



Robert Pedde Building
2717 Wentz Avenue
Saskatoon, SK S7K 4B6
p: (306) 652-9465
f: (306) 664-6226
email: nfu@nfu.ca

July 15, 2021

Pest Management Regulatory Agency Publications Section
Pest Management Regulatory Agency (PMRA)
Health Canada
2720 Riverside Drive
Ottawa, Ontario
K1A 0K9 E-mail: hc.pmra.publications-arla.sc@canada.ca

National Farmers Union submission to Pest Management Regulatory Agency Consultation on Glyphosate, Proposed Maximum Residue Limit PMRL2021-10

The National Farmers Union (NFU) is pleased to provide our comments on the proposed changes to Maximum Residue Limits (MRLs) of glyphosate for certain crops.

The National Farmers Union (NFU) is a voluntary direct-membership, non-partisan, national farm organization made up of thousands of farm families from across Canada who produce a wide variety of food products, including grains, livestock, fruits and vegetables. Founded in 1969, the NFU advocates for policies that promote the dignity, prosperity and sustainable future of farmers, farm families and their communities. The NFU is a leader in articulating the interests of Canada's family farms and in proposing affordable, balanced, and innovative solutions that benefit all citizens. NFU policy positions are developed through a democratic process of discussion and debate by members at regional and national conventions.

We promote food sovereignty, which is a holistic approach that puts people, food and nature in the centre of the policy picture, and that makes democratic control of the food system its priority. Food sovereignty is about empowering farmers and eaters to define their own systems to produce healthy and culturally appropriate food for people through ecologically sound and sustainable methods that support community prosperity. It values food providers, builds knowledge and skills and works with nature. Numerous surveys and opinion polls indicate that non-farming Canadians generally share these values and support efforts to ensure farmers obtain fair returns from producing wholesome food and other agricultural products in an environmentally friendly way.

NFU members are increasingly concerned about the health and environmental impacts of glyphosate. Via our democratic policy development process, we adopted our position opposed to the pre-harvest spraying of glyphosate in 2014. This stance informs our position against the proposed MRL increases.

Strong Communities. Sound Policies. Sustainable Farms.

Des communautés solidaires et des politiques sensées pour une agriculture durable.

nfu.ca

The *Pest Control Products Act* empowers the Minister of Health to set maximum residue limits for approved pesticides. It also states that the Minister’s primary objective when administering the Act is “to prevent unacceptable risks to individuals and the environment from the use of pest control products.” The Minister must also “support sustainable development designed to enable the needs of the present to be met without compromising the ability of future generations to meet their own needs; seek to minimize health and environmental risks posed by pest control products and encourage the development and implementation of innovative, sustainable pest management strategies by facilitating access to pest control products that pose lower risks and by other appropriate measures; encourage public awareness in relation to pest control products by informing the public, facilitating public access to relevant information and public participation in the decision-making process; and ensure that only those pest control products that are determined to be of acceptable value are approved for use in Canada.” The Act emphasizes that the Act’s protection and consideration afforded to children in this Act shall also extend to future generations. And, the Act also requires the Minister to use the precautionary principle, which is defined as: “Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent adverse health impact or environmental degradation.”

The Pest Management Regulatory Agency of Health Canada proposes to raise MRLs for dry beans from 4 ppm to 15 ppm, lentils, chickpeas and dry peas from 5 parts per million (ppm) to 10 ppm, barley bran and pearled barley go from 10 to 15 ppm, oat groats/rolled oats and oat bran rise from 15 to 35 ppm, while wheat bran and wheat germ increase from 5 to 15 ppm.

Product	Current MRL	Proposed MRL	% change
Dry peas, chickpeas	5	10	200
Lentils	4	10	250
Dry beans	4	15	375
Barley bran, pearled barley	10	15	150
Wheat germ, wheat bran	5	15	300
Oat groats, rolled oats, oat bran	15	35	233

MRLs are set by nations to set standards for imported foods. The proposed increase in MRLs mean that imports of dry beans, lentils, chickpeas, etc. will be legally permitted to have double or more the current glyphosate residue present. Canadian farmers exporting will be subject to the importing country’s MRL limits. Raising Canada’s MRL increases the allowable residue in foods consumed by Canadians whether they are imported or domestically produced.

The PMRA’s process for deciding on MRLs is based on the residue limits commonly found as a result of prevailing agricultural practices, and is not driven by health and environmental impacts of pesticide usage that result in expected residue levels.

About glyphosate

Glyphosate is a non-selective, systemic herbicide. This means that it kills all types of plants by affecting all parts of the plant – above and below ground. Glyphosate was originally used as an industrial “descaling” agent and was not recognized as an herbicide until 1970 when Monsanto developed and patented a concentrated form it



introduced as Roundup® in 1974. According to PMRA sales data, glyphosate is Canada's top selling pesticide, although the precise amount is not reported.

Glyphosate interrupts the EPSPS enzyme pathway, a bio-chemical process that all plants and some bacteria and fungi use to produce certain amino acids they need to survive. In 2010 Monsanto was granted a patent for glyphosate when combined with dicarboxylic acid as an antimicrobial agent to treat infections in mammals caused by certain microorganisms that share the EPSPS pathway with plants.¹ Glyphosate herbicide products contain additional chemicals, surfactants, to allow the active ingredient to be more easily absorbed into plant leaves. Once inside the leaves, the chemical moves into growing plant parts, where it kills tissue and prevents growth. The plant yellows and dies within ten days to two weeks after being sprayed.

Glyphosate is used to control weeds before seeding and in glyphosate tolerant crops; to terminate alfalfa stands and for patch treatment of weeds in non- glyphosate tolerant crops. Glyphosate is prohibited in certified organic production. Glyphosate impairs germination, so should not be used on any crops grown for seed.

Glyphosate is not a desiccant – it does not dry the plant on contact. It is not explicitly allowed for pre-harvest dry-down, but labels detailing approved use note that using glyphosate for pre-harvest weed control “may also provide harvest management benefits, by drying down crop and weed vegetative growth for example, where late flushes of annual weeds, green vegetative crop growth, or late tillering may interfere with harvest operations.”² Pre-harvest spraying of cereals, canola, pulse crops and flax, supposedly for weeds, is thus used to allow earlier harvest with the option to straight cut instead of swathing. Harvesting without pre-harvest spraying requires the farmer to wait until the crop is fully ripe and the moisture content of the grain is low enough to allow for safe storage. This is usually accomplished by swathing – cutting the crop when it is nearly ripe, allowing it to ripen and dry in windrows in the field and then combining it.

Glyphosate should not be used for pre-harvest dry down until grain moisture is less than 30%. Spraying earlier increases the amount of glyphosate in harvested kernels. When sprayed with glyphosate, all non-herbicide tolerant plants in the field will be killed within seven to 10 days. It is then possible to eliminate swathing and harvest by straight-cut combining fields when weeds and crop are no longer green.

Pre-harvest spraying is used by some farmers as a way to reduce costs and risks, particularly if a very large amount of land has to be harvested in a short window of time. If the crop is fully mature there will be no glyphosate residue in the seeds because the plants only take the chemical to growing parts. However, it is often the case that crops ripen unevenly due to topography (low spots in the field being wetter, plants stay green longer), uneven germination (some plants are younger than others), tillering (plants sometimes produce side shoots that are younger than the main plant). Some crops, such as lentils are “indeterminate” and continue growing until cut or killed by frost. If such a field is sprayed with glyphosate the green crop plants will up-take the glyphosate and deposit it in the seed -- the plant will die and dry out but the seed will have some glyphosate residue in it.

Pre-harvest glyphosate spraying is a relatively new practice and it is not universal. It is not allowed under organic production and many conventional farmers do not use it either



Implication of higher MRLs

Increasing the MRL for beans, peas, lentils, chickpeas, and for wheat, oats and barley products, will enable more, and earlier use of glyphosate for pre-harvest spraying. There will be less risk of exceeding the MRL by applying before the crop reaches the 30% moisture stage. Higher MRLs will increase the risks of environmental contamination by glyphosate by enabling more widespread use of pre-harvest spraying and will increase health risks by allowing higher levels of glyphosate residues in Canadian food.

The NFU opposes pre-harvest spraying of glyphosate.

The primary source of glyphosate residue in foods is uptake by plants that are sprayed prior to harvest when the exceed 30% moisture.

The CFIA is responsible for monitoring MRL compliance. The 2016 Internal Audit of its National Chemical Residue Monitoring Program³ found serious deficiencies, including that the program does not publish its annual reports, only making them available on request after a delay of several years. Data collected to produce these reports is not made public.

Glyphosate use is prohibited in certified organic farming. Some buyers have a zero tolerance and require all products to be tested. Organic farmers have had sales rejected due to trace amounts of glyphosate that occurred due to environmental exposure from spray drift, contaminated rain water or improperly cleaned storage or transportation units.

The National Chemical Residue Monitoring Program focusses on testing foods sold in Canadian retail outlets. The government relies on commercial processes to deal with MRL issues for commodities such as grain for export or domestic consumption. Thus, farmers who sell into sensitive markets are vulnerable to harm caused when lots or shipments are contaminated with grain that exceeds the MRL, even if they themselves do not use pre-harvest glyphosate. The only discipline for improper use is market loss, but this occurs after the fact. If companies purchasing grain and pulses risk losing sales due to customers' rejection of high residue levels they will have an incentive to test loads and reject them at the elevator. It is not appropriate for public policy to rely on private enforcement for compliance.

Higher MRLs will encourage more widespread, and earlier use of pre-harvest spraying. With economic incentives to use pre-harvest glyphosate and the lack of enforcement of label requirements when pesticides are sprayed, and no government monitoring of residue levels in commodities, increasing the MRLs sends a signal that supports increased pre-harvest spraying and less attention to timing.

Precaution needed

The PMRA sets MRL levels based on observed levels in foods and commodities based on the quantity of residues that are likely to remain in or on the imported food commodities when glyphosate is used according to label directions in the exporting country. Canadian MRLs also apply to food produced for domestic consumption, but as noted, there is very little monitoring and the data collected is not made public. The MRL level is driven by agricultural practices, not by health protection.



In March 2015, the World Health Organization's International Agency for Research on Cancer (IARC) classified glyphosate as probably carcinogenic to humans and concluded that there was strong evidence for genotoxicity, both for the active ingredient glyphosate and for glyphosate formulations as used in agriculture.⁴ The IARC collected all publicly available and pertinent studies, totalling about 1000, which were systematically reviewed by independent experts, free from vested interests, using strict scientific criteria. Studies included research on occupational exposure of farmers to glyphosate.

Higher MRLs will increase farmers' and other nearby residents' exposure to glyphosate directly by occupational exposure and indirectly through spray drift. The PMRA's mandate to use the precautionary principle and to include impact of the use of pesticides in its administration of the Act, means the PMRA should not authorize, or imply permission to increase pre-harvest glyphosate use on farms by increasing MRLs for agricultural products.

Recent research reveals that exposure to glyphosate and other pesticides causes harmful epigenetic changes in humans, animals and microorganisms, which are passed down to subsequent generations through inheritance. Epigenetic changes are changes in how DNA is expressed, and allows faster adaptation to environmental stresses than would occur as a result of evolution resulting from DNA mutations. Exposure to glyphosate has been shown to cause significantly higher incidence of certain diseases in the third generation decedents of exposed animal subjects. Scientists studying the matter say that "these transgenerational pathologies observed are relevant to human populations that have observed generational increases in these diseases, including ovarian disease, kidney disease, prostate disease, testis disease, altered pubertal onset, obesity, parturition abnormalities, and the presence of multiple diseases."⁵ The PMRA's mandate to use the precautionary principle and to include future generations in its consideration of pesticide impacts on children require it to avoid increased exposure to glyphosate residue in food.

Higher MRLs would likely increase the amount of glyphosate used on Canadian fields. Agriculture and Agri Food Canada researchers and others have published scientific evidence showing that there is a consistent association between the serious plant disease, *fusarium*, and prior use of glyphosate on a field where a subsequent cereal crop is grown.⁶ The same mechanisms that promote *fusarium* may be responsible for increased prevalence of other fungal diseases of crops, such as sclerotinia and clubroot in canola. It is notable that even in conditions that promote severe *fusarium* infection, organic crops – where soil has not been exposed to glyphosate -- have little problem with the disease.⁷

Fusarium graminearum does not just cause yield loss, but it produces a toxin known as DON which makes it unsuitable for livestock feed. The PMRA should take into account the systemic effects of pesticide use, not just the chemistry of the product itself. The proposed increase in MRL on legumes has strong potential for increased glyphosate use on fields where canola and cereal crops are part of the rotation, increasing fungal disease pressure and causing economic harm for both grain and livestock farmers.

Another impact of higher glyphosate use due to higher MRLs is increased evolutionary pressure on weed populations, leading to more glyphosate resistant weed types. As more weeds become harder to kill with glyphosate, weed management becomes more complex and expensive, as farmers use tank mixes that include other herbicides such as 2,4,D and Dicamba, and use higher concentrations of glyphosate. Already, glyphosate resistant Canada fleabane, tall waterhemp, common ragweed, and kochia have developed in Canada. The



PMRA’s mandate includes encouraging “the development and implementation of innovative, sustainable pest management strategies.” The proposed MRL increase for glyphosate is a move in the opposite direction. It will lead to a heavier pesticide burden on the environment, more weed resistance and increased exposure for farmers and other rural people.

Proposed MRLs promote import of high residue commodities

The PMRA has provided a chart comparing its proposed MRLs with those of the US and CODEX Alimentarius, the international body that sets standards for food safety to guide countries’ regulators. Many countries have adopted CODEX limits.

Canada’s existing MRLs are lower than both US and CODEX limits, but the proposed MRLs are higher for all but barley and wheat. Allowing higher levels of glyphosate residues in key agricultural commodities would jeopardize markets. We have already seen this with Italy’s rejection of Canadian durum wheat due to unacceptable glyphosate residues.

Product	Current MRL	Proposed MRL	American limit	CODEX limit
Dry peas, chickpeas	5	10	8	5
Lentils	4	10	8	5
Dry beans	4	15	5	2
Barley bran, pearled barley	10	15	30	20
Wheat germ, wheat bran	5	15	30	20
Oat groats, rolled oats, oat bran	15	35	30	30

High domestic MRLs would also reduce barriers for Canadian food processors wishing to import pulse crops from countries with MRLs higher than our current limits, but with lower limits than those being proposed for Canada. This would increase Canadian consumers’ exposure to glyphosate residues, above the current levels and above levels experienced by consumers in other countries, particularly as demand for legume-based plant protein products increases.

NFU Recommendations:

Based on the scientific evidence, Health Canada’s mandate under the Pest Control Products Act, the deficiencies in monitoring and compliance mechanisms, and the democratic direction of our grassroots farmer membership, the NFU therefore recommends:

- That proposed MRL increases for glyphosate are not implemented
- Amend all labels for herbicides with glyphosate active ingredient to prohibit pre-harvest spraying
- Effective MRL enforcement and compliance measures be implemented to safeguard Canada’s markets and international reputation
- That the Canadian Grain Commission monitor export shipments for MRL compliance
- That the CFIA increase its MRL monitoring of foods and commodities and promptly publish both reports and raw data



- That the PMRA conduct an investigation into linkages between glyphosate application and subsequent fusarium infection, that this investigation be done by scientists with no ties to the crop protection sector, and that results be published in full on a publicly accessible website.
- That Health Canada investigate the epigenetic impacts of glyphosate exposure on humans, livestock, plants and soil micro-biota, that this investigation be done by scientists with no ties to the crop protection sector, and that results be published in full on a publicly accessible website.

All of this respectfully submitted by
The National Farmers Union
July 2021

References:

¹ Glyphosate formulations and their use for the inhibition of 5-enolpyruvylshikimate-3-phosphate synthase, US Patent US7771736B2 <https://patents.google.com/patent/US7771736B2/en>

² Roundup Transorb™ Liquid Herbicide REGISTRATION NO. 25344 PEST CONTROL PRODUCTS ACT. ACTIVE INGREDIENT: Glyphosate, 360 grams acid equivalent per litre present as isopropylamine salt. BAYER CROPSCIENCE INC. https://pr-rp.hc-sc.gc.ca/1_1/view_label?p_ukid=203072224

³ Internal Audit Report, Audit of the National Chemical Residue Monitoring Program, Canadian Food Inspection Agency. <https://inspection.canada.ca/about-cfia/transparency/corporate-management-reporting/audits-reviews-and-evaluations/ncrmp-overview/ncrmp-report/eng/1521081149940/1521081245039#a10>

⁴ IARC Monograph on Glyphosate, World Health Organization. <https://www.iarc.who.int/featured-news/media-centre-iarc-news-glyphosate/>

⁵ Millissia Ben Maamar, Daniel Beck, Eric E. Nilsson, Deepika Kubsad & Michael K. Skinner (2020) Epigenome-wide association study for glyphosate induced transgenerational sperm DNA methylation and histone retention epigenetic biomarkers for disease, Epigenetics, DOI: 10.1080/15592294.2020.1853319 <https://www.tandfonline.com/doi/full/10.1080/15592294.2020.1853319?src=#>

⁶ M.R. Fernandez, R.P. Zentner, P. Basnyat, D. Gehl, F. Selles, D. Huber, Glyphosate associations with cereal diseases caused by Fusarium spp. in the Canadian Prairies, European Journal of Agronomy 31 (2009) 133–143 <https://www.sciencedirect.com/science/article/abs/pii/S1161030109000689> and Robert J. Kremera, Nathan E. Means, Glyphosate and glyphosate-resistant crop interactions with rhizosphere microorganisms. European Journal of Agronomy 31 (2009) 153–161 <https://www.sciencedirect.com/science/article/abs/pii/S1161030109000641>

⁷ Organic wheat dodges mycotoxin, by Robert Arnason. Western Producer, March 30, 2017. <https://www.producer.com/news/organic-wheat-dodges-mycotoxin/>

