

# **GROWTH COMPARISON OF TRANSGENIC AND CONVENTIONAL COTTON CULTIVARS USING COTMAN**

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## **Abstract**

COTMAN is a computer-based integrated pest management program that tracks cotton (*Gossypium hirsutum* L.) growth and development. COTMAN was developed by scientists at the University of Arkansas in cooperation with Cotton Incorporated and consists of two components. SQUAREMAN is implemented during early season development and is used to determine first position square retention and growth as compared to an optimal target development curve (TDC). BOLLMAN is utilized to track nodes above white flower (NAWF) from first flower to cutout and to determine the number of days from planting to cutout. The objective of this study was to evaluate and compare differences among six cotton cultivars of varying maturity (four transgenic, including Roundup Ready and Bollgard with Roundup Ready; and two conventional) at two locations in the Texas High Plains using the COTMAN program. At the Crosby County site, significant differences among cultivars were noted for percent square retention for the first and third dates of squaring observations and for days to cutout. At the Parmer County location, differences among cultivars for square retention for the third date of squaring observations were noted, but no differences were observed for days to cutout. Cultivar development deviated considerably from the TDC at both sites. Actual growth curves for all cultivars were below the TDC, which indicated that less than optimal crop growth and development occurred at both sites. Square initiation began somewhat later than recommended at the Crosby County site and the cultivars entered early bloom with fewer than optimal NAWF at both sites according to the TDC. The Crosby County site entered bloom with low vigor as indicated by NAWF, and lint yield was 607 kg ha<sup>-1</sup> (542 lb ac<sup>-1</sup>) when averaged across all cultivars. This was due to lower irrigation capacity which was inadequate to sustain plant vigor. The Parmer County site developed somewhat later and also entered bloom with fewer NAWF than the TDC recommended, yet produced 1515 kg ha<sup>-1</sup> (1353 lb ac<sup>-1</sup>) lint when averaged across all cultivars. This was due to high irrigation capacity and application. In the Texas High Plains, cotton may enter bloom with fewer NAWF because of environmental stresses but plant vigor may be sustained with adequate irrigation. This could explain why actual growth curves at Parmer County could be under the TDC and high yields were still obtained. Observations of growth and development of cotton cultivars at the two locations indicated that no major negative differences were noted for the transgenic compared to conventional types. Data from this project will be used to determine the potential management value of COTMAN to High Plains producers.