The Effect of Water Turbulence and Stocking Density on Mactromeris Polynyma Growth and Survival in a Subtidal Nursery Setting

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Introduction

The Arctic surfclam, Mactromeris polynyma, while native to the Maine coast is generally found only in deep water. The market for these clams has historically been restricted to their use in Asian cuisine. In an attempt to improve the declining clamming industry in Downeast Maine the Downeast Institute (DEI) is attempting to cultivate Mactromeris in a similar way as other shellfish already being cultivated.

This study examined growth and survival of cultured Arctic surfclam juveniles at a sheltered site (Inner Mud Hole Cove 44.4852778°, -67.5836889°) and a more exposed site located approximately 650 m away at the mouth of the cove. It was hypothesized that the more sheltered site might present more favorable conditions for growth and survival (more food, less stress due to wave action).

In addition, the study examined intraspecific density on surfclam growth and survival. In previous studies (Beal et al., 2016, unpub.) clams stocked at lower densities tended to show higher survival and growth. Clams were stocked at either 40 or 20 per tray in this experiment.

Objective

To determine the interactive effects of exposure (sheltered vs. exposed) and intraspecific density on growth and survival of cultured individuals of Mactromeris polynyma.

Materials & Methods

- 48 fish box trays (dimensions), modified with pet screen (1.8 mm aperture) were stocked with either 20 or 40 cultured Mactromeris juveniles (4-8mm shell length) and 4 trays (two replicates of each density treatment) were placed in modified lobster cages. On 1 June 2016, 6 cages were deployed subtidally both at the mouth of Mud Hole Cove and inside the cove. The experiment was left to run for approximately 2 months. On 27 July 2016, the cages were retrieved and all samples were processed within 2 days.

- To determine treatment effects on growth, 10 animals were randomly selected and the initial and final shell length (SL) of each live clam was recorded to the nearest 0.01 mm using Vernier calipers.

- To determine treatment effects on survival, all clams within each tray were counted and percent survival was estimated by dividing the number of live animals by the stocking density (20 or 40 individuals/tray).

Discussion

- It has been found in previous studies that it is necessary to grow clams to a length of at least 8-10mm before they can be seeded on flats. Limited space in hatcheries thus leads to the need for nursery sites in the ocean where clams can continue to grow after they leave the hatchery until they are of appropriate size for seeding. Nursery sites are very well protected coves, such as Mud Hole Cove.

- This study was conducted to see if clams could tolerate nursery settings with medium-low water turbulence. The average initial SL was 7.1099 mm and the average final SL was 11.3456 mm. This study found no significant difference between the growth and survival of clams at either the well protected inside of the cove or the less protected mouth of the cove.

- In addition, no significant difference in growth or survival was found between clams stocked at 20/tray or those stocked at 40/tray. This suggests that other, relatively exposed sites may be suitable for nursery grow out of hatchery clams.