

# STEWARDSHIP PRACTICES THAT FACILITATE COEXISTENCE WHEN PRODUCING ALFALFA SEED INCLUDING GM TRAITS

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## ABSTRACT

Two programs are currently available to guide and assist alfalfa seed producers in the stewardship of genetically modified, GM, alfalfa seed production. The National Alfalfa & Forage Alliance “Best Management Practices for Roundup Ready<sup>®</sup> Alfalfa Seed Production” provides a platform by which seed contractors, seed growers, and contractor field staff agree to perform specific tasks and meet specific obligations in order to reduce the low level presence, LLP, of GM traits in conventional varieties. The Association of Official Seed Certifying Agencies, AOSCA, has developed the Alfalfa Seed Stewardship Program, which provides a platform by which seed certification agencies can assist seed producers in producing seed that will meet the needs of GM-sensitive seed customers. Details of the two programs will be discussed and compared.

**Key Words: Roundup Ready<sup>®</sup> alfalfa, alfalfa seed production, alfalfa seed stewardship, NAFA, AOSCA**

## INTRODUCTION

Alfalfa seed has been produced for a long time, and one would think that perfection would have been reached. Over time, companies, producers, and seed customers communicated capabilities, needs and goals, and with assistance from production partners such as certified crop advisors and seed certification agencies, developed a system that produces quality seed that met end user needs. The release of Roundup Ready<sup>®</sup> alfalfa brought contractors, growers, and the production partners back to the drawing board as they try to determine how to meet customer needs. The alfalfa seed industry watched as the corn and soybean industries benefited and struggled with issues related to the advent of Roundup Ready<sup>®</sup> crops, and thought it would be ready when its turn came to deal with the issue. While the alfalfa seed industry benefited from the experiences of the previous GM crop releases, alfalfa experienced unique challenges. Unlike corn and soybeans, it is a perennial crop and the crop produced for final consumption is not a grain crop. Concerns related to feral alfalfa and a growing organic dairy hay market also impacted the release of the new technology and showed the need for improved stewardship of GM traits in alfalfa seed crops. The National Alfalfa & Forage Alliance, NAFA, and the Association of Official Seed Certifying Agencies, AOSCA, have worked with the alfalfa seed industry to

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develop programs that address problems specific to alfalfa seed production with the advent of GM alfalfa.

## **DISCUSSION**

The first program we will discuss is the NAFA Best Management Practices, BMP, for Roundup Ready® Alfalfa Seed Production. The BMP identifies specific actions RR alfalfa seed contractors and seed producers should perform in order to reduce the LLP (Low Level Presence) of GM traits in conventional varieties. The document is in the form of a contract, and is a required and binding agreement between the contractors producing RR alfalfa seed and Forage Genetics International, the sole licensee for RR alfalfa. The BMP includes logical partners, such as contractor field staff and seed certifying agencies in the management of RR alfalfa seed production. It includes a statement that production polices for RR alfalfa should meet or exceed seed certification standards for Foundation class seed. The BMP was adopted by the NAFA Board of Directors on January 22, 2008, but is a living document, with provisions for revision should research and practical experience indicate a need to do so.

Isolation between RR alfalfa seed fields and conventional alfalfa seed fields is a logical place to start in reducing the impact of RR alfalfa. The NAFA BMP requires that the seed contractor ensure that the isolation distance between a new planting of RR alfalfa seed and any established conventional seed production meets pollinator-specific isolation requirements. The requirements are 900 ft. for leafcutter bees, 1 mile for alkali bees, and 3 miles for honey bees. Contractors are required to collect and test seed from production fields and to work with seed certifying agencies to change standards if the data indicates a need. Seed certifying agencies are to receive GPS coordinates for all established and planned RR alfalfa seed production for further use in producing a pinning map. A significant deviation from the present requirement is that the RR seed contractor must authorize state officials to release, upon request, the isolation distance between a planned new conventional alfalfa seed field and the nearest RR alfalfa seed field. The contractors are also required to honor GM-free seed production zones when so designated, and to require RR alfalfa stewardship training for all new RR alfalfa seed producers.

Obviously, the seed grower is a critical component in reducing LLP. The NAFA BMP grower requirements start with a signed Monsanto Technology/Stewardship Agreement. By doing so, the grower agrees to observe patent rights and to observe all federal, state, and local regulations, including those related to pesticide use, U.S. Patent Rights, PVP, Federal Seed Act, and phytosanitary laws governing seed and pollinators. The producer agrees to specific production practices as part of the BMP. They must manage pollinators to minimize pollen flow, including placement of bee domiciles to maximize distance to other varieties. This requirement includes introducing only the pollinator species specified on the contract, refraining from moving pollinators from RR fields to conventional fields, and informing a custom pollinator of this requirement. The grower is also required to discourage nearby placement of honey bees if they are not specified on the contract as the pollinator species. The grower shall assist the RR alfalfa

seed contractor with field location prior to planting with regard to isolation, notify the contractor if new alfalfa seed fields are planted in close proximity, and facilitate crop improvement inspections as requested. The grower agrees to apply sufficient Roundup® products to kill non-GME seedling alfalfa plants in new plantings and manage weeds and volunteers using integrated weed control strategies to minimize weed shifts or the development of tolerant weeds, as well as keeping the production true to type and variety. The grower is required to destroy RR alfalfa seed fields at the expiration or termination of the seed production contract in a manner that will allow seed certification inspectors to verify destruction of the stand. The stand must be rendered useless for any unlicensed purpose, including unlicensed seed, forage, hay or pasture production purposes. The date of stand destruction and method must be reported to the contractor, and consideration must be given to the following crop so as to allow for the management of alfalfa volunteers, should they occur. In respect to seed harvesting and handling equipment, the grower agrees to use good equipment sanitation. The BMP recognizes that a zero tolerance for seed admixture is not feasible under commercial production conditions, but requires that equipment be managed so as to minimize seed mixture potential between different varieties and or variety types. The grower agrees to use dedicated equipment for planting and harvesting RR alfalfa seed when possible, to clean planters before and after use, and to clean and inspect combines before and after use. Management of seed bins is an important component, and the grower will put RR alfalfa seed in RR alfalfa seed bins only, clean and inspect the bins before use, and store bins of RR alfalfa seed separately from bins of conventional varieties. The grower will plan harvest timing to handle like-trait varieties together, and will clean all seed handling equipment to avoid mixing RR alfalfa and conventional alfalfa seed. The grower agrees to return unused stock seed to the seed contractor and will notify custom harvesters if the field is RR alfalfa. Finally, the grower agrees to keep specific records. These records will include planting date, acres planted, seeding rate, the amount of stock seed received and returned, and an accurate field location, including latitude and longitude as well as a local map. Growing season records shall include Roundup® herbicide application dates, rates, and the formulation used. The grower shall keep records of seed bin numbers, and finally, the stand destruction date and the destruction methods used.

The seed contractor's staff will work closely with RR alfalfa seed growers. They will report each field location, planting date, and stand destruction date to the local crop improvement association. Contractor's staff will coat RR alfalfa stock seed purple for easy identification, and finally, recommend changes to the BMP should the need arise.

The second program we will discuss is the AOSCA Alfalfa Seed Stewardship Program. This program was started when it appeared there was a need for different standards to meet specific needs of a market sector. The science to support development of new standards was deemed insufficient to set new standards for isolation or field history. AOSCA agencies from alfalfa seed producing states met with alfalfa seed industry representatives in Reno, Nevada, in the spring of 2006, with the express purpose of soliciting industry input as RR alfalfa seed production began.

Alfalfa seed companies shared their customers' wants, as well as their thoughts on standards changes that might be necessary to meet their customer's needs. AOSCA learned that alfalfa seed customers fall into three categories regarding LLP. The majority don't care, some care a little, and some care a lot, to the point of a zero tolerance. The seed companies noted that up to this point, their customers have been happy with the seed they have been purchasing, a strong indication that current standards are appropriate when LLP is not an issue. It was also interesting to note that at least one seed company had customers that were in more than one category. If there was one point of agreement from the meeting, it was that every company said a wholesale change in isolation standards or field history requirements would make it difficult or impossible for them to meet certification standards, and would provide a significant disincentive to use seed certification.

As more information became available regarding outcrossing, it became apparent that current isolation standards were not sufficient to meet the AOSCA goal of one percent maximum outcrossing, which affected not only RR alfalfa, but also conventional varieties. In fact, data indicated that outcrossing at current isolation standards was between one and two percent. It was also deemed important to have one set of standards, rather than standards for conventional varieties and different standards for GM varieties.

The discussion in Reno set the stage for development of the AOSCA Alfalfa Seed Stewardship Program (ASSP). The ASSP is designed to provide a flexible platform by which seed producers, meaning contractors or individual farmers, can select additional services in a cafeteria-style manner, depending on their customers' level of sensitivity. The producer then designates the standards for those services, allowing them to further customize the program. The ASSP is sensitive to the economics of seed production and sales, as producers do not have to pay for services they do not believe will benefit them. While the program is a significant departure from structured traditional seed certification, it is considered to be complimentary. People using the ASSP are strongly encouraged to utilize traditional certification as a foundation to their quality seed production system.

It is important to note that not all seed certifying agencies will be able to perform all requested services in excess of traditional certification activities due to time, distance, and staff constraints. With that in mind, the program allows for requests for any reasonable services related to seed production. Logical additional services that could be performed prior to planting include seedstock sampling and testing for the presence of GM traits, verification of field history using a grower affidavit or agency records, and distance to known GM alfalfa fields. Additional services after planting might include isolation verification, seedling inspection, GM trait testing of plants outside the planted row or feral alfalfa on the field border, bloom inspections, random plant sampling, and testing for GM traits. On-farm equipment inspections might include planting, harvesting, seed handling, and seed storage equipment and facilities. Off-farm services might include seed conditioning plant inspections, which could be especially helpful if the seed lot conditioned prior to the seed produced using the ASSP was not enrolled in the program. It would

also be possible for the seed certifying agency to maintain a signed affidavit in its records that the seed conditioning plant had not knowingly cleaned GM alfalfa seed and/or to collect an official seed sample, maintain the chain of custody, and provide testing for the presence of GM traits.

As you can see, the two programs have a lot in common. They both address logical issues such as isolation, recordkeeping, and equipment sanitation. The NAFA BMP provides very specific requirements and procedures. It provides pollinator-specific isolation standards, pollinator management, recordkeeping, and equipment standards. The BMP does not in and of itself increase the cost of seed production, but may inadvertently do so through the use of the services of state seed certifying agencies that are above and beyond normal certification activities. The AOSCA ASSP was designed to be very flexible, allowing the producer to request specific services and designate the standard for those services. The producer will make those decisions based on knowledge, experience, and their customer's needs and ability to absorb higher seed costs, as the ASSP is a fee-based program. The BMP is designed to reduce the impact of Roundup Ready® alfalfa on the seed production of conventional varieties, and the ASSP is designed to assist in the production of alfalfa seed for GM-sensitive markets.