CYTOKININ AMELIORATION OF YIELD LOSSES FROM DROUGHT AND NEMATODES

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Abstract

The influence of applied plant growth regulators (PGR) on growth, development and yield in cotton (Gossypium hirsutum L. and Gossypium barbadense L.) has been studied for over half a century. Studies of PGR containing cytokinin alone or in combination with gibberellins applied at the pinhead square developmental stage have reported both positive and negative effects; however, a majority of the studies report no significant effects on cotton. The objective of this study was to evaluate the effects of a foliar application of a commercial formulation of cytokinin (6-benzyladenine) during the early stages of seedling development, long before the pinhead square stage. Commercial cotton lines were evaluated under water-stress alone; and under limited water in a field infested with nematode. Field studies in 2005, 2006, and 2008 showed yield increases of rainfed cotton of 9.6%, 6.8% and 7%. Application of the cytokinin is effective reducing apical dominance, increasing the rate of development of fruiting branches, thickening of the hypocotyl, and increasing root development. Cotton sprayed with the cytokinin upon emergence showed a yield enhancement equivalent to standard nematicide treatments in a field study in 2010. These results suggest that a cytokinin treatment upon emergence can increase rooting and aid in avoiding abiotic and biotic stresses commonly experienced by developing seedlings.