THE EFFECT OF ENDOPHYTES ON SPARTINA ALTERNIFLORA EXPOSED TO STRESSORS

2023
LANEY TELLEGEN

COASTAL EROSION

Sea-level rise is causing rapid land loss and deterioration of Louisiana's wetlands.

75

Square kilometers of wetland is lost annually.

The highest risk for loss of marshland is due to flooding.

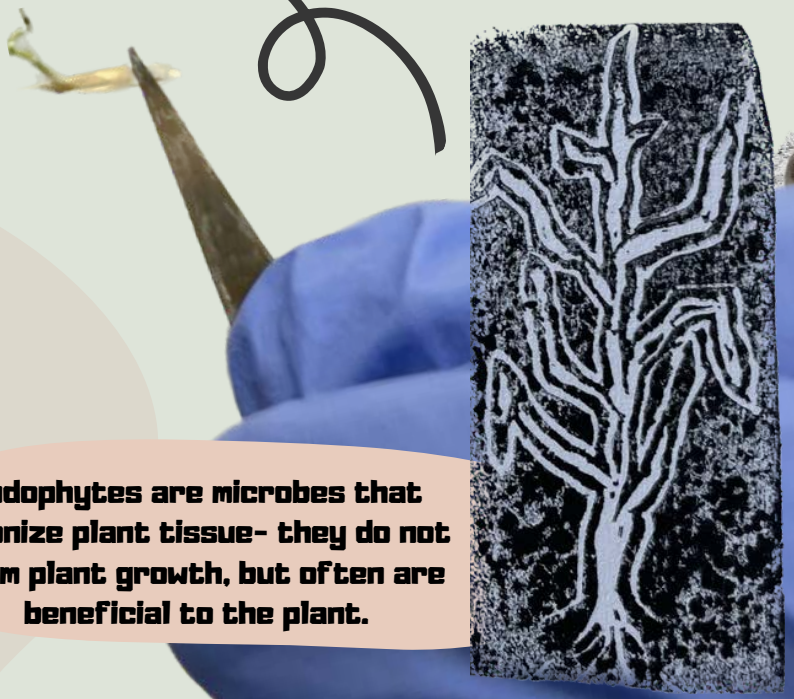
INSIDE WETLANDS

More saltwater causes stress in wetland plants

S. ALTERNIFLROA

(WETLAND CORDGRASS)

Endophytes



Salinity Resistant

Pathogen Inhibiting

Endophytes are microbes that colonize plant tissue- they do not harm plant growth, but often are beneficial to the plant.

Can these endophytes benefit plants that are facing stressful environmental conditions?

THE METHODS

ENDOPHYTE COMBOS

OTU 128
OTU 52
128 & 52 ("doublesalinity")
OTU 85
OTU 153
185 & 153 ("doublepath")
128 & 52 & 185 & 153 ("all")
No isolate ("none")

We grouped these isolates into 8 combinations and we created four stressor treatments

STRESS TREATMENTS

2% MEA ("None")

16 ppt NaCl in 2% MEA ("High Salinity")

F. Paulstre colonizing 2% MEA ("Pathogen")

F. Paulstre colonizing 16 ppt NaCl 2% MEA "Mock Real World")

We inoculated S. alterniflora with each of these isolate combinations and allowed them to grow on each environmental stress treatment for 14 days.

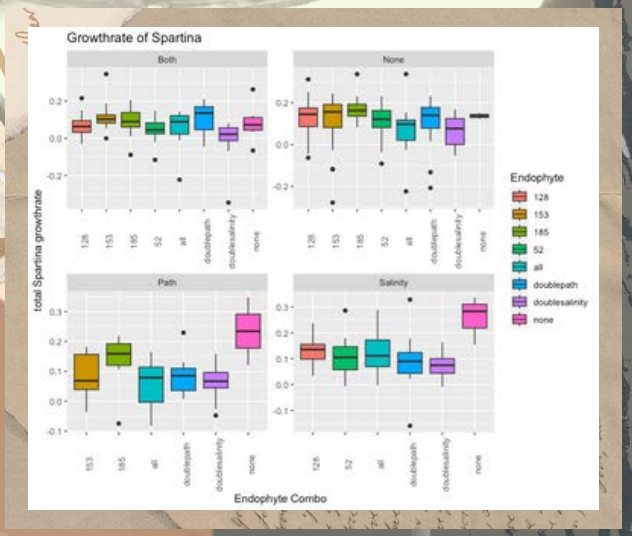
Experimental plates in the growth chamber!

Me and my plates!

RESULTS

Click images to view time-lapses of growth!

The addition of endophytes either did not affect plant growth, or *harmed* growth of S. alterniflora!!



WHY???

The lack of mutualistic effects could be due to the lack of substantial root tissues grown, or because the endophytes will only benefit plants of a certain maturity
This could be because the endophytes utilized resources from the seedling, costing growth.

Literature

Afzal, Imran, et al. "Plant beneficial endophytic bacteria: Mechanisms, diversity, host range and genetic determinants." Microbiological Research, vol. 221, 2019, pp. 36-49.

Eydoux, Louise and Farrer, Emily C. "Does salinity affect lifestyle switching in the plant pathogen Fusarium solani?" Access Microbiology, vol 2, no. 6, 2020.

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