FIELD EVALUATION OF SPRINKLER-INDUCED FLOWER LOSS AND YIELD REDUCTIONS

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Abstract

Research in our laboratory has discovered that cotton pollen is sensitive to water. Pollen grains rupture within 1-2 minutes after being placed in the water. Greenhouse studies were performed to determine how much water was needed to reduce yields. These studies showed that a single spray with 1 ml of water reduced seed and lint development by 55%. Additional spray applications resulted in further losses and ultimately flower shedding. Studies were performed using a center pivot equipped with sprinklers and drag socks to determine the affect of water application method and timing on flower losses and yield reductions under field conditions. Treatments included four different time of day applications (8 am to 10 am, 10 am to noon, noon to 2 pm, and 2 pm to 4 pm) with 3/4 acre-inch of water. The plots were irrigated 8-times over the period of August 1 to September 1, 2000. Flowers were tagged immediately prior to irrigation and tracked for the rest of the season. Approximately 60% of the tagged flowers in the drag sock treatment were shed by the plants across all 4 time-of-day treatments because of abiotic (heat) and biotic (worm and weevil infestations) stresses. Flower losses were greater under the sprinkler treatment with 60% lost in the 8 to 10 am treatment, 80% lost in the 10 am to noon treatment, and approximately 90% lost in the noon to 2 pm and 2 pm to 4 pm treatments. Those flowers that were partially fertilized following the sprinkler treatment resulted in misshapen bolls. Evaluation of lint yields following 8 irrigations over a 32 day period showed 27 to 36% reductions in the sprinkler plots compared with the drag sock plots for the 10 am to 4 pm irrigation time periods. The results of this study suggest that most of the potential yield for a given day can be lost if the open flowers come in contact with water.

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