

Summary of Sea Urchin Research at St. Joseph Bay

Patricia Prado, Ph.D

Project 1: Influence of seagrass canopy structure in juvenile and adult sea urchin predation: a mega-scale comparison across temperate (Mediterranean – North Florida – Western Australia) ecosystems.

The objective of this study was to assess the relative importance of age-dependent predation (sea urchin sizes ≤ 1 cm and ≥ 3 cm) across temperate ecosystems. Predation rates at the St. Joe Bay State Park were investigated on a mixed seagrass area by deploying tethered sea urchin individuals (juveniles and adults) within the canopy of the three seagrass habitats characteristics of the Gulf of Mexico region (*Thalassia testudinum*, *Halodule wrightii* and *Syringodium filiformis*) and in adjacent sandy areas (experimental control) and then counting the numbers of individuals consumed per day. The abundance and size distribution of sea urchins as well as the abundance of potential benthic predators (e.g. gastropods and crabs) was also determined within each habitat. Habitat characteristics investigated included shoot density, seagrass cover, canopy height, and shoot biomass.

Project 2: Functional trophic role of the sea urchin *Lytechinus variegatus* as an herbivore and as a detritivore: multiple evidence from leaf tethering, stable isotopes and food preference experiments.

In this second project, we investigated the magnitude of herbivory (i.e. consumption of living seagrass leaves) versus detritivory (i.e. consumption of detached seagrass leaves) processes as well as the mediating influence of epiphytic communities in the trophic status of sea urchins. To this end, we first conducted tethering experiments with living shoots and decaying leaves of the seagrass *Thalassia testudinum* as well as local estimates of biomass in order to determine consumption rates per m^{-2} and d^{-1} for each resource. Secondly, food preference experiments were also conducted using paired-item combinations of living and decaying *Thalassia* leaves with and without epiphytes. Differences in the epiphytic community between living and decaying leaves were investigated by genus-level identification. Nutrient and stable isotope analyses of the different food sources (living and decaying seagrass leaves and their respective epiphytic communities) and the consumer *Lytechinus variegatus* will also be conducted to provide a more integrative temporal assessment on the importance of each food resource in the sea urchin diet.