



Serial No. 3800
(D.c.5)

ICNAF Res. Doc. 76/VI/20

ANNUAL MEETING - JUNE 1976

The food and feeding of capelin (*Mallotus villosus*) in the Labrador area during Autumn 1973

by

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Introduction

Although it is known that capelin feed mainly on zooplankton, there have been few quantitative studies on capelin feeding. Studies have been reported concerning feeding of capelin in the Barents Sea (Prokhorov, 1965), in the Gulf of St. Lawrence (Able et al., 1975, and ongoing studies, Able pers. comm.), and in the Newfoundland area (Templeman, 1948; Winters, 1970; Koyalyov and Kudrin, 1973). This paper reports the results from a study of the feeding of Labrador capelin conducted in autumn, 1973.

Materials and Methods

Samples were collected at random from catches taken by the midwater trawler "Newfoundland Falcon" on exploratory fishing trips for capelin between late August and late November, 1973. Most of the catches were made off the coast of Labrador (Fig. 1) from depths ranging between 140M and 370M. Time of tows varied from 2 to 5 hours. One sample of 100 fish was taken by the research vessel "A.T. Cameron" in January 1974 off the southwest coast of Newfoundland.

The body cavities of the capelin were injected with 10% formaldehyde solution and the fish were frozen for later examination in the laboratory.

The fullness of each stomach was assessed on the following point system:

- 0 = empty, i.e. the volume equivalent of \leq 30 copepods or no food visible.
- 1 = 1/4 full
- 2 = 1/2 full
- 3 = 3/4 full
- 4 = full, sometimes distended with food.

Damp weights of the major groups of food organisms by sample were recorded. If a sample did not yield enough material to be quantified, the weight of stomach contents of that sample was assigned zero.

Results

Mean stomach fullness for each month (Table 1) suggests that feeding decreased from August through to January.

The main volume of food eaten by capelin fell into 3 major groups - copepods, amphipods and

and euphausiids but fish larvae, thecosomes, mysids, ostracods and chaetognaths were also ingested. In some cases the food organisms could be identified to specific level but in others digestive and/or mechanical processes made such identification impossible. Food organisms that could be classified to species are listed by sample in Table 2.

Of the three main food groups, it is obvious (Table 3) that copepods and amphipods were the most important. Euphausiids did not occur in all the samples and when they did occur were of less importance. Other food items such as fish larvae, molluscs and chaetognaths were encountered only occasionally. The same pattern is evident when the samples are arranged by month (Table 4).

Discussion

Capelin from the Labrador area were feeding intensively in August but this feeding gradually declined up to November. Although only 100 fish were available from January, results from this analysis indicated that feeding was at a low level in the southwest Newfoundland area. This seasonal feeding pattern is similar to that reported by Winters (1970) for Trinity Bay capelin, Campbell and Winters (1973) for Newfoundland capelin in general, Able et al. (1975) for capelin from the Gulf of St. Lawrence and Prokhorov (1965) for Barents Sea capelin.

The capelin from the Labrador area were planktivores with copepods and amphipods being the main food items. Amphipods and euphausiids were most important in the sample from southwest Newfoundland. It is not known whether this difference in food items between the areas is a regional or seasonal difference in availability of prey. Able et al. (1975) reported that Gulf of St. Lawrence capelin fed mainly on euphausiids and other copepods as did Prokhorov (1965) for Barents Sea capelin.

References

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Table 1. Mean stomach fullness of capelin from Labrador and southwest Newfoundland areas, arranged by month.

| Month | Mean Stomach Fullness | Number of Fish |
|-----------|-----------------------|----------------|
| August | 2.60 | 30 |
| September | 1.37 | 52 |
| October | 1.14 | 150 |
| November | 0.25 | 359 |
| January | 0.18 | 100 |

Table 2. Food organisms of capelin that were identified to species level.

| Sample No. | Food organisms |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2 | Copepods - <u>Calanus finmarchicus</u> , St. IV & V Amphipods - <u>Parathemisto gaudichaudi</u> - <u>Parathemisto libellula</u> Euphausiids - either <u>Meganyctiphanes norvegica</u> or <u>Euphausia Krohnii</u> |
| 3 | Copepods - <u>Calanus hyperboreus</u> - <u>Calanus finmarchicus</u> - <u>Metridia longa</u> |
| 4 | Copepods - <u>Calanus finmarchicus</u> Amphipods - <u>Parathemisto gaudichaudi</u> - <u>Parathemisto libellula</u> |
| 5 | Copepods - <u>Calanus finmarchicus</u> Amphipods - <u>Parathemisto gaudichaudi</u> |
| 6 | Copepods - <u>Calanus finmarchicus</u> Amphipods - <u>Parathemisto gaudichaudi</u> - <u>Parathemisto libellula</u> |
| 8 | Copepods - <u>Calanus finmarchicus</u> Amphipods - <u>Parathemisto gaudichaudi</u> |
| 9 | Copepods - <u>Calanus finmarchicus</u> Gastropods - <u>Limacina retroversa</u> - <u>Limacina helicina</u> Ostracod - <u>Conchoecia obtusata</u> |
| 15 | Copepods - <u>Calanus finmarchicus</u> Amphipods - <u>Parathemisto gaudichaudi</u> Gastropods - <u>Limacina helicina</u> |
| 16 | Copepods - <u>Calanus finmarchicus</u> , St. IV & V Amphipods - <u>Parathemisto gaudichaudi</u> |
| 19 | Amphipods - <u>Parathemisto gaudichaudi</u> - <u>Parathemisto sp.</u> |

Note: This table contains only organisms that could be identified to species level and does not contain a complete list of food organisms per sample.

Table 3. Percentage occurrence (% occ.) and percentage weight (% wt) of capelin stomach contents. Stomachs from samples 7, 10-14, 17 and 18 were empty.

| Sample No. | Copepods | | Amphipods | | Euphausiids | | Fish larvae | | Molluscs | | Chaetognaths | |
|------------|----------|------|-----------|------|-------------|------|-------------|------|----------|------|--------------|------|
| | % Occ | % Wt | % Occ | % Wt | % Occ | % Wt | % Occ | % Wt | % Occ | % Wt | % Occ | % Wt |
| 1 | 100 | 75 | 73 | 22 | 13 | 3 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 100 | 45 | 60 | 37 | 13 | 18 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 100 | 90 | 41 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 100 | 63 | 83 | 36 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 80 | 25 | 67 | 62 | 3 | 0 | 3 | 13 | 0 | 0 | 0 | 0 |
| 6 | 33 | 15 | 27 | 85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8 | 87 | 57 | 17 | 23 | 3 | 21 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9 | 87 | 57 | 33 | 30 | 10 | 9 | 0 | 0 | 33 | 1 | 0 | 0 |
| 15 | 23 | 85 | 10 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16 | 31 | 71 | 5 | 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 19 | 0 | 0 | 7 | 58 | 4 | 34 | 0 | 0 | 0 | 0 | <1 | 8 |

Table 4. Percentage weight (% wt) of the main components of the diet of capelin averaged by month.

| Month | Number of samples | Copepods % wt | Amphipods % wt | Euphausiids % wt | Fish larvae % wt | Molluscs % wt | Chaetognaths % wt |
|-----------|-------------------|---------------|----------------|------------------|------------------|---------------|-------------------|
| August | 1 | 75.0 | 22.0 | 3.0 | 0 | 0 | 0 |
| September | 2 | 67.5 | 23.5 | 9.0 | 0 | 0 | 0 |
| October | 4 | 40.0 | 51.5 | 5.5 | 3.0 | 0 | 0 |
| November | 3 | 71.0 | 24.7 | 4.0 | 0 | 0.3 | 0 |
| January | 1 | 0 | 58.0 | 34.0 | 0 | 0 | 8 |

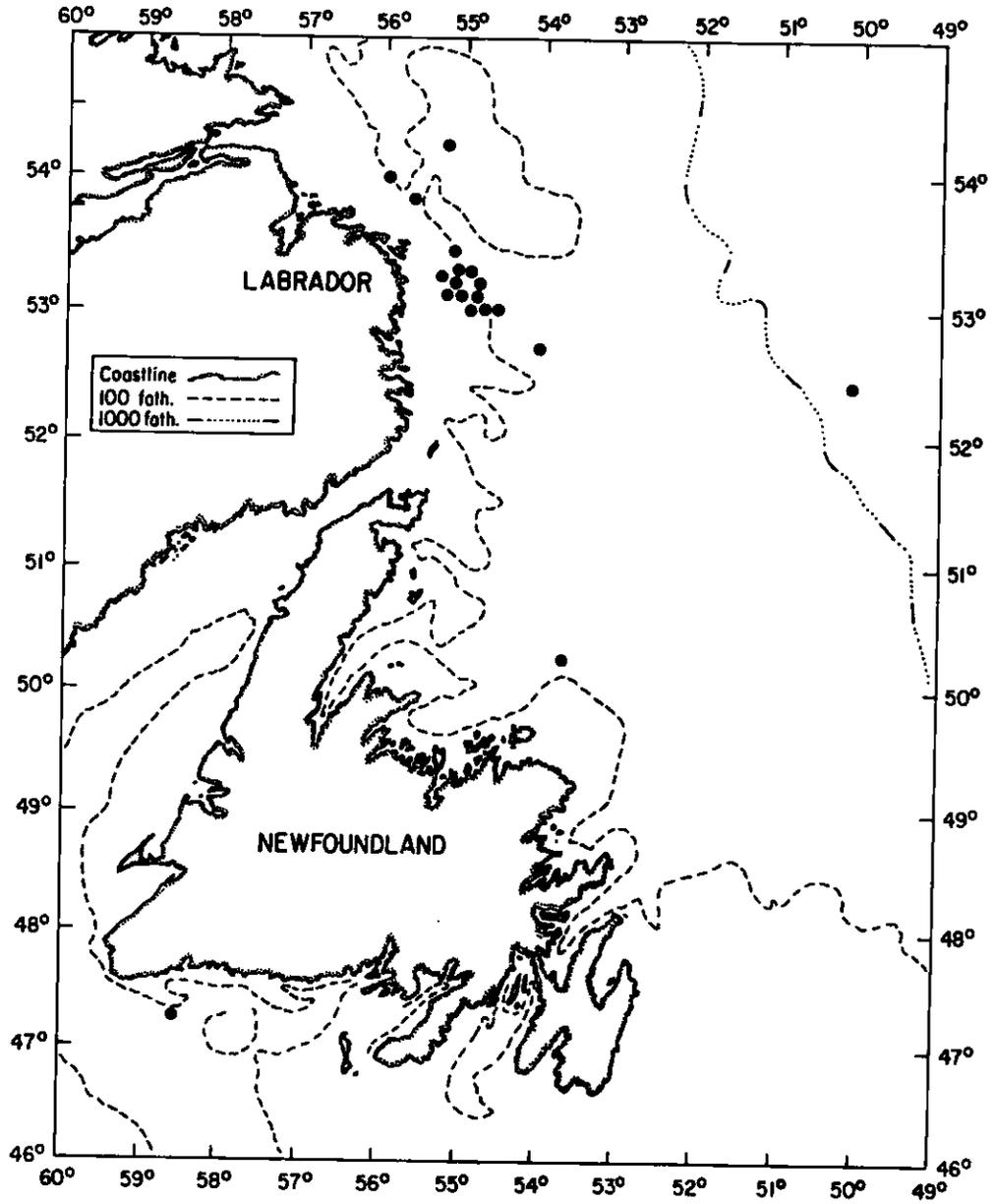


Fig. 1. Location of capelin samples for stomach analysis.

