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Aimed trawling on oceanic redfish (Sebastes mentella Travin) in the Irminger Sea

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Abstract

In April 1977 catching trials on a pelagic redfish stock were conducted in the Irminger Sea and the Reykjanes Ridge area. The gear used was a large midwater trawl with a rope section inserted before. Spawning redfish could be detected by echosounding in midwater layers. They were successfully herded by the ropes into the path of the trawl and caught in commercially interesting quantities. Characteristics of size, colour and parasitical infestation indicate, that the pelagic redfish population represents a completely different stock.

Introduction

Since approximately 15 years exists evidence on the presence of an oceanic redfish stock in the Irminger Sea. A number of publications refer as well to 0 group surveys (4) as to catching trials on adult fishes (1, 2, 3, 5), which belonged exclusively to the type Sebastes mentella Travin, the Beaked Redfish. Especially the reports on fishing experiments conducted with rod and line from a number of research-and weather-ships in this area indicate the existence of a completely pelagic living stock, which so far is not fished commercially. Statistical analysises, spreading over several years, showed that the overall length of the fishes caught was about the same during the whole time and independent from the

season (2). According to notes in literature these redfish stay in the early time of the year in a depth greater than 200 m, but in Summer in a zone of 100 - 150 m below the surface (3).

Intentions during the cruise of FRV "Walther Herwig" in spring 1977 in the Irminger Sea

During the cruise with the research vessel "Walther Herwig" in the Irminger Sea and the area of the Reykjanes Ridge the geographical and vertical distribution of pelagic redfish should be investigated by means of echo survey and catching trials. The time from the end of March to the beginning of May was chosen, because the redfish were supposed to gather in a certain area and/or water depth in order to extrude their larvae. For catching the presumedly scattered fishes recently developed "rope trawls", i.e. midwater trawls with a rope section inserted before, should be utilized. Basically these nets consisted of a pelagic trawl with 630 meshes (80 cm stretched) in circumference. The ropes in front had a length of 20 m (bosom) up to 60 m (wing). By this the mouth area of the gear could be enlarged in the order of 50 to 100 %, depending on the rig of the gear. During the trials the vertical opening was usually about 35 m, the spread about 60 m. For the pursuit of biological and hydrographical investigations a team of scientists belonging to these sections participated in the cruise.

Conditions concerning hydrography and echo survey in the area of investigation

Hydrographical measurements conducted during the cruise indicated that the Irminger Stream had the thermo-haline characteristics of 4^{o} C and 34.5 $^{o}/oo$ S. The east Atlantic current showed 8.0^{o} C and $35.5^{o}/oo$ S. The area in between, including the eastern part of the Irminger Sea and the western slope of the Reykjanes Ridge, formed a homegeneously mixed up water body, in which from the surface down to a depth of 500 m the temperature was 6.5^{o} C and the salinity 35.1 $^{o}/oo$.

As revealed by echo sounding in this intermediate area by far the highest primary production occured. Throughout the whole region an extensive scattering layer, which reached from about 300 m down to 700 m was recorded. Within this layer darker and lighter zones could be distinguished.

Catching trials with the rope trawl

Testhauls, which were slantwise towed through the whole scattering layer resulted in a variety of deep sea fishes (myctophids, snipe eels, anglers), Blue whiting and usually small numbers of redfish. Aimed hauls, directed towards the different zones of the scattering layer proved, that during daytime the redfish stayed preferably in the upper edge of the plancton layer, in a depth of about 350 m. Especially while the ship was drifting they could be distinguished in the echo charts by the presence of darker spots within the otherwise uniformly grey zone (Fig. 1). In the evening these spots emerged from the layer and rose towards the surface (Fig. 2). Best catches were made in the last third of April westward of the Reykjanes Ridge over water depths greater than 1000 m. Obviously the fish had concentrated to some extent during this time in this area. Midwater trawling in daytime in the zone of 330 - 360 m resulted in catches up to 2 - 3 tons per hour. During the night these redfish could be caught in a depth of 30 - 60 m below the surface.

Within the same scattering layer, but in a different zone, 440 - 460m below the surface, Blue whiting occured. This species was only in few cases fished intentionally, but catches up to 3 tons per hour were obtained.

Reactions of the fishes to rope trawls

As already mentioned the mouth of a rope trawl is considerably larger than that of a gear of conventional make. But higher efficiency in catching can only occur, when the row of strings is respected by the fishes in the same way as a piece of netting. One

has to consider, that the distances between the ropes of the trawl used are in the order of 5 m, and it seems probable, that these wide spaces will be used by the fish for escaping.

The graph records of a netsonde installed at the headline of the rope section proved, that pelagic redfish in most cases showed a distinct reaction to the ropes and were concentrated in the centre of the opening frame. This chasing effect was most clear, when the redfish occured in small groupes, which usually was the case. When the fish were dispersed, their reactions to the gear were less obvious (Fig. 3), and single individuals in few cases were observed to swim downward out of the netmouth. Because practically no other species occured together with redfish in the catches, the echotraces are originaly positively from this species.

Most echo observations revealed, that a rope trawl is a suitable gear in order to concentrate and catch sparcely distributed pelagic redfish.

As mentioned before, Blue whiting occured in the same area, but formed a different layer in a greater depth. Netzsonde-echograms indicated that this species showed less or indeed no reaction in the mouth of the rope trawl (Fig. 5) and the same was the case with a dense concentration near the bottom, which was met at the South eastern edge of Dohrn Bank and where 25 tons were caught in 1.5 hours (Fig. 4).

Nevertheless the echo-observations make doubtful, if the rope section in front of the net is of any profit in order to herd and concentrate this fish species in the path of the trawl, but the behaviour may change with the season and/or hydrographical factors.

Biological observations

Without anticipating the investigations of the biologists' team, which shared the cruise, some remarks shall be made on the biological characteristics of the pelagic redfish caught in the Irminger Sea/Reykjanes Ridge area.

The catches consisted mostly (> 90 %) of females, which were in the stage or releasing their larvae and/or partly spent. In their shape they resembled the type Sebastes mentella Travin, the Beaked redfish, as far as the processus of the lower jaw, the spines of the operculum and the relative size of the eyes are concerned. The size was comparatively small, most females measured between 37 and 40 cm, the males between 33 and 35 cm. Some fully mature females of only 28 cm in total length were measured. Apart from their smaller size the pelagic redfish differed in their colour from the typical Sebastes mentella (as for example caught during the same cruise near the bottom in the Vikurall area). Instead of a bright red colour they had a somewhat orange tinge and the back was mixed with grey (which was in some individuals the prevalent colour). A great part of the population was infested with the parasitic copepode Sphyrion lumpi and/or had melanic deposits in the skin. (During a more recent cruise of FRV "Walther Herwig" in the Reykjanes Ridge area in June 1977 alternative hauls with bottom trawls and midwater trawls proved the presence of both types of redfish in the same region: larger fishes of pure red colour without parasites and melanosis at the ground and fishes with the above described characteristics in the midwater.) These findings indicate, that the pelagic population obviously represents a completely different stock.

References

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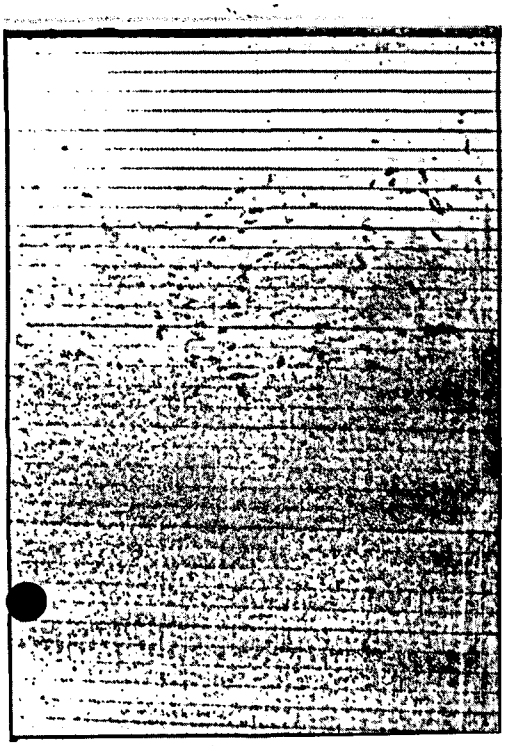

Fig.1:Redfish traces can be distinguished within the upper edge of the scattering layer while the ship is drifting.
Range 0 - 700 m, 33kHz,7 p.m.

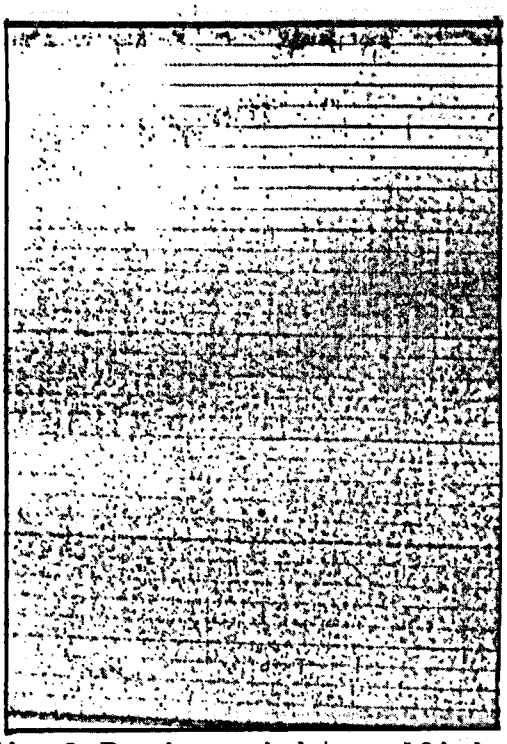

Fig.2:During night redfish ascended and then stayed between surface and 100 m below. Range 0 - 700 m, 33 kHz, 10 p.m.

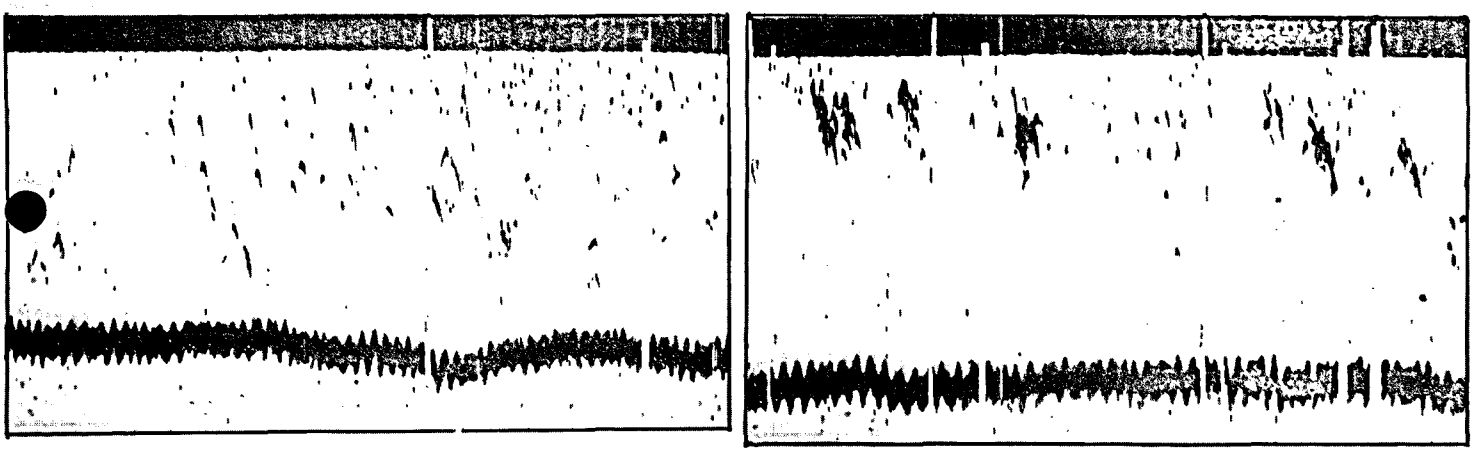

Fig.3: Echograms of the netzsonde show that scattered redfish is distributed in the whole space of the mouth of the rope section (left), whereas small schools concentrate in the centre of the net-mouth.

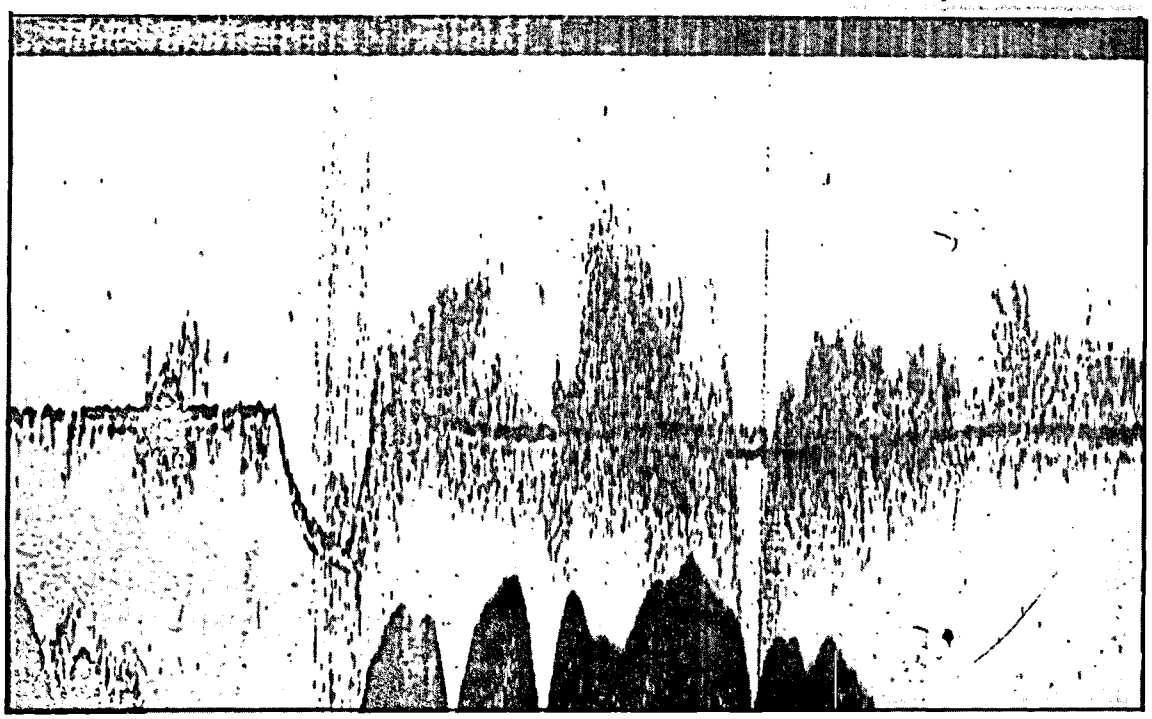

Fig.4:Near bottom concentrations of Blue whiting are cut by the frame lines of the rope section whithout showing any reaction. Opening height 33 m, netzsonde.

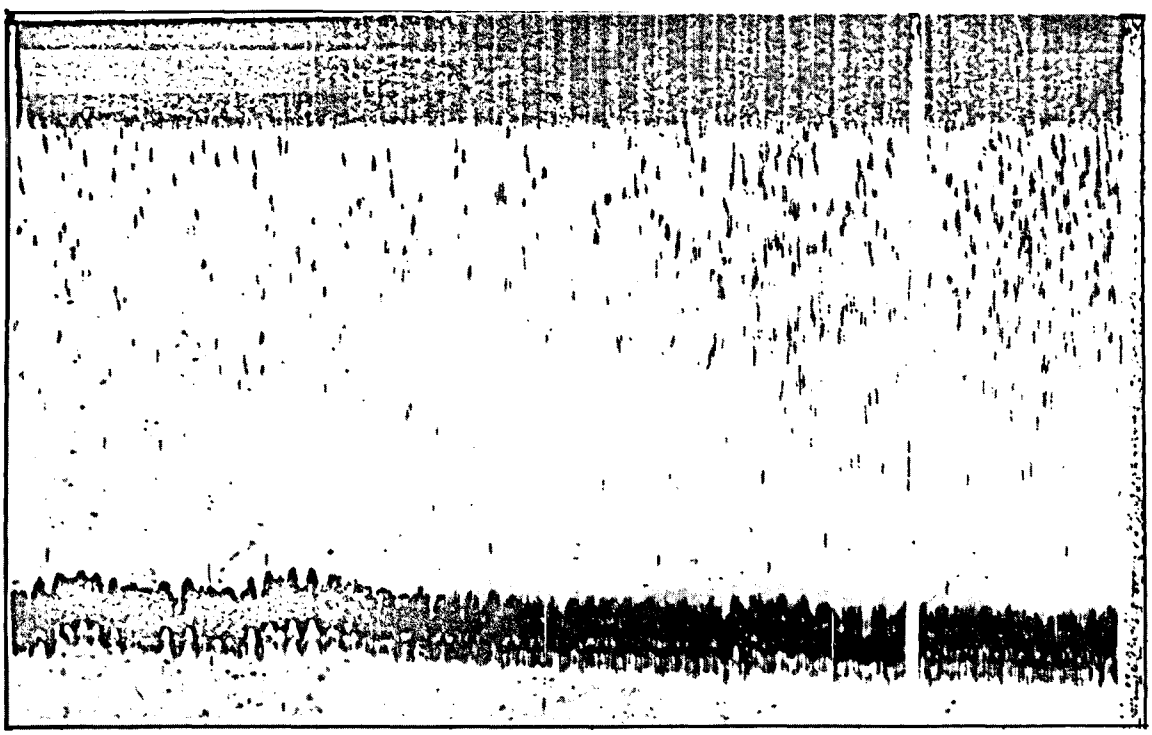

Fig. 5:Midwater traces of Blue whiting in the netmouth in a depth of 460 m. These fishes are concealed by the dark zone shown in the echogram Fig.1. Netzsonde.