

## 2001 Leaf Necrosis Problems In Drip-Irrigated Cotton Fields

Producer observations of premature defoliation of drip-irrigated cotton were noted in 2001. Due to significant investment in drip irrigation technology, and the potential for severe lint yield and quality reductions due to premature defoliation, several fields were scrutinized. In response to producer concerns, a survey was generated by a team of scientists and Extension specialists at the Lubbock Center and distributed to affected producers and seed company representatives. Eight locations exhibiting problematic symptoms in west Texas included Slaton, Sweetwater, Roscoe, Tahoka, Idalou, Post, and Midland. Results from the survey, and soil and tissue analyses were discussed by the team in February, 2002.

### Problem

Drip-irrigated fields with leaf necrosis symptoms were planted to diverse types of varieties, and nothing varietal specific was noted. One somewhat common characteristic of the fields was irrigation capacity of 3 or less gpm/acre. In 7 of the 8 fields, chlorotic and necrotic leaf and/or boll bract symptoms were noted during the extended dry period from late May to September. Symptoms began appearing earlier (early July) in one field, while other locations exhibited the symptoms in late July through August. Producers at seven locations noted that fields had no in-season rainfall. In one field, symptoms were noted in late September after a significant rainfall event. Based on available soil and plant tissue testing, it was noted that leaf tissue had high calcium and sulfate, and sometimes high boron concentrations. No extraordinary sodium or chloride was noted. However, it is hypothesized that water quality was a significant contributing factor. It is likely that high concentrations of some constituents in plant tissue were due to root proliferation near drip lines, very high frequency irrigation (2 times per day) and low irrigation capacity. Roots were located in a zone of high concentration of water constituents (such as calcium sulfates) due to lack of irrigation and/or rainfall necessary to reduce salt concentration. Roots were basically required to proliferate in the highly concentrated areas, resulting in hyper-accumulation of some salt constituents in leaf tissue.

### Team Concerns

One significant concern among team members included the fact that many drip irrigated fields with limited irrigation capacity which received little or no rainfall exhibited no necrosis symptoms, while other adjacent fields did. The reasons for this are unclear. In several symptomatic fields, it was noted that where leaks in drip lines occurred, no leaf necrosis symptoms on plants were noted. This would lead to the conclusion that under

higher irrigation amounts, the symptoms did not occur due to dispersion of salts in the soil. In noticeable areas of some fields where drip lines in some rows were either absent due to installation errors, or in field margins, no symptoms were observed.

### **Potential Management Considerations**

There is evidence that high frequency irrigation (during fruit set and boll development) is advantageous at low irrigation capacity. However, the leaf necrosis problems encountered in some drip irrigated fields might require a somewhat different approach to management, especially if the field has exhibited symptomology in prior years. **One potential solution might be to disperse constituent salts contained in irrigation water by using less frequent and higher quantities of water.** In a normal rainfall year, producers might consider irrigating at 3 or 4 day intervals over the growing season. Another option might be to irrigate at 3 or 4 day intervals during root system establishment (prior to mid-bloom), and then switch to a daily irrigation schedule. During dry growing seasons (such as was encountered in 2000 and 2001), producers could still consider using 3 or 4 day irrigation intervals over the growing season. If significant (about 2-inches) rainfall occurs, producers could then go to a daily irrigation schedule. The best solution for avoiding the problem is rainfall of adequate amounts and distribution during the growing season to disperse the salts accumulated in the soil near the drip lines.

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