



**CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY**

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Project Title Determining Most Effective Root System for Absorbing Nitrates from Soil to Reduce Groundwater Pollution: A Continuation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals The overall goal of this project was to find a way to reduce the amount of nitrate contamination in groundwater. This project focused on the root systems to observe whether plant root systems had an effect on nitrate levels in water leachate. It was hypothesized that out of three different root systems (fibrous, modified adventitious, and tap), the fibrous root system will be the most effective for absorbing the nitrates from the soil due to its large coverage and reasonable depth.</p> <p>Methods/Materials Cat grass was used to represent the fibrous root system, narcissus the modified adventitious root system, and lettuce the tap root system. Bare soil was used as the control. Five plants for each root system were used and grown from seed or bulb. A soil test was conducted before and after the first application of the liquid fertilizer. 24 hours after adding the fertilizer, the water leachate was collected. This was done five times over two weeks. Water samples were analyzed using a Reagent free Ion Chromatography System.</p> <p>Results The fibrous root system experienced the least amount of nitrate leaching form the soil with an average of 266.67 mg/L. This was followed by the tap root system(733.34 mg/L) and the modified adventitious root system (753.34 mg/L). The bare soil experienced an average of 403.34 mg/L of nitrate leaching.</p> <p>Conclusions/Discussion The results supported the hypothesis that the fibrous root system is the most effective for absorbing nitrates from the soil. This study demonstrates that different root systems can have a drastic effect on the nitrate levels in leached water. This is important to know because this contaminated water eventually makes its way down to the groundwater, which supplies our drinking water and leads to our natural water systems. Excess nitrates in groundwater can lead to negative health effects and eutrophication.</p>	
Summary Statement This project finds a way to reduce the amount of nitrate contamination in groundwater.	
Help Received Used lab equipment at USDA of Salinas under the supervision of Dr. McCreight; Analyzed samples at Monterey Health Department; Parent drove to and from USDA and supported us financially	