



Science For A Better Life

Proposed House Bill 539 Bayer Comments

Iain Kelly, Ph.D.,
Director Regulatory Policy and Issues Management
Bayer CropScience

February 3, 2016

The Changing U.S. Honey Bee Industry



▶ Almond pollination requires approximately 1.6 million of the 2.6 million colonies in the U.S. and is a driver of the number of colonies



Honey and Hive Products

Changing
honey bee
industry



Pollination Services

Insect pollination

▶ Not required by most staple crops (e.g. corn, rice, wheat)

Required by some fruits and nuts (e.g. blueberries, apples, almonds)

Not required by other fruits and nuts (e.g. strawberries, pecans)

Bee Armageddon: Are Honey Bees Going Extinct?

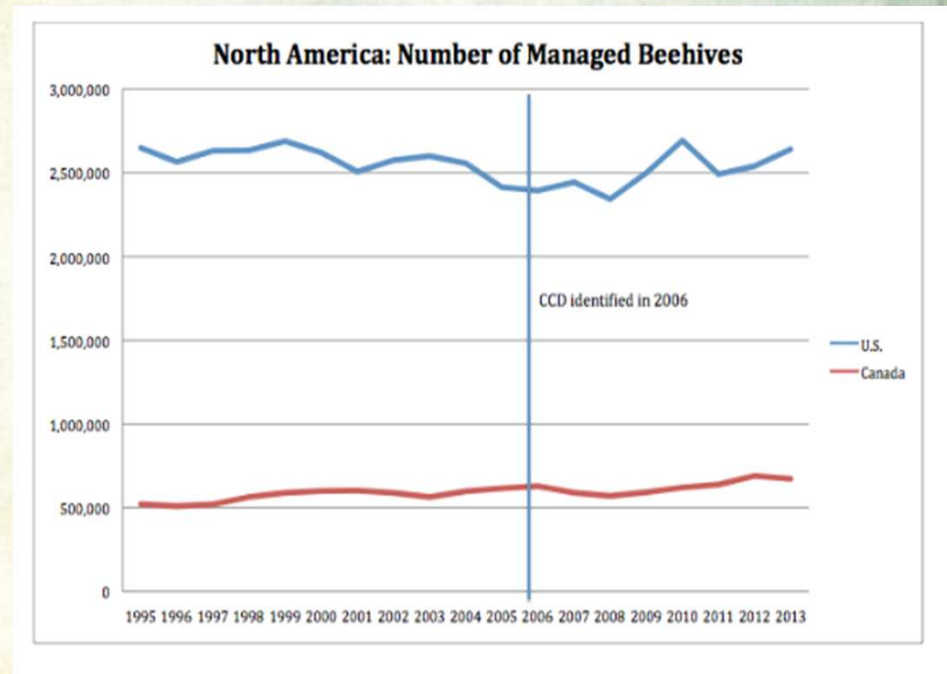


North America Managed Beehives Colony Numbers

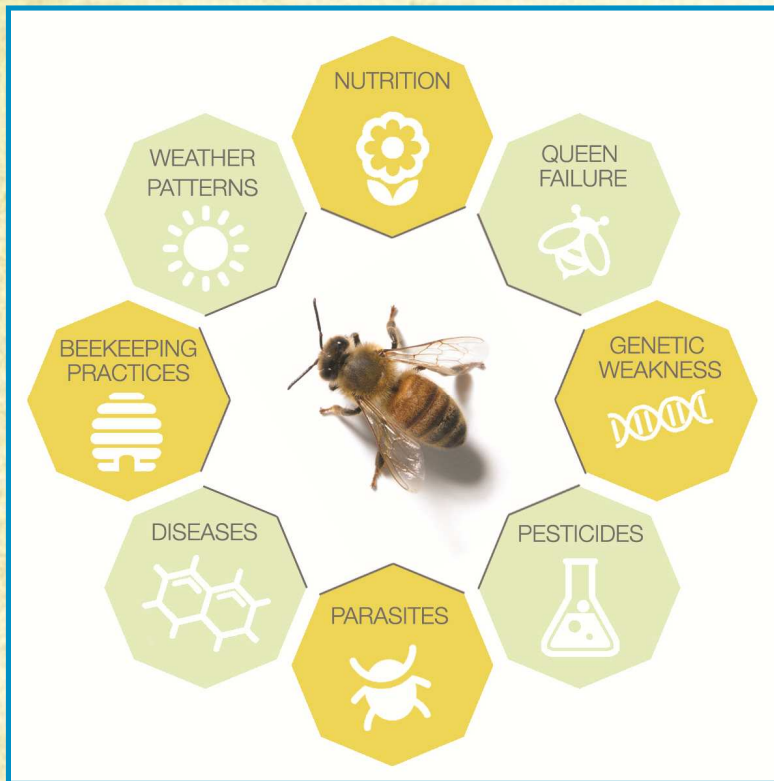


USDA Statistics - U.S. Honey producing colonies - 2014

- Bee population
 - Up nearly 13% since 2008
- Honey production in 2014
 - 178 million pounds of honey
 - up 19% from 2013
 - Colonies producing honey
 - 2.74 million
 - up 4% from 2013



Multiple Stressors Affecting Honey Bee Health



Parasites (Varroa mites)

Diseases (Nosema, bacteria and viruses)

Poor Bee Nutrition

- Lack of varied diet & suitable forage

Weather patterns and changing climate

Pesticides (used in hives as well as in agriculture)

Beekeeping management practices

Lack of genetic diversity

Queen failure



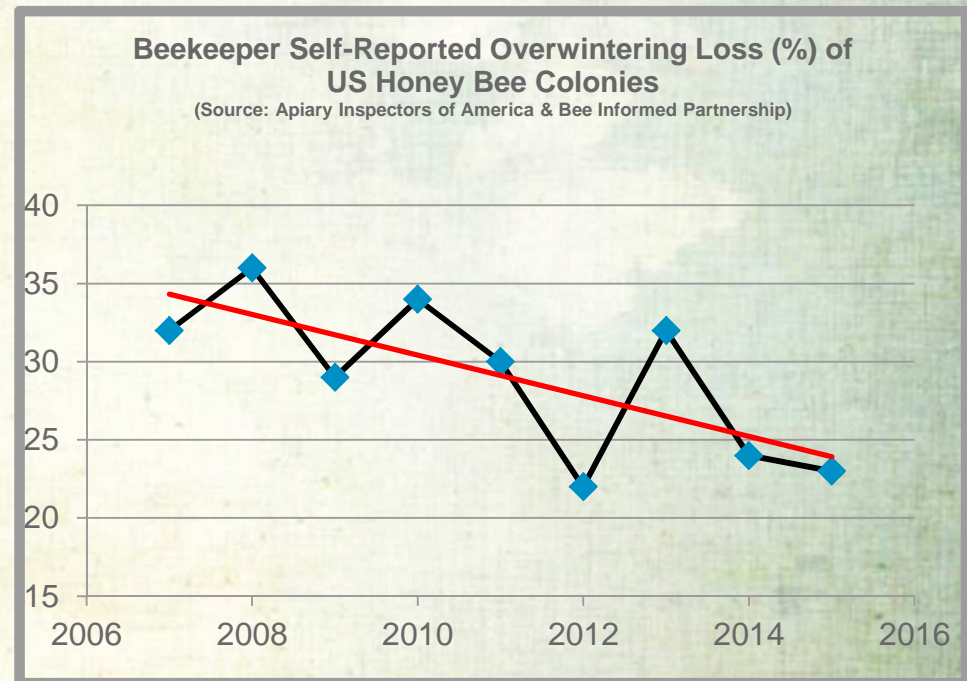
Beekeeper Challenges



Beekeeper Challenges

- Stressors affecting bee health.
- Annual winter losses – 30% or higher.
- Costs of maintaining healthy bee colonies continues to increase.
 - Parasite Control
 - Feeding
 - Queen Replacement
- Aging beekeeper population.

(Wall Street Journal, January 23, 2015)



The National Pollinator Strategy



THREE OVERARCHING GOALS

by Federal departments and agencies in collaboration with public and private partners:

- Reduce honey bee colony losses during winter (overwintering mortality) to no more than 15%.
- Increase the Eastern population of the monarch butterfly to 225 million butterflies
- Restore or enhance 7 million acres of land for pollinators over the next 5 years

NATIONAL STRATEGY TO
PROMOTE THE HEALTH
OF HONEY BEES AND
OTHER POLLINATORS

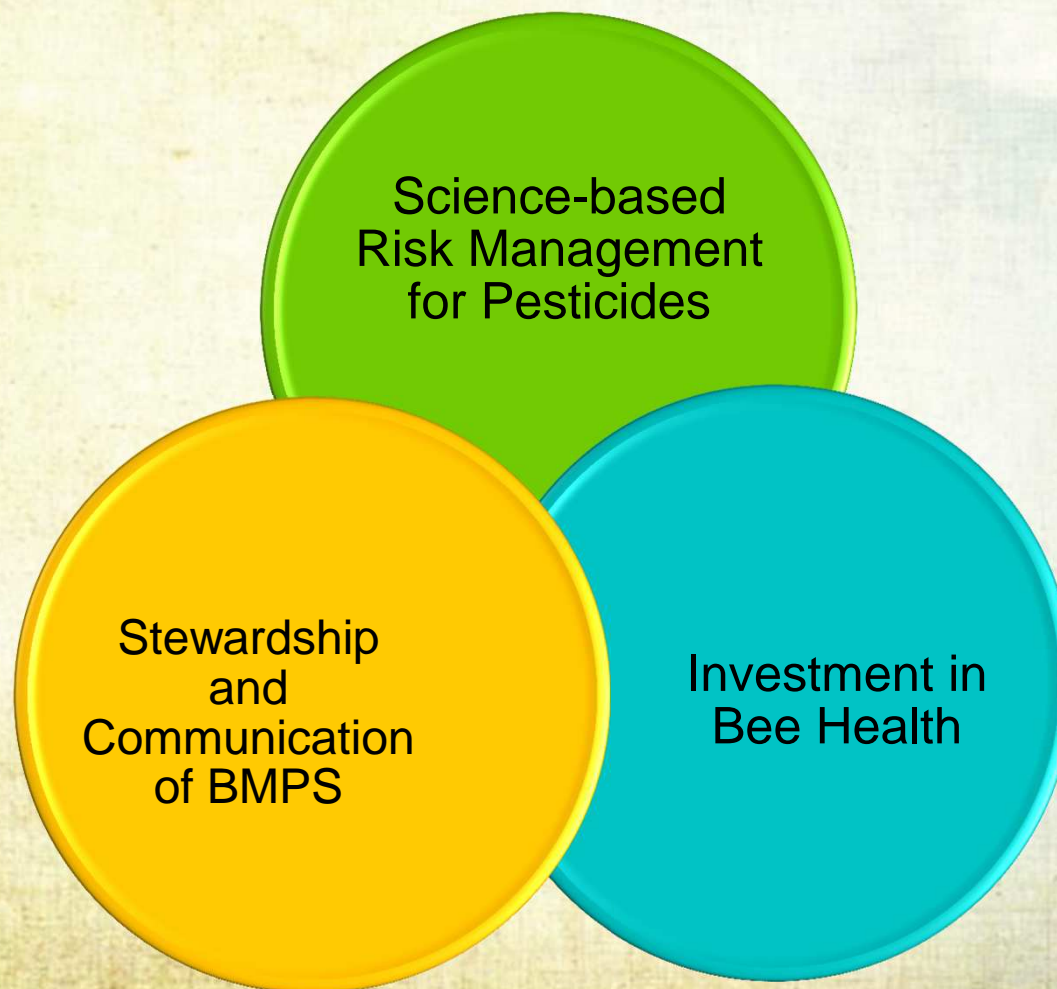
Pollinator Health Task Force

MAY 19, 2015





System-wide approach to bee health



System-wide approach to bee health



Investment in Bee Health

Bee Health Research Needs



- Integrated pest management
- Improved bee habitat
- Supportive agricultural policies
- Targeted research
- Collaboration and partnerships



The crop protection industry rents large numbers of bee colonies for the production of hybrid seeds

Our customers rely heavily on access to healthy bees

Everyone should consider what they can to invest in bee health initiatives.

Bayer Bee Care: Then & Now



- Bees are critical to the environment
- Sustainable environments require modern agriculture techniques & healthy bees



Bayer Bee Care Center: Overview



- 6000 square feet
- Full laboratory
- Honey extraction room
- Research Apiary
- Pollinator Gardens
- Observation Hive
- Meeting Room
- Office space
- Educational displays





Successful Proactive Collaborations

Healthy Hives 2020: developing tangible solutions for hive health within 5 years.



HEALTHY HIVES 2020

Helping Bees Thrive

We all agree that bees are important. Let's work together to help them thrive. By focusing on beekeeping economics, best management practices, and evaluating smart hives and improving bee genetics, Healthy Hives hopes to achieve measurable honey bee health improvements by the year 2020. To learn more about the Bayer Bee Care Program, visit beehealth.bayer.us.

Feed a Bee Home | Education | More Posts | FAQ

This year, we set out to grow 50 million flowers for bees to feast on, and we have exceeded this goal! All of the individual seed packets have been shipped, but you can still support Feed a Bee. Ask Bayer to plant on your "bee-half" or grow a bee-attractant plant, and share photos of your flowers on social media using the hashtag #FeedABee. Organizations interested in planting 10 or more acres of forage should contact feedabee@bayer.com with information on their project proposal.

Plant on my "bee" half »

Send me updates on bee health »

Commit to growing a plant »

Feed a Bee: Rallying individuals to create forage and habitat

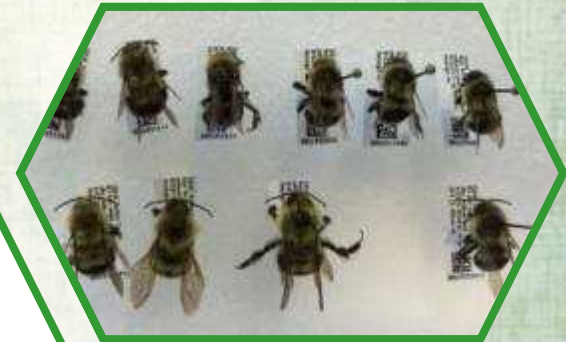
Bayer Bee Care: Bee Health Research



Bee Repellents



Stock Improvement



Biodiversity



Hive Monitoring



Parasites & Pathogens

Bayer Bee Care: Public Outreach



Youth Groups



Tradeshows



Community Events



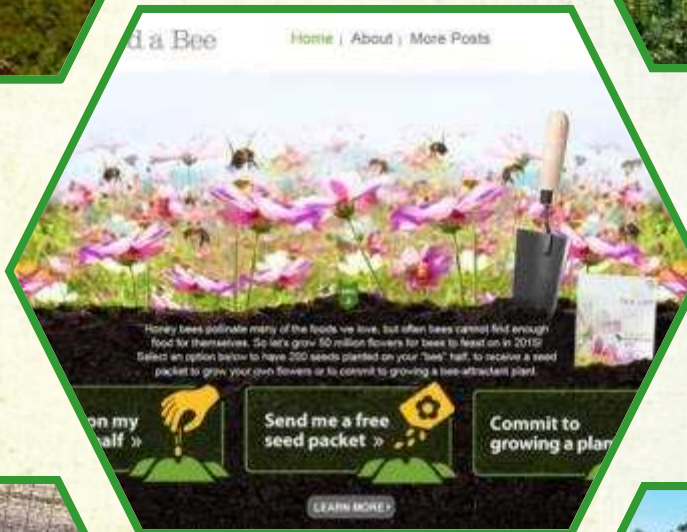
Speaking Engagements



Bee Center Tours



Bayer Bee Care: Forage Improvement



Roadsides & Utility Rights of Ways

Cover Crops

Feed A Bee





System-wide approach to bee health

Science-based
risk
management for
pesticides



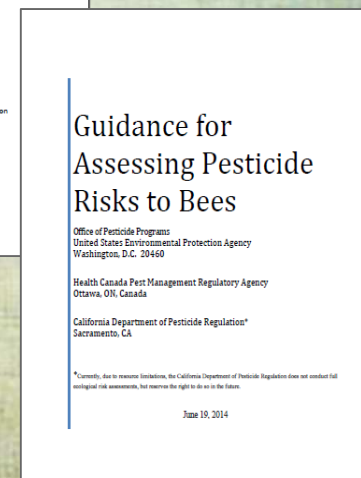
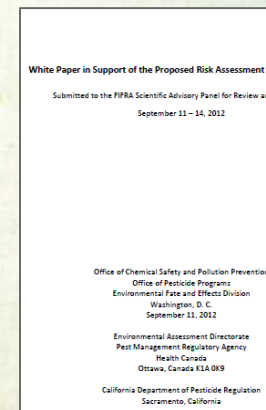
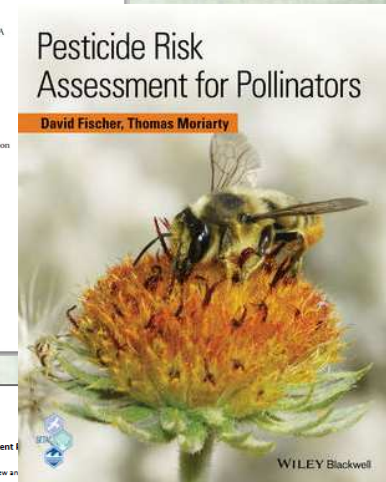
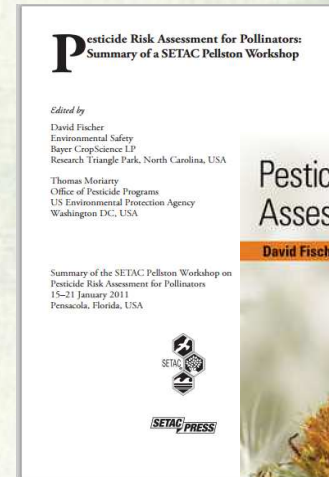
Pollinator protection should be achieved by:

- A robust science-based risk assessment process to determine the potential risks posed by pesticides;
- Adoption of the science into a regulatory testing framework that appropriately balances risks and benefits;
- Consistent label language appropriate to crop, application method, and pesticide product, based on the risk assessment;
- Robust and coordinated stewardship of pesticide products, crops, and managed pollinator populations;
- Applicator training and education of growers to ensure use of best management practices.

Steps Towards Risk Management Framework for Pesticides



- 2011: Global Pellston Workshop
- 2012: EPA Pollinator Risk Assessment Framework White Paper
- 2014: Final EPA Guidance on Risk Assessments for Pollinating Bees
- 2014: State Managed Pollinator Protection Plan (MP3) Proposal
- 2015: EPA's Proposal to Mitigate Exposure to Bees from Acutely Toxic Pesticide Products
- 2016: EPA released Draft Pollinator Ecological Risk Assessment for Imidacloprid



Registration Process and Bees



- Risk Assessment
 - Extensively studied prior to registration.
 - Unprecedented amount of data is being generated
 - Effects at a colony level investigated
- Benefits assessment
 - Agronomic
 - Socio-economic
 - Environmental

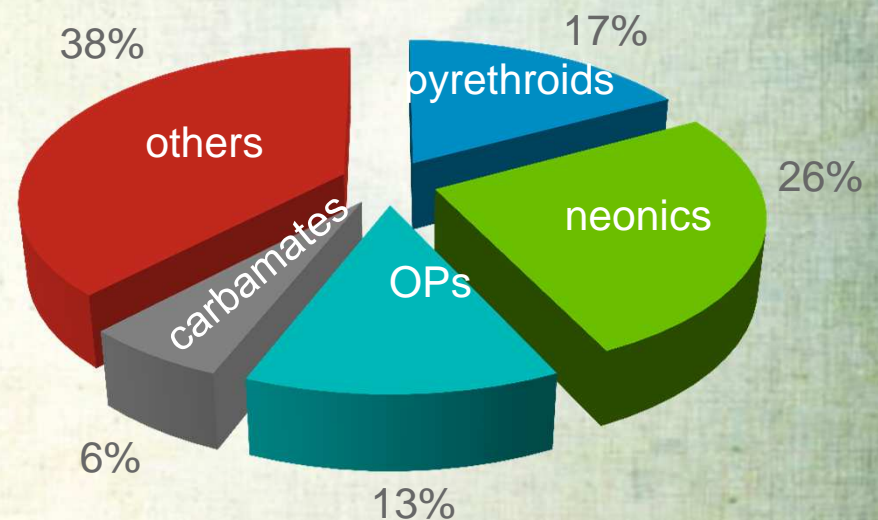


Registration Review and Insecticides



- Registration Review - all registered pesticides undergo periodic review (15 years maximum)
 - Ensure new information and regulatory changes are addressed
 - Well defined process
 - Regulatory action can be taken immediately if imminent hazard
- Neonicotinoids, organophosphates and pyrethroids are all in an advanced phase of the Registration Review process
- Decision on all of these major classes in the next 1-3 years

Global Insecticide Market 2012¹



Limited Modes of Action Available

¹T.C. Sparks, Insecticide discovery: An evaluation and analysis, Pestic. Biochem. Physiol. (2013), <http://dx.doi.org/10.1016/j.pestbp.2013.05.012>

Evolution of Insecticidal Classes



Class	Compound	Acute Toxicity		
		Mammals mg/kg	Bird mg/kg	Fish mg/l
OP (60's – 70's)	Parathion	2-30	0.125 – 24	0.018 – 2.65
Pyrethroids (80's – 90's)	Permethrin	430 – 4000	>2000	0.0008 – 0.072
Nicotinoid	Nicotine	50-60	toxic	4
Neonicotinoids (90'-2000's)	Clothianidin	>5000	>2000	>100
	Imidacloprid	450	31	211
	Thiamethoxam	1563	1552	>100

High target specificity; Low mammalian toxicity

Bee Health Scientific Literature Informing the Risk Assessment



- New publications almost every week - data quality is highly variable
- Weight-of-evidence from multiple studies inform the risk assessment
- Individual studies must be assessed for relevance to:
 - Labeled field rates, realistic exposure routes, practical field equipment use
 - Reproduction, survival and growth of the colony
 - Control of factors not related to the treatment
- Laboratory results often do not translate to the field situations



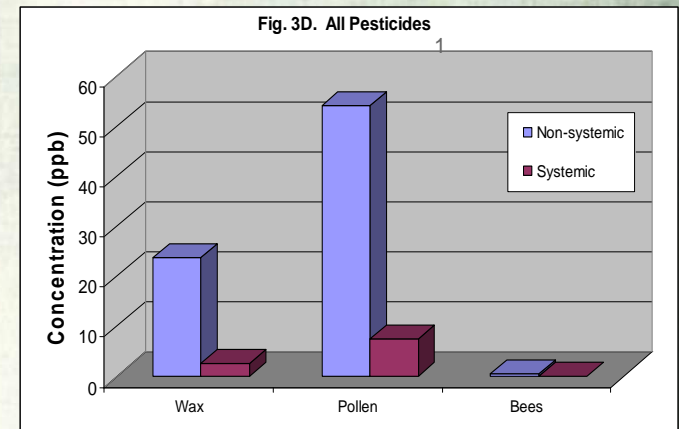
Neonicotinoids in bees: a review on concentrations, side-effects and risk assessment

**Tjeerd Blacquièrè, Guy Smagghe,
Cornelis A. M. van Gestel & Veerle
Mommaerts**

Neonicotinoids Pose Minimal Risk to Bees



- Large “multi-factorial” studies in North America and Europe
- Infrequently detected in hives and only at low levels
- Low colony losses in treated, pollinated crops
- Bee health improvement not seen following suspensions (e.g. France)
- No adverse effects on colonies in appropriate field studies
- Independent literature does not implicate NNIs as honey bee risk
 - Godfray et al. (2014; 2015); Dively et al. (2015); Lawrence et al. (2016)



Concentrations are lower for systemic compounds



Canola Pollination

¹ From D. Fischer and Henderson, C. SETAC North America 32nd Annual Meeting, 2011

Regulatory Authority Reviews



“[The Agency] is not aware of any data that reasonably demonstrates that bee colonies are subject to elevated losses due to chronic exposure to this pesticide [clothianidin].”

US EPA Office of Pesticide Programs (2012)



The accumulated evidence “supports the view that the risk to bee populations from neonicotinoids, as they are currently used, is low.”

UK Department for Environment, Food and Rural Affairs (2013)



The “introduction of the neonicotinoids has led to an overall reduction in the risks to the agricultural environment” ... “Australian honeybee populations are not in decline, despite the increased use of this group of insecticides in agriculture and horticulture since the mid-1990s.”

Australia Pesticides and Veterinary Medicines Authority (2014)



Imidacloprid Registration Review

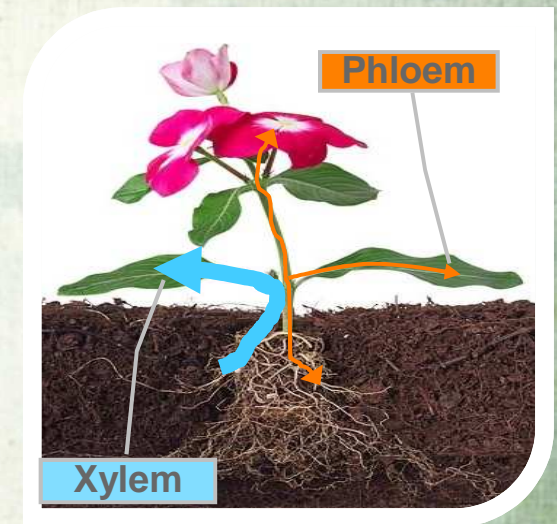


- On January 15, 2016 EPA announced the availability of the Imidacloprid Registration Review; Draft Pollinator Ecological Risk Assessment
 - 60 day comment period opened
- Scope of Assessment
 - Reviewed 5 years of new data focused exclusively for pollinator risk assessment
 - Assessed 37 different use patterns and evaluated thousands of new residue samples
 - Spans more than 500 pages and includes nearly 130 literature citations
- Preliminary assessment of findings
 - Identifies levels of exposure for which pollinator risk is minimal
 - Major crop uses all fall well below the 25 ppb threshold no effect level
 - Finds that most registered uses of imidacloprid will not impact bee populations
 - Provides framework for future studies to more accurately evaluate pollinator risk
 - Minimal risk from carryover residues in crops, soils and weeds
 - Field risks identified in cotton and citrus uses can be mitigated by proposed label changes
- Several areas still to be resolved as part of the process

Neonicotinoid Benefits



- Foliar sprays, soil applications or seed treatments
- Systemic; unprecedented control of soil borne and early season pests
- Efficacious in wide range of crops
- Active against many invasive species
- Control pests on ornamental plants, lawns & pets
- Better safety profile for humans and other vertebrates than previous generations of pesticides





Measuring the Benefits of Neonicotinoid Insecticides

Reports from a new comprehensive study assess the socio-economic benefits of neonicotinoid insecticides in North America. Key statistics¹ highlight the methodology of neonicotinoids to agriculture, as well as residential and urban landscapes, and the significant implications if these products were no longer available.

Grower Listening Sessions Held Across the U.S. & Canada



The Big Picture

133 Million

neonicotinoid-treated acres analyzed including corn, soybean, wheat, cotton and sorghum crops in the U.S.²



Yield Effects

1,000+

independent research trials analyzed to determine yield impact of neonicotinoid seed treatments.



¹ Statistics are from a series of new reports by AgInfomatics, LLC, a group of independent agricultural economists and scientists.

² Based on three-year average from GW Kinetic data (2010-2012)

³ From 12 U.S. states and three Canadian provinces.

⁴ From 14 U.S. states and three Canadian provinces.

⁵ From three Canadian provinces.

⁶ Analysis includes five commodity crops in the U.S., three commodity crops in Canada and 12 specialty crops.

Survey Methods

22,000+

growers, consumers and applicators surveyed



18,885

homeowners participated



Survey Numbers by Crop



622

Corn Farmers³

622

Soybean Farmers⁴



500

Canola Farmers⁵

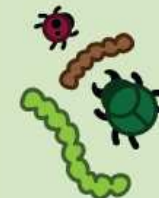
Extensive Scope

Analysis examined neonicotinoids from many perspectives⁶:



98

Active Ingredients



72

Target Pests

AgInfomatics, LLC, is an agricultural consulting firm established in 1995 by professors from the University of Wisconsin-Madison and Washington State University. The research was jointly commissioned by Bayer CropScience, Syngenta and Valent U.S.A., with additional support from Mitsui on the turf and ornamental studies.

Go to GrowingMatters.org for the latest information, reports, videos and infographics on the benefits of neonicotinoid insecticides. ©2014 Growing Matters



Neonicotinoid Benefits Study Reports*

15 Publications: Agriculture & Turf/Ornamental



GrowingMatters.org



Neonicotinoid Benefits Study Key Findings



Neonicotinoids add billions of dollars to the economy, benefiting entire communities, not just individual growers



The loss of neonicotinoids would disrupt pest management practices and force growers to rely on few, older classes of insecticides



The loss of neonicotinoids would result in reduced crop quality and yield, and in some cases, cause catastrophic damage from lack of alternatives to manage invasive pests

*Research by AgInfomatics, LLC with financial support from Bayer Crop Science, Syngenta, Valent USA, and Mitsui Chemicals Agro Inc



System-wide approach to bee health

Stewardship
and
Communication
of BMPS

Product Stewardship

Work side-by-side with dealers, distributors, growers, industry partners and stakeholders to promote bee health



Product Application and Stewardship Tips for Professional Applicators in the Turf and Ornamental and Pest Management Industry

- Read and follow ALL label directions and precautions carefully.
- Avoid drift and runoff.
- Use spray nozzles that produce larger droplets to reduce drift potential.
- Do not spray when it is windy to ensure that pesticide does not drift into unintended areas.
- Use deflector shield guards on granular spreaders.
- Do not spray when rain is in the forecast to ensure that pesticide does not wash off the landscape or driveway into streams or storm drains.
- When product requires watering in, never flood an area causing runoff into storm drains or waterways.
- Avoid hard surfaces such as sidewalks and driveways unless directions for use allow for "spot" or "crack and crevice" treatments. Limit spray to targeted areas.

Bayer will continue to develop, fund and support promising research projects specifically targeted at ensuring bee health.



NEONICOTINOIDS NOT LINKED TO BEE HEALTH ISSUE

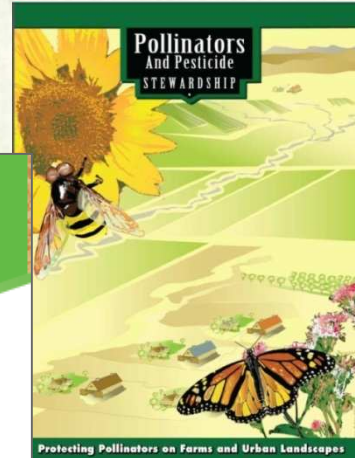
Some media reports have suggested bee health may be affected by a class of chemicals known as neonicotinoids. Because some Bayer products contain neonicotinoid active ingredients (e.g., clothianidin and imidacloprid), we believe it is important to comment on their use. Here are the facts:

- Neonicotinoids have replaced many older products due to their effectiveness and more favorable environmental profiles.
- There has been no demonstrated effect on bees associated with the use of neonicotinoid-based products.
- All Bayer neonicotinoid products undergo extensive field studies to investigate any potential effects, including conducting risk assessments and implementing appropriate safeguards, as needed. Applicators read and follow the label directions when applying.
- The EPA recently stated it "is not aware of any data that honey bee declines...in the U.S. [are] correlated with the use of pesticides in general or with the use of neonicotinoids in particular." (EPA response memo, 07/17/12)



Applying Seed Treatment & Sustaining Bee Health

Minimizing Impact on the Environment and Beneficial Insects



Growing a Healthier World through Agricultural Sustainability

At Bayer CropScience, we are committed to stewardship of our products, natural resources and the viability of modern farming. Farmers understand the critical role they play in feeding a growing planet and the importance of being good stewards of the environment. Through Bayer's sustainability program, we are committed to helping farmers CARE for the land we all love and our families need. Join us in promoting agricultural sustainability by following the tips below.

CARE

C Communicate planting activities to neighboring beekeepers when practical, and be aware of beehives adjacent to the planting area.

A Be aware of wind speed and direction during planting, particularly in areas with flowering crops.

R Help reduce potential risk to pollinators by using Fluency Agent, a new seed lubricant for corn and soybeans.

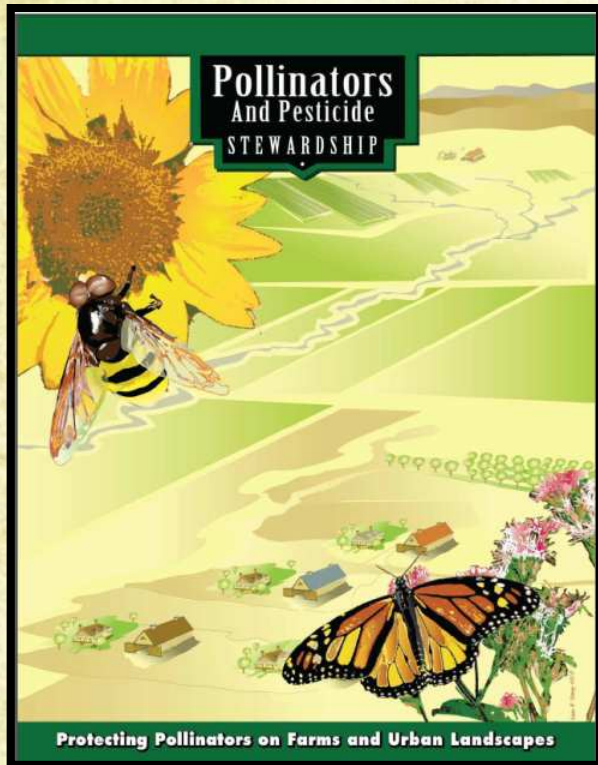
E Ensure seed is planted correctly. To help protect the environment, clean planters and seed boxes in a way to minimize dust release and ensure treated seed is planted at the proper depth.

Learn more at www.BayerCropScience.us.

FLUENCY AGENT
Seed Flow Additive

FLUENCY AGENT FROM BAYER CROPSCIENCE

Pollinator and Pesticide Stewardship



Proper pesticide use starts with reading and following pesticide label directions and precautions.

Reduce potential harm to pollinators

- Communication & Outreach
- Use Integrated Pest Management (IPM)
- Utilize good pesticide stewardship – proper rates, timing, application methods.

[www.curesworks.org/
publications/pollinators](http://www.curesworks.org/publications/pollinators)

Managed Pollinator Protection Plans (MP3) *



Commercial Pesticide Applicators
Field & Forage ♦ 1A Meeting
@ Middlebury April 2, 2015

Pollinator Protection Plans:
Future Directions For Vermont
&
The Role for Pesticide Applicators

Jeff Comstock
Vermont Agency of Agriculture

NORTH DAKOTA POLLINATOR PLAN

A North Dakota Department of Agriculture Publication

Prepared by:
Jerry Sauter, Pesticide & Fertilizer Division
Samantha Brunner, Plant Industries Division
Jim Gray, Pesticide & Fertilizer Division
Carrie Larson, Plant Industries Division

Doug Goehring
Agriculture Commissioner



MISSISSIPPI HONEYBEE STEWARDSHIP PROGRAM

- Presidential memo, of June of 2014
 - Created a Federal Strategy to Promote the Health of Honey Bees and Other Pollinators
 - Directed EPA to engage state agencies in developing **state pollinator protection plans** as a means of mitigating the risk of pesticides to bees and other managed pollinators
- Inventory of State plans
 - 8 Published
 - ~30 other in development
 - Some waiting on EPA label changes
- National Association of State Departments of Agriculture (NASDA) holding Facilitated MP3 Symposium in March 2016

Managed Pollinator Protection Plan Development



- State FIFRA Issues Research and Evaluation Group (SFIREG) Draft Guidance Document
 - Public stakeholder participation process
 - Methods for growers/applicators/beekeepers to locate and contact each other
 - Recommendations on how to minimize risk of pesticides to bees (BMP's tailored for each target)
 - Clear defined plan for public outreach
 - Mechanism to measure effectiveness of an MP3 and a process to periodically review and modify each plan

MP3: Best Management Practices



BMP's may include:

- Notifications
- Communication guidelines
- Reporting bee-kills
- Application recommendations
- Use of IPM
- Hive and apiary identification
- Planting recommendations
- Bee-smart management

Response to Proposed House Bill 539 - Purpose



- Purpose of H539 closely aligns with the broad objectives of multiple stakeholders including the Crop Protection Industry and Bayer CropScience
“to evaluate the causes of reduced pollinator populations in the State and to recommend measures the State can adopt to conserve and protect pollinator populations.”
- Steps that would help promote this goal and inform the Committee’s potential recommendations
 - Conduct a thorough review of the current pollinator population in Vermont
 - Establish benchmark for future assessment.
 - Nationally and in many states, the number of honey bee colonies has been increasing
 - Database for other pollinator species is sparse

Response to Proposed House Bill 539 - Scope



- Fully support the Committee's mission to "recommend measures the State can adopt to conserve and protect pollinator populations"
- However the bill's focus appears limited to the regulation of pesticides and specifically to neonicotinoid insecticides
 - Most experts agree that there are multiple factors associated with colony decline
 - A narrow focus on pesticides implies that additional restrictions on their use will positively impact bee health, even though there is no evidence to support this claim.
 - Focusing on one class of chemistry can have unintended consequences
 - Limit resistance management opportunities
 - Increase use of other chemistries not included in the assessment
 - Limit grower access to beneficial farming practice such as no-till or minimum till

Response to Proposed House Bill 539 - Consistency



- A more holistic approach to bee health would be consistent with and complement other activities:
 - Vermont Agency of Agriculture's recent investigation (2015), which specifically investigated neonicotinoid use and safety in the state and noted
 - "In the few instances of honey bee decline that were reported to the Agency of Agriculture, in those cases, no correlation was identified between *any* type of pesticide and the decline."
 - Support a state Managed Pollinator Protection Plan
 - Complement Alignment with The National Strategy to Promote the Health of Bees and Other Pollinators"
 - Adoption of measures to improve pollinator habitat and forage, would be helpful in achieving H539's intended purpose.
 - Support state agriculture by ensuring proper use of a range of available tools
 - Propose a farmer on the Committee to provide this perspective

Conclusions



- Crop production and apiculture are vital components of modern agriculture
- No single factor is responsible for general honey bee colony losses
- Improvements in bee health requires the collaboration of all stakeholders
- Safe use of pesticides is dependent on sound stewardship and a science-based approach to risk management
- Multiple initiatives are ongoing to improve pollinator health including ensuring the safe use of pesticides
- House Bill 539 would complement other activities more effectively if it incorporated a more holistic approach to bee health

Thank you

