CALIFORNIA STATE SCIENCE FAIR
2007 PROJECT SUMMARY

Name(s)
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Project Number
J1711

Project Title
Mycorrhizal Fungi

Abstract

Objectives/Goals
My objective was to determine if adding mycorrhizal fungi to the soil at the time of planting alfalfa seed would cause a young seedling alfalfa plant to grow more root mass and result in a healthier plant, able to extract more water, fertilizer, other nutrients from the soil.

Methods/Materials
Un-inoculated alfalfa seed was planted in 10 containers of fumigated soil. 5 containers were irrigated with a mixture of water and mycorrhizal fungi and 5 containers were irrigated with pure water. After 7 weeks, the containers were soaked in water and the plants were removed. The wet soil was rinsed from the plants roots, and the plants were photographed and weighed on a digital gram scale.

Results
The results of the experiment showed that the addition of mycorrhizal fungi to the soil as the alfalfa seed are planted and irrigated increased weights from an average of .12 grams for the untreated plants, to an average of .28 grams for the treated plants. The fungi enhanced the early root development of the seedling alfalfa plant and also promoted increased size of the plant above ground level. As a result of this larger plant, it seems reasonable to conclude that it could more efficiently extract water, fertilizer and other nutrients from the soil. However, further testing would be needed to determine whether the growth response resulted from the increased uptake of water, fertilizer, nutrients, or a specific combination of these elements.

Conclusions/Discussion
The results of this experiment seemed to support the original hypothesis that adding mycorrhizal fungi to the soil at the time of planting would enhance the growth of the young alfalfa plant. The problems that occurred were unexpected and raised some questions about the variation in the results. The main reason for the variation could be that since the soil fumigation eliminated the naturally occurring mycorrhizal fungi, it caused a need to add both nitrogen fertilizer and microbial bacteria to the irrigation of the plants in order to promote healthy growth. Since the bacteria were difficult to blend with the water, it is difficult to know whether the mixture was equally applied to the plants. It might have worked better if the bacteria was mixed with the dry soil prior to irrigating the seeds and starting off with a small amount of low analysis fertilizer to speed up the beginning growth of the alfalfa plants.

Summary Statement
The project is about the effect of mycorrhizal fungi on the early growth stage of seedling alfalfa plants, in relation to root mass and plant vigor resulting from enhanced water and nutrient uptake.

Help Received
Dr. Greg Cluff, Professor, Bakersfield College, provided advice on project design and modification to experiment. Vernon Crawford, P.C.A., Wilbur-Ellis Co., provided raw materials for experiment. My Father gave oversight, particularly when materials were mixed and applied.