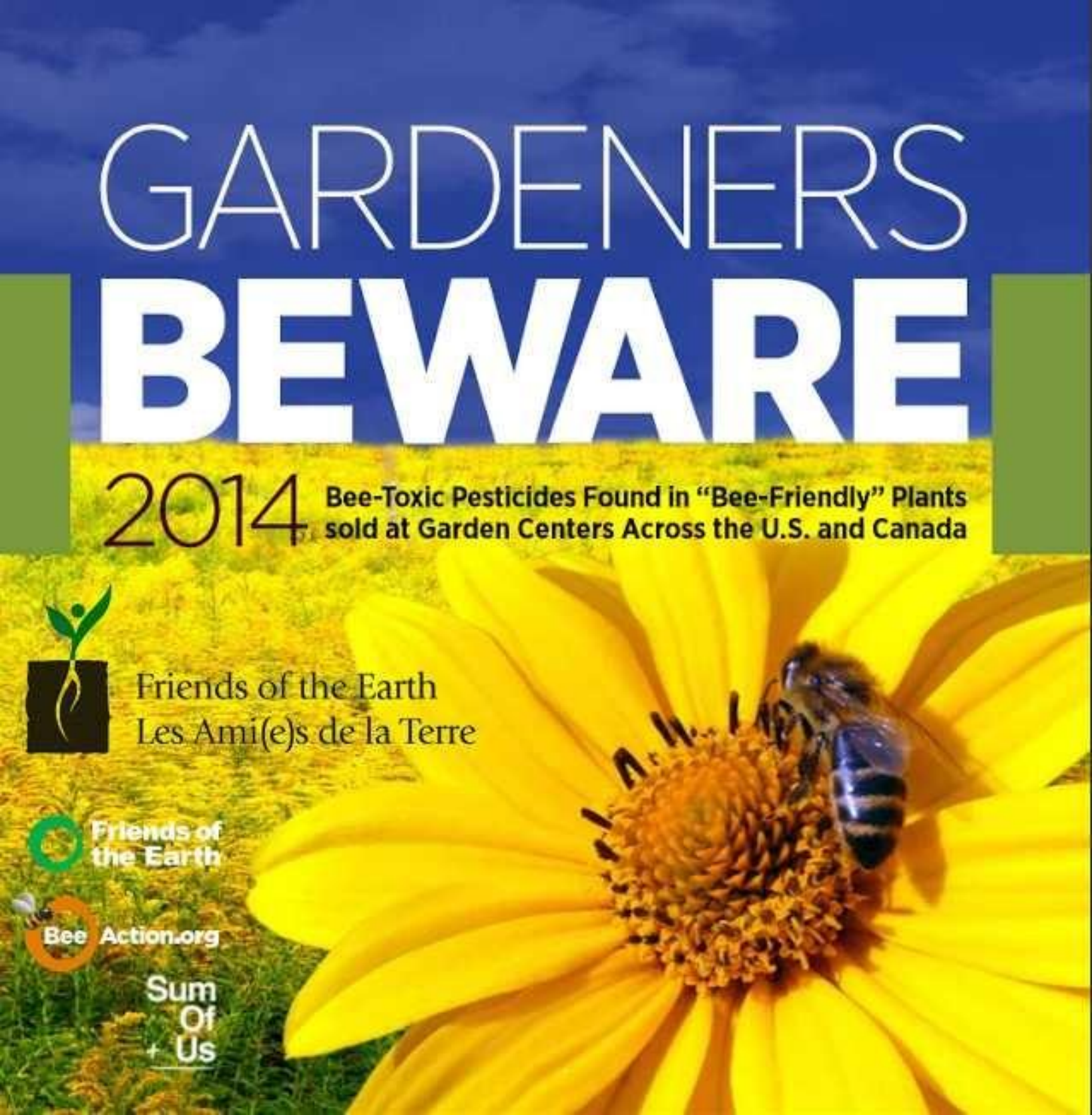
GARDENERS BEWARE

2014

Bee-Toxic Pesticides Found in "Bee-Friendly" Plants sold at Garden Centers Across the U.S. and Canada



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Overview

Two-thirds of the food crops humans eat everyday require bees and other pollinators to successfully produce a crop. However, the health and productivity of honey bees, bumble bees, and other pollinators are in great peril, and populations are dwindling worldwide. Concerned citizens have responded by planting "bee-friendly" gardens to provide urban foraging grounds. Unfortunately, as our new study shows, many of the nurseries that provide bee-attractive plants sold at top retailers in the U.S. and Canada continue to use persistent, systemic neonicotinoid insecticides that have been shown to impair the health and survival of bees and other vulnerable pollinators.

Although managed honey bee losses have been linked to multiple factors—including *Varroa* mite infestations, pathogens, malnutrition and habitat degradation—a strong and growing body of scientific evidence suggests that neonicotinoid pesticides are a major contributing factor. Neonicotinoids, manufactured primarily by Bayer CropScience, Syngenta, and Dow AgroSciences, are used extensively in agricultural and urban/suburban areas. The neonicotinoid imidacloprid—introduced in 1994—is the most widely used insecticide in the world. Neonicotinoids are used as seed treatments on more than 140 crops, with virtually all corn, and a large percentage of soy, wheat, and canola seeds planted in the U.S. being pretreated with neonicotinoids.

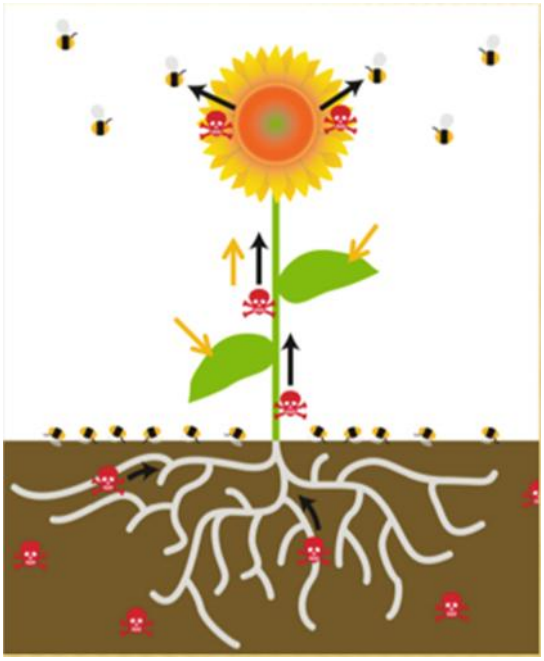
Neonicotinoids are systemic pesticides that are taken up through roots and leaves and distributed throughout the entire plant, including pollen and nectar. These pesticides can poison bees directly, but even low-level exposure can lead to sublethal effects such as altered learning, impaired foraging and immune suppression, which exacerbates the lethality of pathogen infections and mite infestations. Unfortunately, home gardeners have no idea they may actually be poisoning pollinators through their efforts to plant bee-friendly gardens.

The plants included in this new study were purchased from major nursery outlets and garden centers, including Home Depot, Lowe's and Walmart in 18 cities throughout all four official geographic regions of the U.S., as well as three provinces of Canada. The collected plant samples were submitted to an independent accredited analytical laboratory to identify specific neonicotinoids and quantify their concentrations in the flowers alone versus the stems and leaves.

Findings include:

- Neonicotinoid residues were detected in 36 out of 71 (51 percent) of commercial nursery plants. In the samples with detections, the combined concentrations of bee-toxic neonicotinoids ranged from 2 to 748 micrograms per kilogram (µg/kg) in flowers and 2 to 1,945 µg/kg in stems and leaves.
- In approximately half of samples with detections, the neonicotinoid residues were distributed evenly between flowers and stems/leaves or were localized primarily in the flowers. This result suggests that bees are being exposed to neonicotinoids through contact with contaminated flowers and ingestion of pollen and nectar within the flower.
- Since 51 percent of the plants that were tested contained neonicotinoid residues, the change of purchasing a plant contaminated with neonicotinoids is high. Therefore, many home gardens have likely become a source of exposure for bees.
- For the samples with positive detections, adverse effects on bees and other pollinators consuming nectar and pollen from these plants are possible, ranging from sublethal effects on navigation, fertility, and immune function to pollinator death.

Although Health Canada's Pesticide Management Regulatory Agency (PMRA) has not yet taken action, there is still much that can be done to protect bees. Friends of the Earth and allies are asking consumers, retailers, suppliers, institutional purchasers and local, county, state and federal regulators and policymakers to take action to avoid neonicotinoid pesticides to help protect bees and other pollinators.



Neonics are systemic pesticides are absorbed from the soil by the roots and transported to other parts of the plant

How the Study Was Done:

In each location, pollinator-friendly flowering plants were purchased for neonicotinoid residue analysis. Only soft-stemmed (non-woody) flowering plants known to attract both pollinators and pest insects (aphids, etc.) were selected for this study.

Flowers were trimmed first, followed by the stems and leaves. Samplers cleaned their scissors and changed gloves and surface protectors between samples to minimize cross-contamination.

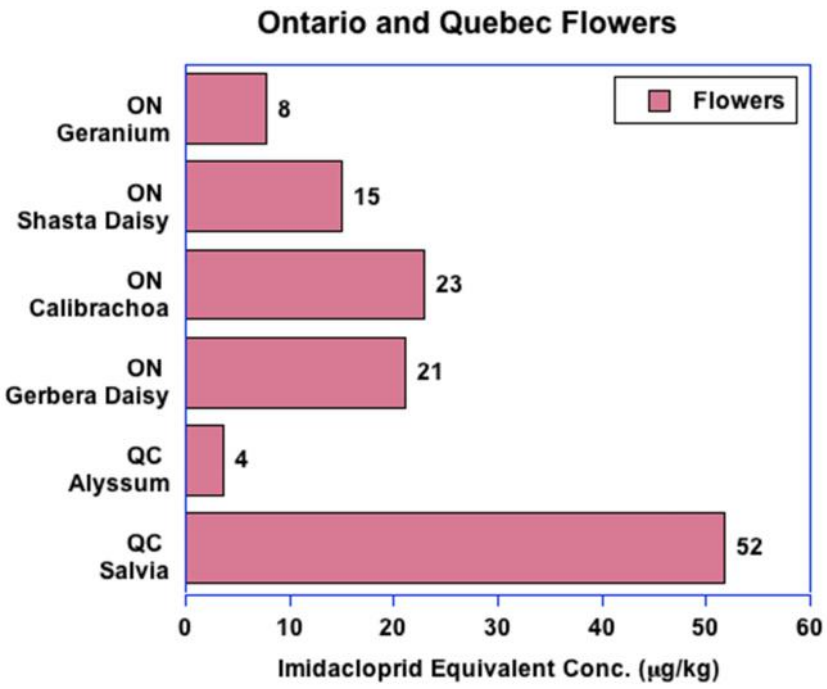
All flowers and emerging buds were cut at the base of the flower head (where the flower joins the stem) and packaged together for neonicotinoid residue analysis in flowers. Likewise, the remaining plant material was cut at the base of the stem, above the roots and level of soil, and packaged together for residue analysis in the stems and leaves.

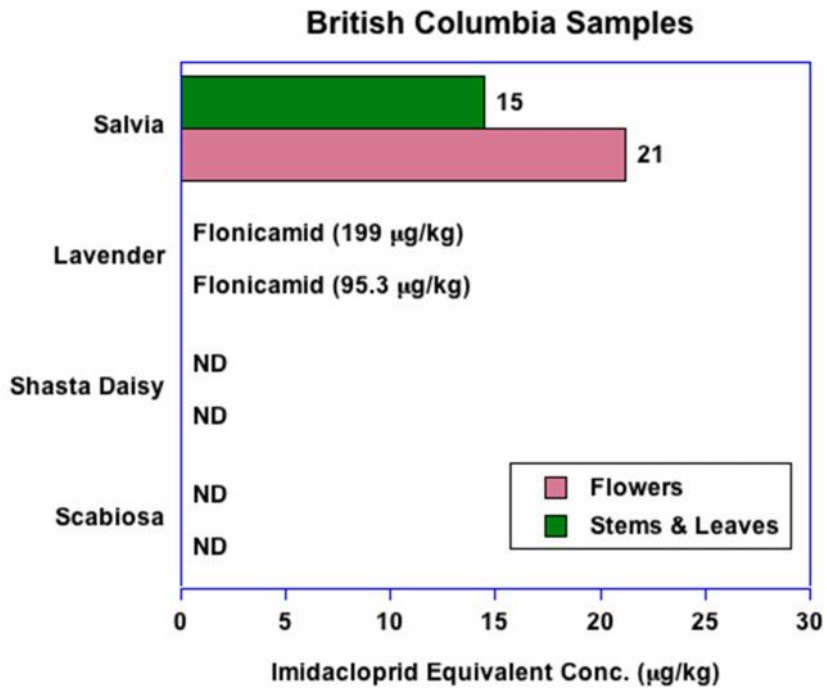
An accredited analytical laboratory performed the sample extractions and subsequent neonicotinoid residue analysis using AOAC method 2007.01. Prepared samples were analyzed for neonicotinoid active ingredients (acetamiprid, clothianidin, dinotefuran, flonicamid, imidacloprid, thiacloprid and thiamethoxam) and degradation products (6-chloronicotinic acid, clothianidin MNG, clothianidin TMG, clothianidin TZMU, clothianidin TZNG, 5-hydroxy imidacloprid, imidacloprid des nitro HCl, imidacloprid olefin, imidacloprid olefin des nitro and imidacloprid urea) with detection limits ranging from 1–50 µg/kg.

Flower and greenery sub-samples for each plant sample were individually packaged before shipping to the lab.

Results

Based on the analysis of flowers, stems and leaves; 36 out of 71 (or 51 percent) of the whole plant samples in the study tested positive for one or more neonicotinoid insecticides.



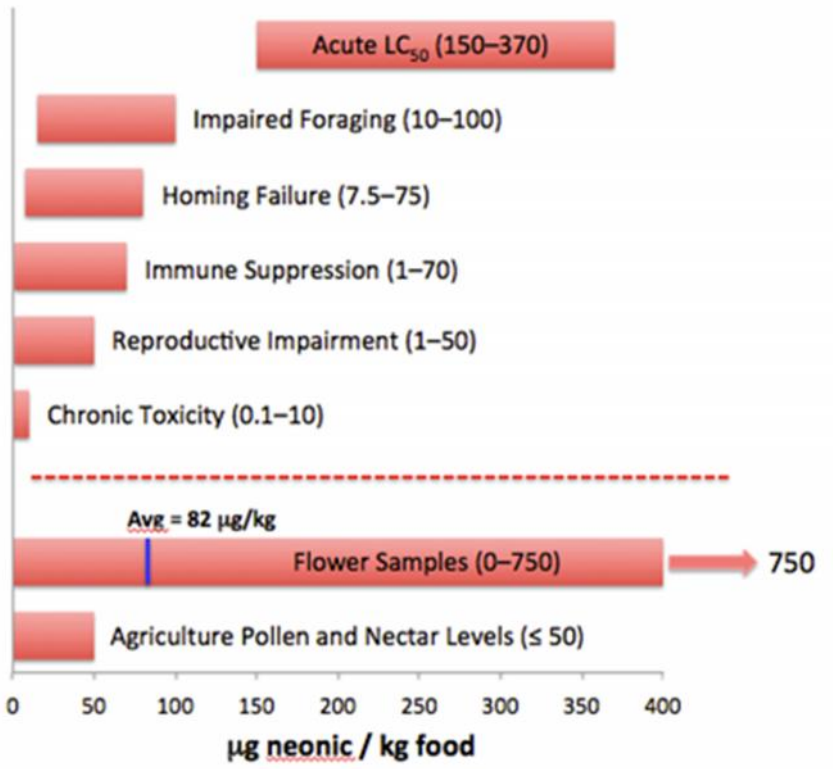


Results by Location:

Location	Sample Type	Sub-Sample	List of Chemicals and Concentrations («g/kg)
BC	Shasta Daisy	Flower	ND
		Stems & Leaves	ND
	Lavender	Flower	Flonicamid (95.3)
		Stems & Leaves	Flonicamid (199)
	Salvia	Flower	Imidacloprid (21.2)
		Stems & Leaves	Imidacloprid (14.5)
	Scabiosa	Flower	ND
		Stems & Leaves	ND
ON	Calibrachoa	Flower	Imidacloprid (9.5), Thiamethoxam (17.2)
	Gerbera Daisy	Flower	Imidacloprid (13.7), Thiamethoxam (9.4)
	Shasta Daisy	Flower	Imidacloprid (6.6), Thiamethoxam (10.7)
	Zonal Geranium	Flower	Thiamethoxam (9.9)
QC	Alyssum	Flower	Imidacloprid (2.7), Imidacloprid 5-hydroxy (38.3)
	Apache beggarticks	Flower	ND
	African Daisy	Flower	ND
	Salvia	Flower	Imidacloprid (51.8)

Concentration Levels:

Neonicotinoids are highly toxic to honey bees and bumblebees, but even at low doses they can impair colony health. Concentrations of neonicotinoids are given in micrograms of pesticide per kilogram of food (µg/kg = parts per billion). The homing failure range is based on honey bee exposure to imidacloprid or thiamethoxam. The reproductive impairment range is based on bumble bee exposure to imidacloprid or clothianidin. All other studies are based on imidacloprid exposure. Chronic toxicity refers to increased bee mortality associated with long-term, low-level exposure. Since 2013, the concentration ranges in this graphic have been updated with data from recent open literature



Concentrations of neonicotinoids associated with effects on bees

Recommendations:

Recommendations for Consumers:

- **Take Action Canada:** Join the Friends of the Earth Canada campaign – take part in The Bee Cause work (www.BeeCauseCanada.org) and sign the petition to influence garden centres in Canada to stop selling neonicotinoid treated plants.
- **Raise Your Voice Locally:** Let your local nursery manager know that you will only purchase plants free of neonicotinoids and ask the manager to communicate your request to their corporate headquarters and suppliers who grow the plants they sell. For a sample letter for Candian companies, visit the FOE Canada website at www.BeeCauseCanada.org.

- **Grow Bee-Safe:** Avoid buying neonicotinoid-treated seeds and seedlings. Purchase organic plant starts or grow your plants from untreated seeds in organic potting soil for your home vegetable and flower gardens.
- **Practice Bee-Safe Pest Control:** Avoid the use of systemic bee-toxic pesticides in your garden (see Appendix A) and use alternative approaches such as providing habitat to attract beneficial insects that prey on pest insects in your garden. If pest pressure is too high, use insecticidal soaps or oils and other eco-friendly pest control products. For more tips and links to more resources for pollinator and eco-friendly gardening, visit www.BeeCauseCanada.org and www.garden4bees.com.
- **Do not buy products that contain neonicotinoids:** Read the label and avoid using off-the-shelf neonicotinoid insecticides in your garden. These products may contain acetamiprid, clothianidin, imidacloprid, thiamethoxam and dinotefuran as active ingredients. See Appendix A at the end of this report for a list of common consumer products containing neonicotinoids.
- **Do a clean sweep:** See if you have these products at home, dispose of them as municipal hazardous waste or take them back to the store where you bought them.

Recommendations for Home Gardeners and Institutional Purchasers (such as schools, universities, private companies, hospitals, and others):

- Stop using all neonicotinoid insecticides on your property and facilities (e.g. landscaping around parking lots, grounds and gardens) and only plant neonicotinoid-free plants.
- Specify in contracts with landscaping companies that service your grounds and trees not to use neonicotinoid insecticides and not to install plants pretreated with neonicotinoids.
- Provide critical habitat for pollinators by planting pollinator friendly trees and flowers.

Recommendations for Garden Retailers:

- Do not sell off-the-shelf neonicotinoid insecticides for home garden use.
- Require neonicotinoid-free vegetable and bedding plants from suppliers and do not sell plants or plant starter mixes pre-treated with these insecticides.
- Offer third-party certified organic starts and plants.
- Educate your customers on why your company has made the decision to protect bees and other pollinators.

Recommendations for Wholesale Nursery Operations Supplying Retailers:

- Use only untreated seeds for plants grown from seed.
- Do not use neonicotinoid insecticides as soil drenches, granules, or foliar treatments when growing vegetable and bedding plants.
- Offer neonicotinoid-free and organic vegetable and bedding plants to your customers and label them as such.
- Educate your customers about why your nursery operation made the choice to limit the use of neonicotinoid pesticides.
- If quarantine regulations require use of systemic insecticides on certain plants that are hosts for invasive pests, treat only those plants, minimize the number of treatments and label treated plants accordingly. Do not use neonicotinoids if less toxic systemic pesticides are approved for use on the target pest. Use pest exclusion systems wherever possible to avoid having to treat plants with pesticides.

Recommendations for Health Canada's Pesticide Management Regulatory Agency (PMRA):

- Suspend the registrations and temporary registrations of neonicotinoid pesticides in both agriculture and minor use pending the results of the PMRA re-evaluation.

Recommendations for Canadian Provinces:

- Enact an immediate moratorium on the sale of neonicotinoid-treated seeds on field crops as well as for minor use in horticulture in each respective province pending the results of the PMRA re-evaluation of neonicotinoids.

You can download the full report, Gardeners Beware 2014, visit BeeCauseCanada.org.