PHENOLOGY AND YIELD OF EIGHT MAR COTTON GENOTYPES UNDER IRRIGATION AND WATER STRESS

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Abstract

Eight cotton genotypes were field tested for two years to quantify growth and phenological development, boll retention, and yield under full irrigation and mid-season water stress. Significant differences were obtained between water treatments and among genotypes during the growing season from first square to maturity for most traits. Differences were noted for plant height, number of main stem nodes, height to node ratio (HNR), nodes above white flower (NAWF), boll retention, and lint yield. Averaged over genotypes, the irrigated plants were 10 inches taller and produced 3 more nodes than the water-stressed plants, 95-130 days after planting (DAP). Height to node ratio was 0.6 units higher in the irrigated treatment. Reduction in NAWF was 1 to 1.8 nodes, 76 to 102 DAP, respectively, in the non-irrigated plots. The water-stressed plants reached NAWF=5 value 8 days earlier than plants in the irrigated plots. Boll retention was reduced 10% under water stress. Reduction in plant height, number of main stem nodes, HNR, NAWF, and boll retention were positively associated with a 40% or 261 lb/acre lower yield in the water-stressed treatment. The genotypes least affected by water stress in phenological response and yield were the MAR-7 strains CUBQHGRPIS-1-92 (smooth) and its isogenic line CUBQHGRPIH-1-92 (hairy), and Tamcot Sphinx. Measurements of HNR, NAWF, and boll retention should provide useful tools for in-season and end-of-season crop management including supplemental fertilization, irrigation timing and amount, use of plant growth regulators, insect management and control, and harvest aids. These tools also will be useful in breeding programs in quantifying phenology, yield potential, and stability of genotypes under water stress and over environments.

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