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Daynard: Critique of the Ontario Government Document on Bee Health and Use of Neonicotinoid Pesticides

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Critique of "A Proposal for Enhancing Pollinator Health and Reducing the Use of Neonicotinoid Pesticides in Ontario" – Discussion Paper by the Government of Ontario

by Terry Daynard [@terrydaynard](#), originally posted on www.tdaynard.com

On November 25, the Province of Ontario announced its intention to dramatically reduce the usage of neonicotinoid (neonic) insecticide seed treatments by farmers, the stated goal being an 80% reduction by 2017. This is portrayed as a core part of a strategy by the province to reduce over-winter bee colony losses to an average of 15%. I have reviewed a [discussion paper](#) (hereafter referred to as the document) released by the government presenting its rationale and intended plan, and I offer the following comments.

In general, the document displays a somewhat superficial understanding of floral pollination and causes of over-winter bee deaths in Ontario, provides a very imbalanced view of the relationship between neonic usage and bee well-being, and proposes solutions which are likely to create serious environmental and agricultural problems with dubious offsetting benefits. The document presents a perspective very similar to that of several prominent anti-pesticide activist organizations (NGOs) though I have not taken the time to check for exact duplications.

The following are more specific comments:

1. The Document refers repeatedly to declining pollinator numbers, but presents no supporting statistics or references to credible data sources. In fact, Statistics Canada ([here and here](#)) shows that honey bee colony numbers have increased steadily in recent years in Ontario and Canada – up by 41% in Ontario from 2009 to 2014, and by 17% for Canada. The same trend exists globally with world hive numbers increasing from about 71 million in 2000 to more than 81 million in 2003 according to [FAO statistics](#). As for wild bees, the report emphasizes declines in native pollinators, citing the [State of Ontario's Biodiversity 2010 Report](#) released by the Ontario Biodiversity Council. But that report says that, though "some species of bumble bees, like the Rusty-patched Bumble Bee found in Ontario, have experienced severe declines," the status

of most of Canada's 700 wild bee species is largely unknown. In addition, a **major recent review** by an international research team including researchers at Ottawa and York Universities stated "we show that pesticide use and habitat loss are unlikely to be major causes of decline for any of the *Bombus* [bumble bee] species examined."

2. The document appears weak in basic knowledge about pollinators, even though that is its stated primary purpose. For example, the document refers in several places to the importance of butterflies as pollinators. It talks about concerns over migrating pollinators – obviously Monarchs butterflies. But while butterflies pollinate a few wild flower species, they are not known to pollinate any farm/horticultural crop and are considered to be quite minor pollinators (**Agriculture and Agri-Food Canada**). This emphasis in the document reads like an attempt to link neonics with popular concerns about Monarchs even though no such linkage is known to exist. The inclusion of photographs of a Monarch butterfly and two of other butterfly species adds to this perception. The document also refers to a need for bee pollination services for peaches. That is simply untrue; this crop is self-pollinated and Ontario peach growers do not use bee pollination services.

3. One apparent driver for the current action by the Province of Ontario involves the 58% loss in Ontario hives in the winter of 2013/14. While this percentage is high, it is not unprecedented. Losses were **60-70%** in the winter of 2006/07 in the Niagara region. Although the document suggests that 15% loss was the norm in previous years, the literature suggests otherwise. An excellent source is **The Rise and Fall of the Honey Bee** by Borst which includes a reference to Hiemstra, Henry. (2006) *The History of Beekeeping in Ontario*, Ontario Beekeepers' Association, stating 'Winter losses of over 50% were not uncommon even before the mites.'

4. Despite public claims and suggestions of this in the document, any linkage between over-winter deaths and neonic seed treatments is completely conjectural. A **report** by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), describing the survey of 2013/14 losses is careful not to ascribe cause, though it does summarize beekeeper opinions which were no doubt influenced by an effective media campaign by activist groups blaming neonics for these deaths. Some research does indicate that sub-lethal exposure to neonics can cause subtle differences in bee behaviour. But virtually all of these results come from within-laboratory research where bees have been exposed for extended periods of time to concentrations of neonics above what bees would experience in real-world conditions. Independent reviews by leading bee experts have concluded that there are no documented effects on honeybees, bumblebees or solitary bees at field realistic doses. See **Blaquière et al., 2012** – a review of more than 1500 publications 15 years. A similar conclusion appears in the November 2014 **Update on Neonicotinoid Pesticides and Bee Health** by the Pest Management Regulatory Agency of Health Canada, and in a review by the **pesticide regulatory agency** in Australia. It's perhaps of interest that bumble bees which have been **identified** as vulnerable to sub-lethal exposure to neonics, collect **very little corn pollen**. Corn pollen has been identified as a possible source of very low level (a few parts per billion), post-planting-season exposure to neonics.

5. Missing in the document is any consideration of reasons why the divergence is so large among data on over-winter bee losses for the most three recent winters in Ontario. For the winters of **2011/12, 2012/13 and 2013/14**, the corresponding loss percentages were 12%, 38% and 58%. This is despite the fact that neonic usage for corn plus soybean seed treatment was essentially the same in all three previous cropping seasons. What was different was the severity of the three winters ranging from very mild (2011/12) to very severe (2013/14). Many Ontario beekeepers say that many hives perished in late winter/early spring of 2014 simply because they ran out of within-hive food supplies. Some beekeepers made a special effort to replenish hive food supplies in late winter and were rewarded by lower hive losses. All of this is largely missing in the document – in favour of a focus on neonics.

6. Dr. Ernesto Guzman, a University of Guelph bee researcher, and his colleagues have **shown** that about 85% of over-winter bee deaths in Ontario can be attributed to varroa mites. Unfortunately, this fact is effectively missing from the document – indeed, varroa mites are not even mentioned in the section called Honey bee over-winter mortality. (Varroa mites are listed along with other bee pests/diseases in a much later section.) Varroa are considered to be the reason why honey bees can no longer survive in the wild in Ontario; feral colonies die quickly from varroa infestation according to Ontario bee researchers. Also largely missing from the document is recognition of how difficult and complicated successful varroa mite management really is. For many beekeepers, excessive usage of older miticides such as Apistan (fluvalinate, a pyrethroid) and Coumophos (an organophosphate) led to mite resistance. Most beekeepers now use Apivar (amitraz) and/or formic acid, for mite control. These pesticides which beekeepers place within hives are themselves quite toxic to bees if not managed properly. This is especially so for formic acid applied in various forms which can be a major contributor to bee deaths if temperature and other conditions are not proper.

7. The document contains only a casual reference to bee viruses, noting correctly that varroa mites are effective agents for viral transmission, but stating that they "are not typically understood to be primary drivers for colony death." The scientific community suggests otherwise. The authors of the document seem unaware of recent survey data for Canada, including Ontario, done by the University of Manitoba showing that close to 100% of sampled hives were infected with the Deformed Wing Virus (DWV) (Dr. Suresh Desai, personal communication). DWV has been directly linked to high winter losses of bees. The attribution of bee viral disease symptoms to neonicotinoids has caused much confusion among beekeepers. For references see **here**, **here** and **here**. A good general reference is Currie, R.W., Pernal, S.F., and Guzmán-Novoa, E. (2010). "**Honey bee colony losses in Canada**."

8. The document describes the need for increasing shipments of bees from Ontario to Atlantic Canada and Quebec for pollination of blueberries and other crops. This now represents about **one-quarter of Ontario hives** at the present time. Unfortunately, the document ignores the major negative effect which this has on bee survival. Industry sources say a mortality rate of 15% is common for these shipments. Bee and blueberry crop experts in Atlantic Canada say that both the transportation process and the inadequate nutrition provided by blueberry flowers can be extremely hard on bees returning to Ontario. Professional beekeepers say they must devote the rest of the summer to a process of trying to rebuild bee health so as to reduce subsequent over-winter losses. Some commercial beekeepers do not ship bees east for pollination purposes, stating that this is the reason for their much lower over-winter losses. Importantly, the shipment of bees from Ontario to Atlantic Canada only began in the early 2000s, about the time that average over-winter bee death percentages rose in Ontario, but this linkage is ignored in the document. Incredulously, the document projects a reduction to overwinter losses of 10-15% in Ontario while simultaneously increasing long-distance shipments of bees for pollination services. This is highly contradictory.

Worth noting, too, is the fact that some large Ontario beekeepers who ship bees east for pollination purposes make no attempt to collect honey from the returning hives all summer long – concentrating fully on attempting to rebuild colonies before the following winter. This is one major reason why average honey production per hive has often declined in Ontario in recent years. However, honey production was up 29% in 2014 over 2013 (reference: [Statistics Canada](#)). Perhaps Ontario honey bee colonies were not as weakened in 2014 as portrayed in the document.

9. The Document refers to survey data provided by PMRA but this information is presented in a somewhat mischievous manner, and includes no recognition of **2014 findings**. It is true that the most recent report from PMRA was not released formally until November 25, the same date as the release of the Ontario government document. However, the data and much of the other information in the PMRA report have been presented publicly by PMRA staff on several occasions in recent months. In addition, one would expect that provincial officials would have consulted frequently with PMRA before releasing a major provincial document on pesticide usage. The 2014 report of PMRA shows that although most reported bee deaths in Ontario in 2012 occurred during the spring corn planting season, that was not so apparent in 2013. And in 2014, about 75% of reported deaths (72% of these from only three beekeepers) occurred after the end of the spring planting season. Although PMRA concludes that neonic-laden dust escaping from certain types of corn/soybean planters was a significant factor with acute bee deaths at spring time, the agency also says available data show no demonstrable linkage between neonic usage/exposure and bee deaths thereafter. Further, PMRA noted that reports of seeding-time bee mortality were down 70% in 2014, a fact that the agency says may be related, at least in part, to measures taken by farmers and the seed industry to reduce seeding-time emissions (new “fluency” agent, “dust deflectors,” etc.). Essentially all of this information is missing from the document, in favour of a targeted focus on neonics.

10. The PMRA review makes reference to the extensive use of neonic seed treatments for canola production in Canada, including Ontario. About 80% of Canadian seed treatment involves canola with the per-acre rate of application of neonic application being about the same with canola as with corn. However, PMRA has received no claims of bee mortality associated with neonic-treated canola crops. European research summarized by the European Food Safety Agency (EFSA, references [here](#), [here](#) and [here](#)) shows that the potential bee floral exposure to neonics is about 10 times higher with oilseed rape (equivalent to canola) flowers as with corn pollen. University of Guelph researcher Dr. Scott-Dupree and Dalhousie University researcher Dr. Cutler, in two recent major research papers ([here](#) and [here](#)), found no effect of canola-neonic-seed treatment on bee mortality. There is further discussion [here](#) on corn-canola comparisons. It is disappointing that this very major anomaly is ignored in the document – surprising since this has been a matter of major public discussion among beekeepers and farmers in Ontario for many months.

11. The document contains high-profile reference to reports from a group called the International Union for Conservation of Nature (IUCN) Task Force on Systemic Pesticides. In fact, this is an international group of activist scientists known for their opposition to pesticides, and the evidence seems clear that their approach (including a high-profile news conference organized for them by several multinational NGOs in Ottawa in July) was part of a well-designed scheme designed to discredit neonic insecticides. This scheme has received major condemnation. For more detail, see [here](#), [here](#), [here](#) and [here](#). The group claims to have checked 800 literature citations on neonics. (The document says they were all peer-reviewed, but a review of the citations shows this is not correct.) Bias in interpretations of the literature is as relevant as number of publications reviewed, and the IUCN group has a definite bias and agenda. Despite that, it is reasonable for reports of the IUCN group to have been considered by the Province in drafting the document. But to have this as about the primary cited source of scientific information seems irresponsible. The other cited source is even worse, the US-based Center for Food Safety (CFI), generally known for its highly negative view to large corporations and many forms of modern technology including pesticides. (See [here](#) for example.) At the same time, authors of the document ignored published reports (see [here](#) and [here](#)) of a highly qualified panel of global experts assembled by the US EPA in 2012, in cooperation with PMRA, to examine risks, including pesticide risks, to pollinators. To cite CFI but not the EPA-PMRA materials or the review of Blacqière et al can only be classed as irresponsible ‘cherry picking.’

12. The document states, “The potential for carryover of residues may be of concern since these may be transported through run-off from fields to nearby water bodies,” apparently based largely on the work of a researcher at the University of Saskatchewan associated with IUCN. But her conclusions about ecological harm have been questioned/doubted by other Canadian researchers ([reference](#)) and the concentrations she **measured** were generally in the range of 0-50 parts per trillion (far below concentrations known to harm bees).

13. Totally ignored in the document is the widespread usage of neonics for flea control on household pets. This omission is hard to understand if neonics are as dangerous as portrayed in the featured IUCN reports.

14. It’s also puzzling that the document makes reference to data provided by the US EPA questioning the benefits of neonic seed treatment to soybean growers, while completely ignoring relevant data from Ontario, including tests done by staff of the Ontario Ministry of Agriculture, Food and Rural Affairs. The Ontario data generally show a consistent yield advantage with neonic seed treatment. There is **credible information** showing that the EPA conclusion may not be accurate for the United States, as well. Under PMRA regulations governing pesticide registration, a pesticide cannot be registered for Canadian usage unless it has proven ‘efficacy,’ i.e., agronomic benefits in yield and/or the management of harmful pests. In fact, the document contains essentially no reference to any published documentation on the benefits of neonic seed treatment to agriculture and Ontario (i.e., local) food production. The document ignores a major recent **report** by the Conference Board of Canada which calculated that benefit may be worth \$630 million annually to Ontario agriculture. These omissions suggest that the intent of the document is to emphasize only negative aspects of farm (though not urban) neonicotinoid usage.

15. The document also contains no consideration of the environmental implications of alternative practices which farmers will be obliged to employ if denied reasonable access to the use of neonic-treated seeds. Experience from Europe seems relevant. Various reports from there including **one** by the Home Grown Cereal Authority (an agency of the Government of the UK) have documented both crop losses experienced by the loss of crop neonic seed treatments and the shift by farmers to the use of other, generally more toxic alternatives such as pyrethroids. There are anecdotal reports of farmers applying insecticides up to five times with field sprayers in an attempt to manage insect pests which were formerly controlled by neonicotinoid seed treatments. In September 2014, the UK **permitted emergency registration** of two new neonic spray treatments to allow farmers to counter the damage created by the neonic seed treatment ban. A shift to pyrethroids is also **occurring** with corn production in France, and it seems reasonable to expect that this will be a likely outcome with the intended process in Ontario.

16. The review of what is happening in other jurisdictions is far from complete and very one-sided. The decision by the European Union to institute a two-year moratorium on neonic seed treatments was opposed by several countries including the United Kingdom. The pesticide regulatory agency in Australia released a major report noting that although neonic seed treatments are used extensively in that country, there has been no notable effect on bees. A common explanation for the colony losses in Australia is that varroa mites have not yet infected their bees. Finally it's worth noting that the Ontario approach goes well beyond what has been introduced in Europe: the European moratorium is for only two years, after which the EU will assess the extent to which this action has proven beneficial to bee health. No such time-limited approach is proposed for Ontario.

17. The two-fisted approach proposed in the document may work for farmers who have persistent problems with insect damage to planted seeds and seedling plants, even though the process seems excessive: it requires both farmer training and expert approval (a bit like having to take a course in alternative medicine before a patient gets a prescription from a medical doctor for an infection). However, the proposed approach will not work when the insect problem is more sporadic and/or unanticipated, as is often the case. In addition, farmers generally make their choices on crop varieties to grow and seed treatments to be used many months before planting. This allows the seed industry to provide the seeds needed before time of planting – not a small task.

If the anticipated insect problem is known many months in advance, this is manageable, but if it only becomes apparent a few days before planting, the only apparent option is for seed companies to provide excess supply of treated seed in the event of this occurrence. The net effect will likely be added expense for the seed industry, higher costs for farmers, and a reduction in the number of varieties offered for sale to farmers in Ontario – all compared to neighbouring and competitive jurisdictions. And of course, if the insect problem does not become apparent until after planting, seed treatment is not an option for control and spray applications and crop losses will follow – just as is now happening in Europe. The document is silent on compensation to farmers for these added costs and crop losses. The expected response for many Ontario corn and soybean farmers (especially the former) will be to opt for banded insecticide applications just as is now happening in France. This is a step back – to using the more risky technologies which were used before neonic seed treatments were introduced.

Curiously, while the document details a need for farmer training on integrated pest management (IPM), it is silent on a similar need for beekeepers for mite control. This would see especially important given the speed at which mites develop resistance to pesticides, the propensity of miticides to kill excessive numbers of bees when not used properly, and the incomplete registration status of some product(s) used.

Bottom Line:

This document will be well received by those groups and individuals who see pesticide bans as a desirable objective regardless of costs and benefits to farmers. It is far less satisfactory to those who want regulatory decisions based on sound science rather than advocacy or political expediency. The proposed actions will lead to higher costs of production and greater crop losses for Ontario farmers compared to competing farmers in adjacent jurisdictions. The document weakens the credibility of the Government of Ontario and its professed intent to improve agri-food competitiveness and productivity in the province. This is the second time this government has imposed a ban (or de facto ban) on pesticide usage in Ontario in defiance of good science. The document refers repeatedly to the need for a precautionary approach, apparently mimicking some European jurisdictions which use this to justify actions when there is limited or no scientific rationale. But proper use of this approach requires consideration of the known risks as well as the unknown benefits of a proposed action – something which clearly has not been done in the present document. It also will lead Ontario farmers and agriculture and other citizens and industries to question what will be the next targets for this selective, activist-driven approach.

And, given the document's focus on neonicotinoid insecticides despite the lack of any linkage other than conjectural to over-winter bee mortality, this expensive exercise by itself is unlikely to result in any notably improvement in bee mortality in Ontario.

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