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Pesticides
and Honey Bees
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PESTICIDES AND HONEY BEES

Prepared by L. N. Standifer, ARS entomologist¹

Honey bees produce honey and beeswax valued at \$100 million annually. Much of this honey comes from cultivated crops. The annual value of crops benefited by insect pollination, the majority of which is performed by honey bees, exceeds \$10 billion. The farmer and the beekeeper are, therefore, dependent upon each other.

Honey bees may be killed when

crops are treated with pesticides. When this occurs, both the farmer and the beekeeper suffer a loss. For this reason, they need to cooperate fully in protecting the bees from pesticide damage.

Observing the precautions recommended in this publication can greatly reduce bee losses from pesticide poisoning.

PRECAUTIONS FOR THE FARMER

- Use biological or other non-chemical control methods if at all possible.
- If chemical control is essential, use the proper dosage of the safest material (on bees) that will give good pest control.
- Notify the beekeeper if you intend to treat the crop. Tell him what material will be used and when it will be applied. However, notification of the beekeeper does not relieve the grower of all responsibility for damage incurred.
- Read the label and follow approved local, State, and Federal recommendations.
- Remember that the time the pesticide is applied, depending on the blooming period and attractiveness of the crop, makes a big difference in the damage to the bees; therefore, treat the field when the plants are least attractive to bees.
- Do not spray or dust chemicals over colonies, especially in hot weather when the bees cluster outside the hive.
- Apply chemicals at night or during early morning hours before bees forage.
- Try to treat the plants before they come into bloom or after the blooming period.

¹Bee Research Laboratory, Tucson, Arizona 85719. Other collaborators were A. S. Michael and S. E. McGregor, ARS entomologists, (retired).

- Remember that treating a non-blooming crop, when weeds and wild flowers are in bloom in the field or close by, can cause bee losses.
- Make as few as possible treatments because repeated applications greatly increase the damage to colonies.
- Do not treat an entire field or area if local spot treatments will control the harmful pests.
- Sprays do not drift as far as dusts and, consequently, are less likely to harm bees.
- Granules are usually the safest and least likely to harm bees.
- Airplane applications are more hazardous to bees than ground equipment applications.

PRECAUTIONS FOR THE BEEKEEPER

- Identify your colonies. Post your name, address, and telephone number in a conspicuous place in the apiary. In some States, this is required. Let the farmers in the area know where the bees are located so they will not be unknowingly poisoned.
- If practicable, do not place colonies near fields that are routinely treated with pesticides.
- Know the pesticides commonly used in your area.
- Be prepared to remove the bees from the area if you are notified that a hazardous material is likely to be applied. Pesticides are grouped according to their relative hazards to bees on pages 5 and 6.
- You can protect small numbers of colonies from pesticides by covering them with wet burlap for a day or more. Cover colonies at night when all the bees are in the hives, and keep the burlap wet throughout the time of confinement. This is not practical where repeated applications of pesticides are made or where large numbers of colonies are involved.
- If the colonies are likely to be repeatedly exposed to pesticides listed in group 1 on page 5, move the colonies to another site.
- If the colonies must be moved, move them at night when all the bees are in the hive.
- Learn as much as you can about the value of pollinating insects to crops as well as to wildflowers, ornamentals, and forests. Pass this information along to the farmers and others in your area. In this way, they learn about the value of bees as pollinators and will be encouraged to protect your bees.

Trade names are used in this publication solely for the purpose of providing specific information. Mention of a trade name does not constitute a guarantee or warranty of the product by the U.S. Department of Agriculture or an endorsement by the Department over other products not mentioned.

PESTICIDES GROUPED ACCORDING TO THEIR RELATIVE HAZARDS TO HONEY BEES^{1 2}

(Arranged in Alphabetical Order Within Groups)

Group 1—Hazardous

Acephate (Orthene*)
Aldicarb (Temik*)³
Aldrin
Aminocarb (Matacil*)
Arsenicals
Azinphosethyl (Ethyl Guthion*)
Azinphosmethyl (Guthion*)
Benzene hexachloride (BHC)
Carbaryl (Sevin*)
Carbofuran (Furadan*)
Chlorpyrifos (Lorsban*, Dursban*)
Crotonamide (Azodrin*)
Diazinon (Spectracide*)
Dichlorvos (DDVP)
Dicrotophos (Bidrin*)
Dieldrin
Dimethoate (Cygon*, DE-FEND*)
EPN
Famphur (Famophos*)
Fenitrothion (Sumithion*)
Fensulfothion (Dasanit*)
Fenthion (Baytex*)
Heptachlor
Imidian*
Lindane
Malathion (Cythion*)
Malathion ULV
Methyl parathion
Metalkamate (Bux*)
Methamidophos (Monitor*, Tamaron*)
Methidathion (Supracide*)
Methiocarb (Mesurol*)
Methomyl (Lannate*, Nudrin*)
Mevinphos (Phosdrin*)
Monocrotophos (Azodrin*)
Naled (Dibrom*)
Parathion
Phosphamidon (Dimecron*)
Propoxur (Baygon*)
Resmethrin (Pyrethroid)

See footnotes at end of table

Tepp*
Tetrachlorvinphos (Gardona*)

Group 2—Moderately Hazardous

Carbophenothion (Trithion*)
Carbanolate (Banol*)
Chlordane
Coumaphos (Co-Ral*)
Counter*
DDT
Demeton (Systox*)
Disulfoton (Di-Syston*)⁴
Endosulfan (Thiodan*)
Endrin
Ethoprop (Mocap*)
Formetanate (Carzol*)
Hexaflurate
Leptophos (Phosvel*)
MAA
Mirex
Oxamyl (Vydate*)
Oxydemeton Methyl (Metasystox-R*)
Perthane*
Phorate (Thimet*)⁵
Phosalone (Zolone*)
Pyramat*
Pyrazophos (Afugan*)
Ronnel
Temephos (Abate*, Biothion*)
Trichloronate (Agritox*)

Group 3—Relatively Nonhazardous

Alachlor (Lasso*)
Allethrin
Amitrole
AMS (Ammate*)
Anilazine (Dyrene*)
Atrazine (AAtrex*)
Bacillus thuringiensis
Benomyl (Benlate*)
Bifenox (Modown*)
Binapacryl (Morocide*)
Bordeaux mixture

Bromacil (Hyvar*)	Folex*
Cacodylic acid (Phytar 138*)	Folpet (Phaltan*)
Captafol (Difolatan*)	Glyodin (Glyoxide*)
Captan	<i>Heliothis</i> polyhedrosis virus
Carboxin (Vitavax*)	Linuron (Lorox*)
Chinotionate (Eradex*)	Mancozeb (Dithane M-45*, Fore*)
Chlorvinphos (Birlane*)	Maneb (Dithane M-2*)
CDAА (Randox*)	MCPA (Weedar*)
CDEC (Vegadex*)	Menazon (Sayfos*)
Chloramben (Amiben*)	Methazole (Probe*)
Chlorbenside (Chlorparacide*)	Methoxychlor
Chlorbromuron (Maloran*)	Metricam (Polyram*)
Chlordecone (Kepone*)	Metribuzin (Sencor*)
Chlordimeform (Fundal*, Galecron*)	Monuron (Telvar*)
Chlorobenzilate (Acaraben*)	MSMA (Daconate*)
Copper oxychloride sulfate	Nabam (Dithane* A40)
Copper 8-quinolinolate	Naptalam (Alanap*)
Copper sulfate (monohydrated)	Neotran*
Cryolite	Nitrofen (TOK*)
Cuprous oxide	Oxycarboxin (Plantvax*)
Cyanazine (Bladex*)	Oxythioquinox (Morestan*)
2,4-D	Paraquat
2,4-DB	Pentac*
Dalapon	Phenmedipham (Betanal*)
Dazomet (Mylone*)	Picloram (Tordon*)
DEF*	Plictran*
Dibromochloropropane (Nemagon*)	Prometon (Pramitol*)
Dicamba (Banvel*)	Prometryn (Caparol*)
Dichlorobenzil (Casoron*)	Pronamide (Kerb*)
Dichlone (Phygon*)	Propachlor (Ramrod*)
Dichlorprop (2,4-DP)	Propanil (Rogue*)
Dicofol (Kelthane*)	Propargite (Omite*, Comite*)
Dimilin*	Propazine (Milogard*)
Dinitrocyclohexylphenol (DNOCHP)	Propham (IPC*)
Dinobuton (Dessin*)	Pyrethrins (natural)
Dinocap (Karathane*)	Rotenone
Dioxathion (Delnav*)	Ryania
Diquat	Sabadilla ⁵
Diathianon (Delan*)	Sesamin
Diuron (Karamex*)	Silvex
DMIT (Mylone*)	Simazine (Princep*)
Dodine (Cyprex*)	Sulfur
DSMA (Methar*)	Terbacil (Sinbar*)
Endothall (Endothal*)	Tetradifon (Tedion*)
EPTC (Eptam*)	2,4,5-T
Ethion	2,3,6-TBA (Trysben*)
EXD (Herbisan*)	Terbutryn (Igran*)
Fenamiosulf (Dexon*)	Tetram*
Fenson	Thioquinox (Eradex*)
Fentin hydroxide (Du-Ter*)	Thiram (Arasan*)
Ferbam	Toxaphene
Fluometuron (Cotoran*)	Trichlorfon (Dylox*, Dipterex*)
Fluorodifen (Pferoran*)	Zineb
	Ziram

See footnotes at end of table

USE OF PESTICIDES

This publication is intended for nationwide distribution. Pesticides are registered by the Environmental Protection Agency (EPA) for countrywide use unless otherwise indicated on the label.

The use of pesticides is governed by the provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. This Act is administered by EPA. According to the provisions of the Act, "It shall be unlawful for any person to use any registered pesticide in a manner inconsistent with its labeling." (Section 12(a) (2) (G))

EPA has interpreted this Section of the Act to require that the intended use of the pesticide must be on the label of the pesticide being used or covered by a Pesticide Enforcement Policy Statement (PEPS) issued by EPA.

The optimum use of pesticides, both as to rate and frequency, may vary in different sections of the country. Users of this publication may also wish to consult their Cooperative Extension Service, State Agricultural Experiment Stations, or County Extension Agents for information applicable to their localities.

The pesticides mentioned in this publication are available in several different for-

mulations that contain varying amounts of active ingredient. Because of this difference, the rates given in this publication refer to the amount of active ingredient, unless otherwise indicated. Users are reminded to convert the rate in the publication to the strength of the pesticide actually being used. For example, 1 pound of active ingredient equals 2 pounds of a 50 percent formulation.

The user is cautioned to read and follow all directions and precautions given on the label of the pesticide formulation being used.

Federal and State regulations require registration numbers on all pesticide containers. Use only pesticides that carry one of these registration numbers.

USDA publications that contain suggestions for the use of pesticides are normally revised at 2-year intervals. If your copy is more than 2 years old, contact your Cooperative Extension Service to determine the latest pesticide recommendations.

The pesticides mentioned in this publication were federally registered for the use indicated as of the issue of this publication. The user is cautioned to determine the directions on the label or labeling prior to use of the pesticide.

¹Terms followed by an asterisk (*) are trade names of proprietary products.

²Information supplied by E. L. Atkins, University of California, in cooperation with the U.S. Department of Agriculture.

³These pesticides, although toxic to bees as foliage residues or contact poisons, are not toxic to honey bees when applied as granules on or in the soil.

⁴Mevinphos (Phosdrin*), naled (Dibrom*), and tepp have short residual activity and kill only the bees contacted at time of treatment or shortly thereafter. They are usually safe to use when bees are not in flight; they are not safe to use around colonies.

⁵Usually, dosages of sabadilla are low enough to be no problem. Sabadilla should not be applied to open flowers that are freely visited by bees.



Use Pesticides Safely

FOLLOW THE LABEL

U.S. DEPARTMENT OF AGRICULTURE

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