

Insecticide Information and Chemical Groups

Insecticide Poisoning in Humans

Organophosphate (OP) and carbamate insecticides can pose a more serious risk to unprotected persons. Poisonings can occur while mixing, loading and/or during the application of these products without the appropriate protective equipment or measures. These pesticides are readily absorbed through the skin or the lungs, and can act as nervous system toxins. Over exposure can produce symptoms such as headache, nausea, pupil dilation and excessive sweating and salivation. Higher doses may cause breathing difficulties, muscle twitching, weakness and spasms. Very high doses have caused respiratory failure and death.

Both OP and carbamate pesticides inhibit an enzyme called cholinesterase. Measurements of cholinesterase in the blood before and during the application season can indicate harmful exposures to OPs and carbamates. **Persons who intend to mix, load and/or apply these types of pesticides repeatedly during a season, need a baseline and repeat measurements. Consult your doctor before the spraying season to arrange for these measurements.**

For more information, see *Monitoring Exposure to Organophosphorous and/or Carbamate Insecticides*, a joint publication of Saskatchewan Health. This publication can be viewed on the SK Labour web site: www.labour.gov.sk.ca.

Degree of Risk and Hazard Rating

Danger poison: LD50 is less than 500 mg/kg and indicates high toxicity.

Warning poison: LD50 is between 500-1000 mg/kg and indicates moderate toxicity.

Caution poison: LD50 is between 1000-4000 mg/kg and indicates low toxicity

(LD50 values are used to rate the toxicity of pesticides. They refer to the dose of pesticide (in mg per kg) that is lethal to 50 percent of a test animal population)

Resistance of Insects to Insecticides

Repeated use of the same or similar insecticides against a particular insect in a given area may result in the effectiveness of the insecticide being reduced. To retard or prevent resistance of insects to insecticides: use insecticides only when the economic threshold for a pest has been surpassed and natural controls fail to limit economic damage, and rotate between insecticides with different chemical structures, particularly if several applications are made in a season.

Insecticides can be classified according to their similarity in chemical structure (insecticide family in the table below) and by mode of action (the process by which the insecticide kills the insect). By selecting products from different chemical families (i.e. which different insecticide structures) for an insecticide rotation program, insecticide resistance can be prevented.)

Chemical Group	Insecticide Family	Trade Name	Active Ingredient	Mode of Entry
1A	Carbamates	Furadan	carbufuran	contact/systemic
		Lannage	methomyl	contact/stomach
		Primor	pirimicarb	contact vapour/systemic
		Sevin	carbaryl	contact/stomach
1B	Organophosphates	Cygon, Lagon	dimethoate	contact/systemic
		Diazinon	diazinon	contact/stomach
		Dibrom	naled	contact/stomach poison
		Di-syston	disulfoton	systemic
		Dylox	Trichlorfon	
		Guthion, Sniper	Azinphos-methyl	contact
		Irnidan	Phosmet	contact
		Lorsban, Pyrinex, Nufos	chlorpyrifos	contact/stomach/inhalation
		Malathion, Fyfanon	malathion	contact
		Monitor	methamidophos	contact/systemic
		Orthene	acephate	contact/stomach/systemic
		Thimet	Phorate	ingestion
2A	Organochlorines	Endosulfan, Thiodan, Thionex	endosulfan	contact/stomach
		Kelthane	dicofol	stomach! contact
		Methoxychlor	methoxychlor	contact/stomach
3	Pyrethroids	Ripcord	cypennethrin	contact/stomach
		Decis	detamethrin	contact/stomach
		Pounce	permethrin	contact/stomach
		Matador	Cyhalothrin-lambda	contact/stomach
		Diphenylethanes	Methoxychlor	Methoxychlor
4		Admire	imidacloprid	contact/stomach/systemic
		Assail	acetarniprid	contact/stomach/systemic
5	Spinosyns	Success 480 SC	spinosad	contact/stomach
6	Antibiotics	Avid	Agrimek	contact/locally systemic
9B	Feeding disruptors	Fulfill	Pymetrozine	ingestion mainly, some contact
11	Biologicals	Dipel	<i>Rt. ssp. kurstaki</i>	stomach
		Foray	<i>Rt. ssp. kurstaki</i>	stomach
17	Benzoylurea	Citation	Cyromazine	contact
18	Hydrazine / Insect Growth regulator	Confirm	Tebufenozide	stomach/contact
21	Pyridazinones	Dyno-Mite, Sanrnite	Pyridaben	contact
	Organotin	Vendex	Fenbutatin-oxide	contact

Introduction to Insect and Disease Management Charts

Fungicides and bactericides registered for use, are listed alphabetically within each vegetable crop table for each disease. Detailed information can be found on the corresponding labels. No mention of a specific disease within the table, indicates that no registered chemical means of management are available at the time this guide was printed.

Disease and Insect Management Table Information

Disease

Name(s) given to the disease, plus pathogen name.

Insect

Name(s) given to the insect.

Product

Fungicides/Bactericides: Registered trade name of the chemical. The PCP# (Pest Control Products Act registration number) is below the trade name in parentheses. This is a unique number given to each pest control product registered for use in Canada.

The products listed in this section are products registered for use on vegetable crops in Manitoba at the time of printing. The tables and the corresponding label information that follow include products that are currently being manufactured and available for sale and products which may no longer be produced and sold, but are products which can be legally applied in Canada.

Chemical Group

The number or letter is the resistance group the chemical belongs to (See Table on following page). Chemicals within the same numbered resistance group, have similar modes of action, use of these chemicals beyond the recommended number of successive or total applications in a season, present an increased risk of chemical resistance occurring, and a subsequent reduction in efficacy of disease control.

Rate/acre

Fungicides/Bactericides: Amount of chemical in kilograms (or grams) applied on a per acre basis (if available at the time of printing).

Insecticide: Amount of chemical in grams or millilitres application a per acre basis.

Preharvest Interval

Minimum number of days that must pass before the vegetable is harvested. "N/A" under this heading usually indicates a chemical used prior to planting or subsequent to harvest. Abbreviated as P.H.1. days in tables.

Application

Methods the chemical may be applied, whether ground (G), aerial (A), seed, or soil treatment. Most products in this section are applied by ground only.

ID₅₀ Mammalian Toxicity

Value indicating the amount of a substance that must be taken in orally to kill 50% of the test population. The LD50 indicates how many mg of the chemical are toxic per kg of body weight. The greater the value, the less toxic the compound. i.e. 10,000 mg/kg is less toxic, than 2,000 mg/kg.

Note for Table on following page: This list was compiled by the Fungicide Resistance Action Committee (FRAC).

(<http://www.frac.info/publications.html>, December 2004 update)

Fungicides within the same numbered group, have similar modes of action, resistance to crop protection chemicals has the greatest chance of occurring, when chemicals within the same group are used in too many successive applications or too many times within a season. Good resistance management, involves the use of different fungicides groups when possible. Chemicals in Group 'M' have multiple modes of action against fungi. Chemicals with an 'M' designation have a very low risk of resistance development. Resistance concerns are based on observations to the present time. Regardless of the levels of resistance concern, never exceed the labeled rates of any fungicide.

"Products designated as URMULE: User requested minor use label expansion, the applicator must be in possession of the supplemental label, when using these products.

Fungicide/Bactericide Groups Registered for Use and Potential Resistance Concerns

Group	Chemical Group	Active Ingredient	Trade Name of Products	Resistance Concerns
1	Benzamidazoles	thiophanate-methyl	Senator® 70WP	High Risk
2	Dicarboximides	iprodione	Rovral® WP	Medium to High Risk
		vinclozolin	Ronilan® EG	
3	Triazoles	myclobutanil	Nova® 40W	Medium Risk
		propiconazole	Tilt® 250	
			Topas® 250E	
4	Acylamines	metalaxyl	Allegiance® FL Ridomil® 2G Ridomil® Gold 480EC	High Risk
		metalaxyl – M (mefenoxam)	Apron® XL LS	
7	Carboximides	boscalid	Lance® WDG	Medium Risk
		carboxin (carbathiin)	One active in Pro-Gro® Vita-flo® 280	
11	Qo1 QoI (Quinone Outside Inhibitors)	pyraclostrobin	Cabrio® Headline® EC	High Risk
		Famoxodone (plus cymoxanil)	Tanos® 50DF	
14	Aromatic Hydrocarbons (Chlorophenyl)	dicloran	Botran® 75W	Low to Medium Risk
28	Carbamates	propamocarb	Previcur® N	Low to Medium Risk
33	Phosphonates	fosetyl-A1	Aliette® WDG	Low Risk
M1	Inorganics	copper salts	Basicop Copper 53W Coppercide Copper Spray Kocide 101 Parasol WP	Low Risk
M2	Inorganics	sulphur	Microscopic Sulfur Kumulus® DF	
M3	Dithiocarbamates	Mancozeb maneb metiram thiram zineb ziram	Dithane® DG Rainshield NT Manzate 200DF Penncozeg 75 DF, 80WP Polyram DF Thiram 75WP Zineb 80W Ziram 85W	
			Various captan formulations including Supra Captan 80WDG and Maestro 80DF Folpan 50Wp Folpan 80WDG	
M4	Phthalimides	captan folpet	Bravo 500	
M5	Chloronitriles	chlorothalonil		