Coexistence for Alfalfa Seed Export Markets

Introduction

In January, 2011, the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) announced its decision to grant non-regulated status for alfalfa that has been genetically enhanced to be resistant to the herbicide commercially known as Roundup. After conducting a thorough and transparent examination of alfalfa through a multi-alternative environmental impact statement (EIS) and several public comment opportunities, APHIS determined that Roundup Ready alfalfa (RRA) is as safe as traditionally bred alfalfa (USDA, 2011). While USDA has made this determination, not all markets accept this technology. Thus, it is important that the industry have mechanisms to maintain production practices for specific markets which may reject or be sensitive to new genetically enhanced (GE) traits, while allowing for the adoption of new technologies – this is termed coexistence.

This National Alfalfa & Forage Alliance (NAFA) document addresses coexistence issues relevant to alfalfa seed exporters. Coexistence issues specific to alfalfa hay exporters and organic alfalfa seed and hay producers are addressed in companion documents.

Alfalfa Seed Export Markets

Statistics from USDA-FAS report the value of the U.S. alfalfa seed export market averaged $61.7 million dollars annually from 2006-2010. The quantity of exported seed ranged from 27.1 - 44.9 million pounds during that period. These statistics include both certified and non-certified seed as well as coated seed. Seed is exported to 63 countries. Mexico, Saudi Arabia, Argentina, and Canada are the largest markets, accounting for over 75% of total U.S. alfalfa seed exports (USDA-FAS, 2007).

Non-dormant alfalfa varieties are adapted to geographies with very long growing seasons. Seed of non-dormant varieties make up greater than 80% of U.S. alfalfa seed export. Most of the non-dormant seed destined for export markets is produced in California. The California Crop Improvement Association estimates that 50% of the alfalfa seed produced in the state is exported out of the country.

The Pacific Northwest (PNW) produces a small portion of the seed for the non-dormant export market and virtually all of the seed of the dormant variety (winterhardy germplasm) export market. About 60% of the U.S. alfalfa dormant variety seed export is to Canada.

Each country establishes its own policies and regulations with regard to the importation of seed. This includes rules specifically governing seed containing GE traits such as RRA. While many countries have a science-based regulatory process for GE traits, similar to that in the U.S., some do not currently have a system for deregulating GE products (e.g., Saudi Arabia). Countries without a regulatory system currently do not accept the import of any seed of GE alfalfa varieties.

In those countries with procedures in place to completely deregulate GE products, there are established mechanisms to remove legal barriers for import of GE seed. RRA has been deregulated in Canada and Japan, and is currently in the deregulation process in Mexico and Argentina.

In countries where RRA has not been deregulated, U.S. exporters may be required to provide written statements that their seed does not contain GE material. Prior to the deregulation of RRA, the U.S. Federal Seed Lab was willing to provide U.S. alfalfa seed exporters with a GE declaration/warranty to accompany shipments; the Federal Seed Lab is no longer willing to provide this declaration. In the absence of international trading standards for GE seed, individual companies must determine their own policies, standards, and procedures. Seed exporters bear the risks associated with actions that may be taken should the government of an importing country determine imported seed violates their policy. These facts underscore that the development and implementation of protocols to enable seed production for adventitious presence-sensitive (APS) export markets is an essential, critical step towards coexistence.

The *NAFA Best Management Practices for Roundup Ready Alfalfa Seed Production (BMPs for RRA Seed Production)* are appropriate for conventional alfalfa seed grown for non-GE sensitive markets. Production of alfalfa seed for APS export markets requires additional precautions, as outlined in *NAFA Best Management Practices for Adventitious*

Presence-Sensitive Alfalfa Seed Production (BMPs for APS Seed Production) (NAFA, 2011). A strategy to mitigate the risks of low level adventitious presence (AP) of GE traits in alfalfa seed produced for APS export markets should be based on several principles pertaining to seed production some of which are discussed in this document.

Strategy to Mitigate AP of GE Traits in Alfalfa Seed Produced for APS Export Markets

INDIVIDUAL SEED COMPANY ACTIVITIES

Verification of non-detectable GE trait(s) in seed stock used for export seed production. Protein-based detection kits are now commercially available (e.g., Strategic Diagnostics, Inc.,Envirologix Inc.) and a testing protocol has been developed and validated by the manufacturers and others (Teuber et al., 2007). Third party commercial testing is available and widely used by the seed and grain industries today. Several state and private seed laboratories offer protein and/or DNA-based testing.

Classification of seed production based on end market risk. Seed production companies will need to identify the end market for specific lots of alfalfa seed in advance of production. If the seed is destined for export APS markets it should be produced under more stringent isolation standards than seed being produced for AP tolerant (APT) markets. Seed companies and their producers will need to check with their local Seed Certification Authorities to determine the location(s) of planned GE seed production in their area prior to planting.

Higher standards for isolation of seed fields based on end market risk. Export seed producers who require GE free seed should consider using greater isolation from any other alfalfa field (e.g., greater than 900 ft, 1 mile or 3 miles when using leafcutter bees, alkali bees, or honey bees for pollination, respectively).

Science-based, pollinator-specific pollen-mediated gene flow data has been used and will continue to be collected to define and inform required isolation distances between GE alfalfa seed production and seed production for APS export markets. The basis for current isolation standards is discussed in a peer reviewed publication describing the biology of alfalfa and alfalfa production in the U.S.; a comprehensive overview of gene flow in alfalfa and procedures to mitigate gene flow (CAST, 2008).

Develop producer base and seed production areas designed for the production of value-added non-detect GE seed for APS markets. The NAFA Grower Opportunity Zones prohibit GE alfalfa seed production within the borders of the GOZ. The Imperial Valley of California is a large and concentrated alfalfa seed production area. In light of the unique growing circumstances in Imperial County and the current international approval status of RRA, Monsanto has worked with the Imperial County Farm Bureau and established unique stewardship requirements for RRA in Imperial County, which are set forth in the Monsanto Technology Use Guide and Monsanto Technology Stewardship Agreement. All alfalfa seed production in Imperial County currently meets the isolation standards for ASSP, making this a very favorable production area for non-dormant alfalfa seed destined for APS markets.

INDUSTRY ACTIVITIES

Commitment from all industry stakeholders and recognition of company/producer rights to produce to meet market specific standards for both GE and conventional varieties. NAFA is working to provide a forum and means to achieve coexistence. The current NAFA genetic supplier members are collaborating to provide leadership and direction in this area. Involvement and commitment of other industry stakeholders is essential. Industry input in drafting, adopting, and implementation of *NAFA BMPs for RRA Seed Production and APS Seed Production* demonstrates the growing consensus that coexistence is an industry, rather than an individual company, concern, and priority. It will be in the individual and collective best interests of companies to work with each other to ensure each company can produce seed of the required seed quality appropriate for various markets. This has been the basis for certified seed production since the early 1900s.

Communication between seed production companies to aid coordination of seed production planning. In 2011, the industry collaborated with California Crop Improvement Association (CCIA) to develop a web-based alfalfa seed production "pinning" map for alfalfa seed production fields in the Western U.S. Participants are pinning both APS and GE seed production fields. The program was designed to aid in industry efforts to concentrate and segregate GE versus APS alfalfa seed production. Seed certifying agencies in all major western alfalfa seed production areas are planning to utilize this asset to assist the industry in coexistence efforts.

Industry/Association of Official Seed Certifying Agencies (AOSCA) collaboration for an annual assessment of *NAFA RRA BMP*. The alfalfa genetic supplier members of NAFA are also the major producers of alfalfa seed. These companies are testing seed lots for the AP of GE traits on a routine basis. They are voluntarily submitting their data to a third party AOSCA expert committee for evaluation. AOSCA representatives are pooling the data across companies and across states to determine the efficacy of *NAFA BMP for RRA seed production* (NAFA, 2011). The data can serve as a landscape level, science based tool for evaluating efficacy and determining if/when BMP adjustments may be necessary.

Process verification from seed certification officials indicating specific standards of production were met (process-based certification). AOSCA now offers the ASSP (Alfalfa Seed Stewardship Program), a voluntary, fee-based identity preserved program of process certification for the production of alfalfa seed destined for APS markets (2010). This identity preserved process certification includes the testing and third party verification of genetic origin and non-detect GE trait status of planting

seedstock and observance of a minimum stated isolation distance from GE alfalfa seed production. The Idaho Crop Improvement Association (ICIA, 2008) manages a similar process-based certification for sweet corn seed produced for export markets. This certification has been widely embraced by both sweet corn seed producers and the export markets to which they sell. The alfalfa seed industry strongly encouraged the development and implementation of the new AOSCA identity preserved program which is well suited to serve the needs of APS alfalfa seed producers.

U.S. government assistance in export markets to mitigate risks associated with LLP. The industry encourages the assistance of the U.S. government to support U.S. alfalfa seed exports. Government to government communication to provide information and education regarding this issue would be useful. U.S. government involvement to encourage foreign governments to accept process based certification is encouraged. The U.S. alfalfa seed industry continues to strongly encourage national and international seed and governmental organizations to work toward the adoption of uniform low level presence (LLP) tolerance standards for GE traits that have been deregulated in one or more Organisation for Economic Co-operation and Development (OECD) countries. The adoption of uniform standards and official recognition of a process-based identity preserved seed production system would be of significant benefit to the U.S alfalfa seed industry. Strategies for production and global movement of seed for APS markets are well established for many crops. Scientific studies on gene flow in alfalfa and verified best management practices allow these basic principles to be applied to address GE and APS markets in alfalfa.

Coexistence Principles

Coexistence is not a new phenomenon in agriculture. For decades, it has been a requirement for many producers of crops, such as sweet corn and canola, in situations where neighboring crops may affect marketability of a specific quality trait. Scientific data and decades of experience in the seed and hay industries are the appropriate basis of coexistence and stewardship programs that are responsive to changing agricultural markets. Coexistence is based on good communication and mutual respect between neighbors and individuals who have adopted different approaches to agriculture. Furthermore, producers serving APS markets must understand contractual quality specifications and their ability to deliver those specifications to their customers. Likewise, the producer-licensees and licensors of GE varieties must understand and observe GE variety stewardship requirements. Science and process-based principles, combined with the availability of tools for monitoring and communication, are key to producing alfalfa for diverse markets. The U.S. alfalfa seed export business is a well-developed industry that is amenable to addressing specialized contract requirements and has a proven history of successfully delivering quality products to an international customer base for decades.

Market Tolerances

In developing coexistence strategies, it must be acknowledged that commercial agricultural product purity is not absolute. Existing tolerances vary by customer preference. The Roundup Ready trait has been reviewed by the Food and Drug Administration (FDA) and has been found to be safe; that finding has not been disputed in the regulatory review of RRA. Thus, tolerances for low level AP should be considered in that context. Practical, acceptable low level tolerances for impurities such as variety off-types, weeds and inert materials have been established for many crop products and are managed within process-based strategies such as the Certified Seed (AOSCA, 2003) and the National Organic Program (NOP) (USDA, 2005a; USDA, 2005b). Tolerances of impurities for AP sensitve alfalfa seed is primarily a question of market preference. Buyers and sellers determine the value of such seed in relationship to other quality classes of seed.

To-date, there is no uniform tolerance established for low-level GE traits presence in conventionally grown crops (e.g., >5% and 0.9% GE in Japan and Europe respectively, must be labeled as such in food). APS markets are estimated to comprise 30-40% of the U.S. seed production (Putnam, 2006), consisting primarily of export seed markets, and secondarily for seed sold to organic producers. Tolerance for low-level GE trait presence driven only by market preference is likely to differ between markets. The implementation and refinement of protocols to enable successful coexistence between diverse production systems, recognizing differing market tolerances, are critical steps to assure alfalfa seed quality that is adequate for all primary markets for the crop.

Conclusions

Methods of assuring APS customers of the non-GE status of alfalfa seed destined for sensitive markets are available using current methodology. These steps are neither extraordinary nor expensive. This process includes the elements of:

- Planting of non-GE foundation seed that has been tested prior to planting;
- Taking steps to ensure adequate isolation prior to planting;
- Careful seed handling in the whole process to prevent comingling of APS and GE seed.
- Application of an identity preserved protocol to assure lot identity and non-GE status;
- Use of AOSCA's Alfalfa Seed Stewardship Production Program for customer assurance of non-GE status.

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The National Alfalfa & Forage Alliance (NAFA) strongly supports the availability and continued use of biotechnology in agriculture. These advances will allow American farmers to effectively compete in the world market and will enable American farmers to supply abundant, safe, high quality food, fiber, and renewable fuel desired by global consumers. NAFA acknowledges and respects different markets and methodologies of food, fiber, and renewable fuel production. NAFA believes that science based stewardship management practices allow for the coexistence of these different markets and methodologies in production agriculture. NAFA believes collaborative efforts among all stakeholders are required to develop methodologies that enable coexistence.

Thus, NAFA sponsored a national forum (2007) open to all alfalfa industry stakeholders to participate in the process of developing a coexistence plan. As a result of the forum, five documents have been created to guide a coexistence strategy for the alfalfa industry. Included among the five documents is a peer-reviewed publication describing the biology of alfalfa and alfalfa production in the U.S.; a comprehensive overview of gene flow in alfalfa and procedures to mitigate gene flow (CAST, 2008). In 2008, NAFA adopted a document entitled, Best Management Practices for Roundup® Ready Alfalfa Seed Production (BMPs for RRA Seed Production). In acknowledgment of their commitment to the industry coexistence strategy, the three NAFA genetic suppliers formally adopted the BMPs for RRA Seed Production. In tandem, NAFA adopted three companion documents to address coexistence issues in each of the GE sensitive market sectors: hay export, seed export and organic alfalfa. Collectively, these five documents are essential tools toward enabling successful coexistence. These documents are updated periodically.

Revised 2/10/12

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Published by NAFA

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