

## The Role of the Gut Microbiome of Marine Invertebrates in the Degradation of Complex Algal Substrates

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**Abstract :** Biological invasion is a global problem. Invasive species can threaten local ecosystems by competing for resources, consuming local species, and reproducing faster than natives. *Sargassum muticum* is an invasive algae in the UK. It negatively impacts local algae through overshadowing and can cause reductions in local biodiversity. One possibility for its success is herbivore release. According to the Enemy Release Hypothesis, invasives are less impacted by local herbivores than natives. In many species, gastrointestinal (GI) tract microbes have been found as a key factor in food preference and similar mechanisms may exist in the relationship between local consumers and *S. muticum*. Some populations of native *Littorina* snails accept *S. muticum* as a food source, while others avoid it. This project aims to establish the relationship between GI tract microbes and the feeding preferences of *L. littorea*, when offered both native algae and *S. muticum*. Individuals of *L. littorea* from a site invaded by *S. muticum* around 18 years ago were compared to those from an un-invaded site nearby. *Sargassum*-experienced snails are more likely to consume it than those naïve, and pronounced differences were found in the GI-tract microbial communities through 16S (prokaryote) and 18S (eukaryote) sequencing. *Sargassum*-naïve snails were then exposed to a faecal pellets from experienced snails to 'inoculate' them with microbes from the exposed snails. Preliminary results suggest these faecal-pellet-exposed but otherwise *Sargassum*-naïve snails subsequently begun consuming *S. muticum*. It is unclear if these results are due to genuine changes in GI-tract microbes or through some other mechanism, such as behavioural responses to chemical cues in the faecal pellets, but these results are nevertheless of significance for invasive ecology, suggesting that foraging preferences for an invasive prey type are malleable and possibly programmable in laboratory settings.

**Keywords :** invasive algae, sea snails, gut microbiome, biocontrol

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