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# Prevent Insecticide Poisoning of Pollinators

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Crops pollinated by insects have an annual economic value that exceeds \$1 billion in the United States. Farmers, beekeepers, applicators and the pest control industry must cooperate with one another to minimize losses of these needed insects. Pollinating insects can be killed particularly when crops are treated with insecticides during the blossoming period. Losses can be caused by direct spray on the bees, by drift from spraying of adjoining croplands and by contaminated drinking water, pollen or nectar. Spraying over hives or nests or spraying just before the bees are placed in the field can kill large numbers. Such spraying may decimate the bee population.

## *Precautions for Growers and Applicators*

- Select the pesticide least hazardous to bees when the application is during the blossoming period or when adjoining crops are in bloom.
- When applying toxic chemicals to crops in bloom, do so only when the bees are not foraging or before pollinators are brought into the field.
- Do not spray blossoming weeds when bees are active.
- Use the least hazardous formulation of insecticide when bees may be present. For reference, the following formulations are listed in order of most toxic to least toxic: Microencapsulated, dusts, ULV, wettable powders, flowables, emulsifiable concentrates, soluble powders and granules.
- Use a preventive control program or apply chemicals early in the season whenever possible so that pests are controlled before pollinators enter the fields.
- Do not apply Type 2 (evening-only) insecticides or Type 3 (when bees are not foraging) insecticides during warm weather when bees are clustered on the outside of their hives or nest domiciles.
- Check the fields for insect pollinators before applying any toxic chemicals.
- Read the label on the insecticide container and follow the instructions consistent with approved local, state and federal recommendations.



- Notify beekeepers if you anticipate problems. The beekeepers name, address and phone number will be posted at the hive location.
- Use ground equipment around bee hazard areas.
- Know the pollinator requirements of your crop and whether bees visit the crop.
- If in doubt on any of the above precautions, **do not spray.**

## *Precautions for Honeybee Management*

- Choose apiary sites as far as practical away from where insecticides will be applied.
- Keep your name, address and phone number posted on the hives so you can be contacted by concerned parties.
- Before moving hives to a new location determine the spray schedules of the local farmers.
- Use pesticides nontoxic to bees when controlling ants, wasps, moths and other pests.

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## Precautions for Wild Bee Management

Alfalfa leafcutting bees and alkali bees are very important pollinators of alfalfa and other crops in Idaho. Both are more susceptible to pesticide poisoning than honeybees.

- Do not use more pesticide than the rate recommended on the label. In addition to being illegal the heavier rate is usually more toxic to bees.
- When you make prebloom applications of Cygon, Supracide, Parathion, Methyl Parathion, Guthion and Malathion, apply them at least 1 week before emergence of wild bees. Allow at least 2 weeks for Furadan. Where there is a possible fumigation hazard to wild bees, do not use Thimet G, Di-Syston, Phosdrin, TEPP, Parathion and Methyl Parathion in adjoining fields.
- Do not mix miticides and insecticides in the same tank. Increased toxicity to bees is the usual result. For added safety, allow 1 to 2 days between applications of miticides and insecticides.
- Move or cover alfalfa leafcutting bee shelters during insecticide application to prevent spray from drifting into the nesting area. Be sure to remove covers during the day.
- Flag alkali bee beds so they may be easily seen and identified by aerial or ground applicators.
- Avoid spraying during evenings that are unusually cool and damp. The residual life of some insecticides may be 20 times longer in wet weather than in warm, dry weather.
- Older alfalfa leafcutting bees (3 to 7 weeks in the field) are more susceptible to pesticide poisonings. The best time for follow-up spray applications is 6 to 7 weeks after the start of activity in the field. This will coincide with the natural decline that occurs between peaks of bee emergence.

## Symptoms and Indicators of Bee Poisoning

### Honeybees

1. Large numbers of dead bees in front of hive.
2. Unusually mean or aggressive bees.
3. Unusual behavior such as abnormal communication dances.
4. Rapid spinning in circles on the ground or on hive surfaces.
5. Very sluggish or slow movements.

### Alfalfa Leafcutting Bees

1. Lack of bees where good numbers existed 1 or 2 days earlier.
2. Dead bees in front of shelter. Usually this is not seen because poisoned leafcutters seldom return to the shelter. Excessive numbers may be found in a shelter that has been sprayed.
3. Excessive numbers of pollen balls in the nesting materials.

### Alkali Bees

1. Excessive numbers of dead bees on the bed.
2. Lack of nesting females; mostly males flying over the bed.

## Toxicity Ratings

Each bee species may have a different susceptibility to poisoning from the same insecticide. We have no data for some insecticides so we recommend you do not use them where pollinators may contact them. Table 1 rates toxicity of insecticides to bees.

Table 1. Toxicity of insecticides to honeybees, alfalfa leafcutting and alkali bees.

Rating scale: 0 = No data or experience is available. *Do not use.*

1 = Do not apply to blossoming plants.

2 = Apply in evening after bees have stopped foraging.

3 = Apply during late evening after bees have stopped foraging until early morning before bees begin foraging.

4 = Can be applied safely at any time.

Insecticide	Honeybee	Alfalfa Leaf-cutting bee	Alkali Bee	Insecticide	Honeybee	Alfalfa Leaf-cutting bee	Alkali Bee
aldrin	1	1	1	Comite	4	4	4
Ambush	1	1	1	calcium arsenate	1	1	1
Aspon	2	0	0	Carzol	2	1	1
azinphosmethyl	1	1	1	Cygon	1	1	1
Azodrin	1	1	1	DDT	2	1	3
BAAM	4	0	0	DeFend	1	1	1
Bacillus thuringiensis	4	4	4	Delnav	3	3	0
Banol	1	0	0	Dibrom	2	2	3
Baygon	1*	1	1	dieldrin	1	1	1
Baygon G	4	4	4	Dimilin	0	0	0
Baytex	1*	1	1	diazinon	1	1	1
BHC	1	1	1	DiSyston EC	2	1	1
Bidrin	1	1	1	DiSyston G	4	4	4
Bromyl	1	1	1	DNOC	1	1	1

Insecticide	Honeybee	Alfalfa Leaf-cutting bee	Alkali Bee	Insecticide	Honeybee	Alfalfa Leaf-cutting bee	Alkali Bee
chlordane	1	1	1	dinoseb	1	1	1
Cidial	1	1	1	Dursban	1*	1	1
Ciodrin	1	0	0	Dylox	2	3	3
endrin	2	1	1	Mesurool	1	1	1
EPN	1	1	1	Metasystox-R	3	3	3
ethion	2	1	1	Metacide	1	1	1
Furadan F	1	1	1	methyl parathion	1	1	1
Furadan G	4	4	4	methyl parathion (microencapsulated)	1	1	1
Guthion	1	1	1	methoxychlor WP	2	2	2
heptachlor	1	1	1	Monitor	1	1	1
Imidan	1	1	2	Morestan	4	4	0
Karathane	4	0	0	Nudrin	2	1	1
Kelthane	4	4	4	Omite	4	4	4
Kelthane + Dylox + Systox	2	2	2	Omite + Dylox + Systox	2	2	2
Korlan	2	0	0	Orthene	2	1	2
Lannate	2	1	1	parathion	1	1	1
Lead arsenate	1	1	1	Penncap M	1	1	1
Lime sulfur	4	4	4	Pentac	4	0	0
Lindane	1	1	1	Perthane	2	0	0
Lorsban	1	1	1	Phosdrin	1	1	1
malathion	2	1	2	phosphamidon	1	1	1
Malathion ULV	1	1	1	Phostex	2	0	0
Malonoban	2	1	3	Pirimor	3	3	3
Matacil	1	0	0	Pounce	1	1	1
Primicid	0	1	0	tedion	4	3	4
Proxol	2	3	3	Temik	1	1	1
Pydrin	1	1	1	TEPP	2	1	3
Rabon	1	2	3	Thimet EC	2	1	1
Rebelate	1	1	1	Thimet G	3	3	3
rotenone	2	0	0	Thiodan	2	1	1
Sevin	1	1	1	toxaphene	2	1	3
sulfur	4	4	4	Trithion	2	1	2
Sumathion	1	0	0	Vapona	1	1	1
Supracide	1	1	1	Vydate	3	3	2
Systox	3	3	3	Zolone	3	3	3

\*Dursban, Baytex and Baygon at mosquito abatement rates can be applied evening only around honeybees.

The toxicity ratings were based on laboratory and field studies by several individuals with major contributions by C. A. Johansen, Washington State University.

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