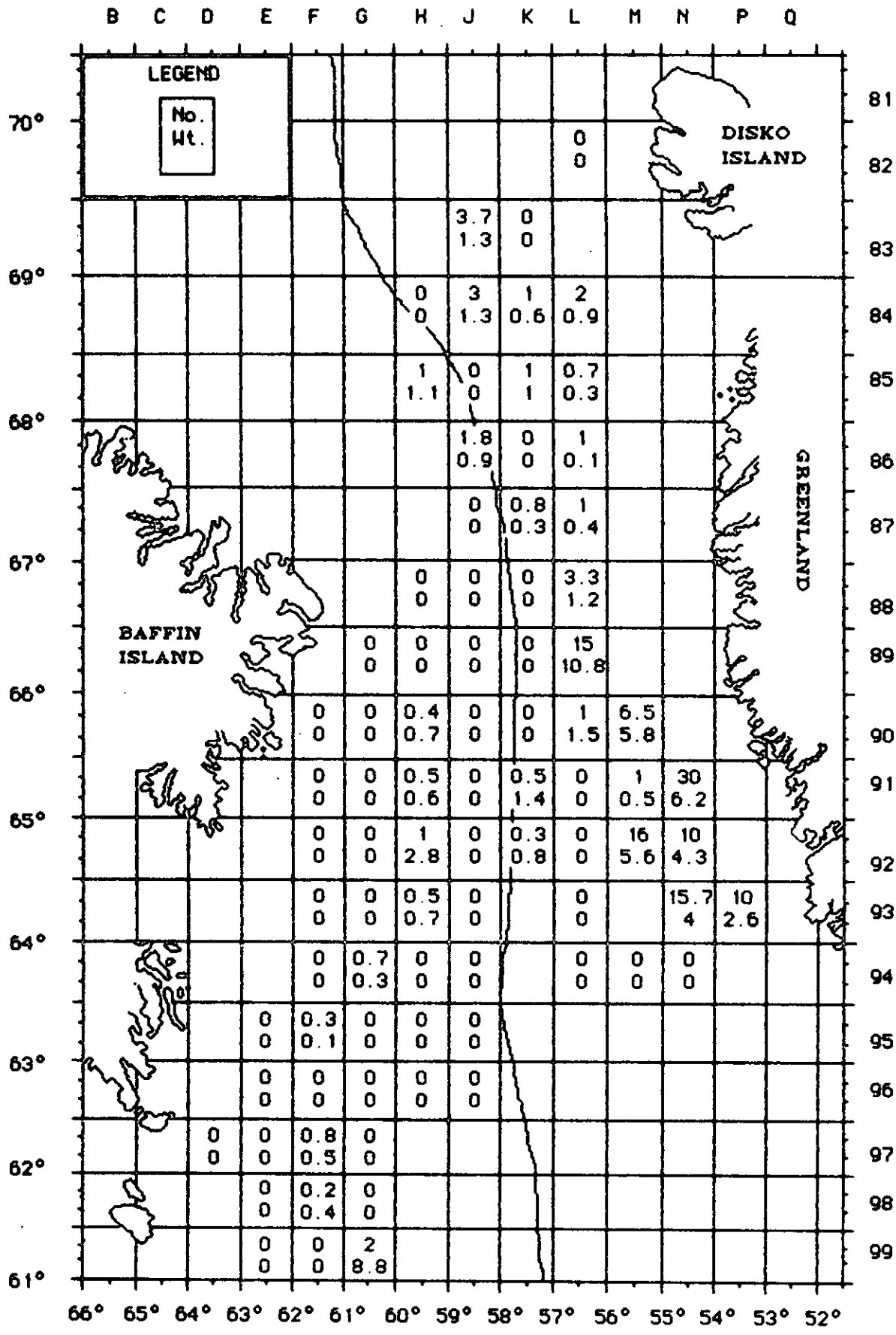

Figure 3: Distribution of S. marinus by Unit Area in NAFO Subareas 0+1 during Canadian bottom trawl survey in 1986.

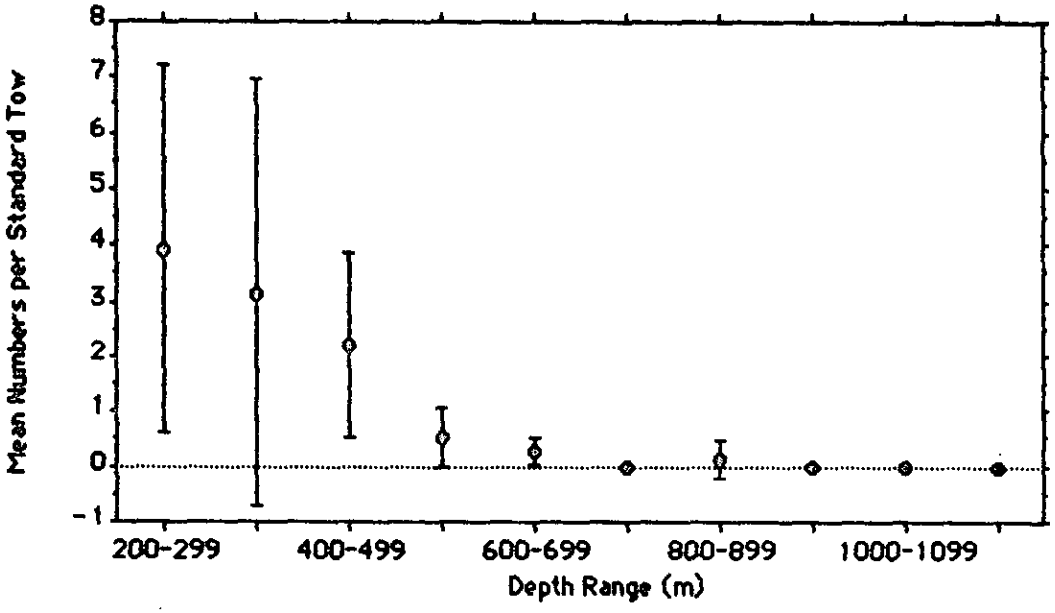

Figure 4a: Mean numbers of S. marinus caught per standard 30 min. tow in each depth range during Canadian research cruise to SA 0+1 in 1986.

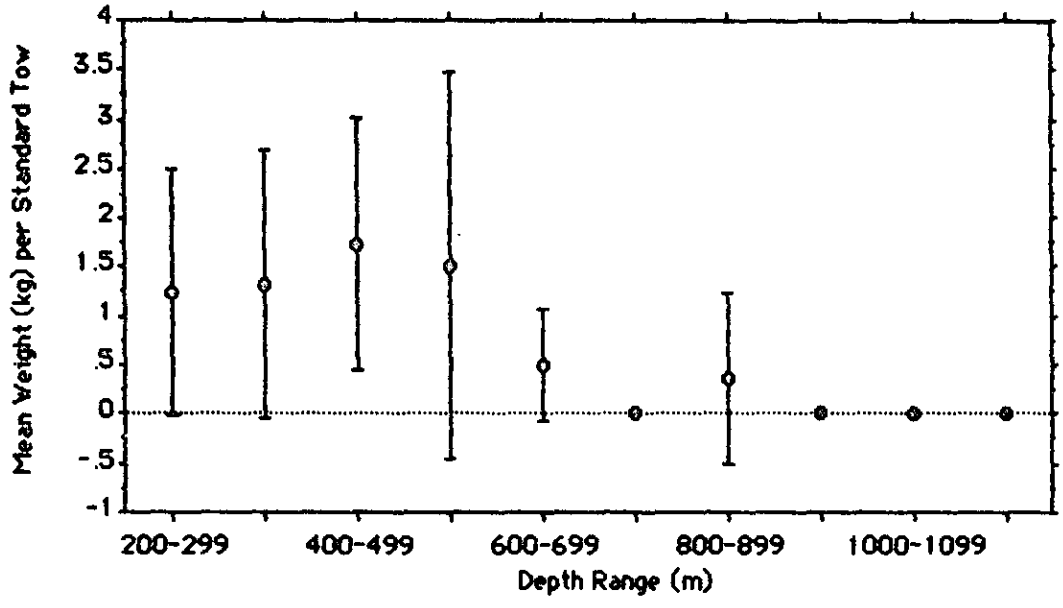

Figure 4b: Mean weights of S. marinus caught per standard 30 min. tow in each depth range during Canadian research cruise to SA 0+1 in 1986.

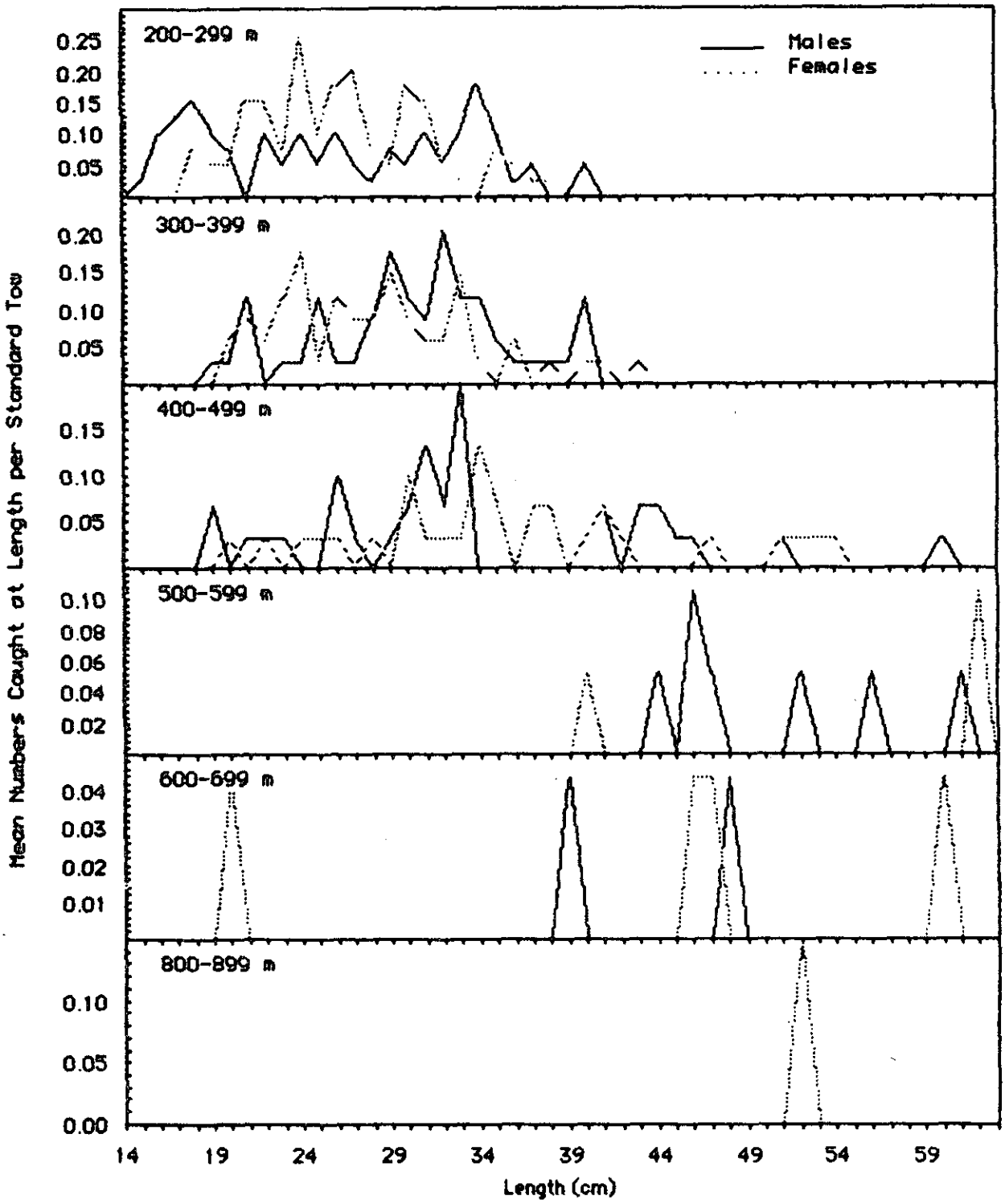

Figure 5: Mean numbers of S. marinus caught per standard tow by depth range during Canadian bottom trawl survey to NAFO SA 0+1 in 1986.

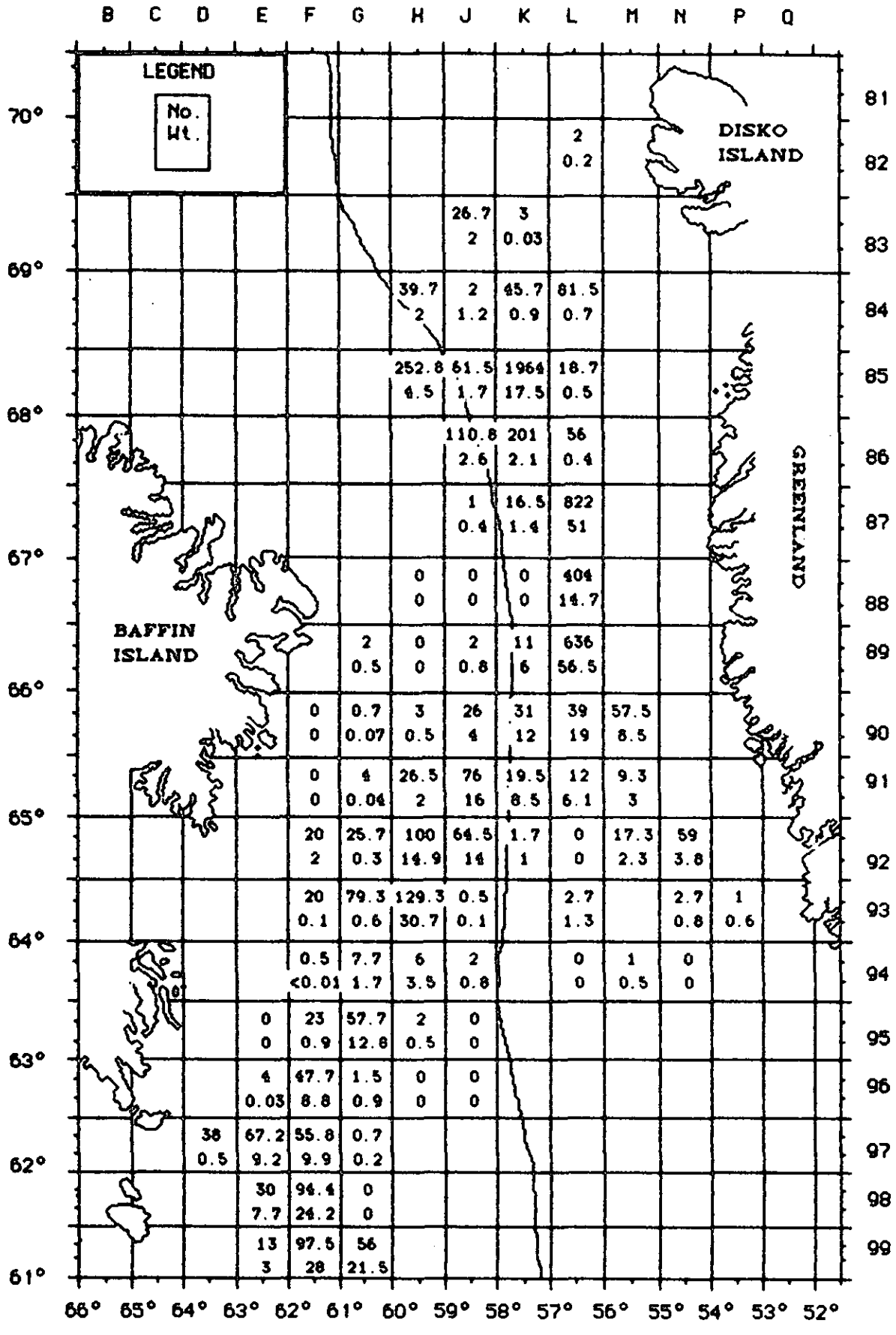

Figure 6: Distribution of S. mentella by Unit Area in NAFO Subareas 0+1 during Canadian bottom trawl survey in 1986.

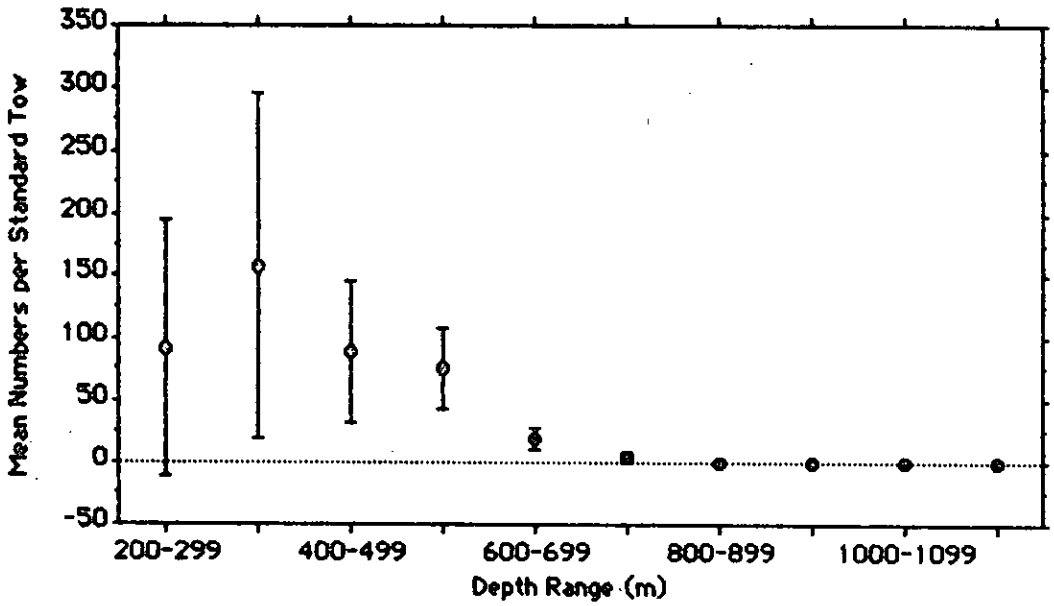

Figure 7a: Mean numbers of S. mentella caught per standard 30 min. tow in each depth range during Canadian research cruise to SA 0+1 in 1986.

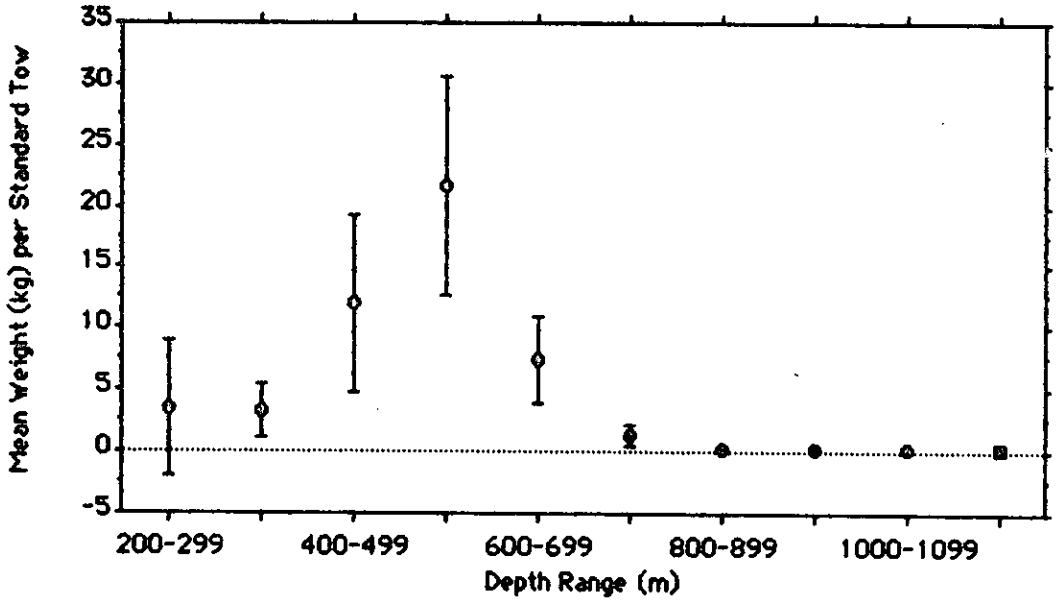

Figure 7b: Mean weights of S. mentella caught per standard 30 min. tow in each depth range during Canadian research cruise to SA 0+1 in 1986.

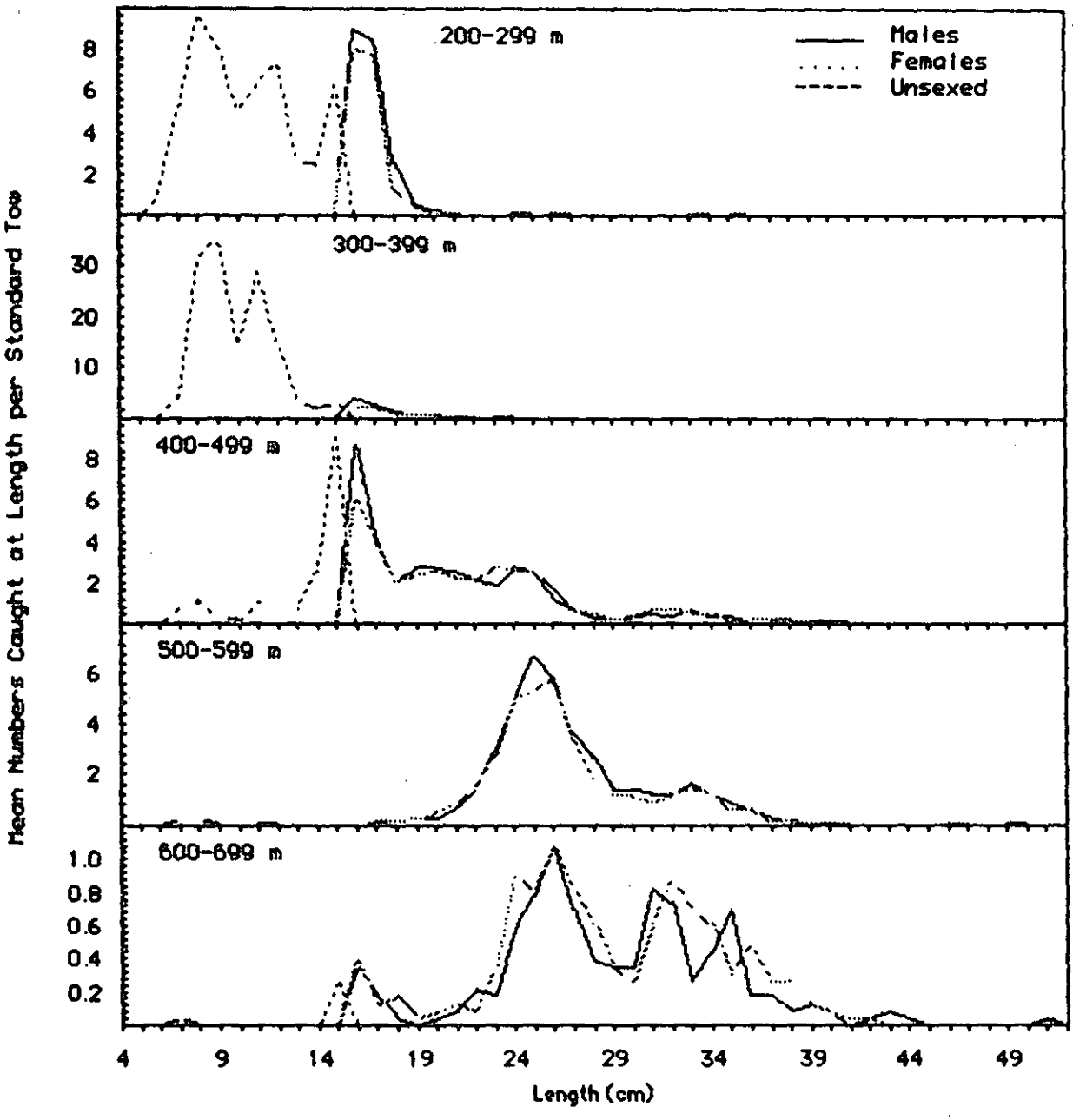

Figure 8a: Mean numbers of S. mentella caught per standard tow by length by depth range during Canadian bottom trawl survey of NAFO SA 0+1 in 1985.

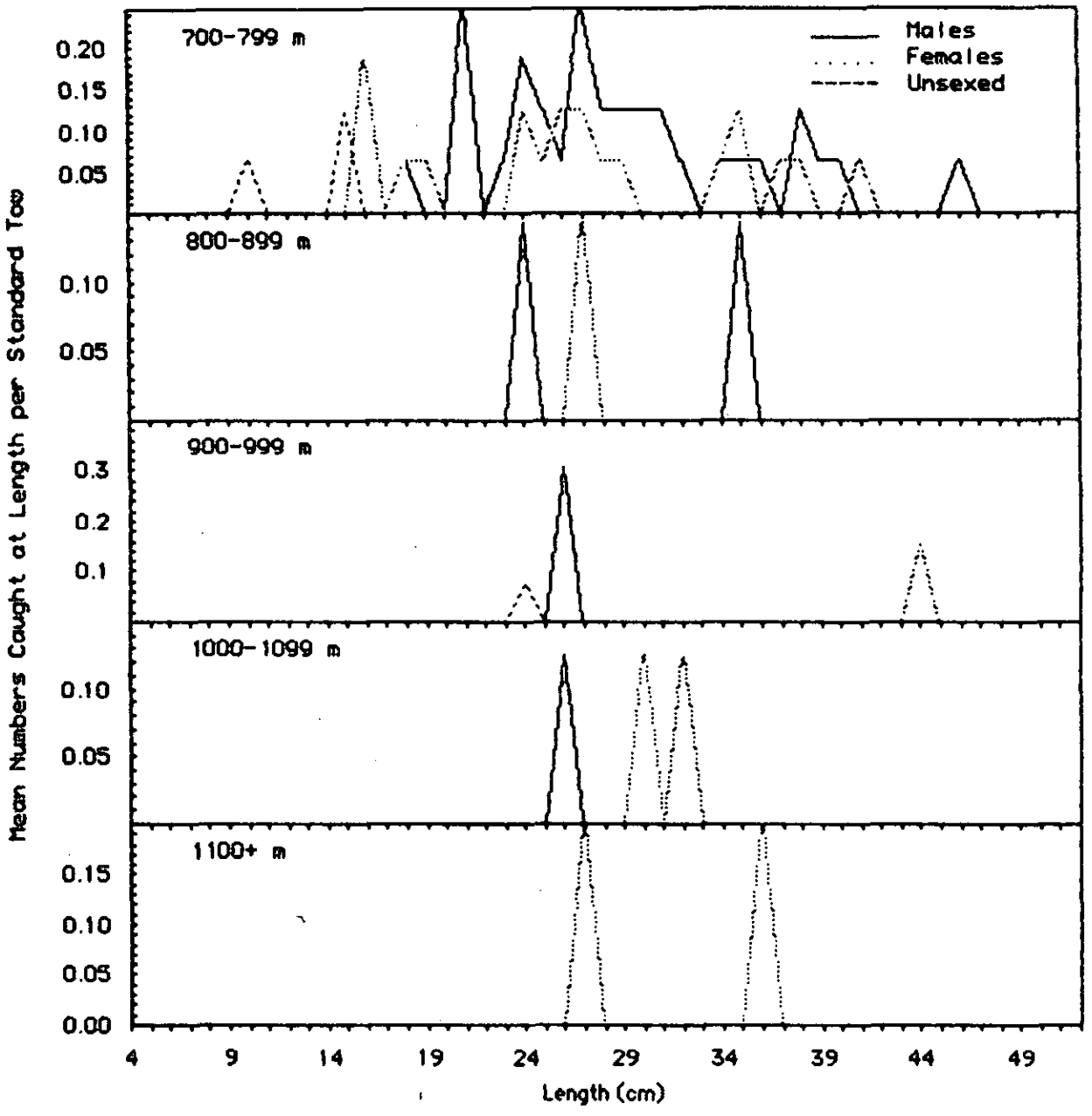

Figure 8b: Mean numbers of S. mentella caught per standard tow by length by depth range during Canadian bottom trawl survey of NAFO SA 0+1 in 1986.

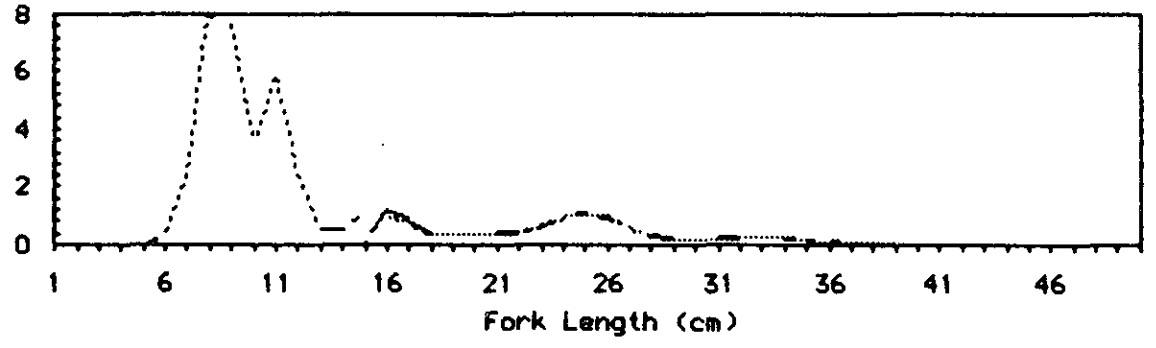

Figure 9: Mean numbers of S. mentella caught at length during Canadian bottom trawl survey of NAFO SA 0+1 in 1986.