Insect Control for Commercial Vegetables

Read the pesticide label before application. High pressure (200 psi) and high volume (50 gallons per acre) aid in vegetable insect control. Ground sprays with airblast sprayers or sprayers with hollow cone drop nozzles are suggested. Incorporate several methods of control for best results. In recent years, the number of generic products has increased significantly. For brevity, these generic products typically are not listed within each section. The trade names listed are intended to aid in identification of products and are neither intended to promote use of specific trade names nor to discourage use of generic products. A list of active ingredients and generic brand names appears in a separate table at the end of this section.

Insecticides are placed into IRAC MOA classes based on their mode of action (insecticides in the same MOA class have the same mode of action). Effective insecticide resistance management involves the use of alternations, rotations, or sequences of different insecticide MOA classes. To prevent the development of resistance, it is important not to apply insecticides with the same MOA to successive generations of the same insect.

The following online databases provide current product labels and other relevant information:	
Database[1]	**Web Address**
Agrian Label Database	https://home.agrian.com/
Crop Data Management Systems	http://www.cdms.net/Label-Database
EPA Pesticide Product and Label System	https://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1
Greenbook Data Solutions	https://www.greenbook.net/
Kelly Registration Systems[2]	http://www.kellysolutions.com

[1] Additional databases not included in this list may also be available. Please read the database terms of use when obtaining information from a particular website.

[2] Available for AK, AL, AZ, CA, CO, CT, DE, FL, GA, IA, ID, IN, KS, MA, MD, MN, MO, MS, NC, ND, NE, NJ, NV, NY, OK, OH, OR, PA, SC, SD, VA, VT, WA, and WI. Kelly Registration Systems works with State Departments of Agriculture to provide registration and license information.

TABLE 2-1. INSECT CONTROL FOR ASPARAGUS

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	dimethoate 400, MOA 1B	1 pt	48 hrs	180	Do not exceed 5 pints per acre per year.
	malathion, MOA 1B (various) 57 EC	2 pt	12 hrs	1	Aphid colonies appear by early September.
	pymetrozine, MOA 9B (Fulfill) 50WDG	2.75 oz	12 hrs	—	For aphid control on ferns after harvest.
	acetamiprid (Assail) 30 SG	2.5 oz	12	1	
Asparagus beetle, Japanese beetle, Grasshopper	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	 2 to 4 lb 1.25 to 2.5 lb 1 to 2 qt	12 hrs	1	Low rate to be used on seedlings or spears. Do not apply more often than once every 3 days. With established beetle populations, three consecutive weekly sprays are required. beetles and grasshoppers in the fall.
	acetamiprid (Assail) 30 SG	2.5 oz	12	1	
	dimethoate 400, MOA 1B	1 pt	48 hrs	180	Do not exceed 5 pints per acre per year.
	malathion, MOA 1B (various) 57 EC	2 pt	12 hrs	1	
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 pt	48 hrs	1	Let a row on edge of field near overwintering sites of asparagus beetles fern out. This will attract and hold beetles for that directed insecticide spray (trap and destroy).
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	spinetoram, MOA 5 (Radiant) 1 SC	4 to 8 fl oz	4 hrs	60	For asparagus beetle only. This use is only for asparagus ferns; do not apply within 60 days of spear harvest.

TABLE 2-1. INSECT CONTROL FOR ASPARAGUS (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Beet armyworm, Cut-worm, Yellow-striped armyworm	*Bacillus thuringiensis,* MOA 11A (Dipel) DF	0.5 to1 lb	4 hrs	0	
	chlorantraniliprole, MOA 28 (Coragen) 1.67SC	3.5 to 5 fl oz	4 hrs	1	
	cyantraniliprole, MOA 28 (Exirel) 0.83EC	7 to 13.5 fl oz	12 hr	1	Do not make applications within 25 ft of water sources.
	methomyl, MOA 1A (Lannate) 2.4 LV (Lannate) 90 SP	 1.5 to 3 pt 0.5 to 1 lb	48 hrs	1	
	spinetoram, MOA 5 (Radiant) 1 SC	4 to 8 fl oz	4 hrs	60	This use is only for asparagus ferns; do not apply within 60 days of spear harvest.
	spinosad MOA 5 (Entrust 2SC)	4 to 6 fl oz	4 hrs	60	This use is only for asparagus ferns; do not apply within 60 days of spear harvest. **OMRI approved.**

INSECT CONTROL

TABLE 2-2. INSECT CONTROL FOR BEANS

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	acetamiprid MOA 4A (Assail) 30SG	2.5 to 5.3 oz	12 hrs	7	
	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	0	On foliage as needed. Re-entry interval of 48 hours
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	 21	See label for soil application instructions. Also controls leaf hoppers and thrips.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.2 fl oz 3.5 fl oz	12 hrs	 7	
	sulfoxaflor (Transform) 50WG	0.75 to 1.0 oz	24 hrs	7	
	flupyradifurone (Sivanto Prime)	7 to 14 fl	4 hrs	7	
	spirotetramat, MOA 23 (Movento) 2 SC	4 to 5 fl oz	24 hrs	1 (succulent); 7 (dried)	
Thrips	acephate, MOA 1B (Orthene) 97 PE	0.5 to 1 lb	24 hrs	14	Lima beans may be treated and harvested the same day. Do not apply more than 2 pounds a.i. per acre per season.
	acetamiprid MOA 4A (Assail) 30SG	2.5 to 5.3 oz	12 hrs	7	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	methomyl, MOA 1A		48 hrs	1	
	(Lannate) 90 SP (Lannate) 2.4 LV	0.5 lb 1.5 pt			
	novaluron MOA 15 (Rimon) 0.83 EC	12 fl oz	12 hrs	1	Effective against immature thrips only.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 6 fl oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 28 fluid ounces per acre per season on succulent beans or more than 12 fluid ounces on dried beans.
	spinosad, MOA 5 (Blackhawk)	2.5 to 3.3 oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 20 ounces per acre per season on succulent beans or more than 8.3 ounces on dried beans.

TABLE 2-2. INSECT CONTROL FOR BEANS (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Corn earworm, European corn borer, Lesser cornstalk borer, Looper, Armyworm	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	
	spinetoram, MOA 5 (Radiant) 1 SC	4.5 to 6 fl oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 28 fluid ounces per acre per season on succulent beans or more than 12 fluid ounces on dried beans.
	spinosad, MOA 5 (Blackhawk)	1.7 to 3.3 oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 20 ounces per acre per season on succulent beans or more than 8.3 ounces on dried beans.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. Not effective against armyworm.
Cowpea curculio	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. Control may be poor in areas where resistant populations occur, primarily in the Gulf Coast areas. Addition of piperonyl butoxide synergist (Exponent) may improve control of pyrethroids.
Cucumber beetle, Bean leaf beetle, Japanese beetle, Cutworm	carbaryl, MOA 1A (Sevin) 50 WP 80 S XLR Plus	 4 lb 2.5 lb 1 qt	12 hrs	3 (succulent); 21 (dried)	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Grasshopper	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Leafminer	cyromazine, MOA 17 (Trigard) 75 WP	2.66 oz	12 hrs	7	
	naled, MOA 1B (Dibrom) 8 EC	1 pt	48 hrs	1	Re-entry interval is 48 hours
	spinetoram, MOA 5 (Radiant) 1 SC	4 to 8 fl oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 28 fluid ounces per acre per season on succulent beans or more than 12 fluid ounces on dried beans.
	spinosad, MOA 5 (Blackhawk)	2.5 to 3.3 oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 20 ounces per acre per season on succulent beans or more than 8.3 ounces on dried beans.
Lygus bug	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	carbaryl, MOA 1A (Sevin) 50 WP 80 S XLR Plus	 3 lb 1.875 lb 1.5 qt	12 hrs	 3 (succulent); 21 (dried)	On foliage when pods begin to form.
	dimethoate, MOA 1B (Dimethoate) 4 EC	1 pt	48 hrs	7	Do not apply if bees are visiting area to be treated when crops or weeds are in bloom.
Mexican bean beetle	acetamiprid MOA 4A (Assail) 30SG	2.5 to 5.3 oz	12 hrs	7	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	 1 to 2 lb 0.625 to 1.25lb 1 qt	12 hrs	3 (succulent); 21 (dry)	On foliage as needed. Use low rate on young plants.
	novaluron MOA 15 (Rimon) 0.83 EC	9 to 12 oz	12 hrs	1	Controls immature stages only.
Potato leafhopper	acetamiprid MOA 4A (Assail) 30SG	2.5 to 5.3 oz	12 hrs	7	
	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	 4 lb 2.5 lb 1 qt	12 hrs	3 (succulent); 21 (dry)	On foliage as needed.
	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	7	
	methomyl, MOA 1A (Lannate) 90 SP (Lannate) 2.4 L	 0.5 lb 1.5 to 3 pt	48 hrs	 1 1 to 3	Do not graze before 3 days or use for hay before 7 days.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and their reentry and pre-harvest intervals.

TABLE 2-2. INSECT CONTROL FOR BEANS (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Seedcorn maggot, Wireworm	**Use seed pretreated with insecticide for seedcorn maggot control.**				Seed can be purchased pretreated. Pretreated seed will not control wireworms.
	bifenthrin MOA 3 (Empower) 1.15G	3.5 to 8.7 lb	9 days	9	Apply preplant broadcast incorporated in the top 1 to 3 inches of soil.
	chlorpyrifos MOA 1B (Lorsban) 4E	2 pts	24 hrs		Can be applied preplant broadcast incorporated in the top1 to 3 inches of soil, or at planting as a T-band application. For at planting application, apply 1.8 fluid ounces per 1,000 feet of row at 30-inch row spacing. Apply the spray in a 3 to 5 inch wide band over the row behind the planting shoe and in front of the press wheel to achieve shallow incorporation. Do not make more than one application per year or apply more than 1 pound a.i per acre.
	phorate, MOA 1B (Thimet) 20 G	4.9 to 9.4 oz/ 1,000 ft row	12 hrs	60	Drill granules to the side of seed at planting. Avoid contact with seed.
Spider mite	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	bifenazate MOA 20D (Acramite) 4 SC	16 to 24 fl oz	12 hrs	3	
	acequinocyl (Kanemite) 15 SC	31 fl oz	12 hrs	7	
	fenpyroximate (Portal) 0.4 EC	2 pt	12 hrs	1	For use on snap bean only.
Stink bug, Kudzu bug	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	naled, MOA 1B (Dibrom) 8 EC	1.5 pt/100 gal water	48 hrs	1	
Whiteflies	acetamiprid MOA 4A (Assail) 30 SG	4.0 to 5.3 oz	12 hrs	7	
	buprofezin, MOA 16 (Courier) 40 SC	9 to 13.6 fl oz	12 hrs	14	For use on snap beans only.
	flupyradifurone (Sivanto Prime)	10.5 to 14 fl	4 hrs	7	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	 21	See label for soil application instructions.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.2 fl oz 3.5 fl oz	12 hrs	 7	
	spirotetramat, MOA 23 (Movento)	4 to 5 fl oz	24 hrs	1 (succulent); 7 (dry)	PHI is 1 day for succulent beans and 7 days for dry beans.

TABLE 2-3. INSECT CONTROL FOR BEET

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	flonicamid, MOA 9A (Beleaf) 50SG	2 to 2.8 oz	12 hrs	7	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	 21	See label for soil application instructions. Will also control flea beetle.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.2 fl oz 3.5 fl oz	12 hrs	 7	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	1	

TABLE 2-3. INSECT CONTROL FOR BEET (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid (cont'd)	thiamethoxam, MOA 4A (Platinum) 75 SG (Actara) 25 WDG	 1.7 to 2.17 oz 1.5 to 3 oz	12 hrs 12 hrs	 7	Platinum may be applied to direct-seeded crops in-furrow at seed or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 12 ounces per acre per season of Platinum. Check label for plant-back restrictions for a number of crops.
Armyworms, Beet webworm	chlorantraniliprole MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	
	methoxyfenozide MOA 18 (Intrepid) 2F	6 to 16 fl oz	4 hrs	7	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	Do not apply more than 32 fluid ounces per acre per season.
	spinosad, MOA 5 (Blackhawk)	1.7 to 3.3 oz	4 hrs	3	
Blister beetle, Flea beetle	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR	 3 lb 1.875 lb 1 qt	12 hrs	7	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Leafminer	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	7	Control will be improved with addition of a spray adjuvant.

TABLE 2-4. INSECT CONTROL FOR BROCCOLI, BRUSSELLS SPROUT, CABBAGE, AND CAULIFLOWER

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	**Where whitefly resistance is an issue (or any other insect with a high potential for resistance to Group 4A MOA insecticides), a foliar-applied Group4A insecticide program and a soil-applied Group 4A program should not be used in the same season. Also, if using a foliar-applied program, avoid using a block of more than three consecutive applications of any products belonging to Group 4A insecticides.**				
	acetamiprid, MOA 4A (Assail) 30 SG	2 to 3 oz	12 hrs	7	
	clothianidin, MOA 4A (Belay) 50WD	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	21 (soil) 7 (foliar)	Soil application at planting only.
	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	7	
	flonicamid, MOA 20D (Beleaf) 50SG	2 to 2.8 oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 12.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 4.4 to 10.5 fl 10 to 24 fl oz	12 hrs	 21	Do not follow soil applications of Admire with foliar applications of any neonicotinoid insecticide. Use only one application method. See label for soil application instructions. Imidacloprid also controls whiteflies.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.3 fl oz 3.75 fl oz	12 hrs	 7	Imidacloprid also controls whiteflies. Not effective against flea beetle.
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	7	
	spirotetramat, MOA 23 (Movento) 2 SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fluid ounces per season. Requires surfactant.
	thiamethoxam, MOA 4A **Soil treatment** (Platinum) 75SG	 1.66 to 3.67 oz	12 hrs	21	Platinum may be applied to direct-seeded crops in-furrow at seed or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 3.67 oz per acre per season.
	Foliar treatment (Actara) 25WDG	 1.5 to 3.0 oz	12 hrs	30	Thiamethoxam also controls whiteflies and certain thrips species.

TABLE 2-4. INSECT CONTROL FOR BROCCOLI, BRUSSELLS SPROUT, CABBAGE, AND CAULIFLOWER (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Diamondback moth, Cabbage looper, Imported cabbageworm, Corn earworm, Cross-stripped cabbageworm, Cabbage webworm, Armyworms	**Insecticide-resistant populations, widespread in Southeastern U.S., may not be controlled with some registered insecticides. To manage resistance, avoid transplants from Georgia and Florida and avoid repeated use of the same materials for extended periods of time. Repeated use of pyrethroid insecticides destroys natural enemies and often aggravates diamondback moth problems. Do not allow populations to increase to large densities before initiating treatments.**				
	Bacillus thuringiensis, MOA 11A (Dipel) 2X (Dipel) 4L (Javelin) WG (Xentari) WDG	 8 oz 1 to 2 qt 0.5 to 1 lb 0.5 to 1 lb	4 hrs	0	On foliage every 7 days. On summer or fall plantings, during periods when eggs and larvae are present. This usually occurs when true leaves appear; on other plantings, it may occur later. A spreader/sticker will be helpful. Not effective against Cabbage webworm.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	3	Foliar or soil application. See label for soil application instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	12 hrs	NA	Verimark is for soil application only. Apply at planting only. See label for application options.
	(Exirel) 0.83SE	7 to 17 fl oz	12 hrs	1	Exirel is for foliar application only. Use higher rates for cabbage looper.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	3.2 to 4.8 oz	12 hrs	7	
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 oz	12 hrs	3	Add a wetting agent to improve spray. Do not apply more than 14 ounces (0.26 pound a.i.) per acre per crop. The minimum interval between sprays is 3 days.
	novaluron, MOA 15 (Rimon) 0.83 EC	6 to 12 fl oz	12 hrs	7	Use lower rates when targeting eggs or small larvae, and use higher rates when larvae are large. Make no more than three applications, or 24 fluid ounces per acre per season.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
Flea beetle	acetamiprid, MOA 4A (Assail) 30 SG	2 to 3 oz	12 hrs	7	
	clothianidin, MOA 4A (Belay) 50WDG	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	 7 (foliar)	Soil applications may only be made at planting.
	cyantraniliprole, MOA 28 (Verimark) 1.67SC (Exirel) 0.83SE	 6.75 to 13.5 fl oz 13.5 to 20.5 fl oz	 4 hrs 12 hrs	 1 1	Verimark is for at planting soil application only. See label for application options. Exirel is for foliar application only.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL **Soil treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 fl oz 5 to 6 oz 9 to 10.5 fl oz	12 hrs	 1 21	See label for soil application options.
	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	7	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Harlequin bug, Stink bug	clothianidin, MOA 4A (Belay) 50WDG	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	NA 7 (foliar)	Soil application at planting only.
	dinotefuran, MOA 4A (Venom) 70 SG (Scorpion) 35 SL	 3 to 4 oz 2 to 7 fl oz	12 hrs	1	Do not exceed 6 oz of Venom per season.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.

INSECT CONTROL

TABLE 2-4. INSECT CONTROL FOR BROCCOLI, BRUSSELLS SPROUT, CABBAGE, AND CAULIFLOWER (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Yellowmargined leaf beetle	pyrethroid, MOA 3		12 hrs		Applications need to be made at the first sign of infestation. Problems are most common in spring and fall months along the gulf coast areas.
	chlorpyrifos, MOA 1B (Lorsban) 4 EC (Lorsban) Advanced (Lorsban) 75 WG	 4 to 4.5 pts 4 to 4.5 pts 3 lb	24 hrs	—	Preplant incorporate: Apply as a broadcast spray to the soil surface in a minimum spray volume of 10 gal or more, and incorporate into the top 2 to 4 inches of soil on the day of application.
	chlorpyrifos, MOA 1B (Lorsban) 4 EC	 1.6 to 2.75 oz/ 1,000 ft row	24 hrs	—	Direct seeded: apply in a 4-in. wide band behind planter shoe and in front of press wheel for shallow incorporation.
	(Lorsban) 15 G	4.6 to 9.2 oz/ 1,000 ft row	24 hrs	—	Direct seeded: place across seed row in 4-in. band behind planter shoe and in front of press wheel.
	diazinon, MOA 1B (Diazinon) 50 W or 50 WP	0.25 to 0.5 lb/ 50 gal	4 days	—	Transplant water: Apply in transplant water or drench water at 4 to 6 oz per plant at transplanting.
	cyantraniliprole (Verimark) 1.67 SC	10 to 13.5 fl oz	4	—	Apply to soil at planting as an in-furrow spray, transplant tray drench, transplant water, hill drench, surface band, or soil shank.
Thrips	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	7	
	acetamiprid (Assail) 30SG	4.0 oz	12 hrs	7	Efficacy will vary depending on thrips species.
	imidacloprid, MOA 4A (Admire Pro) 4.6F (various) 2F	 1.3 fl oz 3.0 fl oz	12 hrs	7	Check label for rates for other formulations. Foliar applications only. Efficacy will vary depending on thrips species.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 fl oz	48 hrs	1	
	novaluron, MOA 15 (Rimon) 0.83 EC	6 to 12 fl oz	12 hrs	7	Make no more than three applications, or 24 fl oz, per acre per season.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	
Whitefly	**Where whitefly resistance is an issue (or any other insect with a high potential for resistance to Group 4A MOA insecticides), a foliar-applied Group 4A insecticide program and a soil-applied Group 4A program should not be used in the same season. Also, if using a foliar-applied program, avoid using a block of more than 3 consecutive applications of any product belonging to Group 4A insecticides.**				
	acetamiprid, MOA 4A (Assail) 30 SG	2.5 to 4.0 oz	12 hrs	7	Use spreader stick to improve control.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 oz	12 hrs	1	Do not follow soil applications with foliar applications of any neonicotinoid insecticide. Use only one application method. Do not apply more than 6 oz per acre per season using foliar applications, or 12 oz per acre per season using soil applications. Soil applications may be applied by: a narrow band below or above the seed line at planting; a post-seeding or transplant drench with sufficient water to ensure incorporation to the root zone; or through drip irrigation.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	 5 to 6 oz 9 to 10.5 fl oz		21	
	flupyradifurone (Sivanto Prime)	10.5 to 14 fl oz	4 hrs	7	
	spiromesifen, MOA 23 (Oberon) 2 SC	7 to 8.5 fl oz	12 hrs	7	Do not exceed 25.5 fl oz per acre per season.
	spirotetramat, MOA 23 (Movento) 2 SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fl oz per season. Requires surfactant. Use a spreader-penetrator adjuvant.
	pyriproxyfen, MOA 7 (Knack) 0.86EC	8 to 10 fl oz	12 hrs	7	Only treat whole fields, and do not apply to any crop other than those for which Knack is registered within 30 days after the last application.

TABLE 2-5. INSECT CONTROL FOR CARROT

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, leafhopper	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 1.6 F	 4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	21	Must be applied to the soil. May be applied via chemigation into the root zone through low-pressure drip, trickle, micro-sprinkler, or equivalent equipment; in-furrow spray or shanked-in 1 to 2 inches below seed depth during planting; or in a narrow band (2 inches or less) 1 to 2 inches directly below the eventual seed row in a bedding operation 14 or fewer days before planting. Higher rates provide longer lasting control. See label for information on approved application methods and rate per 100 row feet for different row spacings.
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum may be applied to direct-seeded crops in-furrow at seeding, immediately after seeding with sufficient water to ensure incorporation into the root zone, or through trickle irrigation.
	(Actara) 25 WDG	1.5 to 3 oz	12 hrs	7	Actara is applied to foliage. Do not exceed 4 ounces Actara per acre per season.
	flonicamid, MOA 29 (Beleaf) 50 SG	2 to 2.8 fl oz	12 hrs	3	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	7	
Armyworms, Parsleyworm	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	carbaryl, MOA 1A (Sevin) 80 S (Sevin) XLR Plus	 1.25 lb 1 qt	12 hrs	7	On foliage as needed.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Coragen may be used for foliar or drip chemigation.
	methomyl, MOA 1A (Lannate) 2.4 LV (Lannate) 90 SP	 0.75 to 1.5 pt 0.25 to 0.5 lb	48 hrs	1	
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	1	Use higher rates against large larvae.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	3	Radiant will not control leafhoppers. Do not make more than 4 applications per year.
Leafminer	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	3	
Wireworm	diazinon, MOA 1B (Diazinon) (AG 500)	4 qt	3 days	—	Broadcast and incorporate preplant.

TABLE 2-6. INSECT CONTROL FOR CELERY

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Leafhopper, Flea beetle	imidacloprid, MOA 4A (Admire Pro) 4.6 F (various) 2 F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	21	Apply via chemigation into the root zone, as an in-furrow spray at planting on/or below the seed, or as a post-seeding or transplant drench.
	flonicamid, MOA 29 (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	0	Will not control flea beetle.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	10.5 to 12.0 fl oz	4 hrs	1	Will not control flea beetle
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	3	Do not exceed 10 fluid ounces per season. Not for flea beetle. Requires surfactant. Will not control flea beetle
	tolfenpyrad, MOA 21A (Torac) 1.29 EC	17 to 21 fl oz	12 hrs	1	
Armyworms, Corn earworm, Looper	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	2.4 to 4.8 oz	12 hrs	7	Do not make more than two sequential applications without rotating to another product with a different mode of action.
	methomyl, MOA 1A (Lannate) 2.4 LV	3 pt	48 hrs	7	Methomyl may induce leafminer infestations.

TABLE 2-6. INSECT CONTROL FOR CELERY (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Armyworms, Corn earworm, Looper (cont'd)	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	7	For early season applications only to young crop and small plants. For mid- to late-season applications and heavier infestations and under conditions in which thorough coverage is more difficult. Do not apply more than 16 fl oz per application and do not exceed 64 fl oz per season. See Rotational Crop Restrictions on label.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	Use higher rates for armyworms.
Leafminer	abamectin, MOA 6 (Agri-Mek) 0.15EC	1.75 to 3.5 fl oz	12 hrs	7	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyromazine, MOA 17 (Trigard 75WP)	2.66 oz	12 hrs	7	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	

TABLE 2-7. INSECT CONTROL FOR COLLARD AND MUSTARD GREENS

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	acetamiprid, MOA 4A (Assail) 30 SG	2 to 3 oz	12 hrs	7	
	clothianidin, MOA 4A (Belay) 50 WDG	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	7 (foliar)	Soil application at planting only.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 fl oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	10.5 to 12.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	21	See label for soil application instructions. Admire Pro will also control flea beetle.
	Foliar treatment (Admire Pro) 4.6 F (various) 2 F	1.3 fl oz 3.8 fl oz	12 hrs	7	
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	7	
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fluid ounces per season. Requires surfactant.
Diamondback moth, Caterpillars, including Cabbage looper, Imported cabbageworm, Cross-stripped cabbageworm, Cabbage webworm, Armyworms	**Insecticide-resistant populations may not be controlled with some registered insecticides. To manage resistance, avoid transplants from Georgia and Florida, and avoid the repeated use of the same materials for extended periods of time. Use of pyrethroid insecticides destroys natural enemies and aggravates diamondback moth problems. Do not allow populations to increase to large densities before treatments are initiated. Also,** do not apply insecticides with the same mode of action (i.e., MOA group) more than twice to any generation of diamondback moth. After two applications, rotate to an insecticide with a different mode of action.				
	Bacillus thuringiensis, MOA 11A (Crymax) WDG (Dipel) 2X, DF (Dipel) (Xentari) WDG	0.5 to1.5 lb 8 oz 1 pt 0.5 to 1 lb	4 hrs	0	Use a spreader/sticker.

TABLE 2-7. INSECT CONTROL FOR COLLARD AND MUSTARD GREENS (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Diamondback moth, Caterpillars, including Cabbage looper, Imported cabbageworm, Cross-stripped cabbageworm, Cabbage webworm, Armyworms (cont'd)	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 4 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	2.4 to 4.8 oz	12 hrs	14	
	indoxacarb, MOA 22 (Avaunt) 30 WDG	3.5 oz	12 hrs	3	Do not apply Avaunt more than twice to any generation of diamondback moth. After two applications, rotate to an insecticide with a different mode of action. Do not make more than 6 applications (4 in GA), or exceed 14 ounces per season per crop.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
Flea beetle	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR	 3 lb 1.875 lb 1 qt	12 hrs	14	
	acetamiprid, MOA 4A (Assail) 30SG	2 to 4 oz	12 hrs	7	
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 fl oz	12 hrs	 7	Do not follow soil applications with foliar applications. Use only one application method. Do not apply more than 6 ounces per acre per season using foliar applications, or 12 ounces per acre per season using soil applications. Soil applications may be applied by: a narrow band below or above the seed line at planting; a post-seeding or transplant drench with sufficient water to ensure incorporation to the root zone; or through drip irrigation.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	 5 to 6 oz 9 to 10.5 fl oz		 21	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. May flare diamond back moth populations.
Grasshopper	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. May flare diamond back moth populations.
Harlequin bug, Stink bug	acetamiprid, MOA 4A (Assail) 30 SG	3 to 4 oz	12 hrs	7	
	clothianidin, MOA 4A (Belay) 50 WDG	 4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	 7 (foliar)	Soil application at planting only.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. May flare diamond back moth populations.
	thiamethoxam, MOA 4A (Actara) 25WDG	3 to 5.5 oz	12 hrs	7	
Root maggot	chlorpyrifos, MOA 1B (Lorsban) 4 EC (Lorsban) 75WDG	 1.6 to 2.75 fl oz 1.1 to 1.8/ 1,000 ft row	24 hrs	—	For directed-seeded crops, apply as a 4-inch band over the row after planting. For transplanted crops, apply as a directed spray immediately after transplanting.
Whitefly	acetamiprid, MOA 4A (Assail) 30 SG	2.5 to 4.0 oz	12 hrs	7	Apply against adults, before nymphs are present. Use a spreader/ sticker to improve control.
	flupyradifurone, MOA 4D (Sivanto) 200 L	10.5 to 14.0 fl oz	4 hrs	1	Do not make more than 3 applications or apply more than 28 fluid oz per season.
	pyriproxyfen, MOA 7C (Knack) 0.86 EC	8 to 10 fl oz	12 hrs	7	Do not apply Knack more than twice per season or exceed 0.134 pound per acre per season.
	spiromesifen, MOA 23 (Oberon) 2 SC	7 to 8.5 fl oz	12 hrs	7	Do not make more than 3 applications or apply more than 25.5 fl oz per season.
	spirotetramat, MOA 23 (Movento) 2 SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fluid ounces per season. Requires surfactant.

TABLE 2-8. INSECT CONTROL FOR CORN, SWEET

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Corn earworm, Fall Armyworms, European corn borer	transgenic sweet corn varieties expressing *Bt* protein				Highly effective against European corn borer. Effectiveness against corn earworm will vary among BT traits; additional insecticide applications may be required to prevent damage to the ear tips of some varieties.
	pyrethroid, MOA 3		12 hrs		Check label for variety limitations and grazing restrictions. Also, instances of corn earworm resistance to pyrethroids are becoming more prevalent in recent years. To protect ears, begin sprays when tassel shoots first appear. The frequency of sprays will vary depending on location and intensity of earworm populations, ranging from daily to twice weekly in higher elevations. Corn earworms and fall armyworms present in the late whorl stage must be controlled before tassel emergence to prevent migration to ears.
	chlorantraniliprole MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	
	methomyl, MOA 1A (Lannate) 90 SP (Lannate) 2.4 LV	 4 to 6 oz 0.75 to 1.5 pt	48 hrs	0	Do not use methomyl for European corn borer control.
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 oz	12 hrs	3	For control of fall armyworm and European corn borer in whorl stage only. Do not apply more than 14 ounces Avaunt (0.26 lb a.i.) per acre per crop. Minimum interval between sprays is 3 days. Make no more than 4 applications per season.
	spinetoram, MOA 5 (Radiant) 1 SC	3 to 6 fl oz	4 hrs	1	Do not apply more than 36 ounces per acre per year.
	spinosad, MOA 5 (Blackhawk)	1.7 to 3.3 oz	4 hrs		
Cutworm	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Flea beetle, Grasshopper, Japanese beetle, Root-worm beetle	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Sap beetle	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	 2 lb 1.25 lb 1 qt	12 hrs	2	Infestations usually associated with prior ear damage. Populations build on over mature and damaged fruit and vegetables. Sanitation is important.
Southern corn billbug, Rootworm, Wireworm, Chinch bugs	***Seed treatments:*** clothianidin, MOA 4A (Poncho 600) imidacloprid, MOA 4A (Gaucho 600)	 1.13 fl oz per 80,000 seeds 4 to 8 oz per cwt seed		—	Seed treatments are applied by commercial seed treaters only. Not for use in hopper bins, slurry mixes, or any other type of on-farm treatment.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	chlorpyrifos, MOA 1B (Lorsban) 4 E	4 pt	24 hrs	0	Preplant incorporation treatment. For post emergence treatment use 2 to 3 pints.
	terbufos, MOA 1B (Counter) 15 G	Banded: 6.5 to 13 lb (40 in. row spacing) OR 8 to 16 oz/ 1,000 ft row OR In-Furrow: 6.5 lb (40 in. row) 8 oz/10 ft row			Place granules in a 7-inch band over the row directly behind the planter shoe in front of press wheel. Place granules directly in the seed furrow behind the planter shoe. Rotation is advised.
Stink bug	pyrethroids, MOA 3				See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	methomyl, MOA 1A (Lannate) 90SP	0.5 lb	48 hrs	0	Re-entry interval is 48 hours.

TABLE 2-9. INSECT CONTROL FOR CUCURBITS (CUCUMBER, CANTALOUPE, PUMPKIN, SQUASH, WATERMELON)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Insecticide applications in cucurbits should be made in late evening to protect pollinating insects. Refer to the pollination section of the general production recommendations in this publication for more information about protecting pollinators.					
Aphid	**Where whitefly resistance is an issue (or any other insect with a high potential for resistance to Group 4A MOA insecticides), a foliar applied Group 4A insecticide program and a soil-applied Group 4A program should not be used in the same season. Also, if using a foliar-applied program, avoid using a block of more than three consecutive applications of any products belonging to Group 4A insecticides.**				
	acetamiprid MOA 4A (Assail) 30SG	2.5 to 4.0 oz	12 hrs	0	Do not exceed 0.5 pound per acre per season.
	cyantraniliprole MOA 28 (Verimark) 1.67 SC	10 to 13.5 fl oz	4 hrs	1	Applied to the soil at planting or later via drip irrigation system. See label for application options.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto Prime) 200 SL **Soil Application**	21 to 28 fl oz	4 hrs	21	Soil applications through drip irrigation, injected below the seed level at planting, or drench at transplanting.
	Foliar Application	7 to 14 fl oz		1	DO NOT make foliar applications of Sivanto to muskmelon, cantaloupe, or honeydew melon.
	imidacloprid, MOA 4A (Admire Pro) 4.6 F	7 to 10.5 fl oz	12 hrs	21	Must be applied to the soil. May be applied preplant; at planting as a post-seeding drench, transplant water drench, or hill drench; subsurface sidedress or by chemigation using low-pressure drip irrigation methods. Will also control cucumber beetles and whiteflies.
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	0	Apply before aphids reach damaging levels. Do not exceed 5.5 ounces per acre per season.
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum is for soil application and may be applied to direct-seeded crops in-furrow at seed or transplant depth, post seeding or plant-back restrictions for a number of crops. Actara is for foliar application only.
Armyworms, Cabbage looper	*Bacillus thuringiensis,* MOA 11A (Crymax) WDG (Dipel) 2X (Xentari) WDG	0.5 to 1.5 lb 8 oz 0.5 to 1 lb	4 hrs	0	On foliage as needed.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Coragen may be used for foliar or drip chemigation.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC (Exirel) 0.83SE	5 to 13.5 fl oz 7 to 17 fl oz	4 hrs 12 hrs	1 1	Verimark is for soil application only. It may be applied to the soil at planting at 6.75 to 13.5 ounces, or via drip chemigation at 5 to 10 fluid ounces. Do not make more than two soil or chemigation. See label for application options.
	indoxacarb, MOA 22 (Avaunt) 30WDG		12 hrs		
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	3	Use higher rates against large larvae.
	novaluron, MOA 15 (Rimon) 0.83EC	9 to 12 fl oz	12 hrs	1	
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	3	
Cucumber beetle	acetamiprid MOA 4A (Assail) 30SG	2.5 to 5.3 oz	12 hrs	0	Do not exceed 0.5 pound per acre per season.
	carbaryl MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	2 lb 1.25 lb 1 qt	12 hrs	3	
	clothianidin, MOA 4A (Belay) 50 WDG	4.8 to 6.4 oz (soil)			Soil application at planting only.
		1.6 to 2.1 oz (foliar)	12 hrs	21 (foliar)	Do not use an adjuvant with foliar applications. Do not spray after the 4th true leaf.
	imidacloprid, MOA 4A (Admire Pro) 4.6 F	7 to 10.5 fl oz	12 hrs	21	Must be applied to the soil. See label for information on approved application methods. Will also control aphids and whiteflies.
Leafminer	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.

TABLE 2-9. INSECT CONTROL FOR CUCURBITS (CUCUMBER, CANTALOUPE, PUMPKIN, SQUASH, WATERMELON) (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Leafminer (cont'd)	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	Do not use more than six applications per season.
	cyromazine, MOA 17 (Trigard) 75 WS	2.7 oz	12 hrs	0	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	2 to 3.5 fl oz	4 hrs	1	For foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	3	
Pickleworm, Melonworm, cutworm	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	carbaryl MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	2 lb 1.25 lb 1 qt	12 hrs	3	On foliage when worms appear in blossoms. Repeat as needed. Protect pollinators. Rarely a problem before July.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	2 to 3.5 fl oz	4 hrs	1	For foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 13.5 fl oz	4 hrs	1	Verimark is for soil application only. It may be applied to the soil at planting at 6.75 to 13.5 ounces, or via drip chemigation at 5 to 10 fluid ounces. Do not make more than two soil or chemigation. See label for application options.
	(Exirel) 0.83SE	7 to 17 fl oz	12 hrs	1	
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	3	
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	3	
Spider mites	**Spider mites are primarily a problem on cucumber and watermelon, and less of an issue on squash and pumpkin.**				
	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.4 fl oz	12 hrs	7	
	bifenazate, MOA 20D (Acramite) 50 WS	0.75 to 1.0 lb	12 hrs	3	Do not make more than one application per season.
	etoxazole, MOA 10B (Zeal) 72 WSP	2 to 3 oz	12 hrs	7	Does not kill adults.
	spiromesifen, MOA 23 (Oberon) 2 SC	7 to 8.5 fl oz	12 hrs	7	
Squash bugs	**Squash bug is a common pest of cantaloupe, pumpkin and squash. Although cucumber and watermelon are occasionally reported as hosts of squash bug, rarely do infestations occur.**				
	acetamiprid MOA 4A (Assail) 30SG	5.3 oz	12 hrs	0	Assail is most effective against newly laid eggs and nymphs.
	clothianidin, MOA 4A (Belay) 50SDG	4.8 to 6.4 oz (soil)		At planting 7	See application instructions and precautionary bee statement above under aphid.
		1.6 to 2.1 oz (foliar)	12 hrs	21 (foliar)	Do not use an adjuvant with foliar applications. Do not spray after the 4th true leaf.
	dinotefuran, MOA 4A (Venom) 70 SG (Scorpion) 35 SL	3 to 4 oz 2 to 7 fl oz	12 hrs	1	Do not exceed 6 ounces Venom per acre per season.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Squash vine borer	**Squash vine borer only attacks squash and pumpkin, and is more common in home gardens opposed to commercial plantings.**				
	acetamiprid MOA 4A (Assail) 30SG	5.3 oz	12 hrs	0	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Thrips	methomyl, MOA 1A (Lannate) 2.4 LV (Lannate) 90 SP	0.75 to 1.5 pt 0.25 to 0.5 lb	48 hrs	0	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	3	
	acetamiprid MOA 4A (Assail) 30SG	1.1 to 2.3 oz	12 hrs	0	

TABLE 2-9. INSECT CONTROL FOR CUCURBITS (CUCUMBER, CANTALOUPE, PUMPKIN, SQUASH, WATERMELON) (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Whiteflies	acetamiprid MOA 4A (Assail) 30SG	1.1 to 2.3 oz	12 hrs	0	
	buprofezin, MOA 16 (Courier) 40 WP	9 to 13.6 oz	12 hrs	7	Use sufficient water to ensure good coverage. Do not apply more twice per crop cycle.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	4 hrs	1	May be applied foliar or through drip irrigation. Drip chemigation must be applied uniformly to the root zone.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	10 fl oz	4 hrs	1	Verimark is for soil application only. It may be applied to the soil at planting at 6.75 to 13.5 ounces, or via drip chemigation at 5 to 10 fluid ounces. See label for application options.
	(Exirel) 0.83SE	13.5 to 20.5 fl oz	12 hrs	1	Exirel is for foliar application only. Use an adjuvant for best results.
	flupyradifurone, MOA 4D (Sivanto Prime) 200 SL **Soil Application**	21 to 28 fl oz			
	Foliar Application	10.5 to 14 fl oz			DO NOT make foliar applications of Sivanto to muskmelon or cantaloupe.
	imidacloprid, MOA 4A (Admire Pro) 4.6 F	7 to 10.5 oz	12 hrs	21	Must be applied to the soil. May be applied preplant; at planting; as a post-seeding drench or hill drench; subsurface sidedress; or by chemigation using low pressure drip or trickle irrigation. See label aphids and cucumber beetles.
	pyriproxyfen, MOA 7C (Knack) 0.86 EC	8 to 10 oz	12 hrs	7	Do not make more than two applications per season, and do not make applications closer than 14 days apart.
	spiromesifen, MOA 23 (Oberon) 2 SG	7 to 8.5 fl oz	12 hrs	7	Apply against adults, before nymphs are present. Do not exceed 3 applications per season.
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 fl oz	12 hrs	30	Platinum is for soil application and may be applied to direct-seeded crops in-furrow at seed or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 11 ounces per acre per season of Platinum. Check label for plant-back restrictions for a number of crops.
	(Actara) 25WDG	3 to 5.5 oz		0	Actara is for foliar application.
Wireworm	diazinon MOA 1B (Diazinon) AG 500	3 to 4 qt	3 days	—	Broacast on soil before planting and thoroughly work into upper 6 inches.

TABLE 2-10. INSECT CONTROL FOR EGGPLANT

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	**Where whitefly resistance is an issue (or any other insect with a high potential for resistance to Group 4A MOA insecticides), avoid making foliar applications of Group 4A insecticides when a soil-applied Group 4A program is used – i.e., do not make both foliar and soil applications of Group 4A insecticides. Also, if using a foliar-applied program, avoid using a block of more than three consecutive applications of any products belonging to Group 4A insecticides.**				
	acetamiprid, MOA 4A (Assail) 30 SG	2 to 4 oz	12 hrs	7	Thoroughly cover foliage to effectively control aphids. Do not apply more than once every 7 days, and do not exceed a total of 7 oz per season.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 4.8 oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 12.0 fl oz	4 hrs	1	
	sulfoxaflor (Closer) 2 SC	1.5 to 2.0 fl oz	12 hrs	1	
	imidacloprid, MOA 4A **Soil Treatment** (Admire Pro) 4.6 F (various) 1.6 F	7 to 10.5 oz 16 to 24 fl oz	12 hrs	21	See label for soil application instructions. For short-term protection of transplants at planting, apply Admire Pro (0.44 ounces per 10,000 plants) not more than 7 days before transplanting by (1) uniformly spraying transplants, followed immediately by sufficient overhead irrigation to wash product into potting media, or (2) injection into overhead irrigation system with adequate volume to thoroughly saturate soil media.
	Foliar Treatment (Admire Pro) 4.6 F (various) 1.6 F	1.3 to 2.2 fl oz 3.75 fl oz	12 hrs	0	

TABLE 2-10. INSECT CONTROL FOR EGGPLANT (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid (cont'd)	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	14	Apply before aphids reach damaging levels. Do not exceed 5.5 ounces per acre per season.
	spirotetramat, MOA 23 (Movento) 2 SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fluid ounces per season. Requires surfactant.
	thiamethoxam, MOA 4A **Soil treatment** (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum may be applied to direct-seeded crops in-furrow at seed or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 8 oz per acre per season. Check label for plant-back restrictions.
	Foliar treatment (Actara) 25 WDG	2 to 3 oz	12 hrs	0	Actara is for foliar application.
Blister beetle	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Colorado potato beetle	**Resistance to many insecticides is widespread in Colorado potato beetle. To reduce risk of resistance, scout fields and apply insecticides only when needed to prevent damage to the crop. Crop rotation will help prevent damaging Colorado potato beetle infestations. If control failures or reduced levels of control occur with a particular insecticide, do NOT make a second application of the same insecticide at the same or higher rate. If an additional insecticide application is necessary, a different insecticide representing a different MOA class should be used. Do NOT use insecticides belonging to the same class 2 years in a row for Colorado potato beetle control.**				
	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	Apply when adults and small larvae are present but before large larvae appear. For resistance management, use the higher rate.
	acetamiprid, MOA 4A (Assail) 30 SG	2 to 4 oz	12 hrs	7	Do not apply more than once every 7 days, and do not exceed 7 ounces of formulation per season.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	1 to 4 oz 2 to 7 fl oz	12 hrs	1	Do not follow soil applications with foliar applications on any neonicotinoid insecticide. Use only one application method. Do not apply more than 6 ounces per acre per season using foliar applications, or 12 ounces per acre per season using soil applications.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	5 to 6 fl oz 9 to 10.5 fl oz		21	Soil applications may be applied by (1) a narrow band below or above the seed line at planting, (2) a post-seeding or transplanting drench with sufficient water to ensure movement to the root zone, or (3) drip irrigation.
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	. 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	21	See application methods under Aphids, Thrips.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	1.3 fl oz 3.75 fl oz	12 hrs	0	
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to 12 fl oz	12 hrs	1	
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	See application methods under Aphids.
	(Actara) 25 WDG	2 to 3 oz	12 hrs	0	
Eggplant lace bug	imidacloprid, MOA 4A **Foliar treatment** (Admire Pro) 4.6 F (various) 1.6 F	1.3 to 2.2 fl oz 3.8 to 6.2 fl oz	12 hrs	0	
	malathion, MOA 1B (various brands) 57 EC	3 pt	12 hrs	3	
Flea beetle	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	2 lb 1.25 lb 1 lb	12 hrs	3	
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	6.75 to 13.5 fl oz	4 hrs	1	Verimark for soil application only. Apply at planting or via drip chemigation. See label for application options.

TABLE 2-10. INSECT CONTROL FOR EGGPLANT (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Flea beetle (cont'd)	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 fl oz	12 hrs	1	Do not follow soil applications with foliar applications on any neonicotinoid insecticide. Use only one application method. Do not apply more than 6 ounces per acre per season using foliar applications, or 12 ounces per acre per season using soil applications.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	 5 to 6 fl oz 9 to 10.5 fl oz		21	Soil applications may be applied by (1) a narrow band below or above the seed line at planting, (2) a post-seeding or transplanting drench with sufficient water to ensure movement to the root zone, or (3) drip irrigation.
	thiamethoxam, MOA 4A (Platinum) 75 SG (Actara) 25 WDG	 1.66 to 3.67 oz 2 to 3 oz	12 hrs 12 hrs	30 0	See application methods under Aphids.
Hornworm, European corn borer, Beet Army worm, Corn earworm	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 4 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	4 hrs	1	Verimark is for soil application only. Drip chemigation must be applied uniformly to the root zone. See label for application options.
	(Exirel) 0.83SE	7 to 13.5 fl oz	12 hrs	1	Exirel is for foliar application only.
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 oz	12 hrs	3	Do not apply more than 14 ounces per acre per season.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 to 3 pt	48 hrs	5	
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 16 fl oz	4 hrs	1	Apply at rates of 4 to 8 fluid ounces early in season when plants are small. Apply at rates of 8 to 16 ounces to large plants or when infestations are heavy. During periods of continuous moth flights, retreatments at 7 to 14 days may be required. Do not apply more than 16 fluid ounces per application or 64 fluid ounces of Intrepid 2F per acre per season.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Leafminer	abamectin, MOA 6 (Agri-Mek) 0.15 EC	8 to 16 fl oz	12 hrs	7	Use low rates for low to moderate infestations, and high rates for severe infestations
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	4 hrs	1	Foliar, soil, or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for application instructions.
	oxamyl, MOA 1A (Vydate) 2 L	1 to 2 qt	48 hrs	7	
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
Stink bug, leaffooted bug	pyrethroid MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 fl oz	12 hrs	1	
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	 5 to 6 fl oz 9 to 10.5 fl oz		21	
	thiamethoxam, MOA 4A (Actara) 25 WDG	3 to 5.5 oz	12 hrs	0	Do not exceed 11 ounces Actara per acre per season.
Spider mite	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	Use low rates for low to moderate infestations, and high rates for severe infestations.
	acequinocyl, MOA 20B (Kanemite) 15SC	31 fl oz	12 hrs	1	
	bifenazate, MOA 20D (Acramite) 50 WS	0.75 to 1.0 lb	12 hrs	3	Do not make more than one application per season.
	etoxazole, MOA 10B (Zeal)	2 to 3 oz	12 hrs	7	Do not make more than one Zeal application per season.
	fenpyroximate MOA 21 (Portal) 0.4EC	2 pts	12 hrs	3	Do not make more than two applications per season.
	hexakis, MOA 12B (Vendex) 50 WP	2 to 3 lb	48 hrs	3	
	spiromesifen, MOA 23 (Oberon) 2 SG	7 to 8.5 fl oz	12 hrs	7	

TABLE 2-10. INSECT CONTROL FOR EGGPLANT (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Thrips	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 fl oz	12 hrs	 1	See Whitefly for application instructions. Soil applications are more effective against thrips than foliar applications are.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	 5 to 6 oz 9 to 10.5 fl oz		 21	
	imidacloprid, MOA 4A Admire Pro 4.6 F (various) 2 F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	21	See Aphids for application instructions.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 to 3 pt	48 hrs	3	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	
Whitefly	acetamiprid, MOA 4A (Assail) 30 SG	2.5 to 4 oz	12 hrs	7	Begin applications when significant populations of adults appear. Do not wait until heavy populations have become established. Do not apply more than once every 7 days, and do not exceed 4 applications per season. Do not apply more than 7 ounces per season.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	12 hrs	1	For foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67SC	6.75 to 13.5 fl oz	4 hrs	1	Verimark for soil application only. Apply at planting or via drip chemigation. See label for application options.
	(Exirel) 0.83SE	13.5 to 20.5 fl oz	12 hrs	1	Exirel for foliar application only.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	 1 to 4 oz 2 to 7 fl oz	12 hrs	1	
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	 5 to 6 fl oz 9 to 10.5 fl oz		21	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	10.5 to 14.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A (Admire Pro) 4.6 F (various) 2 F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	21	Do not follow soil applications with applications of other neonico- tinoid insecticides (Assail or Venom). See Aphids for application methods and restrictions.
	pyriproxyfen, MOA 7C (Knack) 0.86 EC	8 to 10 fl oz	12 hrs	14	Knack prevents eggs from hatching. It does not kill whitefly adults. Applications should begin when 3 to 5 adults per leaf are present. Do not make more than 2 applications per season, and do not apply a second application within 14 days of the first application. Do not exceed 20 fluid ounces of Knack per acre per season. Check label for plant-back restrictions.
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fl oz per season. Requires surfactant.
	spiromesifen, MOA 23 (Oberon) 2 SC	7 to 8.5 fl oz	12 hrs	7	Do not exceed 3 applications or 25.5 fluid ounces per season.
	thiamethoxam, MOA 4A (Platinum) 75 SG	 1.66 to 3.67 oz	12 hrs	30	Platinum is for soil applications and may be applied to direct-seeded crops in furrow at seed or transplant depth, at post seeding or transplant as a drench, or through drip irrigation. Do not exceed 11 ounces per acre per season. Check label for plant-back restrictions for a number of plants.
	(Actara) 25WDG	3 to 5.5		0	Actara is for foliar application.

TABLE 2-11. INSECT CONTROL FOR HOPS

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphids and leafhoppers	imidacloprid, MOA 4A				
	(Admire) 4.6 F	2.8 fl oz	12 hrs		
	(generics) 2	6.4 fl oz	12 hrs	28	
	pymetrozine, MOA 9B (Fulfill) 50 WDG	4 to 6 oz	12 hrs	14	For aphids only. Will not control leafhoppers.
	spirotetramat, MOA 23 (Movento) 2 F	5 to 6 fl oz	24 hrs	7	Do not exceed 12.5 fl oz per acre per season. Will also control twospotted spider mite.
	malathion, MOA 1B				May suppress twospotted spider mite.
	5 EC	1 pt	12 hrs	10	
	8 EC	0.63 pt	12 hrs	10	
	pyrethrins, MOA 3 Pyganic EC 1.4 II Pyganic EC 5 II	16 to 64 fl oz 4.5 to 17 fl oz	12 hrs 12 hrs	0 0	**OMRI approved.** Pyrethrins degrade very quickly in sunlight. Do not expect residual control.
Japanese beetle	bifenthrin, MOA 3				See Table of Generic Insecticides for other bifenthrin products.
	(Brigade) 2 EC	3.8 to 6.4 fl oz	12 hrs	14	
	(Brigade) WD	9.6 to 16 of oz	12 hrs	14	
	imidacloprid, MOA 4A				
	(Admire) 4.6 F	2.8 fl oz	12 hrs		
	(generics) 2	6.4 fl oz	12 hrs	28	
Armyworms, cutworms, loopers, leafroller	*Bacillus thuringiensis,* MOA 11A		4 hrs	0	
	(Dipel) DF, MOA	0.5 to 1 lb			
	(Crymax) WDG	0.5 to 1.5 lb			
	bifenthrin, MOA 3				See Table of Generic Insecticides for other bifenthrin products.
	(Brigade) 2 EC	3.8 to 6.4 fl oz	12 hrs	14	
	(Brigade) WD	9.6 to 16 of oz	12 hrs	14	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	0	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	spinosad, MOA 5 (Entrust) SC	4 to 6 fl oz	4 hrs	1	**OMRI approved.**
	spinetoram, MOA 5 (Delegate) 25WG	2.5 to 4 oz	4 hrs	1	
Spider mites	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	Do not exceed 48 fluid ounces per acre per season, or more than two sequential applications.
	acequinocyl, MOA 20B (Kanemite) 15 SC	31 fl oz	12 hrs	1	The use of a surfactant/adjuvant with Kanemite on tomatoes is prohibited.
	Bifenazate, MOA 20D (Acramite) 50 WS	0.75 to 1.0 lb	12 hrs	3	Do not make more than one application per season.
	etoxazole, MOA 10B (Zeal) 72 WSP	3 to 4 oz	12 hrs	7	Apply when mites are low, because Zeal is primarily a ovicide/larvicide.
	fenpyroximate MOA 21 (Portal) 0.4EC	2 pts	12 hrs	3	Do not make more than two applications per season.
	hexythiazox, MOA 10A (Savey) 50 DF	4 to 6 oz	12 hrs	—	May be applied up to burr formation in hop vines. Apply when mites are low, because Savey is primarily an ovicide, and also sterilizes females.
	Mineral oil (TriTek) Various brands	1 to 2% soln.	4hrs	0	**OMRI approved.** TriTek is the only emulsified formulation of oil. All others do not contain an emulsifier.

TABLE 2-12. INSECT CONTROL FOR LETTUCE

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	acetamiprid, MOA 4A (Assail) 30 SG	2 to 4 oz	12 hrs	7	Do not apply more than once every 7 days, and do not exceed 4 applications per season.
	clothianidin, MOA 4A (Belay) 2.13 SC	4.8 to 6.8 oz (soil); 1.6 to 2.1 oz (foliar)	12 hrs	7 (foliar)	Soil application at planting only.
	dimethoate 4 EC, MOA 1B	0.5 pt	48 hrs	14	
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	10.5 to 12.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A **Soil Treatment** (Admire Pro) 4.6 F (various) 1.6 F	4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	21	Do not follow soil applications with foliar applications of any neonicotinoid insecticide. See label for soil application instructions.
	Foliar Treatment (Admire Pro) 4.6 F (various) 1.6 F	1.3 fl oz 3.8 fl oz	12 hrs	7	
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	7	Apply before aphids reach damaging levels. Do not exceed 5.5 oz per acre per season
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	3	Do not exceed 10 fluid ounces per season. Requires surfactant.
	thiamethoxam, MOA 4A **Soil treatment** (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Do not follow applications of Platinum with foliar applications of any neonicotinoid insecticide. Platinum may be applied to direct-seeded crops in-furrow at the seeding or transplant depth, or as a narrow surface band above the seedling and followed by irrigation. Post seeding it may be applied as a transplant drench or through the drip irrigation.
	Foliar treatment (Actara) 25 WDG	1.5 to 3 oz	12 hrs	7	Actara is for foliar application.
	tolfenpyrad, MOA 21A (Torac) 1.29 EC	17 to 21 fl oz	12 hrs	1	Do not apply until at least 14 days after plant emergence or after transplanting to allow time for root establishment.
Cabbage looper, Corn Earworm, armyworms	*Bacillus thuringiensis,* MOA 11A (Crymax) WDG (Dipel) DF	0.5 to 1.5 lb 8 oz	4 hrs	0	Only target small armyworms with Bts.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar or drip chemigation.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 13.5 fl oz	4 hrs	1	Verimark is for soil application only. Applications made at planting and/or via drip chemigation. Use higher rates (>10 fluid ounces) where cabbage looper is a concern. See label for application options.
	(Exirel) 0.83SE	7 to 17 fl oz	12 hrs	1	Exirel is for foliar application only. Use higher rates (>13.5 fluid ounces) for Cabbage.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	3.2 to 4.8 oz	12 hrs	7	Do not make more than two sequential applications without rotating to another product with a different mode of action.
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 lb	12 hrs	3	Do not apply more than 14 ounces of Avaunt (0.26 lb a.i.) per acre per crop. The minimum interval between sprays is 3 days.
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	1	Low rates for early-season applications to young or small plants. For mid- and late-season applications, use 6 to 10 ounces.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals. Not recommended for armyworms.
Leafhopper	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG	1 to 3 oz	12 hrs	7	Do not follow soil applications with foliar applications of any neonicotinoid insecticide. Use only one application method. Do not apply more than 6 ounces per acre (foliar) or 12 ounces per acre (soil).
	Soil treatment (Venom) 70 SG	5 to 6 fl oz		21	Soil applications may be applied by: (1) narrow band below or above the seed line at planting, (2) post seeding or transplant drench with sufficient water to ensure incorporation, or (3) drip irrigation.

TABLE 2-12. INSECT CONTROL FOR LETTUCE (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Leafhopper (cont'd)	dimethoate 4 EC, MOA 1B	0.5 pt	48 hrs	14	14-day interval for leaf lettuce.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	1	
	imidacloprid, MOA 4A (various) 1.6 F	3.75 fl oz	12 hrs	7	There is a 12-month plant-back restriction for a number of crops. Check label for restrictions.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals.
	thiamethoxam, MOA 4A (Actara) 25 WDG	1.5 to 3 oz	12 hrs	7	
	tolfenpyrad, MOA 21A (Torac) 1.29 EC	14 to 21 fl oz	12 hrs	1	Do not apply until at least 14 days after plant emergence or after transplanting to allow time for root establishment.

TABLE 2-13. INSECT CONTROL FOR OKRA

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	imidacloprid, MOA 4A		12 hrs		See label for soil treatment instructions.
	Soil treatment				
	(Admire Pro) 4.6 F	7 to 10.5 fl oz		21	
	(various) 2 F	16 to 24 fl oz			
	Foliar treatment		12 hrs	0	
	(Admire Pro) 4.6 F	1.3 to 2.2 fl oz			
	(various) 1.6 F	3.8 fl oz			
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 12 fl oz	4 hrs	1	
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	3	Do not exceed 10 fluid ounces per season. Not for flea beetle. Requires surfactant.
	sulfoxaflor (Closer) 2 SC	1.5 to 2.0 fl oz	12 hrs	7	
	malathion, MOA 1B		12 hrs	1	
	(various brands) 8 F	1.5 pt			
	(various brands) 25 WP	6 lb			
Blister beetle, Flea beetle, Japanese beetle	carbaryl, MOA 1A		12 hrs		On foliage as needed.
	(Sevin) 50 WP	4 lb		3	
	(Sevin) 80 S	2.5 lb			
	(Sevin) XLR Plus	2 qt			
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Corn earworm, Tobacco budworm, European corn borer	carbaryl, MOA 1A		12 hrs	3	On foliage as needed.
	(Sevin) 50 WP	4 lb			
	(Sevin) 80 S	2.5 lb			
	(Sevin) XLR Plus	2 qt			
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	2 to 3.5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	4 hrs	1	Verimark is for soil application only. Applications made at planting and/or via drip chemigation. See label for application options.
	(Exirel) 0.83SE	7 to 17 fl oz	12 hrs	1	Exirel is for foliar application only. Rates >13.5 for loopers only.
	methoxyfenozide, MOA 18 (Intrepid) 2 F	8 to 16 fl oz	4 hrs	1	
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to 12 fl oz	12 hrs	1	
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	For corn earworm only.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.

TABLE 2-13. INSECT CONTROL FOR OKRA (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Spider mites	bifenazate, MOA 20D (Acramite) 50 WP	0.75 to 1 lb	12 hrs	3	Do not make more than one application per season.
	fenpyroximate MOA 21 (Portal) 0.4EC	2 pt	12 hrs	3	Do not make more than two applications per season.
Stink bug, leaffooted bug	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Whitefly	buprofezin, MOA 16 (Courier) 40 SC	9 to 13.6 fl oz	12 hrs	1	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	2 to 3.5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.-
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	6.75 to 13.5 fl oz	4 hrs	1	Apply Verimark to at planting and/or later via drip irrigation or soil injection. See label for application options.
	(Exirel) 0.83SE	13.5 to 20.5 fl oz	12 hrs	1	Exirel is for foliar application.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	10.5 to 14.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	7 to 14 fl oz 16 to 32 fl oz	12 hrs	21	See label for soil application instructions.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	1.3 to 2.2 fl oz 3.8 oz	12 hrs	0	
	pyriproxyfen, MOA 7C (Knack) 0.86 EC	8 to 10 fl oz	12 hrs	1	Do not make more than two applications per season.
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	3	Do not exceed 10 fluid ounces per season. Not for flea beetle. Requires surfactant.

TABLE 2-14. INSECT CONTROL FOR ONION

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Armyworms, Cutworm	chlorantraniliprole MOA 28 (Coragen)	3.5 to 7.5 fl oz	4 hrs	1	
	methoxyfenozide MOA 18 (Intrepid) 2F	4 to 8 fl oz 8 to 12 fl oz	4 hrs		Green onion only. Use lower rates in early season on small plants; use higher rates in late season and heavy infestations
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre- harvest intervals.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
Leafminer	cyromazine, MOA 17 (Trigard) 75 WS	2.66 oz	12 hrs	7	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	1	
Onion maggot, Seed corn maggot	**Onion seed pre-treated with cyromazine (Trigard) can be used to control onion and seed corn maggot.**				
	chlorpyrifos, MOA 1B (Lorsban) 4 E	32 fl oz	24 hrs		Apply as in-furrow drench at planting. Use a minimum of 40 gal per acre and incorporate to a depth of 1 to 2 inches. Do not make more than one application per year.
	diazinon, MOA 1B (Diazinon) (AG 500)	2 to 4 qt	3 days		Furrow application; drench the seed furrow at planting time. Apply as a furrow treatment at time of planting. Use separate hoppers for seed and chemical.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Thrips	acetamiprid MOA 4A (Assail) 70 WP	2.1 to 3.4 oz	12 hrs	7	
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 pt	48 hrs	7	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	1	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre- harvest intervals.

TABLE 2-15. INSECT CONTROL FOR PEA, ENGLISH and SNOW PEA (SUCCULENT AND DRIED)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	acetamiprid MOA 4A (Assail) 70 WP	1 to 2.3 oz	12 hrs	7	Also controls leafhoppers. Succulent peas only.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre- harvest intervals.
	dimethoate, MOA 1B (Dimethoate) 400 (4E)	0.33 pt	48 hrs	0	Do not make more than one application per season, and do not feed or graze if a mobile viner is used, or for 21 days if a stationary viner is used. Re-entry interval is 48 hours.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	7	Will also control leafhopper
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	 21	See label for soil application instructions.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.2 fl oz 3.5 fl oz	12 hrs	 7	
Armyworms, Cloverworm, Cutworm, Looper	chlorantraniliprole MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	
	spinetoram, MOA 5 (Radiant) 1 SC	4 to 8 fl oz	4 hrs	3 (succulent); 28 (dried)	Not for cutworm.
	spinosad, MOA 5 (Blackhawk)	2.2 to 3.3 oz	4 hrs	3 (succulent); 28 (dried)	
Leafhopper, Lygus bug, Stink bug	dimethoate, MOA 1B (Dimethoate) 400	0.33 to 1 pt	48 hrs	See label	Do not make more than one application per season. Do not feed or graze if a mobile viner is used, or for 21 days, if a stationary viner is used.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 to 3 pt	48 hrs	3	Apply to foliage as needed.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals.
Seedcorn maggot	See **Beans** for control				

TABLE 2-16. INSECT CONTROL FOR PEA, SOUTHERN (COWPEAS)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Thrips	acetamiprid MOA 4A (Assail) 70 WP	1 to 2.3 oz	12 hrs	7	Succulent peas only.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	7	Will not control thrips.
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	21	See label for soil application instructions.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.3 fl oz 3.5 fl oz	12 hrs	 7	
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 8 fl oz	4 hrs	3 (succulent); 28 (dried)	Radiant is not effective against aphids.
	spinosad, MOA 5 (Blackhawk)	2.2 to 3.3 oz	4 hrs	3 (succulent); 28 (dried)	Blackhawk is not effective against aphids.
	sulfoxaflor (Transform) 50 WG	0.75 to 1.0 oz	12 hrs	7	
Bean leaf beetle	carbaryl, MOA 1A (Sevin) 4 L (Sevin) 80 S	 0.5 to 1 qt 0.625 to 1.25 lb	12 hrs	3	Do not feed treated foliage to livestock.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.

TABLE 2-16. INSECT CONTROL FOR PEA, SOUTHERN (COWPEAS) (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Corn earworm, Loopers, European corn borer,	chlorantraniliprole MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 16 fl oz	4 hrs	7	Use lower rates on smaller plants and higher rates in mid- to late season applications, against corn earworm. Do not apply more than 16 fluid ounces (0.25 pound a.i.) per acre per season.
	spinetoram, MOA 5 (Radiant) 1 SC	3 to 6 fl oz	4 hrs	3 (succulent); 28 (dried)	Do not apply more than 12 fluid ounces (0.188 a.i.) per acre per season.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	methomyl, MOA 1A (Lannate) 90SP	0.5 to 1 lb	48 hrs	1	Re-entry interval is 48 hr.
Cowpea curculio	pyrethroids, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. Control may be poor in areas where resistant populations occur, primarily in parts of Alabama and Georgia. In areas where resistance is a problem, pyrethroid insecticides should be used at the highest labeled rate and synergized by tank-mixing with 1 pint piperonyl butoxide synergist per acre. In fields where resistance is a problem, applications every 3 to 5 days may be necessary to maintain control of the cowpea curculio population.
	methomyl, MOA 1A (Lannate) 90 SP	0.5 to 1 lb	48 hrs	1	Re-entry interval is 48 hours. Not effective against resistant cowpea curculio populations.
Stink bug	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals. Control may be poor in areas where resistant populations occur, primarily in the Gulf Coast areas.
	methomyl, MOA1A (Lannate) 90SP	0.5 to 1 lb	48 hrs	1	Re-entry interval is 48 hours.
Leafminer	spinetoram, MOA 5 (Radiant) 1 SC	5 to 8 fl oz	4 hrs	3 (succulent); 28 (dried)	
	spinosad, MOA 5 (Blackhawk)	2.5 to 3.3 oz	4 hrs	3 (succulent); 28 (dried)	

TABLE 2-17. INSECT CONTROL FOR PEPPER

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Flea beetle	acetamiprid, MOA 4A (Assail) 70 WP	0.8 to 1.2 oz	12 hrs	7	Do not apply more than once every 7 days, and do not exceed 4 applications per season.
	cyantraniliprole, MOA 28 (Coragen) SC	6.75 to 13.5 fl oz	4 hr	1	Apply to soil at planting, as a transplant tray drench, in transplant water or hill drench. After planting may be applied via drip irrigation.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	1 to 4 oz 2 to 7 fl oz	12 hrs	1	Do not follow soil applications with foliar applications. Use only one application method. Do not apply more than 6 ounces per acre per season using foliar applications, or 12 ounces per acre per season using soil applications.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	5 to 6 oz 9 to 10.5 fl oz		21	Soil applications may be applied by 1) a narrow band below or above the seed line at planting; 2) a post-seeding or transplant drench with sufficient water to ensure incorporation to the root zone; or 3) drip irrigation. For flea beetle control only.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 4.8 oz	12 hrs	0	Will not control flea beetle.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 12.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	7 to 14 fl oz 16 to 32 fl oz	12 hrs	21	Where whitefly resistance is a concern, do not follow soil applications with foliar applications of any neonicotinoid. See label for soil application instructions. For short-term protection of transplants at planting, apply Admire Pro (0.44 oz/10,000 plants) not more than 7 days before transplanting by 1) uniformly spraying on transplants, followed immediately by sufficient overhead irrigation to wash product into potting media; or 2) injection into overhead irrigation system using adequate volume to thoroughly saturate soil media.
	Foliar treatment (Admire Pro) 4.6 F (various) 2 F	1.3 fl oz 3.8 fl oz	12 hrs	0	

INSECT CONTROL

TABLE 2-17. INSECT CONTROL FOR PEPPER (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Flea beetle (cont'd)	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	0	Apply before aphids reach damaging levels. Do not exceed 5.5 ounces per acre per season. Not for flea beetle.
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fluid ounces per season. Requires surfactant. Will not control flea beetle.
	sulfoxaflor (Closer) 2 SC	1.5 to 2.0 fl oz	12 hrs	1	
	thiamethoxam, MOA 4A **Soil treatment** (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum may be applied to direct-seeded crops in-furrow seeding or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Actara is applied as a foliar spray. Do not exceed 11 ounces per acre per season of Platinum or Actara. Check label for plant-back restrictions for a number of crops. Actara is for foliar application.
	Foliar treatment (Actara) 25 WDG	1.5 to 3 oz	12 hrs	7	Actara is for foliar application.
Armyworms, Corn earworm, Looper, European corn borer, Hornworm	*Bacillus thuringiensis,* MOA 11A (Dipel) DF (Xentari) WDG	0.5 to 1.5 lb 2 to 4 oz	4 hrs	0	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	2 to 3.5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	4 hrs	1	Verimark is for soil application only. Applications made at planting and/or via drip chemigation. See label for application options.
	(Exirel) 0.83SE	7 to 13.5 fl oz	12 hrs	1	Exirel is for foliar application only.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	2.4 to 4.8 oz	12 hrs	7	Apply when larvae are first observed. Additional applications may be necessary to maintain control.
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 oz	12 hrs	3	Use only higher rate for control of armyworm and corn earworm. Do not apply more than 14 ounces of Avaunt (0.26 pound a.i. per acre per crop). Minimum interval between sprays is 5 days.
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 16 fl oz	4 hrs	1	Apply at rates of 4 to 8 fluid ounces early in season when plants are small. Apply at rates of 8 to 16 ounces to large plants or when infestations are heavy. During periods of continuous moth flights re-treatments at 7 to 14 days may be required. Do not apply more than 16 fluid ounces per application or 64 fluid ounces of Intrepid per acre per season.
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to 12 fl oz	12 hrs	1	The use of a surfactant/adjuvant with Rimon is prohibited on pepper.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Blister beetle, Stink bug, Leaffooted bug	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	1 to 4 oz 2 to 7 fl oz	12 hrs	1	Do not combine foliar applications with soil applications, or vice versa. Use only one application method.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	5 to 6 oz 9 to 10.5 fl oz		21	
	thiamethoxam, MOA 4A (Actara) 25WDG	3 to 5.5 oz	12 hrs	0	
Leafminer	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	
	cyromazine, MOA 17 (Trigard) 75 WP	2.66 oz	12 hrs	0	
	dimethoate 4 EC, MOA 1B	0.5 pt	48 hrs	0	Re-entry interval is 48 hr.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	
Pepper maggot	acephate, MOA 1B (Orthene) 97 PE	0.75 to 1 lb	24 hrs	7	
	dimethoate 4 EC, MOA 1B	0.5 to 0.67 pt	48 hrs	0	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals

TABLE 2-17. INSECT CONTROL FOR PEPPER (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Pepper weevil	acetamiprid, MOA 4A (Assail) 30 SG	4 oz	12 hrs	7	
	oxamyl, MOA 1A (Vydate) 2 L	2 to 4 pt	48 hrs	7	
	thiamethoxam, MOA 4A (Actara) 25 WP	3 to 4 oz	12 hrs	0	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for registered pyrethroids and pre-harvest intervals
Broad mite	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	On foliage as needed.
	fenpyroximate MOA 21 (Portal) 0.4EC	2 pt	12 hrs	3	Do not make more than two applications per season.
	spiromesifen, MOA 23 (Oberon) 2 SG	7 to 8.5 fl oz	12 hrs	7	Do not exceed 3 applications per season
	spirotetramat MOA 23 (Movento) 2SC	4 to 5 fl oz	12 hrs	1	
Thrips	dinotefuran, MOA 4A (Venom) 70 SG (Scorpion) 35SL	5 to 6 oz 9 to 10.5 fl oz	12 hrs	21	
	imidacloprid, MOA 4A (Admire Pro) 4.6 F	7 to 14 fl oz	12 hrs	21	See Aphids for application instructions. Treating transplants before setting in the field, followed by drip irrigation may suppress incidence of tomato spotted virus. Imidacloprid is ineffective against western flower thrips.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 pt	48 hrs	3	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	Do not exceed 29 fluid ounces per acre per season. Control of thrips may be improved by adding a spray adjuvant. See label for instructions. This is an option for insecticide-resistant thrips.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 4.8 oz	12 hrs	0	

TABLE 2-18. INSECT CONTROL FOR POTATO, IRISH

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	acetamiprid, MOA 4A (Assail) 30 SG	1.5 to 4 oz	12 hrs	7	Do not make more than 4 applications per season. Thorough cov- erage is important. Assail belongs to the same class of insecticides (neonicotinoid) as Admire Pro, Provado, Actara, and Platinum and Colorado potato beetle populations have the potential to become resistant to this class.
	clothianidin MOA 4A (Belay) 50 WDG	1.0 to 1.5 oz	12 hrs	7	Apply Belay 50 WDG as foliar spray when populations reach a threshold level. Do not apply more than 3 applications. Belay belongs to the same class of insecticides (neonicotinoid) as Admire Pro, Provado, Actara, and Platinum and Colorado potato beetle populations have the potential to become resistant to this class.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	7	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 12.0 fl oz	4 hrs	1	
	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	0	Do not apply more than 2 pints total per year.
	imidacloprid, MOA 4A (Admire Pro) 4.6F	1.2 fl oz	12 hrs	7	To minimize selection for resistance in Colorado potato beetle, do not use acetamiprid, imidacloprid, or thiamethoxam for aphid control if either of these compounds was applied to the crop for control of Colorado potato beetle. See comments on insecticide rotation under Colorado potato beetle.
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	14	Allow at least 7 days between applications. Do not exceed a total of 5.5 ounces (0.17 lb a.i.) per acre per season.
	thiamethoxam, MOA 4A (Actara) 25 WDG	3 oz	12 hrs	14	To minimize selection for resistance in Colorado potato beetle, do not use imidacloprid or thiamethoxam for aphid control if either of these compounds was applied to the crop for control of Colorado potato beetle.

TABLE 2-18. INSECT CONTROL FOR POTATO, IRISH (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Colorado potato beetle	**Colorado potato beetle populations in most commercial potato-growing areas have developed resistance to many insecticides. As a result, insecticides that are effective in some areas, or were effective in the past, may no longer provide control in particular areas. Colorado potato beetle readily develops resistance to insecticides. The following practices help to reduce the risk of resistance developing:** **CROP ROTATION AND INSECTICIDE ROTATION** **(the use of insecticides representing different modes of action IRAC MoA class number in different years and against different generations of potato beetle within a year)) are essential if insecticide resistance is to be managed and the risks of control failures due to resistance minimized. If control failures or reduced levels of control are observed with a particular insecticide, do NOT make a second application of the same insecticide at the same or higher rate. If an additional insecticide application is necessary, a different insecticide representing a different IRAC MoA class number should be used. Because potato beetle adults will move between adjacent and nearby fields from one year to the next, It is important to maintain the same rotation schedule of insecticide MOA classes in adjacent fields are groups of nearby fields.** **SCOUT FIELDS: All insecticide applications to the potato crop, regardless of the target insect pest, have the potential to increase the resistance of the Colorado potato beetle to insecticides. Unnecessary insecticide applications should be avoided by scouting fields for insect pests and applying insecticides only when potentially damaging insect populations are present.** **SPOT TREATMENTS: Because overwintered potato beetles invade rotated fields from sources outside the field, potato beetle infestations in rotated fields occur first along field edges early in the season. Limiting insecticide applications to infested portions of the field will provide effective control and reduce costs. Growers are advised to keep accurate records on which insecticides have been applied to their potato crop for control of Colorado potato beetle and on how effective those insecticides were at controlling infestations. This will make choosing an insecticide and maintaining** insecticide rotations easier. Monitoring the insecticide resistance status of local populations will also make insecticide selection easier.				
	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	14	Apply when adults and/or small larvae are present but before large larvae appear. Do not exceed two applications per season. Apply in at least 20 gallons water per acre.
	Acetamiprid, MOA 4A (Assail) 70 WP	0.6 to 1.7 oz	12 hrs	7	Apply when most of the egg masses have hatched and many small but few large larvae are present. An additional application should be used only if defoliation increases. Allow at least 7 days between foliar applications. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any IRAC MOA class 4A insecticides were applied to the crop as soil or seed piece treatments. See comments on insect rotation under Colorado potato beetle.
	chlorantraniliprole, MOA 28 (Coragen) 1.67	3.5 to 5 oz	4 hrs	14	Do not apply more than 15.4 ounces Coragen per acre per crop season. Coragen treated insects may take several days to die, but stop feeding almost immediately after treatment.
	clothianidin MOA 4A (Belay) 50 WDG	1.9 to 2.8 fl oz	12 hrs	7	Apply Belay 50 WDG as foliar spray Apply when adults and/or small larvae are present but before large larvae appear. Do not apply more than 3 applications. Belay belongs to the same class of insecticides (neonicotinoid) as Admire Pro, Provado, Actara, and Platinum and Colorado potato beetle populations have the potential to become resistant to this class.
	cyantraniliprole, MOA 28 (Verimark) 1.67SC	6.75 to 13.5 fl oz	4 hr	NA	Apply in-furrow at planting. Do not apply any other MOA Group 28 insecticide for Colorado potato beetle control following an at-plant application for cyantraniliprole. When applied at 10-13.5 fluid ounces per acre will provide control of European corn borer in most years, except possibly in very early planted potatoes.
	dinotefuran, MOA 4A (Venom) 70 SG	1 to 1.5 oz (foliar) 6.5 to 7.5 oz (soil)	12 hrs	7	Soil treatment for preplant, preemergence, or ground crack application only. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any IRAC MOA class 4A insecticides were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle.
	imidacloprid **Seed Piece treatment**, MOA 4A (Genesis) 240 g/L	0.4 to 0.6 fl oz/ 100 lb of seed tubers			Resistance has been reported and may reduce efficacy or duration of control. To minimize selection for resistance, do not use foliar applications of any IRAC MoA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See label for specific instructions. For early planted potatoes control may be marginal because of the prolonged time between application and Colorado potato beetle emergence. Limit use to locations where Colorado potato beetles were a problem in the same or adjacent fields during the previous year. Do not apply other IRAC MOA class 4A insecticides to a field if seed pieces were treated with Genesis. See product label for restrictions on rotational crops.
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6F (various) 2.0 F	0.74 fl oz/ 1,000 ft row	12 hrs	—	Resistance has been reported and may reduce efficacy or duration of control. See comments on insecticide rotation under Colorado potato beetle. Admire Pro applied in-furrow at planting time may provide sea-son-long control. However, for early planted potatoes control may be marginal due to the prolonged time between application and Colorado potato beetle emergence. Use only in potato fields that have a history of potato beetle infestations. If potatoes are rotated to a field adjacent to one planted in potato last year, a barrier treatment may be effective. Admire Pro may also be applied as a seed treatment. Check label for instructions regarding this use. Check label for restrictions on planting crops following Admire Pro treated potatoes. There have been reports of low levels of resistance to imidacloprid. To minimize selection for resistance, do not use foliar applications of any IRAC MoA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle.

TABLE 2-18. INSECT CONTROL FOR POTATO, IRISH (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Colorado potato beetle (cont'd)	**Foliar treatment** (Admire Pro) 4.6 (various) 1.6 F	1.3 fl oz 3.75 fl oz	12 hrs	7	Resistance has been reported and may reduce efficacy or duration of control. To minimize selection for resistance, do not use foliar applications of any IRAC MoA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. Apply when most of the egg masses have hatched and most larvae are small (1/8 to 3/16 in.). An additional application should be made only if defoliation increases. Allow at least 7 days between foliar applications. Do not exceed 5.6 fluid ounces of Admire Pro per field per acre per season. Regardless of formulation, do NOT apply more than a total of 0.31 pound imidacloprid per season. Foliar applications of imidacloprid should not be applied If soil application was used.
	imidacloprid + cyfluthrin premix, MOA 4A and 3 (Leverage) 2.7 SE	3 to 3.75 fl oz		7	There have been reports of low levels of resistance to imidacloprid. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. pply when most of the egg masses have hatched and most larvae are small (1/8 to 3/16 inch). An additional application should be made only if defoliation increases. Leverage will control European corn borer if application coincides with egg hatch and presence of small corn borer larvae. Leverage should not be used in fields treated with Admire Pro.
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to 12 fl oz	12 hrs	14	
	spinosad, MOA 5 (Blackhawk) 36WG	1.7 to 3.3 oz		3	Apply when most egg masses have hatched and both small and large larvae are present. Thorough coverage is important. Do not apply more than a total of 0.33 pound a.i. (14.4 ounces of Blackhawk or 21 ounces of Radiant) per crop. Do not apply in consecutive generations of Colorado potato beetle and do not make more than two applications per single generation of Colorado potato beetle. Do not make successive applications less than 7 days apart. To minimize the potential for resistance, do NOT use spinosad or spinetoram if either product was applied to a potato crop in the field or an adjacent field within the last year.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	See comments above under spinosad.
	thiamethoxam **seed piece treatment,** MOA 4A (Cruiser) 5 FS	0.11 to 0.16 fl oz/ 100 lb			See label for specific instructions. Resistance to neonicotinoid insecticides has been reported and may reduce efficacy or duration of control by thiamethoxam. To minimize selection for resistance, do not use foliar applications of any IRAC MoA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. For early planted potatoes control may be marginal because of the prolonged time between application and Colorado potato beetle emergence. Limit use to locations where Colorado potato beetles were a problem in the same or adjacent fields during the previous year.
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 2.67 oz	12 hrs	7	Resistance to neonicotinoid insecticides has been reported and may reduce efficacy or duration of control by thiamethoxam. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. Platinum applied in-furrow at planting time may provide season-long control. For early planted potatoes control may be marginal because of the prolonged time between application and Colorado potato beetle emergence. Limit use to locations where Colorado potato beetles were a problem in the same or adjacent fields in the previous year. See product label for restrictions on rotational crops.
	(Actara) 25 WDG	3 oz	12 hrs	7	Resistance to neonicotinoid insecticides has been reported and may reduce efficacy or duration of control by thiamethoxam. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. Actara is applied as foliar spray. Apply when most of the eggs have hatched and most of the larvae are small (1/8 to 3/16 inch). An additional application should be made only if defoliation increases. Allow at least 7 days between applications. Do not make more than 2 applications of Actara per crop per season.

TABLE 2-18. INSECT CONTROL FOR POTATO, IRISH (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Colorado potato beetle (cont'd)	thiamethoxam, MOA 4A + chlorantraniliprole, MOA 28 Premix (Voliam Flex)	4 oz		14	Resistance to neonicotinoid insecticides has been reported and may reduce efficacy or duration of control by thiamethoxam. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. Voliam Flexi is applied as a foliar spray. Apply when most of the eggs have hatched and most of the larvae are small (1/8 to 3/16 inch.). An additional application should be made only if defoliation increases. Allow at least 7 days between applications. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. Do not exceed 8 ounces of Voliam Flexi. See label for rotational restrictions. Volam Flexi can be expected to provide control of European corn borer if application is timed correctly (see European corn borer for correct timing.
European corn borer	**The Atlantic variety of potato is very tolerant of injury by European corn borer larvae. Consequently, control is not recommended on Atlantic unless more than 30 percent of the stems are infested. Control on all other varieties is recommended when infestations reach 20 percent infested stems. Application timing is critical. Scout for eggs and treat when eggs hatch or at the first sign of larvae entering petioles. Several days of cool wet weather will kill larvae and may eliminate the need for insecticide applications. If this occurs, flag additional egg masses and apply insecticide at hatch.**				
	pyrethroid, MOA 3		12 hrs		Apply when threshold is reached (usually during the first half of May). A second application may be needed if the percentage of infested stems increases substantially 7 to 10 days after the first application. Ground applications are usually more effective than aerial applications. See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	chlorantraniliprole, MOA 28 (Coragen) 1.67	3.5 to 5 oz	4 hrs	14	Do not apply more than 15.4 ounces Coragen per acre per crop season.
	thiamethoxam, MOA 4A + chlorantraniliprole, MOA 28 premix (Voliam Flexi)	4 oz	12 hrs	14	Voliam Flexi is applied as a foliar spray. Apply when most of the eggs have hatched and most of the larvae are small (1/8 to 3/16 inch.). An additional application should be made only if defoliation increases. Allow at least 7 days between applications. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. Do not exceed 8 ounces of Voliam Flexi. See label for rotational restrictions Voliam Flexi can be expected to provide control of Colorado potato beetle if application is timed correctly (see Colorado potato beetle section for correct timing). If imidacloprid or thiamethoxam resistant Colorado potato beetles occur in the field, application of Volium Flexi should to control European corn borer has the potential to further increase resistance levels.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	Do not apply more than a total of 0.25 pound a.i. (32 fl oz) per crop.
Flea beetle	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 (various) 1.6 F	0.74 fl oz/ 1,000 ft row	12 hrs	—	If imidacloprid or thiamethoxam resistant Colorado potato beetles occur in the field, application of imidacloprid to control flea beetles has the potential to further increase resistance levels. Iimidacloprid applied in-furrow at planting time may provide season-long control of flea beetles. However, for early planted potatoes control may be marginal due to the prolonged time between application and crop emergence. Check label for restrictions on planting crops following Admire Pro treated potatoes.
	Foliar treatment (Admire Pro) 4.6 (various) 1.6 F	1.3 fl oz 3.75 fl oz	12 hrs	7	See comments for imidacloprid resistance in Colorado potato beetle
	thiamethoxam **seed piece treatment**, MOA 4A (Cruiser) 5 FS	0.11 to 0.16 fl oz/100 lb	12 hrs		See label for specific instructions. For early planted potatoes control may be marginal because of the prolonged time between application and flea beetle emergence. Limit use to locations where Colorado potato beetles were a problem in the same or adjacent fields during the previous year. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle.
	thiamethoxam, MOA 4A (Platinum) 2 SC	5 to 8 fl oz	12 hrs	7	Platinum applied in-furrow at planting time may provide season-long control. However, for early planted potatoes control may be marginal due to the prolonged time between application and crop emergence. Limit use to locations where Colorado potato beetles were not a problem in the same or adjacent fields during the previous year. See product label for restrictions on rotational crops. See comments for imidacloprid resistance in Colorado potato beetle.

TABLE 2-18. INSECT CONTROL FOR POTATO, IRISH (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Flea beetle (cont'd)	(Actara) 25 WDG	3 oz	12 hrs	7	Actara is applied as foliar spray. See comments for imidacloprid resistance in Colorado potato beetle. If imidacloprid or thiamethoxam resistant Colorado potato beetles occur in the field, application of Volium Flexi should to control flea beetle has the potential to further increase resistance levels. See comments for imidacloprid resistance in Colorado potato beetle.
	thiamethoxam, MOA 4A chlorantraniliprole MOA 28 (Voliam Flexi)	4 fl oz		14	Do not exceed a total of 8.0 fluid ounces per acre Voliam Flexi or 0.094 lb a.i/ acre of thiamethoxam-containing products or 0.2 pound a.i/acre of chlorantraniliprole-containing products per growing season.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Leafhopper	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S (Sevin) XLR Plus	1 to 2 lb 0.625 to 1.25 lb 1 pt	12 hrs	7	On foliage when leafhoppers first appear. Repeat every 10 days as needed. Often a problem in the mountains.
	dimethoate, MOA 1B (various formulations)				Check label for rate, PHI and REI.
	imidacloprid + cyfluthrin premix, MOA 4A and 3 (Leverage) 2.7 SE (Leverage) 360	3 to 3.80 fl oz 2.8 fl oz	7	7	There have been reports of low levels of resistance to imidacloprid. To minimize selection for resistance, do not use foliar applications of any IRAC MOA class 4A insecticides if any of these compounds were applied to the crop as soil or seed piece treatments. See comments on insecticide rotation under Colorado potato beetle. Apply when most of the egg masses have hatched and most larvae are small (1/8 to 3/16 inch). An additional application should be made only if defoliation increases. Leverage should not be used in fields treated with Admire Pro.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 pt	48 hrs	6	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Leafminer	dimethoate, MOA 1B (various formulations)				Check label for rate, PHI and REI.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	14	
Blister beetle, Leaffooted bug, Plant bug, Stink bug, Vegetable weevil	carbaryl, MOA 1A (Sevin) 50 WP	2 to 4 lb	12 hrs	7	On foliage as needed.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Potato tuberworm	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	14	Do not exceed 4 applications per acre per crop. Do not apply more than 15.4 ounces Coragen per acre per crop season. Minimum interval between applications is 5 days.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 pt	48 hrs	6	Prevent late-season injury by keeping potatoes covered with soil. To prevent damage in storage, practice sanitation.
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Thrips	dimethoate 4 EC, MOA 1B	0.5 pt	48 hrs	0	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	
	spinosad, MOA 5 (Blackhawk) 36WG	2.25 to 3.5 oz	4 hrs	3	Control may be improved by addition of an adjuvant to the spray mixture.
Wireworm	**Planting in fields previously in corn, soybean, or fallow may increase risk of wireworm.**				
	bifenthrin, MOA 3 (Capture LFR)	25.5 fl oz			In furrow at planting.
	Clothianidin (Belay) 50 WDG	6 oz	12 hrs		In-furrow at planting.
	ethoprop, MOA 1B (Mocap) 15 G	1.4 lb per 1,000 row ft	48 hrs	90	In-furrow at planting.
	fipronil, MOA 2B (Regent) 4 SC	3.2 fl oz	0 hrs	90	In-furrow at planting. Do NOT use T-banding over the top of a closed furrow.
	phorate, MOA 1B (Thimet) 20 G	Row Treatment: 10 to 20 oz (38 in. row spacing)	12 hrs	90	Can contribute to insecticide-resistance problems with Colorado potato beetle

TABLE 2-19. INSECT CONTROL FOR RADISH

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Flea beetle, leafminer	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	7	Will not control flea beetles or leafminer.
	imidacloprid, MOA 4A **Foliar treatment:** (Admire Pro) 4.6 F (various) 1.6 F	 1.2 fl oz 3.5 fl oz	12 hrs	 7	Will not control leafminer.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	0	
	thiamethoxam, MOA 4A (Platinum) 75SG (Actara) 25WDG	 1.7 to 2.17 oz 1.5 to 3 oz	12 hrs	 30 7	See label for soil application instructions.
Root maggot	chlorpyrifos, MOA 1B (Lorsban) 4E	1 fl oz/1,000 linear ft	24 hrs	—	Water-based drench in-furrow planting. Use a minimum of 40 gal of water per acre.
Wireworm	diazinon, MOA 1B (AG 500) 50 WP	 2 to 4 qt 4 to 8 lb	3 days		Broadcast just before planting and immediately incorporate into the upper 4 to 8 inches of soil.

TABLE 2-20. INSECT CONTROL FOR SPINACH (cont d)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid	acetamiprid, MOA 4A (Assail) 30SG	2 to 4 oz	12 hrs	7	Do not apply more than once every 7 days, and do not exceed 5 applications per season.
	clothianidin, MOA 4A (Belay) 50 WDG	4.8 to 6.0 oz (soil) 1.6 to 2.1 fl oz (foliar)	12 hrs	7	Soil application at planting only.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	6.75 to 10 fl oz	4 hrs	1	Soil applications made at planting only. See label for application options.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	10.5 to 12.0 fl oz	4 hrs	1	
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	 21	Do not follow soil applications with foliar applications of any neonicotinoid insecticides. See label for soil application instructions.
	Foliar treatment (Admire Pro) 4.6 F (various) 1.6 F	 1.2 fl oz 3.8 fl oz	12 hrs	 7	
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	7	Apply before aphids reach damaging levels. Use sufficient water to ensure good coverage.
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	3	Do not exceed 10 fluid ounces per season. Requires surfactant.
	thiamethoxam, MOA 4A **Soil treatment** (Platinum) 75SG	 1.7 to 2.17 oz	 12 hrs	 30	See label for soil application instructions.
	Foliar treatment (Actara) 25WDG	 1.5 to 3 oz	 12 hr	 7	
	tolfenpyrad, MOA 21A (Torac) 1.29 EC	17 to 21 fl oz	12 hrs	1	
Leafminer	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyromazine, MOA 17 (Trigard) 75 WP	2.66 oz	12 hrs	7	
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	Spray adjuvants may enhance efficacy against leafminers. See label for information on adjuvants.

TABLE 2-20. INSECT CONTROL FOR SPINACH (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Armyworms, Beet webworm, Corn earworm, Cutworm, Looper	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	3	
	indoxacarb, MOA 22 (Avaunt) 30 SG	2.5 to 3.5 oz	12 hrs	3	
	methomyl, MOA 1A (Lannate) 90 SP (Lannate) 2.4 LV	0.5 lb 1.5 pt	48 hrs	7	Air temperature should be well above 32 degrees F. Do not apply to seedlings less than 3 in. in diameter.
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	1	Use low rates for early-season applications to young or small plants and 6 to 10 oz for mid- to late-season applications.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.

TABLE 2-21. INSECT CONTROL FOR SWEETPOTATO

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphids, Leafhopper, Whitefly	**Aphids, leafhoppers, and whiteflies are rarely a problem.**				
	clothianidin, MOA 4A (Belay) 2.13 SC	9 to 12 oz (soil)	12 hrs	21	Soil application as an in-furrow or sidedress application. For sidedress applications, immediately cover with soil.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	7	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 14.0 fl oz	4 hrs	1	For aphids and leafhopper use 7.0 to 10.5 fluid ounces, for whitefly use 10.5 to 14.0 fluid ounces.
	imidacloprid, MOA 4A (Admire Pro) 4.6 F (various) 1.6 F	1.2 fl oz 3.5 fl oz	12 hrs	7	Two applications may be needed to control heavy populations. Allow 5 to 7 days between applications.
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 to 5.5 oz	12 hrs	14	
	thiamethoxam, MOA 4A (Actara) 25 WDG	3 oz		14	Two applications of Actara may be needed to control heavy populations. Allow 7 to 10 days between applications. Do not exceed a total of 6 ounces of Actara per crop per season
Armyworms, Looper, Corn earworm, Hornworm	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar application only on sweetpotato.
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to 12 fl oz	12 hrs	14	Do not make more than 2 applications per crop per season.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	
	spinosad MOA 5 (Blackhawk)	1.7 to 3.5 oz	4 hrs	3	
Cucumber beetle (adults), Japanese beetle (adults), Tortoise beetle	**Cucumber beetle larvae (diabrotica) are a serious pest of sweetpotato in LA and MS. Controlling adult cucumber beetles in areas with a history of diabrotica damage can reduce damage to roots. Foliage feeding by beetles rarely causes economic loss, and control is not warranted unless defoliation is severe.**				
	carbaryl, MOA 1A (Sevin) 50 WP (Sevin) 80 S, WSB (Sevin) XLR Plus	4 lb 2.5 lb 2 qt	12 hrs	7	Treat for tortoise beetles only if significant defoliation is observed. Tortoise beetles are frequently present but rarely reach levels requiring treatment.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	
	bifenthrin, MOA 3 (various) 2 EC	9.6 to 19.2 fl oz	12 hrs	21	
	chlorpyrifos, MOA 1B (Lorsban) 15 G (Lorsban) 4 E (Lorsban Advanced)	13.5 lb 4 pt 4 pt	24 hrs	125 (60 in NC for Lorsban Advanced only)	
	clothianidin MOA 4A (Belay) 2.13 SL	12 fl oz	12 hrs		
	imidacloprid (Admire Pro) 4.6SC	10.5 fl oz or 0.75 fl oz per 1,000 ft	3 days	60 days (NC Only) 125 days elsewhere	

TABLE 2-21. INSECT CONTROL FOR SWEETPOTATO (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Flea beetle, Wireworm, White grub	bifenthrin, MOA 3 (various) 2 EC	9.6 to 19.2 fl oz	12 hrs	21	Apply as broadcast, preplant application to the soil and incorporate 4 to 6 inches prior to bed formation. This use has been demonstrated to control overwintered wireworm populations and reduce damage to roots at harvest. Chlorpyrifos will not control whitefringed beetle or other grubs that attack sweetpotato.
	chlorpyrifos, MOA 1B (Lorsban) 15 G (Lorsban) 4 E (Lorsban Advanced)	13.5 lb 4 pt 4 pt	24 hrs	125 (60 in NC for Lorsban Advanced only)	Research has shown that best control is achieved when chlorpyrifos is applied as a preplant application incorporated 4 to 6 inches deep prior to bed formation, followed by 1 or more soil-directed, incorporations of bifenthrin during routine cultivation.
	chlothianidin MOA 4A (Belay) 2.13 SL	12 fl oz	12 hrs		Bifenthrin should be directed onto each side of the bed from the drill to the middle of the furrow and incorporated with cultivating equipment set to throw soil toward the drill. The objective is to provide a barrier of treated soil that covers the bed and furrows.
	imidacloprid (Admire Pro) 4.6SC	10.5 fl oz or 0.75 fl oz per 1,000 ft	3 days	60 days (NC Only) 125 days elsewhere	Foliar sprays of various insecticides that target adults to prevent egg laying have not been shown to provide any reduction in damage to roots by wireworm larvae at harvest.
Fruit fly (vinegar fly)	pyrethroid, MOA 3 (Pyrenone)	1 gal.100,00 cu ft	12 hrs	—	Postharvest application in storage. Apply as a space fog with a mechanical or thermal generator. Do not make more than 10 applications.
Sweetpotato weevil	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Thrips	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	7	
Whitefringed beetle	phosmet, MOA 1B (Imidan) 70 W	1.33 lb	5 days	7	Do not make more than five applications per season. Whitefringed beetle adults are active in July and August. Do not plant in fields with a recent history of whitefringed beetles.

TABLE 2-22. INSECT CONTROL FOR TOMATO

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Flea beetle	acetamiprid, MOA 4A (Assail) 30 SG	2 to 4 oz	12 hrs	7	Do not apply more than once every 7 days, and do not exceed 5 applications per season.
	clothianidin, MOA 4A (Belay) 50 WDG	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	7	Soil applications at planting only
	cyantraniliprole, MOA 28 (Verimark) 1.67SC	6.75 to 13.5 fl oz	4	1	Soil applications at planting will control aphids and flea beetles. See label for application options.
	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	7	Do not exceed rate with dimethoate as leaf injury may result.
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 4.8 oz	12 hrs	0	Will not control flea beetle.
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	1	Will not control flea beetle.
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6F (various) 2F	7 to 10.5 fl oz 16 to 24 fl oz	12 hrs	21	For short-term protection at planting, apply Admire Pro transplants in the planthouse not more than 7 days before planting at the rate of 0.44 (4.6 F formulation) or 1 ounce (2 F formulation) per 10,000 plants. See label for instructions of greenhouse transplant and field soil applications.
	Foliar treatment (Admire Pro) 4.6F (various) 2F	1.2 fl oz 3.75 fl oz	12 hrs	0	
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	0	For aphids only.
	sulfoxaflur MOA 4C (Closer) 2 SC	1.5 to 2 fl oz	12 hrs	1	
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum may be applied to direct-seeded crops in-furrow seeding or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 11 ounces per acre per season of Platinum. Check label for plant-back restrictions for a number of crops.
	(Actara) 25 WDG	2 to 3 oz	12 hrs	0	

TABLE 2-22. INSECT CONTROL FOR TOMATO (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Armyworms	*Bacillus thuringiensis,* MOA 11A (Crymax) WDG (Dipel) 2X (Xentari)	 0.5 to 1.5 lb 0.5 to 1 lb 0.5 to 1 lb	4 hrs	0	Start applications when larvae are small, and continue at 5- to 7-day intervals during periods of infestation.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 4 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	2.4 to 4.8 oz	12 hrs	7	Apply when larvae are first observed.
	indoxacarb, MOA 22 (Avaunt) 30 DG	3.5 oz	12 hrs	3	Do not apply more than 14 ounces of Avaunt (0.26 a.i.) per acre per crop. The minimum interval between sprays is 5 days.
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	1	Use low rates for early-season applications to young or small plants and 6 to 10 ounces for mid- and late-season applications.
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to 12 fl oz	12 hrs	1	Do not make more than 3 applications per season.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	
Colorado potato beetle	acetamiprid, MOA 4A (Assail) 30 SG	1.5 to 2.5 oz	12 hrs	7	
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uniformly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	4 hrs	1	Apply Verimark to soil via drip irrigation or soil injection.
	(Exirel) 0.83SE	7 to 13.5 fl oz	12 hrs	1	Exirel is for foliar application.
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	 7 fl oz 16 fl oz	12 hrs	 21	See application instructions above under aphid/flea beetle.
	Foliar treatment (Admire Pro) 4.6 F (various) 2 F	 1.3 to 2.2 fl oz 3.75 fl oz	12 hrs	 0	
	spinetoram, MOA 5 (Radiant)1SC	5 to 10 fl oz	4 hrs	1	
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum may be applied to direct-seeded crops in-furrow seeding or transplant depth, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 11 oz per acre per season of Platinum. Check label for plant-back restrictions for a number of crops.
	(Actara) 25 WDG	2 to 3 oz	12 hrs	0	Actara is for foliar applications.
Cabbage looper, Hornworm, Tomato fruitworm, Pinworm	*Bacillus thuringiensis,* MOA 11A (Dipel) DF, MOA (Crymax) WDG	 0.5 to 1 lb 0.5 to 1.5 lb	4 hrs	0	
	pyrethroid, MOA 3				See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	3.5 to 5 fl oz	4 hrs	1	Foliar or drip chemigation. Drip chemigation must be applied uni- formly to the root zone. See label for instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	4 hrs	1	Verimark is for soil application only. Applications made at planting and/or via drip chemigation after planting. See label for applica- tion options.
	(Exirel) 0.83SE	7 to 13.5 fl oz	12 hrs	1	Exirel is for foliar application only.
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	2.4 to 4.8 oz	12 hrs	7	
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 oz	12 hrs	3	Do not apply more than 14 ounces of Avaunt (0.26 pound a.i.) per acre per crop. The minimum interval between sprays is 5 days.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 to 3 pt	48 hrs	1	Methomyl may induce leafminer infestation.
	methoxyfenozide, MOA 18 (Intrepid) 2 F	4 to 10 fl oz	4 hrs	1	Use low rates for early-season applications to young or small plants and 6 to 10 ounces for mid- and late-season applications. Intrepid provides suppression of pinworm only.
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to12 fl oz	12 hrs	1	Do not make more than 3 applications per season.
	spinetoram, MOA 5 (Radiant) 1 SC	5 to 10 fl oz	4 hrs	1	

TABLE 2-22. INSECT CONTROL FOR TOMATO (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Cutworm	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Leafminer	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	Do not exceed 48 fluid ounces per acre per season, or more than two sequential applications.
	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	4 hrs	1	Foliar or soil chemigation. Drip chemigation must be applied uniformly to the root zone. See label for soil application instructions.
	cyromazine, MOA 17 (Trigard) 75 WP	2.66 oz	12 hrs	0	See label for plant-back restrictions.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 8 fl oz	4 hrs	1	Do not exceed 29 fl oz per acre per season.
Spider mite	abamectin, MOA 6 (Agri-Mek) 0.7 SC	1.75 to 3.5 fl oz	12 hrs	7	Do not exceed 48 fluid ounces per acre per season, or more than two sequential applications.
	acequinocyl, MOA 20B (Kanemite) 15SC	31 fl oz	12 hrs	1	The use of a surfactant/adjuvant with Kanemite on tomatoes is prohibited.
	bifenazate, MOA 20D (Acramite) 50 WS	0.75 to 1.0 lb	12 hrs	3	Do not make more than one application per season.
	cyflumetofen, MOA 25 (Nealta) 1.67 SC	13.7 fl oz	12 hrs	3	Do not make more than one application before using an effective miticide with a different mode of action.
	fenpyroximate MOA 21 (Portal) 0.4EC	2 pts	12 hrs	3	Do not make more than two applications per season.
	spiromesifen, MOA 23 (Oberon) 2 SG	7 to 8.5 fl oz	12 hrs	7	Do not exceed 3 applications per season.
Stink bug	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
	dinotefuran, MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	1 to 4 oz 2 to 7 oz	12 hrs	1	Soil applications of Venom or Scorpion may be made in a narrow band under the plant row as a post-transplant drench, as a soil incorporated sidedress after plants are established, or in drip irrigation water. See label for instructions.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	5 to 6 fl oz 9 to 10.5 fl oz		21	
	thiamethoxam, MOA 4A (Actara) 25 WDG	3 to 5.5 oz	12 hrs	0	Do not exceed 11 ounces Actara per acre per season.
Thrips	dimethoate 4 EC, MOA 1B	0.5 to 1 pt	48 hrs	7	
	dinotefuran MOA 4A **Foliar treatment** (Venom) 70 SG (Scorpion) 35SL	1 to 4 oz 2 to 7 fl oz	12 hrs	1	Dinotefuran will not control western flower thrips, nor will soil applications control flower infestations of thrips.
	Soil treatment (Venom) 70 SG (Scorpion) 35SL	5 to 6 oz 9 to 10.5 fl oz		21	
	flonicamid MOA 9C (Beleaf) 50SG	2.4 to 4.8 fl oz	12	0	Beleaf has shown good activity against insecticide resistant western flower thrips.
	imidacloprid (Admire Pro) 4.6 SC Planthouse treatment of transplants	0.44 fl oz per 10,000 plants	12 hrs	—	For suppression of TSWV, treatment transplants in the planthouse not more than 7 days before planting in the field. Transplants should be treated with overhead irrigation immediately after planting to ensure movement of imidacloprid into the soil media. See label for instructions.
	methomyl, MOA 1A (Lannate) 2.4 LV	1.5 to 3 pt	48 hrs	1	On foliage as needed.
	novaluron, MOA 15 (Rimon) 0.83 EC	9 to12 fl oz	12 hrs	1	Do not make more than 3 applications per season.
	spinetoram, MOA 5 (Radiant) 1 SC	6 to 10 fl oz	4 hrs	1	Will control thrips on foliage, not in flowers.
Whitefly	**For resistance management of whiteflies, do not follow a soil application of a neonicotinoid (MOA group 4A) with a foliar application of any neonicotinoid.**				
	acetamiprid, MOA 4A (Assail) 30 SG	2.5 to 4 oz	12 hrs	7	Do not apply more than once every 7 days, and do not exceed 5 applications per season.
	buprofezin, MOA 16 (Courier) 40 SC	9 to 13.6 fl oz	12 hrs	1	Use sufficient water to ensure good coverage. Do not apply more than twice per crop cycle, and allow 28 days between applications.

TABLE 2-22. INSECT CONTROL FOR TOMATO (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Whitefly (cont'd)	chlorantraniliprole, MOA 28 (Coragen) 1.67 SC	5 to 7.5 fl oz	4 hrs	1	Foliar or soil application. Drip chemigation must be applied uniform- ly to the root zone. See label for soil application instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	6.75 to 13.5 fl oz	4 hrs	1	Apply Verimark to at planting and/or later via drip irrigation or soil injection. See label for application options.
	(Exirel) 0.83SE	13.5 to 20.5 fl oz	12 hrs	1	Exirel is for foliar application.
	dinotefuran MOA 4A **Soil treatment** (Venom) 70 SG (Scorpion) 35 SL	5 to 6 oz 9 to 10.5 fl oz	12 hrs	21	See soil application instructions above under stink bug.
	Foliar treatment (Venom) 70 SG (Scorpion) 35 SL	1 to 4 oz 2 to 7 fl oz		1	
	imidacloprid, MOA 4A (Admire Pro) 4.6 F (various) 2 F	16 to 24 fl oz 7 to 10.5 fl oz	12 hrs	21	Apply through a drip irrigation system or as a transplant drench with sufficient water to reach root zone. As a sidedress, apply 2 to 4inches to the side of the row and incorporate 1 inch or more. Residual activity will increase with increased rates. Use higher rate for late-season or continuous infestations. Trickle irrigation applications will also control aphids and suppress stinkbugs.
	pyriproxyfen, MOA 7C (Knack) 0.86EC	8 to 10 fl oz	12 hrs	1	Do not apply more than two applications per growing season, and do not make applications closer than 14 days.
	spiromesifen, MOA 23 (Oberon) 2 SC	7 to 8.5 fl oz	12 hrs	7	Do not make more than 3 applications per season.
	spirotetramat, MOA 23 (Movento) 2SC	4 to 5 fl oz	24 hrs	1	Do not exceed 10 fluid ounces per season. Requires surfactant.
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.66 to 3.67 oz	12 hrs	30	Platinum may be applied to direct-seeded crops in-furrow at seeding or transplanting, post seeding or transplant as a drench, or through drip irrigation. Do not exceed 11 oz per acre per season of Platinum. Check label for plant-back restrictions for a number of crops.
	(Actara) 25 WDG	3 to 5.5 oz	12 hrs	0	Actara is for foliar applications.
Wireworm	diazinon, MOA 1B (Diazinon) AG 500 or 50 WP	2 to 4 qt	48 hrs	—	Broadcast before planting and incorporate. Wireworms may be a problem in fields previously in pasture, corn, or soybean.

TABLE 2-23. INSECT CONTROL FOR TURNIP

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Aphid, Flea beetle	clothianidin, MOA 4A (Belay) 50 WDG	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	7 (foliar)	Soil application as in in-furrow, side dress application, seed or transplant drench, or chemigation. See label for application instructions.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	6.75 to 13.5 fl oz	4 hrs	4	Soil applications made at planting only. See label for application options.
	dimethoate 4 EC, MOA 1B	0.5 pt	48 hrs	14	
	flonicamid, MOA 20D (Beleaf) 50 SG	2 to 2.8 oz	12 hrs	0	
	flupyradifurone, MOA 4D (Sivanto) 200 SL	7.0 to 10.5 fl oz	4 hrs	7	Will not control flea beetle
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6 F (various) 2 F	4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	21	See label for soil application instructions.
	Foliar treatment (Admire Pro) 4.6 F (various) 2 F	1.2 fl oz 3.8 fl oz	12 hrs	7	
	pymetrozine, MOA 9B (Fulfill) 50 WDG	2.75 oz	12 hrs	7	Will not control flea beetle.
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.7 to 4.01 oz	12 hrs	Apply at planting	Platinum is for soil application and Actara for foliar application.
	(Actara) 25 WDG	1.5 to 3 oz	12 hrs	7	

TABLE 2-23. INSECT CONTROL FOR TURNIP (cont'd)

Insect	Insecticide, Mode of Action Code, and Formulation	Amount of Formulation Per Acre	Restricted Entry Interval (REI)	Pre harvest Interval (PHI) (Days)	Precautions and Remarks
Harlequin bug, Vegetable weevil, Yellow margined leaf beetle	clothianidin, MOA 4A (Belay) 50 WDG	4.8 to 6.4 oz (soil) 1.6 to 2.1 oz (foliar)	12 hrs	7 (foliar)	Soil application as in in-furrow, side dress application, seed or trans plant drench, or chemigation. See label for application instructions.
	dinotefuran MOA 4A (Venom) 70 SG	2 to 3 oz	12 hrs	1	For use on turnip greens only, not turnips roots.
	imidacloprid, MOA 4A **Soil treatment** (Admire Pro) 4.6F (Various) 2F	4.4 to 10.5 fl oz 10 to 24 fl oz	12 hrs	21	Soil applications of imidacloprid will not control harlequin bug past 20 days after application.
	Foliar treatment (Admire Pro) 4.6F (Various) 2F	1.2 fl oz 2.4 fl oz		7	
	thiamethoxam, MOA 4A (Platinum) 75 SG	1.7 to 4.01 oz	12 hrs	Apply at plant	Platinum is for soil application and Actara for foliar application.
	(Actara) 25 WDG	1.5 to 3 oz		7	
	pyrethroid, MOA 3		12 hrs		See **Table 2-25** for a list of registered pyrethroids and pre-harvest intervals.
Cabbage looper, Diamondback moth	**Insecticide-resistant populations, widespread in the Southeast, may not be controlled with some registered insecticides. To manage resistance, avoid transplants from Georgia and Florida, and avoid the repeated use of the same materials for extended periods of time. Repeated use of pyrethroid insecticides often aggravates diamondback moth problems. Do not allow populations to increase to large densities before treatments are initiated.**				
	Bacillus thuringiensis, MOA 11A (Crymax) WDG (Dipel) 2 X (Dipel) 4 L (Xentari) WDG	0.5 to 1.5 lb 8 oz 1 to 2 pt 0.5 to 1 lb	4 hrs	0	On foliage every 7 days as needed.
	chlorantraniliprole, MOA 28 (Coragen)	3.5 to 5.0 fl oz	4 hrs	1	For turnip greens or root turnips.
	cyantraniliprole, MOA 28 (Verimark) 1.67 SC	5 to 10 fl oz	4 hrs	1	Verimark and Exirel are for greens only, not root turnips Verimark is for soil application only. Applications made at planting and/or later via drip chemigation. See label for application options. Exirel is for foliar application only.
	(Exirel) 0.83SE	7 to 13.5 fl oz	12 hrs	1	
	emamectin benzoate, MOA 6 (Proclaim) 5 WDG	2.4 to 4.8 oz	12 hrs	14	For turnip greens only.
	indoxacarb, MOA 22 (Avaunt) 30 WDG	2.5 to 3.5 oz	12 hrs	3	Avaunt may be applied only to turnip greens, not root turnips.
	spinetoram, MOA 5 (Radiant) 1 SC	3 to 6 fl oz	4 hrs	1	
Root maggot	chlorpyrifos, MOA 1B (Lorsban) 4 E (Lorsban) 75 WDG	1 to 2 pt 1.1 to 1.8 oz/ 1,000 ft row	24 hrs	21	Irrigation or rainfall after application will enhance activity.

TABLE 2-24. RELATIVE EFFECTIVENESS OF INSECTICIDES AND MITICIDES FOR INSECT AND MITE CONTROL ON FIELD-GROWN VEGETABLES.

Not all insecticides listed below are registered on all vegetable crops. Refer to the label before applying to a specific crop. Ratings are based on a consensus of vegetable entomologists in the southeastern United States.

Key: "E" very effective; "G" effective; "F" somewhat effective; "-" ineffective or insufficient data

Chemical class (IRAC)	Common name	Example Product	Flea Beetle	Colorado potato beetle*	Cucumber beetles	Corn earworm*	European corn borer	Fall armyworm	Cabbage looper	Imported cabbageworm	Diamondback moth*	Squash vine borer	Beet armyworm*	Stinkbugs/Harlequin bug	Squash bug	Aphids*	Thrips	Western Flower Thrips*	Leafminer	Maggots	Whiteflies*	Cutworms	Wireworms	White grubs	Spider mites*
1A	carbaryl	Sevin	E	F	G	F	G	F	F	G	F	F	-	-	-	-	F	-	-	-	-	F	-	-	-
	methomyl	Lannate	F	-	-	G	G	G	G	G	G	-	F	G	G	F	E	G	F	-	F	-	-	-	-
	oxamyl	Vydate	F	F	F	-	-	-	-	-	-	-	-	F	F	G	G	-	-	-	F	-	-	-	-
1B	malathion	Malathion	G	F	G	F	F	F	F	G	F	F	-	F	F	F	F	-	-	F	-	F	-	-	-
	chlorpyrifos	Lorsban	-	-	-	F	F	F	F	G	F	-	-	-	-	-	F	-	-	E	-	G	G	G	-
	acephate	Orthene	-	-	-	F	E	G	F	G	-	-	-	-	-	G	G	-	F	-	F	G	-	-	-
	diazinon	Diazinon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	-	F	G	F	-
	dimethoate	Dimethoate	G	-	F	-	-	-	-	-	-	-	-	G	F	E	E	F	G	-	-	-	-	-	-
3	permethrin	Pounce	G	F	G	G	G	F	G	E	F	E	-	F	G	F	F	-	F	-	-	G	-	-	-
	alpha cypermethrin	Fastac	E	F	E	G	E	G	G	E	F	E	-	G	E	F	F	-	F	-	-	G	-	-	-
	zeta cypermethrin	Mustang Max	E	F	E	G	E	G	G	E	F	E	-	G	E	F	F	-	F	-	-	E	-	-	-
	cyfluthrin	Baythroid/Renounce	G	F	G	G	G	F	G	E	F	E	-	G	E	F	F	-	F	-	-	E	-	-	-
	lambda cyhalothrin	Karate	E	F	E	G	E	G	G	E	F	E	-	G	E	F	F	-	F	-	-	E	-	-	F
	esfenvalerate	Asana XL	G	G	G	G	G	F	G	E	F	G	-	F	G	F	F	-	F	-	-	G	-	-	-
	gamma cyhalothrin	Proaxis	E	F	E	G	E	G	G	E	F	E	-	E	E	F	F	-	F	-	-	E	-	-	-
	fenpropathrin	Danitol	G	-	G	G	G	F	F	E	F	G	-	E	E	F	F	-	F	-	F	G	-	-	F
	bifenthrin	Brigade	E	F	E	G	G	F	F	E	F	E	-	E	E	F	F	-	F	F	F	E	G	F	F
4A	imidacloprid	Admire	F	G	E	-	-	-	-	-	-	-	-	F	G	E	G	-	-	G	G	-	F	G	-
	acetamiprid	Assail	G	E	G	-	-	-	-	-	-	F	-	F	G	E	G	-	-	-	G	-	-	-	-
	clothianidin	Belay	E	E	G	-	-	-	-	-	-	-	-	G	G	G	-	-	F	G	-	-	F	G	-
	thiamethoxam	Platinum/Actara	E	G	G	-	-	-	-	-	-	-	-	G	G	E	F	-	F	G	G	-	F	F	-
	dinotefuran	Venom/Scorpion	E	E	G	-	-	-	-	-	-	-	-	E	E	F	G	-	F	-	G	-	-	-	-
4C	sulfoxaflor	Closer, Transform	-	-	-	-	-	-	-	-	-	-	-	F	-	E	-	-	-	-	E	-	-	-	-
4D	flupyradifurone	Sivanto	-	-	-	-	-	-	-	-	-	-	-	-	-	E	-	-	-	-	E	-	-	-	-
	spinosad	Blackhawk/Entrust	-	E	-	G	G	G	G	E	G	G	G	-	-	-	G	G	E	-	-	F	-	-	-
	spinetoram	Radiant	-	E	-	E	E	G	G	E	G	G	G	-	-	-	E	G	E	-	-	F	-	-	-
	emamectin benzoate	Proclaim	-	-	-	G	G	G	E	E	E	G	E	-	-	-	-	-	F	-	-	F	-	-	-
	abamectin	Agri-Mek	-	E	-	-	-	-	-	-	-	-	-	-	-	-	G	F	E	-	-	-	-	-	E
7C	pyriproxyfen	Knack/Distance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	-	-	-	-
9B	pymetrozine	Fulfill	-	-	-	-	-	-	-	-	-	-	-	-	-	E	-	-	-	-	F	-	-	-	-
9C	flonicamid	Beleaf	-	-	-	-	-	-	-	-	-	-	-	-	-	E	E	E	-	-	-	-	-	-	-
10	etoxazole	Zeal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G
11	Bt	Dipel, various	-	-	-	F	F	F	G	E	G	F	F	-	-	-	-	-	-	-	-	-	-	-	-
15	novaluron	Rimon	-	E	-	E	E	E	G	E	F	G	E	F	F	-	G	G	G	-	G	-	-	-	-
16	buprofezin	Courier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	-	-	-	-
17	cyromazine	Trigard	-	G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	E	-	-	-	-	-	-
18	methoxyfenozide	Intrepid	-	-	-	G	G	E	E	E	F	G	E	-	-	-	-	-	-	-	-	-	-	-	-
20B	acequinocyl	Kanemite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	E
20D	bifenazate	Acramite/Floramite	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	E
	fenpyroximate	Portal	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G
	tolfenpyrad	Torac	G	-	-	F	F	F	F	G	-	-	F	-	-	G	G	F	-	-	F	-	-	-	-
22A	indoxacarb	Avaunt	F	G	F	E	G	G	E	E	G	G	E	-	-	-	-	-	F	-	-	F	-	-	-
	spiromesifen	Oberon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	-	-	-	G
	spirotetramat	Movento	-	-	-	-	-	-	-	-	-	-	-	-	-	E	-	-	-	-	G	-	-	-	-
25	cyflumetofen	Nealta	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G
	chlorantraniliprole	Coragen	-	E	-	E	E	E	E	E	E	G	E	-	-	-	F	-	E	-	G	-	-	-	-
	cyantraniliprole	Verimark/Exirel	G	E	-	E	E	E	E	E	E	G	E	-	-	G	F	F	E	G	G	-	-	-	-

* Denotes that insecticide-resistant populations may occur in some areas and can affect the performance of insecticides.

TABLE 2-25. PREHARVEST INTERVALS *(IN DAYS)* FOR PYRETHROID INSECTICIDES IN VEGETABLE CROPS.

Table 2-24 to compare relative efficacy of these products against specific insect pests. Read the pesticide label for specific rates and application instructions.

		Common Name/Example Product (Restricted Entry Interval – REI)										
		alpha cypermethrin Fastac (12 hrs)	beta cyfluthrin Baythroid XL (12 hrs)	bifenthrin Brigade (12 hrs)	cypermethrin Various names (12 hrs)	cyfluthrin Tombstone (12 hrs)	esfenvalerate Asana XL(12 hrs)	fenpropathrin Danitol (24 hrs)	gamma cyhalothrin Proaxis (24 hrs)	lambda cyhalothrin Karate/Warrior (24 hrs)	permethrin Pounce (12 hrs)	zeta cypermethrin Mustang Max (12 hrs)
	Asparagus	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	1
Bulb Vegetables	Onions, Green	NR	NR	NR	7	NR	NR	NR	NR	NR	NR	7
	Onions, Dry Bulb	NR	NR	NR	7	NR	NR	NR	14	14	1	7
Brassica Leafy Vegetables	Broccoli, Brussels Sprout, Cabbage, Cauliflower, Kohlrabi	1	0	0	7	1	0	3	7	1	7	1
	Collard, Mustard Green	NR	NR	NR	7	NR	NR	NR	14	14	1	7
Cereal Corn	Sweet Corn	3	0	1	NR	0	1	NR	1	1	1	3
Cucurbits	Cantaloupe, Watermelon	1	0	3	NR	0	3	7	NR	1	0	1
	Cucumber, Pumpkin, Summer Squash, Winter Squash	1	0	3	NR	0	3	7	NR	1	0	1
Fruiting Vegetables	Eggplant, Pepper	1	7	7	NR	0	7	3	5	5	3	1
	Tomato	1	0	1	NR	7	1	3	5	5	0	1
	Okra	1	NR	7	NR	NR	NR	NR	NR	NR	NR	1
Legumes	Edible-podded	1	NR	3	NR	NR	3	NR	7	7	NR	1
	Succulent Shelled Pea and Bean	1	3	3	NR	3	3	7	7	7	NR	1
	Dried Shelled Pea and Bean	21	7	14	NR	7	21	NR	21	21	NR	21
Leafy Vegetables, Except Brassica	Head and Leaf Lettuce	1	0	7	5A	0	7A	NR	1	1	1	1
	Spinach	1	0	40	NR	0	NR	NR	NR	NR	1	1
	Celery	1	0	NR	NR	0	NR	NR	NR	NR	3	1
Root and Tuber Vegetables	Beet, Carrot, Radish, Turnip	1	0	21	NR	0	7	NR	NR	NR	1	1
	Potato	1	0	21	NR	0	NR	NR	NR	7	14	1
	Sweetpotato	1	0	21	NR	0	NR	NR	NR	7	NR	1

NR - Not registered.
[A] Head lettuce only.

TABLE 2-26. LIST OF GENERIC INSECTICIDES BY ACTIVE INGREDIENT.

Active Ingredient	Original Product and Formulation (Manufacturer)	Generics and Formulation (Manufacturer)	
Abamectin	Agri-Mek 0.15EC	Abacus 0.15 EC (Rotam)	Reaper 0.15 EC (Loveland)
		Abba 0.15 EC (Makhteshim)	Temprano 0.15 EC (Chemtura)
		Abba Ultra 0.3 EC (Makhteshim)	Timectin 0.15 EC (Tide Intl.)
		Agri-Mek 0.7 EC (Syngenta)	Reaper Advance 0.15 EC (Loveland)
		Epi-Mek 0.15 EC (Syngenta)	Zoro 0.15 EC (Cheminova)
		Nufarm Abamectin 0.15 EC (Nufarm)	
Acephate	Orthene 90SP (Valent)	Acephate 90 Prill (Makhteshim)	Acephate 97 UP (United Phosphorous)
		Acephate 90 WDG (Loveland)	Bracket 90 WDG (Winfield)
		Acephate 90 WSP (Loveland)	Orthene 97 (Amvac)
Bifenthrin	Brigade 2 EC, Capture 2 EC (FMC)	Bifen 2AG Gold (Direct AG Source)	Ruckos LFR (Helena)
		Bifenture 2 EC (United Phosphorous)	Slugbug 2 EC (Real Farm)
		Bifenthrin 2 EC (Aceto)	Sniper 2 EC (Loveland)
		Discipline 2 EC (Amvac)	Tailgunner 2 EC (Makhteshim)
		Fanfare 2 EC (Makhteshim)	Tundra 2 EC Winfield)
		Frenzy Veloz (Real Farm)	Xpedient (Amvac)
		Revere (Adama	
Carbaryl	Sevin 50 WP 4 L, 80 S, SL , XLR (Bayer)	Carbaryl 4 L (Drexel, Loveland)	Prokoz Sevin SL (Prokoz)
Chlorpyrifos	Lorsban 4 E, 15 G, 75 WDG, Advanced 3.76 E (DowAgro Sciences)	Chlorpyrifos 4 E (Makhteshim, Drexel)	Vulcan 3.76 E (Makhteshim)
		Govern 4 E (Tenkos)	Warhawk 4 E (Loveland)
		Hatchet 4 E (Dow AgroSciences)	Whirlwind 4 E (Helena)
		Nufos 4E (Tenkos)	Yuma 4 E (Winfield)
		Saurus 15 G (Helena)	

TABLE 2-26. LIST OF GENERIC INSECTICIDES BY ACTIVE INGREDIENT. (cont'd)

Active Ingredient	Original Product and Formulation (Manufacturer)	Generics and Formulation (Manufacturer)	
Cyfluthrin	Brigade XL, 1 EC, Renounce 20 WP (Bayer)	Tombstone 2 E (Loveland) Battery 2.5 EC (Winfield)	Tombstone Helios 2 E (Loveland) Holster (Loveland)
Esfenvalerate	Asana XL 0.66EC (DuPont)	S-FenvaloStar 0.66 EC (LG Life Sciences)	Zyrate (Rotam)
Gamma-cyhalothrin	Proaxis 0.5 EC (Loveland)	Declare Insecticide 0.5 EC (Cheminova)	Proaxis Insecticide 0.5 EC (Cheminova)
Hexithiazox	Savey, Onager	Hexy 2E (Sharda)	
Imidacloprid	Admire 2 F, Pro 4.6 F, Provado 1.6 F (Bayer)	Advise 2 FL (Winfield) Mana Alias 2 F, 4 F (Makhteshim) Amtide Imidacloprid 2 F (AmTide) Couraze 2 F, 4 F (Cheminova) Imida E-AG, 1.6F, 2F (Cheminova) Imidacloprid 4 SC (Willowood) Lada 2 F (Rotam) Macho 2 FL, 4 F (Albaugh) Malice 75 WSP (Loveland)	Midash 2 SC (Sharda USA) Montana 2 F, 4 F (Rotam NA) NuPrid 2 F, 2 SC, 4 F Max, 4.6 F, (Nufarm) Pasada 1.6 F (Makhteshim) Prey 1.6 F (Loveland) Sherpa 1.6 F (Loveland) Widow 2 F (Loveland) Wrangler 4 F (Loveland)
Lambda-cyhalothrin	Karate 2 ME, Warrior 2 ME (Syngenta)	Grizzly Z 1 CS (Winfield) Kendo 1 EC (Helm) Kiaso 24 WG (Nufarm) Lambda T 1 CS (Helena) Lambda CY 1 EC (United Phosphorous) Lambda-Cyhalothrin 1 EC (Nufarm) LambdaStar 1 EC, 1 CS (LG Life Sciences)	Lamcap 1 CS (Syngenta) Lambda-CY AG (Direct AG Source) Paradigm 1 EC (Makhteshim) Province 1 SC (TENKoz) Silencer 1 EC (Makhteshim) Willowood Lambda-Cy 1 EC (Willowood)
Permethrin	Pounce 3.2 EC (FMC)	Arctic 3.2 EC (Winfield) Perm-Up 3.2 EC (United Phosphorous) Perm Star 3.2 EC (LG Life Sciences)	Permethrin 3.2 EC (Loveland, TENKoz, Helena) Stiletto (Wilbur Ellis)
Zeta-cypermethrin	Mustang Max 1.5 EW (FMC)	Respect 0.8 EC (BASF)	

TABLE 2-27. COMPONENTS OF INSECTICIDE MIXTURES.

Premix Trade Name	Components (Legacy trade name)
Athena	abamectin (Agri-Mek) + bifenthrin (Brigade)
Agri-Flex	abamectin (Agri-Mek) + thiamethoxam (Actara)
Cormoran	acetamiprid (Assail) + novaluron
Gladiator	avermectin B1 (Agri-Mek) + zeta-cypermethrin (Mustang Max)
Hero, Steed	bifenthrin (Brigade) + zeta-cypermethrin (Mustang Max)
Voliam Xpress, Besiege	chlorantraniliprole (Coragen) + lambda-cyhalothrin (Warrior, Karate)
Cobalt, Bolton	chlorpyrifos (Lorsban) + gamma-cyhalothrin (Proaxis)
Kilter	imidacloprid (Admire) + lambda-cyhalothrin (Warrior, Karate)
Endigo ZC	lambda-cyhalothrin (Warrior, Karate) + thiamethoxam (Actara)
Leverage 360	imidacloprid (Admire) + beta-cyfluthrin (Baythroid XL)
Leverage 2.7	imidacloprid (Admire) + cyfluthrin (Baythroid)
Brigadier, Swagger, Skyraider, Tempest	bifenthrin (Brigade) + imidacloprid (Admire)
Durivo, Voliam Flexi	chlorantraniliprole (Coragen) + thiamethoxam (Actara, Platinum)
Triple Crown	zeta-cypermethrin (Mustang Max), bifenthrin (Brigade), imidacloprid (Admire)

INSECT CONTROL FOR GREENHOUSE VEGETABLES

Sound cultural practices, such as sanitation and insect-free transplants, help prevent insect establishment and subsequent damage. Separate plant production houses, use of yellow sticky traps, and timely sprays will help prevent whitefly buildup. Use of Encarsia parasites for whitefly and other biological control agents in conjunction with use of pesticides is encouraged. Unless a pesticide label specifically states that a product cannot be used in a greenhouse vegetable crop, the product can be used on those crops for which it is registered. However, pesticides behave differently in the field and the greenhouse, and for many products, information is not available on greenhouse crop phytotoxicity and residue retention. If unsure of the safety of a product to a crop, apply to a small area before treating the entire crop.

TABLE 2-28. INSECT CONTROL FOR GREENHOUSE VEGETABLES

CROP Insect	Insecticide and Formulation	Amount of Formulation	Re Entry Interval	Pre Harvest Interval (PHI) (Days)	Precautions and Remarks
INSECT CONTROL FOR CUCUMBER					
Aphid	flonicamid, MOA 29 (Beleaf) 50SG	0.065 to 0.1 oz per 1000 sq ft	12 hrs	0	May be applied either to the soil as a drench or drip irrigation for preventive control, or sprayed onto plans as a rescue treatment.
	imidacloprid, MOA 4A (Admire Pro) 4.6 F	0.6 fl oz/1,000 plants	12 hrs	0	Apply in a minimum of 21 gallons water using soil drenches, micro-irrigation, or drip irrigation. Do not apply to immature plants as phytotoxicity may occur. Make only one application per crop per season.
	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	
Cabbage looper	*Bacillus thuringiensis,* MOA 11 (various)	0.5 to 1 lb OR 3 pt/100 gal water	4 hrs	—	Most are **OMRI approved**
	spinosad, MOA 5		4 hrs	1	Do not make more than two consecutive applications.
	(Entrust) SC	3 fl oz/100 gal			**OMRI approved.**
Spider mite	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs		Use predatory mites. **OMRI Approved.**
	mineral oil (TriTek)	1 to 2 gal/100 gal	4 hrs	0	Begin applications when mite populations are low, and repeat at weekly intervals.
	Fenpyroximate, MOA 21A (Akari) 5SC	1 to 2 pts per 100 gal	12 hrs	7	
Whitefly, Leafminer	acetamiprid, MOA 4A (Assail) 30 SG	0.1 oz per 1000 sq ft	12	0	
	flonicamid, MOA 20 (Beleaf) 30SG	0.065 to 0.1 oz per 1000 sq ft	12 hrs	0	
	imidacloprid, MOA 4A (Admire Pro) 4.6 F	0.6 fl oz/1,000 plants	12 hrs	0	Apply in a minimum of 21 gallons water using soil drenches, micro-ir-ri- gation, or drip irrigation. Do not apply to immature plants as phytotoxicity may occur. Make only one application per crop per season.
	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	May be used alone or in combination. Acts as an exciter. **OMRI Approved**.
	Beauveria bassiana (Mycotrol WP)	0.25 lb/20 gal water		0	Apply when whiteflies observed. Repeat in 4- to 5-day intervals. **OMRI Approved.**
INSECT CONTROL FOR LETTUCE					
Aphid, Leafminer, Whitefly	fulymetrozine, MOA 9B (Fulfill) 50 WG	0.063 oz per 1000 sq ft	12 hrs	0	Will not control leafminer.
	pyrethrins, MOA 3 (Pyganic) 5 EC	0.25 to 0.5 fl oz per gal water	12 hrs	0	May be used alone or tank mixed with a companion insecticide (see label for details). **OMRI approved.**
	malathion, MOA 1B (various) 57 EC 25 WP	 1 qt/100 gal water 4 lb/100 gal water	24 hrs	 14 14	
	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	May be used alone or in combination. Acts as an exciter. Insecticidal soaps can cause phytotoxicity under high temperatures or slow drying conditions. If unsure, apply to a small area before treating the entire crop. **OMRI approved**.
	Beauveria bassiana (Mycotrol WP)	0.25 lb/20 gal water	4 hrs	0	Under high aphid or whitely pressure, apply at 2 to 5 day intervals. **OMRI approved.**
Cabbage looper	*Bacillus thuringiensis,* MOA 11 (Javelin) WG	0.5 to 1.25/100 gal water	4 hrs	0	
	spinosad, MOA 5 Entrust SC	3 fl oz/100 gal	4 hrs	1	Do not make more than two consecutive applications.

TABLE 2-28. INSECT CONTROL FOR GREENHOUSE VEGETABLES (cont'd)

CROP Insect	Insecticide and Formulation	Amount of Formulation	Re Entry Interval	Pre Harvest Interval (PHI) (Days)	Precautions and Remarks
INSECT CONTROL FOR LETTUCE (cont'd)					
Slugs	iron phosphate (Sluggo)	0.5 to 1 lb/1,000 sq ft	4 hrs	1	Scatter the bait around the perimeter of the greenhouse to provide a protective barrier. If slugs are within the crop, then scatter the bait on the ground around the plants. Do not make more than 3 applications within 21 days. Sluggo will control slugs and snails, while Bug-N-Sluggo will also control earwigs, cutworms, sowbugs and pillbugs. Sluggo is **OMRI approved.**
	iron phosphate + spinosad (Bug-N-Sluggo)	0.5 to 1 lb/1,000 sq ft	4 hrs	1	
Spider mite	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	Begin applications when mite populations are low, and repeat at weekly intervals.
	mineral oil (TriTek)	1 to 2 gal/100 gal	4 hrs	0	
INSECT CONTROL FOR TOMATO AND PEPPER					
Aphid	flonicamid, MOA 20 (Beleaf) 50SG	0.1 oz per 1000 sq ft	12 hrs	0	May be applied to the soil as a drench or drip irrigation for preventive control, or as a spray for rescue treatments. Will also control whiteflies.
	imidacloprid, MOA 4A (Admire Pro) 4.6	0.6 fl oz/1,000 plants	12 hrs	0	Apply in a minimum of 21 gallons water using soil drenches, microirrigation, or drip irrigation. Do not apply to immature plants as phytotoxicity may occur. Make only one application per crop per season. Also controls whiteflies.
	malathion, MOA 1B (various) 10 A 57 EC 25 WP	 1 lb/50,000 cu ft 1 qt/100 gal water 4 lb/100 gal water	12 hrs	 15 hrs 1 1	
	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	May be used alone or in combination. Acts as an exciter.
	Beauveria bassiana (Mycotrol WP)	0.25 lb/20 gal water		0	Apply when whiteflies are observed. Repeat in 4-to 5-day intervals.
Armyworm, Fruitworm, Cabbage looper, Pinworm	*Bacillus thuringiensis*, MOA 11 (Javelin) WG (Agree) WP (Dipel) DF (Xentari) DF	 0.5 lb to 1.25 lb/100 gal water 1 to 2 lb 0.5 to 1.25 lb 0.5 to 1.5 lb	4 hrs	0	
	chlorfenapyr, MOA 13 (Pylon) 2SC	6.5 to 13 fl oz/100 gal water, or per acre area	12 hrs	0	For use on tomatoes more than 1 inch in diameter at maturity. Do not make more than two applications at 5 to 10 day intervals before rotating to an insecticide with a different mode of action
	cyantraniliprole, MOA 28 (Exirel) SE	7 to 13.5 fl oz per acre, or per 100 gal	12 hrs	1	
	spinosad, MOA 5 (Entrust) SC	3 fl oz/100 gal	4 hrs	1	Do not make more than two consecutive applications. Do not apply to seedling tomatoes or peppers grown for transplants.
Leafminer	cyantraniliprole, MOA 28 (Exirel) SE	13.5 to 20.5 fl oz per acre, or per 100 gal	12 hrs	1	
	diazinon, MOA 1B (Diazinon, Spectracide)	4 to 8 oz/100 gal water	48 hrs	3	Keep ventilators closed for 2 hours or overnight. Plant injury may result if labeling directions are not followed. For use by members of N.C. Greenhouse Vegetable Growers Association only.
	spinosad, MOA 5 (Entrust) SC	10 fl oz/100 gal	4 hrs	1	Do not apply to seedlings grown for transplants
Slug	metaldehyde (various) bait	Follow label directions	12 hrs		Apply to soil surface around plants. Do not contaminate fruit.
	iron phosphate (Sluggo)	½ teaspoon per 9-inch pot		0	
Spider mite, Broad mite, Rust mite	acequinocyl, MOA 20B (Kanemite) 15SC	31 fl oz/100 gal	12 hrs	1	
	bifenazate (Floramite) SC	4 to 8 fl oz/100 gal water (1/4 to 1/2 tsp/gal)	12 hr	3	For use on tomatoes more than 1 inch in diameter at maturity. Not registered on pepper. Not for rust mite.
	mineral oil (TriTek)	1 to 2 gal/100 gal		0	Begin applications when mite populations are low, and repeat at weekly intervals.
	chlorfenapyr, MOA 13 (Pylon) 2SC	9.8 to 13 fl oz/100 gal water or per acre area		0	For use on tomatoes, more than1 inch in diameter at maturity. Do not make more than two applications at 5 to 10 day intervals before rotating to an insecticide with a different mode of action.
	fenpyroximate, MOA 21A (Akari) 5SC	1 to 2 pts per 100 gal	12 hrs	1	
	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	

TABLE 2-28. INSECT CONTROL FOR GREENHOUSE VEGETABLES (cont'd)

CROP Insect	Insecticide and Formulation	Amount of Formulation	Re Entry Interval	Pre Harvest Interval (PHI) (Days)	Precautions and Remarks
INSECT CONTROL FOR TOMATO AND PEPPER (cont'd)					
Thrips, including western flower	*Beauveria bassiana* (Mycotrol WP)	0.25 lb/20 gal water		0	Use screens on intake vents. Apply when whiteflies observed. Repeat in 4- to 5-day intervals.
	cyantraniliprole, MOA 28 (Exirel) SE	13.5 to 20.5 fl oz per acre, or per 100 gal	12 hrs	1	For foliage-feeding thrips only, not those in flowers.
	spinosad, MOA 5 (Entrust) SC	5.5 fl oz/100 gal	4 hrs	1	Do not make more than two consecutive applications, and do not apply more than 6 times in a 12-month period against thrips. Do not apply to seedlings grown from transplants.
Whitefly	imidacloprid, MOA 4A (Admire Pro) 4.6 F	0.6 fl oz/1,000 plants	12 hrs	0	Apply in a minimum of 21 gallons water using soil drenches, micro-irrigation, or drip irrigation. Do not apply to immature plants as phytotoxicity may occur. Make only one application per crop per season. Also controls aphids.
	cyantraniliprole, MOA 28 (Exirel) SE	13.5 to 20.5 fl oz per acre, or per 100 gal	12 hrs	1	
	flonicamid, MOA 29 (Beleaf) 50SG	0.1 oz per 1000 sq ft	12 hrs	0	For use on tomato only.
	insecticidal soap (M-Pede) 49 EC	2 tbsp/gal water	12 hrs	0	
	pyrethrins and PBO, MOA 3 (Pyganic) 5EC	0.25 to 0.5 fl oz per gal	12 hrs	0	May be used alone or tank mixed with a companion insecticide. (See label for details).
	Beauveria bassiana (Mycotrol WP)	0.25 lb/20 gal water	4 hrs	0	Apply when whiteflies are observed. Repeat in 4- to 5-day intervals. **OMRI approved**.
	buprofezin, MOA 16 (Talus) 40SC	9 to 13.6 oz/100 gal water or per acre area	12 hrs	1	Insect growth regulator that affects immature stages of whiteflies. Will not kill adults. For use on tomatoes only.
	pyriproxyfen, MOA 7C (Distance) 0.86EC	6 fl oz/100 gal water	12 hrs	<1	Insect growth regulator that affects immature stages of whiteflies. Will not kill adults. Do not use on tomatoes more than 1 inch in diameter. Do not apply on non-bell peppers.

TABLE 2-29. ALTERNATIVE IPM & BIOINSECTICIDE RECOMMENDATIONS IN VEGETABLE CROPS.

NOTE: Many approved insecticides have not been tested thoroughly in the commercial vegetable systems. Use systems-based and exclusion practices to reduce the overall pest infestation level before resorting to insecticide applications in organic farming systems. Targeted insecticide applications at correct rate can protect natural enemies. Always read the insecticide label before application.

Target Pest	Cropping System	Systems-based Practices (for pest prevention)	Mechanical tactics(for pest prevention)	Biorational Insecticides#
Aphid	Multiple crops	Timely planting and harvest, reduce water stress, early planted okra can be used as a trap crop	Use of reflective mulches to protect transplants, Water jet can dislodge aphids, Insect netting for gardens or short rows*	Insecticidal soap & oil, Paraffinic oil, *Beauveria bassiana*
Armyworms	Multiple crops	Weed control, field sanitation, control soil organic residue (larvae hide under thick organic residue)	Insect netting for gardens or short rows*, High tunnel pest exclusion system for commercial producers^	*Bacillus thuringiensis* (single AI or premix), Insecticidal soap & oil, Spinosad, Neem**, *Chromobacterium*-based insecticide
Asparagus beetle	Asparagus	Use some portion of field as early planted trap crop	Manually remove beetles from trap crops	Pyrethrins, Spinosad
Bean leaf beetle	Snap, lima pole beans,	Sanitation (removal of crop debris), timely planting	Insect netting for gardens or short rows*	Pyrethrins, Spinosad
Blister beetle	Multiple crops	—	Insect netting for gardens or short rows*	Spinosad, Pyrethrin
Cabbage looper (small caterpillars)	Multiple crops	Remove alternate host plants (wild mustard, shepherd's purse)	Insect netting for gardens or short rows*, High tunnel pest exclusion system for commercial producers^	*Bacillus thuringiensis* (single AI or premix), Insecticidal soap, Pyrethrins (single AI or premix), Spinosad, Neem**
Colorado potato beetle	Multiple crops	Crop rotation, plant tolerant varieties	Insect netting for gardens or short rows*	Insecticidal soap, Neem**, Pyrethrins (use for larval control), Spinosad
Corn earworm/ Tomato fruitworm	Multiple crops	—	Insect netting for gardens or short rows*	*Bacillus thuringiensis* (single AI or premix), Insecticidal soap & oil, Spinosad, Neem**, *Chromobacterium* (Grandevo)
Cowpea curculio	Cowpeas, Snap, Lima, Pole beans	Crop rotation, sanitation, early harvest of crop,	Insect netting for gardens or short rows*	Pyrethrins, Spinosad (adults are difficult to kill due to insecticide resistance)
Cucumber beetle	Multiple crops	Perimeter trap cropping with Hubbard squash	Insect netting to block beetles*	Pyrethrins, Neem**, Parasitic nematodes (weekly soil drench for caterpillars)
Cutworm	Multiple crops	Need-based soil tillage and organic matter management	Plant collars, Insect netting (temporary exclusion methods)*	*Bacillus thuringiensis* (single AI or premix with directed spray at plant base; Spinosad foliar and stem spray; spinosad-based bait (Seduce)

TABLE 2-29. ALTERNATIVE IPM & BIOINSECTICIDE RECOMMENDATIONS IN VEGETABLE CROPS. (cont'd)

NOTE: Many approved insecticides have not been tested thoroughly in the commercial vegetable systems. Use systems-based and exclusion practices to reduce the overall pest infestation level before resorting to insecticide applications in organic farming systems. Targeted insecticide applications at correct rate can protect natural enemies. Always read the insecticide label before application.

Target Pest	Cropping System	Systems-based Practices (for pest prevention)	Mechanical tactics(for pest prevention)	Biorational Insecticides#
Diamondback moth & Imported cabbage worm	Collard & Mustard greens	—	Insect netting over short rows to block moths* (soon after transplanting)	*Bacillus thuringiensis* (single AI or premix), Insecticidal soap (for small caterpillars), Neem**, Pyrethrins
European corn borer	Multiple crops	Use tolerant cultivars when possible	—	*Bacillus thuringiensis* (single AI or premix), Insecticidal soap, Neem**, Pyrethrins
Flea beetle	Multiple crops	Timely planting of crops, Perimeter trap cropping with eggplants	Insect netting immediately after transplanting*	Insecticidal oil, Neem**, Spinosad, Parasitic nematodes (drench in soil), Pyrethrins,
Grasshopper	Multiple crops	Maintain a grassy patch (non-crop habitat) and use nematode insecticidal bait	Insect netting for gardens*, High tunnel pest exclusion system for commercial producers^	Pyrethrins (multiple applications), Nolo Bait (*Nosema locustae*) for use in grassy areas or near fences (undisturbed non-crop areas)
Hornworm	Tomato	Timely harvesting of fruits	Insect netting for gardens*, High tunnel pest exclusion system for commercial producers^	Spinosad, *Bacillus thuringiensis,* Pyrethrins, Neem,
Japanese beetle	Multiple crops	Sunflower and sorghum trap crops may deter feeding on main crop	Insect netting for gardens*, High tunnel pest exclusion system for commercial producers^	Pyrethrins, Neem (multiple sprays), Milky spore disease
Leaffooted bug	Fruiting vegetables(tomato, okra, eggplant)	Trap cropping with *Peredovik* sunflower & *NK300* sorghum provides significant reduction. Plant extra rows of trap crop in drought year.	High tunnel pest exclusion system for commercial producers^	Pyrethrins
Leafhopper	Multiple crops	—	—	Insecticidal soap, Pyrethrins, Neem**
Leafminer	Multiple crops	Select vigorous hybrid plant varieties	Pick and destroy mined leaves	Neem**, Spinosad
Mealy bugs	Multiple crops	—	Hand-picking	Insecticidal soap and oil
Onion maggot, seed corn maggot	Multiple crops	Use well-composted manure, soil tillage exposes maggots to natural enemies	—	—
Parsleyworm (black swallowtail)	Parsley, dill, carrot	—	Hand-pick and destroy caterpillars	*Bacillus thuringiensis* (DiPel)
Pepper weevil	Pepper	Crop rotation	Hand-pick insects, Insect netting for small areas	Insecticidal soap, Neem, Pyrethrins, Parasitic nematodes (drench in soil weekly)
Spider mite	Multiple crops	Plant and harvest timely; provide irrigation; problem could be severe in drought years	—	Paraffinic oil, Neem oil, Sulfur dust or spray (check label before use), *Chenopodium* Terpene Extract (Requiem), *Isaria fumosoroseus* (PFR97), Soluble silica (Sil-Matrix); *do not use pyrethrins*
Squash vine borer	Pumpkin, squash	Timely planting, trap cropping with Hubbard squash (Baby Blue and New England), sanitation or removing crop debris	Deworming vines in home garden, Insect netting at plant base early in the season to exclude moths	Pyrethrins, Spinosad (early season spray after detecting moths or eggs at plant base)
Squash bug	Pumpkin, squash	Trap cropping with Hubbard squash; plant tolerant varieties, sanitation (remove crop debris)	Insect netting for gardens*, High tunnel pest exclusion system for commercial producers can slow down pest migration^	Pyrethrins (weekly spray at low population levels)
Stink bug & Harlequin bug	Multiple crops	Trap crop of sorghum, okra for stink bugs	Insect netting for gardens*, High tunnel pest exclusion system for commercial producers^	Pyrethrins, Spinosad (target nymphs after scouting)
Thrips	Multiple crops	Timely planting, avoid planting ornamental close to vegetable crops	Dense insect netting material is available for commercial producers	Spinosad, Insecticidal soap, Paraffinic oil, *Chenopodium* Terpene Extract (Requiem)
Whitefly	Multiple crops	Crop rotation, avoid planting ornamental close to vegetable crops, problem intensifies in drought	—	*Metarhizium anisopliae,* Insecticidal soap, Neem oil, *Beauveria bassiana, Chenopodium* Terpene Extract
Yellowmargined leaf beetle	Brassica crops	Turnips and Napa Cabbage are defoliated rapidly. Trap cropping with turnips and insecticidal treatment can reduce build up.	Insect netting (temporary exclusion methods) for reducing adult insect infestation*	Spinosad, *Chromobacterium* (Grandevo), Pyrethrins (use in rotation with frequent foliar applications)

* Relatively low-cost temporary insect netting products include the Super-Light Insect Barrier (GardensAlive.com), Insect Netting (AgFabric), AgroFabric Pro 19 Row Cover or other lightweight exclusion material are suitable for early season pest prevention over single rows of crop.

** Check the Oregon Department of Agriculture and the Organic Materials Review Institute websites for updates regarding recall of neem-based insecticides.

^ High tunnel pest exclusion (permanent system) using 50 percent woven shade cloth on side- and end-walls can exclude large moths and reduce caterpillar pressure. Details at http://www.southernsare.org/News-and-Media/SSARE-Bulletins/High-Tunnel-Pest-Exclusion-System-HTPE.

Organic insecticides are currently available as single active ingredient (AI) or in the form of premixes, such as Azera (neem + pyrethrins), Leap (BT + methyl salicylate), BotaniGard Maxx (pyrethrins + Beauveria bassiana).