Apr 12th, 8:30 AM - 11:30 AM

Do Differing Enrichment Methodologies Affect the Belowground Productivity of Spartina Alterniflora?

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Coastal marshes, composed dominantly of *Spartina alterniflora* grasses, provide nursery habitats for marine species, food and habitat for migratory birds, and support commercial and recreational fishing. Yet, throughout the past 200 years, Louisiana's coastal wetlands have been significantly declining due to sea level rise, subsidence, and anthropogenic impacts. Enrichment, or introducing nutrients to the affected areas, may facilitate marsh growth and production; however, research disagrees if *Spartina* nutrient enrichment increases or reduces the belowground biomass. This disagreement is important because a decrease in belowground biomass increase marsh susceptibility to erosion and may reduce the ability of marshes to keep up with sea level rise. Results of previous studies on belowground production may disagree due to different enrichment methodologies in which nutrients are introduced by either dissolving fertilizer directly into the water column (mimicking eutrophication) or by adding fertilizer to sediments. We hypothesized that this enrichment location, above or belowground, may affect Spartina production patterns. To determine how nutrient location would impact the production of *Spartina alterniflora*, we enriched $0.25m^2$plots of marsh with Osmocote fertilizer. The plots were enriched in three different ways: aboveground only, belowground only, or a combination of above and below (additively and substitutively) for a total of N=7. To measure how nutrient delivery impacted belowground biomass, we used ingrowth bags and cores taken from each treatment. Core samples were washed and sorted into live and dead root and rhizome biomass, then dried and weighed to a constant weight. Ingrowth bags were sorted for live biomass and then dried and weighed. Nutrient enrichment did not significantly affect root production in any treatments of the ingrowth bags. The impacts of fertilizer enrichment on belowground biomass at differing depths in core samples will be discussed. Understanding the effects of nutrients on belowground biomass is important for restoration efforts which seek to protect marshes from subsidence, erosion, and sea level rise.