



CALIFORNIA STATE SCIENCE FAIR 2016 PROJECT SUMMARY

Name(s) Kaitlyn A. Arst	Project Number S1001
Project Title Using Superabsorbent Biodegradable Hydrogel to Decrease Water Use and Improve Drought Stress on Agronomic Plants	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The object of this study was to determine whether environmentally friendly hydrogel mixed with soil would retain water, decrease water usage and reduce drought stress on Lima Beans, Peas, and Lettuce plants under simulated drought conditions. 4 experiments were performed 1) To determine whether hydrogel would reduce the amount of water used 2) To determine whether .2%, .4% or .8% hydrogel would be most efficient 3) To determine whether hydrogel application at the roots or at the soil surfaces was most efficient in retaining water 4) To determine whether Lima Beans, Peas or Lettuce would be most tolerant to hydrogel amended soil?</p> <p>Methods/Materials Soil was divided into 24 containers. These were then separated into 8 groups of 3 containers per group. The control A group of containers had no hydrogel added to the soil, plants were watered regularly. The control B group of containers, plants was watered once on the first day, no water added afterwards. The third through eight groups of containers, plants had .2%, .4% and .8% hydrogel applied at the root or surface areas of the soil. 15 Lima Bean seeds, 40 pea seeds and 50 lettuce seeds were planted into their appropriate containers The plants were watered when the moisture level were low. The amount of seed germinated were observed and recorded. . The soil content of nitrogen (N), phosphorous (P), potash (K), and pH balance levels were tested.</p> <p>Results Soil treated with hydrogel reduced the amount of water usage by approximately 45% when compared with the control A soil which had no hydrogel in the soil. At the beginning of the experiment, control B was able to retain enough moisture for the seeds to germinate, however by the third week the moisture level dropped and the plants started to wilt and die. Although, the moisture level with the .2%, .4% and .8% hydrogel added to the soil were able to retain moisture level higher than the control A, the soil amended with the .2% at the surface of the soil was most effective in retaining water and producing the healthiest plants. The pH balance tests of the soil ranged from 5.5 (Medium Acid) to 7.5 (Alkaline). The N, P and K tests ranged from depleted to surplus.</p> <p>Conclusions/Discussion The results show that .2% hydrogel applied at the surface of the soil would be an eco-friendly alternative for use in the agricultural sector to efficiently manage water usage in areas where drought is a considerable problem.</p>	
Summary Statement I applied Eco-friendly hydrogel amendment to the soil of three Agronomic plants to reduce water usage and decrease drought stress.	
Help Received I did the experiment myself after conducting online research. My parents helped with reviewing my work.	