

Variations in growth among families of Atlantic cod (*Gadus morhua* L.)*

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*) Part of the EU project: Demonstration of maternal effects of Atlantic cod: Combining the use of unique mesocosms and novel molecular techniques: MACOM

Introduction

Atlantic cod is a major target species for the European fishing fleet. All European cod stocks are under heavy fishing pressure or over exploited. An effect of overexploitation is a reduction in the average age and size, with an increasing proportion of recruit spawners in the stock.

The basis for this EU project* is to follow offspring from selected families of cod reared under identical and semi-natural conditions from hatching, through the larval and juvenile stages, and until sexual maturity, and compare their viability through these stages. Viability comparisons will be made between and within offspring of recruit female spawners and repeat female spawners. Data on performance traits are essential for developing selective breeding strategies

Production of family groups and mesocosm experiments

- Northeast Arctic cod were captured in the Barents Sea in 1998 and 1999 and transported to Parisvatnet in western Norway for use as broodstock.
- Eggs from 30 family groups (15 repeat and 15 recruit female spawners) were produced in 2000 at the field station Parisvatnet.
- After hatching the larval groups were transported and released in two mesocosms (2500m³ and 4400 m³) at the Research station Flødevigen.
- The major viability measures growth, condition, and survival, were taken during the larval and juvenile stages.
- The maternal identity of offspring were ascertained using DNA microsatellite markers.



Parisvatnet
30 family groups
1 (female) x 1 (male cod) x 15 x 2



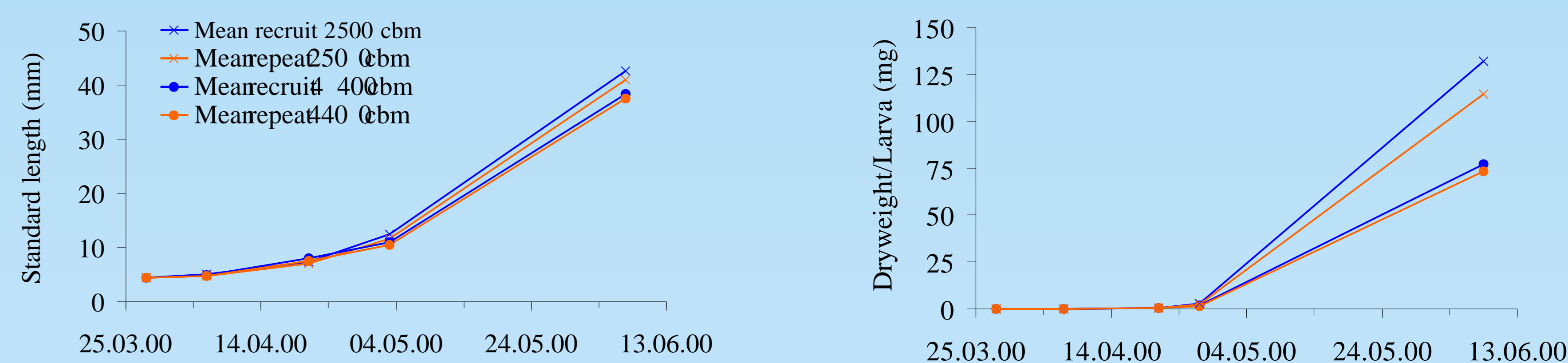
Flødevigen
(2500 & 4400 m³)
Stocking (2000): 84.000 & 134.000 larvae

Tank experiments

- In early June 2000 the mesocosms were emptied, and the surviving cod were transferred to tanks for on growing experiments.
- The fish were reared at ambient sea water temperature, fed to satiation on commercial cod food pellets.

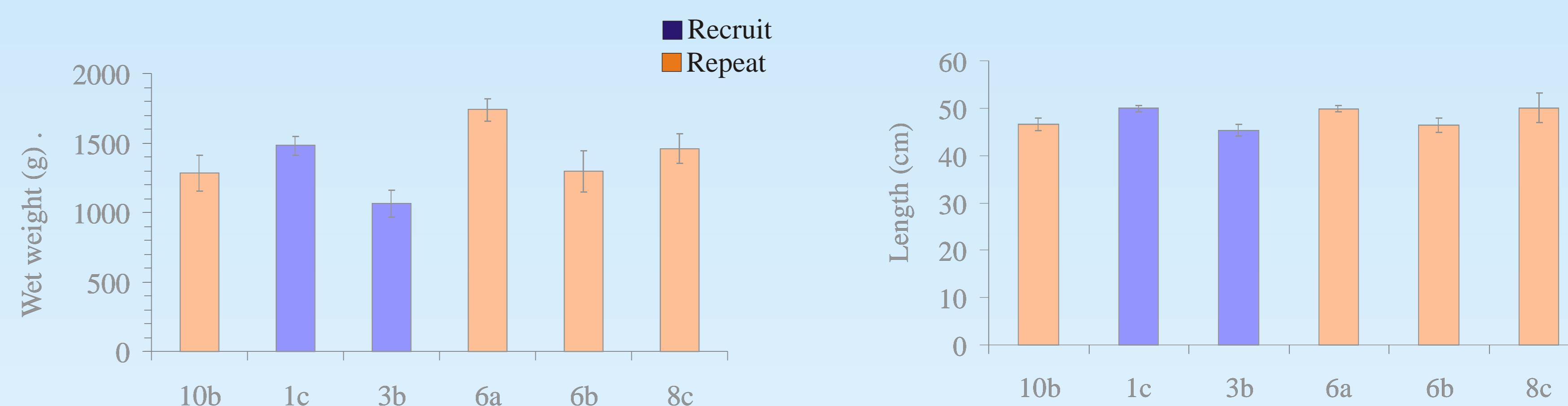


Mesocosm experiments



Comparisons of mean lengths and mean dry weights at age (all samples) of recruit and repeat offspring show that there is no general difference in growth. The higher growth rates observed in the 2500 m³ mesocosm can be attributed to better growth conditions at the end of the experiment.

Tank experiment



Mean wet weights and mean standard lengths (error bars: 2* st. err) of different families at termination of the tank experiments (April 2002). Only families from the 4400 m³ mesocosm with at least 10 surviving fish at termination are shown. Significant variations in growth between families were found (Anova; p < 0.0001)

Present results and conclusions

- The performance of the offspring of recruit and repeat female spawners were similar in a situation when the two categories of brood stock were of nearly equal body size.
- Large variations in growth among families were found
- These findings provide knowledge of important performance traits of cod families, which are essential for developing a selective breeding strategy for cod farming.
- The results from the Macom project will be analysed and reported later this year.