CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Ed van Bruggen; Austin Hartman

Project Number
J1911

Project Title
Do Plants Predict the Dawn? The Psychic Plant!

Abstract

Objectives/Goals
Our aim was to discover whether certain plants could predict on the onset of dawn. Some types of plants open and close their leaves to save dew in night and to maximize their photosynthesis during the day.

Methods/Materials
The experiments were set up in a dark closet. The automated time-lapse trigger was used to have the camera take a picture every 30 minutes and ran for several days. A natural light bulb was used to alter the day and night cycle. The images we recorded and this data was analyzed using a program called ImageJ.

Results
We found that the oxalis plant has leaf movement that was synchronized to the light cycle. The leaf would begin to open many hours before the light comes on. We measured this #dawn response# and found that it would begin 8 hours before dawn. We wanted to know what happens when there is a pulse of light during the sleep cycle. When there is a pulse of light the plant reacts to dawn one hour earlier. When there is no pulse of light the plants #Dawn Response# reacts in 8 hours instead of 9. Every time this pulse is given the canopy begins to open but only when the light was on. This shows that it does not react just to the light, instead it syncs to the light.

Conclusions/Discussion
We have discovered that oxalis has a leaf movement that will predict dawn many hours before it happens. This way the plant has a competitive advantage over plants that don#t do this. If a plant simply responds to the light instead of predicting the onset of dawn, it has fewer canopies covering during the daylight hours and thus less efficient for photosynthesis. Therefore a plant that predicts dawn can grow faster than a plant that simply responds to light. We have also shown that a simple pulse of light during the sleep cycle can initiate the dawn response earlier.

Summary Statement
To discover whether plants can predict the onset of dawn

Help Received
Fathers helped prepare poster. Mentoring help from Jayne Hastedt