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Feeding patterns of yellowtail flounder of two New England stocks

by

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Abstract

Based on the material collected in June 1971 by *RV Argus*, feeding patterns of yellowtail flounder from Georges Bank and Southern New England were studied.

Stomach analysis show[5] that yellowtail flounder feeding ration on Georges Bank consists of 3 species, while in the Southern New England area it is represented by 12 species. In both cases the bulk of the ration is made of one species, *Microdeutopus damnonensis*.

Yellowtail flounder on Georges Bank were feeding 1.6 times more intensively than in Southern New England However, the feeding intensity of both stocks in June was estimated as low.

Introduction

Studies on yellowtail flounder, *Limanda ferruginea* (Storer), a species which, in spite of its low abundance draws a permanent attention of fishery scientists, are focused on the estimation of the stock abundance and on the related problems. The feeding pattern of this species is discussed in only one of the available publications (Bigelow and Schroeder, 1953). These authors indicated that yellowtail flounder feed on small crustaceans, such as *Amphipodae*, shrimps, *Mysidacea*, and on small univalve and bivalve mollusks and worms and occasionally they also feed on small fish.

The present paper aims at determining the species composition of food objects and estimate of feeding intensity of two New England stocks during summer period.

Material and Methods

The material used for the study was collected during trawl survey by *RV Argus* in June 1971 in the area from Browns Bank to Wilmington Canyon (Fig. 1). The material was analysed separately for Georges Bank (141 specimens) and Southern New England (524 specimens). Processing of the material was made by the group method (Manual on the studies of feeding patterns of fishes in the natural conditions, 1961). Absolute and relative indices of stomach filling were estimated.

Absolute index means the ratio of the total food clot weight to the weight of all fishes in prodecimille (‰), while relative one concerns the ratio of the particular food object weight to the weight of all fishes, as well (in ‰) (Zenkevich and Brotskaya, 1931).

Food Objects

The analysis of the stomach content of yellowtail from Georges Bank shows that their ration includes only three species belonging to two orders (Table 1). Two species are *Polychaeta*, and one belongs to *Amphipoda*.

Polychaeta species play a significant role in flounder feeding and hold the second place by relative index. However, the main food object is the *Amphipoda* species - *Microdeutopus damnonensis* (relative index of filling equals 6.0 ‰).

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Table 1. Species composition of food and indices of stomach filling of the two yellowtail flounder stocks.

Food objects	Relative indices of stomach filling (‰)	
	Georges Bank	Southern New England
Polychaeta (unidentified)	4.7	0.5
Nereis pelagica Linnaeus	-	0.2
Nephthys ingens Stimpson	2.0	0.4
Arabella opalina Verrill	0.3	0.4
Clymenella torquata (Leidy)	-	0.1
Total *Polychaeta*	7.0	1.6
Cirolana concharum (Stimpson)	-	0.1
Total *Isopoda*	-	0.1
Gammaridea (unidentified)	1.4	0.3
Ampelisca spinipes Boeck	-	0.1
Microdeutopus damnonensis (Batc)	6.0	6.5
Total *Amphipoda*	7.4	6.9
Thysanopoda acutifrons (Holt et Tattersall)	-	0.2
Total *Euphausiacea*	-	0.2
Crago septemspinosus (Say)	-	0.1
Cancer borealis Stimpson	-	0.1
Total *Decapoda*	-	0.2
Mesoderma deauratum (Turton)	-	+
Total *Teleodesmacea*	-	+
Margarites helicina (Fabricius)	-	+
Total *Archeogastropoda*	-	+
Absolute index of filling (‰)	14.4	9.0
Percentage of empty stomachs	53.9	58.7

Food ration of yellowtail flounder from Southern New England consists of 12 species belonging to 7 orders which in species number is four times more than on Georges Bank. Most numerous (4) in the stomachs are *Polychaeta* species, but they are insignificant by weight. A sum of relative indices of 4 species belonging to this order equals 1.6‰, while for Georges Bank flounder it is 7.0‰. The bulk of the food ration of yellowtail flounder from Southern New England consisted of *M. damnonensis* (relative index of filling equals 6.5‰).

Analysis of the feeding patterns of two yellowtail flounder stocks indicates that the ration of this species includes a wider range of organisms in Southern New England, than on Georges Bank, but the main food object for both stocks is *M. damnonensis*.

Feeding Intensity

Since the index of stomach filling (absolute and relative) is an index of feeding intensity (Zheltenkova, 1964), the next object of our investigation was specifying the feeding intensity on the base of the stomach filling indices obtained (Table 1).

A mean absolute index of stomach filling for Georges Bank yellowtail flounder was 14.4‰. The fish of this area was feeding poorly: only 46.1% of stomachs showed grade 1 and 2 of filling (according to Lebedev's (1950) 5-grade scale), while the rest of the stomachs were empty.

Absolute index of stomach filling for yellowtail flounder in Southern New England was lower (9.0‰) than on Georges Bank and empty stomachs accounted for 58.7%. Consequently, yellowtail flounder on Georges Bank was feeding more intensively than in Southern New England. However, food consumption by these stocks was rather poor. Low feeding intensity is characteristic of flatfish during spawning period (Bigelow and Schroeder, 1953; Nikolsky, 1965). Yellowtail flounder spawn during April - July with a peak in mid-May (Bigelow and Schroeder, 1953).

Summary

Food range of yellowtail flounder from Georges Bank in June included 3 species belonging to 2 orders, while for Southern New England it included 12 species (7 orders), but the bulk of food objects for both stocks was made by one organism - *M. dammonensis*.

Absolute index of stomach filling for yellowtail flounder of the first stock was 1.6 times higher than that of the second one. That is, yellowtail flounder on Georges Bank was feeding more intensively than in Southern New England.

Feeding intensity of both stocks is estimated as low which is confirmed by a large percentage of empty stomachs (an average 57.7% for both stocks).

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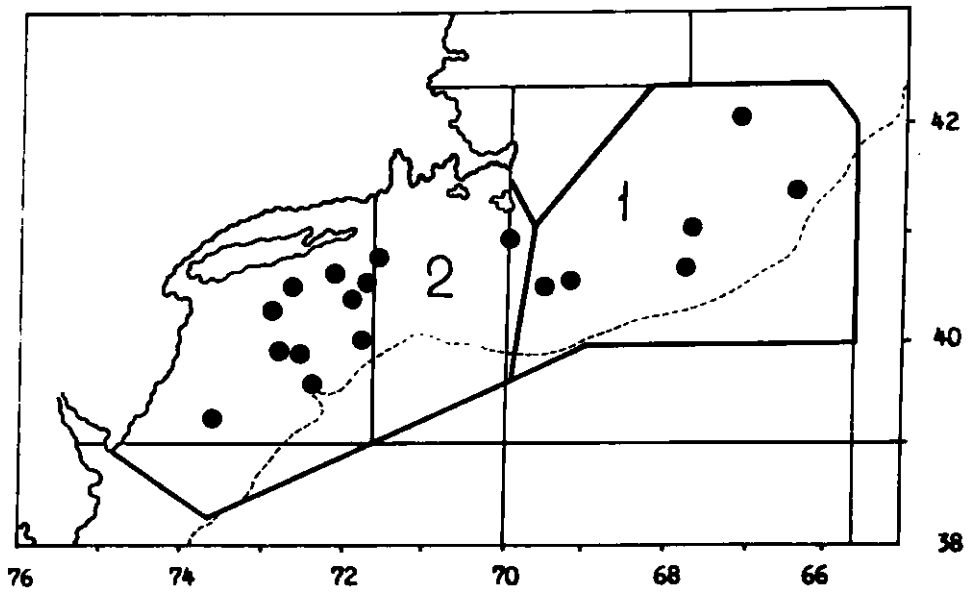

Fig. 1. Position of stomach samples of yellowtail flounder.
1 - Georges Bank stock; 2 - Southern New England stock.