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YIELD CONSEQUENCES OF THE LAST EFFECTIVE BOLL DESIGNATION

C. Owen Gwathmey
University of Tennessee
Jackson TN

Abstract

The last effective bolls (LEB) are the last bolls produced by a crop that are likely to contribute to economic yield. Based on Arkansas research, COTMAN assumes that the LEB is set when there are five nodes above the highest first-position white flower (NAWF=5), or by the last effective bloom date for the location, whichever occurs first. COTMAN uses maturation of the LEB for defoliation timing, assuming that 850 DD60s are needed from flower to mature boll. Objectives of this research were to determine yield effects of LEB designation in different row spacings in Tennessee. Two interrelated experiments were conducted at the Milan (TN) Experiment Station in 2001-2003: a boll tagging study to verify LEB, and a yield response study to determine yield effects of LEB designation. Both studies were conducted on a non-irrigated, no-tilled silt loam, in which 'PM 1218 BG/RR' was planted in early May each year. The boll tagging study was arranged in a RCB with four replications, in which treatments were 10- and 40-inch row spacings. Flowering date and NAWF were noted on tags attached to all first-position (P1) flowers on 16 flagged plants per plot. Tagged bolls were hand-harvested at the end of each season, bolls were counted and seedcotton weighed by NAWF. These data were nested within row spacings for statistical analysis. Criteria for boll 'effectiveness' included boll frequency, size, contribution to yield, and earliness. All bolls except a few at NAWF=1 in 40-inch rows were set before the last effective bloom date of August 8 each year. By NAWF=5, cotton in 10-inch rows had accumulated ~25% of its P1 yield, while cotton in 40-inch rows had accumulated ~55% of its P1 yield. Results suggest that LEB was set higher on the plant than NAWF=5 in this cultivar and environment. The companion yield response study was a RCB split-plot with 4 reps. Main plot treatments were defoliation timings of NAWF=5 + 850 DD60s (the COTMAN standard), and NAWF=2 + 850 DD60s (consistent with the boll tagging results). Sub-plot treatments were row spacings of 10-inch solid, 40-inch solid, and 40-inch 2+1 skip rows. Plants in 10-inch rows reached the critical NAWF sooner than those in 40-inch rows. A standard 3-way tank mixture of harvest aids was applied by high clearance sprayer when 850 DD60s had accumulated after the critical NAWF for each plot. Across years, the NAWF=2 treatments were applied 11 days later in 10-inch rows, and 17 days later in 40-inch rows, than the NAWF=5 treatments. Forty-inch row plots were spindle picked twice each year, and 10-inch rows were harvested with a finger-type stripper once each year. Seedcotton from each plot was weighed and a subsample was ginned to determine lint yields. Lint yields were significantly higher with later defoliation, averaging 64 lb ac^{-1} (6%) more in 10-inch rows, 148 lb ac^{-1} (14%) more in 40-inch solid, and 101 lb ac^{-1} (13%) more in 40-inch skip rows than the standard timing of NAWF=5 + 850 DD60s. Results present a tradeoff dilemma to producers: loss of time versus potential gain of yield. However, results do not imply that producers should "chase phantom bolls" set after the last effective bloom date for a given location.

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