

Pest Management Strategic Plan for Western U.S. Alfalfa and Clover Seed Production

Summary of a workshop held on February 18-19, 2004 in Boise, Idaho

Western Alfalfa Seed/Clover Seed PMSP 16
Genetically Modified Organisms (GMOs)

PRODUCTION ISSUES

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In recent years, alfalfa seed companies have been conducting research to add value to alfalfa forage by developing genetically modified (GMO) alfalfa. The first genetically engineered trait to enter the commercial marketplace will be Roundup Ready™ (RR) alfalfa using transformation technology. As the name implies, alfalfa with this gene will not be affected by the herbicide Roundup. The seeds for the varieties with this trait will most likely be grown somewhere in the current seed growing areas of the northwestern United States. Monsanto and its research partner, Forage Genetics, plan the first release of RR alfalfa products in 2005. However, they have indicated that they will not release the products until they gain regulatory acceptance of GMO alfalfa in Japan and China. No RR clover seed germplasm is being developed.

RR alfalfa will allow for less competition from weeds at establishment and the potential for producing a weed-free crop due to the tolerance to glyphosate. It will allow for effective control against a broad array of weeds with a wide window of application. However, wherever RR alfalfa seed production is introduced, it will bring with it challenges the seed production industry has never faced. Issues will include customer acceptance, crop removal, cross-contamination, organic compliance, increased herbicide use, resistant weeds, segregation of GMO and non-GMO seed all the way from harvest to cleaning, crop rotations between GMO and non GMO alfalfa seed varieties, take-out of GMO fields, and virus recombination.

While the release of RR alfalfa would provide another excellent tool for weed control, seed producers are very concerned about the impacts on the export market because of the current weak acceptance of GMOs in Pacific Rim countries. The ability to distinguish GM alfalfa from conventional alfalfa could aid in the introduction of GM products; Monsanto is developing inexpensive test kits for this purpose.

Alfalfa seed production is different from many other seed crops because it requires the use of bees to pollinate the crop. Both naturally present and introduced bees move pollen with them wherever they go, and in some cases they may move several miles before landing in another alfalfa seed field. The significance of this is that as bees move pollen from one field to another they may introduce GMO traits to non-GMO alfalfa seed fields. Consequently, a GMO alfalfa seed grower could be in jeopardy due to their failure to control the flow of the trademarked and protected RR pollen. The grower of the non-GMO alfalfa seed may have an adventitious presence of a GMO organism in their crop, thereby risking a contract rejection.

As explained in more detail later in the Take-Out/Stand Removal section, many growers use broad-spectrum, contact herbicides such as glyphosate (Roundup) to desiccate and remove the alfalfa seed crop at the end of the production cycle. The use of RR alfalfa will eliminate that option in GMO fields. Other herbicides are available to help with stand removal, but they will likely require tillage operations such as crowning or disking to supplement the procedure.

Reports show a significant increase in the use of glyphosate when a RR system is adapted. Alfalfa would not likely be an exception to the trend. Glyphosate is generally

believed to be immobile in soil and have a low acute toxicity to mammals. But there are some concerns about harmful affects if administered at high doses over long periods of time. For example, with the increase in adoption of the RR system follows the potential increase of glyphosate-resistant weeds. With the continuous use of the same herbicide, there is a natural selection for resistance to the herbicide over time. Tolerant weedy plants that survive the applications may cross and become more resistant to glyphosate. There are some weeds that have already shown more tolerance to the herbicide. The possibility of losing other current herbicides due to lower usage as a result of replacement with glyphosate is of concern as well.

There is some concern about the risks of transgenes from feed being passed on to gut microflora in livestock. Along with the gene that confers glyphosate resistance, an additional gene must be inserted to activate the process. The gene is called a promoter; the one Monsanto uses with the RR trait is from the Cauliflower Mosaic Virus (CMV). The concern is the CMV potential to reactivate dormant viruses as well as recombine with them to create new viruses.