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IMPLICATIONS OF INSECTICIDE TERMINATION AT NAWF=5 PLUS 250, 350 OR 450 HEAT UNITS ON COTTON YIELD AND QUALITY

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Abstract

COTMAN, a crop monitoring program for cotton, uses the concept of 350 heat units after anthesis of the last flower population at NAWF=5 for termination of insecticide applications. Some reports have indicated that terminating insecticide use at 350 heat units after NAWF=5 results in a higher yield than when terminating at either lower or higher heat unit values, but evidence is lacking. It is hypothesized that this yield increase may be attributed to improved carbon partitioning to lower developing bolls following the removal of upper-canopy (above NAWF=5) squares by insects. Field studies were conducted in northeast Arkansas from 1998 to 2001 to determine if boll weight and quality of the last effective boll population at NAWF=5 (physiological cutout) and overall lint yields could be enhanced following the removal of upper-canopy fruit. Assuming that fruit removal is a viable means of enhancing the development of lower bolls and achieving higher lint yields, the second objective of the study was to determine if NAWF=5 plus 350 heat units is in fact the best time to terminate insecticide applications. Treatments consisted of a control with no fruit removal, and hand removal of all upper-canopy fruit above NAWF=5 at 250, 350, and 450 heat units to simulate insect damage. Additional field and growth chamber studies were performed to determine the amount of carbon partitioned to the first position boll at NAWF=5 following fruit removal at different heat units after physiological cutout.

Our studies have not shown a clear trend between treatments for increasing cotton yields or fiber quality, however boll weight was consistently increased when fruit was removed at NAWF=5 plus 250, 350 and 450 heat units. When averaged over four years, lint yields were numerically increased by 37 lb/acre over the control where upper-canopy fruit was removed at NAWF=5 plus 250 heat units. The NAWF=5 plus 350 heat unit treatment represented a non-significant 12 lb/acre decrease in lint yields compared to the control. Our hypothesis was that yields would be the highest when fruit was removed at NAWF=5 plus 350 heat units. However, with low insect pressure late in the season during several of the years, yields were increased more from the earlier fruit removal time which allowed for additional carbohydrate translocation to lower developing bolls instead of feeding upper bolls which would likely not be harvested. Averaged over four seasons, the greatest weight of first position bolls at NAWF=5 was observed by the NAWF=5 plus 250 heat unit fruit removal treatment. This increase in lower boll weight helps to explain why lint yields were the highest for the fruit removal treatment at NAWF=5 plus 250 heat units. No differences or distinct trends were evidenced in relation to fiber quality parameters over the four seasons following fruit removal.