

ROUNDUP READY™ GENE IN COTTON

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Abstract

Since the mid-1980's, Monsanto Company has been developing the Roundup Ready™ gene to confer crop tolerance to Roundup Ultra® herbicide in multiple crops including cotton. Cotton plants with the Roundup Ready™ gene have the EPSPS gene from *Agrobacterium* spp. strain CP4. This gene produces an EPSPS synthase which is not sensitive to Roundup Ultra®. Cotton plants containing this gene are therefore tolerant to over the top or post directed applications of Roundup Ultra® while weeds remain sensitive and will be controlled by the herbicide.

Roundup Ready™ cotton is tolerant to topical applications of Roundup Ultra® from ground crack through the 4 leaf stage of development. Post directed techniques may be used to apply Roundup Ultra® in Roundup Ready™ cotton which is 5 leaves or larger. The maximum rate of Roundup Ultra® which may be used in early season topical or post directed applications is 0.75 lbs ae/A and multiple applications may be made. Roundup Ultra® herbicide may also be applied topically to cotton after it has reached 20% boll crack.

Regulatory review by the USDA and FDA for the Roundup Ready™ gene in cotton were completed in 1995. The final review by the EPA for applications of Roundup Ultra® herbicide in Roundup Ready™ cotton is anticipated to be complete before cotton planting time in 1996. Roundup Ready™ cottonseed in adapted varieties will be allocated to seed increase purposes and only a limited amount of seed will be made available for farmer trial usage in 1996.

Monsanto is working in partnership with Delta & Pine Land, Jacob Hartz, and Paymaster companies. These partners are backcrossing the Roundup Ready™ gene into their best yielding early, mid, and full season varieties. Varieties containing the Roundup Ready™ gene have been demonstrated to have the same lint quality and yield potential as conventional varieties. The Roundup Ready™ gene has also been backcrossed into the same plant with the Bollgard™ gene. The Roundup Ready™ gene will be marketed to cotton growers under the same product licensing program currently being used for Bollgard™.

The use of Roundup Ultra® herbicide in Roundup Ready™ cotton will be a valuable tool for weed management by cotton producers. Early season topical applications in cotton were limited until the recent introduction of the

BXN™ system in 1995 and the impending use of Staple™. Prior to the introduction of these products, management of weeds in cotton which was less than 3 in. tall required critical timing and placement of herbicides to avoid crop injury.

Roundup® is a familiar herbicide which has been used by cotton producers for non-selective weed control for over 20 years. One of its greatest attributes is broad spectrum weed control. Roundup Ultra® controls both annual and perennial weeds including many of the most troublesome weeds in cotton such as morningglories, velvetleaf, Palmer amaranth, cocklebur, prickly sida, sicklepod, and black nightshade. Roundup Ultra® can also be used to manage perennial weeds like silverleaf nightshade, yellow and purple nutsedge, and rhizome johnsongrass. Roundup Ultra® is effective in controlling herbicide resistant weed biotypes which are becoming more prevalent. Roundup Ultra® is also controls both small and large weeds.

Roundup Ready™ cotton and Roundup Ultra® herbicide can be used in all cotton production systems including conservation tillage, no-till, and conventional tillage systems. Aerial application of Roundup Ultra® will facilitate effective weed control in those growing seasons where excessive rainfall may occur. Roundup Ultra® may also be used in place of cultivation to manage weeds during dry periods when moisture conservation is critical.

Roundup Ultra® has a favorable environmental profile. It has no residual activity which can limit rotational crop choices for producers. Roundup Ultra® is bound tightly to the soil to substantially minimize the risk of ground or surface water contamination. The mammalian toxicology profile for Roundup Ultra® is very good and no substantial health risks are associated with exposure or use of this product.