CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY

Name(s)
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Project Number
J0907

Project Title
Mojave Precipitation Records

Abstract

Objectives/Goals
To see if I can take ring samples from local Juniper trees and match the precpitation pattern for the Victorville/Mojave region as recorded by the National Weather Service over the last 100 years. Will the variations in the pattern give me a more accurate precipitation record for my local area in Hesperia. Also can I date the ages of the trees using the known years of precipitation extremes and the ring growth and precipitation patterns?

Methods/Materials
We cut one of the main stems off at the base leaving the rest of the tree intact.
Each sample was sanded down smooth on one side to expose the growth rings of the tree. I then identified the individual rings, marking where each one started and ended. After that I measured the width of each ring in millimeters and recorded this data.I then took the annual rainfall for each year and recorded that next to the ring width for that year.I them plotted a graph comparing the precipitation pattern and growth ring pattern.

Results
The overall patterns generally match with some notable exceptions. 1948 and 1949 had a combined precipitation total of 8.5 in. although the growth pattern for that period would indicate a lot more precipitation had fallen. One explanation is that most of that precipitation fell as snow allowing the water to slowly and deeply penetrate the ground. However the overall pattern remains similar. 1963 and 1965 again show low growth rates for above average precipitation. These years however were at the end of a very long dry period for the Mojave region. Drought conditions can put a lot of stress on a tree. It may take a tree several years to recover from such conditions. But overall the patterns were almost identical

Conclusions/Discussion
I feel quite confident that I was able to date the tree accurately to 1905. The results showed that I was able to match the growth pattern with the precipitation pattern with some expected variations. Some of these minor variations could be the results of more or less precipitation. However, major variations do not necessarily reflect a more accurate precipitation record for my local area. There are many variables that have to be considered. In the results section some of these variables were discussed. In conclusion, the growth ring pattern of the tree was able to accurately show the precipitation changes for the region over the past 100 years but less able to show the precipitation record for a specific year.

Summary Statement
That the Juniper tree is a natural and accurate precipitation record for the Mojave Desert Region

Help Received
My father helped me cut the samples, understand the research, type and helped with the display board.