

Pesticides

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Lakelands Beekeepers Association



Issues

- ▶ May lose foraging workers
 - ▶ May lose super or so of honey – pesticides are fat soluble not typically water soluble. Hence, will contaminate wax prior to honey.
 - ▶ The grower may lose pollination activity in his orchards or fields
 - ▶ When insecticide–contaminated pollen is carried back to hive, greater loss may occur – pollen–queen supersedure syndrome.
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Monetary Losses

- ▶ Immediate monetary losses can be considerable
 - ▶ Long-term losses in yield of insect-pollinated crops can be even greater than immediate losses.
 - Wild bee pollinated pollinators may require three years or more to rebound.
 - ▶ Beekeepers are often unable to continue to supply strong colonies.
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Poisoning Symptoms

- ▶ Excessive number of dead bees piling up in front of the hive.
- ▶ Up to 100 dead bees /day is normal die-off
- ▶ 90% of bees dying of old age die away from the hive. Dead workers at entrance usually represent 10%–20% total number being killed.
- ▶ Heaviest buildups
 - Strong colonies
 - Slow acting chemicals
 - Short distance to treated plants

Excessive
dead bees in
front of hive



Honeybee Death





Bee Reactions



- ▶ Bees become agitated and aggressive.
- ▶ When hive top cover is removed they fly off the top bars.
- ▶ Stupefaction, paralysis, abnormal jerky, wobbly, rapid movements, spinning on back.
- ▶ Abnormal communication dances on the landing board.
- ▶ Mistakes in communicating distance and direction
- ▶ Poor housecleaning
- ▶ Regurgitation
- ▶ Queens are often superseded or colony becomes queenless

Pesticides

- ▶ Kill by:
 - Contact
 - Stomach poison
 - Fumigation
 - Systemic
- ▶ Problems occur:
 - Applied in wrong manner
 - Applied at wrong time
 - Applied at wrong place



Pesticides

- ▶ Types:
 - Fungicides control fungi
 - Herbicides control weeds
 - Miticides control mites
 - Insecticides control insects



Herbicides

- ▶ Most present low hazard to bees
- ▶ Destruction of the bees' food source is much greater than direct poisoning.
- ▶ Round-Up (glyphosate) GMO crops reducing floral diversity, contributing to poor nutrition, soil buildup concern

Insecticides

- ▶ Contamination of open flowers (bloom) with insecticides is the major cause of bee poisoning.
- ▶ Nearly 100% of all bee kills are directly linked to the mis-application of insecticide onto bloom.
- ▶ It is the contamination of bloom – not beehives, that kills bees.




Miticides

- Chemical agents used to kill mites--- to help control varroa (fluvalinate - amitraz - apivar)
- Used in yards, gardens & on people --- Permethrin, Dicofol, Ivermectin



Bee Poisoning Factors

- ▶ Chemicals harmful to bees should never be applied to bloom during the day when bees are foraging.
 - ▶ Safest: late evening / night
 - ▶ Intermediate: midnight to first light
 - ▶ Dangerous: early morning before bees begin foraging.
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Sequence

- ▶ Dust (most hazardous)
- ▶ Wettable powder
- ▶ Flowable
 - Finely ground insecticide is suspended and detergent like compounds are added to make insecticide solubilize
- ▶ Emulsifiable concentrates
 - Concentrated oil solution of pesticide with emulsifying agent added
- ▶ Soluble powder
 - Dissolve in water and do not require agitation
- ▶ Solution
- ▶ Granular (least hazardous)
 - Similar to dusts except the particle size is much larger

Distance– hive to source

- ▶ Injury not usually significant if:
 - Diversified agricultural areas have lots of different blooms
 - Colonies are located a quarter mile or more away from the treatment

Hive location



Application Methods

- ▶ Aerial application is highest risk
- ▶ With applications confined to the target crop, Coarse sprays are more hazardous than fine sprays or aerosols

Application method



General Rule

- ▶ Always apply pesticide according to label directions
- ▶ Never apply to blooms when honeybees present


Our biggest danger!




Salvage of threatened Colonies

- ▶ If foragers only lost, adequate honey and pollen in the hive, colony will usually recover w/o any help from the beekeeper
- ▶ If brood and nurse bees die, poisoned pollen is present in the hive.
 - Colonies should be moved to a safer place and combs with the contaminated pollen removed.


Threatened Colonies – help colonies recover from poisoning

- ▶ Feed pollen or pollen substitute
 - ▶ Feed sugar syrup
 - ▶ Give water
 - ▶ Unite weak colonies
 - ▶ Protect from heat or cold
 - ▶ Move them to a pesticide free area that has natural nectar and pollen available
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Systemic Pesticides

- ▶ Neonicotinoids: imidacloprid, acetamiprid, clothianidin, dinotefuran, thiacloprid, phenylpyrazoles(fipronil)
 - ▶ Treatments for seed, soil, plant foliage
 - ▶ Present in plant tissues, nectar, pollen, plant exudates
 - ▶ Honeybees chronically exposed to sublethal doses
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References

- ▶ Carl A. Johansen & Daniel F. Mayer,” Pollinator Protection, A Bee & Pesticide Handbook,’ 1990 Wicwas press, ISBN:1-878075-00-4
 - ▶ Marion Ellis, U. of Nebraska, Lincoln, “Pesticides Applied to Crops and Honey Bee Toxicity”, Bee Culture, May 2010
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