**Reconstructing and predicting population trends of the invasive marine mud snail *Batillaria attramentaria***

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**ABSTRACT:**

Marine invasive species are often characterised by rapid population growth and dispersal ability. Unlike most marine invertebrate species, the Japanese mud snail (*Batillaria attramentaria*) — an invasive species first reported in BC beaches in the 1960s — does not have a larval stage that can facilitate dispersal. Instead, they lay eggs that develop directly into benthic juveniles. Such an unusual reproductive mode should result in rapid increases in local population density, but how quickly populations density and whether beach characteristics mediate density changes remain unclear. We have compiled mud snail density data from multiple researchers across 13 sites, distributed from Quadra Island, BC to Padilla Bay, USA. These sites were each surveyed at least once between 2014 - 2024. We will first compare survey methods used in the original surveys before re-surveying these sites in spring 2025. This will allow us to estimate current Japanese mud snail densities and determine changes in population size over time. In addition, by measuring beach characteristics such as intertidal slope, substrate characteristics, presence of potential competitors and predators, we will be able to identify key correlates of Japanese mud snail population. Studies such as this will help us to predict, from the onset of colonization events, where hotspots of the Japanese mud snail density are likely to occur.

**BIOGRAPHICAL SKETCH:**

The lead author, Jocelyn R. Heywood, is an undergraduate student in the Department of Biological Sciences at Simon Fraser University, who is studying ecology and conservation. She is currently undertaking her honours research on changes of density and distribution of Japanese mud snails (*Batillaria attramentaria)* in southwest British Columbia under the supervision of Dr. Isabelle M. Côté.

**INTRODUCTION**

Increasing global connectivity is increasing the rate at which invasive species are introduced to new areas (Colautti et al. 2006). These introductions can have harmful ecological effects and threaten local biodiversity (Wonham and Pachepsky 2006). Because of this, it is important to understand and track  densities and distribution of invasive species. Marine invasive species in particular are often characterized by rapid population growth and dispersal ability. *Batillaria attramentaria* (hereafter referred to as *Batillaria*)*,* commonly known as the Japanese mud snail, successfully invaded the West Coast of North America with the Japanese oyster *Crassostrea* in the early 20th century (Byers 1999, Quayle 1964). Now, *Batillaria* ranges from California to British Columbia (Bonnot 1935). *Batillaria* has an interesting life cycle as it lacks a planktonic stage (Furota et al. 2002). Instead, they lay eggs that develop directly into benthic juveniles (Furota et al. 2002). Such an unusual reproductive mode may aid in their ability to maintain and increase populations as they recruit in their parent habitat; especially helpful in fragmented areas (Kanaya et al. 2022). High densities of *Batillaria* are a problem as they can compete for resources with native species potentially displacing them as seen with some native mud snails (Byers 1999). Also, they have the potential to provide aid in the establishment of other invasive species as seen in Washington State, USA (Wonham et al. 2005). How quickly population density and whether beach characteristics mediate density changes remains unclear. Studies that re-survey sites and calculate rates of density change help us to predict, from the onset of colonization events, where hotspots of *Batillaria* density are likely to occur.

**METHODS**

**Study sites**

**RESULTS**

**DISCUSSION**

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**REFERENCES**