Protecting Honey Bees

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The poisoning of honey bees and other beneficial insects by pesticides can be a serious problem. Honey bees provide a valuable service to agriculture because they are the most important pollinators of cultivated crops. They also produce honey and beeswax. Efforts should be made to protect honey bees whenever pesticides are used. The protection of honeybees has become even more critical in recent years because of increased colony loss due to mite parasites and Colony Collapse Disorder (CCD)

Causes of Bee Poisoning

1. Most bee poisoning occurs when insecticides are applied to crops in bloom. This includes crop plants such as sweet corn, which is routinely sprayed when in tassel. Honey bees collect pollen from corn tassels.
2. The application of insecticides to fields with weeds that are in bloom. The spring application of insecticides to alfalfa fields with flowering weeds is a particular problem in Virginia.
3. Drift of toxic sprays or dusts onto adjoining crops or weeds that are in bloom.
4. The contamination of flowering ground-cover crops in orchards when spray applications are made.
5. The contamination of water. This includes water collected by bees for drinking and cooling the hive as well as contact with contaminated water or dew on foliage or flowers.
6. The use of systemic insecticides and the possible contamination of nectar and pollen. This is a concern with the use of neonicotinoid insecticides, such as clothianidin, imidacloprid, and thiamethoxam, although more research is needed.

The most serious problems occur when bees collect contaminated pollen or nectar and carry these materials back to the hive. Insecticidal dusts (particularly Sevin) and encapsulated insecticides are especially dangerous because they adhere to foraging bees and may be collected and stored in the hive with pollen. Such materials can cause serious bee kills within the hive for many months.

Ways to Reduce Bee Poisoning

1. When using pesticides that are hazardous to bees, notify the beekeeper so that he may move or protect his hives.
2. Do not apply insecticides that are toxic to bees to crops in bloom.
3. Use insecticides that are less toxic to bees when such choices are consistent with pest control recommendations (see the table of relative toxicities).
4. Choose the least hazardous formulations when possible. Dusts and encapsulated insecticides are more toxic than sprays of the same material. Wettable powder sprays tend to have a longer residual effect (and are more toxic) than emulsifiable concentrate sprays. Granular applications are usually the safest method of treatment around bees.
5. Avoid drift of toxic sprays onto ground-cover plants, weeds, and crops in nearby fields.
6. Control weeds in fields and avoid direct insecticide applications to flowering weeds whenever possible.
7. If ground-cover plants in orchards are in bloom, mow before spraying.
8. Apply insecticides when bees are not actively foraging, either in the late evening or early morning. This is particularly important with crops such as corn where evening applications avoid many problems since pollen release occurs in the morning. In general, evening applications are least hazardous.
9. Avoid direct treatment over colonies.

Relative Toxicity of Pesticides to Honey Bees by Laboratory and Field Tests

Group I. Highly Toxic

Severe losses may be expected if these pesticides are used when bees are present at treatment time or within a day ***thereafter***.

Abamectin
Acramite (bifenazate)
Actara, Centric, Platinum, Helix, Cruiser, Adage (thiamethoxam)
Address (acephate)
Admire (imidicloprid)
Advantage
Afugan (pyrazophos)
Ambush (permethrin)
Ammo (Fury) (>.025 lb/acre) (cypermethrin)
Apollo (clofentezine)
Arsenicals
Asana (esfenvalerate)
Avaunt (Advion) (indoxacarb)
Avid (avermectin)
Azodrin (monocrotophos)
Baygon (propoxur)
Baytex (fenthion)
Baythroid (cyfluthrin)
BHC
Bidrin (dicrotophos)
Capture, Annex, Brigade (bifenthrin)
Carzol
Cidial (phenthoate)
Clutch (clothianidin)
Commodore (lambda-cyhalothrin)
Curacron (profenofos)
Cygon (dimethoate)
Cymbush
Cythion (malathion)
Danitol (fenopropathin)
Dasanit (fensulfothion)
DDVP (dichlorvos)
Delegate, Radiant (spinetoram)
Denim (emamec-tin benzoate)
Dibrom (naled)
De-fend, Dimate (dimethoate)
Diazinon (spectracide)
Dimecron (phosphamidon)
Dursban, Eradex (chlorpyrifos)
Ectrin (fenvalerate)
Endigo
Envidor (spirodiclofen)
EPN
Ethyl guthion (azinphos-ethyl)
Famphos (famphur)
Ficam (bendiocarb)
Folimat
Fipronil
Furadan F (carbofuran)
Fury (zeta-cypermethrin)
Gardona (tetrachlorvinphos)
Guard Star (permethrin)[1]
Guthion (azinphos-methyl)
Imidan (phosmet)
Karate
Lannate D (methomyl)
Lindane
Lorsban (chlorphyrifos)
Malathion (Malathion G)
Matacil (aminocarb)
Mesurol (methiocarb)
Methyl parathion
Monitor (methamidophos)
Nemacur P (phenamiphos)
Nexter (pyridaben)
Nudrin (methomyl)
Orthene (acephate)
Parathion
Pay Off (flucythrinate)
Phosdrin (mevinphos)
Phosphamidon
Poncho, Titan, Clutch (clothianidin)
Pounce (permethrin)
Proaxis (gamma-cyhalothrin)
Proclaim (emamectin)
Provado (imidachloprid)
Pydrin (fenvalerate 0.1 lb/A)[2]
Pyramite
Rebelate (dimethoate)
Resmethrin
Scout (tralomethrin)
Sevin (carbaryl)[3]
Spectracide
Steward (indoxacarb)
Sumithion (fenitrothion)
Supracide (methidathion)
Swat (bonyl)
Synthrin (resmethrin)
Tameron (methamidophos)
Temik (aldicarb)
TEPP
Vapona (dichlorvos)
Venom (dinotefuran)
Warrior (lambda-cyhalothrin)
Zectran (mexacarbate)
Zephyr (Agri-Mek) (abamectin)

[1]Can be applied to ground in front of beehives for the control of small hive beetles.
[2]Can be applied in the late evening at rate of 0.1 lb/A or less.
[3]Some formulations of Sevin XLR are rated as moderately toxic.

Group II. Moderately Toxic

These can be used around bees if dosage, timing, and method of application are correct, but should not be applied directly on bees in the field or at the colonies.

Abate (temophos)
Acramite (bifenazate)
Agritox (trichloronate)
Assail (acetamiprid)
Banol (carbanolate)
Bolstar (sulprofos)
Calypso (thiacloprid)
Carzol (formetanate)
Chlordane
Ciodrin (crotoxyphos)
Coumaphos[1] (Agridip, Asunthol)
Counter (terbufos)
Decis, Battalion (deltamethrin)
Di-Syston (disulfoton)
Dyfonate (fonofos)
endrin
Esteem (pyriproxyfen)
Ethodan (Ethion)
Korlan (ronnel)
Larvin (thiocarb)
Metasystox (demeton-s-methyl)
Metasystox R (oxydemeton-methyl)
Mocap (ethoprop)
Oil sprays (superior type)
Pirimor (pirimicarb)
Pyramat
Rhonthane (RDE)
SpinTor (Conserve SC) (Entrust) (spinosad)
Systox (demeton)
Trigard (cyromazine)
Thimet (phorate)[2]
Thionex (endosulfan)
Trithion (carbophenothion)
Vydate (oxamyl)

[1]Checkmite (coumaphos) strip can be used in beehives to treat for varroa mites and small hive beetles.
[2]Thimet EC should only be applied during late evening.

Group III. Relatively Nontoxic

These can be used around bees with a minimum of injury

Acaraben (chlorobenzilate)
Acarol (bromopropylate)
Agri-Mek (avermectin)
Allethrin
Altosid (methoprene)
Amitraz
Apollo (clofentezine)
Applaud, Centaur (buprofezin)
Aza-direct (azadirachtin)
Bacillus thuringiensis (Accoate, Biotrol, Dipel, Thuricide)
Calypso (thiacloprid)
Chlorantraniliprole
Chloroparacide (chlorbenside)
Confirm (tebufenozide)
Cyd-X (CM granulovirus)
cyrolite
Dessin (dinobuton)
Dimilin (diflubenzuron)
Dinocap (Karathane)
Dylox (trichlorfon)
Ethrel (ethephon)
Esteem (pyriproxyfen)
Fujimite (fenpyroximate)
Fulfill (pymetrozine)
Heliothis polyhedrosis virus
Intrepid (methoxyfenozide)
Isomate
Kanemite (acequinocyl)
Kelthane (dicofol)
Mavrik (fluvalinate)[1]
methoxychlor (Marlate)
Morestan (oxythioquinox)
Murvesco (fenson)
Neemix (Align) (azidirachtin)
Neotran
nicotine
Omite (propargite)
Ovotran (ovex)
Pentac (dienochlor)
Plictran [mitacid] (cyhexatin)
Pynamin
Pyrellin (rotenone/ pyrithrin)
pyrethrum (natural)
rotenone
ryania
Rynaxypyr (chlorantraniliprole)
sabadilla
Saphos (menazon)
Savey (hexythiazox)
Spur (fluvalinale)
Surround (kaolin)
tetram
Trigard (cyromazine)
Vendex (fenbutatin oxide)
Zeal (etoxazole)

[1]Fluvalinate is used in Apistan strips to treat beehives for varroa mites. It is illegal to use Mavrik in hives.

Fungicides

As a general rule, fungicides are safe to use around honey bees.

Afugan (pyrazophos)
Arasan (thiram)
Benlate (benomyl)
bordeaux mixture
Bravo (chlorothalonil)
Captan
copper oxides
copper oxychloride sulfate
copper sulfate
cupric hydroxide (Kocide)
Cyprix (dodine)
Dithane D-14 (nabam)
Du-Ter (fentin hydroxide)
Dyrene (anilazine)
ferbam
Karathane
Maneb
Mancozeb
Morocide (binapaeryl)
Mylone (dazomet)
Phygon (dichlone)
Plantvax (oxycarboxin)
Polyram (metriam)
Rovral (iprodione)[2]
sulfur
Syllit (dodine)
Terraguard[1],
Procure (triflumizole)
Vitavax (carboxin)
Zerlate (Ziram)
Zineb

[1] May increase the toxicity of neonicatinoid insecticides to honeybees if used together.

[2] May cause loss of honeybee larvae. Use with caution where bees are foraging.

Herbicides, Defoliants and Dessicants

Atrex (atrazine)
Alanap (naptalam)
Amiben (chloramben)
Amitrol
Ammate
Balan (benefin)
Banvel (dicamba)
Betanal AM (bentanex)
Bladex (cyanazine)
cacodylic acid
Caparol (prometryn)
Cotoran (fluometuron)
2,4-D
Daconate (MSMA)
dalapon
2,4-DB
2,4-DP (dichlorprop)
diquat
DSMA
Endothal (endothal)
Eptam
Folex (desmedipham)
Glyphosate
Gramoxone (paraquat)
Herbisan (EXD)
Hyvar (bromacil)
IPC (propham)
Karmex (diuron)
Kerb (proamide)
Lasso (alachlor)
Lorox (linuron)
MCPA
Paarlan (isopropalin)
paraquat
Pendimethalin (Prowl)
Phenmedipham (Betanal)
Pramitol (prometone)
Princep (simazine)
Probe (methazole)
Ramrod (propachlor)
Ronstar (oxadiazon)
Sencor (metribuzin)
Sinbar (terbacil)
Surflan (oryzalin)
Sutan (butylate)
Tordon (picloram)
Treflan (trifluralin)