

Chapter 16. Strawberry Production¹

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Botany and Planting

Strawberry—*Fragaria × ananassa*, Rosaceae.

Table 1. Planting dates for strawberries.

Planting Region	Dates
North Florida	Sept 20–Oct 15
Central Florida	Sept 25–Oct 25
South Florida	Oct 1–Nov 1

Table 2. Planting information for strawberries.

Planting Parameters	Measurements
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

Cultivars

These sections arrange cultivars in order from most to least utilized in Florida.

Main Cultivars

Florida Ember™ ‘FL 20.80-4’. Released in 2024. Medium to large fruit size; uniform conic fruit; bright red external color and light red to white internal color; low acid and high Brix similar to Florida Medallion™ ‘FL 16.30-128’; moderately resistant to rain damage; robust plant with medium vigor; N rates similar to ‘Florida Brilliance’. Recommended planting dates October 1–15. Resistant to moderately susceptible to most diseases with no high susceptibilities; excellent choice for organic production; of the UF varieties the least susceptible to *Pestalotia* caused by *Neopestalotiopsis rosae*.

Florida Encore™ ‘FL 20.34-183’. Released in 2024. Large fruit size; glossy surface with even red external color and medium red internal color; moderate acid and Brix; firm flesh with excellent shelf life and shipping quality; resistant to rain damage. Plant is vigorous with

recommended planting dates from October 12–22; moderate N rates similar to or lower than for ‘Florida Brilliance’. Moderately susceptible to *Colletotrichum* crown rot and charcoal rot. Moderately resistant to anthracnose fruit rot and phytophthora crown rot.

‘Florida Brilliance’. Released in 2017. High early yield; medium 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.

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; 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. 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

Sweet Sensation® ‘Florida127’. Released in 2013. Large fruit size; moderately uniform conic to broad-conic fruit; bright red with lighter color than other cultivars. Exceptional flavor throughout season; 1.0–1.5°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 it 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; moderately susceptible to angular leaf spot; susceptible to *Botrytis* fruit rot and powdery mildew; highly susceptible to *Phytophthora* root rot. Ridomil and phosphite applications are highly recommended.

Florida Pearl® ‘66’ and ‘220’. This variety produces white strawberries, also called “pineberries.” 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. The fruit has pure white internal color and a white external base color with red seeds and a pink blush when ripe. Fertilization rates for ‘66’ should be similar to those of ‘Florida Brilliance’, while ‘220’ will need higher fertility rates due to a more compact and less vigorous plant. Recommended planting dates in central Florida are October 10–20 for ‘66’ and October 1–15 for ‘220’. The cultivar ‘66’ also has the best disease resistance profile with few weaknesses and is moderately resistant to *Pestalotia* caused by *Neopestalotiopsis rosae*.

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 3. Herbicides approved for managing weeds in strawberry. **Labels change frequently. Be sure to read a current product label before applying any chemical.** 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
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. PHI 60 days.
	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 in. tall or rosettes less than 3 in. 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. No 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; PHI 14 days. Consult label for individual product directions.
	Napropamide 4.0	(Devrinol) 2-XT 1–2 gal (Devrinol DF XT) 4–8 lb	15	Annual broadleaves and grasses. Apply under the plastic and in row middles. Mechanically incorporate in the row middle to a 1–2 in. 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 row middles. Do not apply under the plastic. In systems that use irrigation at planting, delay application until after irrigation regime. PHI 35 days.
	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. PHI 30 days.
	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. No more than 1 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. PHI 110 days.

	Active Ingredient lb a.i./Acre	Trade Name Product/Acre	MOA Code	Weeds Controlled/Remarks
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. PHI 60 days.
	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 in. tall or rosettes less than 3 in. across. Good coverage is essential. A nonionic surfactant, methylated seed oil or crop oil concentrate is recommended. PHI 0 days.
	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. PHI 4 days.
	Clopyralid 0.125–0.25	(Stinger) 3 EC 0.33–0.66 pt	4	Broadleaves. No more than 2 applications of 0.33 pt/A per year. Do not include a surfactant. PHI 7 days.
	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. No more than 1 application per year. PHI 14 days.
	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. PHI 14 days. 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. No more than 3 applications per season. Nonionic surfactant recommended. PHI 21 days. 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. No more than 2.5 pt/A per season. Unsatisfactory results may occur if applied to grasses under stress. Crop oil concentrate recommended. PHI 7 days.
	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. PHI 30 days.
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 4. Selected insecticides approved for managing insect pests of strawberry. **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.** Contact: Sriyanka Lahiri, UF/IFAS Gulf Coast Research and Education Center.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
Ants	7A	Extinguish Professional Fire Ant Bait (S-methoprene)	Mound treatments: 3–5 tablespoons/mound Broadcast: 1.0–1.5 lb	–	4	0	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	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	50W: 1 lb AG600 WBC: 12.75 fl oz	3	5	Highly toxic to bees.
	1B	Dibrom 8-E* (naled)	1 pt	5 pt	48	1	Reapplications at least 7 days apart.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5 pt 8F: 1.5–2.0 pt	5EC: 4 8F: 8 pt per year	12	3	Reapplications at least 7 days apart.
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	80 oz	12	0	–
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	17.92 fl oz	12	7	Reapplications at least 5 days apart.
	4A	Actara (thiamethoxam)	1.5–4.0 oz	12 oz	12	3	Reapplications at least 10 days apart.
	4A	Admire Pro (imidacloprid)	Soil: 7.0–10.5 fl oz Foliar: 1.3 fl oz	Soil: 14.0 fl oz Foliar: 3.9 fl oz	12	Soil: 14 Foliar: 7	Foliar: Reapplications at least 5 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: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A	Platinum 75 SG (thiamethoxam)	1.7–4.01 oz	4.01 oz	12	50	–
	4A + 15	Cormoran (acetamiprid + novaluron)	9.0–12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	2.0–5.0 oz	15.0 oz	12	3	–
	4D	Sivanto Prime (flupyradifurone)	7.0–14.0 fl oz	28.0 fl oz	4	0	Reapplications at least 10 days apart.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
	6	Timectin 0.15 EC Ag (abamectin)	16.0 fl oz	64.0 fl oz	12	3	Reapplications at least 7–10 days apart.
	29	Beleaf 50 SG (flonicamid)	2.8 oz	8.4 oz per year	12	0	Reapplications at least 7 days apart.
Armyworms (see also caterpillars)	1A	Carbaryl 4 L (carbaryl)	1–2 qt	10 qt 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: 10 qt per year 80 Solupak: 12.5 qt per year	12	7	–
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	80 oz	12	0	–
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	42.67 fl oz per year	24	2	–
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	17.92 fl oz	12	7	Reapplications at least 5 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: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	2.0–5.0 oz	15.0 oz	12	3	–
	5	Radiant SC (spinetoram)	6.0–10.0 fl oz	39 fl oz per year	4	1	–
	15	Rimon 0.83EC (novaluron)	9.0–12.0 fl oz	36 oz	12	1	Reapplications at least 7 days apart.
	18	Intrepid 2F (methoxyfenozide)	6.0–12.0 fl oz	64 fl oz per year	4	3	–
	28	Coragen (chlorantraniliprole)	3.5–7.5 fl oz	15.4 fl oz	4	1	Reapplications at least 7 days apart.
	28	Harvanta 50SL (cyclaniliprole)	10.9–16.4 fl oz	49.2 fl oz per year	4	1	Reapplications at least 5 days apart.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
Beetles and weevils (including sap beetles) (see also grubs)	1B	Lorsban 75WG (chlorpyrifos)	1.33–2.67 lb	2.67 lb per year	24	21	–
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	80 oz	12	0	–
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	42.67 fl oz per year	24	2	–
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	17.92 fl oz	12	7	Reapplications at least 5 days apart.
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Soil: 14.0 fl oz Foliar: 3.9 fl oz	12	Soil: 14 Foliar: 5	–
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	15	Rimon 0.83EC (novaluron)	9.0–12.0 fl oz	36 oz	12	1	Reapplications at least 7 days apart.
	28	Harvanta 50SL (cyclaniliprole)	10.9–16.4 fl oz	49.2 fl oz per year	4	1	Reapplications at least 5 days apart.
Caterpillars (including budworms, earworms, leafrollers, leaftiers, borers, and loopers) (see also armyworms)	1A	Carbaryl 4 L (carbaryl)	1–2 qt	10 qt 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: 10 qt per year 80 Solupak: 12.5 qt per year	12	7	–
	1B	Diazinon 50W, AG600 WBC (diazinon)	50W: 1–2 lb AG600 WBC: 12.75–25.5 fl oz	–	3	5	No more than 1 foliar application per crop and 1 soil application per crop per season.
	1B	Dibrom 8-E* (naled)	1 pt	5 pt	48	1	–
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: 8 pt per year	12	3	Reapplications at least 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: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
	5	Radiant SC (spinetoram)	6.0–10.0 fl oz	39 fl oz per year	4	1	–
	28	Harvanta 50SL (cyaniliprole)	10.9–16.4 fl oz	49.2 fl oz per year	4	1	Reapplications at least 5 days apart.
Crickets and cockroaches	1A	Carbaryl 4 L (carbaryl)	1–2 qt	10 qt 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	–	3	5	No more than 1 foliar application per crop and 1 soil application per crop per season.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: 8 pt per year	12	3	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	15	Rimon 0.83EC (novaluron)	9.0–12.0 fl oz	36 oz	12	1	Reapplications at least 7 days apart.
Fruit fly (vinegar fly) and spotted wing drosophila	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	80 oz	12	0	–
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	42.67 fl oz per year	24	2	–
	3A	BioMagnet Ruby (deltamethrin)	60 devices	–	0	0	No more than 1–2 applications per year.
	4A	Actara (thiamethoxam)	1.5–4.0 oz	12 oz	12	3	Reapplications at least 10 days apart.
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Soil: 14.0 fl oz Foliar: 3.9 fl oz	12	Soil: 14 Foliar: 5	–
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	0.4 lb a.i.	12	1	Reapplications at least 5 days apart.
Grubs (see also beetles)	1B	Lorsban 75WG (chlorpyrifos)	1.33–2.67 lb	2.67 lb per year	24	21	No more than 1 preplant or 2 foliar applications per year.

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			Appl.	Season ²			
	4A	Admire Pro (imidacloprid)	Soil: 7.0–10.5 fl oz	Soil: 14.0 fl oz	12	Soil: 14	Avoid when bees are present.
	4A	Platinum 75 SG (thiamethoxam)	1.7–4.01 oz	4.01 oz	12	50	–
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
Mites (including twospotted 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	–	3	5	No more than 1 foliar application per crop and 1 soil application per crop per season.
	1B	Dibrom 8-E* (naled)	1 pt	5 pt	48	1	Reapplications at least 7 days apart.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: 8 pt per year	12	3	Reapplications at least 7–10 days apart.
	3A	*Brigade WSB (bifenthrin)	16–32.0 oz	80 oz	12	0	Reapplications at least 7 days apart.
	3A	*Danitol 2.4 EC (fenpropathrin)	16.0–21.33 fl oz	42.67 fl oz per year	24	2	Reapplications at least 30 days apart.
	6	Agri-Mek 0.15 EC*, SC* (abamectin)	0.15 EC: 16 oz SC: 3.5 fl oz	0.15 EC: 64 fl oz SC: 14 fl oz	12	3	Reapplications at least 7–10 days apart.
	10A	Onager Optek (hexythiazox)	12–32 oz	32 oz per year	12	3	No more than 1 application per season.
	10B	Zeal (etoxazole)	2–3 oz	3.0 oz	12	1	–
	12B	*Vendex 50 WP (fenbutatin oxide)	1.5–2.0 lb	4 lb	48	1	Reapplications at least 21 days apart.
	20B	Kanemite 15 SC (acequinocyl)	21.0–31.0 fl oz	62 fl oz	12	1	Reapplications at least 14 days apart.
	20D	Acramite 50 WS (bifenazate)	0.75–1.0 lb	2.0 lb	12	1	Reapplications at least 21 days apart.
	21A	Magister (fenazaquin)	24–36 fl oz	36 fl oz	12	3	No more than 1 application per year.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
	21A	Nexter (pyridaben)	4.4–10.67 oz	–	12	1	No more than 2 applications per year. Reapplications at least 30 days apart.
	21A	Portal (fenpyroximate)	2 pt	4.0 pt per crop cycle	12	1	Reapplications at least 14 days apart.
	23	Oberon 2 SC (spiromesifen)	16.0 fl oz	16.0 fl oz	12	3	–
	25	Nealta (cyflumetofen)	13.7 fl oz	27.4 fl oz	12	1	Reapplications at least 14 days apart.
Plant bugs, including <i>Lygus</i>	1A	Carbaryl 4 L (carbaryl)	1–2 qt	10 qt per year	12	7	–
	1A	Sevin 4F, 80 Solupak (carbaryl)	4F: 1–2 qt 80 Solupak: 1.25–2.5 lb	4F: 10 qt per year 80 Solupak: 12.5 qt per year	12	7	Reapplications at least 7 days apart.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: 8 pt per year	12	3	Reapplications at least 7–10 days apart.
	3A	*Brigade WSB (bifenthrin)	6.4–32.0 oz	80 oz	12	0	Reapplications at least 5 days apart.
	3A	*Danitol 2.4 EC (fenpropathrin)	10.67–21.33 fl oz	42.67 fl oz per year	24	2	–
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	17.92 fl oz	12	7	–
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 1.9–6.9 oz 70 WP: 0.8–3.0 oz	30 SG: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	4C	Transform WG (sulfoxaflor)	1.5–2.25 oz	8.5 oz	24	1	–
	15	Rimon 0.83EC (novaluron)	9–12 fl oz	36 oz	12	1	Reapplications at least 7 days apart.
	29	Beleaf 50 SG (flonicamid)	2.8 oz	8.4 oz per year	12	0	–

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
Thrips (including flower thrips, chilli thrips)	1B	Dibrom 8-E* (naled)	1 pt	5 pt	48	1	Reapplications at least 7 days apart.
	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: 8 pt per year	12	3	–
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 4.0–6.9 oz 70 WP: 1.7–3.0 oz	30 SG: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	4C	Closer SC (sulfoxaflor)	4.5 oz	17.0 oz per year	12	1	Reapplications at least 7 days apart.
	4C	Transform WG (sulfoxaflor)	2.25 oz	8.5 oz	24	1	–
	4D	Sivanto Prime (flupyradifurone)	14.0 fl oz	28 oz per year	4	0	Reapplications at least 10 days apart.
	5	Radiant SC (spinetoram)	6.0–10.0 fl oz	30 fl oz per year	4	1	Reapplications at least 3 days apart.
	6	Timectin 0.15 EC Ag (abamectin)	16.0 fl oz	64 fl oz	12	3	Reapplications at least 7 days apart.
	6 + 28	Minecto Pro (abamectin + cyantraniliprole)	10.0 fl oz	40 fl oz per year	12	3	Reapplications at least 7 days apart.
	15	Rimon 0.83EC (novaluron)	6.0–12.0 fl oz	36 fl oz per year	12	1	Reapplications at least 7 days apart.
	21A	Apta (tolfenpyrad)	27.0 fl oz	81.0 fl oz per year	12	1	Reapplications at least 7 days apart.
	9D	Sefina Inscalis (afidopyropen)	For chilli thrips: 14 fl oz	28 fl oz	12	0	Reapplications at least 7 days apart.
	7C	Knack (pyriproxyfen)	For chilli thrips: 10 fl oz	20 fl oz	12	2	Reapplications at least 30 days apart.
	28	Exirel (cyantraniliprole)	13.5–20.5 fl oz	61.4 fl oz	12	1	Reapplications at least 5 days apart.
Whiteflies	1B	Malathion 5EC, 8F (malathion)	5EC: 1.5–3.2 pt 8F: 1.5–2.0 pt	8F: 8 pt per year	12	3	Reapplications 7 days apart.

Pest	MOA Code ¹	Trade Name (Active Ingredient)	Max Rate/Acre		REI (Hours)	Days to Harvest	Remarks ³
			Appl.	Season ²			
	3A + 4A	*Brigadier (bifenthrin + imidacloprid)	5.1–6.14 fl oz	17.92 fl oz	12	7	–
	4A	Actara (thiamethoxam)	3.0–4.0 oz	12 oz	12	3	Risk to bees and other insect pollinators
	4A	Admire Pro (imidacloprid)	Soil: 10.5–14 fl oz Foliar: 1.3 fl oz	Soil: 14.0 fl oz Foliar: 3.9 fl oz	12	Soil: 14 Foliar: 5	Reapplications at least 7 days apart.
	4A	Assail 30 SG, 70 WP (acetamiprid)	30 SG: 4.0–6.9 oz 70 WP: 1.7–3.0 oz	30 SG: 13.8 oz 70 WP: 6.0 oz	12	1	Reapplications at least 7 days apart.
	4A	Platinum 75 SG (thiamethoxam)	1.7–4.01 oz	4.01 oz	12	50	Risk to bees and other insect pollinators
	4A + 15	Cormoran (acetamiprid + novaluron)	12.0 fl oz	35.0 fl oz	12	1	Reapplications at least 7 days apart.
	4A + 28	Voliam Flexi (thiamethoxam + chlorantraniliprole)	2.0–5.0 oz	15.0 oz	12	3	Reapplications at least 10 days apart.
	4D	Sivanto Prime (flupyradifurone)	7.0–14.0 fl oz	28.0 fl oz	4	0	Reapplications at least 7 days apart.
	7D	Esteem 0.86 EC (pyriproxyfen)	10.0 fl oz	20 fl oz	12	2	Reapplications at least 10 days apart.
	16	Courier SC (buprofezin)	9.0–13.6 fl oz	27.2 fl oz	12	3	Reapplications at least 10 days apart.
	21A	Magister SC (fenazaquin)	32–36 fl oz	36 fl oz	12	1	Do not apply until petal fall.
	21A	Portal (fenpyroximate)	2 pt	4.0 pt	12	1	Reapplications at least 14 days apart.
	23	Oberon 2 SC (spiromesifen)	16.0 fl oz	16 fl oz	12	3	–

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.

² Always double-check labels regarding maximum application limits. Many labels are changing from a maximum rate per season (or crop cycle) to a maximum rate per year.

³ 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.

*Restricted use insecticide.

Table 5. Strawberry fungicides ordered by disease and then FRAC group according to their mode of action. **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.** 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 ³
			Appl.	Season ²	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 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 label	See individual label	1–2	Varies by product from 4 hr to 2 days	Frequent use of copper fungicides may cause foliar phytotoxicity.
	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: Captan Captan 80 WDG, Captan 4L, Captan Gold 80 WDG, Captan Gold 4L, Drexel Captan 80 WDG, Drexel Captan 4L	See individual label	See individual label	1	1	Begin applications at emergence of flower buds. Repeat at 7-day intervals through harvest.
	M4 + 17	Captevate 68 WDG (captan + fenhexamid)	5.25 lb	21 lb	0	1	No more than 2 consecutive applications.
	1 + 3	Protocol (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	No 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	No more than 2 sequential applications before alternating to another fungicide with a different mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	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	No more than 2 consecutive applications.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	0	0.5	No 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	No more than 2 sequential applications before alternating to another fungicide group. No more than 4 applications per crop per year.
	3 + 11	Quilt Xcel (propiconazole + azoxystrobin)	14 oz	56 oz	0	0.5	No more than 2 consecutive applications. No more than 4 applications per crop.
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	No 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	No 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	No more than 2 consecutive applications. No more than 5 applications per crop.
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	13.4 fl oz	26.8 fl oz	0	0.5	No 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	No 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	No more than 2 sequential applications. No more than 4 applications per season. Reapplications at least 14 days apart.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	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	No more than 2 sequential applications. 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	No more than 2 sequential applications. No more than 5 applications per crop year.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	No more than 2 sequential applications of Flint or other Group 11 fungicides. No more than 6 total applications of Group 11 fungicides per season.
	19	Affirm WDG, Ph-D, Oso, Veranda O (polyoxin-D)	See individual label	See individual label	0	4 hr	Use in alternation with fungicides that have different modes of action. No more than 3 applications per season.
	21	Actigard 50 WG (acibenzolar-s-methyl)	0.75 oz	6 oz	0	0.5	Apply in combination with an approved efficacious fungicide when disease first appears and continue on a 7- to 14- day interval. Do not apply within 5 days of transplanting.
	48	Zivion (natamycin)	See individual label	See individual label	N/A	4 hr	For use as preplant dip of transplants.
Botrytis fruit rot	M3	Thiram Granuflo Thiram SC (thiram)	See individual label	See individual label	–	1	Do not rotate treated crops with other crops for which Thiram is not registered.
	M4	(captan) Many brands available: Captan 80 WDG, Captan 4L, Captan Gold 80 WDG, Captan Gold 4L	See individual label	See individual label	1	1	Begin applications at emergence of flower buds. Repeat at 7-day intervals through harvest.
	M4 + 17	Captevate 68 WDG (captan + fenhexamid)	5.25 lb	21 lb	0	1	No more than 2 consecutive applications.
	M12	Fracture (banda de lupinus albus doce—BLAD)	36.6 fl oz	183 fl oz	1	4 hr	No more than 2 sequential applications.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	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 label	See individual label	1	1	Fungicides from different chemical groups should be rotated in spray program for disease resistance management.
	1 + 3	Protocol (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	No 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	No 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	No 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	No 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	No 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	No 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	No 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	No more than 2 consecutive applications. No more than 5 applications per crop.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	7 + 12	Miravis Prime (pydiflumetofen + fludioxonil)	13.4 fl oz	26.8 fl oz	0	0.5	No 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	Scala SC (pyrimethanil)	18 fl oz	54 fl oz	1	0.5	No more than 2 consecutive applications. No more than 2 of 6 applications per season.
	9 + 12	Switch 62.5 WG (cyprodinil + fludioxonil)	14 oz	56 oz	0	0.5	No 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	No more than 2 consecutive applications.
	19	Affirm WDG, Ph-D, Oso, Veranda O (polyoxin-D)	See individual label	See individual label	0	4 hr	Use in alternation with fungicides that have different modes of action. No more than 3 applications per season.
Botrytis (suppression only)	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	No more than 4 applications per year.
	11	Aftershock Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	No more than 2 sequential applications. No more than 4 applications per season. Reapplications at least 14 days apart.
	11	(azoxystrobin) Many brands available: Abound, Aframe, Azaka, Azoxy 2SC, Equation SC, Satori, Trevo	15.4 fl oz	1.92 qt	0	4 hr	No more than 2 sequential applications. 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	No more than 2 sequential applications. No more than 5 applications per crop year.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	No more than 2 sequential applications of Flint or other Group 11 fungicides. No more than 6 total applications of Group 11 fungicides per season.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	11	Intuity (mandestrobin)	6 fl oz	12 fl oz	0	0.5	No more than 2 applications per year. Reapplications at least 14 days apart.
Charcoal rot (<i>Macrophomina phaseolina</i>)	1	Topsin 4.5FL Topsin M WSB (thiophanate methyl)	See individual label	See individual label	1	1	Apply through buried drip irrigation (chemigation) to the root zone. Apply at 14-day intervals beginning at transplant.
	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).
	7	Velum (fluopyram)	6.84 fl oz	13.7 fl oz	0	0.5	Apply via chemigation into the root zone through low-pressure drip.
	48	Zivion (natamycin)	See individual label	See individual 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 label	See individual label	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	No 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 label	See individual label	1	1	Fungicides from different chemical groups should be used in spray program for disease resistance management.
	1 + 3	Protocol, Talaris XL (thiophanate-methyl + propiconazole)	1.33 pt	5.3 pt	1	1	No more than 2 consecutive applications before rotating to another fungicide with a different mode of action.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
Leaf spot	M4	(captan) Many brands available: Captan 50W, Captan 50 WP, Captan 80 WDG, Captec 4L	See individual label	See individual label	1	1	Begin applications when new growth starts.
	2	(iprodione) Many brands available: Enclosure 4, Iprodione 4L AG, Meteor, Nevado 4F, Rovral 4 Flowable	2 pt	2 pt	N/A	1	No 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	Reapplications at least 14 days apart. No 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	No more than 2 consecutive applications.
	3 + 11	Quadris Top (difenoconazole + azoxystrobin)	14 fl oz	56 fl oz	0	0.5	No more than 2 sequential applications before alternating to another fungicide group. No more than 4 applications per crop per year.
	3 + 11	Quilt Xcel (propiconazole + azoxystrobin)	14 oz	56 oz	0	0.5	No more than 2 consecutive applications. No more than 4 applications per crop.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	No 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	No more than 2 sequential applications before rotating with a fungicide from a different group. Suppression only.
	7 + 11	Merivon (fluxapyroxad + pyraclostrobin)	11 fl oz	33 fl oz	0	0.5	No 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	No more than 2 consecutive applications. No more than 5 applications per crop.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	11	Cabrio EG (pyraclostrobin)	14 fl oz	70 fl oz	0	0.5	No more than 2 sequential applications. No more than 5 applications per crop year.
Leather rot	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	No 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	No more than 2 sequential applications. 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	(mono- and dipotassium salts of phosphorous acid) Many brands available: Alude, Confine Extra, Fosphite, Fungi-Phite, K-Phite, Phorcephite, Phostrol, Rampart	See individual label	See individual label	0	4 hr	Avoid mixing with strongly acidic or alkaline materials. Test the compatibility of spray adjuvants (i.e., stickers, spreaders, wetting agents) before use.
Phomopsis leaf blight	3	Mettle 125 ME (tetraconazole)	5 fl oz	20 fl oz	0	0.5	Reapplications at least 14 days apart. No 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	No more than 2 sequential applications before rotating with a fungicide from a different group. Suppression only.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	7 + 11	Luna Sensation (fluopyram + trifloxystrobin)	7.6 fl oz	27.3 fl oz	0	0.5	No more than 2 sequential applications before rotating with a fungicide from a different group.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	No more than 2 sequential applications of Flint or other Group 11 fungicides. No more than 6 total applications of Group 11 fungicides per season. Suppression only.
Phomopsis soft rot	2	(iprodione) Many brands available: Enclosure 4, Iprodione 4L AG, Meteor, Nevado 4F, Rovral 4 Flowable	2 pt	2 pt	N/A	1	No more than 1 application per season. Do not apply after first fruiting flower.
	7 + 9	Luna Tranquility (fluopyram + pyrimethanil)	27 fl oz	54.7 fl oz	1	0.5	No 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	No 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	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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	33	(mono- and dipotassium salts of phosphorous acid) Many brands available: Alude, Confine Extra, Fosphite, Fungi-Phite, K-Phite, Phorcephite, Phostrol, Rampart	See individual label	See individual label	0	4 hr	Avoid mixing with strongly acidic or alkaline materials.
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 label	See individual label	1	1	Do not apply with temperatures above 90°F. Do not use within 2 weeks of an oil spray treatment.
	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	No 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 label	See individual label	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	No 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	No 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	Reapplications at least 14 days apart. No more than 4 applications per season.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	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: Amtide 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	No 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	No more than 4 applications per year.
	3 + 9	Inspire Super (difenoconazole + cyprodinil)	20 fl oz	80 fl oz	0	0.5	No 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	No more than 2 sequential applications before alternating to another fungicide group. No more than 4 applications per crop per year.
	3 + 11	Quilt Xcel (propiconazole + azoxystrobin)	14 oz	56 oz	0	0.5	No more than 2 consecutive applications. No more than 4 applications per crop.
	3 + 11	Topguard (flutriafol + azoxystrobin)	8 fl oz	32 fl oz	0	0.5	No more than 4 applications per year.
	7	Fontelis (penthiopyrad)	24 fl oz	72 fl oz	0	0.5	No 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.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	7	Luna Privilege (fluopyram)	6.84 fl oz	13.7 fl oz	0	0.5	Apply through drip irrigation system preventatively. No 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	No 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	No 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	No 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	No more than 2 consecutive applications. No more than 5 applications per crop.
	11	Aftershock Evito (fluoxastrobin)	5.7 fl oz	22.8 fl oz	1	0.5	No more than 2 sequential applications. No more than 4 applications per season. Reapplications at least 14 days apart.
	11	(azoxystrobin) Many brands available: Abound, Aframe, Azaka, Azoxy 2SC, Equation SC, Satori, Trevo	15.4 fl oz	1.92 qt	0	4 hr	No more than 2 sequential applications. 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	No more than 2 sequential applications. No more than 5 applications per crop year.
	11	Flint (trifloxystrobin)	3.2 oz	19.2 oz	0	0.5	No more than 2 sequential applications of Flint or other Group 11 fungicides. No more than 6 total applications of Group 11 fungicides per season.
	11	Intuity (mandestrobin)	6 fl oz	12 fl oz	0	0.5	No more than 2 applications per year. Reapplications at least 14 days apart.
	13	Quintec (quinoxifen)	6 fl oz	24 fl oz	1	0.5	No more than 2 consecutive applications. No more than 4 applications per crop.

Pertinent Diseases or Pathogens	Fungicide Group ¹	Chemical (Active Ingredients)	Max Rate/Acre		Min. Days to		Remarks ³
			Appl.	Season ²	Harvest	Reentry	
	19	Affirm WDG, Ph-D, Oso, Veranda O (polyoxin-D)	See individual label	See individual label	0	4 hr	Use in alternation with fungicides that have different modes of action. No more than 3 applications per season.
	U6	Torino (cyflufenamid)	3.4 oz	6.8 oz	0	4 hr	No more than 2 applications per year. Reapplications at least 14 days apart.
	50	Prolivo (pyriofenone)	5 fl oz	16 fl oz	0	4 hr	No more than 2 sequential applications of Group 50 fungicides before rotating to a fungicide with a different mode of action.
¹ FRAC code (fungicide group): Numbers and letters 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. Source: FRAC Code List; https://www.frac.info/ (FRAC = Fungicide Resistance Action Committee). ² Always double-check labels regarding maximum application limits. Many labels are changing from a maximum rate per season (or crop cycle) to a maximum rate per year. ³ 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 6. 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. No 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 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. Reapplications at least 7 days apart. No 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 7. 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 ft 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.

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

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