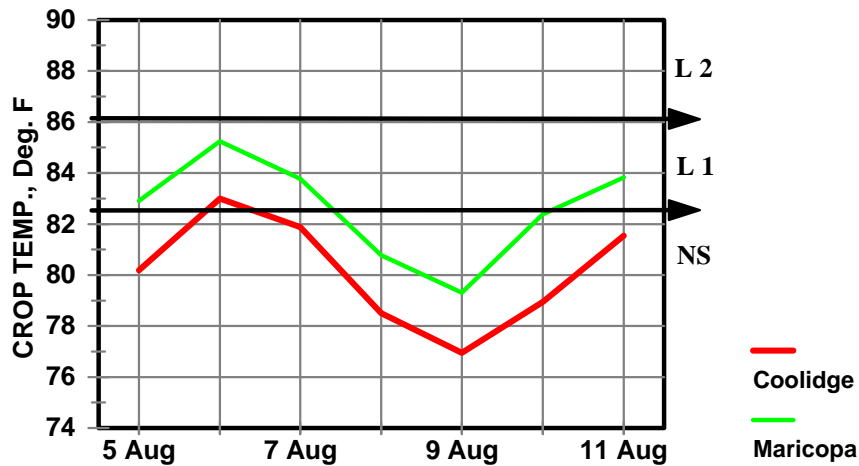


**COTTON HEAT STRESS UPDATE: PINAL COUNTY**  
**12 August 2001**

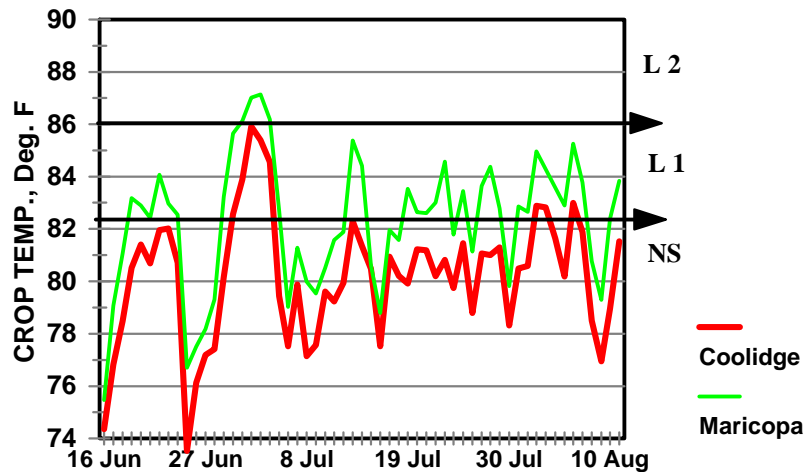
**Paul W. Brown**  
**University of Arizona**

**Summary**

Above normal humidity helped generate a few days of Level 1 stress at Maricopa last week. Cooler nights helped minimize stress in the Coolidge area. Stress conditions peaked on Monday, then diminished through mid-week, before returning for the weekend. Growers should expect to see some shedding of small bolls if their fields remain in the primary bloom cycle. Many fields should be at or near cut-out by now.



**Figure 1.** Estimated crop temperatures for Maricopa and Coolidge for the most recent 7 days. Heat stress is normally not a problem when crop temperatures remain below 82.4 °F (zone below bottom arrow labeled NS). Level 1 heat stress results when crop temperatures average 82.4 -86 °F (zone between arrows labeled L1). Level 2 heat stress develops when crop temperature average above 86 °F (zone above top arrow labeled L2).



**Figure 2.** Mean daily crop temperature for the 2001 summer season at Maricopa and Coolidge. See Fig. 1 caption for explanation of abbreviations: NS, L1, and L2.

### **Heat Stress Definitions**

Level 1 heat stress develops when crop temperature averages between 82.4°F and 86°F for the 24-hour day. Periods of Level 1 stress commonly generate light to moderate fruit shed and smaller sized bolls. Fruit shed usually subsides rather quickly when the stress is relieved. The impact of Level 1 stress on cotton reproductive development is often variable. Possible reasons for this variable response include: 1) relative heat tolerance of varieties; 2) field microclimate (e.g. topography and canopy development); 3) crop condition (e.g. fruit retention and crop vigor); and 4) errors associated with estimating crop temperature (representativeness of weather data and errors in model used to estimate crop temperature).

Level 2 heat stress develops when crop temperatures average in excess of 86°F for the 24-hour day. Level 2 stress is the more severe stress and typically produces heavier fruit shed as well as malformed (hooked) and/or smaller bolls. Fruit shed generally subsides once the stress is alleviated, but Level 2 stress also impacts the viability of young (14 days pre-bloom) squares and thus can produce a second, delayed fruit shed nearly two weeks after the stress event ends.