CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36036

Project Title

Sweet Potato Whitefly Infestation in Agriculture: Examining the Effects of Nitrogen Fertilizer on Whitefly Fecundity

Abstract

Objectives/Goals

The objective of this project is to determine which amount of nitrogen concentration is the most effective to reduce whitefly fecundity while benefiting the host plants.

Methods/Materials

Plant the Top Mark seeds into #Sunshine all-purpose potting soil#. Add 25 ppm, 50 ppm, 100 ppm, 200 ppm, and 300ppm of nitrogen concentrations to the plants. Collect 200 whiteflies using an retrofitted hand-vacuum. Using a second adapted vacuum in a glass chamber, vacuum one whitefly into an improvised clip cage, and place on separate and healthy leaves. Monitor the cages, and keep the cages on each leaf for a total of six days for each trial. After removing the clip cage, count the eggs on each plant. After five weeks from planting the crops, measure the length of the plants, the length of the leaves, and count the number of leaves on each plant. After all the data is collected, put the data together in an excel spreadsheet for analysis.

Results

The dilution containing 25 ppm N produced the most acceptable levels of nutrients for the whiteflies, since they produced the highest average number of eggs in two trials. The 25 ppm N treatment resulted in the least amount of eggs. While 200 ppm N produced the least amount of eggs with an average of 52.8. The tallest plants had 200 ppm treatment with an average length of 73.8 cm, while the shortest plants had 25 ppm treatment with the average length of 38.4 cm. The length of each leaf also had a direct connection to the nutrients that were supplied.

Conclusions/Discussion

The experiment illustrated that the lower nutrient concentration added to the plants, the shorter and unhealthy they get; likewise the higher the nutrient concentration, the taller and healthier the plants are. The significance of this project is since whiteflies are highly resistant, every year the application of pesticides and insecticides are drastically increasing, in order to control whiteflies. The effects of these toxic chemicals and organisms are known to cause many health and environmental issues, such as; cancer, autism, kidney failure, birth defects, damaged organs and immune systems. We especially, are most prone to have health complications, as a result of the high rate of toxins in our food.

Summary Statement

We examined the effects of nitrogen fertilizer on whitefly fecundity and the host plants; in conclusion, the whiteflies are unable to thrive in a nitrogen rich environment, yet nitrogen fertilizer is greatly beneficial to the host plants.

Help Received

Scott Blanco was the scientist who supervised us during the conductment of our project. The USDA is the institution where we performed our research.

Preliminary