

## Toxicity of Tomato and Bell Pepper Insecticides/Miticides to Beneficial Insects<sup>1</sup>

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The following table presents categories that were either obtained from the Environmental Protection Agency, Kopperts Side-Effects Database, UF/IFAS Pest Management Strategic Plans, or label interpretation. When different categories are listed for different life stages (e.g. highly toxic in larval stage but nontoxic as an adult), the more toxic category has been placed in the table.

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**Toxicity of chemical pest management tools to beneficial invertebrates in Florida tomato and bell pepper.**

<b>Beneficial Insects/ Mites</b>	<b>Beneficial mites</b>	<b>Big-eyed bugs</b>	<b>Damsel bugs</b>	<b>Ground beetles</b>	<b>Honeybees</b>	<b>Lacewings</b>	<b>Ladybird beetles</b>	<b>Minute pirate</b>	<b>Parasitic wasps</b>	<b>Predatory midges</b>	<b>Predatory thrips</b>	<b>Spiders</b>	<b>Syrphid fly larvae</b>
<b>Registered materials</b>													
Abamectin (6)	H	O	H	O	H	H	S	O	H	H	H	O	S
Acephate (1)*	H	H	H	H	H	H	H	H	H	H	H	H	H
Acetamiprid (4)	S	O	O	O	M	M	M	O	M	H	H	O	O
Azadirachtin (18)	S	O	O	O	S	S	S	O	M	O	O	O	O
Azinphos-methyl (1)**	M	H	H	H	H	H	H	H	H	H	H	H	H
Bifenazate (25)	S	O	O	O	M	S	S	O	S	O	O	O	O
Bifenthrin (3)	H	H	H	H	H	H	H	H	H	H	H	H	H
Boric acid (no class)	M	O	O	O	S	S	S	S	O	M	M	O	M
Buprofezin (16)**	O	O	O	O	O	S	O	O	S	M	O	O	O
Carbaryl (1)	S	H	H	H	H	H	H	H	H	H	H	H	H
Chlorpyrifos (1)*	H	H	H	H	H	H	H	H	H	H	H	H	H
Cryolite (9)	O	O	O	O	O	O	O	O	O	O	O	O	O
Cyfluthrin (3)	H	H	H	H	H	H	H	H	H	H	H	H	H

**Toxicity scale:**

O = nontoxic

S = slightly toxic

M = moderately toxic

H = highly toxic

\*Bell Pepper only

\*\*Tomato only

\*\*\*When applied on foliage

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<b>Pest Management Tools (IRAC MoA Class)</b>													
Cyhalothrin (gamma/lambda) (3)	H	H	H	H	H	H	H	H	H	H	H	H	H
Cyromazine (17)	O	M	M	O	O	O	O	M	O	O	O	O	O
Diazinon (1)**	H	H	H	H	H	H	H	H	H	H	H	H	H
Dicofol (20)	H	S	S	S	S	S	S	S	M	H	S	S	H
Diflubenzuron (15)*	O	O	M	O	M	H	M	H	O	O	O	O	O
Dimethoate (1)	H	H	H	H	H	H	H	H	H	M	H	H	H
Dinotefuran (4)	M	M	M	M	H	M	H	H	H	H	H	M	H
Disulfoton (1)*	O	O	O	O	O	O	O	O	O	O	O	O	O
Emamectin (6)	H	O	H	O	H	H	S	O	H	H	H	O	S
Endosulfan (2)	H	H	H	H	H	H	H	H	M	H	H	H	H
Esfenvalerate (3)	H	H	H	H	H	H	H	H	H	H	H	H	H
Fenpropathrin (3)**	H	H	H	H	H	H	H	H	H	H	H	H	H
Imidacloprid (4)	M	M	M	M	H	M	H	H	H	H	H	M	H
Indoxacarb (22)	S	S	S	S	H	S	S	S	H	S	S	O	H

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<b>Pest Management Tools (IRAC MoA Class)</b>													
Malathion (1)	M	H	H	H	H	H	H	H	H	H	H	H	H
Methamidophos (1)**	H	H	H	H	H	H	H	H	H	H	H	H	H
Methomyl (1)	H	H	H	H	H	H	H	H	H	H	H	H	H
Methoxyfenozide (18)	O	O	S	O	O	O	O	S	O	O	O	O	O
Naled (1)*	H	H	H	H	H	H	H	H	H	H	H	H	H
Oils (no class)	M	O	O	O	O	S	S	O	S	S	S	O	S
Oxamyl (1)***	H	H	H	H	H	H	H	H	H	H	H	H	H
Oxydemeton-methyl (1)*	H	H	H	H	H	H	H	H	H	H	H	H	H
Permethrin (3)	H	H	H	H	H	H	H	H	H	H	H	H	H
Pymetrozine (9)	O	O	O	O	O	O	O	O	O	O	O	O	O
Pyrethrins + Rotenone (3)	M	M	M	M	H	M	M	M	M	M	M	M	M
Pyrethrins + PBO (3)	M	M	M	M	H	M	M	M	M	M	M	M	M
Pyriproxyfen (7)	S	S	S	S	O	S	H	S	S	S	S	S	M
Soaps (no class)	H	M	M	S	O	H	M	S	M	M	M	O	M

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Spinosad (5)	M	S	S	S	H	M	M	S	M	S	S	O	S
Spiromesifen (23)	M	O	O	O	O	S	S	S	S	S	S	O	S
Sulfur (8)	M	S	S	S	S	S	S	S	S	S	S	O	S
Tebufenozide (18)	O	O	S	O	O	O	O	S	O	O	O	O	O
Thiamethoxam (4)	S	M	H	M	H	S	H	H	H	H	H	M	H
zeta-Cypermethrin (3)	H	H	H	H	H	H	H	H	H	H	H	H	H

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