CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)

Greg C. Pilegard

Project Number

S0811

Project Title

Taming the Fury of the Wind: Investigating the Use of Biodegradable Products to Suppress Fugitive Dust

Abstract

Objectives/Goals

Objective: The purpose of this project is to find an agriculturally and environmentally friendly solution to suppressing fugitive dust and particulate matter created by current agricultural practices in the Central Valley. I believe hardpan will do the best job of suppressing fugitive dust.

Methods/Materials

Materials: A control soil and seven organic variables were tested for there ability to stabilize the soil and prevent it from becoming airborne, creating a health hazard.

The soil and variables moisture content was measured to insure the dry conditions found in the Central Valley. Samples and variables were a consistent volume. Samples were weighed before and after the introduction of a wind source measured at 16 kmph, 24 kmph, and 32 kmph which were within the calculated average wind speeds found in the Fresno area in 2002 (as supplied by the weather bureau). The wind source was introduced at one side of the wind tunnel and applied for five minutes. Effectiveness as a dust suppressant was calculated by measuring the loss of soil mass.

Results

Results: My results showed a fascinating fact. Shape was a determining factor in the success of a variable as a dust suppressant. Hardpan was the best to suppress dust. The second best was wood chips, straight from a chipper machine. The third best was a fine mulch. This suggests a layer of wood chips would provide a solution that might last for more than one season as it breaks down to a fine mulch. Furthermore, the wood chips could provide an alternative to agricultural burns which add to the air particulates. However, straw gave the clue that shape was significant. It was the lightest variable , but out performed some of the heavier ones.

Conclusions/Discussion

Conclusion: My conclusion is that hardpan does a great job on barren fields. However, wood chips has the greatest agricultural impact> It has the potential of suppressing fugitive dust, decreasing agricultural burns, a decrease in commercial and chemical suppressants, and can act as a barrier to prevent unwanted vegetation between crop rows. The success of the fine mulch suggests the wood chips may be effective for more than one growing season.

Summary Statement

This project was designed to find a solution to a growing concern of the Central Valley air pollution by looking at agriculturally and environmentally friendly solutions.

Help Received

Mother and Neighbor helped design and assemble board.