Introduction

Seagrasses face a wide range of stressors and as a result their distribution is declining on a global scale. The rate of the decline is accelerating. Zostera marina (eelgrass) is a protected species of seagrass in New England and Atlantic Canada that provides many important ecological functions. Overgrowth of eelgrass leaves by invasive species of tunicates represents an additional stressor for eelgrass. Eelgrass is a native species of seagrass that occurs along the North American coast from the Carolinas to Newfoundland (about N 39° to N 50°).

The interaction of invasive tunicates and eelgrass is generally negative for eelgrass. When B. violaceus and B. schlosseri were attached to eelgrass, the transmission of light was decreased and eelgrass shoot growth rate was reduced (Wong and Vercaemer 2012). B. violaceus, B. schlosseri, D. vexillum, and A. aspersa blocked 75-80% of ambient light, resulting in reduced growth rate, reduced number of leaves per shoot, reduced canopy height, and higher leaf sugar concentrations (P. Colarusso et al. manuscript in prep).

When tunicates colonize eelgrass leaves, the habitat value of eelgrass for other organisms is reduced. Tunicates take up space that would otherwise be occupied by bay scallops (Argopecten irradians) (Carman and Grunden 2010). Scallop larvae will not settle on D. vexillum (Morris et al. 2009), nor will juvenile or adult mussels and scallops attach to it (Valentine et al. 2007). Reduced habitat complexity (fewer leaves, shorter canopy height) equates to less habitat value for fish.

Due to the negative impacts of this interaction between tunicates and eelgrass and warming ocean temperatures due to global climate change, our study was as attempt to document the latitudinal extent of this interaction in the western North Atlantic.

Methods

- Nineteen sites (Figure 1) were sampled from July to October
- Quadrat (1/16m²) samples were collected within each eelgrass meadow
- Tunicate species presence and percent coverage of individual eelgrass shoots was recorded
- Eelgrass shoot density, canopy height and, where possible, above ground biomass was measured
- Where possible, water temperature was recorded

Results

- The most commonly found tunicates were Botrylloides violaceus and Botryllus schlosseri (Figure 2)
- In total 8 species were found of which only one is considered a native species (Molgula manhattensis)
- The most common coverage was 0-25% with up to 75-100% coverage
- When tunicates are attached, the canopy height of the eelgrass is less than when tunicates are not attached (absent)
- Tunicates tend to occur on eelgrass in deeper (cooler) water, but they can be found on eelgrass in shallow intertidal pools and deeper subtidal meadows.
- Ciona intestinalis was only found on eelgrass in Newfoundland, where it is a new invader

Conclusions

- Tunicates are colonizing eelgrass over a wide range, thus this does not appear to be the result of limited, localized hard substrate availability
- The number of tunicate species now showing the ability to colonize eelgrass may be increasing

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