Sexual maturity cycle and spawning of Greenland halibut, *R. hippoglossoides* Walbum, in the Davis Strait

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INTRODUCTION

Davis Strait south of 67°N between Greenland and Canada is believed to be an important spawning area for the west Greenland / eastern Canada Greenland halibut (*Reinhardtius hippoglossoides*, Walbum) stock component.

In order to fill the gaps in knowledge on the sexual maturation and spawning cycle for Greenland halibut in Davis Strait, a study program covering an entire year was initiated.

AIMS

- Analyse the sexual maturity cycle.
- Identify spawning time of Greenland halibut in the Davis Strait.

MATERIAL & METHODS

A sampling programme extending over a calendar year was set up in collaboration with a commercial fishing company.

Samples were collected during 9 fishing trips south of the Davis Strait Ridge between Canada and Greenland at 1000 to 1500 m depth using gillnets and trawl (Table 1).

Type 1 sample:

1-3 times during each trip ovaries from all fish caught on a gillnet setting were taken out and jointly frozen in a block (~20 kg). Fish length was monitored at regular intervals through out the study.
- frozen ovaries were defrosted
- individual gonads were weighted and maturity classified (visual maturity stage (VMS) classification (Table 2)).

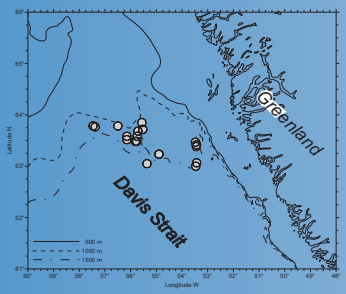
Type 2 sample:

Fresh fish were stored cold and brought to harbour within 1-2 days for individual analyses
- total length
- round weight
- ovary and liver weight
- ovary maturation
- preservation of ovaries in formaldehyde for microscopical analyses of oocyte development and growth).

Mean fish length varied from 71 to 79 cm.

Greenland halibut

Ovaries (upper and lower) and laboratory work (center)



Map showing sampling locations in the Davis Strait area, West Greenland.

Table 1. Survey overview and sampling position for type I and II samples.

Survey	Ship	Type I samples month	day	Position	sample size	Type II samples month	day	N W	sample size
1	Isak L	4	12	63°14 N 54°54 W	225	5	4	63°00 N 53°28 W	50
2	Isak L	5	18	63°25 N 53°26 W	257				
		6	7	63°28 N 53°29 W	174	6	10	63°23 N 53°27 W	47
3	Paamiut					6	27	63°47 N 57°28 W	57
						6	28	63°46 N 57°23 W	44
4	Isak L	9	3	63°43 N 55°32 W	361				
5	Paamiut					9	21	63°47 N 56°30 W	53
						9	24	63°51 N 55°34 W	36
6	Isak L	11	1	63°03 N 55°22 W	220	11	16	63°04 N 53°26 W	45
7	Isak L	12	11	63°31 N 56°09 W	169	12	14	63°35 N 56°09 W	46
8	Isak L	1	31	63°29 N 55°46 W	77	2	16	63°35 N 55°45 W	46
		3	9	63°43 N 55°32 W	270				
9	Isak L	3	10	63°29 N 55°49 W	337	3	21	63°41 N 55°43 W	40
		3	21	63°14 N 54°54 W	270				

Table 2. Visual macroscopic maturity stages (VMS) used for classifying Greenland halibut ovaries.

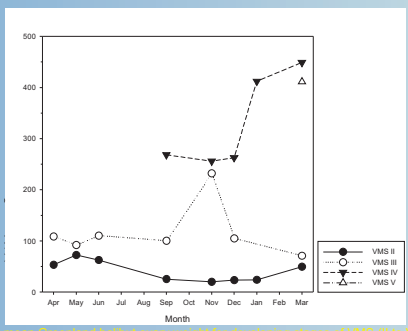
VMS	Description
I	Immature. Ovaries are small. No oocytes are visible to naked eye.
II	Early maturing. Oocytes visible to naked eye, but less than 1 mm in diameter.
III	Maturing. Oocytes 1-2 mm in diameter.
IV	Late maturing. Oocytes 2-4 mm in diameter.
V	Spawning. Oo cytes are hydrated and in spawning condition
VI	Spent. Oocytes are released. Ovary may be red.

RESULTS

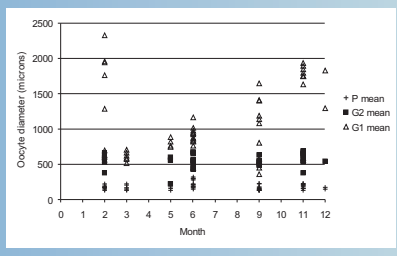
-Monthly maximum gonad index increased from 8 to 18% from September to February.

-Greenland halibut population in Davis Strait follow a seasonal matuirty pattern.

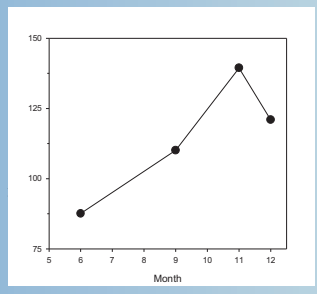
-The abrupt increase in the frequency of Greenland halibut in the spent stage from January to March suggest that main spawning took place in February.



Monthly mean Greenland halibut ovary weight for developing stages of VMS (II to V) from sample type I.



Mean oocyte diameter throughout the year from histological analyses. P = previtellogenic oocytes (immature), G2 = early maturing, and G1 as defined as the leading cohort which will be spent in the next spawning season.



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