



RESPONSE TO HEALTH CANADA'S CALL FOR COMMENTS: "ACTION TO PROTECT BEES FROM EXPOSURE TO NEONICOTINOID PESTICIDES"

The Ontario Beekeepers' Association (OBA) thanks Health Canada's Pest Management Regulatory Agency for recognizing that "current agricultural practices related to the use of neonicotinoid treated corn and soybean seed are not sustainable." We also appreciate the opportunity to respond to the report, "Action to Protect Bees from Exposure to Neonicotinoid Pesticides" released on September 13, 2013.

We begin our comments by responding to the specific additional measures PMRA is proposing and then provide our immediate and longer-term recommendations supporting our position that removing these chemicals from agricultural use is the only effective strategy to protect bees and other wildlife in the short and long-term.

PART ONE: RESPONSE TO PROPOSED ADDITIONAL MEASURES

MEASURE ONE: *Requiring the use of safer dust-reducing seed flow lubricants.*

Our concern with this measure is two-fold. First, we have seen no independent field data that these new lubricants actually reduce the dust; and second (and more to the point), this strategy assumes that dust is the primary cause of the bee deaths experienced in 2012 and 2013.

Bees may be harmed by neonicotinoids regardless of how the chemicals are applied. While the dust generated from planting coated seeds can cause direct mortality of bees, less than 2% of the active ingredients are released through the dust during sowing.ⁱ The remainder is found in pollen and nectar and also in water and soil and are known to accumulate over an extended time periodⁱⁱ creating acute and sub-lethal exposure through the season and for seasons to come. Therefore, a reduction in dust, even at the anticipated 65% rateⁱⁱⁱ, would have limited long-term impact since neonicotinoid pesticides are systemic and appear in all parts of a plant including roots, stems, leaves, flowers and fruits, and honey bees become exposed while gathering nectar, pollen and water. According to recent research, "each corn seed theoretically has enough pesticide to kill well over 10,000 bees".^{iv} Not only are bees exposed to these neurotoxins from dust that settles on adjacent wildflowers, but the pesticide leaches from the soil in which the seeds are planted to

contaminate ponds and puddles in and around the fields that bees rely on for sources of water.^v There is also scientific evidence to indicate that plants grown in open field from coated seeds produced guttation solutions containing high levels of the neonicotinoid insecticides.^{vi} This research confirmed “that the physiological fluids of the corn plant can effectively transfer neonicotinoid insecticides from the seed onto the surface of the leaves, where guttation drops may expose bees and other insects to elevated doses of neurotoxic insecticides.” These concentration levels may represent lethal doses for bees that use guttation drops as a source of water.

Water is essential for honey bee colonies. Bees fly out from hives even in cold weather to collect water from leaves and soil. Since pesticides leach into soil, bees are able to collect and consume it from wet soil. Furthermore, it is important to note that the systemic action of neonicotinoids enables them to remain toxic within the plant for months or even more than a year.^{vii} In addition, some neonicotinoids can persist for extended periods in soil^{viii}. According to the EPA, clothianidin has a soil half-life of up to 38.5 months depending on soil types.^{ix} Health Canada, as well, states in its Regulatory Note (G2004-06) that ‘clothianidin is very persistent in soil, with high carry-over of residues to the next growing season. Clothianidin is also mobile in soil.’ Research also shows that untreated plants may take up residues of neonicotinoids still present in the soil from previous applications.^x Recent research from Quebec is also showing continued expression of clothianidin months after planting.

Research indicates that in agricultural field settings for crops that use less active ingredient per acre than corn (such as canola), when neonicotinoids are applied at currently approved rates, residues in pollen or nectar may not reach levels high enough to cause sudden death of bees. But low concentrations over a long period of time may put bees at risk. Research shows that bees experience detrimental sub-lethal effects such as changes in foraging behavior or delayed development at the residue level. As well, it’s important to stress that neonicotinoids are not separate from the other problems facing honey bees – exposure to these pesticides actually makes them worse. By compromising the bees’ immune system^{xi}, bees are more vulnerable to viruses^{xii} and find it more difficult to fight off varroa^{xiii}; by reducing their navigation skills, neonicotinoids affect the bees’ capacity to forage and communicate forage opportunities to other bees; by reducing the availability of a diversity of uncontaminated plants, neonicotinoids compromise nutrition^{xiv}.

With their environmental persistence and multiple pathways of exposure, the balance of evidence shows that the impact of neonicotinoid pesticides on bee mortality cannot be controlled only through safer dust reducing lubricants. And finally, we would like to point out that the current trend toward using mid-rate seed treatments at .5 mg active ingredient, which is double the low rate dose of .25 mg used in recent years, essentially negates any potential benefits of dust reduction.

MEASURE TWO: *Requiring adherence to safer seed planting practices.*

The OBA contends that Best Management Practices (BMP’s) and Integrated Pest Management (IPM) in the absence of policy levers are not sufficient to protect bees.

Enhanced BMP's were published by Health Canada this year, yet we continue to see the same, if not more, acute bee kills associated with the planting of neonicotinoid treated corn and soybeans. This would indicate that the BMP's do not work, they are impractical and/or that compliance is an issue.

The goal of Integrated Pest Management (IPM) is to utilize the least hazardous pest management options only when there is a demonstrated need and to take special precautions to reduce the danger to the environment. However, in Canada, neonicotinoid-treated seeds are generally applied prophylactically regardless of whether pests are present in a particular field or at levels that will lead to economic losses. Numerous studies indicate that preventive treatments like seed coatings may not result in yield benefits and can be less cost effective than other control measures.

In the opinion of Tracey Baute, Field Crop Entomologist from Ontario's Ministry of Agriculture and Food (OMAF):

"We have seen the use of neonicotinoid seed treatment evolve from being used on those acres that needed it for specific pest problems, to being used on nearly 100% of corn acres and 65% of soybean acres in Ontario. Based on my experience, only 10 to 20% of the corn and soybean acres are actually at risk of most of the soil pests on the product labels. I recognize the ease that insecticide seed treatments have provided, but they are insecticides and should be used for that purpose. Growers not fitting into the high risk factors may not need insecticide seed treatment, and should consider trying fungicide-only seed next year."^{xv}

Farmers paying the same or slightly less for neonicotinoid treated seed cannot be relied on to choose IPM vs. prevention. Current market conditions do not signal the true cost of using neonicotinoids. We understand from OMAF that the price of pesticide has been calculated at \$5 per acre or \$.03 per bushel. Neonicotinoid coated seeds are cheap insurance and there is little or no economic incentive for farmers to consider the benefits of withholding neonicotinoid treated seed in fields where it might not be needed.

MEASURE THREE: *Requiring new pesticide and seed package labels with enhanced warnings.*

We would like to point out that existing labels and Federal regulatory notes are clear about the short and long term toxicity. Poncho: "DANGEROUS FOR THE ENVIRONMENT; do not contaminate water with the product or its container; avoid contamination via drains, treated seed should not be left on the soil surface." And yet bees are still dying by the millions.

While stronger labels may clarify the toxicity and dangers inherent in the products, labels are for the most part, unenforceable. As well, the effectiveness of labels in changing behaviours are, for the most part, unknown.^{xvi} Clearly, directions such as those currently appearing on neonicotinoid products are not adhered to in actual practice, as many beekeepers can attest to and have repeatedly communicated to PMRA enforcement and registration officials.

MEASURE FOUR: *Requiring updated value information be provided to support the continued need for neonicotinoid treatment on up to 100% of the corn seed and 50% of soybean seed.*

We continue to be concerned about the increased use of neonicotinoid pesticides without a clear understanding of their need for crop production.

Although Canadian figures are not available, we know that North and South America represent 75% of the global market for treated seeds^{xvii}, a market worth \$2.3 billion in 2012. In 2003, total pounds of neonicotinoid insecticides used in agriculture in the U.S. were less than 500,000 pounds.^{xviii} By 2009, the use amounted to 3.3 million pounds, a 560% increase, which has likely increased since then. And the pesticide industry expects that this market will double in the next five years.^{xix}

Earlier in this response, the OBA pointed out our concern about the prophylactic use of neonicotinoid-coated seeds in contradiction to the principles of Integrated Pest Management. Because of application methods such as seed treatments and their long-term persistence, the use of neonicotinoids negates mitigation strategies typically employed to reduce harm to bees. Nighttime spraying, not spraying during bloom, and relocating honey bee hives simply become irrelevant to pollinator protection wherever long-residual systemic insecticides are used. IPM practices, such as pest monitoring to determine when action is appropriate, are also negated by prophylactic treatment of seeds to control pests that might not even show up.^{xx}

The OBA supports, in principle, any requirements that would increase the enforceability practices requiring proof of need, leading to reduced use of pesticides in general.

PART TWO: RECOMMENDATIONS

RECOMMENDATION ONE: The OBA asks that regulators immediately reassess the bee safety of all neonicotinoid pesticides products and suspend all conditional registrations until we understand how to manage the risks posed by these products to honey bees and other pollinators.

We believe this to be the only effective option to protect honey bees and other pollinators. It is our understanding that PMRA has the capacity to immediately suspend the use of pesticides when the strength of research supports such a decision. We believe that the balance of scientific evidence of the effect on pollinators and our ecosystems is compelling enough to warrant such an action.

RECOMMENDATION TWO: Recognize the validity of the precautionary principle as a public policy guideline to be used in the review of all pesticide applications.

The precautionary principle is established as a public policy guideline for environmental issues in Canada as described in Environment Canada's "Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada."

Canada's environmental policy is guided by the precautionary principle and is reflected in the FSDS as required by the Federal Sustainable Development Act which states that the Minister of Environment must "develop a Federal Sustainable Development Strategy based on the precautionary principle". The precautionary principle states that: "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 environmental degradation" (United Nations, 1992) In other words, the absence of complete scientific evidence to take precautions does not mean that precautions should not be taken – especially when there is a possibility of irreversible damage....Failure to act in any of these areas threatens our natural environment, society and economy.^{xxi}

Although we continue to believe that there is sufficient scientific evidence to warrant suspending the use of neonicotinoid treatments for agricultural use immediately, we also point out that the precautionary principle, in itself, is sufficient grounds for suspension.

RECOMMENDATION THREE: Improve assessment protocols for pollinator risk assessment

Risk assessment should include, at a minimum, testing of acute and chronic oral toxicity for adult and larval honey bees, bumble bees, and a solitary bee species, taking into account the cumulative and permanent nature of the effects on the insect central nervous systems. Acute contact toxicity testing should be conducted for adults of all three bee groups. Chronic exposure tests should last for the duration of bloom for each plant registered for use. Tests should also look at potential interactions and synergy between products encountered together in the field, such as the combination of neonicotinoids with adjuvant, fungicides, miticides used in honey bee colonies, or other products that are commonly used along-side insecticide treatments.^{xxii}

RECOMMENDATION FOUR: Compensate beekeepers for losses to crops, bees and equipment caused by deaths, chronic disease or toxic residues in equipment caused by the use of neonicotinoid pesticide products from the crop year 2012 and forward.

The OBA believes that these pesticides were approved without adequate independent science to support these decisions and that the Government of Canada must assume some liability related to the subsequent impact on individual beekeepers as well as the beekeeping industry. Compensation will need to cover loss of income from honey sales and pollination rentals, cost to replace bees and cost to replace equipment.

RECOMMENDATION FIVE: Independent research should be undertaken to determine threats of long-term soil, water and pollinator toxicity.

We also encourage research to better understand the effects of neonicotinoids on other pollinators such as butterflies, moths, beetles, flies and wasps. We believe more science is needed on the levels of exposure to all beneficial insects, whether through contaminated floral resources, contaminated prey, or residues in places such as soil or leaf litter.^{xxiii}

IN CONCLUSION, the Ontario Beekeepers' Association believes that without clear evidence that neonicotinoid pesticides are safe over the long-term for non-target species, the use of neonicotinoids should be removed from use on field crops.

Respectfully submitted,



Dan Davidson, President

ⁱ "An overview of the environmental risks posed by neonicotinoid insecticides.

ⁱⁱ Beyond the Birds and the Bees: Xerces Society http://www.xerces.org/wp-content/uploads/2013/09/XercesSociety_CBCneonics_sep2013.pdf

ⁱⁱⁱ This figure was provided to us informally by OMAF staff, we have not received any research results as yet.

^{iv} Hunt G. J; Krupke C.H. (2012) "Neonicotinoid seed treatment and honey bee health". American Bee Journal 152| (9): 889-891.

^v Van Dijk, Tessa C, Van Staalduinen, Marja A, Van de Sluijs, Jeroen P. "Macro-Invertebrate Decline in Surface Water Polluted with Imidacloprid." May 2013 PLOS ONE

^{vi} Tapparo A, Giorio C, MarzaroM, Marton D, Solda L, Girolami V. "Rapid analysis of neonicotinoid insecticides in guttation rops of corn seedlings obtained from coated seeds." PubMed.gov. <http://www.ncbi.nlm.nih.gov/pubmed/21509402/>

^{vii} Maus, C., G Cure, and R. Schmuck. 2003 "Safety of imidacloprid seed dressings to honey bees: a comprehensive overview and compilation of the current state of knowledge". Bulletin of Insectology 56:51-57.

^{viii} "Are Neonicotinoids Killing Bees?" The Xerces Society for Invertebrate Conservation

^{ix} EPA (Environmental Protection Agency) 2010. Pesticide Fact Sheet: Clothianidin http://www.epa.gov/opp00001/chem_search/reg_actions/registration/fs_PC-044309_30-May-03.pdf

^x Bonmatin, J. M., I. Moineau, R. Charvet, C. Fleche, M. E. Colin, and E. R. Bengsch. 2003. A LC/APCI-MS/MS method for analysis of imidacloprid in soils, in plants, and in pollens. *Analytical Chemistry* 75:2027–2033.

^{xi} "Neonicotinoid clothianidin adversely affects insect immunity and promotes replication of a viral pathogen in honey bees" National Academy of Sciences of the US. Gennaro Di Presco, et al.

^{xii} Cedric Alaux, Jean-Luc Brunet, Yves Le Conte "Interactions between nosema microspores and neonicotinoid weakened honey bees." *Environmental Microbiology*, 2010 March

^{xiii} ^{xiii} "Immune suppression by neonicotinoid insecticides at the root of global wildlife declines" http://www.gmfrecymru.org/pivotal_papers/JEIT-D-12-00001_proofs.pdf

^{xiv} A common pesticide decreases foraging success and survival in honey bees."

http://zembla.vara.nl/fileadmin/uploads/VARA/be_users/documents/tv/pip/zembla/

2011/Moord_op_de_honingbij/Bees-Pesticides-Henry-03-30-12-Science.pdf

^{xv} <http://www.omafr.gov.on.ca/english/crops/field/news/croptalk/2013/ct-0913a1.htm>

^{xvi} Overall, this suggests that although previous research efforts have shed some light on the effectiveness of warning labels, the ideal combination of factors that create the most effective warning label has yet to be identified. Argo, Jennifer J. and Kelley J. Main (2004), "Meta-Analyses of the Effectiveness of Warning Labels," *Journal of Public Policy & Marketing*, 23(2), 193-208.

^{xvii} <http://www.marketsandmarkets.com/Market-Reports/seed-treatment-market-503.html>

^{xviii} http://www.xerces.org/wp-content/uploads/2013/09/XercesSociety_CBCneonics_sep2013.pdf

^{xix} <http://www.marketsandmarkets.com/Market-Reports/seed-treatment-market-503.html>

^{xx} "Are neonicotinoids killing bees?" The Xerces Society for Invertebrate Conservation

^{xxi} "Planning for a Sustainable Future: A Federal Sustainable Development Strategy for Canada". Environment Canada, October 2010 <http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=06E31414-1>

^{xxii} "Are neonicotinoids killing bees?" The Xerces Society for Invertebrate Conservation

^{xxiii} *ibid.*