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Re: Comments on the Proposed Cumulative Risk Assessment Framework PRO2017-01 and the need to assess the potential impacts of herbicide-tolerant crops on pesticide use

The question of the use of herbicide-tolerant crops is relevant to the Proposed Cumulative Risk Assessment Framework and the future of pesticide (and GM crop/Plants with Novel Traits) risk assessment. In fact, there is an urgent need to assess the potential long-term and system-wide health and environmental impacts of herbicide-tolerant cropping systems because new corn and soy varieties with stacked GM traits for tolerance to multiple herbicides are commercially available in Canada for the first time this year, and because a new (the fifth) GM glyphosate-tolerant crop (alfalfa) was also recently commercially released. The role of herbicide-tolerant crops needs to be fully incorporated into pesticide exposure assessment, and the environmental assessment of GM crops.

The Canadian Biotechnology Action Network (CBAN) brings together 16 organizations from across Canada, including farmer associations and environmental groups, to research, monitor and promote public education on the use of genetically engineered (also called genetically modified or GM) crops and animals in agriculture. Our following comments and recommendations reflect CBAN's latest research published in six reports available at www.gmoinquiry.ca References for the following can be found in our report *"Are GM Crops Better for the Environment?"* www.gmoinquiry.ca/environment

Herbicide-tolerant crops in Canada

The health and environmental consequences of introducing herbicide-tolerant (Ht) crops and, in particular, the multiple GM herbicide-tolerant crops (soy, canola, corn, sugarbeet and most recently alfalfa) are not yet being addressed in pesticide and GM crop risk assessments.

Herbicide-tolerant crops are designed to survive sprayings of certain herbicides, often now genetically engineered to survive sprayings of multiple herbicides. The widespread cultivation of these crops has changed the way that certain herbicides are used, led to an increase in the sales of some herbicides, and spurred the evolution and spread of new glyphosate-tolerant weeds.

Almost 100% of all the canola and white sugar beet, 60% of the soy, and 80% of the corn grown in Canada is genetically engineered, and almost all these GM crops are engineered to be herbicide tolerant. (For more details, see CBAN's GMO Inquiry report *"Where in the World are GM Crops and Foods?"* www.gmoinquiry.ca/where The Canadian government does not track how many hectares of GM crops are grown in Canada, where they are grown or what specific GM traits are in use.)

The role of Ht crops in increasing herbicide use

The majority of Ht crops are engineered to be glyphosate-tolerant. The widespread cultivation of these crops has driven up the use of glyphosate-based herbicides over the past twenty years. (The first glyphosate-tolerant crop was approved in Canada in 1995.) Glyphosate use in Canada tripled between 2005 and 2011, climbing from 30.2 million litres to 89.7 million in Western Canada, and from 3.8 million litres to 12.3 million in Eastern Canada. (This increased use is not simply a result of increased cropland but is better explained by increasing "pesticide use intensity", or the amount of pesticide that is applied per hectare.) Herbicide sales in Canada increased by 130% – from 21.9 million kilograms to 50.3 million kilograms – between 1994 and 2011.

In 2012, the Environmental Commissioner of Ontario expressed concern over the long-term sustainability of the partnership of genetically modified crops and glyphosate herbicides, and stated that the adoption of GE crops has resulted in "a huge increase in the application of glyphosate to agricultural soils."

The increased use of certain herbicides with Ht crops also has wider impacts. One such consequence is the emergence and spread of some herbicide-resistant weeds, which in turn threaten to further increase herbicide use, and has already led to the development on new herbicide-tolerant crops.

The role of Ht crops in creating herbicide-resistant weeds and further increasing the use of multiple herbicides

Over the past 20 years, weed scientists and environmentalists have repeatedly warned that Ht crops would lead to the emergence and spread of herbicide-resistant weeds. The reality of this trend has been documented by CBAN in our GMO Inquiry project. Please see the report *"Are GM Crops Better for the Environment?"* at www.gmoinquiry.ca/environment.

The first glyphosate-resistant weeds began to emerge in Canada in 2008, and by 2010, the seed and pesticide company Monsanto had started offering rebates to farmers who were using herbicides other than their brand-name glyphosate herbicide, Roundup, to control glyphosate-resistant weeds. There are now five species of glyphosate-resistant weeds found in Canada. A 2013 online survey of farmers estimated that more than one million acres of Canadian farmland had glyphosate-resistant weeds. In Canada, some glyphosate-resistant weeds have been found to be resistant to ALS inhibitors as well, and in the US, some glyphosate-resistant weeds are resistant to two or three other herbicide classes.

In response to the emergence and spread of glyphosate-resistant weeds, biotechnology companies have genetically engineered crops to be tolerant to 2,4-D and dicamba as well as glyphosate. Canada was the first country in the world, in 2012, to approve 2,4-D-tolerant crops (corn and soy developed by the company Dow AgroSciences), and dicamba-tolerant soy (developed by Monsanto). However, while new GM events require government scientific evaluation and approval, stacking individual GM traits together does not trigger a safety assessment. Individual GM traits are approved for use in certain crops by the Canadian Food Inspection Agency and companies are then free to stack these traits together without further risk assessment.

Adoption of the newly approved GM 2,4-D- and dicamba-tolerant crops will increase the use of these herbicides. For example, the US Department of Agriculture projects that the cultivation of 2,4-D-tolerant crops will lead to a many-fold increase in the use of 2,4-D in the US. Scientist Charles Benbrook has predicted that the widespread use of 2,4-D-tolerant crops in the US could increase herbicide use by 50%, and lead to the further spread of herbicide-resistant weeds. According to Canadian scientists Hugh Beckie and Linda Hall, "Cultivars with stacked-HR [herbicide-tolerant] traits (e.g., glyphosate, glufosinate, dicamba or 2,4-D) will provide a short-term respite from HR weeds, but will perpetuate the chemical treadmill and selection of multiple-HR weeds." There are already 16 species of 2,4-D-resistant weeds around the world (four in the US and two in Canada) and six species resistant to dicamba (two in the US and two in Canada).

The Environmental Commissioner of Ontario published an analysis in 2012 that stated, "If these new GM plants are approved in Canada, Ontario may see a lot more 2,4-D applied to agricultural fields in years to come."

In 2014, the Environmental Commissioner of Ontario, when commenting on the approval of glyphosate-tolerant alfalfa, stated, "Issues related to sustainable and organic agriculture, increased herbicide use, and related social and economic effects play no role in the federal approval process for GE crops."

Recommendations:

1. The Canadian government needs to track which GM traits and crops are on the market, and where and how much of each is planted. The government also needs to track pesticide use. Such tracking would serve multiple goals, including to enable the ongoing assessment of any relationship between the use of herbicide-tolerant crops and pesticide use.

2. The systemic and long-term health and ecosystem impacts of herbicide-tolerant crops should be assessed as part of the government approval process for these crops.

3. Stacking multiple herbicide-tolerant traits together in one plant should trigger a pesticide exposure assessment and require an environmental risk assessment by the Canadian Food Inspection Agency.

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