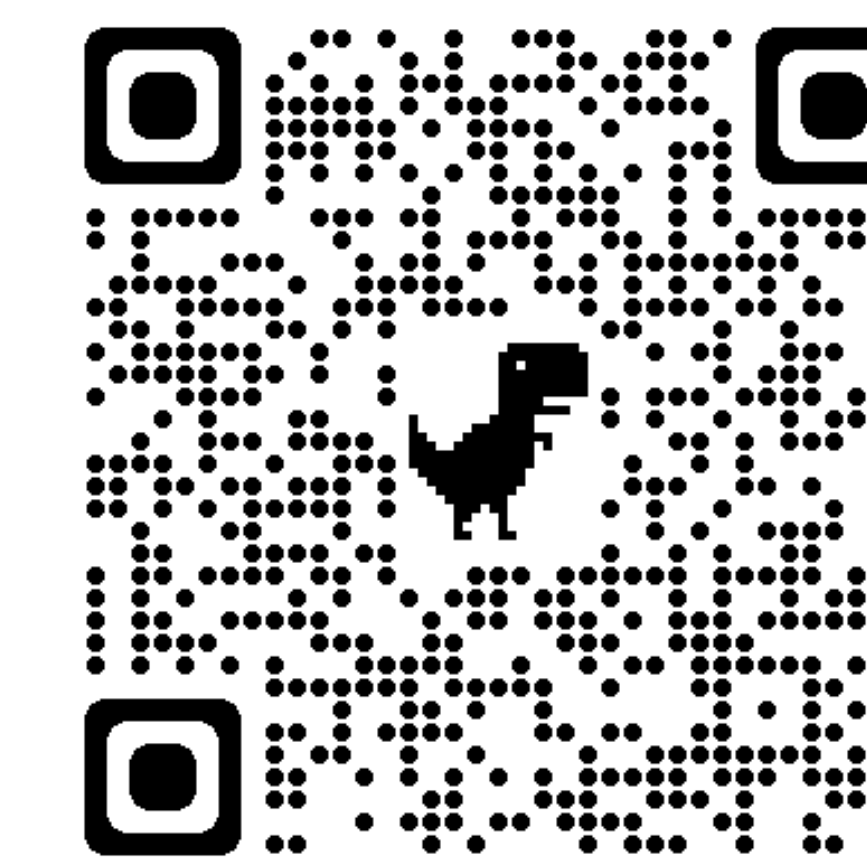




Effect of Harvest Treatment on Lipid Content in Hybridized *Heterandria formosa*

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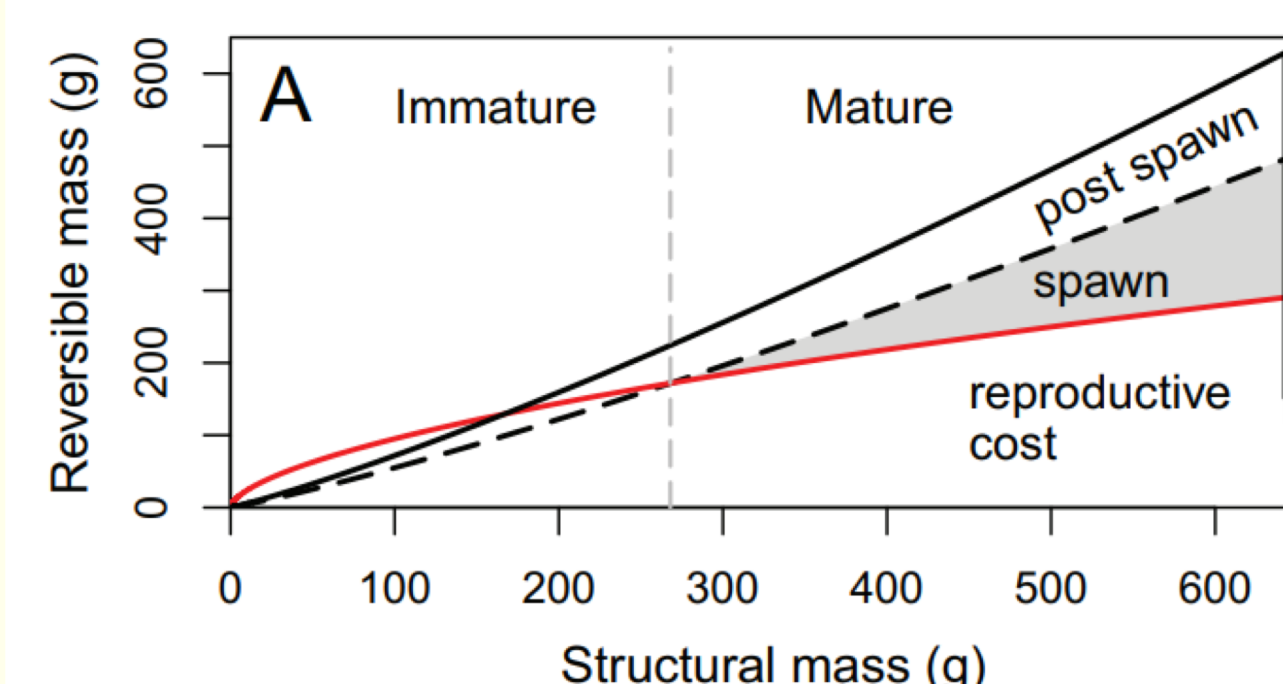


Introduction

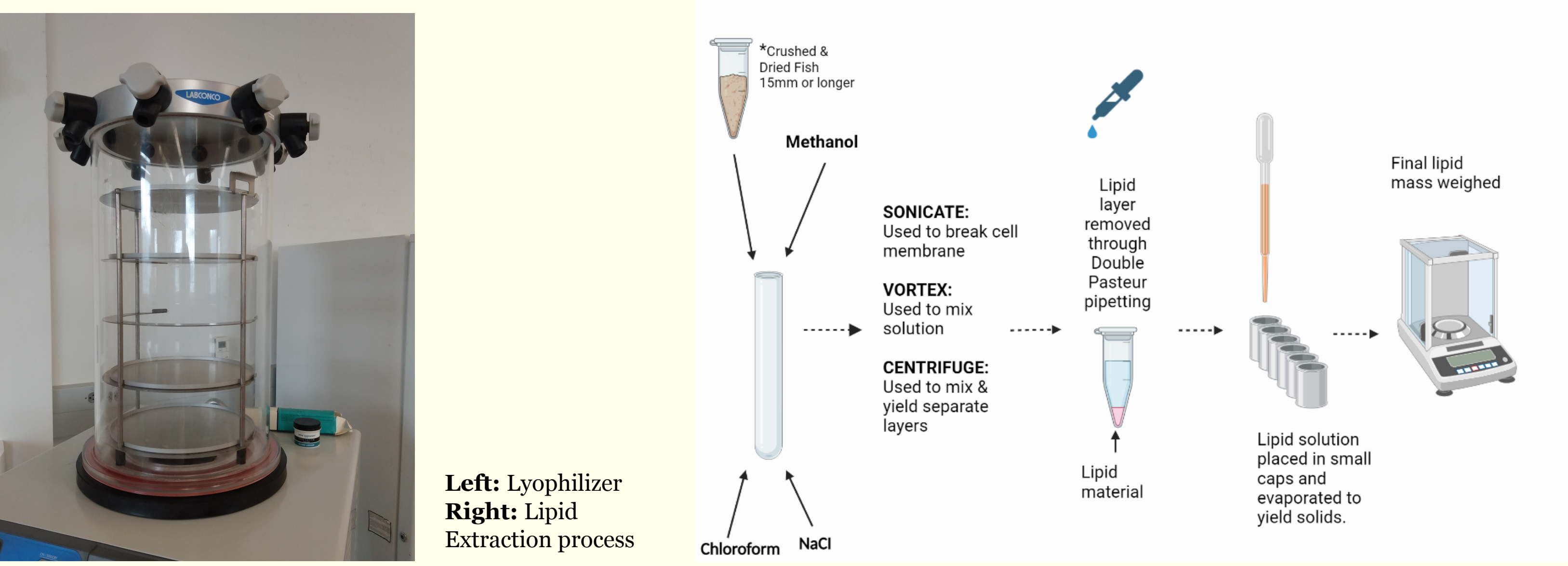
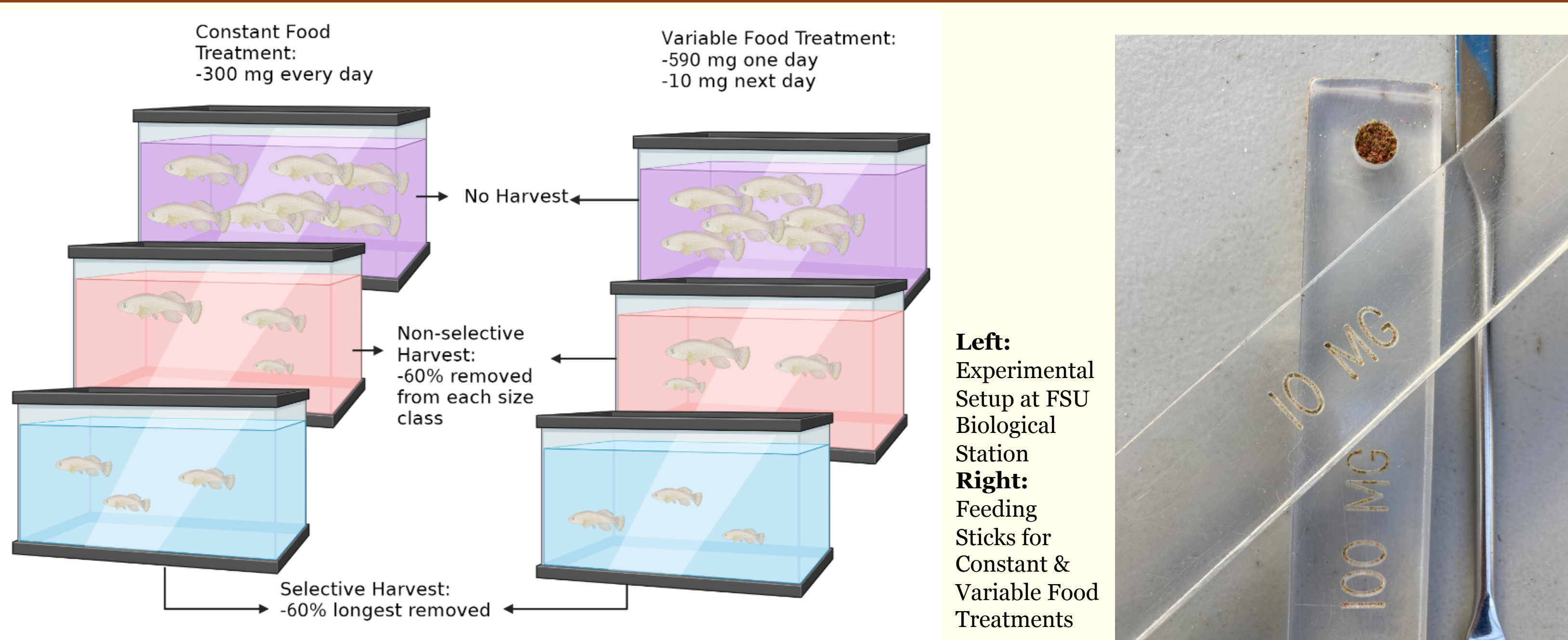
- Fish continue to grow throughout their lifespan maintaining a reversible and non-reversible mass. When food is plentiful, energy not used for somatic functions or reproduction is typically stored as fat in the body.
- Reversible mass consists of lipid-based energy storage or reproductive mass. Non-reversible mass consists of mass necessary for somatic functions and survival.
- The Least Killifish (*Heterandria formosa*) is a species native to the Southeastern United States. They are known as the world's smallest live-bearing fish.
- Two populations were interbred to create a genetically diverse *H. formosa*. By subjecting hybridized *H. formosa* to varying treatments, we assume that lipid content will differ across food availability and harvest type.
- Fish in size-selective harvest tanks are predicted to have higher lipid content due to reduced competition for food. Measuring lipid content can point to changes in reversible mass which can determine fish survival and performance.



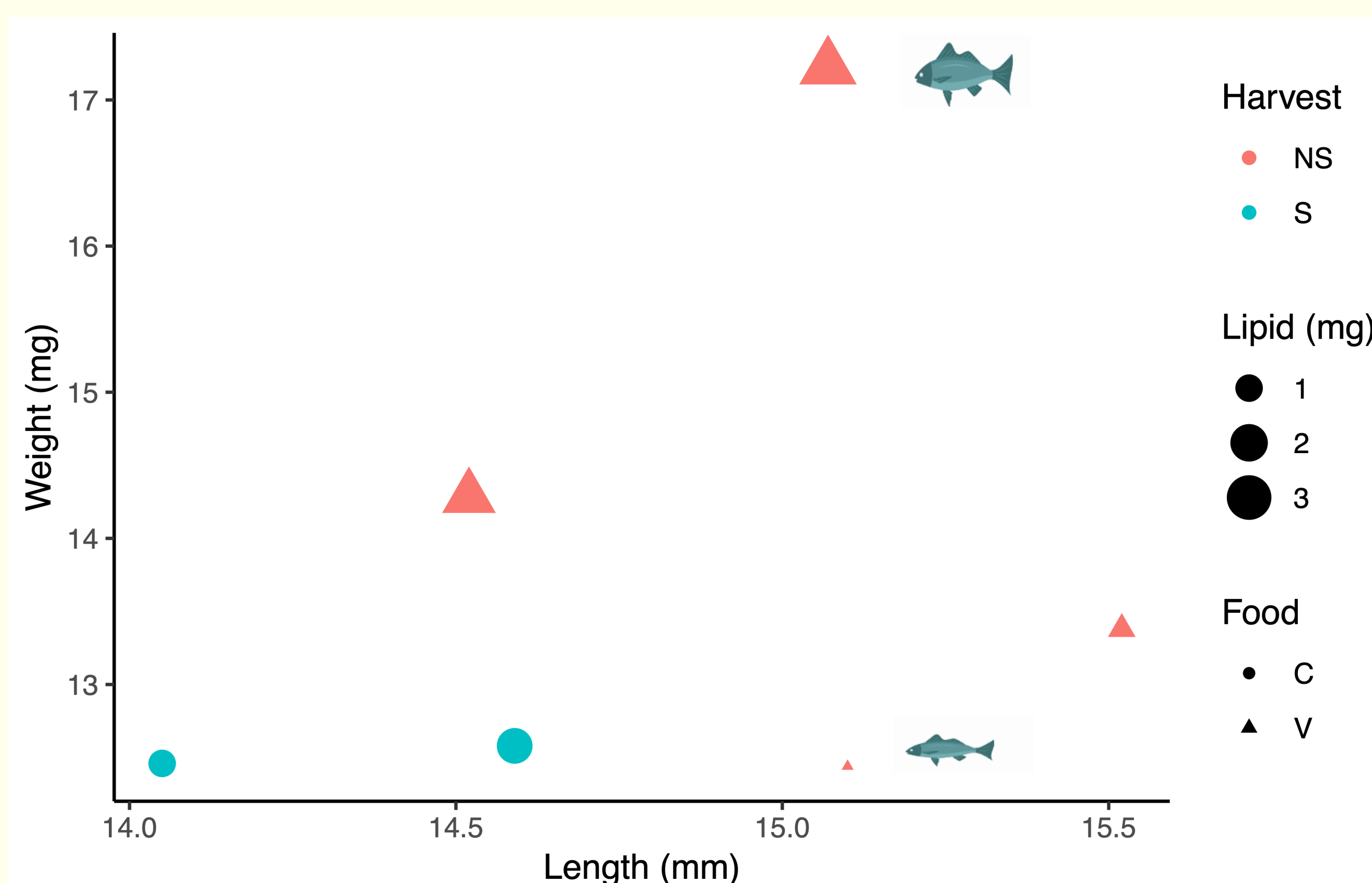
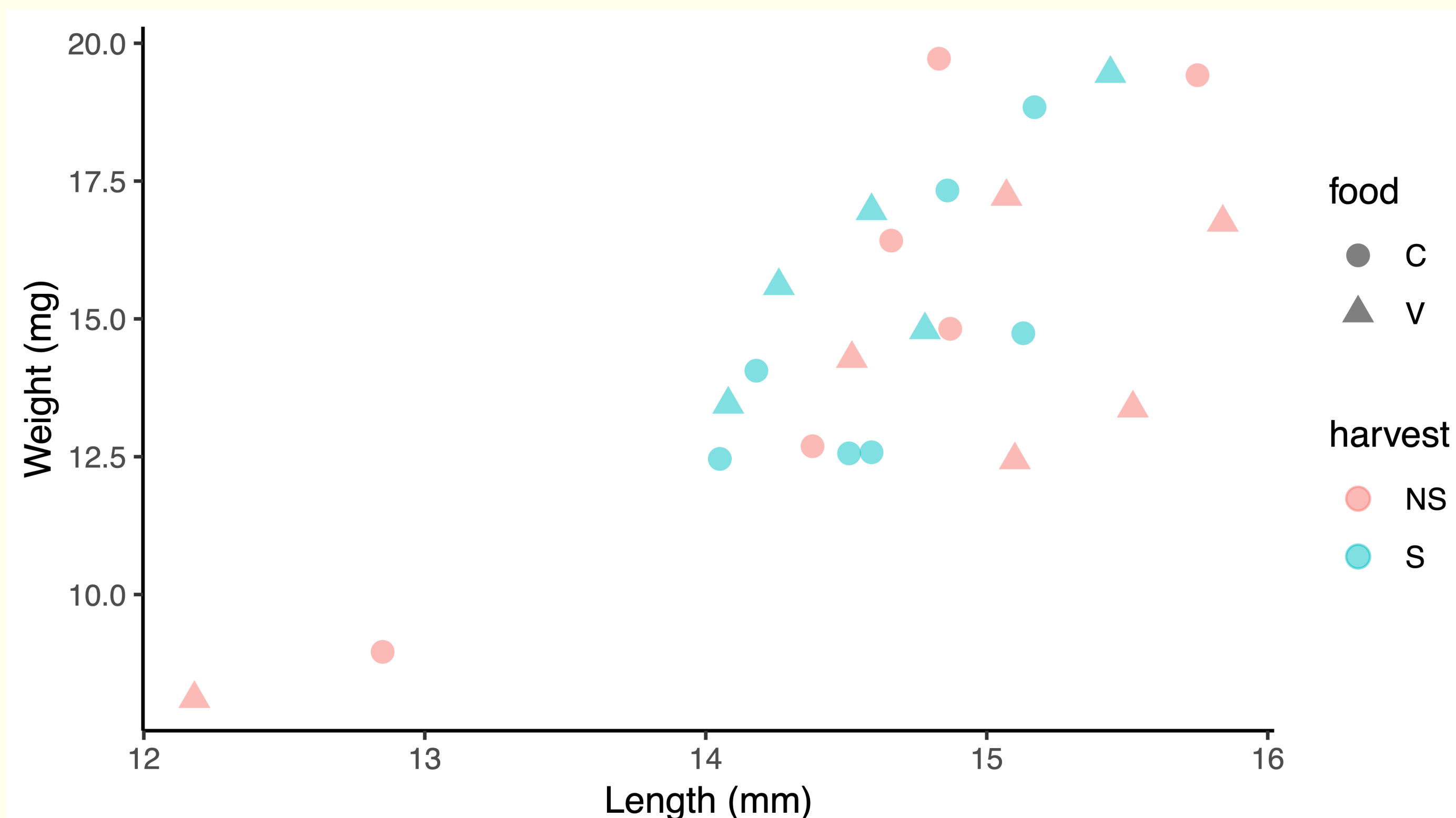
Left: Male (top) and Female (bottom) *H. formosa*. Photo Credit: Zachary Randall
Right: Graph demonstrating Reversible v Non-Reversible Mass. Photo Credit: Audzijonyte & Richards



Materials & Methods



Data



Top (Figure 1): Length and Weights of male *H. formosa* (> 15 mm) separated by harvest and food treatments. Slightly higher length-weight ratios with selective harvest treatment.

Bottom (Figure 2): Length, weight, and lipid content of male *H. formosa* separated by harvest and food treatments. Demonstrates higher lipid content with higher length-weight ratio.

Conclusions

- After undergoing selective harvest, the remaining fish in these tanks are the smallest 40% in the population. Having experienced a large decline in population there is more food and space for the survivors.
- The size of effects may not have stayed constant over time
- Since both tanks receive the same amount of food, selective harvest fish receive more food per unit body mass. This allows them to store more food as reversible mass.
- Though lipid content was a small percentage of overall weight, lipid content was shown to be higher in fish with higher length to weight ratios.
- Heavier fish were most likely to have higher amounts of fat than lighter fish of the same length (Figure 2).



Top (Photo 1): 10% difference in weight between 14.6 mm fish. Top fish weighs 65.44 mg and underwent variable food treatment and nonselective harvest. Bottom fish weighs 72.56 mg, undergoing constant food treatment and selective harvest.

Results

- Similar Trends surrounding selective harvest and variable food treatment to past experiments measuring body composition of *H. formosa*, as calculated by a generalized linear mixed effects model.
- Fish in Selective Harvest tanks were slightly heavier than those in non-selective harvest tanks (Slope: 0.05789, +5.95% from non-selective).
- Fish undergoing variable food treatment were slightly lighter than those receiving constant food (Slope: -0.03605, -3.55% from constant).
- Heavier fish had more lipid content than their lighter counterparts.

References and Acknowledgments

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