

Chapter 10. Minor Vegetable Crop Production¹

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Celery, Okra, and Parsley Botany and Planting

Celery—*Apium graveolens*, Apiaceae (Umbelliferae)

Okra—*Abelmoschus esculentus*, Malvaceae

Parsley—*Petroselinum crispum*, Apiaceae (Umbelliferae)

Table 1. Planting information for celery, okra, and parsley.

Planting Dates	Celery	Okra	Parsley
North Florida	Aug–Feb	Mar–Jun	Sept–Mar
Central Florida	Sept–Mar	Feb–Aug	Sept–Mar
South Florida	Oct–Mar	Jan–Mar/Aug–Oct	All year
Planting Information			
Distance between rows (in)	18–40	36–60	6–12
Distance between plants (in)	6–12	4–10	drilled
Seeding depth (in)	on surface	0.5–1.0	0.25
Seed per acre (lb)	1–2	6–81	6–8
Days to maturity from seed	75–90	60–70	70–80
Plant population (acre)	58,080	43,560	1 million+

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Cultivars

Table 2. Common cultivars of celery, okra, and parsley.

Celery	Okra	Parsley
Floribelle M9	Annie Oakley II (H ¹)	Dark Green Italian (PL)
Florida 683	Cajun Delight (H)	Forest Green (CL ¹)
June Belle	Clemson Spineless	Improved Market Gardeners (CL)
	Clemson Spineless 80	Jade (CL, H)
	Millionaire (H)	
	North and South (H)	
	Spike (H)	

¹ H=hybrid, CL=curley leaf, PL=plain leaf

Table 3. Herbicides approved for managing weeds in celery.

Active Ingredient lb a.i./A	Trade Name Product/A	MOA Code	Weeds Controlled/Remarks
Labels change frequently. Be sure to read a current product label before applying any chemical.			
*** PREPLANT/PREEMERGENCE ***			
Bensulide 5.0–6.0	(Prefar) 4 E 5–6 qt	8	Broadleaf and grass weeds. Incorporate mechanically 1–2 in. deep or with irrigation 2–4 in. deep.
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2.0 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weeds. Apply as a preplant burndown. Consult label for individual product directions.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Apply as a preplant burndown treatment. Scythe is a contact and nonresidual herbicide and can be tank-mixed with residual preemergence herbicides to lengthen control.
Prometryn 1.0–2.0	(Caparol) 4 L 2–4 pt	5	Most annual broadleaf and grass weeds. Do not exceed one application. Consult label for rotational crop restrictions.
Pyraflufen ethyl 0.0008–0.003	(ET Herbicide/Defoliant) 0.5–2.0 fl oz	14	Broadleaf and grass weeds. Burndown preplant application 1 day before planting. Include an NIS or COC in the spray solution.
S-metolachlor 0.95–1.26	(Dual Magnum) 1.0–1.33 pt	15	Broadleaf, grass weeds, and nutsedge. Label is a Third Party Registration (TPR, Inc.), and authorization and waiver agreements must be obtained prior to use. Rates are based on organic matter.
Trifluralin 0.5	(Treflan, Trifluralin) 4 EC 1 pt (Treflan, Trifluralin) 10 G 5 lb	3	Annual broadleaf and grass weeds. Do not apply to muck soils. For mineral soils with 2%–5% organic material, apply 0.75 lb a.i./A. Incorporate 4 in. or less within 8 hr of application.
*** POSTTRANSPLANT/POSTEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2.0 EC up to 2 fl oz	14	Emerged broadleaf weeds. Apply as hooded application to row middles only. Use crop oil concentrate or nonionic surfactant at recommended rates. May be tank-mixed with other herbicides. Do not exceed 6.1 fl oz per cropping season. PHI 0 days.
Clethodim 0.09–0.13 0.07–0.13	(Select, Arrow) 2 EC 6–8 fl oz (Select Max) 1 EC 9–16 fl oz	1	Perennial and annual grass weeds. In fields with heavy grass pressure or larger grass weeds, use higher rates or repeat applications 14 days apart. Use a crop oil concentrate at 1% v/v in the finished spray volume. Nonionic surfactant with Select Max. PHI 30 days.
Linuron 0.5–1.0	(Lorox DF) 50 DF 1–2 lb	7	Broadleaf and grass weeds. Apply after transplanting but before celery is 8 in. tall. Do not apply when temperatures exceed 85°F nor as a tank mix with surfactants, nitrogen, or fertilizer solution. PHI 45 days.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaf and grass weeds. Direct spray to row middles with hooded or shielded sprayer. Product is a contact, nonselective herbicide with no residual control. May be tank-mixed with several soil residual compounds.
Prometryn 0.8–1.6	(Caparol) 4 L 1.6–3.2 pt	5	Broadleaf weeds. Apply one application during the 2-to-6-week period after transplanting. Weeds should not exceed 2 in.
S-metolachlor 0.95–1.26	(Dual Magnum) 1.0–1.33 pt	15	Broadleaf, grass weeds, and nutsedge. Label is a Third Party Registration (TPR, Inc.), and authorization and waiver agreements must be obtained prior to use. Rates are based on organic matter.
Sethoxydim 0.28	(Poast) 1.5 EC 1.5 pt	1	Emerged grass weeds. A maximum of 3 pt/A per season. Include a crop oil concentrate. Unsatisfactory results may occur if applied to grasses under stress. PHI 30 days.
*** CELERY SEEDBEDS ***			
Prometryn 0.6–0.8	(Caparol) 4 L 1.2–1.6 pt	5	Broadleaf weeds. Apply once per year to seedbeds. Apply after celery has 2–5 true leaves. Apply after seedbed covers have been removed for at least one week.

Table 4. Herbicides approved for managing weeds in okra.

Active Ingredient lb a.i./A	Trade Name Product/A	MOA Code	Weeds Controlled/Remarks
Labels change frequently. Be sure to read a current product label before applying any chemical.			
*** PREEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2 EC up to 2 fl oz	14	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Flumioxazin up to 0.128	(Chateau) 51 WDG up to 4 oz	14	Annual broadleaf weeds. Apply to row middles of raised plastic-mulched beds that are at least 4 in. higher than the treated row middle and 24 in. bed width. Label is a Third-Party Registration (TPR, Inc.). Use without a signed authorization is a waiver of liability and is a misuse of the product. Tank-mix with a burndown herbicide to control emerged weeds. 0 day pretransplant interval.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weed control. Apply as a preplant burndown for emerged weeds. Read label for individual product directions.
Lactofen 0.25–0.5	(Cobra) 2 EC 16–32 fl oz	14	Broadleaf weeds. Apply to row middles only with a shielded or hooded sprayer. A minimum of 24 fl oz/A is required for residual control. Add a crop oil concentrate or nonionic surfactant for control of emerged weeds. Registration is through Third Party Registrations, Inc. (TPR, Inc.), and a copy of the label must be on-hand at time of application. PHI 30 days.
Mesotrione 0.19	(Callisto) 4 L 6 fl oz	28	Broadleaf and grass weeds. Apply to row middles only. Leave one foot untreated area or 6 in. on either side of the plant row. Injury risk is greatest on coarse-textured soils (sand, sandy loam, or loamy sand). Apply as one preemergence application OR one postemergence application. Callisto will cause whitening of the okra leaves.
Paraquat 0.5–1.0	(Gramoxone) 2 SL 2.0–4.0 pt	22	Emerged broadleaf and grass weed control. Apply one application before crop emergence. Do not exceed 8 pt/A per season. Consult label for new restrictions.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Broadleaf and grass weeds. Scythe is a contact, nonselective herbicide with no residual activity. May be tank-mixed with trifluralin for soil residual activity. Consult label for rates and other information.
Prometryn 0.75–1.5	(Caparol) 4 L 1.5–3.0 pt	5	Apply after planting, but before crop emergence. Apply as one PRE application at 3 pt OR 1 PRE application at 1.5 pt followed by one POST-directed application at 1.5 pt. Do not exceed 3 pt/A per crop cycle.
Sulfentrazone 0.07–0.09	(Willowood sulfentrazone) 4SC 2.25–3.0 fl oz	14	Broadleaf and grass weed control, nutsedge suppression. Do not apply on sands with less than 1% organic matter. Do not apply more than 12 fl oz/A within a 12-month period. Should be trialed on a small area to find suitable rate for the soil type in your area.
Trifluralin 0.5–0.75	(Treflan, Trifluralin) 4 EC 0.5–1.5 pt (Treflan, Trifluralin) 10 G 5.0–7.5 lb	3	Annual broadleaf and grass weeds. Incorporate 4 in. or less within 8 hr. Results in Florida are erratic on soils with low organic matter and clay contents. Note precautions against planting nonregistered crops within 5 months.
*** POSTEMERGENCE ***			
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2 EC up to 2 fl oz	14	Emerged broadleaf weeds. Apply to row middles only with a hooded sprayer. Maximum rate of 0.096 lb a.i./A per season. Rates apply to mineral and muck soils. Use crop oil concentrate or nonionic surfactant at recommended rates. PHI 0 days.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaf and grass weeds. Apply to row middles only with a hooded sprayer. PHI 14 days.
Halosulfuron 0.024–0.05	(Sandeia) 75 WG 0.5–1.0 oz	2	Broadleaf and purple/yellow nutsedge weeds. Apply to row middles of direct-seeded or transplanted okra. If plastic is used, prevent herbicide contact with the plastic. Do not apply more than 2 oz/A per 12-month period. PHI 30 days.
Lactofen 0.25–0.5	(Cobra) 2 EC 16–32 fl oz	14	Broadleaf weeds. Apply to row middles only with a shielded or hooded sprayer. A minimum of 24 fl oz/A is required for residual control. Add a crop oil concentrate or nonionic surfactant for control of emerged weeds. One POST application may be made per growing season at 18 days after transplanting. Cobra contacting green foliage or fruit can cause excessive injury. Registration is through Third Party Registration, Inc., and a copy of the label must be on hand at time of application. PHI 30 days.
Mesotrione 0.09	(Callisto) 4 L 3 fl oz	28	Broadleaf and grass weeds. Direct spray with hooded sprayer to minimize contact with okra plants. Okra must be at least 3 in. tall. Use of a nonionic surfactant is required. Injury risk is greatest on coarse-textured soils. Apply as one preemergence or one postemergence application. PHI 28 days.
Paraquat 0.5–1.0	(Gramoxone) 2 SL 2.0 pt	22	Emerged broadleaf and grass weeds. Apply to row middles only and do not allow contact to okra plants. Limit of 2 applications after crop emergence. Do not exceed 8 pt/A per season. PHI 60 days. Consult label for new restrictions.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Broadleaf and grass weeds. Apply to row middles only with a shielded sprayer.
Prometryn 0.75	(Caparol) 4 L 1.5 pt	5	Apply 1 postemergence application directed to the base of the crop. If a PRE application was made do not exceed 3 pt/A. PHI 14 days.
Sethoxydim 0.19–0.28	(Poast) 1.5 EC 1.0–1.5 pt	1	Grass weeds. Efficacy will be decreased if grass weeds are under stress. Include a crop oil concentrate or methylated seed oil in the spray. PHI 14 days.

Table 5. Herbicides approved for managing weeds in parsley.

Active Ingredient lb a.i./A	Trade Name Product/A	MOA Code	Crops	Weeds Controlled/Remarks
Labels change frequently. Be sure to read a current product label before applying any chemical.				
*** PREEMERGENCE ***				
Bensulide 5.0–6.0	(Prefar) 4 E 5–6 qt	8	Parsley	Annual broadleaf and grass weeds. Incorporate or irrigate 1–2 in. deep within 36 hr of application. Consult label for rotation restrictions.
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2.0 EC up to 2 fl oz	14	Parsley, cilantro	Apply as a preplant burndown for emerged broadleaf weeds. Use crop oil concentrate, methylated seed oil, or nonionic surfactant at recommended rates. Maximum rate of 0.096 lb a.i./A per season. No pretransplant interval.
Glyphosate	(various formulations) consult label	9	Parsley, cilantro	Control emerged broadleaf and grass weeds. Consult individual labels for restrictions.
Linuron 0.5–1.5	(Lorox DF) 50 DF 1–3 lb	7	Parsley, cilantro	Mineral and muck soils. Apply after planting and before crop emergence. Use lower rates on coarse soils.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Parsley, cilantro	Controls emerged weeds. Apply before emergence of crop. Product is a contact, nonselective, foliar-applied herbicide. There is no residual activity.
Prometryn 1.0–1.6	(Caparol) 4 L 1.0 pt	5	Parsley, cilantro	A single preemergence application can be applied up to 14 days after planting. A second application can be made up to 30 days prior to harvest. Do not apply on sand or loamy sand. Read label for rotation restrictions.
Pyraflufen 0.001–0.003	(ET Herbicide/Defoliant) 0.5–2.0 fl oz	14	Parsley	Emerged broadleaf and grass weeds. Plant 1 day after application. Apply as a preplant burndown treatment.
*** POSTEMERGENCE ***				
Carfentrazone up to 0.031	(Aim) 1.9 EW up to 2 fl oz (Aim) 2.0 EC up to 2 fl oz	14	Parsley, cilantro	Emerged broadleaf control. Post-direct hooded application to row middles. Read the label for adjuvant requirements. PHI 0 days.
Clethodim 0.10–0.13 0.07–0.13	(Arrow, Select) 2 EC 6–8 fl oz (Select Max) 1 EC 9–16 fl oz	1	Parsley, cilantro	Annual and perennial grass control. Read the label for required adjuvants.
Linuron 0.5	(Lorox DF) 50 DF 1 lb	7	Parsley, cilantro	Apply after the crop has a minimum of 3 true leaves or crop injury may result. Apply when weeds are in the 1 to 3 true leaf stage. Do not exceed 3 lb of Lorox per acre per season. PHI 30 days.
Prometryn 0.5	(Caparol) 4 L 1.0 pt	5	Parsley, cilantro	An application can be made up to 30 days prior to harvest. Another application can be applied after harvest to the new regrowth. Do not use on sand or loamy sands. Read label for rotation restrictions.
Sethoxydim 0.19–0.28	(Poast) 1.5 EC 1.0–1.5 pt	1	Parsley, cilantro	Growing grass weeds. Decreased efficacy if weeds are under stress. Do not exceed 3.0 pt/A per season. Include a COC in the spray solution. PHI 15 days.

Table 6. Insecticides approved for management of arthropod pests of celery.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
Labels change frequently. Be sure to read a current product label before applying any chemical.						
Please refer to Chapter 19 for information on biopesticides, including materials labeled for certified organic production.						
Aphids	1B	Malathion 5EC, 8F (malathion)	5EC: 2.4 pt 8F: 1–1.5 pt	24	7	Maximum of 2 applications per year.
	1B	Orthene 97 (acephate)	0.5–1.0 lb	24	21	Do not use more than 2 lb a.i. per acre per season. All tops must be removed before shipment.
	3A	*Brigade 2EC (bifenthrin)	2.1–6.4 fl oz	12	7	Maximum of 32 fl oz/acre per season.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	1	Maximum of 1.0 lb a.i./acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	4A	Actara (thiamethoxam)	1.5–5.5 oz	12	7	Do not use if other 4A insecticides have been or will be used.
	4A	Admire Pro (imidacloprid)	4.4–10.5 fl oz (soil application)	12	45	Maximum of 10.5 fl oz/acre per year.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	4A	Assail 30SG (acetamiprid)	2.0–4.0 oz	12	7	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
	4A	Belay (clothianidin)	Foliar: 3–4 fl oz Soil: 9–12 fl oz	12	Foliar: 7 Soil: 21	Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz). Do not apply at intervals of less than 10 days. Highly toxic to bees.
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees. Do not allow drift to flowering weeds or nearby crops in bloom.
	4A	Platinum 75 SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10.0–13.0 fl oz	12	30	Maximum of 13 fl oz/acre per season.
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. An adjuvant may be used when applying to celery.
	4C	Closer SC (sulfoxaflor)	1.5–2.0 fl oz	12	3	Maximum of 17 fl oz/acre per year. See pollinator protection restrictions on label.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	1	Maximum of 28 fl oz/acre per crop season. Maximum of 3 crop seasons per year.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	10 fl oz	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products including all application types.
	9B	Fulfill (pymetrozine)	2.75 oz	12	7	Apply when aphids first appear, before populations build to damaging levels. Two applications (maximum allowed) may be needed to control persistent aphid populations.
	9B	PQZ (pyrifluquinazon)	2.4–3.2 fl oz	12	1	Maximum of 4.8 fl oz/acre per crop cycle.
	9D	Versys (afidopyropen)	1.5 fl oz	12	0	Maximum of 14 fl oz/acre per season.
	21A	Torac (tolfenpyrad)	14–21 fl oz	12	1	Do not apply until at least 14 days after emergence or after transplanting. Do not apply more than 42 fl oz per acre per crop cycle, and apply no more than twice per crop or 4 times per year. To protect pollinators, do not allow to drift to flowering weeds or nearby crops in bloom.
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	3	Do not apply more than 10 fl oz/acre per crop.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Verimark), including all application types. For best performance, use an adjuvant.
	28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	4	N/A— applied at planting	Maximum of 13.5 fl oz at planting or 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Exirel), including all application types.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	0	Do not apply more than 8.4 oz/acre per season. Begin applications before pests reach damaging levels.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	BotaniGard ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gallons/acre. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed ² .
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	Can be used in organic production. OMRI-listed.
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	-	Neemix 4.5 EC (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.
	-	Requiem EC (extract of <i>Chenopodium ambrosioides</i>)	2.0–4.0 qt	4	0	Apply before pests reach damaging levels.
	-	JMS Stylet-Oil, Saf-T-Side, Suffoil-X, Sun Spray 98.8%, others Oil, insecticidal	3–6 qt/100 gal (JMS), 1–2 gal/100 gal	4	0	Organic Stylet-Oil, Saf-T-Side, and Suffoil-X are OMRI-listed ² .
	-	Trilogy (extract of neem oil)	0.5%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed.
Caterpillars (includes beet armyworm, cabbage looper, celery leaf-tier, corn earworm, cutworms, fall armyworm)	1A	*Lannate LV, *SP (methomyl)	LV: 0.75–3 pt SP: 0.25–1.0 lb	48	7	Do not apply more than 21 pt of LV or 7 lb SP per acre per season.
	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	14	Maximum of 6 qt/acre per year.
	1B	Orthene 97 (acephate)	1.0 lb	24	21	Do not use more than 2 lb a.i. per acre per season. All tops must be removed before shipment.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.
	3A	*Brigade 2EC (bifenthrin)	2.1–6.4 fl oz	12	7	Maximum of 32 fl oz/acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	3A	*Pounce 25 WP (permethrin)	3.2–12.8 oz	12	1	Maximum of 1.0 lb a.i./acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10.0–13.0 fl oz	12	30	Do not exceed more than 13 fl oz per acre per season.
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. An adjuvant may be used when applying to celery.
	5	Entrust SC (spinosad)	1.5–10.0 fl oz	4	1	See label for resistance management recommendations. Apply no more than 29 oz per acre per year. OMRI-listed.
	5	Radiant SC (spinetoram)	5–10 fl oz	4	1	Maximum of 6 applications, no more than 2 consecutive applications before rotating to another MOA.
	6	*Proclaim (emamectin benzoate)	2.4–4.8 oz	12	7	Provides suppression of leafminers. Rotate with other products with different modes of action.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	5.5–10.0 fl oz 7.5–10.0 fl oz for cabbage looper	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.
	11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Apply when larvae are small for best control. OMRI-listed.
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed.
11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Use high rate for armyworms. Treat when larvae are young.	
11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb	4	0	Use higher rates for armyworms. OMRI-listed.	
11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. See label for rates for specific pests. For organic production.	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12–1.5 lb	4	0	Treat when larvae are young. Thorough coverage is essential. OMRI-listed.
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	18	Intrepid 2F (methoxyfenozide)	4–10 fl oz	4	1	Do not apply more than 64 fl oz per acre per season.
	22	Avaunt Avaunt eVo (indoxacarb)	3.5 oz eVo: 3.5–6.0 oz	12	3	Maximum of 14 oz/acre per crop and 56 oz/acre per year (Avaunt) or 18 oz/acre per crop and 72 oz/acre per year (Avaunt eVo).
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	4	1	May be applied via drip chemigation in addition to foliar and various soil application methods.
	28	Exirel (cyantraniliprole)	7.0–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Verimark), including all application types.
	28	Verimark (cyantraniliprole)	5.0–13.5 fl oz	4	N/A— applied at planting	Maximum of 13.5 fl oz at planting or 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Exirel), including all application types.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	Grandevo (<i>Chromobacterium</i> <i>subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	Can be used in organic production. OMRI-listed.
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .
	-	Neemix 4.5 EC (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.
Fire ants	7A	Extinguish (S-methoprene)	1–1.5 lb	4	0	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Flea beetles	1A	Sevin 4F, XLR Plus (carbaryl)	0.5–1.0 qt	12	14	Maximum of 6 qt/acre per year.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.
	3A	*Brigade 2EC (bifenthrin)	2.1–6.4 fl oz	12	7	Maximum of 32 fl oz/acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	3A	*Ambush 25W (permethrin)	6.4–12.8 oz	12	1	Do not apply more than 128 oz/acre per season.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–5.5 oz	12	7	Do not use if other 4A insecticides have been or will be used.
	4A	Belay (clothianidin)	Foliar: 3–4 fl oz Soil: 9–12 fl oz	12	Foliar: 7 Soil: 21	Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz). Do not apply at intervals of less than 10 days. Highly toxic to bees.
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees.
	4A	Platinum 75 SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10.0–13.0 fl oz	12	30	Do not exceed 13 fl oz per acre per season.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. An adjuvant may be used when applying to celery.
	21A	Torac (tolfenpyrad)	14–21 fl oz	12	1	Do not apply until at least 14 days after emergence or after transplanting. Do not apply more than 42 fl oz per acre per crop cycle and apply no more than twice per crop or 4 times per year. To protect pollinators, do not allow to drift to flowering weeds or nearby crops in bloom.
Grasshoppers	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.
	4A	Belay (clothianidin)	Soil: 9–12 fl oz	12	21	See label for application methods. Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz).
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
Leafhoppers	1A	Sevin 4F, XLR Plus (carbaryl)	0.5–1.0 qt	12	14	Maximum of 6 qt/acre per year.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.
	3A	*Brigade 2EC (bifenthrin)	2.1–6.4 fl oz	12	7	Maximum of 32 fl oz/acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–5.5 oz	12	7	Do not use if other 4A insecticides have been or will be used.
	4A	Admire Pro (imidacloprid)	4.4–10.5 fl oz	12	45	Do not apply more than 0.38 lb a.i. (10.5 fl oz product) per acre per year.
	4A	Belay (clothianidin)	Foliar: 3–4 fl oz Soil: 9–12 fl oz	12	Foliar: 7 Soil: 21	Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz). Do not apply at intervals of less than 10 days. Highly toxic to bees.
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees.
	4A	Platinum 75 SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10.0–13.0 fl oz	12	30	Do not exceed more than 13 fl oz per acre per season.
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. An adjuvant may be used when applying to celery.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	1	Maximum of 28 fl oz/acre per crop season. Maximum of 3 crop seasons per year.
	16	Courier 40SC (buprofezin)	9.0–13.6 fl oz	12	7	Do not make more than 2 applications per crop cycle. IGR targets immatures.
	21A	Torac (tolfenpyrad)	14–21 fl oz	12	1	Do not apply until at least 14 days after emergence or after transplanting. Do not apply more than 42 fl oz per acre per crop cycle and apply no more than twice per crop or 4 times per year. To protect pollinators, do not allow to drift to flowering weeds or nearby crops in bloom.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .
	-	JMS Stylet-Oil, Saf-T-Side, Suffoil-X, Sun Spray 98.8%, others Oil, insecticidal	3–6 qt/100 gal (JMS), 1–2 gal/100 gal	4	0	Organic Stylet-Oil, Saf-T-Side, and Suffoil-X are OMRI-listed ² .
Leafminers	1A	*Vydate L (oxamyl)	2–4 pt	48	21	Do not apply more than 24 pt/acre per season.
	1B	Dimethoate 4EC (dimethoate)	1 pt	48	7	Do not apply more than 3 pt per acre per year.
	3A	*Ambush 25W (permethrin)	6.4–12.8 oz	12	1	Do not apply more than 128 oz/acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Belay (clothianidin)	Soil: 9–12 fl oz	12	21	See label for application methods. Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz).
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees. Do not allow drift to flowering weeds or nearby crops in bloom.
	4A	Platinum 75 SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	5	Entrust SC (spinosad)	1.5–10.0 fl oz	4	1	See label for resistance management recommendations. Apply no more than 29 oz per acre per year. OMRI-listed.
	5	Radiant SC (spinetoram)	5–10 fl oz	4	1	Maximum of 6 applications; no more than 2 consecutive applications before rotating to another MOA.
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	7	No more than 2 sequential applications. Must be used with an adjuvant (but not binder-sticker types). Not for use on leafy vegetables grown for transplant.
	6	*Proclaim (emamectin benzoate)	2.4–4.8 oz	12	7	Provides suppression of leafminers. Rotate with other products with different modes of action.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	5.5–10.0 fl oz	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.
	17	Trigard (cyromazine)	2.66 oz	12	7	Do not make more than six applications per crop.
	28	Coragen (chlorantraniliprole)	5.0–7.5 fl oz	4	1	May be applied via drip chemigation in addition to foliar and various soil application methods.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Verimark) including all application types. For best performance, use an adjuvant.
	28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	4	N/A— applied at planting	Maximum of 13.5 fl oz at planting or 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Exirel), including all application types.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .	
-	Neemix 4.5 EC (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	-	Requiem EC (extract of <i>Chenopodium ambrosioides</i>)	2.0–4.0 qt	4	0	Apply before pests reach damaging levels.
	-	SunSpray 98.8%, JMS Stylet-Oil, Saf-T-side, others (Oils, insecticidal)	3–6 qt/100 gal (JMS); 1–2 gal/100 gal	4	0	See label for cautions on tank mixes. Organic Stylet-Oil and Saf-T-Side are OMRI-listed.
Plant bugs	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	14	Repeat as needed, up to 5 times, at least 7 days apart.
	3A	*Brigade 2EC (bifenthrin)	2.1–6.4 fl oz	12	7	Maximum of 32 fl oz/acre per season.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	0	Do not apply more than 8.4 oz/acre per season. Begin applications before pests reach damaging levels.
Planthoppers	16	Courier 40SC (buprofezin)	9.0–13.6 fl oz	12	7	Do not make more than 2 applications per crop cycle. IGR targets immatures.
Stink bugs	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	14	Repeat as needed, up to 5 times, at least 7 days apart.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
Two-spotted spider mite	1B	Malathion 5EC, 8F (malathion)	5EC: 2.4 pt 8F: 1–1.5 pt	24	7	Maximum of 2 applications per year.
	3A	*Brigade 2EC (bifenthrin)	2.1–6.4 fl oz	12	7	Maximum of 32 fl oz/acre per season.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	7	No more than 2 sequential applications. Must be used with an adjuvant (but not binder-sticker types). Not for use on leafy vegetables grown for transplant.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	5.5–10.0 fl oz	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.
	-	Suffoil-X (mineral oil)	1–2 gal/100 gal	4	0	OMRI-listed ² .

¹ Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 9.4 March 2020. Number codes (1 through 29) are used to distinguish the main insecticide mode of action groups, with additional letters for certain subgroups within each main group. All insecticides within the same group (with same number) indicate same active ingredient or similar mode of action. This information must be considered for the insecticide resistance management decisions. - = unknown, or a mode of action that has not been classified yet.

² Information provided in this table applies only to Florida. Be sure to read a current product label before applying any product. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by UF/IFAS Extension nor discrimination against similar products or services not mentioned. OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

* **Restricted use insecticide.**

Table 7. Insecticides approved for managing insect pests of okra crops.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	Max Rate Product per Season	REI (Hours)	Days to Harvest	Remarks ²
Aphids	1B	Malathion * 5 EC Malathion 8F (malathion)	1.5 pt 1.2 pt	9.5 pt/yr 6.0 pt/yr	12 12	1 1	
	3A	*Brigade 2 EC (bifenthrin)	2.1–6.4 fl oz	12.8 fl oz	12	1	
	3A	PyGanic 5.0 (pyrethrins)	4.5–15.6 fl oz	10 appl.	12	0	OMRI-listed ² .
	4A	Admire Pro (imidacloprid)	Soil: 7–14 fl oz Foliar: 1.3–2.2 fl oz	Soil: 14 fl oz Foliar: 6.7 fl oz	12 12	Soil: 21 Foliar: 0	Do not apply to both soil and foliage. Do not use other 4A insecticides if imidacloprid is used.
	4A	Assail 30SG (acetamiprid)	2.0–4.0 oz	16 oz	12	7	
	4D	Sivanto Prime (flupyradifurone)	Foliar: 7.0–14 fl oz Soil: 21–28 fl oz	28 fl oz/yr 28 fl oz/yr	4	Foliar: 1 Soil: 45	
	9D	Sefina Inscalis (afidopyropen)	3.0 fl oz	28 fl oz	12	0	
	23	Movento (spirotetramat)	4–5 fl oz	10.0 fl oz	24	1	
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	0.4 lb a.i.; see label	12	1	
	29	Beleaf 50 SG (flonicamid)	2.8–4.28 oz	8.4 oz	12	0	
	-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Antifeedant, repellent insect growth regulator.
	-	Azatin O (azadirachtin)	5–16 fl oz	as needed	4	0	OMRI-listed ² . Antifeedant, repellent insect growth regulator. Rate depends on pest. See label.
	-	Grandevo (<i>Chromobacterium</i> <i>subtsugae</i> strain PRAA4-1)	2–3 lb	none	4	0	OMRI-listed ² .
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	2.0 gm a.i. per appl.	4	0	OMRI-listed ² . Antifeedant, repellent insect growth regulator. May be used in greenhouses.
	-	BotaniGard ES BotaniGard 22WP (<i>Beauveria bassiana</i> strain GHA)	0.25–1.0 qt 0.50–2.0 qt	no limit no limit	4 4	0 0	Compatible in tank mix with some fungicides.
	- , 3A	BotaniGard Maxx (<i>Beauveria bassiana</i> strain GHA and pyrethrins)	0.25–2.0 qt	no limit	12	0	
	-	Sun Spray 98.8%, JMS Stylet Oil, Saf-T- Side, others (oil, insecticidal)	3–6 qt/100 gal (JMS); others 1–2 gal/100gal	no limit	4	0	OMRI-listed ² . See label for tank-mix cautions.
Beetles (including cucumber beetles, flea beetles)	1B	Malathion * 5 EC Malathion 8F (malathion)	1.9 pt 1.2 pt	9.5 pt/yr 6.0 pt/yr	12 12	1 1	Do not graze or feed forage to livestock.
	3, 28	Besiege (chlorantraniliprole, lambda-cyhalothrin)	5–10 fl oz	31 fl oz	24	7—edible podded succulent shelled 21—dry shelled	
	3A	*Capture LFR (bifenthrin)	3.4–6.8 fl oz	0.2 lb a.i.	12	at plant	
	3A	PyGanic 5.0 (pyrethrins)	4.5–15.6 fl oz	10 applications	12	0	OMRI-listed ² .
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	24 fl oz	12	1	
	4A	Admire Pro (imidacloprid)	Soil: 7–14 fl oz Foliar: 1.3–2.2 fl oz	Soil: 14 fl oz Foliar: 6.7 fl oz	12 12	Soil: 21 Foliar: 0	Do not apply to both soil and foliage. Do not use other 4A insecticides if imadacloprid is used.
	4A	Assail 30SG (acetamiprid)	1.5–2.5 oz	16 oz	12	7	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	Max Rate Product per Season	REI (Hours)	Days to Harvest	Remarks ²
	15	Rimon 0.83 EC (novaluron)	9–12 fl oz	36.0 fl oz	12	1	Rimon disrupts molting and has no effect on adult insects.
	-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Antifeedant, repellent insect growth regulator.
Caterpillars (including armyworms, loopers, tomato fruitworm—also known as corn earworm, caterpillars, cutworms)	1A	Sevin 4F, XLR Plus (carbaryl)	4F: 1–1.5 qt XLR: 1–1.5 qt	6 qt/year	12	3	
	3, 28	Besiege (chlorantraniliprole, lambda-cyhalothrin)	5–10 fl oz	31 fl oz	24	7—edible podded succulent shelled 21—dry shelled	
	3A	*Asana XL	5.8–9.6 fl oz	38.4 fl oz	12	1	Do not feed or graze livestock on treated vines.
	3A	*Brigade 2 EC (bifenthrin)	2.1–6.4 fl oz	12.8 fl oz	12	1	
	3A	*Capture LFR (bifenthrin)	3.4–6.8 fl oz	0.2 lb a.i.	12	at plant	
	3A	PyGanic 5.0 (pyrethrins)	4.5–15.6 fl oz	10 appl.	12	0	OMRI-listed ² .
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	24 fl oz	12	1	
	5	Entrust SC (spinosad)	1.5–2.5 fl oz	9.0 fl oz	4	1	OMRI-listed ² .
	5	Radiant SC (spinetoram)	5–10 fl oz	34 fl oz	4	1	
	6, 28	Minecto Pro (cyantraniliprole, abamectin)	5.5–10.0 oz	0.4 lb a.i.; see label	12	1—greenhouse tomato 7—all other crops	
	11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	no limit	4	0	Use high rate for armyworms. Treat when larvae are young.
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb	as needed	4	0	OMRI-listed ² . Use higher rate for armyworms.
	11A	DiPel (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	no limit	4	0	Can be used in organic production.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12–1.50 lb	no limit	4	0	OMRI-listed ² . Treat when larvae are young. Thorough coverage is essential.
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	no limit	4	0	OMRI-listed ² .
	15	Rimon 0.83 EC (novaluron)	9–12 fl oz	36.0 fl oz	12	1	Rimon disrupts molting and has no effect on adult insects.
	18	Intrepid (methoxyfenozide)	4–16 fl oz	64 fl oz	4	1	
	22	Avaunt (indoxacarb)	2.5–3.5 oz	14 oz	12	3	
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	15.4 fl oz of chlorantraniliprole products	4	1	
	28	Exirel (cyantraniliprole)	7.0–13.5 fl oz	0.4 lb a.i. of cyantraniliprole or cyazapyr products	12	1	
-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.	
-	Azatin O (azadirachtin)	5–16 fl oz	as needed	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator. Rate depends on pest. See label.	
-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	no limit	4	0	OMRI-listed ² .	
-	Neemix 4.5 (azadirachtin)	4–16 fl oz	20 gm a.i.	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	Max Rate Product per Season	REI (Hours)	Days to Harvest	Remarks ²
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1.0 qt	no limit	4	0	May be used in greenhouses.
	-	BotaniGard 22WP (<i>Beauveria bassiana</i> strain GHA)	0.50–2.0 qt	no limit			Contact dealer if an adjuvant must be used. Compatible in tank mix with some fungicides.
	-, 3A	BotaniGard Maxx (<i>Beauveria bassiana</i> strain GHA and pyrethrins)	0.25–2.0 qt	no limit			
Fire ants	7A	Extinguish (S-methoprene)	1–1.5 lb broadcast	as needed	4	0	Insect Growth Regulator. Colonies will get reduced after three weeks and eliminated after 8–10 weeks.
	7C	Esteem Ant Bait (pyriproxyfen)	1.5–2.0 lb	0.134 lb a.i.	12	1	Insect Growth Regulator. Apply at first sign of ant activity.
Leafminers	3A	*Brigade 2 EC (bifenthrin)	2.1–6.4 fl oz	12.8 fl oz	12	7	
	5	Entrust SC (spinosad)	2–3 fl oz	9 fl oz	4	1	OMRI-listed ² .
	5	Radiant SC (spinetoram)	6–10 fl oz	34 oz/yr	4	1	Use adjuvant for leafminer.
	6, 28	Minecto Pro (cyantraniliprole, abamectin)	5.5–10.0 oz	0.4 lb a.i.; see label	12	1—greenhouse tomato 7—all other crops	
	15	Rimon 0.83 EC (novaluron)	12 fl oz	36.0 fl oz	12	1	Rimon disrupts molting and has no effect on adult insects.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	0.4 lb a.i.; see label	12	1	
	28	VeriMark (cyantraniliprole)	6.75–13.5 fl oz	13.5 oz of cyantraniliprole or cyazapyr products	4	1	Apply at planting or in drip.
	-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.
	-	Azatin O (azadirachtin)	5–16 fl oz	as needed	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator. Rate depends on pest. See label.
	-	Neemix 4.5 (azadirachtin)	4–7 oz	20 gm a.i.	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.
	-	Sun Spray 98.8%, JMS Stylet Oil, Saf-T-Side, others (oil, insecticidal)	3–6 qt/100 gal (JMS); others 1–2 gal/100gal	no limit	4	0	OMRI-listed ² . See label for tank-mix cautions.
Mites	3A	PyGanic 5.0 (pyrethrins)	4.5–15.6 fl oz	10 appl.	12	0	OMRI-listed ² .
	6, 28	Minecto Pro (cyantraniliprole, abamectin)	5.5–10.0 oz	0.4 lb a.i.; see label	12	1—greenhouse tomato 7—all other crops	
	10B	Zeal (etoxazole)	2.0–3.0 oz	3.0 oz	12	7	
	20B	Kanemite 15 SC (acequinocyl)	31 fl oz	62 oz	12	1	
	20D	Acramite-50WS (bifentrate)	0.50–1.0 lb	1.0 lb	12	3	
	21A	Portal (fenpyroximate)	2.0 pt	4.0 pt	12	1	
	23	Movento (spirotetramat)	4–5 fl oz	10.0 fl oz	24	1	
	-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Insect growth regulator.
	-	Trilogy (Extract of neem oil)	1.0%–2.0% v/v	as needed	4	0	OMRI-listed ² .
	-	Sun Spray 98.8%, JMS Stylet Oil, Saf-T-Side, others (oil, insecticidal)	3–6 qt/100 gal (JMS); others 1–2 gal/100gal	no limit	4	0	OMRI-listed ² .

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	Max Rate Product per Season	REI (Hours)	Days to Harvest	Remarks ²
Stink bugs	1A	Sevin 4F, XLR Plus (carbaryl)	4F: 1–1.5 qt XLR: 1–1.5 qt	6 qt/year	12	3	
	3A	*Brigade 2 EC (bifenthrin)	2.1–6.4 fl oz	12.8 oz	7	1	
	3A	PyGanic 5.0 (pyrethrins)	4.5–15.6 fl oz	10 appl.	12	0	OMRI-listed ² .
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	24 fl oz	12	1	
	15	Rimon 0.83 EC (novaluron)	12 fl oz	36.0 fl oz	12	1	Rimon disrupts molting and has no effect on adult insects.
Thrips	4A	Admire Pro (imidacloprid)	soil: 7–14 fl oz	soil: 10.5 fl oz	12	soil: 21	Soil application only for thrips. Do not use other 4A insecticides if imidacloprid is used.
	5	Entrust SC (spinosad)	1.25–2.5 oz	9.0 oz	4	1	OMRI-listed ² .
	6, 28	Minecto Pro (cyantraniliprole, abamectin)	5.5–10.0 oz	0.4 lb a.i.	12	1—greenhouse tomato 7—all other crops	
	15	Rimon 0.83 EC (novaluron)	12 fl oz	24.0 fl oz	12	1	Rimon disrupts molting and has no effect on adult insects.
	-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	2–3 lb	none	4	0	OMRI-listed ² .
	-	Requiem EC (extract of <i>Chenopodium ambrosioides</i>)	2.0–4.0 qt	10 appl.	4	0	
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	1.0–2.0 qt	as needed	4	0	May be used in greenhouses.
	-	BotaniGard 22WP (<i>Beauveria bassiana</i> strain GHA)	1.0–2.0 qt	as needed	4	0	Compatible in tank mix with some fungicides.
	-, 3A	BotaniGard Maxx (<i>Beauveria bassiana</i> strain GHA and pyrethrins)	0.25–2.0 qt	as needed	12	0	
	-	Sun Spray 98.8%, JMS Stylet Oil, Saf-T-Side, others (oil, insecticidal)	3–6 qt/100 gal (JMS); others 1–2 gal/100gal	no limit	4	0	OMRI-listed ² .
Whiteflies	3A	*Brigade 2 EC (bifenthrin)	2.1–6.4 fl oz	12.8 fl oz	12	7	
	3A	PyGanic 5.0 (pyrethrins)	4.5–15.6 fl oz	10 appl.	12	0	OMRI-listed ² .
	4A	Admire Pro (imidacloprid)	Soil: 7–14 fl oz Foliar: 1.3–2.2 fl oz	14 fl oz 6.7 fl oz	12 12	Soil: 21 Foliar: 0	Do not apply to both soil and foliage. Do not use other 4A insecticides if imidacloprid is used.
	4A	Assail 30SG (acetamiprid)	2.5–4.0 fl oz	16 oz	12	7	
	4D	Sivanto Prime (flupyradifurone)	Foliar: 10.5–14 fl oz Soil: 21–28 fl oz	28 fl oz/yr 28 fl oz/yr	4 4	1 45	
	9D	Sefina Inscalis (afidopyrophen)	14 fl oz	28 fl oz	12	0	
	6, 28	Minecto Pro (cyantraniliprole, abamectin)	5.5–10.0 oz	0.4 lb a.i.; see label	12	1—greenhouse tomato 7—all other crops	
	7C	Knack IGR (pyriproxyfen)	8–10 fl oz	20 fl oz	12	1	Insect growth regulator
	15	Rimon 0.83 EC (novaluron)	12.0 fl oz	24.0 oz	12	1	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	Max Rate Product per Season	REI (Hours)	Days to Harvest	Remarks ²
	16	Courier 40 SC (buprofezin)	9.0–13.6 fl oz	27.2 fl oz	12	1	
	23	Movento (spirotetramat)	4–5 fl oz	10.0 fl oz	24	1	
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	0.4 lb a.i.; see label	12	1	
	28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	13.5 fl oz of cyantraniliprole or cyazapyr products	4	1	
	-	Aza-Direct (azadirachtin)	1–2 pt	3.5 pt	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.
	-	Azatin O (azadirachtin)	5–16 fl oz	as needed	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator. Rate depends on pest.
	-	Grandevo (<i>Chromobacterium subsugae</i> strain PRAA4-1)	2–3 lb	no limit	4	0	OMRI-listed ² . Can be used in organic production.
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	20 gm a.i.	4	0	OMRI-listed ² . Antifeedant, repellent, insect growth regulator.
	-	Requiem EC (extract of <i>Chenopodium ambrosioides</i>)	2–4 qt	as needed	4	0	
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1.0 qt	no limit	4	0	May be used in greenhouses.
	-	BotaniGard 22WP (<i>Beauveria bassiana</i> strain GHA)	0.50–2.0 qt	no limit			
	-, 3A	BotaniGard Maxx (<i>Beauveria bassiana</i> strain GHA and pyrethrins)	0.25–2.0 qt	no limit	12	0	Compatible in tank mix with some fungicides.
	-	Sun Spray 98.8%, JMS Stylet Oil, Saf-T-Side, others (oil, insecticidal)	3–6 qt/100 gal (JMS); others 1–2 gal/100gal	no limit	4	0	OMRI-listed ² .
Wireworm	3A	*Capture LFR (bifenthrin)	3.4–6.8 fl oz	0.2 lb a.i.	12	at plant	Extremely toxic to bees, fish, and aquatic invertebrates.

¹ Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 9.4, March 2020. Number codes (1 through 28) are used to distinguish the main insecticide mode of action groups, with additional letters for certain subgroups within each main group. All insecticides within the same group (with the same number) indicate the same active ingredient or similar mode of action. This information must be considered for the insecticide resistance management decisions. Un=unknown, or a mode of action that has not been classified yet.

² Information provided in the table applies only to Florida. Be sure to read a current product label before applying any product. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by UF/IFAS Extension nor discrimination against similar products or services not mentioned. OMRI-listed: Listed by Organic Materials Review Institute for use in organic production.

* **Restricted use insecticide**

Table 8. Insecticides labeled for management of arthropod pests of parsley.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
Aphids	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–2.4 pt 8F: 1.5 pt	24	7	Maximum of 2 applications per year.
	3A	*Pounce 25 WP (permethrin)	3.2–12.8 oz	12	1	Do not apply more than 1.0 lb a.i./acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	3A	*Pounce 25 WP (permethrin)	6.4–12.8 oz	12	1	Maximum of 0.8 lb a.i./acre per season.
	3A,-	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–5.5 oz	12	7	Do not use if other 4A insecticides have been or will be used. Toxic to bees.
	4A	Admire Pro (imidacloprid)	Foliar: 1.3 fl oz Soil: 4.4–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 6.5 fl oz (foliar) or 10.5 fl oz (soil)/acre per year. Toxic to bees.
	4A	Assail 30SG (acetamiprid)	2.0–4.0 oz	12	7	Begin applications for whiteflies when first adults are noticed. Do not apply more than 5 times per season or apply more often than every 7 days.
	4A	Belay (clothianidin)	Foliar: 3–4 fl oz Soil: 9–12 fl oz	12	Foliar: 7 Soil: 21	Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz). Do not apply at intervals of less than 10 days. Highly toxic to bees.
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees. Do not allow drift to flowering weeds or nearby crops in bloom.
	4A	Platinum 75 SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10.0–13.0 fl oz	12	30	Maximum of 13 fl oz/acre per season.
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. Do not use an adjuvant. Highly toxic to bees. Do not allow drift to weeds or nearby crops in bloom.
	4C	Closer SC (sulfoxaflor)	1.5–2.0 fl oz	12	3	Do not make more than 2 consecutive applications or more than 4 total applications per season.
	4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	1	Maximum of 28 fl oz/acre per crop season. Maximum of 3 crop seasons per year.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	10 fl oz	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.
	9B	Fulfill (pymetrozine)	2.75 oz	12	7	Apply when aphids first appear, before populations build to damaging levels. Two applications (maximum allowed) may be needed to control persistent aphid populations.
	9B	PQZ (pyrifluquinazon)	2.4–3.2 fl oz	12	1	Maximum of 4.8 fl oz/acre per crop cycle.
	9D	Versys (afidopyropen)	1.5 fl oz	12	0	Maximum of 14 fl oz/acre per season.
	23	Movento (spirotetramat)	4.0–5.0 fl oz	24	3	Do not apply more than 10 fl oz per acre per crop.
28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Verimark), including all application types. For best performance, use an adjuvant.	
28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	4	N/A— applied at planting	Maximum of 13.5 fl oz at planting or 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Exirel), including all application types.	
29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	0	Do not apply more than 8.4 oz/acre per season. Begin applications before pests reach damaging levels.	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	-	Aza-Direct (azadirachtin)	1–2 pt, to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	BotaniGard ES Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt	4	0	Apply in sufficient water to cover foliage, typically 5–100 gallon/acre. Compatible in tank mix with some fungicides. Mycotrol ESO OMRI-listed ² .
	-	Grandevo (<i>Chromobacterium subtsugae</i> strain PRAA4-1)	1–3 lb	4	0	Can be used in organic production. OMRI-listed.
	-	M-Pede 49% EC Soap, insecticidal	1%–2% v/v	12	0	OMRI-listed ² .
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.
	-	Trilogy (extract of neem oil)	1.0%–2.0% v/v	4	0	Apply morning or evening to reduce potential for leaf burn. Toxic to bees exposed to direct treatment. OMRI-listed.
Caterpillars (includes beet armyworm, cabbage looper, celery leaf-tier, corn earworm, cutworms, fall armyworm)	1A	*Lannate LV, *SP (methomyl)	LV: 1.5–3 pt SP: 0.5–1.0 lb	48	10	Do not apply more than 12 pt of LV or 4 lb SP per acre per season.
	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	14	Maximum of 6 qt/acre per year.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.
	3A	*Ambush 25W (permethrin)	6.4–12.8 oz	12	1	Do not apply more than 2 lb a.i./acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	3A	*Pounce 25 WP (permethrin)	3.2–12.8 oz	12	1	Do not apply more than 1.0 lb a.i./acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10–13 oz	12	30	May be applied by one of several soil application methods. One application per season.
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. Do not use an adjuvant. Highly toxic to bees. Do not allow drift to weeds or nearby crops in bloom.
	5	Entrust SC (spinosad)	1.5–10.0 fl oz	4	1	Use no more than 29 oz per acre per crop. OMRI-listed.
	5	Radiant SC (spinetoram)	5–10 fl oz	4	1	Maximum of 6 applications, and no more than 2 consecutive applications before rotating to another MOA.
	6	*Proclaim (emamectin benzoate)	2.4–4.8 oz	12	7	Do not apply more than 28.8 oz/A per season.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	5.5–10.0 fl oz 7.5–10.0 for cabbage looper	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.
	11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Apply when larvae are small for best control. OMRI-listed.
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. Can be used in the greenhouse. OMRI-listed.
11A	Crymax WDG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Use high rate for armyworms. Treat when larvae are young.	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb	4	0	Use higher rates for armyworms. OMRI-listed.
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Good coverage is essential. See label for rates for specific pests. Can be used for organic production.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.12–1.5 lb	4	0	Treat when larvae are young. Thorough coverage is essential. OMRI-listed.
	11A	Xentari DF (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb	4	0	Treat when larvae are young. Thorough coverage is essential. May be used in the greenhouse. Can be used in organic production.
	18	Intrepid 2F (methoxyfenozide)	4–10 fl oz	4	1	Do not apply more than 64 fl oz per acre per season.
	22	Avaunt Avaunt eVo (indoxacarb)	2.5–3.5 oz eVo: 2.5–6.0 oz	12	3	Maximum of 24 oz/acre per crop and 96 oz/acre per year (Avaunt) or 18 oz/acre per crop and 72 oz/acre per year (Avaunt eVo).
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	4	1	May be applied via drip chemigation in addition to foliar and various soil application methods.
	28	Exirel (cyantraniliprole)	7.0–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Verimark), including all application types.
	28	Verimark (cyantraniliprole)	5.0–13.5 fl oz	4	N/A— applied at planting	Maximum of 13.5 fl oz at planting or 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Exirel), including all application types.
	-	Aza-Direct (azadirachtin)	1–2 pt, up to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
	-	Grandevo (<i>Chromobacterium</i> <i>subtsugae</i> strain PRAA4-1)	1–2 lb	4	0	Can be used in organic production. OMRI-listed.
	-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.
Fire ants	7A	Extinguish (S-methoprene)	1.0–1.5 lb	4	0	Slow-acting IGR (insect growth regulator). Best applied early spring and fall where crop will be grown. Colonies will be reduced after three weeks and eliminated after 8 to 10 weeks. May be applied by ground equipment or aerially.
Flea beetles	1A	Sevin 4F, XLR Plus (carbaryl)	0.5–1.0 qt	12	14	Maximum of 6 qt/acre per year.
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria</i> <i>bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Actara (thiamethoxam)	1.5–5.5 oz	12	7	Do not use if other 4A insecticides have been or will be used. Toxic to bees.
	4A	Admire Pro (imidacloprid)	1.3 fl oz	12	7	Maximum of 6.5 fl oz/acre per year. Toxic to bees.
	4A	Belay (clothianidin)	Foliar: 3–4 fl oz Soil: 9–12 fl oz	12	Foliar: 7 Soil: 21	Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz). Highly toxic to bees. Flea beetles only.
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees. Flea beetles only.
	4A	Platinum 75 SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²	
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.	
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10–13 oz	12	30	May be applied by one of several soil application methods. One application per season.	
	4A, 28	Voliam Flexi (thiamethoxam, chlorantraniliprole)	4.0–7.0 oz	12	7	Do not apply more than 14 oz per acre per growing season. Do not use an adjuvant. Highly toxic to bees. Do not allow drift to weeds or nearby crops in bloom.	
Grasshoppers	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.	
	4A	Belay (clothianidin)	Soil: 9–12 fl oz	12	21	See label for application methods. Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz).	
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.	
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.	
Leafhoppers	1A	Sevin 4F, XLR Plus (carbaryl)	0.5–1.0 qt	12	14	Maximum of 6 qt/acre per year.	
	3A	*Ambush 25W (permethrin)	6.4–12.8 oz	12	1	Do not apply more than 2 lb a.i./acre per season.	
	3A	*Baythroid XL (beta-cyfluthrin)	0.8–3.2 fl oz	12	0	Maximum of 12.8 fl oz/acre per season.	
	3A	*Mustang Maxx (zeta-cypermethrin)	2.24–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.	
	3A	*Pounce 25 WP (permethrin)	3.2–12.8 oz	12	1	Do not apply more than 1.0 lb a.i./acre per season.	
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.	
	3A,-	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.	
	4A	Actara (thiamethoxam)	1.5–5.5 oz	12	7	Do not use if other 4A insecticides have been or will be used. Toxic to bees.	
	4A	Admire Pro (imidacloprid)	Foliar: 1.3 fl oz Soil: 4.4–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 6.5 fl oz (foliar) or 10.5 fl oz (soil)/acre per year. Toxic to bees.	
	4A	Belay (clothianidin)	Foliar: 3–4 fl oz Soil: 9–12 fl oz	12	Foliar: 7 Soil: 21	Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz). Do not apply at intervals of less than 10 days. Highly toxic to bees.	
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees.	
	4A	Platinum 75SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.	
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.	
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.	
	4A, 28	Durivo (thiamethoxam, chlorantraniliprole)	10–13 oz	12	30	May be applied by one of several soil application methods. One application per season.	
		4D	Sivanto Prime (flupyradifurone)	7–14 fl oz	4	1	Maximum of 28 fl oz/acre per crop seasons. Maximum of 3 crop seasons per year.
		16	Courier 40SC (buprofezin)	9.0–13.6 fl oz	12	7	Do not make more than 2 applications per crop cycle. IGR targets immatures.
		-	Aza-Direct (azadirachtin)	1–2 pt, to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
		-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
		-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .
	-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.	

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
Leafminers	3A	*Ambush 25W (permethrin)	6.4–12.8 oz	12	1	Do not apply more than 2 lb a.i./acre per season.
	3A	*Pounce 25 WP (permethrin)	3.2–12.8 oz	12	1	Do not apply more than 1.0 lb a.i./acre per season.
	3A	PyGanic Crop Protection EC 5.0 (pyrethrins)	4.5–15.6 fl oz	12	0	Can be used in greenhouses. Thorough coverage is essential. Breaks down rapidly in sunlight. OMRI-listed.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	4A	Belay (clothianidin)	Soil: 9–12 fl oz	12	21	See label for application methods. Regardless of application method, do not apply more than 0.2 lb a.i./acre per year (12 fl oz).
	4A	Belay 50 WDG (clothianidin)	Foliar: 1.6–2.1 oz Soil: 4.8–6.4 oz	12	7	Maximum of 6.4 oz/acre per season. Do not use an adjuvant. Toxic to bees. Do not allow drift to flowering weeds or nearby crops in bloom.
	4A	Platinum 75SG (thiamethoxam)	1.66–3.67 oz	12	30	Maximum of 3.67 oz/acre per season. Do not use in conjunction with other 4A insecticides.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	5	Entrust SC (spinosad)	1.5–10.0 fl oz	4	1	Use no more than 29 oz per acre per crop. OMRI-listed.
	5	Radiant SC (spinetoram)	5–10 fl oz	4	1	Maximum of 6 applications, and no more than 2 consecutive applications before rotating to another MOA.
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	7	No more than 2 sequential applications. Must be used with an adjuvant (but not binder-sticker types). Not for use on leafy vegetables grown for transplant.
	6	*Proclaim (emamectin benzoate)	2.4–4.8 oz	12	7	Do not apply more than 28.8 oz/A per season.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	5.5–10.0 fl oz	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.
	17	Trigard (cyromazine)	2.66 oz	12	7	No more than 5 applications per crop.
	28	Coragen (chlorantraniliprole)	5.0–7.5 fl oz	4	1	May be applied by drip chemigation, in addition to foliar and various soil application methods.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	12	1	Maximum of 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Verimark), including all application types. For best performance, use an adjuvant.
	28	Verimark (cyantraniliprole)	6.75–13.5 fl oz	4	N/A— applied at planting	Maximum of 13.5 fl oz at planting or 0.4 lb a.i./acre per year of cyantraniliprole-containing products (such as Exirel), including all application types.
	-	Aza-Direct (azadirachtin)	1–2 pt, to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
	-	Azatin XL (azadirachtin)	5–21 fl oz	4	0	Antifeedant, repellent, insect growth regulator.
-	Molt-X (azadirachtin)	10 fl oz	4	0	OMRI-listed ² .	
-	Neemix 4.5 (azadirachtin)	4–16 fl oz	12	0	IGR and feeding repellent. OMRI-listed.	
-	Requiem EC (extract of <i>Chenopodium ambrosioides</i>)	2.0–4.0 qt	4	0	Apply before pests reach damaging levels.	
Plant bugs	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	14	Maximum of 6 qt/acre per year.
	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	29	Beleaf 50 SG (flonicamid)	2.0–2.8 oz	12	0	Do not apply more than 8.4 oz/acre per season. Begin applications before pests reach damaging levels.

Insect or Mite Pest	MOA Code ¹	Trade Name (Active Ingredient) *Restricted	Rate (Product/Acre)	REI (Hours)	Days to Harvest	Remarks ²
Planthoppers	16	Courier 40SC (buprofezin)	9.0–13.6 fl oz	12	7	Do not make more than 2 applications per crop cycle. IGR targets immatures.
Stink bugs	1A	Sevin 4F, XLR Plus (carbaryl)	1–2 qt	12	14	Maximum of 6 qt/acre per year.
	3A	*Mustang Maxx (zeta-cypermethrin)	3.2–4.0 fl oz	12	1	Maximum of 24 fl oz/acre per season.
	4A	Scorpion 35 SL (dinotefuran)	Foliar: 2–5.25 fl oz Soil: 9–10.5 fl oz	12	Foliar: 7 Soil: 21	Maximum of 10.5 fl oz (foliar) or 21 fl oz (soil)/acre per season. See pollinator protection restrictions on label.
	4A	Venom (dinotefuran)	Foliar: 1.0–3.0 oz Soil: 5.0–6.0 oz	12	Foliar: 7 Soil: 21	Maximum of 6 oz (foliar) or 12 oz (soil)/acre per season. See pollinator protection restrictions on label.
	-	Aza-Direct (azadirachtin)	1–2 pt, to 3.5 pt if needed	4	0	Antifeedant, repellent, insect growth regulator. OMRI-listed.
Two-spotted spider mite	3A, -	BotaniGard Maxx (pyrethrins, <i>Beauveria bassiana</i> strain GHA)	Ground appl.: 0.25–2.00 qt Aerial appl.: 0.25–1.00 qt	12	0	Apply in sufficient water to cover foliage. Compatible in tank mix with some fungicides. May not be compatible with adjuvants.
	6	*Agri-Mek SC (abamectin)	1.75–3.5 fl oz	12	7	No more than 2 sequential applications. Must be used with an adjuvant (but not binder-sticker types). Not for use on leafy vegetables grown for transplant.
	6, 28	*Minecto Pro (abamectin, cyantraniliprole)	5.5–10.0 fl oz	12	7	Maximum of 20 fl oz/acre per year, or 0.4 lb a.i./acre per year of cyantraniliprole-containing products and 0.056 lb a.i./acre per year of abamectin-containing products, including all application types.

¹ Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 9.4 March 2020. Number codes (1 through 29) are used to distinguish the main insecticide mode of action groups, with additional letters for certain subgroups within each main group. All insecticides within the same group (with same number) indicate same active ingredient or similar mode of action. This information must be considered for the insecticide resistance management decisions. - = unknown, or a mode of action that has not been classified yet.

² Information provided in this table applies only to Florida. Be sure to read a current product label before applying any product. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by UF/IFAS Extension nor discrimination against similar products or services not mentioned. OMRI-listed: Listed by the Organic Materials Review Institute for use in organic production.

* **Restricted use insecticide.**

Table 9. Celery fungicides ordered by disease and then FRAC group according to their mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredient)	Max Rate/Acre		Min. Days to Harvest	Min. Days to Reentry	Remarks ²
			Appl.	Season			
Alternaria	7	Endura (boscalid)	9 oz	18 oz	0	0.5	Alternate with non-FRAC code 7 fungicide.
	9 & 12	Switch (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Rotate with fungicides of dissimilar mode of action.
	11	Many brands available: Azoxystrobin (azoxystrobin) SC, Quadris SC, Satori, Willowood Azoxy	15.4 fl oz	96 fl oz	0	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
Botrytis	7	Endura (boscalid)	9 oz	18 oz	0	0.5	Alternate with non-FRAC code 7 fungicide.
	9 & 12	Switch (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Rotate with fungicides of dissimilar mode of action.
Sclerotinia	7	Endura (boscalid)	9 oz	18 oz	0	0.5	Alternate with non-FRAC code 7 fungicide.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	3	0.5	Alternate with non-FRAC code 7 fungicide.
Bacterial blight	M1	(copper compounds) Many labels available: Badge SC, Badge X2, Basic Copper 53, C-O-S WDG, Champ DP, Champ WG, Champ Formula 2, Champ WP, Champion++, COC DF, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Kentan DF, Kocide DF, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Kop-hydroxide, Mastercop, Nordox 75 WG, Nu-Cop 50WP, Nu-Cop 3L, Nu-Cop HB, Nu-Cop DF, Previs- to, Stretch, Tenn-Cop 5E, Top Cop w/ Sulfur	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days	
	25	Agri-mycin 17 AG Streptomycin Bac-Master Firewall 17 WP (streptomycin)	200 ppm			0.5	See label for details. For transplant production.
Early blight (Cercospora)	M2	(sulfur) Many labels available: Cosavet, Dusting Sulfur – IAP, Kumulus DF, Micro Sulf, Microfine Sulfur, Microthiol Dispers, Sulfur 90W, Super-Six, Top Cop w/ Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not apply during periods of weather. Do not apply within 2 weeks of an oil spray.
	M5	(chlorothalonil) Many labels available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720 SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720SST, Equus DF, Initiate 720, Initiate ZN, Praiz	SEE INDIVIDUAL LABELS		7	0.5	
M5 & 33	Catamaran (chlorothalonil + phosphite)	4 pt	60 pt	7	0.5		
3	Rhyme (flutriafol)	7 fl oz	28 fl oz	7	0.5	Do not apply more than 4 applications per year.	
3	(propiconazole) Many labels available: Amide Propiconazole, Bumper 41.8EC, Fitness, Propicure, Propi-Star EC, Propimax EC, Shar-Shield PPZ, Tilt, Topaz	4 fl oz	16 fl oz	14	0.5	Do not exceed 4 total applications.	
3 & 11	Topguard EQ (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredient)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	7 & 11	Merivon SC (pyraclostrobin & fluxapyroxad)	11.0 fl oz	33 fl oz	1	0.5	Alternate with fungicides of dissimilar modes of action.
	7 & 11	Pristine (boscalid + pyraclostrobin)	15 oz	50 oz	0	0.5	Do not make more than 1 application without rotating to a fungicide of dissimilar mode of action.
	7 & 11	Luna Sensation (flupyrrom + trifloxystrobin)	5.8 fl oz	23 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 & 12	Miravis Prime (pydiflumetofen; fludioxonil)	13.4 fl oz	36.5 fl oz	0	0.5	See label for restrictions.
	9 & 12	Switch (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Rotate with fungicides of dissimilar mode of action.
	11	(azoxystrobin) Many brands available: Azoxystrobin, Azteroid SC, Equation SC, Quadris SC, Satori, Willowood Azoxy	15.4 fl oz or 0.8 fl oz/1000 row ft	96 fl oz	0	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Evito 480SC (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Flint (trifloxystrobin)	3 oz	12 oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Gem 500SC (trifloxystrobin)	2.9 fl oz	11.6 fl oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.7 pt	22.2 pt	7	0.5	Do not exceed 2 sequential and 6 total applications of Quadris Opti or rotate with non-Qol fungicides.
	11 & 3	Quit Quit XCEL (azoxystrobin + propiconazole)	14 fl oz	56 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	27 & 11	Tanos (cymoxanil + famoxadone)	8 oz	72 oz	3	0.5	Do not alternate or tank-mix with another FRAC group 11 fungicide.
	M2	(sulfur) Many labels available: Cosavet, Dusting Sulfur – IAP, Kumulus DF, Micro Sulf, Microfine Sulfur, Microthiol Dispers, Sulfur 90W, Super-Six, Top Cop w/ Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
	M5	(chlorothalonil) Many labels available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720 SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720SST, Equus DF, Initiate 720, Initiate ZN, Praiz	SEE INDIVIDUAL LABELS		7	0.5	
M5 & 33	Catamaran (chlorothalonil + phosphite)	4 pt	60 pt	7	0.5		
3	(propiconazole) Many labels available: Amide Propiconazole, Bumper 41.8EC, Fitness, Propicure, Propi-Star EC, Propimax EC, Shar-Shield PPZ, Tilt, Topaz	4 fl oz	16 fl oz	14	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.	
3	Rhyme (flutriafol)	7 fl oz	28 fl oz	7	0.5	Do not apply more than 4 applications per year.	
3 & 11	Topguard EQ (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.	
7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	3	0.5	Alternate with non-FRAC code 7 fungicide. See label for directions	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredient)	Max Rate/Acre		Min. Days to		Remarks ²	
			Appl.	Season	Harvest	Reentry		
Downy mildew	7 & 11	Merivon SC (pyraclostrobin & fluxapyroxad)	11.0 fl oz	33 fl oz	1	0.5	Alternate with fungicides of dissimilar modes of action.	
	7 & 11	Pristine (boscalid + pyraclostrobin)	15 oz	50 oz	0	0.5	Do not make more than 1 application without rotating to a fungicide of dissimilar mode of action.	
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	5.8 fl oz	23 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.	
	7 & 12	Miravis Prime (pydiflumetofen; fludioxonil)	13.4 fl oz	36.5 fl oz	0	0.5	See label for restrictions.	
	9 & 12	Switch (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Rotate with fungicides of dissimilar mode of action.	
	11	(azoxystrobin) Many brands available: Azoxystrobin, Azteroid SC, Equation SC, Quadris SC, Satori, Willowood Azoxy	15.4 fl oz	96 fl oz	0	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
	11	Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
	11	Evito 480SC (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
	11	Reason (fenamidone)	8.2 fl oz	24.6 fl oz	2	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
	11	Flint (trifloxystrobin)	3 oz	12 oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
	11	Gem 500SC (trifloxystrobin)	2.9 fl oz	11.6 fl oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
	Downy mildew	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.7 pt	22.2 pt	7	0.5	Do not exceed 2 sequential and 6 total applications of Quadris Opti. or rotate with non-Qol fungicides.
11 & 3		Quit (azoxystrobin + propiconazole)	14 fl oz	56 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
11 & 3		Quit XCEL (azoxystrobin + propiconazole)	14 fl oz	56 fl oz	14	0.5	Alternate every other application with a fungicide of dissimilar mode of action.	
12		Cannonball (fludioxonil)	7 oz	28 oz	0	0.5	Alternate with fungicides of dissimilar modes of action.	
27 & 11		Tanos (cymoxanil + famoxadone)	8 oz	72 oz	3	0.5	Do not alternate or tank-mix with another FRAC group 11 fungicide.	
40		Forum (dimethomorph)	6 fl oz	18 fl oz	0	0.5	Rotate with fungicides of dissimilar mode of action.	
40		Revus (mandipropamid)	8 fl oz	32 fl oz	1	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.	
40 & 45		Zapro (dimethomorph + ametoctradin)	14 fl oz	52 fl oz	0	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.	
43		Presidio (flupicalide)	4 fl oz	12 fl oz	2	0.5	Must be tank-mixed with another fungicide active against the pathogen but of dissimilar mode of action.	
14		Botran 75W (dichloran)	2 lb	5.33 lb	7	0.5	Direct spray to base of plant.	
Powdery mildew		M2	(sulfur) Many labels available: Cosavet, Dusting Sulfur – IAP, Kumulus DF, Micro Sulf, Microfine Sulfur, Microthiol Disperss, Sulfur 90W, Super-Six, Top Cop w/ Sulfur	SEE INDIVIDUAL LABELS	SEE INDIVIDUAL LABELS	1	1	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
		7 & 12	Miravis Prime (pydiflumetofen; fludioxonil)	13.4 fl oz	36.5 fl oz	0	0.5	See label for restrictions.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredient)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	9 & 12	Switch (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Rotate with fungicides of dissimilar mode of action.
Pythium	33	Aliette WDG Legion 80WDG Linebacker WDG (fosetyl-Al)	5 lb	20 lb		0.5	
Pythium seedling blight	4	Apron XL (mefenoxam)	0.64 fl oz/100 lb seed			2	Seed treatment only.
	4	Metastar 2E (metalaxyl)	8 pt			2	Apply as a broadcast soil application and incorporate into top 2 inches. See label for directions.
Pythium seedling diseases	4	Ridomil Gold SL (mefenoxam)	2 pt			2	Apply at seeding in a 7"-12" band on soil over seed furrow.
	4	Ridomil Gold GR (mefenoxam)	40 lb			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	4	Ultra Flourish (mefenoxam)	4 pt			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	4 & 11	Uniform (mefenoxam + azoxystrobin)	0.34 fl oz/1000 ft of row	1 appl.		2	Soil incorporated.
Stalk rot (Rhizoctonia)	M5	(chlorothalonil) Many labels available: Bravo Ultrex, Bravo Weather Stik, Bravo ZN, Chloronil 720, Chlorothalonil 720 SC, Echo 720, Echo 90DF, Echo ZN, Equus 500 ZN, Equus 720SST, Equus DF, Initiate 720, Initiate ZN, Praiz	SEE INDIVIDUAL LABELS		7	0.5	
	3	(propiconazole) Many labels available: Amide Propiconazole, Bumper 41.8EC, Propi-Star EC, Propimax EC, Shar-Shield PPZ, Tilt 3.6E	4 fl oz	16 fl oz	14	0.5	Do not exceed 4 total applications.
	7 & 11	Merivon SC (pyraclostrobin & fluxapyroxad)	11.0 fl oz	33 fl oz	1	0.5	Alternate with fungicides of dissimilar modes of action.
	11	Aftershock (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Evito 480SC (fluoxastrobin)	5.7 fl oz	22.8 fl oz	3	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Flint (trifloxystrobin)	3 oz	12 oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11	Gem 500SC (trifloxystrobin)	2.9 fl oz	11.6 fl oz	7	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
	11 & M5	Quadris Opti (azoxystrobin + chlorothalonil)	3.7 pt	22.2 pt	7	0.5	Do not exceed 2 sequential and 6 total applications of Quadris Opti or rotate with non-Qol fungicides.
Various	7 & 11	Merivon SC (pyraclostrobin & fluxapyroxad)	11.0 fl oz	33 fl oz	1	0.5	Alternate with fungicides of dissimilar modes of action.
	11	Cabrio EG (pyraclostrobin)	16 oz	64 oz	0	0.5	Do not exceed 1 sequential application of Qol fungicides. See label for soil application.
	11	(azoxystrobin) Many brands available: Azoxyzone, Azteroid SC, Equation SC, Quadris SC, Satori, Willowood Azoxy	15.4 fl oz or 0.8 fl oz/1000 row ft	96 fl oz	0	0.5	Do not exceed 1 sequential application of Qol fungicides. See label for soil application.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredient)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	19	OSO 5%SC (polyoxin D zinc salt)	13 fl oz	84 fl oz	0	4 hr	See label for details.
	33	(mono- and dipotassium salts of phosphorous acid) Many brands available: Alude, Confine Extra, Fosiphite, Fungi- phite, K-Phite, Oxiphos, Phitticide, Phostrol, Prophyt, Rampart, Reveille	3 qt		0	4 hr	See label for details.
Various seedling diseases	12	Maxim 4FS (fludioxonil)	0.16 fl oz/100 lb seed			0.5	Seed treatment only.
	4 & 11	Uniform (mefenoxam + azoxystrobin)	0.34 fl oz/1000 ft of row	1 appl.		0	Soil incorporated.

¹FRAC code (fungicide group): Number (1 through 46) and letters (U and P) are used to distinguish the fungicide mode of action groups. All fungicides within the same group (with the same number or letter) indicate the same active ingredient or a similar mode of action. This information must be considered for the fungicide resistance management decisions. U = unknown, or a mode of action that has not been classified yet and is typically associated with another number; P = host plant defense inducers. Source: FRAC Code List 2019; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).

²Information provided in this table applies only to Florida. Be sure to read a current product label before applying any chemical. The use of brand names and any mention or listing of commercial products or services in the publication does not imply endorsement by UF/IFAS Extension nor discrimination against similar products or services not mentioned.

Table 10. Okra fungicides ordered by disease and then FRAC group according to their mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Anthracnose	M1	AmeriCop 40 DF (copper hydroxide)	1.5 lb	13.1 lb	0	2 (Field) 1 (GH)	OMRI product
	M1	Champion++ (copper hydroxide)	1.75 lb	17.5 lb	0	2	
	M1	Kentan DF (copper hydroxide)	1.5 lb	5.25 lb	0	2	
	M1	Kocide 2000 (copper hydroxide)	3 lb	15 lb	0	2	
	M1	Kocide 3000 (copper hydroxide)	1.75 lb	17.5 lb	0	2	
	M1	Nu-Cop 50 DF (copper hydroxide)	2.1 lb	10.5 lb	1	2	
	M1	Previsto (copper hydroxide)	3 qt	69 qt		2	
	M1	Cueva (copper octanoate)	2 gal	6.7 gal	0	4 hr	
	M1	Kop-5 (copper sulfate pentahydrate)	32 fl oz	10.6 gal		2 (Field) 1 (GH)	
	M1	Mastercop (copper sulfate pentahydrate)	1.5 pt	9 pt	0	2	
	M1	Cuproxtat FL (basic copper sulfate)	3.0 pt	26.25 pt	0	2	
	M1 & M1	Badge SC Badge X2 (copper hydroxide, copper oxychloride)	1.8 pt	18.8 pt	0	1 (GH) 2 (Field)	OMRI product

Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to Chapter 19 for information on biopesticides including materials labeled for certified organic production.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	M5	Bravo Ultrex (chlorothalonil)	1.4 lb	10.9 lb	3	0.5	
	M5	Bravo Weather Stik (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Chloronil 720 (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Echo 720 (chlorothalonil)	1.5 pt	9.0 lb a.i. pt	3	0.5	
	M5	Equus DF (chlorothalonil)	1.4 lb	10.9 lb	3	0.5	
	M5	Equus 720 SST (chlorothalonil)	1.5 pt	12 pt	3	0.5	Do not apply at <7-day intervals.
	M5	Initiate 720 (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Orondis Opti B (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5 & 27	Ariston (chlorothalonil, cymoxanil)	2.44 pt	17.5 pt	3	0.5	
	3	Mettle 125ME (tetraconazole)	8 fl oz	16 fl oz	0	0.5	
	3	Rhyme Fungicide (flutriafol)	7 fl oz	28 fl oz	7	0.5	
	3	Topguard (flutriafol)	14 fl oz	56 fl oz	0	0.5	
	3 & 9	Inspire Super (difenoconazole, cyprodinil)	20 fl oz	80 fl oz	7	0.5	Do not apply more than 2 sequential applications.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	Only suppression; make no more than 2 sequential applications.
	11	Aframe (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Azoxystar (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Azoxyzone (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	AZteroid FC (azoxystrobin)	19.5 fl oz	77.5 fl oz	0	4 hr	
	11	Mazolin (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Quadris (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Satori Fungicide (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	Do not apply more than 1 application.
	11	Tetranan (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Trevo (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Willowood Azoxy 25C (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²	
			Appl.	Season	Harvest	Reentry		
Bacterial leaf spot	7 & 11	Luna Sensation (fluopyram; trifloxystrobin)	7.6 fl oz	27.1 fl oz	3	0.5	Do not make more than 2 sequential applications of Luna Sensation or any Group 7 or Group 11 containing fungicide before rotating with a fungicide of a different Group.	
	7 & 3	Aprovia Top (benzovindiflupyr; difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5		
	11 & 3	Quadris Top (azoxystrobin; difenoconazole)	14 fl oz	55.3 fl oz	0	0.5	Make no more than 2 consecutive applications.	
	M1	AmeriCOP 40 DF (copper hydroxide)	1.5 lb	13.1 lb	0	1 (GH) 2 (Field)	OMRI product	
	M1	Champion++ (copper hydroxide)	1.75 lb	17.5 lb	0	2		
	M1	Kentan DF (copper hydroxide)	1.5 lb		0	2		
	M1	Kocide 2000 (copper hydroxide)	3 lb	15 lb	0	2		
	M1	Kocide 3000 (copper hydroxide)	1.75 lb	17.5 lb	0	2		
	M1	Nu-Cop 50 DF (copper hydroxide)	2.1 lb	10.5 lb	1	2		
	M1	Previsto (copper hydroxide)	3 qt	69 qt		2		
	M1	Cueva (copper octanoate)	2 gal	6.7 gal	0	4 hr		
	M1	Kop-5 (copper sulfate pentahydrate)	32 fl oz	10.6 gal		2 (Field) 1 (GH)		
	M1	Mastercop (copper sulfate pentahydrate)	1.5 pt	9 pt	0	2		
	M1	Cuproxtat FL (basic copper sulfate)	3.0 pt	26.25 pt	0	2		
	M1 & M1	Badge SC Badge X2 (copper hydroxide, copper oxychloride)	1.8 pt	18.8 pt	0	1 (GH) 2 (Field)	OMRI product	
	Cercospora leaf spot	3	Monsoon (tebuconazole)	6 fl oz	24 fl oz	3	2	Group 3 = DMI fungicide
		3	Onset 3.6L (tebuconazole)	6 fl oz	24 fl oz	7	0.5	
3		Orius 3.6F (tebuconazole)	6 fl oz	24 fl oz	3	0.5		
3		Tebu-Crop 3.6F (tebuconazole)	6 fl oz	24 fl oz	3	0.5		
3		TebuCon 3.6F (tebuconazole)	6 fl oz	24 fl oz	3	0.5		
3		TebuStar 3.6L (tebuconazole)	6 fl oz	24 fl oz	3	0.5		
3		TebuZol 3.6F (tebuconazole)	6 fl oz	24 fl oz	3	0.5		
3		Toledo (tebuconazole)	6 fl oz	24 fl oz	3	0.5		

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3	Topguard (tebuconazole)	14 fl oz	56 fl oz	0	0.5	
	3	Willowood Teb 3.6SC (tebuconazole)	6 fl oz	24 fl oz	3	0.5	
	3	Rhyme Fungicide (flutriafol)	7 fl oz	28 fl oz	0	0.5	
	3	Topguard (flutriafol)	14 fl oz	56 fl oz	0	0.5	
	11 & 3	Quadris Top (azoxystrobin, difenoconazole)	14 fl oz	55.3 fl oz	0	0.5	Do not make 2 sequential applications.
	M5	Bravo Ultrex (chlorothalonil)	1.4 lb	10.9 lb	3	0.5	
	M5	Bravo Weather Stik (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Chloronil 720 (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Echo 720 (chlorothalonil)	1.5 pt	9.0 lb a.i. pt	3	0.5	
	M5	Equus 720 SST (chlorothalonil)	1.5 pt	12 pt	3	0.5	Do not apply at <7-day intervals.
	M5	Equus DF (chlorothalonil)	1.4 lb	10.9 lb	3	0.5	
	M5	Initiate 720 (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Orondis Opti B (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M2 & 3	Unicorn DF (sulfur, tebuconazole)	3.75 lb	15 lb	14	0.5	Do not mix with other DMI fungicides (Group 3).
	M5 & 27	Ariston (chlorothalonil, cymoxanil)	2.44 pt	18.1 pt	3	0.5	
	7 & 3	Luna Experience (fluopyram, tebuconazole)	12.8 fl oz	34 fl oz	3	0.5	Do not apply more than 2 sequential applications of Luna or any fungicide containing Group 7 or Group 3 before rotation with a fungicide of a different Group.
	7 & 3	Aprovia Top (benzovindiflupyr, difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	Do not make more than 2 sequential applications.
Phytophthora	4	Acquire (mefenoxam)	0.75 fl oz/100 lb seed			1	
	4	Allegiance FL (mefenoxam)	0.75 fl oz/100 lb seed			1	Seed treatment; do not use with other seed treatment products without previous experience.
	4	Metalaxyl 4.0 ST (mefenoxam)	0.5 fl oz/100 lb seed			1	Seed treatment
	4	Apron XL (mefenoxam)	0.64 fl oz/100 lb seed			2	Seed treatment only.
	11	Reason 500 SC (fenamidone)	8.2 fl oz	24.6 fl oz	14	0.5	Ground application only.
	21	Ranman (cyazofamid)	2.75 fl oz	16.75 fl oz	7	0.5	Do not exceed 6 applications per season. Rotate with dissimilar modes of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	22	Elumin (ethaboxam)	8 fl oz	16 fl oz	2	0.5	Do not apply at intervals of less than 14 days.
	40	Orondis Ultra B (mandipropamid)	8 fl oz	32 fl oz	1	0.5	Do not exceed 4 applications. Do not make more than 2 sequential applications. Do not exceed more than 33% of total foliar applications.
	40	Micora (mandipropamid)	8 fl oz	16 fl oz	1	4 hr	For suppression
	U15	Orondis Gold 200 (oxathiapripolin)	9.6 fl oz	38.6 fl oz	2	4 hr	Intended for use with Orondis Gold B (mefenoxam). See label for details. Do not exceed 4 applications. Do not use soil and foliar appl with oxathiapripolin during same season.
	U15	Orondis Ultra A (oxathiapripolin)	4.8 fl oz	19.2 fl oz	0	4 hr	Intended for use with Orondis Ultra B (mandipropamid). See label for details. Do not exceed 4 applications. Do not use soil and foliar application with oxathiapripolin during same season.
	U15	Orondis Opti A (oxathiapripolin)	4.8 fl oz	19.2 fl oz	0	4 hr	Intended for use with Orondis (oxathiapripolin). See label for details. Do not exceed 4 applications. Check plant-back restrictions.
	7 & 11	Pageant Instrinsic (pyraclostrobin, boscalid)	23 oz; 18 oz/100 gal			0.5	
	4 & 12	Spirato M 185 FS (metalaxyl, fludioxonil)	1.5 fl oz/100 lb seed			1	
	U15 & 40	Orondis Ultra (oxathiapripolin, mandipropamid)	8 fl oz	32 fl oz	7	4	Make no more than 2 sequential applications. Use either soil applications or foliar applications, but not both, for disease control.
Pod spot	M1	AmeriCOP 40 DF (copper hydroxide)	1.5 lb	13.1 lb	0	1 (GH) 2 (Field)	Minimum retreatment interval is 5 days
	M1	Champion++ (copper hydroxide)	1.75 lb	17.5 lb	0	2	
	M1	Kentan DF (copper hydroxide)	1.5 lb		0	2	
	M1	Kocide 2000 (copper hydroxide)	3 lb	15 lb	0	2	
	M1	Kocide 3000 (copper hydroxide)	1.75 lb	17.5 lb	0	2	
	M1	Nu-Cop 50 DF (copper hydroxide)	2.1 lb	10.5 lb	1	2	OMRI product
	M1	Previsto (copper hydroxide)	3 qt	69 qt		2	
	M1	Cueva (copper octanoate)	2 gal	6.7 gal	0	4 hr	
	M1	Kop-5 (copper sulfate pentahydrate)	32 fl oz	10.6 gal		2 (Field) 1 (GH)	
	M1	Mastercop (copper sulfate pentahydrate)	1.5 pt	9 pt	0	2	
	M1	Cuproxtat FL (basic copper sulfate)	3.0 pt	26.25 pt	0	2	
	M1 & M1	Badge SC Badge X2 (copper hydroxide, copper oxychloride)	1.8 pt	18.8 pt	0	1 (GH) 2 (Field)	OMRI product

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Powdery mildew	M1	AmeriCop 40 DF (copper hydroxide)	1.5 lb	13.1 lb	0	2 (Field) 1 (GH)	OMRI product
	M1	Champion++ (copper hydroxide)	1.75 lb	17.5 lb	0	2	
	M1	Kentan DF (copper hydroxide)	1.5 lb		0	2	
	M1	Kocide 2000 (copper hydroxide)	3 lb	15 lb	0	2	
	M1	Kocide 3000 (copper hydroxide)	1.75 lb	17.5 lb	0	2	
	M1	Nu-Cop 50 DF (copper hydroxide)	2.1 lb	10.5 lb	1	2	
	M1	Previsto (copper hydroxide)	3 qt	69 qt		2	
	M1	Cueva (copper octanoate)	2 gal	6.7 gal	0	4 hr	
	M1	Kop-5 (copper sulfate pentahydrate)	32 fl oz	10.6 gal		2 (Field) 1 (GH)	
	M1	Mastercop (copper sulfate pentahydrate)	1.5 pt	9 pt	0	2	
	M1	Cuproxat FL (basic copper sulfate)	3.0 pt	26.25 pt	0	2	
	M2	Cosavet DF (sulfur)	10 lb	-	-	1	May cause leaf burn if applied during high temperatures.
	M2	Micro Sulf (sulfur)	10 lb	-	-	1	
	M2	Microthiol-Dispers (sulfur)	10 lb	-	-	1	
	M2	Suffa (sulfur)	0.5 gal	-	-	1	
	M2	Thiolux (sulfur)	10 lb	-	-	1	
	M2	Sulfur 90W (sulfur)	20 lb	-	-	1	
	M5	Bravo Ultrex (chlorothalonil)	1.4 lb	10.9 lb	3	0.5	
	M5	Bravo Weather Stik (chlorothalonil)	1.5 pt	12 pt	3	0.5	
	M5	Chloronil 720 (chlorothalonil)	1.5 pt	12 pt	3	0.5	
M5	Echo 720 (chlorothalonil)	1.5 pt	9.0 lb a.i. pt	3	0.5		
M5	Equus 720 SST (chlorothalonil)	1.5 pt	12 pt	3	0.5	Do not apply at <7-day intervals.	
M5	Orondis Opti B (chlorothalonil)	1.5 pt	12 pt	3	0.5		
U6	Torino (cyflufenamid)	3.4 oz	10.2 oz	0	4 hr		
U8	Vivando (metrafenone)	15.4 fl oz	46.2 fl oz	0	0.5		

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3	Mettle 125ME (tetraconazole)	8 fl oz	16 fl oz	0	0.5	
	3	Rally (myclobutanol)	5 oz	1.25 lb	0	1	Do not exceed 4 applications per season.
	3	Rhyme Fungicide (flutriafol)	7 fl oz	28 fl oz	0	0.5	
	3	Topguard (flutriafol)	14 fl oz	56 fl oz	0	0.5	
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	
	11	Aframe (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Azoxystar (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	Do not apply more than 1 application of Azoxystar or other Group 11 fungicides before alternation with a non-Group 11 fungicide.
	11	Azoxyzone (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	AZteroid FC (azoxystrobin)	19.5 fl oz	77.5 fl oz	0	4 hr	
	11	Mazolin (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Quadris (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Satori Fungicide (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	Do not apply more than 1 application.
	11	Tetranban (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Trevo (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	11	Willowood Azoxy 25C (azoxystrobin)	15.5 fl oz	61.5 fl oz	0	4 hr	
	12	Emblem Spirato GHN (fludioxonil)	7 fl oz	28 fl oz	0	0.5	
	3 & 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	7	0.5	Do not apply more than 2 sequential applications.
	7 & 3	Aprovia Top (benzovindiflupyr, difenoconazole)	13.5 fl oz	53.6 fl oz	0	0.5	Do not apply more than 2 sequential applications.
	7 & 11	Luna Sensation (fluopyram, trifloxystrobin)	7.6 fl oz	27.1 fl oz	3	0.5	
	7 & 11	Pageant Intrinsic (pyraclastrobin, boscalid)	23 oz; 18 oz/100 gal			0.5	
	7 & 12	Miravis Prime (pydiflumetofen, fludioxonil)	11.4 fl oz	22.8 fl oz	0	0.5	Do not apply more than 2 sequential applications.
	M5 & 27	Ariston (chlorothalonil, cymoxanil)	2.44 pt	17.5 pt	3	0.5	
	11 & 3	Quadris Top (azoxystrobin + difenoconazole)	14 fl oz	55.3 fl oz	0	0.5	Do not make 2 consecutive applications.
	9 & 12	Switch 62.5WG (cyprodinil; fludioxonil)	14 oz	56 oz	0	0.5	After 2 applications, alternate with another fungicide with a different mode of action for 2 applications.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	M1 & M1	Badge SC Badge X2 (copper hydroxide, copper oxychloride)	1.8 pt	18.8 pt	0	1 (GH) 2 (Field)	OMRI product
Pythium damping-off	4	Acquire (mefenoxam)	0.75 fl oz/100 lb seed			1	Seed treatment; do not use with other seed treatment products without previous experience.
	4	Allegiance FL (mefenoxam)	0.75 fl oz/100 lb seed			1	Seed treatment.
	4	Metalaxyl 4.0 ST (mefenoxam)	0.5 fl oz/100 lb seed			1	Seed treatment only.
	4	Apron XL (mefenoxam)	0.64 fl oz/100 lb seed			2	
	4 & 12	Spirato M 185 FS (metalaxyl, fludioxonil)	1.5 fl oz/100 lb seed			1	

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Table 11. Parsley fungicides ordered by disease and then FRAC group according to their mode of action.

Pertinent Diseases or Fungicides	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Labels change frequently. Be sure to read a current product label before applying any chemical. Please refer to Chapter 19 for information on biopesticides including materials labeled for certified organic production.							
Alternaria	3	(propiconazole) Many brands available: Bumper41.8EC, Propi-star, Tilt, Topaz	4 fl oz	16 fl oz	14	0.5	Do not apply more than 2 sequential and 4 total applications.
	3	Procure 480SC (triflumizole)	8 fl oz	18 fl oz	0	0.5	Repeat applications at 14 day intervals.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	7	0.5	Do not apply more than 4 applications per year.
	3 & 11	Topguard EQ (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	3	0.5	
	7	Endura (boscalid)	9 oz	18 oz	14	0.5	Do not make more than 2 applications without rotating to a fungicide of dissimilar mode of action.
	7 & 11	Merivon Xenium (pyraclostrobin + fluxapyroxad)	11 fl oz	33 fl oz	1	0.5	Alternate with fungicides with dissimilar modes of action.
	7 & 12	Miravis Prime (pydiflumetofen, fludioxonil)	13.4 fl oz	36.5 fl oz	0	0.5	No more than 2 sequential applications without moving to dissimilar mode of action.
	9 & 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
Bacterial blight	M1	(copper compounds) Many brands available: Badge SC, Badge X2, Basic Copper 53, C-O-C-S WDG, Champ DP, Champ WG, Champ Formula 2, Champ WP, COC DF, COC WP, Copper Count N, Cueva, Cuprofix Ultra, Cuproxat, Kentan DF, Kocide 2000, Kocide 3000, Kocide 4.5 LF, Kup-hydroxide, Nordox 75 WG, NuCop 50WP, NuCop 3L, NuCop HB, NuCop DF, Stretch	SEE INDIVIDUAL LABELS		1	Varies by product from 4 hr to 2 days	

Pertinent Diseases or Fungicides	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Basal rot & Botrytis	12	Cannonball WP (fludioxonil)	7 oz	28 oz	0	0.5	
	3	Bumper 41.8EC (propiconazole)	4 fl oz	16 fl oz	14	0.5	Do not apply more than 2 sequential applications without alternating to different mode of action.
Cercospora	7 & 11	Merivon Xenium (pyraclostrobin + fluxapyroxad)	11 fl oz	33 fl oz	1	0.5	Alternate with fungicides with dissimilar modes of action.
	33	Aliette WDG Legion 80WDG Linebacker WDG (fosetyl-Al)	5 lb	35 lb		0.5	
Downy mildew	11 & 27	Tanos (cymoxanil + famoxadone)	10 oz	48 oz	1	0.5	Must be tank-mixed with appropriate contact fungicide with different mode of action. Do not make more than 1 application without rotating to a fungicide of dissimilar mode of action.
	21	Ranman (cyazofamid)	2.75 fl oz	16.5 fl oz	0	0.5	Alternate with fungicides with dissimilar modes of action.
	33	(mono- and dipotassium salts of phosphorous acid) Many brands available: Alude, Fosphite, Fungi-phite, K-phite, Phiticide, Phostrol, Rampart, Reveille	SEE INDIVIDUAL LABELS		0	0.5	See label for details.
	40	Forum (dimethomorph)	6 fl oz	18 fl oz	0	0.5	See label for details.
	40	Revus (mandipropamid)	8 fl oz	32 fl oz	1	4 hr	Do not exceed 2 sequential applications. See label for soil applications.
	40 + 45	Zampro (mandipropamid)	14 fl oz	42 fl oz	1	4 hr	Do not exceed 2 sequential applications.
	43	Presidio (flupicolide)	3-4 fl oz	12 fl oz	2	0.5	Must be tank-mixed with a fungicide of different mode of action. Do not exceed two sequential applications. See label for soil applications.
	U15	Orondis Gold 200 (oxathiapiprolin)	9.6 fl oz	19.2 fl oz	0	4 hr	Soil application only.
Powdery mildew	U15	Orondis Ultra (mandipropamid + oxathiapiprolin)	4.8 fl oz	19.2 fl oz	0	4 hr	Do not make foliar applications with Orondis Ultra if Orondis Gold was applied using soil applications. Do not make more than 2 sequential applications, and do not exceed more than 33% of all fungicide applications with Orondis.
	M2	(sulfur) Many brands available: Sulfur 90W, Super Six, Top Cop w/ Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not apply during periods of warm weather. Do not apply within 2 weeks of an oil spray.
	3	Bumper 41.8EC (propiconazole)	4 fl oz	16 fl oz	14	0.5	Do not apply more than 2 sequential applications without alternating to different mode of action.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	7	0.5	Do not apply more than 4 applications per year.
	3	Tilt (propiconazole)	4 fl oz	16 fl oz	14	0.5	Do not exceed 2 sequential and 4 total applications.
	3	Procur 480SC (triflumizole)	8 fl oz	18 fl oz	0	0.5	Repeat applications at 14 day intervals.
	3	Trionic (triflumizole)	8 fl oz	16 fl oz	0	0.5	No more than 2 applications, spaced by at least 14 days.
	3 & 11	Topguard EQ (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.

Pertinent Diseases or Fungicides	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Pythium damping-off; Pythium seedling blight; Pythium seedling diseases	7	Endura (boscalid)	9 oz	18 oz	14	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 & 11	Merivon Xemium (pyraclostrobin + fluxapyroxad)	11 fl oz	33 fl oz	1	0.5	Alternate with fungicides with dissimilar modes of action.
	7 & 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	15.3 fl oz	0	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
	7 & 12	Miravis Prime (pydiflumetofen; fludioxonil)	13.4 fl oz	36.5 fl oz	0	0.5	No more than 2 sequential applications without moving to dissimilar mode of action.
	9 & 12	Switch 62.5WDG (cyprodinil + fludioxonil)	14 oz	56 oz	7	0.5	
	4	(metalaxy)	0.75 fl oz/100 lb seed			2	Seed treatment only.
	4	Various brands available: Acquire, Allegiance, Sebring 2.65ST	0.64 fl oz/100 lb seed			2	Seed treatment only.
	4	Apron XL (mefenoxam)	2 pt			2	Apply at seeding in a 7"–12" band on soil over seed furrow.
	4	Ridomil Gold EC (mefenoxam)	40 lb			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	4	Ridomil Gold GR (mefenoxam)	4 pt			2	See label for specifics regarding preplant incorporated applications and surface applications at the time of planting.
	4	Ultra Flourish (mefenoxam)	4 fl oz	16 fl oz	14	0.5	Do not exceed 2 sequential and 4 total applications.
	Septoria	3	Tilt (propiconazole)	7 fl oz	28 fl oz	7	0.5
3		Rhyme (flutriafol)	8 fl oz	32 fl oz	7	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
3 & 11		Topguard EQ (flutriafol + azoxystrobin)	24 fl oz	72 fl oz	3	0.5	
7		Fontelis (penthiopyrad)	5.5 fl oz	16.5 fl oz	7		Limit is 3 applications per season, and no more than 2 sequential applications without alternating to a different mode of action.
7 & 11		Merivon Xemium (pyraclostrobin + fluxapyroxad)	7.6 fl oz	15.3 fl oz	0	0.5	Do not make more than 2 sequential applications without rotating to a fungicide of dissimilar mode of action.
7 & 12		Miravis Prime (pydiflumetofen; fludioxonil)	13.4 fl oz	36.5 fl oz	0	0.5	No more than 2 sequential applications without moving to dissimilar mode of action.
11		Cabrio EG (pyraclostrobin)	16 oz	64 oz	0	0.5	Do not exceed 1 sequential and 4 total applications of QoI fungicides.
11		(azoxystrobin)	15.4 fl oz or 0.8 fl oz/1000 row ft	92.3 fl oz	0	4 hr	Do not exceed 1 sequential and 4 total applications of QoI fungicides. See label for soil applications.
11		Reason (fenamidone)	8.2 fl oz	24.6 fl oz	2	0.5	Alternate every other application with a fungicide of dissimilar mode of action.
12		Maxim 4FS (fludioxonil)	0.16 fl oz/100 lb of seed			0.5	Seed treatment only.

Pertinent Diseases or Fungicides	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	4 & 11	Uniform (mefenoxam + azoxystrobin)	0.34 fl oz/1000 row ft	1 appl.		0	Soil incorporated.

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Table 12. Nonfumigant nematocides for celery crops in Florida.

Application Directions	
Product	
Nimitz (a.i. fluensulfone)	All applications must be incorporated either physically or via drip or overhead irrigation. Make preplant applications at a rate of 3.5 to 7 pints, (56.0 to 80.0 fl oz) per acre, a minimum of seven days before planting. Do not plant any unlisted crops into treated land for 365 days after application of the product. Do not apply more than one application per crop, and no more than 112 fl oz of product per acre, per year (365 days). Provides control only for nematodes. Growers applying Nimitz must consult the product label to observe the plant-back (recropping) intervals for a variety of leafy vegetables and brassica crops, onions, bananas, sugarcane, and other crops.
Vydate L (a.i. oxamyl)	Apply ½ to 1 gal/acre at planting, preferably via drip application. Make additional applications on a 10-to-14-day interval. Do not apply more than 2 gal per acre per season. Minimum retreatment interval is 7 days unless a longer interval is stated. If an at plant application of more than ½ gal/acre is made, do not make more than 2 additional applications