

SEAGRASS ECOSYSTEMS AND ENVIRONMENTAL CHANGE: EFFECTS OF MULTIPLE STRESSORS ON PLANT-HERBIVORE INTERACTIONS

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The ecological impact of multiple stressors is hard to predict, and when these stressors impact foundation species, such as seagrasses, the effects can cascade throughout the entire ecosystem. Gulf of Mexico ecosystems are currently experiencing a suite of novel stressors, which include increased water temperature accompanied by increased herbivory due to tropicalization. In this study, we investigated the impact of these stressors on *Thalassia testudinum*, the dominant seagrass species in the Gulf of Mexico, and herbivore feeding activity by integrating a mesocosm study with feeding trials using the sea urchin *Lytechinus variegatus*. We found that warming temperatures will negatively impact *T. testudinum* meadows both directly through reduced biomass, productivity, density, and structural complexity as well as indirectly through increased palatability due changes in leaf tissue nutrient concentrations and leaf toughness. Feeding choice experiments support these findings, as *L. variegatus* individuals frequently selected seagrass leaves that were grown under heated conditions over those grown under ambient temperatures. However, our results indicate that grazing treatments induced increases in leaf toughness and interacted with temperature treatments to mitigate losses in the number of leaves per plant. While these positive effects of grazing may counteract some of the negative effects of rising temperatures, we predict that future coastal conditions with warmer temperatures and increased herbivory will yield diminished seagrass structure and cover, as all plants grown under heated conditions exhibited reduced density, biomass, and productivity. This loss of biomass will compound current global declines in seagrass cover, and decreases in seagrass structure and cover will likely have deleterious consequences for associated species as well as coastal economies that rely on seagrass ecosystem services.

PRESENTER BIO: Jamila Roth is an Interdisciplinary Ecology PhD student at the University of Florida. For her dissertation, she is focusing on the effects of changing environmental conditions on seagrass communities and exploring mechanisms for increasing the resilience of seagrass ecosystems.