Organic Pesticides: Use With Caution

Although in general, organic pesticides are less toxic and do break down more quickly than conventional chemicals, it should be noted that **not all organic pesticides are safe for bees.**

Routes of exposure may be 1) direct to adult bees through direct contact through contaminated nectar, pollen or water, or 2) indirect to the brood through contaminated pollen brought into the hive or nest. Soil drench is of particular concern as 70% of native bees are ground nesters.

Effects may be lethal or sub-lethal. **Effects are disproportionally greater to native bees** compared to honey bees.

Many organic pesticides have never been tested for effects on bees. Whatever testing has been done on bees usually is done on adult honey bees only, not native bees.

Also, testing of multiple pesticides which may be encountered in near-by sites has not been done.

What the Home Gardener Needs to Know

1) An assessment should be done on the extent of the problem. Many times a situation can be solved by **doing nothing or by physical intervention** such as removal of offending insects, spraying with water, etc. Use chemicals only as a last resort (Integrated Pest Management).

2) Application should be done using **all appropriate precautions** to reduce the degree of toxicity and the level of exposure, including things like choice of application method, drift protection, timing, buffers, etc. Never spray on blooming plants. Do not use any organics as a soil drench method as that may cause harm to ground-nesting pollinators and/or beneficial insects. Read all labels and other warnings.

SPECIFIC ORGANIC PESTICIDES

Azadirachtin and Neem Oil – Moderately toxic to bees and parasitoid wasps. Toxicity to bees increases when mixed with soap.

***Bacillus thuringiensis* (Bt)** – Most subspecies (*kurstaki, israelensis*, and *tenebrionis*) have little or no toxicity to bees but *ssp. Aizawai* was found to be highly toxic to honey bees when fed at high doses over two weeks. *Ssp kurstaki* (common brand name DiPel) is safe for bees but can be harmful to butterflies and moths. Know what sub-species of Bt you might be using!

Boric Acid/borax – low toxicity to adult bees and beneficial insects. However, some boron fertilizers can be harmful to bees if applied when plants are in bloom.

Cedar Oil – derived from various species of cedar and juniper. Commonly used as mosquito and tick repellent. May have some contact toxicity to bees and other beneficial insects. Should not be sprayed on flowering shrubs or flowers on butterfly host plants. Do not use as a soil drench.

Cinnamaldehyde (Cinnamon oil) – Typically used as a fungicide. Toxic to some soft-bodied beneficial insects, mites, and nematodes, but low toxicity to honey bees.

Diatomaceous Earth (DE) – A universal insecticide that can kill pollinators and beneficial insects if they crawl on leaf or stem surfaces with recently applied DE. Avoid creating clouds of DE dust during application which could be harmful to humans.

Garlic, cottonseed or clove oil – Used as deterrents to insects or small animals. Some evidence that garlic oil can be toxic to honey bee workers and larvae.

Horticultural oil/narrow range oil – Harmful to bees upon direct contact. Apply at night to minimize risk to bees. Non-selective and may cause harm to some beneficial insects.

Insecticidal soap – Mortality may occur if directly applied to foraging bees and other beneficial insects. Apply at night to minimize risk to bees.

Kaolin/kaolin clay – Low toxicity to bees but may affect some beneficial insects. Kaolin application can disrupt bee foraging. Apply at night to minimize exposure.

Limonene/d-limonene – Applied at recommended doses is low in toxicity to bees. Apply only when bees are not present. Should not be used as a fumigant to honey bees in hives.

Pyrethrins – Broad spectrum insecticides derived from chrysanthemums. Highly toxic to bees. Pyrethrins degrade rapidly when exposed to sunlight and air. Applying at night can minimize risk to bees. Use only as a last resort.

Spinosad – Highly toxic to bees and other beneficial insects. Much less toxic after residues have dried. Applying at night can minimize risks to bees. Use only as a last resort.

NOTE: The above information is not meant to be recommendations, but is provided as a guide for those who wish to make appropriate management decisions only after all other options have been considered.

For more detailed information please see Xerces publication *Organic Pesticides: Minimizing Risks to Pollinators and Beneficial Insects at* https://xerces.org/guidelines-organic-pesticides.

Protect Our Pollinators

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