

Effects of Cover Crops and Organic Amendments on Nutrient Management of Organic Spinach

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INTRODUCTION

- Management of nitrogen while also ensuring other nutrients are managed is challenging
 - At the optimal nitrogen levels, organic amendments often supply too much phosphorus (Erich et. al 2002)
- Cover crops benefit a growing system and nutrient management by providing biological N fixation (if a legume), providing organic matter, preventing erosion, and more (Snapp et. al 2005)
- Florida specifically deals with hot weather, high rainfall, and very sandy soil so managing nutrients is very valuable to growers
- Overall project is analyzing effects of cover crops and organic amendment combinations in an organic vegetable system
- Attempting to further understand nutrient management in Florida vegetable systems
- Testing how these combinations affect spinach germination and growth as well as soil and plant nutrition

METHODS

- 20 treatments: 5 cover crop treatments x 4 organic amendments
- 5 replicates per treatment → 100 pots
- Pots contained equal amounts of soil and cover crop residues
 - Amendment amounts were calculated with a target of supplying a plant available nitrogen equivalent to 90 lbN/acre
- Place pots in a climate-controlled greenhouse with drip irrigation
- Check on germination and crop growth every two days until fully germinated
- Every two weeks soil samples are taken for nutrient analysis
- Sap analysis and SPAD values will be taken once plants are of adequate size
- Yield will be measured at end of experiment

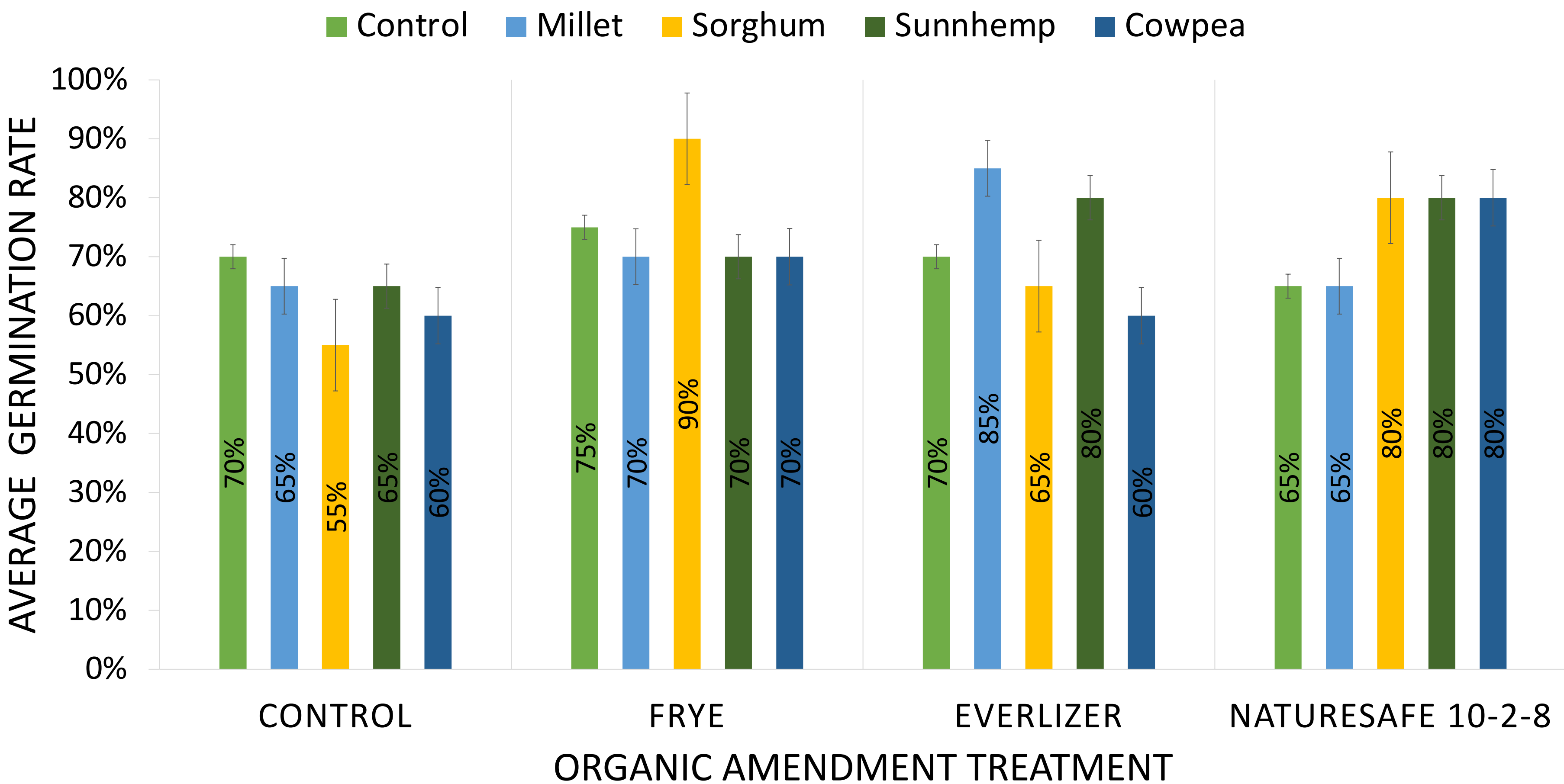
Cover Crops	Organic Amendments
• Sunn Hemp	• NatureSafe 10-2-8 Organic Fertilizer
• Cowpea	• Frye Biochar
• Millet	• Everlizer Poultry Manure
• Sorghum	• Control
• Control	

HYPOTHESIS

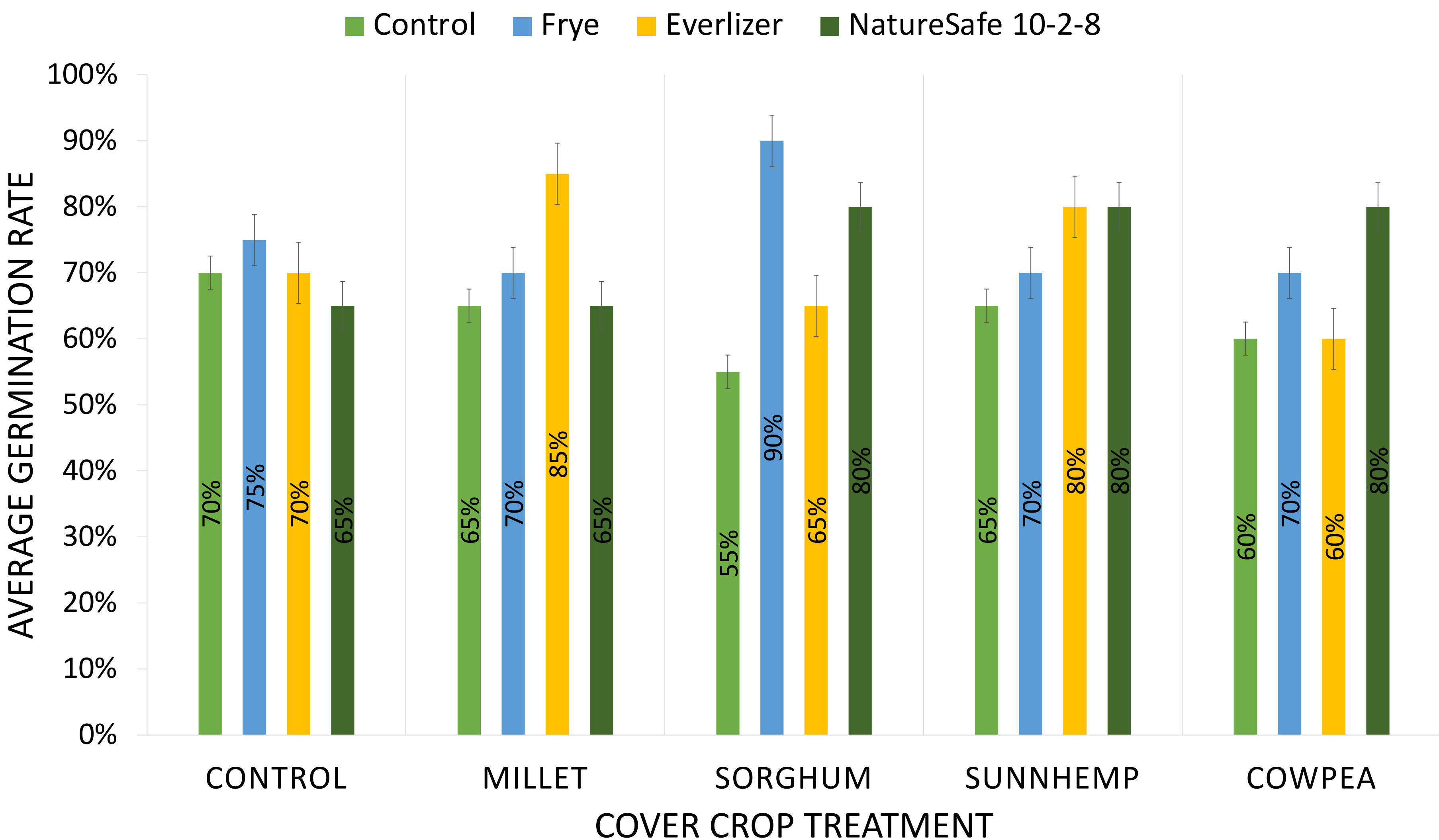
- Leguminous crops will release N into the soil and produce a better yield by having immediately available N compared to the millet or sorghum
- Biochar will enhance nutrient uptake and overall improve soil quality especially in combination with a nitrogen source (Chan et. al 2007)

RESULTS

GERMINATION OF SPINACH SEEDS BY ORGANIC AMENDMENT TREATMENT



GERMINATION OF SPINACH SEEDS BY COVER CROP TREATMENT



CONCLUSIONS

- Experiment still ongoing– plants still relatively small and no plant data has been taken other than germination rates
- Germination was semi-random with multiple amendments and cover crops showing different results with different treatments
- The combination of Sorghum and Frye Biochar produced the highest amount of successfully germinated plants (90%); however, without further data no conclusion can be made
- Further investigation into the soil and plant nutrition and statistical analysis of this data is needed to make a conclusion
- At its end, this experiment can give insight into sustainable agriculture and integrated nutrient management. The results can allow for the sustainable maximization of nutrients in organic systems. It can also add knowledge as far as managing nutrient levels effectively in organic systems. Having insight into improved nutrient management as well as soil and plant health can help organic farmers in Florida to grow more food and maintain soil health.

REFERENCES

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