

# Vegetables

## Vegetables – Commercial

### Residues

Federal laws prohibit the sale of food products that contain more than the specifically permitted amounts of pesticide residues. The recommendations in this guide are within these limits, and only insecticides that have been approved at the rates and time intervals specified are included. Disregarding the standards established by the Environmental Protection Agency could result in unnecessary losses and inconveniences. The kind and amount of pesticide present in food products are the responsibility of the food producer.

Specific instructions for the safe and effective use of farm chemicals must be given on the container label by law. It is your responsibility to carefully read and follow these label instructions and precautions.

### Application checklist

To obtain satisfactory control of vegetable insects:

1. Use one of the insecticides recommended for the particular crop against the particular pest.
2. Use the correct amount of insecticide.
3. Follow the recommended schedule of applications whenever regular applications are indicated.
4. Use hollow cone nozzles, not herbicide nozzles.
5. Set the nozzles about 20 inches from the surface to be sprayed.
6. Use sufficient pressure to obtain a full spray pattern for the nozzle; the manufacturer's list recommended psi for each style of the nozzle. Excessive pressure will increase the drift and decrease the deposit and should generally be avoided.

Use a sufficient spray to cover plants thoroughly, especially when fungicides are combined with insecticides. The amount of spray may be increased by slowing the ground speed of the sprayer or by using larger nozzles. Increasing pressure is not recommended.

### Dosages and formulations

Dosages of sprayable powders (water-soluble or wettable powders) and liquids are given as the amount of formulated product that should be used in 50 gallons of spray. Sufficient spray should be applied to provide thorough coverage of the plants. Granular insecticides commonly used for soil insect control are stated as the formulated product. Rates given are based on a broadcast application unless otherwise stated.

The formulations listed are not necessarily all that are available. If another formulation is used, convert to the proper dosage using those given in these recommendations as a guide.

Most insecticides are available as an emulsifiable concentrate (EC) that is based on solvents and/or oils or as a wettable powder (WP). Wettable powders are safer than emulsions to use on tender foliage. Certain insecticides are available as water-soluble (WS) powders and should not be confused with wettable powders. Water soluble powders go into solution while wettable powders merely form suspensions that settle out on standing.

Some insecticides are marketed as flowable. This formulation is generally less toxic to foliage than the standard EC.

Whenever possible, the formulations of emulsifiable concentrates have been quoted in pounds of active ingredient per gallon (example: 5 pounds EC). This was done because in many products the percentage of ingredients will vary due to the use of different solvents. Malathion, for example, is 5 pounds EC yet may be formulated anywhere from 55%-57% of active material.

### Precautions

Phosphate and carbamate insecticides, such as Parathion, Azinphos methyl, Methomyl and Trithion, are highly toxic to humans and animals. Take special precautions in handling and applying these chemicals and others of a similar nature. Check the label carefully and observe all safety precautions. Wash at once and change clothes if spillage occurs. Bathe promptly after use and wash clothes before reuse. Generally, symptoms of phosphate insecticide poisoning include blurred vision, headache, abdominal cramps and tightness of the chest.

**Note:** Take special precautions when mixing Methomyl. Wear a recommended respirator. Do not inhale the dust or powder.

**Warning:** Reentry times for workers entering groves and/or treated fields should be strictly observed. Be sure to check the label for this information.

**pH:** Adjust pH before adding insecticide; the optimum range is 5.5-6.0 for most insecticides. Diazinon needs no adjustment. Test water to adjust. DO NOT JUST ADD BUFFER.

**Spreader Stickers:** Needed on waxy leaf plants. May be used on most crops. Overdose will burn foliage.

**Table 1. Artichoke**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Leaf hoppers, Psyllids	Bifenthrin (Capture 2EC)	6.4 ounces	5	Observe label.
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	1	
	Permethrin (Ambush, Pounce) 25W	6.4-19.2 ounces	0	
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	

**Table 2. Beans (Lima and Snap)**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Bifenthrin (Brigade 2EC)	1.6-6.4 fluid ounces	3	Observe label. Do not feed treated vines to livestock.
	Imidacloprid (Admire Pro)	7-10 fluid ounces	21	
	Lambda-cyhalothrin (Warrior II)	1.28-1.92 oz/A	3	
	Malathion 5EC	1.0 pint	1	
	Malathion 25WP	2.5 pounds	1	
	Naled (Dibrom 8EC)	0.5 pint	1	
Bean leaf beetles, flea beetles, leaf hoppers	Carbaryl (Sevin) 50WP	2.0 pounds	None	Observe label. At pod set: begin weekly applications when the longest pods are 1-inch long and continue throughout harvest for maximum pod protection. Add an insecticide for the control of mites or leafminers as needed.
	Carbaryl (Sevin) 80S	1.0 pound	None	
Cucumber beetles, Mexican bean beetles	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	3	Observe label.
	Carbaryl (Sevin) 50WP	2.0 pound	None	
	Carbaryl (Sevin) 80S	1.25 pound	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	3	
	Malathion 5EC	1.0 pint	1	
	Malathion 25WP	2.5 pounds	1	
	Zeta-cypermethrin (various)	1.4-4.3 ounces		

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Bean leaf beetles, cucumber beetles, earworms, leafhoppers, lima bean pod borers, stink bugs</b>	Bifenthrin (Brigade, Capture 2EC)	2.1-6.4 fluid ounces	3	Observe label.
	Carbaryl (Sevin) 50WP	2.0 pounds	None	
	Carbaryl (Sevin) 80S	1.25 pounds	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	3	
	Zeta-cypermethrin (various)	1.4-4.3 ounces		
<b>Mites</b>	Bifenazate (Acramite)	16-24 fluid ounces	3	Observe label.
<b>Leafminers</b>	Naled (Dibrom 8EC)	0.5 pint	1	Do not feed treated vines to meat or dairy animals.
	Spinetoram (Radiant SC)	C4-8 fluid ounces	3(succulent) 28(dried)	Observe label.

**Table 3. Beet**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Imidacloprid (Admire Pro 4.6F soil)	4.4-10.5 ounces	21	Must be applied to soil. May be applied to direct-seeded crops in-furrow at seed or transplant depth. Do not exceed 12 ounces per acre per season.
<b>Armyworms, beet webworms</b>	Spinetoram (Radiant SC)	5-10 fluid ounces	1	Observe label.
<b>Flea beetles or webworms</b>	Carbaryl (Sevin) 80S	0.6 pound	3 (14 if tops are used for food)	Observe label.
	Methomyl (Lannate LV)	0.75-3.0 pints	0 roots, 10 tops	
	Methomyl (Lannate SP)	0.25-1.0 pound	0 roots, 10 tops	
<b>Leafminers</b>	Spinetoram (Radiant SC)	6.0-10.0 ounces	7	Observe label.
<b>Vegetable weevils</b>	Carbaryl (Sevin) 50WP	0.5 pound	3	Observe label.
	Malathion 5EC	1.0 pint	7	
	Malathion 25WP	2.5 pounds	7	

**Table 4. Brussels Sprouts**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Acetamiprid (Assail 30SG)	2-3 ounces	7	Observe label.
	Pymetrozine (Fulfill)	2.75 ounces	7	
	Imidacloprid (Admire Pro 4.6F)	4.4-10.5 ounces	21	
Diamondback moths, imported cabbage worms, loopers	<i>Bacillus thuringiensis</i>			Use maximum rate recommended by manufacturer.
	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Emamectin benzoate (Proclaim)	2.4-4.8 ounces	7	
	Indoxacarb (Avaunt)	3.5 ounces	3	
	Methomyl (Lannate LV)	1.5-3.0 pints	3	
	Methomyl (Lannate SP)	0.25-1.0 pound	3	Do not use in home plantings.
	Permethrin (Ambush 2EC)	3.26-4.0 ounces	1	Do not apply more than 8 applications per season.
	Permethrin (Ambush 25WP)	3.2-6.4 ounces	1	Observe label.
	Permethrin (Pounce 3.2 EC)	2.0-4.0 ounces	1	
	Novaluraon (Rimon 0.83EC)	6.0-12.0 fluid ounces	7	Loopers are most difficult to control; watch for loopers on underside of leaf along borders. Treat on a 7-day schedule and change to 5 days for heavy infestations. Use a wetting agent according to manufacturer's instructions. Add <i>Bacillus thuringiensis</i> to sprays to increase control.
	Spinetoram (Radiant SC)	5-10 fluid ounces	1	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
Whiteflies	Acetamiprid (Assail 30SG)	2.5-4.0 ounces	7	Observe label.
	Dinotefuran (Venom 70SG)	1.0-4.0 ounces (foliar)	1	Do not apply more than 6 ounces per season foliar.
	Dinotefuran (Venom 70SG)	5.0-6.0 ounces (soil)	21	Observe label.
	Pymetrozine (Fulfill)	2.75 ounces	7	
	Spiromesifen (Oberon 2SC)	7-8.5 fluid ounces	21	

**Table 5. Cabbage and Broccoli**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Diamondback moths, imported cabbage worms, loopers,</b>	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Emamectin benzoate (Proclaim)	2.4-4.8 ounces	7	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	3	
	Indoxacarb (Avaunt)	3.5 ounces	3	
	Methomyl (Lannate LV)	1.5-3.0 pints	3	
	Methomyl (Lannate SP)	0.25-1.0 pound	3	Do not use in plantings.
	Permethrin (Ambush 2EC)	3.2-6.4 ounces	1	Observe label.
	Permethrin (Ambush 25WP)	3.2-6.4 ounces	1	Loopers are most difficult to control; watch for loopers on underside of leaf along borders. Treat on 7-day schedule and change to 5 days for heavy infestations. Use a wetting agent according to manufacturer's instructions.
	Permethrin (Pounce 3.2 EC)	2.0-4.0 ounces	1	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
<b>Leafminers, thrips</b>	Spinosad (SpinTor 2SC)	3.0-10.0 ounces	1	Observe label.
<b>Root aphids, root maggots</b>	Diazinon AG500	2.0-3.0 quarts	7-broccoli 21-cabbage	Broadcast just before planting and immediately incorporate into the top 3-4 inches of soil.
<b>Whiteflies</b>	Acetamiprid (Assail 30SG)	2.5-4 ounces	7	Use spreader stick to improve control.
	Dinotefuran (Venom 70SG)	1-4 ounces (foliar)	1	Observe label.
	Spiromesifen (Oberon 2SC)	7.0-8.5 fluid ounces	7	Do not exceed 25.5 fluid ounces per acre per season.
<b>Wireworms</b>	Diazinon AG500	3.0-4.0 quarts	14	

**Table 6. Cantaloupe**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Bifenthrin	2.6-6.4 ounce	3	Limit 2 applications after bloom.
	(Various) 2EC			
	Fonicamid (Beleaf 50SG)	2-2.8 ounce	0	
	Pymetrozine (Fulfill 50WDG)	2.7 ounce	0	Apply before aphids reach damage level. Do not exceed 5.5 ounces per season per acre.

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Cucumber beetles, melon worms, pickleworms, squash bugs, squash vine borers</b>	Bifenthrin (Capture 2EC)	5.12-6.4 ounces	3	Observe label.
	Carbaryl (Sevin) 50WP	1.0 pound	None	
	Carbaryl (Sevin) 80S	0.6 pound	None	
	Esfenvalerate (Asana XL)	5.6-9.8 ounces	3	
	Permethrin (Ambush 25W)	6.4-12.8 ounces	3	
<b>Cutworms</b>	Diazinon AG500	2.0-4.0 quarts	3	Observe label.
<b>Leafminers</b>	Naled (Dibrom 8EC)	0.25-0.5 pint	1	Observe label.
	Oxamyl (Vydate 10G)	40-60 pounds (broadcast)		Apply within 1 week of planting.
	Oxamyl (Vydate L) 2EC	2.0-4.0 pints	1	Observe label.
	Permethrin (Pounce 2.5WP)	12.8 ounces	1	
	Permethrin (Pounce 3.2EC)	8.0 ounces	1	
	Spinetoram (Radiant SC)	5-10 fluid ounces	3	
<b>Spider mites</b>	Bifenazate (Acramite 50WS)	0.75-1.0 pound	3	Observe label.
	Bifenthrin (Capture 2EC)	5.12-6.4 ounces	3	
	Permethrin (Ambush 25W)	6.4-12.8 ounces	0	
	Abamectin (Agri-Mek) 0.15EC	8-16 ounces	7	
	Spiromesifen (Oberon 2 SG)	7-8.5 fluid ounces	7	
<b>Wireworms</b>	Diazinon AG500	3.0-4.0 quarts	3	Observe label.

**Table 7. Carrot**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Thiamethoxam (Actara 25 WPG)	1.5-3 ounces	7	Observe label.

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Armyworms, flea beetles, leafhoppers,</b>	Beta-cyfluthrin (Baythroid 2EC)	1.6-2.8 ounces	0	Observe label.
	Carbaryl (Sevin) 50WP	0.5 pound	None	
	Carbaryl (Sevin) 80S	0.6 pound	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	7	
	Malathion 5EC	1.0-1.5 pints	7	
	Methomyl (Lannate LV)	1.0-3.0 pints	1	
	Methomyl (Lannate SP)	0.33-1.0 pound	1	
	Spinetoram (Radiant SC)	3.0-6.0 fluid ounces	3	Radiant will not control leafhoppers; no more than 4 applications per year.
<b>Vegetable weevils</b>	Malathion 5EC	1.0 pint	7	Observe label.
<b>Wireworms</b>	Diazinon AG500	3.0-4.0 quarts	14	Observe label.

**Table 8. Cauliflower**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Imidacloprid (Provado 1.6FL)	3.75 ounces	7	Observe label.
	Pymetrozine (Fulfill)	2.75 ounces	7	
<b>Diamondback moths, flea beetles, loopers</b>	Esfenvalerate (Asana 1.9EC)	1.7-3.4 ounces	1	Observe label.  Loopers are most difficult to control; watch for loopers on underside of leaf along borders. Treat on a 7-day schedule and change to 5 days for heavy infestations. Use a wetting agent according to manufacturer's instructions. Add <i>Bacillus thuringiensis</i> to sprays to increase control.
	Permethrin (Ambush 2EC)	3.2-6.4 ounces	1	
	Permethrin (Ambush 25WP)	3.2-6.4 ounces	1	

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Imported cabbage worms	<i>Bacillus thuringiensis</i>			Use maximum amount recommended by manufacturer.
	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Emamectin benzoate (Proclaim)	2.4-4.8 ounces	7	
	Indoxacarb (Avaunt)	3.5 ounces	1	
	Methomyl (Lannate LV)	0.75-3.0 pints	3	Do not use in home plantings.
	Methomyl (Lannate SP)	0.25-1.0 pound	3	
	Permethrin (Pounce 2.5WP)	3.2-6.4 ounces	1	Observe label.
	Permethrin (Pounce 3.2EC)	24.0 ounces	1	
	Spinetoram (Radiant SC)	5-10 fluid ounces	1	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
Mole crickets	Diazinon AG500	1.0 quart	7	Observe label.
Root maggots	Diazinon AG500	2.0-3.0 pints	7	Observe label.
Whiteflies	Acetamiprid (Assail 30SG)	2.5-4 ounces	7	Observe label.
	Spiromesifen (Oberon 2SC)	7-8.5 ounces		
Wireworms	Diazinon AG500	3.0-4.0 quarts	7	Observe label.

Table 9. Collards and Greens

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Acetamiprid (Assail 30SG)	2.0-3.0 ounces	7	Observe label.
	Imidacloprid (Admire Pro)	4.4-10.5 ounces	21	Observe label. Will also control flea beetles.
	Malathion 5EC	1.0 pint	7	Observe label.
	Malathion 25WP	2.5 pounds	7	
	Pymetrozine (Fulfill)	2.75 ounces	7	
	Spirotetramat (Movento 25C)	4.0-5.0 fluid ounces	1	Do not exceed 10 fluid ounces per season.



Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Caterpillars, loopers	<i>Bacillus thuringiensis</i>		0	Use maximum rate recommended by manufacturer. On foliage every 7 days. Apply to both sides of leaves when larvae are small.
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	7	Collards only.
	Emamectin benzoate (Proclaim 5WDG)	2.4-4.8 ounces	14	Observe label.
	Indoxacarb (Avaunt 30WDG)	2.5-3.5 ounces	3	
	Permethrin (Ambush 25W)	3.2-6.4 ounces	1	
	Permethrin (Pounce 25WP)	3.2-6.4 ounces	1	
	Spinetoram (Radiant SC)	5-10 fluid ounces	1	
	Zeta-cypermethrin (various)	2.24-4.0 ounces	1	
Flea beetles	Carbaryl (Sevin) 50WP	3.0 pounds	14	Observe label.
Stinkbugs	Acetamiprid (Assail 30SG)	3.0-4.0 ounces	7	Observe label.
	Clothianidin (Belay 2.13SC)	3.4 ounces (foliar) 9.0-12.0 ounces (soil)	21 (foliar)	Soil application at plant only.
Whiteflies	Acetamiprid (Assail 30SG)	2.5-4.0 ounces	7	Observe label.
	Spiromesifen (Oberon 2SC)	7.0-8.5 fluid ounces	7	
	Spirotetramat (Movento 2SC)	4.0-5.0 fluid ounces	1	Do not exceed 10 fluid ounces per season.

Table 10. Cucumber

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Acetamiprid (Assail 30SG)	2.5-4 ounces	0	Observe label.
	Flonicamid (Beleaf 50SG)	2-2.8 ounces	0	
	Pymetrozine (Fulfill)	2.75 ounces	14	
	Thiamethoxam (Actara)	2.0-3.0 ounces	None	
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Cucumber beetles, vegetable weevils</b>	Malathion 5EC	1.0 pint	7	Observe label.
	Methomyl (Lannate LV)	1.5-3.0 pints	1.5 (1-day) > 1.5 (3-days)	
	Methomyl (Lannate SP)	0.5-1.0 pound	0.5 (1-day) > 0.5 (3-days)	
<b>Leafminers</b>	Abamectin (Agri-Mek) 0.15EC	8.0-16.0 ounces	7	Observe label.
	Naled (Dibrom 8EC)	0.5-0.75 pint	None	
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	To harvest	Not more than 1.6 pounds/A.I. per acre per season.
	Permethrin (Pounce 25 WP)	6.4-12.8 ounces	To harvest	
	Rynaxypyr (Coragen 1.6SC)	5-7.5 fluid ounces	1	Soil, foliar or drip chemigation.
	Spinetoram (Radiant SC)	6-8 ounces	1	Observe label.
<b>Melon worms, pickleworms, squash bugs, squash vine borers</b>	Bifenthrin (various)	2.6-6.4 ounces	3	Observe label. Limit 19.2 fluid ounces per acre per season; allow 7 days between applications.
	Carbaryl (Sevin) 50WP	1.0 pound	None	Observe label.
	Carbaryl (Sevin) 80S	0.6 pound	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	3	
	Permethrin (Ambush 25W)	0.1-0.2 pound	None	
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	To harvest	Not more than 1.6 pounds
	Permethrin (Pounce 25 WP)	6.4-12.8 ounces	To harvest	Observe label.
	Rynaxypyr (Coragen 1.67SC)	3.5-5 fluid ounces	1	Foliar or drip.
Spinetoram (Radiant SC)	5.0-10.0 fluid ounces	1	Observe label.	
<b>Spider mites</b>	Abamectin (Agri-Mek) 0.15EC	5-16 ounces	7	On foliage as needed; no more than 2 applications.
	Bifenazate (Acramite 50WS)	.75-1 pound	3	Do not exceed 1 application per season.
	Bifenthrin (Brigade) 2EC	2.6-6.4 ounces	7	Observe label.
	Fenpropathrin (Danitol 2.4EC)	10.66 ounces	7	
	Spiromesifen (Oberon 25G)	7-8.5 fluid ounces	7	

**Table 11. Eggplant**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Imidacloprid (Admire Pro)	1.3-2.2 fluid ounces	0	Observe label. Foliar treatment.
	Malathion 5EC	1.0 pint	3	
	Malathion 25WP	3.5 pounds	3	
	Naled (Dibrom 8EC)	0.5 pint	1	
	Thiamethoxam (Actara)	2.0-4.0 ounces	None	
<b>Colorado potato beetles, flea beetles, horn worms, thrips, tomato fruitworms</b>	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Carbaryl (Sevin) 50WP	2.0 pounds	None	
	Carbaryl (Sevin) 80S	1.5 pounds	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	1	
	Imidacloprid (Admire 2F)	10.0-24.0 ounces		
	Indoxacarb (Avaunt)	3.5 ounces	3	
	Permethrin (Ambush 25WP)	0.1-0.2 pound	3	
	Permethrin (Pounce 3.2 EC)	8.0 ounces	3	Foliar or drip chemigation.
	Rynaxypyr (Coragen 1.67SC)	3.5-5.0 fluid ounces	1	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
<b>Spider mites</b>	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 fluid ounces	7	Observe label.
	Bifenazate (Acramite 50WS)	0.75-1.0 pound	3	
	Fenbutatin-oxide (Vendex 50WP)	2.0-3.0 pounds	3	
	Fenpyroximate (Portal 0.4EC)	2 pints	3	
	Spiromesifen (Oberon 2SG)	7.0-8.5 fluid ounces	7	
<b>Whiteflies</b>	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	Observe label.
	Thiamethoxam (Actara)	2.0-4.0 ounces	0	
	Acetamiprid (Assail 30SG)	2.5-4.0 ounces	7	No more than 1 every 7 days. Do not exceed 4 applications per season or 7 ounces per season.
	Spiromesifen (Oberon 2EC)	7.0-8.5 SC	7	Do not exceed 3 applications/season

**Table 12. English Pea**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids, cabbage loopers, cutworm	Bifenthrin (Capture 2EC)	1.6-6.4 ounces	3	Observe label.
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	1	
	Imidacloprid (Admire Pro 4.6F)	1.2 fluid ounces	7	
	Malathion 5EC	1.0 pint	3	
	Pymetrozine (Fulfill 50WPG)	2.75 ounces	14	

**Table 13. Irish Potato**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids, caterpillars, Colorado potato beetles, cucumber beetles, flea beetles, flea hoppers, leafhoppers, plant bugs, psyllids	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	14	Observe label.
	Acetamiprid (Assail 30SG)	1.5-4.0 ounces	7	
	Carbaryl (Sevin) 80S	0.6 pound	None	Foliage applications only.
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	1	Observe label.
	Imidacloprid (Admire Pro 4.6F)	1.2 fluid ounces	7	Observe label. Foliar treatment.
	Indoxacarb (Avaunt)	3.5-6.0 ounces	7	Observe label.
	Permethrin (Ambush 25W)	0.05-0.2 pound	7	
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	7	
	Pymetrozine (Fulfill)	2.75 ounces	14	
	Spinetoram (Radiant SC)	6.0-8.0 fluid ounces	7	
	Spinosad (Blackhawk 36WG)	1.7-3.3 ounces	3	
	Thiamethoxam (Actara)	1.5 ounces	14	
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	
Caterpillars	Methomyl (Lannate LV)	0.75-3.0 pints	10	Do not use in home plantings.
	Methomyl (Lannate SP)	0.25-1.0 pound	14	Observe label.
Mites	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	14	Observe label.
Whiteflies	Imidacloprid (Provado 1.6 F)	3.25 ounces	7	Observe label.
	Pymetrozine (Fulfill)	2.75 ounces	14	
	Thiamethoxam (Actara)	1.5 ounces	14	
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Wireworms	Ethoprop (Mocap 15G)	1.4 pounds per 1,000 ft. row	90	Observe label.

Table 14. Lettuce

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Acetamiprid (Assail 30SG)	2-4 ounces	7	Do not apply more than 1 every 7 days; do not exceed 4 applications/year.
	Imidacloprid (Admire Pro 4.6F)	1.0-3.0 fluid ounces	7	Observe label.
	Malathion 5EC	1.0-2.0 pints	7 (head) 14 (leaf)	
	Pymetrozine (Fulfill)	2.75 ounces	7	
	Spinosad (SpinTor 2SC)	1.5-3.0 ounces	1	
	Spirotetramat (Movento 2SC)	4.0-5.0 fluid ounces	3	
Caterpillars	<i>Bacillus thuringiensis</i>			Use maximum rate recommended by manufacturer.
	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Emamectin benzoate (Proclaim)	2.4-4.8 ounces	7	
	Indoxacarb (Avaunt)	2.5-3.5 ounces	3	
	Permethrin (Ambush 25W)	0.1-0.2 pounds	1	Do not feed refuse leaves to livestock. On leaf lettuce, do not use more than 2 applications per season; head lettuce only.
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	7	Observe label.
	Permethrin (Pounce 25WP)	6.4-12.8 ounces	1	
	Spinosad (SpinTor 2SC)	1.5-3.0 ounces	1	
	Tebufenozide (Confirm)	6.0-8.0 ounces	7	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
Leafhoppers, leafminers	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	Observe label.
	Bifenthrin (various)	2.6-6.4 ounces	7	
	Imidacloprid (Provado 1.6F)	3.75 fluid ounces	7	Check label for plant-back restrictions.
	Malathion 25WP	2.0-5.0 pounds	7 (head) 14 (leaf)	Observe label.
Wireworms	Diazinon AG500	3.0-4.0 quarts	14	Observe label.

**Table 15. Okra**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Imidacloprid (Admire Pro 4.6F)	1.3-2.2 fluid ounces	0	Observe label.
	Malathion 5EC	1.0 pint	1	
	Malathion 25WP	2.5 pounds	1	
Beetles, leaf-footed bugs stink bugs	Bifenthrin (Brigade 2EC)	2.6-6.4 ounces	7	Observe label.
	Buprofezin (Courier 40SC)	9-13.6 ounces	1	
	Carbaryl (Sevin) 50WP	2.0 pounds	None	Observe label. Sevin will not control stinkbugs.
	Carbaryl (Sevin) 80S	1.25 pounds	None	
Zeta-cypermethrin (various)	2.24-4 ounces	1	Observe label.	
Corn earworms	Carbaryl (Sevin) 50WP	2.0 pounds	None	Observe label.
	Carbaryl (Sevin) 80S	1.25 pounds	None	
	Spinosad (SpinTor 2SC)	1.5-8.0 ounces	1	

**Table 16. Onion, Shallot**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Onion thrips, thrips	Acetamiprid (Assail 70WP)	2.1-3.4 ounces	7	Observe label.
	Malathion 5EC	0.6 pint	3	
	Malathion 25WP	1.5 pounds	3	
	Permethrin (Ambush 25W)	9.6-19.2 ounces	1	
	Permethrin (Pounce 25WP)	9.6-19.2 ounces	1	
	Spinetoram (Radiant SC)	6-8 fluid ounces	1	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
Onion maggots	Diazinon AG500	2.0-4.0 quarts	14	Observe label.

**Table 17. Parsley**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Imidacloprid (Admire 4.6F)	7-10 ounces	21	Soil application.
	Imidacloprid (Provado 1.6F)	3.75 ounces	0	Observe label.
	Malathion 5EC	1.0 pint	21	
	Pymetrozine (Fulfill)	2.75 ounces	7	
Caterpillars, loopers	<i>Bacillus thuringiensis</i>		None	Observe label.
	Permethrin (Ambush 25W)	0.4-0.8 pound	1	
Flea beetles	Carbaryl (Sevin) 50W	2.0-4.0 pounds	14	Observe label.
	Malathion 5EC	1.0-2.0 pints	21	
	Methomyl (Lannate LV)	1.5-3.0 pints	10	
	Methomyl (Lannate SP)	0.5-1.0 pounds	10	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	

**Table 18. Peppers**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids	Imidacloprid (Admire Pro)	7.0-14.0 ounces	21	Soil or foliar application.
	Methomyl (Lannate LV)	1.5-3.0 pints	3	Observe label.
	Methomyl (Lannate SP)	0.5-1.0 pound	3	
	Naled (Dibrom 8EC)	0.5 pint	1	
	Oxamyl (Vydate L)	2.0-4.0 pints	7-14	
	Thiamethoxam (Actara)	2.0-4.0 ounces	0	
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Flea beetles, hornworms, leaf-footed bugs, tomato fruitworms, yellow-striped armyworms</b>	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Carbaryl (Sevin) 50WP	2.0 pounds	None	
	Carbaryl (Sevin) 80S	1.25 pounds	None	
	Methomyl (Lannate LV)	1.5-3.0 pints	3	
	Methomyl (Lannate SP)	0.5-1.0 pound	3	
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	3	
	Spinosad (SpinTor 2SC)	1.5-8.0 ounces	1	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		
<b>Leafminers</b>	Abamectin (Agri-Mek) 0.15EC	8.0-16.0 ounces	7	Observe label.
	Cyromazine (Trigard 75WP)	2.66 ounces	0	
	Oxamyl (Vydate L)	2.0-4.0 pints	7-14	
	Permethrin (Pounce 3.2EC)	4.0-8.0 ounces	3	
	Spinosad (SpinTor 2SC)	1.5-8.0 ounces	1	
<b>Pepper weevils</b>	Acephate (Orthene) 75S	0.66 pound	7	Do not use on bell peppers. Use in conjunction with pyrethroids.
	Acetamiprid (Assail 30SG)	4.0 ounces	7	Observe label.
	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	(General Comment) Begin spray application for control of pepper weevil as soon as damage is observed. Spray on 3- to 4-day schedule until control is obtained (usually 3 weeks). Destroy all pepper plants when through harvesting.
	Carbaryl (Sevin) 80S	2.5 pounds	None	
	Esfenvalerate (Asana XL)	5.8-9.7 ounces	7	
	Permethrin (Ambush 25WP)	6.4-12.8 ounces	3	Bell peppers only.
	Permethrin (Pounce 3.2EC/25WP)	4.0-8.0 ounces	3	Bell peppers only.
<b>Spider mites</b>	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	Observe label.
	Bifenazate (Acramite 50WS)	0.75-1.0 pound	3	No more than 1 application per season; will not control broad mite.
	Bifenthrin (Capture 2EC)	2.1-6.4 ounces	7	Observe label.
	Fenpyroximate (Portal .4EC)	2 pints	3	
	Spiromesifen (Oberon)	7.0-8.5 fluid ounces	7	Do not exceed 3 applications per season.



Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Vegetable weevils, thrips	Malathion 57EC	1.0 pint	7	Late afternoon and evening spraying is best. Clearing or treating dead lands and ditch banks is effective.
	Imidacloprid (Admire Pro 4.6F)	7.0-14.0 ounces	21	
	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	Observe label.
	Spinetoram (Radiant SC)	4.0-8.0 ounces	1	
Whiteflies	Imidacloprid (Admire 2F)	16.0-32.0 ounces	21	Soil application.
	Imidacloprid (Admire Pro)	1.3-2.2 ounces	0	Foliar application. Minimum interval between foliar applications: 5 days. Do not use more than 6.7 fluid ounces/acre per crop season.
	Pymetrozine (Fulfill)	2.75 ounces	7	Observe label.
	Thiamethoxam (Actara)	2.0-4.0 ounces	None	
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	

Table 19. Pumpkin

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids, whiteflies	Pymetrozine (Fulfill)	2.75 ounces	7	Observe label.
	Bifenthrin (Brigade 2EC)	2.6-6.4 fluid ounces	3	
	Imidacloprid (Admire 2F)	16.0-24.0 ounces	21	Soil application.
	Thiamethoxam (Actara)	2.0-4.0 ounces	None	Observe label.
Cucumber beetles, melon worms, pickleworms, squash bugs, squash vine borers	Carbaryl (Sevin) 50WP	1.0 pound	None	Observe label. Make first application for cucumber beetle when seedlings first crack soil; repeat as needed.
	Carbaryl (Sevin) 80S	0.6 pound	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	3	
	Permethrin (Pounce 3.2 EC)	8.0 ounces	1	
	Permethrin (Ambush 25WP)	6.4-12.8 ounces		
	Permethrin (Pounce 25WP)	12.8 ounces	1	
Spider mites	Spinosad (SpinTor 2SC)	4.0-8.0 ounces	3	
	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	Observe label.
	Bifenazate (Acramite 50WS)	0.75-1.0 pound	3	No more than 1 application per season
	Spiromesifen (Oberon 2SG)	7-8.5 ounces	7	No more than 3 applications per season.

**Table 20. Radishes**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids, dipterous leafminers, flea beetles,</b>	Beta-cyfluthrin (Baythroid)	1.6-2.8 ounces	None	Observe label.
	Carbaryl (Sevin) 50WP	1.0 pound	3	
	Carbaryl (Sevin) 80S	0.6 pound	3	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	7	Observe label. Foliar treatment.
	Imidacloprid (Admire Pro)	1.2 fluid ounces	7	
	Spinosad (SpinTor 2SC)	3.0-6.0 ounces	7	
<b>Wireworms</b>	Diazinon AG500	3.0-4.0 quarts	14	Observe label.

**Table 21. Southern Pea**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Imidacloprid (Admire Pro)	7.0-10.5 fluid ounces	21	Soil or foliar application.
	Malathion 5EC	1.0 pint	1	Observe label.
	Malathion 25WP	2.5 pounds	1	
<b>Corn earworms, cowpea curculios, stinkbugs</b>	Bifenthrin (Capture 2EC) Capture 2EC	2.1-6.4 ounces	3	Observe label.
	Carbaryl (Sevin) 50WP	2.0 pounds	None	
	Carbaryl (Sevin) 80S	1.25 pounds	None	Carbaryl should be applied as a spray rather than a dust. Will not control stinkbugs.
	Methomyl (Lannate LV)	0.75-3.0 pints	3	Do not graze or feed treated forage to livestock.
	Methomyl (Lannate SP)	0.25-1.0 pound	3	Observe label.
	Spinosad (SpinTor 2SC)	3.0-6.0 ounces	3	
	Zeta-cypermethrin (various)	2.4-4.3 ounces		

**Table 22. Spinach**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Acetamiprid (Assail SG)	2.0-4.0 ounces	7	Do not apply more than once every 7 days; do not exceed 5 applications/season.
	Flonicamid (Beleaf 50SG)	2.0-2.8 ounces	0	Observe label.
	Imidacloprid (Admire Pro)	4.4-10.5 fluid ounces	21	Soil or foliar application.
	Malathion 5EC	1.0 pint	7	Observe label.
	Spirotetramat (Movento 2SC)	4.0-5.0 fluid ounces	3	Do not exceed 10 fluid ounces per season.
<b>Caterpillars, flea beetles, loopers</b>	Indoxacarb (Avaunt 30SG)	2.5-3.5 ounces	3	Observe label.  Spray on 5- to 7-day schedule or as needed. Apply sufficient spray to cover foliage completely.
	Methomyl (Lannate 90SP)	0.5 pound	7	
	Permethrin (Pounce 3.2 EC)	4.0 ounces	1	
	Permethrin (Ambush 25WP, Pounce 25WP)	6.4 ounces	1	
	Spinosad (SpinTor 2SC)	1.5-10.0 ounces	1	
	Tebufenozide (Confirm 2E)	6.0-8.0 ounces	7	
<b>Leafminers</b>	Cyromazine (Trigard 75WP)	2.66 ounces	7	Observe label.
	Spinetoram (Radiant SC)	6.0-10.0 ounces	1	

**Table 23. Squash (Summer and Winter)**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Acetamiprid (Assail 30SG)	2.5-4.0 ounces	0	Limit 19.22 fluid ounces per season – 2 applications post bloom; allow 7 days between applications.
	Bifenthrin (Capture 2EC)	2.6-6.4 fluid ounces	3	
	Pymetrozine (Fulfill 50WDG)	2.75 ounces	0	
<b>Cucumber beetles</b>	Bifenthrin 2EC	2.6-6.4 fluid ounces	3	Limit 19.22 fluid ounces per season – 2 applications post bloom; allow 7 days between applications.
	Imidacloprid (Admire Pro 4.6F)	7.0-10.5 fluid ounces	21	
	Dinotefuran (Venom 70SG)	3.0-4.0 ounces (foliar)	1	
5.0-6.0 ounces (soil)		21		

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Leafminers	Bifenthrin (Capture 2EC)	5.12-6.4 ounces	3	Observe label.
	Cyromazine (Trigard 75WP)	2.66 ounces	7	
	Naled (Dibrom 8EC)	0.5-1.0 pint	None (summer) 1 day (winter)	
	Oxamyl (Vydate L)	2.0-4.0 pints	1	Leafminers only.
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	To harvest	Not more than 1.6 pounds/A.I. per acre per season.
	Permethrin (Pounce 25WP)	6.4-12.8 ounces	To harvest	Observe label.
	Spinetoram (Radiant SC)	6.0-10.0 ounce	1	
	Spinosad (SpinTor 2SC)	4.0-8.0 ounces	3	
Melon worms, pickleworms, squash bugs, squash vine borers	Carbaryl (Sevin) 50WP	1.0 pound	None	Observe label.
	Permethrin (Pounce 3.2EC)	4.0-8.0 ounces	To harvest	Not more than 1.6 pounds/A.I. per acre per season.
	Permethrin (Pounce 25WP)	6.4-12.8 ounces	To harvest	Observe label.
	Acetamiprid (Assail 30WG)	5.3 ounces	0	
	Bifenthrin (Capture 2EC)	5.12-6.4 ounces	3	
	Spinosad (SpinTor 2SC)	4.0-8.0 ounces	3	
	Methomyl (Lannate LV)	1.5-3.0 pints	3	
	Methomyl (Lannate SP)	0.5-1.0 pound	3	
Esfenvalerate (Asana XL)	1.7-3.4 ounces	3		
Spider mites	Bifenthrin (Capture 2EC)	5.12-6.4 ounces	7	Observe label.
Whiteflies	Imidacloprid (Admire 2F)	16.0-24.0 ounces	21	Soil application.
	Pymetrozine (Fulfill)	2.75 ounces	7	Observe label.
	Spiromesifen (Oberon 2SC)	7.0-8.5 fluid ounces	7	Do not apply more than 3 applications per season
	Thiamethoxam (Platinum)	5.0-8.0 ounces	30	Observe label.

**Table 24. Sweet Corn**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Corn rootworms, wireworms	Bifenthrin(Various)	0.4-8.0 ounces/1,000 linear feet/row	0	Apply as 5-7 in T-band over open seed furrow.

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Cutworms</b>	Beta-cyfluthrin (Baythroid XL)	0.8-1.6 fluid ounces	0	Observe label.
	Bifenthrin (Brigade 2EC)	2.1-6.4 fluid ounces	1	
	Esfenvalerate (Asana XL)	4.8 ounces	1	
<b>European corn borers, fall armyworms</b>	Bifenthrin(various)	0.4-8.0 ounces./1,000 linear feet/row	0	Apply as 5-7 in T-band over open seed furrow.
	Carbaryl (Sevin) 50WP	4.0 pounds	None	Observe label.
	Carbaryl (Sevin) 80S	2.5 pounds	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	1	
	Indoxacarb (Avaunt 30DG)	2.5-3.5 ounces	3	For control of European corn borer in whorl stage only. Do not apply more than 14 ounces per acre per crop.
	Permethrin (Ambush 25WP)	6.4-12.8 ounces	1	(General comment) For best control apply to silks when silks first appear on 2-day schedule until silks wilt.
	Permethrin (Pounce 3.2 EC)	4.0-8.0 ounces	1	
	Permethrin (Pounce 25WP)	6.4-12.8 ounces	1	
	Rynaxypyr (Coragen 1.67SC)	3.5-5.0 fluid ounces		
	Spinetoram (Radiant SC)	3.0-6.0 ounces	1	Do not apply more than 36 ounces per acre per season.
	Spinosad (SpinTor 2EC)	1.5-6.0 ounces	1	Observe label.
Zeta-cypermethrin (Fury 2EC)	2.4-4.3 ounces	3	Observe label.	
<b>Seed corn maggots</b>	Diazinon AG500	2.0-4.0 quarts	7	Observe label.

**Table 25. Field Tomato**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Aphids, flea beetles	Acetamiprid (Assail 30SG)	2.0-4.0 ounces	7	Do not apply more than once every 7 days. Do not exceed 5 applications per season.
	Dimethoate 4EC	0.5-1.0 pint	7	Do not exceed rate as leaf damage may occur.
	Fonicamid (Beleaf 50SG)	2.0-2.8 ounces	0	Will not control flea beetles.
	Imidacloprid (Admire Pro 4.6F)	7.0 fluid ounces	21	Short-term protection at planting. May also be applied to transplants in the planting house.
	Pymetrozine (Fulfill 50WDG)	2.75 ounce	0	For aphids only.
	Spirotetramat (Movento 2SC)	4.0-5.0 fluid ounces	1	Do not exceed 10 fluid ounces/season.
	Thiamethoxam (Platinum 2SC)	5.0-11.0 ounces	30	May be applied to direct-seeded crops. Do not exceed 11 ounces per acre per season. Check label for plant-back restrictions for a number of crops.
	Thiamethoxam (Actara 25 WDG)	2.0-3.0 ounces	0	For foliar applications.
Armyworms	Bacillus thuringiensis (Crymax WDG)	0.5-1.5 pounds	0	Start application when larvae are small and continue at 5- to 7-day intervals during periods of infestation.
	Bacillus thuringiensis (Dipel 2X)	0.5-1 pound	0	
	Bacillus thuringiensis (XenTari)	0.5-1 pound	0	
	Emamectin benzoate (Proclaim 5WDG)	2.4-4.8 ounces	7	Apply when larvae are first observed.
	Indoxacarb (Avaunt 30DG)	3.5 ounces	3	Do not apply more than 14 ounces per acre per crop. Minimum interval between sprays is 5 days.
	Methoxyfenozide (Intrepid 2F)	4.0-10.0 ounces	1	Use low rates for early-season applications; 6-10 ounces for mid- to late-season applications.
	Rynaxypyr (Coragen 1.67SC)	3.5-5.0 fluid ounces	1	Foliar or drip chemigation. Observe label.
	Spinetoram (RadiantSC)	5.0-10.0 ounces	1	

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Cabbage loopers, hornworms, pinworms, tomato fruitworms	Bacillus thuringiensis (Crymax WDG)	0.5-1.5 pound	0	Do not tank-mix <i>Bacillus thuringiensis</i> formulations with Dyrene.
	Bacillus thuringiensis (Dipel 2X)	0.5-1 pound	0	
	Beta-cyfluthrin (Baythroid XL)	1.6-2.8 fluid ounces	0	Do not exceed 16.8 fluid ounces per acre per season.
	Bifenthrin (various)	2.6-6.4 fluid ounces	1	
	Emamectin benzoate (Proclaim 5WDG)	2.4-4.8 ounces	7	
	Esfenvalerate (Asana XL 0.66 EC)	4.8-9.6 ounces	1	
	Fenpropathrin (Danitol 2.4 EC)	10.667 fluid ounces	3	Use a spray volume of 25-120 gallons per acre. Do not exceed 2.667 pints (42.667 fluid ounces) per acre per season.
	Gamma-cyhalothrin (Proaxis 0.5EC)	2.56-3.84 fluid ounces	5	
	Indoxacarb (Avaunt 30DG)	2.5-3.5 ounces	3	Do not apply more than 14 ounces per acre per crop. Minimum interval between sprays is 5 days.
	Lambda-cyhalothrin (Warrior II)	1.28-1.92 ounces	5	Do not exceed 2.88 pints per acre per season. Do not use on cherry tomatoes.
	Methomyl (Lannate 2.4LV)	1.5-3.0 pints	1	Methomyl may increase leafminer infestation.
	Methoxyfenozide (Intrepid 2F)	4.0-10.0 ounces	1	Use low rates for early-season applications; 6-10 ounces for mid- to late-season applications.
	Rynaxypyr (Coragen 1.67SC)	3.5-5 fluid ounces	1	Foliar or drip chemigation, observe label. Must be applied uniformly to root zone.
	Spinetoram (Radiant SC)	5.0-10.0 ounces	1	
Zeta-cypermethrin + bifenthrin (Mustang Max .8EC)	2.24-4.0 ounces	1		
Colorado potato beetles	Acetamiprid (Assail 30SG)	1.5-2.5 ounces	7	For soil, foliar or transplant drench treatment.
	Imidacloprid (Admire Pro 4.6F)	7.0 fluid ounces	21	Foliar or drip chemigation. Observe label.
	Rynaxypyr (Coragen 1.67SC)	3.5-5.0 fluid ounces	1	
	Spinetoram (Radiant SC)	5.0-10.0 ounces	1	
	Thiamethoxam (Actara 25 WDG)	2.0-3.0 ounce	0	For foliar applications.
	Thiamethoxam (Platinum 25C)	5.0-11.0 ounces	30	May be applied to direct-seeded crops. Do not exceed 11 ounces per acre per season. Check label for plant-back restrictions for a number of crops.

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Cutworms</b>	Beta-cyfluthrin (Baythroid XL)	1.6-2.8 fluid ounces	0	Do not exceed 16.8 fluid ounces per acre per season.
	Esfenvalerate (Asana XL 0.66 EC)	4.8-9.6 ounces	1	
	Gamma-cyhalothrin (Proaxis 0.5EC)	2.56-3.84 fluid ounces	5	
	Lambda-cyhalothrin (Warrior II)	1.28-1.92 ounces	5	Do not exceed 2.88 pints per acre per season. Do not use on cherry tomatoes.
	Zeta-cypermethrin (various)	3.2-4.0 ounce	1	
<b>Leafminers</b>	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	Do not exceed 48 fluid ounces per acre per season or more than 2 sequential applications.
	Cyromazine (Trigard 75WP)	2.66 ounce	0	See label for plant-back restrictions.
	Spinetoram (Radiant SC)	6.0-8.0 ounces	1	Do not exceed 29 fluid ounces per acre per season.
<b>Spider mites</b>	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	Do not exceed 48 fluid ounces per acre per season or more than 2 sequential applications.
	Bifenazate (Acramite 50WS)	0.75-1.0 pound	3	Do not make more than 1 application per season.
	Spiromesifen (Oberon 2SG)	7.0-8.5 fluid ounces	7	Do not exceed 3 applications per season.
<b>Stinkbugs</b>	Bifenthrin (various)	2.6-6.4 fluid ounces	1	
	Fenpropathrin (Danitol 2.4 EC)	10.667 fluid ounces	3	Use a spray volume of 25-120 gallons per acre. Do not exceed 2.667 pints (42.667 fluid ounces) per acre per season.
	Gamma-cyhalothrin (Proaxis 0.5EC)	2.56-3.84 fluid ounces	5	
	Lambda-cyhalothrin (Warrior II)	1.28-1.92 ounces	5	
	Thiamethoxam (Actara 25 WDG)	3.0-5.5 ounces	0	Do not exceed 11 ounces/A/season.
	Zeta-cypermethrin + bifenthrin (Mustang Max .8EC)	3.2-4.0 ounces	1	
<b>Thrips</b>	Dimethoate 4EC	0.5-1 pint	7	
	Dinotefuran (Venom 70SG)	1.0-4.0 ounces foliar	1	See comments under Whitefly for application instructions and restrictions.
		5.0-6.0 ounces soil	21	
	Methomyl (Lannate 2.4LV)	1.5-3 pints	1	On foliage as needed.
	Spinetoram (Radiant SC)	6.0-10.0 ounces	1	Controls thrips on foliage, not in flowers.



Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
Whiteflies	Acetamiprid (Assail 30SG)	2.5-4.0 ounces	7	Do not apply more than once every 7 days. Do not exceed 5 applications/season.
	Buprofezin (Courier 40 SC)	9.0-13.6 fluid ounces	7	Use sufficient water to ensure good coverage. Do not apply more than 2 per crop cycle; allow 28 days between applications.
	Dinotefuran (Venom 70SG)	1-4oz foliar	1	Do not follow soil applications with applications of other neonicotinoid insecticides (Actara or Venom) Use only 1 application method. May also control stink bugs.
	Dinotefuran (Venom 70SG)	5-6 ounces soil	21	
	Imidacloprid (Admire Pro)	1.3-2.2 fluid ounces	0	Foliar application. Minimum interval between foliar applications: 5 days. Maximum = 6.7 fluid ounces per acre per crop season.
	Imidacloprid (Admire Pro 4.6F Soil)	7.0-10.5 fluid ounces	21	Do not follow soil applications with applications of other neonicotinoid insecticides (Actara, Provado or Venom). Residual activity will increase with increasing rates applied. Use higher rate for late-season or continuous infestations. Trickle irrigation will also control aphids and stink bugs.
	Pyriproxfen (Knack 0.86EC)	8.0-10.0 ounces	14	Do not apply more than 2 applications per growing season. Do not make applications closer than 14 days.
	Spiromesifen (Oberon 2SG)	7.0-8.5 fluid ounces	7	Do not exceed 3 applications per season.
	Spirotetramat (Movento 2SC)	4.0-5.0 fluid ounces	1	Do not exceed 10 fluid ounces per season.
	Thiamethoxam (Actara)	3.0-5.5 ounces	0	Actara is for foliar applications.
Thiamethoxam (Platinum 2SC)	5.0-11.0 ounces	30	Do not follow soil applications with applications of other neonicotinoid insecticides (Actara, Provado or Venom). May be applied to direct-seeded crops. Do not exceed 11ounces per acre per season. Check label for plant-back restrictions for a number of crops.	
Wireworms	Diazinon AG 500	2.0-4.0 quart	0	Broadcast before planting and incorporate. Wireworms may be a problem in fields previously in pasture, corn or soybeans.

**Table 26. Turnip**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Imidacloprid (Admire Pro)	4.4-10.5 ounces	21	Greens only.
	Naled (Dibrom 8EC)	0.5 pint	1	Observe label.
	Malathion 5EC	1.0 pint	7	
	Malathion 25WP	2.5 pounds	3	
	Pymetrozine (Fulfill)	7.75 ounces	7	Greens only.
<b>Cabbage loopers, diamondback moths</b>	Emamectin benzoate (Proclaim 5WDC)	2.4-4.8 ounces	14	For turnip greens only.
	Esfenvalerate (Asana XL)	5.8-9.6 fluid ounces	7	Observe label.
	Indoxacarb (Avaunt 30WDG)	2.5-3.5 ounces	3	
	Spinetoram (Radiant SC)	3.0-6.0 fluid ounces	1	
<b>Caterpillars, flea beetles, loopers</b>	<i>Bacillus thuringiensis</i>			Use maximum rate recommended by manufacturer. Spray on 5- to 7-day schedule. Apply sufficient spray to cover foliage completely.
	Imidacloprid (Ambush 25W)	3.2-6.4 ounces	1	Observe label.
	Naled (Dibrom 8EC)	0.51 pint	1	
	Spinetoram (Radiant IC)	3-6 fluid ounces	1	
	Tebufenozide (Confirm 2F)	6.0-8.0 ounces	7	

**Table 27. Watermelon**

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Aphids</b>	Bifenthrin (Brigade 2EC)	2.6-6.4 fluid ounces	3	Observe label.
	Imidacloprid (Admire Pro)	7.0-10.5 ounces	21	Soil or foliar application.
	Naled (Dibrom 8EC)	0.25-0.5 pint	1	Observe label.
	Pymetrozine (Fulfill)	2.75 ounces	7	
	Thiamethoxam (Actara)	2.0-4.0 ounces	0	

Insects	Insecticide and Formulations	Rate/A	Cutoff Date	Remarks, Restrictions, or Limitations
<b>Cucumber beetles</b>	Acetamiprid Assail 30SG	2.5-5.3 ounces	0	Observe label.
	Dinotefuran (Venom 70 SG)	1.0-4.0 ounces (foliar); 5.0-6.0 ounces (soil)	1	
	Imidacloprid (Admire Pro 4.6F)	7.0-10.5 fluid ounces	21	
<b>Cutworms</b>	Esfenvalerate (Asana XL)	4.8-9.6 ounces	3	Observe label.
	Permethrin (Various) 25W	12.8 ounces	0	
	Permethrin (Various) 3.2EC	8.0 fluid ounces	0	
<b>Leafminers</b>	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	21	Observe label.
	Cyromazine (Trigard 75WP)	2.66 ounces	0	
	Spinetoram (Radiant SC)	8.0 ounces	3	
<b>Melon worms, pickleworms</b>	Bifenthrin (Capture 2EC)	5.12-6.4 ounces	3	Observe label.
	Carbaryl (Sevin) 50WP	1.0 pound	None	Observe label.
	Carbaryl (Sevin) 80S	0.6 pound	None	
	Esfenvalerate (Asana XL)	5.8-9.6 ounces	1	
	Oxamyl (Vydate L)	2.0-4.0 pints	1	
	Permethrin (Pounce 3.2EC)	4.0-8.0 ounces	None	Not more than 1.6 pounds active ingredient per acre per season.
	Permethrin (Pounce 25WP)	6.4-12.8 ounces	None	Observe label.
	Abamectin (Agri-Mek 0.15EC)	8.0-16.0 ounces	7	
	Bifenazate (Acramite 50WG)	0.75-1.0 pound	3	
	Bifenthrin (Brigade 2EC)	2.6-6.4 ounces	3	
Etoxazole (Zeal 72WP)	2.0-3.0 ounces	7		
<b>Spider mites</b>	Spiromesifen (Oberon 2SG)	7.0-8.5 fluid ounces	7	Observe label.
<b>Whiteflies</b>	Acetamiprid (Assail 30SG)	2.5-5.3 ounces	0	Observe label.
	Buprofezin (Courier 40SC)	9.0-12.5 fluid ounces	7	
	Pymetrozine (Fulfill)	2.75 ounces	7	
	Spiromesifen (Oberon 70SC)	7.0-8.5 fluid ounces	7	
	Thiamethoxam (Actara)	2.0-4.0 ounces	0	

**Table 28. General Pests**

Pest	Insecticide	Rate	Restrictions and Limitations
Blister beetles	Carbaryl	1.0 pound active ingredient per acre	Apply as spot treatment as needed. Observe label.
	Malathion	1.0 pound active ingredient per acre	
Snails, slugs	Metaldehyde bait	10 pounds of 25% bait	Apply to soil around plants. Do not contaminate edible parts. Observe label.

## Commercial Greenhouse Tomatoes

Certain cultural practices play a significant role in reducing or eliminating many insect problems in greenhouses. The following cultural practices will aid in the control of insect pests:

1. Maintain a clean, closely mowed area adjacent to the greenhouse.
2. Dispose of any trash, boards, or old plant debris in the area.
3. Keep doors, screens, and ventilation fan screens in good repair.
4. Use clean sterile soils, tools, flats, and other equipment.
5. At the conclusion of the season remove all plants and any plant debris, clean the greenhouse thoroughly and fumigate. (See Insecticide Use Suggestions) "An ounce of prevention is worth a pound of cure."

## Chemical Safety in the Greenhouse

When used as recommended on the labels, pesticides are safe and effective. All pesticides are poisonous, however, and if misused, they may be hazardous to humans and animals and may contribute to the pollution of the environment.

Before using any pesticide, read the label in its entirety. Note any special precautions such as the necessity of wearing special protective clothing when applying the chemical (PPE), re-entry intervals (REI), and pre-harvest intervals (PHI). Follow all safety precautions set forth on the label. The following suggestions will aid in developing safe pesticide-use practices in greenhouses.

1. Become familiar with the use of a pesticide before using it. Know its toxicity and the necessary precautions for its safe use.
2. Keep all safety equipment such as facemasks, respirators, and protective clothing on hand and in good working order.
3. When mixing pesticides use a well-ventilated area or mix outdoors. Avoid contact with skin and do not breathe vapors.
4. Do not save used pesticide containers. Dispose of old containers properly.
5. Store all pesticides in a secure place away from pets, children, and unknowledgeable persons. Never store pesticides in unmarked containers.
6. Post caution signs during fumigation and after treatment of the greenhouse to avoid contact with chemicals.
7. Apply the correct dosage of the pesticide. Using less than the correct amount may result in poor control of the pest. Using more than the correct amount may result in excessive residue or damage to plants.
8. Obey specified time intervals between treatments and cutoff dates before harvest. A failure to observe these restrictions may result in excessive residue or damage to plants.
9. The use of certain chemicals may be phytotoxic to some varieties of plants. This should be checked before using a chemical.
10. Special restrictions apply to greenhouses connected to living quarters. Read label restrictions where this applies and follow all restrictions carefully.

## Liquid and Weight Conversions

### Liquid

- 1 level tablespoon = 3 level teaspoonfuls
- 1 fluid ounce = 2 tablespoons = 29.57 milliliters
- 1 cupful = 8 fluid ounces
- 1 pint = 2 cups = 16 fluid ounces
- 1 quart = 2 pints = 32 fluid ounces
- 1 gallon = 4 quarts = 128 fluid ounces

### Weight

- 1 ounce = 28.3 grams
- 1 pound = 16 ounces = 454 grams
- 1 ton = 2,000 pounds

## Greenhouse Dilution Tables

**Table 1. Wettable Powders (WP)**

Number of ounces of wettable powder to use in small sprayers when amount per 100 gallons is known:

Target Amount	100 gallons	10 gallons	5 gallons	2 gallons	1 gallon
WP Weight	0.5 pound	0.8 ounce	0.4 ounce	0.2 ounce	0.1 ounce
WP Weight	1.0 pound	1.6 ounces	0.8 ounce	0.3 ounce	0.2 ounce
WP Weight	2.0 pounds	3.2 ounces	1.6 ounces	0.6 ounce	0.3 ounce
WP Weight	3.0 pounds	4.8 ounces	2.4 ounces	1.0 ounce	0.5 ounce
WP Weight	4.0 pounds	6.4 ounces	3.2 ounces	1.3 ounces	0.6 ounce
WP Weight	5.0 pounds	8.0 ounces	4.0 ounces	1.6 ounces	0.8 ounce

**Table 2. Emulsifiable Concentrates (EC)**

Number of fluid ounces of emulsifiable concentrate to use in small sprayers when amount per 100 gallons is known:

Target Amount	100 gallons	10 gallons	5 gallons	2 gallons	1 gallon
EC Volume	1 pint	1.6 fluid ounces	0.8 fluid ounce	0.3 fluid ounce	0.2 fluid ounce
EC Volume	1 quart	3.2 fluid ounces	1.6 fluid ounces	0.7 fluid ounce	0.3 fluid ounce
EC Volume	2 quarts	6.4 fluid ounces	3.2 fluid ounces	1.3 fluid ounces	0.6 fluid ounce
EC Volume	1 gallon	12.8 fluid ounces	6.4 fluid ounces	2.6 fluid ounces	1.3 fluid ounces

**Table 3. Mist Blower**

Quantity of emulsifiable concentrate (EC) needed to make a 25X concentrate:

If amount per 100 gallons for a high volume spray is:	Use this amount in a 25 gallon mist blower	Use this amount in a 10 gallon mist blower	Use this amount in a 2 gallon mist blower	Use this amount in a 1 gallon mist blower
1 pint	6.25 pints	2.5 pints	8.0 fluid ounces	4.0 fluid ounces
1 quart	6.25 quarts	5.0 pints	1.0 pint	8.0 fluid ounces
2 quarts	3.13 gallons	5.0 quarts	1.0 quart	1.0 pint
1 gallon	6.25 gallons	2.5 gallons	2.0 quarts	1.0 quart

**Note:** Your county agent can give you further help with dilutions.

## Pesticide Recommendations

### Table 4. Aphid

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Acetamiprid (TriStar 8.5 SL)	See label.	12 hours	1 day	Follow label.
Azadiractin (various)	See label.	4 hours	0	OMRI approved
Imidacloprid (Admire pro) 4.6F	0.6 fl. oz./1,000 plants	12 hours	0	Apply in minimum of 21 gal. water using soil drenches or drip irrigation. Do not apply to immature plants. Make only one application per crop per season.
Insecticidal Soap (M-Pede) 49EC	2.5-5 fl. oz./gal. stand alone 1.25 fl. oz./gal. tank mix	12 hours	0	Plant injury may occur if applied to heat or drought stressed plants, or at more than 3 sequential applications at 7-day intervals. OMRI approved
Malathion (various) 10A 57 EC 25 WP	1 lb./50,000 cu.ft. 1 qt./100 gal. water 4lb./100 gal. water	12 hours	15 hours 1 day 1 day	Follow label.

### Table 5. Broad mite, russet mite, spider mite

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Acequinocyl 15.8% (Kanemite 15 SC)	See label.	12 hours	7 day	Limited control of russet mite. Do not use adjuvants or surfactants. Do not exceed two applications per crop with minimum of 21 days between treatments.
Bifenazate (Floramite) SC	4-8 fl.oz./100 gal. ¼ to ½ tsp./gal.	12 hours	3 days	Limited control of russet mite. For use on tomatoes greater than 1 inch diameter at maturity. Do not exceed two applications per year. Not registered on pepper.
Chlorfenapyr 2 SC (Pylon)	2.6-5.2 fl. oz./100 gal.	12 hours	0	Use on tomatoes greater than 1 inch diameter at maturity. Do not make two consecutive applications. Alternate with another product 5-7 days after application as needed. Do not exceed three applications per crop.

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Etoxazol 5% WDG (TetraSan 5 WDG)	8-20 oz./100 gal.	12 hours	1 day	Limited control of russet mites. Controls eggs and nymphs only. Do not use adjuvants or surfactants. Do not exceed two applications per crop with minimum of 21 days between treatments.
Fenproximate 5% SC (Akari 5SC)	16-32 fl. oz./100 gal.	12 hours	1 day	Do not make two consecutive applications. Alternate with another product 5-7 days after application as needed. Do not exceed two applications per crop.
Insecticidal Soap (M-Pede) 49EC	2.5-5 fl. oz./gal. stand alone 1.25 fl. oz./gal. tank mix	12 hours	0	Plant injury may occur if applied to heat or drought stressed plants, or at more than 3 sequential applications at 7-day intervals. OMRI approved
Sulphur 90%	Thorough coverage dust 4 tbs/gal	24 hours	See label	Do not mix with oil or apply within 2 weeks of an oil spray. OMRI approved

**Table 6. Caterpillars: armyworm, cabbage looper, catworm, fruitworm**

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Bacillus thuringiensis (various)	See label.	4 hours	0	Follow label.
Chlorfenapyr (Pylon 2SC)	6.5-13 oz./100 gal. water or per acre area	12 hours	0	For use on tomatoes more than 1 inch in diameter at maturity. Do not make more than 2 applications at 5- to 10-day intervals.
Malathion(various) 10A 57 EC 25 WP	1 lb./50,000 cu. ft. 1 qt./100 gal. water 4 qt./100 gal. water	12 hours	15 hours	Hazardous to honeybees.
Spinosad (Entrust SC)	3 fl. oz./100 gal.	4 hours	1 day	Do not make more than 2 consecutive applications. Do not apply to seedling tomatoes or peppers grown for transplants. OMRI approved

**Table 7. Cricket, millipede**

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Malathion (various) 5D	Follow label.	12 hours	See label.	Apply to soil at base of plants, Do not contaminate fruit.



**Table 8. Leafminer**

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Malathion (Various) 10A	1lb./50,000 cu.ft.	12 hours	15 hours	See aphid.
Spinosad (Entrust SC)	10 fl. oz./100 gal.	4 hours	1 day	Do not apply to seedlings grown for transplants.

**Table 9. Slug**

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Metaldehyde (various)	Follow label.	See label.	See label.	Apply to soil surface around plants. Do not contaminate fruit.

**Table 10. Thrips**

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Chlorfenapyr (Pylon 2SC)	9.8-13 fl.oz./gal. water or per acre area	12 hours	0	For use on tomatoes more than 1 inch at maturity. Do not make more than 2 applications at 5- to 10- day intervals.
Spinosad (Entrust SC)	5.5 fl. oz./100 gal. water	4 hours	1 day	Do not make more than 2 consecutive applications. Do not apply more than 6 times in a 12-month period against thrips. Do not apply to seedlings grown for transplants. OMRI approved.

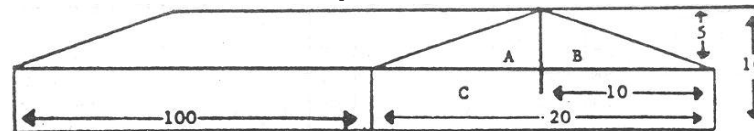
**Table 11. Whitefly**

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Buprofezin (Talus 70DF)	9-13.6 oz./100 gal. water or per acre area	12 hours	1 day	Insect growth regulator that only controls immatures.. Does not kill adults. For use on tomatoes only.
Imidacloprid (Admire Pro) 4.6F	0.6 fl. oz./1,000 plants	12 hours	0	Apply in minimum of 16 gal water using soil drenches or drip irrigation to field typ soils. Do not apply to immature plants or those in rock wool, perlite, or other hydroponic method. Remove bees prior to treatment. Make only 1 application per crop per season.
(Macho 4)	0.05 fl. oz./1,000 plants			

Insecticide and Formulation	Amount of Formulation	Re-entry Interval	Preharvest Interval	Precautions and Remarks
Insecticidal soap (M-Pede) 49EC	2.5-5 fl. oz./gal. stand alone 1.25 fl. oz./gal. tank mix	12 hours	0	Plant injury may occur if applied to heat or drought stressed plants, or at more than 3 sequential applications at 7-day intervals. OMRI approved
Pyrethrins and PBO (pyrenone)	12 oz./20 gal. water	See label.	0	May be used alone or tank-mixed with a companion insecticide.
Pyriproxyfen (Distance 0.86EC)	6 fl. oz./100 gal. water	See label.	14 days	Insect growth regulator that affects immature stages of whiteflies; will not kill adults.

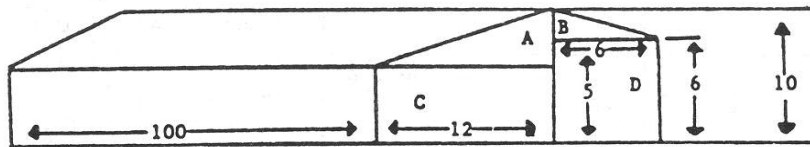
### CALCULATION OF GREENHOUSE VOLUME

#### Even Span Structure



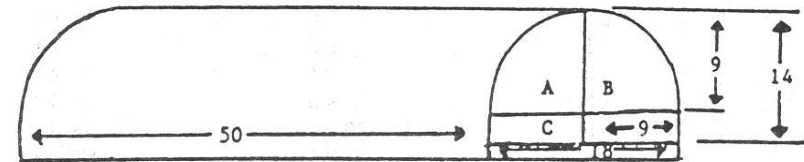
Area A and B =  $.5(5 \times 10) = 25$   
 Area C =  $20 \times 5 = 100$   
 Total Area =  $A + B + C = 100 + 25 + 25 = 150$   
 Volume = Length  $\times$  Total Area =  $100 \times 150 = 15,000$  cu. ft.

#### 3/4 Span House



Area A =  $.5(12 \times 5) = 30$   
 Area B =  $.5(4 \times 6) = 12$   
 Area C =  $6 \times 6 = 36$   
 Total Area =  $A + B + C + D = 30 + 12 + 60 + 36 = 138$  sq. ft.  
 Volume = Length  $\times$  Total Area =  $100 \times 138 = 13,800$  cu. ft.

#### Roundtop Structure



Area A + B =  $.5(r^2) = 127$   
 Area C =  $5 \times 9 = 45$  sq. ft.  
 Total Area =  $A + B + C = 127 + 45 = 172$  sq. ft.  
 Volume = Length  $\times$  Total Area =  $50 \times 172 = 8,600$  cu. ft.

## Home Gardens

Table 1. Beans

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin 0.3%	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion	2.0 teaspoons	1	See label.	Wait at least 7 days between applications.
Beetles	Carbaryl	1.5-3.0 tablespoons	3	See label.	Repeat as needed up to 4 times; 7 days between applications.
	Bifenthrin 0.3%	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
Leafhoppers	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	M-PEDE	3.0 tablespoons	0	See label.	Follow label.
Whiteflies	Bifenthrin 0.3%	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year.

Table 2. Beet

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Webworms, flea beetles	Malathion 57%	2.0 teaspoons	7,3	12	Repeat up to 6 times but no more than once every 7 days.
	Carbaryl	1.5-3.0 tablespoons			
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.

**Table 3. Broccoli**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 50%	2.0 teaspoons	3	See label.	Follow label.
	Bifenthrin 0.3%	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
Caterpillars	Bt (Dipel, Thuricide)	As recommended on label	0	See label.	Use weekly, add wetting agent in sprays.
	Permethrin	2.0 tablespoons	1	See label.	Follow label.
	Spinosad	4.0 tablespoons	1	See label.	Maximum of 6 applications per season; wait 4 days between applications.
Stink bugs	Carbaryl	3.0-6.0 tablespoons	3	See label.	Wait 7 days between applications.
	Bifenthrin	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
Whiteflies	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.

**Table 4. Cabbage**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion 57% EC	2.0 teaspoons	7	12	Wait at least 7 days between applications.
Caterpillars	Bifenthrin	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
	Bt (Dipel, Thuricide)	As recommended on label	0	See label.	Use weekly until harvest, add wetting agent in sprays.
	Permethrin	2 tablespoons	1	See label.	Follow label.
	Spinosad	4 tablespoons	1	See label.	Maximum of 6 applications per season; wait 4 days between applications.
Flea beetles	Carbaryl	1.5-3 tablespoons	3	See label.	On foliage, repeat as needed up to 4 times, but no more than once every 7 days.

**Table 5. Collards**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion 50%	2 teaspoons	7	See label.	Apply as necessary; wait 7 days between applications.
Flea beetles	Carbaryl	1.5-3 tablespoons	14	See label.	On foliage as needed; Repeat as necessary up to 4 times, but no more than once every 7 days.

**Table 6. Cantaloupe**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin 0.3%	1.5 fluid ounces	7	See label.	Wait at least seven days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion 57% EC	2.0 teaspoons	3	12	Follow label.
Beetles	Carbaryl	3.0 tablespoons		See label.	Follow label.
	Bifenthrin 0.3%	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year.
	Permethrin	Follow label	0	See label.	Follow label.
Caterpillars	Carbaryl	1.5-3.0 tablespoons	3	See label.	Do not use Carbaryl for aphid control.
	Bifenthrin 0.3%	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Permethrins	As recommended on label	0	See label.	Follow label.
	Spinosad	4 tablespoons	3	See label.	Maximum of 6 applications per season; wait 5 days before reapplying.
Caterpillars	Spinosad	4.0 tablespoons	3	See label.	Maximum of 6 applications per season; wait 5 days between applications.

**Table 7. Carrot**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids, leafhoppers, vegetable weevils	Malathion 57% EC	2.0 teaspoons	7	12	When insects appear.

**Table 8. Cucumber**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. (1-ft. x 10 ft.) of vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Safer Insecticidal Soap	5.0 tablespoons	0	See label.	For suppression, repeat applications may be needed. Repeat at weekly intervals up to 3 times. Do not make more than 3 sequential applications over a 2-week period. Do not apply when temps exceed 90 F.
Cucumber beetles, squash bugs	Bifenthrin	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Carbaryl	3.0 tablespoons	3	See label.	Apply late in day to minimize killing pollinating insects.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion 50%	4.0 teaspoons	1	See label.	Apply when needed. Wait at least 7 days between applications.
	Permethrin	As recommended on label	0	See label.	Follow label.

**Table 9. Eggplant**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.
	Malathion 50% EC	2.0 teaspoons	3	See label.	Apply when aphids present and repeat when needed; wait 7 days between applications.
Caterpillars	Bt (Dipel, Thuricide)	As recommended on label	0	See label.	Use weekly, add wetting agent in sprays.
	Carbaryl 80% S	2.0 tablespoons	12	See label.	Follow label.
	Spinosad	See label	1	See label.	Follow label.
Flea beetles	Bifenthrin	1.5 fluid ounces	3	See label.	Wait at least 7 days between applications.
	Carbaryl	1.5-3.0 tablespoons	3	See label.	On foliage as needed; no more than once every 7 days.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.
	Malathion 50%	1.0 tablespoon	3	See label.	Wait at least 7 days between applications.
Spider mites	Malathion	1.0 tablespoon	3	See label.	Repeat treatments often as necessary.
	Ultrafine oil	Follow label		See label.	Follow label.
Whiteflies	Bifenthrin	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.

**Table 10. English pea**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids, leafhoppers	Imidacloprid	0.5 ounce per quart per 10 sq. ft. vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion 57% EC	2.0 teaspoons	3	12	When insects appear.

**Table 11. Irish Potato**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 57% EC	2.0 teaspoons	3	12	When insects appear.
	Imidacloprid	See label.	3	See label.	Apply to soil immediately at planting for long-term control.
Colorado potato beetles	Permethrin 2.5L	3.0 tablespoons	7	See label.	Follow label.
	Spinosad	4.0 tablespoons	7	See label.	Maximum of 6 applications per season; wait 7 days before reapplying.
Flea beetles, leafhopper	Carbaryl 80% S	2.0 tablespoons	0	12	Follow label.
	Malathion 57% EC	2.0 teaspoons	3	12	Follow label.

**Table 12. Lettuce**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin 0.3%	1.5 fluid ounces	7	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
	Malathion 50% EC	1.0 tablespoons	14-leaf 7-head	12	When insects appear. Wait at least 7 days between applications.
Caterpillars	Bifenthrin 0.3%	1.5 fluid ounces	7-head	See label.	Wait 7 days between applications.
	Bt (Dipel, Thuricide)	As recommended on label	0	See label.	Repeat weekly until harvest, add wetting agent to spray.
	Permethrin 2.5%	4.0 tablespoons	1	See label.	Apply every 5 to 10 days as needed but no more than 10 times (liquid form) per season.
	Spinosad 0.5%	4.0 tablespoons	1	See label.	Apply no more than 6 applications per season; wait 4 days between applications.

**Table 13. Mustard**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 57% EC	2.0 teaspoons	7	12	Follow label.



Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Caterpillars	Bt (Dipel, Thuricide)	Follow label.	0	See label.	Apply as soon as damage is found; repeat weekly, add wetting agent to spray.
	Carbaryl 5% D	0.75 pound/100 square feet	12	See label.	Follow label
	Malathion 57% EC	2.0 teaspoons	7	12	When insects appear.
	Spinosad 0.5%	4.0 tablespoons	1	See label.	Maximum 6 applications per season; wait 4 days between applications.
Flea beetles	Carbaryl	1.5-3.0 tablespoons	14	See label.	Repeat up to 4 times; no more than once every 7 days.
Vegetable weevils	Malathion 57% EC	2.0 teaspoons	3	12	Follow label.

Table 14. Okra

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 50%	2.0 teaspoons	1	12	When insects appear; wait 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
Earworms	Permethrin 2.5% liquid	Follow label.	1	See label.	Every 5 to 7 days as needed; no more than 10 times per season.
	Carbaryl 80% S	2.0 tablespoons	0	12	Follow label
Stinkbugs	Carbaryl 80% S	2.0 tablespoons	0	12	Follow label

Table 15. Onion, Shallot

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Thrips	Malathion 50%	1.0 teaspoons	3	12	When insects appear.

**Table 16. Parsley**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 57% EC	2.0 teaspoons	21	12	When insects appear.
Beetles	Carbaryl 80% S	2.0 tablespoons	14	12	Follow label.
Caterpillars	Bt (Dipel, Thuricide)	Follow label.	0	See label	Repeat applications weekly

**Table 17. Peppers**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 50%	2.0 teaspoons	3	12	When insects appear.
	Bifenthrin	1.5 fluid ounces	7	See label.	Wait 7 days between applications
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge for season-long control.
Caterpillars, armyworms, loopers, leafminers	Cyfluthrin .03%	Ready to use formula	7	See label.	Do not apply more than 6 times during season.
	Cyfluthrin 0.75%	1.0 tablespoons	7	See label.	Do not apply more than 6 times during season.
	Permethrin	Follow label	3	See label.	No more than 8 applications per season.
	Safer Insecticidal Soap	5.0 tablespoons	0	See label.	For suppression; repeat applications may be needed (no more than 3 over a 2-week period).
	Spinosad 0.5%	4.0 tablespoons	1	See label.	Maximum of 6 applications per season; wait 4 days between applications.
Pepper weevils, vegetable weevils	Carbaryl 80% S	2.0 tablespoons	1	12	Follow label.
	Malathion	2.0 teaspoons	3	12	Follow label.
Whiteflies, thrips	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil immediately after transplants are set for long-term control.
Flea beetles	Carbaryl liquid	1.5-3.0 tablespoons	3	See label.	Follow label.

**Table 18. Squash, Pumpkin**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Malathion 50% EC	2.0 teaspoons	3-pumpkin 1-squash	12	When insects appear; wait 7 days between applications; apply when leaves are dry.
	Bifenthrin .3%	1.5 fluid ounces	3	See label.	Wait 7 days between applications.
	Safer Insecticidal Soap	5.0 tablespoons	0	See label.	For summer squash; for suppression.
Cucumber beetles, flea beetles	Bifenthrin	1.5 fluid ounces	3	See label.	Wait 7 days between applications.
	Carbaryl liquid	3.0 tablespoons	3	See label.	Repeat applications up to 6 times, but not more often than once every 7 days.
	Permethrin 2.5%	4.0 tablespoons	3	See label.	Do not apply liquid more than 8 times per season.
Leafminer	Spinosad 0.5%	4.0 tablespoons	3	See label.	Maximum 6 applications season.
Pickleworms, vine borers	Bifenthrin	1.5 fluid ounces	3	See label.	Wait 7 days between applications.
	Carbaryl 22.5% liquid	1.5-3 tablespoons	3	See label.	Repeat as necessary up to 6 times, but no more than once every 7 days.
	Permethrin	Follow label	0	See label.	No more than 8 times per season.
Squash bugs	Bifenthrin	1.5 fluid ounces	3	See label.	Wait 7 days between each application.
	Carbaryl 80% S	2.0 tablespoons	0	12	Follow label.
	Permethrin	Follow label	0	See label.	No more than 8 applications per season.
Whiteflies	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.

**Table 19. Southern pea**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.
	Malathion 50% EC	1.0 tablespoons	3	12	When insects appear.
Earworms, curculio	Carbaryl 80% S	2.0 tablespoons	0	12	Follow label.

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
European corn borers	Carbaryl liquid 22.5%	3.0-4.5 tablespoons	3- fresh 21-dried	See label.	Follow label.
	Cyfluthrin 0.75%	1.0 tablespoons	7	See label.	Do not apply more than 6 applications per season.
	Spinosad	4.0 tablespoons	3	See label.	Maximum 6 applications per season; wait 5 days between applications.

Table 20. Spinach

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.
	Malathion 57% EC	2.0 teaspoons	7	See label.	When insects appear.
Caterpillars	Bt (Dipel, Thuricide)	3.0 tablespoons	0	See label.	Use weekly, add wetting agent in sprays.
	Bifenthrin	See label.	7	See label.	Follow label.
	Cyfluthrin	See label.	0	See label.	Follow label.

Table 21. Sweet corn

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Corn earworms, fall armyworms, European corn borers	Bifenthrin 0.3%	1.5 fluid ounces	1	See label.	Wait 7 days between applications.
	Carbaryl 80% S	2.0 tablespoons	0	12	Treat silks every other day for earworm.
	Cyfluthrin 0.75%	1.0 tablespoons	0	See label.	Do not apply more than 5 times per season.
	Permethrin 2.5% liquid	3.0 tablespoons	1	See label.	Apply as needed every 5 days, but no more than 6 times per season.
	Spinosad 0.5%	4.0 tablespoons	1	See label.	Maximum of 6 applications per season; wait 3 days between applications.

Table 22. Tomato

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin	1.5 fluid ounces	1	See label.	Wait at least 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil shortly after seedlings emerge or transplants for season-long control.
	Malathion 50% EC	2.0 teaspoons	1	12	When insects appear.
	Safer Insecticidal Soap	5.0 tablespoons	0	See label.	For suppression, repeat applications may be required.
Beetles	Bifenthrin 0.3%	1.5 fluid ounces	1	See label.	Wait 7 days between applications.
	Carbaryl liquid 22.5%	1.5-3.0 tablespoons	3	See label.	Repeat applications up to 7 times, but no more than once every 7 days.
	Permethrin	Follow label.	0	See label.	No more than 6 times per year.
Cutworms	Carbaryl 22.5% liquid	6.0 tablespoons	3	See label.	Mix in enough water to get sufficient coverage of plants and soil around plants. Repeat weekly no more than 5 times per season.
	Cyfluthrin 0.75%	1.0 tablespoons	3	See label.	Do not apply more than 5 times per season.
	Permethrin 2.5%	3.0 tablespoons	0	See label.	Do not apply more than eight times per season.
Fruitworms, hornworms	Bifenthrin	1.5 fluid ounces	1	See label.	Wait 7 days between applications.
	Bt (Dipel, Thuricide)	Follow label.	0	See label.	Repeat weekly when insects are present.
	Carbaryl 80% S	2.0 tablespoons	0	12	Weekly—from bloom through harvest.
	Cyfluthrin 0.75 %	1.0 tablespoons	0	See label.	Do not apply more than 5 times per season.
	Permethrin 2.5% liquid	3.0 tablespoons	0	See label.	No more than 8 times per season.
	Spinosad 0.5%	4.0 tablespoons	1	See label.	No more than 6 applications per season; wait 4 days between applications.
Leaf-footed bugs, stink bugs	Bifenthrin	1.5 fluid ounces	1	See label.	Wait 7 days between applications.
	Carbaryl 80% S	2.0 tablespoons	0	12	Follow label.
	Cyfluthrin 0.75%	1.0 tablespoons	0	See label.	Do not apply more than 5 times per season.
	Permethrin 0.25%	Follow label.	0	See label.	Maximum 6 applications/season.
Leafminer	Spinosad 0.5%	4.0 tablespoons	1	See label.	No more than 6 applications per season; wait 4 days between applications.
Spider mites	Bifenthrin 0.3%	1.5 fluid ounces	1	See label.	Wait 7 days between applications.

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Tomato pinworms	Bifenthrin 0.3%	1.5 fluid ounces	1	See label.	Wait 7 days between applications.
	Spinosad 0.5%	4.0 tablespoons	1	See label.	Maximum 6 applications per season; wait 4 days between applications.
Whiteflies	Bifenthrin 0.3%	1.5 fluid ounces	1	See label.	Wait 7 days between applications.
	Safer Insecticidal Soap	5.0 tablespoons	0	See label.	No more than 3 applications in 2 weeks. Do not apply when temperature exceeds 90 F.
	Pyrethrin	Follow label.	0	See label.	Spray underside of leaves; repeated weekly applications needed for control.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil for season-long control.

Table 23. Turnip

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil when seedlings emerge or immediately after transplants are set for season-long control.
	Malathion 50% EC	2.0 teaspoons	7	12	When insects appear.
Caterpillars	Bt (Dipel, Thuricide)	Follow label		0	Repeat weekly when insects present.
Flea beetles, worms	Carbaryl 80% S	2.0 tablespoons	3 for roots 14 for tops	2	Follow label.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.

**Table 24. Watermelon**

Pest	Insecticide and Formulation	Amount per 1 Gallon Water	PHI	REI Hours	Application Procedure
Aphids	Bifenthrin 0.3%	1.5 fluid ounces	3	See label	Wait 7 days between applications.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	See label.	See label.	No more than 1 application per year. Apply to soil when seedling emerge or immediately after transplants are set for season-long control.
	Malathion 57% EC	2.0 teaspoons	1	12	When insects appear.
Beetles	Carbaryl 80% S	2.0 tablespoons	0	12	Don't use Carbaryl for aphids.
	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year. Apply to soil when seedlings emerge immediately after transplants are set for season-long control.
	Permethrin liquid 2.5%	Follow label	0	See label.	Do not apply more than 8 times per year.
Thrips	Imidacloprid	0.5 ounce per quart per 10 sq. ft. per vegetable row	21	See label.	No more than 1 application per year.
	Spinosad 0.5%	4.0 tablespoons	3	See label.	No more than 6 applications per year; wait 5 days between applications.

**Homeowner Insecticide Products (not a complete list)**

Common Chemical Name	Trade Name(s) (Examples)	Manufacturer/Brand
<i>Bacillus thuringiensis</i> (B.t.)	Dipel dust	Fertilome
	Dipel dust	Hi-Yield
	BT Worm Killer	Greenlight
	Thuricide	Bonide
	Thuricider HPC	Southern Ag
Bifenthrin	Ortho Bug-B-Gone Max Lawn and Garden Insect Killer	Ortho

Common Chemical Name	Trade Name(s) (Examples)	Manufacturer/Brand
<b>Carbaryl</b>	Bayer Complete Insect Killer for Gardens	Bayer Advanced
	Sevin	Spectracide
	Bug B Gone	Ortho
	Sevin	Garden Tech
	Sevin-10	Garden Tech
	Liquid Carbaryl Garden Spray	Ferti-Lome
	5% Carbaryl Garden and Pet Dust	Hi-Yield
<b>Cyfluthrin</b>	Bayer Advanced Garden	Bayer
	PowerForce Multi-Insect Killer, Concentrate	
	Bayer Advanced Lawn and Garden Multi Insect Killer	Bayer
<b>Dimethoate</b>	Cygon	Bonide
	Cygon 2E	Hi-Yield
<b>Imidacloprid</b>	Bayer Advanced	Bayer
<b>Malathion</b>	50% Malathion	Greenlight
	Malathion Plus Insect Spray Concentrate	Ortho
	Malathion	Ace
	50% Malathion	Martin's
	Malathion Insect spray	Hi-Yield
	Malathion 50% E.C.	Southern Ag
<b>Oil</b>	Sun-spray Ultra-Fine Oil	Security Products
	Parafin Horticultural Oil	Southern Ag



Common Chemical Name	Trade Name(s) (Examples)	Manufacturer/Brand
<b>Permethrin</b>	Bayer Complete Insect Dust for Gardens	Bayer Advanced
	Permethrin Insect Control	Spectracide
	Bug-B-Gone	Ortho
	Permethrin 10%	Martin's
	Indoor/Outdoor Multipurpose Insect Spray	Ferti-Lome
	Vegetable Fruit and Flower Spray	Bonide
	Multipurpose Garden Insect Killer	KGRO
	Vegetable Plus	Martins
<b>Pyrethrin</b>	Tomato and Vegetable	Safer
	Tomato Vegetable Insect Spray	Spectracide
<b>Spinosad</b>	Lawn and Garden Spray with Spinosad	Greenlight
	Borer Bagworm, Tent caterpillar & Leafminer Spray	Fertilome
	Monterey Garden Insect Spray	Monterey
	Spinosad Landscape and Garden	Natural Guard
	Insecticide	
<b>Neem</b>	Greenlight Neem Concentrate	Greenlight
	Triple Action Neem Oil	Southern Ag
<b>Insecticidal soaps</b>	M-Pede	Dow Agro Sciences
	Insecticidal Soap	Safer
	Insecticidal Soap	Garden Safe
	Tomato Vegetable Insect Killer	Safer

**Disclaimer Statement:**

The pesticides recommended in this publication were registered for the prescribed uses at the time of publication. Pesticide registrations are reviewed continuously. Should registration of a recommended pesticide be canceled, it would no longer be recommended by the LSU AgCenter.

Uses of brand or trade names in this publication are for clarity and information. Such use does not imply approval of the product to the exclusion of others that may be of similar, suitable composition, and it does not guarantee or warrant the standard of any given product. The above list is not a complete list of all products that may be available.

## Organic Gardening

If you desire to be a certified organic gardener, apply to a USDA-accredited certifying agent. The website of the national organic program contains information on organic certification. It maintains a list of allowed and prohibited substances. Visit the website for further information.

Read and follow the directions on the insecticide label. Use insecticides only on vegetables for which they are labeled.

Rotenone, which will kill beneficials, is highly toxic to fish and moderately toxic to mammals. It is slow-acting and has a residual of approximately one week. It kills beetles and sucking insects. Pyrethrum will kill lady beetles but has very low toxicity to mammals. Pyrethrum will kill pests rapidly or not at all. It has a very short residual and should be sprayed directly on the pest. Pyrethrum kills beetles, caterpillars, and sucking insects. Insecticidal soaps are not very toxic to beneficials.

Applications may be needed more frequently than once a week. Injury to plants may occur if they are used too frequently.

Insecticidal soaps kill soft-bodied pests, such as aphids, spider mites, and whiteflies. *Bacillus thuringiensis* (Bt) is nontoxic to beneficials and mammals but has a residual of a few days. Bt is effective against various caterpillars. Usually, caterpillars quit feeding within an hour of eating Bt. However, they remain on the plant and do not die for a few days. Even though the caterpillars remain on the plant and are not feeding, an additional application is not needed. Bt is most effective when caterpillars are young. Thus, frequent scouting is important. Sulfur may be used to control mites, but if temperatures are high, sulfur may injure plants.

Many of the principles of integrated pest management will be helpful in managing pests in organic gardens. These may include keeping plants healthy, rotating crops, interplanting, intercropping, planting at times to escape pests, planting resistant varieties, controlling pests when they are young, scouting the garden twice a week, correctly identifying the pest problem, controlling weeds, destroying plants after harvest, hand picking and crushing pests, using barriers to keep pests off of plants, spraying plants with water to knock pests off, traps and using beneficial organisms.