

Pollinator Protection/ Honey Bee Health

Michigan Mosquito Control Association
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Michigan Department of Agriculture & Rural Development

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Concerns, Then - Now

- 25 years ago
 - American Foulbrood
 - Other diseases?
 - Terramycin
 - Pesticides used by others.

 - Registration
 - Inspection
 - Honey prices
 - Over-winter in Michigan/ Closed State
 - Neighboring beekeepers



Adult Bee with Varroa and Deformed Wing Virus

- Today
 - CCD
 - Varroa Mites
 - Tracheal Mites
 - Small Hive Beetle
 - 2 Nosema parasites
 - 28 Viruses
 - In Colony Pesticide and antibiotic
 - Resistance
 - Residue
 - Misuse
 - Pesticides
 - New products
 - Neonicotinid?
 - Fungicides?
 - Synergistic effects of pesticides in bees
 - International trade in honey products
 - Honey prices
 - Move to Over-winter locations / South
 - Pollination contracts
 - Competition for colonies, nucs, queens
 - Right to Farm
 - Agricultural and Homeowner Pesticide use.
 - Price of queens, package bees.
 - Queen rejection or early replacement
 - Neighbors
 - Zoning Laws
 - Africanized Bee/Cape Bee
 - Imported bees from Australia and New Zealand
 - Tropilaelaps?
 - Certification for Movement
 - Citrus Canker

 - The list continues....

Parasitic Mites

- **Varroa Mite**

- External parasite
- Reproduces in the cell
- Deforms/Kills young bees as they develop
- Moves from colony to colony on drifting bees
- Builds up numbers quickly



- **Tracheal Mite**

- Internal parasite
- Entire life cycle in trachea
- Quests to locate juvenile bees
- Damages young bees by sucking hemolymph, destroying the trachea.
- Reduces life span of overwintering bees.



MAAREC

For Michigan Beekeepers, the Pollination Season starts in February.

- Well Traveled Migratory Bees return in April:
- Florida: 40,000 + colonies
- California: Strong Colonies tend to make their way west. – Some MI to GA to CA to GA to MI, High pollination rates (\$150-\$200 per colony) offset the costs and provide operating dollars.
- Georgia and other states: 10-15,000 colonies. 15-20,000 packages of bees. These numbers have increased in recent years.
- As many as 70,000 colonies return to Michigan each spring



Almond Pollination

- Bees in California's Central Valley waiting to move into Almonds.
- Nearly 1.2 million colonies, ½ of US Bees
- Rental value based on hive strength, evaluated by industry.



Pollination Resources:

- In Michigan 50-75 full time commercial beekeepers. Operations range from 500-5000 colonies and more.
- Michigan has 1200-1500 (2500?) beekeepers, many provide some level of pollination services.
- There is no registration in Michigan, beekeeping statistics are estimates at best.
- Migratory bees brought up from Southern states are generally strong and ready to go in early April.
- High availability and historically lower pollination rates
- Michigan bees are pollinating Blueberries in Maine and Cranberries in Wisconsin.

Michigan's Pollination Resource

- Migratory bees are generally ready to take up pollination duties when they get here.
 - Migratory beekeepers replace their lost colonies during the winter when their bees are in warmer locations where they can work with their bees through the winter.
- Over-wintering in Michigan has it's issues.
 - Colony losses occur throughout the winter.
 - Brood development has just gotten started.
 - Losses cannot be replaced until spring so bees will not be ready for early pollination work.
- Migratory beekeepers are very aware of and interested in protecting pollination contracts. Michigan beekeepers have historically met Michigan's pollination needs.

Symptoms of CCD 2006



Sudden loss of adult bees,
Honey and pollen present.
Queen and Insufficient
Work Force.
Presence of capped brood.
Robbing delayed
Invasion by wax moth and
small hive beetles delayed.

N. Rice



CCD Workgroup

Honey Bee Health

Fall 2012

Multiple stakeholders,

May 2013 Press release on findings

<http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf>

Parasites

Diseases

Genetics: Diversity and Hygenics

Nutrition: Diversity and Land Management issues

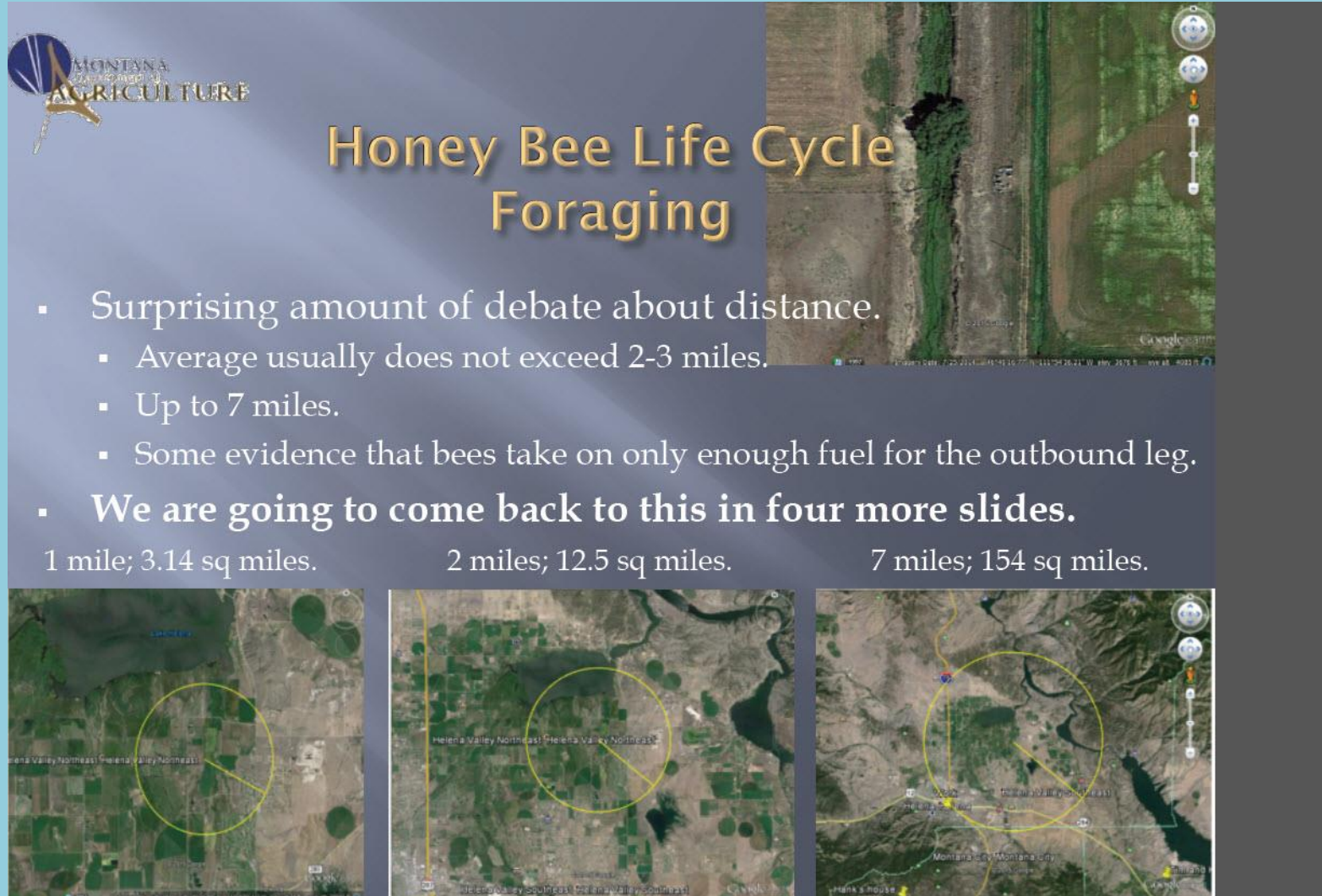
Pesticide Exposure: Reports and Enforcement

Best Management Practices



How Far do you look!

Slide credit Cam Lay, Montana State Entomologist



Honey Bee Life Cycle Foraging

- Surprising amount of debate about distance.
 - Average usually does not exceed 2-3 miles.
 - Up to 7 miles.
 - Some evidence that bees take on only enough fuel for the outbound leg.
- **We are going to come back to this in four more slides.**

1 mile; 3.14 sq miles. 2 miles; 12.5 sq miles. 7 miles; 154 sq miles.

Crop/Grower Diversity



Information?

Pesticide formulation	Bee exposure	Special precautions
Microencapsulated, dust, wettable powder, flowable	Particles similar in size to pollen, stick to bee hairs, and can be taken to hive and fed to brood	Avoid weather conditions that increase drift of dust.
Emulsifiable concentrate	Direct spray and residues	Ultralow volume (ULV) formulations may be more hazardous than other liquid formulations.
Solution, soluble powder	Direct spray and residues	Ultralow volume (ULV) formulations may be more hazardous than other liquid formulations. Chemigation drips or puddles may attract bees.
Seed coatings	Applied directly to seed. Ideally, bee exposure not expected	Can transfer to talc during planting and drift onto blooming crops, weeds, or adjacent habitat.
Granular	Applied to soil, honey bees do not pick up	Avoid applying near known nesting beds of ground nesting bees, such as the alkali bee.
Systemic (soil, injection, or foliar applications absorbed by plant)	Some systemic insecticides may translocate to nectar, pollen, and guttation droplets, and can be ingested by bees.	Whether field concentrations are high enough to adversely affect bee colonies is a subject of research.



Proposal to Mitigate acute Risk to Bees

- Proposal Released by EPA May 29, 2015
 - Addresses acute contact exposure to foliar pesticide applications
 - Strategies
 - Label Restrictions for Contract Pollination Services
 - State and Tribal Managed Pollinator Protection Plans for bee Colonies Not under Contract Pollination Services.
- <http://www.epa.gov/pesticides/epa-takes-strong-steps-better-protect-bees-pesticides>

Approach and Rationale

- Pesticide have been identified among the factors
- Reported bee kill incidents for pesticide categorized as toxic to bees from acute contact exposure
- Large number of bee colonies used for commercial pollination services
- Lack of communication mechanisms between beekeepers, growers and applicators
- Focus is on managed bees, but the measures will help to protect wild bees.

Commercial Pollination

- Label restriction prohibiting applications while bees are onsite under contract for pollination services.
- All FIFRA Sect 3 and 24c products that have:
 - Liquid or dust formulations
 - Foliar use directions for crops that utilize commercial pollination
 - Acute contact toxicity LD50 less than 11 micrograms/bee
- Section 18 petitions considered case by case

Proposed Label Restrictions

- Contracts will be interpreted broadly – written and or oral
- There are no other exceptions to the at bloom restriction
- The restriction applies to 76 active ingredients that are toxic to bees including most insecticides and some herbicides.
- Propose mitigation is based on an acute toxicity threshold and is not intended to supersede more restrictive product-specific use prohibitions
- EPA will continue to conduct chemical-specific risk assessments for bees to address other routes of exposure and effects (Seed Treatments, Chronic, whole Hive)
- EPA will consider addition product-specific mitigation as needed in registration and registration-review.

Other Scenarios

- There is a potential for bees not under contract for pollination services to be exposed to toxic pesticides
 - Neighboring sites within the forage range or foraging on crops that done require pollination (e. g. honey production)
- Exposure is less certain that when large numbers of hives are onsite under contract for pollination services.
- Wide range of local conditions suggest a flexible, localized approach rather ahtn a singular regulatory approach.
- EPA will continue to encourage state and tribal Managed Pollinator Protection Plans (MP3s)

Pollinator Protection Plans, Scope and Flexibility

- EPA is promoting MP3's general to mitigate exposure to managed bees from acutely toxic pesticides when not under contract for pollination services.
- EPA is not proposing to approve MP3's
- Following an MP3 does not negate label requirements
- States and Tribes have flexibility:
 - Adopting a regulatory or voluntary approach
 - Plan may be expanded to address other pesticide-related issues
 - Plan may include other factors impacting pollinator health such as access to foraging habitat
 - May expand scope to address wild bees and other pollinators

Measure Success of MP3s

- EPA is working with state and tribal agencies to develop measures for evaluating the success of pollinator protection plans
 - Earlier discussion identified potential measures for improved communication, change in behavior, reduction in exposure/risk, and overall pollinator health.
- EPA will monitor the success of these plans in reducing pesticide exposure to bees in deciding whether further label restrictions are needed.

Extension Org: http://www.extension.org/bee_health/

GAAMPS (Michigan) www.michigan.gov/gaamps

Project Apis M <http://projectapism.org/>

Bee Informed Partnership: www.beeinformed.org

Apinews: www.apinews.com (International newsletter of apiary news)

Mid Atlantic Apiculture Resource and Extension Consortium:
<http://agdev.anr.udel.edu/maarec/>

American Beekeeping Federation: www.abfnet.org

American Honey Producers: www.ahpanet.com

Apiary Inspectors of America: www.apiaryinspectors.org

American Association of Professional Apiculturists <http://aapa.cyberbee.net/>

Canadian Association of Professional Apiculturists www.capabees.org

USDA ARS programs: CCD:

<http://www.ars.usda.gov/News/docs.htm?docid=15572>

Penn State University: <http://ento.psu.edu/pollinators>

Questions?

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