

INSTRUMENTATION FOR SALINITY SURVEY

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OBJECTIVES: To develop apparatus and instrumentation for field scale survey-measuring salinity based upon theories developed by the USDA Salinity Laboratory, Riverside, CA.

PROCEDURE: The probe design was based upon earlier reported research by Carter. In concept the probe compacts a ribbon of soil .75 inch wide at the depth of operation using a curved wedge. The soil strain of .5 inch has been determined in the past for maximum mechanical compaction. To remove the surface organic material from the contact area, a forward sweeping tine was attached to the front of the probe. A five probe design, rather than the classical 4-probe design, was chosen to allow symmetrical operation behind a tractor in bedded soils. This configuration allows a probe in each of 5 furrows with the inter-probe distance fixed at the row spacing. For non-bedded soils the inter-probe distance can be varied between 20 and 42 inches. A folding 3-point mounting tool bar was designed with a detachable highway compatible truck for transportation behind a pickup. The system was designed so that one or two people could attach the tool to a tractor and prepare the system for operation within 5 minutes.

RESULTS: The system was tested in dry and wet soils without instrumentation for integrity as a tillage tool. Operation was found feasible beyond 6 mph. The instrumentation package was attached including the 5 probe monitor and geographic position sensor. The instrumentation was calibrated by Dr. Rhoades in a very saline soil.

FUTURE PLANS: The system will be field calibrated for variability with respect to speed, moisture, and soil types and field tested for suitability to task as the Shafter contribution to the cooperative program. At completion the system will be used to map salinity of several large agricultural areas. The future plans include development of a method and apparatus to utilize a electromagnetic sensor as a measure for salinity.