

**STEWARDSHIP ISSUES FOR ROUNDUP READY ALFALFA -
A California Perspective on Roundup Ready Alfalfa**

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The definition of stewardship is: “The careful and responsible management of something entrusted to one’s care.”

The careful and responsible management of the Roundup Ready trait is the responsibility of regulator agencies, Monsanto and Forge Genetics, and growers. It is in the best interest of growers to carry out best management stewardship practices in order to maintain this new weed control strategy.

Extensive testing has been regulated by the United States Department of Agriculture, Animal and Plant Health Inspection Service, Biotechnology Regulator Service. Food and feed safety assessments demonstrated equivalence to conventional alfalfa varieties with an EPA analysis providing support for a reduction in the potential risk to human health and the environment with the use of glyphosate, as compared to some currently used herbicides.

Forage Genetics and Monsanto are committed to commercialization of Roundup Ready alfalfa in a manner that is sensitive to disruption of existing markets. Applications to deregulate Roundup Ready alfalfa have been developed and commercial releases will be coordinated with Japanese approval. Pollen flow studies with honey bees are now underway to be used by Forage Genetics to establish isolation distances from seed fields. Monsanto has developed a technology, stewardship agreement which growers sign as well as providing an online stewardship course for grower education.

Management of pollen flow will be a concern and challenge for growers. Hay fields will have to be planted the established isolation distance from seed fields. Since there are no sexually compatible food crops or weeds to alfalfa, out crossing is of minimal concern. But, feral and volunteer alfalfa plants could be a concern and control will be most important. Volunteer alfalfa plants will need to be effectively controlled in rotational crops such as cotton and corn. Road side and ditch bank feral alfalfa plants will be another concern. Cutting schedules in hay will have to be diligently adhered to so that the hay is cut at early bloom stage before pollen is produced.

Effective removal of old alfalfa stands will need to be monitored closely. Alfalfa fields are primarily removed by mechanical cultivation, but sometimes herbicides are used instead, alone or in combination with cultivation. Since glyphosate will not be effective in removing Roundup Ready alfalfa, other means will be needed. Trials conducted in California indicated treatments containing 2,4-D and dicamba tended to be most effective, but use and crop rotation

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restrictions may prevent their use. Alfalfa control was 100 percent with all herbicides evaluated when followed by cultivation.

As with any herbicide program, herbicide resistance management is key to stewardship of Roundup Ready alfalfa. This becomes more of a concern as acreage treated with glyphosate increases. The Roundup Ready technology is already available in many crops, including cotton, corn and soybeans. Glyphosate resistance has already been identified in ryegrass and horse weed or maretail. Reduced control of lambsquarters and barnyardgrass have been reported. Continued use of glyphosate on hard to control weeds such as stinging nettle, cheeseweed and hairy fleabane can be the cause of weed species shift. Although, this problem is not unique to glyphosate, but common for other classes of herbicides. The development of weeds with resistance to glyphosate is thought to be less likely than other herbicides, as glyphosate has no soil residual activity and glyphosate has a unique mode of action. Conversely, Roundup Ready crops offer an option for managing weeds with resistance to other herbicides. Resistant management strategies including rotations of herbicides with different modes of action, using recommended rates of herbicides, monitoring and control of escape weeds, use of certified seed, cleaning equipment and crop rotation are needed to prevent resistance.

Particular thought and considerations must be given to rotating to subsequent crops. The question becomes: "Should one Roundup Ready crop be rotated with another Roundup Ready crop?" Probably not. Following Roundup Ready corn with Roundup Ready cotton has caused problems with the control of corn in the cotton crop. Using Roundup Ready technology in the same field too frequently may result in weed species shifts or resistance.

Roundup Ready alfalfa will give growers a control option that will provide broad spectrum control with simplicity. It provides an alternative system that can be used in Ground Water Protection Areas of the Central Valley of California where some commercially standard herbicides are restricted. It will likely have a large effect on weed control options available for alfalfa potentially enhancing yield and quality. Economic benefits will depend upon technology fees and pricing structure not yet provided. The major concerns associated with Roundup Ready technology: weed resistance, weed species shifts and pollen flow will be addressed with best management practices.