Determining Plant Suitability for Floating Treatment Wetlands in Coastal Brackish Stormwater Ponds

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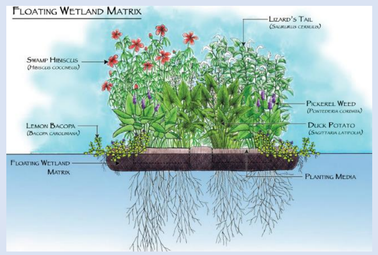
Background

Stormwater ponds

- > 9,000 stormwater ponds in coastal SC
- Water quality concerns prevalent

Floating treatment wetlands

- Demonstrated success in freshwater ponds



Objective

Determine whether floating treatment wetlands improve water quality in brackish environments

Experimental Design & Methods

Salinity Tolerance & Nutrient Uptake

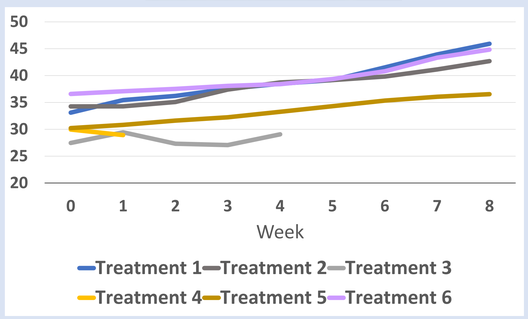
- Six plant species were screened over 2-6 salinity levels
- 2.5 - 5 ppm N (13N-2P-13K)

Methods

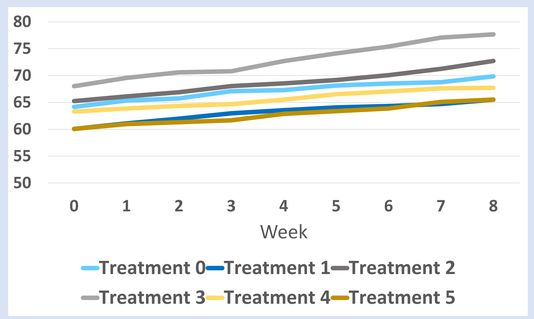
- Measure growth for 8-weeks
- Quantify stress symptoms
- Collect water quality data
- Quantify nutrient dynamics

Results

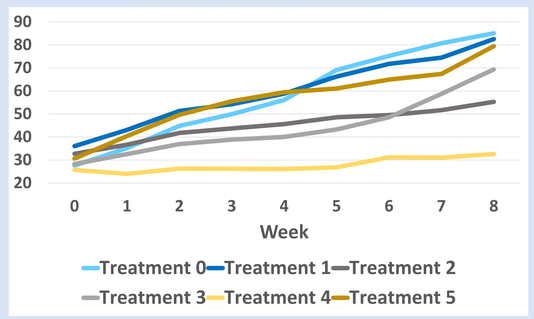
Kosteletzkya virginica



Borrichia frutescens



Bacopa monnieri



Key Treatment 0 = Freshwater; Treatment 1 = 0.5 ppt; Treatment 2 = 5.0 ppt; Treatment 3 = 10 ppt; Treatment 4 = 18 ppt; Treatment 5 = Increasing salinity; Treatment 6 = Random salinity

Discussion

- Most plants survived best in lower salinities < 5 ppt
- Only a few plants survived in brackish water > 10 ppt
- Understanding salinity ranges in your pond to determine the right plant.

Plant Species	0.5 ppt	5 ppt	10 ppt	18 ppt
Kosteletzkya virginica	●	●	○	⊘
Hibiscus coccineus	●	○	⊘	⊘
Spartina alterniflora	●	●	●	●
Borrichia frutescens	●	●	●	●
Canna flaccida	●	○	⊘	⊘
Bacopa monnieri	●	●	●	○

● = **Recommended for use in this salinity**

○ = **Plant can tolerate periods of this salinity but not recommended for prolonged exposure**

⊘ = **Not recommended**

Next Steps

Field scale studies of FTWs will begin in Spring 2023 at three brackish stormwater ponds. Design of FTW will be guided by results from this project.

Acknowledgements

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