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ISSUES

THE UNEXPECTED CONSEQUENCE OF ONTARIO'S CLASS 12 LEGISLATION

BY DENNIS EDELL, CHAIR – ISSUES MANAGEMENT & EXTERNAL RELATIONS COMMITTEE

Ontario's Class 12 legislation was designed to reduce the risk to insect pollinators from the overuse of neonicotinoid treatments on corn and soy seed. However, sales reports and research are showing that new pesticides being used in place of neonics may have actually increased the risk.

As of July 1, 2015, to protect insect pollinators from the overuse of pesticides, new requirements for buying and using neonicotinoid-treated corn and/or soybean seed were phased in across Ontario. At that time, more than 90% of corn and 65% of soy seeds planted were treated.

Neonicotinoids are a class of systemic pesticides that are water soluble and work by being ingested by the plant-killing insects when they feed on the target crop. However, less than 20% of the pesticide is absorbed by the plant – the rest remains in the soil and can translocate to adjoining flowering plants or migrate from runoff to creeks and waterways.

The goal of Class 12 was to reduce the usage of these pesticides by containing the use to about 15% of cropping areas. This was OMAFRA crop specialists' estimate of the percentage of acreage that was subject to pest pressure and where the use of neonicotinoid seed treatment was warranted. Per the legislation, in order to purchase neonic-treated seeds, farmers had to attend an IPM course and have independent verification that pests targeted by neonics were present in their soil.

One other requirement of the legislation was annual reporting on the sale of corn and soy seeds treated with the three neonicotinoid molecules: clothianidin, thiamethoxam, and imidacloprid. The annual sales survey sent to dealers asked for sales by acreage and by the mass (tons) of neonicotinoid-treated and non-treated seeds sold or transferred.

With 2016 as the first crop year reported, we now have three years of data on sales of neonicotinoid-treated and untreated seeds. However, because the legislation only covered neonicotinoids, the survey was not able to ask for sales of seeds treated with other chemicals.

Based on reported data from seed dealers, on a total acreage basis, the use of neonics has decreased over three growing seasons by 23% for soy and 13% for corn – for example, reported sales per acreage for corn treated seed was 1.636 million acres in 2016, down to 1.416 million acres in 2018. This is an improvement, but nowhere near the goal of an 85% reduction. (*www.ontario.ca/page/neonicotinoid-regulations-seed-vendors#section-5*)

It is important to note that the total acreage of neonic-treated seeds sold in Ontario, as reported, represents only 47% of the total acres planted in soy and corn in Ontario. Reporting of untreated seed sales refers only to seeds that were not treated with neonicotinoids. We have no quantifiable data on what chemicals are being applied in the other 53% or 2.7 million acres.

The possibilities include:

- Seed treated with neonics that were purchased outside of Ontario or Canada and not tracked through thedealers surveyed.
- New pesticides, such as flupyradifurone (FPF, Sivanto, Bayer) used on potatoes
- DuPont Lumivia, with the active ingredient chlorantraniliprole, used on corn and soy
- Fungicides normally applied with pesticides as a seed treatment on all corn and soy seeds

In terms of corn and soy, Lumivia is gaining popularity as a substitute for neonics. Lumivia is a Class 2 pesticide and therefore avoids the neonicotinoid restrictions.

A new insecticide seed treatment made by DuPont will be used on the vast majority of corn sold by Pioneer in Ontario next season (2019), according to Russ Barker, a Pioneer sales representative and Certified Crop Adviser. "This could be an option for farmers looking for a substitute for neonicotinoids." (*https://ontariograinfarmer.ca/2016/12/01/new-alternative/*)

Based on research from the manufacturer, the federal Pest Management Regulatory Agency (PMRA) concluded that Lumivia poses a minimal risk to beneficial insects and pollinators when used according to the instructions on the label. "We did extensive research prior to the product's introduction on a wide range of beneficial insects, including pollinators, predators, and parasitoids," says Adam Vaughan, manager for registration, regulatory affairs, and field development at DuPont. (*https://ontariograinfarmer.ca/2016/12/01/new-alternative/*)

Reality, however, may be different. Based on its label, Lumivia does not appear to be as safe as claimed by DuPont:

Environmental hazards:

- *Toxic to aquatic organisms*
- *Residues of chlorantraniliprole are persistent and may carry over. It is recommended that any products containing chlorantraniliprole not be used in areas treated with this product during the previous season.*
- *The use of this chemical may result in contamination of groundwater, particularly in areas where soils are permeable (e.g. sandy soil) and/or the depth to the water table is shallow.*
- *Treated seed is toxic to birds.*
- *Any spilled or exposed seeds must be incorporated into the soil or otherwise cleaned up from the soil surface.*

And DuPont's claim about Lumivia being benign to bees has been contradicted by new research recently published in *Nature (https://www.nature.com/articles/s41598-019-39193-3)*:

"Chlorantraniliprole (Lumivia) not only induces a dose-dependent calcium release from internal stores of honey bee muscle cells, but also a dose-dependent blockade of the voltage-gated calcium current involved in muscles and brain excitability. We measured a long lasting impairment in locomotion after exposure to a sublethal dose and despite an apparent remission, bees suffer a critical relapse seven days later. A dose that was sublethal when applied onto the thorax turned out to induce severe mortality when applied on other body parts."

So after three growing seasons, what do we know about the widespread use of systemic pesticides in Ontario?

- Despite Class 12 legislation, neonicotinoid-treated corn and soy seeds continue to be applied to millions of acres of field crops in Ontario.
- New systemic pesticides are being substituted in response to public and regulatory resistance to neonicotinoids.
- Contrary to the manufacturer's claims, independent research is now showing that new pesticides (such as Lumivia) might be as lethal to bees, wild pollinators, and aquatic insects as neonicotinoids.
- Despite OBA requests to the Ministry of the Environment, Conservation and Parks (MOECP) to track sales of all pesticides used on field crops, Ontario's tracking of pesticides only covers the 44,000 tons of neonicotinoid-treated seeds sold. This represents only a fraction of chemicals being introduced into Ontario soils and waterways.
- Class 12 was designed to be flexible to add other molecules, but there appears to be little or no desire on the part of the Ontario government to expand Class 12.
- Honey bee and insect pollinator health will continue to be threatened from direct and indirect pesticide exposure. The timing and severity of these effects is likely more dependent on weather and seasonal variations than regulatory action.