CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Jake M. McFarland

Project Number
J1722

Project Title
The Effects of Electromagnetic Fields on Developing Garden Bean and Radish Seedlings

Abstract

Objectives/Goals
The purpose of this experiment was to answer the following question. Will the exposure of electromagnetic fields(EMF) on plants effect their overall growth? It was hypothesized that if a plant seedling is exposed to an electromagnetic field, then its overall growth, including shoot length, leaf length, and leaf diameter will be decreased because the plant will undergo less cell division and cell enlargement.

Methods/Materials
In this experiment, forty radish seeds and forty bean seeds were grown in individual peat pots. Peat pots were filled with soil and seeds were placed about two centimeters from the surface of the soil. Each plant received the same amount of sunlight and water. In the experimental group, there were twenty radish and twenty bean seedlings that were exposed to electromagnetic fields emitted from an electric blanket for six hours a day. Another twenty radish and twenty bean seedlings served as the control group and were not affected by electromagnetic fields. Five external temperature readings were taken and recorded to rule out the heat of the blanket as a confounding factor. Shoot length, leaf length,and leaf diameter measurements were taken in both the control and experimental group. Plants were taken to a pathology lab and made into slides. Cross sections were stained and the plant cells were observed.

Results
The hypothesis made was proved incorrect by the results. The experimental group had greater shoot length, leaf leangth, and leaf diameter than the control group. This proved true for both the radish plants and the bean plants.

Conclusions/Discussion
The cells in the experimental group were darker. It was concluded that this was because the ribosomes in the experimental group had changed. It was concluded that the productivity of the ribosomes had been increased because of the electromagnetic fields. This increased the amount of proteins that the plants could make and made them bigger and stronger. It appears that exposure to electromagnetic fields affects plants on a cellular level. More research needs to be done to find out whether or not this also affects humans and animals on a cellular level.

Summary Statement
This experiment was conducted to observe the effects of electromagnetic fields on plants.

Help Received
Dr. Mimose helped observe the cells; my dad helped plant seeds; my mom helped edit the report; Mr Harrington helped guide my research.