

Alton N. Sparks Jr., Extension Entomologist  
David G. Riley, Research Entomologist

COMMERCIAL VEGETABLE INSECT CONTROL

BRASSICA & LEAFY VEGETABLES (Broccoli, Cabbage, Collards, Kale, Mustard, Spinach, and Turnip)

PEST	INSECTICIDE	MOA	Broccoli Cabbage	Collard, Kale & Mustard	Spinach	Turnip	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>										
Pre-mixes for multiple pests	<i>thiamethoxam</i> + <i>chlorantraniliprole</i> Durivo SC	4A + 28	√	√	√	Not Labeled	10–13 fl oz	0.13–0.17 + 0.065–0.085	12 H/ 30 D	
aphid, whitefly	<i>clothianidin</i> Belay 2.13SC	4A	√	√	√	Not Labeled	9–12 fl oz	0.15–0.2	12 H/ 21 D	
	<i>cyantraniliprole</i> Verimark 1.67SC	28	√	√	√	√	6.75–13.5 fl oz Rate varies with pest targeted		4 H/ at planting	Also labeled for transplant drench no earlier than 72 hours prior to planting.
	<i>dinotefuran</i> Venom 70SG	4A	√	Not Labeled	√	Not Labeled	5–7.5 oz	0.226–0.328	12 H/ 21 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	√	√	√	√	21–28 fl oz	0.274–0.365	4 H/ 21 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	√	√	√	√	4.4–10.5 fl oz	0.158–0.375	12 H/ 21 D	
	<i>thiamethoxam</i> Platinum 75SG	4A	√	√	√	Not Labeled	1.66–3.67 oz	0.078–0.17	12 H/ 30 D	Also in a pre-mix for multiple pests.
caterpillar pests	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	Not Labeled	3.5–7.5 fl oz	0.045–0.098	4 H/ Spinach 1 D Others 3 D	Labeled at higher rates for suppression of whitefly nymphs. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Verimark 1.67SC	28	√	√	√	√	5–10 fl oz Rate varies with pest targeted		4 H/ at planting	Also labeled for transplant drench no earlier than 72 hours prior to planting.
soil insects	<i>bifenthrin</i> Empower 1.15G	3	√	Not Labeled	Not Labeled	Not Labeled	3.5–8.7 lb	0.04–0.1	5 D/ 7 D	May be applied pre-plant or during the season.
	<i>chlorpyrifos</i> Lorsban 15G, 75WG, 4E, Advanced	1B	√	√	Not Labeled	√	See label		24 H/ See Label	Labeled for pre-plant, at planting and broadcast application.
	<i>diazinon</i> 4E 50W	1B	√	√	See Remarks	Not Labeled	2–4 qt 4–8 lb	2–4 2–4	4 D/ Pre-plant	Spinach PHI—3 days.

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PEST	INSECTICIDE	MOA	Broccoli Cabbage	Collard, Kale & Mustard	Spinach	Turnip	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS</b>										
Pre-mixes for multiple pests	<i>imidacloprid</i> + <i>beta-cyfluthrin</i> Leverage 360 SC	4A + 3	√	√	√	√	3 fl oz	0.047 + 0.023	12 H/ 7 D	
	<i>lambda-cyhalothrin</i> + <i>chlorantraniliprole</i> Voliam Xpress SC	3 + 28	√	Not Labeled	Not Labeled	Not Labeled	5–9 fl oz Rate varies with targeted pests		24 H/ 3 D	
	<i>lambda-cyhalothrin</i> + <i>thiamethoxam</i> Endigo ZC SC	3 + 4A	√	Not Labeled	Not Labeled	Not Labeled	4–4.5 fl oz	0.028–0.03 + 0.037–0.04	24 H/ 1 D	
	<i>novaluron</i> + <i>acetamiprid</i> Cormoran EC	15 + 4A	√	Not Labeled	Not Labeled	Not Labeled	9–12 fl oz	0.059–0.079 + 0.047–0.06	12 H/ 7 D	Rate varies with pest targeted.
	<i>spirotetramat</i> + <i>pyriproxifen</i> Senstar SE	23 + 7C	√	√	See Remarks	Not Labeled	6–10 fl oz	0.047–0.078 + 0.016–0.027	24 H/ 7 D	Rates on Spinach are 8–10 fl oz.
	<i>thiamethoxam</i> + <i>chlorantraniliprole</i> Voliam Flexi WDG	4A + 28	√	√	√	Not Labeled	4–7 oz	0.05–0.0875 + 0.05–0.0875	12 H/ Cole Crops 3 D Others 7 D	
	<i>zeta-cypermethrin</i> + <i>bifenthrin</i> Hero EC	3 + 3	√	√	Not Labeled	Not Labeled	4–10.3 fl oz	0.01–0.025 + 0.03–0.075	12 H/ 7 D	
aphid	<i>acetamiprid</i> Assail 30SG	4A	√	See Remarks	√	See Remarks	2–4 oz	0.038–0.075	12 H/ See Remarks	Maximum rate on collard, kale, mustard, and turnip is 5.3 oz with 3-day PHI. Others 7 day PHI.
	<i>afidopyropen</i> Versys 0.83DC	9D	√	√	√	√	1.5 fl oz	0.01	12 H/ 0 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	See Remarks	√	2.1–6.4 fl oz	0.033–0.10	12 H/ See Remarks	Also in a pre-mix for multiple pests. PHI: Spinach—40 days, Broccoli & Cabbage—3 days, Others—7 days.
	<i>clothianidim</i> Belay 2.13SC	4A	√	√	√	Not Labeled	3–4 fl oz	0.05–0.067	12 H/ 7 D	
	<i>cyantraniliprole</i> Exirel 0.83SC	28	√	√	√	√	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	

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BRASSICA & LEAFY VEGETABLES (Broccoli, Cabbage, Collards, Kale, Mustard, Spinach, and Turnip)

PEST	INSECTICIDE	MOA	Broccoli Cabbage	Collard, Kale & Mustard	Spinach	Turnip	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
aphid (continued)	<i>dimethoate</i> 4EC 2.67EC	1B	See Remarks	See Remarks	Not Labeled	✓	0.5 pt 0.75 pt	0.25 0.25	48 H/ Broccoli 7 D Others 14 D	Also available as Cygon 3.35 EC. Not labeled on cabbage or collard. Maximum rate on broccoli is 0.5 lb ai.
	<i>dinotefuran</i> Venom 70SG	4A	✓	See Remarks	See Remarks	See Remarks	1–4 oz	0.045–0.179	12 H/ Cole Crops 1 D Spinach 7 D	Rates on spinach 1–3 oz. Rates on Leafy Brassica are 2–3 oz.
	<i>flonicamid</i> Beleaf 50SG	29	✓	✓	✓	✓	2–2.8 oz	0.062–0.089	12 H/ 0 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	✓	✓	✓	✓	7–14 fl oz	0.09–0.18	4 H/ 1 D	Use 10.5–14 fl oz for green peach aphid.
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	✓	✓	See Remarks	1.3 fl oz	0.047	12 H/ 7 D	Also in a pre-mix for multiple pests. Rate is 1.2 fl oz on turnips.
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	Not Labeled	Not Labeled	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>malathion</i> 5EC 8EC	1B	✓	✓	✓	✓	See Label	See Label	12–48 H/ 2–7 D	Rate, REI, PHI varies with product selection.
	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	✓	✓	✓	✓	2.4–3.2 fl oz	0.035–0.047	12H/ 1D	Use of an adjuvant is recommended.
	<i>pymetrozine</i> Fulfill 50WDG	9B	✓	✓	✓	✓	2.75 oz	0.086	12 H/ 7 D	
	<i>spirotetramat</i> Movento 2SC	23	✓	✓	✓	Not Labeled	4–5 fl oz	0.0625–0.078	24 H/ Cole Crops 1 D Spinach 3 D	Use of an adjuvant is necessary.
	<i>sulfoxaflor</i> Transform 50WG	4C	Not Labeled	Not Labeled	Not Labeled	✓	0.75–1.0 oz	0.023–0.031	24 H/ Turnips 7 D	
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	✓	Not Labeled	1.5–3 oz	0.023–0.0468	12 H/ Cole Crops 0 D Others 7 D	Also in a pre-mix for multiple pests.
<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.	
beet armyworm, diamondback moth caterpillar	<i>Bacillus thuringiensis</i> "Bt" various names	11B	✓	✓	✓	✓	Follow label		4 H/ 0 D	
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ Cole Crops 3 D Others 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.

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<b>FOLIAR TREATMENTS (continued)</b>										
beet armyworm, diamondback moth caterpillar  (continued)	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	7–13.5 fl oz	0.045–0.088	12 H/ 1 D	
	<i>cyclaniliprole</i> Harvanta 0.42SL	28	✓	✓	✓	✓	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>emamectin benzoate</i> Proclaim 5% WDG	6	✓	✓	✓	✓	2.4–4.8 oz	0.0075–0.015	12 H/ See Remarks	PHI Cabbage, Broccoli, & Spinach—7 days, Others—14 days
	<i>indoxacarb</i> Avaunt eVo 30DG	22	✓	✓	✓	✓	3.5 oz	0.065	12 H/ 3 D	
	<i>methoxyfenozide</i> Intrepid 2F	18	See Remarks	See Remarks	See Remarks	See Remarks	4–10 fl oz	0.06–0.16	4 H/ 1 D	Not recommended for diamondback moth caterpillars.
	<i>novaluron</i> Rimon 0.83EC	15	✓	Not Labeled	Not Labeled	Not Labeled	6–12 fl oz	0.039–0.078	12 H/ 7 D	
	<i>spinetoram</i> Radiant 1SC	5	✓	Not Labeled	✓	✓	5–10 fl oz	0.039–0.078	4 H/ Turnips 3 D Others 1 D	
	<i>tolfenpyrad</i> Torac 1.29EC	21A	✓	✓	✓	✓	17–21 fl oz	0.17–0.21	12 H/ 1 D	Use of an adjuvant is recommended. Do not apply until at least 14 days after emergence or transplanting.
diamondback moth caterpillar	NOTE: Registered carbamate (Group 1A), organophosphate (Group 1B), and pyrethroid (Group 3) insecticides can provide good control of non-resistant caterpillars; however, resistance to any registered insecticides is a potential problem in Georgia. Resistance management programs for this pest should be strictly followed.									
cabbage looper, cabbage webworm, imported cabbageworm, cross-striped cabbageworm	<i>Bacillus thuringiensis</i> "Bt" various names	11B	✓	✓	✓	✓	Follow label		4 H/ 0 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	✓	1.6–2.4 fl oz	0.0125–0.019	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	See Remarks	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ See Remarks	Also in a pre-mix for multiple pests. Spinach PHI—40 days, Broccoli & Cabbage—3 days, Others—7 days.
	<i>carbaryl</i> Sevin 4F	1A	See Remarks	See Remarks	See Remarks	See Remarks	1–2 qt	1–2	12 H/ See Remarks	Not labeled for loopers. PHI Broccoli & Cabbage—3 days, Others—14 days
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ Cole Crops 3 D Others 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	10–17 fl oz	0.065–0.11	12 H/ 1 D	Rates listed are for loopers, minimum rate for others is 7 fl oz.
	<i>cyclaniliprole</i> Harvanta 0.42SL	28	✓	✓	✓	✓	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	✓	✓	✓	✓	1.6–2.4 fl oz	0.025–0.038	12 H/ 0 D	

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PEST	INSECTICIDE	MOA	Broccoli Cabbage	Collard, Kale & Mustard	Spinach	Turnip	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
cabbage looper cabbage webworm, imported cabbageworm, cross-striped cabbageworm  (continued)	<i>cypermethrin</i> Ammo 2.5EC	3	See Remarks	See Remarks	Not Labeled	Not Labeled	3.75–5 fl oz	0.075–0.1	12 H/ 1 D	Rates listed are for loopers. Labeled at 2.5–5 fl oz. for other caterpillars.
	<i>emamectin benzoate</i> Proclaim 5% WDG	6	✓	✓	✓	✓	3.2–4.8 oz	0.01–0.015	12 H/ See Remarks	PHI Broccoli, Cabbage, and Spinach—7 days, Others—14 days
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	See Remarks	Not Labeled	✓	5.8–9.6 fl oz	0.03–0.05	12 H/ See Remarks	Not labeled on Kale. PHI Broccoli & Cabbage—3 days, Other PHI—7 days
	<i>fenpropathin</i> Danitol 2.4EC	3	✓	Not Labeled	Not Labeled	Not Labeled	10.66–16 fl oz	0.2–0.3	24 H/ 7 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	Not Labeled	Not Labeled	Not Labeled	2.56–3.84 fl oz	0.01–0.015	24 H/ 1 D	
	<i>indoxacarb</i> Avaunt eVo 30DG	22	✓	✓	See Remarks	✓	2.5–3.5 oz	0.045–0.065	12 H/ 3 D	Spinach: 3.5 oz only.
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	Not Labeled	Not Labeled	Not Labeled	0.96–1.6 fl oz	0.015–0.025	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>malathion</i> 5EC, 8EC	1B	See Remarks	See Remarks	Not Labeled	✓	See Label	See Label	12-48 H/ 2-7 D	Not labeled for loopers. Rate, REI, PHI varies with product selection.
	<i>methomyl</i> Lannate 2.4LV	1A	✓	✓	✓	✓	1.5–3 pt	0.45–0.9	48 H/ See Remarks	90 SP formulation also registered. PHI Cabbage—1 day, Broccoli—3 days, Spinach—7 days, Others—10 days.
	<i>methoxyfenozide</i> Intrepid 2F	18	✓	✓	✓	✓	4–10 fl oz	0.06–0.16	4 H/ 1 D	
	<i>novaluron</i> Rimon 0.83EC	15	✓	Not Labeled	Not Labeled	Not Labeled	6–12 fl oz	0.039–0.078	12 H/ 7 D	
	<i>permethrin</i> Permethrin 3.2EC	3	See Remarks	See Remarks	See Remarks	✓	4–8 fl oz	0.1–0.2	12 H/ 1 D	Also available as 25WP formulation. Not labeled on Kale or Mustard Greens.
	<i>spinetoram</i> Radiant 1SC	5	✓	Not Labeled	✓	✓	5–10 fl oz	0.039–0.078	4 H/ Turnips 3 D Others 1 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests. Rates listed are for loopers. Labeled at 2.24–4 fl oz for other caterpillars.
corn earworm	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	✓	2.4–3.2 fl oz	0.019–0.025	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	See Remarks	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ See Remarks	Also in a pre-mix for multiple pests. PHI Spinach—40 days, Broccoli & Cabbage—3 days, Others—7 days.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ Cole crops 3 D Others 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.

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<b>FOLIAR TREATMENTS (continued)</b>										
corn earworm (continued)	<i>cyclaniliprole</i> Harvanta 0.42SL	28	✓	✓	✓	✓	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	7–13.5 fl oz	0.045–0.088	12 H/ 1 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	✓	✓	✓	✓	2.4–3.2 fl oz	0.038–0.050	12 H/ 0 D	
	<i>cypermethrin</i> Ammo 2.5EC	3	✓	✓	Not Labeled	Not Labeled	2.5–5 fl oz	0.05–0.10	12 H/ 1 D	
	<i>emamectin benzoate</i> Proclaim 5% WDG	6	✓	✓	✓	✓	2.4–4.8 oz	0.0075–0.015	12 H/ See Remarks	PHI Cabbage, Broccoli, Spinach—7 days, Others—14 days
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	Not Labeled	Not Labeled	Not Labeled	2.56–3.84 fl oz	0.01–0.015	24 H/ 1 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	Not Labeled	Not Labeled	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>novaluron</i> Rimon 0.83EC	15	✓	Not Labeled	Not Labeled	Not Labeled	6–12 fl oz	0.039–0.078	12 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
NOTE: Danitol, Asana, Lannate, and Permethrin give adequate control on labeled crops.										
cutworm	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	✓	0.8–1.6 fl oz	0.0065–0.0125	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	See Remarks	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ See Remarks	Also in a pre-mix for multiple pests. PHI Spinach—40 days, Broccoli & Cabbage—3 days, Others—7 days.
	<i>cyfluthrin</i> Tombstone 2EC	3	✓	✓	✓	✓	0.8–1.6 fl oz	0.013–0.025	12 H/ 0 D	
	<i>cypermethrin</i> Ammo 2.5EC	3	✓	✓	Not Labeled	Not Labeled	2.5–5 fl oz	0.05–0.10	12 H/ 1 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	See Remarks	Not Labeled	✓	5.8–9.6 fl oz	0.03–0.05	12 H/ See Remarks	Not labeled on Kale. PHI Broccoli & Cabbage—3 days, Others—7 days
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	Not Labeled	Not Labeled	Not Labeled	1.92–3.2 fl oz	0.0075–0.0125	24 H/ 1 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	Not Labeled	Not Labeled	Not Labeled	0.96–1.6 fl oz	0.015–0.025	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>permethrin</i> Permethrin 3.2 EC	3	See Remarks	See Remarks	See Remarks	✓	2–4 fl oz	0.05–0.1	12 H/ 1 D	Not labeled on Kale or Mustard Greens. Maximum rate on Cabbage and Spinach is 8 fl oz.

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<b>FOLIAR TREATMENTS (continued)</b>										
cutworm (continued)	zeta-cypermethrin Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
	NOTE: <i>Chlorpyrifos</i> (Lorsban) as applied for root maggots gives good control of cutworms present at time of planting.									
flea beetle	beta-cyfluthrin Baythroid XL 1EC	3	✓	✓	✓	✓	2.4–3.2 fl oz	0.019–0.025	12 H/ 0 D	Also in a pre-mix for multiple pests.
	bifenthrin Brigade 2EC	3	✓	✓	See Remarks	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ See Remarks	Also in a pre-mix for multiple pests. PHI Spinach—40 days, Broccoli & Cabbage—3 days, Others—7 days.
	carbaryl Sevin 4F	1A	✓	✓	✓	✓	0.5–1 qt	0.5–1	12 H/ See Remarks	PHI Broccoli & Cabbage—3 days, Others—14 days.
	clothianidin Belay 2.13SC	4A	✓	✓	✓	Not Labeled	3–4 fl oz	0.05–0.067	12 H/ 7 D	
	cyfluthrin Tombstone 2EC	3	✓	✓	✓	✓	2.4–3.2 fl oz	0.038–0.05	12 H/ 0 D	
	cypermethrin Ammo 2.5EC	3	✓	✓	Not Labeled	Not Labeled	2.5–5 fl oz	0.05–0.10	12 H/ 1 D	
	esfenvalerate Asana 0.66EC	3	✓	See Remarks	Not Labeled	✓	5.8–9.6 fl oz	0.03–0.05	12 H/ See Remarks	Not labeled on Kale. PHI Broccoli & Cabbage—3 days, Others—7 days.
	imidacloprid Admire Pro 4.6F	4A	✓	✓	✓	See Remarks	1.3 fl oz	0.047	12 H/ 7 D	Also in a pre-mix for multiple pests. Rate on turnips is 1.2 fl oz.
	lambda-cyhalothrin Warrior II 2.08CS	3	✓	Not Labeled	Not Labeled	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	malathion 5EC, 8EC	1B	✓	✓	✓	✓	See Label	See Label	12-48 H/ 2-7 D	Rate, REI, PHI varies with product selection.
	tolfenpyrad Torac 1.29EC	21A	✓	✓	✓	✓	17–21 fl oz	0.17–0.21	12 H/ 1 D	Use of an adjuvant is recommended. Do not apply until at least 14 days after emergence or transplanting.
	zeta-cypermethrin Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
harlequin bug	beta-cyfluthrin Baythroid XL 1EC	3	✓	✓	✓	✓	2.4–3.2 fl oz	0.019–0.025	12 H/ 0 D	Also in a pre-mix for multiple pests.
	bifenthrin Brigade 2EC	3	✓	✓	See Remarks	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ See Remarks	Also in a pre-mix for multiple pests. PHI Spinach—40 days, Broccoli & Cabbage—3 days, Others—7 days.
	cyfluthrin Tombstone 2EC	3	✓	✓	✓	✓	2.4–3.2 fl oz	0.038–0.050	12 H/ 0 D	

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COMMERCIAL VEGETABLE INSECT CONTROL

BRASSICA & LEAFY VEGETABLES (Broccoli, Cabbage, Collards, Kale, Mustard, Spinach, and Turnip)

PEST	INSECTICIDE	MOA	Broccoli Cabbage	Collard, Kale & Mustard	Spinach	Turnip	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
harlequin bug (continued)	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	Not Labeled	Not Labeled	Not Labeled	2.56–3.84 fl oz	0.01–0.015	24 H/ 1 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	Not Labeled	Not Labeled	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
silverleaf whitefly	<i>acetamiprid</i> Assail 30SG	4A	✓	See Remarks	✓	See Remarks	2.5–4 oz	0.05–0.075	12 H/ See Remarks	Maximum rate on Collard, Kale, Mustard, and Turnip is 5.3 oz with 3 day PHI. Others PHI—7 days.
	<i>buprofezin</i> Courier 3.6SC	16	✓	✓	See Remarks	✓	9–13.6 fl oz	0.25–0.38	12 H/ Spinach 7 D Others 1 D	Primarily active against nymphs. Also in a pre-mix for multiple pests.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	5–7.5 oz	0.065–0.098	4 H/ Cole crops 3 D Others 1 D	
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	<i>dinotefuran</i> Venom 70SG	4A	✓	See Remarks	See Remarks	See Remarks	1–4 oz	0.045–0.179	12 H/ Cole crops 1 D Spinach 7 D	Spinach rate is 1–3 oz. Rates on Leafy Brassica are 2–3 oz.
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	✓	✓	✓	✓	10.5–14 fl oz	0.136–0.18	4 H/ 1 D	
	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	✓	✓	✓	✓	2.4–3.2 fl oz	0.035–0.047	12H/ 1D	Use of an adjuvant is recommended.
	<i>pyriproxyfen</i> Knack 0.86EC	7C	✓	✓	Not Labeled	✓	8–10 fl oz	0.054–0.067	12H/ 7D	Activity on eggs and last instar nymphs. 24C label in Georgia allows 4 applications at 5 fl oz/A.
	<i>spiromesifen</i> Oberon 2SC	23	✓	Not Labeled	✓	Not Labeled	7–8.5 fl oz	0.11–0.13	12 H/ 7 D	
	<i>spirotetramat</i> Movento 2SC	23	✓	✓	✓	Not Labeled	4–5 fl oz	0.0625–0.078	24 H/ Spinach 3 D Others 1 D	Use of an adjuvant is necessary. Activity on early instar nymphs.
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	✓	Not Labeled	3–5.5 oz	0.0468–0.086	12 H/ Cole crops 0 D Others 7 D	Also in a pre-mix for multiple pests.
<p><b>NOTE:</b> Reduced residual activity has been noted with all Group 4A insecticides.  <b>NOTE:</b> Group 4A insecticides should not be used for foliar applications if a Group 4A was applied in the soil.</p>										

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**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF BRASSICA CROPS**

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	FLEA BEETLE	CORN EARWORM	CABBAGE LOOPER	IMPORTED CABBAGEWORM	DIAMONDBACK MOTH	BEET ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	SILVERLEAF WHITEFLY	CUTWORMS
1A	<i>methomyl</i>	Lannate	+	++	++	++	++	+	++	+	+++	+	—
1B	<i>malathion</i>	Malathion	++	+	+	++	+	—	+	+	+	—	+
3	<i>permethrin</i>	Pounce	++	++	++	+++	+	—	++	+	+	—	++
	<i>zeta-cypermethrin</i>	Mustang Maxx	+++	++	++	+++	+	—	++	+	++	—	+++
	<i>beta-cyfluthrin</i>	Baythroid	++	++	++	+++	+	—	++	+	+	—	+++
	<i>lambda-cyhalothrin</i>	Warrior II	+++	++	++	+++	+	—	++	+	++	—	+++
	<i>esfenvalerate</i>	Asana XL	+++	++	++	+++	+	—	+	+	+	—	++
	<i>fenpropathrin</i>	Danitol	++	++	+	+++	+	—	++	+	+	+	++
	<i>bifenthrin</i>	Brigade	+++	++	+	+++	+	—	++	+	++	+	+++
4A	<i>imidacloprid</i>	Admire Pro	+++	—	—	—	—	—	—	+++	+	++	—
	<i>acetamiprid</i>	Assail	++	—	—	—	—	—	+	+++	+	++	—
	<i>thiamethoxam</i>	Platinum/Actara	+++	—	—	—	—	—	++	+++	+	++	—
	<i>dinotefuran</i>	Venom	+++	—	—	—	—	—	++	++	+	++	—
4C	<i>sulfoxaflor</i>	Transform	—	—	—	—	—	—	—	+++	—	+	—
4D	<i>flupyradifurone</i>	Sivanto Prime 1.67SL	—	—	—	—	—	—	—	+++	—	++	—
5	<i>spinetoram</i>	Radiant	—	+++	++	+++	++	++	—	—	+++	—	+
6	<i>emamectin benzoate</i>	Proclaim	—	++	+++	+++	+++	+++	—	—	—	—	+
7C	<i>pyriproxyfen</i>	Knack	—	—	—	—	—	—	—	—	—	++	—
9B	<i>pymetrozine</i>	Fulfill	—	—	—	—	—	—	—	+++	—	+	—

**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF BRASSICA CROPS (*continued*)**

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	FLEA BEETLE	CORN EARWORM	CABBAGE LOOPER	IMPORTED CABBAGEWORM	DIAMONDBACK MOTH	BEE TARMY WORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	SILVERLEAF WHITEFLY	CUT WORMS
9D	<i>afidopyropen</i>	Versys	—	—	—	—	—	—	—	+++	—	+	—
11	<i>Bt</i>	Dipel, various	—	+	++	+++	+	+	—	—	—	—	—
15	<i>novaluron</i>	Rimon	—	++	++	+++	++	+++	+	—	+	+	—
16	<i>buprofezin</i>	Courier	—	—	—	—	—	—	—	—	—	++	—
18	<i>methoxyfenozide</i>	Intrepid	—	++	+++	+++	+	+++	—	—	—	—	—
21A	<i>tolfenpyrad</i>	Torac	++	+	+	+	++	+	—	—	++	—	—
22	<i>indoxacarb</i>	Avaunt	+	+++	+++	+++	++	+++	—	—	—	—	+
23	<i>spiromesifen</i>	Oberon	—	—	—	—	—	—	—	—	—	+	—
	<i>spirotetramat</i>	Movento	—	—	—	—	—	—	—	++	—	++	—
28	<i>chlorantraniliprole</i>	Coragen	—	+++	+++	+++	+++	+++	—	—	—	++	+
	<i>cyantraniliprole</i>	Verimark/Exirel	—	+++	+++	+++	+++	+++	—	+++	+	++	+
	<i>cyclaniliprole</i>	Harvanta	—	+++	+++	+++	+++	+++	—	—	—	—	+
29	<i>flonicamid</i>	Beleaf	—	—	—	—	—	—	—	+++	—	—	—

Ratings for products was initially conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use for all crops in this group. Please refer to the appropriate section of the Pest Management Handbook for details on product labeling.

Efficacy ratings:  
 — Ineffective or insufficient data  
 + Somewhat effective  
 ++ Effective  
 +++ Very effective

CARROT

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>						
aphids, flea beetle, leafhopper	<i>imidacloprid</i> Admire Pro 4.6F	4A	4.4–10.5 fl oz	0.156–0.375	12 H/ 21 D	
	<i>thiamethoxam</i> Platinum 75SG	4A	1.7–4.01 oz	0.078–0.1875	12 H/ AP	
soil insects	<i>diazinon</i> 4E 50W	1B	2–4 qt	2–4	3 D/ Pre-plant	
			4–8 lb	2–4		
<b>FOLIAR TREATMENTS</b>						
Pre-mixes for multiple pests	<i>imidacloprid</i> + <i>beta-cyfluthrin</i> Leverage 360 SC	4A + 3	2.4–2.8 fl oz	0.038–0.044 + 0.019–0.022	12 H/ 7 D	
	<i>spirotetramat</i> + <i>pyriproxyfen</i> Senstar SE	23 + 7C		0.078 + 0.027	24 H/ 7 D	
	<i>zeta-cypermethrin</i> + <i>bifenthrin</i> Hero EC	3 + 3		0.01–0.025 + 0.03–0.075	12 H/ 21 D	
aphid	<i>bifenthrin</i> Brigade 2EC	3	5.12–6.4 fl oz	0.08–0.1	12 H/ 21 D	Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	<i>flonicamid</i> Beleaf 50SG	29	2–2.8 oz	0.062–0.089	12 H/ 3 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	7–10.5 fl oz	0.09–0.136	4 H/ 7 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	1.2 fl oz	0.043	12 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>spirotetramat</i> Movento 2SC	23	5 fl oz	0.08	24 H/ 1 D	Use of an adjuvant is necessary. Activity on early instar nymphs.
	<i>sulfoxaflor</i> Transform 50WG	4C	0.75–1.5 oz	0.023–0.047	24H/ 7D	
	<i>thiamethoxam</i> Actara 25 WDG	4A	1.5–3 oz	0.023–0.047	12 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

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## COMMERCIAL VEGETABLE INSECT CONTROL

### CARROT

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>						
armyworm	<i>chlorantraniliprole</i> Coragen 1.67SC	28	3.5–5 fl oz	0.045–0.065	4 H/ 1 D	
	<i>methoxyfenozide</i> Intrepid 2F	18	8–16 fl oz	0.12–0.25	4 H/ 1 D	
	<i>spinetoram</i> Radiant 1SC	5	6–8 fl oz	0.047–0.063	4 H/ 3 D	
	<i>spinosad</i> Blackhawk 36WDG	5	1.7–3.3 oz	0.038–0.074	4 H/ 3 D	
carrot weevil	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	2.8 fl oz	0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>cyfluthrin</i> Tombstone 2E	3	2.8 fl oz	0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	9.6 fl oz	0.05	12 H/ 7 D	
	<i>oxamyl</i> Vydate 2L	1A	2–4 pt	0.5–1	48 H/ 14 D	
cutworm	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	5.12–6.4 fl oz	0.08–0.1	12 H/ 21 D	Also in a pre-mix for multiple pests.
	<i>cyfluthrin</i> Tombstone 2E	3	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	5.8–9.6 fl oz	0.03–0.05	12 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8 EC	3	1.28–4 fl oz	0.008–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
flea beetles	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	5.12–6.4 fl oz	0.08–0.1	12 H/ 21 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	0.5–1 qt	0.5–1	12 H/ 7 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	1.2 fl oz	0.04	12 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>thiamethoxam</i> Actara 25WDG	4A	1.5–3 oz	0.023–0.047	12 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8 EC	3	1.76–4 fl oz	0.011–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

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CARROT

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>						
leafhoppers	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	0.5–1 qt	0.5–1	12 H/ 7 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	5.8–9.6 fl oz	0.03–0.05	12 H/ 7 D	
	<i>methomyl</i> Lannate 2.4LV	1A	1.5–3 pt	0.45–0.9	48 H/ 1 D	90 SP formulation also registered.
	<i>thiamethoxam</i> Actara 25WDG	4A	1.5–3 fl oz	0.023–0.047	12 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8 EC	3	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
vegetable weevil	NOTE: Group 3 insecticides (pyrethroids) as applied for other pests will give helpful control.					

CORN (Sweet)

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>						
soil insects	<i>bifenthrin</i> Brigade 2EC Empower 1.15G	3	0.15-0.3 fl oz/1000 ft of row 3.2-8 oz/1000 ft of row		Brigade 24 H/30 D Empower 18 D/AP	
	<i>chlorethoxyfos</i> Fortress 5G	1B	3-3.75 oz/1,000 ft of row		48 H/ AP	Maximum rate for rootworms is 4.5 oz.
	<i>cyfluthrin</i> Aztec 2.1G 4.67G	3	6.7 oz/1000 ft of row 3 oz/1000 ft of row		48 H/ AP	
	<i>ethoprop</i> Mocap 15G	1B	8 oz/1000 ft of row		48 H/ AP	Also labeled for broadcast application prior to planting.
	<i>phorate</i> Thimet 20G	1B	4-5.6 oz/1,000 ft of row		48 H/ 30 D	Also registered for application at cultivation. Do not apply in-furrow.
	<i>tefluthrin</i> Force 3G	3	3-5 oz/1,000 ft of row		0 H/ AP	Also labeled for cultivation application within 30 days of crop emergence.
	<i>terbufos</i> Counter 20G	1B	4.5-6 oz/1,000 ft of row		48 H/ 60 D	Also labeled for post-emergence incorporated application.
pre-tassel caterpillar pests	<i>chlorantraniliprole</i> Coragen 1.67SC	28	5 fl oz	0.065	4 H/ AP	See 24C label for application instructions.
cutworm, soil insects	<i>chlorpyrifos</i> Lorsban 4E, 15G, 75WG, Advanced	1B	See label		24 H/ 21 D	Labeled for pre-plant, at-planting, and post-planting (except 15G) application.

## COMMERCIAL VEGETABLE INSECT CONTROL

### CORN (Sweet)

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS</b>						
pre-mixes for multiple pests	<i>lambda-cyhalothrin</i> + <i>chlorantraniliprole</i> Besiege SC	3 + 28	6–10 fl oz Rate varies with targeted pests		24 H/ 1 D	
	<i>methoxyfenozide</i> + <i>spinetoram</i> Intrepid Edge SC	5 + 18	4–12 fl oz	0.078–0.234 + 0.015–0.047	4 H/ 3 D	Rate varies with pest targeted.
	<i>novaluron</i> + <i>acetamiprid</i> Cormoran EC	15 + 4A	9–12 fl oz	0.059–0.079 + 0.047–0.06	12 H/ 7 D	Rate varies with pest targeted.
	<i>zeta-cypermethrin</i> + <i>bifenthrin</i> Hero EC	3 + 3	4–10.3 fl oz	0.01–0.025 + 0.03–0.075	12 H/ 3 D	
aphid	<i>acetamiprid</i> Assail 30SG	4A	2.1–2.9 oz	0.04–0.054	12 H/ 1 D	
	<i>bifenthrin</i> Brigade 2EC	3	2.1–6.4 fl oz	0.033–0.10	12 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	7–10.5 fl oz	0.09–0.136	4 H/ 7 D	
	<i>sulfoxaflor</i> Transform 50WG	4C	0.75–1.5 oz	0.023–0.047	24H/ 7D	
corn earworm, European corn borer	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	
	<i>bifenthrin</i> Brigade 2EC	3	2.1–6.4 fl oz	0.033–0.10	12 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>cyfluthrin</i> Tombstone 2EC	3	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	5.8–9.6 fl oz	0.03–0.05	12 H/ 1 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	2.56–3.84 fl oz	0.01–0.015	24 H/ 1 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	0.75–1.5 pt	0.225–0.45	48 H/ 0 D	90 SP formulation also registered.

CORN (Sweet)

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>						
corn earworm, European corn borer (continued)	<i>permethrin</i> Permethrin 3.2EC	3	4–8 fl oz	0.1–0.2	12 H/ 1 D	Also available as 25WP formulation.
	<i>spinetoram</i> Radiant 1SC	5	3–6 fl oz	0.023–0.047	4 H/ 1 D	
	<i>spinosad</i> Blackhawk 36WDG	5	2.2–3.3 oz	0.05–0.074	4 H/ 1 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	2.8–4 fl oz	0.0175–0.025	12 H/ 3 D	Also in a pre-mix for multiple pests.
European corn borer (not corn earworm)	<i>indoxacarb</i> Avaunt eVo 30DG	22	2.5–3.5 oz	0.045–0.065	12 H/ 3 D	For application through tassel push only. PHI is 14 days if hand-harvested.
	<i>methoxyfenozide</i> Intrepid 2F	18	4–16 fl oz	0.06–0.25	4 H/ 3 D	
fall armyworm	<i>chlorantraniliprole</i> Coragen 1.67SC	28	3.5–5 fl oz	0.045–0.065	4 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>indoxacarb</i> Avaunt eVo 30DG	22	2.5–3.5 oz	0.045–0.065	12 H/ 3 D	For application through tassel push only. PHI is 14 days if hand-harvested.
	<i>methomyl</i> Lannate 2.4LV	1A	0.75–1.5 pt	0.225–0.45	48 H/ 0 D	90 SP formulation also registered.
	<i>novaluron</i> Rimon 0.83EC	15	6–12 fl oz	0.038–0.078	12 H/ 1 D	If used after tassel push, tank-mix with a knockdown product.
	<i>spinetoram</i> Radiant 1SC	5	3–6 fl oz	0.023–0.047	4 H/ 1 D	
	<i>spinosad</i> Blackhawk 36WDG	5	1.67–3.3 oz	0.038–0.074	4 H/ 1 D	
spider mites	<i>abamectin</i> Agri-mek 0.7SC	6	1.75–3.5 fl oz	0.01–0.02	12 H/ 7 D	Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>propargite</i> Comite 6.55EC	12C	32–48 fl oz	1.64–2.45	13 D/ 30 D	Apply when mite populations are low. Apply only when corn leaves are dry.
	<i>spinosesifen</i> Oberon 4SC	23	2.85–8 fl oz	0.089–0.25	12 H/ 5 D	Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
stinkbugs	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	
	<i>bifenthrin</i> Brigade 2EC	3	2.1–6.4 fl oz	0.033–0.1	12 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>cyfluthrin</i> Tombstone 2EC	3	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	2.56–3.84 fl oz	0.01–0.015	24 H/ 1 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.

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## COMMERCIAL VEGETABLE INSECT CONTROL

### CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>									
Pre-mixes for multiple pests	<i>thiamethoxam</i> + <i>chlorantraniliprole</i> Durivo SC	4A + 28	√	√	√	10–13 fl oz	0.13–0.17 + 0.065–0.085	12 H/ 30 D	
aphids, whitefly	<i>cyantraniliprole</i> Verimark 1.67SC	28	√	√	√	6.75–13.5 fl oz Rate varies with pest targeted		4 H/ 1 D	Rates for drip chemigation are 5–10 fl oz. Also labeled for transplant drench no earlier than 72 hours prior to planting.
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	√	√	√	21–28 fl oz See Remarks	0.274–0.365	4 H/ 21 D	State 2(ee) Label recommendation allows for use from 14–21 oz in Georgia and Florida.
	<i>imidacloprid</i> Admire Pro 4.6F	4A	√	√	√	Planthouse: 0.44 fl oz/10,000 plants		12 H/ NA	Apply within 7 days prior to transplanting.
aphid, whitefly, cucumber beetles	<i>clothianidin</i> Belay 2.13SC	4A	√	√	√	9–12 fl oz	0.15–0.2	12 H/ 21 D	
	<i>dinotefuran</i> Venom 70SG	4A	√	√	√	5–7.5 oz	0.226–0.328	12 H/ 21 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	√	√	√	7–10.5 fl oz	0.25–0.375	12 H/ 21 D	
	<i>thiamethoxam</i> Platinum 75SG	4A	√	√	√	1.66–3.67 oz	0.078–0.17	12 H/ 30 D	Also in a pre-mix for multiple pests.
caterpillar pests, whitefly	<i>cyantraniliprole</i> Verimark 1.67SC	28	√	√	√	6.75–13.5 fl oz Rate varies with pest targeted		4 H/ 1 D	Rates for drip chemigation are 5–10 fl oz. Also labeled for transplant drench no earlier than 72 hours prior to planting.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	See label for application timing. Also in a pre-mix for multiple pests.
soil insects	<i>bifenthrin</i> Empower 1.15G	3	√	√	√	3.5–8.7 lb	0.04–0.1	24 H/ 3 D	May be applied pre-plant or during the season.
	<i>diazinon</i> 4E 50W	1B	√	Not Labeled	Not Labeled	2–4 qt 4–8 lb	2–4 2–4	3 D/ Pre-plant	
<b>FOLIAR TREATMENTS</b>									
Pre-mixes for multiple pests	<i>bifenthrin</i> + <i>avermectin</i> Athena	3 + 6	√	√	√	7–17 fl oz	0.04–0.1 + 0.006–0.015	12 H/ 7 D	
	<i>cyantraniliprole</i> + <i>abamectin</i> Minecto Pro SC	28 + 6	√	√	√	5.5–10 fl oz	0.048–0.088 + 0.01–0.019	12 H/ 7 D	Must be mixed with adjuvant (see label). DO NOT use binder or sticker type adjuvant.

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CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
Pre-mixes for multiple pests (continued)	lambda-cyhalothrin + chlorantraniliprole Voliam Xpress	3 + 28	√	√	√	6–9 fl oz	0.02–0.029 + 0.039–0.059	24 H/ 1 D	
	lambda-cyhalothrin + thiamethoxam Endigo ZC	3 + 4A	√	√	√	4–4.5 fl oz	0.028–0.03 + 0.037–0.04	24 H/ 1 D	
	novaluron + acetamiprid Cormoran EC	15 + 4A	√	√	√	9–12 fl oz	0.059–0.079 + 0.047–0.06	12 H/ 1 D	Rate varies with pest targeted.
	thiamethoxam + chlorantraniliprole Voliam flexi WDG	4A + 28	√	√	√	4–7 oz	0.05–0.0875 + 0.05–0.0875	12 H/ 1 D	
	zeta-cypermethrin + bifenthrin Hero	3 + 3	√	√	√	4–10.3 fl oz	0.01–0.025 + 0.03–0.075	12 H/ 3 D	
aphid	acetamiprid Assail 30SG	4A	√	√	√	2.5–4 oz	0.047–0.075	12 H/ 0 D	
	afidopyropen Sefina 0.42DC	9D	√	√	√	3 fl oz	0.01	12 H/ 0 D	
	bifenthrin Brigade 2EC	3	√	√	√	2.6–6.4 fl oz	0.04–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	clothianidin Belay 2.13SC	4A	√	√	√	3–4 fl oz	0.05–0.067	12 H/ 7 D	
	cyantraniliprole Exirel 0.83SC	28	√	√	√	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	dimethoate 4EC 2.67EC	1B	See Remarks	Not Labeled	Not Labeled	0.5–1 pt 0.75–1.5 pt	0.25–0.5 0.25–0.5	48 H/ 3 D	Also available as Cygon 3.35EC. Minimum labeled rate on cantaloupe is 0.5 lb AI.
	dinotefuran Venom 70SG	4A	√	√	√	1–4 oz	0.045–0.179	12 H/ 1 D	
	flonicamid Beleaf 50SG	29	√	√	√	2–2.8 oz	0.062–0.089	12 H/ 0 D	
	flupyradifurone Sivanto Prime 1.67SL	4D	See Remarks	√	√	7–12 fl oz	0.09–0.156	4 H/ 1 D	Not labeled for cantaloupe.
	malathion 5EC, 8EC	1B	√	√	√	See Label	See Label	12–24 H/ 1 D	Rate, REI, PHI varies with product selection.
oxamyl Vydate 2L	1A	√	√	√	2–4 pt	0.5–1	48 H/ 1 D		

COMMERCIAL VEGETABLE INSECT CONTROL

CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
aphid (continued)	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	√	√	√	2.4–3.2 fl oz	0.035–0.047	12H/ 1D	Use of an adjuvant is recommended.
	<i>pymetrozine</i> Fulfill 50 WDG	9B	√	√	√	2.75 oz	0.086	12 H/ 0 D	
	<i>sulfoxaflor</i> Transform 50WG	4C	√	√	√	0.75 fl oz	0.023	24H/ 7D	
	<i>thiamethoxam</i> Actara 25WDG	4A	√	√	√	1.5–3 oz	0.023–0.0468	12 H/ 0 D	Also in a pre-mix for multiple pests.
aphid/mosaic suppression in squash and pumpkin	JMS stylet oil Saf-T-Side Sunspray UFO		√	√	√	3 qt/100 gal finished spray 1 gal/100 gal finished spray 1 ga/100 gal finished spray		4 H/ 0 D	
	NOTE: Oils when used at the above rates applied 2 to 3 times per week with a high pressure (400 PSI) high volume (100 GPA) sprayer give noted suppression of aphid transmitted virus infection. To prevent aphid colonization, treat with a neonicotinoid insecticide (4A) at planting or tank-mix an effective contact insecticide with every 2 to 3 applications of oil.								
beet armyworms	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	√	√	√	7–13.5 fl oz	0.045–0.088	12 H/ 1 D	
	<i>cyclaniliprole</i> Harvanta 0.42SL	28	√	√	√	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>indoxacarb</i> Avaunt eVo 30DG	22	√	√	√	3.5–6 oz	0.065–0.11	12 H/ 3 D	
	<i>methoxyfenozide</i> Intrepid 2F	18	√	√	√	4–10 fl oz	0.06–0.16	4 H/ 3 D	
	<i>novaluron</i> Rimon 0.83EC	15	√	√	√	9–12 fl oz	0.058–0.078	12 H/ 1 D	
	<i>spinetoram</i> Radiant 1SC	5	√	√	√	5–10 fl oz	0.039–0.078	4 H/ Cucumber 1 D Others 3 D	
cucumber beetle	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	√	√	√	2.4–2.8 fl oz	0.019–0.022	12 H/ 0 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	2.6–6.4 fl oz	0.04–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	√	√	√	1 qt	1	12 H/ 3 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	√	√	√	2.4–2.8 fl oz	0.038–0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	√	√	√	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	

CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
cucumber beetle (continued)	<i>fenpropathrin</i> Danitol 2.4EC	3	√	√	√	10.66–16 fl oz	0.2–0.3	24 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pest.
	<i>malathion</i> 5EC 8EC	1B	√	√	√	See Label	See Label	12–24 H/ 1 D	Rate, REI, PHI varies with product selection.
	<i>permethrin</i> Permethrin 3.2EC	3	√	√	√	4–8 fl oz	0.1–0.2	12 H/ 0 D	Also available as 25WP formulation.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	2.8–4 fl oz	0.018–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
cutworm	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	√	√	√	0.8–1.6 fl oz	0.0065–0.0125	12 H/ 0 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	2.6–6.4 fl oz	0.04–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>cyfluthrin</i> Tombstone 2EC	3	√	√	√	0.8–1.6 fl oz	0.013–0.025	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	√	√	√	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>permethrin</i> Permethrin 3.2EC	3	√	√	√	4–8 fl oz	0.1–0.2	12 H/ 0 D	Also available as 25WP formulation.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	1.28–4 fl oz	0.008–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
leafminer	<i>abamectin</i> Agri-Mek 0.15EC 0.7SC	6	√	√	√	0.5–1 pt 1.75–3.5 fl oz	0.01–0.02 0.01–0.02	12 H/ 7 D	Also in a pre-mix for multiple pests. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	5–7.5 fl oz	0.065–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests. Use of a surfactant is recommended.
	<i>cyromazine</i> Trigard 75 WP	17	√	√	√	2.66 oz	0.125	12 H/ 0 D	
	<i>spinetoram</i> Radiant 1SC	5	√	√	√	6–10 fl oz	0.047–0.078	4 H/ Cucumber 1 D Others 3 D	

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## COMMERCIAL VEGETABLE INSECT CONTROL

### CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
pickleworm, melonworm, rindworm complex	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	√	√	√	1.6–2.4 fl oz	0.0125–0.019	12 H/ 0 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	2.6–6.4 fl oz	0.04–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	See Remarks	See Remarks	See Remarks	0.5–1 qt	0.5–1	12 H/ 3 D	Not labeled for rindworm complex.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	√	√	√	7–13.5 fl oz	0.045–0.088	12 H/ 1 D	
	<i>cyclaniliprole</i> Harvanta 0.42SL	28	√	√	√	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	√	√	√	1.6–2.4 fl oz	0.025–0.038	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	√	√	√	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	<i>indoxacarb</i> Avaunt eVo 30DG	22	√	√	√	2.5–6 oz	0.045–0.11	12 H/ 3 D	Not labeled for rindworm complex but should provide good control of most species.
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>malathion</i> 5EC, 8EC	1B	√	√	√	See Label	See Label	12–24 H/ 1 D	Rate, REI, PHI varies with product selection.
	<i>methomyl</i> Lannate 2.4LV	1A	√	√	See Remarks	1.5–3 pt	0.45–0.9	48 H/ 1–3 D	90 SP formulation also registered. Not labeled on pumpkin.
	<i>methoxyfenozide</i> Intrepid 2F	18	√	√	√	4–10 fl oz	0.06–0.16	4 H/ 3 D	
	<i>novaluron</i> Rimon 0.83EC	15	√	√	√	12 fl oz	0.078	12 H/ 1 D	
	<i>permethrin</i> Permethrin 3.2EC	3	√	√	√	4–8 fl oz	0.1–0.2	12 H/ 0 D	Also available as 25WP formulation.
<i>spinetoram</i> Radiant 1SC	5	√	√	√	5–10 fl oz	0.039–0.078	4 H/ Cucumber 1 D Others 3 D		
<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	2.8–4 fl oz	0.018–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.	

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CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
spider mite	<i>abamectin</i> Agri-Mek 0.15EC 0.7SC	6	√	√	√	0.5–1 pt 1.75–3.5 fl oz	0.01–0.02 0.01–0.02	12 H/ 7 D	Also in a pre-mix for multiple pests. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>acequinocyl</i> Kanemite 15SC	20B	√	√	Not Labeled	31 fl oz	0.3	12 H/ 1 D	See adjuvant mixing instructions on label.
	<i>bifenazate</i> Acramite 50WS Acramite 4SC	un	√	√	√	0.75–1 lb 12–16 fl oz	0.375–0.5	12 H/ 3 D	Good coverage is essential.
	<i>etoxazole</i> Zeal 72WG	10B	√	√	√	2–3 oz	0.09–0.135	12 H/ 7 D	Predominately an ovicide/larvicide.
	<i>fenpyroximate</i> Portal 0.4EC	21A	√	√	Not Labeled	2 pt	0.1	12 H/ Cucumber 1 D Others 3 D	
	<i>spiromesifen</i> Oberon 2SC	23	√	√	√	7–8.5 fl oz	0.11–0.13	12 H/ 7 D	
squash bug (see note)	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	2.6–6.4 fl oz	0.04–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	√	√	√	1 qt	1	12 H/ 3 D	
	<i>dinotefuran</i> Venom 70SG	4A	√	√	√	4 oz	0.045–0.179	12 H/ 1 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	√	√	√	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	√	√	See Remarks	1.5–3 pt	0.45–0.9	48 H/ 1–3 D	90 SP formulation also registered. Not labeled on pumpkin.
	<i>permethrin</i> Permethrin 3.2EC	3	√	√	√	8 fl oz	0.2	12 H/ 0 D	Also available as 25WP formulation.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	2.8–4 fl oz	0.018–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
<b>NOTE:</b> This pest is difficult to control. Efficacy studies suggest best control with a tank-mix of <i>methomyl</i> plus <i>bifenthrin</i> .									

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## COMMERCIAL VEGETABLE INSECT CONTROL

### CUCURBIT CROPS (Cantaloupe, Cucumber, Pumpkin, Squash, and Watermelon)

PEST	INSECTICIDE	MOA	Cantaloupe Watermelon	Cucumber	Squash Pumpkin	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
silverleaf whitefly	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	2.5–5.3 oz	0.047–0.1	12 H/ 0 D	
	<i>buprofezin</i> Courier 3.6SC	16	✓	✓	✓	9–13.6 fl oz	0.25–0.38	12 H/ 1 D	Activity on nymphs. Also in a pre-mix for multiple pests.
	<i>afidopyropen</i> Sefina 0.42DC	9D	✓	✓	✓	14 fl oz	0.046	12 H/ 0 D	
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	5–7.5 fl oz	0.065–0.098	4 H/ 1 D	Activity on nymphs. Addition of an adjuvant has shown increased efficacy. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	✓	1–4 oz	0.045–0.179	12 H/ 1 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	See Remarks	✓	✓	10.5–14 fl oz	0.136–0.18	4 H/ 1 D	Not labeled for cantaloupe.
	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	✓	✓	✓	2.4–3.2 fl oz	0.035–0.047	12H/ 1D	Use of an adjuvant is recommended.
	<i>pyriproxyfen</i> Knack 0.86EC	7C	✓	✓	✓	8–10 fl oz	0.054–0.067	12 H/ 7 D	Activity on eggs and last instar nymphs. 24C label in Georgia allows 4 applications at 5 fl oz/A.
	<i>spiromesifen</i> Oberon 2SC	23	✓	✓	✓	7–8.5 fl oz	0.11–0.13	12 H/ 7 D	
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	✓	3–5.5 oz	0.0468–0.086	12 H/ 0 D	Also in a pre-mix for multiple pests.
<p><b>NOTE:</b> Reduced residual activity has been noted with all Group 4A insecticides.  <b>NOTE:</b> Group 4A insecticides should not be used for foliar applications if a Group 4A was applied in the soil.</p>									
thrips, western flower	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	✓	1–4 oz	0.045–0.179	12 H/ 1 D	
	<i>tolfenpyrad</i> Torac 1.29EC	21A	✓	✓	✓	21 fl oz	0.21	12 H/ 1 D	Use of an adjuvant is recommended.
	<i>spinetoram</i> Radiant 1SC	5	✓	✓	✓	6–10 fl oz	0.047–0.078	4 H/ Cucumber 1 D Others 3 D	
	<p><b>NOTE:</b> <i>methomyl</i> (Lannate) at rate for pickleworm gives good control.  <b>NOTE:</b> Assail as applied for whiteflies provides suppression of thrips.</p>								

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**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF CUCURBIT CROPS**

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	CUCUMBER BEETLES	CABBAGE LOOPER	BEE T ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	WESTERN FLOWER THRIPS	SILVERLEAF WHITEFLY	CUTWORMS	SPIDER MITES	PICKLEWORM, MELONWORM	LEAFMINER
1A	<i>carbaryl</i>	Sevin	—	+	—	—	—	+	—	—	+	—	+	—
	<i>methomyl</i>	Lannate	—	++	+	++	+	+++	++	+	—	—	++	—
1B	<i>malathion</i>	Malathion	++	+	—	+	+	+	—	—	+	—	+	—
3	<i>permethrin</i>	Pounce	++	++	—	++	+	+	—	—	++	—	++	—
	<i>zeta-cypermethrin</i>	Mustang Maxx	+++	++	—	++	+	++	—	—	+++	—	+++	—
	<i>beta-cyfluthrin</i>	Baythroid	++	++	—	++	+	+	—	—	+++	—	+++	—
	<i>lambda-cyhalothrin</i>	Warrior II	+++	++	—	++	+	++	—	—	+++	—	+++	—
	<i>esfenvalerate</i>	Asana XL	++	++	—	+	+	+	—	—	++	—	+++	—
	<i>fenpropathrin</i>	Danitol	++	+	—	++	+	+	—	—	++	—	+++	—
	<i>bifenthrin</i>	Brigade	+++	+	—	++	+	++	—	—	+++	—	+++	—
4A	<i>imidacloprid</i>	Admire Pro	+++	—	—	—	+++	+	—	++	—	—	—	—
	<i>acetamiprid</i>	Assail	++	—	—	+	+++	+	—	++	—	—	—	—
	<i>thiamethoxam</i>	Platinum/Actara	++	—	—	++	+++	+	—	++	—	—	—	—
	<i>dinotefuran</i>	Venom	++	—	—	++	++	+	—	++	—	—	—	—
4C	<i>sulfoxaflor</i>	Transform	—	—	—	—	+++	—	—	+	—	—	—	—
4D	<i>flupyradifurone</i>	Sivanto Prime	—	—	—	—	+++	—	—	++	—	—	—	—
5	<i>spinetoram</i>	Radiant	—	++	++	—	—	+++	++	—	+	—	+++	+
6	<i>abamectin</i>	AgriMek	—	—	—	—	—	++	+	—	—	+++	—	+++
7C	<i>pyriproxyfen</i>	Knack	—	—	—	—	—	—	—	++	—	—	—	—
9B	<i>pymetrozine</i>	Fulfill	—	—	—	—	+++	—	—	+	—	—	—	—

Ratings for products was initially conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use for all crops in this group. Please refer to the appropriate section of the Pest Management Handbook for details on product labeling.

Efficacy ratings:  
 — Ineffective or insufficient data  
 + Somewhat effective  
 ++ Effective  
 +++ Very effective

EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF CUCURBIT CROPS (*continued*)

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	CUCUMBER BEETLES	CABBAGE LOOPER	BEE T ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	WESTERN FLOWER THRIPS	SILVERLEAF WHITEFLY	CUTWORMS	SPIDER MITES	PICKLEWORM, MELONWORM	LEAFMINER
9D	<i>afidopyropen</i>	Sefina	—	—	—	—	++	—	—	+	—	—	—	—
10B	<i>etoxazole</i>	Zeal	—	—	—	—	—	—	—	—	—	++	—	—
11	<i>Bt</i>	Dipel, various	—	++	+	—	—	—	—	—	—	—	+	—
15	<i>novaluron</i>	Rimon	—	++	+++	+	—	+	+	+	—	—	+++	—
16	<i>buprofezin</i>	Courier	—	—	—	—	—	—	—	++	—	—	—	—
17	<i>cyromazine</i>	Trigard	—	—	—	—	—	—	—	—	—	—	—	+++
18	<i>methoxyfenozide</i>	Intrepid	—	+++	+++	—	—	—	—	—	—	—	++	—
20B	<i>acequinocyl</i>	Kanemite	—	—	—	—	—	—	—	—	—	++	—	—
21A	<i>fenpyroximate</i>	Portal	—	—	—	—	—	—	—	—	—	+++	—	—
21A	<i>tolfenpyrad</i>	Torac	—	+	+	++	—	++	++	—	—	—	—	—
22	<i>indoxacarb</i>	Avant	+	+++	+++	—	—	—	—	—	+	—	+++	—
23	<i>spiromesifen</i>	Oberon	—	—	—	—	—	—	—	+	—	++	—	—
28	<i>chlorantraniliprole</i>	Coragen	—	+++	+++	—	—	—	—	++	+	—	+++	+
	<i>cyantraniliprole</i>	Verimark/Exirel	—	+++	+++	—	+++	++	+	++	+	—	+++	+
	<i>cyclaniliprole</i>	Harvanta	—	+++	+++	—	—	—	—	+	+	—	+++	—
29	<i>flonicamid</i>	Beleaf	—	—	—	—	+++	—	—	—	—	—	—	—
UN	<i>bifenazate</i>	Acramite	—	—	—	—	—	—	—	—	—	+++	—	—

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Efficacy ratings:  
 — Ineffective or insufficient data  
 + Somewhat effective  
 ++ Effective  
 +++ Very effective



FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>										
Pre-mixes for multiple pests	<i>thiamethoxam</i> + <i>chlorantraniliprole</i> Durivo SC	4A + 28	✓	✓	✓	Not Labeled	10–13 fl oz	0.13–0.17 + 0.065–0.085	12 H/ 30 D	
aphid, whitefly	<i>cyantraniliprole</i> Verimark 1.67SC	28	✓	✓	✓	✓	6.75–13.5 fl oz Rate varies with pest targeted		4 H/ 1 D	Rates for drip chemigation are 5–10 fl oz. Also labeled for transplant drench no earlier than 72 hours prior to planting.
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	✓	✓	✓	✓	21–28 fl oz	0.274–0.365	4 H/ 45 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	✓	✓	✓	Planthouse: 0.44 fl oz/10,000 plants		12 H/ NA	Apply within 7 days prior to transplanting.
aphid, cucumber beetle, whitefly	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	✓	Not Labeled	5–7.5 oz	0.226–0.328	12 H/ 21 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	See Remarks	✓	See Remarks	7–10.5 fl oz	0.25–0.375	12 H/ 21 D	Maximum rate on pepper and okra is 14 fl oz.
	<i>thiamethoxam</i> Platinum 75SG	4A	✓	✓	✓	Not Labeled	1.66–3.67 oz	0.078–0.17	12 H/ 30 D	Also in a pre-mix for multiple pests.
caterpillar pests	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Coragen is labeled at higher rates for suppression of whitefly. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Verimark 1.67SC	28	✓	✓	✓	✓	5–13.5 fl oz Rate varies with pest targeted		4 H/ 1 D	Rates for drip chemigation are 5–10 fl oz. Also labeled for transplant drench no earlier than 72 hours prior to planting.
soil insects	<i>bifenthrin</i> Empower 1.15G	3	Not Labeled	✓	✓	Not Labeled	3.5–8.7 oz	0.4–1	24 H, 9 D	May be applied pre-plant or during the season.
	<i>diazinon</i> 4E 50W	1B	✓	Not Labeled	Not Labeled	Not Labeled	2–4 qt 4–8 lb	2–4 2–4	2 D/ Pre-plant	

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COMMERCIAL VEGETABLE INSECT CONTROL

FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS</b>										
Pre-mixes for multiple pests	<i>bifenthrin</i> + <i>avermectin</i> Athena	3 + 6	✓	✓	✓	Not Labeled	7–17 fl oz	0.04–0.1 + 0.006–0.015	12 H/ 7 D	
	<i>cyantraniliprole</i> + <i>abamectin</i> Minecto Pro SC	28 + 6	✓	✓	✓	✓	5.5–10 fl oz	0.048–0.088 + 0.01–0.019	12 H/ 7 D	Must be mixed with adjuvant (see label). DO NOT use binder or sticker type adjuvant.
	<i>imidacloprid</i> + <i>beta-cyfluthrin</i> Leverage 360 SC	4A + 3	✓	✓	✓	Not Labeled	3.8–4.1 fl oz	0.059–0.064 + 0.03–0.032	12 H/ Tomato 0 D Others 7 D	
	<i>lambda-cyhalothrin</i> + <i>chlorantraniliprole</i> Voliam Xpress SC	3 + 28	✓	✓	✓	Not Labeled	5–9 fl oz Rate varies with targeted pests		24 H/ 5 D	
	<i>lambda-cyhalothrin</i> + <i>thiamethoxam</i> Endigo ZC SC	3 + 4A	✓	✓	✓	Not Labeled	4–4.5 fl oz	0.028–0.03 + 0.037–0.04	24 H/ 5 D	
	<i>novaluron</i> + <i>acetamiprid</i> Cormoran EC	15 + 4A	✓	✓	✓	Not Labeled	9–12 fl oz	0.059–0.079 + 0.047–0.06	12 H/ 7 D	Rate varies with pest targeted.
	<i>spirotetramat</i> + <i>pyriproxyfen</i> Senstar SE	23 + 7C	✓	✓	✓	✓	8–10 fl oz	0.063–0.078 + 0.022–0.027	24 H/ 1 D	
	<i>thiamethoxam</i> + <i>chlorantraniliprole</i> Voliam Flexi WDG	4A + 28	✓	✓	✓	Not Labeled	4–7 oz	0.05–0.0875 + 0.05–0.0875	12 H/ 1 D	
	<i>zeta-cypermethrin</i> + <i>bifenthrin</i> Hero EC	3 + 3	✓	✓	✓	✓	4–10.3 fl oz	0.01–0.025 + 0.03–0.075	12 H/ Tomato 1 D Others 7 D	
aphid	<i>acephate</i> Orthene 97	1B	Not Labeled	✓	Not Labeled	Not Labeled	0.5–1 lb	0.5–1	24 H/ 7 D	
	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	✓	2–4 oz	0.038–0.075	12 H/ 7 D	
	<i>afidopyropen</i> Sefina 0.42DC	9D	✓	✓	✓	✓	3 fl oz	0.01	12 H/ 0D	

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FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
aphid <i>(continued)</i>	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H; Tomato 1 D Others 7 D	Also in a pre-mix for multiple pests. Maximum rate on tomato 5.2 fl oz.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	<i>dimethoate</i> 4EC 2.67EC	1B	✓	See Remarks	Not Labeled	Not Labeled	0.5–1 pt 0.75–1.5 pt	0.25–0.5 0.25–0.5	48 H/ Pepper 0 D Tomato 7 D	Maximum rate on pepper is 0.33 lb ai. Also available as Cygon 3.35EC.
	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	✓	Not Labeled	1–4 oz	0.045–0.179	12 H/ 1 D	
	<i>flonicamid</i> Beleaf 50SG	29	✓	✓	✓	✓	2.8–4.28 oz	0.089–0.133	12 H/ 0 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	✓	✓	✓	✓	7–12 fl oz	0.09–0.156	4 H/ 1 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	✓	✓	✓	1.3–2.2 fl oz	0.047–0.079	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>malathion</i> 5EC, 8EC	1B	✓	✓	✓	✓	See Label	See Label	12 H/ 1–3 D	Rate, REI, PHI varies with product selection.
	<i>oxamyl</i> Vydate 2L	1A	✓	✓	✓	Not Labeled	2–4 pt	0.5–1	48 H/ See Remarks	PHI Eggplant—1 day, Tomato—3 days, Pepper—7 days.
	<i>pymetrozine</i> Fulfill 50WDG	9B	✓	✓	✓	Not Labeled	2.75 oz	0.086	12 H/ 0 D	
	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	✓	✓	✓	✓	2.4–3.2 fl oz	0.035–0.047	12H/ 1D	Use of an adjuvant is recommended.
	<i>spirotetramat</i> Movento 2SC	23	✓	✓	✓	✓	4–5 fl oz	0.0625–0.078	24 H/ 1 D	Use of an adjuvant is necessary.
	<i>sulfoxaflor</i> Transform 50WG	4C	✓	✓	✓	✓	0.75–1.0 oz	0.023–0.031	24 H/ 1 D	
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	✓	Not Labeled	2–3 oz	0.03–0.0468	12 H/ 0 D	Also in a pre-mix for multiple pests.
<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.	
beet armyworms fall armyworm	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	7–13.5 fl oz	0.045–0.088	12 H/ 1 D	
	<i>cyclaniliprole</i> Harvanta 0.42SL	28	✓	✓	✓	✓	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>emamectin benzoate</i> Proclaim 5WDG	6	✓	✓	✓	Not Labeled	2.4–4.8 oz	0.0075–0.015	12 H/ 7 D	

COMMERCIAL VEGETABLE INSECT CONTROL

FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
beet armyworms fall armyworm  (continued)	<i>indoxacarb</i> Avaunt eVo 30DG	22	√	√	√	√	3.5–6 oz	0.065–0.11	12 H/ 3 D	
	<i>methomyl</i> Lannate 2.4LV	1A	√	√	√	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ See Remarks	Not recommended for Beet Armyworm. PHI Tomato—1 day, Pepper—3 days, Eggplant—5 days
	<i>methoxyfenozide</i> Intrepid 2F	18	√	√	√	√	4–16 fl oz	0.06–0.25	4 H/ 1 D	
	<i>novaluron</i> Rimon 0.83EC	15	√	√	√	√	9–12 fl oz	0.058–0.078	12 H/ 1 D	
	<i>spinetoram</i> Radiant ISC	5	√	√	√	√	5–10 fl oz	0.039–0.078	4 H/ 1 D	
cabbage looper, hornworm	<i>Bacillus thuringiensis</i> "Bt" various names	11B	√	√	√	√	Follow label		4 H/ 0 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	√	√	√	Not Labeled	2.1–2.8 fl oz	0.0165–0.022	12 H/ Tomato 0 D Others 7 D	Hornworm minimum rate is 1.6 fl oz. Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	√	√	√	2.1–6.4 fl oz	0.033–0.1	12 H/ Tomato 1 D Others 7 D	Also in a pre-mix for multiple pests. Maximum rate on tomato is 5.2 fl oz.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	√	√	√	√	10–17 fl oz	0.065–0.11	12 H/ 1 D	Rates listed are loopers, minimum rate for others is 7 fl oz.
	<i>cyfluaniliprole</i> Harvanta 0.42SL	28	√	√	√	√	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>cyfluthrin</i> Tombstone 2E	3	√	√	√	Not Labeled	2.1–2.8 fl oz	0.033–0.044	12 H/ Tomato 0 D Others 7 D	Hornworm minimum rate is 1.6 fl oz.
	<i>emamectin benzoate</i> Proclaim 5WDG	6	√	√	√	Not Labeled	3.2–4.8 oz	0.01–0.015	12 H/ 7 D	Hornworm minimum rate is 2.4 fl oz.
	<i>esfenvalerate</i> Asana 0.66EC	3	√	√	√	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ Tomato 1 D Others 7 D	Hornworm minimum rate is 2.9 fl oz.
	<i>fenpropathrin</i> Danitol 2.4EC	3	√	√	√	Not Labeled	10.66 fl oz	0.2	24 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	√	√	√	Not Labeled	1.92–3.2 fl oz	0.0075–0.0125	24 H/ 5 D	
<i>indoxacarb</i> Avaunt eVo 30DG	22	√	√	√	√	2.5–6 oz	0.045–0.11	12 H/ 3 D		

FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
cabbage looper, hornworm <i>(continued)</i>	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	Not Labeled	0.96–1.6 fl oz	0.015–0.025	24 H/ 5 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	✓	✓	✓	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ See Remarks	90 SP formulation also registered. PHI Tomato—1 day, Pepper—3 days, Eggplant—5 days.
	<i>methoxyfenozide</i> Intrepid 2F	18	✓	✓	✓	✓	4–16 fl oz	0.06–0.25	4 H/ 1 D	
	<i>novaluron</i> Rimon 0.83EC	15	✓	✓	✓	✓	9–12 fl oz	0.058–0.078	12 H/ 1 D	
	<i>permethrin</i> Permethrin 3.2EC	3	✓	✓	✓	Not Labeled	4–8 fl oz	0.1–0.2	12 H/ Tomato 0 D Others 3 D	Also available as 25WP formulation.
	<i>spinetoram</i> Radiant 1SC	5	✓	✓	✓	✓	5–10 fl oz	0.039–0.078	4 H/ 1 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Hornworm minimum rate is 2.24 fl oz. Also in a pre-mix for multiple pests.
Colorado potato beetle, flea beetle, blister beetle	<i>abamectin</i> Agri-Mek 0.15EC 0.7SC	6	✓	✓	✓	Not Labeled	0.5–1 pt 1.75–3.5 fl oz	0.01–0.02 0.01–0.02	12 H/ 7 D	Also in a pre-mix for multiple pests. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	✓	1.5–2.5 oz	0.028–0.047	12 H/ 7 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	Not Labeled	2.8 fl oz	0.022	12 H/ Tomato 0 D Others 7 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ Tomato 1 D Others 7 D	Also in a pre-mix for multiple pests. Maximum rate on tomato is 5.2 fl oz.
	<i>carbaryl</i> Sevin 4F	1A	✓	✓	✓	See Remarks	1–2 qt	1–2	12 H/ 3 D	Maximum rate on okra is 1.5 qt.
	<i>cyfluthrin</i> Tombstone 2E	3	✓	✓	✓	Not Labeled	1.6–2.8 fl oz	0.025–0.044	12 H/ Tomato 0 D Others 7 D	
	<i>dinotefuran</i> Venom 20SG	4A	✓	✓	✓	Not Labeled	1–4 oz	0.045–0.179	12 H/ 1 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	✓	✓	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ Tomato 1 D Others 7 D	

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COMMERCIAL VEGETABLE INSECT CONTROL

FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
Colorado potato beetle, flea beetle, blister beetle (continued)	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	✓	✓	Not Labeled	2.56–3.84 fl oz	0.01–0.015	24 H/ 5 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	✓	✓	✓	1.3–2.2 fl oz	0.047–0.079	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>lamda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 5 D	Also in a pre-mix for multiple pests.
	<i>novaluron</i> Rimon 0.83EC	15	✓	✓	✓	✓	9–12 fl oz	0.058–0.078	12 H/ 1 D	Not recommended for flea beetle or blister beetle.
	<i>oxamyl</i> Vydate 2L	1A	✓	✓	✓	Not Labeled	2–4 pt	0.5–1	48 H/ See Remarks	PHI Eggplant—1 day, Tomato—3 days, Pepper—7 days.
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	✓	Not Labeled	2–3 oz	0.03–0.0468	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>tolfenpyrad</i> Torac 1.29EC	21A	✓	✓	✓	✓	17–21 fl oz	0.17–0.21	12 H/ 1 D	Use of an adjuvant is recommended.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
tomato fruitworm (corn earworm), tomato pinworm, european corn borer	<i>abamectin</i> Agri-Mek.15EC 0.7SC	6	See Remarks	See Remarks	See Remarks	See Remarks	0.5–1 pt 1.75–3.5 oz	0.01–0.02 0.01–0.02	12 H/ 7 D	For tomato pinworm control only. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>acephate</i> Orthene 97	1B	Not Labeled	See Remarks	Not Labeled	Not Labeled	0.75–1 lb	0.75–1	24 H/ 7 D	Labeled for ECB only.
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	Not Labeled	1.6–2.8 fl oz	0.0125–0.022	12 H/ Tomato 0 D Others 7 D	Pinworm minimum rate is 2.1 fl oz. Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ Tomato 1 D Others 7 D	Maximum rate: tomato 5.2 fl oz. Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	✓	✓	✓	See Remarks	1–2 qt	1–2	12 H/ 3 D	Okra maximum rate 1.5 qt.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Use of an adjuvant is recommended. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	✓	✓	✓	✓	7–13.5 fl oz	0.045–0.088	12 H/ 1 D	

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FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
tomato fruitworm (corn earworm), tomato pinworm, european corn borer (continued)	<i>cyclanilprole</i> Harvanta 0.42SL	28	✓	✓	✓	✓	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>cyfluthrin</i> Tombstone 2E	3	✓	✓	✓	Not Labeled	1.6–2.8 fl oz	0.025–0.044	12 H/ Tomato 0 D Others 7 D	Minimum rate 2.1 fl oz for pinworm.
	<i>emamectin benzoate</i> Proclaim 5WDG	6	✓	✓	✓	Not Labeled	2.4–4.8 oz	0.0075–0.015	12 H/ 7 D	Not labeled for European corn borer.
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	✓	✓	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ Tomato 1 D Others 7 D	
	<i>fenpropathrin</i> Danitol 2.4EC	3	✓	✓	✓	Not Labeled	10.66 fl oz	0.2	24 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	✓	✓	Not Labeled	2.56–3.84 oz	0.01–0.015	24 H/ 5 D	
	<i>indoxacarb</i> Avaunt eVo 30DG	22	✓	✓	✓	✓	3.5–6 oz	0.065–0.11	12 H/ 3 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 5 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	✓	✓	✓	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ See Remarks	90 SP formulation also registered. PHI Tomato—1 day, Pepper—3 days, Eggplant—5 days.
	<i>methoxyfenozide</i> Intrepid 2F	18	See Remarks	See Remarks	See Remarks	See Remarks	4–16 fl oz	0.06–0.25	4 H/ 1 D	Labeled for ECB. Pinworm and fruitworm suppression only.
	<i>novaluron</i> Rimon 0.83EC	15	✓	✓	✓	✓	9–12 fl oz	0.058–0.078	12 H/ 1 D	
	<i>permethrin</i> Permethrin 3.2EC	3	✓	✓	✓	Not Labeled	4–8 fl oz	0.1–0.2	12 H/ Tomato 0 D Others 3 D	Minimum rate for corn borer is 8 fl oz. Also available as 25WP formulation.
	<i>spinetoram</i> Radiant 1SC	5	✓	✓	✓	✓	5–10 fl oz	0.039–0.078	4 H/ 1 D	
<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.	

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COMMERCIAL VEGETABLE INSECT CONTROL

FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
cutworm	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	Not Labeled	2.1–2.8 fl oz	0.0165–0.022	12 H/ Tomato 0 D Others 7 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ Tomato 1 D Others 7 D	Also in a pre-mix for multiple pest Maximum rate for tomato is 5.2 fl oz.
	<i>cyfluthrin</i> Tombstone 2E	3	✓	✓	✓	Not Labeled	2.1–2.8 fl oz	0.033–0.044	12 H/ Tomato 0 D Pepper 7 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	✓	✓	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ Tomato 1 D Others 7 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	✓	✓	Not Labeled	1.92–3.2 fl oz	0.0075–0.0125	24 H/ 5 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	Not Labeled	0.96–1.6 fl oz	0.015–0.025	24 H/ 5 D	Also in a pre-mix for multiple pests.
	<i>permethrin</i> Permethrin 3.2EC	3	✓	✓	✓	Not Labeled	4–8 fl oz	0.1–0.2	12 H/ Tomato 1 D Others 3 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
leafminer	<i>abamectin</i> Agri-Mek 0.15EC 0.7SC	6	✓	✓	✓	Not Labeled	0.5–1 pt 1.75–3.5 fl oz	0.01–0.02 0.01–0.02	12 H/ 7 D	Also in a pre-mix for multiple pests. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	✓	5–7.5 fl oz	0.065–0.098	4 H/ 1 D	Adjuvants have been shown to increase efficacy. Also in a pre-mix for multiple pests.
	<i>cyromazine</i> Trigard 75WP	17	✓	✓	Not Labeled	Not Labeled	2.66 oz	0.125	12 H/ 0 D	
	<i>spinetoram</i> Radiant 1SC	5	✓	✓	✓	✓	6–10 fl oz	0.047–0.078	4 H/ 1 D	

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FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
pepper weevil	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	✓	2.5–4 oz	0.047–0.075	12 H/ 7 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	✓	Not Labeled	2.8 fl oz	0.022	12 H/ Tomato 0 D Others 7 D	Also in a pre-mix for multiple pests. Severe resistance to pyrethroid insecticides (Group 3) has been documented in Georgia.
	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ Tomato 1 D Others 7 D	Also in a pre-mix for multiple pests. Maximum rate on Tomato is 5.2 fl oz. Severe resistance to pyrethroid insecticides (Group 3) has been documented in Georgia.
	<i>cyclaniliprole</i> Harvanta 0.42SL	28	✓	✓	✓	✓	10.9–16.4 fl oz	0.036–0.054	4 H/ 1 D	
	<i>cyfluthrin</i> Tombstone 2E	3	✓	✓	✓	Not Labeled	2.8 fl oz	0.044	12 H/ Tomato 0 D Others 7 D	Severe resistance to pyrethroid insecticides (Group 3) has been documented in Georgia.
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	✓	✓	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ Tomato 1 D Others 7 D	Severe resistance to pyrethroid insecticides (Group 3) has been documented in Georgia.
	<i>novaluron</i> Rimon 0.83EC	15	✓	✓	✓	✓	9–12 fl oz	0.06–0.078	12 H/ 1 D	
	<i>oxamyl</i> Vydate 2L	1A	✓	✓	✓	Not Labeled	2–4 pt	0.5–1	48 H/ See Remarks	PHI Eggplant—1 day, Tomato—3 days, Peppers—7 days.
	<i>permethrin</i> Permethrin 3.2EC	3	✓	✓	✓	Not Labeled	4–8 fl oz	0.1–0.2	12 H/ Tomato 0 D Others 3 D	Also available as 25WP formulation. Severe resistance to pyrethroid insecticides (Group 3) has been documented in Georgia.
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	✓	Not Labeled	3–5.5 oz	0.047–0.086	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>tolfenpyrad</i> Torac 1.29EC	21A	✓	✓	✓	✓	17–21 fl oz	0.17–0.21	12 H/ 1 D	Use of an adjuvant is recommended.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	✓	2.24–4 fl oz	0.014–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests. Severe resistance to pyrethroid insecticides (Group 3) has been documented in Georgia.
<b>NOTE:</b> resistance to pyrethroid (Group 3) insecticides has been noted in Georgia.										

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## COMMERCIAL VEGETABLE INSECT CONTROL

### FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
spider mite, broad mite (see remarks)	<i>abamectin</i> Agri-Mek.15EC 0.7SC	6	√	√	√	Not Labeled	0.5–1 pt 1.75–3.5 fl oz	0.01–0.02 0.01–0.02	12 H/ 7 D	Also in a pre-mix for multiple pests. Provides good control of broad mite. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>acequinocyl</i> Kanemite 15SC	20B	√	√	√	√	31 fl oz	0.3	12 H/ 1 D	See adjuvant mixing instructions on label.
	<i>bifenazate</i> Acramite 50WS Acramite 4SC	un	√	√	√	√	0.75–1 lb 12–16 fl oz	0.375–0.5	12 H/ 3 D	Good coverage is essential.
	<i>etoxazole</i> Zeal 72WG	10B	Not Labeled	√	√	√	2–3 oz	0.09–0.135	12 H/ 7 D	Predominately an ovicide/larvicide.
	<i>fenpyroximate</i> Portal 0.4EC	21A	√	√	√	√	2 pt	0.1	12 H/ 1 D	Provides good control of broad mite.
	<i>hexakis</i> Vendex 50WP	12B	Not Labeled	Not Labeled	√	Not Labeled	2–3 lb	1–1.5	48 H/ 3 D	
	<i>spiromesifen</i> Oberon 2SC	23	√	√	√	Not Labeled	7–8.5 fl oz	0.11–0.13	12 H/ 1 D	Provides control of broad mite but must be used preventively.
	<i>tolfenpyrad</i> Torac 1.29EC	21A	√	√	√	√	14–21 fl oz	0.14–0.21	12 H/ 1 D	Only labeled for Broad mite. Use of an adjuvant is recommended.
NOTE: Proclaim at moderate to high rates has provided good control of spider mites.										
stink bug, leaffooted bug	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	√	√	√	Not Labeled	1.6–2.8 fl oz	0.0125–0.022	12 H/ Tomato 0 D Others 7 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	See Remarks	√	√	√	2.1–6.4 fl oz	0.033–0.1	12 H/ Tomato 1 D Others 7 D	Also in a pre-mix for multiple pests. Maximum rate: tomato 5.2 fl oz.
	<i>cyfluthrin</i> Tombstone 2E	3	√	√	√	Not Labeled	1.6–2.8 fl oz	0.025–0.044	12 H/ Tomato 0 D Others 7 D	
	<i>fenpropathrin</i> Danitol 2.4EC	3	√	√	√	Not Labeled	10.66 fl oz	0.2	24 H/ 3 D	
	<i>gamma-cyhalothin</i> Proaxis 0.5EC	3	√	√	√	Not Labeled	2.56–3.84 fl oz	0.01–0.015	24 H/ 5 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	Not Labeled	1.28–1.92 fl oz	0.02–0.03	24 H/ 5 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	√	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

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FRUITING VEGETABLES (Eggplant, Okra, Pepper, and Tomato)

PEST	INSECTICIDE	MOA	Tomato	Pepper	Eggplant	Okra	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>										
western flower thrips	<i>acetamiprid</i> Assail 30SG	4A	√	√	√	√	4 oz	0.075	12 H/ 7 D	
	<i>dinotefuran</i> Venom 70SG	4A	√	√	√	Not Labeled	1–4 oz	0.045–0.179	12 H/ 1 D	
	<i>spinetoram</i> Radiant 1SC	5	√	√	√	√	6–10 fl oz	0.047–0.078	4 H/ 1 D	
	<i>tolfenpyrad</i> Torac 1.29EC	21A	√	√	√	√	21 fl oz	0.21	12 H/ 1 D	Use of an adjuvant is recommended.
NOTE: Lannate as applied for registered pests gives fair to good control of western flower thrips with short residual activity.										
silverleaf whitefly	<i>acetamiprid</i> Assail 30SC	4A	√	√	√	√	2.5–4 oz	0.05–0.075	12 H/ 7 D	
	<i>afidopyropen</i> Sefina 0.42DC	9D	√	√	√	√	14 fl oz	0.046	12 H/ 0D	
	<i>buprofezin</i> Courier 3.6SC	16	√	√	√	√	9–13.6 fl oz	0.25–0.38	12 H/ 1 D	Activity on nymphs. Also in a pre-mix for multiple pests.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	√	5–7.5 fl oz	0.065–0.098	4 H/ 1 D	Activity on nymphs. Addition of an adjuvant has shown increased efficacy. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83SC	28	√	√	√	√	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	<i>dinotefuran</i> Venom 70SG	4A	√	√	√	Not Labeled	1–4 oz	0.045–0.179	12 H/ 1 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	√	√	√	√	10.5–14 fl oz	0.136–0.18	4 H/ 1 D	
	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	√	√	√	√	2.4–3.2 fl oz	0.035–0.047	12H/ 1D	Use of an adjuvant is recommended.
	<i>pyriproxyfen</i> Knack 0.86EC	7C	√	√	√	√	8–10 fl oz	0.054–0.067	12 H/ 1 D	Activity on eggs and last instar nymphs. 24C label in Georgia allows 4 applications at 5 fl oz/A.
	<i>spiromesifen</i> Oberon 2SC	23	√	√	√	Not Labeled	7–8.5 fl oz	0.11–0.13	12 H/ 1 D	
	<i>spirotetramat</i> Movento 2SC	23	√	√	√	√	4–5 fl oz	0.0625–0.078	24 H/ 1 D	Use of an adjuvant is necessary. Activity on early instar nymphs.
<i>thiamethoxam</i> Actara 25WDG	4A	√	√	√	Not Labeled	3–5.5 oz	0.0468–0.086	12 H/ 0 D	Also in a pre-mix for multiple pests.	
NOTE: If a Group 4 or Group 23 insecticide was applied in the soil, an alternative Group should be used for at least two foliar applications after the residual period of the soil applied insecticide.										

**Statement on generic products:** For brevity, generic products typically are not listed within this section. The trade names listed are intended to aid in identification of products and are not intended to promote use of specific trade name products nor to discourage use of generic products. When a generic product is selected for use and is a different formulation than indicated in the table, the label should be consulted for proper product use rate. Pounds active ingredient per acre should be similar.

**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF FRUITING VEGETABLE CROPS**

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	FLEA BEETLE	COLORADO POTATO BEETLE	CORN EARWORM	EUROPEAN CORN BORER	FALL ARMYWORM	BEE T ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	WESTERN FLOWER THRIPS	SILVERLEAF WHITEFLY	CUTWORMS	SPIDER MITES	BROAD MITE	LEAFMINER
1A	<i>carbaryl</i>	Sevin	+++	+	+	++	+	—	—	—	+	—	—	+	—	—	—
	<i>methomyl</i>	Lannate	+	—	++	++	++	+	++	+	+++	++	—	—	—	—	—
1B	<i>malathion</i>	Malathion	++	+	+	+	+	—	+	+	+	—	—	+	—	—	—
	<i>acephate</i>	Orthene	—	—	+	+++	++	—	—	++	++	—	—	++	—	—	—
3	<i>permethrin</i>	Pounce	++	++	++	++	+	—	++	+	+	—	—	++	—	—	—
	<i>zeta-cypermethrin</i>	Mustang Maxx	+++	+	++	+++	+	—	++	+	++	—	—	+++	—	—	—
	<i>beta-cyfluthrin</i>	Baythroid	++	++	++	++	+	—	++	+	+	—	—	+++	—	—	—
	<i>lambda-cyhalothrin</i>	Warrior II	+++	+	++	+++	+	—	++	+	++	—	—	+++	—	—	—
	<i>esfenvalerate</i>	Asana XL	+++	++	++	++	+	—	+	+	+	—	—	++	—	—	—
	<i>fenpropathrin</i>	Danitol	++	—	++	++	+	—	++	+	+	—	—	++	—	—	—
	<i>bifenthrin</i>	Brigade	+++	—	++	++	+	—	++	+	++	—	—	+++	—	—	—
4A	<i>imidacloprid</i>	Admire Pro	+++	+++	—	—	—	—	—	+++	+	—	++	—	—	—	—
	<i>acetamiprid</i>	Assail	++	+++	—	—	—	—	+	+++	+	—	++	—	—	—	—
	<i>thiamethoxam</i>	Platinum/Actara	+++	+++	—	—	—	—	++	+++	+	—	++	—	—	—	—
	<i>dinotefuran</i>	Venom	+++	+++	—	—	—	—	++	++	+	—	++	—	—	—	—
4C	<i>sulfoxaflor</i>	Transform	—	—	—	—	—	—	—	+++	—	—	+	—	—	—	—
4D	<i>flupyradifurone</i>	Sivanto Prime	—	—	—	—	—	—	—	+++	—	—	++	—	—	—	—
5	<i>spinetoram</i>	Radiant	—	+++	+++	+++	++	++	—	—	+++	++	—	+	—	—	+
6	<i>abamectin</i>	AgriMek	—	+++	—	—	—	—	—	—	++	+	—	—	+++	+++	+++
	<i>emamectin benzoate</i>	Proclaim	—	—	++	++	++	+++	—	—	—	—	—	+	+++	—	—

Ratings for products was initially conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use for all crops in this group. Please refer to the appropriate section of the Pest Management Handbook for details on product labeling.

Efficacy ratings:  
 — Ineffective or insufficient data  
 + Somewhat effective  
 ++ Effective  
 +++ Very effective

**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF FRUITING VEGETABLE CROPS** *(continued)*

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	FLEA BEETLE	COLORADO POTATO BEETLE	CORN EARWORM	EUROPEAN CORN BORER	FALL ARMYWORM	BEE T ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	WESTERN FLOWER THRIPS	SILVERLEAF WHITEFLY	CUTWORMS	SPIDER MITES	BROAD MITE	LEAFMINER
7C	<i>pyriproxyfen</i>	Knack	—	—	—	—	—	—	—	—	—	—	++	—	—	—	—
9B	<i>pymetrozine</i>	Fulfill	—	—	—	—	—	—	—	+++	—	—	+	—	—	—	—
9D	<i>afidopyropen</i>	Sefina	—	—	—	—	—	—	—	++	—	—	+	—	—	—	—
10B	<i>etoxazole</i>	Zeal	—	—	—	—	—	—	—	—	—	—	—	—	++	—	—
11	<i>Bt</i>	Dipel, various	—	—	+	+	+	+	—	—	—	—	—	—	—	—	—
15	<i>novaluron</i>	Rimon	—	+++	++	+++	+++	+++	+	—	+	+	+	—	—	—	—
16	<i>buprofezin</i>	Courier	—	—	—	—	—	—	—	—	—	—	++	—	—	—	—
17	<i>cyromazine</i>	Trigard	—	—	—	—	—	—	—	—	—	—	—	—	—	—	+++
18	<i>methoxyfenozide</i>	Intrepid	—	—	++	++	+++	+++	—	—	—	—	—	—	—	—	—
20B	<i>acequinocyl</i>	Kanemite	—	—	—	—	—	—	—	—	—	—	—	—	++	—	—
21A	<i>fenpyroximate</i>	Portal	—	—	—	—	—	—	—	—	—	—	—	—	+++	+++	—
21A	<i>tolfenpyrad</i>	Torac	++	—	+	+	+	+	—	—	++	++	—	+	—	+	—
22	<i>indoxacarb</i>	Avaunt	+	+++	+++	++	++	+++	—	—	—	—	—	+	—	—	—
23	<i>spiromesifen</i>	Oberon	—	—	—	—	—	—	—	—	—	—	+	—	+++	++	—
	<i>spirotetramat</i>	Movento	—	—	—	—	—	—	—	++	—	—	++	—	—	—	—
28	<i>chlorantraniliprole</i>	Coragen	—	+++	+++	+++	+++	+++	—	—	—	—	++	+	—	—	+
	<i>cyantraniliprole</i>	Verimark/Exirel	—	+++	+++	+++	+++	+++	—	+++	+	+	++	+	—	—	+
	<i>cyclaniliprole</i>	Harvanta	—	—	+++	+++	+++	+++	—	—	—	—	—	+	—	—	+
29	<i>flonicamid</i>	Beleaf	—	—	—	—	—	—	—	+++	—	—	—	—	—	—	—
UN	<i>bifenazate</i>	Acramite	—	—	—	—	—	—	—	—	—	—	—	—	+++	—	—

Ratings for products was initially conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use for all crops in this group. Please refer to the appropriate section of the Pest Management Handbook for details on product labeling.

Efficacy ratings:  
 — Ineffective or insufficient data  
 + Somewhat effective  
 ++ Effective  
 +++ Very effective

COMMERCIAL VEGETABLE INSECT CONTROL

LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>									
Foliage feeding caterpillars, whitefly	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	5–7.5 fl oz	0.065–0.098	4 H/ 1 D	Apply as in-furrow spray. Also provides good control for lesser cornstalk borer and whitefly.
	<i>cyantraniliprole</i> Verimark 1.67SC	28	✓	✓	✓	6.75–13.5 fl oz	0.088–0.176	4 H/ NA	Also provides control of aphids.
Soil Insects	<i>bifenthrin</i> Empower 1.15G	3	✓	✓	✓	3.5–8.7 lb	0.04–0.1	See Remarks	May be applied pre-plant or during the season. REI: 24 hours for processing, 9 days for fresh market. PHI: 3 days, 9 days if hand-harvested.
	<i>diazinon</i> 4E 50W	1B	✓	✓	✓	2–4 qt 4–8 lb	2–4 2–4	3 D/ pre-plant	
	<i>chlorpyrifos</i> Lorsban 4E, Advanced	1B	✓	✓	✓	See Label		24 H/ See Remarks	Labeled for pre-plant and at-planting application.
aphid, whitefly	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	✓	✓	7–10.5 fl oz	0.25–0.375	12 H/ 21 D	
<b>FOLIAR TREATMENTS</b>									
Pre-mixes for multiple pests	<i>cyantraniliprole</i> + <i>abamectin</i> Minecto Pro SC	6 + 28	✓	✓	✓	7.5–10 fl oz	0.066–0.088 0.014–0.018	12 H/ 7 D	Must be mixed with adjuvant (see label).
	<i>lambda-cyhalothrin</i> + <i>chlorantraniliprole</i> Besiege SC	3 + 28	✓	✓	✓	5–10 fl oz Rate varies with targeted pests		24 H/ 7 D	
	<i>novaluron</i> + <i>acetamiprid</i> Cormoran EC	15 + 4A	✓	✓	✓	9–12 fl oz	0.059–0.079 + 0.047–0.06	12 H/ 7 D	Rate varies with pest targeted.
	spirotetramat + pyriproxyfen Senstar SE	23 + 7C	✓	✓	✓	8–10 fl oz	0.063–0.078 + 0.022–0.027	24 H/ 7 D	
	<i>zeta-cypermethrin</i> + <i>bifenthrin</i> Hero EC	3 + 3	✓	✓	✓	4–10.3 fl oz	0.01–0.025 + 0.03–0.075	12 H/ 3 D	
aphid	<i>acephate</i> Orthene 97	1B	Not Labeled	✓	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	
	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	2.5–5.3 oz	0.047–0.1	12 H/ 7 D	
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>dimethoate</i> 4E 2.67EC	1B	✓	✓	Not Labeled	0.5–1 pt 0.75–1.5 pt	0.25–0.5 0.25–0.5	48 H/ 0 D	Also available as Cygon 3.35EC.

LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
aphid (continued)	<i>esfenvalerate</i> Asana 0.66EC	3	√	Not Labeled	√	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	√	√	√	7–10.5 fl oz	0.09–0.136	4 H/ 7 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	√	√	√	1.2 fl oz	0.04	12 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>spirotetramat</i> Movento 2SC	23	√	√	√	4–5 fl oz	0.063–0.08	24 H/ 1 D	Use of an adjuvant is necessary.
	<i>sulfoxaflor</i> Transform 50WG	4C	√	√	√	0.75–1 oz	0.023–0.031	24H/ 7D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
NOTE: Exirel as applied for labeled pests will provide good control.									
beet armyworms, fall armyworms	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4 LV	1A	See Remarks	See Remarks	See Remarks	1.5 pt	0.45	48 H/ 1-3 D	Not recommended for beet armyworm. 90 SP formulation also registered.
	<i>methoxyfenozone</i> Intrepid 2F	18	√	√	√	4–16 fl oz	0.06–0.25	4 H/ 7 D	
	<i>novaluron</i> Rimon 0.83EC	15	√	Not Labeled	Not Labeled	6–12 fl oz	0.039–0.078	12 H/ 1 D	
	<i>spinetoram</i> Radiant 1SC	5	√	√	√	4–8 fl oz	0.03–0.063	4 H/ 3 D	
	<i>spinosad</i> Blackhawk 36WDG	5	√	√	√	2.2–3.3 oz	0.05–0.074	4 H/ 3 D	
NOTE: Avaunt or Exirel as applied for labeled pests will provide good control.									
bean leaf beetle	<i>acephate</i> Orthene 97	1B	Not Labeled	√	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	2.1–6.4 fl oz	0.033–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	√	√	√	0.5–1 qt	0.5–1	12 H/ 3 D	
	<i>dimethoate</i> 4EC 2.67EC	1B	√	√	Not Labeled	0.5–1 pt 0.75–1.5 pt	0.25–0.5 0.25–0.5	48 H/ 0 D	Also available as Cygon 3.35EC.
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	√	√	√	2.56–3.84 fl oz	0.01–0.015	24 H/ 7 D	

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## COMMERCIAL VEGETABLE INSECT CONTROL

### LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
bean leaf beetle (continued)	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	2.72–4 fl oz	0.017–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
corn earworm, European corn borer	<i>acephate</i> Orthene 97	1B	Not Labeled	✓	Not Labeled	0.75–1 lb	0.75–1	24 H/ 1 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	Not Labeled	Not Labeled	✓	1.6–2.1 fl oz	0.0125–0.0165	12 H/ 3 D	
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	✓	2.1–6.4 fl oz	0.033–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	✓	✓	✓	10–20.5 fl oz	0.065–0.133	12 H/ 1 D succulent 7 D dried	
	<i>cyfluthrin</i> Tombstone 2EC	3	Not Labeled	Not Labeled	✓	1.6–2.1 fl oz	0.025–0.033	12 H/ 3 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	Not Labeled	✓	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	✓	✓	2.56–3.84 fl oz	0.01–0.015	24 H/ 7 D	
	<i>indoxacarb</i> Avaunt eVo 30DG	22	✓	✓	✓	3.5–6 oz	0.065–0.11	12 H/ 3 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	✓	✓	✓	1.5–3 pt	0.45–0.9	48 H/ 1-3 D	90 SP formulation also registered.
	<i>methoxyfenozide</i> Intrepid 2F	18	See Remarks	See Remarks	See Remarks	4–16 fl oz	0.06–0.25	4 H/ 7 D	Labeled for corn earworm suppression only.
	<i>spinetoram</i> Radiant 1SC	5	See Remarks	See Remarks	See Remarks	4–8 fl oz	0.03–0.063	4 H/ 3 D	Minimum rate for ECB is 3 fl oz.
	<i>spinosad</i> Blackhawk 36WDG	5	✓	✓	✓	2.2–3.3 oz	0.05–0.074	4 H/ 3 D	Minimum rate for ECB is 1.7 oz.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	2.72–4 fl oz	0.017–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

**Statement on generic products:** For brevity, generic products typically are not listed within this section. The trade names listed are intended to aid in identification of products and are not intended to promote use of specific trade name products nor to discourage use of generic products. When a generic product is selected for use and is a different formulation than indicated in the table, the label should be consulted for proper product use rate. Pounds active ingredient per acre should be similar.



LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Vegetable Type			AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
			Snap	Lima	Cowpea				
<b>FOLIAR TREATMENTS (continued)</b>									
cowpea curculio (see note)	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	Not Labeled	Not Labeled	✓	2.1 fl oz	0.0165	12 H/ 3 D	
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ 3 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	Not Labeled	Not Labeled	✓	1.6–2.1 fl oz	0.025–0.033	12 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	✓	✓	2.56–3.84 fl oz	0.01–0.015	24 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	2.72–4 fl oz	0.017–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
NOTE: Cowpeas are the preferred host. A preventive program starting prior to curculio reproduction is necessary for good control. NOTE: <i>Methomyl</i> (Lannate) as applied for caterpillars gives some control. NOTE: Field failures have occurred with all registered insecticides. Insecticide resistance can be severe with this pest.									
cutworm	<i>acephate</i> Orthene 97	1B	Not Labeled	✓	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	Not Labeled	Not Labeled	✓	0.8–1.6 fl oz	0.0065–0.0125	12 H/ 3 D	
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>cyfluthrin</i> Tombstone 2EC	3	Not Labeled	Not Labeled	✓	0.8–1.6 fl oz	0.013–0.025	12 H/ 3 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	Not Labeled	✓	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	✓	✓	✓	1.92–3.2 fl oz	0.0075–0.0125	24 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	✓	0.96–1.6 fl oz	0.015–0.025	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	✓	1.28–4 fl oz	0.008–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

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## COMMERCIAL VEGETABLE INSECT CONTROL

### LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
leafminer	<i>abamectin</i> Agri-mek 0.7SC	6	√	√	See Remarks	1.75–3.5 fl oz	0.01–0.02	12 H/ 7 D	Only for use on cowpeas grown for dry seed. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	√	7.5 fl oz	0.098	4 H/ 1 D	
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	√	√	√	10–20.5 fl oz	0.065–0.133	12 H/ 1 D succulent 7 D dried	
	<i>cyromazine</i> Trigard 75WP	17	√	√	√	2.66 oz	0.125	12 H/ 7 D	
	<i>spinetoram</i> Radiant 1SC	5	√	√	√	5–8 fl oz	0.039–0.063	4 H/ 3 D	
NOTE: Avoid over use of broad spectrum insecticides that may encourage leafminer infestations.									
lygus bug, stink bug	<i>acephate</i> Orthene 97	1B	Not Labeled	See Remarks	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	Not labeled for stink bugs.
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	Not Labeled	Not Labeled	√	1.6–2.1 fl oz	0.0125–0.0165	12 H/ 3 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	5.12–6.4 fl oz	0.08–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	√	√	√	1–1.5 qt	1–1.5	12 H/ 3 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	Not Labeled	Not Labeled	√	1.6–2.1 fl oz	0.025–0.033	12 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	√	√	√	2.56–3.84 fl oz	0.01–0.015	24 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
Mexican bean beetle	<i>acephate</i> Orthene 97	1B	Not Labeled	√	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	
	<i>acetamiprid</i> Assail 30SG	4A	√	√	√	2.5–5.3 fl oz	0.047–0.1	12 H/ 7 D	

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LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
Mexican bean beetle (continued)	carbaryl Sevin 4F	1A	√	√	√	0.5–1 qt	0.5–1	12 H/ 3 D	
	esfenvalerate Asana 0.66EC	3	√	Not Labeled	√	2.9–5.8 fl oz	0.015–0.03	12 H/ 3 D	
	gamma-cyhalothrin Proaxis 0.5EC	3	√	√	√	1.92–3.2 fl oz	0.0075–0.0125	24 H/ 7 D	
	lambda-cyhalothrin Warrior II 2.08CS	3	√	√	√	0.96–1.6 fl oz	0.015–0.025	24 H/ 7 D	Also in a pre-mix for multiple pests.
	zeta-cypermethrin Mustang Maxx 0.8EC	3	√	√	√	2.72–4 fl oz	0.017–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
looper	<i>Bacillus thuringiensis</i> "Bt" various names	11B	√	√	√	Follow label		4 H/ 0 D	
	bifenthrin Brigade 2EC	3	√	√	√	2.1–6.4 fl oz	0.033–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	chlorantraniliprole Coragen 1.67SC	28	√	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests.
	esfenvalerate Asana 0.66EC	3	√	Not Labeled	√	5.8–9.6 fl oz	0.03–0.05	12 H/ 3 D	
	gamma-cyhalothrin Proaxis 0.5EC	3	√	√	√	2.56–3.84 fl oz	0.01–0.015	24 H/ 7 D	
	lambda-cyhalothrin Warrior II 2.08CS	3	√	√	√	1.92 fl oz	0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	methoxyfenozide Intrepid 2F	18	√	√	√	4–16 fl oz	0.06–0.25	4 H/ 7 D	
	novaluron Rimon 0.83EC	15	√	Not Labeled	Not Labeled	6–12 fl oz	0.039–0.078	12 H/ 1 D	
	spinetoram Radiant 1SC	5	√	√	√	4–8 fl oz	0.03–0.063	4 H/ 3 D	
	spinosad Blackhawk 36WDG	5	√	√	√	2.2–3.3 oz	0.05–0.074	4 H/ 3 D	
zeta-cypermethrin Mustang Maxx 0.8EC	3	√	√	√	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.	

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COMMERCIAL VEGETABLE INSECT CONTROL

LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
spider mite	<i>abamectin</i> Agri-mek 0.7SC	6	√	√	See Remarks	1.75–3.5 fl oz	0.01–0.02	12 H/ 7 D	Only for use on cowpeas grown for dry seed. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>acequinocyl</i> Kanemite 15SC	20B	√	√	√	31 fl oz	0.3	12 H/ 7 D	See adjuvant mixing instructions on label.
	<i>bifenazate</i> Acramite 4SC 5OWS	UN	√	√	√	16–24 fl oz 1–1.5 lb	0.5–0.75	12 H/ 3 D	Good coverage is essential.
	<i>fenpyroximate</i> Portal 0.4EC	21A	√	Not Labeled	Not Labeled	2 pt	0.1	12 H/ 1 D	
<b>PRE-BLOOM TREATMENTS</b>									
thrips	<i>acephate</i> Orthene 97	1B	Not Labeled	√	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	
	<i>acetamiprid</i> Assail 30SG	4A	√	√	√	4.5–5.3 oz	0.085–0.1	12 H/ 7 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	Not Labeled	Not Labeled	√	1.6–2.1 fl oz	0.0125–0.0165	12 H/ 3 D	
	<i>bifenthrin</i> Brigade 2EC	3	√	√	√	2.1–6.4 fl oz	0.033–0.10	12 H/ 3 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	√	√	√	1 qt	1	12 H/ 3 D	
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	√	√	√	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D succulent 7 D dried	
	<i>cyfluthrin</i> Tombstone 2EC	3	Not Labeled	Not Labeled	√	1.6–2.1 fl oz	0.025–0.033	12 H/ 3 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	√	√	√	2.56–3.84 fl oz	0.01–0.015	24 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	√	√	√	1.5–3 pt	0.45–0.9	48 H/ 1–3 D	90 SP formulation also registered.
	<i>spinetoram</i> Radiant 1SC	5	√	√	√	5–8 fl oz	0.039–0.063	4 H/ 3 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	√	√	√	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

LEGUME VEGETABLES (Snap Bean, Lima Bean, Cowpea)

PEST	INSECTICIDE	MOA	Snap	Lima	Cowpea	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>									
thrips (bloom stage)	<b>BLOOM STAGE TREATMENTS</b>								
	<i>acephate</i> Orthene 97	1B	Not Labeled	✓	Not Labeled	0.5–1 lb	0.5–1	24 H/ 1 D	
	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	4.5–5.3 oz	0.085–0.1	12 H/ 7 D	
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	✓	✓	✓	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D succulent 7 D dried	
	<i>methomyl</i> Lannate 2.4LV	1A	✓	✓	✓	1.5–3 pt	0.45–0.9	48 H/ 1-3 D	90 SP formulation also registered.
	<i>spinetoram</i> Radiant 1SC	5	✓	✓	✓	5–8 fl oz	0.039–0.063	4 H/ 3 D	
silverleaf whitefly	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	✓	4–5.3 oz	0.075–0.1	12 H/ 7 D	Reduced efficacy of Group 4 foliar applied insecticides has been noted.
	<i>buprofezin</i> Courier 3.6SC	16	✓	✓	✓	9–13.6 fl oz	0.25–0.38	12 H/ 14 D	Activity on nymphs.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	✓	5–7.5 fl oz	0.065–0.098	4 H/ 1 D	Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	✓	✓	✓	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D succulent 7 D dried	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	✓	✓	✓	10.5–14 fl oz	0.136–0.18	4 H/ 7 D	Reduced efficacy of Group 4 foliar applied insecticides has been noted.
	<i>pyriproxifen</i> Knack 0.86EC	7C	✓	✓	✓	8–10 fl oz	0.054–0.067	12 H/ 7 D	Activity on eggs and last instar nymphs.
	<i>spirotetramat</i> Movento 2SC	23	✓	✓	✓	4–5 fl oz	0.063–0.08	24 H/ 1 D	Use of an adjuvant is necessary. Activity against early instar nymphs.
	NOTE: Reduced residual activity has been noted with all Group 4A insecticides. Group 4A insecticides should not be used for foliar applications if a Group 4A was applied in the soil.								

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**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF LEGUME VEGETABLE CROPS**

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	CUCUMBER BEETLES	CORN EARWORM	EUROPEAN CORN BORER	FALL ARMYWORM	CABBAGE LOOPER	BEET ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	WESTERN FLOWER THRIPS	SILVERLEAF WHITEFLY	CUTWORMS	SPIDER MITES	LEAFMINER
1A	<i>carbaryl</i>	Sevin	++	+	++	+	+	—	—	—	+	—	—	+	—	—
	<i>methomyl</i>	Lannate	—	++	++	++	++	+	++	+	+++	++	—	—	—	—
1B	<i>malathion</i>	Malathion	++	+	+	+	+	—	+	+	+	—	—	+	—	—
3	<i>zeta-cypermethrin</i>	Mustang Maxx	+++	++	+++	+	++	—	++	+	++	—	—	+++	—	—
	<i>beta-cyfluthrin</i>	Baythroid	++	++	++	+	++	—	++	+	+	—	—	+++	—	—
	<i>lambda-cyhalothrin</i>	Warrior II	+++	++	+++	+	++	—	++	+	++	—	—	+++	—	—
	<i>esfenvalerate</i>	Asana XL	++	++	++	+	++	—	+	+	+	—	—	++	—	—
	<i>bifenthrin</i>	Brigade	+++	++	++	+	+	—	++	+	++	—	—	+++	—	—
4A	<i>imidacloprid</i>	Admire Pro	+++	—	—	—	—	—	—	+++	+	—	++	—	—	—
	<i>acetamiprid</i>	Assail	++	—	—	—	—	—	+	+++	+	—	++	—	—	—
4D	<i>flupyradifurone</i>	Sivanto Prime	—	—	—	—	—	—	—	+++	—	—	++	—	—	—
5	<i>spinetoram</i>	Radiant	—	+++	+++	++	++	++	—	—	+++	++	—	+	—	+
	<i>spinosad</i>	Blackhawk	—	+++	+++	++	++	++	—	—	+	+	—	+	—	+
6	<i>abamectin</i>	Agri-Mek	—	—	—	—	—	—	—	—	+	+	—	—	+++	+++
7C	<i>pyriproxyfen</i>	Knack	—	—	—	—	—	—	—	—	—	—	++	—	—	—
11	<i>Bt</i>	Dipel, various	—	+	+	+	++	+	—	—	—	—	—	—	—	—
15	<i>novaluron</i>	Rimon	—	++	+++	+++	++	+++	+	—	+	+	+	—	—	—
16	<i>buprofezin</i>	Courier	—	—	—	—	—	—	—	—	—	—	++	—	—	—
17	<i>cyromazine</i>	Trigard	—	—	—	—	—	—	—	—	—	—	—	—	—	+++
18	<i>methoxyfenozide</i>	Intrepid	—	++	++	+++	+++	+++	—	—	—	—	—	—	—	—

**EFFICACY OF INSECTICIDES/ACARICIDES FOR CONTROLLING ARTHROPOD PESTS OF LEGUME VEGETABLE CROPS (*continued*)**

CHEMICAL CLASS (IRAC)	COMMON NAME	EXAMPLE PRODUCT	CUCUMBER BEETLES	CORN EARWORM	EUROPEAN CORN BORER	FALL ARMYWORM	CABBAGE LOOPER	BEE T ARMYWORM	STINK BUGS, SQUASH BUG	APHIDS	THRIPS	WESTERN FLOWER THRIPS	SILVERLEAF WHITEFLY	CUTWORMS	SPIDER MITES	LEAFMINER
20B	<i>acequinocyl</i>	Kanemite	—	—	—	—	—	—	—	—	—	—	—	—	+++	—
21A	<i>fenpyroximate</i>	Portal	—	—	—	—	—	—	—	—	—	—	—	—	+++	—
23	<i>spirotetramat</i>	Movento	—	—	—	—	—	—	—	+++	—	—	++	—	—	—
28	<i>chlorantraniliprole</i>	Coragen	—	+++	+++	+++	+++	+++	—	—	—	—	++	+	—	+
	<i>cyantraniliprole</i>	Verimark/Exirel	—	+++	+++	+++	+++	+++	—	++	++	++	++	+	—	+
UN	<i>bifenazate</i>	Acramite	—	—	—	—	—	—	—	—	—	—	—	—	+++	—

Ratings for products was initially conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use for all crops in this group. Please refer to the appropriate section of the Pest Management Handbook for details on product labeling.

Efficacy ratings:  
 — Ineffective or insufficient data  
 + Somewhat effective  
 ++ Effective  
 +++ Very effective

## COMMERCIAL VEGETABLE INSECT CONTROL

### ONION

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>						
soil insects	<i>chlorpyrifos</i> Lorsban 4E, Advanced, 15G, 75WG	1B	See Label		24 H/ 60 D	15G labeled for at-planting only. Others labeled for at-planting and post-planting applications.
	<i>diazinon</i> 4E 50W	1B	2–4 qt 4–8 lb	2–4 2–4	3 D/ Pre-plant	
<b>FOLIAR TREATMENTS</b>						
Pre-mixes for multiple pests	<i>cyantraniliprole</i> + <i>abamectin</i> Minecto Pro SC	28 + 6	7–10 fl oz	0.06–0.088 + 0.013–0.019	12 H/ 7 D	Must be mixed with adjuvant (see label). DO NOT use binder or sticker type adjuvant.
cutworms, seedcorn maggot adults	<i>cypermethrin</i> Ammo 2.5EC	3	2–5 fl oz	0.04–0.1	12 H/ 7 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	1.92–3.2 fl oz	0.0075–0.0125	24 H/ 14 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	0.96–1.6 fl oz	0.015–0.025	24 H/ 14 D	
	<i>permethrin</i> Permethrin 3.2EC	3	4–12 fl oz	0.1–0.3	12 H/ 1 D	Also available as 25WP formulation.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	2.24–4 fl oz	0.014–0.025	12 H/ 7 D	
seedcorn maggot adults	<i>malathion</i> 5EC, 8EC	1B	See Label	See Label	12 H/ 3–7 D	Rate, REI, PHI varies with product selection.
thrips	<i>acetamiprid</i> Assail 30SG	4A	5–8 oz	0.097–0.15	12 H/ 7 D	
	<i>cyantraniliprole</i> Exirel 0.83SC	28	13.5–20.5 fl oz	0.088–0.133	12 H/ 1 D	
	<i>cypermethrin</i> Ammo 2.5EC	3	4–5 fl oz	0.08–0.1	12 H/ 7 D	
	<i>gamma-cyhalothrin</i> Proaxis 0.5EC	3	2.56–3.84 fl oz	0.01–0.015	24 H/ 14 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	1.28–1.92 fl oz	0.02–0.03	24 H/ 14 D	
	<i>malathion</i> 5EC, 8EC	1B	See Label	See Label	12 H/ 3–7 D	Rate, REI, PHI varies with product selection.
	<i>methomyl</i> Lannate 2.4LV	1A	3 pt	0.9	48 H/ 7 D	90 SP formulation also registered.



ONION

PEST	INSECTICIDE	MOA	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>						
thrips (continued)	<i>permethrin</i> Permethrin 3.2EC	3	6–12 fl oz	0.15–0.3	12 H/ 1 D	Also available as 25WP formulation.
	<i>spinetoram</i> Radiant 1SC	5	6–10 fl oz	0.047–0.078	4 H/ 1 D	
	<i>tolfenpyrad</i> Torac 1.29EC	21A	24 fl oz	0.24	12 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	2.88–4 fl oz	0.018–0.025	12 H/ 7 D	
NOTE: Reduced efficacy of IRAC Group 1B and Group 3 insecticides has been noted in the past few years (this may also be associated with the prevalence of onion thrips in some fields). Reliance on any single chemistry can result in rapid development of resistance in thrips.						

POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS</b>								
soil insects	<i>bifenthrin</i> Brigade 2EC	3	√	√	9.6–19.2 fl oz 3.2–9.6 fl oz	0.15–0.3 0.05–0.15	12 H/ 21 D	(at planting) (lay-by)
	<i>chlorpyrifos</i> Lorsban 4E, Advanced 75WG 15G	1B	Not Labeled	√	4 pt 2.67 lb 13.5 lb	2 2 2	24 H/ 125 D	Applied pre-plant incorporated.
	<i>phorate</i> Thimet 20G	1B	√	Not Labeled	8.5–17.3 oz/1,000 ft of row		48 H/ 90 D	Also labeled for post-emergence application at 8.5–11.3 oz.
	<i>ethoprop</i> Mocap 15G	1B	See Remarks	√	1.6–2.1 oz/1,000 ft of row		48 H/ See Remarks	Rate on Irish potato is 1.4 oz. Apply 2–3 weeks before planting.
NOTE: Growers should avoid planting sweet potatoes in fields that have a high potential for soil insect problems or that have had a history of problems.								
aphid, Colorado potato beetle, flea beetle, leafhopper, whitefly	<i>clothianidin</i> Belay 2.13 SC	4A	√	√	9–12 fl oz	0.15–0.2	12 H/ See Remarks	Apply at planting or at ground cracking.
	<i>cyantraniliprole</i> Verimark 1.67SC	28	See Remarks	See Remarks	6.75–13.5 fl oz Rate varies with pest targeted		4 H/ at planting	Labeled for Aphids, Whiteflies, and Caterpillars.
	<i>imidacloprid</i> Admire Pro 4.6F	4A	√	See Remarks	5.7–8.7 fl oz	0.2–0.312	12 H/ Irish Potato 21 D Sweet Potato 125 D	Rate for sweet potato 4.4–10.5 fl oz.

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COMMERCIAL VEGETABLE INSECT CONTROL

POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>PRE-PLANT, AT-PLANTING, AND CHEMIGATION TREATMENTS (continued)</b>								
aphid, Colorado potato beetle, flea beetle, leafhopper, whitefly (continued)	<i>dinotefuran</i> Venom 70SG	4A	√	√	6.5–7.5 oz	0.28–0.33	12 H/ See Remarks	One application pre-plant, pre-emergence, or ground cracking.
	<i>thiamethoxam</i> Platinum 75SG	4A	√	√	1.66–2.67 oz	0.078–0.125	12 H/ See Remarks	Apply at planting, plant emergence, or last hilling.
wireworms	<i>fipronil</i> Regent 4SC	2B	√	Not Labeled	See label. Rate varies with row spacing		0 H/ 90 D	In-furrow only.
<b>FOLIAR TREATMENTS</b>								
Pre-mix for multiple pests	<i>bifenthrin</i> + <i>avermectin</i> Athena SC	3 + 6	√	√	7–17 fl oz	0.04–0.1 0.006–0.015	12 H/ 21 D	
	<i>cyantraniliprole</i> + <i>abamectin</i> Minecto Pro SC	28 + 6	√	√	5.5–10 fl oz	0.048–0.088 + 0.01–0.019	12 H/ 14 D	Must be mixed with adjuvant (see label). DO NOT use binder or sticker type adjuvant.
	<i>imidacloprid</i> + <i>beta-cyfluthrin</i> Leverage 360 SC	4A + 3	√	See Remarks	2.8 fl oz	0.044 + 0.022	12 H/ 7 D	Rate on sweet potato is 2.4–2.8 fl oz.
	<i>lambda-cyhalothrin</i> + <i>chlorantraniliprole</i> Besiege SC	3 + 28	√	√	5–9 fl oz Rate varies with pest targeted		24 H/ 14 D	
	<i>lambda-cyhalothrin</i> + <i>thiamethoxam</i> Endigo ZC	3 + 4A	√	√	3.5–4.5 fl oz Rate varies with pest targeted		24 H/ 14 D	
	<i>methoxyfenozide</i> + <i>spinetoram</i> Intrepid Edge SC	5 + 18	Not Labeled	√	4–12 fl oz	0.078–0.234 + 0.015–0.047	4 H/ 3 D	Rate varies with pest targeted.
	<i>novaluron</i> + <i>acetamiprid</i> Cormoran EC	15 + 4A	√	√	6–12 fl oz	0.039–0.079 + 0.03–0.06	12 H/ 7 D	Rate varies with pest targeted.
	<i>spirotetramat</i> + <i>pyriproxyfen</i> Senstar SE	23 + 7C	√	√	8–10 fl oz	0.063–0.078 + 0.022–0.027	24 H/ 7 D	
	<i>thiamethoxam</i> + <i>chlorantraniliprole</i> Voliam Flexi WDG	4A + 28	√	√	4 oz	0.05 + 0.05	12 H/ 14 D	
	<i>zeta-cypermethrin</i> + <i>bifenthrin</i> Hero EC	3 + 3	√	√	4–10.3 fl oz	0.01–0.025 + 0.03–0.075	12 H/ 21 D	

POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>								
aphid	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	2.5–4 oz	0.047–0.075	12 H/ 7 D	
	<i>clothianidin</i> Belay 2.13 SC	4A	✓	✓	2–3 fl oz	0.033–0.05	12 H/ 14 D	
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	✓	✓	13.5–20.5 fl oz	0.088–0.133	12 H/ 7 D	
	<i>dimethoate</i> 4EC 2.67EC	1B	✓	Not Labeled	0.5–1 pt 0.75–1.5 pt	0.25–0.5 0.25–0.5	48 H/ 0 D	Also available as Cygon 3.35EC.
	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	1–1.5 oz	0.05–0.066	12 H/ 7 D	
	<i>flonicamid</i> Beleaf 50SG	29	✓	✓	2–2.8 oz	0.062–0.089	12 H/ 7 D	
	<i>flupyradifurone</i> Sivanto Prime 1.67SL	4D	✓	✓	7–10.5 fl oz	0.09–0.136	4 H/ 7 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	See Remarks	1.3 fl oz	0.047	12 H/ 7 D	Also in a pre-mix for multiple pests. Sweet potato rate is 1.2 fl oz.
	<i>malathion</i> 5EC, 8EC	1B	✓	See Remarks	See Label	See Label	12 H/ 0-3 D	Rate, PHI, REI varies with product selection.
	<i>pymetrozine</i> Fulfill 50WDG	9B	✓	✓	2.75–5.5 oz	0.086–0.172	12 H/ 14 D	
	<i>pyrifluquinazon</i> PQZ 1.87SC	9B	✓	✓	2.4–3.2 fl oz	0.035–0.047	12 H/ 14 D	Use of an adjuvant is recommended.
	<i>spirotetramat</i> Movento 2SC	23	✓	✓	4–5 fl oz	0.0625–0.078	24 H/ 7 D	Use of an adjuvant is necessary.
	<i>sulfoxaflor</i> Transform 50WG	4C	✓	✓	0.75–1.5 oz	0.023–0.047	24 H/ 7 D	
<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	3 oz	0.047	12 H/ 14 D	Also in a pre-mix for multiple pests.	
beet armyworm, fall armyworm	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ Irish 14 D Sweet 1 D	Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	✓	✓	7–13.5 fl oz	0.045–0.088	12 H/ 7 D	
	<i>methomyl</i> Lannate 2.4LV	1A	See Remarks	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ 6 D	90 SP formulation also registered. Not recommended for beet armyworm.
	<i>methoxyfenozide</i> Intrepid 2F	18	Not Labeled	✓	6–10 fl oz	0.09–0.16	4 H/ 7 D	

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## COMMERCIAL VEGETABLE INSECT CONTROL

### POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>								
beet armyworm, fall armyworm  (continued)	<i>novaluron</i> Rimon 0.83EC	15	√	√	6–12 fl oz	0.039–0.078	12 H/ 14 D	
	<i>spinetoram</i> Radiant 1SC	5	√	√	6–8 fl oz	0.047–0.063	4 H/ 7 D	
	<i>spinosad</i> Blackhawk 36WDG	5	√	√	2.25–3.5 oz	0.05–0.079	4 H/ 7 D	
cabbage looper, other foliage feeding caterpillars	<i>Bacillus thuringiensis</i> "Bt" various names	11B	√	√	Follow label		4 H/ 0 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	√	√	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	√	√	3.5–7.5 fl oz	0.045–0.098	4 H/ Irish 14 D Sweet 1 D	Adjuvants have been shown to increase efficacy. Also in a pre-mix for multiple pests.
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	√	√	10–17 fl oz	0.065–0.11	12 H/ 7 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	√	√	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	√	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ 7 D	
	<i>indoxacarb</i> Avaunt eVo 30 DG	22	√	√	2.5–6 fl oz	0.045–0.11	12 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	√	√	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>malathion</i> 5EC, 8EC	1B	√	√	See Label	See Label	12 H/ 0-3 D	Rate, REI, PHI varies with product selection.
	<i>methoxyfenozide</i> Intrepid 2F	18	Not Labeled	√	6–10 fl oz	0.09–0.16	4 H/ 7 D	
	<i>methomyl</i> Lannate 2.4LV	1A	√	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ 6 D	90 SP formulation also registered.
	<i>novaluron</i> Rimon 0.83EC	15	√	√	6–12 fl oz	0.039–0.078	12 H/ 14 D	
	<i>permethrin</i> Permethrin 3.2EC	3	√	Not Labeled	4–8 fl oz	0.1–0.2	12 H/ 14 D	Also available as 25WP formulation.
	<i>spinetoram</i> Radiant 1SC	5	√	√	6–8 fl oz	0.047–0.063	4 H/ 7 D	
	<i>spinosad</i> Blackhawk 36WDG	5	√	√	2.25–3.5 oz	0.05–0.079	4 H/ 7 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8 EC	3	√	√	1.76–4 fl oz	0.011–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.

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POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>								
Colorado potato beetle	<i>abamectin</i> Agri-Mek 0.15 EC 0.7SC	6	✓	✓	8–16 fl oz 1.75–3.5 fl oz	0.01–0.02 0.01–0.02	12 H/ 14 D	Also in a pre-mix for multiple pests. Must be mixed with spray adjuvant (see label). DO NOT use binder or sticker adjuvants.
	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	1.5–4 oz	0.028–0.075	12 H/ 7 D	
	<i>carbaryl</i> Sevin 4F	1A	✓	✓	1–2 qt	1–2	12 H/ 7 D	
	<i>clothianidin</i> Belay 2.13 SC	4A	✓	✓	2–3 fl oz	0.033–0.05	12 H/ 14 D	
	<i>cyantraniliprole</i> Exirel 0.83 SC	28	✓	✓	5–13.5 fl oz	0.033–0.088	12 H/ 7 D	
	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	1–1.5 oz	0.05–0.066	12 H/ 7 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	See Remarks	1.3 fl oz	0.047	12 H/ 7 D	Also in a pre-mix for multiple pests. Rate on sweet potatoes is 1.2 fl oz.
	<i>novaluron</i> Rimon 0.83EC	15	✓	✓	6–12 fl oz	0.039–0.078	12 H/ 14 D	
	<i>spinetoram</i> Radiant 1SC	5	✓	✓	4.5–8 fl oz	0.035–0.063	4 H/ 7 D	
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	1.5–3 oz	0.023–0.047	12 H/ 14 D	Also in a pre-mix for multiple pests.
	<i>tolfenpyrad</i> Torac 1.29EC	21A	Not Labeled	✓	14–21 fl oz	0.14–0.21	12 H/ 14 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
NOTE: Thimet as applied for soil insects will help reduce early season infestations.								
false chinch bug	<i>malathion</i> 5EC 8EC	1B	✓	✓	See Label	See Label	12 H/ 0-3 D	Rate, REI, PHI varies with product selection.
flea beetles	<i>acetamiprid</i> Assail 30SG	4A	✓	✓	1.5–2.5 oz	0.028–0.047	12 H/ 7 D	
	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>bifenthrin</i> Brigade 2EC	3	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ 21 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	✓	✓	0.5–1 qt	0.5–1	12 H/ 7 D	

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## COMMERCIAL VEGETABLE INSECT CONTROL

### POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>								
flea beetles (continued)	<i>clothianidin</i> Belay 2.13 SC	4A	✓	✓	2–3 fl oz	0.03–0.05	12 H/ 14 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	✓	✓	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>dinotefuran</i> Venom 70SG	4A	✓	✓	1–1.5 oz	0.05–0.066	12 H/ 7 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ 7 D	
	<i>imidacloprid</i> Admire Pro 4.6F	4A	✓	See Remarks	1.3 fl oz	0.047	12 H/ 7 D	Also in a pre-mix for multiple pests. Rate on sweet potato is 1.2 fl oz.
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	1.5–3 oz	0.023–0.047	12 H/ 14 D	Also in a pre-mix for multiple pests.
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	1.76–4 fl oz	0.011–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
leafhoppers, potato	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	0.8–1.6 fl oz	0.0065–0.0125	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>carbaryl</i> Sevin 4F	1A	✓	✓	0.5–1 qt	0.5–1	12 H/ 7 D	Labeled up to 2 qt for aster leafhopper.
	<i>clothianidin</i> Belay 2.13 SC	4A	✓	✓	2–3 fl oz	0.033–0.05	12 H/ 14 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	✓	✓	0.8–1.6 fl oz	0.013–0.025	12 H/ 0 D	
	<i>dimethoate</i> 4EC 2.67EC	1B	✓	Not Labeled	0.5–1 pt 0.75–1.5 pt	0.25–0.5 0.25–0.5	48 H/ 0 D	Also available as Cygon 3.35EC.
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	Not Labeled	5.8–9.6 fl oz	0.03–0.05	12 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>malathion</i> 5EC, 8EC	1B	✓	✓	See Label	See Label	12 H/ 0-3 D	Rate, REI, PHI varies with product selection.
	<i>methomyl</i> Lannate 2.4LV	1A	✓	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ 6 D	90 SP formulation also registered.
	<i>thiamethoxam</i> Actara 25WDG	4A	✓	✓	1.5–3 oz	0.023–0.047	12 H/ 14 D	Also in a pre-mix for multiple pests.

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POTATO (Irish and Sweet)

PEST	INSECTICIDE	MOA	Irish	Sweet	AMOUNT OF PRODUCT PER ACRE	POUNDS ACTIVE PER ACRE	REI/PHI (Hours or Days)	REMARKS
<b>FOLIAR TREATMENTS (continued)</b>								
leafhoppers, potato (continued)	<i>tolfenpyrad</i> Torac 1.29EC	21A	Not Labeled	✓	14–21 fl oz	0.14–0.21	12 H/ 14 D	
	<i>zeta-cypermethrin</i> Mustang Maxx 0.8EC	3	✓	✓	3.2–4 fl oz	0.02–0.025	12 H/ 1 D	Also in a pre-mix for multiple pests.
tuberworm, potato	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D	Also in a pre-mix for multiple pests.
	<i>chlorantraniliprole</i> Coragen 1.67SC	28	✓	✓	3.5–7.5 fl oz	0.045–0.098	4 H/ Irish 14 D Sweet 1 D	
	<i>cyfluthrin</i> Tombstone 2EC	3	✓	✓	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
	<i>esfenvalerate</i> Asana 0.66EC	3	✓	Not Labeled	2.9–9.6 fl oz	0.015–0.03	12 H/ 7 D	
	<i>lambda-cyhalothrin</i> Warrior II 2.08CS	3	✓	✓	1.28–1.92 fl oz	0.02–0.03	24 H/ 7 D	Also in a pre-mix for multiple pests.
	<i>methomyl</i> Lannate 2.4LV	1A	✓	Not Labeled	1.5–3 pt	0.45–0.9	48 H/ 6 D	90 SP formulation also registered.
	<i>novaluron</i> Rimon 0.83EC	15	✓	✓	6–12 fl oz	0.039–0.078	12 H/ 14 D	
	sweet potato weevil	<i>beta-cyfluthrin</i> Baythroid XL 1EC	3	✓	✓	1.6–2.8 fl oz	0.0125–0.022	12 H/ 0 D
<i>bifenthrin</i> Brigade 2EC		3	✓	✓	2.1–6.4 fl oz	0.033–0.1	12 H/ 21 D	Also in a pre-mix for multiple pests.
<i>cyfluthrin</i> Tombstone 2EC		3	✓	✓	1.6–2.8 fl oz	0.025–0.044	12 H/ 0 D	
<i>phosmet</i> Imidan 70WP		1B	✓	✓	1.33 lb	1	5 D/ 7 D	Crop must be mechanically harvested.
<i>phosmet</i> Imidan 5 Dust		1B	Not Labeled	See Remarks	2–4 oz/50 lb bushel		See Remarks	Post-harvest storage treatment only.
whiteflies	<i>flupyradifurone</i> Sivanto Prime 1.67 SL	4D	✓	✓	10.5–14 fl oz	0.136–0.18	4 H/ 7 D	
	<i>pyriproxyfen</i> Knack 0.86 EC	7C	✓	✓	8 fl oz	0.054	12 H/ 3 D	
	<i>spiromesifen</i> Oberon 2SC SC4	23	✓	✓	8–16 fl oz 4–8 fl oz	0.125–0.25	12 H/ 7 D	
	<i>spirotetramat</i> Movento 2SC	23	✓	✓	4–5 fl oz	0.06–0.08	24 H/ 7 D	Use of an adjuvant is necessary. Activity on early instar nymphs.
NOTE: Assail, Actara, Coragen, PQZ, and Exirel as applied for labeled pests should provide good control. High labeled rates of Assail, Actara, and Coragen are recommended for whiteflies.								

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## ASPARAGUS

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Rust, Cercospora, Leaf spot	11	Quadris	6–15.5 fl oz	4 H/100 D	Apply to ferns after harvest; spray at first appearance, 7–10-day intervals.
	3	Rally 40 W	5 fl oz	24 H/180 D	
	3	Tebuconazole 3.6 F	4–6 fl oz	12 H/180 D	
	3	Nova or Rally	5 fl oz	24 H/180 D	
	M	Bravo Weather Stik	2–4 pt	12 H/190 D	
	M	Dithane M 45	2 lb	24 H/180 D	
	M	Dithane F 45	1.6 qt	24 H/180 D	
	M	Dithane Rain Shield	2 lb	24 H/180 D	
	M	Dithane DF	2 lb	24 H/180 D	
	M	Manzate 75 DF	2 lb	24 H/180 D	
	M	Penncozeb 75 DF	2 lb	24 H/180 D	
	M	Penncozeb 80 WP	2 lb	24 H/180 D	
M	Sulfur W	See label			
Crown Rot	M	Manzate75 DF	1 lb/100 gal	24 H/180 D	Pre-plant root and crop dip. Dip loosely packed crowns for 5 minutes. Drain and plant as soon as possible. See label.
	M	Dithane DF	1 lb/100 gal	24 H/180 D	
	M	Dithane M 45	1 lb/100 gal	24 H/180 D	
	M	Dithane F 45	1.6 pt/100 gal	24 H/180 D	
Phytophthora, Crown Rot, Spear Rot	4	Ridomil Gold EC	1 pt		Broadcast application with a minimum of 10 gal of water over beds. See labels. Apply 30–60 days before first cutting. For additional control, make another application just before the beginning of harvest.
	4	Ridomil Gold SL	1 pt		
	4	MetaStar	2 qt		

## BEANS (Snap and Pole)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Bacterial Blight	M	Basic Copper Sulfate	2–4 lb	48 H/0 D	See label
	M	Nordox 75WG	0.6–2.5 lb	12 H/0 D	See label
	M	KOP-Hydroxide	1–3 lb	48 H/0 D	See label
	M	Blue Shield DF	1–3 lb	48 H/0 D	Apply on 7–14 day schedule, depending on conditions.
	M	Champ DP	0.6–2 lb	48 H/0 D	Apply when disease threatens followed by 5–10 day intervals. Use western grown seed and rotate every 3 years. Do not work in fields when vines are wet.



BEANS (Snap and Pole)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Bacterial Blight <i>(continued)</i>	M	Kocide 3000	0.5–1.25 lb	48 H/0 D	
	M	Kocide DF	1–3 lb	48 H/0 D	
	M	Nu-Cop 3L	0.6–4 pt	48 H/0 D	
	33	K-Phite	4 pt	4 H/0 D	See label.
Seedling Disease and Stem Rot Rhizoctonia		Quadris	0.4–0.8 fl oz/1000 row ft		Applied in-furrow or banded. See label.
	14	Blocker 4F	2–3 pt	NA	Apply as a directed spray in the seed furrow.
Pythium & Rhizoctonia Seedling Rots		Ridomil Gold PC GR	10 lb/13,000 linear ft at planting. See Label. 0.34 fl oz/1000 row ft, 4/11		Adjust the application equipment so the granules are mixed with the soil surrounding the seed. This product is effective against Pythium only.
		Uniform			Use as an in-furrow spray. This product is effective against Rhizoctonia only.
Pythium Damping-Off	4	Ridomil Gold EC	0.5–1 pt		Incorporate in the top 2" of soil pre-plant or on surface after planting. Ridomil Gold EC should be incorporated mechanically before planting or be moved into the seed zone after planting with 0.5–1-inch sprinkler irrigation.
Rust Common and Asian Soybean	11	Quadris	6.2 fl oz	4 H/0 D	Use every 7–14 days. See label.
	7	Endura	8–11 fl oz	12 H/7 D	See label.
	7	Fontelis	14–30 fl oz	12 H/0 D	Do not exceed 72 fl oz per season.
	3	Tebuconazole 3.6 F	4–6 fl oz	12 H/14 D	Use every 7–14 days. See label.
	7 + 11	Priaxor	4–8 fl oz	12 H/14 D	Spray prior to disease development.
	11	Headline	6–9 fl oz	12 H/7 D	
	M	Bravo 500 or	2–4.25 pt	12 H/7 D	See label.
	M	Bravo Weather Stik	1–3 pt	12 H/7 D	
	M	Equus 720	1.37–2 pt	12 H/7 D	Use at first sign of disease and weekly until disease is under control.
	M	Echo 720	1.37–3 pt	12 H/7 D	
	M	Bravo S	4–8 pt	12 H/7 D	
3	Nova or Rally	4–5 fl oz	24 H/0 D	Begin applications when rust is first observed.	
Southern Blight		Quadris (Amistar)	6.2–15.4 fl oz (2–5 oz)		Apply at beginning flower. Plant behind corn or some other grass crop. Deep plow to cover old crop debris.
	14	Blocker 4F	4 pt	12 H/0 D	Apply as an in-row band over the seed just after planting. Do not apply to emerged plants.

## VEGETABLE DISEASE CONTROL

### BEANS (Snap and Pole)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Stem Anthracnose	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Use every 7–14 days. See label. Plant disease-free seed and rotate with other crops.
	7	Fontelis	14–30 fl oz	12 H/4 D	Do not exceed 72 fl oz per season.
	11	Headline	6–9 fl oz	12 H/0 D	Rotate with non-strobilurins.
	1	Topsin M	1–1.5 lb	24 H/7 D	See label.
	1	Topsin 4.5 L	20–30 fl oz	24 H/14 D	
	1	T-Methyl 70WSB	1–1.5 lb	24 H/14 D	
	1	T-Methyl 4.5F	20–30 fl oz	24 H/14 D	
White Mold (Sclerotinia) Botrytis	7	Endura	8–11 fl oz	12 H/7 D	Apply at beginning flower or disease onset.
	1	Topsin-M 70W	1–2 lb	Lima 24 H/28 D Snap 24 H/14 D	Apply Topsin at 25–50% bloom and repeat at peak bloom.
	14	Botran 75-W	2.25 lb (bush) 4 lb (pole)	12 H/2 D 12 H/2 D	Apply when disease is anticipated; repeat at 7-day intervals during disease favorable periods.
	7	Fontelis	14–30 fl oz	12 H/0 D	Do not exceed 72 fl oz per season.
	7 + 11	Priaxor	6–8 fl oz	12 H/14 D	Suppression only.
Pythium Rhizoctonia Web blight, Pod/Tip Rot	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Apply at beginning flower.
	3	Nova or Rally	4–5 fl oz	24 H/0 D	Begin applications when pods begin to develop. Continue applications on a 7–10 day schedule during periods favorable for disease development.
Pythium Pod Rot	4 + M	Ridomil Gold Copper	1 pt/2.5 A	48 H/3 D	Use at disease onset and every 7–10 days.

### BEETS

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Leaf spots, Blights	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after two sequential sprays of Quadris or Cabrio.
	7	Fontelis	14–30 fl oz	12 H/28 D	Do not apply more than 61 fl oz to beets per season.
	11	Cabrio	8–12 fl oz	12 H/0 D	
	3	Tebuconazole 3.6 F	3–7.2 fl oz	12 H/7 D	Use every 14 days.
	M	Basic Copper Sulfate	2–3 lb	48 H/0 D	Begin when disease appears and repeat every 7–10 days.
	M	Nordox 75WG	0.66–2.5 lb	12 H/0 D	
Pythium and <i>Phytophthora</i> spp.	4	Ridomil Gold EC	1–2 pt		Apply as a pre-plant broadcast spray prior to planting.
	4	Ridomil Gold SL	1–2 pt		

## BROCCOLI, CABBAGE, BRUSSELS SPROUTS

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Wire Stem	14	Blocker 4F	2.8–3.75 gal/A in 80 gal of water	N/A	Apply as a pre-plant broadcast spray prior to planting. Spray as an 8" band centered on the row at or just prior to planting.
	14		1.9–2.8 gal/A in 35 gal of water on a 40" row spacing	N/A	
Pythium	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See labels.
	4	Ridomil Gold SL	1–2 pt		
	4	MetaStar	4–8 pt		
Black Leg	2	Rovral 4F	2 pt	24 H/0 D	Apply to base of plants at 2–4 leaf stage.
	2	Iprodione 4L (broccoli only)	2 pt	24 H/0 D	
Alternaria Leaf spot	7	Fontelis	14–30 fl oz	12 H/0 D	Do not exceed 72 fl oz of product per season.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	7	Endura	6–9 fl oz	12 H/0D	See label.
	11 + 3	Quadris Top	14 fl oz	4 H/0 D	Rotate to other chemistry after 1 application.
	9 + 12	Switch	11–14 fl oz	12 H/7 D	
	7 + 11	Priaxor 500 SC	6–8.2 fl oz	12 H/3 D	
	M	Bravo Weather Stik	1.5 pt	12 H/7 D	
	M	Echo 720	1.5 pt	12 H/7 D	
	M	Equus 720	1.5 pt	12 H/7 D	
	M	Bravo S	4.5 pt	12 H/7 D	
	7 + 11	Topguard EQ	See label.		
7	Rhyme	See label.			
Downy mildew	M	Phosphites; K-Phite ProPhyt,	See label.		
	40	Reason	5.5 fl oz	12 H/2 D	Rotate with non-strobilurins.
	40 + 45	Zampro	14 fl oz	12 H/7 D	Apply when conditions are favorable for disease, but before disease is present.
Powdery mildew	3	Procure	6–8 fl oz	12 H/1 D	<b>Inspire Super:</b> Begin applications prior to disease development, and continue on a 7–10 day interval. Make no more than 2 sequential applications before rotating to another effective fungicide with a different mode of action. Do not exceed 80 fl oz/season.
	9 + 12	Switch	11–14 fl oz	12 H/0 D	
	9 + 3	Inspire Super 2.82 SC		12 H/7 D	

■ VEGETABLE DISEASE CONTROL

**BROCCOLI, CABBAGE, BRUSSELS SPROUTS**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Black Rot	P	Actigard	0.5–1 fl oz	12 H/7 D	Suppression only. See label. Use no more than 4 oz/season. Primary method for reducing losses to Black rot is to use certified, non-infected seed.
	M	Nordox 75WG	0.66–2.5 lb	12 H/0 D	
	M	Kocide DF	1–2 lb	48 H/0 D	
	M	Kocide LF	2.6 pt	48 H/0 D	
	M	Kocide 4.5LF	0.6–1.3 pt	48 H/0 D	
	M	Kocide 101	1–2 lb	24 H/0 D	
	M	Kocide 3000	0.5–0.75 lb	48 H/0 D	
	M	Champ DP	0.3–0.6 lb	48 H/0 D	
	M	Nu-Cop 3L	0.3–1.3 pt	48 H/0 D	
	M	Cuprofix Disperss	1.5–2.5 lb	48 H/0 D	

**CABBAGE**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Alternaria Leaf spot	9 + 12	Switch	11–14 fl oz	12 H/7 D	Begin application after plants are set in the field or after emergence for direct seeded.
	7	Fontelis	14–30 fl oz	12 H/0 D	Do not apply more than 72 fl oz/A per season.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	11 + 3	Quadris Top	14	4 H/1 D	Rotate to other chemistry after 1 application.
	7	Endura	6–9 fl oz	12 H/0 D	See label.
	M	Champ DP	0.3–0.6 lb	48 H/0 D	
	M	Bravo Weather Stik	1.5 pt	12 H/7 D	
	M	Echo 720	1.5 pt	12 H/7 D	
	M	Equus 720	1.5 pt	12 H/7 D	Do not apply to Chinese cabbage or Chinese broccoli within 7 days of harvest.
	M	Bravo S	4.5 pt	12 H/7 D	
	7 + 11	Topguard EQ	See label.		
	7	Rhyme	See label.		
Club Root	14	Blocker 4F	3 pt/100 gal of water		Use in transplant water.
	14		5.67 gal/A/ 25 gal of water		Apply in a 12" band directly over the row prior to planting.
	14		7.5 gal in 30 gal of water		This is the broadcast application that should be incorporated into the soil just prior to planting.
	29	Omega 500	Transplant: 12.9–25.75 fl oz/100 gal water Banded: 20 fl oz	12 H/0 D	

**CABBAGE**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium Damping-Off		Ridomil Gold EC	0.5–1 pt/13,000 linear ft of row or incorporate 1–2 pt/A		See label.
		Ridomil Gold SL			
		Metastar	4–8 pt	48 H/7 D	
Downy Mildew	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with protectant fungicides.
	33	K-Phite	2–4 pt	4 H/0 D	See label.
	40	Micora/Revus	8 fl oz	4 H/1 D	Use surfactants.
	M	Bravo Weather Stik	1.5 pt	12 H/0 D	
	M	Echo	1.5 pt	12 H/0 D	
	M	Equus 720	1.5 pt	12 H/0 D	
	M	Bravo S	4.5 pt	12 H/0 D	
	33	Aliette	2–5 lb	12 H/3 D	Do not mix with Copper fungicide. See label.
	40 + 45	Zampro	14 fl oz	12 H/7 D	Spray preventively.
	M5+U15	Orondis Opti (premix)	1.75–2.5 pt	12 H/0 D	Begin foliar applications prior to disease development and continue on a 7- to 14-day interval.
	U15 + 40	Orondis Ultra A + Orondis Ultra B	2.0–4.8 fl oz + 8 fl oz	4 H/0 D	Must tank-mix Orondis Ultra and Ultra B before application. Apply prior to disease development at 10-day intervals. Make no more than 2 sequential applications before alternating with fungicides that have a different mode of action. Maximum of 4 applications per crop per year of all Orondis products.
22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).	
33	Potassium phosphite	2–4 pt	4 H/0 D	Apply when weather is foggy as a preventative. Do not apply to plants under water or temperature stress. Spray solution should have a pH greater than 5.5. Apply in at least 30 gal water/A.	
Sclerotinia (Raisin Head)	7	Endura	6–9 fl oz	12 H/0 D	See label.

**CHINESE CABBAGE**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Tight headed varieties only	M	Bravo Weather Stik	1–1.5 pt	12 H/7 D	Repeat at 7–10 day intervals.
	M	Equus 720	1.5 pt	12 H/7 D	Do not apply to Chinese cabbage or Chinese broccoli within 7 days of harvest.
	M	Echo 720	1–1.5 pt	12 H/7 D	See label.

## VEGETABLE DISEASE CONTROL

### CANTALOUPE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Alternaria Leafspot	7 + 11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	7	Fontelis	12–16 fl oz	12 H/1 D	Do not exceed 67 fl oz per season.
	11	Quadris	11–15.4 fl oz	4 H/1 D	Resistance to Quadris (FRAC 11) has been reported in Alternaria leaf blight. Risk of cross-resistance.
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	11	Cabrio	12–16 fl oz	12 H/0 D	Resistance to Quadris (FRAC 11) has been reported in Alternaria leaf blight. Risk of cross-resistance.
	11 + 3	Quadris Top	10–14 fl oz	12 H/0 D	Rotate after 1 application.
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	9 + 12	Switch	11–14 fl oz	12 H/1 D	
	M	Manzate 75DF	2–3 lb	24 H/5 D	
	M	Penncozeb 80WP	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Penncozeb 75DF	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved. See label.
	M	Dithane M-45	2–3 lb	24 H/5 D	
	M	Dithane DF	2–3 lb	24 H/5 D	Apply fungicides when true leaves are fully expanded. Continue every 7–14 days until harvest.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	M	Bravo Weather Stik	1.5 pt	12 H/7 D	
M	Echo 720	1.5 pt	12 H/7 D		
M	Bravo 500	2.25–2.75 pt	12 H/7 D		
M	Equus 720	2–3 pt	12 H/7 D		
Anthracnose	7 + 11	Pristine	18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris or Cabrio.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	7+3	Aprovia Top	10.5–13.5 fl oz	12 H/0 D	No more than 2 sequential applications.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.

CANTALOUPE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose (continued)	11	Cabrio	12–16 fl oz	12 H/0 D	
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	See label.
	1	Topsin M 70W	0.25–0.5 lb	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	Use western-grown seed. Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	1	T-Methyl 4.5	10 fl oz	24 H/0 D	
	11	Quadris (Amistar)	11–15.4 fl oz	4 H/1 D	
	11	Cabrio	3.5–5 fl oz	12 H/0 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> . See label.
	M	Manzate 75DF	2–3 lb	24 H/5 D	
	M	Penncozeb 80WP	2–3 lb	24 H/5 D	
	M	Penncozeb 75DF	2–3 lb	24 H/5 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved.
	M	Dithane M-45	2–3 lb	24 H/5 D	Greenhouse approved.
	M	Dithane DF	2–3 lb	24 H/5 D	Greenhouse approved.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75 pt	12 H/0 D	
M	Equus 720	1.5–2 pt	12 H/0 D		
Downy Mildew	U15	Orondis Opti A	2.0–4.8 fl oz	4 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after 1 spray.
	U15+M	Orondis Opti (pre-mix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	40 + 45	Zampro	14 fl oz	12 H/0 D	Spray preventively.
	U15+40	Orondis Ultra (pre-mix)	5.5–8.0 fl oz	4H/0 D	See label.
	11	Flint	4 oz/A	12 H/14 D	Rotate with non-strobilurins.
	11	Reason	5.5 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	21	Ranman	2.1–2.75 fl oz	12 H/3 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	27	Curzate	3.2 fl oz	12 H/2 D	See label.
	M + 27	Ariston	1.9–3 pt	12 H/5 D	
	28	Previcur Flex	1.2 pt	12 H/3 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .	

## VEGETABLE DISEASE CONTROL

### CANTALOUPE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Downy Mildew (continued)	40	Revus	8 fl oz	4 H/0 D	Use with protectant fungicides & surfactants.
	M	Manzate 75DF	2–3 lb	24 H/5 D	Can be used as a tank-mix partner with labeled fungicides.
	M	Penncozeb 80WP	2–3 lb	24 H/5 D	
	M	Penncozeb 75DF	2–3 lb	24 H/5 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	
	M	Dithane M-45	2–3 lb	24 H/5 D	Greenhouse approved.
	M	Dithane DF	2–3 lb	24 H/5 D	Must be tank-mixed with another fungicide.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	4 + M	Ridomil Gold MZ	2.5 lb	48 H/5 D	
	40	Forum	6 fl oz	12 H/5 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	22 + M	Gavel	2 lb	48 H/0 D	
	4 + M	Flouronil	2 lb	48 H/0 D	
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75 pt	12 H/0 D	
	M	Equus 720	1.5–2 pt	12 H/0 D	
33	Aliette	4 lb	12 H/5 D		
Pythium spp. Damping-off Cottony leak Phytophthora	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label. Activity on Pythium only.
	4	Ridomil Gold Sc	1–2 pt		
	4	Ultra Flourish	2–4 pt		
	4	MetaStar	4–8 pt		
	21	Previcur Flex	1:1000 stock sol	12 H/3 D	Apply pre-plant to greenhouse media.
	43	Presidio	3–4 fl oz	12 H/2 D	See label.
	U15	Orondis Gold 200	2.4–19.2 fl oz	4 H/0 D	Apply at planting, in-furrow, by drip, or in transplant water.
	U15 + 40	Orondis Ultra (pre-mix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. Apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide beginning at first appearance of symptoms.
	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	40	Revus	8 fl oz	4 H/0 D	Tank-mix with copper + use surfactant.
	21	Ranman	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
11 + 27	Tanos	8–10 fl oz	12 H/0 D	Foliar and fruit phase suppression only.	



CANTALOUPE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Gummy Stem Blight	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	7+12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to 1 soil application and 2 foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10-day spray interval if conditions remain favorable for disease development.
	1	Topsin M 70W	4–8 fl oz	24 H/0 D	
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Use western-grown seed. Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest. Rotate to another chemistry after 1 application.
	7	Fontelis	12–16 fl oz	12 H/1 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	1	T-Methyl 4.5F	10 fl oz	24 H/0 D	Make no more than two sequential applications of Fontelis before switching to a different mode of action.
	9 + 12	Switch	11–14 fl oz	12 H/1 D	Make no more than two sequential applications of Fontelis before switching to a different mode of action.
	M	Penncozeb 75DF	2–3 lb	24 H/5 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved.
	M	Dithane M-45	2–3 lb	24 H/5 D	Greenhouse approved.
	M	Dithane DF	2–3 lb	24 H/5 D	Greenhouse approved.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	M	Echo 720	2–3 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75 pt	12 H/0 D	
	M	Equus 720	2–3 pt	12 H/0 D	Make no more than two sequential applications of Fontelis before switching to a different mode of action.
	M	ManKocide	2–3 lb	48 H/5 D	
7 + 11	Topguard EQ	See label.			
7	Rhyme	See label.			

## VEGETABLE DISEASE CONTROL

### CANTALOUPE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Powdery Mildew	U13	Gatten	6–8 lb	12 H/0 D	See label.
	U8	Vivando	15.4 fl oz	12 H/0 D	See label.
	U6	Torino	3.4 fl oz	4 H/0 D	Make no more than 2 applications per crop per year.
	7+12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	11	Flint	1.5–2 fl oz/A	12 H/0 D	Spray preventively when conditions are favorable for disease and repeat every 7–10 days.
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	Rotate to other chemistry after 1 application.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to one soil application and two foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10-day spray interval if conditions remain favorable for disease development.
	13	Quintec	4–6 fl oz	12 H/3 D	See label.
	3	Nova or Rally	2.5–5 fl oz	24 H/0 D	Apply at first sign of disease and continue every 7–10 days. Rotate with other fungicides.
	3	Procure	4–8 fl oz	12 H/0 D	Tank-mix with protectants.
	1	T-Methyl 70 WP	4–8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	1	T-Methyl 4.5F	10 fl oz	24 H/0 D	
	9 + 12	Switch	11–14 fl oz	12 H/1 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75 pt	12 H/0 D	
M	Equus 720	2–3 pt	12 H/0 D	Apply every 10-14 days.	
Alternaria Blight	7	Endura	4.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	7	Fontelis	16–30 fl oz	12 H/0 D	Make no more than two sequential applications of Fontelis before switching to a different mode of action.
	7 + 11	Pristine	8–10.5 fl oz	12 H/0 D	
	11	Quadris (Amistar)	9.2–20.3 fl oz (3–5 oz)	4 H/0 D	Apply no more than two sequential applications of Quadris or Cabrio before rotating to a fungicide with a different mode of action.
	3 + 11	Quilt Xcel	14 fl oz	12 H/14 D	

## CARROTS

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Alternaria Blight (continued)	29	Omega 500	1 pt	12 H/45 D	Use 30–40 gallons of water per acre for soilborne diseases.
	11 + M	Quadris Opti		12 H/0 D	
	3 + 11	Quadris Top	12–14 fl oz	12 H/7 D	Use 14 fl oz rate for southern blight.
	11	Cabrio	8–12 fl oz	12 H/0 D	
	9 + 12	Switch	11–14 fl oz	12 H/7 D	
	2	Rovral 4F	1–2 pt	24 H/0 D	Apply every 7–14 days as needed.
	M	Bravo 500	2.25–2.75 pt	12 H/7 D	Apply when disease threatens and every 7–10 days until disease is no longer present.
	M	Bravo Weather Stik	1.5–2 pt	12 H/7 D	
	M	Echo 720	1.5–2 pt	12 H/7 D	
	M	Echo 720	0.75–2 pt	12 H/14 D	
M	Bravo 500	1.125–2.75 lb	12 H/14 D		
Cercospora Leaf Blight	7 + 11	Pristine	8–10.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	11	Quadris	9.2–20.3 fl oz	4 H/0 D	Make no more than 2 sequential applications of Quadris or Cabrio before rotating to a fungicide with a different mode of action.
	11	Cabrio	8–12 fl oz	12 H/0 D	
	7	Fontelis	16–30 fl oz	12 H/0 D	Make no more than 2 sequential applications of Fontelis before switching to a different mode of action.
	3	Tilt	4 fl oz	12 H/14 D	
	M	<i>chlorothalonil</i> same as for Alternaria blight.	1.3 pt 1.5 lb	12 H/7 D	Apply every 7–10 days as needed. See label.
Bacterial leaf blight					Plant disease-free seed.
Foliar oomycetes	4 + M	Ridomil Gold/Copper	2 lb	48 H/7 D	See label.
	4 + M	Ridomil Gold Bravo	1.5–2 lb	48 H/7 D	
	4 + M	Flouronil	1.5–2 lb	48 H/7 D	
Pythium and <i>Phytophthora</i> spp.	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SC	1–2 pt		
	4	MetaStar	4–8 pt		
	4	Ultraflourish	2–4 pt		
	7	Ranman	8.2 fl oz	12 H/14 D	Alternate with <i>mefenoxam</i> -containing products. Do not use a spreader/sticker.
Rhizoctonia	11	Quadris	9.2–20.3 fl oz	4 H/0 D	See label.
	3 + 11	Quadris Top	14 fl oz	12 H/7 D	Use 14 fl oz/A for southern blight.

## VEGETABLE DISEASE CONTROL

### CORN (Sweet)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Leaf Blights and Rust	11	Quadris	6.2–9.2 fl oz (Rust) 9.2–15.4 fl oz (Leaf Blight)	4 H/7 D	Apply no more than 3 sequential applications of Quadris before rotating to a fungicide with a different mode of action.
	3 + 11	Quilt Xcel	10.5–14 fl oz	12 H/14 D	
	11	Headline	6–9 fl oz	12 H/7 D	Spray at 7–14 day intervals.
	3 + 11	Headline AMP	10–14.5 fl oz	12 H/7 D	
	3	Tebuconazole 3.6 F	4–6 fl oz	12 H/7 D	
	7 + 11	Priaxor	4–8 fl oz	12 H/7 D	
	3 + 11	Stratego	10 fl oz	12 H/14 D	
	3 + 11	Stratego YLD	4–5 fl oz	12 H/0 D	
	3	Tilt	2–4 fl oz	12 H/14 D	
	M	Manzate 75DF	1.5 lb	24 H/7 D	
	M	Penncozeb 80WP	1–1.5 lb	24 H/7 D	Apply when disease threatens and every 3–7 days. Plant early enough to miss build up of disease late in season. Do not apply to seed corn to be processed. (Rust)
	M	Penncozeb 75DF	1–1.5 lb	24 H/7 D	
	M	Dithane F-45	1.2 qt	24 H/7 D	
	M	Dithane M-45	1.5 lb	24 H/7 D	
M	Dithane DF	1.5 lb	24 H/7 D		
M	Dithane DF Rain Shield	1.5 lb	24 H/7 D		
Leaf Blights and Rust	M	Bravo Weather Stik	0.75–2 pt	12 H/14 D	
	M	Echo 720	0.75–2 pt	12 H/14 D	
	M	Bravo 500	1.125–2.75 lb	12 H/14 D	
	M	Equus 720	0.75–2 pt	12 H/14 D	
	M	Equus 720	0.75–2 pt	12 H/14 D	

### CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Angular Leafspot	P	Actigard	0.5–1 fl oz	12 H/0 D	Apply at least every 7 days.
	M	ManKocide	2–2.5 lb	48 H/5 D	
	M	Nordox 75WG	1–1.25 lb	12 H/0 D	
	M	Basic Copper Sulfate (H)	2 lb	48 H/0 D	
	M	Kocide DF	1.5–2 lb	48 H/0 D	
	M	Kocide LF	2–2.6 pt	48 H/0 D	

## CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Angular Leafspot (continued)	M	Kocide 4.5 LF	1.3 pt	48 H/0 D	Apply at least every 7 days.
	M	Kocide 3000	0.5–1.25 lb	48 H/0 D	
	M	Champ DP	1.3 lb	48 H/0 D	
	M	Champ 2F	1.3 pt	48 H/0 D	
	M	Champ F	2–2.3 pt	48 H/0 D	
	M	Nu-Cop 50DF	1.5–2 lb	48 H/0 D	
	M	Nu-Cop 3L	1–4 pt	48 H/0 D	
	M	Cuprofix Disperss	2.5 lb	48 H/0 D	
<i>Pythium</i> spp. Damping-off Cottony leak Phytophthora	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SC	1–2 pt		
	4	Ultra Flourish	2–4 pt		
	4	MetaStar	4–8 pt		
	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with copper.
	U15	Orondis Gold 200	2.4–19.2 fl oz	4 H/0 D	Apply at planting, in furrow, by drip, or in transplant water.
	U15 + 40	Orondis Ultra (pre-mix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease-resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. At first appearance of symptoms, apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide.
	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	40	Revus	8 fl oz	4 H/0 D	Tank-mix with copper + use surfactant.
	28	Previcur Flex	1:1000 stock sol	12 H/3 D	Apply pre-plant to greenhouse media.
	21	Ranman	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	11 + 27	Tanos	8–10 fl oz	12 H/0 D	Foliar and fruit phase suppression only.
40 + 45	Zampro	14 fl oz	12 H/0 D	Spray prior to symptom expression. Use of an organosilicone surfactant may help performance.	
Anthracnose	7 + 11	Pristine	18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7-14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7-14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris or Cabrio. Use western-grown seed. Apply fungicides when first three leaves fully expand and alternate Topsin M with Bravo. Continue every 7-14 days until harvest. Field resistance to this fungicide has been observed.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7-14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.

## VEGETABLE DISEASE CONTROL

### CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose (continued)	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	7+3	Aprovia Top	10.5–13.5 fl oz		No more than 2 sequential applications.
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	Rotate to other chemistry after 1 application.
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	
	11	Cabrio	12–16 fl oz	12 H/0 D	
	1	Topsin M 70W	4–8 fl oz	24 H/0 D	
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	1	T-Methyl 4.5F	10 fl oz	24 H/0 D	
	11 + 27	Tanos	8 fl oz	12 H/3 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved. See label.
	M	Manzate 75DF	2–3 lb	24 H/5 D	
	M	Dithane M-45	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane DF	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	M	Penncozeb 75DF	1.5–3 lb	24 H/5 D	
	M	Penncozeb 80WP	1.5–3 lb	24 H/5 D	
	4 + M	Ridomil Gold Bravo	2–3 lb	48 H/0 D	
	4 + M	Flouronil	2–3 lb	48 H/0 D	
	M	Equus 720	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
	M	Nordox 75WG	1–1.25 lb	12 H/0 D	
	M	Champ DP	1.3 lb	48 H/0 D	
	M	Champ 2F	1.3 pt	48 H/0 D	
	M	Nu-Cop 3L	1–4 pt	48 H/0 D	
Alternaria Leafspot	7 + 11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris or Cabrio.
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.

CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Alternaria Leafspot <i>(continued)</i>	7	Fontelis	16–30 fl oz	12 H/0 D	
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	11	Cabrio	12–16 fl oz	12 H/0 D	
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	Rotate to other chemistry after 1 application.
	9 + 12	Switch	11–14 fl oz	12 H/1 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	
	M	Dithane M-45	2–3 lb	24 H/5 D	
	M	Dithane DF	2–3 lb	24 H/5 D	
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	M	Penncozeb 75DF	1.5–3 lb	24 H/5 D	
	M	Penncozeb 80WP	1.5–3 lb	24 H/5 D	
	M	Equus 720	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M + 11	Catamaran	4 pt	12 H/0 D	
	7 + 11	Topguard EQ	See label.		
7	Rhyme	See label.			
Corynespora Leafspot	11	Cabrio	12–16 fl oz	12 H/0 D	Alternate to another fungicide class after 1 spray of Quadris or Cabrio.
	1	Topsin M 70W	4–8 fl oz	24 H/0 D	Apply when disease appears or when runners form. Repeat at 7–14 day intervals.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	1	T-Methyl 4.5F	10 fl oz	24 H/0 D	
	M	Equus 720	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
Bacterial Wilt					No control. Eliminate cucumber beetles.

## VEGETABLE DISEASE CONTROL

### CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Downy Mildew	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	M + 27	Ariston	1.9–3 pt	12 H/5 D	
	40 + 45	Zampro	14 fl oz	12 H/0 D	Rotate with non-strobilurins.
	28	Previcur	1.2 pt	12 H/2 D	See label.
	11	Flint	4	12 H/0 D	Rotate similar to Quadris and Cabrio.
	U15 + M	Orondis Opti (pre-mix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	U15	Orondis Opti A	2.0–4.8 fl oz	4 H/0 D	Apply prior to disease onset. Tank-mixing application with Bravo may improve disease control.
	U15 + 40	Orondis Ultra	5.5–8.0 fl oz	4 H/0 D	See label.
	21	Ranman	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	11	Reason	5.5 fl oz	12 H/14 D	Rotate with non-strobilurins.
	11 + 27	Tanos	8 fl oz	12 H/3 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	27	Curzate	3.2 fl oz	12 H/3 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with protectant + surfactant.
	40	Revus	8 fl oz	4 H/0 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	M	Manzate 75DF	2–3 lb	24 H/5 D	
	M	Penncozeb 80WP	1.5–3 lb	24 H/5 D	
	M	Penncozeb 75DF	1.5–3 lb	24 H/5 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved. See label.
	M	Dithane M-45	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane DF	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	4 + M	Flouronil	2 lb	48 H/0 D	See label.
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	See label.
	M	Echo 720		12 H/0 D	
	M	Bravo 500 (H)		12 H/0 D	
	M	Equus 720		12 H/0 D	
	33	Aliette		12 H/0 D	
	P	Actigard		12 H/0 D	Apply at least every 7 days.



CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Fruit & Belly Rot (Rhizoctonia)	11	Quadris	11–15.5 fl oz	4 H/1 D	Make first application of Quadris at the 1–3 leaf stage with second application just prior to vines running or 10–14 days later, whichever comes first.
	1	Tebuconazole (various)	See Label	See Label	See label.
	1	T-Methyl 70WP	8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
Gummy Stem Blight	7+3	Aprovia Top	10.5–13.5 fl oz	12 H/0 D	Begin applications prior to disease onset when conditions are conducive for disease.
	7	Fontelis	16–30 fl oz	12 H/0 D	
	7 + 12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application to a total of 17 fl oz/year. Apply up to 1 soil application and 2 foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10-day spray interval if conditions remain favorable for disease development.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	Use every 10–14 days in rotation.
	1	Topsin M 70W	4–8 fl oz	24 H/0 D	
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	1	T-Methyl 4.5F	10 fl oz	24 H/0 D	
	7 + 11	Topguard EQ	See label.		
	7	Rhyme	See label.		
	9 + 12	Switch	11–14 fl oz	12 H/1 D	Use western-grown seed. Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	M	Manzate 75DF	2–3 lb	24 H/5 D	
	M	Penncozeb 80WP	1.5–3 lb	24 H/5 D	
	M	Penncozeb 75DF	1.5–3 lb	24 H/5 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved.
	M	Dithane M-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved.
	M	Dithane DF	2–3 lb	24 H/5 D	Greenhouse approved.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	4 + M	Ridomil Gold Bravo	2–3 lb	48 H/0 D	
	4 + M	Flouronil	2–3 lb	48 H/0 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.

## VEGETABLE DISEASE CONTROL

### CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Gummy Stem Blight (continued)	M	Bravo Weather Stik	2–3 pt	12 H/ 0 D	
	M	Echo 720	2–3 pt	12 H/ 0 D	
	M	Bravo 500	2.25–2.75 pt	12 H/ 0 D	
	M	Equus 720	2–3 pt	12 H/ 0 D	
Powdery Mildew	7 + 11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	U13	Gatten	6–8 fl oz	12 H/0 D	See label.
	7+12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	U8	Vivando	15.4 fl oz	12 H/0 D	See label.
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon to any crops in the cucurbit vegetable group as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to 1 soil application and 2 foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10-day spray interval if conditions remain favorable for disease development.
	7	Fontelis	16–30 fl oz	12 H/0 D	Make no more than two sequential applications of Fontelis before switching to a different mode of action.
	11	Cabrio	12–16 fl oz	12 H/0 D	
	11	Flint	1.5–2 oz/A	12 H/0 D	Spray preventively when conditions are favorable for disease and repeat every 7–10 days.
	U6	Torino	3.4 fl oz	4 H/0 D	
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	3	Nova or Rally	2.5–5 fl oz	24 H/0 D	Apply at first sign of disease and continue every 7–10 days. Rotate with other fungicides.
	3	Procure	4–8 fl oz	12 H/0 D	
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	Rotate to other chemistry after 1 application.
	3	Tebuconazole 3.6 F	4–6 fl oz	12 H/7 D	Do not rotate with Procure or Rally.
	1	Topsin M 70WP	4–8 fl oz	24 H/0 D	Apply when disease threatens and alternate Topsin with <i>chlorothalonil</i> products or other mode of action. Continue every 7–14 days until disease is no longer a problem. Apply every 10–14 days.
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	1	T-Methyl 4.5F	10 fl oz	24 H/0 D	
	9 + 12	Switch	11–14 fl oz	12 H/1 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	
M	Bravo 500	2.25–2.75 pt	12 H/0 D		
M	Equus 720	2–3 pt	12 H/0 D	Apply every 7–10 days as needed.	

CUCUMBER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Scab	M	Bravo 500	2.75–4.25 pt	12 H/0 D	Apply when disease threatens and every 7–10 days.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane M-45	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane DF	2–3 lb	24 H/5 D	Greenhouse approved. See label.
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved. See label.
	M	Manzate 75DF	2–3 lb	24 H/5 D	See label.
	M	Penncozeb 75DF	1.5–3 lb	24 H/5 D	
	M	Penncozeb 80WP	1.5–3 lb	24 H/5 D	
	4 + M	Ridomil Gold Bravo	2–3 lb	48 H/5 D	
	4 + M	Flouronil	2–3 lb	48 H/5 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	
	M	Equus 720	2–3 pt	12 H/0 D	

EGGPLANT

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
<i>Pythium</i> and <i>Phytophthora</i> spp.	4	Ridomil Gold EC	1–2 pt		Pythium activity only. Apply in sufficient water (20–50 gal) to provide adequate coverage. See label.
	4	Ridomil Gold SL	1–2 pt		
	4	Ultraflourish	2–4 pt		
	U15	Orondis Gold 200	2.4–19.2 fl oz	4 H/0 D	
	U15+M	Orondis Opti	See Label	See Label	
	U15+40	Orondis Ultra	See Label	See Label	
	22	Elumin	8 fl oz	12 H/2 D	Only Phytophthora activity.
	43	Presidio	4 fl oz	12 H/ 2D	Only Phytophthora activity.
	40	Revus	8 fl oz	12 H/0 D	Only Phytophthora activity.
45+40	Zampro	14 fl oz	12 H/0 D	Only Phytophthora activity.	
Phomopsis, Alternaria, Anthracnose, Fruit Rots & Leaf Blights	7	Endura	2.5–3.5 oz/A/100 gal	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after two sprays.
	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Quadris and Cabrio are primarily for Anthracnose and Alternaria. No more than 1 application of either of these fungicides should be made before rotating to different fungicide chemistry.
	M + 27	Ariston	2–2.44 pt	12 H/3 D	

## VEGETABLE DISEASE CONTROL

### EGGPLANT

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Phomopsis, Alternaria, Anthracnose, Fruit Rots & Leaf Blights <i>(continued)</i>	7	Fontelis	10–24 fl oz	12 H/0 D	Make no more than 2 sequential applications of Fontelis before switching to a different mode of action.
	7 + 11	Priaxor	4–8 fl oz	12 H/7 D	Spray prior to disease onset.
	11 + 3	Quadris Top	10–14 fl oz	12 H/14 D	Rotate to other chemistry after 1 application.
	M	Blue Shield	2 lb	48 H/0 D	
	40	Forum	6 fl oz	12 H/0 D	Forum is labeled for suppression of Phytophthora fruit and crown rot.
	M	Cuprofix Disperss	2.5 lb	48 H/0 D	
	11	Cabrio	8–12 fl oz	12 H/0 D	
	11	Evito	3.8–5.7 fl oz	12 H/3 D	
	11	Flint	1.5–2 fl oz	12 H/0 D	
	M	Bravo Weather Stik	1.5 pt	12 H/3 D	
	M	Nordox 75WG	1.25–2.5 lb	12 H/0 D	
	M	Kocide 101	2 lb	24 H/0 D	
	M	Kocide DF	2 lb	48 H/0 D	
	M	Kocide LF	2.6 pt	48 H/0 D	
	M	Kocide 4.5 LF	1.3 pt	48 H/0 D	
	M	Kocide 3000	0.75 lb	48 H/0 D	
	7 + 11	Topguard EQ	See label.		
	7	Rhyme	See label.		
	M	Champ DP	1.3 lb	48 H/0 D	
	M	Champ 2F	1.3 pt	48 H/0 D	
	M	Champ F	2.6 pt	48 H/0 D	
	M	Nu-Cop 50DF	2 lb	48 H/0 D	
	M	Nu-Cop 3L	1.3 pt	48 H/0 D	
	M	Blue Shield	2 lb	48 H/0 D	
	40	Forum	6 fl oz	12 H/0 D	Forum is labeled for suppression of Phytophthora fruit and crown rot.
	M	Cuprofix Disperss	2.5 lb	48 H/0 D	

IRISH POTATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Black Leg	1 tsp	Streptomycin sulfate 21.2 WP	0.5 lb/100 gal		Soak cut-seed pieces for 30 minutes and plant. Eradicate seedcorn maggots.
Black Scurf	14	Terraclor 10G (H)	180–250 lb broadcast or 100 lb/ 12,400 ft row		Apply according to label directions.
	14	Terraclor 75 WP (H)	24–33 lb broadcast or 13 0.25–0.5 lb/ 12,400 ft or row		
Early Blight and Late Blight	7	Endura	2.5–4.5 fl oz	12 H/30 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after 2 sprays.
	U15	Orondis Opti A	1.6–4.8 fl oz	4 H/0 D	Only for late blight.
	7 + 11	Priaxor	4–8 fl oz	12 H/7 D	Spray prior to disease onset. Use higher rates and a shorter spray interval (7 instead of 14 days) when disease is found in the area.
	9	Scala	7 fl oz	12 H/7 D	Alternate with protectant fungicides.
	29	Omega 500	5.5–8 fl oz	12 H/14 D	Begin when plants are 6–8" high or when disease pressure increases.
	11	Quadris	6.2–15.4 fl oz	4 H/14 D	Use only in combination with protectant fungicide.
	11 + M	Quadris Opti	1.6 pt	12 H/14 D	Surfactant recommended.
	3 + 40	Revus Top	5.5–7 fl oz	12 H/14 D	Rotate with non-strobilurins.
	11	Reason	5.5–8.2 fl oz	12 H/14 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> . Only for late blight.
	11 + 27	Tanos	6–8 fl oz	12 H/14 D	See label.
	27	Curzate 60DF	3.3 fl oz	12 H/14 D	
	11	Evito	3.8 fl oz	12 H/7 D	
	11 + 3	Quadris Top	8–14 fl oz	12 H/14 D	Rotate to other chemistry after 1 application.
	M	Bravo 500	1.5–2 pt	12 H/0 D	
	M	Polyram 80DF	1.5–2 lb	24 H/0 D	
	M	Dithane DF Rain Shield	0.5–2 lb	24 H/14 D	Spray every week beginning when plants are 4-6" high, and continue weekly until harvest.
	M + 27	Ariston (late blight only)	2 pt	12 H/14 D	
M	Dithane M-45	0.5–2 lb	24 H/14 D		
M	Dithane DF	0.5–2 lb	24 H/14 D		
M	Dithane F-45	0.4–1.6 qt	24 H/14 D		

## VEGETABLE DISEASE CONTROL

### IRISH POTATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Early Blight and Late Blight (continued)	M	Manzate 75DF	1–2 lb	24 H/14 D	
	M	Penncozeb 75DF	0.5–2 lb	24 H/14 D	
	M	Penncozeb 80WP	0.5–2 lb	24 H/14 D	
	M	ManKocide	1.5–2 lb	48 H/14 D	Mix with organosilicone surfactant. Forum for late blight only.
	21	Ranman (late blight only)	2.1–2.75 fl oz	12 H/14 D	Tank-mix with <i>chlorothalonil</i> or <i>mancozeb</i> .
	40	Forum (late blight only)	6 fl oz	12 H/7 D	
	22 + M	Gavel 75DF	1.5–2 lb	48 H/14 D	
	28	Previcur Flex (late blight only)	1.2 pt	12 H/14 D	
	4 + M	Ridomil Gold Bravo	2 lb	48 H/14 D	
	4 + M	Ridomil Gold MZ	2.5 lb	48 H/14 D	
	4 + M	Ridomil Gold/Copper	2 lb	48 H/14 D	Add 0.8 lb a.i./A of EBDC or <i>chlorothalonil</i> to Ridomil Gold/Copper.
	4 + M	Flouronil	2 lb	48 H/14 D	Begins sprays prior to disease development.
	40 + 45	Zampro	14 fl oz	12 H/4 D	
	M	Bravo Weather Stik	1–1.5 pt	12 H/0 D	
	M	Echo 720	1–1.5 pt	12 H/0 D	
	M	Equus 720	1–1.5 pt	12 H/0 D	
	M	Bravo S	3–4.5 pt	12 H/0 D	See label.
	M	Super Tin	2.5–3.75 lb	48 H/21 D	
	2	Rovral 4F	1–2 pt	24 H/14 D	Rovral for early blight only.
	M + 33	Catamaran	4–5 pt	12 H/7 D	See labels.
		Most CuOH ( <i>copper hydroxide</i> ) & CuSO <sub>4</sub> ( <i>copper sulfate</i> ) compounds	See labels	See labels	
Seed Piece Rot	M	Dithane M-45	1.25 lb/50 gal		
	M	Dithane DF	1.25 lb/50 gal		
	M	Dithane F-45	1 qt/50 gal		
	M	Penncozeb 75DF	1.25 lb/50 gal		
	M	Penncozeb 80WP	1.25 lb/50 gal		
	M	Manzate 75DF	1.25 lb/50 gal		
	M	Manzate 80WP	1.25 lb/50 gal		
	1	Mertect 340F	0.42 oz/2000 lb		
		Tops 2.5 Dust	1 lb/100 lb seed		

LETTUCE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium Damping-off	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold GR	20–40 lb		
	4	Ridomil Gold SL	1–2 pt		
	4	Metastar	4–8 pt		
Sclerotinia Bottom Rot/ Drop	7	Endura	8–11 fl oz	12 H/14 D	Apply prior to disease onset.
	14	Botran 75WP	2.7 lb	12 H/14 D	Spray at first appearance and continue at 7–10 day intervals.
	2	Rovral 4F	1.5–2 pt	24 H/14 D	Apply at 3-leaf stage. See label.
	2	Iprodione 4L	1.5–2 pt	24 H/14 D	
Downy Mildew	11	Quadris	12.3–15.4 fl oz	4 H/0 D	Apply no more than 3 sequential applications of Quadris before rotating to a fungicide with a different mode of action. Apply under favorable disease conditions. Apply at first appearance of disease and every 7–10 days.
	U15	Orondis Gold 200	4.8–19.2 fl oz	4 H/0 D	See label.
	40 + 45	Zampro	14 fl oz	12 H/0 D	Begin sprays prior to disease development.
	11	Reason	5.5–8.2 fl oz	12 H/14 D	Rotate with non-strobilurins.
	11 + 27	Tanos	8 fl oz	12 H/3 D	Tank-mix Tanos with other fungicides.
	40	Forum	6 fl oz	12 H/0 D	Tank-mix Forum with other fungicides.
	28	Previcur Flex	2 pt	12 H/2 D	See label.
	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with protectants.
	40	Revus	8 fl oz	4 H/1 D	Surfactant recommended.
33	Aliette	2–5 lb	12 H/3 D		

LIMA BEAN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose	11	Quadris	6.2–15.4 fl oz	4 H/1 D	Apply prior to disease onset on a 7–14 day interval.
	11	Headline	6–9 fl oz	12 H/7 D	Rotate with non-strobilurins.
	1	Topsin M 70W	1–2 lb	24 H/14 D	Apply at 10–30% bloom or when conditions are favorable for disease and repeat at 7-day intervals.
	7	Fontelis	14–30 fl oz	12 H/0 D	Use prior to disease development.
	1	T-Methyl 70WP	1.2 lb	24 H/14 D	
	1	Topsin 4.5L	20–30 fl oz	24 H/14 D	
	1	T-Methyl 4.5L	20–30 fl oz	24 H/14 D	

## VEGETABLE DISEASE CONTROL

### LIMA BEAN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Powdery Mildew	11	Headline	6–9 fl oz	24 H/14 D	Rotate with non-strobilurins.
Botrytis (Gray Mold), Sclerotinia (White Mold)	1	Topsin M 70W (gray mold)	1–2 lb	24 H/14 D	Apply at 10–30% bloom or when conditions are favorable for disease and repeat 7-day intervals. See label.
	1	T-Methyl 70WP	1–2 lb	24 H/14 D	
	1	Topsin 4.5L (gray mold)	30–40 fl oz	24 H/14 D	
	1	T-Methyl 4.5L	30–40 fl oz	24 H/14 D	
	2	Rovral 4F	1.5–2 pt	24 H/14 D	Apply Rovral as foliar spray at early bloom (1–10%) bloom. Repeat on 7-day intervals if conditions are favorable for disease. See label.
	7	Fontelis (white mold)	14–30 fl oz	24 H/14 D	Use prior to disease development.
Rhizoctonia & Pythium, Damping-off, Root Rot	4	Ridomil Gold EC	0.5–1 pt.	24 H/14 D	Incorporate into soil. See Label.
	4	Ridomil Gold SL	0.5–1 pt	24 H/14 D	
	11	Quadris (Amistar)	0.4–0.8 fl oz/ 1000 row feet (0.125–0.25 fl oz/ 1000 row feet)	24 H/14 D  12 H/7 D	Apply in-furrow.
	4 + 11	Uniform	0.34 fl oz/1000 row ft	24 H/14 D	Use as an in-furrow spray.

### OKRA

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Foliar diseases	11	Quadris	6.2–15.4 fl oz	4 H/0 D	See comments on eggplant.

### ONION (Dry)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium Damping-Off	4	Ridomil Gold SL	0.5–1 pt		Incorporate into soil. See label.
Purple Blotch <sup>1</sup> , Bacterial Leaf Blight <sup>2</sup> , Botrytis Leaf Blight <sup>3</sup> , Downy Mildew <sup>4</sup>	7 + 11	Pristine <sup>1,3,4</sup>	10.5–18.5 fl oz <sup>1</sup> 14.5–18.5 fl oz <sup>2</sup> 18.5 fl oz <sup>3</sup>	12 H/7 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after two sprays. Pristine only suppresses downy mildew.
	7	Fontelis <sup>1,3</sup>	16–24 fl oz	12 H/3 D	
	U15	Orondis Opti A (downy mildew)	2.0–4.8 fl oz	4 H/0 D	See label.
	9	Scala <sup>1,3</sup>	9–12 fl oz	12 H/7 D	Use low rate of Scala with tank-mix only.



ONION (Dry)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Purple Blotch <sup>1</sup> , Bacterial Leaf Blight <sup>2</sup> , Botrytis Leaf Blight <sup>3</sup> , Downy Mildew <sup>4</sup> <i>(continued)</i>	11	Quadris <sup>1,4</sup>	6.2–15.4 fl oz	4 H/0 D	Apply no more than two sequential applications of Quadris or Cabrio before rotating to a fungicide with a different mode of action.
	40 + 45	Zampro <sup>4</sup> (downy mildew)	14 fl oz	12 H/0 D	Spray prior to disease development.
	3 + 9	Inspire Super <sup>1,3</sup>	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	11 + M	Quadris Opti	2.4–3.6 pt	12 H/14 D	
	11	Cabrio <sup>1,4</sup>	8–12 fl oz	12 H/0 D	
	29	Omega 500 <sup>1,4</sup>	1 pt	12 H/7 D	
	3	Tebuconazole 3.6 F <sup>1</sup>	4–6 fl oz	12 H/7 D	Tank-mix to broaden activity spectrum.
	7 + 11	Merivon	4–11 fl oz	12 H/7 D	<b>Purple Blotch</b> —Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon more than 33 fl oz/A/season.
	7 + 11	Merivon	8–11 fl oz	12 H/7 D	<b>Botrytis Leaf Blight</b> —Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon more than 33 fl oz/A/season.
	7 + 11	Merivon	8–11 fl oz	12 H/7 D	<b>Downy Mildew—Suppression only.</b> Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon more than 33 fl oz/A/season.
	4 + M	Ridomil Gold MZ <sup>4</sup>	2.5 lb	48 H/7 D	Spray on a 7–14 day schedule depending on weather and disease pressure.
	3 + 33	Viathon	2–3 pt	12 H/7 D	
	3 + 11	Quilt Xcel <sup>1,3</sup>	14–26 fl oz	12 H/14 D	
	11 + 3	Quadris Top <sup>1,3</sup>	14 fl oz	12 H/14 D	Rotate to other chemistry after 1 application.
	4 + M	Ridomil Gold/Copper <sup>4</sup>	2 lb	48 H/7 D	
	4 + M	Ridomil Gold Bravo <sup>1,3,4</sup>	2 lb	48 H/10 D	
	M	Bravo Weather Stik <sup>1,3,4</sup>	1–2 pt	12 H/7 D	
	M	Echo 720 <sup>1,3,4</sup>	1–2 pt	12 H/7 D	
	M	Equus 720 <sup>1,3,4</sup>	1–2 pt	12 H/7 D	
	9 + 12	Switch 62.5 WG <sup>1,3</sup>	11–14 fl oz	12 H/7 D	12 month rotational restriction to crops other than onions or strawberries with Switch.
	M	Dithane DF <sup>1,3,4</sup>	3 lb	24 H/7 D	
	M	Dithane M-45 <sup>1,3,4</sup>	3 lb	24 H/7 D	
	M	Dithane F-45 <sup>1,3,4</sup>	2.4 qt	24 H/7 D	
	M	Manzate 75DF <sup>1,3,4</sup>	3 lb	24 H/7 D	
	M	Penncozeb 75DF <sup>1,3,4</sup>	2–3 lb	24 H/7 D	
M	Penncozeb 80WP <sup>1,3,4</sup>	2–3 lb	24 H/7 D		
M	ManKocide <sup>1,2,3,4</sup>	2.5 lb	48 H/7 D		
40	Forum (downy mildew)	6 fl oz	12 H/7 D	Tank-mix Forum with other fungicides.	

## VEGETABLE DISEASE CONTROL

### ONION (Dry)

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Purple Blotch <sup>1</sup> , Bacterial Leaf Blight <sup>2</sup> , Botrytis Leaf Blight <sup>3</sup> , Downy Mildew <sup>4</sup> (continued)	43	Presidio (downy mildew)	3–4 fl oz	12 H/2 D	Tank-mix with protectants.
	40	Revus (downy mildew)	8 fl oz	12 H/2 D	Tank-mix with protectants + surfactant.
	29	Omega 500 <sup>1-4</sup>	1 pt	24 H/7 D	See label.
	3 + 9	Inspire Super	16–20 fl oz	24 H/7 D	See label.
	9	Scala	9–18 fl oz	12 H/7 D	See label.
	M	Nordox 75WG	1.25–2.5 lb	12 H/2 D	
	M	Kocide 101 <sup>1,4</sup>	2 lb	12 H/2 D	
	M	Kocide DF <sup>1,4</sup>	2 lb	12 H/2 D	Application of copper compounds may be phytotoxic to leaves.
	M	Kocide LF <sup>1,4</sup>	2.6 pt	12 H/2 D	
	M	Kocide 4.5 LF <sup>1,2,4</sup>	1.3 pt	12 H/2 D	
	M	Kocide 3000 <sup>1,2,4</sup>	0.75 lb	12 H/2 D	
	M	Champ DP <sup>1,2,4</sup>	1.3 lb	12 H/2 D	
	M	Champ 2F <sup>1,2,4</sup>	1.3 pt	12 H/2 D	
	M	Champ F <sup>1,4</sup>	2.6 pt	12 H/2 D	
	M	Nu-Cop 50DF <sup>1,4</sup>	2 lb	12 H/2 D	
	M	Nu-Cop 3L <sup>1,4</sup>	1.3–2.6 pt	12 H/2 D	
	M	Cuprofix Dispers <sup>1,4</sup>	2.5–6 lb	12 H/2 D	
	2	Rovral 4F <sup>1,3</sup>	1.5 pt	12 H/2 D	Rotate with non-strobilurins.
	33	Aliette <sup>4</sup>	2–3 lb	12 H/2 D	
	P	Actigard <sup>4</sup>	0.75–1 fl oz	12 H/2 D	Apply prior to disease onset.
11	Reason	5.5 fl oz	12 H/2 D	If disease pressure high, spray every 14 days.	
33	K-Phite	4 pt	4 H/0 D	See label (can be used in conjunction with Bravo to replace catamaran. This fungicide tank-mix will provide protection against Botrytis leaf blight and purple blotch.	
Bacterial Streak and Bulb Rot	Follow recommended cultural practices and disease prevention practices. Copper compounds tank-mixed with EBDC fungicides may reduce disease spread.				
Pantoea	P	Actigard	0.75–1 fl oz	12 H/7 D	Apply prior to disease onset.
	M	Copper (various)	See Label		

**ONION (Green & Green Bunching)—Garlic, Leek, Shallot, Onion Grown For Seed**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Botrytis Leaf Blight, Downy Mildew, Neck Rot, Purple Blotch	11 + M	Quadris Opti	2.4–3.6 pt	12 H/14 D	
	7	Fontelis <sup>1,3</sup>	16–24 fl oz	12 H/3 D	
	3 + 9	Inspire Super	16–20 fl oz	12 H/14 D	No more than 2 sequential applications.
	7 + 11	Merivon	4–11 fl oz	12 H/7 D	<b>Purple Blotch</b> —Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon more than 33 fl oz/A/season.
	7 + 11	Merivon	8–11 fl oz	12 H/7 D	<b>Botrytis Leaf Blight</b> —Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon more than 33 fl oz/A/season.
	7 + 11	Merivon	8–11 fl oz	12 H/7 D	<b>Downy Mildew—Suppression only.</b> Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon more than 33 fl oz/A/season.
	40 + 45	Zampro <sup>4</sup>	14 fl oz	12 H/0 D	Spray prior to disease development.
	4 + M	Ridomil Gold Bravo	2 lb	48 H/14 D	See label.
	4 + M	Ridomil Gold /Copper	2 lb	48 H/21 D	See label.
	M	Bravo Weather Stik	1.5–3 pt	12 H/14 D	See label.
	M	Equus 720	1.5–3 pt	12 H/14 D	See label.
	11 + 3	Quadris Top	14 fl oz	12 H/7 D	Rotate to other chemistry after 1 application.
	11	Reason	5.5 fl oz	12 H/7 D	Rotate with non-strobilurins.
	33	K-Phite	4 pt	4 H/0 D	See label (can be used in conjunction with Bravo to replace catamaran. This fungicide tank-mix will provide protection against Botrytis leaf blight and purple blotch.
3 + 33	Viathon	2–3 pt	12 H/7 D		

**PEAS (English)**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Rhizoctonia & Pythium, Damping-off	4	Ridomil Gold EC	0.5–1 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	0.5–1 pt		
	11	Quadris (Amistar)	0.4–0.8 fl oz/ 1000 row ft (0.125–0.25 oz/ 1000 row ft)		Applied in-furrow.
	4 + 11	Uniform	0.34 fl oz/1000 row ft		Use as an in-furrow spray.

■ **VEGETABLE DISEASE CONTROL**

**PEAS (English)**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Powdery Mildew & other foliar fungal diseases	M	Sulfur (spray or dust) (H)	See label	24 H/0 D	Start application at first sign of disease and repeat every 7–10 days. Do not apply when temperature is above 90°F or when plants are wet.
	M	Cuprofix Disperss	2–4	48 H/0 D	
	11	Quadris (Amistar)	6.2–15.4 fl oz (2–5 oz)	4 H/1 D	Apply at or prior to disease onset.
	11	Headline	6–9 fl oz	12 H/7 D	Rotate with non-strobilurins.
Bacterial leaf spot		Leap	16–64 fl oz	12 H/0 D	See label.

**BLACKEYE PEAS (Southern)**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Rhizoctonia & Pythium, Damping-off	4	Ridomil Gold EC	0.5–1 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	0.5–1 pt		
	4	MetaStar	2–4 pt		
	11	Quadris	0.4–0.8 fl oz/ 1000 row ft		Apply in-furrow.
	4 + 11	Uniform	0.34 fl oz/1000 row ft		Use as an in-furrow spray.
Scab, Anthracnose, Mildew, Rust	11	Quadris	6.2–15.4 fl oz	4 H/1 D	Apply at or prior to disease onset.
	11	Headline	6–9 fl oz	12 H/7 D	Rotate with non-strobilurins.

**BLACKEYE PEAS (Dry)**

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium Damping-off, Rust, Anthracnose, Downy Mildew, Cercospora Leafspot	4	Ridomil Gold EC	0.5–1 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	0.5–1 pt		
	4	MetaStar	2–4 pt		
	11	Quadris	6.2–15.4 fl oz	4 H/1 D	Apply at or prior to disease onset.
	M	Bravo 500	2–3 pt	12 H/42 D	See label.
	M	Bravo Weather Stik	1–2 pt	12 H/42 D	See label.
	M	Echo 720	1–2 pt	12 H/42 D	See label.
	M	Equus 720	1.6–2 pt	12 H/42 D	See label.
	M	Headline	6–9 fl oz	12 H/21 D	Rotate with non-strobilurins.

PEPPER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Cercospora, Alternaria, Anthracnose	7	Endura	2.5–3.5 oz/100 gal/A	12 H/0 D	Endura is primarily for diseases caused by Alternaria and Cercospora on this group of crops.
	11	Aftershock	2–5.7 fl oz	12 H/3 D	
	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Quadris and Cabrio are primarily for Anthracnose and Alternaria. No more than one application of Quadris or Cabrio should be made before rotating to different fungicide chemistry.
	7	Fontelis	10–24 fl oz	12 H/0 D	Spray prior to disease symptoms.
	7 + 11	Priaxor	4–8 fl oz	12 H/7 D	Spray prior to disease symptoms.
	11 + 3	Quadris Top	12–14 fl oz	12 H/14 D	Rotate to other chemistry after 1 application.
	11	Cabrio	8–12 fl oz	12 H/0 D	
	11	Evito	3.8–5.7 fl oz	12 H/3 D	
	11	Flint	1.5–2 fl oz	12 H/0 D	Flint is for powdery mildew.
	11 + 27	Tanos	8–10 fl oz	12 H/3 D	Tank-mix Tanos with copper or maneb.
	M	Manzate	1.6–3.2 lb	24 H/7 D	
	M	Bravo Weather Stik	1.5 pt	12 H/3 D	Spray on a 7–10 day interval. Shorten interval under high disease pressure or when weather is favorable for disease.
	7 + 11	Topguard EQ	See label.		
7	Rhyme	See label.			
Bacterial spot	M	Top Cop Tri-Basic (H)	1–2 qt	24 H/0 D	
	M	Nordox 75WG	1.25–2.5 lb	12 H/0 D	
	M	Kocide 101	2–3 lb	24 H/0 D	
	M	Kocide DF	2–3 lb	48 H/0 D	
	M	Kocide LF	2.6–4 pt	48 H/0 D	
	M	Kocide 4.5 LF	1.3–2 pt	48 H/0 D	
	M	Kocide 3000	0.5–1.25 lb	48 H/0 D	
	M	Champ DP	1.3–2 lb	48 H/0 D	
	M	Champ 2F	1.3–2 pt	48 H/0 D	
	M	Champ F	2.6–4 pt	48 H/0 D	
	M	Nu-Cop 50DF	2–3 lb	48 H/0 D	
	M	Nu-Cop 3L	1.3–4 pt	48 H/0 D	
	M	Cuprofix Ultra 40	1.25–3 lb	48 H/0 D	
	P	Leap	1–2 qt	12 H/0 D	
	P	Actigard	0.3–0.75 fl oz	12 H/14 D	Apply 0.75 oz within one week of transplanting. Use 0.33 oz every 7 days until bloom.
	13	Quintec	4–6 fl oz	12 H/ 3 D	
	25	Streptomycin sulfate	1 lb/100 gal		Only for greenhouse use.

## VEGETABLE DISEASE CONTROL

### PEPPER

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
<i>Pythium</i> and <i>Phytophthora</i> spp.	4	Ridomil Gold EC	1 pt		Apply Ridomil Gold EC at planting and again in 30 days. Make 3–4 applications of Ridomil Gold/Copper every 10–14 days.
	4	Ridomil Gold SL	1 pt		
	4	MetaStar	4 pt		
	43	Presidio	3–4 fl oz	12 H/2 D	Use copper with Presidio and Revus. Phytophthora control only.
	U15	Ridomil Gold 200	2.4–19.2 fl oz	4 H/0 D	See label. Soil application only.
	40	Revus	8 fl oz	4 H/1 D	Use surfactant with Revus. Phytophthora control only.
	4 + M	Ridomil Gold /Copper	2.5 lb	48 H/7 D	Rotate Presidio and Revus with Ridomil Gold Copper.
	40 + 45	Zampro	14 fl oz	12 H/0 D	Apply pre-plant to greenhouse media. Apply at planting. See label.
	28	Previcur Flex	1:1000 stock sol 1.2 pt	12 H/0 D	Only for greenhouse use.
	11 + 27	Tanos	8–10 fl oz	12 H/3 D	Foliar and fruit phase suppression only.
	U15 + 40	Orondis Ultra (premix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease-resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. At first appearance of symptoms, apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide.
	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	U15	Orondis Opti (pre-mix)	See label	4 H/0 D	See label.
	U15 + M	Orondis Opti (pre-mix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
Southern Blight	14	Blocker	4.5–7.5 pt in 100 gal of transplant water	NA	Use 8.0 fl oz of solution per plant.
	7	Fontelis	16–30 fl oz	12 H/0 D	

PUMPKIN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Downy Mildew	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	U15	Orondis Opti A	2–4.8 fl oz	4 H/0 D	See label.
	U15 + 45	Orondis Ultra	5.5–8 fl oz	4 H/0 D	See label.
	U15 + M	Orondis Opti (pre-mix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	40 + 45	Zampro	14 fl oz	12 H/0 D	Spray prior to disease symptoms.
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris, Cabrio, or Flint.
	M + 27	Ariston	1.9–3 pt	12 H/5 D	
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	<b>Suppression only.</b> Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	11	Flint	3.8–5.7 fl oz	12 H/0 D	Apply when disease threatens and every 7 days.
	21	Ranman	2.1–2.75 fl oz	12 H/0 D	Apply when disease threatens and every 7 days.
	11	Reason	5.5 fl oz	12 H/14 D	Tank-mix with organosilicone surfactant.
	40	Forum	6 fl oz	12 H/0 D	Rotate with non-strobilurins.
	22 + M	Gavel	2 lb	48 H/5 D	Forum must be tank-mixed with other fungicides.
	21	Ranman	2.1–2.7 lb	12 H/0 D	
	28	Previcur Flex	1.2 pt	12 H/2 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	27	Curzate	3.2 fl oz	12 H/3 D	
	43	Presidio	3–4 fl oz	12 H/43 D	
	40	Revus	8	4 H/0 D	Tank-mix with protectant fungicides.
	4 + M	Ridomil Gold Bravo	2 lb	48 H/5 D	Tank-mix with protectants & surfactant.
	4 + M	Flouronil	2 lb	48 H/5 D	
	M	Bravo Weather Stik	1.5–2 pt	48 H/5 D	
	M	Echo 720	1.5–2 pt	48 H/5 D	
	M	Bravo 500	2.25–2.75 pt	48 H/5 D	
	M	Equus 720	1.5–2 pt	48 H/5 D	
	33	Aliette	2–5 lb	12 H/33 D	
	P	Actigard	0.5–1 fl oz	12 H/0 D	Apply at least every 7 days.

## VEGETABLE DISEASE CONTROL

### PUMPKIN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose	7 + 11	Pristine	18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	3	Proline	5.7 fl oz	12 H/7 D	
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris or Cabrio.
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	Rotate to another chemistry after 1 application.
	11	Cabrio	12–16 fl oz	12 H/0 D	
	11 + 27	Tanos	8 fl oz	12 H/3 D	Tank-mix Tanos with <i>mancozeb</i> or <i>chlorothalonil</i> .
	7+3	Aprovia Top	10.5–13.5 fl oz	12 H/0 D	See label.
	1	Topsin M 70W	4–8 fl oz	24 H/0 D	See label.
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	Use western-grown seed. Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	1	T-Methyl 4.5L	10 fl oz	24 H/0 D	
	M	Manex	1.2–1.6 qt	24 H/7 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	4 + M	Ridomil Gold Bravo	2–3 lb	48 H/5 D	
	4 + M	Flouronil	2–3 lb	48 H/5 D	
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo 500	2 ¼–2 ¾ pt	12 H/0 D	
	M	Equus 720	1.5–2 pt	12 H/0 D	
	M	ManKocide	2–3 lb	48 H/0 D	
	M	Nordox 75WG	1–1.25 lb	12 H/0 D	
	M	Kocide 4.5LF	1.3 pt	48 H/0 D	
	M	Kocide 3000	0.5–1.25 lb	48 H/5 D	
	M	Nu-Cop 3L	1–4 pt	48 H/0 D	Apply every 7–10 days as needed.
	M	Champ DP	1.3 lb	48 H/0 D	
	M	Champ 2F	1.3 pt	48 H/0 D	
M	Cuprofix Disperss	2.5 lb	48 H/0 D		



## PUMPKIN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Gummy Stem Blight	11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	7	Fontelis	12–16 fl oz	12 H/1 D	Spray prior to disease development.
	7+3	Aprovia Top	10.5–13.5 fl oz	12 H/0 D	See label.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to one soil application and two foliar applications of Proline 480 SC per year. Repeat application as needed using a 5- to 10-day spray interval if conditions remain favorable for disease development.
	7 + 12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	11 + M	Quadri Opti	3.2 pt	4 H/1 D	
	7 + 3	Luna Experience	10–17 fl oz	12 H/7 D	
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
	1	T-Methyl 4.5L	10 fl oz	24 H/0 D	
	9 + 12	Switch	11–14 fl oz	12 H/1 D	
	4 + M	Flouronil	2–3 lb	48 H/0 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	M	Bravo 500	2.75–4.25	12 H/0 D	
	M	Equus 720	2–3 pt	12 H/0 D	
	M + 33	Catamaran	4 pt	12 H/7 D	
	7 + 11	Topguard EQ	See label.		
	7	Rhyme	See label.		
Powdery Mildew	U13	Gatten	6–8 lb	12 H/0 D	See label.
	U8	Vivando	15.4 fl oz	12 H/0 D	See label.
	U6	Torino	3.4 fl oz	4 H/0 D	Make no more than 2 applications per crop per year.
	7+12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	7 + 11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	7	Fontelis	12–16 fl oz	12 H/1 D	Spray prior to disease development.

## VEGETABLE DISEASE CONTROL

### PUMPKIN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Powdery Mildew (continued)	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris, Cabrio, or Flint.
	U6	Torino	3.4 fl oz	4 H/0 D	Make no more than 2 applications per year.
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3 + 9	Inspire Super	16–20 fl oz	12 H/0 D	No more than 2 sequential applications.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to one soil application and two foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10 day spray interval if conditions remain favorable for disease development.
	11	Cabrio	12–16 fl oz	12 H/0 D	
	11	Flint	1.5–2 fl oz/A	12 H/0 D	Spray preventively when conditions are favorable for disease and repeat every 7–10 days.
	3	Nova or Rally	2.5–5 fl oz	24 H/0 D	Apply at first sign of disease and continue every 7–10 days. Rotate with other fungicides.
	13	Quintec	4–6 fl oz	12 H/0 D	See label.
	3	Procure	4–8 fl oz	12 H/0 D	
	3	Tebuconazole 3.6 F	4–6 fl oz	12 H/7 D	Tank-mix with protectants.
	1	Topsin M 70WP	4–8 fl oz	24 H/0 D	See label.
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
Alternaria Leafspot	7 + 11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after 1 spray.
	7	Fontelis	12–16 fl oz	12 H/1 D	Spray prior to disease development.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris or Cabrio.
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	Rotate to other chemistry after 1 application.
	11	Cabrio	12–16 fl oz	12 H/0 D	
	11 + 27	Tanos	8 fl oz	12 H/3 D	Tank-mix Tanos with <i>mancozeb</i> or <i>chlorothalonil</i> .
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	9 + 12	Switch	11–14 fl oz	12 H/1 D	
	M	Bravo Weather Stik	1.5 pt	12 H/0 D	

## PUMPKIN

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Alternaria Leafspot (continued)	M	Echo 720	1.5 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75	12 H/0 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	M	Equus 720	2–3 pt	12 H/0 D	
Pythium spp. Damping-off Cottony leak Phytophthora	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	1–2 pt		
	4	Ultra Flourish	2–4 pt		
	4	MetaStar	4–8 pt		
	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with copper.
	U15+M	Orondis Opti	1.75–2.5 pt	4 H/0 D	
	U15	Orondis Gold 200	2–19.2 fl oz	4 H/0 D	Soil application. See label.
	U15 + 40	Orondis Ultra (pre-mix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease-resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. At first appearance of symptoms, apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide.
	40	Revus	8 fl oz	4 H/7 D	Tank-mix with copper + surfactant.
	21	Ranman	2.1–2.75 fl oz	12 H/3 D	Tank-mix with organosilicone surfactant.
40 + 45	Zapro	14 fl oz	12 H/0 D	Spray prior to Phytophthora development.	

## RADISH

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium and Phytophthora	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	1–2 pt		
	43	Presidio	3–4 fl oz	12 H/7 D	Tank-mix with non-Group 43 fungicides.
Alternaria Leafspot	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Apply no more than 2 sequential applications of Quadris or Cabrio before rotating to a fungicide with a different mode of action.
	11	Cabrio	8–12 fl oz	12 H/0 D	
	7 + 11	Merivon	4–5.5 fl oz	12 H/7 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	M	Top Cop with Sulfur (H)	2 qt	24 H/0 D	Begin application as soon as disease threatens and repeat at 7–10 day intervals. Use 3 day interval in plant beds. See label.
	M	Top Cop Tri Basic (H)	1–2 qt	24 H/0 D	
Foliar oomycetes	4 + M	Ridomil Gold/Copper	2 lb	48 H/7 D	See label.

## VEGETABLE DISEASE CONTROL

### SPINACH

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium Damping-off	4	Ridomil Gold EC	1–2 pt	48 H/0 D	Incorporate into soil. See label.
	4	Ridomil Gold GR	20–40 lb	48 H/0 D	
	4	Ridomil Gold SL	1–2 pt	48 H/0 D	
Anthracnose & Cercospora Leafspot	11	Cabrio	12–16 fl oz	12 H/0 D	Rotate for resistance management. Apply no more than 3 sequential applications of Quadris before using another fungicide chemistry.
	7	Fontelis	14–24 fl oz	12 H/3 D	Spray prior to disease development.
	11	Quadris	12.3–15.4 fl oz	4 H/0 D	
	7 + 11	Merivon	4–11 fl oz	12 H/1 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	M	Cuprofix Disperss	2.5–4 lb	48 H/0 D	Spray at 7–10 day intervals.
Downy Mildew & White Rust	11	Reason	5.5–8.2 fl oz	12 H/2 D	
	7 + 11	Merivon	4–11 fl oz	12 H/1 D	<b>Suppression only to Downy Mildew. No effect on White Rust.</b> Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	33	Aliette	2–5 lb	12 H/3 D	Begin application as soon as disease threatens and repeat at 7–10 day intervals.
	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with protectants.
	40	Revus	8 fl oz	4 H/1 D	Tank-mix with protectants and surfactant.
	4 + M	Ridomil Gold/Copper	2.5 lb	48 H/21 D	
	M	Cuprofix Disperss	2.5–4 lb	48 H/0 D	See label.
Angular Leafspot	P	Actigard	0.5–1 fl oz	12 H/0 D	Apply at least every 7 days.
	M	Nordox 75WG	1–1.25 lb	12 H/0 D	
	M	Kocide 4.5LF	1.3 pt	48 H/0 D	
	M	Kocide 3000	0.5–1.25 lb	48 H/0 D	Repeat applications of copper may cause yellowing. Begin at first sign of disease and repeat every 7–10 days as necessary.
	M	Champ DP	1.3 lb	48 H/0 D	
	M	Champ 2F	1.3 pt	48 H/0 D	
	M	Nu-Cop 3L	1–4 pt	48 H/0 D	
	M	Cuprofix Disperss	4 lb	48 H/0 D	

## SPINACH

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Angular Leafspot (continued)	7 + 11	Topguard EQ	See label.		
	7	Rhyme	See label.		
<i>Pythium</i> spp. Damping-off Cottony leak <i>Phytophthora</i>	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	1–2 pt		
	4	Ultra Flourish	2–4 pt		
	4	MetaStar	4–8 pt		
	28	Previcur Flex	1:1000 stock solution	12 H/3 D	Apply pre-plant to greenhouse media.
	21	Ranman	2.1–2.75 fl oz	12 H/3 D	Tank-mix with organosilicone surfactant.
	U15 + 40	Orondis Ultra (pre-mix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. At first appearance of symptoms, apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide.
	11 + 27	Tanos	8–10 fl oz	12 H/2 D	Foliar and fruit phase suppression only.
	43	Presidio	3–4 fl oz	12 H/0 D	Tank-mix with copper.
	40	Revus	8 fl oz	4 H/1 D	Tank-mix with copper + surfactant.
	40 + 45	Zapro	14	12 H/0 D	Use prior to disease development.

## SQUASH

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Downy Mildew	U15 + 40	Orondis Ultra (pre-mix)	See Label	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	U15 + M	Orondis Opti (pre-mix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	U15	Orondis Opti A	2–4.8 fl oz	4 H/0 D	See label.
	M + 27	Ariston	1.9–3 pt	12 H/5 D	
	11 + M	Quadris Opti	3.2 pt	12 H/0 D	
	M	Dithane F-45	1.6–2.4 qt	24 H/5 D	Greenhouse approved.
	M	Dithane DF Rain Shield	2–3 lb	24 H/5 D	
	21	Ranman	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	11	Reason	5.5 fl oz	12 H/14 D	Rotate with non-strobilurins.
40	Forum	6 fl oz	12 H/0 D	Tank-mix Forum with other fungicides.	

## VEGETABLE DISEASE CONTROL

### SQUASH

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Downy Mildew (continued)	22 + M	Gavel	2 lb	48 H/5 D	See label.
	28	Previcur Flex	1.2 pt	12 H/2 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	27	Curzate	3.2 fl oz	12 H/3 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	4 + M	Flouronil	2 lb	48 H/0 D	
	P	Actigard	0.5–1 fl oz	12 H/1 D	Apply at least every 7 days.
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75	12 H/0 D	
	M	Equus 720	1.5–2 pt	12 H/0 D	
	33	Aliette	2–5 lb	12 H/0 D	
Powdery Mildew	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	7	Fontelis	12–16 fl oz	12 H/1 D	Use prior to disease development.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	U13	Gatten	6–8 lb	12 H/0 D	See label.
	U8	Vivando	15.4 fl oz	12 H/0 D	See label.
	U6	Torino	3.4 fl oz	4 H/0 D	Make no more than 2 applications per crop per year.
	7+12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to 1 soil application and 2 foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10 day spray interval if conditions remain favorable for disease development.
	3	Nova or Rally	2.5–5 fl oz	24 H/0 D	Apply at first sign of disease and continue every 7–10 days. Rotate with other fungicides.
	3	Procure	4–8 fl oz	12 H/0 D	
	1	Topsin M 70WP	4–8 fl oz	24 H/0 D	Apply when disease threatens and alternate Topsin with <i>chlorothalonil</i> products or other mode of action. Continue every 7–14 days until disease is no longer a problem.
	1	T-Methyl 70WP	4–8 fl oz	24 H/0 D	
Scab	M	Bravo 500	2.75–4.25 pt	12 H/0 D	Begin when first blooms appear and continue every 3–5 days until 7 days before harvest. Use disease-free treated seed. Practice crop rotation.
	M	Equus 720	2–3 pt	12 H/0 D	
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	
Phytophthora	Please see section of Phytophthora control in cantaloupe and cucumber				

SWEET POTATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Black Rot & Root Rot Scurf	1	Mertect 340-F	8 fl oz/7.5 gal		Use certified seed. Use new land for bed or treat old bed with methyl bromide. Follow a 3 or 4 year rotation where black rot has been a problem. Treat seed in Mertect 340-F for 1–2 minutes and plant immediately. Do not use treated roots for food or feed.
	14	Botran 75-W	1 lb/7.5 gal (seed dip) 3–3.75 lb/14 gal/1000 sq ft		Botran may be applied as a seed dip (10–15 sec.) or as a plantbed spray.
Sclerotial Blight, Circular Spot, Soft Rot		Botran 75-W	1 lb/7.5 gal (seed dip)	12 H/14 D	Dip seed in chlorine then dip in Botran suspension. Dip seed 10–15 seconds in well agitated suspension. Drain and bed promptly. Prepare fresh suspension daily. Spray or sprinkle over bedded sweet potatoes before covering.
<i>Pythium</i> & <i>Phytophthora</i> spp.	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	1–2 pt		
	43	Presidio	3–4 fl oz	12 H/7 D	Tank-mix with protectant fungicides.
Rhizopus Soft Rot	14	Botran 75-W	1 lb/100 gal	12 H/14 D	Spray immediately after washing or dip. See label.
Streptomyces (Soil Pox)		Telone C-17	10.5 gal	fumigant	Rates are for 36–42" rows with one chisel/row. Treatment is more effective if pH is under 5.5. Do not lime or plant back to heavily infested fields.
		chloropicrin	1.8 gal	fumigant	
Foliar Diseases	11	Quadris	6.2–15.4 fl oz	4 H/14 D	Apply no more than 3 sequential applications of Quadris before rotating to a fungicide with a different mode of action.
	11 + 3	Quadris Top	8–14 fl oz	12 H/14 D	
	11	Reason	5.5–8.2 fl oz	12 H/14 D	Rotate with non-strobilurins.

TOMATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose <sup>1</sup> , Early Blight <sup>2</sup> , Gray Leaf Spot <sup>3</sup> , Gray Leaf Mold <sup>4</sup> , Late Blight <sup>5</sup> , Septoria Leaf Spot <sup>6</sup>	7	Endura (no late blight control; refer to efficacy table)	2.5–3.5 fl oz <sup>1</sup> 9–12.5 fl oz <sup>4</sup>	12 H/0 D	See label.
	9	Scala <sup>2</sup>	7 fl oz	12 H/7 D	Always tank-mix Scala with protectants. Alternate with protectant fungicides after 1 application of Cabrio or Quadris.
	7 + 11	Priaxor <sup>1,2,3,6</sup>	4–8 fl oz	12 H/7 D	
	11	Quadris <sup>1,2,5,6</sup>	5–6.2 fl oz	4 H/0 D	
	M + 27	Ariston <sup>5</sup>	1.9–3 pt	12 H/3 D	
	7	Fontelis <sup>1,2,3,4,6</sup>	14–24 fl oz	12 H/3 D	
	3 + 9	Inspire Super <sup>1,2,3,4,6</sup>	16–20 fl oz	12 H/0 D	
	11	Cabrio <sup>1,2,5,6</sup>	8–12 fl oz	12 H/0 D	
	11 + 3	Quadris Top <sup>1,6</sup>	8 fl oz	12 H/0 D	Rotate to other chemistries after 1 application.
	11	Evito <sup>1,5</sup>	3.8–5.7 fl oz	12 H/0 D	
	11 + 27	Tanos <sup>1,2,3,5,6</sup>	6–8 fl oz	12 H/0 D	

## VEGETABLE DISEASE CONTROL

### TOMATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose <sup>1</sup> , Early Blight <sup>2</sup> , Gray Leaf Spot <sup>3</sup> , Gray Leaf Mold <sup>4</sup> , Late Blight <sup>5</sup> , Septoria Leaf Spot <sup>6</sup> (continued)	3 + 40	Revus Top <sup>5</sup>	5.5–7 fl oz	12 H/1 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	M	Bravo 500 <sup>1-6</sup>	1.5–2.125 pt	12 H/3 D	Surfactant recommended.
	M	DithaneRainShield <sup>1-6</sup>	1.5–3 lb	24 H/5 D	
	M	Dithane M-45 <sup>1-6</sup>	1.5–3 lb	24 H/5 D	Spray every week beginning when plants are 4-6 inches high, and continue every 7–14 days depending on disease pressure.
	M	Dithane DF <sup>1-6</sup>	1.5–3 lb	24 H/5 D	
	M	Dithane F-45 <sup>1-6</sup>	1.2–2.4 qt	24 H/5 D	
	M	Manzate 75DF <sup>1-6</sup>	1.5–3 lb	24 H/5 D	
	M	Penncozeb 75DF <sup>1-6</sup>	1.5–3 lb	24 H/5 D	
	M	Penncozeb 80WP <sup>1-6</sup>	1.5–3 lb	24 H/5 D	
	21	Ranman <sup>5</sup>	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	11	Reason <sup>5</sup>	5.5–8.2 fl oz	12 H/14 D	Rotate with non-strobilurins.
	U15 + M	Orondis Opti (premix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	40	Forum <sup>5</sup>	6 fl oz	12 H/0 D	Tank-mix Forum with other fungicides except <i>mefenoxam</i> . See label.
	40 + 45	Zampro <sup>5</sup>	14 fl oz	12 H/4 D	Spray prior to late blight development.
	28	Previcur Flex <sup>5</sup>	0.7–1.5 pt	12 H/5 D	
	7+12	Miravis Prime <sup>1,2,3,4,6</sup>	9.2–11.4 fl oz	12 H/1 D	
	7+3	Aprovia Top <sup>1,2,3,4,6</sup>	13.5 fl oz	See label	
	4 + M	Ridomil Gold Bravo <sup>1-6</sup>	2–3 lb	48 H/14 D	Add 0.8 lb ai/A of EBDC or <i>chlorothalonil</i> to Ridomil Gold/Copper.
	4 + M	Ridomil Gold MZ <sup>5</sup>	2.5 lb	48 H/5 D	Increase rate of <i>chlorothalonil</i> products from 1.35–2 pt/A in early season to 2–2.88 pt/A at fruit set. Higher rates are recommended for Anthracnose, Alternaria fruit rot, Botrytis gray mold, late blight, and Rhizoctonia fruit rot.
	9 + 12	Switch <sup>1,4</sup>	11–14 fl oz	12 H/0 D	
	4 + M	Ridomil Gold/Copper <sup>5</sup>	2 lb	48 H/14 D	
	4 + M	Flouronil <sup>1-6</sup>	2–3 lb		
	M	Bravo Weather Stik <sup>1-6</sup>	1.375–3 pt	12 H/0 D	
	M	Echo 720 <sup>1-6</sup>	1.35–3 pt	12 H/0 D	
	M	Equus 720 <sup>1-6</sup>	1.35–2.88 pt	12 H/0 D	
	M	Bravo S	4.5–8.5 pt	12 H/0 D	
			Most CuOH (copper hydroxide) & CuSO <sub>4</sub> (copper sulfate) compounds <sup>1,2,4,5,6</sup>	Several rates and formulations. See labels.	
7 + 11	Topguard EQ		See label.		
7	Rhyme		See label.		



TOMATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Powdery Mildew	3	Nova or Rally	2.5–4 fl oz	24 H/0 D	Nova or Rally for powdery mildew only.
	9 + 3	Inspire Super	16–20 fl oz	12 H/0 D	No more than 2 consecutive applications.
	3	Sulfur	See label	24 H/0 D	
Bacterial Spot, Bacterial Speck, Bacterial Canker	P	Actigard	0.3–0.75 fl oz	12 H/14 D	Begin applications within 1 week of transplanting or emergence; apply only with ground equipment. Make up to 6 weekly sequential applications. Use 0.3 oz/A in 30–50 GPA 0–2 weeks after transplanting; 0.5 oz/A in 60–70 GPA 3–4 weeks after transplanting; and 0.75 oz/A in 70–100 GPA 5–8 weeks after transplanting.
	25	Streptomycin SO4	200 ppm		Begin at 2-leaf stage and repeat every 4–5 days <u>until</u> transplanting.
	M	ManKocide	2–5 lb	48 H/0 D	Use hot water treated disease-free seed. Apply spray at first sign of disease and repeat at 5–10 day intervals. Plant certified seeds or transplants.
	P	Leap	1–2 qt	12 H/0 D	See label.
	M	Basicop	2–4 lb	24 H/0 D	
	M	Nordox 75WG	1.25–2.5 lb	12 H/0 D	
	M	Kocide DF	2–4 lb	48 H/0 D	
	M	Kocide LF	2.6–5.3 pt	48 H/0 D	
	M	Kocide 4.5LF	1.3–2.6 pt	48 H/0 D	
	M	Kocide 101	2–4 lb	24 H/0 D	
	M	Kocide 3000	0.75–1.75 lb	48 H/0 D	
	M	Nu-Cop 3L	1.3–5.3 pt	48 H/0 D	Copper may be mixed with Maneb or <i>mancozeb</i> products to increase activity on copper tolerant bacteria and to broaden control on foliar fungal pathogens.
	M	Nu-Cop 50DF	2–4 lb	48 H/0 D	
	M	Champ DP	1.3–2.6 lb	48 H/0 D	
	M	Champ 2F	1.3–2.6 pt	48 H/0 D	
	M	Champ F	2.6–5.3 pt	48 H/0 D	
M	Cuprofix Ultra 40	1.25–3 lb	48 H/0 D		
Botrytis Gray Mold	7	Endura	9–12.5 fl oz	12 H/0 D	See label.
	9	Scala	7 fl oz	12 H/1 D	Always tank-mix Scala with protectants.
	M	Bravo 500	2–3 lb	12 H/14 D	Apply at first sign of disease and continue at 7 day intervals.
	M	Bravo Weather Stik	2.75–4.25 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	
	M	Equus 720	2–2.8 pt	12 H/0 D	Primarily a problem in greenhouses.
	M	Ziram 4L	2 pt./100 gal	48 H/0 D	Greenhouse use.

■ VEGETABLE DISEASE CONTROL

TOMATO

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Pythium Damping-off	4	Ridomil Gold EC	1–2 pt		Incorporate into soil. See label.
	4	Ridomil Gold SL	1–2 pt		
	4	Ridomil Gold GR	20 lb		
	4	Ultra Flourish	2–4 pt		
	33	Aliette	2–5 lb		
	28	Previcur Flex	1:1000 stock solution		Apply pre-plant to greenhouse media.
	14	Terramaster 4EC	6.5 fl oz/500 gal		Greenhouse production only. See label.
Southern Blight	14	Blocker	4.5–7.5 pt in 100 gal of transplant water	N/A	Use 8 fl oz of solution per plant.
	7	Fontelis	1–1.6 fl oz/1000 row ft	24 H/0 D	See label.

TURNIPS, MUSTARD, COLLARDS & KALE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Cercospora, Cercospora, & Alternaria Leafspots	11	Quadris	6.2–15.4 fl oz	4 H/0 D	Quadris and Cabrio suppress most foliar fungal diseases. No more than 2 sequential applications of Quadris or Cabrio should be made before rotating to different fungicide chemistry. Collards, Kale: Resistance to Quadris and Cabrio have been reported on Alternaria.
	11	Cabrio	8–12 fl oz	12 H/0 D	Collards, Kale: Resistance to Quadris and Cabrio have been reported on Alternaria.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 consecutive applications.
	9 + 12	Switch	11–12 fl oz	12 H/7 D	
	3	Tebuconazole 3.6 F	3–4 fl oz	12 H/7 D	Tank-mix with Maneb. Up to 7.2 fl oz on turnips.
	11 + 3	Quadris Top	14 fl oz	12 H/1 D	Rotate to other chemistry after 1 application.
	33	K-Phite	4 pt	4 H/0 D	See label. Activity on downy mildew control.
	40	Revus	8 fl oz	4 H/1 D	Tank-mix for downy mildew.
	M	Nordox 75WG	0.66–2 lb	12 H/10 D	
		Top Cop Tri-Basic (H)	2 qt	24 H/0 D	
		Top Cop with Sulfur (H)	2 qt	24 H/0 D	
	M	Kocide DF	1–2 lb	48 H/0 D	Apply every 7 days when disease threatens. Use higher rates if disease pressure increases.
	M	Kocide 4.5 LF	0.6–1.3 pt	48 H/0 D	
	M	Kocide 3000	0.5–0.75 lb	48 H/0 D	
	M	Champ DP	0.3–0.6 lb	48 H/0 D	
M	Champ DF	0.3–0.6 pt	48 H/0 D		

TURNIPS, MUSTARD, COLLARDS & KALE

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Cercospora, Cercosporiella, & Alternaria Leafspots (continued)	7 + 11	Merivon	4–5.5 fl oz	12 H/7 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	M	Nu-Cop 50DF	1–2 lb	48 H/0 D	
	M	Cuprofix Disperss	1.5–2.5 lb	48 H/0 D	
Powdery Mildew	3	Procure	6–8 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	7 + 11	Merivon	4–5.5 fl oz	12 H/7 D	
	M	Microthiol Disperss	3–10 lb	24 H/0 D	
Clubroot (Not on turnips)	14	Blocker 4F	3 pt/100 gal water		Use in transplant water.
	14	Blocker 4F	5.67 gal/A/25 gal water		Apply in a 12" band directly over the row prior to planting.
	14	Blocker 4F	7.5 gal in 30 gal water		This is the broadcast application that should be incorporated into the soil just prior to planting.
Wirestem (Not on turnips)	14	Blocker 4F	2.8–3.75 gal/A in 80 gal water		Apply as a pre-plant broadcast spray.
	14	Blocker 4F	1.9–2.8 gal/A in 35 gal water on a 40" row spacing 18–27 fl oz		Spray as an 8" band centered on the row at or just prior to planting.
	11	Quadris (Amistar)	0.125–0.25 fl oz rates/1000 row ft		Use in-furrow or as a soil-applied band. See label for specific recommendations.
Downy Mildew	33	Aliette (not turnip)	2–5 lb	12 H/3 D	Do not mix Aliette with copper fungicides. Apply every 7 days when disease threatens. Use higher rates if disease pressure increases.
	M	Nordox 75WG	0.66–2 lb	12 H/0 D	
	M	Kocide DF	1–2 lb	48 H/0 D	
	M	Kocide 4.5 LF	0.6–1.3 pt	48 H/0 D	
	M	Kocide 3000	0.5–0.75 lb	48 H/0 D	
	M	Champ DP	0.3–0.6 lb	48 H/0 D	
	M	Champ DF	0.3–0.6 pt	48 H/0 D	
	M	Nu-Cop 50DF	1–2 lb	48 H/0 D	
	M	Cuprofix Disperss	1.5–2.5 lb	48 H/0 D	
	40	Forum	6 fl oz	12 H/0 D	
	40	Revus	8 fl oz	4 H/1 D	Tank-mix plus use surfactant.

## VEGETABLE DISEASE CONTROL

### WATERMELON

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Anthracnose	7 + 11	Pristine	18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after one spray.
	3 + 7	Luna Experience	10–17 fl oz	12 H/7 D	
	11	Quadris	11–15.4 fl oz	4 H/1 D	Apply every 7–14 days. Alternate to a fungicide with a different mode of action after one spray of Quadris or Cabrio.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	11 + M	Quadris Opti	3.2 pt	12 H/1 D	
	11 + 3	Quadris Top	10–14 fl oz	12 H/1 D	Rotate to other chemistry after 1 application.
	11	Cabrio	12–16 fl oz	12 H/0 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	11 + 27	Tanos	8 fl oz	12 H/3 D	See label.
	1	Topsin M 70W	0.25–0.5 lb	24 H/0 D	Use western-grown seed. Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	1	T-Methyl 70WP	0.25–0.5 lb	24 H/0 D	
	7 + 11	Merivon	4–5.5 fl oz	12 H/7 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3	Proline	5.7 fl oz	12 H/7 D	
	1	Topsin 4.5L	10 fl oz	24 H/0 D	
	7 + 3	Aprovia Top	10.5–13.5 fl oz	12 H/0 D	See label.
	1	T-Methyl 4.5L	10 fl oz	24 H/0 D	
	7 + 11	Topguard EQ	See label.		
7	Rhyme	See label.			
<i>Pythium</i> Damping-off <i>Phytophthora</i>	28	Ridomil Gold EC	1–2 pt	48 H/4 D	Incorporate into soil. See label. Pythium control.
	21	Ridomil Gold SL	1–2 pt	48 H/4 D	
	11 + 27	Ultra Flourish	2–4 pt	48 H/4 D	
	43	MetaStar	4–8 pt	48 H/4 D	
	28	Previcur Flex	1:1000 stock solution	48 H/4 D	Apply pre-plant to greenhouse media.
	21	Ranman	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	4	Orondis Gold 200	2.4–19.2 fl oz	4 H/0 D	See label.
	43	Presidio	3–4 fl oz	12 H/2 D	Tank-mix with copper.
	40 + 45	Zampro	14 fl oz	12 H/0 D	Spray developing fruit prior to disease development.
	U15 + 40	Orondis Ultra (pre-mix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. At first appearance of symptoms, apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide.

WATERMELON

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
<i>Pythium</i> Damping-off <i>Phytophthora</i> (continued)	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	40	Revus	8 fl oz	4 H/0 D	Tank-mix with copper + surfactant.
	U15+M	Orondis Opti	See Label	See Label	
Bacterial Fruit Blotch	P	Actigard	0.5–1 fl oz	12 H/0 D	Apply at least every 7 days.
	M	ManKocide	2.5 lb	48 H/5 D	<b>Use disease-free seed and transplants.</b> Most copper containing fungicides can reduce the spread of fruit blotch. Begin sprays prior to bloom and continue until fruit are mature.
	M	Nordox 75WG	1–1.25 lb	12 H/0 D	
	M	Champ 2F	1.3 pt	48 H/5 D	Tank-mix copper fungicides with <i>mancozeb</i> product (EBDC's) to broaden foliar disease control spectrum and to increase copper activity against bacteria. Studies have shown that 0.5 rate of copper materials applied weekly is as effective as applying the full rate on a 14 day schedule.
	M	Champ DP	1.3 lb	48 H/5 D	
	M	Nu-Cop 3L	1–4 pt	48 H/5 D	
	M	Kocide DF	2 lb	48 H/5 D	
	M	Kocide 4.5LF	1.3 pt	48 H/5 D	
	M	Kocide 3000	0.5–1.25 lb	48 H/5 D	
	M	Cuprofix Disperss	2.5 lb	48 H/5 D	
Downy Mildew	22	Elumin	8 fl oz	12 H/2 D	Make soil spray or foliar fungicide applications beginning when conditions are favorable for disease development and prior to disease onset, and continuing throughout the season. For best results, begin application at planting/transplanting. Injection (drip irrigation) for soilborne diseases: Inject Elumin into the irrigation water at the listed application rate (see label).
	40 + 45	Zampro	14 fl oz	12 H/0 D	Spray prior to disease development.
	U15	Orondis Opti A	2–4.8 fl oz	4 H/0 D	See label.
	U15 + M	Orondis Opti (pre-mix)	1.75–2.5 pt	4 H/0 D	Begin foliar applications prior to disease development on a 7–14 day interval.
	U15 + 40	Orondis Ultra (pre-mix)	5.5–8 fl oz	4 H/0 D	Use higher rate if disease is present. For best results, begin the disease resistance program with an initial treatment at planting or transplanting with a fungicide registered for its use. At first appearance of symptoms, apply Orondis Ultra as a foliar spray in a mixture with a copper-based fungicide.
	M + 27	Ariston	1.9–3 pt	12 H/5 D	
	M	Manzate 75DF	2–3 lb	12 H/5 D	
	M	Penncozeb 80WP	2–3 lb	12 H/5 D	See label.
	M	Penncozeb 75DF	2–3 lb	12 H/5 D	
	M	Dithane F-45	1.6–2.4 qt	12 H/5 D	Greenhouse approved.
	M	Dithane M-45	2–3 lb	12 H/5 D	Greenhouse approved.
	M	Dithane DF	2–3 lb	12 H/5 D	Greenhouse approved.

## VEGETABLE DISEASE CONTROL

### WATERMELON

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Downy Mildew (continued)	M	Dithane DF Rain Shield	2–3 lb	12 H/5 D	
	4 + M	Ridomil Gold MZ	2.5 lb	48 H/5 D	
	M	Ranman	2.1–2.75 fl oz	12 H/0 D	Tank-mix with organosilicone surfactant.
	11	Reason	5.5 fl oz	12 H/14 D	Rotate with non-strobilurins.
	40	Forum	6 fl oz	12 H/0 D	Tank-mix Forum with other fungicides.
	43	Presidio	3–4 fl oz	12 H/2 D	Resistance has been reported in southeastern US. Tank-mix with protectant fungicides.
	40	Revus	8 fl oz	4 H/0 D	Tank-mix with protectants + surfactants.
	22 + M	Gavel	1.5–2 lb	48 H/0 D	
	28	Previcur Flex	1.2 pt	12 H/3 D	See label.
	27	Curzate	3.2 fl oz	12 H/2 D	Tank-mix with <i>mancozeb</i> or <i>chlorothalonil</i> .
	4 + M	Ridomil Gold Bravo	2 lb	48 H/3 D	Apply fungicides when true leaves fully expand. Continue every 7–14 days until harvest.
	4 + M	Flouronil	2 lb	48 H/0 D	
	P	Actigard	0.5–1 fl oz	12 H/1 D	Apply at least every 7 days.
	M	Bravo Weather Stik	1.5–2 pt	12 H/0 D	
	M	Echo 720	1.5–2 pt	12 H/0 D	
	M	Bravo 500	2.25–2.75 pt	12 H/0 D	Apply at least every 7 days.
M	Equus 720	1.5–2 pt	12 H/0 D		
33	Aliette	2–5 lb	12 H/0 D		
Gummy Stem Blight	3 + 7	Luna Experience	10–17 fl oz	12 H/7 D	
	7	Fontelis	12–16 fl oz	12 H/1 D	Resistance has been reported with Endura. Risk of cross-resistance.
	7 + 11	Merivon	5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to 1 soil application and 2 foliar applications of Proline 480 SC per year. Repeat application as needed using a 5–10 day spray interval if conditions remain favorable for disease development.
	3 + 33	Viathon	4 pt	12 H/7 D	
	3 + 9	Inspire Super	16–20 fl oz	12 H/0 D	No more than 2 consecutive applications.
	7 + 3	Aprovia Top	10.5–13.5 fl oz	12 H/0 D	See label.
	7+12	Miravis Prime	9.2–11.4 fl oz	12 H/1 D	See label.
	M	Bravo Weather Stik	2–3 pt	12 H/0 D	
	M	Echo 720	2–3 pt	12 H/0 D	

## WATERMELON

DISEASE	MOA	RATE OF MATERIAL TO USE		REI/PHI (Hours or Days)	REMARKS
		MATERIAL	FORMULATED		
Gummy Stem Blight (continued)	M	Bravo 500	2.25–2.75 pt	12 H/0 D	
	M + 33	Catamaran	4 pt	12 H/7 D	
	7 + 11	Topguard EQ	See label.		
	7	Rhyme	See label.		
Powdery Mildew	7 + 11	Pristine	12.5–18.5 fl oz	12 H/0 D	Apply prior to disease onset and on a 7–14 day schedule. Alternate to a fungicide with a different mode of action after 1 spray.
	U8	Vivando	15.4 fl oz	12 H/0 D	
	3 + 7	Luna Experience	10–17 fl oz	12 H/7 D	
	7 + 11	Merivon	4–5.5 fl oz	12 H/0 D	Begin application prior to disease development and continue on 7–14 day interval if conditions are favorable for disease development. Do not apply Merivon as a tank-mix with any other pesticide products, adjuvants, liquid fertilizers, nutrients, any other additives, or anything other than water.
	3	Proline	5.7 fl oz	12 H/7 D	Limit application up to a total of 17 fl oz/year. Apply up to 1 soil application and 2 foliar applications of Proline 480 SC/year. Repeat application as needed using a 5–10 dayspray interval if conditions remain favorable for disease development.
	7	Fontelis	12–16 fl oz	12 H/1 D	Spray prior to disease symptoms.
	3 + 9	Inspire Super	16–20 fl oz	12 H/7 D	No more than 2 sequential applications.
	3	Procure	4–8 fl oz	12 H/0 D	Apply at first sign of disease and continue every 7–10 days. Rotate with non-group 3 fungicides.
13	Quintec	4–6 fl oz	12 H/3 D	See label.	

Always check label for proper rates.

MOA—Mode of Action code used for rotating fungicides based on mode of action ([www.frac.info/frac/content.htm](http://www.frac.info/frac/content.htm)).

# EFFICACY OF FUNGICIDES/BACTERICIDES FOR CONTROLLING FOLIAR DISEASES OF BEANS<sup>1</sup>

Bhabesh Dutta, Extension Plant Pathologist

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES													
	COMMON RUST	ASIAN SOYBEAN RUST	ANTHRACNOSE	CERCOSPORA	DOWNY MILDEW	POWDERY MILDEW	FOLIAR BACTERIAL DISEASES	WHITE MOLD (SCLEROTINIA)	SOUTHERN STEM ROT (S. ROLFSSII)	PYTHIUM DAMPING-OFF	PYTHIUM COTTONY LEAK	RHIZOCTONIA SORE SHIN	AERIAL RHIZOCTONIA	FUSARIUM CROWN ROT
Endura ( <i>boscalid</i> )	U	U	U	U	N	U	N	E	F	N	N	U	U	N
Headline ( <i>pyraclostrobin</i> )	E	E	G	E	U	U	N	N	G-F	N	P	F	G	N
Quadris/Amistar ( <i>azoxystrobin</i> )	E	E	G	G	U	U	N	N	E	N	F-V	G	E	N
Switch ( <i>cyprodinil + fludioxinil</i> )	U	U	U	G	N	U	N	P	N	N	N	U	U	N
Ridomil Gold Copper ( <i>mefenoxam + cupric hydroxide</i> )	P	P	P	P	G-F	N	G-F	N	N	P	G-V	N	N	N
Rildomil Gold SC ( <i>mefenoxam</i> )	N	N	N	N	N	N	N	N	N	G	P	N	N	N
Rovral ( <i>iprodione</i> )	N	N	N	N	N	N	N	P	N	N	N	F	P	N
Blocker	N	N	N	N	N	N	N	N	G-F	N	N	G	N	N
Fixed copper <sup>3</sup>	P	P	P	P	N	P	G	N	N	N	P	N	N	N
Bravo/Equus ( <i>chlorothalonil</i> )	F	F	F	G	G	P	N	N	N	N	N	N	P	N
Tebuconazole/Tebuzol ( <i>tebuconazole</i> )	G	G	P	F	N	P	N	P	F	N	N	U	F	N
Rally ( <i>myclobutanil</i> )	E	E	N	G-F	N	G	N	N	N	N	N	U	F	N
Topsin ( <i>thiophanate methyl</i> )	U	U	G-F	G	N	U	N	F	N	N	N	P	P	P
Omega 500	U	U	U	U	F-G	N	N	E	F	P	P	P	P	N
Fontelis ( <i>penthiopyrad</i> )	U	U	U	F	N	U	N	E	G	N	N	U	U	N
Uniform ( <i>mefenoxam + azoxystrobin</i> )	N	N	N	N	N	N	N	F	F	G	P	E	N	N

1. Ratings for products were conducted at the 2005 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use.

V—Variable levels of control.  
 E—Excellent disease suppression.  
 G—Good disease suppression,  
 F—Fair disease suppression,  
 P—Poor to no disease suppression  
 U—Unknown efficacy  
 N—No efficacy



# EFFICACY OF FUNGICIDES/BACTERICIDES FOR CONTROLLING FOLIAR DISEASES OF BRASSICA VEGETABLES<sup>1</sup>

Bhabesh Dutta, Extension Plant Pathologist

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES										
	BLACK ROT	BACTERIAL SOFT ROT	BLACK LEG	CLUB ROOT	DOWNY MILDEW	POWDERY MILDEW	CERCOSPORA/ CERCOPORELLA	ALTERNARIA LEAF SPOT	RAISIN HEAD (SCLEROTINIA)	PYTHIUM DAMPING-OFF	WIRESTEM & BOTTOM ROT (RHIZOC.)
Endura ( <i>boscalid</i> )	N	N	G	N	N	F	E	G	F-G	N	U
Cabrio ( <i>pyraclostrobin</i> )	N	N	U	N	P	F	G	F-R	N	N	U
Quadris/Amistar ( <i>azoxystrobin</i> )	N	N	U	N	P	F	F-G	P	N	N	G
Presidio ( <i>fluopicolide</i> )	N	N	N	N	G-C	N	N	N	N	N	N
Revus ( <i>mandipropamid</i> )	N	N	N	N	G-C	N	N	N	N	N	N
Aliette ( <i>fosetyl—Al</i> )	N	N	N	N	p	N	N	N	N	N	N
Forum ( <i>dimethomorph</i> )	N	N	N	N	G-C	N	N	N	N	N	N
Reason ( <i>fenamidone</i> )	N	N	N	N	G	N	P	N	N	U	N
Switch ( <i>cyprodinil + fludioxinil</i> )	N	N	N	N	N	G	F	G	P	N	N
Ridomil Gold Bravo ( <i>mefenoxam + chlorothalonil</i> )	N	N	N	N	F	N	N	G	N	F	N
Rildomil Gold SC ( <i>mefenoxam</i> )	N	N	N	N	N	N	N	N	N	G	N
Rovral ( <i>iprodione</i> )	N	N	G*	G-F	N	N	N	G*	G*	N	F
Blocker	N	N	N	N	N	N	N	N	N	N	F
Orondis Opti A	N	N	N	N	G	N	N	N	N	N	N
Fixed copper <sup>3</sup>	F	N	N	N	F	N	N	P	N	N	N

1. Ratings for products were conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.  
3. Phytotoxicity observed when Aliette is tank-mixed with copper.

C—When used in combination with Aliette or maneb.  
E—Excellent disease suppression.  
G—Good disease suppression.  
F—Fair disease suppression.  
P—Poor to no disease suppression.  
U—Unknown efficacy, R—Resistance reported  
\* Applications of *iprodione* (Rovral) made for black leg may suppress Alternaria, Sclerotinia, and wirestem on broccoli only.

## EFFICACY OF FUNGICIDES/BACTERICIDES FOR CONTROLLING FOLIAR DISEASES OF BRASSICA VEGETABLES

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES										
	BLACK ROT	BACTERIAL SOFT ROT	BLACK LEG	CLUB ROOT	DOWNY MILDEW	POWDERY MILDEW	CERCOSPORA/ CERCOPORELLA	ALTERNARIA LEAF SPOT	RAISIN HEAD (SCLEROTINIA)	PYTHIUM DAMPING- OFF	WIRESTEM & BOTTOM ROT (RHIZOC.)
Actigard ( <i>acibenzolar-S-methyl</i> )	F-P	N	N	N	F	P	U	U	N	U	U
Manzate ( <i>mancozeb</i> )	N	N	N	N	F	N	P	P	N	N	N
Bravo/Equus ( <i>chlorothalonil</i> )	N	N	N	N	G-F	N	G	G	N	N	N
Tebuconazole/Tebuzol ( <i>tebuconazole</i> )	N	N	N	N	N	U	E-G	F	N	N	F
Procure ( <i>triflumizole</i> )	N	N	N	N	N	G	U	N	N	N	N
Inspire Super	N	N	U	N	N	G	G	E	F	N	U
Quadris Top	N	N	U	N	U	U	G	F	F	N	G
Zampro ( <i>amectoctradin + dimethomorph</i> )	N	N	N	N	E	N	N	N	N	U	N
Fontelis ( <i>penthiopyrad</i> )	N	N	U	N	N	U	F	G	G	N	U
Omega 500 ( <i>fluazinam</i> )	N	N	U	G	N	N	N	N	U	N	U
Inspire Super ( <i>difenoconazole + cyprodinil</i> )	N	N	U	N	N	F	G	G	P	N	U

1. Ratings for products were conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use.
2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.

E—Excellent disease suppression.  
 G—Good disease suppression.  
 F—Fair disease suppression.  
 P—Poor to no disease suppression.  
 U—Unknown efficacy.  
 N—No efficacy.  
 \* Applications of *iprodione* (Rovral) made for black leg may suppress Alternaria, Sclerotinia, and wirestem on broccoli only.

# EFFICACY OF FUNGICIDES/BACTERICIDES AGAINST FOLIAR DISEASES OF CUCURBITS<sup>1</sup>

Bhabesh Dutta, Extension Plant Pathologist

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES												
	ANTHRACNOSE	ALTERNARIA LEAF SPOT AND BLIGHT	GUMMY STEM BLIGHT	TARGET SPOT	PLECTOSPORIUM BLIGHT	POWDERY MILDEW	DOWNY MILDEW	BACTERIAL FRUIT BLITCH	ANGULAR LEAF SPOT	PHYTOPHTHORA FRUIT AND CROWN ROT	PYTHIUM COTTONY LEAK	RHIZOCTONIA BELLY ROT	SOUTHERN STEM BLIGHT (S. ROFLSII)
Pristine ( <i>boscalid + pyraclostrobin</i> )	G	G	F-R	G	G	U	N	N	N	N	N	P	P
Cabrio ( <i>pyraclostrobin</i> )	E-G	E	E-R	G	G	F-R	P-R	N	N	N	N	P	P
Quadris/Amistar ( <i>azoxystrobin</i> )	E-G	E	E-R	G	G	F-R	P-R	N	N	N	N	E	F
Flint ( <i>trifloxystrobin</i> )	G	E	E-R	G	G	F-R	P-R	N	N	N	N	P	P
Ranman ( <i>cyazofamid</i> )	N	N	N	N	N	N	G	N	N	P	U	N	N
Presidio ( <i>fluopicolide</i> )	N	N	N	N	N	N	F	N	N	G	P	N	N
Revus ( <i>mandipropamid</i> )	N	N	N	N	N	N	P	N	N	G-F	U	N	N
Forum ( <i>dimethomorph</i> )	N	N	N	N	N	N	P	N	N	F	U	N	N
Gavel ( <i>zoxamide + mancozeb</i> )	G-F	P	P	G-F	N	N	G	N	N	U	U	N	N
Tanos ( <i>famoxate + cymoxanil</i> )	P	G	P	P	U	N	F-G	P	N	P	P	N	N
Previcur Flex ( <i>propamocarb</i> )	N	N	N	N	N	N	G-F	N	N	N	P	N	N
Orondis Gold 200 ( <i>oxathiapripolin</i> , soil use only)	N	N	N	N	N	N	U	N	N	G	N	N	N
Orondis Ultra ( <i>oxathiapripolin + mandipropamid</i> )	N	N	N	N	N	N	G	N	N	G	N	N	N
Aprovia Top ( <i>solatenol + difenoconazole</i> )	G-F	F	G	N	N	F	N	N	N	N	N	N	N
Orondis Opti ( <i>oxathiapripolin + chlorothalonil</i> premix)	N	N	N	N	N	N	G-F	N	N	N	N	N	N
Switch ( <i>cyprodinil + fludioxinil</i> )	F	G	F	U	U	F	N	N	N	N	N	N	N
Ridomil Gold Bravo ( <i>mefenoxam + chlorothalonil</i> )	G-F	G-F	G-F	G	G	F	F-R	N	N	F-R	F	P	P
Ridomil Gold MZ ( <i>mefenoxam + mancozeb</i> )	G	P	P	F	F	N	F-R	N	N	F-R	F	P	P
Ridomil Gold Copper ( <i>mefenoxam + Cu hydroxide</i> )	N	N	N	N	N	N	F-R	N	N	F-R	F	P	P
Ridomil Gold SC ( <i>mefenoxam</i> )	N	N	N	N	N	N	N	N	N	F-R	P	N	N

1. Ratings for products were conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use.

2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Alette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.

R—Pathogen resistance (insensitivity) may be present at some locations.

E—Excellent disease suppression.

G—Good disease suppression.

F—Fair disease suppression.

P—Poor to no disease suppression.

U—Unknown efficacy; N—No efficacy.

## EFFICACY OF FUNGICIDES/BACTERICIDES AGAINST FOLIAR DISEASES OF CUCURBITS

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES												
	ANTHRACNOSE	ALTERNARIA LEAF SPOT AND BLIGHT	GUMMY STEM BLIGHT	TARGET SPOT	PLECTOSPORIUM BLIGHT	POWDERY MILDEW	DOWNY MILDEW	BACTERIAL FRUIT BLOTCH	ANGULAR LEAF SPOT	PHYTOPHTORA FRUIT AND CROWN ROT	PYTHIUM COTTONY LEAK	RHIZOCTONIA BELLY ROT	SOUTHERN STEM BLIGHT (S. ROFELSI)
Rally ( <i>myclobutanol</i> )	N	N	N	N	N	F	N	N	N	N	N	N	N
Quintec ( <i>quinoxifen</i> )	N	N	N	N	N	E	N	N	N	N	N	N	N
Fixed copper <sup>3</sup>	P	P	P	P	P	P	F-P	G	G	F-P	P	N	N
Actigard ( <i>acibenzolar-S-methyl</i> )	U	U	U	U	U	F	F	F-G	G	U	U	N	N
Manzate ( <i>mancozeb</i> )	F	P	P	G-F	F	P	F	P	P	P	P	N	N
Bravo/Equus ( <i>chlorothalonil</i> )	F	F	F	F	F	F	F	N	N	P	P	P	N
Topsin ( <i>thiophanate methyl</i> )	P	P	F-R	F-R	U	F-R	N	N	N	N	N	P	N
Tebuconazole/Tebuol ( <i>tebuconazole</i> )	P	F	F-R	U	U	F	N	N	N	N	N	F	F
Procure ( <i>triflumizole</i> )	N	N	N	N	N	F	N	N	N	N	N	N	N
Inspire Super ( <i>difenoconazole + cyprodinil</i> )	G	E	E	G	U	G	N	N	N	N	N	N	N
Quadris Top ( <i>azoxystrobin + difenoconazole</i> )	G	E	F-R	G	U	G	N	N	N	N	N	N	N
Fontelis ( <i>penthiopyrad</i> )	F	E	F-R	U	U	F-R	N	N	N	N	N	U	G
Luna Experience ( <i>fluopyram + tebuconazole</i> )	F	E	G-R	U	U	E-R	N	N	N	N	N	N	U
Zampro ( <i>amectotradin + dimethomorph</i> )	N	N	N	N	N	N	F-G	N	N	F	U	N	N
Torino ( <i>cyflufenamid</i> )	N	N	N	N	N	F-R	N	N	N	N	N	N	N
Ariston ( <i>cymoxanil + chlorothalonil</i> )	G	G-F	G-F	G	G	P	F-G	N	N	F	N	P	N
Proline ( <i>prothioconazole</i> )	G	U	G	U	U	G	N	N	N	N	N	U	E
Miravis Prime ( <i>pydiflumetofen + fludioxonil</i> )	U	U	G	U	U	F-G	U	U	U	U	U	U	U
Merivon ( <i>pyraclostrobin + fluxapyroxad</i> )	G	E	F-P	G	G	F-R	U	N	N	N	N	U	U
Gatten	N	N	N	N	N	E	N	N	N	N	N	N	N

1. Ratings for products were conducted at the 2009 Southeast Extension Vegetable Workers Conference in Fletcher, NC. Efficacy ratings do not necessarily indicate a labeled use.  
 2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.

C—When used in combination with Aliette or maneb  
 R—Pathogen resistance (insensitivity) may be present at some locations  
 E—Excellent disease suppression.  
 G—Good disease suppression.  
 F—Fair disease suppression.  
 P—Poor to no disease suppression.  
 U—Unknown efficacy.  
 N—No efficacy.

# EFFICACY OF FUNGICIDES/BACTERICIDES ON ONION DISEASES<sup>1</sup>

Bhabesh Dutta, Extension Plant Pathologist

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES												
	PYTHIUM DAMPING-OFF	ONION SMUT	BOTRYTIS LEAF BLIGHT	PURPLE BLOTCH	STEMPHYLIUM BLIGHT	DOWNY MILDEW	ERWINIA SOFT ROT	FUSARIUM BASAL ROT	PINK ROOT	CENTER ROT	BACTERIAL STREAK	WHITE ROT (SCLEROTIUM)	TWISTER (ANTHRACNOSE)
Pristine ( <i>boscalid + pyraclostrobin</i> )	P	U	F	E	F-G	N	N	U	G	N	N	U	G
Cabrio ( <i>pyraclostrobin</i> )	P	U	F	E-G	F	N	N	U	P	N	N	U	G
Quadris/Amistar ( <i>azoxystrobin</i> )	P	U	F	E-G	F	N	N	U	P	N	N	U	G
Endura ( <i>boscalid</i> )	P	U	F	E-G	F	N	N	U	G	N	N	U	P
Orondis Ultra ( <i>oxathiapripolin + mandipropamid</i> )	N	N	N	N	N	F-G	N	N	N	N	N	N	N
Presidio ( <i>fluopicolide</i> )	P	N	N	N	N	P	N	N	N	N	N	N	N
Revus ( <i>mandipropamid</i> )	P	N	N	N	N	F	N	N	N	N	N	N	N
Aliette ( <i>fosetyl—Al</i> )	P	N	N	N	N	F	N	N	N	N	N	N	N
Forum ( <i>dimethomorph</i> )	P	N	N	N	N	F	N	N	N	N	N	N	N
Scala ( <i>pyrimethanil</i> )	N	U	G	G	G	N	N	U	U	N	N	U	U
Rovral ( <i>iprodione</i> )	N	P	G-F	G	G-F	N	N	N	N	N	N	N	N
Reason ( <i>fenamidone</i> )	P	N	N	F-P	F-P	F	N	N	N	N	N	N	N
Switch ( <i>cyprodinil + fludioxinil</i> )	N	U	G	G	G	N	N	N	U	N	N	U	G-F
Ridomil Gold Bravo ( <i>mefenoxam + chlorothalonil</i> )	F	F-P	N	G-F	G-F	G-R	N	N	N	N	N	N	G-F
Ridomil Gold MZ ( <i>mefenoxam + mancozeb</i> )	F	F-P	N	G-F	G-F	G-R	N	N	N	N	N	N	G-F

1. Information in this table was partly derived from ratings given at the IR-4 Bulb Vegetable Crop Group Workshop held during the 1999 American Phytopathological Society annual meeting in Montreal, Canada. Ratings for products do not necessarily indicate a labeled use.  
 2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.

R—Pathogen resistance (insensitivity) may be present at some locations.  
 E—Excellent disease suppression.  
 G—Good disease suppression.  
 F—Fair disease suppression.  
 P—Poor to no disease suppression.  
 U—Unknown efficacy.  
 N—No efficacy.

## EFFICACY OF FUNGICIDES/BACTERICIDES ON ONION DISEASES

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES												
	PYTHIUM DAMPING-OFF	ONION SMUT	BOTRYTIS LEAF BLIGHT	PURPLE BLOTCH	STEMPHYLIUM BLIGHT	DOWNY MILDEW	ERWINIA SOFT ROT	FUSARIUM BASAL ROT	PINK ROOT	CENTER ROT	BACTERIAL STREAK	WHITE ROT (SCLEROTIUM)	TWISTER (ANTHRACNOSE)
Ridomil Gold Copper ( <i>meneoxam + Cu hydroxide</i> )	F	P	P	P	P	P	P	N	N	F	G	N	P
Rildomil Gold SC ( <i>mefenoxam</i> )	G	N	N	N	N	F-P	N	N	N	N	N	N	N
Fixed copper <sup>3</sup>	N	P	P	P	P	P	P	N	N	F	G	N	P
Actigard ( <i>acibenzolar-S-methyl</i> )	U	U	P	P	P	U-G	U	U	P	U	U	P	U
Manzate ( <i>mancozeb</i> )	N	U	P	P	P	G-F	N	N	N	N	N	N	G-F
Bravo/Equus ( <i>chlorothalonil</i> )	N	F-P	G-F	G-F	G-F	F	N	N	N	N	N	N	G-F
Tebuconazole/Tebuol ( <i>tebuconazole</i> )	N	U	F	G-F	G-F	N	N	N	N	N	N	G	P
Inspire Super ( <i>difenoconazole + cyprodinil</i> )	N	U	G	E	E	N	N	N	U	N	N	U	G
Quadris Top ( <i>azoxystrobin + difenoconazole</i> )	N	U	G	E	E	U	N	N	U	N	N	U	G
Omega 500 ( <i>fluzinam</i> )	P	U	G	E	E	G	N	N	U	N	N	F	U
Fontelis ( <i>penthiopyrad</i> )	N	U	E	E	E	N	N	U	F	N	N	G	U
Zampro ( <i>amectocraadin + dimethomorph</i> )	N	N	N	N	N	F	N	N	N	N	N	N	N
Quilt Excel ( <i>azoxystrobin + propiconazole</i> )	N	U	F	G	G-F	P	N	N	N	N	N	U	G
Merivon ( <i>pyraclostrobin + fluxapyroxad</i> )	P	U	E	E	E	F	N	U	G	N	N	U	G
Viathon ( <i>potassium phosphite + tebuconazole</i> )	P	U	F	F	F	F-G	N	U	N	N	N	N	F

1. Information in this table was partly derived from ratings given at the IR-4 Bulb Vegetable Crop Group Workshop held during the 1999 American Phytopathological Society annual meeting in Montreal, Canada. Ratings for products do not necessarily indicate a labeled use.

2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Alette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.

E—Excellent disease suppression.

G—Good disease suppression.

F—Fair disease suppression.

P—Poor to no disease suppression.

U—Unknown efficacy.

N—No efficacy.

# EFFICACY OF FUNGICIDES/BACTERICIDES AGAINST PEPPER DISEASES<sup>1</sup>

Bhabesh Dutta, Extension Plant Pathologist

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES						
	ANTHRACNOSE OF FRUIT	BOTRYTIS FRUIT ROT	BACTERIAL SPOT	PHYTOPHTHORA (ROOT AND CROWN)	PHYTOPHTHORA (FRUIT AND FOLIAGE)	PYTHIUM CROWN ROT	SOUTHERN BLIGHT
Endura ( <i>boscalid</i> )	N	G	N	N	N	N	N
Quadris/Amistar ( <i>azoxystrobin</i> )	E	P	N	N	N	N	G
Cabrio ( <i>pyraclostrobin</i> )	E	P	N	N	N	N	N
Orondis Gold 200	N	N	N	E–G	G	N	N
Tanos ( <i>famoxate + curzate</i> )	P	P	P	N	P	N	N
Orondis Ultra ( <i>oxathiapripolin + mandipropamid</i> )	N	N	N	N	E–G	N	N
Presidio ( <i>fluopicolide</i> )	N	P	N	F	E–G	N	N
Revus ( <i>mandipropamid</i> )	N	P	N	P	E–G	N	N
Forum ( <i>dimethomorph</i> )	N	P	N	P	P	N	N
Manzate ( <i>mancozeb</i> )	P	P	P	N	N	N	N
Ridomil Gold SC ( <i>mefenoxam</i> )	N	P	N	E–R	N	E	N
Ridomil Gold Copper ( <i>mefenoxam + Cu hydroxide</i> )	N	P	N	N	N	P	N
Terraclor (PCNB)	N	P	N	N	N	N	G
Previcur Flex ( <i>propamocarb</i> )	N	P	N	N	N	N	N
Bravo, Echo ( <i>chlorothalonil</i> )	P	F	N	N	N	N	N
fixed copper	P	P	G–F–R	N	N	N	N
Actigard ( <i>acibenzolar-S-methyl</i> ) <sup>3,4</sup>	U	U	F	U	U	N	N
Streptomycin sulfate <sup>5</sup>	U	U	G–R	N	N	N	N
Quadris Top ( <i>azoxystrobin + difenoconazole</i> )	G	N	N	N	N	N	F–P
Fontelis ( <i>penthiopyrad</i> )	N	G	N	N	N	N	G
Zampro ( <i>amectotradin + dimethomorph</i> )	N	N	N	G	G	U	N
Quintec ( <i>quinoxifen</i> )	N	N	F	N	N	N	N
Ariston ( <i>cymoxanil + chlorothalonil</i> )	F	P	N	P	P	N	P

- Information in this table was mostly taken from ratings developed at the 2009 Southeast Vegetable Workers Conference in Fletcher, NC. Ratings for products do not necessarily indicate a labeled use.
- Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.
- Actigard is labeled for chili pepper only.
- Phytotoxicity observed. Follow label carefully.
- Streptomycin is labeled for transplants only. Not labeled for field use.

R—Pathogen resistance (insensitivity) may be present at some locations.  
 E—Excellent disease suppression.  
 G—Good disease suppression.  
 F—Fair disease suppression.  
 P—Poor to no disease suppression.  
 U—Unknown efficacy.  
 N—No efficacy.

# EFFICACY OF FUNGICIDES/BACTERICIDES AGAINST TOMATO DISEASES<sup>1</sup>

Bhabesh Dutta, Extension Plant Pathologist

REGISTERED FUNGICIDES <sup>2</sup>	DISEASES												
	BACTERIAL CANKER <i>Clavibacter michiganensis</i>	BACTERIAL SPECK <i>Pseudomonas syringae</i> pv. <i>tomato</i>	BACTERIAL SPOT <i>Xanthomonas campestris</i> pv. <i>vesicatoria</i>	BOTRYTIS GRAY MOLD AND SCLEROTINIA	CRYSTALARIELLA LEAF SPOT	TARGET SPOT	EARLY BLIGHT	LATE BLIGHT	POWDERY MILDEW	SEPTORIA LEAF SPOT	SOUTHERN STEM ROT <i>Sclerotium rolfsii</i>	PYTHIUM COLLAR ROT	TOMATO SPOTTED WILT VIRUS
Endura ( <i>boscalid</i> )	N	N	N	G	P	G	E	N	U	P	U	N	N
Cabrio ( <i>pyraclostrobin</i> )	N	N	N	P	U	U	E	N	E-G	E-G	G	P	N
Quadris/Amistar ( <i>azoxystrobin</i> )	N	N	N	P	U	U	E	N	E-G	E-G	G	P	N
Flint ( <i>trifloxystrobin</i> )	N	N	N	P	U	U	E	N	E-G	E-G	G	P	N
Ranman ( <i>cyazofamid</i> )	N	N	N	N	N	N	F	F	N	N	N	N	N
Presidio ( <i>fluopicolide</i> )	N	N	N	N	N	N	N	G	N	N	N	N	N
Revus Top ( <i>mandipropamid + difenoconazole</i> )	N	N	N	N	N	G	F	G	U	U	U	N	N
Previcur Flex ( <i>propamocarb</i> )	N	N	N	N	N	N	N	G-F	N	N	N	P	N
Aliette ( <i>fosetyl—Al</i> )	N	N	N	N	N	N	N	F	N	N	N	N	N
Forum ( <i>dimethomorph</i> )	N	N	N	N	N	N	N	G-C	N	N	N	N	N
Gavel ( <i>zoxamide + mancozeb</i> )	N	N	N	N	N	N	G-F	G-F	N	N	N	N	N
Tanos ( <i>famoxate + cymoxanil</i> )	P	P	P	N	U	F	E-G	F	P	P	N	N	N
Reason ( <i>fenamidone</i> )	N	N	N	N	U	U	G	G-F	N	N	N	N	N
Switch ( <i>cyprodinil + fludioxinil</i> )	N	N	N	G	U	U	G	N	G	F	N	N	N
Ridomil Gold Bravo ( <i>mefenoxam + chlorothalonil</i> )	N	N	N	F	P	N	G	G-R	P	N	N	F-P	N
Ridomil Gold MZ ( <i>mefenoxam + mancozeb</i> )	P	P	P	P	P	N	P	G-R	P	N	N	F-P	N

1. Information in this table was mostly taken from ratings developed at the 2009 Southeast Vegetable Workers Conference in Fletcher, NC. Ratings for products do not necessarily indicate a labeled use.  
2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam + chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.

C—When used in combination with *mancozeb*.  
R—Pathogen resistance (insensitivity) may be present at some locations.  
E—Excellent disease suppression.  
G—Good disease suppression.  
F—Fair disease suppression.  
P—Poor to no disease suppression.  
U—Unknown efficacy.  
N—No efficacy.



REGISTERED FUNGICIDES <sup>2</sup>	DISEASES												
	BACTERIAL CANKER <i>Clavibacter michiganensis</i>	BACTERIAL SPECK <i>Pseudomonas syringae</i> pv. <i>tomato</i>	BACTERIAL SPOT <i>Xanthomonas campstris</i> pv. <i>vesicatoria</i>	BOTRYTIS GRAY MOLD AND SCLEROTINIA	CRYSTALARIELLA LEAF SPOT	TARGET SPOT	EARLY BLIGHT	LATE BLIGHT	POWDERY MILDEW	SEPTORIA LEAF SPOT	SOUTHERN STEM ROT <i>Sclerotium rolfsii</i>	PYTHIUM COLLAR ROT	TOMATO SPOTTED WILT VIRUS
Ridomil Gold Copper ( <i>meneoxam</i> + <i>Cu hydroxide</i> )	G-F	G-F	G-F	P	P	N	P	G-R	P	N	N	F-P	N
Rildomil Gold SC ( <i>mefenoxam</i> )	N	N	N	N	N	N	N	N	N	N	N	G	N
Rally ( <i>myclobutanil</i> )	N	N	N	N	E-G	N	N	N	E	N	N	N	N
Actigard ( <i>acibenzolar-S-methyl</i> ) <sup>4</sup>	U	G-F	G-F	P	P	P	P	F-P	P	P	P	P	F-P
Maneb/ <i>mancozeb</i>	P	P	P	P	P	F	P	N	P	G-F	P	P	P
Bravo/Equus ( <i>chlorothalonil</i> )	N	N	N	F	P	F	G	N	P	G	N	F-P	N
Scala ( <i>pyrimethanil</i> )	N	N	N	G-R	U	F-G	G	P	P	P	N	N	N
Streptomycin sulfate <sup>3</sup>	G-R	G-R	G-R	N	N	N	N	N	N	N	N	N	N
Inspire Super ( <i>difenoconazole</i> + <i>cyprodinil</i> )	N	N	N	G	U	G	G	N	G	G	U	N	N
Quadris Top ( <i>azoxystrobin</i> + <i>difenoconazole</i> )	N	N	N	N	U	G	G	N	G	G	F	N	N
Blocker (PCNB)	N	N	N	N	N	N	N	N	N	N	G	N	N
Fontelis ( <i>penthiopyrad</i> )	N	N	N	G	U	G-F	E	N	G	G	G	N	N
Priaxor ( <i>fluxapyrad</i> + <i>pyraclostrobin</i> )	N	N	N	G	U	G	E	N	G	G	F	N	N
Zampro ( <i>amectotradin</i> + <i>dimethomorph</i> )	N	N	N	N	N	N	N	G	N	N	N	N	N
Ariston ( <i>cymoxanil</i> + <i>chlorothalonil</i> )	N	N	N	N	P	F-P	G	G	P	F	N	N	N

1. Information in this table was mostly taken from ratings developed at the 2009 Southeast Vegetable Workers Conference in Fletcher, NC. Ratings for products do not necessarily indicate a labeled use.  
 2. Fungicides registered specifically on cole crops (cabbage, cauliflower, broccoli) include *chlorothalonil*, *iprodione*, and *mefenoxam* + *chlorothalonil*. Aliette is not labeled on turnips. Please refer to the appropriate sections of the Pest Management Handbook for details on product labeling.  
 3. Streptomycin may only be used in plant beds, not registered for field use.  
 4. Phytotoxicity observed. Follow label carefully.

R—Pathogen resistance (insensitivity) may be present at some locations.  
 E—Excellent disease suppression.  
 G—Good disease suppression.  
 F—Fair disease suppression.  
 P—Poor to no disease suppression.  
 N—No efficacy.  
 U—Unknown efficacy.

# COMMERCIAL VEGETABLE NEMATODE CONTROL

Abolfazl Hajihassani, Extension Nematologist

Follow manufacturer's label in all cases.

COMMODITY	MATERIAL	APPLICATION METHOD FOR GIVEN SOILS	PRODUCT (AMT/ACRE)	FORMULATED (OZ/100 FT ROW) (OR 100 SQ FT)	SCHEDULE AND REMARKS	
Most Vegetables (multi-purpose fumigants)	Telone II (1,3-dichloropropene; 1,3-D)	Broadcast, mineral soil	9–15 gal	2.6–5.3 fl oz	Fall application usually preferred to spring application. Wait 3 weeks before planting; longer if soil is cold or very wet. Chisels should be spaced 12" and inserted 6–8" deep (8–12" deep in very sandy soils). See label for specific details for application of Telone EC.	
		Broadcast, muck or peat soil	24–36 gal	7–10.6 fl oz		
		Row, mineral soil	5.3–10.8 gal	4.5–6 fl oz		
		Row, muck or peat soil	14.3–21.6 gal	14.2–21.2 fl oz		
	Telone EC (1,3-D + chloropicrin)	Drip tape application	9–18 gal	—	Fall application often is preferred to spring application. Wait 3 weeks before planting or longer in cold, wet soil, or if odor persists. Read label for row application use in organic soils, chisel depth, and spacing, exact rates, and special uses. Vapam and K-Pam can also be used in a sprinkling system. When used with plastic covers, all products are more effective and lower rates can be used. Follow label for application of InLine and Dominus.	
		Broadcast	9–24 gal	—		
	Vapam, Setacon 42 (metam-sodium)	Broadcast	37.5–75 gal	7.2–14.4 fl oz		
	K-Pam, Setacon K54 (metam-potassium)	Broadcast	30–62 gal	5.8–11.5 fl oz		
		Chloropicrin	Broadcast, mineral soil	37–82 gal		11–24 fl oz
	Row		15–25 gal	4.4–7.3 fl oz		
	Telone C17 (1,3-D + chloropicrin)	Broadcast (mineral)	10.8–17.1 gal	3.5–5.9 fl oz		
		Broadcast (muck or peat)	27.4–30 gal	—		
InLine (1,3-D + chloropicrin)	Drip tape application	13–30.8 gal	—			
Dominus (allyl isothiocyanate)	Broadcast	25–40 gal	—			
<b>NON-FUMIGANTS (ALL VEGETABLE TRANSPLANTS)</b>						
Beans (Snap and Lima)	Mocap 15% G	Broadcast	40–54 lb	N/A		Make application in a band 12–15" wide on the row. Make only one application per season. Follow label directions for application of Mocap 15G. Broadcast application should be done from 3 days before planting to at-planting time. Use of higher rates of Mocap 15G is recommended for fields with high population density of nematodes.
		Row (36 inch row spacing)	13–20 lb	1.44–2.24 fl oz		
Cabbage	Mocap 150% G	Broadcast	34 lb	N/A		
		Row (36 inch row spacing)	13 lb	0.9 lb		
Cucumber	Mocap 15% G	Row (7 ft row spacing)	13 lb	2.1 lb	Use of Mocap 15G as a seed furrow treatment is not recommended. See label for directions.	
	Nimitz	Broadcast Band or drip tape application	3.5–7 pt	56–112 fl oz	Apply a minimum of 7 days before transplanting. Do not apply more than 1 application per crop, and no more than 112 fl oz of product/A/ year. Do not plant any crops not on this label into treated land for 365 days after application of product.	

Follow manufacturer’s label in all cases.

COMMODITY	MATERIAL	APPLICATION METHOD FOR GIVEN SOILS	PRODUCT (AMT/ACRE)	FORMULATED (OZ/100 FT ROW) (OR 100 SQ FT)	SCHEDULE AND REMARKS
Cucumber (continued)	Vydate L (oxamyl)	Pre-plantbroadcast, band treatment, drip tape application	0.5–1 gal	—	Follow label for application timing, rates and methods.
		Foliar treatment	2–4 pt	—	
Cucurbit vegetables including melons (cantaloupes, watermelon & honeydew), squash, and other cucurbits  Fruiting vegetables including tomatoes, okra, eggplant, peppers (bell & non-bell)  Brassica (Cole) leafy vegetables including broccoli, cabbage, cauliflower and other brassicas  Leafy vegetables including celery, lettuce (head and leaf), spinach and other leafy vegetables	Nimitz (fluensulfone)	Broadcast	3.5–7 pt	56–112 fl oz	Apply 7 days before seeding/transplanting. Do not apply more than 1 application per crop, and no more than 112 fl oz of product/A/year. Do not plant any crops not on this label into treated land for 365 days after application of product.  Apply and incorporate 6–8" deep. Irrigate with 0.5 to 1.0 in. of water 2–5 days after application.
		Banded soil	See label	—	Table 2 in label specifies rate based on row spacing. Incorporate 6 to 8" deep at least 7 days before transplanting. Irrigate with 0.5 to 1.0 in. water 2–5 days after application.
		Drip irrigation	See label	—	Table 3 in label specifies rate based on bed width. Uniformly wet entire bed width and root zone 6–8" deep at least 7 days before transplanting. Irrigate with 0.5 to 1.0" of water 2–5 days after application.
Sweet Potato	Mocap 15% G (ethoprop)	Broadcast	60–80 lb	—	
		Row (42" spacing)	20–26 lb	2.56–3.36 fl oz	Apply on row 12–15" band, incorporate 2–4" deep, apply 2 to 3 weeks before planting. Make only one application per season.
	Mocap EC (ethoprop)	Row (42" spacing)	—	0.51–0.69 fl oz	Incorporate 2–4" deep.
Sweet Corn	Mocap 15% G	Row	—	1.2–1.6 fl oz	Apply on row 12–15" band for row application. Incorporate 2–4", plant immediately or 3 days later.
		Broadcast	40 lb	—	
	Counter 20G (terbufos)	Row	—	4.5–6 fl oz	Place granules in 4–5" band over the open seed furrow and incorporate thoroughly into top 1" of the soil. Apply no more than 6.5 lb per acre.
		In-furrow	—	4.5–6 fl oz	Place granules directly in the seed furrow behind planter shoe.
Cabbage (transplants & direct seed)	Mocap EC	Row (36" spacing)	2.4 fl oz	—	Incorporate in soil 2 to 4" deep. Do not apply into seed furrow.

## COMMERCIAL VEGETABLE NEMATODE CONTROL

Follow manufacturer's label in all cases.

COMMODITY	MATERIAL	APPLICATION METHOD FOR GIVEN SOILS	PRODUCT (AMT/ACRE)	FORMULATED (OZ/100 FT ROW) (OR 100 SQ FT)	SCHEDULE AND REMARKS
Irish Potatoes	Mocap 15% G	Row (36" spacing)	N/A	1.4 lb (100 ft row)	For suppression of stubby root nematodes. Incorporate 2 to 4" deep. Avoid application of Mocap 15G directly into seed furrow. Make only one application per season and do not make aerial applications.
		Broadcast	40–60 lb	N/A	For suppression of stubby root nematodes; Apply and immediately incorporate 2 to 4" deep no more than 2 wk before planting or before crop emergence. Make only one application per season and do not make aerial applications.
	Mocap EC	Row (36" spacing)	N/A	4.4 fl oz (100 ft row)	For suppression of stubby root nematodes.
		Broadcast	1–1.5 lb (max 9 lb/A)	N/A	In broadcast applications, the product should be incorporated 2–4" deep 2 weeks before planting.
	Vydate C-LV	Foliar ground, Drip tape, Aerial, At-plant in-furrow	See label		Vydate C-LV is labeled for potatoes to manage nematodes and certain insects. Therefore, see the label for application details.
Brassica (Cole) Leafy Vegetables, Cucurbits, Fruiting vegetables	Velum Prime ( <i>fluopyram</i> )	Drip irrigation	6.5 to 6.84 fl oz	—	See label for specific labeled crops. Chemigation into root zone through low-pressure drip, trickle, micro-sprinkler or equivalent equipment. Can be applied the day of harvest. Velum is also labeled for powdery mildew control. The first foliar fungicide application after Velum Prime should be a product from a different FRAC group.
Potatoes					Apply specified dosage using overhead chemigation equipment. May offer suppression only if root-knot nematode pressure is high and other methods of suppression should also be employed. Velum Prime is also registered to suppress early blight ( <i>Alternaria solani</i> ) and suppress white mold ( <i>Sclerotinia sclerotiorum</i> ).
Sweetpotato					Apply as post-planting drench, or hill drench. May offer suppression only if root-knot pressure is high and other methods of suppression should also be employed. Velum Prime is also registered to suppress white mold ( <i>Sclerotinia sclerotiorum</i> ).
Brassica (Cole) Leafy Vegetables Fruiting Vegetables Leafy vegetables (except Brassica) Potato and other tubers	Movento ( <i>spirotetramat</i> )	Foliar Drip irrigation		4.5–5.0 fl oz	Movento is labeled for these crops to suppress or control nematode and insect pests. Must be tank-mixed with a spray adjuvant/additive to maximize leaf uptake. Follow the label for the application method, interval and timing.
Cantaloupe, Honeydew melon, Watermelon, Squash, Pumpkin, Pepper (bell and non-bell), Carrot, Cucurbits, Eggplant, Onion, Potato, Sweet Potato, Tomato	Vydate L (Vydate is labeled on many vegetable crops. Therefore, follow the label carefully for application timing, rates and methods.)	Pre-plant	2–4 gal	—	See label for details on application rates and methods for specific crops.
		In-furrow	1–2 gal	—	Broadcast in 20 gal water (carrot). Apply in seed furrow (carrot).
		Foliar	2–4 pt	—	Incorporate 2–4" in soil (cucurbits, eggplant).
		Transplant water	2–4 pt in 40–200 gal	—	Apply 2–4 weeks after planting and again 2–3 weeks later (cucurbits, eggplant). Transplant is for pepper only. Use in 40–200 gal water/A.
		Drip irrigation	2–4 pt	—	Can use up to 8 pt/A on large tomatoes (see label). Foliar applications for pepper and tomato.

# COMMERCIAL VEGETABLE WEED CONTROL

Stanley Culpepper, Extension Agronomist—Weed Science  
Taylor Randell, Extension Agronomist—Weed Science

## ASPARAGUS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>ASPARAGUS: PRE-EMERGENCE (Seeded and New Crown Plantings)</b>						
Contact kill of green foliage; annual weeds should be 3" or less.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.7–2.7 pt 2.5–4 pt	0.64–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix.
Most emerged weeds except for resistant pigweed or horseweed, spiderwort, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)	9	16–32 fl oz 11–22 fl oz 10–21 fl oz	0.38–0.77 lb ae	4 H/ NA	Apply to emerged weeds but before crop emergence. Do not apply within a week of when spears emerge. Perennial weeds may require higher rates. The need for an adjuvant depends on brand used.
<b>ASPARAGUS: POST-EMERGENCE (Seeded and New Crown Plantings)</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>linuron</i> Lorox DF 50WDG	7	1–2 lb	0.5–1	24 H/ 1 D	Apply when ferns are 6–18" and weeds are < 4". Do not use a surfactant or fertilizer solution in spray mixture. Use lower rate on coarse soils; label prohibits application on sands or loamy sands. Repeat applications may be made, but do not exceed 4 lb/A/yr.
Actively growing annual and perennial grasses. In general, <i>clethodim</i> and <i>fluazifop</i> are better on perennials such as bermudagrass.	<i>fluazifop-P-butyl</i> Fusilade DX 2EC	1	6–16 fl oz	0.1–0.25	12 H/ 1 D	With <i>sethoxydim</i> , add 1 qt COC/A. With <i>fluazifop-P</i> , add 1 qt NIS or 1 gal COC/100 gal of spray mix. Do not apply more than 48 oz/A/season <i>fluazifop</i> ; do not apply more than 5 pt/A/season <i>sethoxydim</i> .
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.29	12 H/ 1 D	Do not mix with other pesticides.
	<i>clethodim</i> SelectMax 0.97EC TapOut 0.97EC	1	9–16 fl oz 9–16 fl oz	0.07–0.12	24 H/ 1 D	Add NIS at 1 qt/100 gal spray mix. Do not apply more than 64 oz/A/season. Select 2 EC is also labeled at 6–8 fl oz/A and can be applied twice 14 days apart; label requires mixing with crop oil, which may cause injury, and has a 1 D PHI. Do not mix with other pesticides.
<b>ASPARAGUS: POST-EMERGENCE (Transplant Crowns or Established Beds)</b>						
Post control of nutsedge, ragweed, wild radish. Residual control of pigweed and radish.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1 oz	0.024–0.048	12 H/ 1 D	Apply before, during, or after harvest season. For 1st year transplants, apply no sooner than six weeks after fern emergence. See label regarding the need for an adjuvant. Two applications per crop cycle can be made as long as they are at least 21 days apart. Contact with fern may cause yellowing. Try on limited acreage; no GA research.

## COMMERCIAL VEGETABLE WEED CONTROL

### ASPARAGUS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>ASPARAGUS: PRE-EMERGENCE (Established at Least 2 Years)</b>						
Annual grasses, including Texas millet, and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan 4EC	3	1–3 pt	0.5–1.5	12 H/ NA	Apply to dormant asparagus in winter or early spring after removing mature ferns. Do not apply after new spears begin to emerge. Do not apply more than 2 pt/A on coarse soils. Split applications (before and after harvest) may also be used. Treflan must be incorporated within 8 hours of application.
Annual grasses and small-seeded broadleaves.	<i>napropamide</i> Devrinol 50DF	15	8 lb	4	24 H/ NA	Apply to the soil surface in spring before weed and spear emergence. Do not exceed 8 lb/A/year.
Annual broadleaf and grass weeds.	<i>linuron</i> Lorox DF 50WDG	7	2–4 lb	1–2	24 H/ 1 D	Apply before cutting season or immediately after cutting. Do not use a surfactant or fertilizer solution in spray mixture. Lower rate on coarse soils; label prohibits use on sand or loamy sand soils. Repeat applications may be made, but do not exceed 4 lb/A/yr.
	<i>diuron</i> Karmex 80DF Direx 4L	7	1–2 lb 0.8–1.6 qt	0.8–1.6	12 H/ NA	Apply in spring no earlier than 4 wk before spear emergence and no later than early cutting period. A second application may be made immediately after last harvest but do not exceed 3 lb Karmex or 2.4 qt Direx/A/season. Low rates are more suitable on most GA soils.
	<i>terbacil</i> Sinbar 80WP	5	0.25–0.5 lb	0.2–0.4	12 H/ 5 D	Apply in spring before weeds emerge and before new growth, or in the fall after plants become dormant. Higher rates can be used on some soils, see label. Not recommended for soils containing less than 1% organic matter. Do not allow Sinbar to come into contact with exposed roots. Study rotation restrictions.
	<i>metribuzin</i> numerous brands 75DF Metri 4F	5	1.3–2.67 lb 2–4 pt	1–2	12 H/ 14 D	Make a single application to small emerged weeds and soil surface in early spring before spear emergence. Low rates are suggested for most GA soils; see label. Do not apply within 14 days of harvest or after spear emergence. Apply POST only after the last spears are harvested. Do not exceed 2 lb ai/A/year.
<b>ASPARAGUS: POST-EMERGENCE (Established at Least 2 Years)</b>						
Broadleaf weeds including radish, primrose, spiderwort, horseweed; often does not adequately control henbit, chickweed, or geranium.	<i>2,4-D</i> Amine 4 3.8 SL	4	1.5–2 qt	1.4–1.8	48 H/ 3 D	Apply in spring before spear emergence or immediately following a clean cutting. Also may apply after last harvest but prior to emergence. Post-harvest sprays should be directed under ferns, avoiding contact with ferns, stems, or emerging spears. Do not make more than 2 applications/season (2 lbs ae/A). Applications should be spaced at least 30 days apart. Do not apply if sensitive crops are planted nearby or if conditions favor drift or volatility.
Broadleaf weeds including horseweed, and mornningglory; good on primrose; poor on large radish.	<i>dicamba</i> Clarity 4 SL	4	8 to 16 fl oz	0.25 to 0.5	12 H/ 1 D	Apply immediately after cutting but at least 24 hours before next cutting. Apply in 40 to 60 gallons of diluted spray to emerged and actively growing weeds. If spray contacts emerged spears, twisting of some spears may result. Do not harvest twisted spears. Do not apply more than 0.5 lb ai/A per year. Do NOT add ammonium salt products or any product that reduces water pH. Do not apply if sensitive crops are planted nearby or if conditions favor drift or volatility.

ASPARAGUS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>ASPARAGUS: POST-EMERGENCE (Established at Least 2 Years) (continued)</b>						
Contact kill of emerged weeds, and contact kill of volunteer ferns.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.7–2.7 pt 2.5–4 pt	0.64–1	24 H/ 6 D	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to control emerged weeds (including volunteer ferns). Apply prior to emergence of crop or after last harvest; crop plants emerged will be killed. Add 1 qt NIS or 1 gal COC/100 gal spray mix. Do not make more than 3 applications/yr.
Most emerged weeds except for resistant pigweed or horseweed, spiderwort, big morningglory, established volunteer ferns.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	16–32 fl oz 11–22 fl oz 10–21 fl oz	0.38–0.78 lb ae	4 H/ 14 D	Apply to emerged weeds up to 1 week before spear emergence, or immediately after last cutting has removed all above-ground parts, or as a directed spray under mature ferns.  <b>Direct contact of spray with asparagus may result in serious crop injury.</b> For spot treatment, apply immediately after cutting, but prior to emergence of new spears. The need for an adjuvant varies by brand.
Post-emergence control of nutsedge, wild radish, and ragweed. Residual control of pigweed and radish.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1.5 oz	0.024–0.072	12 H/ 1 D	<b>Post-emergence:</b> Apply before or during the harvesting season. Do not use an adjuvant as unacceptable crop injury may occur. However when not including a surfactant, weed control may be reduced.  <b>Post-Harvest:</b> Apply after final harvest with drop nozzles to limit contact with crop. Contact with the fern may result in temporary yellowing. Add a NIS at 1 qt/100 gal of spray mixture. Under heavy nutsedge pressure, split applications will be more effective, see label for details. Do not exceed 2 oz/A/yr; do not make more than 2 applications/crop cycle.
Annual grasses and small-seeded broadleaf weeds.	<i>linuron</i> Lorox DF 50WDG	7	1–2 lb	0.5–1	24 H/ 1 D	Apply before weeds exceed 2" and before cutting or immediately after cutting. Do not use a surfactant or fertilizer solution in spray mixture. Label prohibits use on sand or loamy sand soils. Do not exceed 4 lb/A/yr, including PRE applications.
Actively growing annual and perennial grasses. In general, <i>clethodim</i> and <i>fluazifop</i> are better on perennial grasses such as bermudagrass.	<i>clethodim</i> SelectMax 0.97EC TapOut 0.97EC	1	9–16 fl oz 9–16 fl oz	0.07–0.12	24 H/ 1 D	Add NIS at 1qt/100 gal spray mix. Do not apply more than 64 oz/A/year. Select 2 EC is also labeled at 6–8 fl oz/A and can be applied twice 14 days apart; label requires mixing with crop oil, which may cause injury.
	<i>fluazifop-P-butyl</i> Fusilade DX 2EC	1	8–16 fl oz	0.13–0.25	12 H/ 1 D	For <i>fluazifop-P</i> , add 1 qt NIS or 1 gal COC/100 gal of spray mix. For <i>sethoxydim</i> , add 1 qt COC/A. Do not apply more than 48 oz/A/season of <i>fluazifop</i> ; do not apply more than 5 pt/A/season <i>sethoxydim</i> .
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.28	12 H/ 1 D	The addition of adjuvants can increase injury potential in hot and/or moist environments.  Do not mix with other pesticides.

## COMMERCIAL VEGETABLE WEED CONTROL

### BEANS

RECOMMENDED HERBICIDE USES IN SPECIFIC BEAN CROPS		BEAN TYPE			
HERBICIDE	APPLICATION METHOD*	DRY	LIMA	SNAP	SOUTHERN PEA
<i>carfentrazone</i> Aim EC	Pre-plant	X	X	X	X
<i>paraquat</i> (numerous brands)	Pre-plant		X	X	X
<i>glyphosate</i> Roundup, others	Pre-plant	X	X	X	X
<i>EPTC</i> Eptam	PPI	X		X	
<i>ethalfluralin</i> Sonalan	PPI	X			
<i>pendimethalin</i> Prowl, others	PPI	X	X	X	X
<i>trifluralin</i> Treflan, others	PPI	X	X	X	X
<i>imazethapyr</i> Pursuit	PPI or PRE	X	X	X	X
<i>S-metolachlor</i> Dual Magnum	PPI or PRE	X	X	X	X
<i>fomesafen</i> Reflex	PRE	X		X	
<i>halosulfuron</i> Sandea	PRE	X	X	X	
<i>clomazone</i> Command 3 ME	PRE		X	X	X
<i>bentazon</i> Basagran	POST	X	X	X	X
<i>clethodim</i> SelectMax, TapOut	POST	X	X	X	X
<i>fluazifop</i> Fusilade DX	POST	X			
<i>fomesafen</i> Reflex	POST	X		X	
<i>halosulfuron</i> Sandea	POST		X	X	
<i>imazethapyr</i> Pursuit	POST	X			X
<i>quizalofop-P-ethyl</i> Assure II, Targa	POST	X		X	X
<i>sethoxydim</i> Poast	POST	X	X	X	X
<i>s-metolachlor</i> Dual Magnum	Directed or POST		X	X	X
<i>carfentrazone</i> Aim EC	Row Middle Only	X	X	X	X
<i>glyphosate</i> Roundup, others	Row Middle Only	X	X	X	X
<i>halosulfuron</i> Sandea	Row Middle Only	X	X	X	

\* PPI—pre-plant incorporated; PRE—Pre-emergence; POST—Post-emergence.



BEANS

BEAN TYPES LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>BEANS: PRE-PLANT (Refer to the First Column to Determine Specific Herbicide Labeled for Each Bean Type)</b>							
Dry Bean Lima Bean Snap Bean Southern Pea	Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae)	9	32–64 fl oz	0.75–1.54 lb ae	4 H/ NA	Apply at least 3 days before seeding; irrigate after application and before planting.  For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
		5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)		22–44 fl oz 21–41 fl oz			
	Morningglory, spiderwort, and small pigweed.	<i>carfentrazone</i> Aim EC 2.0 EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	Apply prior to or within 24 hr of planting to weeds less than 3"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.
Lima Bean Snap Bean Southern Pea (not Dry Bean)	Contact kill of green foliage; annual weeds should be less than 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix.  For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5-7 days later.
<b>BEANS: PRE-PLANT INCORPORATED (Refer to the First Column to Determine Specific Herbicide Labeled for Each Bean Type)</b>							
Dry Bean (not Lima, Snap or Southern Pea)	Annual grasses including Texas millet, and small-seeded broadleaf weeds including pigweed and purslane.	<i>ethalfuralin</i> Sonalan HFP 3EC	3	1.5–2 pt	0.6–0.75	24 H/ NA	Apply PPI 2–3" into the soil before planting in the spring. Fall applications may be made only with dry bulk fertilizer (according to the label). Use lower rates on coarse soils or when following with a Dual type product PRE.
Dry Bean Lima Bean Snap Bean Southern Pea		<i>pendimethalin</i> Prowl 3.3EC Prowl H20 3.8AS	3	1.8–2.4 pt 1.5–2 pt	0.75–1 0.72–0.95	24 H/ NA	Incorporate 1–2" deep prior to planting. Rates lower than some products recommend (1.2–1.5 pt/A) are suggested for sandy soils with low organic matter or when following with a Dual type product PRE.  Applying immediately after planting and then irrigating is not supported by the label because of injury concerns.
		<i>trifluralin</i> Treflan 4EC Trifluralin 4EC	3	1 pt 1 pt	0.5	24 H/ NA	Incorporate 2–3" deep, within 8 hr of application, into the soil prior to SPRING (according to label) planting. Rates lower than those labeled (12 oz/A) are suggested for sandy soils with low organic matter or when following with a Dual type product PRE.  Applying immediately after planting and then irrigating is not supported by the label.
Dry Bean Snap Bean (not Lima Bean or Southern Pea)	Annual grass, broadleaves, nutsedge suppression.	<i>EPTC</i> Eptam 7E	8	2.25–3.5 pt	2–3	12 H/ NA	Apply PPI 3" deep into the soil before planting. Suggest mixing with <i>pendimethalin</i> or <i>trifluralin</i> ; see label for recommendations and restrictions.

## COMMERCIAL VEGETABLE WEED CONTROL

### BEANS

BEAN TYPES LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>BEANS: PRE-PLANT INCORPORATED OR PRE-EMERGENCE (Refer to the first column to determine specific herbicide labeled for each bean type)</b>							
Dry Bean Lima Bean Snap Bean Southern Pea	Annual grass and broadleaf weeds including pigweed, spiderwort, and purslane; partial control of Texas millet.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	12–16 fl oz	0.7–0.95	24 H/ NA	Apply PRE after planting, but before crop emergence, or apply pre-plant, and soil incorporate 2" deep into the soil before planting. <i>PRE application suggested</i> ; apply within 1 day of planting and irrigate within 1 day of application (2 days after planting). Use lower rates on sandy soils with low organic matter and when in a system with <i>pendimethalin</i> or <i>trifluralin</i> . Other brands are available; check label for rates of other brands if used.
	Wild radish, nightshade, suppression of non-ALS resistant pigweed and purslane.	<i>imazethapyr</i> Pursuit 2EC	2	See remarks for rate by bean type	See remarks	4 H/ See remarks	Apply preplant before planting or PRE to the soil surface immediately after planting; suggest PRE application. Consider mixing with a grass herbicide. Dry beans include navy great northern, red kidney, black turtle, cranberry, Pinto, and small white dry beans, and adzuki. Rotational restrictions are a significant concern, see label. Do not make more than 1 application per year.  <b>Rates per acre by bean type:</b> Dry: 2–3 fl oz; 0.03–0.047 lb ai; 60 day PHI Lima: 2–3 fl oz; 0.03–0.047 lb ai; 30 day PHI Snap: 1.5 fl oz; 0.023 lb ai; 30 day PHI Southern pea: 3–4 fl oz; 0.047–0.06 lb ai; 30 day PHI
<b>BEANS: PRE-EMERGENCE (Refer to the first column to determine specific herbicide labeled for each bean type)</b>							
Snap Bean (not for Dry Bean, Lima Bean, or Southern Pea)	Annual grasses and broadleaf weed suppression; weak on pigweed.	<i>clomazone</i> Command 3ME	13	0.4–0.67 pt	0.15–0.25	12 H/ NA	Apply PRE to the soil surface immediately after seeding. See label for buffer and rotation restrictions.
Dry Bean Lima Bean Snap Bean (devastating injury for Southern Pea)	Nutsedge suppression; non-ALS resistant pigweed, ragweed, wild radish.	<i>halosulfuron</i> Sanda 75DF	2	0.5–0.67 oz	0.024–0.031	12 H/ 30 D	Apply within 1 day of planting; do not apply while soil is cracking. Use lower rate on coarse soils with low organic matter. See label for higher rate use on lima and snap beans.
Snap Bean Dry Bean (not for Lima Bean or Southern Pea; serious injury)	Pigweed, wild radish, bristly starbur, and suppression of yellow nutsedge.	<i>fomesafen</i> Reflex 2EC	14	12–16 fl oz	0.19–0.25	24 H/ Dry Beans 45 D; Snap Beans 30 D	A rate of 12 oz/A is ideal for most soils. Apply as a PRE application within 1 day of planting. Overhead irrigate lightly after application between 2 days after planting and 36 hours before emergence in an effort to avoid splashing treated soil onto beans when they are emerging. Rotational restrictions are a significant concern to some crops, see label. Do not make more than 1 application/year (includes POST).

BEANS

BEAN TYPES LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>BEANS: POST-EMERGENCE BROADLEAF WEED CONTROL (Refer to the first column to determine specific herbicide labeled for each bean type)</b>							
Dry Bean Lima Bean Snap Bean Southern Pea	Annual broad-leaf weeds such as cocklebur and smallflower morningglory.	<i>bentazon</i> Basagran 4SL Basagran 5SL	6	6–16 fl oz 4.8–12.8 fl oz	0.19–0.5	48 H/ Succulent Southern Pea 10 D All other crops 30 D	Dry beans, Lima beans, and Snap beans are tolerant after the first trifoliate leaf has fully expanded. For Southern pea, English pea, or Garden pea, apply after 3 pairs of leaves are present. Yellowing, bronzing, speckling or burning of leaves may occur.  According to the label, Basagran cannot be applied alone and must be mixed with Raptor or Pursuit, see labels. <b>However, neither Raptor nor Pursuit are labeled post-emergence on all bean types;</b> see labels.  The addition of an oil additive may increase leaf burn.
Dry Bean Snap Bean (Not for Lima Bean or Southern Pea; significant injury)	Morningglory and pigweed less than 1".	<i>fomesafen</i> Reflex 2EC	14	12–16 fl oz	0.19–0.25	24 H/ Dry Beans 45 D Snap Beans 30 D	Apply to beans with at least two fully expanded trifoliate leaves; add NIS at 1 qt/100 gal of spray. Minor injury is expected. Injury may be more severe if applied in the morning with plants wet or when applying under overcast sky that clears off to significant sun/heat.  Allow at least 3 days between an application of Reflex and a grass herbicide. One application/yr. <i>Rotational restrictions are significant to some crops, see label.</i>
Dry Bean Lima Bean Snap Bean (Not for Southern Pea; damage is severe)	Nutsedge, ragweed, cocklebur, and wild radish.	<i>halosulfuron</i> Sanda 75DG	2	0.5–0.67oz	0.024–0.031	12 H/ 30 D	Apply after the 3rd trifoliate stage but before flowering. Directed sprays are recommended to reduce injury. Can cause temporary chlorosis and stunting; rarely there is a maturity delay of a few days. Greatest injury most often occurs in cool environments when the crop is growing slowly. Add NIS at 1qt/100 gal spray mix. Do not exceed 1 oz/A/crop cycle (PRE + Post + Hood). <b>Label states use of Sandea is at the grower's risk.</b> Review rotational restrictions.
Dry Bean Southern Pea (Not for Lima or Snap Bean)	Wild radish, nightshade, suppression of non-ALS resistant pigweed and purslane.	<i>imazethapyr</i> Pursuit 2EC	2	See remarks for rate for each bean type	See remarks	4 H/ See remarks	<b>Dry Bean:</b> apply 3 fl oz (0.047 lb ai/A; PHI 60 days) after bean has at least one fully expanded trifoliate leaf. Dry beans include navy great northern, red kidney, black turtle, cranberry, pinto, and small white dry beans.  <b>Southern Pea:</b> apply 3–4 fl oz (0.047–0.063 lb ai/A; PHI 30 days) after Southern pea is at least 3" tall but prior to 5 nodes and before flowering.  Add NIS at 1 qt/100 gal spray mixture; do not use COC. Do not make more than 1 application/year. <b>Rotational restrictions are a significant concern, see label.</b>

## COMMERCIAL VEGETABLE WEED CONTROL

### BEANS

BEAN TYPES LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>BEANS: POST-EMERGENCE GRASS CONTROL (Refer to the first column to determine specific herbicide labeled for each bean type)</b>							
Dry Bean Lima Bean Snap Bean Southern Pea	Actively growing grasses. In general <i>clethodim</i> , <i>fluazifop</i> , and <i>quizalofop</i> are better on perennials while <i>clethodim</i> and <i>sethoxydim</i> are better on annuals.	<i>clethodim</i> SelectMax 0.97EC TapOut 0.97EC	1	9–16 fl oz 9–16 fl oz	0.07–0.12	24 H/ Dry beans 30 D Others 21 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant. Applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with the lowest injury potential. The addition of NIS with SelectMax at 1 qt/100 gal spray mix is recommended for large grasses and goosegrass. Repeat application may be made with a minimum 14 day interval.  Select 2 EC is also labeled at 6–8 fl oz/A; label requires mixing with crop oil, which may cause injury. Other brands are available.  Do not apply a POST broadleaf herbicide within 3 days of <i>clethodim</i> as reduced grass control may occur. Do not mix with other pesticides.
Dry Bean (Not for Lima, Snap or Southern Pea)		<i>fluazifop-P-butyl</i> Fusilade DX 2EC	1	8–16 fl oz	0.13–0.25	12 H/ 60 D	Label requires addition of 1 qt NIS or 1 gal COC/100 gal of spray mix; crop oil increases injury potential. Do not apply more than 48 oz/A/season. Do not mix with other pesticides.
Dry Bean Snap Bean Southern Pea (Not for Lima Bean)		<i>quizalofop P-ethyl</i> Assure II 0.88EC Targa 0.88EC	1	6–12 fl oz 6–12 fl oz	0.04–0.08	12 H/ Dry beans 30 D Southern pea 30 D Snap beans 15 D	Add 1 qt NIS/100 gal spray. Do not mix with other pesticides. For dry bean, do not apply more than 24 oz/A of Assure or 28 oz/A of Targa per season. For snap bean or southern pea do not apply more than 14 oz/A/season.
Dry Bean Lima Bean Snap Bean Southern Pea		<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.29	12 H/ Dry bean 30 D Others 15 D	Label requires addition of COC at 1 qt/A; see label about use of other additives. Adding crop oil increases injury potential. Do not mix with other pesticides. Do not apply more than 4 pt/A/season.
<b>BEANS: POST-EMERGENCE OR DIRECTED ROW MIDDLE SPRAY (Refer to the first column to determine specific herbicide labeled for each bean type)</b>							
Lima Bean Snap Bean Southern Pea (Not for Dry Bean)	Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	8–12 fl oz	0.47–0.7	24 H/ 50 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use. Apply after 1st trifoliolate; expect some leaf speckling if applied topically. Greater damage expected on southern pea, suggest only 8 oz/A if topically applied. Avoid spraying plants with dew and apply only in water. <b>Label is designed for directed application while cultivating.</b>  Do not apply more than 2 pt/A of Dual Magnum for the entire season including PRE and POST.

BEANS

BEAN TYPES LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>BEANS: ROW MIDDLE SPRAY (Refer to the first column to determine specific herbicide labeled for each bean type)</b>							
Dry Bean Lima Bean Snap Bean Southern Pea	Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Apply as a hooded spray or as a wiper application in row middles; UGA suggests against hooded sprays as drift often occurs. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
	Moringlory, spiderwort, and small pigweed, 1" or less.	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles avoiding contact with crop. Apply to weeds less than 2". Add 1–2 gal COC/100 gal of spray mix.
Dry Bean Lima Bean Snap Bean (Not for southern pea, severe damage)	Nutsedges, non ALS-resistant pigweed, cocklebur, ragweed, radish.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1 oz	0.024–0.048	12 H/ 30 D	Apply between crop rows minimizing contact with crop. For emerged weeds add a NIS at 1 qt/100 gals of spray mix. For dry bean, do not exceed two applications of 0.67 oz/A/crop cycle. For lima and snap bean, do not make more than two applications and do not exceed 1 oz/A/crop cycle.

## COMMERCIAL VEGETABLE WEED CONTROL

### BEETS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (HOURS OR DAYS)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>BEETS (GARDEN OR TABLE): PRE-PLANT</b>						
Most emerged weeds except for resistant pigweed, primrose, spiderwort, or big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ NA	<b>Garden beets only.</b> Apply at least 3 days before seeding; if possible, irrigate after application and before planting.
<b>BEETS (GARDEN OR TABLE): POST-EMERGENCE</b>						
A few broadleaf weeds including clover, nightshade, jimsonweed and ragweed.	<i>clopyralid</i> Stinger 3EC	4	0.25–0.5 pt	0.09–0.19	12 H/ 30 D	<b>Garden beets only.</b> Apply to beets between the 2 and 8 leaf stage when weeds are small and actively growing. No Georgia research, try on limited acreage first. Apply no more than 0.5 pt/A/year; see label for rotational restrictions.
Broadleaf weeds; including mustard and purslane suppression.	<i>phenmedipham</i> Spin-Aid 1.3EC	5	3–6 pt	0.58–1.17	12 H/ 60 D	<b>Red (garden) beets only.</b> Apply when beets have at least 6 true leaves and weeds have less than 2 leaves. Use higher rates only on well-established plants on heavier soils not under stress. A split application approach on younger beets using lower rates can be used if needed, see label. Minor crop stunting may be observed for approximately 10 days. Do not use additional wetting agents. <b>Restricted use pesticide.</b> Carryover to grains is a concern.
Actively growing annual and perennial grasses. In general, <i>clethodim</i> will be more effective on perennials such as bermudagrass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 30 D	<b>Garden beets only.</b> For Select, label requires addition of 1 gal COC/100 gal spray mix. For SelectMax or TapOut, add 1qt NIS/100 gal spray mix. Controls annual bluegrass. Adding crop oil will likely increase crop injury. Do not mix with other pesticides. Application of a broadleaf herbicide within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.29	12 H/ 60 D	<b>Garden and Table beets.</b> Label requires addition of 1 qt of COC/A. Adding crop oil will likely increase crop injury. Do not apply more than 5 pt/A/season <i>sethoxydim</i> . Do not mix with other pesticides.
<b>BEETS (GARDEN OR TABLE): ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Apply as a hooded spray or as a wiper application in row middles; UGA suggests against hooded sprays because drift often occurs. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and very small pigweed, < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2", except pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.

CARROTS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CARROTS: PRE-PLANT</b>						
Contact kill of all green foliage; sensitive weeds should be < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix.
Most emerged weeds except for resistant pigweed, primrose, spiderwort, or big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ NA	Apply at least 3 days before seeding; irrigate after application and before planting.
<b>CARROTS: PRE-PLANT INCORPORATE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan, others 4EC	3	1 pt	0.5	12 H/ NA	Apply pre-plant and soil incorporate 2–3" deep before seeding. Incorporate within 8 hours of application or the herbicide may be lost to volatility.
<b>CARROTS: PRE-EMERGENCE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>pendimethalin</i> Prowl H20 3.8 SL	3	< 2 pt	< 0.95	24 H/ 60D	Label says to apply as a pre-emergence treatment within 2 days after planting and to make a single broadcast application by ground, air, or chemigation at 2 pt/A. Georgia research notes this rate is very high for most of our soils/irrigation production systems; <i>trifluralin</i> incorporated may be less injurious. Prowl H20 may also be used at layby as a directed spray to the soil between rows. DO NOT APPLY MORE than 2 pt/A per season.
<b>CARROTS: POST-EMERGENCE BROADLEAF AND GRASS WEEDS</b>						
Annual broadleaf weeds and some grasses.	<i>linuron</i> Lorox DF 50WDG	7	1.5–3 lb	0.75–1.5	24 H/ 14 D	Label prohibits use on soils with < 1% organic matter. Apply after carrots are 3" tall and weeds are less than 2". Label warns that growers are at their own risk if adding surfactant and little benefit from surfactant in weed control has been noted; DO NOT add any other product. Avoid spraying after 3 or more cloudy days or when temperature exceeds 85°F. Repeat applications may be made, but do not exceed 4 lb product/A/yr.
	<i>metribuzin</i> Numerous brands 75DF Metri 4F	5	0.33 lb 0.5 pt	0.25	12 H/ 60 D	Apply overtop when carrots have 5–6 true leaves but weeds are less than 1". Some injury may occur under cool, moist conditions. Avoid spraying after 3 or more cloudy days. Do not apply within 3 days of other pesticides. Need for additive is not discussed on label. Do not exceed 0.5 lb ai/A/ crop season. Try limited acres; some GA growers believe injury level is not acceptable.
Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	8–12 fl oz	0.47–0.7	24 H/ 64 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use. Apply 8 oz/A when carrots are at least 4" and have 5 leaves; 12 oz/A can be applied once carrots are 6" with at least 9 leaves. Avoid spraying plants with dew and apply only in water. Limit use and rate until experience obtained.

## COMMERCIAL VEGETABLE WEED CONTROL

### CARROTS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CARROTS: POST-EMERGENCE GRASS WEEDS</b>						
Actively growing annual and perennial grasses. In general, <i>clethodim</i> and <i>fluzifop</i> are more effective on perennial grasses such as bermudagrass. <i>Clethodim</i> and <i>sethoxydim</i> are more effective on annuals. <i>Clethodim</i> also controls annual bluegrass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 30 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS at 1 pt/100 gal spray mix with SelectMax is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix; injury is more likely with crop oil. <b>Do not mix with other pesticides.</b> Application of a broadleaf herbicide within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.29	12 H/ 30 D	Label requires addition of 1 qt of COC/A; crop oil increases injury potential. Do not apply more than 5 pt/A/season <i>sethoxydim</i> . Do not mix with other pesticides.
	<i>fluzifop-P-butyl</i> Fusilade DX 2EC	1	6–16 fl oz	0.1–0.25	12 H/ 45 D	Label requires addition of 1 gal COC or 1 qt NIS/100 gal spray mix. Adding crop oil increases injury potential. Do not mix with other pesticides. Do not apply more than 48 oz/A/season.
<b>CARROTS: ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, primrose, spiderwort, or big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Apply as a hooded spray or as a wiper application in row middles; UGA suggests against hooded sprays as drift often occurs. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots. The need for an adjuvant varies by brand.
Morningglory, spiderwort, and very small pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2" except pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.



CELERY

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CELERY: PRE-PLANT</b>						
Most emerged weeds except for resistant pigweed.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae in a single application. Also, irrigate (rain) 0.5” and wait at least 7 days between application and transplanting. <b>Seeding:</b> Wait at least 3 days after application before planting and irrigate between application and planting.
Primrose, geranium, pigweed, henbit, and a few grasses; excellent herbicide for winter weeds.	<i>oxyfluorfen</i> Goaltender 4F Goal 2 XL 2EC	14	up to 1 pt up to 2 pt	up to 0.5 lb	24 H/ NA	<b>Transplants only.</b> Apply to soil surface of pre-formed beds at least <b>30 days prior to transplanting.</b> No Georgia research, try on limited acres.
<b>CELERY: PRE-PLANT INCORPORATED OR PRE-EMERGENCE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan, other 4EC	3	1 pt	0.5	12 H/ NA	May be applied to direct seeded or transplant celery before planting, at planting, or immediately after planting. Incorporate within 8 hours of application to avoid losing herbicide to volatility.
	<i>bensulide</i> Prefer 4-E	8	5–6 qt	5–6	12 H/ NA	Apply preplant or PRE after planting. Incorporation needed immediately.
<b>CELERY: POST-EMERGENCE BROADLEAF WEEDS</b>						
Annual grasses and broadleaf weeds 2” and less.	<i>linuron</i> Lorox DF 50WDG	7	1.5–2.5 lb	0.75–1.25 lb	24 H/ 45 D	Make a single application after transplants are established but before celery is 8” tall. Do not use surfactant or crop oil. Avoid spraying after 3 or more cloudy days or when temperature exceeds 85° F. Not recommended for sands or loamy sand soil. Suggest not applying within 3 days of other pesticides.
<b>CELERY: POST-EMERGENCE GRASS WEEDS</b>						
Actively growing annual and perennial grasses. In general, <i>clethodim</i> is more effective than <i>sethoxydim</i> on perennial weeds such as bermudagrass. <i>Clethodim</i> also controls annual bluegrass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 30 D	For Select, label requires addition of 1 gal COC/100 gal spray mix. For SelectMax, add 1qt NIS/100 gal spray mix. Adding crop oil increases injury potential. Do not mix with other pesticides. Application of a broadleaf herbicide within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D	Label requires addition of 1 qt of COC/A; crop oil increases injury potential. Do not apply more than 3 pt/A/season. Do not mix with other pesticides.
<b>CELERY: ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, spiderwort, primrose, or big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Labeled as a hooded spray or as a wiper application in row middles; UGA suggests against hooded sprays because of drift potential. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots. The need for an adjuvant varies by brand.
Morningglory, spiderwort, and very small pigweed < 1”.	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2” except pigweed being less than 1”. Add 1–2 gal COC/100 gal of spray mix.

## COMMERCIAL VEGETABLE WEED CONTROL

### COLE CROPS (Broccoli, Cabbage, Cauliflower)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>COLE CROPS (BROCCOLI, CABBAGE, CAULIFLOWER): PRE-PLANT</b>						
Contact kill of all green foliage; annual weeds should be < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence or transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix. If applying over plastic, must wash off with 0.5" of rain or irrigation in a single event prior to planting.
Most emerged weeds except for resistant pigweed. For nutsedge, purslane, and ryegrass: apply <i>glyphosate</i> followed by <i>paraquat</i> 5-7 days later.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.77–2.25 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting. <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. <b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.
Excellent residual option for henbit, purslane, pigweed, primrose, smartweed, and many others; controls small emerged broadleaf weeds.	<i>oxyfluorfen</i> Goal 2 XL 2EC Galigan 2E Goaltender 4F Galigan H2O 4F	14	8–24 fl oz 8–24 fl oz 4–12 fl oz 4–12 fl oz	0.13–0.375	24 H/ NA	<b>Transplants only.</b> Prepare land, apply oxyfluorfen, irrigate, and then wait 3 days (need at least 1 sunny day) before transplanting. Do not incorporate or knock the bed off after application. Label suggests 0.25 to 0.5 lb ai/A which may be too high for most GA soils. Consider 0.13 to 0.19 lb ai/A for most fields especially when cold.  Do not apply overtop of crop. The use of young (less than 5 weeks old) transplants grown in containers less than 1" increases injury potential. Leaf cupping or crinkling may be observed on leaves present when planting.
<b>COLE CROPS (BROCCOLI, CABBAGE, CAULIFLOWER): PRE-PLANT, PRE-PLANT INCORPORATE, AND/OR PRE-EMERGENCE</b>						
Annual grass and broadleaf weeds; weak on pigweed.	<i>clomazone</i> Command 3ME	13	10.7 fl oz	0.25	12 H/ 45 D	<b>FOR USE IN CABBAGE AND BROCCOLI ONLY!</b> <b>Transplants:</b> Prepare land, apply clomazone, irrigate, and then wait 3 days (need a sunny day) before transplanting. Roots of the transplants must be below the chemical barrier. Some plant whitening will likely occur. See label about rotation restrictions. <i>Rate for Cabbage can be increased to 16 fl oz/A.</i> <b>Seeded:</b> Apply prior to seeding or after seeding but prior to crop emergence. No GA data on seeded crops.
Annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan, others 4EC	3	12–16 fl oz	0.38–0.5	12 H/ NA	<b>Transplants:</b> Apply pre-plant and incorporate into the soil 2–3" within 8 hours of application. Use lower rates on coarse soils with low organic matter or when cold and/or wet. <b>Direct Seeded:</b> Apply pre-plant and incorporate 2–3" into the seed bed within 8 hours of application. Suggest no more than 12 oz/A for most locations. If soil conditions are cool and wet, reduced stands and stunting may occur.

COLE CROPS (Broccoli, Cabbage, Cauliflower)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>COLE CROPS (BROCCOLI, CABBAGE, CAULIFLOWER): PRE-PLANT, PRE-PLANT INCORPORATE, AND/OR PRE-EMERGENCE (continued)</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>bensulide</i> Prefar 4E	8	5–6 qt	5–6	12 H/ NA	Also labeled for, but not limited to, Chinese broccoli, broccoli raab, brussels sprouts, Chinese cabbage, Chinese mustard cabbage, and kohlrabi. Incorporate to a 1" depth or apply immediately after planting followed by irrigation immediately. Check replant restrictions for small grains and other crops on label.
Annual grasses and small-seeded broadleaf weeds including common ragweed and smartweed.	<i>napropamide</i> Devrinol 50DF Devrinol 2-XT	15	2–3 lb 2–3 qt	1–1.5	24 H/ NA	Apply to weed-free soil surface just after seeding or transplanting as a surface application. Rainfall or irrigation will be needed within 24 hours to activate the herbicide; the XT formulation should be SLIGHTLY slower to degrade with lack of activation.  Plantback 60 days to leafy vegetables and 180 days for grains.
<b>COLE CROPS (BROCCOLI, CABBAGE, CAULIFLOWER): POST-EMERGENCE</b>						
Residual control of grasses and some broadleaf weeds including purslane, spiderwort, and partial control of Texas millet.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	10–12 fl oz	0.6–0.7	24 H/ 60 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at syngenta-us.com/labels/indemnified-label-login prior to this use. Label includes Chinese cabbage.  <b>Transplants:</b> After transplanting in bareground, irrigate to seal soil around root ball; about 10 days after sealing soil apply Dual Magnum overtop. If applying in mulched systems, apply 10 days after transplanting. <b>Seeded:</b> Apply overtop after crop reaches 3".
Actively growing annual and perennial grasses. In general, <i>clethodim</i> is more effective on perennial weeds like bermuda grass. <i>Clethodim</i> also controls annual bluegrass.	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D	Label requires addition of 1 qt of COC/A. Crop oil increases potential for injury. Do not apply more than 3 pt/A/season. Do not mix with other pesticides.
	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 30 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" is the best option for control while minimizing injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, label requires addition of 1 gal COC/100 gal spray mix; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide within 3 days of <i>clethodim</i> may result in reduced grass control.
Limited weed spectrum such as clover, sowthistle, cocklebur, ragweed.	<i>clopyralid</i> Stinger 3EC	4	0.25–0.5 pt	0.09–0.19	12 H/ 30 D	Labeled for broccoli, cabbage, cauliflower, broccoli raab, brussels sprouts, cavalo broccoli, Chinese cabbage (bok choy), Chinese broccoli, Chinese mustard, and Chinese cabbage (Napa). Apply to crop when weeds are small and actively growing. Do not exceed 0.5 pt/A/yr. <b>Review rotational restrictions.</b>
<b>COLE CROPS (BROCCOLI, CABBAGE, CAULIFLOWER): ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, primrose, spiderwort or big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Label allows a hooded spray or as a wiper application in row middles; UGA suggests against hooded sprays because of drift potential. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots. The need for an adjuvant varies by brand.

## COMMERCIAL VEGETABLE WEED CONTROL

### COLE CROPS (Broccoli, Cabbage, Cauliflower)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>COLE CROPS (BROCCOLI, CABBAGE, CAULIFLOWER): ROW MIDDLE SPRAYS</b> <i>(continued)</i>						
Morningglory, spiderwort, and very small pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in the row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.
Excellent residual for pigweed, purslane, beggarweed, other broadleaf weeds; include a labeled tank-mix partner for improved grass control.  <i>Critical tool in plasticulture.</i>	<i>flumioxazin</i> Chateau 51WDG	14	up to 8 oz	up to 0.256	12 H/ NA	<b>Broccoli, Brussel Sprouts, Cabbage, Chinese and Napa Cabbage, Cauliflower:</b> Apply up to 8 oz/acre per application per crop; see label for rotational restrictions especially at high rates.  Row middle applications in RAISED BED (at least 24" wide and at least 4" tall) plasticulture only. Third Party Indemnification Label Available ONLY Through GFVGA. Growers must obtain label to receive the appropriate application procedures (and to be legal). <b>Failure to follow these procedures will likely result in crop death:</b> <ol style="list-style-type: none"> <li>1) Spray must remain between raised beds after plastic is laid but <b>before planting</b>; spray can contact no more than the bottom 1 inch of the side of the raised bed.</li> <li>2) Use hooded sprayer.</li> <li>3) Rainfall of at least 0.25 inch needed after application but before planting.</li> <li>4) Severe injury expected if spray contacts the top of the mulch.</li> </ol>
Residual control of grasses and some broadleaf weeds including purslane, spiderwort, and partial control of Texas millet.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	Up to 1.33 pt	up to 1.27	24 H/ 60 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use. Label includes Chinese cabbage.  May be used to treat the area between the crop rows after planting; however, DO NOT apply more than 1.33 pt/A total for the season in the row middle.

CORN (Sweet)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CORN (SWEET): PRE-PLANT</b>						
Contact kill of all green foliage; annual weeds should be < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2 SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix.
Most emerged weeds except for resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ NA	Apply at least 3 days before seeding. Ideally, irrigate after application and prior to planting. Do not feed crop residue to livestock for 8 weeks following treatment.
Morningglory, spiderwort, and small pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.031	12 H/ NA	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Likely need to mix with <i>glyphosate</i> .
<b>CORN (SWEET): PRE-PLANT INCORPORATED</b>						
Nutsedge suppression plus grasses and broadleaves including panicum.	<i>EPTC</i> Eradicane 6.7EC	8	4.75 pt	4	12 H/ NA	Apply and incorporate immediately just prior to planting. A 2 pass incorporation is beneficial for nutsedge.  Crop injury and reduced weed control may occur early in the growing season when conditions are cool and wet.
<b>CORN (SWEET): PRE-EMERGENCE</b>						
Residual control of grass and broadleaves including pigweed, purslane, and spiderwort.	<i>alachlor</i> Micro-Tech 4FME	15	2–2.75 qt	2–2.75	12 H/ NA	Apply to soil surface immediately after planting. Use low rate on coarse textured soils and higher rates on medium textured soils. High rates improve control of ragweed and lambsquarters.
	<i>S-metolachlor</i> Dual II Mag. 7.64EC	15	1–1.33 pt	0.95–1.27	24 H/ 30 D	Apply to soil surface immediately after planting. Use lower rates on coarse soils and/or if organic matter is less than 3%. In addition to the PRE, one may apply up to another 2 pt/A POST after corn emergence.  In harsh conditions, Dual II Magnum is safer than Micro-Tech or Outlook and much safer than Dual Magnum.
Most annual broadleaf and grass weeds.	<i>atrazine</i> various brands 4L 90WDG	5	1–2 qt 1.1–2.2 lb	1–2	12 H/ NA	Apply to the soil surface immediately after planting. Does not control fall panicum or smooth crabgrass. Check label for rotational restrictions. Do not apply more than 2.5 lb ai/A/yr with PRE+POST.  <i>Atrazine</i> is recommended for all acres except where carryover is an issue.
	<i>simazine</i> Princep 4 L Princep Caliber 90WDG	5	1–1.2 qt 1.1–1.3 lb	1–1.2	48 H/ 45 D	Apply to soil surface immediately after planting. See label for directions and rotational restrictions.

## COMMERCIAL VEGETABLE WEED CONTROL

### CORN (Sweet)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CORN (SWEET): PRE-EMERGENCE (continued)</b>						
Most annual broadleaf and grass weeds. <i>(continued)</i>	<i>S-metolachlor</i> + <i>atrazine</i> Bicep II Magnum, Bicep II Magnum FC 5.5 F	15 + 5	1.3–2.6 qt	0.78–1.56 + 1–2	24 H/ NA	Apply to soil surface immediately after planting. Use lower rates on coarse soils and/or with less than 3% organic matter. Check label for rotational restrictions.
	<i>S-metolachlor</i> + <i>atrazine</i> + <i>mesotrione</i> Lexar 3.75F	15 + 5 + 27	3 qt	1.31 + 1.31 + 0.17	24 H/ 60	Apply to soil surface immediately after planting. Check label for rotational restrictions. Do not apply organophosphate or carbamate insecticides within 7 days of Lexar as severe injury can occur. Experiment on limited acres; not all cultivars have been tested with <i>mesotrione</i> .
<b>CORN (SWEET): POST-EMERGENCE</b>						
Most annual broadleaf weeds; grasses < 1".	<i>atrazine</i> 4L 90WDG	5	1–2 qt 1.1–2.2 lb	1–2	12 H/ NA	Apply overtop before corn exceeds 12" in height. Addition of COC improves activity on weeds but may result in some foliar burn of the crop. Do not exceed a total of 2.5 lbs/ai/A per calendar year.
Most weeds except resistant pigweed, spiderwort, primrose, or big morningglory.	<i>glyphosate</i> 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	22–44 fl oz 21–40 fl oz	0.77–1.54 lb ae	4 H/ 30 D	<b>SWEET CORN HYBRIDS WITH ROUNDUP READY 2 TECHNOLOGY.</b> Apply up to 1.54 lb ae overtop from emergence through 8 leaf collars or until sweet corn reaches 30", whichever is first. From 24 to 48" apply with drop nozzles avoiding spray into whorls to improve weed coverage and avoid injury.  An excellent program would consist of a sound at-plant residual herbicide program followed by <i>glyphosate</i> at 1.13 lb ae/A mixed with <i>atrazine</i> ( <i>atrazine</i> must be applied prior to 12" tall corn) postemergence.
Annual broadleaf weeds including pigweed; limited data; experiment on small acres.	<i>mesotrione</i> Callisto 4L	27	3 fl oz	0.094	12 H/ 45 D	Apply overtop up to the 8-leaf corn with weeds less than 4". Addition of NIS at 1 qt/100 gals of spray mix is recommended, however COC may be used at 1 gal/100 gals of spray mix. Crop oil will increase weed control but may increase corn injury. Rotation to most vegetables is 18 months. Do not apply any organophosphate or carbamate insecticide within 7 days of <i>mesotrione</i> as severe injury can occur.
Residual control of annual grasses and small-seeded broadleaf weeds; does not control emerged weeds.	<i>pendimethalin</i> Prowl 3.3 EC Prowl H20 3.8 AS	3	1.8–2.4 pt 2 pt	0.75–1 0.9	24 H/ NA	May be applied from early post-emergence until sweet corn is 24" tall or has 8 leaf collars (V8), whichever is more restrictive. Drop nozzles would be more effective in larger corn. Do not apply in reduced tillage programs. Control may be poor if activation does not occur within 24 hours of application.

CORN (Sweet)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CORN (SWEET): POST-EMERGENCE (continued)</b>						
Control of small emerged weeds plus excellent residual control including Texas millet; will not control emerged grasses over 0.25" consistently.	<i>pendimethalin</i> Prowl 3.3EC + <i>atrazine</i> AAtrex 4F	3 + 5	1.8–2.4 pt + 1–2 qt	0.75–1 + 1–2	24 H/ NA	Apply tank-mix from early post-emergence until corn is 12" tall or has 8 leaf collars, whichever is more restrictive. Prowl will not control emerged weeds; <i>atrazine</i> rarely controls emerged grasses larger than 0.25". Activation needed within 24 hours of application for Prowl.
	<i>S-metolachlor</i> Dual II Mag. 7.64EC + <i>atrazine</i> AAtrex 4L AAtrex 90WDG	15 + 5	1–1.67 pt + 1–2 qt 1.1–2.2 lb	0.95–1.6 + 1–2	24 H/ 30 D	Apply overtop of corn (5" or less) before weeds exceed the 2-leaf stage. Also available as the commercial product Bicep II Magnum. Check label for rotational restrictions. Do not exceed a total of 2.5 lbs ai <i>atrazine</i> /yr. Do not exceed a total of 2 pt/A of Dual Magnum POST to corn.
Cocklebur, common ragweed, smallflower, morningglory.	<i>bentazon</i> Basagran 4SL Basagran 5SL	6	1–2 pt 0.8–1.6 pt	0.5–1	48 H/ NA	Apply postemergence to corn. Add COC at 1 gal/100 gal solution (1% v/v). Sequential application may be made as long as a 5 or more day interval between applications is followed. May tank mix with <i>atrazine</i> , follow appropriate application restrictions when doing so.
Limited weed spectrum such as clover, sowthistle, cocklebur, and ragweed.	<i>clopyralid</i> Stinger 3EC	4	0.3–0.67 pt	0.13–0.25	12 H/ 30 D	Apply to sweet corn used <b>for processing only</b> . Apply after sweet corn emergence up to 18" tall with weeds less than 5 leaf and actively growing. Will control most legumes. Do not exceed 0.67 pt/A/year. See label about rotation restrictions.
Cocklebur, pigweed, lambsquarters, morningglory, sicklepod, and many other annual broadleaf weeds.	<i>2,4-D amine</i> (various brands) 3.8SL	4	0.5–1 pt	0.24–0.48	48 H/ 45 D	<b>Significant injury expected.</b> Suggest not using except for salvage. Apply when corn is less than 8 inches, but to minimize injury do not apply just after leaves have unfolded. Use drop nozzles and direct spray toward base of corn. <b>Do not apply overtop.</b> Do not use additives. Reduce rate of <i>2,4-D</i> if extremely hot and soil is wet. Do not cultivate for at least 10 days after application as corn may be brittle. Do not apply within 2 weeks of tasseling to dough stage. Do not make more than 1 application. Avoid drift to sensitive crops.
Nutsedge, cocklebur, passionflower (maypop), non-ALS resistant 0.5" pigweed.	<i>halosulfuron</i> Sanda 75DG	2	0.67 oz	0.032	12 H/ 30 D	Apply overtop or with drop nozzles to sweet corn from spike to layby for control of emerged weeds. Add NIS at 1qt/100 gal of spray mix. Not recommended for "Jubilee". Any injury arising from the use of <i>halosulfuron</i> is the responsibility of the grower. See label for tank-mix partners including <i>atrazine</i> . Review rotational restrictions. Do not make more than 2 applications/year.

## COMMERCIAL VEGETABLE WEED CONTROL

### CORN (Sweet)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CORN (SWEET): POST-EMERGENCE (continued)</b>						
Small pigweed < 2" and the best option for 1-2" Texas millet; best option for controlling emerged grasses without hurting crop.	<i>tembotrione</i> Laudis 3.5SC	27	3 fl oz	0.082	12 H/ NA	Apply once from emergence to V7 stage of growth. Should be tank-mixed with <i>atrazine</i> at 0.5 lb ai/A if corn is less than 12 in. Use a methylated seed oil at 1% v/v and nitrogen (1.5 qt/A UAN or 1.5 lb/A AMS). Rain-free period is 1 hour. Label rotational restrictions are 18 months to most vegetable crops.  DO NOT apply to Merit or Shogun cultivars. With new cultivars try on limited acres until crop tolerance experience is obtained.
Small pigweed, nightshade, common ragweed, and very small crabgrass.	<i>topramezone</i> Impact 2.8L	27	0.75 fl oz	0.016	12 H/ 45 D	Apply to weeds smaller than 3". The addition of a methylated seed oil or crop oil concentrate that contains at least 14% emulsifiers and 80% oil must be used at a rate of 1–1.5% v/v. Mixtures with <i>atrazine</i> are far more effective. Limited research, try on a few acres only.  Rotation is 18 months to vegetables, 9 months to cotton, peanut, potato, sorghum, soybean, and 3 months to wheat, barley, oats, and rye.
<b>CORN (SWEET): ROW MIDDLE SPRAYS</b>						
Contact kill of annual grasses and broadleaf weeds.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	0.75–1.3 pt 1–2 pt	0.28–0.49	24 H/ —	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b>  SALVAGE APPLICATION ONLY AS SEVERE INJURY IS EXPECTED. Suggest application as hooded spray only. Add a NIS at a rate of 2 pt/100 gal of spray mix.
Morningglory, spiderwort, and small pigweed < 1".	<i>carfentrazone</i> Aim 2EC	14	0.5–1 fl oz	0.008–0.016	12 H/ NA	Suggest as directed application. If leaf contact occurs, significant leaf speckling and necrosis will occur in hot, humid conditions; however, crop is expected to recover.  Apply to sensitive weeds 2" or less; pigweed less than 1". Add 1 qt NIS/100 gal spray mix. Mixing with <i>atrazine</i> improves control.  Do not apply after 14 leaf collars.



CUCURBITS

RECOMMENDED HERBICIDE USES IN SPECIFIC CUCURBIT CROPS		CUCURBIT					
HERBICIDE	APPLICATION METHOD*	CANTALOUPE (MUSKMELON)	CUCUMBER	PUMPKIN	SUMMER SQUASH	WINTER SQUASH	WATERMELON
<i>carfentrazone</i> Aim EC	Pre-plant	X	X	X	X	X	X
<i>paraquat</i> (numerous)	Pre-plant	X	X	X	X	X	X
<i>pyraflufen</i> ET	Pre-plant	X	X	X	X	X	X
<i>glyphosate</i> Roundup, others	Pre-plant	X	X	X	X	X	X
<i>fomesafen</i> Reflex	Pre-plant or PRE			X	X		X
<i>bensulide</i> Prefar	PPI or PRE	X	X	X	X	X	X
<i>clomazone</i> Command 3 ME	Pre-plant or PRE	X	X	processing only	X	X	X
<i>halosulfuron</i> Sandea	Pre-plant or PRE	X	X	X		X	X
<i>terbacil</i> Sinbar	Pre-plant or PRE						X
<i>ethalfluralin</i> Curbit	PRE	X	X	X	X	X	X
<i>ethalfluralin</i> + <i>clomazone</i> Strategy	PRE	X	X	X	X	X	X
<i>halosulfuron</i> Sandea	POST	X	X	X		X	
<i>S-metolachlor</i> Dual Magnum	POST			X	X		
<i>clethodim</i> Select, SelectMax, TapOut	POST	X	X	X	X	X	X
<i>sethoxydim</i> Poast	POST	X	X	X	X	X	X
<i>carfentrazone</i> Aim EC	Row middles only	X	X	X	X	X	X
<i>flumioxazin</i> Chateau	Row middles only	X	X	X	X	X	X
<i>glyphosate</i> Roundup, others	Row middles only	X	X	X	X	X	X
<i>halosulfuron</i> Sandea	Row middles	X	X	X	X	X	X
<i>paraquat</i> Gramoxone	Row middles only	X	X	X	X	X	X
<i>S-metolachlor</i> Dual Magnum	Row middle only	X		X	X		X
<i>trifluralin</i> Treflan HFP	Row middles only	X	X	X	X	X	X

\*PPI—pre-plant incorporated; PRE—pre-emergence; POST—post-emergence.

## COMMERCIAL VEGETABLE WEED CONTROL

### CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer, and Winter Squash, Watermelon)

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CUCURBITS: PRE-PLANT (Refer to column 1 for specific herbicide labeled for each cucurbit)</b>							
Cantaloupe Cucumber Pumpkin Summer Squash Winter Squash Watermelon	Suppression or control of most annual grasses and broadleaf weeds. Full rate will provide about 80% control of nutsedge if applied properly; greater control is achieved when used in a system with chloropicrin.	<i>metam sodium</i> Vapam HL 42%	Fumigant	45–75 gal	19–31.5	5 D/ NA	Rates are dependent on soil type and weeds present. Apply when soil moisture is near field capacity (60–80%). Apply through soil injection preferably shanking the product to a depth of 4" using knives spaced 4" apart; follow immediately with a bed shaper, roller, or other method to smooth, and compact the soil surface. If irrigation is available, irrigate with about 0.25" and/or cover with tarp immediately. If using irrigation to seal soil, sequential irrigations may be needed for the first week but do not overwater as it may reduce activity. May apply through drip irrigation prior to planting a second, third, or fourth crop on mulch. Plant back interval is often 14–21 days and can be 30 days in some environments. May also apply pre-plant through center pivot but must follow serious buffer restrictions noted on label. First crop mulch, chloropicrin (150 lb/A) broadcast will also be needed in a program with metam to obtain adequate nutsedge control. Visit <a href="http://www.gaweed.com">www.gaweed.com</a> for the latest circular on fumigation.  <b>Labels require buffer restrictions, additional worker protection safety procedures, and a fumigant management plan; study label.</b>
	Contact kill of all green foliage.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence or transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix. If applying over plastic, must wash off with 0.5" of rain or irrigation prior to planting.
	Most emerged weeds except for resistant pigweed. For nutsedge, purslane, and ryegrass: apply <i>glyphosate</i> followed by <i>paraquat</i> 5-7 days later.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.75–2.25 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting.  <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A.  <b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.
	Morningglory, spiderwort, and small pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	Apply prior to planting to weeds <2"; pigweed < 1". Add 1–2 gal COC/100 gal of spray mix.  <b>Transplants:</b> May apply 1 day prior to planting except on mulch where there should be a single 0.5" irrigation/rain event plus a 7 day waiting period between application and planting.  <b>Seeded:</b> Apply at least 7 days prior to seeding.
	Morningglory and small pigweed < 1".	<i>pyraflufen ethyl</i> ET 0.208L	14	1–2 fl oz	0.0016–0.0032	12 H/ NA	Apply prior to planting to weeds <2"; pigweed < 1". Add 1–2 gal COC/100 gal of spray mix.  <b>Bareground:</b> Wait 1 day following pre-plant burndown application before planting.  <b>Mulch:</b> Suggest if applying over mulch to wait 7 days plus a single 0.5" irrigation/rain event before planting.

CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer, and Winter Squash, Watermelon)

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CUCURBITS: PRE-PLANT FOR CANTALOUPE-COTTON INTERCROPPING ONLY</b>							
Cantaloupe-Cotton intercropping only.	Annual grass and broadleaf weeds including purslane, and pigweed.	<i>trifluralin</i> Treflan 4EC	3	1–1.5 pt	0.5–0.75	12 H/ 30 D	<b>A State 2(ee) Label.</b> After laying mulch without holes and developing a bed facilitating herbicide wash off, Treflan can be applied. Irrigate within 24 hours to activate the herbicide and remove it from the mulch. One most likely needs to mix with <i>glyphosate</i> or <i>paraquat</i> ; see guidelines above for those products in the preplant section.  Maximum Treflan use rate for season is 1.5–2 pt/A; depending on soil type.
<b>CUCURBITS: PRE-PLANT OR PRE-PLANT INCORPORATED (Refer to column 1 for specific herbicide labeled for each cucurbit)</b>							
Cantaloupe Cucumber Pumpkin Summer Squash Winter Squash Watermelon	Suppresses annual grasses and small-seeded broadleaf weeds such as pigweed.	<i>bensulide</i> Prefar 4E	8	5–6 qt	5–6	12 H/ NA	Apply pre-plant and soil incorporate 1" deep before planting, or apply pre-emergence and follow with irrigation within 24 hours. Check replant restrictions for small grains and other crops on label.
<b>CUCURBITS: PRE-PLANT OR PRE-EMERGENCE (Refer to column 1 for specific herbicide labeled for each cucurbit)</b>							
Pumpkin Summer Squash Watermelon  (Not for use in cucumber or cantaloupe; severe injury)	Pigweed, wild radish, bristly starbur, and suppression of yellow nutsedge. Evaluate rotation restrictions on label before use.	<i>fomesafen</i> Reflex 2EC	14	Watermelon: 12 fl oz	0.19	24 H/ NA	Watermelon and Summer Squash (straight neck yellow, crooked neck yellow, and zucchini types only). <b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to use.  <b>Mulch transplants or seeds:</b> May apply under mulch as long as plastic laying process does not disturb treated soil; thus, do not apply prior to laying drip or forming bed. May apply over mulch as long as the mulch is washed with 0.5" rainfall/irrigation in a single event prior to punching holes and planting; bed formation must allow herbicide to wash off the mulch and not concentrate in low areas on the mulch. Damage may occur to plants/seeds planted in "old" holes or within 3" of old holes.  <b>Bareground transplant:</b> Prepare land for planting; apply Reflex; lightly irrigate to activate herbicide and move it into soil; and then prepare plant holes and plant.  <b>Bareground seeded:</b> Apply within 1 day of planting; lightly irrigate after application but at least 36 hours prior to emergence.  <b>Row middle:</b> Must apply prior to crop emergence or transplanting. May use up to 16 oz/A in watermelon and up to 12 oz/A in squash.
				Squash: 8 fl oz	0.13		
				Pumpkin: 8–10 fl oz	0.13–0.16		

■ COMMERCIAL VEGETABLE WEED CONTROL

**CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer, and Winter Squash, Watermelon)**

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CUCURBITS: PRE-PLANT OR PRE-EMERGENCE (Refer to column 1 for specific herbicide labeled for each cucurbit) (continued)</b>							
Cantaloupe Cucumber Pumpkin Winter Squash Watermelon (Not for use in summer squash)	Nutsedge suppression, non-ALS resistant pigweed, wild radish, and ragweed control.	<i>halosulfuron</i> Sanda 75DG	2	0.5–0.75 oz	0.024–0.036	12 H/ 30 D	<p>Pumpkin is very sensitive and injury is almost certain at these rates on sandy soils. Winter squash has not been thoroughly tested in GA. UGA suggests avoiding use in pumpkin or any winter squash type without a lot of experience; for other labeled crops, stunting occasionally occurs but should be short lived in favorable growing conditions.</p> <p><b>For mulch.</b> Apply to preformed beds prior to laying mulch, do not disturb treated area when laying mulch; wait 7 days before transplanting or seeding. <b>DO NOT APPLY OVER MULCH.</b></p> <p><b>For bareground seeded,</b> apply after seeding but before cracking.</p> <p><b>For bareground transplants,</b> apply herbicide to preformed beds, lightly irrigate, and wait 7 days after application before transplanting. Review rotational restrictions. Do not exceed 2 oz/ crop cycle for cantaloupe and cucumber and 1 oz/crop cycle for pumpkin, winter squash and watermelon. Crop cycle and year (includes PRE, POST, and hooded applications).</p>
Watermelon ONLY Other cucurbits will likely die	Morningglory and pigweed suppression; very effective with Reflex.	<i>terbacil</i> Sinbar 80WP	5	2–4 oz	0.1–0.2	12 H/ 70 D	<p><b>Watermelon only.</b> Apply prior to transplanting or immediately after seeding. <b>DO NOT</b> apply overtop of the crop. May be applied under plastic mulch (avoid soil movement while laying plastic). May be applied over mulch without holes but must be washed off of mulch with at least 0.5" rain/irrigation in a single event prior to punching holes and transplanting. Make sure to check rotational restrictions prior to applying this product.</p>

CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer, and Winter Squash, Watermelon)

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CUCURBITS: PRE-EMERGENCE (Refer to column 1 for specific herbicide labeled for each cucurbit)</b>							
Cantaloupe Cucumber Summer Squash Winter Squash Watermelon  (For processing pumpkin only, see label for numerous restrictions.)	Suppression of annual grasses and some broadleaf weeds; weak on pigweed and morningglory.	<i>clomazone</i> Command 3ME	13	See remarks	0.15–0.75	12 H/ 45 D	<p><b>Cantaloupe:</b> 6.4 to 10.7 fl oz/A  <b>Cucumber:</b> 6.4 to 16 fl oz/A  <b>Summer Squash*:</b> 10.7 to 21.3 fl oz/A  <b>Winter Squash*:</b> 10.7 to 32 fl oz/A (no GA research)  <b>Watermelon:</b> 6.4 to 10.7 fl oz/A.</p> <p><i>For cantaloupe, cucumber and watermelon:</i> Apply immediately after seeding or just prior to transplanting.  <i>For summer and winter squash:</i> The label requires applications be made prior to transplanting or seeding.</p> <p>Roots of transplants and seeds must be below the chemical barriers when planting. Suggest when applying prior to planting to irrigate after application and before preparing the planting hole or planting. See label for buffer and rotation restrictions.</p> <p><b>*The label restricts clomazone use on some squash cultivars.</b></p>
Cantaloupe Cucumber Pumpkin Summer Squash Winter Squash Watermelon	Annual grasses and small-seeded broadleaf weeds such as pigweed.	<i>ethalfluralin</i> Curbit 3EC	3	1–1.5 pt	0.38–0.56	24 H/ NA	<p>Apply immediately after seeding but before crop and weeds emerge. <b>Do not apply prior to seeding and do not incorporate. Do not use under mulch.</b> Labels do not allow application over transplants; only in row middles of transplanted crop. If applying in row middles can use higher rate, see label. Avoid applications when periods of cool, moist conditions exist prior to emergence to prevent crop injury. Injury can also be observed if planted too shallow. Suggested use rates are lower than recommended due to injury potential.</p> <p><i>Clomazone</i> label restricts pumpkin use to processing only and also prohibits use on several squash cultivars, see label for cultivar, rotation, and buffer restrictions.</p>
		<i>ethalfluralin</i> + <i>clomazone</i> Strategy 2.1L	3 + 13	2–3 pt	0.4–0.6 + 0.13–0.18	24 H/ NA	

■ COMMERCIAL VEGETABLE WEED CONTROL

CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer, and Winter Squash, Watermelon)

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
CUCURBITS: POST-EMERGENCE (Refer to column 1 for specific herbicide labeled for each cucurbit)							
Cantaloupe Cucumber Pumpkin Winter Squash (Not labeled for summer squash or watermelon)	Yellow and purple nutsedge, ragweed, cocklebur, and wild radish. Residual control of radish and pigweed.	<i>halosulfuron</i> Sanda 75DG	2	0.5–0.67 oz	0.024–0.032	12 H/ Cucumber, Pumpkin, Winter Squash 30 D Cantaloupe 57 D	Limited research on winter squash; however, results so far have noted up to 35% stunting. Research has also shown up to 25% stunting on pumpkin. Injury for winter squash and pumpkin has noted up to 1 week delayed maturity; thus, a directed spray may be in order with these two crops. Cantaloupe and cucumber are tolerant to topical applications as long as crops are growing normally.  Label allows applications after seeded crop has reached the 3rd true leaf for cantaloupe and cucumber, and has reached the 4th true leaf for pumpkin and winter squash but before flowering. Apply to transplants no sooner than 14 days after transplanting, may apply otop of plastic mulch. Add NIS at 1 qt/100 gal of spray solution for adequate weed control.  Review rotational restrictions. Do not exceed 2 oz/crop cycle for cantaloupe and cucumber and 1 oz/crop cycle for pumpkin or winter squash. A crop cycle includes PRE + POST + Row Middle.
Pumpkin Squash (yellow and zucchini) (Not for cucumber, cantaloupe, or watermelon; significant stunting observed)	Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	8–12 fl oz	0.47–0.7	24 H/ 30 D Squash 60 D Pumpkin	<b>Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use. Minor speckling may be noted. Avoid applications to wet plants including dew. Apply Dual Magnum only in clean water.  <b>Bareground seeded:</b> Apply topically/directed once plants reach 4 inches in height.  <b>Bareground transplant:</b> After planting, immediately irrigate to seal soil around root ball and then apply topically/directed 10–14 days later.  <b>Mulch seeded:</b> Apply topically/directed once plants reach 3".  <b>Mulch transplant:</b> Apply topically/directed 7–10 days after planting.  <b>Row middles only:</b> Rate can be increased to 1.33 pt/A.

CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer and Winter Squash, Watermelon)

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>CUCURBITS: POST-EMERGENCE GRASSES (Refer to column 1 for specific herbicide labeled for each cucurbit) (continued)</b>							
Cantaloupe Cucumber Pumpkin Summer Squash Winter Squash Watermelon	Actively growing annual and perennial grasses. <i>Clethodim</i> is usually more effective on perennial grasses such as bermuda grass. <i>Clethodim</i> controls annual bluegrass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 14 D	<p><b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (&lt; 1.5" for goosegrass) is the best option for control with lowest injury potential.</p> <p>The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 5 days of <i>clethodim</i> may result in reduced grass control.</p>
		<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ Cantaloupe 3 D Cucumber 3 D Others 14 D	
<b>CUCURBITS: ROW MIDDLE SHIELDED OR HOODED SPRAYS (Refer to column 1 for specific herbicide labeled for each cucurbit)</b>							
Cantaloupe Watermelon (Not for cucumber)	Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	12 fl oz	0.7	24 H/ 60 D	<p><b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to use.</p> <p><b>All Crops:</b> Apply between crop rows; avoid contact with crop, top of any mulch if present, or with soil within 6 inches of the crop root ball.</p>
Squash/Pumpkin				1.33 pt	1.27	24H/ 30D Squash 60 D Pumpkin	
Cantaloupe Cucumber Pumpkin Summer Squash Winter Squash Watermelon	Residual control of annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan 4EC Trifluralin 4L	3	1–1.5 pt	0.5–0.75	12 H/ 30 D; except Watermelon 60 D	Apply as a directed spray in row middles when plants have reached the 3–4 true leaf stage of growth. Avoid direct crop contact and incorporate immediately. Incorporation equipment may be set to move treated soil around the plant base. Maximum use rate for season is 1.5–2 pt; depending on soil type.
	Purple & yellow nutsedge, wild radish, ragweed. Residual control of radish and pigweed.	<i>halosulfuron</i> Sanda 75DG	2	0.75–1 oz	0.036–0.048	12 H/ Cantaloupe, Watermelon 57 D Others 30 D	Apply between crop rows avoiding spray contact with crop. Add a NIS at 1 qt/100 gals of spray. Review rotational restrictions. Do not exceed 2 oz/crop cycle for cantaloupe and cucumber and 1 oz/crop cycle for pumpkin, squash, and watermelon. A crop cycle is PRE, POST, and row middle.

■ COMMERCIAL VEGETABLE WEED CONTROL

CUCURBITS (Cantaloupe, Cucumber, Pumpkin, Summer and Winter Squash, Watermelon)

CUCURBIT TYPE LABELED FOR USE	WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
				AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
CUCURBITS: ROW MIDDLE HOODED SPRAYS (Refer to column 1 for specific herbicide labeled for each cucurbit)							
Cantaloupe Cucumber Pumpkin Summer Squash Winter Squash Watermelon	Contact kill of emerged annual weeds < 3".	<i>paraquat</i> Gramoxone 2 SL Gramoxone 3 SL	22	1.95 pt 1.25 pt	0.5	24 H/ —	EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use. Use precision hooded application equipment adjusted to prevent spray contact with crop plants. Add a NIS at a rate of 2 pt/100 gal of spray mix. Do not exceed 30 psi nozzle pressure or spray under conditions which may cause drift. Do not make more than 3 applications/yr.
	Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Labeled as a <b>hooded spray or wiper application</b> in row middle; UGA does not recommend hooded sprays once the crop is planted because drift is likely. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
	Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles before any fruit is present. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Speckling of crop leaves should be expected from drift.
	Excellent residual for pigweed, purslane, beggarweed, and other broadleaf weeds. Critical tool in raised bed plasticulture.	<i>flumioxazin</i> Chateau 51WDG	14	up to 8 oz	up to 0.256	12 H/ NA	Apply up to 8 oz/acre per application per crop; see label for rotational restrictions especially at high rates.  Row middle applications in RAISED BED (at least 24" wide and at least 4" tall) plasticulture only. Third Party Indemnification Label Available ONLY Through GFVGA. Growers must obtain label to receive the appropriate application procedures (and to be legal).  <b>Failure to follow these procedures may cause crop death:</b>  1) Spray must remain between raised beds after plastic is laid but <b>before planting</b> ; spray can contact no more than the bottom 1" of the side of the raised bed.  2) Use hooded sprayer.  3) Rainfall at least 0.25 inch needed after application but before planting.  4) Severe injury expected if spray contacts top of mulch.  5) Labeled on many additional cucurbits, see label.



EGGPLANT

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
EGGPLANT: PRE-PLANT						
Suppression or control of most annual grasses and broadleaf weeds. Full rate will provide about 80% nutsedge control; greater control is achieved when used in a system with chloropicrin.	<i>metam sodium</i> Vapam HL 42%	Fumigant	45–75 gal	19–31.5	5 D/ NA	Rates are dependent on soil type and weeds present. Apply when soil moisture is near field capacity (60–80%). Apply through soil injection preferably shanking the product to a depth of 4" using knives spaced 4" apart; follow immediately with a final bed press, roller, or other method to smooth and compact the soil surface. If irrigation is available, irrigate with about 0.25" and/or cover with tarp immediately. May apply through drip irrigation prior to planting a second, third, or fourth crop on mulch. Plant back interval is often 14–21 days and can be 30 days in some environments. For first crop mulch, <i>chloropicrin</i> (150 lb/A broadcast) will also be needed in a program with metam to obtain adequate nutsedge control. Visit <a href="http://www.gaweed.com">www.gaweed.com</a> for the latest circular on fumigant systems. <b>Labels require buffer restrictions, additional worker protection safety procedures, and a fumigant management plan; study this label closely.</b>
Contact kill of all green foliage; annual weeds should be 3" or less.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence or transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix. If applying over plastic, must wash off with 0.5" of rain/irrigation prior to planting. For stale seedbed apply <i>glyphosate</i> 5–7 days prior to planting and follow with <i>paraquat</i> 1–2 days prior to planting.
Most emerged weeds except for resistant pigweed, primrose, and spiderwort. For nutsedge, purslane, and ryegrass: apply <i>glyphosate</i> followed by <i>paraquat</i> 5-7 days later.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.77–2.25 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting. <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. <b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. <b>Transplants:</b> May apply 1 day prior to planting except on mulch where a single 0.5" irrigation/rain event plus a 7 day waiting period between application and planting is needed. <b>Seeded:</b> Apply at least 7 days prior to seeding.
Morningglory and pigweed < 1".	<i>pyraflufen ethyl</i> ET 0.208L	14	1–2 fl oz	0.0016–0.0032	12 H/ NA	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1 gal COC/100 gal of spray mix. <b>Bareground:</b> Wait 1 day following pre-plant burndown application before planting. <b>Mulch:</b> Suggest if applying over mulch wait 7 days plus a single 0.5" irrigation/rain event before planting.

## COMMERCIAL VEGETABLE WEED CONTROL

### EGGPLANT

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>EGGPLANT: PRE-PLANT, PRE-PLANT INCORPORATED, PRE-EMERGENCE</b>						
Annual grasses, ragweed, smartweed, galinsoga, and suppression of pigweed.	<i>napropamide</i> Devrinol 50DF Devrinol 2-XT	15	2–4 lb 2–4 qt	1–2	24 H/ NA	<i>Transplants for bareground:</i> Label notes to apply pre-plant and incorporate into the soil 1–2" before transplanting. Use the lower rate on coarse soils. <i>Transplants in plasticulture:</i> Apply to the soil surface of preformed beds immediately prior to laying plastic. Ensure the plastic laying process does not incorporate or disturb the treated bed. Soil must be moist for activity. <b>Devrinol is much less likely to cause injury compared to Treflan.</b>
Annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan, others 4EC	3	≤ 1 pt ≤ 1 pt	≤ 0.5	12 H/ NA	BE AWARE that any tillage practices that concentrate <i>trifluralin</i> in the root zone will cause significant stunting and delayed maturity. Similarly, cold and wet conditions will increase injury potential. Eggplant tolerance to <i>trifluralin</i> is marginal unless one can place the root ball below the treated area.  NOT RECOMMENDED FOR MULCH SYSTEMS!
<b>EGGPLANT: POST-EMERGENCE</b>						
Residual annual grass and small-seeded broadleaf weed control.	<i>DCPA</i> Dacthal W-75 Dacthal 6F	3	6–8 lb 6–8 pt	4.5–6	12 H/ NA	Can be applied over-the-top of transplants 4-6 weeks after transplanting. Can also be applied after direct seeded plants that are 4-6" tall. Does not control emerged weeds.
Actively growing annual and perennial grasses.  In general, <i>clethodim</i> is more effective on perennial weeds like bermuda grass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 20 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 20 D	Label requires addition of 1 qt of COC/A. Adding crop oil may increase injury. Do not apply more than 4.5 pt/A/season. Do not mix with other pesticides.
<b>EGGPLANT: ROW MIDDLE SHIELD OR HOODED SPRAY</b>						
Contact kill of all green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, other 3SL Gramoxone 2SL	22	1.3 pt 2 pt	0.5	24 H/ —	<b>EPA has restricted the use of paraquat to certified applicators ONLY and applicators must take a specialized training before use.</b> Use hooded application equipment to prevent spray contact with crop plants. Add NIS at 2 pt/100 gal of spray mix. Do not exceed 30 psi nozzle pressure or spray under when conditions favor drift. Maximum 3 applications per season.
Most emerged weeds excluding resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Labeled as a hooded spray or wiper application in row middle; UGA does not recommend hooded sprays as drift is likely to occur. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.

EGGPLANT

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>EGGPLANT: ROW MIDDLE SHIELD OR HOODED SPRAY (continued)</b>						
Yellow and purple nutsedge, wild radish, ragweed. Residual radish and pigweed control.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1 oz	0.024–0.048	12 H/ 30 D	Apply to row middles as a pre-emergence or post-emergence spray. Do not allow spray to contact crop. In plasticulture, do not allow spray to contact bedtop. Add a NIS at 1 qt/100 gal spray solution. Review rotational concerns.
Excellent residual control for pigweed, purslane, beggarweed, and other broadleaf weeds. The addition of a grass control product is beneficial.	<i>flumioxazin</i> Chateau 51WDG	14	up to 8 oz	up to 0.256	12 H/ NA	Apply up to 8 oz/acre per application per crop; see label for rotational restrictions especially at high rates.  Row middle applications in RAISED BED (at least 24" wide and at least 4" tall) plasticulture only. Third party indemnification label available ONLY through the GFVGA. <b>Growers must obtain label to receive the appropriate application procedures (and to be legal). Failure to follow these procedures may result in crop death:</b> <ol style="list-style-type: none"> <li>1) Spray must remain between raised beds after plastic is laid but <i>before planting</i>; spray can contact no more than the bottom 1" of the side of the raised bed.</li> <li>2) Use hooded sprayer.</li> <li>3) Rainfall of at least 0.25 inch needed after application but before planting.</li> <li>4) Severe injury expected if spray contacts top of mulch.</li> </ol>
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2 EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.

## COMMERCIAL VEGETABLE WEED CONTROL

### GARLIC

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>GARLIC: PRE-PLANT</b>						
Contact kill of all green foliage.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.7–2.7 pt 2.5–4pt	0.64–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds but before crop emergence or transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix.  For stale seedbed apply <i>glyphosate</i> 7 days prior to planting; follow with <i>paraquat</i> 1–2 days prior to planting.
Most emerged weeds except for resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ NA	<b>Transplant bareground:</b> Suggest no more than 1.13 lb ae/A in a single application. Also, irrigate 0.5" and wait at least 7 days between application and transplanting. <b>Seeding bareground:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting.  For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
<b>GARLIC: PRE-PLANT INCORPORATED OR PRE-EMERGENCE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>bensulide</i> Prefar 4E	8	5–6 qt	5–6	12 H/ NA	Apply preplant incorporated to a depth of 1" or apply PRE after planting and irrigate immediately. Poor growing conditions may reduce stands and vigor.
<b>GARLIC: PRE-EMERGENCE</b>						
Residual control of annual grasses and small-seedbed broadleaf weeds.	<i>pendimethalin</i> Prowl 3.3EC Prowl H20 3.8AS	3	1.8–2.4 pt 1.5–2 pt	0.75–1 0.72–0.95	24 H/ 45 D	Apply PRE after planting but before weed and crop emergence. Can be applied sequentially by applying PRE followed by a POST application, see label. Does not control emerged weeds. Use lower rates on coarse soils. No GA data.

GARLIC

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>GARLIC: POST-EMERGENCE</b>						
Residual control of annual grasses and small-seeded broadleaf weeds.	<i>pendimethalin</i> Prowl 3.3EC Prowl H20 3.8AS	3	1.8–2.4 pt 1.5–2 pt	0.75–1 0.72–0.95	24 H/ 45 D	Apply to garlic in the 1–5-leaf stage but before weed emergence. Can be applied sequentially by applying a PRE followed by a POST application. Use lower rates on coarse soils.
Excellent residual option for henbit, purslane, pigweed, primrose, smartweed, and many others; controls small emerged weeds as well.	<i>oxyfluorfen</i> Goal 2XL 2EC Galigan 2E Goaltender 4F Galigan H20 4F	14	0.5–2 pt 0.5–2 pt 0.25–1 pt 0.25–1 pt	0.125–0.5	48 H/ 60 D	<b>Seeded dry bulb only.</b> Apply 8 fl oz of Goal 2 XL (4 oz for Goaltender) to seeded garlic that has at least 2 true leaves. Multiple applications may be made but do not exceed total of 2 pt/A (1 pt/A for Goaltender). <b>Transplant dry bulb only.</b> Suggest making a single application using up to 2 pt/A of Goal 2XL (1 pt/A of Goaltender) within 2 days of transplanting <b>but after</b> an irrigation to seal the soil around the root ball. Do not exceed 2 pt/A of Goal 2XL (1 pt/A of Goaltender) per crop season. A program with Prowl has been excellent.
Actively growing annual and perennial grasses.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–16 fl oz 9–32 fl oz 9–32 fl oz	0.09–0.25 0.07–0.25 0.07–0.25	24 H/ 45 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>fluazifop-P-butyl</i> Fusilade DX 2 EC	1	6–16 fl oz	0.1–0.25	12 H/ 45 D	Add 1 gal COC or 1 qt NIS/100 gal spray mix. Adding crop oil increases injury potential. Do not apply more than 48 oz/A/season. Do not mix with other pesticides and do not apply a broadleaf herbicide or cultivate within 3 days of application.
	<i>sethoxydim</i> Poast 1.53 EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D	Add 1 qt of COC/A according to the label. Adding crop oil may increase crop injury. Do not apply more than 4.5 pt/A/season. Do not mix with other pesticides and do not apply a broadleaf herbicide or cultivate within 3 days of application.
<b>GARLIC: ROW MIDDLE HOODED SPRAYS</b>						
Most emerged weeds excluding resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Label allows hooded spray or wiper application in row middles; UGA does not recommend hooded sprays because of drift potential. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2 EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect some speckling from drift.

## COMMERCIAL VEGETABLE WEED CONTROL

### GREENS (Collard, Kale, Mustard, Turnip)

RECOMMENDED HERBICIDE USES IN SPECIFIC GREENS		CROP			
HERBICIDE	APPLICATION METHOD*	COLLARD	KALE	MUSTARD	TURNIP
<i>paraquat</i> (numerous)	Pre-plant	X			X
<i>glyphosate</i> Roundup, others	Pre-plant	X	X	X	X
<i>bensulide</i> Prefar	PPI or PRE	X	X	X	
<i>trifluralin</i> Treflan HFP, others	PPI	X	X	X	X
DCPA Dacthal	PRE or PPI	X	X	X	X
<i>clethodim</i> Select, SelectMax, TapOut	POST	X	X	X	X
<i>clopyralid</i> Stinger	POST	X	X	X	X
<i>S-metolachlor</i> Dual Magnum	POST	X	X		
<i>sethoxydim</i> Poast	POST	X	X	X	
<i>carfentrazone</i> Aim EC	Row middles only	X	X	X	X
<i>glyphosate</i> Roundup, others	Row middles only	X	X	X	X

\*PPI—pre-plant incorporated; PRE—pre-emergence; POST—post-emergence.

### GREENS (Collard, Kale, Mustard, Turnip)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>GREENS (COLLARD, KALE, MUSTARD, TURNIP): PRE-PLANT</b>						
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> <b>Collard and turnip only.</b> Apply to emerged weeds but before crop emergence or transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix. If applying over plastic, must wash off with 0.5" rain/irrigation prior to planting. For stale seedbed, nutsedge, or purslane: Apply <i>glyphosate</i> 7 days prior to planting and follow with <i>paraquat</i> 1–2 days prior to planting.
Most emerged weeds except for resistant pigweed, primrose, and spiderwort. For nutsedge, purslane, and ryegrass: Apply <i>glyphosate</i> followed by <i>paraquat</i> 5-7 days later.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.77–2.25 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting. <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. <b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.

GREENS (Collard, Kale, Mustard, Turnip)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>GREENS (COLLARD, KALE, MUSTARD, TURNIP): PRE-PLANT INCORPORATE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan, others 4EC	3	12–16 fl oz	0.375–0.5	12 H/ NA	Apply and incorporate 2–3" deep before planting. Rates less than 1 pt/A needed on sandy soils with low organic matter or when conditions are cold and wet. Rates can be increased on heavier soils, see label. Incorporate within 8 hours of application. Label allows use in turnip for root production.
<b>GREENS (COLLARD, KALE, MUSTARD, TURNIP): PRE-PLANT INCORPORATE OR PRE-EMERGENCE</b>						
Suppresses annual grasses and small-seeded broadleaves.	<i>bensulide</i> Prefar 4E	8	5–6 qt	5–6	12 H/ NA	<b>Not labeled for turnip.</b> Apply preplant incorporated to a 1" depth or apply PRE after planting and irrigate immediately. Also labeled for, but not limited to, rape greens, mustard spinach, arugula, cress, endive, parsley, and radicchio. Review rotational restrictions.
<b>GREENS (COLLARD, KALE, MUSTARD, TURNIP): POST-EMERGENCE</b>						
A few broadleaf weeds including clover, sowthistle, cocklebur, jimsonweed, ragweed.	<i>clopyralid</i> Stinger 3EC	4	0.3–0.5 pt	0.11–0.19	12 H/ 30 D  Turnip Tops 15 D	Also labeled on mizuna, mustard spinach, and rape. Apply to crop when weeds are small and actively growing. One application/yr. <b>See label for rotational issues.</b> Minor mustard green injury has been observed in some experiments. <b>Will not control radish!</b>
Actively growing annual and perennial grasses. In general, <i>clethodim</i> is more effective on perennial grasses such as bermuda grass. <i>Clethodim</i> also controls annual bluegrass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.07–0.13	24 H/ 14 D  Turnip Root 30 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D Mustard 14 D	<b>Not labeled on turnip.</b> Add 1 qt of COC/A. Adding crop oil may increase crop injury at high temperatures. Do not apply more than 3 pt/A/season. Do not mix with other pesticides and do not plow or apply broadleaf herbicide within 3 days.
<b>GREENS (COLLARD AND KALE ONLY): POST-EMERGENCE</b>						
Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	10–12 fl oz	0.6–0.7	24 H/ 30 D	<b>Collards and Kale Only. A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use. <b>Transplants.</b> After transplanting into bare soil, irrigate to seal soil around root ball. About 10 days after sealing soil, apply Dual Magnum overtop. If applying in mulched systems, apply 10 days after transplanting. <b>Seeded.</b> Apply overtop after crop reaches 3". <b>Row middle.</b> May apply 1.33 pt/A in row middles as a banded application.

## COMMERCIAL VEGETABLE WEED CONTROL

### GREENS (Collard, Kale, Mustard, Turnip)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>GREENS (COLLARD, KALE, MUSTARD, TURNIP): HOODED ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Labeled as a hooded spray or wiper application in row middle; UGA does not recommend hooded sprays as drift often occurs. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect speckling from drift.

### LETTUCE

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>LETTUCE: PRE-PLANT</b>						
Control of most annual grasses and broadleaf weeds, full rate will provide about 80% nutsedge control if applied properly.	<i>metam sodium</i> Vapam HL 42%	Fumigant	45–75 gal	19–31.5	5 D/ NA	Rates are dependent on soil type and weeds present. Apply when soil moisture is near field capacity (60–80%). Apply through soil injection preferably shanking the product to a depth of 4" using knives spaced 4" apart; follow immediately with a bed shaper, roller, or other method to smooth and compact the soil surface. If irrigation is available, irrigate with about 0.25" and/or cover with tarp immediately. If using irrigation to seal soil, sequential irrigations are needed for the first week but do not over irrigate as this may reduce pest control. May apply through drip irrigation prior to planting a second, third, or fourth crop on mulch. Plant back interval is often 14–21 days and can be 30 days in some environments. May also apply pre-plant through center pivot but must follow serious buffer restrictions noted on label.  <b>Labels require buffer restrictions, additional worker protection safety procedures, and a fumigant management plan; study this label closely which can be found atcdms.net.</b>
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds before crop emergence or transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix. If applying over plastic, must wash off with 0.5" rain/irrigation prior to planting. For stale seedbed, apply <i>glyphosate</i> 7 days prior to planting and follow with <i>paraquat</i> 1–2 days prior to planting; both herbicides must be washed from mulch prior to planting.



LETTUCE

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS		
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT				
<b>LETTUCE: PRE-PLANT (continued)</b>								
Most emerged weeds except for resistant pigweed, primrose, and spiderwort. For nutsedge, purslane, and ryegrass: apply <i>glyphosate</i> followed by <i>paraquat</i> 5-7 days later.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.77–2.25 lb ae	4 H/ NA	<p><b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting.</p> <p><b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest &lt; 1.13 lb ae/A.</p> <p><b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.</p>		
	<b>LETTUCE: PRE-PLANT INCORPORATE OR PRE-EMERGENCE</b>							
	Suppression of annual grasses and small-seeded broadleaf weeds.	<i>bensulide</i> Prefar 4E	8	5–6 qt	5–6		12 H/ NA	Apply PPI to a depth of 1" or apply PRE after planting. With PRE application, irrigate immediately. See label for more directions and rotational restrictions.
	<i>benefin</i> Balan 60DF	3	2–2.5 lb	1.2–1.5	12 H/ NA	Apply pre-plant and incorporate 2–3" deep before seeding or transplanting. Use lower rate on coarse soils.		
Most annual grasses and broadleaf weeds.	<i>pronamide</i> Kerb 3.3SC	3	1.25–5 pt	0.5–2	24 H/ 55 D	Kerb 3.3 SC has supplemental label allowing use on leaf lettuce and head lettuce. A single pre-plant, post-plant, or post-emergence application or a split application can be made. Split application consists of some part of the max allowable use rate can be initially applied to head or leaf lettuce, endive, escarole, or radicchio greens, and the balance of the max use rate can be applied up to 10 days later, see label. Limited GA research, suggest using low rates on most soils. Use less than 3.5 pt of 3.3 SC on val temp, grande verde, and prima verde varieties of crisp head lettuce, or on endive, escarole, or radicchio greens. See label regarding rotational restrictions.		
<b>LETTUCE: POST-EMERGENCE</b>								
Most annual grasses and broadleaf weeds.	<i>pronamide</i> Kerb 3.3SC	3	1.25–5 pt	0.5–2	24 H/ 55 D	Kerb 3.3 SC has a supplemental label now allowing use on leaf lettuce as well as head lettuce. Apply before weed germination if possible, no later than weeds in the 2-leaf stage. See label and Kerb PRE section for restrictions and use patterns. Consult label for rotational restrictions and other restrictions.		
Actively growing annual and perennial grasses. <i>Clethodim</i> is usually more effective on perennial grasses like bermuda grass and also controls annual bluegrass.	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ See Remarks	Label requires adding 1 qt of COC/A. Adding crop oil increases injury potential. Do not apply more than 3 pt/A/season. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control. <i>Head Lettuce PHI 30 days; Leaf Lettuce PHI 15 days.</i>		
	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 14 D	Head and leaf lettuce only. <b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil.  Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.		

## COMMERCIAL VEGETABLE WEED CONTROL

### LETTUCE

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>LETTUCE: HOODED ROW MIDDLE SPRAYS</b>						
Most weeds except for resistant pigweed, primrose, or spiderwort.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Label allows hooded spray or as a wiper application in row middles; UGA advises against hooded sprays because of drift potential. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect leaf speckling from drift.

### OKRA

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>OKRA: PRE-PLANT</b>						
Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–64 fl oz 22–44 fl oz 21–41 fl oz	0.75–1.54 lb ae	4 H/ NA	<b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. If using transplants follow new plant-back restrictions on state label (contact Extension agent).  For nutsedge, purslane, or ryegrass: Apply glyphosate and follow with paraquat 5–7 days later.
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone 2SL Gramoxone 3SL	22	2–4 pt 1.3–2.7pt	0.5–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal of spray mix. For stale seedbed, apply <i>glyphosate</i> 5–7 days prior to planting; follow with <i>paraquat</i> 1–2 days prior to planting. If applied over mulch, a 0.5" rain/irrigation is required prior to planting.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	<b>Transplants ONLY.</b> Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Likely need to mix with <i>glyphosate</i> .
<b>OKRA: PRE-PLANT INCORPORATE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>trifluralin</i> Treflan 4EC Trifluralin 4L	3	1–1.5 pt	0.5–0.75	12 H/ NA	Apply and soil incorporate 2–3" deep before planting. Incorporate within 8 hours of application. <b>Use lower rates on coarse soils.</b>
<b>OKRA: PRE-EMERGENCE</b>						
Small seeded broadleaves and annual grasses.	<i>prometryn</i> Caparol 4L	5	1.5–2 pt	0.75–1	12 H/ NA	Apply after planting but before emergence. Stunting of < 10% is expected at 2 pt/A. Apply a max of 1.5 pt/A if a directed Caparol application will also be made.

OKRA

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>OKRA: POST-EMERGENCE</b>						
Actively growing annual and perennial grasses. <i>Clethodim</i> is usually more effective on perennial grasses like bermuda grass and also controls annual bluegrass.	<i>clethodim</i> SelectMax 0.97EC	1	9–16 fl oz	0.07–0.12	24 H/ 20 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of clethodim may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 14 D	Label requires addition of 1 qt of COC/A. Adding crop oil increases injury potential. Do not apply more than 5 pt/A/season. Do not mix with any other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>sethoxydim</i> may result in reduced grass control.
<b>OKRA: POST-EMERGENCE DIRECTED</b>						
Small seeded broadleaves and annual grasses.	<i>prometryn</i> Caparol 4L	5	1.5 pt	0.75	12 H/ 14 D	Direct spray to base of okra with 7–9 leaves; expect up to 10% chlorosis. There is no mention of adjuvant on the label and an adjuvant would likely increase injury significantly.
<b>OKRA: HOODED ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ 14 D	Label allows hooded spray or as a wiper application in row middles. To avoid severe injury, do not allow herbicide to contact foliage, green shoots, stems, exposed roots, or fruit of crop.
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone 2SL Gramoxone 3SL	22	2 pt 1.3 pt	0.5	24 H/ —	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Spray must not contact okra plants.  May apply twice with hooded sprayers if applications are at least 14 days apart. Add 1 qt NIS or 1 gal COC/100 gal of spray mix.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow spray to contact crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.
Nutsedge, wild radish, ragweed.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1 oz	0.02–0.048	12 H/ 30 D	Apply between rows of crop while avoiding contact with crop. Do not apply more than 2 oz/A per crop cycle.

## COMMERCIAL VEGETABLE WEED CONTROL

### ONIONS (Dry Bulb & Green)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>ONIONS (DRY BULB AND GREEN): PRE-PLANT</b>						
Suppression or control of most annual grasses and broadleaf weeds. Full rate provides about 80% control of nutsedge.	<i>metam sodium</i> Vapam HL 42%	Fumigant	45–75 gal	19–31.5	5 D/ NA	Rates are dependent on soil type and weeds present. Apply when soil moisture is near field capacity (60–80%). Apply through soil injection preferably shanking the product to a depth of 4" using knives spaced 4" apart; follow immediately with a bed shaper, roller, or other method to smooth and compact the soil surface. If irrigation is available, irrigate with about 0.25" and/or cover with tarp immediately. If using irrigation to seal soil, sequential irrigations are needed for the first week but do not overwater as this may reduce pest control. May apply through drip irrigation prior to planting a second, third, or fourth crop on mulch. Plant back interval is often 14–21 days and can be 30 days in some environments. May also apply pre-plant through center pivot but must follow serious buffer restrictions noted on label. <b>Labels require buffer restrictions, additional worker protection safety procedures, and a fumigant management plan; study this label closely.</b>
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.7–2.7 pt 2.5–4 pt	0.64–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b>  <b>Seeded Onion:</b> Apply to emerged weeds before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix. For stale seedbed, apply <i>glyphosate</i> 5–7 days before planting and follow with <i>paraquat</i> 1–2 days before planting. <i>Label does not currently mention transplants.</i>
Most emerged weeds except for resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.88 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting.  <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting.  <i>For nutsedge, purslane, or ryegrass:</i> Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
<b>ONIONS (DRY BULB AND GREEN): PRE-EMERGENCE</b>						
Annual grasses and small-seeded broadleaf weeds.	<i>DCPA</i> Dacthal W-75 Dacthal 6 F	3	≤ 6–8 lb ≤ 6–8 pt	≤ 4.5–6	12 H/ NA	<b>Seeding:</b> Apply after seeding and incorporate using approximately 0.25" irrigation; pre-plant incorporation is not recommended. A label with a PRE and delayed PRE application to reduce injury potential and improve weed control is being developed; contact your Extension agent or the manufacturer for the latest details. Injury can occur when onion emergence is delayed under cool or wet conditions.  <b>Transplant:</b> Can apply overtop after transplanting.

ONIONS (Dry Bulb Only)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>ONIONS (DRY BULB AND GREEN): POST-EMERGENCE</b>						
Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	8–16 fl oz	0.47–0.96	24 H/ Green Onion 21 D Dry Bulb 60 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to use. <b>Seeded (green or dry bulb):</b> Do not apply before 4 leaf stage. From the 4-6 leaf stage may apply 8 oz/A; rate can be increased to 12 oz/A after the 6 leaf stage. <b>Transplant (dry bulb only):</b> Transplant, irrigate to seal soil around the root ball, and then apply within 48 hours of planting. Rates of 12–16 fl oz are often in order.
Residual control of pigweed, purslane, spiderwort, and grasses.	<i>dimethenamid</i> Outlook 6 L	15	10–12 fl oz	0.47–0.56	12 H/ 30 D	Label allows application after 2 leaf; between 2–6-leaf apply no more than 10 oz/A; rate can be increased to 12 oz/A after the 6 leaf stage. If applied to 2 leaf onions, some stunting is expected. <i>For transplants:</i> suggest transplanting into weed-free fields, irrigate to seal soil around the root ball, and then apply within 48 hours.
Actively growing annual grasses.	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D	Label requires addition of 1 qt of COC/A. Adding crop oil increases injury potential. Do not apply more than 4.5 pt/A/season. Do not mix with other pesticides and do not apply within 3 days of a broadleaf herbicides or cultivation.
<b>ONIONS (DRY BULB ONLY): POST-EMERGENCE</b>						
Residual control of annual grasses and small-seeded broadleaf weeds including purslane.	<i>pendimethalin</i> Prowl 3.3 EC Prowl H20 3.8 AS	3	1.8–2.4 pt 1.5–2 pt	0.75–1 0.72–0.95	24 H/ NA	<b>Seedbed:</b> Apply when onions have 2–9 true leaves but prior to weed emergence. Use lower rates for applications to very young onions. <b>Transplants:</b> Apply to onions after soil has settled (watered) around transplants and no cracks are present. If no rainfall occurs within 2 days after application, irrigate as needed.
Actively growing annual and perennial grasses. <i>Clethodim</i> is generally more effective on annual grasses and annual bluegrass.	<i>clethodim</i> Select, others 2 EC SelectMax 0.97 EC TapOut 0.97 EC	1	6–16 fl oz 9–32 fl oz 9–32 fl oz	0.09–0.25 0.07–0.25 0.07–0.25	24 H/ 45 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>fluazifop-P-butyl</i> Fusilade DX 2 EC	1	6–16 fl oz	0.1–0.25	12 H/ 45 D	Label requires addition of 1 gal COC or 1 qt NIS/100 gal spray mix. Adding crop oil increases injury potential. Do not mix with other pesticides. Do not apply more than 48 oz/A/season.

COMMERCIAL VEGETABLE WEED CONTROL

ONIONS (Dry Bulb Only)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>ONIONS (DRY BULB ONLY): POST-EMERGENCE (continued)</b>						
Excellent residual control of henbit, purslane, pigweed, primrose, smartweed, and many others; controls small emerged weeds as well.	<i>oxyfluorfen</i> Goal 2 XL 2EC Galigan 2E Goaltender 4F Galigan H20 4F	14	3–32 fl oz 3–32 fl oz 1.5–16 fl oz 1.5–16 fl oz	0.05–0.5	48 H/ 60 D	<p><b>Seeded dry bulb onions:</b> Apply 3–8 oz/A of Goal 2XL (1.5–4 oz/A of Goaltender) in a minimum of 40 GPA and with no less than 20 psi. Apply when onions have at least 3 true leaves, when weeds are 1" or smaller, and when conditions are not cool, wet, and/or cloudy. Use lower rates on younger onions with 3–4 oz/A of Goal 2XL ideal for onion in the 3–4-leaf stage. Sequential applications may be made but do not exceed 2 pt/A/season of Goal 2 XL (1 pt/A for Goaltender).</p> <p><b>Transplanted onions:</b> Suggest making a single application using up to 2 pt/A of Goal 2XL (1 pt/A of Goaltender) within 2 days of transplanting but after irrigating to seal soil around root ball. <b>Waiting longer than 2 days will likely increase injury and reduce weed control.</b> Do not exceed 2 pt/A of Goal 2XL (1 pt/A of Goaltender) per crop season. A tank-mix with Prowl has shown excellent season long control.</p> <p><b>NOTE:</b> Apply <i>oxyfluorfen</i> only with water; no adjuvant pesticide or fertilizers!</p>
<b>ONIONS (DRY BULB ONLY): ROW MIDDLE HOODED SPRAYS</b>						
Most emerged weeds except for resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.8 SL (4.88 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ 14 D	Label allows a hooded spray or as a wiper application in row middles; UGA does not recommend hooded sprays because of drift potential. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2 EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect some leaf speckling from drift.

PEAS, GREEN (Note: For southern pea recommendations, see Bean section.)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
PEAS, GREEN (See bean section for Southern pea): PRE-PLANT						
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use. Apply to emerged weeds before crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix. For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–64 fl oz 22–44 fl oz 21–41 fl oz	0.75–1.54 lb ae	4 H/ NA	<b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. Do not feed crop residue to livestock for 8 weeks following treatment. For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	Apply prior to planting or before crop emergence to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.
PEAS, GREEN (See bean section for Southern pea): PRE-PLANT INCORPORATE OR PRE-EMERGENCE						
Annual grasses and broadleaf weed suppression; POOR pigweed control.	<i>clomazone</i> Command 3ME	13	up to 1.3 pt	up to 0.48	12 H/ —	Succulent peas only. Apply to the soil surface immediately after seeding. Limited GA research; limit acres treated and use lower rates until confidence is obtained. See label for buffer and rotation restrictions.
Annual grasses and small-seeded broadleaf weeds such as pigweed and purslane.	<i>pendimethalin</i> Prowl 3.3EC Prowl H20 3.8AS	3	1.8–2.4 pt 1.5–2 pt	0.75–1 0.72–0.95	24 H/ 45 D	English, Dry, Garden, Dwarf, Green, Pigeon, and Edible Pod. Incorporate 1–2" deep prior to planting. Rates lower than some products recommend (1.2–1.5 pt/A) are suggested for sandy soils with low organic matter or when following with a Dual type product PRE. Applying after planting and then irrigating is not supported by the label.
	<i>trifluralin</i> Treflan, other 4EC	3	1–1.5 pt	0.5–0.75	12 H/ NA	Incorporate 2–3" deep, within 8 hours of application, into the soil prior to SPRING (according to label) planting. Rates lower than those labeled (12 oz/A) are suggested for sandy soils with low organic matter or when following with a Dual type product PRE. Applying after planting and then irrigating is not supported by the label.
Annual grasses, small-seeded broadleaves, and suppression of yellow nutsedge, and Texas millet.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	12–16 oz	0.7–0.95	24 H/ NA	Label specifies use in English peas only. Apply to soil surface within 1 day of planting and irrigate the following day (2 days after planting). Use lower rates on sandy soils with low organic matter and when in a system with <i>pendimethalin</i> or <i>trifluralin</i> .
Wild radish, nightshade, suppression of non-ALS resistant pigweed and purslane.	<i>imazethapyr</i> Pursuit 2EC	2	2–3 fl oz	0.03–0.047	4 H/ 30 D	English peas only. Apply pre-plant incorporated prior to planting or to soil surface immediately after planting. Suggest mixing with a grass herbicide. Do not make more than 1 application Pursuit/yr. Rotational restrictions are a concern to some crops.

## COMMERCIAL VEGETABLE WEED CONTROL

### PEAS, GREEN (Note: For southern pea recommendations, see Bean section.)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>PEAS, GREEN (See bean section for Southern pea): POST-EMERGENCE</b>						
Broadleaves such as cocklebur and smallflower morningglory.	<i>bentazon</i> Basagran 4SL Basagran 5SL	6	8–16 fl oz 4.8–12.8 fl oz	0.5–1	48 H/ Succulent Pea 10 D Dry Pea 30 D	Garden and English peas. Apply after 3 pairs of leaves are present. Injury such as yellowing, bronzing, speckling, or burning of leaves may occur. Do not add oil according to label. In Georgia, Basagran cannot be applied alone. May be applied ONLY when mixed with Raptor or Pursuit, see labels. Raptor is not labeled on some peas/beans grown in Georgia, see label.
Wild radish, nightshade, suppression of non-ALS resistant pigweed and purslane.	<i>imazethapyr</i> Pursuit 2EC	2	3 fl oz	0.047	4 H/ 30 D	English pea only. Apply to 1–3" weeds when peas are at least 3" tall but prior to 5 nodes. Add NIS at 1 qt/100 gal of spray mix. Do not use COC. Do not make more than 1 application per year. <b>Rotational restrictions are a significant concern.</b>
Actively growing annual and perennial grasses. <i>Clethodim</i> and <i>quizalofop</i> are usually better on perennials and <i>clethodim</i> and <i>sethoxydim</i> are usually better on annuals.	<i>clethodim</i> SelectMax 0.97EC TapOut 0.97EC	1	9–16 fl oz 9–16 fl oz	0.07–0.12	24 H/ 21 D	Apply only one application before bloom. <b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced control.
	<i>quizalofop p-ethyl</i> Assure II 0.88EC Targa 0.88EC	1	6–12 fl oz 6–12 fl oz	0.04–0.08	12 H/ 30 D	With <i>sethoxydim</i> , according to label, add 1 qt of COC/A; see label about use of other additives. With <i>quizalofop</i> , add 1 qt NIS/100 gal to spray mix. Do not mix with other pesticides. Do not exceed 14 oz/A/season <i>quizalofop</i> . Do not apply more than 4 pt/A/season <i>sethoxydim</i> .
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ Succulent Pea 15 D Dry Pea 30 D	Application of a broadleaf herbicide or cultivation within 3 days of application may result in reduced control.
<b>PEAS, GREEN (See bean section for Southern pea): HOODED ROW MIDDLE SPRAYS</b>						
Most weeds except resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ 14 D	Labeled as a hooded spray or as a wiper application in row middles; UGA suggests against using hooded sprays as drift is likely. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and small pigweed.	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect leaf speckling from drift.



PEPPERS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
PEPPER: PRE-PLANT						
Suppression or control of most annual grasses and broadleaf weeds. Full rate will provide about 80% control of nutsedge; a program approach with <i>chloropicrin</i> is needed to improve control.	<i>metam sodium</i> Vapam HL 42%	Fumigant	45–75 gal	19–31.5	5 D/ NA	Rates are dependent on soil type and weeds present. Apply when soil moisture is near field capacity (60–80%). Apply through soil injection preferably shanking the product to a depth of 4" deep using knives spaced 4" apart; follow immediately with a final bed press, roller, or other method to smooth and compact the soil surface. If irrigation is available, irrigate with about 0.25" and/or cover with tarp immediately. May apply through drip irrigation prior to planting a second, third, or fourth crop on mulch. Plant back interval is often 14–21 days and can be 30 days in some environments. For first crop mulch, <i>chloropicrin</i> (150 lb/A broadcast) will also be needed in a program with metam to obtain adequate nutsedge control. Visit gaweed.com for the latest circular on fumigant systems.  <b>New labels require buffer restrictions, additional worker protection safety procedures, and a fumigant management plan; study this label closely.</b>
Most emerged weeds except for resistant pigweed, primrose, and spiderwort. For nutsedge, purslane, and ryegrass: apply <i>glyphosate</i> followed by <i>paraquat</i> 5-7 days later.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.75– 2.25 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting.  <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A.  <b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds before transplanting or crop emergence. Add 1 qt NIS or 1 gal COC/100 gal spray mix. If applying over plastic, must wash off with 0.5" rain or irrigation before transplant.  For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
Broadleaf weeds such as henbit, geranium and primrose.	<i>oxyfluorfen</i> Goal 2 XL 2EC Goaltender 4F	14	up to 2 pt up to 1 pt	up to 0.5 lb	24 H/ NA	Plasticulture only. Apply to soil surface of preformed beds <b>at least 30 days prior to transplanting</b> . Plastic mulch can be laid any time after application but do not disturb treated preformed bed.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.  <b>Transplants:</b> May apply 1 day prior to planting except on mulch where a single 0.5" irrigation/rain event plus a 7 day waiting period between application and planting is needed.  <b>Seeded:</b> Apply at least 7 days prior to seeding.

## COMMERCIAL VEGETABLE WEED CONTROL

### PEPPERS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>PEPPER: PRE-PLANT (continued)</b>						
Morningglory and pigweed < 1".	<i>pyraflufen ethyl</i> ET 0.208L	14	1–2 fl oz	0.0016–0.0032	12 H/ NA	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1 gal COC/100 gal of spray mix. <b>Bareground:</b> Wait 1 day following pre-plant burndown application before planting. <b>Mulch:</b> Suggest if applying over mulch wait 7 days plus a single 0.5" irrigation/rain event before planting.
<b>PEPPER: PRE-PLANT OR PRE-EMERGENCE</b>						
Annual grasses and small-seeded broadleaf weeds. Devrinol is generally the safest option with moderate weed control.	<i>bensulide</i> Prefar 4E	8	5–6 qt	5–6	12 H/ NA	Pre-plant incorporate 1" or apply preemergence after planting. With preemergence application, irrigate immediately after application. See label for rotational restrictions.
	<i>napropamide</i> Devrinol 50 DF Devrinol 2 XT	15	2–4 lb 2–4 qt	1–2	24 H/ NA	<b>Bareground:</b> Apply pre-plant and incorporate into the soil 1–2" as soon as possible after application. Shallow cultivation or irrigation will improve control. Can be used on direct-seeded and transplanted peppers. <b>Plasticulture:</b> Apply to the soil surface of preformed beds immediately prior to laying plastic. Make sure the plastic laying process does not incorporate or disturb the treated bed. Soil must be moist for activity.
	<i>trifluralin</i> Treflan, other 4 EC	3	≤ 1 pt	≤ 0.5	12 H/ NA	Transplants only. Apply pre-transplant and incorporate to a depth of 2–3" within 8 hours. Use of high rates and/or deep incorporation WILL result in crop injury. <b>Lower than labeled rates may be needed on some soils. Any tillage practice that concentrates trifluralin in the root zone WILL cause significant injury.</b> <b>NOT SUGGESTED FOR USE IN MULCHED SYSTEMS.</b>
Annual grasses and small-seeded broadleaf weeds, morningglory suppression, poor pigweed control.	<i>clomazone</i> Command 3 ME	13	0.7–2.67 pt	0.25–1	12 H/ NA	Apply to the soil surface of preformed beds immediately prior to laying plastic. Ensure the plastic laying process does not incorporate or disturb the treated bed. Pepper has excellent tolerance but one should consult the label for rotational crop intervals and buffer zonerequirements. <b>Not labeled for use on banana pepper.</b>
<b>PEPPER: PRE-PLANT or POST-EMERGENCE</b>						
Residual control of pigweed, purslane, spiderwort, and grasses; suppresses Texas millet.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	8–16 fl oz	0.47–0.94	24 H/ 60 D	Bell Pepper Transplants Only. A <b>Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use. <b>Mulch Production:</b> <b>Option 1:</b> Preferred application is to apply 10–12 oz/A Dual Magnum overtop of bell pepper 1–2 weeks after transplanting. <b>Option 2:</b> Apply 8–12 oz/A to the soil surface of pre-formed beds prior to laying plastic; make sure the plastic laying process does not disturb the treated bed. Pepper stunting can be observed, especially in the fall, if high amounts of water through drip irrigation are implemented. <b>Option 3:</b> A split application (pre-plant under mulch followed by POST) is also labeled; total rate used must not exceed 1 pt/A. <b>Option 4:</b> Row middle application at 1 pt/A. <b>Bareground Production:</b> Apply conservative rate overtop of transplants 2–14 days after both transplanting and sealing soil around root ball with irrigation. Dual also may be applied pre-transplant without disturbance but stunting is expected.

PEPPERS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>PEPPER: PRE-PLANT AND/OR ROW MIDDLE</b>						
Yellow nutsedge, pigweed, eclipta, purslane suppression. Carryover is huge concern to some crops, especially when applied under mulch. Degradation may not begin until the mulch is removed.	<i>fomesafen</i> Reflex 2L	14	12–16 fl oz	0.19–0.25	24 H/ NA	<p><b>Transplants Only.</b> A <b>Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to this use.</p> <p><b>Plasticulture First Crop:</b> Apply on soil surface of preformed bed after laying drip BUT before laying mulch. Make sure plastic laying process does not disturb treated area. Soil must be moist for activity.</p> <p><b>Plasticulture Second Crop:</b> May be applied overtop of mulch prior to transplanting but only if 1) bed formation allows the herbicide to be washed from the mulch, 2) a single rainfall or irrigation event of at least 0.5" occurs after applying Reflex and prior to transplanting, and 3) transplant holes are not punched until after the herbicide is washed from the mulch. <u>Transplants placed in "old" holes may be damaged.</u> Suggest no more than 12 oz/A for this use.</p> <p><b>Bareground:</b> Prepare land for planting, apply Reflex at no more than 12 oz/A non-incorporated pre-plant up to 7 days prior to transplanting, irrigate lightly, and then transplant. Do not concentrate the treated soil around the plant with the transplanting process. Use lower rates in cool, wet conditions and on sands.</p> <p><b>Row Middle:</b> Apply 1–1.5 pt/A prior to transplanting; do not contact mulch top. If contacts mulch, must be washed off prior to planting.</p>
<b>PEPPER: POST-EMERGENCE GRASSES</b>						
Actively growing annual and perennial grasses. <i>Clethodim</i> is usually better on perennials and annual bluegrass.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 20 D	<p><b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass &lt; 1.5") is the best option for control with lowest injury potential. The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.</p>
	<i>sethoxydim</i> Poast 1.53 EC	1	1–1.5 pt	0.19–0.3	12 H/ 7 D	
<b>PEPPER: HOODED ROW MIDDLE SPRAYS</b>						
Nutsedge, wild radish, non-ALS resistant 1" pigweed, ragweed.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1 oz	0.024–0.048	12 H/ 30 D	Apply to row middles as a pre-emergence or post-emergence spray. <b>DO NOT</b> allow spray to contact the crop or the plastic mulch. Add a NIS at 1 qt/100gal spray solution. See rotational restrictions on label.
Contact kill of succulent weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3 pt 2 pt	0.47	24 H/ —	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Use hooded sprays adjusted to prevent spray contact with crop. Add a NIS at a rate 2 pt/100 gal of spray mix. Do not exceed 30 psi nozzle pressure or spray under conditions which may cause drift. Do not make more than 3 applications/season and suggest not applying after pepper fruit has formed.

## COMMERCIAL VEGETABLE WEED CONTROL

### PEPPERS

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>PEPPER: HOODED ROW MIDDLE SPRAYS (continued)</b>						
Most emerged weeds except resistant pigweed, spiderwort, primrose, or big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ 14 D	Labeled as a hooded spray or wiper application in row middle; UGA does not recommend hooded sprays as drift is likely. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 3"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect some leaf speckling from drift.
Excellent residual control for pigweed, purslane, beggarweed, and other broadleaf weeds. Mixtures with grass control products encouraged. Critical tool for plastic.	<i>flumioxazin</i> Chateau 51WDG	14	up to 8 oz	up to 0.256	12 H/ NA	Apply up to 8 oz/acre per application per crop; see label for rotational restrictions especially at high rates.  Row middle applications in RAISED BED (at least 24" wide and at least 4" tall) plasticulture only. Third party indemnification label available ONLY through the GFVGA. Growers must obtain label to receive the appropriate application procedures (and to be legal). <b>Failure to follow these procedures may result in crop death:</b> 1) Spray must remain between raised beds after plastic is laid but before planting; spray can contact no more than the bottom 1" of the side of the raised bed. 2) Use hooded sprayer. 3) Rainfall of at least 0.25 inch needed after application but before planting. 4) Severe injury expected if spray contacts top of mulch.

### POTATO (Irish)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>POTATO, IRISH: PRE-PLANT</b>						
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3 pt 2 pt	0.49	24 H/ NA	<b>EPA has restricted the use of paraquat to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds up before crop emergence. May be used instead of the drag-off operation to kill emerged weeds before the application of PRE herbicides. Add 1 qt NIS or 1 gal COC/100 gal spray mix.  For stale seedbed, nutsedge, purslane or ryegrass: apply <i>glyphosate</i> followed by <i>paraquat</i> 5–7 days later.
Most emerged weeds except for resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ NA	Apply to emerged weeds before crop emergence. The need for an adjuvant depends on brand used.  For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ NA	Apply prior to planting through 1 day after planting to weeds < 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Do not contact any portion of the crop or expect severe injury.

POTATO (Irish)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>POTATO, IRISH: PRE-PLANT OR PRE-EMERGENCE</b>						
Annual grasses and small-seeded broadleaves.	<i>pendimethalin</i> Prowl 3.3EC Prowl H20 3.8AS	3	1.8–2.4 pt 1.5–2 pt	0.75–1 0.72–0.95	24 H/ NA	Apply just after planting or drag-off to weed-free soil before crop emerges. Incorporate into the top 1–2" without damaging sprouts or seed pieces. Can also be applied early POST from crop emergence to the 6" stage of growth. Only 1 application can be made per season.
	<i>trifluralin</i> Treflan 4EC Trifluralin 4L	3	1–1.5 pt	0.5–75	12 H/ NA	Apply and incorporate after planting but before emergence or immediately following drag-off or after plants have fully emerged. Do not concentrate the herbicide in the bed during the incorporation process and do not damage sprouts or seed pieces.
Annual grasses (suppresses Texas millet), purslane, pigweed, spiderwort, suppresses yellow nutsedge.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	1–1.33 pt	0.95–1.27	24 H/ 60 D	Apply immediately after drag-off to weed-free soil before crop emerges. Can also be applied at layby for residual control of late-season weeds. Consult label for tank-mixtures with <i>metribuzin</i> , <i>linuron</i> , <i>pendimethalin</i> , and <i>EPTC</i> . Injury can result with cool/wet soil conditions especially for early maturing cultivars such as "Superior." Irrigate within 48 hours of application.
Annual grasses, most broadleaf weeds; nutsedge suppression.	<i>EPTC</i> Eptam 7E	8	3.5 pt	3.1	12 H/ 30 D	Apply pre-plant and incorporate 2–3" deep.
Annual broadleaf weeds including pigweed, purslane, Florida pusley.	<i>flumioxazin</i> Chateau 51WDG	14	1.5 oz	0.048	12 H/ NA	Apply after drag-off or hilling but before potatoes and weeds emerge. A minimum of 2" of soil must cover the potatoes or injury may occur. <i>Check label for proper sprayer clean out instructions. No GA research.</i>
Pigweed, yellow nutsedge, eclipta, and wild poinsettia.	<i>fomesafen</i> Reflex 2L	14	12–16 fl oz	0.019–0.25	24 H/ 70 D	Apply after planting but before potato emergence. May mix with other registered herbicides. Do not pre-plant incorporate. Do not apply to emerged potato. Do not apply on yams. No GA research, try on few acres at the 12 oz/A or lower rate.
Limited residual control but controls many emerged grasses and broadleaf weeds.	<i>linuron</i> Lorox DF 50WDG	7	1.5–2.5 lb	0.75–1.25	24 H/ NA	Apply just after planting seed at least 2" deep but before emergence. If beds are to be dragged or hilled, apply after the final dragging or hilling operation. Labeled on sandy loam soils with 1–2% organic matter. Do not use on sand or loamy sand soils. If emerged weeds are present, add 1 pt NIS/25 gal spray mixture. May tank-mix with Dual Magnum.
Most annual broad-leaf weeds and some annual grasses.	<i>metribuzin</i> Metri 75 DF Metri 4 F	5	0.3–1.3 lb 0.5–2 pt	0.25–1	12 H/ 60 D	Apply just after planting or drag-off, but before crop emerges. Refer to label for specific cultivar tolerances. Not recommended for use on sand or sandy loam soils; do not apply more than 0.5 lb ai/A on sandy soils. Refer to product label for specific rates and cultivar tolerances. See label for rotational restrictions.
Fair control of pigweed, lambsquarter, and morningglory.	<i>rimsulfuron</i> Matrix 25DF	2	1–1.5 oz	0.016–0.02	4 H/ 60 D	Apply after drag-off or hilling but before potatoes and weeds emerge. If emerged weeds are present, add 1 qt NIS/100 gal of water. No GA research.

COMMERCIAL VEGETABLE WEED CONTROL

POTATO (Irish)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>POTATO, IRISH: POST-EMERGENCE</b>						
Many annual broadleaf weeds and some annual grasses.	<i>metribuzin</i> Metribuzin 75DF Metri 4F	5	0.3–0.67 lb 0.5–1 pt	0.25–0.5	12 H/ 60 D	Can be used on russet or white-skinned varieties that are not early maturing. Apply only if there have been at least 3 successive days of sunny weather before application. Treat before weeds are 1" tall. Treatment may cause some chlorosis or minor necrosis. See rotational restrictions.
	<i>rimsulfuron</i> Matrix 25DF	2	1–1.5 oz	0.016–0.02	4 H/ 30 D	Apply to young actively growing weeds after crop emergence but before the crop exceeds 14" tall. Add 1 qt NIS/100 gal of water. No GA research. Do not exceed 2.5 oz/A/yr.
Actively growing annual and perennial grasses.  <i>Clethodim</i> is usually more effective on perennials and is effective on annual bluegrass.	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D	Label requires addition of 1 qt COC/A. Adding crop oil increases injury potential. Do not apply more than 5 pt/A/season. Do not mix with other pesticides and do not cultivate or apply broadleaf herbicide within 3 days of application.
	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–16 fl oz 9–32 fl oz 9–32 fl oz	0.09–0.25 0.07–0.25 0.07–0.25	24 H/ 30 D	Select label requires addition of 1 gal COC/100 gal spray mix. Adding crop oil may increase crop injury at high temperatures. For SelectMax add 1qt NIS/100 gal spray mix.  Do not mix with other pesticides. Do not apply a broadleaf grass herbicide or cultivate within 3 days of applying <i>clethodim</i> as reduced grass control may occur.
<b>POTATO, IRISH: ROW MIDDLE SPRAY</b>						
Most emerged weeds except resistant pigweed, primrose, spiderwort, and big morningglory.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.77–1.13 lb ae	4 H/ 14 D	Label allows a hooded spray or as a wiper application in row middles; however, UGA recommends against the hooded spray as drift is likely.  Do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and small pigweed.	<i>carfentrazone</i> Aim EC 2.0EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 7 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.

POTATO (Sweet)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>POTATO, SWEET: PRE-PLANT</b>						
Most emerged weeds except for resistant pigweed, primrose, and spiderwort.	<i>glyphosate</i> 4 SL (3 lb ae) 5.5 SL (4.5 lb ae) 5.88 SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. <i>If poking holes with a transplant wheel and not using a typical transplanter then one also needs to irrigate (rain) 0.5" and wait at least 7 days between application and transplanting.</i> <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with paraquat 5–7 days later.
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3 pt 2 pt	0.49	24 H/ NA	<b>EPA has restricted the use of paraquat to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds up before transplanting. Add 1 qt NIS or 1 gal COC/100 gal spray mix. For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
Controls most problematic broadleaf weeds including pigweed, purslane, and Fl. Pusley.	<i>flumioxazin</i> Valor SX 51 WDG Chateau 51 WDG	14	2.5 oz 2.5 oz	0.08	12 H/ NA	Apply 2–5 days prior to transplanting to the pre-formed row. Do not incorporate and minimize movement of soil during transplanting. <b>Do not apply after transplanting or severe injury and crop death can occur.</b> Do not use greenhouse grown transplants. If using a variety other than Beauregard, test a small area before use. See label for other precautions including tank clean out concerns.
<b>POTATO, SWEET: POST-TRANSPLANT AND PRE-EMERGENCE</b>						
Annual grass and broadleaf weeds, morningglory suppression, weak on pigweed.	<i>clomazone</i> Command 3ME	13	1.5 pt	0.56	12 H/ 95 D	<b>Post-transplant.</b> Apply within 5 days of transplanting for pre-emergence control of annual grasses and broadleaf weeds. Place roots below soil surface where treatment will occur. Great tolerance but see label regarding buffers and rotation restrictions.
Residual suppression of annual grass and broadleaf weeds.	<i>napropamide</i> Devrinol 50DF Devrinol 2-XT	15	2–4 lb 2–4 qt	1–2	24 H/ NA	<b>Plant beds:</b> Apply to soil surface after sweet potato roots are covered with soil but prior to soil cracking and sweet potato plant emergence. <b>Production fields:</b> Apply to soil surface immediately after transplanting. If rainfall does not occur within 24 hours, irrigate with sufficient water to wet the soil to a depth of 2–4".
Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62 EC	15	8–12 fl oz	0.47–0.7	24 H/ 40 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to use. Research has shown stunting from Dual Magnum if applied too closely to planting; thus applications 2–3 weeks after transplanting is suggested. Sequential applications can be made as long as the total use rate does not exceed 1.33 pt/A and applications are not made within 40 days of harvest. <b>Do not</b> concentrate Dual around the crop root ball with tillage.

## COMMERCIAL VEGETABLE WEED CONTROL

### POTATO (Sweet)

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>POTATO, SWEET: POST-EMERGENCE</b>						
Actively growing annual and perennial grasses. Generally, <i>clethodim</i> and <i>fluazifop</i> are more effective on perennials, and <i>clethodim</i> and <i>sethoxydim</i> are more effective on annuals.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–16 fl oz 9–32 fl oz 9–32 fl oz	0.09–0.25 0.07–0.25 0.07–0.25	24 H/ 30 D	For Select, label requires the addition of 1 gal COC/100 gal spray mix. Adding crop oil increases injury potential. For SelectMax add 1 qt NIS/100 gal spray mix. Effective on annual bluegrass. Do not apply a broadleaf herbicide or cultivate within 3 days of application as reduced grass control may occur.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 30 D	With <i>sethoxydim</i> , label requires addition of 1 qt COC/A. With <i>fluazifop</i> , label requires addition of 1 gal of COC or 1 qt NIS/100 gal spray mix. Adding crop oil increases injury potential. Do not apply more than 48 oz/A <i>fluazifop</i> /season. Do not apply more than 5 pt/A/season <i>sethoxydim</i> . Do not mix with other pesticides. Do not apply a broadleaf herbicide or cultivate within 3 days of application as reduced grass control may occur.
	<i>fluazifop-P-butyl</i> Fusilade DX 2EC	1	6–16 fl oz	0.1–0.25	12 H/ 1 D	
<b>POTATO, SWEET: ROW MIDDLE HOODED SPRAY</b>						
Most emerged weeds except for resistant pigweed, spiderwort, primrose, and big morningglory	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75 to 1.13 lb ae	4 H/ 14 D	Label allows hooded spray or wiper application in row middles; however, UGA suggests not making hooded sprays because of drift potential. Do not allow herbicide to contact any part of the crop including exposed roots.  <b>Roundup PowerMax labels also allow the use of a broadcast wiper as long as no contact is made with the crop with a 7 day PHI.</b>
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2 EC	14	0.8–2 fl oz	0.013–0.031	12 H/ 7 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.



SPINACH

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>SPINACH: PRE-PLANT</b>						
Most emerged weeds except for resistant pigweed, primrose, and spiderwort.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.88 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting. <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A. For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later. Do not feed crop residue to livestock for 8 weeks following treatment.
<b>SPINACH: POST-EMERGENCE</b>						
Broadleaf weeds including clover, sowthistle, cocklebur, ragweed, jimsonweed.	<i>clopyralid</i> Stinger 3EC	4	0.25–0.33 pt	0.1–0.13	12 H/ 21 D	Apply to spinach in the 2–5-leaf stage when weeds are small and actively growing. Will control most legumes. See label for rotational concerns. Do not exceed 0.5 pt/A/yr.
Broadleaf weeds	<i>phenmedipham</i> Spin-aid 1.3EC	5	3–6 pt	0.5–1	12 H/ 21 D	<b>Processing spinach only.</b> Do not use when expected high temperatures will be above 75°F. For best results, spray when weeds are in the 2-leaf stage and crop has at least 6 true leaves. Use lower rates on lighter soils and only use higher rates on well-established crop not under stress. The application may be split, see label. Additives are not required.
Actively growing annual and perennial grasses. In general, <i>clethodim</i> is more effective on perennial grasses.	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 15 D	Label requires addition of 1 qt COC/A. Adding crop oil increases injury potential. Do not apply more than 3 pt/A/season <i>sethoxydim</i> . Do not mix with other pesticides. Do not apply a broadleaf grass herbicide or cultivate within 3 days of application as reduced grass control may occur.
	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–8 fl oz 9–16 fl oz 9–16 fl oz	0.09–0.12 0.07–0.12 0.07–0.12	24 H/ 14 D	For Select, label requires addition of 1 gal COC/100 gal spray mix. Adding crop oil will increase injury potential. For SelectMax, add 1qt NIS/100 gal spray mix. Effective on annual bluegrass. Do not mix with other pesticides. Do not apply a broadleaf herbicide or cultivate within 3 days of application as reduced grass control may occur.
<b>SPINACH: HOODED ROW MIDDLE SPRAYS</b>						
Most emerged weeds except for resistant pigweed, primrose, and spiderwort.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–48 fl oz 22–32 fl oz 21–30 fl oz	0.75–1.13 lb ae	4 H/ 14 D	Labeled as a hooded spray or a wiper application in row middles; UGA recommends against hooded sprays because of drift potential. To avoid severe injury, do not allow herbicide to contact any part of the crop including exposed roots.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix. Expect some leaf speckling from drift.

## COMMERCIAL VEGETABLE WEED CONTROL

### TOMATO

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>TOMATO: PRE-PLANT</b>						
Suppression or control of most annual grasses and broadleaf weeds. Full rate provides about 80% control; systems with <i>chloropicrin</i> are needed for improved control.	<i>metam sodium</i> Vapam HL 42%	Fumigant	45–75 gal	19–31.5	5 H/ NA	Rates are dependent on soil type and weeds present. Apply when soil moisture is near field capacity (60–80%). Apply through soil injection preferably shanking the product to a depth of 4" using knives spaced 4" apart; follow immediately with a final bed press, roller, or other method to smooth and compact the soil surface. If irrigation is available, irrigate with about 0.25" and/or cover with tarp immediately. May apply through drip irrigation prior to planting a second, third, or fourth crop on mulch. Plant back interval is often 14–21 days and can be 30 days in some environments. For first crop mulch, <i>chloropicrin</i> (150 lb/A broadcast) will also be needed in a program with metam to obtain adequate nutsedge control. Visit <a href="http://gaweed.com">gaweed.com</a> for the latest circular on fumigant systems.  <b>New labels require buffer restrictions, additional worker protection safety procedures, and a fumigant management plan; study this label closely.</b>
Most emerged weeds except for resistant pigweed, primrose, and spiderwort. For nutsedge, ryegrass, or purslane: apply <i>glyphosate</i> followed by <i>paraquat</i> 5–7 days later.	<i>glyphosate</i> 4SL (3 lb ae) 5.5SL (4.5 lb ae) 5.88SL (4.8 lb ae)	9	32–96 fl oz 22–64 fl oz 21–60 fl oz	0.75– 2.25 lb ae	4 H/ NA	<b>Bareground transplants:</b> Suggest applying no more than 1.13 lb ae/A in a single application. Also, irrigate (rain) 0.5" and wait at least 7 days between application and transplanting.  <b>Bareground seeding:</b> Wait at least 3 days after application before planting and, if possible, irrigate between application and planting. Suggest < 1.13 lb ae/A.  <b>Plasticulture:</b> Apply 1.13 lb ae/A at least 3 days before transplanting or up to 2.25 lb ae/A at least 10 days before transplanting. Irrigate/rain of at least 0.5" in a single event between application and planting is required, regardless of rate, to remove product from mulch. Do NOT poke holes until after washing mulch and transplants landing in "old" holes may be damaged.
Contact kill of green foliage; annual weeds < 3".	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2SL	22	1.3–2.7 pt 2–4 pt	0.49–1	24 H/ NA	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> Apply to emerged weeds before transplanting. Add 1 qt NIS or 1 gal COC/100 gal spraymix.  If applying over plastic, must wash off with 0.5" of rain or irrigation before planting.  For nutsedge, purslane, or ryegrass: Apply <i>glyphosate</i> and follow with <i>paraquat</i> 5–7 days later.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2EC	14	0.8–2 fl oz	0.013–0.03	12 H/ N/A	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1–2 gal COC/100 gal of spray mix.  <b>Transplants:</b> May apply 1 day prior to planting except on mulch where a single 0.5" irrigation/rain event plus a 7 day waiting period between application and planting is needed.  <b>Seeded:</b> Apply at least 7 days prior to seeding.
Morningglory and pigweed < 1".	<i>pyraflufen ethyl</i> ET 0.208L	14	1–2 fl oz	0.0016–0.0032	12 H/ N/A	Apply prior to planting to weeds less than 2"; pigweed less than 1". Add 1 gal COC/100 gal of spray mix.  <b>Bareground:</b> Wait 1 day following pre-plant burndown application before planting.  <b>Mulch:</b> Suggest if applying over mulch wait 7 days plus a single 0.5" irrigation/rain event before planting.

TOMATO

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>TOMATO: PRE-PLANT (continued)</b>						
Broadleaf weeds and a few grasses including radish, geranium, and primrose.	<i>oxyfluorfen</i> Goaltender4F Goal XL 2EC	14	up to 1 pt up to 2 pt	up to 0.5 lb	24 H/ N/A	Plasticulture only. <b>Apply to soil surface of preformed beds at least 30 days prior to transplanting crop.</b> Plastic mulch can be laid any time after application but do not disturb treated preformed bed when laying plastic.
Annual grasses, small-seeded broadleaf weeds; suppresses yellow nutsedge.	<i>S-metolachlor</i> Dual Magnum 7.62EC	15	12–16 fl oz	0.7–0.95	24 H/ 30 D	Can be applied pre-plant to pre-formed beds just prior to laying plastic. Do not disturb treated bed when laying plastic. In environments where significant watering through drip irrigation is required, some crop stunting may be observed especially with higher rates.
Annual grasses and broadleaf weeds. Devrinol is generally safer but a little less effective.	<i>napropamide</i> Devrinol 50DF Devrinol 2XT	15	2–4 lb 2–4 qt	1–2	24 H/ N/A	<b>Bareground:</b> Apply pre-plant and incorporate into the soil 1–2" as soon as possible after application. Shallow cultivation or irrigation will improve control. Can be used on direct-seeded and transplants. <b>Plasticulture:</b> Apply to the soil surface of pre-formed beds immediately prior to laying plastic. Make sure the plastic laying process does not incorporate or disturb the treated bed. Soil must be moist for activity.
	<i>trifluralin</i> Treflan, others 4EC	3	≤ 1 pt	≤ 0.5	12 H/ N/A	Apply pre-transplant and incorporate to a depth of 2–3" within 8 hours of application. Use of high rates and/or deep incorporation WILL result in crop injury. Lower than labeled rates may be needed in some GA fields. Cultural practices that concentrate trifluralin in the root zone WILL cause tomato injury. <b>NOT SUGGESTED FOR MULCH SYSTEMS.</b>
Nutsedge suppression; wild radish, non-ALS resistant pigweed.	<i>halosulfuron</i> Sanda 75DG	2	0.5–1 oz	0.024–0.048	12 H/ N/A	<b>Transplants only:</b> Apply after final bed forming and just prior to laying plastic mulch, do not disturb bed when laying mulch. May transplant into treated area 7 days after application. Do not exceed a total of 2 oz/A/yr. Rotational restrictions may be a concern, see label. Use conservative rate if in bareground production. Likely more helpful for nutsedge post-emergence.
Yellow nutsedge, pigweed, eclipta; suppresses purslane.  Carryover is a huge concern, especially when applied under mulch. Degradation may not begin until mulch is removed.	<i>fomesafen</i> Reflex 2L	14	12–16 fl oz	0.19–0.25	24 H/ N/A	<b>Transplants Only. A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to use. <b>Plasticulture First Crop:</b> Apply on soil surface of preformed bed after laying drip BUT before laying mulch. Make sure plastic laying process does not disturb treated area. Soil must be moist for activity. <b>Plasticulture Second Crop:</b> May be applied otop of mulch prior to transplanting but only if: 1) bed formation allows the herbicide to be washed from the mulch; 2) a single rainfall or irrigation event of at least 0.5" occurs after applying Reflex and prior to transplanting; and 3) transplant holes are not punched until after the herbicide is washed from the mulch. <u>Transplants placed in "old" holes may be damaged.</u> Suggest applying no more than 12 oz/A. <b>Bareground:</b> Prepare land for planting, apply Reflex non-incorporated pre-emergence up to 7 days prior to transplanting, irrigate, and then transplant. Suggest applying no more than 12 oz/A. Do not concentrate the treated soil around the plant when transplanting. Use conservative rate if cool, wet or on sands. <b>Row Middle:</b> Apply 1–1.5 pt/A prior to transplanting; do not contact mulch or if mulch is contacted it must be washed prior to planting.

## COMMERCIAL VEGETABLE WEED CONTROL

### TOMATO

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>TOMATO: PRE-PLANT (continued)</b>						
Annual grasses and broadleaf weeds including cocklebur, ragweed, smartweed, and velvetleaf.	<i>metribuzin</i> Metribuzin 75DF Metri 4F	5	0.3–0.6 lb 0.5–1 pt	0.25–0.5	12 H/ N/A	<b>Transplants only:</b> Apply after final bed forming and just prior to laying plastic mulch, do not disturb bed when laying mulch. Place tomato transplant roots below herbicide layers to avoid injury. Use conservative rates when on sands or if it is cool/wet. See label for other instructions.  See rotational restrictions on label, a 2nd crop of cucumber may be damaged.
<b>TOMATO: POST-EMERGENCE</b>						
Annual grasses and broadleaf weeds including cocklebur, ragweed, smartweed, velvetleaf, and morningglory.	<i>metribuzin</i> Metribuzin 75DF Metri 4F	5	0.3–0.5 lb 0.5–0.75 pt	0.25–0.37	12 H/ 7 D	Seeded tomato must have at least 5–6 true leaves. For transplanted tomatoes, do not apply within 14 days of transplanting and recovery from transplant shock and new growth is evident. Apply only if there have been at least 3 successive days of sunny weather prior to application. Do not exceed 1 lb ai/yr.  <b>Do not apply within 24 hours of application of other pesticides. Do not tank-mix with other pesticides.</b>  See rotational restrictions on label, a 2nd crop of cucumber may be damaged.
Nutsedge ragweed, radish, cocklebur; residual control of non-ALS resistant pigweed.	<i>halosulfuron</i> Sanda 75DG	2	0.5–0.75 oz	0.024–0.036	12 H/ 30 D	Apply post-emergence 14 days after transplanting but before first bloom. May apply over plastic mulch. Add NIS at 1qt/100 gal of spray mix.  If a PRE under plastic application of <i>halosulfuron</i> was made, use <i>halosulfuron</i> as a POST spot treatment only. Do not exceed a total of 2 oz/A/yr. Review rotational restrictions.
Suppresses wild radish, common purslane, non-ALS resistant 1" pigweed and some annual grasses.	<i>rimsulfuron</i> Matrix DF 25WDG	2	1–2 oz	0.015–0.03	4 H/ 45 D	Apply after the crop has at least 2 true leaves and weeds are small (1" or less) and actively growing. Add nonionic surfactant at 1 qt/100 gal of spray solution. See label for rotational restrictions.
Residual control of pigweed, purslane, spiderwort, and grasses.	<i>S-metolachlor</i> Dual Magnum 7.62 EC	15	8–12 fl oz	0.47–0.7	24 H/ 30 D	<b>A Section 24(c) Georgia Local Need Label</b> must be obtained at <a href="http://syngenta-us.com/labels/indemnified-label-login">syngenta-us.com/labels/indemnified-label-login</a> prior to use.  <b>Do Not</b> exceed 1.33 pt/A for season.  <b>Post-transplant Mulch:</b> Apply topically or directed 7–14 days after transplant.  <b>Post-transplant Bareground:</b> Transplant, irrigate to seal soil around root ball, apply topically or directed 7–14 days after transplanting and irrigating.  Topical applications may cause minor leaf speckling; use 8 oz/A in hot humid conditions. No injury expected with directed applications to base of plant.

TOMATO

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>TOMATO: POST-EMERGENCE</b> <i>(continued)</i>						
Actively growing annual and perennial grasses. In general, <i>clethodim</i> is more effective on perennial grasses.	<i>clethodim</i> Select, others 2EC SelectMax 0.97EC TapOut 0.97EC	1	6–16 fl oz 9–32 fl oz 9–32 fl oz	0.07–0.25	24 H/ 20 D	<b>A Section 24(c) Georgia Local Need Label</b> allows an application of SelectMax without the addition of an adjuvant; applying SelectMax at 9–10 fl oz/A when grasses are less than 3" (goosegrass < 1.5") is the best option for control with lowest injury potential potential (for repeat applications, make on a minimum of a 14 day interval). The addition of NIS with SelectMax at 1 pt/100 gal spray mix is recommended for large grasses and goosegrass. For Select, add 1 gal COC/100 gal spray mix according to the label; injury is more likely with crop oil. Do not mix with other pesticides. Application of a broadleaf herbicide or cultivation within 3 days of <i>clethodim</i> may result in reduced grass control.
	<i>sethoxydim</i> Poast 1.53EC	1	1–1.5 pt	0.19–0.3	12 H/ 20 D	Add 1 qt/A of COC. Apply after transplants have recovered from shock (label specifies 14 D) or after seeded tomatoes have 5–6 leaves. Adding crop oil may increase crop injury at high temperatures. Do not apply more than 4.5 pt/A/season <i>sethoxydim</i> . Do not mix with other pesticides.
<b>TOMATO: DIRECTED SPRAYS</b>						
Very small annual grasses plus broadleaf weeds including cocklebur, ragweed, smartweed, velvetleaf, and morningglory.	<i>metribuzin</i> Metribuzin 75DF Metri 4F	5	0.6–1.33 lb 1–2 pt	0.5–1	12 H/ 7 D	<b>Post-emergence directed:</b> Seeded tomato must have at least 5–6 true leaves. For transplanted tomatoes, do not apply within 14 days of transplanting and until recovery from transplant shock and new growth are evident. Multiple treatments should be separated by at least 14 D. Apply only if there have been at least 3 successive days of sunny weather prior to application.  Do not exceed 1 lb ai/yr. Do not apply within 24 hours of application of other pesticides. Do not tank-mix with other pesticides.
Nutsedge and annual broadleaf weed control including <i>Ipomoea</i> morningglory.	<i>trifloxysulfuron</i> Envoke 75 WDG	2	0.1–0.2 oz	0.0047–0.0094	12 H/ 45 D	Apply as a post-emergence directed spray adjusted to limit contact with tomato foliage. Add nonionic surfactant at 1 qt/100 gal of spray mix. See label for rotation restrictions.

■ COMMERCIAL VEGETABLE WEED CONTROL

TOMATO

WEED	FORMULATION	MOA	RATE/A BROADCAST		REI/PHI (Hours or Days)	REMARKS AND PRECAUTIONS
			AMOUNT OF FORMULATION	LBS ACTIVE INGREDIENT		
<b>TOMATO: HOODED ROW MIDDLE SPRAYS</b>						
Contact kill of all green foliage.	<i>paraquat</i> Gramoxone, others 3SL Gramoxone 2 SL	22	1.3 pt 2 pt	0.5	24 H/ 30 D	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b>  Apply for control of emerged weeds between rows of tomato. Do not exceed 30 PSI. Add 1 qt NIS or 1 gal COC/100 gal spray mix. Do not allow spray to contact crop or injury will occur. Do not make more than 3 applications/season; suggest not to make applications once fruit has formed.
Morningglory, spiderwort, and pigweed < 1".	<i>carfentrazone</i> Aim EC 2 EC	14	0.8–2 fl oz	0.013–0.03	12 H/ 0 D	Apply as a hooded spray in row middles. Do not allow herbicide to contact the crop. Apply to weeds less than 2". Add 1–2 gal COC/100 gal of spray mix. Expect some leaf speckling from drift.
Excellent residual control for pigweed, purslane, beggarweed, and other broadleaf weeds.	<i>flumioxazin</i> Chateau 51 WDG	14	up to 8 oz	up to 0.256	12 H/ NA	Apply up to 8 oz/acre per application per crop; see label for rotational restrictions especially at high rates. Row middle applications in RAISED BED (at least 24" wide and at least 4" tall) plasticulture only. Third party indemnification label available ONLY through the GFVGA. Growers must obtain label to receive the appropriate application procedures (and to be legal). <b>Failure to follow these procedures may result in crop death:</b> <ol style="list-style-type: none"> <li>1) Spray must remain between raised beds after plastic is laid but <b>before planting</b>; spray can contact no more than the bottom 1" of the side of the raised bed.</li> <li>2) Use hooded sprayer.</li> <li>3) Rainfall of at least 0.25 inch needed after application but before planting.</li> <li>4) Severe injury expected if spray contacts top of mulch.</li> </ol>

# WEED RESPONSE TO HERBICIDES USED IN VEGETABLE CROPS

Stanley Culpepper, Extension Agronomist—Weed Science

HERBICIDE	PREFAR	SUTAN	EPTAM/ ERADICANE	TILLAM	RO-NEET	TREFLAN/ PROWL	PURSUIT	OUTLOOK	LIASSO	DUAL MAGNUM <sup>1</sup>
TIME OF APPLICATION	PPI	PPI	PPI	PPI	PPI	PPI	PPI/PRE	PPI/PRE	PPI/PRE	PPI/PRE
<b>PERENNIAL WEEDS</b>										
johnsongrass (rhizome)	P	F	F-G		P	P	P-F	P	P	P
purple nutsedge	P	G	G	F-G	P	P	F-G	P	P	P
yellow nutsedge	P	G-E	G-E	F-G	P	P	F	F	P	F
<b>ANNUAL GRASSES</b>										
barnyardgrass	F-G	E	G-E	G-E	G	E	F	G-E	E	E
crabgrass	F-G	E	G-E	G-E	G	E	F	E	E	E
crowfootgrass	F-G	E	G-E	G-E	G	E	P	E	E	E
fall panicum	F-G	G	G	G	G	G	P-F	G-E	G-E	G-E
foxtails	F-G	E	G-E	G-E	G	E	F-G	E	E	E
goosegrass	F-G	G	G	F-G	G	E	F	E	E	E
johnsongrass (seedling)	F-G	G	G	G	G	G-E	G	P-F	P-F	P-F
sandbur	F-G	G-E	G	G	G	E	P	F-G	F-G	F-G
signalgrass, broadleaf	F-G	G-E	G-E	P	G	E	P-F	F-G	F-G	G
Texas panicum	F	F-G	F-G	P-F	G	G	P	P-F	P-G	P-F
<b>ANNUAL BROADLEAF WEEDS</b>										
bristly starbur			P	G		P	F	P-F	F	P-F
citronmelon	P					P	P	P	P	P
cocklebur	P	P	P	P		P	G-E	P	P	P
crotalaria						P		P	P	P
croton, tropic						P	P	P	P-F	P
cutleaf eveningprimrose	P-F	G	G	G		G	G-E	F-G	G	G

PPI—pre-plant incorporated  
 PRE—pre-emergence.  
 1. Weed response from Dual Magnum and Dual II Magnum is similar.

E—Excellent control, control above 90%  
 G—Good control, control above 80%  
 F—Fair control, control between 60 and 80%  
 P—Poor control, control less than 60%  
 If no response symbol is shown control is unknown.

WEED RESPONSE TO HERBICIDES USED IN VEGETABLE CROPS

HERBICIDE	PREFAR	SUTAN	EPTAM/ ERADICANE	TILLAM	RO-NEET	TREFLAN/ PROWL	PURSUIT	OUTLOOK	LASSO	DUAL MAGNUM <sup>1</sup>
TIME OF APPLICATION	PPI	PPI	PPI	PPI	PPI	PPI	PPI/PRE	PPI/PRE	PPI/PRE	PPI/PRE
<b>ANNUAL BROADLEAF WEEDS (continued)</b>										
Florida beggarweed	P	P-F	P-F			P	P	F	F	F
Florida pusley	F	G-E	G-E	G		E	G	G	G	G
jimson weed	P	P	P	P	P	P	F-G	P	P	P
lambsquarters	F	G	G	F	F	G-E	F-G	G	F-G	F-G
morningglory	P	P-F	P-F	P		P	F-G	P	P	P
nightshade, East. black					P	G		G	G	
pigweed	F	G	G	G	G	G-E	G-E	G	G-E	G
prickly sida		P-F	P-F	P-F		P	G	P-F	P-F	P-F
purslane	P-F	G	G	G	G	E	G	G	G	G
ragweed, common	P	P-F	P-F	P-F	P	P	F-G	F	P-F	P
sicklepod	P	P-F	P-F	P		P	P	P	P-F	P
<b>WINTER ANNUALS</b>										
annual ryegrass	P					F-G		F-G	P	F-G
cudweed	P									
shepherdspurse	P-F			P	G	F-G	G		G	
swinecress	P									
wild mustards	P	P				P	E	P	P	P
wild radish	P	P				P	E	P	P	P

<p>PPI—pre-plant incorporated PRE—pre-emergence.</p> <p>1. Weed response from Dual Magnum and Dual II Magnum is similar.</p>	<p>E—Excellent control, control above 90% G—Good control, control above 80% F—Fair control, control between 60 and 80% P—Poor control, control less than 60% If no response symbol is shown control is unknown.</p>
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HERBICIDE	ATRAZINE	CURBIT/ PROWL	COMMAND	DACTHAL	DEVRIKOL
TIME OF APPLICATION	PRE	PRE	PRE	PRE	PRE
<b>PERENNIAL WEEDS</b>					
johnsongrass (rhizome)	P	P	P	P	P
purple nutsedge	P	P	P	P	P
yellow nutsedge	P	P	P	P	P-F
<b>ANNUAL GRASSES</b>					
barnyardgrass	F	G-E	G-E	F-G	G-E
crabgrass	G	G-E	E	G	G-E
crowfootgrass	G	G-E	E	G	G-E
fall panicum	P	G	G-E	F	G
foxtails	F	G-E	E	F-G	G-E
goosegrass	F-G	G	E	G	G
johnsongrass (seedling)	P	G	F-G	G	G
sandbur	F	G	F-G	F-G	G-E
signalgrass, broadleaf	P	G	E	F-G	G
Texas panicum	P	F-G	F	F	G
<b>ANNUAL BROADLEAF WEEDS</b>					
bristly starbur	G	P	P	P	P
citronmelon	F-G	P	P		P
cocklebur	G-E	P	P-F	P	P
crotalaria	G-E	P		P	P
croton, tropic	G	P	E	P	P
cutleaf eveningprimrose	E	G	F	F	F
Florida beggarweed	E	P	F-G	P	P-F
Florida pusley	E	G-E	F-G	F-G	G
jimsonweed	E	P	F-G	P	P
lambsquarters	E	G	G	G	G
morningglory	G	P	P-F*	P	P
nightshade, east. black	G	P		N	P
pigweed	E	G-E	P	F-G	F-G
prickly sida	E	P	E	G	F
purslane	E	G-E	G	F-G	G-E
ragweed, common	E	P	F-G		G
sicklepod	G	P	P	P	P

HERBICIDE	ATRAZINE	CURBIT/ PROWL	COMMAND	DACTHAL	DEVRIKOL
TIME OF APPLICATION	PRE	PRE	PRE	PRE	PRE
<b>WINTER ANNUALS</b>					
annual ryegrass	G				
cudweed				P-F	
shepherdspurse	G	P	F	P-F	F-G
swinecress	G			P-F	
wild mustards	G	P		P-F	P
wild radish	G	P		P-F	P

PRE—pre-emergence.  
 \* Command provides fair control of pitted morningglory, but poor control of other morningglory species.

E—Excellent control, control above 90%  
 G—Good control, control above 80%  
 F—Fair control, control between 60 and 80%  
 P—Poor control, control less than 60%.  
 If no response symbol is shown control is unknown.

## WEED RESPONSE TO HERBICIDES USED IN VEGETABLE CROPS

HERBICIDE	GOAL	REFLEX	SANDEA	SENCOR	VALOR/CHATEAU
TIME OF APPLICATION	PRE	PRE	PRE	PRE	PRE
<b>PERENNIAL WEEDS</b>					
johnsongrass (rhizome)	P	N	P	P	P
purple nutsedge	P	P-F	F	P	P
yellow nutsedge	P	G	F	P	P
<b>ANNUAL GRASSES</b>					
barnyardgrass	P		P	G	P
crabgrass	P	F-G	P	F-G	P
crowfootgrass	P		F	G	P
fall panicum	P	F	P	P	P
foxtails	P		P	P	P
goosegrass	P		P	F-G	P
johnsongrass (seedling)	P		P	P-F	P
sandbur	P		P	P	P
signalgrass, broadleaf	P	F-G	P	P-F	P
Texas panicum	P	F	P	P	P
<b>ANNUAL BROADLEAF WEEDS</b>					
bristly starbur		G-E	F	G	F
citronmelon				P-F	G
cocklebur		G	G	F	P
crotalaria				G	G
croton, tropic		F-G		G	G
cutleaf eveningprimrose	G-E			G-E	E
Florida beggarweed		P	F	G-E	G-E
Florida pusley		F	F	G-E	G-E
jimsonweed			G	G	G

PRE—pre-emergence.

\* Reflex provides P-F control of Ipomoea morningglory and G control of smallflower morningglory.

E—Excellent control, control above 90%

G—Good control, control above 80%

F—Fair control, control between 60 and 80%

P—Poor control, control less than 60%.

If no response symbol is shown control is unknown.

HERBICIDE	GOAL	REFLEX	SANDEA	SENCOR	VALOR/CHATEAU
TIME OF APPLICATION	PRE	PRE	PRE	PRE	PRE
<b>ANNUAL BROADLEAF WEEDS (continued)</b>					
lambquarters	F	E	F-G	G	G-E
morningglory		P-G*	P-F	P-G	F-G
nightshade, eastern black			P	G	
pigweed	G-E	E	G-E	G-E	E
prickly sida				G	G-E
purslane	G-E	G	F	G-E	E
ragweed, common	F	G	G	G	G
sicklepod	P	P	P	F-G	P
<b>WINTER ANNUALS</b>					
annual ryegrass	P		P	G	F
cudweed	G-E			G	
shepherdspurse	G-E			G	
swinecress	G-E			G	E
wild mustards	G-E	E	G-E	G-E	G
wild radish	G-E	E	G-E	G-E	G

PRE—pre-emergence.

\* Reflex provides P-F control of Ipomoea morningglory and G control of smallflower morningglory.

E—Excellent control, control above 90%

G—Good control, control above 80%

F—Fair control, control between 60 and 80%

P—Poor control, control less than 60%.

If no response symbol is shown control is unknown.

## WEED RESPONSE TO HERBICIDES USED IN VEGETABLE CROPS

HERBICIDE	AIM	ATRAZINE	BASAGRAN	CALLISTO	GOAL	LOROX	MATRIX	PURSUIT	SANDEA	ENVOKE	LAUDIS	REFLEX
TIME OF APPLICATION	POST/ PD	POST	POST	POST	POST	POST/ PD	POST	POST	POST	POST	POST	POST
<b>PERENNIAL WEEDS</b>												
johnsongrass (rhizome)	P	P	P	P	P	P		P	P	P		P
purple nutsedge	P	P	P	P-F	P-F	P		G	E	F-G		P
yellow nutsedge	P	P	G	P-F	P-F	P-F	P-F	F	E	G		P-F
<b>ANNUAL GRASSES</b>												
barnyardgrass	P		P			F-G	G	F-G	P	P		P
crabgrass	P	F-G	P	F-G	P-F	G	F	P-F	P	P	G	P
crowfootgrass	P	F-G	P	P	P	G		P-F	P	P		P
fall panicum	P	F-G	P	P	P	G	F-G	P-F	P	P		P
goosegrass	P	F-G	P	P	P	G	P	P	P	P		P
johnsongrass (seedling)	P	F	P	P	P	G		F	P	P-F		P
sandbur	P	F	P	P	P-F	G			P	P		P
signalgrass, broadleaf	P	P-F	P	F	P-F	G		P-F	P	P		P
Texas panicum	P	P-F	P	P-F	P	G		P-F	P	P	G	P
<b>ANNUAL BROADLEAF WEEDS</b>												
bristly starbur	P	E	G-E		F-G	G		P-F	G-E	G-E		
citronmelon		G	P		F-G	G-E		P-F		G-E		
cocklebur	F-G	E	E	G-E	F-G	G-E	P-F	G-E	E	G-E		F-G
crotalaria	F	G	P		F-G	E		P				G-E
croton, tropic	F	G	P		G	G		P		F		
cutleaf eveningprimrose	P-F		F-G		F-G	F-G		F-G	P			P-F
Florida beggarweed	F	G	P		F	G-E		P	P-F	G-E		P
Florida pusley	F	G	P		P-F	G		F	P	P		P-F
jimsonweed	F	E	E	G-E	G	G	F	G	F	P		G
lambsquarters	G	E	P	G-E	P-F	E	F-G	P-F	P	G		P-F
morningglory, Ipomoea	G-E	E	P	F-G	G-E	G	F	F-G	P-F	G-E		F-G
morningglory, smallflower	F-G	E	G	F-G	G-E	G-E	F	P-F	P-F	P		G-E

POST—post-emergence  
 PD—post-directed.  
 \*Will not control ALS-resistant pigweed.

E—Excellent control, control above 90%  
 G—Good control, control above 80%  
 F—Fair control, control between 60 and 80%  
 P—Poor control, control less than 60%  
 If no response symbol is shown control is unknown.

HERBICIDE	AIM	ATRAZINE	BASAGRAN	CALLISTO	GOAL	LOROX	MATRIX	PURSUIT	SANDEA	ENVOKE	LAUDIS	REFLEX
TIME OF APPLICATION	POST/ PD	POST	POST	POST	POST	POST/ PD	POST	POST	POST	POST	POST	POST
<b>ANNUAL BROADLEAF WEEDS</b>												
nightshade, eastern black	G		P			F-G	P		P			
pigweed	F-G	E	P	G	G-E	G-E	G*	E*	G*	F*	G	G-E
prickly sida	F	E	G	P	F-G	G		P		P		P
purslane	F	E	P		F-G	G	F-G	F	P			
ragweed, common	P	E	F	F-G	G	E	P	P-F	G-E	G		G-E
sicklepod	P	E	P	P	F-G	G-E		P	P	E	P	P
<b>WINTER ANNUALS</b>												
annual ryegrass	P	F	P	P	F-G	F-G			P	P		P
cudweed					E	G						
shepherdspurse					G	G	G	P-F				
swinecress					G	G						
wild mustards	F	F-G	P-F		F-G	G		G-E	E		G	G-E
wild radish	F	F-G	P-F		F-G	G	G	G-E	E		G	G-E

POST—post-emergence  
 PD—post-directed.  
 \*Will not control ALS-resistant pigweed.

E—Excellent control, control above 90%  
 G—Good control, control above 80%  
 F—Fair control, control between 60 and 80%  
 P—Poor control, control less than 60%  
 If no response symbol is shown control is unknown.

## WEED RESPONSE TO HERBICIDES USED IN VEGETABLE CROPS

HERBICIDE	SENCOR	SPIN-AID	STINGER	FUSILADE	SELECT	POAST	GLYPHOSATE	PARAQUAT
TIME OF APPLICATION	POST	POST	POST	POST	POST	POST	POST/HOOD	POST/HOOD
<b>PERENNIAL WEEDS</b>								
johnsongrass (rhizome)	P	P	P	G-E	G-E	G	G-E	P
purple nutsedge	P	P	P	P	P	P	F-G	P-F
yellow nutsedge	P	P	P	P	P	P	F	P-F
<b>ANNUAL GRASSES</b>								
barnyardgrass	F	P	P	G-E	E	E	E	G
crabgrass	F	P	P	G	G-E	G-E	E	F
crowfootgrass	F-G	P	P	F	G	F-G	E	G
fall panicum	P-F	P	P	G-E	G-E	G-E	E	G
goosegrass	F	P	P	G	G-E	G-E	E	G
johnsongrass (seedling)	G	P	P	G-E	E	E	E	G
sandbur	G	P	P	G	G	E	E	G
signalgrass, broadleaf	P	P	P	G-E	E	E	E	G-E
Texas panicum	P	P	P	G-E	E	E	E	G
<b>ANNUAL BROADLEAF WEEDS</b>								
bristly starbur	G		F-G	F	P	P	G-E	E
citronmelon			F-G	P	P	P	G-E	G
cocklebur	E		G-E	P	P	P	E	G
crotalaria	E		G-E	P	P	P	G	G
croton, tropic	G		G	P	P	P	E	F
cutleaf eveningprimrose	G	G		P	P	P	P-F	F
Florida beggarweed	G	E	G	P	P	P	E	E
Florida pusley	F-G	G	F	P	P	P	P-G	P-F
jimsonweed	E	G	G	P	P	P	E	G
lambquarters	G-E	F-G	P	P	P	P	G	F
morningglory	F-G	F-G	P	P	P	P	F-G	F-G**

POST—post-emergence  
PD—post-directed.

\*\**Paraquat* provides P-F control of smallflower morningglory but G control of other morningglories.

E—Excellent control, control above 90%

G—Good control, control above 80%

F—Fair control, control between 60 and 80%

P—Poor control, control less than 60%

If no response symbol is shown control is unknown.

HERBICIDE	SENCOR	SPIN-AID	STINGER	FUSILADE	SELECT	POAST	GLYPHOSATE	PARAQUAT
TIME OF APPLICATION	POST	POST	POST	POST	POST	POST	POST/HOOD	POST/HOOD
<b>ANNUAL BROADLEAF WEEDS (continued)</b>								
nightshade, eastern black	P		P	P	P	P	G	
pigweed	E	P-F	P	P	P	P	E	G
prickly sida	E			P	P	P	F-G	P-F
purslane	G	F-G	P	P	P	P	G	G
ragweed, common	G	F-G	G	P	P	P	E	F
sicklepod	E		F	P	P	P	E	G-E
<b>WINTER ANNUALS</b>								
annual ryegrass	F-G	F	P	G-E	G-E	E	G	F-G
cudweed	G	G		P	P	P	G	G
shepherdspurse	G	G	P	P	P	P	G	F
swinecress	G	G		P	P	P	G	P
wild mustards	G-E	E		P	P	P	F-G	F-G
wild radish	G-E	E		P	P	P	F-G	F-G

POST—post-emergence  
 PD—post-directed.

\*\**Paraquat* provides P-F control of smallflower morningglory but G control of other morningglories.

E—Excellent control, control above 90%  
 G—Good control, control above 80%  
 F—Fair control, control between 60 and 80%  
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If no response symbol is shown control is unknown.

# HARVEST AIDS/DESICCANTS AND POST-HARVEST CONTROL OF CROPS

Stanley Culpepper, Extension Agronomist—Weed Science  
Taylor Randell, Extension Agronomist—Weed Science

## CHILI PEPPERS

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>sodium chlorate</i> (3 lb Chlorate) 3 L (Defol 750) 7.5 L	4–10 qt 1.6–4 qt	3–7.5	<b>PROCESSING ONLY.</b> Consult processor before applying. Apply in 20–40 gal of water by ground rig. Apply 10 days before anticipated harvest, longer if temperatures are cool. Do not graze treated fields or feed waste to livestock.

## CORN (SWEET)

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>carfentrazone</i> Aim 2 EC	up to 1.9 fl oz	up to 0.031	Desiccation of morningglory and tropical spiderwort. Apply when crop is mature and grain has begun to dry down. Use a minimum of 10 gallon of finished spray for ground application. Add crop oil concentrate at 1% v/v. Do not apply within 3 days of harvest.  Aerial applications pose significant drift concerns and should be avoided.

**DRY BEANS** (sweet lupin, white sweet lupin, white lupin, grain lupin, adzuki beans, asparagus beans, black beans, broad beans, field beans, garbanzo beans, kidney beans, lablab beans, lima beans, moth beans, mung beans, navy beans, pinto beans, rice beans, tepary beans, urd beans, blackeyed peas, cowpeas, crowder peas, southern peas, catjang, and guar) **AND DRY PEAS.**

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>paraquat</i> Gramoxone, others 3 SL Gramoxone 2 SL	0.8–1.3 pt 1.2–2 pt	0.3–0.48	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b>  Apply <i>paraquat</i> for weed and bean/pea desiccation. Apply when the crop is mature and AT LEAST 80% of the pods are yellowing and mostly ripe with no more than 40% (bush-type beans) or 30% (vine-type beans) of the leaves still green in color. Add nonionic surfactant at 1 qt/100 gal spray mix. Do not apply when weather conditions favor spray drift. Do not harvest or graze for at least 7 days after application. Make application in at least 20 gal of water/A.



DRY BEAN, GUAR BEAN, SOUTHERN PEA

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>sodium chlorate</i> (3 lb Chlorate) 3 L (Defol 750) 7.5 L	8 qt 3.2 qt	6	Apply in 10–20 gal of water to facilitate harvest. Apply approximately 7–10 days before anticipated harvest, longer if temperatures are cool. Do not graze treated fields or feed waste to livestock.

POTATO

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>diquat</i> Reglone 2 SL	1–2 pt	0.25–0.5	Desiccation of non-stressed potato vines. Under conditions of heavy vine cover 2 applications may be applied. Applications must be at least 5 days apart. Do NOT harvest within 7 days of application. Apply in at least 20 gal water/A. Add nonionic surfactant at 0.06–0.5% of finished spray volume or add 0.5–4 pt nonionic surfactant/100 gal of spray.
<i>glufosinate-ammonium</i> Rely 280 2.34 SL	21 fl oz	0.375	Apply at the beginning of natural senescence of potato vines. Do not split application or apply more than once. Thorough coverage of the potato vines is essential. Use sufficient volume (20–100 gal) of water for excellent vine coverage. <b>DO NOT harvest potatoes until 9 days or more after application.</b> DO NOT apply to potatoes grown for seed.
<i>carfentrazone</i> Aim 2 EC	3.2–5.8 fl oz	0.05–0.09	<b>Labeled for tuberous and corn vegetables subgroup 1C.</b> This includes potato, sweet potato, yam, and many others. Water volume must provide coverage of potato (> 20 GPA). Desiccation fair at best; may make second application 7–14 days after the first application if needed. Add a NIS (2 pt/100 gal spray, COC (1–2 gal/100 gal spray) or methylated seed oil. Do not apply more than 11.6 oz/A per season. Do not apply within 7 days of harvest
<i>pyraflufen ethyl</i> ET 0.208 L	2.75–5.5 fl oz	0.0045–0.0089	Apply as a foliar spray in the early stage of crop senescence. Apply by ground in 20–50 gallons of water/A. Make 1–2 applications at a minimum 7 day interval. Do not exceed 2 applications or 11 fl oz/A/season. Do not apply within 7 days of harvest.

TOMATO: POST-HARVEST ONLY

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>paraquat</i> Gramoxone, others 3 SL Gramoxone 2 SL	1.6–2.5 pt 2.4–3.75 pt	0.6–0.94	<b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b> After final harvest. Apply in 40–120 gal of water/A. Add nonionic surfactant at 0.125% of final spray volume. Thorough coverage of vines is required.
<i>diquat</i> Reglone 2 SL	1.5 pt	0.375	After final harvest. Apply in 60–120 gallons of clean water per acre. Add 1–2 pt/A of nonionic surfactant. Thorough coverage of vines required.

■ HARVEST AIDS/DESICCANTS AND POST-HARVEST CONTROL OF CROPS

VEGETABLES: POST-HARVEST ONLY

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>paraquat</i> Gramoxone, others 3 SL Gramoxone 2 SL	1.5–2 pt 2.25–3 pt	0.56–0.75	<p><b>EPA has restricted the use of <i>paraquat</i> to certified applicators ONLY and applicators must take a specialized training before use.</b></p> Broadcast spray over plants following harvest to control many vegetables and emerged weeds. Add a nonionic surfactant at 1 qt/100 gal of spray mix. Do not graze livestock in treated areas. Do not use treated vegetables for human or animal consumption.
<i>glyphosate</i> Roundup WeatherMax 5.5 SL	11–32 fl oz	0.5–1.5	<p>May be applied as a POST-harvest application for the control of many crops. Below are the crop groupings and a few of the vegetables common to GA, label provides many other crops.</p> <p><u>Brassica vegetables:</u> broccoli, cabbage, collard, kale, mustard</p> <p><u>Bulb crops:</u> garlic, leek, onion</p> <p><u>Cucurbits:</u> cucumber, melons, pumpkin, squash,</p> <p><u>Leafy vegetables:</u> celery, lettuce, spinach</p> <p><u>Fruiting vegetables:</u> eggplant, pepper, tomato</p> <p><u>Legume vegetables:</u> lima bean, snap bean, southern pea, English pea, garden pea</p> <p><u>Root and Tuber:</u> beet, carrot, parsley, radish, rutabaga, sweet potato</p> <p><u>Other:</u> globe artichoke, okra, sugar beet</p> Apply at least 30 days prior to planting any non-labeled crop.

VEGETABLES: CUCURBIT & FRUITING VEGETABLE TRANSPLANTS: POST-HARVEST ONLY

DESICCANT	BROADCAST RATE/ACRE		REMARKS AND PRECAUTIONS
	AMOUNT OF FORMULATION	POUNDS ACTIVE INGREDIENT	
<i>carfentrazone</i> Aim 2 EC	0.5–2 fl oz	0.008–0.032	Burndown of previous crop and weeds prior to transplanting a new crop. Be aware of drift as severe injury will occur to most other crops and plants if contacted. A single 0.5" water event, either by rainfall or irrigation, and a 7 day interval between application and transplanting the next crop is required to remove residues from mulch.

## **FOLIAR CALCIUM SPRAYS**

George Boyhan, Professor and Extension Vegetable Specialist

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**Foliar calcium sprays are no longer recommended. Consult soil test recommendations for application rates for a specific crop. Never apply more than two pounds of elemental Calcium to any crop during the season.**

## **FOLIAR BORON SPRAYS**

George Boyhan, Professor and Extension Vegetable Specialist

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**Foliar boron sprays are no longer recommended. Consult soil test recommendations for application rates for a specific crop. Never apply more than two pounds of elemental Boron to any crop during the season.**