

**RESPONSE OF NON-ROUNDUP READY COTTON TO
SIMULATED DRIFT RATES OF ROUNDUP ULTRAMAX**

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Abstract

In 2001, approximately 4.7 million out of the estimated 15.5 million acres of upland cotton planted in the United States did not have the Roundup Ready technology. This includes conventional, non-transgenic varieties, as well as other non-Roundup Ready transgenic varieties. The potential for herbicide drift or misapplication exists on non-Roundup Ready cotton cultivars that are often planted adjacent to Roundup Ready cotton varieties. Experiments were conducted at three locations in 2002, including: Lubbock, TX; Munday, TX; and Altus, OK, (which represent upland cotton producing regions of the Texas Southern High and Rolling Plains and Southwest Oklahoma) to determine the effects of low rates of Roundup UltraMax (similar to drift) on non-Roundup Ready cotton. At the Lubbock location, Paymaster HS26 was planted and at Munday and Altus, DPL 237B was planted. Roundup UltraMax was applied at 0.38 lb ae/A (12.8 oz/A), 0.19 lb ae/A (6.4 oz/A), 0.094 lb ae/A (3.2 oz/A), 0.047 lb ae/A (1.6 oz/A), and 0.023 lb ae/A (0.8 oz/A) postemergence-topical (POST) to cotton at the cotyledon to 1-leaf (COT-1 lf), 4- to 5-leaf (4-5 lf), pinhead square (PHSQ), and first bloom (FBLM) growth stages. An additional treatment of Roundup UltraMax at 0.75 lb ae/A (26.0 oz/A) was applied at all growth stages at the Lubbock and Munday locations. Cotton visual injury ratings were taken at 14 days after treatment (DAT), 21 DAT, 28 DAT, and at the end of the season. Plants were mapped at the end of the season and cotton lint yields and quality were also determined.

At Lubbock, 14 DAT, all rates above 0.023 lb ae/A injured cotton when applied at COT-1 lf, 4-5 lf, and PHSQ (8 to 98%). The lowest rates (0.023 and 0.047 lb ae/A) did not show any visual injury when applied at FBLM compared to higher rates, which injured cotton 60 to 95%. By the end of the season, injury decreased slightly from the higher rates applied early season (COT-1 lf, 4-5 lf), with only 0.19 lb ae/A and higher showing significant injury (10 to 82%). Later season applications however, showed an increase in injury from the 0.38 and 0.75 lb ae/A rates to at or near 100% visual injury. Roundup UltraMax applications as low as 0.094 lb ae/A caused visual injury when applied at PHSQ, while rates as low as 0.047 lb ae/A applied at FBLM injured cotton. Although all but the 0.023 lb ae/A application at COT-1 lf showed visual injury 14 DAT, yield was only reduced by rates as low as 0.19 lb ae/A. All rates except 0.023 lb ae/A reduced yield following Roundup UltraMax applications on 4-5 lf cotton. All rates applied at PHSQ reduced cotton yield, even 0.023 lb ae/A, which showed no visual injury 14 DAT. Only Roundup UltraMax at 0.023 lb ae/A applied at FBLM did not reduce yields. The 0.75 lb ae/A rate applied at PHSQ and FBLM and 0.38 lb ae/A applied at FBLM produced no yield.

At Munday, 14 DAT, all rates applied at COT-1 lf injured cotton 20 to 82%, and rates above 0.023 lb ae/A applied at 4-5 lf cotton caused visual injury (30 to 81%). Roundup UltraMax rates of 0.094 lb ae/A and greater applied at PHSQ caused 40 to 70% visual injury, while 0.19 lb ae/A and greater applied at FBLM injured cotton 12 to 30%. The injury from FBLM applications was much less than injury at other growth stages. By the end of the season, injury from early season applications was only seen from 0.75 lb ae/A applied at the COT-1 lf and 4-5 lf stages. Injury from 0.094 lb ae/A and greater applied at the PHSQ stage was still apparent by the end of the season, but injury was reduced to 15 to 45%. Rates of 0.094 lb ae/A and greater applied at FBLM showed visual injury at the end of the season. Although visual injury decreased by the end of the season, yield reductions were observed with rates of 0.094 lb ae/A and greater applied at the COT-1 lf, 4-5 lf, and PHSQ stages. Even though all the rates showed initial and end of season visual injury less than injury at other stages, only 0.023 lb ae/A applied at FBLM did not decrease yield.

Rates above 0.023 lb ae/A applied at the COT-1 lf and 4-5 lf stages showed visual injury 14 DAT at Altus, with injury ranging from 10 to 92%. All rates applied at PHSQ injured cotton 10 to 40%, while only 0.19 lb ae/A applied at FBLM showed any visible injury (10%). By the end of the season, the only visual injury observed was from 0.38 lb ae/A applications made at the COT-1 lf (20%) and 4-5 lf (28%) stages and from 0.19 lb ae/A applied at FBLM (10%). The 0.38 lb ae/A rate reduced

yields when applied at all growth stages. The 0.19 lb ae/A rate applied at COT-1 lf and FBLM reduced cotton yields, while rates as low as 0.094 lb ae/A applied at 4-5 lf decreased yields.

At all locations, application timing and Roundup UltraMax rate affected cotton injury levels; however, visual injury did not always result in a yield reduction. Visual injury tended to over estimate yield loss, especially for early applications (COT-1 lf, 4-5 lf). Later applications (PHSQ, FBLM) affected yield more than early applications. Cotton injury varied by location and was dependent on the growing season and crop conditions.