



Neonics and the spillover

Ricardo Ramirez

Entomologist

Utah State University





UTAH PESTS News

Utah Plant Pest Diagnostic Laboratory and USU Extension

Vol. IX, Fall 2015

What's Inside

Cover Crops - Seriously!

Cover Crops for Pest Management

Pitch Moth Update

Russet Mites on Tomatoes

Cool-Season Turfgrass Varieties for Utah

Centers for Disease Control Acquits Hobo Spider

Ghosts of Holiday Pests

Why Did my Tomatoes Ripen so Late?

Fall is for Mushroom Hunting and Spore Prints

How to Make a Spore Print

National IPM News

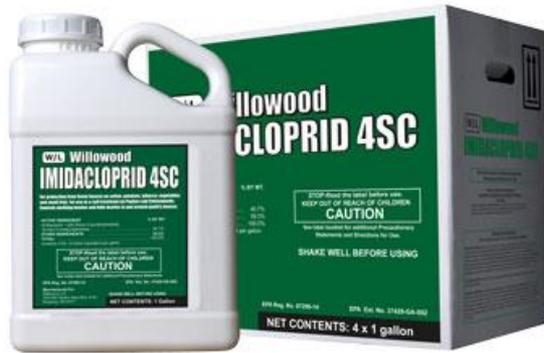
Neonicotinoids: From Innovation to Bad Word



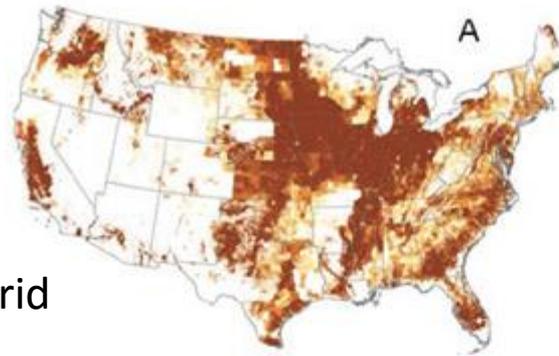
In recent years, the neonicotinoid class of insecticides, or “neonics”, has come under scrutiny, primarily because of concerns with their effects on bees, but also from other environmental issues. The first neonicotinoid (imidacloprid) was released in 1994, at a time when a number of insect pests had developed resistance to several of the major insecticide classes including pyrethroids, organophosphates, and carbamates.

Several characteristics of the neonicotinoids were seen to be favorable, including low mammalian toxicity, high selectivity for arthropods, persistence, and systemic activity. The water solubility allows for movement into plant tissues. While foliar applications can be made, neonics are mainly applied as a seed coating or soil application. These two methods reduced insecticide exposure to the applicator and to beneficial insects. Unfortunately, applicators also saw an opportunity to use neonicotinoids preventively, regardless of the presence of the pest, fitting with a “set it and forget it” mentality. All of these characteristics resulted in increased adoption of neonicotinoids in agricultural and urban settings, making them the most-used insecticides worldwide.

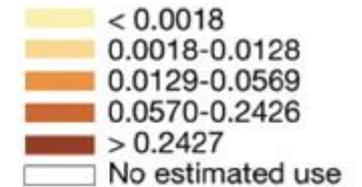
- Neonicotinoid use in 2011



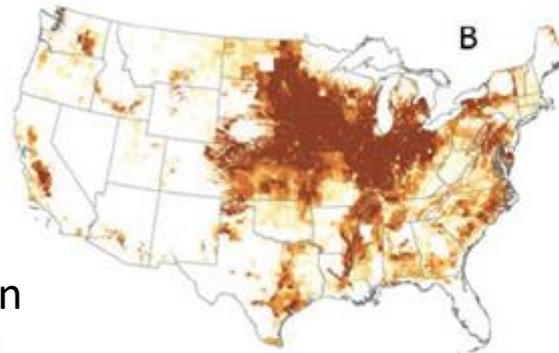
Imidacloprid



Estimated use on agricultural land, in pounds per square mile



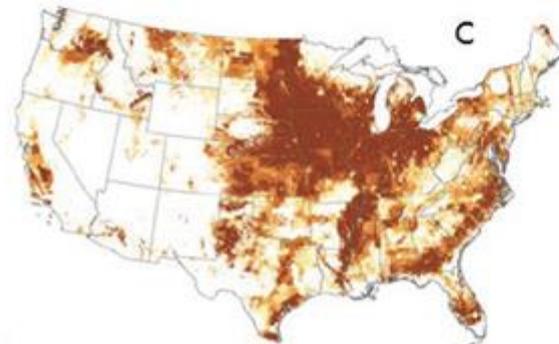
Clothianidin



Estimated use on agricultural land, in pounds per square mile



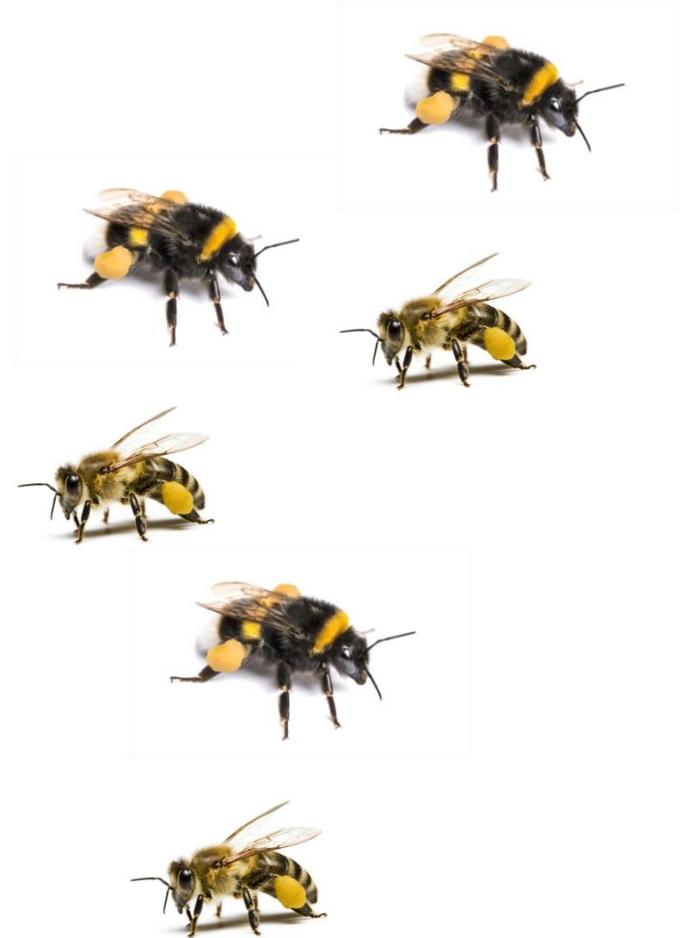
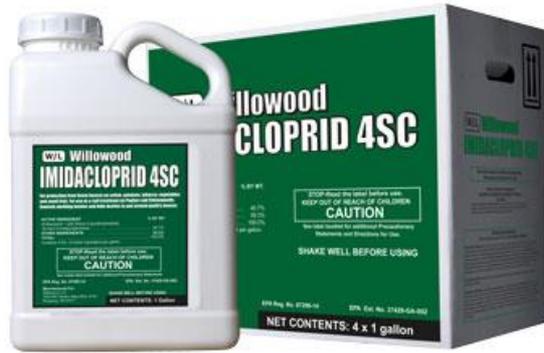
Thiamethoxam



Estimated use on agricultural land, in pounds per square mile



Do neonics harm bees?



Portland bans use of insecticides believed to be harmful to bees on city property



By [Andrew Theen](#) | [The Oregonian/OregonLive](#)
[Email the author](#) | [Follow on Twitter](#)

on April 01, 2015 at 1:12 PM, updated April 01, 2015 at 1

Portland banned the **use of neonicotinoid insecticides**, a wide-ranging classification of chemical pest killers, on city-owned property.

The City Council unanimously approved an emergency ordinance Wednesday, making the insecticide ban effective immediately.

"We're doing another good thing for the people of Portland, Oregon, the United States, maybe the entire world," said Commissioner Amanda Fritz, who introduced the policy.

Few question the efficacy of the insecticides, which have a long shelf life and quickly kill pests. But the chemical sprays persist in the environment, and opponents say they provide a clear and documented harm to bees, birds and butterflies.

- Organic Consumers Association and other activists lead “save the bees” campaigns

Show Bees Some
LOVE



TELL HOME DEPOT
AND LOWE'S TO
STOP SELLING BEE
KILLING PESTICIDES!

valentine.beeaction.org

Join the National Swarm February 10th-16th



Public impact

- In 2015, Home Depot required a **label to indicate neonic treatment.** Other retailers requested no neonics be used.



Insecticide Active ingredient	Insecticide class	Toxicity			
		Mammal LD ⁵⁰ (mg/kg)	Bird LD ⁵⁰ (mg/kg)	Fish LC ⁵⁰ (mg/L)	Honey bee LD ⁵⁰ (µg/bee)
Clothianidin	Neonicotinoid	>500	430	104	0.004
Dinotefuran	Neonicotinoid	>2000	>2000	>100	>0.023
Imidacloprid	Neonicotinoid	424	152	211	0.0037
Thiamethoxam	Neonicotinoid	>1563	576	>125	0.005
Azadiractin	Biorational	>5000	>225	440	>5.9
Spinosad	Biorational	>5000	>2250	2.96	0.024
Chlorantraniliprole	Diamide	>5000	>2250	>12	>4
Bifenthrin	Pyrethroid	54.5	1800	0.00026	0.1
Lambda- cyhalothrin	Pyrethroid	56	>3950	0.00021	0.038
Carbaryl	Carbamate	614	>2000	2.6	0.14
Chlorpyrifos	Organophosphate	64	13.3	0.0013	0.059

Adapted from Richmond, D and A Paton. 2014. Golf Course Management



Neonicotinoid Pesticide Reduces Bumble Bee Colony Growth and Queen Production

Penelope R. Whitehorn,¹ Stephanie O'Connor,¹ Felix L. Wackers,² Dave Goulson^{1*}

Growing evidence for declines in bee populations has caused great concern because of the valuable ecosystem services they provide. Neonicotinoid insecticides have been implicated in these declines because they occur at trace levels in the nectar and pollen of crop plants. We exposed colonies of the bumble bee *Bombus terrestris* in the laboratory to field-realistic levels of the neonicotinoid imidacloprid, then allowed them to develop naturally under field conditions. Treated colonies had a significantly reduced growth rate and suffered an 85% reduction in production of new queens compared with control colonies. Given the scale of use of neonicotinoids, we suggest that they may be having a considerable negative impact on wild bumble bee populations across the developed world.

OPEN

Neonicotinoid pesticides severely affect honey bee queens

Geoffrey R. Williams^{1,2}, Aline Troxler^{1,2}, Gina Retschnig^{1,2}, Kaspar Roth^{1,2}, Orlando Yañez^{1,2}, Dave Shutler³, Peter Neumann^{1,2,4} & Laurent Gauthier²

Received: 18 May 2015

Accepted: 23 July 2015

Published: 13 October 2015

Queen health is crucial to colony survival of social bees. Recently, queen failure has been proposed to be a major driver of managed honey bee colony losses, yet few data exist concerning effects of environmental stressors on queens. Here we demonstrate for the first time that exposure to field-realistic concentrations of neonicotinoid pesticides during development can severely affect queens of western honey bees (*Apis mellifera*). In pesticide-exposed queens, reproductive anatomy (ovaries) and physiology (spermathecal-stored sperm quality and quantity), rather than flight behaviour, were compromised and likely corresponded to reduced queen success (alive and producing worker offspring). This study highlights the detriments of neonicotinoids to queens of environmentally and economically important social bees, and further strengthens the need for stringent risk assessments to safeguard biodiversity and ecosystem services that are vulnerable to these substances.

THE NEW EPA BEE ADVISORY BOX

On EPA's new and strengthened pesticide label to protect pollinators

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 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/tribe, go to: www.aapco.org. Pesticide incidents can also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: beekill@epa.gov

Alerts users to separate restrictions on the label. These prohibit certain pesticide use when bees are present.



The new bee icon helps signal the pesticide's potential hazard to bees.

Makes clear that pesticide products can kill bees and pollinators.

Bees are often present and foraging when plants and trees flower. EPA's new label makes it clear that pesticides cannot be applied until all petals have fallen.

Warns users that direct contact and ingestion could harm pollinators. EPA is working with beekeepers, growers, pesticide companies, and others to advance pesticide management practices.

Highlights the importance of avoiding drift. Sometimes, wind can cause pesticides to drift to new areas and can cause bee kills.

The science says that there are many causes for a decline in pollinator health, including pesticide exposure. EPA's new label will help protect pollinators.



Read EPA's new and strengthened label requirements: <http://go.usa.gov/jHH4>



MANAGED POLLINATOR PROTECTION PLAN

MANAGED POLLINATOR PROTECTION PLAN (MP3)

As part of the national strategy to promote the health of honey bees and other pollinators, the Utah Department of Agriculture and Food (UDAF) is developing a [Managed Pollinator Protection Plan \(MP3\)](#). The goals of this plan are to protect honey bees from pesticide poisoning, promote honey bee forage resources and improve overall pollinator health.



UDAF has developed a preliminary plan to promote pollinator health, which emphasizes cooperation among all stakeholders:

- Beekeepers
- Landowners
- Applicators

The goal is to create a balanced solution to a complex problem. UDAF urges stakeholders and interested members of the general public to provide comments and suggestions about Utah's MP3. If you have suggestions regarding protecting pollinators, please email us your ideas: agriculture@utah.gov

Do neonics in TURF harm bees?





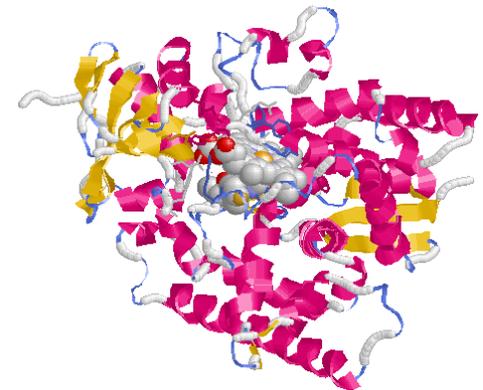
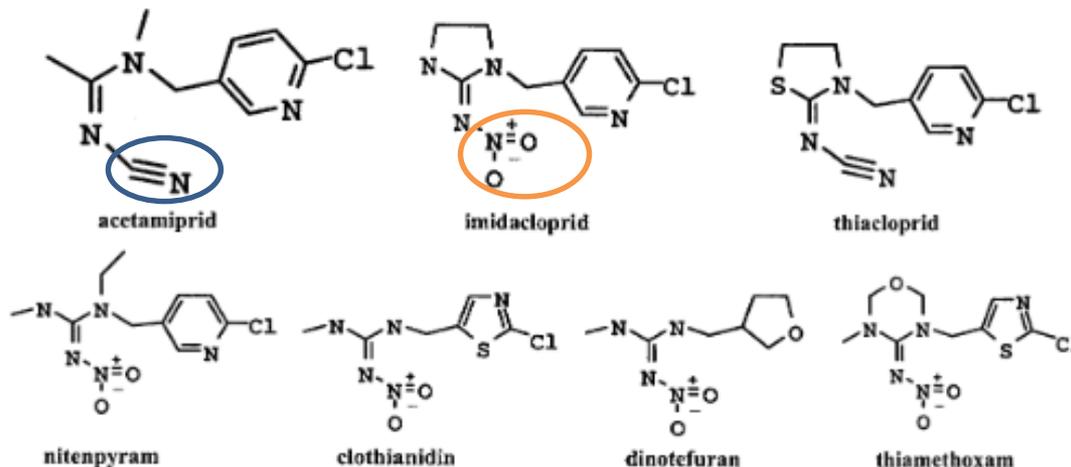
Weeds may provide a path for exposure

- Turf treatment: clothianidin or chlorantraniliprole
- Bee colonies exposed to clothianidin with clover: reduced weight gain and no queens
- Chlorantraniliprole did not appear to harm bees.
- Mowed clover: no effect of insecticides

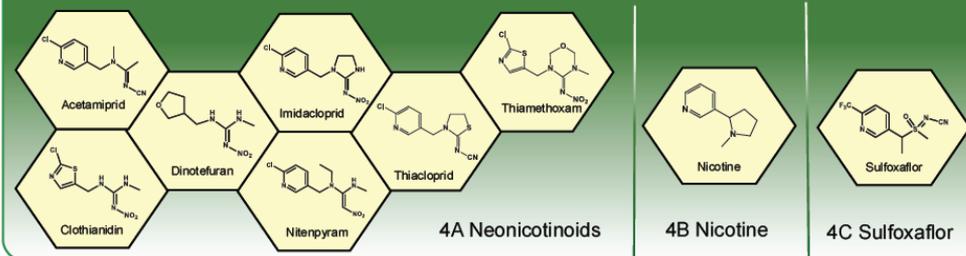


Neonics created equal?

- Acetamiprid and thiacloprid (cyano-substituted neonics) show much lower toxicity compared to nitro-substituted neonics.
- Quick degradation by enzymes used in detoxification- P450



Group 4: Nicotinic acetylcholine receptor (nAChR) agonists



Group 4: Nicotinic acetylcholine receptor agonists

4A Neonicotinoids

4B Nicotine

4C Sulfoxaflor

Product profile

Active ingredient	Flupyradifurone
Chemical class	Butenolide
Brand name	SIVANTO® prime
Formulation	SL 200 Soluble Liquid FS 480 Flowable concentrate for seed treatment
Mode of action	Agonist of the insect nicotinic acetylcholine receptor (nAChR)
IRAC classification	Group 4D
Crops	Vegetables, fruits incl. grapes, citrus and plantation crops (coffee, cocoa), as well as cotton, soybean (seed treatment)
Key pests	Aphids, whiteflies and psyllids, selected hoppers, scales, beetles mirids, leaf miners



EPA Releases Preliminary Risk Assessment for Imidacloprid

The U.S. Environmental Protection Agency said a preliminary pollinator risk assessment for the insecticide imidacloprid shows the chemical can threaten bees.

January 6, 2016



Pest Management

WASHINGTON— The [U.S. Environmental Protection Agency \(EPA\)](#) announced a [preliminary pollinator risk assessment for imidacloprid](#), which shows a threat to some pollinators. EPA's assessment, prepared in collaboration with California's Department of Pesticide Regulation, indicates that imidacloprid potentially poses risk to hives when the pesticide comes in contact with certain crops that attract pollinators.

“Delivering on the President's National Pollinator Strategy means EPA is committed not only to protecting bees and reversing bee loss, but for the first time assessing the health of the colony for the neonicotinoid pesticides,” said Jim Jones Assistant Administrator of the Office of Chemical Safety and Pollution Prevention. “Using science as our guide, this preliminary assessment reflects our collaboration with the State of California and Canada to assess the results of the most recent testing required by EPA.”

The preliminary risk assessment identified a residue level for imidacloprid of 25 ppb, which sets a threshold above which effects on pollinator hives are likely to be seen, and at that level and below which effects are unlikely. These effects include decreases in pollinators as well as less honey produced. .

For example, data show that citrus and cotton may have residues of the pesticide in pollen and nectar above the threshold level. Other crops such as corn and leafy vegetables either do not produce nectar or have residues below the EPA identified level. Additional data is being generated on these and other crops to help EPA evaluate whether imidacloprid poses a risk to hives.

Pesticides

Contact Us Share

Pesticides Home

A-Z Index

Bed Bugs

Antimicrobial Pesticides

Biopesticides

Freedom of Information Act Requests

International Activities Related to Pesticides

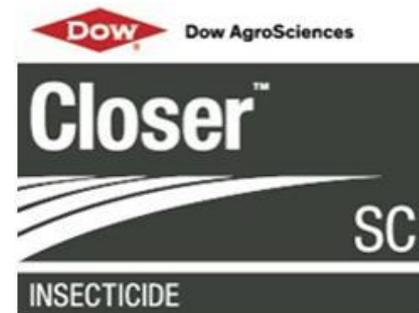
You are here: [EPA Home](#) » [Pesticides](#) » Cancellation Order Issued for Sulfoxaflor

Cancellation Order Issued for Sulfoxaflor

For Release: November 13, 2015

On November 12, 2015, EPA issued a cancellation order for all previously registered Sulfoxaflor products. This cancellation order is in response to the September 10, 2015, order of the Ninth Circuit Court of Appeals finding that EPA improperly approved the Federal Insecticide, Fungicide, and Rodenticide Act registrations of the pesticide sulfoxaflor; the court's order became effective on November 12.

Registration occurred May 6, 2013



Know the risks and have a back up plan?

- Integrated Pest Management (IPM)
- Alternative Management Strategies
- Chemical Rotations

