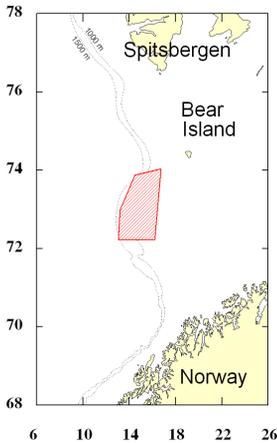




Pelagic occurrence of Greenland halibut (*Reinhardtius hippoglossoides*) determined from experimental fishing with vertical longlines

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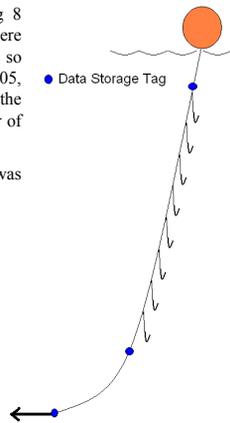
Greenland halibut is considered to be a demersal species, and annual bottom trawl surveys are used in stock assessments. However, recent results suggest that individuals may use part of the time pelagically. To gain more information on the species pelagic behaviour, a series of experiments were made with vertical longlines. Concurrent acoustic surveys provided additional information about vertical distribution of potential prey organisms.

Experiments were made in March, August and November during 8 cruises, from November 2002 to August 2005. Vertical longlines were deployed in sets of three, differing in location of the hooked section, so that together they covered the whole water column. In August 2005, however, the hooked section ran from the surface to 20-100 m off the bottom. Archival tags were used to record the position and behaviour of the vertical longline throughout the setting time.

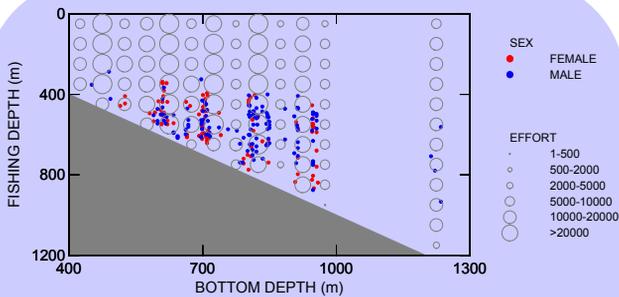
Catches increased by setting time until saturation at 15 hours. Effort was therefore defined as:

$$\text{Effort} = (1/100) \# \text{ hooks} / t'$$

for setting time $t < 15\text{h}$ $t' = t$
for setting time $t \geq 15\text{h}$ $t' = 15 \text{ hours}$



Pelagic distribution

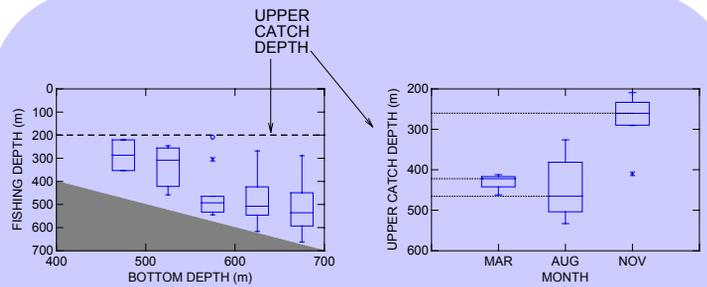


Individual catches from August 2003-2005 by fishing depth and bottom depth, together with overall effort in every 100 m fishing depth interval and 50 m bottom depth interval.

Greenland halibut was caught pelagically over all bottom depths. Catch rates, in terms of number per unit effort, were highest at 0-200 m distance from the bottom, at bottom depths 600-800 m.

The upper catch depth of 350 m, coincided with an acoustic layer. This continuous and well-defined layer consisted of blue whiting and mesopelagic fish and crustaceans.

Seasonal trends



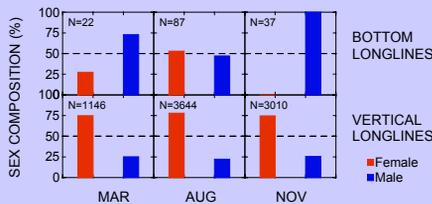
Fishing depth by 50 m bottom depth intervals, all seasons combined.

Highest individual catch in each 50 m bottom depth interval of every cruise, by season.

Greenland halibut was caught pelagically during all periods of the year. They were caught up to 600 m above the bottom.

The upper catch depth was higher in November than in March and August. In each period, the upper catch depth was independent of bottom depth.

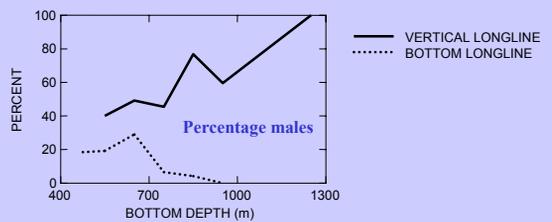
Differences by sex



Overall sex composition in percent for bottom longlines, and for vertical longlines, by season.

Sex composition of pelagic Greenland halibut varied with season. In November, only males were caught pelagically.

The percentage of males was in all periods much higher in pelagic catches than in bottom catches.



Percentage of males increased with distance from the bottom and with depth. With bottom longlines, the percentage of males decrease with depth.

At bottom depths deeper than 700 m, for each sex, pelagic specimens were on average smaller than those caught on the bottom. At shallower depths, there were little or no difference.

CONCLUSIONS

- Greenland halibut was caught in the water column during all seasons.
- Catches were evenly distributed up to an upper catch limit, which varied through the year.
- The percentage of males was higher in pelagic catches than on the bottom.
- Numerous pelagic Greenland halibut were caught in August, in the same area and time period as the annual bottom trawl survey.
- The influence of the species' pelagic behaviour on assessments should be investigated by quantifying pelagic occurrence.