Public Works Department,
Park Division
965 Fir Street
(530) 896-7800

Agenda Prepared: 10/06/18
Agenda Posted: 10/08/18
Prior to: 5:00 p.m.

CITY OF CHICO
BIDWELL PARK AND PLAYGROUND COMMISSION (BPPC)
TREE COMMITTEE
(Commissioners Hernandez (Chair), Thomas-Petty, Haar)
Regular Meeting Agenda
October 11, 2018, 6:00 p.m.
Chico Municipal Center Council Chamber Building - 421 Main Street, Conference Room 2

Materials related to an item on this Agenda are available for public inspection in the Park Division Office at 965 Fir Street during normal business hours or online at http://www.chico.ca.us/.

1. CALL TO ORDER

2. REGULAR AGENDA

2.1. CONSIDERATION OF THE CITY OF CHICO STREET TREE APHID CONTROL PROGRAM.

Staff wishes to explore alternatives to neonicotinoids (Aphids) under an integrated pest management (IPM) strategy. An IPM approach considers all relevant and available information to make informed management decisions, providing pest control options based on actual need. Staff requests the

Recommendation: *Staff requests the Committee review and discuss IPM alternatives to using neonicotinoid insecticides in the management of street tree aphid infestations*

3. BUSINESS FROM THE FLOOR

Members of the public may address the Committee at this time on any matter not already listed on the agenda; comments are limited to three minutes. The Committee cannot take any action at this meeting on requests made under this section of the agenda.

4. ADJOURNMENT

Unless otherwise noticed, adjourn to the next regular meeting scheduled for 6:00 pm. November 15, 2018 in Conference Room 2, Chico Municipal Center building (421 Main Street, Chico, California).

Please contact the Park Division Office at (530) 896-7800 if you require an agenda in an alternative format, or if you need to request a disability-related modification or accommodation. This request should be received at least three (3) working days prior to the meeting

BPPC Tree Committee Report Meeting Date 10/11/2018

DATE: 10/11/18

TO: Bidwell Park and Playground Commission (BPPC) Tree Committee

FROM: Richie Bamlet, Urban Forest Manager

SUBJECT: **CONSIDERATION OF THE CITY OF CHICO STREET TREE APHID CONTROL PROGRAM**

RECOMMENDATION

Staff requests the Committee review and discuss IPM alternatives to using neonicotinoid insecticides in the management of street tree aphid infestations

BACKGROUND

City of Chico Public Works Tree Division annually treats 923 Hackberry trees and 78 other tree species for aphid infestations. Approximately twenty gallons of neonicotinoid insecticide (active ingredient Imidacloprid) is applied to street trees situated in parkstrips, medians or behind the sidewalk adjacent to residential property. Scientific evidence now shows that neonicotinoids are harmful to bees.

Staff wishes to explore alternatives to neonicotinoids under an integrated pest management (IPM) strategy. An IPM approach considers all relevant and available information to make informed management decisions, providing pest control options based on actual need.

DISCUSSION

In February 2018, a report from the European Union's scientific risk assessors (EFSA) concluded that the high risk to both honeybees and wild bees resulted from any outdoor use, because the pesticides contaminate soil and water. This leads to the pesticides appearing in wildflowers or succeeding crops. A recent study of honey samples revealed global contamination by neonicotinoids. In May 29, 2018 the European Commission determined that neonicotinoid insecticides cause harm to bees and that all products, with a few exceptions must cease use in the European Union. See Appendix A. The Unites States EPA plans to issue an updated pollinator risk assessment and a proposed interim decision for public comment in spring 2019. In the meantime, the EPA has added warning nomenclature to draw attention to the potential detrimental effects on bees. See pages 4 and 5 of Appendix B – Imidacloprid 2F Turf Ornamental Label.

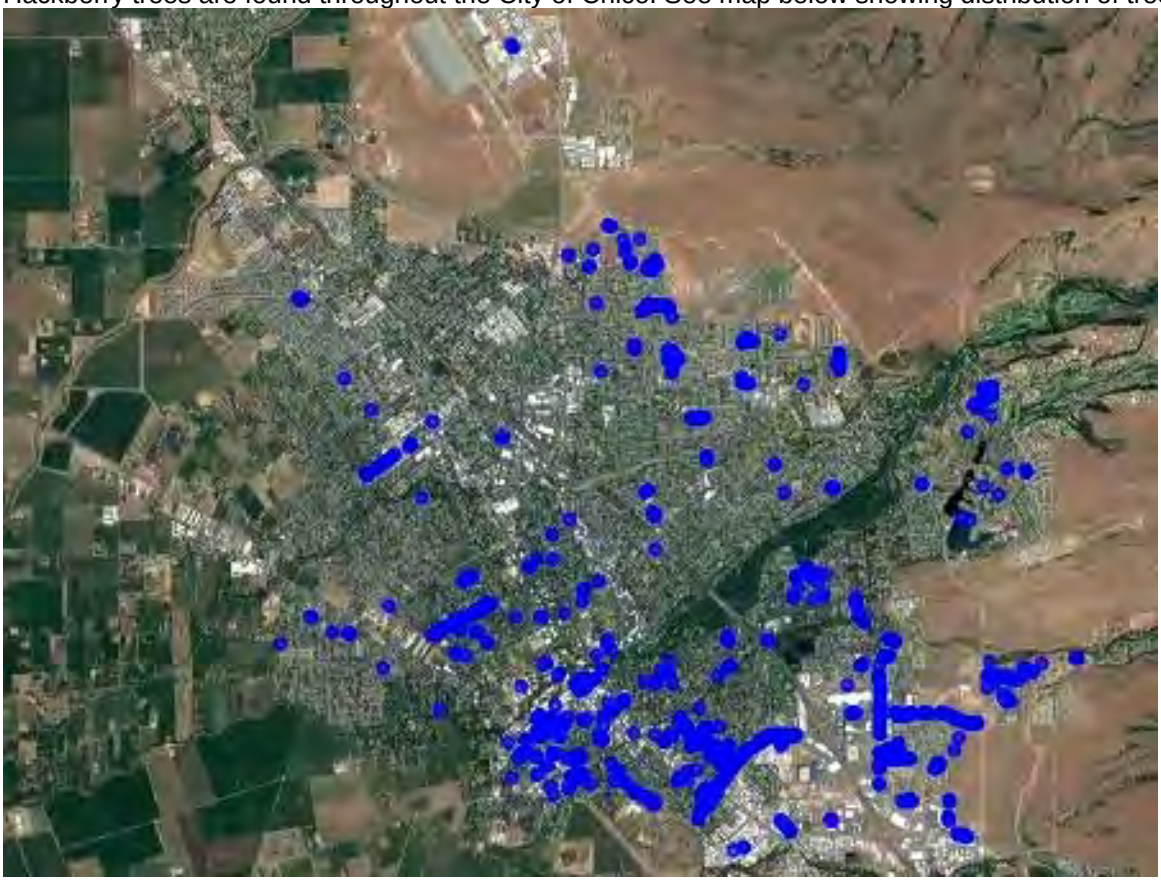
Ahead of any formal decision by the EPA to ban neonicotinoid insecticide use in the Unites States, the City of Chico Public Works plans to analyze use of this class of chemical under Integrated Pest management protocols. The objective of the exercise is to determine if current usage levels are warranted and justified.

Hackberry woolly aphid, sometimes called Asian woolly hackberry aphid (*Shivaphis celti*), was discovered in California in 2002. It infests hackberry, especially Chinese hackberry *(Celtis sinensis*), throughout the state. This aphid was accidentally introduced into the United States in the late 1990s and also occurs from Florida to Texas and northward to at least Tennessee. The Asian woolly hackberry aphid is present in Chico. This aphid is a pest because its copious honeydew excretions create a sticky mess and promote the growth of blackish sooty mold on leaves and surfaces beneath infested trees. No long-term or serious damage to hackberry trees has been found after several years of infestations. Insecticides apparently are not necessary to protect the health or survival of infested hackberry trees. Treatment has historically been justified when honeydew excretions are intolerable to people. Hackberry is wind pollinated. However, it is reported that bees will forage pollen from this tree. See Appendix C for a summary of noenicitinoid findings from the Xerces Society.

Closeup photo of Woolly adelgid.


Closeup photo of adelgid infestation on Chinese hackberry

Hackberry trees are found throughout the City of Chico. See map below showing distribution of trees in the city.



See map below of distribution of higher concentration of hackberry trees in the southern half of town.

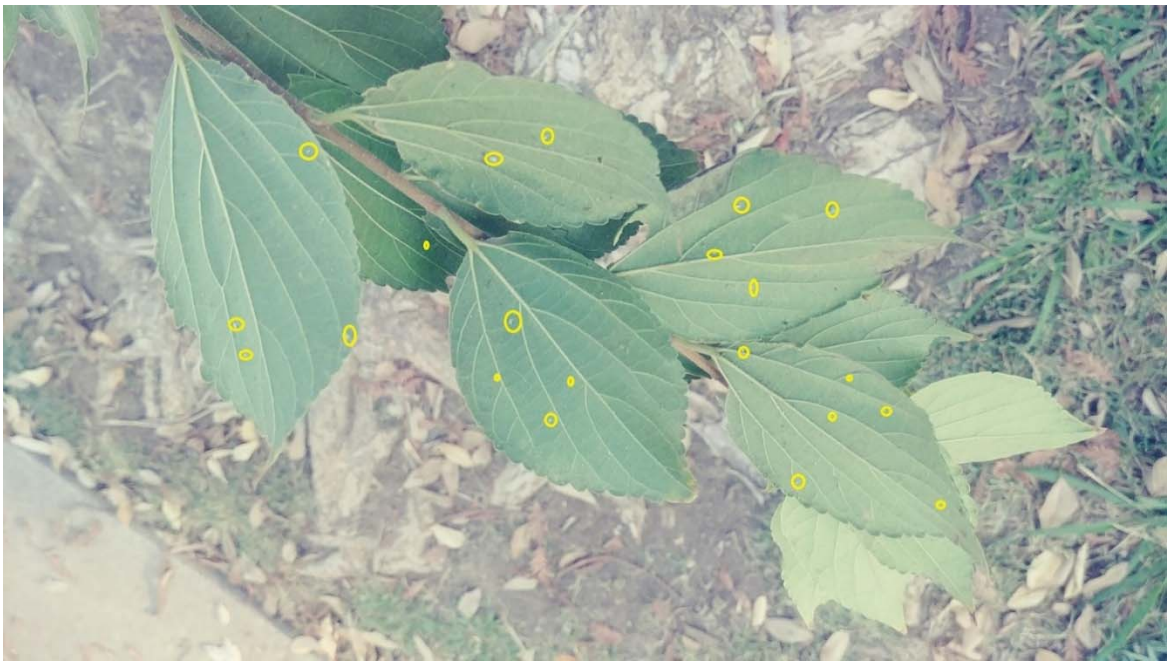
Currently, City of Chico treats by ground injection 923 Hackberry trees and 78 other tree species for aphid infestations. The City has a total street tree population of 1261 hackberry trees comprising of 353 European hackberry (*Cercis australis*), 899 Chinese hackberries (*Cercis sinensis*) and 9 Common hackberries (*Cercis occidentalis*). Previous attempts to reduce the number of trees being chemically treated resulted in 338 trees being taken off the treatment list.

Suggested measures:

1. Stop treating these trees and cease use of neonicotinoid insecticide.

2. Remove all 353 European hackberries from the treatment list only. European hackberries reportedly are resistant to Wooley adelgid. See photo below of a leaf sample from a European hackberry leaf sample from Hartford Ave, Chico. The is anecdotally a marked reduction in aphid occurrence (ringed in yellow in the photo) compared to the Chinese hackberry.

3. Research other less toxic insecticides that can be used on the non-hackberry tree species list.



1. Continue treatment of aphid infestations in city Business Districts only.

Residential options

1. Allow residents to use the permit system to contract with approved pesticide professionals to have aphid infestations treated at homeowner expense.

2. If the infestation of Woolly aphid on hackberry trees is causing a public nuisance, that Staff be authorized by the Bidwell Park & Commission to administratively approve the removal of the tree through the permit process without further BPPC approval.

Public Outreach:

All residential options will require a program of public outreach. Outreach measures would need to include information topics such as:

1. The benefits of trees.

2. Other measures to mitigate honeydew such as washing sidewalks and vehicles and tolerating aphid outbreaks. Honeydew is water soluble and is easily washed away. However, many residents view this as an unacceptable nuisance for the enjoyment of property.

3. Information on pesticide use and its detrimental effect on bees.

4. The cost of using contracted pesticide services if residents wish to continue insecticide treatment if the City ceases to provide this service.

5. The cost and procedures involved in removing Hackberry trees and replacing to Landscape Standards with other approved city trees.

FISCAL IMPACT:

The Street Tree Division currently procures pesticides at a cost of $1500 per year and allocates approximately six weeks of Senior Tree Maintenance Worker time to the application of aphid outbreak treatments.

ATTACHMENTS

Appendix A: COMMISSION IMPLEMENTING REGULATION (EU) 2018783\
Appendix B: Imidacloprid_2F_Turf Ornamental Label
Appendix C: How Neonics Can Kill Bees-Summary_XercesSociety

30.5.2018 EN Official Journal of the European Union L 132/31

COMMISSION IMPLEMENTING REGULATION (EU) 2018/783

of 29 May 2018

amending Implementing Regulation (EU) No 540/2011 as regards the conditions of approval of the active substance imidacloprid

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC ([1]), and in particular Article 21(3), Article 49(2) and Article 78(2) thereof,

Whereas:

(1) The active substance imidacloprid was included in Annex I to Council Directive 91/414/EEC ([2]) by Commission Directive 2008/116/EC ([3]).

(2) Active substances included in Annex I to Directive 91/414/EEC are deemed to have been approved under Regulation (EC) No 1107/2009 and are listed in Part A of the Annex to Commission Implementing Regulation (EU) No 540/2011 ([4]).

(3) Commission Implementing Regulation (EU) No 485/2013 ([5]) amended the conditions of approval of the active substance imidacloprid and required the applicant to provide confirmatory information as regards:

(a) the risk to pollinators other than honey bees;

(b) the risk to honey bees foraging in nectar or pollen in succeeding crops;

(c) the potential uptake via roots to flowering weeds;

(d) the risk to honey bees foraging on insect honey dew;

(e) the potential guttation exposure and the acute and the long-term risk to colony survival and development, and the risk to bee brood resulting from such exposure;

(f) the potential exposure to dust drift following drill and the acute and the long-term risk to colony survival and development, and the risk to bee brood resulting from such exposure;

(g) the acute and long-term risk to colony survival and development and the risk to bee brood for honeybees from ingestion of contaminated nectar and pollen.

(4) In December 2014, the applicant submitted additional information concerning bees (i.e. honey bees, bumble bees and solitary bees) to the rapporteur Member State Germany within the time period provided for its submission.

(5) Germany assessed the additional information submitted by the applicant. It submitted its assessment, in the form of an addendum to the draft assessment report, to the other Member States, the Commission and the European Food Safety Authority ('the Authority') on 18 January 2016.

(6) The Commission consulted the Authority which presented its conclusion on the risk assessment of imidacloprid on 13 October 2016 ([6]). The Authority identified for most crops high acute risks for bees from plant protection

([1]) OJ L 309, 24.11.2009, p. 1.
([2]) Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market (OJ L 230, 19.8.1991, p. 1).
([3]) Commission Directive 2008/116/EC of 15 December 2008 amending Council Directive 91/414/EEC to include aclonifen, imidacloprid and metazachlor as active substances (OJ L 337, 16.12.2008, p. 86).
([4]) Commission Implementing Regulation (EU) No 540/2011 of 25 May 2011 implementing Regulation (EC) No 1107/2009 of the European Parliament and of the Council as regards the list of approved active substances (OJ L 153, 11.6.2011, p. 1).
([5]) Commission Implementing Regulation (EU) No 485/2013 of 24 May 2013 amending Implementing Regulation (EU) No 540/2011, as regards the conditions of approval of the active substances clothianidin, thiamethoxam and imidacloprid, and prohibiting the use and sale of seeds treated with plant protection products containing those active substances (OJ L 139, 25.5.2013, p. 12).
([6]) EFSA (European Food Safety Authority), 2016. Peer review of the pesticide risk assessment for the active substance imidacloprid in light of confirmatory data submitted. *EFSA Journal* 2016;14(11):4607. doi: 10.2903/j.efsa.2016.4607.

products containing the active substance imidacloprid. In particular, as regards exposure via dust, the Authority identified high risks for bees for several field uses. For bees foraging in the treated crop, a high risk was identified for the use on potatoes and winter cereals. For almost all field uses, a high risk to bees was also identified in the succeeding crops. In addition, the Authority identified a number of data gaps.

(7) As foreseen in recital 16 of Implementing Regulation (EU) No 485/2013, the Commission initiated a review of new scientific information on 11 February 2015 by mandating EFSA to organise an open call for data. EFSA launched an open call for data which ended on 30 September 2015 ([1]).

(8) On 13 November 2015, the Commission requested EFSA to provide conclusions concerning an updated risk assessment for bees as regards the use of imidacloprid applied as a seed treatment or granules by organising a peer review and taking into account the data collected in the framework of the specific open call for data and any other new data from studies, research and monitoring activities that are relevant to the uses under consideration. The Authority presented its conclusion on the peer review of the updated pesticide risk assessment for bees for the active substance imidacloprid considering the uses as seed treatment and granules on 28 February 2018 ([2]). The applicant was given the opportunity to comment on this conclusion. The applicant submitted its comments which have been carefully examined.

(9) The draft assessment report, the addendum to the draft assessment report and the conclusions of the Authority were reviewed by the Member States and the Commission within the Standing Committee on Plants, Animals, Food and Feed and finalised on 27 April 2018 in the form of a revised addendum to the Commission review report for imidacloprid.

(10) The Commission invited the applicant to submit its comments on the revised addendum to the review report for imidacloprid. The applicant submitted its comments which have been carefully examined.

(11) Having reviewed the information submitted by the applicant in 2014 the Commission has concluded that the further confirmatory information required by Implementing Regulation (EU) No 485/2013 has not been provided, and having also considered the conclusion on the updated risk assessment for bees, the Commission has concluded that further risks to bees cannot be excluded without imposing further restrictions. Bearing in mind the need to ensure a level of safety and protection consistent with the high level of protection of animal health that is sought within the Union, it is appropriate to prohibit all outdoor uses. Therefore, it is appropriate to limit the use of imidacloprid to permanent greenhouses and to require that the resulting crop stays its entire life cycle within a permanent greenhouse, so that it is not replanted outside.

(12) The Annex to Implementing Regulation (EU) No 540/2011 should therefore be amended accordingly.

(13) Taking into account the risks for bees from treated seeds, the placing on the market and the use of seeds treated with plant protection products containing imidacloprid should be subject to the same restrictions as the use of imidacloprid. It is therefore appropriate to provide that seeds treated with plant protection products containing imidacloprid shall not be placed on the market or used, except where the seeds are intended to be used only in permanent greenhouses and the resulting crop stays in a permanent greenhouse during its entire life cycle.

(14) Member States should be allowed sufficient time to amend or withdraw authorisations for plant protection products containing imidacloprid.

(15) For plant protection products containing imidacloprid, where Member States grant a grace period pursuant to Article 46 of Regulation (EC) No 1107/2009, that period should, at the latest, expire on 19 December 2018.

(16) The prohibition of placing on the market and use of treated seeds should apply only as of 19 December 2018 in order to allow for a sufficient period of transition.

(17) The measures provided for in this Regulation are in accordance with the opinion of the Standing Committee on Plants, Animals, Food and Feed,

([1]) EFSA (European Food Safety Authority), 2015. Technical report on the open call for new scientific information as regards the risk to bees from the use of the three neonicotinoid pesticide active substances clothianidin, imidacloprid and thiamethoxam applied as seed treatments and granules in the EU. EFSA supporting publication 2015:EN-903. 8pp.

([2]) EFSA (European Food Safety Authority), 2018. Conclusions on the peer review of the pesticide risk assessment for bees for the active substance imidacloprid considering the uses as seed treatments and granules. *EFSA Journal* 2018;16(2):5178. 113 pp.

HAS ADOPTED THIS REGULATION:

Article 1

Amendment to Implementing Regulation (EU) No 540/2011

Part A of the Annex to Implementing Regulation (EU) No 540/2011 is amended in accordance with the Annex to this Regulation.

Article 2

Prohibition of the placing on the market and use of treated seeds

Seeds treated with plant protection products containing imidacloprid shall not be placed on the market or used, except where:

(a) the seeds are intended to be used only in permanent greenhouses; and

(b) the resulting crop stays within a permanent greenhouse during its entire life cycle.

Article 3

Transitional measures

Member States shall, in accordance with Regulation (EC) No 1107/2009, where necessary amend or withdraw existing authorisations for plant protection products containing imidacloprid as active substance by 19 September 2018 at the latest.

Article 4

Grace period

Any grace period granted by Member States in accordance with Article 46 of Regulation (EC) No 1107/2009 shall be as short as possible and shall expire by 19 December 2018 at the latest.

Article 5

Amendment to Implementing Regulation (EU) No 485/2013

As regards seeds which have been treated with plant protection products containing imidacloprid, Article 2 of Implementing Regulation (EU) No 485/2013 is deleted.

Article 6

Entry into force

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

However, Article 2 and Article 5 shall apply as of 19 December 2018.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 29 May 2018.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX

The column 'Specific provisions' of row 216, imidacloprid, of Part A of the Annex to Implementing Regulation (EU) No 540/2011 is replaced by the following:

'PART A

Only uses as insecticide, in permanent greenhouses or for the treatment of seeds intended to be used only in permanent greenhouses, may be authorised. The resulting crop must stay within a permanent greenhouse during its entire life cycle.

PART B

For the implementation of the uniform principles as referred to in Article 29(6) of Regulation (EC) No 1107/2009, the conclusions of the review report on imidacloprid, and in particular Appendices I and II thereof, as finalised in the Standing Committee on the Food Chain and Animal Health on 26 September 2008 and the conclusions of the revised addendum of the review report on imidacloprid as finalised in the Standing Committee on Plants, Animals, Food and Feed on 27 April 2018 shall be taken into account.

In this overall assessment Member States must pay particular attention to:

— the risk to bees and bumble bees released for pollination in permanent greenhouses,

— the impact on aquatic organisms,

— the exposure of bees via the consumption of contaminated water from the permanent greenhouses.

Member States shall ensure that the seed coating shall only be performed in professional seed treatment facilities. Those facilities must apply the best available techniques in order to ensure that the release of dust during application to the seed, storage, and transport can be minimised.

Conditions of use shall include risk mitigation measures, where appropriate.'

QUALI-PRO®

APPENDIX B

GROUP 4 INSECTICIDE

Imidacloprid 2F

Turf & Ornamental Insecticide

For use on Turf and Ornamentals, Nurseries and Greenhouses

FOLIAR AND SYSTEMIC INSECT CONTROL

ACTIVE INGREDIENT:	**% BY WT.**
Imidacloprid: 1-[(6-Chloro-3-pyridinyl)methyl]-*N*-nitro-2-imidazolidinimine	21.8%
OTHER INGREDIENTS:	78.2%
TOTAL:	100.0%

Contains 2 pounds of imidacloprid per gallon. Flowable insecticide.
Shake well before using.

EPA Reg. No. 66222-203

EPA Est. No. 53883-TX-002

KEEP OUT OF REACH OF CHILDREN

CAUTION / PRECAUCION

PRECAUCION AL USUARIO: Si usted no puede leer o entender ingles, no use este producto hasta que la etiqueta le haya sido explicada ampliamente. (TO THE USER: If you cannot read or understand English, do not use this product until the label has been fully explained to you.)

For additional precautionary, handling, and use statements, see inside of this booklet.

Manufactured for:
Makhteshim Agan of North America, Inc.
3120 Highwoods Blvd, Suite 100
Raleigh, NC 27604

Net Contents: 1 Gallon

EPA 120313/Rev A

APPENDIX B

FIRST AID	
IF SWALLOWED:	• Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by a poison control center or doctor. • Do not give anything by mouth to an unconscious person.
IF INHALED:	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a poison control center or doctor for further treatment advice.
IF ON SKIN OR CLOTHING:	• Take off contaminated clothing • Rinse skin immediately with plenty of soap and water for 15 to 20 minutes. • Call a poison control center or doctor for treatment advice.
IF IN EYES:	• Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
HOT LINE NUMBER: In case of emergency, contact Prosar at 1-877-250-9291. Have the product container or label with you when calling a poison control center or doctor or going for treatment.	
NOTE TO PHYSICIAN: No specific antidote is available. Treat patient symptomatically.	

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION

Harmful if swallowed, inhaled, or absorbed through skin. Avoid contact with skin eyes, or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, or using tobacco. Remove contaminated clothing and wash clothing before reuse.

Keep children or pets away from treated area until dry.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Some materials that are chemical-resistant to this product are listed below. If you want more options, follow the instructions for Category A on an EPA chemical-resistance category selection chart.

Follow manufacturer's instructions for cleaning/ maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Applicators and other handlers must wear:

Worker Protection Standard Uses:

Applicators and other handlers (mixers and loaders) who handle this product for uses covered by the Worker Protection Standard (40 CFR Part 170) – such as sod farms, must wear:

- Long-sleeved shirt and long pants
- Chemical-resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC) or viton. If you want more options, follow the instructions for Category A on an EPA chemical resistance category selection chart.
- Shoes plus socks

Non- Worker Protection Standard Uses:

Applicators and other handlers must wear:

- Shirt and pants
- Gloves
- Shoes plus socks

ENGINEERING CONTROLS STATEMENTS

When handlers use closed systems, enclosed cabs, or aircraft in a manner that meets the requirements listed in the Worker Protection Standard (WPS) for agricultural pesticides [40 CFR 170.240(4)(4-6)], the handler PPE requirements may be reduced or modified as specified in the WPS.

USER SAFETY RECOMMENDATIONS

Users should:

- Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. Wash thoroughly and change into clean clothing. Wash contaminated clothing before reuse.

ENVIRONMENTAL HAZARDS

This product is highly toxic to aquatic invertebrates. Do not apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwaters or rinsate.

This product is highly toxic to bees exposed to direct treatment or residues on blooming crops/plants or weeds. Do not apply this product or allow it to drift to blooming crops/plants or weeds if bees are foraging.

This chemical demonstrates the properties and characteristics associated with chemicals detected in groundwater. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination.

Apply this product only as specified on this label. Extreme care must be taken to avoid runoff. Apply only to soil or other fill substrate that will accept the solution at the specified rate. Do not treat soil that is water-saturated or frozen or in any conditions where run-off or movement from the treatment area (site) is likely to occur.

PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

Look for the bee hazard icon  in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.

Bees and other insect pollinators will forage on plants when they flower, shed pollen, or produce nectar.

Bees and other insect pollinators can be exposed to this pesticide from:

- Direct contact during foliar applications, or contact with residues on plant surfaces after foliar applications
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:

- Minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives or off-site to pollinator attractive habitat can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at http://pesticidestewardship.org/PollinatorProtection/Pages/default.aspx.

Pesticide incidents (for example, bee kills) should immediately be reported to the state/tribal lead agency. For contact information for your state, go to www.aapco.org/officials.html. Pesticide incidents should also be reported to the National Pesticide Information Center at www.npic.orst.edu or directly to EPA at beekill@epa.gov

APPENDIX B
DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

See individual sites for specific pollinator protection application restrictions. If none exist under the specific site, for foliar applications, follow these application directions for food/feed crops and commercially grown ornamentals that are attractive to pollinators, and for non-agricultural uses:

FOR FOOD/FEED CROPS AND COMMERCIALLY GROWN ORNAMENTALS NOT UNDER CONTRACT FOR POLLINATION SERVICES BUT ARE ATTRACTIVE TO POLLINATORS

Do not apply this product while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen unless one of the following conditions is met:

- The application is made to the target site after sunset
- The application is made to the target site when temperatures are below 55˚F
- The application is made in accordance with a government-initiated public health response
- The application is made in accordance with an active state-administered apiary registry program where beekeepers are notified no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying
- The application is made due to an imminent threat of significant crop loss, and a documented determination consistent with an IPM plan or predetermined economic threshold is met. Every effort should be made to notify beekeepers no less than 48-hours prior to the time of the planned application so that the bees can be removed, covered or otherwise protected prior to spraying.

Non-Agricultural Products:

Do not apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE while bees are foraging. Do not apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE to plants that are flowering. Only apply after all flower petals have fallen off.

Read entire label before using this product. This label must be in the possession of the user at the time of pesticide application.

Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulation.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted-entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during the restricted-entry interval (REI) of 12 hours.

Exception: If the product is applied by drenching, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water is:

- Coveralls
- Chemical-resistant gloves made of any waterproof material such as barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinylchloride (PVC) or viton. If you want more options, follow the instructions for category A on an EPA chemical resistance category selection chart.
- Shoes plus socks

NON-AGRICULTURAL USE REQUIREMENTS

The requirements in this box apply to uses of this product that are NOT within the scope of the Worker Protection Standard for agricultural pesticides (40 CFR Part 170). The WPS applies when this product is used to produce agricultural plants on farms, forests, nurseries, or greenhouses.

Keep children and pets off treated area until dry.

APPLICATION ON TURFGRASS

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE may be used to control listed insect pests on turfgrass in residential lawns, business and office complexes, shopping complexes, multi-family residential complexes, golf courses, airports, cemeteries, parks, playgrounds, athletic fields and sod farms.

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE controls listed soil inhabiting pests such as Northern & Southern masked chafers, *Cyclocephala borealis, C. immaculata,* and/or *C. lurida*; Asiatic

garden beetle, *Maladera castanea*; European chafer, *Rhizotrogus majalis*; Green June beetle, *Cotinis nitida*; May or June beetle, *Phyllophaga* spp.; Japanese beetle, *Popillia japonica*; Oriental beetle, *Anomala orientalis*; Billbugs *Spherophorus* spp.; Annual bluegrass weevil, *Hyperodes* spp.; Black turfgrass ataenius, *Ataenius spretulus* and *Aphodius* spp.; European Crane Fly, *Tipula paludosa*; and mole crickets, *scapteriscus* spp. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE can also be used for suppression of cutworms and chinch bugs.

For optimum control, make applications preceding or during the egg laying period of the target pest. The active ingredient in QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE has enough residual activity so that applications can be made preceding the egg laying activity. Application timing can be based on historical monitoring of the site, previous records or experiences, current season adult trapping or other methods. Most favorable control will be achieved when applications are made prior to egg hatch of the target pests. Follow applications with sufficient irrigation or rainfall to move the active ingredient through the thatch.

RESTRICTIONS: Do not make applications when turfgrass areas are waterlogged or the soil is saturated with water. Sufficient distribution of the active ingredient cannot be achieved under these conditions. The treated turf area must be in such a condition that the rainfall or irrigation will penetrate vertically in the soil profile.

Do not exceed a total of 1.6 pt (0.4 lb of active ingredient)/A per year.

APPLICATION EQUIPMENT FOR USE ON TURFGRASS

Apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE in sufficient water to provide adequate distribution in the treated area. The use of accurately calibrated equipment normally used for the application of turfgrass insecticides is required. Use equipment which will produce a uniform, coarse droplet spray, using a low pressure setting to eliminate off target drift. Check calibration periodically to ensure that equipment is working properly.

RESTRICTION: Do not apply through any irrigation system.

APPENDIX B
APPLICATIONS

TURF GRASSES

PEST	RATE	APPLICATION INSTRUCTIONS
Larvae of: Annual bluegrass weevil Asiatic garden beetle Billbug Black turfgrass ataenius Cutworms (suppression) European chafer European crane fly Green June Beetle Japanese beetle Northern Masked chafer Oriental beetle *Phyllophaga* spp. Southern masked chafer	1.25 to 1.6 pt/A or 0.46 to 0.6 fl. oz. (14 to 17 mL) per 1000 sq. ft.	For best control of grubs, billbugs, annual bluegrass weevil, and European Crane Fly, apply prior to egg hatch of the target pest. Read **APPLICATION EQUIPMENT** section of this label.
Chinch bugs (suppression) Mole crickets	1.6 pt /A or 0.6 fl. oz. (17 mL) per 1000 sq. ft.	For suppression of chinch bugs, apply before hatching of the first instar nymphs. To control mole crickets apply before or during the peak egg hatch period. Use a curative insecticide in addition to QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE when adults or large nymphs are present and actively tunneling. Follow label instructions for other insecticides when tank-mixing.

Consult your local turf, state Agricultural Experiment Station, or State Extension Service Specialists for more specific information regarding timing of application.

Irrigation or rainfall must occur within 24 hours after application to move the active ingredient through the thatch. Do not mow turf or lawn area until after sufficient irrigation or rainfall has occurred so that uniformity of application will not be affected.

RESTRICTION:
- Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year.
- Do not apply this product in a way that will contact people or pets.
- Do not allow children or pets to enter treated areas until sprays have dried.
- Do not allow this product to contact plants in bloom if bees are foraging in the treatment area.

APPENDIX B

APPLICATION TO ORNAMENTALS

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE is for use on ornamentals in commercial and residential landscapes and interior plantscapes. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE is a systemic product and will be taken up into the plant system from root uptake. The product must be placed where the growing portion of the target plant can absorb the active ingredient. The addition of a nitrogen containing fertilizer, where applicable, into the solution may enhance the uptake of the active ingredient. Application can be made by foliar application or soil applications including soil injection, drenches, and broadcast sprays. Foliar applications offer locally systemic activity against insect pests.

When making soil applications to plants with woody stems, systemic activity will be delayed until the active ingredient is taken up throughout the plant. In some cases, this translocation delay could take 60 days or longer. For this reason, apply prior to anticipated pest infestation to achieve optimum levels of control.

RESTRICTIONS:

- For outdoor applications, do not exceed a total of 1.6 pt (0.4 lb of active ingredient) /A per year.
- Not for use on grass grown for seed or on commercial fruit and nut trees.
- Do not apply this product, by any application method, to linden, basswood, or other *Tilia* species.

Ant Management Programs

Use QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE to control aphids, scale insects, mealybugs and other sucking pests on ornamentals to limit the honeydew available as a food source for ant populations. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE applications can be then supplemented with residual sprays, bait placements or other ant control tactics to further reduce the pest population.

APPLICATION EQUIPMENT FOR FOLIAR APPLICATIONS

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE mixes readily with water and may be used in many types of application equipment. Mix product with the required amount of water and apply as desired dependent upon the selected use pattern.

When making foliar applications on hard to wet foliage such as holly, pine or ivy, the addition of a spreader/sticker is recommended. If concentrate or mist type spray equipment is used, an equivalent amount of product should be used on the area sprayed as would be used in a dilute application.

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE has been found to be compatible with commonly used fungicides, miticides, liquid fertilizers, and other commonly used insecticides. Check physical compatibility using the correct proportion of products in a small jar test if local experience is unavailable.

RESTRICTION:

- Do not apply through any irrigation system.
- Do not apply this product in a way that will contact people or pets.
- Do not allow children or pets to enter treated areas until sprays have dried.

APPENDIX B

APPLICATIONS

FOR USE ONLY IN AND AROUND THE PERIMETER OF INDUSTRIAL AND COMMERCIAL BUILDINGS AND RESIDENTIAL AREAS

CROP	PEST	RATE	APPLICATION INSTRUCTIONS
Trees Shrubs Evergreens Flowers Foliage plants Groundcovers Interior plantscapes	Adelgids Aphids Japanese beetles Lace bug Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Mealybugs Psyllids Sawfly Larvae Thrips (suppression) Whiteflies	1.5 fl. oz. (45 mL) per 100 gal of water	**Foliar Applications:** Begin applications before the onset of high pest populations and reapply as needed.
	White grub larvae (such as Japanese beetle larvae, Chafers, *Phyllophaga* spp., Asiatic garden beetle, Oriental beetle)	0.46 to 0.6 fl. oz. (14 to 17 mL) per 1000 sq. ft.	**Broadcast Applications:** Use enough water to mix the product and thoroughly apply to the treatment area. Do not use less than 2 gallons of water per 1000 sq ft. Irrigate after application to incorporate QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE into the upper soil layer. For additional use directions, refer to the **FLOWERS and GROUND COVERS** section of this label.

SOIL INJECTION* AND SOIL DRENCH APPLICATIONS IN AND AROUND THE PERIMETER OF INDUSTRIAL AND COMMERCIAL BUILDINGS AND RESIDENTIAL AREAS, AND STATE, NATIONAL AND PRIVATE WOODED AND FORESTED AREAS

*No Soil injection Applications Allowed in Nassau or Suffolk Counties of New York.

PEST	CROP/RATE	APPLICATION INSTRUCTIONS	REMARKS
Adelgids Aphids Armored scales (suppression) Black vine weevil larvae Eucalyptus longhorned borer Flatheaded borer (including bronze, alder and emerald ash) Japanese beetles Lace bugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Pine tip moth larvae Psyllids Roundheaded borers (including Asian longhorned beetles) Royal palm bugs Sawfy larvae Soft scales Thrips (suppression) White grub larvae Whitefies	**TREES** Use the following rates as a function of tree Diameter at Breast Height (D.B.H.): Apply 0.1 to 0.4 fl. oz. (3 to 12 mL) per inch of trunk diameter (D.B.H.) You may use the higher rate (0.3 – 0.4 fl. oz.) only for trees greater than 15 D.B.H. to control the following pests: Asian longhorned beetle, Emerald Ash Borer, Eucalyptus longhorned borer, Bronze birch borer, Alder borer **RESTRICTION:** Do not exceed a total of 1.6 pt (0.4 lb of active ingredient) /A per year. Diameter at Breast Height (D.B.H.) = is measured at 4.5 feet from the ground.	**SOIL INJECTION:** **Grid System:** Space holes in a grid pattern on 2.5 foot centers extending to the drip line of the tree. **Circle System:** Apply in holes evenly spaced in circles (use more than one circle dependent upon the size of the tree) beneath the drip line of the tree extending in from that line. **Basal System:** Space injection holes evenly around the base of the tree trunk no more than 6 to 12 inches out from the base. **Soil Drench:** Apply uniformly as a drench around the base of the tree in not less than 10 gallons of water per 1000 square feet. Direct application to the root area. Remove plastic or any other barrier that will stop solution from reaching the root zone.	Use enough water to mix the product and inject an equal amount of solution in each hole. Use low pressure and sufficient solution for distribution of the liquid into the treatment area. Keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per tree. **For Control of Specified Borers:** Trees with existing insect damage and stress may not recover after treatment with QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE.

(continued)

PEST	CROP/RATE	APPLICATION INSTRUCTIONS	REMARKS
	SHRUBS 0.1 to 0.2 fl. oz. (3 to 6 mL) per foot of shrub height	**Soil Injection:** Apply at the specified dosage to each plant. **Soil Drench:** Apply uniformly as a drench around the base of the tree in not less than 10 gallons of water per 1000 square feet. Direct application to the root area. Remove plastic or any other barrier that will stop solution from reaching the root zone.	Use enough water to mix the product and inject an equal amount of solution in each hole. Use low pressure and sufficient solution for distribution of the liquid into the treatment area. Keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per shrub.
	FLOWERS AND GROUNDCOVERS 0.46 to 0.6 fl. oz. (14 to 17 mL) per 1000 sq. ft.	Apply as a broadcast treatment before or after planting, prior to bloom or after all flower petals have fallen off for established plants. Mix into soil. On established plants, irrigate thoroughly after application.	

FOLIAR APPLICATIONS FOR USE ONLY IN AND ON RESIDENTIAL AREAS

CROP	PEST	RATES	APPLICATION INSTRUCTIONS
POME FRUITS Apple Crabapple Loquat Mayhaw Pear Pear (oriental) Quince	Aphids (except Wooly apple aphid) Leafhoppers (including glassy-winged sharpshooter) Leafminer Mealybugs[1] San Jose scale[1]	1.5 fl. oz. (45 mL) per 100 gal or 6.0 fl. oz./A[3]	Apply specified dosage as foliar spray as needed after petal-fall is complete. For control of rosy apple aphid, apply prior to leafrolling caused by the pest. For first generation leafminer control, make first application as soon as petal-fall is complete. Greatest leafminer control will result from the earliest possible application. For second and succeeding generations of leafminer, optimal control is obtained from applications made early in the adult flight against egg and early instar larvae. A second application may be required 10 days later if severe pressure continues or if generations are overlapping. A single application may result in suppression only. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE will not control late stage larvae. For San Jose Scale, time applications to the crawler stage. Treat each generation. For late season (preharvest) control of leafhopper species, apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE while most leafhoppers are in the nymphal stage. For control of mealybug, insure good spray coverage of the trunk and scaffolding limbs or other resting sites of the mealybug. **RESTRICTIONS:** • Do not apply more than 6.0 fl. oz./A in a single application. • Do not make more than 5 applications /A per year. • Do not apply more than 1.6 pt (0.4 lb of active ingredient) per year. • Allow 10 or more days between applications. Allow at least 7 days between last application and harvest.

(continued)

FOLIAR APPLICATIONS FOR USE ONLY IN AND ON RESIDENTIAL AREAS *(continued)*

CROP	PEST	RATES	APPLICATION INSTRUCTIONS
Pecan[2]	Yellow pecan aphid Black margined aphid Pecan leaf phylloxera Pecan spittlebug Pecan stem phylloxera	1.5 fl. oz. (45 mL) per 100 gal or 6.0 fl. oz./A[3]	Make foliar applications as pests begin to build before populations become extreme. Two applications at a 10 to 14 day interval may be required to achieve control. Scout and re-treat if needed. Thorough uniform coverage of foliage is necessary for optimal control. Addition of an organosilicone-based spray adjuvant at a rate not to exceed the adjuvant manufacturer's use rate may improve coverage. **RESTRICTIONS:** • Do not apply more than a total of 18.0 fl. oz. of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE /A per year. Do not make more than 3 applications. • Allow 10 or more days between applications. Allow at least 7 days between last application and harvest.

[1] Not for use in California for control on pears.

[2] Use on pecans not permitted in California unless directed by state-specific 24(c) supplemental labeling.

[3] The amount of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE required /A will depend on tree size and volume of foliage present. The rate /A is based on a standard of 400 gallons of dilute spray solution /A for large trees.

FOLIAR APPLICATION FOR USE ONLY IN AND ON INDUSTRIAL AND COMMERCIAL BUILDINGS AND RESIDENTIAL AREAS

CROP	PEST	RATE	APPLICATION INSTRUCTIONS
Grapes	Leafhoppers (including glassy-winged sharpshooter) Mealybugs	1.5 fl. oz. (45 mL) per 100 gal or 3.0 fl. oz/A (90 mL/A)	Apply specified dosage as a foliar spray using 200 gallons of water /A. **RESTRICTIONS**: • Do not apply more than a total of 6.0 ounces of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE /A per year. • Allow at least 14 days between applications. Applications may be applied up to and including day of harvest. Pre-Harvest Interval = 0 days.

Restrictions

- Keep children and pets off treated area until dry.
- Do not graze treated areas or use clippings from treated areas for feed or forage.
- Do not allow runoff or puddling of irrigation water following application. Do not apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE to areas which are water logged or saturated, which will not allow penetration into the root zone of the plant.
- Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year.

APPLICATION IN GREENHOUSES, NURSERIES, ORNAMENTALS, FRUIT AND NUT TREES AND VEGETABLE PLANTS

APPLICATION TO ORNAMENTALS AND VEGETABLE PLANTS

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE may be used to control listed insect pests on ornamental and vegetable plants in nurseries and greenhouses. Insect protection is achieved because QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE is a systemic product and the active ingredient moves upward into the plant system. Apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE to the growing part of the plant for more absorption of the active ingredient. Nitrogen containing fertilizer may be added to the solution to aid in the uptake of the active ingredient where applicable. Apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE as a foliar spray or by soil applications such as soil injection, drenches, chemigation and broadcast sprays.

Soil applications to plants with woody stems will require applications of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE before expected pest infestations due to the delay in the uptake of the active ingredient and the time until the product is taken up throughout the plant.

Restriction: For outdoor applications, do not exceed a total of 1.6 pt (0.4 lb of active ingredient) /A per year.

Bark Media: The length of protection after treatment with QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE may be shortened if the media has 30% or more bark content.

APPLICATION EQUIPMENT FOR ORNAMENTALS AND VEGETABLE PLANTS

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE mixes with water and may be applied with different types of application equipment. After mixing with the correct amount of water, follow the application directions for the selected use pattern.

For applications on hard to wet foliage such as holly, pine or ivy, the use of a spreader/ sticker is recommended. For application by concentrate or mist type spray equipment, use the same amount as would be used in a dilute application.

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE is compatible with frequently used fungicides, miticides, liquid fertilizers. Compatibility may be tested in a small jar by using the correct proportion of products if compatibility information is not available.

APPLICATION THROUGH IRRIGATION SYSTEMS

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE may be applied alone or as a tank mixture with other chemicals or pesticides registered for application through irrigation systems. The normal dilution ratio is 1:100 to 1:200 depending on the system. Always meter the product into the irrigation water during the first part of the irrigation cycle. The product may be mixed separately prior to injection. Agitation may be necessary if the mixture is allowed to stand more than 24 hours.

Remove scale, pesticide residue and other foreign matter from the tank and entire irrigation system.

Apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE only through micro irrigation (individual spaghetti tubes), drip irrigation, overhead irrigation, ebb and flood, or hand-held or motorized calibrated irrigation equipment.

Do not apply this product through any other type of irrigation system. Crop injury or lack of effectiveness can result from non uniform distribution of treated water.

If you have any questions about calibration, contact your State Extension Service specialist, equipment manufacturers or other experts in this area.

Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system unless the pesticide label-prescribed safety devices for public water systems are in place.

A person knowledgeable of the chemigation system and responsible for its operation or a person who is under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.

SAFETY DEVICES FOR IRRIGATION SYSTEMS CONNECTED TO PUBLIC WATER SUPPLIES:

If the source of water for your irrigation system is a public water supply, follow the instructions below:

1. Public water system means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year.
2. Chemigation systems connected to public water systems must contain a functional, reduced-pressure zone, backflow preventer (RPZ) or the functional equivalent in the water supply line upstream from the point of pesticide introduction. As an option to the RPZ, water from the public water system should be discharged into a reservoir tank prior to pesticide introduction. There shall be a complete physical break (air gap) between the outlet end of the fill pipe and the top or overflow rim of the reservoir tank of at least twice the inside diameter of the fill pipe.
3. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.

4. The pesticide injection pipeline must contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
5. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops, or in cases where there is no water pump, when the water pressure decreases to the point where pesticide distribution is adversely affected.
6. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump) effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

SAFETY DEVICES FOR IRRIGATION SYSTEMS NOT CONNECTED TO A PUBLIC WATER SUPPLY:

1. The system must contain a functional check valve, vacuum relief valve and low pressure drain appropriately located on the irrigation pipeline to prevent water source contamination from backflow.
2. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump.
3. The pesticide injection pipeline must also contain a functional normally closed solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down.
4. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops.
5. The irrigation line or water pump must include a functional pressure switch which will stop the water pump motor when the water pressure decreases to the point where the pesticide distribution is adversely affected.
6. Systems must use a metering pump such as a positive displacement injection pump (e.g. diaphragm pump) effectively designed and constructed of material that is compatible with pesticides and capable of being fitted with a system interlock.
7. Do not apply when wind speed favors drift beyond the area intended for treatment.

APPENDIX B

APPLICATION TO GRASSY AREAS IN NURSERIES

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE may be used on nursery grass in areas such as under or around field or container grown plants, on roadways or other grassy areas in or around nurseries.

QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE controls listed soil inhabiting pests of grassy areas of nurseries, such as Northern and Southern masked chafers, *Cyclocephala borealis*, *C. immaculata*, and/or *C. lurida*; Asiatic garden beetle, *Maladera castanea*; European chafer, *Rhizotroqus majalis*; Green June beetle, *Cotinis nitida*; May or June beetle, *Phyllophaga* spp.; Japanese beetle, *Popillia japonica*; Oriental beetle, *Anomala orientalis*; Billbugs, *Spherophorus* spp.; Annual bluegrass weevil, *Hyperodes* spp.; Black turfgrass ataenius, *Ataenius spretulus* and *Aphodius* spp. and mole crickets, *Scapteriscus* spp. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE can also be used for suppression of cutworms and chinch bugs.

For optimum control, make applications preceding or during the egg laying period of the target pest. The active ingredient in QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE has enough residual activity so that applications can be made preceding the egg laying activity. Application timing can be based on historical monitoring of the site, previous records or experiences, current season adult trapping or other methods. Most favorable control will be achieved when applications are made prior to egg hatch of the target pests. Follow application with sufficient irrigation or rainfall to move the active ingredient through the thatch.

RESTRICTIONS

- Do not make applications when grassy areas are waterlogged or the soil is saturated with water. Sufficient distribution of the active ingredient cannot be achieved under these conditions. The treated grassy area must be in such a condition that the rainfall or irrigation will penetrate vertically in the soil profile.
- Do not apply more than a total of 1.6 pt (0.4 lb of active ingredient) /A per year.

APPLICATION EQUIPMENT FOR USE ON GRASSY AREAS IN NURSERIES

Apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE in enough water to provide sufficient distribution in the treated area. Use accurately calibrated equipment typically used for the application of soil insecticides which will produce a uniform, course droplet spray, using a low pressure setting to eliminate off target drift. Check calibration periodically to ensure that equipment is working properly.

GRASSY AREAS OF FIELD AND FOREST NURSERIES

PEST	RATES	APPLICATION INSTRUCTIONS
Larvae of: Annual bluegrass weevil Asiatic garden beetle Billbugs Black turfgrass ataenius *Phyllophaga* spp. Cutworms (suppression) European chafer Green June Beetle Japanese beetle Northern masked chafer Oriental beetle Southern masked chafer	19.2 to 25.6 fl. oz. /A or 0.45 to 0.6 fl. oz. (13 to 17 mL) per 1,000 sq. ft.	For best control of grubs, billbugs and annual bluegrass weevil, make application prior to egg hatch of the target pest. Make sure to read **APPLICATION EQUIPMENT** section of this label. For suppression of chinch bugs, make application prior to the hatching of the first instar nymphs. For control of mole crickets make application before or during the peak egg hatch period. When adults or large nymphs are present and actively tunneling, QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE application should be accompanied by a curative insecticide. Follow label instructions for other insecticides when tank-mixing. Consult your local turf, State Agricultural Experiment Station, or State Extension Service Specialist for more specific information regarding timing of application. Irrigation or rainfall must occur within 24 hours after application to move the active ingredient through the thatch. Do not mow grass area until after adequate irrigation or rainfall has occurred so that evenness of application will not be affected. **RESTRICTION:** · Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year. · Do not apply this product in a way that will contact people or pets. · Do not allow children or pets to enter treated areas until sprays have dried. · Do not allow this product to contact plants in bloom if bees are foraging in the treatment area.
Chinch bugs (suppression) Mole crickets	25.6 fl. oz./A or (17 mL) per 1,000 sq. ft.	

APPENDIX B

ORNAMENTALS

FOLIAR AND SYSTEMIC APPLICATION IN OR ON FIELD-GROWN NURSERY AND CONTAINER STOCK, GREENHOUSE ORNAMENTALS, AND ORNAMENTALS GROWN IN FLAT BENCHES OR BEDS

PEST	CROP	RATES	APPLICATION INSTRUCTIONS
Adelgids Aphids Japanese beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Sawfly larvae Thrips (suppression) Whiteflies	Trees (including non-bearing fruit and nut) Shrubs Evergreens Flowers Ground covers Vegetable plants*	1.7 fl. oz. (50 mL) per 100 gal. of water	**Foliar Applications:** Start treatments before high pest pressure is observed and reapply as needed. For resistance management purposes, do not make a QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE foliar application following a soil application in the same crop. **RESTRICTIONS** • For use on vegetable plants intended for resale only including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato. • Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year. Minimum interval between applications: 5 days.
White grub larvae (such as Japanese beetle larvae, Chafers, *Phyllophaga* spp., Asiatic garden beetle, Oriental beetle)		0.45 to 0.6 fl. oz. (13 to 17 mL) per 1,000 sq. ft.	**Broadcast Applications:** Mix required amount of product in enough water to uniformly and exactly cover the treatment area. Do not use less than 2 gallons of water per 1000 sq. ft. Irrigate to integrate QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE into the upper soil level. Refer to **REMARKS** section for use directions specific for **FLOWERS AND GROUND COVERS** concerning additional use directions. **RESTRICTION:** Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year. Minimum interval between applications: 5 days.

* For use on vegetable plants intended for resale only including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato.

APPENDIX B

SOIL INJECTION, SOIL DRENCH AND BROADCAST APPLICATIONS IN NURSERY AND GREENHOUSE

PEST	CROP/RATES	APPLICATION INSTRUCTIONS
Adelgids Aphids Armored scales Black vine weevil larvae Eucalyptus longhorned borers Flatheaded borers (including bronze birch and alder borers) Japanese beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Pine Tip moth larvae Psyllids Royal palm bugs Sawfly larvae Soft scales Thrips (suppression) White grub larvae Whiteflies	**TREES** Apply 0.1 to 0.2 fl oz (3 to 6 mL) per inch of trunk diameter. Diameter at Breast Height (D.B.H.) = is measured at 4.5 feet from the ground.	**Soil Injections:** **Grid System:** Space holes on 2.5 foot centers, in a grid pattern, extending to the drip line of the tree. **Circle System:** Apply in holes evenly spaced in circles, (use more than one circle dependent upon the size of the tree) beneath the drip line of the tree extending in from that line. **Basal System:** Space injection holes evenly around the base of the tree trunk no more than 6 to 12 inches out from the base. Mix required dosage in sufficient water to inject an equal amount of solution in each hole. Maintain a low pressure and use sufficient solution for distribution of the liquid into the treatment zone. Keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per tree. **Soil Drench:** Uniformly apply the dosage in no less than 10 gallons of water per 1000 square feet as a drench around the base of the tree, directed to the root zone. Remove plastic or any other barrier that will stop solution from reaching the root zone. **For Control of Specified Borers:** Application to trees already heavily infested may not prevent the eventual loss of the trees due to existing pest damage and tree stress. **RESTRICTIONS** • **No Soil Injection Application Allowed in Nassau or Suffolk Counties of New York.** • Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year.

(continued)

PEST	CROP/RATES	APPLICATION INSTRUCTIONS
	SHRUBS 0.1 to 0.2 fl. oz. (3 to 6 mL) per foot of shrub height	**Soil Injection:** Apply to individual plants using dosage indicated. Mix required dosage in sufficient water to inject an equal amount of solution in each hole. Maintain a low pressure and use sufficient solution for distribution of the liquid into the treatment zone. Keep the treated area moist for 7 to 10 days. Do not use less than 4 holes per shrub. **Soil Drench:** Uniformly apply the dosage in no less than 10 gallons of water per 1,000 square feet as a drench around the base of the tree, directed to the root zone. Remove plastic or any other barrier that will stop solution from reaching the root zone. **RESTRICTIONS** • **No Soil Injection Application Allowed in Nassau or Suffolk Counties of New York.** • Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year.
	FLOWERS AND GROUND COVERS 0.45 to 0.6 fl. oz. (13 to 17 mL) per 1,000 sq. ft.	Apply as a broadcast treatment before or after planting, prior to bloom or after all flower petals have fallen off for established plants. After application to established plants, irrigate thoroughly. **RESTRICTION:** Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year.

EBB & FLOOD APPLICATION

Prior to treatment, to ensure accurate uptake by the plants, at least 10 plants must be brought up to a known field capacity and allowed to dry out for one or two days. Once dry, re-wet these plants to determine how much water on average each plant will absorb to bring it back at field capacity. Use the volume absorbed per plant (keeping pot sizes uniform) multiplied by the number of pots being treated. Add to this volume a required minimum to flood your smallest treatment area. This should minimize the return back to the storage tank. Re-use the returned volume with subsequent irrigation or nutrients on the same plants.

PEST	POT SIZE (inches)	Herbaceous species including vegetable plants* (1 or 2 plants per pot)	Woody perennials, Herbaceous species including vegetable plants* (3 or more plants per pot)	APPLICATION INSTRUCTIONS
		ML per 100 Plants	ML per 100 Plants	
Adelgids Aphids Armored scales Fungus Gnats (larvae only)[1] Japanese beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Psyllids Root mealybugs[2] Root Weevil Complex (such as Apopka Weevil, Black Vine Weevil, Citrus Weevil[3]) Soft scales Thrips (suppression)[4] Whiteflies White grub larvae (such as Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	2 3 4 5 6 7 8 9 10 11 12	1.6 mL 2.5 mL 3.3 mL 4.2 mL 5 mL 5.9 mL 6.6 mL 7.4 mL 8.3 mL 9 mL 10 mL	2.5 mL 3.7 mL 5 mL 6.3 mL 7.7 mL 9.1 mL 10 mL 11.1 mL 12.5 mL 14.3 mL 16.7 mL	[1] **Fungus gnat larvae:** Control in the soil by drench or incorporation. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE will not control adult Fungus Gnats. [2] **Root Mealybug:** To obtain control, thoroughly drench the containerized media but do not allow leaching from the bottom of the container. Use the following rate of 1.7 fl oz (50 mL) in 150 gallons of water. [3] **Citrus Root Weevil:** For use on non-bearing citrus nursery stock. [4] **Thrips:** For suppression on foliage only. Thrips in buds and flowers will not be suppressed. Foliar insect control is accomplished by the uptake of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE from a healthy root system. This allows the active ingredient to move up into the plant. **RESTRICTIONS** • For use on vegetable plants intended for resale only including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato. • Do not apply more than 1.6 pt (0.4 lb of active ingredient) /A per year.

DRENCH AND IRRIGATION APPLICATIONS

For use only on greenhouse and nursery ornamentals, vegetable plants*, and interiorscape plants using soil drenches, micro irrigation, drip irrigation, overhead irrigation, ebb and flood irrigation, or hand-held or motorized calibrated irrigation equipment.

PEST	POT SIZE (inches)	Herbaceous species including vegetable plants* (1 or 2 plants per pot)	Woody perennials, Herbaceous species including vegetable plants* (3 or more plants per pot)	APPLICATION INSTRUCTIONS
		No. pots treated with 1.7 fl. oz. (50 mL)	No. pots treated with 1.7 fl. oz. (50 mL)	
Adelgids Aphids Fungus Gnats (larvae only)[1] Japanese beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Psyllids Root mealybugs[2] Root Weevil Complex (such as Apopka Weevil, Black Vine Weevil, Citrus Weevil[3]) Soft scales Thrips (suppression)[4] Whiteflies White grub larvae (such as Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	2 3 4 5 6 7 8 9 10 11 12	3,000 2,000 1,500 1,200 1,000 850 750 675 600 550 500	2,000 1,350 1,000 800 650 550 500 450 400 350 300	Thoroughly wet most of the potting medium but do not allow runout or leaching from the bottom of the container. Follow the application with moderate irrigation. During the next 10 days, carefully irrigate to avoid the loss of the active ingredient due to leaching. [1] **Fungus gnat larvae:** Control in the soil by drench or incorporation. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE will not control adult Fungus Gnats. [2] **Root Mealybug:** To obtain control, thoroughly drench the containerized media but do not allow leaching from the bottom of the container. Use the following rate of 1.7 fl oz (50 mL) in 150 gallons of water. [3] **Citrus Root Weevil:** For use on non-bearing citrus nursery stock. [4] **Thrips:** For suppression on foliage only. Thrips in buds and flowers will not be suppressed. Foliar insect control is accomplished by the uptake of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE from a healthy root system. This allows the active ingredient to move up into the plant.

(continued)

DRENCH AND IRRIGATION APPLICATIONS *(Continued)*

For use only on greenhouse and nursery ornamentals, vegetable plants*, and interiorscape plants using soil drenches, micro irrigation, drip irrigation, overhead irrigation, ebb and flood irrigation, or hand-held or motorized calibrated irrigation equipment. *(continued)*

PEST	POT SIZE (inches)	Herbaceous species including vegetable plants* (1 or 2 plants per pot)	Woody perennials, Herbaceous species including vegetable plants* (3 or more plants per pot)	APPLICATION INSTRUCTIONS
		No. pots treated with 1.7 fl. oz. (50 mL)	No. pots treated with 1.7 fl. oz. (50 mL)	
	Ornamental and vegetable plants* grown in flats, benches, or beds		1.7 fl. oz. (50 mL) per 3,000 sq. ft.	Mix the appropriate amount of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE in sufficient water to evenly cover the treatment area. **RESTRICTION:** Do not use less than 2 gallons of mixture per 1000 sq. ft. Apply as a broadcast treatment. Before planting, mix into the potting medium or apply after to established plants. Lightly irrigate after application to established plants for best control. **RESTRICTION:** Do not allow leaching or runout for 10 days after application.
* For use on vegetable plants intended for resale only including: Broccoli, Chinese Broccoli, Broccoli Raab, Brussels Sprouts, Cabbage, Chinese Cabbage, Cauliflower, Collards, Eggplant, Ground Cherry, Kale, Kohlrabi, Lettuce, Mustard Greens, Pepinos, Peppers, Potatoes, Rape Greens, Sorghum, Sugarbeets, Tomatillo, and Tomato.				

(continued)

DRENCH AND IRRIGATION APPLICATIONS *(Continued)*

PEST	Containerized Plants		APPLICATION INSTRUCTIONS
	Container Size	No. pots treated with 1.7 fl. oz. (50 mL)	
Adelgids Aphids Fungus Gnats (larvae only)[1] Japanese beetles (adults) Lacebugs Leaf beetles (including elm and viburnum leaf beetles) Leafhoppers (including glassy-winged sharpshooter) Leafminers Mealybugs Psyllids Root mealybugs[2] Root Weevil Complex (such as Apopka Weevil, Black Vine Weevil, Citrus Weevil[3]) Soft scales Thrips (suppression)[4] Whiteflies White grub larvae (such as Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	1 gallon 2 gallon 3 gallon 5 gallon 7 gallon 10 gallon 15 gallon 20 gallon	340 to 244 280 to 210 220 to 165 160 to 110 100 to 75 60 to 45 40 to 30 20 to 15	Apply in sufficient water to wet the potting medium. For best control, make applications prior to egg hatch of the target pest. Irrigate moderately after application to move the active ingredient into the root zone. To prevent leaching, use 1.7 fl. oz. (50 mL) of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE in the appropriate amount of water to treat the number of pots based on the pot size as stated in the table. Foliar insect control is accomplished by the uptake of QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE from a healthy root system. This allows the active ingredient to move up into the plant. [1] **Fungus gnat larvae:** Control in the soil by drench or incorporation. QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE will not control adult Fungus Gnats. [2] **Root Mealybug:** To obtain control, thoroughly drench the containerized media but do not allow leaching from the bottom of the container. Use the following rate of 1.7 fl oz (50 mL) in 150 gallons of water. [3] **Citrus Root Weevil:** For use on non-bearing citrus nursery stock. [4] **Thrips**: For suppression on foliage only. Thrips in buds and flowers will not be suppressed.

(continued)

PEST	Containerized Plants		APPLICATION INSTRUCTIONS
	Container Size	No. pots treated with 1.7 fl. oz. (50 mL)	
Field and Forest Nurseries			
White grub larvae (such as Japanese Beetle, Masked Chafers, European Chafer, Oriental Beetle, Asiatic Garden Beetle)	1.7 fl. oz. (50 mL) per 1,000 ft. of row or 3,000 sq. ft.		Before application, mow the vegetation in the treatment area to a height of 3 inches or less. Mow to the lowest height possible. Applications must be made May through July. Treatment must be followed by rainfall or irrigation. Do not use less than 2 gallons of spray volume per 1000 square feet. Apply as a uniform band on either side of the row using a band width six (6) inches wider than the actual root ball diameter to be dug. Do not overlap bands in adjacent rows. For grub control in areas of turf, apply as a broadcast application using 1.35 to 1.7 fl oz (40 to 50 mL) per 3000 sq. ft.

RESTRICTIONS

Do not graze treated areas or use clippings for treated areas for feed or forage. Do not allow runoff or puddling of irrigation water following application.

Do not apply QUALI-PRO IMIDACLOPRID 2F TURF & ORNAMENTAL INSECTICIDE to soils which are water logged or saturated, which will not allow penetration into the root zone of the plants.

Do not allow leachate run out for the first 10 days after application, in order to retain the product and facilitate full plant uptake of the active ingredient.

For outdoor ornamentals, do not apply more than a total of 1.6 pt (0.4 lb of active ingredient imidacloprid) /A per year.

Food Crops: Treated areas may be replanted with any crop specified on an imidacloprid label, or with any crop for which a tolerance exists for the active ingredient.

For crops not listed on an imidacloprid label, or for crops for which no tolerances for the active ingredient have been established, a 12 month plant-back interval must be observed.

APPENDIX B
STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

PESTICIDE STORAGE: Store in a cool, dry place and in such a manner as to prevent cross contamination with other pesticides, fertilizers, food and feed. Store in original container and out of reach of children, preferably in a locked storage area. Store upright at room temperature. Avoid exposure to extreme temperatures. In case of spillage or leakages, soak up with an absorbent material such as sand, sawdust, earth, Fuller's earth, etc. Dispose of with chemical waste.

PESTICIDE DISPOSAL: Open dumping is prohibited. Pesticide wastes are toxic. Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the hazardous waste representative at the nearest EPA Regional Office for guidance.

CONTAINER HANDLING:

Rigid, Nonrefillable containers small enough to shake (i.e. with capacities equal to less than five gallons).

Nonrefillable container. Do not reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling or reconditioning if available, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or a mix tank or collect rinsate at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Once container is rinsed, offer for recycling if available, or puncture and dispose of in a sanitary landfill.

Rigid, Nonrefillable containers that are too large to shake (i.e. with capacities greater than 5 gallons or 50 lbs).

Nonrefillable container. Do not reuse or refill this container. Triple rinse or pressure rinse container (or equivalent) promptly after emptying.

Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Turn the container over onto its other end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Offer for recycling or reconditioning if available, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

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(continued)

STORAGE AND DISPOSAL *(continued)*

Pressure rinse as follows: Empty the remaining contents into application equipment or a mix tank and continue to drain for 10 seconds after the flow begins to drip. Hold container upside down over application equipment or a mix tank or collect rinsate at about 40 PSI for at least 30 seconds. Drain for 10 seconds after the flow begins to drip. Once container is rinsed, offer for recycling if available, or puncture and dispose of in a sanitary landfill.

Refillable Container

Refill this container with pesticide only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller.

Refilling or Returning Containers

If refilling or returning container is planned, end users are not authorized to remove tamper evident cables, one way values or clean container.

Recycle or Disposal of Containers

End users are authorized to remove tamper evident cable as required to remove the product from the container unless the container is equipped with one way valves and refilling or returning is planned.

Instructions for container rinsing and either recycling or disposal are as follows:

Bottom Discharge IBC (e.g. Schuetz Caged IBC or Snyder Square Stackable).

Pressure rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To pressure rinse the container before final disposal, empty the remaining contents from the IBC into application equipment or mix tank. Raise the bottom of the IBC by 1.5 inches on the side which is opposite of the bottom discharge valve to promote more complete product removal. Completely pump or drain rinsate into application equipment or rinsate collection system while pressure rinsing. Continue pressure rinsing for 2 minutes or until rinsate becomes clear. Replace the lid and close bottom valve.

Top Discharge IBC, Drums, Kegs (e.g. Snyder 120 Next Gen, Bonar B120, Drums and Kegs).

Triple rinsing the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To triple rinse the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Rinse all interior surfaces. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times.

APPENDIX B

LIMITATION OF WARRANTY AND LIABILITY

Read the entire directions for use, conditions of warranties and limitations of liability before using this product. If terms are not acceptable, return the unopened product container at once.

By using this product, user or buyer accepts the following **CONDITIONS, DISCLAIMER OF WARRANTIES, and LIMITATIONS OF LIABILITY.**

CONDITIONS: The directions for use of this product are believed to be adequate and must be followed carefully. However, it is impossible to eliminate all risks associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application, all of which are beyond the control of Makhteshim Agan of North America, Inc. All such risks shall be assumed by the user or buyer.

DISCLAIMER OF WARRANTIES: To the extent consistent with applicable law, Makhteshim Agan of North America, Inc. makes no other warranties, express or implied, of merchantability or of fitness for a particular purpose or otherwise, that extend beyond the statements made on this label. No agent of Makhteshim Agan of North America, Inc. is authorized to make any warranties beyond those contained herein or to modify the warranties contained herein. To the extent consistent with applicable law, Makhteshim Agan of North America, Inc. disclaims any liability whatsoever for special, incidental or consequential damages resulting from the use or handling of this product.

LIMITATIONS OF LIABILITY: To the extent consistent with applicable law, the exclusive remedy of the user or buyer for any and all losses, injuries or damages resulting from the use or handling of this product, whether in contract, warranty, tort, negligence, strict liability or otherwise, shall not exceed the purchase price paid or at Makhteshim Agan of North America, Inc.'s election, the replacement of product.

Summary of Report

How Neonicotinoids Can Kill Bees

The Science Behind the Role These Insecticides Play in Harming Bees

Neonicotinoids are absorbed by the plant and transferred through the vascular system, making the plant itself toxic to insects.

Home and garden products may be applied to ornamental and landscape plants at rates many times higher than those approved for agricultural crops.

Bee safety of currently approved products should be reassessed and all conditional registrations immediately suspended.

Neonicotinoids have been adopted for use on an extensive variety of farm crops as well as ornamental landscape plants. They are the most widely used group of insecticides in the world, and have been for a decade. Developed as alternatives for organophosphate and carbamate insecticides, neonicotinoids are compounds that affect the nervous system of insects, humans, and other animals. Although less acutely toxic to mammals and other vertebrates than older insecticides, neonicotinoids are highly toxic in small quantities to many invertebrates, including beneficial insects such as bees.

The impact of this class of insecticides on pollinating insects such as honey bees and native bees is a cause for concern. Because they are systemic chemicals absorbed into the plant, neonicotinoids can be present in pollen and nectar, making them toxic to pollinators that feed on them. The potentially long-lasting presence of neonicotinoids in plants, although useful from a pest management standpoint, makes it possible for these chemicals to harm pollinators even when the initial application is made weeks before the bloom period. In addition, depending on the compound, rate, and method of application, neonicotinoids can persist in the soil and be continually taken in by plants for a very long periods of time.

A sleeping cluster of male sweat bees on apple blossom. Neonicotinoids can be applied to apple trees in backyards at rates between 12 and 120 times greater than allowed in commercial orchards. (Photo: Tom Potterfield/Flickr.com.)

Across Europe and North America, a possible link to honey bee die-offs has made neonicotinoids controversial. In December 2013, the European Union significantly limited the use of clothianidin, imiadcloprid, and thiamethoxam on bee-attractive crops. In the United States, Canada, and elsewhere, local, state, and federal decision makers are also taking steps to protect pollinators from neonicotinoids. For example, the U.S. Fish and Wildlife Service phased out all uses of neonicotinoids on National Wildlife Refuges lands starting in January 2016.

This report reviews research on the impact of these pesticides on bees. For a research review on beneficial insects, including those important to biological control, see Hopwood et al. (2013). See Morrissey et al. (2015), Mineau et al. (2013), and Gibbons et al. (2015) for reviews on aquatic invertebrates, birds, and vertebrates, respectively.

The Xerces Society for Invertebrate Conservation also maintains an annotated bibliography of relevant research published since the writing of this report on its web site. That bibliography can be accessed at: www.xerces.org/neonicotinoids-and-bees.

XERCES SOCIETY
for Invertebrate Conservation

www.xerces.org
(855) 232-6639

To download the full report and read policy recommendations, go to www.xerces.org/neonicotinoids-and-bees.

Findings

The following findings are divided into three sections. In the first section, we present clearly documented information about neonicotinoid impacts on bees, i.e., facts that are supported by an extensive body of research. (Fully cited evidence for these is detailed in the main body of this report.) The second section covers what can be inferred from the available research. This includes possible effects for which there is currently only limited research or the evidence is not conclusive. In the third section, we identify knowledge gaps in our understanding of pollinator and neonicotinoid interactions. Filling these gaps will allow better-informed decisions about the future use and regulation of these chemicals.

Clearly Documented Facts

Exposure of Bees to Neonicotinoids

- Neonicotinoid residues found in pollen and nectar are consumed by flower-visiting insects such as bees. Residue concentrations can reach levels that cause sublethal effects through a variety of application methods, including use of coated seed, and in some situations can reach lethal levels.
- Neonicotinoids can persist in soil for months or years after a single application. Residues have been found in woody plants up to six years after soil drench application.
- Untreated plants have been found to absorb the residues of some neonicotinoids that persisted in the soil from the previous year.
- Neonicotinoids applied to crops, even as seed coatings, can contaminate adjacent vegetation, including bee-attractive wildflowers.
- Products approved for home and garden use may be applied to plants at rates substantially higher than the maximum label rate approved for agricultural crops.
- Direct contact from foliar applications of the most toxic neonicotinoids has caused bee kills; additionally, foliar residues on plant surfaces may remain lethal to bees for several days.
- Bee kills have been caused by legal applications of neonicotinoids to *Tilia* (linden, basswood). Some of these applications, designed to be uptaken by the trees, occurred weeks to months prior to when bees visited the trees.

Effects on Honey Bees (*Apis mellifera*)

- Clothianidin, dinotefuran, imidacloprid, and thiamethoxam are highly toxic to honey bees by contact and ingestion.
- Thiacloprid and acetamiprid are moderately toxic to honey bees. (To understand how the EPA defines the levels of toxicity, see EPA Toxicity Classification Scale for Bees on right.)
- Neonicotinoids absorbed by plants are metabolized over time. Some of the resulting breakdown products are also toxic to honey bees, and sometimes even more toxic than the original compound.
- Honey bees exposed to sublethal levels of neonicotinoids can experience problems with flight and navigation, reduced taste sensitivity, and slower learning of new tasks, all of which impact foraging ability and hive productivity.
- Larvae exposed to sublethal doses of imidacloprid in brood food had reduced survival and pupation, altered metabolism, and reduced olfactory response as adults.
- Contaminated talc, abraded seed coating, or dust that becomes airborne during planting of neonicotinoid-coated seed is acutely toxic on contact to honey bees.

To download the full report and read policy recommendations, go to
www.xerces.org/neonicotinoids-and-bees.

Effects on Bumble Bees (*Bombus* spp.)

- Imidacloprid, clothianidin, dinotefuran, and thiamethoxam are highly toxic to bumble bees.
- Exposure to sublethal amounts of neonicotinoids can result in reductions in food consumption, reproduction, worker survival rates, colony survival, and foraging activity.
- Queen production is significantly reduced by sublethal amounts of neonicotinoids, which may lower bumble bee populations because fewer colonies are established the following year.

Effects on Solitary Bees

- Clothianidin and imidacloprid are highly toxic to blue orchard bees (*Osmia lignaria*) and alfalfa leafcutter bees (*Megachile rotundata*).
- Imidacloprid residues on alfalfa foliage increase rates of mortality of alfalfa leafcutter bees and alkali bees (*Nomia melanderi*).
- Blue orchard bee larvae required more time to mature after consuming sublethal levels of imidacloprid in pollen.
- Sublethal amounts of neonicotinoids can have harmful effects on the reproduction of red mason bees (*Osmia bicornis*).

Presence in the Environment

- Tens of millions of acres of neonicotinoid-coated seed is planted annually in the United States and Canada. When applied systemically and taken up by the plant, imidacloprid, thiamethoxam, and clothianidin can have residual activity within plants for months to years.
- Imidacloprid, thiamethoxam, and clothianidin are persistent in soil, with residues present for months to years.
- Neonicotinoids can move into water and have been found in a range of water bodies, where they may persist. Clothianidin has been found in rivers and streams, wetlands, groundwater, and puddles. Imidacloprid has been found in surface water, groundwater, and puddles. Thiamethoxam has been found in waterways, wetlands, groundwater, and puddles, and has also been detected in irrigation water pulled from ground wells. Acetamiprid and dinotefuran have been found in waterways.

Inferences from Research Results

Exposure of Bees to Neonicotinoids

- Application as a seed coating can result in low levels of residues in pollen and nectar that have been linked with sublethal effects in solitary bees.
- Application methods such as foliar sprays, soil drenches, and trunk injections apply a higher dosage per plant than seed coatings and may result in much higher—even lethal—levels of neonicotinoid residues in pollen and nectar.
- Application of neonicotinoids before and during bloom may result in residue levels in pollen and nectar that cause sublethal effects or even mortality.
- Application by soil drench or trunk injection to woody ornamental species may result in residue levels in blossoms that cause lethal and sublethal effects for more than a year after treatment.
- Foliar applications may have shorter residual toxicity in comparison to other application methods such as trunk injection and soil drench.
- Pesticide residues, including from planting coated seeds, have been found in honey bee hives.

To download the full report and read policy recommendations, go to
www.xerces.org/neonicotinoids-and-bees.

Effects on Pollinators

- There is no direct link demonstrated between neonicotinoids and the honey bee syndrome known as colony collapse disorder (CCD). However, recent research suggests that pesticides, including neonicotinoids, may make honey bees more susceptible to parasites and viruses, including the intestinal parasite *Nosema*, which has been implicated as one causative factor in CCD.
- Neonicotinoids may synergistically interact with demethylase inhibitor (DMI) fungicides. DMI fungicides have significantly increased the toxicity of neonicotinoids to honey bees in some laboratory tests. The synergistic effects of these mixtures in field settings using formulated pesticides in water appear to be less dramatic in comparison with the laboratory research.
- Bumble bees and solitary bees can be affected by neonicotinoids at lower concentrations than are honey bees. Currently, evaluation of other pollinators beyond honey bees is extremely limited in EPA's pesticide registration process.

Knowledge Gaps

Exposure of Bees to Neonicotinoids

- What are the conditions under which residue levels both in the plant and soil increase in concentration over time with repeated applications?
- What is the risk posed by neonicotinoid contamination of nontarget plants growing near treated plants?
- What is the risk posed by bees from forage cover crops absorbing neonicotinoids when planted in a rotation with a neonicotinoid-treated row crop?
- How do these chemicals move through the plant? For example, how soon after product application do neonicotinoid residues appear in pollen and nectar, how fast is it metabolized in the plant, and how do levels vary with application method, crop, and specific compound? Do they move in phloem tissue in addition to xylem?
- Is the combined presence of neonicotinoids and their break-down products in pollen or nectar as toxic or more toxic to bees than the individual chemicals?
- Does the movement of neonicotinoids within a plant vary with the type of plant (e.g., herbaceous vs. woody), or by functional group (e.g., forbs vs. legumes vs. grasses)?
- How do residue levels vary in plants grown under differing field conditions (e.g., drought), soil types (e.g., sandy vs. loam), or under variable nutrient levels?

Effects on Pollinators

- What are the acute and chronic contact and ingestion effects of neonicotinoids to bees other than honey bees?
- What is the full extent of the sublethal effects of neonicotinoids on adult bees?
- What is the full extent of effects of neonicotinoids on larval bees?
- Do honey bees experience delayed effects of neonicotinoids during adverse weather conditions (e.g., winter or drought) when stored foods are consumed?
- What is the full extent of effects that soil residues have on ground-nesting bees (which represent approximately 70% of bee species)?
- What effects, if any, do neonicotinoid contaminated plant tissues and mud have on bees that construct nests from these materials?
- How do neonicotinoids affect other pollinators such as butterflies, moths, beetles, flies, and wasps?

To download the full report and read policy recommendations, go to www.xerces.org/neonicotinoids-and-bees.