

## WEED MANAGEMENT SYSTEMS IN ENHANCED ROUNDUP® READY COTTON

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### Abstract

Roundup Ready cotton is planted on about 82% of the acreage in Georgia and 75% of the acreage across the southeastern United States. Growers enjoy the convenience and broad spectrum weed control with Roundup Ready cotton utilizing glyphosate (Roundup, others). Although this technology is well accepted, Georgia growers continue to struggle with making overtop applications within the time frame recommended on labels as well as managing several difficult-to-control weeds, such as morningglories (*Ipomoea* sp.). With the anticipated release of Enhanced Roundup Ready cotton in 2006, growers will likely be able to make topical applications to larger cotton than is recommended for the current Roundup Ready varieties. Enhanced Roundup Ready will also allow greater cotton coverage with directed applications. It may also be possible to increase the rate of glyphosate to assist in managing difficult-to-control weeds.

Experiments were conducted at two locations in Georgia to determine the following: 1) tolerance of DP 436 RR or DP 5415 RR and Enhanced Roundup Ready cotton to topical glyphosate applications at 1-, 5-, and 10-leaf cotton and directed applications at 15-leaf cotton, 2) weed response to potential Enhanced Roundup Ready programs, and 3) potential for eliminating all directed applications in Enhanced Roundup Ready cotton.

A split-plot experimental design was utilized with the whole plot being herbicide systems and the subplot being cotton cultivars. Herbicide systems included Roundup® UltraMax (glyphosate) 0.8 pt/A applied topically to cotyledonary cotton, UltraMax 1.6 pt/A applied topically to 5-leaf cotton, and either UltraMax 1.6 pt/A alone or mixed with Staple (pyrithiobac) 0.6 oz/A or Dual Magnum (*S-metolachlor*) 1 pt/A applied topically to 10-leaf cotton. These treatments were followed by no lay-by or UltraMax at 1.6 pt/A lay-by. An additional treatment consisted of UltraMax 0.8 pt/A applied topically to cotyledonary cotton followed by UltraMax 2.4 pt/A applied topically to 5- and 10-leaf cotton. A non-treated control was included for comparison. Cotton cultivars included DP 436 RR and an Enhanced Roundup Ready line at one location and DP 5415 RR and an Enhanced Roundup Ready line at the second location. Pitted morningglory (*Ipomoea lacunosa*), smallflower morningglory (*Jacquemontia tammifolia*), and the annual grasses Texas panicum (*Panicum texanum*) and large crabgrass (*Digitaria sanguinalis*) were present at both locations. Sicklepod (*Senna obtusifolia*), common cocklebur (*Xanthium strumarium*), and yellow nutsedge (*Cyperus esculentus*) were present at only one location.

Visible injury to Enhanced Roundup Ready cotton and DP 436 RR or DP 5415 RR from UltraMax was similar and less than 3%. Dual Magnum mixed with UltraMax at the 10-leaf stage of cotton increased injury 9 to 11% at both locations. Staple mixed with UltraMax did not injure cotton at one location; however, injury was 12% at the second location, and differences were most likely a response to temperature, humidity, and dew. Visible injury appeared as necrotic speckling of leaves contacted by spray solution. No injury was detectable from any treatment by 3 weeks after application.

All herbicide systems controlled yellow nutsedge and sicklepod at least 98% late in the season. Total POST UltraMax systems utilizing 1.6 pt/A of UltraMax at 5- and 10-leaf cotton without a lay-by controlled pitted morningglory, smallflower morningglory, annual grasses, and common cocklebur 73, 89, 93, and 80%, respectively. Adding Staple to UltraMax at the 10-leaf stage improved pitted and smallflower morningglory control 15 and 7%, respectively. Similarly, increasing the rate of UltraMax from 1.6 to 2.4 pt/A at the 5- and 10-leaf stage of cotton improved pitted and smallflower morningglory control 15 and 6%, respectively. Dual Magnum mixed with UltraMax at the 10-leaf stage of cotton only improved annual grass control 4% when compared to the UltraMax alone system.

A lay-by application following UltraMax overtop of 5- and 10-leaf cotton improved pitted morningglory, smallflower morningglory, annual grass, and common cocklebur control 21, 10, 5, and 18%, respectively. However, the lay-by following the Staple system increased control only of common cocklebur by 13%. This was likely due to residual activity of Staple as the cocklebur population was intense and weed continued to emerge throughout the season.

Yield data will not be presented because of testing agreements. However, yields with all herbicide systems were greater than the non-treated control. Within each cultivar, yields were similar among herbicide systems.