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Appendix 1 "Position Paper on the Introduction of Genetically Modified Alfalfa, Saskatchewan Organic Directorate

Appendix 2 "No to GE Alfalfa" Campaign Signatories

1. Who is the Saskatchewan Organic Directorate

The Saskatchewan Organic Directorate (SOD) is the umbrella group for the organic sector in Saskatchewan, Canada. In 2001 the Organic Agriculture Protection Fund (OAPF) Committee was established by SOD in order to protect organic farms and food from contamination by genetically engineered (GE) organisms.

The OAPF Committee provided support to legal action against Monsanto and Aventis (now Bayer) under the Class Actions Act of Saskatchewan to bring about an injunction to stop the commercialization of GE wheat and to make the biotech companies liable for losses to organic farmers due to contamination of certified organic crops and fields by GE canola. If this case had been certified as a class action suit and heard, it would have sought damages and reparation for organic grain farmers in Saskatchewan for losses due to the unintended presence of genetically engineered material in their crops and fields.

SOD is opposed to the introduction of genetically engineered alfalfa in Canada and asks the USDA not to permit commercial plantings in the U.S.. SOD sees that the commercialization of genetically engineered (GE) alfalfa in Canada would have severe, negative impacts on Canadian agriculture, markets, and our environment. Deregulation and subsequent commercial plantings of GE alfalfa in the U.S. would have a similar negative impact to release in Canada, largely due to unavoidable gene flow from GE alfalfa planted in the U.S. to non-GE alfalfa in Canada through importation of GE alfalfa and/or GE contaminated alfalfa hay and seed. We refer you to our "Position Paper on the Introduction of Genetically Modified Alfalfa" (Appendix 1).

Canada's legislated organic regulation and standard, like all organic standards worldwide, prohibits the use of GE organisms in organic production. This common approach is stressed by the U.S.-Canada Organic Equivalency Agreement. Our domestic and international buyers demand organic products that are GE-free. Certified organic production requires high quality seed free from contamination by GE varieties.

Genetically engineered glyphosate-tolerant (GT) alfalfa has not been commercialized in Canada and the GT alfalfa seed is not legal to sell to farmers in Canada. Though the GT alfalfa has been approved by Canadian regulatory agencies for environmental release and human consumption, Monsanto and Forage Genetics International would need to apply for, and be granted, variety registration according to process set out in the Seeds Act regulations before the GE alfalfa seed is legal to sell in Canada. GT alfalfa is therefore not commercially available in Canada.

In 2009, SOD and the Canadian Biotechnology Action Network (a nation-wide network of farm, environmental, community and international development groups) invited organizations, producer associations, companies and community groups to endorse the following statement opposing GE alfalfa. 101 groups have signed thus far. (Please see Appendix 2):

"We oppose the sale, trade and production of GE Alfalfa in Canada. We ask the Canadian Food Inspection Agency (CFIA) to reassess its approval for environmental release of GE Alfalfa. We want the public to understand the hazards, costs and market losses that would result if GE Alfalfa were released into our environment."

The endorsement of the above statement by such a large number of organizations reflects the high sensitivity to, indeed rejection of, GE alfalfa in both the conventional and organic farming communities in Canada and on the part of Canadian consumers.

2. Introduction

The deregulation of GE alfalfa in the U.S. will result in the unintended presence of GE alfalfa in Canadian non-GE alfalfa. Even if GE alfalfa is never commercialized and grown in Canada, pollen mediated gene flow and seed escape from GE alfalfa originating in the U.S. would result in the unintended presence of GE alfalfa in conventional and organic alfalfa in Canada. This unavoidable contamination will become widespread, affecting conventional, certified organic, and feral stands of alfalfa. Seed and crop contamination with GE alfalfa will have grave economic consequences for the organic food and farming sector in particular. The presence of the glyphosate tolerant (GT) alfalfa would have significant impacts on agricultural production systems in both the U.S. and Canada, and affect U.S. organic food trade to Canada.

The Draft Environmental Impact Statement (DEIS) states:

"Distribution of Costs of Loss of Production and Avoidance: Organic producers could have either a loss of production or need to add additional measures to reduce the likelihood of unintended presence if:

- 1) there is an amount of GT alfalfa in organic alfalfa that the organic market will reject, or*
- 2) current alfalfa production practices are not already in place to protect against unintended presence of GT alfalfa in GT-sensitive alfalfa fields.*

There is no evidence that supports either of these assumptions." (page xvii)

We disagree with the above conclusion as stated in the DEIS. On the contrary, in this submission we offer evidence from the experience of Canadian farmers that:

- 1) both export and domestic markets will reject product with GE contamination,
- 2) measures currently in place are unable to prevent such contamination and, furthermore,
- 3) no measures could be established that would prevent or minimize unintended presence.

Real world experience with GE canola and GE flax validates our warning regarding the inevitability of gene flow through various predictable and unexpected means as well as the resultant significant impacts of unintended presence on agriculture production systems including impacts on markets and the immediate and long-term costs to affected farmers.

3. Background on Alfalfa

3.1 Status of Alfalfa Production in Canada

Alfalfa is the most important forage crop in both the U.S. and Canada. Much of US alfalfa seed and hay imports come from Canada and almost all U.S. processed alfalfa imports come from Canada, though Canada also imports alfalfa hay from the U.S..

Alfalfa is one of the most widely planted crops by area in Canada, since it is used for a variety of functions in farm systems. By area, alfalfa is the third largest crop in Canada, with 4.5 million hectares in production, including pure stands and mixes. Most of Canada's alfalfa (75%) is grown in the three Prairie provinces, with a further 20% planted in Ontario and Quebec.ⁱ

Alfalfa seed production is significant in Canada. In 2003, Canada produced 14 000 tons of alfalfa seed, second only to the U.S.'s 30 000.ⁱⁱ Most of our alfalfa seed imports come from the U.S..ⁱⁱⁱ Saskatchewan farms account for approximately 75 per cent of the alfalfa seed acreage in Canada.

The Canadian alfalfa processing industry, also known as the dehydration industry, ranks in the world's top five largest exporters of alfalfa pellets and alfalfa cubes.

Most of the alfalfa acreage in Canada is planted in stands mixed with grass species and used as pasture for grazing animals or conserved as hay or haylage.^{iv} Much of this mixed hay is used domestically for the dairy and beef industries, though there are export markets for double-compressed hay that contains alfalfa and other forages.^v

Pure alfalfa stands are less common in Canada than in the U.S..^{vi} Where pure stands exist, they are mainly intended for seed production, or for production of dehydrated alfalfa products. Pure alfalfa stands may also be used in regular crop rotations, as alfalfa is a powerful soil-building crop.

3.2 Status of GT Alfalfa in Canada

The DEIS states that, "In the case of Canada...GT alfalfa has also been approved." (page 143) This statement is technically correct but not fully descriptive of the current regulatory status for GT alfalfa in Canada. While GT alfalfa has been approved for environmental release and human consumption by Canadian regulatory authorities, GT alfalfa seed cannot be legally sold in Canada until the seed variety is registered according process set out in the Seeds Act regulations. The variety registration process for GT alfalfa in Canada has, to our knowledge, not officially started, and would take at least two years to complete under current rules.

Furthermore, there is no guarantee that GT alfalfa will receive variety registration in Canada. The likelihood that GT alfalfa will receive variety registration is reduced in light of the recent GM flax contamination crisis in Canada along with the well-established opposition to GT alfalfa in Canada among conventional and organic farming communities, and consumer groups. (We again refer you to Appendix 2).

4. Environmental Impacts

4.1 The Biological Impossibility of Preventing Gene Flow

If deregulated, the flow of genes and traits from GE alfalfa is certain and will result in significant negative impacts on the human environment. The unintended presence of GE alfalfa cannot be prevented. Therefore, we contest the DEIS conclusion that alfalfa production practices are in place, or could be put in place, to protect against the unintended presence of GE alfalfa.

The movement of genes between GE and non-GE alfalfa plants is a certainty. Moreover, this gene movement will be widespread and result in a high level of unintended presence despite any implementation of "best practices" or stewardship agreements. The diverse use of alfalfa in agriculture across the U.S. and Canada, and the myriad risk factors, will assure the rapid movement of genes. It will be impossible to prevent the spread of GE alfalfa beyond the fields in which it is planted.

Canadian organic and conventional farmers who grow alfalfa or use alfalfa products will be negatively impacted by a decision to grant nonregulated status to GE alfalfa in the U.S., due to gene flow from GE alfalfa to non-GE alfalfa. Even if GE alfalfa is never commercialized and grown in Canada, if planted in the U.S. we would expect to see the unintended presence of GE alfalfa in conventional and organic alfalfa in Canada as a result of pollination and seed escape.

The factors outlined in the DEIS that increase the probability of gene flow are all relevant factors that together lead us to the conclusion that gene flow is certain, that the level of unintended presence will be high and widespread, and that no stewardship plan or "best practices" for management can protect against this contamination.

There is no way to prevent the sexual reproduction and seed dispersal of plants in nature. Out-crossing through pollination is an evolutionary survival strategy that promotes biodiversity and resilience in the face of environmental change. GE alfalfa plants are no different from conventional plants in this respect. They will perform their natural functions with the same promiscuity that has allowed alfalfa to thrive and spread across virtually all of the agricultural landscape of North America. As noted in the DEIS, "gene flow between alfalfa populations is a natural occurrence and bee-mediated cross-pollination among plants within a cultivar is necessary for commercial seed production." (page 32)

The DEIS discusses the role of stewardship plans in decreasing the probability of gene flow, however stewardship agreements do not help to prevent unintended transgene flow among fields of non-adopting farmers. Furthermore, we warn against reliance on stewardship agreements as issues of imperfect compliance can arise. For example, an industry study in Canada found that 20% of corn growers were not following stewardship requirements relating to *Bt* corn refuge management.^{vii} Serious and widespread compliance issues were also found in Canadian government audits of *Bt* potato refuge.^{viii}

The mandatory stewardship plans outlined by Monsanto and Forage Genetics International are unrealistic and inadequate: Plants can't read, can't be sued, fined or put in jail, thus neither the U.S. government nor Monsanto and Forage Genetics International have the ability to control GE alfalfa plants once they are released into the environment.

Additionally, organic farmers will not be able to minimize cross-fertilization despite the measures described in the DEIS, even if they can find non-contaminated alfalfa seed. The measures described are not reasonable. For example, the heavy burden of trying to stop the unintended presence of GE alfalfa by avoiding simultaneous flowering to neighboring GE alfalfa is unrealistic. Attempts to change harvesting and planting schedules based on neighbors' schedules would be extremely difficult to manage especially if alfalfa is to be cut up to 3 times in one season. Similarly unrealistic is the measure to remove beehives surrounding alfalfa fields prior to blooming. The honeybee forage distance of over 6 miles exposes the difficulty, and even futility, of this exercise. These difficulties combined with the predictable failures of isolation distances and buffer zones contradict the DEIS conclusion that measures to reduce the likelihood of gene flow will be effective.

The DEIS is incorrect in its assumption that current alfalfa production practices are already in place to protect against unintended presence of GE alfalfa and the USDA would be wrong to assume such practices could exist.

In fact, we are concerned that the DEIS articulates a significant level of misunderstanding of organic farming practice. In particular, the description of Alfalfa Farming Practices (page 71) details a methodology for alfalfa seeding and weed management that is not used by any organic alfalfa farmers we know of in Canada and the U.S.. This incorrect description shows a misunderstanding of organic farming practice generally. The great majority of alfalfa in Western Canada and the Great Plains region of the U.S. is seeded with a cover crop of cereal such as oats in order to suppress weeds. The cover crop germinates and is harvested in the first year, and the following spring the alfalfa will leaf out quickly and outcompete any weeds that might emerge. Alfalfa's great ability to out-compete weeds makes it a valuable "clean-up" crop that is actually used in crop rotations as a method to resolve several weed issues. Though the above is partially described in the DEIS on pages 70 and 73, it is not referenced in "2. Alfalfa Farming Practices a. Organic Farming."

Our knowledge of the biology of alfalfa and the realities of farming leads us to strongly challenge the central conclusion of the DEIS that:

"If alfalfa farmers take these factors into consideration and employ measures to counter these factors, such measures should also help alfalfa farmers effectively reduce or prevent gene flow between neighboring alfalfa crops. Combined with the measures...that can be employed to decrease the probability of gene flow between alfalfa fields and crops, we do not believe that the potential for flow of genes and traits between alfalfa populations in the United States should amount to a significant impact on the human environment." (page 105)

In the following sections we further articulate some of the specific factors that will result in unmanageable GE contamination in alfalfa.

I. Seed Escape

Monsanto's stipulation that GE alfalfa seed producers may not save or sell patented seed is a well-known restriction that is built into Monsanto's contracts with seed purchasers.

However there are many ways in which accidental seed mixing can occur and lead to contamination including the following:

- Failure to clean out hoppers and bins between crops
- Spillage while hauling (failure to tarp, leaky gates, etc.)
- Volunteer growth due to seed shattering
- Tornados and high winds blowing swaths during harvest
- Flooding resulting in floating swaths during harvest
- Birds and rodents spreading seed from storage bins
- Manure (undigested seed from hay consumed by livestock)

The DEIS includes reference to Forage Genetics International Best Practices for cleaning equipment (page 103) but even the best and most careful cleaning requirements can fail and are subject to human error.

The transport of seed is also a well-known potential source of contamination, something observed many times over with GE canola.^{ix}

Canada imports some hay and alfalfa seed from the U.S.. In addition to cross-border biological contamination through pollination, GE alfalfa may be introduced to Canada through contaminated seed crossing the border in the context of this trade.

II. Pollinator Mediated Gene Flow

Alfalfa seed is pollinated by bees, primarily leafcutter bees, but also honeybees, several species of wild bees and wasps. In locations where alfalfa is produced in concentrated areas, as is the case with alfalfa seed, cross-pollination is a particular risk.

The measures stipulated in Monsanto's Stewardship Agreement are not adequate to significantly decrease the probability of gene flow. This includes the measure of isolation through distance between GE alfalfa from other alfalfa fields: "For pollination with leafcutter bees the distance must be greater than or equal to 900 feet, for Alkali bees greater than or equal to 1 mile, for honey bees greater than or equal to 3 miles." (page 103)

The stipulated distance of pollination with leafcutter bees of 900 feet is only applicable in perfect conditions where the bees have adequate food and there is no significant wind. Leafcutter bees are normally placed in nests in shelters in an alfalfa field at a minimum rate of 20,000 bees per acre. A significant percentage of these bees do not return to their shelters. Leafcutter bees will

move several miles away in search of better bloom, within a quarter or half mile, if they are placed in a field that is not in full bloom for example. They can also be blown away in strong winds and storms. A large quantity of leafcutter bees can easily end up a mile away and a smaller number can move several miles.

The DEIS recognizes that “the movement of honey bees from crop to crop” is an additional factor that increases the probability of gene flow including the problem of farmers potentially releasing too many bees to pollinate one alfalfa field leading to the unintended and wide dispersal of bees. (pages 104-105) We argue, as above, that there are many factors relating to the movement of bees that will increase gene flow.

III. Blooming

There are many factors that can result in unplanned large-scale blooming of alfalfa. While alfalfa cut for hay, or for dehydrated products may be at a reduced risk of gene flow, the probability is still high. Alfalfa for hay production will often be cut after blooming starts, giving an opportunity for bees and other pollinating insects to transfer pollen from the GE crop to other alfalfa seed crops.

The Monsanto Technology Agreement for alfalfa would require GE alfalfa hay growers to harvest at or before 10 percent bloom (i.e. 10% of the blooms have opened in the alfalfa stand). The quality of alfalfa hay is optimal at the stage of first flower and Canadian management guides also suggest that alfalfa hay should be cut at 10% bloom or less, in order to optimize yields with forage quality. However, farmers are rarely able to manage their operations in exact accordance with recommended practices. Many other influences, the most significant being weather, can delay hay harvest until a later flowering stage, increasing the number of blooms available as sources of pollen with the GE trait. It is very common in areas with longer seasons to get 2 or even 3 cuts of hay, so the issue of blooming can exist more than once in a season as long as pollinators are active. By way of illustration, the U.S. National Honey Board says that alfalfa blooms throughout the summer because it is usually cut several times for hay.^x

Additionally, re-growth of alfalfa could create a contamination route. An unexpectedly long growing season can result in an unplanned second growth of alfalfa. The costs and/or timing of haying could make it too expensive or unrewarding to cut the second growth before blooming, thus creating a flush of viable seed. The alfalfa would re-grow, produce a second set of flowers and be left to set seed rather than be harvested as a second hay crop.

Many pastures are also allowed to get well into bloom before grazed off, intentionally or otherwise. This includes the scenario of abandoned pastures that may contain GE alfalfa that reaches maturity and would aid the spread of genes.

Accidental pollination from GE alfalfa hay fields that are allowed to come into bloom would contaminate fields several miles away. This contamination could affect alfalfa seed fields, and could allow alfalfa to set seed in ditches and field margins.

IV. Volunteer GE Alfalfa

Volunteer GE alfalfa (either produced from roots or plants that have gone to seed during seed production, or in hay fields, pastures, wasteland or ditches) will be a source of contamination for several years after destruction of any GE alfalfa field. This is particularly the case because, as noted in the DEIS, alfalfa seed crops produce a percentage of “hard seed” that can germinate several years after the field has been ploughed up. This would mean that a GE alfalfa seed crop would have the potential of contaminating non-GE alfalfa crops planted even a few years later.

For organic farmers, volunteer GE alfalfa would result in a long-term cleanup challenge particular

to the biology of alfalfa. Hand-removal of volunteer alfalfa plants would be unrealistic because the alfalfa plants could not be fully pulled up from their roots. Organic standards demand that farmers shall not knowingly grow any crop with the presence of GE volunteers. The scenario of volunteer GE alfalfa plants in a crop such as sweet clover, for example, would also pose a serious challenge as farmers would not be able to separate clover seed from alfalfa seed at harvest because the tiny alfalfa seeds are not much bigger than the clover seeds.

The issue of volunteer alfalfa in hay and pasture fields is not straightforward as, generally speaking, farmers are unconcerned if alfalfa plants are volunteering in hay or pasture fields and are in fact happy to leave the plants because of the resultant soil advantage. Pasture fields are much less intensively managed than hay fields and thus alfalfa seeds and volunteers would persist.

V. Feral Alfalfa

Feral (wild growing) alfalfa is ubiquitous in alfalfa production regions. It will act as a bridge for moving genes from one field to another, typically in a fashion that is difficult to predict. Escaped alfalfa occurs in ditches and on roadsides and commonly flowers synchronously with nearby hay and seed fields^{xi}, and this can be a significant sink and source for stray genes. Alfalfa is a very hardy species that is highly adapted to resource-poor environments such as road verges.^{xii} In broad field studies, Bagavanthiannan and Van Acker have investigated the nature and dynamics of feral alfalfa populations in western Canada and their role in long distance pollen mediated gene flow. Their conclusion is that feral alfalfa produces persistent and hardy feral populations that can act as a barrier to successful co-existence.^{xiii} In this respect, they conclude that the biology and ecology of alfalfa favors its persistence in unmanaged habitats and that these populations will facilitate long-distance gene flow among cropped and non-cropped alfalfa populations within farming regions. Knispel et al (2008) also found that escaped roadside populations of canola were found to accumulate transgenes and could act as a source and sink for unintended transgenes.^{xiv}

VI. Animal Vectors

Livestock manure or wild animal droppings as well as hoof action could also spread GE alfalfa seed. Alfalfa, like many legumes, has a proportion of "hard seeds" which pass right through the ruminant gut. If an animal therefore ingests hay that includes seed heads with viable seeds, some of the seed will pass through and be present in the manure where it may germinate sooner or later. The possibility of cattle grazing on fields adjoining alfalfa fields also raises the scenario of cattle spreading seeds from GE alfalfa volunteers.

4. 2 The Vulnerability of Certified Seed: Case Studies in the Failure of Coexistence Strategies

Our experience with GE canola and GE flax clearly demonstrates that all coexistence strategies will fail at some point. These lessons are further supported by repeated contamination incidents with various GE crops, and even animals, around the world, including the U.S., with various causes including human error. The lessons learned in Canada from GE canola and GE flax contamination are relevant to examining the questions of gene flow between GE alfalfa and non-GE alfalfa as well as the significant impacts of such unintended presence on agricultural production systems and consumer markets. In particular, we would like to draw your attention to the repeated problem of contamination in certified seed stocks.

I. Canola Contamination

Unintended presence from GE canola reached such a point in Canada that most, if not all, pedigreed seed growers in Saskatchewan would not warrant their canola seed to be GE-free and most, if not all, grain farmers in Saskatchewan could not warrant their canola crop, even if planted with GE-free seeds, to be free of GE contamination.^{xv} This indicates that it is erroneous to assume that certified or pedigreed seed can be protected from unintended presence and instead illustrates that certified seed is in fact highly vulnerable to contamination. The case of canola indicates that, even with the pedigreed seed sector's strict varietal purity management control systems and the economic incentive to ensure that these controls work, the seed industry has not been able to prevent unwanted presence of GE traits in non-GE seed varieties. If professional seed growers cannot avoid the unintended presence of GE in their seed, it is not reasonable to expect the general population of farmers to succeed in doing so.

Friesen et al (2003) tested certified canola seed stocks for the presence of unintended transgenes.^{xvi} Of the 27 unique, commercial certified canola seedlot samples, 14 had contamination levels above 0.25% and therefore failed the 99.75% cultivar purity guideline for certified canola seed. Three seedlots had glyphosate resistance contamination levels in excess of 2.0%. Some lots were tolerant to both glyphosate and glufosinate. The objective of this study was to survey pedigreed canola seedlots for contaminating herbicide resistance traits because of complaints from farmers regarding glyphosate-resistant canola volunteers occurring unexpectedly in their fields at densities and in patterns that suggested that pollen-mediated gene flow from neighboring fields in previous years was not the source of contamination.

Friesen et al concluded that, unexpected contamination (even at 0.25%) can cause problems for producers that practice direct seeding and depend on glyphosate for nonselective, broad-spectrum weed control.^{xvii} They stated that, "To avoid unexpected problems and costs, it is important that farmers are cognizant of the high probability that pedigreed canola seedlots are cross-contaminated with the various herbicide resistance traits."^{xviii}

A year prior to the study by Friesen et al. Drs. Downie and Beckie from the federal government department Agriculture and Agri-Food Canada, collected 70 certified canola seed lots in Saskatchewan and examined them using a laboratory Petri dish assay.^{xix} They found 59% of the seed lots had unintended transgene contamination and that 25% of the seedlots had contamination levels exceeding the maximum acceptable standard for certified seeds.

The Canadian Food Inspection Agency requires a distance of 200 meters separation between fields growing certified seeds from any other Brassica, and a distance of 50 meters from weedy relatives. However Canadian producers of hybrid canola seed have required a separation of 2 kilometers from a Brassica crop, in recognition that pollen from a Brassica crop may travel as far as a kilometer or more and that government-determined isolation distances are not adequate. The inability of Canadian government agencies to predict sufficient isolation distances was also observed in the matter of government field-testing for GE wheat where buffer zones were repeatedly increased in response to new understandings of risk.^{xx}

II. Flax Contamination

The current GE flax contamination crisis in Canada offers similar warnings relevant to the question of GE alfalfa. The GE flax "CDC Triffid" (tolerant to "Glean" herbicide residues in soil) was developed at the Crop Development Centre (CDC) at the University of Saskatchewan. The CDC Triffid was approved for environmental release and human consumption, and the variety was registered by the Canadian government (1998). The Flax Council of Canada and the Saskatchewan Flax Development Commission however were deeply concerned that GE flax would contaminate flax bound for the European market, making it impossible to sell there. They convinced the government agency responsible to de-register the GE flax variety in 2001, making

it illegal to sell the flax seeds. None had yet been sold commercially but about 40 seed growers had multiplied around 200,000 bushels of the GE flax seed for future use. These stocks were ordered crushed when the flax was taken off the market that year. Despite this far-reaching measure, in September 2009 the GE flax CDC Triffid was discovered in Canadian flax exports, impacting 35 countries.

The source of GE flax contamination has not yet been established and may never be identified. Tests of the 2009 crop thus far reveal that the contamination is widespread. About 3.5 per cent of the farmer and elevator flax samples tested have been positive for CDC Triffid at or above 0.01 per cent (one seed in 10,000). Ten to 15 per cent of the rail shipments tested positive and seven per cent of the vessel holds.

Just as in the case with GE canola, certified seed stocks of flax (two varieties) were found contaminated. This occurred in a stringently controlled, small breeding center where the flax breeders were well aware of the negative consequences of GE contamination. Even in these circumstances contamination was not avoided and the certified seed issuing from these programs actually added to the contamination problem.

4.3 Agronomic Impacts of GE Alfalfa on Organic Production

I. GE alfalfa would compromise organic soil management

There is no replacement crop for the unique perennial alfalfa. If organic farmers are forced to abandon alfalfa as a crop due to GE contamination, with no equivalent perennial crop that has the soil building characteristics of alfalfa, the environmental benefits of alfalfa will be lost.

Alfalfa is used in organic systems not only as a commercial crop (hay for feed, seed, and sprouting seed for human consumption) but is also used to build soil quality. Its ability to fix atmospheric nitrogen allows organic farmers to build soil fertility without animal manure and to build soil fertility in accordance with organic standards that prohibit the use of purchased petrochemical-derived fertilizers. Because alfalfa has deep, fibrous roots it improves soil texture by adding organic matter, an important carbon sink. Alfalfa is often used to protect or improve soils on marginal lands and highly erode-able land. Alfalfa can be used to make heavy clay soils more porous, and to make light sandy soils better able to retain moisture. It has a role in making soils more resilient in the face of both drought and flooding, increasing concerns as the climate changes.

II. GE alfalfa would threaten organic livestock production including dairy

If GE alfalfa were introduced, contamination would occur and the crop would no longer be available for organic livestock feed. Organic meat and dairy is a growing market, particularly when cattle are raised on pasture and/or are grass fed. Alfalfa, known as "The Queen of Forages", is an extremely important forage crop as, in addition to its other advantages, it is high in protein. The loss of alfalfa could significantly reduce the number of organic livestock and dairy operations and/or increase the costs for producers, as the availability of certified organic feed is already a limiting factor in the growth of this market.

Losses of organic livestock due to the loss of alfalfa as an organic crop would have a cascading effect on the fertility of organic farms, as manure from organic livestock is an important source of phosphorus as well as nitrogen.

5. Socioeconomic Impacts

Organic markets will not tolerate the unintended presence of GE alfalfa. Organic standards prohibit the use of GE organisms in organic production and domestic and international buyers require organic products that are GE-free. We therefore strongly contest the DEIS conclusion that the organic market will bear a level of unintended presence of GE alfalfa.

5. 1 The Costs of Contamination for Farmers

The consequences of GE canola contamination for organic grain farmers in Canada is a strong cautionary tale that is highly relevant to the question of the negative economic impacts that will be felt by organic alfalfa producers. This lesson in canola cautions that the U.S. survey by Brookes and Barfoot (2004) which is referred to in the DEIS in relation to the impacts of unintended presence on organic farmers is outdated and not relevant to examining the case of alfalfa (page 135). The DEIS states that the Brookes and Barfoot survey showed "the vast majority of U.S. organic farmers had not incurred any direct additional costs or incurred losses due to GE crops having been grown near their organically produced crops". Surveys of such impacts need to be understood and undertaken in relation to particular crops and crop-specific contamination issues. It is clear that many more farmers have been affected by the costs of contamination incidents in the U.S. since 2003/2004.

In Canada, GE canola from neighboring farms increasingly appeared as weeds or volunteers in certified organic fields where other crops such as wheat, oat or peas were grown. In order to maintain or re-establish certified organic status for the crop, field or farm, such GE contamination required manual removal of the canola plants as well as on-going measures to avoid contamination of current or future crops. The costs of removing unwanted volunteer GE canola from fields were born by the affected farmers. As mentioned earlier, the manual removal of GE alfalfa volunteers would not even be possible because of the nature of the plant's root system.

The unintended presence of GE canola in an organic canola field was not detectable before harvest, nor could it be prevented due to the prevalence of GE canola on prairie farms. Buyers in the organic market tested for the presence of GE canola and did not accept contaminated lots. Organic grain farmers abandoned growing this crop altogether because of the depth of the problem of unintended presence, because the organic market did not accept this unintended GE presence, and because the risks and costs of contamination became too burdensome to bear.

The unintended presence of GE canola in Canada forced organic farmers to abandon growing and marketing that crop: "Every organic grain farmer has lost the right to grow organic canola free of GMO contamination risk. Every organic grain farmer has lost the ability to sell organic canola into Europe."^{xxi} Because of extensive unintended presence of GE canola in the Canadian Prairies, many, if not all, certified organic grain growers abandoned canola in their crop rotations. Organic grain farmers in the Canadian Prairies have abandoned organic canola production except in a few isolated areas where other farmers do not grow canola.

Organic grain farmers suffered severe economic losses as a consequence of unintended presence. Saskatchewan organic grain farmers attempted to certify a class action suit seeking compensation for this loss from the corporations Monsanto and Aventis (now Bayer) which developed and commercialized the GE canola varieties. In the class action, the farmers sought damages for the loss of canola as a crop to be used in regular rotation and the loss of the opportunity to participate in the certified organic canola market. The request to certify this case as a class action was not granted and the case for liability and compensation itself was therefore not heard by the courts.

The market impacts of unintended GE presence can now be seen in flax with the 2009 discovery of GE flax in Canadian flax exports. Canada is the world's leader in the production and export of

flax - flax is one of Canada's five major cash crops, along with wheat, barley, oats and canola. In September 2009 Canada's European market - 60% of its flax exports - was closed. Contamination was found, or declared to have been distributed to, 35 countries that had not approved GE flax for human consumption or environmental release.

Before the contamination scandal, cash bids for flax in Manitoba were \$9.90CND to \$9.92CND per bushel. But just based on rumour, before contamination was confirmed, flax bids in Manitoba were down to \$6.78CND a bushel - a fall in price of 32%. The price of flax is still depressed and the markets remain uncertain.

Farmers are now seeing a new, additional cost associated with unintended presence from GE crops. Under the auspices of cleaning up the contamination, grain companies are now requiring flax farmers to buy and plant only certified seed for the 2010 crop that is destined for sale to the EU market. This requirement will force many farmers to abandon their farm-saved seed, even if tests prove it is uncontaminated. Farmers will therefore experience this cost not just as the price of buying new, high-priced certified seed from the market but also as the loss of their farm-saved, older varieties that may no longer be easily available and which are adapted to specific local conditions and/or particular market demands.

The widespread unintended GE presence in flax is a problem for both conventional and organic flax farmers as they must all bear the costs of market closure, testing and clean up. The grain industry's expensive and onerous measures to eliminate GE flax from our seed and handling system may force some farmers to ultimately to abandon flax altogether.

If organic farmers were no longer able to grow alfalfa due to GE contamination, they would lose the use of the "Queen of Forages" with its various unique and superior agronomic and economic advantages, as well as its valuable health-oriented market. Alfalfa has economic and management advantages over other forage crops. Alfalfa is a high protein feed, the fastest drying legume for haying and the highest yielding forage. Farmers would lose this option in crop rotations and be forced to turn to less valuable alternatives such as sweet clover or Birdsfoot trefoil. In turning to other forage crops, farmers would also find that there are fewer varieties of these crops available as there has been less breeding investment in them. There is a great deal of infrastructure in place that supports the use of alfalfa for forage and similar infrastructure does not exist for alternative crops.

5. 2 Organic Markets will not bear the Unintended Presence of GE Alfalfa

There is no basis for the assumption of the DEIS that consumers of organic products will tolerate "unintended" GE presence. The DEIS incorrectly segments the organic consumer market into "GT-sensitive" and "non-GT sensitive". Organic regulations clearly prohibit the use of genetically engineered organisms and require organic farmers to clean up any unintended presence.

I. A Wide Range of Organic Products would be Affected by Unintended GE Presence

A wide range of organic foods and food ingredient exports from the U.S. to Canada will be severely impacted by GE contamination.

Canada's growing demand for organic food on the part of consumers and organic ingredients on the part of processors is largely satisfied by imports from the United States. Imports, mostly from the U.S., account for 80 to 90 percent of the organic products sold at retail in Canada.^{xxii} The large majority are organic fruits and vegetables, but there are many organic ingredients that are also

imported. In 2007, the organic food market accounted for approximately 2.0 percent of total Canadian retail food sales and was valued at \$2.6 billion at retail. The market for organic food is growing at 15-20 percent per year.^{xxiii}

In addition to the retail sale of alfalfa sprouts as well as alfalfa seeds for home sprouting which will immediately experience consumer rejection due to unintended presence, alfalfa forage is an upstream input to human food production, as noted in the DEIS. Alfalfa feed is an input to dairy farms, beef cattle, as well as other animal feeds. Dairy is an important piece of the organic value chain in Canada, with an approximate 25% increase in organic milk production from 2006-2007.^{xxiv}

Honey production would also be negatively affected. According to the U.S National Honey Board alfalfa is ranked as the most important honey plant in Utah, Nevada, Idaho, Oregon and most of the western states. The Board lists 73 U.S. suppliers of alfalfa honey.^{xxv}

II. Organic Consumers will Reject Unintended GE Presence

Organic farming prohibits the use of genetically engineered organisms and in the absence of mandatory labelling of GE foods, organics is the non-GE choice for consumers. Consumers are buying organic foods for a number of reasons, including the fact that organic is currently the only certified and labelled non-GE choice on grocery store shelves. In Canada, over 9 surveys since 1999 found that over 80% of Canadian consumers want mandatory labelling of GE foods. A 2000 consumer survey showed that more Canadians were buying organic food and buying their food from health food stores because of concerns over GE ingredients.^{xxvi} The survey found that upon learning that certified organic foods do not contain GE, 38 percent of Canadians said they are more likely to buy organic foods. Many organic consumers have ongoing concerns about the health impacts of consuming GE foods, this includes health concerns about consuming end products such as meat and milk.

It is wrong for the USDA to assume that consumers would accept unintended GE presence if the contamination is unintended or not detectable in the end product. It is well established, for example, through our experience with recombinant Bovine Growth Hormone (rBGH) for dairy cows, that Canadian consumers do not tolerate the use of GE products even where there is no detectable transgene in the final product. Canadian consumer and farmer opposition to the use of rBGH was so strong that regulatory agencies in Canada responded by denying approval for commercialization of this product.^{xxvii} Consumer resistance to rBGH is also strong in the U.S. and opposition has persisted for over 15 years to the current day.

Further, as mentioned in our introduction, 101 consumer and farmer groups in Canada have signed a statement opposing the trade, sale, and production of GE alfalfa in Canada. (Appendix 2) This list is an indication of the degree to which organic consumers, and organic and conventional farmers agree about the serious negative impacts of planting GE alfalfa.

III. U.S.-Canada Organic Trade Will be Disrupted

Organic food from the U.S. will be compromised by the unintended presence of GE alfalfa. Many U.S. organic farmers will lose their certification, resulting in a decline in certified organic foodstuffs produced in the U.S. for export into Canada. This diminished supply, combined with a predicted consumer mistrust of U.S. organic products, may lead many Canadian processors and retailers to seek alternative sources of certified organic foods and food ingredients.

6. Conclusion

The Saskatchewan Organic Directorate Organic Agriculture Protection Fund argues that:

- Gene flow from GE alfalfa to non-GE alfalfa cannot be prevented but is inevitable if GE alfalfa is planted.
- By definition, there is high GE-sensitivity in the market for organic alfalfa in the U.S. and Canada that is consistent with the rules of organic farming that prohibit GE and with the public reputation of organics as a non-GE choice.

The unintended presence of GE alfalfa will have widespread and deep impacts on agricultural production systems in both the U.S and Canada. This is true because of the central role of this unique perennial in organic farming and food systems. GE alfalfa will not be accepted by organic markets but will instead create new costs for both organic and conventional growers. These serious negative impacts can only be prevented if the USDA denies the request for non-regulated status to J101 and J163 glyphosate-tolerant alfalfa events.

Endnotes

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Position Paper on the Introduction of Genetically Modified Alfalfa

The Saskatchewan Organic Directorate (SOD) is opposed to the introduction of genetically modified alfalfa for the following reasons:

Organic standards prohibit the use of Genetically Modified Organisms (GMO's) for use in organic production. A crop with any detectable GMO contamination cannot be certified organic. Our domestic and international buyers require organic products that are GMO free.

- 1) All organic farmers use legumes as a soil-building component in their crop rotations. Alfalfa is a perfect legume for nitrogen fixation in the crop rotation for the majority of organic farms. To lose alfalfa in organic farm crop rotation would severely hamper our ability to maintain soil fertility and prevent soil erosion, which would harm the future of our soils health and sustainability.
- 2) Canadian organic livestock producers are in positioned for exponential growth. The release of GM alfalfa in Canada poses a threat to their ability to grow or buy GMO free hay or pellets. GMO free feed is necessary for the production of organic livestock. There is potential for huge damage to the organic hay, pellets and livestock markets.
- 3) If organic livestock production is adversely affected by the introduction of a genetically modified alfalfa, it goes without saying that the market for organic alfalfa seed for hay production would also be critically damaged.
- 4) There is a significant market, both domestic and export, for certified organic alfalfa seed for growing sprouts for human consumption. Consumers of alfalfa seed for sprouting prefer Canada's high quality seed and reputation for clean organic products. This is a constantly growing market. The potential annual market loss if genetically modified alfalfa is introduced is over a half of a million pounds of alfalfa seed.
- 5) It will be impossible to prevent the spread of GM alfalfa beyond the fields that it is planted in for the following reasons:
 - ▶ Alfalfa seed is a crop that is pollinated by bees, primarily leafcutter bees, but also honeybees, several species of wild bees and wasps. Leafcutter bees are normally placed in nests in shelters in an alfalfa field at a rate of 20,000 bees per acre. A significant percentage of these leafcutter bees do not return to their shelters; they drift several miles away in search of better bloom, or are blown away in strong winds and in storms. Honeybees have a very wide flying range, up to 4 miles. The isolation distance to prevent transfer of the genes by insect pollination from GM alfalfa to non – genetically modified alfalfa would need to be several miles. However there is no mechanism for separating GMO and non-GMO growing areas, and alfalfa seed is usually produced in concentrated areas, so cross pollination and contamination would be inevitable.
 - ▶ GM alfalfa for hay production will often be cut after blooming starts, giving an opportunity for bees and other pollinating insects to transfer pollen from the GM crop to other alfalfa seed crops.

- ▶ Alfalfa seed crops produce a percentage of “hard” seed that can germinate several years after the field has been ploughed up. This would mean that a GM alfalfa seed crop would have the potential of contaminating non-GM alfalfa crops planted even a few years later.
- ▶ Volunteer GM alfalfa, (either produced from roots or plants that have gone to seed during seed production, or in hay fields, pastures, wasteland or ditches) will be a source of contamination for several years after destruction of a GM alfalfa field.
- ▶ Accidental pollination from GM alfalfa hay fields that are allowed to come into bloom would contaminate fields several miles away. This contamination could affect alfalfa seed fields, and alfalfa allowed to set seed in ditches and field margins.
- ▶ Livestock manure or wild animal droppings could also spread GM alfalfa seed.

6) Conventional alfalfa seed that is contaminated by GM alfalfa will also be rejected for import by several countries due to their rejection of GMO crops, food and feed. Alfalfa seed production has been a strong sector in Canadian agriculture, and will suffer losses in its market both within Canada and as an export crop, if genetically modified varieties are introduced.

7) Canada is the world’s largest exporter of alfalfa pellets and alfalfa cubes. We export 350,000 cubic meters of alfalfa pellets and 250,000 cubic meters of alfalfa cubes. A large portion of this export market would be lost if the alfalfa cubes and pellets contained genetically modified alfalfa.

8) The biotech industry claim of reduced pesticide use has not happened. In fact the opposite has happened. “Independent reports from the US show that since 1996, GM corn, soybean and cotton have resulted in an increase in pesticide use of 55 million kilograms.” (Mail & Guardian online, January 10, 2006)

Canadian agricultural producers are going through desperate times in recent years, often only keeping the farm afloat by pouring one or two off farm incomes into the farm. The single bright spot in Canadian agriculture is the vigour and continued growth of the organic sector. Organic agriculture has been growing by 10% or more annually, since it became a market force in the early 1980’s. In the US organics is now an annual \$10 billion dollar food sector. (The Western Producer, December 29, 2005)

In conclusion the Saskatchewan Organic Directorate recommends that the Government of Canada support organic agriculture in Canada, by rescinding approvals for environmental release and for food and feed safety of genetically modified alfalfa, banning the importation of GM alfalfa or GM contaminated alfalfa into Canada, and prohibiting testing, commercial release or any other introduction of genetically modified alfalfa into Canada.

Adopted by resolution by the Saskatchewan Organic Directorate, March 23, 2006.



103 Groups Endorse the "No to GE Alfalfa" Campaign

March 2, 2010

The commercialization of genetically engineered alfalfa -- GE Alfalfa -- planned by Monsanto and Forage Genetics International, would have a severe, negative impact on Canadian agriculture, markets, and our environment. The undersigned agriculture producer groups, consumer and environmental organizations, as well as concerned individuals, support the following:

1. We oppose the sale, trade and production of GE Alfalfa in Canada.
2. We ask the Canadian Food Inspection Agency (CFIA) to reassess its approval for environmental release of GE Alfalfa.
3. We want the public to understand the hazards, costs and market losses that would result if GE Alfalfa were released into our environment.

Signatories:

1. AFEAS (Association féminine d'éducation et d'action sociale), Quebec
2. Alberta Organic Producers Association
3. Alternatives Journal, Ontario
4. AppleGate School, Ontario
5. AmiEs de la terre de Québec
6. Arbutus Ridge Farms, BC
7. Artesian Acres Inc., Alberta
8. L'Association Agriculture Biologique Gaspésie
9. Avenue BIO de l'Est, Quebec
10. BC Food Systems Network
11. Be the Change Group, Ontario
12. Befriending the Earth (BTE), Ontario
13. Beyond Factory Farming
14. Canadian Biotechnology Action Network (CBAN)
15. Canadian Organic Certification Co-operative Ltd.
16. Canadian Organic Growers
17. CEED Centre Society (Community Education on the Environment and Development) BC
18. Club d'encadrement technique (CET) l'Envol-lait biologique, Quebec
19. COABC, Certified Organic Associations of British Columbia BC
20. Cobble Hill Farmers Institute, BC
21. Commission scolaire des Trois-lois, Quebec
22. Creston Valley Food Action Coalition, BC
23. Eatmore Sprouts and Greens Ltd., BC
24. Ecocert Canada
25. Ecological Farmers Association of Ontario
26. Farm Folk/City Folk, BC

27. Ferme St. Joseph, Quebec
28. Field Gate Organics Inc. Ontario
29. Fleur de mil Un pays inc., Quebec
30. Food Action Committee, Ecology Action Centre, Nova Scotia
31. Future of Food in the Kootenays Working Group, BC
32. Garderie les petits bricoleurs, Quebec
33. Genesis Food, Quebec
34. Greenpeace Canada
35. HANS - Health Action Network Society, BC
36. Harbour House Hotel Organic Farm, BC
37. International Organic Inspectors Association
38. Island Natural Growers, BC
39. Jalava Consulting, Ontario
40. John Zuelzer & Son Canada Ltd., BC
41. JUST Community Market Co-operative Ltd., Manitoba
42. Kalamalka Orchards, BC
43. Keystone Grain Ltd, Manitoba
44. Kootenay Country Store Cooperative, BC
45. Kootenay Food Strategy Society (KFSS), BC
46. Kootenay Organic Growers Society (KOGS), BC
47. La Grande Ruche, Quebec
48. La Voil du Tai Chi et Qigong, Quebec
49. Les Fermes Longpres Ltee., Quebec
50. Les Miels Bizz Bizz, Quebec
51. Les Miels du Suroct, Quebec
52. Lillooet Food Matters, BC
53. Local Food Plus, Ontario
54. Mapleton Organic Dairy, Ontario
55. Manitoba Forage Council
56. MCS Global (Multiple Chemical Sensitivity)
57. Mumm's Sprouting Seeds Ltd, SK
58. National Farmers Union
59. National Farmers Union - Ontario (Bruce Local)
60. Nature's Path
61. NE Sask OCIA Chapter #3
62. New Brunswick Partners in Agriculture
63. Northwest Organic Producers Inc. Saskatchewan
64. OCIA #5 Marysburg/Loehr Organic Project Saskatchewan
65. OCIA Canada - Head Office
66. OCIA New Brunswick (Ch 1)
67. Organic Council of Nova Scotia
68. Organic Council of Ontario
69. Organic Food Council of Manitoba
70. Organic Materials Review Institute
71. Organic Meadow Co-operative Inc. Ontario
72. Organic Producers Association of Manitoba
73. Organic Trade Association in Canada
74. Patri-semences, Quebec
75. Pitt Polder Preservation Society, BC
76. POCIC-OCIA Chapter 6 Saskatchewan
77. Power Seed Inc., Ontario
78. Quality Assurance International
79. Quinte Farmers Cooperative, Ontario
80. RealFood, Red Willow, Alberta

81. Robertson - Stow Farms Ltd., Manitoba
82. Rolling Acres Farm, Saskatchewan
83. Les Ruchers du Québec inc
84. Saltspringers for Safe Food, BC
85. Sask Organic Certification Association Inc
86. Saskatchewan Organic Directorate
87. Ship's Point Ventures Ltd., BC
88. Source Acres Bison, Saskatchewan
89. Southwest Sask OCIA Chapter #8
90. Spruce Acres Bison, Ontario
91. Steep Hill Food Cooperative, Saskatchewan
92. Stop the Hogs Coalition, Saskatchewan
93. Terra Sativa, terre de cultures inc., Quebec
94. The Big Carrot Natural Food Market, Toronto, Ontario
95. The Community Farm Store, BC
96. The Stone Store Natural Foods, Guelph, Ontario
97. Thompson Watershed Coalition, BC
98. Toronto Farmers Market Network
99. Trinity Bellwoods Farmers Market/Friends of Trinity Bellwoods Park
100. Union des consommateurs, Quebec
101. Union Paysanne, Quebec
102. West Kootenay Plants, BC
103. Western Alfalfa Milling Co. Ltd., Saskatchewan

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