

**WEED MANAGEMENT IN CONVENTIONAL
AND NO-TILLAGE COTTON USING BXN,
ROUNDUP READY, AND STAPLE OT SYSTEMS**

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Abstract

Buctril, Roundup, and Staple have different weed control spectrums and thus, different needs for supplementary soil-applied or layby herbicides. All three herbicides allow no-till cotton production. Deciding which system is correct depends on the target weed spectrum, suitability of available cotton varieties to the growing region and tillage system, and herbicide-resistance management and carryover in rotational crops. Studies were conducted in 1997 and 1998 at two North Carolina locations to evaluate herbicide systems using Buctril, Roundup Ultra, and Staple in conventional and no-tillage cotton for weed control and cotton response and yield.

Cotton varieties were 'Stoneville 474' and 'Stoneville BXN47' each year and 'Paymaster 1330RR' and 'DP5415RR' in 1997 and 1998, respectively. Herbicide systems in non-transgenic cotton included: 1) nontreated, 2) Prowl at 1 pt/A preplant incorporated (PPI) in conventional tillage or preemergence (PRE) in no-tillage followed by (fb) Cotoran PRE at 1 qt/A, 3) Prowl plus Cotoran followed early-season by Cotoran plus Bueno 6 at 1.3 qt/A post directed (PDS), 4) #3 fb a layby application of Bladex at 0.8 qt/A plus Bueno 6 at 1.3 qt/A, 5) #4 with the PDS replaced by Staple over-the-top (OT) at 1.2 oz/A (#5 is the Standard OT for non-transgenic cotton), and 6) #5 with Bueno 6 at 1 pt/A mixed with Staple OT. In BXN cotton, herbicide systems included: 7) the same standard OT but using Buctril (Prowl plus Cotoran fb Buctril OT fb layby), 8) #7 with the layby application replaced with the option of multiple as-needed (ASN) Buctril applications, 9) #7 with Cotoran PRE replaced with Buctril ASN, and 10) #9 with Buctril plus Bueno 6 early postemergence plus Buctril ASN. In Roundup Ready cotton, systems included: 11) the same standard OT using Roundup Ultra (Prowl plus Cotoran fb Roundup Ultra OT fb layby), 12) Roundup ASN alone, 13) Prowl plus Cotoran fb Roundup ASN, and 14) Roundup ASN fb layby. Arcsine square root-transformed weed control data and yield data were subjected to analysis of variance with sums of squares partitioned to reflect year and location interactions and a split-plot treatment design (main plot tillage and 14 herbicide-system subplots).

Only the herbicide-system main effect existed for weed control. Standard OT treatments for each variety controlled

large crabgrass, morningglory (entireleaf, ivyleaf, pitted, and tall), prickly sida, smooth pigweed, common lambsquarters, jimsonweed and velvetleaf near 100% and increased control over soil-applied herbicides alone. The standard Roundup system controlled sicklepod 82% and more than the standard Buctril or Staple systems (near 60%). Buctril and Staple required Bueno 6 to control sicklepod. Roundup ASN did not adequately control goosegrass due to escapes late season. Smooth pigweed control was improved in the Buctril system by addition of Cotoran PRE. Staple systems controlled velvetleaf near 100% compared to 80 to 90% control by Cotoran plus Bueno 6 PDS.

Both herbicide-system and tillage main effects were significant for cotton lint yield but the interaction was not significant. Cotton lint yield with the standard systems ranged between 1067 and 1152 lb/A with the Roundup system (1152 lb/A) yielding slightly more than the Staple system (1067 lb/A) and the Buctril system was not different from either Roundup or Staple. A soil-applied only program of Prowl fb Cotoran yielded less than 400 lb lint/A. In non-transgenic cotton, Cotoran plus Bueno 6 PDS without a layby yielded less (800 lb/A) than the other postemergence systems (at least 1000 lb/A). In BXN cotton, all systems yielded over 900 lb lint/A but the two systems containing Cotoran PRE yielded more than the Buctril ASN systems. In Roundup Ready cotton, all systems yielded at least 1000 lb/A but the Roundup ASN only system yielded slightly less than the standard of Prowl plus Cotoran fb one Roundup application fb layby. When averaged over years, locations, and herbicide systems the tillage main effect indicated no-tillage cotton yielded less (904 lb/A) than conventionally-tilled cotton (1077 lb/A). This was probably due delayed soil warming in no-till cotton. Cool springs are inherent in North Carolina, and in 1997 conditions were exceptionally cool. No-tillage cotton seemed to emerge and grow slower in 1998 as well. Further evidence of this condition is early season cotton stunting. A tillage main effect existed for cotton stunting early season with the no-tillage cotton stunted 3% compared to no stunting in conventionally-tilled cotton. The lack of an herbicide-system effect for stunting suggest that tillage and not herbicides caused the stunting.