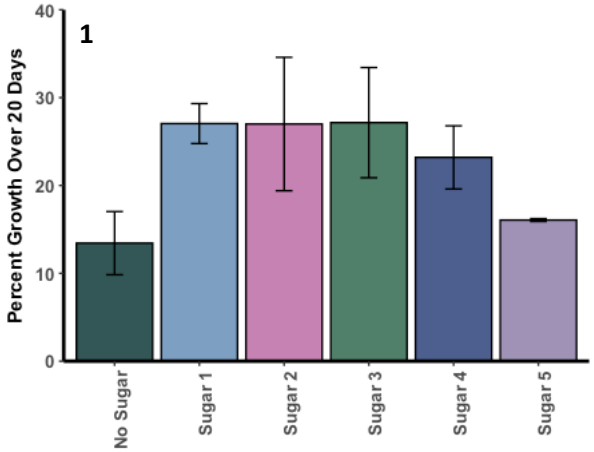
Sweet solution for an age-old problem: Exploring alternative feeds for Greenshell™ mussel spat

The sustainable growth of New Zealand's farmed Greenshell™ mussel industry faces two significant challenges. The first is ensuring a year-round supply of high-quality seed mussels to farms, and the second is reducing spat losses during grow-out. The hatchery and nursery culture of juveniles is the most promising way to navigate these issues. Hatchery production of spat enables high-quality spat to be deployed year-round, while nursery culture promotes the seeding of larger spat, which can help to overcome large scale losses of spat from farms.

One of the biggest obstacles preventing our Greenshell™ mussel industry from expanding hatchery and nursery culture is the costly and labour-intensive production of live phytoplankton feed. Attempts to replace live phytoplankton with alternative feeds have had limited success. Current alternatives lack the nutritional value of live feeds, and experimental trials have shown that they often decrease growth and survival rates. In response to this challenge, my PhD project has been focused on exploring cost-effective alternative feed options for the Greenshell™ mussels.

During my research I have found that Greenshell™ spat can efficiently absorb dissolved sugars from seawater and use them to fuel their growth. In my experiments, I used dissolved sugars as a supplementary feed to live phytoplankton, and this resulted in a 14 % increase in growth and boosted energy reserves compared to those spat that were only fed phytoplankton. This simple and affordable method of adding sugar to seawater shows significant potential for reducing the costs of nursery and hatchery culture of mussels.



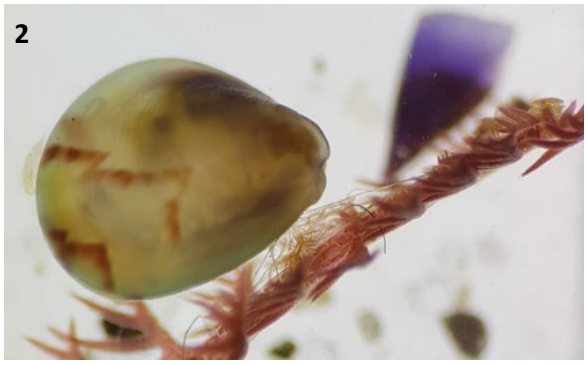


Figure 1. The percent change in the shell length of spat from each of the treatment groups from my sugar feeding experiment. Five different concentrations of dissolved sugar were used to determine the optimum concentration to enhance growth. **Figure 2.** Greenshell mussel spat, *Perna canaliculus.*

Building on this result, I am currently undertaking work to understand if dissolved sugars can be used to improve the nutritional condition of Kaitaia/Te Hiku spat before being seeded onto farms. It is possible that dissolved sugars could play the role of half-time oranges for Kaitaia spat that have typically spent a significant period without any food before they reach mussel farms. Providing these spat with dissolved sugars before deployment may give them the energy to establish successfully on seeded lines, leading to higher spat retention rates.

With just under two years left of my PhD, I look forward to continuing to explore the commercial application of dissolved sugars and experimentally testing other alternative feed options. I hope my work may reduce some of the costs associated with feeding juveniles in hatcheries and nurseries so that the industry can transition to a supply model that yields better results for our mussel farmers.

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