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Assessment of the Redfish Stock in Div. 3M by the Data from the Trawl Survey in 1995

by

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Abstract

By the results from the trawl survey (TS), having been conducted on the Flemish Cap Bank in May 1995, redfish abundance and biomass were assessed. The data on size-age composition and distribution of the fish are presented.

In 1995 the fish stock on the Flemish Cap Bank (Div.3M), having been assessed on the basis of TS, amounted to 137.9 mill.spec. by abundance and 20.7 thou.t by biomass.

Redfish with length of 8-45 cm, at age from 2 to 22 occurred in catches. Fish from the strong 1990-1989 year-class, aged 5-6, 18-22 cm long made up the bulk of the catches.

Introduction

The data, presented in this paper, had been obtained during research cruises, having been carried out by the Polar Institute on the Flemish Cap Bank. These investigations are aimed at obtaining the data to assess the stock status of main commercial fish, one of which is the redfish.

This paper contains stock assessments for mixed year-classes of S.mentella and S.fasciatus.

The redfish stock was calculated using the data from the trawl survey, having been conducted in May 1995 by RV "Olenitsa".

Material and methods

The trawl survey was carried out by stratified-random method (Doubleday, 1981; Bulatova, Chumakov, 1986), as well as those ones having been conducted before (Vaskov, 1994).

Tows were made 24 hours a day. Small-meshed 10-12 mm insertion in the cod-end was used in the sampling bottom trawl. In all 65 half an hour tows were made, of which 58 were the valid ones (Fig.1). The investigations were prosecuted to the depth of 730 m, in the area of Stratum 501-519, using a new stratification of the division, proposed in the paper by Bishop (Bishop, 1994).

The age of the redfish was read by scale.

Results

In May redfish was observed in the catches over the entire surveyed area of the Flemish Cap Bank, except for Stratum 502 (Table 1). At the depths from 127 to 256 m the mean redfish catches per a valid tow didn't exceed 20 fish by abundance and 2

kg by biomass. The densest concentrations of the redfish (295-1239 spec. by abundance and 127-140 kg by biomass) were recorded in Strata 514, 516 and 518 in the depth range of 365- 730 m.

Size series of the redfish in the catches with the sampling bottom trawl varied from 8 to 45 cm (Fig.2). Small immature redfish of 18-22 cm in length prevailed in the catches. During the survey the dividing of redfish population into the concentrations, consisting of mature males and those ones of small immature fish and females having completed the extrusion of larvae was noted. Concentrations of large mature males, 33-40 cm long, were distributed in the eastern Flemish Cap Bank, at the depths of 365-546 m (Stratum 516). Concentrations of small redfish with the length of 18-22 cm and females of 33-45 cm in length were recorded at the depths of 547-730 m in the southern part of the bank (Strata 514 and 518).

Redfish males in catches were represented by specimens at age from 3 to 17 (Fig.3). Females were 3-22 years old. During all the period of survey 16 specimens of juvenile redfish of 8-16 cm in length, aged 2-4, have been caught. Fish at age 5-6 from the strong 1990-1989 year-classes made up the bulk of catches in males and females. Curves of male-female age series resemble that one of the size series.

Redfish biomass in the bottom layer amounted to 20.7 thou.t, abundance - to 137.9 mill.t (Table 2). The results obtained are at the level under the mean long-term value. The similar level of redfish stock bottom component assessments in this division was recorded in 1990 and 1992. There was no acoustic survey during the period of investigations, therefore, the data on redfish stock pelagic component are not available.

Fluctuations of bottom trawl survey stock assessments are caused by not only the vertical migrations, but by redfish migrations within the area of the division. By the data from the Canadian survey, having been conducted in 1994 (Bowering et al., 1994), the redfish biomass was estimated at 7.7 thou.t. Over 50% of the biomass assessed had been obtained in the northern division in Strata 520 and 528. According to the results from the survey, having been carried out by Canada in 1995, the redfish biomass decreased and was equal to 4.4 thou.t. However, the most considerable portion of the biomass assessed had been obtained in the southern division, on the Beothuck Knoll Bank.

Variations of stock assessments while conducting the trawl survey were noticed by Spanish scientists (Vazques, 1995). Biomass of the redfish from the Sebastes genus, having been assessed in 1990, 1992 and 1994, was at the level of 104-126 thou.t. In 1991 and 1993 in that area biomass was noticed to have been reduced down to 63-64 thou.t.

Low assessment of the redfish stock in 1995, in our opinion, is associated with distribution of its main concentrations on the deeper south slope of the Flemish Cap Bank, which has not been surveyed.

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Table 1. Results from the trawl survey for Redfish in Div. 3M, 1995.

| Stratum | Depth, m | Area, mile sq. | Nos. of tows | Mean catch/ 1 valid tow | fish | kg | Abundance, '000 | Biomass, tons |
|---------|----------|----------------|--------------|-------------------------|-------|----------|-----------------|---------------|
| 501 | 127-146 | 342 | 3 | 0,3 | 0,04 | 8,4 | 0,9 | |
| 502 | 147-183 | 838 | 3 | - | - | - | - | |
| 503 | 184-255 | 628 | 3 | 2,7 | 0,4 | 124,0 | 17,7 | |
| 504 | "- | 348 | 3 | 14,3 | 1,8 | 369,5 | 46,2 | |
| 505 | "- | 703 | 3 | 11,7 | 1,2 | 607,5 | 60,4 | |
| 506 | "- | 496 | 3 | 6,0 | 0,6 | 220,4 | 23,3 | |
| 507 | 256-364 | 822 | 3 | 18,3 | 1,8 | 1116,3 | 109,3 | |
| 508 | "- | 646 | 3 | 7,7 | 0,8 | 366,9 | 38,0 | |
| 509 | "- | 314 | 3 | 163,0 | 18,3 | 3791,3 | 426,0 | |
| 510 | "- | 951 | 3 | 470,7 | 44,1 | 33155,9 | 3106,8 | |
| 511 | "- | 806 | 4 | 55,3 | 5,1 | 3298,6 | 306,5 | |
| 512 | 365-546 | 670 | 3 | 40,7 | 6,0 | 2018,3 | 298,1 | |
| 513 | "- | 249 | 3 | 373,3 | 35,4 | 6885,9 | 653,7 | |
| 514 | "- | 602 | 3 | 1239,0 | 131,0 | 55250,2 | 5840,2 | |
| 515 | "- | 666 | 3 | 43,7 | 4,9 | 2154,2 | 239,9 | |
| 516 | 547-728 | 634 | 3 | 295,3 | 127,2 | 13869,7 | 5975,4 | |
| 517 | "- | 216 | 3 | 198,0 | 51,1 | 3168,0 | 817,7 | |
| 518 | "- | 210 | 3 | 480,3 | 140,4 | 7471,8 | 2230,6 | |
| 519 | "- | 414 | 3 | 132,3 | 16,7 | 4058,2 | 511,2 | |
| Total | | | 58 | | | 137935,1 | 20701,9 | |

Table 2. Estimates provided by the trawl-acoustic survey for redfish in Div. 3M for 1983-1995.

| Year | Trawl survey | | Acoustic survey | | Total | |
|------|----------------------|-----------------|----------------------|-----------------|----------------------|-----------------|
| | Numbers, fish 10^6 | Biomass, thou.t | Numbers, fish 10^5 | Biomass, thou.t | Numbers, fish 10^6 | Biomass, thou.t |
| 1983 | 644,0 | 154,9 | | | | |
| 1984 | 376,7 | 132,3 | | | | |
| 1985 | 177,3 | 51,9 | | | | |
| 1986 | 1200,2 | 309,5 | | | | |
| 1987 | 463,2 | 106,4 | | | | |
| 1988 | 183,1 | 47,0 | 1632,1 | 332,0 | 1815,2 | 379,0 |
| 1989 | 283,8 | 83,3 | 1947,3 | 282,6 | 2231,1 | 365,9 |
| 1990 | 74,7 | 17,7 | 1331,4 | 228,7 | 1406,1 | 246,4 |
| 1991 | 2006,1 | 45,4 | 1850,0 | 62,3 | 3856,1 | 107,7 |
| 1992 | 119,5 | 18,2 | 149,6 | 81,3 | 269,1 | 99,5 |
| 1993 | 681,7 | 69,8 | 380,6 | 77,3 | 1062,3 | 147,1 |
| 1994 | - | - | - | - | - | - |
| 1995 | 137,9 | 20,7 | - | - | 137,9 | 20,7 |

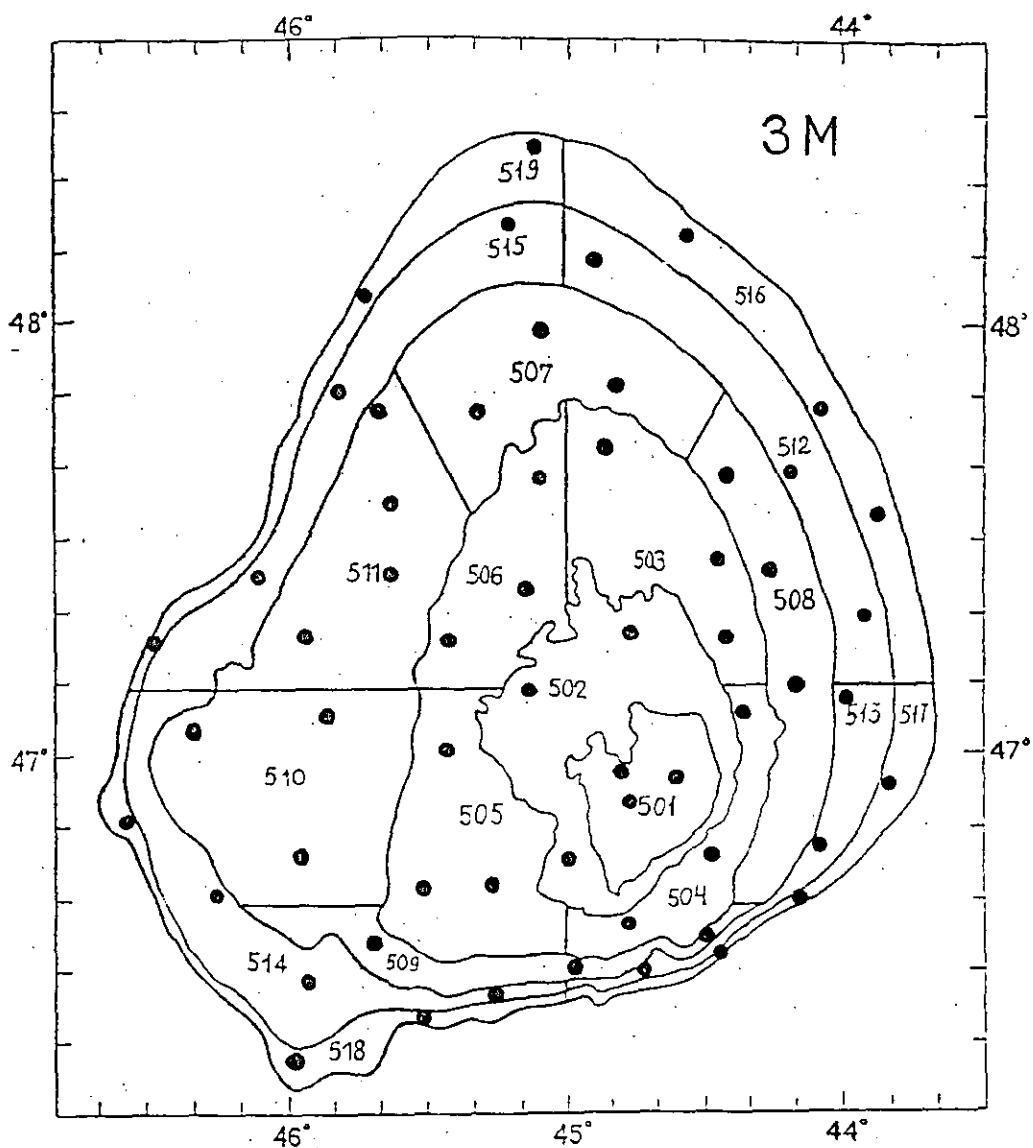


Fig. 1. Position of trawl stations in Div. 3M in 1995.

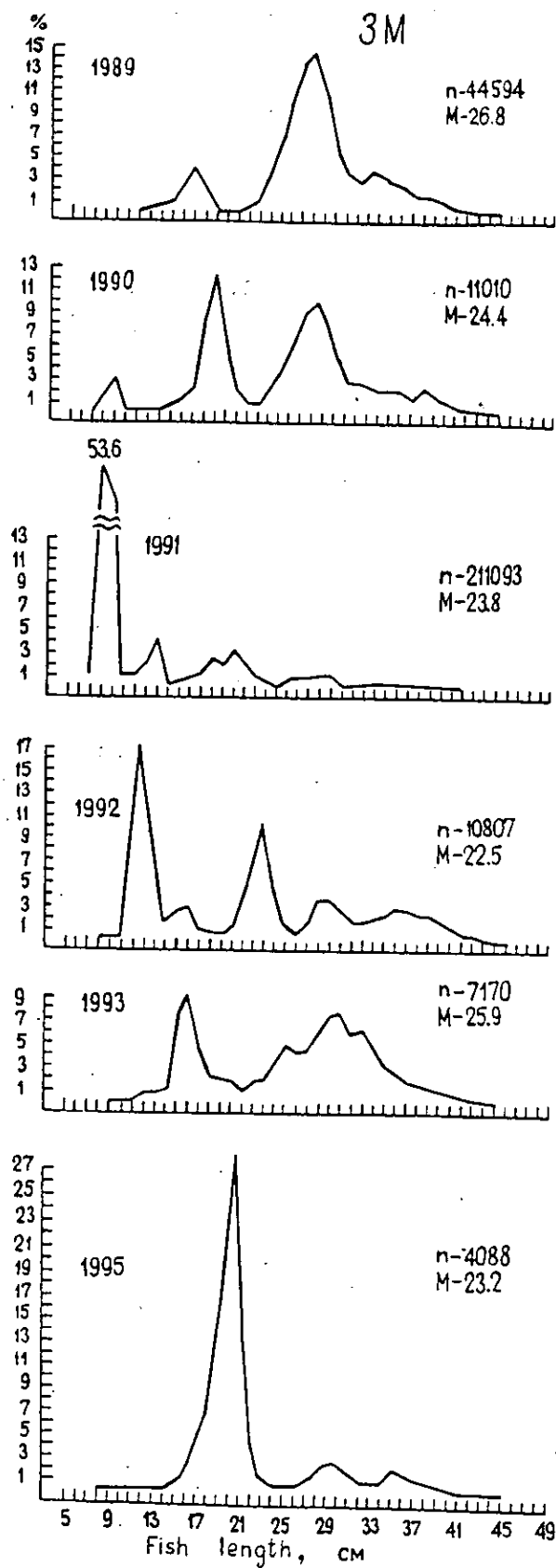


Fig. 2. Size composition of redfish in catches taken with a small-meshed trawl in Div. 3M in 1989-1995.

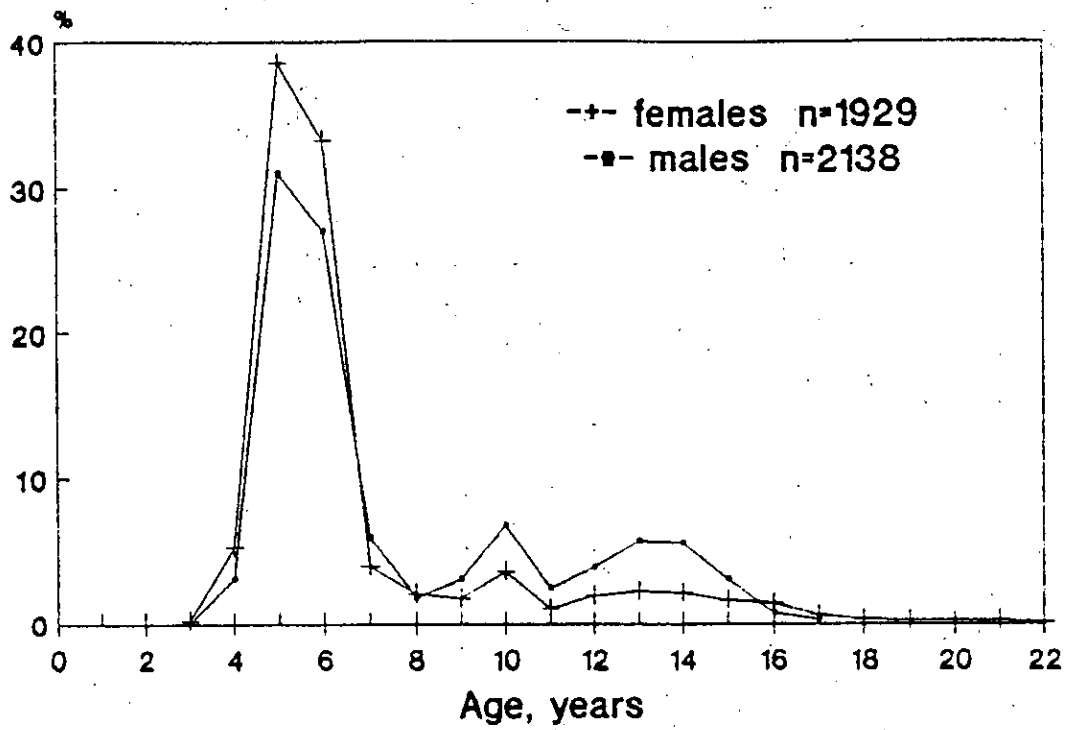


Fig. 3. Age composition of Redfish in the Flemish Cap. May, 1995.