

Chapter 16. Strawberry Production¹

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Botany and Planting

Strawberry—*Fragaria ×ananassa*, Rosaceae.

Table 1. Planting information for strawberries.

Planting Dates	
North Florida	Sept 15–Oct 15
Central Florida	Sept 25–Oct 25
South Florida	Oct 1–Nov 1
Planting Information (2-Row Beds)	
Number of plant rows per bed	2
Distance between beds (in)	48–60
Distance between plants within a row (in)	12–16
Distance between plant rows (in)	12–14
Days to first ripe fruit	25–50
Plant populations (acre)	16,000–22,000

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Use pesticides safely. Read and follow directions on the manufacturer's label.

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Cultivars

Main Cultivars

Florida Brilliance. Released in 2017. Highest early yield of all varieties; large fruit size; uniform conic to broad-conic shape; very firm with excellent shelf life; externally very glossy red; light red internally; moderately resistant to rain damage; balanced flavor. The plant is robust but not overly vigorous; is upright with long stems, allowing ease of harvest; and does not require high N applications as Florida Medallion™ ‘FL 16.30-128’ does. Fruit can develop weak skin during hot periods in mid-late season, and both N rates and irrigation volumes should be reduced to counteract this possible problem. Recommended planting dates in central Florida are Oct. 5–15. Resistant to anthracnose fruit rot; moderately resistant to powdery mildew and charcoal rot; moderately susceptible to Botrytis fruit rot, angular leaf spot, and Colletotrichum crown rot; susceptible to Phytophthora root rot.

Sweet Sensation® Florida127. Released in 2013. Large fruit size; moderately uniform conic to broad-conic fruit; bright-red with lighter color than other cultivars. During cool weather a longer interval between harvests compared to other cultivars is usually necessary to allow optimum color development. Exceptional flavor throughout season; 1.0 to 1.5 degree Brix higher and slightly lower acidity than ‘Florida Brilliance’; susceptible to rain damage. The plant is vigorous, which may be an advantage in north Florida but in central Florida will require reduced nutrient applications early in the season and/or later planting dates to maintain a small plant size. Recommended planting dates in central Florida are Oct. 15–25. Resistant to anthracnose fruit rot and Colletotrichum crown rot; moderately resistant to charcoal rot (caused by *Macrophomina phaseolina*); moderately susceptible to angular leaf spot; susceptible to Botrytis fruit rot and powdery mildew (caused by *Podosphaera aphanis*); highly susceptible to Phytophthora root rot. Ridomil and phosphite applications are highly recommended.

Florida Medallion™ ‘FL 16.30-128’. Released in 2020. Medium size; extremely uniform, conic fruit with glossy appearance; glossy-red external color and medium-red internal color; moderately acidic and high brix like or even more so than Sweet Sensation® ‘Florida127’; moderately firm with good shipping quality. Low to medium plant vigor with upright canopy; N rates higher than for ‘Florida Brilliance’ will be required for optimum plant growth. Recommended planting dates in central Florida are Oct. 1–10 due to a compact plant and low runner production. Moderately susceptible to Colletotrichum crown rot and angular leaf spot; susceptible to Botrytis fruit rot and

powdery mildew; highly susceptible to Phytophthora root rot and charcoal rot.

Minor Cultivars

Florida Pearl® ‘109’ and ‘66’. Released in 2020, the ‘109’ was the first white-fruited strawberry or “pineberry” released by UF/IFAS. It is the result of hybridization between descendants of Japanese white strawberries, the source of its unique color, and red Florida strawberries, the source of its yield, disease resistance, and other commercial production qualities. It has a pure white internal color and a white external base color with red seeds and a pink blush when ripe. It has a distinctive low-acid flavor and often has aromatic notes similar to those of pineapple or apricot. Fruit have moderate gloss and are uniform, conic, and less firm than red varieties. Fertilization rates should be similar to those of ‘Florida Brilliance’. Recommended planting dates in central Florida are Oct. 10–20. It has moderate resistance to most diseases. The ‘66’ was released in 2022 with improved early yield and firmness over the ‘109’. It otherwise has similar management needs. It also has a good disease resistance profile with few weaknesses and is tolerant to diseases caused by *Neopestalotiopsis* sp.

The following tables list registered pesticides that should be integrated with other pest management methods. Additional information on integrated management methods can be requested from UF/IFAS Extension horticulture or agriculture agents. A list of local UF/IFAS Extension offices is available at <https://sfyl.ifas.ufl.edu/find-your-local-office/>.

Table 2. Herbicides approved for managing weeds in strawberry. Contact: Nathan S. Boyd, UF/IFAS Gulf Coast Research and Education Center.

Active Ingredient lb a.i./Acre	Trade Name Product/Acre	MOA Code	Weeds Controlled/Remarks
Labels change frequently. Be sure to read a current product label before applying any chemical.			
PRETRANSPLANT			
Acifluorfen up to 0.375	(Ultra Blazer) 1.5 pt	14	Broadleaves. May be applied under the plastic mulch or with a shielded or hooded spray directed to row middles. 60-day PHI.
Carfentrazone up to 0.031	(Aim) 2.0 EC up to 2 fl oz	14	Broadleaves. Apply as a preplant burndown for emerged broadleaves up to 4 inches tall or rosettes less than 3 inches across. Good coverage is essential. A nonionic surfactant, methylated seed oil, or crop oil concentrate is recommended. No pretransplant interval.
DCPA 9	Dacthal W-75 12 lb	3	Broadleaves and some grasses. Apply to formed beds prior to laying the plastic mulch or to row middles. Preplant incorporation is recommended.
Flumioxazin 0.1	(Chateau) SW 3 oz	14	Broadleaves. May be applied under the plastic mulch or with a shielded or hooded spray directed to row middles before weed emergence. 30-day pretransplant interval if applied under the plastic mulch. Do not apply after fruit set.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaves and grasses. Apply as a preplant burndown. Consult label for individual product directions.
Napropamide 4	(Devrinol) 2-XT 1–2 gallons (Devrinol DF XT) 4–8 lb	15	Annual broadleaves and grasses. Apply under the plastic and in the row middles. Mechanically incorporate in the row middle to a 1–2 in. depth within 24 hours of application. When applied under plastic, incorporate mechanically or with irrigation. Do not apply between bloom and harvest.
Oxyfluorfen 0.25–0.5	(Galigan H2O, GoalTender) 4 EC 0.5–1.0 pt (Collide, Goal 2XL) 2 EC 1–2 pt	14	Broadleaves. Apply pretransplant just prior to installation of plastic mulch. 30-day pretransplant interval. Mulch may be applied any time during the 30-day interval.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaves and grasses. Apply as a preplant burndown treatment or post-transplant with shielded or hooded sprayers. Product is a contact, nonselective, foliar-applied herbicide with no residual control.
Pendimethalin 0.72	(Prowl H2O) 3.8 1.5 pt	3	Broadleaves and grasses, in the row middles. Do not apply under the plastic. In systems that use irrigation at planting, delay application until after irrigation regime. 35-day PHI.
S-metolachlor 0.64–1.27	Dual Magnum 0.67–1.33 pt	15	Broadleaves, grasses and nutsedge suppression. Apply to row middles using a shielded applicator pre- and posttransplant. Label is a 24(C) local indemnified label and a waiver of liability must be signed for use. 30-day PHI.
Sulfentrazone 0.125	(Spartan FL) 4F 4 oz	14	Broadleaves, grasses, and nutsedge species. Apply under the plastic mulch or in row middles. Do not use on soils with less than 1% organic matter.
Terbacil 0.2	(Sinbar WDG) 80 WDG 4 oz	3	Broadleaves, grasses, and some sedges. One application per crop of 4 oz/A after bedding but prior to transplanting. Rainfall or irrigation required. Do not apply to soils with less than 0.5% organic matter. 110-day PHI.
POSTTRANSPLANT			
Acifluorfen up to 0.375	(Ultra Blazer) 1.5 pt	14	Broadleaves. Apply directed to the row middles with a shielded or hooded sprayer. Do not allow to contact strawberry plants. 60-day PHI.
Carfentrazone up to 0.031	(Aim) 2.0 EC up to 2 fl oz	14	Broadleaves. Apply with hooded applicator directed to the row middles for control of emerged broadleaves up to 4 inches tall or rosettes less than 3 inches across. Good coverage is essential. A nonionic surfactant, methylated seed oil, or crop oil concentrate is recommended. 0-day PHI.
Clethodim 0.09–0.13 0.07–0.13	(Arrow, Select) 2 EC 6–8 fl oz (Select Max) 1 EC 9–16 fl oz	1	Perennial and annual grasses. Use higher rates under heavy grass pressure or larger weeds. Surfactant or crop oil concentrate recommended. Consult label. 4-day PHI.
Clopyralid 0.125–0.25	(Stinger) 3 EC 0.33–0.66 pt	4	Broadleaves. Do not exceed 2/3 pt/A per year. Do not include a surfactant. 7-day PHI.

DCPA 9	Dacthal W-75 12 lb	3	Broadleaves and some grasses. Apply to row middles with shielded applicator. Do not apply after first bloom.
Fluazifop-P-butyl 0.25	Fusilade DX 16 fl oz	1	Supplemental label. Emerged annual and perennial grasses. Most effective on young, actively growing grasses. Do not apply more than 1 application per year. 14-day PHI.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaves, grasses, and nutsedge. Apply directed to the row middles. Injury has been observed from translocation from daughter plants in the row middle to the mother plants. 14-day PHI. Spot treatment has 7-day PHI.
Paraquat 0.5	(Gramoxone) 2 SL 2 pt (Firestorm) 3 SL 1.3 pt	22	Emerged broadleaves and grasses. Apply as a directed spray to row middles only. Do not allow spray to contact plants. Do not apply more than 3 times per season. Nonionic surfactant recommended. 21-day PHI. Consult label for new restrictions.
Pelargonic acid	(Scythe) 4.2 EC 3%–10% v/v	27	Emerged broadleaves and grasses. Apply as a preplant burndown treatment or posttransplant with shielded or hooded sprayers. Product is a contact, nonselective, foliar-applied herbicide with no residual control.
Sethoxydim 0.28–0.47	(Poast) 1.5 EC 1.5–2.5 pt	1	Emerged grasses. A maximum of 2.5 pt/A applied in one season. Unsatisfactory results may occur if applied to grasses under stress. Crop oil concentrate recommended. 7-day PHI.
S-metolachlor 0.64–1.27	Dual Magnum 0.67–1.33 pt	15	Broadleaves, grasses and nutsedge suppression. Apply to row middles using a shielded applicator posttransplant. Label is a 24(C) local indemnified label and a waiver of liability must be signed for use. 30-day PHI.
POSTHARVEST			
Paraquat 0.49	(Gramoxone) 2 SL 1.95 pt	22	Broadcast spray over the top of the plants after the last harvest. Thorough coverage is required to ensure maximum herbicide burndown. Do not use treated crop for human or animal consumption. Nonionic surfactant recommended. Consult label for new restrictions.

Table 3. Selected insecticides approved for managing insect pests of strawberry. Contact: Sriyanka Lahiri, UF/IFAS Gulf Coast Research and Education Center.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
Ants	7A	Extinguish Professional Fire Ant Bait (S-methoprene)	See label		4	0	
	7C	Esteem Ant Bait (pyriproxyfen)	1.5–2.0 lb		12	1	
Aphids	1B	Diazinon 50W, AG600 WBC (diazinon)	50W: 1 lb AG600 WBC: 12.75 fl oz	Make a maximum of one foliar application per crop and one soil application per crop.	3 days	5	Highly toxic to bees.
	1B	Dibrom 8-E* (naled)	1 pint	Do not apply more than 5 pints per season.	48	1	Do not make more than 5 applications per season. Allow minimum of 7 days between applications.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pints 8F: 1.5–2.0 pints	8F: Do not apply more than 8 pints/A per year	12	3	Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A per season.	12	0	
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0–16.0 fl oz		12	0	Do not make applications less than 7 days apart. Do not make more than 10 applications in a season.
	3A	PyGanic EC 5.0 (pyrethrins)	See label		12	0	OMRI approved.
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A per season.	12	7	Do not make applications less than 5 days apart.
3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more 68 fl oz in a growing season after transplanting.	12	3	Make 2 applications 7–10 days apart. If further applications are needed, wait 21 days after the second application before repeating sequence of two applications. Do not make more than 4 applications per growing season. Do not make more than 2 applications per season. Do not apply more than once every 7 days.	
3A + -	Azera Insecticide (azadirachtin + pyrethrins)	3.5 pints/A	Do not apply more than 10 times per season.	4	0	OMRI approved. Repeat applications as required but not more than 5–7 days apart.	

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.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	4A	Actara (thiamethoxam)	1.5–4.0 oz	Do not exceed a total of 12 oz/A (0.188 lb a.i./A) of Actara or 0.188 lb a.i. of thiamethoxam-containing products per acre per growing season.	12	3	Minimum interval between applications is 10 days. Do not use Actara in nurseries, greenhouses, plant propagation houses, or on any plants grown for use as transplants. Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Do not apply more than 14.0 fl oz/A for soil and 3.9 fl oz/A for foliar applications per season.	12	Soil: 14 Foliar: 5	Soil applications may be made as chemigation, as a plant hole treatment, or as a band spray over the row followed by overhead irrigation. Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	4A	Platinum 75 SG (thiamethoxam)	1.7–4.01 oz	Do not exceed 4.01 oz/A per growing season.	12	50	
	4A + 15	Cormoran (acetamiprid + novaluron)	9.0–12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	2.0–5.0 oz	Do not exceed 15.0 oz/A per growing season.	12	3	Application restrictions exist for this product because of the risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators.
	4D	Sivanto Prime (flupyradifurone)	7.0–10.5 fl oz	Maximum allowed per year is 28.0 fl oz/A.	4	0	10-day minimum interval between applications.
	6	Timectin 0.15 EC Ag (abamectin)	16.0 fl oz	Do not apply more than 16 fl oz/A per application and more than 64 fl oz/A per season.	12	3	Highly toxic to fish, mammals, and aquatic organisms. Allow a minimum of 7–10 days between applications.
	29	Beleaf 50 SG (flonicamid)	2.8 oz	Do not apply more than 8.4 oz/A Beleaf 50 SG per year.	12	0	Do not apply more than 3 applications per year. Allow a minimum of 7 days between applications.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	-	Aza-Direct (azadirachtin)	See label; 1–2 pints for most pests and crop conditions. Add 3.5 pints/A under severe pest pressure.		4	0	OMRI approved. Agitation is necessary, and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	M-Pede (potassium salts of fatty acids)	See label.		12	0	OMRI approved.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	OMRI approved.
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI approved.
	-	SuffOil-X (unsulfonated residue of petroleum oil)	1–2 gallons		4	0	OMRI approved.
	-	Trilogy (neem oil)	0.5%–2%		4	0	OMRI approved. Avoid tank mixes with captan, sulfur, or other chemically similar products.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 quarts		4	0	OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Armyworms (see also caterpillars)	1A	Carbaryl 4 L (carbaryl)	1–2 quarts	Do not apply more than a total of 10 quarts/A per crop per year.	12	7	Bee restriction: do not apply to target crops in bloom.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	1A	Sevin 4F, 80 Solupak (carbaryl)	4F: 1–2 quarts 80 Solupak: 1.25–2.5 lb	4F: Do not apply more than a total of 10 quarts/A per crop per year. 80 Solupak: Do not apply more than a total of 12.5 quarts/A per crop per year.	12	7	
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A per season.	12	0	
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	Do not apply more than 42.67 fl oz/A per year.	24	2	Do not apply more than twice a year to the same planting. May be tank-mixed with Dipel DF for armyworm control.
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0–16.0 fl oz		12	0	
	3A	PyGanic EC 5.0 (pyrethrins)	See label.		12	0	OMRI approved.
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A per season.	12	7	Do not make applications less than 5 days apart.
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz in a growing season after transplanting.	12	3	Make 2 applications 7–10 days apart. If further applications are needed, wait 21 days after the second application before repeating sequence of two applications. Do not make more than 4 applications per growing season. Do not make more than 2 applications per season. Do not apply more than once every 7 days.
	3A + -	Azera Insecticide (pyrethrins + azadirachtin)	3.5 pints/A	Do not apply more than 10 times per season	4	0	OMRI approved. Repeat applications as required but no more than 5-7 days apart.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	2.0–5.0 oz	Do not exceed 15.0 oz/A per growing season.	12	3	Application restrictions exist for this product because of the risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators.
	5	Entrust SC Naturalyte Insect Control (spinosad)	4.0–6.0 fl oz	Do not apply more than 18 fl oz/A/year.	4	1	OMRI approved. Do not make more than 3 applications in a year.
	5	Radiant SC (spinetoram)	6.0–10.0 fl oz	Do not apply more than a total of 39 fl oz/A per year.	4	1	
	11A	Agree WG (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i> strain GC-91)	0.5–2.0 lb		4	0	OMRI approved.
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb		4	0	OMRI approved.
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb		4	0	OMRI approved.
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb		4	0	For armyworm and cutworm control, use the higher rate. OMRI approved.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb		4	0	OMRI approved
	11A	Xentari (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb		4	0	For organic production.
	15	Rimon 0.83EC (novaluron)	9.0–12.0 fl oz	Do not apply more than 36 oz/A per season.	12	1	7-day minimum interval between applications.
	18	Intrepid 2F (methoxyfenozide)	6.0–12.0 fl oz	Do not apply more than 64 fl oz/A per year.	4	3	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	Do not apply more than 15.4 fl oz/A per crop.	4	1	Make no more than 4 applications/A per crop. Minimum interval between treatments is 7 days.
	28	Harvanta 50SL (cyclaniliprole)	10.9–16.4 fl oz	Do not apply more than 49.2 fl oz/A/year	4	1	Do not make more than 3 applications per year. Minimum interval between treatments is 5 days.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pints for most pests and crop conditions. Apply 3.5 pints/A under severe pest pressure.		4	0	OMRI approved. Agitation is necessary, and mixture should be applied within 8 hr. Check pH of water to be 5.5 – 6.5.
	-	Grandevo (Heat-killed <i>Chromobacterium subsugae</i> strain PRAA4-1 and spent fermentation media)	1–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	1–4 quarts		4	0	OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Beetles and weevils (including sap beetles) (see also grubs)	1B	*Govern 4E (chlorpyrifos)	See label.	Do not apply more than 2 quarts preplant/A per year or 2 quarts foliar/A per year.	24	21	Do not make more than 1 preplant or 2 foliar applications per year. Do not apply after berries form or when berries are present.
	1B	Lorsban 75WG (chlorpyrifos)	1.33–2.67 lb	Do not apply more than 2.67 lb/A per year.	24	21	Do not make more than 1 preplant or 2 foliar applications per year.
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A per season.	12	0	
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	Do not apply more than 42.67 fl oz/A per year.	24	2	Do not apply more than twice a year to the same planting. May be tank-mixed with Dipel DF for armyworm control.
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A per season.	12	7	Do not make applications less than 5 days apart.
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz in a growing season after transplanting.	12	3	Make 2 applications 7–10 days apart. If further applications are needed, wait 21 days after the second application before repeating sequence of two applications. Do not make more than 4 applications per growing season. Do not make more than 2 applications per season. Do not apply more than once every 7 days.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	3A +-	Azera Insecticide (pyrethrins + azadirachtin)	3.5 pints/A	Do not apply more than 10 times per season	4	0	OMRI approved. Repeat applications as required but no more than every 5-7 days.
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Do not apply more than 14.0 fl oz/A for soil and 3.9 fl oz/A for foliar applications per season.	12	Soil: 14 Foliar: 5	Soil applications may be made as chemigation, as a plant-hole treatment, or as a band spray over the row followed by overhead irrigation. Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	15	Rimon 0.83EC (novaluron)	9.0–12.0 fl oz	Do not apply more than 36 oz/A per season.	12	1	7-day minimum interval between applications.
	28	Harvanta 50SL (cyclaniliprole)	10.9–16.4 fl oz	Do not apply more than 49.2 fl oz/A/year	4	1	Do not make more than 3 applications per year. Minimum interval between treatments is 5 days.
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	Drench: 40–80 fl oz/100 gal Foliar: 0.5 pint–2 quarts		4	0	
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
Caterpillars (including budworms, earworms, leafrollers, leafleters, borers, and loopers) (see also armyworms)	1A	Carbaryl 4 L (carbaryl)	1–2 quarts	Do not apply more than a total of 10 quarts/A per crop per year.	12	7	Bee restriction: do not apply to target crops in bloom.
	1A	Sevin 4F, 80 Solupak (carbaryl)	4F: 1–2 quarts 80 Solupak: 1.25–2.5 lb	4F: Do not apply more than a total of 10 quarts/A per crop per year. 80 Solupak: Do not apply more than a total of 12.5 quarts/A per crop per year.	12	7	
	1B	Diazinon 50W, AG600 WBC (diazinon)	50W: 1–2 lb AG600 WBC: 12.75–25.5 fl oz	Make a maximum of one foliar application per crop and one soil application per crop.	3 days	5	
	1B	Dibrom 8-E* (naled)	1 pint	Do not apply more than 5 pints per season.	48	1	
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pints 8F: 1.5–2.0 pints	8F: Do not apply more than 8 pints/A per year.	12	3	Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	3A + -	Azera Insecticide (pyrethrins + azadirachtin)	3.5 pints/A	Do not apply more than 10 times per season	4	0	OMRI approved. Repeat applications as required but no more than every 5–7 days.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/ calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications
	5	Entrust SC Naturalyte Insect Control (spinosad)	4.0–6.0 fl oz	Do not apply more than 18 fl oz/A/year.	4	1	OMRI approved. Do not make more than 3 applications per year.
	5	Radiant SC (spinetoram)	6.0–10.0 fl oz	Do not apply more than a total of 39 fl oz/A per year.	4	1	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb		4	0	
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb		4	0	
	11A	DiPel DF (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb		4	0	For armyworm and cutworm control, use the higher rate.
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb		4	0	
	11A	Xentari (<i>Bacillus thuringiensis</i> subspecies <i>aizawai</i>)	0.5–2.0 lb		4	0	
	28	Harvanta 50SL (cyclaniliprole)	10.9–16.4 fl oz	Do not apply more than 49.2 fl oz/A/year	4	1	Do not make more than 3 applications per year. Minimum interval between treatments is 5 days.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation)	1–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	1–4 quarts		4	0	OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
Crickets and cockroaches	1A	Carbaryl 4 L (carbaryl)	1–2 quarts	Do not apply more than a total of 10 quarts/A per crop per year.	12	7	Bee restriction: do not apply to target crops in bloom.
	1B	Diazinon 50W, AG600 WBC (diazinon)	50W: 1–2 lb AG600 WBC: 12.75–25.5 fl oz	Make a maximum of one foliar application per crop and one soil application per crop.	3 days	5	
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pints 8F: 1.5–2.0 pints	8F: Do not apply more than 8 pints/A per year.	12	3	Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/ calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	15	Rimon 0.83EC (novaluron)	9.0–12.0 fl oz	Do not apply more than 36 oz/A per season.	12	1	7-day minimum interval between applications.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pints for most pests and crop conditions. Apply 3.5 pints/A under severe pest pressure.		4	0	OMRI approved. Agitation is necessary and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
Fruit fly (vinegar fly) and spotted wing drosophila	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A per season.	12	0	
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	Do not apply more than 42.67 fl oz/A per year.	24	2	Do not apply more than twice a year to the same planting.
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0–16.0 fl oz		12	0	
	3A	PyGanic EC 5.0 (pyrethrins)	See label.		12	0	OMRI approved.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	4A	Actara (thiamethoxam)	1.5–4.0 oz	Do not exceed a total of 12 oz/A (0.188 lb a.i./A) of Actara or 0.188 lb a.i. of thiamethoxam-containing products per acre per growing season.	12	3	Minimum interval between applications is 10 days. Do not use Actara in nurseries, greenhouses, plant propagation houses, or on any plants grown for use as transplants. Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Do not apply more than 14.0 fl oz/A for soil and 3.9 fl oz/A for foliar applications per season.	12	Soil: 14 Foliar: 5	Soil applications may be made as chemigation, as a plant-hole treatment or as a band spray over the row followed by overhead irrigation. Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz		12	1	For control of spotted wing drosophila.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pints for most pests and crop conditions. Apply 3.5 pints/A under severe pest pressure. 2–3 lb		4	0	OMRI approved. Agitation is necessary and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)			4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2-4 quarts		4	0	OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Grubs (see also beetles)	1B	*Govern 4E (chlorpyrifos)	See label.	Do not apply more than 2 quarts preplant/A per year or 2 quarts foliar/A per year.	24	21	Do not make more than 1 preplant or 2 foliar applications per year. Do not apply after berries form or when berries are present.
	1B	Lorsban 75WG (chlorpyrifos)	1.33-2.67 lb	Do not apply more than 2.67 lb/A per year.	24	21	Do not make more than 1 preplant or 2 foliar applications per year.
	3A + 6	Athena (bifenthrin + avermectin B1)	8.5-17.0 fl oz at plant	Do not apply more than 68 fl oz in a growing season after transplanting.	12	3	
	4A	Admire Pro (imidacloprid)	Soil: 10.5-14 fl oz Foliar: 1.3 fl oz	Do not apply more than 14.0 fl oz/A for soil and 3.9 fl oz/A for foliar applications per season.	12	Soil: 14 Foliar: 5	Soil applications may be made as chemigation, as a plant-hole treatment or as a band spray over the row followed by overhead irrigation. Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.
	4A	Platinum 75 SG (thiamethoxam)	1.7-4.01 oz	Do not exceed 4.01 oz/A per growing season.	12	50	
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GHA)	0.25-1 quart		4	0	Apply in sufficient water to cover foliage, typically 5-100 gallons per acre.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25-1 quart		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5-100 gallons per acre.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
Mites (including two-spotted spider mite, strawberry spider mite, carmine spider mite, cyclamen mite, broad mite)	1B	Diazinon 50W, AG600 WBC (diazinon)	50W: 1–2 lb AG600 WBC: 12.75–25.5 fl oz	Make a maximum of one foliar application per crop and one soil application per crop.	3 days	5	
	1B	Dibrom 8-E* (naled)	1 pint	Do not apply more than 5 pints per season.	48	1	Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pints 8F: 1.5–2.0 pints	8F: Do not apply more than 8 pints/A per year.	12	3	Make 2 applications 7–10 days apart. If further applications are needed, wait 21 days after the second application before repeating sequence of two applications. Do not make more than 4 applications per growing season. Do not make more than 2 applications per season. Do not apply more than once every 7 days.
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A per season.	12	0	Do not apply more than twice a year to the same planting. May be tank-mixed with Dipel DF for armyworm control.
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	Do not apply more than 42.67 fl oz/A per year.	24	2	
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz in a growing season after transplanting.	12	3	
	6	Agri-Mek 0.15 EC*, SC* (abamectin)	0.15 EC: 16 oz SC: 3.5 fl oz	0.15 EC: Do not apply more than 64 fl oz/A (0.075 lb a.i./A) of Agri-Mek SC or any other foliar-applied abamectin-containing product in a growing season. SC: Do not apply more than 14 fl oz/A (0.075 lb a.i./A) of Agri-Mek SC or any other foliar-applied abamectin-containing product in a growing season.	12	3	Wait at least 21 days after second application before repeating application. Agri-Mek SC must be mixed with a surfactant approved for use on strawberries. Make 2 applications 7–10 days apart when mites first appear.
	10A	Onager Optek (hexythiazox)	6 oz	Do not apply more than 6 oz/A per year.	12	3	Do not make more than 1 application per season.
	10B	Zeal (etoxazole)	2–3 oz	Do not apply more than 3.0 oz/A per season.	12	1	Make no more than 4 applications per season.
	12B	*Vendex 50 WP (fenbutatin oxide)	1.5–2.0 lb	Apply no more than 4 lb/A per season.	48	1	Allow a minimum of 21 days between treatments. Do not make more than 2 applications per year.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	20B	Kanemite 15 SC (acequinocyl)	21.0–31.0 fl oz	Do not apply more than 62 fl oz/A per season.	12	1	Allow 14 days between applications.
	20D	Acramite 50 WS (bifenazate)	0.75–1.0 lb	Two applications allowed per season; 21 days minimum between applications.	12	1	Acramite is not systemic in action; therefore, complete coverage of both upper and lower leaf surfaces and of fruit is necessary for effective control.
	21A	Nexter (pyridaben)	7.5–17 oz	Do not make more than two applications per year. Allow 30 days between sequential applications.	12	10	
	21A	Portal (fenpyroximate)	2 pints	Do not apply more than 4.0 pints/A per crop cycle.	12	1	Do not make more than 2 applications per crop season. Allow a minimum of 14 days between applications.
	23	Oberon 25C (spiromesifen)	12.0–16.0 fl oz	Do not apply more than 48 fl oz/A per crop season.	12	3	Active against eggs, nymphs, and adults. Thorough coverage is necessary.
	25	Nealta (cyflumetofen)	13.7 fl oz	Do not apply more than 27.4 fl oz/A per season per crop.	12	1	Active against eggs, nymphs and adults. Thorough coverage is necessary. Do not make more than 2 applications per year. Allow a minimum of 14 days between applications.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pints for most pests and crop conditions. Apply 3.5 pints/A under severe pest pressure.		4	0	OMRI approved. Agitation is necessary and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.
	-	Grandevo (Heat-killed <i>Chromobacterium subsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	JMS Stylet Oil (paraffinic oil)	3 quarts/100 gal water		4	0	OMRI approved.
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	Drench: 40.0–80.0 fl oz/100 gal Foliar: 0.5 pint–2 quarts		4	0	
	-	M-Pede (potassium salts of fatty acids)	See label.		12	0	OMRI approved.
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)		1–2 lb	4	0	OMRI approved.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	-	SuffOil-X (unsulfonated residue of petroleum oil)	1–2 gallons		4	0	OMRI approved.
	-	Trilogy (neem oil)	0.5%–2%		4	0	OMRI approved. Avoid tank mixes with captan, sulfur, or other chemically similar products.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–3 lb		4	0	OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Plant bugs, including Lygus	1A	Carbaryl 4 L (carbaryl)	1–2 quarts	Do not apply more than a total of 10 quarts/A per crop per year.	12	7	
	1A	Sevin 4F, 80 Solupak (carbaryl)	4F: 1–2 quarts 80 Solupak: 1.25–2.5 lb	4F: Do not apply more than a total of 10 quarts/A per crop per year. 80 Solupak: Do not apply more than a total of 12.5 quarts/A per crop per year.	12	7	Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pints 8F: 1.5–2.0 pints	8F: Do not apply more than 8 pints/A per year.	12	3	Make 2 applications 7–10 days apart. If further applications are needed, wait 21 days after the second application before repeating sequence of two applications. Do not make more than 4 applications per growing season. Do not apply more than 2 applications per season. Do not apply more than once every 7 days.
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A per season.	12	0	Do not make applications less than 5 days apart.
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	Do not apply more than 42.67 fl oz/A per year.	24	2	
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0–16.0 fl oz		12	0	Allow a minimum of 7 days between applications. Do not make more than 10 applications per season.
	3A	PyGanic EC 5.0 (pyrethrins)	See label		12	0	OMRI approved. Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A per season.	12	7	Do not apply more than twice a year to the same planting. May be tank-mixed with Dipel DF for armyworm control.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz in a growing season after transplanting.	12	3	
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	7-day minimum interval between applications.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	4C	Transform WG (sulfoxaflor)	1.5–2.25 oz	Do not exceed 8.5 oz per season.	24	1	
	15	Rimon 0.83EC (novaluron)	9–12 fl oz	Do not apply more than 36 oz/A per season.	12	1	Do not apply more than 3 applications per year. Allow a minimum of 7 days between applications.
	29	Beleaf 50 SG (flonicamid)	2.8 oz	Do not apply more than 8.4 oz/A Beleaf 50 SG per year.	12	0	Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Grandevo (Heat-killed <i>Chromobacterium subtugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	Bee restriction: do not apply to target crops in bloom.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2-4 quarts		4	0	Can be used in organic production. OMRI-listed. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Thrips (including flower thrips, chilli thrips)	1B	Dibrom 8-E* (naled)	1 pint	Do not apply more than 5 pints per season.	48	1	Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5-3.2 pints 8F: 1.5-2.0 pints	8F: Do not apply more than 8 pints/A per year.	12	3	
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0-16.0 fl oz		12	0	
	3A	PyGanic EC 5.0 (pyrethrins)	See label.		12	0	OMRI approved. Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	3A +-	Azera Insecticide (pyrethrins + azadirachtin)	3.5 pints/A	Do not apply more than 10 times per season.	4	0	OMRI approved. Repeat application as required but not more than every 5-7 days.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9-6.9 oz 70 WP: 0.8-3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	OMRI approved. Do not make applications less than 5 days apart except for thrips.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/ calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	4C	Closer SC (sulfoxaflor)	4.5 oz	Do not apply more than 17 oz per year.	12	1	Highly toxic to bees! Suppression only. Do not make more than 4 applications per year. Minimum interval between applications is 7 days.
	4C	Transform WG (sulfoxaflor)	2.25 oz	Do not exceed 8.5 oz per season.	24	1	
	4D	Sivanto Prime (flupyradifurone)	14 oz	Do not apply more than 28 oz/A per year.	4	0	Minimum interval between applications is 10 days.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	5	Entrust SC Naturalyte Insect Control (spinosad)	4.0–6.0 fl oz	Do not apply more than 18 fl oz/A/year.	4	1	OMRI approved. Do not make more than 3 applications a year.
	5	Radiant SC (spinetoram)	6.0–10.0 fl oz	Do not apply more than a total of 39 fl oz/A per year.	4	1	Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	6	Timectin 0.15 EC Ag (abamectin)	16.0 fl oz	Do not apply more than 16 fl oz/A per application and 64 fl oz/A per season.	12	3	Highly toxic to fish, mammals and aquatic organisms. Minimum interval of 7–10 days required between applications.
	6 + 28	Minecto Pro (abamectin + cyantraniliprole)	10.0 fl oz	Do not apply more than 40 fl oz/A per year.	12	3	Toxic to fish, mammals, and aquatic organisms. Minimum application interval is 7 days.
	15	Rimon 0.83EC (novaluron)	6.0–12.0 fl oz	Do not apply more than 36 fl oz/A per year.	12	1	Minimum interval between applications is 7 days. Apply when thrips populations begin to build.
	21A	Apta (tolfenpyrad)	27.0 fl oz	Do not apply more than 81.0 fl oz/A per year.	12	1	Do not make more than 3 applications per year. Minimum interval between applications is 7 days.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz		12	1	The label for this product contains warnings for the protection of pollinators.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pints for most pests and crop conditions. Apply 3.5 pints/A under severe pest pressure.		4	0	OMRI approved. Agitation is necessary, and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	
	-	Captiva Prime (capsicum oleoresin extract + garlic oil + canola oil)	1–2 pints	Spray every 4–7 days for preventative management.	4	0	OMRI approved.
	-	Grandevo (Heat-killed <i>Chromobacterium subsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	Drench: 40–80 fl oz/100 gal Foliar: 0.5 pint–2 quarts		4	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	OMRI approved.
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI approved.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 quarts		4	0	Can be used in organic production. OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Whiteflies	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pints 8F: 1.5–2.0 pints	8F: Do not apply more than 8 pints/A per year.	12	3	Make 2 applications 7–10 days apart. If further applications are needed, wait 21 days after the second application before repeating sequence of two applications. Do not make more than 4 applications per growing season. Do not make more than 2 applications per season. Do not apply more than once every 7 days.
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0–16.0 fl oz		12	0	
	3A	PyGanic EC 5.0 (pyrethrins)	See label.	Do not apply more than 10 times per season.	12	0	OMRI approved.
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A per season.	12	7	
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz in a growing season after transplanting.	12	3	
	3A + -	Azera Insecticide (pyrethrins + azadirachtin)	3.5 pints	Do not apply more than 10 times per season.	4	0	OMRI approved. Do not make applications less than 5–7 days apart.
	4A	Actara (thiamethoxam)	3.0–4.0 oz	Do not exceed a total of 12 oz/A (0.188 lb a.i./A) of Actara or 0.188 lb a.i. of thiamethoxam-containing products per acre per growing season.	12	3	Application restrictions exist for this product because of risk to bees and other insect pollinators. Follow application restrictions found in directions for use to protect pollinators.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Do not apply more than 14.0 fl oz/A for soil and 3.9 fl oz/A for foliar applications per season.	12	Soil: 14 Foliar: 5	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: Do not exceed a total of 13.8 oz of Assail 30 SG/A during each growing season. 70 WP: Do not exceed a total of 6.0 oz Assail 70 WP/A per growing season.	12	1	
	4A	Platinum 75 SG (thiamethoxam)	1.7–4.01 oz	Do not exceed 4.01 oz/A per growing season.	12	50	Application restrictions exist for this product because of the risk to bees and other insect pollinators. Follow application restrictions found in the directions for use to protect pollinators.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb of IRAC Gp. 4A and 0.23 lb IRAC Gp. 15 products per acre/calendar year. Do not apply more than 35.0 fl oz of product per acre per season.	12	1	Allow a minimum of 7 days between applications.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	2.0–5.0 oz	Do not exceed 15.0 oz/A per growing season.	12	3	10-day minimum interval between applications.
	4D	Sivanto Prime (flupyradifurone)	7.0–14.0 fl oz	Maximum allowed per year is 28.0 fl oz/A.	4	0	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.
	7D	Esteem 0.86 EC (pyriproxyfen)	10.0 fl oz	Do not exceed 20 fl oz/A per season.	12	2	Do not make more than 2 applications per crop cycle. Allow at least 10 days between applications.
	16	Courier SC (buprofezin)	9.0–13.6 oz	Do not apply more than 27.2 fl oz/A per crop cycle.	12	3	Do not make more than 2 applications per crop cycle.
	21A	Portal (fenpyroximate)	2 pints	Do not apply more than 4.0 pints/A per crop cycle.	12	1	Do not make more than 3 applications per crop season.
	23	Oberon 25C (spiromesifen)	12.0–16.0 fl oz	Do not apply more than 48 fl oz/A per crop season.	12	3	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate (Product/Acre)	Rate per Season	REI (Hours)	Days to Harvest	Notes
	-	Aza-Direct (azadirachtin)	See label: 1–2 pints for most pests and crop conditions. Apply 3.5 pints/A under severe pest pressure.		4	0	OMRI approved. Agitation is necessary, and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI approved. Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	JMS Stylet Oil (paraffinic oil)	3 quarts/100 gal water		4	0	
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	Drench: 40.0–80.0 fl oz/100 gal Foliar: 0.5 pint–2 quarts		4	0	
	-	M-Pede (potassium salts of fatty acids)	See label.		12	0	OMRI approved. Apply in sufficient water to cover foliage, typically 5–100 gallons per acre.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 quart		4	0	
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	OMRI approved.
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI approved.
	-	SuffOil-X (unsulfonated residue of petroleum oil)	1–2 gallons		4	0	OMRI approved. Do not make more than 4 applications per year. Minimum retreatment interval is 7 days.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 quarts		4	0	OMRI approved. Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.

¹Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 10.2 March 2022. 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 the same number) indicate the 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.
²Information 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 4. Strawberry fungicides ordered by disease and then FRAC group according to their mode of action. Contact: Natalia Peres, UF/IFAS Gulf Coast Research and Education Center.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Angular leaf spot	M1	(copper compounds) Many brands available: AmeriCop 40 DF, Badge SC, Badge X2, Basic Copper 53, Champ DP Dry Prill, Champ Formula 2 Flowable, Champ WG, COC DF, C-O-C-S WDG, COC WP, Copper Count-N, CS 2005 Cueva, Cuprofix Ultra 40 Dispers, Cuproxat, Cuproxat Flowable, Kentan DF, Kocide 2000, Kocide 3000, Kocide DF, Mastercop, Nordox, Nordox 75WG, Nu Cop 3L, Nu Cop 50 DF, Nu Cop 50 WP, Nu Cop HB, and many others	SEE INDIVIDUAL LABELS		1-2	Varies by product from 4 hr to 2 days	Frequent use of copper fungicides may cause foliar burn.
	21	Actigard 50 WG (acibenzolar-s-methyl)	0.75 oz	6 oz	0	0.5	Do not apply to plants that are stressed due to drought, excessive moisture, cold weather, herbicide injury, etc.
Anthracnose fruit rot	M4	(captan) Many brands available: Captain 50W, Captan 50 WP, Captan 80 WDG, Captan 4L	SEE INDIVIDUAL LABELS		1	1	Rate per treated acre. Special label for FL allows up to 24 applications per season.
	M4 + 17	Captivate 68 WDG (captan + fenhexamid)	5.25 lb	21 lb	0	1	Do not make more than 2 consecutive applications.
	1 + 3	Protocol (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	Do not make more than 2 consecutive applications before rotating to another fungicide with a different mode of action.
	3	Inspire (difenoconazole)	7 fl oz	28 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide with a different mode of action.
	3	(propiconazole) Many brands available: Amtide Propiconazole EC, Bumper 41.8 EC, Fitness, Orbit, Propi-Star EC, Shar-Shield PPZ, Tilt, Topaz	4 fl oz	16 fl oz	0	0.5	Do not make more than 2 consecutive applications.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide with a different mode of action.
	3 + 11	Quadris Top (difenoconazole + azoxystrobin)	14 fl oz	56 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide group, and no more than 4 appl./crop per year.
	3 + 11	Quilt Xcel (propiconazole + azoxystrobin)	14 oz	56 oz	0	0.5	Do not make more than 2 consecutive applications and no more than 4 appl./crop.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Merivon (flupyroxad + pyraclostrobin)	11 fl oz	33 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another non-Group 7, non-Group 11 fungicide.
	7 + 11	Pristine (boscalid + pyraclostrobin)	23 oz	115 oz	0	0.5	Do not make more than 2 consecutive applications, and no more than 5 appl./crop.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	13.4 fl oz	26.8 fl oz	0	0.5	Do not make more than two consecutive applications of Miravis Prime or other Group 7 and 12 fungicides before alternation with a fungicide that is not in Group 7 or 12.
	9 + 12	Switch 62.5 WG (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Do not make more than 2 consecutive applications. Do not plant crops not on the label for 30 days after last application. See special label for instructions on dipping transplants.
	11	Aftershock Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Do not make more than 2 sequential applications and no more than 4 applications per season, and leave a minimum interval of 14 days between applications.
	11	(azoxystrobin) Many brands available: Abound, Aframe, Azaka, Azoxy 2SC, Equation SC, Satori, Trevo	15.4 fl oz	1.92 qt	0	4 hr	Do not make more than 2 sequential applications and no more than 4 appl./crop year. See label for instructions on dipping transplants.
	11	Cabrio EG (pyraclostrobin)	14 fl oz	70 fl oz	0	0.5	Do not make more than 2 sequential applications and no more than 5 appl./crop year.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	Do not apply more than 2 sequential applications of Flint or other Group 11 fungicides. Do not exceed more than 6 total applications of Group 11 fungicides per season.
	19	Affirm WDG, Ph-D, Oso, Veranda O (polyoxin-D)	SEE INDIVIDUAL LABELS		0	4 hr	Use in alternation with fungicides that have different modes of action. Do not make more than 3 applications per season.
	48	Zivion (natamycin)	SEE LABEL		N/A	4 hr	For use as preplant dip of transplants.
Botrytis fruit rot	M3	Thiram Granuflo Thiram 24/7 (thiram)	SEE INDIVIDUAL LABELS			1	Do not rotate treated crops with other crops for which Thiram is not registered.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	M4	(captan) Many brands available: Captan 50W, Captan 50 WP, Captan 80 WDG, Captan 4L	SEE INDIVIDUAL LABELS	1	1	1	Rate per treated acre. Special label for FL allows up to 24 applications per season.
	M4 + 17	Captevate 68 WDG (captan + fenhexamid)	5.25 lb	21 lb	0	1	Do not make more than 2 consecutive applications.
	M12	Fracture (banda de lupinus albus doce—BLAD)	36.6 fl oz	183 fl oz	1	4 hr	Do not make more than 2 sequential applications.
	1	(thiophanate-methyl) Many brands available: Cercobin, Incognito 4.5F, Nurfarm T-Methyl 4.5 F, Nurfarm T-Methyl 70WSB, Thiophanate-methyl 85 WDG, Topsin 4.5 FL, Topsin 70 WDG, Topsin M 70 WP, Topsin M WSB	SEE INDIVIDUAL LABELS	1	1	1	Fungicides from different chemical groups should be used in spray program for disease resistance management.
	1 + 3	Protocol (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	Do not make more than 2 consecutive applications before rotating to another fungicide with a different mode of action.
	2	(iprodione) Many brands available: Enclosure 4, Iprodione 4L AG, Meteor, Nevada 4F, Rovral 4 Flowable	2 pt	2 pt	N/A	1	Do not make more than 1 application per season. Do not apply after first fruiting flower.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide with a different mode of action.
	7	Fontelis (penthioopyrad)	24 fl oz	72 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to a fungicide from a different group.
	7	Kenja 400 SC (isofetamid)	15.5 fl oz	54 fl oz	0	0.5	Do not plant other crops not registered within 30 days after last application.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	11 fl oz	33 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another non-Group 7, non-Group 11 fungicide.
	7 + 11	Pristine (boscalid + pyraclostrobin)	23 oz	115 oz	0	0.5	Do not make more than 2 consecutive applications, and no more than 5 appl./crop.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	13.4 fl oz	26.8 fl oz	0	0.5	Do not make more than two consecutive applications of Miravis Prime or other Group 7 and 12 fungicides before alternation with a fungicide that is not in Group 7 or 12.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	9	Scala SC (pyrimethanil)	18 fl oz	54 fl oz	1	0.5	Do not make more than 2 consecutive applications. Do not use more than 2 of 6 applications in any one season.
	9 + 12	Switch 62.5 WG (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	Do not make more than 2 consecutive applications. Do not plant crops not on the label for 30 days after last application. See special label for instructions on dipping transplants.
	17	Elevate 50 WDG (fenhexamid)	1.5 lb	6 lb	0	0.5	Do not make more than 2 consecutive applications.
	19	Affirm WDG, Ph-D, Oso, Veranda O (polyoxin-D)	SEE INDIVIDUAL LABELS		0	4 hr	Use in alternation with fungicides that have different modes of action. Do not make more than 3 applications per season.
Botrytis (suppression only)	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	Do not apply more than 4 applications per year.
	11	Aftershock Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Do not make more than 2 sequential applications, and no more than 4 applications per season; leave a minimum interval of 14 days between applications.
	11	(azoxystrobin) Many brands available: Abound, Aframe, Azaka, Azoxy 25C, Equation SC, Satori, Trevo	15.4 fl oz	1.92 qt	0	4 hr	Do not make more than 2 sequential applications, and no more than 4 appl./crop year. See label for instructions on dipping transplants.
	11	Cabrio EG (pyraclostrobin)	14 fl oz	70 fl oz	0	0.5	Do not make more than 2 sequential applications and no more than 5 appl./crop year.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	Do not apply more than 2 sequential applications of Flint or other Group 11 fungicides. Do not exceed more than 6 total applications of Group 11 fungicides per season.
	11	Intuity (mandestrobin)	6 fl oz	12 fl oz	0	0.5	Do not make more than 2 applications per year. Do not apply at intervals of less than 14 days.
Charcoal rot (<i>Macrophomina phaseolina</i>)	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Product is to be applied through drip irrigation (see label for chemigation directions).
	48	Zivion (natamycin)	SEE LABEL		n/a	4 hr	For use as preplant dip of transplants.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
Colletotrichum crown rot	1	(thiophanate-methyl) Many brands available: Cercobin, Incognito 4.5F, Nufarm T-Methyl 4.5 F, Nufarm T-Methyl 70WSB, Thiophanate-methyl 85 WDG, Topsin 4.5 FL, Topsin 70 WDG, Topsin M 70 WP, Topsin M WSB	SEE INDIVIDUAL LABELS		1	1	Fungicides from different chemical groups should be used in spray program for disease resistance management.
	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	Do not apply more than 4 applications per year.
	7	Kenja 400 SC (isofetamid)	15.5 fl oz	54 fl oz	0	0.5	Do not plant other crops not registered within 30 days after last application.
Leaf scorch	1	(thiophanate-methyl) Many brands available: Cercobin, Incognito 4.5F, Nufarm T-Methyl 4.5 F, Nufarm T-Methyl 70WSB, Thiophanate-methyl 85 WDG, Topsin 4.5 FL, Topsin 70 WDG, Topsin M 70 WP, Topsin M WSB,	SEE INDIVIDUAL LABELS		1	1	Fungicides from different chemical groups should be used in spray program for disease resistance management.
	1 + 3	Protocol (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	Do not make more than 2 consecutive applications before rotating to another fungicide with a different mode of action.
Leaf spot	M4	(captan) Many brands available: Captan 50W, Captan 50 WP, Captan 80 WDG, Captan 4L	SEE INDIVIDUAL LABELS		1	1	Rate per treated acre. Special label for FL allows up to 24 applications per season.
	2	(iprodione) Many brands available: Enclosure 4, Iprodione 4L AG, Meteor, Nevada 4F, Rovral 4 Flowable	2 pt	2 pt	n/a	1	Do not make more than 1 application per season. Do not apply after first fruiting flower.
	3	Mettle 125 ME (tetraconazole)	5 fl oz	20 fl oz	0	0.5	Do not apply same product within 14 days. Do not apply more than 4 applications per season.
	3	Rally 40WSP Sonoma 40 WSP (myclobutanil)	5 oz	30 oz	0	1	Do not plant rotational crops until 30 days after last application.
	3	(propiconazole) Many brands available: Amtide Propiconazole EC, Bumper 41.8 EC, Orbit, Propi-Star EC, Shar-Shield PPZ, Tilt, Topaz	4 fl oz	16 fl oz	0	0.5	Do not make more than 2 consecutive applications.
	3	Rally 40WSP Sonoma 40 WSP (myclobutanil)	5 oz	30 oz	0	1	Do not plant rotational crops until 30 days after last application.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3 + 11	Quadris Top (difenoconazole + azoxystrobin)	14 fl oz	56 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide group, and no more than 4 appl./crop per year.
	3 + 11	Quilt Xcel (propiconazole + azoxystrobin)	14 oz	56 oz	0	0.5	Do not make more than 2 consecutive applications, and no more than 4 appl./crop.
(suppression only)	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
(suppression only)	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	11 fl oz	33 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another non-Group 7, non-Group 11 fungicide.
	7 + 11	Pristine (boscalid + pyraclostrobin)	23 oz	115 oz	0	0.5	Do not make more than 2 consecutive applications, and no more than 5 appl./crop.
	11	Cabrio EG (pyraclostrobin)	14 fl oz	70 fl oz	0	0.5	Do not make more than 2 sequential applications, and no more than 5 appl./crop year.
Leather rot	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	Do not apply more than 4 applications per year.
	4	Metalaxyl 2E AG MetaStar 2E AG (metalaxyl)	2 qt	6 qt	0	2	See label for use in drip irrigation.
	4	Ridomil Gold EC Ridomil Gold SL Ultra Flourish (mefenoxam)	1 pt/ treated acre	1.5 qt/ treated acre	0	2	See label for use in drip irrigation.
	11	(azoxystrobin) Many brands available: Abound, Aframe, Azaka, Azoxy 2SC, Equation SC, Satori, Trevo	15.4 fl oz	1.92 qt	0	4 hr	Do not make more than 2 sequential applications, and no more than 4 appl./crop year. See label for instructions on dipping transplants.
	33	Aliette WDG Legion 80WDG Linebacker WDG (fosetyl-AI)	5 lb	30 lb	0.5	0.5	Do not tank-mix with copper fungicides, adjuvants, or foliar fertilizers.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	33	Alude, Confine Extra, Fosphite, Fungi-Phite, K-Phite, Phorcephite, Phostrol, Rampart (mono- and dipotassium salts of phosphorous acid)	SEE INDIVIDUAL LABELS	0	0	4 hr	Do not tank-mix with copper fungicides.
Phomopsis leaf blight	3	Mettle 125 ME (tetraconazole)	5 fl oz	20 fl oz	0	0.5	Do not apply same product within 14 days. Do not apply more than 4 applications per season.
	3	Rally 40WSP Sonoma 40 WSP (myclobutanol)	5 oz	30 oz	0	1	Do not plant rotational crops until 30 days after last application.
(suppression only)	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
(suppression only)	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	Do not apply more than 2 sequential applications of Flint or other Group 11 fungicides. Do not exceed more than 6 total applications of Group 11 fungicides per season.
Phomopsis soft rot	2	(iprodione) Many brands available: Enclosure 4, Iprodione 4L AG, Meteor, Nevada 4F, Rovral 4 Flowable	2 pt	2 pt	n/a	1	Do not make more than 1 application per season. Do not apply after first fruiting flower.
(suppression only)	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
Phytophthora crown rot	4	Metalaxyl 2E AG MetaStar 2E AG (metalaxyl)	2 qt	6 qt	0	2	See label for use in drip irrigation.
	4	Ridomil Gold EC Ridomil Gold SL Ultra Flourish (mefenoxam)	1 pt/ treated acre	1.5 qt/ treated acre	0	2	See label for use in drip irrigation.
	4 + 49	Orondis Gold (mefenoxam + oxathiapiprolin)	62 fl oz	124 fl oz	28	2	Make no more than 2 sequential applications before rotating to a fungicide with a different 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	
	21	Actigard 50 WG (acibenzolar- <i>s</i> -methyl)	0.75 oz	6 oz	0	0.5	Do not apply to plants that are stressed due to drought, excessive moisture, cold weather, herbicide injury, etc.
	33	Alude, Confine Extra, Fosphite, Fungi-Phite, K-Phite, Phorcephite, Phostrol, Rampart (mono- and dipotassium salts of phosphorous acid)	SEE INDIVIDUAL LABELS		0	4 hr	Do not tank-mix with copper fungicides.
Powdery mildew	M2	(sulfur) Many brands available: Acoidal, Cosavet DF, Crusade DF, Kumulus DF, Microfine Sulfur, Micro Sulf, Microthiol Dispers, Rebel DF, Sulfur 90W, Wettable Sulfur, Wettable Sulfur 92, Yellow Jacket Dusting Sulfur, Yellow Jacket Wettable Sulfur	SEE INDIVIDUAL LABELS		1	1	Do not use during hot weather.
	M2 + 33	Sanction (potassium phosphate + sulfur)	6 pt	24 pt	n/a	1	Do not apply during hot weather. May cause injury during certain climatic conditions.
	M12	Fracture (banda de lupinus albus doce—BLAD)	24.4 fl oz	122 fl oz	1	4 hr	Do not make more than 2 sequential applications.
	1	(thiophanate-methyl) Many brands available: Cercobin, Incognito 4.5F, Nufarm T-Methyl 4.5 F, Nufarm T-Methyl 70WSB, Thiophanate-methyl 85 WDG, Topsin 4.5 FL, Topsin 70 WDG, Topsin M 70 WP, Topsin M WSB	SEE INDIVIDUAL LABELS		1	1	Fungicides from different chemical groups should be used in spray program for disease resistance management.
	1 + 3	Protocol (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	Do not make more than 2 consecutive applications before rotating to another fungicide with a different mode of action.
	3	Inspire (difenoconazole)	7 fl oz	28 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide with a different mode of action.
	3	Mettle 125 ME (tetraconazole)	5 fl oz	20 fl oz	0	0.5	Do not apply same product within 14 days. Do not apply more than 4 applications per season.
	3	Nova 40W Rally 40WSP Sonoma 40 WSP (myclobutanil)	5 oz	30 oz	0	1	Do not plant rotational crops until 30 days after last application.
	3	Procure 480 SC (triflumizole)	8 oz	32 oz	1	0.5	Do not plant leafy vegetables within 30 days, root vegetables within 60 days, or rotational crops not on label for one year after application.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	3	(propiconazole) Many brands available: Amicide Propiconazole EC, Bumper 41.8 EC, Bumper ES, Orbit, Propi-Star EC, Shar-Shield PPZ, Tilt, Topaz	4 fl oz	16 fl oz	0	0.5	Do not make more than 2 consecutive applications.
	3	Rally 40WSP Sonoma 40 WSP (myclobutanil)	5 oz	30 oz	0	1	Do not plant rotational crops until 30 days after last application.
	3	Rhyme (flutriafol)	7 fl oz	28 fl oz	0	0.5	Do not apply more than 4 applications per year.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide with different mode of action.
	3 + 11	Quadris Top (difenoconazole + azoxystrobin)	14 fl oz	56 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another fungicide group, and no more than 4 appl./crop per year.
	3 + 11	Quilt Xcel (propiconazole + azoxystrobin)	14 oz	56 oz	0	0.5	Do not make more than 2 consecutive applications, and no more than 4 appl./crop.
	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	Do not apply more than 4 applications per year.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to a fungicide from a different group.
	7	Kenja 400 SC (isofetamid)	15.5 fl oz	54 fl oz	0	0.5	Do not plant other crops not registered within 30 days after last application.
	7	Luna Privilege (fluopyram)	6.84 fl oz	13.7 fl oz	0	0.5	Apply through drip irrigation system preventatively. Do not make more than 2 sequential applications before alternating to a fungicide from a different group.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	Do not make more than 2 sequential applications before rotating with a fungicide from a different group.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	11 fl oz	33 fl oz	0	0.5	Do not make more than 2 sequential applications before alternating to another non-Group 7, non-Group 11 fungicide.
	7 + 11	Pristine (boscalid + pyraclostrobin)	23 oz	115 oz	0	0.5	Do not make more than 2 consecutive applications, and no more than 5 appl./crop.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	11	Aftershock Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	Do not make more than 2 sequential applications, and no more than 4 applications per season; leave a minimum interval of 14 days between applications.
	11	(azoxystrobin) Many brands available: Abound, Aframe, Azaka, Azoxy 25C, Equation SC, Satori, Trevo	15.4 fl oz	1.92 qt	0	4 hr	Do not make more than 2 sequential applications, and no more than 4 appl./crop year. See label for instructions on dipping transplants.
	11	Cabrio EG (pyraclostrobin)	14 fl oz	70 fl oz	0	0.5	Do not make more than 2 sequential applications, and no more than 5 appl./crop year.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	Do not apply more than 2 sequential applications of Flint or other Group 11 fungicides. Do not exceed more than 6 total applications of Group 11 fungicides per season.
	11	Intuity (mandestrobin)	6 fl oz	12 fl oz	0	0.5	Do not make more than 2 applications per year. Do not apply at intervals of less than 14 days.
	13	Quintec (quinoxifen)	6 fl oz	24 fl oz	1	0.5	Do not make more than 2 consecutive applications or more than 4 applications per crop.
	19	Affirm WDG, Ph-D, Oso, Veranda O (polyoxin-D)	SEE INDIVIDUAL LABELS		0	4 hr	Use in alternation with fungicides that have different modes of action. Do not make more than 3 applications per season.
	U6	Torino (cyflufenamid)	3.4 oz	6.8 oz	0	4 hr	Do not make more than 2 applications per year. Do not apply more than once every 14 days.
	U8	Prolivo (pyriofenone)	5 fl oz	16 fl oz	0	4 hr	Do not make more than 2 sequential applications of Group U8 fungicides before rotating to a fungicide with a different mode of action.

¹ FRAC 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 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 2022; <http://www.frac.info/> (FRAC = Fungicide Resistance Action Committee).
² Information 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 5. Nonfumigant nematicides for strawberry in Florida. Contact: Johan Desaeger, UF/IFAS Gulf Coast Research and Education Center.

Product	Application Rates and Procedures
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.
Velum (a.i. fluopyram)	Apply max 6.84 fl oz/acre using only chemigation into root zone through low-pressure drip, trickle, microsprinkler, or equivalent equipment. Observe minimum 7-day interval between soil applications. Do not apply more than 13.7 fl oz of Velum (0.446 lb fluopyram) per acre per year, regardless of formulation (Velum and/or Luna) or method of application (soil or foliar). For soil application, to limit the potential for development of disease resistance to this chemical class, the first foliar fungicide application after Velum should be a product from a different FRAC group.

Velum is a fungicide/nematicide; Nimitz is a true nematicide. Unlike fumigants, these products are not volatile and will move through the soil via water; depending on the water solubility, these products will have different recommendations for how to best apply them (see specific label recommendations); when nematode pressure is high, they may not be as consistently effective against root nematodes as the fumigants.

Table 6. Fumigant nematicides for strawberry in Florida. Contact: Johan Desaeger, UF/IFAS Gulf Coast Research and Education Center.

Nematicide	Broadcast Application ¹		In-the-Row Applications
	Gallons or lb per Acre	fl oz/1000 ft/ chisel-spaced 12" apart	
Telone II ^{2,3} Telone EC ^{2,3}	27 to 35 gal	79 to 102	For any row spacing, application rates given may be concentrated in the row but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-17 ^{2,3}	32.4 to 42 gal	95 to 123	For any row spacing, application rates given may be concentrated in the row but shall never exceed the labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone C-35 ^{2,3}	39 to 50 gal	114 to 146	For any row spacing, application rates given may be concentrated in the row but shall never exceed labeled maximum for broadcast applications. Consult the product label for additional detail.
Telone InLine ^{2,3}	29 to 56 gal	-	For drip fumigation, consult the product label for overall rate, drip concentration, and flow-modifying application directions.
Pic Clor 60 ^{2,3}	19.5 to 31.5 gal	57 to 90	Consult product label for overall rate and chisel flow-modifying application directions.
Pic Clor 60 EC ^{2,3}	19.5 to 31.5 gal	-	For drip fumigation, consult product label for proportionately reduced overall rates, drip concentration, and drip flow-modifying directions and procedures.
Vapam HL	75 gal	-	For drip fumigation and crop termination, consult product label for proportionately reduced overall rates, drip concentration, and flow-modifying directions and procedures.
KPam HL	60 gal	-	For drip fumigation and crop termination, consult product label for proportionately reduced overall rates, drip concentration, and flow-modifying directions.
Allyl Isothiocyanate (AITC) Dominus	40 gal	-	For drip or in-row fumigation and crop termination, consult product label for overall rates, drip concentration, and flow-modifying directions.

¹ Gallons/acre and fl oz/1000 feet provided only for mineral soils. Higher rates may be possible for heavier-textured (loam, silt, clay) or highly organic soils.

² All of the fumigants mentioned are for retail sale and use only by state-certified applicators or persons under their direct supervision. New supplemental labeling for the Telone products must be in the hands of the user at the time of application. See label details for additional use restrictions based on soil characteristics, buffer zones, requirements for personal protective equipment (PPE), mandatory good agricultural practices (GAPs), product and applicator training certification, and rate-modifying recommendations with use of highly retentive Totally Impermeable mulch films (TIF).

³ Higher application rates are possible in the presence of cyst-forming nematodes.

Rates are believed to be correct for products named, and similar products of other brand names, when applied to mineral soils. Higher rates are required for muck (organic) soils. However, the **grower** has the final responsibility to see that each product is used legally; **read the label** of the product to be sure that you are using it properly.