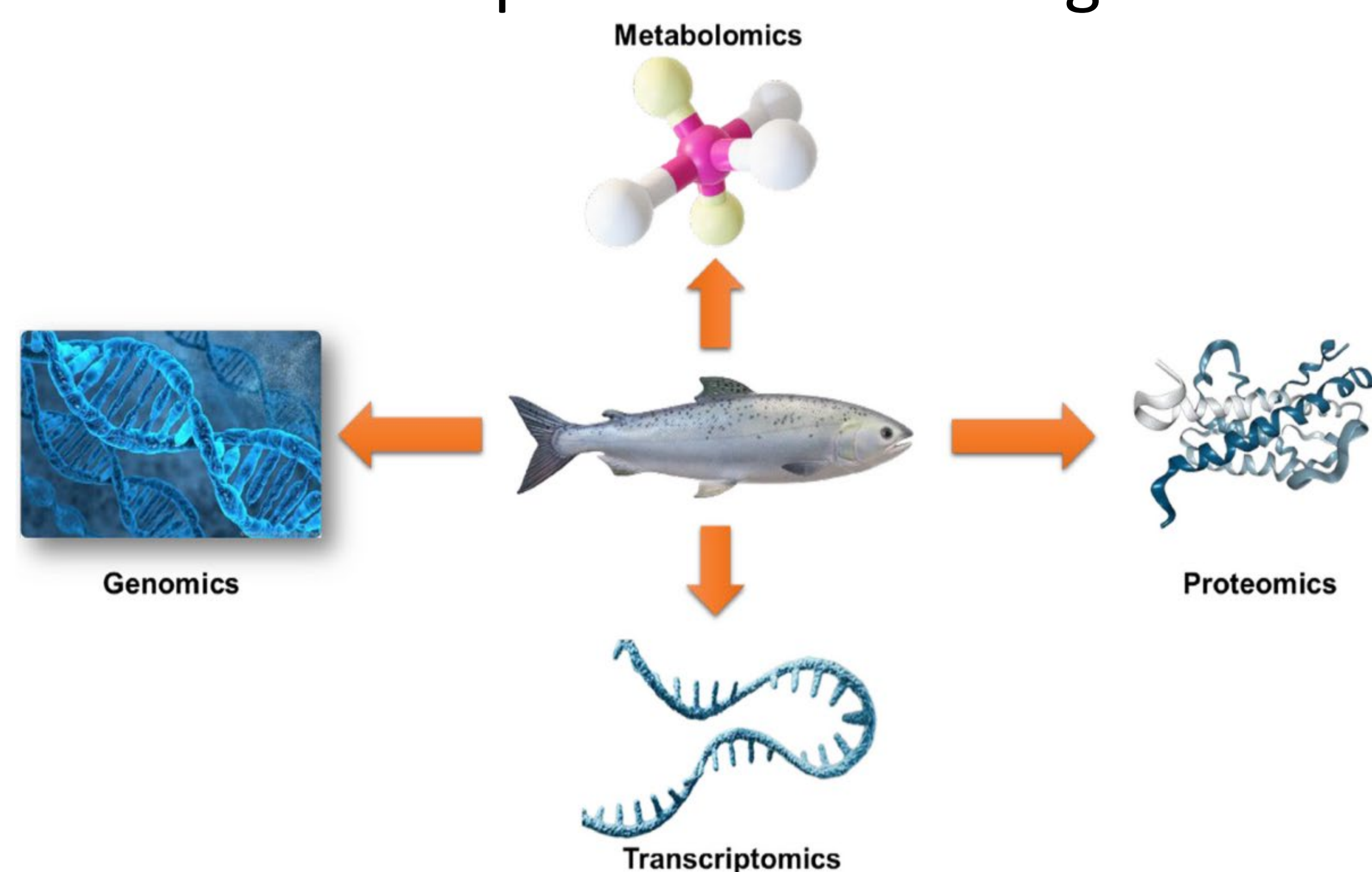


Conservation of Stress and Immune Gene Families Across Major Aquaculture Fish Species

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Background

Aquaculture environments impose thermal, oxidative, and immune stress. Successful species must maintain cellular stability under these conditions. They can do this by the relative expression of stress genes.

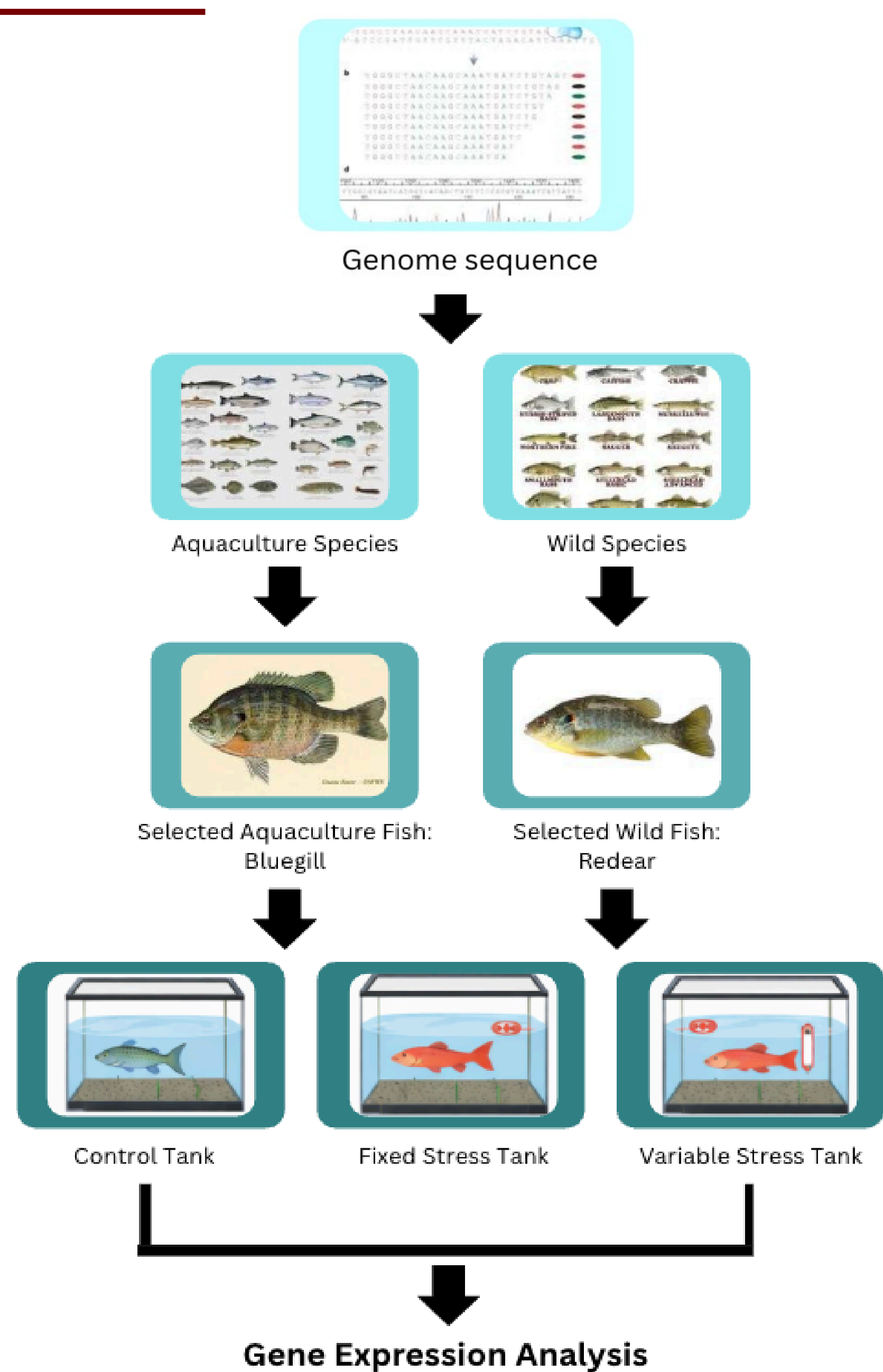


Genes driving resilience in aquaculture species. *Iqbal, et al., 3 Oct, 2025*

Objectives

Do conserved genes underlie cross-species resilience and do aquaculture fish differ from wild fish.

Methods

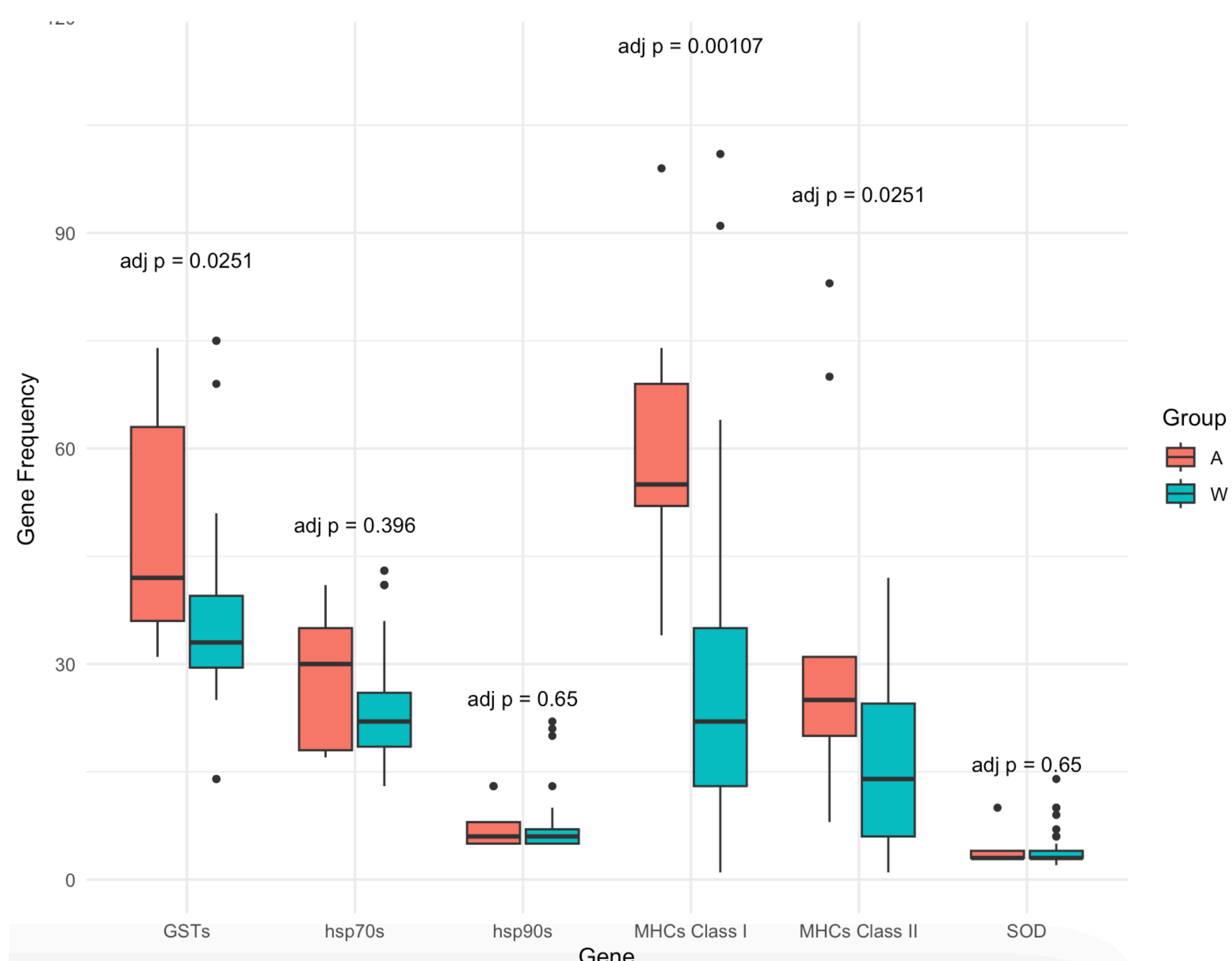


Julia Pearson, Apr 8, 2026

Results

Core stress genes (HSP70, HSP90, SOD) are conserved across groups. Immune-related genes exhibited copy number variation and all gene families remained universally present.

No significant difference in core stress gene presence between aquaculture and wild species



Stress Gene Comparison: Top Aquaculture vs Wild.

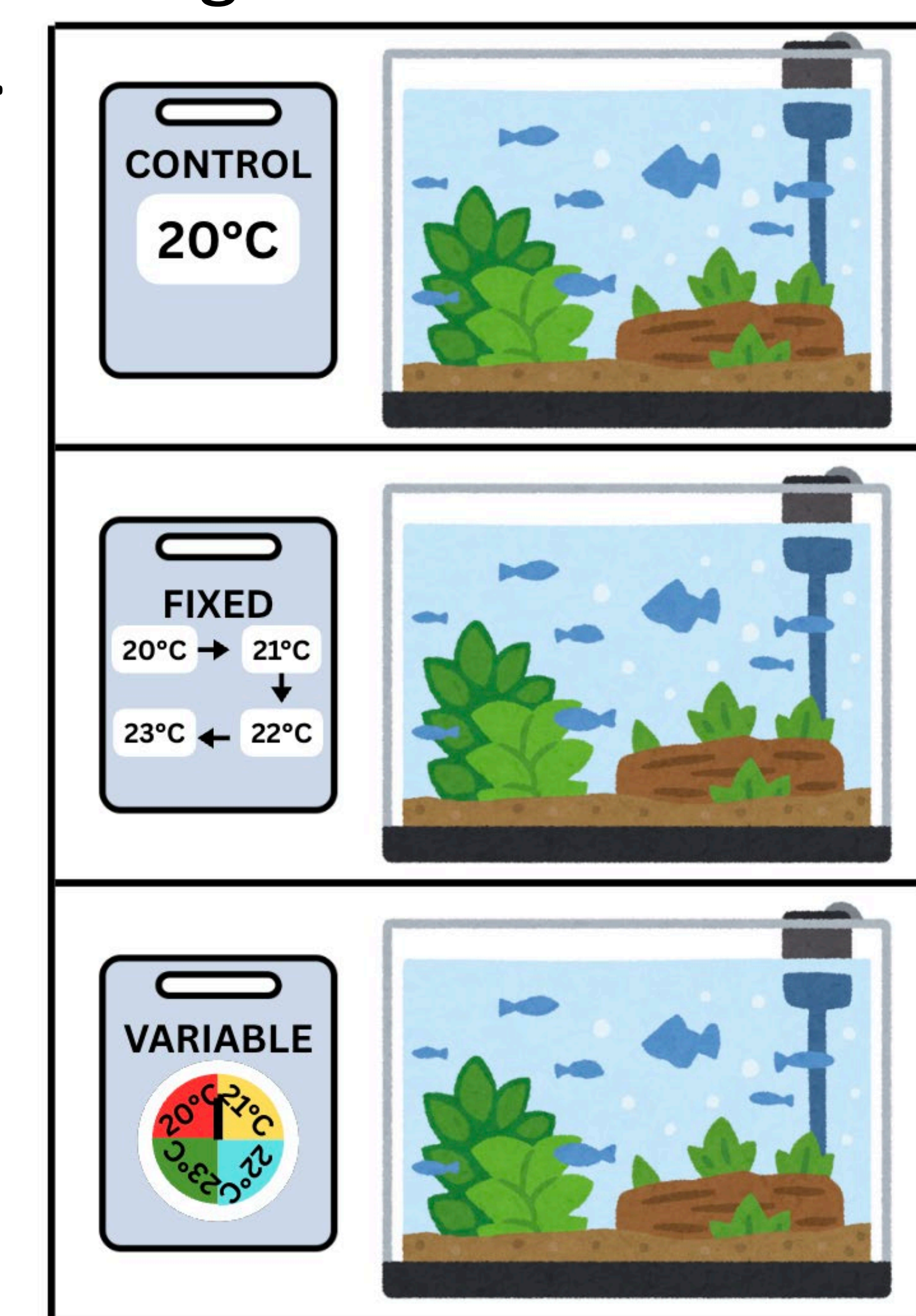
Julia Pearson, 2 Feb. 2026

Conclusion

Core stress gene conservation is consistent across species. Immune gene variability does not affect overall presence. The findings support the conclusion that **many** fish species are a candidate for aquaculture.

Future Experiment

The experimental design includes a control tank with no applied stressor, fixed stress tanks with constant exposure, and variable stress tanks with fluctuating conditions for each species of fish.



Julia Pearson and Abby Briggs, Apr 9, 2026

The measured outcomes will be the expression levels of HSP70, HSP90, and SOD, the survival rate across conditions, and the physiological stress response indicators.

Research Question

Are core stress and immune genes conserved across aquaculture fish, indicating a shared genomic basis for viability?

References:

- R Core Team. (2024). *R: A language and environment for statistical computing.*
- FishBase. <https://www.fishbase.se/>
- Stress response gene family expansions correlate with invasive potential in teleost fish <https://doi.org/10.1242/jeb.243263>