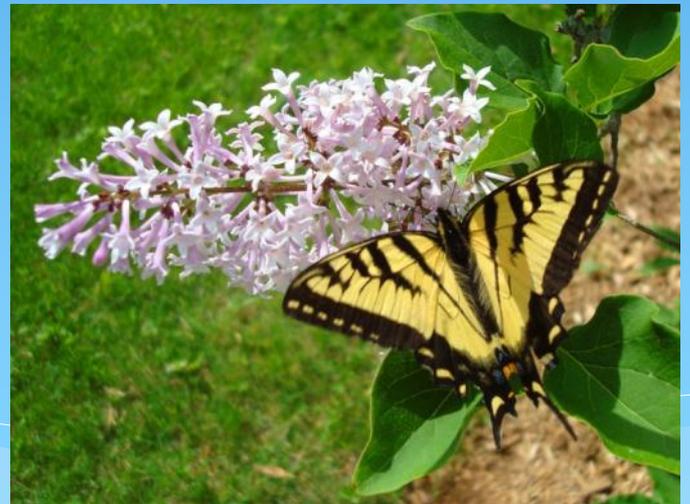


Pollinator Protection for Pesticide Applicators

Gary Fish
Maine Board of Pesticide Control
28 SHS
Augusta, ME 04333-0028
207-287-7545
gary.fish@maine.gov



Life with bees...



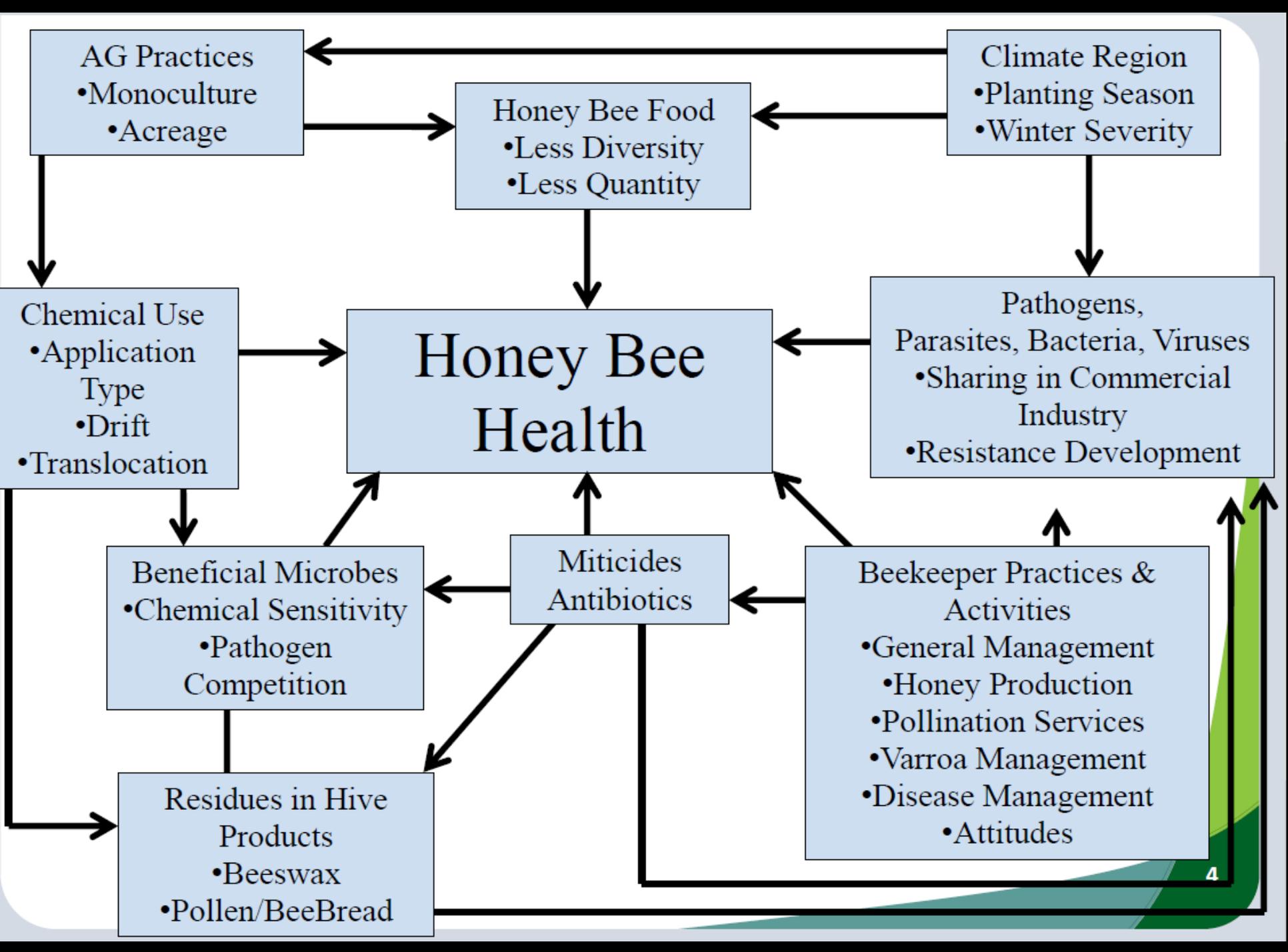
... and without bees



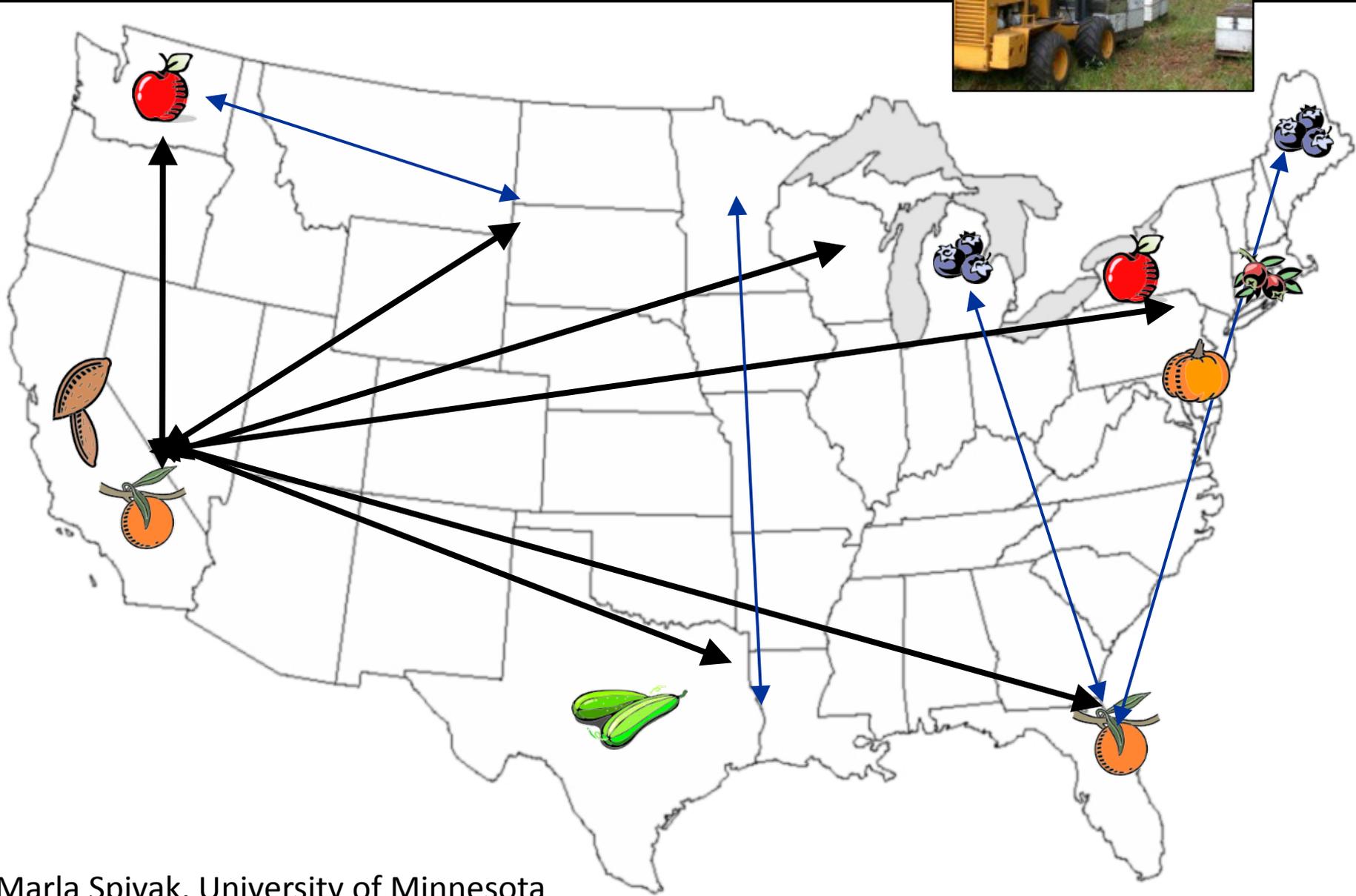


Marla Spivak, University of Minnesota

David Hansen



Major Migratory Routes of Honey Bee Colonies for Pollination



Marla Spivak, University of Minnesota

Importance of Pollinators

- Fruit and seed production needed for the survival of the majority of flowering plants in our environment.
- Essential to the production of more than 85 crops.
- 1 out of every 3 bites of food can be attributed to pollinators.

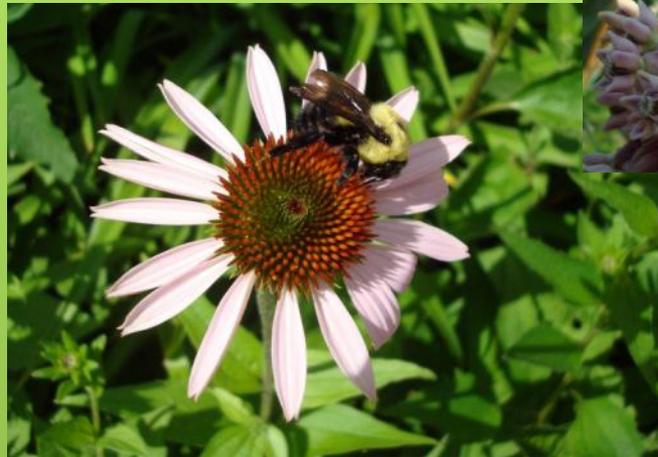


Who Are the Pollinators?

Honey bees are relied on to perform most of the commercial pollination.



What organisms serve as pollinators?



Bee Decline from the beekeeper point of view -2009-2010 winter losses

Honey Bee Colony Losses in the U.S., winter 2009-2010*
(2010 – 2011 results similar)

- Responding beekeepers attributed their losses to

- | | |
|--|-----|
| ■ Starvation | 32% |
| ■ Weather | 29% |
| ■ Weak colonies in the Fall | 14% |
| ■ Mites | 12% |
| ■ Poor queens | 10% |
| ■ Only 5% of beekeepers attributed Colony Collapse Disorder (CCD) as the major cause | |



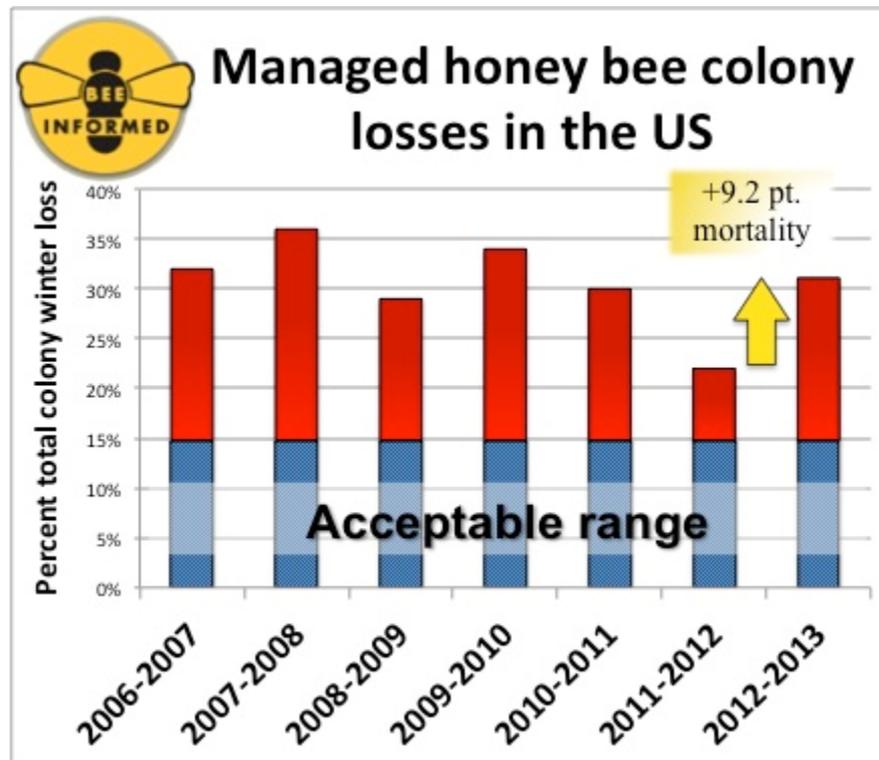
*<http://ento.psu.edu/news/2010/losses-2009-10>. Dennis van Engelsdorp, Jerry Hayes, Dewey Caron, and Jeff Pettis.

Bee Decline from the beekeeper point of view - 2011-2012 winter losses

Factor	% Selecting That Factor
Poor Wintering Conditions	36.71
CCD	35.99
Pesticides	33.72
Varroa	25.64
Nosema	25.13
Weak in the Fall	24.10
Queen Failure	21.81
Don't Know	21.58
Starvation	20.89
Small Hive Beetle	19.78



Winter Loss Survey Results Over 7 Years



National Stakeholders Conference on Honeybee Health - Key Findings

- * Parasites and disease are major factors
- * Increased genetic diversity is needed
- * Poor nutrition has a major impact on bee and colony longevity
 - * Mono-cropping may contribute to dietary deficiencies



National Stakeholders Conference on Honeybee Health - Key Findings

- * Need to improve collaboration and information sharing
- * Additional research is needed to determine pesticide risks
- * Undernourished or malnourished bees appear to be more susceptible to pathogens, parasites, and other stressors, including pesticides and other environmental contaminants.
 - * Research is needed on forage, pollen quality, artificial and natural food sources, and food processing and storage in the hive.



National Stakeholders Conference on Honeybee Health - Key Findings

- * Federal and state partners should consider actions affecting land management to maximize available nutritional forage
 - * to promote and enhance good bee health and
 - * to protect bees by keeping them away from pesticide-treated crop acreage.



Consider adding a bee pasture!

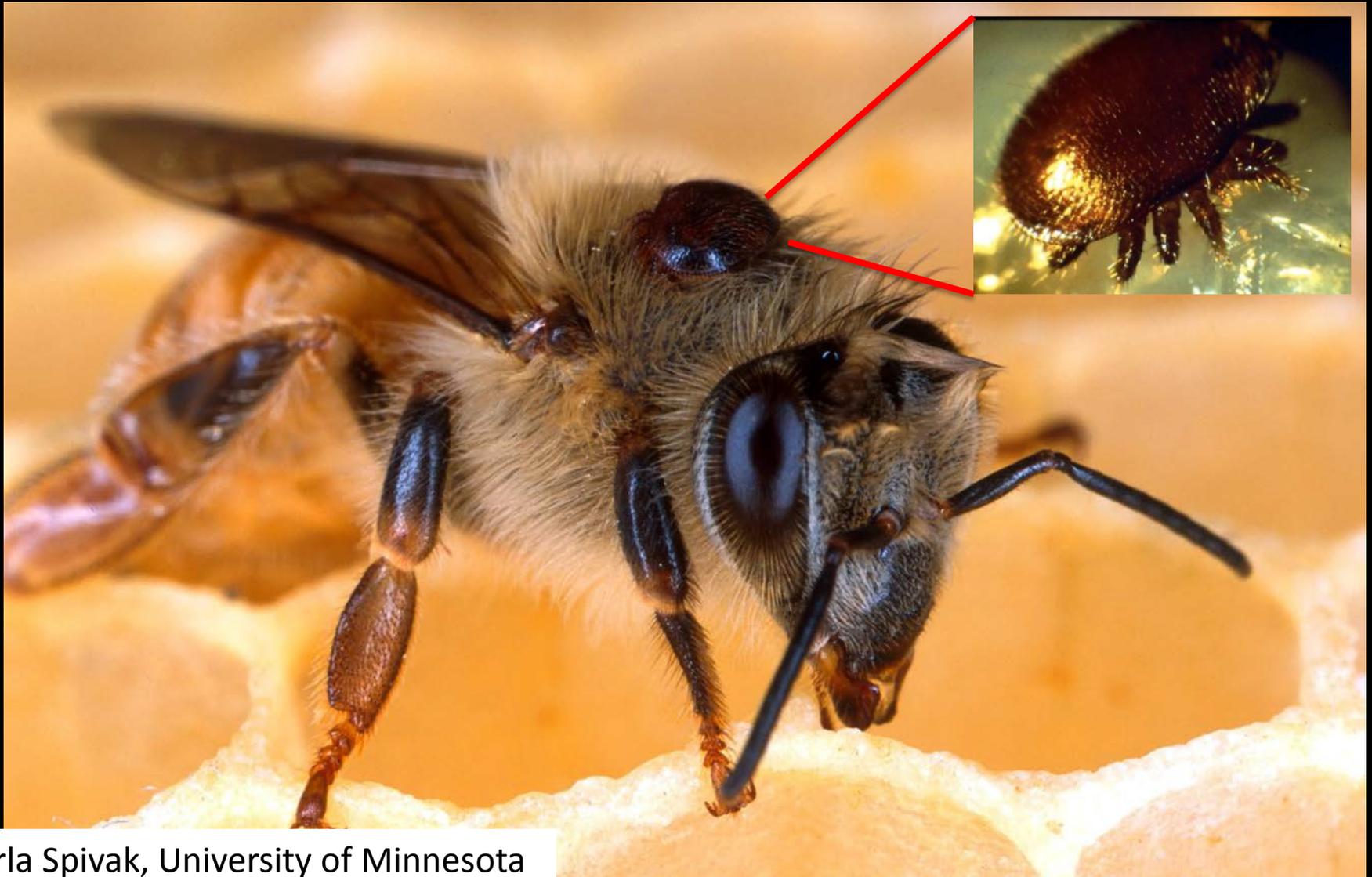
National Stakeholders Conference on Honeybee Health - Key Findings

- * Pathogens and parasites have major negative impacts on colonies. The management of the parasitic Varroa mite and viruses needs special attention.
- * More outreach to farmers on managing potential exposure of honey bees to pesticides is needed.
 - * Efforts would benefit from involvement of beekeepers, crop consultants, pesticide manufacturers, pesticide applicators, state pesticide control agencies and extension educators.



Varroa destructor mite

sucks bee blood and circulates viruses



National Stakeholders Conference

Key Findings

- * Best management practices associated with bees and pesticide use exist, but are not widely or systematically followed by members of the crop producing industry.
 - * We need informed and coordinated communication between growers and beekeepers and effective collaboration between stakeholders.

Sources for BMPs:

1. [Protecting Pollinators: Why and How Pesticide Applicators Can Help Them](#). North American Pollinator Protection Campaign.
2. [How to Reduce Bee Poisoning from Pesticides](#). L. Hooven, R. Sagili, and E. Johansen.
3. [Protecting Honey Bees from Pesticides](#). Malcolm Sanford, Univ. of FL.
4. [Bee Health: The Role of Pesticides](#). Congressional Research Service 7-5700.
5. [Pollinators and Pesticide Stewardship](#). Coalition for Urban/Rural Environmental Stewardship, Syngenta, and Bayer CropScience.

National Stakeholders Conference

Key Findings

- * Beekeepers accentuated the need for accurate and timely bee kill incident reporting, monitoring, and enforcement.
- * Breeding should emphasize traits such as hygienic behavior that confer improved resistance to Varroa mites and diseases (such as American Foulbrood).



Managed Pollinator Coordinated Agriculture Program Update Highlights

- * Varroa mite is vector of Israeli Acute Paralysis Virus (IAPV) which is a potentially serious problem
- * Sentinel apiary study –
 - * Bee mortality increases as Ag land % increases
 - * 6.2 pesticides on average found in bee pollen
 - * 130 different pesticide residues found but no trend associated with bee mortality
 - * High levels of varroa = high levels of IAPV = low populations of adult bees and brood



Managed Pollinator Coordinated Agriculture Program Update Highlights

- * High degree of cross-infection of viruses between honey bees and native bumble bees
- * Bee susceptibility to interactions (synergism) between agricultural insecticides and fungicides
- * Some of those fungicides include, chlorothalonil, boscalid, captan, propiconazole and myclobutanil
- * Acetamiprid is not very toxic to bees on its own, but when combined with propiconazole it becomes 900times more toxic



Pesticide applicators must reduce risks to honey bees and other pollinators.

Read the label

Use IPM

Follow Best
Management
Practices



Penn State Pesticide Education Program

What Can You Do...?

- As an applicator...
 - Choose an insecticide with low hazard to bees
 - Communicate with beekeepers
 - Timing of application



pesticidepics.org

What Can You Do...?

- Avoid drift
- Good weed control in fields
- Be aware of blooming plants in the area when applying pesticides
- Mow blooming weeds around application sites before application, when possible



Did You Know?

- Most **pesticides** are not acutely toxic to honey bees and other pollinators.
- As a general rule: **insecticides** pose greater concerns to pollinators than fungicides and herbicides, but all can have impacts.
 - However, **not all insecticides are toxic to pollinators.**



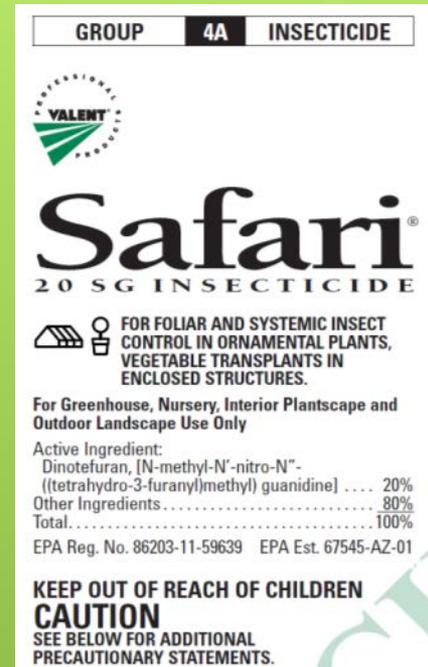
Did You Know?

- New research shows that some combinations of insecticides and fungicides can be very toxic to bees.
- Research also shows that pollen contaminated with some fungicides can impact bee larvae by interfering with beneficial microbes used in making the “bee bread” (fermented pollen).
- Any pesticide that is toxic to insect pollinators will have new warnings on its label.



Formulation types differ in risk to pollinators

- More risky
 - Dusts
 - Microencapsulated
 - Wettable powders
 - Flowables
 - Emulsifiable concentrates
 - Systemic products
 - Some adjuvants
 - Super-Organosilicone surfactants

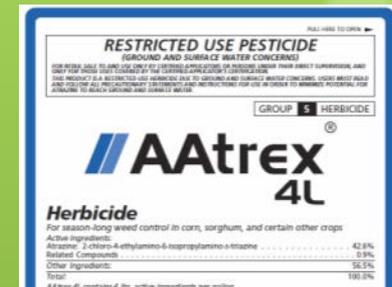


No endorsement intended or implied



Formulation types differ in risk to pollinators

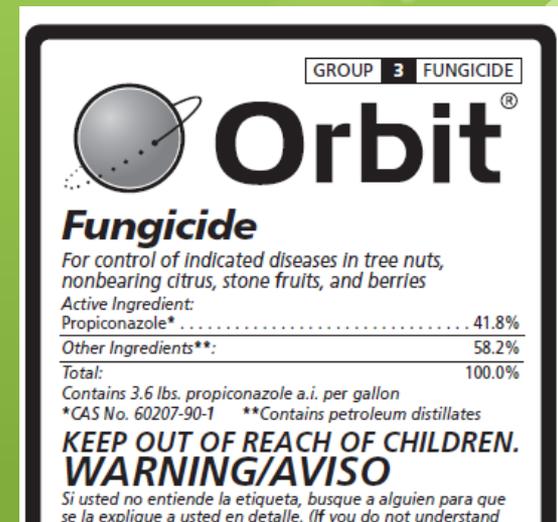
- Less risky
 - Non-systemic granules
 - Soluble liquids and powders
 - Oil sprays
 - Some adjuvants
 - Other non-ionic surfactants show some toxicity and
 - crop oils are least toxic



No endorsement intended or implied

Different Tank Mixes may also increase risk to pollinators

- Some combinations can be very risky...
 - Insecticides mixed with miticides
 - Insecticides mixed with fungicides or PBO
 - Acetamiprid (Assail) and propiconazole (Orbit)
 - Pyrethroids and propiconazole
 - Piperonyl butoxide and some neonicotinoids
- Avoid tank mixes entirely



No endorsement intended or implied

Pollinator Protection Checklist

1. Read and follow the label.
2. Determine if the pesticide is toxic to pollinators.
3. Learn about local pollinator visitation habits.
4. Use Integrated Pest Management.
5. Follow pesticide stewardship practices.
6. Cooperate and communicate with others.
7. Know symptoms of pesticide exposure to bees.
8. Check local ordinances pertaining to pollinators.



Pollinator Protection Checklist

1. Read and follow ALL pesticide label directions and precautions.

- ✓ Must reduce risk of pesticide exposure to honey bees and other pollinators.



Many insecticides have specific label warnings



BEE CAUTION: May kill honeybees and other bees in substantial numbers. This product is highly toxic to bees exposed to direct treatment or residues on crops or weeds in bloom.

Notifying beekeepers within 1 mile of treatment area at least 48 hours before product is applied will allow them to take additional steps to protect their bees.

Limiting applications to times when bees are least active, e.g., within 2 hours of sunrise or sunset, will minimize risk to bees.

For crops in bloom (except corn and soybeans):

Do not apply this product to target crops or weeds in bloom.

For corn and soybeans:

If application cannot be avoided when target crop or weeds are in bloom, limiting applications to times when bees are least active, e.g., within 2 hours of sunrise or sunset, will minimize risk to bees.



Look for the bee icon on new labels

- * Products with acute or residual toxicity to pollinators will have the bee icon on their labels
- * The new warnings will be next to that icon



Pollinator Protection

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.epa.gov. 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>

Pollinator Protection Checklist

2. Determine if the pesticide may be toxic to pollinators.

- The Environmental Hazard section of a label will indicate if a pesticide is **moderately** or **highly toxic** to bees that contact the pesticide.
- There is also a “**practically non-toxic to pollinators**” category of pesticides.



Even pesticides approved for organic grower use can be highly toxic to pollinators

Toxicity of Common Organic-Approved Pesticides to Pollinators

PESTICIDE	NON-TOXIC	LOW TOXICITY	HIGHLY TOXIC
Insecticides/Repellants/Pest Barriers			
<i>Bacillus thuringiensis</i> (Bt)	Green		
<i>Beauveria bassiana</i>			Red
<i>Cydia pomonella granulosis</i>	Green		
Diatomaceous Earth			Red
Garlic	Green		
Insecticidal Soap			Red
Kaolin Clay	Green		
Neem		Orange	
Horticultural Oil			Red
Pyrethrins			Red
Rotenone			Red
Sabadilla			Red
Spinosad			Red
Herbicides/Plant Growth Regulators/Adjuvants			
Adjuvants		Orange	
Com Gluten	Green		
Gibberellic Acid	Green		
Horticultural Vinegar		Orange	
Fungicides			
Copper		Orange	
Copper Sulfate			Red
Lime Sulfur	Green		
Sulfur			Red

Soaps and Oils, only when directly sprayed upon the pollinator

INVERTEBRATE CONSERVATION FACT SHEET

Organic-Approved Pesticides Minimizing Risks to Pollinators



While organic farming offers significant environmental benefits, even some organic-approved pesticides can cause harm to pollinators.

By selecting the least toxic options and applying them when pollinators are not present, harm can be minimized.

Productive cropping systems do not have to rely on chemical inputs for pest control. Photograph by Matthew Shepherd

Approximately four thousand species of bees are native to the United States. These wild insects provide crop pollination services, and are often specialized for foraging on particular flowers, such as tomatoes, squash, berries, melons, or forage crops. This specialization results in efficient pollination, high yields, and larger fruit.

While the non-native European honey bee (*Apis mellifera*) is the most important managed crop pollinator, its numbers are in decline because of disease and other factors. This makes native bees, which contribute an estimated \$1 billion worth of crop pollination annually to the U.S. economy, more important than ever. Native bees are of particular importance to organic farmers because unlike honey bees, these populations can be supported without the use of antibiotics and other chemical inputs.

The reduced use of pesticides, as well as more sustainable management practices, makes organic farms an important asset in protecting our national pollinator resources. Many organic operators already have good numbers of wild bees. In some cases, these native bees can effectively provide all necessary crop pollination services; when adequate habitat is available and low-toxicity management practices are implemented.

Unfortunately, however, even pesticide approved for organic agriculture can cause significant harm to bees. This fact sheet provides a brief overview of how to select and apply pesticides for organic farm operations while minimizing pollinator mortality. Keep in mind that the same practices outlined here that help protect pollinators also may protect beneficial insects such as parasitoid wasps, predaceous flies and beetles, aphids and acarine bugs, lepidoptera, and others. The presence of these insects can further reduce pest pressure and the need for chemical treatment.

Written by Eric Mader

The Xerces Society for Invertebrate Conservation
www.xerces.org

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

New use directions – Ag products

DIRECTIONS FOR USE



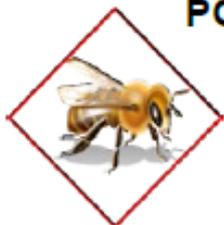
1. FOR CROPS UNDER CONTRACTED POLLINATION SERVICES

Do not apply this product while bees are foraging. Do not apply this product until flowering is complete and all petals have fallen unless the following condition has been met.

If an application must be made when managed bees are at the treatment site, the beekeeper providing the pollination services must be 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.

New use directions – Ag products

2. FOR FOOD CROPS AND COMMERCIALY 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**

New use directions – Ag products & Non-Ag products

- **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.**

3. Non-Agricultural Products:



Do not apply [insert name of product] while bees are foraging. Do not apply [insert name of product] to plants that are flowering. Only apply after all flower petals have fallen off.

The DACF has a registered beekeeper list

- Urban & suburban applicators can contact the DACF apiarist to find out if any registered beekeepers are within 2 miles of the areas they are planning to apply pollinator toxic pesticides

www.maine.gov/dacf/php/apiary/index.shtml

US EPA: Pesticides - Pro... Board of Pesticides ... Imported From Firef... Maine State Webma... FOOTPRINT:: The P... ipmPRIME Pesticide ... EQ Calculator

Maine.gov Agencies | Online Services | Help | Search Maine.gov Page Tools GO

DEPARTMENT OF Agriculture, Conservation and Forestry Contact Us | News | Online Services | Sitemap Search DACF Search

About DACF Animals & Plants Forest Geology Recreation Farming Planning Licensing & Regulations Bureaus & Programs

DACF Home → Bureaus & Programs → Bureau of Agriculture → Division of Animal and Plant Health → Apiary (Bees)

Division of Animal and Plant Health	<h2>Apiary (Bees)</h2> <p>The purpose of this program is to prevent the introduction and/or spread of regulated honey bee diseases, parasites, and undesirable genetic material in resident and migratory honey bee colonies, as well as encourage and maintain interstate movement of honey bees for crop pollination and honey production.</p> <p>Major responsibilities of the program include:</p> <ul style="list-style-type: none">licensing of resident beekeepers and permitting the entry of migratory bees from other states into Maine;inspection of resident and migratory honey bee colonies for regulated diseases and parasites;surveying commercial bee keeping operations for Africanized honey bee;educating beekeepers, growers, and the general public about bee keeping techniques and the value of honeybees to Maine agriculture. <p>Anyone who keeps honeybees in Maine MUST obtain an apiary license.</p> <ul style="list-style-type: none">Apiary License Application (PDF) (Word)
About Us	
FAQ	
Laws & Rules	
Programs	
Agricultural Compliance	
Animal Health	
Animal Welfare	
Apiary (Bees)	
Arborist	
Board of Pesticides Control (BPC)	
Compost	
Ginseng	
Horticulture	
Integrated Pest Management (IPM)	



FEATURED LINKS

- [Apiary License Application \(PDF\) \(Word\)](#)
- [List of Swarm Collectors \(PDF\)](#)
- [Maine State Beekeepers Association](#)
- [Statutes & Rules](#)

PROGRAM CONTACTS

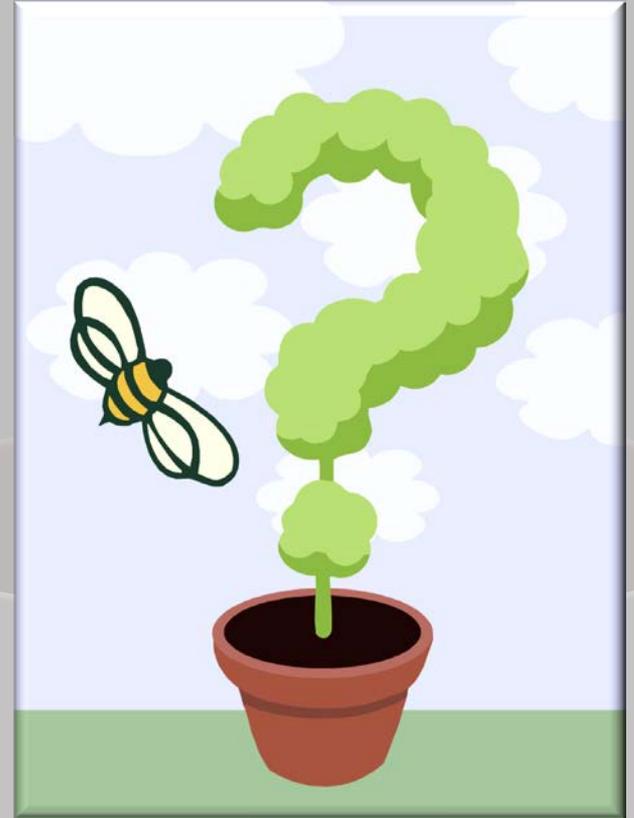
[email](#)
28 State House Station
Augusta, ME 04333
phone: (207) 287-3891
fax: (207) 287-7548

Residual Toxicity

Definition:

Residues on plants which can harm pollinators that visit the area after the treatment is dry or absorbed by the soil

Some pesticides have extended residual toxicity to bees and other pollinators.

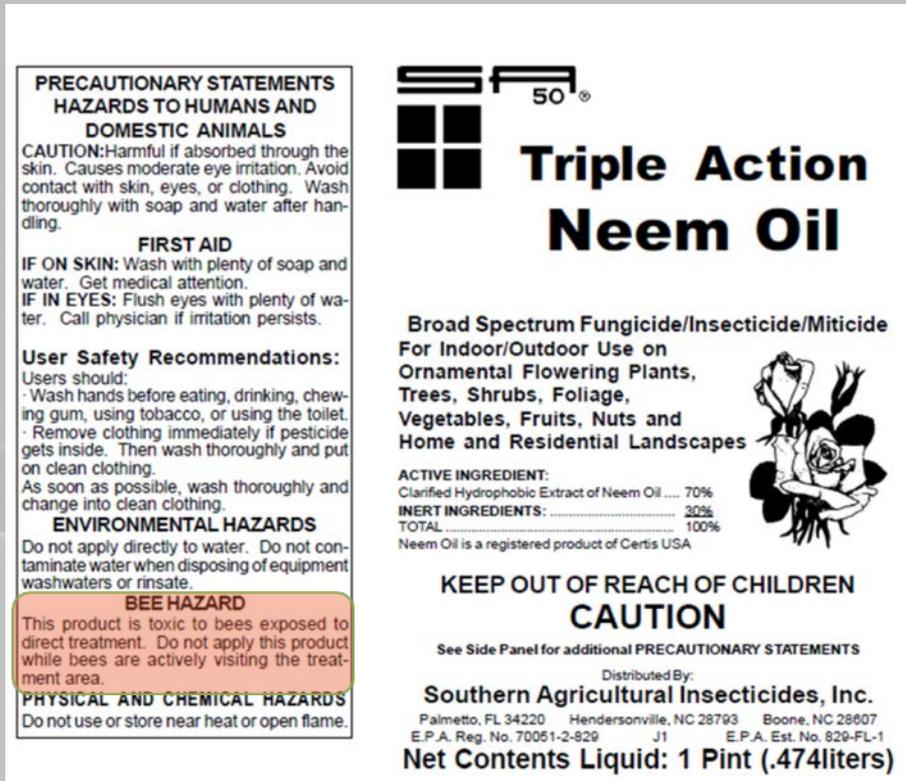


Residual Toxicity

If the pesticide **does not** have extended residual toxicity:

The pesticide can still harm pollinators exposed to **direct treatment**; during or shortly after the application while the plants are still wet.

Can often be applied **after evening pollinator foraging is complete** without harming pollinators that arrive the next day.



PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
CAUTION:Harmful if absorbed through the skin. Causes moderate eye irritation. Avoid contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling.

FIRST AID
IF ON SKIN: Wash with plenty of soap and water. Get medical attention.
IF IN EYES: Flush eyes with plenty of water. Call physician if irritation persists.

User Safety Recommendations:
Users should:
- Wash hands 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.
As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS
Do not apply directly to water. Do not contaminate water when disposing of equipment washwaters or rinsate.

BEE HAZARD
This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.

PHYSICAL AND CHEMICAL HAZARDS
Do not use or store near heat or open flame.

SFA 50®
**Triple Action
Neem Oil**

Broad Spectrum Fungicide/Insecticide/Miticide
For Indoor/Outdoor Use on Ornamental Flowering Plants, Trees, Shrubs, Foliage, Vegetables, Fruits, Nuts and Home and Residential Landscapes

ACTIVE INGREDIENT:
Clarified Hydrophobic Extract of Neem Oil ... 70%
INERT INGREDIENTS: 30%
TOTAL 100%

Neem Oil is a registered product of Certis USA

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

See Side Panel for additional PRECAUTIONARY STATEMENTS

Distributed By:
Southern Agricultural Insecticides, Inc.
Palmetto, FL 34220 Hendersonville, NC 28793 Boone, NC 28607
E.P.A. Reg. No. 70051-2-829 J1 E.P.A. Est. No. 829-FL-1

Net Contents Liquid: 1 Pint (.474liters)

Additional Restrictions for pesticide with Extended Residual Activity

www.epa.gov/pesticides/ecosystem/pollinator/bee-label-info-lrt.pdf

2. FOR FOOD CROPS AND COMMERCIALY 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**

Northern wintered bees fly at lower temps

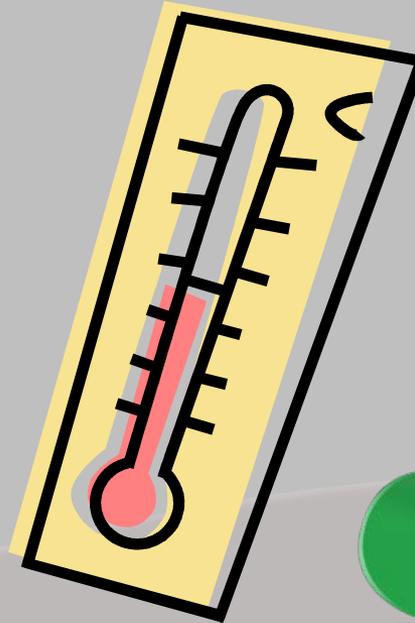
- * Northern bees may fly at temps in the mid – high 40's
- * Especially to visit early blooming trees, shrubs and weeds
 - * Serviceberry
 - * Cherries
 - * Willow
 - * Crabapples
 - * Bluets
 - * Dandelion
 - * Rhodora



Residual Toxicity

Environmental conditions can affect residual toxicity.

- Examples: **Low temperatures** or **heavy dews** for the night or early AM after application may increase residual toxicity.

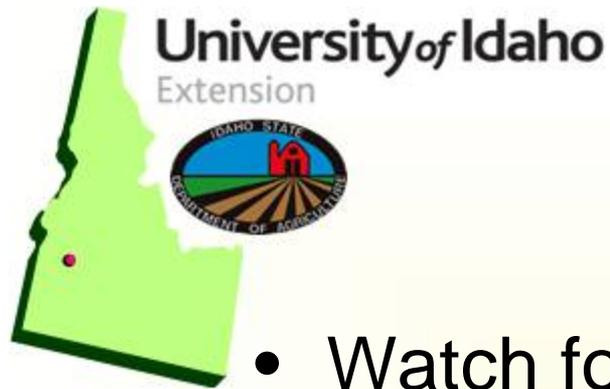


Pollinator Protection Checklist

3. Understand local pollinator visitation habits.

- Pollinators are at most risk **when ANY vegetation is blooming.**
- Observe application timing on the label relative to the **blooming stage of crop** and **other plants.**
- The right timing may be reduced by extended bloom or unfavorable weather conditions.
- **Evening or nighttime** applications are generally the **least harmful** to honey bees.





During Application

- Watch for bee activity.
 - Stop spraying if bees are present at the application site.
- Be careful with refill or mixing/loading operations.
 - Clean up any spills.
 - Don't contaminate any standing water.



Pollinator Protection Checklist

4. Use Integrated Pest Management (IPM)

- Consider all suitable practices for managing pests.
- Use cultural practices that discourage pests from using a crop or landscape as a habitat.
- Carefully diagnose your pest problems.
- Monitor and assess pest populations to determine when levels warrant pesticide treatment.



www.gotpests.org

Pollinator Protection Checklist

4. Use Integrated Pest Management (IPM)

- Determine your best combination of management options.
- Use the recommended pesticide at the lowest appropriate labeled rate, based on the life stage of the pest/infestation level with the proper timing and placement.
 - Using rates below the labeled rate may cause loss of control or development of pest resistance.

		Rate
		DuPont™ LANNATE® LV Pts. Per Acre
Crops	Insects	
Broccoli	Loopers Diamondback Moth	1 1/2 - 3 **

Pollinator Protection Checklist

5. Always follow pesticide stewardship practices.

- Minimize spray drift.
- Minimize volatility.
- Minimize off-site drift of seed treatment materials.



Minimize Spray Drift

Establish appropriate buffers.

Check weather forecast.

Shut off the sprayer when making turns and near ponds and other sources of water.

Choose **low pressure or low-drift nozzles**.

Colfax Weather at a Glance

Weather Station - Report - Buy a Station		Elevation
Pullman		2572 ft
Now	Temperature	Wind(mph)
 Clear	43.4 °F Feels Like 40 °F	



Minimize Vapor Drift

More prone to pesticides formulated as **emulsifiable concentrates**.

Spray during **cool temperatures**.

Soil-incorporate volatile products.

Use relatively **coarse spray droplets**.

XR110025 (50)	15		M	0.15	19	11.1
	20		M	0.18	23	13.4
	30		F	0.22	28	16.3
	40		F	0.25	32	18.6
	50		F	0.28	36	21
	60		F	0.31	40	23
XR8003 XR11003 (50)	15	M	M	0.18	23	13.4
	20	M	M	0.21	27	15.6
	30	M	F	0.26	33	19.3
	40	M	F	0.30	38	22
	50	M	F	0.34	44	25
	60	F	F	0.37	47	27
XR8004 XR11004 (50)	15	C	M	0.24	31	17.8
	20	C	M	0.28	36	21
	30	M	M	0.35	45	26
	40	M	M	0.40	51	30
	50	M	F	0.45	58	33
	60	M	F	0.49	63	36
XR8005 XR11005 (50)	15	C	M	0.31	40	23
	20	C	M	0.35	45	26
	30	C	M	0.43	55	32
	40	M	M	0.50	64	37
	50	M	M	0.56	72	42
	60	M	F	0.61	78	45
XR8006 XR11006 (50)	15	C	C	0.37	47	27
	20	C	C	0.42	54	31
	30	C	M	0.52	67	39
	40	C	M	0.60	77	45
	50	C	M	0.67	86	50
	60	C	M	0.73	93	54

Minimize Off-Site Drift of Seed Treatment Materials



Specific label information takes precedence.

Always buy and **use high quality seed**, free from excessive dust.

When the pesticide needs to be coated onto the seed, always **use an appropriate coating system** to keep abrasion of coated pesticide to a minimum.

Minimize Off-Site Drift of Seed Treatment Materials



Follow planter manufacturer recommendations for use of talc, graphite, or other flow agent.

- Avoid excess to minimize dust.

Avoid releasing dust from seed treatments into the air that could expose pollinators.

- Be careful when opening seed containers and when filling, emptying, or cleaning the planting equipment.



After Application

- Properly dispose of leftover tank mix, rinsates and wash waters.
 - Bees are attracted to water sources.
 - Cover, drain, or dispose of any puddles or pools.
- Store unused pesticides in a secure facility.



Pollinator Protection Checklist

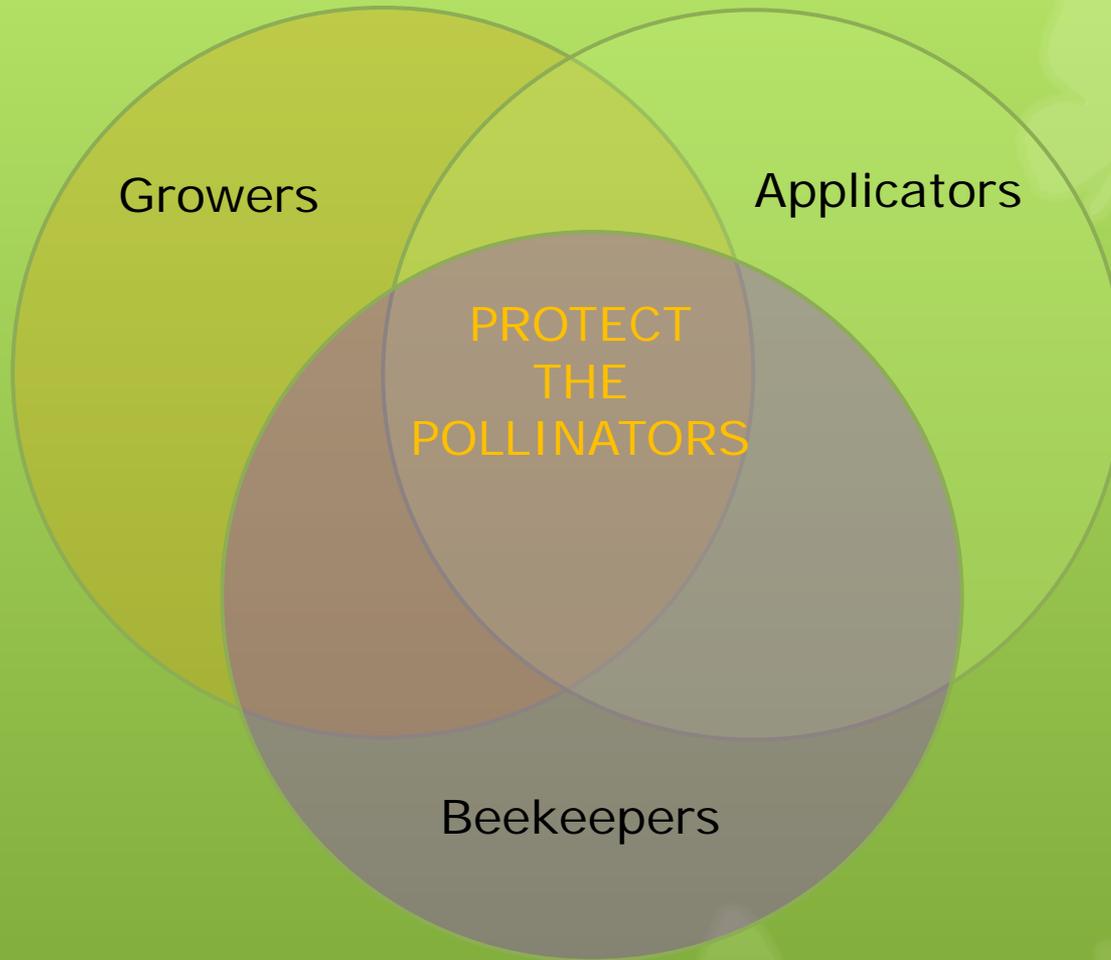
6. Cooperate and communicate with others who are concerned about preserving beneficial insects, including pollinators.

- Beekeepers
- Custom applicators
- Neighboring growers



Penn State Pesticide Education Program

Pollinator Protection requires **COMMUNICATION!**



What Can You Do...?

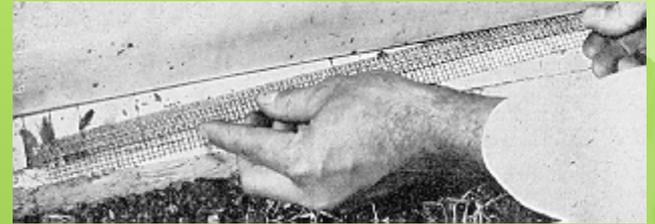
- **As a Beekeeper...**
 - **Notify applicator of the location of hives**
 - **Have your contact information on the hives**
 - **All bee medications, even organic ones, (miticides) can also contribute to these problems. Minimize your use**



<http://scientificbeekeeping.com/>

What Can You Do...?

- When highly toxic & long residual pesticides are applied nearby:
 - consider moving hives
- When highly toxic & short residual pesticides are applied nearby :
 - confine your bees



Pollinator Protection Checklist

7a. Know the common symptoms of honey bee exposure to pesticides

7b. Know what other stressors impact bee health.



iStockphoto.com

Common Symptoms of Honey Bee Exposure to Pesticides

Excessive numbers of dead bees in front of hives.

Lack of the usual numbers of foraging bees, if not weather-related.

Bees in front of hives that appear disoriented and unable to fly.



Common Other Stressors to Bee Health

Colony starvation and
nutritional deficiency.

Excessive cooling or heating
of the colony and brood.

Parasites.



Pollinator Protection Checklist

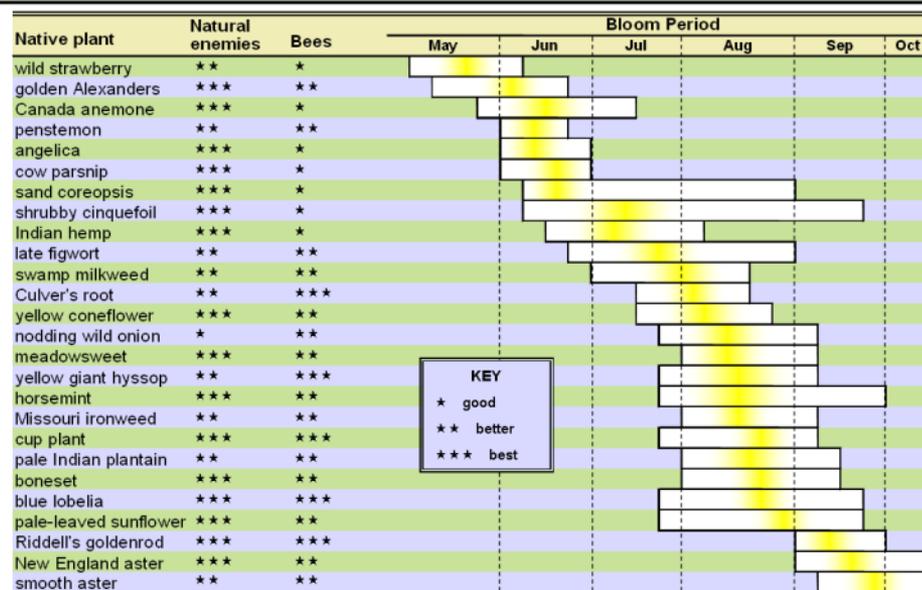
8. Check for specific local ordinances pertaining to pollinators, especially beehive locations or designated preserves.



What we all can do to improve pollinator survival?

- * Grow plant for pollinators
- * Convert lawns and fallow field areas to bee gardens or bee pastures
- * Simply planting clovers, sunflowers or asters can make a big difference

Bloom Timing of Native Plants Attractive to Beneficial Insects



Attracting Beneficial Insects with Native Flowering Plants
 by Doug Landis, Rufus Isaacs



Use of this presentation or parts of this presentation is encouraged as long as this credit slide is included.

Photo/Graphic Credits:

- Tom Butzler, Penn State Extension (slides 2, 3, and 4).
- Environmental Protection Agency (slides 8, 12, and 30).
- iStockphoto.com (slides 25 and 27).
- Penn State Pesticide Education Program (slides 5, 7, 24, and 28).

Resources:

- **Bee Labeling Info Graphic** (PDF). U.S. EPA.
<http://www.epa.gov/opp00001/ecosystem/pollinator/bee-label-info-graphic.pdf>
- **Pollinator Protection web page**, U.S. EPA. <http://www.epa.gov/pesticides/ecosystem/pollinator/>
- **Pollinators and Pesticide Stewardship**. Coalition for Urban/Rural Environmental Stewardship, Syngenta, and Bayer CropScience.
<http://pesticidestewardship.org/pages/resources.aspx>





This presentation was created in partnership with the
Pesticide Education Program, Penn State Cooperative Extension;
and the Pennsylvania Department of Agriculture.

It was slightly modified by
Washington State University
Urban IPM and Pesticide Safety Education Program

Where trade names appear, no discrimination is intended, and no endorsement by WSU or Penn State Cooperative Extension is implied. WSU and Penn State is committed to affirmative action, equal opportunity, and the diversity of its workforce.

© The Pennsylvania State University 2013

September 2013



Penn State **Extension**
Pesticide Education Program

Other contributors to this presentation

- * Frank Drummond – University of Maine
- * Tony Jadczyk - MDACF
- * Sherm Takatori – Idaho Department of Agriculture
- * Thia Walker - Colorado State University
- * Carol Black – Washington State University
- * Jack Peterson – Arizona Department of Agriculture
- * Kerry Richards – Penn State University

Resources

- * <http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf>
- * <http://www.beccdcap.uga.edu>
- * <http://pesticidestewardship.org/PollinatorProtection/Pages/default.aspx>
- * <http://www.epa.gov/opp00001/ecosystem/pollinator/>

Questions?

* That's all folks!