Effects of Domestication Selection in Captive Delta Smelt

Samantha Chase[1], Luke Ellison[1], Amanda Finger[2], Evan W. Carson[3], Tien-Chieh Hung[1]

[1]Fish Conservation and Culture Laboratory, University of California, Davis
[2]Genomic Variation Laboratory, University of California, Davis
[3]U.S. Fish and Wildlife Service, San Francisco Bay-Delta Fish and Wildlife Office

Introduction

- Delta Smelt (*Hypomesus transpacificus*) is endangered in the wild, but a captive population is maintained at the UC Davis Fish Conservation and Culture Lab.
- **Domestication** could unintentionally occur in captive populations, leading to **fish that may no longer be well-suited to the wild**[1].
- It is **unclear** whether Delta Smelt with **low, mixed, or high Domestication Indices (DI)* differ in growth and survival**.

  Low DI: 0-6, combination of **cultured** and **wild parentage**

  High DI: 8-10, many generations of **cultured parentage**

  Mixed DI: 0-6 (43.5%) and 8-10 (56.5%), **a mix of low** and **high** DI groups

*DI is the number of generations an individual's genome has spent in captivity[1]. See footnote for the equation of DI calculation.

Mean Length over Time

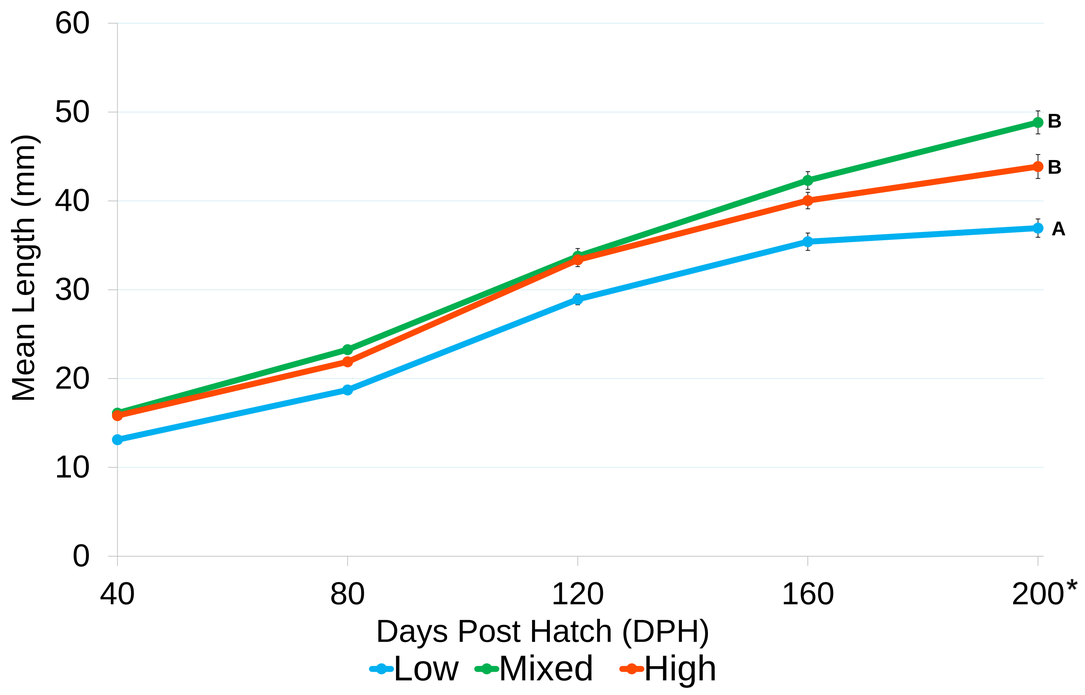

Figure 1: The length (mean, SE) of the three groups measured every ~40 days. **Low** DI length (A) was **significantly shorter** (t-test, $p<0.05$) than **mixed** and **high** DI (B) at 200 DPH. *Final **low** DI measurement at 174 DPH due to extremely low survival.

Mean Survival over Time

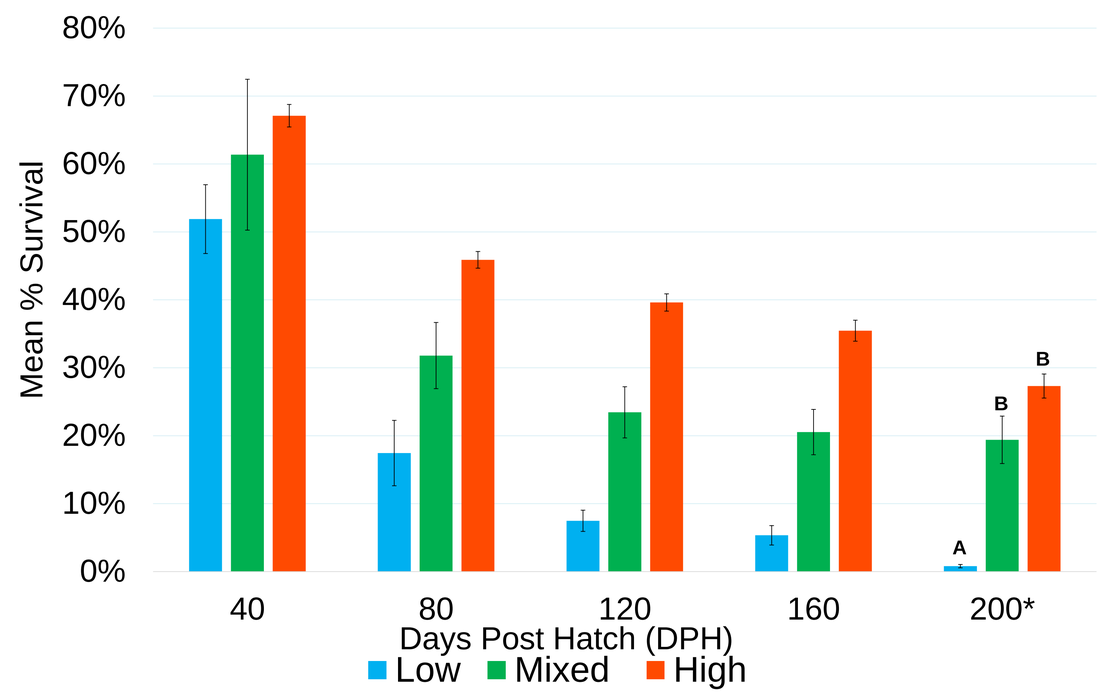

Figure 2: Survival % (mean, SE) of the three groups measured every ~40 days. **Low** DI survival (A) was **significantly lower** (t-test, $p<0.05$) than **mixed** and **high** DI (B) at 200 DPH. *Final **low** DI measurement at 174 DPH due to extremely low survival.

Low DI fish had slower growth and lower survival at 200 days post hatch compared to mixed and high DI fish.

Results and Discussion

Results

- The **fork length** of the **low** DI group was **significantly shorter** compared to the **high** and **mixed** DI groups at 200 DPH.
- The **% survival** of the **low** DI group was **significantly lower** compared to the **high** and **mixed** DI groups at 200 DPH.

Discussion

- **Low** DI *H. transpacificus* **could face slower growth** and **lower survival success** in a **captive environment.**
- Conversely, **high** and **mixed DI** fish had **faster growth and higher survival**, but their **success** in a **captive environment may not translate into success** in a **wild habitat** if they are ever **reintroduced.**

Acknowledgments

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Footnote: Wild DI=0
Captive DI= (Female Parent DI + Male Parent DI) / 2 + 1

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