

# RESPONSE OF ATLANTIC HERRING LARVAE TO OCEAN ALKALINITY ENHANCEMENT



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## BACKGROUND

Ocean alkalinity enhancement (OAE) has emerged as a promising negative emission technology. It accelerates a natural process – weathering of minerals – that increases the capacity of seawater to store CO<sub>2</sub> from the atmosphere and, by elevating pH, counters ocean acidification. Yet, the impacts of OAE on marine organisms such as fish are largely unknown [A].

## APPROACH



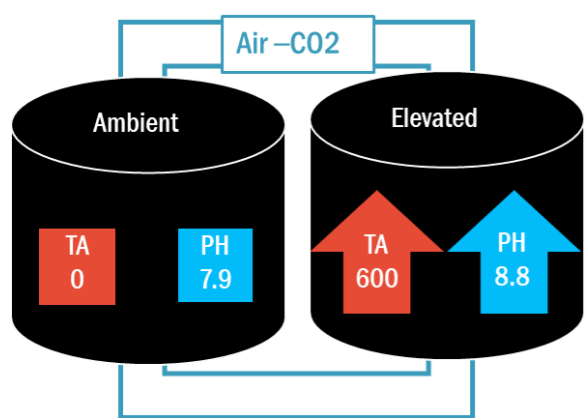
➤ Parental fish: Norwegian spring spawning herring caught west of Bergen

### Rearing Conditions

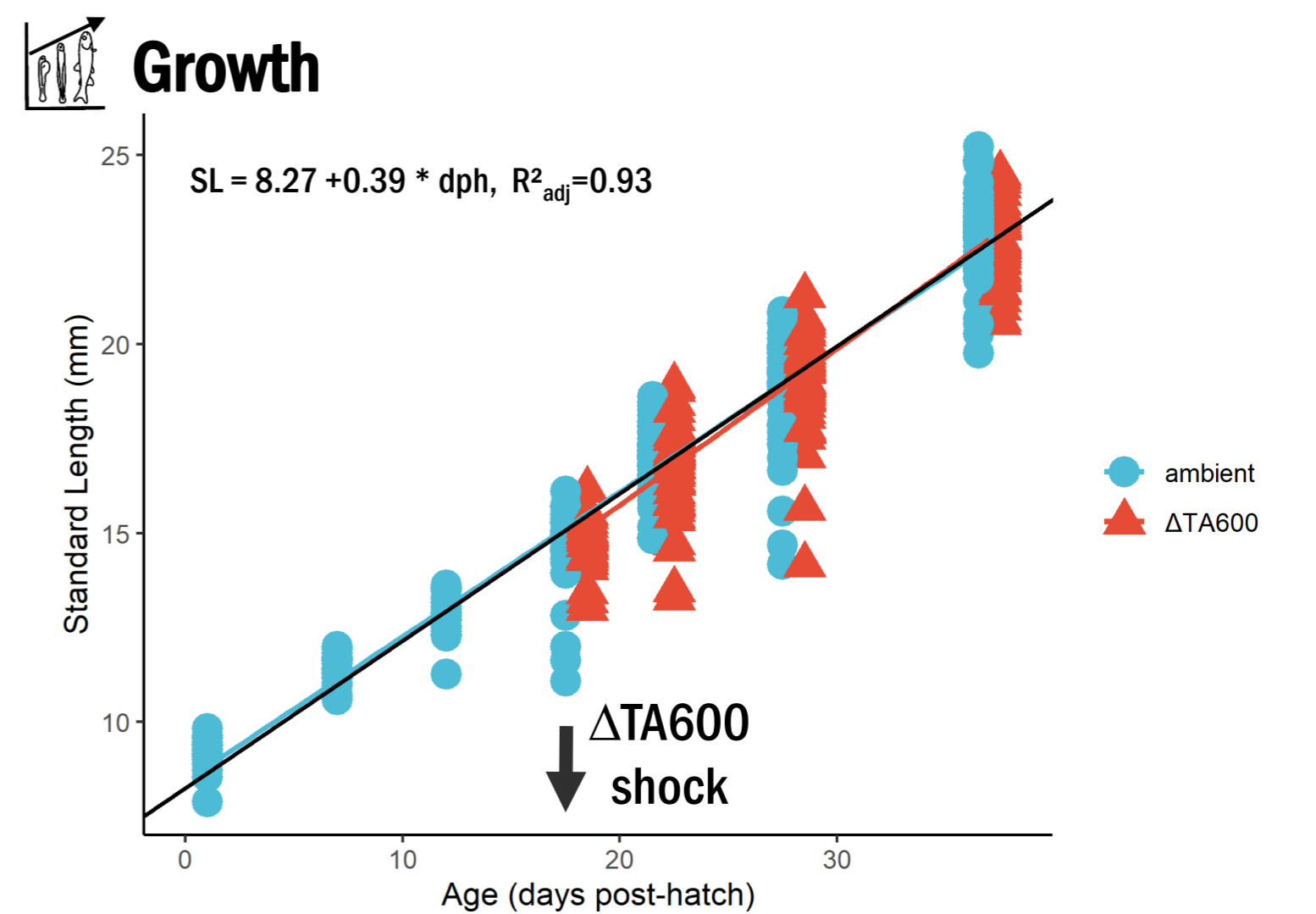
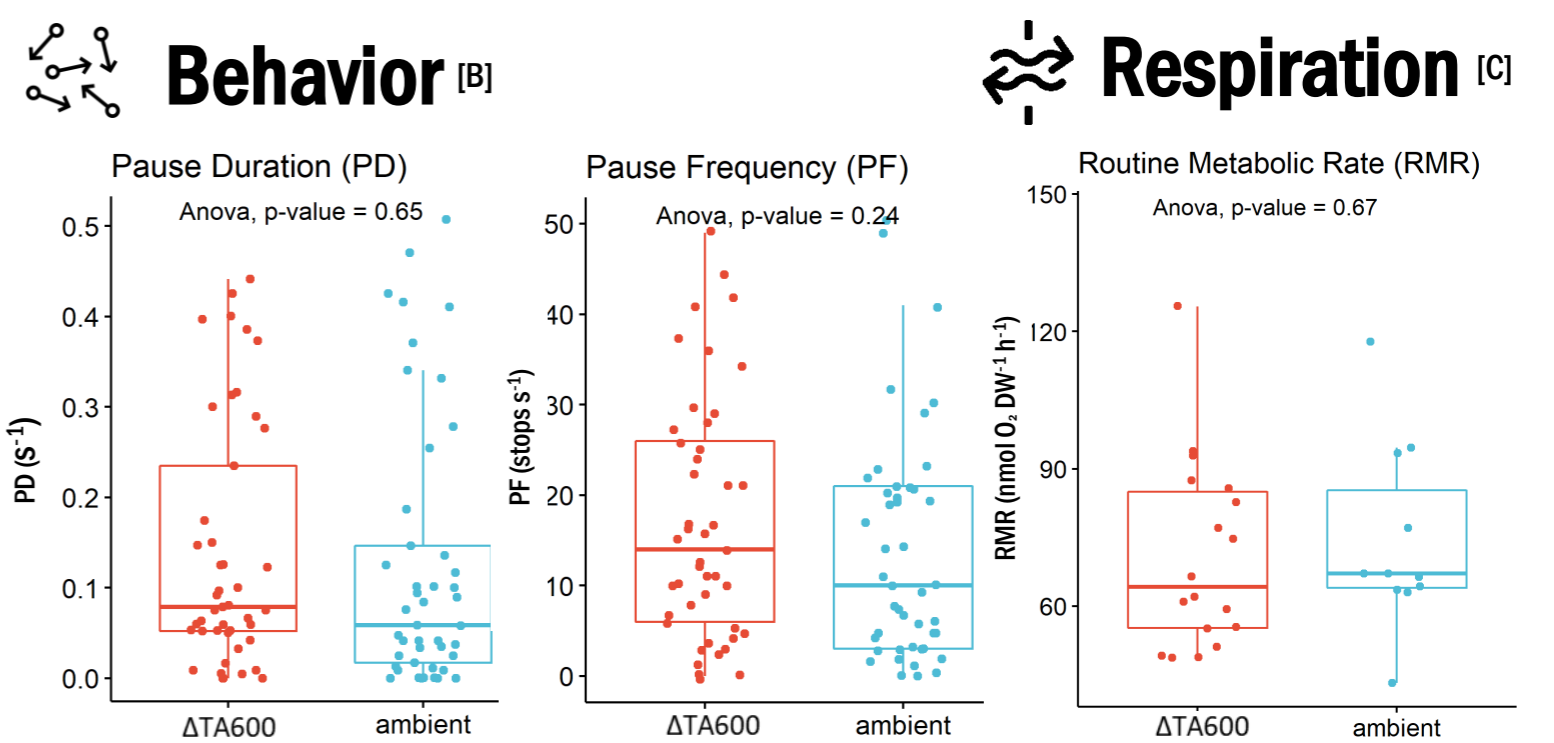
- 2x 3 tanks (400 L) with 1500 larvae at 8.5°C
- fed with natural plankton community
- mortality <0.002% per day

### OAE-Treatment

- at 18-dph larvae shocked with non-air equilibrated OAE ( $\Delta$ TA 600  $\mu$ Eq L<sup>-1</sup>)
- pCO<sub>2</sub> levels equilibrated within 12 days, TA remained constant
- behavior, metabolic rate and growth were measured at 22, 27 and 37 days post-hatch (dph)



## FINDINGS



➤ no effect of OAE on behavior, metabolic rate and growth

## CONCLUSION

**NO EVIDENCE FOR AN IMPACT ON BEHAVIOR, PHYSIOLOGY AND, CONSEQUENTLY, GROWTH SUGGESTING THAT HERRING LARVAE ARE RESILIENT TO SHORT-TERM OAE AND ITS ASSOCIATED PH INCREASE.**



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**References:**

- [A]: Bach, L. T., et al., (2019). CO<sub>2</sub> Removal With Enhanced Weathering and Ocean Alkalinity Enhancement: Potential Risks and Co-benefits for Marine Pelagic Ecosystems. *Front. Clim.* 1. doi:10.3389/fclim.2019.00007
- [B]: Illing, B., et al., Behavioral and physiological responses to prey match-mismatch in larval herring, *Estuarine, Coastal and Shelf Science* (2016), <http://dx.doi.org/10.1016/j.ecss.2016.01.003>
- [C]: Berg F, Andersson L, Folkvord A (2020) Respiration rates of herring larvae at different salinities, and effects of previous environmental history. *Mar Ecol Prog Ser* 650:141-152. <https://doi.org/10.3354/meps13318>