



2021

# GMO REVIEW

GMO STATUS UPDATE: CANADA

The Canadian Biotechnology Action Network

**cban.ca**

The Canadian Biotechnology Action Network (CBAN) brings together 16 groups to research, monitor and raise awareness about issues relating to genetic engineering in food and farming. CBAN members include farmer associations, environmental and social justice organizations, and regional coalitions of grassroots groups across Canada. CBAN is a project on the shared platform of MakeWay Charitable Society.

**cban.ca**

This GMO Review is a snapshot of the most up-to-date information on genetically modified organisms (GMOs) in Canada. Follow the links on each page for more in-depth information on that topic, to take action, and for sources and references for our research.

## WHAT ARE GMOS?

Genetically modified organisms (GMOs) are living organisms that have been genetically modified (genetically engineered) in the laboratory to have new characteristics. Genetic engineering makes changes directly to the genetic material of an organism, without mating, by introducing genetic material or using techniques that induce change to an organism's genome. Genome editing (also called gene editing) is a set of new genetic engineering techniques.

# GM FOODS IN CANADA

There is no mandatory labelling of genetically engineered (genetically modified or GM) foods in Canada.

**The bulk of the GM foods on the market are GM corn, canola and soy.** Most are used as processed food ingredients and animal feed.

The produce sections of grocery stores in Canada are largely non-GM, but this could change soon. Currently, there are very few GM fruits and vegetables in our grocery stores:

- There is a small amount of GM sweet corn on the market.
- There is a small amount of US-grown GM squash and GM papaya sold in Canada.
- A GM (non-browning) apple may be on the market in Canada but only as pre-cut GM apple slices for use by restaurants and catering companies.
- A new GM pink pineapple called “Pinkglow” is now being sold as a specialty item in a few shops.

**Canadians were the first people in the world to eat a genetically engineered animal, the GM Atlantic salmon, which is now produced and sold in both Canada and the US.**

[cban.ca/products](http://cban.ca/products)

## GM FOODS

Corn

Canola

Soy

Sugar Beet

Alfalfa

Salmon (Atlantic)

Apple

Papaya

Squash

Pineapple



# GM CROPS GROWN IN CANADA

Five GM crops are grown in Canada: corn, canola, soy, white sugar beet, and a small amount of GM alfalfa.

All have GM herbicide-tolerant traits, which means that they are genetically engineered to withstand being sprayed by certain herbicides. Some have additional GM traits: insect resistance or, in the case of alfalfa, low lignin.

GM apples and GM potatoes are not commercially grown in Canada yet.

Globally, GM corn, canola, soy, and cotton account for 99% of all GM crops. Canada is the world's fourth-largest producer of GM crops.

[cban.ca/grocerychainranking](http://cban.ca/grocerychainranking)



CANOLA



CORN



SOY



SUGAR BEET



ALFALFA







# GMOs AND HERBICIDES

**100% of the GM crops currently grown in Canada are genetically engineered to be herbicide-tolerant.**

This means that they are all genetically engineered to withstand spraying by certain herbicides (some have additional GM traits). Most, but not all, are genetically engineered to withstand applications of glyphosate-based herbicides. Glyphosate is the top herbicide ingredient sold in Canada.

---

**Herbicide sales in Canada have increased by 189% since the introduction of GMOs (1994-2018).**

The widespread and frequent use of certain herbicides has led to some weeds developing herbicide resistance. Glyphosate-resistant weeds are now found in five provinces. Higher doses and additional kinds of herbicides are being used to control these herbicide-resistant weeds. The emergence of these weeds displays the failure of the GM herbicide-tolerant cropping system introduced over twenty years ago by Monsanto and other companies.

Herbicide sales in Canada have increased by 189% since the introduction of GMOs (1994-2018).

**[cban.ca/pesticides](http://cban.ca/pesticides)**

# 2,4-D- AND DICAMBA-TOLERANT CROPS

Biotechnology companies have responded to the emergence of glyphosate-resistant weeds by developing GM seeds that are tolerant to the older, more toxic herbicides 2,4-D and dicamba, and by “stacking” multiple herbicide-tolerant traits together in one seed so that **the GM crop plant can survive being sprayed by many different herbicides.**

The Canadian Food Inspection Agency first approved dicamba- and 2,4-D-tolerant crops in 2012, but they first came to market in 2017. In 2020, Canada approved a GM corn from Bayer (MON 87429) that is tolerant to four herbicides, including both 2,4-D and dicamba. Bayer sells a GM soy that is tolerant to dicamba, glyphosate and glufosinate (XtendFlex™) and Corteva sells GM corn and soy tolerant to 2,4-D and glyphosate (Enlist™).

These new GM herbicide-tolerant crops will accelerate the cycle of rising herbicide use and herbicide-resistant weeds in a “pesticide treadmill.” Their approval demonstrates a continued failure by our regulatory agencies to consider the negative environmental, health and economic impacts of increased herbicide use.

**[cban.ca/24Dcrops](http://cban.ca/24Dcrops)**

**These new GM herbicide-tolerant crops will accelerate the cycle of rising herbicide use and herbicide-resistant weeds in a “pesticide treadmill.”**



# GM CROP FAILURE

**GM crops in Canada are now failing to do what they were marketed for.** The spread of herbicide-resistant weeds has reduced the effectiveness of herbicide-tolerant crops, and insects are beginning to evolve resistance to GM insect-resistant crops. These problems pose challenges and costs for farmers and the environment.

The use of GM (Bt) insect-resistant corn is leading to the evolution of some Bt-resistant insects, observed in Nova Scotia and Ontario, and as already seen in other countries. Government of Ontario experts are now recommending crop rotation as the only pest management tool left to control the corn rootworm.

Biotechnology companies are responding by combining multiple GM traits in one seed. Monsanto's "SmartStax" corn, for example, has six Bt toxins and two herbicide-tolerant traits. However, this merely replaces one failing technology with a short-term approach that escalates the problem.

---

**Monsanto's "SmartStax" corn has six Bt toxins and two herbicide-tolerant traits in the one seed.**

**[GMOinquiry.ca/environment](http://GMOinquiry.ca/environment)**



# GM TREES

Researchers in the US have asked the US government, and will soon ask the Canadian government, to approve the planting of GM blight-resistant American chestnut trees in forests. **If approved, the GM American chestnut will be the first genetically engineered forest tree planted in the wild in North America**, and the first genetically engineered plant released with the specific purpose of spreading freely through wild ecosystems.

The release of GM trees could have serious unpredictable and irreversible environmental consequences. Genetically engineered trees pose an even greater risk of unwanted spread than GM crop plants because trees live for decades, have so many nearby wild relatives, and their pollen can travel hundreds of kilometres. If a GM tree is released, it will be difficult, or impossible, to track or reverse its spread over time. The impacts on forest ecosystems are unknown and cannot be known until they are observed in the wild, over decades and centuries. The release of GM trees would be a large-scale, open-air experiment.

**The only reliable way to prevent negative impacts from GM trees is to prohibit their release.**

**The release of GM trees could have serious unpredictable and irreversible environmental consequences.**

**[cban.ca/trees](http://cban.ca/trees)**

**TAKE ACTION HERE**

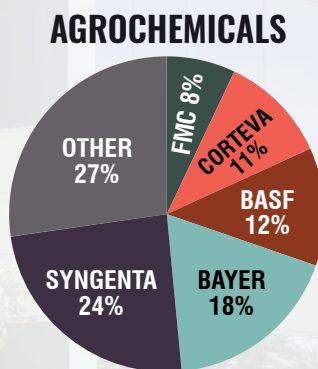
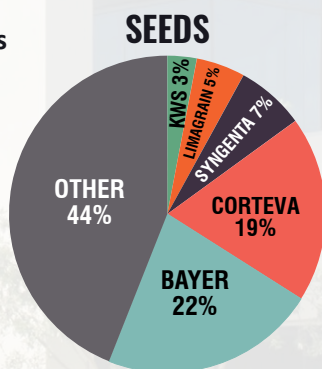


# CORPORATE CONTROL

Until 2016, the global market for GM crops was dominated by six companies: Monsanto, Dupont, Syngenta, Dow, Bayer and BASF. After a wave of mergers, genetic engineering is now largely controlled by just four companies: Bayer bought Monsanto, Dow and Dupont merged and rebranded as Corteva, ChemChina bought Syngenta, and some of Bayer's and Monsanto's business was sold to BASF. The new company Corteva is now the second largest seed company and fourth largest pesticide company in the world, and holds more patents on the genome editing CRISPR technology than any other company or institution in the world. Sales of pesticides and GM seeds are closely tied together for these companies.

**Sales of pesticides and GM seeds are closely tied together for these companies.**

Five companies now control 56% of the global seed market and 73% of the global pesticide market.



[cban.ca/corporate-control](http://cban.ca/corporate-control)

# CORPORATE PUBLIC RELATIONS

The pesticide and biotechnology industry lobby group CropLife Canada has a new public relations website to promote gene editing called “Nature Nurtured.” It headlines misinformation about gene editing. For example, the website says gene editing is a “proven solution” even though very few gene edited crops are actually on the market anywhere in the world.

CropLife Canada members include the biggest biotechnology seed companies in the world: Bayer, Syngenta and Corteva. **These same companies are members of the Canadian Centre for Food Integrity (CCFI), which is leading a national industry campaign to build public trust in Canada’s food system.**

In 2021, the Minister of Agriculture and Agri-Food announced “an investment” of over \$244,000 to support the CCFI. The CCFI runs projects like “Best Food Facts”, which promotes genetically engineered products and responds to consumer questions and concerns about pesticides and GMOs. One of their answers, for example, states that the herbicide glyphosate is “safer than table salt.”

---

One of their answers, for example, states that the herbicide glyphosate is “safer than table salt.”

**[cban.ca/corporate-PR](http://cban.ca/corporate-PR)**

# GENOME EDITING

Genome editing, often called gene editing, is a collection of new genetic engineering techniques that alter the genetic material (usually DNA) of plants, animals and other organisms. These techniques aim to insert, delete or otherwise change a DNA sequence at a specific, targeted site in the genome. Generally, genome editing uses DNA cutters that are guided to a location within an organism's DNA and used to cut the DNA. This cut DNA is then repaired by the cell's own repair mechanism, which creates "edits" or changes to the organism. The most frequently used genome editing technique is called CRISPR-Cas9 or CRISPR, but other techniques follow similar principles.

**Genome editing can be imprecise and can cause unexpected and unpredictable effects.** Many studies have now shown that genome editing can create genetic errors, such as "off-target" and "on-target" effects. These effects can lead to unexpected and unpredictable outcomes, such as changes in protein composition, in the resulting GMO. Small changes in a DNA sequence can have significant effects, even if there is no foreign DNA present.

**[cban.ca/genome-editing](http://cban.ca/genome-editing)**

---

**Many studies have now shown that genome editing can create genetic errors.**





# REGULATION

There is a global fight over the regulation of new GMOs produced through genome editing techniques. Companies do not want new genome edited GMOs to be regulated.

Health Canada and the Canadian Food Inspection Agency (CFIA) are proposing to remove the “regulatory burden” for companies by exempting most genetically engineered plants that have no foreign DNA from regulation. There would be no government safety assessments for these genome-edited GMOs. Instead, companies would assess the safety of their own products. This is a shift to corporate self-regulation. Health Canada and the CFIA would have no ability to require information from companies about these unregulated products, and many may go entirely unreported. **These proposals would allow some unregulated, unknown genetically engineered genome-edited foods and seeds onto the market.**

To ensure safety and provide transparency, government regulators should assess the safety of all genetically engineered foods and seeds, including those that have no foreign DNA.

**Companies would assess the safety of their own products. This is a shift to corporate self-regulation.**

**[cban.ca/NoExemptions](http://cban.ca/NoExemptions)**

**TAKE ACTION HERE**



A close-up photograph of a purple flower cluster on a green stem, with other similar flowers in the background. The image is used as a background for the page.

# RESOURCES

Alert: Proposed Release of Genetically Engineered American Chestnut Trees in the US and Canada, February 2021. [www.cban.ca/GEACalert](http://www.cban.ca/GEACalert)

Introduction to Genetic Engineering:  
What are GMOs? May 2021.  
[www.cban.ca/GMOintro](http://www.cban.ca/GMOintro)

Introduction to Genome Editing, June 2020.  
[www.cban.ca/GenomeEditingIntro](http://www.cban.ca/GenomeEditingIntro)

Genome Editing in Food and Farming:  
Risks and Unexpected Consequences,  
June 2020. [www.cban.ca/GenomeEditingReport2020](http://www.cban.ca/GenomeEditingReport2020)

GMOs in your grocery store: Ranking  
company transparency, December 2020.  
[www.cban.ca/grocerychainranking](http://www.cban.ca/grocerychainranking)

Updates and analysis on the regulatory guidance  
proposals including detailed responses from CBAN.  
[www.cban.ca/NoExemptions](http://www.cban.ca/NoExemptions)

For specific information and citations please consult  
the URLs on each page or contact [info@cban.ca](mailto:info@cban.ca)

[cban.ca](http://cban.ca)