Soil Salinity Management Using Synthetic Organic Polymer

Dr. Girisha Ganjegunte, John Clark and Dr. Zhuping Sheng
Texas A&M AgriLife Research

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Pecan Orchard in El Paso County, Texas

BACKGROUND

Significant portion of the Rio Grande Project area between Elephant Butte reservoir in New Mexico and Fort Quitman in Texas is affected by salinity and sodicity. Soil salinity affects plant growth and yield through reduced water/nutrient availability and poor growing conditions. Pecan is a major cash crop in the region and it is highly susceptible to salinity. At present farmers use expensive deep tillage to improve soil permeability to leach accumulated salts. Synthetic organic polymers may offer an efficient and cost effective alternative to conventional method of sub-soiling. Application of polymer to salt affected soils may improve permeability by stabilizing soil structure by promoting better flocculation and improving pore continuity. Improved permeability can result in better leaching of salts below effective root zone of pecan. This project evaluates synthetic organic polymer's effects on soil permeability and salinity within the effective root zone of pecan.

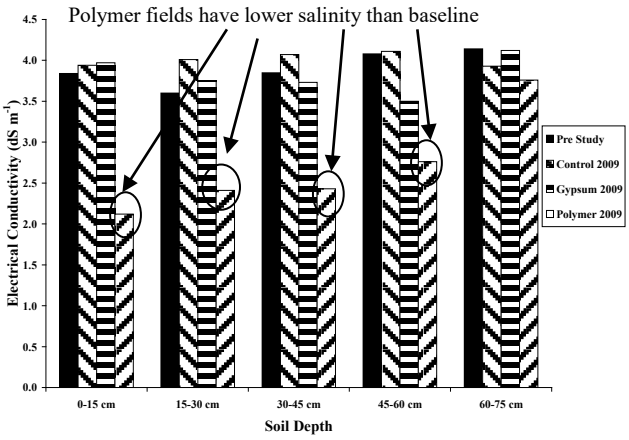
OBJECTIVES

- Evaluate effects of a synthetic organic polymer on soil permeability.
- Determine effects of synthetic organic polymer on soil salinity and sodicity in the effective root zone of pecan.
- Evaluate effects of polymer application on pecan yield.

Organic polymer being mixed and applied with irrigation water

FINDINGS AND BENEFITS

Results from the past three years have indicate that polymer application through irrigation water reduced salinity (see figure) and sodicity in top two feet of soil by 41% and 56%, respectively, compared to the control area that did not receive polymer application. As evidence of improved soil conditions, pecan nut yields increased by 34% in the polymer treated area over the control area. Study results suggested that polymer application can help in effective utilization of native Ca sources to counter sodicity and facilitate salt leaching. Polymer application maintained the improved permeability conditions created by land preparation activity prior to irrigation for longer time compared to control. These effects reduce the need for frequent deep tillage or sub-soiling to improve soil permeability and consequently reduce the cost of production and increase profits for growers in the region.



Soil salinity in polymer applied field is lower than that of control

Texas A&M AgriLife Research Center at El Paso
1380 A&M Circle, El Paso, Texas 79927
Phone: (915) 859-9111, Fax: (915) 859-1078
http://elpaso.tamu.edu/Research