

Toxicity Ratings for Beneficials in Oregon and Washington Hazelnuts

Key to Beneficials:

BEB = Big-eyed bug (*Geocoris pallens*)

DB = Damsel bug (*Nabis alternatus*)

HB = Honey bee (*Apis mellifera*)

LW = Lacewings (*Chrysopa* spp.)

LB = Lady beetles (*Hippodamia convergens*)

MPB = Minute pirate bugs (*Orius* spp.)

PM = Predatory mites (*Acari: Phytoseiidae*)

PN = Parasitic nematodes

PW = Parasitic wasps (*Ichneumonidae* and *Braconidae* families, including *Trioxys pallidus*)

S = Spiders (*Arachnida: Araneae*)

SF = Syrphid flies

TF = Tachinid flies

Rating Scale: O = Non-toxic; L = Slightly toxic; M = Moderately toxic; H = Highly toxic; ND = No Data

	BEB	DB	HB	LW	LB	MPB	PM	PN	PW	S	SF	TF	COMMENTS
Registered Material:													
<i>Insecticides/Miticides:</i>													
Azadirachtin (Neemix, Azatin, Azatrol)	L	L	L	L	L	L	L	ND	L	L	L	L	
<i>Bacillus thuringiensis</i> (Bt)	O	O	O	O	O	O	O	O	O	O	O	O	
<i>Beauveria bassiana</i> (Mycotrol)	ND	ND	ND	O	ND	ND	ND	ND	O	ND	ND	ND	
Bifenazate (Acramite)	L	L	L	L	L	L	L	ND	L	L	L	L	
Bifenthrin (Brigade and other brands)	M	H	H	M	H	H	H	ND	H	H	H	H	
Calcium polysulfide (lime sulfur, Suforix)	L	ND	O	M	M	H	L	ND	M	ND	M	M	
Carbaryl (Sevin, others)	M	M	H	M	H	M	H	ND	M	M	M	M	
Chlorpyrifos (Lorsban, others)	H	H	H	H	H	H	H	H	H	H	H	H	
Cyfluthrin (Baythroid)													ND for all.
Deltamethrin (Decis)													ND for all.
Diazinon	M	M	H	M	M	M	H	ND	L	M	H	ND	
Dicofol (Dicofol, Kelthane)	M	M	M	L	M	M	M	H	M	M	M	M	
Diflubenzuron (Dimilin)													ND for all.
Endosulfan (Thiodan and other brands)	M	M	M	M	M	M	M	L	M	M	M	M	
Esfenvalerate (Asana)	M	H	O	M	H	H	H	ND	H	H	H	H	

	BEB	DB	HB	LW	LB	MPB	PM	PN	PW	S	SF	TF	COMMENTS
Ziram	ND	ND	ND	ND	ND	L	ND	ND	ND	ND	ND	ND	
<i>Herbicides:</i>													
None													
Cultural/Non-Chemical:													
Adjacent area management	ND	ND	ND	ND	ND	ND	ND	ND	H	H	H	H	May be hazardous if habitat removed.
Crop rotation													Largely neutral.
Cultivar selection													Neutral.
Enhancing habitat for beneficials													Provides good habitat, shelter, and alternative prey for the beneficials.
Irrigation management													Neutral.
Row middle vegetation													Provides good habitat, shelter, and alternative prey for the beneficials.
Sanitation (remove nuts, prunings)													Neutral.
Straw mulch													May provide good habitat and shelter for some beneficials.
Weed control													May remove habitat or alternative prey for some species.