Acute Toxicity of Pesticides

Integrated Pest Management Factsheet #3 **V1.0 Dec 2025**

Pesticide Risk

Pesticides are widely used in modern agriculture to aid in the production of high-quality food; however, some have the potential to cause health and/or environmental damage. Producers are encouraged to use practices that reduce environmental risk from pesticides while ensuring label directions are followed. The **risk** that a pesticide poses to the environment results from: **exposure** to the pesticide, and its **toxicity** to organisms, including humans, fish, birds and bees.

Beneficial Management Practices

Beneficial management practices (BMPs) are practices that minimize pesticide **exposure** to organisms and the environment. Using an integrated pest management program that incorporates cultural, physical, and/or biological tools can reduce pest pressures and the overall need for pesticide control products. Apply pesticides only when necessary by making targeted application decisions based on data gathered through pest monitoring. Reduce the probability of exposure by spraying when pollinators are not present and avoid spraying before forecasted precipitation. Only mix the necessary amount of product, and load and rinse sprayer tanks away from streams and wells. Incorporate beneficial management practices to reduce runoff and soil erosion during all phases of the production cycle (field setup, fall and winter management, crop rotation).

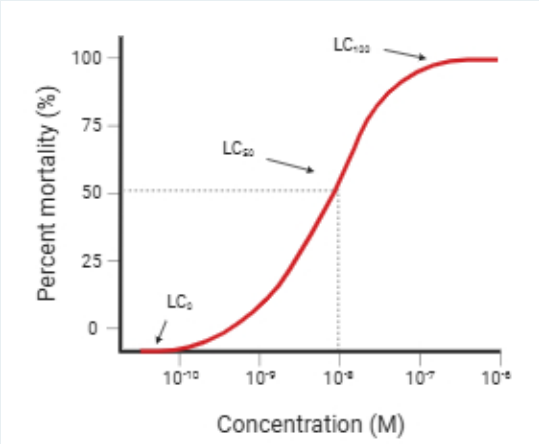

Fig. 1 Lethal dose concentration curve

Product Choice

Where possible, select a pest control product with lower toxicity. The short-term (acute) toxicity of a chemical can be measured using the LC50 (lethal concentration) value, a measurement of how much product is required to kill 50% of a test population over a specific time-period (Figure 1). For example, the 96-hour LC50 of chlorothalonil (the active ingredient in Bravo ZN) for fish is 0.039 mg/L[1].

The following tables were developed to assist producers in decision-making by providing information on the acute toxicity hazard of pesticides to freshwater fish, birds, and bees using data from SAgE Pesticides (http://www.sagepesticides.qc.ca). Insecticides, fungicides and herbicides commonly used in potato production on PEI were placed into one of six hazard categories represented by a color scale including nil (purple), low (green), slight (blue), moderate (orange), high (red) and extremely high (burgundy) potential for toxicity. It does not reflect the overall environmental or human health risk posed through using these products, as factors such as application rates, environmental conditions at time of application or probability of exposure, have not been considered.

Rotate between pesticide products with different modes of action ('group' found on the label) to reduce the chances of resistance development. **The following tables (Tables 1-3) are not comprehensive lists and are only provided as a reference. Always read the product label.** In case of disagreement between the table and the label, the label shall be considered correct: https://pr-rp.hc-sc.gc.ca/ls-re/index-eng.php**.**

Multiple provincial funding streams can help support the purchase and implementation of integrated pest management and soil conservation projects. To learn more about integrated pest management and the provincial support provided, see the remaining integrated pest management series factsheets or contact Shauna Barry (Agri-Environmental Specialist) at slbarry@gov.pe.ca or (902) 314-0388.

References

[1]Bravo ZN safety data sheet. Syngenta 2022. https://assets.syngenta.ca/pdf/ca/msds/Bravo_ZN_28900_en_SDS.pdf

Table 1. Acute toxicity hazard of fungicide active ingredients to freshwater fish, birds, and bees

Active Ingredient	Product Name	Relative Ranking		
		Fish	Birds	Bees
ametoctradin + dimethomorph	Zampro	Extremely High	Slight	Low
azoxystrobin	Quadris F, Azoshy SC, Elatus A	High	Low	Low
azoxystrobin + difenoconazole	Quadris Top	High	Low	Low
azoxystrobin + difenoconazole + fludioxonil	Stadium	High	Low	Low
bacillus amyloliquefaciens strain D747	Double Nickel LC	Nil	Low	Low
bacillus mycoides isolate	LifeGard WG	Nil	Low	Nil
bacilus subtilis QST 713	Serenade Opti, Minuet	Nil	Nil	Nil
benzovindiflupyr	Elatus B	Extremely High	Slight	Low
benzovindiflupyr + difenoconazole	Aprovia Top	Extremely High	Slight	Low
boscalid	Cantus	Moderate	Low	Low
captan	Maestro 80 WSP	High	Moderate	Slight
chlorothalonil	Bravo ZN, Echo 90 WSP, Echo 720	Extremely High	Low	Low
chlorothalonil + mancozeb	Elixir	Extremely High	Slight	Low
chlorothalonil + propamocarb	Tattoo	Extremely High	Low	Low
copper (hydroxide)	Parasol WP, Parasol Flowable, Kocide 2000	Extremely High	Moderate	Low
cyazofamid	Ranman 400 SC, Cyazofamid 400 SC	Low	Low	Low
cymoxanil	Curzate 60 DF	Slight	Low	Low
cymoxanil + famoxadone	Tanos	Extremely High	Low	Low
difenoconazole + fludioxinil + thiamethoxam	Cruiser Maxx Potato Extreme	High	Slight	High
difenoconazole + fludioxonil	Maxim D	High	Low	Low
difenoconazole + mandipropamid + sedaxane	Vibrance Ultra Potato	High	Slight	Low
difenoconazole + pydiflumetofen	Miravis Duo	High	Low	Low
dimethomorph	Forum	Moderate	Low	Low
fenamidone	Reason 500 SC	High	Low	Low
fluazinam	Allegro 500 F	Extremely High	Low	Low
fludioxonil	Maxim PSP	High	Low	Low
fluopicolide	Presidio	High	Low	Low
fluopyram	Velum Prime	Moderate	Low	Low
fluopyram + penflufen	Velum Rise	High	Slight	Slight
fluopyram + prothioconazole	Proline Gold, Propulse	Moderate	Low	Low
fluopyram + pyrimethanil	Luna Tranquility	Moderate	Moderate	Low
fluoxastrobin	Evito 480 SC	High	Low	Low
fluxapyroxad	Sercadis	High	Low	Low
hydrogen peroxide + peroxyacetic acid	Oxidate	High	Slight	Nil
mancozeb	Dithane Rainshield NT, Manzate Pro-Stick, Penncozeb 75 DF Raincoat, Manzate Max	Extremely High	Slight	Low
mancozeb + metalaxyl-M & S-isomer	Ridomil Gold MZ	Extremely High	Slight	Low
mancozeb + zoxamide	Gavel 75 DF	Extremely High	Slight	Low
mandipropamid	Revus	Moderate	Slight	Low
mandipropamid + oxathiapiprolin	Orondis Ultra	High	Slight	Low
mefentrifluconazole	Cevya	High	Low	Low
mefentrifluconazole + pyraclostrobin	Veltyma	Extremely High	Low	Low
metalaxyl-M & S-isomer	Ridomil Gold 480 EC	Slight	Slight	Low
metalaxyl-M & S-isomer + oxathiopiprolin	Orondis Gold	High	Slight	Low
metconazole	Quash SC	Moderate	Slight	Low
metiram	Polyram DF	High	Low	Low
metiram + pyraciostrobin	Cabrio Plus	Extremely High	Low	Low
penflufen + prothioconazole	Emesto Silver	High	Low	Low
penthiopyrad	Vertisan	High	Low	Low
phosphorous acid	Phostrol, Confine Extra, Rampart	Low	Slight	Low
prothioconazole	Emesto Pro	Moderate	Slight	Slight
prothioconazole + trifloxystrobin	USF0728 325 SC, Delaro 325 SC	Extremely High	Low	Low
pyraclostrobin	Headline 250 EC, Preach	Extremely High	Low	Low
pyrimethanil	Scala SC	Moderate	Moderate	Low
thiabendazole	Mertect SC	High	Low	Moderate
thiophanate-methyl	Senator 70 WP	Moderate	Low	Low

Table 2. Acute toxicity hazard of insecticide active ingredients to freshwater fish, birds, and bees

Active Ingredient	Product Name	Relative Ranking		
		Fish	Birds	Bees
abamectin	Agri-Mek SC	Extremely High	Moderate	High
abamectin + cyantraniliprole	Minecto Pro	Extremely High	Moderate	High
acetamiprid	Assail 70 WP, Aceta 70	Low	Moderate	Moderate
acetamiprid + novaluron	Cormoran	Extremely High	Moderate	Moderate
afidopyropen	Sefina	Moderate	Slight	Low
broflanilide	Cimegra	High	Low	High
carbaryl	Sevin XLR	Extremely High	Low	High
chlorantraniliprole	Coragen/ Coragen MaX	Extremely High	Low	Low
clothianidin	Clutch 50 WDG, Titan ST, Nipsit Inside	Low	Low	High
clothianidin + penflufen	Emesto Quantum (insecticide + fungicide)	High	Low	High
cyantraniliprole	Verimark, Exirel	Extremely High	Low	High
cyantraniliprole + thiamethoxam	Minecto Duo	Extremely High	Low	High
cyclaniliprole	Harvanta	Extremely High	Low	High
cypermethrin	Ripcord 400, Up Cyde 2.5 EC, Mako, Ship 250	Extremely High	Low	High
deltamethrin	Decis 5 EC, Poleci 2.5 EC	Extremely High	Low	High
deltamethrin + imidacloprid	Concept	Extremely High	Moderate	High
dimethoate	Lagon 480, Cygon 480	Moderate	High	High
flonicamid	Beleaf 50 SG	Slight	Slight	Low
fluazaindolizine	Salibro (nematicide)	Slight	Low	Low
flupyradifurone	Sivanto Prime	Slight	Moderate	High
imidacloprid	Admire 240 F, Alias 240 SC	Moderate	Moderate	High
kaolin clay	Surround	Nil	Nil	Low
lambda-cyhalothrin	Matador 120 EC, Silencer 120 EC, Labamba	Extremely High	Low	High
malathion	Malathion 50 EC, Malathion 500 E, Malathion 85 E	Extremely High	Slight	High
mineral oil	Superior 70 Oil, SuffOil-X Spray Oil Emulsion	High	Low	Low
novaluron	Rimon 10 EC	Extremely High	Low	Low
oxamyl	Vydate L	High	Extremely High	High
permethrin	Perm Up, Pounce, Ambush 500 EC	Extremely High	Low	High
phorate	Thimet 20 G	Extremely High	Extremely High	High
phosmet	Imidan 50 WP	Extremely High	Slight	High
pymetrozine	Fulfill 50 WG	Slight	Low	Low
spinetoram	Delegate	High	Low	High
spinosad	Success, Entrust	Slight	Slight	High
spirotetramat	Movento 240	Moderate	Low	Low
sulfoxaflor	Closer	Low	Slight	High
tetraniliprole	Vayego	High	Low	High
thiamethoxam	Actara 240	Low	Slight	High

Table 3. Acute toxicity hazard of herbicide active ingredients to freshwater fish, birds, and bees

Active Ingredient	Product Name	Relative Ranking		
		Fish	Birds	Bees
acetic acid	Serene	Slight	Nil	Nil
caprylic and capric acid	BioLink Herbicide EC	High	Slight	Slight
carfentrazone-ethyl	Aim EC	Moderate	Low	Low
clethodim	Arrow 240 EC, Select 1EC, Clethodim 240, Centurion	Low	Slight	Low
dimethenamid-P	Outlook, Frontier Max	Moderate	Slight	Low
diquat	Reglone 240, Dessicash	Moderate	Moderate	Low
EPTC	Eptam EC	Moderate	Slight	Low
fenoxaprop-p-ethyl	Excel Super	High	Low	Low
fluazifop-p-butyl	Venture L	Moderate	Low	Low
fomesafen	Reflex Liquid Herbicide	Slight	Slight	Slight
glufosinate ammonium	Ignite 15 SN	Low	Low	Low
glyphosate	Roundup products	Slight	Low	Low
linuron	Lorox L, Afolan F	High	Moderate	Low
metribuzin	Sencor 75 DF, Sencor 480 F, Sencor Solupak 75 DF, Metrix, TriCor 75 DF, Meter 75 DF	Moderate	Moderate	Low
metribuzin + S-metolachlor	Boundary LQD, Strim MTZ, Flag LQD	Moderate	Moderate	Low
pelargonic acid	Beloukha	Low	Slight	Slight
pyroxasulfone	Zidua	Moderate	Low	Low
rimsulfuron	Prism, Sharda Rimsulfuron	Low	Low	Low
sethoxydim	Poast Ultra	Slight	Low	Moderate
S-metolachlor	Dual II Magnum, Metallica	Slight	Low	Low