Fecundity of Greenland halibut (*Reinhardtius hippoglossoides* W.) in the waters of Iceland

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INTRODUCTION

Greenland halibut is a deepwater flatfish widely distributed in both the North Atlantic and the North Pacific. The relationship between Greenland halibut in the different areas is not known.

For management purposes the stock has been divided in several management units. Greenland halibut in the waters of East Greenland, Iceland and Faroe Islands constitute a management unit in the ICES system, and is often referred to as the West-Nordic Greenland halibut.

West-Nordic Greenland halibut

Greenland halibut are found around Iceland, but the highest concentrations are found in the western area.

The main fishing areas in Icelandic waters are located in the continental slope to the west of Iceland towards the border between Greenland and Iceland.

Greenland halibut

AIM

The aim of this study was to obtain information on fecundity of Greenland halibut in the waters of Iceland.

MATERIAL

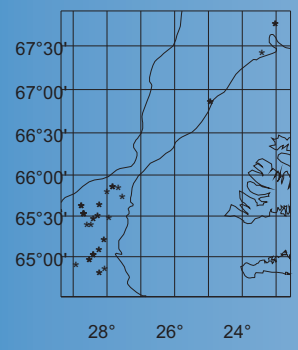
Sampling was conducted during the Icelandic annual fall groundfish survey in October 1998 at the main fishing grounds off the west coast of Iceland.

Fishing depth was 450-1250 m.

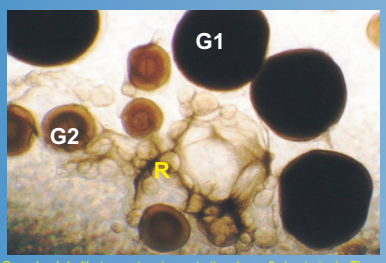
Sampling was conducted using a commercial Greenland halibut trawl ("Gulltoppur") lined with 40 mm mesh in the cod end.

47 maturing ovaries where collected and preserved in 3.6% buffered formaldehyde at sea.

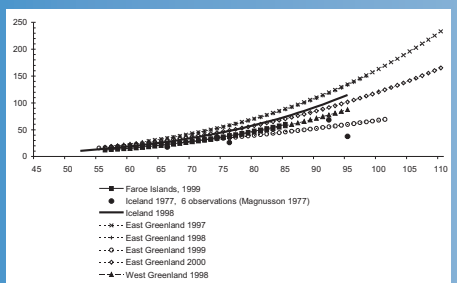
Additional biological measurements on each female were total length, round weight, gonad and liver weight.



Sampling locations (West of Iceland) for Greenland halibut ovaries used for fecundity counts.



Greenland halibut oocytes in maturity stage 3 (maturing). Three different groups were observed: pre-vitellogenic oocytes (recruits/ rudiments: R), early vittelogenic oocytes (G2) and fully vitellogenic oocytes (G1). G1 will be spawned in the next spawning season and were counted for the fecundity estimates.



Comparisons of fecundity total length relationships for Greenland halibut in East-Greenland (1997-2000) and West-Greenland (1998), Faroe Islands (1999) and Iceland (1998) (Gundersen et al 2001; Gundersen 2002).

METHODS

Gravimetric method was used for fecundity counts (Bagenal and Braun 1978). Only fully vitellogenic oocytes that will be spawned in the next spawning season were counted. These oocytes appear dark when visualized under binocular microscope.

DATA ANALYSES

Estimates of the fecundity of each individual female were obtained from an average of raised sub-sample counts (two to four sub-samples) from the middle section of the right ovary lobe. Estimation of fecundity as a function of length was done on a log10-transformed model.

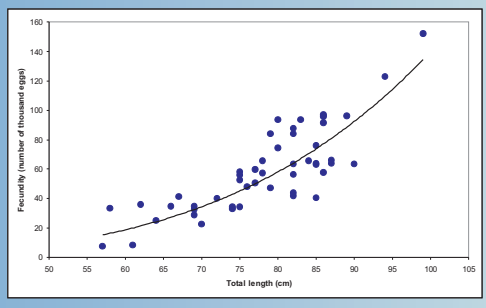
Bootstrap analysis (5000 replicates) was done to obtain confidence intervals in the parameter estimates as well as to check for potential bias in the estimates.

RESULTS

Potential fecundity was in the range of 8000 to 152000 oocytes for fish sized 57 to 99cm in total length.

The relationship that describes fecundity (F) as a function of length (L) in 1000 is:

$$F = 1.941 = 10^{-3} L^{3.93}$$



Relationship between total length of Greenland halibut females and fecundity shown as the back-transformed estimated power equation.

ACKNOWLEDGEMENTS

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REFERENCES

Bagenal, T. B. & E. Braum. 1978. Eggs and early life history. *In*: IBP handbook. Methods for assessment of fish production in fresh waters T. M. Bagenal (ed.), 3 (7): 165-201.
Gundersen, A.C., J.E. Rønneberg & J. Boje. 2001. Fecundity of Greenland halibut (Reinhardtius hippoglossoides) in East Greenland waters. Fisheries Research. 51: 229-236.
Gundersen, A.C., 2002. (Ed). Reproduction of West-Nordic Greenland halibut Studies reflecting on maturity, fecundity, spawning, and TEP. TEMA NORD 2002:519, 322p.
Magnusson, J. V. 1977. Notes on eggs and larvae of Greenland halibut at Iceland. ICES CM 1977/F:47.

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