

COTTON HEAT STRESS UPDATE: COOLIDGE & MARICOPA

10 August 2002

Paul W. Brown
University of Arizona

Summary

Cool temperatures early in the week followed by the return of dry air combined to minimize heat stress last week. Heat stress has been limited in recent weeks. Fruit retention should be improving in late crops that have not yet attained cutout. This will be the final published heat stress update for 2002. Daily updates on heat stress will still be available via the AZMET web page at <http://ag.arizona.edu/azmet>.

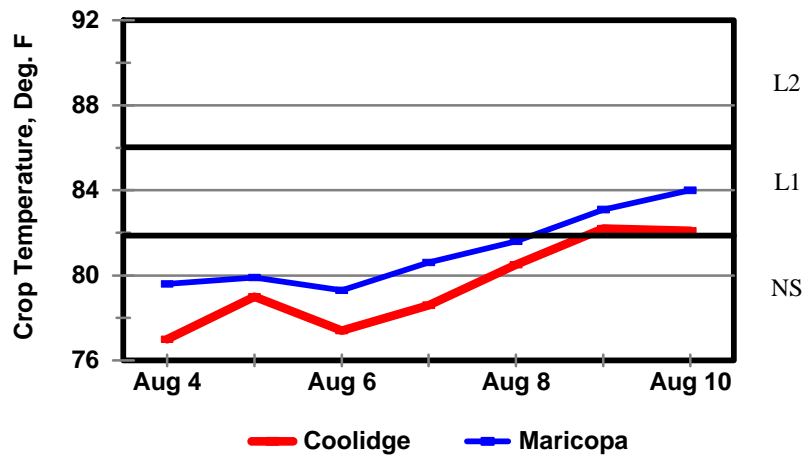


Figure 1. Estimated crop temperatures for Coolidge and Maricopa for the most recent 7 days. Heat stress is normally not a problem when crop temperatures remain below 82.4 °F (zone labeled NS). Level 1 heat stress results when crop temperatures average 82.4 -86 °F (zone labeled L1). Level 2 heat stress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

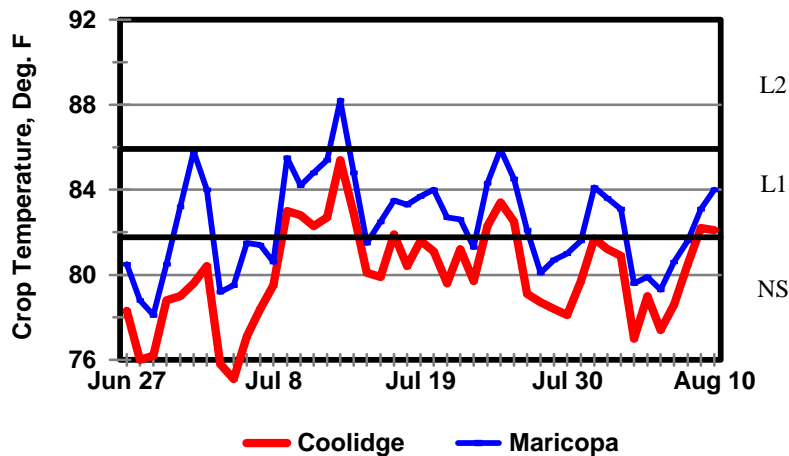


Figure 2. Mean daily crop temperature for the 2002 summer season at Coolidge and Maricopa. See Fig. 1 caption for explanation of abbreviations: NS, L1, and L2.

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.