Can Calcium and Sodium Help to Restore Prairie Soil Following Removal of an Invasive Tree?

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BACKGROUND:

- Chinese Tallow (*Triadica sebifera*) is an invasive tree in the southeast US that rapidly outcompetes native grasses and shrubs, reduces biodiversity, and threatens grassland ecosystems.
- *T. sebifera* has been shown to be sensitive to changes in soil salinity and suggests that calcium and sodium may be important factors that affect growth.
- Ca and Na may help to improve restoration techniques by altering soil characteristics and preventing recolonization following removal of *T. sebifera*.

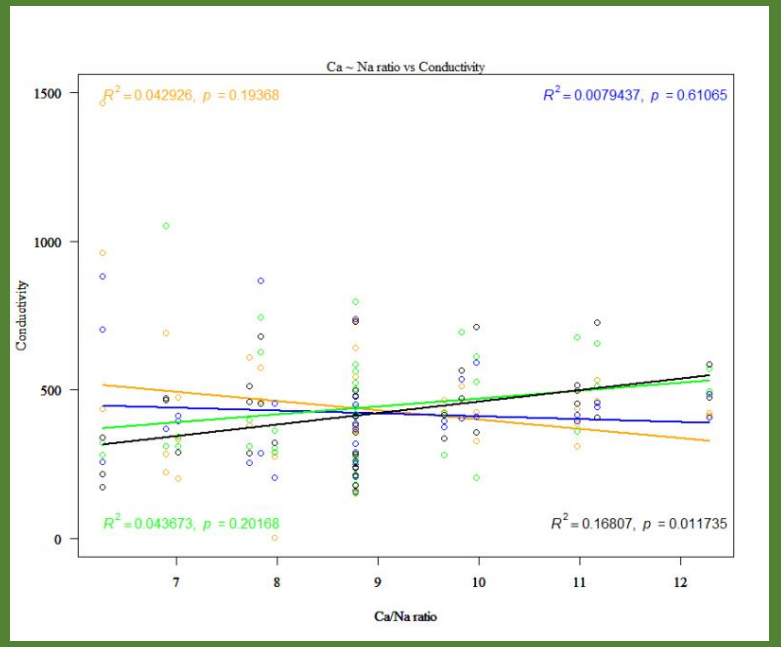
METHODS

- We manipulated the amount of Ca and Na (by 10%, 25%, and 40% above ambient levels in a fully factorial designed experiment) in 3 meter by 3 meter plots.
- Each plot had one of four levels of invasion of *T. sebifera*, pristine (control), low invasion, medium invasion, and high invasion areas.
- 16 treatments x 4 levels of invasion x 3 replicates + 12 additional controls = 204 plots.
- We collected soil samples from each plot with a soil auger in mid-July 2019 and these samples were frozen until analysis. We measured soil moisture, pH, conductivity, and root moisture.

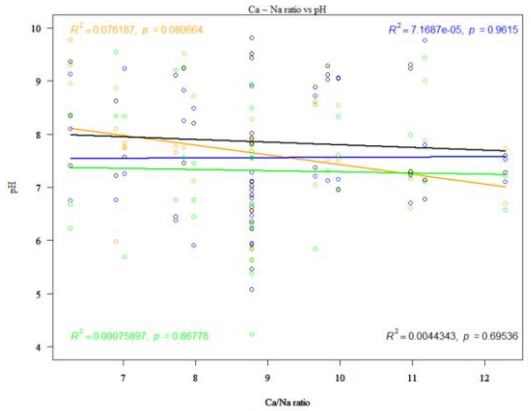
RESULTS

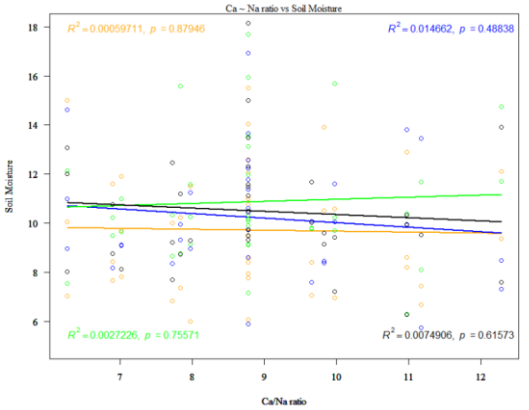
- The results show that as the ratio of Ca and Na was raised, the conductivity of the soil was increased in areas of high invasion of *T. sebifera*.
- For other variables, such as pH, soil moisture, and root moisture, had no significant effect as the ratio of Ca to Na was increased.
- These results suggest that the micronutrients Ca and Na could change the soil conductivity in high invasion areas and in turn help to make coastal tallgrass prairies more resilient to this invasive tree.

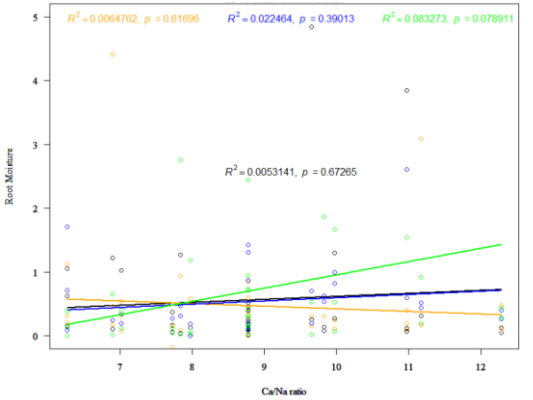
Increases in Ca to Na ratio causes an increase in soil conductivity in tall grasses prairies that could aid in the restoration after the removal of an invasive tree.



Levels of Invasion:
Orange- Pristine (control)
Blue- Low
Green- Medium
Black- Heavy







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