CALIFORNIA STATE SCIENCE FAIR
2012 PROJECT SUMMARY

Name(s)
Natalie G. Opalach

Project Number
J1923

Project Title
Ring around the Redwood

Abstract

Objectives/Goals
This two-year study calculated and examined the correlation of young and old redwood tree diameter growth to rainfall at elevations of 100 and 1,500 feet. A total of four stands were included in the study. The young redwood stands were 25 to 30 years old and the old redwood stands were 80 to 100 years old.

Methods/Materials
Diameter core increment samples were taken from ten redwood trees within each stand, and annual tree growth was measured and recorded for the past ten years. This data was compared to rainfall data, and correlation coefficients were calculated.

Results
The correlation significance between rainfall and old low elevation trees was 96%, young low elevation trees was 98%, old high elevation trees was 29%, and young high elevation trees had a negative correlation to rainfall of 88% significance. At the low elevation, diameter growth was strongly related to rainfall even in the north coastal region of California where water seems abundant. Interestingly, rainfall seems to influence young tree growth negatively at high elevations.

Conclusions/Discussion
Greater water abundance is not the only outcome of greater precipitation; others include low temperatures, snow, freezing rain, wind, hail, and erosion. Young trees at the high elevation could have reacted poorly to one or more of these rather than simply greater amounts of water. One hypothesis concerning the effects of global climate change suggests it will lead to greater rainfall in north coast California. An increase in tree growth is associated with more water in lower elevation redwood forests, consequently increasing the trees# carbon dioxide intake. Redwood trees may therefore in some part counter these possible global climate change effects.

Summary Statement
This study found the correlation between rainfall and young and old redwood tree growth.

Help Received
Father helped calculate correlation coefficients; Allyson Carrol helped conduct background research.