CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36704

Project Title

Drought Impact on Soilborne Fungal Pathogen of Tomato

Abstract

Objectives/Goals

The Goal of my research is to study each factor that may contribute to Fusarium Oxysporum Lycopersici Race 3 growth/decline and learn whether my hypothesis is true or false.
Hypothesis: Under a drought condition, soilborne pathogen will increase because of changes in the soil such as its water retention capacity, affecting the pathogen population to harm the plant.

Methods/Materials

First, I tested 6 Main Soils used in farming throughout California by using an autoclave to find the dry/wet weight of the soils, as this gave me a good estimate of how much water the soils can retain. Thereafter, other labs were completed using a Hemocytometer, Scanning Tunneling Microscope, and Laboratory Counter; to cultivate, inoculate, and test the pathogen in the soil. Later, after I finished conducting the root dip, and raising the tomato plants. I counted the Fusarium count in the soil and plated the samples, where I was able to find the results on how much harm the pathogens had on the plant.

Results

My Experiments found that Soil #3 (Euic Soil) did the best in terms of Water Retention, Soil Separation, and Pathogen Severity.However, in the Amount of Pathogen Test it had the highest pathogenic cell count of Fusarium.
Soil #4 (Potting Soil) did the worst in all of the experiments except for the Amount of Pathogen Test. It had the least amount of pathogen, but the most harm. It was noted that both of these soils were completely different, and in the conclusion I analyze these results and show why this occurred.

Conclusions/Discussion

I learned that my hypothesis is false. In fact the pathogen level went down in all of my samples. For example, in Potting Soil it had the lowest amount of pathogenic cells, but it had the worst effect on the Tomato Plants. Analyzing the soils I conclude that Pathogens thrive in a soil that contains good properties for plants and they don#t harm the plant because the plant is tougher due to these factors.However, if the soil is unable to retain water, and is dry; the Colony Formation Unit will be smaller, but they will impact the plant rapidly. My project alerts not only farmers, but the general population about the diseases that is affecting their food and how the drought is harming agriculture in the status quo.

Summary Statement

This project looks at the Fusarium growth/decline in Early Pak Race 7 tomato plants, under 6 main different soils while simulating a drought condition.

Help Received

Dean of Agriculture at UC Davis: Helene Dillard. She helped me understand the necessities of how a lab would be carried out, and connected me with Mrs. Pia van Benthem. Mrs. Pia introduced me to a PHd student, Hung Doan; who gave me guidance on materials and basic procedures.

Preliminary