

IMPACT OF MID-SEASON BOLL REMOVAL ON VIRGINIA COTTON AND IMPLICATIONS FOR IMPROVED MANAGEMENT OF INSECT PESTS

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Abstract

Past research has shown that cotton plants can sustain relatively large amounts of square loss and not sustain significant lint yield reduction. However, no data are available from Virginia that can help predict plant response to mid-season boll damage. Field plots were established at the Tidewater Agricultural Research and Extension Center in Suffolk, Virginia. The overall objective of the experiment was to determine the impact of different levels of boll removal, from different locations on the plant, at different times on plant growth and yield. The specific objectives were to investigate the use of COTMAN to document the effects of boll removal on plant growth and maturity and to use boll loss response data to improve management recommendations for mid-season insect pests. Ten to 14 days old bolls were removed at 0, 5, 15 and 20% rates during the three week period prior to the onset of boll worm sprays (early August). A split-plot experimental design with four replication was used. Plants were mapped using the COTMAN system to monitor growth and development before and after the treatments were administered. During week 1, the 20% boll removal rate significantly increased lint yield compared with the 0, 5, and 15% removal rates. The 20% boll removal rate earlier in the season might have stimulated weight increase in the remaining bolls on the plant. In week 2 unlike week 1, the 20% boll removal rate significantly reduced lint yield compared with the 15% boll removal rate. The reduction in lint yield observed at the 20% boll removal rate in week 2 could be due to the limited time left for the cotton plant to compensate for the removed bolls. Although not significant, a similar trend was observed in week 3. The general growth pattern observed in response to various boll removal rates was different between the three weeks. The growth and development curves indicated yield compensation by the cotton plant to early season boll removal rates of 15-20%. This was indicated by a higher apogee, an extended slope prior to and after apogee, and a much slower cutout for those treatments where a yield increase was observed.

Overall, the 20% boll removal rate during week 1 stimulated yield as it was indicated by a yield increase over the rest of the treatments. This yield increase was 209 lb lint/acre over the average of the 0, 5 and 15% boll removal rates. However, boll removal rates in excess of 20% later in the growing season decreased lint yields significantly (week 2) and numerically (week 3). The data generated by the COTMAN program showed the importance of using a standard growth curve to describe the effects of boll loss late in the season on yield.