



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

Name(s) Hannah B. Spinner	Project Number S1923
Project Title Do Plants Talk? The Effects of Mycorrhizal Networks on Defense Signaling in Corn	
Objectives/Goals The purpose of this research was to determine if Zea mays, corn, inoculated with mycorrhizal fungi would be able to communicate with their neighbors and warn them about pest attacks.	
Abstract	
Methods/Materials Forty corn seeds were planted into two plastic bins (each bin had 20 seeds), which were filled with one cubic foot of sterilized soil. In one bin, 62.5 grams of mycorrhizal fungi was added to the soil; and the other acted as the control and did not contain mycorrhizal fungi. After the plants grew for six weeks, 7 plants were pulled from each population so that all remaining plants could have as much room to grow as possible. The corn grew for two more weeks and then two plants in each population were infected with a xylanase elicitor (enzyme that triggers the plants' defense mechanisms). Then they were taken to the plant pathology USDA lab in Florida and defense mechanisms were tested with a gas chromatography mass spectrometer. They were analyzed and grouped based upon how close they were to the plants infected with elicitor.	
Results The plants with mycorrhiza in their roots had the largest amount of MBOA, a product of plant defense chemicals. The mean value of MBOA in all plants grown with mycorrhiza was 3,259,673.25. The control plants had much less MBOA, more than 2 million less, with a mean value of 1,132,703.66.	
Conclusions/Discussion The hypothesis of plant communication through mycorrhizal networks was supported because all mycorrhiza plants, not just the two that were infected, thought that they were under attack. The control plants did not release as many defense chemicals, showing that they did not communicate with each other. This clearly illuminates that Zea mays are able to communicate through mycorrhizal networks and warn their neighbors about pest attacks. Future research will be pursued, including an investigation of the possible pesticide uses of this fungus.	
Summary Statement This research is about the defense chemicals in corn being activated and transmitted through fungal networks; even plants that are not attacked can be alerted of a pest attack.	
Help Received Used lab equipment at USDA Plant Pathology lab in Florida	