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Monitoring Water Movement in Cracking Clay Soils

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OBJECTIVE

To provide a better understanding of the hydrology of cracking clay soils and to develop a resistivity based method to monitor water movement in irrigated soils.

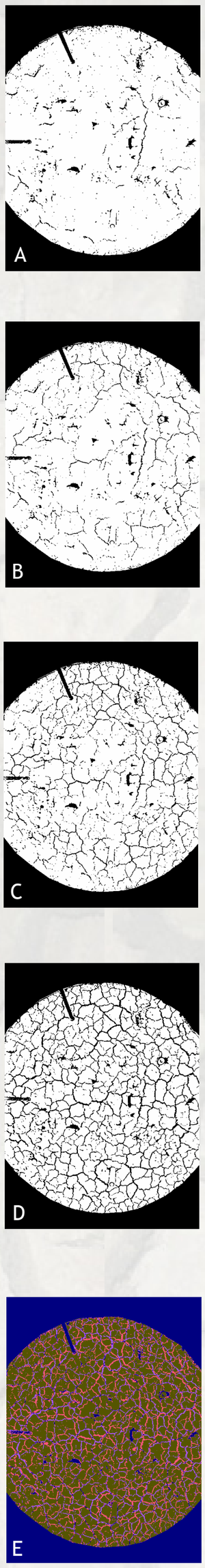
BACKGROUND

Cracking clay soils are common in Australian agriculture. Little is known neither about crack dynamics and geometry nor about water flow and transport processes in irrigated cracking soils. To prevent water logging and quick bypass flow and to optimise irrigation water usage a better understanding of these processes is crucial.

METHOD

Several cracking soils are investigated in the laboratory and in the field using a combination of surface time labs images, tracer applications, soil core and water quality analysis, lysimeter studies and electrical resistivity tomography

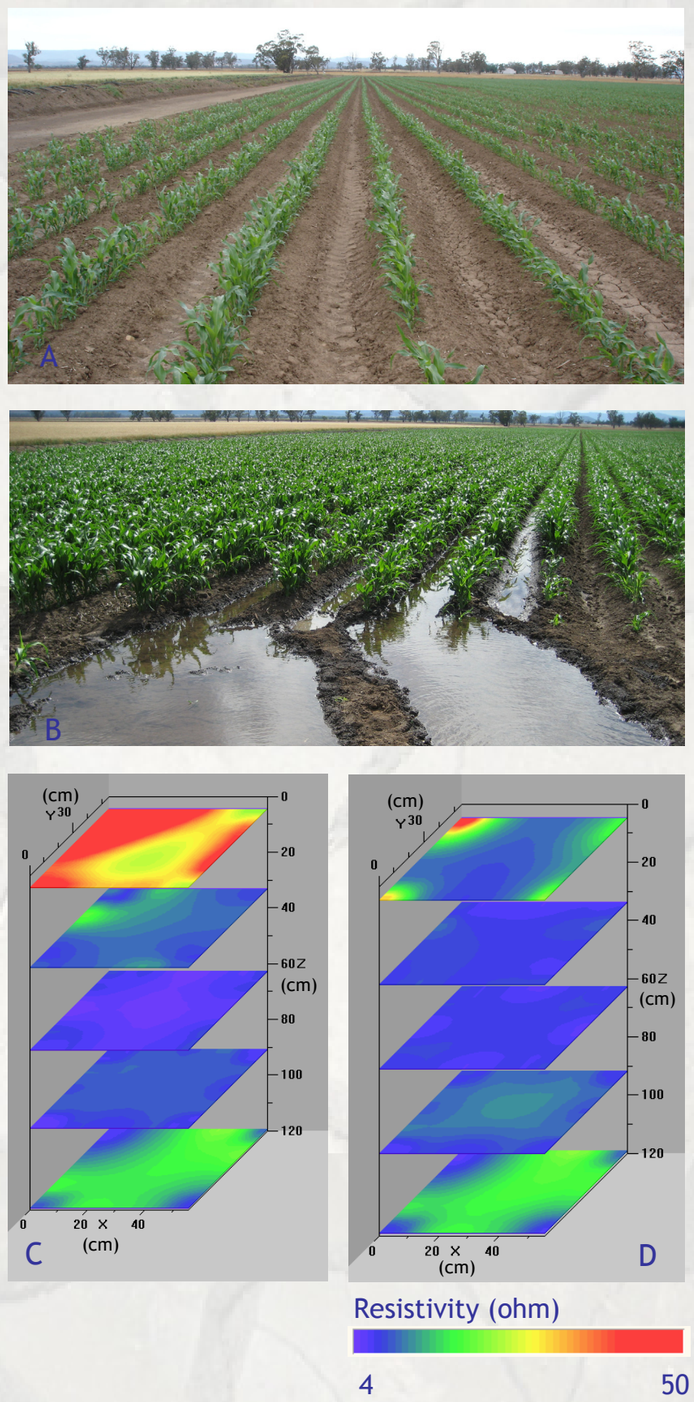
A: soil core in dry cracked soil B: ABEM resistivity meter for electrical resistivity tomography C: Tracer application on soil column D: Lysimeter installation in the field E: EC monitoring and collection of effluent from soil column F: light setup for time lab surface images



Time lab images of surface cracks

A-D: 0,2,4 and 10 days after irrigation

E: crack network at end of drying period 3 (purple) on top oft the crack network at end of drying period 2 (pink).



A-B: Sorghum field before and during flood irrigation C-D Resistivity distribution in clay soil before and after flood irrigation (units on axis are cm)

IMPLICATIONS

The study will provide knowledge and tools for the farmer and policy maker to sustainably manage irrigated soil. The first results of the small scale resistivity tomography show that electrical resistivity can be used to monitor small scale water changes in soils. In the course of this study this method will be developed further to provide a tool for optimising water usage during irrigation.

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MORE INFORMATION

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