

A Maintenance Method to Prevent Manganese Oxide Plugging in SDI Systems (Field 3)

James P. Bordovsky and Joe Mustian

Objective: To evaluate a method to prevent manganese (Mn) compounds contained in well water from plugging SDI drip emitters.

Methodology: Deposits of manganese (Mn) compounds caused by Mn in the well water were plugging drip emitters and causing severe plant stress within SDI zones during the 2002 growing season. The emitters were unplugged in the Fall of 2002. In 2003, a low concentration of hydrogen peroxide (H_2O_2) was

continuously injected into buffered irrigation water ($pH < 7.0$) in an attempt to keep dissolved Mn in solution until passing through drip emitters, thereby preventing the Mn plugging problem. Arrays of soil samples were also taken adjacent to SDI tubing at four locations to determine the concentrations of Mn in the root zone around the tape.



Figure 1. An area in Field 3 where emitters were plugged with Mn oxides in 2002 (left) and the same location following emitter cleaning during the 2003 growing season (right). A procedure was used to keep dissolved Mn in solution to reduce the probability of future emitter plugging.

Results: Figure 1 shows the effects on cotton growth of Mn emitter plugging before (Oct. 2002) and after (July 2003) SDI emitters are cleared of Mn-oxides. The H_2O_2 injection used during the 2003 irrigation season appeared to keep Mn in solution with no visible signs of emitter plugging. The cost of continuous injection of the “Mn solution” was high at near \$50/ac. A less expensive alternative will be attempted in 2004. Figure 2 depicts the spatial concentration on Mn deposited in the soil profile around the drip tape in September 2003. Although low, the level of Mn in the soil should be monitored to determine if Mn concentrations begin to affect cotton production.

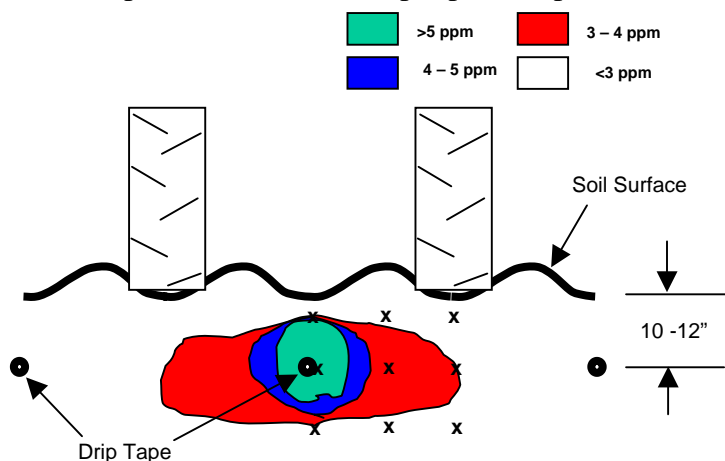


Figure 2. Soil sample locations and average residual manganese concentration around SDI drip tape. Samples were taken at four locations within the 16-acre SDI Design Study area, Helms Farm, 2003.

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The chemicals used for Mn cleaning and maintenance are ***extremely hazardous***. In addition, the effects of these materials on equipment and growing crops have not been sufficiently investigated. If deemed necessary, use of these procedures should be left to certified SDI consultants. We highly recommend periodic water analysis to determine emitter plugging potential.