CALIFORNIA STATE SCIENCE FAIR
2004 PROJECT SUMMARY

Name(s)
Tyler P. Hines

Project Number
J1612

Project Title
The Evaluation of Nitrogen, Phosphorus, and Potassium in Corn Grown Hydroponically

Abstract

Objectives/Goals
The purpose of this experiment was to evaluate the growth pattern of corn plants when limiting critical macronutrients in hydroponic growing solutions. My hypothesis is that plants grown hydroponically with the right amounts of Nitrogen, Phosphorus, and Potassium should grow better than those plants with elements omitted from their growing solutions, because when these elements are eliminated plants begin to show signs of deficiencies in their growth.

Methods/Materials
First I gathered 30 growth pouches and placed two seeds in each. Then, I placed 100ml of distilled water into each pouch. Each pouch was placed in the wooden slot box and covered with foil. The boxes were put in a window greenhouse, until they sprouted. The nutrient solutions were prepared and added to the appropriate experimental group.The solution levels were monitored weekly.Four plants, with the best growth rate, in each experimental group, were measured using the tallest leaf of each plant. Each plant was then cut right above the root system and weighed.

Results
The plants grown in solutions with all the nutrients present had the highest growth rates. Solution 1 (all nutrients) performed the best in both height, 44.13 cm, and weight, 3.85 g. Solution 3 (without phosphorus)performed the second best in both height, 39.38 cm, and weight, 2.22g. Solution 2 (without nitrogen) performed the third best in both height, 24.63 cm, and weight, .94 g. Solution 5 (no nutrients)performed the fourth best in both height, 20.75 cm, and weight, .52 g. Solution 4 (without potassium)performed the worst in both height, 8.13 cm, and weight, .05 g.

Conclusions/Discussion
The results of this investigation concluded that the plant requirements for Nitrogen and Potassium are more critical than the requirements for phosphorus. Additionally, to achieve optimum plant growth it is critical to supply all three of these macronutrients.

Summary Statement
The purpose of my experiment was to evaluate the growth of corn plants grown hydroponically using Nitrogen, Phosphorus, and Potassium; the data showed that plants receiving equal amounts of each nutrient had the best growth rates.

Help Received
Mother helped with the board, typing , and with the measuring.