Growth potential of farmed cod

Cod Farming in the Nordic Countries

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Presentation overview

- Research projects
- Experiment design
- Larval stage
- Grow-out stage
- Growth depression
- Age-dependent growth
- Growth potential
- Conclusions

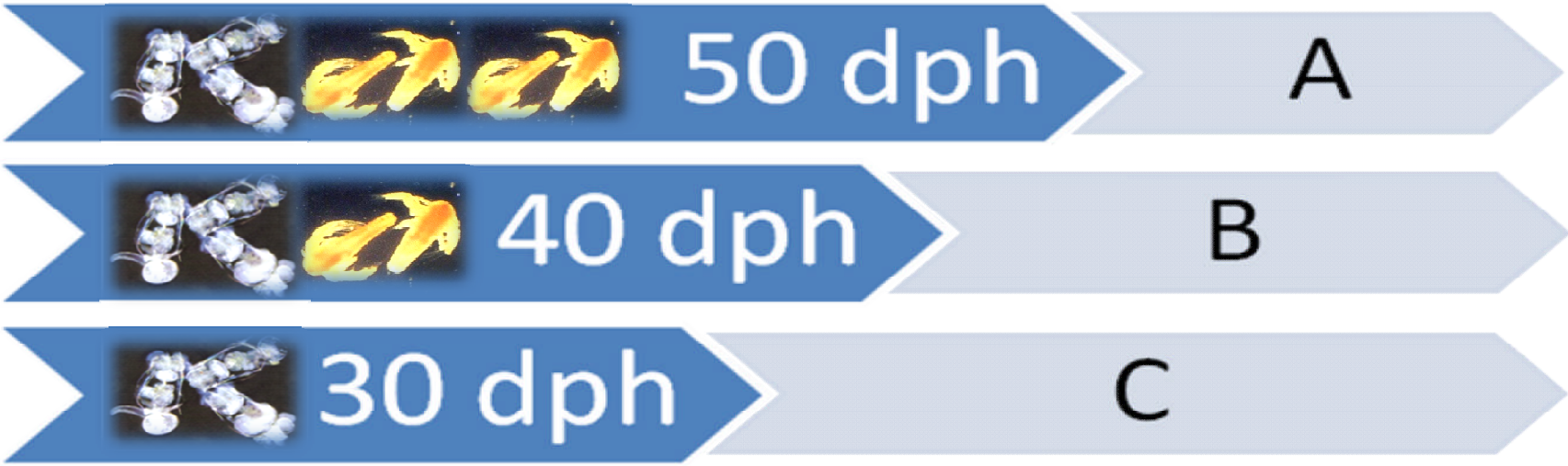
Research projects

- **<u>GROWCOD</u> (Growth potential of farmed cod).**
  - MRI, Icecod and HB-Grandi.
  - 2008-2011
  - Supported by AVS.

- **<u>OPTILAR</u> (Optimizing larval production of Atlantic cod).** Part of the TOPCOD project.
  - MRI, APN, Matís and Hólaskóli.
  - 2009-2011
  - Supported by AVS and Rannís.

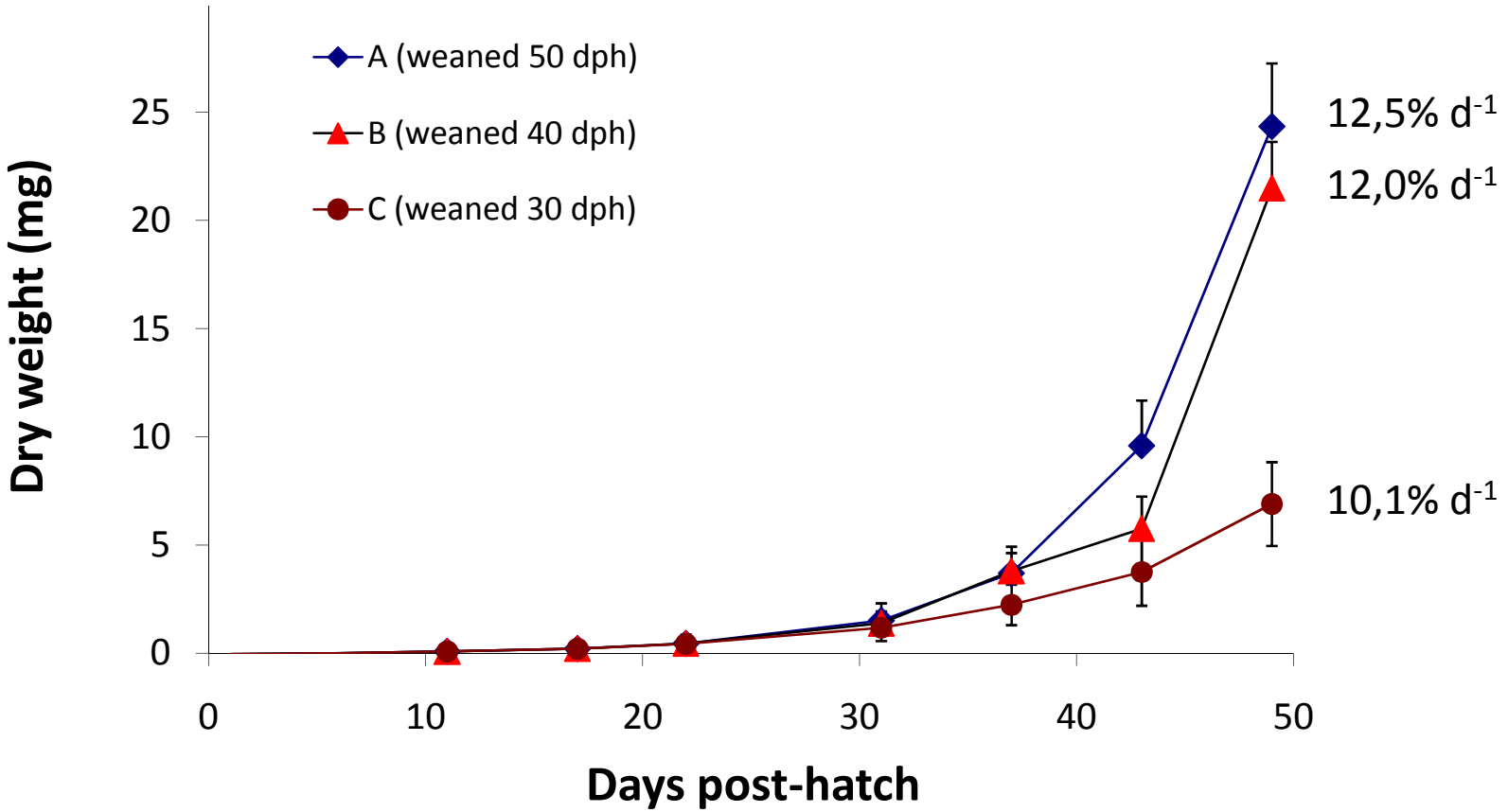
Experiment design (OPTILAR)

Three live feeding strategies:

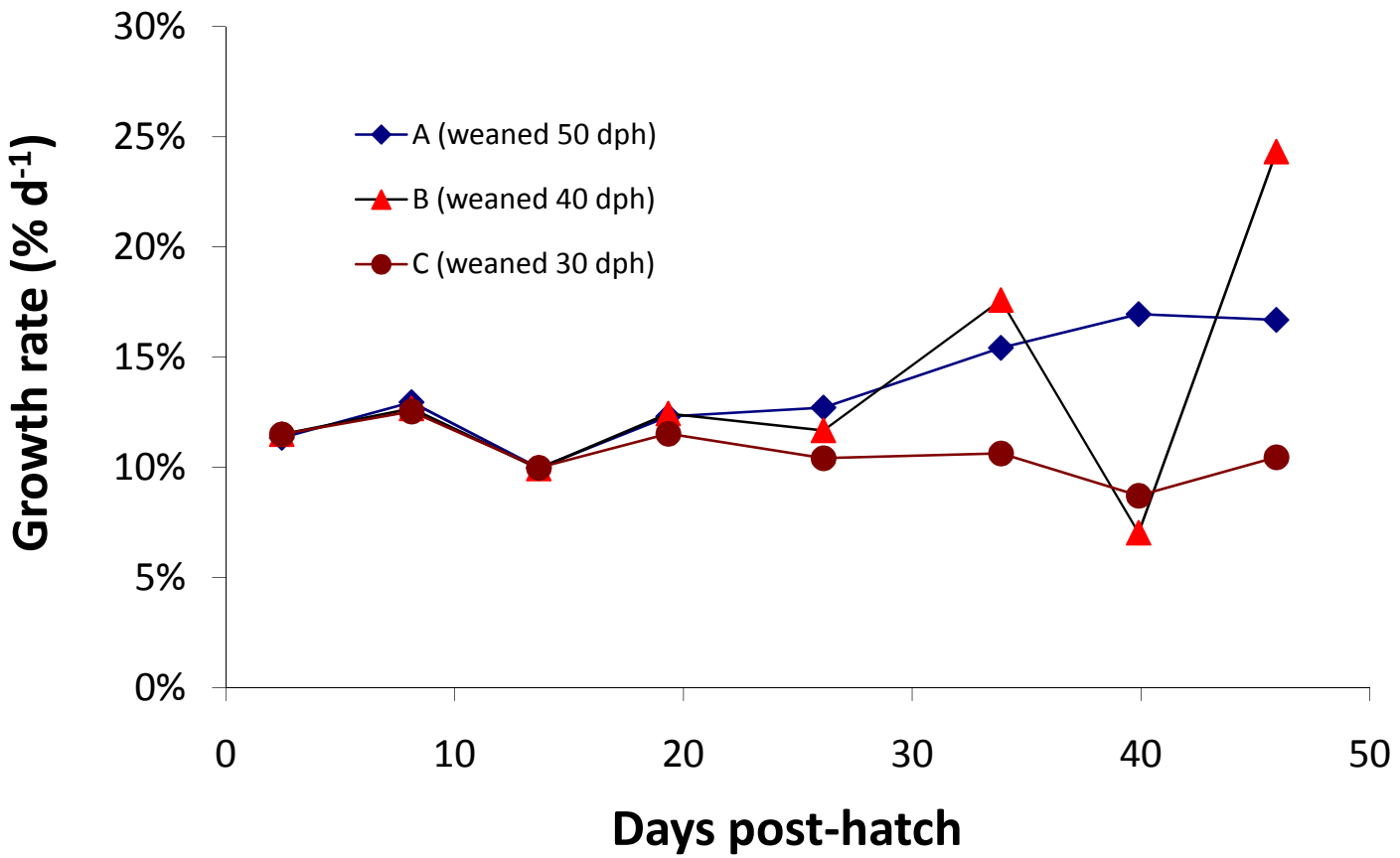


Weaning in days-post-hatch (dph)

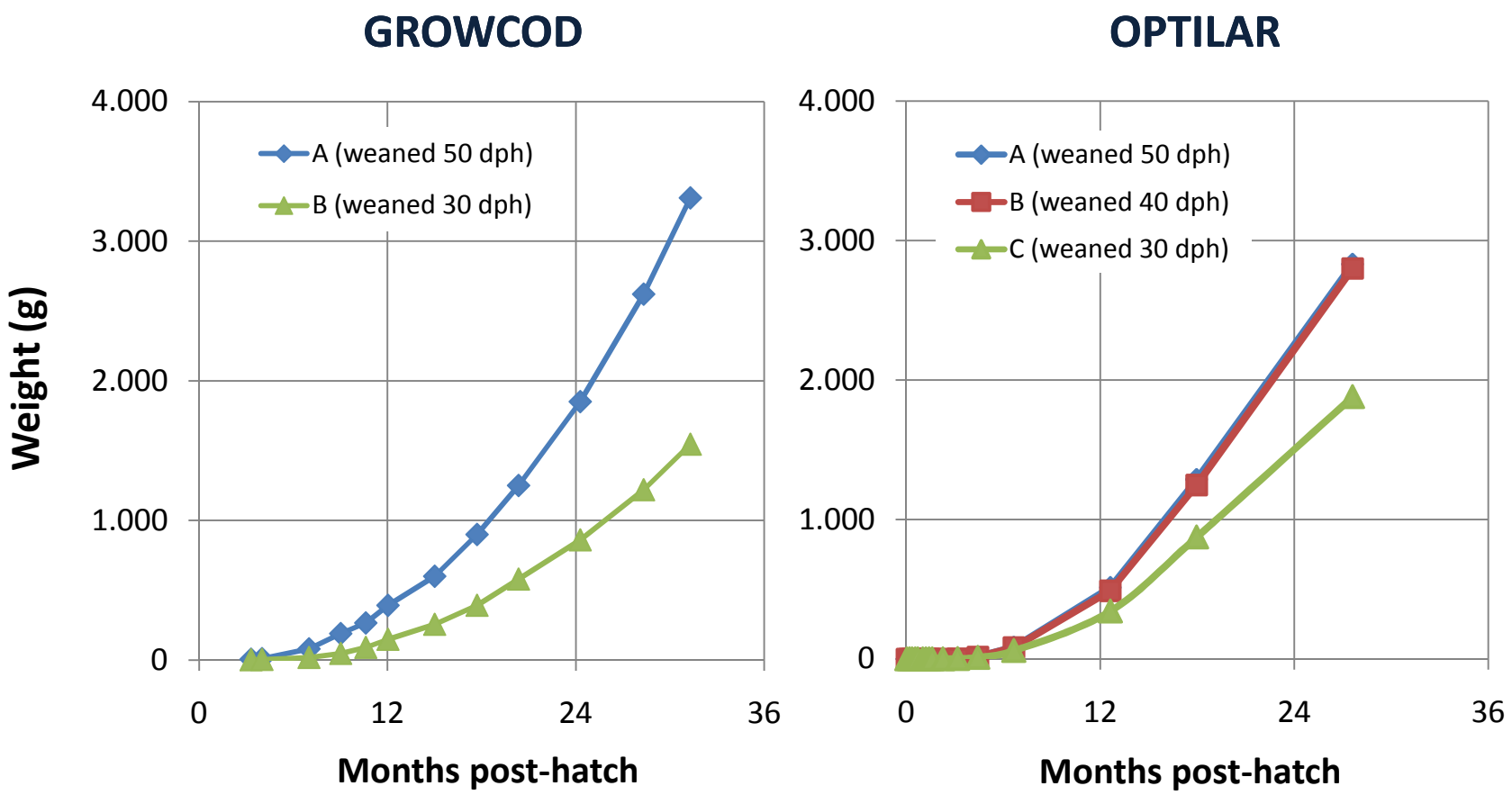
Exponential larval growth (OPTILAR)



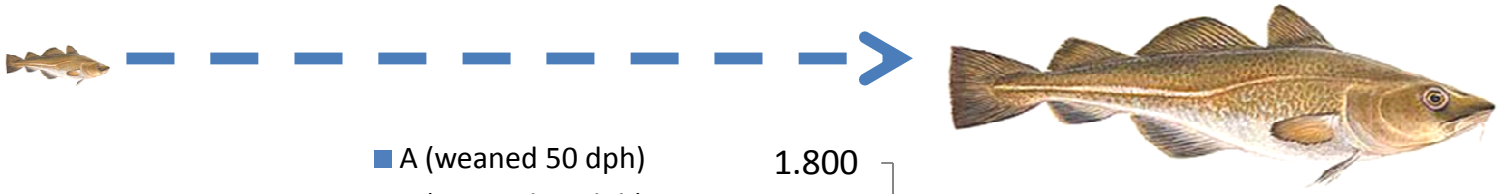
Larval growth rates (OPTILAR)

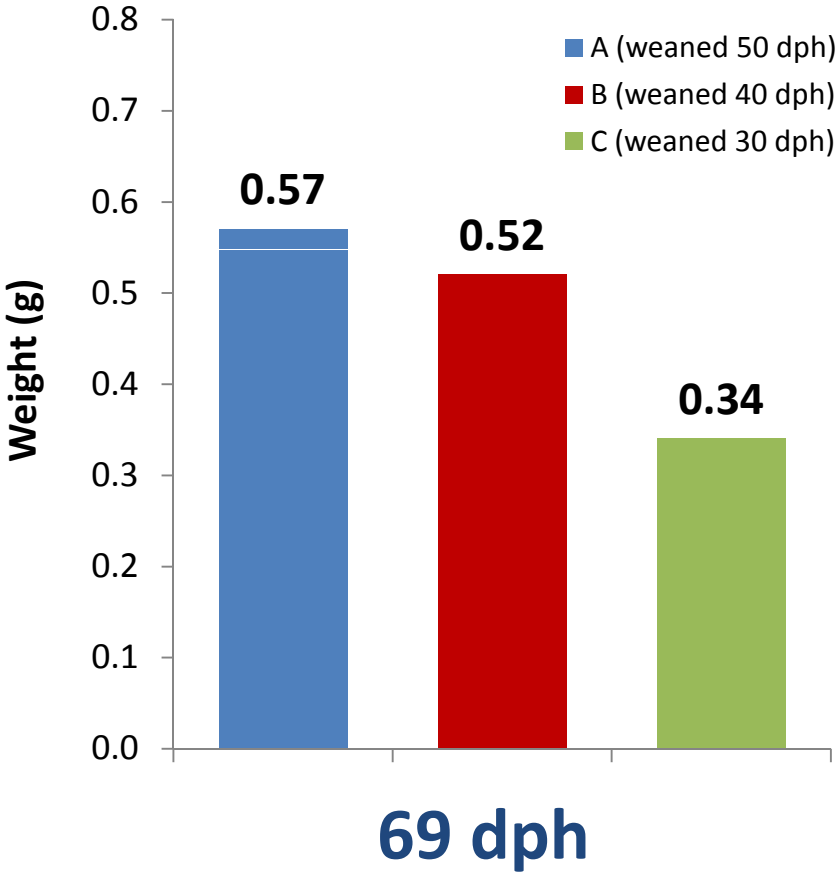


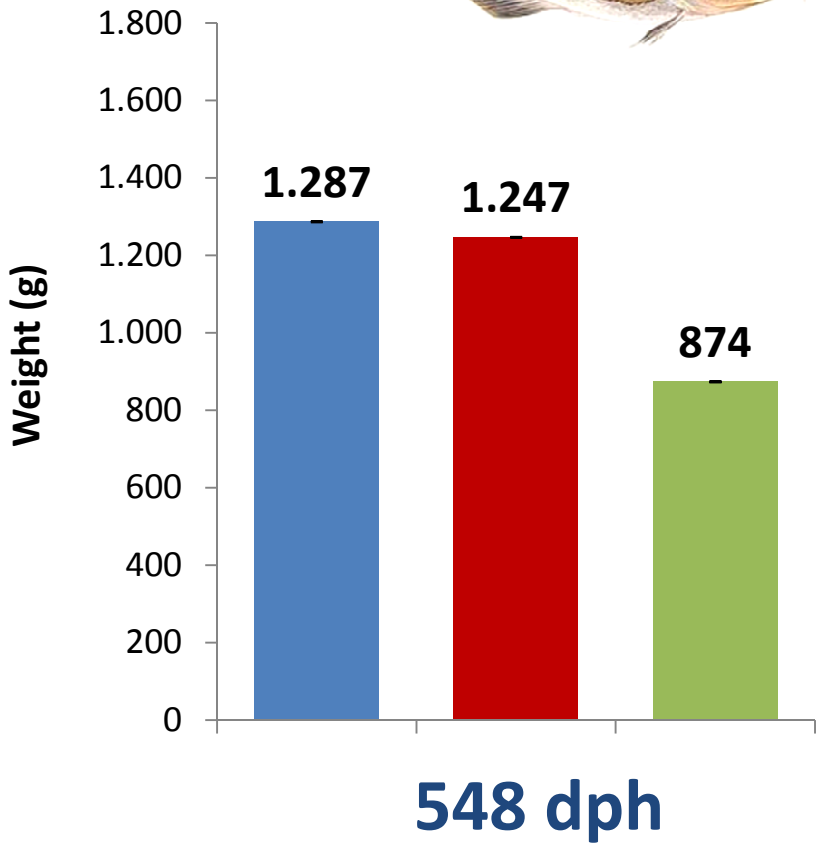
Growth during grow-out stage



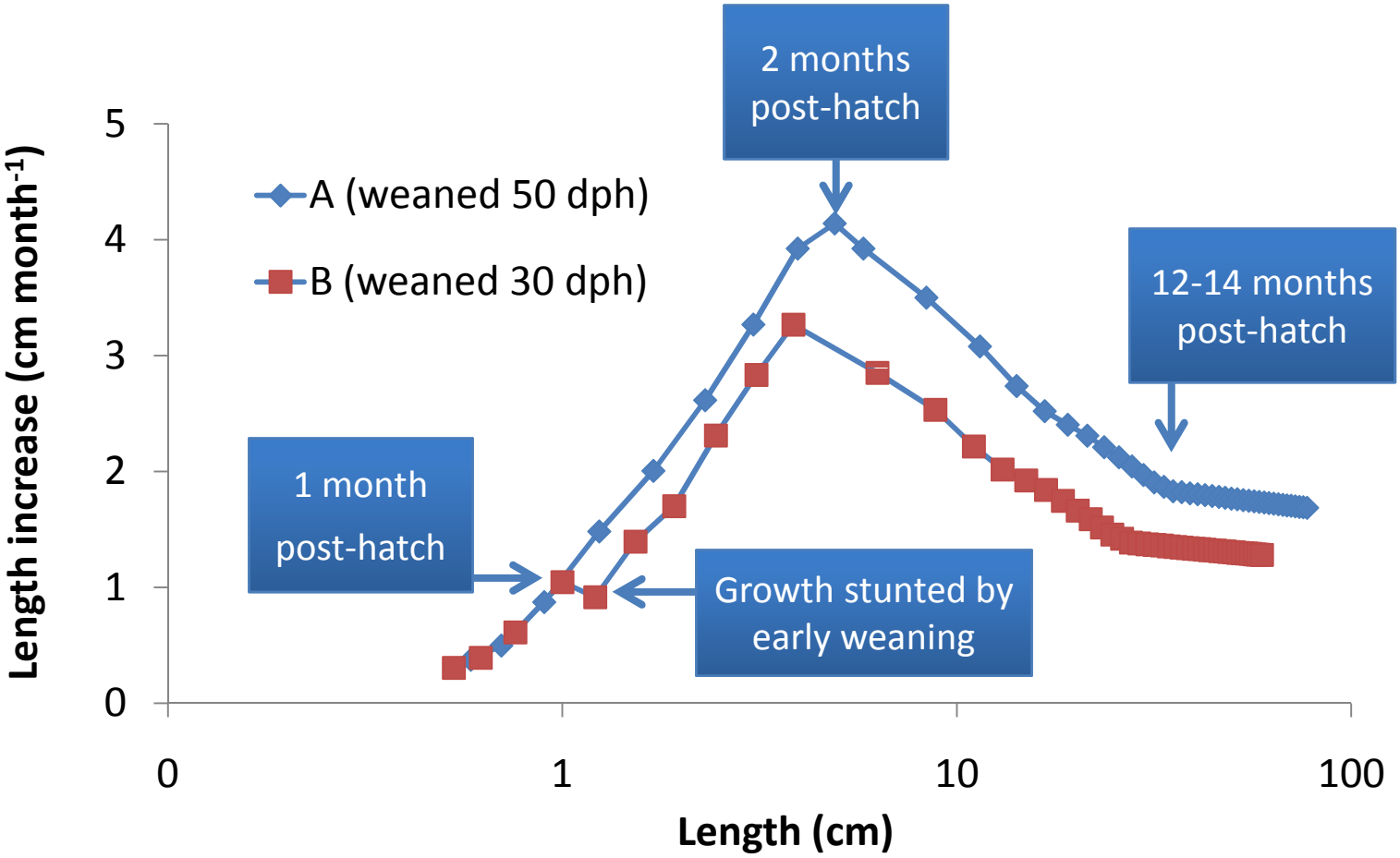
Fixed size ratios (OPTILAR)



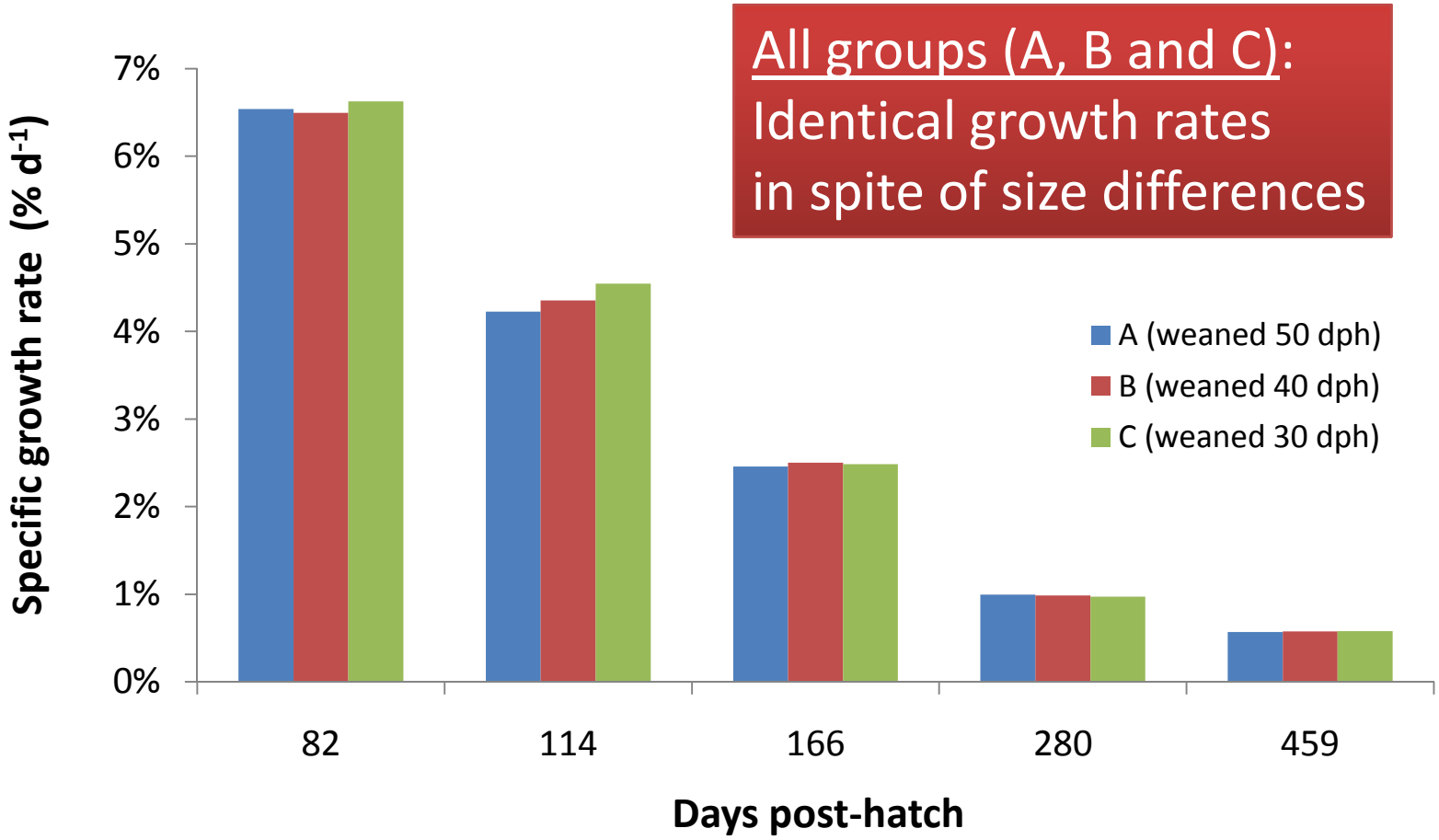




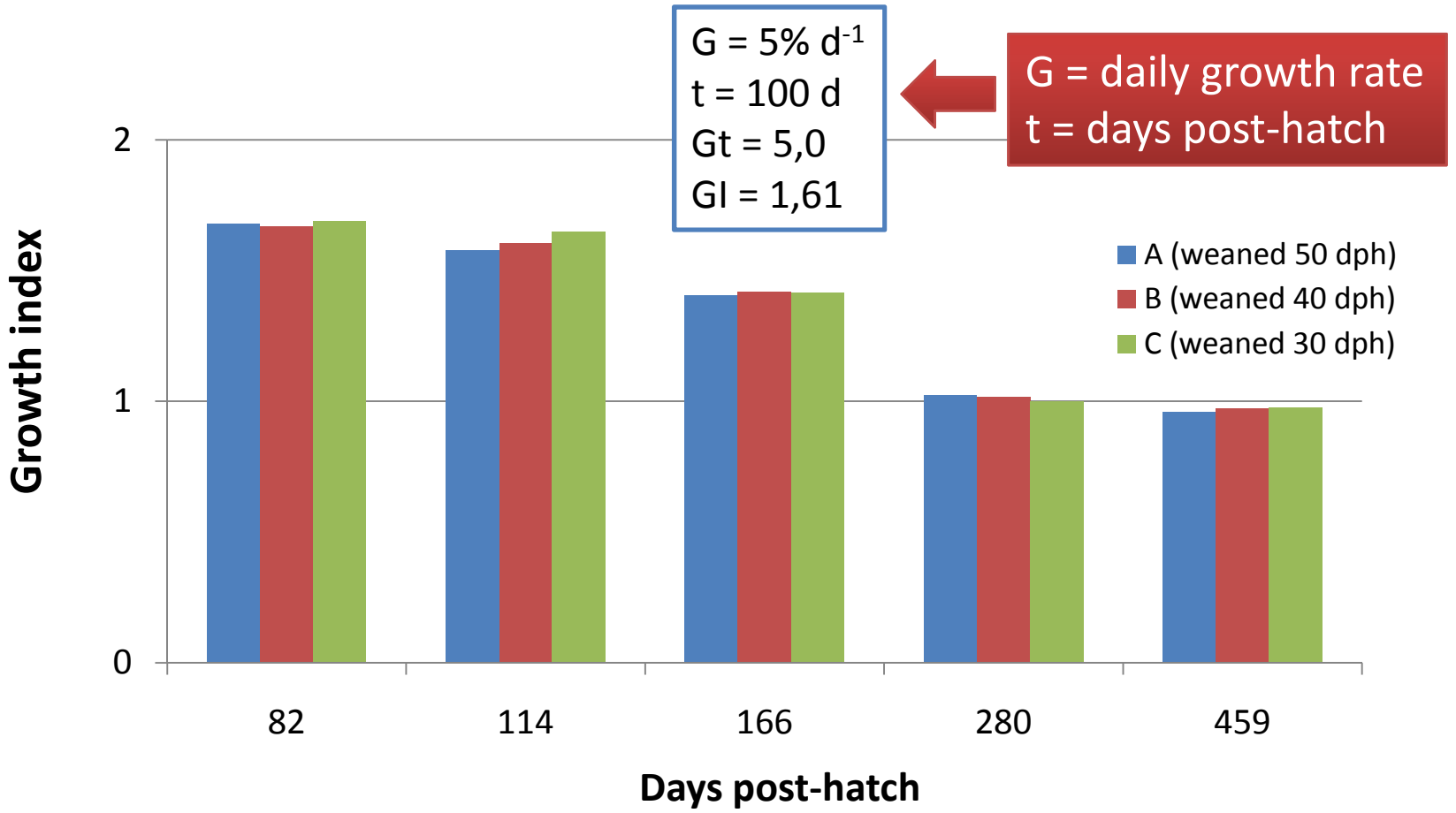
Larval growth depression (GROWCOD)



Age dependent growth rates

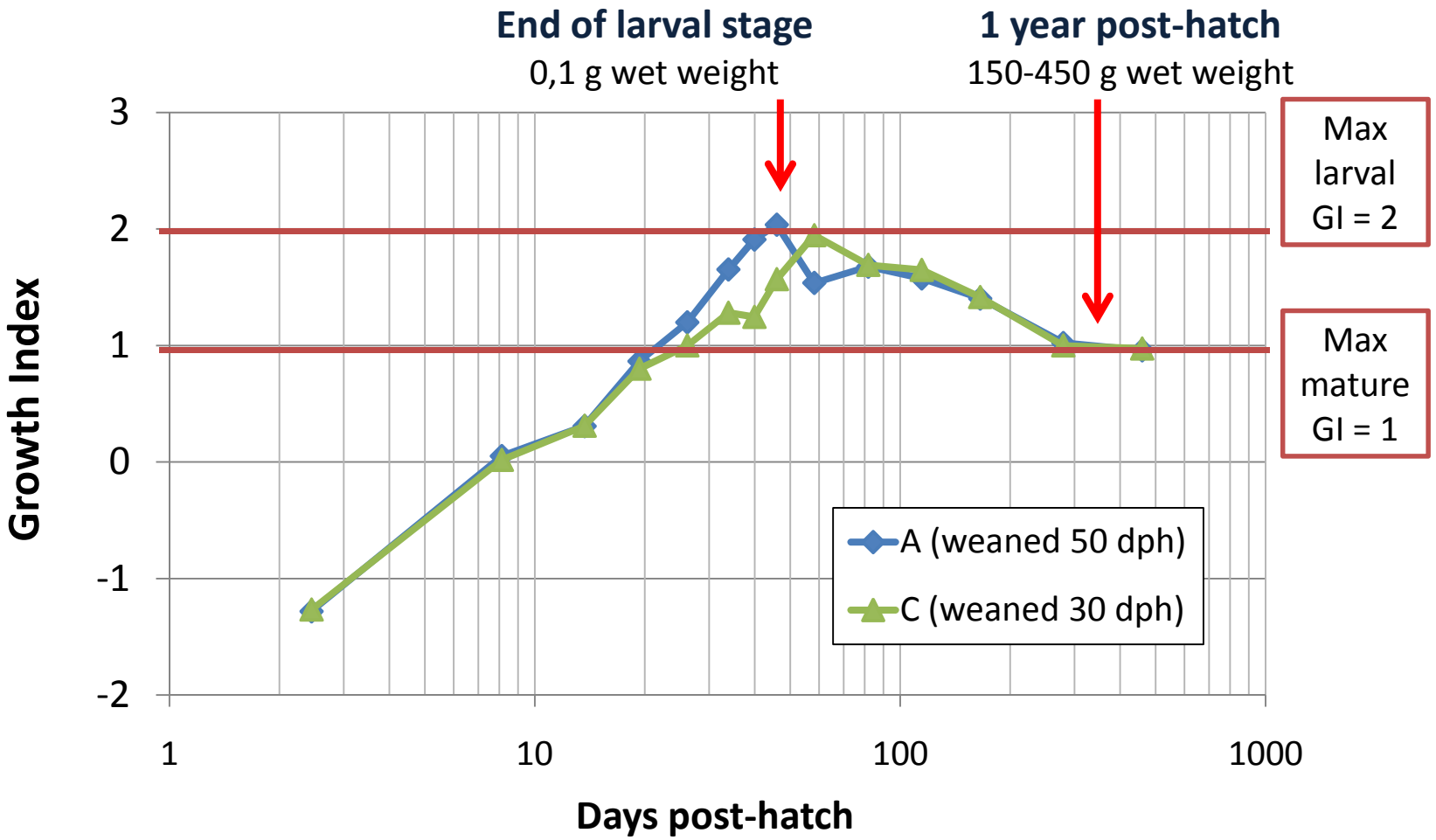


Growth index* (GI) = Ln(Gt)



* Growth index is the authors own preliminary terminology.

Growth index from hatch to maturity



Growth potential of >1 year old cod*

*12 months post-hatch

G = 2,72/t

$2,72 = e^1$

Maximum long-term growth rates:

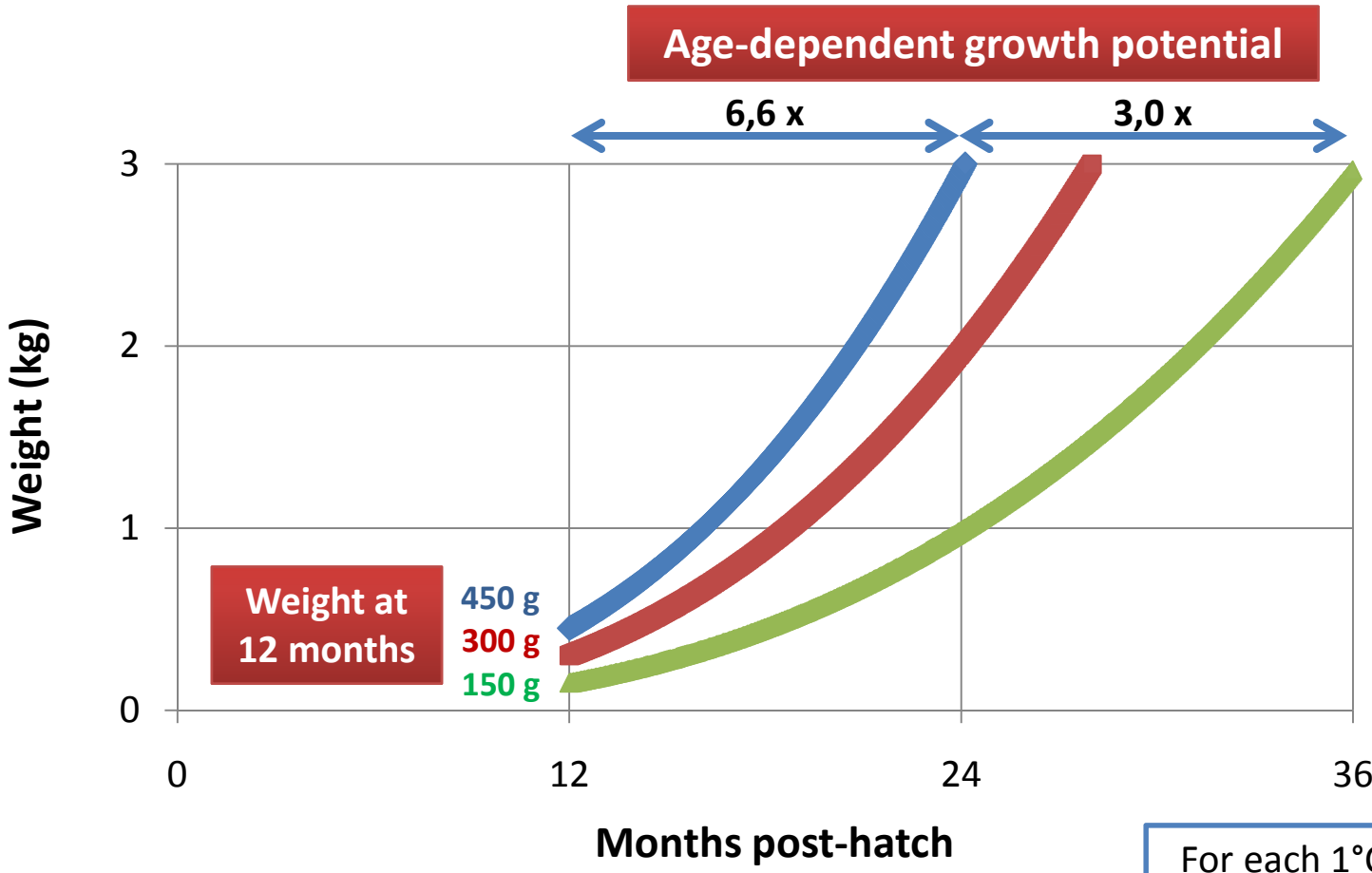
1000 day old cod: 2,72 / 1000d = 0,272% d^{-1}

500 day old cod: 2,72 / 500d = 0,544% d^{-1}

Maximum growth rates require optimum temperatures.

Short-term compensation growth can be faster.

Growth during grow-out is 100% fixed!



*Growth at optimal temperature (8,5°C year-average).

For each 1°C reduction in temperature: subtract ≈10% in weight-at-age.

Conclusions

- Cod's growth potential is fixed by end of its larval stage.
- Larval growth rates limit long-term growth potential.
- Early weaning may cause permanent growth depression.
- Feeding Artemia until 40 dph is the optimal strategy.
- Hatchery-produced cod juveniles are growth-depressed.
- Growth rates of larvae should be maximized.
- Selective breeding advances must be realized during the larval stage, otherwise it may be too late.
- A cod's growth rate is entirely age-dependent.

Farmed Atlantic cod

A fish with great potential!