



## Do Greenland halibut, *Reinhardtius hippoglossoides*, spawn in inshore Disko Bay, West Greenland?

### Background

Connectivity between distribution areas of Greenland halibut in the inshore Disko area, West Greenland and life history stages has been questioned for decades. Previously it has been debated whether Greenland halibut in Disko Bay actually spawn there, migrate to the Davis Strait to spawn or never ripen their gonads (dead end) (e.g. Jensen, 1935; Smidt, 1969; Riget & Boje, 1989; Riget *et al.*, 1992; Jørgensen & Boje, 1994; Rasmussen *et al.*, 1999; Simonsen & Gundersen, 2005). During 1998–2002 maturity data at different times of the year were collected in fishing areas in Davis, Disko and Baffin area.

The present work closes the circle with respect to annual coverage of maturity samples in the Disko area and supplements previous work by Simonsen and Gundersen (2005) who found Greenland halibut going through gonadal development during the first half of the year. It relates the results to adjacent areas in Baffin Bay and Davis Strait. Sampling areas are shown in Figure 1.

Samples were collected at sea and at the Illilusat fish plant. One selection of ovaries were frozen, another was preserved in formaldehyde. Further studies on oocyte diameter, histology and gonad index was carried out in the laboratory.

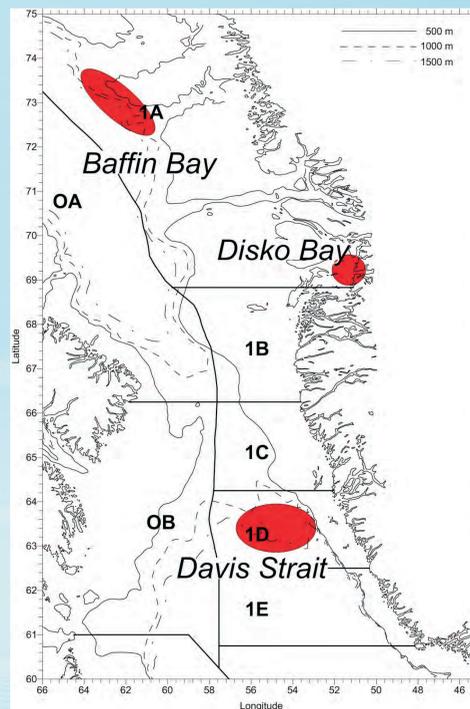


Figure 1. Areas where Greenland halibut were sampled North: Baffin Bay, Middle: Disko, South: Davis Strait.



Longline fishery for Greenlandhalibut in Disko Bay (top) and sampling at sea (right).



Greenland halibut ovaries: Immature (left), maturing (middle) and running (right). Running eggs are 4-5 mm in diameter.

### Results

In general the proportion of advanced mature specimens in the Disko Bay sub-area was markedly lower than what was previously described from the Davis Strait (Gundersen *et al.*, 2010) (Figure 2) and seemed similar to unpublished data from the Baffin Bay (Møreforskning and Greenland Institute of Natural Resources).

Only a limited proportion of the Greenland halibut ripens gonads and spawns in the Disko area. In December gonado-somatic index was up to 8.8% (Figure 3).

Oocyte modal diameter in the leading cohort was 2 300 µm which is smaller than in spawning fish, but larger than previously reports from the area: 1 400 (August) and 2 000 µm (September).

The fish size in the area differs from adjacent waters and implies that length distributions either are affected by fishing removing larger (mature) individuals from the system or are results of migration out of the area, or both.

Liver index of maturing females indicates a better condition than observed e.g. in the Davis Strait implying that the females maturing actually may be first time spawners.

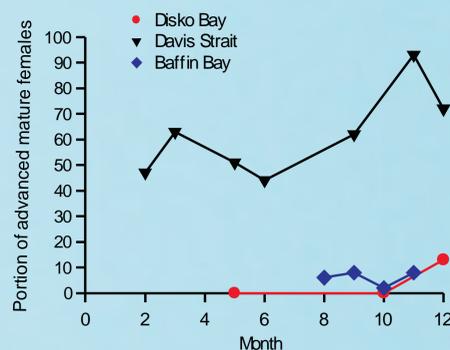


Figure 2. Proportion of maturing Greenland halibut females in Disko Bay, Baffin Bay and Davis Strait.

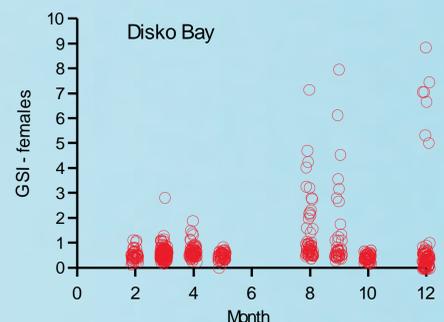


Figure 3. Gonadosomatic index of Greenland halibut females in Disko Bay by month.

### Summing up

- The Greenland halibut in the Disko Bay show a population structure similar to what might be expected in a nursery area.
- Limited spawning may occur, but it is not likely that this will support the relatively large fishery occurring within the Disko Bay area.
- The adolescent phase is described to be several years (Junquera *et al.*, 2003). It is likely that the Disko area serves as a juvenile/feeding area for adolescent individuals and that maturing specimens migrate out of this fjord-system before spawning, maybe related to a migration to the Davis Strait as previously suggested.
- Given the hydrographical characteristics it is likely that this inshore population is sustained by spawning elsewhere.

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