



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

Name(s) Merv D. Carter	Project Number J1607
Project Title The Gravitropic Response in Maize Roots	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The objectives of this experiment is to provide evidence that germinating maize roots (<i>Zea Mays</i> var. <i>rugosa</i>) sense and respond to altered gravitational forces (Gravitropism) applied in both length and direction of the field applied more rapidly than those not exposed to this altered environment. Additionally, this experiment will demonstrate that the gravitropically germinated seedlings when transplanted in pots, displayed measurable differences in the average root and shoot growth rates in maize plants exposed to the "signal" of gravitropism.</p> <p>Methods/Materials In this experiment, a centrifuge apparatus was constructed which housed the experimental maize seed samples germinated with agar in petri dishes. The tests were carried out under simulated greenhouse conditions, with all other variables (light, temperature, moisture) remaining constant. This altered gravitational field (gravitropic) allowed the seeds to get a "head start" and created an environment designed to signal the maize roots to emerge faster and in the direction of the force applied (Positive Gravitropism). This "signal" was further dispatched when germinated seedlings were transplanted in potting soil and allowed to thrive motionless under greenhouse conditions. Daily measurements of the average root and shoot growth rates were taken and recorded against control samples.</p> <p>Results An analysis of the data provided evidence that gravity could be overcome in the centrifuge apparatus, and that increased maize root growth rates occurred in an organized fashion oriented according to the new stronger artificial gravitational forces (gravitropism). Furthermore, it was demonstrated that these germinated seeds displayed characteristics that remembered signals triggered by gravitropism. When transplanted into potting soil and allowed to thrive, they responded with longer and stronger overall growth rates than those of the control groups.</p> <p>Conclusions/Discussion Gravitropism profoundly affects the growth of both roots and shoots in maize (<i>Zea Mays</i> var. <i>rugosa</i>) plants. Significant differences were observed and recorded for both gravitropic and non-gravitropic maize plants within the parameters measured. Responses of overall plant height and roots and root growth rates were markedly different even in the absence of gravistimulation. This was evident in the potting experiment conducted.</p>	
Summary Statement This experiment is about how Gravitropism affects the growth of germinating maize (<i>Zea Mays</i> var. <i>rugosa</i>) roots.	
Help Received No help was received in doing this project.	