How to Use This Honey Bee Pesticide Table

The following table has been developed to support the interpretation of results provided by beekeepers when they have sent samples in for testing suspected pesticide poisoning events. The table describes commonly reported pesticides impacting bees, notes on the type of spray, what crops the sprays are often used on, what the lethal dose of that pesticide is and additional notes. Pesticides that are highlighted in blue are banned in Australia or are not legally registered for use.

Symbols:

< meaning lower

> meaning higher

Oral LD50: The amount of pesticide ingested by a honey bee that gives a 50% chance of mortality

Contact LD50: The amount of pesticide absorbed by a honey bee that gives a 50% chance of mortality

See appendix 1 and 2 to learn more

Analyte	Spray mostly used for what pests/disease on what crops	LD50 for Honey Bees: mg/bee	Mode of use / Toxicity
Acephate	Organophosphate Insecticide. Use: Bananas, Crucifiers, Macadamias, Ornamentals, Potatoes, Tomatoes and Tobacco	Contact LD50: 0.00178 mg/bee / Oral LD50: >0.00023	Foliar Spray. It is highly soluble in water and most organic solvents, and is volatile. It is not expected to leach to groundwater. While it is mobile, it tends not to persist in soil or aquatic systems. It has moderate to high toxicity to honey bees.
Aldicarb	Insecticide. Use: Cotton, sugarcane, citrus	Contact LD50: 0.00028mg/bee / Oral LD50: 0.00016mg/bee	Soil application (granular).It is highly soluble and volatile. It is not persistent in soil but may be in in aqueous systems. It is highly toxic to humans but has a low potential to bioaccumulate. Highly toxic to birds and honey bees.
Aldrin	Organochlorine Insecticide. It was banned in Australia in the mid-1990s.		Seed treatment, soil application. It is banned from most of the developed world. It is virtually insoluble in water, quite volatile but unlikely to leach to groundwater. There are field studies that have shown that aldrin can be persistent in soils. It has a high toxicity to honey bees.
Aldrin bhc [what is the bhc abbreviation?]	It is now banned in Australia and is considered toxic to humans and animals.		Seed treatment, soil application. It is banned from most of the developed world. It is virtually insoluble in water, quite volatile but unlikely to leach to groundwater. There are field studies that have shown that aldrin can be persistent in soils. High toxicity to honey bees.
alpha-Endosulfan	Organochlorine Insecticide. Use: On crops such as cotton, fruit, vegetables, grains, teas, and tobacco. Australia banned the		Foliar Spray. Alpha-endosulfan has a low aqueous solubility. It is moderately persistent in the soil but has a low mobility. It is moderately toxic to honey bees.

	use of endosulfan, including alpha-endosulfan, in 2010.		
Atrazine	Herbicides are used in Australia to control weeds in crops and plantations.	LD50: 0.097 mg/bee	Foliar Spray. It has a moderate aqueous solubility, it is volatile, and based on its physico-chemical properties there is some concern that it could leach to groundwater. It is generally not persistent in the field nor in aquatic systems.
Azinphos ethyl	Organophosphate Insecticide, Broad-spectrum : To control sucking and chewing pests.	Contact LD50: 0.00139mg/bee	Foliar spray. It is moderately toxic to honey bees. It may be moderately persistent in some soil systems but is not expected to be persistent in water. There are concerns regarding its potential to bioaccumulate. It is moderately toxic to honey bees.
Azinphos methyl	Organophosphate Insecticide. Use: On some fruit and nut crops (apples, apricots, blueberries, cherries, citrus, grapes, kiwifruit, lychees, macadamias, nectarines, peaches, pears, plums, and quinces)	Contact LD50: 0.00042mg/bee	Foliar spray. Is not expected to bioaccumulate but it is highly toxic to birds, honey bees and most aquatic life.
Bensulfuron methyl	Herbicide that controls weeds in crops like rice and wheat.	Contact LD50:> 0.00034mg/bee / Oral LD50: 0.0514mg/bee	Soil application (herbicide). It is sparingly soluble in water, non-volatile and moderately mobile. It would not be expected to persist in soil but could be persistent in water systems under certain conditions. It shows a moderate toxicity to honey bees.
beta-BHC	Banned in Australia		
beta-Endosulfan	Banned in Australia in 2010		Foliar spray. Little is known about the ecotoxicology, impact on human health, or environmental fate of this particular isomer, or how it differs from endosulfan.

Bifenthrin	Pyrethroid insecticide. Use: for the control of borers and termites in timber, insect pests in agricultural crops (bananas, apples, pears, ornamentals) and turf, as well as for general pest control (spiders, ants, fleas, flies, mosquitoes).	Contact LD50: 0.000016mg.bee / Oral LD50: 0.0001mg/bee	Foliar spray, soil treatment. There are some concerns about bioaccumulation and the pesticide shows a high oral toxicity to mammals. It is toxic to birds, most aquatic organisms, honey bees and earthworms.
Bioresmethrin	Pyrethroid insecticide. Use: Household insecticide used for the control of flies, mosquitoes, spiders, ants, cockroaches, fleas, silverfish, and moths.	For resmethrin: 0,000045 mg/bee	Foliar spray. It has a low aqueous solubility and is moderately volatile. It is not considered environmentally persistent. Is highly toxic to fish, aquatic invertebrates and honey bees.
Bromacil	Herbicide. Use: Control of weeds and grasses in fruit orchards and plantations, as well as in commercial and industrial areas, rights of way, and around agricultural buildings.	Contact LD50: >0.011 mg/bee	Soil application. It tends to demonstrate a low to moderate toxicity to most fauna and flora. It may be persistent in soil and water systems depending on local conditions.
Bromophos ethyl	Obsolete organophosphate insecticide that is highly toxic to aquatic invertebrates and honey bees. Use: To control biting and sucking pests, used on stored wheat grain, maize, rice, cotton, fruit, vines, and in forestry.	Contact LD50: > 0.00044mg/bee	Foliar spray. It is highly toxic to honey bees. It has a low aqueous solubility and is quite volatile. It is not generally persistent in soil systems.
Bupirimate	Pyrimidinol Fungicide to control powdery mildew. Use: apples, melons, Pumpkins; Squash; Strawberry; Blackcurrant; Raspberry; Gooseberry; Hops; Courgette; Ornamentals	Contact LD50: >0.05 mg/bee. Oral LD50 >0.2mg/bee	Foliar spray. It exhibits moderate aqueous solubility and low volatility. Depending on local conditions, bupirimate may be moderately persistent in both soil and aquatic systems.
Buprofezin	Insecticide. Use: Selective insecticide controlling scale, mealybugs and jassids in citrus, grapes, pears, persimmons, custard apples, passionfruit and mangoes.	Contact LD50: >0.2 mg/bee. Oral LD50 >0.1635mg/bee	Foliar spray. It has a low aqueous solubility and a low volatility. Depending on local conditions, it can be moderately persistent in soils and very persistent in water

			systems.It may have low toxicity to honeybees.
Carbaryl	Insecticide. Use: To control pests in gardens, poultry, and domestic situations. However, the Australian Pesticides and Veterinary Medicines Authority (APVMA) has restricted the use of carbaryl.	LD50: 0.0000428 mg/bee / Different study: LD50: 0.000004331 mg/bee after 48h ; 0.000000715 mg/bee after 96h	Foliar spray, wettable powder. It has a low aqueous solubility and is volatile. It is not persistent in either soil or water systems. It is highly toxic to mammals but it is not expected to bioaccumulate. High toxicity to honey bees.
Carbendazim	Benzimidazole Fungicide, to control *Botrytis fabae* and grey mould *Botrytis cinerea*. Use: ONLY in pulse crops - faba beans, lentils, vetch and chickpea	Contact LD50: >0.05 mg/bee / Oral LD50: >0.756mg/bee	Foliar spray. It has a low aqueous solubility, is volatile and moderately mobile. It is moderately persistent in soil and can be very persistent in water systems under certain conditions. It is moderately toxic to honey bees and most aquatic organisms.
Carbofuran-3-hydroxy	3-hydroxy Carbofuran is an active metabolite of carbofuran (Item No. 25635), which is an insecticide that inhibits acetylcholinesterase in mammals and insects.		
Carbofuran	Carbamate Insecticide. Use: rice, sugarcane, tobacco, and wheat, is also used as a nematicide to control worms	Contact LD50: 0.000036mg/bee / Oral LD50: 0.000038mg/bee	Soil application. It is moderately soluble in water, is relatively volatile and, based on its chemical properties, has a high potential for leaching to groundwater. It is highly toxic to birds and honey bees.
Carbophenothion	Non-systemic Organophosphorus Insecticide and Acaricide. Use: for pre-harvest treatments on deciduous fruits, citrus fruits, small fruits, vegetables and field crops, and for ectoparasite control on cattle and sheep. It is also used as a cereal seed dressing.	Contact LD50: 0.0014mg/bee	Foliar spray. It has a low aqueous solubility, low volatility and, based on its chemical properties, would not be expected to leach to groundwater. It may be quite persistent in soil systems. Moderate toxicity to honey bees.

Chlorfenvinphos (E)	Organophosphate Insecticide. Chlorfenvinphos is partially banned in Australia for use on crops, but is still used for some veterinary purposes (control of ectoparasites on cattle and sheep).	Contact LD50: 0.0041 mg/bee / Oral LD50: 0.00055 mg/bee	Foliar spray, seed treatments, and wettable powders. Moderate aqueous solubility and is miscible with many organic solvents. Relatively volatile, and there is some risk that it may leach to groundwater, moderately persistent in soil systems. Highly toxic to honey bees.
Chlorfenvinphos (Z)	Organophosphate Insecticide. Chlorfenvinphos is partially banned in Australia for use on crops, but is still used for some veterinary purposes (control ectoparasites on cattle and sheep).	Contact LD50: 0.0041 mg/bee / Oral LD50: 0.00055 mg/bee	Foliar spray, seed treatments,wettable powders. Moderate aqueous solubility and is miscible with many organic solvents. Relatively volatile and there is some risk that it may leach to groundwater, moderately persistent in soil systems. Highly toxic to honey bees.
Chlorothalonil	Organochlorine Fungicide: Use: To control fungi that threaten vegetables, trees, small fruits, turf, ornamentals, and other agricultural crops. A broad spectrum, non-systemic fungicide.	Contact LD50: 0.1353 mg/bee / Oral LD50: >0.04 mg/bee	Foliar spray. It has a low aqueous solubility, is volatile and would not be expected to leach to groundwater. It is slightly mobile. It tends not to be persistent in soil systems but may be persistent in water. Moderately toxic to honey bees.
Chlorpyrifos methyl	Organophosphate Insecticide.The Australian Pesticides and Veterinary Medicines Authority (APVMA) has canceled the use of chlorpyrifos in Australian homes and gardens.	Contact LD50:0.00015 mg/bee / Oral LD50: 0.00018mg/bee	Foliar spray. It has a low aqueous solubility, is quite volatile and is non-mobile. There is a low risk of leaching to groundwater based on its chemical properties. It tends not to be persistent in soil or water systems. It is highly toxic to fish, aquatic invertebrates and honey bees.
Chlorpyrifos	Organophosphate insecticide. Use: to control a wide range of insect pests, including agricultural pest insects, ants, termites and mosquitos. Restricted in	LD50: 0.00025 mg/L/ LD50: 0.00000867 mg/bee after 48h ;	Foliar spray. It has a low aqueous solubility, is quite volatile and is non-mobile. There is a low risk of leaching to groundwater based on its chemical properties. Moderately persistent in soil systems but is not usually

	Australia due to health and environmental concerns.	0.000001957 mg/bee after 96h	persistent in water. It is highly toxic to birds and honey bees.
Chlorotoluron	Herbicide. Use: to control weeds in cereal crops	Contact LD50: >0.2mg/bee/ Oral LD50: >0.1001mg/bee	Foliar spray. It is moderately soluble in water, volatile with a high potential for leaching to groundwater. It is moderately persistent in soil but tends not to be persistent in water due to rapid aqueous photolysis. It has low toxicity to honey bees.
Cis-Chlordane	Chlordane is a persistent organic pollutant (POP) that was banned in Australia in 1997. There are no registered products that contain chlordane in Australia, but de-registered compounds may still be detected in water.	Contact LD50: 0.006 mg/bee	Granules, dusts, wettable powders and oils. It has a low aqueous solubility, is quite volatile and is not normally expected to leach to groundwater. It can be very persistent in both soil and water systems. High toxicity to honeybees.
Coumaphos	Organophosphate Insecticide - Acaricide. Use: To treat ectoparasites on livestock	Contact LD50: 0.02029 mg/bee to 0.024 mg/bee / Oral LD50: 0.00461 mg/bee	Foliar spray, livestock treatment. Detection in wax samples: Range 91900.0 to 1 ppb. Classified as an extremely hazardous substance in the United States. It has a moderate toxicity to honey bees.
Cyanazine	Herbicide. Use: For the control of various weeds in field peas, processing peas, chickpeas, faba beans, lentil, vetches, onions, potatoes, sweetcorn	Contact LD50: 0.1mg/bee	Soil application. It is moderately soluble in water and many organic solvents, and it is relatively volatile. It is not persistent in soil systems but can often be persistent in water. It has a moderate toxicity to honey bees.
Cyfluthrin	Pyrethroid insecticide. Use: broad-spectrum insecticides used for the control of spiders, ants, fleas, flies, silverfish, cockroaches, bedbugs and mosquitoes	Contact LD50: 0.000001mg/bee / Oral LD50: 0.00005mg/bee	Foliar spray. It has a low aqueous solubility and is non-volatile. It may be moderately persistent in some soil systems. Cyfluthrin is highly toxic to most biodiversity. It shows a high toxicity to honey bees.
Cyhalothrin	Pyrethroid insecticide. Use: To control pests on crops and in public health	Contact LD50: 0.000038 mg/bee /	Foliar spray. It has a low aqueous solubility and is not volatile. It may be environmentally

	settings. Broad-spectrum insecticide effective against aphids, caterpillars, beetles, mosquitoes, and cockroaches	Oral LD50: 0.00091mg/bee	persistent depending on local conditions. There is a low risk of cyhalothrin leaching to groundwater. It has a high toxicity to honey bees.
Cypermethrin	Pyrethroid insecticide. Use: A contact and ingested insecticide and repellent with good activity on caterpillars. Has repellent and anti-feeding action. Some insects will starve rather than eat treated plants.	LD50 79.58 to 44.76 mg/L / Different study: LD50: 0.00006 mg/bee	Foliar spray, livestock treatment (pour on). It has a low aqueous solubility and is volatile. It is considered a serious marine pollutant. It is moderately persistent in soils. It is highly toxic to most aquatic species and honey bees.
Cyprodinil	Fungicide. Use: for control of a range of fungal diseases in cereals, grapes, pome fruit, stone fruit, strawberries, vegetables, field crops and ornamentals, and as a seed dressing for barley	Contact LD50: >0.784 mg/bee / Oral LD50: 0.1125mg/bee	Foliar spray. It has a moderate aqueous solubility, is unlikely to leach to groundwater and is volatile. In soils it is moderately persistent but may be persistent in water systems depending on local conditions. It has a moderate toxicity to honey bees.
delta-BHC	Organo-chlorine pesticide		
Deltamethrin	Pyrethroid insecticide. Use: It is used on around 25 food crops including cereal, vegetables and is also used on cotton, tobacco and wildflowers. Deltamethrin has extensive household use in food preparation areas, and is also used on animals against external parasites and on timber against borers.	LD50: 0.0007 mg/bee	Foliar spray, pour-on or spot-on for livestock. It has a low aqueous solubility, is semi-volatile and has a low potential to leach to groundwater. It is not persistent in soil and is non-mobile. It presents a high risk to most aquatic organisms and honey bees.
Dimethoate	Organophosphate Insecticide - Acaricide. Broad spectrum control of sucking and chewing pests in ornamentals and forestry situations.	Oral LD50: 0.00034mg/bee	Foliar spray. It is highly soluble in water, has low groundwater leaching potential and is volatile. It is non-persistent in soil, mobile but does not normally persist in aerobic aquatic systems. It has a high toxicity to honey bees.

Demeton-S-methyl	Organophosphate Insecticide/ Acaracide. Use: Registered in Australia for over 50 uses, mainly against aphids, mites and flies in around 10 food crops, including fruit, cereal and vegetables, plus cotton, ornamental plants, tobacco, and various pastures	Contact LD50: 0.0026mg/bee / Oral LD50: 0.00019mg/bee	Foliar spray. It is highly soluble in water, volatile and, based on its physico-chemical data, it is not expected to leach to groundwater. It is not persistent in soil systems.It is highly toxic to birds, aquatic invertebrates and honey bees.
Diazinon	Non-systemic organophosphate insecticide. The Australian Pesticides and Veterinary Medicines Authority (APVMA) has banned the use of diazinon for certain purposes, including in food production and on livestock.	Contact LD50: 0.00013 to 0.00038mg/bee / Oral LD50: 0.00009 to 0.00021mg/bee	Spray. It is moderately soluble and highly volatile and it should be considered a potential groundwater pollutant.It is listed as a severe marine pollutant. It is highly toxic to aquatic organisms, birds and honey bees.
Dichlofluanid	Fungicide. Use: widely used to control many fungal diseases in plants. It is also added as an antifouling agent to copper-based boat paints.	Contact LD50: 0.016mg/bee	Wettable powders or dustable powders. It has a low aqueous solubility and is volatile and, based on its chemical properties, it is unlikely to leach to groundwater. It is not persistent in most soil or aquatic systems. Is moderate to highly toxic for most biodiversity including bees.
Dichlorvos	Insecticide. Use: Commonly used in Australia against a large variety of insects that infest domestic, public and commercial buildings, recreational areas, abattoirs, wineries (non-food producing areas), animal houses, mushroom growing facilities, glasshouses, greenhouses and food storage areas. The major use of dichlorvos is as a disinfestant fumigant or spray for stored grain and for grain handling equipment.	Oral LD50: 0.0001376 mg/bee	Aerosol spray. It has high aqueous solubility, quite volatile and is unlikely to leach to groundwater. It is not usually persistent in soils or water. It is highly toxic to mammals and has a high tendency to bioaccumulate. It has a high toxicity to honey bees.

Dicloran	Fungicide. Use: Fruit including apricots, nectarines, oranges, grapes, peaches, plums, cherries, rhubarb; vegetables including beans, celery, onions, shallots; sweet potatoes; tomatoes; ornamentals including Christmas trees	Contact LD50: 0.18mg/bee / Oral LD50: >0.113mg/bee	Dust, wettable powder and liquid. It has a low aqueous solubility and is volatile. Based on its chemical properties, it may leach to groundwater. It can also be quite persistent in soils but not usually so in water. It has a low toxicity to honey bees.
Dicofol	Acaricide. Use: to control many species of phytophagous mite on a range of food and ornamental crops. Was phased out in Australia in 2020	Contact LD50 : 0.019mg/bee / Oral LD50 : >0.01mg/bee	Foliar spray. It has a low aqueous solubility, volatile and, based on its chemical properties, is unlikely to leach to groundwater. It is moderately persistent in soils but does not normally persist in water. It has a moderate toxicity to honey bees.
Dieldrin	Insecticide. Dieldrin is a banned chemical that was used as an insecticide in Australia	LD50 range: 0.00133–0.00220mg/g of honey bee	Spray. It has a low aqueous solubility and is volatile. Based on its chemical properties, it is not expected to leach to groundwater. Its data suggests it is very persistent in soils and is non-mobile. It has a high toxicity to mammals and honey bees.
Difenoconazole	Fungicide. Use: Controls target spot of potatoes and tomatoes, leaf blight of carrots, leaf spot diseases of bananas and husk spot on macadamias.	Contact LD50: >0.1 mg/bee / Oral LD50: > 0.177 mg/bee	Foliar spray or seed treatments. It has potential for particle bound transport. It is slightly volatile, persistent in soil and in the aquatic environment. There are some concerns regarding its potential for bioaccumulation. It has a low toxicity to honey bees
Dimethomorph	Fungicide. Use: Control diseases in cucurbits, grapevines, lettuce, onions, oilseed poppies and potatoes.	Contact LD50: >0.01 mg/bee to >0.102mg/bee / Oral LD50: > 0.0324 mg/bee	Foliar spray. It has a moderate aqueous solubility and a low volatility. It may be moderately persistent in both soil and water systems. Risks to biodiversity are generally in the moderate to low range. It has a moderate toxicity to honey bees.

Dioxathion	Non-systemic insecticide and acaricide. Use: Dioxathion products are used on livestock principally cattle in Australia	Unknown mode acute LD50: >0.05mg/bee	Spray. It has a moderate toxicity to honey bees.
Diphenylamine	Fungicide and Antioxidant. Use: for control of superficial scald in stored apples. Diphenylamine is one of several salts of glyphosate, a broad-spectrum herbicide.		Spray. Detected in wax comb: 100.7 ppb
Diuron	Herbicide and algaecide . Use: For the control of weeds in asparagus, bananas, cereals, cotton, lupins, pulse crops and sugarcane.	Contact LD50:> 0.1017mg/bee / Oral LD50: >0.08675mg/bee / Chronic: > 0.03051mg/bee	It has a moderate aqueous solubility, a low volatility and may, under certain conditions, leach to groundwater. It may be moderately persistent in soil systems and may also persist in water. It has a moderate toxicity to honey bees.
Endosulfan sulfate	Organochlorine Insecticide. Use: Pest management strategy of various crops, particularly cotton in inland northern NSW and Queensland. Used as insecticide and acaricide on a variety of other crops, including vegetables, fruit, nuts, cereal as well as in plant nurseries, on lawn, pasture and fodder, flowers and ornamentals	Contact LD50: 0.00635 to >0.00781mg/bee / Oral LD50: > 0.0156 mg/bee	Foliar spray. It has a low aqueous solubility and is volatile. Based on its chemical properties it may have a tendency to leach to groundwater. Endosulfan is moderately persistent in soil but does not tend to persist in water systems. It is moderately toxic to honey bees.
Endothal	Herbicide. Use: for the control of winter grass in turf crops and lawns.		Aquatic suspension or a granular formulation. It is highly soluble in water and semi-volatile. Based on its chemical properties it is not expected to leach to groundwater. It is generally non-persistent in soils.
Endrin aldehyde	Termiticide. Endrin has not been used in Australia for at least 30 years and is banned in the country.	Contact LD50: >0.00046mg/bee	

Endrin Ketone	Endrin has not been used in Australia for at least 30 years and is banned in the country.	Contact LD50: >0.00046mg/bee	
Endrin	Endrin has not been used in Australia for at least 30 years and is banned in the country.	Contact LD50: >0.00046mg/bee	Soil application. It has a low aqueous solubility and is non-volatile. Based on its chemical properties it is not expected to leach to groundwater. Endrin tends to be persistent in soil systems. It has a high toxicity to honey bees.
Ethion	Organophosphate insecticide and acaricide. Use: Fruit including apples, pears, citrus; Onions; Cotton; Cereals/ To control: Red spidermite (*Tetranychus urticae*); Planthoppers; Aphids; Scale insects; Codling moth	Contact LD50:0.011mg/bee / Unknown mode acute LD50: 0.0206 mg/bee	Spray and livestock treatment. It has a low water solubility but is miscible with most organic solvents. It is moderately persistent in soils but can be persistent in water bodies . It is not mobile. Eethion is not expected to leach to groundwater. It has a moderate toxicity to honey bees.
Fenamiphos	Organophosphate Insecticide. Use: For the control of nematodes and sucking insects in crops and turf.	Contact LD50: 0.00028mg/bee / Oral LD50: 0.00045 mg/bee	Drip irrigation, spray, soil incorporation. It is moderately soluble in water, has a low volatility and would not normally be expected to leach to groundwater. It is not normally persistent in soil or water systems. It has a high toxicity to honey bees.
Fenarimol	Pyrimidine fungicide. Use : Fruit including bananas, chrry, filberts, grapes, pears; Ornamental plants and trees; Turf/ To control:Powdery mildew, Dollar spot, Snow mould, Scab, leaf spot, Rusts	Contact LD50: 0.1mg/bee / Oral LD50: 0.01mg/bee	Wettable powder, spray. It has a moderate aqueous solubility but is soluble in many organic solvents. It is not considered to be volatile. Fenarimol may be very persistent in soils and aquatic systems. It has a moderate toxicity to honey bees.
Fenchlorphos	Organophosphate insecticide. Obsolete. Fenchlorphos is not registered for use in Australia, Use: To control Cockroaches; Flies		Spray

Fenitrothion	Insecticide. Use: for the control of certain insect pests in broadacre and horticultural crops, in stored grain, in grain storage facilities and in poultry houses.	Contact LD50: 0.00016mg/bee / Oral LD50: 0.0002 mg/bee	Spray. It has a moderate aqueous solubility, is highly soluble in many organic solvents and is volatile. It has a low potential for leaching to groundwater and is not expected to be persistent in soil or water systems. It has a high toxicity to honey bees.
Fenoxycarb	Carbamate Insecticide. Use: for the control of Codling Moth and Light Brown Apple Moth in Apples and Pears. It is also used as a bait to control insects on fruit, vines, and stored products, and fire ant control.	Contact LD50: >0.204mg/bee/ Oral LD50: >0.204mg/bee	Foliar spray. It has a low aqueous toxicity and is not considered to be volatile. It tends not to be persistent in soil systems but may be much more persistent in water systems. Is not expected to leach to groundwater. It has low toxicity to bees.
Fenthion	Organophosphate insecticide, avicide, and acaricide. Use: To control pests in agricultural, commercial and domestic situations and external parasites on cattle. Fenthion is also used to control pest birds in and around buildings.	Contact LD50: 0.00022mg/bee to 0.000308	Foliar spray. It has a low water solubility but is generally highly soluble in organic solvents. It is volatile and is not expected to leach to groundwater. Its persistence in soil and water systems depends on local conditions. It is highly toxic to birds and honey bees.
Fenvalerate	Pyrethroid Insecticide. Use: To control insects on crops, animal feed, and in stables.	Contact LD50: 0.00023mg/bee	Spray, fog, or granule. It has a low aqueous solubility and has a low volatility. Evidence suggests it is moderately persistent in both soil and water systems. It is not expected to leach to groundwater. It is highly toxic to most aquatic organisms and to bees.
Fipronil	Termiticide and Insecticides. Use: has a range of agricultural uses, including seed dressings, control of pests in bananas, cotton, sorghum, vegetables and turf. Fipronil is also included in insect baits for household and commercial uses, and in	Contact LD50 0.0000059 / Oral LD50: 0.00000417 mg/bee	Foliar spray, braits. domestic pets/livestock treatment. It has a low aqueous solubility, a low volatility and is not greatly mobile in the environment. It can be quite persistent in soil systems but is less so in aquatic and sediment systems. It is highly toxic to honey bees and might bio-accumulate.

	home veterinary products for cats and dogs.		
Flusilazole	Organosilicon fungicide. Use: To control fungal infections in a variety of crops, including fruits, vegetables, and soybeans	Contact LD50:0.165 mg/bee / Oral LD50: 0.0338 mg/bee	Foliar spray. It has a moderate aqueous solubility and a low volatility. It can be persistent in soils and water-sediment systems . Risk of leaching to groundwater is low. It is moderately toxic to honey bees.
Formothion	Insecticide and acaricide. An obsolete systemic, broad spectrum. Use: Tree fruit; Vines; Olives; Hops; Cereals; Sugarcane; Rice. To control: Spider mites; Aphids; Psyllids; Mealy bugs; Whiteflies	Contact LD50: 0.00015mg/bee	Spray. Exposure to Formothion can cause severe and rapid *Organophospate* poisoning. It is higly toxic to honey bees.
gamma-BHC(Lindane)	Insecticide, is a neurotoxin that interferes with GABA neurotransmitter function. Use: To treat lice and scabies.	Contact LD50:0.00023 mg/bee / Oral LD50: 0.000011 mg/bee	Seed treatment, spray. It has a low aqueous solubility, but it is readily soluble in organic solvents. It is quite volatile and has a high potential for leaching to groundwater. It can be very persistent in soil and water systems. It is highly toxic to fish and honey bees.
HCB			
Heptachlor epoxide	Heptachlor metabolite. Heptachlor epoxide, an oxidation product of heptachlor, is not commercially available.		
Heptachlor	Organochlorine Insecticide, is persistent in the environment and accumulates in the food chain	Contact LD50: >0.000526 mg/bee	Spray. It has a low aqueous solubility but is highly soluble in most organic solvents. It is volatile and has low potential for leaching to groundwater. Heptachlor. It can be persistent in soil systems, but is not generally persistent in water systems. Highly toxic to honey bees.

Hexaconazole	Fungicide. Use: on a variety of crops, including apples, coffee, peanuts, rice, vines, bananas, cucurbits, and peppers. Used to control powdery mildew, scabs and rusts.	Contact LD50: 0.1mg/bee / Oral LD50: 0.1mg/bee	Spray. It has a moderate aqueous solubility and a low viscosity. It tends to be environmentally persistent in both soil and aquatic systems. It has low toxicity to honey bees.
Hexazinone	Herbicide. Use: Against a variety of annual and perennial weeds in tree plantations, sugarcane, pineapple and alfalfa. In Australia it is commonly used in bark treatments of woody weed species, as well as on a variety of weeds in pine plantations, commercial/industrial areas and rights-of-way	Contact LD50:> 0.1mg/bee / Unknown mode acute LD50: 0.6mg/bee	Spray. It is moderately toxic to honey bees.
Imazalil	Fungicide. Use: widely used in agriculture, particularly in the growing of citrus fruits.	Contact LD50:0.039 mg/bee / Oral LD50: 0.0351 mg/bee	It can be applied to crops by spraying, drenches, waxing, or foaming equipment. It can also be applied to seeds. It is moderately toxic to honey bees.
Imazethapyr	Herbicide. Use: To control of certain weeds in Centrosema (Cavalcade), chickpeas, faba beans, field peas, lucerne, mung beans, peanuts, serradella, soybeans and subterraneum clover	Contact LD50: >0.1mg/bee / Oral LD50: >0.0246mg/bee	Spray. It is moderately toxic to honey bees.
Imidacloprid	Neonicotinoid insectide. Use: Effective against beetles, aphids, thrips, and psyllids. Versatile Use: Ideal for cotton, fruits, vegetables, and ornamentals	LD50: 0.000081 mg/bee / Different study: LD50: 0.000002359 mg/bee after 48h ;0.000000477 mg/bee after 96h	Spray, seed treatment. It is highly soluble, non-volatile and persistent in soil. It is moderately mobile. It has a low risk of bioaccumulating. It is highly toxic to birds and honey bees.
Iprodione	Fungicide and Nematicide. Use: To treat almonds, boysenberries & grapes, kiwifruit,	Contact LD50: >0.1 mg/bee / Oral LD50: >0.1 mg/bee	Foliar spray, seed treatment, or postharvest dip. It has low toxicity to honey bees.

	macadamias, mandarins (non-bearing), passionfruit, raspberries, stone Fruit.		
Isoproturon	Herbicide. Isoproturon is not registered in Australia	Contact LD50: 0.2mg/bee / Oral LD50: 0.195mg/bee	Spray. It has low toxicity to honey bees.
Linuron	Herbicide. Use: For control of certain weeds in cereals, potatoes, carrots, coriander and other crops	Contact LD50: >0.0978 mg/bee / Oral LD50: >0.1121 mg/bee	Spray. It is moderately toxic to honey bees.
Malathion	Organophosphate Insecticide, Use: Used outdoors to control a wide variety of insects in agricultural settings and around homes, in public health mosquito control and fruit fly eradication programs	Contact LD50: 0.00016 mg/bee to 0.00047 mg/bee / Oral LD50: 0.00040 mg/bee to 0.00917 mg/bee	Foliar spray, aerosol. It is moderately soluble in water and readily soluble in many organic solvents. It is quite volatile and has a low potential for leaching to groundwater. Malathion is not usually persistent in soil or water systems. It is highly toxic to honey bees.
Metalaxyl	Phenylamide Fungicide. Use: It is used on many food and feed crops, and on non-food, residential and greenhouse crops such as tobacco, ornamental plants, trees, shrubs and vines, and lawns and turf. It is specifically registered to control Pythium Leaf Blight, Phytophthora Heart Rot and Root Rot	Contact LD50: >0.1mg/bee to 0.2mg/bee / Oral LD50: 0.269mg/bee	Spray, drenching, or incorporating into the soil. It has low toxicity to honey bees.
Methacrifos	Methacrifos is no longer registered for use in Australia		Fumigation
Methamidophos	Organophosphate Insecticide. In Australia, the use of methamidophos, a highly toxic organophosphate insecticide, was phased out between June 2012 and June 2014	Oral LD50: 0.00022mg/bee	Spray. Highly soluble in water and many organic solvents, and is volatile. It would not normally be expected to be persistent in soil or water systems. It is higly toxic to honey bees.

Methidathion	Organophosphate Insecticide. Methidathion, an organophosphate insecticide, is no longer registered for use in Australia	Contact LD50: 0.00013mg/bee	Spray. It is higly toxic to honey bees
Methomyl	Cabamate Acaricide - Insecticide. Use: In Australia, methomyl has up to 57 uses on crops, fruit and ornamentals against Lepidoptera, Diptera, Hemiptera, Homoptera and Coleoptera, as well as mites. It is also used against flies on garbage tips and in animal areas.	Contact LD50: 0.00016mg/bee / Oral LD50: 0.00028mg/bee	Spray. It is highly soluble in water but has a low volatility and would not normally be expected to leach to groundwater. It is not normally persistent in soil or water systems. It is higly toxic to honey bees.
Methoprene	Insect growth regulator used in Australia to control mosquitoes, fleas, mites, lice, and other insect pests	Contact LD50: 1mg/bee / Oral LD50: 0.0002mg/bee	Foliar spray. It is higly toxic to honey bees.
Methoxychlor	Organochlorine insecticide. Use: Has been used against a wide range of chewing insects in crops, fruit and vegetables as well as against insect pests in animal houses, dairies and industrial premises.	Contact LD50: >0.0236mg/bee / Oral LD50: 0.00502mg/bee	A spray to agricultural crops to control a variety of insects. Also used on livestock, in animal feed, in barns and grain storage bins. It is higly toxic to honey bees.
Metolachlor	Herbicide. Use: A selective herbicide for the control of annual grass weeds, yellow nutsedge, and some broadleaf species.	Contact LD50: 0.11mg/bee / Oral LD50: 0.11mg/bee	Soil application, usually applied to moist soil before weeds and grasses germinate. It has low toxicity to honey bees.
Metsulfuron methyl	Herbicide. Use: for the control of certain broadleaf weeds in winter cereal crops and broadleaf weeds and brush species	Contact LD50: >0.05mg/bee / Oral LD50: > 0.0443	Spray. It is moderately toxic to honey bees.
Mevinphos	Insecticide and acaricide. Mevinphos is no longer registered for use in Australia	Contact LD50: 0.000094mg/bee	Spray. Readily soluble in water, volatile, slow aquatic hydrolysis, rapidly degrades in soil. Whilst the molecule is potentially mobile, it would not be expected to leach into

			groundwater due to rapid soil degradation. It is higly toxic to honey bees.
Molinate	Herbicide. Use: for the control of grass weeds in rice only, post-emergence	Oral LD50: >0.011mg/bee	Spray. It is highly soluble and persistent in water. It is also quite volatile. It would not normally be persistent in soil systems. It is moderately toxic to honey bees.
Monocrotophos	Organophosphate Insecticide. Use: To sorghum, sunflowers, tomatoes, cotton, potato, lucerne, soybean and tobacco. For pests: Helicoverpa spp., spurthroated locust, sorghum midge, western flower thrips, aphids, the green vegetable bug, mites, the stem Borer, potato tuber moth.	Oral LD50: 0.00002mg/bee	Foliar spray. It is higly toxic to honey bees.
Omethoate	Organophosphate: Insecticide - Acaricide. The Australian Pesticides and Veterinary Medicines Authority (APVMA) has banned the use of omethoate on food-producing crops and pastures.	Oral LD50: 0.000048mg/bee	Spray. It is higly toxic to honey bees.
o-Phenylphenol	Disinfectant, fungicide, and germicide. Use: Used as a post-harvest treatment for citrus fruits / Used in the leather industry, and to preserve aqueous products like glues and concrete additives	Contact LD50: >0.1mg/bee	Used to protect crops in storage. It is moderately soluble in water, moderately volatile but is not expected to be persistent in the environment. 2-phenylphenol has a moderate to low toxicity to biodiversity. It has low toxicity to honey bees.
Oxamyl (Thixamyl)	Carbamate Insecticide. Use: For the control of weevil borers and nematodes in agricultural crops. Available as a liquid concentrate formulation applied by stem injection and hand spray to banana crops, and by irrigation to tomato and capsicum crops.	LD50: 0.000379 mg/bee	Applied directly to the soil before drilling or planting. It is highly soluble in water, has a low volatility and may have the capacity to leach to groundwater. It is not expected to be persistent in soil or water systems.It is highly toxic to honey bees.

p,p-DDD	DDD (dichlorodiphenyldichloroethane) is a banned organochlorine pesticide that was once used in Australia. It was banned in the mid-1990s		It is practically insoluble in water and is not highly volatile. It is, like DDT, very environmentally persistent in both soils and water.
p,p-DDE	Australia banned the use of DDT, DDD, and other organochlorine pesticides in the mid-1990s		Spray. It has a low aqueous solubility, is relatively volatile and has a low potential to leach to groundwater. It is highly persistent in soil and non-mobile. It is higly toxic to honey bees.
p.p-DDT	Australia banned the use of DDT, DDD, and other organochlorine pesticides in the mid-1990s		Spray. High chemical stability, low water solubility, high solubility in organic solvents and characteristic resistance to chemical and biological degradation. Such features allow to bioaccumulate and biomagnificate in animal fatty bodies.
Parathion (ethyl)	Organophosphate insecticide and acaricide. Use: Alfalfa; Barley; Rapseed; Cotton; Sorghum; Soybeans; Sunflowers; Wheat; Broccoli; Brussel sprouts. The APVMA's concerns about parathion ethyl remain and it will not consider the registration of any product containing parathion ethyl unless all the concerns identified in the review are fully addressed.	Oral LD50: 0.00021mg/be / Unknown mode acute LD50: 0.000175 mg/bee	Spray. It is higly toxic to honey bees.
Parathion methyl	Organophosphorus insecticide and acaricide. Use: For control of sucking and chewing insects and mites in a variety of crops. In Australia used on fruit, grapes, and vegetables, as well as potatoes, clover, cotton and tobacco.	Contact LD50: 0.0195mg/bee	Spray. It is moderately toxic to honey bees.
Penconazole	Triazole Fungicide: Controls black spot (apple scab and pear scab) of apples and	Contact LD50: >0.03mg/bee /	Spray. It is moderately toxic to honey bees.

	pears, as well as powdery mildew of apples and grapes.	Oral LD50: >0.112mg/bee	
Pendimethalin	Dinitroaniline Herbicide. Controls weeds in crops such as corn, cotton, potatoes, soybeans, tobacco, peanuts, carrots, and more	Contact LD50: 0.0498 to 0.1mg/bee / Oral LD50: >0.1012mg/bee	Pre-emergent spray. It is moderately toxic to honey bees.
Permethrin	Pyrethroid insecticide. Use: To treat head lice, scabies, and other pests.	Contact LD50: 0.00006mg/bee to 0.000024mg/bee / Oral LD50: 0.00013mg/bee	Fumigants, shampoos and spot-on treatments. It is not highly soluble in water, has a low volatility and is not normally expected to leach to groundwater. It would also not be expected to persist in soil or water systems. It is higly toxic to honey bees.
Phenothrin	Insecticide. Use: Domestic situations; Commercial and industrial sites; Gardens; Pet health products. To control: Flies; Mosquitoes; Fleas; Ticks; Mites; Lice	Contact LD50: 0.00013mg/bee / Oral LD50: 0.00016mg/bee	Spray. It is higly toxic to honey bees.
Phorate	Organophosphate Insecticide. Phorate is a prohibited chemical in Australia.	Contact LD50: 0.00032mg/bee	Applied to crops and soil as a granule. It is higly toxic to honey bees.
Phosalone	Organophosphate Insecticide and Acaricide. Use: for fruits, vegetables, ornamentals, and other crops	Contact LD50:0.0044mg/bee / Oral LD50: 0.102mg/bee	Spray. It is moderately toxic to honey bees.
Piperonyl Butoxide	Is an organic compound used as an adjuvant component of pesticide formulations for synergy. Use: For the treatment of head, pubic (crab), and body lice.	Contact LD50: 0.294mg/bee	Available in a range of formulations including dusts, emulsifiable concentrates, foggers, paper coatings, pressurized sprays, wettable powders, shampoos and as impregnated collars. It has low toxicity to honey bees.
Pirimicarb	Carbamate Insecticide. Use: To control aphids on a variety of crops and pastures	Contact LD50: 0.01256 to 0.0178mg/bee /	Often supplied as wettable granules that are mixed with water and used as a spray but

		Oral LD50: 0.00301mg/bee to 0.004mg/bee	also available in many other formulations. It is moderately toxic to honey bees.
Pirimiphos ethyl	Obsolete insecticide . Use: Top fruit including apples, pears; Turf. To control Aphids		Available in a wide variety of different formulations including granules and emulsifiable concentrates.
Pirimiphos methyl	Organophosphate and fumigant insecticide. Use: For control of pests such as cockroaches, fleas, ants, mosquitoes and flies in domestic, public, commercial and industrial areas, and agricultural buildings. It is also used as a fumigant to treat stored grain and peanuts.	Oral LD50: >0.00022mg/bee / Different study: LD50: 0.000066mg/bee	Available in a variety of formulations including emulsifiable concentrates and smoke generators. It is higly toxic to honey bees.
Prochloraz	Fungicide. Use: For the control of certain diseases of mangoes, mushrooms, proteas, violas and some lettuce Varieties.	Contact LD50: 0.1413mg/bee / Oral LD50: >0.101mg/bee	Often supplied as emulsifiable concentrates or wettable powder. It has low toxicity to honey bees.
Procymidone	Systemic dicarboximide fungicide. Use: For the control of fungal diseases in canola, beans, lentils, grapes, stone fruit, onions, garlic, potatoes, ornamentals and turf grass. Also available in a seed dressing.	Contact LD50: >0.1mg/bee / Oral LD50: >0.1 mg/bee	Usually supplied as a wettable powder. It has low toxicity to honey bees.
Profenophos	Insecticide. Use: in Australia is used to control insects on cotton crops	Contact LD50: 0.000095 mg/bee	Applied by spraying or dipping. It is higly toxic to honey bees.
Prometryn	Herbicide. Use: cotton; celery; pigeon peas; dill; potatoes; sunflowers; carrots; peanuts	Contact: 0.099mg/bee	Often supplied as a wettable powder. It is moderately toxic to honey bees
Propargite	Acaricide (Miticide). Use: on a wide variety of food crops, ornamentals and cotton for the control of mites.	Contact LD50: 0.0479mg/bee / Oral LD50: >0.1 mg/bee	Often supplied as emulsifiable concentrates, oil-water emuslsion, water-soluble bags or wettable powder. It is moderately toxic to honey bees.

Propazine	Herbicide. Use: sorghum; corn; some umbelliferae vegetables; carrots; fennel; ornamentals; greenhouse	Contact: 0.016mg/bee	Often supplied as water-dispersible granules or wettable powder. It is moderately toxic to honey bees.
Propiconazole ||	Fungicide: For the control of certain fungal diseases of bananas, oats, peanuts, perennial ryegrass, pineapples, stone fruit, sugar cane, wheat and other crops		
Propiconazole	Fungicide. Use: For the control of certain fungal diseases of bananas, oats, peanuts, perennial ryegrass, pineapples, stone fruit, sugar cane, wheat and other crops.	Contact LD50:0.025mg/bee to >0.1 mg/bee / Oral LD50: >0.1 mg/bee	Often supplied as emulsifiable concentrates or wettable powder. It has low toxicity to honey bees.
Prothiofos	Organophosphorus insecticide. Was banned in Australia for use on grapes in 2022.		Usually formulated as an emulsifiable concentrate or wettable powder.
Pyrimethanil	Anilinopyrimidine Fungicide. Use: To treat molds, powdery mildew, and rusts in fruit and potatoes	Contact LD50: >0.1 mg/bee / Oral LD50: >0.1 mg/bee	It has low toxicity to honey bees.
Pyriproxifen	Insecticide . Use: An insect growth regulator (IGR) used in Australia to treat fire ants, fleas, and other pests in citrus, cotton and a range of melon and fruiting vegetable crops.	Contact LD50: 0.074 mg/bee / Oral LD50: >0.1 mg/bee	Usually supplied as an emulsifiable concentrate that is mixed with water and applied as a spray for crops. Also available as bait and wettable powders. It is moderately toxic to honey bees.
Sethoxydim	Herbicide. Use: For grass control in cotton, clover, pasture, ornamentals, alfalfa; citrus; sorghum; corn; small grains; rice; ornamental grass; oilseed rape; sugarbeet; vegetables	Contact LD50: >0.01mg/bee	Usually supplied as an emulsifiable concentrate. It is moderately toxic to honey bees.
Simazine	Herbicide. Use: For the control of a broad range of weeds in crops including canola, lupins, chickpeas and faba beans.	Contact LD50: 0.097mg/bee	Available in a range of formulations including wettable powders, water dispersible

			granules, liquids and granules. It is moderately toxic to honey bees.
Tebuconazole	Fungicide. Use: For the control of leaf spot and leaf speckle on bananas; rust; leaf spot and net bloch of peanuts; foliar diseases on cereal crops; and other diseases.	Contact LD50: >0.2 mg/bee / Oral LD50: >0.08305 mg/bee	Often supplied as an oil in water emulsion or concentrate that is mixed with water and used as a spray. It is moderately toxic to honey bees.
Tebufenpyrad	Pyrazolium Insecticide and Acaricide. Use: In Australia to control spider and rust mites on crops	Contact LD50: 0.0067 mg/bee / Oral LD50: 0.0603mg/bee	Often supplied as water soluble bag formulations or emulsifiable concentrates. It is moderately toxic to honey bees.
Tebuthiuron	Herbicide. Use: For control of Brigalow regrowth, Tea Tree regrowth, Mimosa pigra and certain problem woody weeds on grazing lands.	Contact LD50: >0.03 mg/bee	Usually supplied as wettable powders, granules or pellets. It is moderately toxic to honey bees
Temephos	Insecticide. Use: In Australia to control mosquitoes, midges, fleas, lice, and skin parasites on animals. It is also used to control the Small Hive Beetle (SHB) in beekeeping. Its use is restricted in Australia and New Zealand due to its toxicity.	Contact LD50: >0.00155mg/bee	Usually available as emulsifiable concentrate, granules and capsules. It is moderately toxic to honey bees.
Terbuthylazine	Herbicide. It is not currently registered for use in Australia	Contact LD50: >0.032 mg/bee / Oral LD50: >0.0226 mg/bee	Usually supplied as a suspension concentrate or suspended emulsion formulation. It is moderately toxic to honey bees.
Tetradifon	Tetradifon is not currently registered for use in Australia	Contact LD50: 0.011 mg/bee	Available in a variety of formulations including emulsifiable concentrates, wettable powders and smoke generators. It is moderately toxic to honey bees.
Thiabendazole	Fungicide. Use: Used in fruits including apples, pears, citrus; Seed potatoes; Peas & chickpeas; Lentils; Cereals including	Contact LD50: >0.034mg/bee / Oral LD50: >0.004	Formulations include dry powders, soluble liquids and suspension concentrates. It is moderately toxic to honey bees.

	wheat, barley, oats, rye, triticale, field corn; popcorn; sweetcorn		
Thiodicarb	Carbamate Insecticide. Use: To control pests on crops such as cotton, sweet corn, and soybeans	Contact LD50: 0.0031 mg/bee / Oral LD50: 0.000153 mg/bee	Usually sulpplied as ready-to-use bait or pellets but may be applied via aerosal dispersal. It is higly toxic to honey bees.
Thiometon	Insecticide and acaricide. Use: Fruit including strawberries, citrus, olives; beet crops; tobacco; cereals; cotton. There are currently no products containing thiometon registered for use in Australia	Contact LD50: >0.00055mg/bee	Usually formulated as an emulsifiable concentrate or Ultra-low volume (ULV). It is higly toxic to honey bees.
trans-Chlordane	Insecticide. Australia banned the use of chlordane in 1997. Chlordane is a persistent organic pollutant (POP) that was used	Contact LD50: 0.0006mg/bee	Dust, granules, spray, oils, wettable powders. It has a low aqueous solubility, is quite volatile and is not normally expected to leach to groundwater. It can be very persistent in both soil and water systems. It is higly toxic to honey bees.
Triadimefon	Fungicide. Use: For the control of fungal diseases of wheat and barley	Oral LD50: > 0.025mg/bee	Usually formulated as an emulsifiable concentrate or wettable powder. It is moderately toxic to honey bees.
Triazophos	Organophosphate Insecticide. Use: Can be used on a wide range of crops to kill Lepidopteran pests like cotton bollworms and pink bollworms	Contact LD50: 0.0598mg/bee	Usually supplied as an emulsifiable concentrate, wettable powder, granules or ULV. It is moderately toxic to honey bees.
Trifluralin	Herbicide. Use: for grasses and broad-leaved weeds in a variety of vegetables, fruit, winter cereals and cotton. In Australia, trifluralin has around 2700 uses in about 35 food crops, as well as cotton, flowers and improved pasture.	Contact LD50: >0.1 mg/bee / Oral LD50: 0.1mg/bee	Usually formulated as an emulsifiable concentrate or granules. It has low toxicity to honey bees.

Vamidothion	Organophosphate Insecticide . Use: cotton; apples; citrus; rice; beans; maize; sorghum. Pests: Aphids including wooly apple aphids, citrus aphid, cotton aphid; spidermites; thrips. No longer approved in European Union.	Contact LD50: 0.00056mg/bee	Usually supplied as an emulsifiable concentrate. It is higly toxic to honey bees.
Vinclozolin	No products containing vinclozolin are currently registered for use in Australia.	Oral LD50: >0.1mg/bee	Usually formulated as a wettable powder. It has low toxicity to honey bees.

Ecotoxicity Categories for bees

Toxicity Category	**Acute Concentration (mg/bee)**	**Acute Concentration (µg/bee)**
highly toxic	<0.002	<2
moderately toxic	0.002 – 0.011	2-11
Low toxic	>0.011	>11

USEPA ecological risk assessments for pesticide.

< meaning lower and **>** meaning higher

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Appendix 1 – Practical examples

1. Less toxic scenario

- EPA found in the sample the following pesticide: Fipronil **0.001** mg/kg
- The oral lethal dose (LD50) of Fipronil for a bee: **0.00000417** mg/bee
- The contact lethal dose (LD50) of Fipronil for a bee: **0.0000059** mg/bee
- The average weight of a bee: **0.1** g (or **0.0001** kg)

How much Fipronil is in each bee?

The concentration in the sample is 0.001 mg per kg of bee weight, which means that every 1 kg of bees contains 0.001 mg of Fipronil.

Since a single bee weighs approximately **0.0001 kg**, we calculate **how much Fipronil is in one bee**:

0.001 mg/kg × **0.0001** kg= **0.0000001** mg per bee

Comparing with the lethal dose (LD50)

- **Oral LD50**: The LD50 is **0.00000417 mg per bee**. This means that if a bee ingests this amount, there is a **50% chance it will die**.

Now, let's compare how much Fipronil was found in the bee versus the Oral LD50:

0.0000001 mg / **0.00000417** mg = 0.024 (2.4%)

This means that **the amount of Fipronil found in each bee is about 2.4% of the Oral LD50**, which is relatively low and unlikely to cause direct lethal effects.

- **Contact LD50**: The LD50 is **0.0000059 mg per bee**. This means that if a bee absorbs this amount, there is a **50% chance it will die**.

Now, let's compare how much Fipronil was found in the bee versus the Contact LD50

0.0000001 mg / **0.0000059** mg = 0.017 (1.7%)

This means that **the amount of Fipronil found in each bee is about 1.7% of the Oral LD50**, also indicating a low direct lethal risk.

What does this mean for your bees?

- The detected amount is below the LD50, so it might not immediately kill half of the bees.
- However, even at low doses, Fipronil can cause sublethal effects such as confusion, disorientation, reduced foraging ability, and weakened immune systems.
- If bees continue to be exposed over time, the effects could accumulate, leading to colony collapse.

2. Worst case scenario

- EPA found in the sample the following pesticide: Fipronil **0.5** mg/kg
- The oral lethal dose (LD50) of Fipronil for a bee: **0.00000417** mg/be
- The contact lethal dose (LD50) of Fipronil for a bee: **0.0000059** mg/bee
- The average weight of a bee: **0.1** g (or **0.0001** kg)

How much Fipronil is in each bee?

The concentration in the sample is 0.5 mg per kg of bee weight, which means that every 1 kg of bees contains 0.5 mg of Fipronil.

Since a single bee weighs approximately **0.0001 kg**, we calculate how much Fipronil is in one bee:

0.5 mg/kg × **0.0001** kg= 0.00005mg per bee

Comparing with the lethal dose (LD50)

- **Oral LD50**: The LD50 is **0.00000417 mg per bee**. This means that if a bee ingests this amount, there is a **50% chance it will die**.

Now, let's compare how much Fipronil was found in the bee versus the Oral LD50:

0.00005 mg / **0. 00000417** mg = 12

This means the detected amount is **12 times the oral LD50**, suggesting a high probability of lethal effects if ingested.

- **Contact LD50**: The LD50 is **0.0000059 mg per bee**. This means that if a bee absorbs this amount, there is a **50% chance it will die**.

Now, let's compare how much Fipronil was found in the bee versus the Contact LD50

0.00005 mg / **0.0000059** mg = 8.5

This means the detected amount is **8.5 times the contact LD50**, also indicating a high likelihood of death through contact exposure.

What does this mean for your bees?

 The detected level of Fipronil is highly toxic and exceeds the lethal dose for both oral and contact exposure. However, this does not necessarily mean the bee was exposed through both routes, as the exact pathway of intoxication remains uncertain. If the concentration in the sample had exceeded the lethal dose for only one route (either oral or contact), it might have provided a clearer indication of the likely exposure pathway.

 Acute bee mortality is very likely, as the amount per bee is significantly above the LD50.

 Colony health is at severe risk, as exposed bees returning to the hive can contaminate the colony.

 Urgent action is needed to identify and eliminate the contamination source.

Appendix 2 – Poisoning report form

General information		
Your name	Phone number	
Address where the bees were found dead		
Symptoms		
Types of Symptoms Make sure to take videos and photos to register	Dead bees at hive entrance	Yes/No
	Dead bees inside the hive	Yes/No
	Dead brood	Yes/No
	Lack of foraging bees seen leaving the hive	Yes/No
	Reduced brood / adult bee numbers	Yes/No
	Live adults slow / paralysed	Yes/No
	Bees behaving aggressively	Yes/No
	Queen failure	Yes/No
	Other:	
Number of hives affected		
Date and time that symptoms were observed		
Sample collection		
Have you collected any of the following samples for laboratory analysis Remember, samples should be dispatched on ice immediately or stored in the freezer.	Dead bees from outside the hive	Yes/No
	Dead bees and comb from inside the hive	Yes/No
	Honey from inside the hive	Yes/No
	Pollen from the comb/ bee bread	Yes/No
	Swab sample from the outside of the hive*	Yes/No
Suspected cause		
Any crop/pasture/agriculture in a 7 km radius?	Yes/No	
What crop/s?		
Any particular activity in these crops right before/during start of symptoms?		
Notes (comments from witnness, observations etc)		
Your signature	Date	

*Providing a swab sample from the outside of the hive is appropriate if you suspect that a chemical has come directly into contact with the hives (eg spray drift or aerial application). A swab can be taken from the outside of the hive using a clean tissue or cotton wool ball.

For detailed guidance on sample preparation and handling in response to a bee poisoning event, consult BeeAware and DPI NSW websites:

https://beeaware.org.au/pollination/pollination-and-pesticides/responding-to-a-poisoning-event/

https://www.dpi.nsw.gov.au/animals-and-livestock/bees/management/pesticides2/pesticides-reducing-damage-to-honey-bees