

The Use of Neonicotinoids at the Chicago Botanic Garden

Overall Goal

The Chicago Botanic Garden is committed to using the most environmentally safe and efficient methods of pest control to keep the plants in its care healthy, to maintain the beauty of the Garden, to safeguard staff and visitors, and to promote practices that sustain biodiversity.

Chicago Botanic Garden History

For over 30 years, the Chicago Botanic Garden has cared for the health of its living plant collection through a comprehensive plant health care (PHC) program focusing on “Best Plant, Best Location, Best Care.” It begins with proper plant selection and placement and includes a strong focus on cultural (maintenance) practices. Within the PHC program, the Garden instituted an integrated pest management (IPM) approach over 35 years ago to manage plant pests such as insects and diseases. This program involves vigilant plant monitoring and managing pest populations at a tolerable level with methodology that is least intrusive on the environment. Alternative methods (such as pruning off diseased plant parts, washing off pests, or releasing predatory insects), rather than chemical methods, are used whenever possible. The goal of these programs is to minimize negative effects on the environment while achieving the desired goal of plant health for the Garden’s living plant collection. The Garden always strives to use the least amount of any type of pesticide, whether synthetic or organic. Pesticides are used on a limited basis to achieve the desired goals, including an insecticide class called neonicotinoids.

Background: Pesticide Evolution and Neonicotinoids in the United States

Over the years, pesticides have evolved and have become safer for people and the environment. The use of any pesticide may have potential negative environmental consequences that must be understood and managed. Unfortunately, the negatives are often discovered after the fact. In the 1960’s, DDT, an organochloride insecticide, was widely used and later banned because of safety concerns and negative environment impacts. Organophosphate and carbamate insecticides types replaced them, and in the mid-1990’s pyrethroid and neonicotinoid types began replacing them for the same reasons. Neonicotinoids are much less toxic to vertebrates, low-risk to humans and other mammals, especially when compared to the organophosphate and carbamate compounds that they have partially replaced. Their use has also increased because of effectiveness and ease of application. The U.S. EPA has classified some types of neonicotinoids as Reduced Risk Pesticides. Reduced Risk Pesticides, as defined by the EPA, are a better choice because of their low impact on human health, lower toxicity to non-target organisms, low potential for ground water contamination, low-concentration formula rates, low pest resistance potential, and compatibility with integrated pest management practices.

Neonicotinoids are a class of insecticide chemically related to nicotine. Neonicotinoids are primarily soil applied and move systemically throughout the plant. This method of application avoids non-target drift associated with open sprays. There are many different types of neonicotinoids; imidacloprid is the most commonly used neonicotinoid and can be found in some garden centers for homeowner use, and is one of the longer lasting neonicotinoids.

Because of their ease of application and other benefits compared with previous pesticides, neonicotinoid insecticide use has been greatly increasing worldwide since being introduced and it is currently the most widely used group of insecticides globally. Primarily used in the agriculture industry, neonicotinoid use also spans forestry, horticulture, and even the treatment and prevention of fleas in cats and dogs and termites in wood structures.

In the agriculture industry, neonicotinoids are commonly applied as a seed coating to protect crops from a broad range of insect pests. This seed coating is applied proactively and allows the insecticide to systemically move through the plant as it grows and protects the plant from potential insect feeding, whether actually needed or not.

However, the impact of many years of aggressive and excessive agricultural use of neonicotinoids has now led to negative environmental impacts. Many scientific studies have resulted in highlighting the following concerns:

- the negative effects on pollinators and beneficial insects;
- the persistent chemical residual in plant, soil, and water; and possible movement throughout the ecosystem;
- the chemical reaching non-target plants growing near treated plants.

Neonicotinoids at the Chicago Botanic Garden

As a result of negative environmental impacts of neonicotinoids, the Garden has greatly reduced their use in both its Plant Production area and throughout its display gardens and natural areas. The three remaining types of trees currently treated with neonicotinoids are: white-barked birches for bronze borers; elms in high public use areas adjacent to the Regenstein Center for leaf beetles and flea weevils; and a few rare ash trees (too small for injection with Tree-age, which is not a neonicotinoid) for emerald ash borers. Use on ash will end in two years, when the trees have grown enough. Neonicotinoids are also selectively used to control unusual outbreaks of insects that threaten the life of a plant or group of plants. They will not be used on insect pollinated plants. Neonicotinoids comprise less than 2% of the total Garden pesticide use.

As with any pesticide, understanding all of the possible negative effects is key for safe, effective, and responsible use. The Garden recognizes the concerns with neonicotinoids and uses them only when necessary within its integrated pest management program. Neonicotinoids will only be used on a very limited basis when the impacts are deemed safer to the environment than other treatments, mainly to replace conventional cover sprays of strong insecticides that have large-scale impact on the surrounding environment, including non-target insects, staff, and the public. As with all pesticides, the Garden strives to annually decrease usage.

Chicago Botanic Garden Position on Neonicotinoids

The Garden's position on neonicotinoids is:

- Neonicotinoids will not be used on any species of plants in the living plant collection that are insect pollinated.
- Plants that are generally known to have serious insect pest concerns that may require the use of a neonicotinoid will not be added to the collection (e.g. birches, ashes).

- Birch and elms currently planted in key Garden areas will be allowed to live out their lifespan (birch 20-30 years, elms 40-50 years), and then will be replaced with different trees. Birches are currently a signature tree in the Garden's landscape and a part of the view looking out of the Regenstein Center. The elms on the Esplanade and near the Regenstein Center are in areas used heavily by visitors.
- The Garden will not use neonicotinoids in Plant Production on plants such as annual flowers that are destined for outdoor gardens. They will continue to be used on plants for indoor use (e.g., poinsettias), because neonicotinoids are safer for our staff and the public than alternatives and pollinators are not found indoors. Once treated with neonicotinoids, these plants will not be used outdoors.
- The Garden will use a neonicotinoid in one-time applications in special emergency situations, such as severe outbreaks of a pest (e.g., scale on a bonsai plant, a mealybug explosion in the greenhouses) when quick action needs to be taken and the life of the plant is threatened. All before mentioned criteria and concerns will guide the final decision to use (or not) in an emergency situation.
- The Garden will continue to evaluate the use of neonicotinoids and experiment on how to further reduce future usage. The Garden will keep abreast of new research findings on neonicotinoids.
- The Garden will continue to educate and inform the public and green industry professionals on the environmental concerns with neonicotinoid usage and will be a role model for safe, appropriate usage.

More information may be found in the Garden's Plant Health Care Department Mission Statement and Policy.

6/1/15