Saving Distichlis spicata , Saltgrass

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Abstract

Salltgrass (Distichlis spicata) is a vital Gulf Coast plant currently threatened by environmental shifts and manmade beach repairs. This study addresses the limited existing knowledge regarding Saltgrass cultivation by exploring natural growth solutions that do not disrupt surrounding ecosystems. Specifically, the research investigates: How does Saltgrass respond to varying tidal conditions and glass sand concentrations?

In partnership with Glass Roots, a company specializing in recycled glass materials, Saltgrass was monitored across four water stages—high tide, medium tide, low tide, and drought—using four different concentrations of glass sand. Experimental results indicated that high tide conditions with a medium amount of glass yielded the most significant growth. In contrast, medium tide conditions showed the highest health decline and variation, likely due to rapid regional weather changes or a general lack of data on the species. We conclude that utilizing glass sand is a safe, effective method for encouraging Saltgrass restoration and stabilizing Gulf Coast shorelines.

Research Question

Asking Questions

Why is Distichlis spicata (Saltgrass) important to our area?
Where is it commonly found?
What areas have it the most?
How does saltgrass grow in different environments?
Can saltgrass tolerate extreme temperatures?

Introduction

Salt grass is a revolutionary investment for the Gulf Coast. It helps with the erosion caused by rising tides. With the reduction of erosion, our beaches are more stable and the shoreline can better protect cities from natural disasters. Furthermore, the animals that inhabit the shorelines where this saltgrass will be planted are better protected. The saltgrass protects sand dunes because of its long, almost tunnel-like roots that dig deep into the sand and support it. The way it grows is extremely unique. Because of its thick roots, the salt grass spreads rapidly and clumps together in large, thick mats that float over the water. This is the same process with sandy soil. Because of this, it helps act like a natural filtration system. The best environment for saltgrass is where sand is abundant.

Unfortunately, there is a shortage of salt grass, due to a lack of growers and changes in the environment. Salt grass is used for a wide variety of things, making it an important resource for everyone. For example, people use it for livestock, medicine, restoring wetlands, and spice. Lots of companies and movements use saltgrass, such as Miles Pharmaceutical which uses it to treat respiratory allergies (found in Saltgrass, Distichlis spicata, Plant Fact Sheet). There's also the Theodore Payne Foundation, this foundation sells salt grass in order to encourage its growth in native areas (Distichlis spicata - Saltgrass (Plant) – Theodore Payne Foundation). These foundations use saltgrass to help both our shorelines and our bodies of water. Furthermore, without saltgrass, our beaches are ruined by removing the stability in the sand dunes. That damages the environment by reducing the filtering system that keeps the water clean.

Salt grass also helps a multitude of animals such as the waterfowl and Florida salt marsh vole (both endangered species) by providing them with a food source. It also helps ducks in the same way since they are reported to eat their dried seeds. Not only does it work as a food source, the plant is also a shelter for local beach birds, sea turtles and butterflies to lay their eggs. The saltgrass roots that hold down the sand dunes help provide a stable place for these animals to nest and lay their eggs. Whenever the salt grass decomposes they also provide a source of nutritional food for animals such as clams, crabs, and fish.

Salt grass is known as a good source of soil nutrients, for example, when the roots of the salt grass decay, lots of nutrients get absorbed by the soil. This makes it a more suitable habitat for healthy bacteria to grow and positively impact the growing cycle and the animals that live in salt marshes.

In addition, Saltgrass is a very under researched plant so it's best that we learn more about it to see what it actually does and how it benefits our environment. From what we currently know, Saltgrass helps filter water for drinking, prevent erosion, and help with crop growth. This is a further reason as to why people should help this plant grow along our beaches. If we continue to learn about Saltgrass, we could potentially save thousands of marine species or other sand growing plants and animals.

With all that said, salt grass prevents erosion which stabilizes a species' way of reproducing, as well as providing a habitat that benefits humans as well. Saltgrass should be taken into consideration when going to the beach or thinking about helping the environment. Saltgrass is a vital instrument in coastal environments for both the benefit of humans but also the plant itself and surrounding environments. Saltgrass is very important despite our limited knowledge on the subject, but this fails to stop us from seeing the facts, pushing us to continue working with Saltgrass to continue its growth along beaches in the coast.

Research Methods

Testing: How does salt grass grow in different water conditions?

Land Cover (Biometry): Once a week, the plants were measured by tracking the tallest grass blade and counting the number of stems to monitor growth trends.

Soil Characterization: Each container was filled with a specific 50% glass sand and 50% regular soil mixture to test the viability of recycled glass materials in coastal restoration.

Hydrology: Water conditions were strictly controlled using a drip regulator and solar panel timer to simulate four distinct tidal stages: high tide, medium tide, low tide, and drought.

- 6 containers with saltgrass planted in 50% glass sand/50% regular soil each container will have holes drilled in the appropriate spots to maintain water levels.
- Each container contains 15 plants.
- 2 containers are high tide.
- 2 containers are medium tide.
- 1 container low tide.
- 1 container drought.
- Drip regulator to water plants hooked up to a solar panel timer.
- 1 barrel of fertilized water.
- Check and add water and fertilizer 1 to 2 times a week according to water level in the barrel.
- Once a week plants will be measured to monitor growth.
- Will measure the tallest grass blade. Will also count the number of stems.
- Chart data.

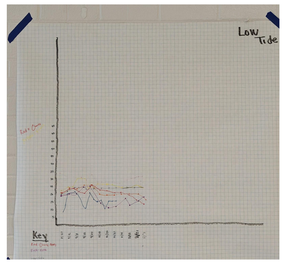
Location of Plants

The experiment was conducted at Bayou View Middle in the United States. The study site is located within the Gulf Coast region, specifically targeting the preservation of plants in the southern half of the U.S.. This area is characterized by a humid subtropical climate, which often experiences rapidly changing weather patterns that can affect plant health and tide levels. The site focus is on manmade beaches and surrounding coastal environments that are currently undergoing repairs and experiencing environmental stress.

Picture 1 shows Medium tide plant health, Picture 2 shows low tide plant health, and picture 3 shows high tide plant growth. Plants photographed in the fall.

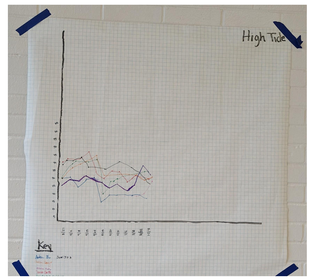
Results

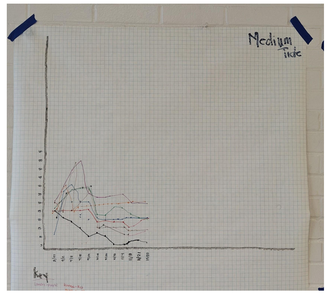
Analyzing Data



The low tide has relatively stayed the same or has dramatic changes over the months with one death with the grass.

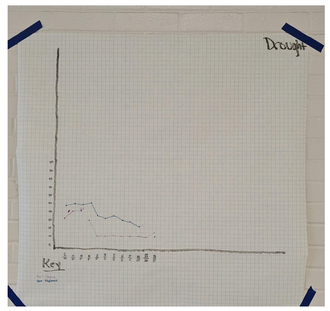
The high tide has varied the most with dramatic growth and decay with the glass.





Medium tide has had the most growth over the months and shows the best living conditions for saltgrass with the glass inside.

Drought has had the least about of growth and decay and has stayed the same with the glass.



Discussion

Saltgrass is a plant that is worth protecting. Saltgrass can protect our beaches from erosion, provide protection and food for animals, and can be used for things like medicine and livestock. Our goal is to ensure that these grasses remain abundant throughout the Gulf Coast. Our experiment results show that salt grass grows best in medium tide conditions, since the plants grow relatively taller than saltgrass in other experiments. The research also shows that saltgrass does not grow as well in low tide or drought conditions. One way to battle erosion is to use glass sand. Glass sand can hold salt grass in place. Groups like Glass Roots are starting to make glass sand. Also, encouraging people to plant salt grass themselves is another way to aid the plants' restoration. Participating in restoration projects can keep saltgrass on the coast.

Conclusions

Our research demonstrates that Saltgrass (Distichlis spicata) is a vital instrument for coastal stability, though its growth is highly sensitive to tidal conditions and soil composition. After monitoring growth across four water stages, we conclude that high tide conditions paired with a medium amount of recycled glass sand yielded the most significant growth. This contradicts our initial assumption that low tide was preferable, as Saltgrass in high tide environments was able to grow taller when supported by the drainage and stability of the glass sand. Conversely, plants in drought conditions showed almost no survival, highlighting the plant's dependence on consistent moisture.

To improve the accuracy of future testing, the experiment should be conducted in a strictly controlled greenhouse environment. Our results showed high variation and declining health in the medium tide section, which we believe was caused by the rapidly changing weather in the Southern half of the U.S. during the study. Controlling for temperature and humidity would ensure that the tidal levels are the only variable impacting plant health.

Future studies should investigate the specific nutritional decay of Saltgrass roots to see how quickly they enrich the soil for healthy bacteria . We also recommend testing different ratios of glass sand to determine if "high glass" concentrations might eventually hinder root expansion. Community action should focus on encouraging local coastal residents to plant Saltgrass in native areas to aid in the natural filtration of our water systems.

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