

The Canadian Seed Trade Association's
so-called **“COEXISTENCE PLAN”**
is a **GATEWAY** to **GM ALFALFA**
CONTAMINATION

COMMENTARY AND TECHNICAL PAPER



CANADIAN BIOTECHNOLOGY ACTION NETWORK and The NATIONAL FARMERS UNION



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The Canadian Seed Trade Association's So-called "Coexistence Plan"
is a Gateway to GM Alfalfa Contamination
Commentary and Technical Paper

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FOR MORE DETAILS, PLEASE CONTACT:

Lucy Sharratt, Coordinator

Canadian Biotechnology Action Network (CBAN)

Suite 206, 180 Metcalfe Street

Ottawa, Ontario, Canada, K2P 1P5

Phone: 613 241 2267 ext. 25 | Fax: 613 241 2506 | coordinator@cban.ca

www.cban.ca



Commentary and Introduction

Canadian farmers and consumers oppose the release of genetically engineered (also called genetically modified, or GM) alfalfa because it is impossible to keep it from spreading to farms, fields and food sources where it is not wanted. Altered gene sequences are contained in the plant's pollen, which is carried by bees from flower to flower, over long distances without regard to fences, contracts, handshake agreements, or any other man-made barrier. The seed produced following pollination will germinate and grow into new alfalfa plants that contain the genetically engineered trait (in this case, Monsanto's Roundup Ready herbicide tolerance trait), which by spreading pollen will become more widely distributed and more concentrated, and so on in perpetuity.

Monsanto and its commercial partner, Forage Genetics International (FGI), are well aware of this complex reality, but wish to introduce their GM alfalfa product regardless. The companies hope to placate the public and provide decision-makers with an excuse not to intervene by publishing a so-called "co-existence" plan, developed on their behalf by the Canadian Seed Trade Association. The plan however, ignores basic facts of biology as well as many realities of farming, and shows a complete disregard for the interests of those farmers whose businesses will be harmed by GM contamination.

The Canadian Seed Trade Association (CSTA) is finalizing an industry "coexistence plan" to pave the way for Monsanto and Forage Genetics International (FGI) to introduce genetically engineered alfalfa into Eastern Canada. The CSTA, whose members include Monsanto and FGI, defines a coexistence plan as: "A framework that guides the implementation of stewardship and best management practices to be employed in order for three production systems (organic, conventional and GM) to successfully coexist." The goal of coexistence planning, according to the CSTA, is to "provide producers with freedom of choice and opportunity to pursue diverse markets." However, without GM alfalfa, producers are already free to pursue established and growing markets for certified organic and non-GM products. By allowing GM alfalfa to contaminate the environment, Monsanto and FGI would gain a market for their seed and chemicals with a tiny minority of farmers, while imposing costs and losses on all other participants in the sector. The CSTA's "coexistence plan" is an aggressive, harmful intrusion into the existing, well-functioning farming systems and markets that benefit from alfalfa use. **COEXISTENCE WITH GM ALFALFA IS NOT POSSIBLE.**

CSTA's Process

On October 24 2012 the CSTA held a workshop in Kitchener, Ontario where some farmers and organic sector representatives voiced strong concerns, clearly stating that coexistence was not possible (CSTA Workshop Proceedings, 2012). (Around 100 farmers and consumers also protested outside the meeting.) The CSTA published a draft coexistence plan in February 2013 that dismissed this critical input from the workshop. The CSTA then engaged "a group of experts in alfalfa hay biology, production and use" to develop "Best Management Practices", to be presented at the CSTA Annual General meeting in Quebec City on July 16, 2013. The "Best Management Practices" are being developed to pad out the coexistence plan and provide a veneer of professionalism, in an attempt to increase the level of authority of a plan that has no legitimacy. The mask of "Best Management Practices" cannot disguise the faulty premises underpinning the plan.

The CSTA Plan

The plan lists four main routes by which "GM traits may enter non-GM alfalfa hay production in Eastern Canada":

- *Seed mixing before or during harvest;*
- *Pollen flow and subsequent gene flow during production;*
- *Volunteer GM alfalfa in a non-GM alfalfa field;*
- *Mixing of GM and non-GM hay during harvest, storage and/or transportation.*

These routes are then addressed in a one-page list of bullet point measures for "mitigating the risk of low level presence (LLP)"¹:

- *Preventing LLP at Planting*
- *Reducing the Risk of LLP from Gene Flow*
- *Preventing Volunteers from a Prior GM Crop*
- *Preventing Mixing during Harvest*
- *Preventing Mixing during Handling and Storage*
- *Monitoring and Compliance*

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Overview

The CSTA's coexistence plan fails before it even begins. Science already tells us that containment is not possible. Furthermore, the CSTA has no jurisdiction over coexistence measures except that corporate members of the CSTA may request or require that farmers use them. The time and cost burden of implementing any measures to reduce risk largely lies with the farmers who are trying to protect their current farming system from contamination. The CSTA's coexistence plan suggests unrealistic practices for farmers that they may be unable to implement, and which certainly could not be maintained by all farmers, in every instance, in perpetuity. For example, the plan relies heavily on good communication and "mutual respect" between neighbours, which, though a goal to strive towards, is highly variable and unpredictable in reality. Similarly, the plan does not recognize the real constraints that farmers face in suggested containment measures such as cleaning out equipment to remove every last tiny alfalfa seed. The plan does not address the fact that even *if the probability of contamination were, as it claims, very low* (which it isn't), a low probability is still a probability. If even a single one of the proposed practices fails, contamination cannot be undone, flowers cannot be un-pollinated, and GM alfalfa cannot be taken back. **THIS IS A VERY LIMITED RISK REDUCTION PLAN, NOT A COEXISTENCE OR CONTAINMENT PLAN.**

[1] The coexistence plan makes use of the term "Low-Level Presence" which, firstly, implies an acknowledgement that containment of GM alfalfa is not possible and, secondly, presumes a definition of Low-Level Presence despite the fact that there is no domestic or international agreement on/definition of LLP. For further information on current Canadian LLP policy proposals see <http://www.cban.ca/Resources/Topics/Low-Level-Presence>

TECHNICAL PAPER

RESPONSE TO THE CANADIAN SEED TRADE ASSOCIATION'S "COEXISTENCE PLAN" FOR GM ALFALFA

- A. Six Fundamental Weaknesses of the "Coexistence Plan"*
- B. Inadequate Description of Alfalfa Biology*
- C. Point-by-Point Rebuttal of the "Coexistence Plan"*

A. SIX FUNDAMENTAL WEAKNESSES OF THE "COEXISTENCE PLAN"

1. The plan does not consider existing scientific and experiential knowledge of the risks of contamination of GM crops, and GM alfalfa in particular.
 - >> We have multiple, relevant experiences of GM contamination in Canada including the contamination of canola and flax. (CBAN 2013)
 - >> There are important studies on feral alfalfa in the Prairies in particular from Bagavathiannan and Van Acker.
 - >> Emerging research from the US shows a high probability of feral Roundup Ready alfalfa. (Greene 2012)
2. The plan relies heavily on farmers being able to discuss cultivation plans with their neighbours in order to avoid contamination. This is generally unrealistic.
 - >> Farmers work under tremendous time constraints and must make decisions based on a wide range of factors.
 - >> It assumes good relations between neighbours and a willingness on the part of neighbours to discuss planting issues. Not all farmers may want to or be able to discuss these issues with their neighbours, and not all will be willing to change their seeding choices or management practices based on these conversations.
 - >> Even if it were possible, adapting cultivation patterns based on the practices of nearby farms is insufficient to prevent contamination.
 - >> As a perennial, alfalfa is grown for several years in a given field. A farmer's decision would have a multi-year impact on the crops that other farmers could grow. Whose plans would take precedence?
3. The plan ignores the realities of farming schedules and practices.
 - >> There is no compensation for the farmer who delays or changes their rotation to accommodate the neighbour. How would the amount of such compensation be calculated? Who would be responsible for paying compensation: the farmer growing GM alfalfa, FGI, the non-GM farmer, the CSTA or the federal government? If there is no compensation for the cost of complying, why would compliance be expected?
 - >> Farmers cannot guarantee that harvest is completed at a certain time (before any plants bloom for example) or that each plant will be cut at harvest.
 - >> Farmers can neither guarantee containment of all GM alfalfa seeds during transport nor a surgical cleaning of equipment, for example, especially as alfalfa is such a tiny seed.
4. The plan deliberately minimizes the impact of the biology of alfalfa on the probability of contamination.
 - >> Alfalfa is pollinated by insects.
 - >> Alfalfa has very small seed.
 - >> Alfalfa has some percentage of hard seed.
 - >> Alfalfa is a perennial crop.
 - >> Alfalfa has survived well as a feral population.
5. The plan does not acknowledge the fact that GM contamination from Roundup Ready alfalfa would be impossible to reverse, if it happens.
6. The CSTA does not address the fact that some farmers in Ontario do save alfalfa seed, or has yet to properly research the actual situation.

B. REDUCING THE RISK OF LLP FROM GENE FLOW

The CSTA "Coexistence Plan" deliberately minimizes the impact of the biology of alfalfa on the probability of contamination and does not therefore fully account for the high probability of contamination. The plan aims to "describe the key aspects of alfalfa biology" and examine their relevance to a coexistence plan but fails, as follows:

.....
"Alfalfa seed is contained in a coiled, non-shattering pod. Seed dispersal is local and not likely to be dispersed by the wind." (page 8)

- >> Seed is consumed by birds and other wildlife, which travel varying distances.
- >> In addition, seed is often transported over long distances and moved from storage to planting equipment where spillage is a factor, with seed left behind.

.....
"This hard seed may remain dormant after planting, but can often subsequently germinate in field conditions, and may represent a source of volunteer alfalfa plants in following crops. The appearance of GM alfalfa from hard seed in a field's following crops is a topic for best management practices." (page 8)

- >> Best management practices will not prevent volunteer growth, which is inevitable in subsequent years regardless of the crop.
- >> The risk of volunteer alfalfa is even greater in non-forage crop fields, which may go to seed because they are not harvested as often. The unharvested seed can then germinate and mature to seed set, which multiplies the risk of contamination through pollination and seed escape.

"This autotoxic effect has implications for alfalfa best management practices with regards to feral populations, as seeds produced by feral plants would experience low germination rates due to the autotoxic compounds produced by the feral stand..." (page 8)

- >> Autotoxicity in alfalfa does not completely kill plants. It may cause slower growth or reduced germination rates, but the risk of contamination from feral alfalfa remains problematic.
- >> Autotoxicity is obviously not a complete barrier to feral alfalfa as feral alfalfa is widespread. Experiments show that alfalfa can self-establish in grass swards and in the presence of mature alfalfa plants. (Van Acker)
- >> Seeds can be easily transported by equipment, birds and animals beyond the area in which autotoxicity occurs.
- >> Feral plants **re-seeding** is not the only issue as feral plants offer opportunities for pollinator-mediated contamination. The role of feral alfalfa as a bridge for contamination has been shown in studies in Western Canada and the US.

.....
"In Eastern Canada, few alfalfa plants are found outside of the field, and feral alfalfa is not expected to be a major risk for GM gene flow⁸. In addition to the relative scarcity of feral populations, alfalfa is not a good seed producer in Eastern Canada and auto-toxicity would prevent feral/GM alfalfa seedling establishment." (page 8)

- >> Alfalfa has the inherent capacity to establish feral plants and feral alfalfa populations are a major risk for gene flow in other areas.
- >> Although we do not yet have a map of feral alfalfa or equivalent research, feral alfalfa is not uncommon in Eastern Canada.
- >> While not commonly grown commercially for seed in Ontario, that doesn't mean it wouldn't set seed in volunteer and feral populations

“There are several ways the Roundup Ready trait could occur as low level presence (LLP) in conventional alfalfa hay. These could be from seed co-mingling during planting of a hay crop, pollen flow during hay production, rotation of a non GM crop after production of a GM alfalfa crop, and inadvertent mixing of GM alfalfa and conventional hay during harvest, transportation, and storage. Of these, a low level presence in seed and the possibility of mixing hay after harvest are clearly the most likely routes to LLP (and the most easily addressed). Adventitious presence due to pollen flow and crop rotation problems are less likely sources of LLP due to a range of biological factors.”
(page 8)

>> This general dismissal of the important role of pollen flow and crop rotation problems in the probability of contamination is unsupported.

For a full accounting of the routes by which genetic contamination of alfalfa can occur, please see “The Inevitability of Contamination from GM Alfalfa Release in Ontario”, Canadian Biotechnology Action Network April 2013
WWW.CBAN.CA/ALFALFAONREPORT

C. POINT-BY-POINT REBUTTAL OF THE “COEXISTENCE PLAN”

The coexistence plan (as per February 2013) is a single page of bullet point categories for which Best Management Practices will be developed (page 9). Below is a response to each of these.

A. PREVENTING LLP AT PLANTING

“COEXISTENCE PLAN”	REALITY
<p><i>Choose a seed variety which does not contain the GM trait - obtain certified seed of a conventional variety from a reputable supplier.</i></p>	<p>This is not always possible in other GM crops, and companies may not guarantee GM free seed. For example, seed companies will no longer guarantee GM-free canola seed and GM flax contamination was found in certified seed, just as it was in canola. Farmers cannot test all the seed they buy. Flax grown in Canada is now permanently GM contaminated at the level of 1 seed in 100,000. (Lamb and Booker, 2012)</p>
<p><i>Planting equipment should be cleaned and free of any unknown alfalfa seed, and if production is for a non-GM market, it is recommended that seed for planting be tested for the GM trait prior to planting, either by the seed company or the producer.</i></p>	<p>Alfalfa seed is so tiny that it is not always possible to fully clean equipment. There are no studies measuring this parameter for forage seed, but research has shown that combines have grain left in them even after a thorough cleaning, alfalfa seeds are especially small.</p>

It is recommended that seed suppliers require the return of unused GM seed.

A recommendation of this type is entirely insufficient advice to prevent GM contamination. There is no mechanism to determine whether purchased seed was all planted or whether there is an unused remainder. There is no legal authority (or even a protocol) to ensure that unused seed is returned, no accountability for oversight of seed used and no penalty, either to suppliers for failing to account for seed use or growers who do not return unused GM seed.

B. REDUCING THE RISK OF LLP FROM GENE FLOW

"COEXISTENCE PLAN"	REALITY
<i>Communication between producers to assess the distance to neighboring GM alfalfa fields – Consider GPS tracking.</i>	Because it relies heavily on individual personalities and neighbourly relationships, this advice is unrealistic and naïve – no more than wishful thinking. Relationships cannot be quantified, and are insufficient to support a robust and systematic approach to reducing risk.
<i>Control flowering alfalfa on the edges of fields and in ditch banks.</i>	Again, this is an unrealistic wish disguised as a mechanism to control contamination. Who will be responsible for this control, and who will pay its costs? What if cannot be done on time? Will farmers who grow GM alfalfa take time to do this?
<i>Harvest before significant flowering or seed pod formation.</i>	This suggestion belies the reality of weather and unforeseen circumstances such as farmer illness or equipment breakdowns that inevitably delay harvest. The standard recommendation is to cut alfalfa hay at 10% bloom for best palatability and nutrition, which does not equate to zero risk.
<i>In cases where feral populations have been identified, mowing of roadside populations is an effective method to control seed production.</i>	Research shows that even in mowed roadside sites there was still substantive seed production (Bagavathiannan et al., 2010). Advanced matrix modelling shows that you would need absolute prevention of seed return for seven or more years in order to begin to eradicate isolated feral populations of alfalfa. (Bagavathiannan et al., 2012) Feral alfalfa grows in many locations that are not subject to frequent mowing. Typically, local jurisdictions are responsible for mowing roadsides/ditches. A farmer is unlikely to cut at all, or to cut sooner at his/her own expense. Moreover, this point does not speak to regrowth and the second cut of hay.

C. PREVENTING VOLUNTEERS FROM A PRIOR GM CROP

"COEXISTENCE PLAN"	REALITY
<i>Treat volunteers as weeds in subsequent crops.</i>	Farmers already have weed and volunteer management strategies in place. The problem is that glyphosate is the most popular burn-off chemical, but with GM alfalfa present, other pesticide mixes will be required, which significantly raises cost. Hand weeding is not an option due to alfalfa's root structure and for obvious reasons primarily related to field size and number.
<i>Crop rotation with non-alfalfa crops (years of separation).</i>	This strategy may not necessarily get rid of alfalfa. It can grow with other crops, set seed if not harvested in a timely manner, and/or regrow from the root even after it is harvested.

D. PREVENTING MIXING DURING HARVEST

"COEXISTENCE PLAN"	REALITY
<i>Assure that swathers, rakes, balers, wagons etc. are free of partial bales or stems of hay.</i>	Farmers typically keep their equipment free of visible detritus, and may also conduct more thorough cleaning between seeding or harvesting different crops. Requiring this 'surgical' type of cleaning is an additional burden for farmers during their busiest seasons.
<i>Consider eliminating the first one or two bales when collecting non-GM hay if the equipment has previously been used in a GM field.</i>	Again, this is a cost borne directly by the farmer, who is unlikely to receive a discount equal to the value of those bales when purchasing seed. There is the added problem of what to do with those bales. There are few options for their disposal. Burning is risky, and in some locations, illegal.

E. PREVENTING MIXING DURING HANDLING AND STORAGE

"COEXISTENCE PLAN"	REALITY
<i>Label GM Hay Lots.</i>	Using GM alfalfa is supposed to make farmers more efficient. This step is unnecessary when conventional alfalfa is grown, and begs the question as to why a farmer would choose to grow the GM variety.

<i>Consider testing hay lots.</i>	Again, the costs of this testing will become the burden of farmers.
<i>Physically separate hay lots for transportation and storage.</i>	Again there are significant costs associated with this advice. On the transportation front, all trucks used to haul GM hay would have to be very well cleaned between loads, and there would need to be some way to determine whether the cleaning was done and whether it was sufficient. Furthermore, hay is usually transported uncovered, which can allow hay that contains seeds or seeds themselves to be blown off the truck to drop and germinate in the ditches. On the storage side, there would need to be additional storage for GM hay, whether a pole barn or a segregated site.

F. MONITORING AND COMPLIANCE

"COEXISTENCE PLAN"	REALITY
<i>Formalized compliance monitoring – in contracts and stewardship agreements for GM alfalfa and for organic production. Clear corrective action for noncompliance.</i>	A monitoring and compliance system like this would be expensive to set up and operate, and raises a number of questions: the legal regime required to support it and who would have jurisdiction, how it would be paid for and who would enforce compliance? There is a real problem with a system that requires those who are harmed by the actions of others to pay for the harm done to them by others, or to pay to protect themselves against the negligence of others. It is illogical and, quite simply, unfair.

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