Products containing imidacloprid for use in greenhouses and nurseries have been classified "Restricted Use" in New York State

Imidacloprid: Best Management Practices for Long Island, New York

Greenhouses and Nurseries

CORNELL Cooperative Extension of SUFFOLK COUNTY

New York State Department of Environmental Conservation

BAYER

Bayer CropScience

Best Management Practices
For Use of Marathon® Insecticides in Greenhouses and Nurseries on Long Island, NY

Introduction

Imidacloprid-based insecticides have been available to the New York commercial agricultural industries since the mid-1990's. For greenhouse and nursery use, the product is sold under the trade name Marathon® in three formulations: Marathon® 1G, Marathon® 60WP and Marathon® II (2F). These products have become especially important in greenhouse production and are highly effective for control of difficult-to-manage species such as silverleaf (formerly sweetpotato strain B) and greenhouse whiteflies, green peach and melon aphids. Imidacloprid has largely replaced several other insecticides formerly used to control these species, some of which are no longer available, were less effective, have higher mammalian acute toxicity[1] and/or pose a greater risk of phytotoxicity (plant injury).

Imidacloprid is highly systemic in plants when applied to the root zone, offering weeks to months of efficacy. In some cases, such as in poinsettia production, a single treatment of the growing medium has replaced six to eight foliar sprays over the life of a crop, representing a significant savings in labor costs and simplification of an otherwise difficult and unpleasant job. Marathon® products have relatively short 12-hour re-entry intervals (REI) following application, which generally are acceptable in greenhouse and nursery production systems. There have been almost no reports of plant injury to even normally sensitive greenhouse ornamentals when used as a foliar spray or a media treatment.

The majority of imidacloprid applied in commercial production of ornamental plants on Long Island is used in greenhouses as a growing medium-applied systemic ('systemic' uses') for aphid and whitefly control, mostly with the granular formulation (1G) and limited use of drench formulations (60WP, 2F). It has particular value for overhead hanging baskets where spray applications are difficult. Care is necessary when watering plants to avoid leaching material out of treated pots and to provide best results. The spray formulation (2F only) is also used occasionally for whitefly and aphid infestations, especially for plants near the time of sale. Very little imidacloprid is used in nursery field and container

production, although there are several important uses for container-grown plants such as media treatments for root aphids, white grubs or Japanese beetle adults or as a foliar spray for aphids.

According to the Extension Toxicology Network Pesticide Information Profile for imidacloprid[2], "There is generally not a high risk of groundwater contamination with imidacloprid if used as directed. The chemical is moderately soluble, and has moderate binding affinity to organic materials in soils. However, there is a potential for the compound to move through sensitive soil types including porous, gravelly, or cobbly soils, depending on irrigation practices." Soils or subsoils around much of Long Island are generally well-drained, sandy or sandy loams and leaching models run by the NY State Department of Environmental Conservation (NYSDEC) at maximum use rates indicate the potential for movement to subsurface water.

Since groundwater monitoring began on Long Island in 1997 as a condition of New York State registration, imidacloprid has been detected in several shallow wells in Suffolk County, NY**.** Detections of imidacloprid remain far below established levels for health concerns according to the US Environmental Protection Agency and New York State and below an action level agreed upon by the NYSDEC and Bayer. However, in order to maintain continued registration and uses of these valuable products to the agricultural community on Long Island and to minimize the risk of imidacloprid movement to Long Island's sole-source aquifer, the following Best Management Practices for the use of Marathon® in agricultural production are offered to guide responsible management of the products. Guidelines for other uses of imidacloprid in potato and vegetable crops, turf care and arboriculture are addressed in other Best Management Practices available from dealers, Bayer CropScience or Cornell Cooperative Extension.

Store and handle concentrated material carefully. Try to avoid spills and especially those that might lead to a point-source contamination. Place packages and containers inside secondary containment such as plastic bins to reduce chances of spillage. Mix and load over a properly designed and maintained containment pad if available. If there is no containment pad, handle product and mix over an impervious surface or plastic sheet and not over the same area each time. Maintain a minimum distance of 25 feet or utilize a 15-foot vegetative strip between the mixing/loading area and potential surface-to-groundwater conduits such field sumps, uncased wellheads, sinkholes, floor drains or recharge basins.

Clean up spills promptly and dispose of properly. Avoid contaminating ground and surface water when washing equipment. Every farm should maintain a spill cleanup kit on site with personal protective equipment and cleanup materials, including: gloves, coveralls, boots, goggles, a shovel, broom, dustpan, and heavy-duty storage bags. In the event of a liquid spill, promptly spread an absorbent material such as sawdust or cat litter. When there is a high likelihood of surface or groundwater contamination, dam around the spill. Do not allow the material to wash into drains, recharge basins, or similar areas where there is a high risk of leaching or runoff. Sweep or shovel the absorbent material into a heavy-duty plastic bag. Repeat this procedure a number of times to ensure thorough decontamination. For areas where soil needs to be removed, immediately shovel the top 2-3 inches of soil into a heavy-duty bag and cover area with fresh topsoil. Sweep up granules or dry product. Imidacloprid-contaminated soil and absorbent material in quantities under 500 lbs can be disposed of through the normal waste stream. For larger spills and for more information regarding disposal and spill guidelines, contact Bayer CropScience at 1-800-334-7577, Chemtrec at 1-800-424-9300, or the State Department of Environmental Conservation at either 1-800-457-7362 (to report spills) or 631-444-0320 (for questions regarding spill clean-up).

Identify the pest or problem before treating. Insect pests, plant diseases and/or other factors sometimes cause similar symptoms. For example, potato leafhopper injury might be mistaken for fertilizer or herbicide damage and above-ground symptoms of root damage caused by grubs are similar to those caused by root rots. Be sure of the identity, presence and severity of the target pest before applying any insecticide.

Consider alternative insecticides or biological controls where available, suitable and effective. Contact Cornell Cooperative Extension or your distributor for a copy of *Alternatives to Marathon* and consult the Cornell Guide for the Integrated Management of Greenhouse Florist Crops. While Marathon® systemic use has been important in certain situations, some labeled

insects are easily controlled with other products. Sometimes foliar applications with Marathon® II may be more appropriate than systemic treatments - be sure to include adjuvant (such as a spreader-sticker) for waxy insects or foliage and strive for good coverage. For resistance management reasons it is important not to depend solely on the use of Marathon® (or any one product or mode of action) for insect control. Do not apply Marathon® II sprays or repeat Marathon® soil treatment to the same insect population following an earlier soil application. Marathon® is not highly effective against western flower thrips and does not control mites, so other options should be used for these pests. Biological controls have been shown to be effective in a few cases, such as for certain aphids or whiteflies, but must be used early in an infestation, under favorable environmental conditions and not with incompatible pesticides.

Incorporate cultural or other non-chemical controls. Sometimes the most effective option is to remove and destroy infested or damaged foliage or even entire plants before a new crop is introduced. Infested crops or older plants are a common source of persistent problems and should be isolated from younger clean stock when possible.

Calibrate and maintain application equipment to be sure treatment rates are accurate for the area or pot size treated. When applying to individual pots, be sure drenches are of appropriate volume and *use careful irrigation practices to avoid leaching insecticide from treated pots*. Application equipment should be in good working condition without leaks.

Limit frequency of use. Although Marathon® systemic treatment is often used early in the crop with good justification, such as where prior history indicates pest problems are highly likely or where susceptible plants are to be grown in an infested environment, in other cases preventive application is unnecessary. Yellow sticky cards and visual inspections can help determine whether whitefly or aphid treatment is necessary. Some pests such as white grubs in container-grown plants are very hard to detect early when treatments are most effective, so past experience will be necessary to judge treatment need in certain cases.

Limit application rates. Growers on Long Island, and in other areas with similar conditions, should use the lowest labeled applications rates for systemic uses. While there may be somewhat shorter residual control, use of lower rates will reduce the amount of material applied per area and the potential risk of off-site movement.

Limit application timing. When using Marathon® systemic treatments for pests such as aphids or whiteflies, experience indicates best results are usually obtained when applications are made early in the crop to very young and vigorously growing plants, when roots have reached the outer edge of the pot. A delayed application seems to be much less effective and is a common factor when a control 'failure' occurs. In container and field-grown nursery plants, white grubs are most susceptible during earliest stages (first and second instars) but they are difficult to detect when small. In general, treat growing medium with Marathon® only when it will be most effective against the pest of concern.

Keep good application records, including target pest(s) and weather conditions (for outdoor treatment) at application and for the next 48 hours.

Take utmost care to avoid leaching the material after application. Apply Marathon® systemics only to plants that are well-rooted; do not apply to growing medium that is frozen, saturated or waterlogged or directly to water or intertidal areas. Following application, water lightly without leaching for at least three cycles. For outdoor plants such as mums or nursery crops, apply when there is little chance of heavy rain within 24 hours and only in sufficient water to wet the root zone. Irrigate lightly for at least 10 days to allow uptake and minimize risk of leaching. When treating container-grown plants, apply material to individual pots rather than broadcast over an area to avoid off-target movement of material.

Shallow groundwater areas. In areas where the water table is shallow or where a high risk of leaching is expected, consider using other materials for insect control.

Applying in irrigation systems. The Marathon® 60W and Marathon® II labels include detailed instructions to follow when applying through irrigation systems. Whether connected to public or non-public water supplies, the irrigation system must include backflow prevention, check valves, interlocking controls and a metering pump to control distribution of the pesticide and prevent material being drawn back into the well or public water system. For drip systems, use pressure-compensating emitters to evenly distribute insecticide and apply without incurring runoff. For closed ebb-and-flood systems, calculate the amount of irrigation water taken up per plant and apply material in a minimal amount of water for good uptake. Irrigation water should remain in the system and return to the tank for repeat cycles. Use in closed irrigation systems (e.g. ebb-and-flood) as labeled may be the most conservative approach, providing all irrigation waters remain contained.

Future applied research. Further research might shed light on actual risk of leaching or runoff associated with different kinds of greenhouse or nursery growing media, alternate delivery methods such as 'painted pot technology[3]', slow-release granular or prilled formulations, lower use rates or split applications. Trials on Long Island and elsewhere continue to evaluate other options for their potential use against critical pest problems, at present best controlled with imidacloprid.

Best Management Practices Training Sessions. All users of Marathon® are encouraged to attend training sessions and/or educational programs. Contact Cornell Cooperative Extension or your local distributor for dates and locations.

1) Imidacloprid acute toxicity: rat oral LD50 = 450, dermal LD50 >5000 mg/kg
2) Internet accessed 5/15/03 at http://ace.ace.orst.edu/cgi-webglimpse/mfs/services/data/info/extoxnet?link=http://ace.orst.edu/info/extoxnet/pips/imidaclo.htm&file=/services/data/info/extoxnet/pips/imidaclo.htm&line=114#mfs
3) Nameth, S. & C. Pasian. Painted pot technology. Greenhouse Product News, February 2003 pp 28 - 32.

IMPORTANT!

This bulletin is not intended to provide all the information necessary for the use of this product. Before using the product, read and carefully observe the precautionary statements, directions for use, restrictions, storage and disposal statements and other pertinent information on the label. For additional product information, call toll-free 1-866-99BAYER (1-866-992-2937) or visit our Web site at BayerCropScienceUS.com, or contact Cornell Cooperative Extension of Suffolk County.

ALWAYS READ AND FOLLOW LABEL DIRECTIONS. These guidelines are not a substitute for pesticide labeling. Applicators should be sure to verify current NY pesticide labels and registration status at http://pmep.cce.cornell.edu/pims/current/.

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