



CALIFORNIA SCIENCE & ENGINEERING FAIR 2019 PROJECT SUMMARY

Name(s) Mardi Barnard	Project Number J1102
Project Title Do Soil Types Influence the Movement of Salt in the Soil when Treated with a Soil Wetting Aid?	
<p style="text-align: center;">Abstract</p> <p>Objectives To determine if a soil wetting aid can reduce salt or sodium (Na) levels in different soil types (sandy, sandy-loam and clay soil) so that plants have more water and nutrients available to grow.</p> <p>Methods Fill 12 plant containers with 3 types of soil. Fill 4 of the containers with the same amount of sandy soil, 4 with the same amount of sandy-loam soil and 4 containers with the same amount of clay soil. Mix 30 ml of table salt in 500 ml of water and apply the solution to all the containers. After 1-day place drip trays underneath the containers of each soil type and treat 2 of the containers marked as UTC (untreated control) with 500 ml of irrigation water in each soil type. Treat 2 containers with 500 ml irrigation water that is treated with 30 ml of soil wetting aid. After 24-hours, measure the amount of water and record the quantity of each drip tray. Save a sample of the water from each drip tray for the sodium (Na) analysis in an analytical laboratory. Record and add the 2 data points from each treatment of each soil type to get a total value and calculate the average, ex. $(x + y) / 2 =$ average of each treatment.</p> <p>Results In sandy soil on average from 2 replicates 10.3% more sodium (Na) was recovered from the containers treated with water with a soil wetting aid than the untreated control. In the Sandy loam soil on average from 2 replicates 15.7% more sodium (Na) was recovered from the containers treated with water with a soil wetting aid than the untreated control. The clay soil on average from 2 replicates recovered 20.5% more sodium (Na) from the containers treated with water with a soil wetting aid than the untreated control.</p> <p>Conclusions A soil wetting aid is a soapy substance or formulation that reduces the surface tension of water. The lower surface tension of the water increases the mobility of water in the soil to move water in between the smaller soil particles which causes a specific soil type to hold more water. Salt or scientifically referred to Sodium (Na) accumulate in the soil as a by product released from fertilizer compounds used in crop production programs and irrigation water. In all cases of different soil types more sodium was removed from the soil irrigated with water treated with a soil wetting aid than the treatments irrigated with water alone. More salt was removed from sandy soil. Although more sodium was recovered from the sandy soil the concentration difference between the treated and untreated control was the highest in the clay soil. This suggests that a higher concentration of sodium can be removed from clay soil than sandy soil types per volume of soil.</p>	
Summary Statement My project focus on the rehabilitation of fertilizer contaminated soil by removing excessive sodium from the soil with a soil wetting aid and increasing the soil water holding capacity of different types of soil.	
Help Received I conducted the experiment myself. The collected water samples was analyzed for sodium content by a analytical chemist Samantha Clooney in the analytical laboratory of Oro Agri Inc.	