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PHYSIOLOGICAL CONSEQUENCES OF DROUGHT STRESS IN COTTON

Bill Pettigrew
Crop Genetics and Production Research Unit
USDA-ARS
Stoneville, MS

Abstract

Abiotic stresses pose considerable limitations to cotton's (*Gossypium hirsutum* L.) growth, development, and yield production. The objectives of this study were to examine the physiological consequences of moisture deficit stress for cotton grown in the humid southeastern US. Eight genotypes were grown in the field under either irrigated or moisture deficient conditions in 1998-2001. The genotypes included an okra-normal leaf isoline pair as well as genetically modified genotypes and their recurrent parent lines. Dry matter partitioning, gas exchange, chlorophyll fluorescence measurements and other physiological data were collected. Drought stress reduced the leaf area index of the cotton crop, and thereby reduced the amount of canopy light interception. Smaller leaves on the non-irrigated plants provided for greater morning leaf CO_2-exchange rates (CER), but these rates subsequently crashed in the afternoon and were then less than those measured in irrigated plants. Photosystem II quantum efficiency values matched the pattern of the CER values for the two soil moisture treatments. The most obvious detrimental responses to moisture deficit stress were increased fruit abortion and an accelerated termination of the vegetative and reproductive growth.