

Laks og rensefisk sin mestringsevne for vannstrøm

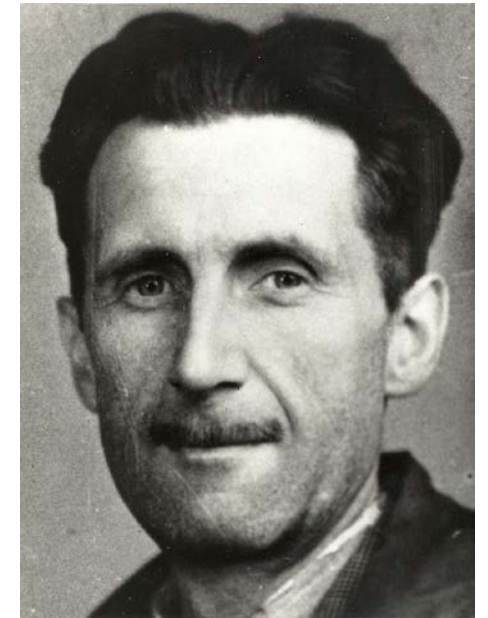
- og andre fysiologiske forskelle mellom laks og rensefisk

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“All animals are equal,
but some animals are
more equal than others”



- George Orwell - Animal Farm, 1945



Cleaner fish introduction

- In *SFI Exposed* we have done several pioneering studies on cleaner fish physiology and environmental limits.
- 2018: First scientific paper on welfare concerns in cleaner fish:

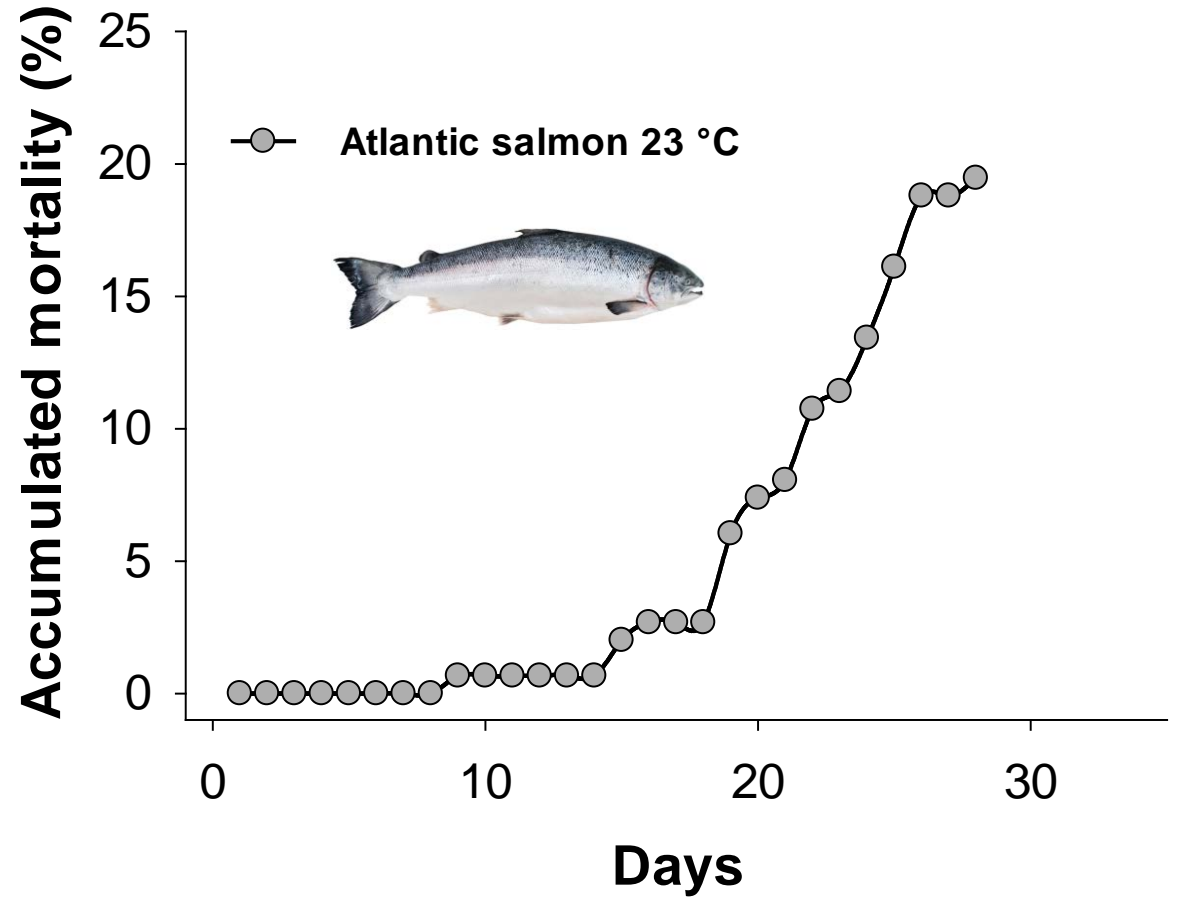
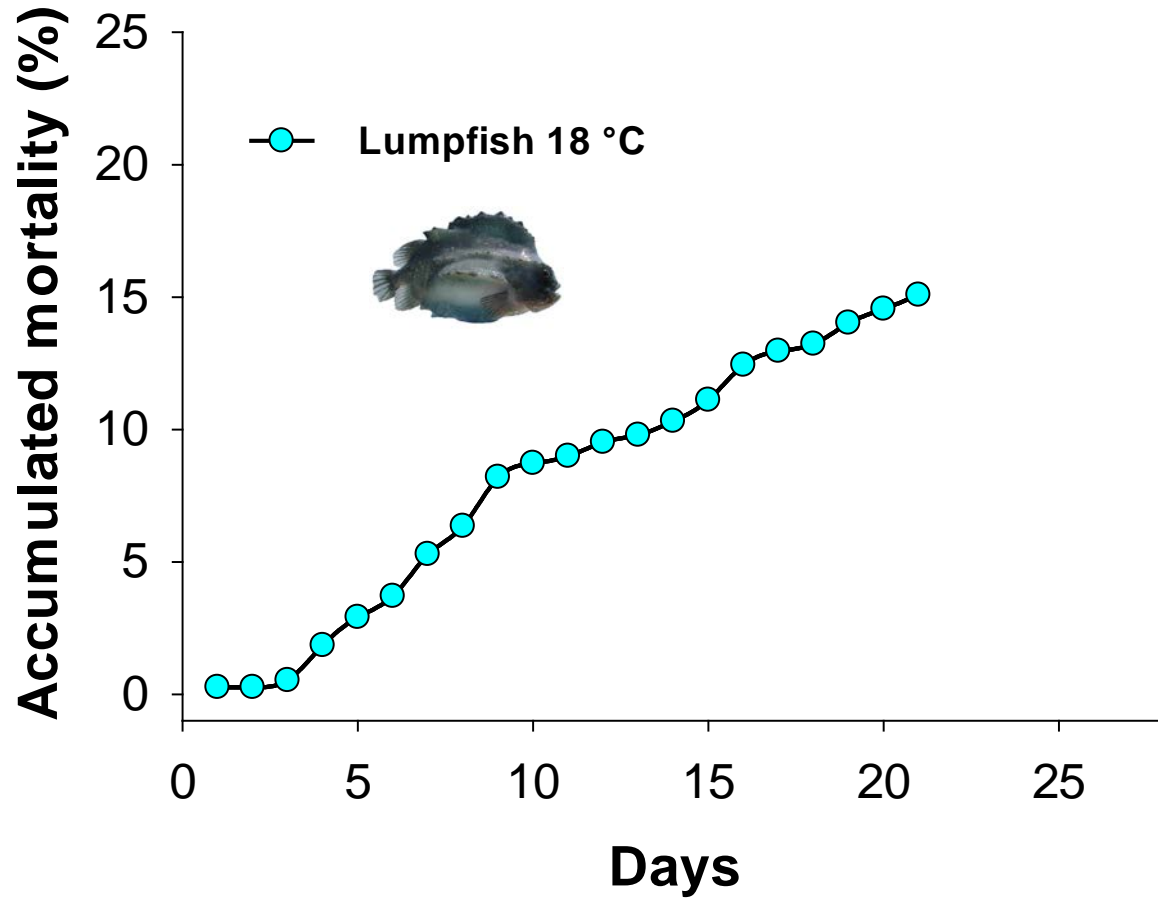


However, anecdotal reports of very high unaccounted mortalities in marine sea cages have led to ethical concerns about their utilization as cleaner fish. Farm locations are chosen based on environmental conditions that allow Atlantic salmon to thrive, and it is currently underappreciated that lumpfish may not necessarily cope in similar environments owing to fundamental physiological differences between the two species.



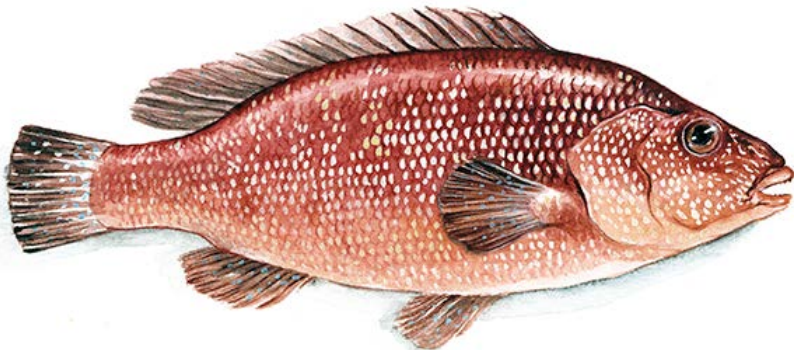
- Hvas et al. 2018 *Biology Open*

Temperature (climate) tolerance



Ballan wrasse is a tropical fish?

- Thrives at 25 °C.
- Becomes lethargic below 9 °C.



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Physiological performance of ballan wrasse (*Labrus bergylta*) at different temperatures and its implication for cleaner fish usage in salmon aquaculture

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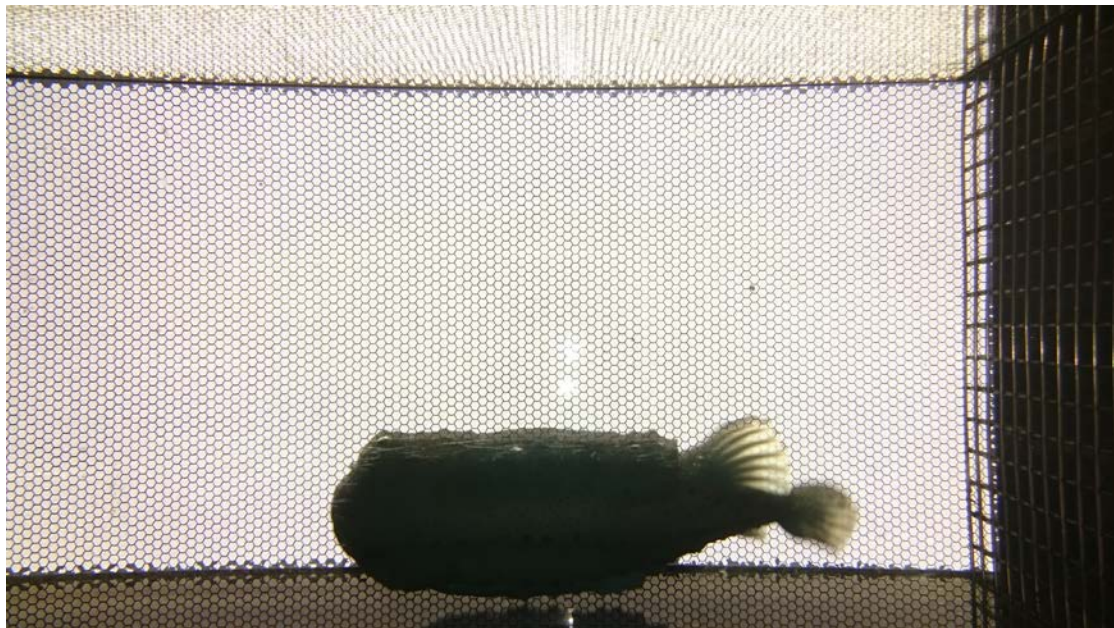
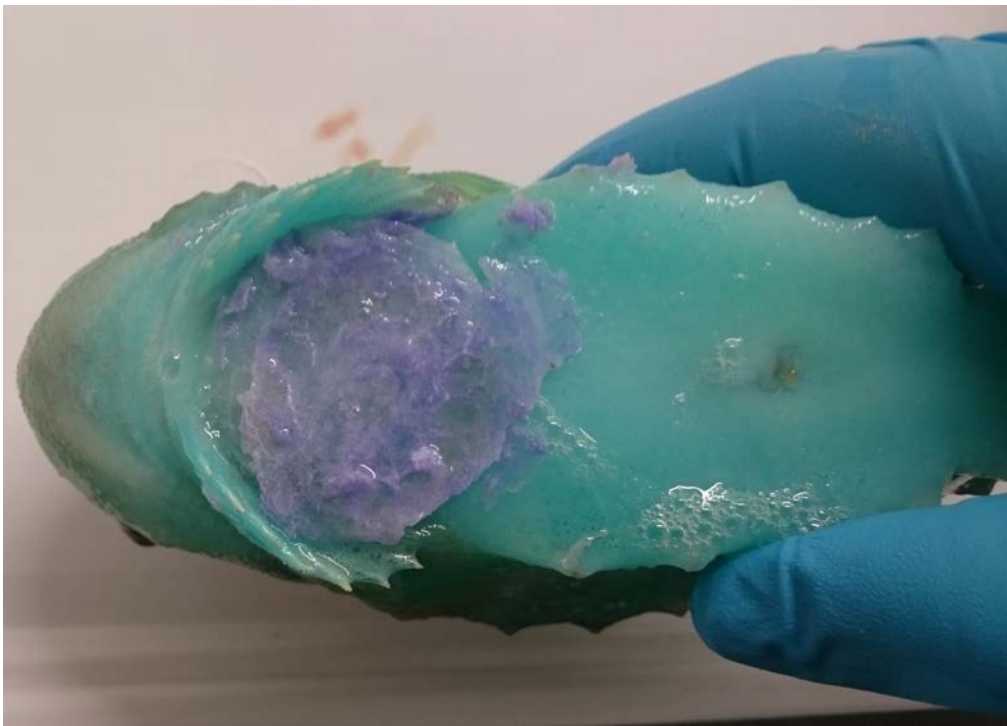
Cleaner fish are the **only vertebrate species** used to control parasitic pests in industrial-scale farming systems, and since vertebrates have high cognitive capacity (Branson, 2008), they are typically protected by animal welfare legislation. Therefore, it is crucial to understand their physiological and environmental limits for responsible and efficient use in aquaculture.

Analogy for land animals

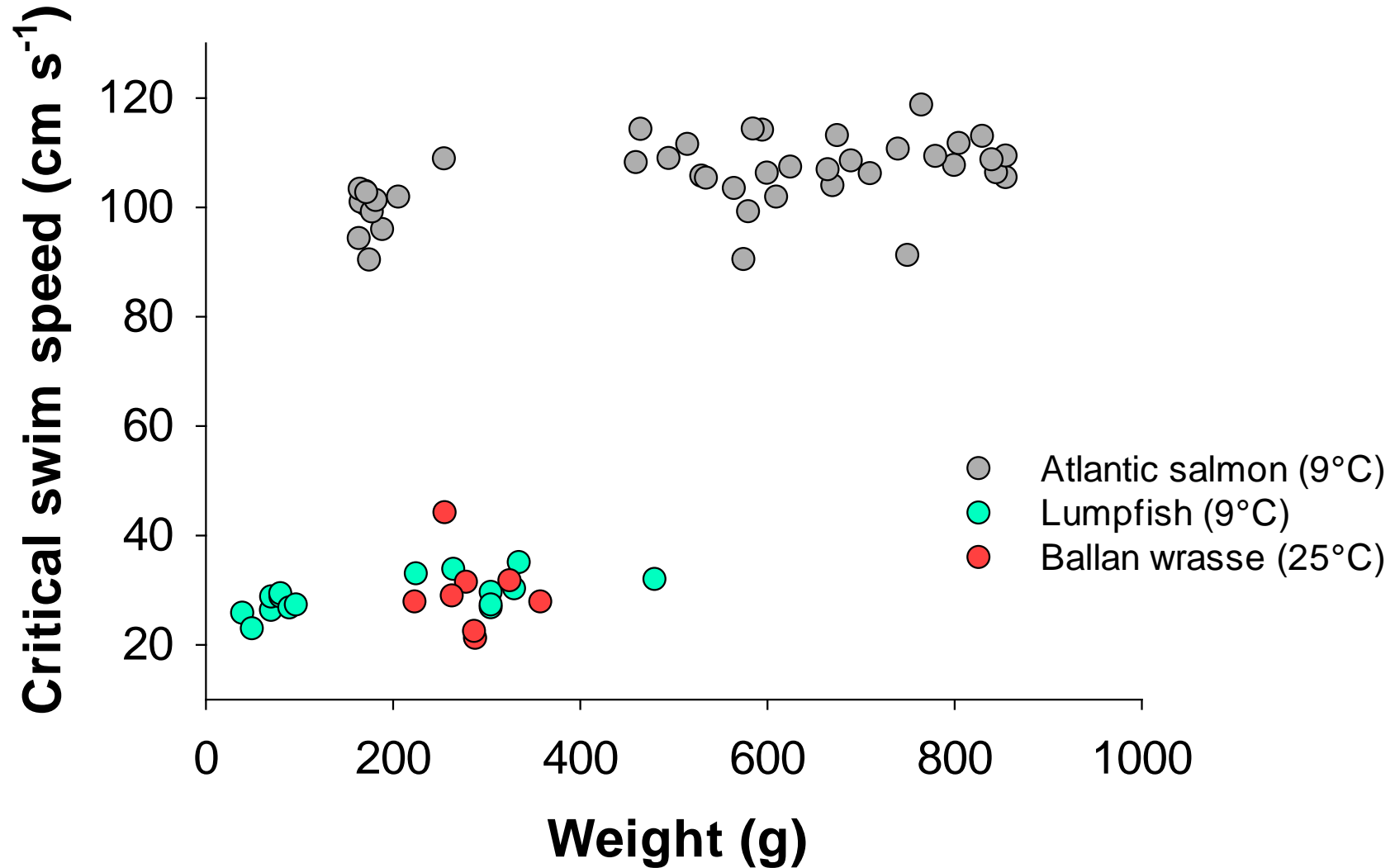


Swim tunnels

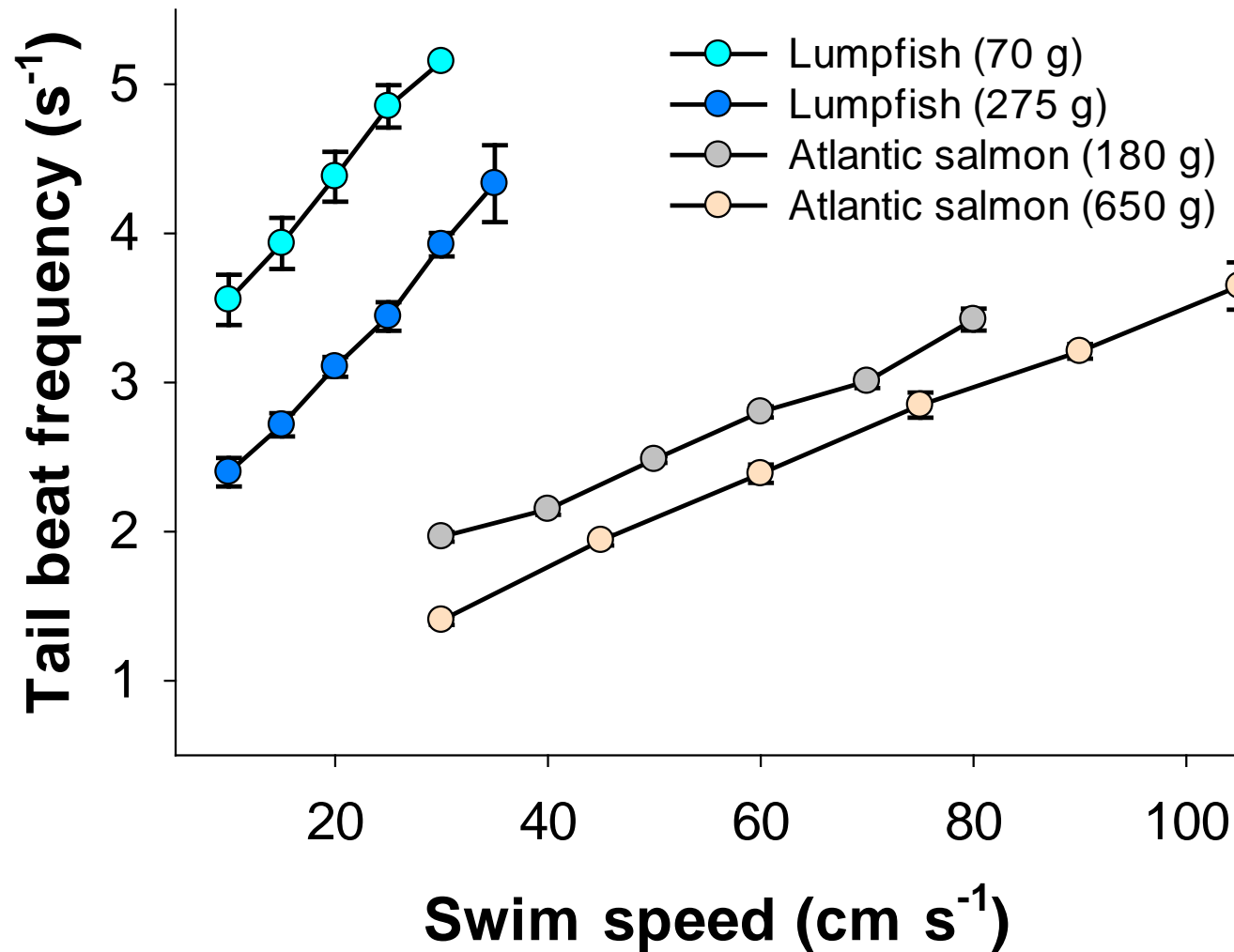




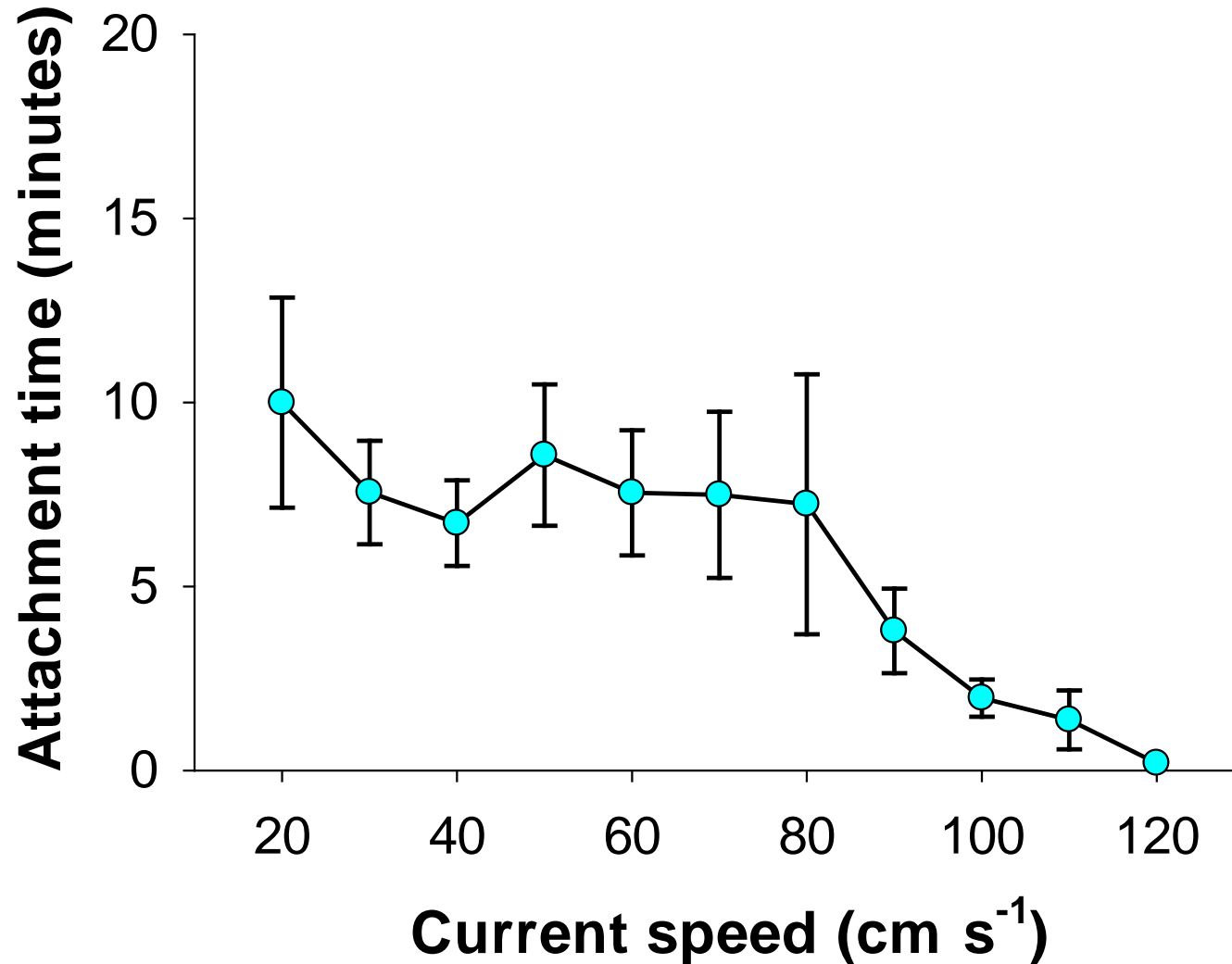
Swimming capacity



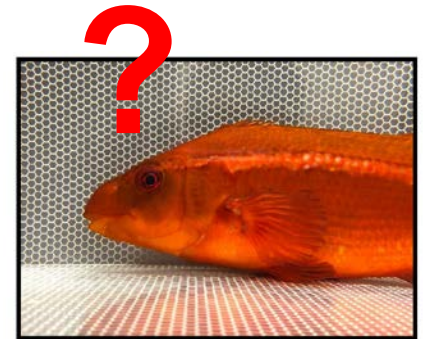
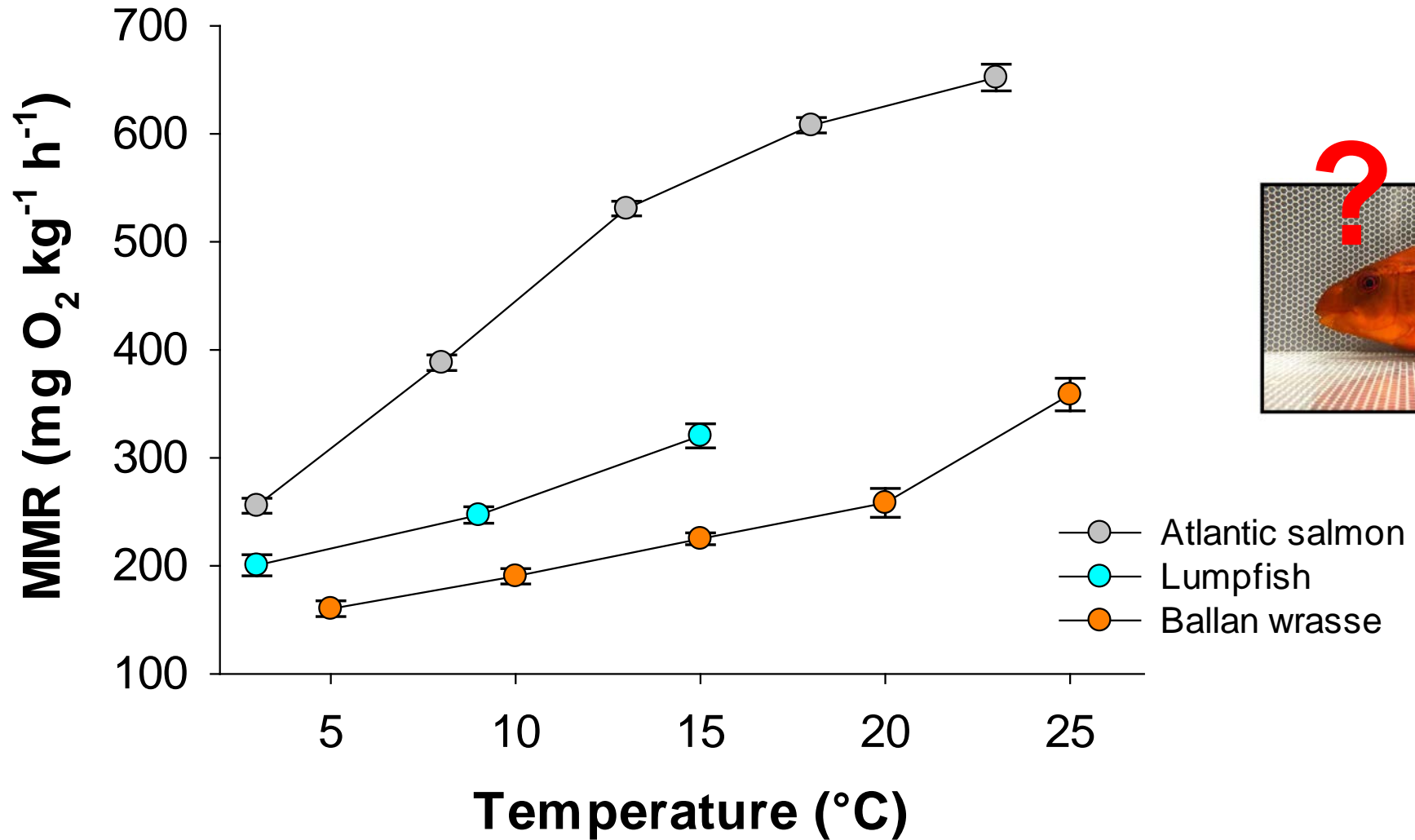
Tail beat frequency



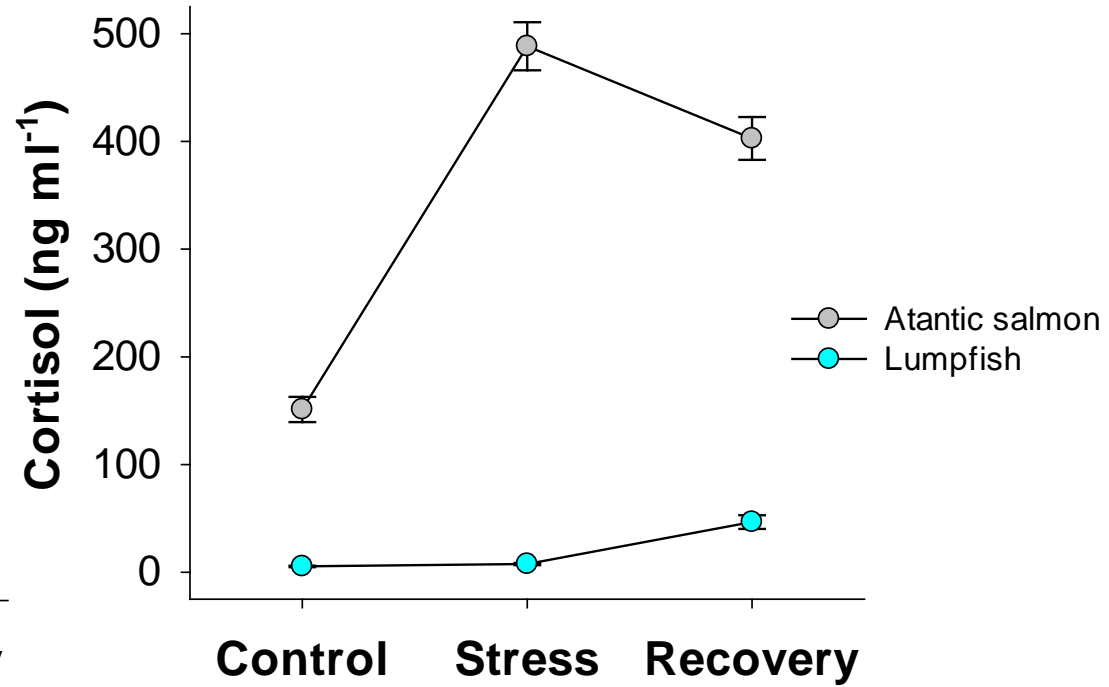
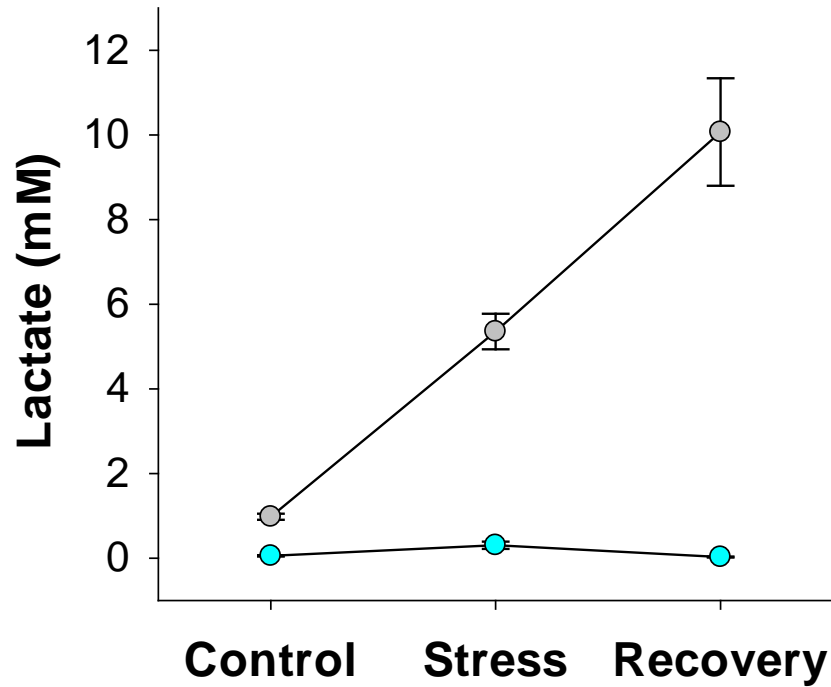
Lumpfish attachment behaviour in strong currents



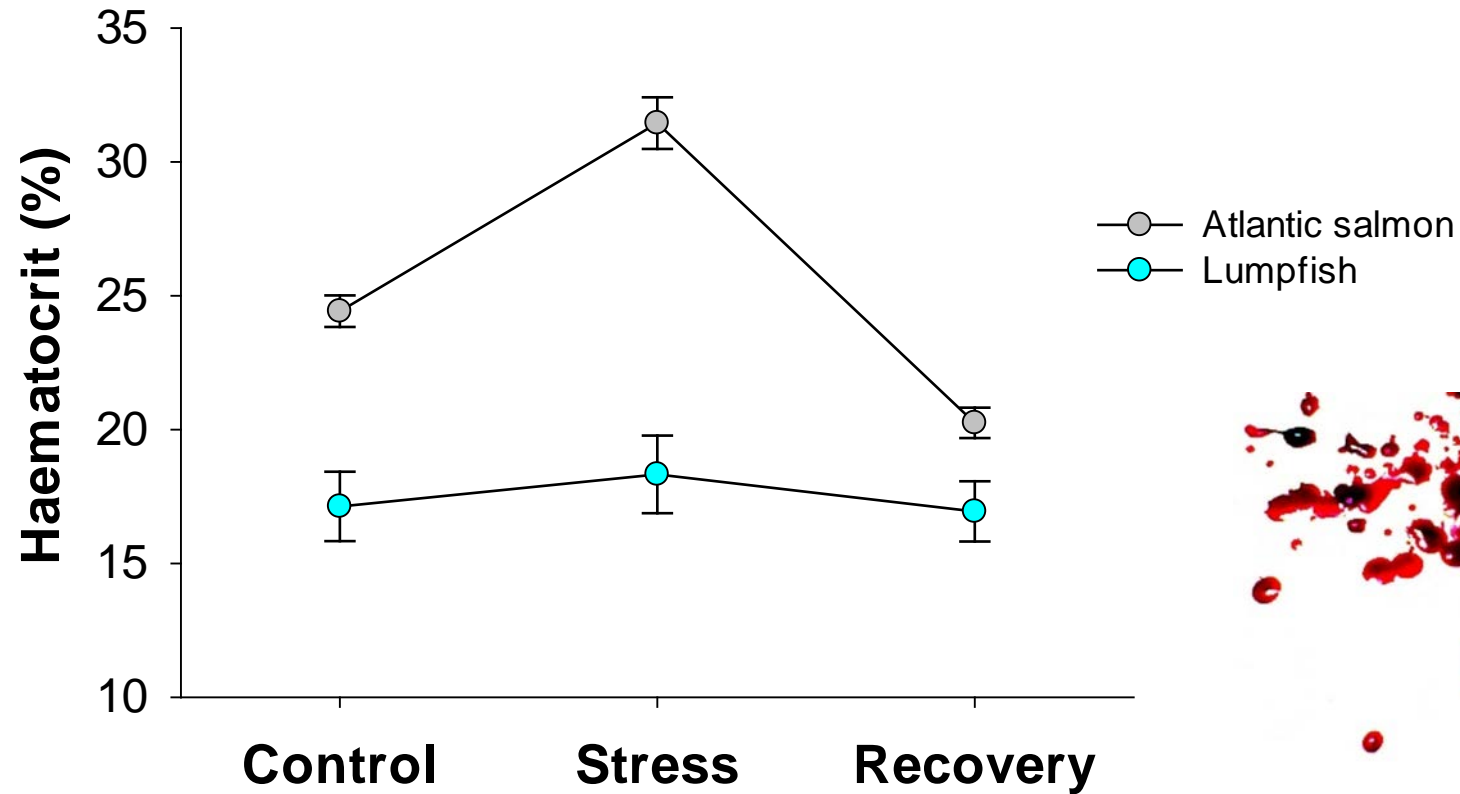
“VO₂max”



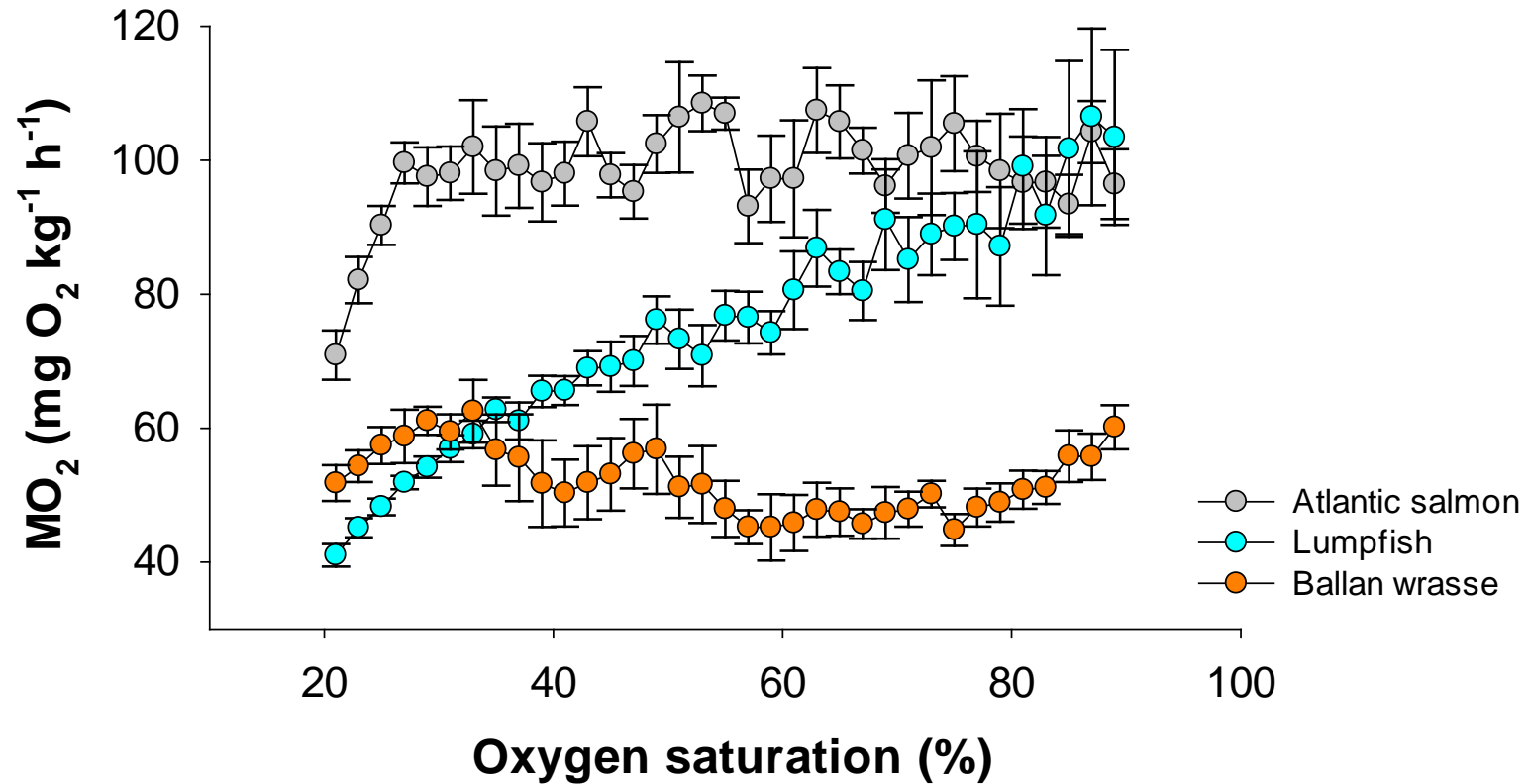
Exhaustive stress – Lactate and cortisol



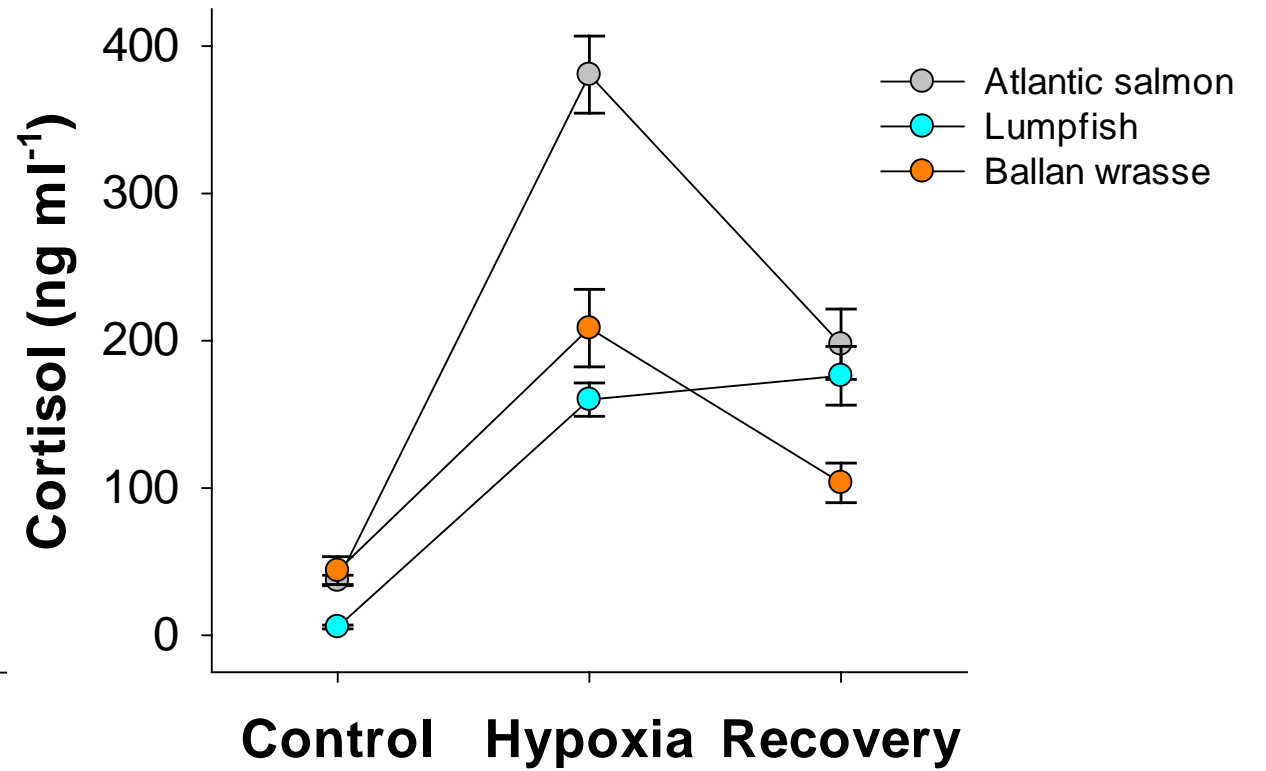
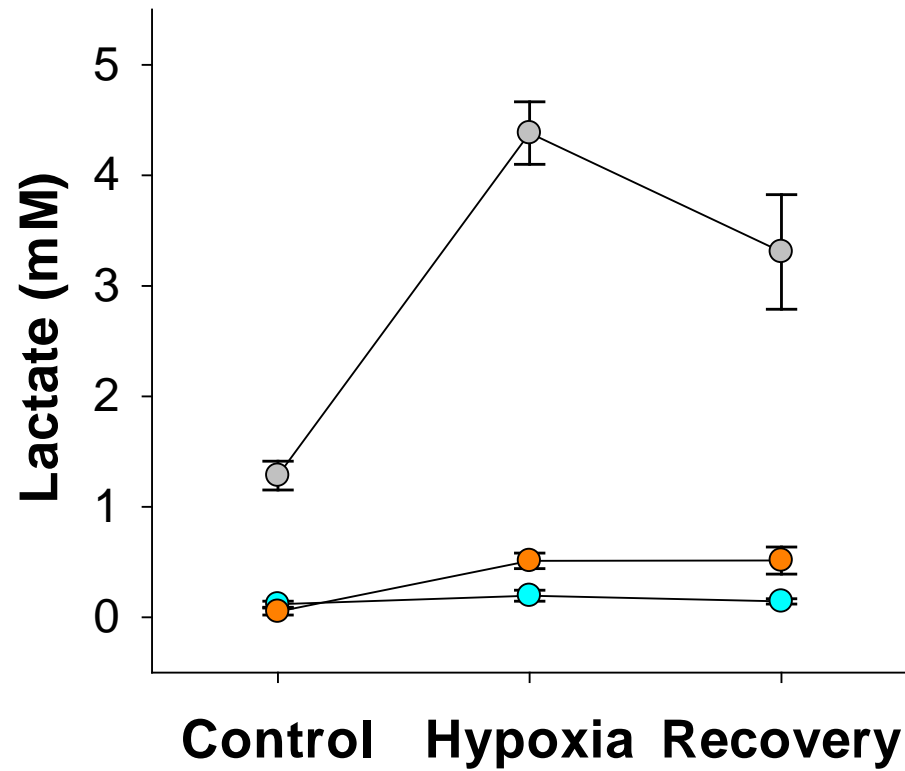
Exhaustive stress - Haematocrit



Hypoxia responses: Metabolic rates



Hypoxia responses: Lactate and cortisol



Summary

- Atlantic salmon and cleaner fish are very different species!
- Vastly different environmental tolerances and physiological limits.
- Using sentient vertebrate animals only for pest control is a major ethical issue (even if it works).

