

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 20–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	35–50
Plant populations (acre)	16,000–20,000

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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 October 5–15. Resistant to anthracnose fruit rot and Colletotrichum crown rot; moderately 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; 1.0–1.5 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 N rates are lower than for ‘Florida Brilliance’. Recommended planting dates in central Florida are October 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 October 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, powdery mildew, and Phytophthora root rot; highly susceptible to charcoal rot and anthracnose fruit and root rots.

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 of ‘109’ and ‘66’ should be similar to those of Sweet Sensation® ‘Florida127’ and ‘Florida Brilliance’, respectively. Recommended planting dates in central Florida are October 10–20. It has moderate resistance to most diseases. The ‘66’ was released in 2022 with improved early yield and firmness over the ‘109’ and also with more intense flavor. It otherwise has similar management needs except that it can be planted as early as October 5. The ‘66’ 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 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.
Flumioxazin 0.1	(Chateau) EZ 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 make more than 1 application per year.
Glyphosate	(various formulations) consult labels	9	Emerged broadleaves and grasses. Apply preplant or in row middles with a shielded applicator (14-day PHI). Consult label for individual product directions.
Napropamide 4	(Devrinol) 2-XT 1–2 gal (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 inches depth within 24 hr 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	(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.
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.

Flumioxazin 0.1	(Chateau) EZ 3 oz	14	Broadleaves. May be applied with a shielded or hooded spray directed to row middles before weed emergence. Do not apply after fruit set.
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 1 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	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.							
Ants	7A	Extinguish Professional Fire Ant Bait (S-methoprene)	Mound treatments: 3–5 tablespoons/mound. Broadcast: 1.0–1.5 lbs	Repeat applications can be made as often as fire and pavement ants are observed	4	0	IGR (insect growth regulator) specifically for fire and pavement ants. Do not apply during a hot day or when rain is expected within 6 hr.
	7C	Esteem Ant Bait (pyriproxyfen)	1.5–2.0 lb	0.134 lb/A	12	1	Avoid if rain is expected within 4–6 hr.
Aphids	1B	Diazinon 50W, AG600 WBC (diazinon)	50W : 1 lb AG600 WBC : 12.75 fl oz	No more than 1 foliar or soil application.	3	5	Highly toxic to bees.
	1B	Dibrom 8-E* (naled)	1 pt	Do not apply more than 5 pt 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 pt 8F : 1.5–2.0 pt	8F : Do not apply more than 8 pt/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.	12	0	
	3A	Evergreen EC 60-6 (pyrethrins + piperonyl butoxide)	2.0–12.6 fl oz	Do not apply more than 10 applications.	12	0	Do not make applications less than 7 days apart.
	3A	PyGanic EC 5.0 (pyrethrins)	4.5 – 15.61 fl. oz	15.61 fl oz/A or 0.05 lb a.i./A	12	0	OMRI-listed. ²
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A.	12	7	Do not make applications less than 5 days apart.
	3A + 6	Athene (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz/A 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 2 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 pt/A	Do not apply more than 10 applications.	4	0	OMRI-listed. ² Repeat applications as required but not more than 5–7 days apart.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	4A	Actara (thiamethoxam)	1.5–4.0 oz	Do not exceed a total of 12 oz/A of Actara or 0.188 lb a.i./A of thiamethoxam-containing products.	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.	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/A of Assail 30 SG 70 WP: Do not exceed a total of 6.0 oz/A of Assail 70 WP	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.	12	50	
	4A + 15	Cormoran (acetamiprid + novaluron)	9.0–12.0 fl oz	Do not apply more than 0.26 lb/A of IRAC Group 4A and 0.23 lb/A IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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	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.	12	3	Highly toxic to fish, mammals, and aquatic organisms. Allow a minimum of 7–10 days between applications.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	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.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pt for most pests and crop conditions. Add 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ² 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 qt		4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI-listed. ² 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-listed. ²
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	OMRI-listed. ²
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI-listed. ²
	-	Suffoil-X (unsulfonated residue of petroleum oil)	1–2 gal		4	0	OMRI-listed. ²
	-	Trilogy (neem oil)	0.5%–2%		4	0	OMRI-listed. ² Avoid tank-mixes with captan, sulfur, or other chemically similar products.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 qt		4	0	OMRI-listed. ² 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 qt	Do not apply more than a total of 10 qt/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 qt 80 Solupak: 1.25–2.5 lb	4F: Do not apply more than a total of 10 qt/A per crop per year. 80 Solupak: Do not apply more than a total of 12.5 qt/A per crop per year.	12	7	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	Do not apply more than 80 oz/A.	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-listed. ²
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A.	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/A 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 2 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 pt/A	Do not apply more than 10 times.	4	0	OMRI-listed. ² 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	Do not exceed a total of 13.8 oz/A of Assail 30 SG 70 WP: Do not exceed a total of 6.0 oz/A Assail 70 WP	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/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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	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 per year.	4	1	OMRI-listed. ² Do not make more than 3 applications in a year.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	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-listed. ²
	11A	Biobit HP (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.5–2.0 lb		4	0	OMRI-listed. ²
	11A	Deliver (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb		4	0	OMRI-listed. ²
	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-listed. ²
	11A	Javelin WG (<i>Bacillus thuringiensis</i> subspecies <i>kurstaki</i>)	0.25–1.5 lb		4	0	OMRI-listed. ²
	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.	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	
	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 per 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 per 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 pt for most pests and crop conditions. Apply 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ² 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)	1–3 lb		4	0	OMRI-listed. ² 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	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	1–4 qt		4	0	OMRI-listed. ² 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 qt/A preplant per year or 2 qt/A foliarly 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.	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.	12	7	Do not make applications less than 5 days apart.
	3A + 6	Athene (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz/A 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 2 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 pt/A	Do not apply more than 10 times.	4	0	OMRI-listed. ² 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.	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/A of Assail 30 SG 70 WP: Do not exceed a total of 6.0 oz/A of Assail 70 WP	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	Remarks ²
Caterpillars (including budworms, earworms, leafrollers, leaf tiers, borers, and loopers) (see also armyworms)	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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.	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 per year	4	1	Do not make more than 3 applications per year. Minimum interval between treatments is 5 days.
	-	METS2 EC (<i>Metarhizium anisopliae</i> strain F52)	Drench: 40–80 fl oz/100 gal Foliar: 0.5 pt–2 qt		4	0	
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	1A	Carbaryl 4 L (carbaryl)	1–2 qt	Do not apply more than a total of 10 qt/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 qt 80 Solupak: 1.25–2.5 lb	4F: Do not apply more than a total of 10 qt/A per crop per year. 80 Solupak: Do not apply more than a total of 12.5 qt/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 1 foliar application per crop and 1 soil application per crop.	3	5	
	1B	Dibrom 8-E* (naled)	1 pt	Do not apply more than 5 pt.	48	1	
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: Do not apply more than 8 pt/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 pt	Do not apply more than 10 times.	4	0	OMRI-listed. ² 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/A of Assail 30 SG. 70 WP: Do not exceed a total of 6.0 oz/A of Assail 70 WP.	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	Remarks ²
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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 per year.	4	1	OMRI-listed. ² 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	
	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 per 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 qt		4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Grandevo (Heat-killed <i>Chromobacterium subtugae</i> strain PRAA4-1 and spent fermentation)	1–3 lb		4	0	OMRI-listed. ² 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 qt		4	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	-	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 qt		4	0	OMRI-listed. ² Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
Crickets and cockroaches	1A	Carbaryl 4 L (carbaryl)	1–2 qt	Do not apply more than a total of 10 qt/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 1 foliar application per crop and 1 soil application per crop.	3	5	
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: Do not apply more than 8 pt/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/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product .	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.	12	1	7-day minimum interval between applications.
	-	Aza-Direct (azadirachtin)	See label; 1–2 pt for most pests and crop conditions. Apply 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ² 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 qt		4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.
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.	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.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	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-listed. ²
	4A	Actara (thiamethoxam)	1.5–4.0 oz	Do not exceed a total of 12 oz/A of Actara or 0.188 lb a.i./A of thiamethoxam-containing products	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.	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/A of Assail 30 SG 70 WP: Do not exceed a total of 6.0 oz/A Assail 70 WP	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/A of IRAC Group 4A and 0.23 lb/A IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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 pt for most pests and crop conditions. Apply 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ² Agitation is necessary, and mixture should be applied within 8 hr. Check pH of water to be within 5.5–6.5.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI-listed. ² Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 qt		4	0	OMRI-listed. ² 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 qt/A preplant per year or 2 qt foliarly 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 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	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.	12	50	
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	12	1	Allow a minimum of 7 days between applications.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
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 1 foliar application per crop and 1 soil application per crop.	3	5	
	1B	Dibrom 8-E* (naled)	1 pt	Do not apply more than 5 pt/A	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 pt 8F: 1.5–2.0 pt	8F: Do not apply more than 8 pt/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 2 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.	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/A 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 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	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)	12–32 oz	Do not apply more than 32 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.	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.	48	1	Allow a minimum of 21 days between treatments. Do not make more than 2 applications per year.
	20B	Kanemite 15 SC (acequinocyl)	21.0–31.0 fl oz	Do not apply more than 62 fl oz/A.	12	1	Allow 14 days between applications.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	20D	Acramite 50 WS (bifenazate)	0.75–1.0 lb	2 applications allowed; 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 2 applications per year. Allow 30 days between sequential applications.	12	10	
	21A	Portal (fenpyroximate)	2 pints	Do not apply more than 4.0 pt/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 2SC (spiromesifen)	12.0–16.0 fl oz	Do not apply more than 48 fl oz/A	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	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 pt for most pests and crop conditions. Apply 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ² 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-listed. ² Broad spectrum, repels, reduces fecundity. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.
	-	Organic JMS Stylet Oil (paraffinic oil)	3 qt/100 gal water		4	0	OMRI-listed. ² Use ceramic nozzles and spray at no less than 400 psi.
	-	MET52 EC (<i>Metarhizium anisopliae</i> strain F52)	Drench: 40.0–80.0 fl oz/100 gal Foliar: 0.5 pt–2 qt		4	0	
	-	M-Pede (potassium salts of fatty acids)	See label.		12	0	OMRI-listed. ²
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)		1–2 lb	4	0	OMRI-listed. ²
	-	Suffoil-X (unsulfonated residue of petroleum oil)	1–2 gal		4	0	OMRI-listed. ²

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	-	Trilogy (neem oil)	0.5%–2%		4	0	OMRI-listed. ² 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-listed. ² 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 qt	Do not apply more than a total of 10 qt/A per year.	12	7	
	1A	Sevin 4F, 80 Solupak (carbaryl)	4F: 1–2 qt 80 Solupak: 1.25–2.5 lb	4F: Do not apply more than a total of 10 qt/A per year. 80 Solupak: Do not apply more than a total of 12.5 qt/A 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 pt 8F: 1.5–2.0 pt	8F: Do not apply more than 8 pt/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 2 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.	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	Do not make more than 10 applications.	12	0	Allow a minimum of 7 days between applications.
	3A	PyGanic EC 5.0 (pyrethrins)	See label	Do not make more than 2 applications per growing season. Do not apply more than once every 7 days.	12	0	OMRI-listed. ²
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A.	12	7	Do not apply more than twice a year to the same planting. May be tank-mixed with Dipel DF for armyworm control.
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz/A after transplanting.	12	3	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	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/A of Assail 30 SG during each growing season. 70 WP: Do not exceed a total of 6.0 oz/A Assail 70 WP.	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/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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.	24	1	
	15	Rimon 0.83EC (novaluron)	9–12 fl oz	Do not apply more than 36 oz/A.	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 gal/A.
	-	Botanigard ES (<i>Beauveria bassiana</i> strain GH4)	0.25–1 qt		4	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI-listed. ² 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 GH4)	0.25–1 qt		4	0	
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI-listed. ² Bee restriction: do not apply to target crops in bloom.
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 qt		4	0	Can be used in organic production. OMRI-listed. ² 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	Remarks ²
Thrips (including flower thrips, chili thrips)	1B	Dibrom 8-E* (naled)	1 pt	Do not apply more than 5 pt/A.	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 pt 8F: 1.5–2.0 pt	8F: Do not apply more than 8 pt/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-listed. ² 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 pt/A	Do not apply more than 10 times.	4	0	OMRI-listed. ² 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/A of Assail 30 SG. 70 WP: Do not exceed a total of 6.0 oz/A	12	1	OMRI-listed. ² 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/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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.	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.
	5	Entrust SC Naturalyte Insect Control (spinosad)	4.0–6.0 fl oz	Do not apply more than 18 fl oz/A per year.	4	1	OMRI-listed. ² 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 gal/A.
	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	12	3	Highly toxic to fish, mammals, and aquatic organisms. Minimum interval of 7–10 days required between applications.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	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 pt for most pests and crop conditions. Apply 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ² 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 GH4)	0.25–1 qt		4	0	
	-	Captiva Prime (capsicum oleoresin extract + garlic oil + canola oil)	1–2 pt	Spray every 4–7 days for preventative management.	4	0	OMRI-listed. ²
	-	Grandevo (Heat-killed <i>Chromobacterium subsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI-listed. ² 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 pt–2 qt		4	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GH4)	0.25–1 qt		4	0	
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	OMRI-listed. ²
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI-listed. ²
	-	Venerate (Heat-killed <i>Burkholderia rinojensis</i> strain A396)	2–4 qt		4	0	Can be used in organic production. OMRI-listed. ² 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	Remarks ²
Whiteflies	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: Do not apply more than 8 pt/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 2 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.	12	0	OMRI-listed. ²
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	Maximum allowed is 17.92 fl oz/A.	12	7	
	3A + 6	Athena (bifenthrin + avermectin B1)	7.0–17.0 fl oz	Do not apply more than 68 fl oz/A after transplanting.	12	3	
	3A + -	Azera Insecticide (pyrethrins + azadirachtin)	3.5 pints	Do not apply more than 10 times.	4	0	OMRI-listed. ² 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 of Actara or 0.188 lb a.i./A of thiamethoxam-containing products.	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.
	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.	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/A of Assail 30 SG 70 WP: Do not exceed a total of 6.0 oz/A of Assail 70 WP	12	1	
	4A	Platinum 75 SG (thiamethoxam)	1.7–4.01 oz	Do not exceed 4.01 oz/A	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.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	Do not apply more than 0.26 lb/A of IRAC Group 4A and 0.23 lb/A of IRAC Group 15 products per calendar year. Do not apply more than 35.0 fl oz/A of product.	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	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.	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	12	3	Do not make more than 2 applications per crop cycle.
	21A	Portal (fenpyroximate)	2 pt	Do not apply more than 4.0 pt/A	12	1	Do not make more than 3 applications per crop season.
	23	Oberon 2SC (spiromesifen)	12.0–16.0 fl oz	Do not apply more than 48 fl oz/A	12	3	
	-	Aza-Direct (azadirachtin)	See label; 1–2 pt for most pests and crop conditions. Apply 3.5 pt/A under severe pest pressure.		4	0	OMRI-listed. ²
	-	BotaniGard ES (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	
	-	Grandevo (Heat-killed <i>Chromobacterium subtsugae</i> strain PRAA4-1 and spent fermentation media)	2–3 lb		4	0	OMRI-listed. ² 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 qt/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 pt–2 qt		4	0	
	-	M-Pede (potassium salts of fatty acids)	See label.		12	0	OMRI-listed. ² Apply in sufficient water to cover foliage, typically 5–100 gal/A.
	-	Mycotrol ESO (<i>Beauveria bassiana</i> strain GHA)	0.25–1 qt		4	0	

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Rate Product/Acre	Rate per Season	REI (Hours)	Days to Harvest	Remarks ²
	-	Neemix 4.5% EC (azadirachtin)	4.0–16.0 fl oz		12	0	OMRI-listed. ²
	-	PFR-97 20%WDG (<i>Cordyceps javanica</i> Apopka strain 97)	1–2 lb		4	0	OMRI-listed. ²
	-	SuffOil-X (unsulfonated residue of petroleum oil)	1–2 gal		4	0	OMRI-listed. ² 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 qt		4	0	OMRI-listed. ² Broad spectrum, degrades exoskeleton, interferes with molting. Tank-mix with a contact insecticide for improved control and resistance management of targeted pests.

¹ Mode of Action (MOA) codes for plant pest insecticides from the Insecticide Resistance Action Committee (IRAC) Mode of Action Classification v. 11.1 January 2024. Number codes 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.

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 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	
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.							
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 Disperss, 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- <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.
Anthracnose fruit rot	M4	(captan) Many brands available: Captan 50W, Captan 50WP, Captan 80 WDG, Captec 4L	SEE INDIVIDUAL LABELS		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.
	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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	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 applications per 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 applications per crop.
	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 applications per crop.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	13.4 fl oz	26.8 fl oz	0	0.5	Do not make more than 2 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. Leave a minimum interval of 14 days between applications.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	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 applications per 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 applications per 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.
	M4	(captan) Many brands available: Captan 50W, Captan 50 WP, Captan 80 WDG, Captec 4L	SEE INDIVIDUAL LABELS		1	1	Rate per treated acre. Special label for FL allows up to 24 applications per season.
	M4 + 17	Captevat 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, 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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	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, Nevado 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 (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 + 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 applications per crop.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	13.4 fl oz	26.8 fl oz	0	0.5	Do not make more than 2 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 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 applications per 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 applications per 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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
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.
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.

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, 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 + 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 applications per 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 applications per 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 applications per 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 applications per 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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	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, Azoxystrobin, 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 applications per crop year. See label for instructions on dipping transplants.
	33	Aliette WDG Legion 80WDG Linebacker WDG (fosetyl-Al)	5 lb	30 lb	0.5	0.5	Do not tank-mix with copper fungicides, adjuvants, or foliar fertilizers.
	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.
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 (myclobutanil)	5 oz	30 oz	0	1	Do not plant rotational crops until 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.
(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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
(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.
	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.
	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 Disperss, 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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	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	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 1 year after application.
	3	(propiconazole) Many brands available: Amcide 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.

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 applications per 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 applications per 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 (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	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 applications per crop.
	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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ²
			Appl.	Season	Harvest	Reentry	
	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 applications per 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 applications per 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 (1–54) 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 2024; <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 Desaegeer, 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 3.5–7 pt/A (56.0–80.0 fl oz/A) a minimum of 7 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 1 application per crop and no more than 112 fl oz/A 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/A 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/A of Velum (0.446 lb/A fluopyram) 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.
Biological nematicides	See chapter 19
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 Desaegeer, UF/IFAS Gulf Coast Research and Education Center.

Nematicide	Broadcast Application ¹		In-the-Row Applications
	Gallons per Acre	fl oz/1000 ft/chisel-spaced 12" apart	
Telone II ^{2,3} Telone EC ^{2,3}	27–35	79–102	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}	32.4–42	95–123	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}	39–50	114–146	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}	29–56	-	For drip fumigation, consult the product label for overall rate, drip concentration, and flow-modifying application directions.
Pic Clor 60 ^{2,3}	19.5–31.5	57–90	Consult product label for overall rate and chisel flow-modifying application directions.
Pic Clor 60 EC ^{2,3}	19.5–31.5	-	For drip fumigation, consult product label for proportionately reduced overall rates, drip concentration, and drip flow-modifying directions and procedures.
Vapam HL	75	-	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	-	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	-	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.