



**CALIFORNIA STATE SCIENCE FAIR  
2004 PROJECT SUMMARY**

<b>Name(s)</b> Ryan M. Quint	<b>Project Number</b> <b>J1423</b>
<b>Project Title</b> <b>Electromagnetic Fields and Onions: How Was Tip Growth Affected?</b>	
<p style="text-align: center;"><b>Abstract</b></p> <p><b>Objectives/Goals</b> My objective was to study the affect of an electromagnetic field (EMF) on onion root tip growth. My belief was that EMF would have a positive affect on growth.</p> <p><b>Methods/Materials</b> Eight onions were grown under identical conditions except four were subjected to an electromagnetic field. The electromagnetic field was created using a four foot electrical cord wrapped around the experimental group. The plants were grown for twenty-one days and the onion tips examined. Thin slices of onion tip root are placed onto a microscope slide and stained so the chromosome would be visible. The eight root tips were examined for mitosis. One hundred cells for each test group were counted, recording the number of cells in mitosis.</p> <p><b>Results</b> Onion root tips grown in the electromagnetic field were observed to have cells in mitosis ranging from 13 to 23% with an average of 17.4%. The control group was significantly less with mitosis observed ranging from 5 to 12% with an average of 8.4%. The EMF group on average had twice (2.1) the number of cells in mitosis as compared to the control onion tips.</p> <p><b>Conclusions/Discussion</b> Electromagnetic fields and potential harmful affects on humans have been a widely published topic. There is limited information on how plants are affected by these fields. I have long enjoyed gardening and became interested in plant growth and electromagnetic fields last year. My data supports my hypothesis that EMF has a positive affect on plant growth in the onion. In each of the EMF groups there were more cells in mitosis as compared to the control group. I hope to repeat my experiment with larger numbers of plants. EMF may be beneficial to agriculture to help grow plants at a faster rate.</p>	
<b>Summary Statement</b> How onion tip growth was affected by electromagnetic fields.	
<b>Help Received</b> I used lab equipment at Alta Sierra Intermediate under the supervision of my science teacher, Mr. Piercy. My father helped to review and organize my board.	