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Bees and pesticides

Proper pesticide practices protect pollinators!

Most insecticides and some other pesticides such as herbicides kill beneficial insects in addition to the intended targets that cause damage to crop plants. Beneficial insects include bees that produce honey and wax, pollinators, and natural enemies of pests.

For insect-pollinated crops, thorough pollination can increase the size and number of fruits and vegetables.

Predatory and parasitic insects help keep down the numbers of pest insects. when you kill off pollinators and the natural enemies of pests you inherit their work.

"bee-lieve the difference: the strawberries above were cross-pollinated by honey bees — the ones below were not."

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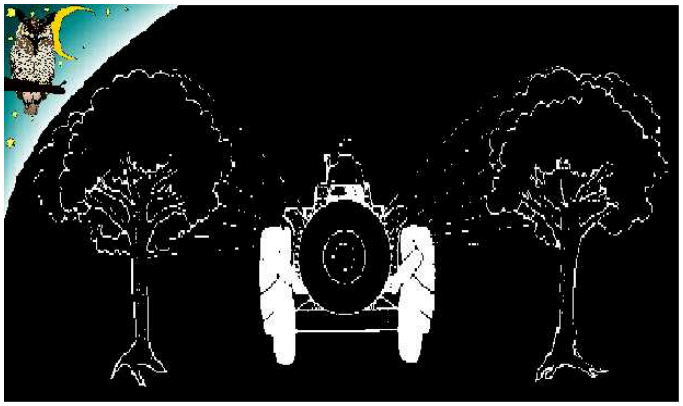
Poor pesticide practices and habitat destruction have led to a decrease of pollinating insects in many agricultural areas. Growers have had to make up for the loss of free pollination services by providing nest boxes for mason bees or by bringing in colonies of bumblebees or honeybees.

Native bees such as this orchard bee can be harmed by pesticides.

It is illegal to apply pesticides except in accordance with label directions. Always follow pesticide label instructions.

Pesticide label directions may include specific safeguards for protecting honeybees and other pollinating insects. Some general guidelines for protecting pollinating insects are:

- use a program of integrated pest management to ensure that pesticides are used only when necessary.
- choose pesticides that are effective against target pests but have minimal impacts on non-target organisms. Do not apply hazardous pesticides to crops that are in bloom or if weeds growing beneath crop plants are in bloom.
- do not apply hazardous pesticides if winds might cause drift to blooming plants near the treated crop area.
- apply pesticides late in the day when honeybees have stopped foraging. (this can also make some pesticides work better if they break down quickly in sunlight or they are meant to control night-feeding insects.



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if honeybee hives are near:

- Advise beekeepers of treatments of hazardous pesticide at least 24 hours before treatments.
- Do not apply hazardous pesticides if winds will cause drift into areas where beehives or mason bee nests are located.
- Minimize drift onto non-crop flowers such as ground cover or weeds, where bees may be foraging.
- Prevent contamination of water sources used by bees.
- Establish "diversionary plots" of plants that produce nectar and/or pollen so bees will be discouraged from foraging on weeds growing amongst treated crops. Chose plants that will bloom during periods when crop plants are not in flower to avoid drawing pollinators away from your main crop. Diversionary plantings help ensure that bees have enough to eat throughout the year and also increase the numbers of natural enemies of crop pests.

Other things to keep in mind, with respect to risk to bees from pesticides:

- Granulars are generally less hazardous than other formulations of the same pesticide.
- Emulsifiable concentrates have less residual toxicity to bees than wettable powders.
- water-based formulations are less hazardous than oil-based formulations.
- Sprays are less harmful than dust formulations of pesticides.
- Bait formulations of pesticides, may be hazardous to bees if prepared with material such as apple pomace.

The following list of commonly used pesticides have been grouped by their relative toxicity to honeybees (within categories pesticides are arranged alphabetically by active ingredient — common trade names appear in parentheses).

highly toxic to bees (ld50 less than 2 µg/bee)	**moderately toxic to bees (ld50 between 2 and 11 µg/bee)**	**relatively non-toxic to bees (ld50 greater than 11 µg/bee)**
• Abamectin (agri-mek, avid) • Acephate (orthene) • Aldicarb (temik) • Aminocarb (matacil) • Azinphos-methyl (guthion, apm) • Carbaryl (sevin) • Carbofuran (furadan) • Chlorpyrifos (lorsban, dursban) • Diazinon (basudin, bug-b-gon, dia-one) • Dichlorvos (ddvp) • Dimethoate (cygon, di-thoate, lagon) • Fenitrothion (sumithion, folithion) • Fensulfothion (dasanit) • Fenthion (baytex, tiguvon, spotton, lysoff, entex) • Fenvalerate (bovaid) • Fonofos (dyfonate)	• coumaphos (co-ral) • Crotoxyphos demeton (systox) • Disulfoton (disyston) • Endosulfan (thiodan, thionex) • Formetanate hydrochloride (carzol) • Oxamyl (vydate) • Oxydemethon-methyl (metasystox-r) • Phorate (thimet) • Phosalone (zolone) • Sethoxydim (poast) • Terbufos (counter) • Triforine (funginex)	• 2,4-d (weed-b-gone) • 2,4-db (weedaway, caliber, cobutox, embutox, see) • Amitrole (x-all, steril, altizol, amitrol-t, amizol) • Anilazine (dyrene) • Atrazine (aatrex) • Bacillus thuringiensis (dipel, thuricide, novabac, vectobac, teknar, foray, trident, novodor, tersan) • Benomyl (benlate) • Bentazon (basagran) • Bordeaux mixture • Bromacil (hyvar) • Bromoxynil (pardner, torch, brominal, unity, karil) • Butylate (sutan+) • Captan chloramben (no-hoe) • Chlormequat chloride (cycocel) • Chlorophacinone (rozol, ksc5, rat-xc, super bloc,

- Lindane (lindane, ambrocide, stockpest)
- Malathion (malathion 50e, malathion ulv, cythion, fyfenon)
- Methamidophos (monitor)
- Methidathion (supracide)
- Methiocarb (mesurol)
- Methomyl (lannate)
- Naled (dibrom)
- Parathion
- Permethrin (ambush, pounce, ectiban, atroban, permectin, siecn)
- Phosmet (imidan)
- Propoxur (baygon)
- Resmethrin
- Tetrachlorvinphos

ratol, disblok, ground force, parapel, gopher doom, ratachlor)
- Chloropicrin (timber fume)
- Chlorothalonil (bravo, daconil, nopcocide, nuocide, exotherm, termil)
- Chlorpropham (sprout nip, chlorolpc, spud-nic)
- Clofentezine (apollo sc)
- Copper 8-quinolinolate (pq, quinolate, cupristat)
- Cyanazine (bladex) cycloate (ro-neet)
- Daminozide (b-nine sp)
- Dazomet (basamid, slime-trol, metasol, nalcon, amerstat)
- Dicamba (banvel, dycleer, clarity, cadence)
- Dichlobenil (casoron, stryke)
- Dichlone (phygon)
- Dichlorprop
- Diclofop-methyl (hoe grass)
- Dicofol (kelthane)
- Dienochlor (pentac)
- Diflubenzuron (dimilin)
- Dinocap (karathane)
- Diquat (reglone) diuron (diurex, karmx)
- Dodemorph acetate (meltatox)
- Dodine (betz, equal, cyprex, syllit)
- Endothall (des-i-cate) eptc (eptam, eradicane)
- Ethephon (cerone, ethrel, nu-tomatotone, base-250)
- Ethofumesate (nortron)
- Ferbam folpet (phaltan, folpan)
- Fosamine ammonium (krenite)
- Gibberellic acid (activol)
- Glyphosate (round-up, side-kick, wrangler, laredo, renegade, rustler, rup, clear-it, touchdown, glyfos)
- Iprodione (chipco) linuron (lorox)
- Mancozeb (manzate, penncozeb)
- Maneb mcpb (topside, tropotox)
- Mecoprop (mecoturf, compitox, chemweed)

		• Metalaxyl (apron, subdue, ridomil) • Metaldehyde (slug bait) • Methoxychlor (flo-pro, methoxol, moth proofer, marlate) • Methyl bromide (meth-o-gas, terr-o-gas) • Metiram (polyram df) • Metobromuron (patoran) • Metolachlor (dual) • Metribuzin (sencor, lexone, fire) • Monolinuron (afesin) • Msma (glowon) • Napropamide (devrinol) naptalam (alanap) • Nicotine oxadiazon (ronstar) • Oxycarboxin (plantvax) • paraquat (sweep) • Pebulate (tillam) • Phenmedipham (spin-aid) • Picloram (tordon) • Pirimicarb (pirimor) • Prometryn propargite (omite) • Pyrethrins • Rotenone (noxfish, deritex, rotacide, chem-fish, my-t-mite) • Simazine (princep) • Sulfur (kumulus) • Tca [trichloracetic acid] (nata, bar-fox) • Terbacil (sinbar) • Thiabendazole (arbortect, mertect, apl lustr, britex) • Thiophanate-methyl (senator, easout, zap cap) • Thiram (skoot, ropellant) • Trichlorfon (dipterex, dylox, grybex) • Triclopyr (garlon) • Trifluralin (treflan, triflurex, rival, bonanza) • Vernolate (vernam, surpass) • warfarin (rodentkil, warfarin) • Zineb (zineb) • Ziram (ziram)