

PROTECTING BEES FROM PESTICIDES

B.DHIVAGAR

SER-11-003

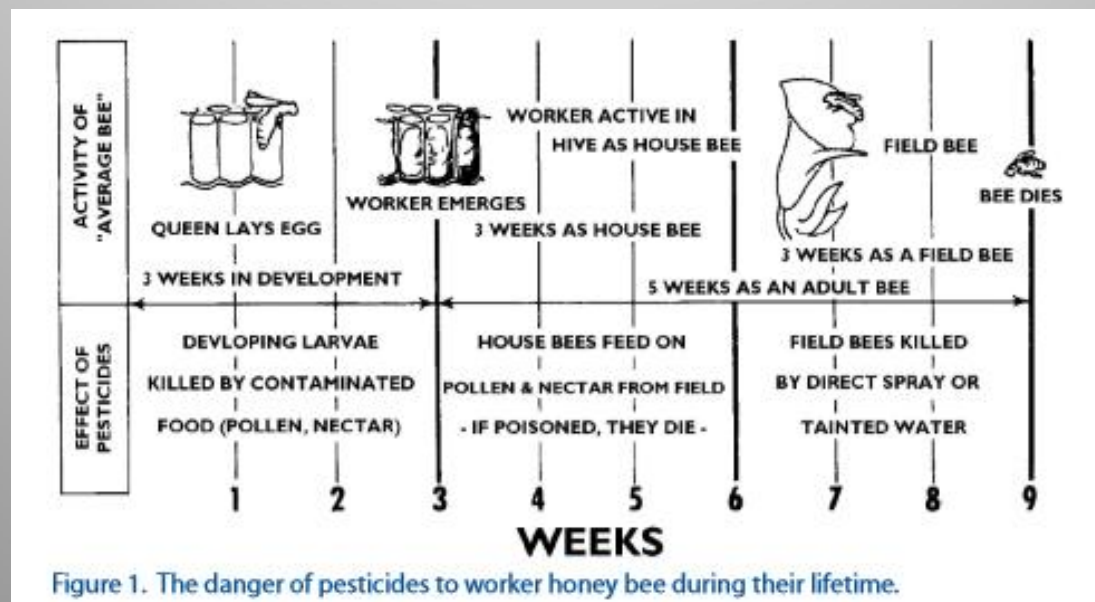
Introduction...

- The bees are susceptible to many insecticides used in field and orchard crops and use of these chemicals in or near the fields having the bees colonies is an acute problem.
- DDT has been used as a standard for comparing other chemicals for their relative toxicity to bees.
- Insecticides more toxic than DDT were considered too lethal to use around bee colonies.



Poisoning and Developmental Stages

- Worker bees are those primarily affected by pesticides.
- Worker bees take about twenty-one days to develop from egg to adult.
- During its growth, the larval stage is the most susceptible to pesticide poisoning during development.



Cont...

- The effect of pesticides on honey bees varies from one another.

House bees



Gets poisoned by contaminated pollen which is collected in the field, brought back and stored in the hive

Field bees



The field bees are killed by contact with pesticides in the field, and also collect contaminated nectar and pollen and contribute to poisoning their sisters in the colony.

Recognizing Bee Kills

- Before dying, poisoned bees can become irritable (likely to sting), paralyzed and appear to be 'chilled' or exhibit other abnormal behavior.
- Queens are likely to be superseded when a colony is being poisoned.
- Many chronic management problems such as starvation, winter kill, chilled brood or disease may be caused by pesticides in an indirect manner.



Reporting Bee Kills

- At the present time every bee kill should be reported using the **pesticide incident report**. The form is self-explanatory. The main rule to follow when filling it out is to be as specific as possible.
- Sending the form to the Environmental Protection Agency (EPA), it would be valuable to send a photocopy or duplicate copy.
- In cases where dead and dying bees are observed, a sample of dying insects (more than a cup if possible) and a 2 x 2 inch square of comb containing pollen should be collected and frozen.
- It is usually suggested that County Extension Agents, Agriculture Stabilization and Conservation Service (ASCS) personnel, State Bee Inspectors, or other local officials involves in collecting the samples..

Honey Bees and Pesticides

Please contact the following Beekeeper before spraying:

NAME: _____

ADDRESS: _____

CONTACT PHONE NUMBERS

DAYTIME _____

EVENING _____

Email _____

CROP/AREA TO BE SPRAYED _____

PRODUCT NAME _____

HSE NUMBER FOR THE PRODUCT _____

LOCATION OF HIVES POTENTIALLY AFFECTED _____

SPRAYING WILL BE DONE BY _____

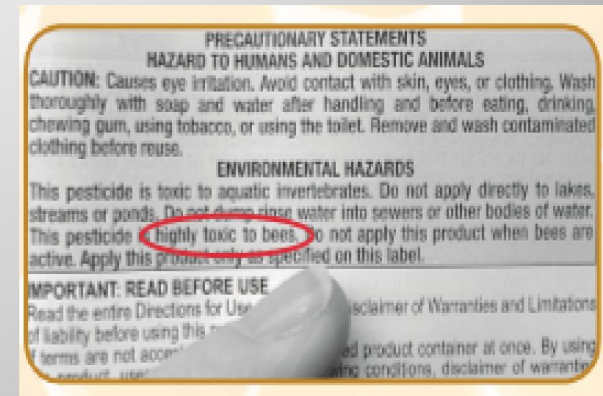
TIME AND DATE OF SPRAYING _____

PLEASE KEEP THIS FORM IN A SAFE PLACE

Thank you for informing the beekeeper!

Precautions for Pesticide Applicators

- Always read and follow any warning statements regarding honeybees on the pesticide label.
- Avoid applying any bee-toxic pesticides on blooming plants that attract bees.
- The time of pesticide application is very important. Apply pesticides that are toxic to bees in the late afternoon (after 3 p.m.) or in the evening, if possible.
- Most honey- bees have stopped foraging and have returned to their hives by 3 p.m. This allows the maximum time for the pesticide to decompose before the bees come into contact with it the next day.



Cont...

- The mode of pesticide application is also important, aerial applications are generally more dangerous than applications by ground equipment.
- Never apply a pesticide directly over beehive.
- Notify beekeeper who have beehives near an area to be treated with a pesticide so that they may attempt to protect their bees.
- Follow proper precautions in disposing of unused pesticides and pesticide containers.



Protecting bees from pesticides

- Use pesticides only when needed:
- Do not apply pesticides while crops are in bloom
- Apply pesticide when bees are not flying
- Do not contaminate water.
- Use less toxic compounds
- Use less toxic formulations
- Identify attractive blooms

Activity	SPRAY	NO SPRAY	SPRAY
Plant	 bud	 bloom	 petal fall
Attractiveness To Bees	NOT ATTRACTIVE	ATTRACTIVE	NOT ATTRACTIVE

Cont...

- Cover (with wet burlap) or move your beehives if possible when bee-toxic pesticides are being applied near your apiary.

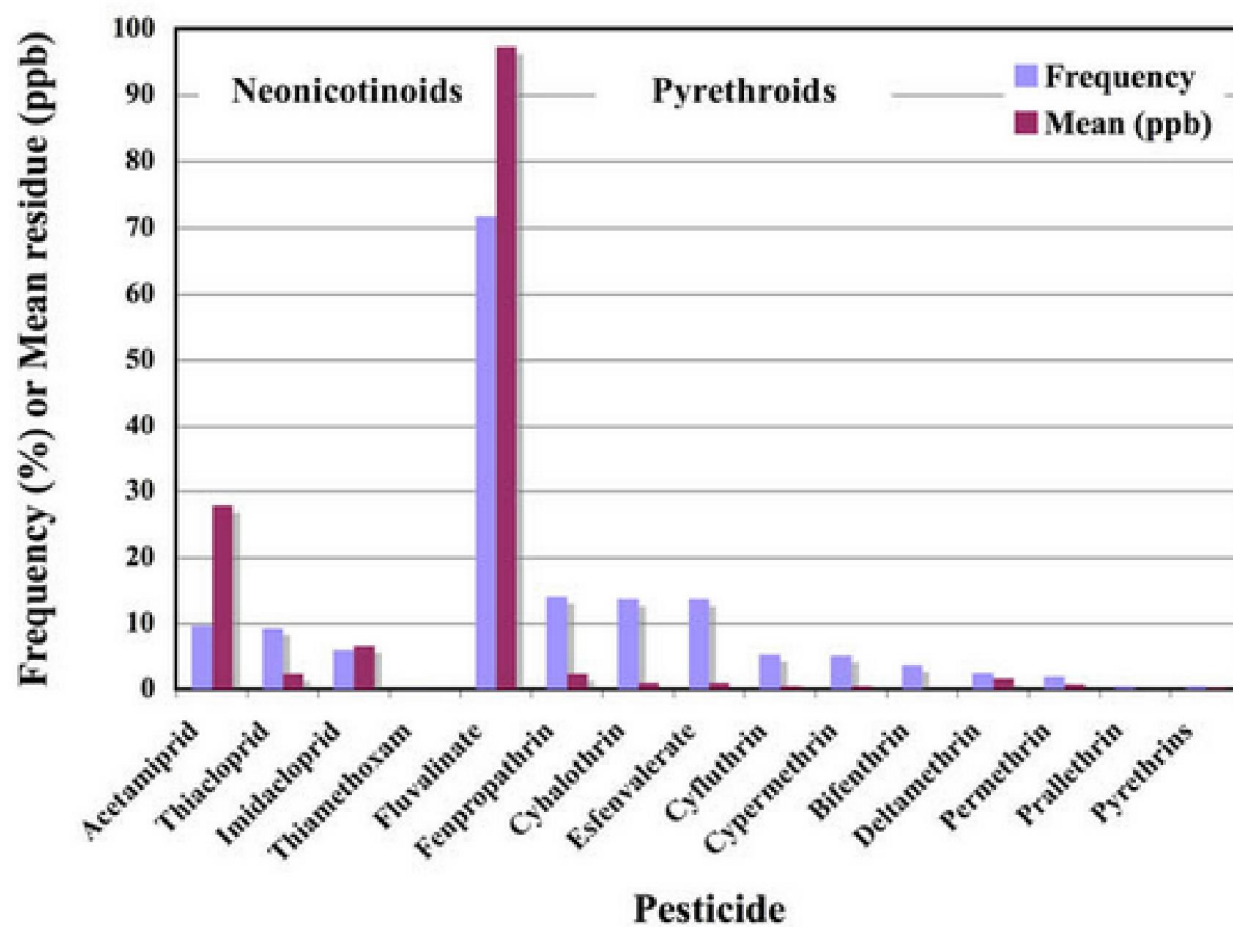


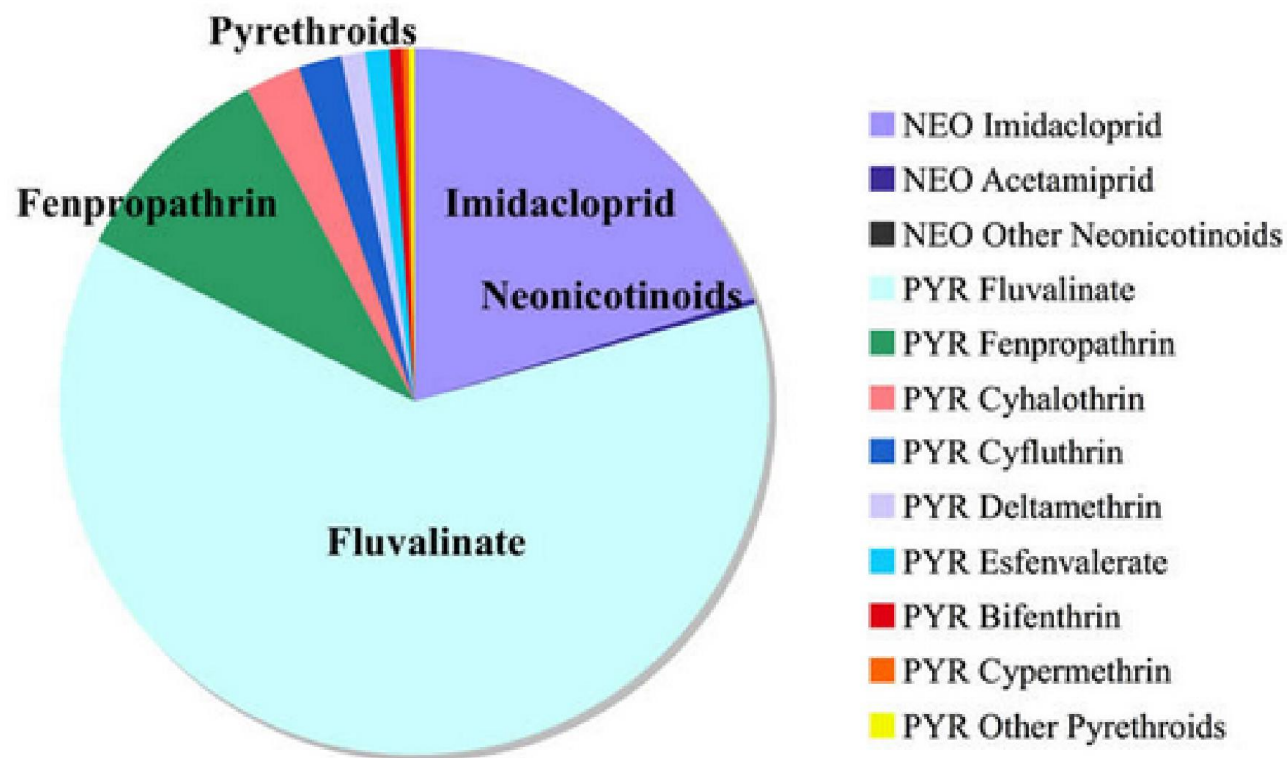
Bee Kill Estimations

DEAD BEES/DAY	TYPE OF KILL
0-100	Low kill
200-400	Normal kill
500-900	Moderate kill
1000 & above	High kill

What are Neonicotinoids???

- Neonicotinoids are synthetic variants of nicotine and used to kill insect pests. Applied as a seed dressing, the pesticide gets into the pollen and nectar of crops such as oilseed rape, which the bees feed on.
- Neonicotinoids have previously been linked to Colony Collapse Disorder in honey bees.





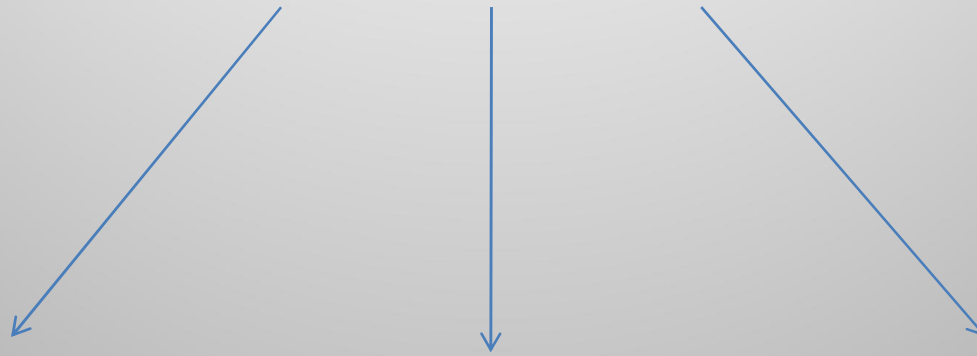
Based on toxicity of pesticides

Toxicity of pesticides

Relatively Toxic

Moderately Toxic

Relatively nontoxic



Relative Toxicity of Pesticides to Honeybees

Group 1—HIGHLY TOXIC. Severe bee losses may be expected if the following pesticides are used when bees are present, if the product is applied near beehives, or if bees forage in the application area withing a day after treatment.

Acephate (Orthene) Aldicarb (Temik) Arsenicals Avermectin Azinphos-methly (Guthion) Bifenthrin (Brigade, Capture) Bioethanomethrin Carbaryl (Sevin 80 S) Carbofuran (Furaden) Carbosulfan (Vantage) Chlorpyrifos (Dursba, Lorsban) Clothianidin (Poncho 600) Cyfluthrin (Baythroid) Cyhalothrin (Karate) Cypermethrin (Ammo, Cymbush) D-phenothrin)Sumithrin) Decamethrin (Decis) Diazinon (Spectracide) Dichlorvos (DDVP, Vapona) Dicotophos (Bidrin)	Dimethoate (Cygon, DE-FEND) Famoxadone (Famoxate) Famphur (Fampohos) Fenitrothion)Sumithion) Fenpropathrin (Danitol, Dansnit) Fenthion (Baytex) Flucythrinate (Pay-Off) Famoxadone (Famoxate) Heptachlor Indoxacarb (Steward, Avaunt) Lindane LPOS (sulfotine, RAID TVK) Malathion (Cythion) Methamidophos (Monitor, Tamaron) Methidathion (Supracide) Methiocarb (Mesurol) Methomyl (Lannate, Nudrin) Methoprene Methyl parathion (Penncap-M) Mevinphos (Phosdrin)	Mexacarbate (Zectran) Monocrotophos (Azodrin) Mald (Dibrom) Parathion Permethrin (Ambush, Pounce) Phosmet (Imidan) Phosphamidon (Dimecron) Prallethrin (ETOC) Propoxur (Baygon) Pyrazophos (Afugan) Resmethrin (Synthrin) Spinosad (XE-105, Tracer) TEPP Tetrachlorvinphos (Appex, Gardona) Tralomethrin (Scout)
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Group 2—MODERATELY TOXIC—These pesticides can be used in the vicinity of bees if dosage, timing, and method of application are correct, but these products should **NEVER** be applied directly on bees in the field or at the colony locations (apiaries).

Acetamprid	Phosalone (Zolone)
Aldicarb sulfoxide	Profenox (Curacron)
Bifenazale (Floramite)	Propamocarb (Carbamult)
Aluminum phosphide (Phostoxin)	Propamocarb hydrochloride (Banol)
<i>Bacillus thuringiensis</i> (Di-Beta)	Pyrethrum
Biothion	Ronnel
Carbophenothion	Sulprofox (Bolstar)
Coumphaos (Co-Ral)	Sumithrin (Anvillollo)
Crotoxyphos	Tartar emetic
Demeton (Systox)	Temephos (Abate)
Disulfoton (Di-Syston)	Terbufos (Counter)
Endosulfan (Thiodian)	Thiacloprid (Calypso, YRC-2894)
Endothion	Thiazopyr (MANDATE, VISOR)
Endrin	Thiodicarb (Larvin)
Ethoprop (Mocap)	Zepphyr
Fonofos (Carzol)	
Oxamyl (Vydate)	
Oxydemeton-methyl (Metasystox-R)	
Phorate (Thimet)	

Group 3—RELATIVELY NONTOXIC. These pesticides can be used around bees with a minimum of injury if dosage, timing, and method of application are correct. Never apply pesticides directly to the beehive.

Acaricides, Diseases, IGRs, and Insecticides		
Aldoxycarb (Standak) Allethrin Amitraz (Mitac) Azadirachtin (Margosan-O) <i>Bacillus thuringiensis</i> (Biotrol) <i>Bacillus thuringiensis</i> (Dipel) <i>Bacillus thuringiensis</i> (Thuricide) <i>B.t. kurstaki</i> (Dipel 4L) <i>B.t. kurstaki</i> (Javelin) <i>B.t. tenebrionis</i> Chlordimeform (Fundal) Chlordimeform (Galecron) Chlorobenzilate (Acaraben) Chlorobenzilate (Folbex)	Cryolite (kyocide) Cyromazine (Trigard) Dibromochloropropane (Nemagon) Dicofol (Kelthane) Diflubenzuron (Dimlin) Dinobuton (Dessin) Dioxathion (Delnav) Esfenvalerate (Asana) Ethion (Ethiol) Heliothis virus Methoxychlor (Marlate) Multimethylalkenois (Stirrup) Nicotine Nosema locustae fungus (Canning)	Pirimicarb (Primor) Polynactins Propargite (Comite, Omite) Prethrum Pyriproxyfen Rotenone Ryania Tetadifon (Tedion) Tetraflubenzuron (CME) Toxaphene Trichlorfon (Dylox) Z-11-hexadecanol (tomato pinworm pheromone)
Fungicides		
Acibenzolar-S-methyl (Actigard) Anilazine (Dyrene) Anilaine (Kemate) Azoxystrobin Benomyl (Benlate) Bordeaux mixture Captan (Difolatan) Captan (Orthocide) Chloropicrin Copper 8-quinolate Copper hydroxide Copper sulfate—monohydrated Cuprous oxide Cyclanilide (FINISH) Cymoyanil (Curzate 60DF) Cyrodinil (Vangard WP)	Dazomet (Mylone) Dicholone Dimethomorph (Acrobat MZ) Diniconazole (Spotless) Dinocap (Karathene) Dithianon (Thyron) Dodine (Cyprex) Fenaminosulf (Lesan) Fenhexamid (Elevate 50 WDG) Fluazinam (Omega 500F) Folpet (Phaltan) Glyodin (Glyoxide) Mancozeb Maneb (Manzate) Metiram (Polynam) Nabam (Parzate)	Mancozeb Maneb (Manzate) Metiram (Polynam) Nabam (Parzate) Polyphase P-100 (Troyson) Prochloraz Prochloraz/carbendazim (Sportac) Sulfur Thiram Thiram/methoxychlor (Atasan) Trifloxystrobin (Flint, Stratego, Compass) Triforine (Funginex) Triphenyltin hydroxide (Du-Ter) Ziram (Zerlate) Zoxamide (Zoxium 80W)

Reference...

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- Gary, N. E. 1967. "A method of evaluating honey bee flight activity at the hive entrance." Jour. Econ. Ent. 60 (1): 102-05
- Atkins, E. L., L. D. Anderson, and F. Todd. 1970. "Honey bee field research aided by Todd dead bee hive entrance trap." Calif. Agric. 24(10): 12-13.
- Johansen, C. A., M. D. Levin, J. D. Eves, W. R. Forsyth, H. B. Busdicker, D. S. Jackson, and L. I. Butler. 1965. "Bee poisoning hazard of undiluted malathion applied to alfalfa in bloom." Wash. Agric. Exp. Stn., Cir. 455.



THANK Q