



Peaceful Coexistence: Creating a Strategy for Harmony Among GM, Organic and Conventional Alfalfa Producers

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CONVENTIONAL/ROUNDUP READY ALFALFA FORAGE PRODUCTION

1. Other than the intended trait of glyphosate tolerance between Roundup Ready alfalfa and conventional alfalfa, are there any other trait differences that may have environmental (and economic/social) benefits and/or consequences?

Consider growth traits, disease/insect susceptibility, mineral composition, nutritional composition, level of resistance to glyphosate, nutrient/water uptake and susceptibility to other herbicides.

O.3 t yield advantage of RR in Midwest and 1 t/a yield advantage in the West. Better weed control with RR (especially winter annual and some grassy weeds). Therefore higher forage quality of harvested RR hay. Better drydown of RR in haymaking due to lack of weeds. Better water use of RR. Don't need to use herbicides with multi-year carry over for RR.

2. Is it likely that Roundup Ready alfalfa will lead to an increase in the development of glyphosate resistant weeds in Roundup Ready alfalfa fields, conventional alfalfa fields and/or other crop fields?

If yes, how will cultivation/tillage practices and the use of glyphosate and other herbicides change?

Consider potential regional differences, resulting primary and secondary impacts and how these impacts can be mitigated (i.e. no-till, other tillage practices, rotation length/rotated crops).

We are lessening problem by putting a forage crop into a grain system. (Crop rotation) frequent mowing will reduce weed problems. Nature breeds to overcome any resistance. Stewardship and awareness of weed issues will overcome problems. Need to use good management (some range of mode of action).

3. Will the use of Roundup Ready alfalfa lead to an increase in feral glyphosate tolerant alfalfa in non-crop ecosystems?

If yes, where is this likely to occur, what are the potential impacts and how could potential impacts be mitigated?

Amount of feral alfalfa varies regionally. Will have to increase from current 0 level but will be rare and of little impact because seed production from these are minimal and they are easy to control with 2, 4-D.

4. How much will gene flow from Roundup Ready alfalfa fields affect non-GE cultivated alfalfa crop systems, feral alfalfa or wild relatives of alfalfa over time?

Identify the sources of gene flow.

How can industry and individual growers work together to mitigate gene flow?

Consider pollen, seed mixtures and influence of transportation, humans, wind, water, insect and soil movement.

Minimal because pollination will be low, viable seed will not form for 6 weeks after pollination, and autotoxicity will reduce germination and establishment. We do not expect users of Roundup Ready to

be in this situation. There are no wild relatives of alfalfa in North America. Roundup ready alfalfa should not be used in CRP. Current Grower Agreement prohibits hay grower from letting alfalfa go past 10% bloom. Naturally occurring distance between RR and conventional will also limit gene flow. Regional difference in number and density of pollinators (high in West, lacking in Midwest and Northeast).

5. Will the use of the Roundup Ready alfalfa production system lead to a negative or positive change in soil, water and air quality?

Consider use of fertilizers, nutrient loss/retention, soil erosion, rotational/cropping changes, glyphosate residue and surfactants in soil, mineral availability, soil microbial population including rhizobia, residuals in groundwater, drinking water concerns, impacts to fish, etc.

Less residual herbicides with RR. Reduced ground and surface water contamination from herbicides, nitrate. Better for fish. Rotational benefits with alfalfa incorporated into production systems with row crops. Will increase nitrogen credits and reduce nitrogen fertilizer needs of next crop. Increased yield of RR will remove more phosphorus from soils, fits better into a nutrient (manure) management plan will increase fixing of carbon dioxide. May increase alfalfa stand life so reduce inputs and reduce soil erosion.

6. Will animal feed or human food safety, quality or markets be improved/threatened (if so, how) by the Roundup Ready trait?

Will result in higher quality hay in markets that will improve hay value and milk and animal production. Improved to extent that toxic weeds will be reduced. Removal of cheat grass can reduce animal health problems. Will have less cholera in horses. Roundup is much safer for applicator than many alternative herbicides. No threatened markets in U.S. for hay other than organic.

7. Will Roundup Ready alfalfa forage production affect threatened and endangered species?

Consider increased glyphosate use, toxicity of Roundup Ready alfalfa indirect effects to soil microorganisms and soil biology, potential regional differences. Compare any concerns with conventional and organic production.

No, this safe herbicide will have less effect on soil microbes than other pesticides. Not aware of much good research in this area. Would expect increased wildlife benefits from more alfalfa. Grassland songbirds increase with more alfalfa.

8. How will the deregulation of Roundup Ready alfalfa positively/negatively alter the economics of alfalfa farming?

Consider cost of seed, change in herbicide use, weed problems, cultivation/tillage practices, disease/insect susceptibility, yield, quality, public perception, change in demand.

Higher yields of higher quality forage with reduced input costs will increase bottom line. One farmer reported benefit of \$190/acre per year. Will allow establishment of crops with weed pressure where could not previously. Good return on additional cost seed cost of premium product.

9. How can growers of conventional alfalfa and GE alfalfa “peacefully coexist” in our ever-evolving global market and specifically, what tools are needed to ensure the long-term viability of all market opportunities?

Consider cost of responsible stewardship, segregation, education/training, contracts, isolation distances, parent seed sourcing, testing, quality management systems, timing isolation, equipment cleaning, zoning, technical assistance, etc.

Not aware of any issue between conventional and GE alfalfa growers. Should set a reasonable tolerance level and standardize methods for testing. Education of differences among testing methods. If reasonable tolerances are set co-existence can occur with organic growers.