CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY

Name(s)

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Project Number

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Project Title

The Effect of Fumigants on Fusarium oxysporum forma specialis vasinfectum

Abstract

Objectives/Goals

The purpose of this ongoing experiment is to determine if certain fumigants can effectively neutralize or lessen the harmful effects of Fusarium oxysporum f. sp. vasinfectum (FOV) on cotton crops. Lack of knowledge and inadvertent dispersal of this fungal disease has caused it to become a major threat to cotton.

Methods/Materials

The fumigants used in this experiment were Methyl Bromide with Chloropicrin, Telone Chloropicrin, Metam-Sodium (Vapam), and the non fumigants, AM120 mycorrhizae, solarization, and a control. At the test site, these six treatments and four varieties of cotton plants were randomly allocated throughout the approximately 300# x 100# of the sample infected field. Once the treatments were confirmed to have taken effect, the cotton varieties were planted. The crops were then monitored for the effect of FOV.

Results

The fumigants Methyl Bromide with Chloropicrin and Telone Chloropicrin proved successful but expensive treatments that were expected to lessen the effects of FOV on the cotton crops, and they did. Metam-Sodium (Vapam), AM120 mycorrhizae, and solarization are less expensive treatments that were not predicted to lessen the effects of FOV. Metam-Sodium (Vapam) and AM120 mycorrhizae, as predicted, did little to lower the effects of FOV. However, solarization did lessen the fungi strand to the degree of the expensive treatments, leading to a possibly less expensive, alternative method.

Conclusions/Discussion

The finding of these results is critical to cotton farmers in the San Joaquin Valley and around the world. Methyl Bromide with Chloropicrin and Telone Chloropicrin are very powerful in dealing with just about any soil-borne disease, but they have two fatal flaws that make them inconvenient to use. First, they are very expensive. To a cotton farmer, they cannot afford to douse their field with the spray. It is possible that they could use them in the #hot spots# where a population is concentrated, but it is still a financial burden that they could barely uphold with the loss of their previous yields. In addition, these two fumigants add to the breakdown of our ozone layer, and must be used in extreme moderation to stop this from continuing. The solarization treatment is an alternative to the use of these two fumigants, and comes at a much more economical cost. Although more labor intensive and tedious, it still lowers the fungi population at an affordable cost to the farmers.

Summary Statement

The purpose of the project is to determining methods in which to lessen the destructive power of the fungal disease, Fusarium oxysporum forma specialis vasinfectum, on cotton.

Help Received

Dustin Rodgers of Highland High School under the direction of Ag Futures Internship mentor Dr. Rebecca Bennett of the USDA pathology lab at the Shafter Extension and Research Center